

REPORT NUMBER: TO5-MGA-2002-005

**RIGID POLE SIDE IMPACT TEST AT 285 DEGREES
2001 SATURN L200 WITH HEAD CURTAIN AIRBAG**

ES-2 DRIVER POSITION

**PREPARED BY:
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July 9, 2002

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
VOLPE NATIONAL TRANSPORTATION SYSTEM CENTER
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This final test report was prepared for the U.S. Department of Transportation, Volpe National Transportation System Center, under Contract No. DTRS57-98-D-00041.

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SECTION 1
PURPOSE AND TEST PROCEDURE

This Side Impact test is conducted as part of Contract No. DTRS57-98-D-00041, task order 5, sponsored by the U.S. Department of Transportation, Volpe National Transportation System Center. The purpose of this test is to evaluate the responses of the ES-2 and SID/HIII dummies in a 2001 Saturn L200, with head curtain airbag, when subjected to a rigid pole side impact at 285 degrees.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

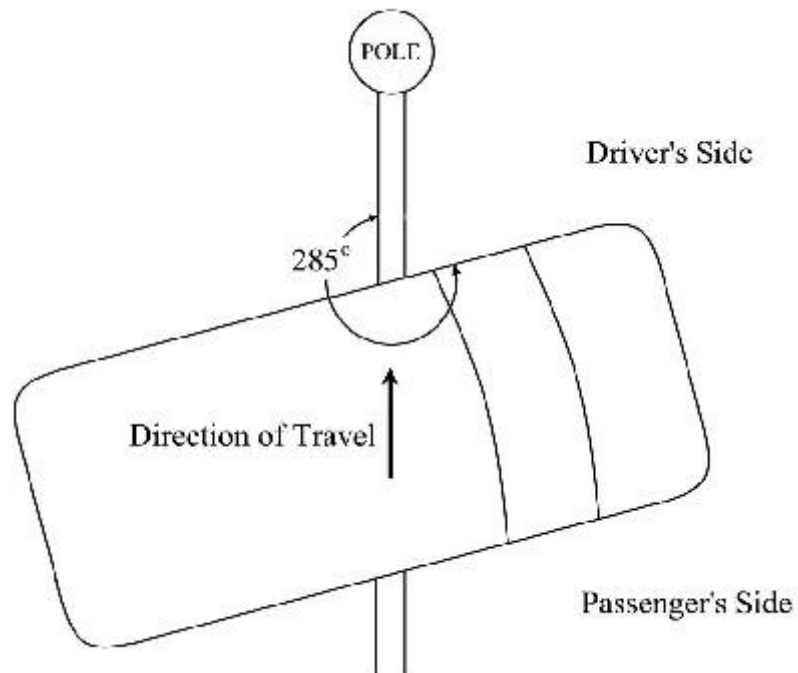
SECTION 2 SUMMARY OF SIDE IMPACT TEST

A rigid pole side impact test at 285 degrees was performed on a model year 2001 Saturn L200 4 door without head curtain airbag. The subject vehicle was towed into a rigid pole at a velocity of 32.3 km/h. The weight of the vehicle as tested was 1598.4 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on July 9, 2002. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

One ES-2 side impact dummy was placed in the left front designated seating position according to instructions specified in the FMVSS 201P Laboratory Test Procedure which is dated April 21, 2000 and Evaluation of Eurosid-1 Positioning Procedure Appendix A dated February 5, 1997. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Appendix B contains the vehicle and dummy response data traces. A summary of the side impact dummy (ES-2) configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report.

Appendix E contains a copy of the ES-2 dummy positioning procedure used and Appendix F contains the ES-2 peak responses.



The following table summarizes the results of the Left Side Impact test:

		Left Front
1) Head Performance Criteria		
< 1000	T1 (msec)	48.4
	T2 (msec)	64.9
	HPC	670
2) Thorax Performance Criteria		
2.1) Chest Deflection < 42 mm	Upper Rib Deflection	52.3
	Mid Rib Deflection	44.4
	Lower Rib Deflection	30.1
2.2) Viscous Criteria < 1.0 (m/sec)	Upper Rib	0.91
	Mid Rib	0.79
	Lower Rib	0.61
3) Abdominal Protection Criterion		
Sum < 2500 N	Front Abdominal Force	178
	Mid Abdominal Force	459
	Rear Abdominal Force	685
	Sum of Abdominal Force	1224
4) Pelvis Performance Criterion		
< 6000 N	Pubic Symphysis Force	2327

		Left Front
HIC	T1 (msec)	48.4
	T2 (msec)	64.9
	T2 - T1 (msec)	16.5
	HIC	670

Fir Filtered	Left Front
Upper Rib Y (g's)	81.8
Mid Rib Y (g's)	117.9
Lower Rib Y (g's)	217.9
Lower Spine Y (g's)	76.8
Pelvis Y (g's)	51.6
TTI (g's)	147

Contacts	Left Front
Arm (msec)	23.2
Rib (msec)	34.6
Pelvis (msec)	27.7

TEST NOTES

SECTION 3
SIDE IMPACT DUMMY (ES-2) AND VEHICLE TEST DATA

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

TEST VEHICLE INFORMATION

Make	Saturn
Model	L200
Body Style	4 door
VIN	1G8JU54F31Y537687
Color	White
Odometer Reading	111
Transmission	automatic
Final Drive	front
Number of Cylinders	4
Engine Displacement	2.2 Liters
Engine Placement	lateral

TEST VEHICLE OPTIONS

Front Airbags	yes
Curtain Airbags	yes
Power Windows	yes
Power Steering	yes
Power Door	yes
Tilt Wheel	yes
Air Conditioning	yes
Power Brakes	yes
Anti-lock Brakes	no
AM/FM/Cassette	yes
Cruise Control	yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Saturn Corporation	GVWR (kg)	1819
Date of Manufacture	12/00	GAWR Front (kg)	897
		GAWR Rear (kg)	922

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	210	210
Cold Pressure (kPa)	210	210
Recommend Tire Size	P195/65R15	P195/65R15
Tire Size on Vehicle	P195/65R15	P195/65R15
Tire Manufacturer	Firestone	Firestone

Measured Parameter	Front	Rear	Third	Total
Type of Seats	bucket	bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				420
Cargo Weight (RCLW) (kg)				79.8

DATA SHEET NO. 1...(continued)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	423.2	272.2		439.5	365.1	
Right	kg	391.9	280.8		433.2	360.6	
Ratio	%	59.6	40.4		54.6	45.4	
Totals	kg	815.1	553.0	1368.1	872.7	725.7	1598.4

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Vehicle Target Weight (TVT _W)*	kg	1598.5

* Based on previous tests in this series.

TEST VEHICLE ATTITUDES

	Units	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	deg	0.5 ND	0.1 ND	0.4 ND
Left Door Sill Angle	deg	1.0 ND	0.7 ND	0.8 ND
Front Bumper Angle	deg	0.3 LD	0.7 LD	0.4 LD
Rear Bumper Angle	deg	0.3 LD	0.7 LD	0.5 LD

ND = Nose Down, BD = Back Down, LD = Left Down, RD = Right Down

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2702
Total Vehicle Length at Left Side	mm	3778
Total Vehicle Length at Centerline	mm	4785
Total Vehicle Length at Right Side	mm	3778
Weight of Ballast in Cargo Area	kg	0
Amount of Water in Fuel Tank	liters	60.6

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Actual Impact Point	mm	2 forward

DATA SHEET NO. 1...(continued)
GENERAL TEST AND VEHICLE PARAMETER DATA

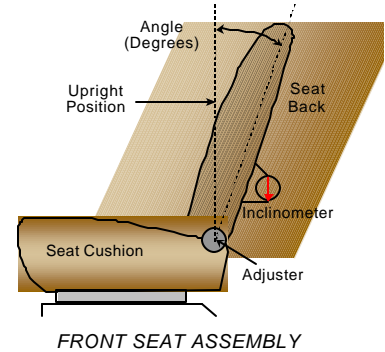
Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 20.8 deg. measured on seat frame
(adjusted forward 4.7 deg. to achieve
head clearance)

Passenger seat back angle: non adjustable



SEAT FORE/AFT POSITIONS

The driver's seat is manually operated and the rear passenger seat has no adjustments.

Driver seat fore/aft total travel: 17 detents

Rear passenger seat fore/aft total travel: non adjustable

Driver seat fore/aft position: 5th notch, 1st as one (adjusted forward 4 notches to
achieve 50 mm head clearance)

Rear passenger seat fore/aft position: non adjustable

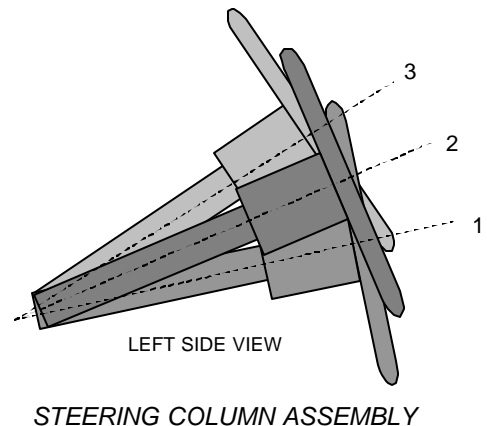
SEAT BELT UPPER ANCHORAGE

The test vehicle "D" ring anchorage for the driver's seat position was placed in the full up position.

STEERING COLUMN ADJUSTMENT

The steering column contained 4 adjustment positions.

The column was set in the second position with top as one.



**DATA SHEET NO. 2
POST TEST OBSERVATIONS**

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	ES-2
Head Contact	Airbag curtain
Upper Torso Contact	Door trim panel
Lower Torso Contact	Armrest
Left Knee Contact	Door trim panel
Right Knee Contact	Left knee

POST TEST DOOR OPENING

Description	Front	Rear
Left Side Door Opening	Remained latched	Remained latched
Right Side Door Opening	Remained latched	Remained latched

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failures
Sill Separation	None
Windshield Damage	Windshield cracked
Window Damage	Struck side windows down for test
Other Notable Effects	None

AIRBAG DEPLOYMENT

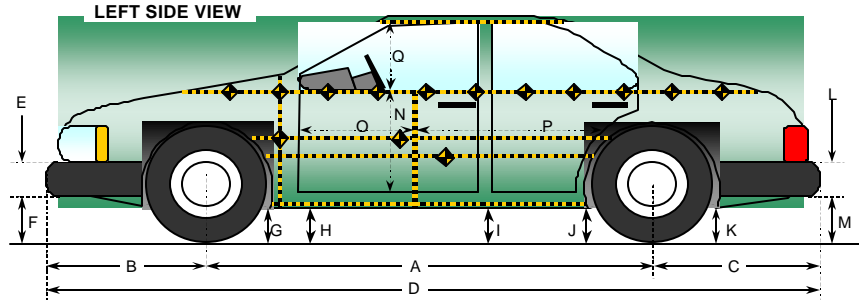
	Driver	Right Front	Left Rear
Front	no	no	
Side			
Curtain	yes	no	

**SECTION 4
OCCUPANT AND VEHICLE INFORMATION**

DATA SHEET NO. 3
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002



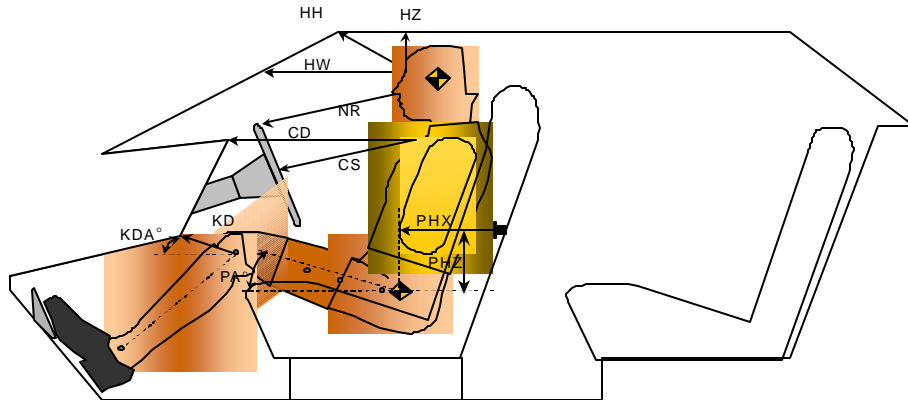
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2702	2397	305
B	Front Axle to FSOV	973	1019	-46
C	Rear Axle to RSOV	1110	1143	-33
D	Total Length at Centerline	4785	4559	226
E	Front Bumper Thickness	104	104	0
F	Front Bumper Bottom to Ground	406	488	-82
G	Sill Height at Front Wheel Well	194	167	27
H	Sill Height at Front Door Leading Edge	211	185	26
I	Sill Height at "B" Pillar	222	206	16
J1	Sill Height at Rear Wheel Well	227	235	-8
J2	Pinch Weld Height at Rear Wheel Well	229	234	-5
K	Sill Height Aft of Rear Wheel Well	261	237	24
L	Rear Bumper Thickness	234	234	0
M	Rear Bumper Bottom to Ground	441	382	59
N	Sill Height to Window Bottom Sill	637	634	3
O	Front Door Leading Edge to Impact CL	873	870	3
P	Rear Door Trailing Edge to Impact CL	978	956	22
Q	Front Window Opening	468	431	37
R	Right Side Length	3778	3814	-36
S	Left Side Length	3778	3460	318
T	Vehicle Width at "B" Post	1745	1304	441

DATA SHEET NO. 4
ES-2 LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002



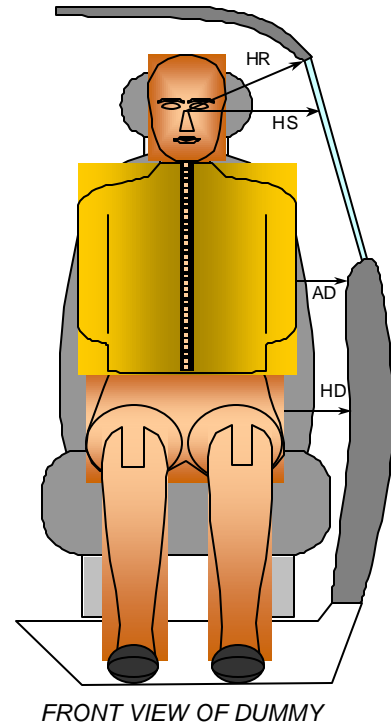
Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	295	
HW	Head to Windshield	481	
HZ	Head to Roof	156	
NR	Nose to Rim	394	
CD	Chest to Dash	494	
CS	Chest to Steering Wheel	309	
KDL	Left Knee to Dash	172	0
KDR	Right Knee to Dash	170	0
PA	Pelvic Angle (Longitudinal)		23.1
PA	Pelvic Angle (Lateral)		0.9
SA	Spine Angle (Longitudinal)		25.2
SA	Spine Angle (Lateral)		0.3
PHX	H-Point to Striker (X-Axis)	248	
PHZ	H-Point to Striker (Z-Axis)	144	

DATA SHEET NO. 5
ES-2 LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	190
HS	Head to Side Window	mm	299
AD	Arm to Door	mm	109
HD	H-Point to Door	mm	121



**DATA SHEET NO. 6
DUMMY POSITIONING**

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

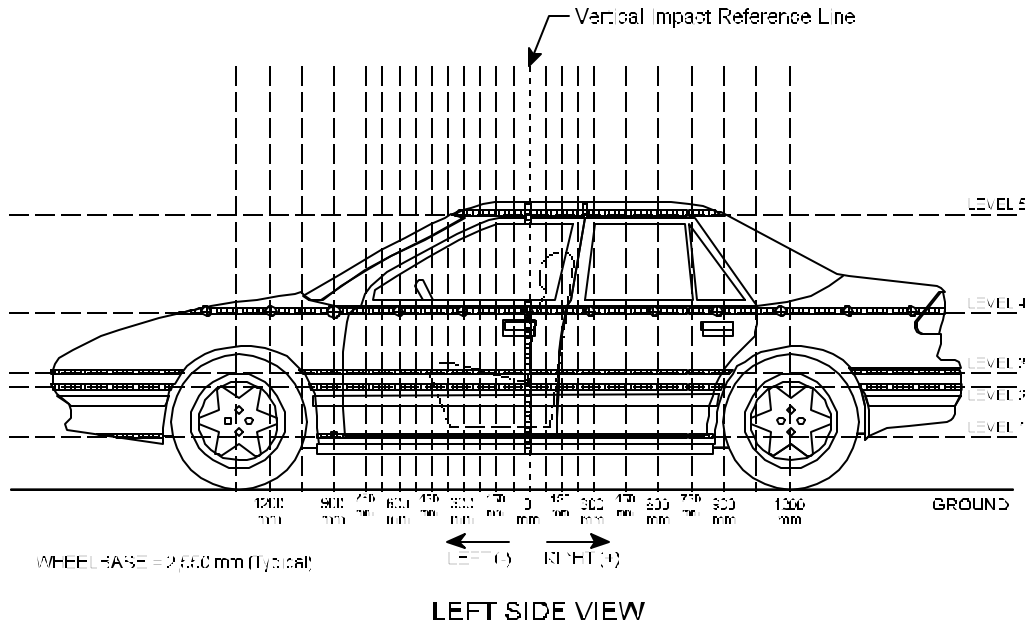
	Left Front	
	H-Point Machine	Dummy H Point after seat back adjustment
HP to Floor Z (mm)	148	155
HP to Hinge X (mm)	745	719
HP to Sill Y (mm)	211	210
HP to Striker X (mm)	353	380
HP to Dash X (mm)	553	524
HP to Header Z (mm)	781	765
H-POINT MACHINE (deg)		
Left Knee	126	
Right Knee	125	
Left Foot	124	
Right Foot	128	
Left Leg (mm)	105	
Right Leg (mm)	103	
Hip Angle	99	
Back Angle	25	

**DATA SHEET NO. 7
VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



Measurements are taken with vehicle in the as tested condition.

Measurements along the vertical 800 mm.

Level	Measurement Description	Units	Height Above Ground
5	Window	mm	1462
4	Window Sill	mm	1025
3	Mid Door	mm	766
2	Occupant H-Point	mm	641
1	Sill Top	mm	460

DATA SHEET NO. 8
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

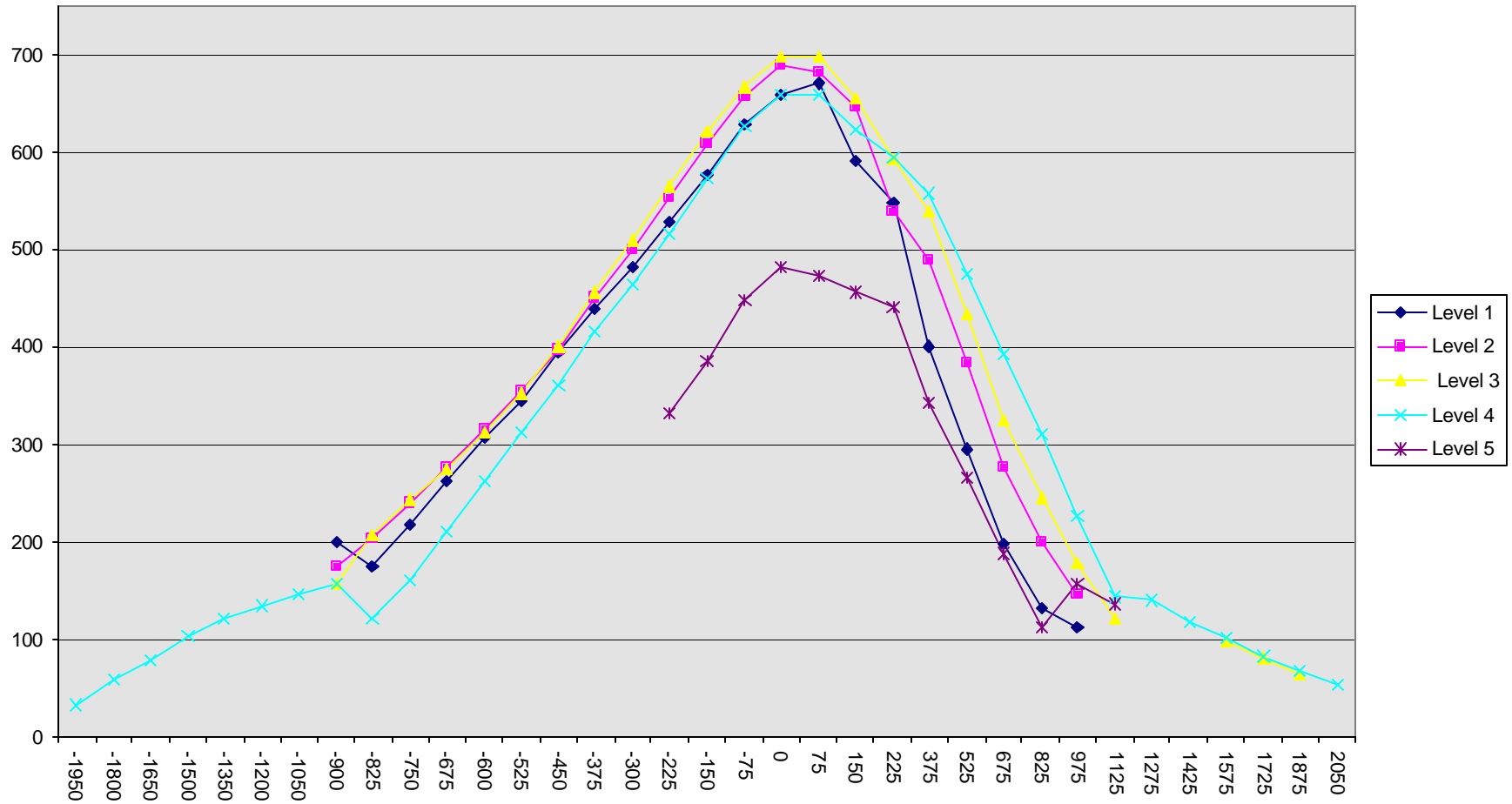
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1950				394					428					34	
-1800				362					421					59	
-1650				342					421					79	
-1500				325					428					103	
-1350				314					435					121	
-1200				307					442					135	
-1050				302					448					146	
-900	264	240	239	298		463	416	396	455		199	176	157	157	
-825	264	242	240	299		440	446	446	420		176	204	206	121	
-750	262	241	239	298		480	481	482	459		218	240	243	161	
-675	259	240	239	297		521	518	514	508		262	278	275	211	
-600	258	239	237	297		564	554	549	559		306	315	312	262	
-525	258	239	237	296		603	593	589	608		345	354	352	312	
-450	256	239	236	294		652	637	637	655		396	398	401	361	
-375	256	238	234	293		695	688	690	708		439	450	456	415	
-300	255	237	234	292		738	737	743	755		483	500	509	463	
-225	256	237	233	291	518	785	792	799	807	850	529	555	566	516	332
-150	256	236	233	288	513	833	846	854	861	899	577	610	621	573	386
-75	256	236	232	287	508	884	894	899	914	957	628	658	667	627	449
0	256	236	232	286	507	916	925	931	946	990	660	689	699	660	483
75	256	236	232	286	505	906	918	931	946	977	670	682	699	660	472
150	258	236	232	284	505	849	883	887	907	962	591	647	655	623	457
225	258	236	233	286	504	807	776	826	881	946	549	540	593	595	442
375	257	235	232	284	501	657	724	771	842	844	400	489	539	558	343
525	257	234	231	283	504	553	618	665	758	770	296	384	434	475	266
675	257	233	232	284	506	455	510	557	677	694	198	277	325	393	188
825	258	233	233	286	511	391	433	479	597	624	133	200	246	311	113
975	259	235	236	289	520	372	381	416	517	677	113	146	180	228	157
1125			237	297	537			358	442	674			121	145	137
1275				305					446					141	
1425				316					434					118	
1575			260	330				358	431				98	101	
1725			278	347				359	430				81	83	
1875			296	365				361	433				65	68	
2050				388					441					53	

Reference plane is parallel to test vehicle longitudinal centerline
 Given dimensions = Reference plane to car body
 Measurements are in mm.

DATA SHEET NO. 8...(continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001/Saturn/L200/4 door

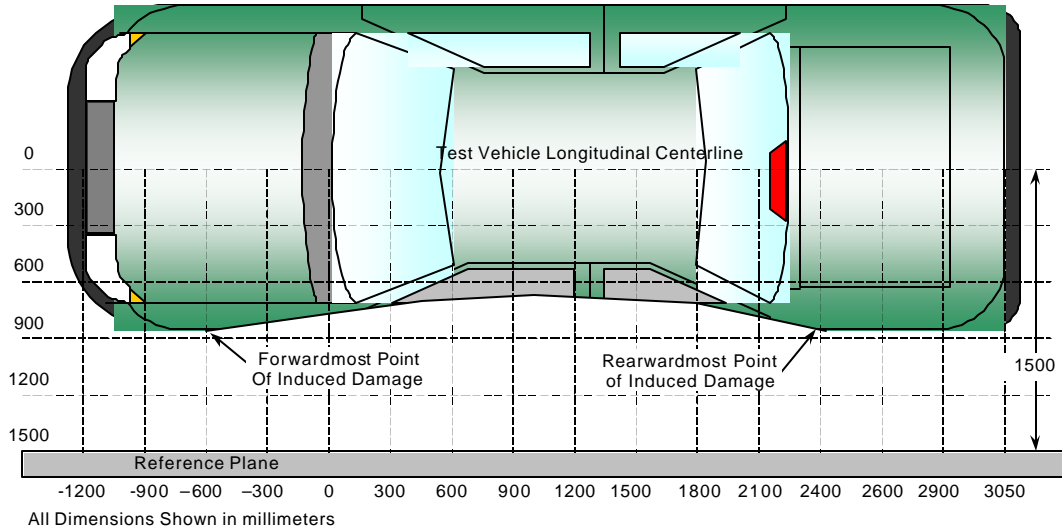
Test Date: July 9, 2002



**DATA SHEET NO. 9
VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002



TOP VIEW

Damage Profile Distances

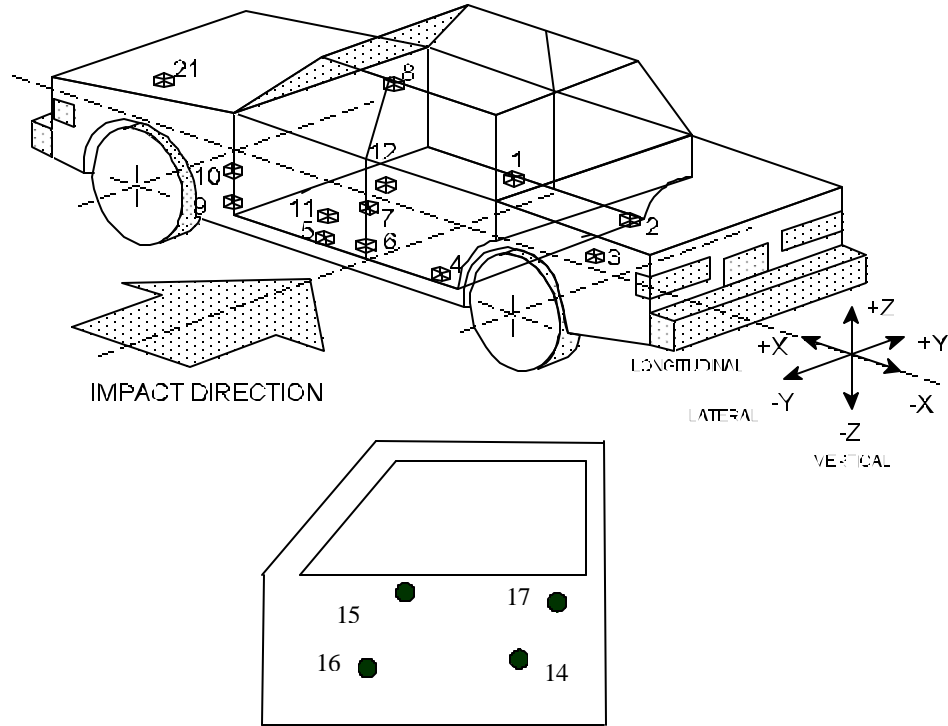
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	1950 mm	4	388	441	53
2	1224 mm	4	311	439	128
3	399 mm	4	260	789	529
4	-509 mm	1	257	617	360
5	-1236 mm	4	312	440	128
6	-1950 mm	4	394	428	34

Reference plane is parallel to test vehicle longitudinal centerline
Given dimensions = Reference plane to car body

DATA SHEET NO. 10
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002



No.	Location
1	Right Side Sill at Front Seat
2	Right Side Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Side Sill at Rear Door
5	Left Side Sill at Front Door
6	Left Lower B Post
7	Left Mid B Post
8	Left Upper B Post
9	Left Lower A Post
10	Left Mid A Post
11	Driver Seat Track

No.	Location
12	Vehicle CG
13	Left A Pillar @ Roof
14	Left Front Door @ Pelvis
15	Left Front Door @ Arm
16	Left Front Door @ Knee
17	Left front Door @ Rib
19	Left Driver Seat Frame
20	Right Driver Seat Frame
21	Lower Center Radiator Support

DATA SHEET NO. 10...(continued)
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Long. (X) Maximums (g's) (CFC 60)		Lat.. (Y) Maximums (g's)		Vert. (Z) Maximums (g's)		Resultant (g's)
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Right Side Sill at Front Seat	1.3	1.6	9.3	0.5	4.3	4.1	9.3
2	Right Side Sill at Rear Seat	1.3	2.0	10.5	0.2	2.8	2.8	10.5
3	Rear Floorpan Above Axle	3.4	2.7	9.3	0.1	2.9	5.4	9.6
4	Left Side Sill at Rear Door			15.5	0.2			
5	Left Side Sill at Front Door			28.6	11.8			
6	Left Lower B Post			77.3	8.1			
7	Left Mid B Post			48.2	28.2			
8	Left Upper B Post			**	**			
9	Left Lower A Post			26.0	15.3			
10	Left Mid A Post			9.9	3.7			
11	Driver Left Seat Track			83.2	15.2			
12	Vehicle CG	5.8	22.8	26.6	46.9	34.4	23.5	54.8
13	Left A Pillar @ Roof			**	**			
14	Left Front Door @ Pelvis *			149.1	-			
15	Left Front Door @ Arm			85.0	24.7			
16	Left Rear Door @ Knee			160.2	81.6			
17	Left Rear Door @ Rib			100.0	5.2			
19	Left Driver Seat Frame			73.9	22.3			
20	Right Driver Seat Frame			72.3	16.6			
21	Lower Center Radiator Support	3.2	6.3	9.1	5.9	5.5	12.9	13.5

Sign Convention X - (+ forward)
 Y - (+ to right)
 Z - (+ down)

* No valid data after 16 msec

** Not used to avoid interference with the curtain airbag

DATA SHEET NO. 10...(continued)
VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002

VEHICLE ACCELEROMETER COORDINATES

Loc. No.	Description	Coordinates (mm)*		
		X	Y	Z
1	Right Side Sill at Front Seat	2510	693	316
2	Right Side Sill at Rear Seat	1562	661	318
3	Rear Floorpan Above Axle	1044	0	615
4	Left Side Sill at Rear Door	1564	-661	317
5	Left Side Sill at Front Door	2495	-670	314
6	Left Lower B Post	2142	-680	375
7	Left Mid B Post	2083	-740	935
8	Left Upper B Post	**	**	**
9	Left Lower A Post	2071	-532	1420
10	Left Mid A Post	3221	-790	940
11	Driver Left Seat Track	2375	-545	390
12	Vehicle CG	2541	-15	390
13	Left A Pillar @ Roof	**	**	**
14	Left Front Door @ Pelvis	2431	-750	750
15	Left Front Door @ Arm	2673	-753	882
16	Left Rear Door @ Knee	2882	-748	695
17	Left Rear Door @ Rib	2401	-745	1021
19	Left Driver Seat Frame	2135	-575	826
20	Right Driver Seat Frame	2135	-176	829
21	Lower Center Radiator Support	4390	0	305

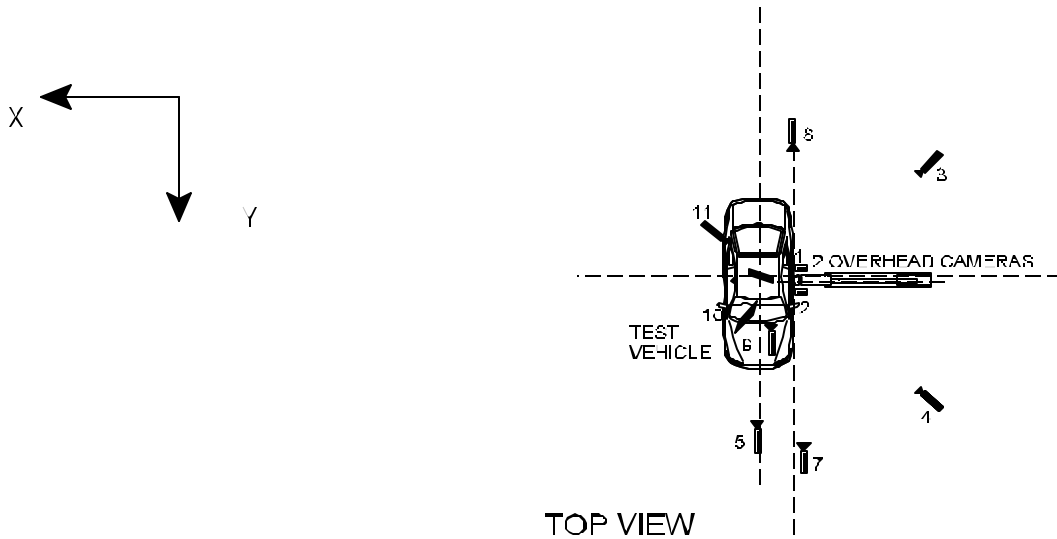
Sign Convention X - Rear Bumper (+ Forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ up)

** No used to avoid interference with the curtain airbag

DATA SHEET NO. 11
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: July 9, 2002



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	-1000	0	5000	8	952
2	Overhead Close-up	10	0	5000	13	1005
3	Left Side 45° Rearward Pole View	-3419	-7000	1210	50	995
4	Left Side 45° Forward Pole View	-2850	4985	1280	50	980
5	Real Time					
7	Front Ground Level Vehicle/Pole Impact	900	9140	1310	25	1031
8	Rear Ground Level Vehicle/Pole Impact	750	-9060	1230	25	1010
9	Test Vehicle Onboard Driver Hip				8	505
10	Test Vehicle Onboard Hood				13	513
11	Test Vehicle Onboard Driver Head Contact				13	500

Reference Points X - + Forward of Impact
 Y - + Right of Impact
 Z - + Up from Ground

**APPENDIX A
PHOTOGRAPHS**

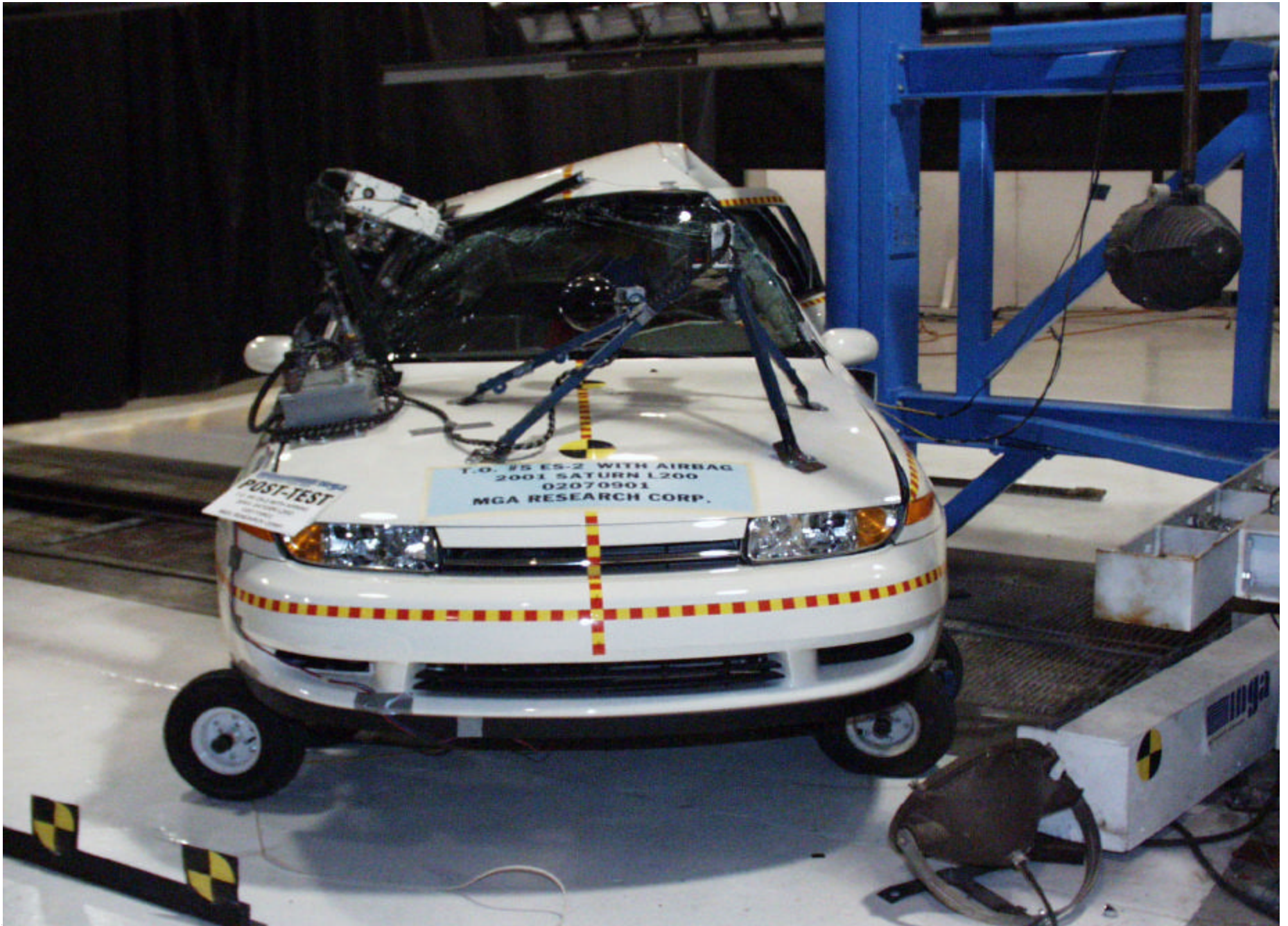
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A-1.



Pre-Test Front View of Test Vehicle



Post-Test Front View of Test Vehicle



Pre-Test Rear View of Test Vehicle

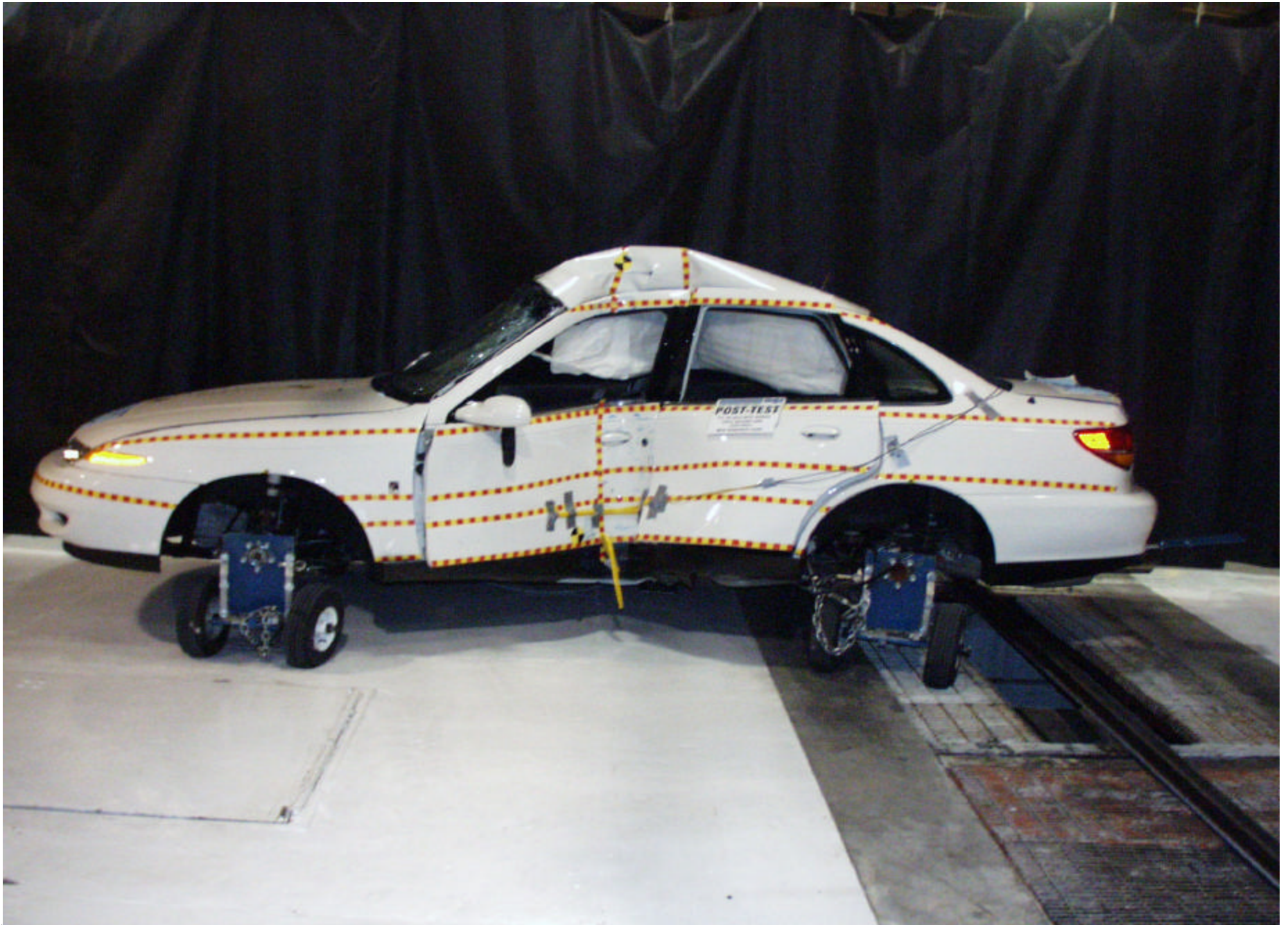


Post-Test Rear View of Test Vehicle

A-5.



Pre-Test Left Side View of Test Vehicle



Post-Test Left Side View of Test Vehicle



Pre-Test Left Front View

A-8.



Post-Test Left Front View

A-9.

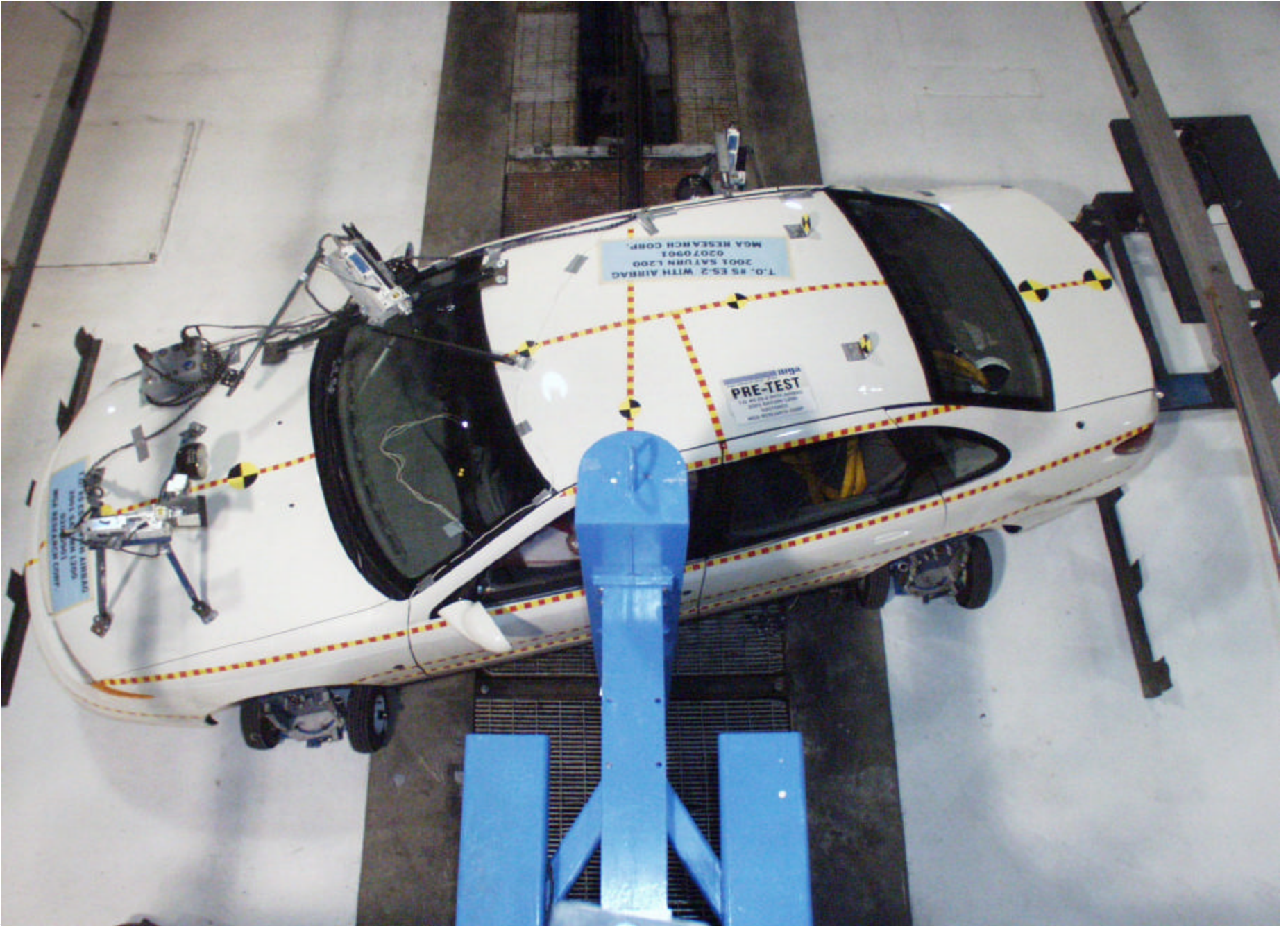


Pre-Test Left Rear View

A-10.

