

REPORT NUMBER: NCAP-MGA-2001-012

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**Hyundai Motor Company
2001 Hyundai Elantra 4 door
NHTSA NUMBER: M10500**

**PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105**



February 6, 2001

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
400 SEVENTH STREET, SW, ROOM 5311
WASHINGTON, D.C. 20590**

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Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

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16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2001 Hyundai Elantra 4 door at MGA Research Corporation on February 6, 2001. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity was 56.3 km/h. The ambient temperature at the barrier face at the time of impact was 21 degrees Celsius. The vehicle's maximum post test static crush is 529 mm located at the vehicle centerline. The test vehicle is equipped with a 3-point continuous belt system and a second generation supplemental airbag in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows: <table style="width: 100%; border-collapse: collapse; margin-top: 20px;"> <thead> <tr> <th style="text-align: left;"><u>Measurement Description</u></th> <th style="text-align: left;"><u>Units</u></th> <th style="text-align: left;"><u>Threshold</u></th> <th style="text-align: left;"><u>Driver ATD</u></th> <th style="text-align: left;"><u>Pass. ATD</u></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC)</td> <td>N/A</td> <td>1000</td> <td>482</td> <td>398</td> </tr> <tr> <td>Max. Thorax Accel. (3msec Clip)</td> <td>G's</td> <td>60</td> <td>44.2</td> <td>42.7</td> </tr> <tr> <td>Left Femur force</td> <td>Newtons</td> <td>10009</td> <td>2254</td> <td>2025</td> </tr> <tr> <td>Right Femur force</td> <td>Newtons</td> <td>10009</td> <td>4204</td> <td>1200</td> </tr> </tbody> </table>				<u>Measurement Description</u>	<u>Units</u>	<u>Threshold</u>	<u>Driver ATD</u>	<u>Pass. ATD</u>	Head Injury Criteria (HIC)	N/A	1000	482	398	Max. Thorax Accel. (3msec Clip)	G's	60	44.2	42.7	Left Femur force	Newtons	10009	2254	2025	Right Femur force	Newtons	10009	4204	1200
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the FY' 01 New Car Assessment Program (NCAP) frontal barrier crashworthiness evaluation program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract Number DTNH22-01-D-12005. The purpose of this test is to obtain vehicle crashworthiness, occupant restraint system performance, lower leg data, and child seat research data for frontal barrier impacts. The impact velocity used in this test is in excess of the current 30 mph (48.3 km/h) FMVSS 208/212/219/301 requirements.

1.2 TEST PROCEDURE

This 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Test Procedure, dated December 1999 and the corresponding MGA Research Corporation Test Procedure NHTSA3, dated January 5, 2001. Data was obtained indicant of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Retention"; FMVSS 219, "Windshield Zone Intrusion (Partial)"; and FMVSS 301, "Fuel System Integrity" performance. Procedures for receiving, inspection, and reporting of test results are described in the test procedures and are not repeated in this report.

The test was conducted at MGA Research Corporation on February 6, 2001 at a speed of 56.3 km/h. The test vehicle was instrumented with nine (9) accelerometers to measure longitudinal axis accelerations. The driver's restraint system was instrumented with one (1) seat belt load cell to measure lap belt tension and the passenger's restraint system was instrumented with two (2) seat belt load cells to measure lap and shoulder belt tension. The specified impact velocity range was 55.5 to 57.1 km/h. The frontal barrier impact event was documented by one (1) real-time panning motion picture camera and fifteen (15) high-speed motion picture cameras. The pre- and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The test vehicle contained three anthropomorphic test devices (ATDs). Two (2) part 572E 50th percentile adult male ATDs and one (1) part 572P 3 year old ATD. Both adult ATDs were instrumented with head, chest, and pelvic tri-axial accelerometers, left and right femur load cells, upper and lower tibia sensors, and foot accelerometers. In addition, chest displacement and upper neck six-axis force and moment sensors were utilized. The adult ATDs were positioned in the front outboard seating positions according to the dummy placement procedures specified in the Laboratory Indicant Test Procedure. The child ATD was instrumented with head, chest, and pelvic tri-axial accelerometers, and upper and lower neck load cells. The child ATD was positioned according to the child seat manufacturer's instructions. One hundred and eighteen (118) channels of data were recorded with an EME on-board data acquisition system. The data was digitally sampled at 10,000 samples per second and processed per section IP11 of the Laboratory Test Procedure.

The driver (Serial No. 066) and the right-front passenger (Serial No. 065) were calibrated two tests prior to this test. FMVSS 208 "Occupant Crash Protection" injury criteria were not exceeded by either ATD during these frontal barrier impact tests.

1.3 SUMMARY OF FRONTAL IMPACT TEST

A rigid load cell barrier was impacted by a 2001 Hyundai Elantra 4 door at a velocity of 56.3 km/h. The test vehicle weight was 1508.3 kilograms with two (2) part 572E 50th percentile adult male ATDs and one (1) part 572P 3 year old ATD. Six (6) load cell barrier data channels were obtained in conducting the NCAP Test. The test vehicle is equipped with a transversely mounted 2.0-liter, 4-cylinder engine and an automatic transmission.

The driver Head Injury Criteria (HIC) was 482. The maximum resultant chest deceleration over three (3) milliseconds was 44.2 g's. The left and right femur loads were 2,254 and 4,204 Newtons, respectively. Chest deflection for the driver ATD peaked at 28 mm. The driver ATD head and chest contacted the airbag, the left and right knees contacted the knee bolster and steering column.

The right front passenger's HIC was 398. The maximum resultant chest deceleration over three (3) milliseconds was 42.7 g's. The left and right femur loads were 2,025 and 1,200 Newtons, respectively. Chest deflection for the passenger ATD peaked at 28 mm. The passenger ATD head, chest, and abdomen contacted the airbag, and left and right knees contacted the glovebox.

Seat belt spool out was not measured by on-board pullout potentiometers due to the vehicle being equipped with seat belt pre-tensioners.

There was 100 percent windshield retention (minimum 50 percent required for passive restraint systems). No intrusion occurred into the protected or unprotected zone of the windshield. No Stoddard Solvent leakage occurred after impact or during any phase of the rollover.

The test vehicle sustained a maximum static crush of 529 mm located at the vehicle centerline. Both the driver and passenger side doors opened without the aid of tools.

1.4 GENERAL COMMENTS

The 2001 Hyundai Elantra 4 door passed the requirements of FMVSS 208, FMVSS 212, FMVSS 219, and FMVSS 301-75. Data pertaining to these standards are presented in the data sheets.

The vehicle, occupant, camera, and measurement data are presented in Section 2. Appendix A contains the still photograph prints. Appendix B contains the dummy and vehicle response data traces. Appendix C contains the dummy calibration data. Appendix D contains the instrumentation calibration data and Appendix E contains the owner's manual instructions for the occupant seating and restraint systems and Appendix F contains the child data and photos.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Old Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressure	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

*Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1**CRASH TEST SUMMARY**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001**PRIMARY IMPACT DATA**

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.3
Test Weight	kg	1508.3
Impact Angle	degrees	90
Average Rebound	mm	814
Maximum Static Crush	mm	529

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	yes	yes
Rear Door Opening	yes	yes
Seat Track Shift (mm)	2 mm forward	1 mm forward
Seat Back Failure	None	None

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type / Serial No.	066	065
Head Contact	Airbag / headrest	Airbag / headrest
Chest Contact	Airbag	Airbag
Abdomen Contact	None	Airbag
Left Knee Contact	Knee bolster and column	Glovebox
Right Knee Contact	Knee bolster and column	Glovebox

16mm MOVIE COVERAGE

High Speed	15
Real Time	1
Total	16

Driver ATD Sensors	42
Passenger ATD Sensors	42
Belt Assessment Sensors	3
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	6
Total	102

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

TEST VEHICLE INFORMATION

Manufacturer	Hyundai Motor Co.
Model	Elantra
Body Style	4 door sedan
NHTSA No.	M10500
VIN	KMHDN45D91U062461
Color	midnight gray
Delivery Date	January 8, 2001
Odometer Reading (mile)	154
Dealer	Rosen Hyundai
Transmission	automatic
Final Drive	front
Number of Cylinders	4
Engine Displacement (L)	2.0
Engine Placement	transverse

TEST VEHICLE OPTIONS

Driver Airbag	yes
Passenger Airbag	yes
Power Windows	yes
Power Steering	yes
Power Door Locks	yes
Tilt Wheel	yes
Air Conditioning	yes
Power Brakes	yes
Disc Brakes, Front	yes
Disc Brakes, Rear	no
Anti-lock Brakes	no
AM/FM/Cassette	yes
Anti-theft System	no
Cruise Control	no

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Co.	GVWR (kg)	1740 lbs
Date of Manufacture	10/00	GAWR Front (kg)	939 lbs
		GAWR Rear (kg)	839 lbs

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	262
Cold Pressure (kPa)	210	262
Recommended Tire Size	P185/65R15 or P195/60R15	P185/65R15 or P195/60R15
Tire Size on Vehicle	P195/60R15	P195/60R15
Tire Manufacturer	Michelin	Michelin

Measured Parameter	Front	Rear	Third	Total
Type of Seats	bucket	bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				385.0
Cargo Weight (RCLW) (kg)				45.0

DATA SHEET NO. 2...(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	412.8	251.3		458.6	303.5	
Right	kg	416.0	234.1		459.5	286.7	
Ratio	%	63.1	36.9		60.9	39.1	
Totals	kg	828.8	485.4	1314.2	918.1	590.2	1508.3

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1314.2
Weight of 2 P572E ATDs	kg	156.0
Rated Cargo/Luggage Weight (RCLW)	kg	45.0
Calculated Vehicle Target Weight (TVTWT)	kg	1515.2

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	673	673	662	663	963
As Tested	mm	659	659	641	640	1021
Post Test	mm	728	756	624	610	

Vehicle Wheelbase (mm): 2610

Weight of Ballast secured in cargo area (kg): 0

Vehicle Components Removed: trunk lid, rear bumper, rear door glass and interior panels, spare tire, trunk interior, door mirrors, exhaust pipe, and muffler

Ballast weight does not include cameras, instrumentation, and brake abort system.

FUEL SYSTEM DATA

Fuel System Capacity From Owner's Manual (L): 54.9

Usable Capacity Figure Furnished by COTR (L): 54.9

Actual Test Volume (L): 40.9

Test Fluid Type: Stoddard Solvent; Specific Gravity: 0.77

Is Vehicle Fuel Pump Electric or Mechanical?: Electric

If electric, does pump operate with ignition switch "ON" & engine "OFF"?: Yes

Fuel System Particulars: _____

DATA SHEET NO. 3**POST IMPACT DATA**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 - 57.1	56.3
Trap No. 1 Entry Distance	mm	<1524	1300
Trap No. 1 Exit Distance	mm	<1524	300
Trap No. 2 Velocity (Redundant)	km/h	55.5 - 57.1	56.3
Trap No. 2 Entry Distance	mm	<1524	1425
Trap No. 2 Exit Distance	mm	<1524	425

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4168	3724	444
Center	mm	4297	3768	529
Right Side	mm	4157	3734	423

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	834
Center	mm	790
Right Side	mm	818
Average	mm	814

DATA SHEET NO. 4
TEST VEHICLE INFORMATION

Test Vehicle: 2001/Hyundai/Elantra/4 door

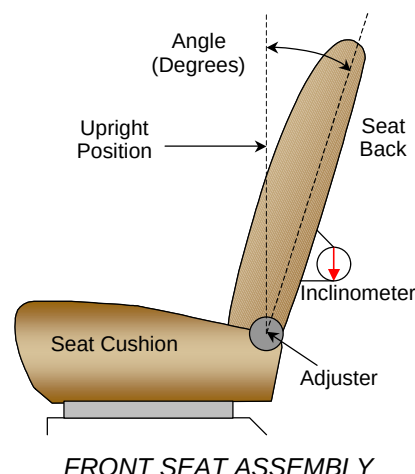
NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle. The procedure is as follows: seat back angle is measured along rear edge of metal seat back frame from the vertical. Position can also be located with back adjusted to the 9th latch position from the initial lock position.



Driver seat back angle: 22.5 degrees

Passenger seat back angle: 22.1 degrees

SEAT FORE/AFT POSITIONS

Both driver and passenger seats are manually operated. The total travel on the driver is 25 seat positions and the passenger is 25 seat positions. The fore/aft position is set at the middle position for both driver and passenger.

Driver seat fore/aft position: 13th position of 25 total

Passenger seat fore/aft position: 13th position of 25 total

SEAT BELT UPPER ANCHORAGE

The test vehicle is equipped with adjustable anchorages for both the driver and passenger seat positions. There are 3 positions or detents. The anchorages are placed in the full up position.

DATA SHEET NO. 4...(continued)

TEST VEHICLE INFORMATION

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

FUEL TANK CAPACITY DATA

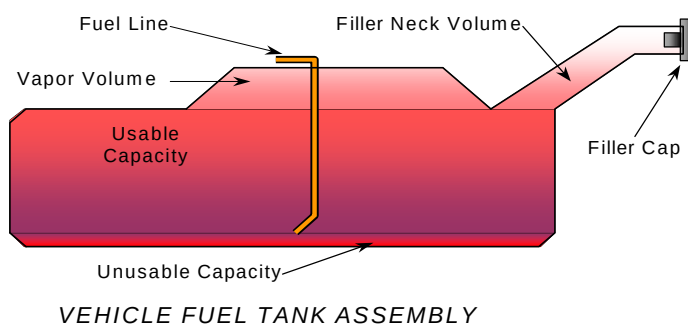
The "Usable Capacity" of the standard equipment fuel tank is: 54.9 liters

The "Usable Capacity" of any optional equipment fuel tank is: N/A liters

The "Usable Capacity" used for certification to FMVSS 301 requirements: 54.9 liters

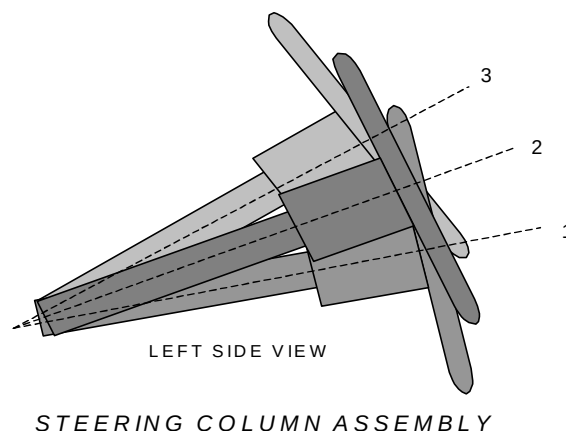
Actual amount of Stoddard solvent added to vehicle for certification test: 40.9 liters

The test vehicle is equipped with an electric fuel pump. The fuel pump operates only when the engine is running. The fuel filler door is located on the left rear fender.



STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes, when it is moved through its full range of motion. A metal plate is placed across the rim of the steering wheel, and inclinometer is placed onto the plate and the angle is measured.



Lowermost, position 1: 20.2°

Geometric center, position 2: 22.5°

Uppermost, position 3: 24.7°

DATA SHEET NO. 5

DUMMY POSITIONING IN VEHICLE

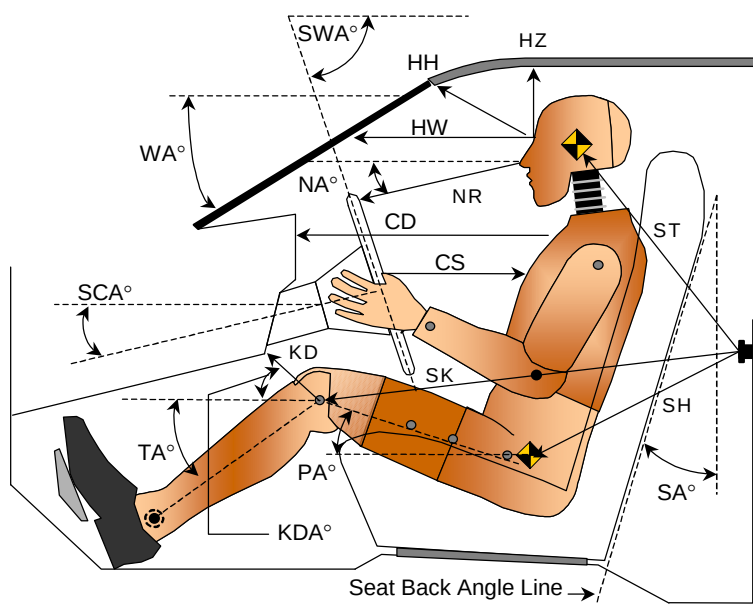
Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

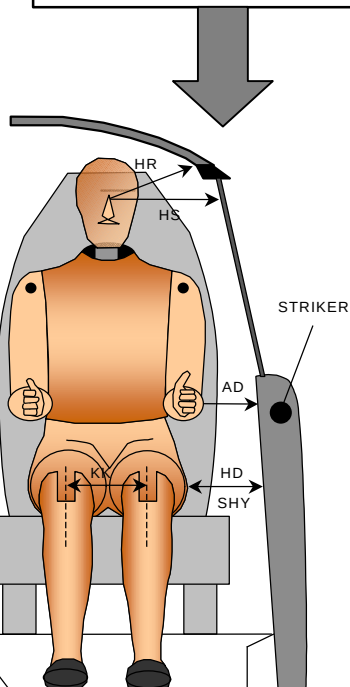
Test Program: NCAP

Test Date: February 6, 2001

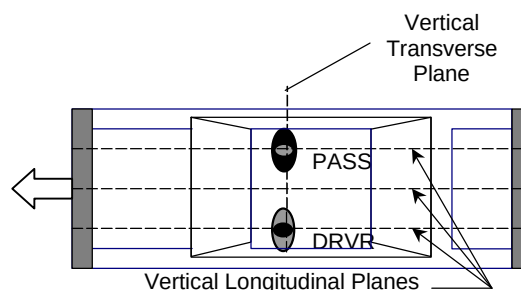
DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS



AD	Arm to Door
HD	H-Point to Door
HR	Head to Side Header
HS	Head to Side Window
KK	Knee to Knee
SHY	Striker to H-Point (Y Axis)



CD	Chest to Dash
CS	Chest to Steering Wheel Hub
HH	Head to Header
HW	Head to Windshield
HZ	Head to Roof
KDA	Knee to Dash Angle
KDL	Left Knee to Dash
KDR	Right Knee to Dash
NA	Nose to Rim Angle
NR	Nose to Rim
PA	Pelvic Angle
RA	Rim to Abdomen
SA	Seat Back Angle
SCA	Steering Column Angle
SH	Striker to H-Point
SK	Striker to Knee
ST	Striker to Head
SWA	Steering Wheel Angle
TA	Tibial Angle
WA	Windshield Angle



DATA SHEET NO. 5...(continued)

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		30.9		
SWA	Steering Wheel Angle		67.6		
SCA	Steering Column Angle		22.5		
SA	Seat Back Angle		22.5		22.1
HZ	Head to Roof (Z)	175	90.0	171	90.0
HH	Head to Header	298	25.4	285	33.1
HW	Head to Windshield	521	0.0	530	0.0
HR	Head to Side Header (Y)	235		215	
NR	Nose to Rim	390	14.0		
CD	Chest to Dash	550		577	
CS	Chest to Steering Hub	307	0.0		
RA	Rim to Abdomen	195	0.0		
KDL	Left Knee to Dash	190	0.0	152	
KDR	Right Knee to Dash	210		165	29.0
PA	Pelvic Angle		22.8		23.8
TA	Tibia Angle		42.3		44.8
KK	Knee to Knee (Y)	309		292	
SK	Striker to Knee	590	92.7	588	92.9
ST	Striker to Head	512	9.4	489	11.1
SH	Striker to H-Point	237	38.4	237	37.3
SHY	Striker to H-Point (Y)	243		238	
HS	Head to Side Window	310		312	
HD	H-Point to Door (Y)	148		126	
AD	Arm to Door (Y)	125		123	
AA	Ankle to Ankle	331		262	

DATA SHEET NO. 6

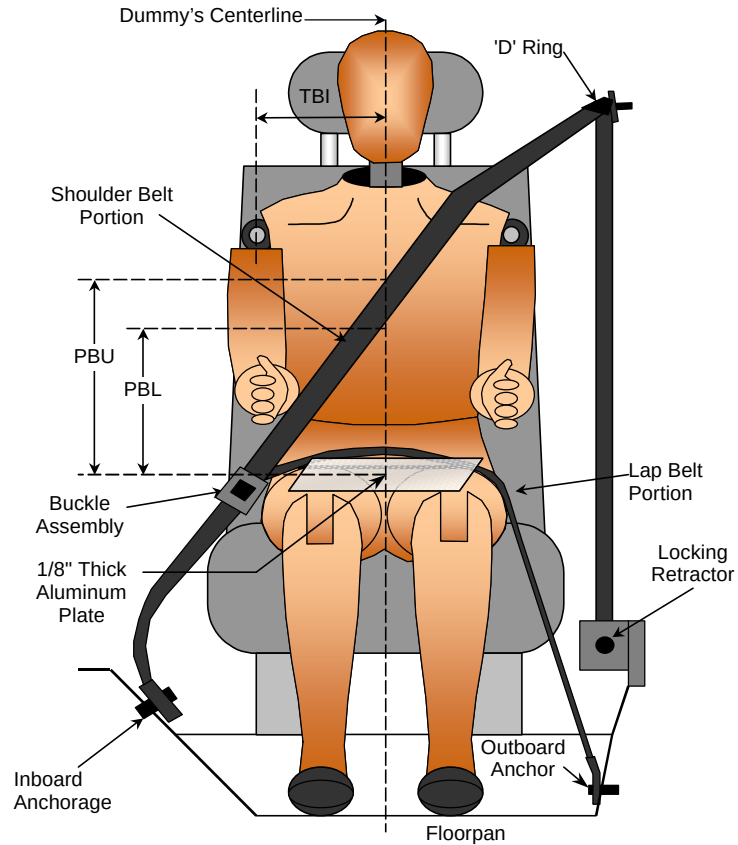
SEAT BELT POSITIONING DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	195	190
PBU - Top surface of reference to belt upper edge	mm	330	350
PBL - To surface of reference to belt lower edge	mm	250	265

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

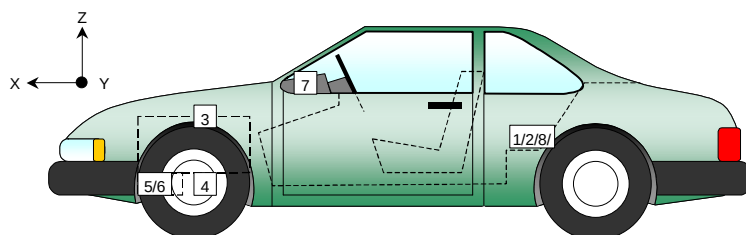
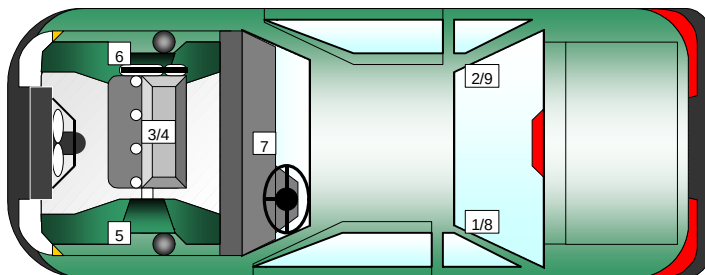
VEHICLE X-AXIS ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)			Peak Values				
		X	Y	Z	Units	Max	Time	Min	Time
1	Left Rear X-Member (Primary)	1478	-626	398	G's	2.3	130	35.6	50
2	Right Rear X-Member (Primary)	1478	623	398	G's	2.6	126	32.4	55
3	Engine Top	3668	11	830	G's	63.3	41	171.8	32
4	Engine Bottom	3532	112	293	G's	19.6	45	134.9	26
5	Left Brake Caliper	3487	-665	385	G's	35.0	60	83.4	48
6	Right Brake Caliper	3487	665	395	G's	28.8	63	99.7	51
7	Instrument Panel	2709	-2	990	G's	21.1	27	47.6	35
8	Left Rear X-Member (Redundant)	1478	-626	398	G's	2.5	130	32.0	49
9	Right Rear X-Member (Redundant)	1478	623	398	G's	2.3	126	33.0	55

Reference Points: X - From Rear Surface of Vehicle (+ forward)

Y - Vehicle Centerline (+ to right)

Z - Ground Plane (+ up)



DATA SHEET NO. 8

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	1.1	199	56.6	72	1.7	28	53.1	69
Head CG	Y	G's	4.0	34	12.2	71	11.3	80	2.4	31
Head CG	Z	G's	22.0	55	1.2	91	18.5	53	6.9	87
Head CG Resultant	N/A	G's	60.5	71			54.3	69		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	1.8	141	44.4	64	1.8	150	43.5	74
Chest CG	Y	G's	3.1	75	5.4	53	6.9	58	3.2	87
Chest CG	Z	G's	6.9	67	8.8	89	6.4	50	4.4	86
Chest CG Resultant	N/A	G's	44.5	64			43.7	74		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	950	49	2254	57	1186	83	2025	59
Right Femur	Z	Newtons	571	70	4204	53	530	44	1200	62

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	6881	58			7688	59		
Shoulder Belt Force	N/A	Newtons	**	**			5651	52		

** Not used at vehicle manufacturers request.

HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary	482	44.7	54.0	90.0	398	43.9	55.4	86.6

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	44.2	61.5	64.5	42.7	72.4	75.5

DATA SHEET NO. 8...(continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	4.4	199	62.1	55	3.0	200	53.3	55
Pelvis	Y	G's	9.8	64	8.7	46	8.9	52	6.3	20
Pelvis	Z	G's	3.6	193	25.5	62	2.7	196	21.1	76

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	709	66	376	50	56	84	519	61
Neck Force	Y	Newtons	130	63	53	93	111	99	122	149
Neck Force	Z	Newtons	1397	62	190	90	1936	62	190	155
Neck Moment	X	N•m	3.8	144	12.9	101	14.0	108	6.0	70
Neck Moment	Y	N•m	21.4	52	61.2	65	34.0	125	38.0	63
Neck Moment	Z	N•m	15.9	91	6.8	143	6.1	142	12.3	91

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	10.3	26	41.5	49	17.9	84	68.7	35
Left Foot Aft	Z	G's	5.2	29	50.8	45	21.3	83	76.2	35
Left Foot Fore	Z	G's	15.4	50	97.1	45	46.5	84	101.8	34
Right Foot Aft	X	G's	20.5	26	118.7	45	10.6	64	39.2	48
Right Foot Aft	Z	G's	12.8	63	129.2	40	17.1	71	69.5	30
Right Foot Fore	Z	G's	105.3	39	298.4	40	17.6	65	103.7	30

UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Lower Moment	X	N•m	12.0	25	91.6	55	84.9	54	12.1	85
Left Lower Moment	Y	N•m	49.9	63	8.5	16	53.6	55	12.1	84
Left Lower Force	Z	Newtons	2200	41	242	169	5631	53	57.0	184
Left Upper Moment	X	N•m	*	*	*	*	30.4	54	31.5	80
Left Upper Moment	Y	N•m	21.6	138	105.6	55	43.9	58	131.7	36
Left Upper Force	Z	Newtons	1676	41	123	170	*	*	*	*
Right Lower Moment	X	N•m	38.6	36	120.8	43	59.7	59	10.8	36
Right Lower Moment	Y	N•m	61.9	51	59.2	42	129.6	62	12.0	50
Right Lower Force	Z	Newtons	5997	48	129	185	3666	35	136	114
Right Upper Moment	X	N•m	70.4	36	54.6	52	49.0	60	29.7	36
Right Upper Moment	Y	N•m	17.3	145	223.3	46	20.7	141	98.3	36
Right Upper Force	Z	Newtons	4666	48	91	195	3046	32	117	151

* No Valid Data Collected

DATA SHEET NO. 8...(continued)

HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			27.7	72			28.4	89

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	1.4	199	56.4	72	1.4	28	52.6	70
Head CG	Y	G's	3.0	34	12.0	72	13.4	74	2.6	31
Head CG	Z	G's	21.9	55	2.1	88	18.3	52	7.2	87
Head CG Resultant	N/A	G's	59.4	71			54.1	70		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	1.7	140	44.5	62	1.9	199	42.9	74
Chest CG	Y	G's	3.9	74	5.8	53	7.0	58	1.9	87
Chest CG	Z	G's	6.9	68	8.5	90	6.8	50	4.3	87
Chest CG Resultant	N/A	G's	44.5	62			43.1	74		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary Redundant	459	43.9	54.0	90.0	390	43.5	55.4	86.6

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary Redundant	43.7	60.6	63.7	42.2	72.4	75.5

DATA SHEET NO. 9**SEAT BELT PERFORMANCE ASSESSMENT TEST DATA**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001**SEAT BELT PLACEMENT MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
TBI - Dummy centerline to shoulder bolt	mm	195	190
PBU - Top surface of reference to belt upper edge	mm	330	350
PBL - Top surface of reference to belt lower edge	mm	250	265

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Retractor reel to "D" ring	mm	175	175
Shoulder belt length as measured on ATD	mm	854	880
Lap belt length as measured on ATD	mm	804	809
Total belt length for continuous webbing systems	mm	1833	1864

SHOULDER BELT SPOOL-OUT DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm		
As determined electronically	mm		
As determined by film analysis	mm		

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm		
As determined electronically	mm		

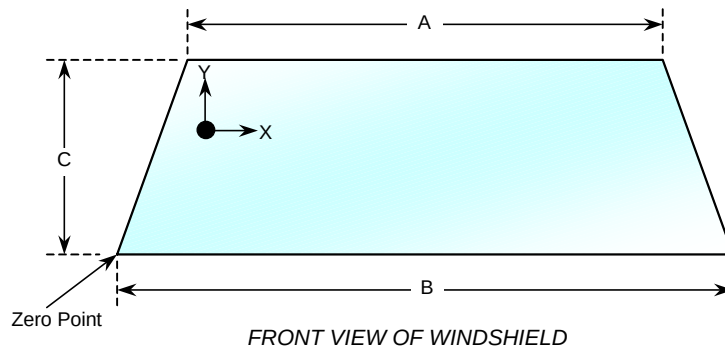
DATA SHEET NO. 10**SUMMARY OF FMVSS 212 DATA**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001**Windshield Mounting Details:**

Windshield glass is secured to the vehicle frame with a rubber trim and glue.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles, which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21 °C**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2037	2037	100
Right Side	2035	2035	100
Total	4072	4072	100

**WINDSHIELD DIMENSIONS**

Item	Units	Segment Length	Molding Width
A	mm	1088	9
B	mm	1431	7
C	mm	775	14

DATA SHEET NO. 11

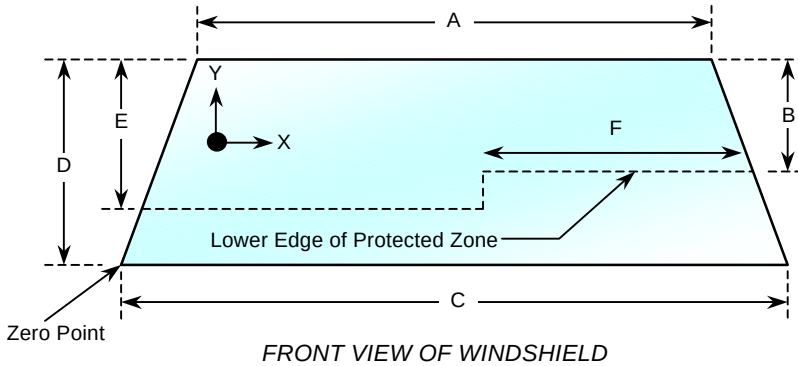
WINDSHIELD ZONE INTRUSION FMVSS 219 (Partial) DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001



Item	Units	Value
A	mm	1088
B	mm	510
C	mm	1431
D	mm	775
E	mm	515
F	mm	720

AREA OF PROTECTED ZONE FAILURES

- A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 inches by a vehicle component other than one that is normally in contact with the windshield. **None**

X	Y

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component. **None**

X	Y

DATA SHEET NO. 12

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

Test Time: 4:24 p.m.

Temperature at Time of Impact: 21 °C

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.
(Maximum Allowable = 1 oz./minute)
- D. Spillage Details: None

DATA SHEET NO. 13

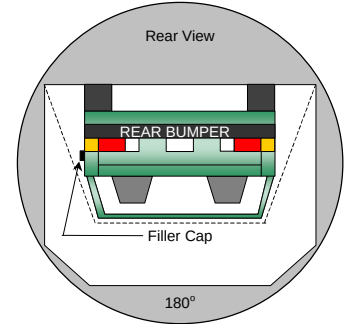
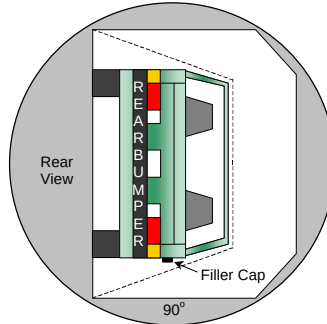
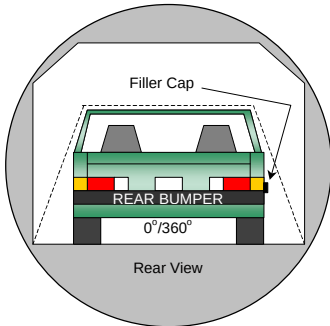
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSANO.: M10500

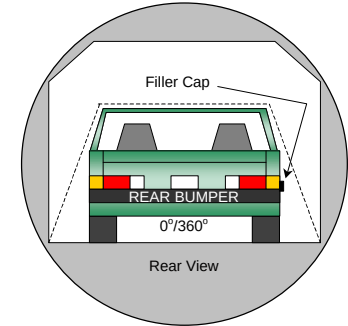
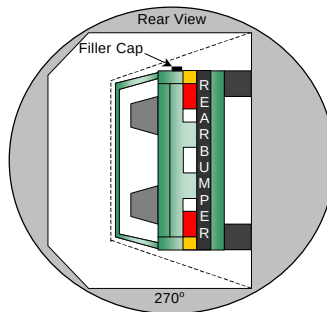
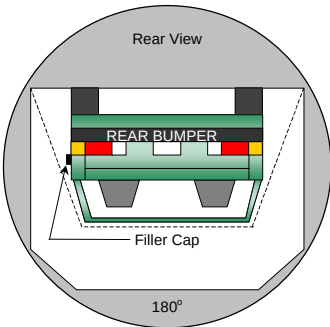
Test Program: NCAP

Test Date: February 6, 2001



0° TO 90°

90° TO 180°



180° TO 270°

270° TO 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations:

Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage (oz.)
0° TO 90°	159	300	0
90° TO 180°	143	300	0
180° TO 270°	148	300	0
270° TO 360°	158	300	0

DATA SHEET NO. 14**VEHICLE MEASUREMENTS**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total length of vehicle at centerline	mm	4297	3768	529
2	RSOV to front of engine	mm	3690	3520	170
3	RSOV to firewall centerline	mm	3196	3131	65
4	RSOV to leading edge of right door	mm	2854	2830	24
5	RSOV to leading edge of left door	mm	2852	2843	9
6	RSOV to lower leading edge of right door	mm	2896	2895	1
7	RSOV to lower leading edge of left door	mm	2900	2902	-2
8	RSOV to upper leading edge of right door	mm	1839	1826	13
9	RSOV to upper leading edge of left door	mm	1836	1824	12
10	RSOV to lower trailing edge of right door	mm	1838	1828	10
11	RSOV to lower trailing edge of left door	mm	1836	1838	-2
12	RSOV to bottom of right 'A' pillar	mm	2902	2895	7
13	RSOV to bottom of left 'A' pillar	mm	2902	2902	0
14	RSOV to firewall on right side	mm	3180	3122	58
15	RSOV to firewall on left side	mm	3180	3152	28
16	RSOV to steering column	mm	2444	2455	-11
17	Center of steering column to left 'A' pillar	mm	402	368	34
18	Center of steering column to headlining	mm	434	425	9
19	RSOV to right side of front bumper	mm	4157	3734	423
20	RSOV to left side of front bumper	mm	4168	3724	444
21	Length of engine block	mm	522	522	0
RD	RSOV to right side of dash panel	mm	2684	2655	29
CD	RSOV to center of dash panel	mm	2692	2695	-3
LD	RSOV to left side of dash panel	mm	2684	2671	13

RSOV = Rear Surface of Vehicle

DATA SHEET NO. 14...(continued)

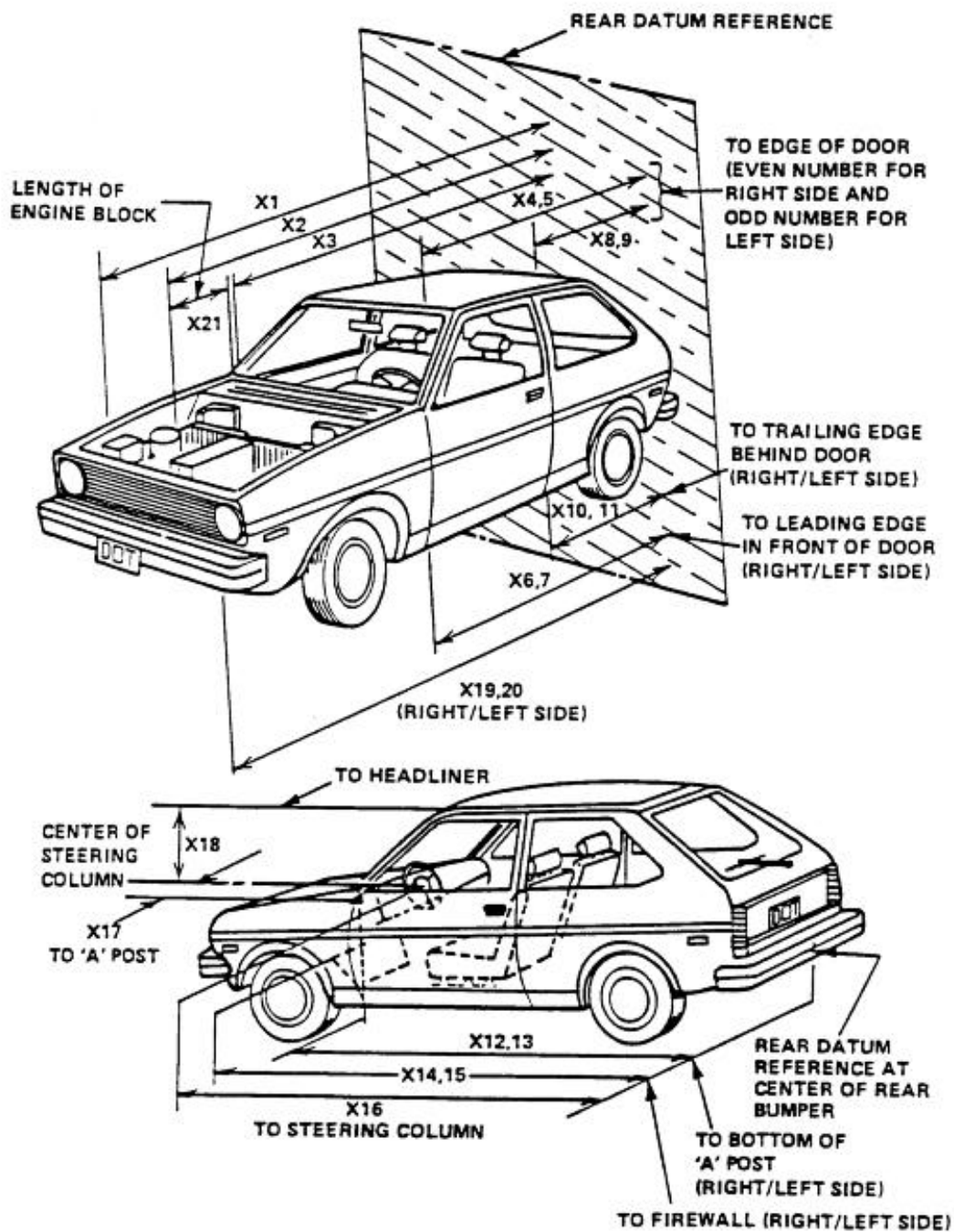
VEHICLE MEASUREMENTS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001



DATA SHEET NO. 15**CAMERA LOCATIONS**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001

No.	Camera View	Location (mm) *			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				18	32
2	Left Front View	1000	-7950	1480	25	1020
3	Steering Column Top	2000	-7000	1560	25	1042
4	Steering Column Bottom	2000	-7000	1030	25	1000
5	Driver Close-up	1500	-10100	1310	75	962
6	Driver Angle	4810	-5230	2030	50	1087
7	Onboard RRS				8	513
8	Onboard LRS				**	**
9	Right Overall	2000	6680	1400	13	1015
10	Right Passenger Half	1000	7680	1380	25	1020
11	Right Close-up	1800	10540	1320	75	1064
12	Right Angle	4940	5640	2120	50	1124
13	Windshield	-450	0	2710	13	1010
14	Top Driver	70	-440	1780	13	1010
15	Top Passenger	80	-440	1770	13	1015
16	Pit Front	1140	0	-3200	13	1005
17	Pit Rear	2820	0	-3200	13	1005

***COORDINATES:**

+X = film plane rearward of barrier

+Y = film plane to right of monorail centerline

+Z = film plane to above ground level

ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

** Camera not used.

CAMERA LOCATIONS

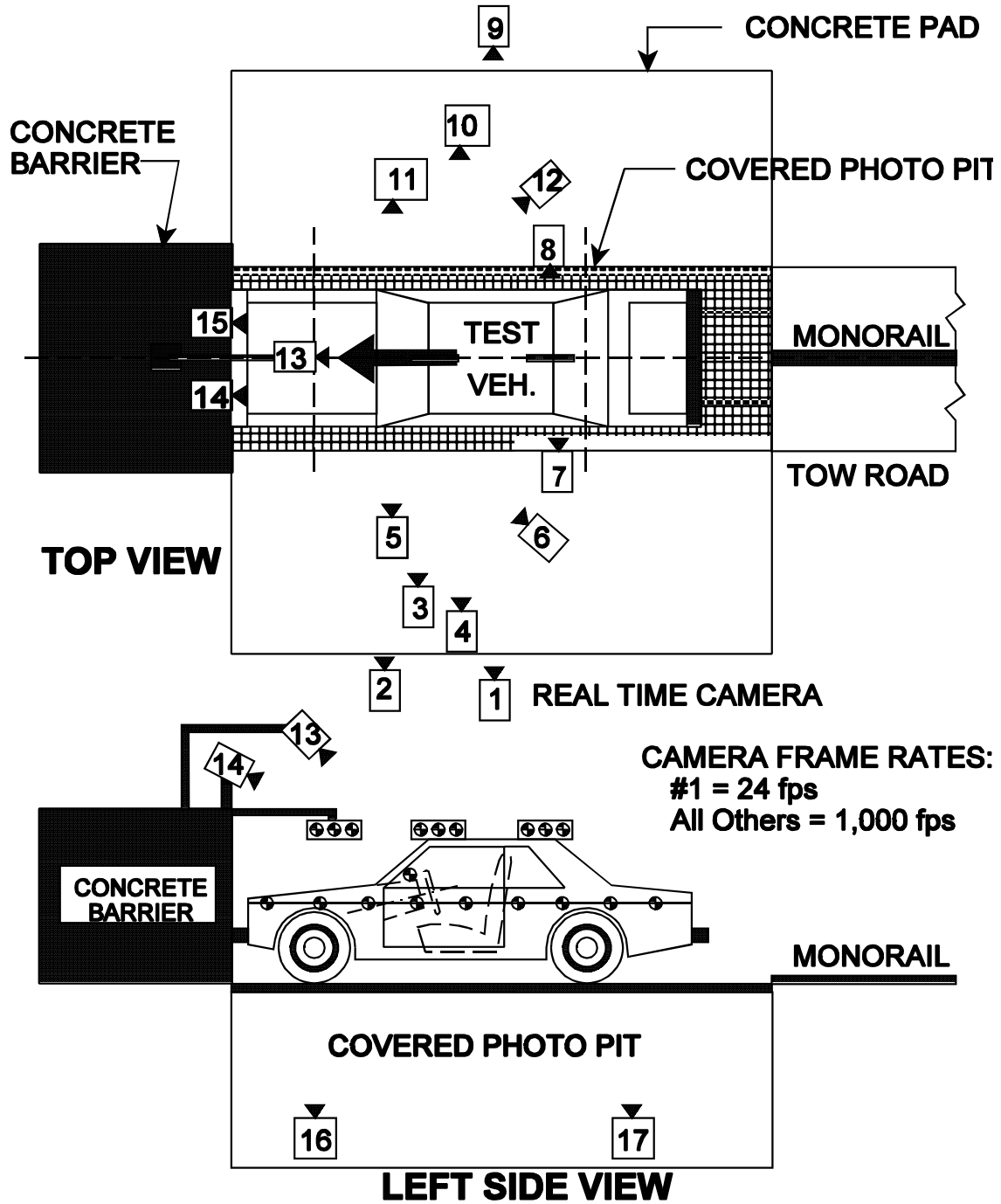
Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 16

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

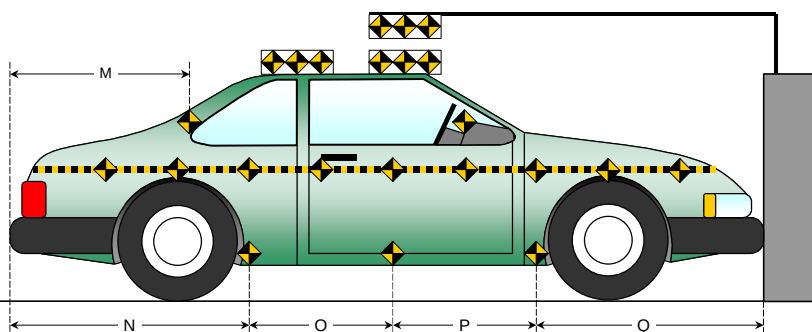
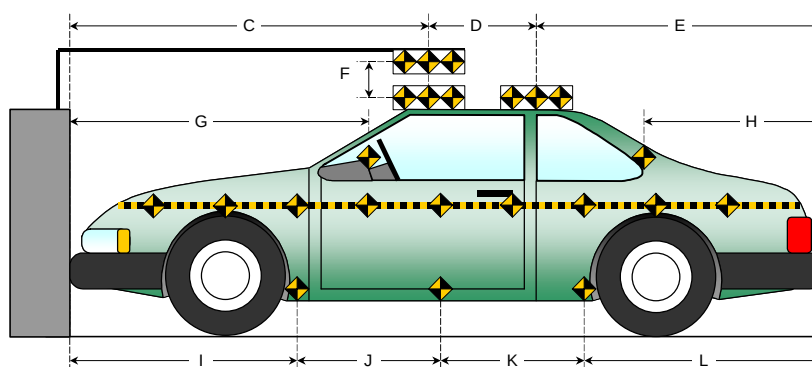
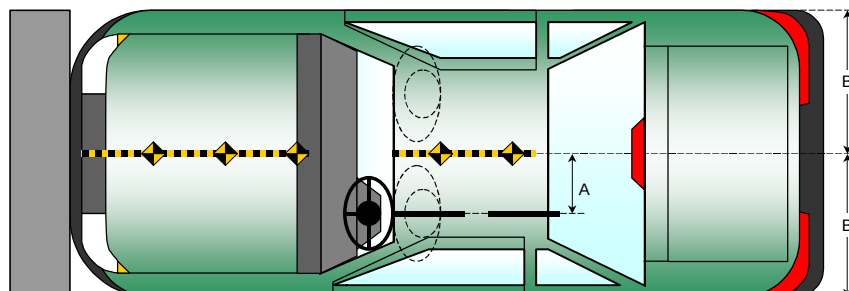
Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

Item	Value
A	352
B	852
C	2158
D	610
E	1529
F	275
G	1610
H	878
I	1254
J	898
K	899
L	1246
M	887
N	1250
O	897
P	900
Q	1250

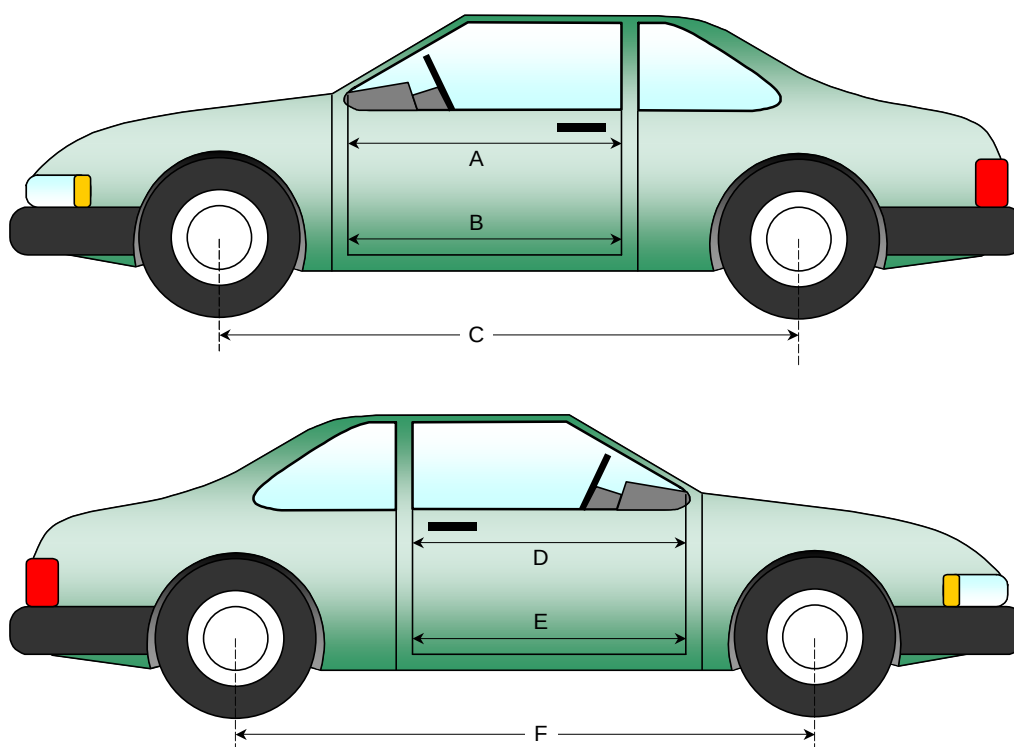


DATA SHEET NO. 17**VEHICLE INTRUSION MEASUREMENTS**Test Vehicle: 2001/Hyundai/Elantra/4 doorNHTSA No.: M10500Test Program: NCAPTest Date: February 6, 2001**DOOR OPENING WIDTH**

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	978	975	3
B	Left Side Lower	mm	924	918	6
D	Right Side Upper	mm	980	975	5
E	Right Side Lower	mm	920	916	4

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2610	2491	119
F	Right Side Wheelbase	mm	2612	2522	90



DATA SHEET NO. 17...(continued)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

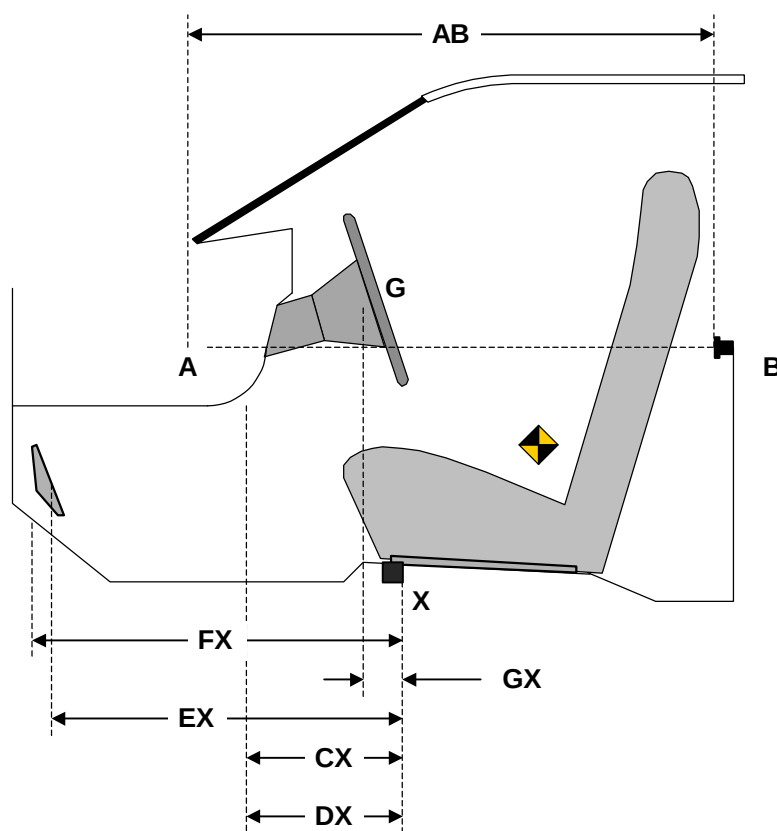
Test Program: NCAP

Test Date: February 6, 2001

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	978	975	3
CX	Left Knee Bolster to X	mm	357	319	38
DX	Right Knee Bolster to X	mm	361	293	68
EX	Brake Pedal to X	mm	550	454	96
FX	Foot Rest to X	mm	539	524	15
GX	Center of Steering Column Wheel Hub to X	mm	86	46	40

X = Left Front Seat Front Outboard Anchor Bolt Head



DRIVER COMPARTMENT

DATA SHEET NO. 17...(continued)

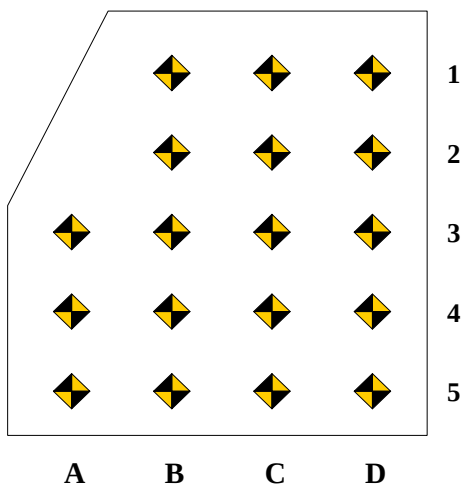
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001



Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan. Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.

DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		685	687	680		538	540	552		147	147	128
2		627	630	623		502	482	497		125	148	126
3	549	545	547	547	520	489	465	459	29	56	82	88
4	405	395	397	401	380	352	322	315	25	43	75	86
5	252	247	250	248	232	209	188	209	20	38	62	39

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1		19	16	12		100	117	128		81	101	116
2		-16	-23	-37		34	38	-2		50	61	35
3	-79	-72	-74	-87	-65	-45	32	-54	14	27	106	33
4	-90	-75	-84	-92	-64	-53	-35	-70	26	22	49	22
5	-91	-87	-86	-85	-98	-132	-123	-89	-7	-45	-37	-4

DATA SHEET NO. 17...(continued)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

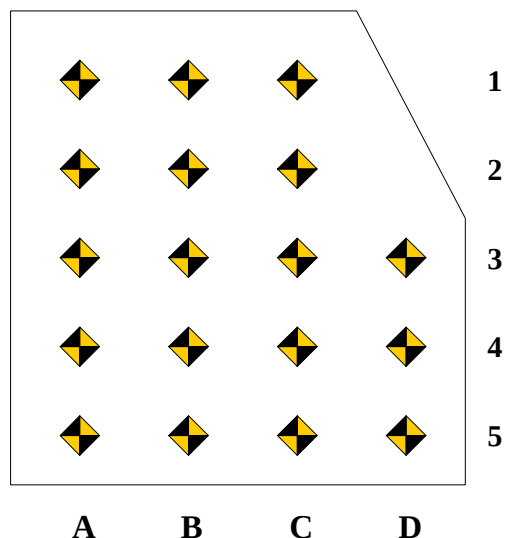
Measurement reference point for X and Z axis is the forward outboard seat mounting bolt.

Columns A through D are evenly spaced.

Rows 1 and 2 are on the toe kick portion of the floor pan.

Rows 3, 4, and 5 are located on the most level portion of the floor pan.

Row 3 will be at the intersection of the toe kick and the level sections of the floor pan.



PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	663	661	665		561	539	559		102	122	106	
2	600	599	596		503	510	555		97	89	41	
3	534	535	526	532	530	530	520	525	4	5	6	7
4	375	375	370	371	360	356	359	367	15	19	11	4
5	210	210	210	210	210	198	204	219	0	12	6	-9

PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	10	10	10		92	94	104		82	84	94	
2	-38	-25	-35		27	26	24		65	51	59	
3	-80	-78	-70	-85	-48	-41	-43	-48	32	37	27	37
4	-85	-72	-72	-87	-84	-74	-78	-87	1	-2	-6	0
5	-82	-78	-78	-84	-144	-116	-109	-87	-62	-38	-31	-3

DATA SHEET NO. 17...(continued)

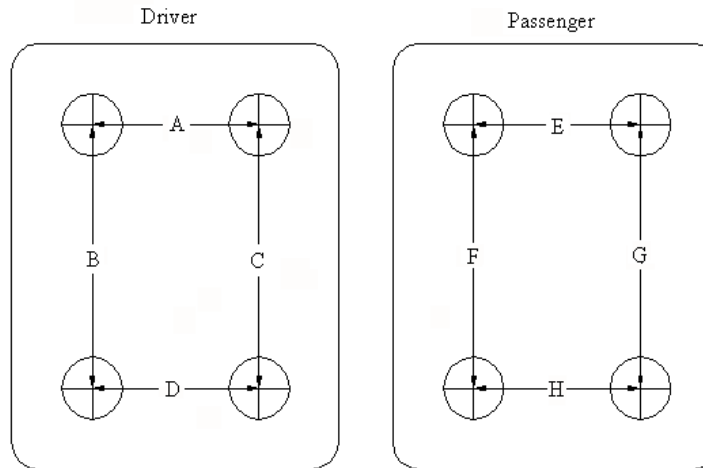
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001



UNDERBODY FLOORBOARD DEFORMATION

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	290	265	25
B	307	305	2
C	370	286	84
D	351	326	25
E	292	291	1
F	360	310	50
G	298	310	12
H	347	331	16

DATA SHEET NO. 18

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2001/Hyundai/Elantra/4 door

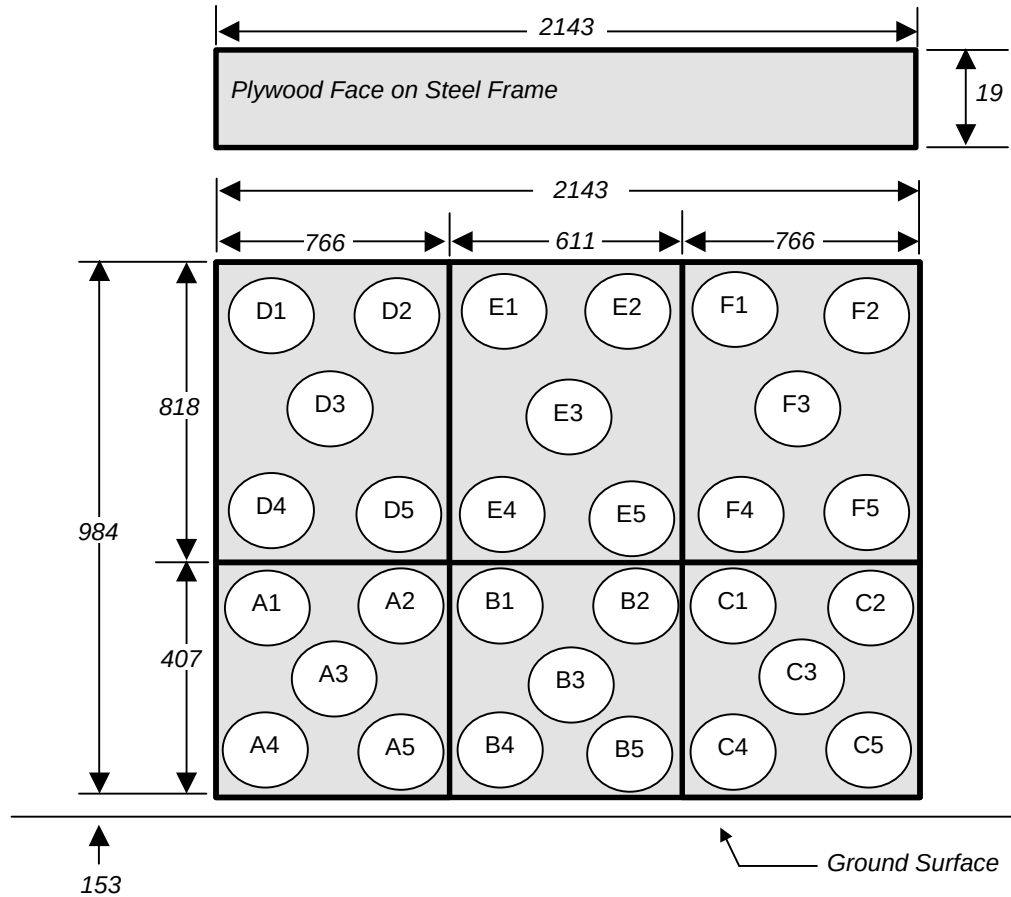
NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

30 Load Cell Rigid Barrier

Load Cell Locations on Fixed Barrier



Group 4 D1-D5	Group 5 E1-E5	Group 6 F1-F5
Group 1 A1-A5	Group 2 B1-B5	Group 3 C1-C5

6 Groups of 5 Load Cells Each

The Data is presented in Appendix C with the following requirements:

1. Data from 30 individual load cells
2. Sum data from 6 groupings shown above (5 cells/group)
3. Total or sum of all 30 individual load cells

DATA SHEET NO. 19

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

VEHICLE INFORMATION

VIN: KMHDN45D91U062461

Wheelbase (mm): 2610

Vehicle Size Category: Small

Test Weight (kg): 1508.3

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on page 13

Cal. Procedure/Interval: MGA procedure / 6 month

Integration Algorithm: Trapezoidal

Linearity: >99.9%

Impact Velocity (km/h): 56.3

Velocity Change (km/h): 69.1

Time of Separation (msec): 137

CRUSH PROFILE

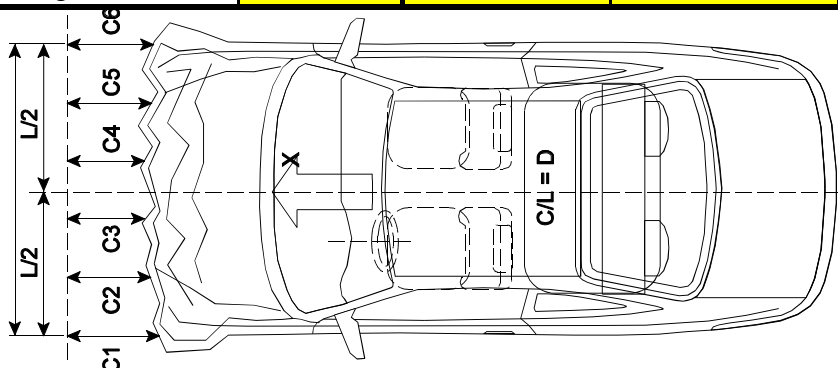
Collision Deformation Classification: Frontal

Midpoint of Damage: CL

Damage Region Length (mm): 1704

Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4168	3724	444
C2	Crush zone 2 at left side	mm	4247	3758	489
C3	Crush zone 3 at left side	mm	4282	3769	513
C4	Crush zone 4 at right side	mm	4290	3771	519
C5	Crush zone 5 at right side	mm	4248	3764	484
C6	Crush zone 6 at right side	mm	4157	3734	423



DATA SHEET NO. 20

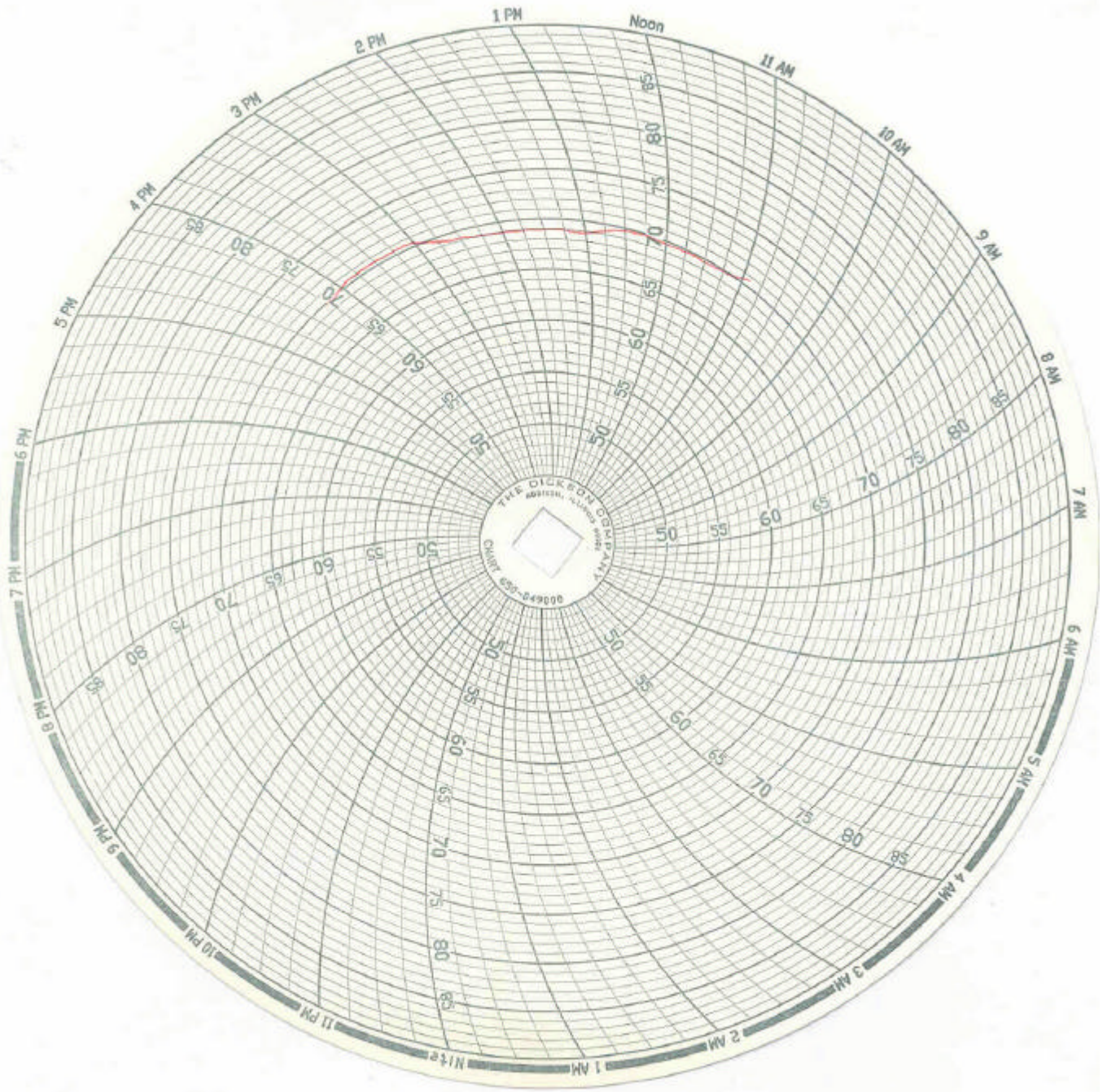
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001



A = Dummies installed in vehicle at 11:00 a.m.

B = Test conducted at 4:24 p.m.

APPENDIX A
PHOTOGRAPHS

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Photo No. A-1 - Pre-Test Front View of Test Vehicle

A-2

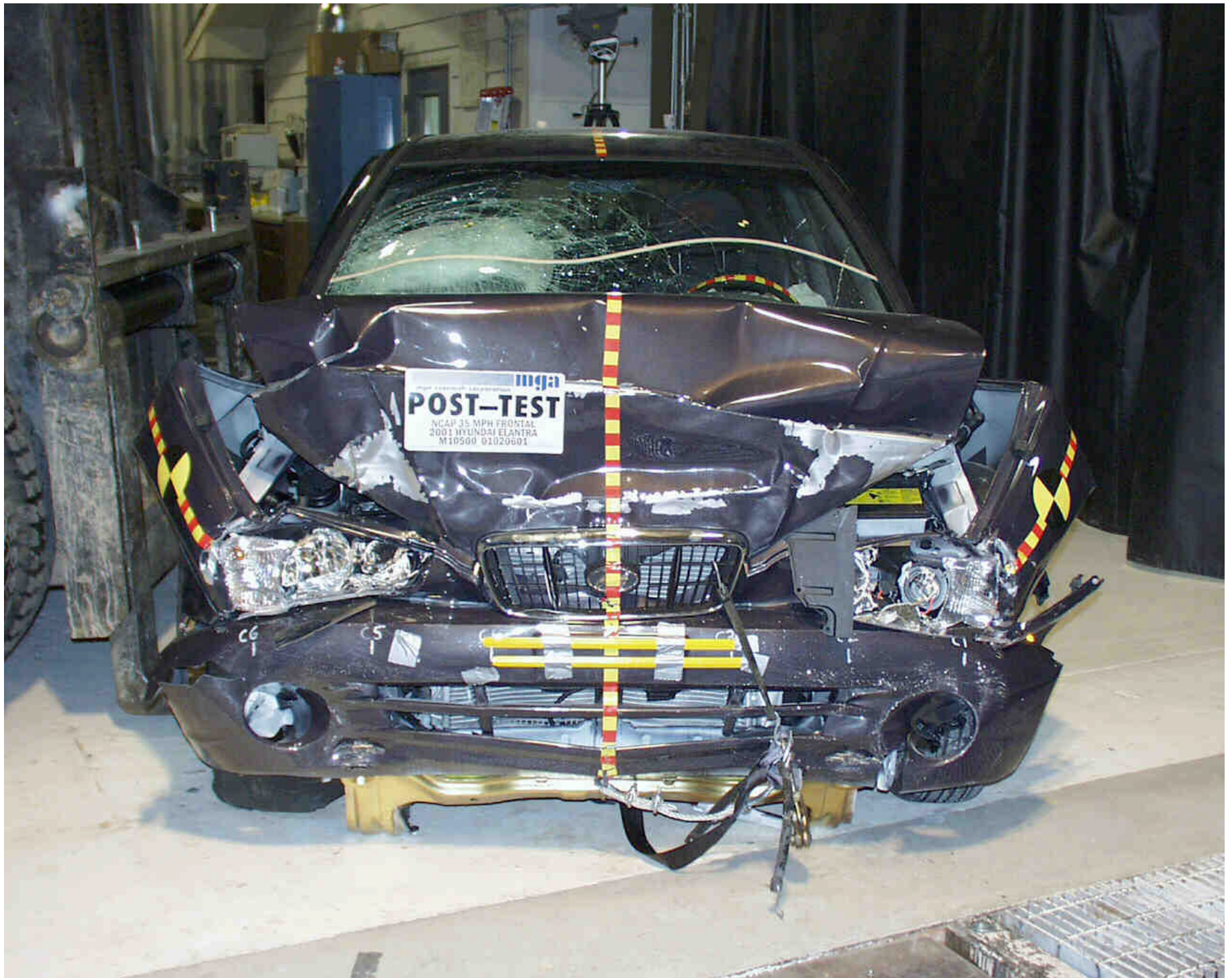


Photo No. A-2 - Post-Test Front View of Test Vehicle



Photo No. A-3 - Pre-Test Rear View of Test Vehicle



Photo No. A-4 - Post-Test Rear View of Test Vehicle



Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

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Photo No. A-6 - Post-Test Left Side View of Test Vehicle



Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle



Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle



Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

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Photo No. A-10 - Post-Test Right Side View of Test Vehicle



Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle



Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle



Photo No. A-13 - Pre-Test Fuel Filler Cap View



Photo No. A-14 - Pre-Test Engine Compartment View

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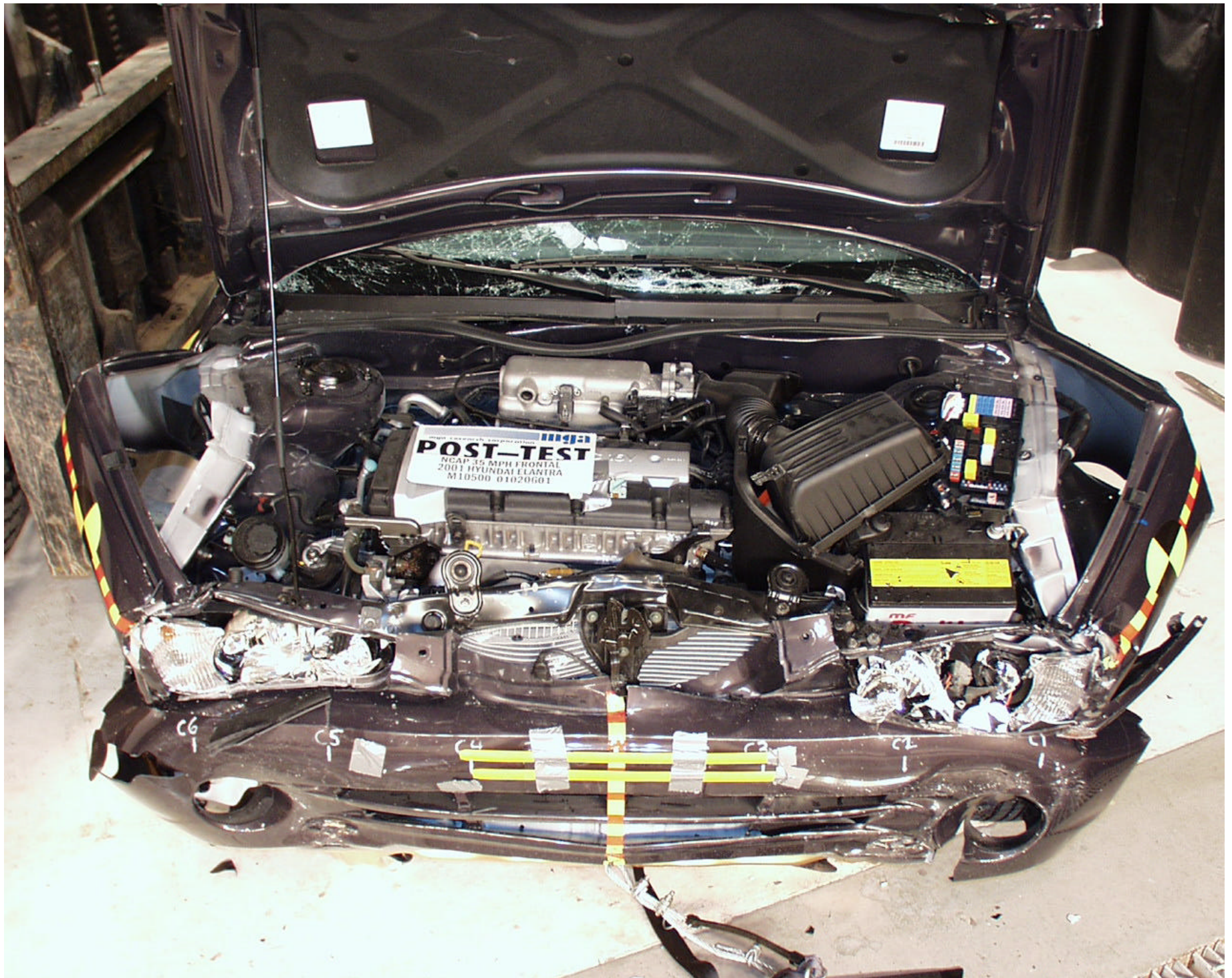


Photo No. A-15 - Post-Test Engine Compartment View

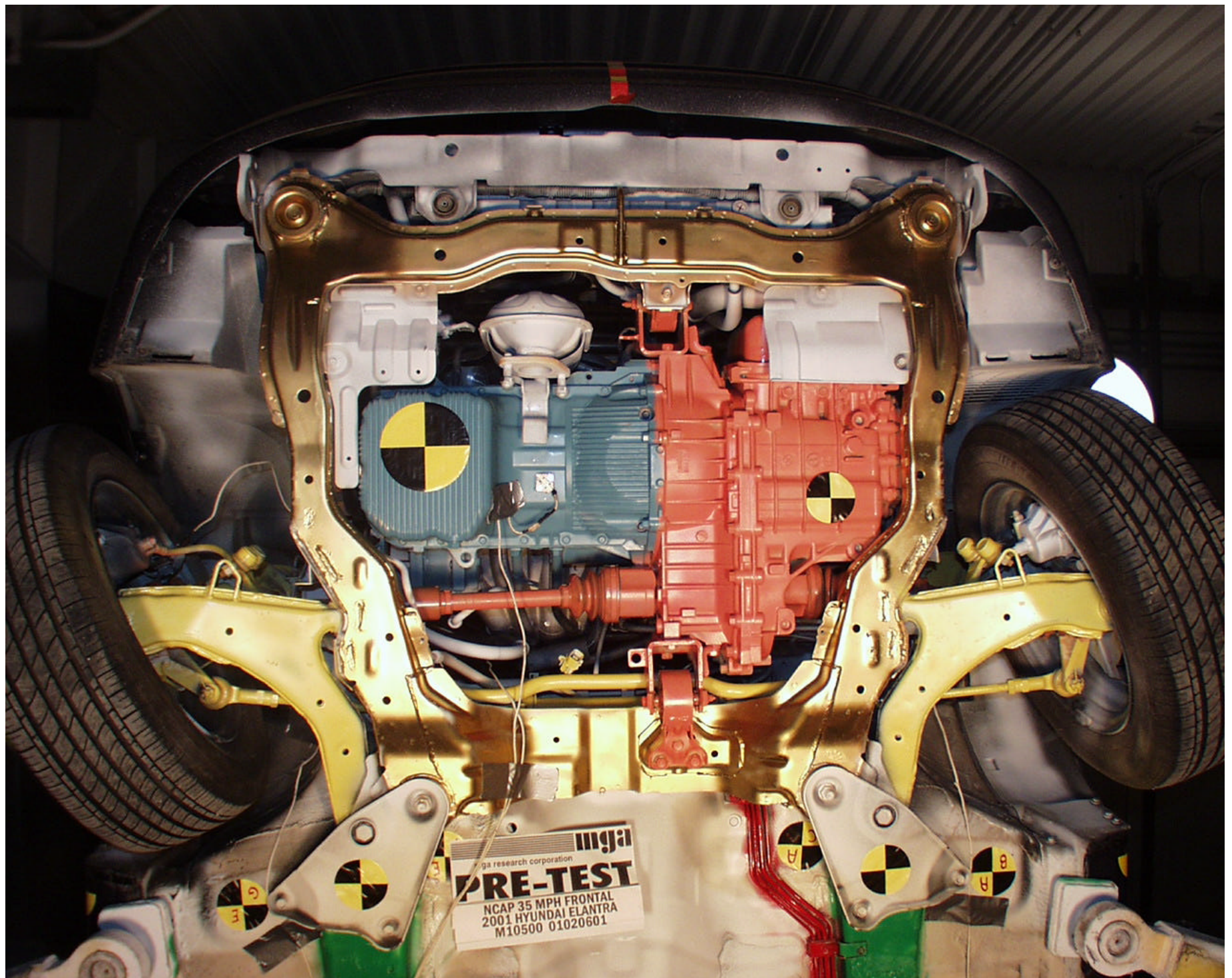


Photo No. A-16 - Pre-Test Front Underbody View

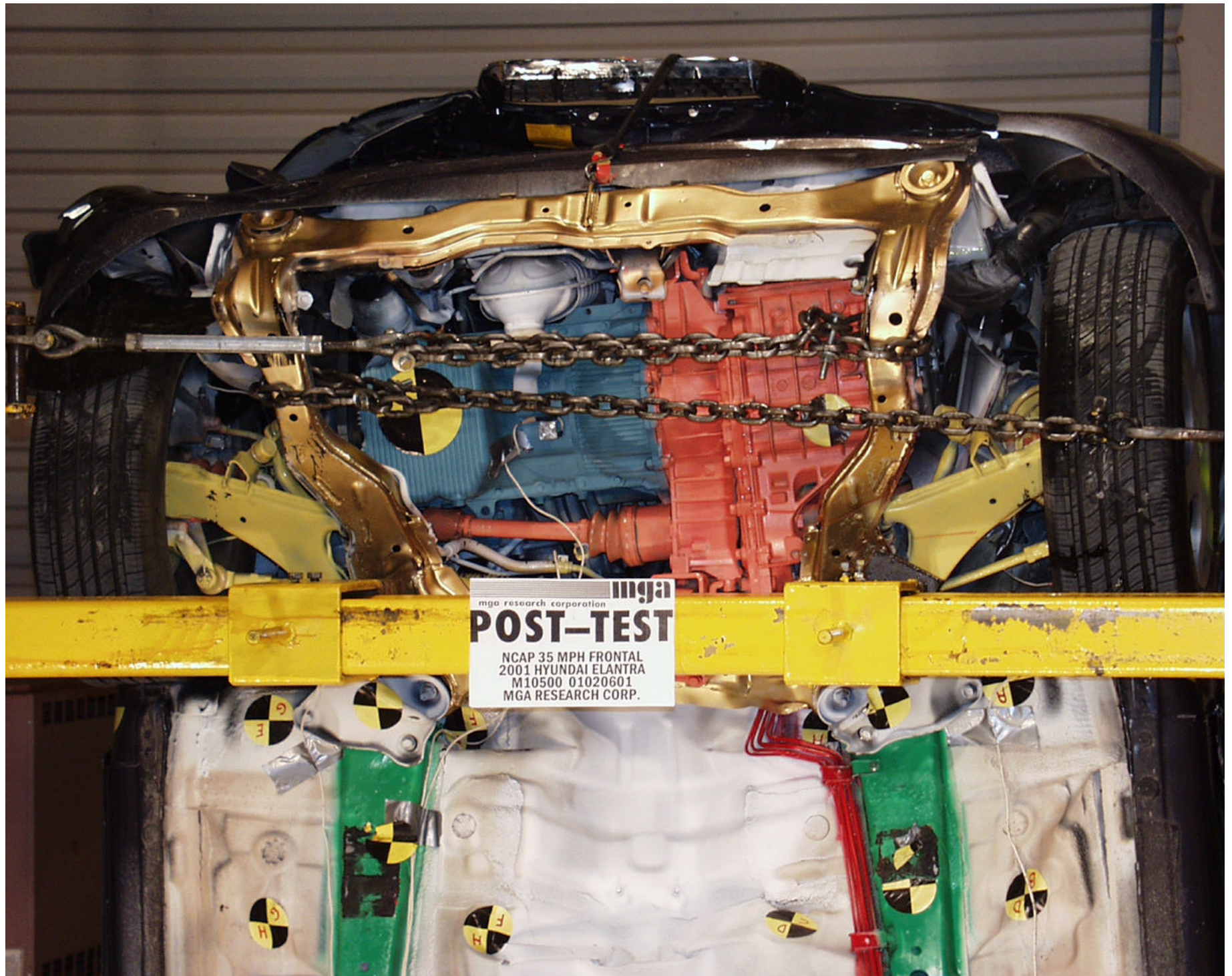


Photo No. A-17 - Post-Test Front Underbody View

A-18

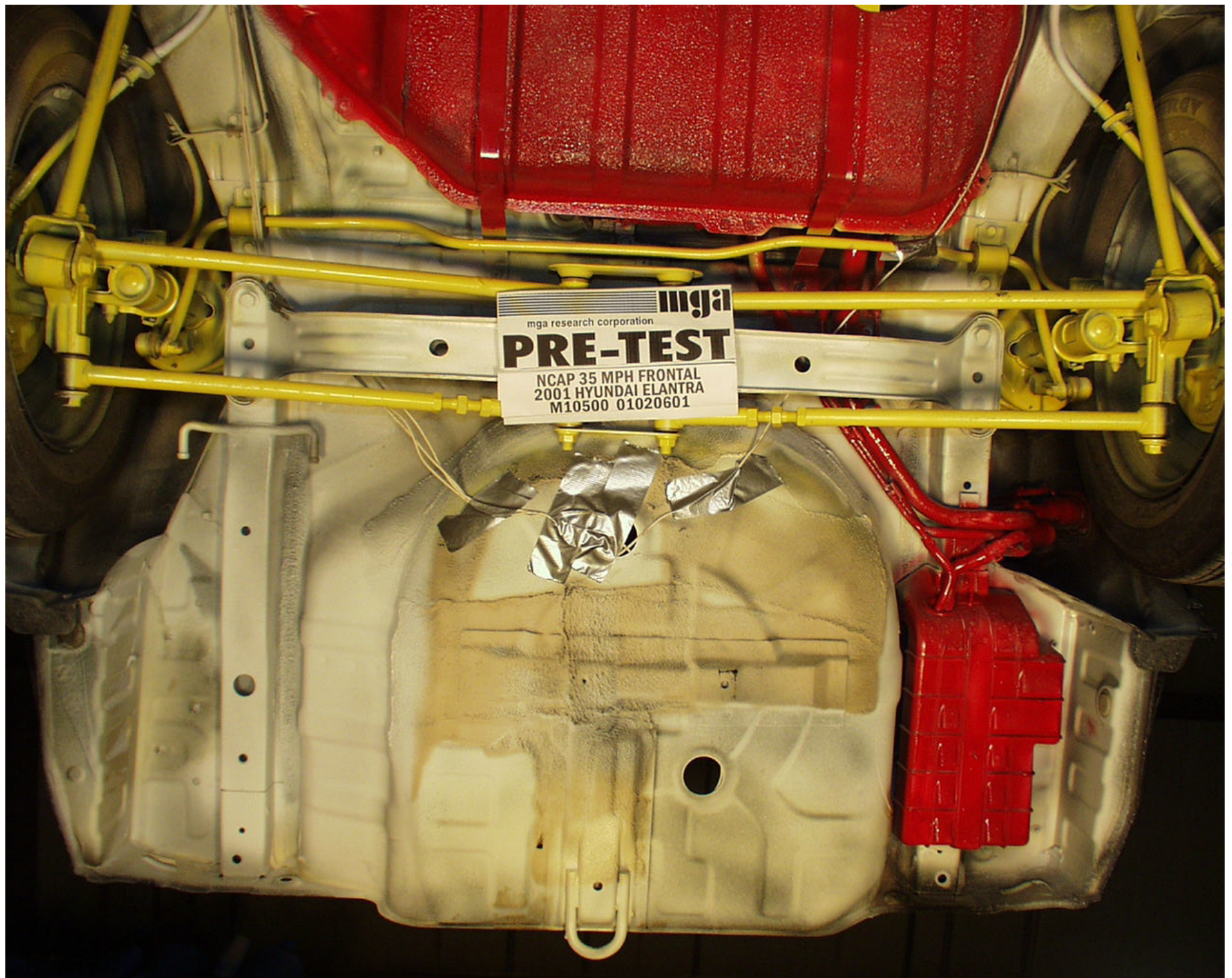


Photo No. A-18 - Pre-Test Rear Underbody View

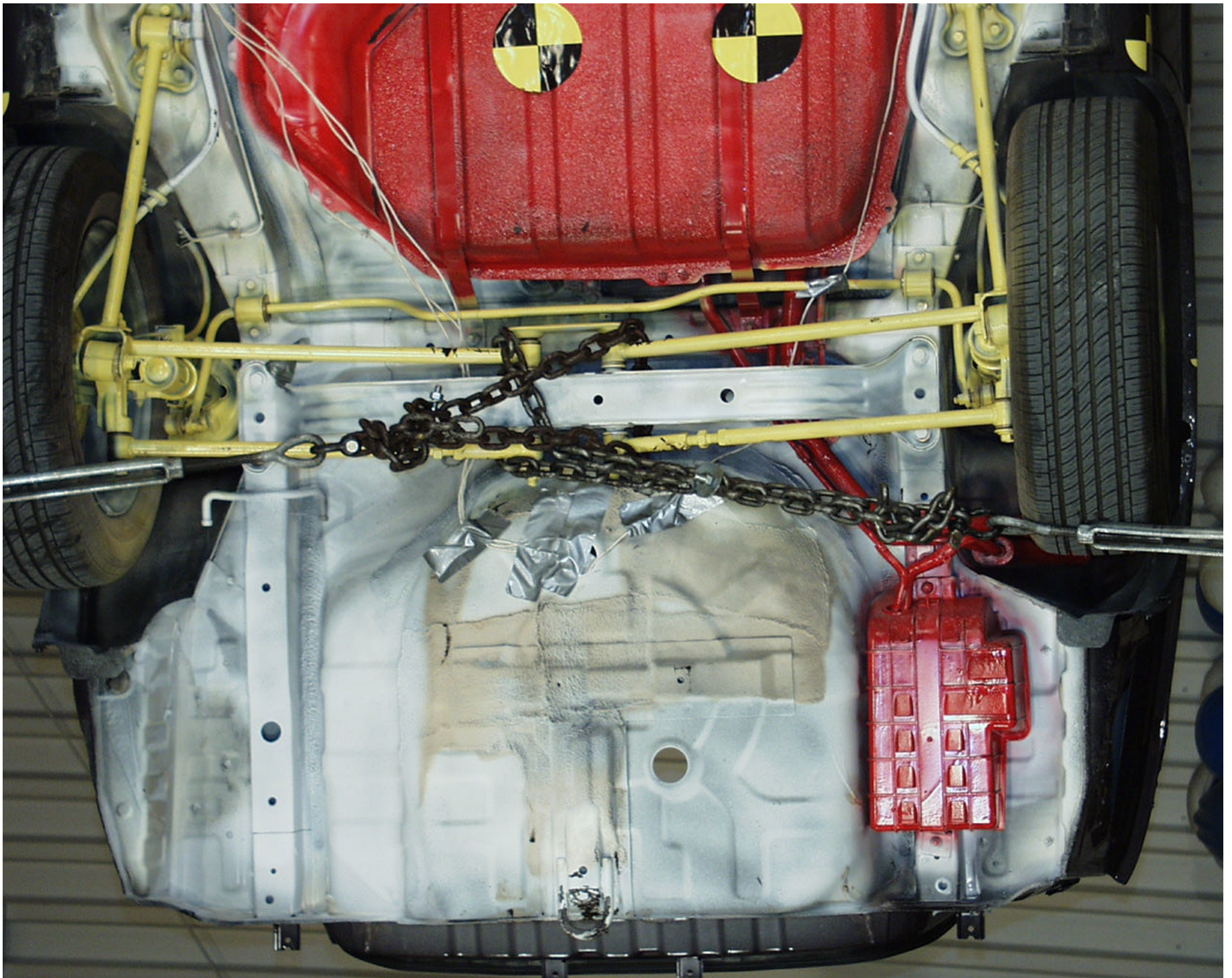


Photo No. A-19 - Post-Test Rear Underbody View

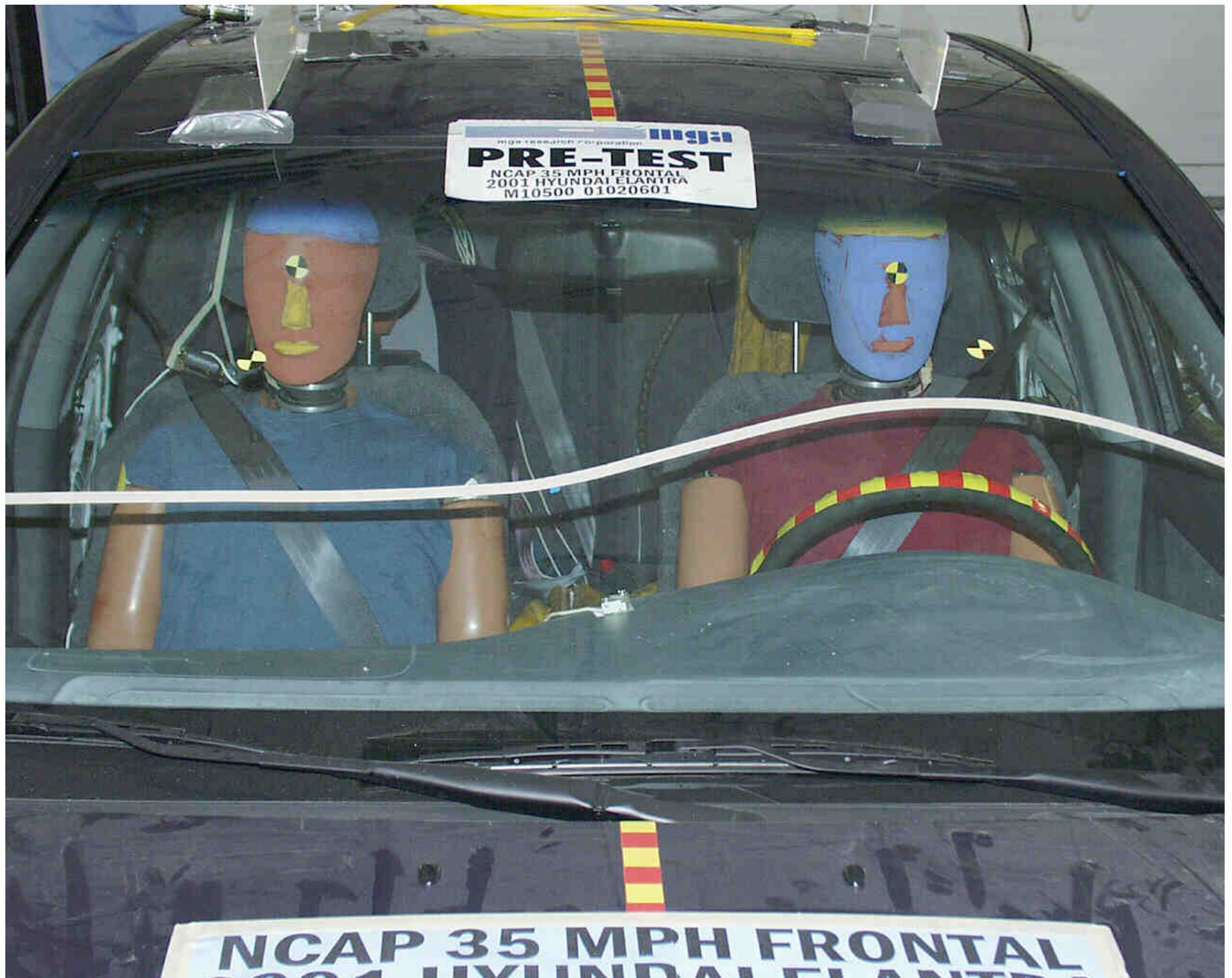


Photo No. A-20 - Pre-Test Windshield View



Photo No. A-21 - Post-Test Windshield View

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Photo No. A-22 - Pre-Test Driver Dummy Position Left Side View



Photo No. A-23 - Post-Test Driver Dummy Position Left Side View



Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)



Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)



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Photo No. A-26 - Pre-Test Driver Seat Position View



Photo No. A-27 - Post-Test Driver Seat Position View



Photo No. A-28 - Pre-Test Driver Dummy Knee Position



Photo No. A-29 - Post-Test Driver Dummy Knee Position

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Photo No. A-30 - Post-Test Driver Airbag Contact

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Photo No. A-31 - Post-Test Driver Knee Contact View

Photo No. A-32 - Post-Test Driver Knee Contact View

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Photo No. A-33 - Post-Test Driver Head Contact View



Photo No. A-34 - Pre-Test Driver Windshield View

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Photo No. A-35 - Post-Test Driver Windshield View



Photo No. A-36 - Pre-Test Passenger Dummy Position Right Side View



Photo No. A-37 - Post-Test Passenger Dummy Position Right Side View

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Photo No. A-38 - Pre-Test Passenger Dummy Position Right Side View (Door Open)



Photo No. A-39 - Post-Test Passenger Dummy Position Right Side View (Door Open)



Photo No. A-40 - Pre-Test Passenger Seat Position View



Photo No. A-41 - Post-Test Passenger Seat Position View



Photo No. A-42 - Pre-Test Passenger Dummy Knee Position

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Photo No. A-43 - Post-Test Passenger Dummy Knee Position



Photo No. A-44 - Post-Test Passenger Airbag Contact

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Photo No. A-45 - Post-Test Passenger Knee Contact View

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Photo No. A-46 - Post-Test Passenger Head Contact View



Photo No. A-47 - Pre-Test Passenger Windshield View

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Photo No. A-48 - Post-Test Passenger Windshield View



Photo No. A-49 - Vehicle Certification Label

1	TIRE INFLATION PRESSURE(COLD)	
STANDARD INFLATION PRESSURE FOR ALL LOAD		
1ST SEAT	2 PASS.	
2ND SEAT	3 PASS.	
TOTAL	5 PASS.	
LUGGAGE	45kg(100LBS)	
VEHICLE CAPACITY WT.		
385kg(850LBS)		
TIRE	P185/65R15 86T	
SIZE	P195/60R15 87H	
FRONT		REAR
210kPa (30psi)		210kPa (30psi)
TIRE SIZE T125/70D15 T125/70R15		
TEMPORARY USE ONLY		
420kPa		(60psi)

Photo No. A-50 - Tire Placard



Photo No. A-52 - Rollover 180E



Photo No. A-53 - Rollover 270E



Photo No. A-54 - Rollover 360E

APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

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VEHICLE DATA FILTER CHANNEL CLASS

Head Accelerations 1000 (1650 Hz)
 Chest Accelerations 180 (300 Hz)
 Vehicle Accelerations 60 (100 Hz)
 Barrier Load Cells 60 (100 Hz)
 Femur Load Cells 600 (1000 Hz)
 Lap and Torso Belts 60 (100 Hz)
 Tibia Load Cells 600 (1000Hz)
 Foot Accelerations 180 (300Hz)

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* No valid data collected

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* No valid data collected.

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Figure B-147 - Sum of Right Barrier Force vs. Time	B-147
Figure B-148 - Sum of Barrier Force vs. Time	B-148



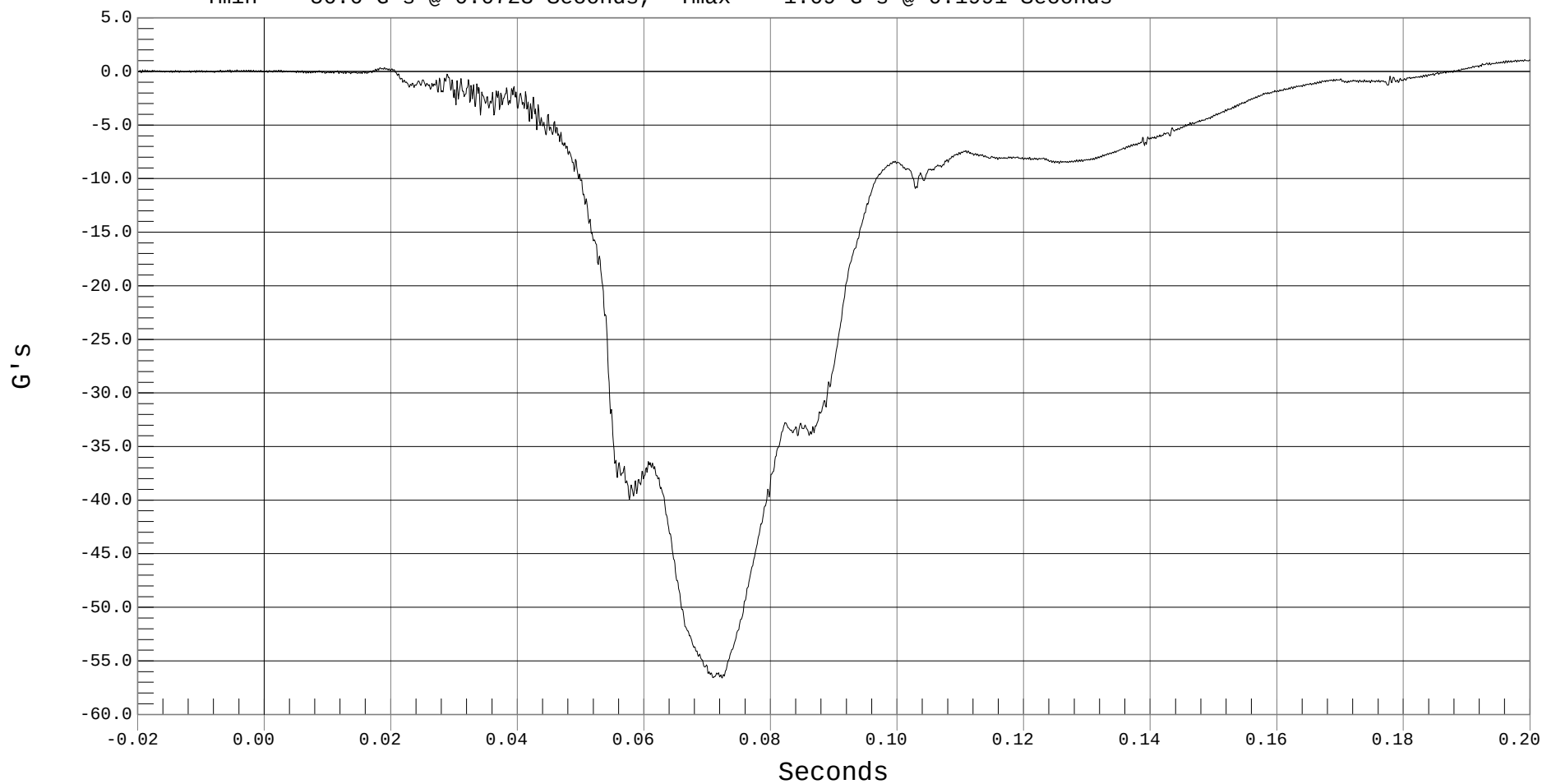
DRIVER HEAD X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

1 DRIVER HEAD X, b01013AT.A01

Ymin = -56.6 G's @ 0.0723 Seconds, Ymax = 1.09 G's @ 0.1991 Seconds





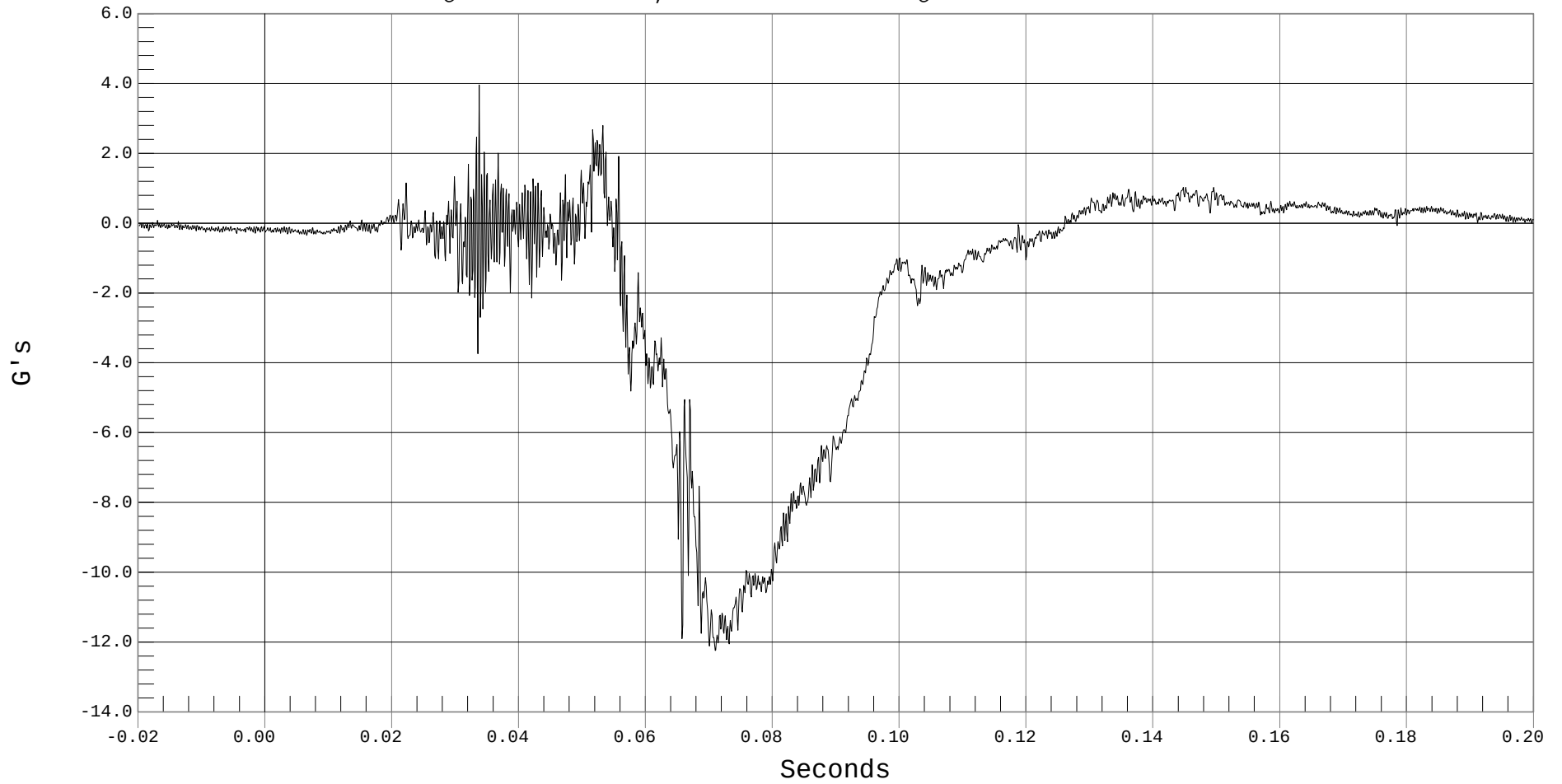
DRIVER HEAD Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

1 DRIVER HEAD Y, b01013AT.A02

Ymin = -12.24 G's @ 0.0709 Seconds, Ymax = 3.97 G's @ 0.0337 Seconds





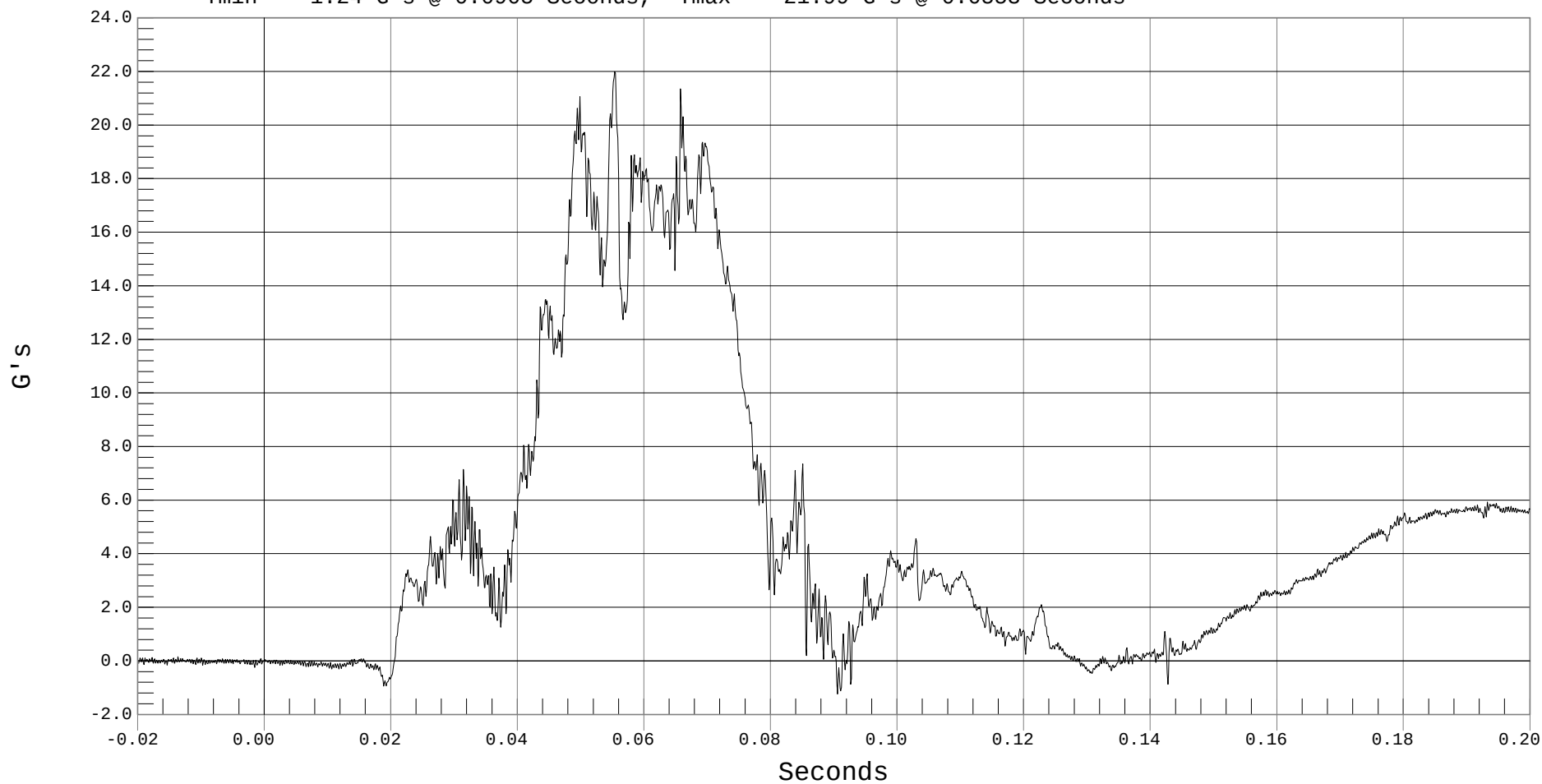
DRIVER HEAD Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD Z, b01013AT.A03

Ymin = -1.24 G's @ 0.0905 Seconds, Ymax = 21.99 G's @ 0.0553 Seconds





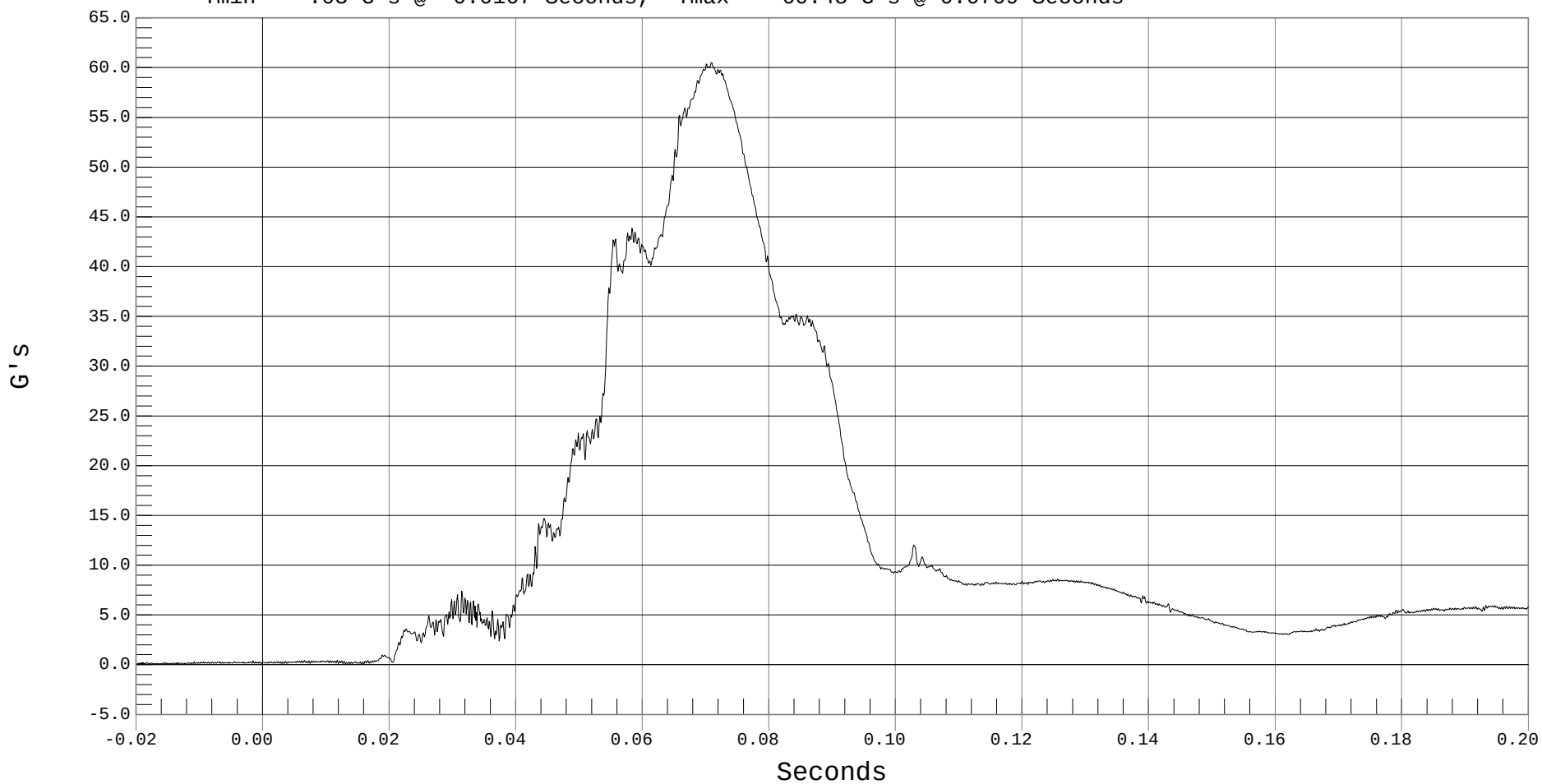
DRIVER HEAD RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD RESULTANT ACCELERATION, b01013AV.A01

Ymin = .03 G's @ -0.0167 Seconds, Ymax = 60.48 G's @ 0.0709 Seconds





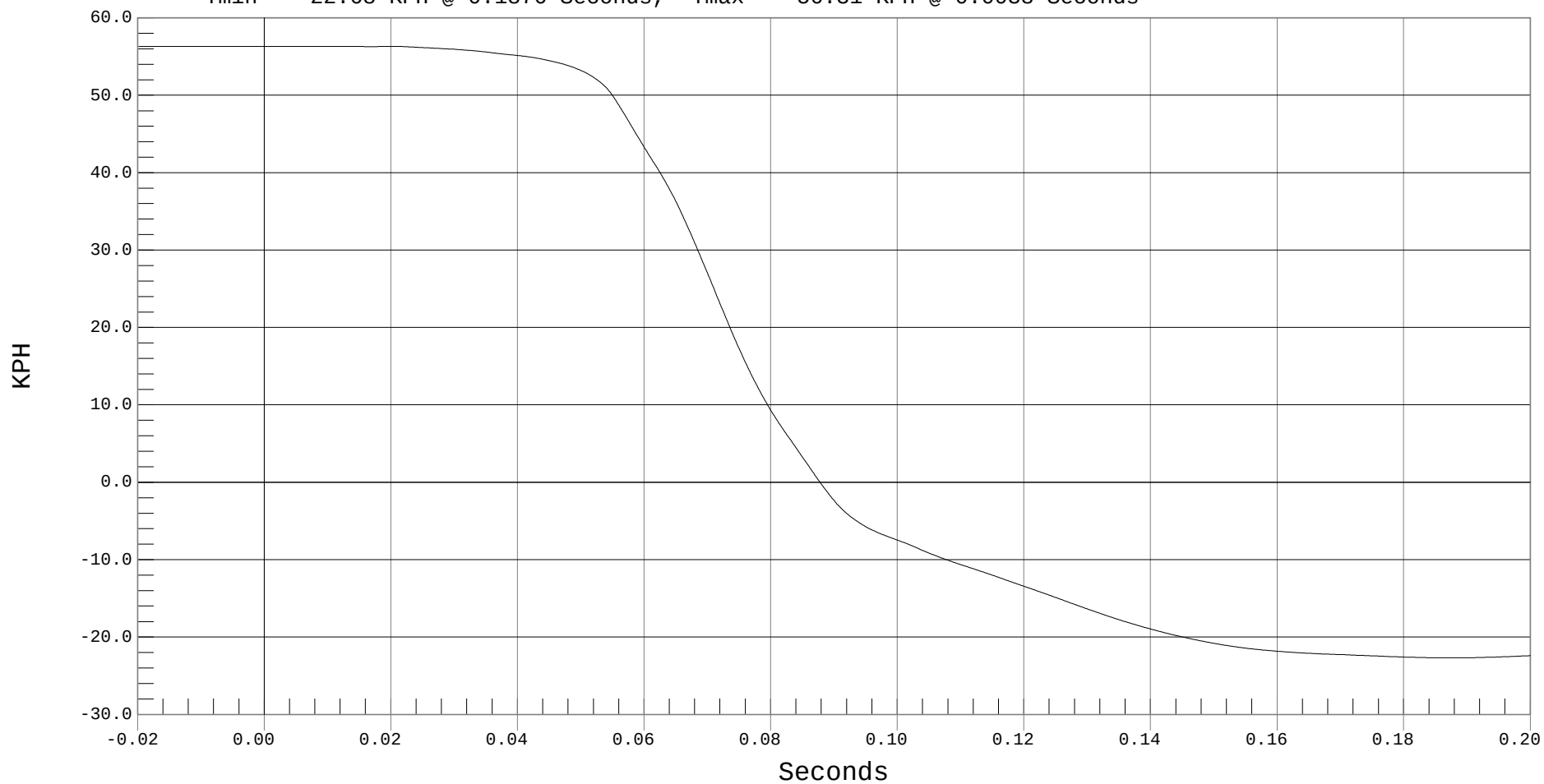
DRIVER HEAD X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER HEAD X VELOCITY, b01013AI.V01

Ymin = -22.68 KPH @ 0.1876 Seconds, Ymax = 56.31 KPH @ 0.0038 Seconds





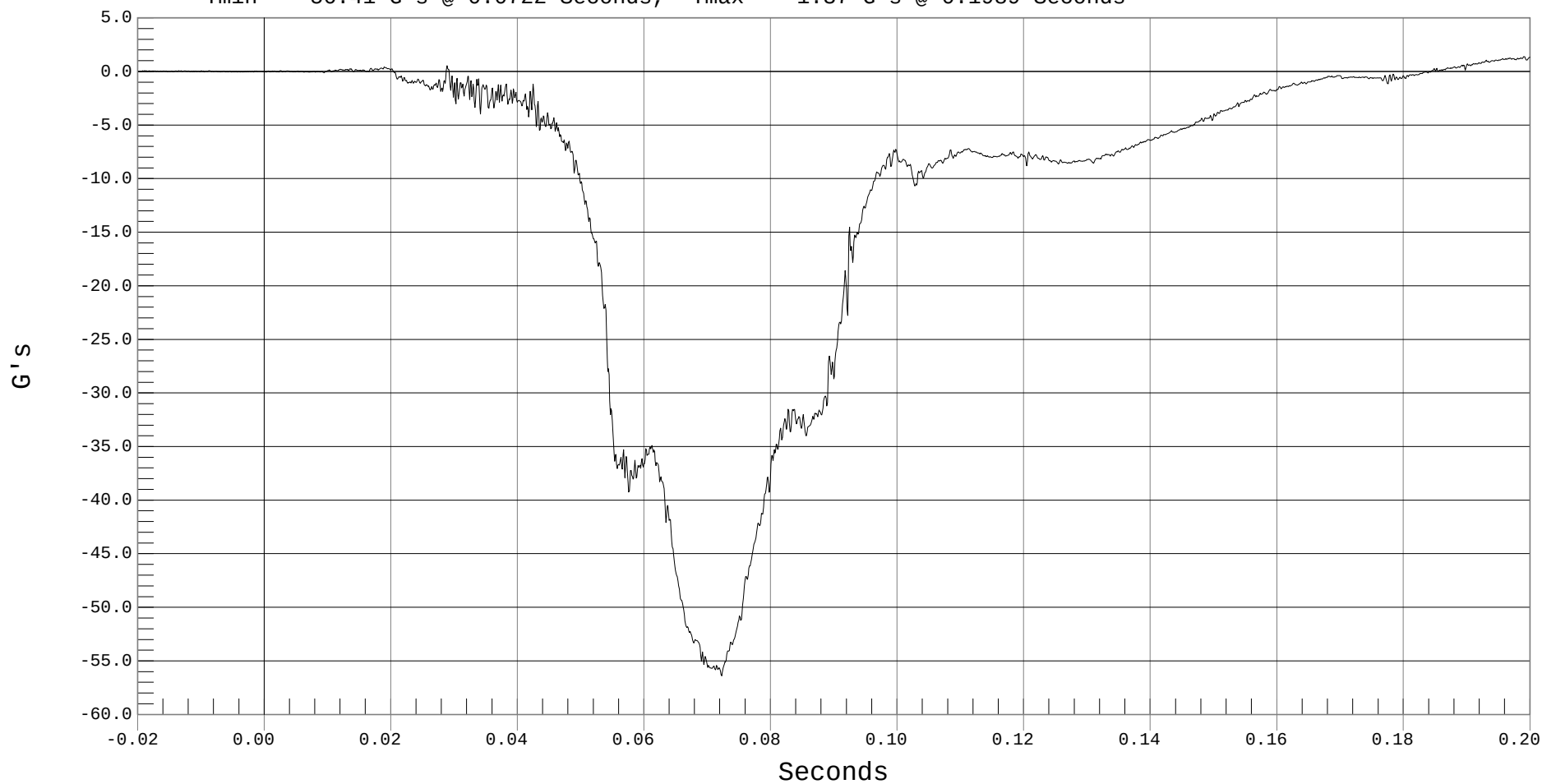
DRIVER HEAD REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD Xr, b01013AT.A33

Ymin = -56.41 G's @ 0.0722 Seconds, Ymax = 1.37 G's @ 0.1989 Seconds





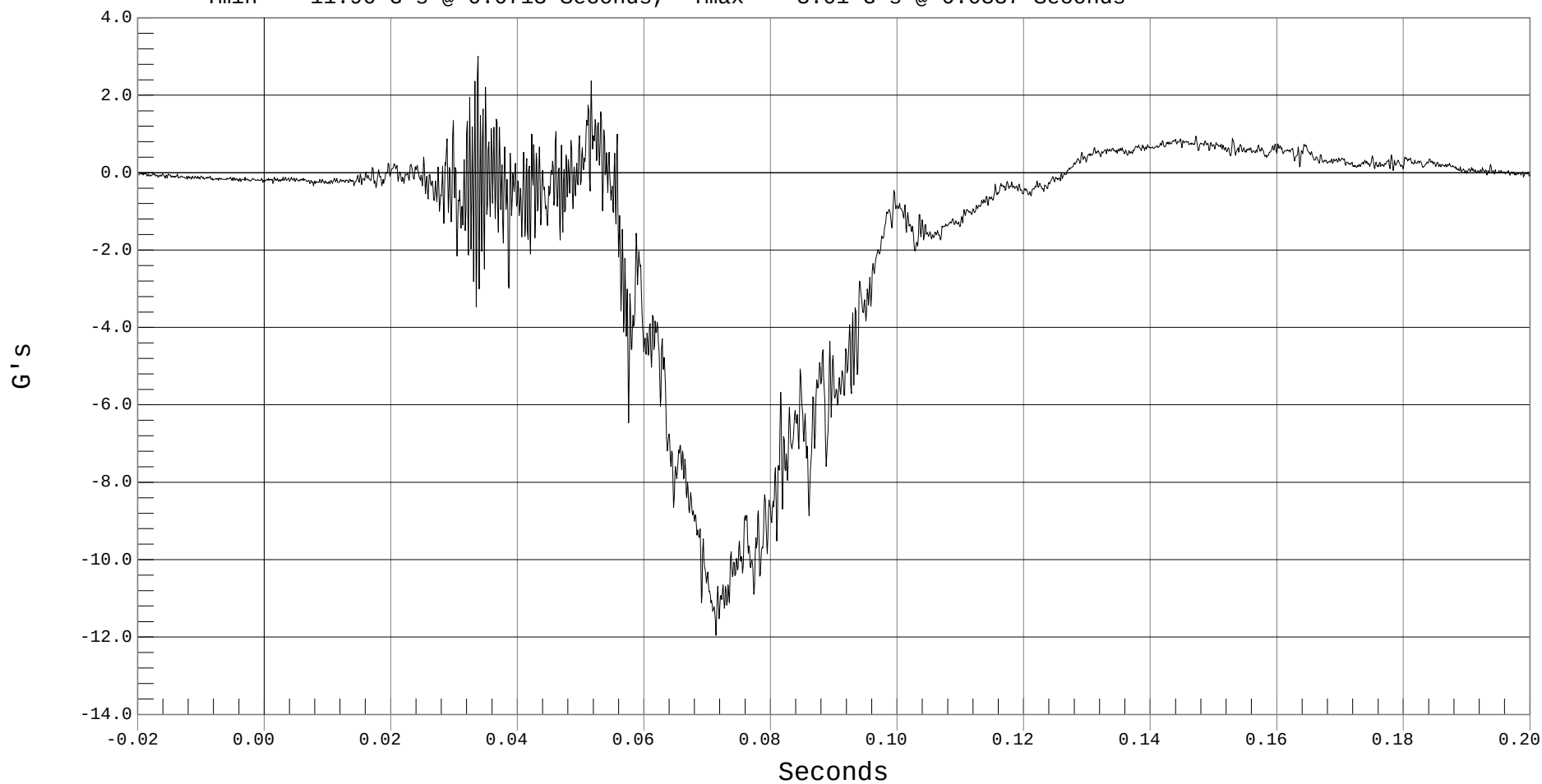
DRIVER HEAD REDUNDANT Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD Yr, b01013AT.A34

Ymin = -11.96 G's @ 0.0713 Seconds, Ymax = 3.01 G's @ 0.0337 Seconds





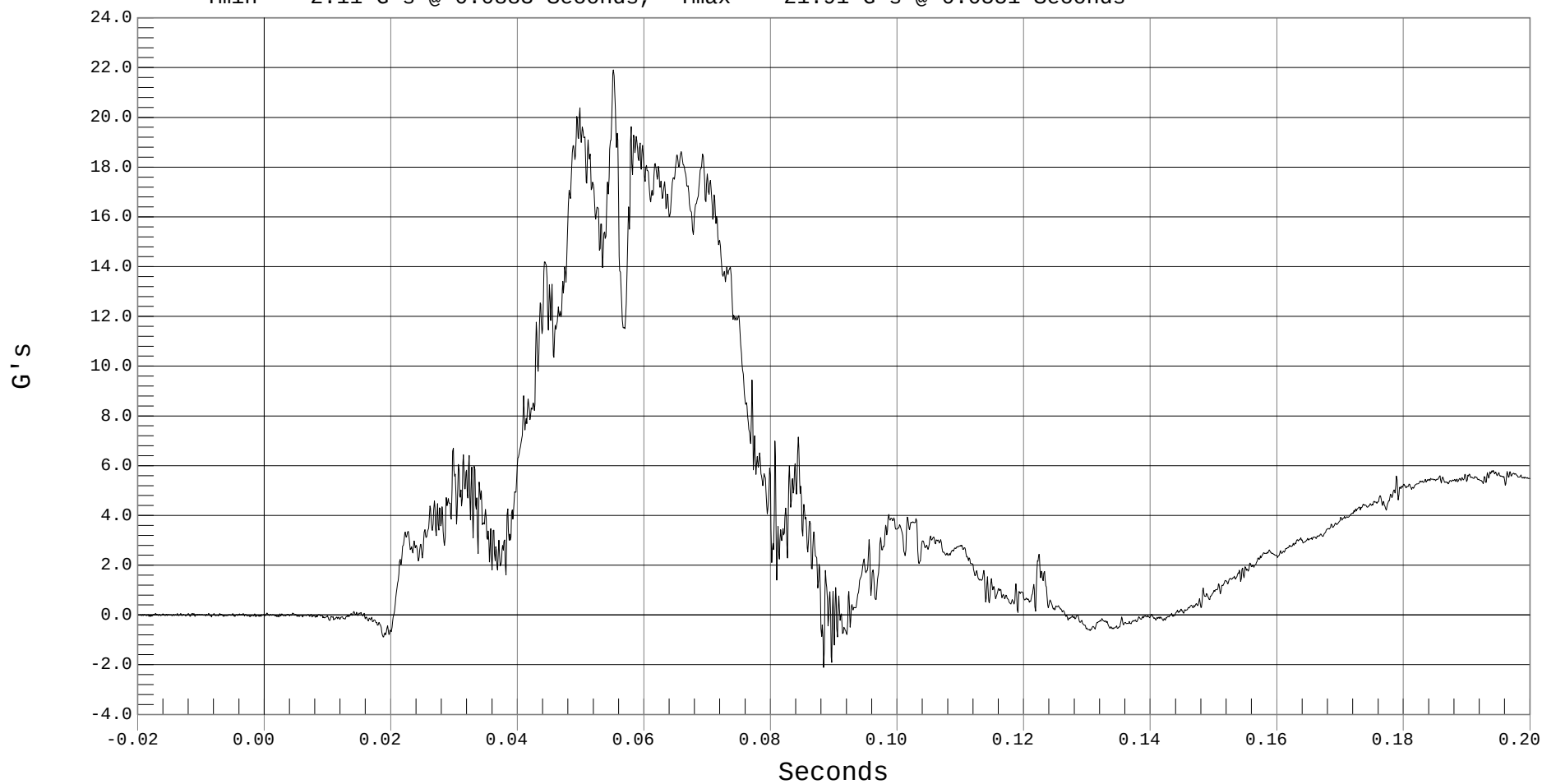
DRIVER HEAD REDUNDANT Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD Zr, b01013AT.A35

Ymin = -2.11 G's @ 0.0883 Seconds, Ymax = 21.91 G's @ 0.0551 Seconds





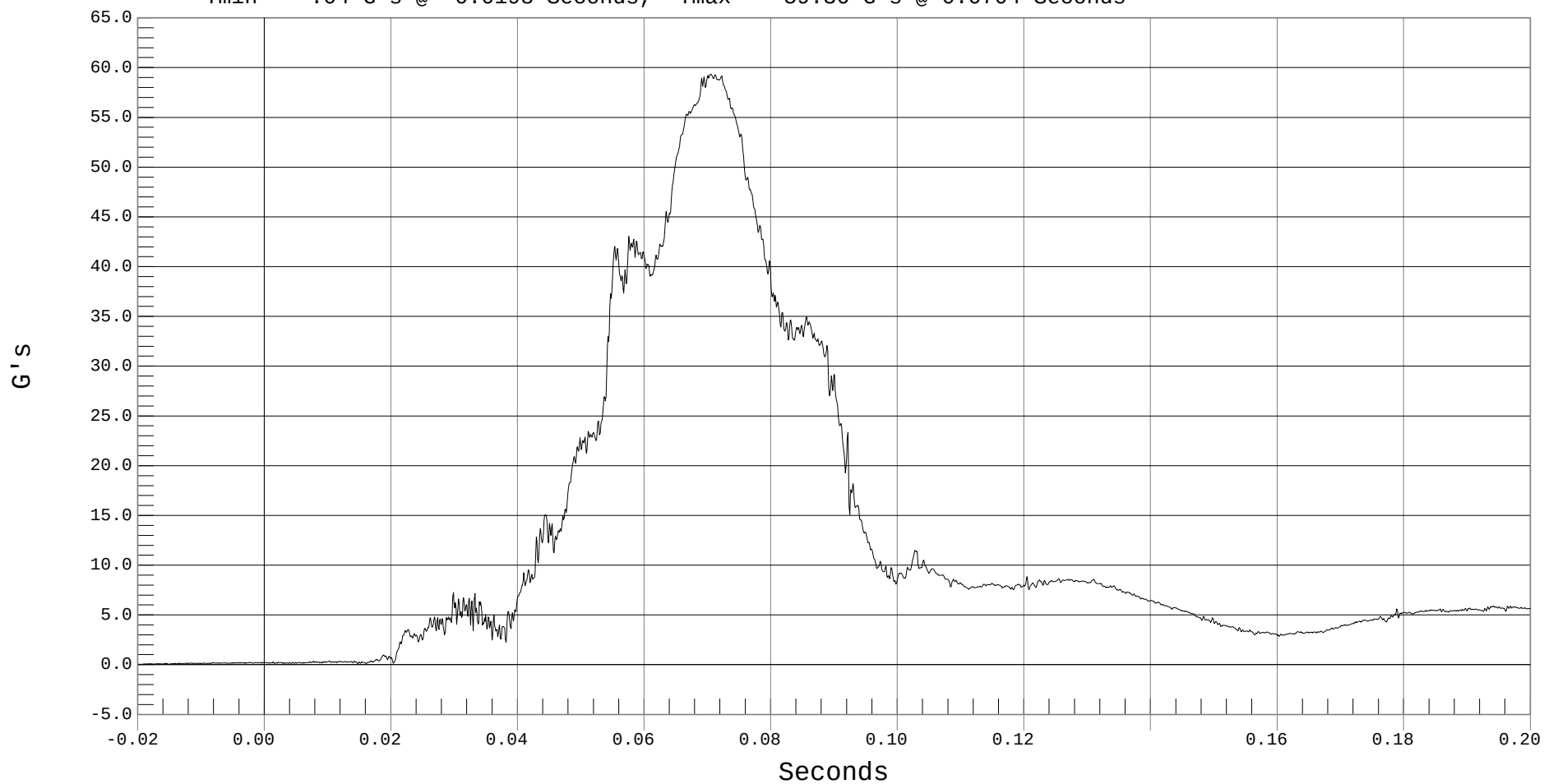
DRIVER HEAD REDUNDANT RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

1 DRIVER HEAD REDUNDANT RESULTANT ACCELERATION, b01013AV.A33

Ymin = .04 G's @ -0.0198 Seconds, Ymax = 59.36 G's @ 0.0704 Seconds





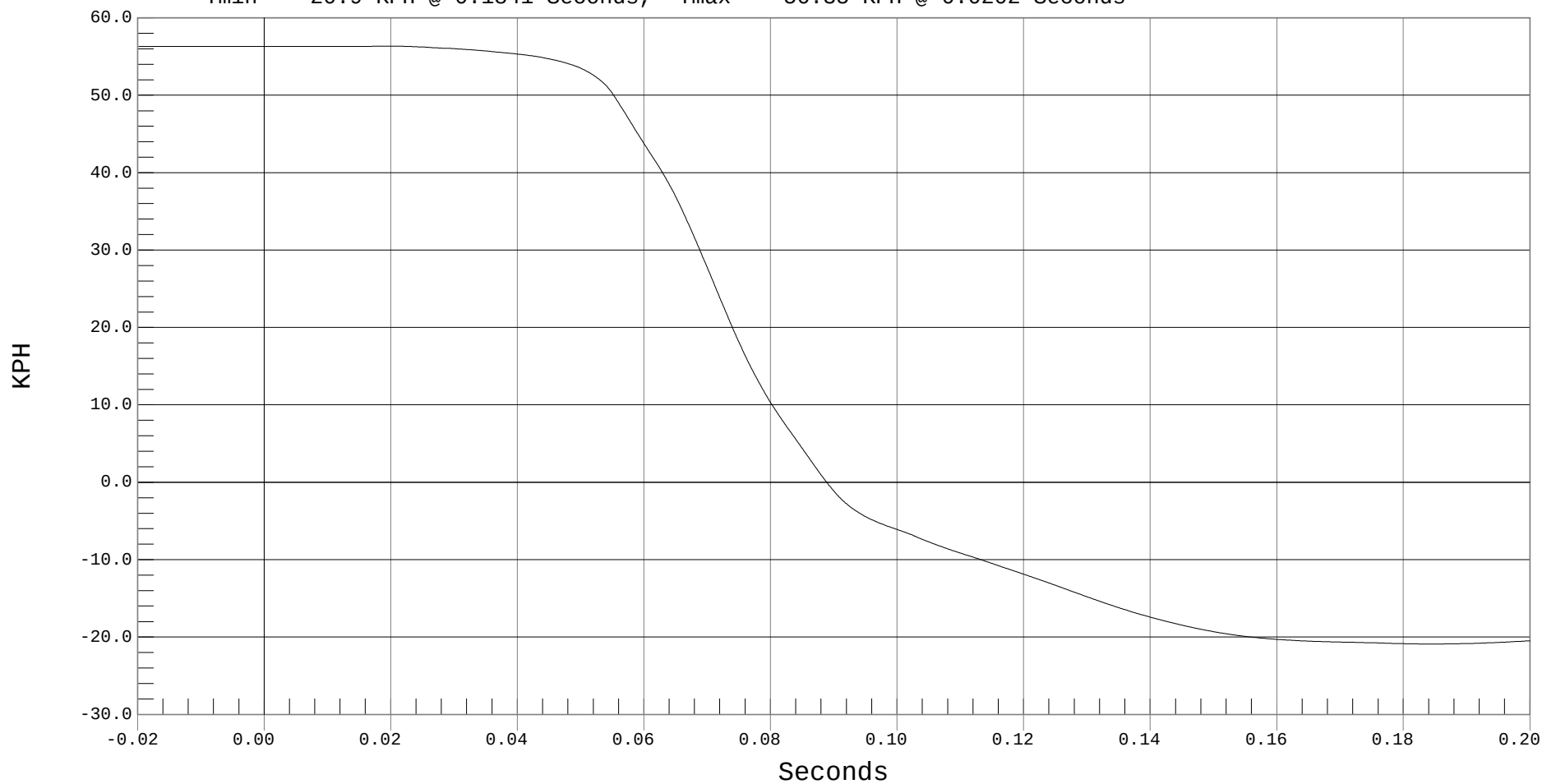
DRIVER HEAD REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER HEAD REDUNDANT X VELOCITY, b01013AI.V33

Ymin = -20.9 KPH @ 0.1841 Seconds, Ymax = 56.35 KPH @ 0.0202 Seconds





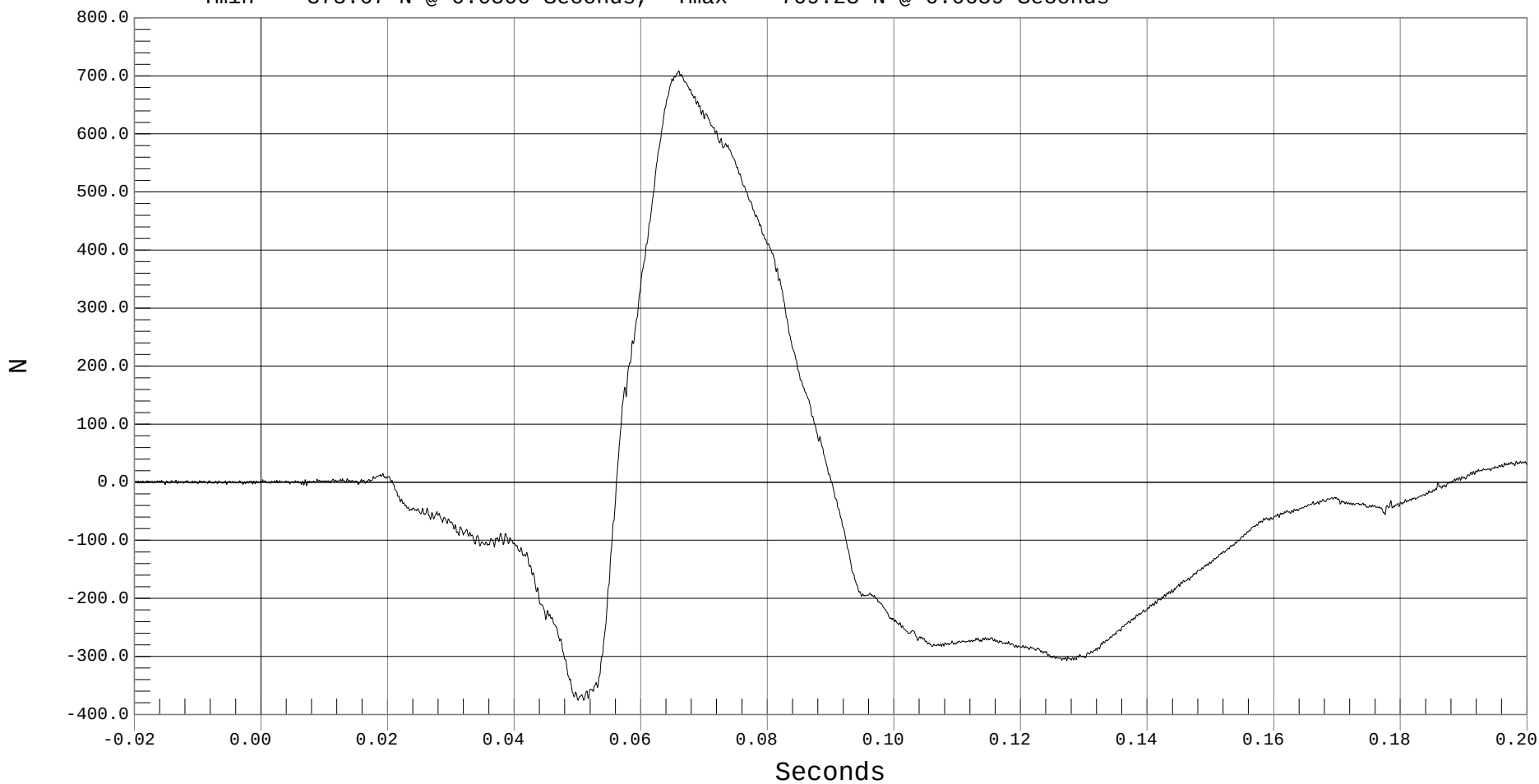
DRIVER NECK FORCE X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER NECK FX, b01013FT.F04

Ymin = -375.67 N @ 0.0500 Seconds, Ymax = 709.23 N @ 0.0659 Seconds





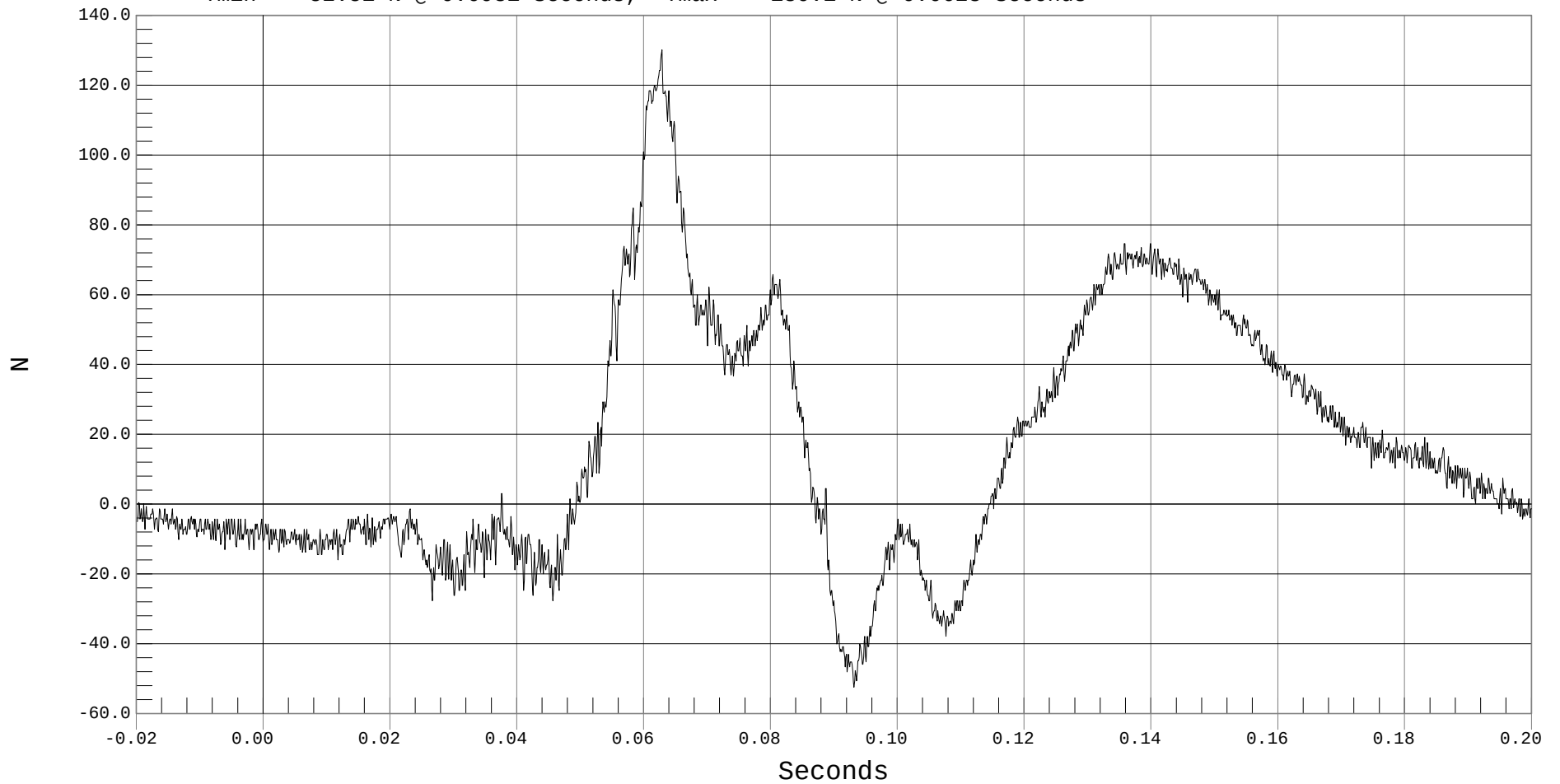
DRIVER NECK FORCE Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER NECK FY, b01013FT.F05

Ymin = -52.51 N @ 0.0931 Seconds, Ymax = 130.1 N @ 0.0628 Seconds





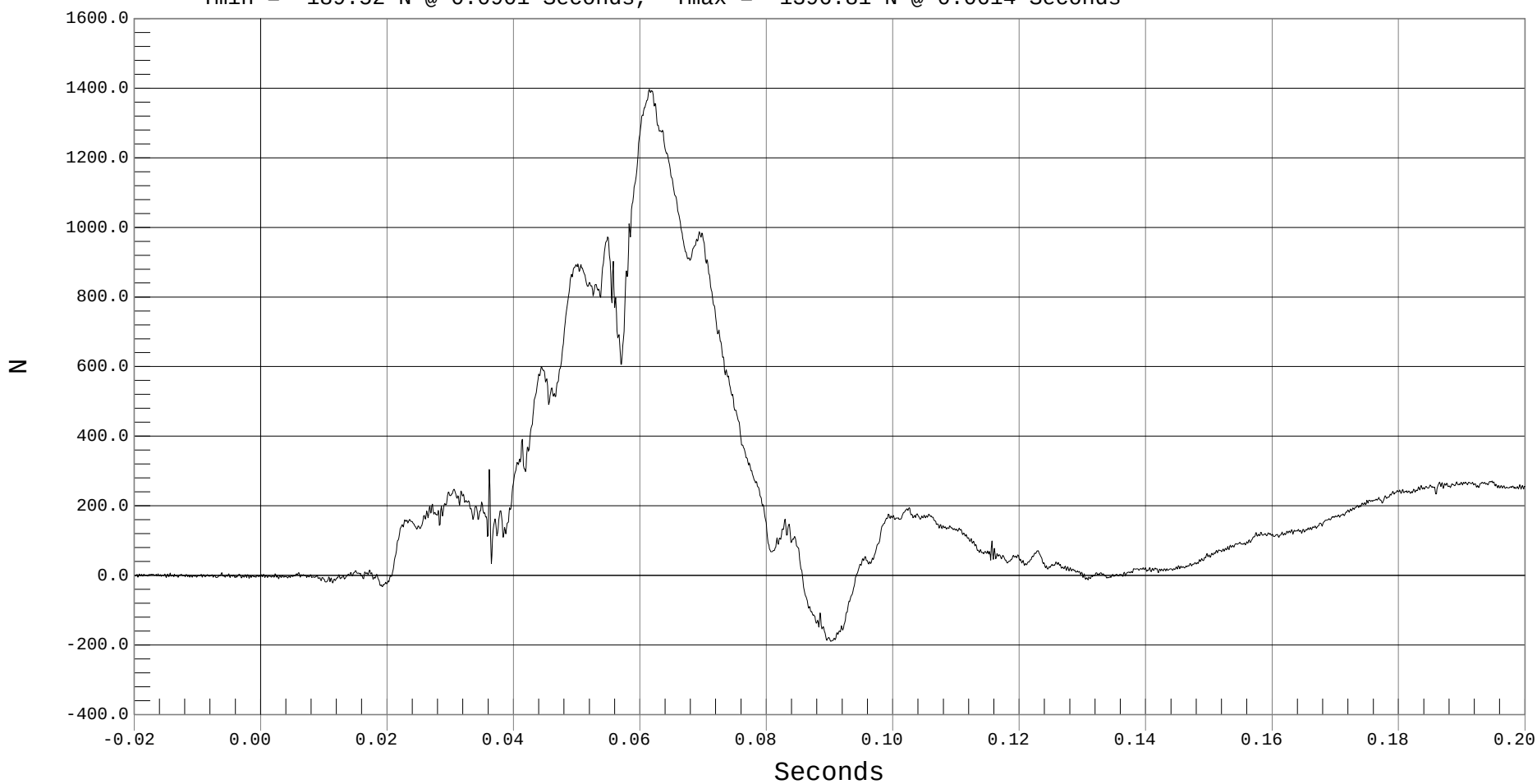
DRIVER NECK FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER NECK FZ, b01013FT.F06

Ymin = -189.52 N @ 0.0901 Seconds, Ymax = 1396.81 N @ 0.0614 Seconds





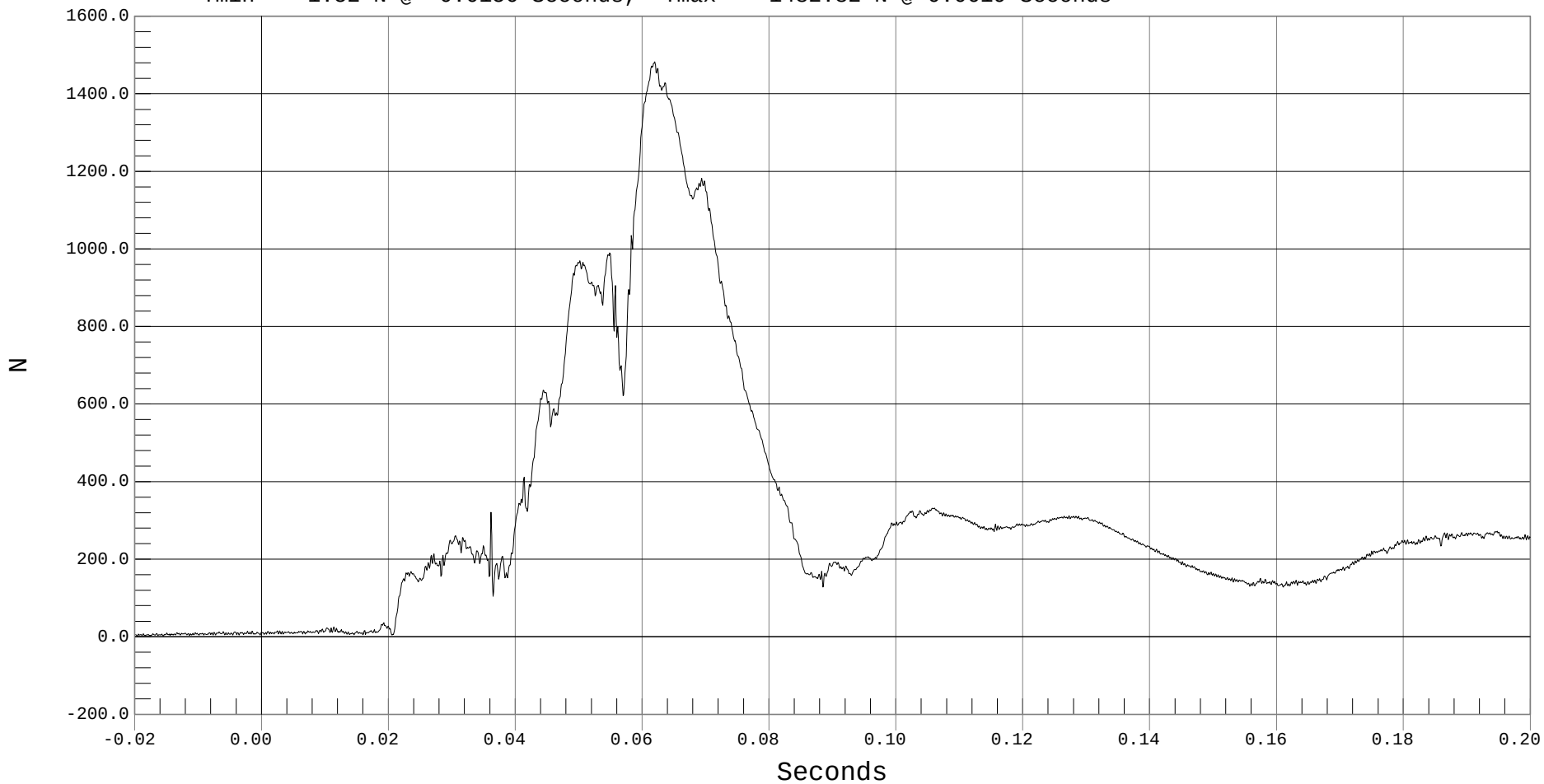
DRIVER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER NECK FORCE RESULTANT, b01013FV.F04

Ymin = 1.52 N @ -0.0156 Seconds, Ymax = 1482.82 N @ 0.0619 Seconds





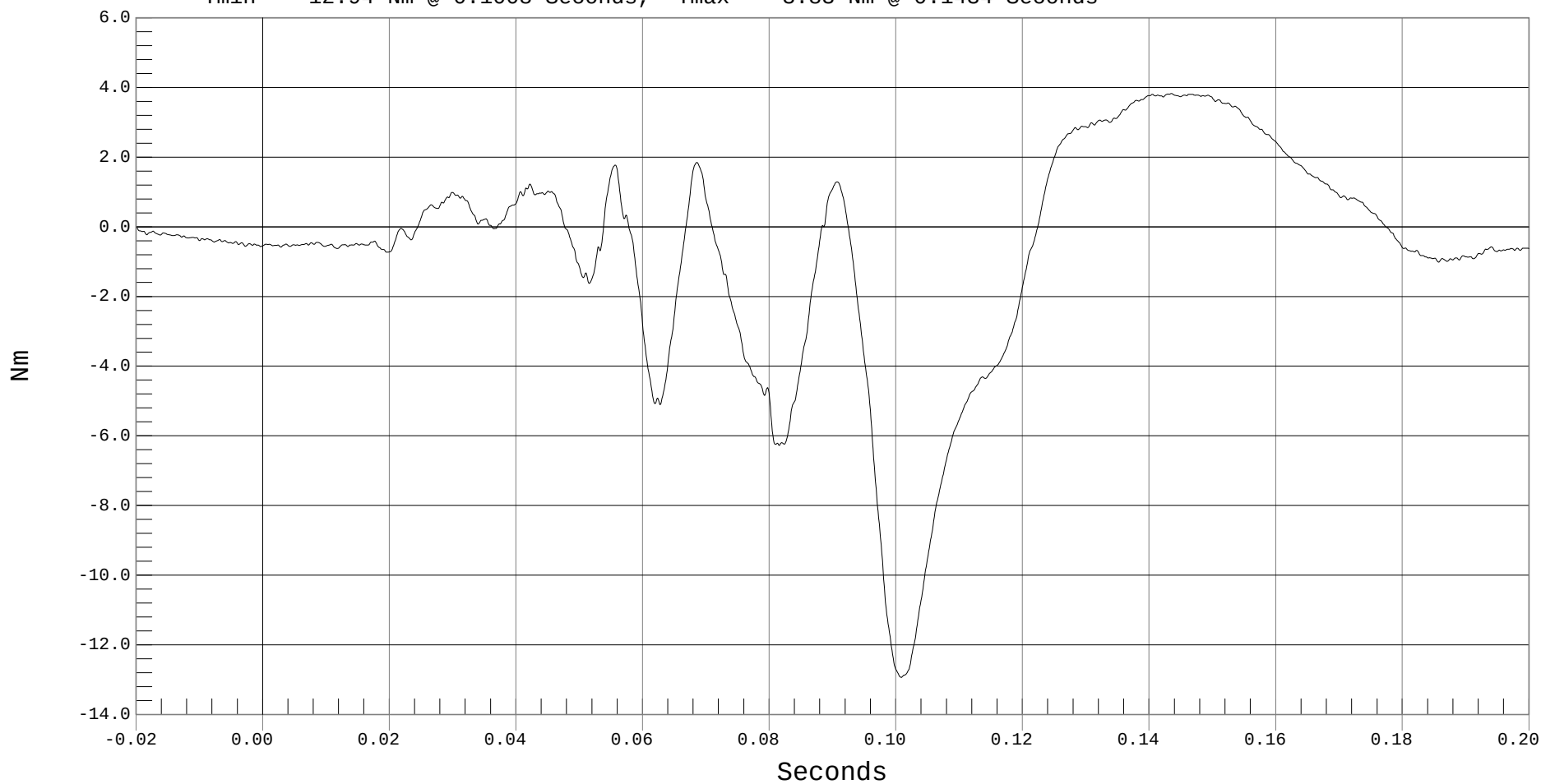
DRIVER NECK MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER NECK MX, b01013MF.M07

Ymin = -12.94 Nm @ 0.1008 Seconds, Ymax = 3.83 Nm @ 0.1434 Seconds





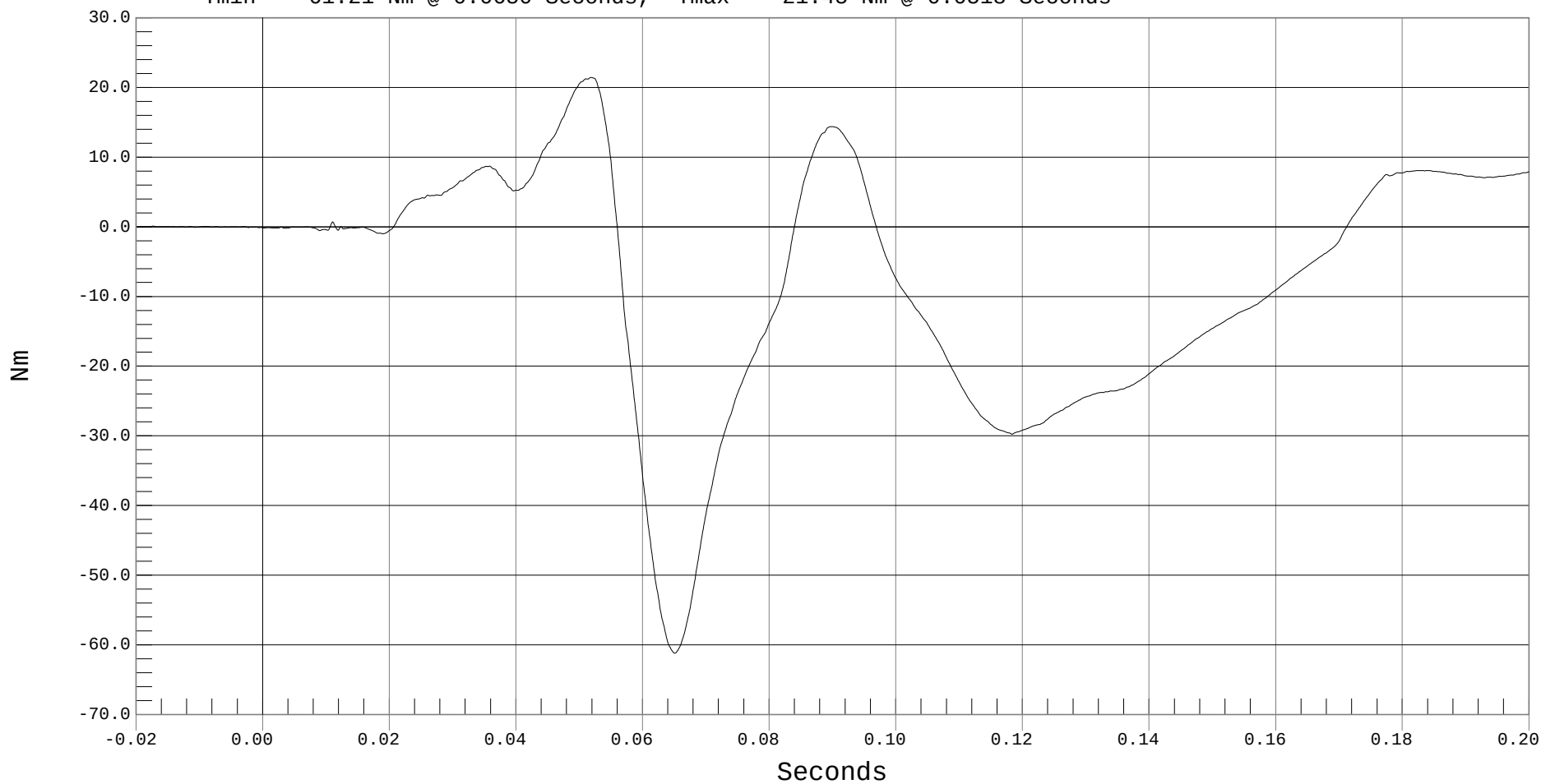
DRIVER NECK MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER NECK MY, b01013MF.M31

Ymin = -61.21 Nm @ 0.0650 Seconds, Ymax = 21.45 Nm @ 0.0518 Seconds





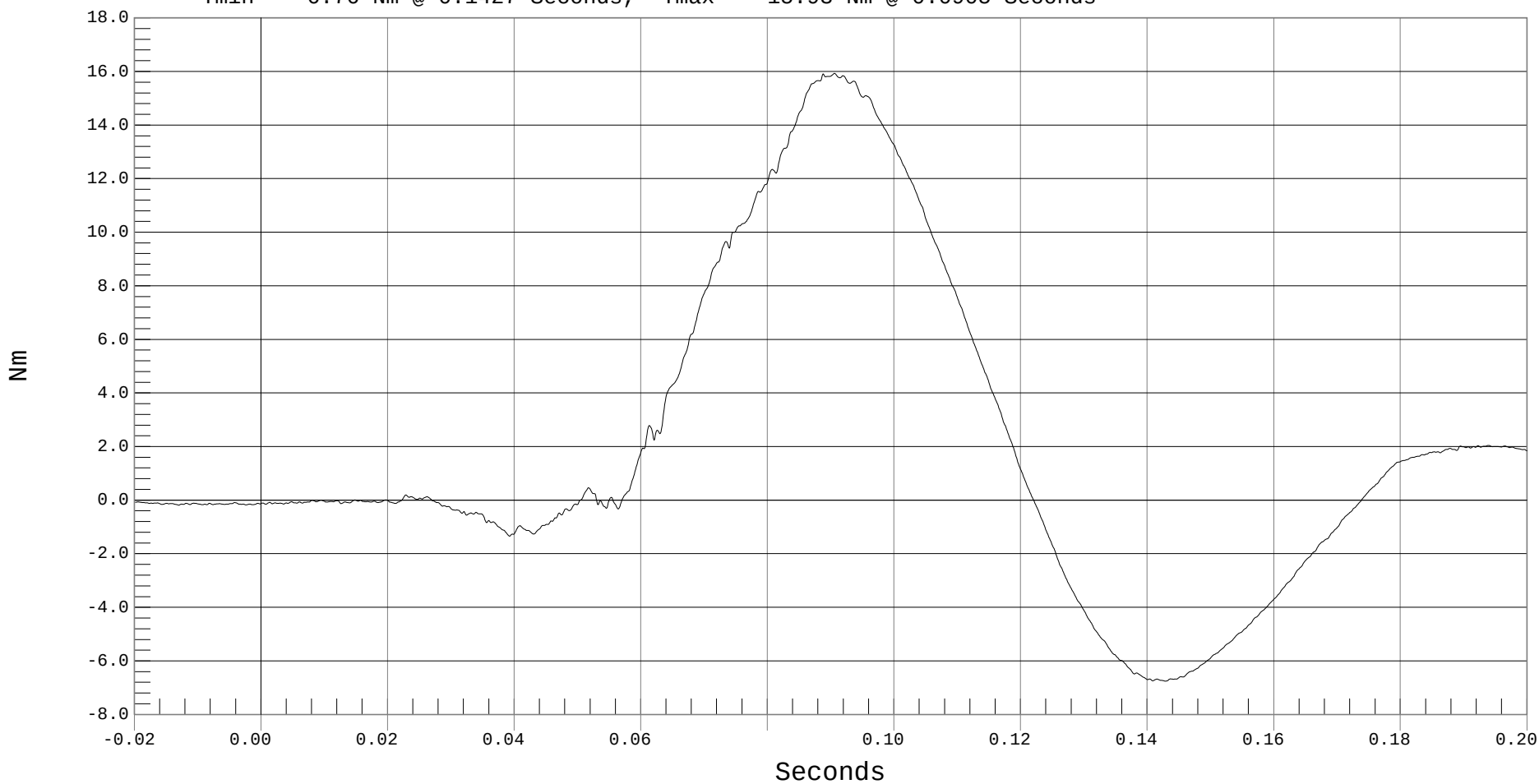
DRIVER NECK MOMENT Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER NECK MZ, b01013MF.M09

Ymin = -6.76 Nm @ 0.1427 Seconds, Ymax = 15.93 Nm @ 0.0905 Seconds





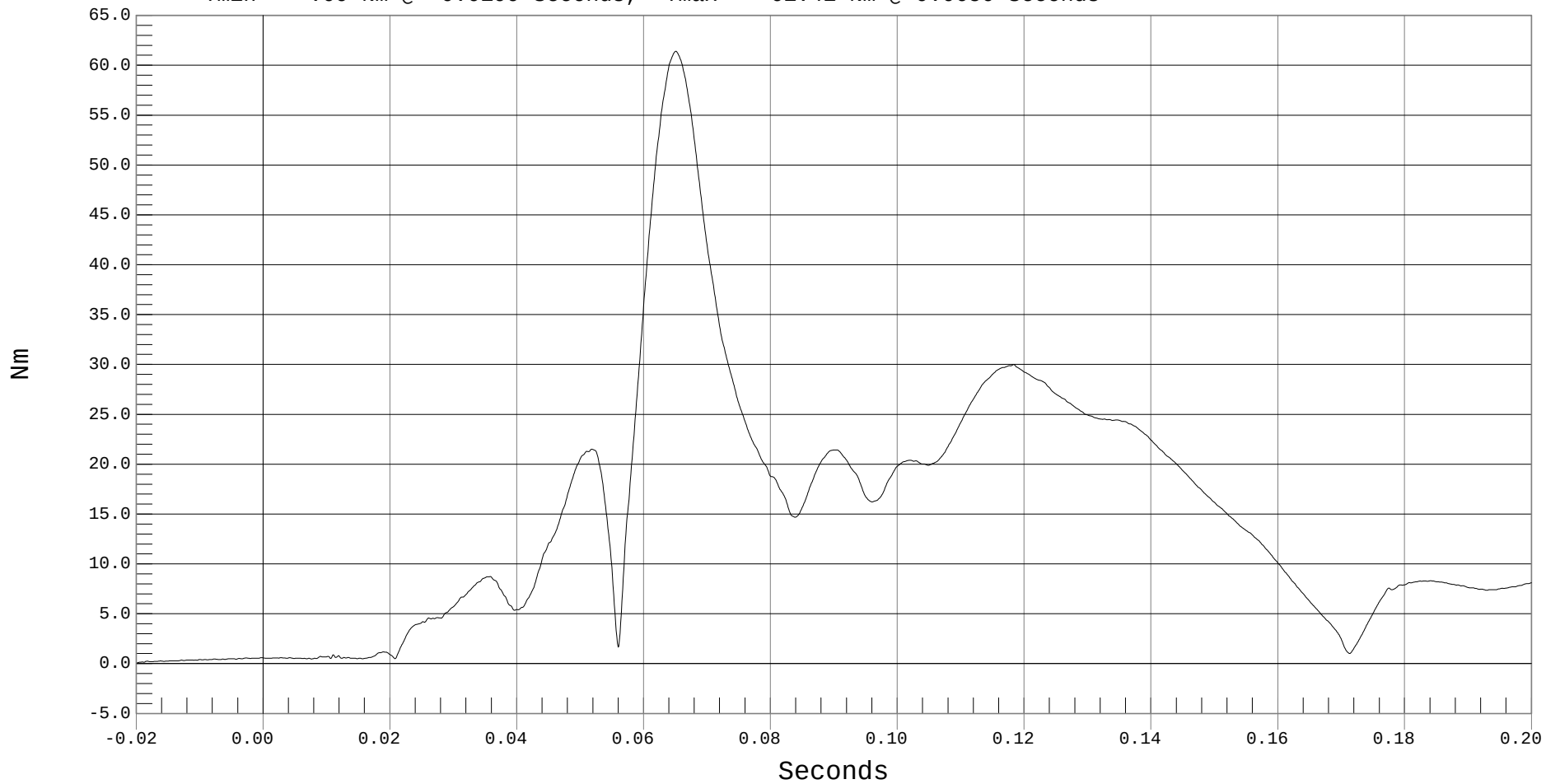
DRIVER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER NECK MOMENT RESULTANT, b01013MV.M07

Ymin = .09 Nm @ -0.0199 Seconds, Ymax = 61.41 Nm @ 0.0650 Seconds





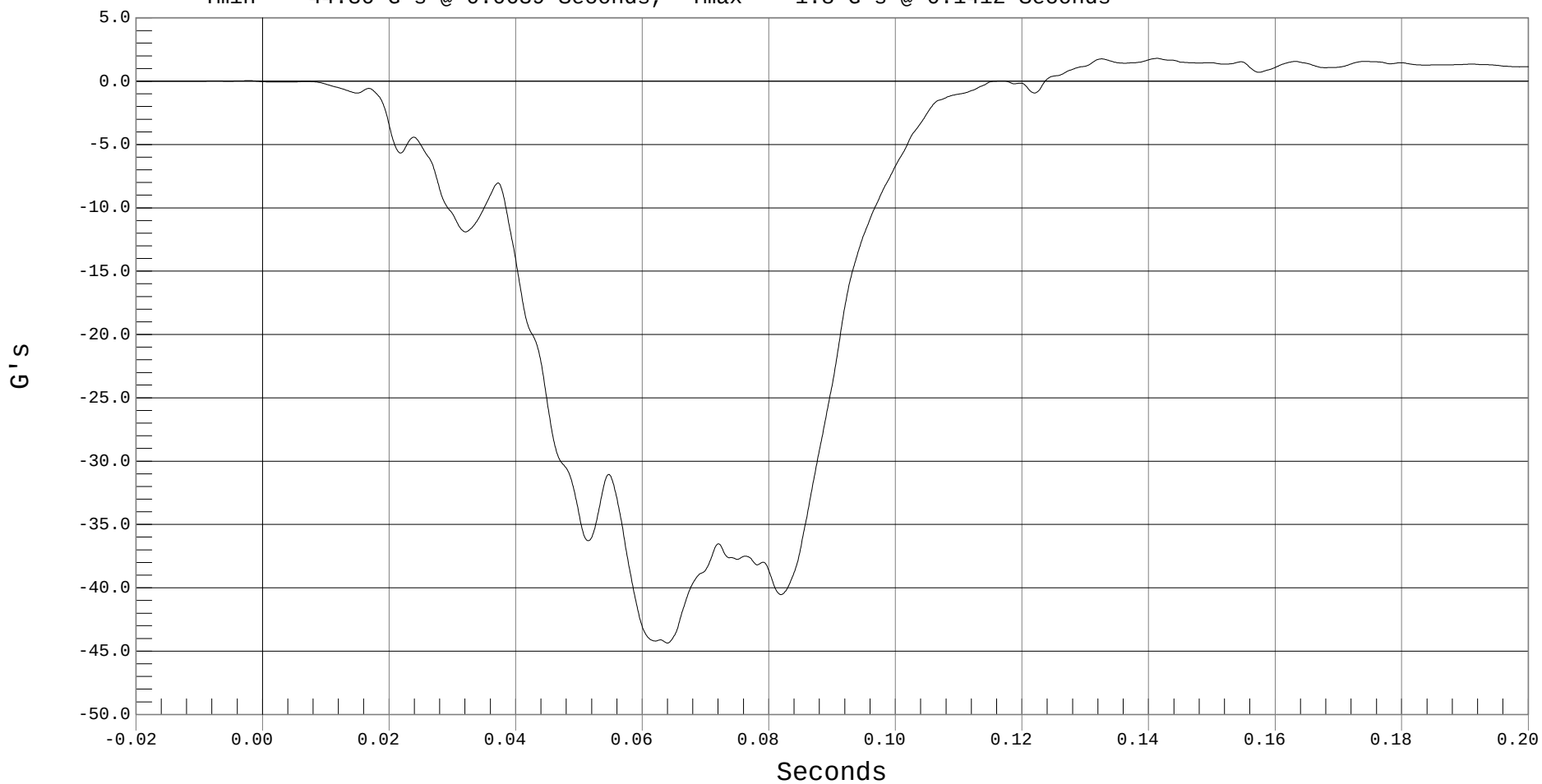
DRIVER CHEST X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST X, b01013AF.A10

Ymin = -44.36 G's @ 0.0639 Seconds, Ymax = 1.8 G's @ 0.1412 Seconds





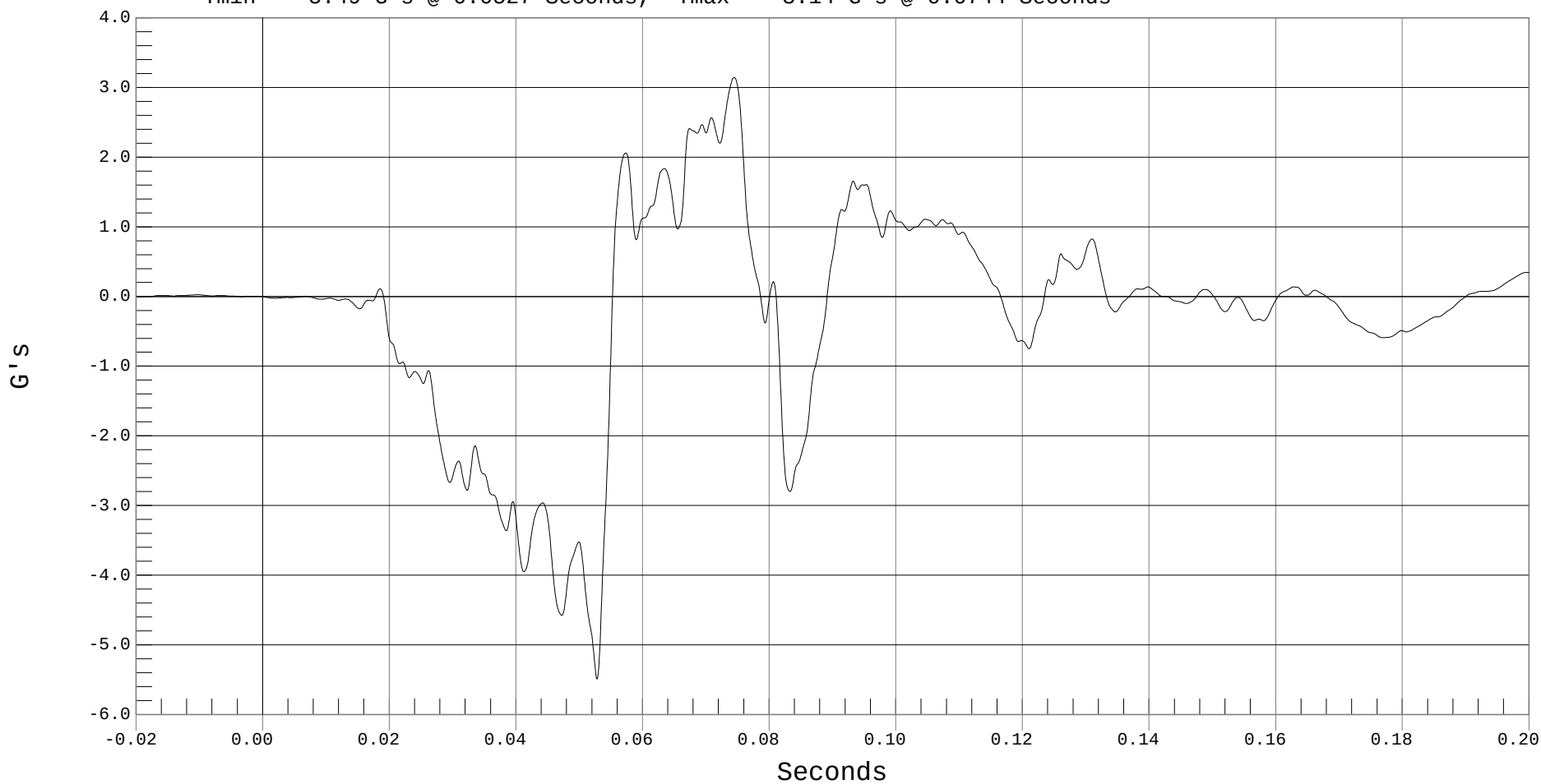
DRIVER CHEST Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST Y, b01013AF.A11

Ymin = -5.49 G's @ 0.0527 Seconds, Ymax = 3.14 G's @ 0.0744 Seconds





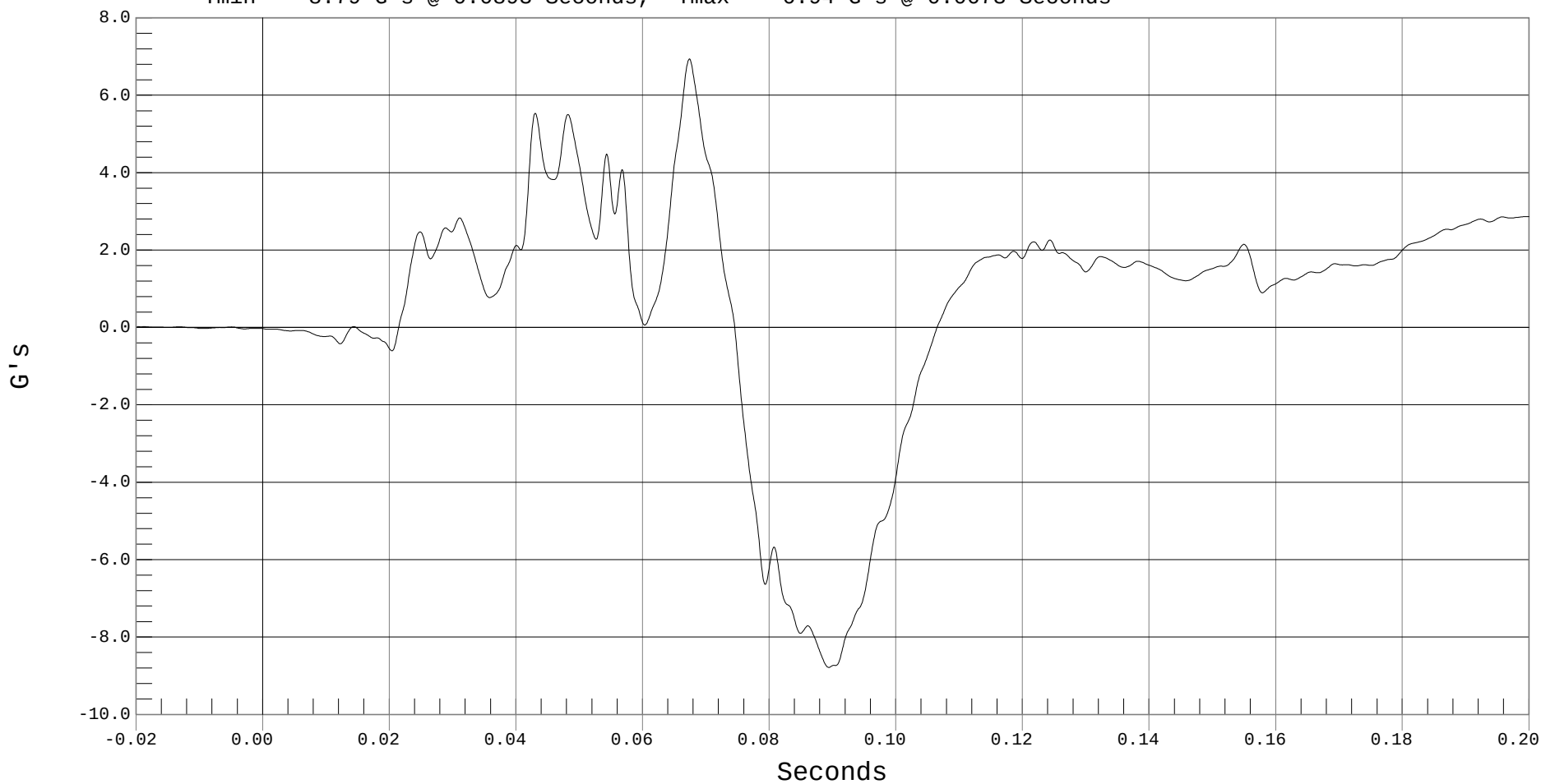
DRIVER CHEST Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST Z, b01013AF.A12

Ymin = -8.79 G's @ 0.0893 Seconds, Ymax = 6.94 G's @ 0.0673 Seconds



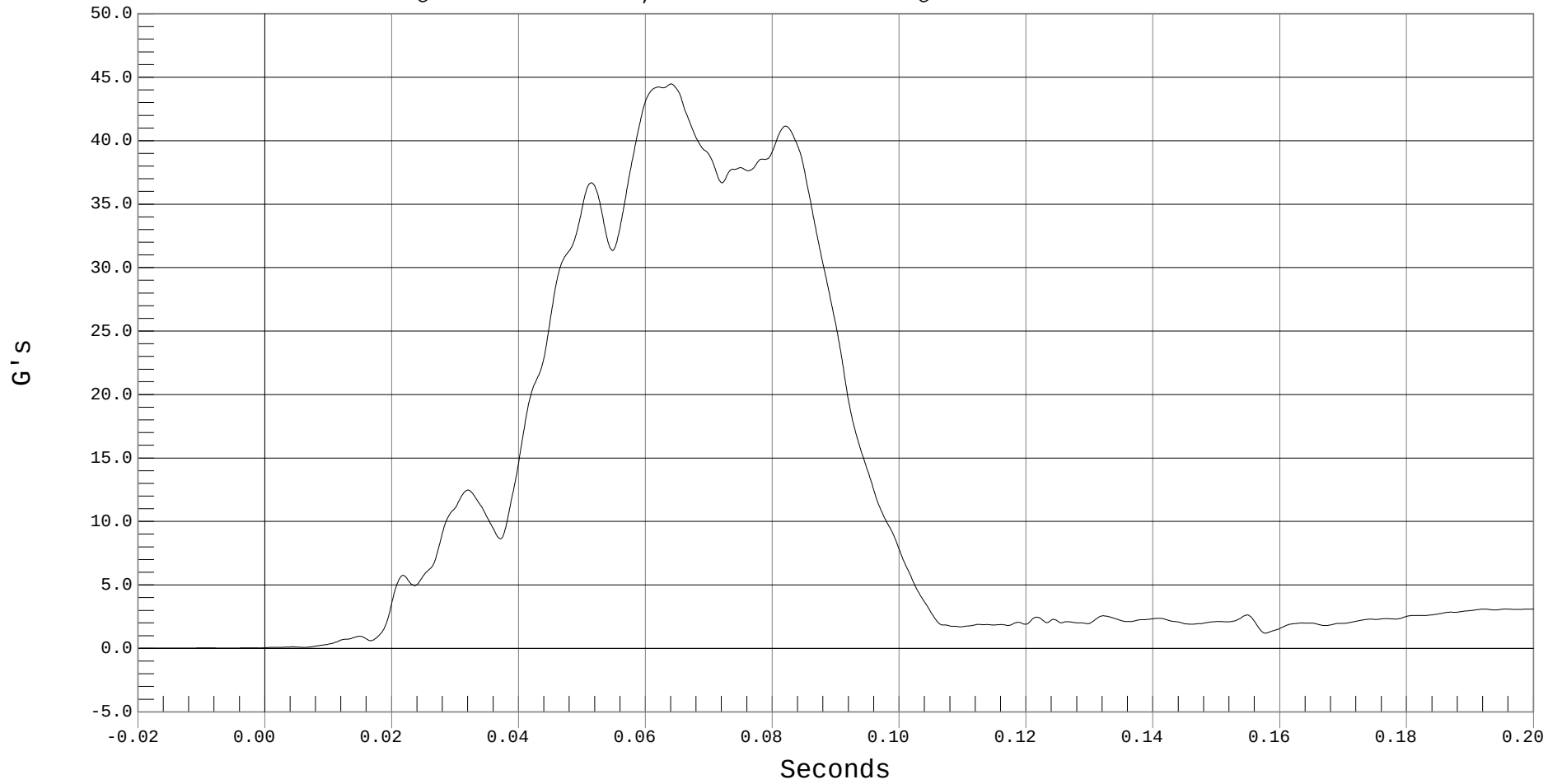


Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST RESULTANT ACCELERATION, b01013AV.A10

Ymin = .01 G's @ -0.0175 Seconds, Ymax = 44.47 G's @ 0.0640 Seconds





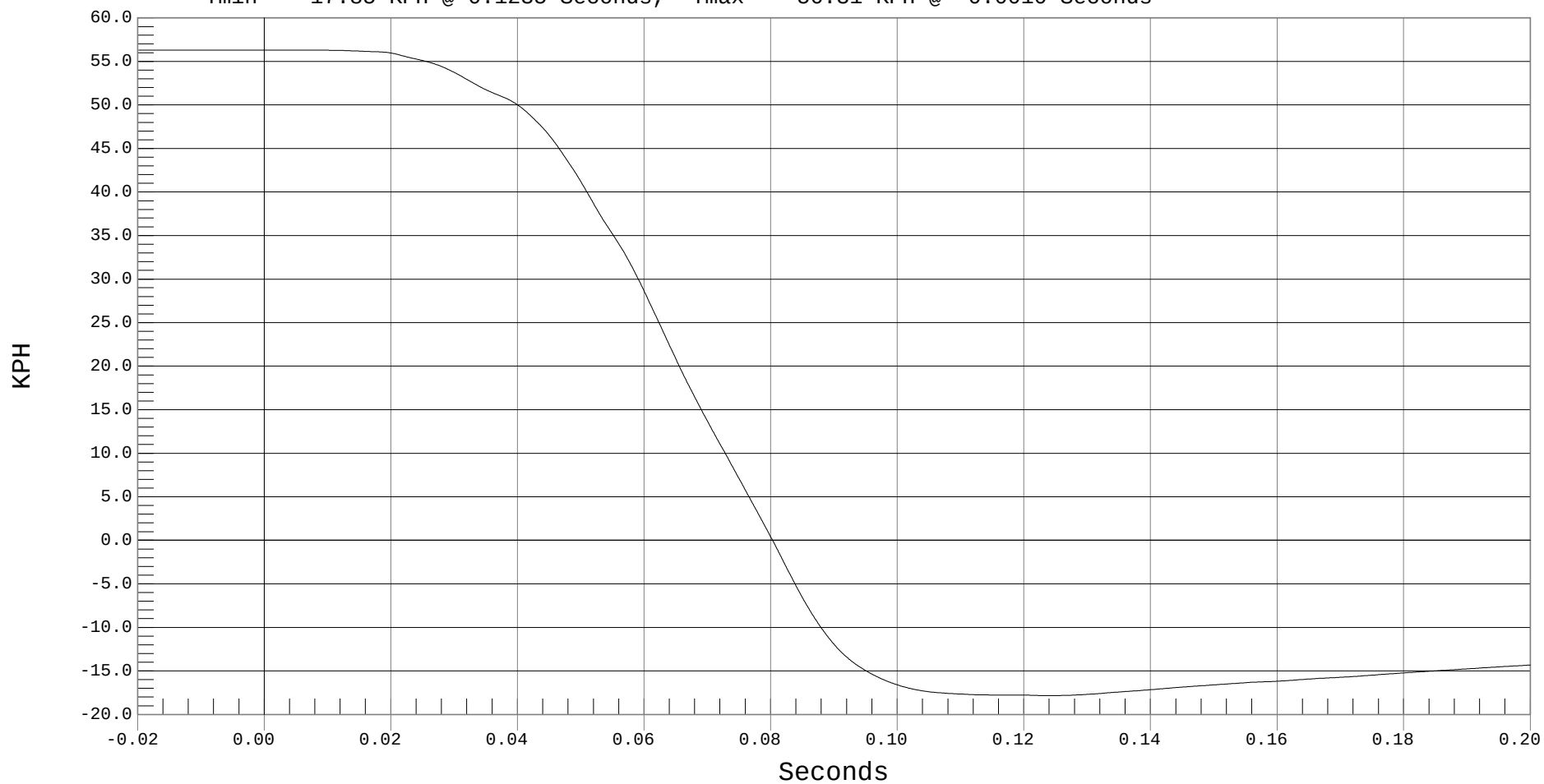
DRIVER CHEST X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST X VELOCITY, b01013AI.V10

Ymin = -17.85 KPH @ 0.1235 Seconds, Ymax = 56.31 KPH @ -0.0010 Seconds





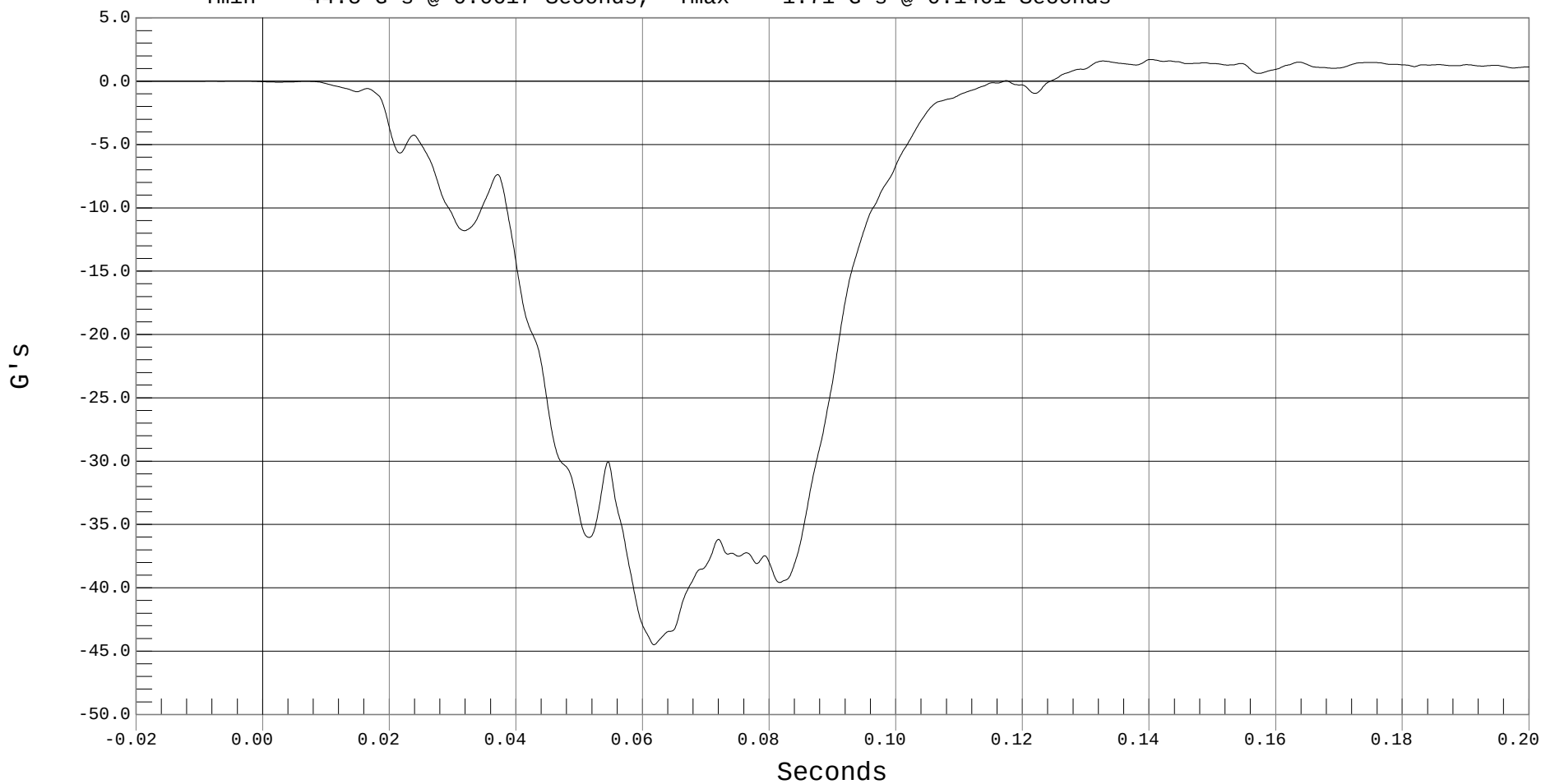
DRIVER CHEST REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST Xr, b01013AF.A36

Ymin = -44.5 G's @ 0.0617 Seconds, Ymax = 1.71 G's @ 0.1401 Seconds





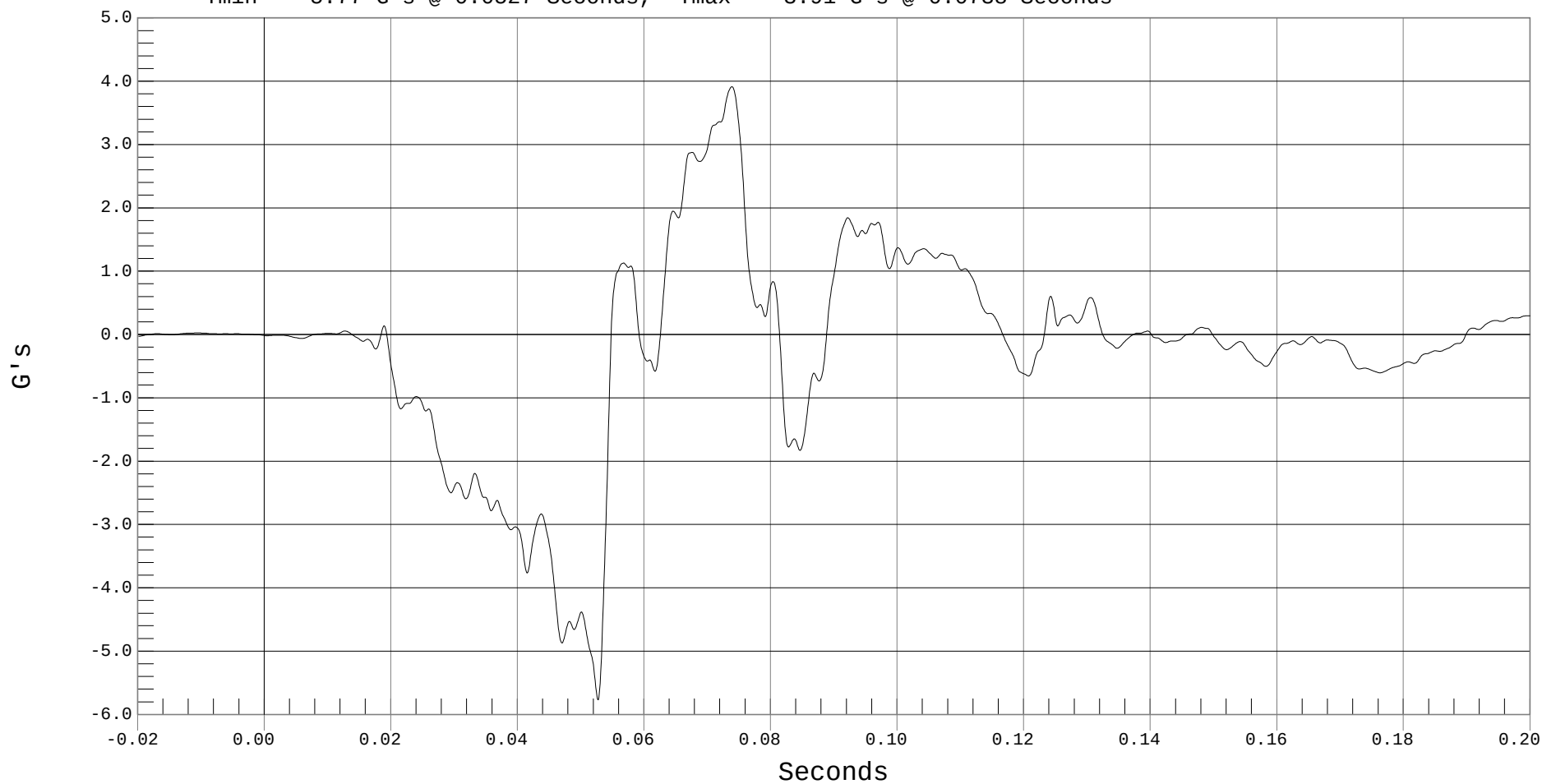
DRIVER CHEST REDUNDANT Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST Yr, b01013AF.A37

Ymin = -5.77 G's @ 0.0527 Seconds, Ymax = 3.91 G's @ 0.0738 Seconds





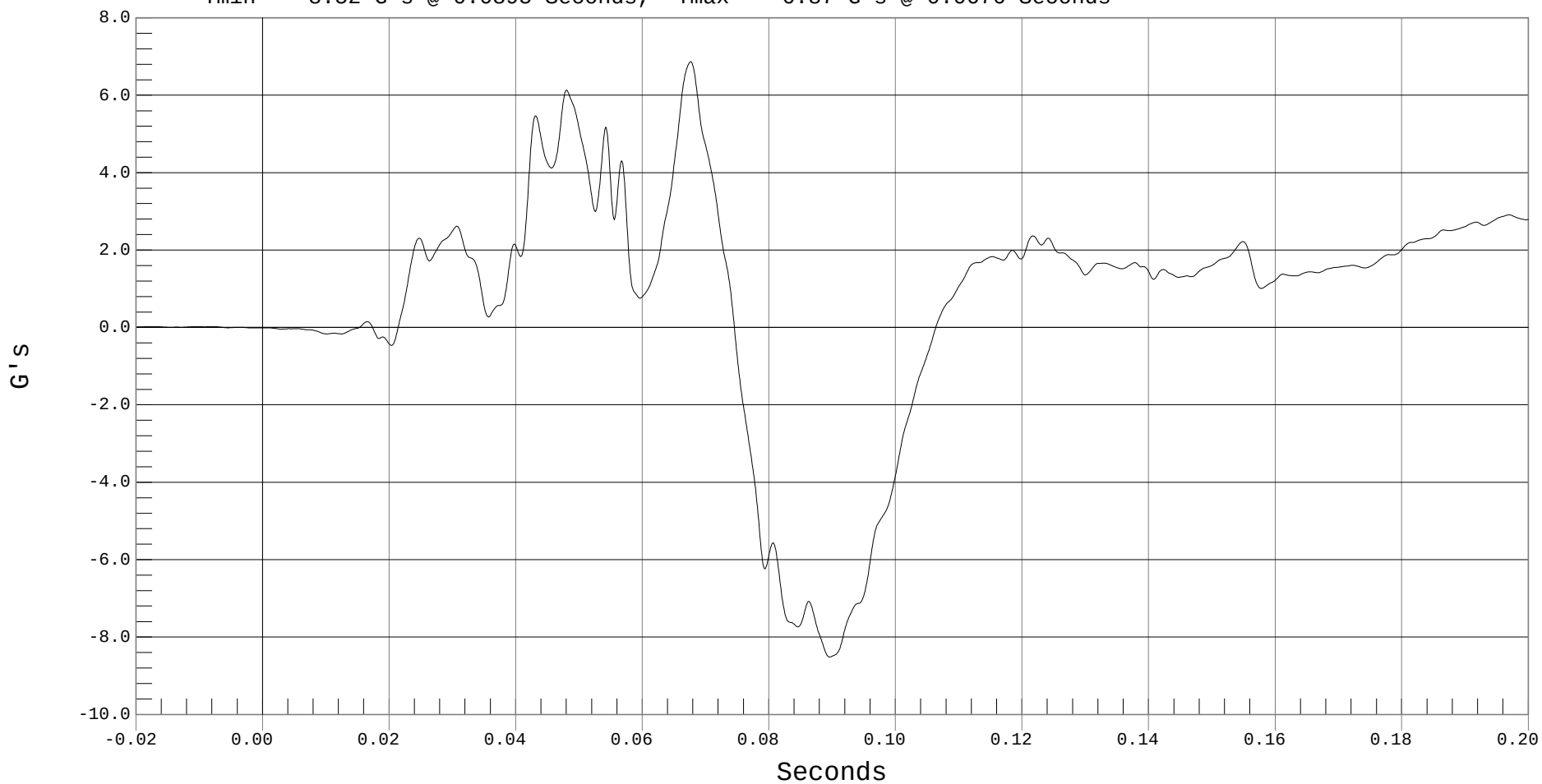
DRIVER CHEST REDUNDANT Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST Zr, b01013AF.A38

Ymin = -8.52 G's @ 0.0895 Seconds, Ymax = 6.87 G's @ 0.0676 Seconds





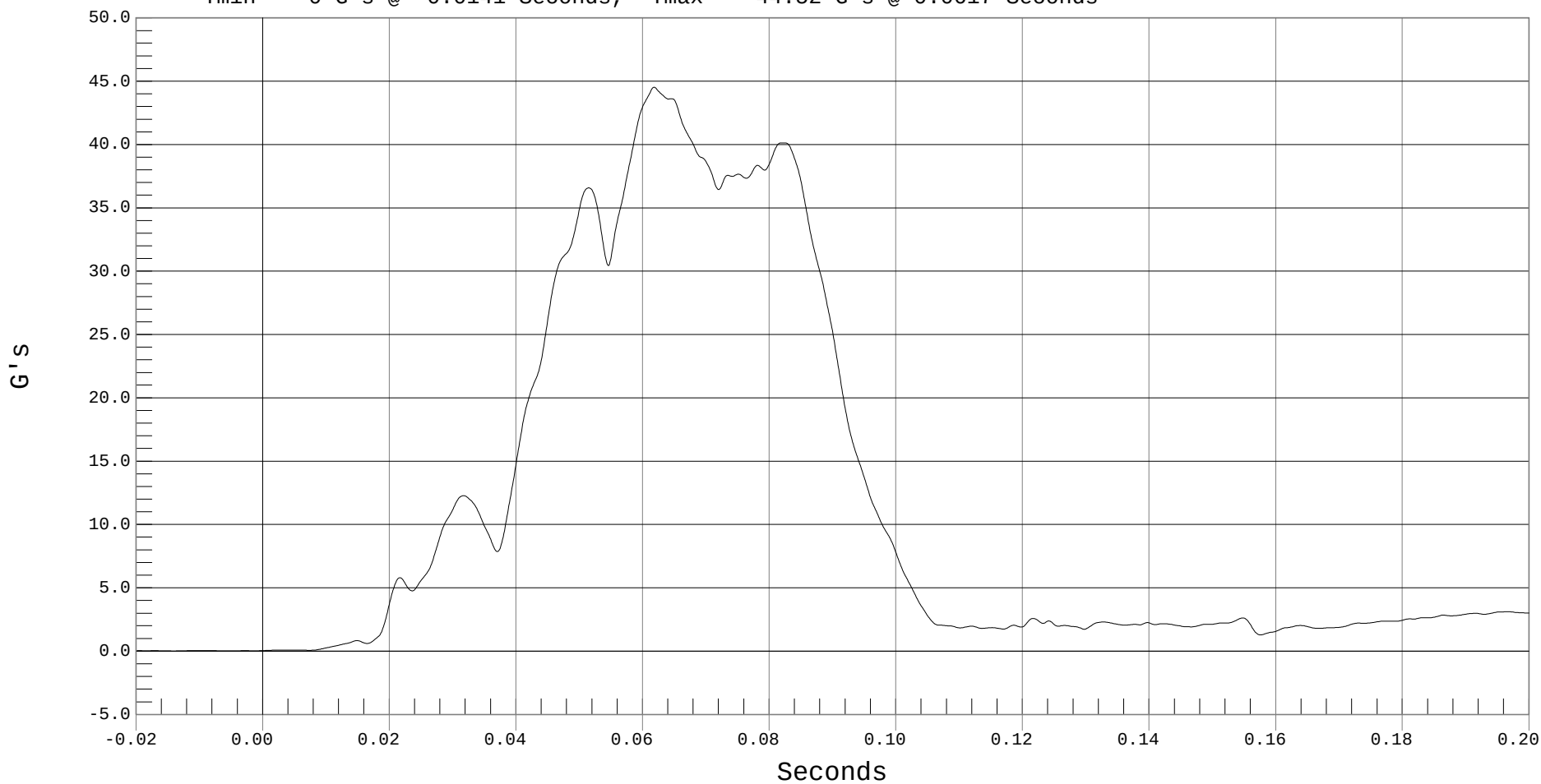
DRIVER CHEST REDUNDANT RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 DRIVER CHEST REDUNDANT RESULTANT ACCELERATION, b01013AV.A36

Ymin = 0 G's @ -0.0141 Seconds, Ymax = 44.52 G's @ 0.0617 Seconds





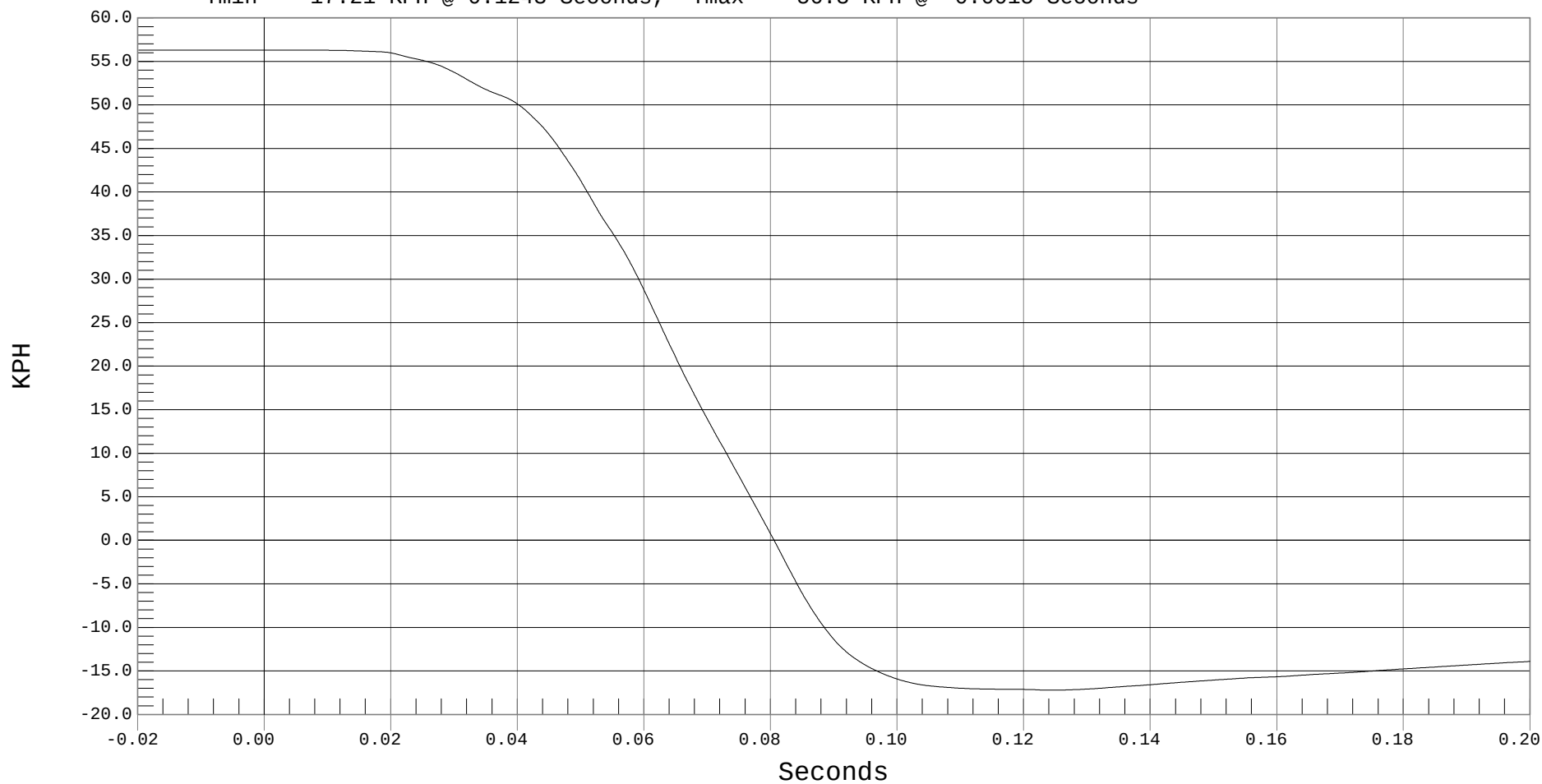
DRIVER CHEST REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER CHEST REDUNDANT X VELOCITY, b01013AI.V36

Ymin = -17.21 KPH @ 0.1243 Seconds, Ymax = 56.3 KPH @ -0.0015 Seconds





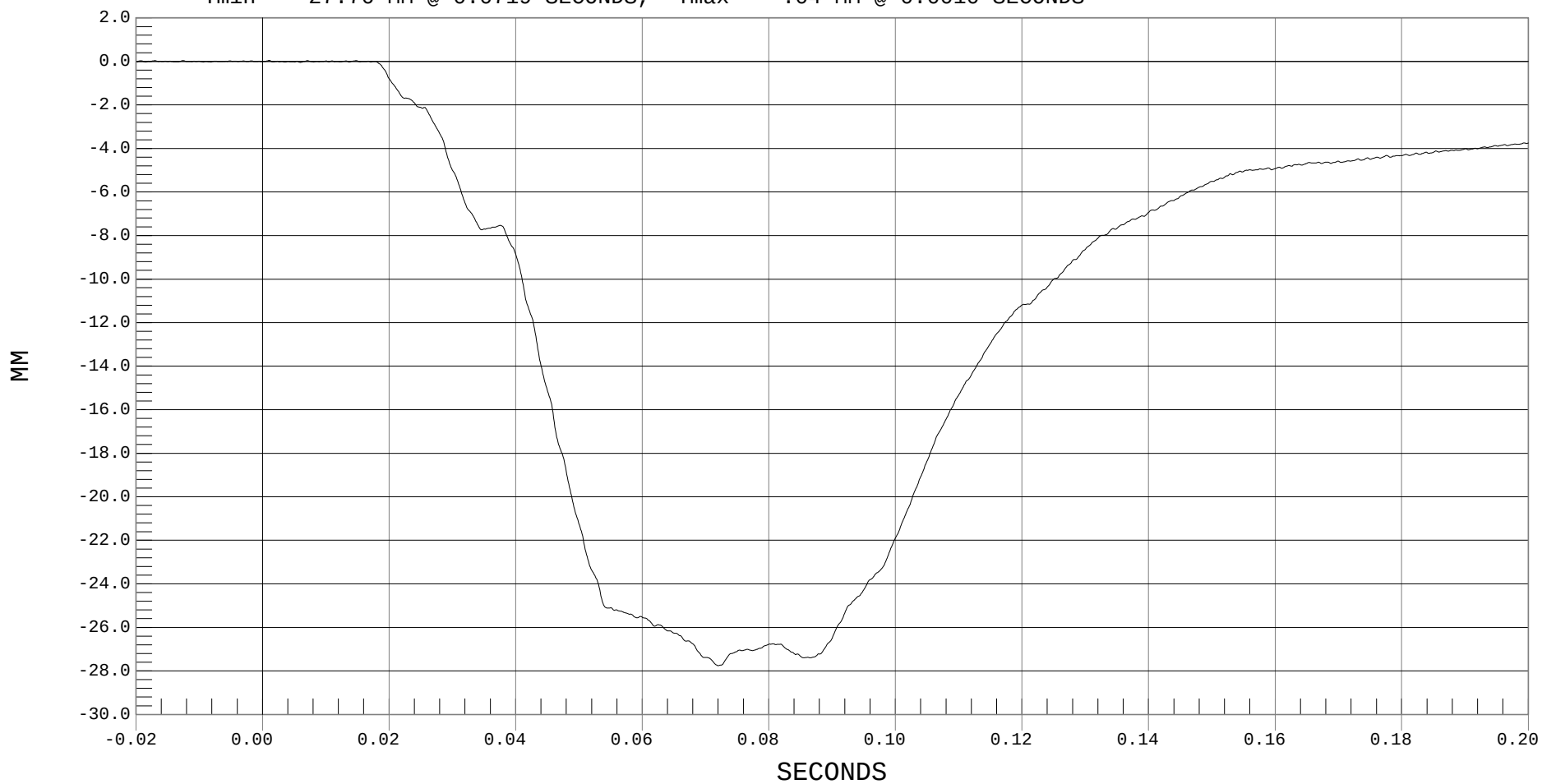
DRIVER CHEST COMPRESSION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER CHEST DISPLACEMENT, b01013DF.D13

Ymin = -27.76 MM @ 0.0719 SECONDS, Ymax = .04 MM @ 0.0010 SECONDS





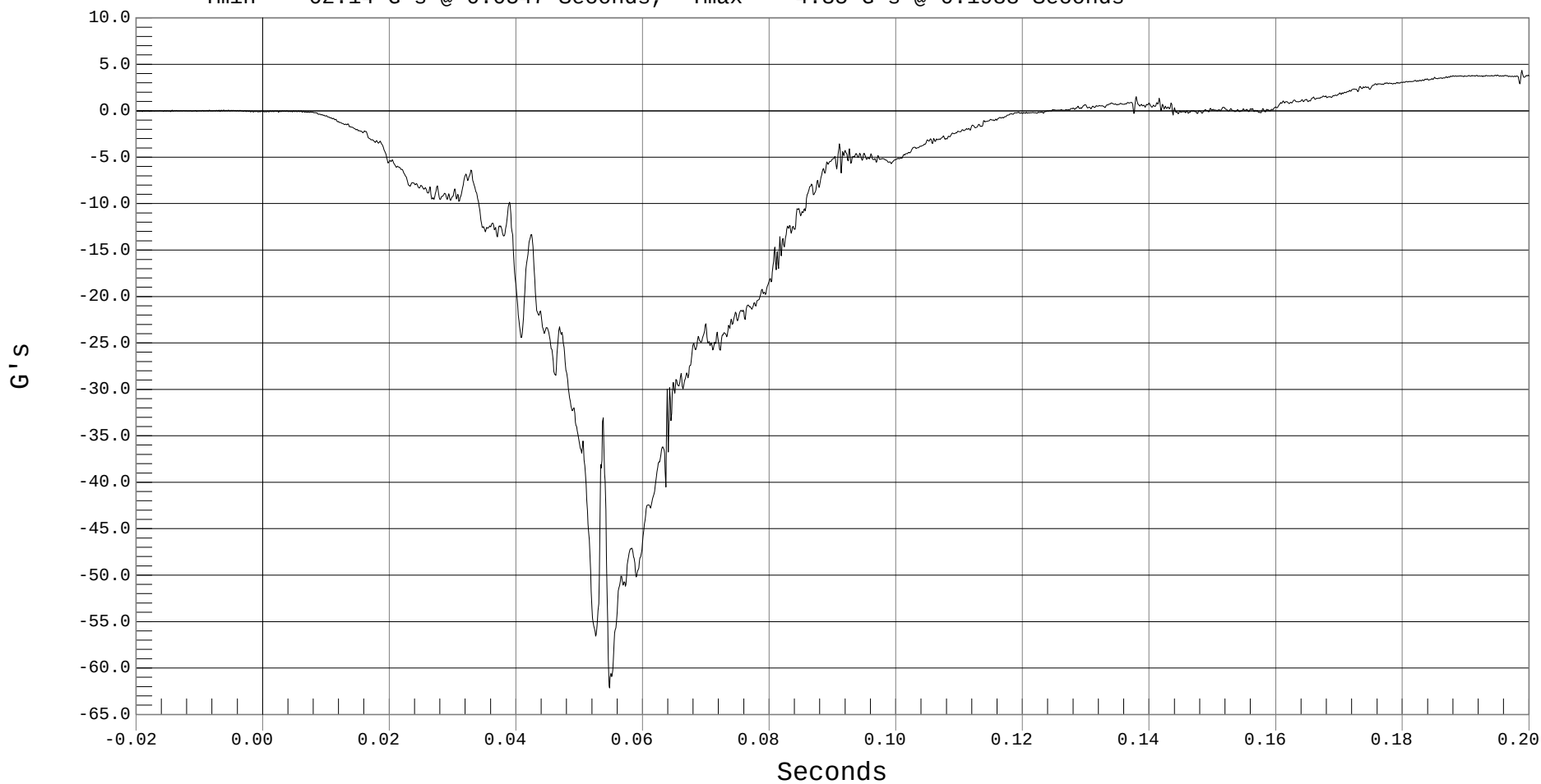
DRIVER PELVIS X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS X, b01013AT.A14

Ymin = -62.14 G's @ 0.0547 Seconds, Ymax = 4.35 G's @ 0.1988 Seconds





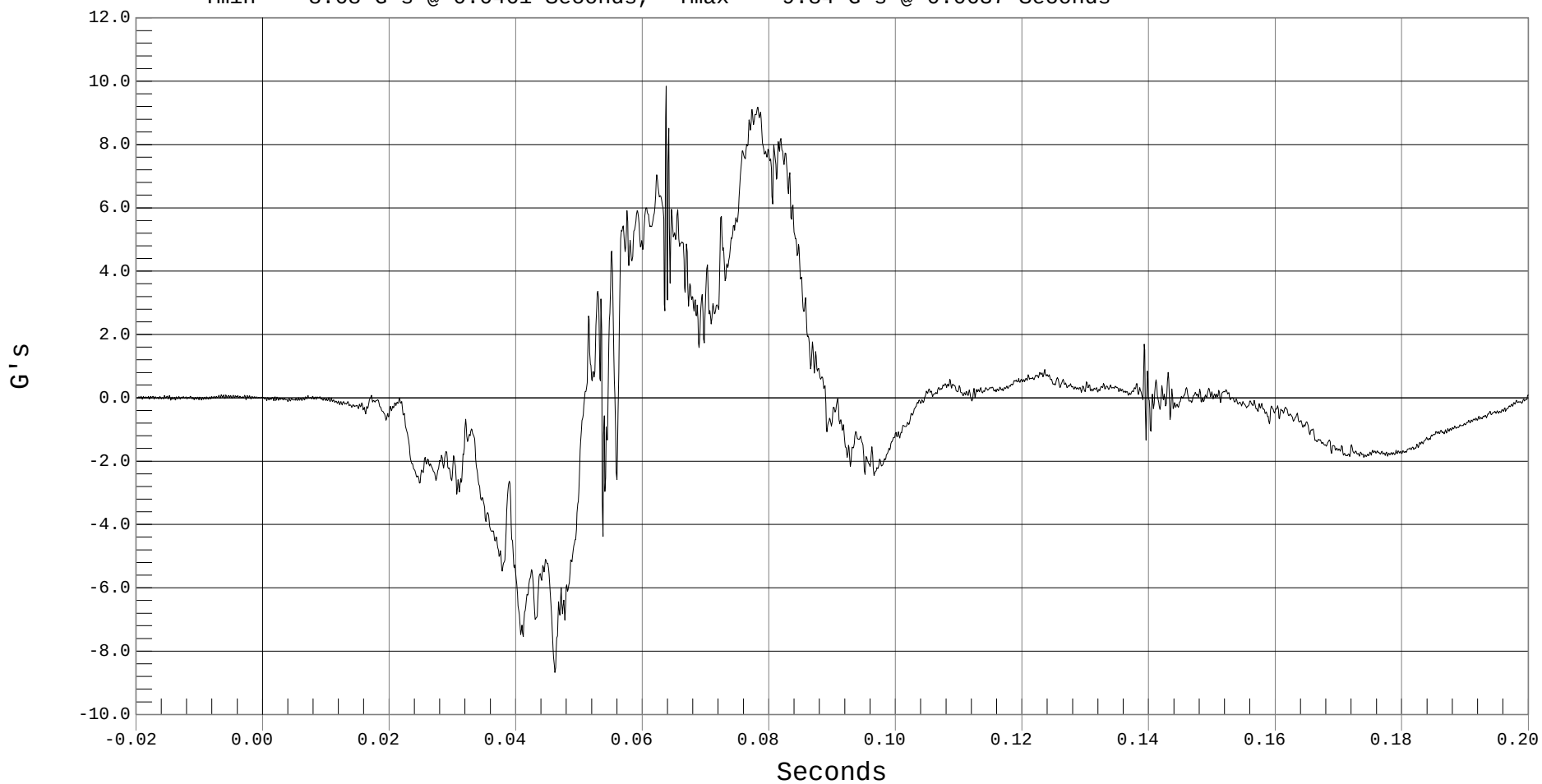
DRIVER PELVIS Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS Y, b01013AT.A15

Ymin = -8.68 G's @ 0.0461 Seconds, Ymax = 9.84 G's @ 0.0637 Seconds





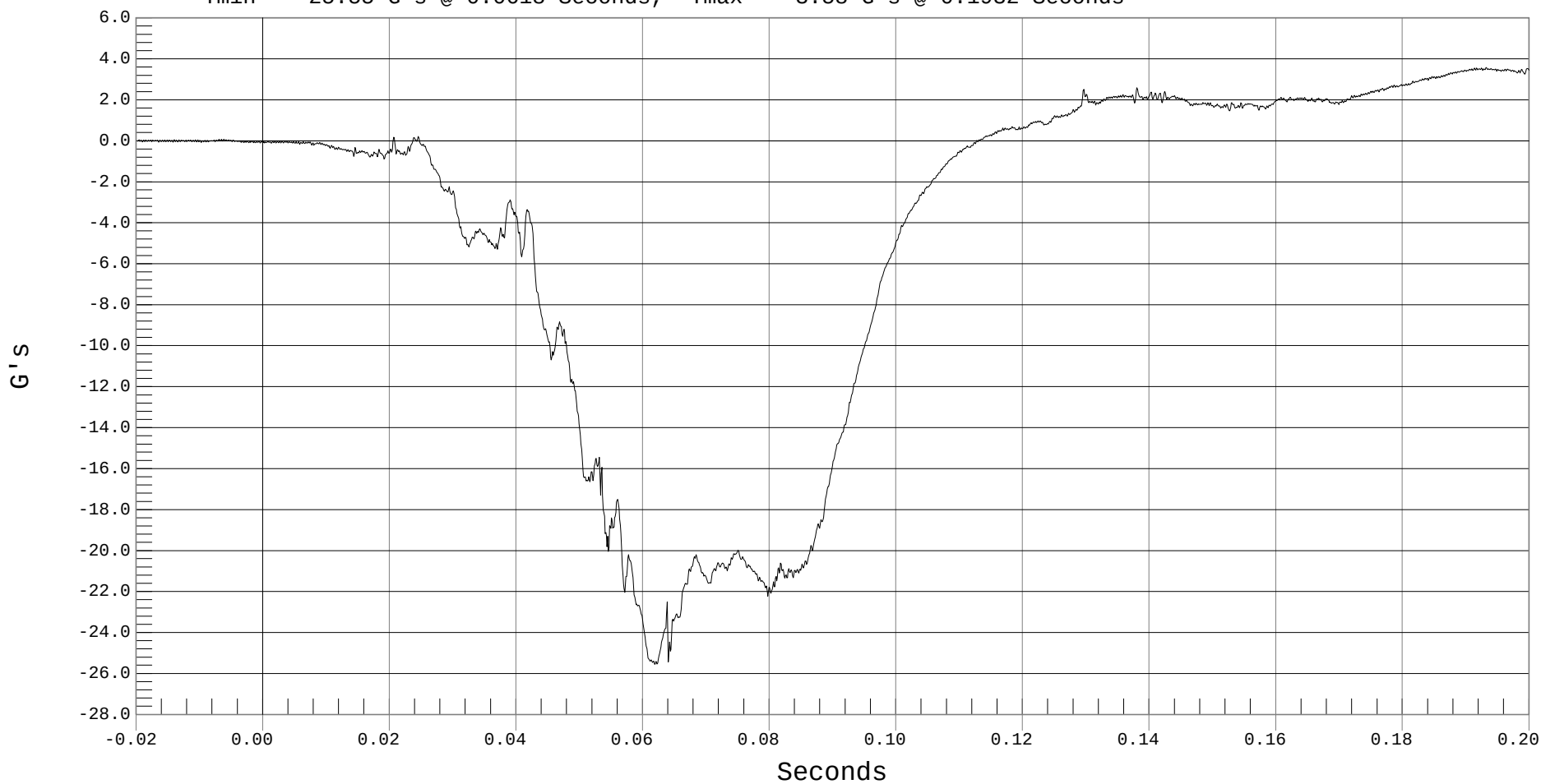
DRIVER PELVIS Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS Z, b01013AT.A16

Ymin = -25.55 G's @ 0.0618 Seconds, Ymax = 3.58 G's @ 0.1932 Seconds





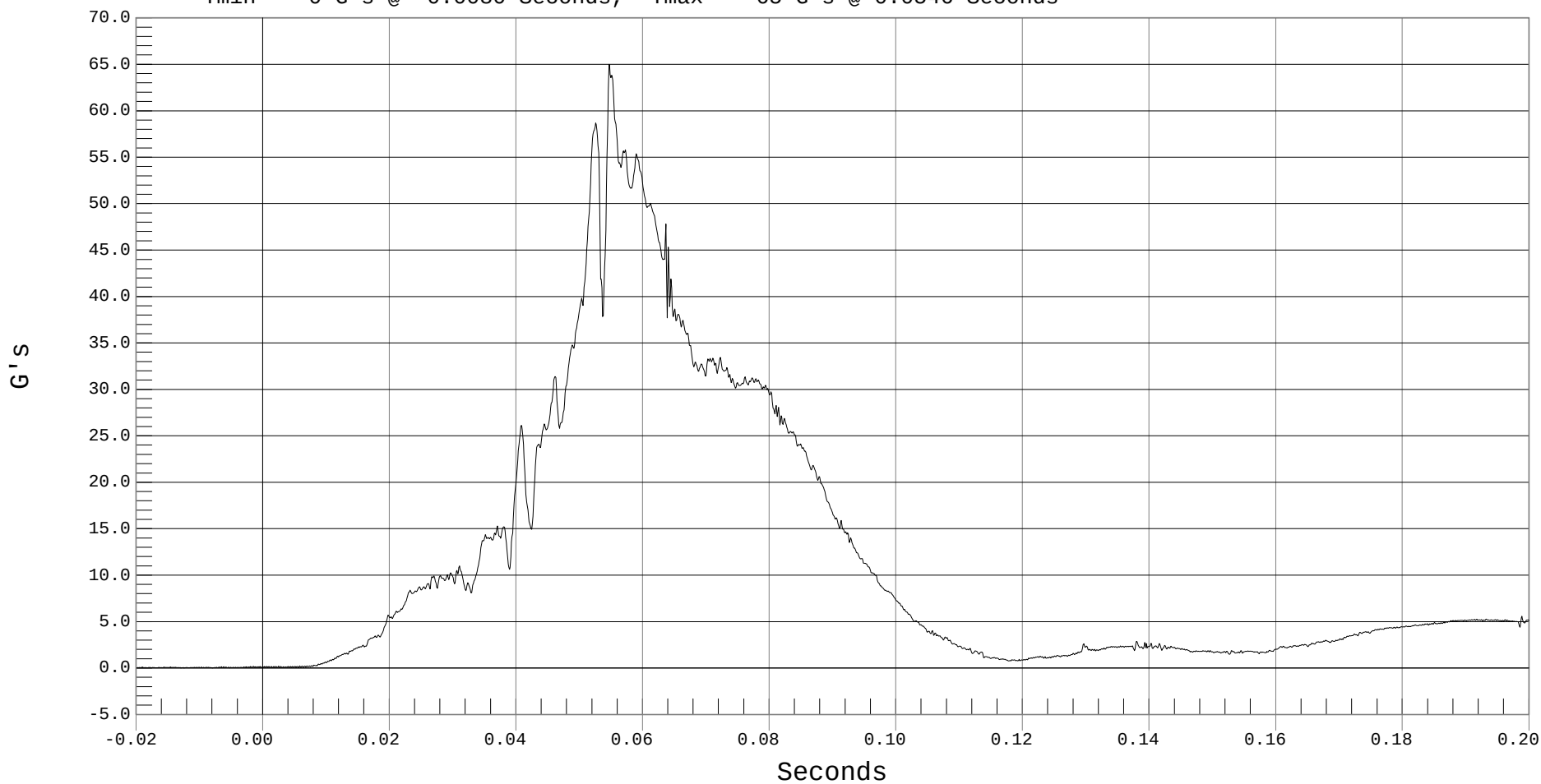
DRIVER PELVIS RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

1 DRIVER PELVIS RESULTANT ACCELERATION, b01013AV.A14

Ymin = 0 G's @ -0.0080 Seconds, Ymax = 65 G's @ 0.0546 Seconds





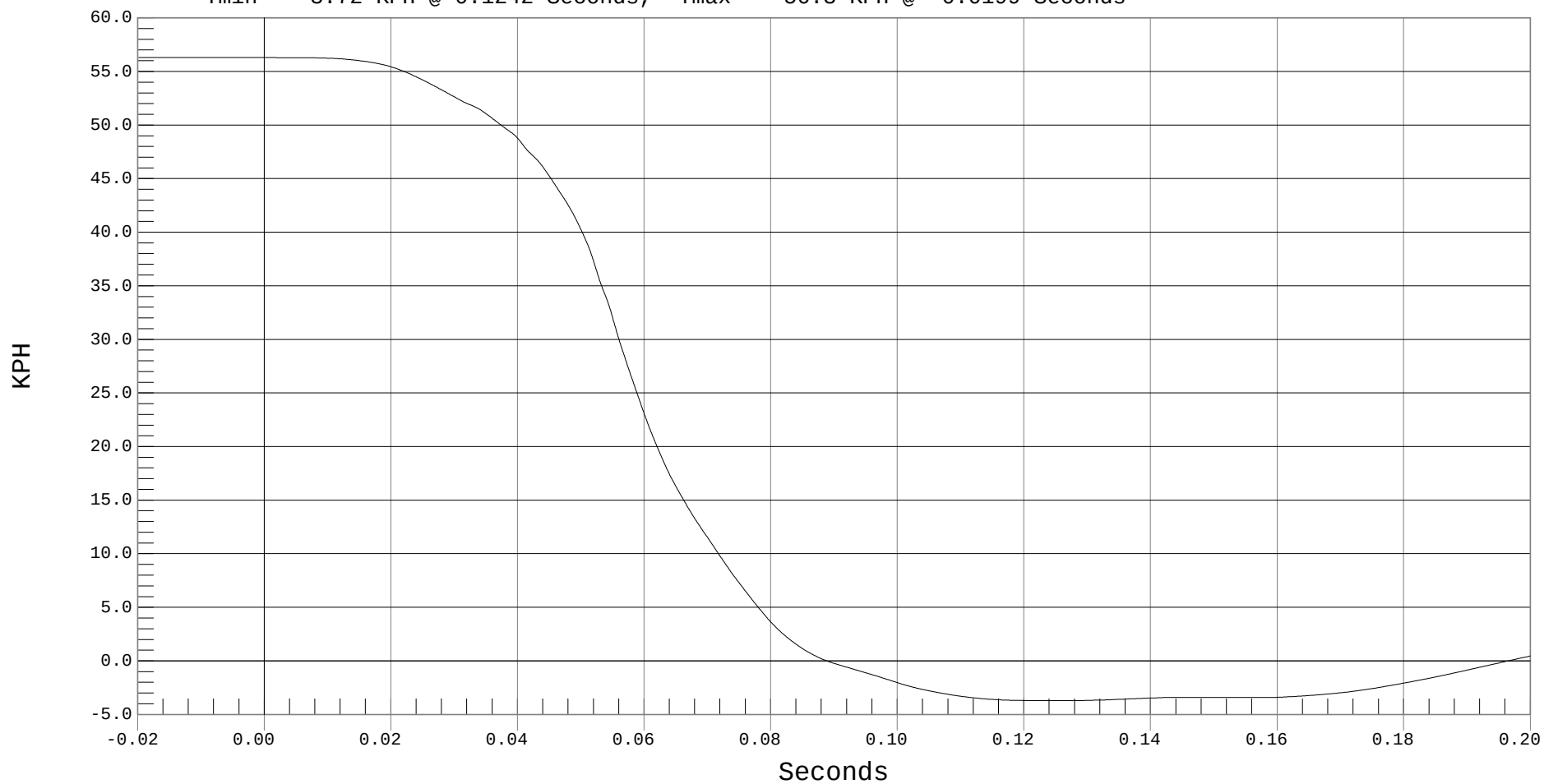
DRIVER PELVIS X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER PELVIS X VELOCITY, b01013AI.V14

Ymin = -3.72 KPH @ 0.1242 Seconds, Ymax = 56.3 KPH @ -0.0199 Seconds





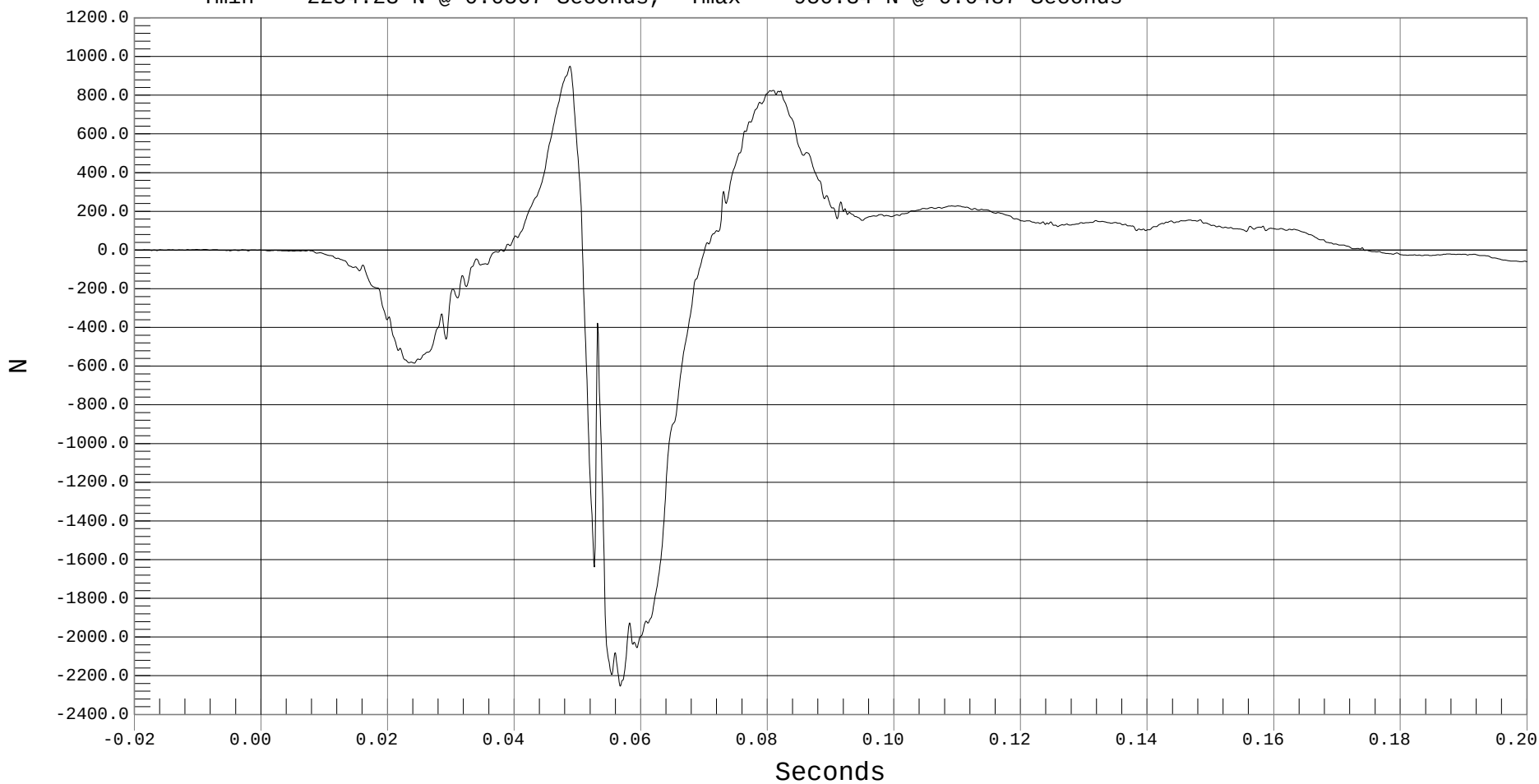
DRIVER LEFT FEMUR FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

1 DRIVER LEFT FEMUR Z, b01013FF.F18

Ymin = -2254.23 N @ 0.0567 Seconds, Ymax = 950.34 N @ 0.0487 Seconds





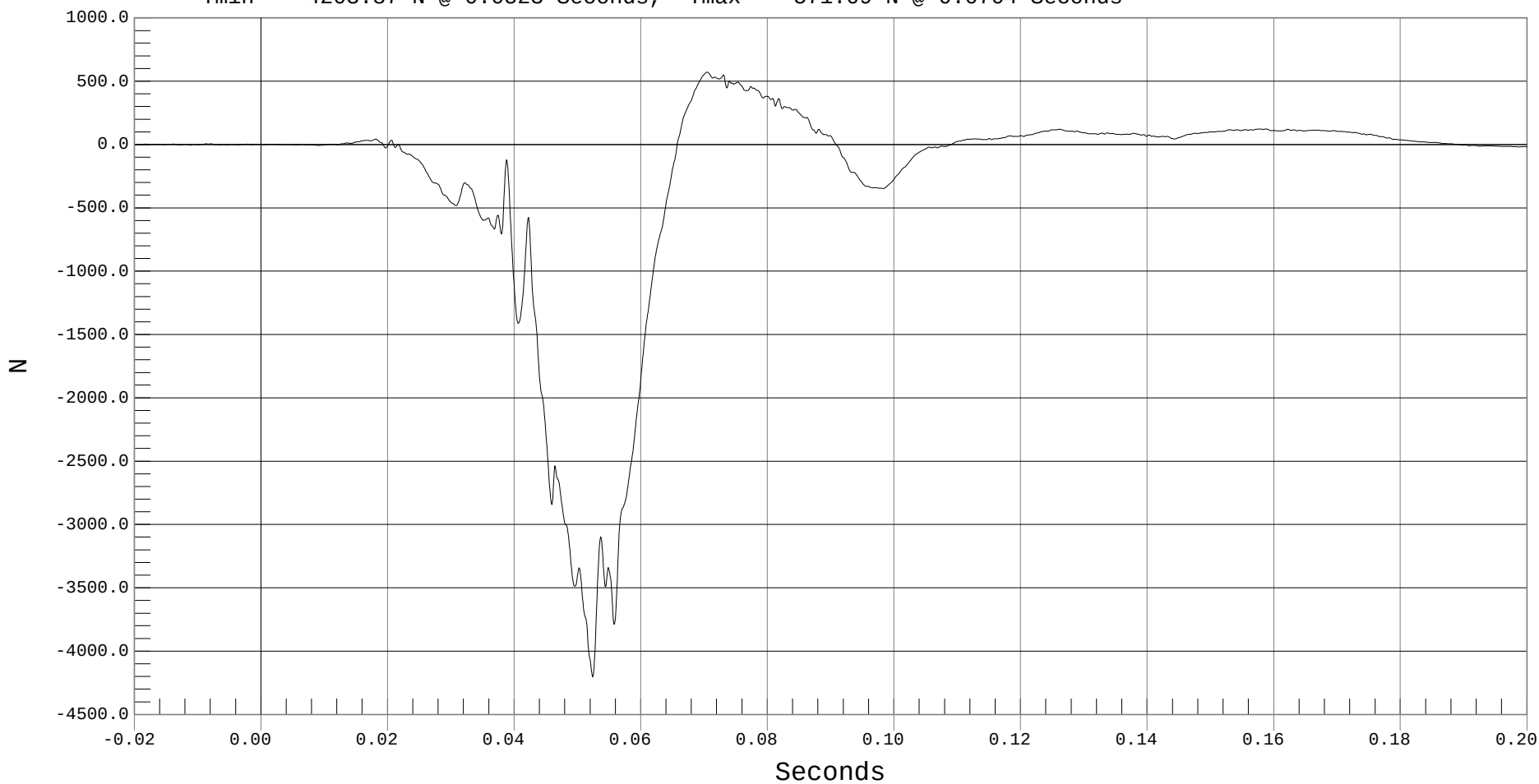
DRIVER RIGHT FEMUR FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

1 DRIVER RIGHT FEMUR Z, b01013FF.F17

Ymin = -4203.87 N @ 0.0523 Seconds, Ymax = 571.09 N @ 0.0704 Seconds



DRIVER LEFT UPPER TIBIA MOMENT X VS. TIME
NO VALID DATA COLLECTED



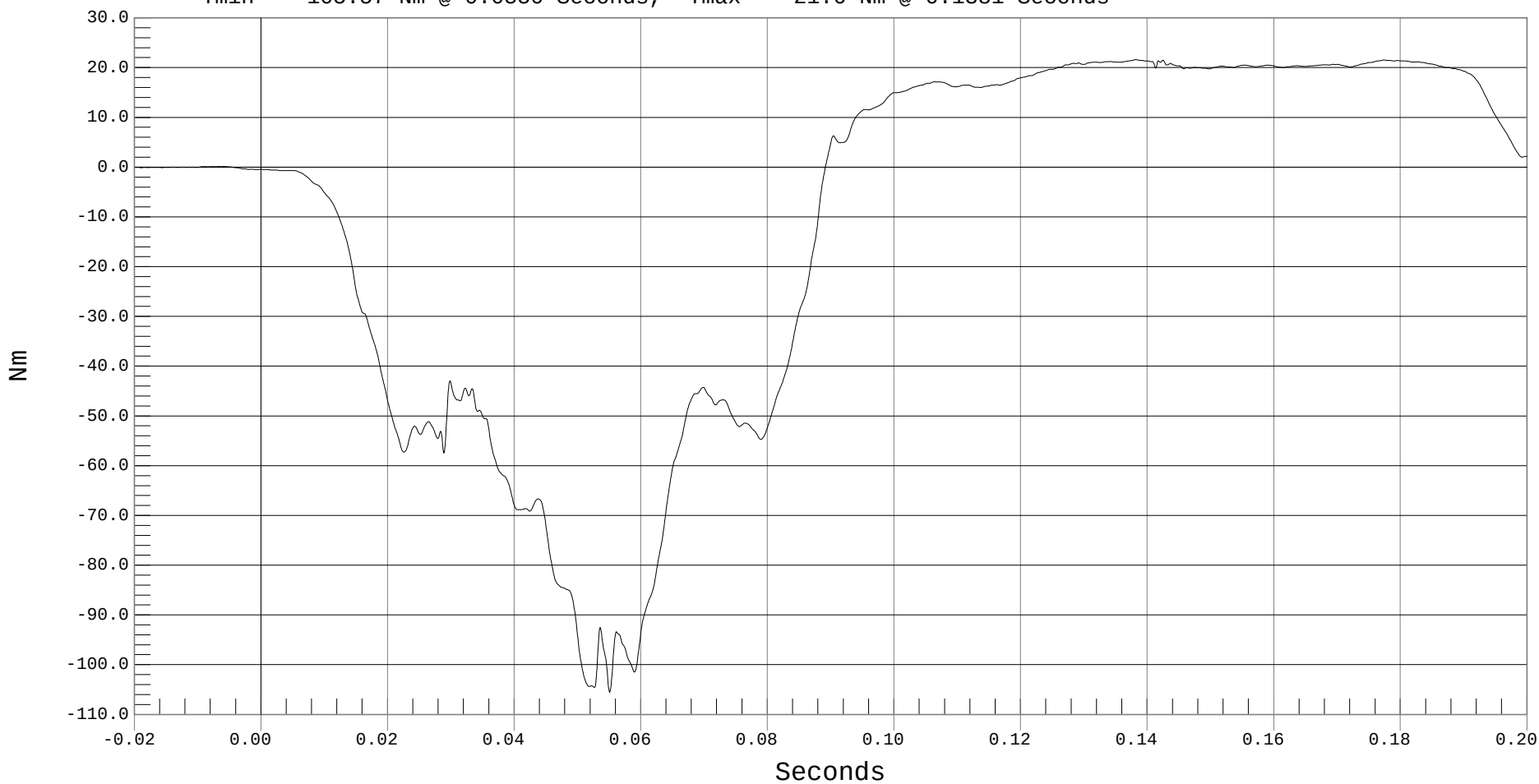
DRIVER LEFT UPPER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER LEFT UPPER TIBIA MY, b01013MF.M76

Ymin = -105.57 Nm @ 0.0550 Seconds, Ymax = 21.6 Nm @ 0.1381 Seconds





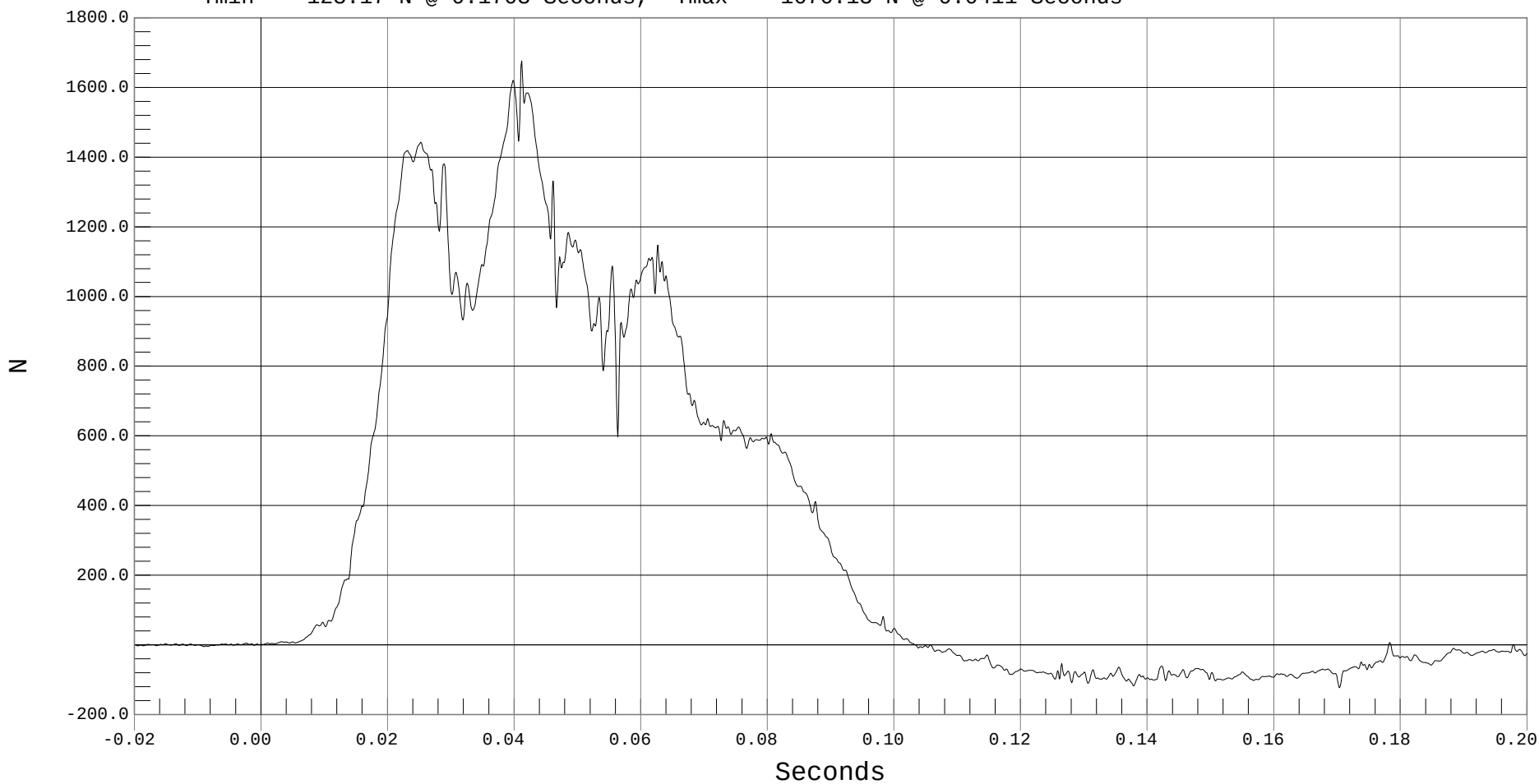
DRIVER LEFT UPPER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER LEFT UPPER TIBIA FZ, b01013FF.F77

Ymin = -123.17 N @ 0.1703 Seconds, Ymax = 1676.13 N @ 0.0411 Seconds





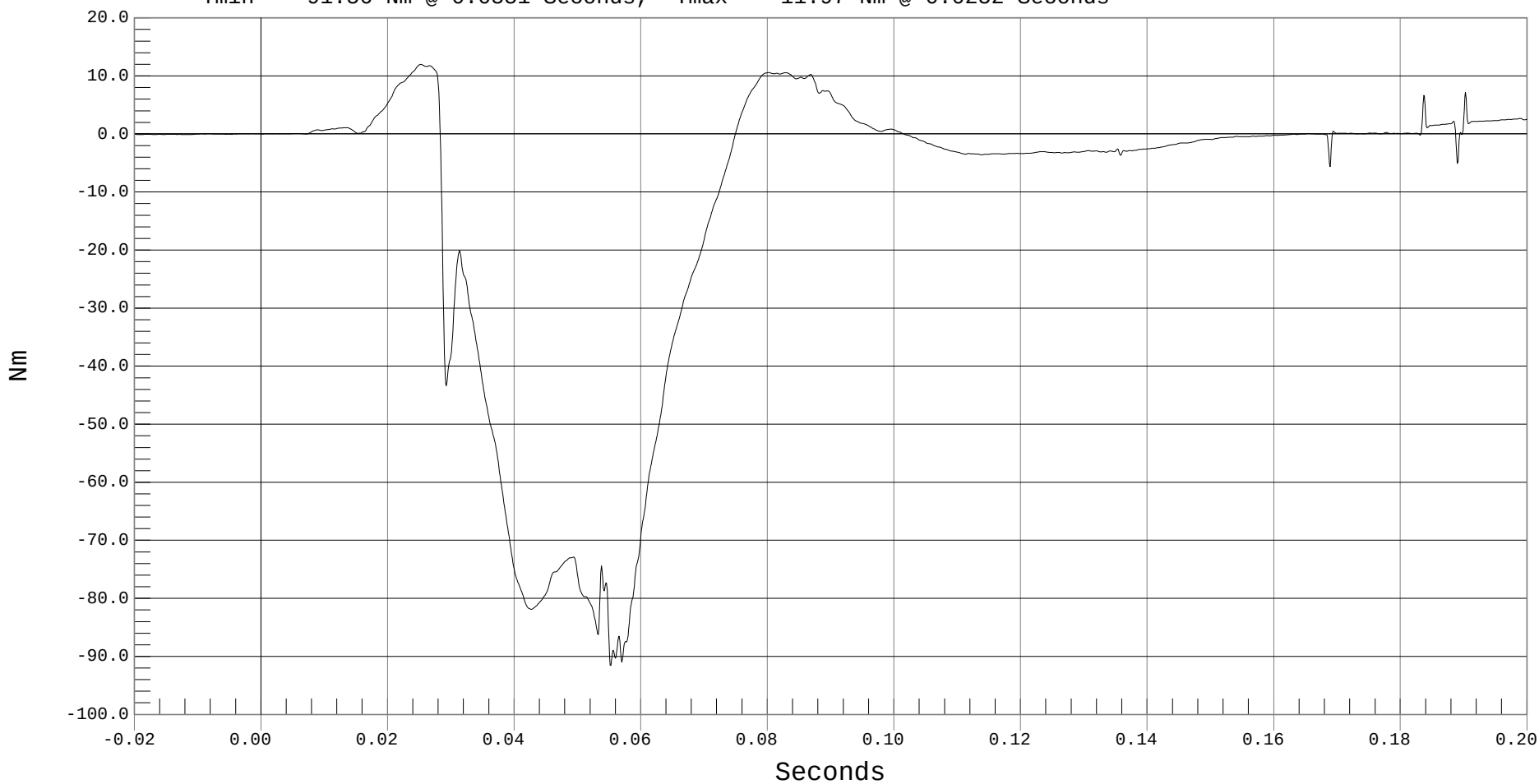
DRIVER LEFT LOWER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER LEFT LOWER TIBIA MX, b01013MF.M78