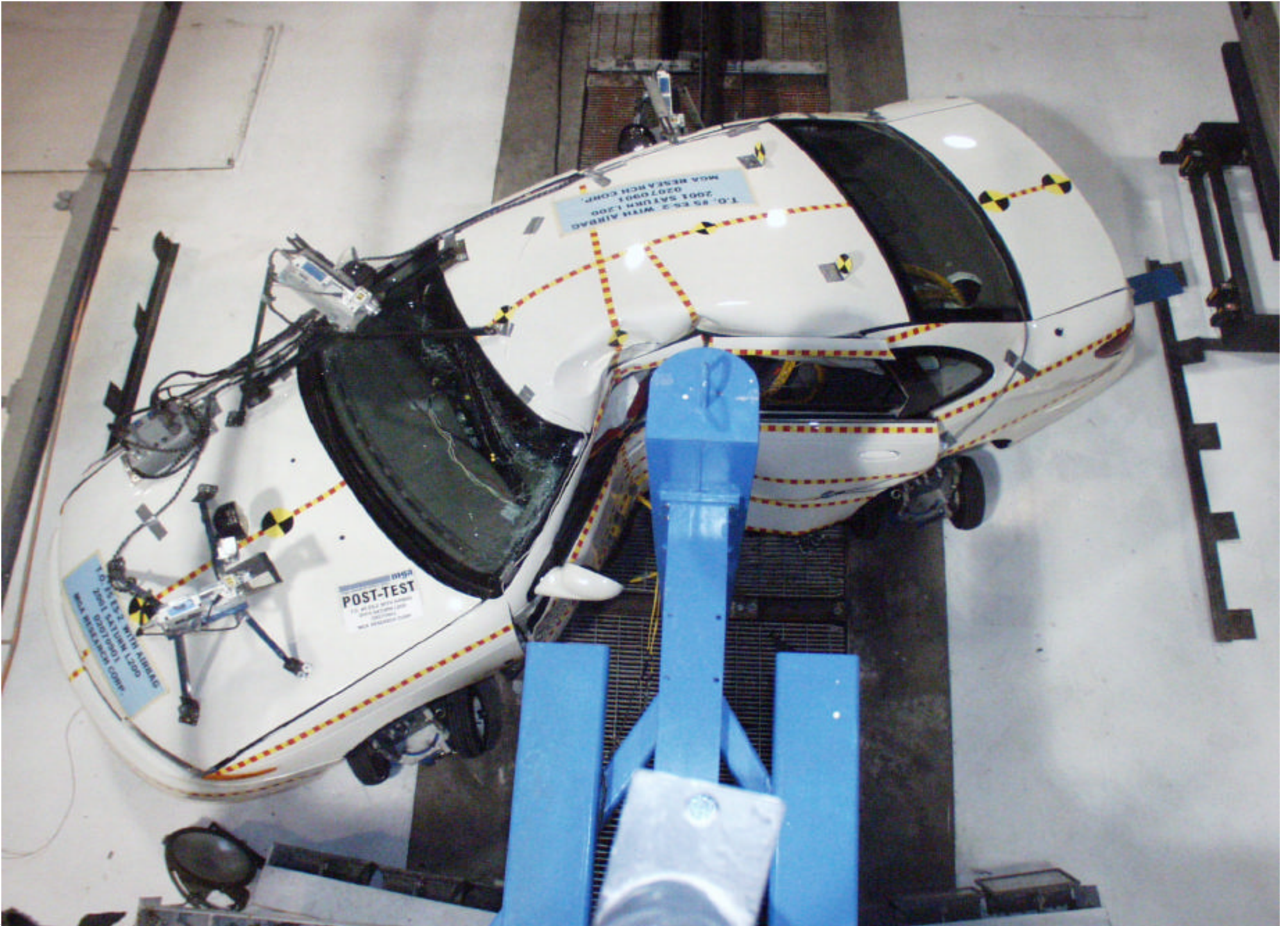


Post-Test Left Rear View



A-11.

Pre-Test Overhead View



Post-Test Overhead View

A-13.



Pre-Test Left Rear Vehicle against Pole View

A-14.



Post-Test Left Rear Vehicle against Pole View

A-15.

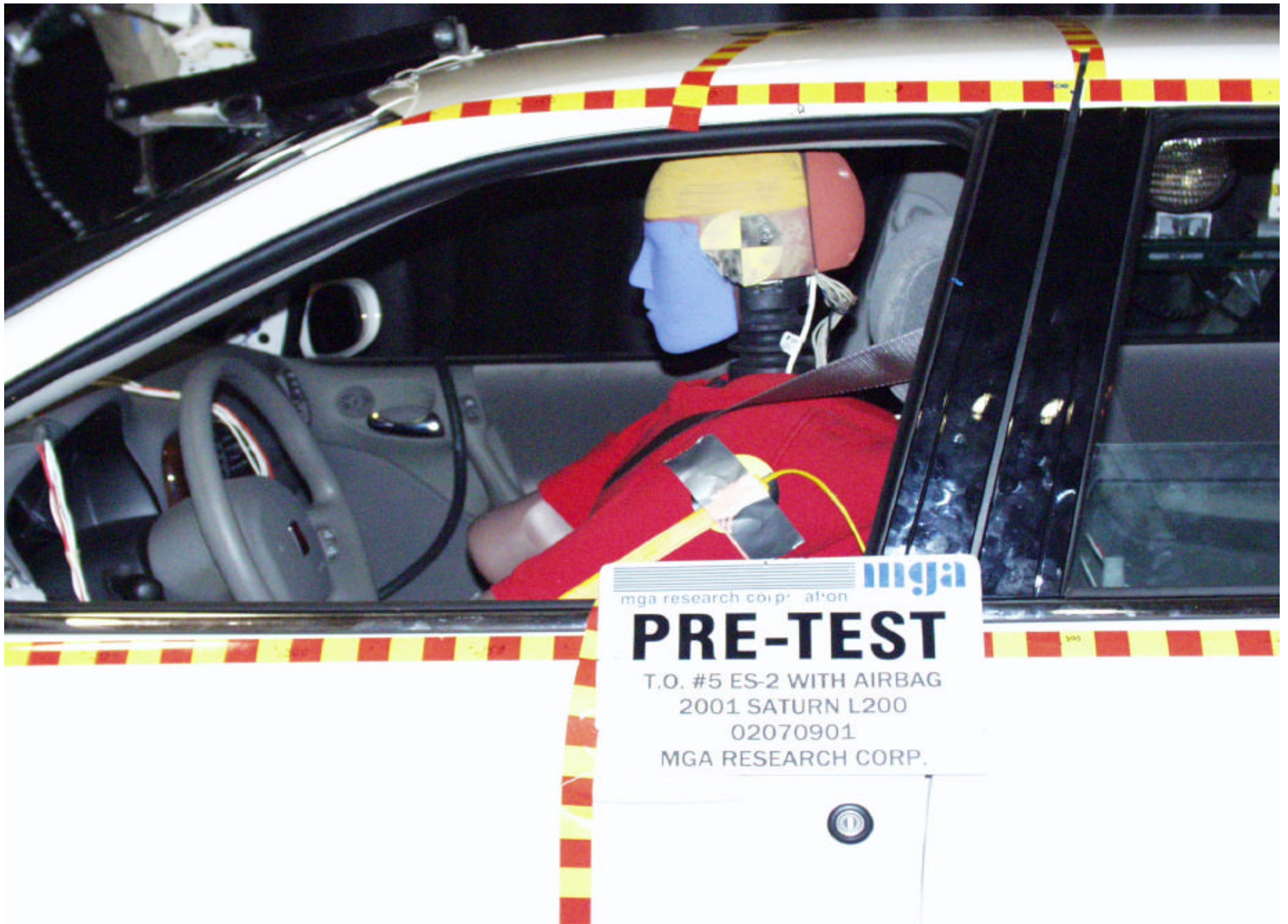


Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View

A-17.



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View



Pre-Test Driver Dummy Left Side View (Door Open)



Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View



Pre-Test Seat Position



MFD BY SATURN CORPORATION

DATE
12/00

GVWR
1819 KG
4011 LB

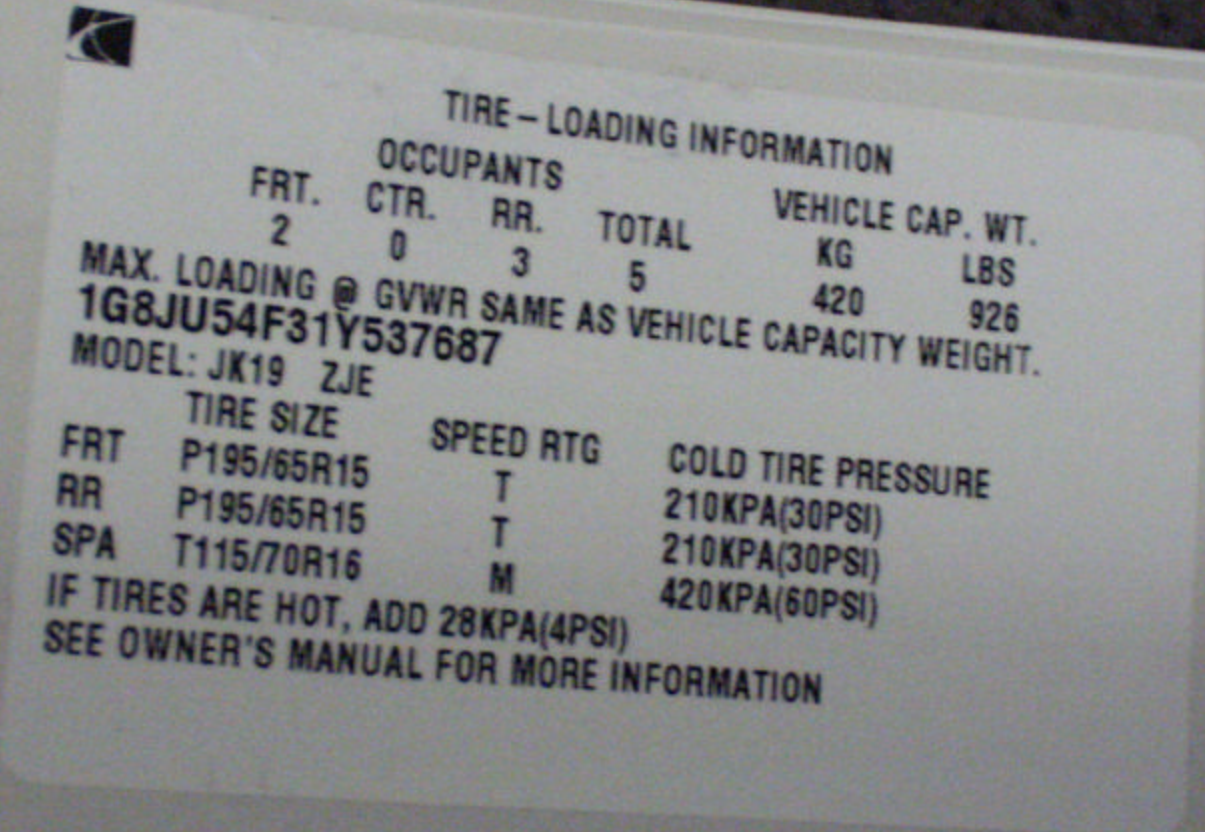
GAWR FRT
897 KG
1977 LB

GAWR RR
922 KG
2034 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR
VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN
EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

1G8JU54F31Y537687

TYPE: PASS CAR



TIRE - LOADING INFORMATION

OCCUPANTS				VEHICLE CAP. WT.	
FRT.	CTR.	RR.	TOTAL	KG	LBS
2	0	3	5	420	926

MAX. LOADING @ GVWR SAME AS VEHICLE CAPACITY WEIGHT.
1G8JU54F31Y537687
MODEL: JK19 ZJE

	TIRE SIZE	SPEED RTG	COLD TIRE PRESSURE
FRT	P195/65R15	T	210KPA(30PSI)
RR	P195/65R15	T	210KPA(30PSI)
SPA	T115/70R16	M	420KPA(60PSI)

IF TIRES ARE HOT, ADD 28KPA(4PSI)
SEE OWNER'S MANUAL FOR MORE INFORMATION

Tire Placard



Pre-Test Impact Point on Vehicle



Post-Test Impact Point on Vehicle

A-27.



Post-Test Driver Dummy Head Contact with Airbag



Post-Test Driver Dummy Head Contact



Post-Test Driver Dummy Contact

A-30.



Impact

APPENDIX B
VEHICLE AND ES-2 RESPONSE DATA TRACES

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* No Valid Data After Approximately 16 msec.

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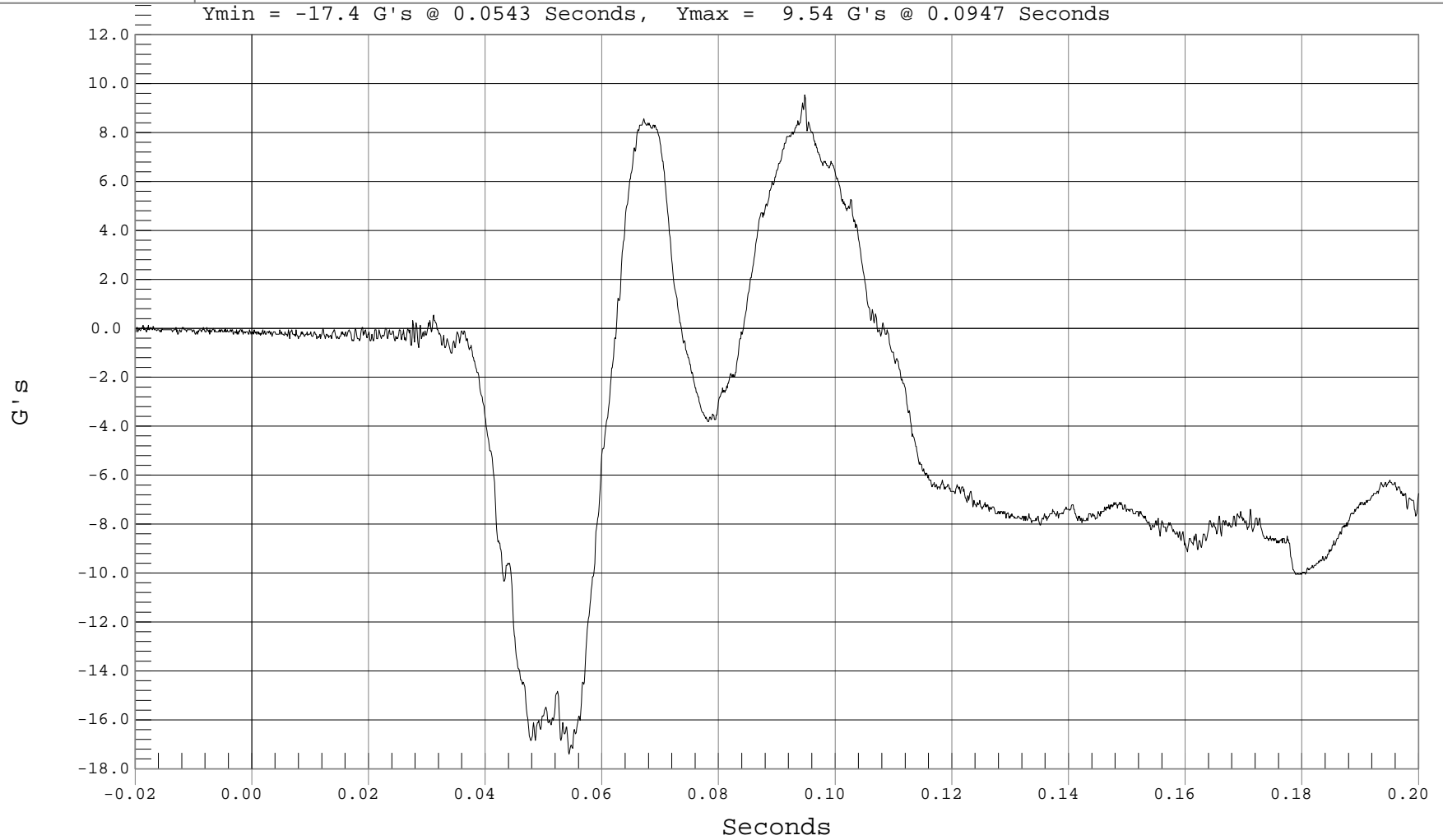
DRIVER HEAD X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD X, B02055AT.A01

Ymin = -17.4 G's @ 0.0543 Seconds, Ymax = 9.54 G's @ 0.0947 Seconds



B-1



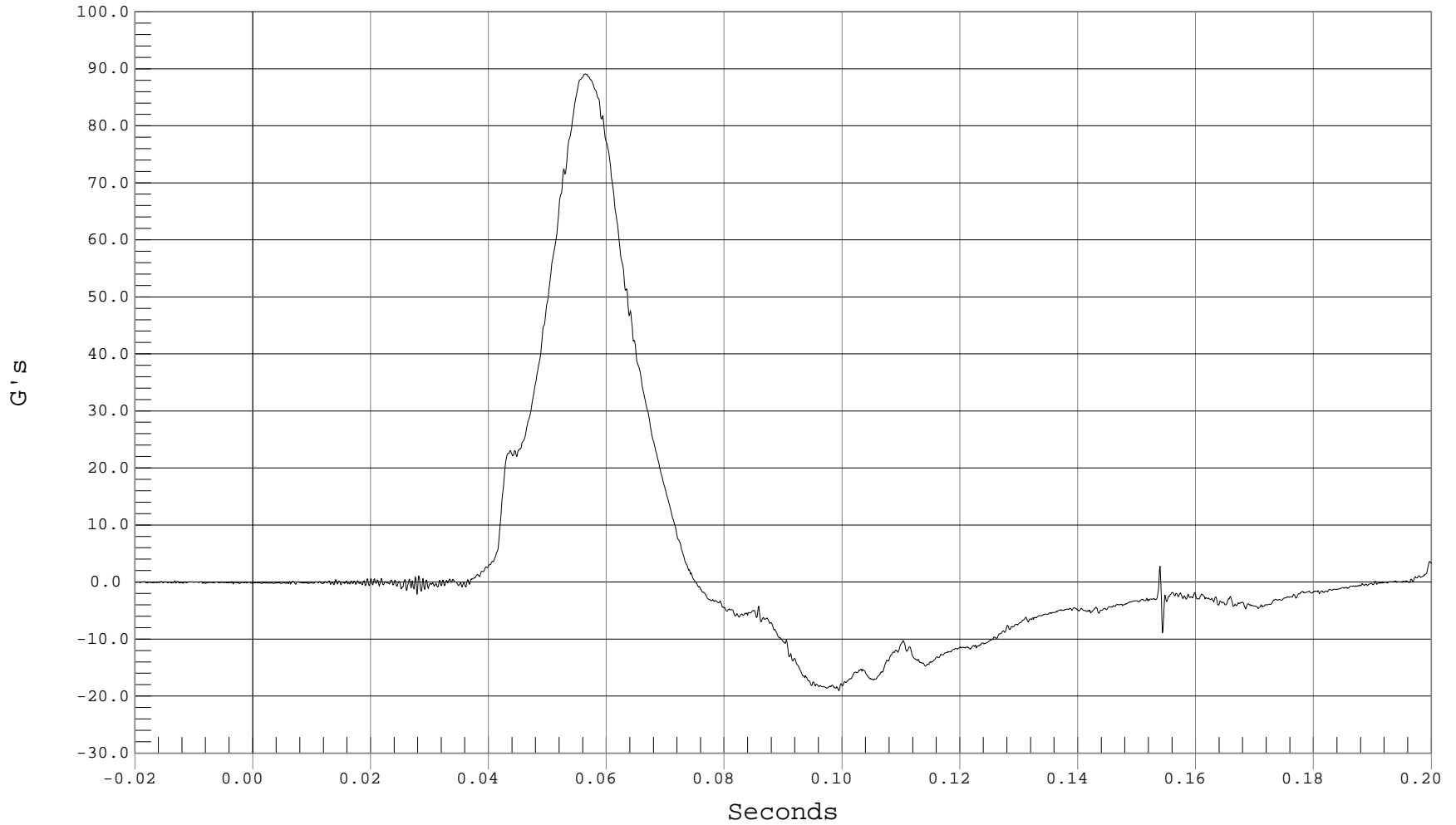
DRIVER HEAD Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD Y, B02055AT.A02

Ymin = -19.08 G's @ 0.0994 Seconds, Ymax = 89.12 G's @ 0.0564 Seconds





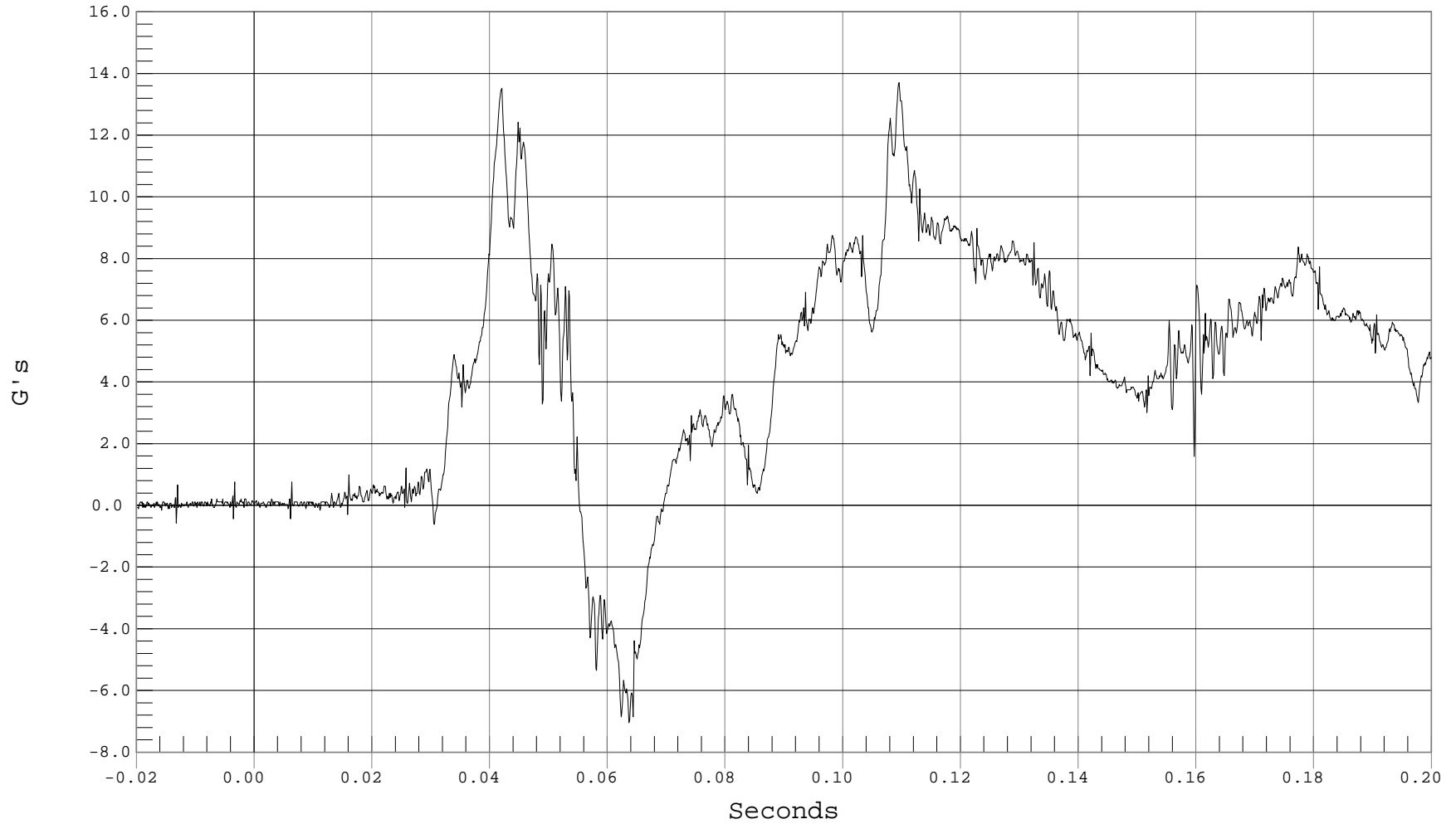
DRIVER HEAD Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD Z, B02055AT.A03

Ymin = -7.05 G's @ 0.0636 Seconds, Ymax = 13.7 G's @ 0.1095 Seconds





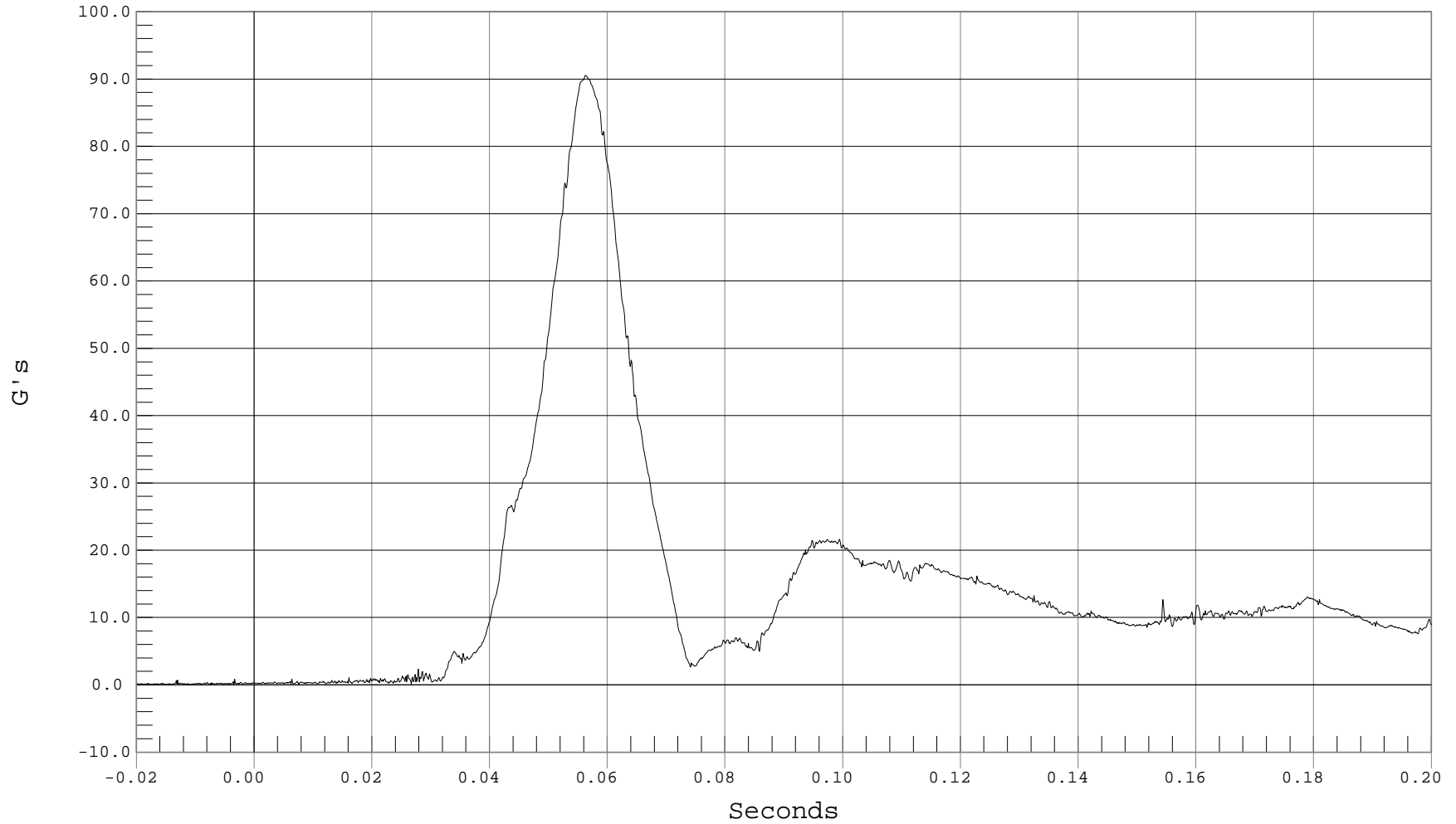
DRIVER HEAD RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD RESULTANT, B02055AV.A01

Ymin = .06 G's @ -0.0177 Seconds, Ymax = 90.53 G's @ 0.0562 Seconds





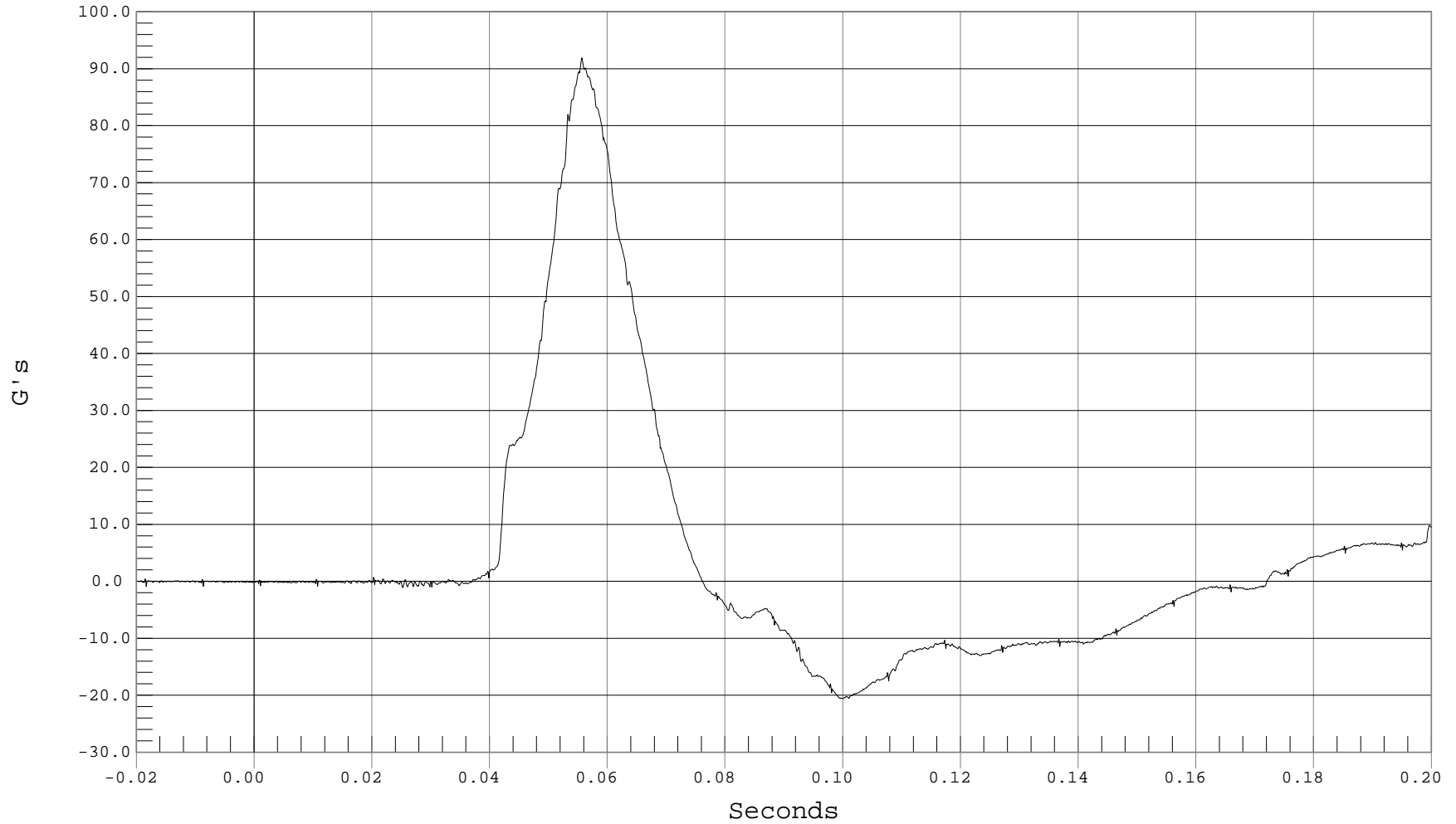
DRIVER HEAD FRONT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD FRONT Y, B02055AT.A75

Ymin = -20.53 G's @ 0.0994 Seconds, Ymax = 91.92 G's @ 0.0556 Seconds



B-5



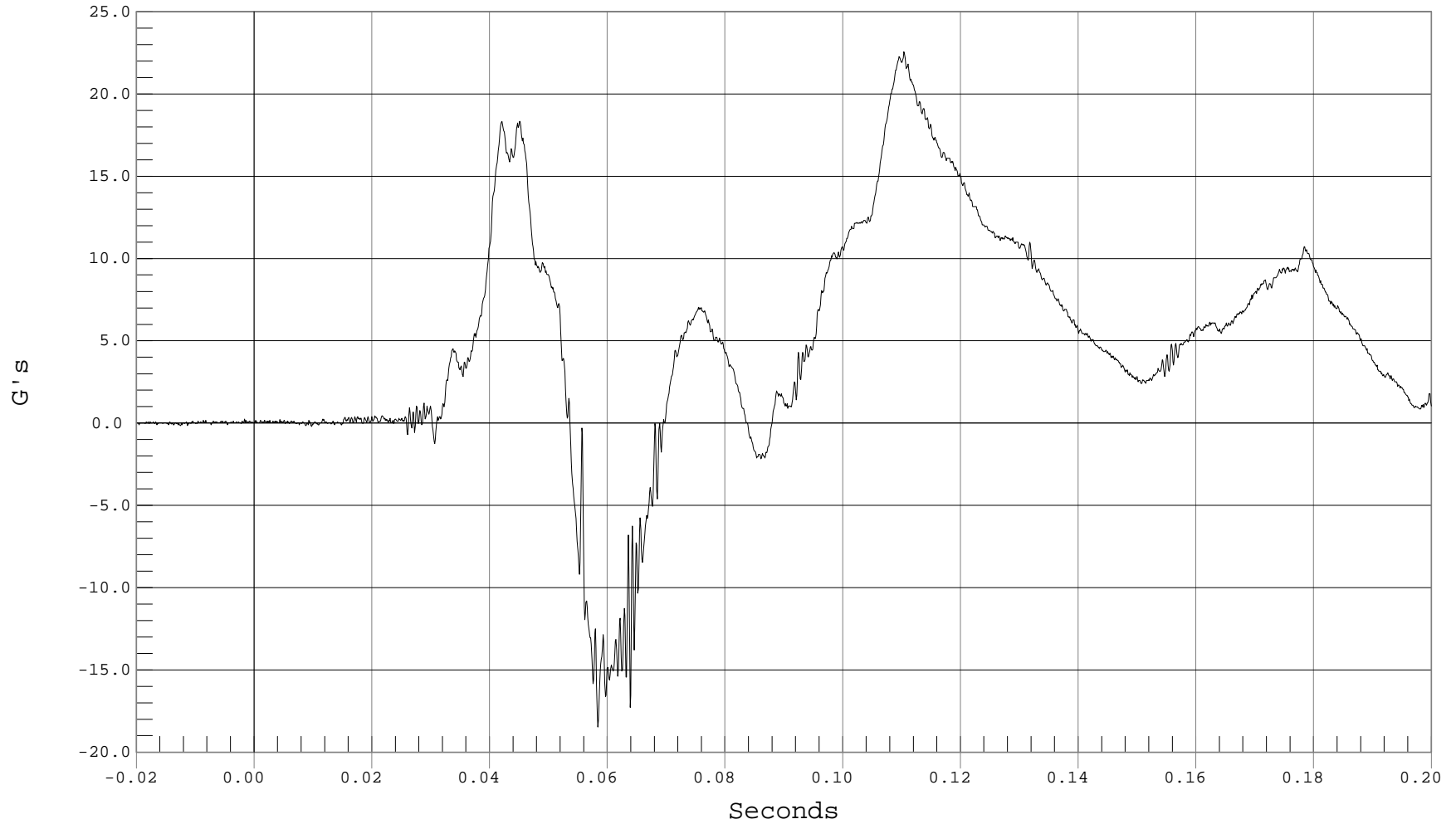
DRIVER HEAD FRONT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD FRONT Z, B02055AT.A76

Ymin = -18.47 G's @ 0.0583 Seconds, Ymax = 22.56 G's @ 0.1103 Seconds



B-6



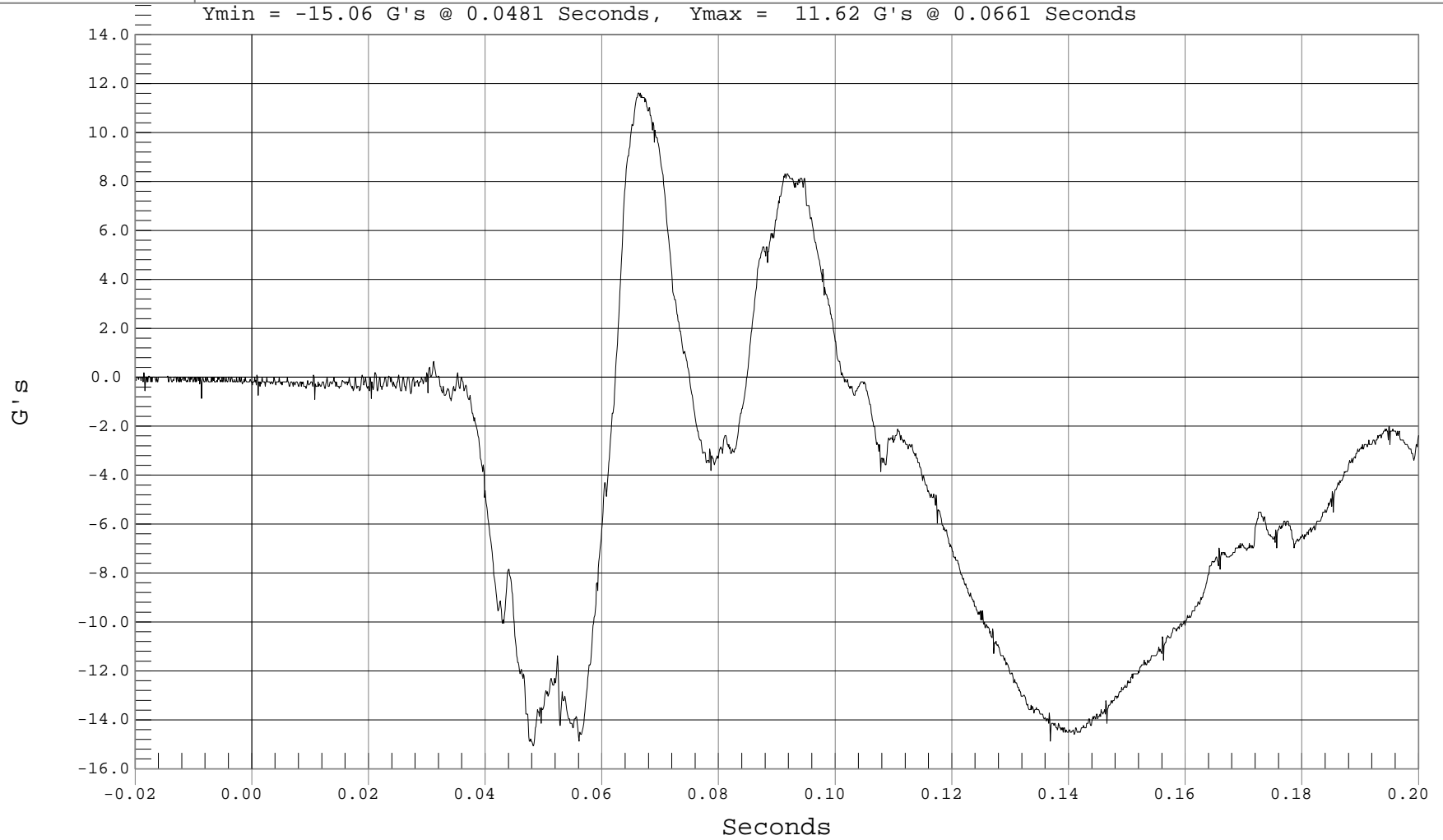
DRIVER HEAD LEFT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD LEFT X, B02055AT.A77

Ymin = -15.06 G's @ 0.0481 Seconds, Ymax = 11.62 G's @ 0.0661 Seconds



B-7



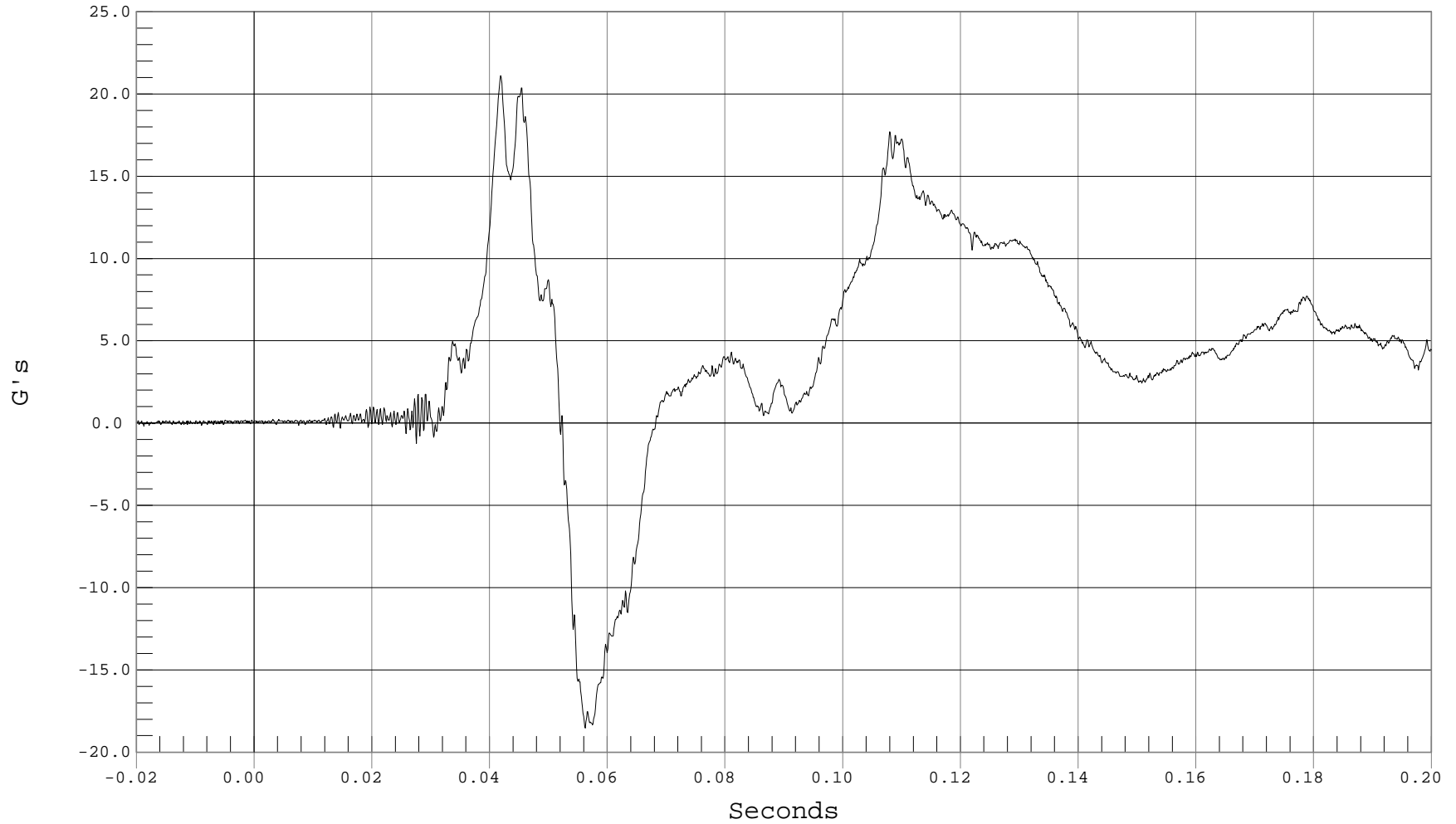
DRIVER HEAD LEFT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD LEFT Z, B02055AT.A78

Ymin = -18.54 G's @ 0.0562 Seconds, Ymax = 21.11 G's @ 0.0418 Seconds





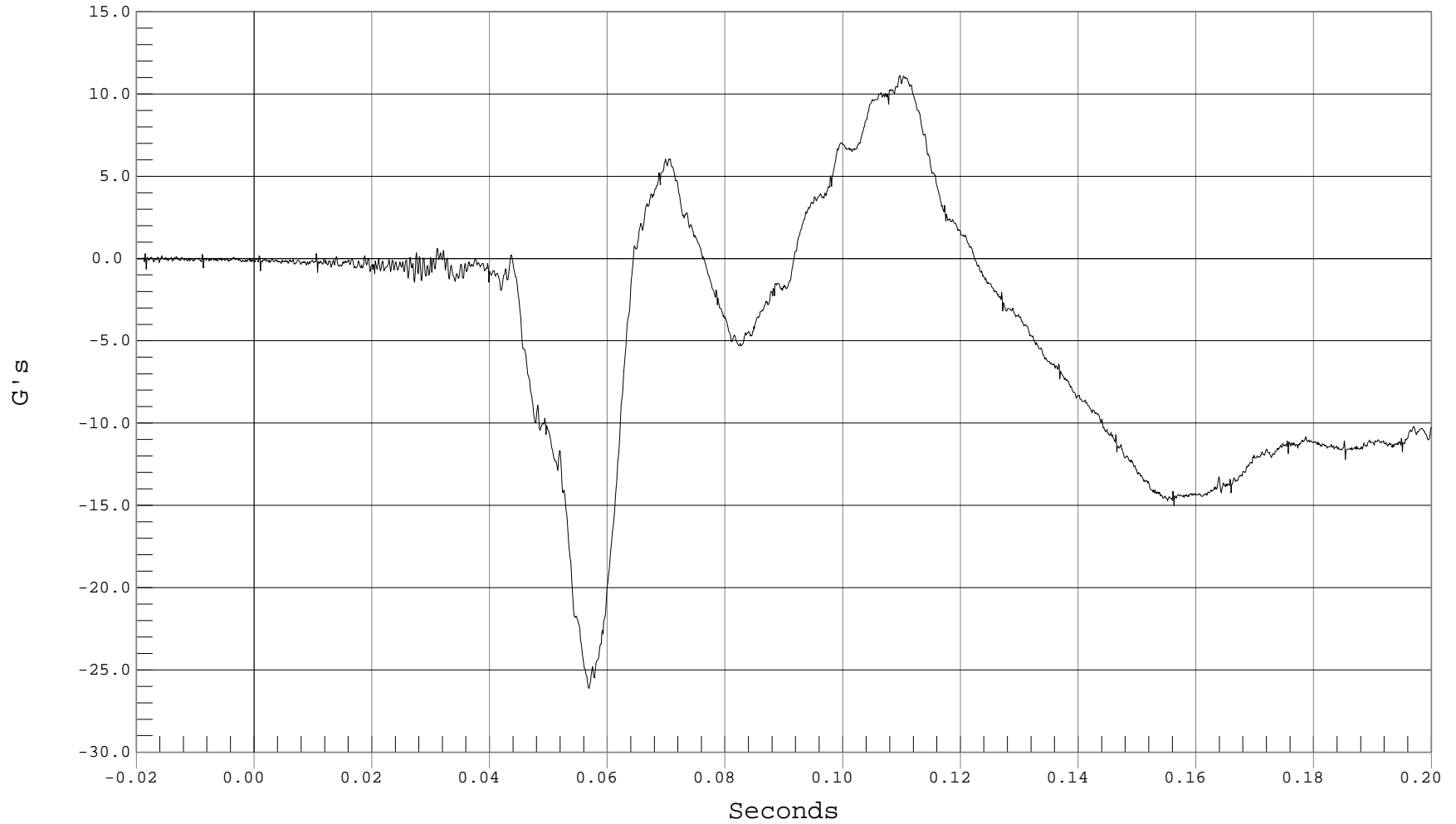
DRIVER HEAD TOP X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD TOP X, B02055AT.A79

Ymin = -26.12 G's @ 0.0568 Seconds, Ymax = 11.14 G's @ 0.1096 Seconds



B-9



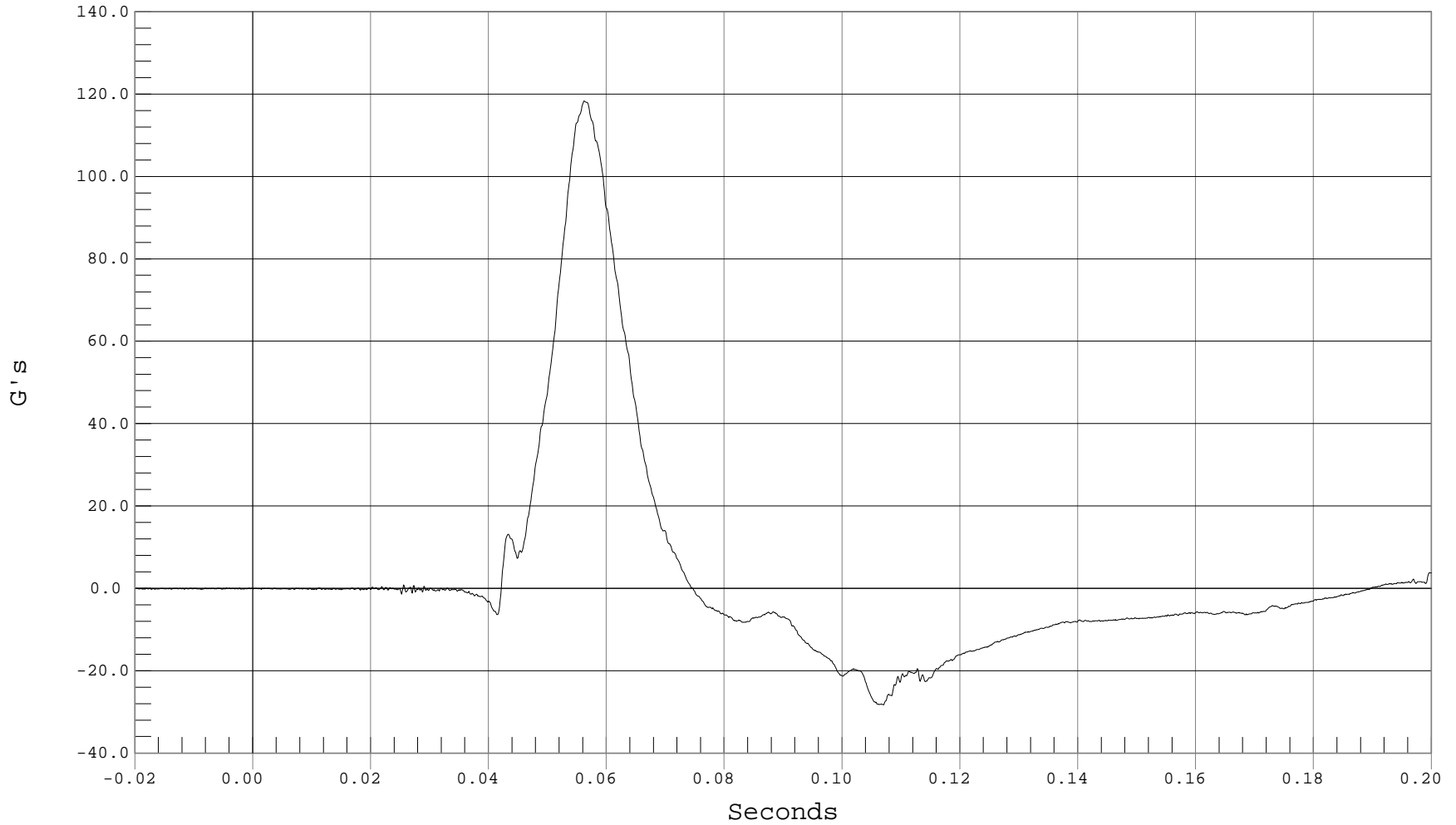
DRIVER HEAD TOP Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER HEAD TOP Y, B02055AT.A80

Ymin = -28.29 G's @ 0.1069 Seconds, Ymax = 118.36 G's @ 0.0562 Seconds



B-10



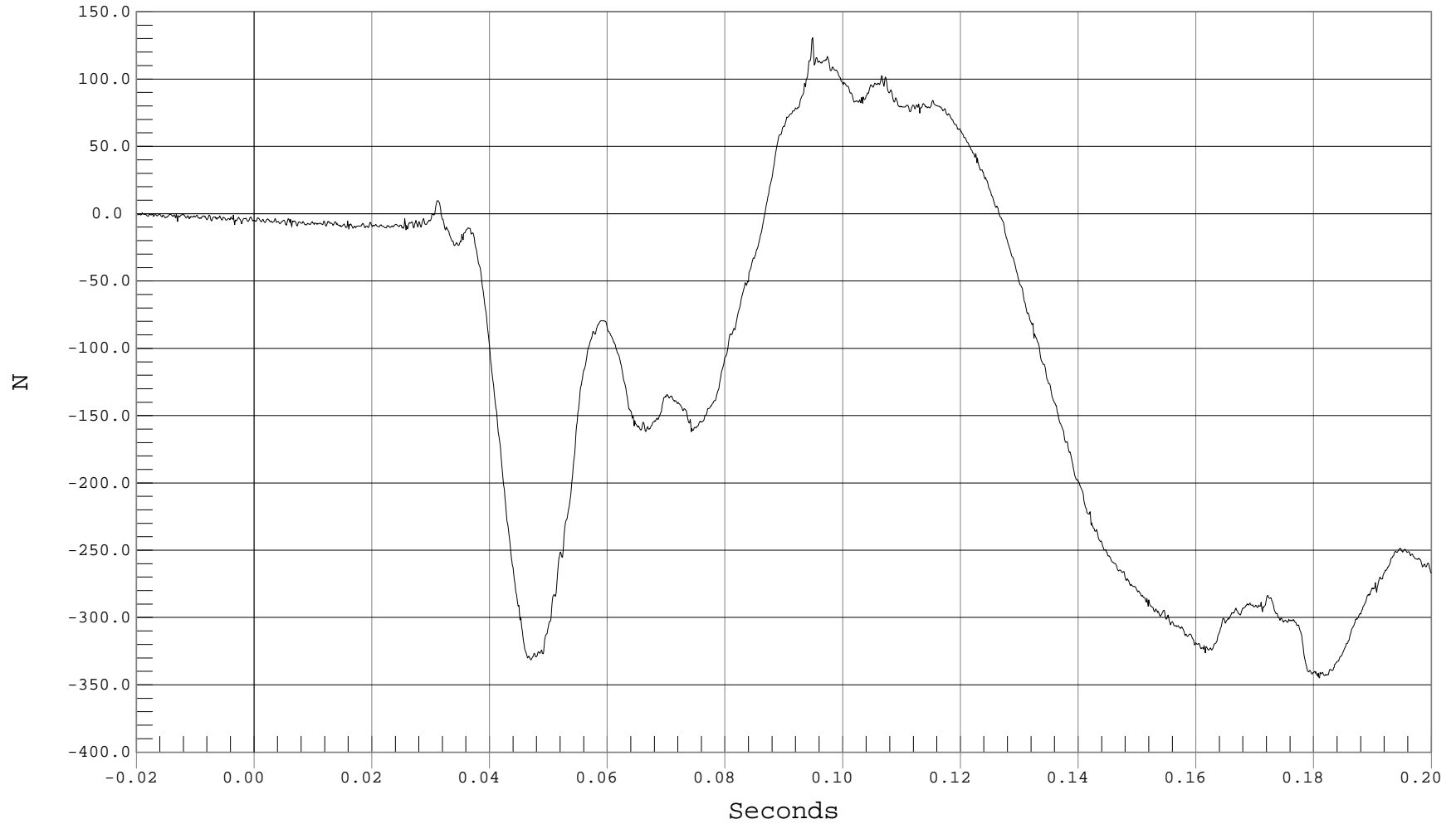
DRIVER UPPER NECK FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER UPPER NECK FX, B02055FT.F15

Ymin = -344.93 N @ 0.1809 Seconds, Ymax = 130.69 N @ 0.0948 Seconds



B-11



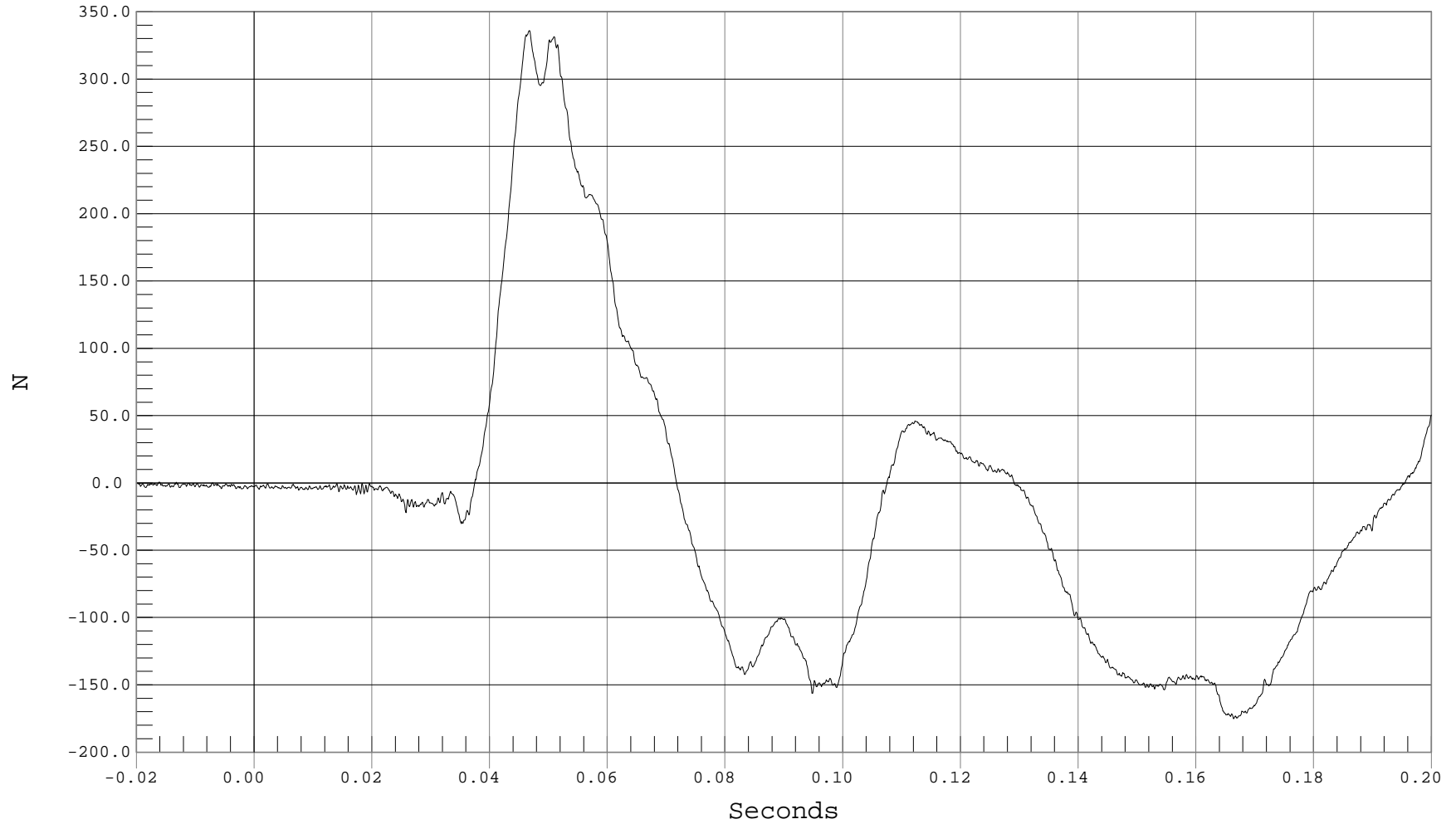
DRIVER UPPER NECK FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER UPPER NECK FY, B02055FT.F16

Ymin = -175.23 N @ 0.1663 Seconds, Ymax = 335.92 N @ 0.0467 Seconds





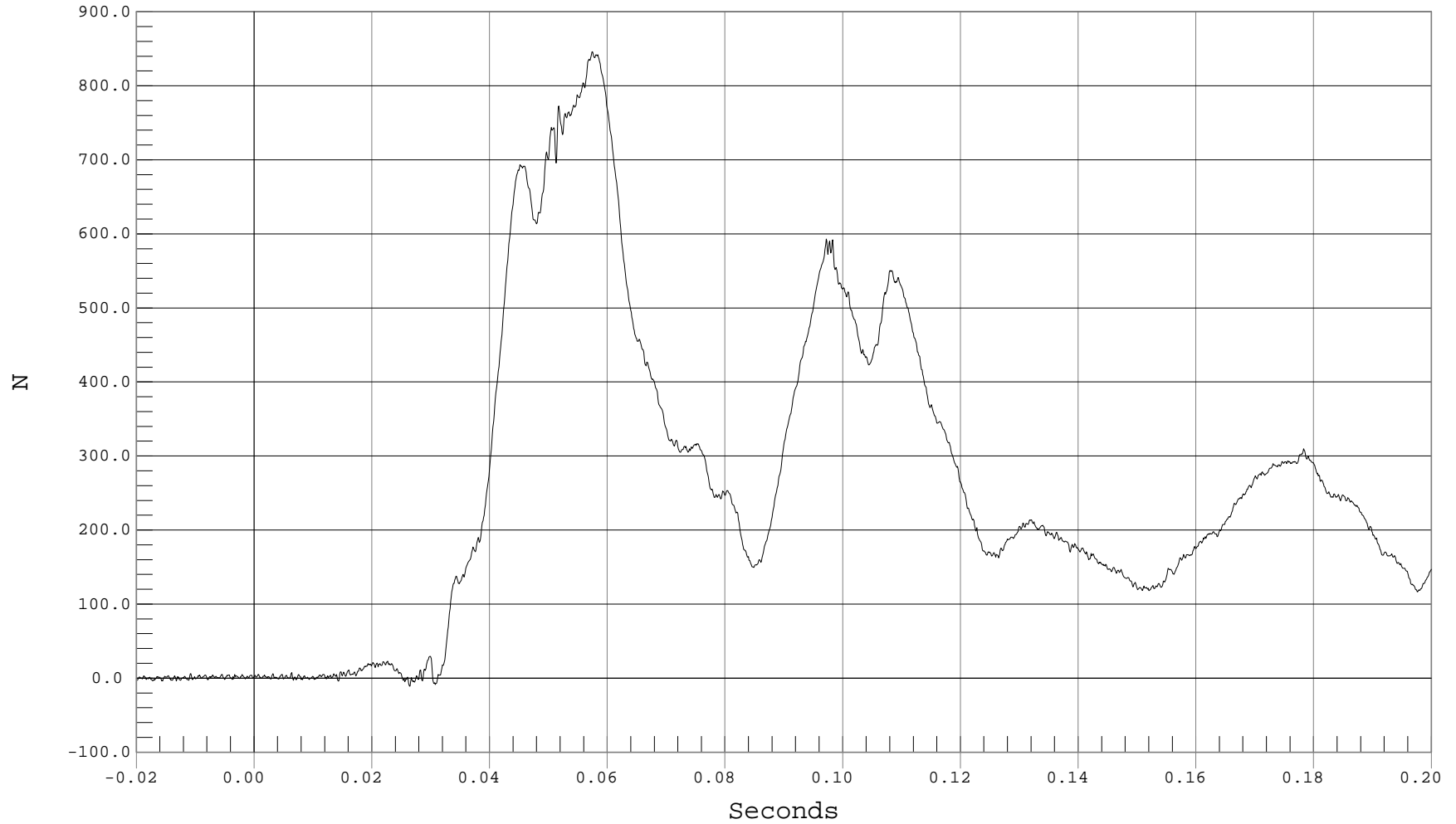
DRIVER UPPER NECK FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER UPPER NECK FZ, B02055FT.F17

Ymin = -10.96 N @ 0.0263 Seconds, Ymax = 846.14 N @ 0.0573 Seconds



B-13



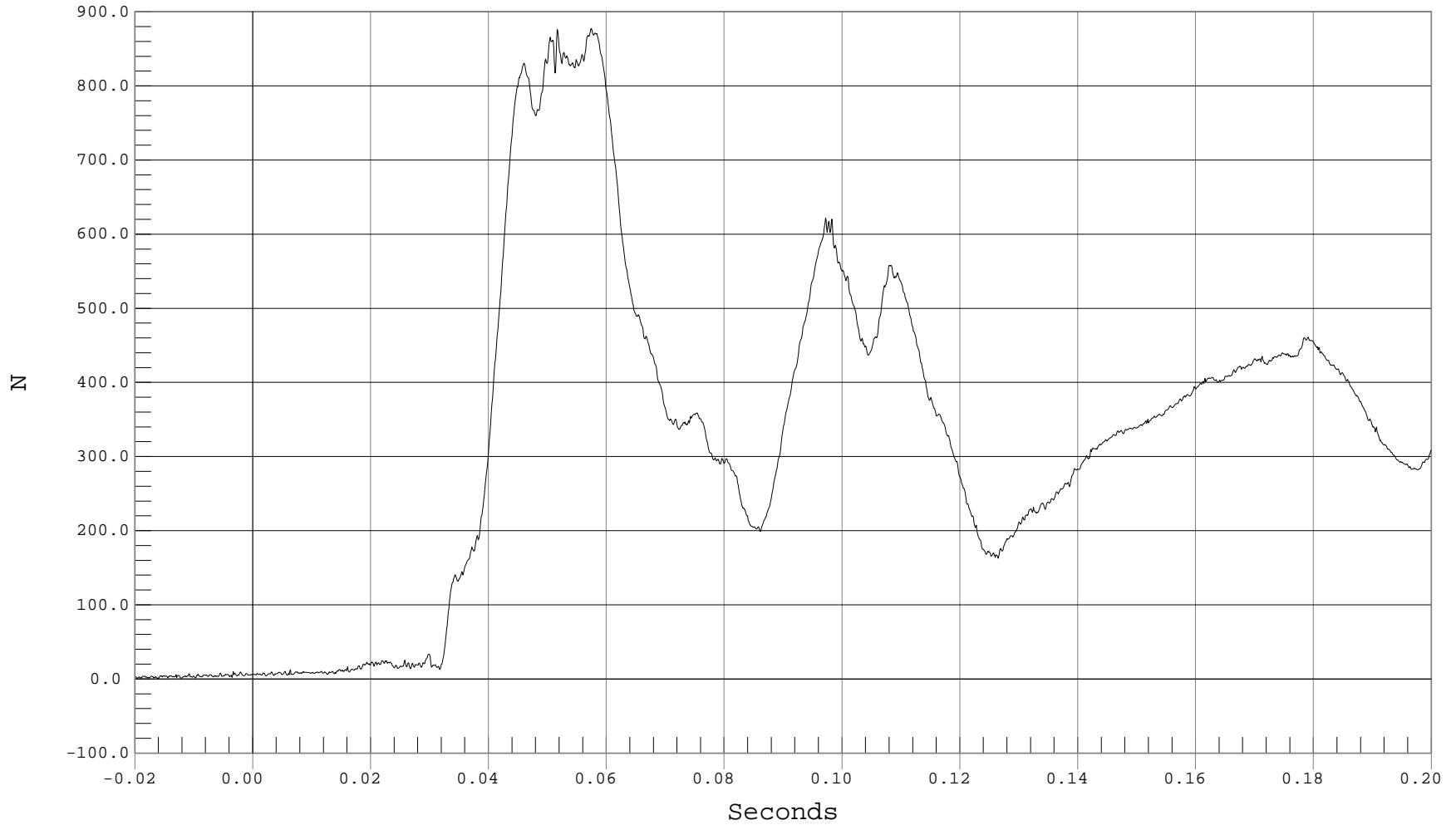
DRIVER UPPER NECK FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER UPPER NECK FORCE RESULTANT, B02055FV.F15

Ymin = .75 N @ -0.0162 Seconds, Ymax = 877.5 N @ 0.0573 Seconds



B-14



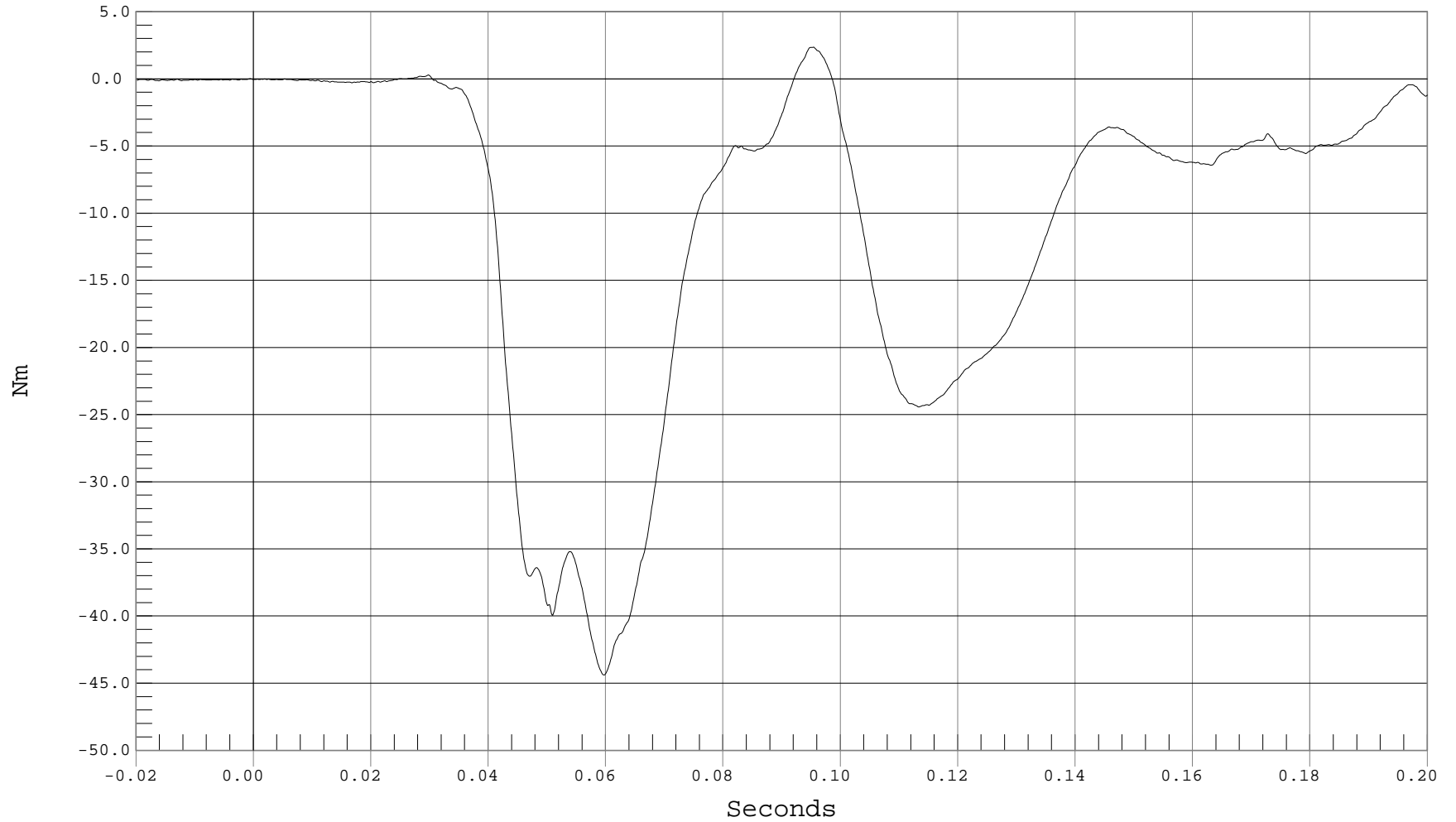
DRIVER UPPER NECK MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER NECK MX, B02055MF.M18

Ymin = -44.39 Nm @ 0.0596 Seconds, Ymax = 2.35 Nm @ 0.0953 Seconds





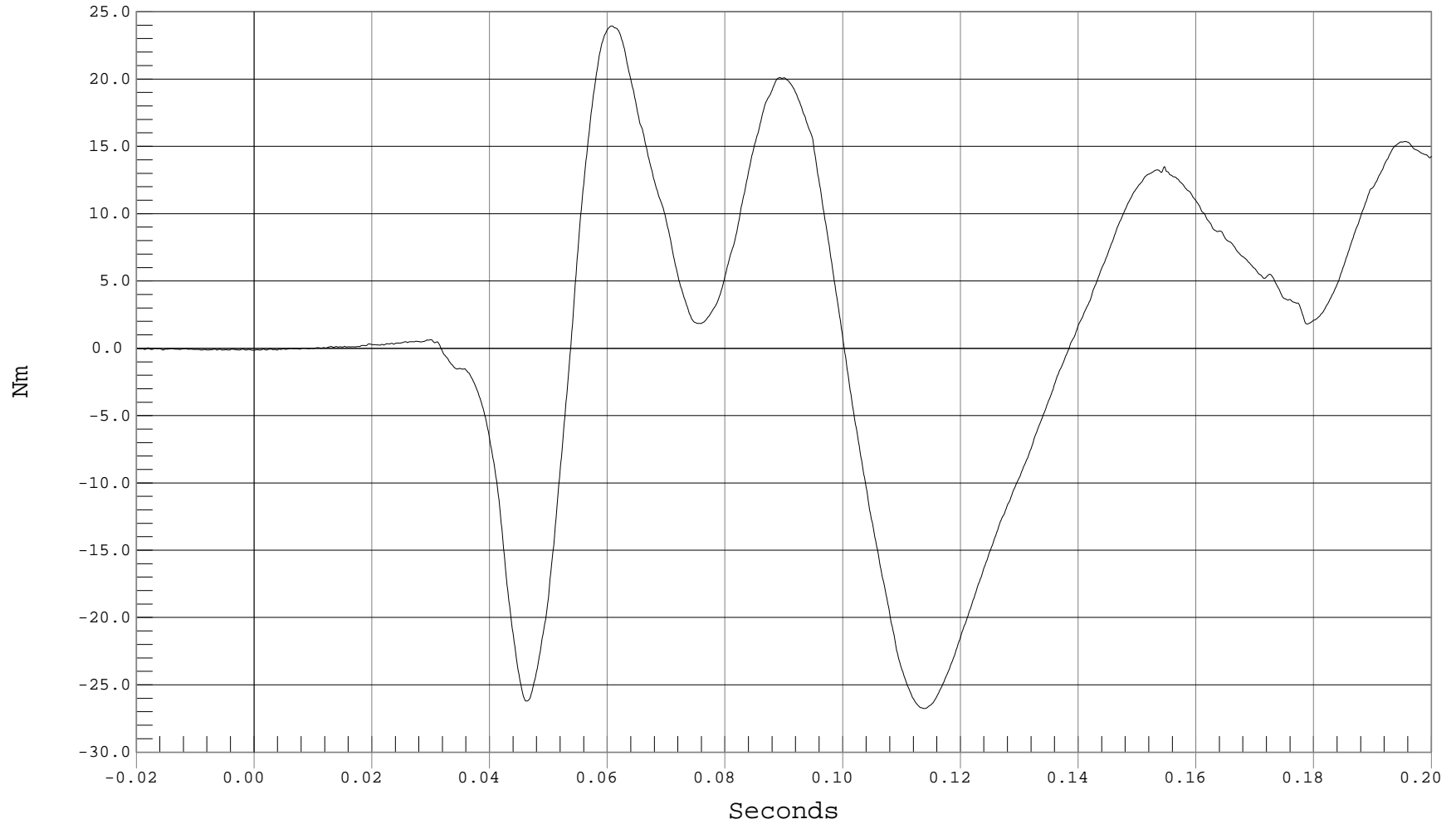
DRIVER UPPER NECK MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER NECK MY, B02055MF.M19

Ymin = -26.76 Nm @ 0.1138 Seconds, Ymax = 23.94 Nm @ 0.0607 Seconds





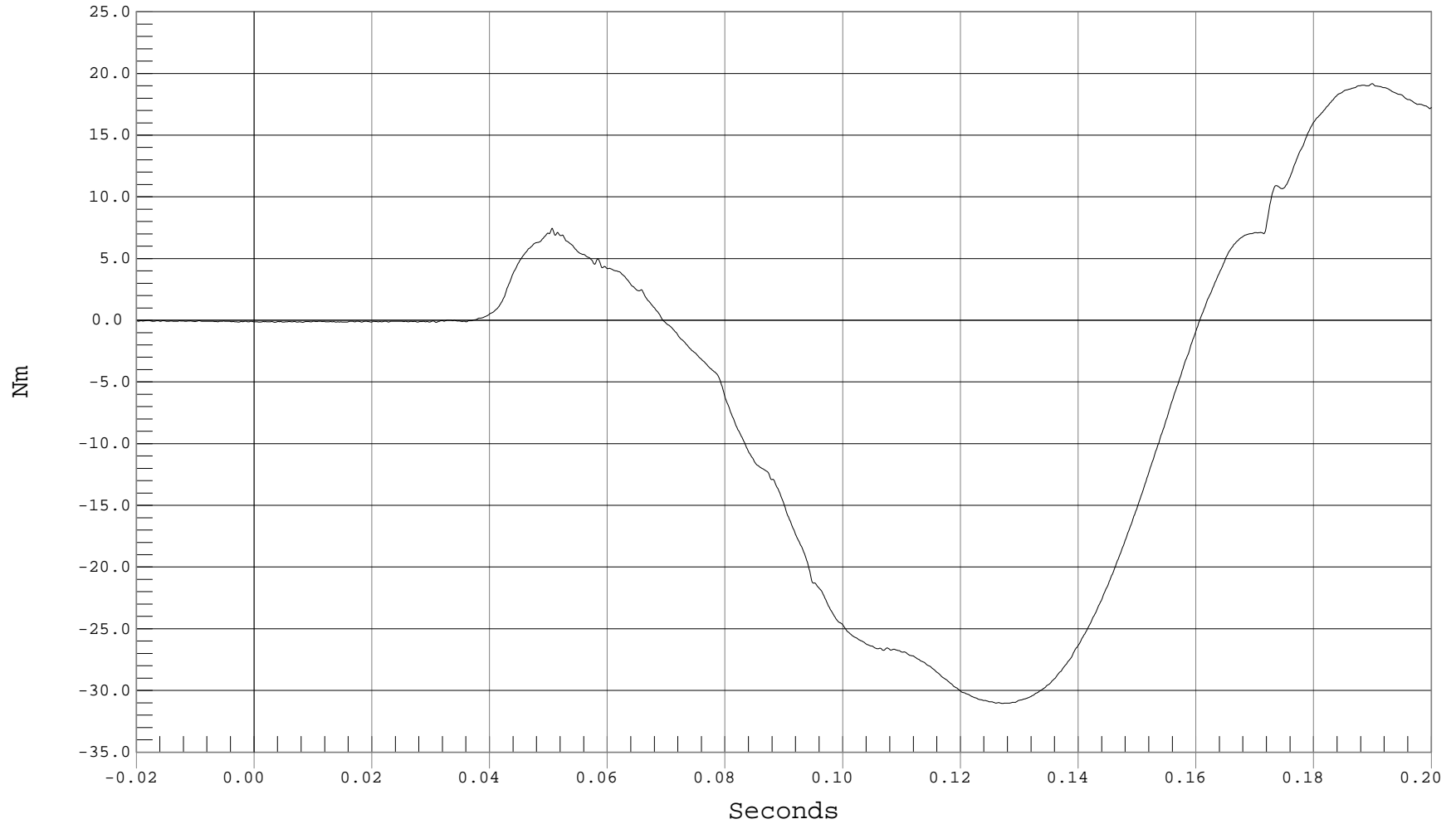
DRIVER UPPER NECK MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER NECK MZ, B02055MF.M20

Ymin = -31.06 Nm @ 0.1270 Seconds, Ymax = 19.18 Nm @ 0.1899 Seconds



B-17



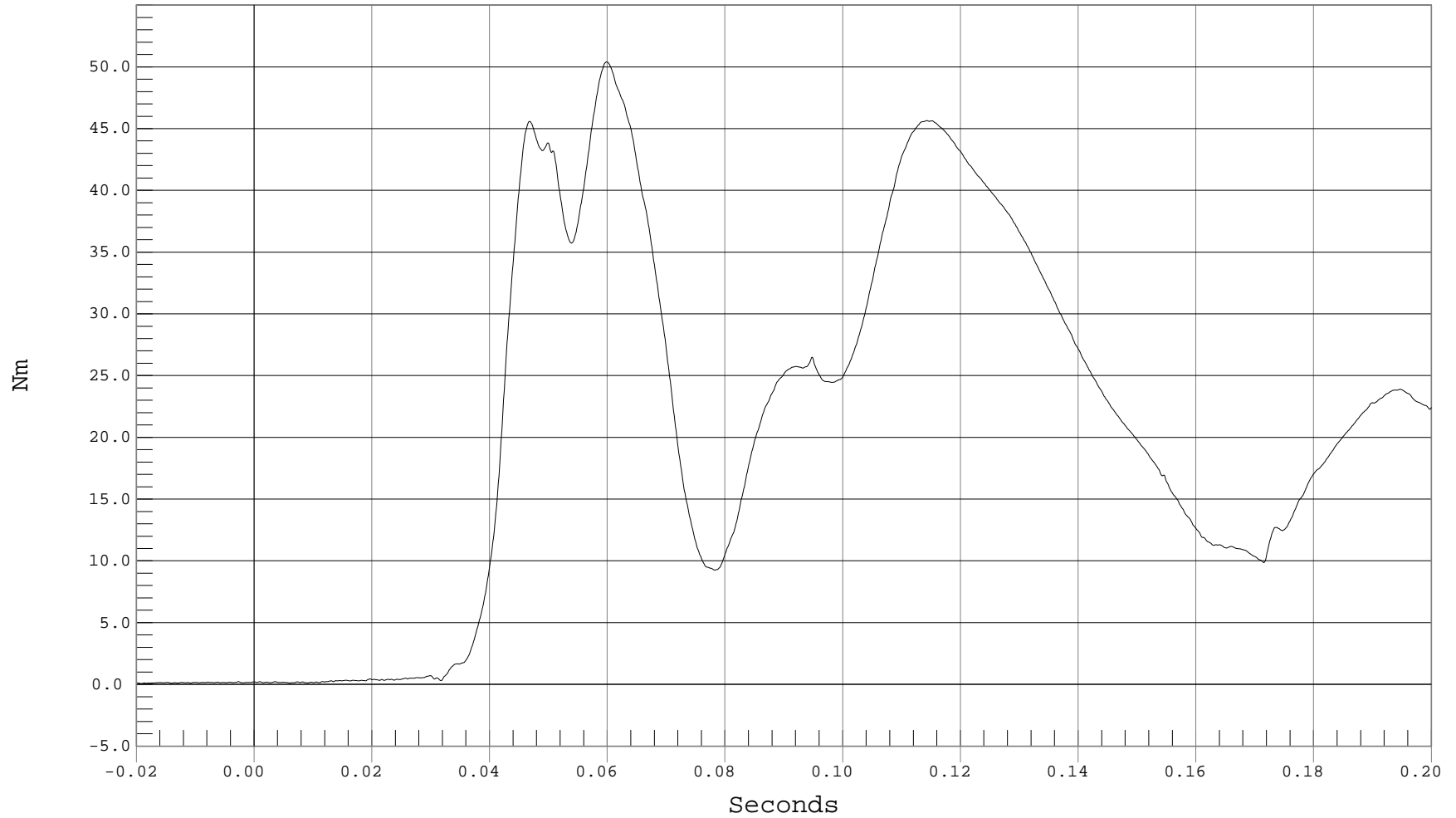
DRIVER UPPER NECK MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER UPPER NECK MOMENT RESULTANT, B02055MV.M18

Ymin = .07 Nm @ -0.0193 Seconds, Ymax = 50.4 Nm @ 0.0598 Seconds



B-18



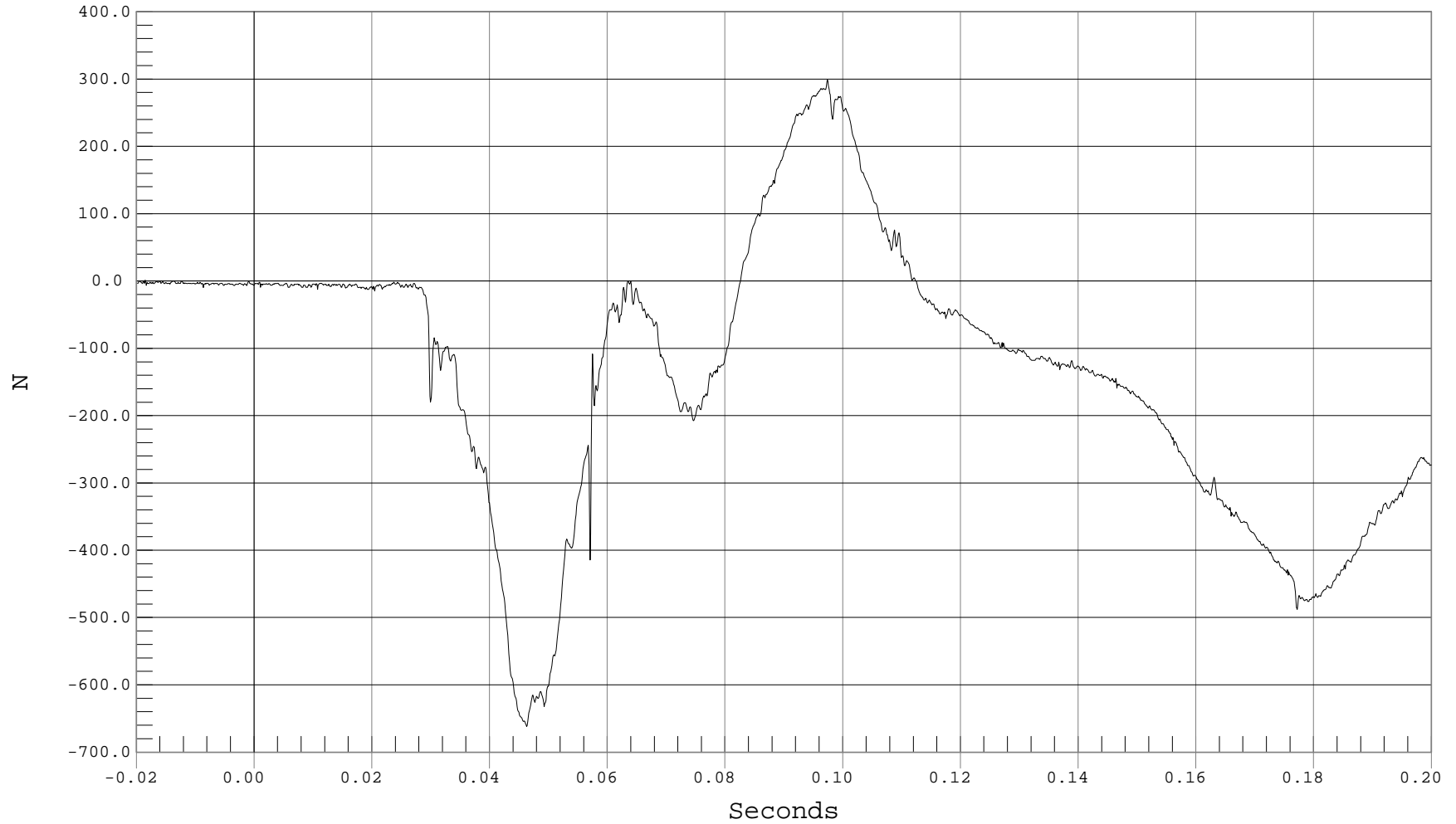
DRIVER LOWER NECK FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FX, B02055FT.F69

Ymin = -661.8 N @ 0.0462 Seconds, Ymax = 299.1 N @ 0.0973 Seconds



B-19



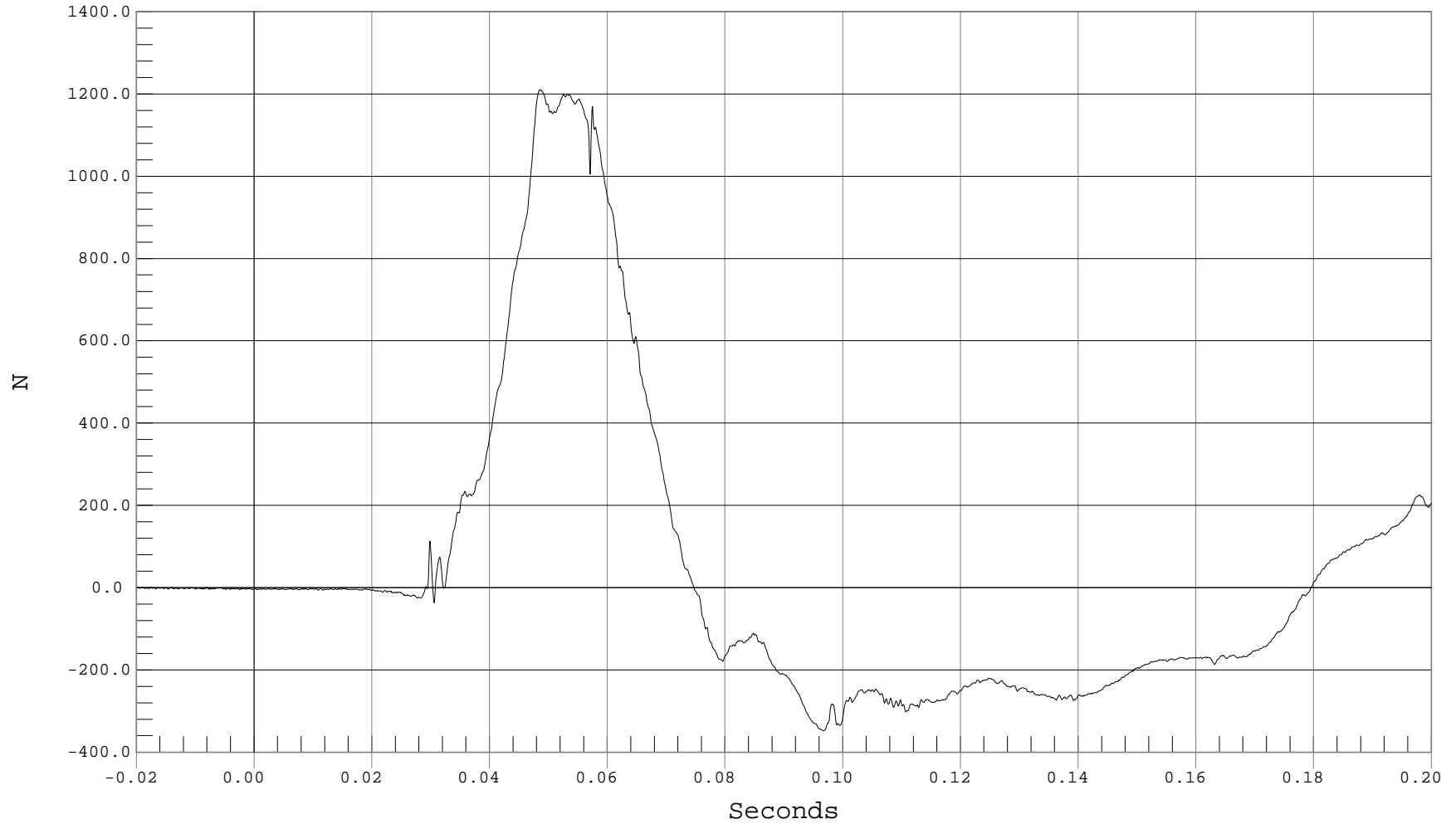
DRIVER LOWER NECK FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FY, B02055FT.F70

Ymin = -347.62 N @ 0.0965 Seconds, Ymax = 1210.06 N @ 0.0484 Seconds



B-20



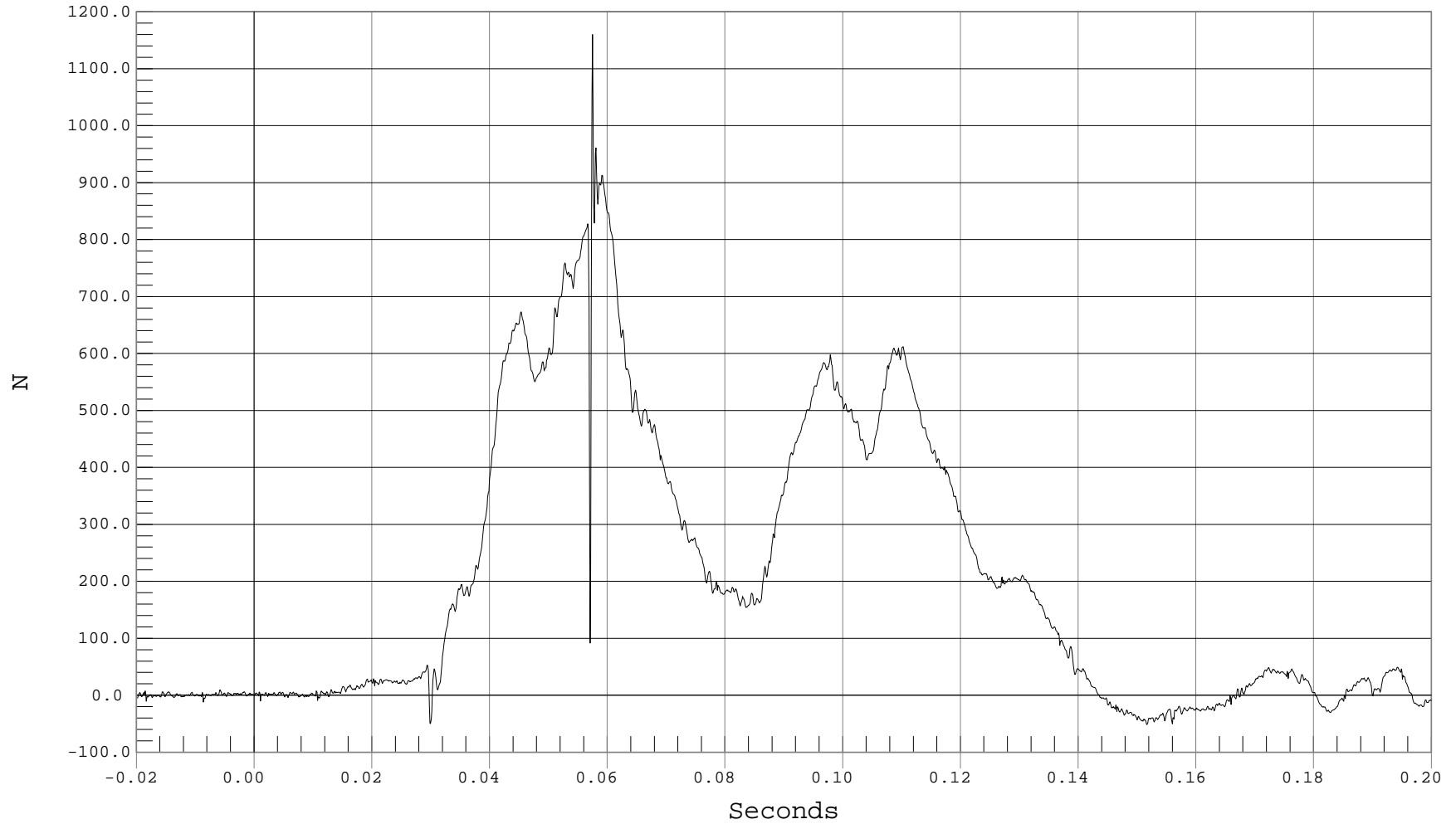
DRIVER LOWER NECK FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FZ, B02055FT.F71