Ymin = -91.56 Nm @ 0.0551 Seconds, Ymax = 11.97 Nm @ 0.0252 Seconds





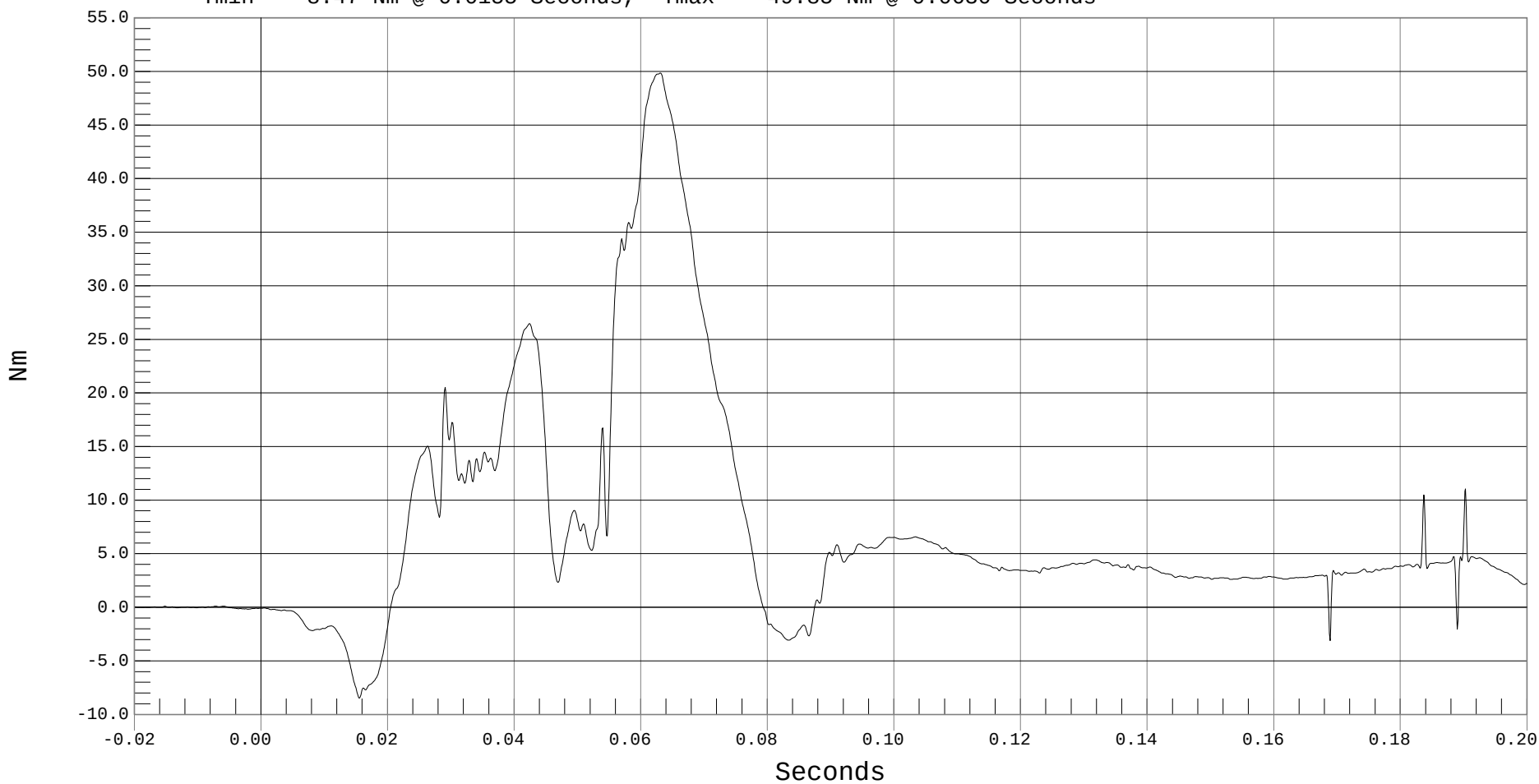
DRIVER LEFT LOWER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER LEFT LOWER TIBIA MY, b01013MF.M79

Ymin = -8.47 Nm @ 0.0155 Seconds, Ymax = 49.85 Nm @ 0.0630 Seconds





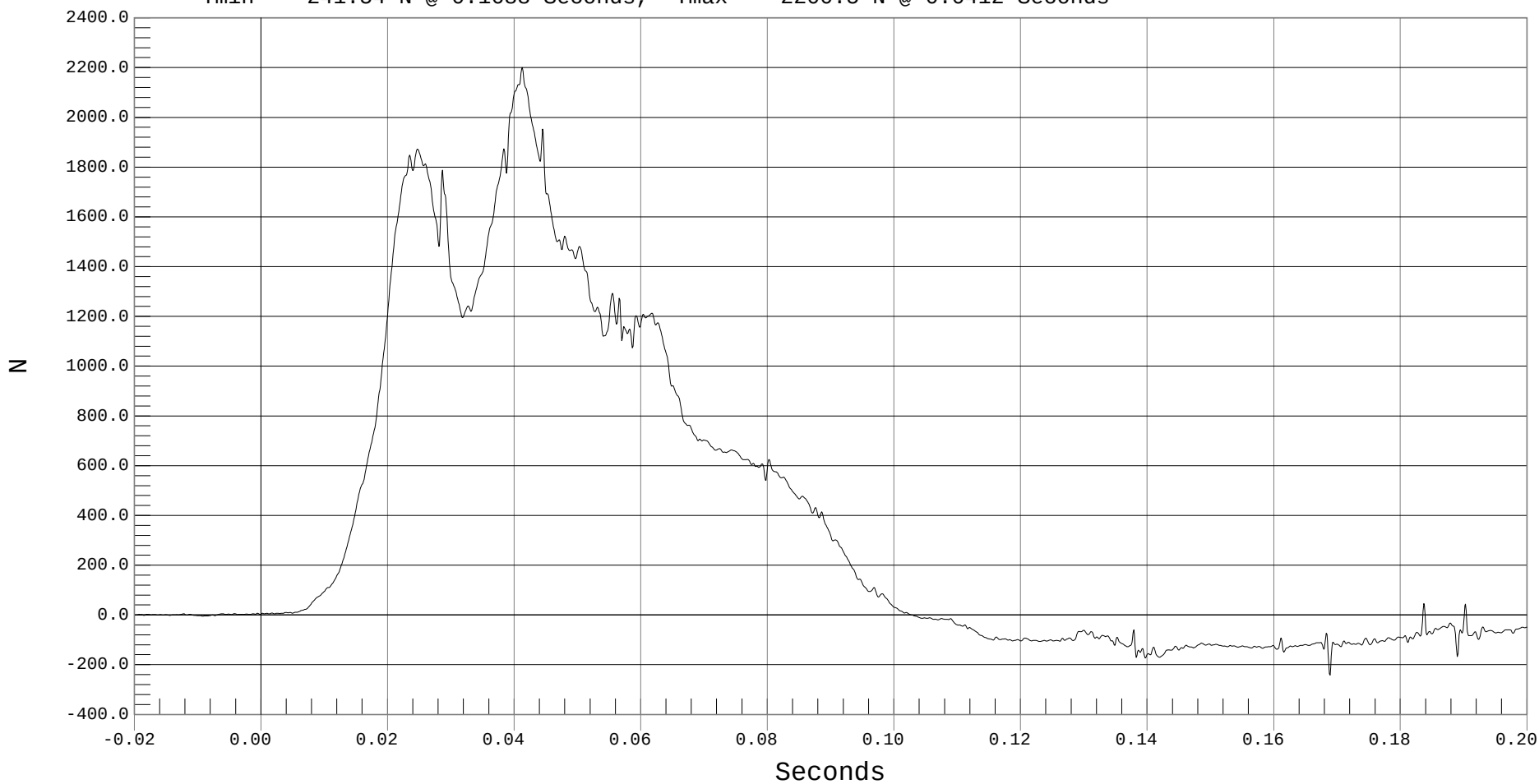
DRIVER LEFT LOWER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER LEFT LOWER TIBIA FZ, b01013FF.F80

Ymin = -241.54 N @ 0.1688 Seconds, Ymax = 2200.5 N @ 0.0412 Seconds





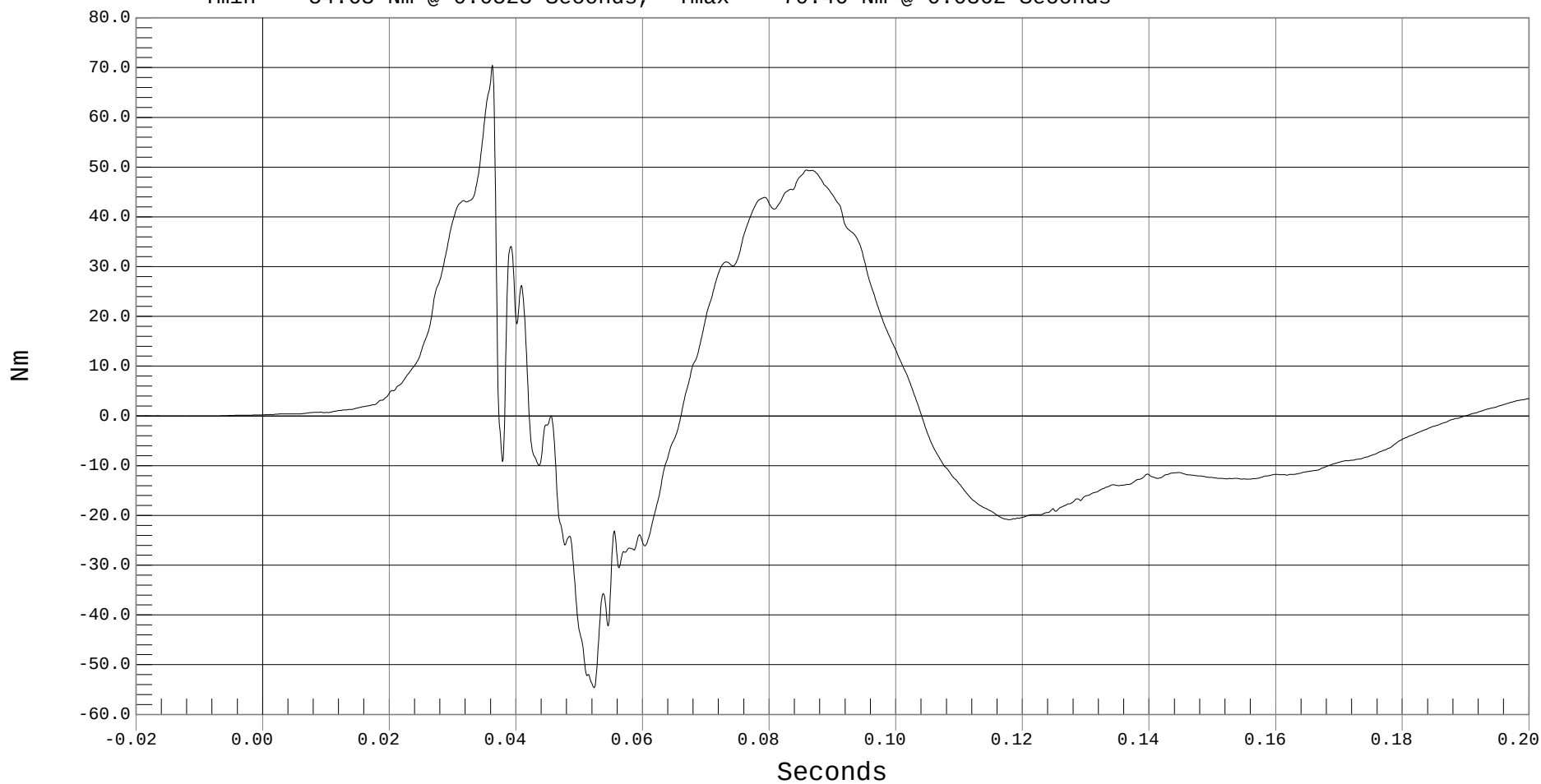
DRIVER RIGHT UPPER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT UPPER TIBIA MX, b01013MF.M69

Ymin = -54.63 Nm @ 0.0523 Seconds, Ymax = 70.46 Nm @ 0.0362 Seconds





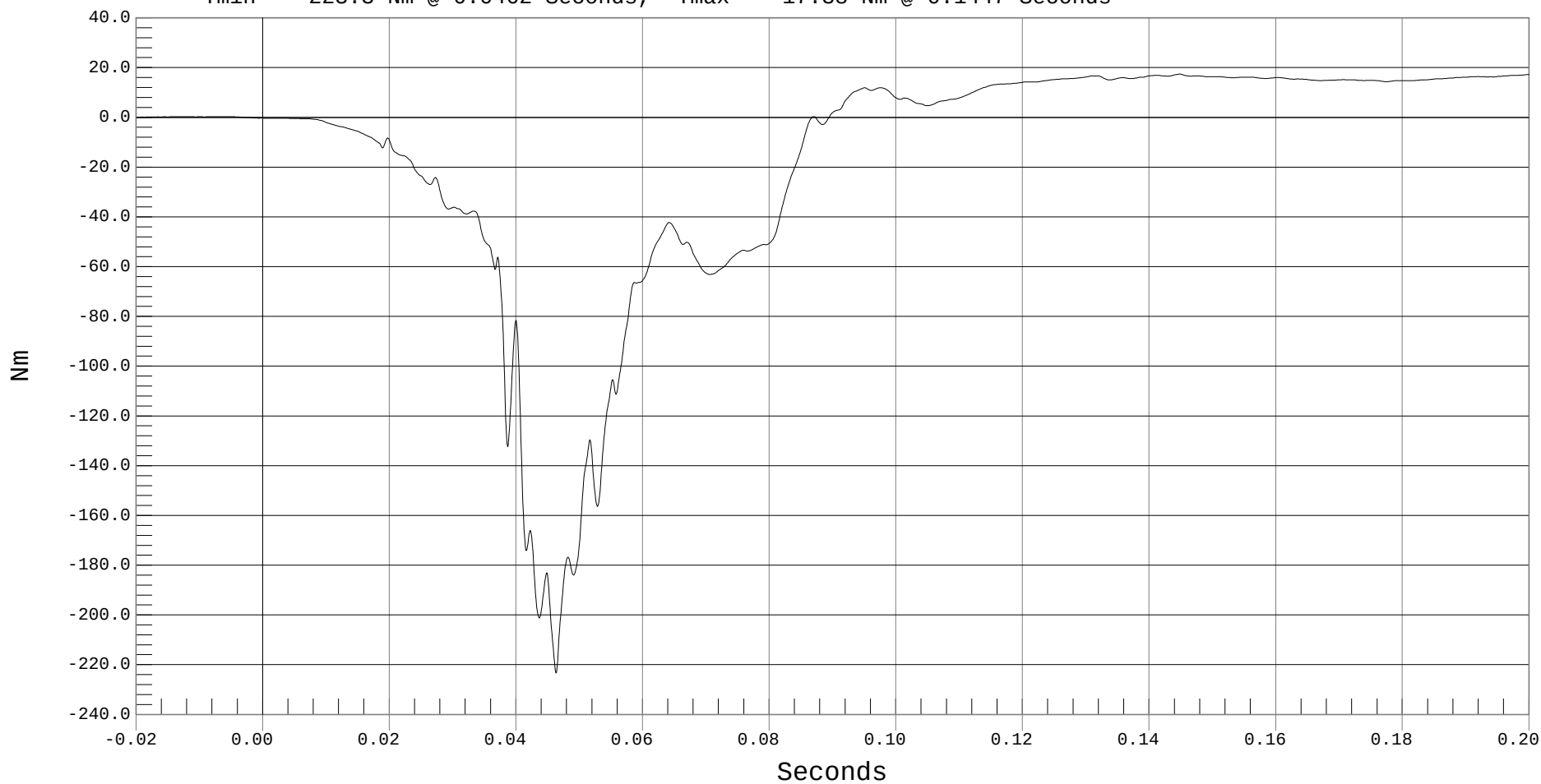
DRIVER RIGHT UPPER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT UPPER TIBIA MY, b01013MF.M70

Ymin = -223.3 Nm @ 0.0462 Seconds, Ymax = 17.38 Nm @ 0.1447 Seconds





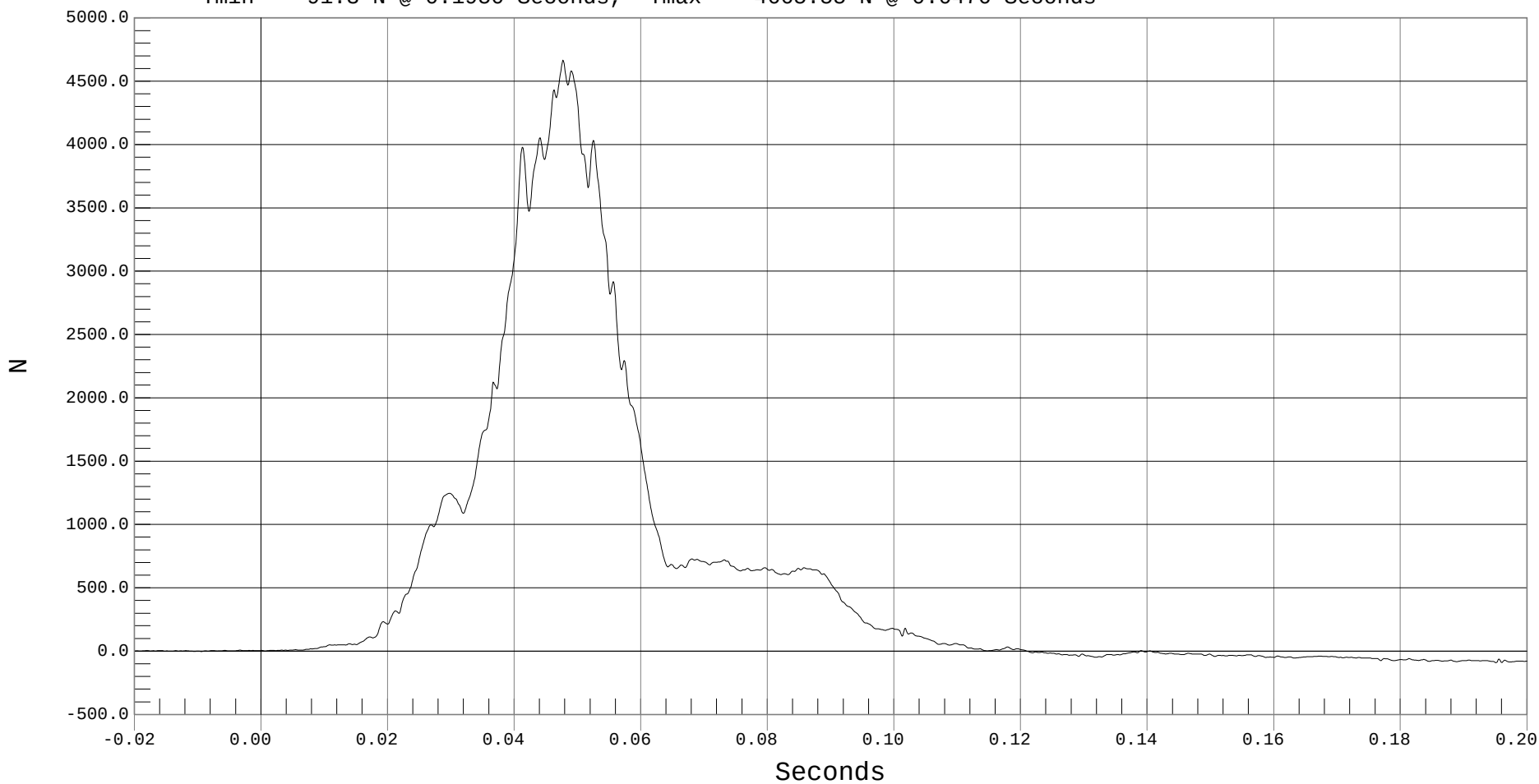
DRIVER RIGHT UPPER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT UPPER TIBIA FZ, b01013FF.F71

Ymin = -91.3 N @ 0.1950 Seconds, Ymax = 4665.55 N @ 0.0476 Seconds





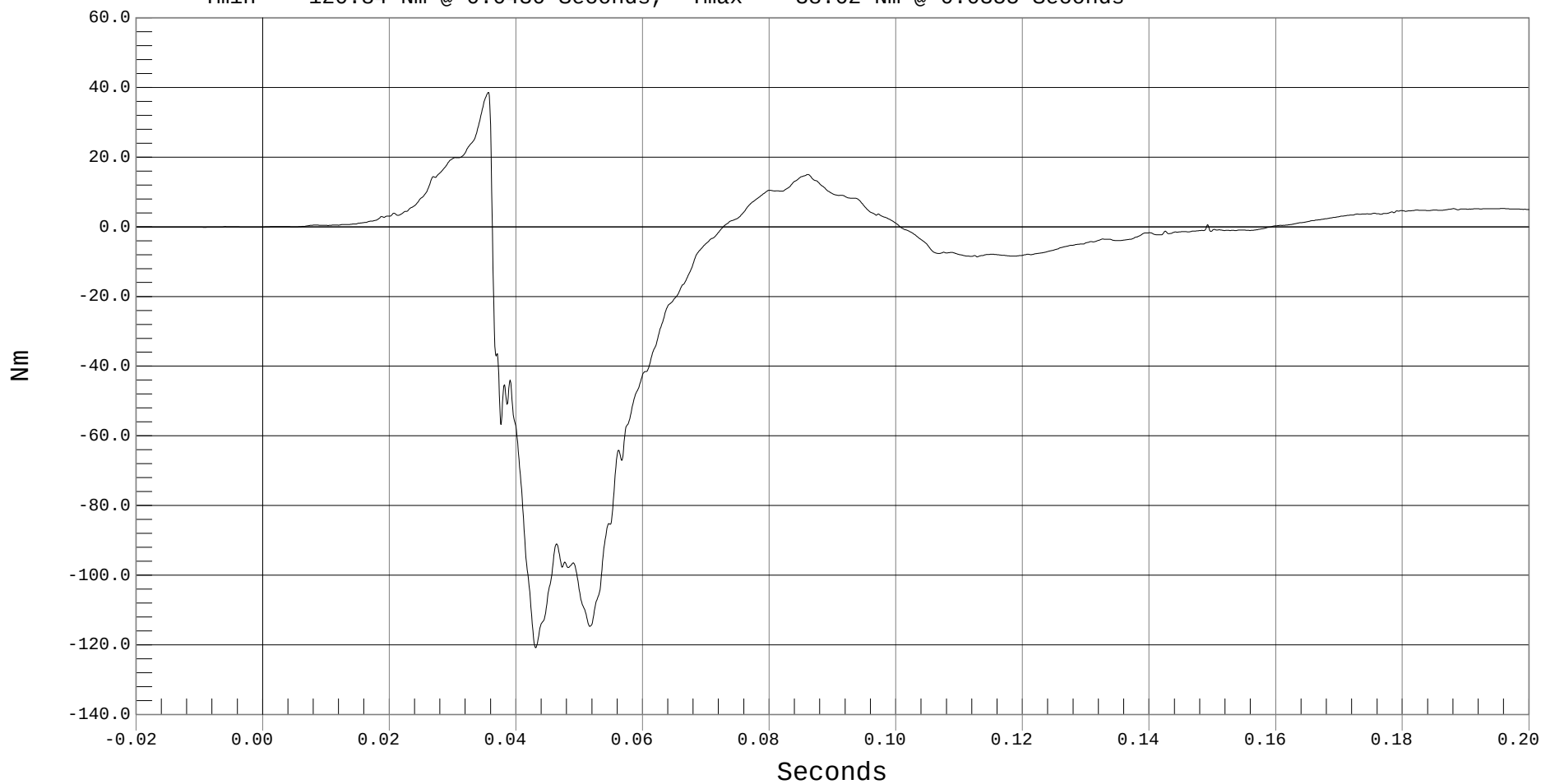
DRIVER RIGHT LOWER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT LOWER TIBIA MX, b01013MF.M72

Ymin = -120.84 Nm @ 0.0430 Seconds, Ymax = 38.62 Nm @ 0.0355 Seconds





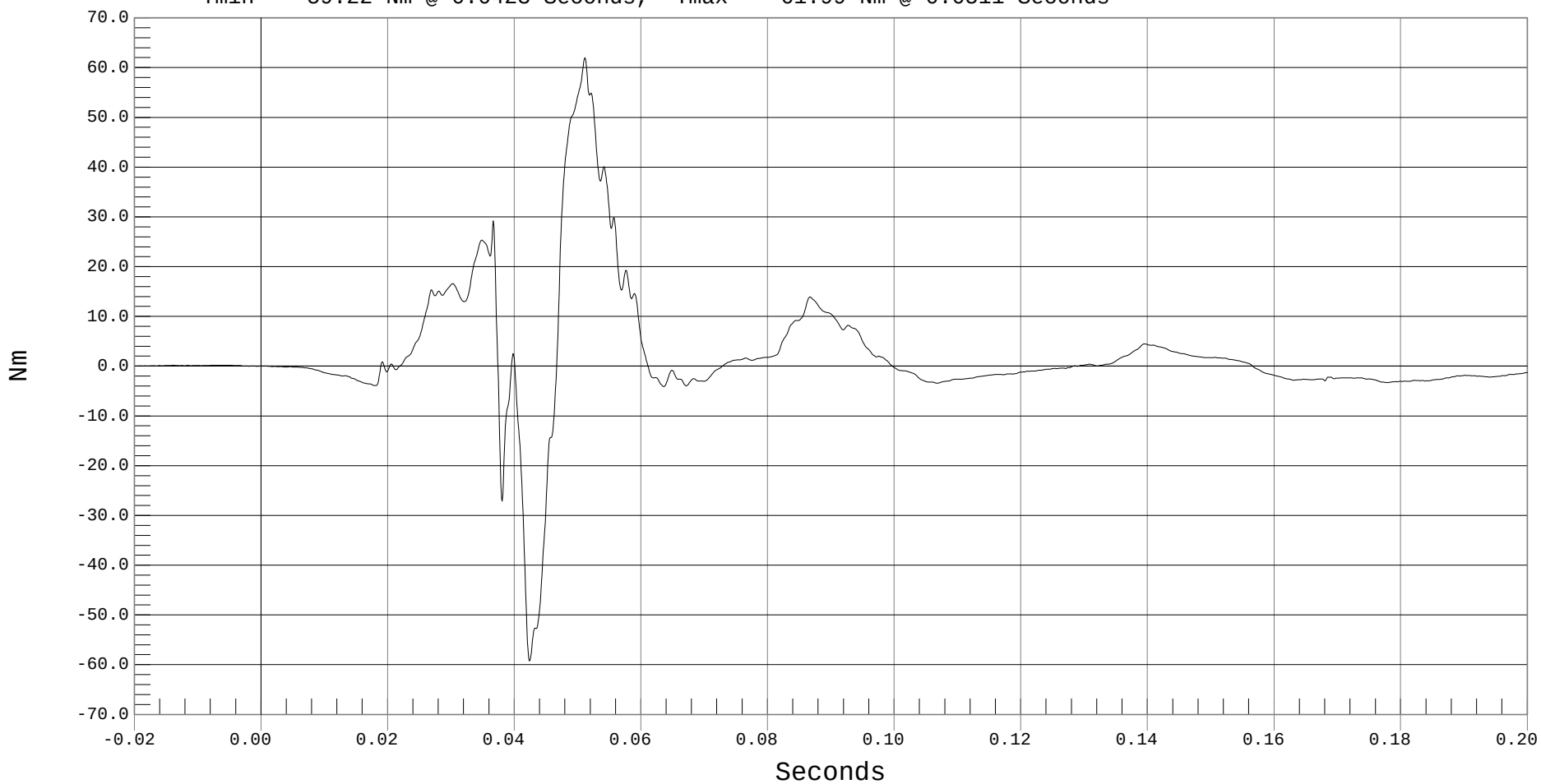
DRIVER RIGHT LOWER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT LOWER TIBIA MY, b01013MF.M73

Ymin = -59.22 Nm @ 0.0423 Seconds, Ymax = 61.99 Nm @ 0.0511 Seconds





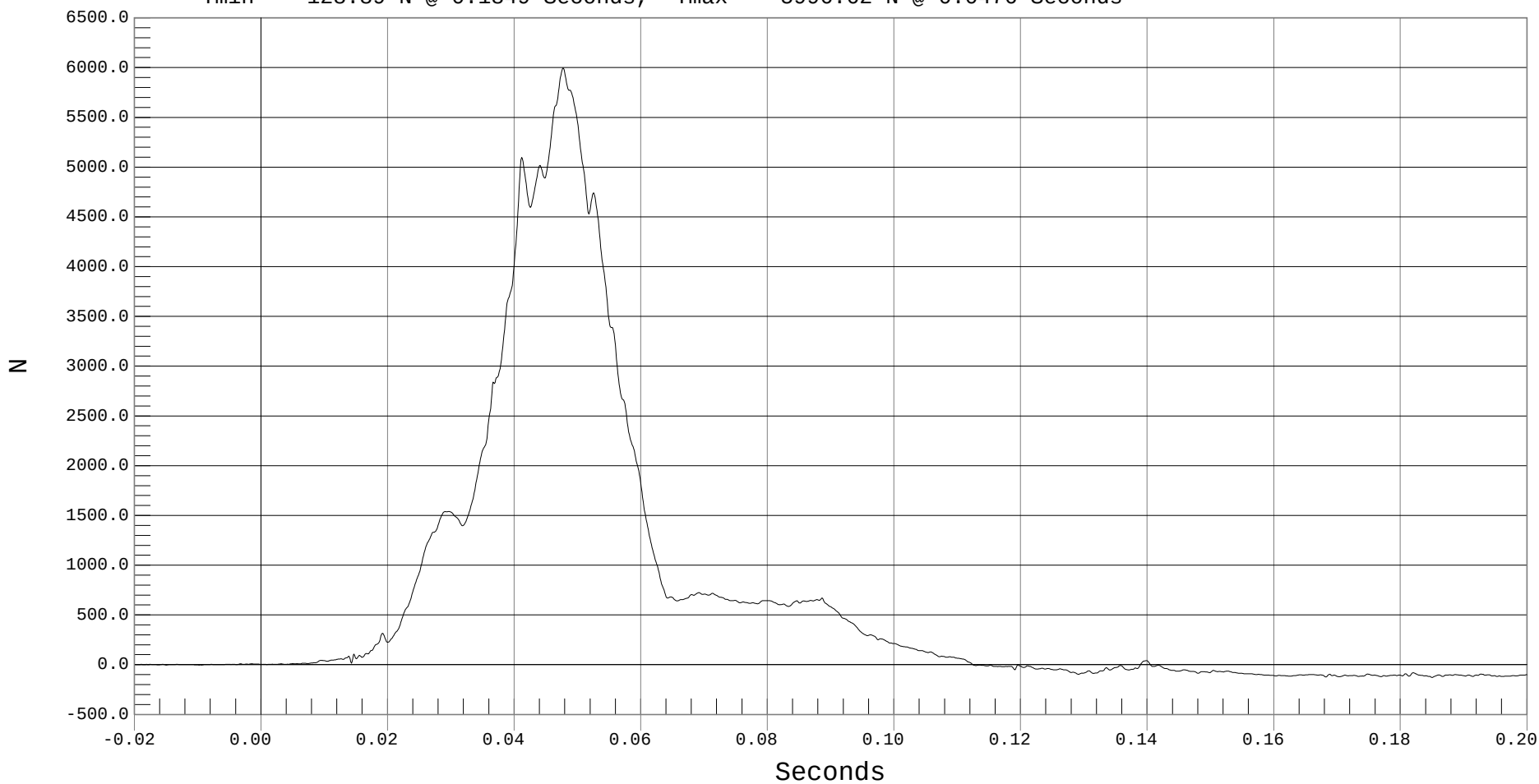
DRIVER RIGHT LOWER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT LOWER TIBIA FZ, b01013FF.F74

Ymin = -128.89 N @ 0.1849 Seconds, Ymax = 5996.62 N @ 0.0476 Seconds





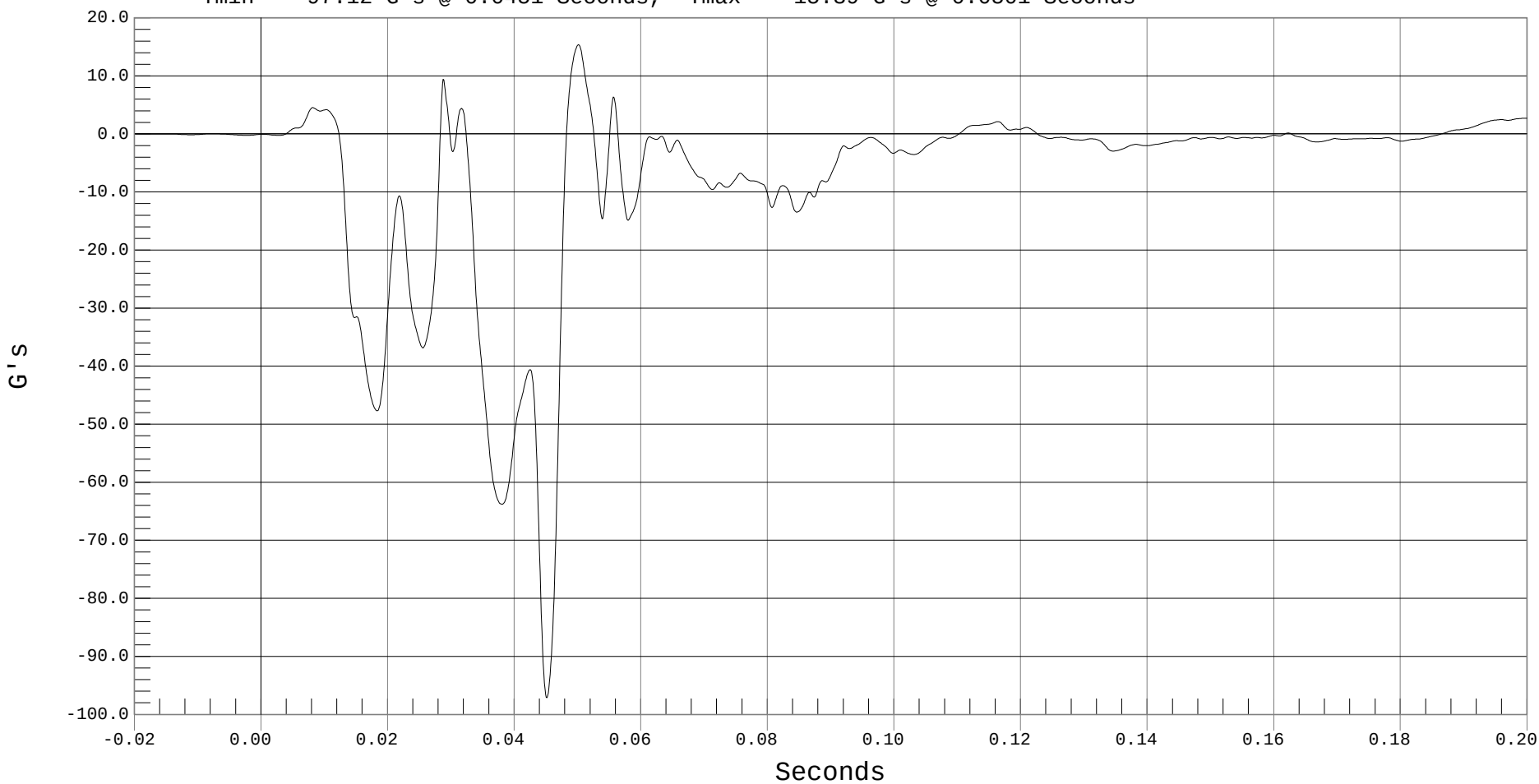
DRIVER LEFT FOOT @ BALL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER LEFT FOOT @ BALL Z, b01013AF.A12

Ymin = -97.12 G's @ 0.0451 Seconds, Ymax = 15.39 G's @ 0.0501 Seconds





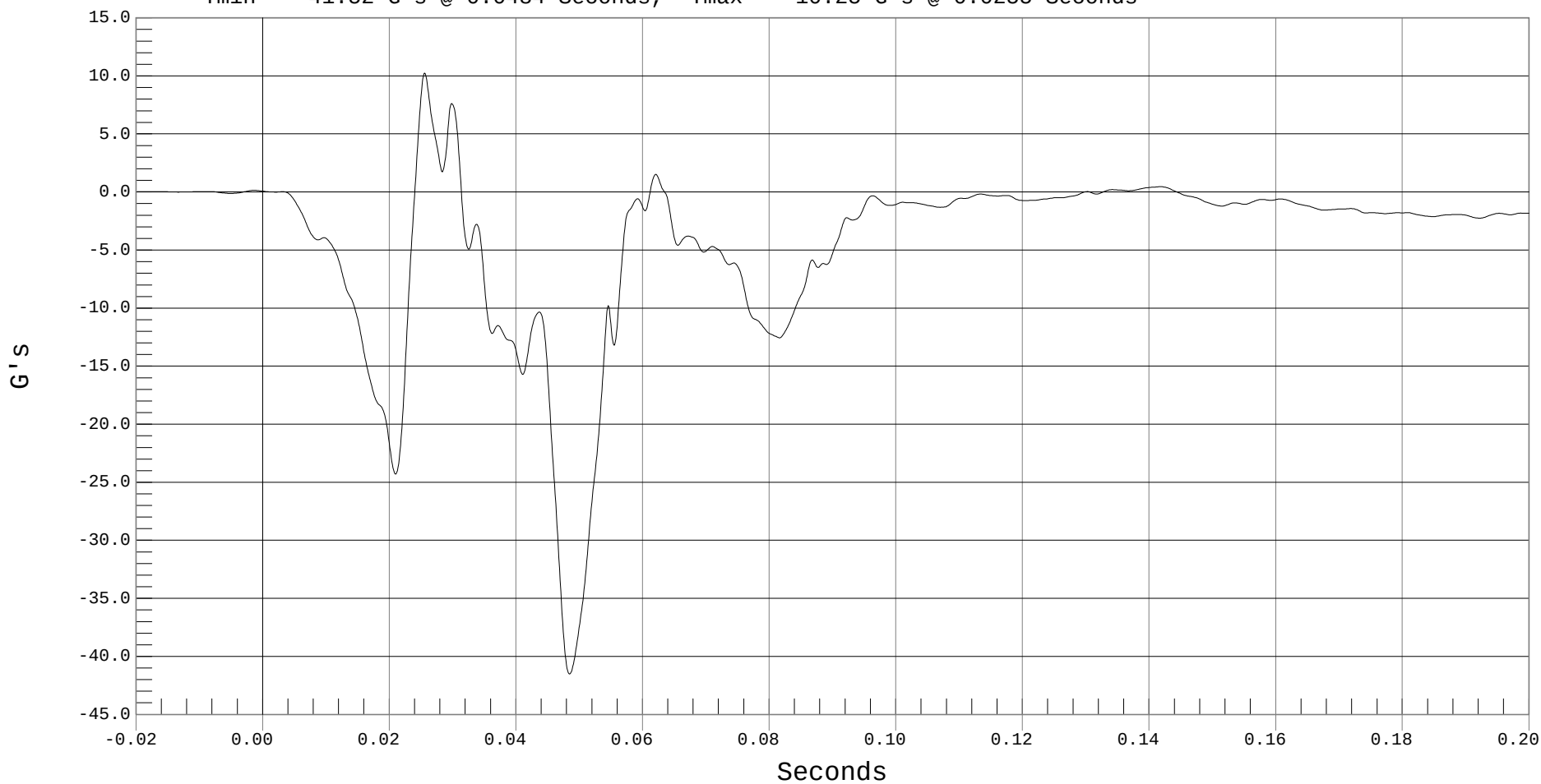
DRIVER LEFT FOOT @ HEEL X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER LEFT FOOT @ HEEL X, b01013AF.A10

Ymin = -41.52 G's @ 0.0484 Seconds, Ymax = 10.25 G's @ 0.0255 Seconds





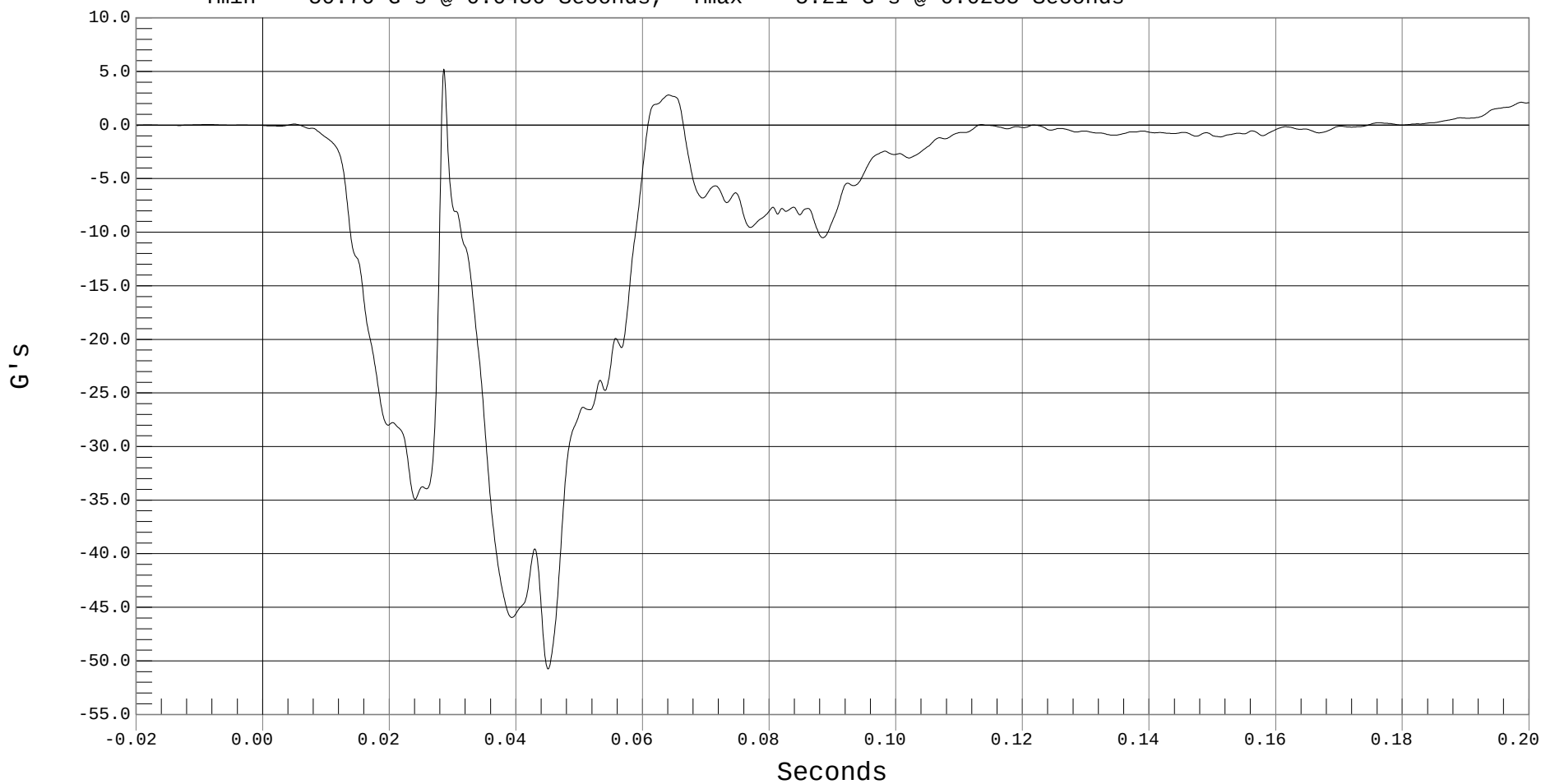
DRIVER LEFT FOOT @ HEEL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 DRIVER LEFT FOOT @ HEEL Z, b01013AF.A11

Ymin = -50.76 G's @ 0.0450 Seconds, Ymax = 5.21 G's @ 0.0285 Seconds





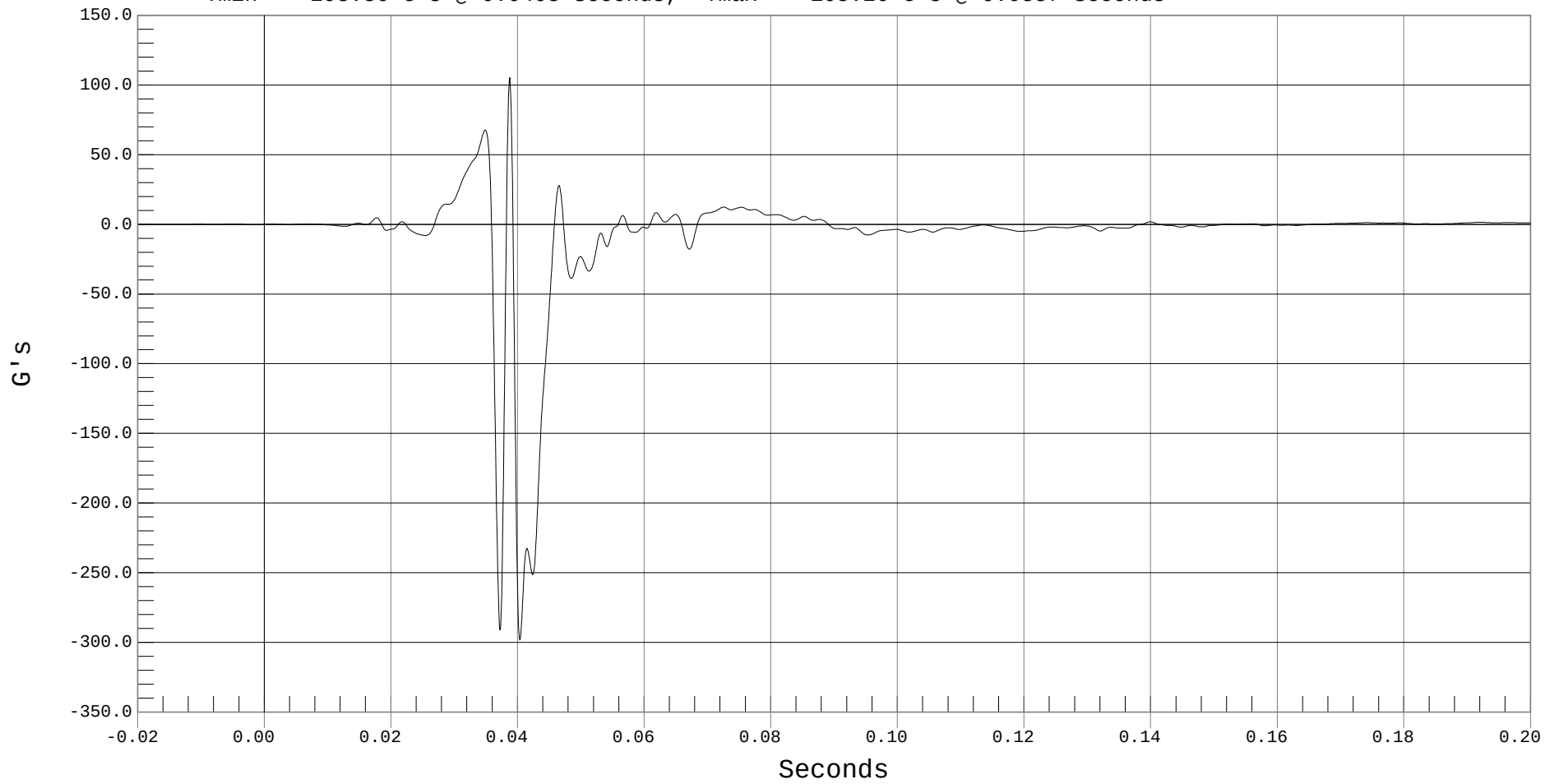
DRIVER RIGHT FOOT @ BALL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER RIGHT FOOT @ BALL Z, b01013AF.A95

Ymin = -298.36 G's @ 0.0403 Seconds, Ymax = 105.26 G's @ 0.0387 Seconds





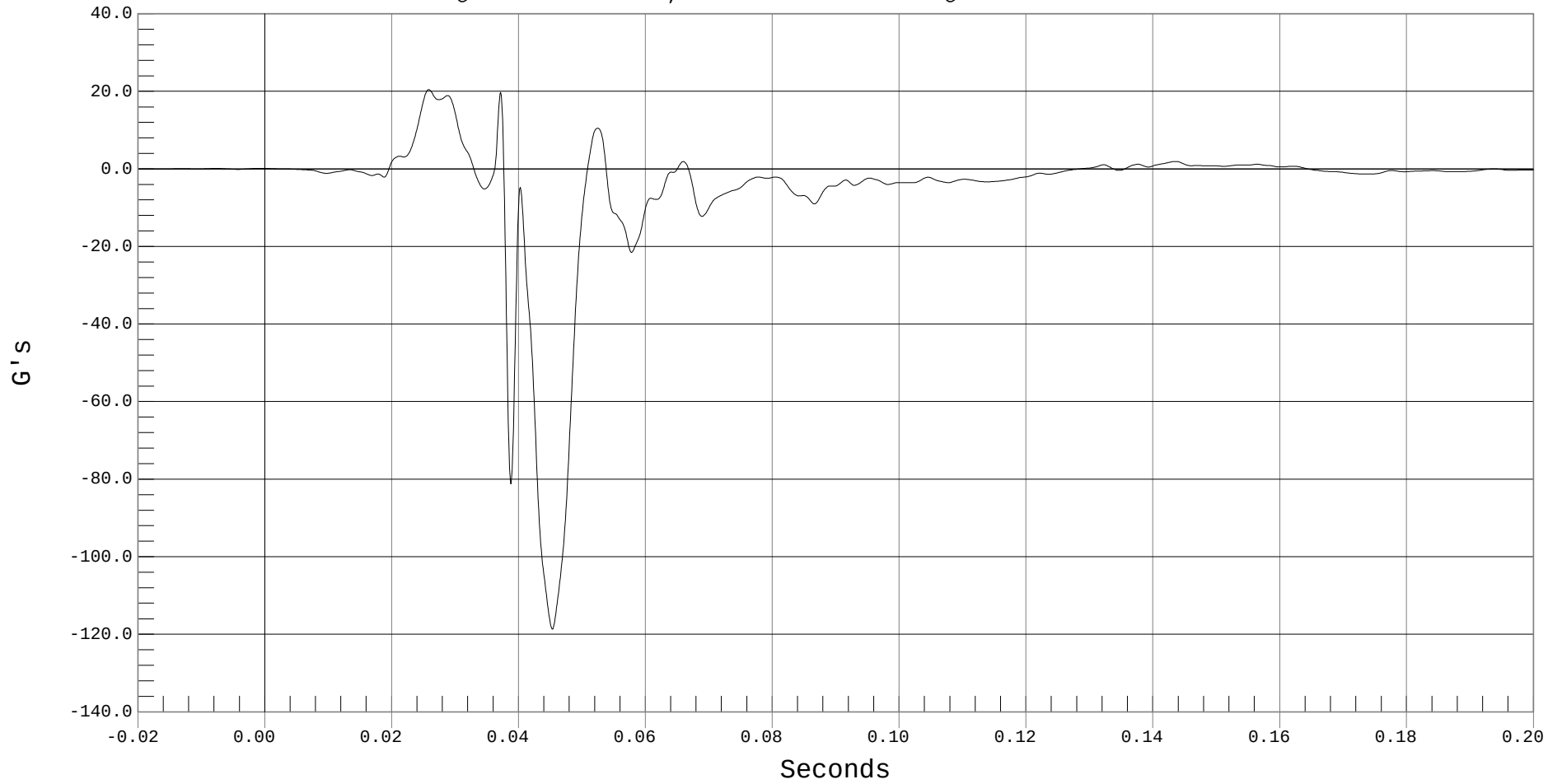
DRIVER RIGHT FOOT @ HEEL X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 DRIVER RIGHT FOOT @ HEEL X, b01013AF.A93

Ymin = -118.66 G's @ 0.0453 Seconds, Ymax = 20.47 G's @ 0.0258 Seconds





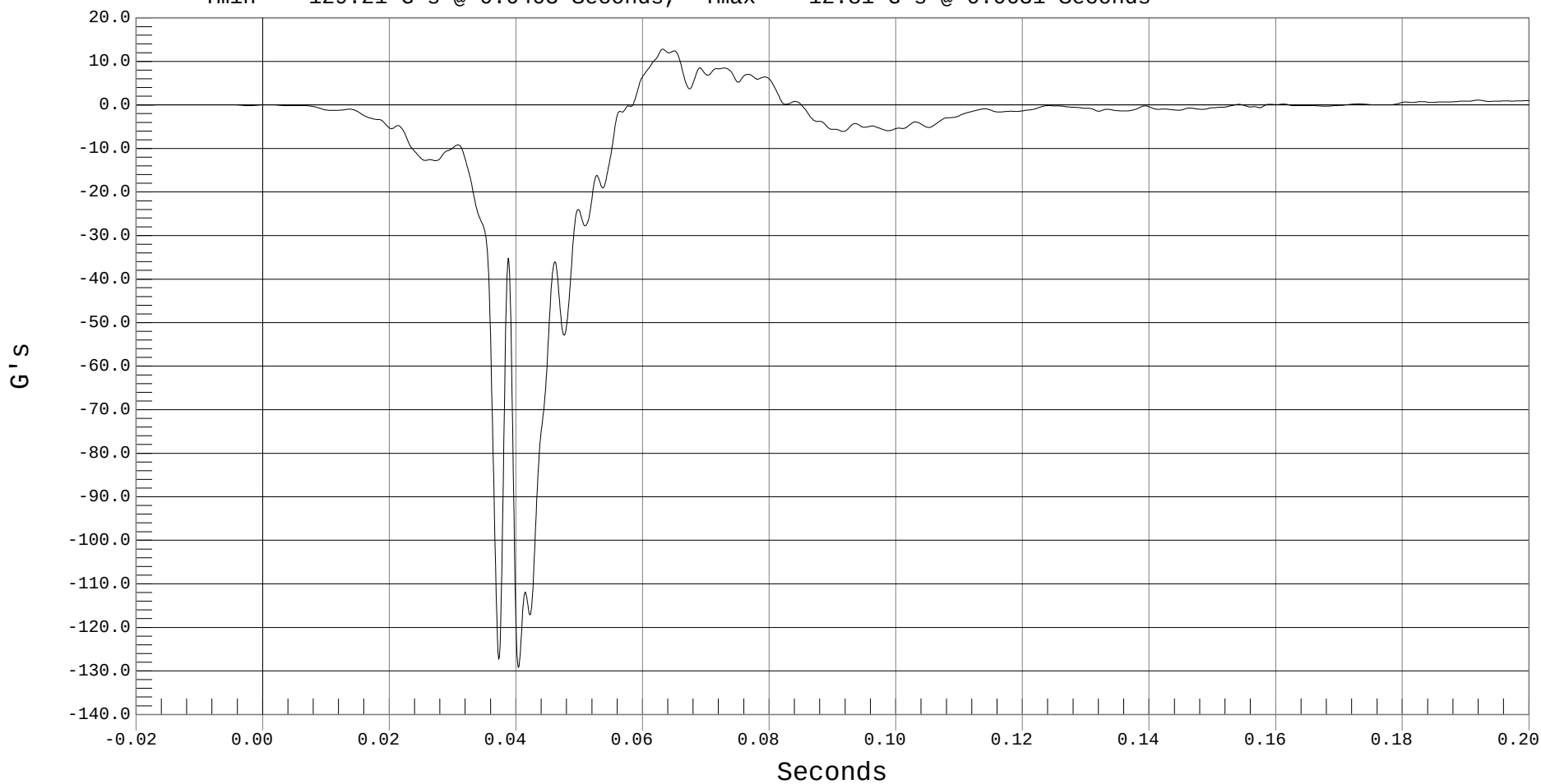
DRIVER RIGHT FOOT @ HEEL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 DRIVER RIGHT FOOT @ HEEL Z, b01013AF.A94

Ymin = -129.21 G's @ 0.0403 Seconds, Ymax = 12.81 G's @ 0.0631 Seconds





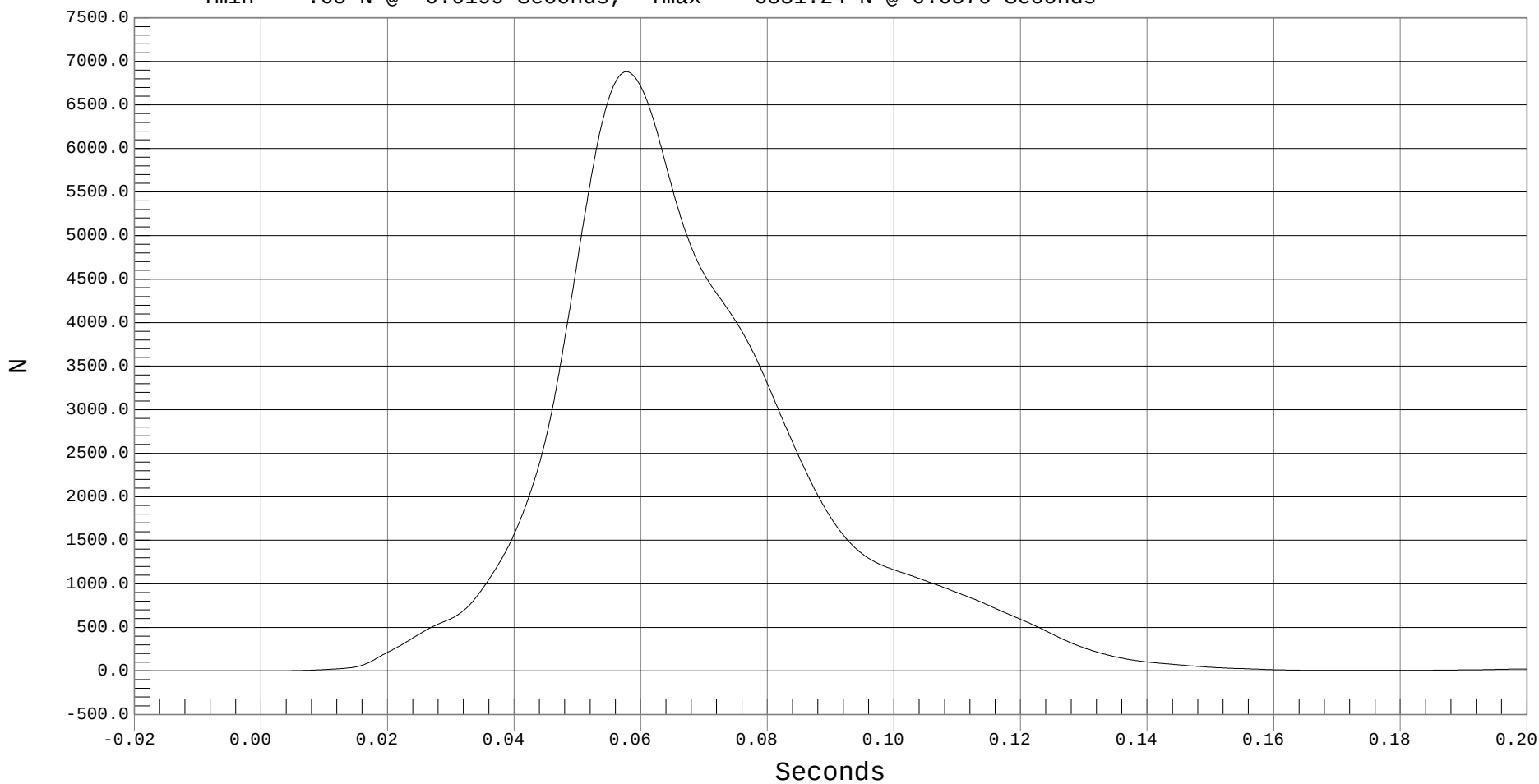
DRIVER LAP BELT FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 DRIVER LAP BELT, b01013FF.F66

Ymin = -.65 N @ -0.0199 Seconds, Ymax = 6881.24 N @ 0.0576 Seconds





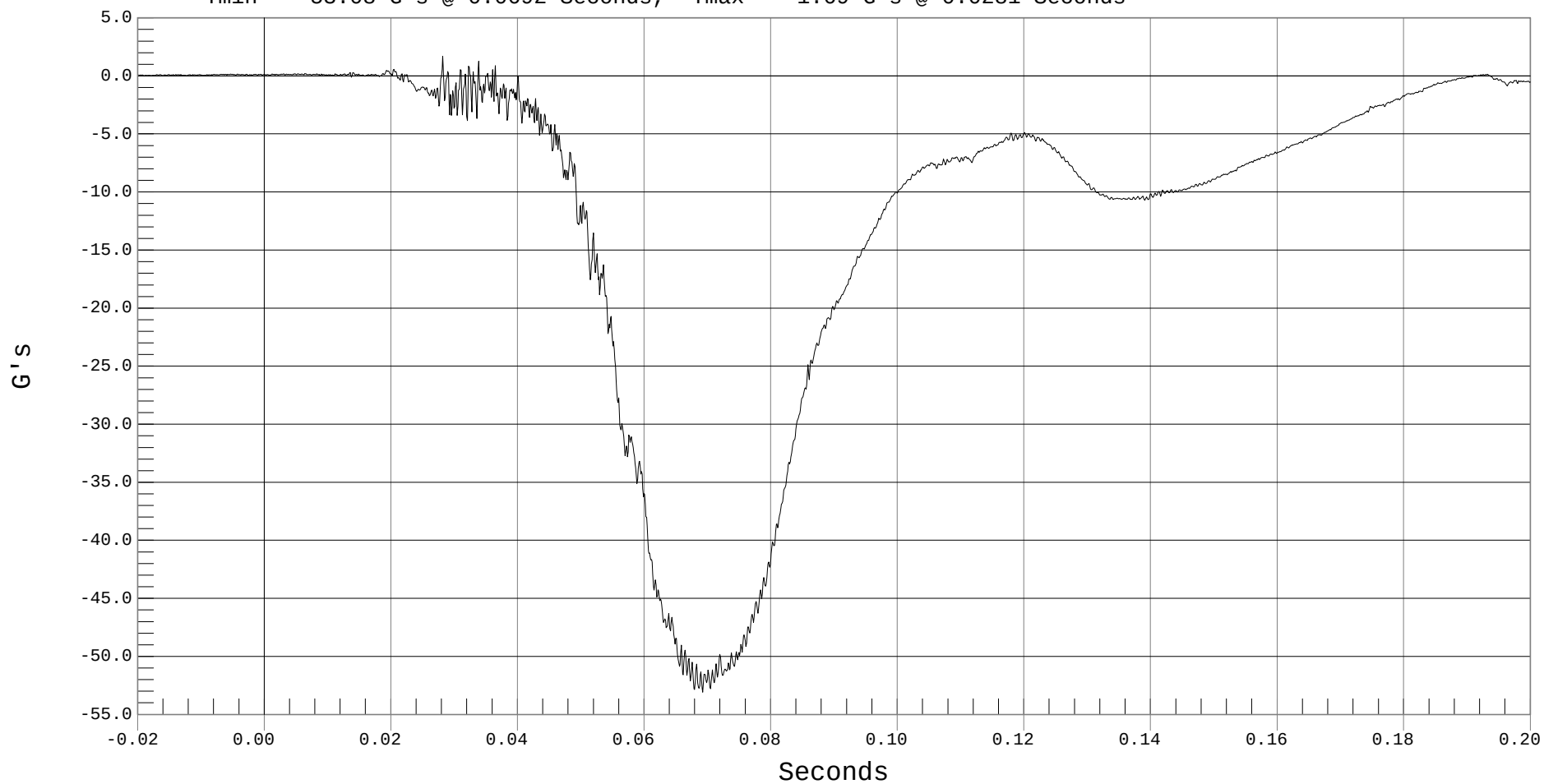
PASSENGER HEAD X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD X, b01013AT.A19

Ymin = -53.08 G's @ 0.0692 Seconds, Ymax = 1.69 G's @ 0.0281 Seconds





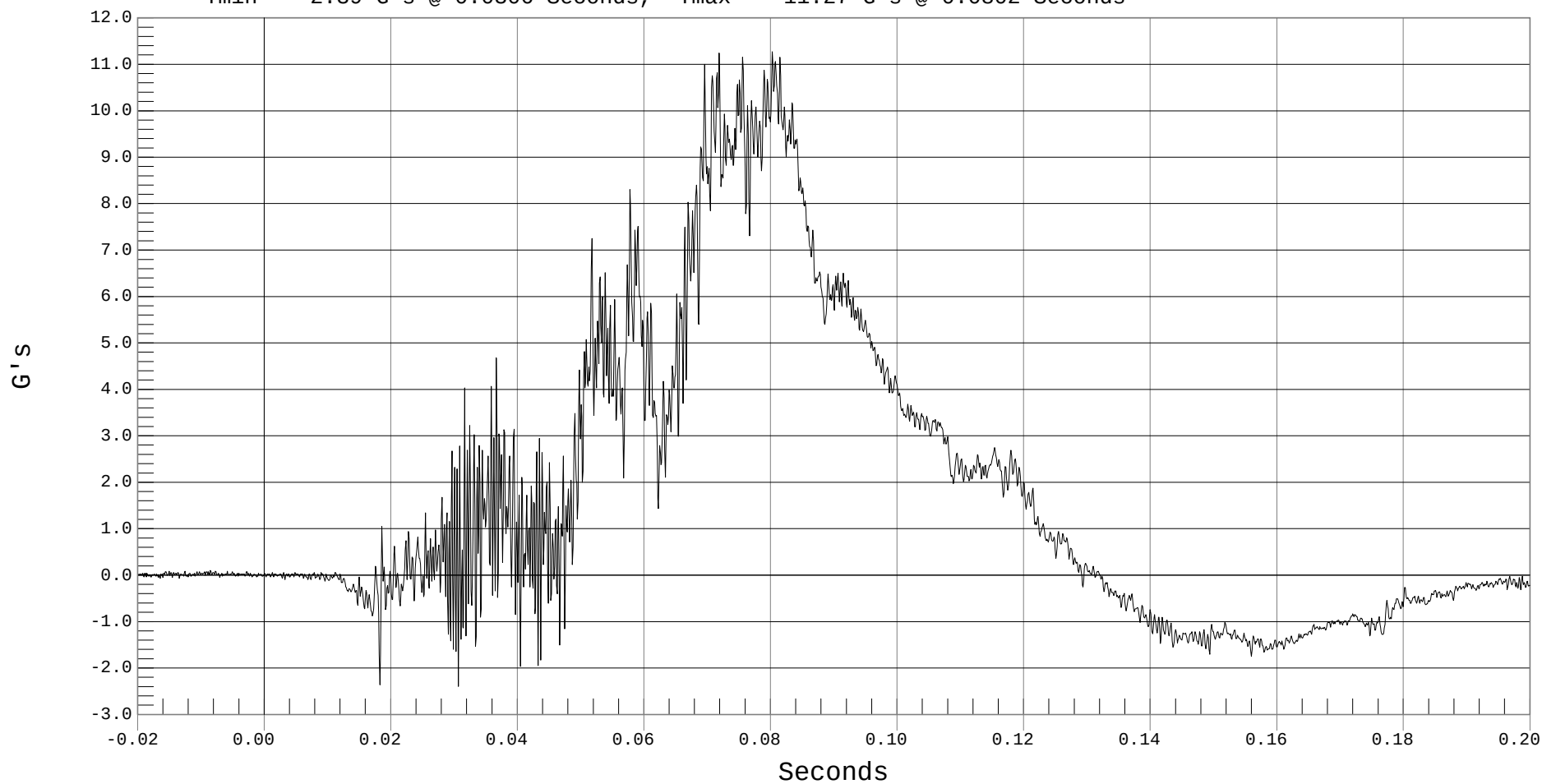
PASSENGER HEAD Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD Y, b01013AT.A20

Ymin = -2.39 G's @ 0.0306 Seconds, Ymax = 11.27 G's @ 0.0802 Seconds





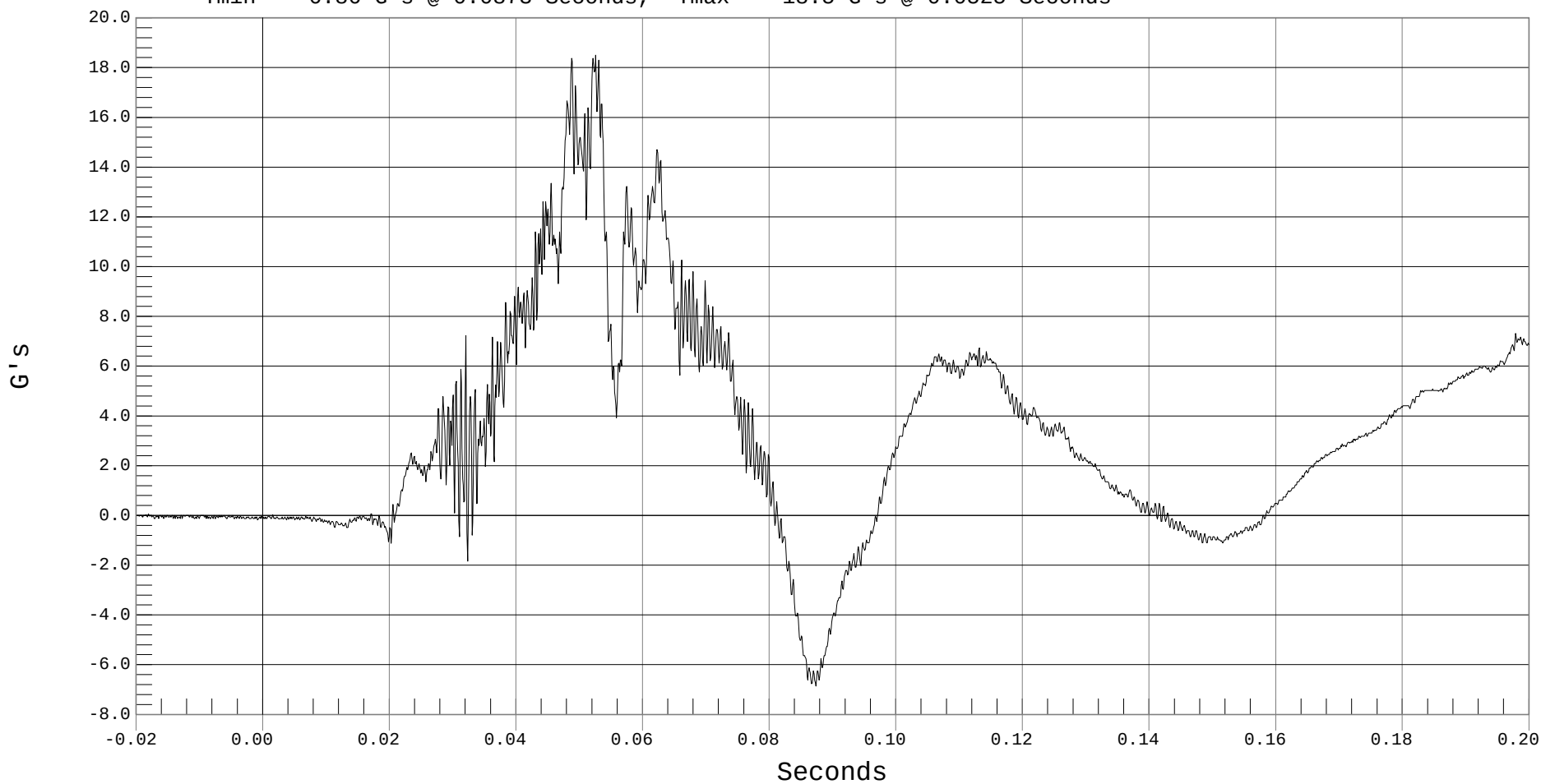
PASSENGER HEAD Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD Z, b01013AT.A21

Ymin = -6.86 G's @ 0.0873 Seconds, Ymax = 18.5 G's @ 0.0525 Seconds





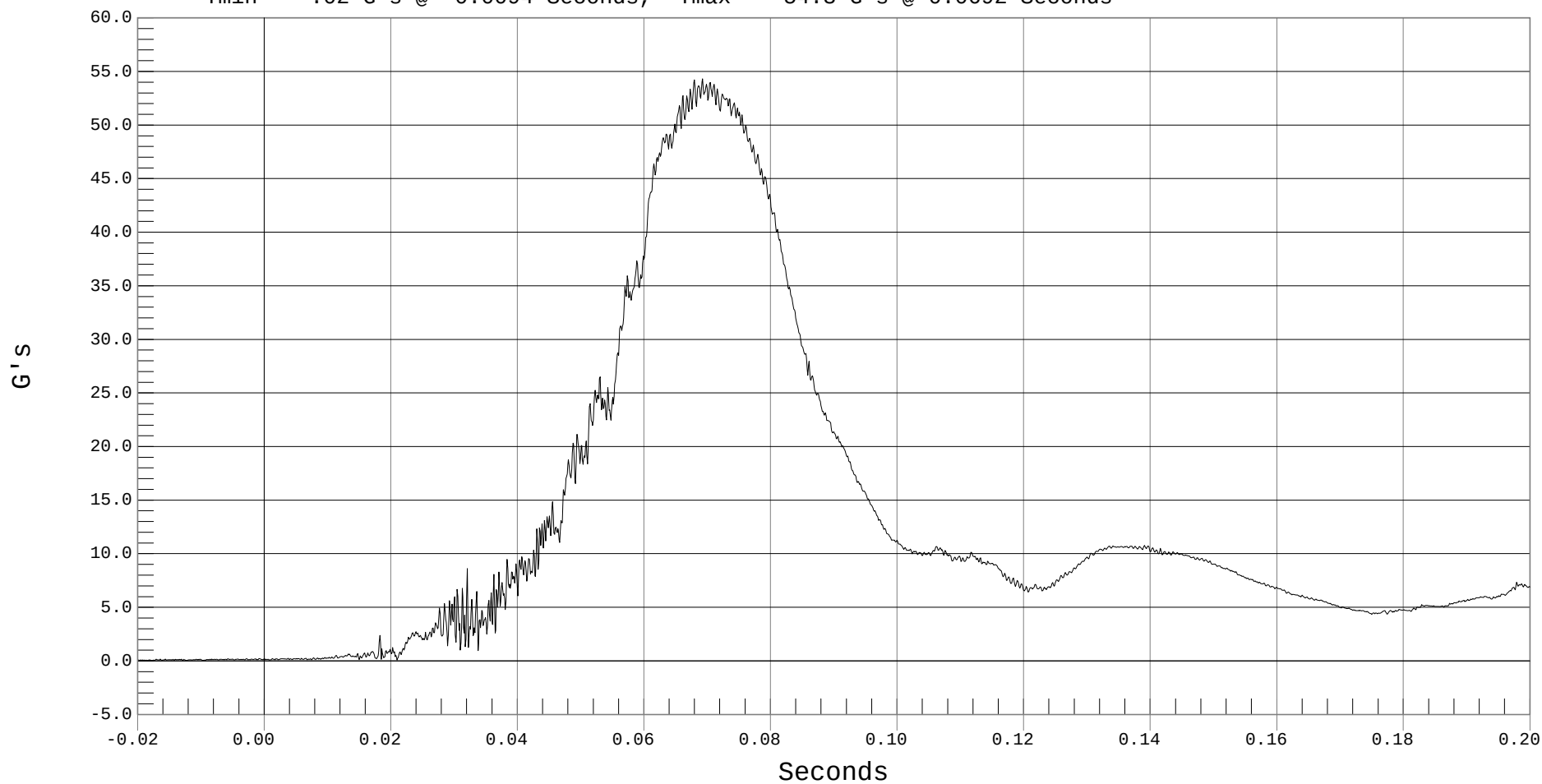
PASSENGER HEAD RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD RESULTANT ACCELERATION, b01013AV.A19

Ymin = .02 G's @ -0.0094 Seconds, Ymax = 54.3 G's @ 0.0692 Seconds





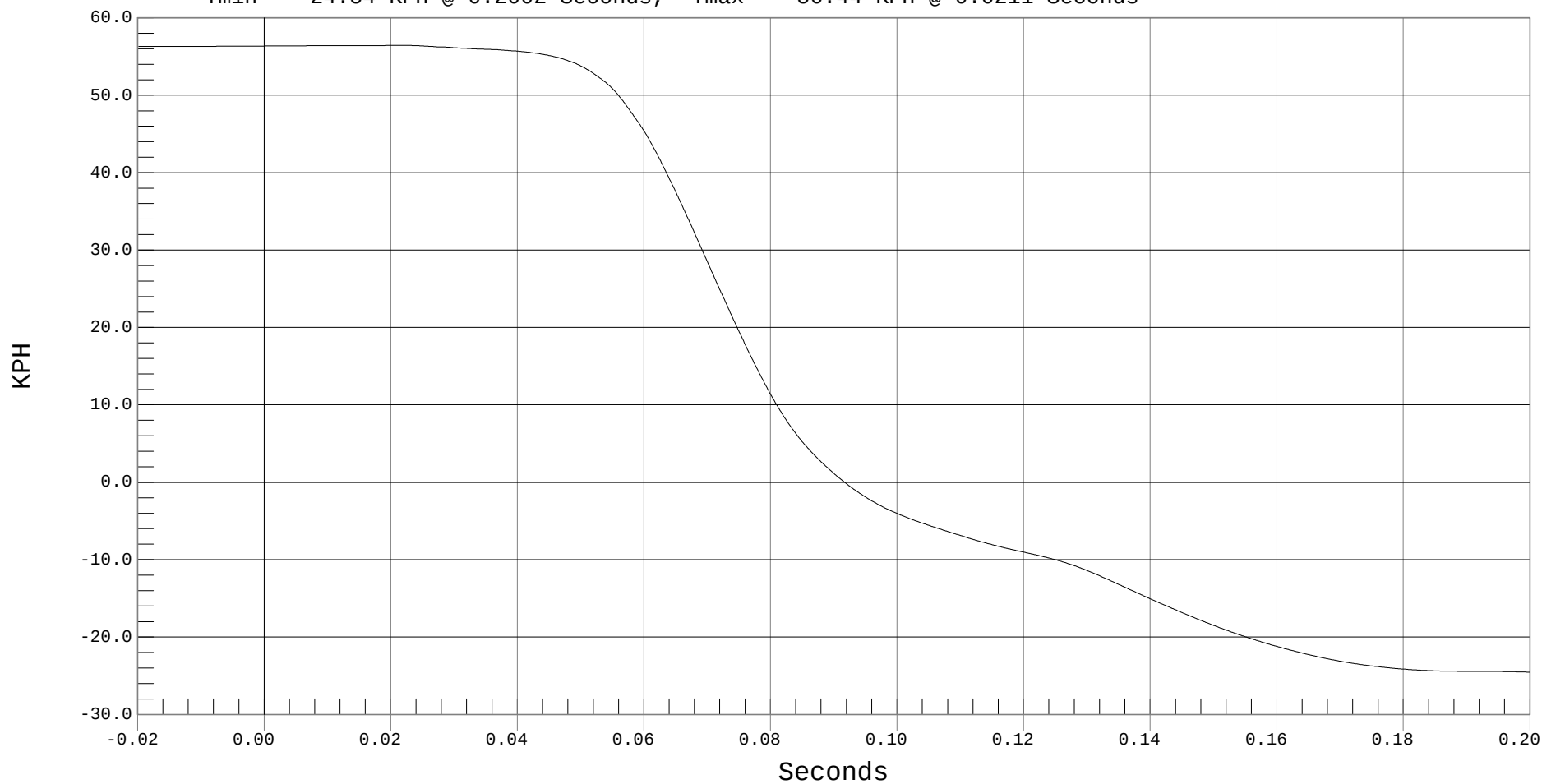
PASSENGER HEAD X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER HEAD X VELOCITY, b01013AI.V19

Ymin = -24.54 KPH @ 0.2002 Seconds, Ymax = 56.44 KPH @ 0.0211 Seconds





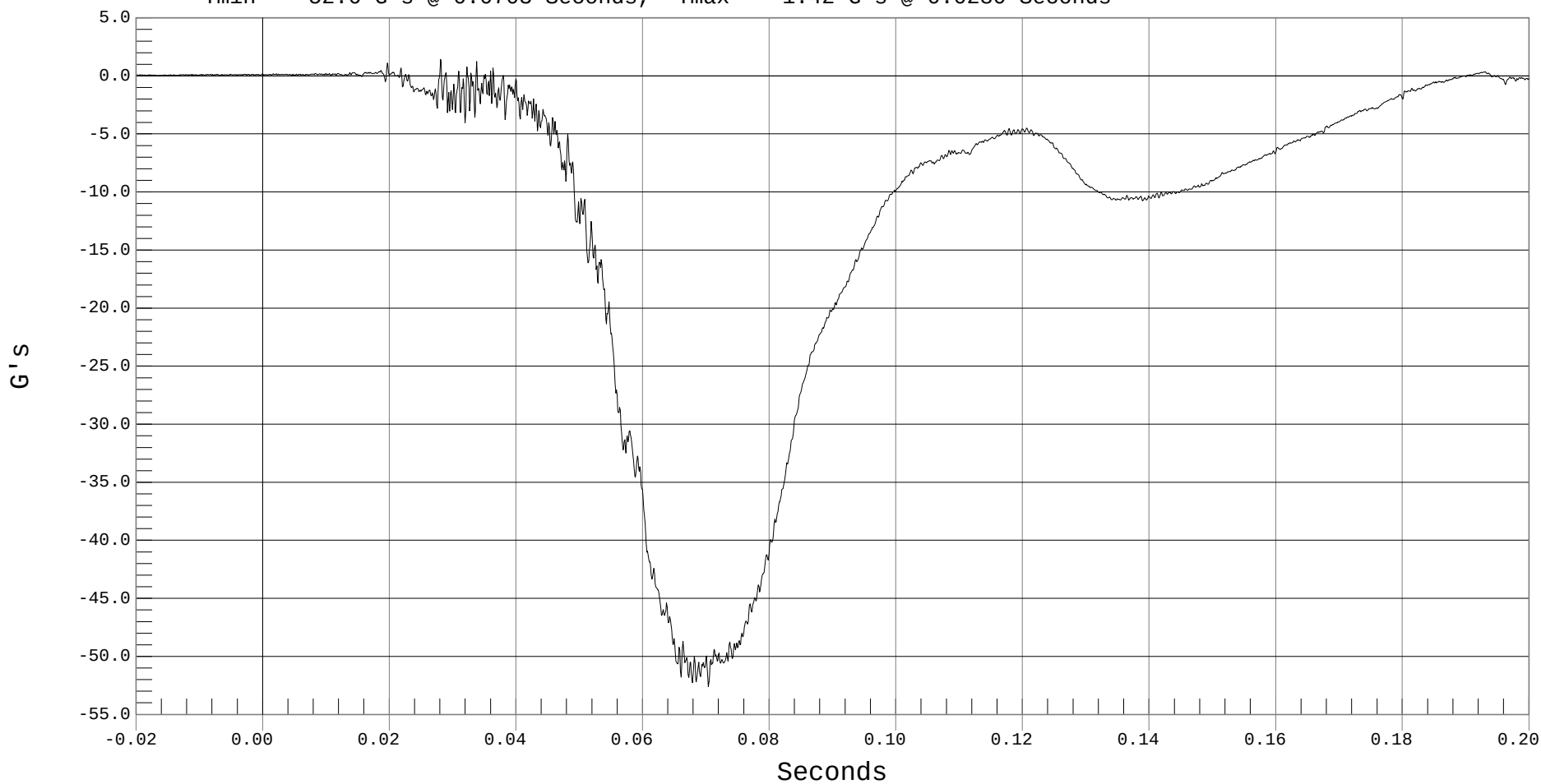
PASSENGER HEAD REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD Xr, b01013AT.A41

Ymin = -52.6 G's @ 0.0703 Seconds, Ymax = 1.42 G's @ 0.0280 Seconds



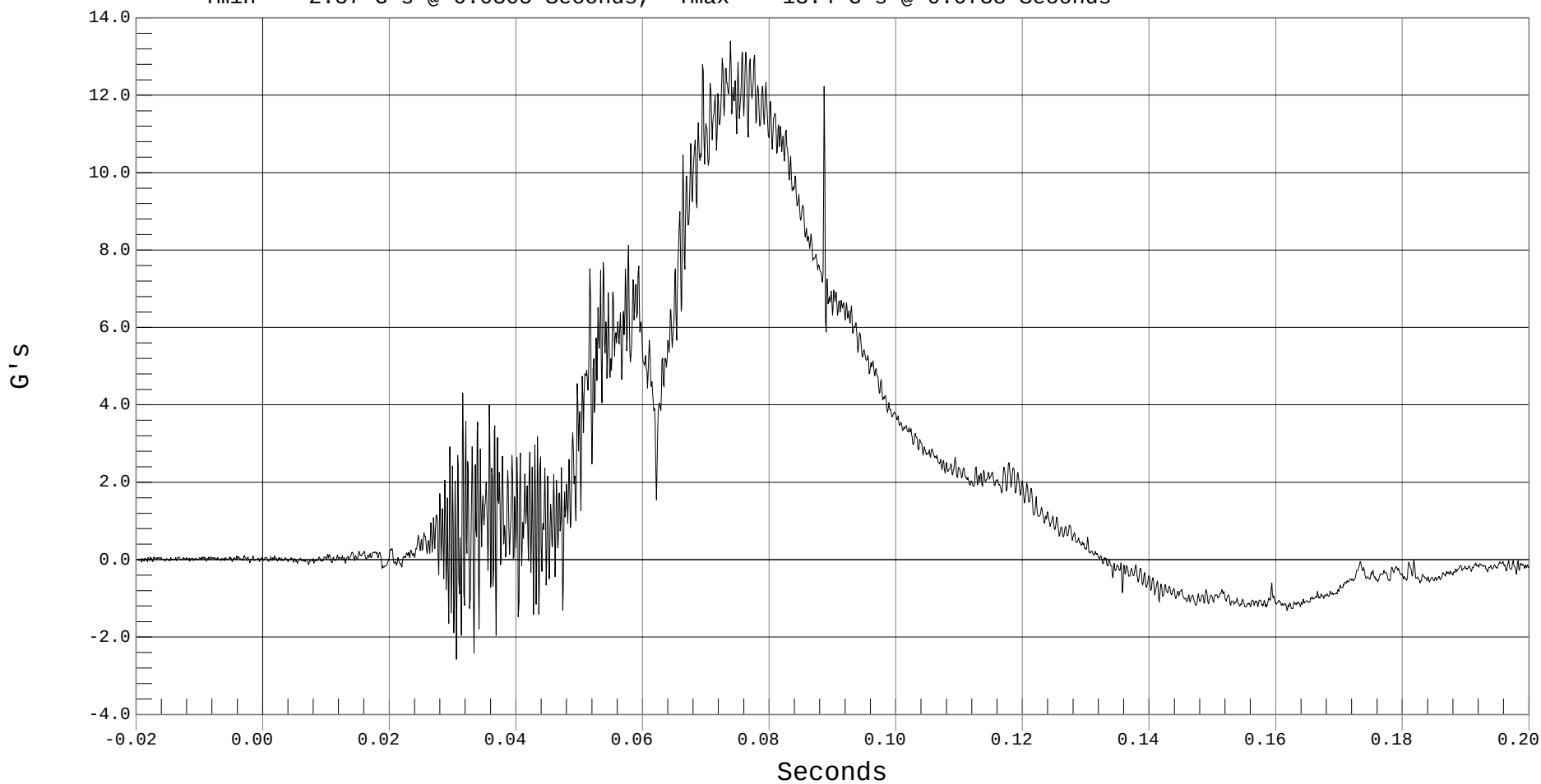


PASSENGER HEAD REDUNDANT Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

Ymin = -2.57 G's @ 0.0305 Seconds, Ymax = 13.4 G's @ 0.0738 Seconds





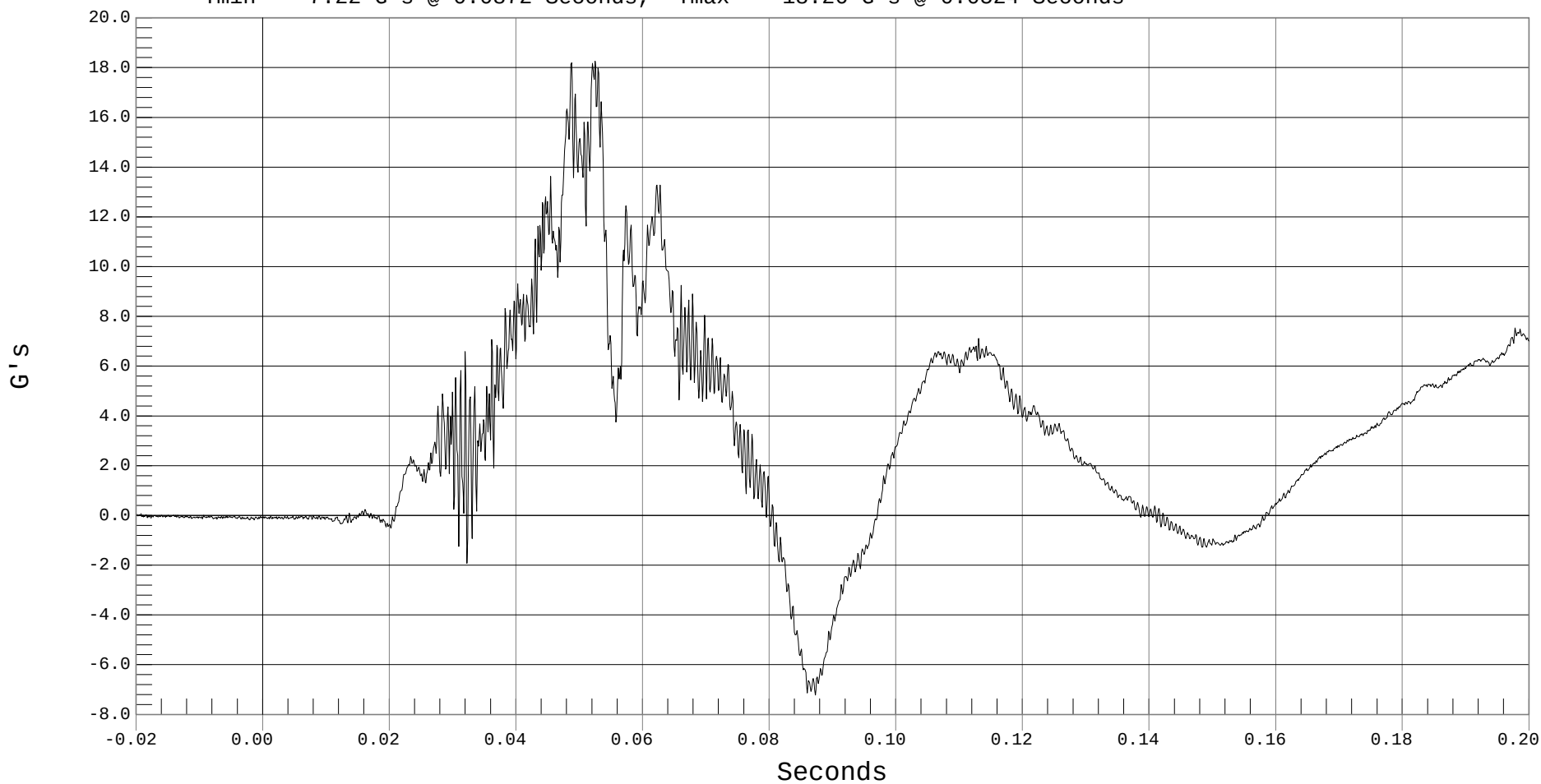
PASSENGER HEAD REDUNDANT Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD Zr, b01013AT.A43

Ymin = -7.22 G's @ 0.0872 Seconds, Ymax = 18.26 G's @ 0.0524 Seconds





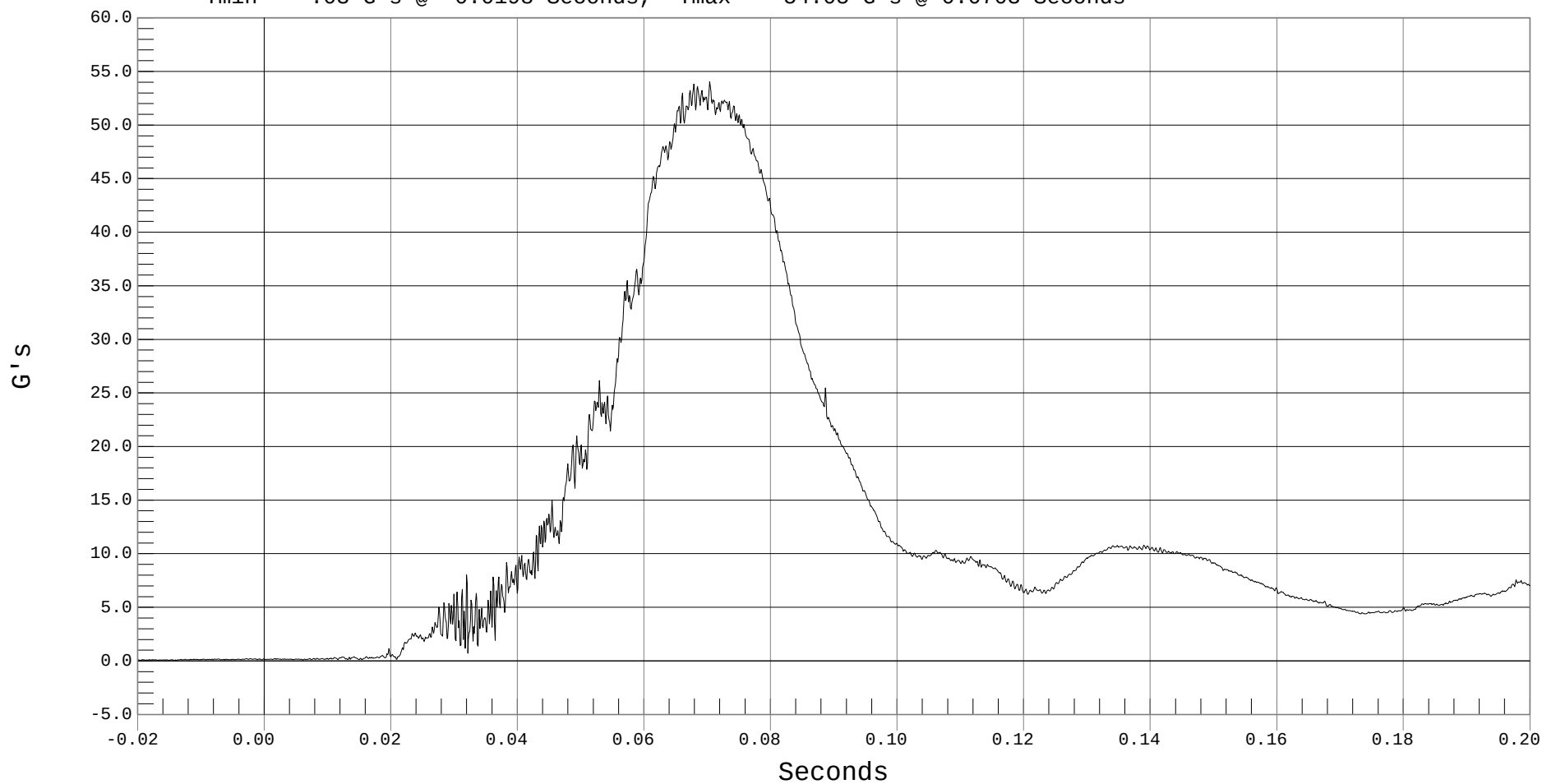
PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION, b01013AV.A41

Ymin = .03 G's @ -0.0198 Seconds, Ymax = 54.05 G's @ 0.0703 Seconds





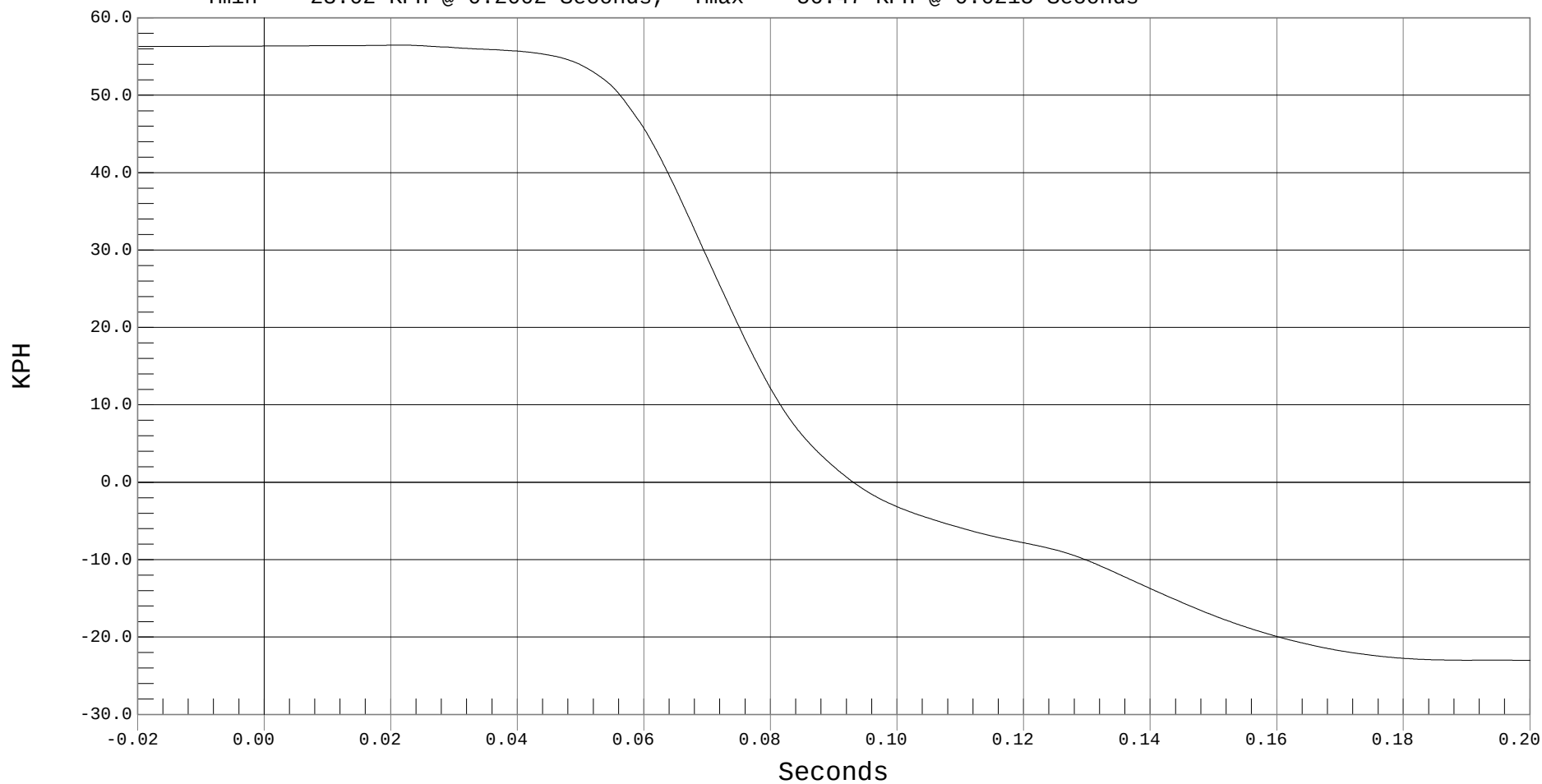
PASSENGER HEAD REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 PASSENGER HEAD REDUNDANT X VELOCITY, b01013AI.V41

Ymin = -23.02 KPH @ 0.2002 Seconds, Ymax = 56.47 KPH @ 0.0215 Seconds





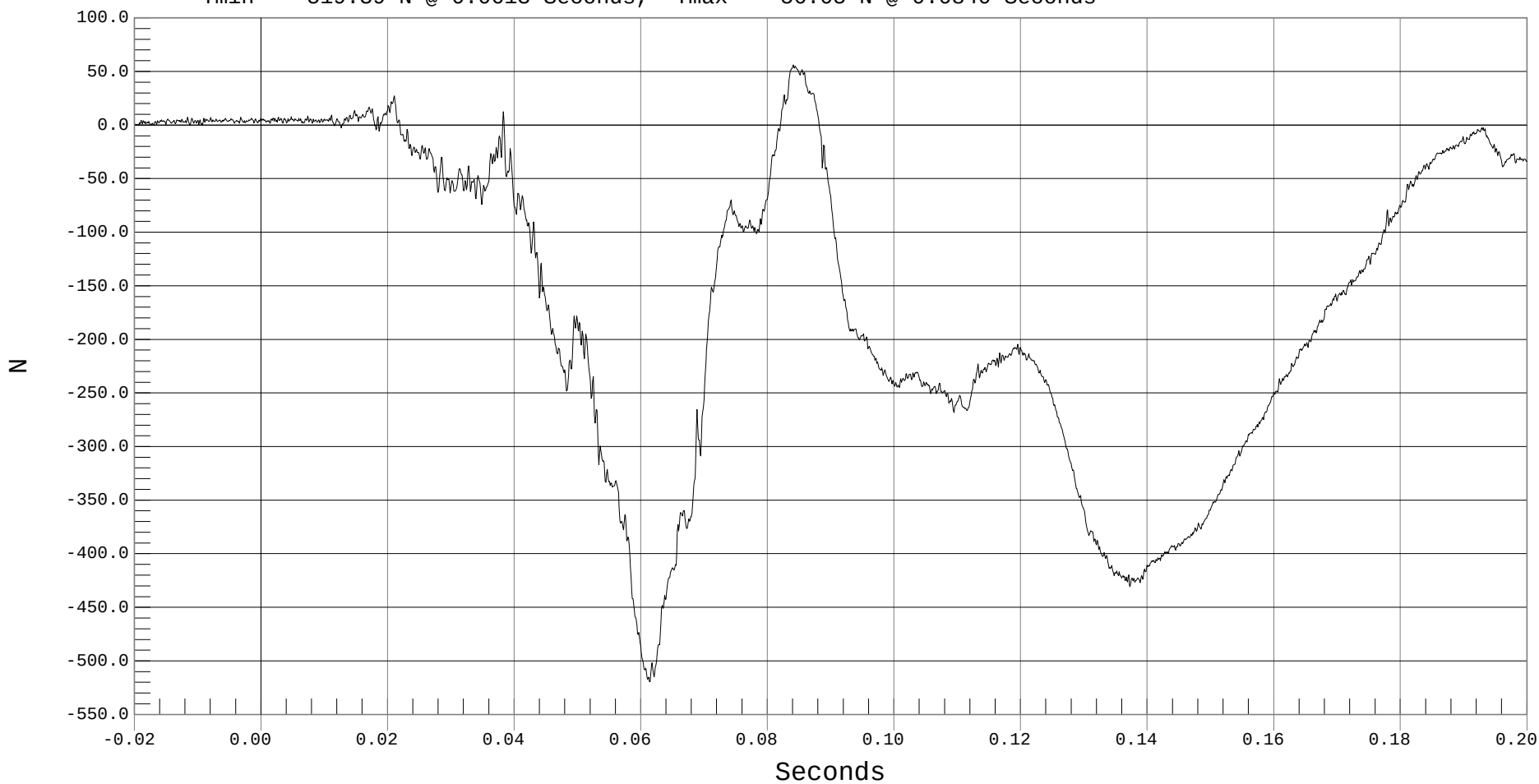
PASSENGER NECK FORCE X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER NECK FX, b01013FT.F44

Ymin = -519.39 N @ 0.0613 Seconds, Ymax = 56.05 N @ 0.0840 Seconds





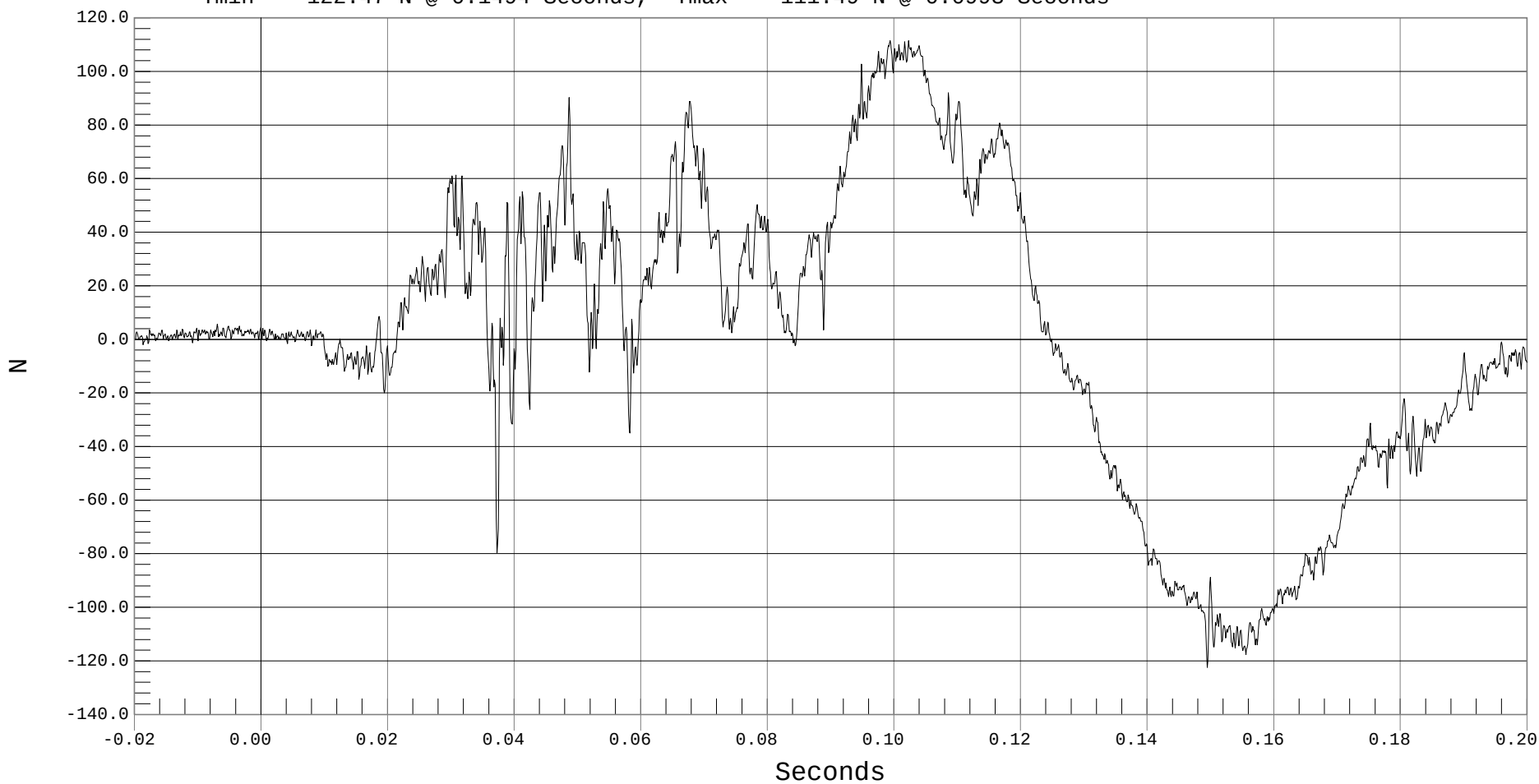
PASSENGER NECK FORCE Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER NECK FY, b01013FT.F40

Ymin = -122.47 N @ 0.1494 Seconds, Ymax = 111.49 N @ 0.0993 Seconds





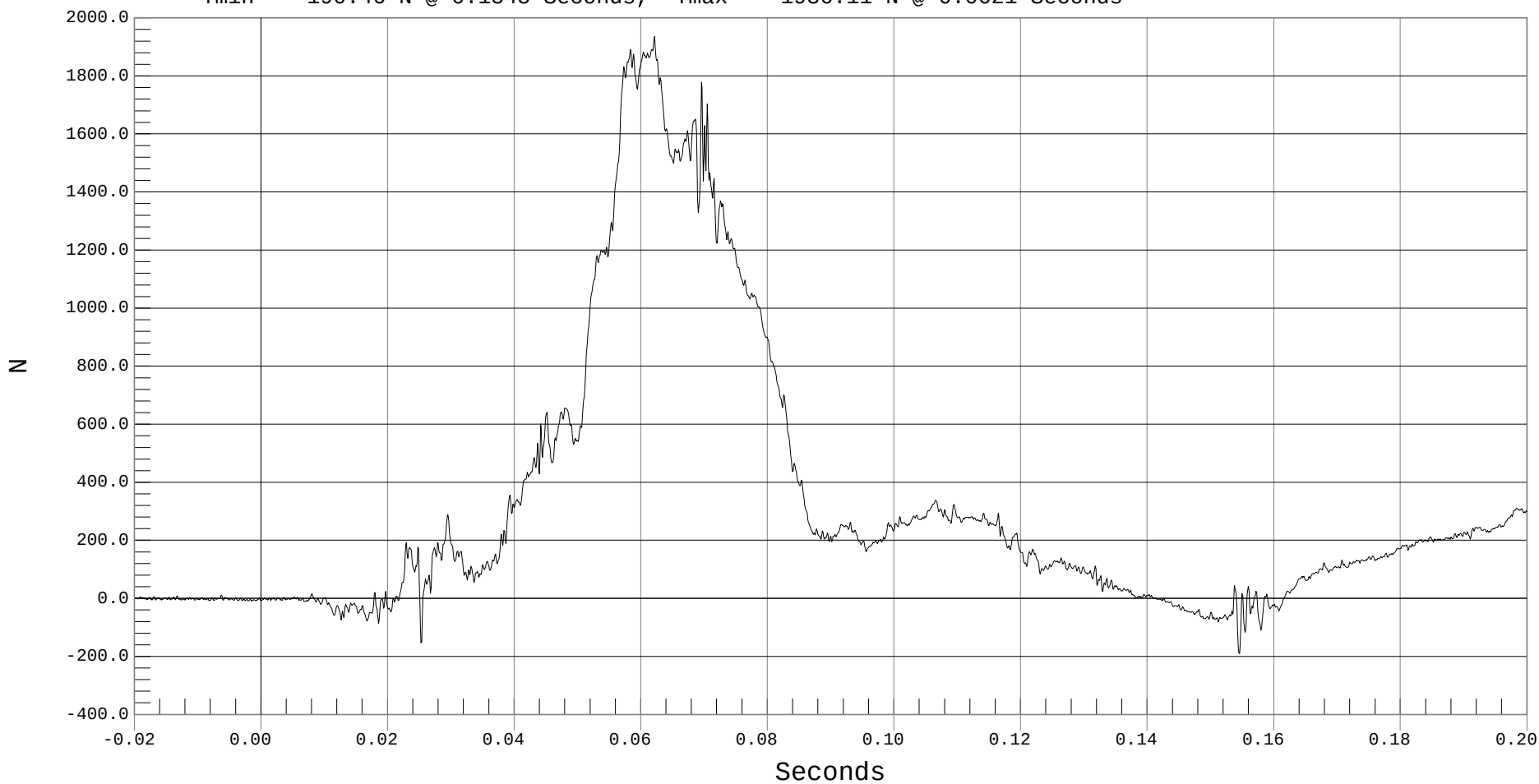
PASSENGER NECK FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER NECK FZ, b01013FT.F46

Ymin = -190.46 N @ 0.1545 Seconds, Ymax = 1936.11 N @ 0.0621 Seconds





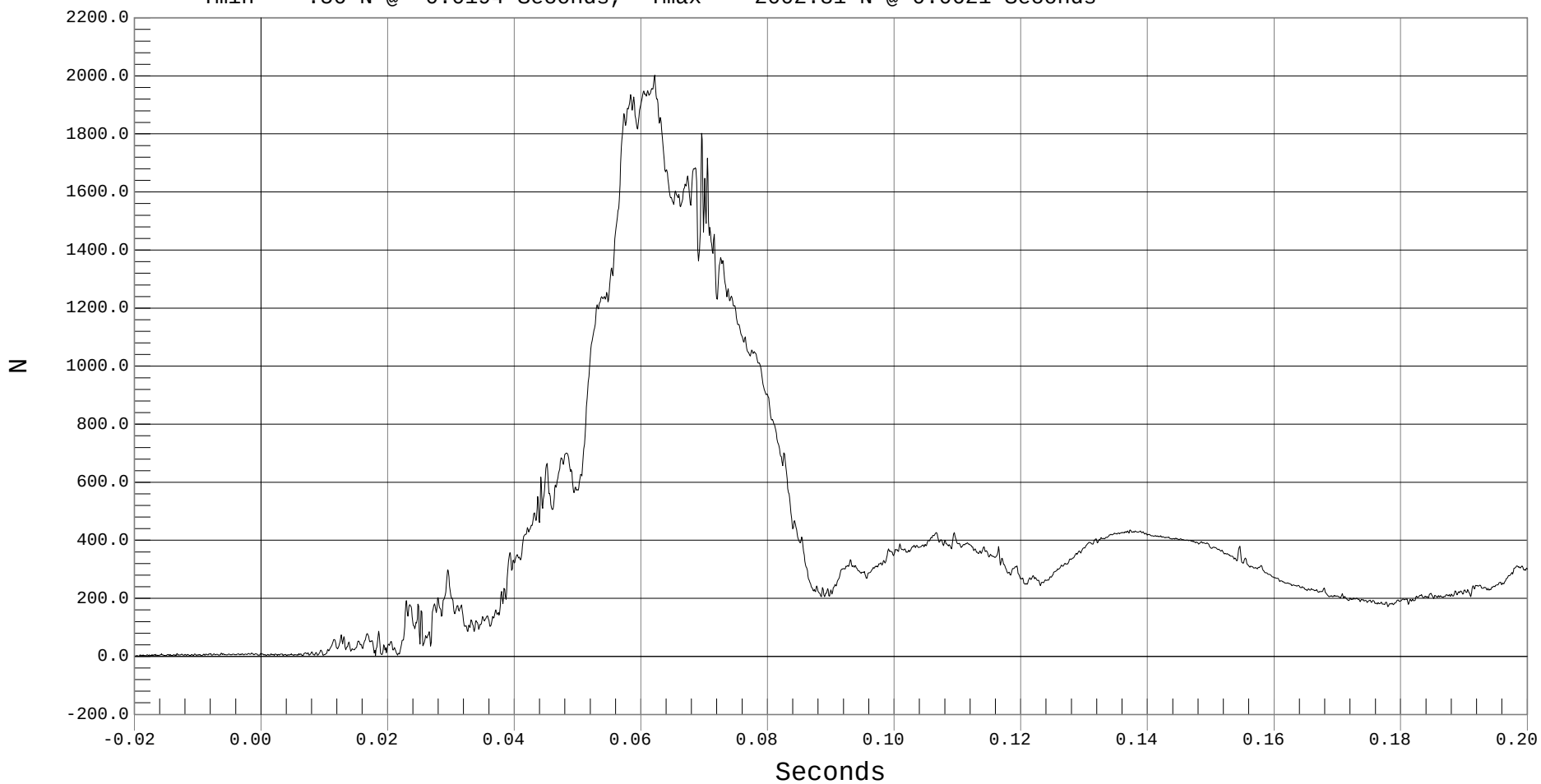
PASSENGER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER NECK FORCE RESULTANT, b01013FV.F40

Ymin = .56 N @ -0.0194 Seconds, Ymax = 2002.81 N @ 0.0621 Seconds





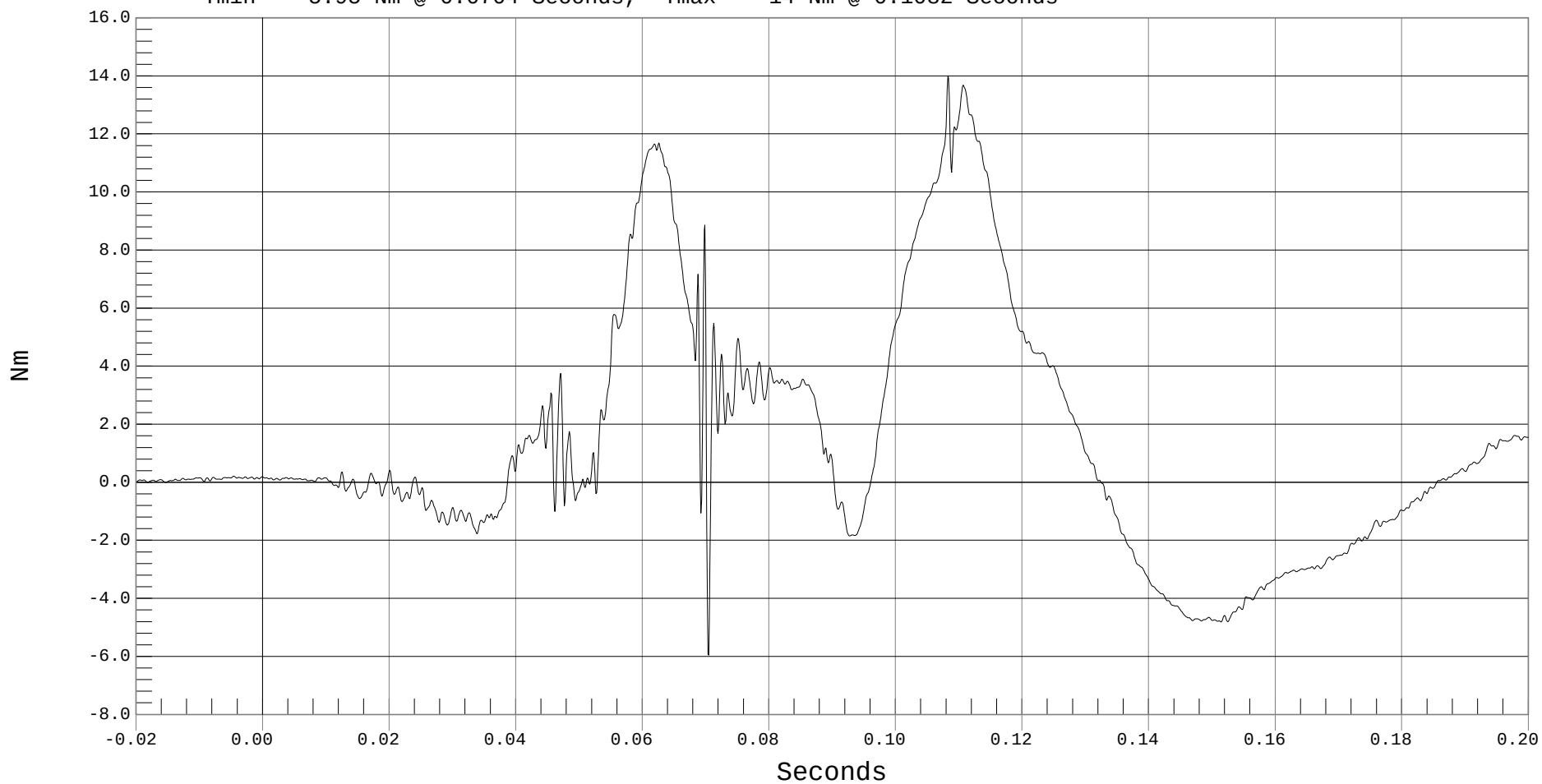
PASSENGER NECK MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER NECK MX, b01013MF.M47

Ymin = -5.95 Nm @ 0.0704 Seconds, Ymax = 14 Nm @ 0.1082 Seconds





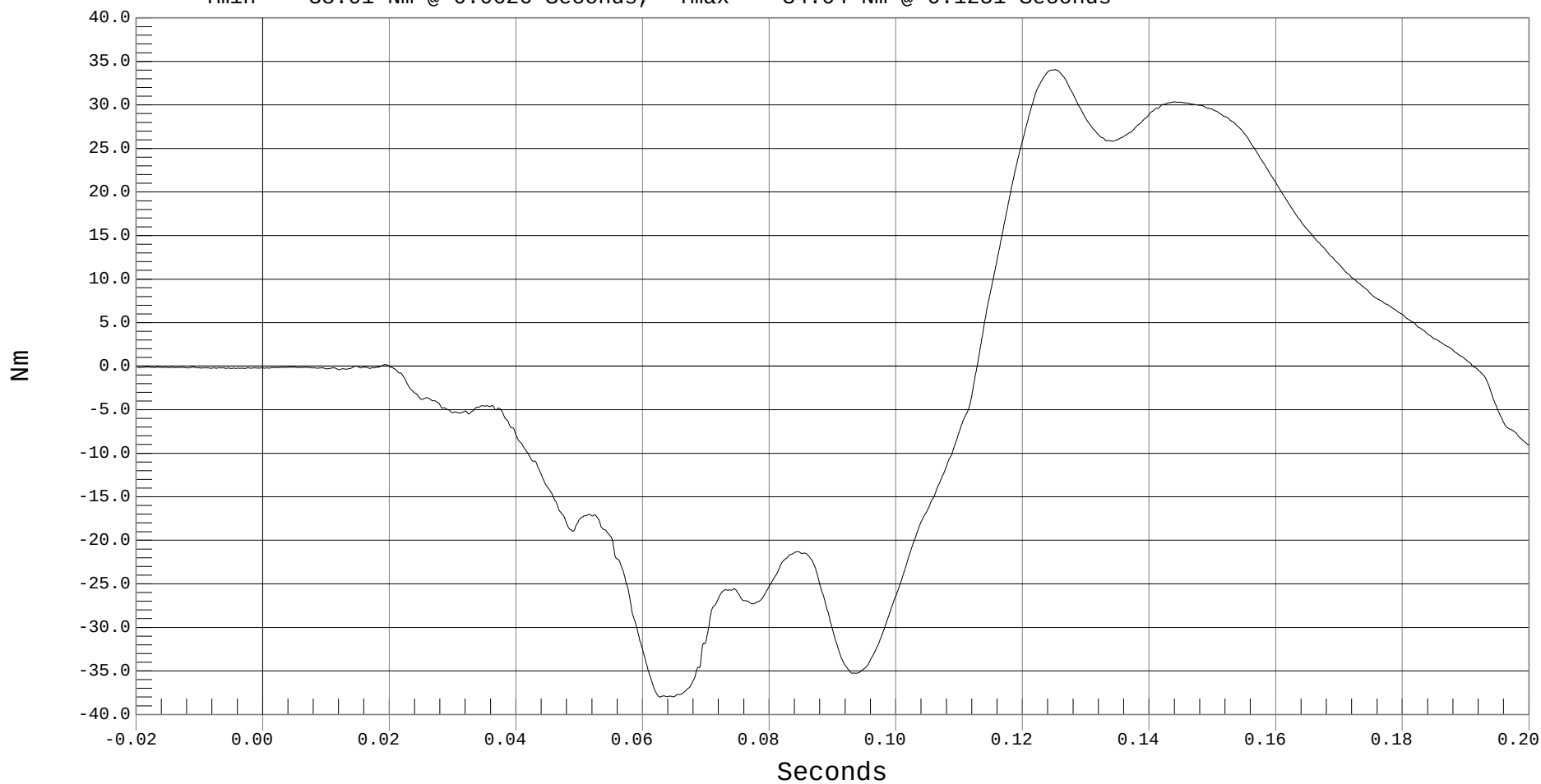
PASSENGER NECK MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER NECK MY, b01013MF.M48

Ymin = -38.01 Nm @ 0.0626 Seconds, Ymax = 34.04 Nm @ 0.1251 Seconds





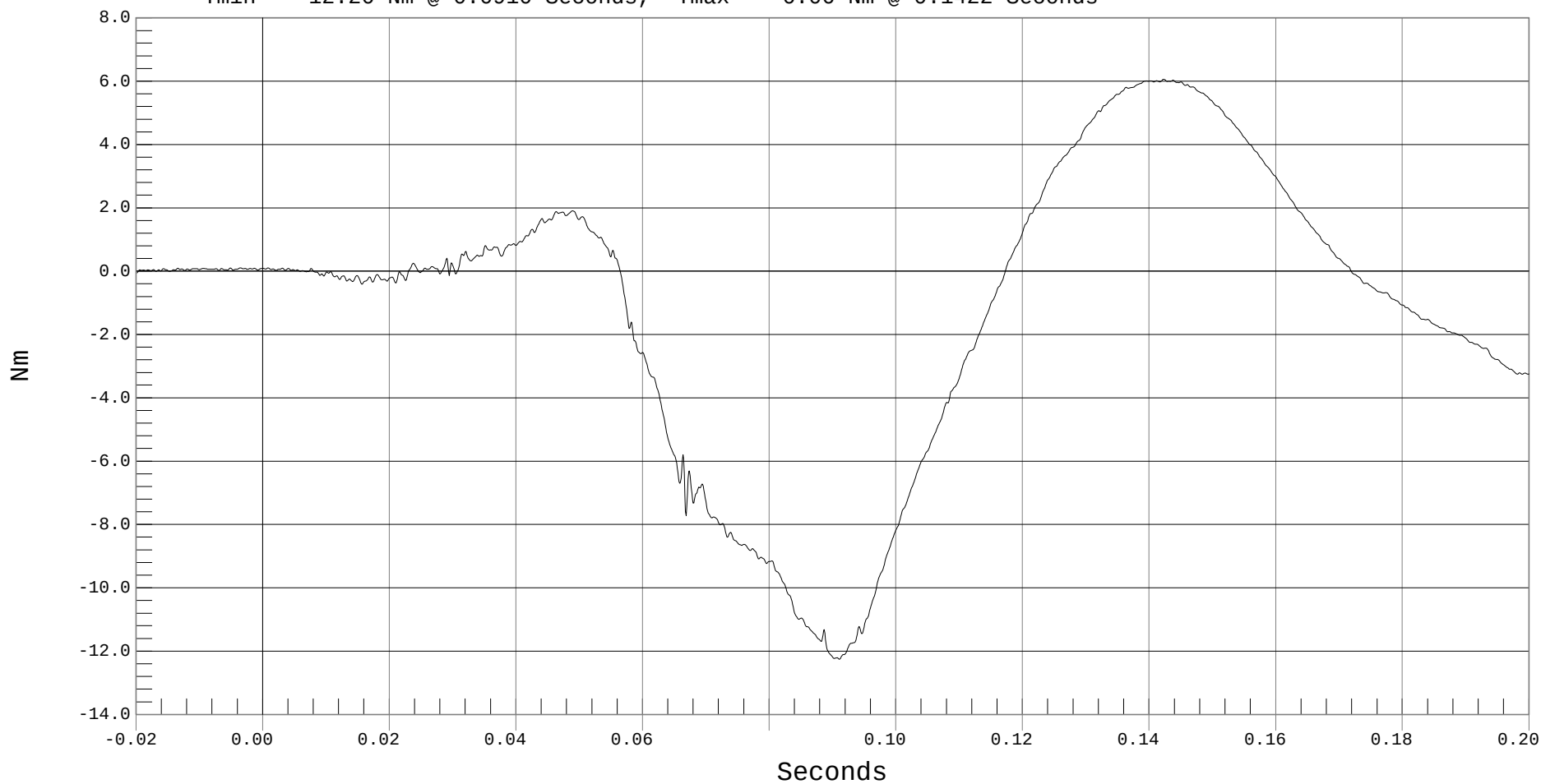
PASSENGER NECK MOMENT Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER NECK MZ, b01013MF.M49