Ymin = -51.76 N @ 0.1516 Seconds, Ymax = 1159.97 N @ 0.0574 Seconds





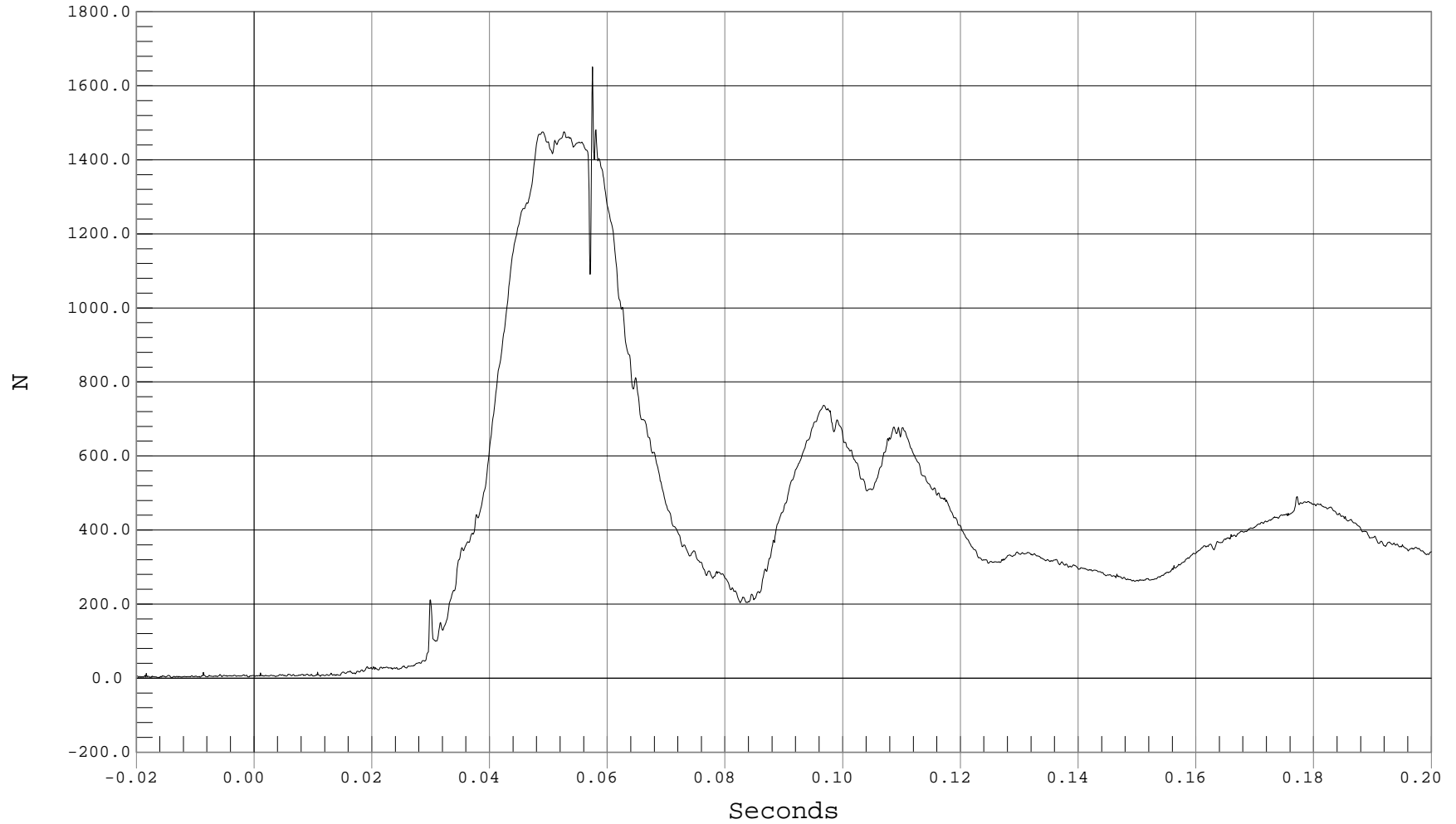
DRIVER LOWER NECK FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FORCE RESULTANT, B02055FV.F69

Ymin = 1.07 N @ -0.0162 Seconds, Ymax = 1650.87 N @ 0.0574 Seconds





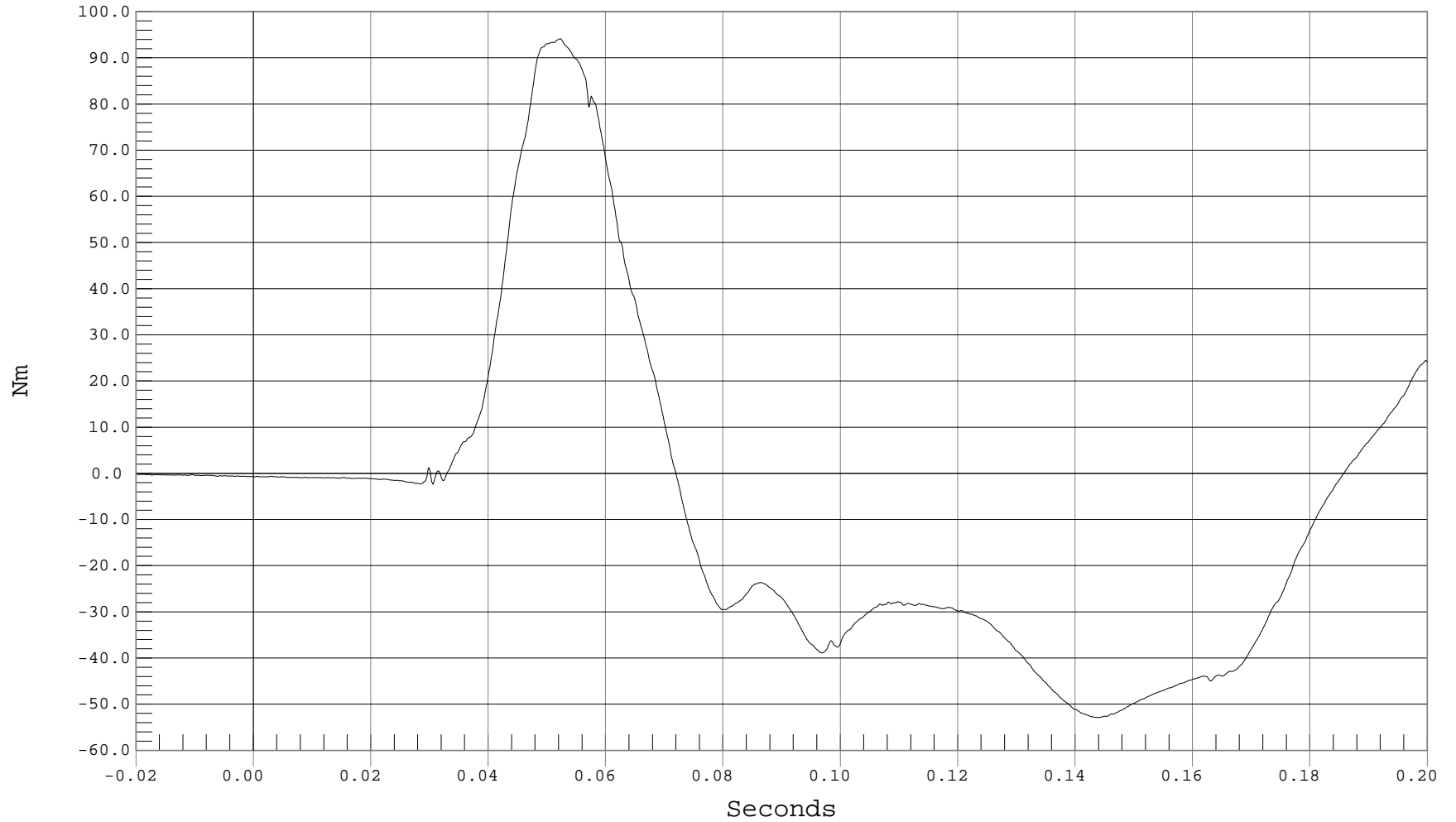
DRIVER LOWER NECK MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MX, B02055MF.M72

Ymin = -52.89 Nm @ 0.1439 Seconds, Ymax = 94.15 Nm @ 0.0522 Seconds





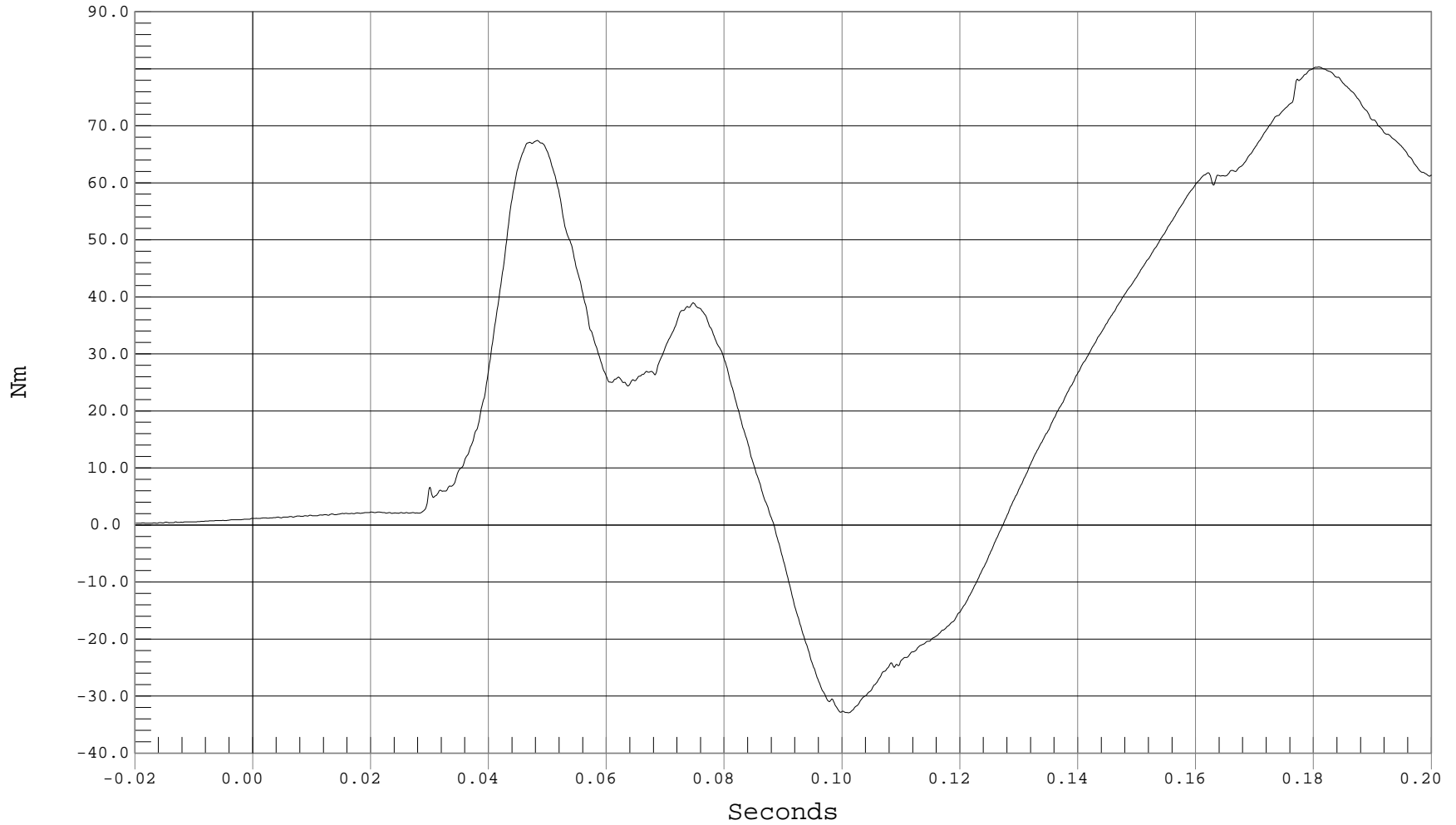
DRIVER LOWER NECK MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MY, B02055MF.M73

Ymin = -32.95 Nm @ 0.1010 Seconds, Ymax = 80.31 Nm @ 0.1808 Seconds





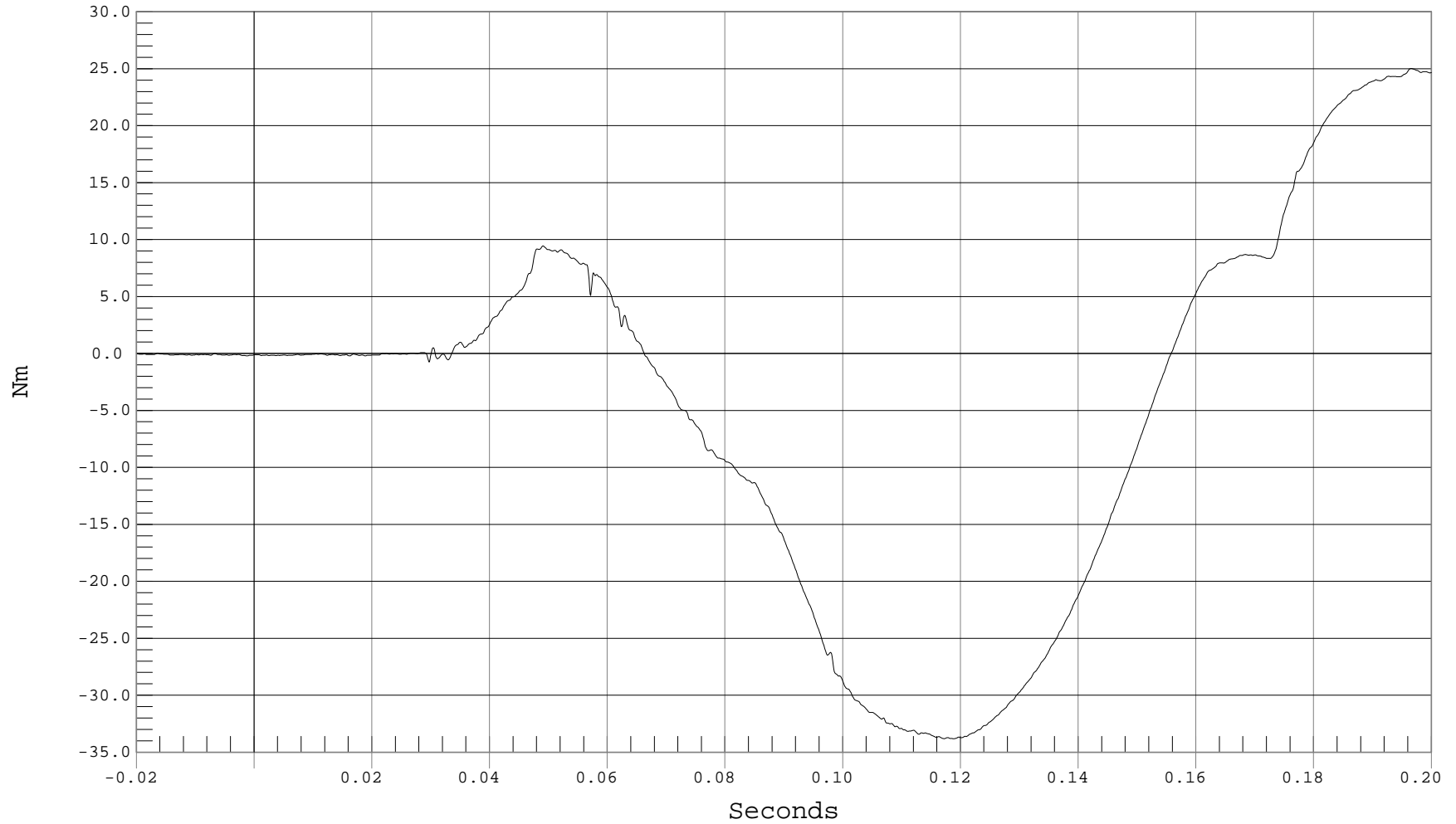
DRIVER LOWER NECK MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MZ, B02055MF.M74

Ymin = -33.82 Nm @ 0.1187 Seconds, Ymax = 25.03 Nm @ 0.1965 Seconds



B-25



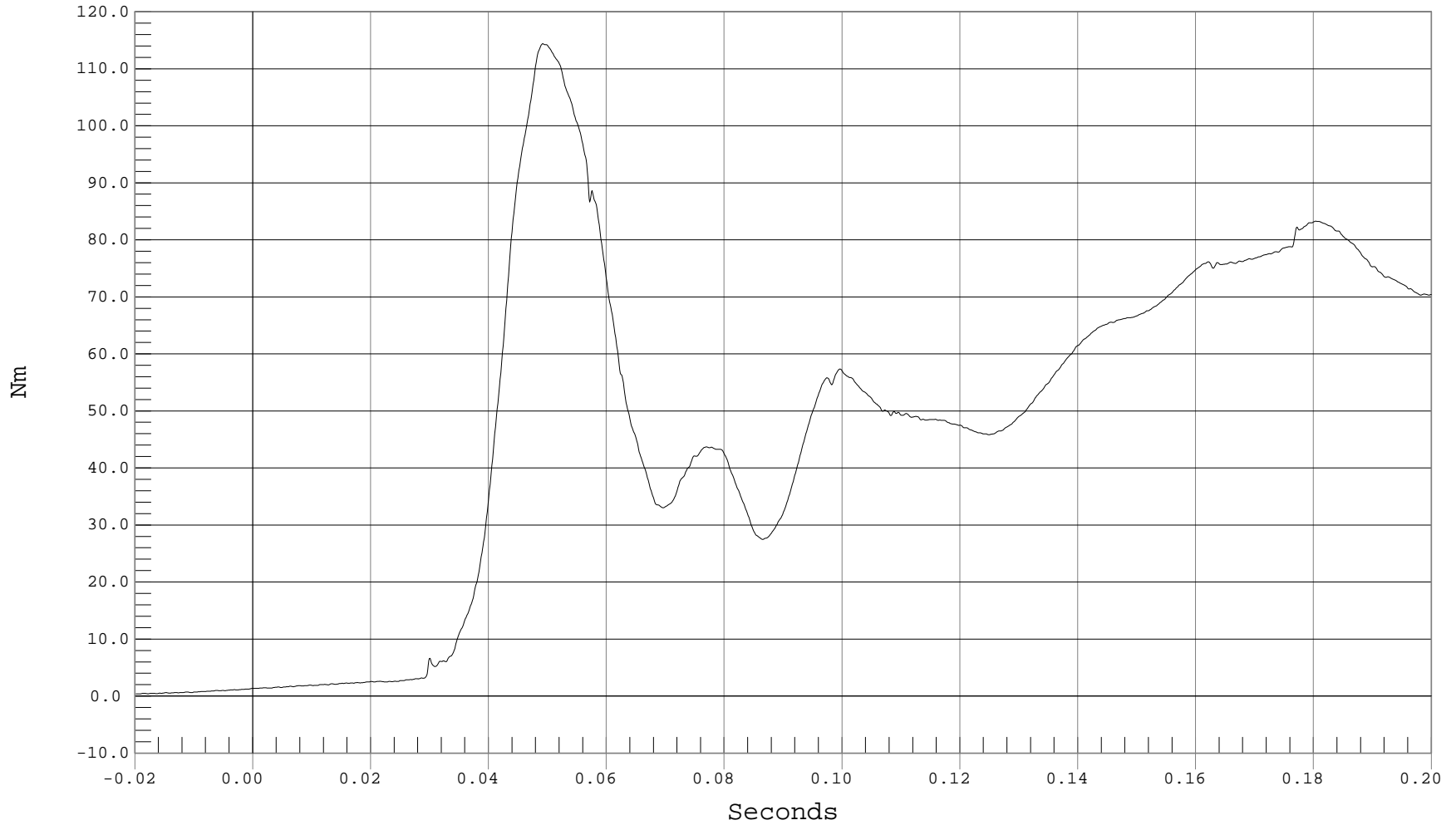
DRIVER LOWER NECK MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MOMENT RESULTANT, B02055MV.M72

Ymin = .38 Nm @ -0.0194 Seconds, Ymax = 114.4 Nm @ 0.0491 Seconds





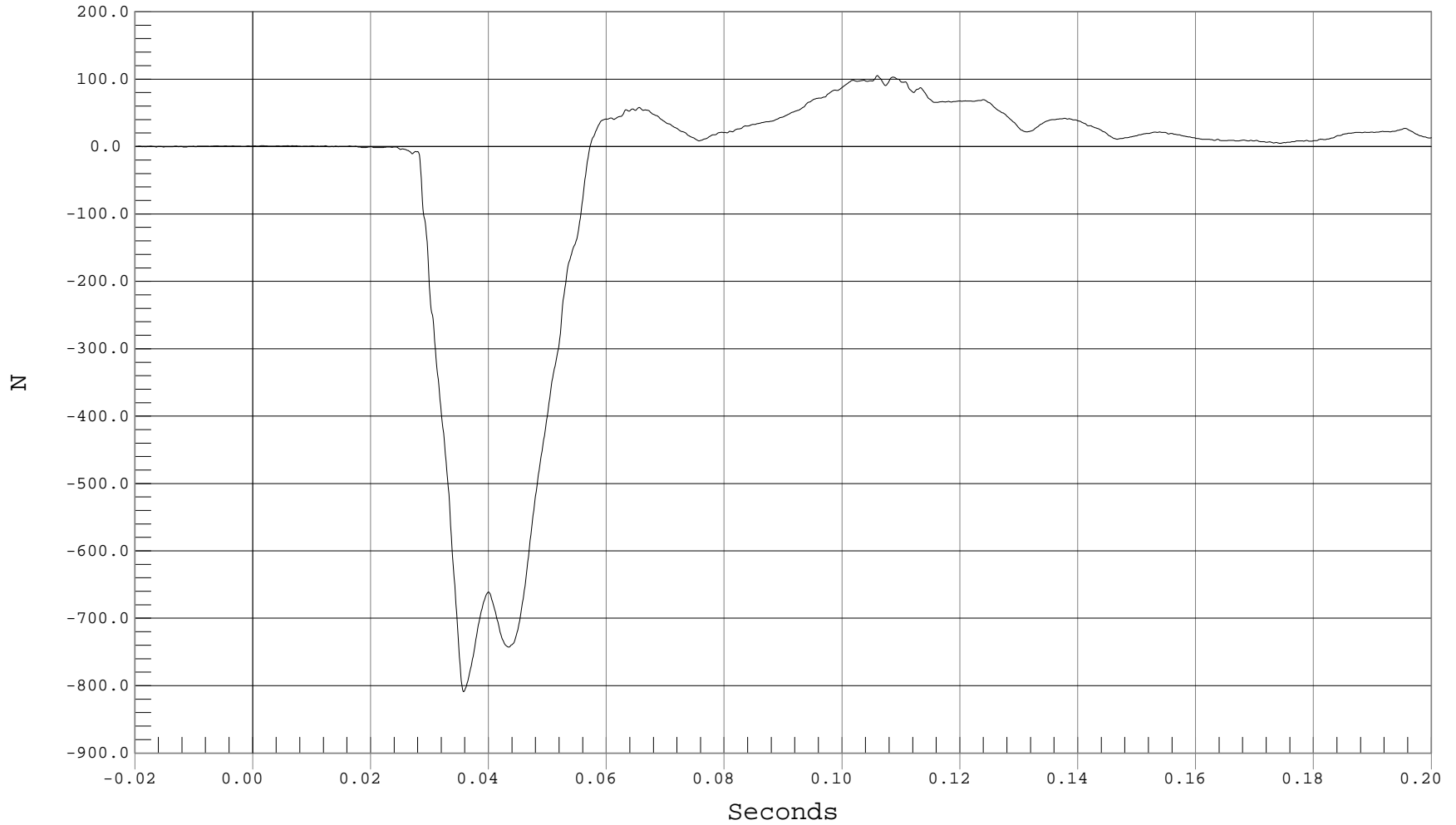
DRIVER SHOULDER FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER SHOULDER FX, B02055FF.F81

Ymin = -809.1 N @ 0.0357 Seconds, Ymax = 105.33 N @ 0.1059 Seconds





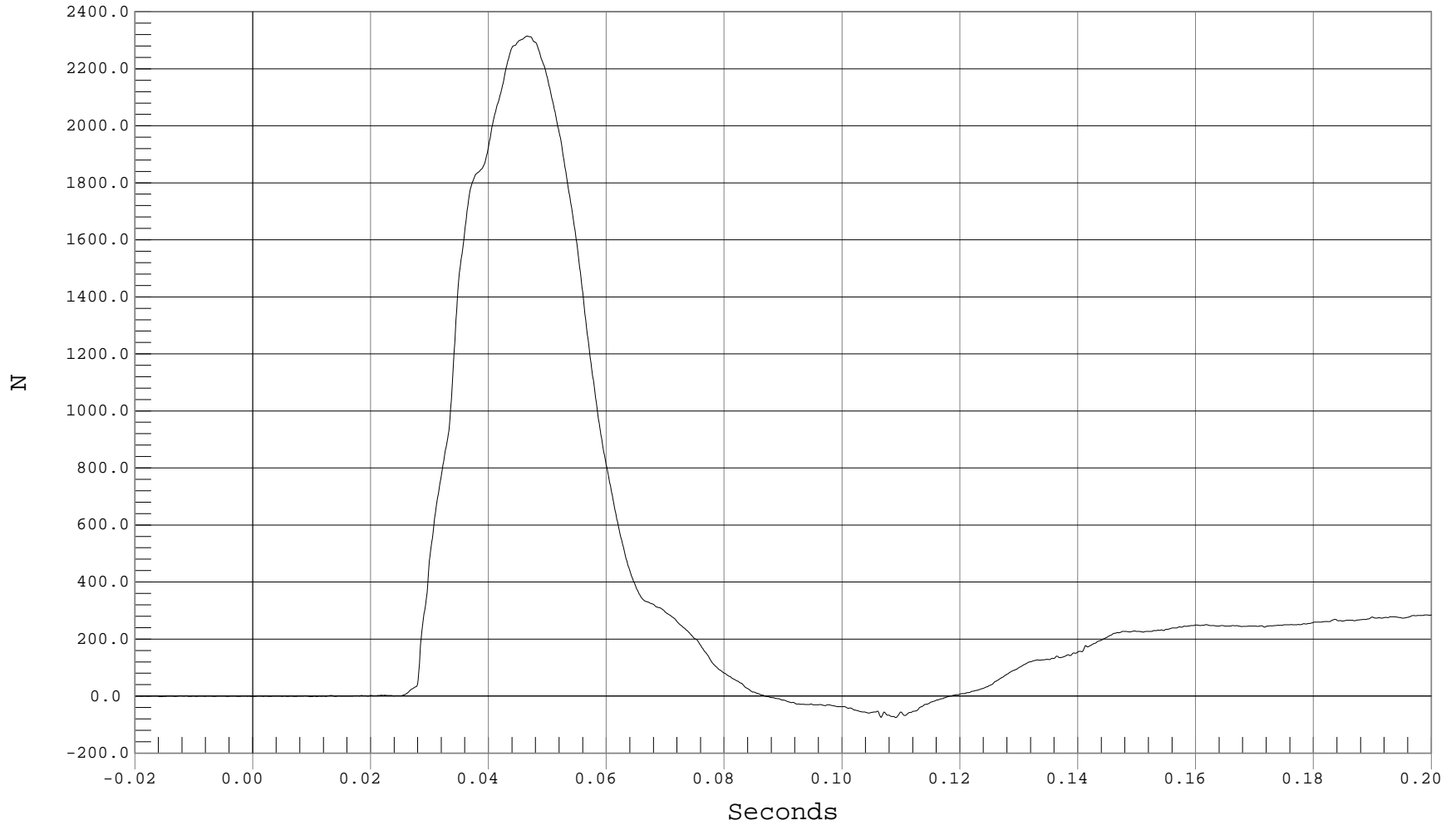
DRIVER SHOULDER FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER SHOULDER FY, B02055FF.F82

Ymin = -75.39 N @ 0.1090 Seconds, Ymax = 2314.66 N @ 0.0465 Seconds





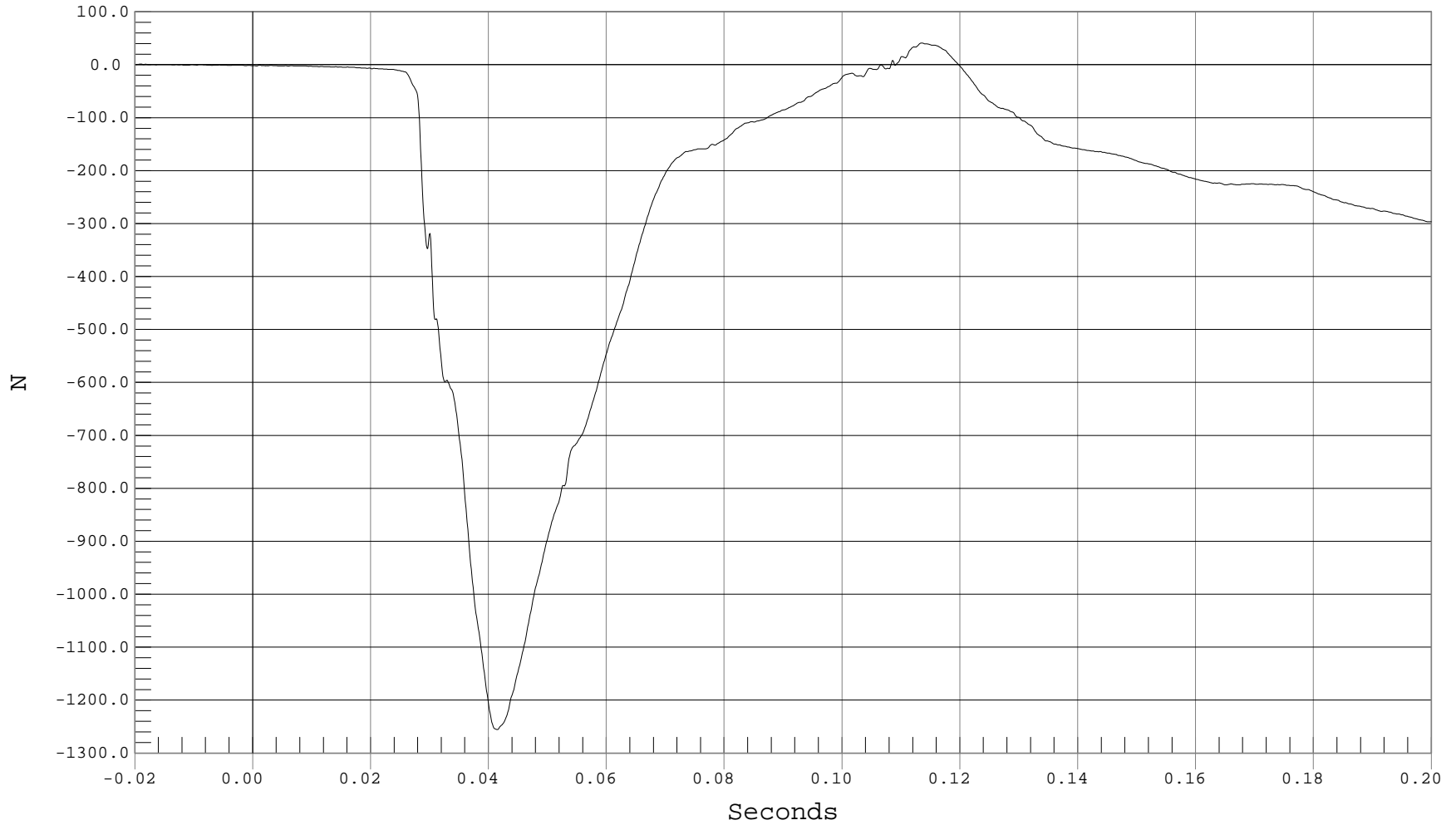
DRIVER SHOULDER FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

1 DRIVER SHOULDER FZ, B02055FF.F83

Ymin = -1255.67 N @ 0.0414 Seconds, Ymax = 41.12 N @ 0.1134 Seconds





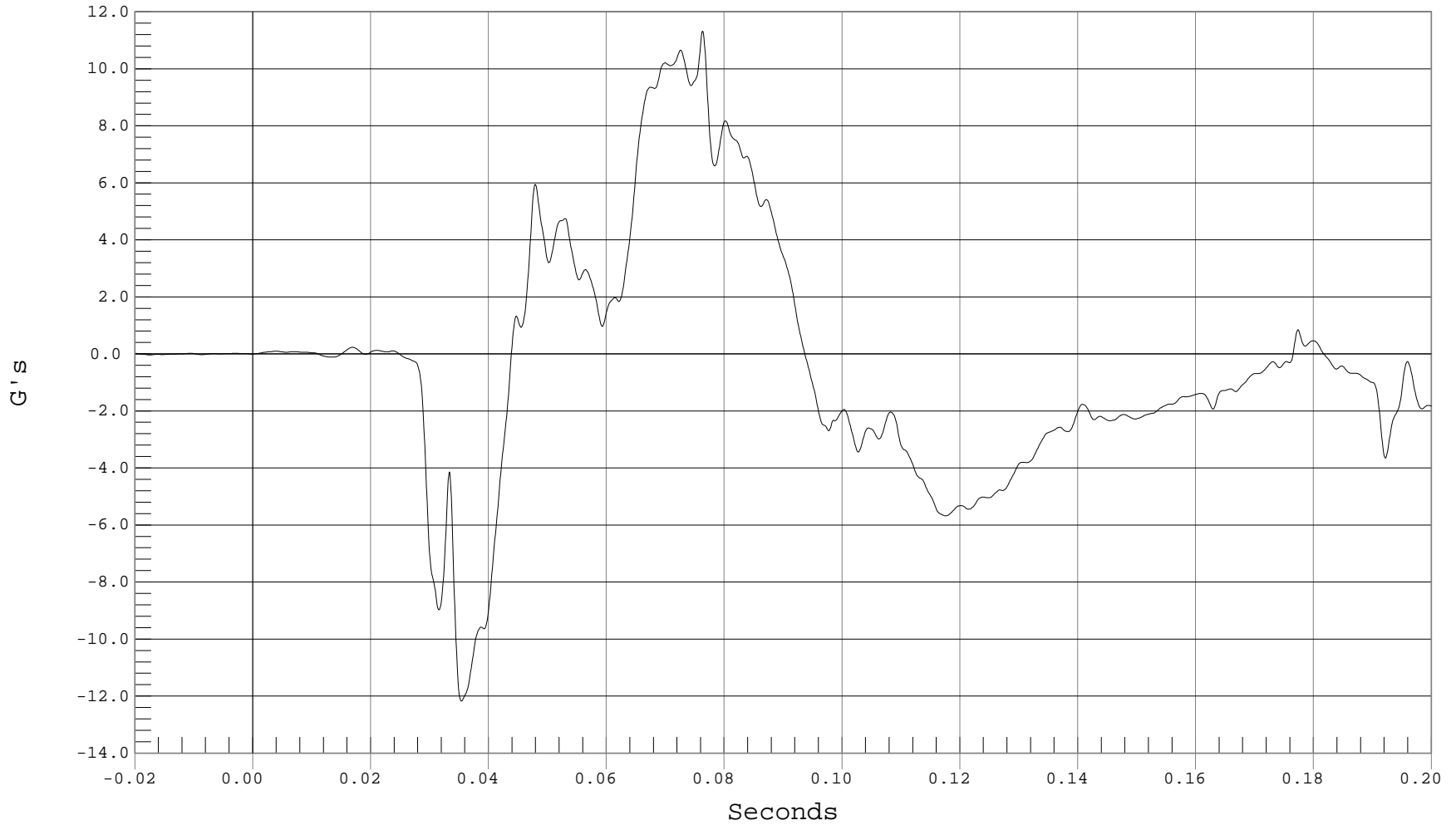
UPPER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE X, B02055AF.A06

Ymin = -12.17 G's @ 0.0353 Seconds, Ymax = 11.32 G's @ 0.0763 Seconds



B-30



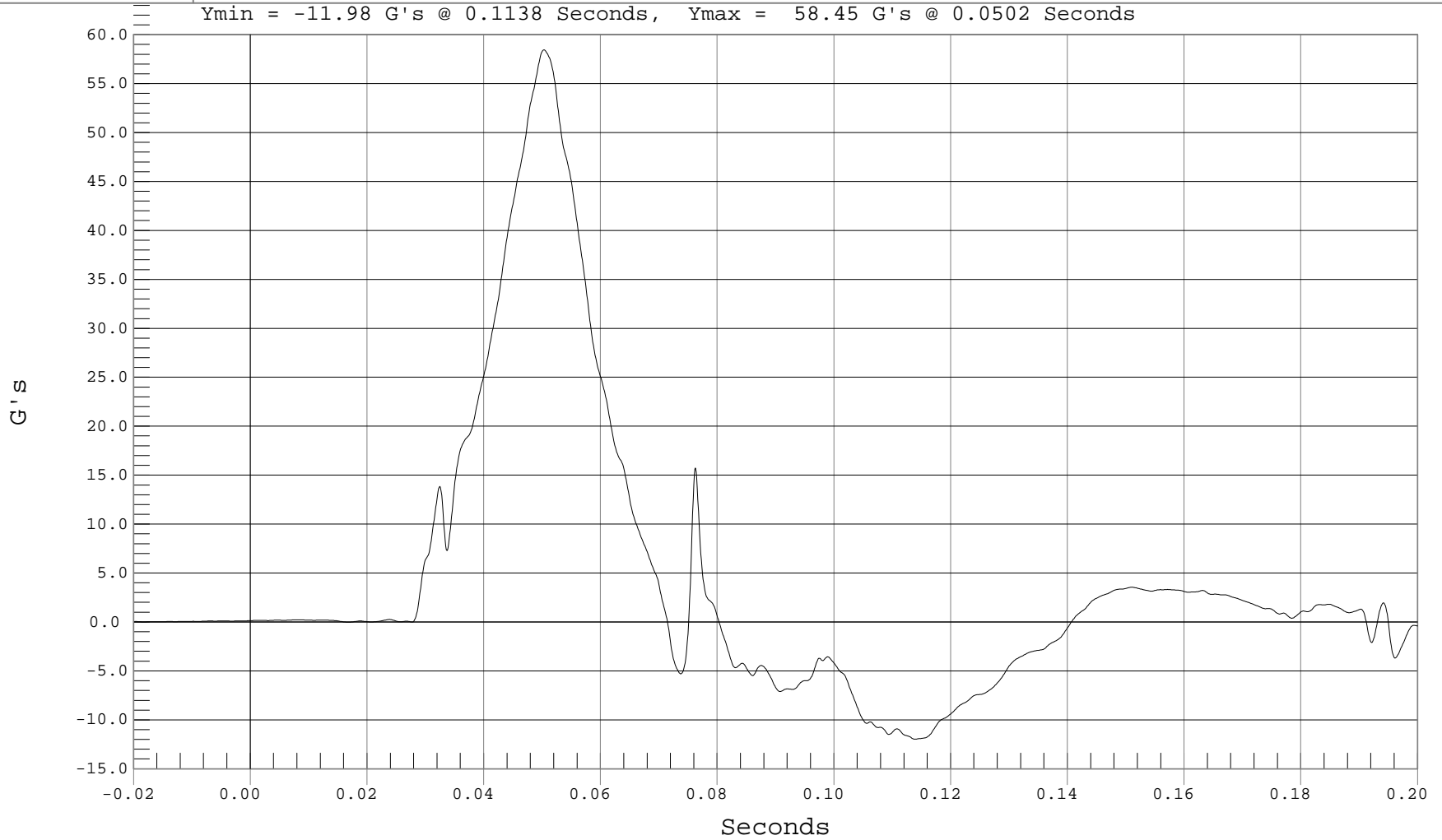
UPPER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE Y, B02055AF.A07

Ymin = -11.98 G's @ 0.1138 Seconds, Ymax = 58.45 G's @ 0.0502 Seconds





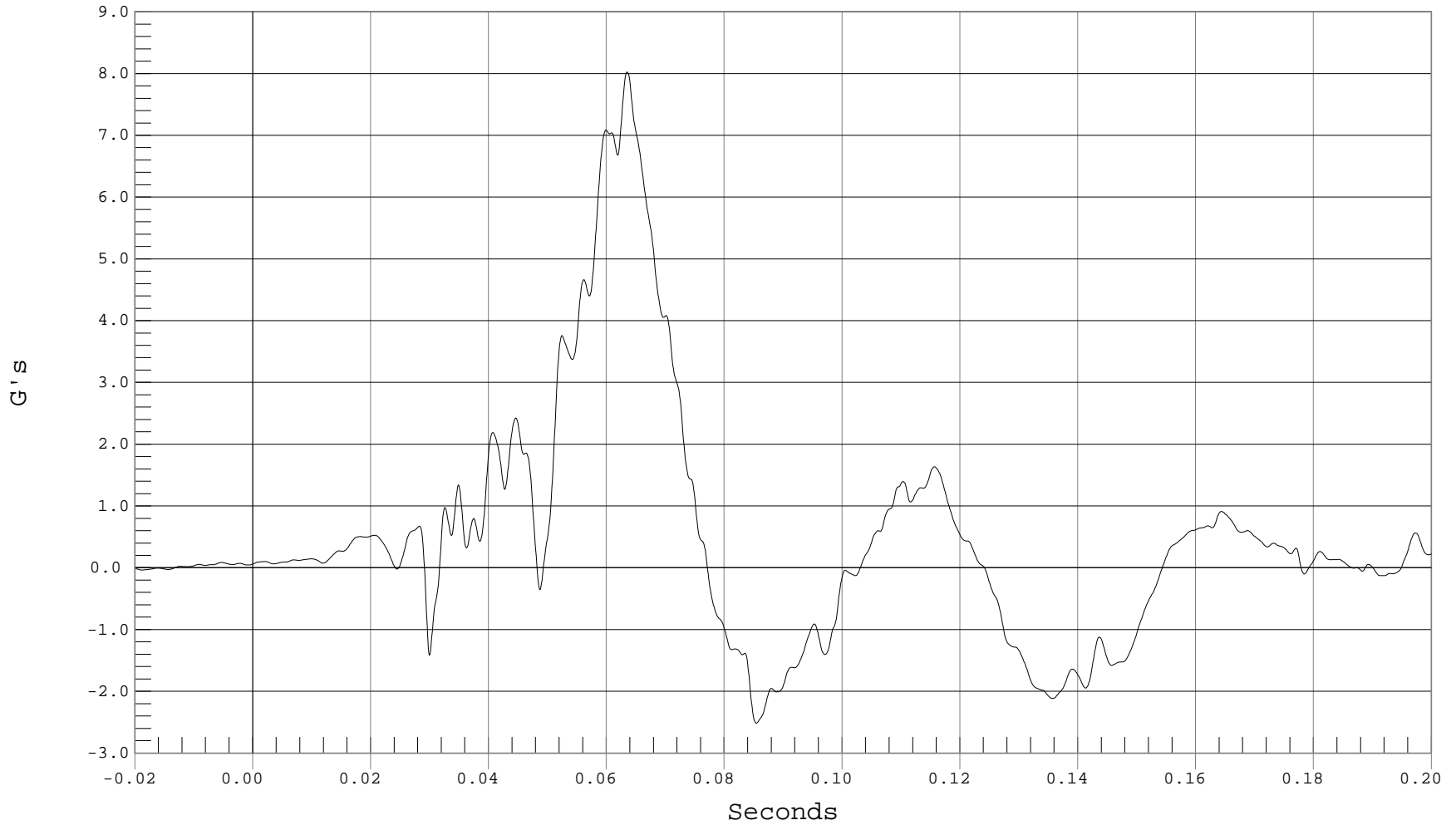
UPPER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE Z, B02055AF.A08

Ymin = -2.51 G's @ 0.0854 Seconds, Ymax = 8.02 G's @ 0.0635 Seconds





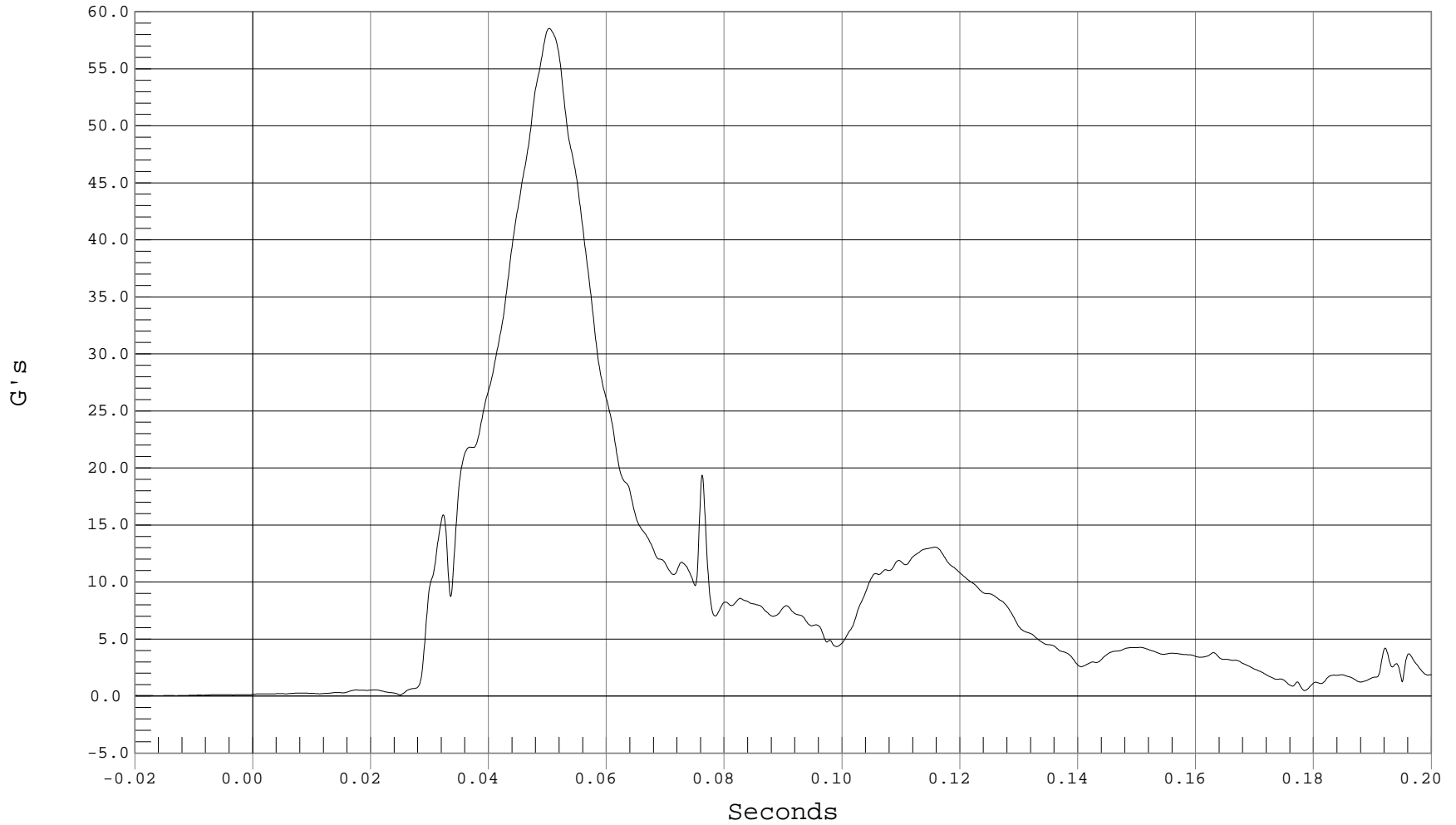
UPPER SPINE RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE RESULTANT, B02055AV.A06

Ymin = .03 G's @ -0.0162 Seconds, Ymax = 58.54 G's @ 0.0502 Seconds



B-33



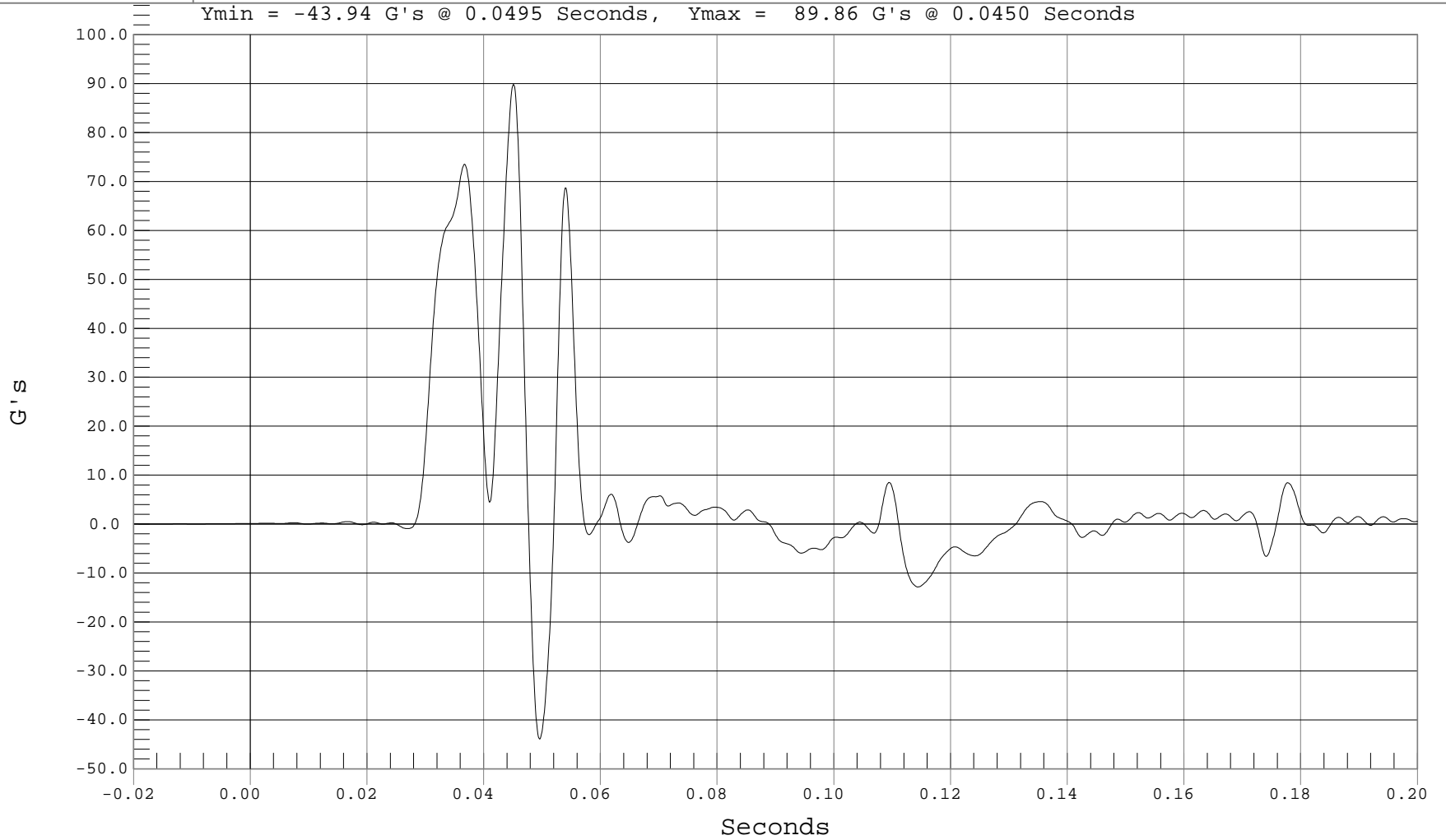
DRIVER UPPER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 140

— 1 DRIVER UPPER RIB Y, B02055AF.A04

Ymin = -43.94 G's @ 0.0495 Seconds, Ymax = 89.86 G's @ 0.0450 Seconds





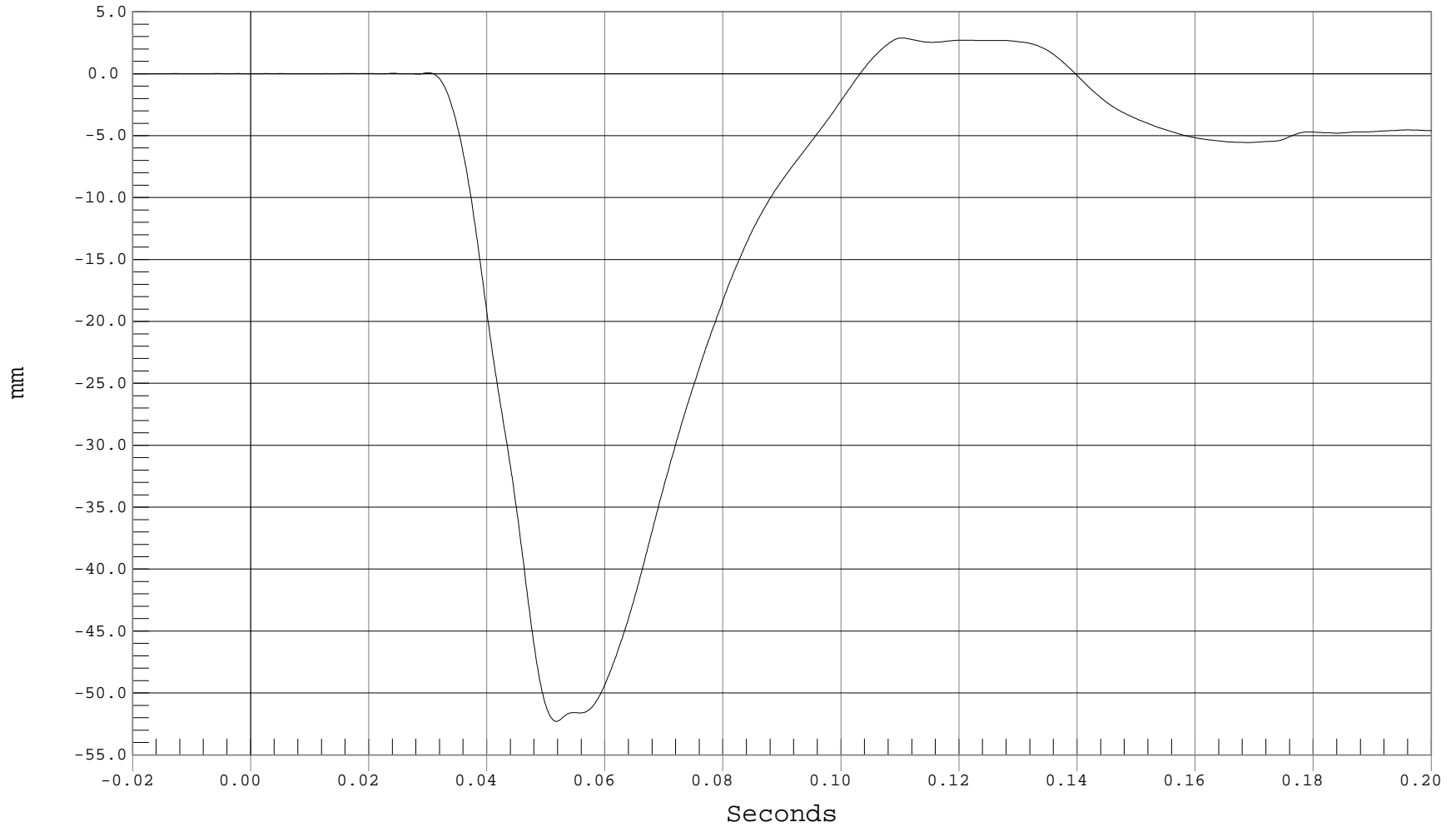
DRIVER UPPER RIB DISPLACEMENT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER UPPER RIB DISP, B02055AF.A55

Ymin = -52.29 mm @ 0.0517 Seconds, Ymax = 2.88 mm @ 0.1102 Seconds





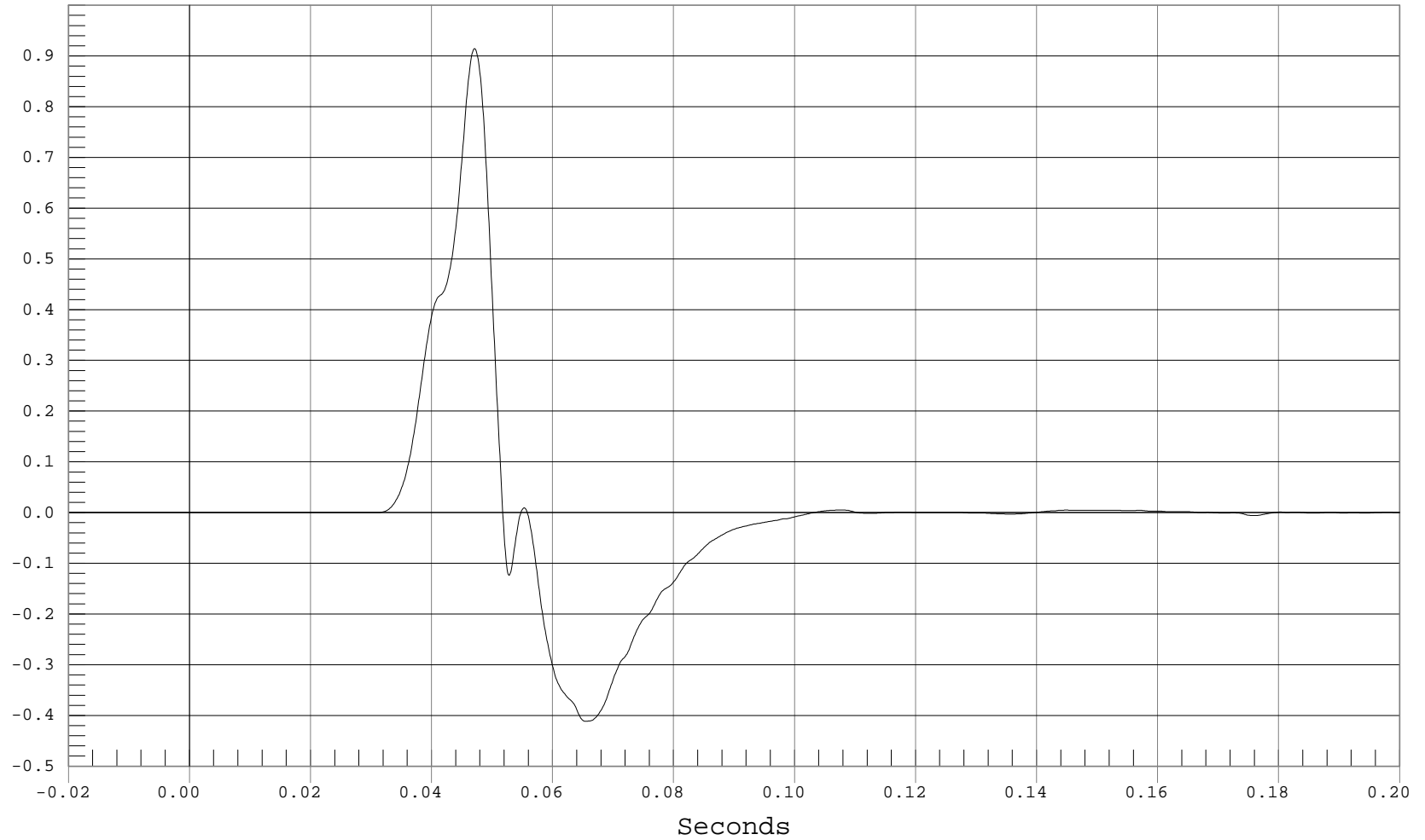
DRIVER UPPER RIB VISCOUS CRITERIA

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 Viscous Criterion, B02055DV.C55

Ymin = -.41 @ 0.0654 Seconds, Ymax = .91 @ 0.0470 Seconds





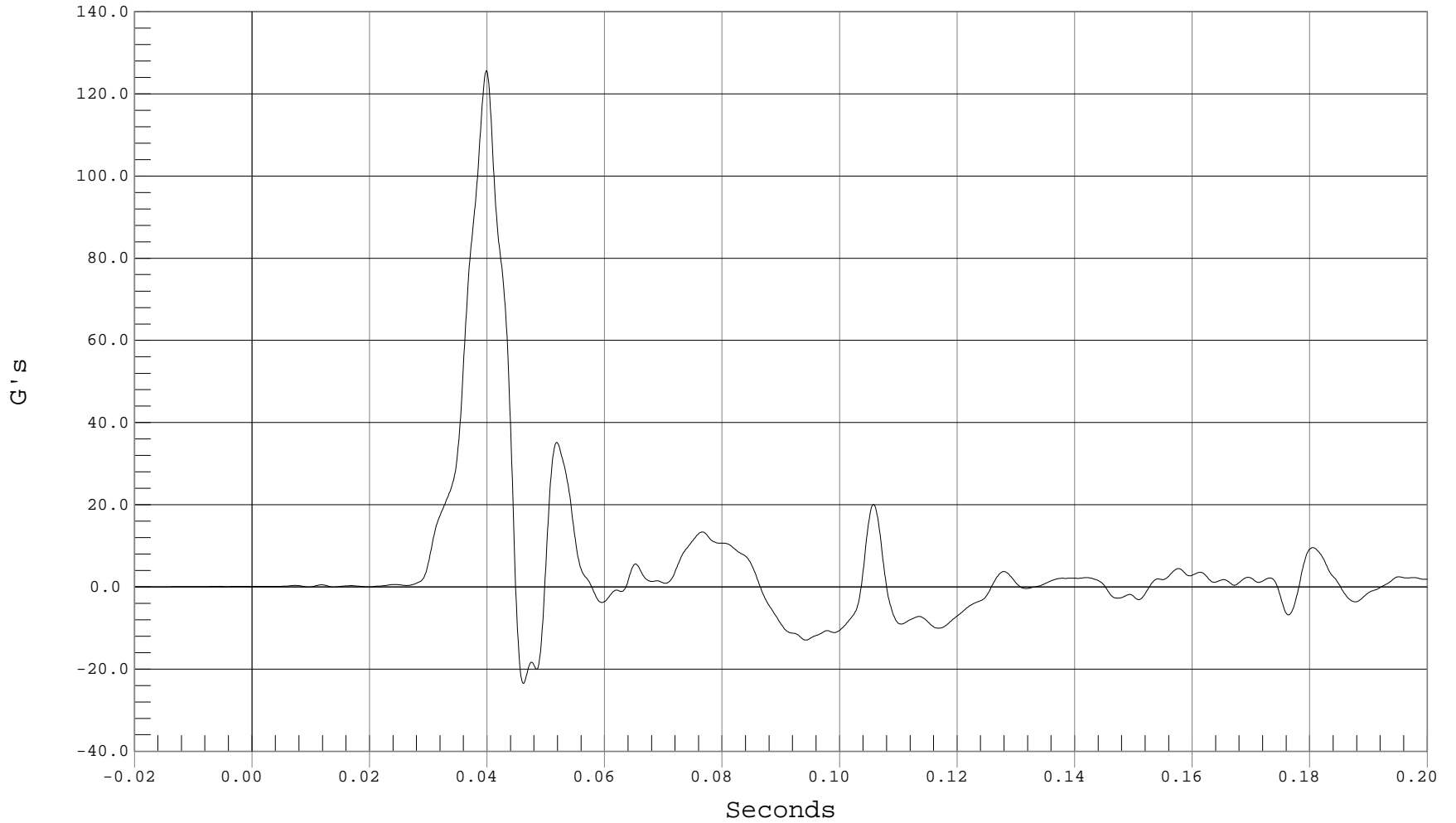
DRIVER MID RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 140

— 1 DRIVER MID RIB Y, B02055AF.A58

Ymin = -23.48 G's @ 0.0461 Seconds, Ymax = 125.69 G's @ 0.0398 Seconds





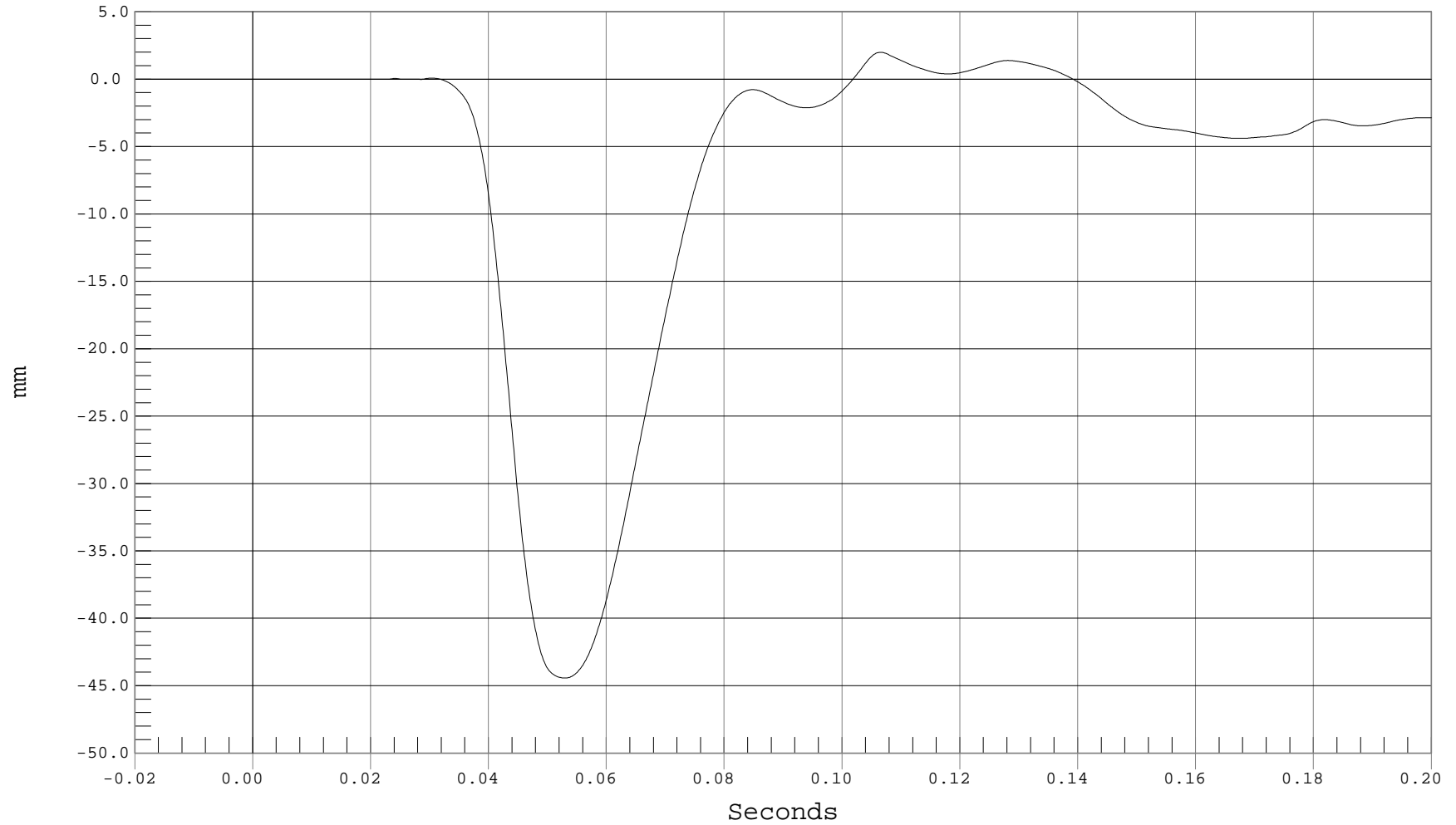
DRIVER MID RIB DISPLACEMENT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER MID RIB DISP, B02055AF.A56

Ymin = -44.43 mm @ 0.0528 Seconds, Ymax = 1.99 mm @ 0.1065 Seconds





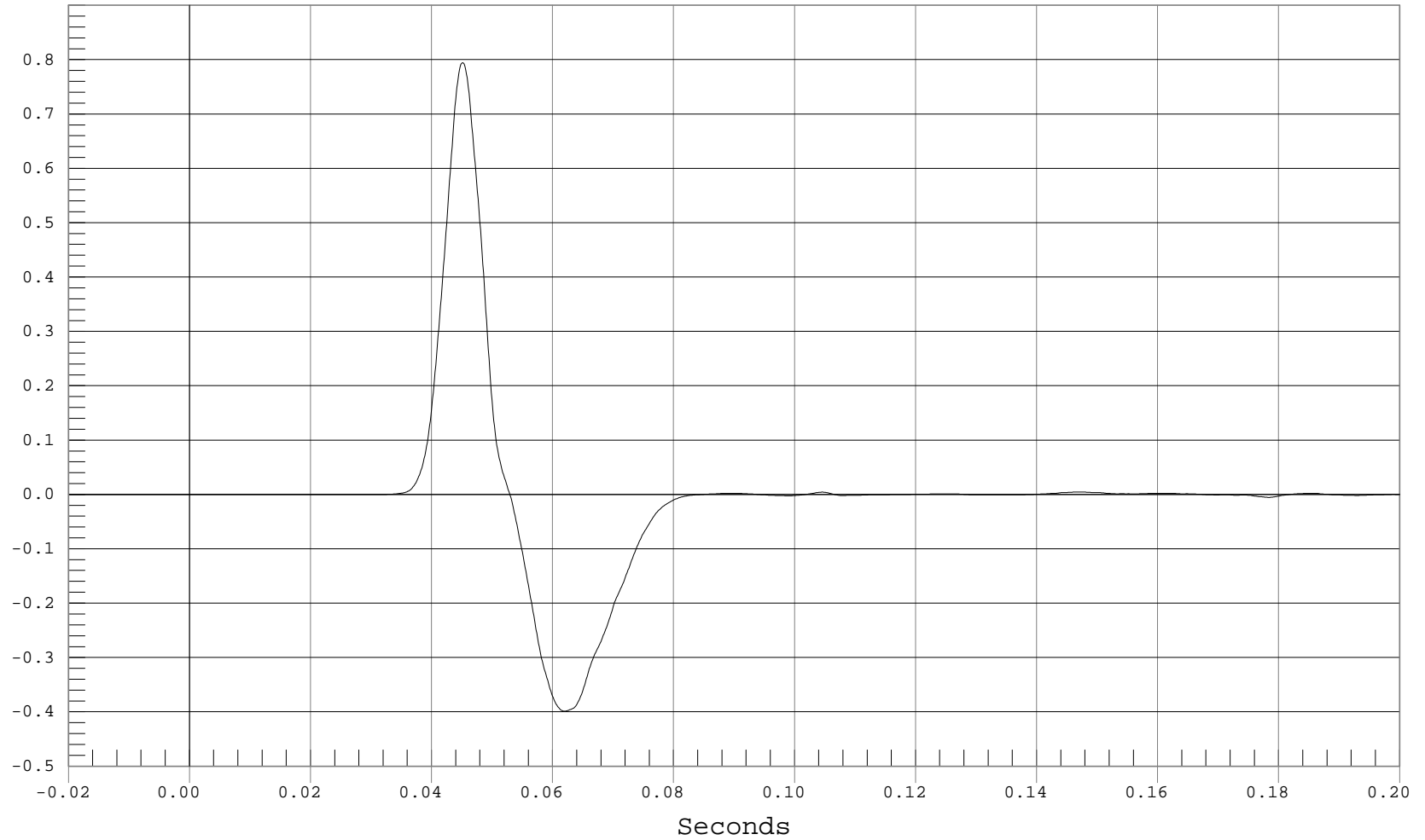
DRIVER MID RIB VISCOUS CRITERIA

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 Viscous Criterion, B02055DV.C56

Ymin = -.4 @ 0.0619 Seconds, Ymax = .79 @ 0.0450 Seconds





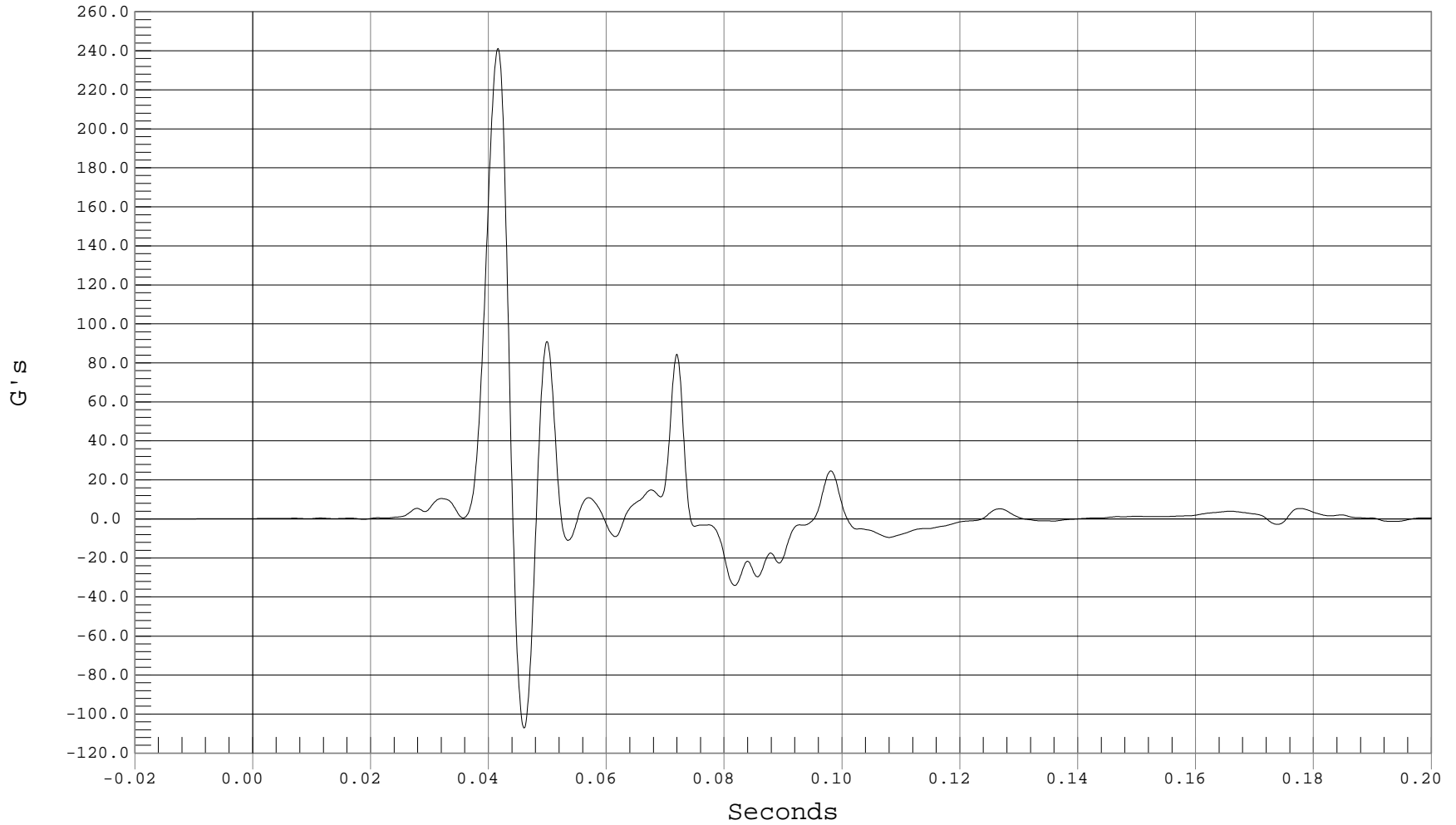
DRIVER LOWER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 140

— 1 DRIVER LOWER RIB Y, B02055AF.A05

Ymin = -107.18 G's @ 0.0460 Seconds, Ymax = 241.2 G's @ 0.0415 Seconds



B-40



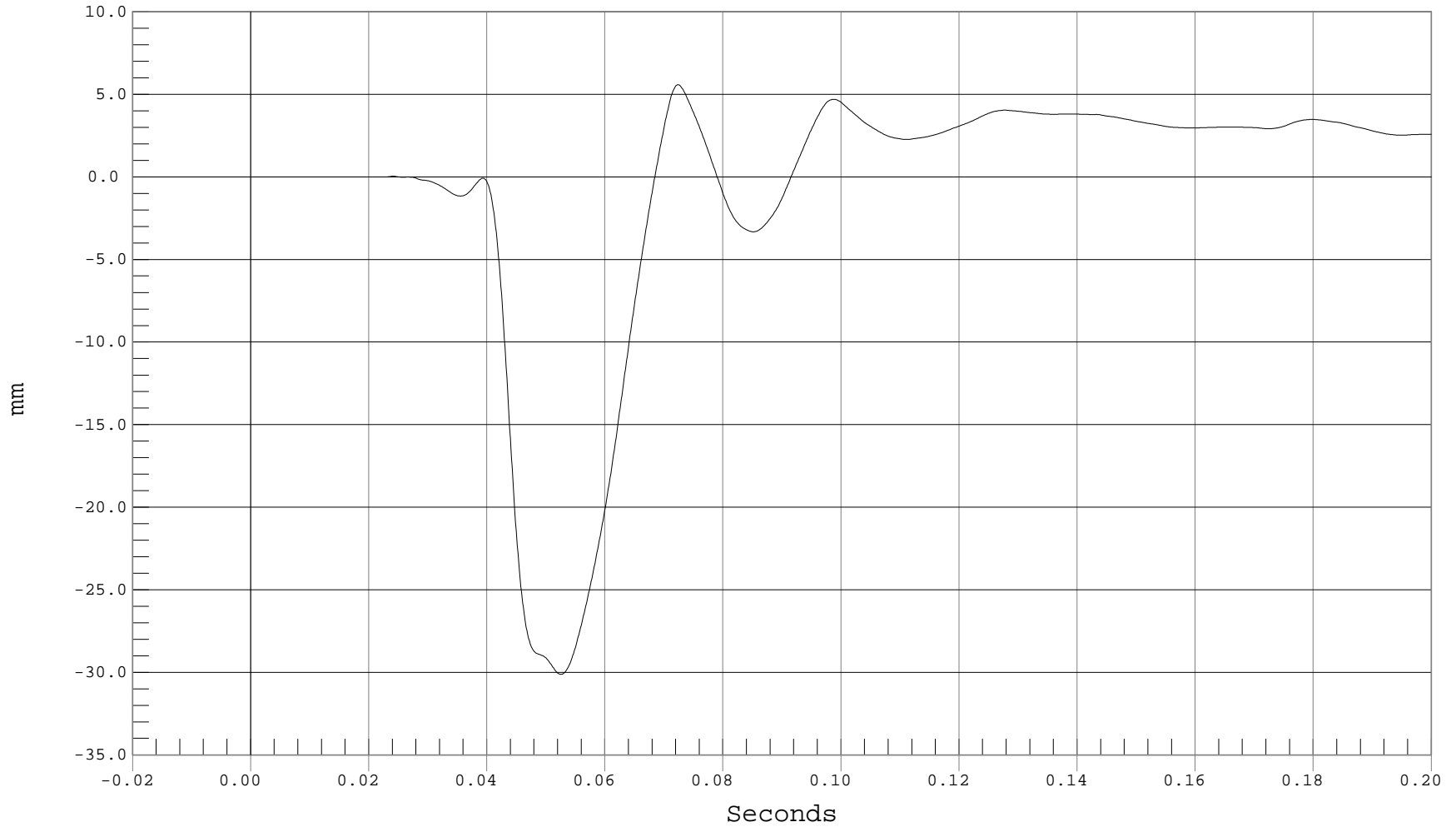
DRIVER LOWER RIB DISPLACEMENT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER LOWER RIB DISP, B02055AF.A57

Ymin = -30.12 mm @ 0.0525 Seconds, Ymax = 5.58 mm @ 0.0723 Seconds





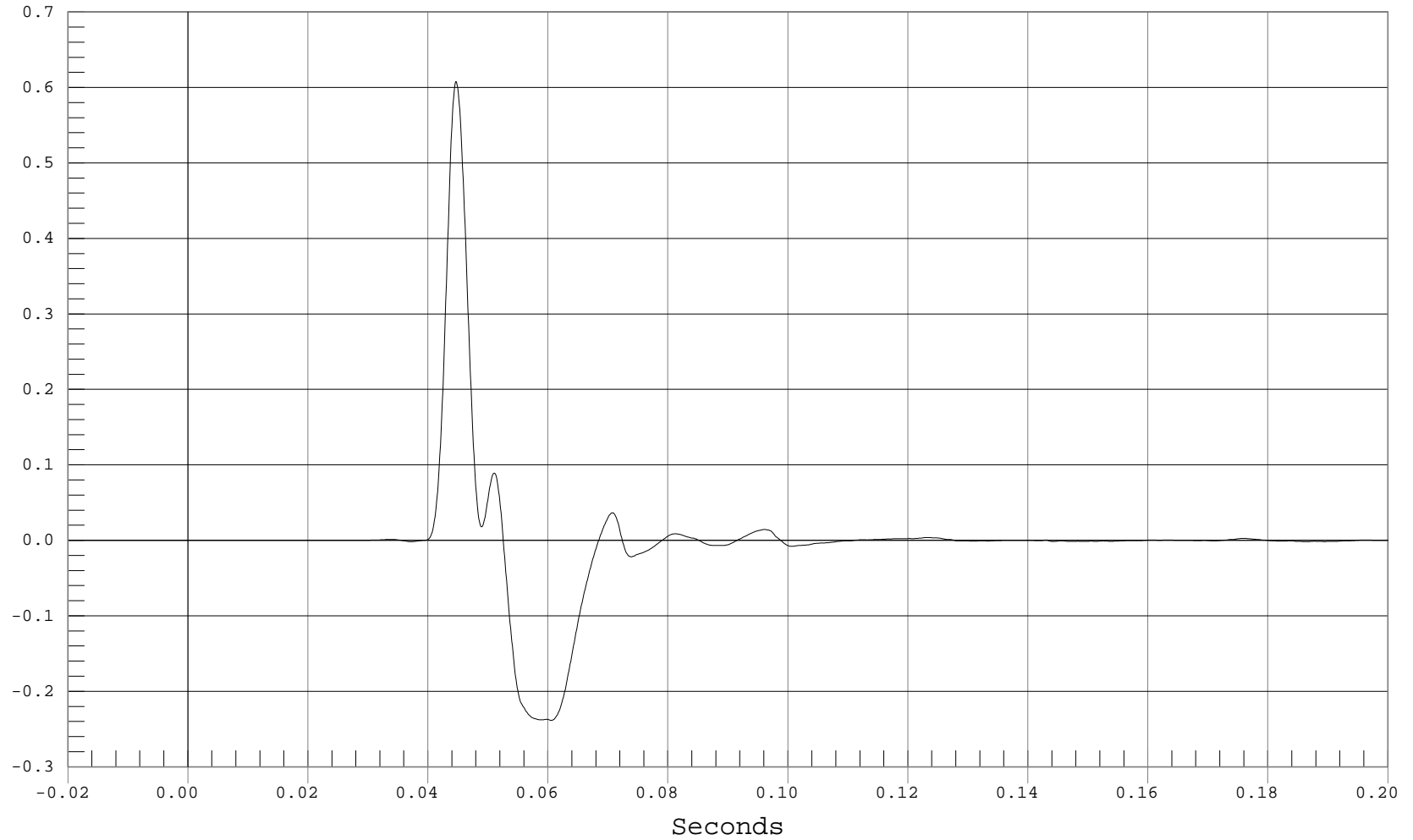
DRIVER LOWER RIB VISCOUS CRITERIA

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 Viscous Criterion, B02055DV.C57

Ymin = -.24 @ 0.0605 Seconds, Ymax = .61 @ 0.0446 Seconds



B-42



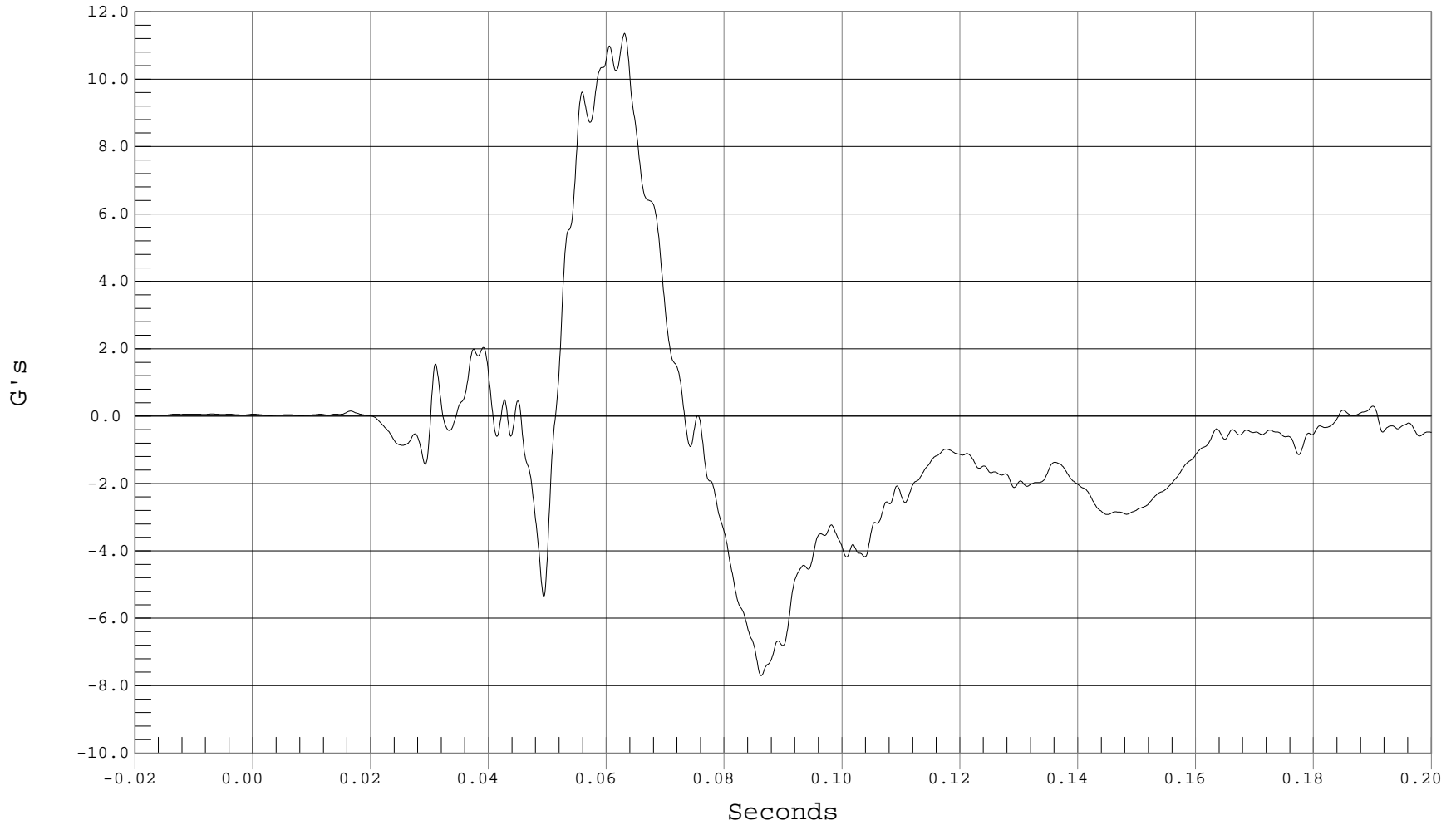
LOWER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE X, B02055AF.A09

Ymin = -7.7 G's @ 0.0862 Seconds, Ymax = 11.36 G's @ 0.0630 Seconds



B-43



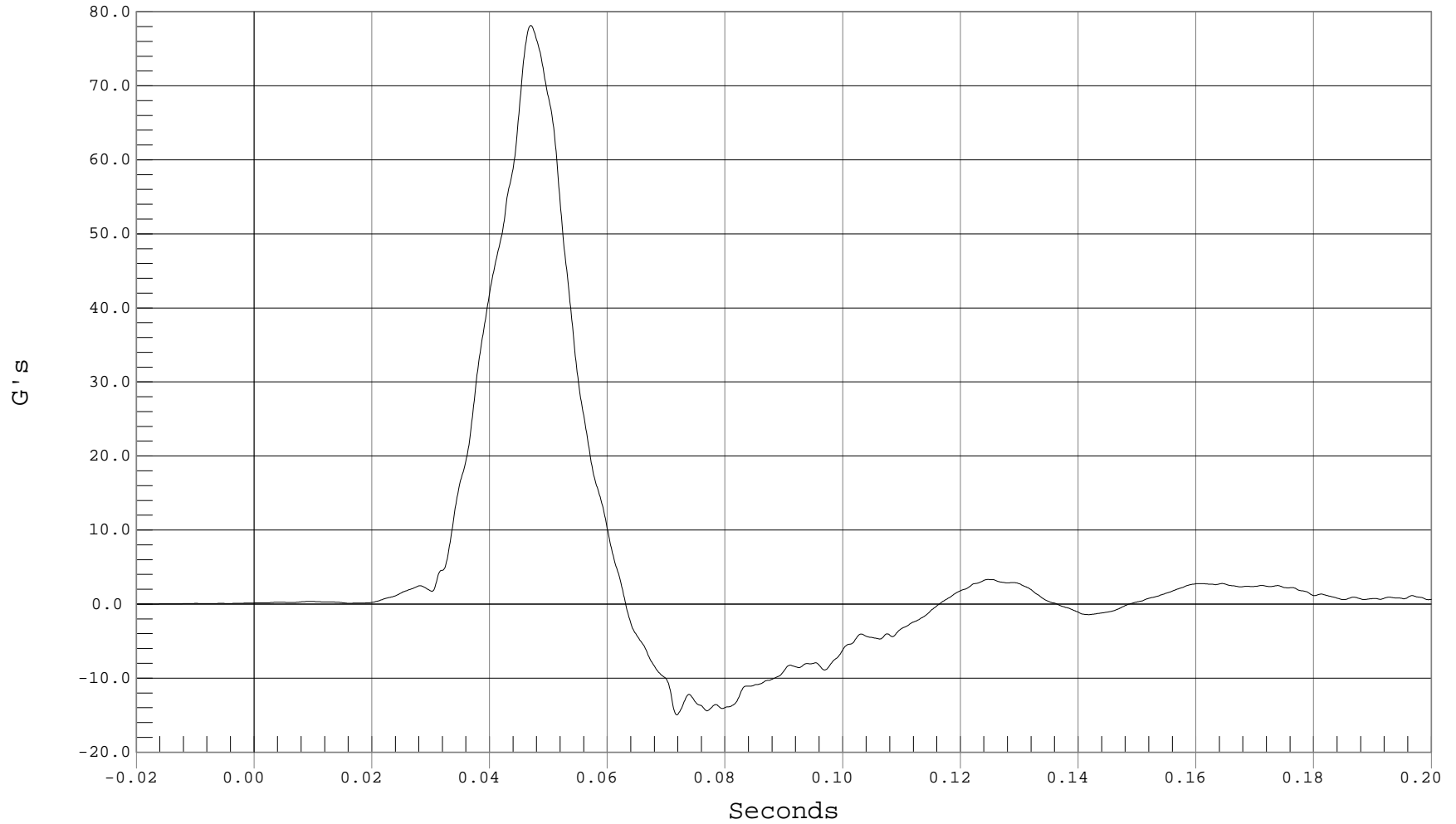
LOWER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE Y, B02055AF.A10

Ymin = -14.96 G's @ 0.0717 Seconds, Ymax = 78.15 G's @ 0.0469 Seconds





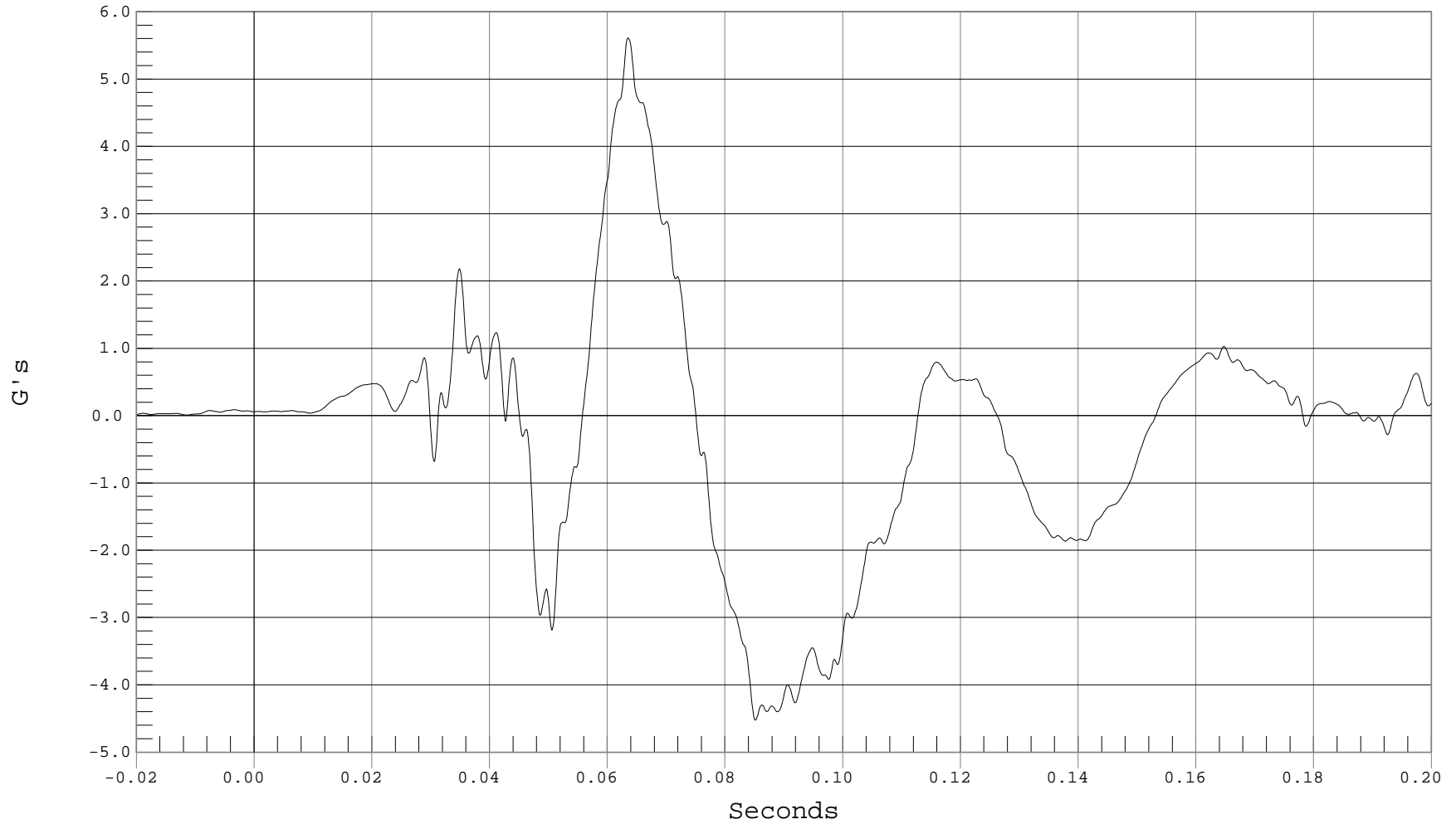
LOWER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE Z, B02055AF.A11