Ymin = -12.26 Nm @ 0.0910 Seconds, Ymax = 6.06 Nm @ 0.1422 Seconds





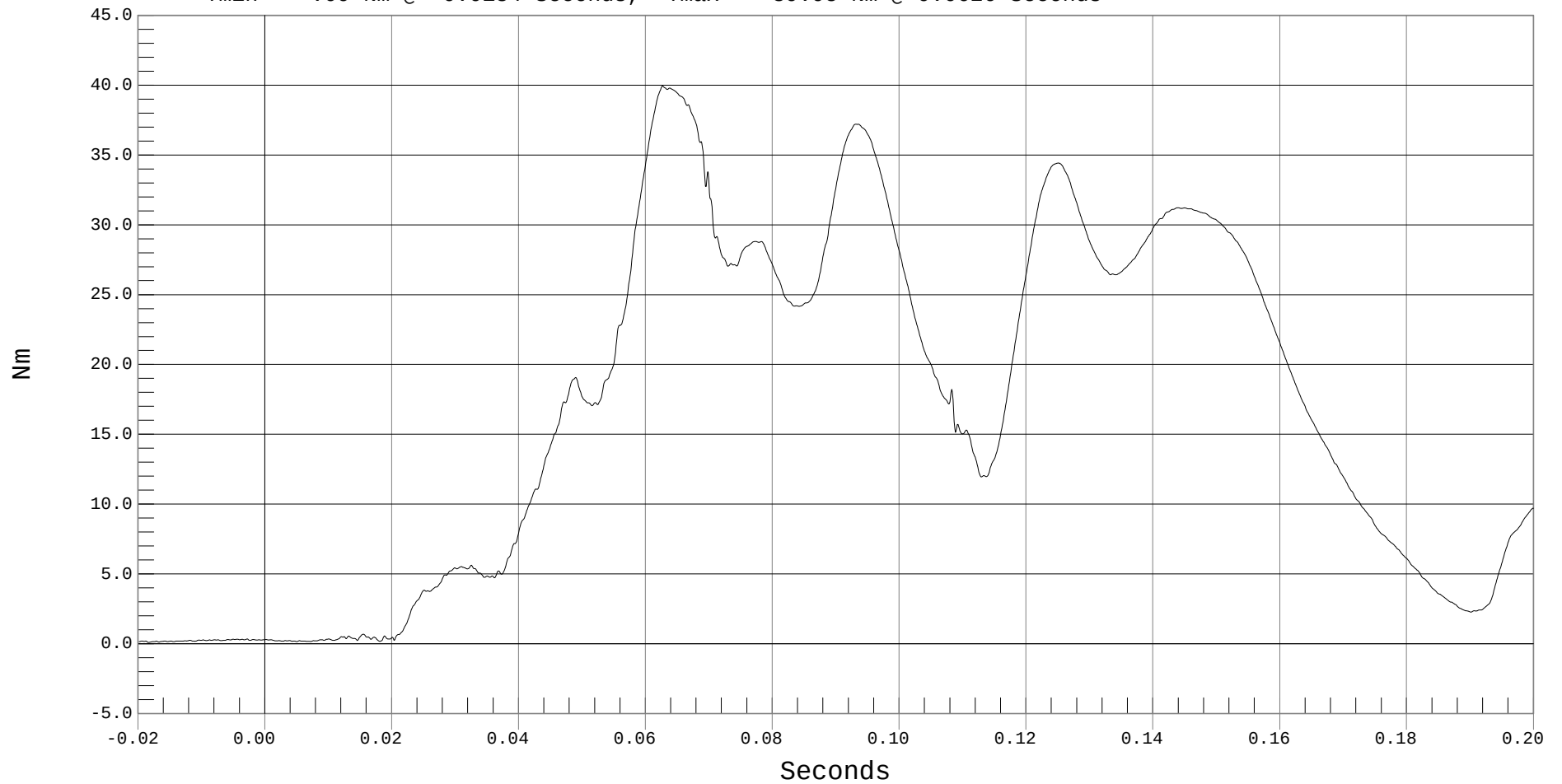
PASSENGER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER NECK MOMENT RESULTANT, b01013MV.M47

Ymin = .09 Nm @ -0.0184 Seconds, Ymax = 39.95 Nm @ 0.0626 Seconds





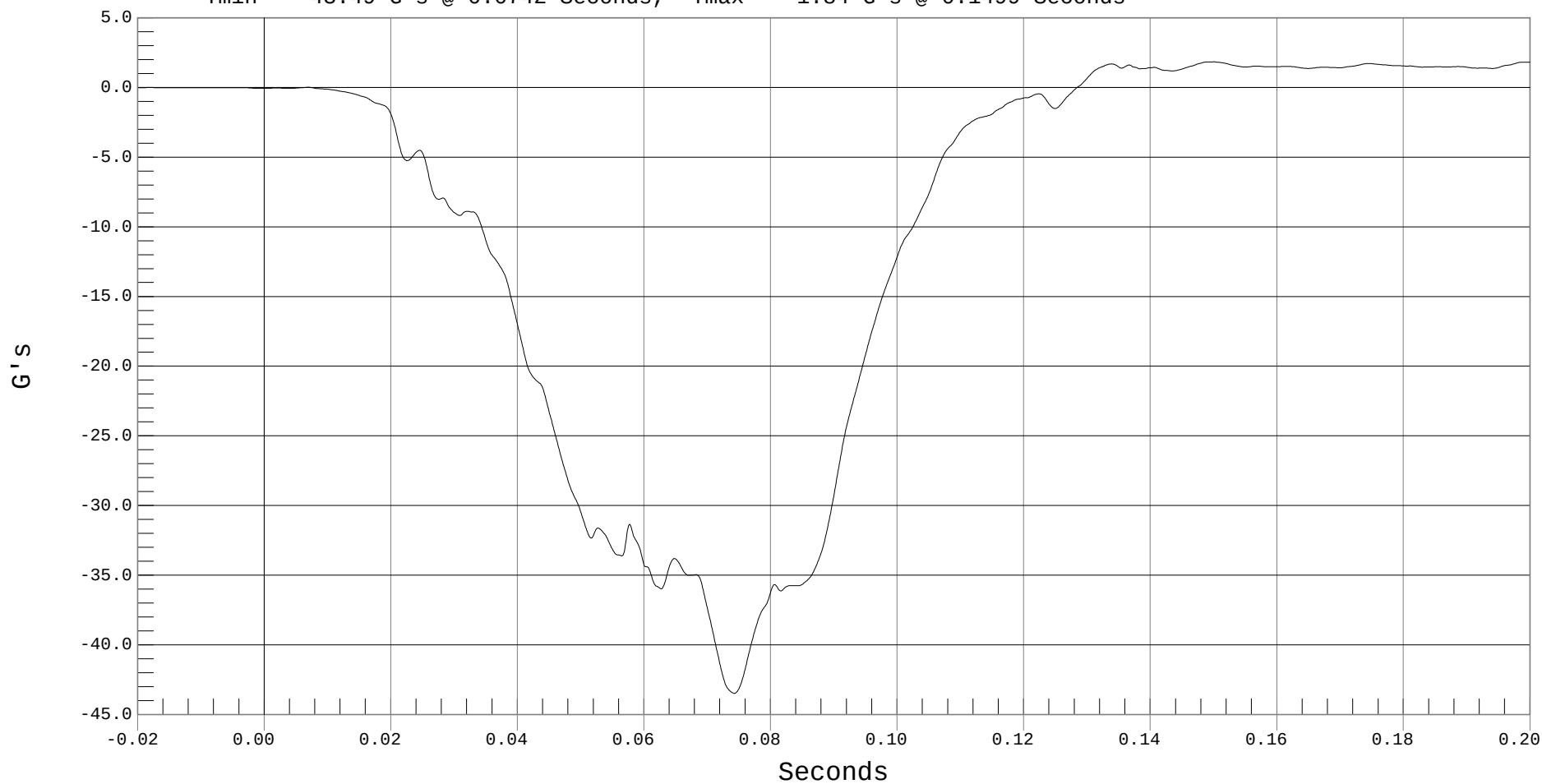
PASSENGER CHEST X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST X, b01013AF.A22

Ymin = -43.49 G's @ 0.0742 Seconds, Ymax = 1.84 G's @ 0.1499 Seconds





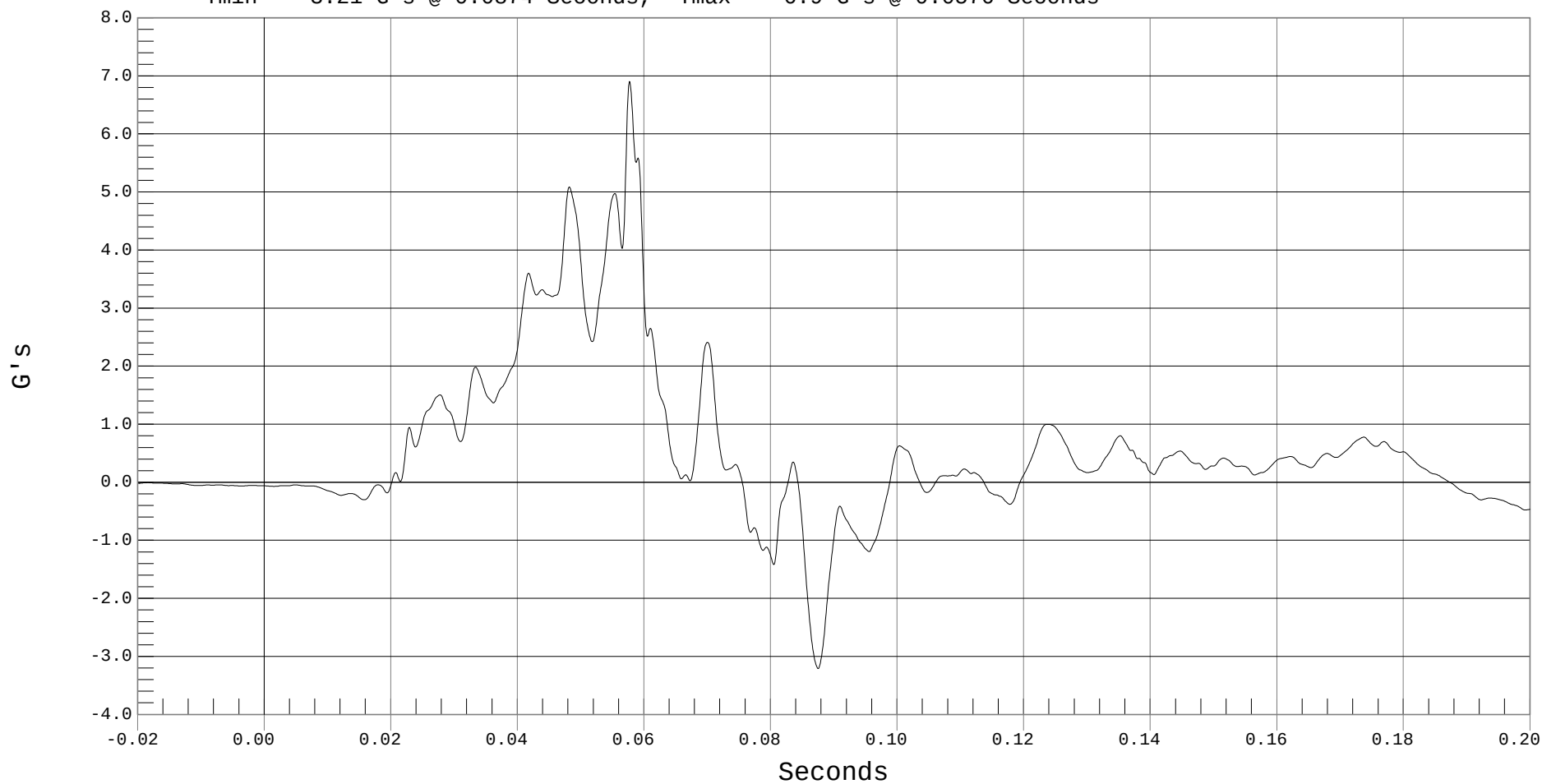
PASSENGER CHEST Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST Y, b01013AF.A23

Ymin = -3.21 G's @ 0.0874 Seconds, Ymax = 6.9 G's @ 0.0576 Seconds





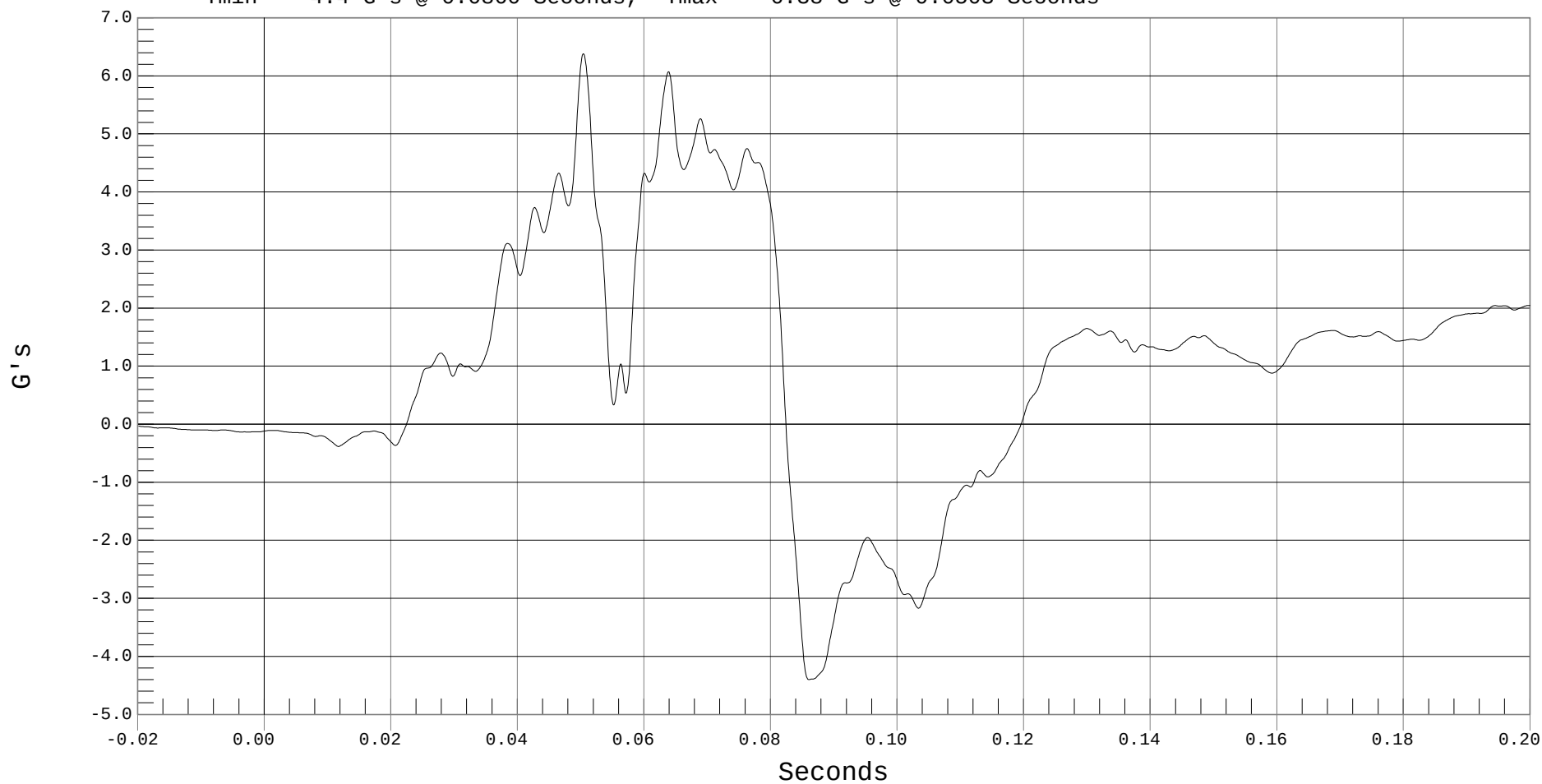
PASSENGER CHEST Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST Z, b01013AF.A53

Ymin = -4.4 G's @ 0.0860 Seconds, Ymax = 6.38 G's @ 0.0503 Seconds





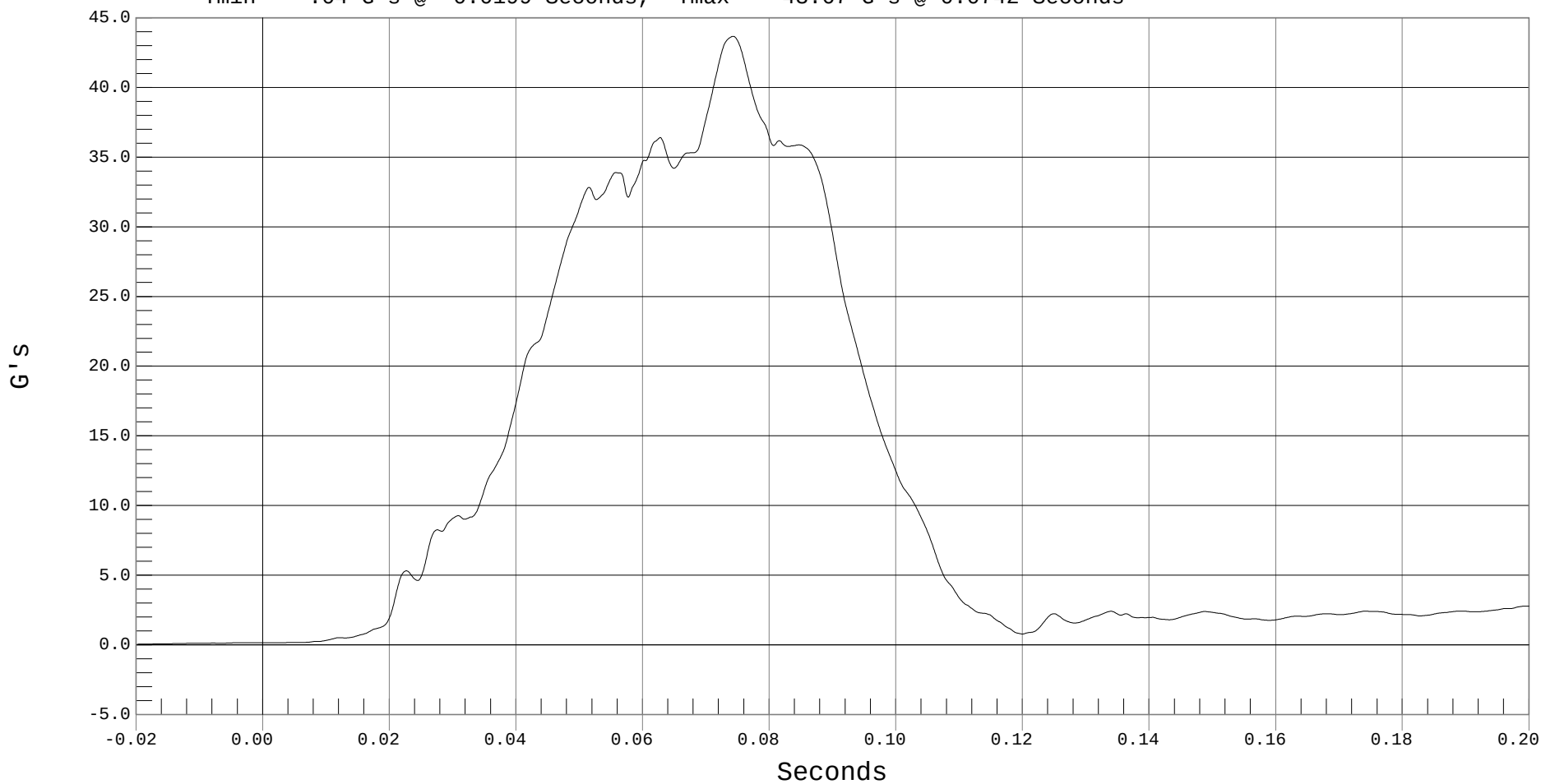
PASSENGER CHEST RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST RESULTANT ACCELERATION, b01013AV.A22

Ymin = .04 G's @ -0.0199 Seconds, Ymax = 43.67 G's @ 0.0742 Seconds





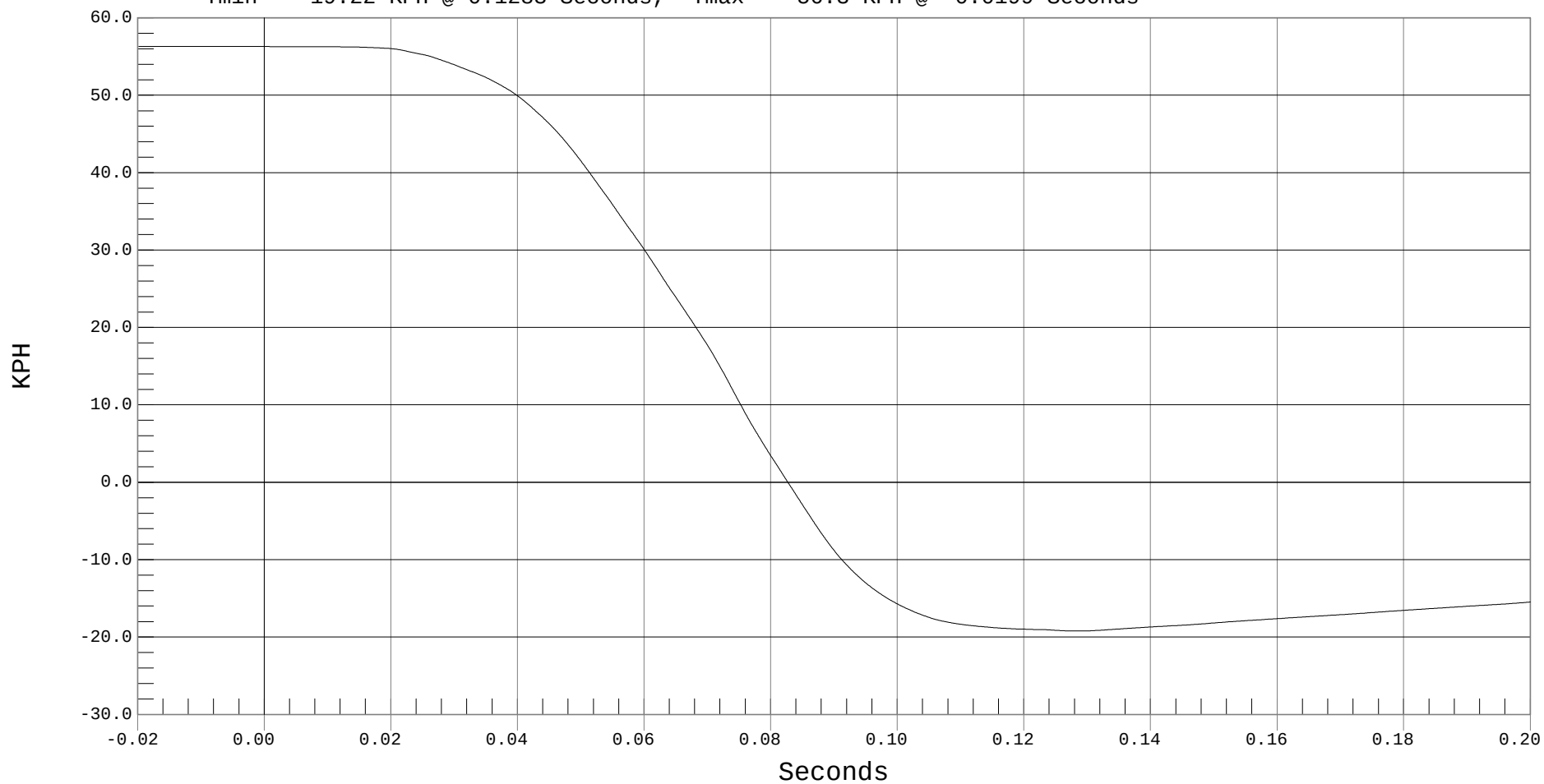
PASSENGER CHEST X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST X VELOCITY, b01013AI.V22

Ymin = -19.22 KPH @ 0.1283 Seconds, Ymax = 56.3 KPH @ -0.0199 Seconds





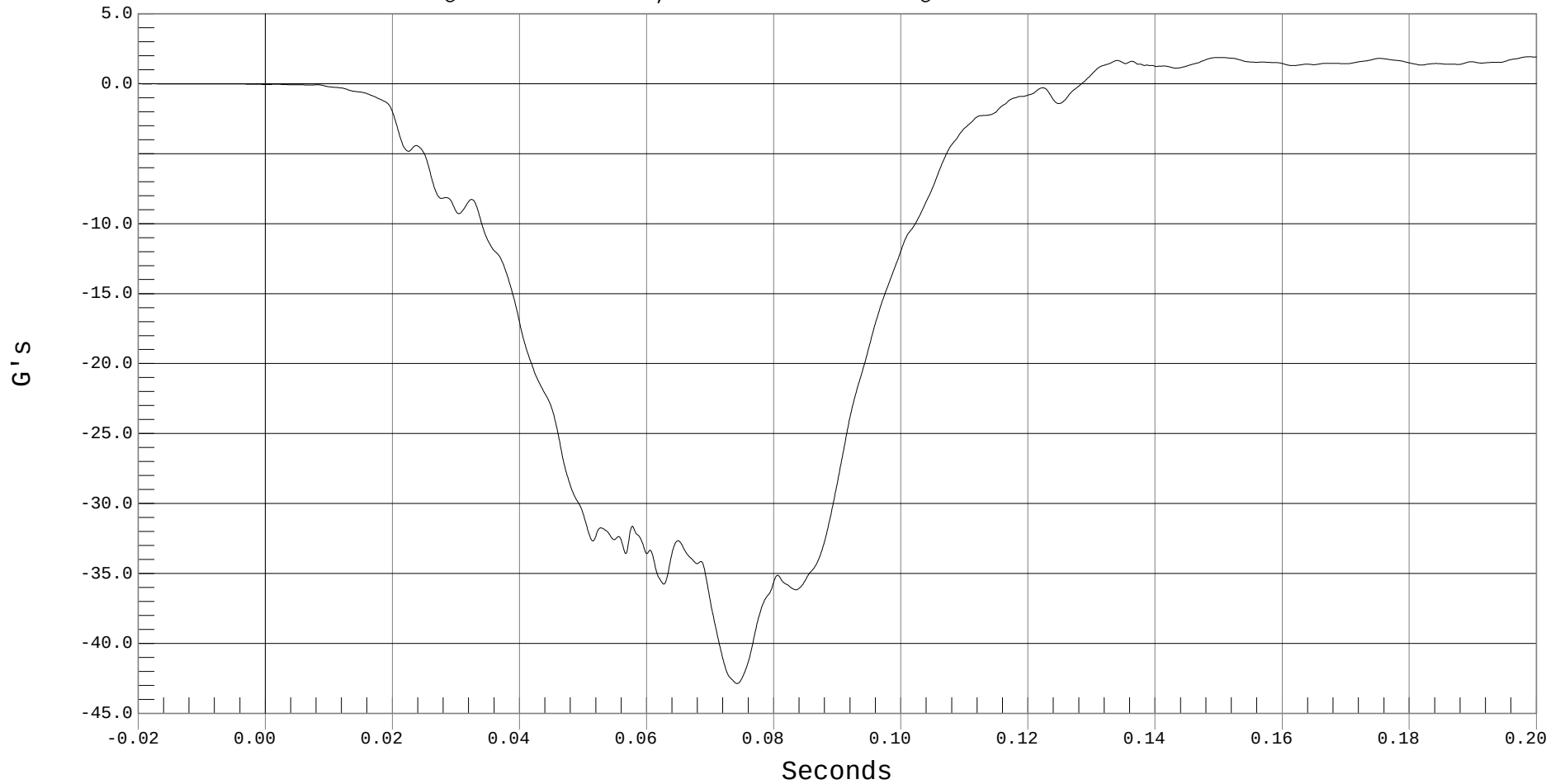
PASSENGER CHEST REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST Xr, b01013AF.A50

Ymin = -42.87 G's @ 0.0741 Seconds, Ymax = 1.94 G's @ 0.1987 Seconds





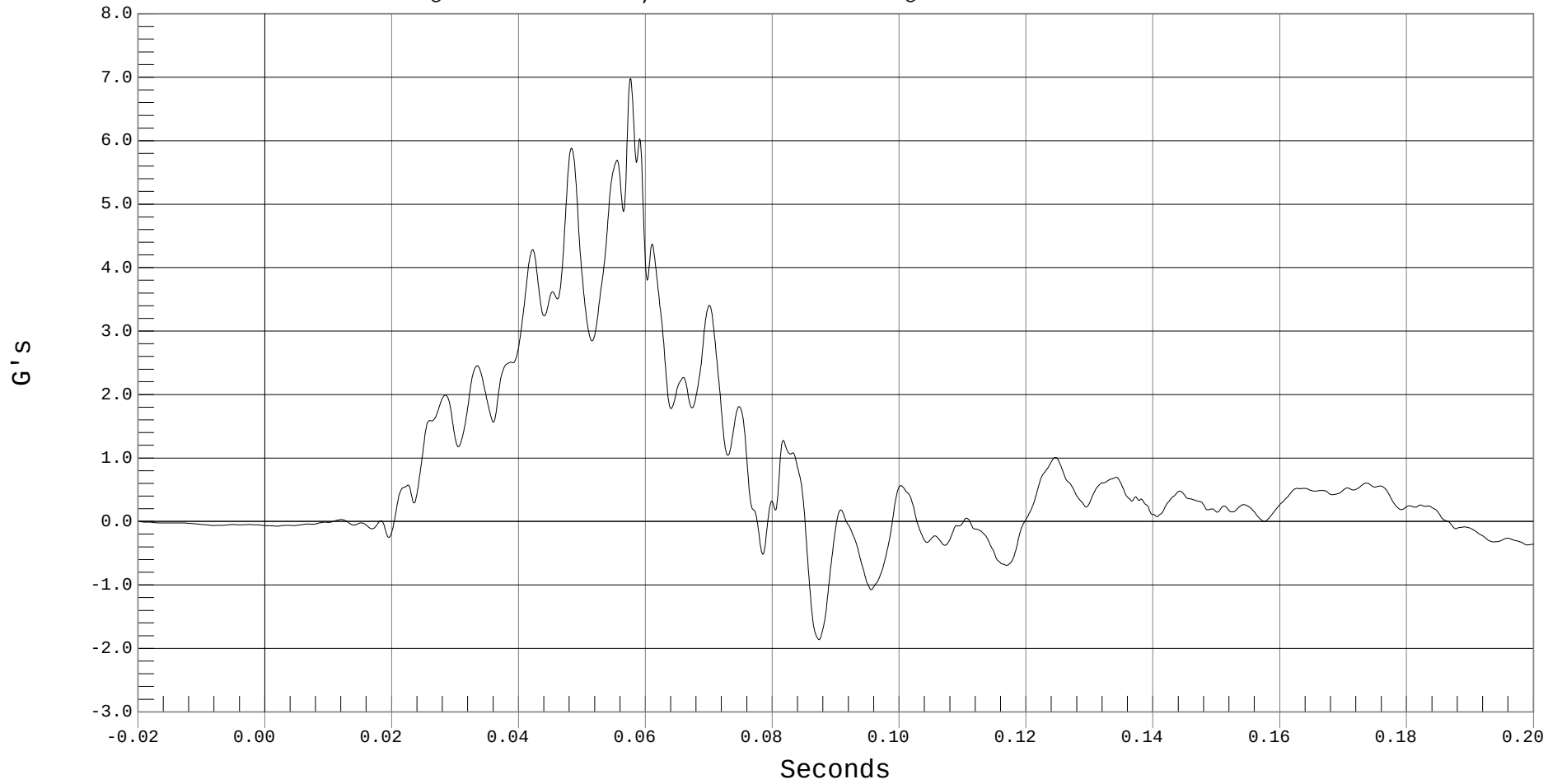
PASSENGER CHEST REDUNDANT Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST Yr, b01013AF.A51

Ymin = -1.86 G's @ 0.0873 Seconds, Ymax = 6.97 G's @ 0.0575 Seconds





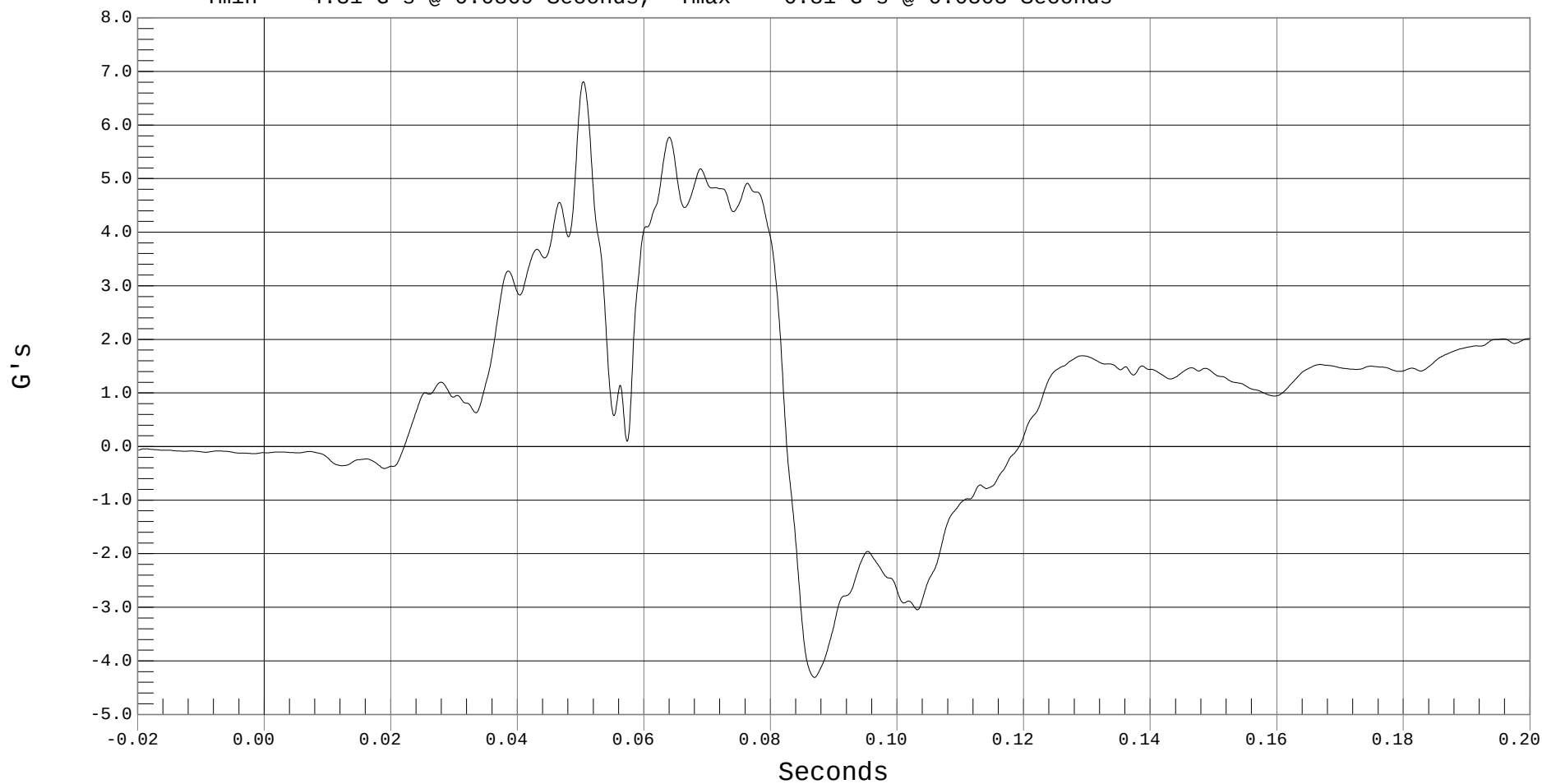
PASSENGER CHEST REDUNDANT Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST Zr, b01013AF.A52

Ymin = -4.31 G's @ 0.0869 Seconds, Ymax = 6.81 G's @ 0.0503 Seconds





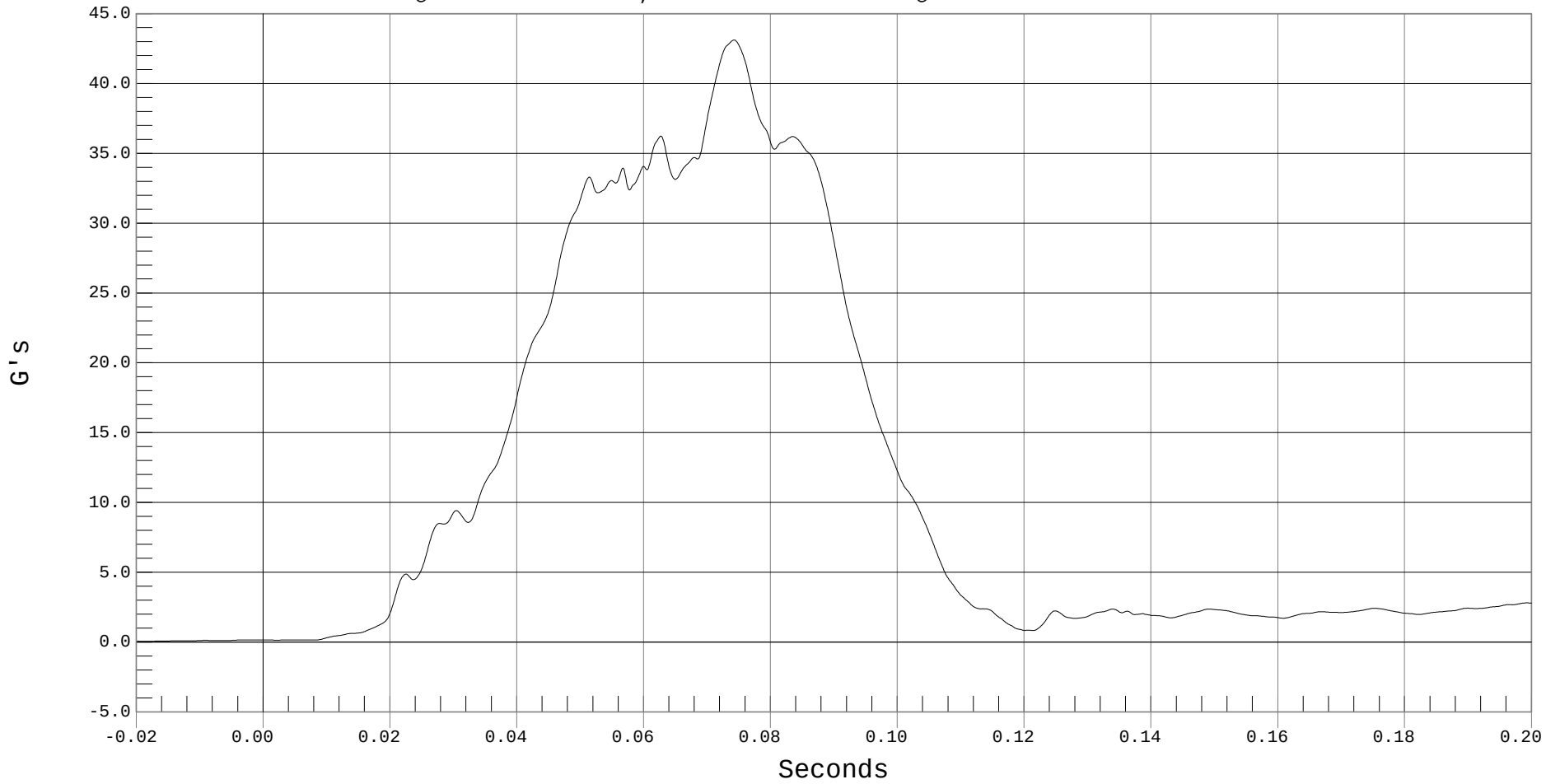
PASSENGER CHEST REDUNDANT RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST REDUNDANT RESULTANT ACCELERATION, b01013AV.A50

Ymin = .04 G's @ -0.0189 Seconds, Ymax = 43.12 G's @ 0.0742 Seconds





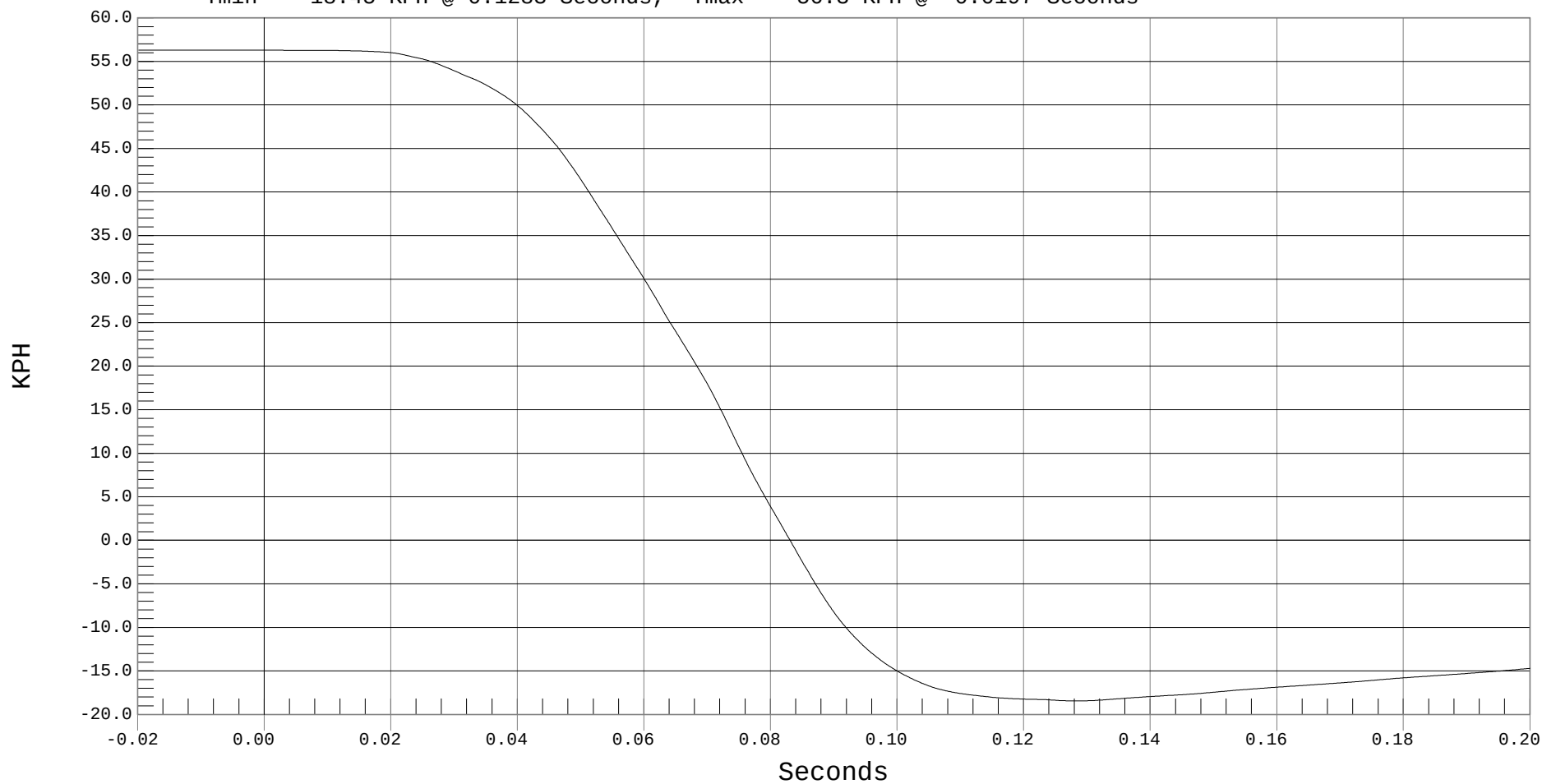
PASSENGER CHEST REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER CHEST REDUNDANT X VELOCITY, b01013AI.V50

Ymin = -18.45 KPH @ 0.1283 Seconds, Ymax = 56.3 KPH @ -0.0197 Seconds





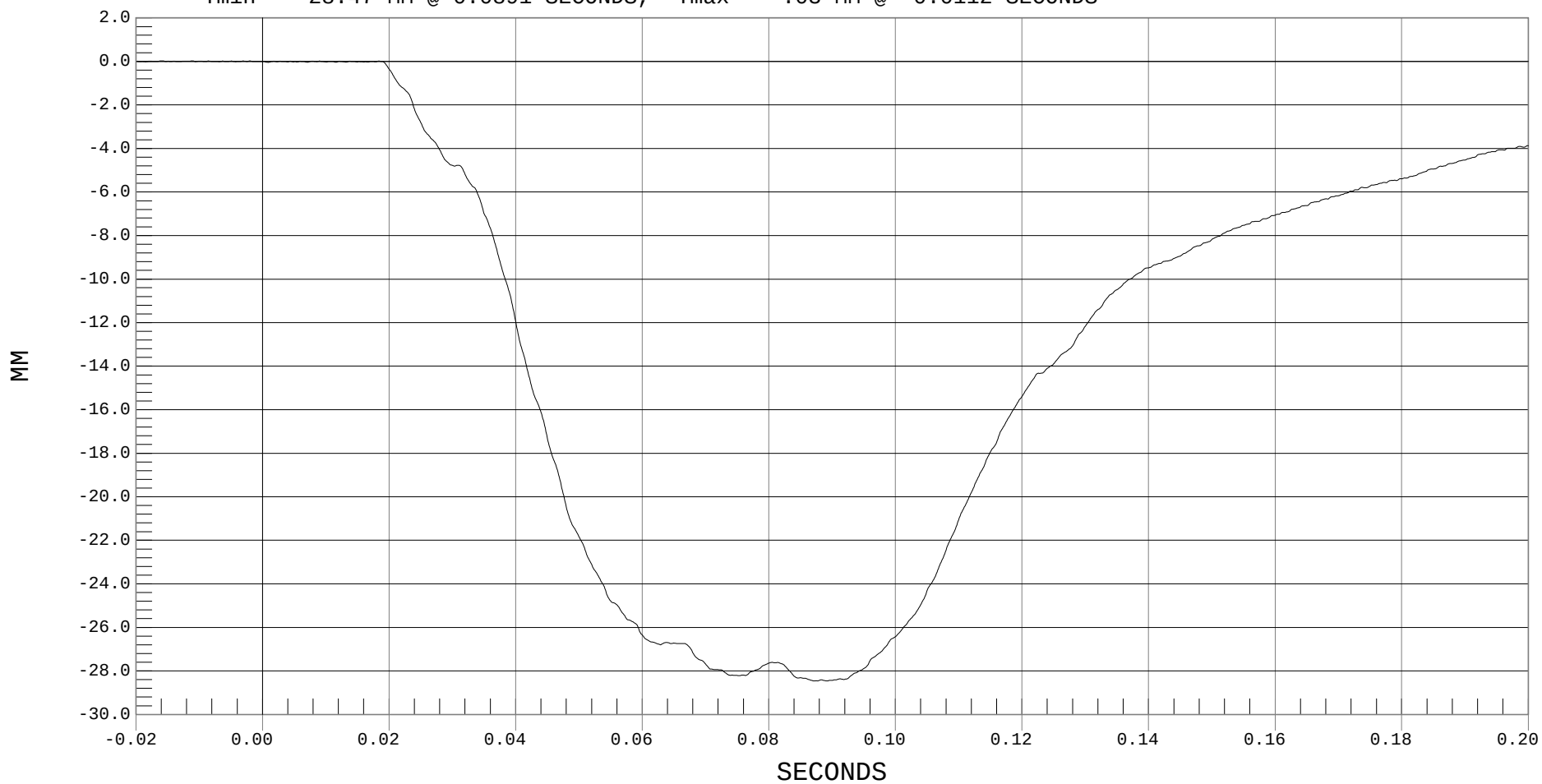
PASSENGER CHEST COMPRESSION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER CHEST DISP, b01013DF.D25

Ymin = -28.47 MM @ 0.0891 SECONDS, Ymax = .03 MM @ -0.0112 SECONDS





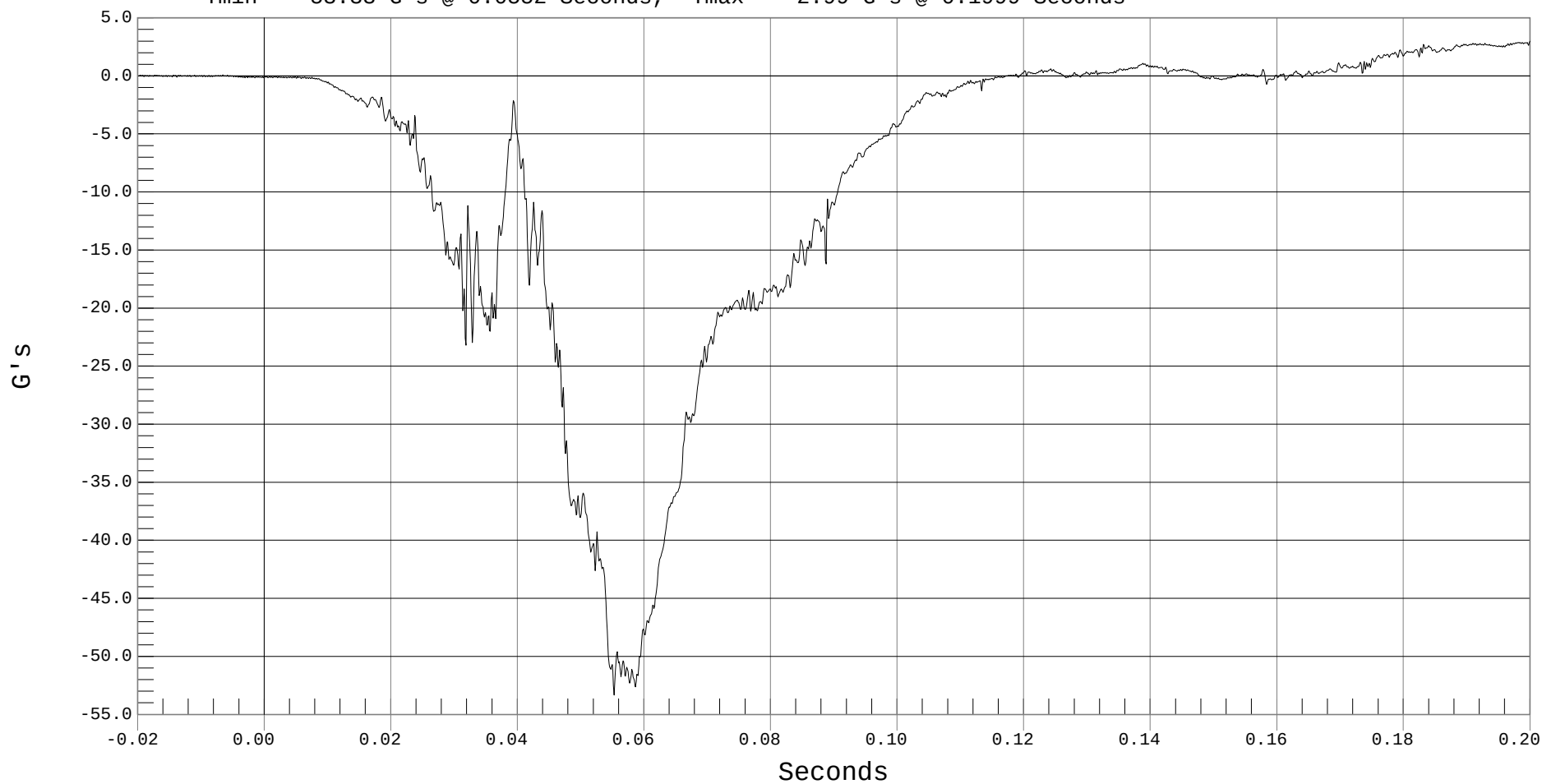
PASSENGER PELVIS X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER PELVIS X, b01013AT.A26

Ymin = -53.33 G's @ 0.0552 Seconds, Ymax = 2.99 G's @ 0.1999 Seconds





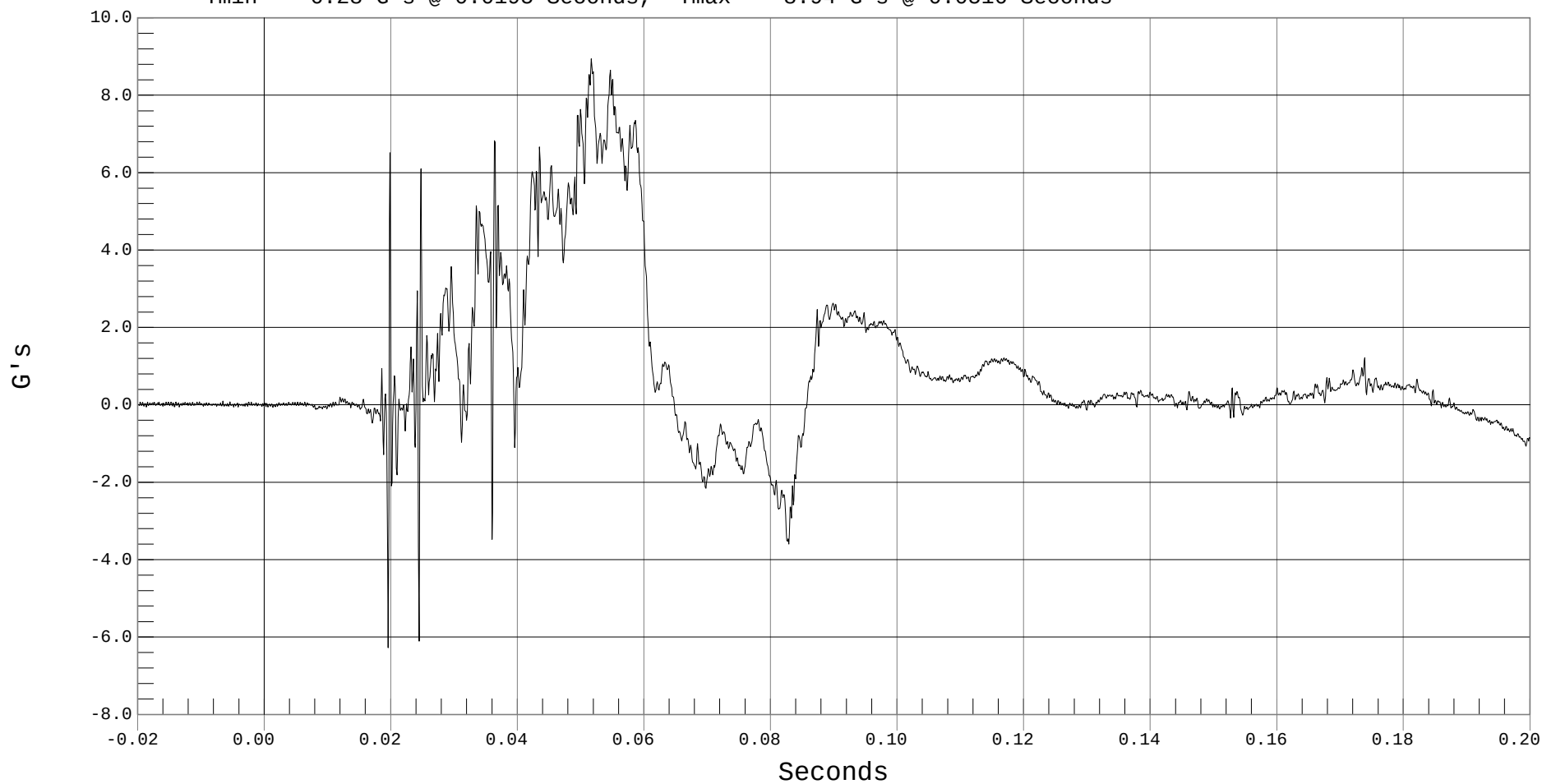
PASSENGER PELVIS Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER PELVIS Y, b01013AT.A27

Ymin = -6.28 G's @ 0.0195 Seconds, Ymax = 8.94 G's @ 0.0516 Seconds





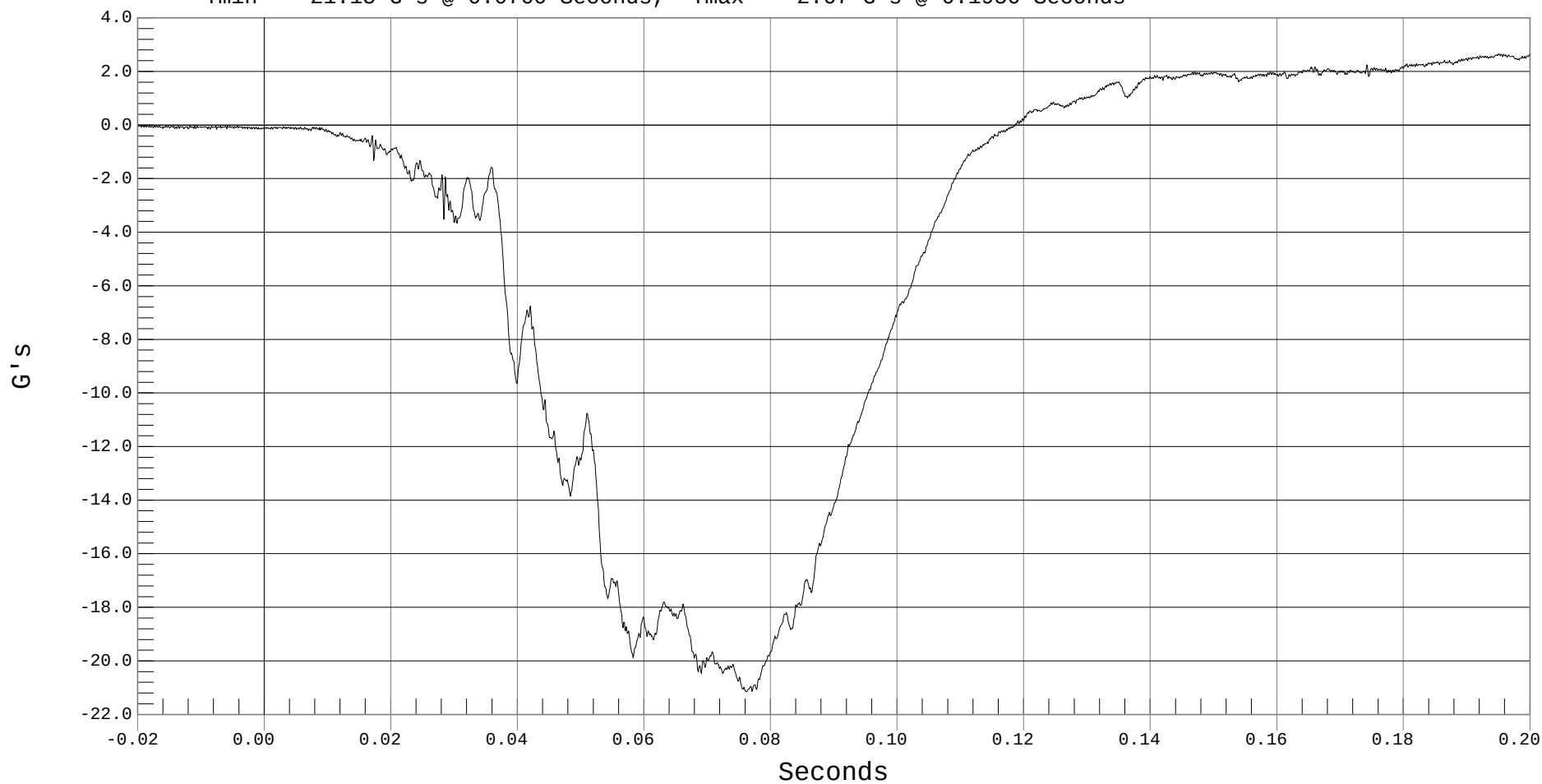
PASSENGER PELVIS Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER PELVIS Z, b01013AT.A28

Ymin = -21.15 G's @ 0.0760 Seconds, Ymax = 2.67 G's @ 0.1950 Seconds





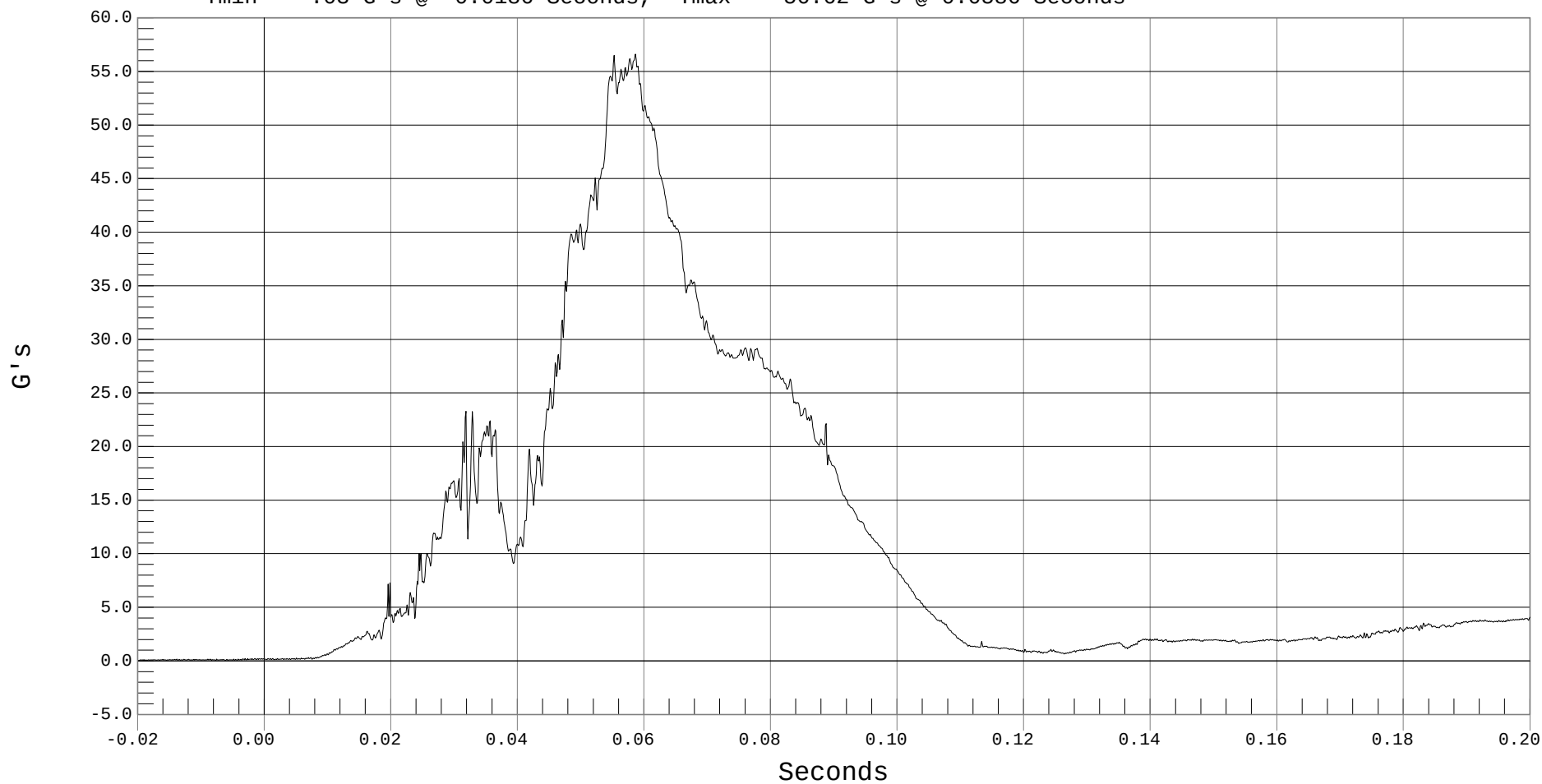
PASSENGER PELVIS RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 PASSENGER PELVIS RESULTANT ACCELERATION, b01013AV.A26

Ymin = .03 G's @ -0.0186 Seconds, Ymax = 56.62 G's @ 0.0586 Seconds





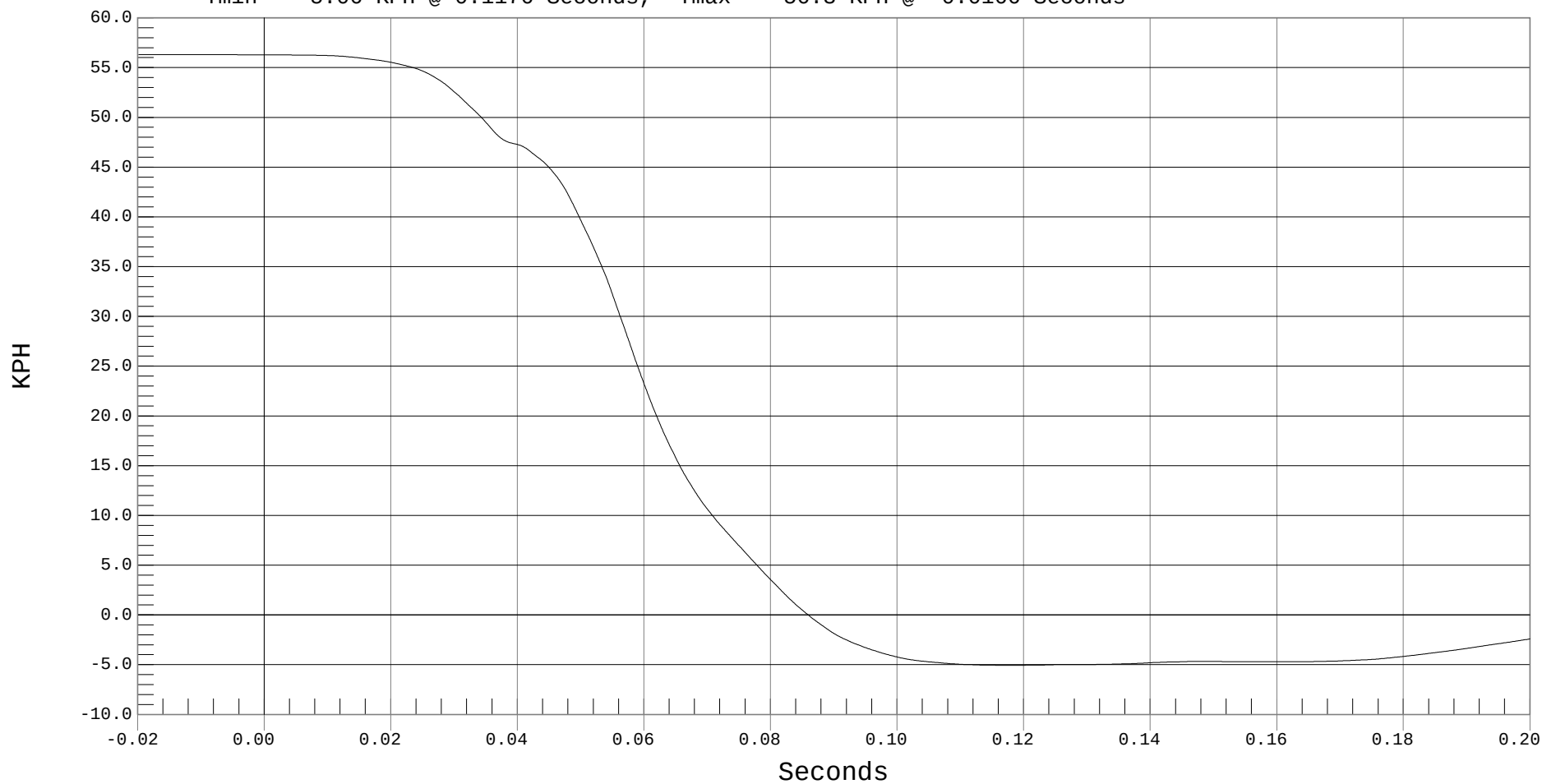
PASSENGER PELVIS X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER PELVIS X VELOCITY, b01013AI.V26

Ymin = -5.06 KPH @ 0.1176 Seconds, Ymax = 56.3 KPH @ -0.0166 Seconds





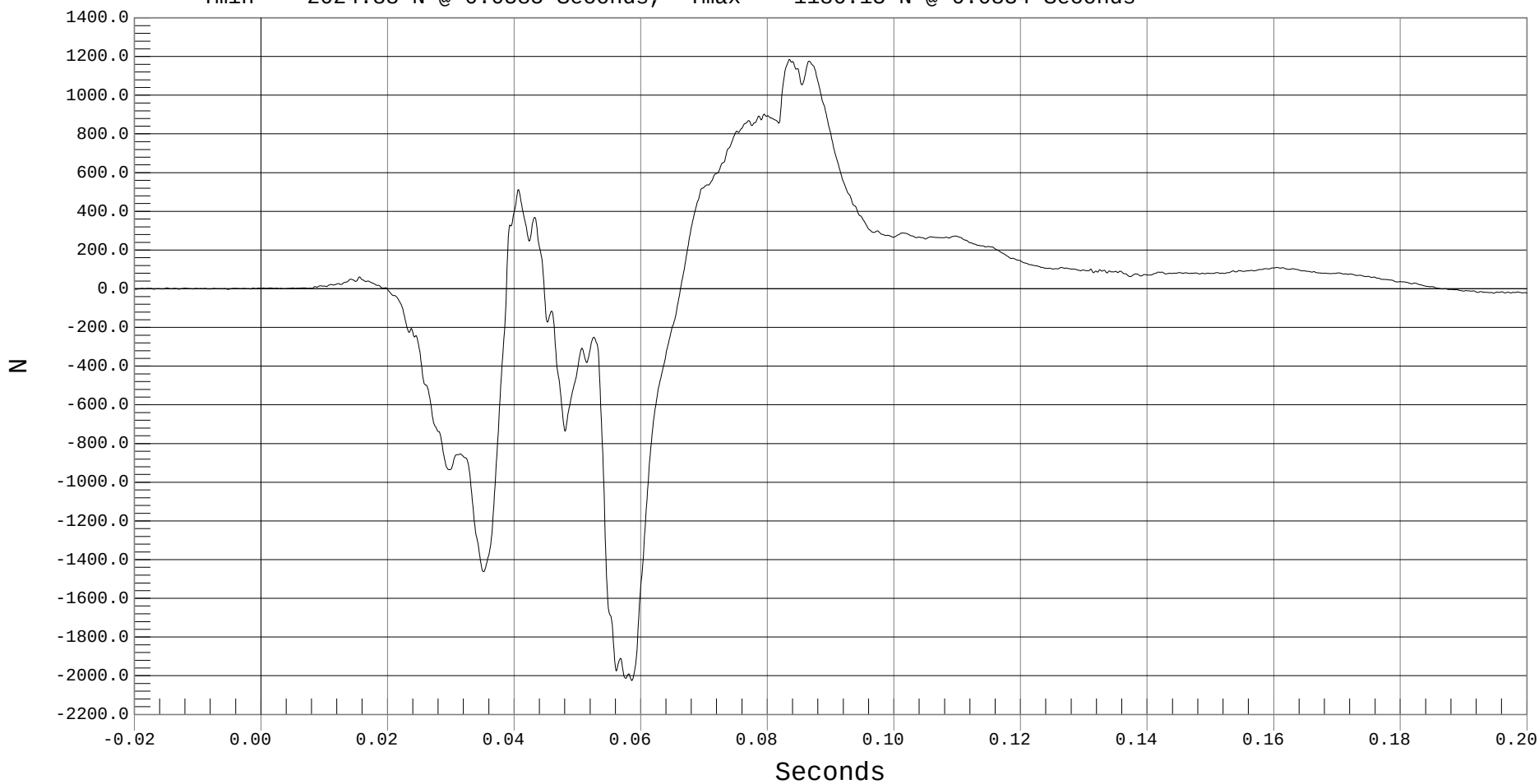
PASSENGER LEFT FEMUR FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

1 PASSENGER LEFT FEMUR, b01013FF.F30

Ymin = -2024.88 N @ 0.0585 Seconds, Ymax = 1186.13 N @ 0.0834 Seconds





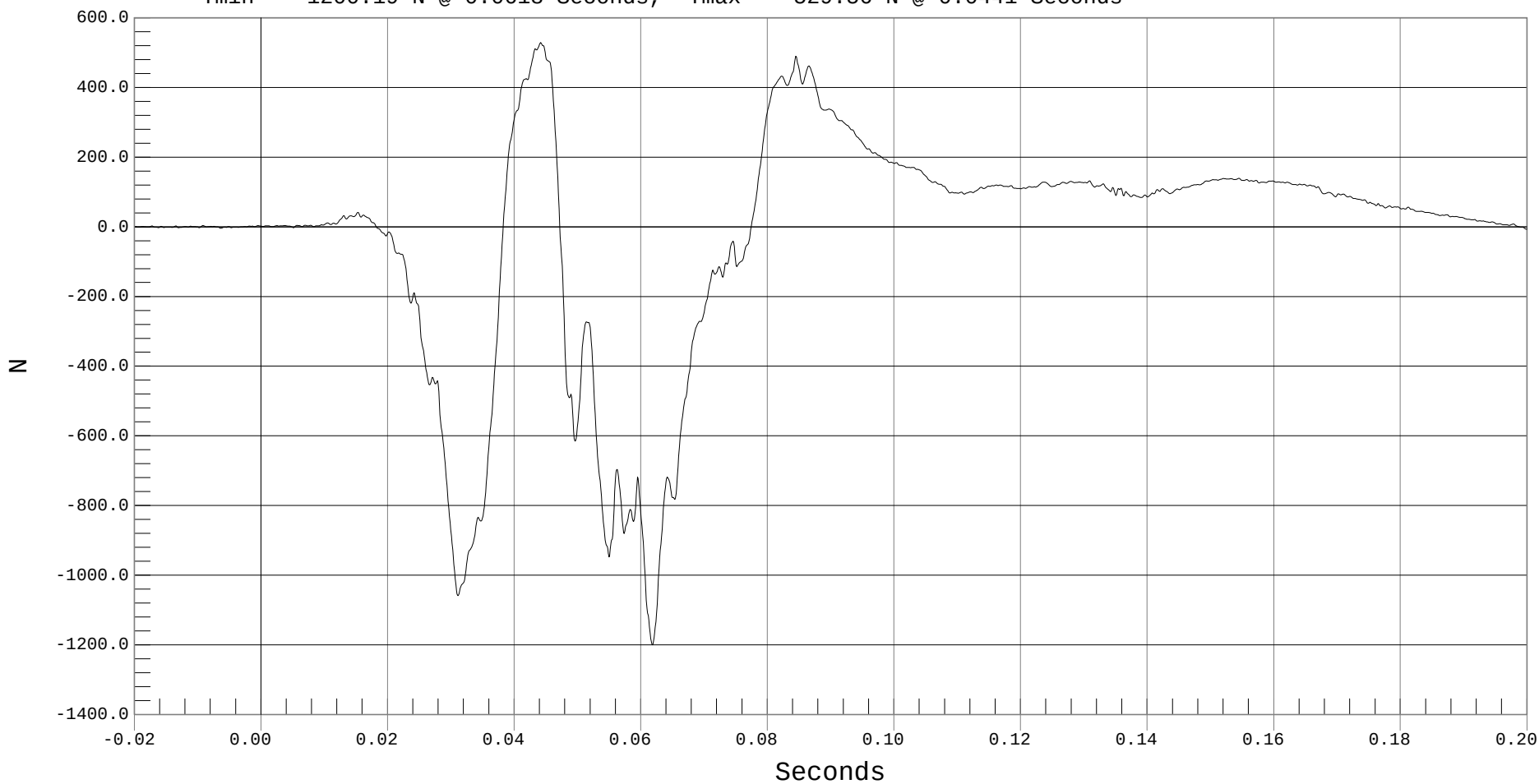
PASSENGER RIGHT FEMUR FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT FEMUR, b01013FF.F29

Ymin = -1200.19 N @ 0.0618 Seconds, Ymax = 529.56 N @ 0.0441 Seconds





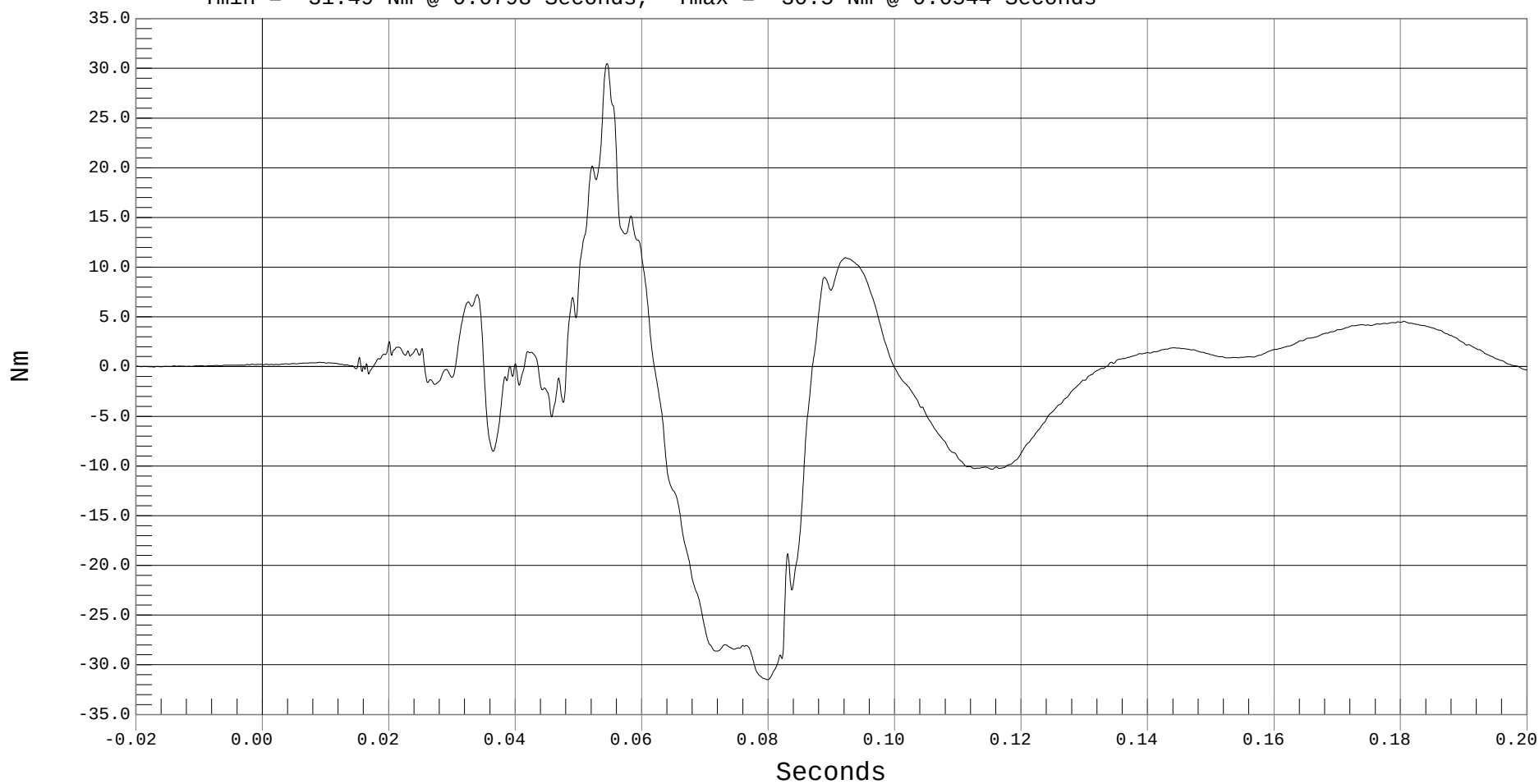
PASSENGER LEFT UPPER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER LEFT UPPER TIBIA MX, b01013MF.M87

Ymin = -31.49 Nm @ 0.0798 Seconds, Ymax = 30.5 Nm @ 0.0544 Seconds





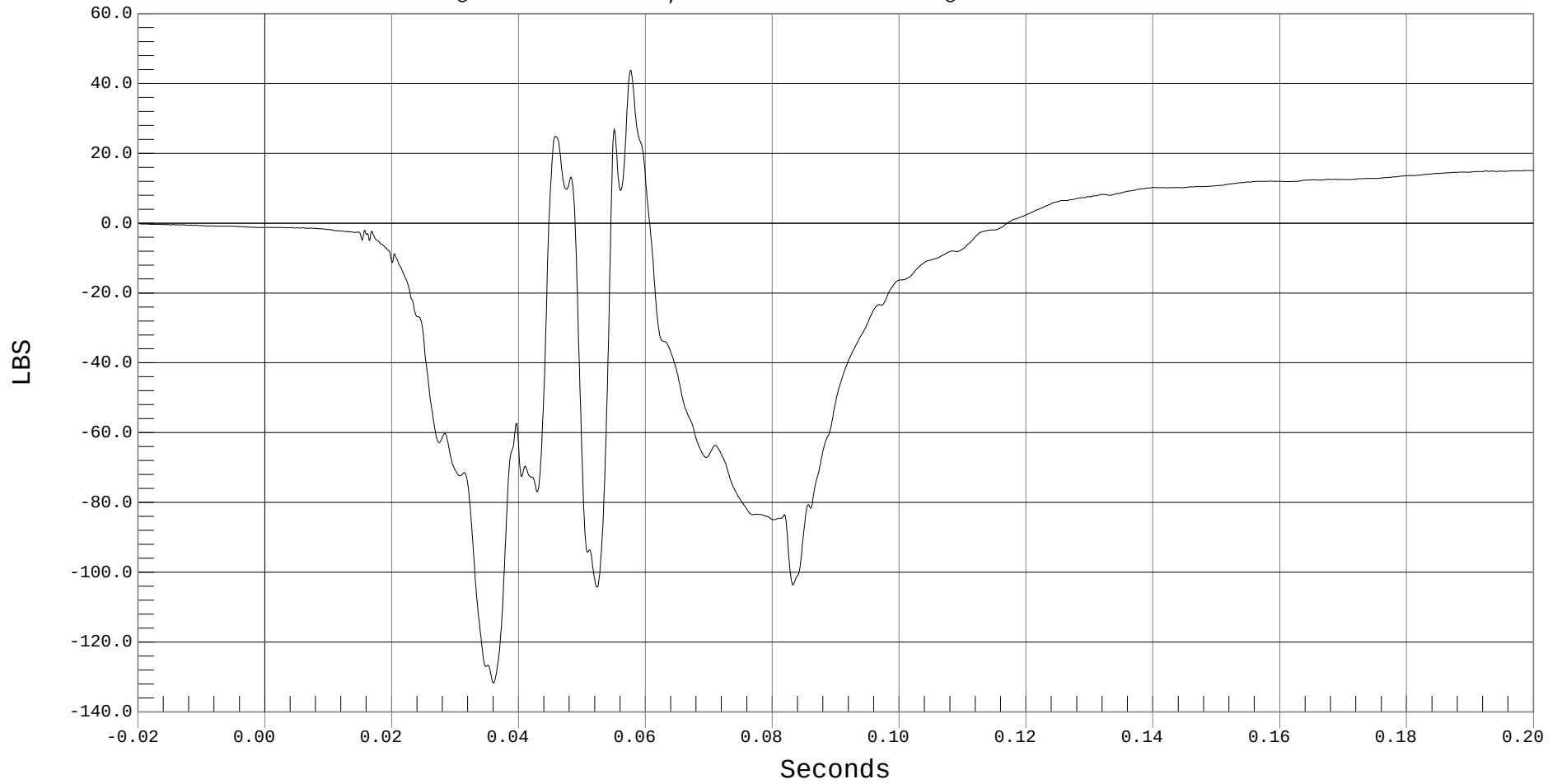
PASSENGER LEFT UPPER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER LEFT UPPER TIBIA MY, b01013MF.M88

Ymin = -131.72 LBS @ 0.0360 Seconds, Ymax = 43.87 LBS @ 0.0576 Seconds



PASSENGER LEFT UPPER TIBIA FORCE Z VS. TIME
NO VALID DATA COLLECTED



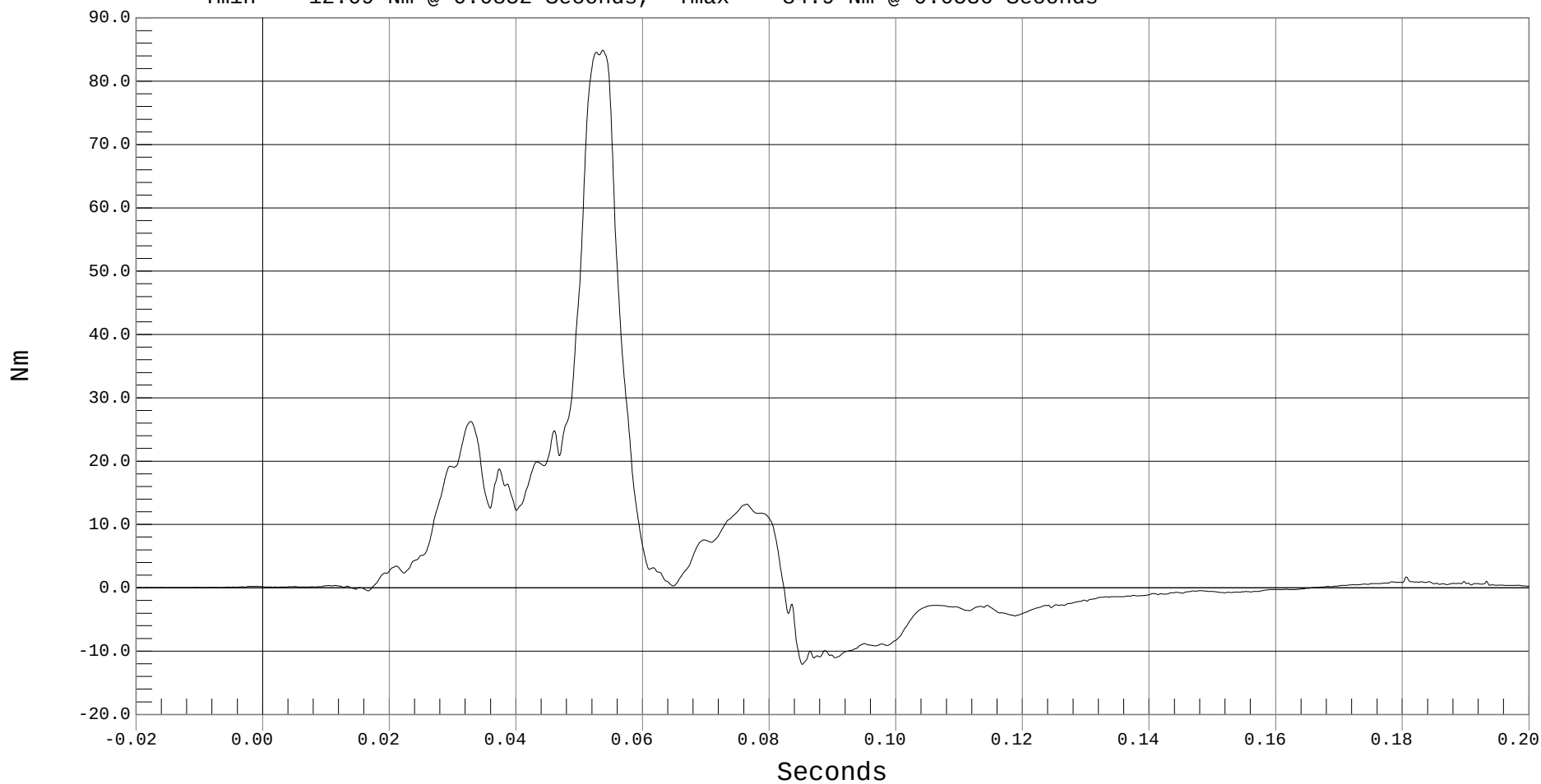
PASSENGER LEFT LOWER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER LEFT LOWER TIBIA MX, b01013MF.M90

Ymin = -12.09 Nm @ 0.0852 Seconds, Ymax = 84.9 Nm @ 0.0536 Seconds





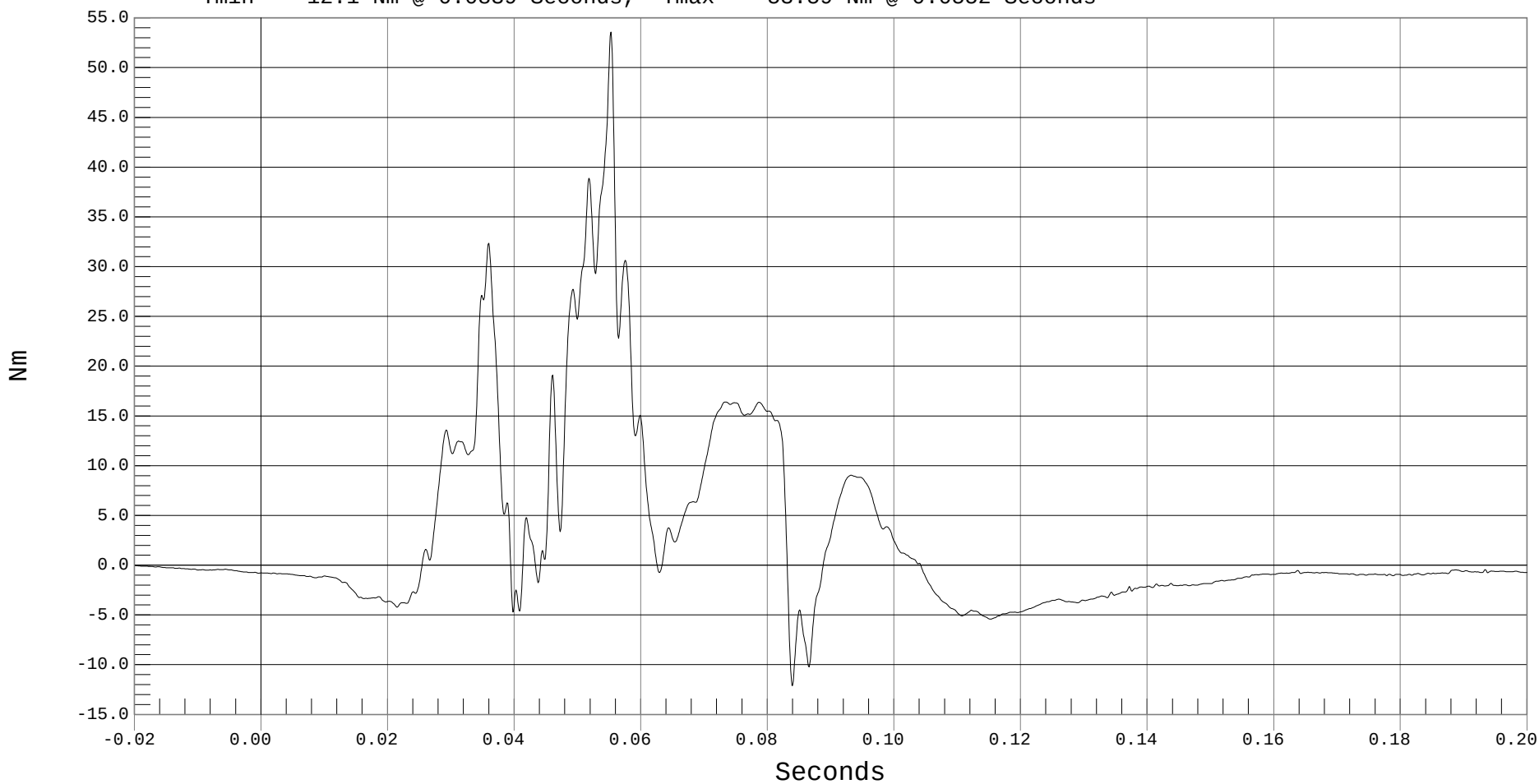
PASSENGER LEFT LOWER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER LEFT LOWER TIBIA MY, b01013MF.M91

Ymin = -12.1 Nm @ 0.0839 Seconds, Ymax = 53.59 Nm @ 0.0552 Seconds





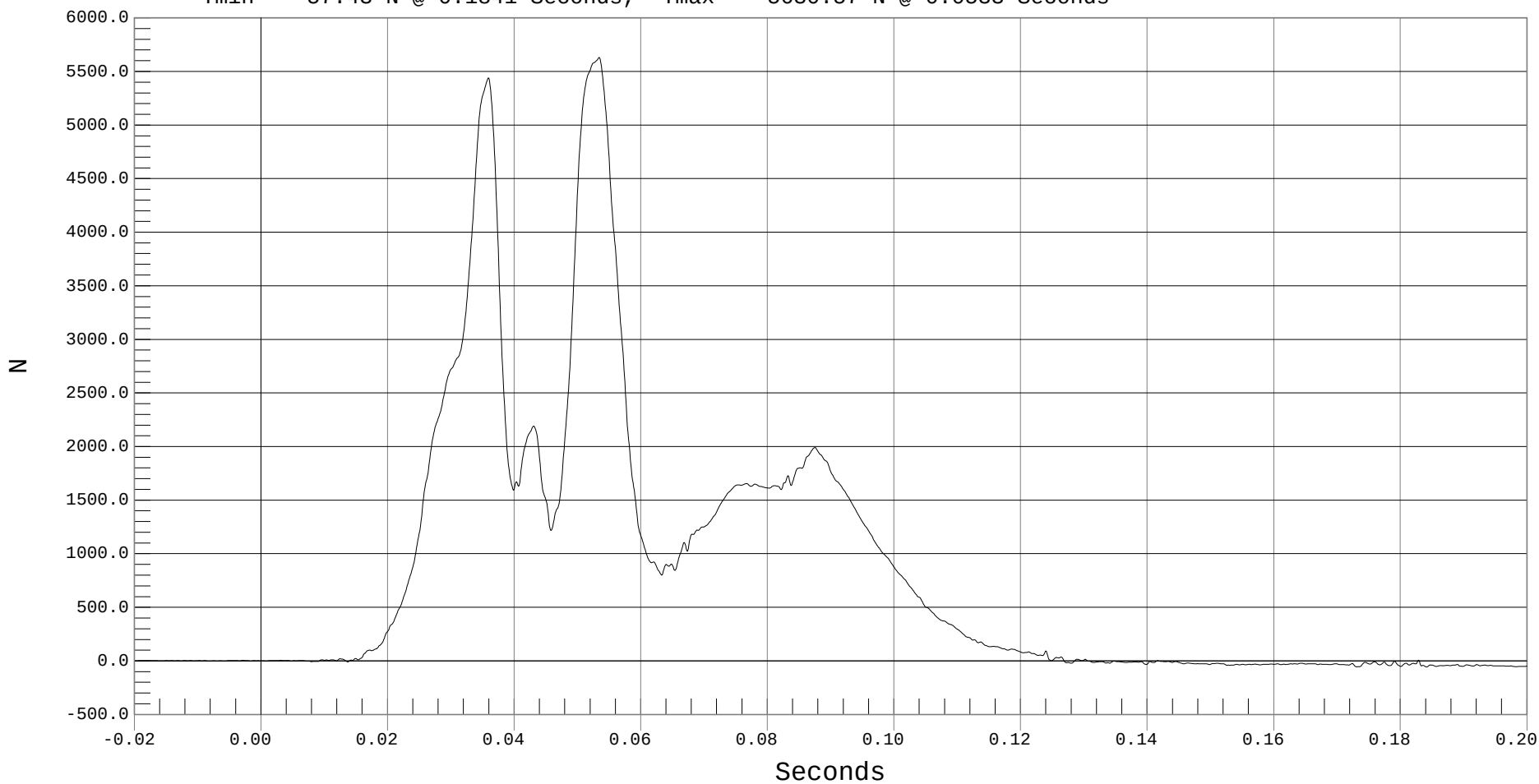
PASSENGER LEFT LOWER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER LEFT LOWER TIBIA FZ, b01013FF.F92

Ymin = -57.43 N @ 0.1841 Seconds, Ymax = 5630.57 N @ 0.0533 Seconds





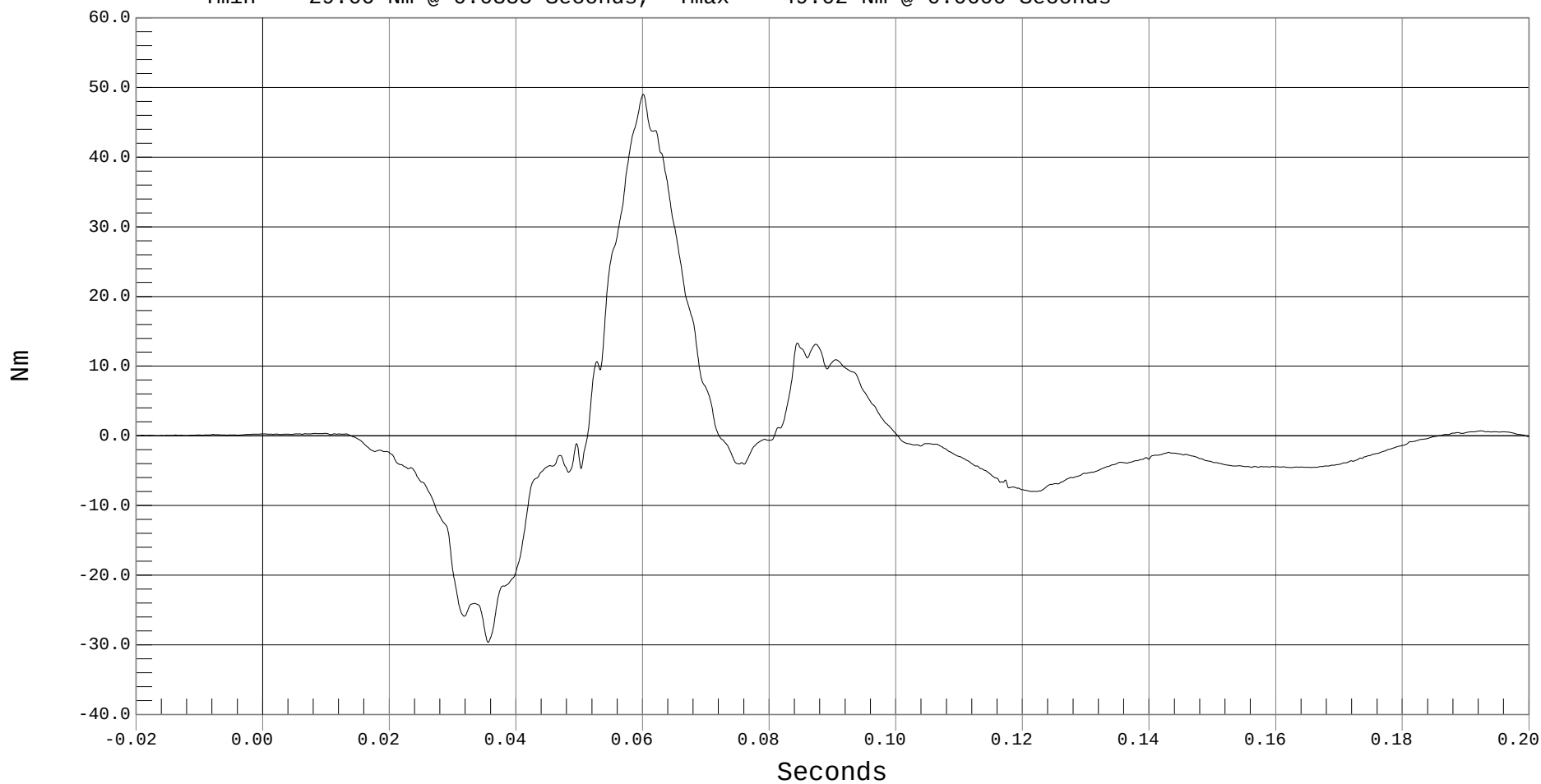
PASSENGER RIGHT UPPER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT UPPER TIBIA MX, b01013MF.M81

Ymin = -29.66 Nm @ 0.0355 Seconds, Ymax = 49.02 Nm @ 0.0600 Seconds





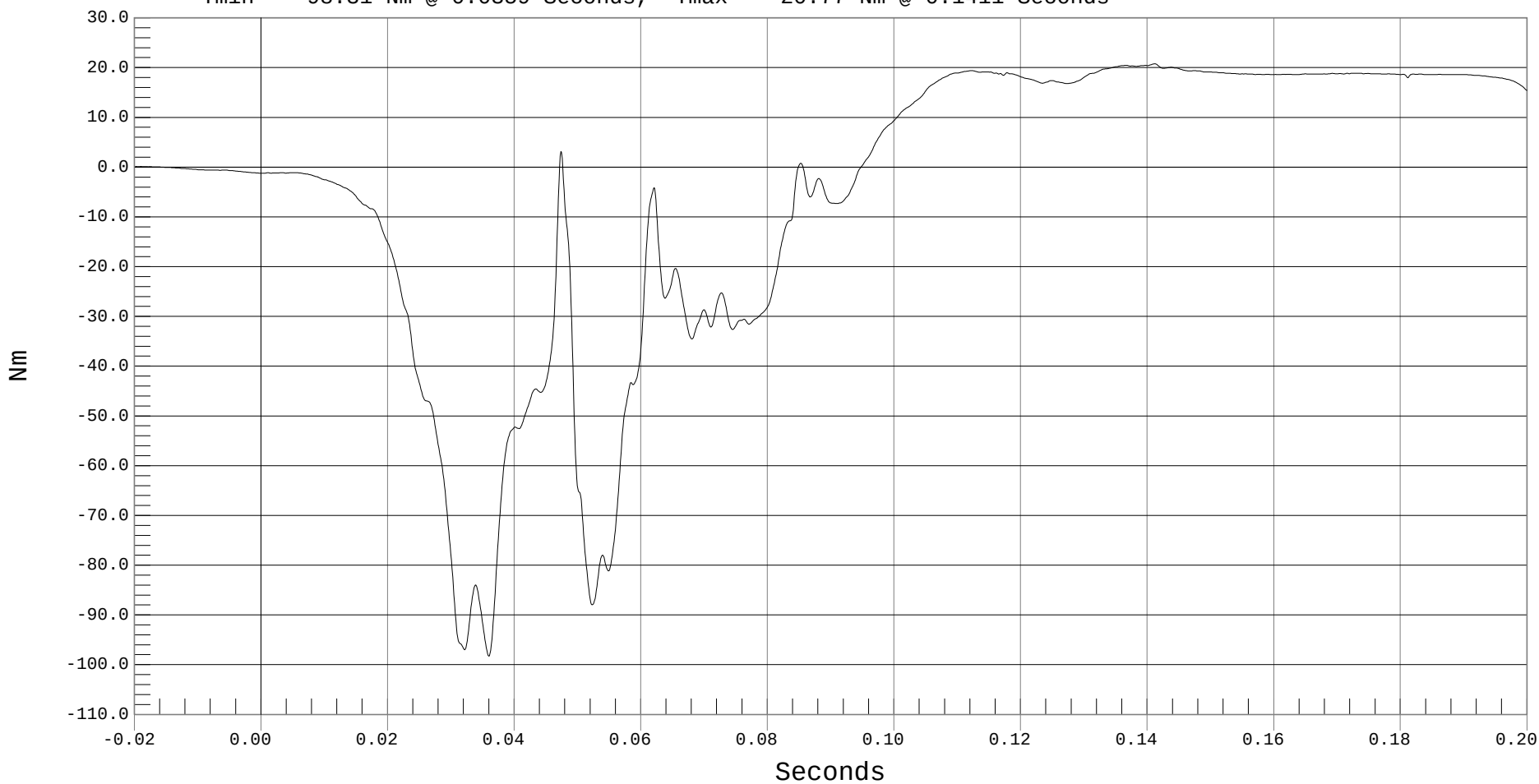
PASSENGER RIGHT UPPER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT UPPER TIBIA MY, b01013MF.M82

Ymin = -98.31 Nm @ 0.0359 Seconds, Ymax = 20.77 Nm @ 0.1411 Seconds





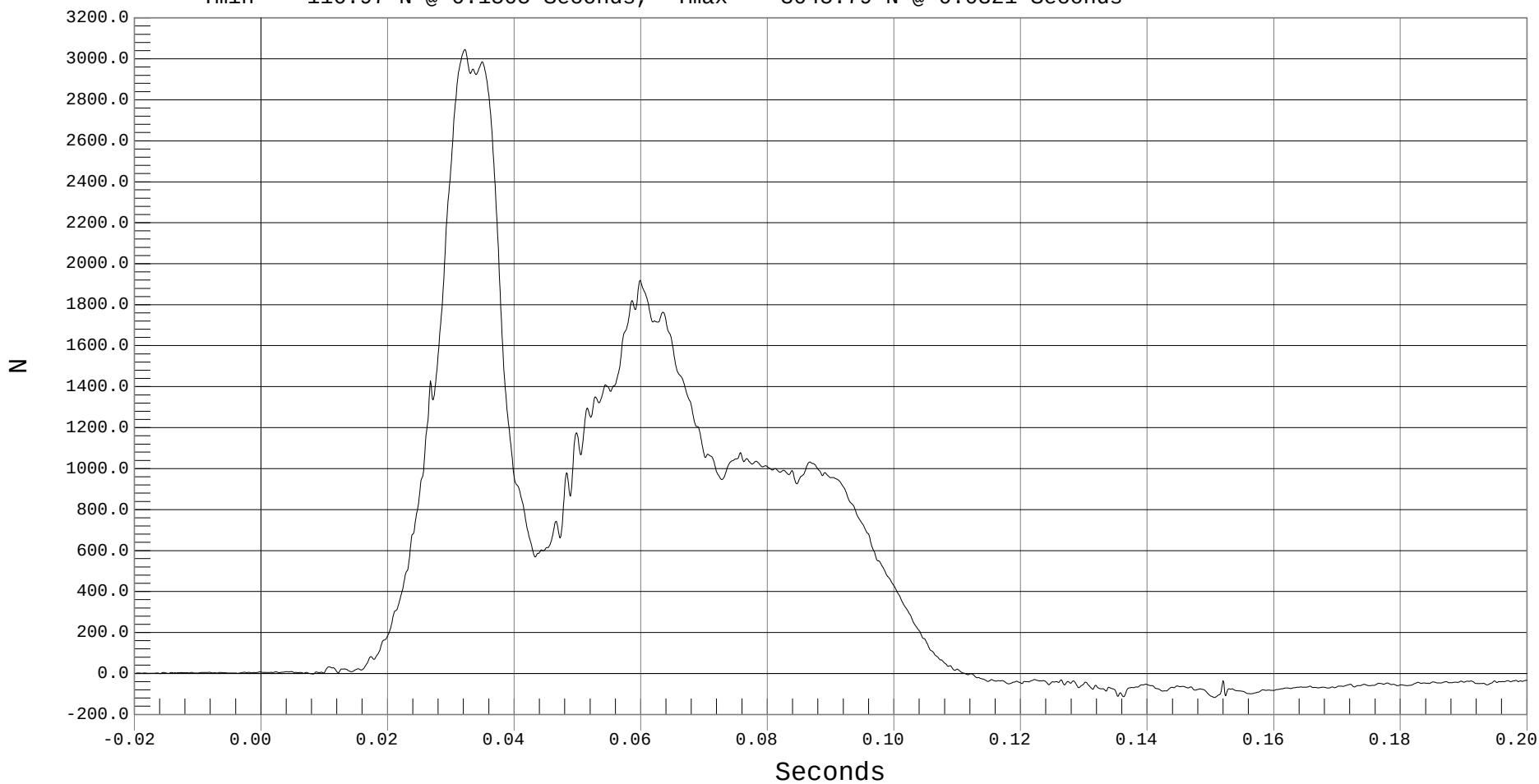
PASSENGER RIGHT UPPER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT UPPER TIBIA FZ, b01013FF.F83

Ymin = -116.97 N @ 0.1505 Seconds, Ymax = 3045.79 N @ 0.0321 Seconds





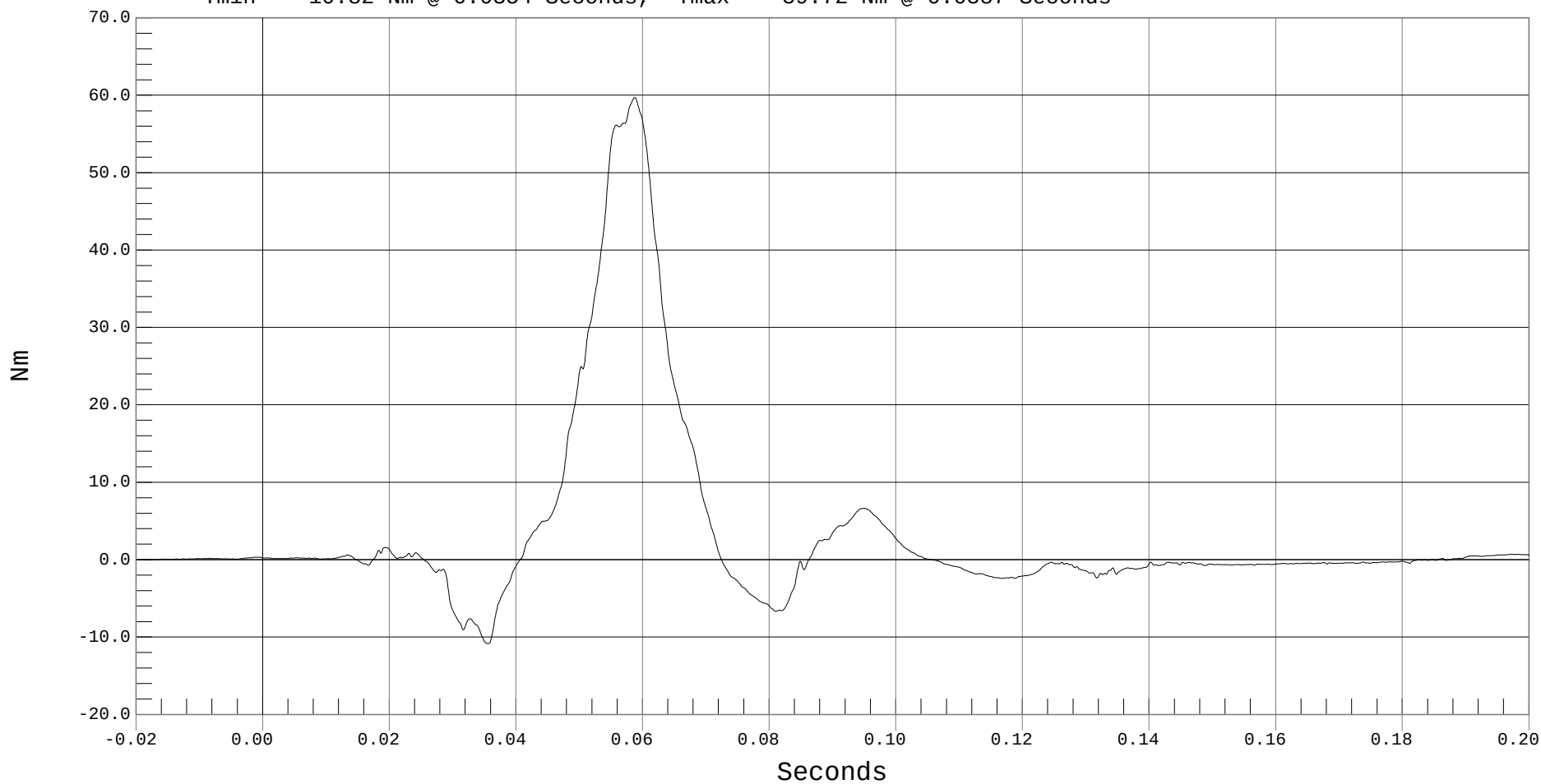
PASSENGER RIGHT LOWER TIBIA MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT LOWER TIBIA MX, b01013MF.M84

Ymin = -10.82 Nm @ 0.0354 Seconds, Ymax = 59.72 Nm @ 0.0587 Seconds





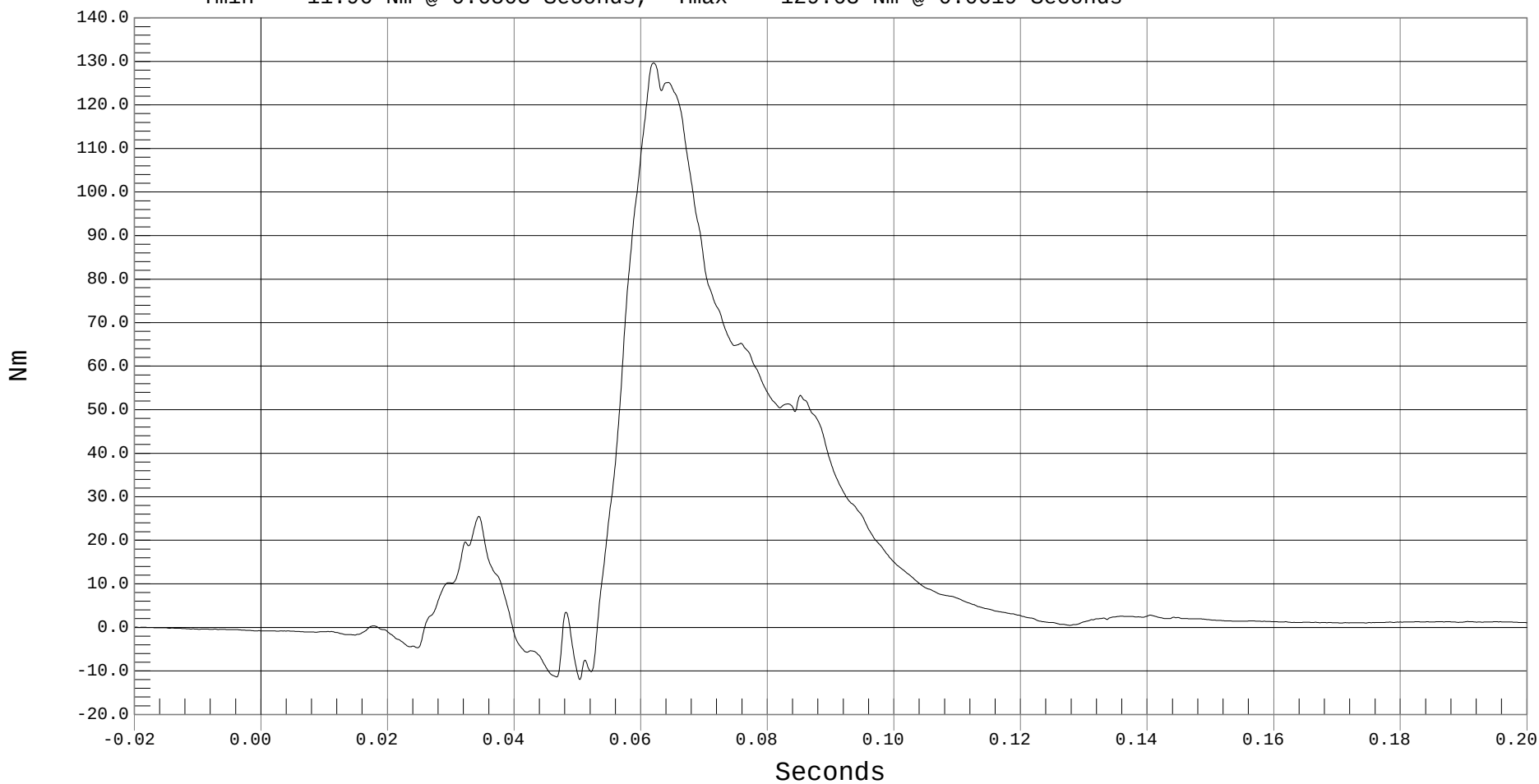
PASSENGER RIGHT LOWER TIBIA MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT LOWER TIBIA MY, b01013MF.M85

Ymin = -11.96 Nm @ 0.0503 Seconds, Ymax = 129.63 Nm @ 0.0619 Seconds





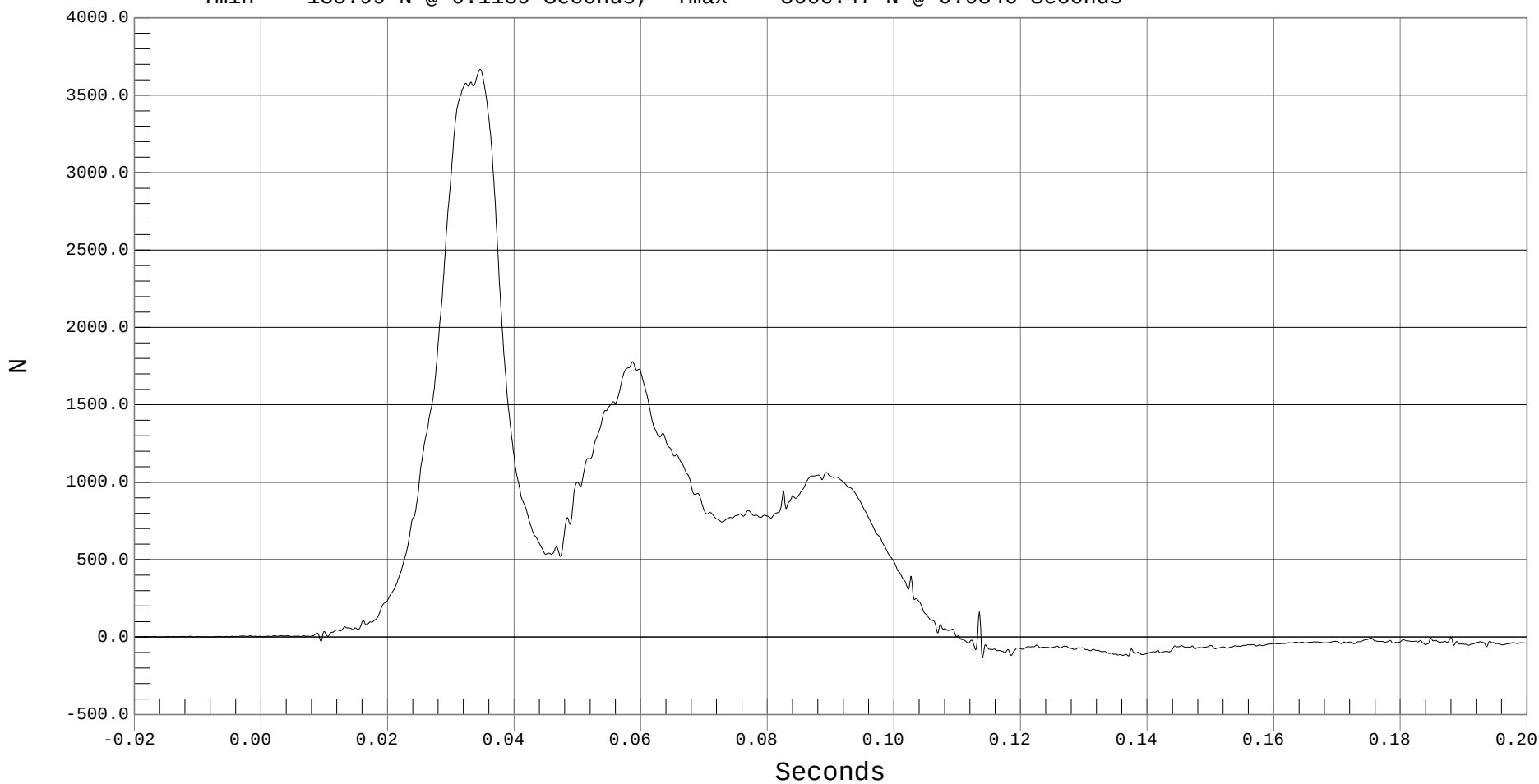
PASSENGER RIGHT LOWER TIBIA FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 PASSENGER RIGHT LOWER TIBIA FZ, b01013FF.F86

Ymin = -135.99 N @ 0.1139 Seconds, Ymax = 3666.47 N @ 0.0346 Seconds





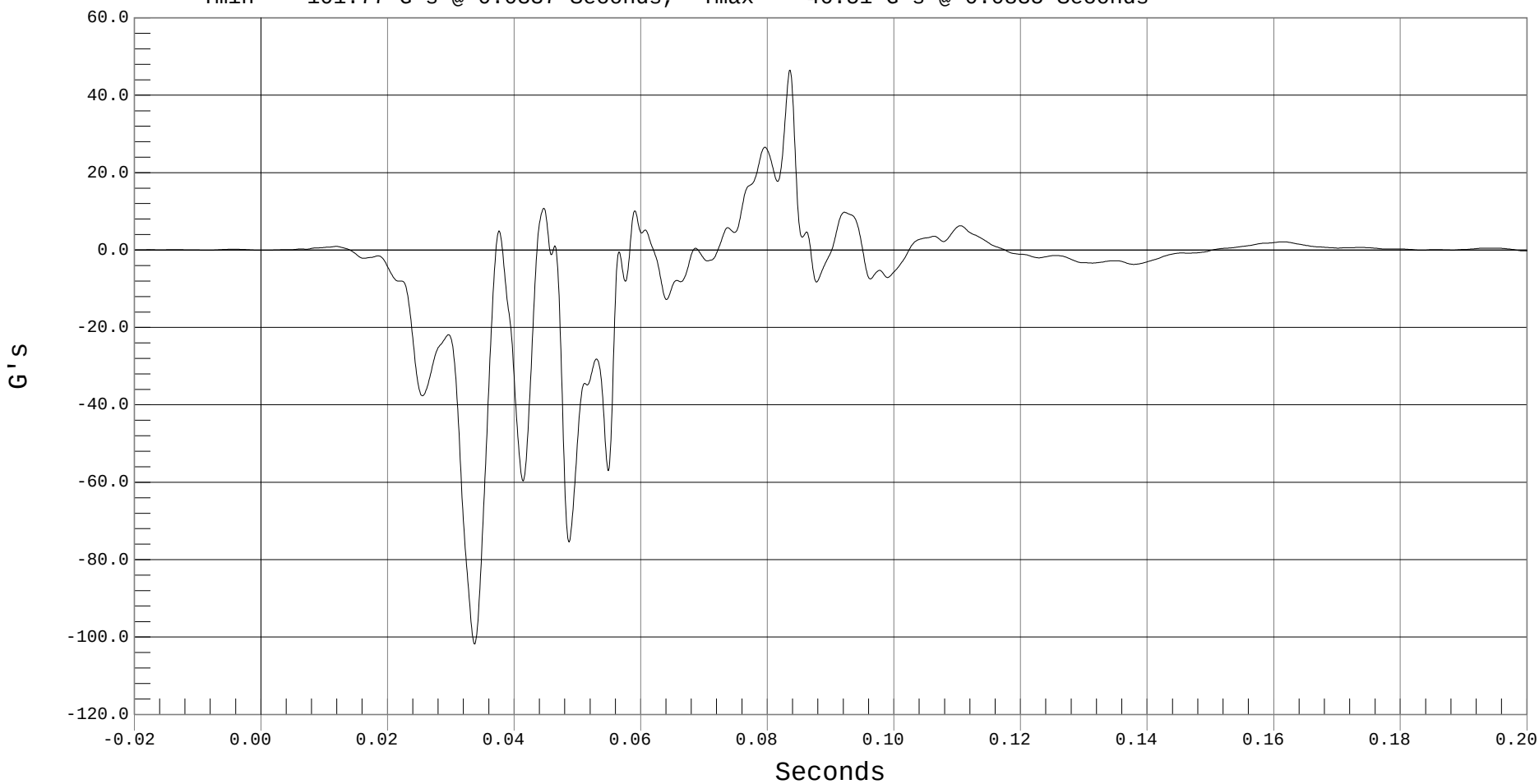
PASSENGER LEFT FOOT @ BALL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER LEFT FOOT @ BALL Z, b01013AF.A09

Ymin = -101.77 G's @ 0.0337 Seconds, Ymax = 46.51 G's @ 0.0835 Seconds





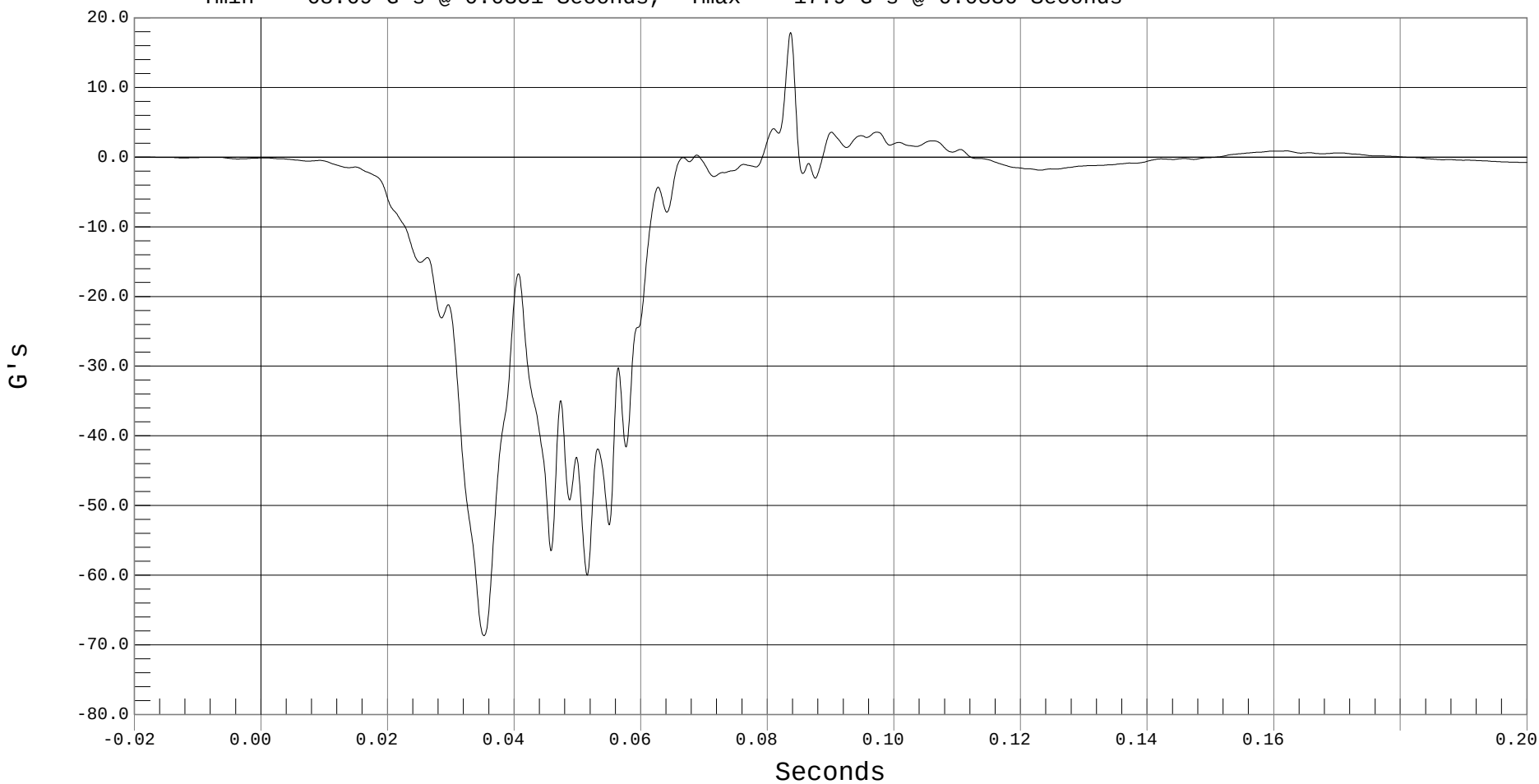
PASSENGER LEFT FOOT @ HEEL X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER LEFT FOOT @ HEEL X, b01013AF.A07

Ymin = -68.69 G's @ 0.0351 Seconds, Ymax = 17.9 G's @ 0.0836 Seconds





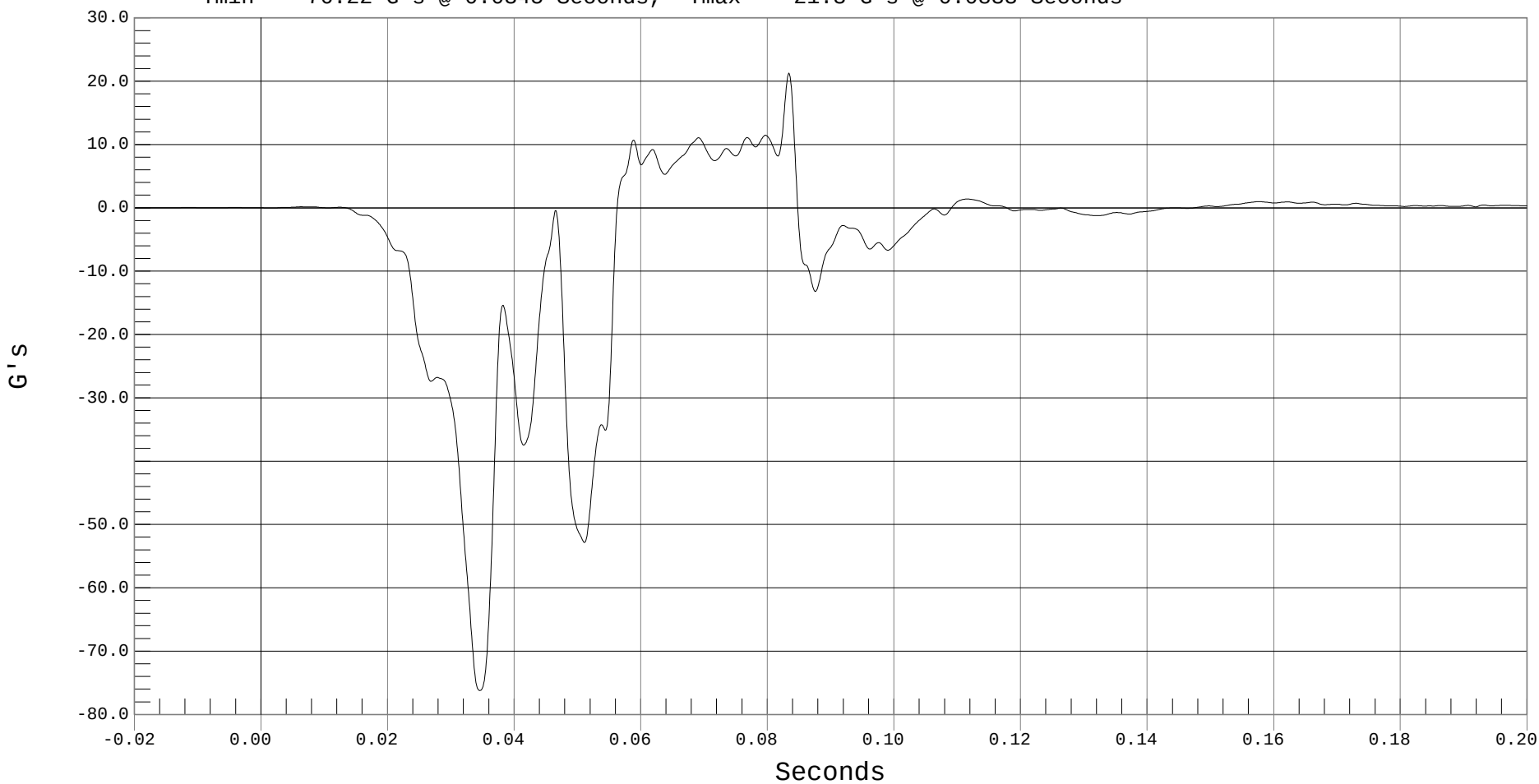
PASSENGER LEFT FOOT @ HEEL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER LEFT FOOT @ HEEL Z, b01013AF.A08

Ymin = -76.22 G's @ 0.0345 Seconds, Ymax = 21.3 G's @ 0.0833 Seconds





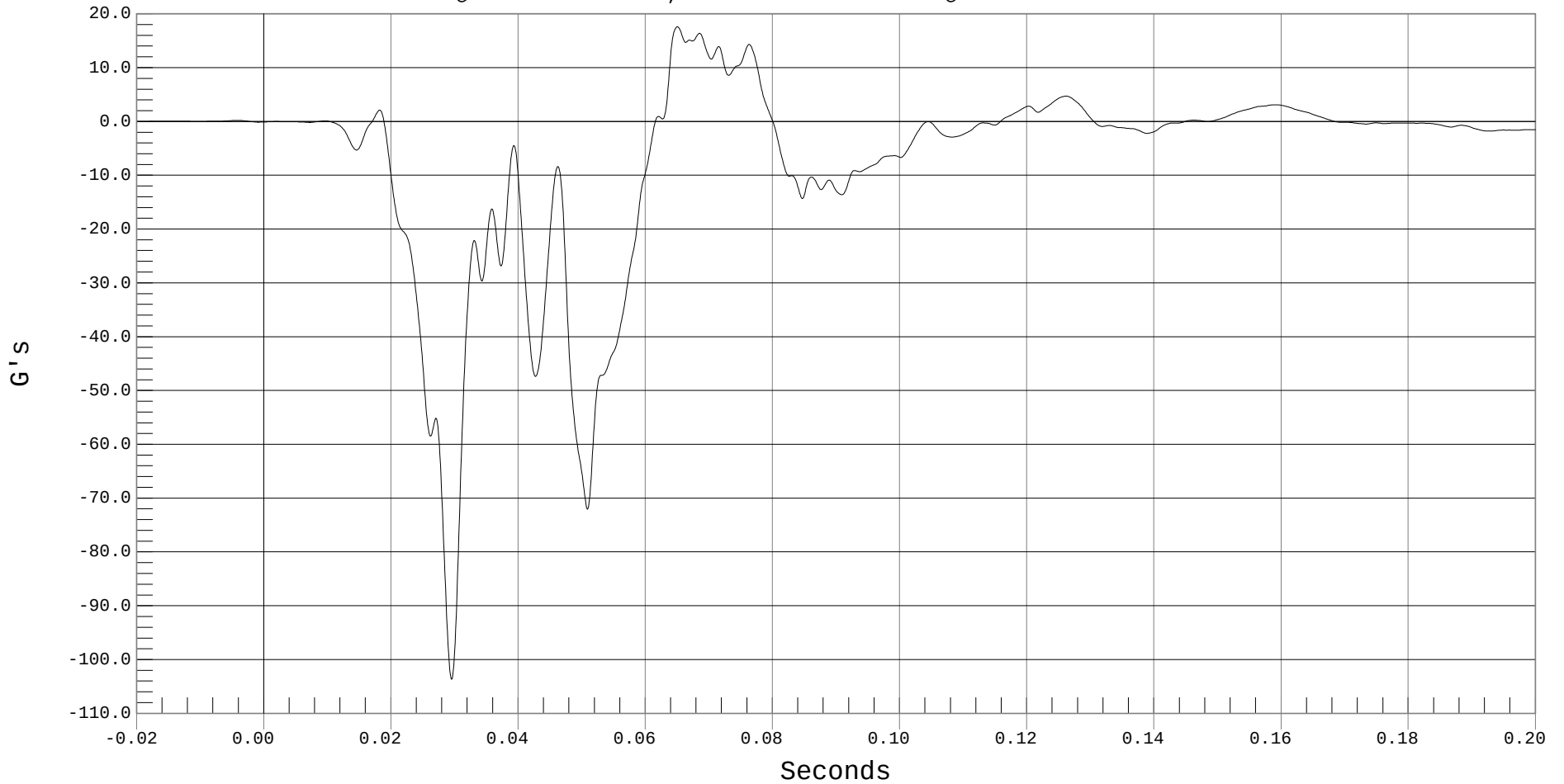
PASSENGER RIGHT FOOT @ BALL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER RIGHT FOOT @ BALL Z, b01013AF.A06

Ymin = -103.67 G's @ 0.0295 Seconds, Ymax = 17.59 G's @ 0.0650 Seconds





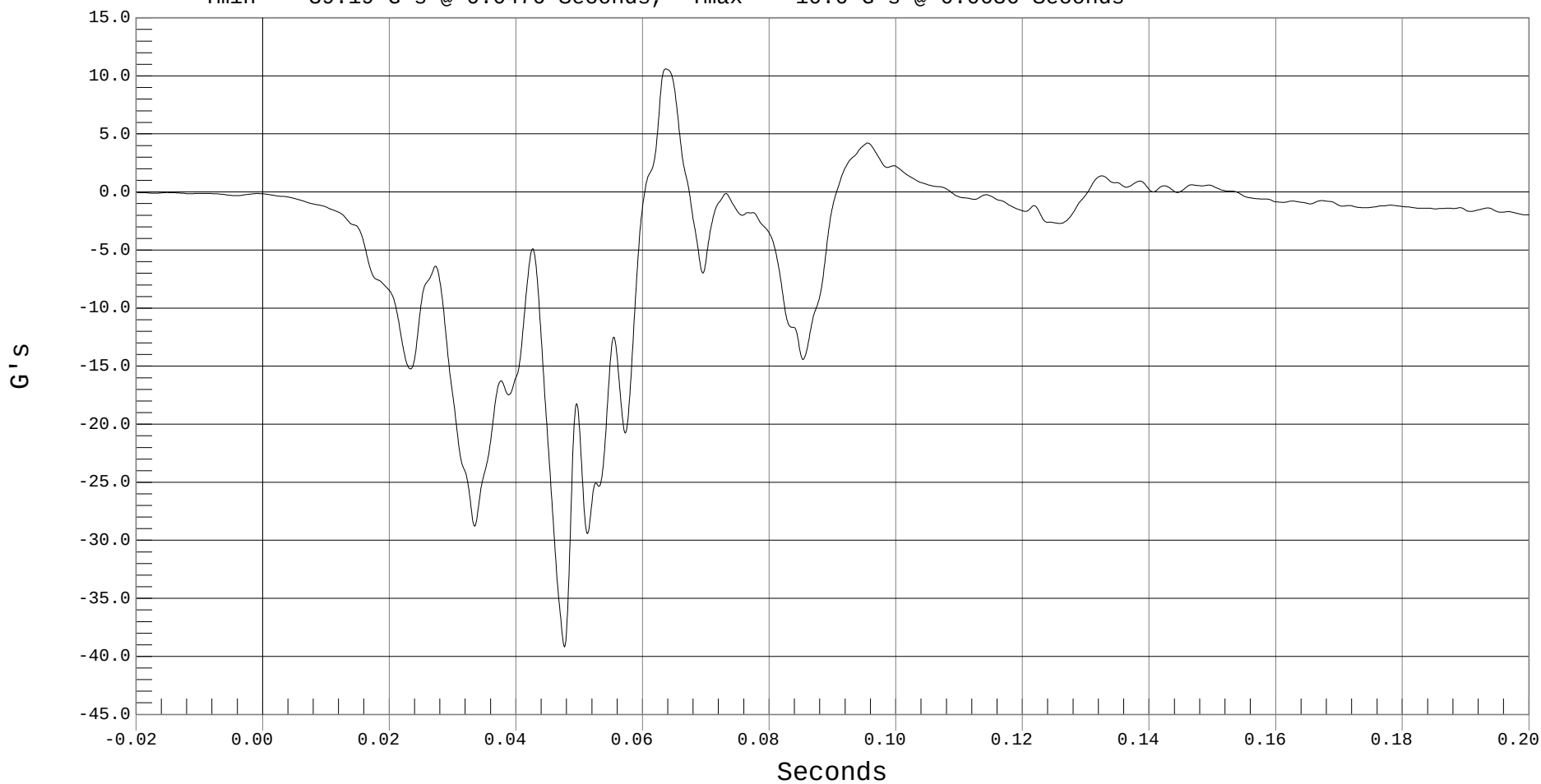
PASSENGER RIGHT FOOT @ HEEL X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER RIGHT FOOT @ HEEL X, b01013AF.A04

Ymin = -39.19 G's @ 0.0476 Seconds, Ymax = 10.6 G's @ 0.0636 Seconds





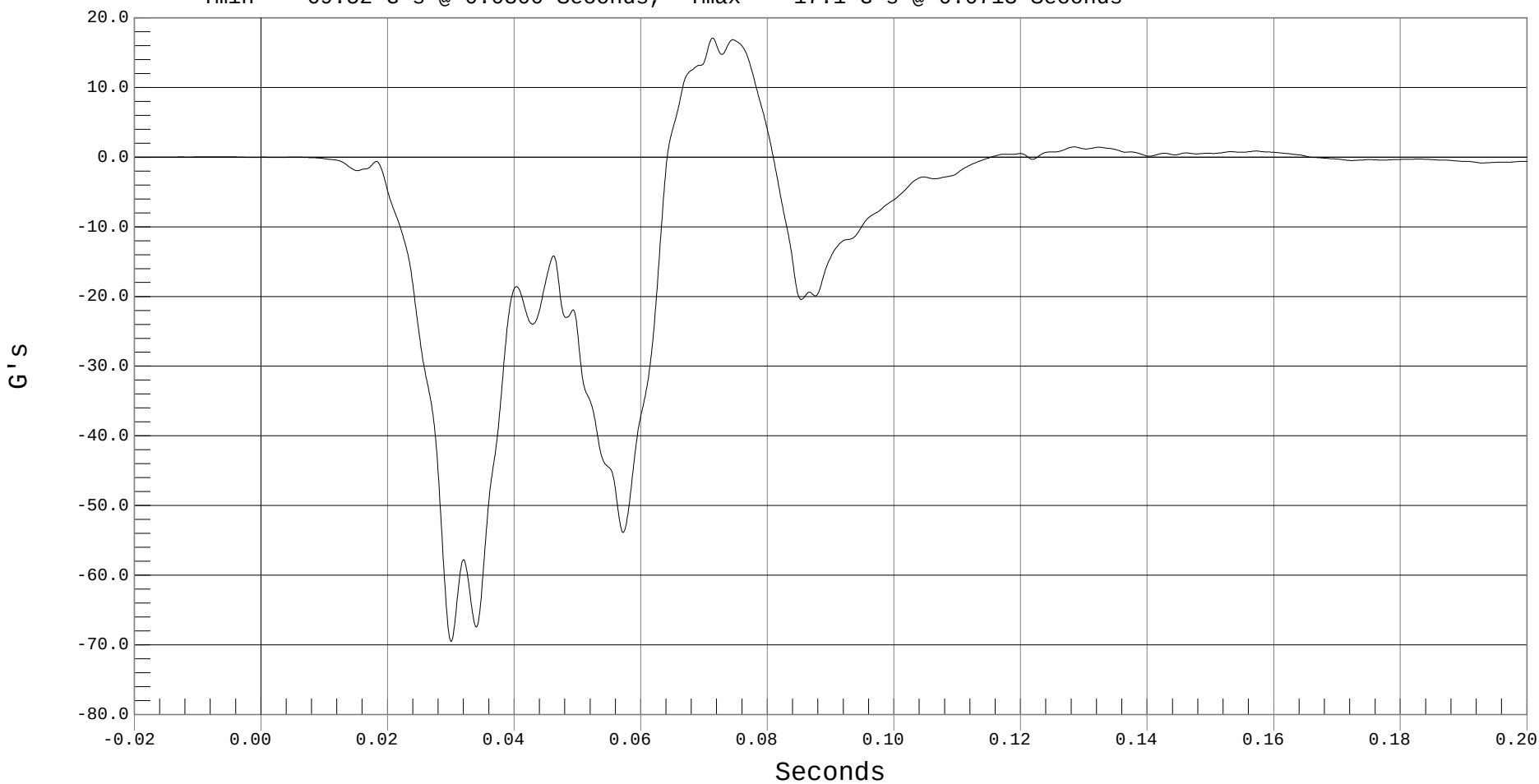
PASSENGER RIGHT FOOT @ HEEL Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 PASSENGER RIGHT FOOT @ HEEL Z, b01013AF.A05

Ymin = -69.52 G's @ 0.0300 Seconds, Ymax = 17.1 G's @ 0.0713 Seconds





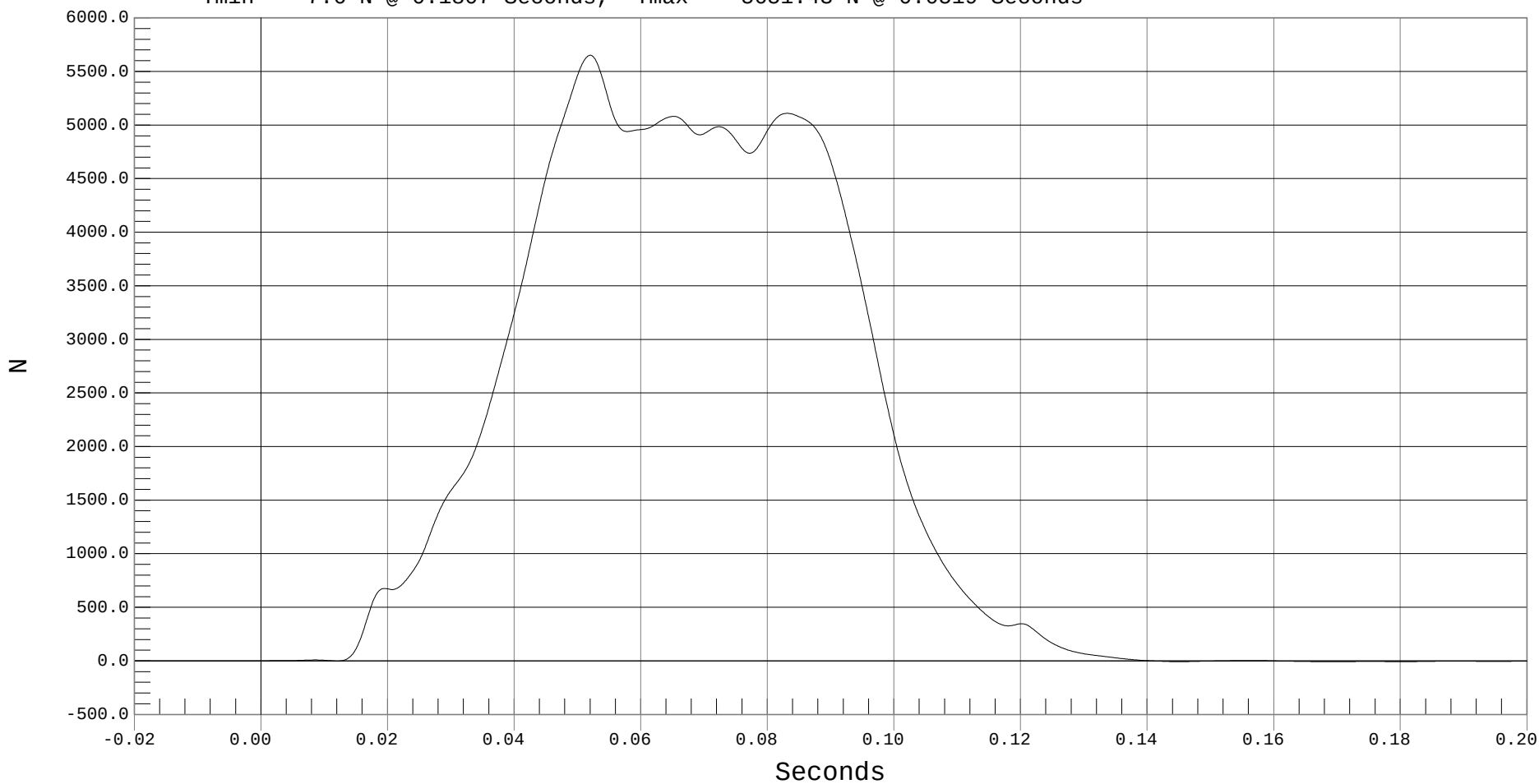
PASSENGER LAP BELT FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 PASSENGER SHOULDER BELT, b01013FF.F67

Ymin = -7.6 N @ 0.1807 Seconds, Ymax = 5651.43 N @ 0.0519 Seconds





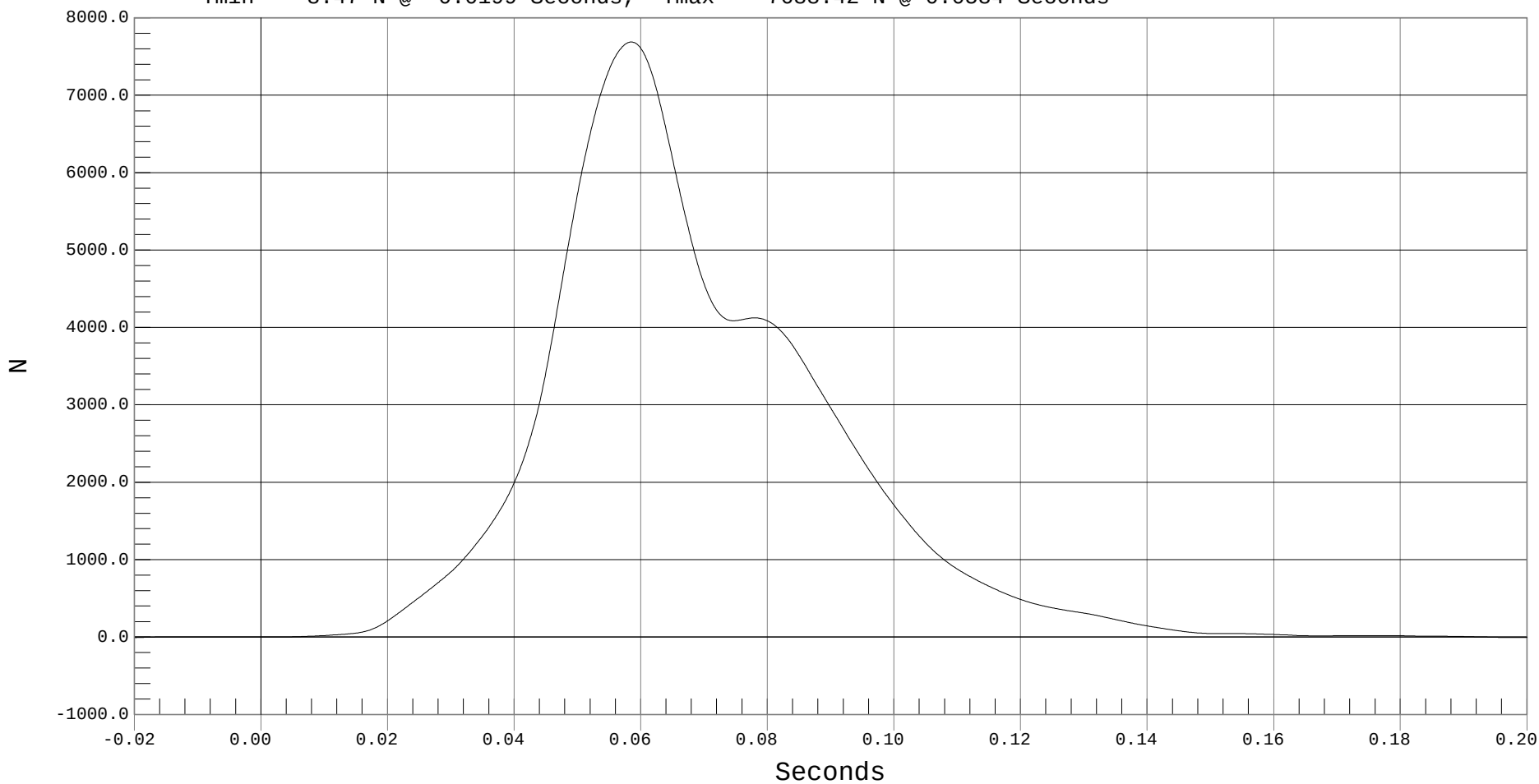
PASSENGER LAP BELT FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 PASSENGER LAP BELT, b01013FF.F68

Ymin = -8.47 N @ -0.0199 Seconds, Ymax = 7688.42 N @ 0.0584 Seconds





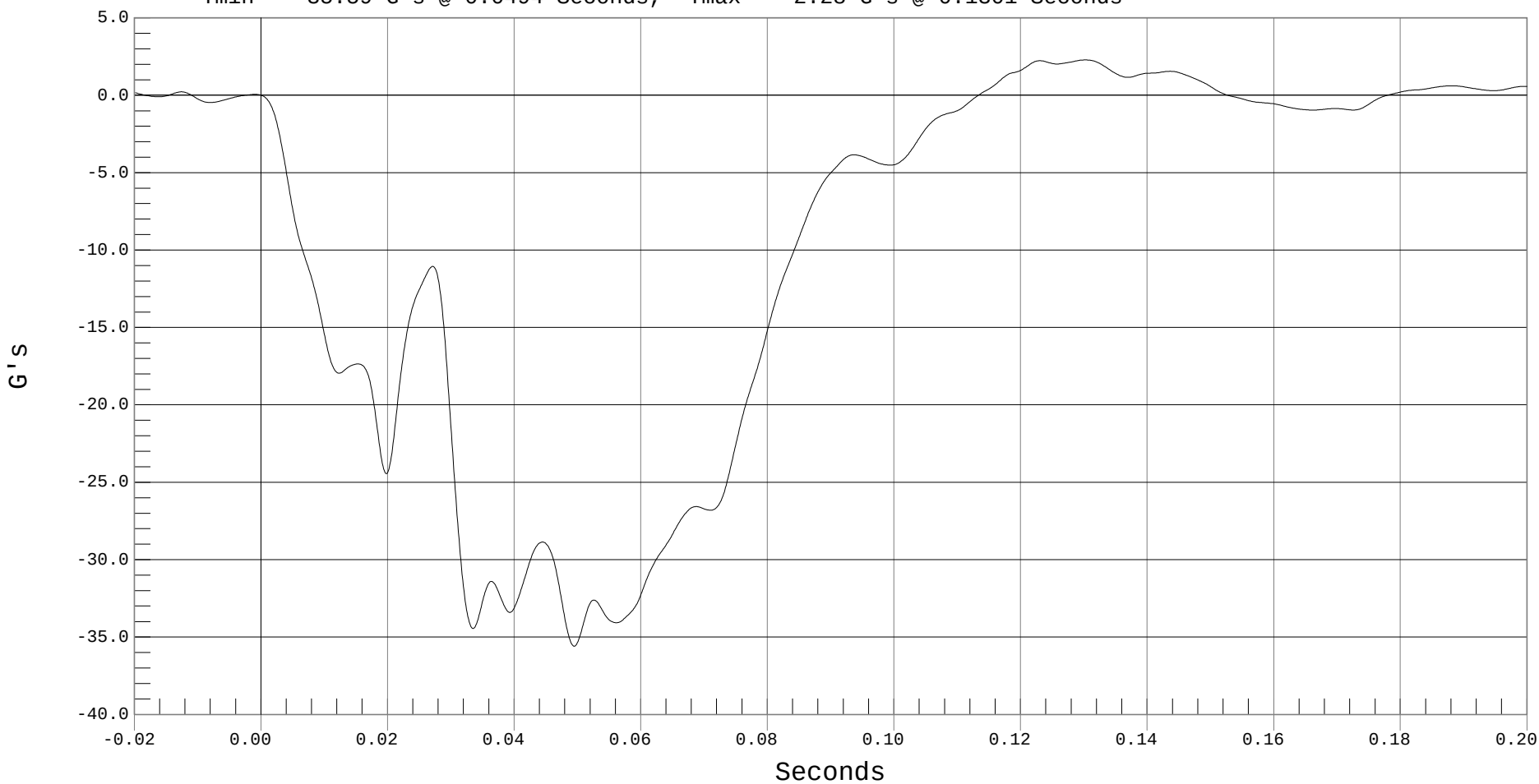
LEFT REAR SEAT CROSSMEMBER X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 LEFT REAR SEAT CROSSMEMBER X, b01013AF.A59

Ymin = -35.59 G's @ 0.0494 Seconds, Ymax = 2.28 G's @ 0.1301 Seconds





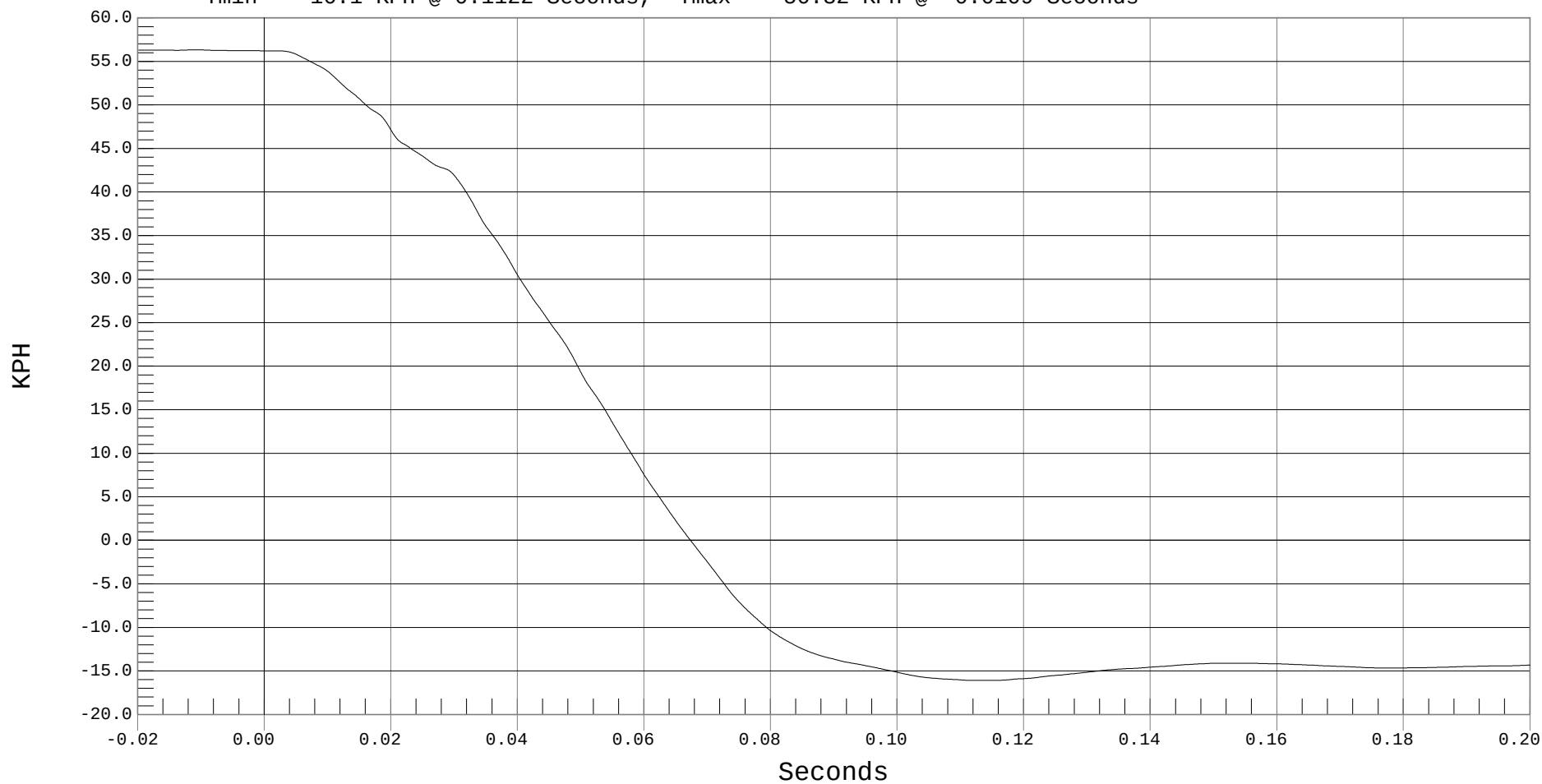
LEFT REAR SEAT CROSSMEMBER X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER X VELOCITY, b01013AI.V59

Ymin = -16.1 KPH @ 0.1122 Seconds, Ymax = 56.32 KPH @ -0.0109 Seconds





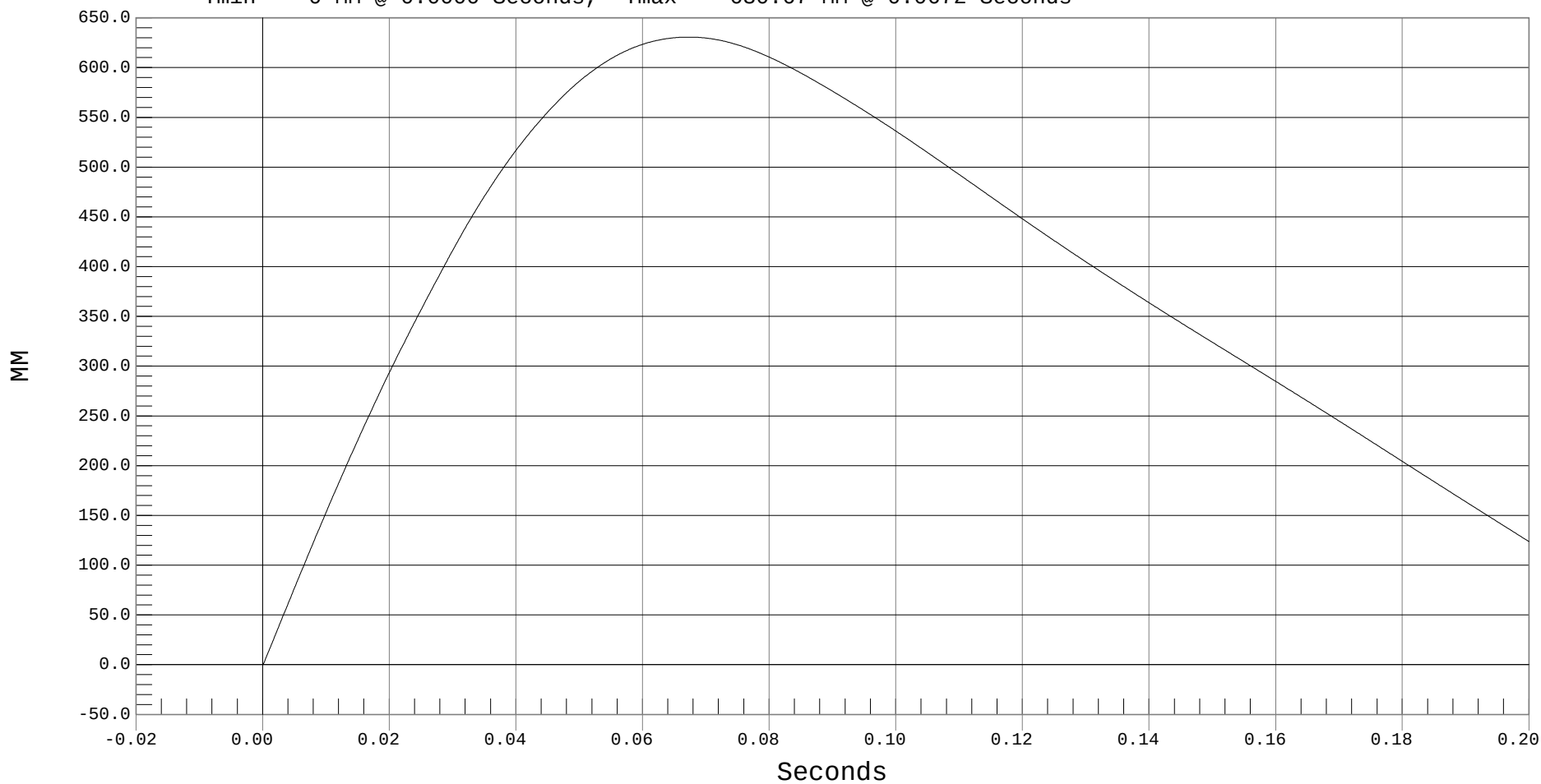
LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT, b01013AI.D59

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 630.67 MM @ 0.0672 Seconds





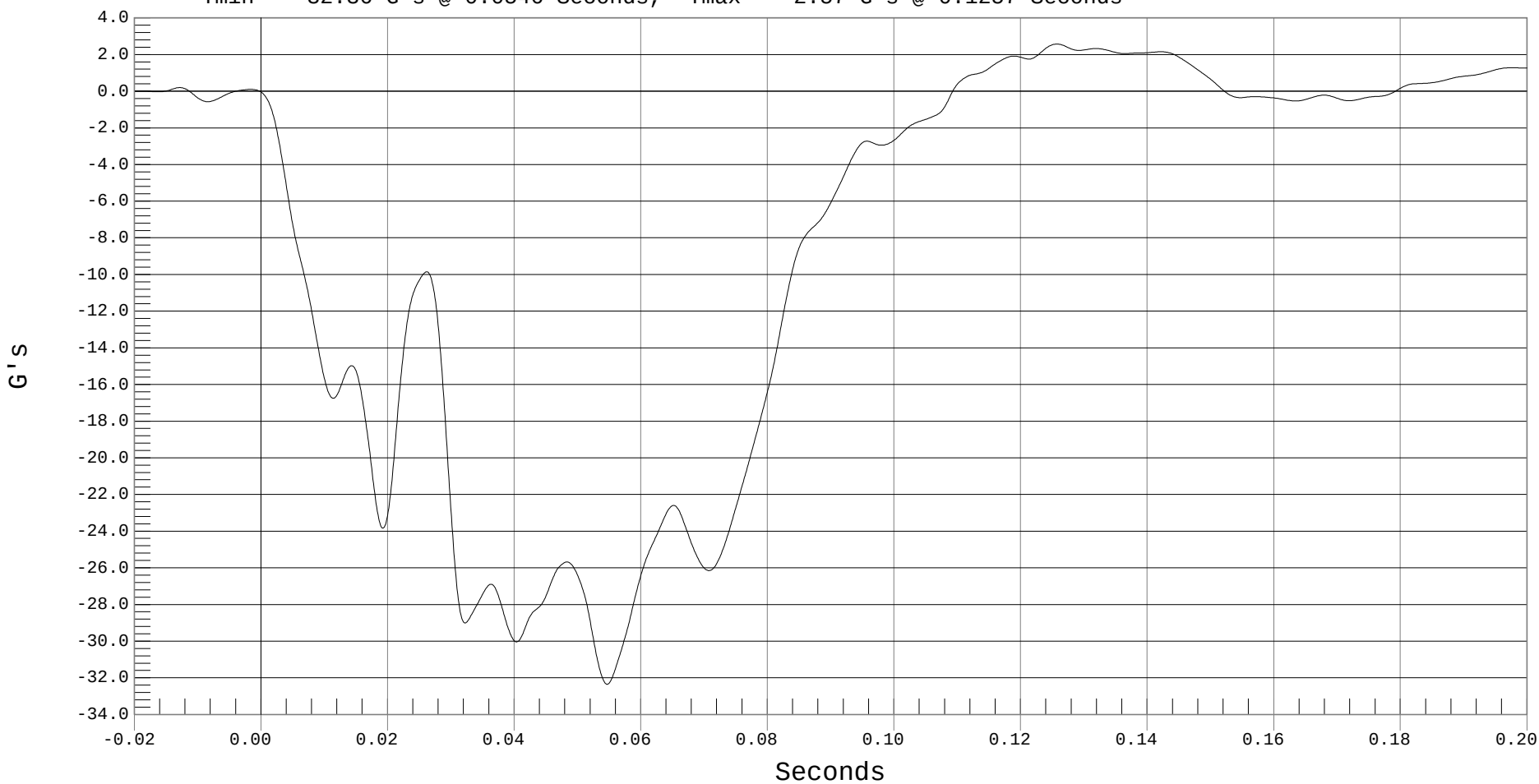
RIGHT REAR SEAT CROSSMEMBER X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 RIGHT REAR SEAT CROSSMEMBER X, b01013AF.A58

Ymin = -32.36 G's @ 0.0546 Seconds, Ymax = 2.57 G's @ 0.1257 Seconds





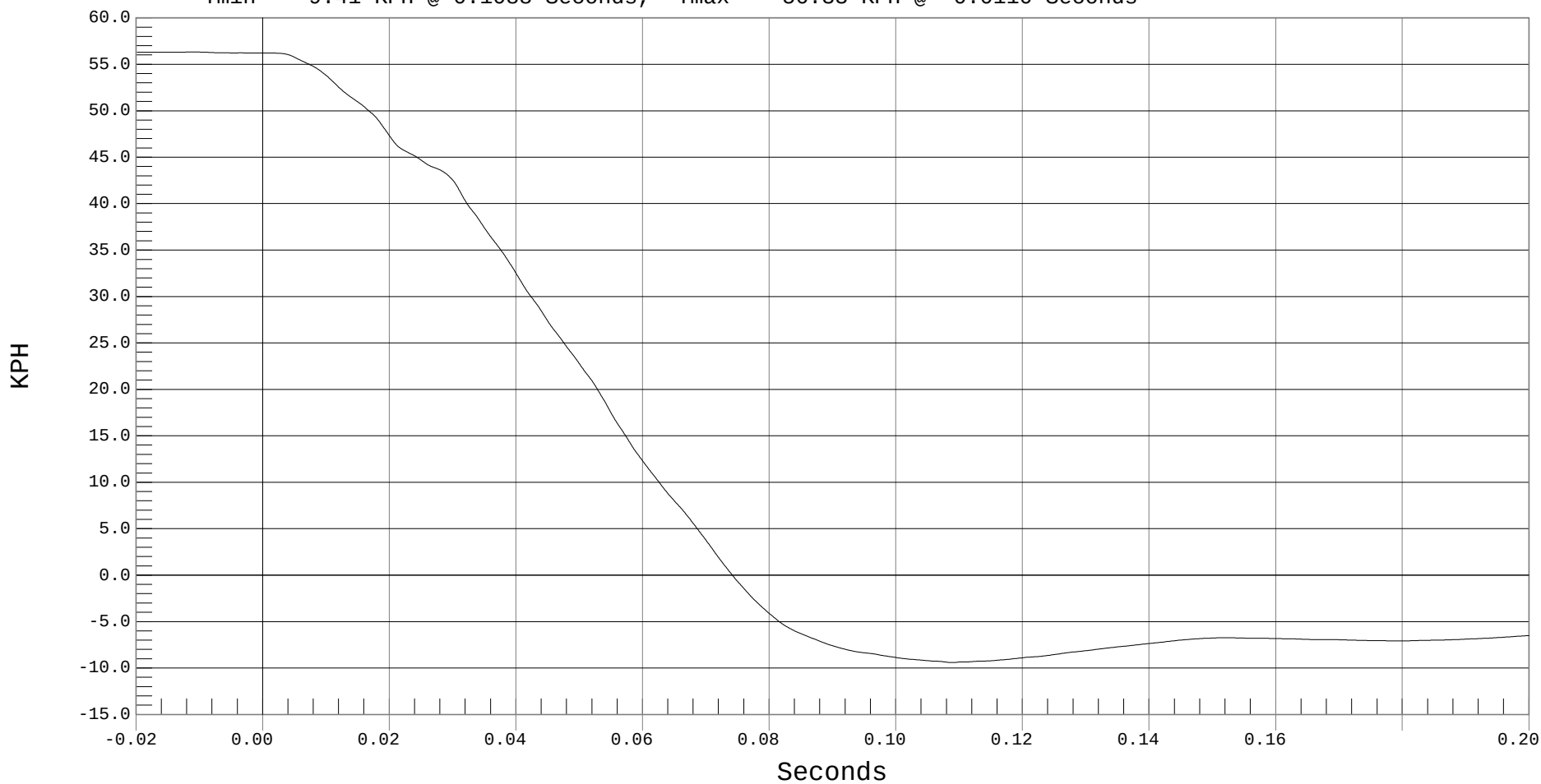
RIGHT REAR SEAT CROSSMEMBER X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RIGHT REAR SEAT CROSSMEMBER X VELOCITY, b01013AI.V58

Ymin = -9.41 KPH @ 0.1088 Seconds, Ymax = 56.33 KPH @ -0.0110 Seconds





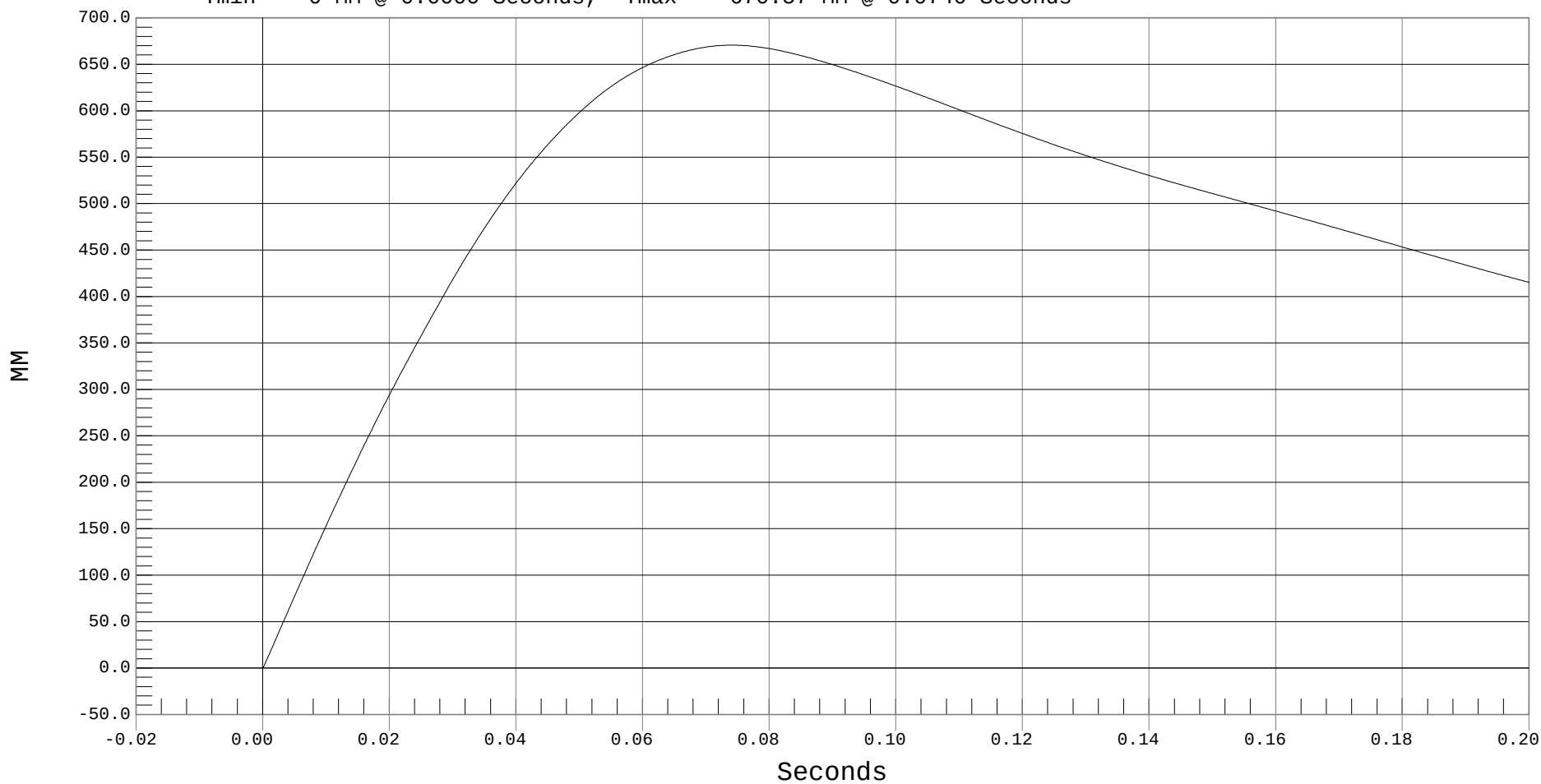
RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT, b01013AI.D58

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 670.57 MM @ 0.0740 Seconds





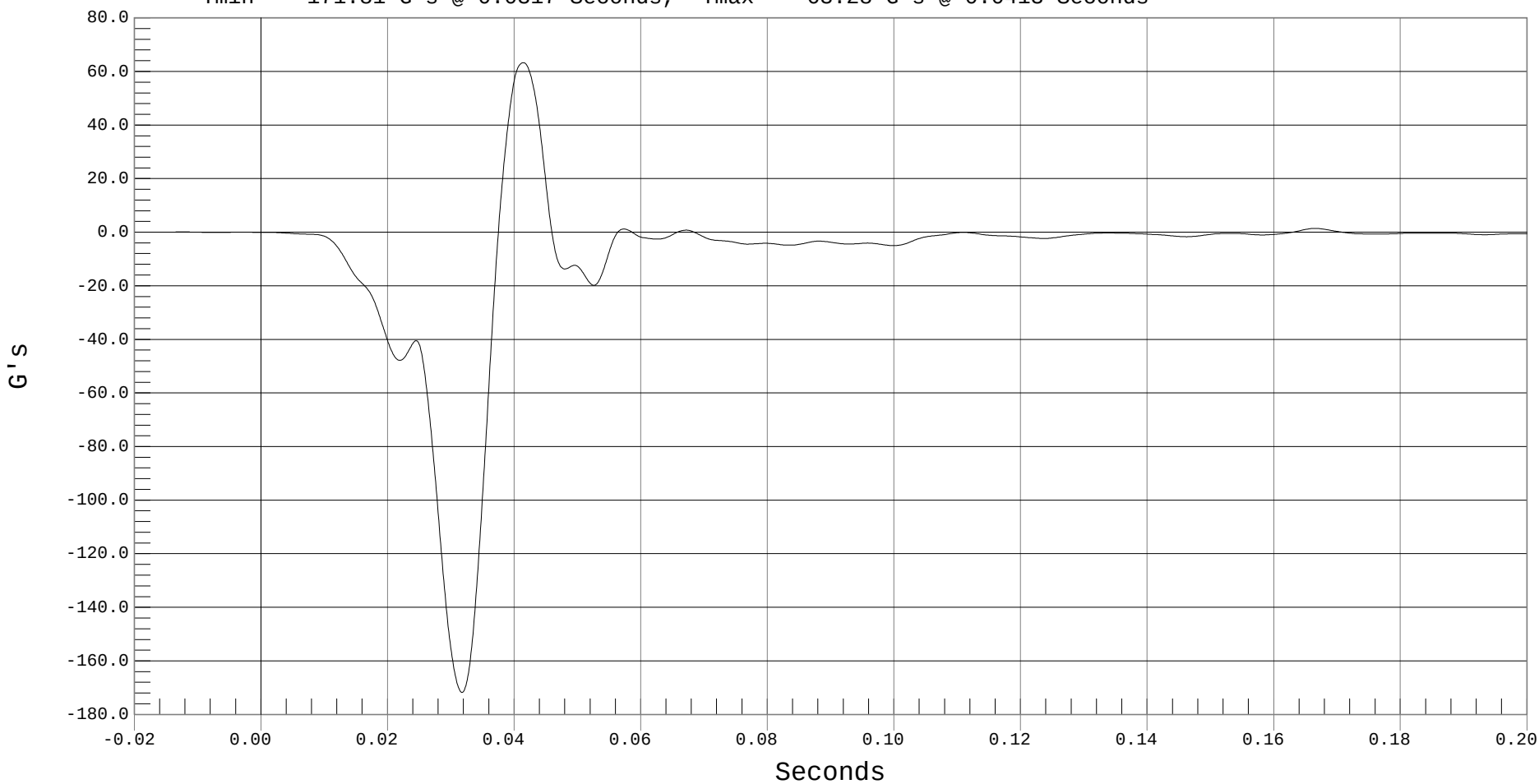
UPPER ENGINE X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 ENGINE UPPER X, b01013AF.A55

Ymin = -171.81 G's @ 0.0317 Seconds, Ymax = 63.28 G's @ 0.0413 Seconds





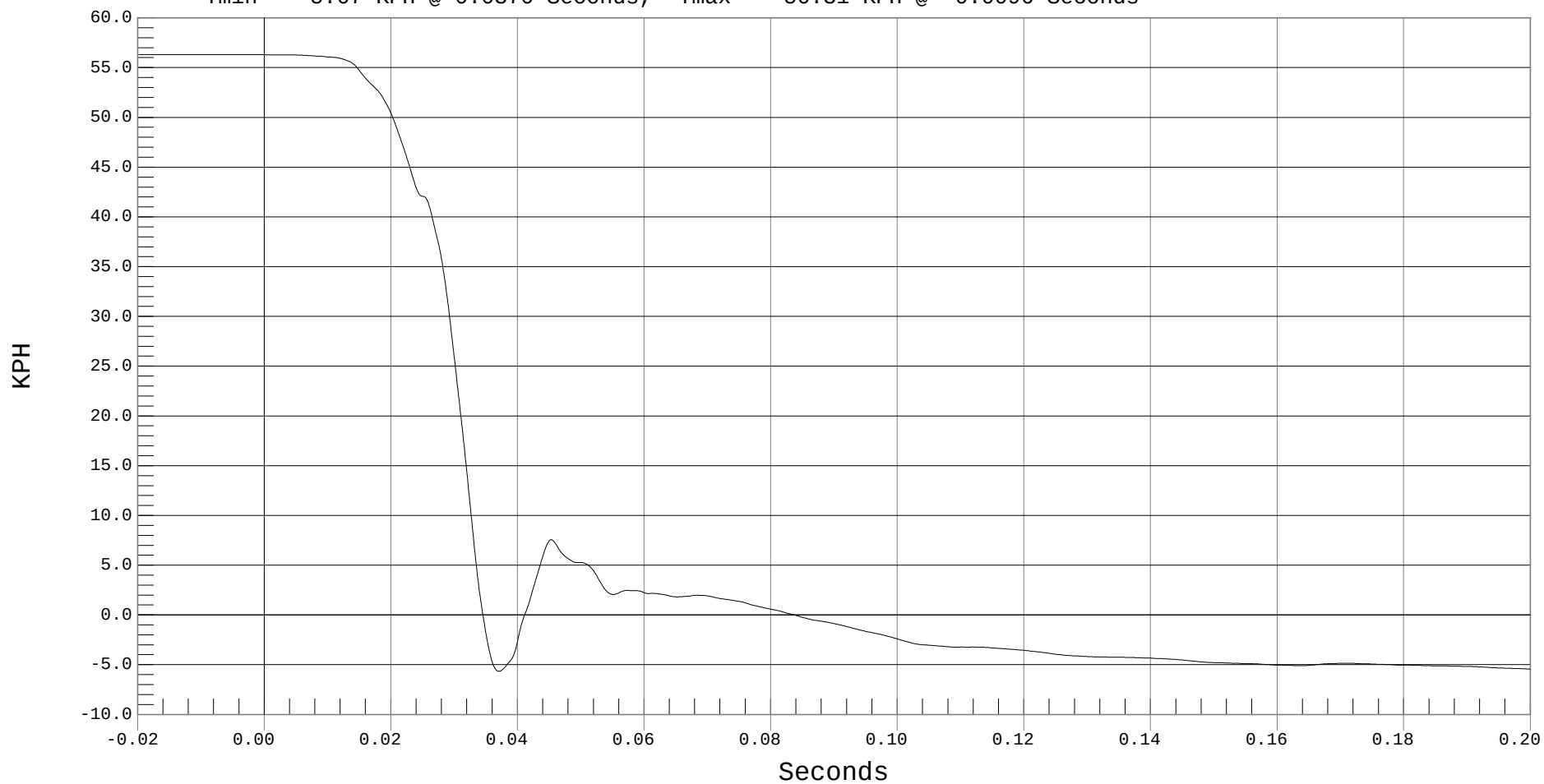
UPPER ENGINE X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 TOP OF ENGINE BLOCK X VELOCITY, b01013AI.V55

Ymin = -5.67 KPH @ 0.0370 Seconds, Ymax = 56.31 KPH @ -0.0096 Seconds





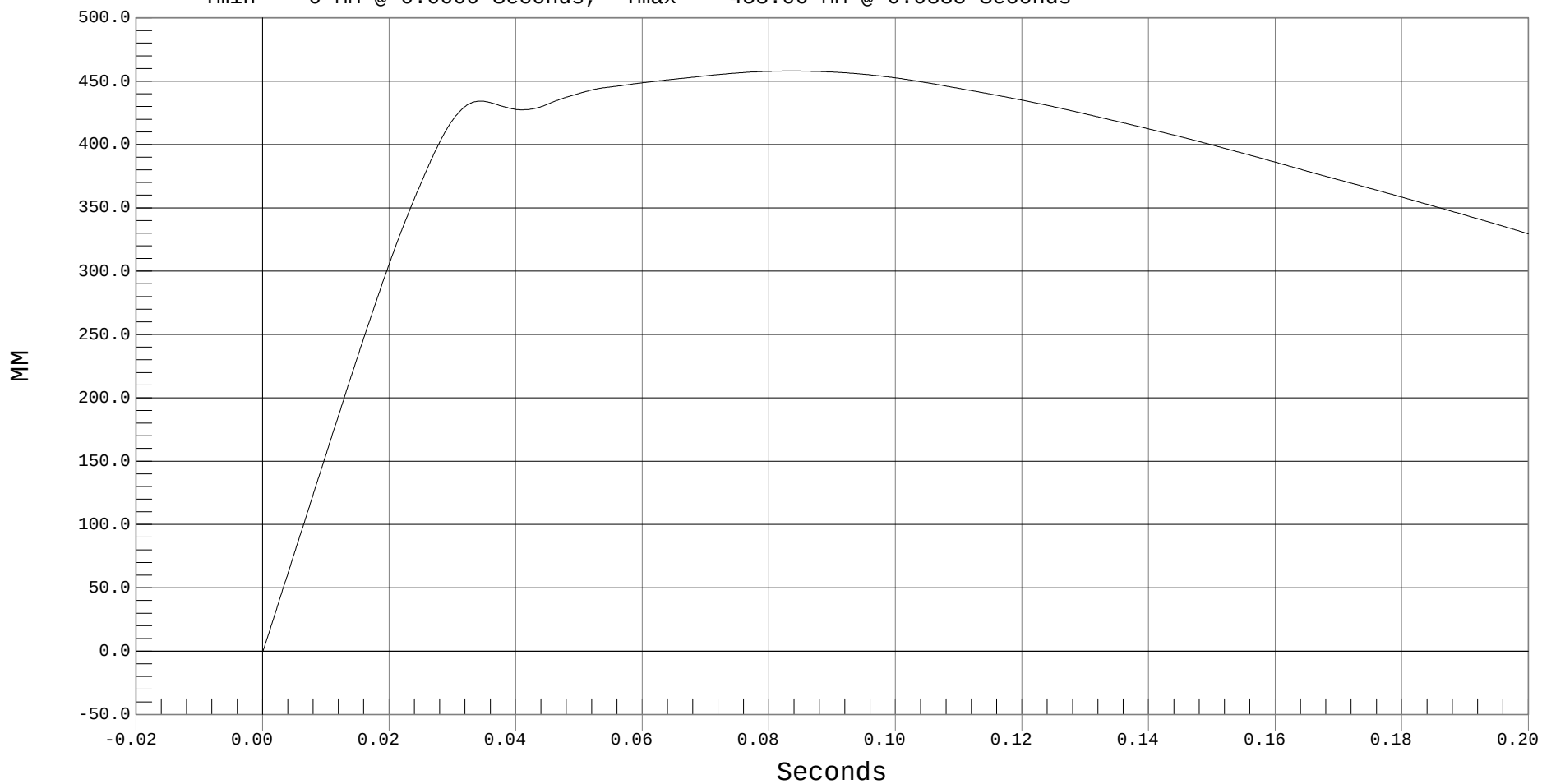
UPPER ENGINE X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 TOP OF ENGINE BLOCK X DISPLACEMENT, b01013AI.D55

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 458.06 MM @ 0.0835 Seconds





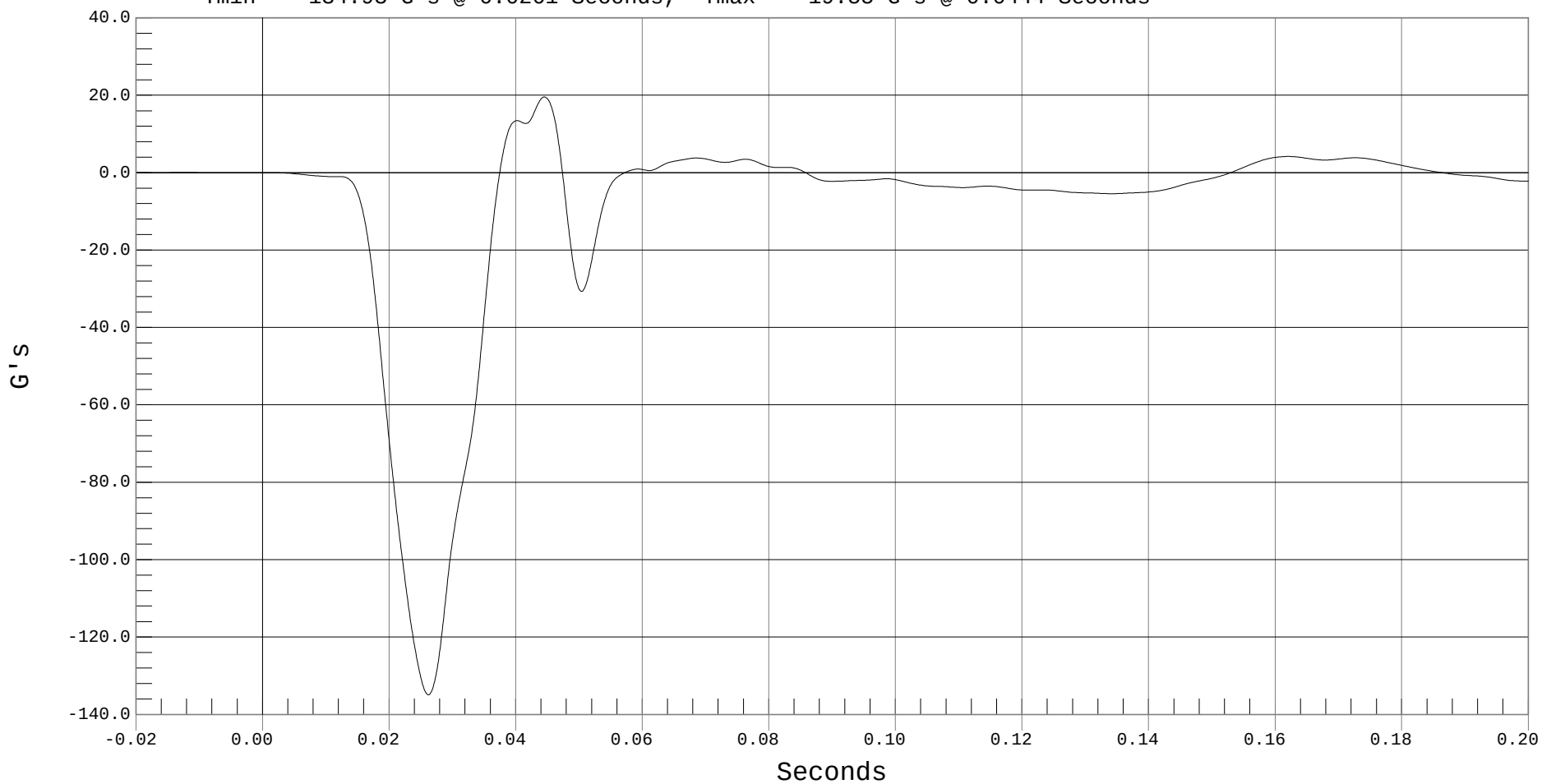
LOWER ENGINE X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 ENGINE LOWER X, b01013AF.A56

Ymin = -134.93 G's @ 0.0261 Seconds, Ymax = 19.55 G's @ 0.0444 Seconds





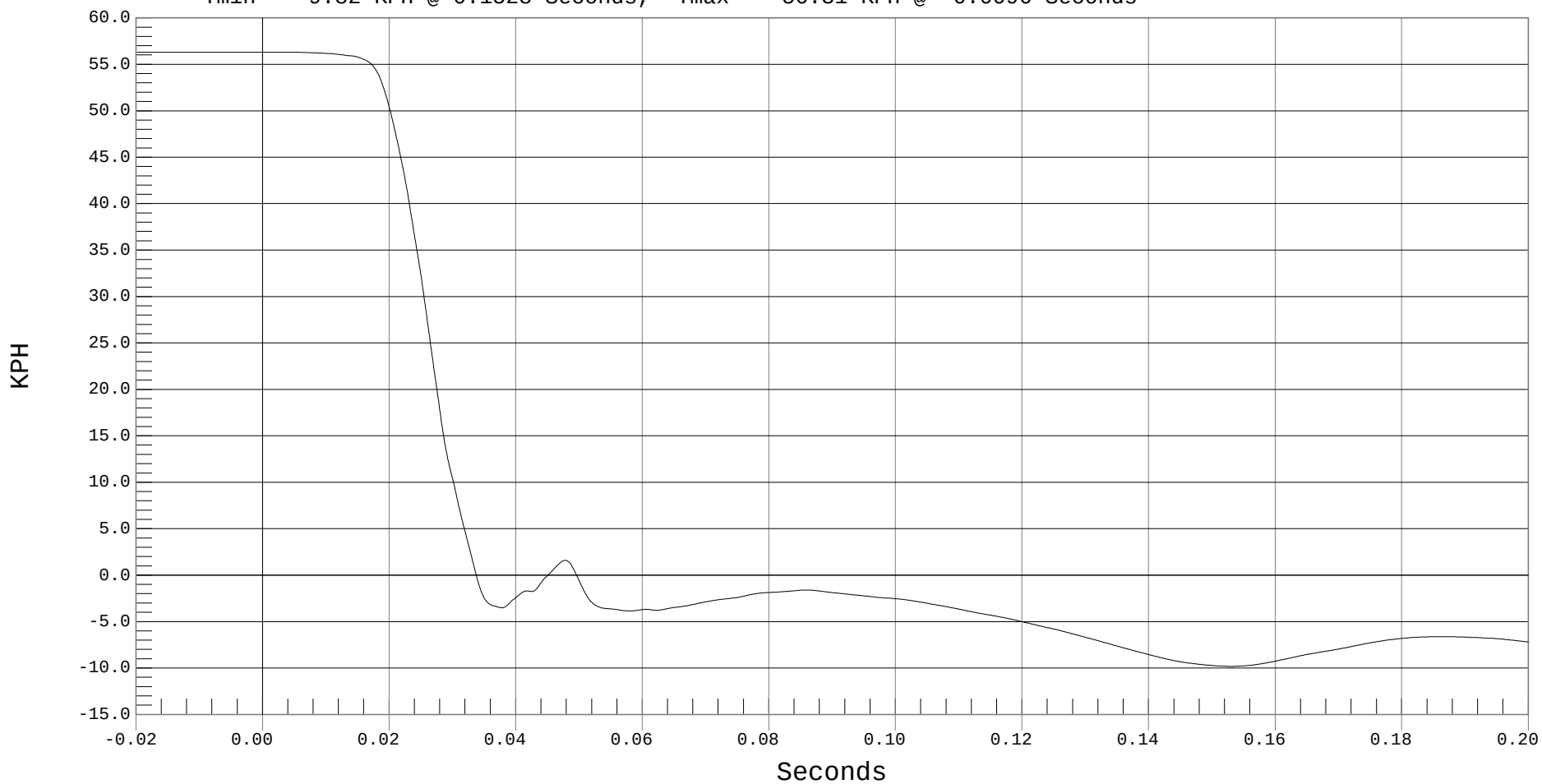
LOWER ENGINE X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 BOTTOM OF ENGINE X VELOCITY, b01013AI.V56

Ymin = -9.82 KPH @ 0.1528 Seconds, Ymax = 56.31 KPH @ -0.0096 Seconds





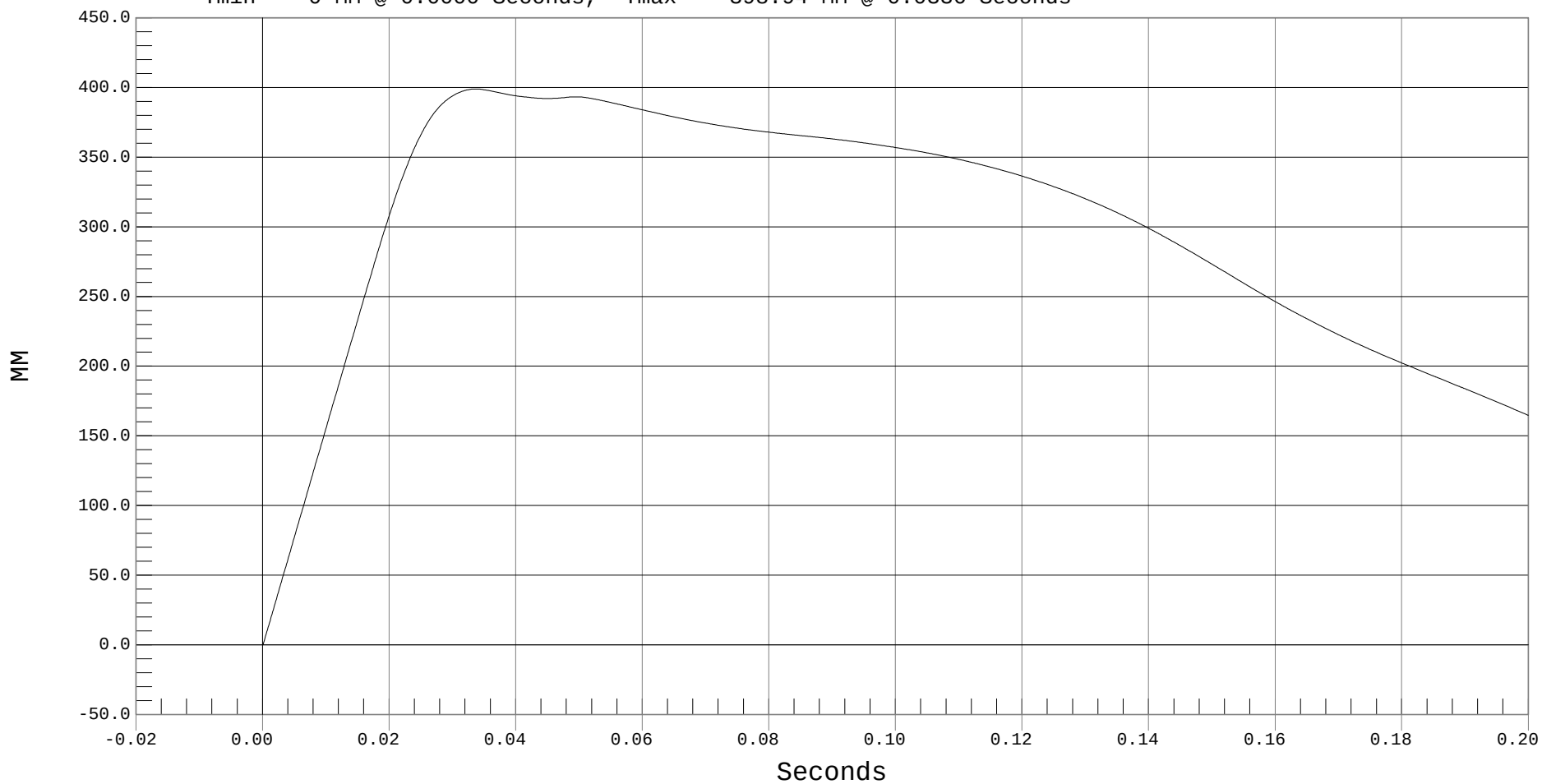
LOWER ENGINE X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 BOTTOM OF ENGINE X DISPLACEMENT, b01013AI.D56

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 398.94 MM @ 0.0336 Seconds





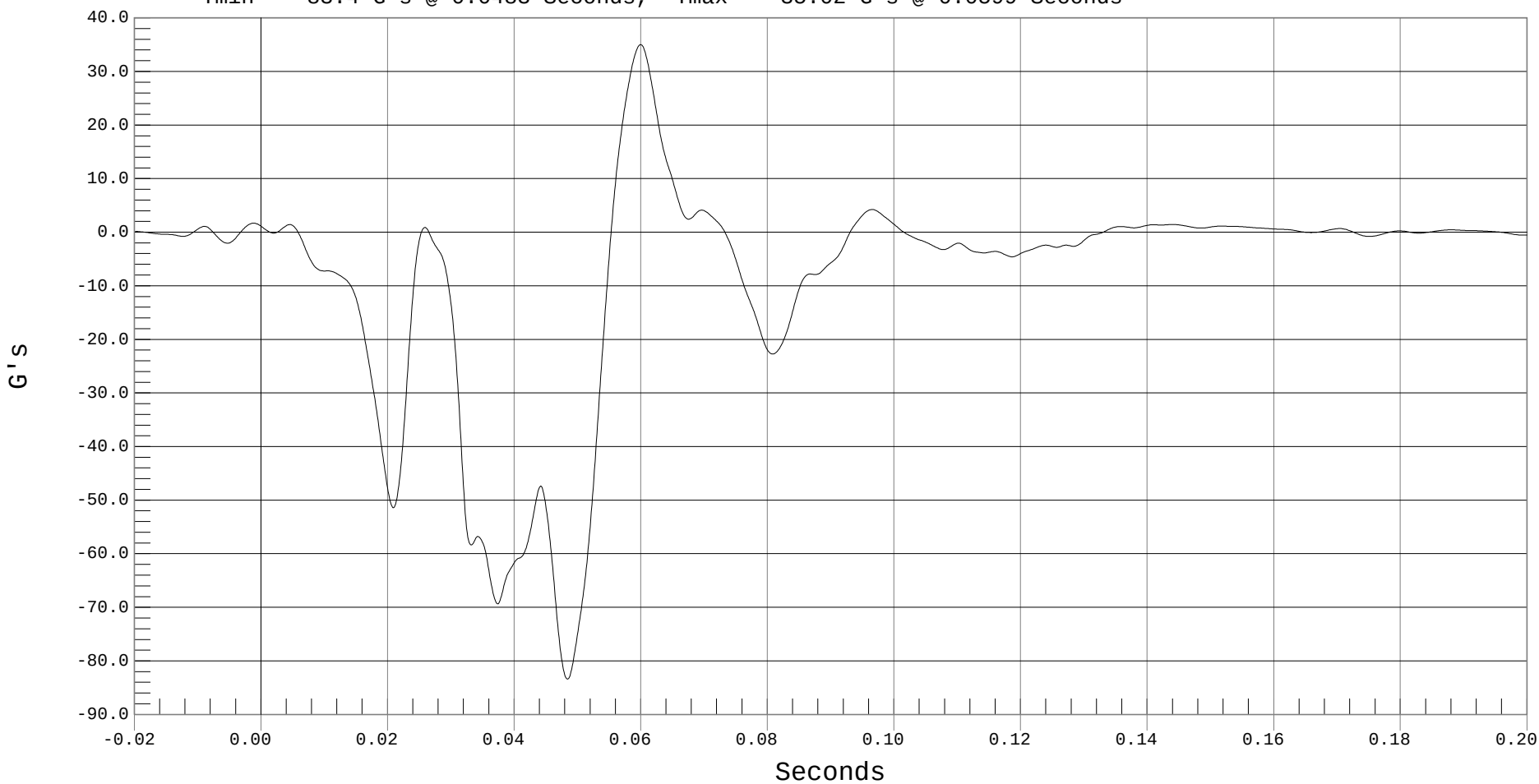
LEFT BRAKE CALIPER X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 LEFT BRAKE CALIPER X, b01013AF.A61

Ymin = -83.4 G's @ 0.0483 Seconds, Ymax = 35.02 G's @ 0.0599 Seconds





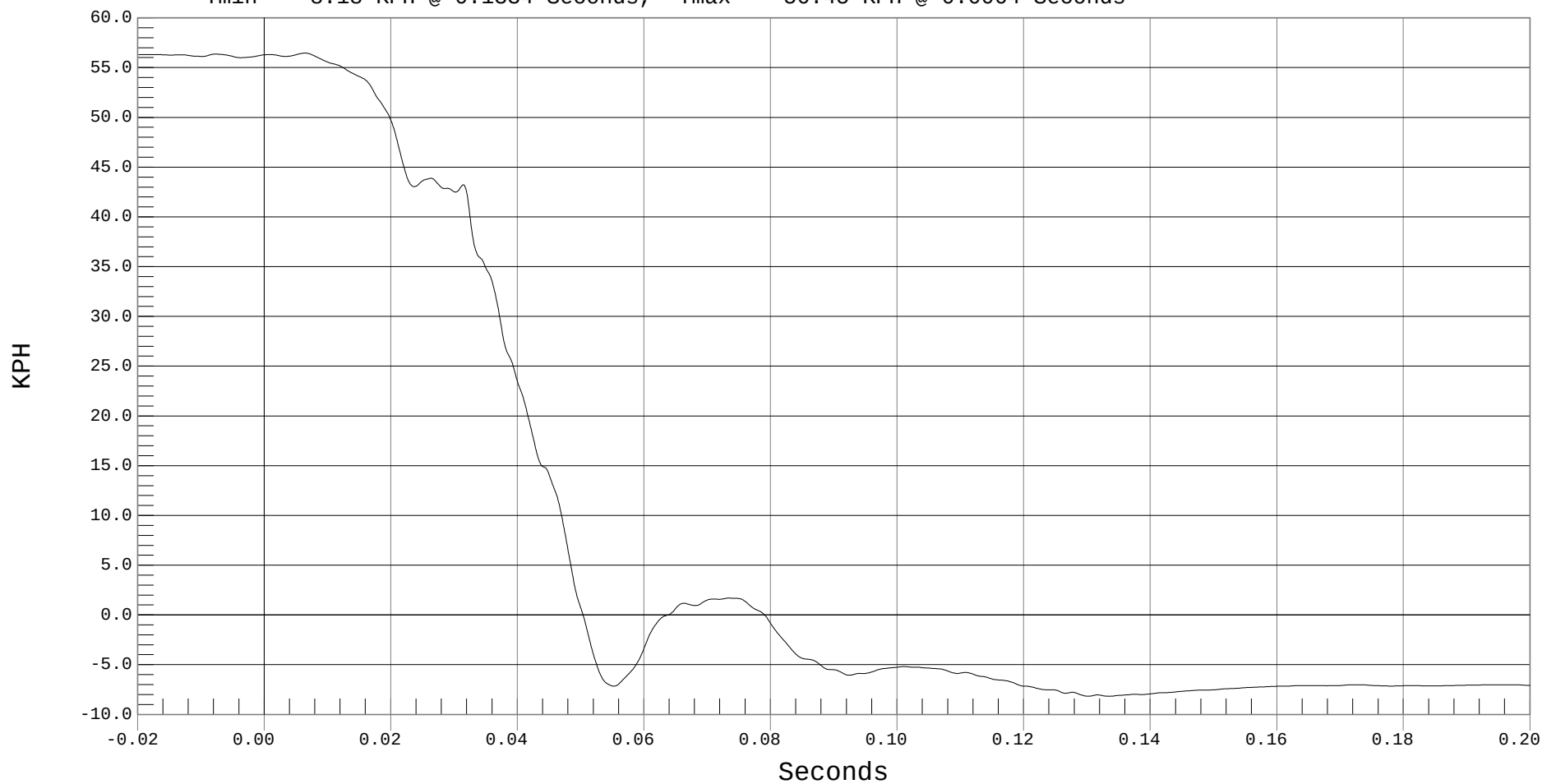
LEFT BRAKE CALIPER X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT BRAKE CALIPER X VELOCITY, b01013AI.V61

Ymin = -8.18 KPH @ 0.1334 Seconds, Ymax = 56.45 KPH @ 0.0064 Seconds





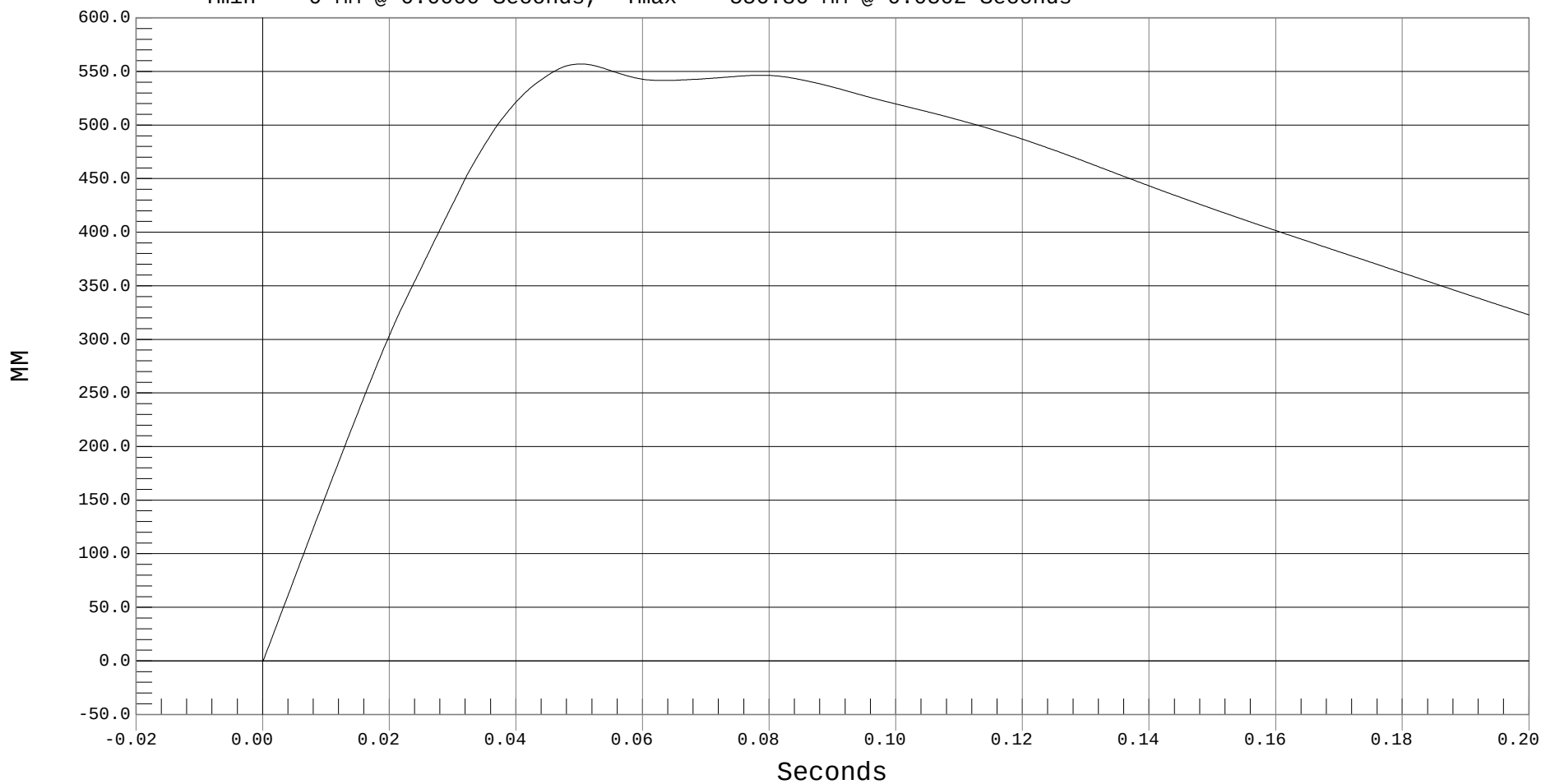
LEFT BRAKE CALIPER X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT BRAKE CALIPER X DISPLACEMENT, b01013AI.D61

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 556.86 MM @ 0.0502 Seconds





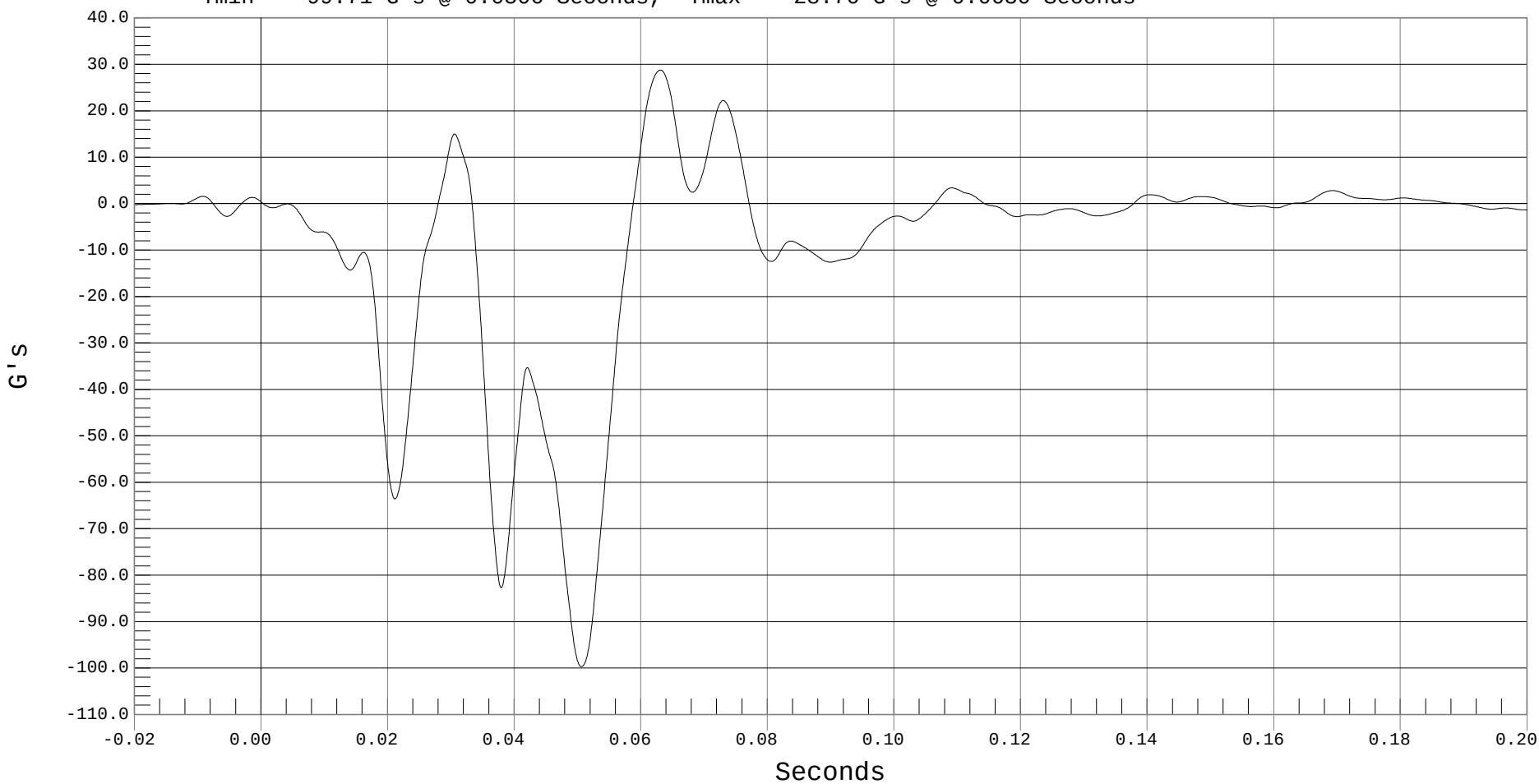
RIGHT BRAKE CALIPER X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 RIGHT BRAKE CALIPER X, b01013AF.A60

Ymin = -99.71 G's @ 0.0506 Seconds, Ymax = 28.76 G's @ 0.0630 Seconds





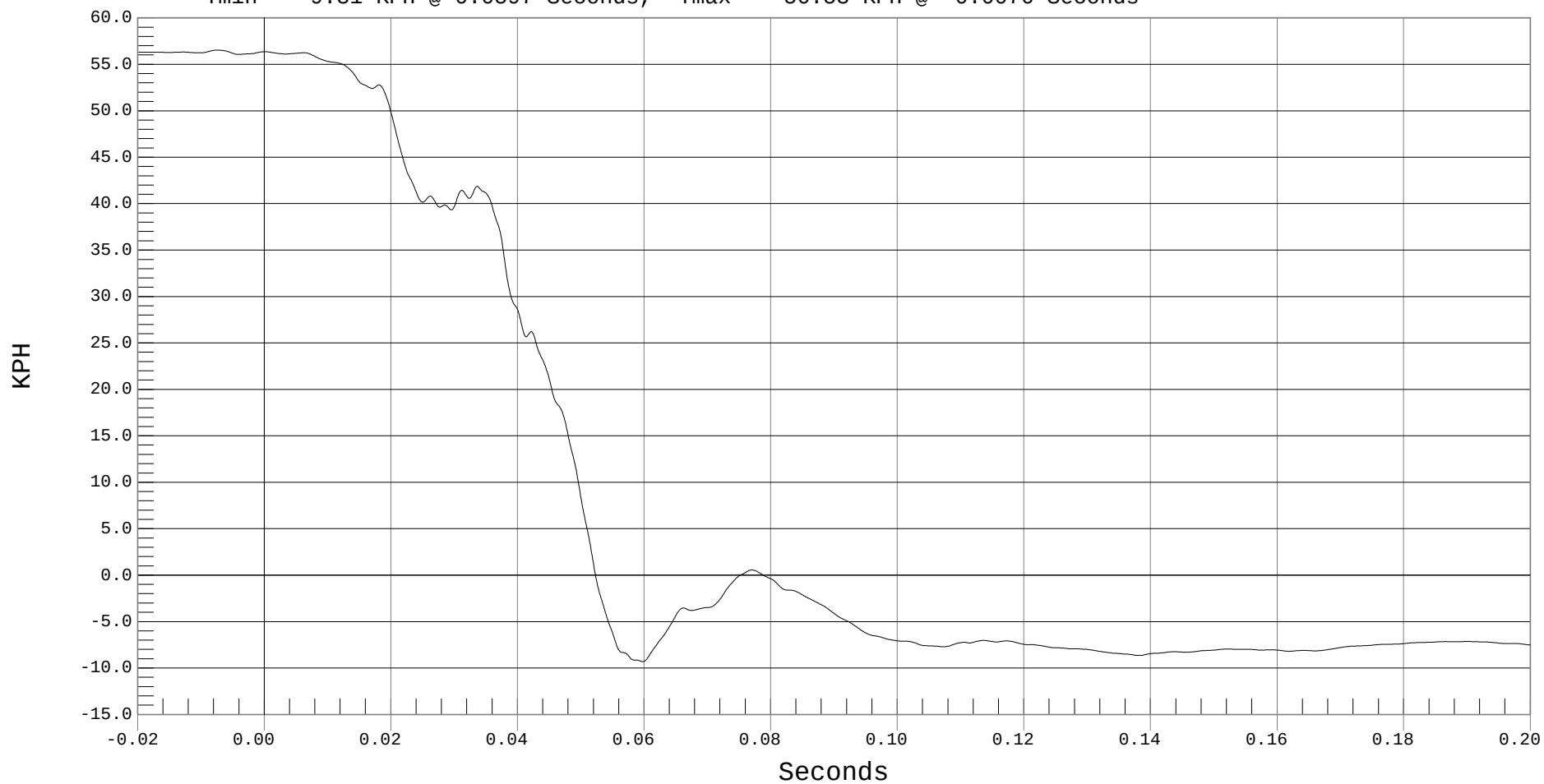
RIGHT BRAKE CALIPER X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RIGHT BRAKE CALIPER X VELOCITY, b01013AI.V60

Ymin = -9.31 KPH @ 0.0597 Seconds, Ymax = 56.53 KPH @ -0.0076 Seconds





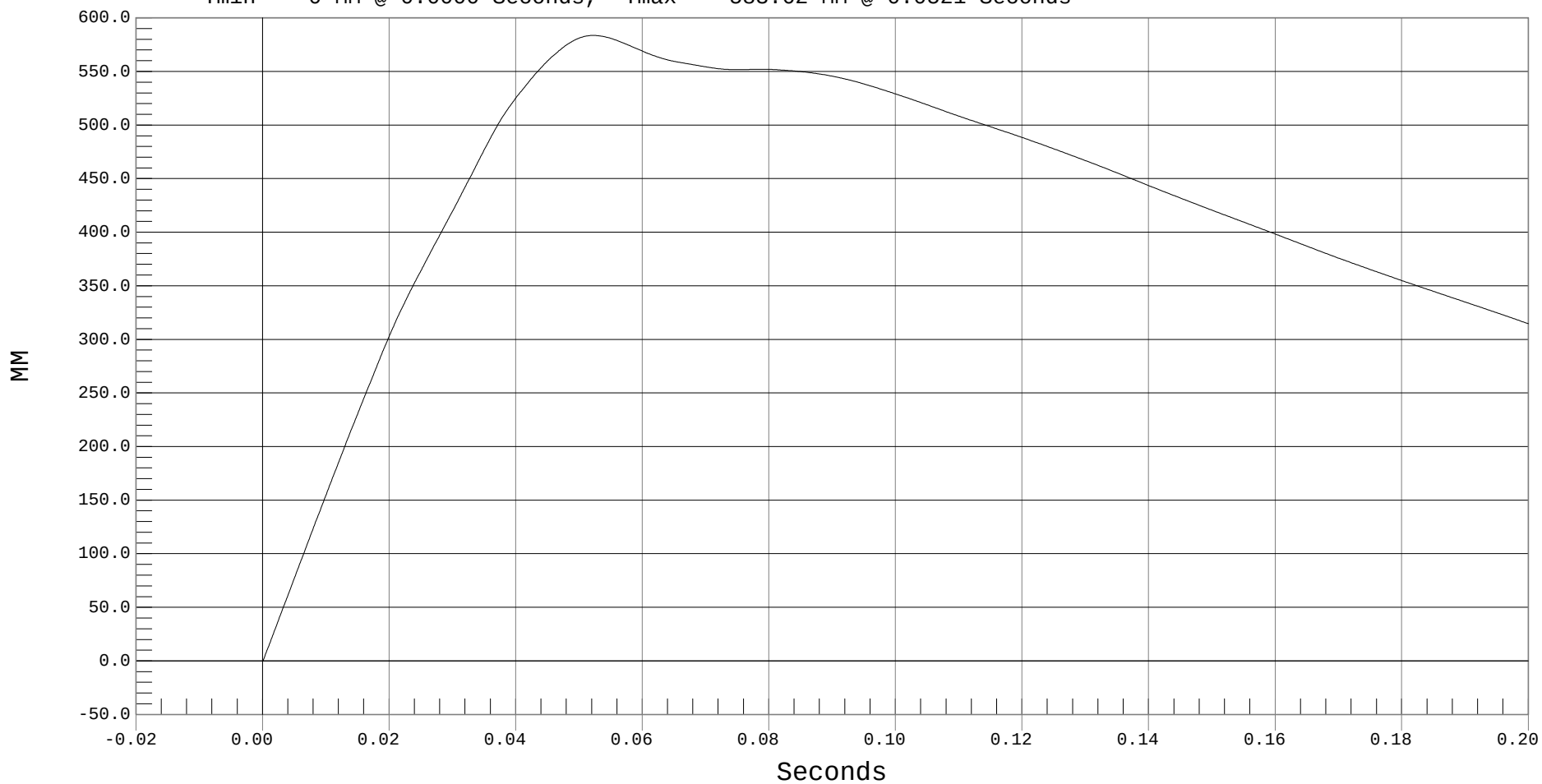
RIGHT BRAKE CALIPER X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RIGHT BRAKE CALIPER X DISPLACEMENT, b01013AI.D60

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 583.62 MM @ 0.0521 Seconds





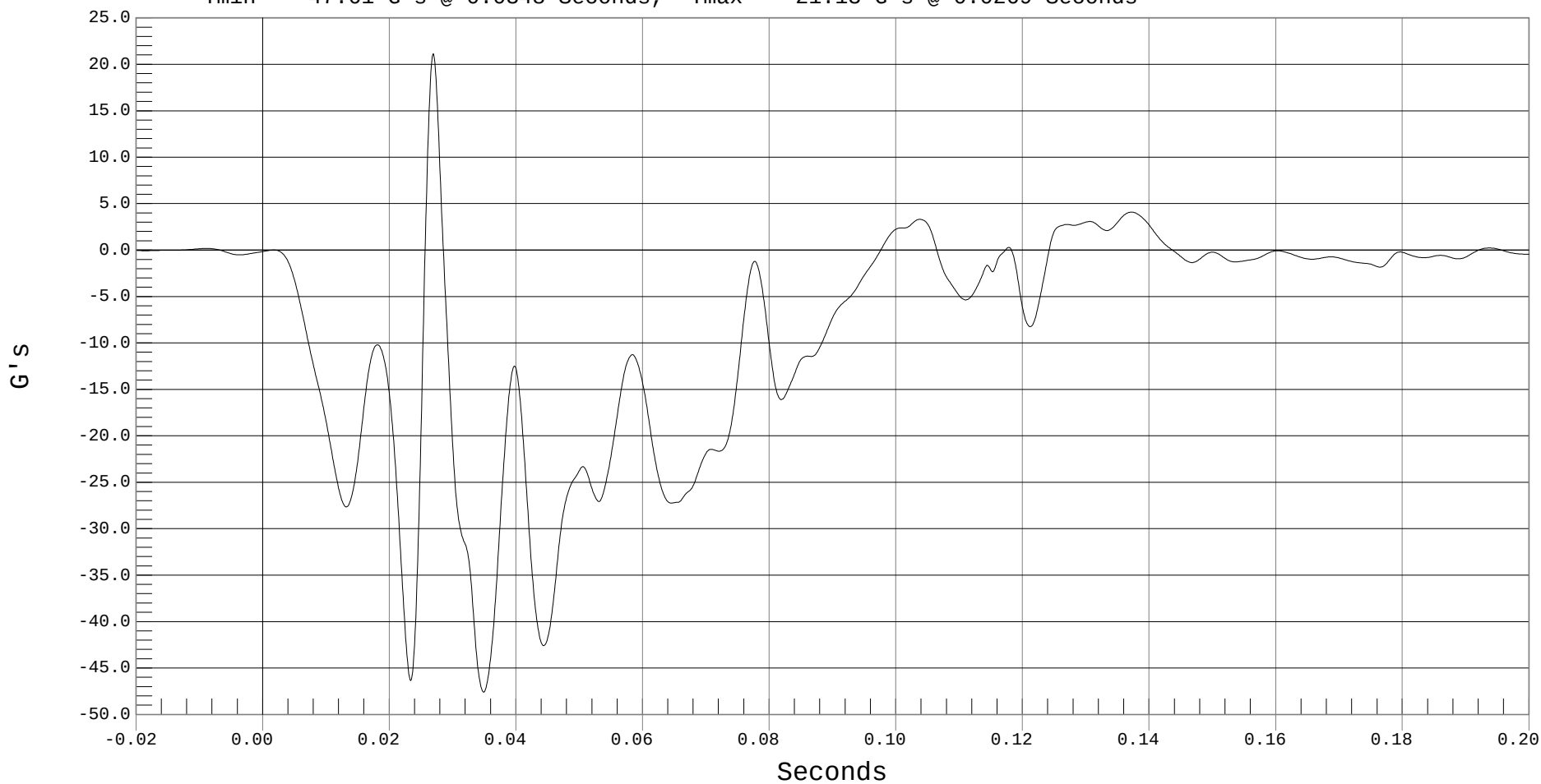
INSTRUMENT PANEL X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 INSTRUMENT PANEL X, b01013AF.A57

Ymin = -47.61 G's @ 0.0348 Seconds, Ymax = 21.13 G's @ 0.0269 Seconds





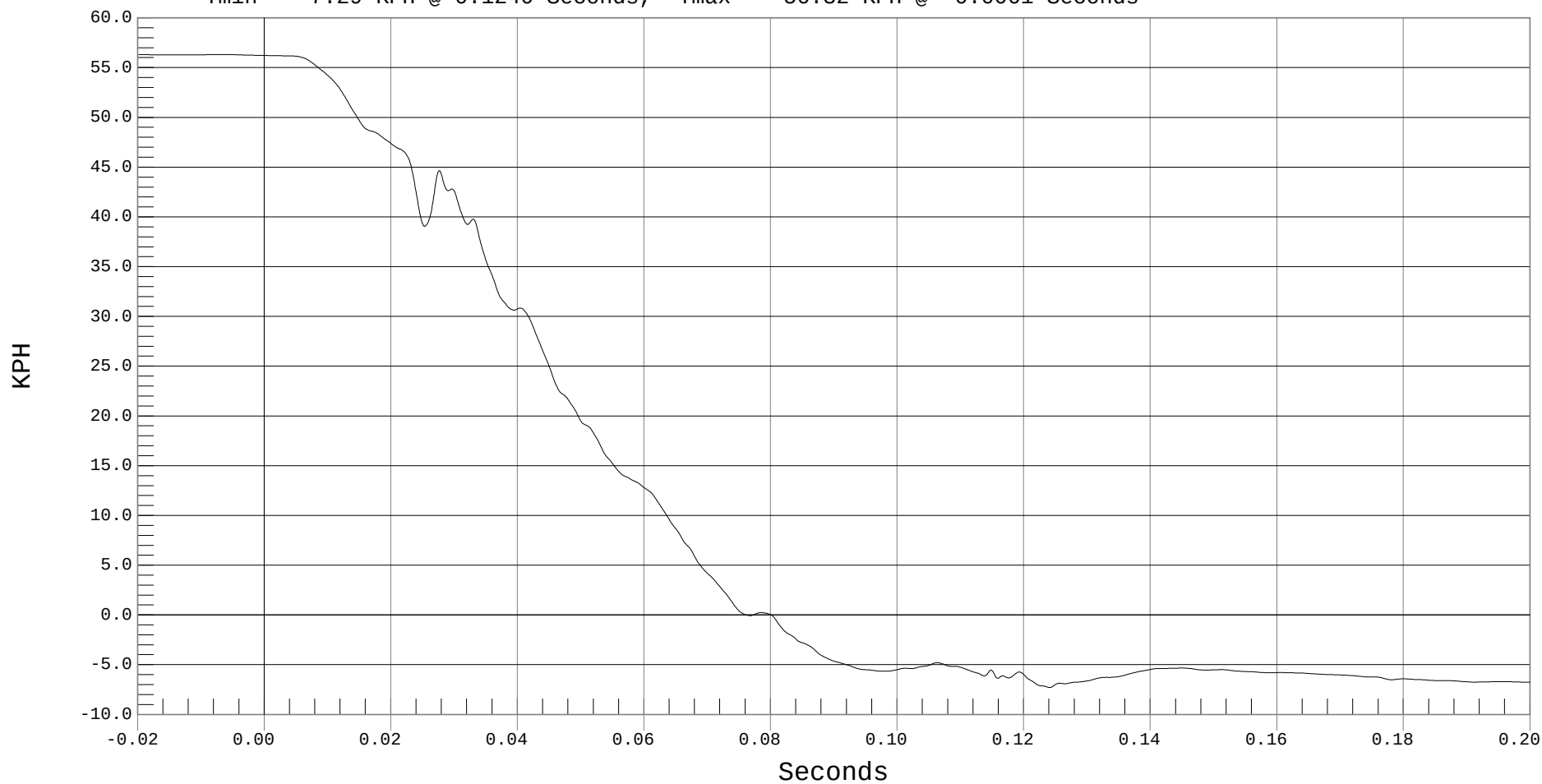
INSTRUMENT PANEL X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

1 INSTRUMENT PANEL X VELOCITY, b01013AI.V57

Ymin = -7.29 KPH @ 0.1240 Seconds, Ymax = 56.32 KPH @ -0.0061 Seconds





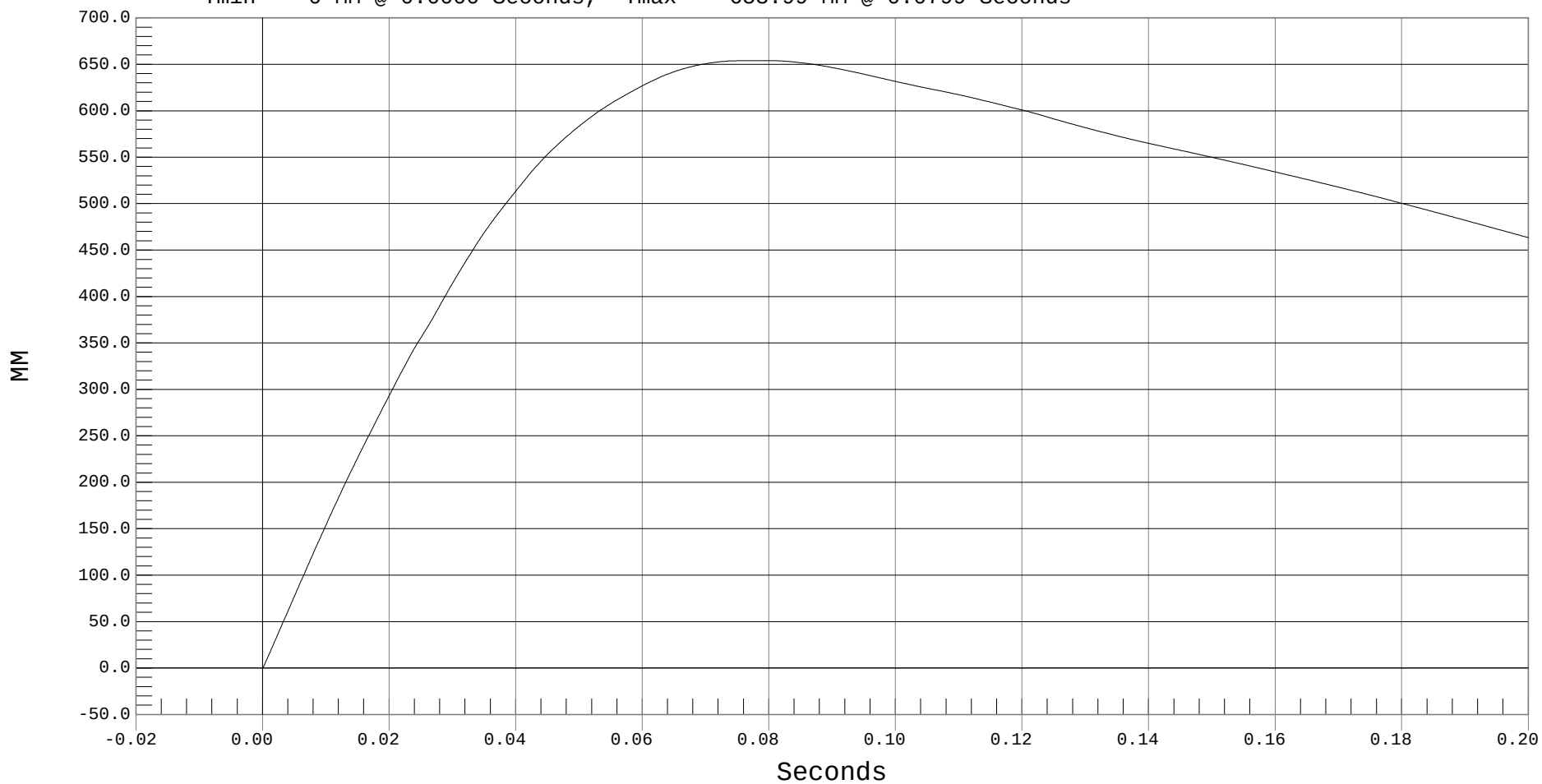
INSTRUMENT PANEL X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 INSTRUMENT PANEL X DISPLACEMENT, b01013AI.D57

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 653.99 MM @ 0.0799 Seconds





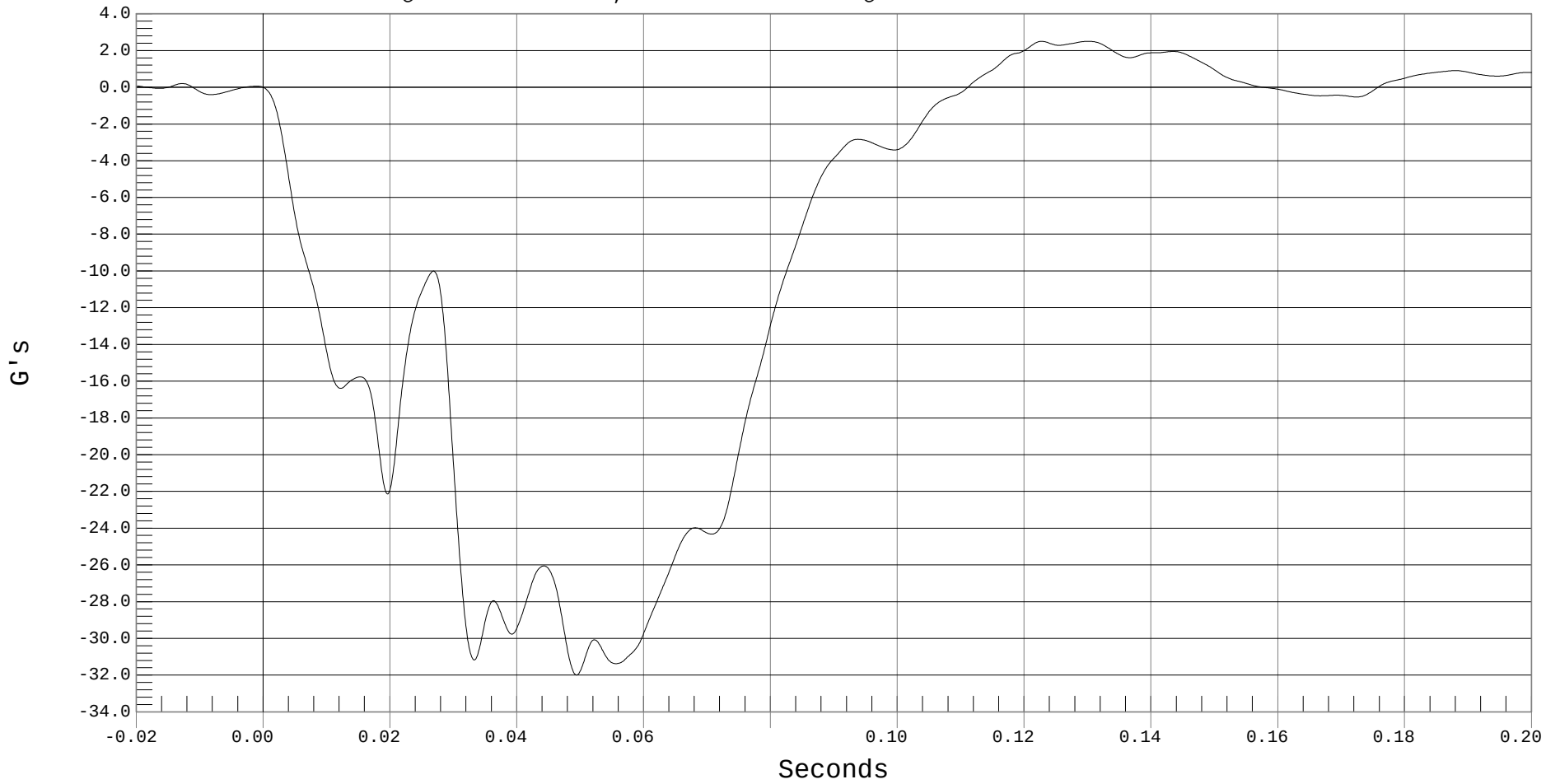
LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 LEFT REAR SEAT X-MEMBER Xr, b01013AF.A03

Ymin = -32 G's @ 0.0493 Seconds, Ymax = 2.5 G's @ 0.1300 Seconds





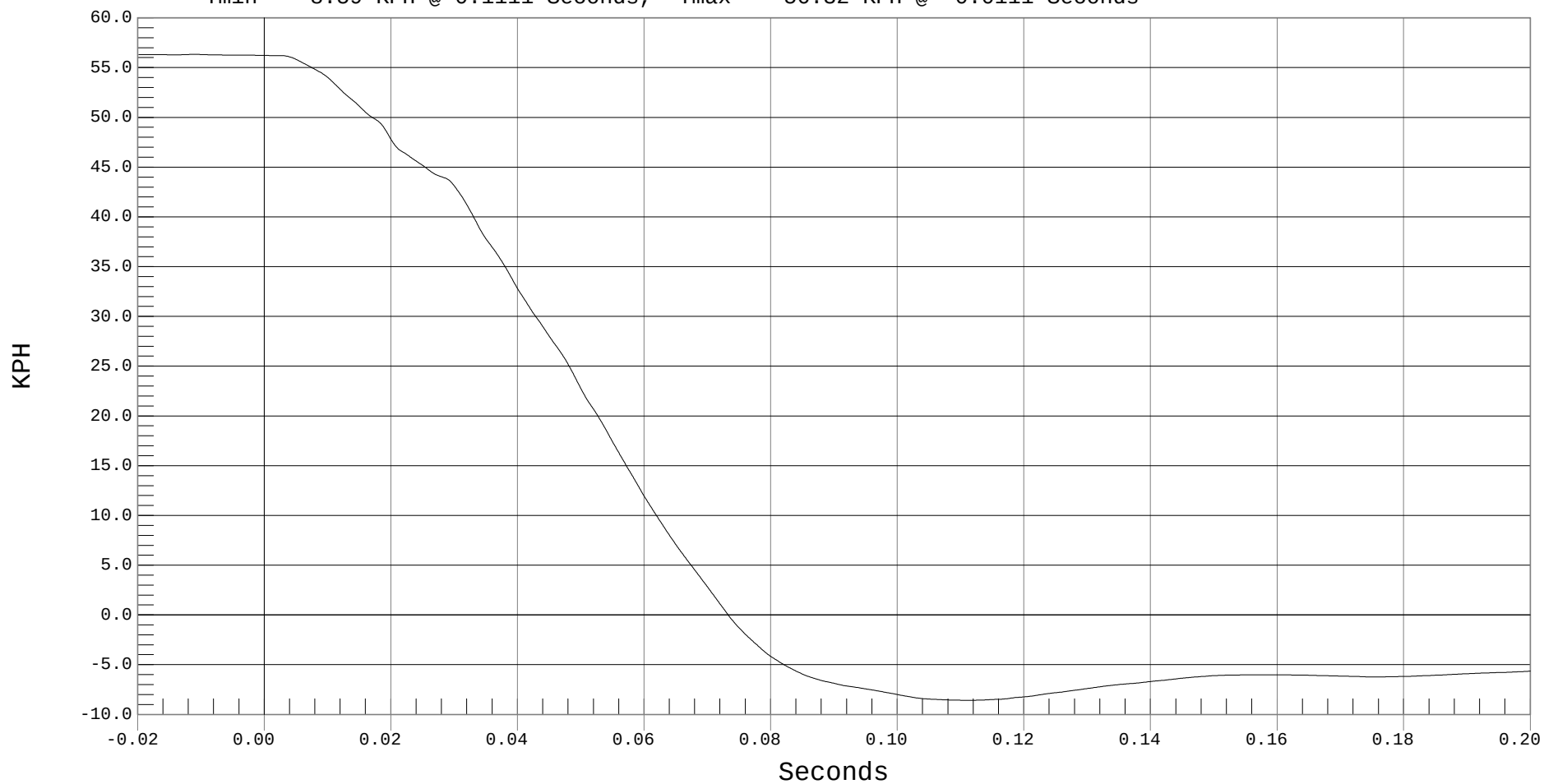
LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY, b01013AI.V03

Ymin = -8.59 KPH @ 0.1111 Seconds, Ymax = 56.32 KPH @ -0.0111 Seconds





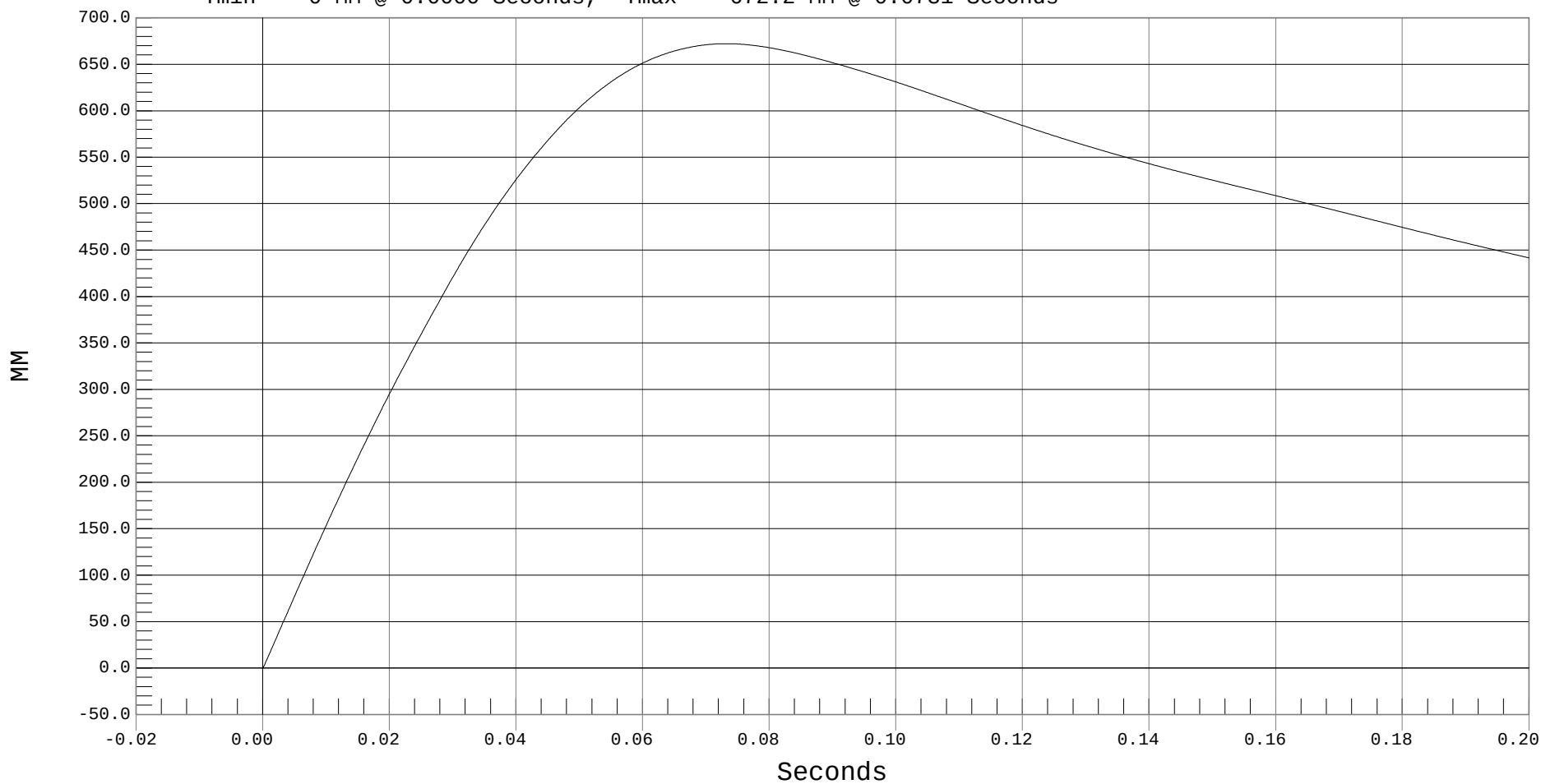
LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT, b01013AI.D03

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 672.2 MM @ 0.0731 Seconds





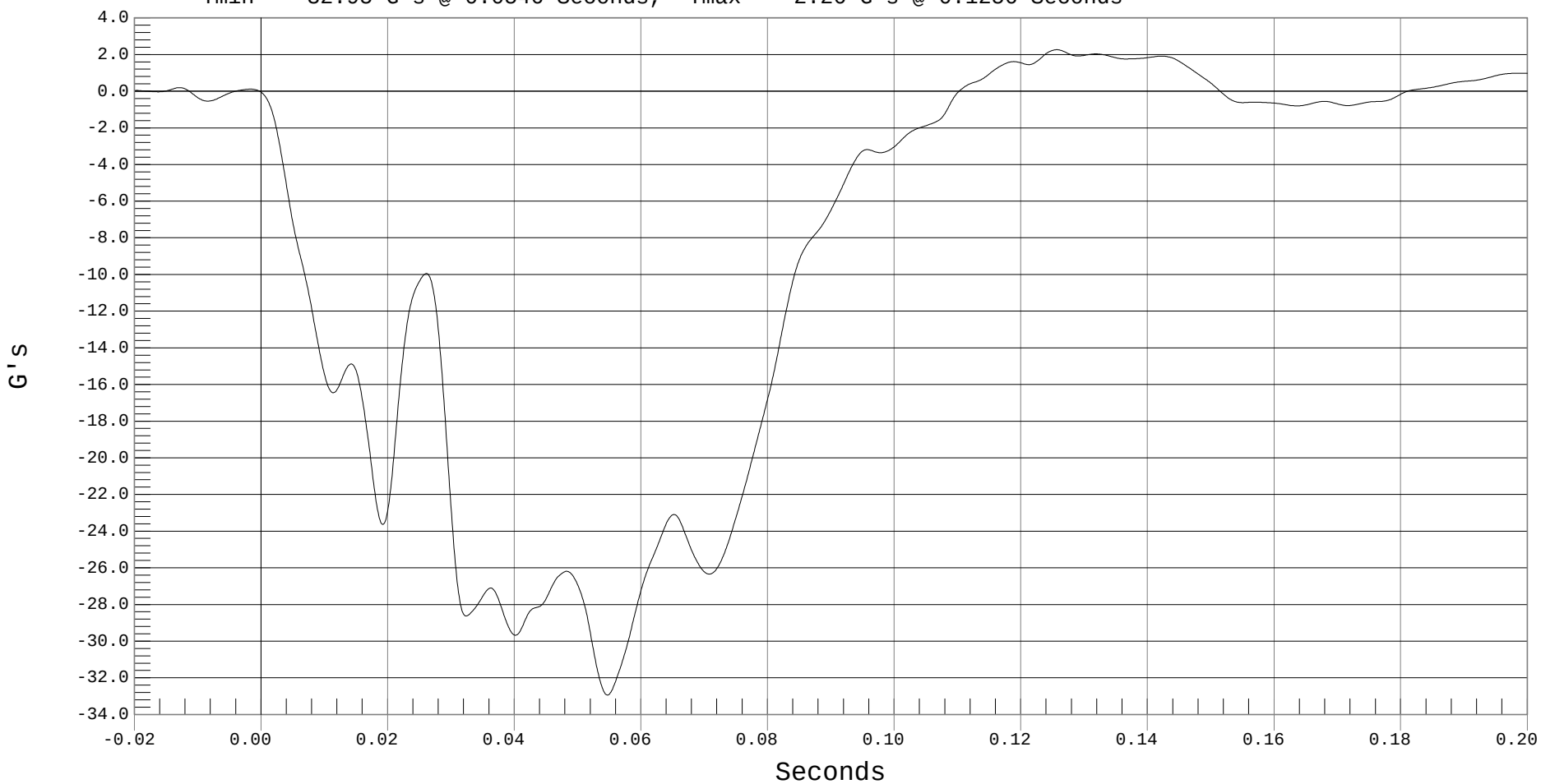
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 RIGHT REAR SEAT X-MEMBER Xr, b01013AF.A02