Ymin = -4.53 G's @ 0.0851 Seconds, Ymax = 5.61 G's @ 0.0634 Seconds



B-45



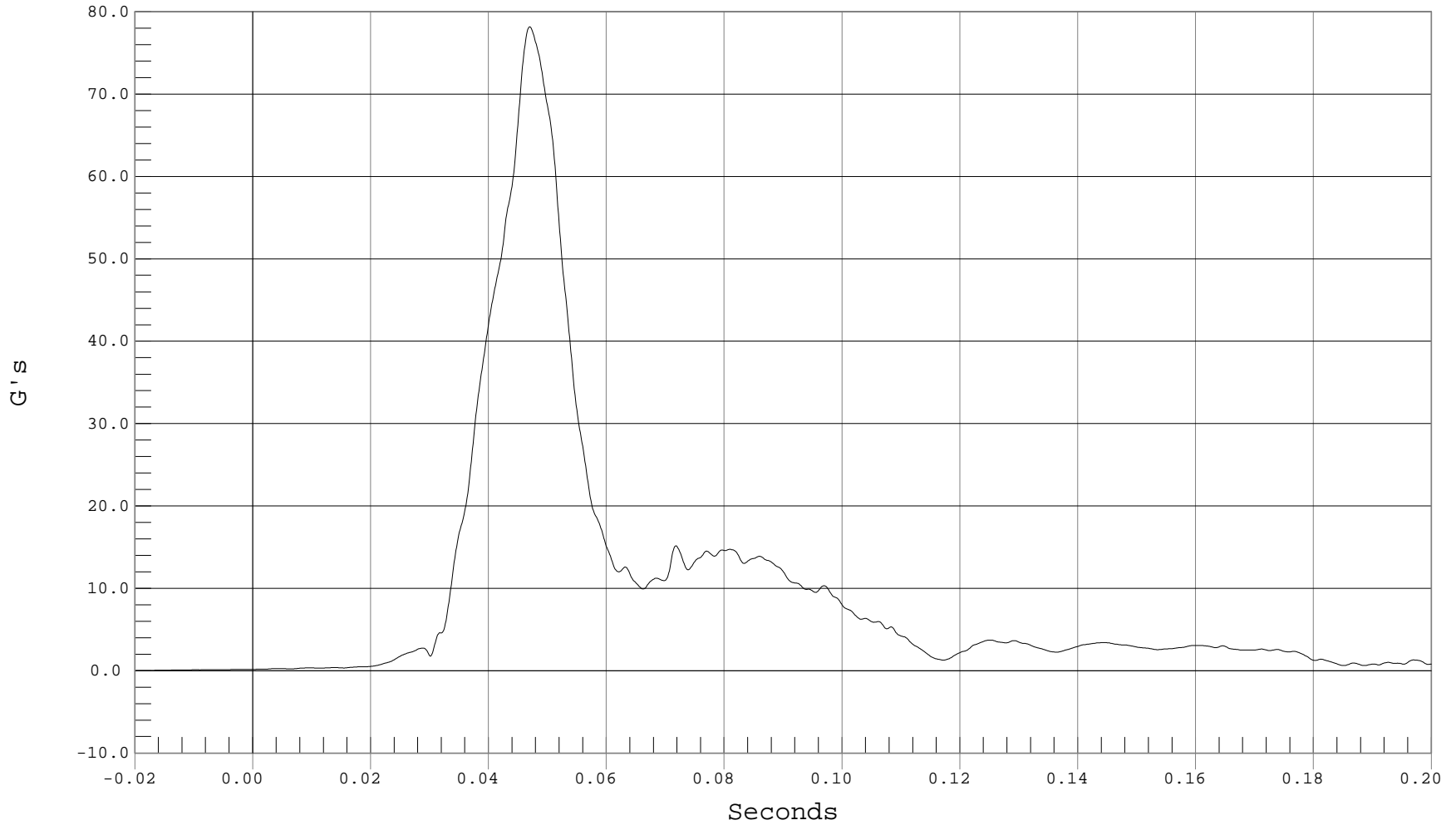
LOWER SPINE RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE RESULTANT, B02055AV.A09

Ymin = .03 G's @ -0.0178 Seconds, Ymax = 78.17 G's @ 0.0469 Seconds





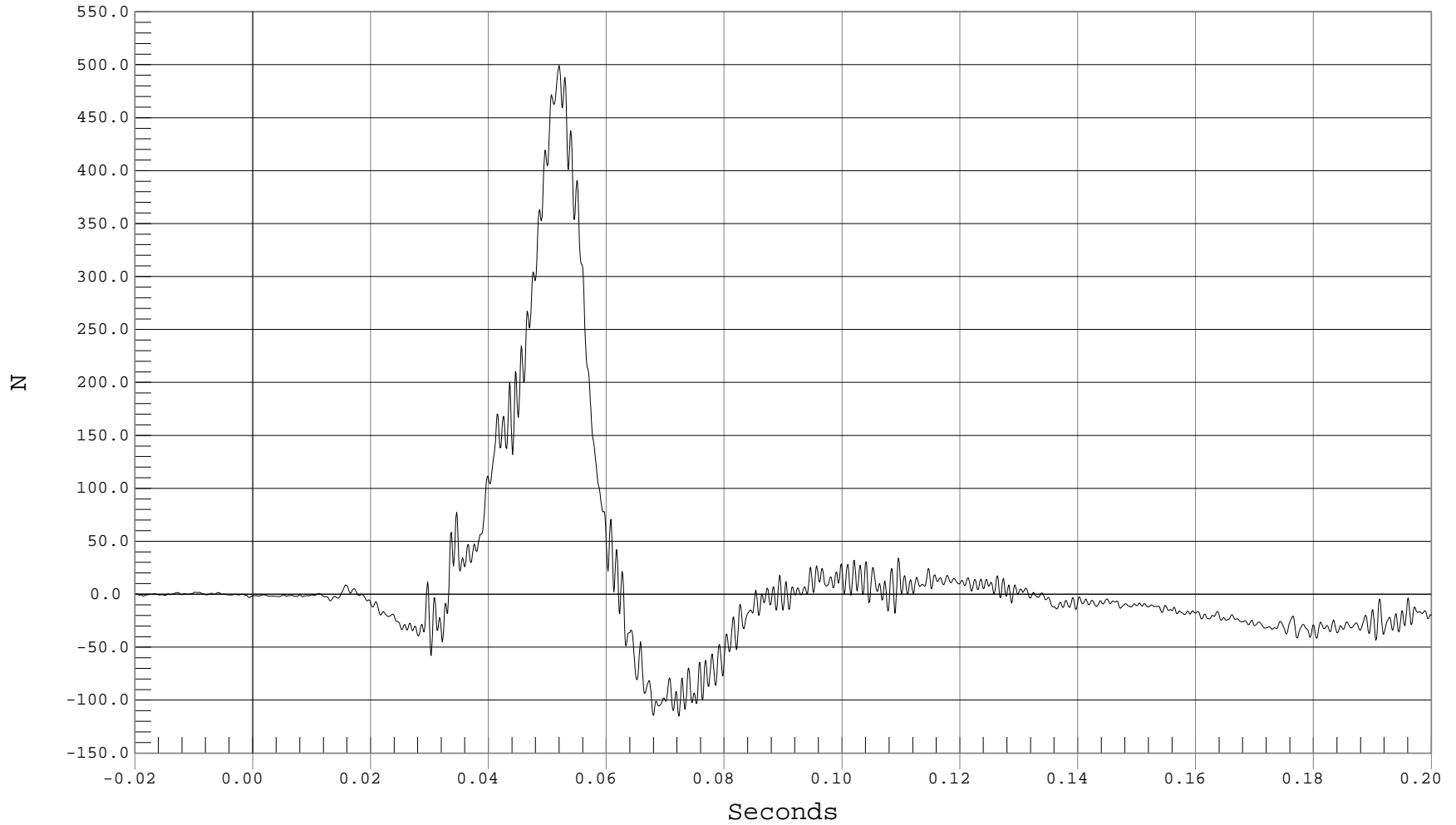
DRIVER TORSO FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER TORSO FX, B02055FF.F59

Ymin = -115.2 N @ 0.0722 Seconds, Ymax = 499.44 N @ 0.0519 Seconds





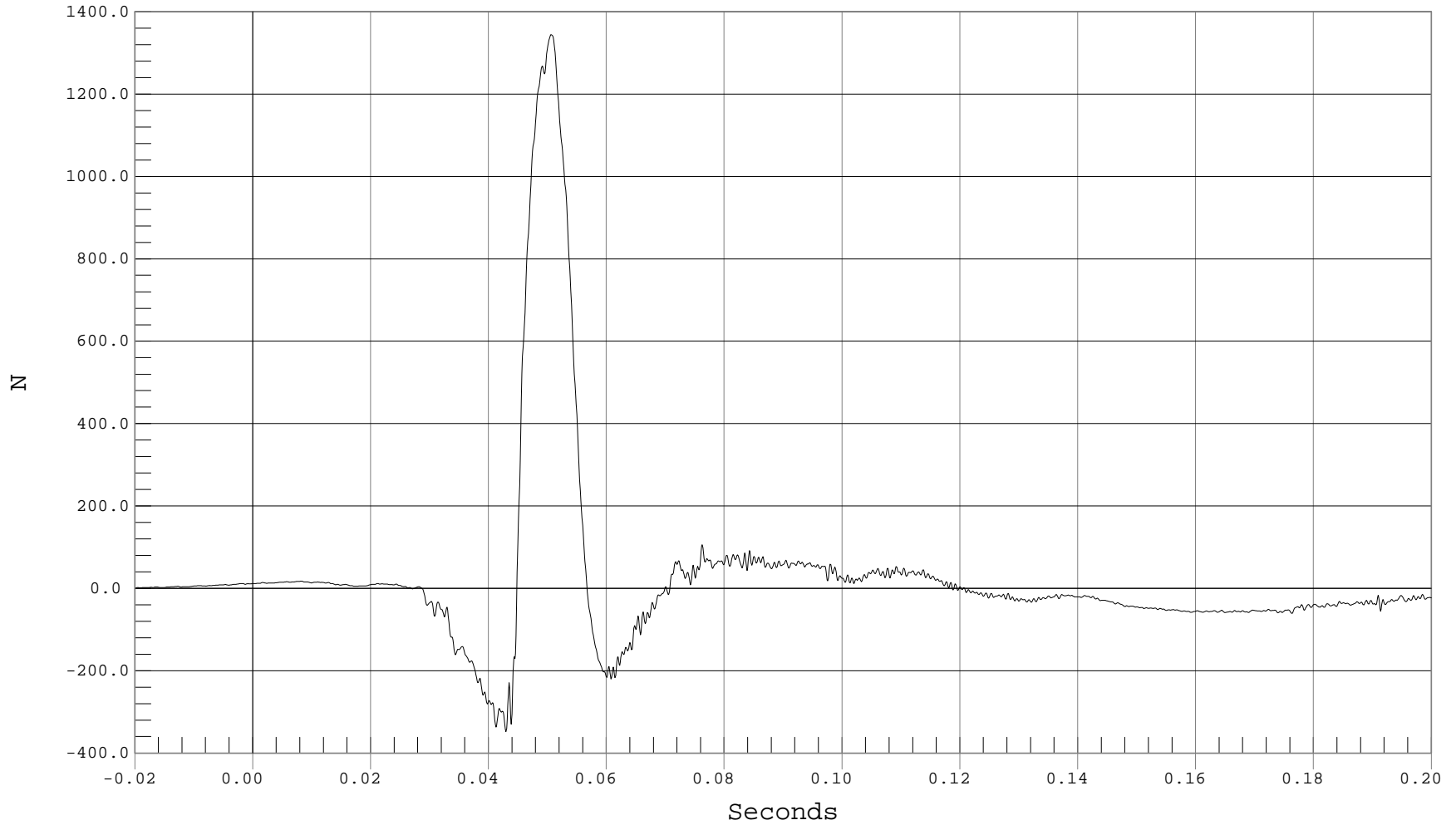
DRIVER TORSO FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER TORSO FY, B02055FF.F60

Ymin = -347.95 N @ 0.0429 Seconds, Ymax = 1344.27 N @ 0.0505 Seconds





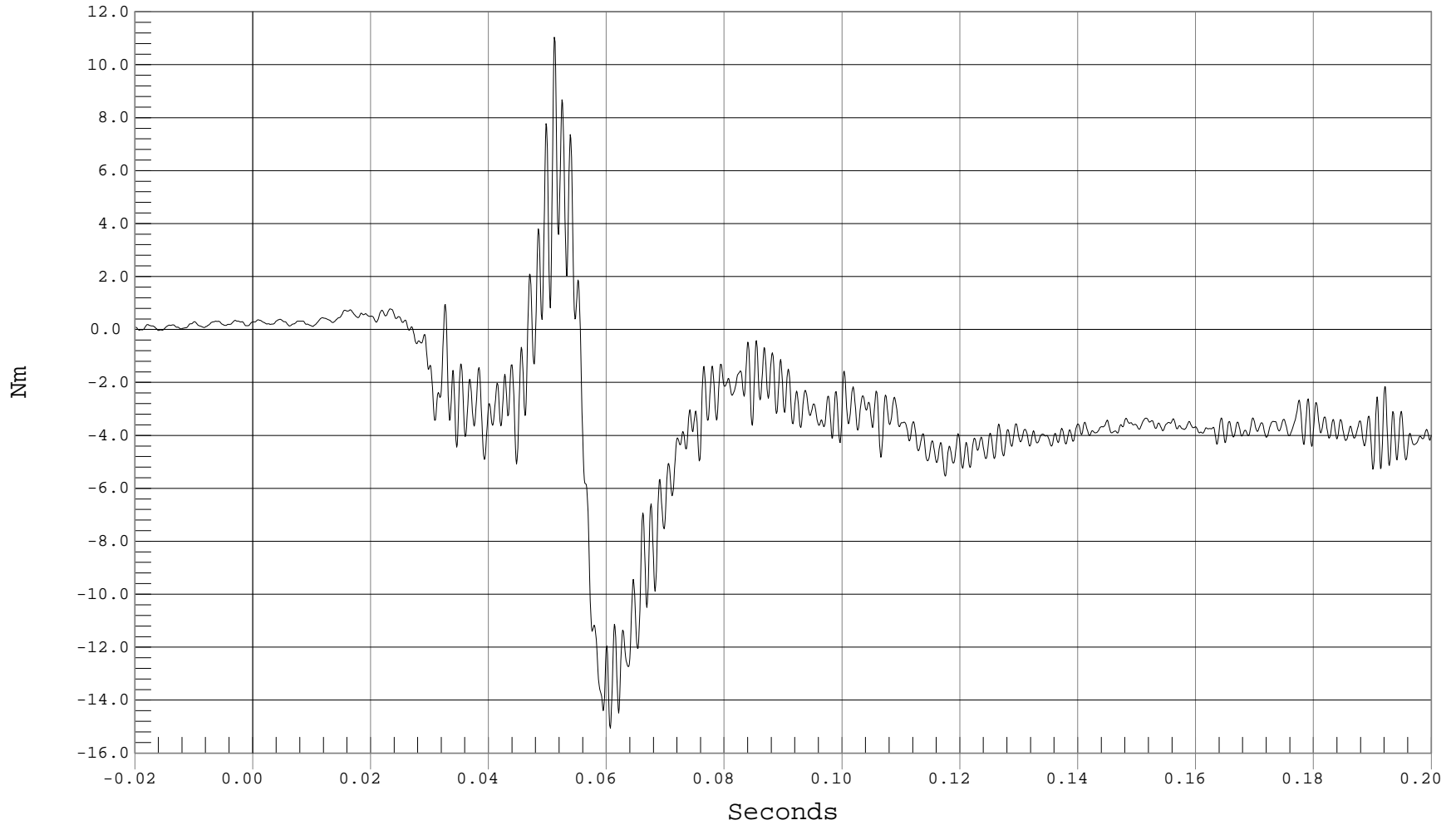
DRIVER TORSO MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER TORSO MY, B02055MF.M61

Ymin = -15.06 Nm @ 0.0606 Seconds, Ymax = 11.04 Nm @ 0.0511 Seconds





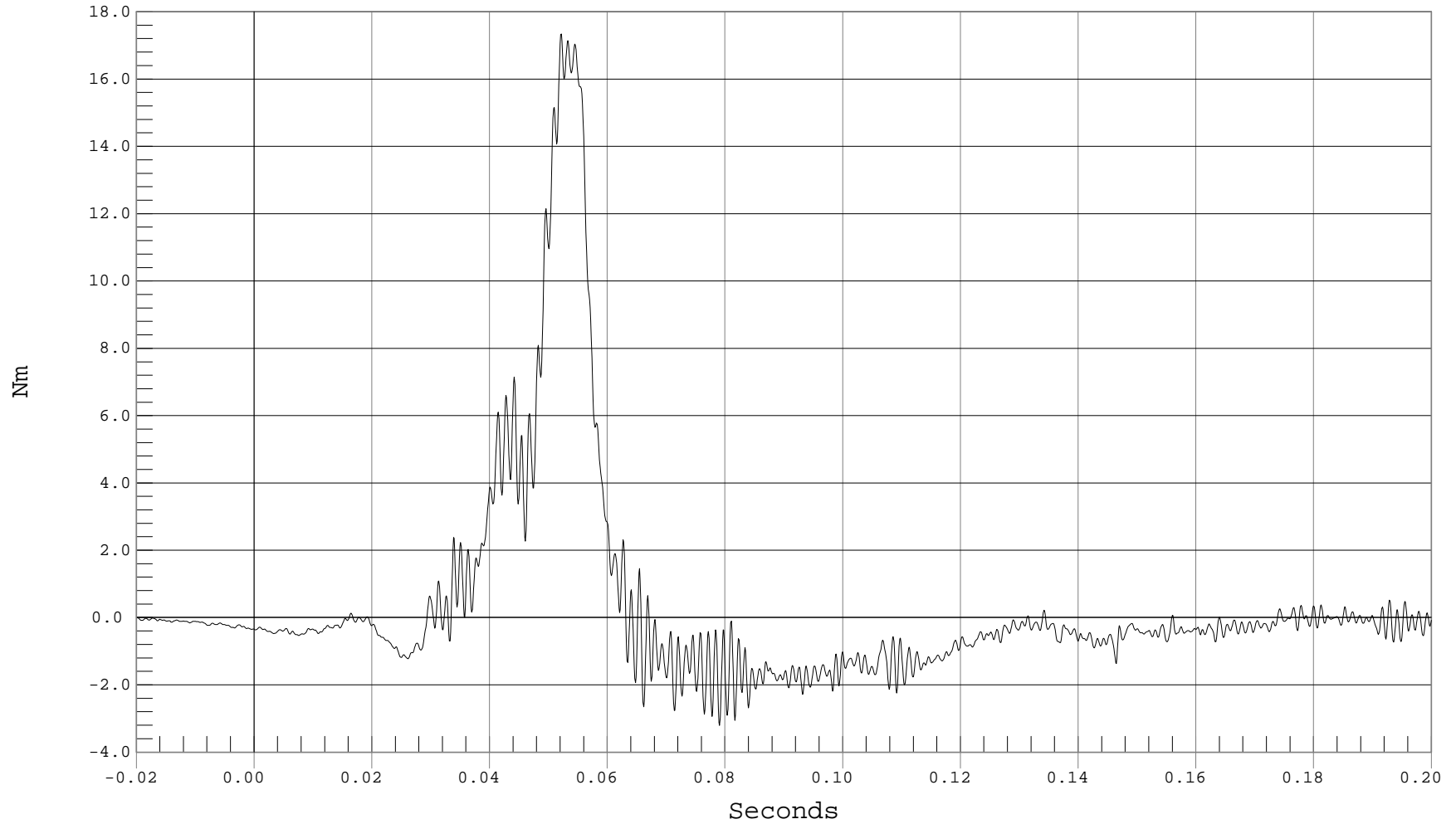
DRIVER TORSO MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER TORSO MZ, B02055MF.M62

Ymin = -3.2 Nm @ 0.0790 Seconds, Ymax = 17.34 Nm @ 0.0521 Seconds



B-50



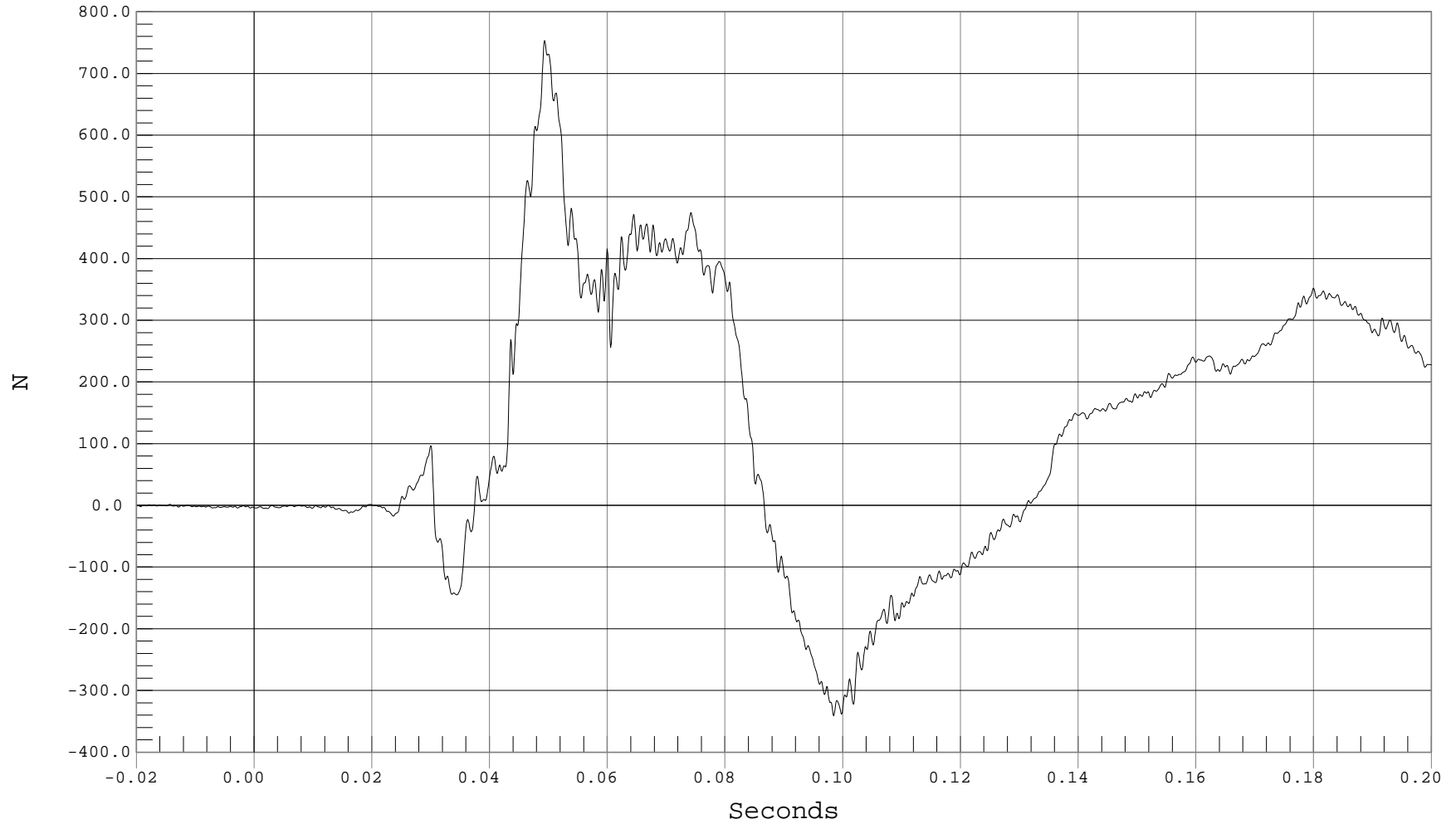
DRIVER T-12 FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER T-12 FX, B02055FF.F65

Ymin = -341.08 N @ 0.0984 Seconds, Ymax = 753.3 N @ 0.0493 Seconds



B-51



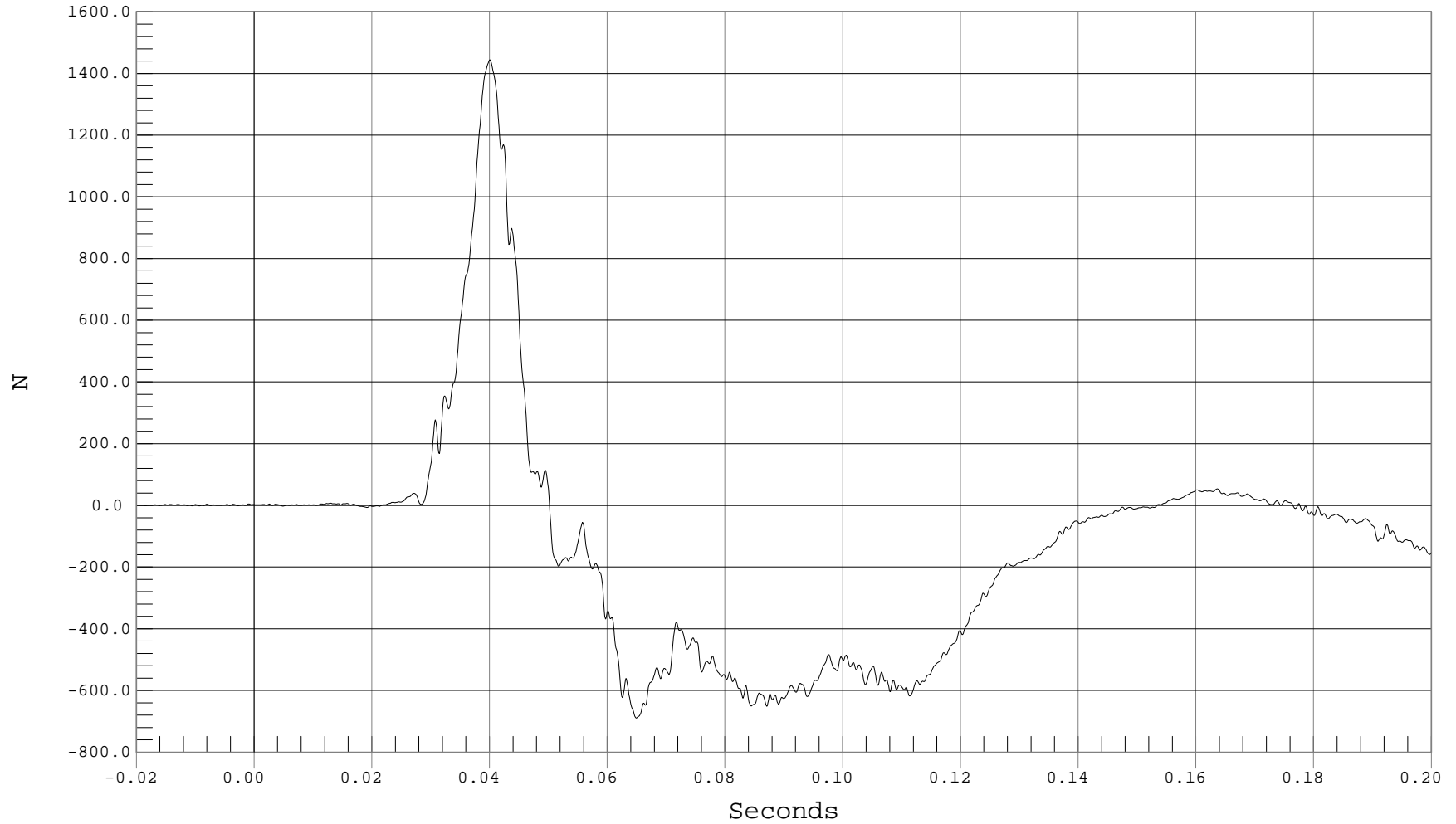
DRIVER T-12 FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER T-12 FY, B02055FF.F66

Ymin = -689.49 N @ 0.0648 Seconds, Ymax = 1444.34 N @ 0.0400 Seconds



B-52



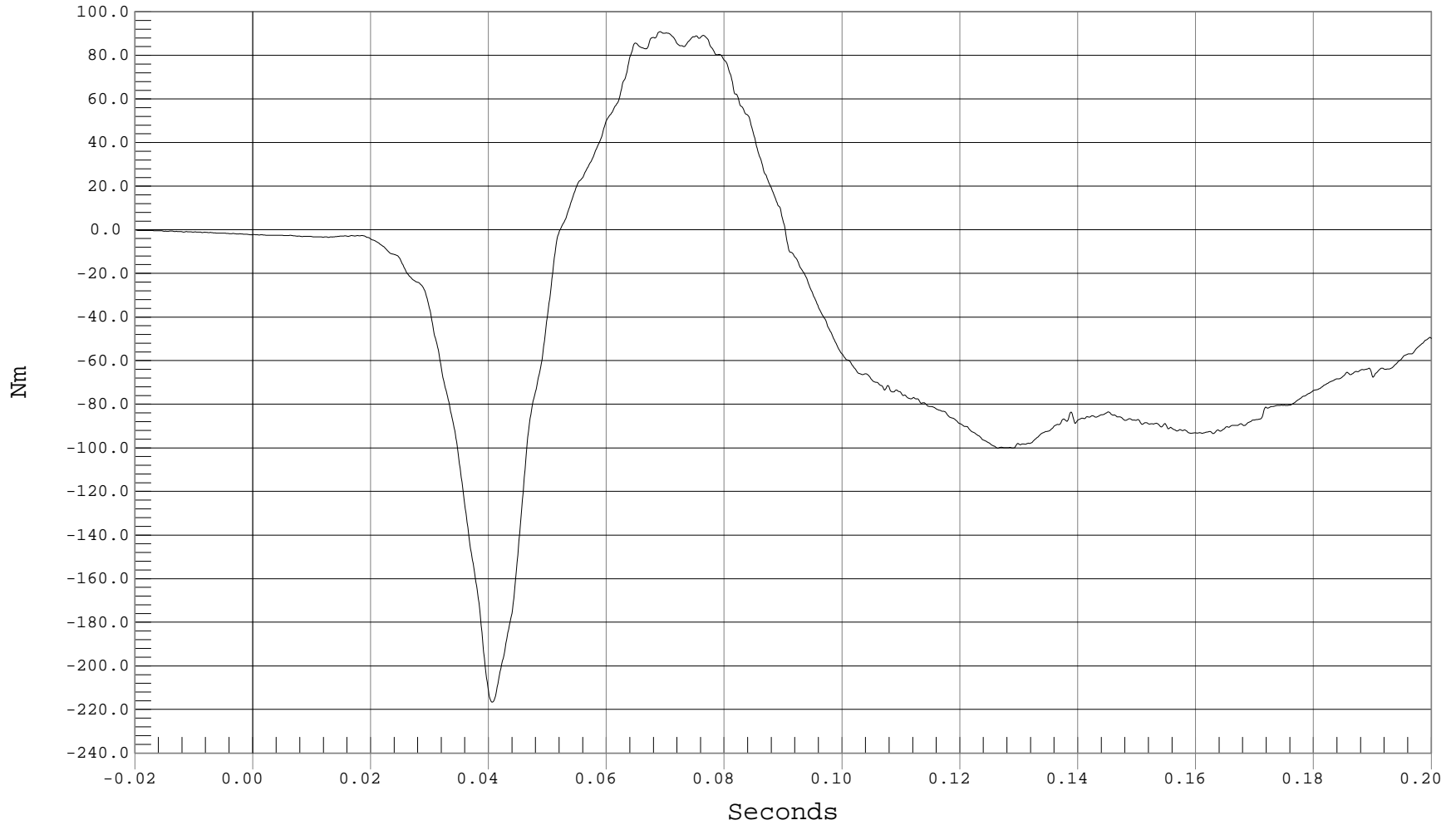
DRIVER T-12 MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER T-12 MX, B02055MF.M67

Ymin = -216.61 Nm @ 0.0405 Seconds, Ymax = 90.89 Nm @ 0.0690 Seconds





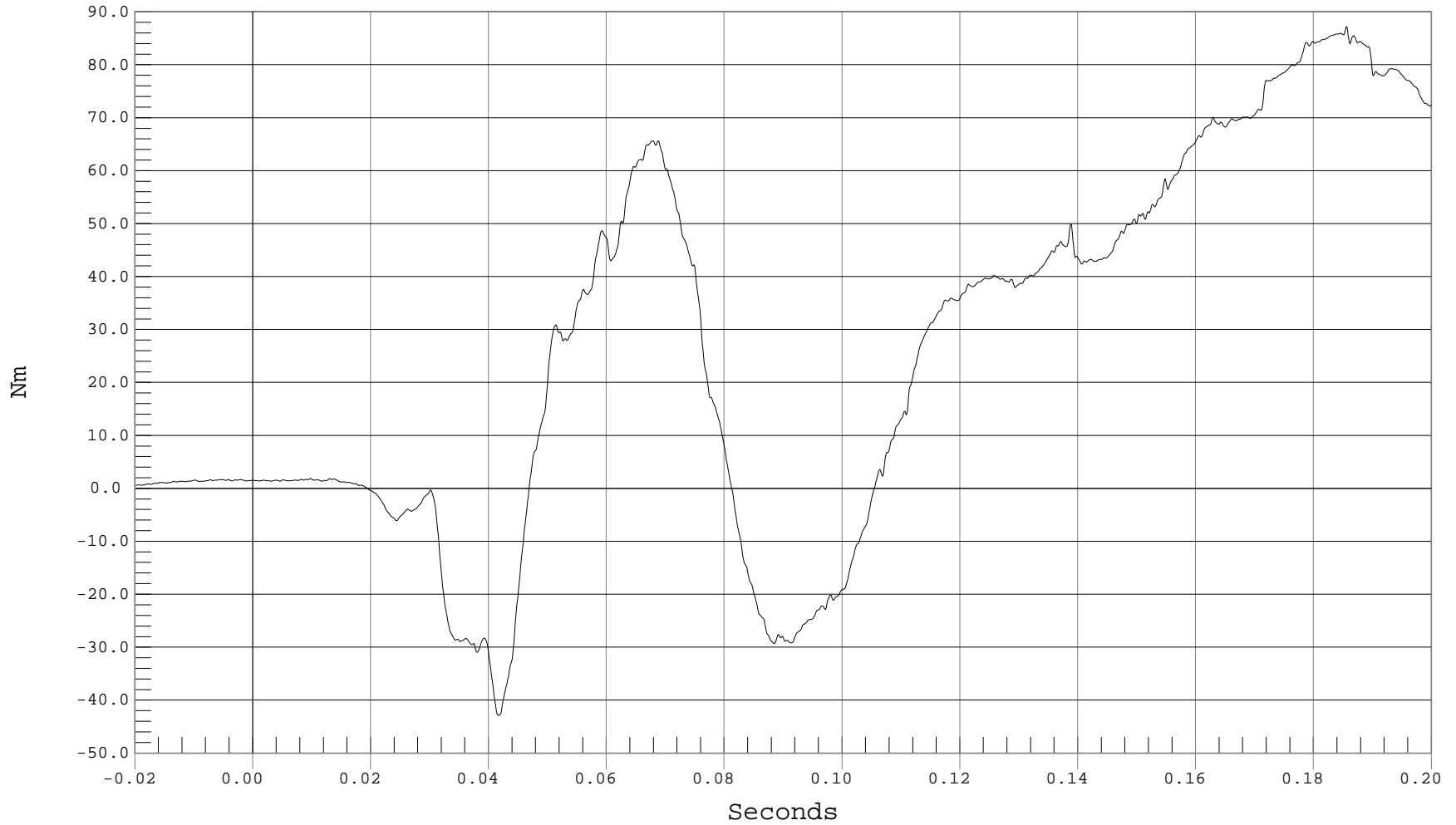
DRIVER T-12 MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER T-12 MY, B02055MF.M68

Ymin = -42.89 Nm @ 0.0416 Seconds, Ymax = 87.22 Nm @ 0.1855 Seconds





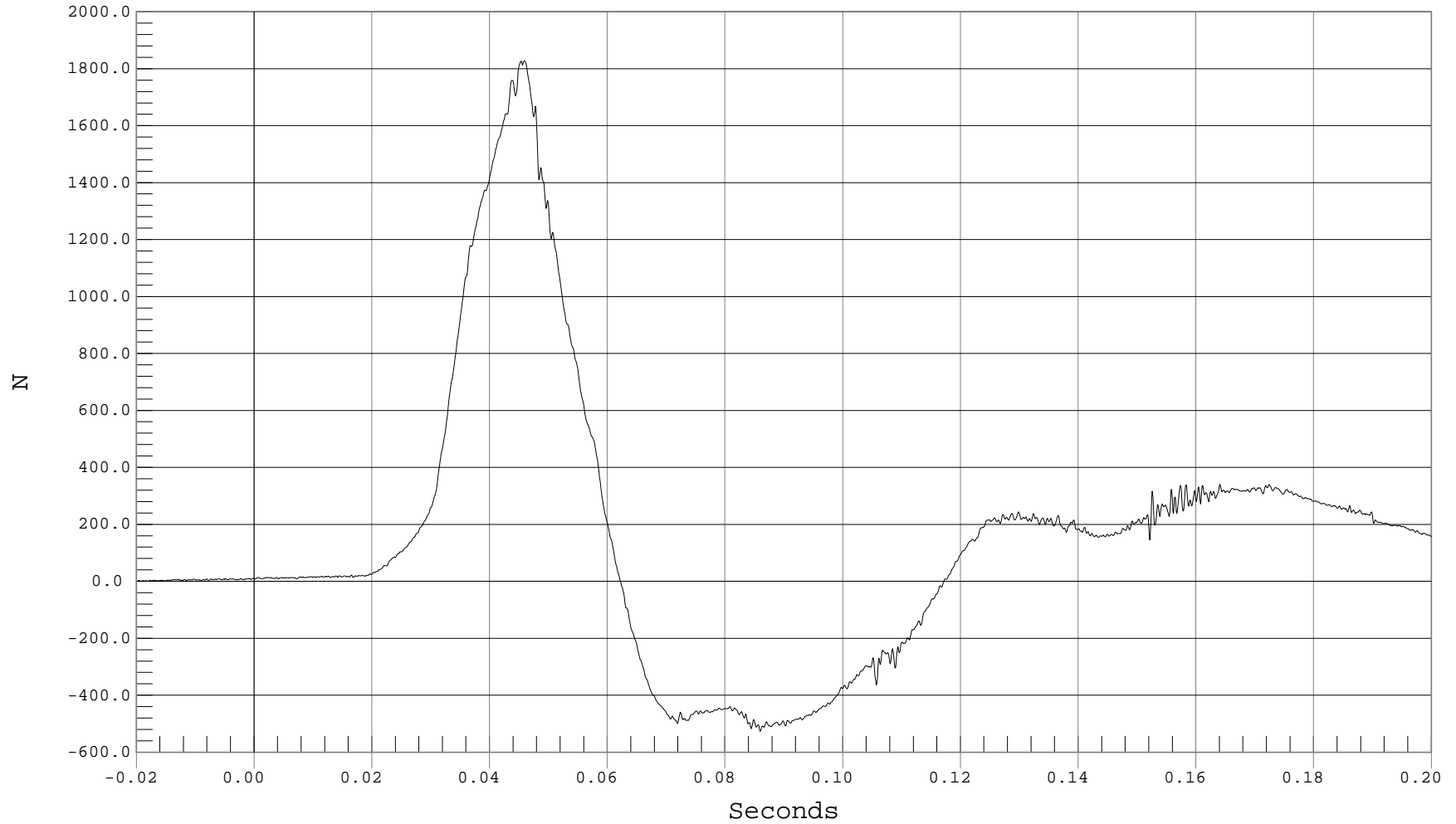
DRIVER LUMBAR FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LUMBAR FY, B02055FT.F84

Ymin = -527.06 N @ 0.0859 Seconds, Ymax = 1828.03 N @ 0.0458 Seconds



B-55



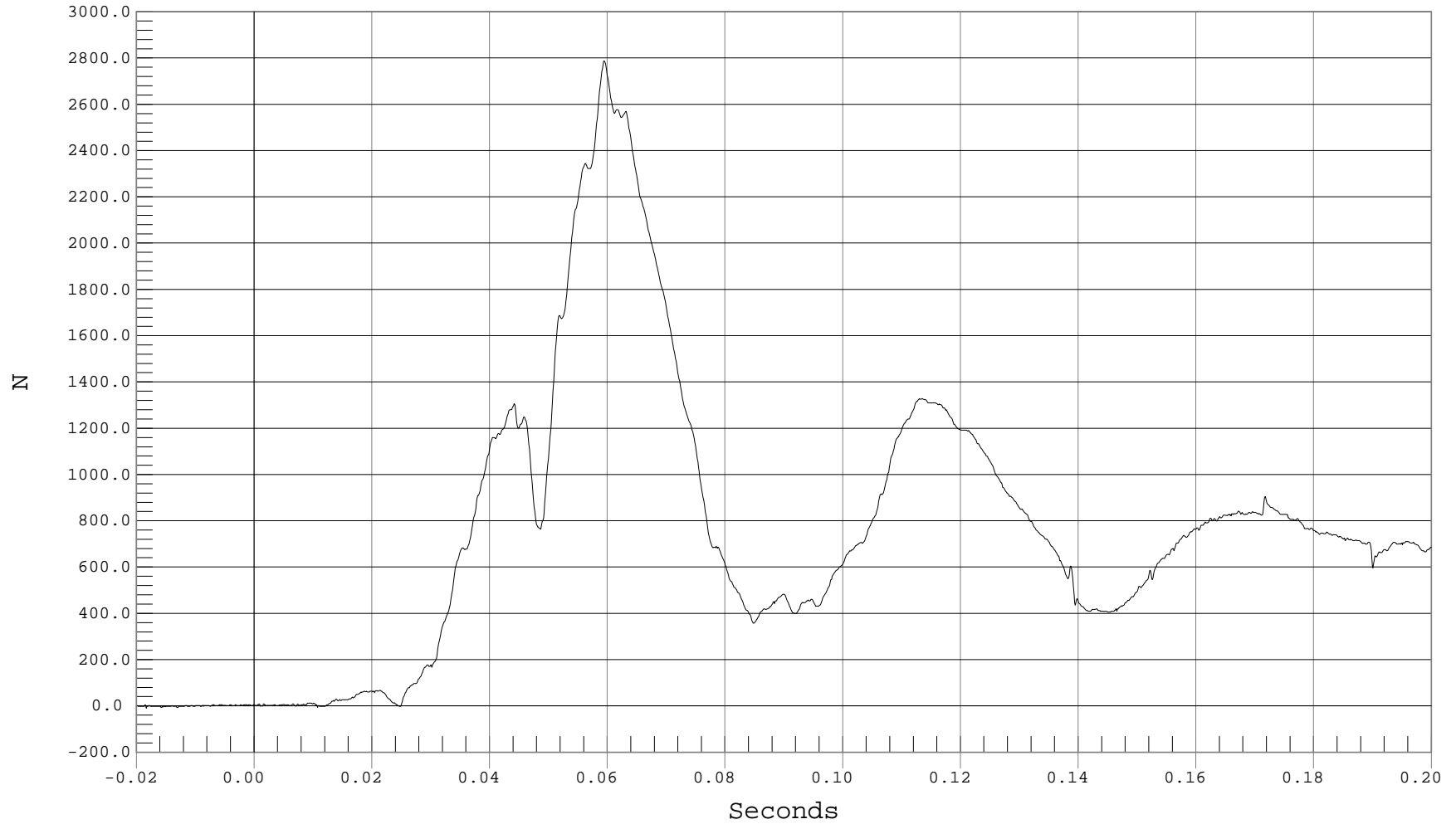
DRIVER LUMBAR FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LUMBAR FZ, B02055FT.F85