Ymin = -32.95 G's @ 0.0546 Seconds, Ymax = 2.26 G's @ 0.1256 Seconds





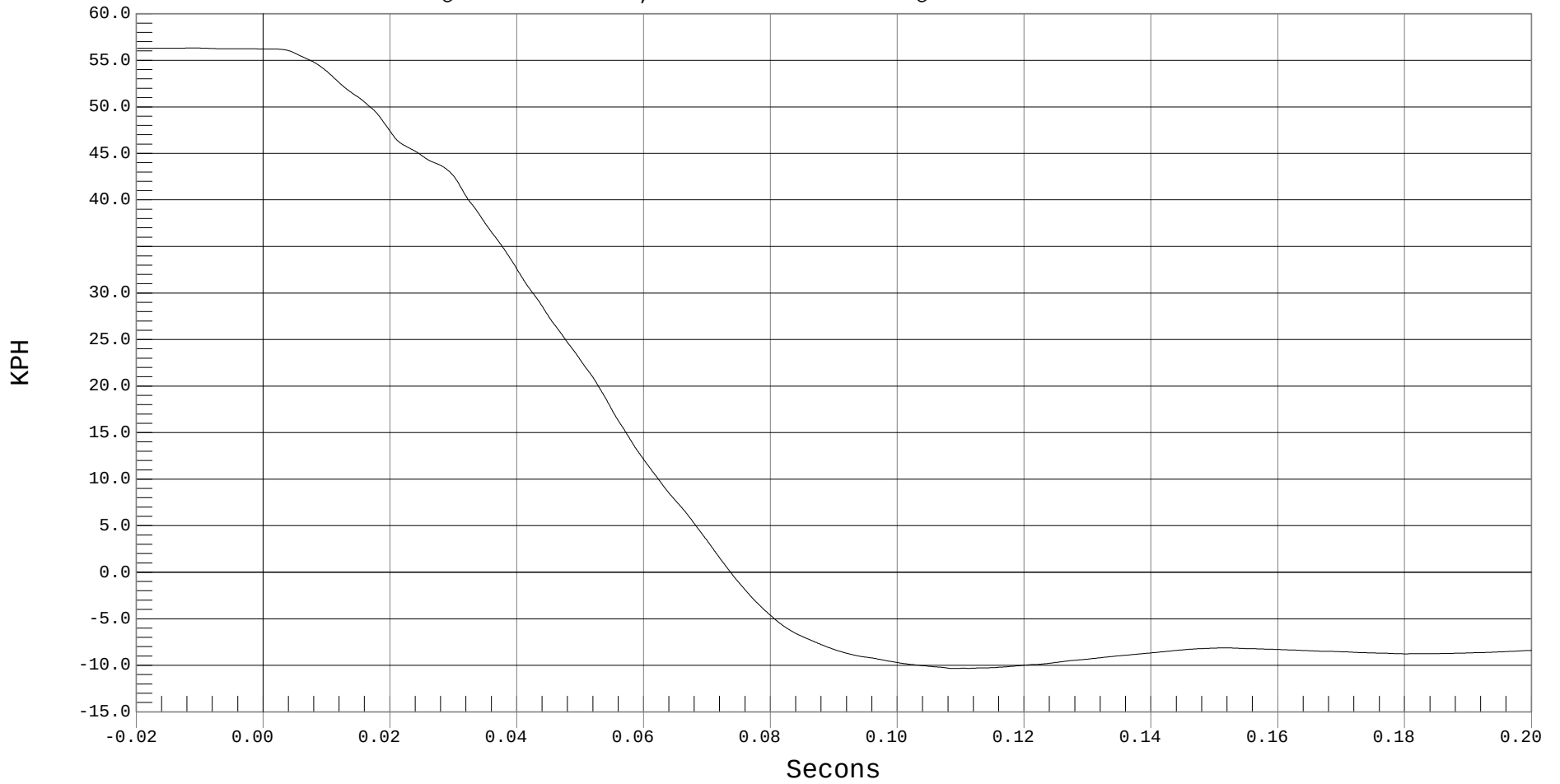
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY, b01013AI.V02

Ymin = -10.35 KPH @ 0.1088 Secons, Ymax = 56.33 KPH @ -0.0111 Secons





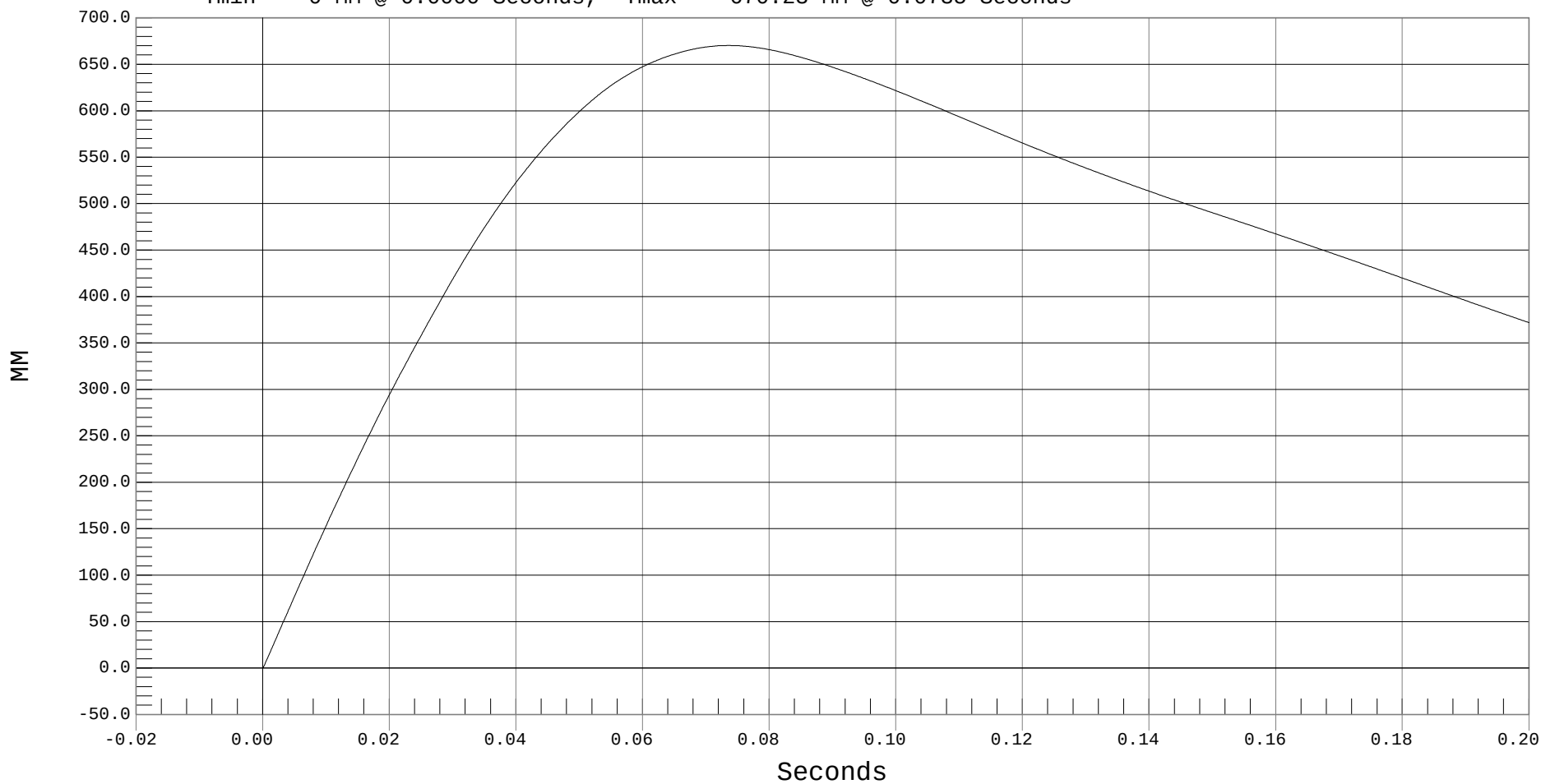
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT, b01013AI.D02

Ymin = 0 MM @ 0.0000 Seconds, Ymax = 670.23 MM @ 0.0735 Seconds





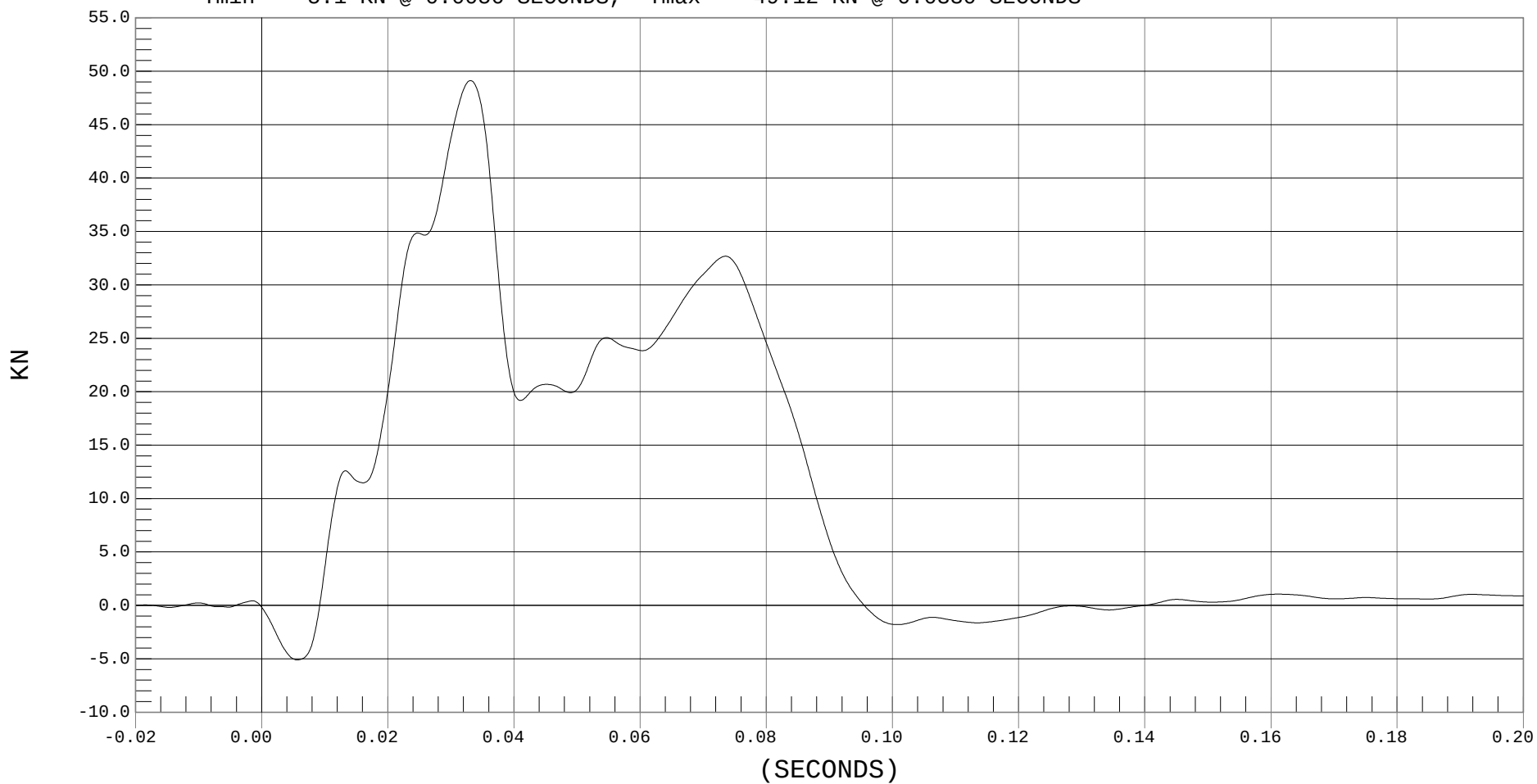
UPPER LEFT BARRIER FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 BARRIER UPPER LEFT, b01013FF.F02

Ymin = -5.1 KN @ 0.0056 SECONDS, Ymax = 49.12 KN @ 0.0330 SECONDS





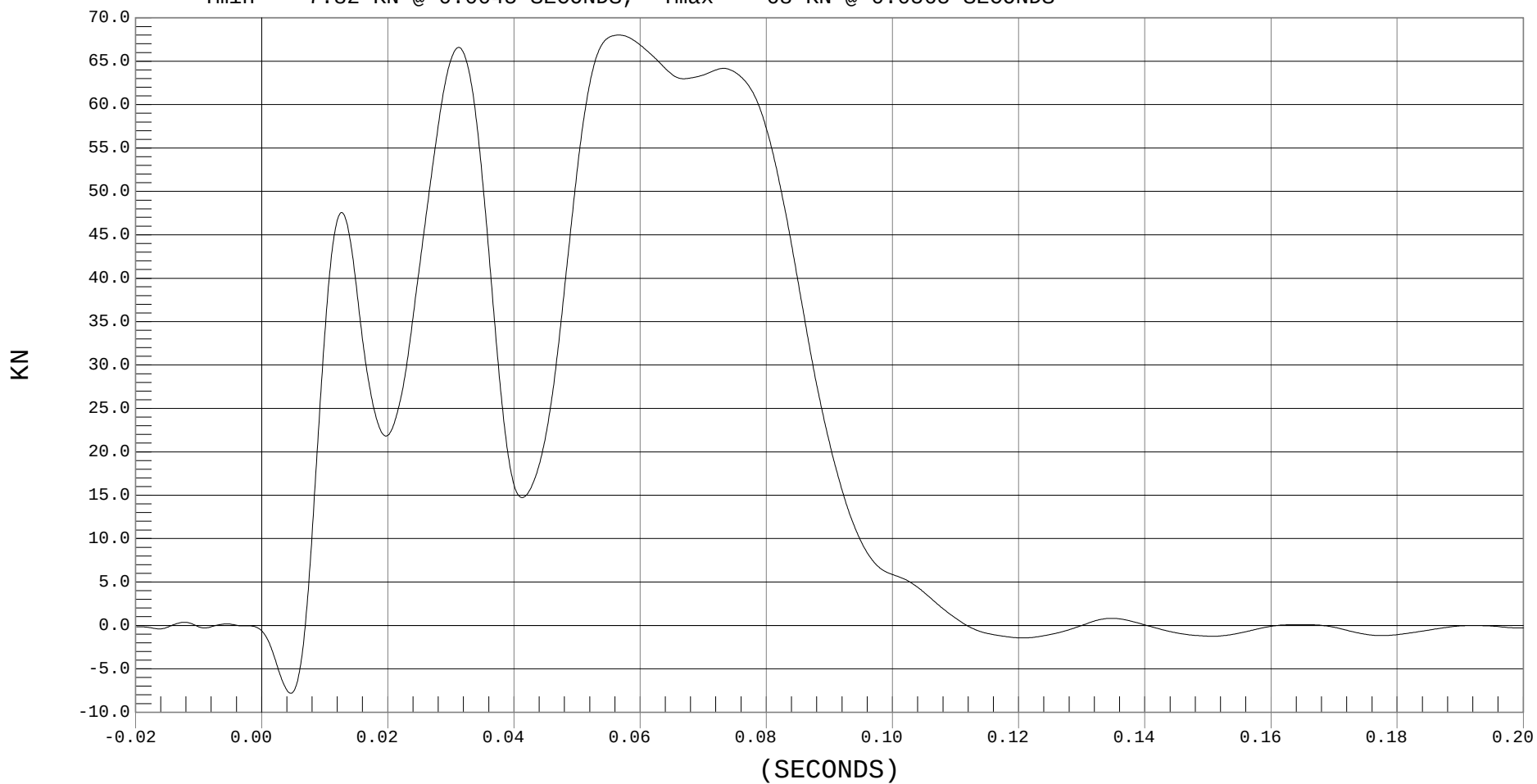
UPPER CENTER BARRIER FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 BARRIER UPPER CENTER, b01013FF.F03

Ymin = -7.82 KN @ 0.0045 SECONDS, Ymax = 68 KN @ 0.0565 SECONDS





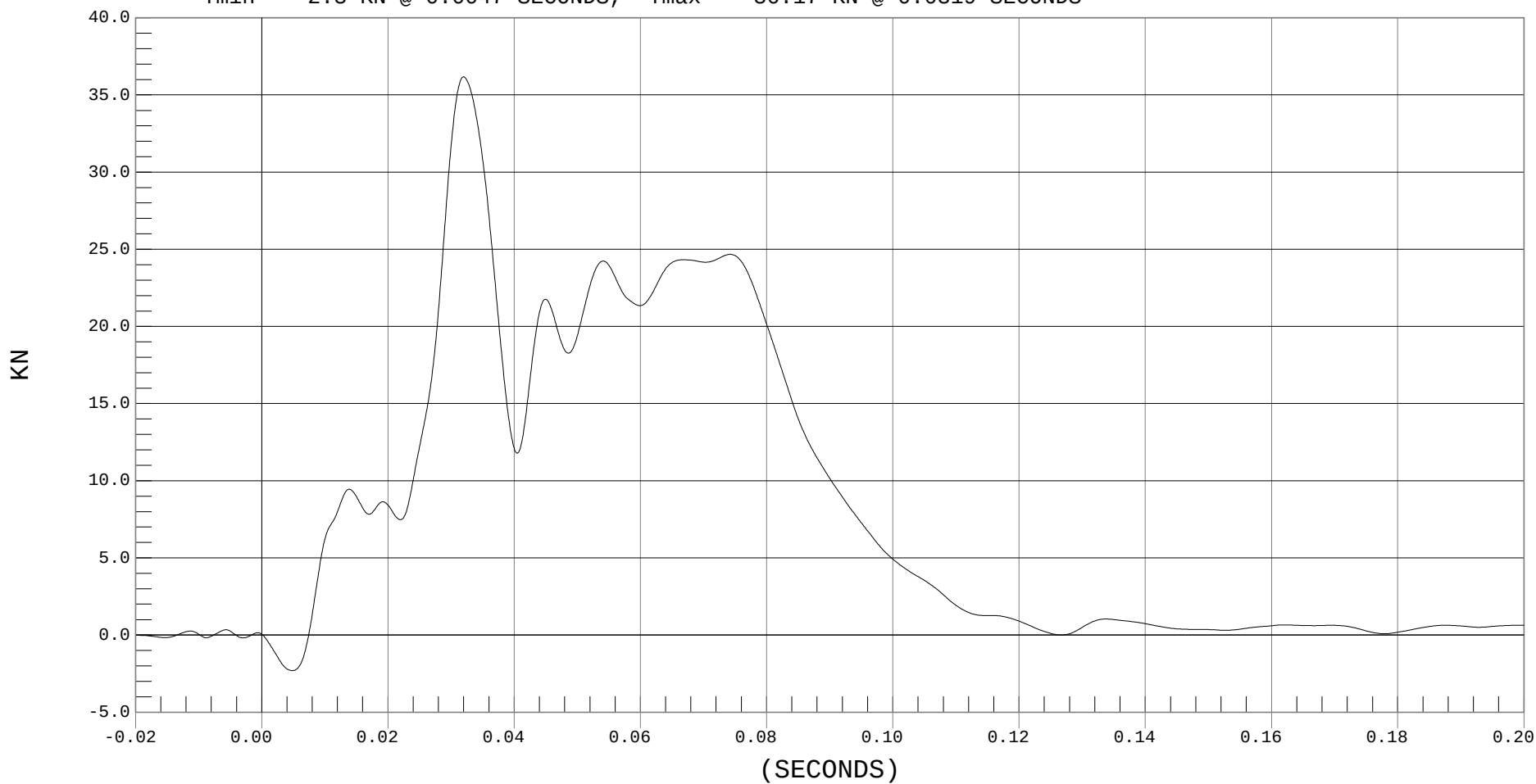
UPPER RIGHT BARRIER FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 BARRIER UPPER RIGHT, b01013FF.F04

Ymin = -2.3 KN @ 0.0047 SECONDS, Ymax = 36.17 KN @ 0.0319 SECONDS





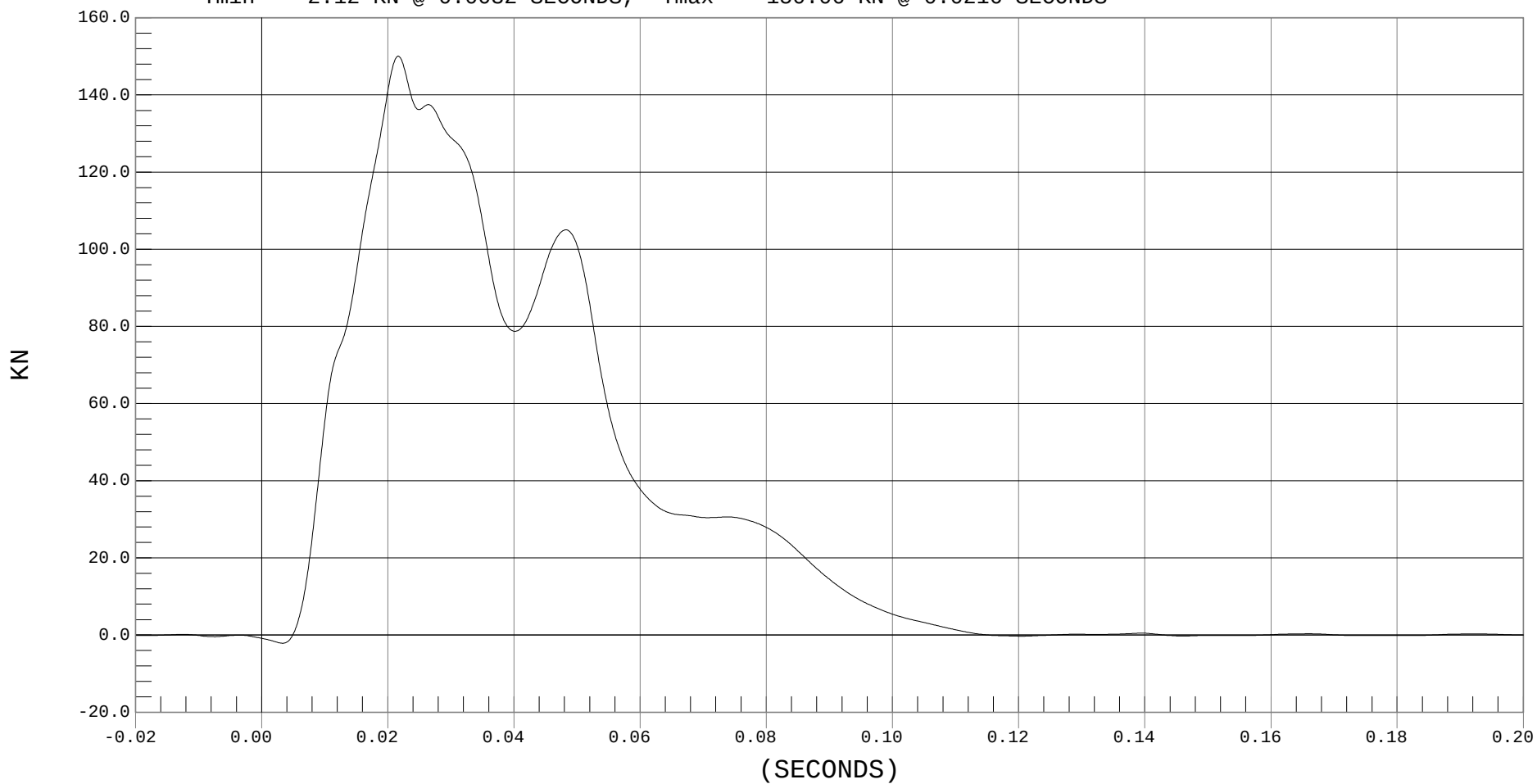
LOWER LEFT BARRIER FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 BARRIER LOWER LEFT, b01013FF.F05

Ymin = -2.12 KN @ 0.0032 SECONDS, Ymax = 150.06 KN @ 0.0216 SECONDS





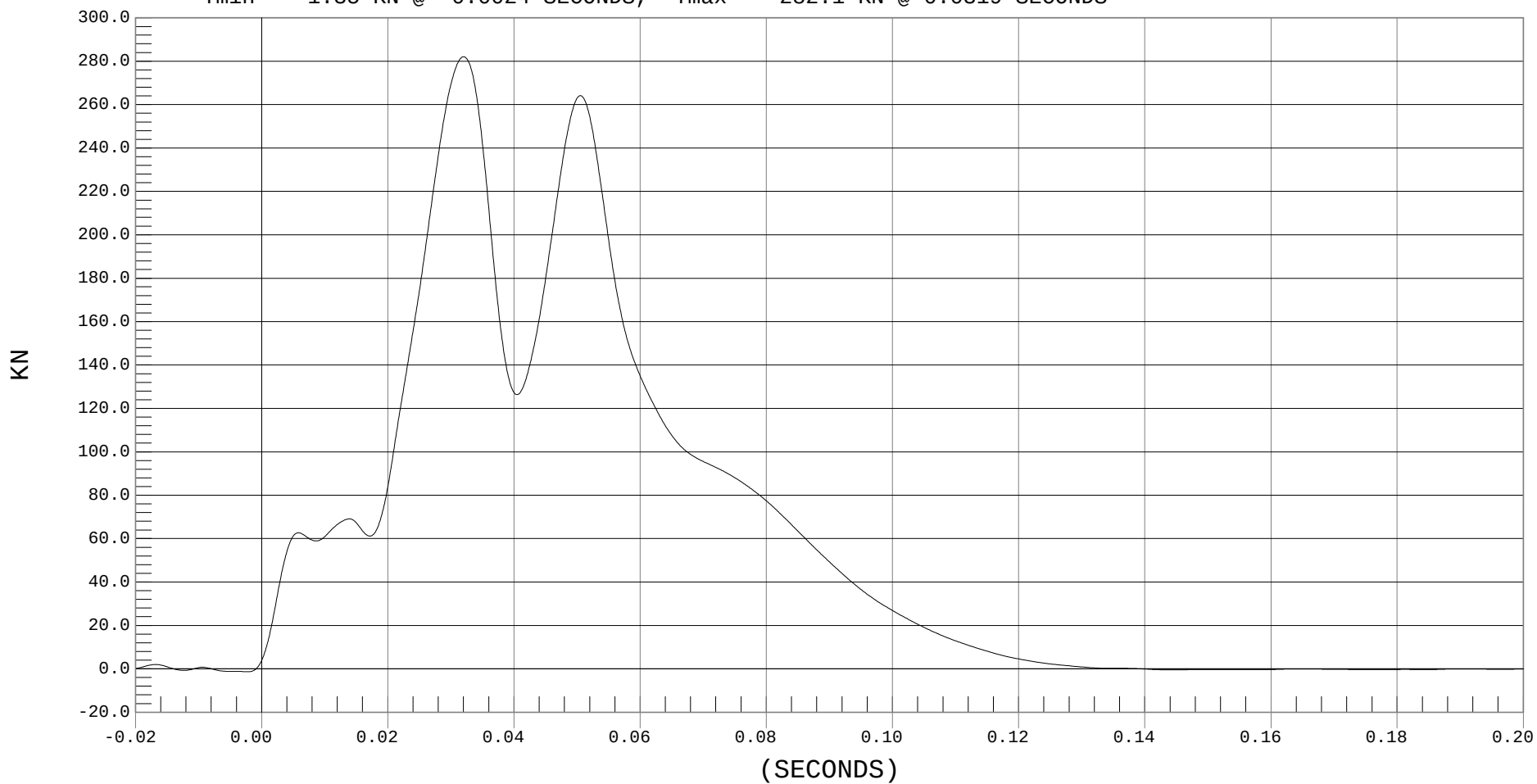
LOWER CENTER BARRIER FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 BARRIER LOWER CENTER, b01013FF.F06

Ymin = -1.35 KN @ -0.0024 SECONDS, Ymax = 282.1 KN @ 0.0319 SECONDS





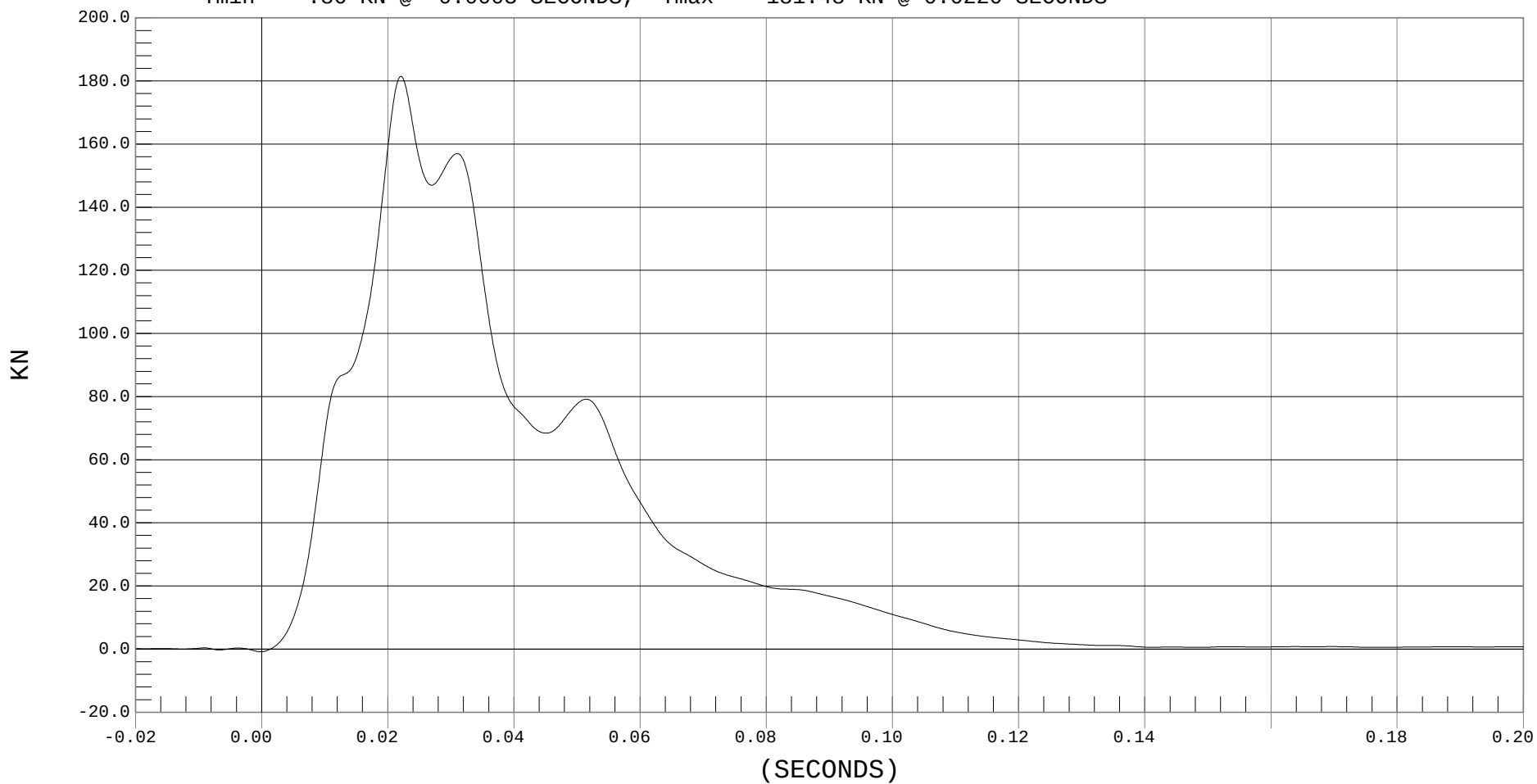
LOWER RIGHT BARRIER FORCE

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 BARRIER LOWER RIGHT, b01013FF.F07

Ymin = -.86 KN @ -0.0003 SECONDS, Ymax = 181.48 KN @ 0.0220 SECONDS





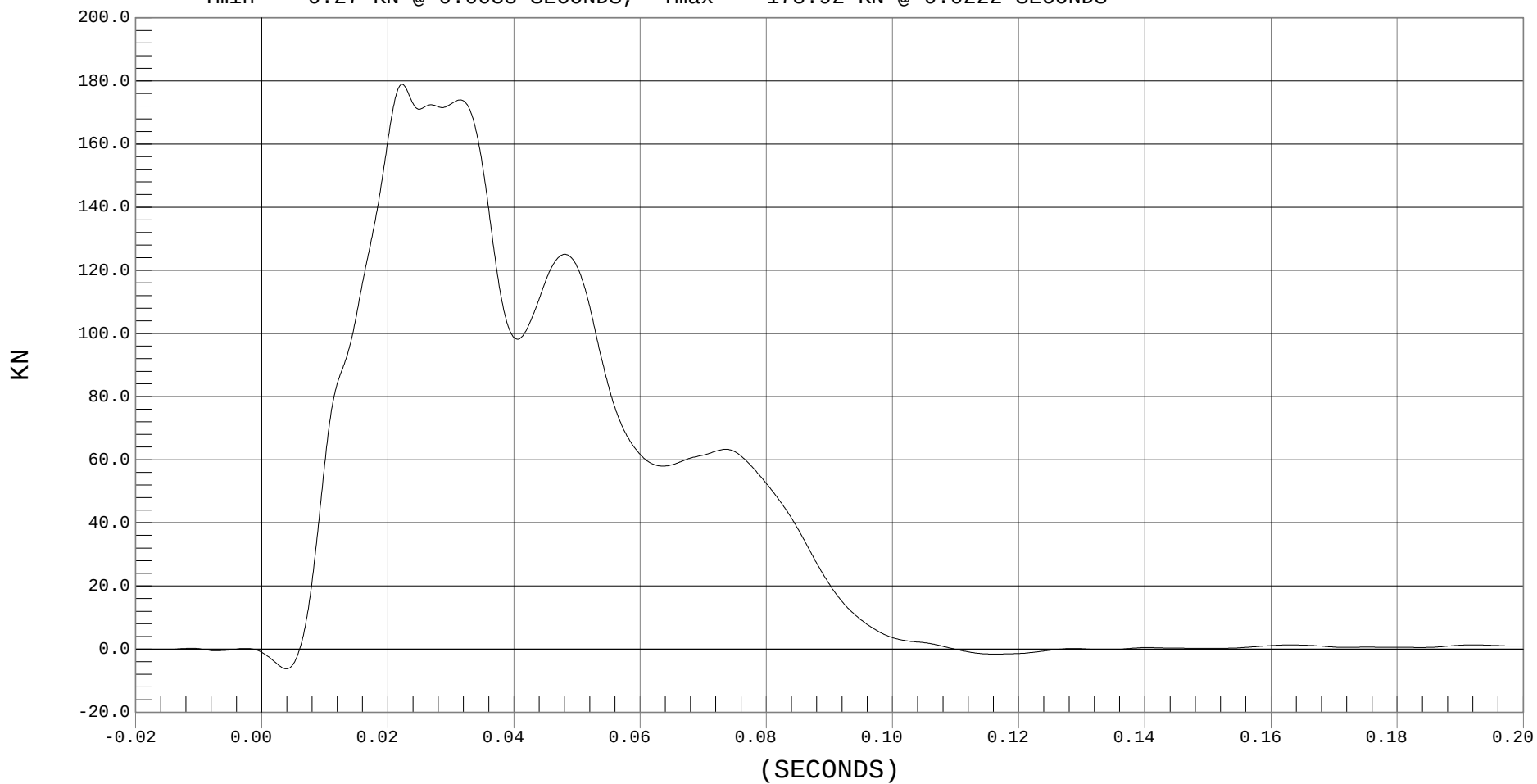
SUM OF LEFT BARRIER FORCES

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 SUM OF LEFT BARRIER FORCES, b01013FU.F02

Ymin = -6.27 KN @ 0.0038 SECONDS, Ymax = 178.92 KN @ 0.0222 SECONDS





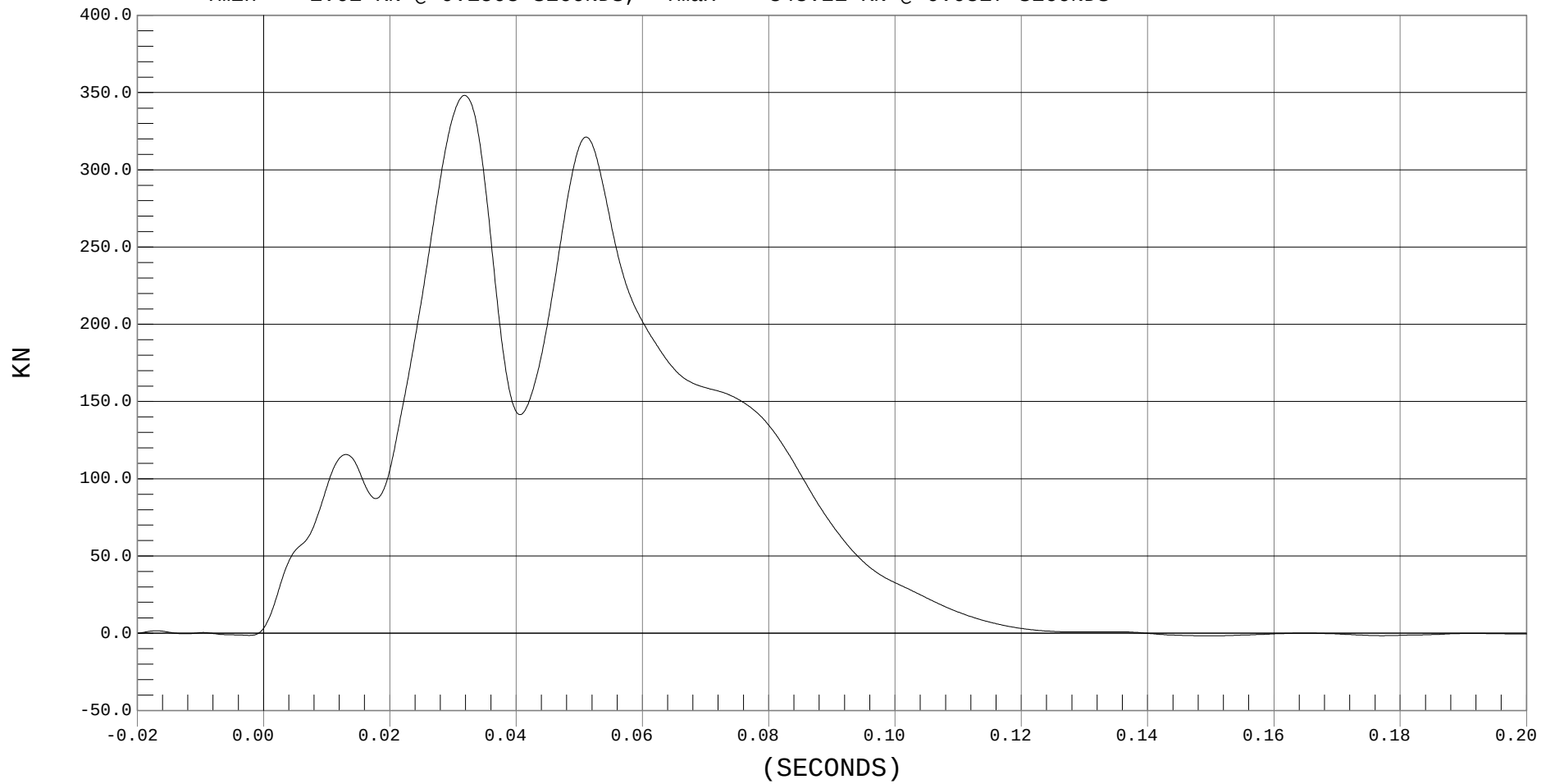
SUM OF CENTER BARRIER FORCES

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 SUM OF CENTER BARRIER FORCES, b01013FU.F03

Ymin = -1.61 KN @ 0.1503 SECONDS, Ymax = 348.21 KN @ 0.0317 SECONDS





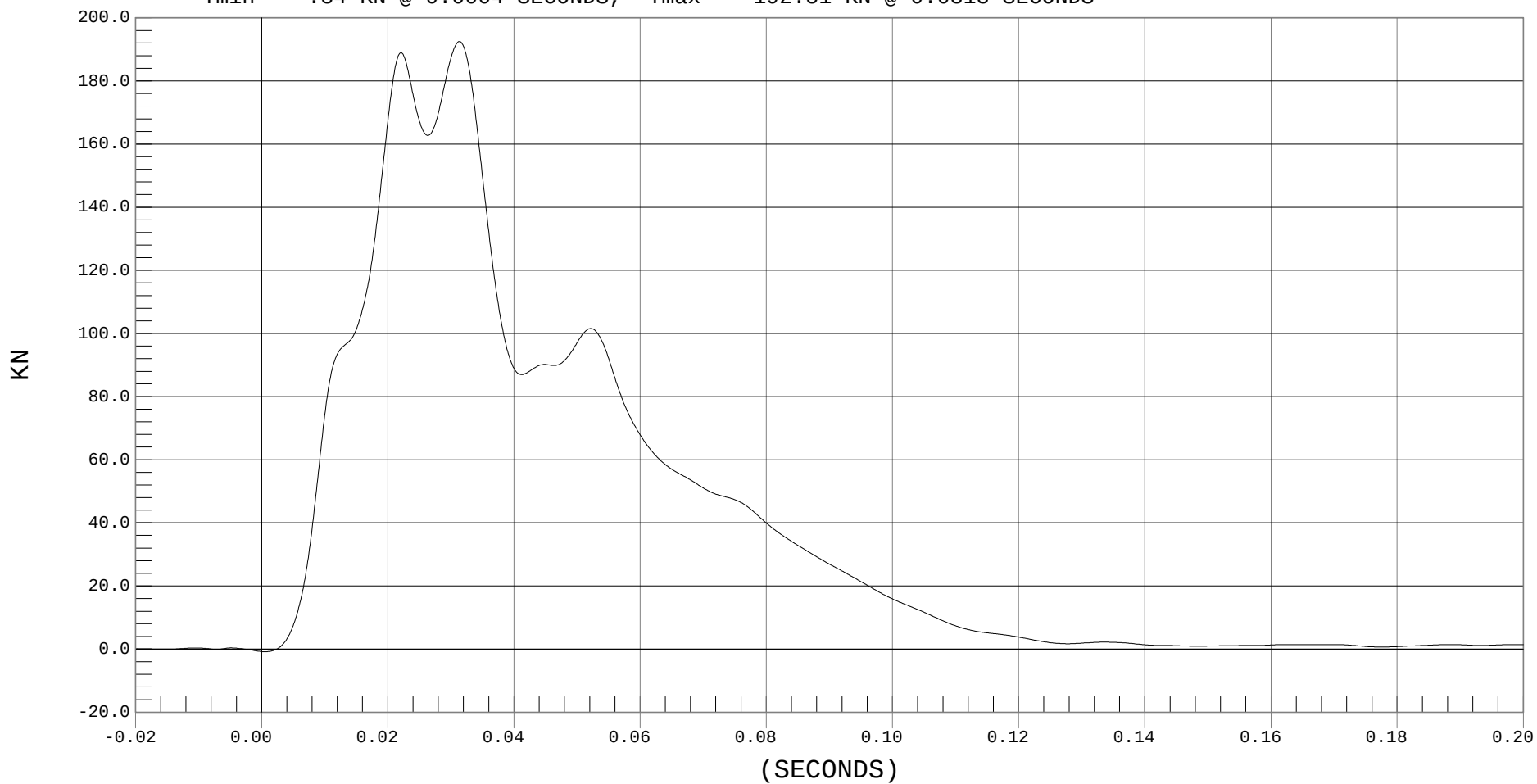
SUM OF RIGHT BARRIER FORCES

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 SUM OF RIGHT BARRIER FORCES, b01013FU.F04

Ymin = -.84 KN @ 0.0004 SECONDS, Ymax = 192.51 KN @ 0.0313 SECONDS





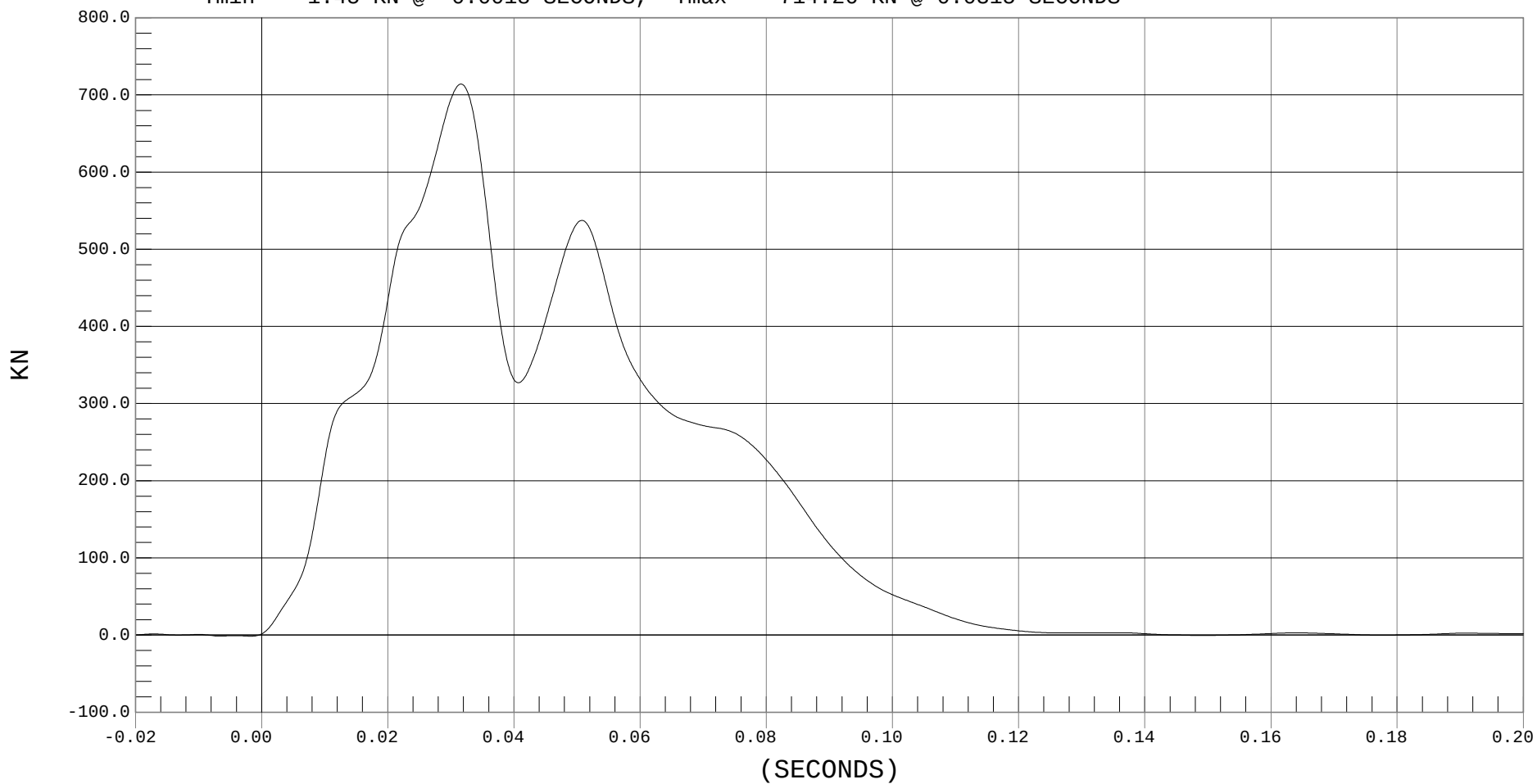
SUM OF BARRIER FORCES

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 60

— 1 SUM OF BARRIER FORCES, b01013FU.F05

Ymin = -1.45 KN @ -0.0018 SECONDS, Ymax = 714.26 KN @ 0.0315 SECONDS



APPENDIX C

DUMMY CALIBRATION DATA TRACES AND TABLES

Hybrid III Calibration Data Sheet
50th Percentile Male
Left Knee Impact Test

ATD Serial No.: 066

Test I.D.: D01096

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	25	PASS
Probe Velocity	m/s	2.07 to 2.13	2.11	PASS
Peak Probe Force	Newtons	4715 to 5782	4757	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01

Test Date

Approved By



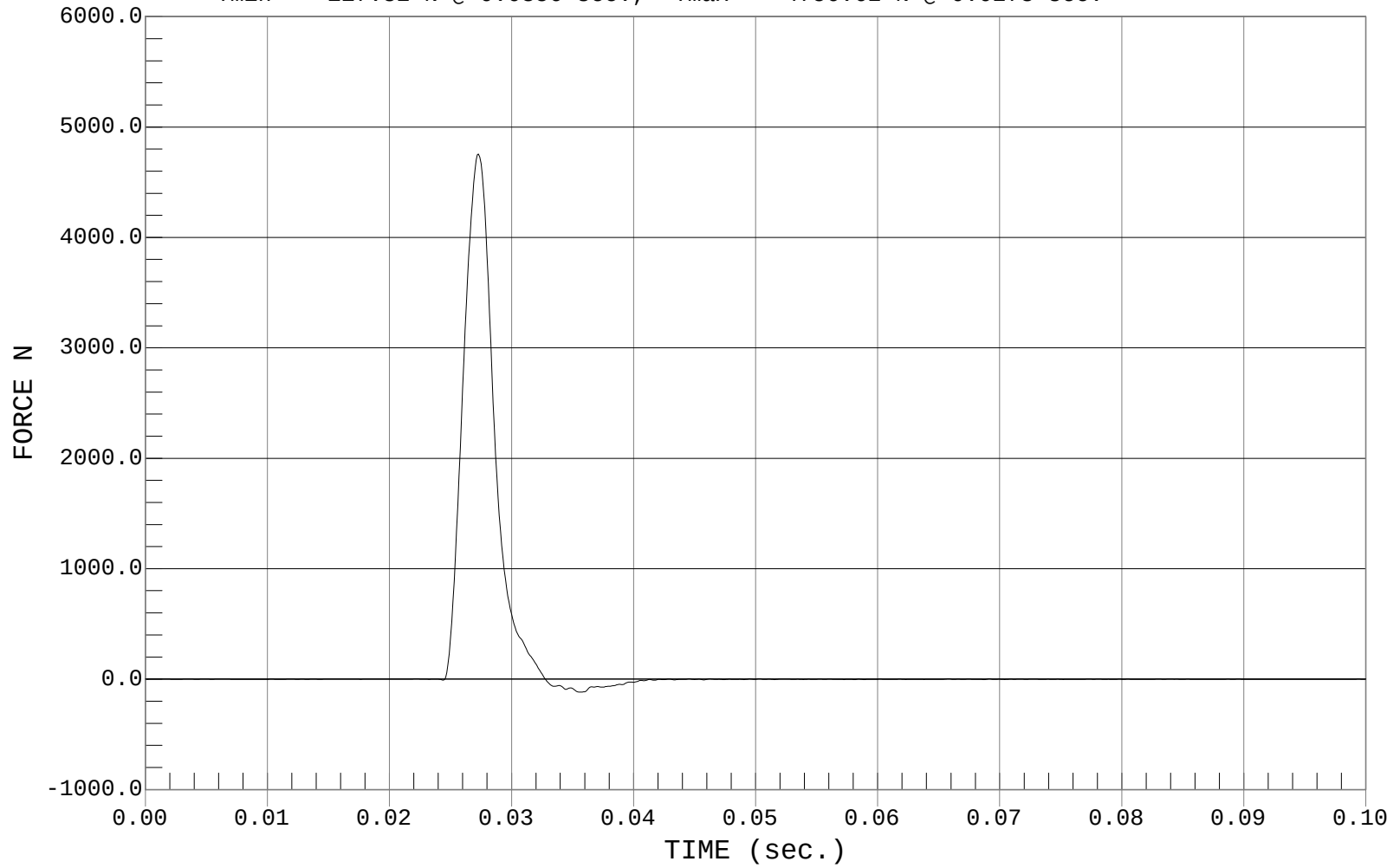
LEFT KNEE IMPACT

Test Desc.: Dummy Calibration - Left Knee Impact
Component: Dummy #066

Test Date: 01-23-01
Speed: 6.91 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01096FF.F09

Ymin = -117.82 N @ 0.0356 sec., Ymax = 4756.62 N @ 0.0273 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Right Knee Impact Test

ATD Serial No.: 066

Test I.D.: D01095

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.2	PASS
Laboratory Relative Humidity	%	10 to 70	25	PASS
Probe Velocity	m/s	2.07 to 2.13	2.11	PASS
Peak Probe Force	Newtons	4715 to 5782	4776	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01

Test Date

Approved By



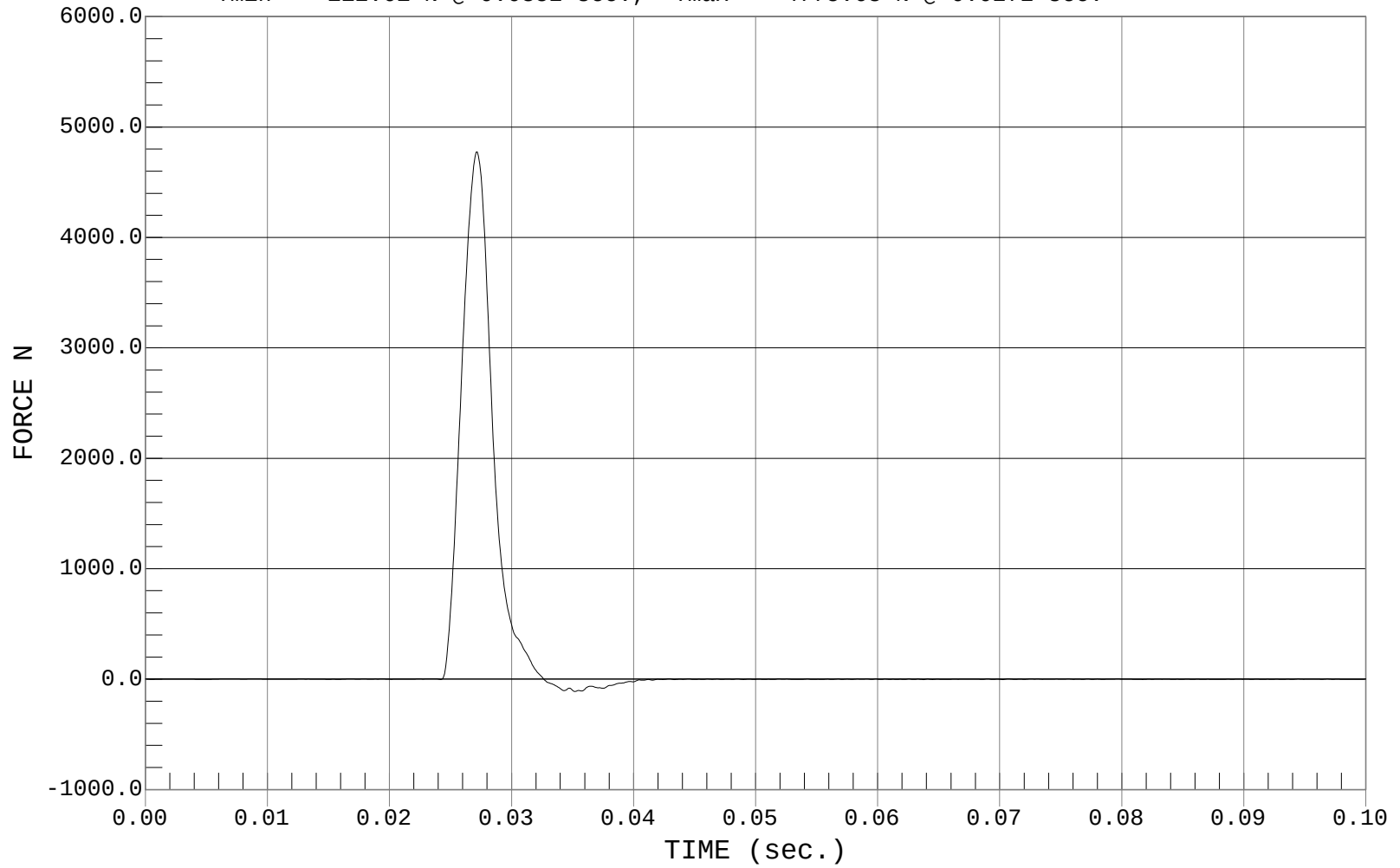
RIGHT KNEE IMPACT

Test Desc.: Dummy Calibration - Right Knee Impact
Component: Dummy #066

Test Date: 01-23-01
Speed: 6.91 FT/SEC, 2.11 M/SEC

— 1 FORCE, D01095FF.F09

Ymin = -112.61 N @ 0.0352 sec., Ymax = 4775.63 N @ 0.0272 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Head Drop Calibration

ATD Serial No.: 066

Test I.D.: D01091

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.3	PASS
Laboratory Relative Humidity	%	10 to 70	23	PASS
Peak Resultant Accel.	G's	225.0 to 275.0	262.9	PASS
Peak Lateral Accel.	G's	$\leq \pm 15.0$	10.0	PASS
Is Acceleration Unimodal?	Yes/No	Yes	Yes	PASS
Overall Test Results				PASS

Laboratory Technician

1/22/01
Test Date

Approved By



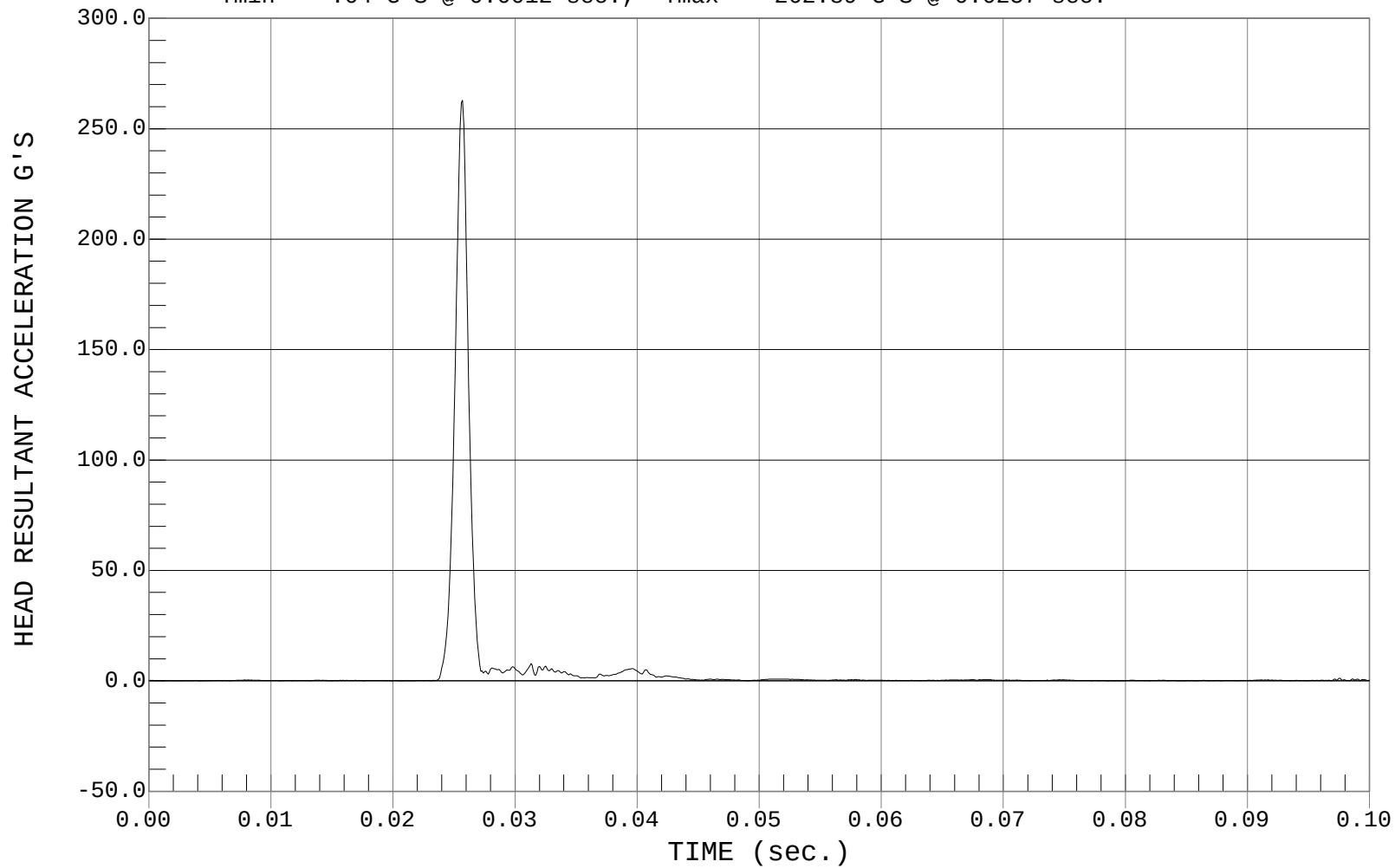
PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #066

Test Date: 01-22-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT ACCELERATION, D01091AV.A01

Ymin = .04 G'S @ 0.0012 sec., Ymax = 262.89 G'S @ 0.0257 sec.





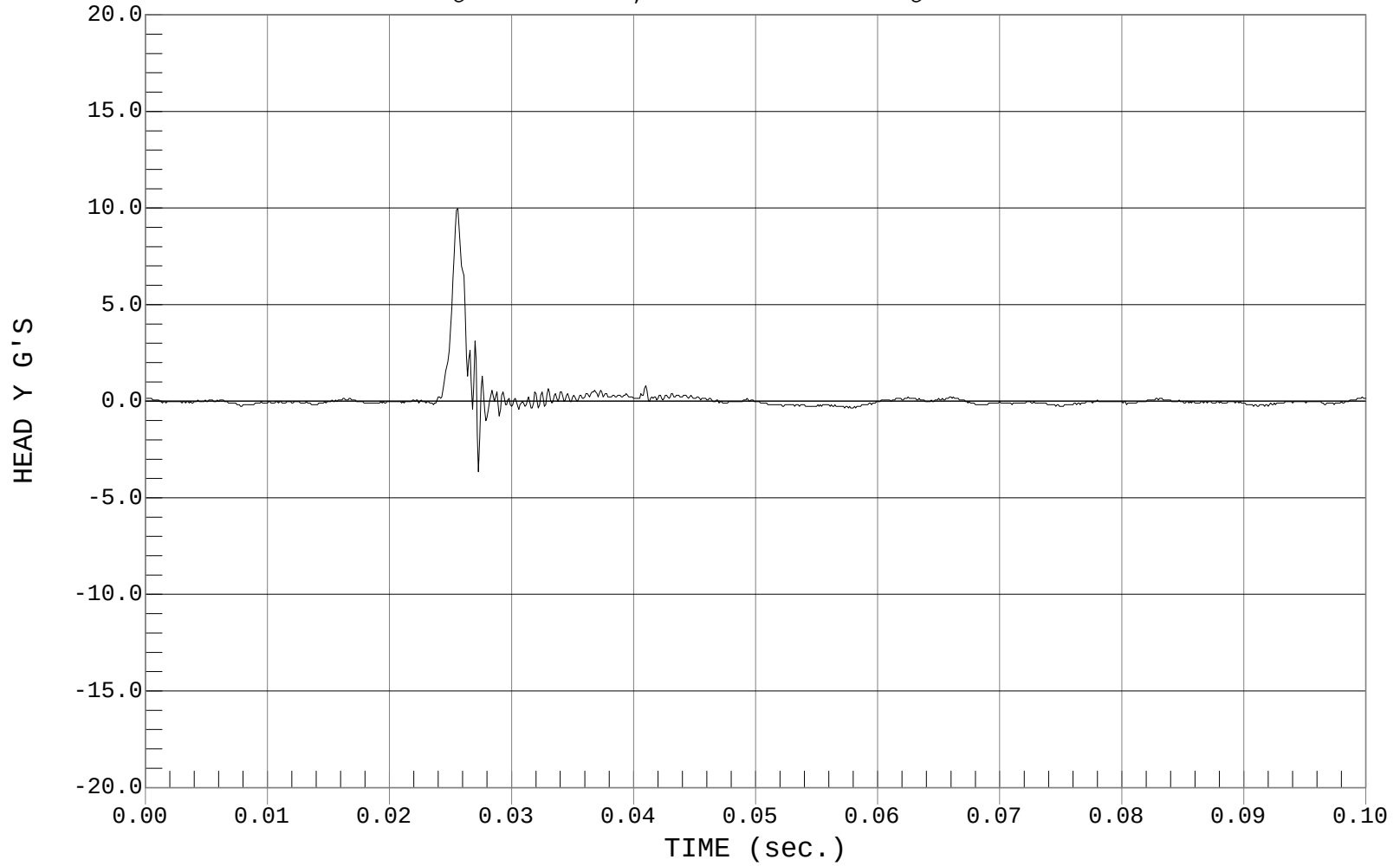
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #066

Test Date: 01-22-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01091AR.A02

Ymin = -3.65 G'S @ 0.0273 sec., Ymax = 9.98 G'S @ 0.0256 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Thorax Impact Test

ATD Serial No.: 066

Test I.D.: D01094

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	26	PASS
Probe Velocity	m/s	6.58 to 6.82	6.64	PASS
Peak Probe Force	Newtons	5159 to 5893	5678	PASS
Peak Sternum Displacement	CM	6.35 to 7.26	6.51	PASS
Internal Hysteresis	%	69 to 85	75	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01
Test Date

Approved By



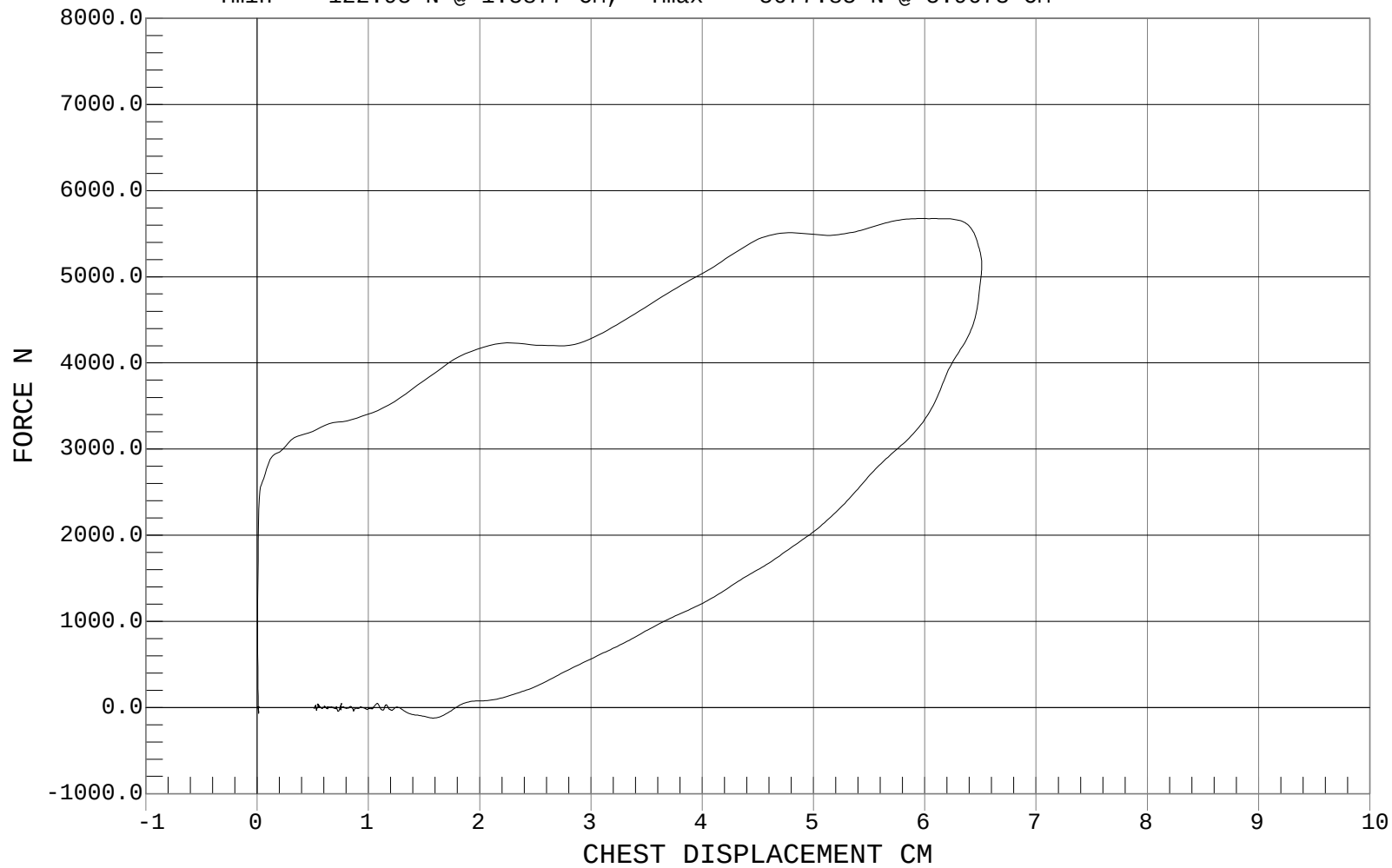
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #066

Test Date: 01-23-01
Speed: 21.78 FT/SEC, 6.64 M/SEC

— 1 FORCE, D01094CH.FVD

Ymin = -122.95 N @ 1.5877 CM, Ymax = 5677.85 N @ 5.9673 CM



Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Flexion Test

ATD Serial No.: 066

Test I.D.: D01092

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	PASS
Laboratory Relative Humidity		%	10 to 70	23	PASS
Pendulum Velocity		m/s	6.89 to 7.13	7.02	PASS
Pendulum Deceleration	10 Msec.	G's	22.50 to 27.50	24.52	PASS
	20 Msec.	G's	17.60 to 22.60	20.14	PASS
	30 Msec.	G's	12.50 to 18.50	15.10	PASS
Peak Pendulum Decel. After 30 Msec.		G's	≤29.0	15.1	PASS
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	35.8	PASS
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	72.7	PASS
	Time	Msec.	57.0 to 64.0	57.5	PASS
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	113.8	PASS
Moment About Occipital Condyle	Maximum	N· m	84.1 to 108.5	99.7	PASS
	Time	Msec.	47.0 to 58.0	49.9	PASS
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.4	PASS
Overall Test Results				PASS	

Laboratory Technician

1/23/01

Test Date

Approved By



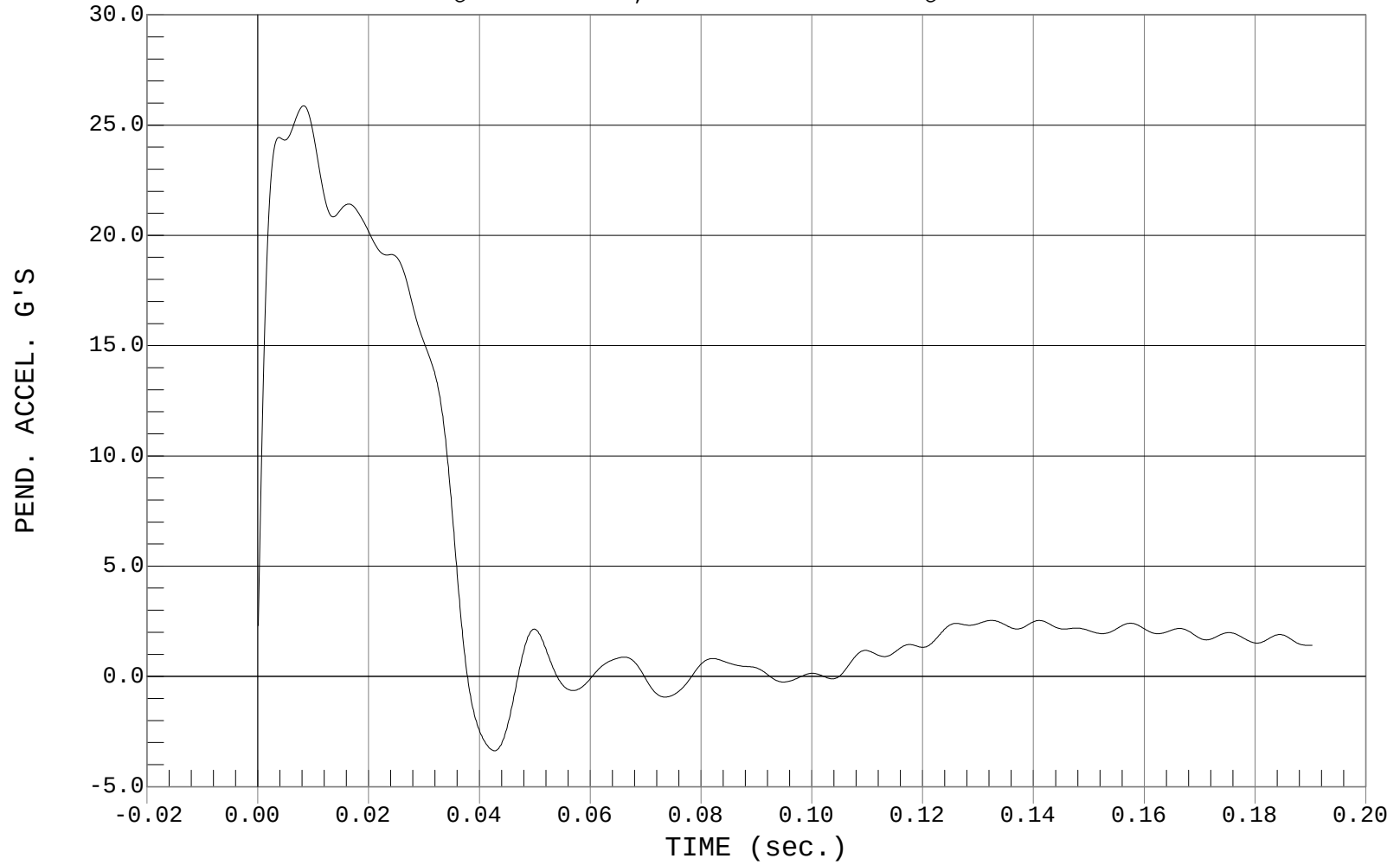
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #066

Test Date: 01-23-01
Speed: 23.04 FT/SEC, 7.02 M/SEC

— 1 PEND. ACCEL., D01092AF.A04

Ymin = -3.37 G'S @ 0.0427 sec., Ymax = 25.88 G'S @ 0.0083 sec.





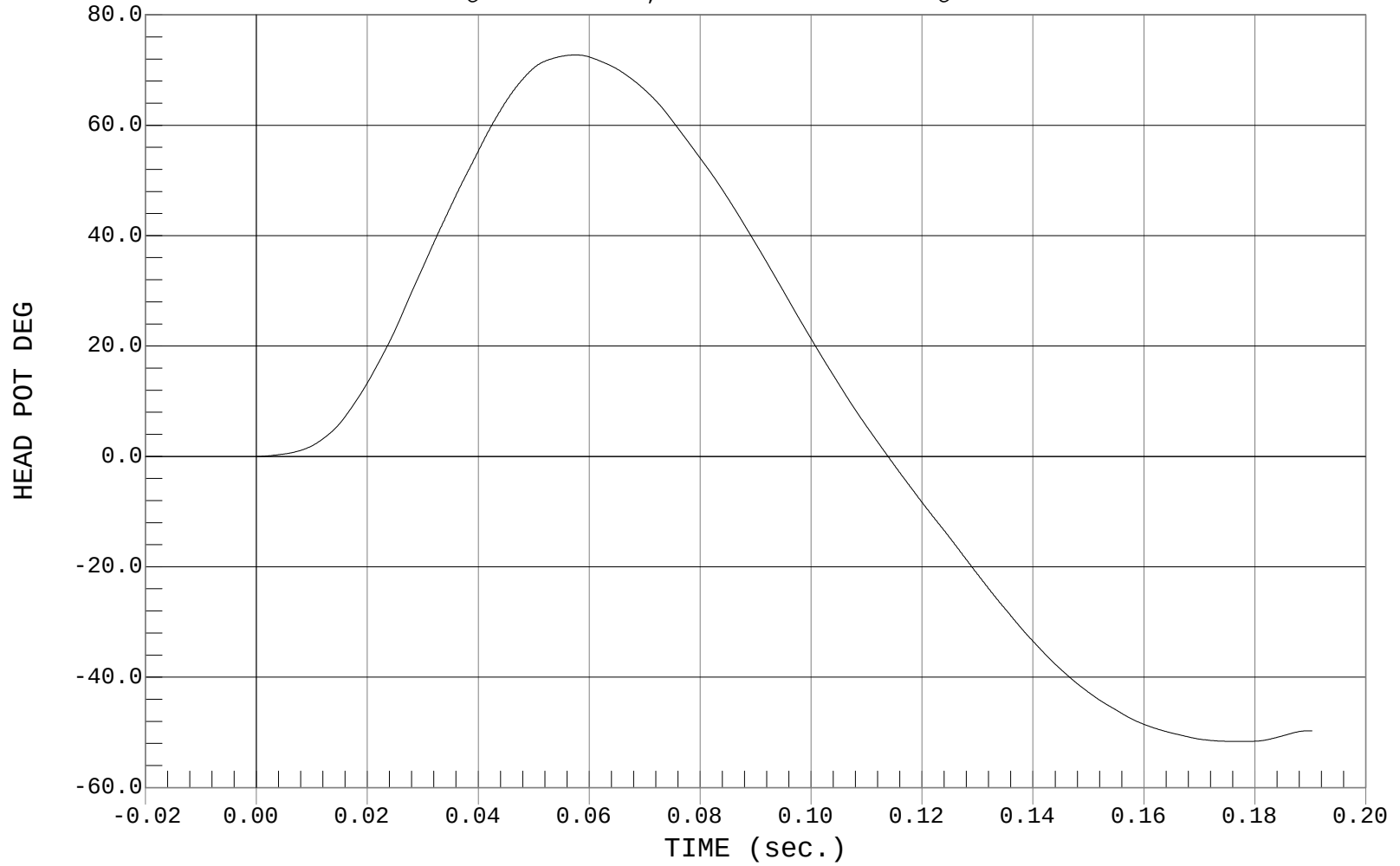
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #066

Test Date: 01-23-01
Speed: 23.04 FT/SEC, 7.02 M/SEC

— 1 HEAD POT, D01092DU.D05

Ymin = -51.65 DEG @ 0.1779 sec., Ymax = 72.73 DEG @ 0.0575 sec.



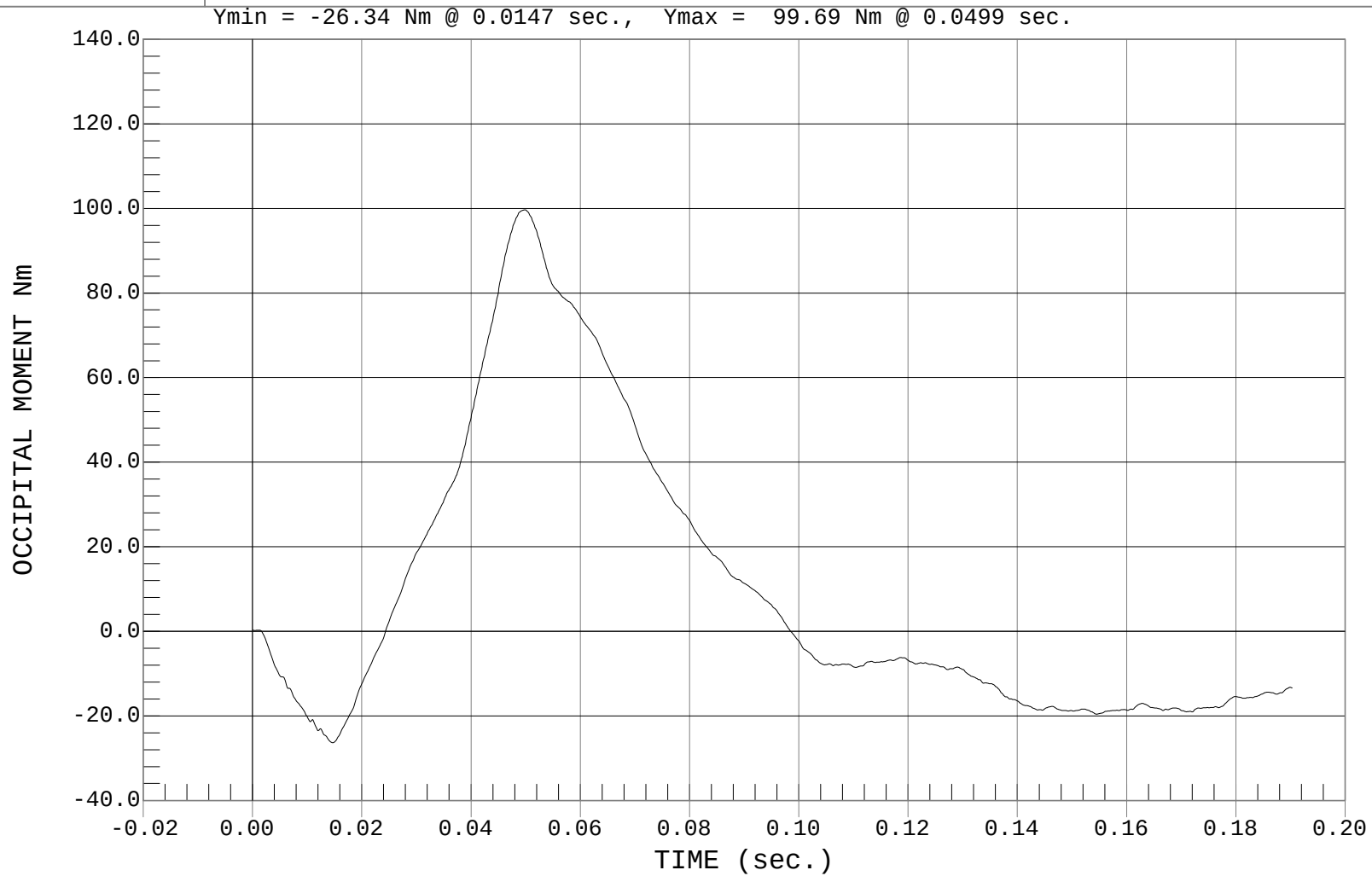


OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #066

Test Date: 01-23-01
Speed: 23.04 FT/SEC, 7.02 M/SEC

— 1 OCCIPITAL MOMENT, D01092NK.MNT



Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Extension Test

ATD Serial No.: 066

Test I.D.: D0109

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	PASS
Laboratory Relative Humidity		%	10 to 70	23	PASS
Pendulum Velocity		m/s	5.95 to 6.19	6.12	PASS
Pendulum Deceleration	10 Msec.	G's	17.20 to 21.20	18.17	PASS
	20 Msec.	G's	14.00 to 19.00	16.31	PASS
	30 Msec.	G's	11.00 to 16.00	13.85	PASS
Peak Pendulum Decel. After 30 Msec.		G's	≤22.0	13.9	PASS
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	40.3	PASS
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.7	PASS
	Time	Msec.	72.0 to 82.0	78.6	PASS
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	157.2	PASS
Moment About Occipital Condyle	Minimum	N· m	-52.9 to -79.9	-65.5	PASS
	Time	Msec.	65.0 to 79.0	72.4	PASS
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	142.3	PASS
Overall Test Results				PASS	

Laboratory Technician

1/23/01

Test Date

Approved By



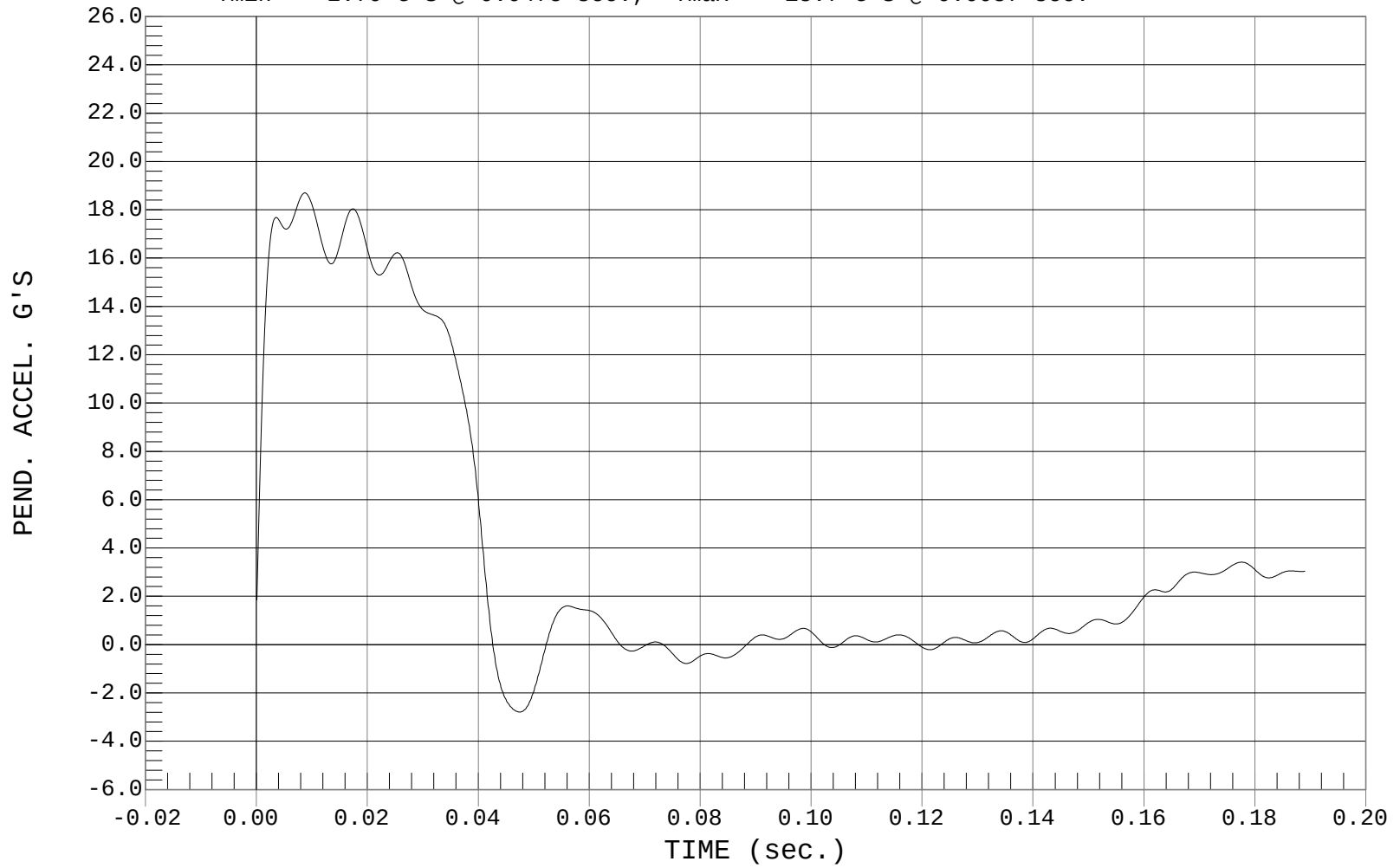
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #066

Test Date: 01-23-01
Speed: 20.07 FT/SEC, 6.12 M/SEC

— 1 PEND. ACCEL., D01093AF.A04

Ymin = -2.79 G'S @ 0.0475 sec., Ymax = 18.7 G'S @ 0.0087 sec.





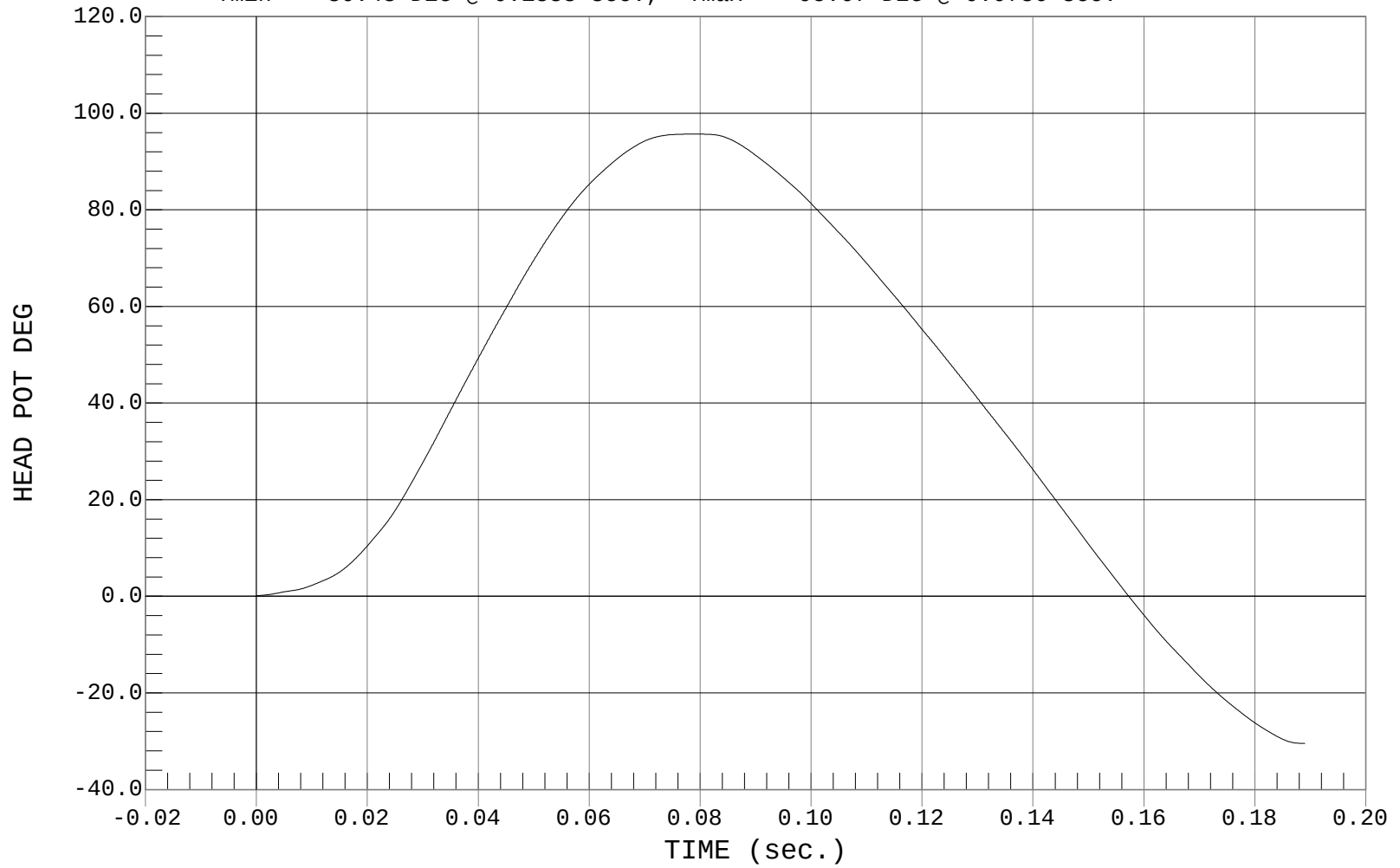
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #066

Test Date: 01-23-01
Speed: 20.07 FT/SEC, 6.12 M/SEC

— 1 HEAD POT, D01093DU.D05

Ymin = -30.43 DEG @ 0.1883 sec., Ymax = 95.67 DEG @ 0.0786 sec.





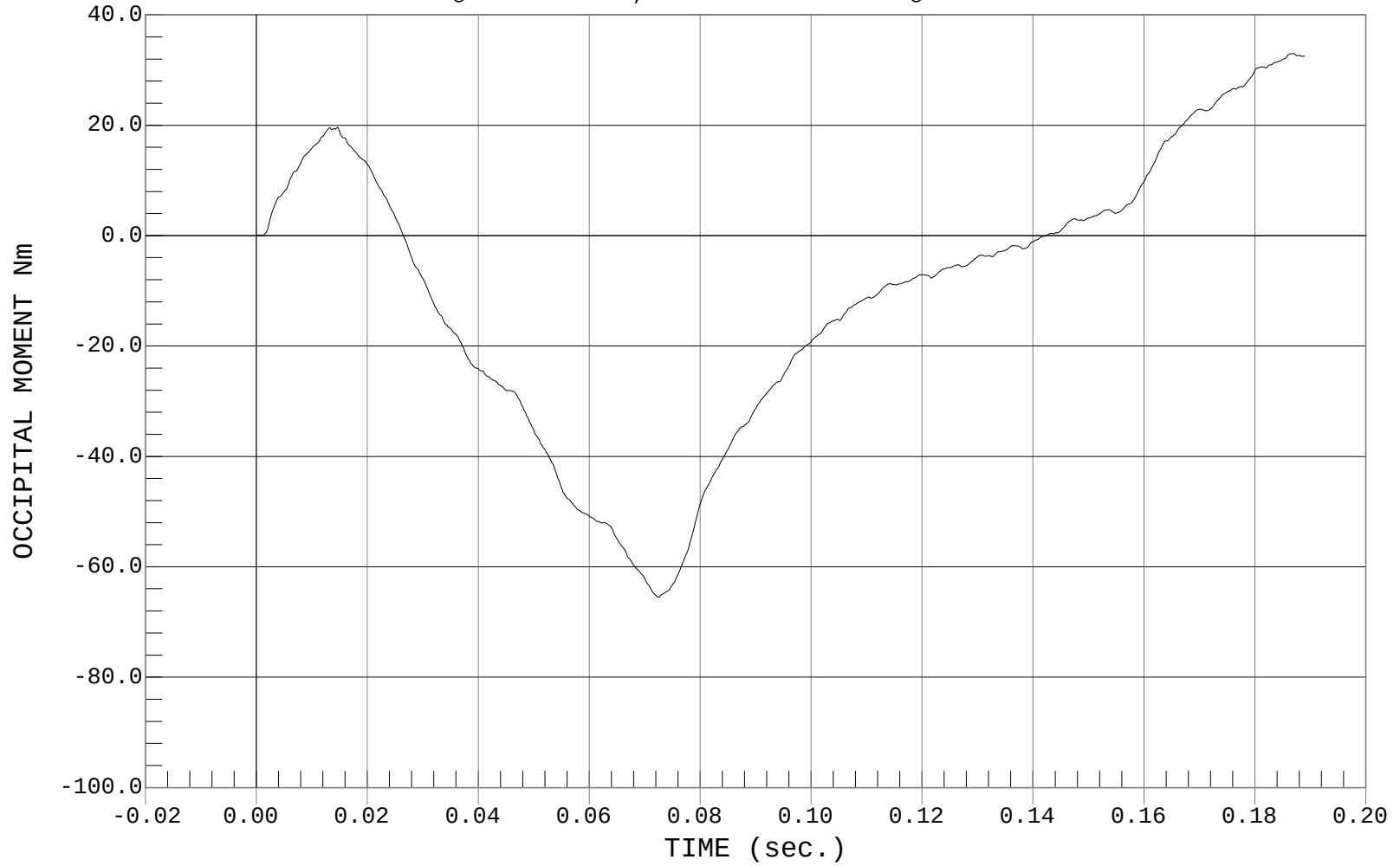
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #066

Test Date: 01-23-01
Speed: 20.07 FT/SEC, 6.12 M/SEC

— 1 OCCIPITAL MOMENT, D01093NK.MNT

Ymin = -65.51 Nm @ 0.0724 sec., Ymax = 32.99 Nm @ 0.1869 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Hip-Femur Flexion Test

ATD Serial No.: 066

Test I.D.: D01099/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Temperature	°C	18.9 to 25.6	21.0	21.0	PASS
Relative Humidity	%	10 to 70	25	25	PASS
Rotation Rate	deg/sec	5 – 10	Yes	Yes	PASS
30 Degrees	Nm	94.9 Nm Max.	70.5	68.0	PASS
150 ft-lbf / 203.4 Nm	Deg	40 – 50 Degree Max. rotation	46	44	PASS
Overall Test Results					PASS

Laboratory Technician

1/23/01

Test Date

Approved By



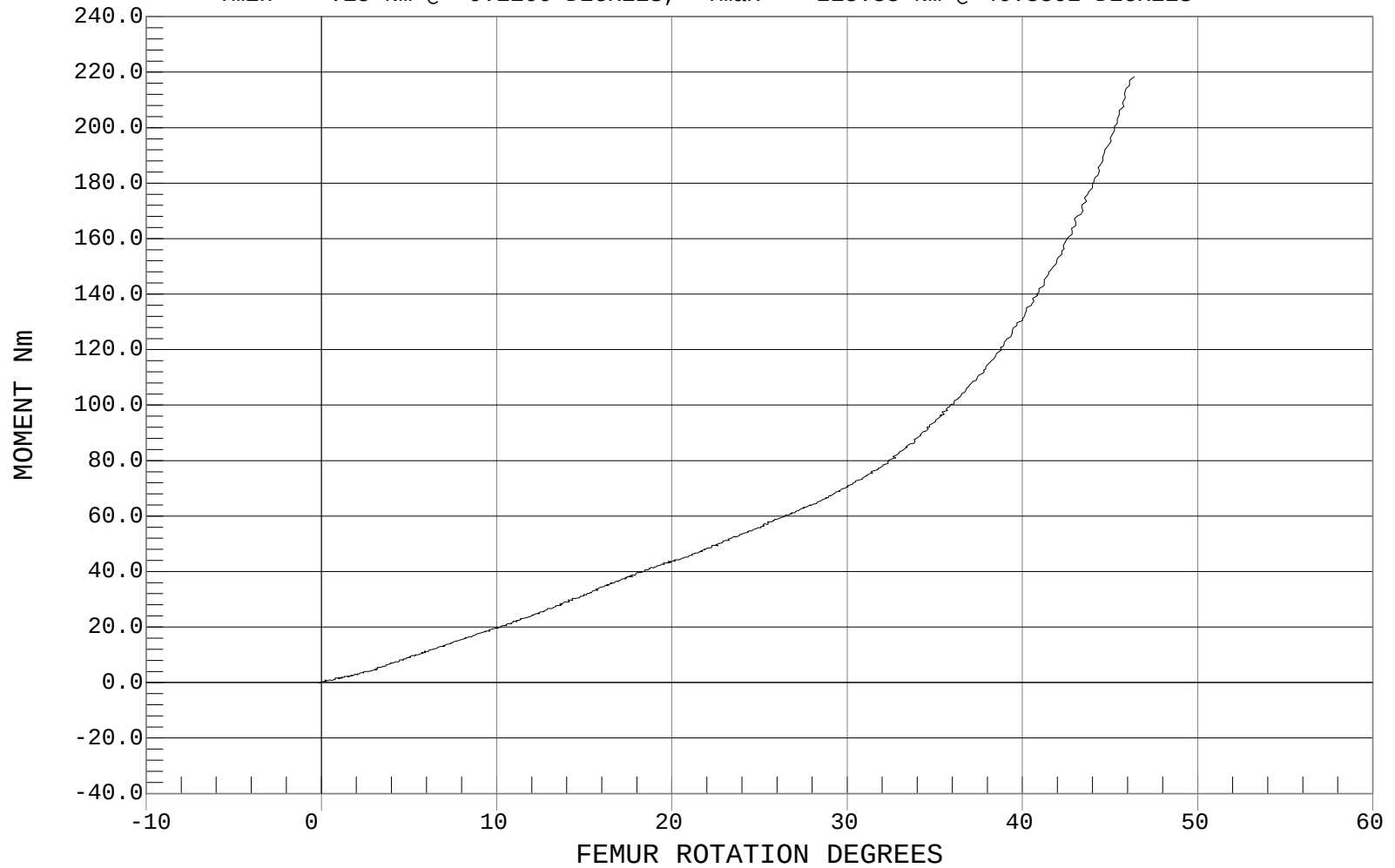
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 066 RIGHT FEMUR

Test Date: 01-23-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01099FC.F14

Ymin = -.15 Nm @ -0.1166 DEGREES, Ymax = 218.38 Nm @ 46.3802 DEGREES





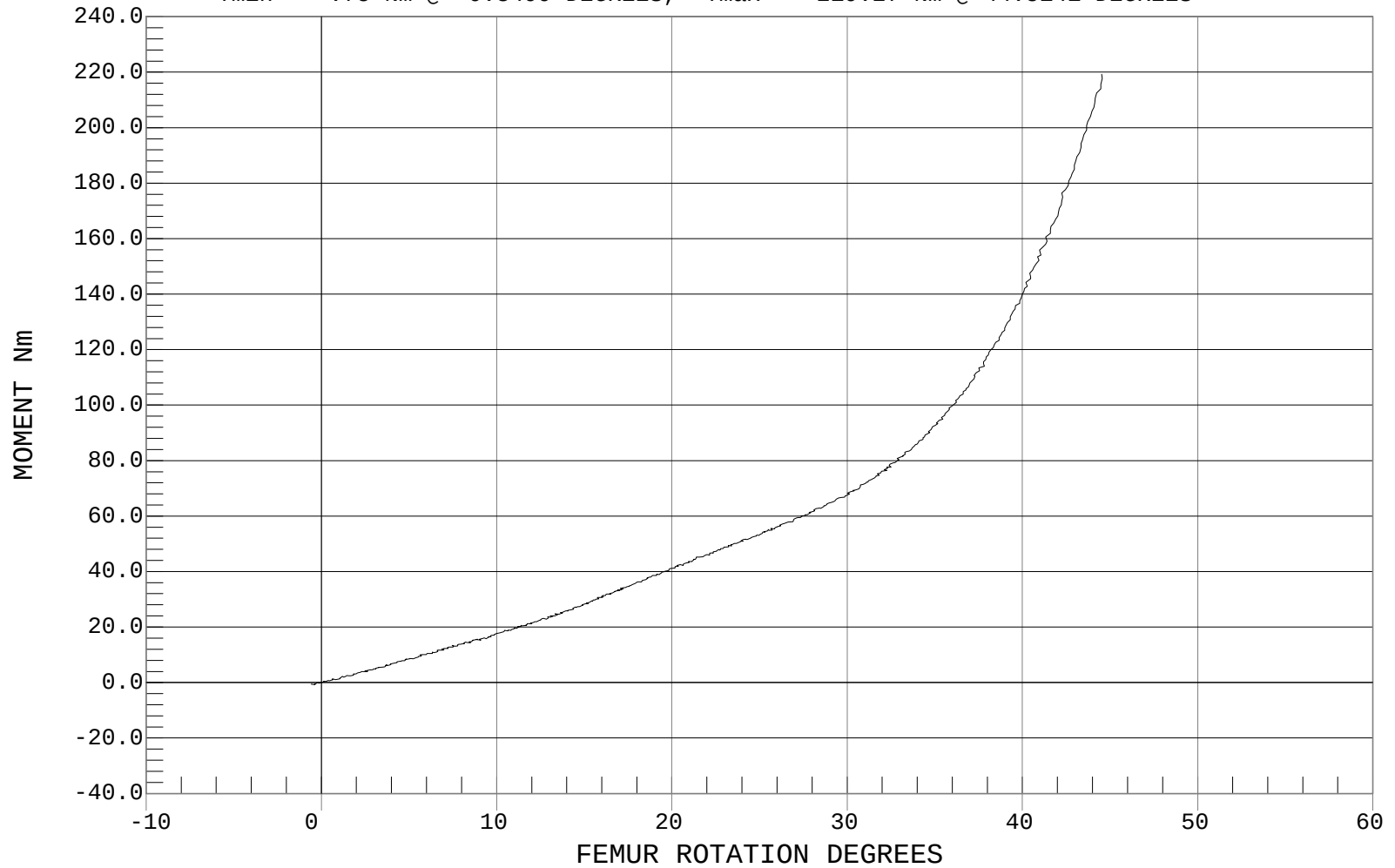
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 066 LEFT FEMUR

Test Date: 01-23-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01090FC.F14

Ymin = -.75 Nm @ -0.3499 DEGREES, Ymax = 219.27 Nm @ 44.5141 DEGREES



Hybrid III Calibration Data Sheet

50th Percentile Male

External Measurements

ATD Serial No.: 066

Test I.D.: D0109

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.4 to 22.1	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	33	PASS
A – Total sitting height	mm	879 to 889	881	PASS
B – Shoulder pivot height	mm	506 to 521	513	PASS
C – “H” point height	mm	84 to 89	86	PASS
D – “H” point from seat back	mm	135 to 140	140	PASS
E – Shoulder pivot from back	mm	84 to 94	89	PASS
F – Thigh clearance	mm	140 to 155	145	PASS
G – Elbow back to wrist pivot	mm	290 to 305	295	PASS
H – Skull cap to back line	mm	41 to 46	43	PASS
I – Shoulder to elbow length	mm	330 to 345	338	PASS
J – Elbow rest height	mm	191 to 211	193	PASS
K – Buttock to knee length	mm	579 to 605	599	PASS
L – Popliteal length	mm	429 to 455	442	PASS
M – Knee pivot height	mm	485 to 500	495	PASS
N – Buttock popliteal length	mm	452 to 478	467	PASS
O – Chest depth	mm	213 to 229	221	PASS
P – Foot breadth	mm	252 to 267	264	PASS
V – Shoulder breadth	mm	422 to 437	432	PASS
W – Foot length	mm	91 to 107	102	PASS
Y – Chest circumference	mm	970 to 1001	996	PASS
Z – Waist circumference	mm	836 to 866	859	PASS
AA – Location for chest circumference	mm	429 to 434	432	PASS
BB – Location for waist circumference	mm	226 to 231	229	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01

Test Date

Approved By

Hybrid III Calibration Data Sheet
50th Percentile Male
Left Knee Impact Test

ATD Serial No.: 065

Test I.D.: D01086

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	24	PASS
Probe Velocity	m/s	2.07 to 2.13	2.09	PASS
Peak Probe Force	Newtons	4715 to 5782	5087	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01

Test Date

Approved By



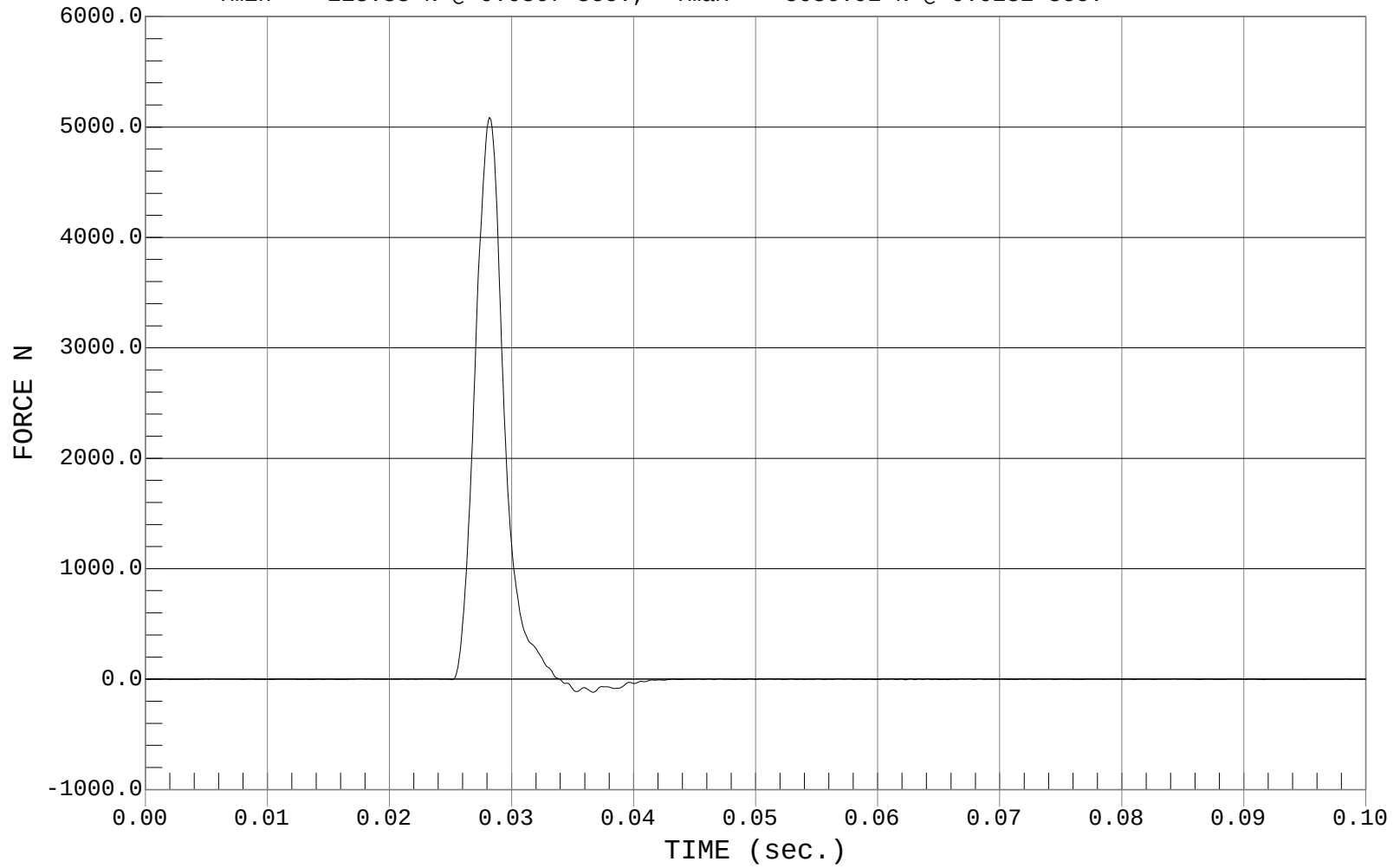
LEFT KNEE IMPACT

Test Desc.: Dummy Calibration - Left Knee Impact
Component: Dummy #065

Test Date: 01-23-01
Speed: 6.87 FT/SEC, 2.09 M/SEC

— 1 FORCE, D01086FF.F09

Ymin = -118.83 N @ 0.0367 sec., Ymax = 5086.92 N @ 0.0282 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Right Knee Impact Test

ATD Serial No.: 065

Test I.D.: D01085

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	24	PASS
Probe Velocity	m/s	2.07 to 2.13	2.09	PASS
Peak Probe Force	Newtons	4715 to 5782	5243	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01

Test Date

Approved By



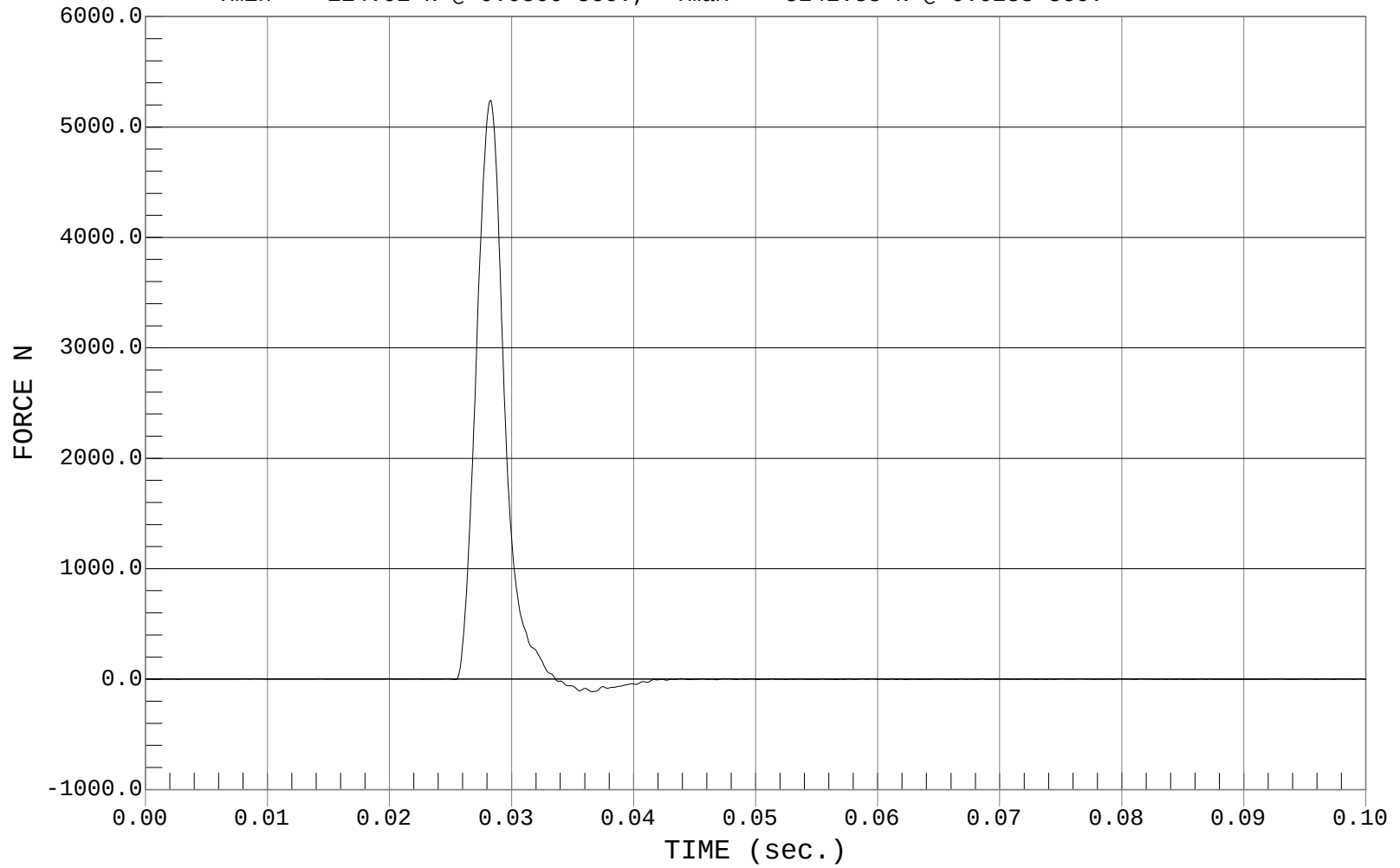
RIGHT KNEE IMPACT

Test Desc.: Dummy Calibration - Right Knee Impact
Component: Dummy #065

Test Date: 01-23-01
Speed: 6.86 FT/SEC, 2.09 M/SEC

— 1 FORCE, D01085FF.F09

Ymin = -114.01 N @ 0.0366 sec., Ymax = 5242.83 N @ 0.0283 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Head Drop Calibration

ATD Serial No.: 065

Test I.D.: D01081

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	21.3	PASS
Laboratory Relative Humidity	%	10 to 70	22	PASS
Peak Resultant Acceleration	G's	225.0 to 275.0	251.3	PASS
Peak Probe Force	G's	≤15.0	7.6	PASS
Is Acceleration Unimodal?	Yes/No	Yes	Yes	PASS
Overall Test Results				PASS

Laboratory Technician

1/22/01
Test Date

Approved By



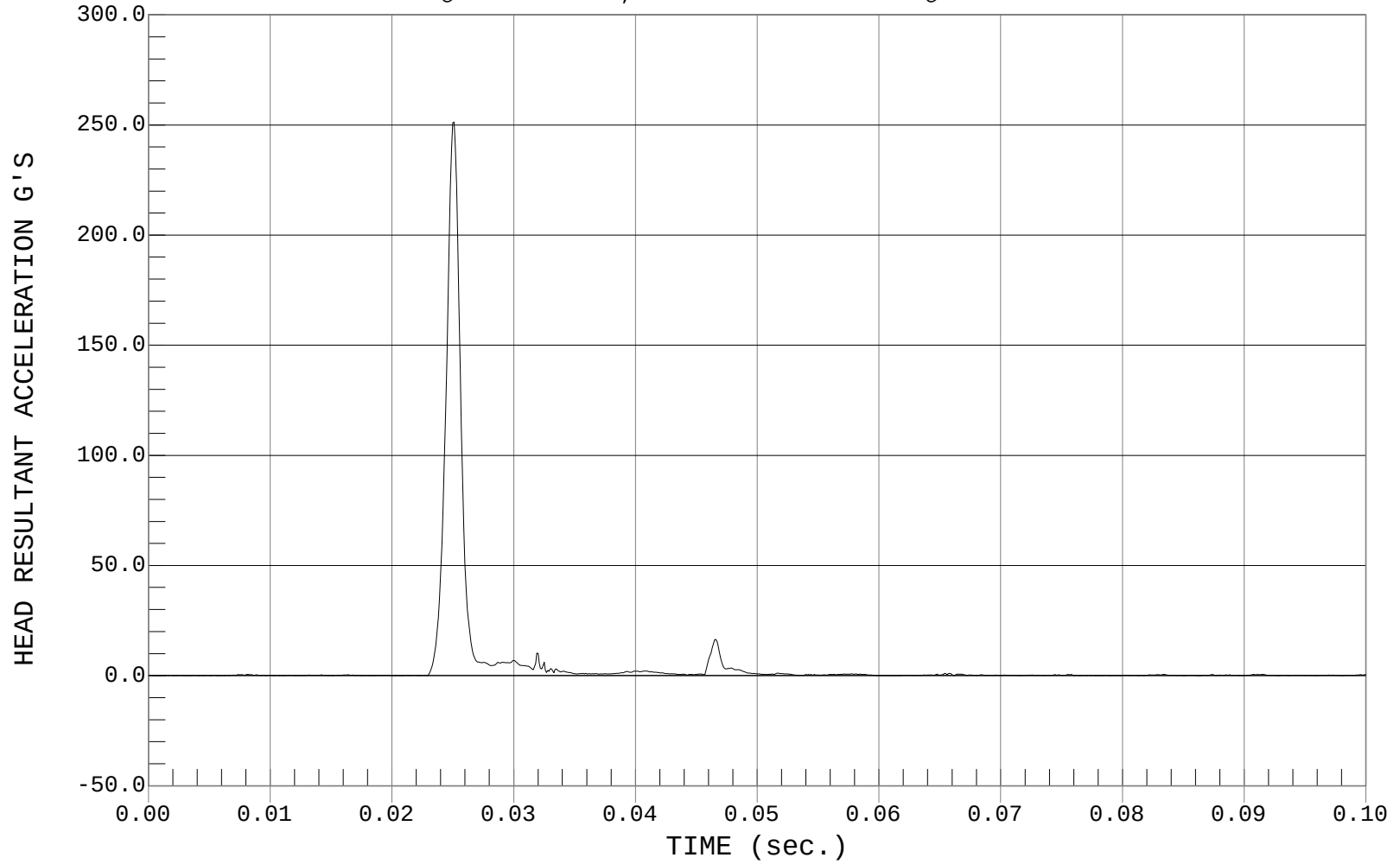
PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #065

Test Date: 01-22-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT ACCELERATION, D01081AV.A01

Ymin = .03 G'S @ 0.0010 sec., Ymax = 251.29 G'S @ 0.0251 sec.





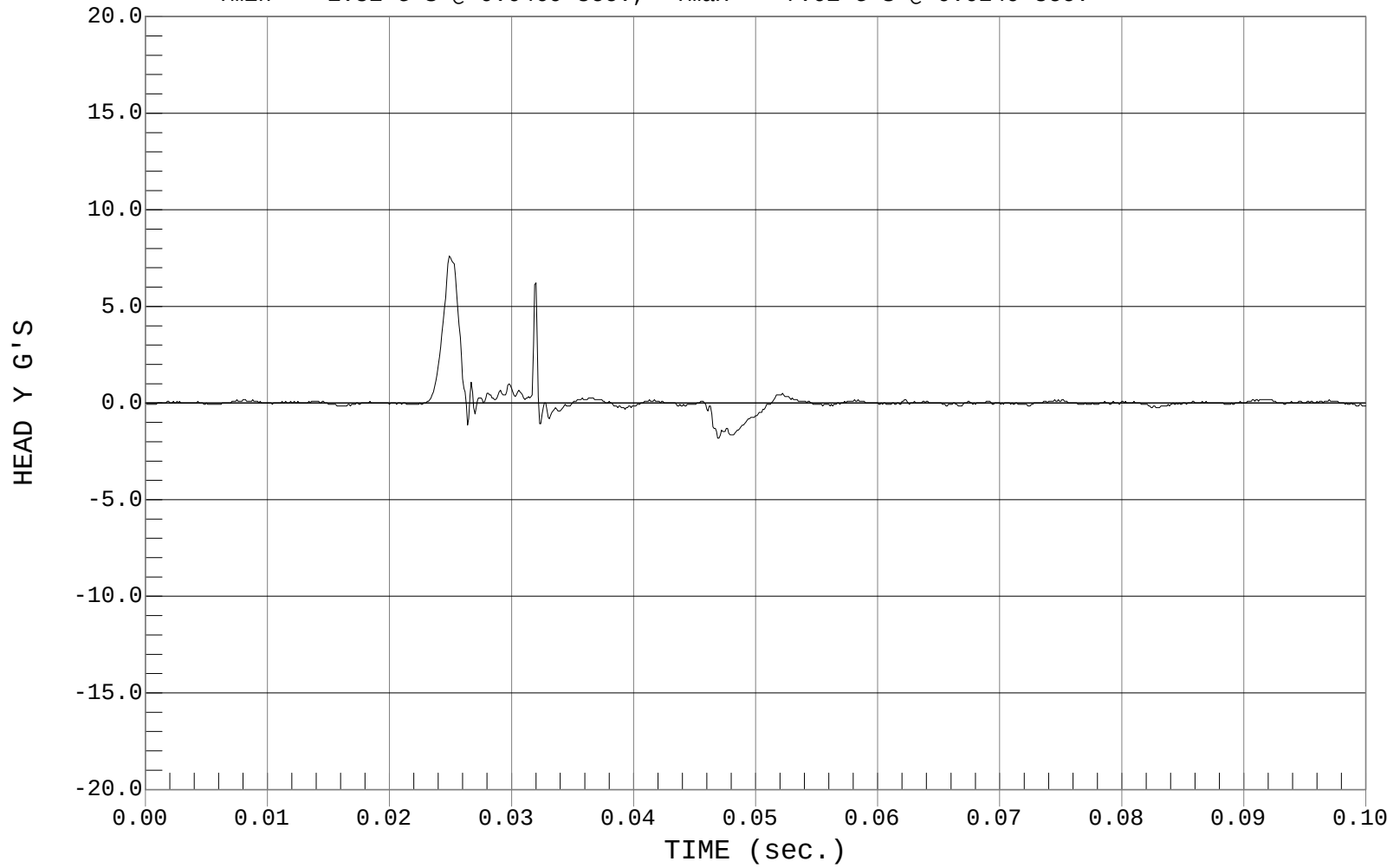
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #065

Test Date: 01-22-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01081AR.A02

Ymin = -1.81 G'S @ 0.0469 sec., Ymax = 7.61 G'S @ 0.0249 sec.