Ymin = -9.8 N @ -0.0184 Seconds, Ymax = 2788.15 N @ 0.0594 Seconds



B-56



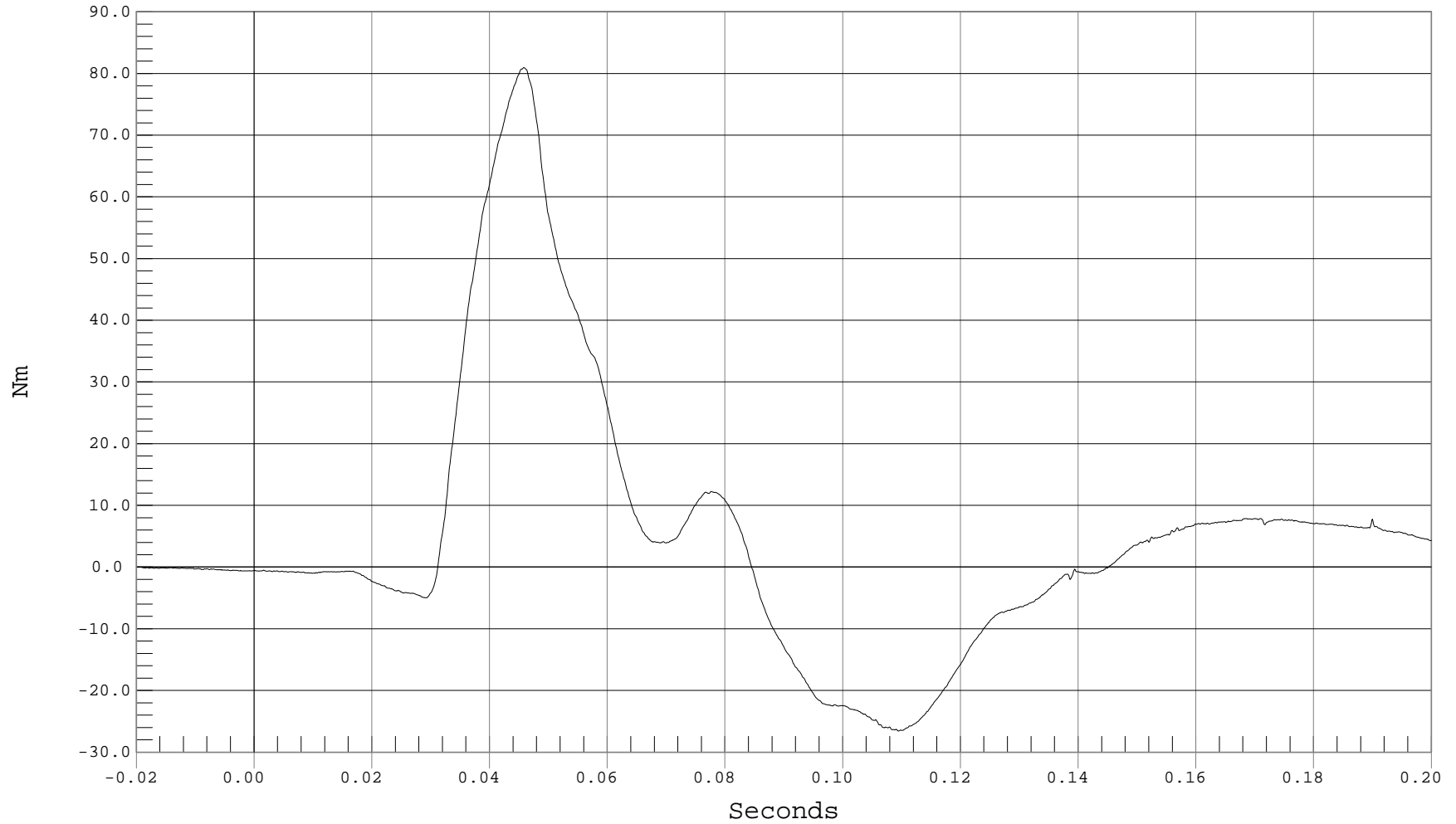
DRIVER LUMBAR MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER LUMBAR MX, B02055MT.M86

Ymin = -26.6 Nm @ 0.1094 Seconds, Ymax = 80.95 Nm @ 0.0458 Seconds





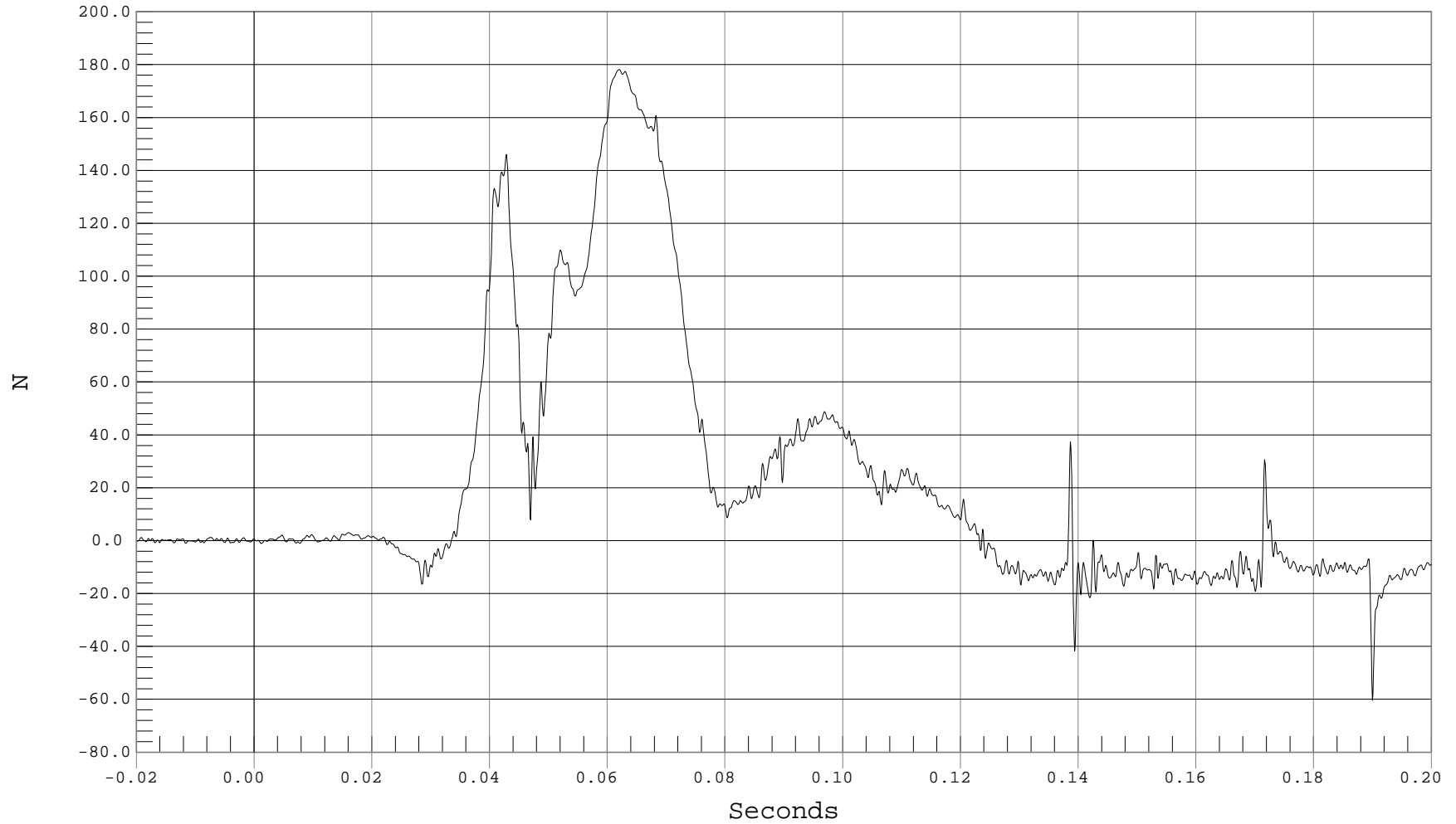
DRIVER ABDOMEN FRONT FORCE

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER FRONT ABDOMEN FY, B02055FF.F87

Ymin = -60.38 N @ 0.1899 Seconds, Ymax = 178.15 N @ 0.0619 Seconds





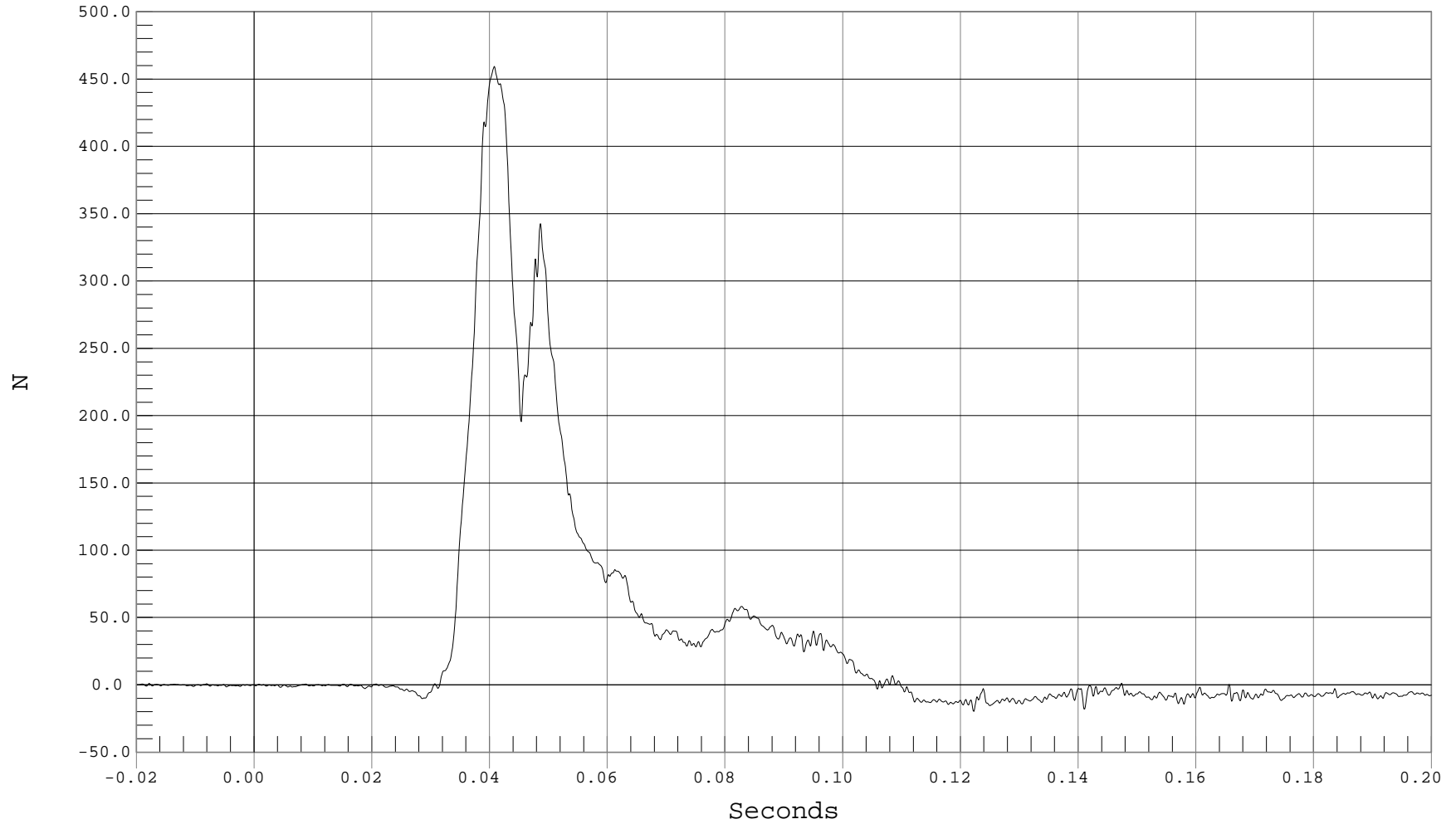
DRIVER ABDOMEN MID FORCE

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER MID ABDOMEN FY, B02055FF.F88

Ymin = -19.67 N @ 0.1222 Seconds, Ymax = 459.36 N @ 0.0407 Seconds



B-59



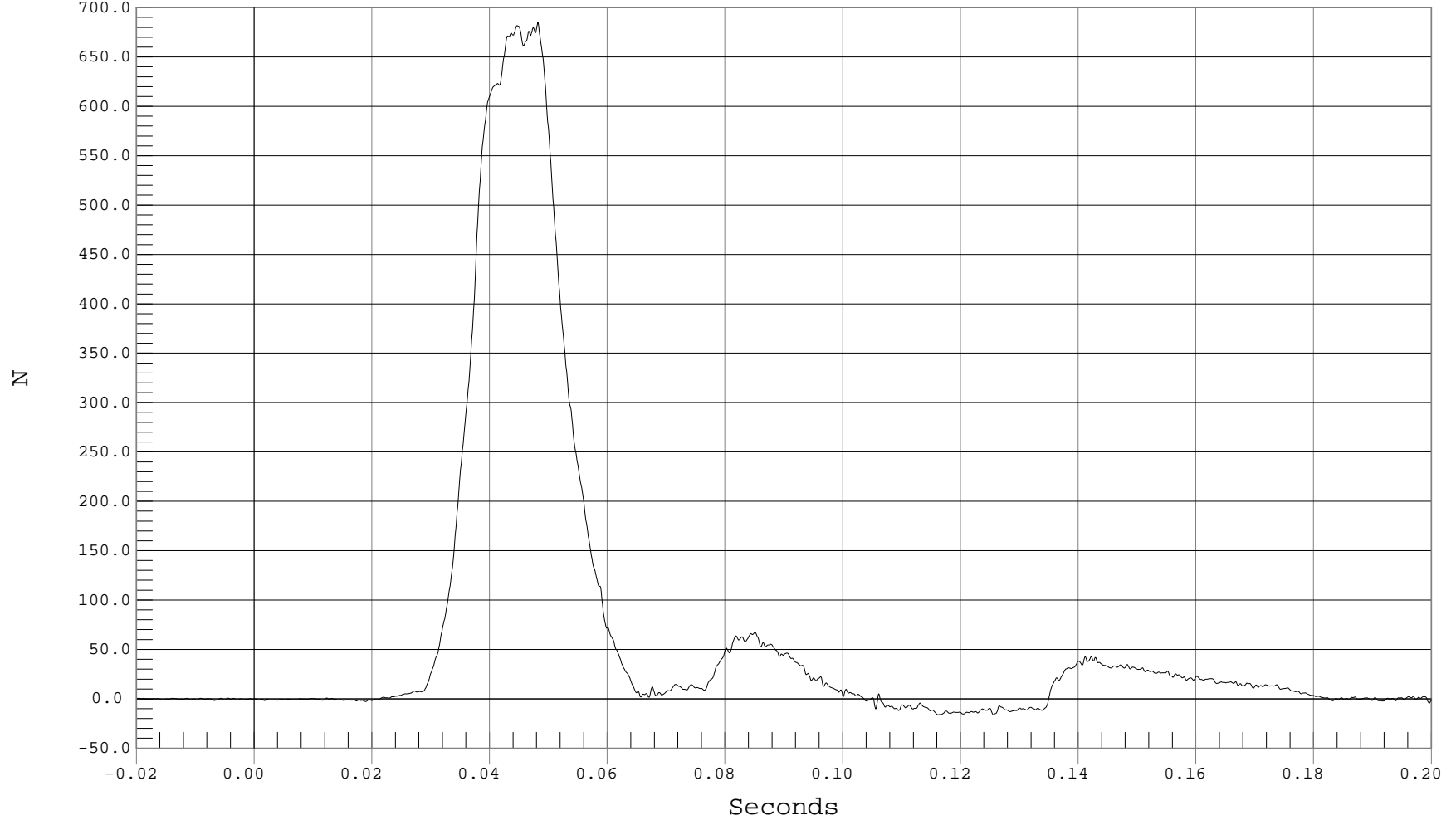
DRIVER ABDOMEN REAR FORCE

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER REAR ABDOMEN FY, B02055FF.F89

Ymin = -16.41 N @ 0.1255 Seconds, Ymax = 684.96 N @ 0.0481 Seconds



B-60



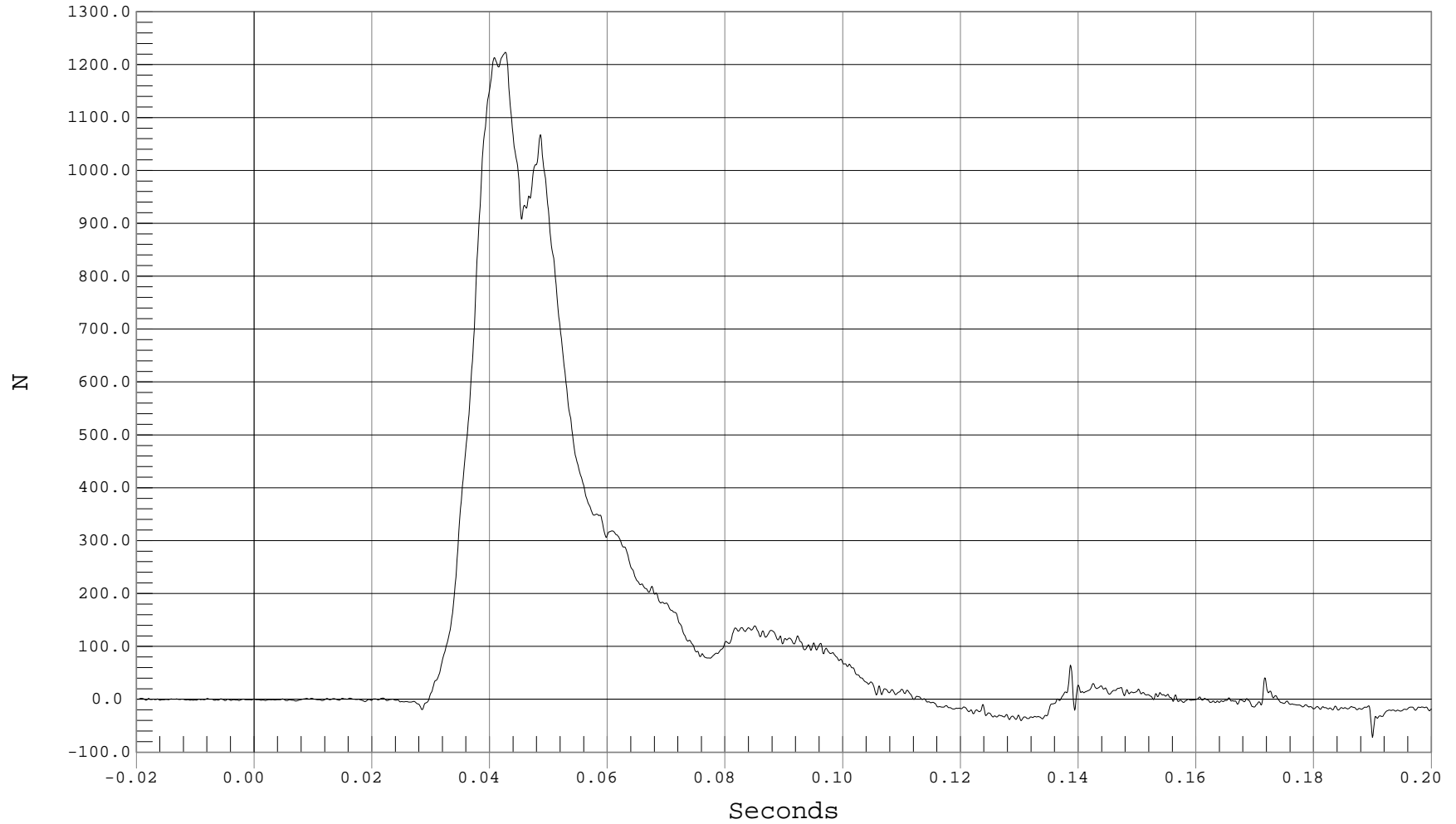
DRIVER SUMMED ABDOMEN FORCE

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

1 DRIVER SUMMED ABDOMEN FORCE, B02055FU.F87

Ymin = -71.85 N @ 0.1899 Seconds, Ymax = 1223.53 N @ 0.0426 Seconds



B-61



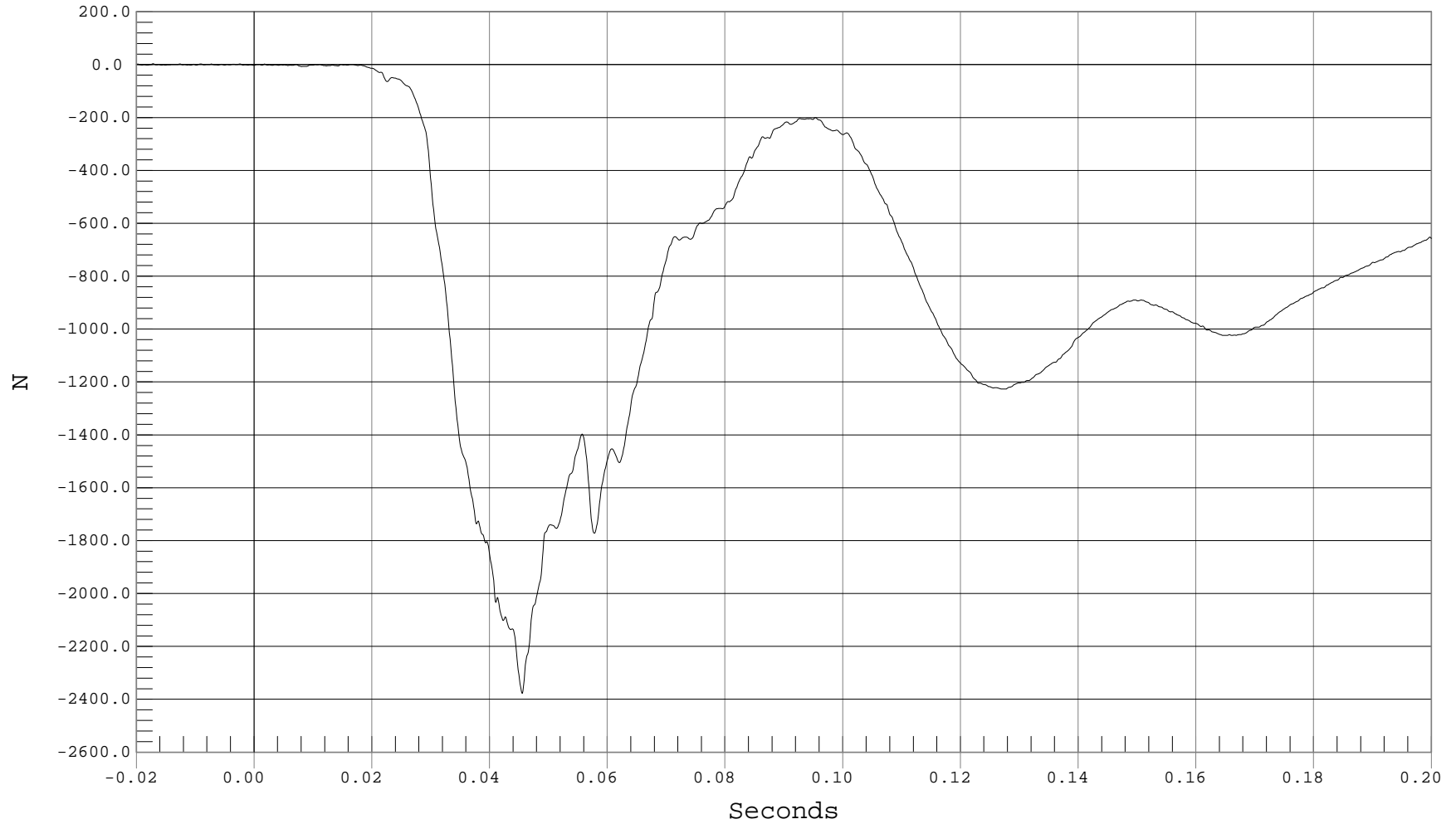
DRIVER PUBIC SYMPHYSIS FORCE

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 PUBIC SYMPHYSIS FORCE, B02055FF.F90

Ymin = -2377.26 N @ 0.0455 Seconds, Ymax = 2.94 N @ -0.0172 Seconds



B-62



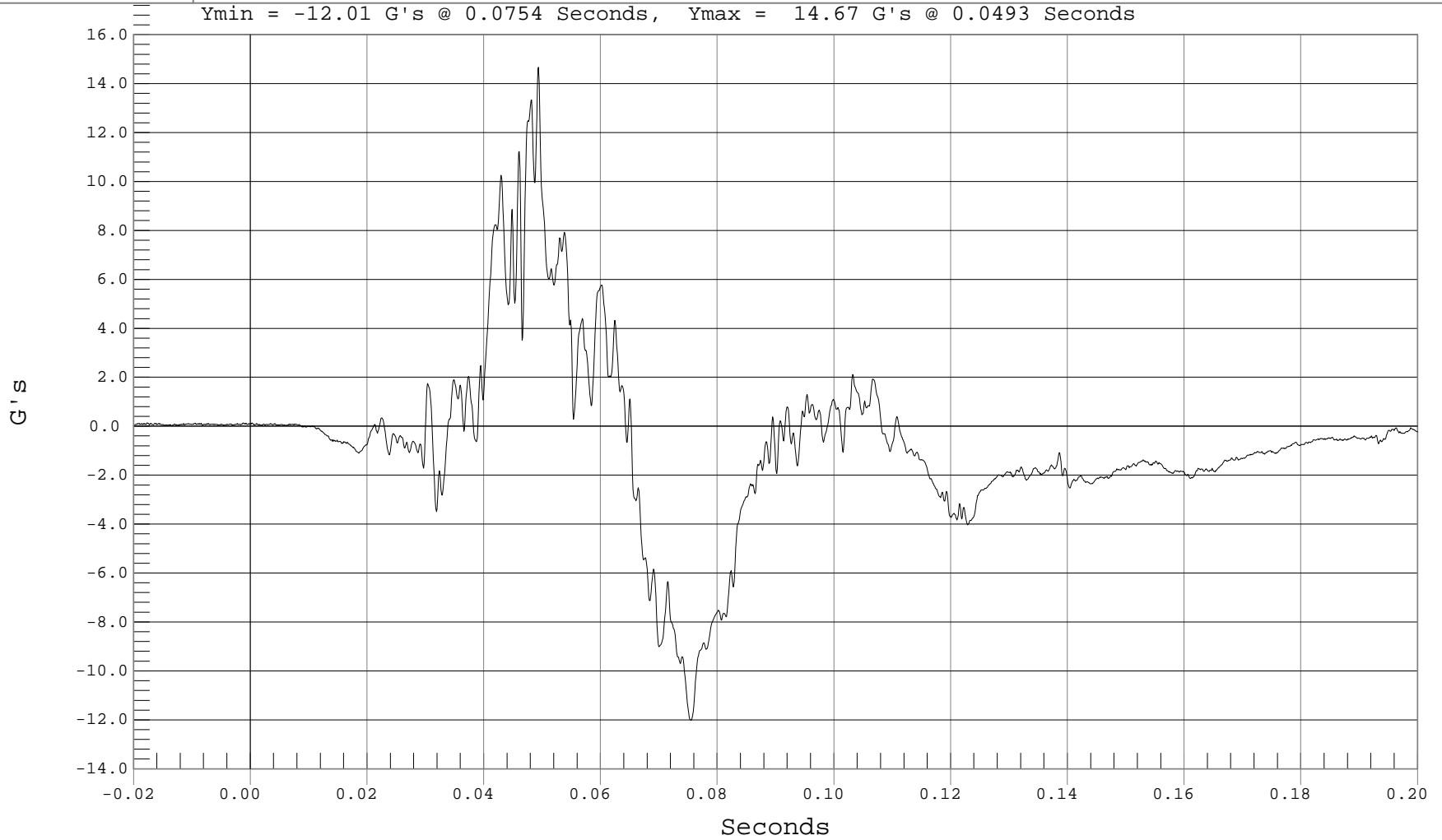
DRIVER PELVIS X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS X, B02055AT.A12

Ymin = -12.01 G's @ 0.0754 Seconds, Ymax = 14.67 G's @ 0.0493 Seconds





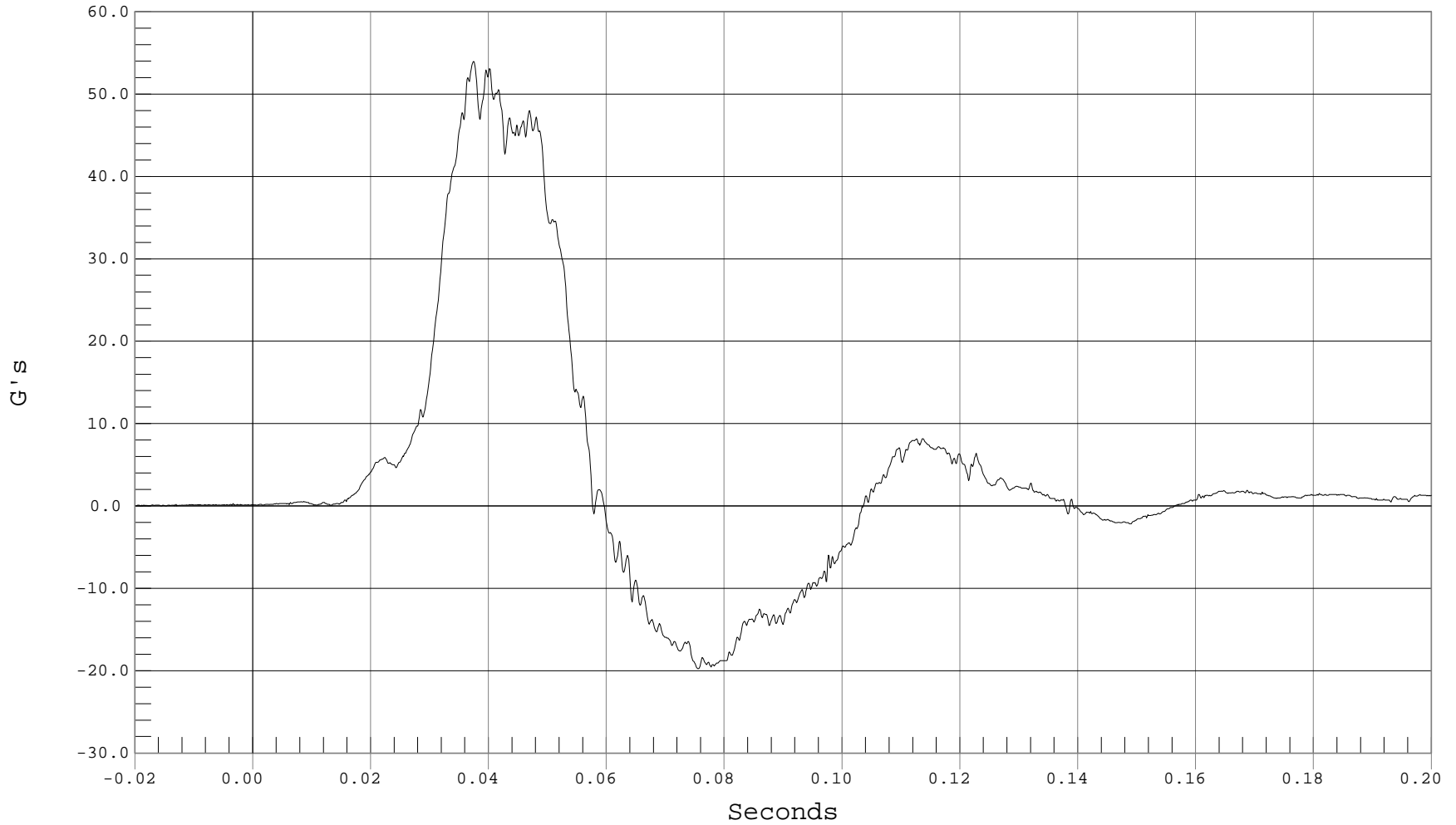
DRIVER PELVIS Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS Y, B02055AT.A13

Ymin = -19.76 G's @ 0.0754 Seconds, Ymax = 53.97 G's @ 0.0374 Seconds



B-64



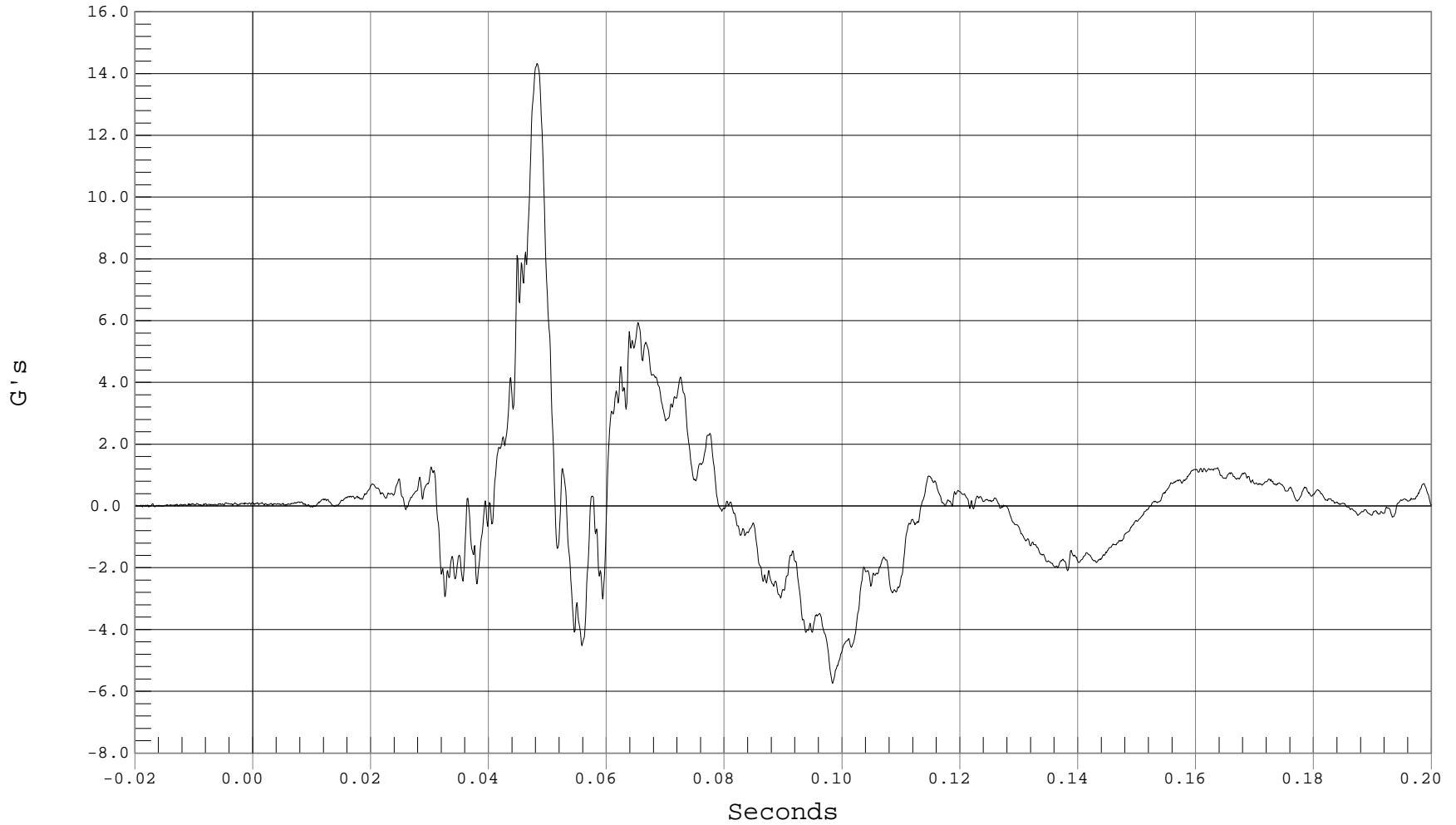
DRIVER PELVIS Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS Z, B02055AT.A14

Ymin = -5.74 G's @ 0.0983 Seconds, Ymax = 14.33 G's @ 0.0482 Seconds



B-65



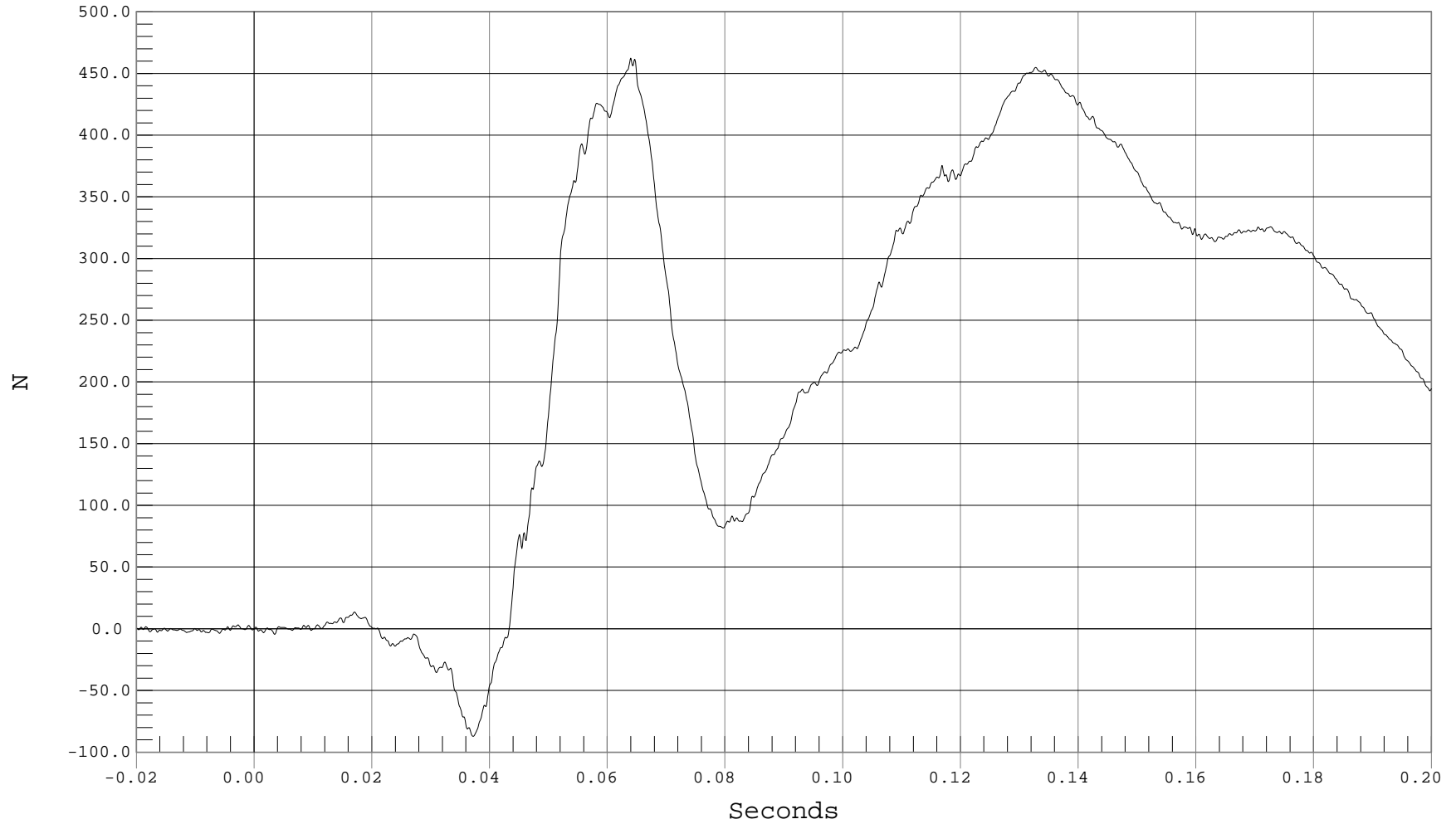
DRIVER LEFT FEMUR FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FX, B02055FF.F01

Ymin = -87.23 N @ 0.0371 Seconds, Ymax = 462.4 N @ 0.0639 Seconds



B-66



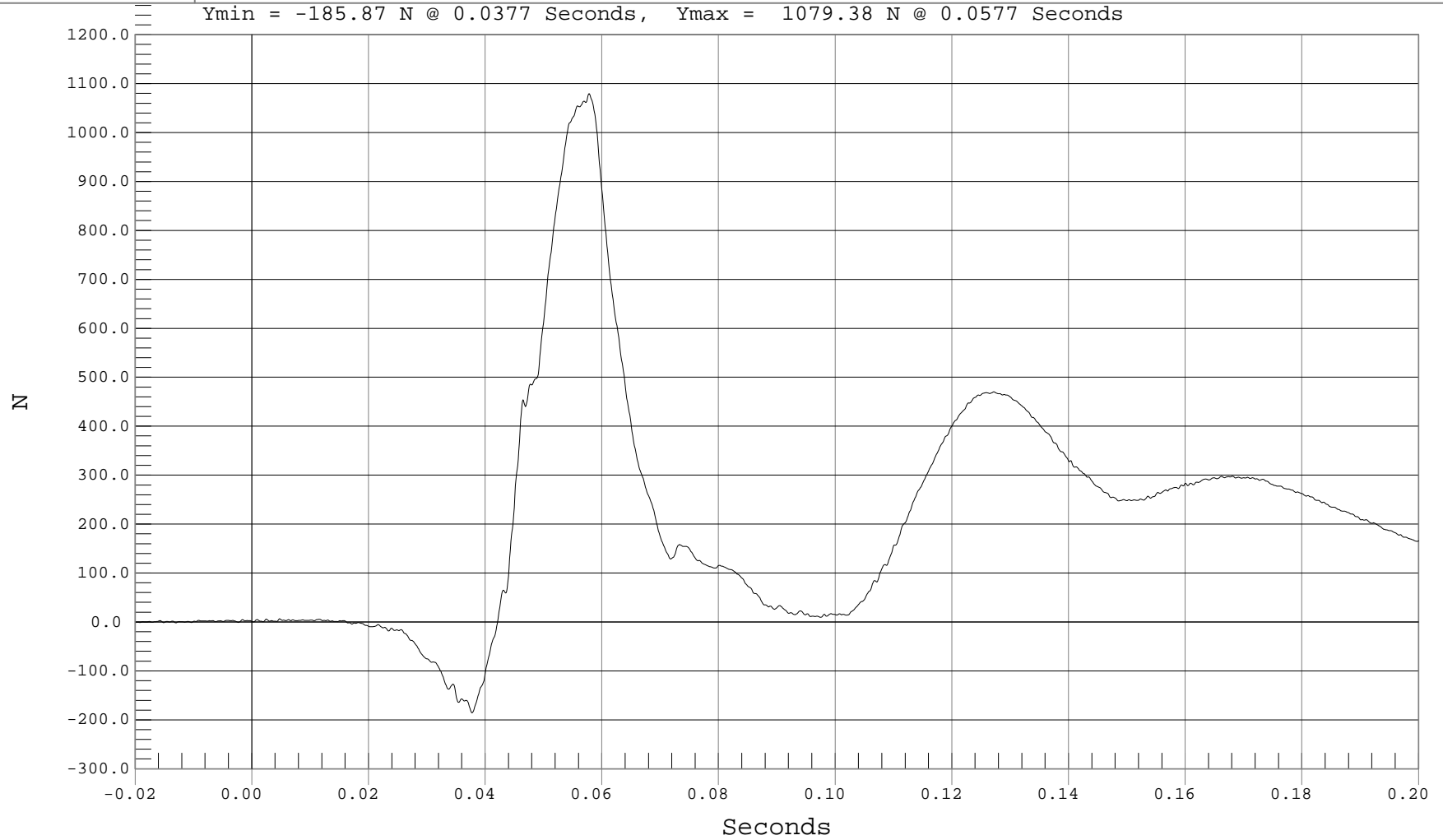
DRIVER LEFT FEMUR FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FY, B02055FF.F02

Ymin = -185.87 N @ 0.0377 Seconds, Ymax = 1079.38 N @ 0.0577 Seconds



B-67



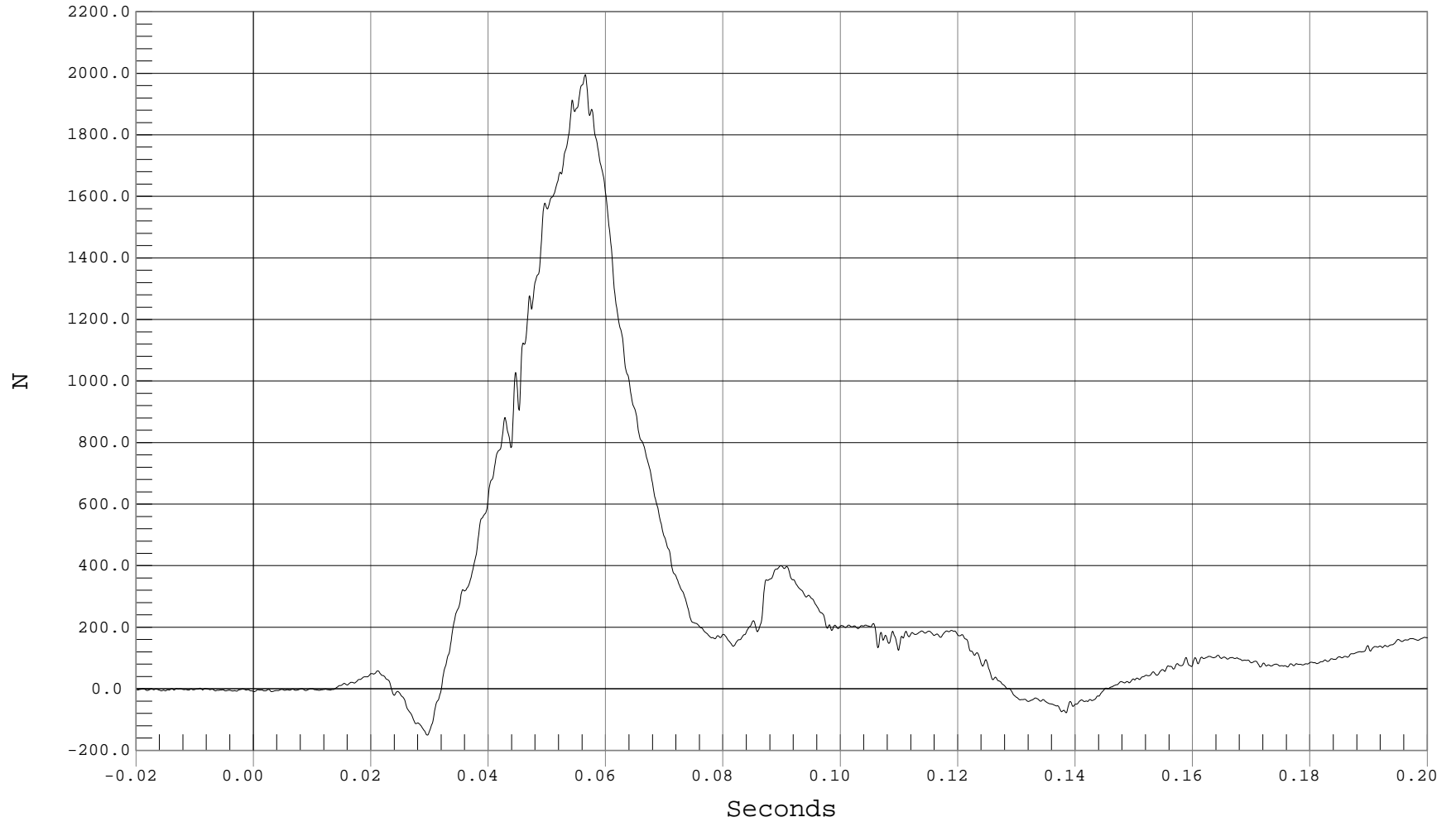
DRIVER LEFT FEMUR FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FZ, B02055FF.F03