Hybrid III Calibration Data Sheet
50th Percentile Male
Thorax Impact Test

ATD Serial No.: 065

Test I.D.: D01084

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	26	PASS
Probe Velocity	m/s	6.58 to 6.82	6.65	PASS
Peak Probe Force	Newtons	5159 to 5893	5617	PASS
Peak Sternum Displacement	CM	6.35 to 7.26	6.99	PASS
Internal Hysteresis	%	69 to 85	71	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01
Test Date

Approved By



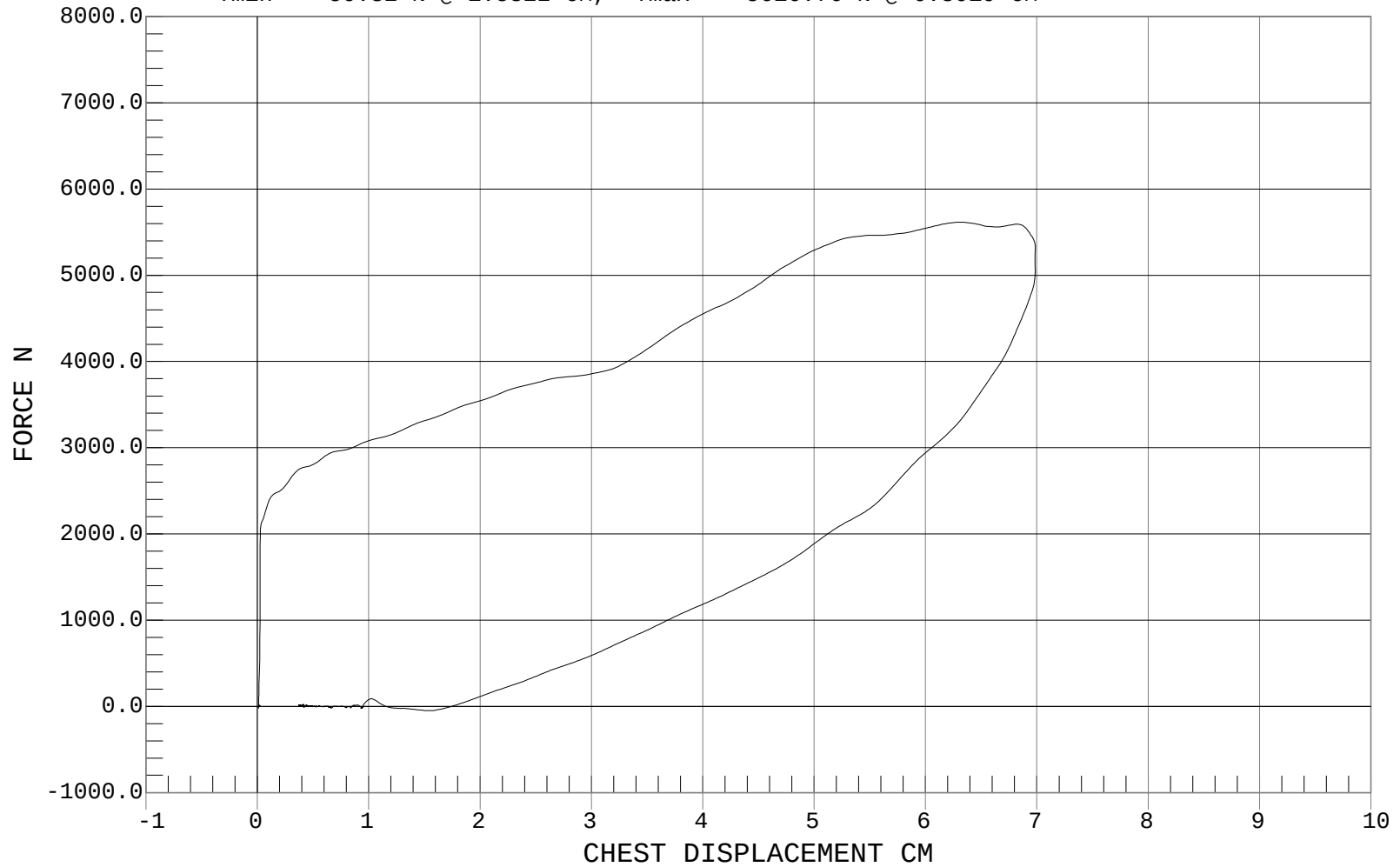
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #065

Test Date: 01-23-01
Speed: 21.82 FT/SEC, 6.65 M/SEC

— 1 FORCE, D01084CH.FVD

Ymin = -50.32 N @ 1.5322 CM, Ymax = 5616.76 N @ 6.3019 CM



Hybrid III Calibration Data Sheet
50th Percentile Male
Neck Flexion Test

ATD Serial No.: 065

Test I.D.: D01082

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	PASS
Laboratory Relative Humidity		%	10 to 70	23	PASS
Pendulum Velocity		m/s	6.89 to 7.13	7.01	PASS
Pendulum Deceleration	10 Msec.	G's	22.50 to 27.50	24.79	PASS
	20 Msec.	G's	17.60 to 22.60	20.45	PASS
	30 Msec.	G's	12.50 to 18.50	15.21	PASS
Peak Pendulum Decel. After 30 Msec.		G's	≤29.0	15.2	PASS
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	35.5	PASS
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	76.1	PASS
	Time	Msec.	57.0 to 64.0	58.3	PASS
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	114.5	PASS
Moment About Occipital Condyle	Maximum	N· m	84.1 to 108.5	96.2	PASS
	Time	Msec.	47.0 to 58.0	49.0	PASS
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	100.3	PASS
Overall Test Results				PASS	

Laboratory Technician

1/23/01

Test Date

Approved By



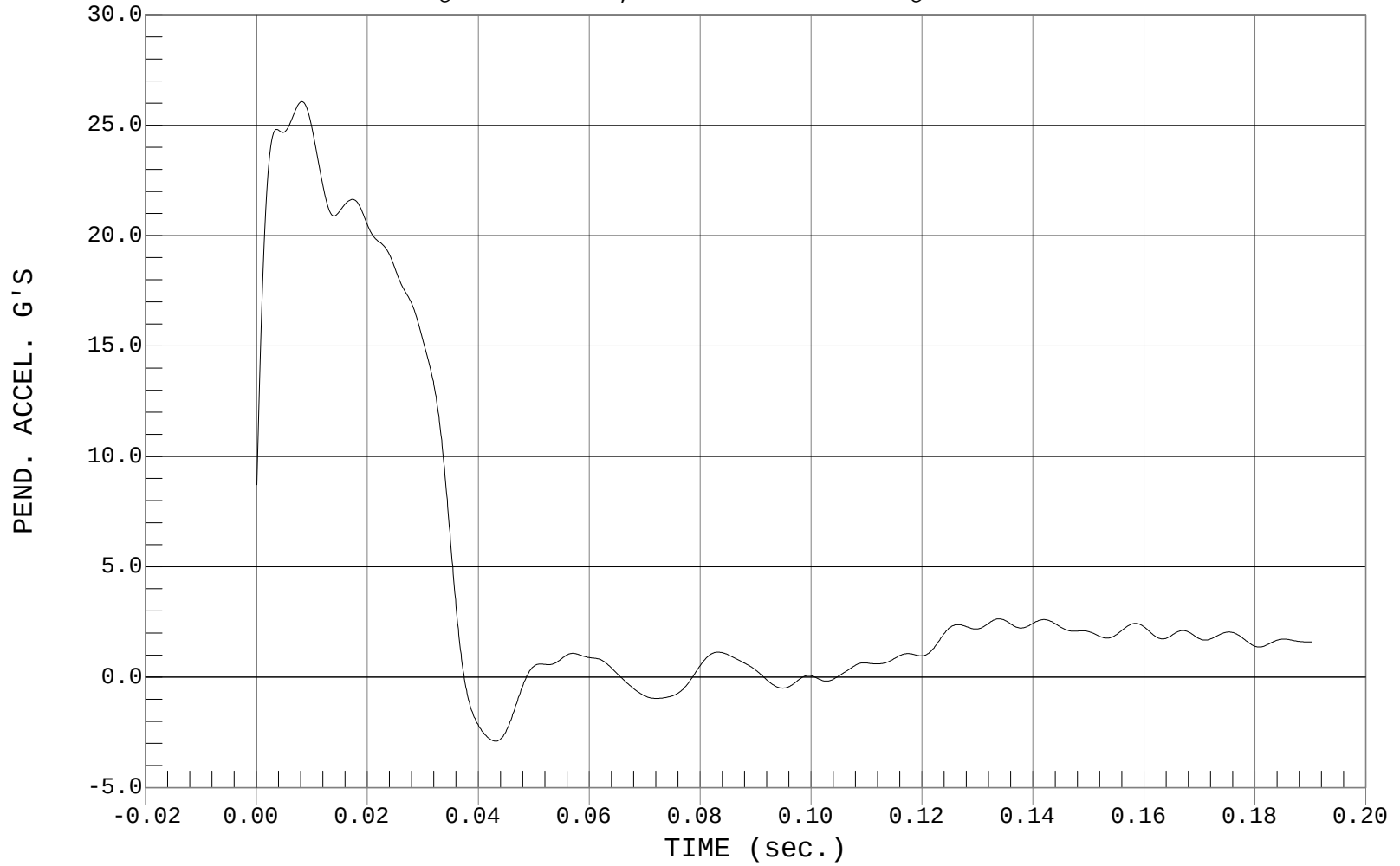
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #065

Test Date: 01-23-01
Speed: 22.99 FT/SEC, 7.01 M/SEC

— 1 PEND. ACCEL., D01082AF.A04

Ymin = -2.9 G'S @ 0.0431 sec., Ymax = 26.07 G'S @ 0.0082 sec.





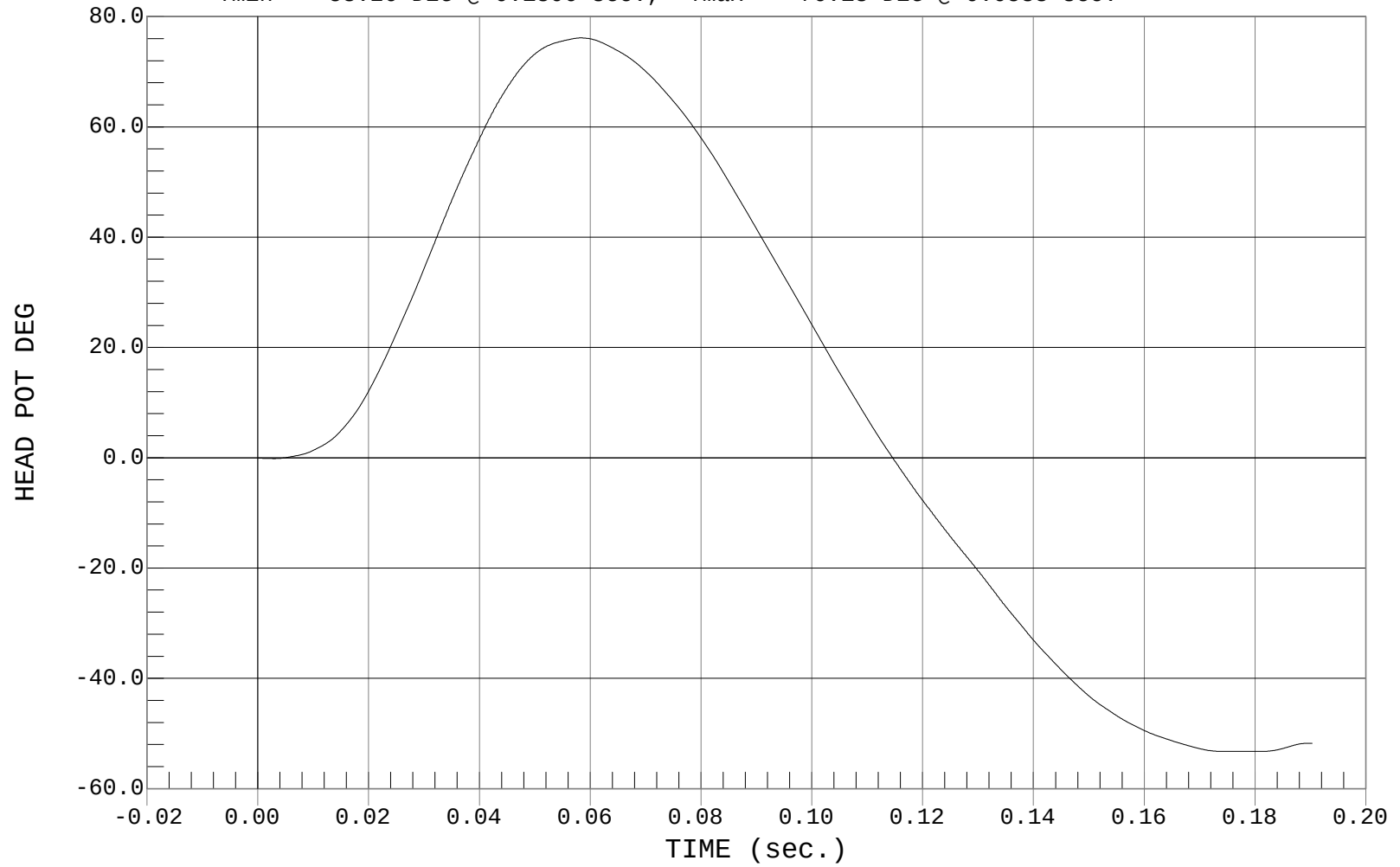
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #065

Test Date: 01-23-01
Speed: 22.99 FT/SEC, 7.01 M/SEC

— 1 HEAD POT, D01082DU.D05

Ymin = -53.26 DEG @ 0.1806 sec., Ymax = 76.13 DEG @ 0.0583 sec.



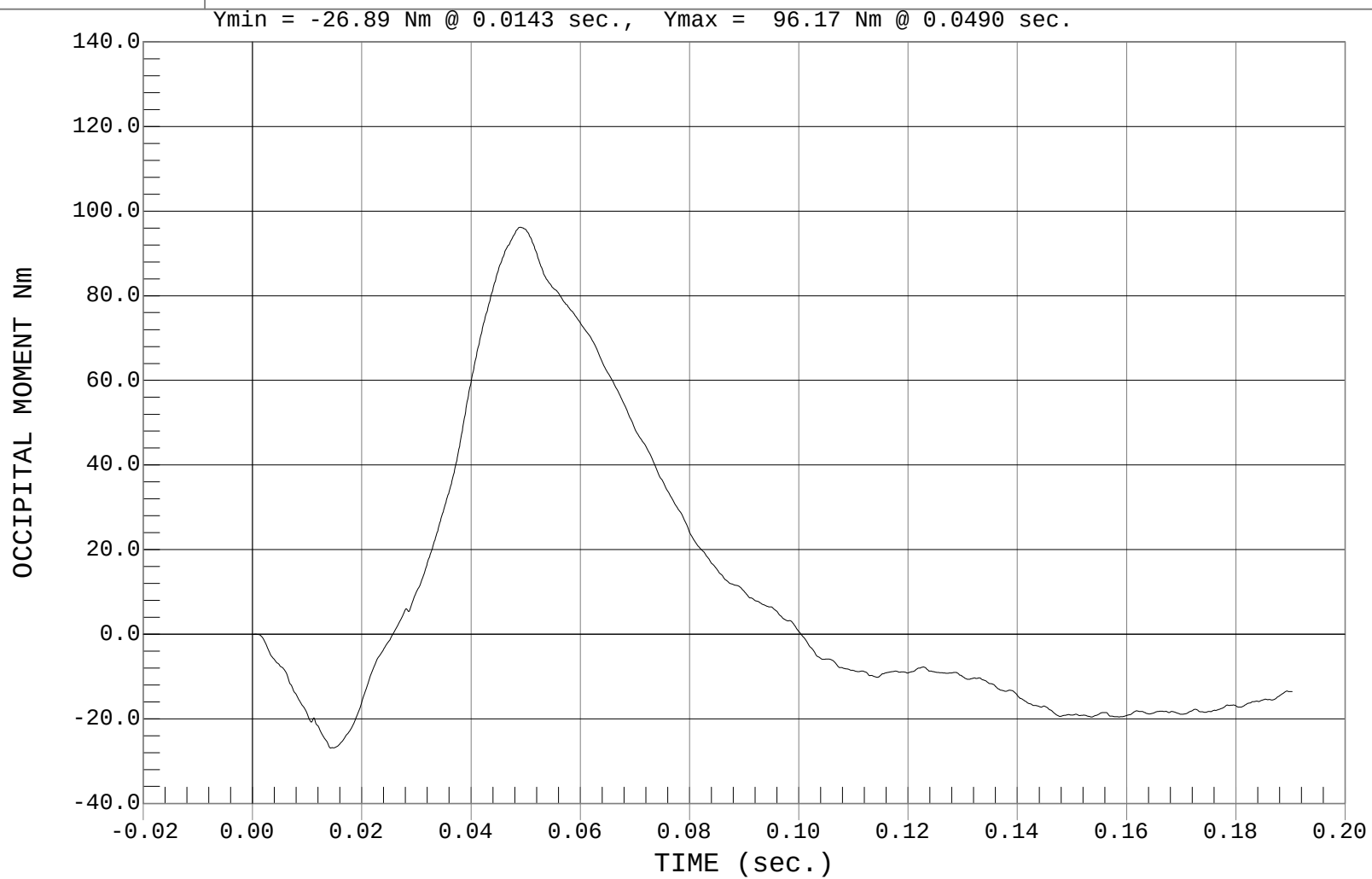


OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #065

Test Date: 01-23-01
Speed: 22.99 FT/SEC, 7.01 M/SEC

— 1 OCCIPITAL MOMENT, D01082NK.MNT



Hybrid III Calibration Data Sheet

50th Percentile Male

Neck Extension Test

ATD Serial No.: 065

Test I.D.: D01083

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.0	PASS
Laboratory Relative Humidity		%	10 to 70	23	PASS
Pendulum Velocity		m/s	5.95 to 6.19	6.07	PASS
Pendulum Deceleration	10 Msec.	G's	17.20 to 21.20	17.68	PASS
	20 Msec.	G's	14.00 to 19.00	15.67	PASS
	30 Msec.	G's	11.00 to 16.00	12.37	PASS
Peak Pendulum Decel. After 30 Msec.		G's	≤22.0	12.4	PASS
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	43.3	PASS
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	99.8	PASS
	Time	Msec.	72.0 to 82.0	79.7	PASS
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	158.5	PASS
Moment About Occipital Condyle	Minimum	N· m	-52.9 to -79.9	-62.6	PASS
	Time	Msec.	65.0 to 79.0	74.7	PASS
Negative Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	147.6	PASS
Overall Test Results				PASS	

Laboratory Technician

1/23/01

Test Date

Approved By



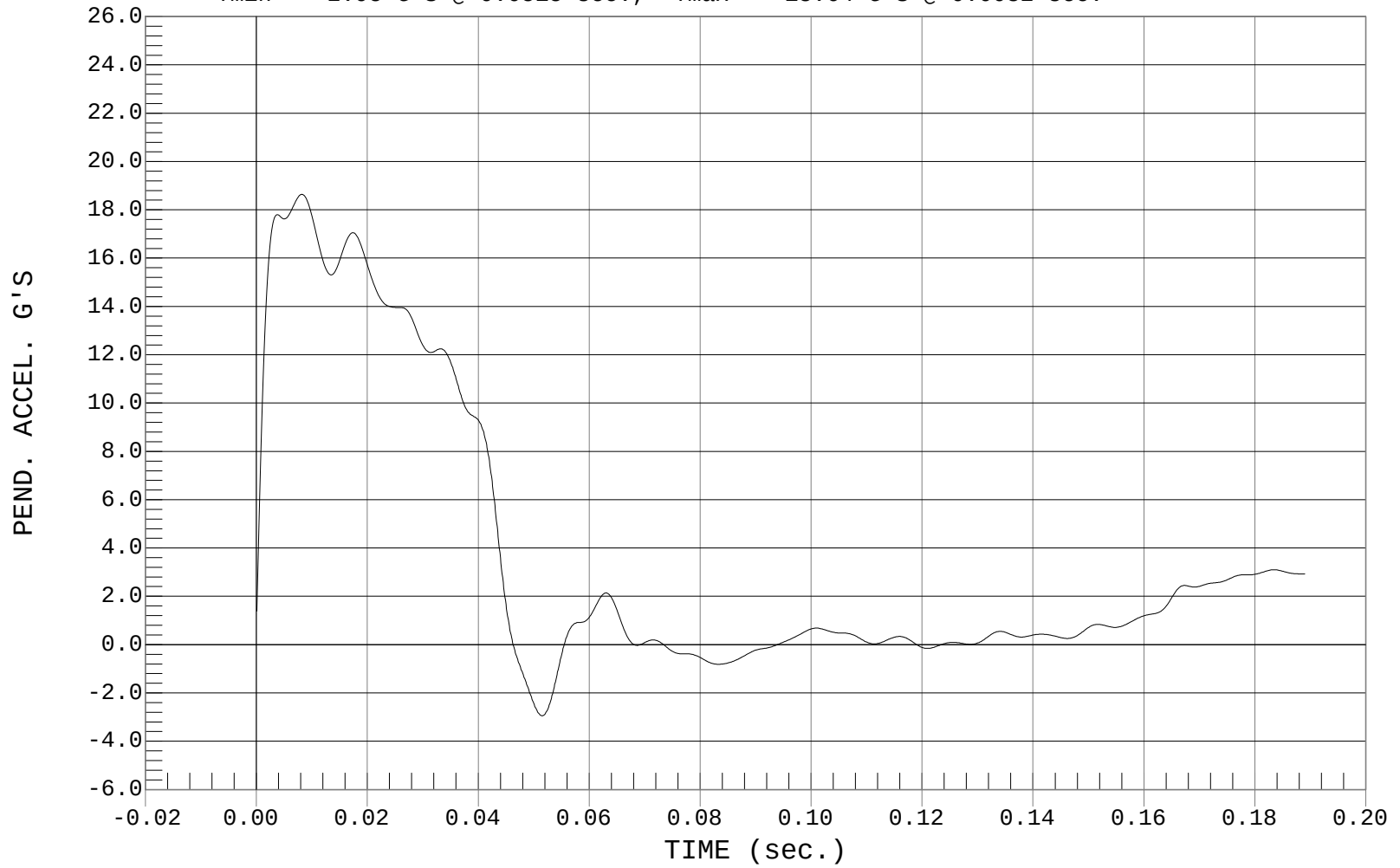
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #065

Test Date: 01-23-01
Speed: 19.90 FT/SEC, 6.07 M/SEC

— 1 PEND. ACCEL., D01083AF.A04

Ymin = -2.95 G'S @ 0.0515 sec., Ymax = 18.64 G'S @ 0.0082 sec.





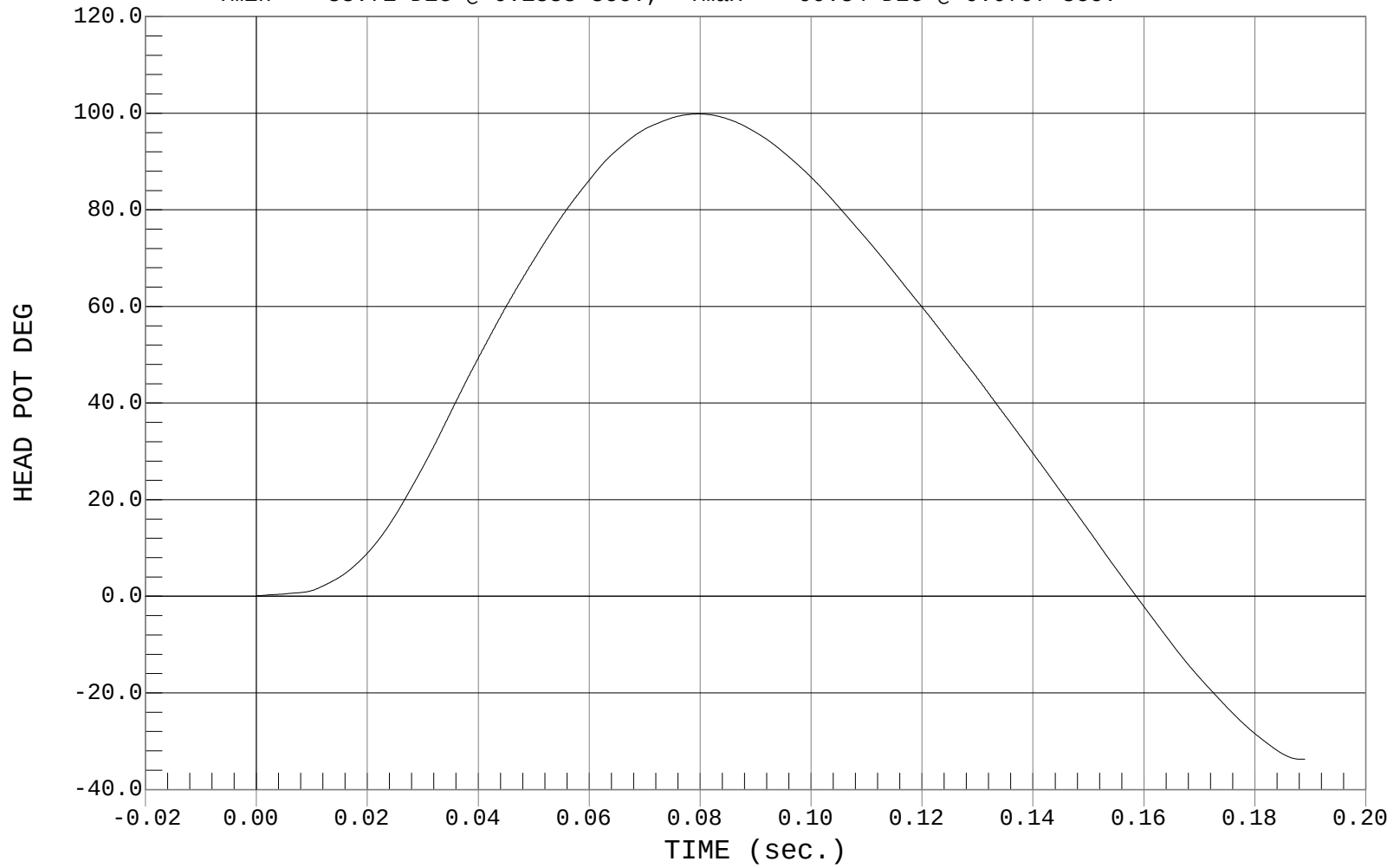
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #065

Test Date: 01-23-01
Speed: 19.90 FT/SEC, 6.07 M/SEC

— 1 HEAD POT, D01083DU.D05

Ymin = -33.71 DEG @ 0.1883 sec., Ymax = 99.84 DEG @ 0.0797 sec.



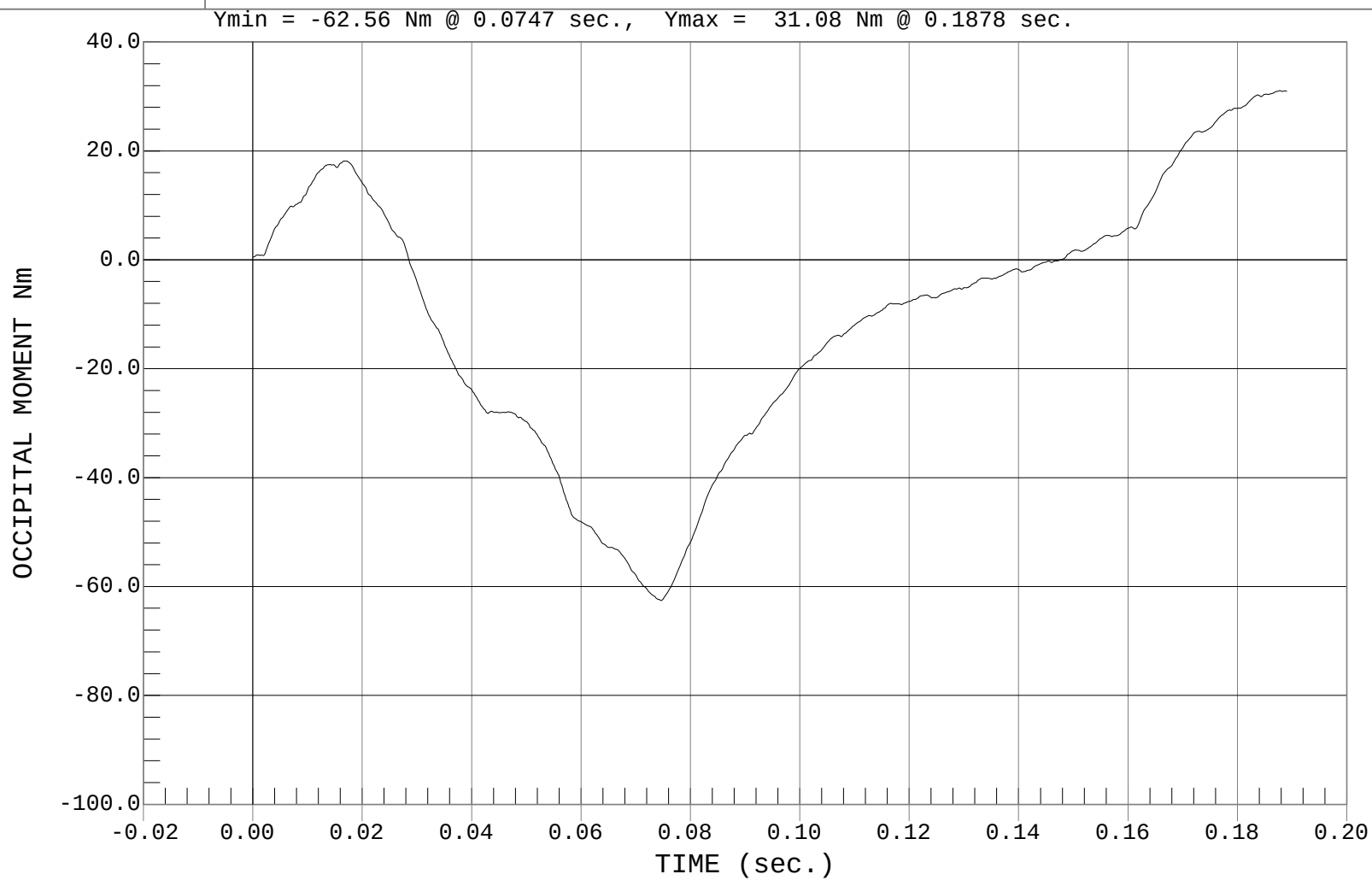


OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #065

Test Date: 01-23-01
Speed: 19.90 FT/SEC, 6.07 M/SEC

— 1 OCCIPITAL MOMENT, D01083NK.MNT



Hybrid III Calibration Data Sheet
50th Percentile Male
Hip-Femur Flexion Test

ATD Serial No.: 065

Test I.D.: D01089/0

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Temperature	°C	18.9 to 25.6	21.0	21.0	PASS
Relative Humidity	%	10 to 70	25	25	PASS
Rotation Rate	deg/sec	5 – 10	Yes	Yes	PASS
30 Degrees	Nm	94.9 Nm Max.	70.3	63.5	PASS
150 ft-lbf / 203.4 Nm	Deg	40 – 50 Degree Max. rotation	45	44	PASS
Overall Test Results					PASS

Laboratory Technician

1/23/01

Test Date

Approved By



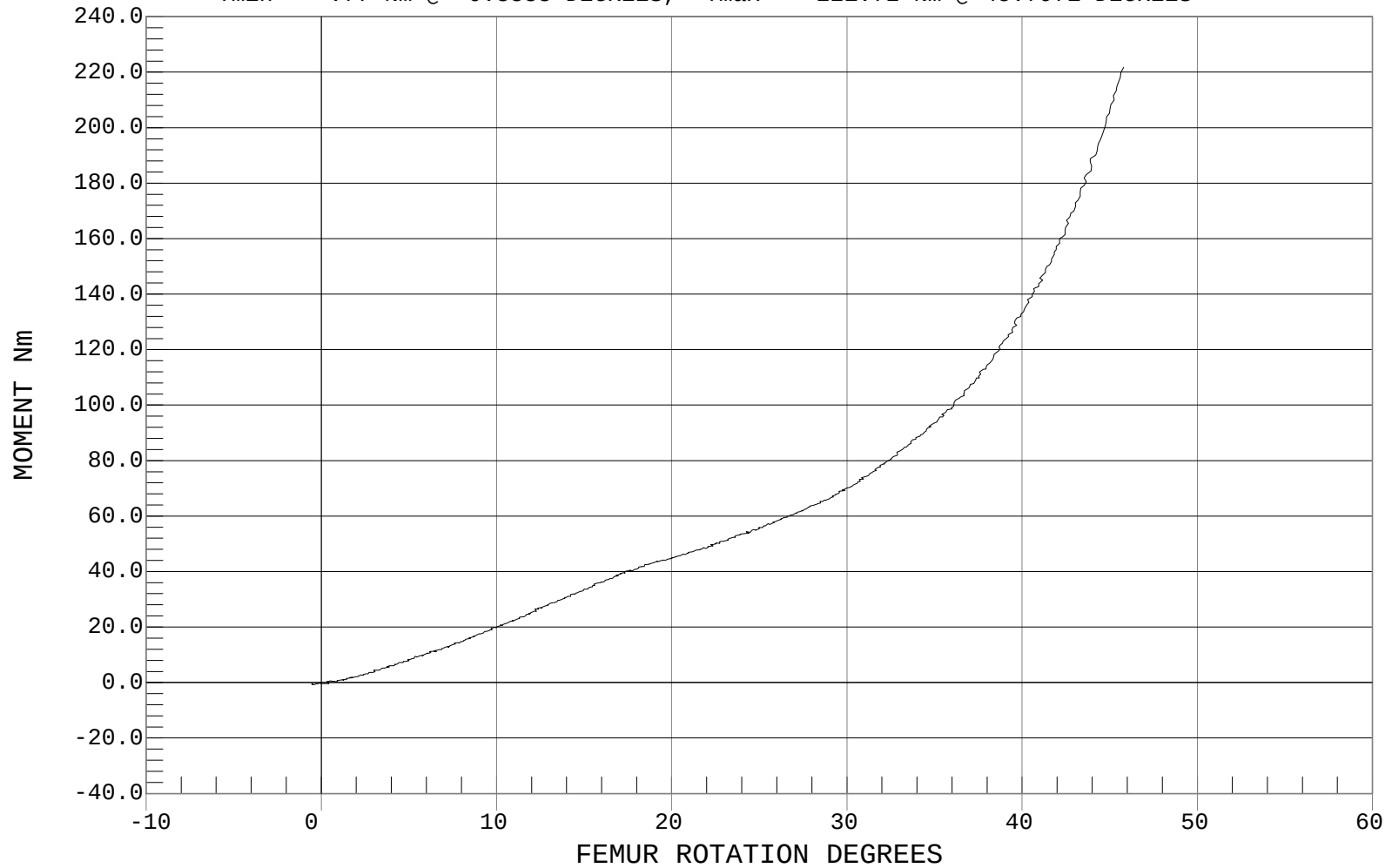
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 065 RIGHT FEMUR

Test Date: 01-23-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01089FC.F14

Ymin = -.77 Nm @ -0.3888 DEGREES, Ymax = 221.72 Nm @ 45.7971 DEGREES





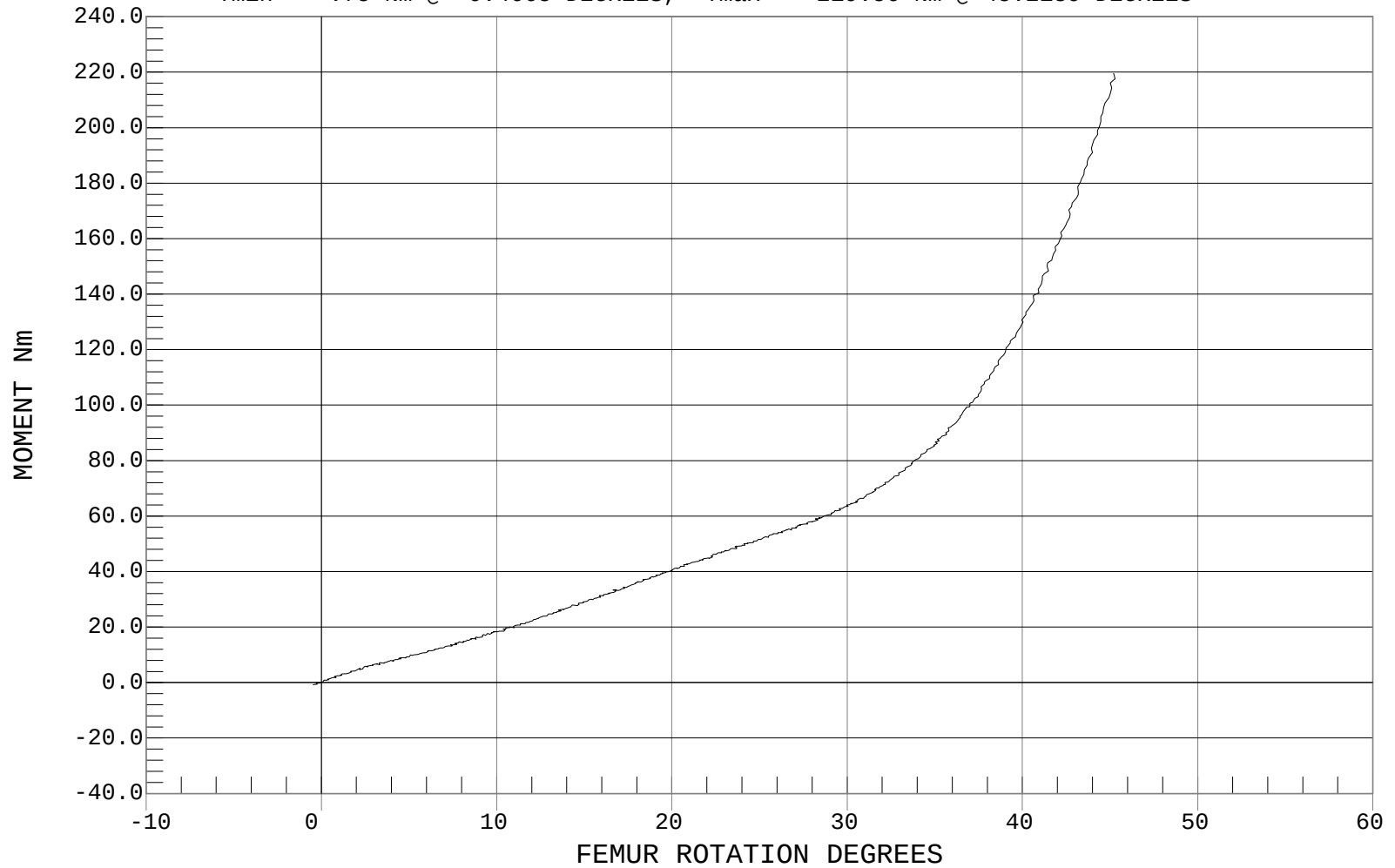
HIP-FEMUR FLEXION

Test Desc.: DUMMY CALIBRATION - HIP-FEMUR FLEXION
Component: DUMMY # 065 LEFT FEMUR

Test Date: 01-23-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 MOMENT, D01080FC.F14

Ymin = -.75 Nm @ -0.4665 DEGREES, Ymax = 219.56 Nm @ 45.2139 DEGREES



Hybrid III Calibration Data Sheet

50th Percentile Male

External Measurements

ATD Serial No.: 065

Test I.D.: D0108

External Measurement Data				
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.4 to 22.1	21.1	PASS
Laboratory Relative Humidity	%	10 to 70	33	PASS
A – Total sitting height	mm	878 to 889	884	PASS
B – Shoulder pivot height	mm	506 to 521	516	PASS
C – “H” point height	mm	84 to 89	86	PASS
D – “H” point from seat back	mm	135 to 140	137	PASS
E – Shoulder pivot from back	mm	84 to 94	86	PASS
F – Thigh clearance	mm	140 to 155	150	PASS
G – Elbow back to wrist pivot	mm	290 to 305	292	PASS
H – Skull cap to back line	mm	41 to 46	43	PASS
I – Shoulder to elbow length	mm	330 to 345	335	PASS
J – Elbow rest height	mm	191 to 211	206	PASS
K – Buttock to knee length	mm	579 to 605	597	PASS
L – Popliteal length	mm	429 to 455	452	PASS
M – Knee pivot height	mm	485 to 500	493	PASS
N – Buttock popliteal length	mm	452 to 478	472	PASS
O – Chest depth	mm	213 to 229	216	PASS
P – Foot breadth	mm	252 to 267	264	PASS
V – Shoulder breadth	mm	422 to 437	434	PASS
W – Foot length	mm	91 to 107	99	PASS
Y – Chest circumference	mm	970 to 1001	993	PASS
Z – Waist circumference	mm	836 to 866	851	PASS
AA – Location for chest circumference	mm	429 to 434	432	PASS
BB – Location for waist circumference	mm	226 to 231	229	PASS
Overall Test Results				PASS

Laboratory Technician

1/23/01

Test Date

Approved By

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

DUMMY, VEHICLE, AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR DUMMY NO. 066

	INSTRUMENTS FOR DRIVER DUMMY NO. 066		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	8/30/00
Head Y	ACC61	Endevco	8/30/00
Head Z	ACCW9	Endevco	8/30/00
Head X Redundant	AJ621	Endevco	8/30/00
Head Y Redundant	AJ619	Endevco	8/30/00
Head Z Redundant	AHY54	Endevco	8/30/00
Chest X	ACCY1	Endevco	8/30/00
Chest Y	ACCC8	Endevco	8/30/00
Chest Z	ACCT7	Endevco	8/30/00
Chest X Redundant	AJ9D4	Endevco	8/30/00
Chest Y Redundant	AJ9F3	Endevco	8/30/00
Chest Z Redundant	AJ9D3	Endevco	8/30/00
Right Femur Load Cell	261	Denton	10/16/00
Left Femur Load Cell	262	Denton	10/16/00
Pelvis X	AHTR2	Endevco	9/19/00
Pelvis Y	AGTE9	Endevco	9/19/00
Pelvis Z	AJ9B0	Endevco	9/19/00
Neck Force X	606	Denton	11/30/00
Neck Force Y	606	Denton	11/30/00
Neck Force Z	606	Denton	11/30/00
Neck Moment X	606	Denton	11/30/00
Neck Moment Y	606	Denton	11/30/00
Neck Moment Z	606	Denton	11/30/00
Chest Deflection Gauge	066	Servo	10/12/00
Lap Belt Load Cell	192	Denton	10/6/00

DUMMY, VEHICLE, AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR DUMMY NO. 066

	INSTRUMENTS FOR DRIVER DUMMY NO. 066		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	106	Denton	10/11/00
Upper Right Tibia Moment Y	106	Denton	10/11/00
Upper Right Tibia Force Z	106	Denton	10/11/00
Lower Right Tibia Moment X	135	Denton	10/11/00
Lower Right Tibia Moment Y	135	Denton	10/11/00
Lower Right Tibia Force Z	135	Denton	10/11/00
Upper Left Tibia Moment X	109	Denton	10/11/00
Upper Left Tibia Moment Y	109	Denton	10/11/00
Upper Left Tibia Force Z	109	Denton	10/11/00
Lower Left Tibia Moment X	138	Denton	10/11/00
Lower Left Tibia Moment Y	138	Denton	10/11/00
Lower Left Tibia Force Z	138	Denton	10/11/00
Left Foot Ball Z Acceleration	ALDD6	Endevco	11/16/00
Left Heel X Acceleration	J20392	Endevco	11/16/00
Left Heel Z Acceleration	AGT18	Endevco	11/16/00
Right Foot Ball Z Acceleration	AH0A5	Endevco	11/16/00
Right Heel X Acceleration	AJ9C4	Endevco	11/16/00
Right Heel Z Acceleration	AN8A4	Endevco	11/16/00

DUMMY, VEHICLE, AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR DUMMY NO. 065

	INSTRUMENTS FOR PASSENGER DUMMY NO. 065		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	10/3/00
Head Y	ACCH1	Endevco	10/3/00
Head Z	AAMW5	Endevco	10/3/00
Head X Redundant	AJ9D2	Endevco	10/3/00
Head Y Redundant	AH1E2	Endevco	10/3/00
Head Z Redundant	AJ7K3	Endevco	10/3/00
Chest X	ACC78	Endevco	10/3/00
Chest Y	ACCE6	Endevco	10/3/00
Chest Z	ACCY3	Endevco	10/3/00
Chest X Redundant	AJ9J7	Endevco	10/3/00
Chest Y Redundant	AJ7A2	Endevco	10/3/00
Chest Z Redundant	AJ819	Endevco	10/3/00
Right Femur Load Cell	259	Denton	10/13/00
Left Femur Load Cell	260	Denton	10/13/00
Pelvis X	AM748	Endevco	9/19/00
Pelvis Y	ALCH7	Endevco	9/19/00
Pelvis Z	AALH1	Endevco	9/19/00
Neck Force X	443	Denton	11/11/00
Neck Force Y	443	Denton	11/11/00
Neck Force Z	443	Denton	11/11/00
Neck Moment X	443	Denton	11/11/00
Neck Moment Y	443	Denton	11/11/00
Neck Moment Z	443	Denton	11/11/00
Chest Deflection Gauge	065	Servo	10/12/00
Lap Belt Load Cell	196	Denton	10/6/00
Shoulder Belt Load Cell	192	Denton	10/6/00

DUMMY, VEHICLE, AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR DUMMY NO. 065

	INSTRUMENTS FOR PASSENGER DUMMY NO. 065		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	103	Denton	10/11/00
Upper Right Tibia Moment Y	103	Denton	10/11/00
Upper Right Tibia Force Z	103	Denton	10/11/00
Lower Right Tibia Moment X	133	Denton	10/11/00
Lower Right Tibia Moment Y	133	Denton	10/11/00
Lower Right Tibia Force Z	133	Denton	10/11/00
Upper Left Tibia Moment X	105	Denton	10/11/00
Upper Left Tibia Moment Y	105	Denton	10/11/00
Upper Left Tibia Force Z	105	Denton	10/11/00
Lower Left Tibia Moment X	134	Denton	10/11/00
Lower Left Tibia Moment Y	134	Denton	10/11/00
Lower Left Tibia Force Z	134	Denton	10/11/00
Left Foot Ball Z Acceleration	AP2D6	Endevco	11/16/00
Left Heel X Acceleration	J11548	Endevco	11/16/00
Left Heel Z Acceleration	J10866	Endevco	11/16/00
Right Foot Ball Z Acceleration	AGMT2	Endevco	11/16/00
Right Heel X Acceleration	AH0A2	Endevco	11/16/00
Right Heel Z Acceleration	AJ837	Endevco	11/16/00

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	MGA-045	Entran	9/14/00
Right Rear Seat Crossmember X	F18-G08	Entran	11/15/00
Top of Engine Block X	H07-A24	Entran	12/14/00
Bottom of Engine X	H07-A04	Entran	12/14/00
Left Brake Caliper X	E10-F20	Entran	10/4/00
Right Brake Caliper X	F18-G08	Entran	8/8/00
Instrument Panel X	G13-B14	Entran	9/14/00
Redundant Left Rear Seat Crossmember X	I18-E05	Entran	12/13/00
Redundant Right Rear Seat Crossmember X	I25-F10	Entran	11/15/00

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	C12885	Endevco	1/17/01
Neck Bending Head Rotary Potentiometer	018	Spectrol	10/2/00
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	10/2/00
Chest Probe Accelerometer	J14395	Endevco	1/11/01
Knee Impact Accelerometer	J14398	Endevco	1/11/01

APPENDIX E

VEHICLE OWNER'S MANUAL OCCUPANT RESTRAINT INSTRUCTIONS

FEATURES OF YOUR HYUNDAI

WARNING:

- o The height adjuster must be in the locked position when the vehicle is moving.
- o The misadjustment of height of the shoulder belt could reduce the effectiveness of the seat belt in a crash.

B190A01S-AAT

SEAT BELT-Driver's 3-Point System with Emergency Locking Retractor To Fasten Your Belt

To fasten your seat belt, pull it out of the retractor and insert the metal tab into the buckle. There will be an audible "click" when the tab locks into the buckle.

The seat belt automatically adjusts to the proper length only after the lap belt portion is adjusted manually so that it fits snugly around your hips. If you lean forward in a slow, easy motion, the belt will extend and let you move around. If there is a sudden stop or impact, the belt will lock into position. It will also lock if you try to lean forward too quickly. Check to make sure that the belt is properly locked and that the belt is not twisted.

NOTE:

If the driver's seat belt is not fastened when the ignition key is in the "ON" position, the seat belt warning light will flash and the warning chime will sound for approximately six seconds.

B190A01Y-AAT

SEAT BELTS-Front Passenger and Rear Seat 3-Point System with Combination Locking Retractor To Fasten Your Belt



Combination retractor type seat belts are installed in the rear seat outboard positions to help accommodate the installation of child restraint systems. Although a combination retractor is also installed in the front passenger seat position, Hyundai strongly recommends that children always be seated in the rear seat. NEVER place any infant restraint system in the front seat of the vehicle.

This type of seat belt combines the features of both an emergency locking retractor seat belt and an automatic locking retractor seat belt. To fasten your seat belt, pull it out of the retractor and insert the metal tab into the buckle. There will be an audible "click" when the tab locks into

1- 11

FEATURES OF YOUR HYUNDAI

the buckle. When not securing a child restraint, the seat belt operates in the same way as the driver's seat belt (Emergency Locking Retractor Type). It automatically adjusts to the proper length only after the lap belt portion of the seat belt is adjusted manually so that it fits snugly around your hips. When the seat belt is fully extended from the retractor to allow the installation of a child restraint system, the seat belt operation changes to allow the belt to retract, but not to extend. (Automatic Locking Retractor Type). See page 1-14.

NOTE:

Although the combination retractor provides the same level of protection for seated passengers in either emergency or automatic locking modes, it is recommended that seated passengers use the emergency locking feature for improved convenience. The automatic locking function is intended to facilitate child restraint installation. To convert from the automatic locking feature to the emergency locking operation mode, allow the unbuckled seat belt to fully retract.

WARNING:

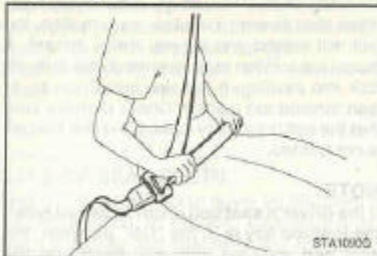
- o For maximum restraint system protection, seat belts must always be used whenever the car is moving.
- o Seat belts are most effective when seatbacks are in the upright position.
- o Children must always be seatbelted in the rear seats. Never allow children to ride in the front passenger seat.

1- 12

- o The shoulder belt should be positioned midway over the shoulder nearest the door for the most effective protection. Never wear the seat belt under the arm nearest the door. Wearing the belt under the arm nearest the door could cause serious or fatal injuries in an accident.
- o Avoid wearing twisted seat belts. A twisted belt can't do its job as well. In a collision, it could even cut into you. Be sure the belt is straight and not twisted.
- o Be careful not to damage the belt webbing or hardware. If the belt webbing or hardware is damaged, replace it.

B200A01A-AAT

Adjusting Your Seat Belt



WARNING:

You should place the lap belt portion as low as possible and snugly across your hips, not on your waist. If the lap belt is located too high on your waist, it may increase the chance of injury in the event of a collision. Both arms should not be under or over the belt. Rather, one should be over and the other under, as shown in the illustration. Never wear the seat belt under the arm nearest the door.

B210A01A-AAT

To Release the Seat Belt



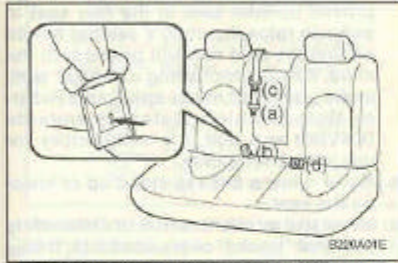
The seat belt is released by pressing the release button in the locking buckle. When it is released, the belt should automatically draw back into the retractor.

If this does not happen, check the belt to be sure it is not twisted, then try again.

FEATURES OF YOUR HYUNDAI

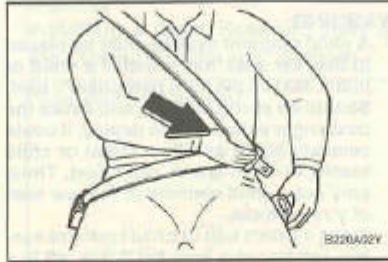
B220A01E-AAT

SEAT BELTS - Rear Seat Center's 3-Point System With Combination Locking Retractor



1. Before fastening the rear seat center belt, confirm the metal tab (a) and buckle (b) are latched together.
2. After confirming that (a) and (b) are latched, pull the seat belt out of the retractor and insert the metal tab (c) into the buckle (d).

There will be an audible "click" when the tab locks in the buckle. The seat belt automatically adjusts to the proper length only after the lap belt is adjusted manually so that it fits snugly around your hips. If you lean forward in a slow, easy motion, the belt will extend and let you move around. If there is a sudden stop or impact, the belt will lock into position. It will also lock if you try to lean forward too quickly.



WARNING:

- o When using the rear seat center belt, you must lock all metal tabs and buckles. If any metal tab or buckle is not locked, it will increase the chance of injury in the event of collision.
- o Never unlock the metal tab (a) and the buckle (b) with the following exceptions.
 - 1) In case of folding rear seatbacks down.
 - 2) If transporting an object on the rear seat may cause damage to the rear seat center belt.
- o Lock the metal tab (a) and the buckle (b) immediately after folding rear seatbacks up.
- o To disconnect the metal tab (a) from the buckle (b), insert a sharp-ended tool into the groove located on the buckle (b).

B220C01Y-AAT

To Release the Seat Belt



When you want to release the seat belt, press the button in the locking buckle.

WARNING:

The rear seat center belt latching mechanism is different from those for the outboard rear seat shoulder belts. When fastening the outboard rear seat shoulder belts or the rear seat center belt, make sure they are inserted into the correct buckles to obtain maximum protection from the seat belt system and assure proper operation.

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FEATURES OF YOUR HYUNDAI

B230A01A-AAT

CHILD RESTRAINT SYSTEM

Children riding in the car should sit in the rear seat and must always be restrained to minimize the risk of injury in an accident, sudden stop or sudden maneuver. According to accident statistics provided by the National Highway Traffic Safety Administration (NHTSA), children are safer when properly restrained in the rear seats than in the front seat. Larger children should use one of the seat belts provided.

You are required by law to use safety restraints for children. If small children ride in your vehicle (generally children younger than four years and/or weighing less than 40 Lbs.) you must put them in a child restraint system (safety seat). You must use a commercially available child restraint system that meets the requirements of the Federal Motor Vehicle Safety Standards (FMVSS).

Children could be injured or killed in a crash if their restraints are not properly secured. For small children and babies, a child seat or infant seat must be used. Before buying a particular child restraint system, make sure it fits your car seat and seat belts, and fits your child. Follow all the instructions provided by the manufacturer when installing the child restraint system.

WARNING:

- o A child restraint system must be placed in the rear seat. Never install a child or infant seat on the front passenger's seat. Should an accident occur and cause the passenger side airbag to deploy, it could severely injure or kill an infant or child seated in an infant or child seat. Thus, only use a child restraint in the rear seat of your vehicle.
- o Since a safety belt or child restraint system can become very hot if it is left in a closed vehicle, be sure to check the seat cover and buckles before placing a child there.
- o When the child restraint system is not in use, store it in the trunk or fasten it with a safety belt so that it will not be thrown forward in the case of a sudden stop or an accident.
- o Children who are too large to be in a child restraint should sit in the rear seat and be restrained with the available lap/shoulder belts. Never allow children to ride in the front passenger seat.
- o Always make sure that the shoulder belt portion of the lap/shoulder belt is positioned midway over the shoulder, never across the neck. Moving the child closer to the center of the vehicle may help provide a good shoulder belt fit. The lap belt portion of the lap/shoulder belt or

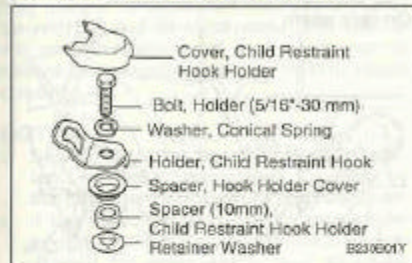
the center seat lap belt must always be positioned as low as possible on the child's hips and as snug as possible.

- o If the seat belt will not properly fit the child, we recommend the use of an approved booster seat in the rear seat in order to raise the child's seating height so that the seat belt will properly fit the child. Before purchasing a booster seat, make sure that it meets applicable Federal Motor Vehicle Safety Standards (FMVSS) and that it is satisfactory for use with this vehicle.
- o Never allow a child to stand up or kneel on the seat.
- o Never use an infant carrier or child safety seat that "hooks" over a seatback; it may not provide adequate security in an accident.
- o Never allow a child to be held in a person's arms while they are in a moving vehicle, as this could result in serious injury to the child in the event of an accident or a sudden stop. Holding a child in a moving vehicle does not provide the child with any means of protection during an accident, even if the person holding the child is wearing a seat belt.

FEATURES OF YOUR HYUNDAI

B230001E-GAT

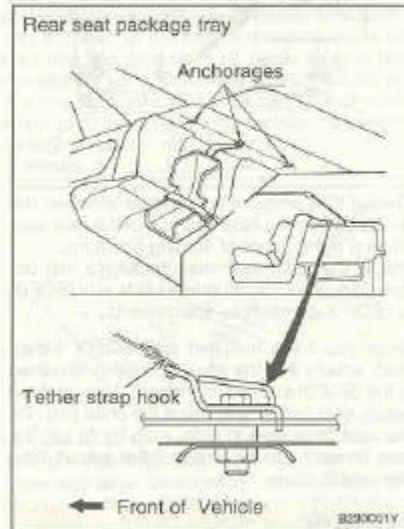
Using a Child Restraint System



For small children and babies, the use of a child seat or infant seat is strongly recommended. This child seat or infant seat should be of appropriate size for the child and should be installed in accordance with the manufacturer's instructions. It is further recommended that the seat be placed in the vehicle's rear seat since this can make an important contribution to safety. Your vehicle is provided with three child restraint hook holders for installing the child seat or infant seat.

B230001E-GAT

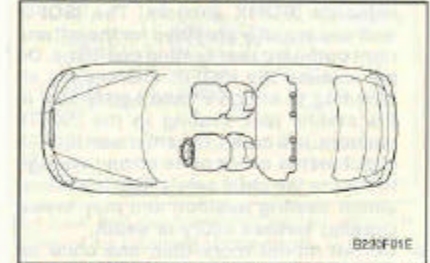
Installing a Child Restraint Seat with the "Tether Anchorage" System



Three child restraint hook holders are located on the rear seat package tray. To install the child restraint seat, connect the child restraint tether strap hook to the child restraint hook holder and tighten to secure the seat.

B230001E-GAT

Securing the Child Restraint Seat with the "ISOFIX" System



Some child seat manufacturers make safety seats that are labeled as ISOFIX or ISOFIX-compatible child seats. These seats include two rigid or webbing mounted attachments that connect to two ISOFIX anchors at specific seating positions in your vehicle. This type of child seat eliminates the need to use seat belts to attach the child seat for forward-facing child seats.

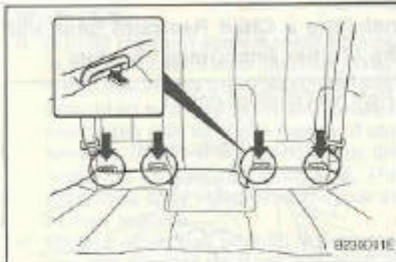
ISOFIX anchors have been provided in your vehicle. The ISOFIX anchors are located in the left and right outboard rear seating positions. There is no ISOFIX anchor provided for the center rear seating position. Their locations are shown in the illustration.

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FEATURES OF YOUR HYUNDAI

WARNING:

- o Do not install a child safety seat at the rear center seating position using the vehicle's ISOFIX anchors. The ISOFIX anchors are only provided for the left and right outboard rear seating positions. Do not misuse the ISOFIX anchors by attempting to attach a child safety seat in the middle rear seating to the ISOFIX anchors. In a crash, the child seat ISOFIX attachments may not be strong enough to secure the child safety seat in the rear center seating position and may break, causing serious injury or death.
- o Do not mount more than one child restraint to a single tether or to a child lower anchorage point. The improper increased load may cause the anchorage points or tether anchor to break, causing serious injury or death.
- o Attach the ISOFIX or ISOFIX-compatible child seat only to the appropriate locations shown.
- o Always follow the installation and use instructions provided by the manufacturer of the child restraint.



The ISOFIX anchors are located between the seatback and the seat cushion of the rear seat left and right outboard seating positions. Follow the child seat manufacturer's instructions to properly install safety seats with ISOFIX or ISOFIX-compatible attachments.

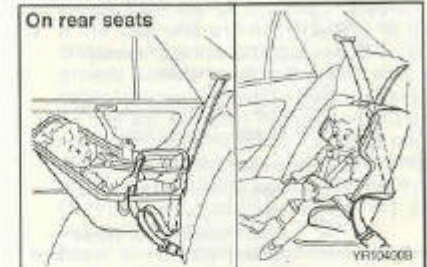
Once you have installed the ISOFIX safety seat, assure that the seat is properly attached to the ISOFIX and tether anchors. Also, test the safety seat before you place the child in it. Tilt the seat from side to side. Also try to tug the seat forward. Check to see if the anchors hold the seat in place.

WARNING:

If the safety seat is not anchored properly, the risk of a child being seriously injured or killed in a collision greatly increases.

B230001A-GAT

Installation on Rear Seats



To install a child restraint system in the rear seats, extend the shoulder/lap belt entirely from its retractor until a "click" is felt. This will engage the seat belt retractor automatic locking feature, which allows the seat belt to retract but not extend. Install the child restraint system, buckle the seat belt and allow the seat belt to take up any slack. Make sure that the lap portion of the belt is tight around the child restraint system and the shoulder portion of the belt is positioned so that it cannot interfere with the child's head or neck. Also, double check to be sure that the retractor has engaged the automatic locking feature by trying to extend webbing out of the retractor. If the retractor is in the automatic locking mode, the belt will be locked. After installation of the child restraint system, try to move it in all directions to be sure the child restraint system is securely installed.

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FEATURES OF YOUR HYUNDAI

If you need to tighten the belt, pull more webbing toward the retractor. When you unbuckle the seat belt and allow it to retract, the retractor will automatically revert back to its normal seated passenger emergency locking usage condition.

NOTE:

- Before installing the child restraint system, read the instructions supplied by the child restraint system manufacturer.
- If the seat belt does not operate as described, have the system checked immediately by your authorized Hyundai dealer.

WARNING:

- If the retractor is not in the Automatic Locking mode, the child restraint system can move when your vehicle turns or stops abruptly.
- Do not install any child restraint system in the front passenger seat. Should an accident occur and cause the passenger side airbag to deploy, it could severely injure or kill an infant or child seated in an infant or child seat. Therefore, only use a child restraint system in the rear seat of your vehicle.

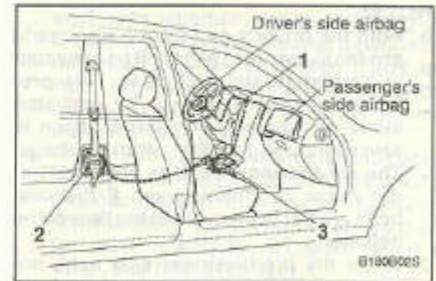
B180904S-AAT

Pre-tensioner Seat Belt

Your Hyundai vehicle is equipped with driver's and front passenger's pre-tensioner seat belts. The purpose of the pre-tensioner is to make sure that the seat belts fit tightly against the occupant's body in certain frontal collisions. The pre-tensioner seat belts can be activated alone or, where the frontal collision is severe enough, together with the airbags.



The pre-tensioner seat belt operates in the same way as an Emergency Locking Retractor (ELR) type of seat belt. When the vehicle stops suddenly, or if the occupant tries to lean forward too quickly, the seat belt retractor will lock into position. However, in certain frontal collisions, the pre-tensioner will activate and pull the seat belt into tighter contact against the occupant's body.



The seat belt pre-tensioner system consists mainly of the following components. Their locations are shown in the illustration.

- SRS airbag warning light
- Seat belt pre-tensioner assembly
- SRS control module

WARNING:

To obtain maximum benefit from a pre-tensioner seat belt:

- The seat belt must be worn correctly.
- The seat belt must be adjusted to the correct position.

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FEATURES OF YOUR HYUNDAI

NOTE:

- Both the driver's and front passenger's pre-tensioner seat belts will be activated in certain frontal collisions. The pre-tensioner seat belts can be activated alone or, where the frontal collision is severe enough, together with the airbags. The pre-tensioners will be activated under these conditions even if the seat belts are not being worn at the time of the collision.
- When the pre-tensioner seat belts are activated, a loud noise may be heard and fine dust, which may appear to be smoke, may be visible in the passenger compartment. These are normal operating conditions and are not hazardous.
- Although it is harmless, the fine dust may cause skin irritation and should not be breathed for prolonged periods. Wash your hands and face thoroughly after an accident in which the pre-tensioner seat belts were activated.

CAUTION:

- Because the sensor that activates the SRS airbag is connected with the pre-tensioner seat belt, the SRS airbag warning light  on the instrument panel will blink for approximately 6 seconds after the ignition key has been turned to the "ON" or "ACC" positions, and then it should turn off.

- If the pre-tensioner seat belt is not working properly, this warning light will illuminate even if there is no malfunction of the SRS airbag system. If the SRS airbag warning light does not illuminate when the ignition key is turned to "ON" or "ACC", or if it remains illuminated after blinking for approximately 6 seconds, or if it illuminates while the vehicle is being driven, please have an authorized Hyundai dealer inspect the pre-tensioner seat belt or SRS airbag system as soon as possible.

WARNING:

- Pre-tensioners are designed to operate only one time. After activation, pre-tensioner seat belts must be replaced. All seat belts, of any type, should always be replaced after they have been worn during a collision.
- The pre-tensioner seat belt assembly mechanisms become hot during activation. Do not touch the pre-tensioner seat belt assemblies for several minutes after they have been activated.
- Do not attempt to inspect or replace the pre-tensioner seat belts yourself. This must be done by an authorized Hyundai dealer.
- Do not strike the pre-tensioner seat belt assemblies.
- Do not attempt to service or repair the pre-tensioner seat belt system in any manner.

- Improper handling of the pre-tensioner seat belt assemblies, and failure to heed the warnings to not strike, modify, inspect, replace, service or repair the pre-tensioner seat belt assemblies may lead to improper operation or inadvertent activation and serious injury.
- Always wear the seat belts when driving or riding in a motor vehicle.

B260A21F-AAT

SUPPLEMENTAL RESTRAINT (AIRBAG) SYSTEM "SRS"



Your Hyundai is equipped with a Supplemental Restraint (Airbag) System. The indications of the system's presence are the letters "SRS AIR BAG" embossed on the airbag pad cover in the steering wheel and the passenger's side front panel pad above the glove box.

1-18

FEATURES OF YOUR HYUNDAI

The Hyundai SRS consists of airbags installed under the pad covers in the center of the steering wheel and the passenger's side front panel above the glove box. The purpose of the SRS is to provide the vehicle's driver and the front passenger with additional protection when used together with the seat belt, in case of a frontal impact.

NOTE:

Be sure to read information about the SRS on the labels provided on the backside of the sun visor and in the glove box.

WARNING:

- o As its name implies, the SRS is designed to work with, and be supplemental to, the driver's and the passenger's three point seat belt systems and is not a substitute for them. Therefore your seat belts must be worn at all times while the vehicle is in motion. In addition, the airbags deploy only in certain frontal impact conditions severe enough to cause significant injury to the vehicle occupants.
- o The SRS is designed to deploy the airbags only when an impact is sufficiently severe and when the impact angle is less than 30° from the forward longitudinal axis of the vehicle and will not deploy in side, rear or rollover impacts. Additionally, the airbags will only deploy once. Thus, seat belts must be worn at all times.

- o The driver should sit back as far as possible while still maintaining control of the vehicle. If you are sitting too close to the airbag, it can cause death or serious injury when it inflates.
- o No objects should be placed over or near the airbag modules on the steering wheel, instrument panel, and the front passenger's panel above the glove box, because any such object could cause harm if the vehicle is in a crash severe enough to cause the airbags to inflate.
- o If the airbags inflate, they must be replaced by an authorized Hyundai dealer.
- o Do not tamper with or disconnect SRS wiring, or other components of the SRS system. Doing so could result in injury, due to accidental firing of the airbags or by rendering the SRS inoperative.
- o Do not install a child restraint system in the front passenger seat position. A child restraint system must never be placed in the front seat. The infant or child could be severely injured or killed by an airbag deployment in case of an accident.
- o Do not allow children to ride in the front passenger seat. If older children (teenages and older) must ride in the front seat, make sure they are always properly belted and that the seat is moved back as far as possible.
- o For maximum safety protection in all types of crashes, all occupants including the driver should always wear their

seat belts whether or not an airbag is also provided at their seating position to minimize the risk of severe injury or death in the event of a crash. Do not sit or lean unnecessarily close to the airbag while the vehicle is in motion.

- o The SRS airbag system must deploy very rapidly to provide protection in a crash. If an occupant is out of position because of not wearing a seat belt, the airbag may forcefully contact the occupant causing serious or fatal injuries.

B340B02A-AAT

SRS Components and Functions



The SRS consists of the following components:

- Driver's Side Airbag Module
- Passenger's Side Airbag Module
- Knee Bolster
- SRS Service Reminder Indicator (SRI)
- SRS Control Module (SRSCM)

1- 19

FEATURES OF YOUR HYUNDAI

The SRSCM continually monitors all elements while the ignition is "ON" to determine if a frontal or near-frontal impact is severe enough to require airbag deployment.

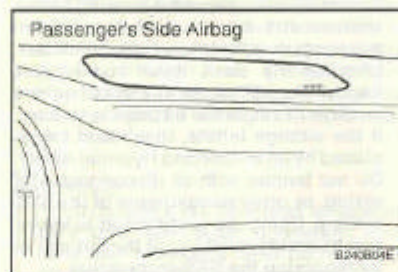


The SRS service reminder indicator (SRI) on the instrument panel will blink for about 6 seconds after the ignition key is turned to the "ON" position or after the engine is started, after which the SRI should go out.



1- 20

The airbag modules are located both in the center of the steering wheel and in the front passenger's panel above the glove box. When the SRSCM detects a considerable impact to the front of the vehicle, it will automatically deploy the airbags.



Upon deployment, tear seams molded directly into the pad covers will separate under pressure from the expansion of the airbags. Further opening of the covers then allows full inflation of the airbags.

A fully inflated airbag in combination with a properly worn seat belt slows the driver's or the passenger's forward motion, thus reducing the risk of head or chest injury.



After complete inflation, the airbag immediately starts deflating, enabling the driver to maintain forward visibility.

CAUTION:

When installing a container of liquid air freshener inside a vehicle, do not place it near the instrument cluster nor on the instrument panel pad surface. If there is any leakage from the air freshener onto these areas (instrument cluster, instrument panel pad or air ventilator), it may damage these parts. If the liquid from the air freshener does leak onto these areas, wash them with water immediately.

FEATURES OF YOUR HYUNDAI

WARNING:

- When the SRS is activated, there may be a loud noise and fine dust will be released throughout the vehicle. These conditions are normal and are not hazardous. However, the fine dust generated during airbag deployment may cause skin irritation. Be sure to wash your hands and face thoroughly with lukewarm water and a mild soap after an accident in which the airbags were deployed.
- The SRS can function only when the ignition key is in the "ON" position. If the SRS SRI does not come on, or continuously remains on, after flashing for about 6 seconds when the ignition key is turned to the "ON" position, or after the engine is started, or comes on while driving, the SRS is not working properly. If this occurs, have your vehicle immediately inspected by your Hyundai dealer.
- Before you replace a fuse or disconnect a battery terminal, turn the ignition key to the "LOCK" position or remove the ignition key. Never remove or replace the air bag related fuse(s) when the ignition key is in the "ON" position. Failure to heed this warning will cause the SRS SRI to illuminate.

B990A00Y-AAT

PASSENGER PRESENCE DETECTION

The passenger presence detection system detects the presence of a passenger in the front seat. If no passenger is recognized on the front passenger seat, the deployment of the front passenger and/or side airbag will be prevented. This system is designed to prevent the replacement of airbag components that deploy needlessly in an accident.

NOTE:

Luggage or other cargo heavier than 33 lbs should not be placed on the passenger front seat. This can allow the deployment of the front passenger and/or side air bag in the case of an accident.

WARNING:

The Passenger Presence Detection system is not intended to prevent airbag deployment while a child is in the front passenger's seat. It is intended only as a means to reduce unnecessary collision damage repair expense by preventing airbag and seat belt pretensioner deployment when the right front passenger seat is unoccupied. Deployment is still possible if only a few pounds are placed upon the seat. Therefore, children must not be transported in the front seat. All children must be seated in the rear seat and properly restrained with the vehicle's restraint system or a child restraint system appropriate for the child's size and weight.

B900B02Y-GAT

Side Airbag (If Installed)



Your Hyundai is equipped with a side airbag in each front seat. The purpose of the airbag is to provide the vehicle's driver and/or the front passenger with additional protection than that offered by the seatbelt alone. The side impact airbags are designed to deploy only during certain side impact collisions, depending on the crash severity, angle, speed and point of impact. The air bags are not designed to deploy in all side impact situations.

1-21

FEATURES OF YOUR HYUNDAI



WARNING:

- For best protection from the side airbag system and to avoid being injured by the deploying side airbag, both front seat occupants should sit in an upright position with the seat belt properly fastened. The driver's hands should be placed on the steering wheel at the 9:00 and 3:00 o'clock positions. The passenger's arms and hands should be placed in their laps.
- Do not use any accessory seat covers.
- Use of seat covers could reduce or prevent the effectiveness of the system.
- Do not install any accessories on the side or near the side airbag.
- Do not use excessive force on the side of the seat.
- Do not place any objects over the airbag or between the airbag and yourself.

B240C02A-AAT

SRS Care

- The SRS is virtually maintenance free and there are no parts you can safely service by yourself. The entire SRS system must be inspected by an authorized Hyundai dealer in 10 years after the date that the vehicle was manufactured.
- Any work on the SRS system, such as removing, installing, repairing, or any work on the steering wheel must be performed by a qualified Hyundai technician. Improper handling of the airbag system may result in serious personal injury.



WARNING:

- Do not install a child restraint system in the front passenger seat position. A child restraint system must never be placed in the front seat. The infant or child could be severely injured or killed by an airbag deployment in case of an accident.
- Modification to SRS components or wiring, including the addition of any kind of badges to the pad covers or modifications to the body structure, can adversely affect SRS performance and lead to possible injury.
- For cleaning the airbag pad covers, use only a soft, dry cloth or one which has been moistened with plain water. Solvents or cleaners could adversely affect the airbag covers and proper deployment of the system.

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APPENDIX F

CHILD SEAT

POST-TEST OBSERVATIONS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

	Right Rear Passenger
Child Seat	Fisher Price
Child Seat Mass (kg)	6.8
Belt Fraying	None
Stress Marks	None
Cracks	None
Buckle Stress	None
Latch Hooks	None
Contact	Feet to seat back

HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Head CG	X	G's	32.7	197	44.2	74
Head CG	Y	G's	5.2	71	1.6	96
Head CG	Z	G's	56.5	67	10.1	39
Head CG Resultant	N/A	G's	67.0	74		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	G's	10.9	205	40.8	73
Chest CG	Y	G's	3.3	89	2.1	190
Chest CG	Z	G's	11.2	184	38.6	57
Chest CG Resultant	N/A	G's	48.1	57		

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Tether	N/A	Newtons				

HEAD INJURY CRITERIA (HIC)

Location	Right Rear Passenger			
	HIC	Avg G's	T ¹	T ²
Head CG Primary (36 msec)	671	51.9	56.8	91.4
Head CG Primary (15 msec)	450	61.8	64.4	79.4

CHEST CLIP (3 MSEC)

Location	Right Rear Passenger		
	Clip	T ¹	T ²
Chest CG Primary	47.8	54.4	57.4

HYBRID III 3 YEAR OLD ATD INJURY CRITERIA AND SENSOR DATA...(continued)

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Pelvis	X	G's	7.2	190	46.1	69
Pelvis	Y	G's	6.1	85	9.9	62
Pelvis	Z	G's	11.7	185	35.6	59

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	36	176	1109	76
Neck Force	Y	Newtons	50	54	61	96
Neck Force	Z	Newtons	2352	76	258	44
Neck Moment	X	N"m	6.0	74	3.7	107
Neck Moment	Y	N"m	5.8	134	9.0	55
Neck Moment	Z	N"m	1.1	70	0.6	232

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Neck Force	X	Newtons	275	195	1710	76
Neck Force	Y	Newtons	101	72	45	89
Neck Force	Z	Newtons	799	187	351	44
Neck Moment	X	N"m	12.3	71	7.1	103
Neck Moment	Y	N"m	184.5	76	16.0	195
Neck Moment	Z	N"m	5.9	72	6.0	89

CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Right Rear Passenger			
			Max	Time	Min	Time
Chest CG	X	mm			20	78

DUMMY DIMENSIONS

Test Vehicle: 2001/Hyundai/Elantra/4 door

NHTSA No.: M10500

Test Program: NCAP

Test Date: February 6, 2001

Measurement Description	Right Rear Passenger
	Length (mm)
Head to Roof (Z)	346
Head to Seatback (X)	541
Head to Door (Y)	404
Chest to Seatback (X)	552
Left Knee to Seatback	360
Right Knee to Seatback	354

CHILD SEAT PHOTOGRAPHS

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Photo 1 - Pre-Test RRS 3 Year Old Left Side View



Photo 2 - Post-Test RRS 3 Year Old Left Side View



Photo 3 - Pre-Test RRS 3 Year Old Left Side View (Door Open)



Photo 4 - Post-Test RRS 3 Year Old Left Side View (Door Open)



Photo 5 - Post-Test RRS 3 Year Old Foot Contact View



Photo 6 - Post-Test RRS 3 Year Old Head Contact View



Photo 7 - Post-Test RRS Top Tether View



Photo 8 - Post-Test RRS Top Tether View

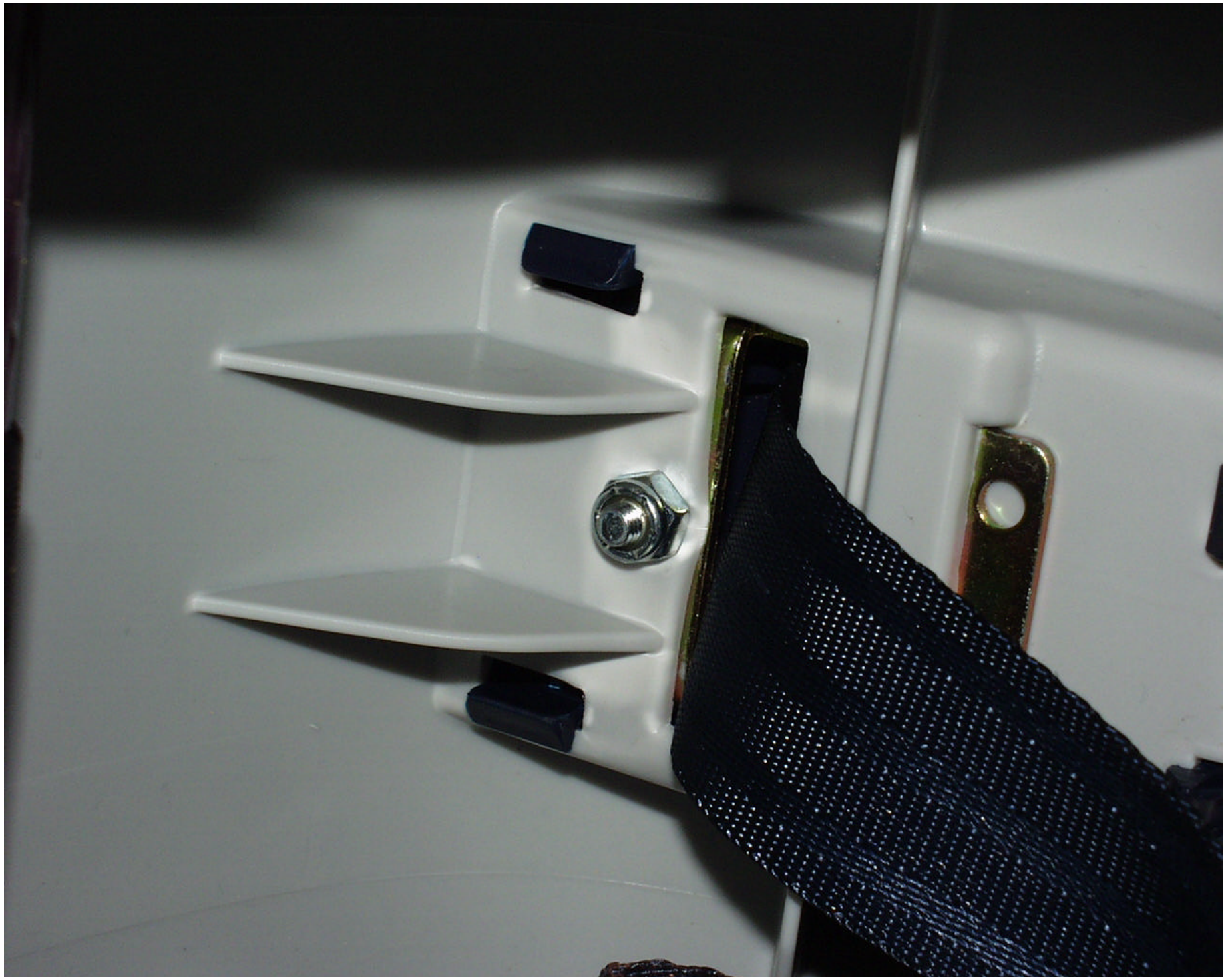


Photo 9 - Post-Test Child Seat Back View

CHILD DATA PLOTS

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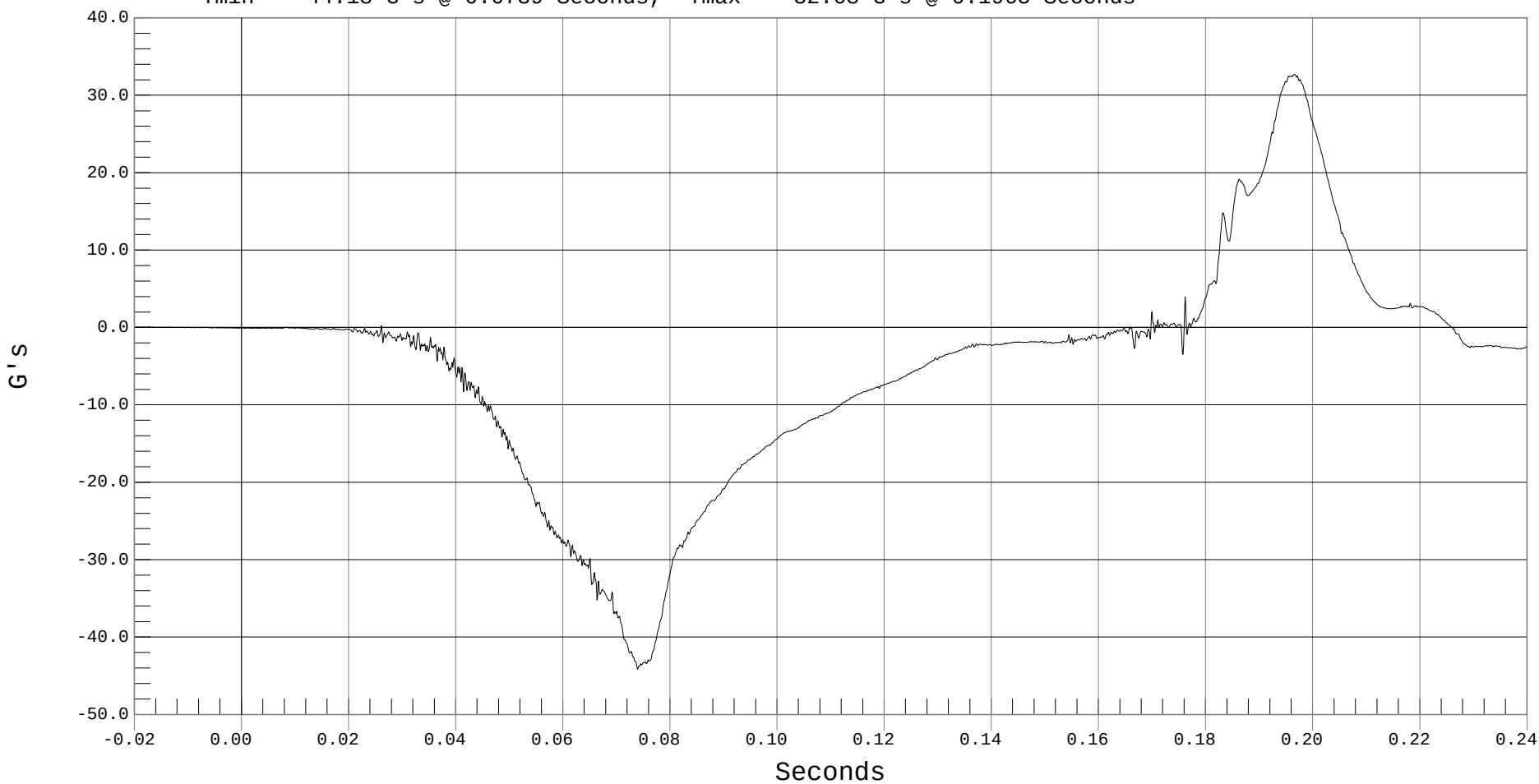
RRS 3 YR OLD HEAD X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD HEAD X, B01013AT.A37

Ymin = -44.18 G's @ 0.0739 Seconds, Ymax = 32.68 G's @ 0.1965 Seconds





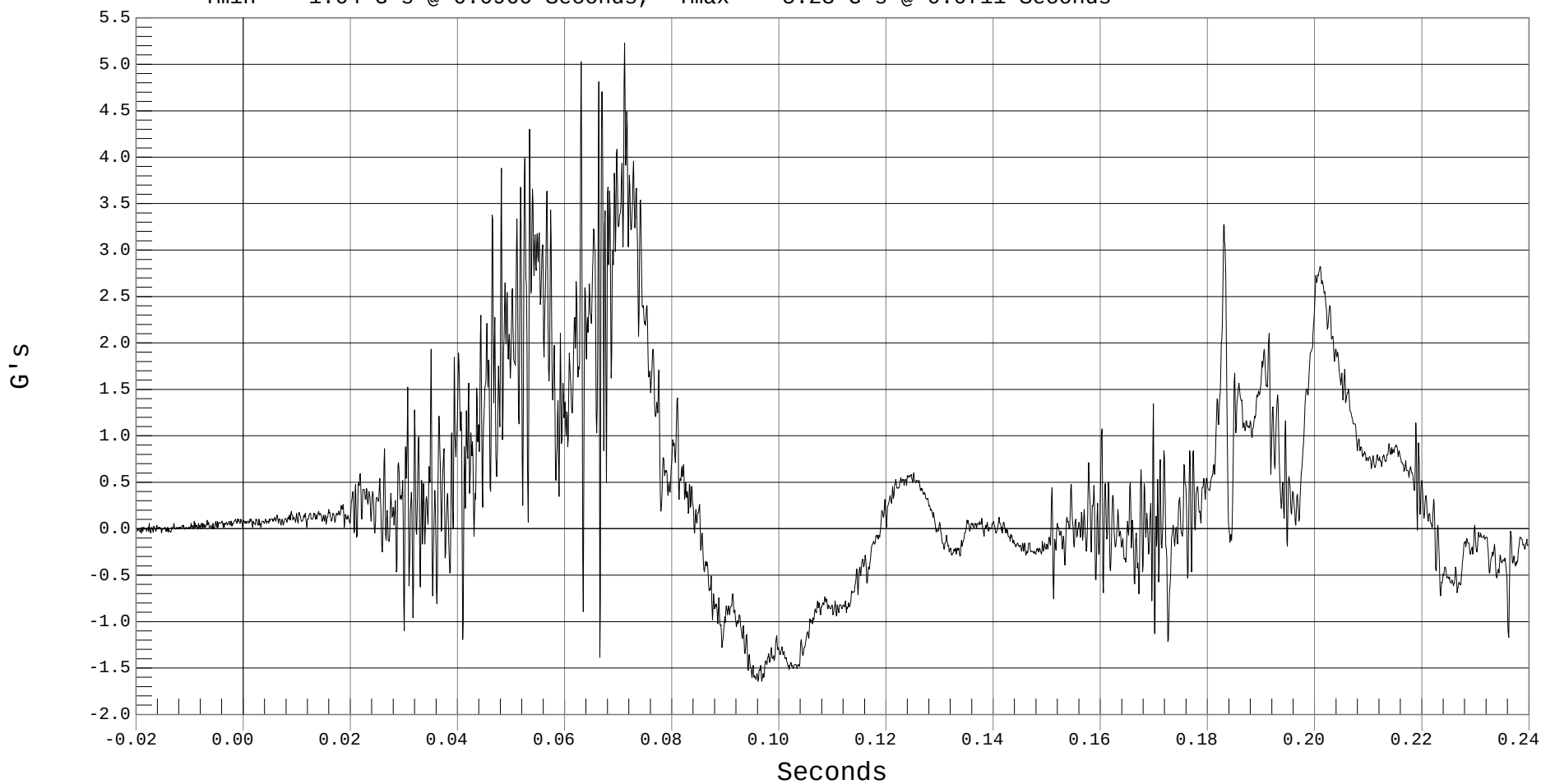
RRS 3 YR OLD HEAD Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD HEAD Y, B01013AT.A38

Ymin = -1.64 G's @ 0.0960 Seconds, Ymax = 5.23 G's @ 0.0711 Seconds





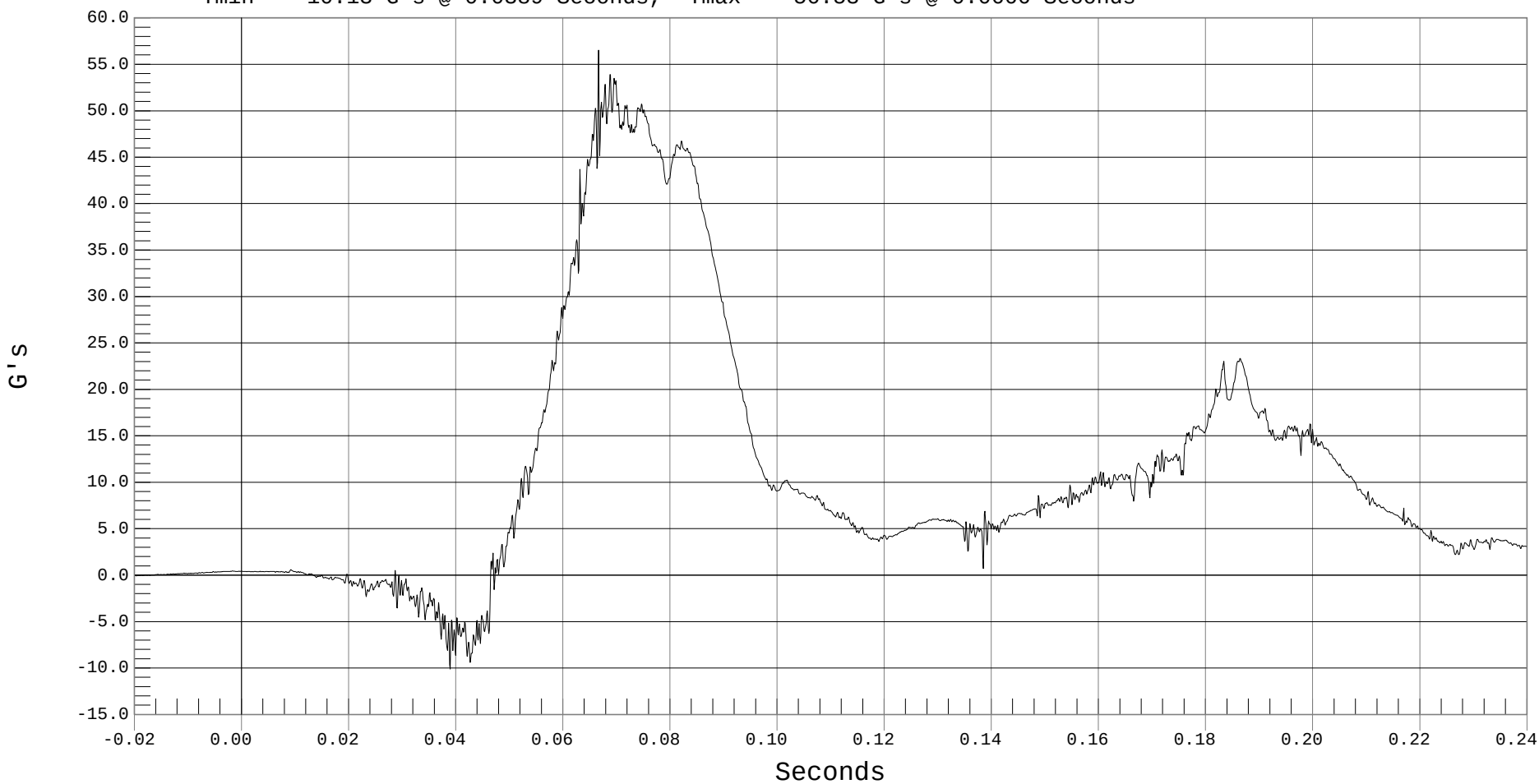
RRS 3 YR OLD HEAD Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD HEAD Z, B01013AT.A39

Ymin = -10.13 G's @ 0.0389 Seconds, Ymax = 56.53 G's @ 0.0666 Seconds





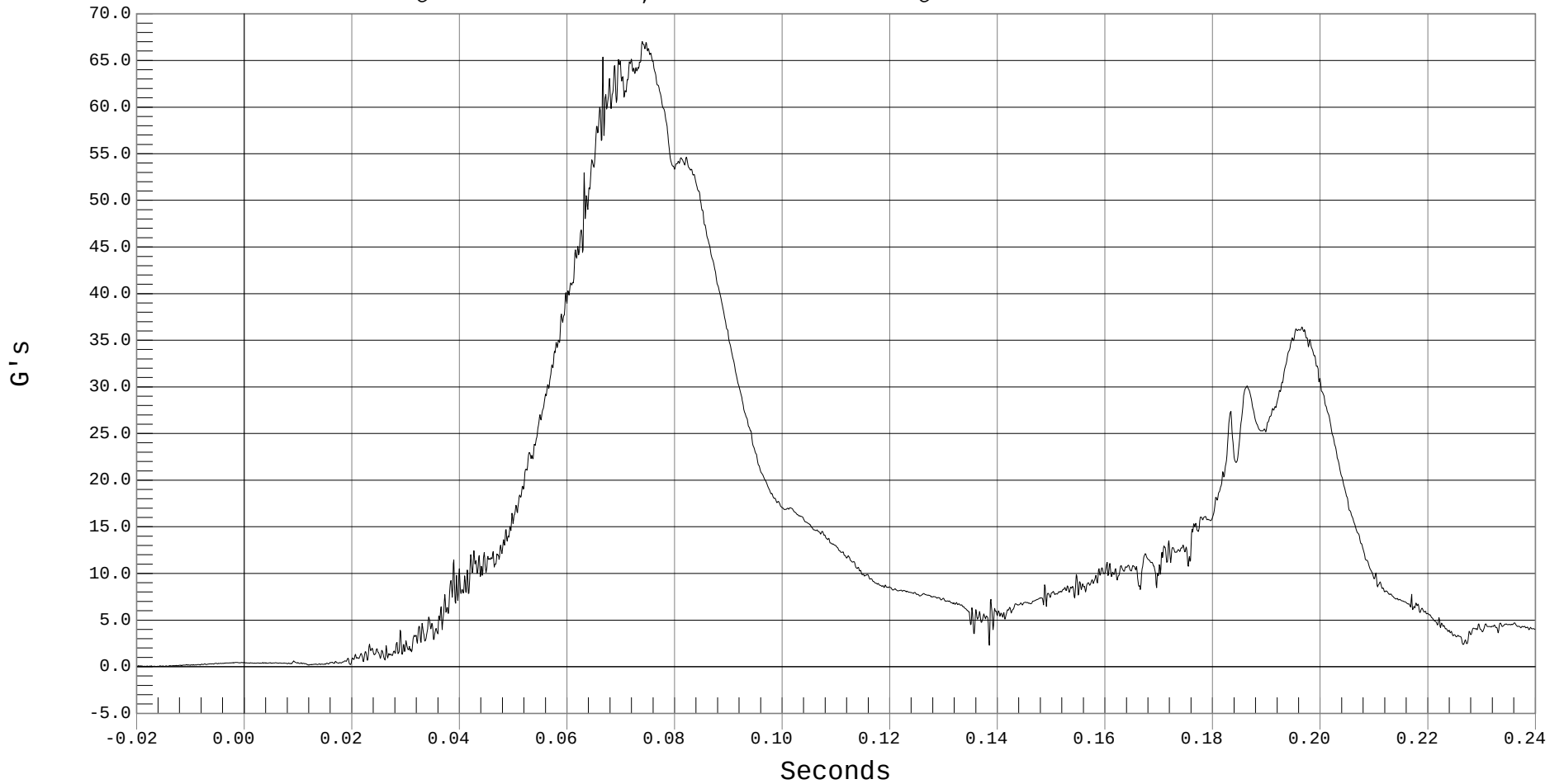
RRS 3 YR OLD HEAD RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD HEAD RESULTANT ACCELERATION, B01013AV.A37

Ymin = .02 G's @ -0.0170 Seconds, Ymax = 67.04 G's @ 0.0739 Seconds





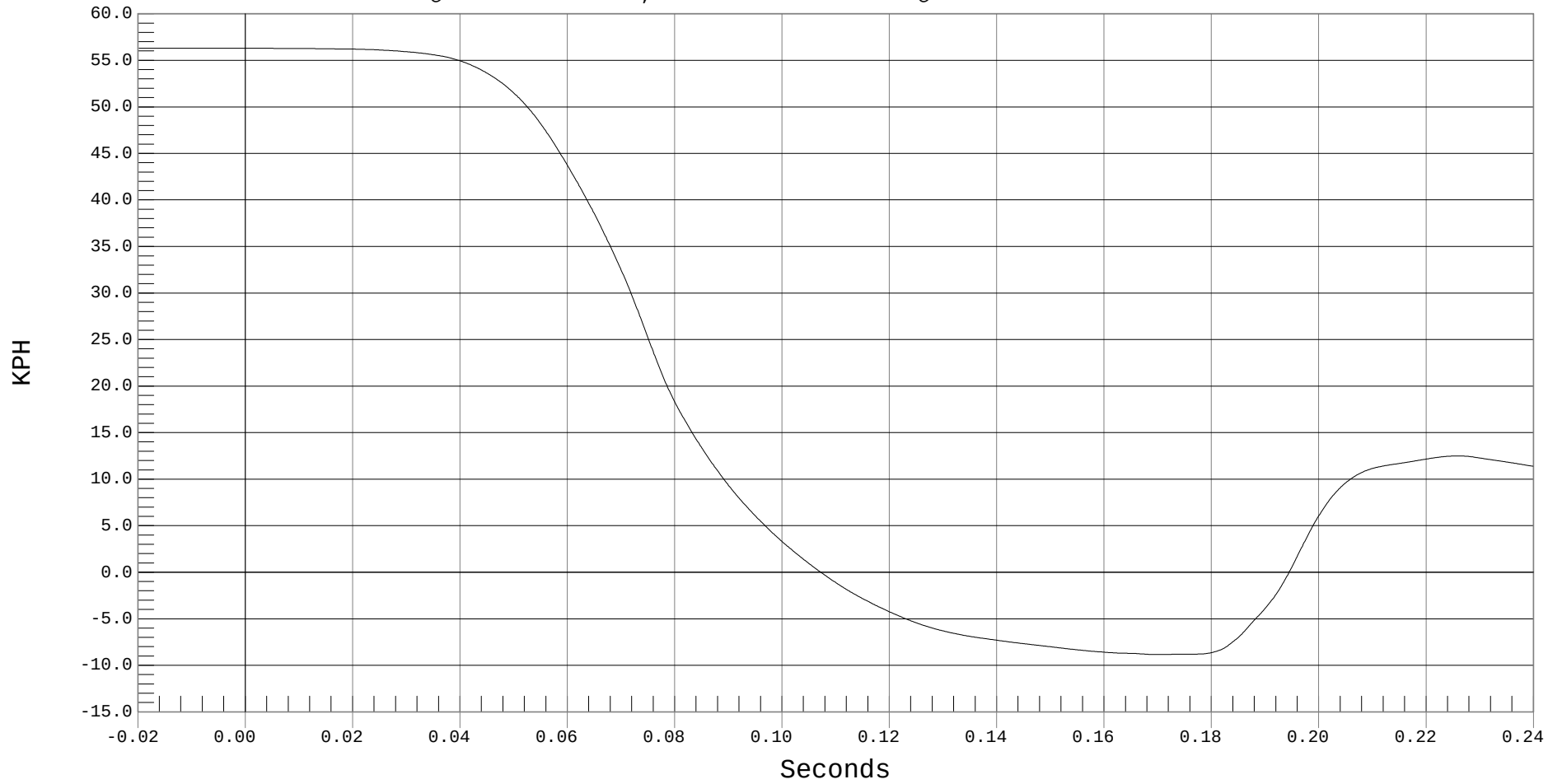
RRS 3 YR OLD HEAD X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD HEAD X VELOCITY, B01013AI.V37

Ymin = -8.85 KPH @ 0.1697 Seconds, Ymax = 56.31 KPH @ -0.0111 Seconds





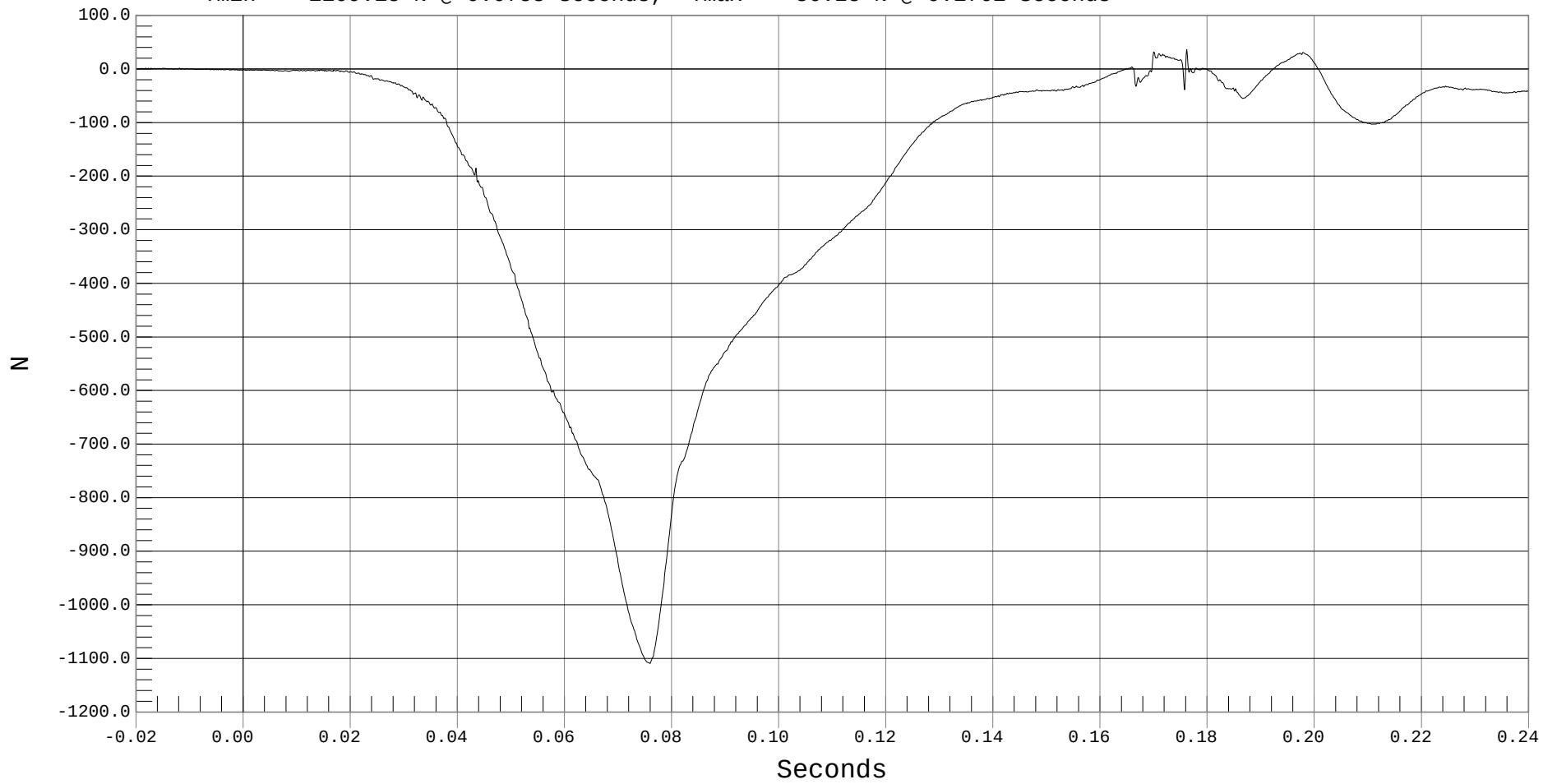
RRS 3 YR OLD UPPER NECK FORCE X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD UPPER NECK FORCE X, B01013FT.F40

Ymin = -1109.15 N @ 0.0758 Seconds, Ymax = 36.25 N @ 0.1761 Seconds





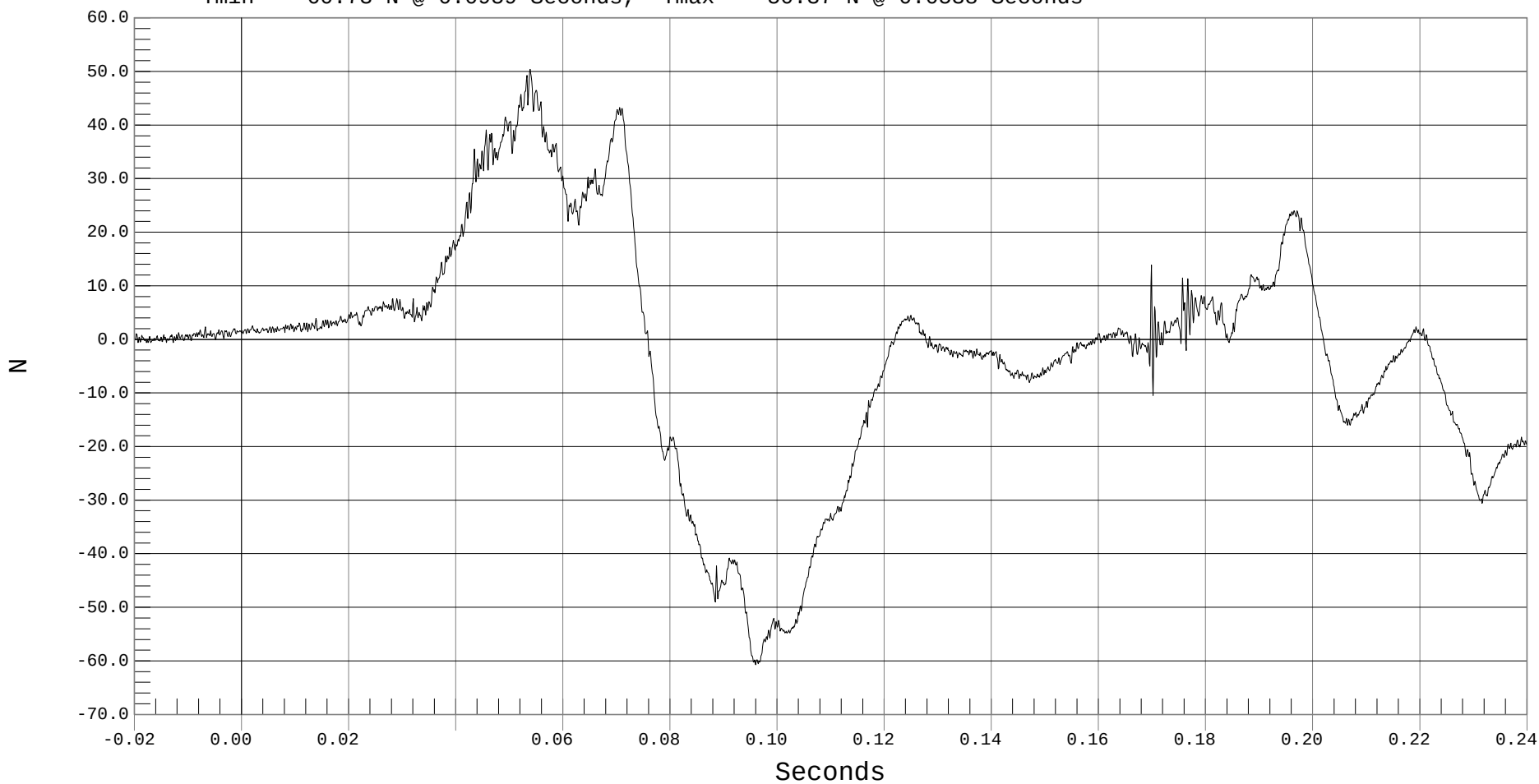
RRS 3 YR OLD UPPER NECK FORCE Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD UPPER NECK FORCE Y, B01013FT.F41

Ymin = -60.73 N @ 0.0959 Seconds, Ymax = 50.37 N @ 0.0538 Seconds





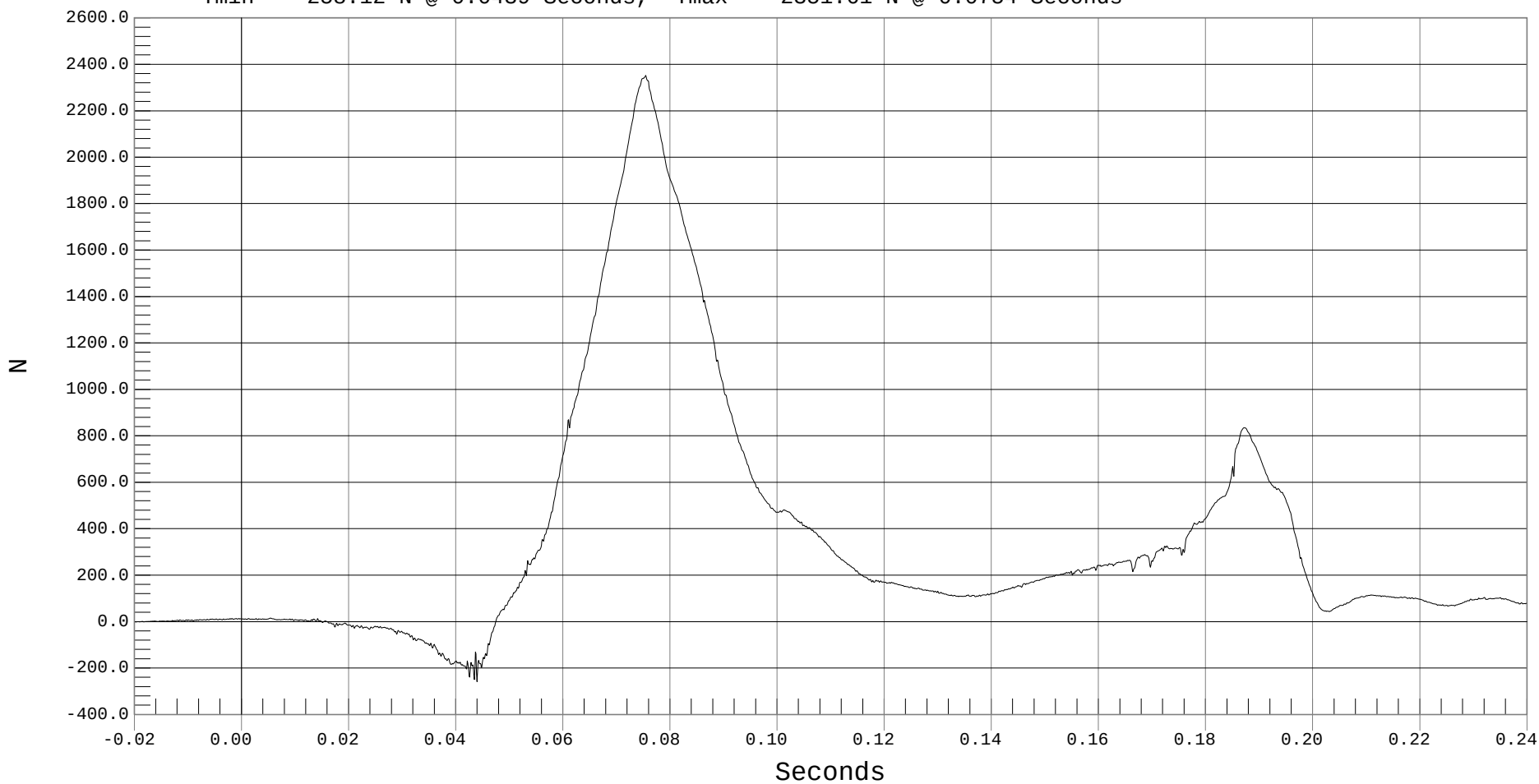
RRS 3 YR OLD UPPER NECK FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD UPPER NECK FORCE Z, B01013FT.F42

Ymin = -258.12 N @ 0.0439 Seconds, Ymax = 2351.61 N @ 0.0754 Seconds





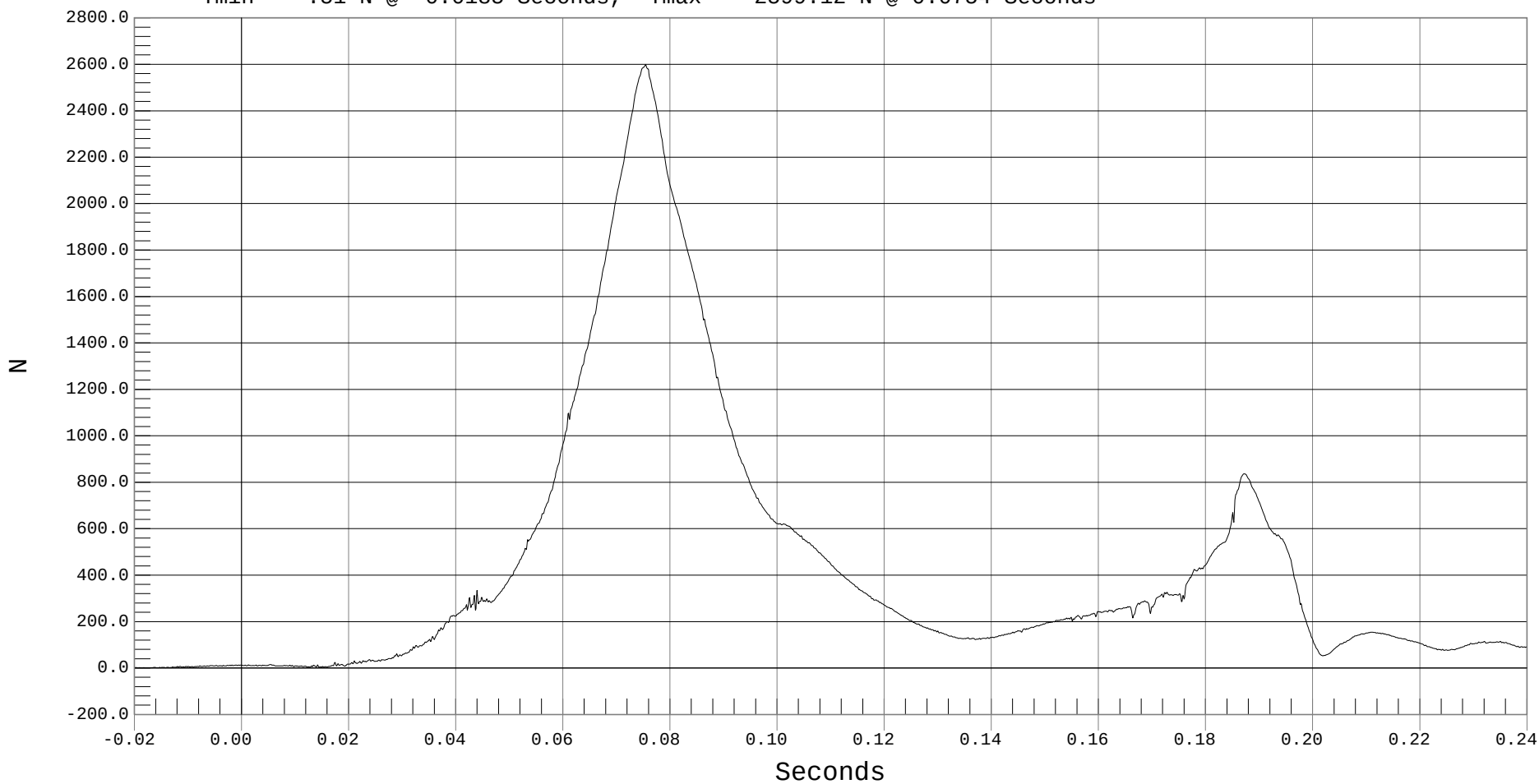
RRS 3 YR OLD UPPER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD UPPER NECK FORCE RESULTANT, B01013FV.F40

Ymin = .51 N @ -0.0185 Seconds, Ymax = 2599.12 N @ 0.0754 Seconds





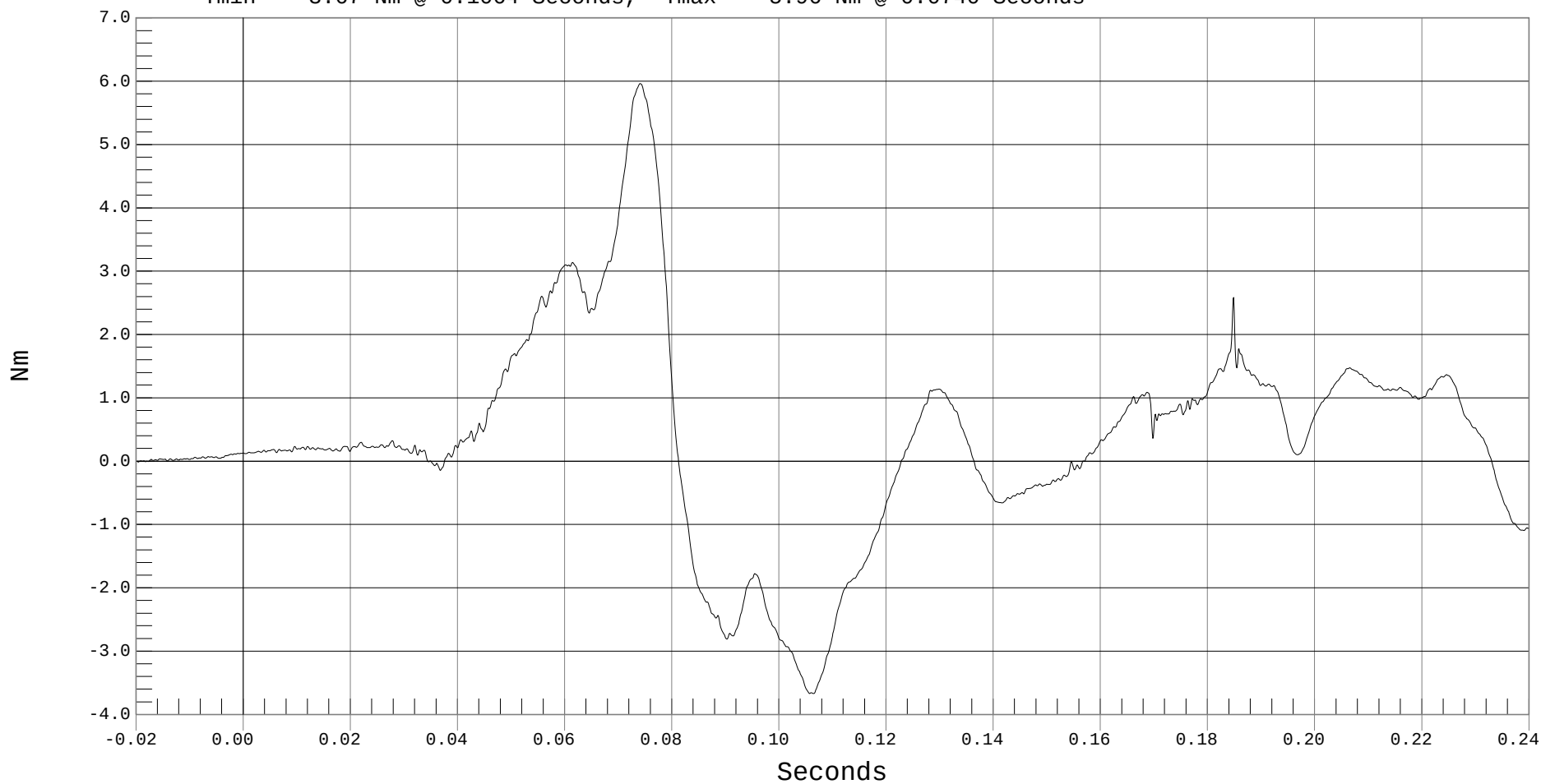
RRS 3 YR OLD UPPER NECK MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD UPPER NECK MOMENT X, B01013MF.M43

Ymin = -3.67 Nm @ 0.1064 Seconds, Ymax = 5.96 Nm @ 0.0740 Seconds





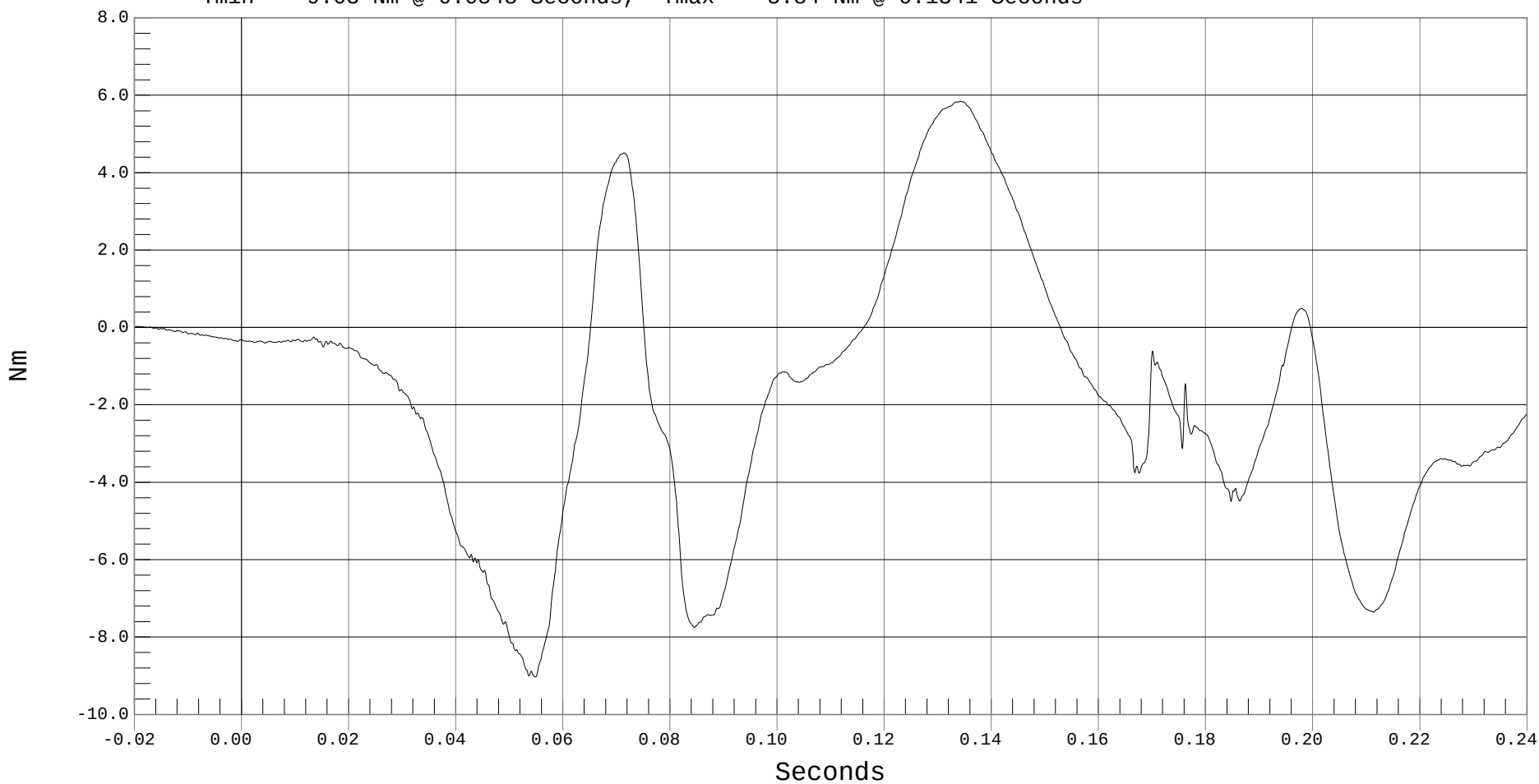
RRS 3 YR OLD UPPER NECK MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD UPPER NECK MOMENT Y, B01013MF.M44

Ymin = -9.03 Nm @ 0.0548 Seconds, Ymax = 5.84 Nm @ 0.1341 Seconds





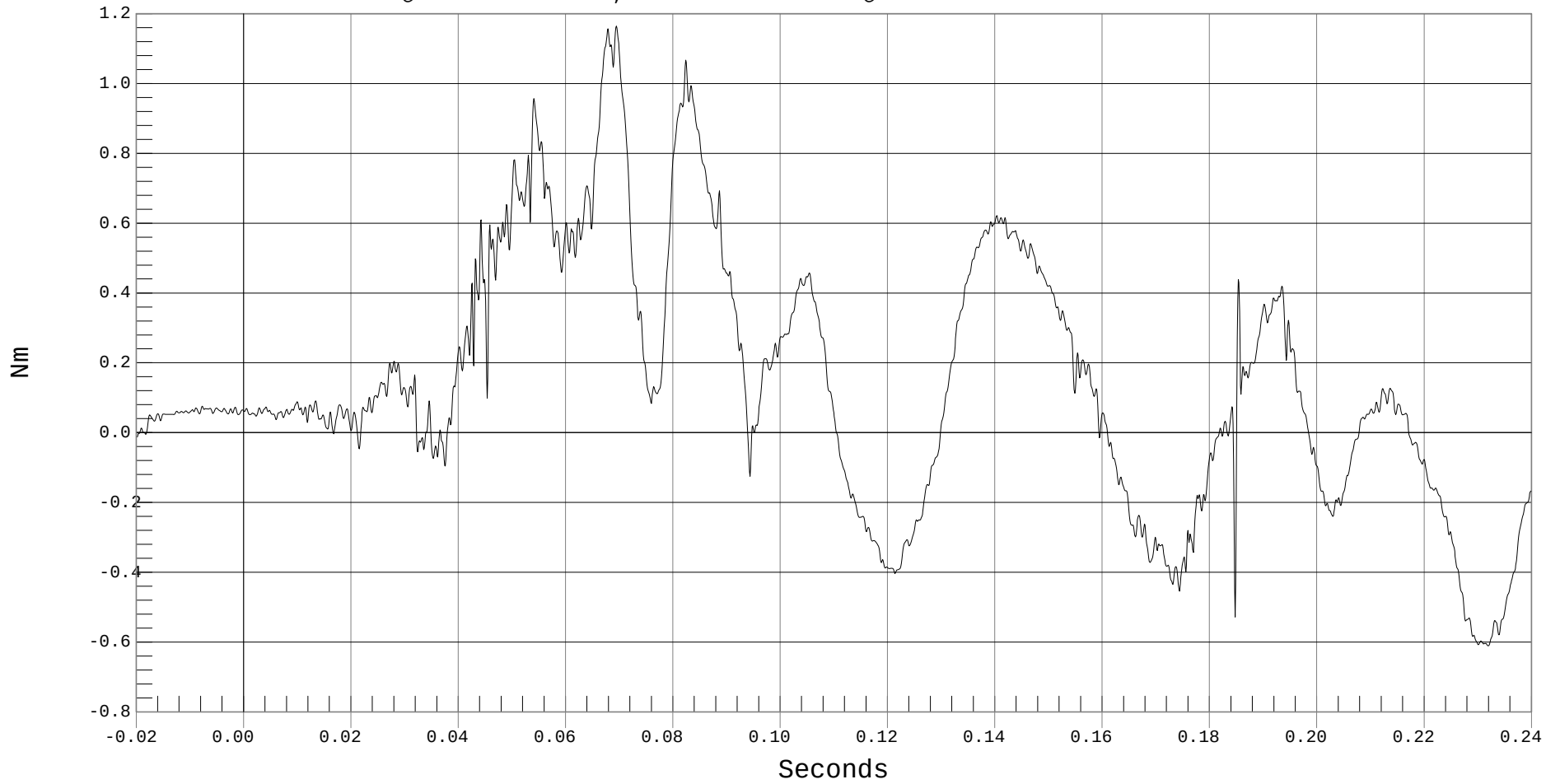
RRS 3 YR OLD UPPER NECK MOMENT Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD UPPER NECK MOMENT Z, B01013MF.M45

Ymin = -.61 Nm @ 0.2318 Seconds, Ymax = 1.16 Nm @ 0.0694 Seconds





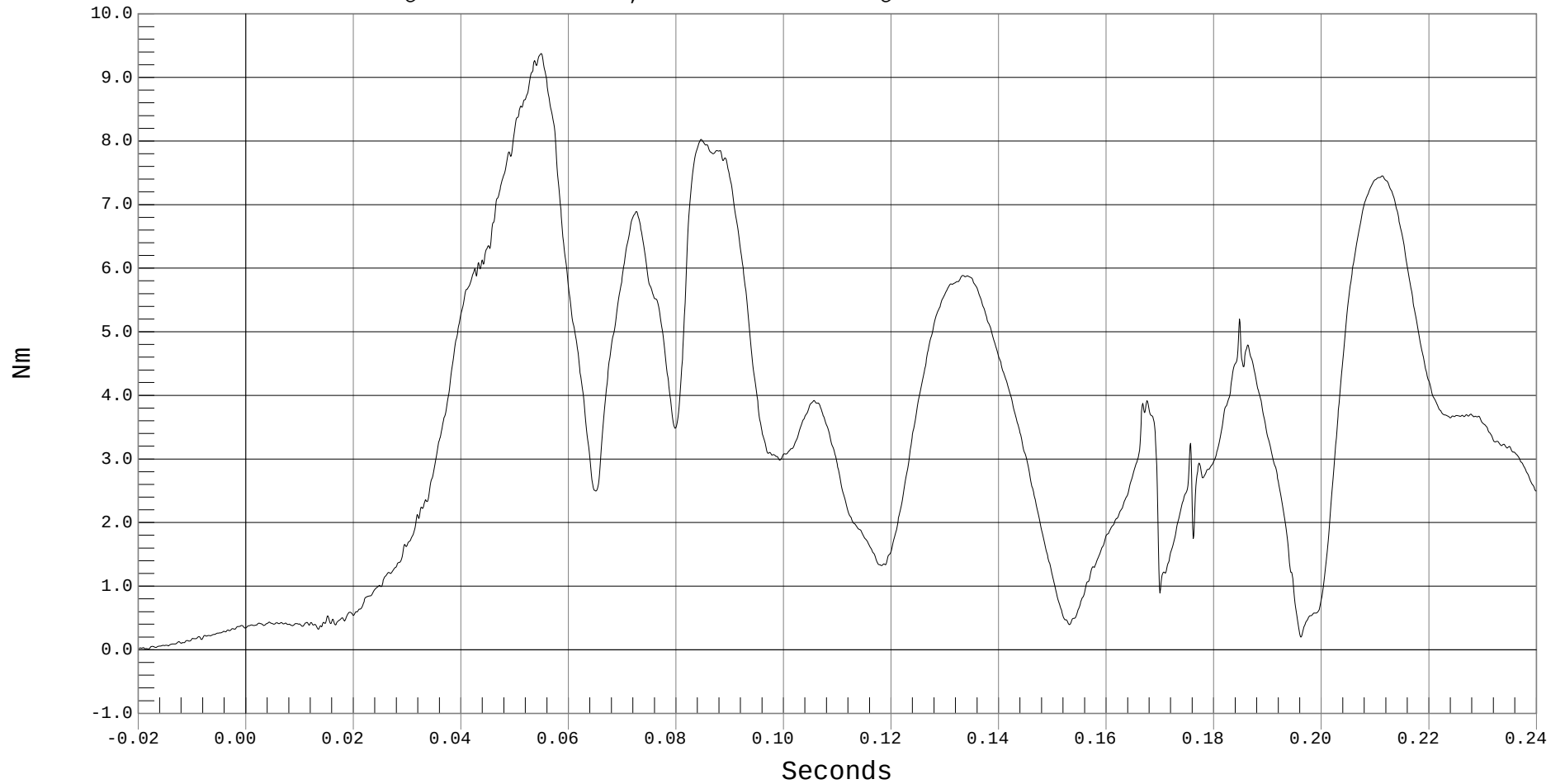
RRS 3 YR OLD UPPER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

1 RRS 3 YR OLD UPPER NECK MOMENT RESULTANT, B01013MV.M43

Ymin = .01 Nm @ -0.0181 Seconds, Ymax = 9.37 Nm @ 0.0549 Seconds





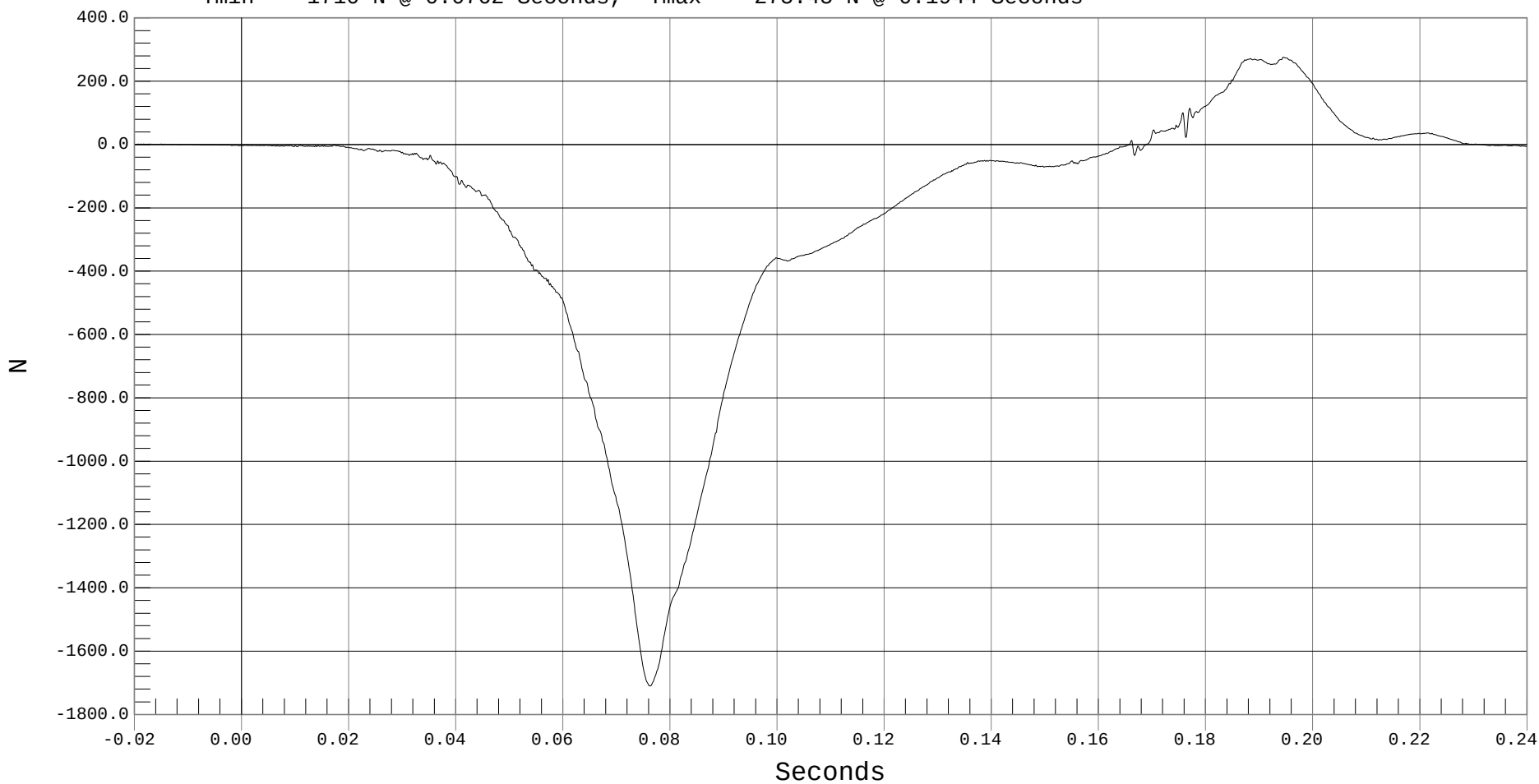
RRS 3 YR OLD LOWER NECK FORCE X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD LOWER NECK FORCE X, B01013FT.F46

Ymin = -1710 N @ 0.0762 Seconds, Ymax = 275.45 N @ 0.1944 Seconds





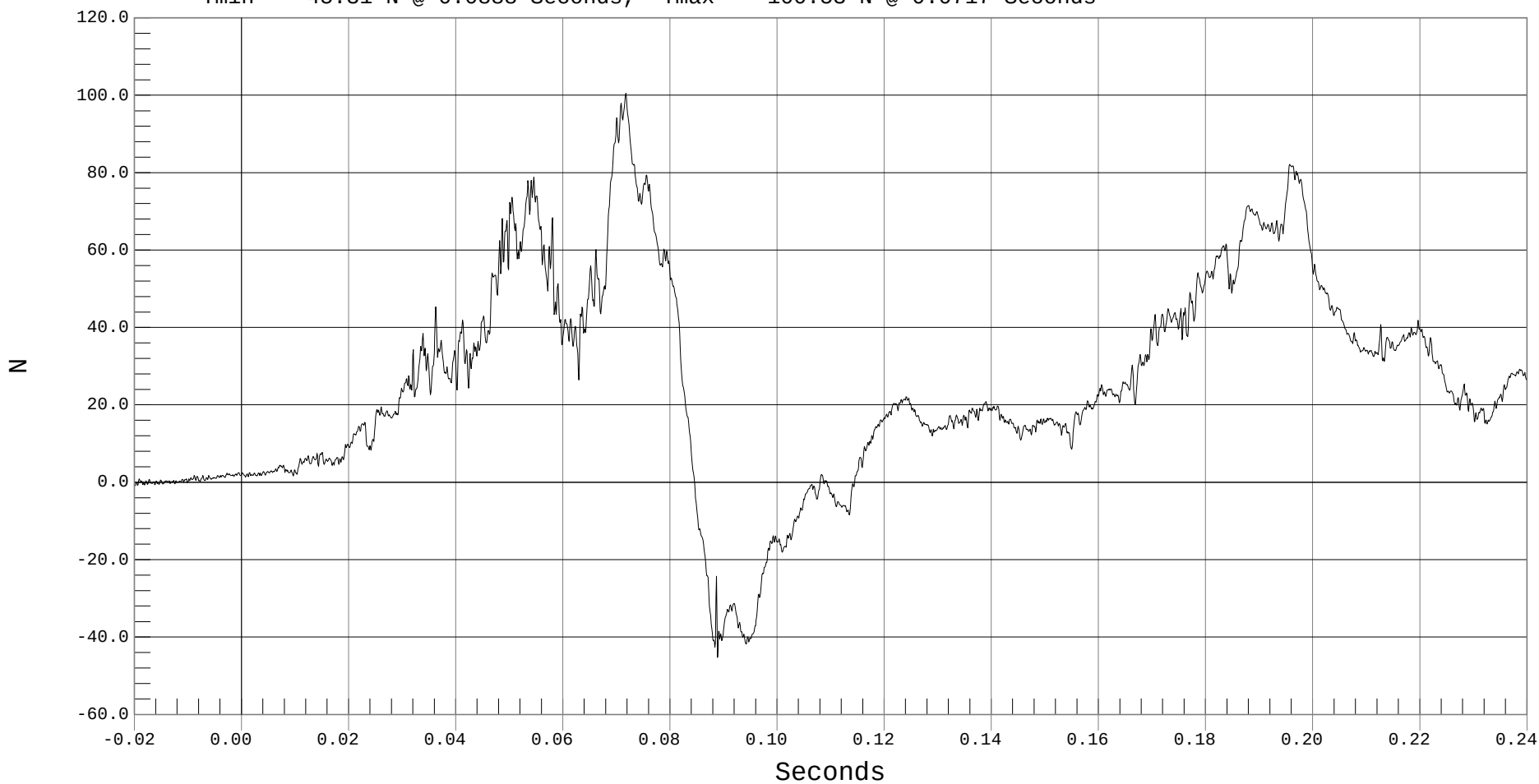
RRS 3 YR OLD LOWER NECK FORCE Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD LOWER NECK FORCE Y, B01013FT.F47

Ymin = -45.31 N @ 0.0888 Seconds, Ymax = 100.53 N @ 0.0717 Seconds





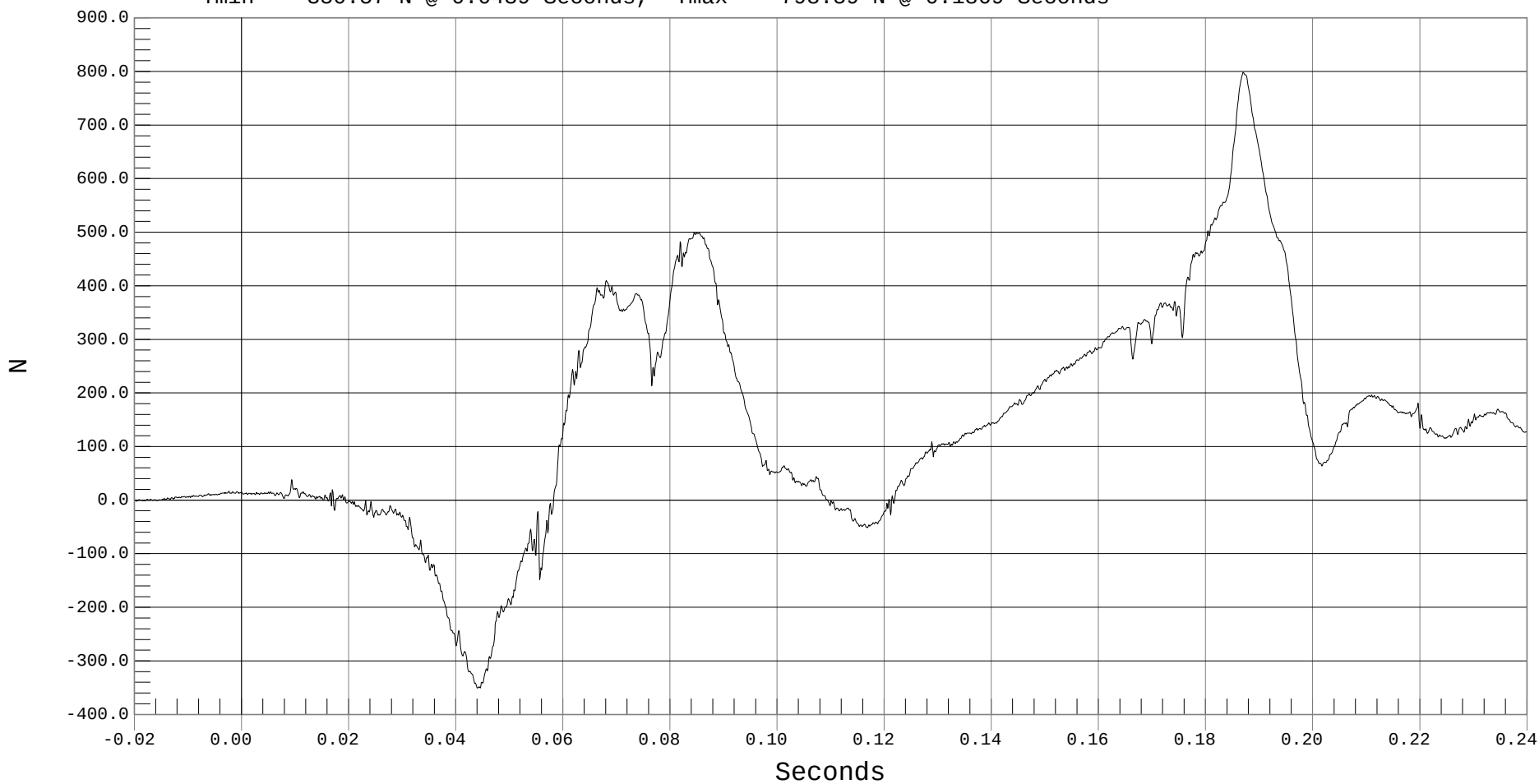
RRS 3 YR OLD LOWER NECK FORCE Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD LOWER NECK FORCE Z, B01013FT.F48

Ymin = -350.57 N @ 0.0439 Seconds, Ymax = 798.59 N @ 0.1869 Seconds





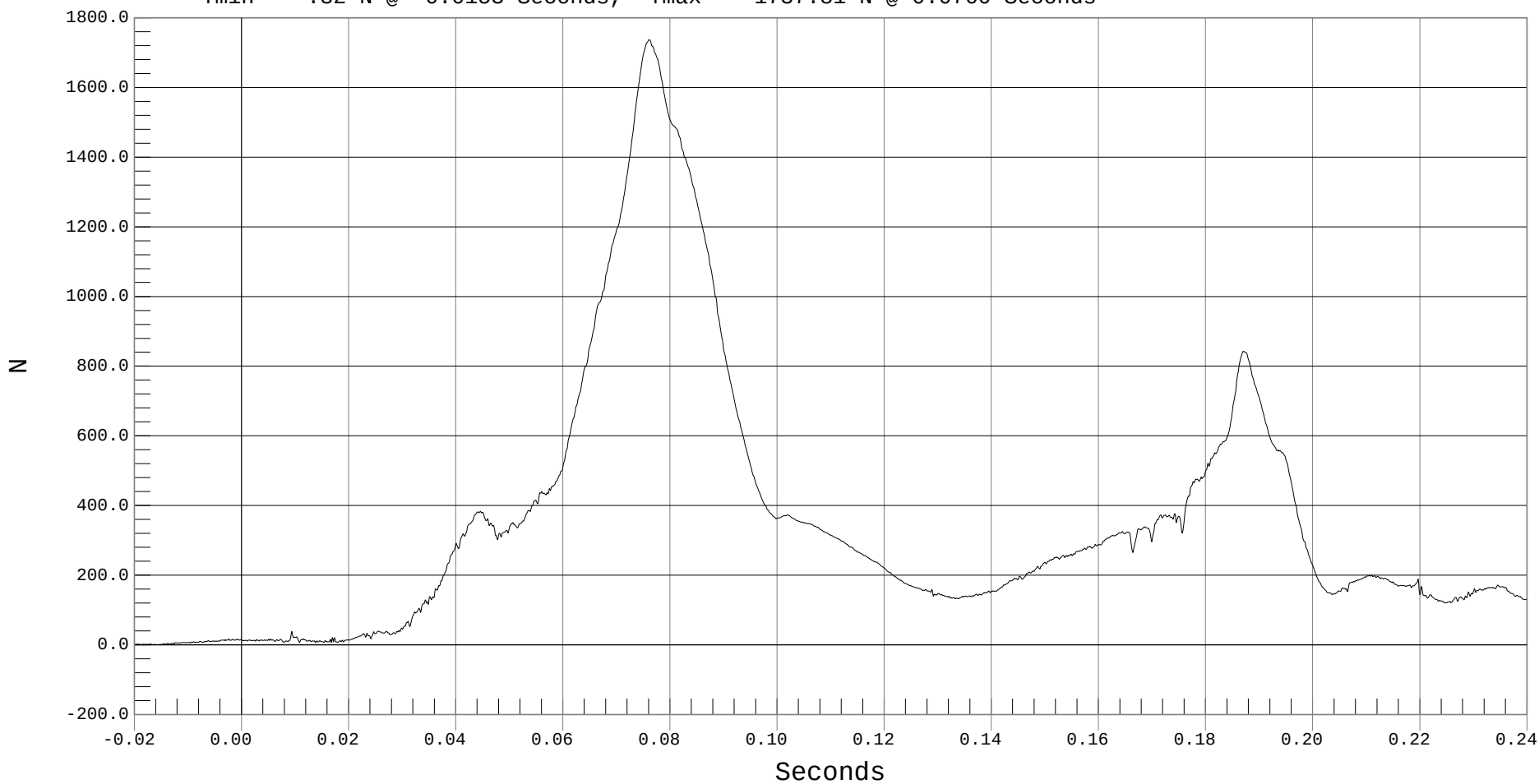
RRS 3 YR OLD LOWER NECK FORCE RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD LOWER NECK FORCE RESULTANT, B01013FV.F46

Ymin = .32 N @ -0.0153 Seconds, Ymax = 1737.81 N @ 0.0760 Seconds





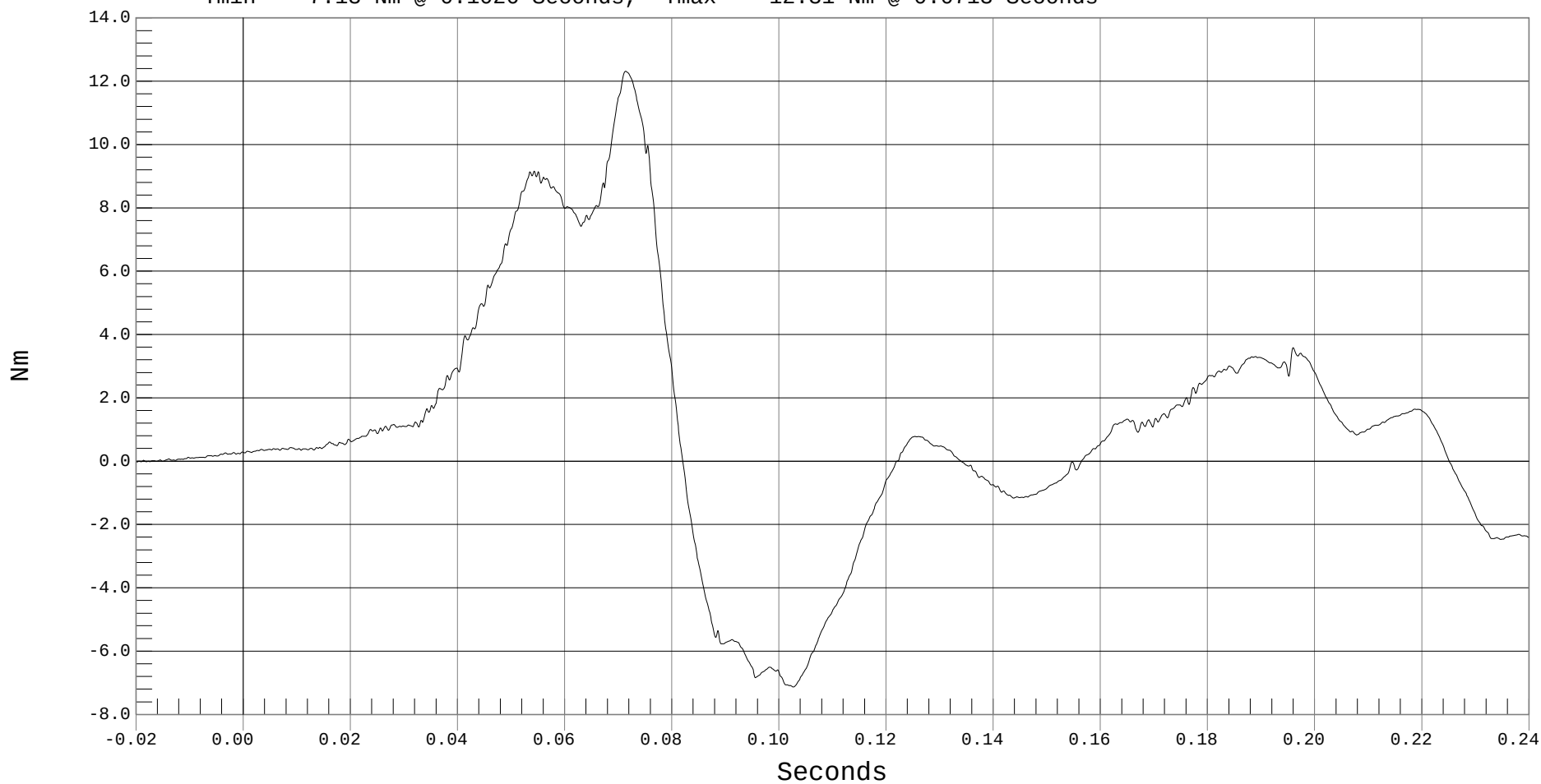
RRS 3 YR OLD LOWER NECK MOMENT X

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD LOWER NECK MOMENT X, B01013MF.M49

Ymin = -7.13 Nm @ 0.1026 Seconds, Ymax = 12.31 Nm @ 0.0713 Seconds





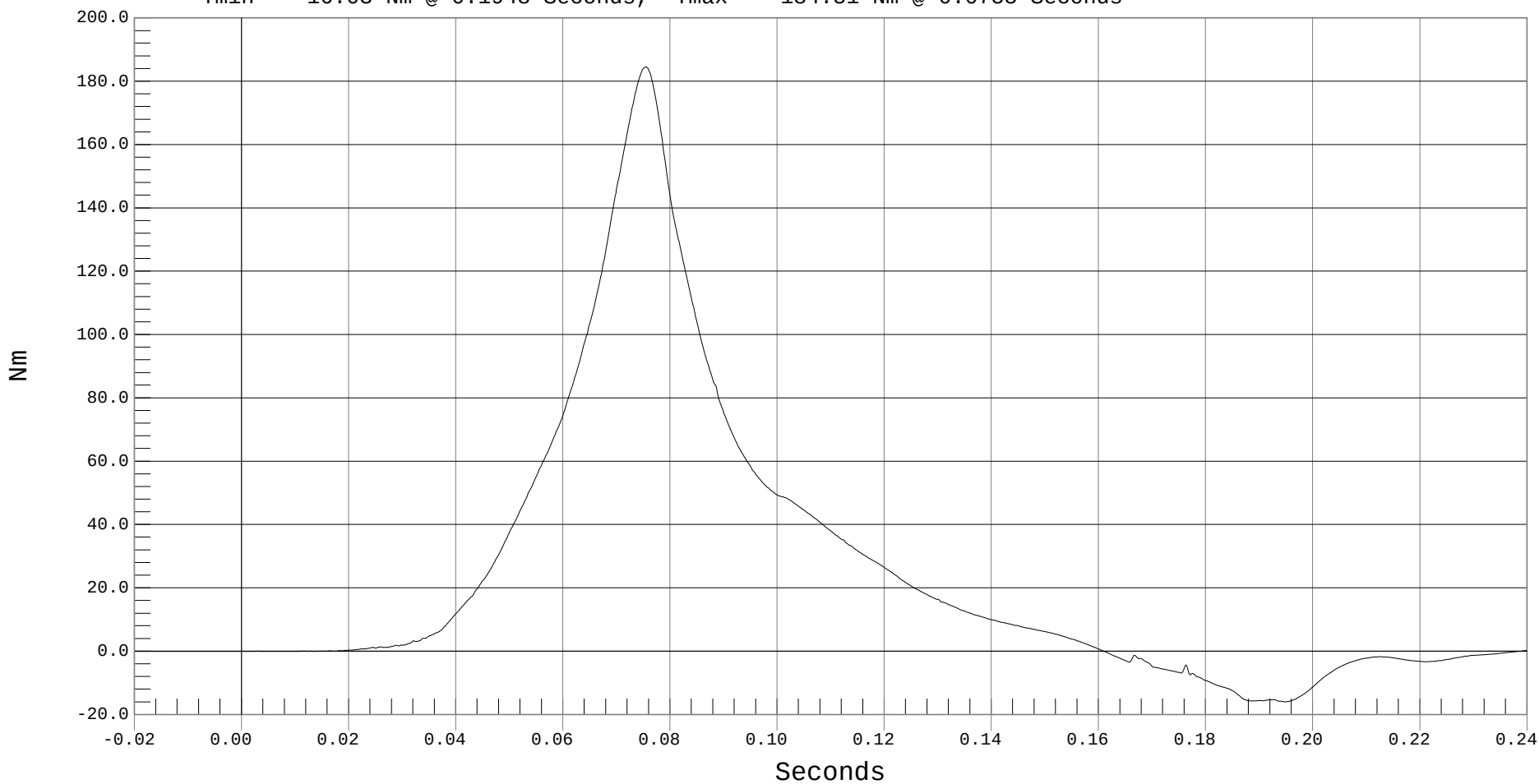
RRS 3 YR OLD LOWER NECK MOMENT Y

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD LOWER NECK MOMENT Y, B01013MF.M50

Ymin = -16.03 Nm @ 0.1948 Seconds, Ymax = 184.51 Nm @ 0.0755 Seconds





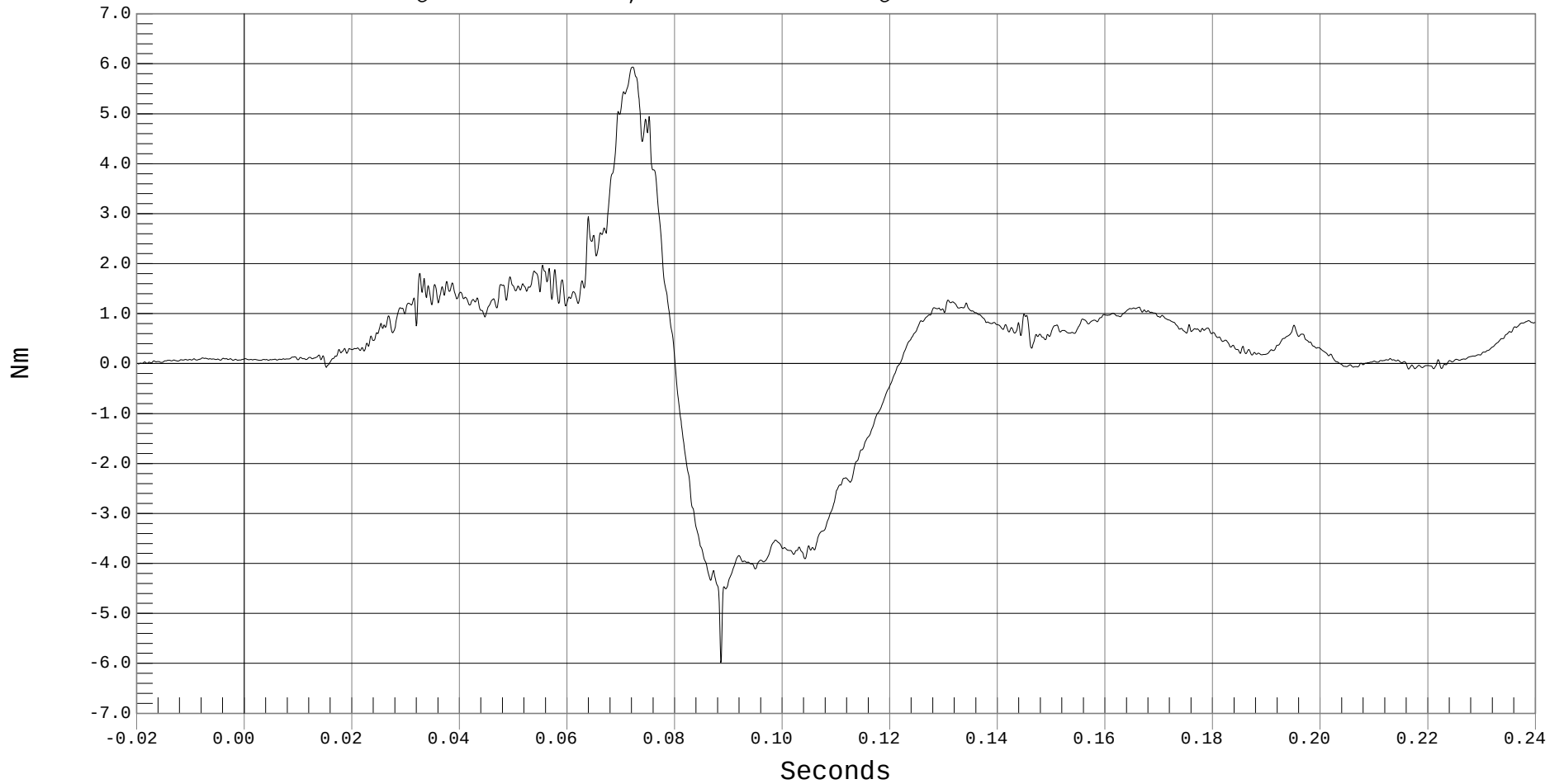
RRS 3 YR OLD LOWER NECK MOMENT Z

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 RRS CHILD LOWER NECK MOMENT Z, B01013MF.M51

Ymin = -5.98 Nm @ 0.0885 Seconds, Ymax = 5.93 Nm @ 0.0722 Seconds





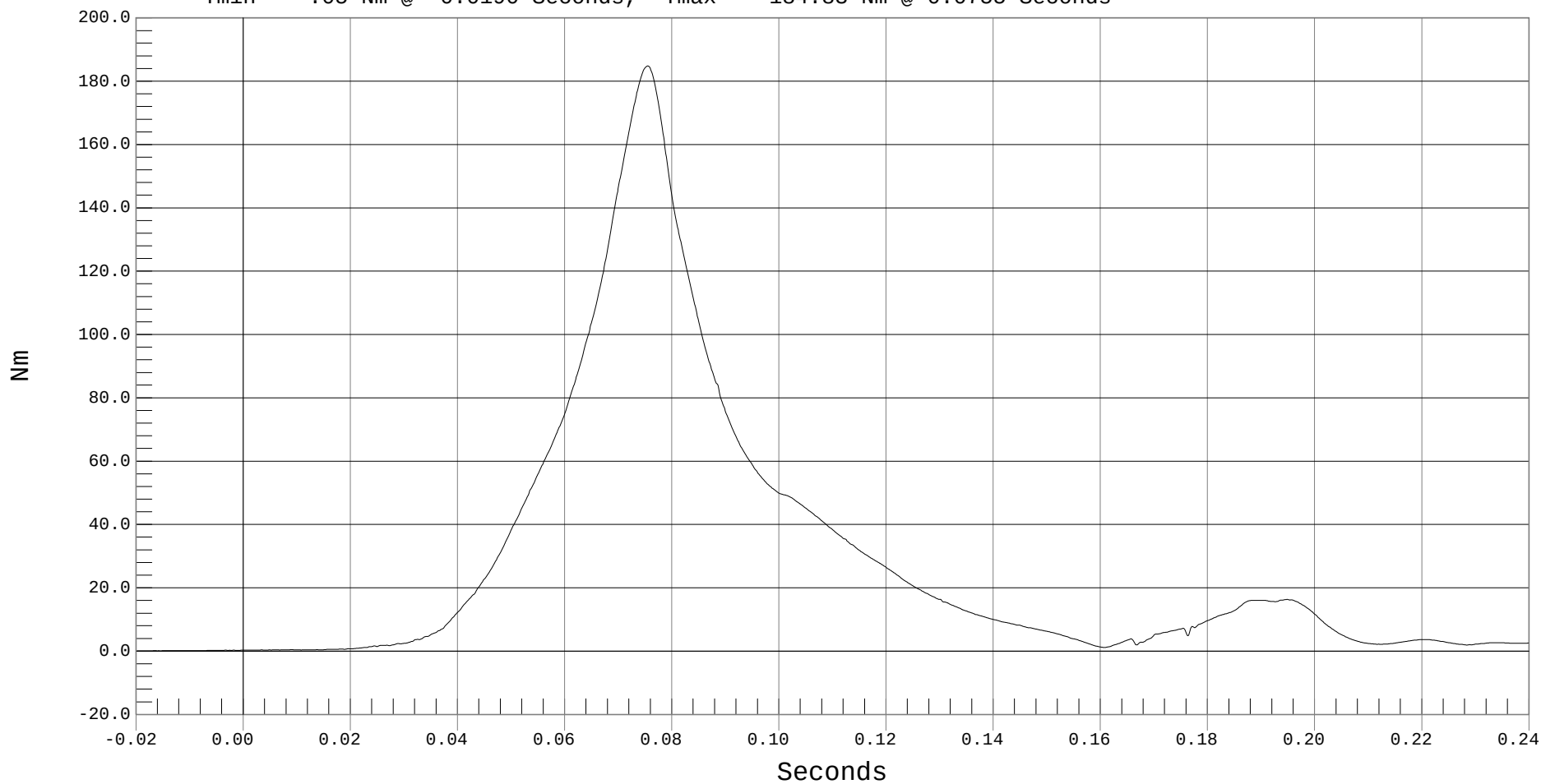
RRS 3 YR OLD LOWER NECK MOMENT RESULTANT

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

1 RRS 3 YR OLD LOWER NECK MOMENT RESULTANT, B01013MV.M49

Ymin = .05 Nm @ -0.0190 Seconds, Ymax = 184.83 Nm @ 0.0755 Seconds





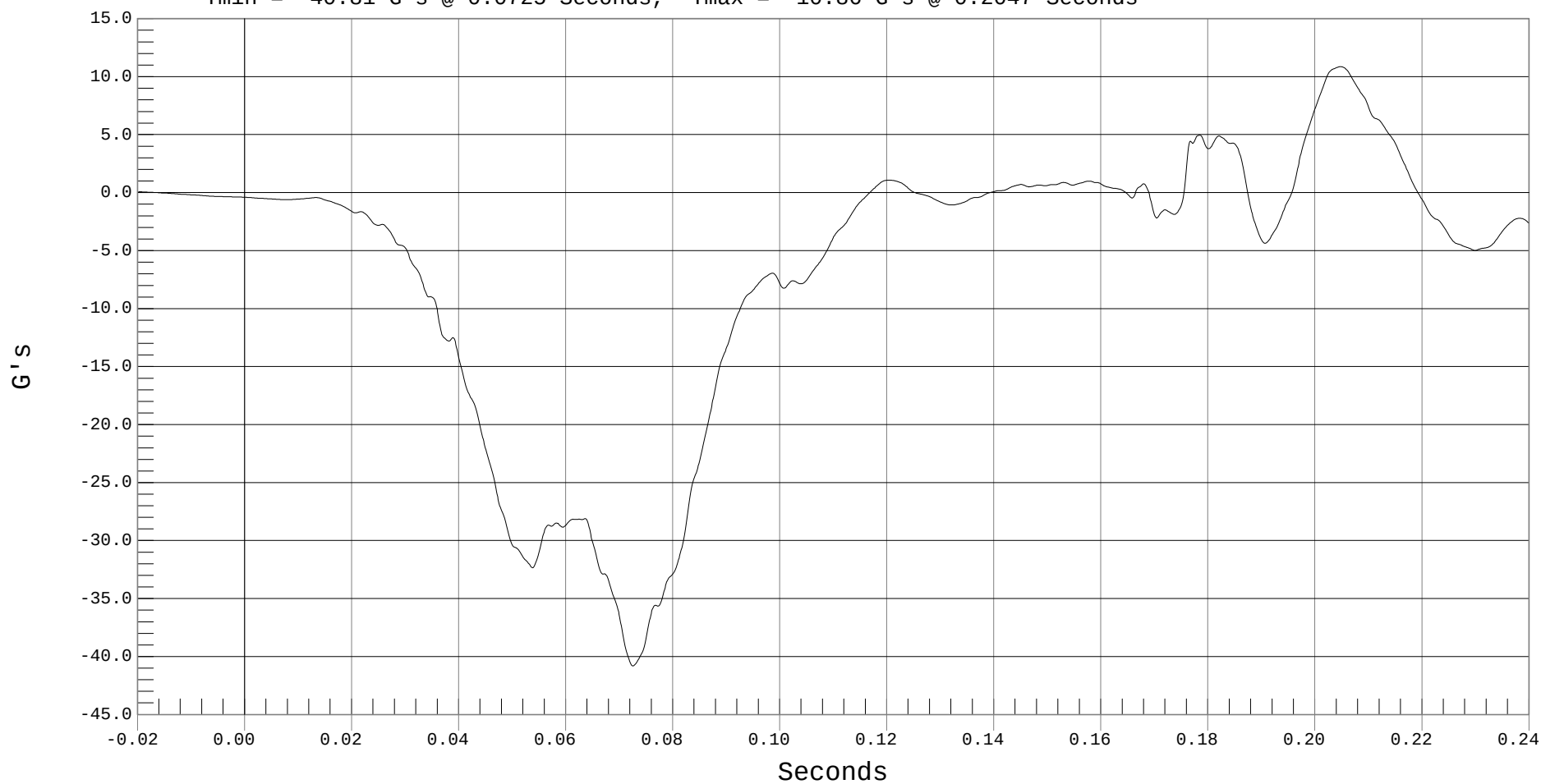
RRS 3 YR OLD CHEST X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS CHILD CHEST X, B01013AF.A52

Ymin = -40.81 G's @ 0.0725 Seconds, Ymax = 10.86 G's @ 0.2047 Seconds





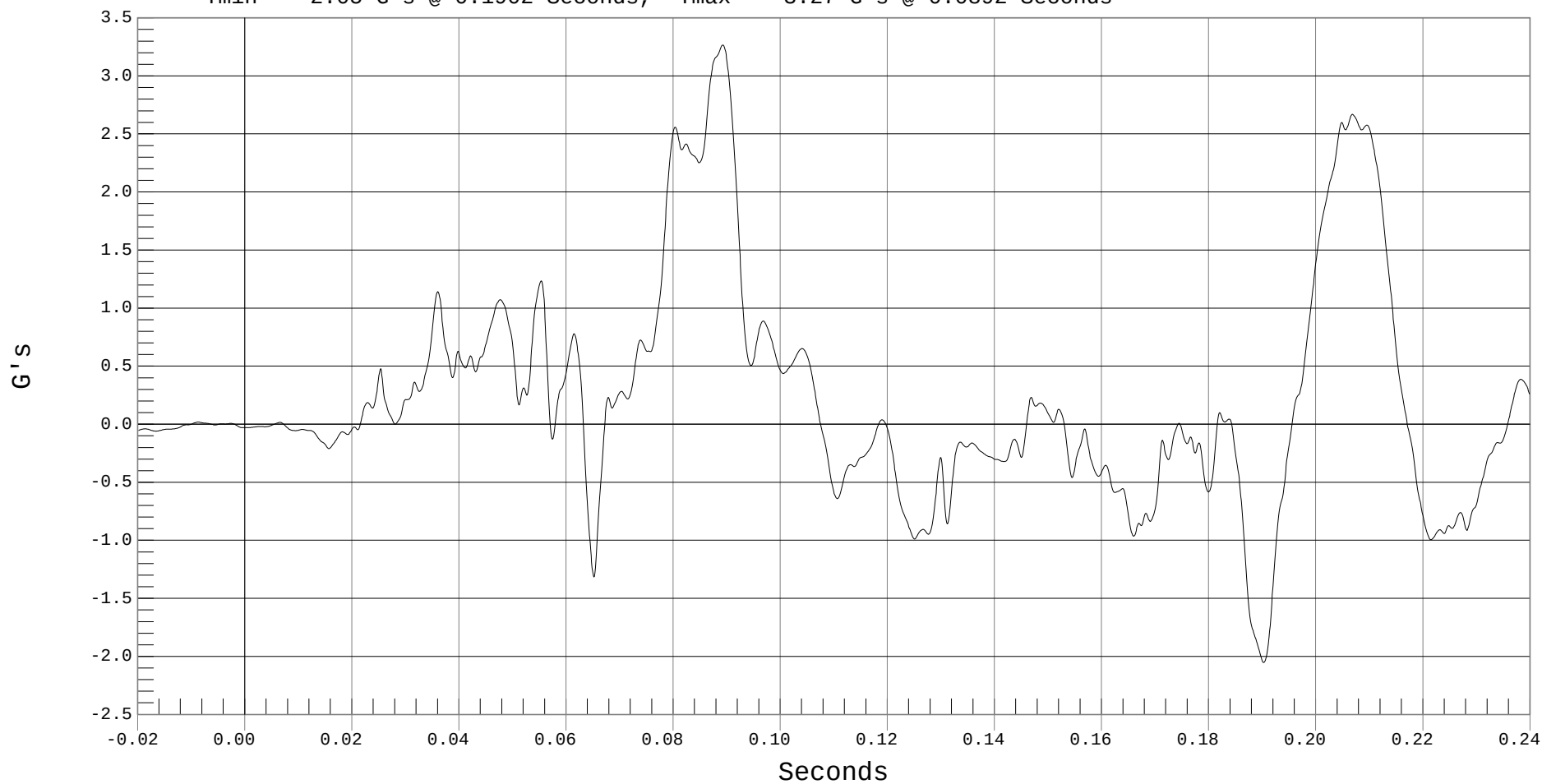
RRS 3 YR OLD CHEST Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS CHILD CHEST Y, B01013AF.A53

Ymin = -2.05 G's @ 0.1902 Seconds, Ymax = 3.27 G's @ 0.0892 Seconds





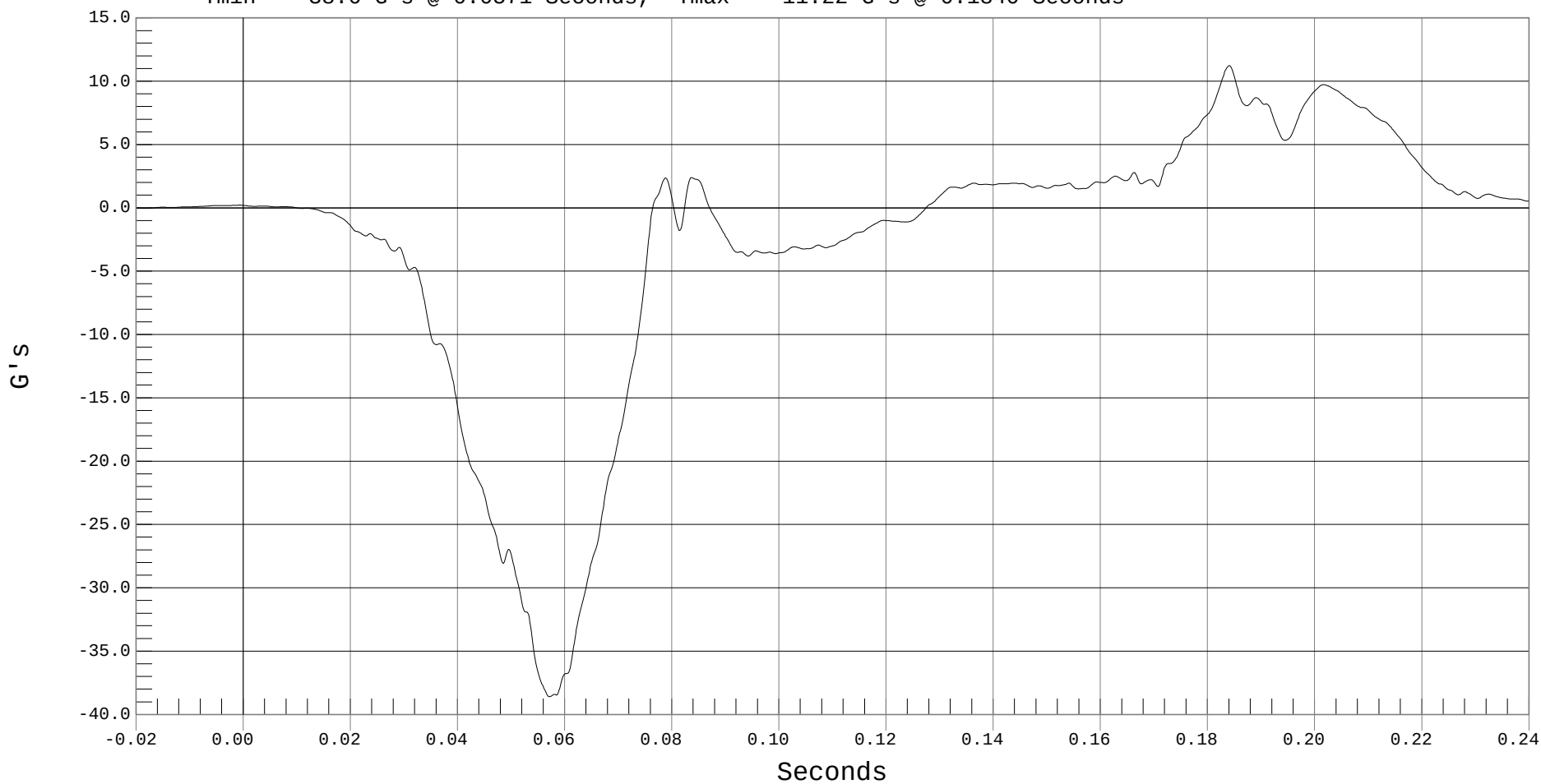
RRS 3 YR OLD CHEST Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS CHILD CHEST Z, B01013AF.A54

Ymin = -38.6 G's @ 0.0571 Seconds, Ymax = 11.22 G's @ 0.1840 Seconds





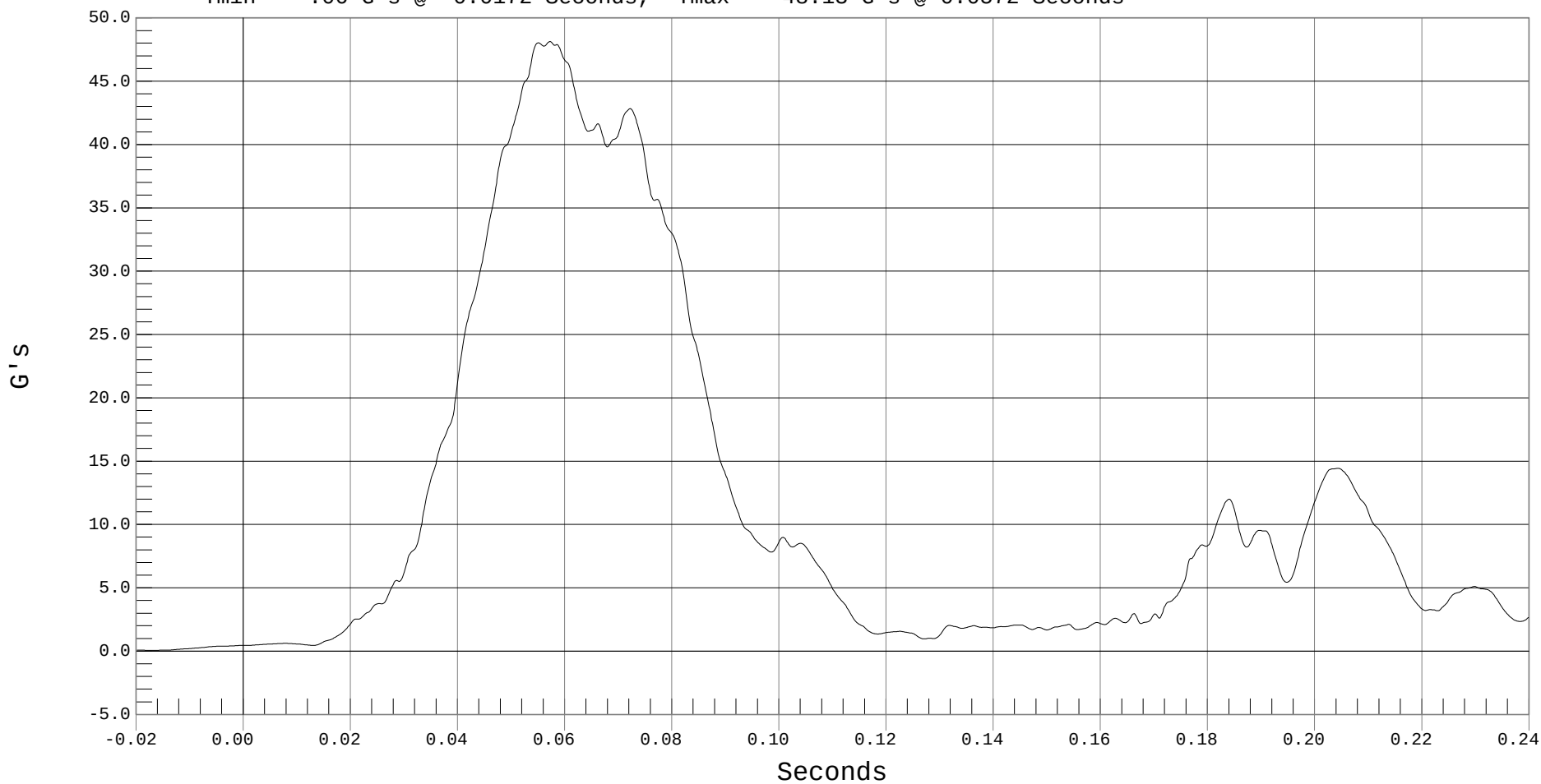
RRS 3 YR OLD CHEST RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD CHEST RESULTANT ACCELERATION, B01013AV.A52

Ymin = .06 G's @ -0.0172 Seconds, Ymax = 48.13 G's @ 0.0572 Seconds





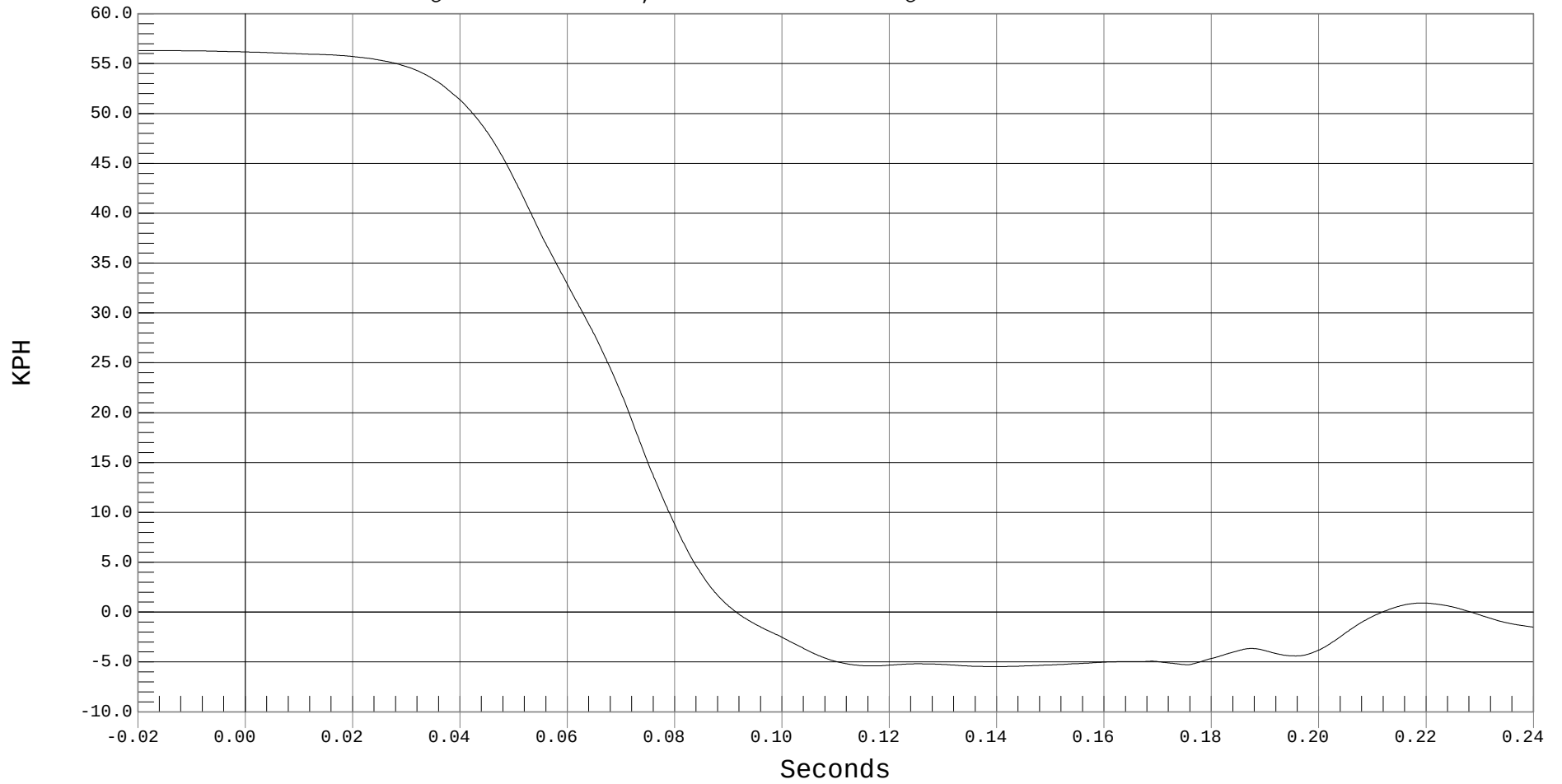
RRS 3 YR OLD CHEST X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD CHEST X VELOCITY, B01013AI.V52

Ymin = -5.47 KPH @ 0.1392 Seconds, Ymax = 56.3 KPH @ -0.0165 Seconds





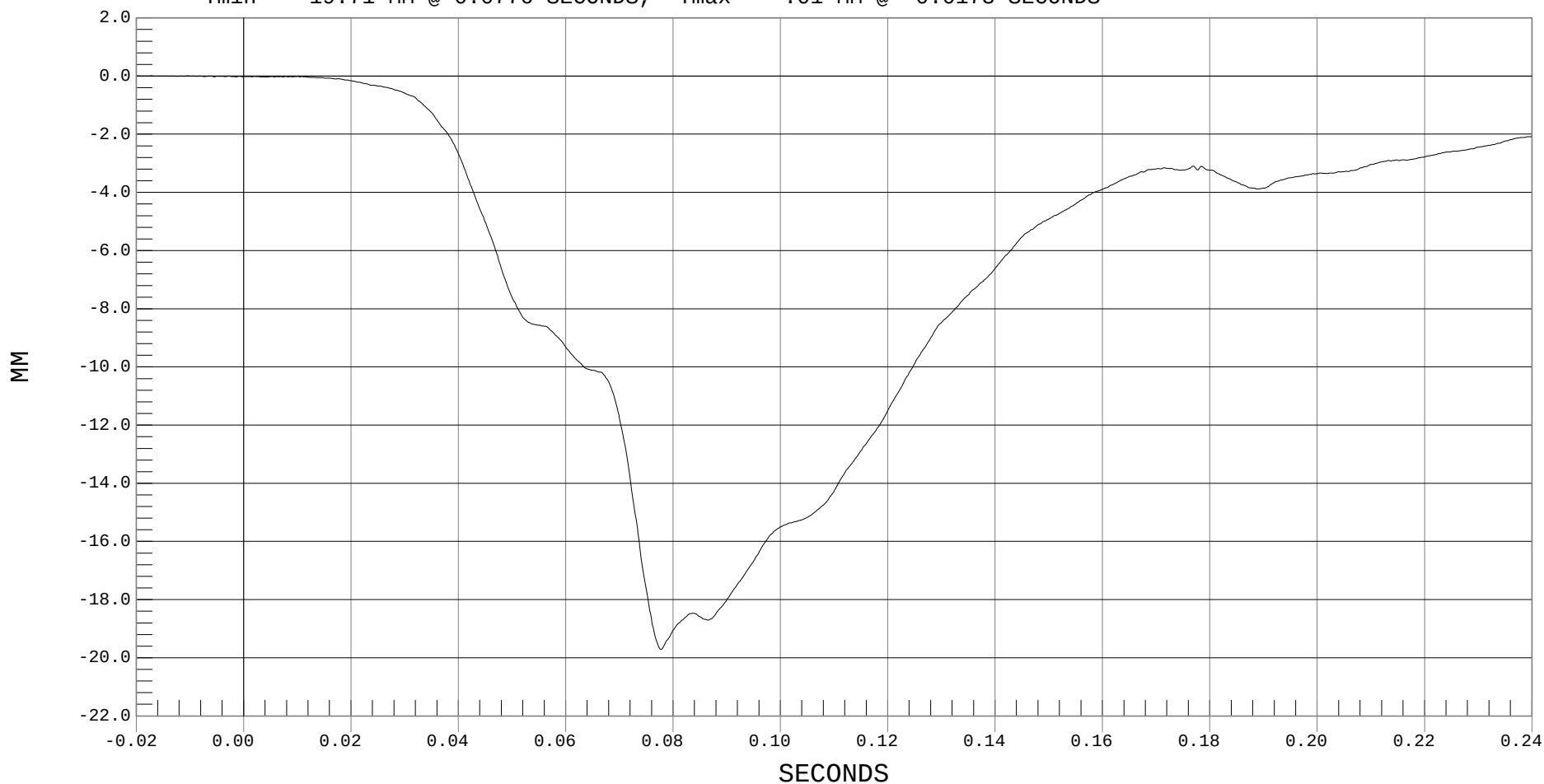
RRS 3 YR OLD CHEST COMPRESSION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 600

— 1 DISPLACEMENT, B01013DF.D55

Ymin = -19.71 MM @ 0.0776 SECONDS, Ymax = .01 MM @ -0.0173 SECONDS





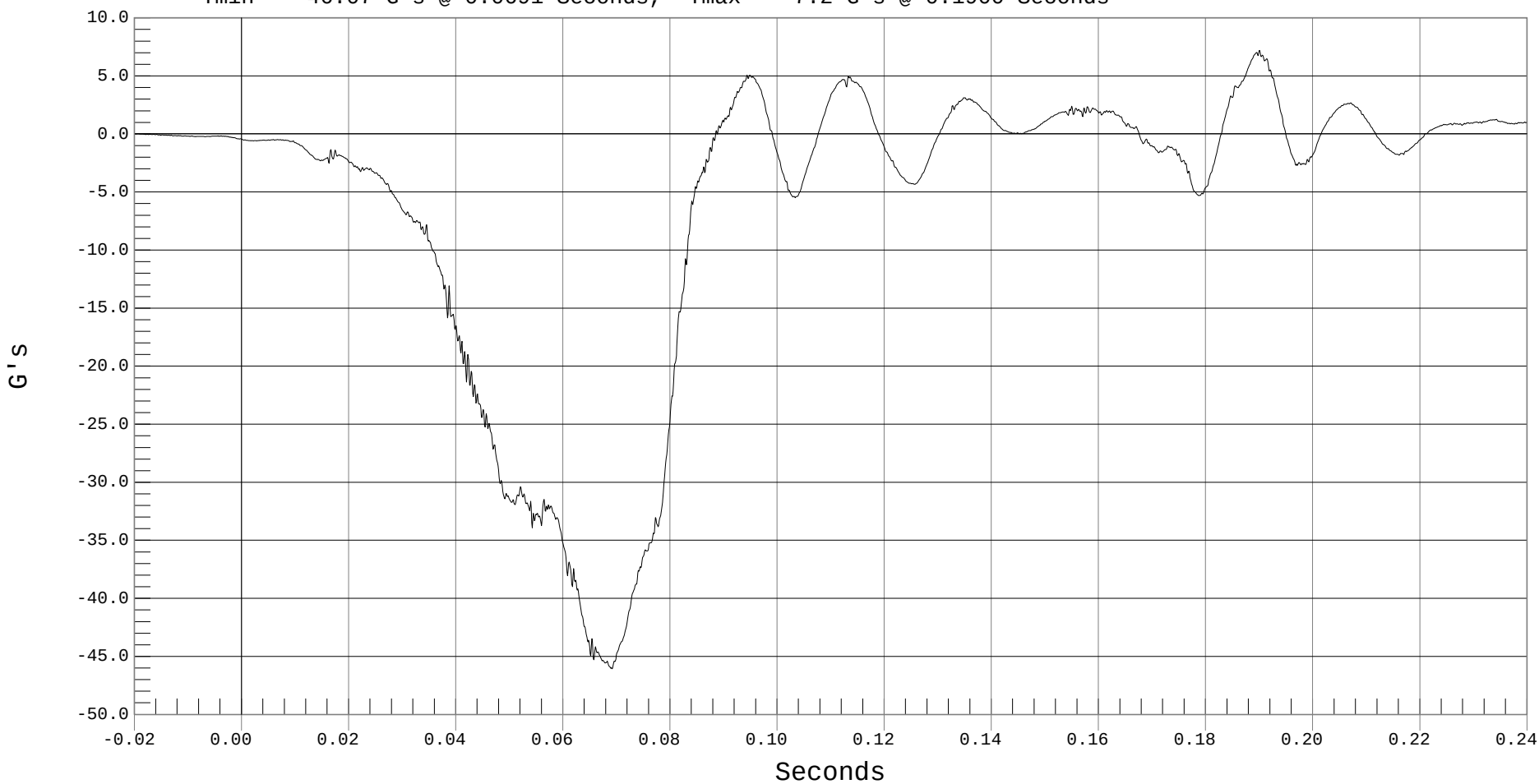
RRS 3 YR OLD PELVIS X ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD PELVIS X, B01013AT.A56

Ymin = -46.07 G's @ 0.0691 Seconds, Ymax = 7.2 G's @ 0.1900 Seconds





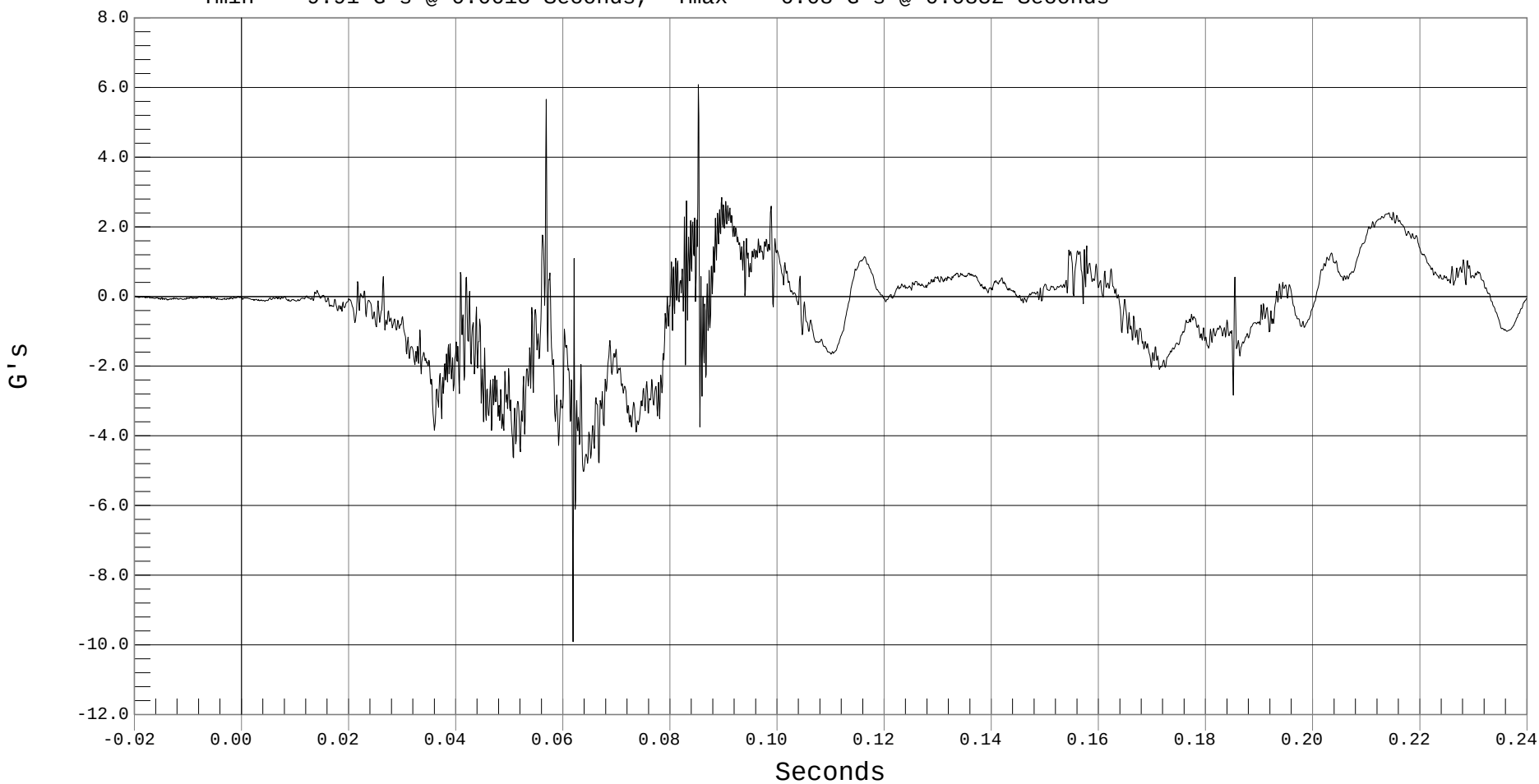
RRS 3 YR OLD PELVIS Y ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD PELVIS Y, B01013AT.A57

Ymin = -9.91 G's @ 0.0618 Seconds, Ymax = 6.08 G's @ 0.0852 Seconds





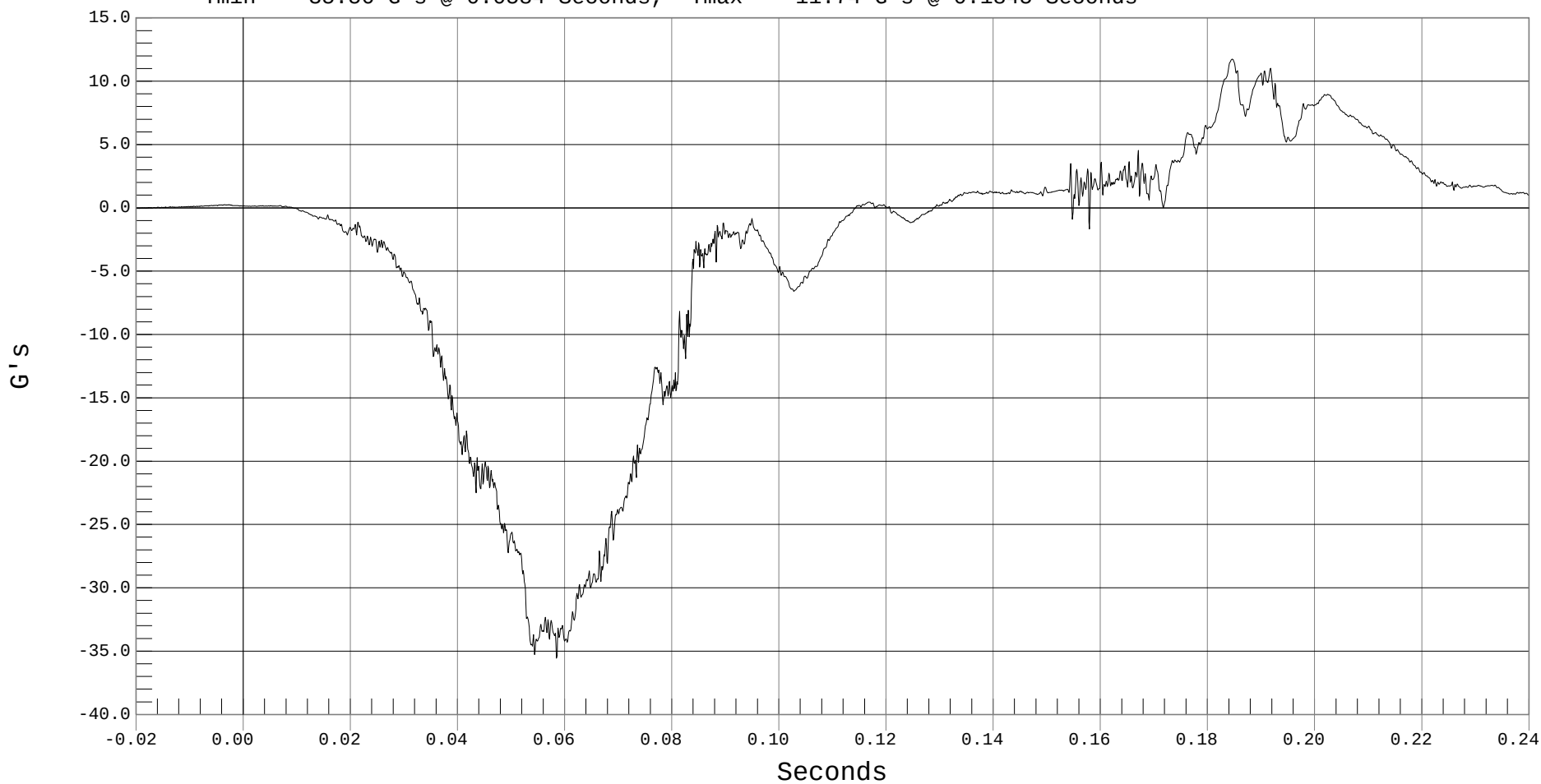
RRS 3 YR OLD PELVIS Z ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS CHILD PELVIS Z, B01013AT.A58

Ymin = -35.56 G's @ 0.0584 Seconds, Ymax = 11.74 G's @ 0.1845 Seconds





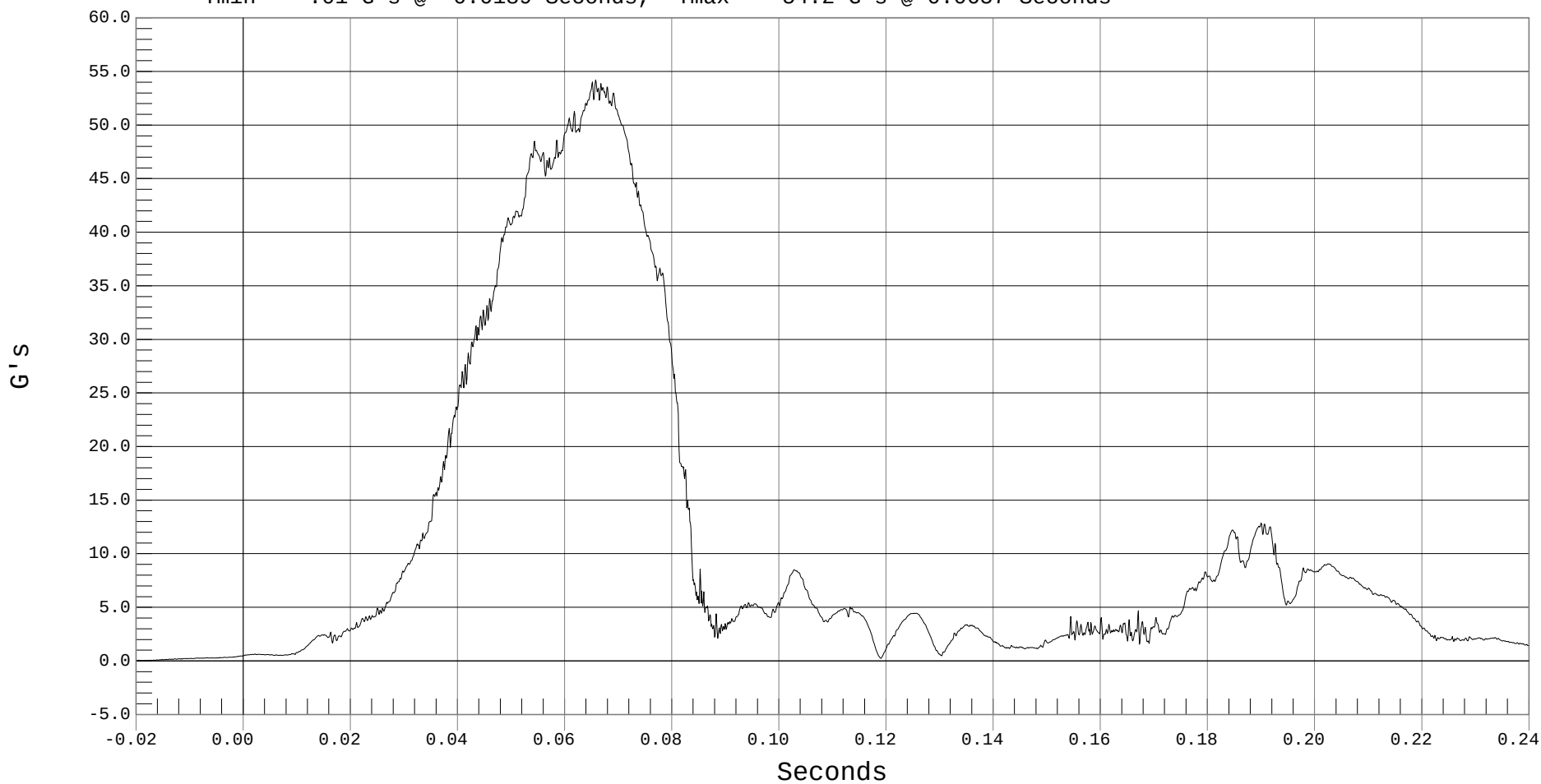
RRS 3 YR OLD PELVIS RESULTANT ACCELERATION

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 1000

— 1 RRS 3 YR OLD PELVIS RESULTANT ACCELERATION, B01013AV.A56

Ymin = .01 G's @ -0.0189 Seconds, Ymax = 54.2 G's @ 0.0657 Seconds





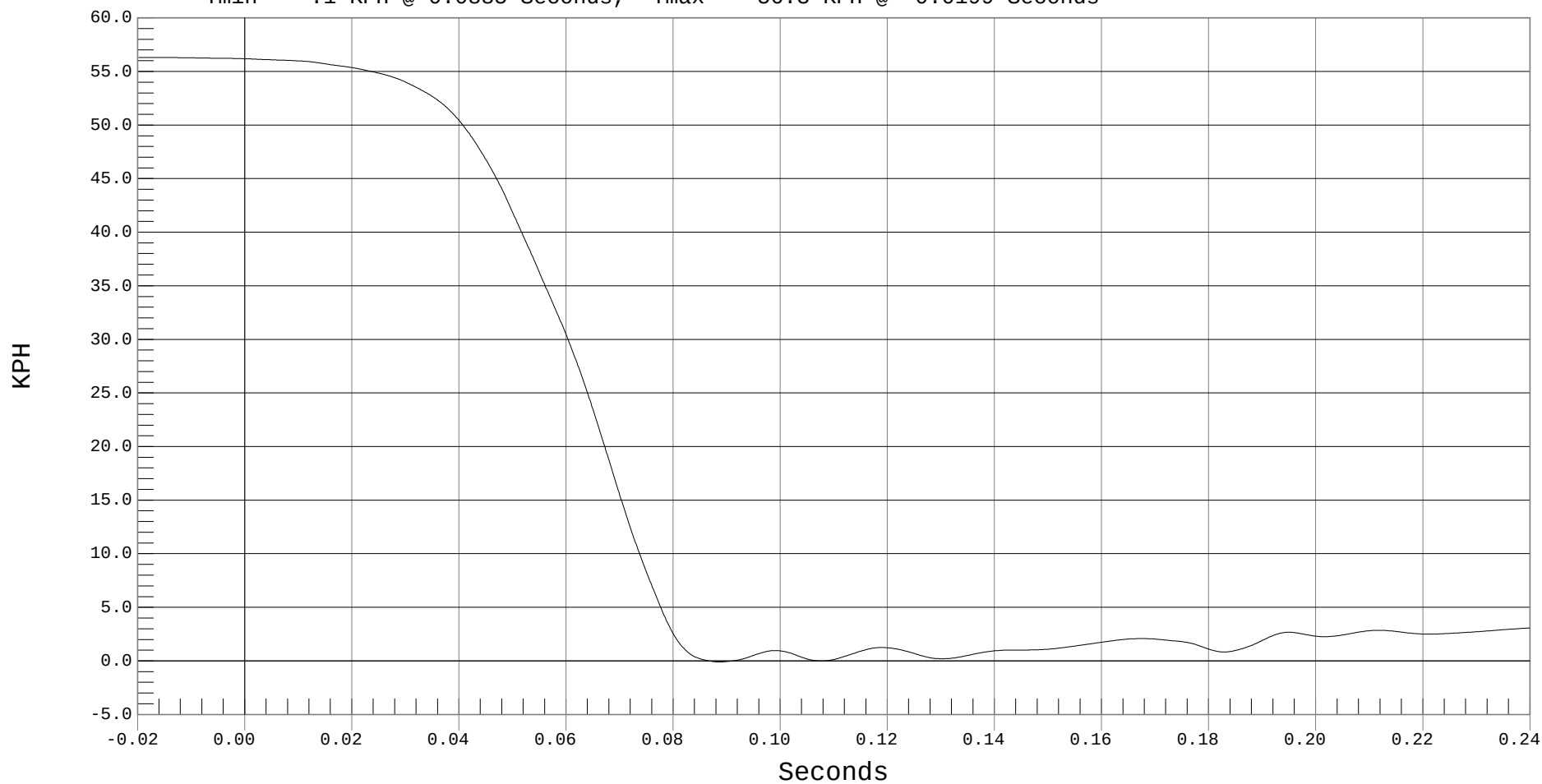
RRS 3 YR OLD PELVIS X VELOCITY

Test Desc.: NCAP FRONTAL IMPACT
Component: 2001 HYUNDAI ELANTRA (M10500)
Other Info:

Test Date: 02-06-01
Speed: 35.0 MPH, 56.3 KPH
Filter Class: 180

— 1 RRS 3 YR OLD PELVIS X VELOCITY, B01013AI.V56

Ymin = -.1 KPH @ 0.0885 Seconds, Ymax = 56.3 KPH @ -0.0199 Seconds



CHILD DUMMY CALIBRATION DATA TRACES AND TABLES

Hybrid III Calibration Data Sheet
3 Year Old
Head Drop Calibration

ATD Serial No.: 142C

Test I.D.: D01071

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.5	22.1	PASS
Laboratory Relative Humidity	%	10 to 70	23	PASS
Peak Resultant Acceleration	G's	250.0 to 280.0	267.9	PASS
Peak Lateral Acceleration	G's	≤±15.0	-4.0	PASS
Is Acceleration Unimodal?	Yes/No	<10% Peak	Yes	PASS
Overall Test Results				PASS

Laboratory Technician

1/11/01

Test Date

Approved By



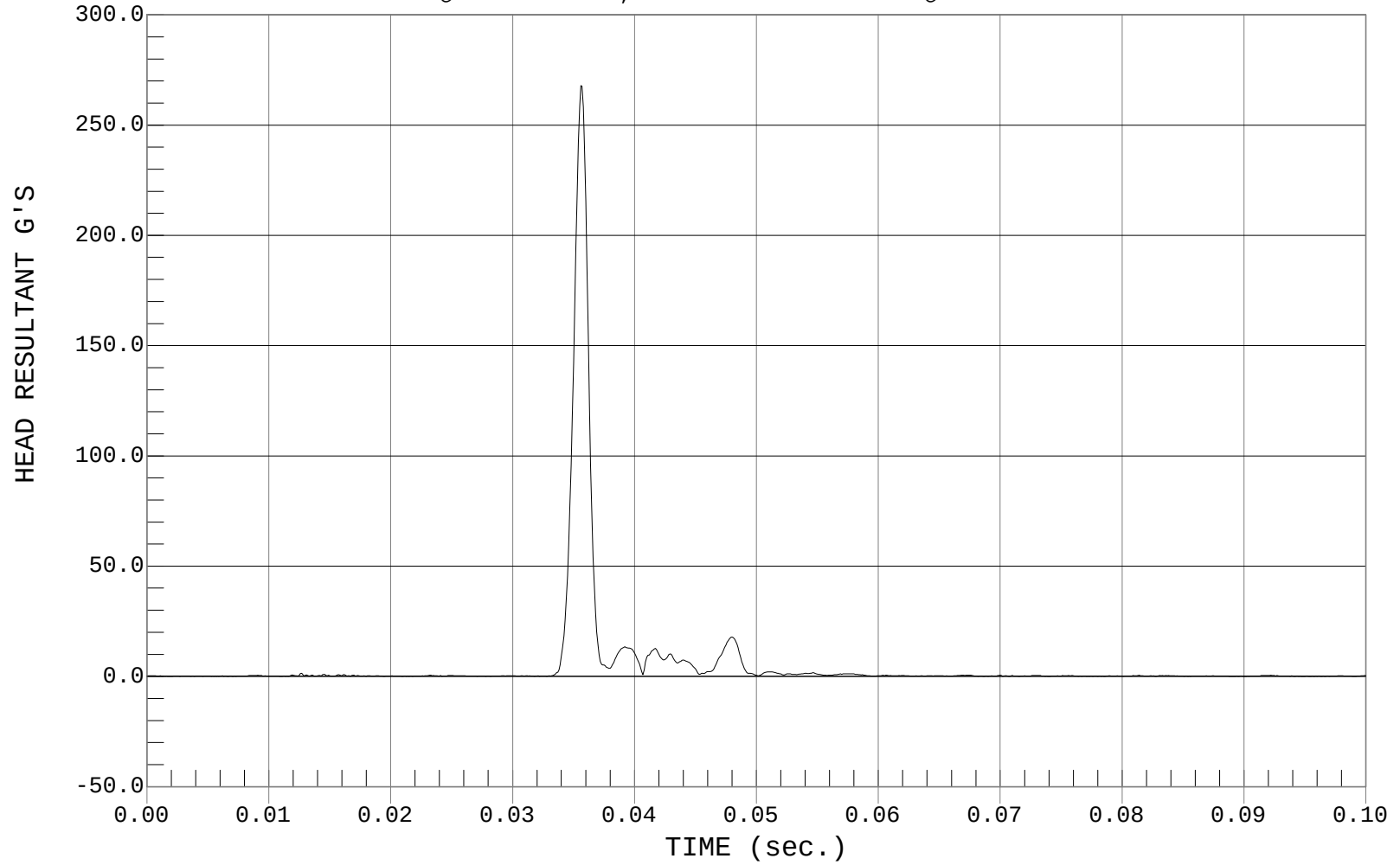
PEAK RESULTANT ACCELERATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #142C

Test Date: 01-11-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD RESULTANT, D01071AV.A01

Ymin = .07 G'S @ 0.0015 sec., Ymax = 267.89 G'S @ 0.0356 sec.





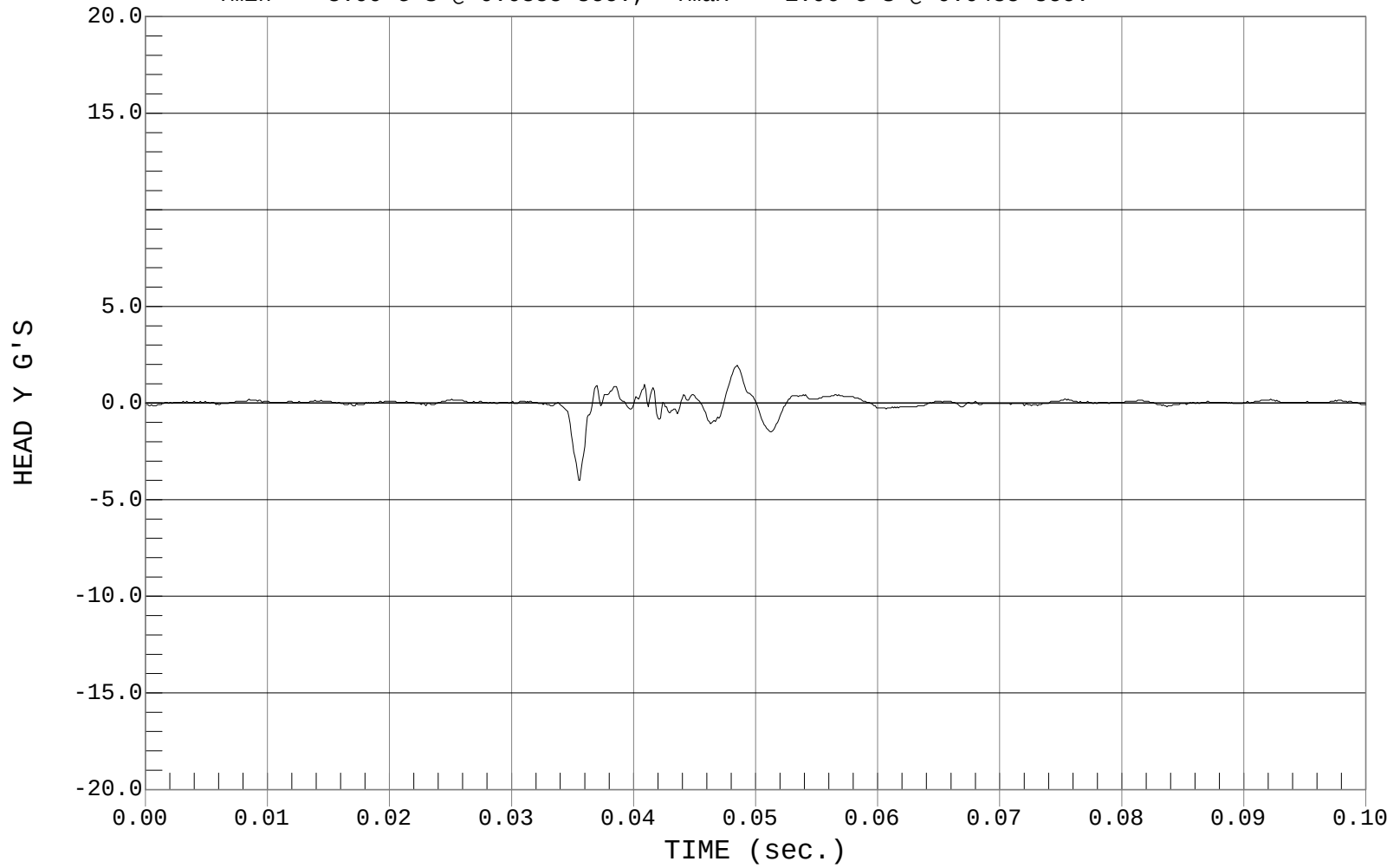
PEAK LATERAL ACCELARATION

Test Desc.: Dummy Calibration - Head Drop
Component: Dummy #142C

Test Date: 01-11-01
Speed: 0.00 FT/SEC, 0.00 M/SEC

— 1 HEAD Y, D01071AR.A02

Ymin = -3.99 G'S @ 0.0355 sec., Ymax = 1.96 G'S @ 0.0485 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Thorax Impact Test

ATD Serial No.: 142C

Test I.D.: D01074

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.7	PASS
Laboratory Relative Humidity	%	10 to 70	29	PASS
Probe Velocity	M/s	6.58 to 6.82	6.0	PASS
Peak Resistive Force Within Deflection Corridor	kN	.68 to .81	.80	PASS
Internal Hysteresis	%	65 to 85%	73	PASS
Max Force 12.5 mm to 32 mm Deflection	kN	Max .86	.88	FAIL
Overall Test Results				FAIL

* TEST DOES NOT MEET SPECIFICATION

Laboratory Technician

1/14/01
Test Date

Approved By



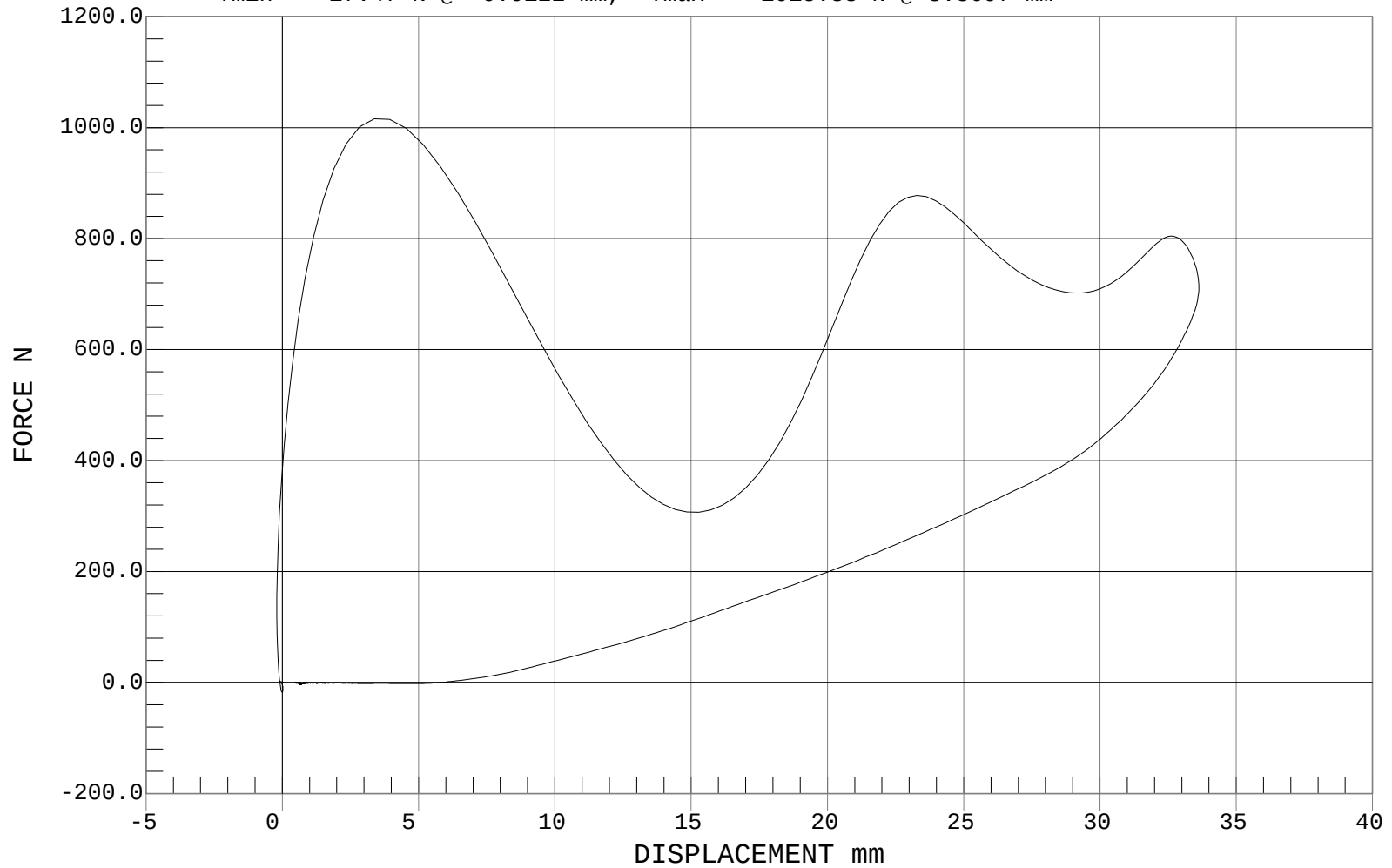
THORAX IMPACT

Test Desc.: Dummy Calibration - Chest Impact
Component: Dummy #142C

Test Date: 01-14-01
Speed: 19.72 FT/SEC, 6.01 M/SEC

1 FORCE, D01074CH.FVD

Ymin = -17.47 N @ -0.0122 mm, Ymax = 1015.88 N @ 3.3697 mm



Hybrid III Calibration Data Sheet
3 Year Old
Neck Flexion Test

ATD Serial No.: 142C

Test I.D.: D01072

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	PASS
Laboratory Relative Humidity		%	10 to 70	22	PASS
Pendulum Velocity		m/s	5.4 to 5.6	5.5	PASS
Pendulum Deceleration	10 Msec.	m/s	2.0 to 2.7	2.4	PASS
	15 Msec.	m/s	3.0 to 4.0	3.4	PASS
	20 Msec.	m/s	4.0 to 5.1	4.6	PASS
"D" Plane Rotation	Maximum	Deg.	70.0 to 82.0	73.8	PASS
Moment About Occipital Condyle	Maximum	Nm	42.0 to 53.0	44.4	PASS
Positive Moment Decay Time to 10Nm		Msec.	60.0 to 80.0	73.4	PASS
Overall Test Results					PASS

Laboratory Technician

1/12/01
Test Date

Approved By



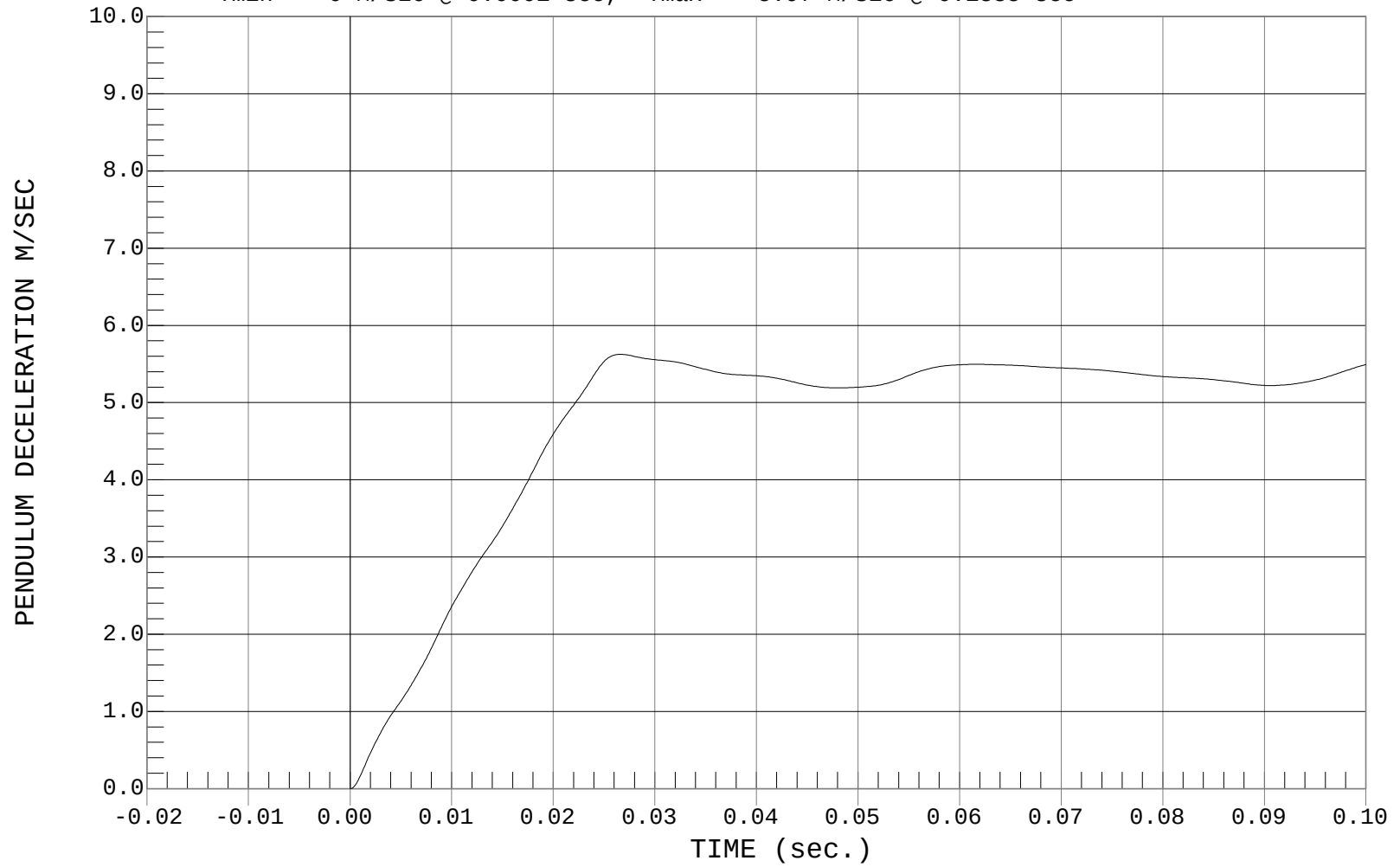
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #142C

Test Date: 01-12-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 PENDULUM DECELERATION, D01072AI.A04

Ymin = 0 M/SEC @ 0.0001 sec, Ymax = 5.97 M/SEC @ 0.1885 sec





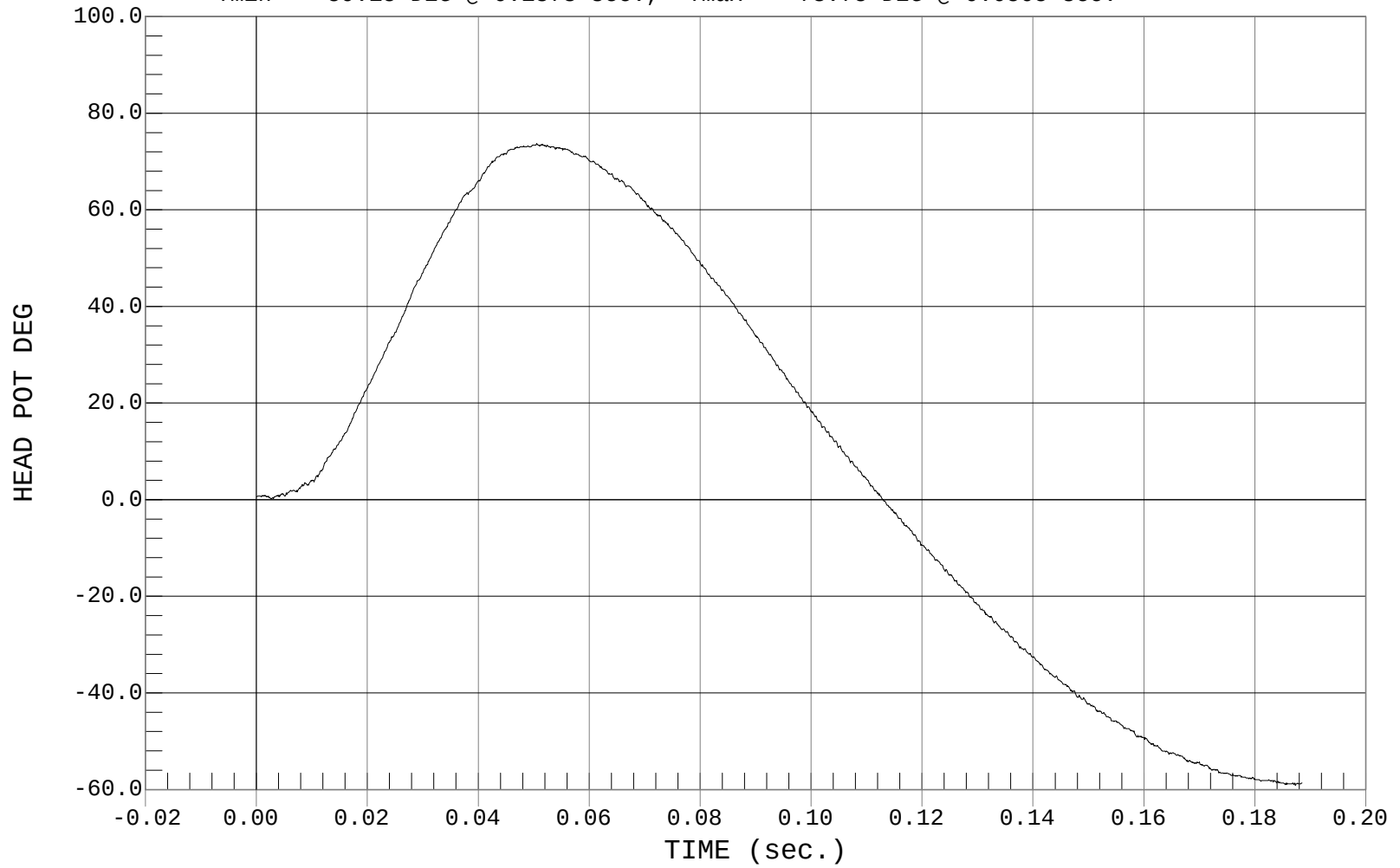
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #142C

Test Date: 01-12-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 HEAD POT, D01072DU.D05

Ymin = -59.15 DEG @ 0.1873 sec., Ymax = 73.75 DEG @ 0.0505 sec.





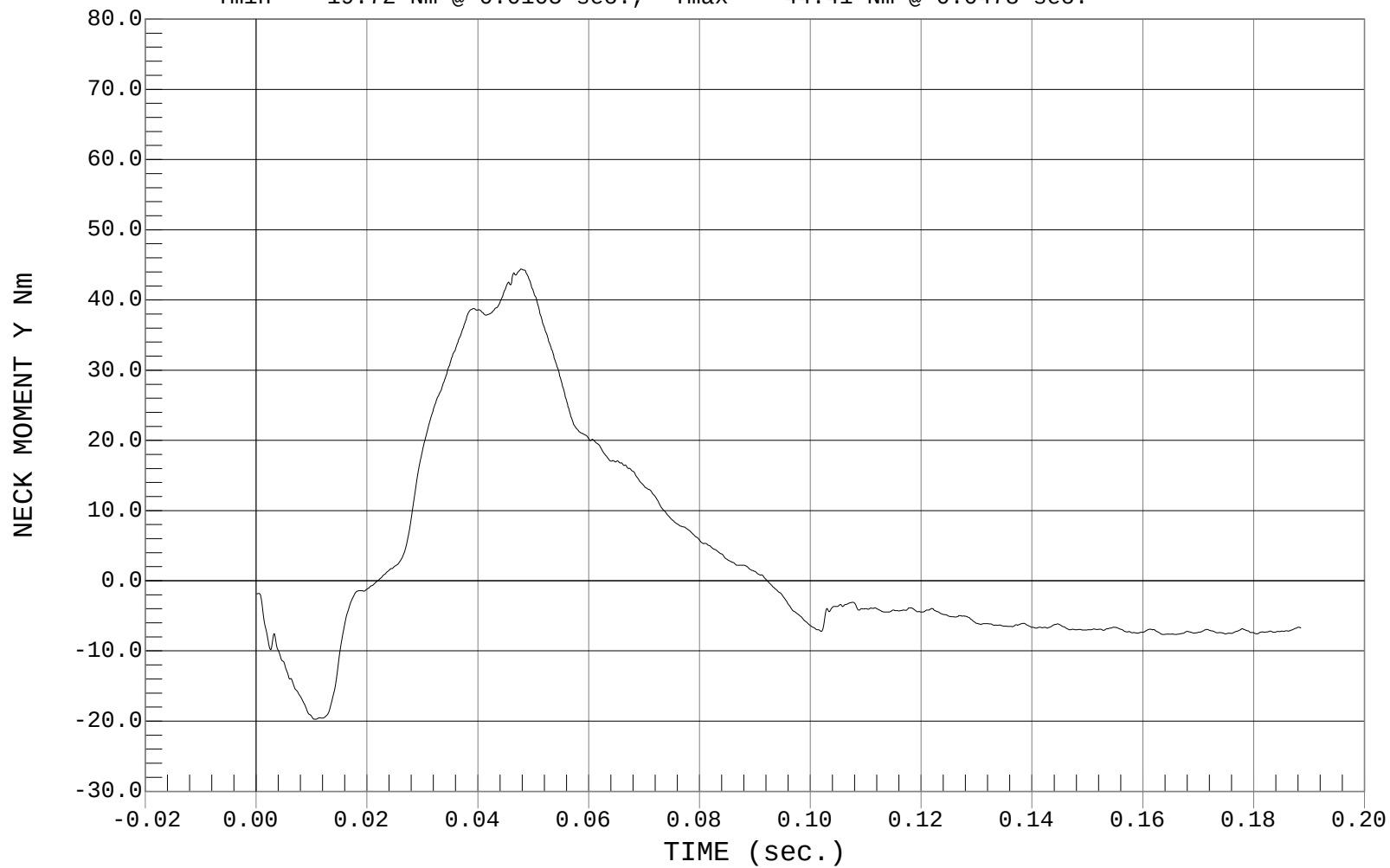
OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Flexion
Component: Dummy #142C

Test Date: 01-12-01
Speed: 18.00 FT/SEC, 5.49 M/SEC

— 1 NECK MOMENT Y, D01072MF.M01

Ymin = -19.72 Nm @ 0.0105 sec., Ymax = 44.41 Nm @ 0.0478 sec.



Hybrid III Calibration Data Sheet
3 Year Old
Neck Extension Test

ATD Serial No.: 142C

Test I.D.: D01073

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.3	PASS
Laboratory Relative Humidity		%	10 to 70	22	PASS
Pendulum Velocity		m/s	3.55 to 3.75	3.66	PASS
Pendulum Deceleration	6 Msec.	m/s	1.0 to 1.4	1.2	PASS
	10 Msec.	m/s	1.9 to 2.5	2.1	PASS
	14 Msec.	m/s	2.8 to 3.5	2.9	PASS
"D" Plane Rotation	Maximum	Deg.	83.0 to 93.0	88.8	PASS
Moment About Occipital Condyle	Minimum	Nm	-53.3 to -43.7	-46.3	PASS
Negative Moment Decay Time to -10 Nm		Msec.	60.0 to 80.0	68.8	PASS
Overall Test Results					PASS

Laboratory Technician

1/12/01
Test Date

Approved By



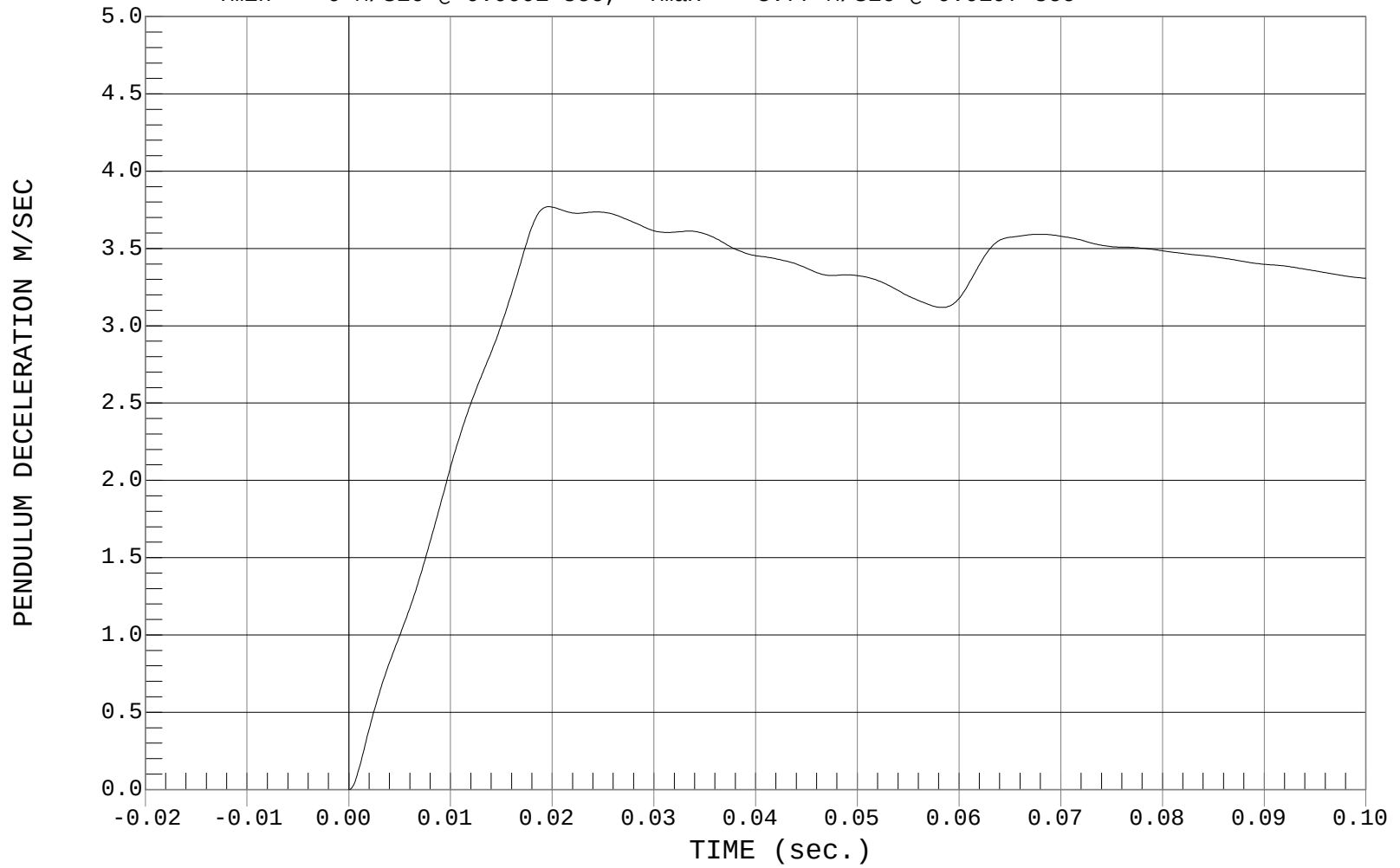
PENDULUM DECELERATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #142C

Test Date: 01-12-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 PENDULUM DECELERATION, D01073AI.A04

Ymin = 0 M/SEC @ 0.0001 sec, Ymax = 3.77 M/SEC @ 0.0197 sec





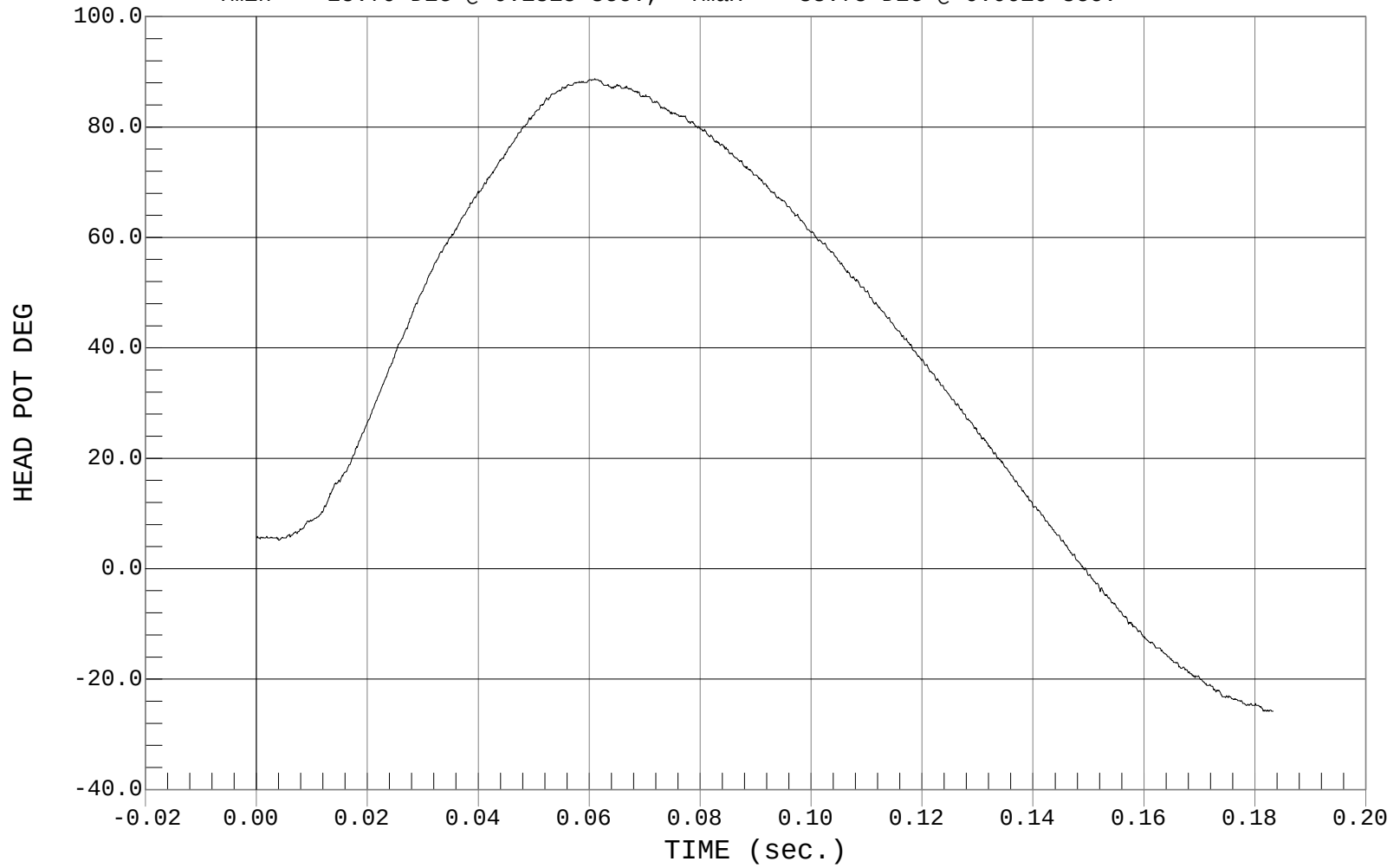
NECK ROTATION

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #142C

Test Date: 01-12-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 HEAD POT, D01073DU.D05

Ymin = -25.79 DEG @ 0.1815 sec., Ymax = 88.75 DEG @ 0.0610 sec.



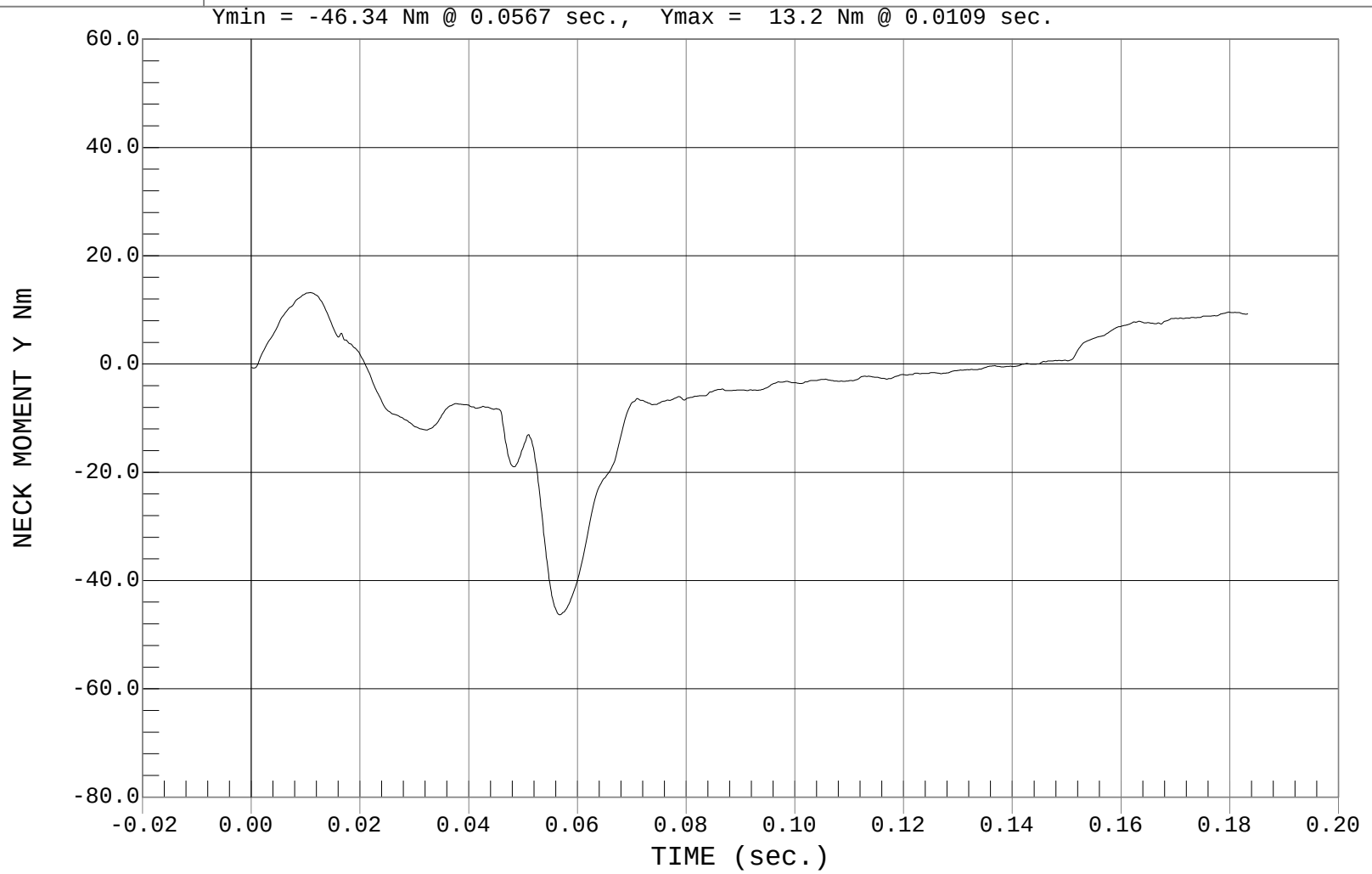


OCCIPITAL MOMENT

Test Desc.: Dummy Calibration - Neck Extension
Component: Dummy #142C

Test Date: 01-12-01
Speed: 12.00 FT/SEC, 3.66 M/SEC

— 1 NECK MOMENT Y, D01073MF.M01



Hybrid III Calibration Data Sheet
3 Year Old
Torso Flexion Test

ATD Serial No.: 142C

Test I.D.: D01075

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	°C	18.9 to 25.6	21.4	PASS
Relative Humidity	%	10 to 70	25	PASS
Force @ 45°	N	130 to 180	158	PASS
Initial Angle	Deg	0 to 15	6°	PASS
Return Angle	Deg	0 to 10	2	PASS
Overall Test Results				PASS

Laboratory Technician

1/12/01

Test Date

Approved By

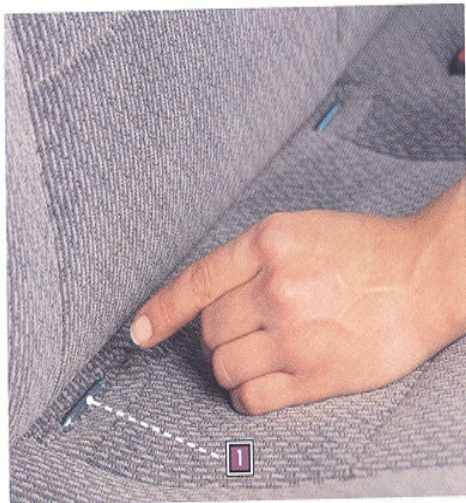
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

DUMMY AND LABORATORY INSTRUMENT CALIBRATION
INSTRUMENTS FOR CHILD DUMMY NO. 142C

	INSTRUMENTS FOR DUMMY NO. 142C		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	J19927	Endevco	1/4/01
Head Y	J18736	Endevco	1/4/01
Head Z	J14674	Endevco	1/4/01
Chest X	J14235	Endevco	1/4/01
Chest Y	J18724	Endevco	1/4/01
Chest Z	AJ5R0	Endevco	1/4/01
Pelvis X	J19440	Endevco	1/4/01
Pelvis Y	AJ4W2	Endevco	1/4/01
Pelvis Z	J20093	Endevco	1/4/01
Upper Neck Force X	120	FTSS	11/6/00
Upper Neck Force Y	120	FTSS	11/6/00
Upper Neck Force Z	120	FTSS	11/6/00
Upper Neck Moment X	120	FTSS	11/6/00
Upper Neck Moment Y	120	FTSS	11/6/00
Upper Neck Moment Z	120	FTSS	11/6/00
Lower Neck Force X	121	FTSS	11/8/00
Lower Neck Force Y	121	FTSS	11/8/00
Lower Neck Force Z	121	FTSS	11/8/00
Lower Neck Moment X	121	FTSS	11/8/00
Lower Neck Moment Y	121	FTSS	11/8/00
Lower Neck Moment Z	121	FTSS	11/8/00
Chest Deflection Gauge	142C	Servo	1/12/01

CHILD SEAT OWNER'S MANUAL RESTRAINT INSTRUCTIONS

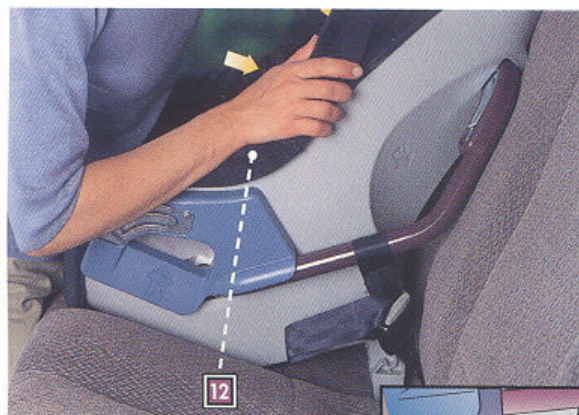
Installing Your Car Seat in a Vehicle Using the Easy & Secure LATCH System



- 1** Once you have selected an acceptable seating location for the car seat (see car seat Owner's Manual), locate the special anchor points in your vehicle.

FORWARD-FACING POSITION 1 YEAR AND UP (22 - 40 LBS.)

Installing Your Car Seat in a Vehicle Using the Easy & Secure LATCH System



- 12** To remove the car seat from the vehicle:

While pushing down on the car seat armrest, press the release button on the Easy & Secure LATCH System buckle to loosen the strap.

With the strap loose, unfasten the Easy & Secure LATCH System hook from the vehicle special anchor point.

Repeat this procedure to loosen and unfasten the other strap.

Installing Your Car Seat in a Vehicle



WARNING

ALWAYS secure this car seat with your vehicle belt system exactly as described in this manual. Refer also to your vehicle owner's manual for specific information on your vehicle belt system and specific instructions on how to install a car seat in your vehicle.

ALWAYS use the tether strap in the forward-facing position. Your child's safety is significantly enhanced in the event of a crash if the tether strap is used. The tether strap significantly reduces forward motion of your child's head during a crash, greatly reducing the likelihood of head injury.

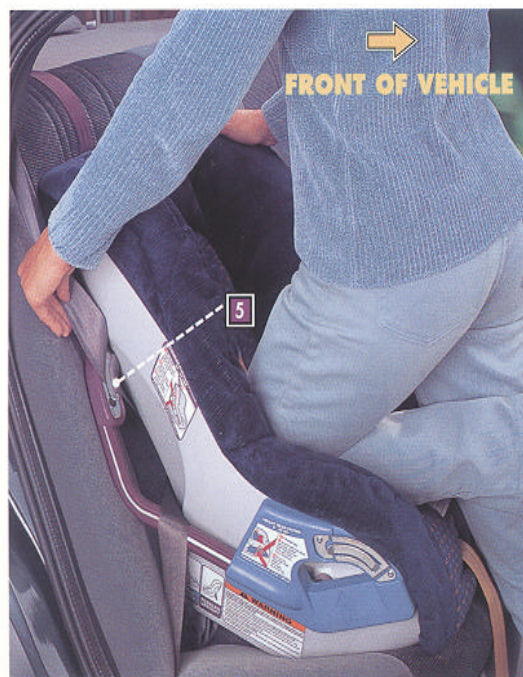
IMPORTANT!

When installing this car seat in your vehicle, only use the front seat when no acceptable rear seating location is available. If the front seating location is equipped with an airbag but must be used to install this car seat in the forward-facing position, adjust the vehicle seat as far back from the dashboard as possible. Consult your vehicle owner's manual regarding front seat, forward-facing child restraint use.

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FORWARD-FACING POSITION 1 YEAR AND UP (22 - 40 LBS.)

Installing Your Car Seat in a Vehicle



5 If you are using a vehicle seating location equipped with a shoulder belt, you must use **only one** forward-facing position locking clip on the car seat to prevent the vehicle belt system from loosening during use. With the vehicle belt system tight, fit the **shoulder belt** into the forward-facing position locking clip on the burgundy tube.

IMPORTANT!

Your car seat is equipped with two forward-facing position locking clips (one on each side of the seat). Use **only one** forward-facing position locking clip to install the car seat. Use the forward-facing position locking clip closest to where the vehicle shoulder belt is attached to the vehicle.

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FORWARD-FACING POSITION 1 YEAR AND UP (22 - 40 LBS.)