Ymin = -150.44 N @ 0.0296 Seconds, Ymax = 1995.22 N @ 0.0565 Seconds



B-68



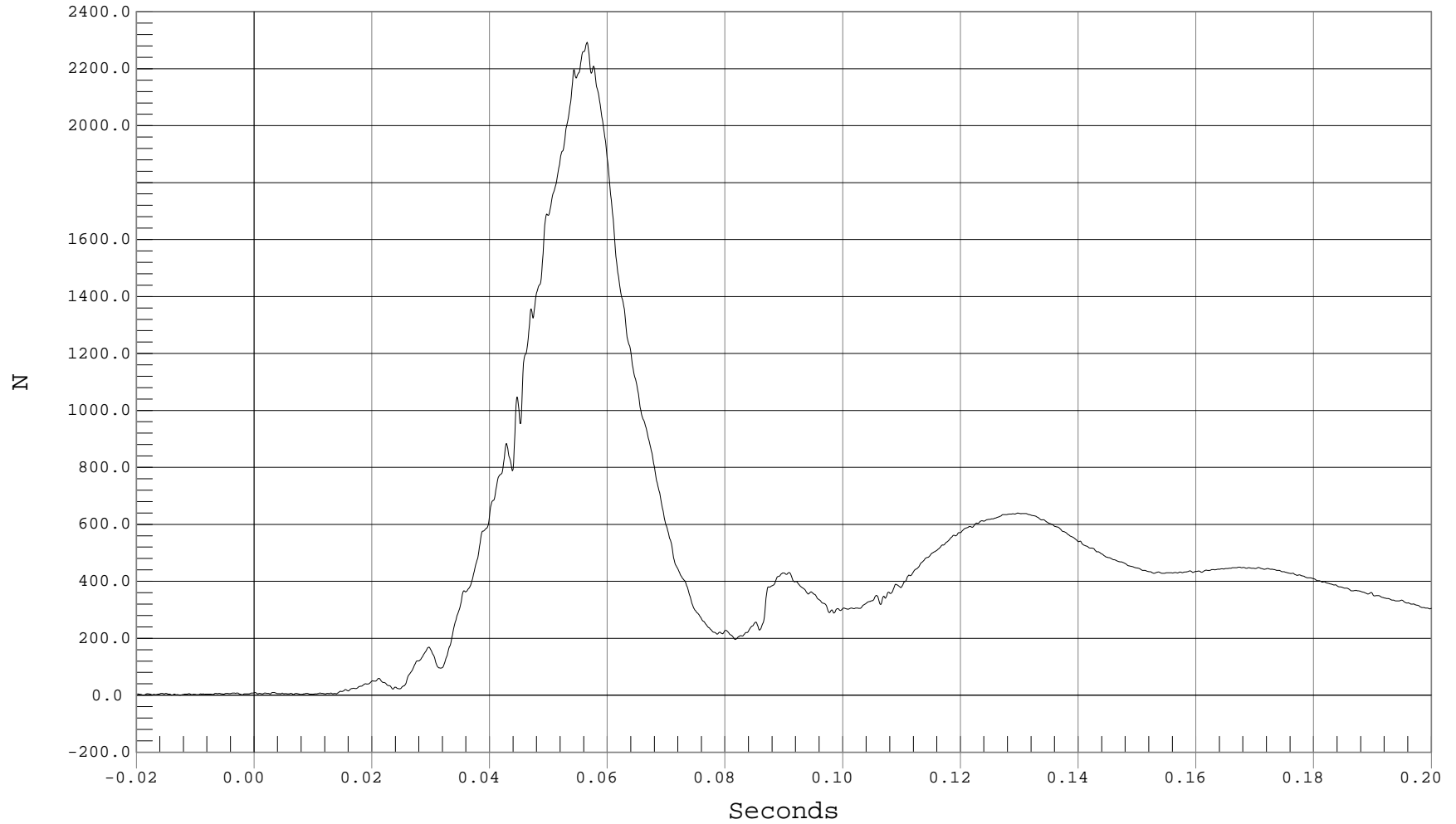
DRIVER LEFT FEMUR FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FORCE RESULTANT, B02055FV.F01

Ymin = .31 N @ -0.0141 Seconds, Ymax = 2292.77 N @ 0.0565 Seconds





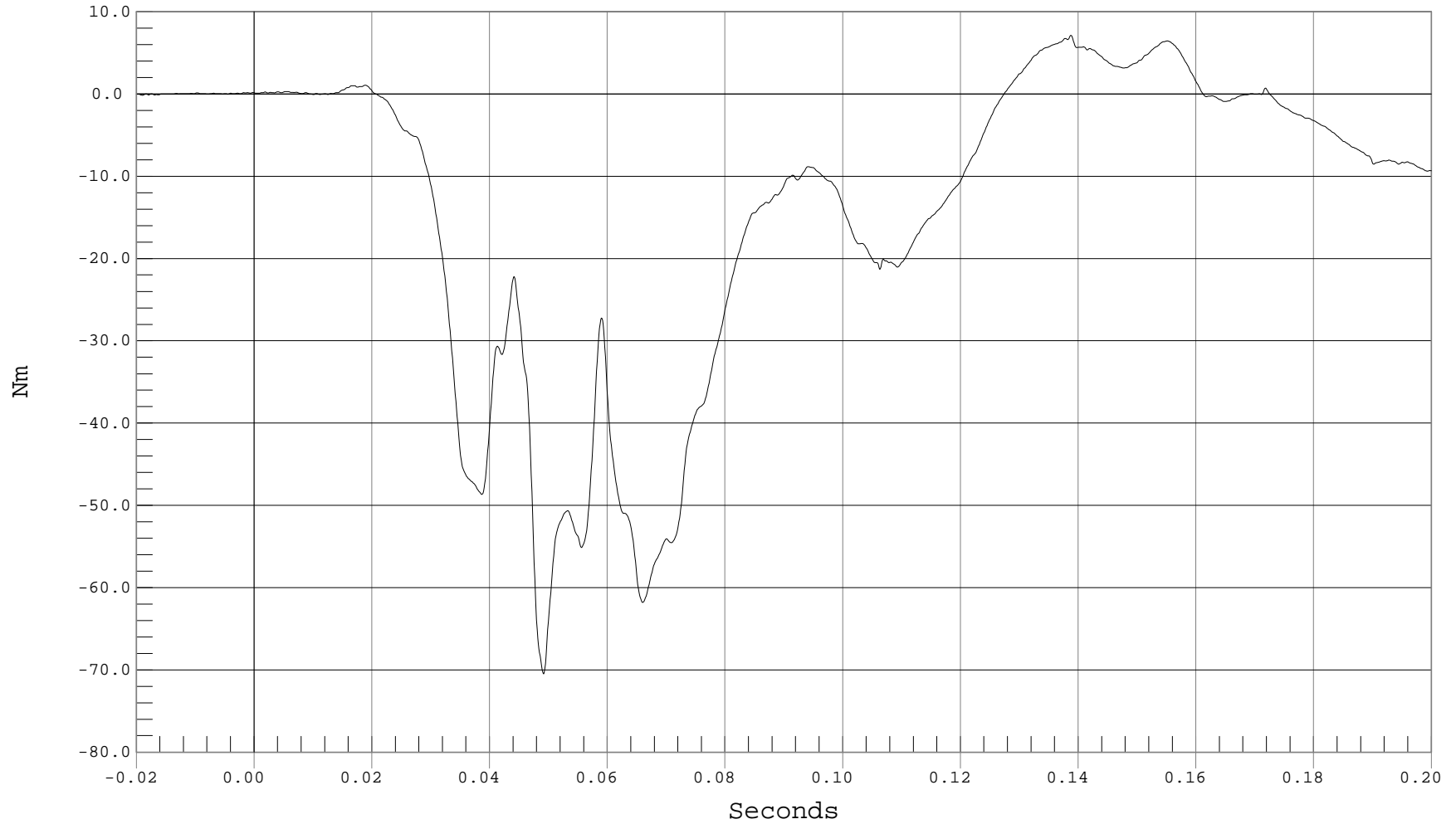
DRIVER LEFT FEMUR MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MX, B02055MF.M04

Ymin = -70.47 Nm @ 0.0491 Seconds, Ymax = 7.14 Nm @ 0.1387 Seconds



B-70



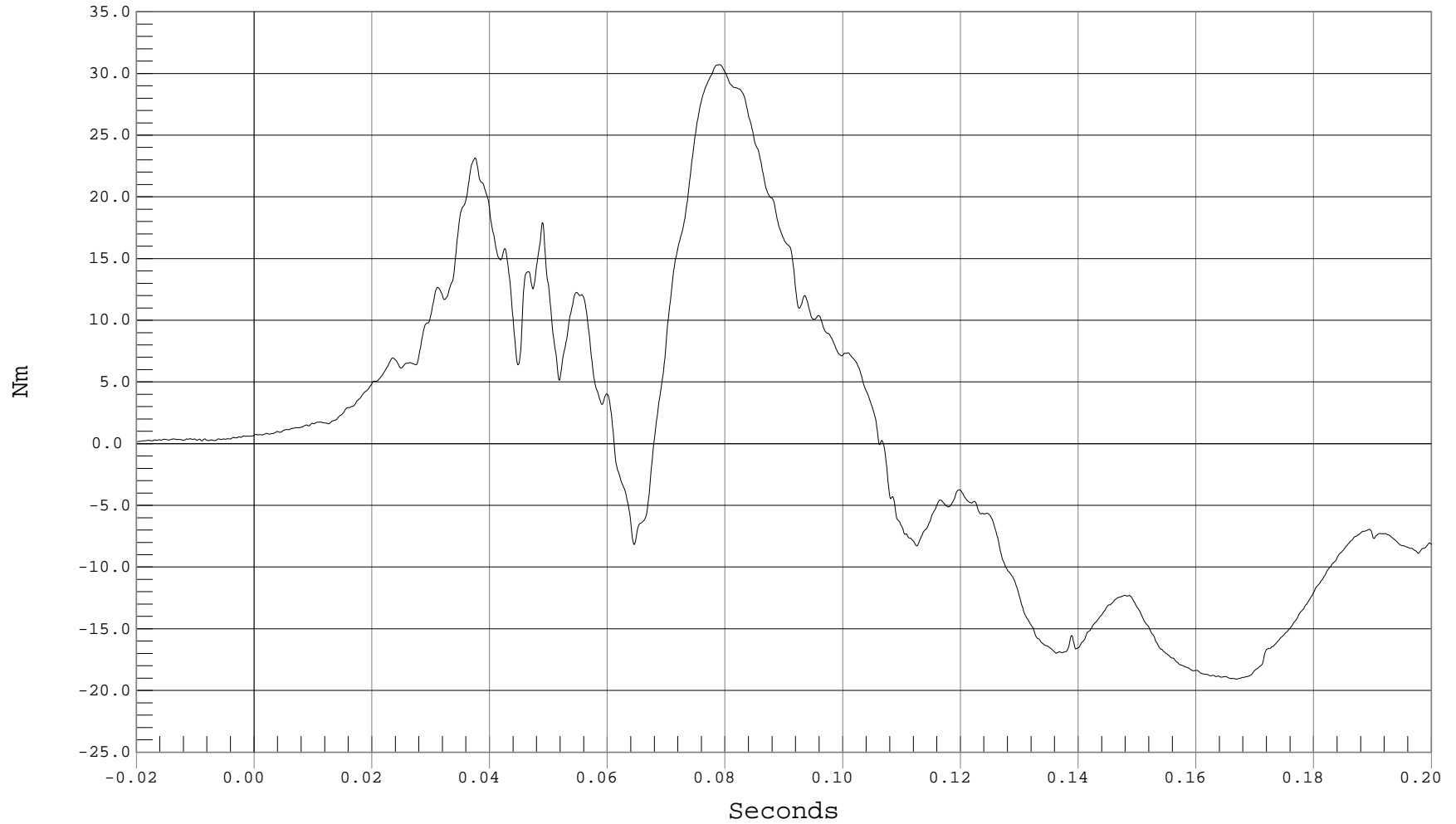
DRIVER LEFT FEMUR MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MY, B02055MF.M05

Ymin = -19.08 Nm @ 0.1668 Seconds, Ymax = 30.71 Nm @ 0.0790 Seconds





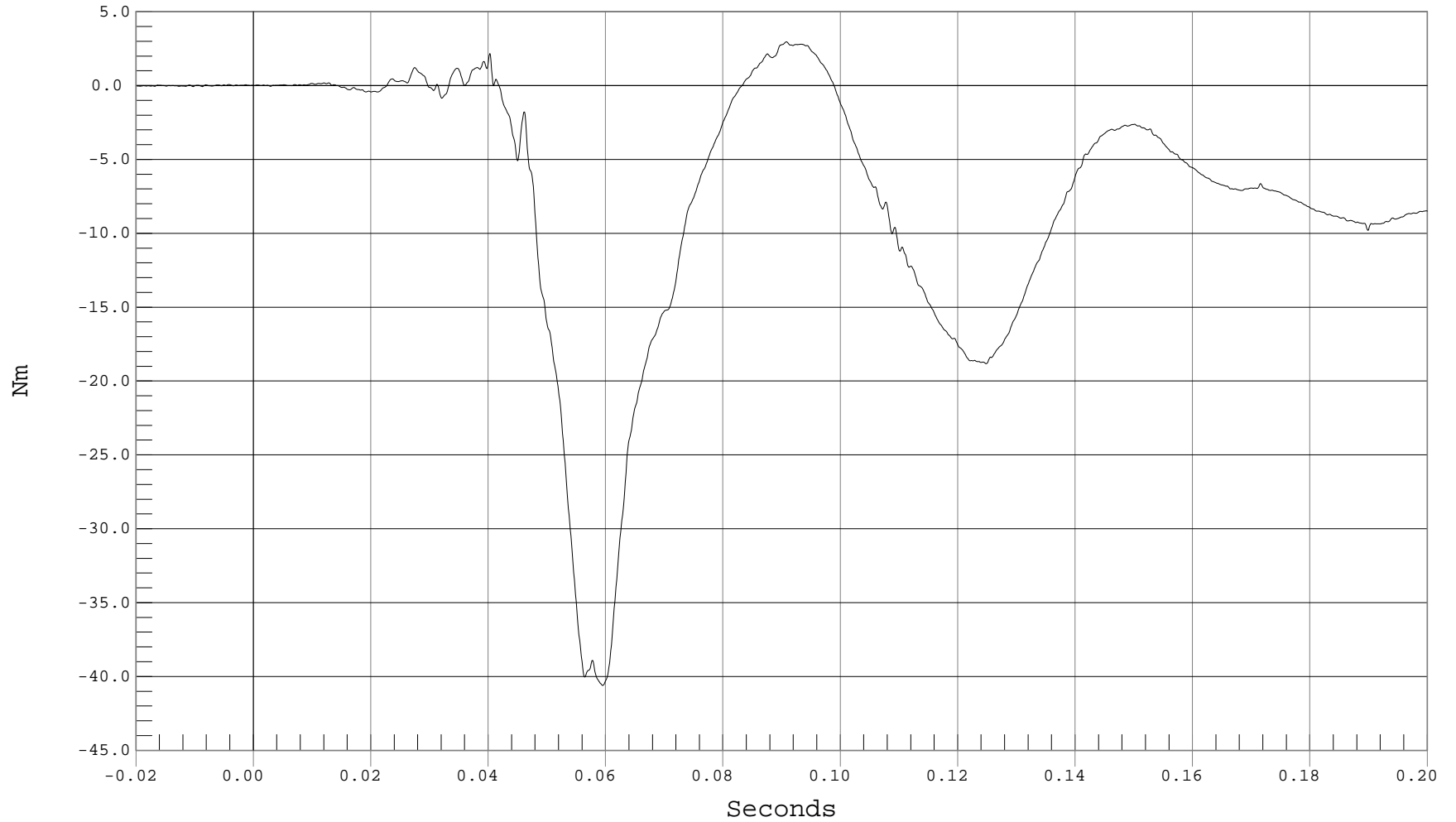
DRIVER LEFT FEMUR MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MZ, B02055MF.M06

Ymin = -40.6 Nm @ 0.0594 Seconds, Ymax = 2.97 Nm @ 0.0907 Seconds



B-72



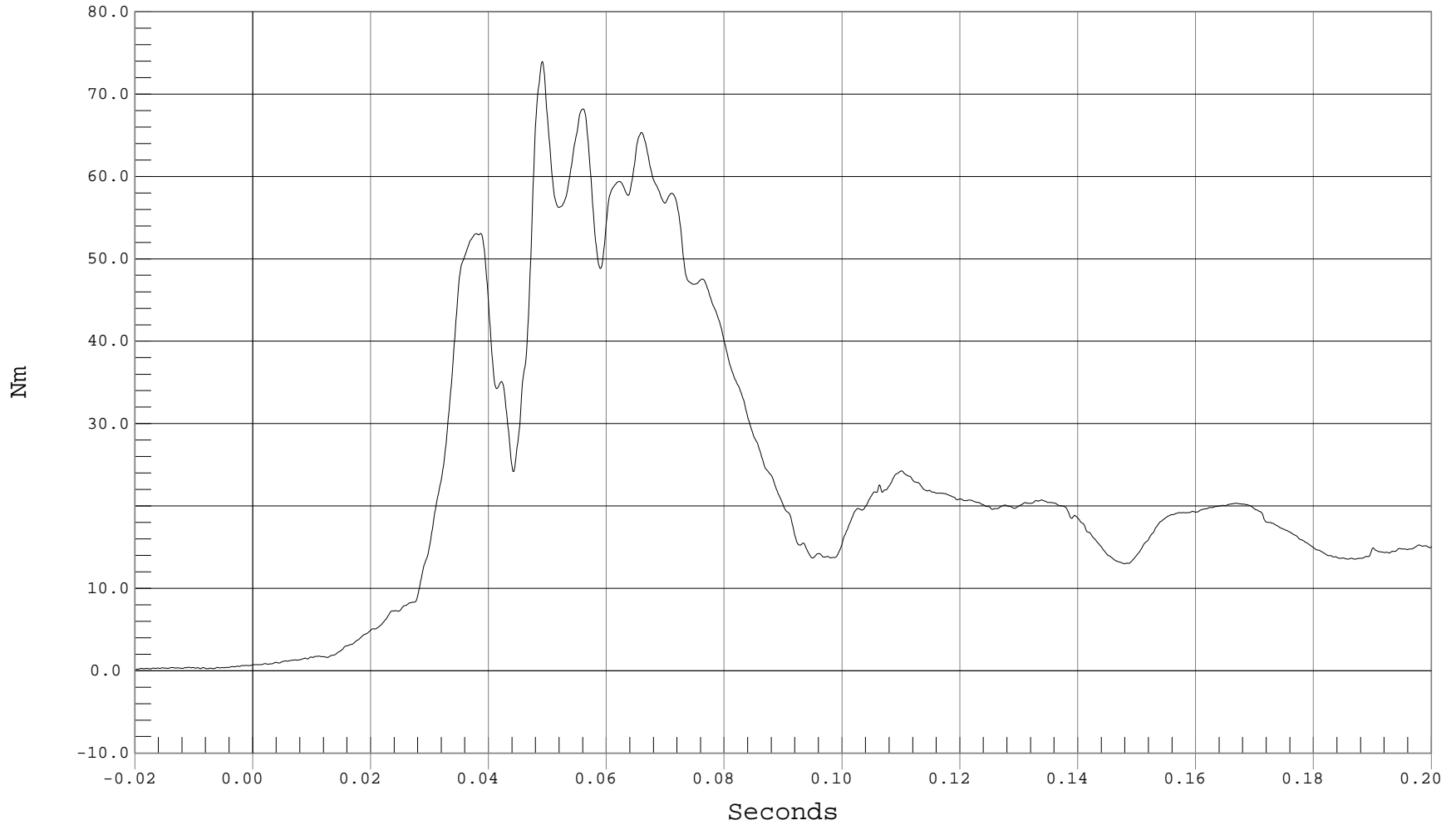
DRIVER LEFT FEMUR MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MOMENT RESULTANT, B02055MV.M04

Ymin = .17 Nm @ -0.0199 Seconds, Ymax = 73.95 Nm @ 0.0491 Seconds





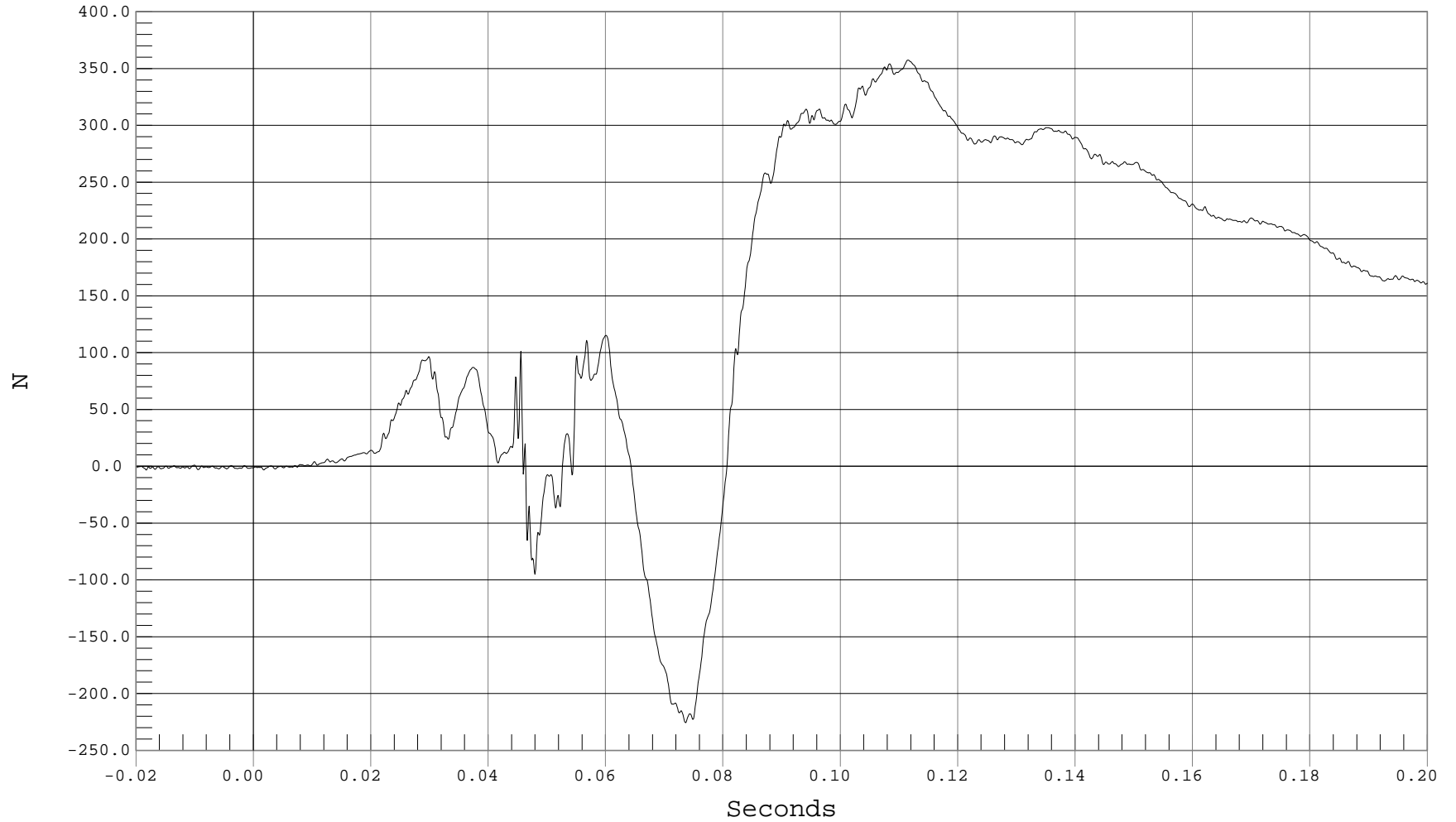
DRIVER RIGHT FEMUR FORCE X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FX, B02055FF.F91

Ymin = -225.69 N @ 0.0735 Seconds, Ymax = 357.37 N @ 0.1115 Seconds





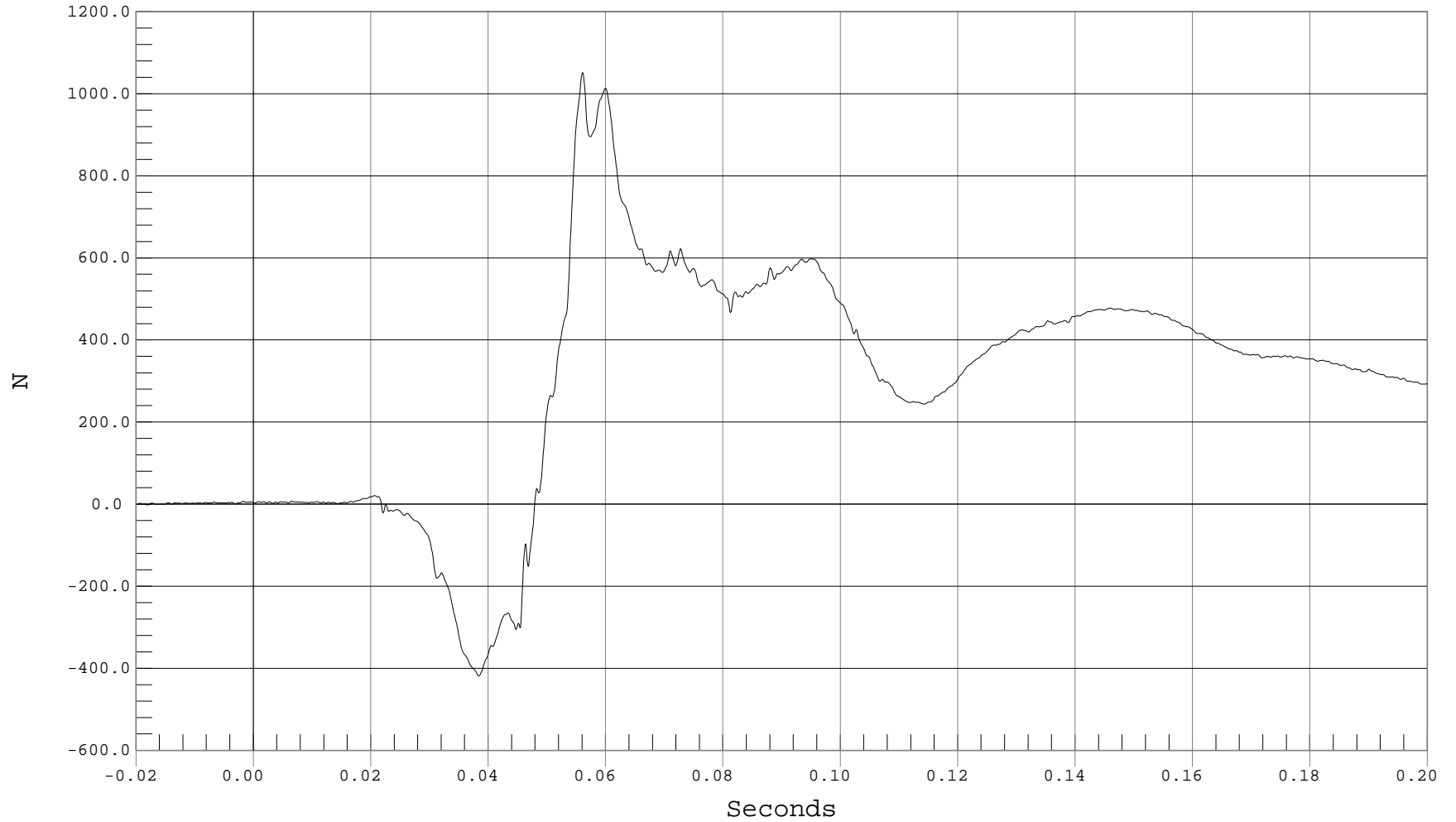
DRIVER RIGHT FEMUR FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FY, B02055FF.F92

Ymin = -418.86 N @ 0.0383 Seconds, Ymax = 1051.71 N @ 0.0560 Seconds



B-75



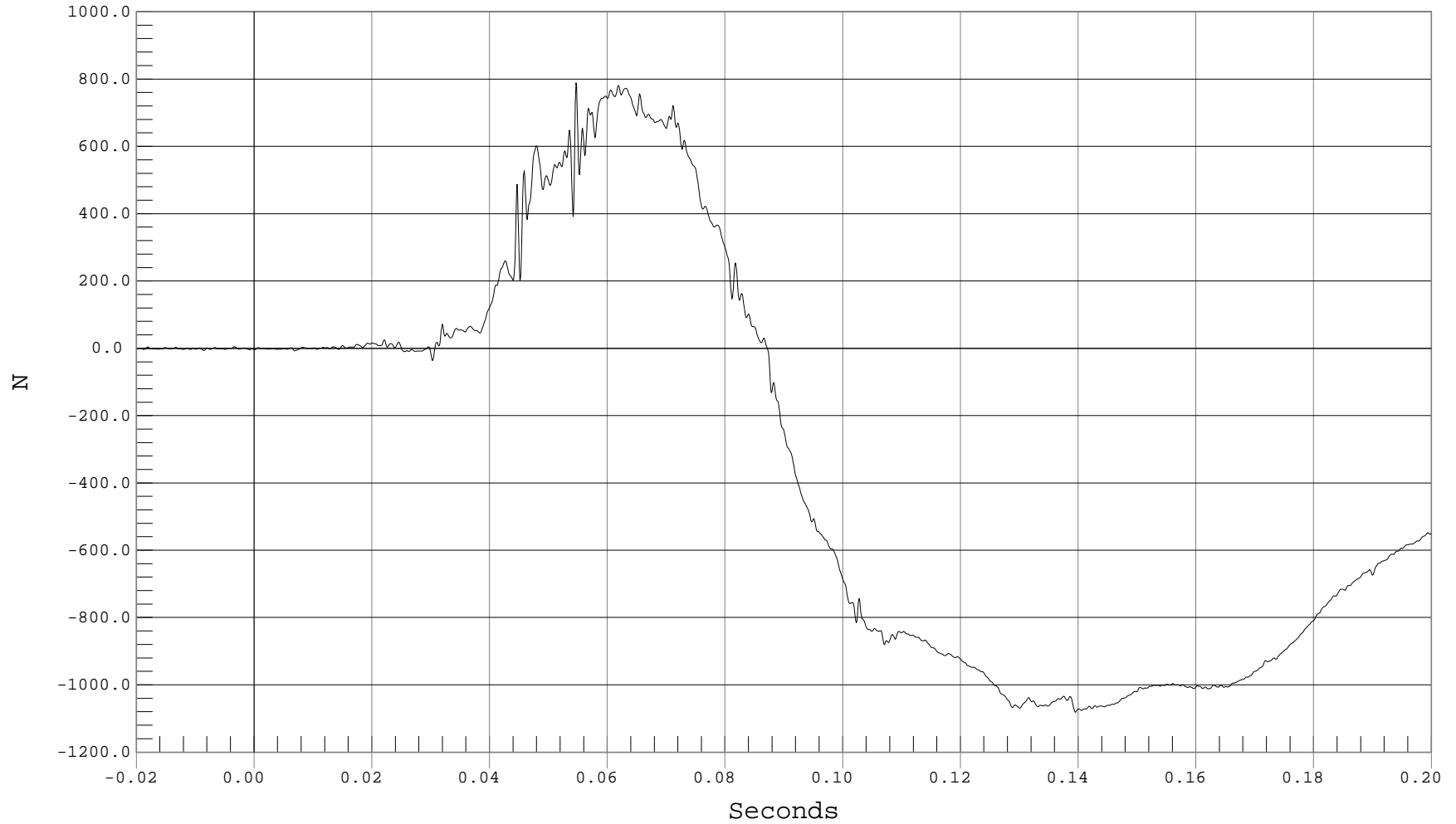
DRIVER RIGHT FEMUR FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FZ, B02055FF.F93

Ymin = -1081.42 N @ 0.1394 Seconds, Ymax = 788.65 N @ 0.0546 Seconds



B-76



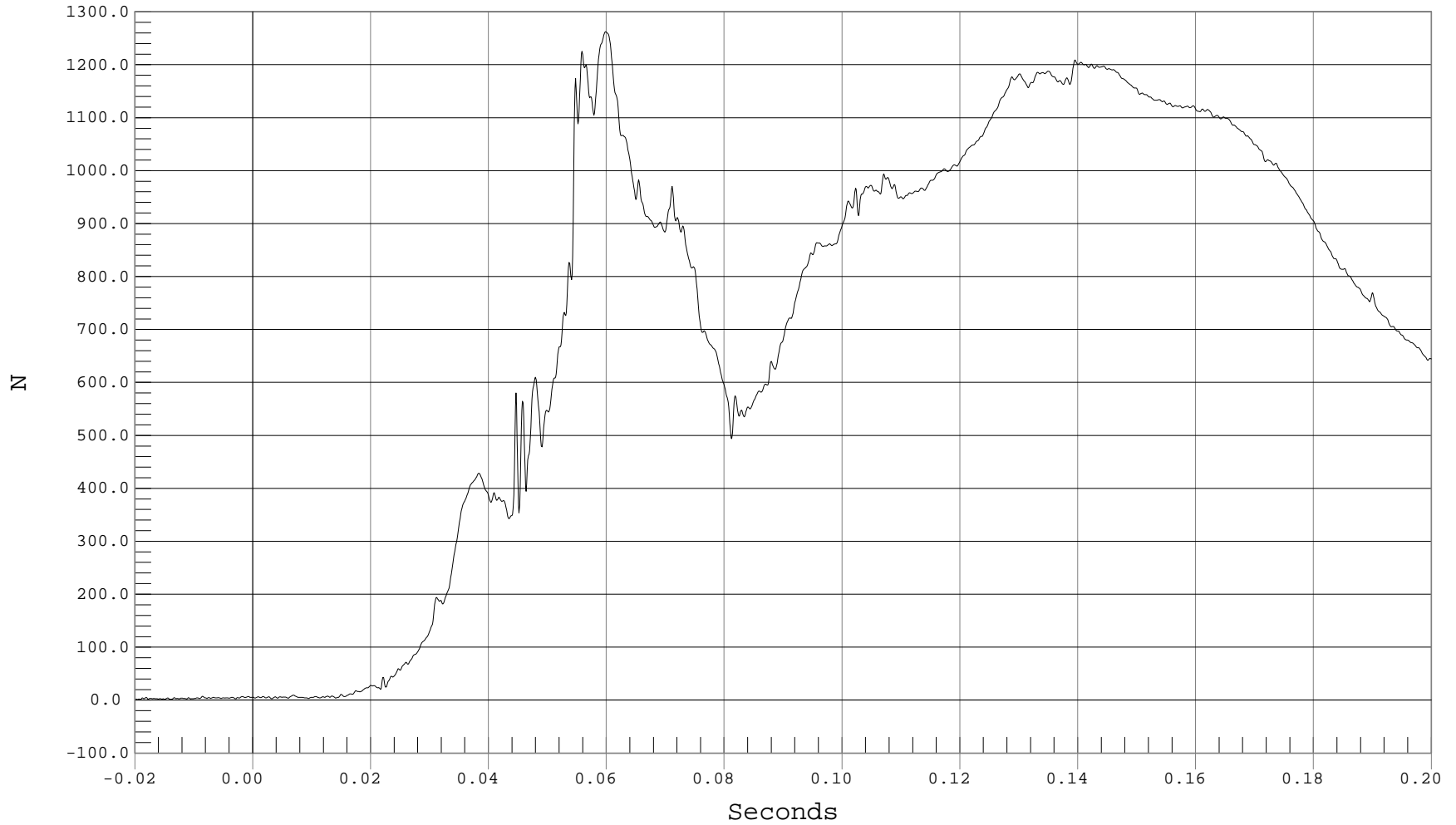
DRIVER RIGHT FEMUR FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FORCE RESULTANT, B02055FV.F91

Ymin = 1.12 N @ -0.0196 Seconds, Ymax = 1262.62 N @ 0.0598 Seconds



B-77



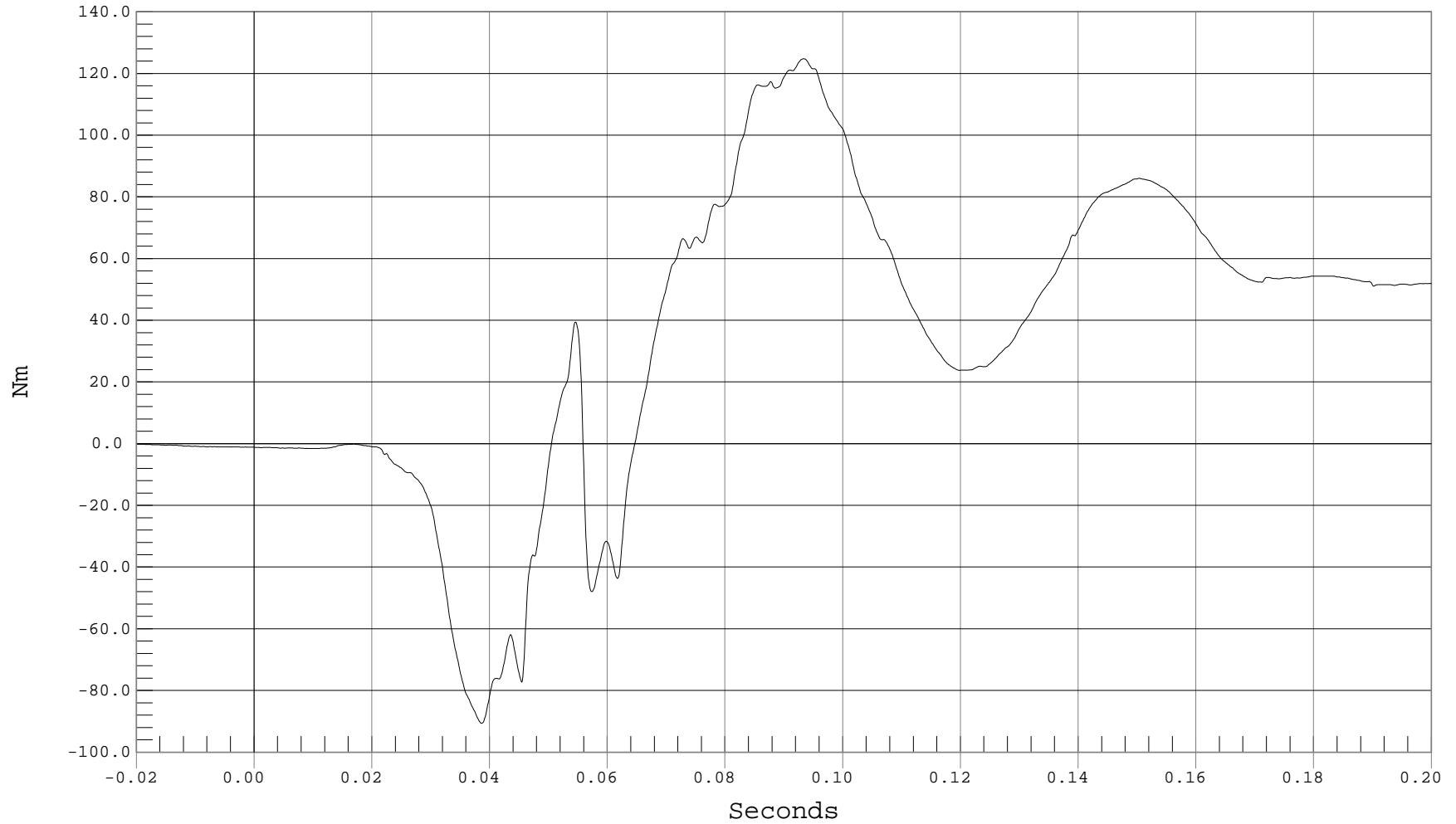
DRIVER RIGHT FEMUR MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MX, B02055MF.M94

Ymin = -90.68 Nm @ 0.0386 Seconds, Ymax = 124.75 Nm @ 0.0933 Seconds





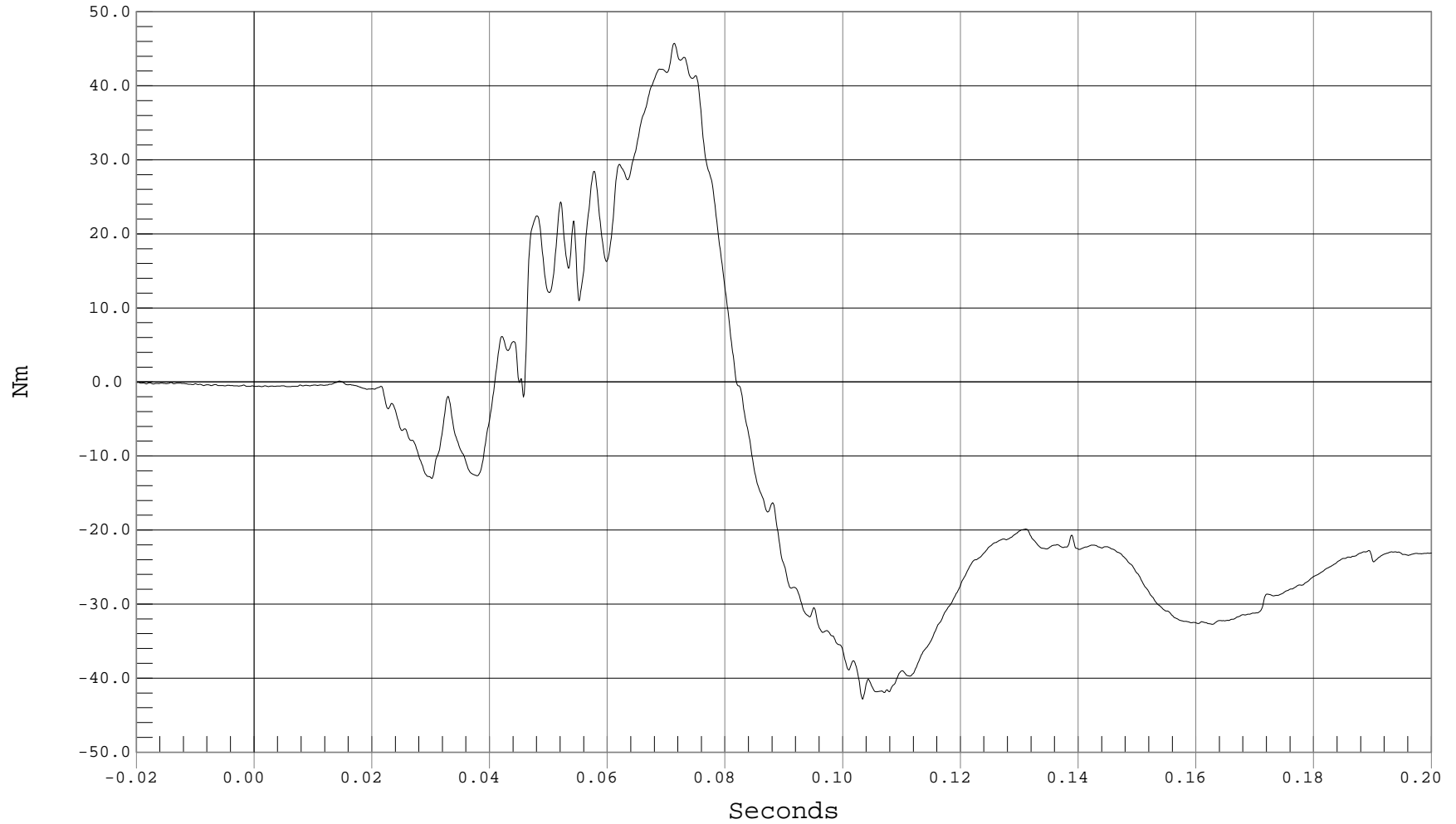
DRIVER RIGHT FEMUR MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MY, B02055MF.M95

Ymin = -42.82 Nm @ 0.1033 Seconds, Ymax = 45.73 Nm @ 0.0713 Seconds





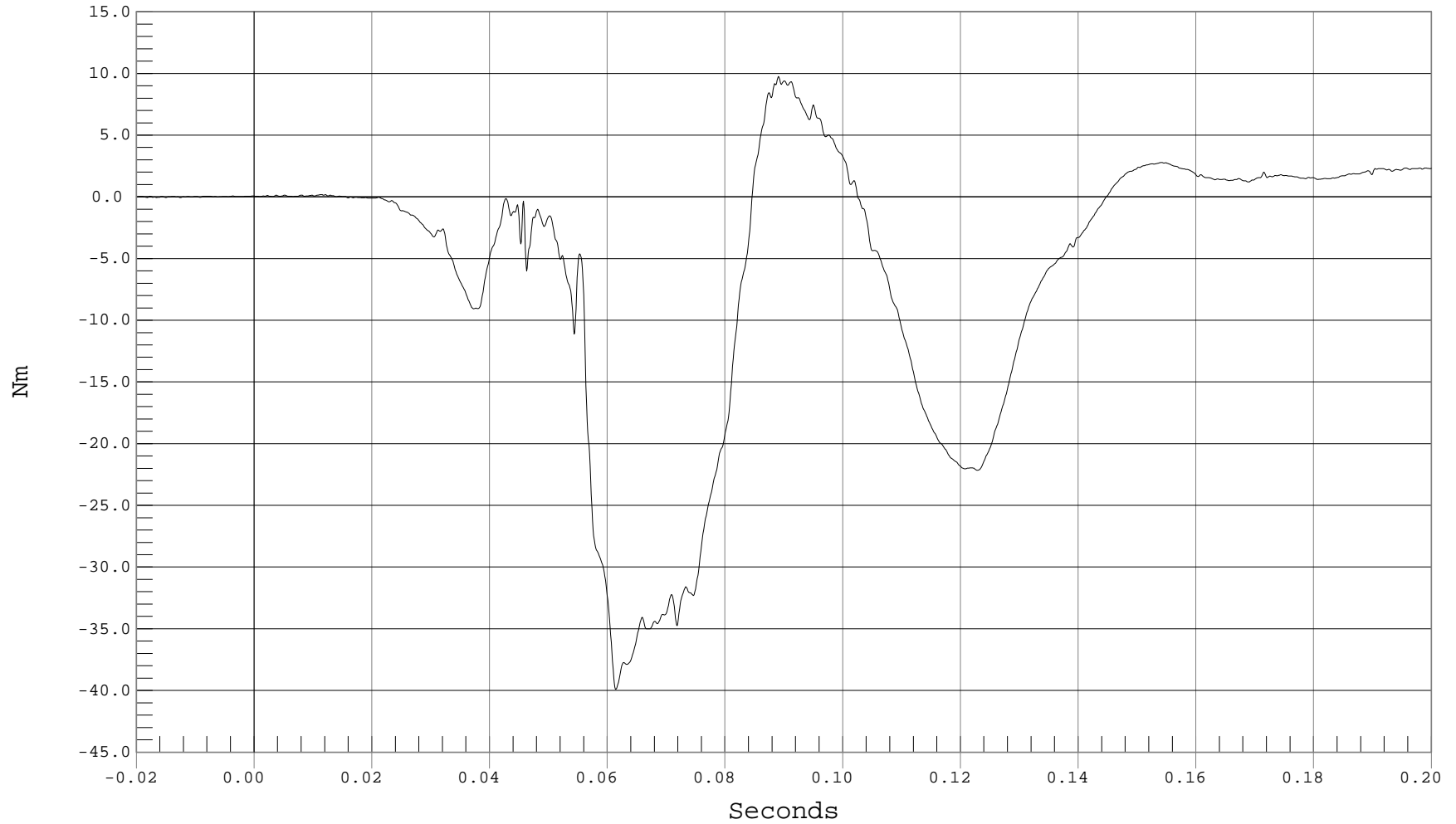
DRIVER RIGHT FEMUR MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MZ, B02055MF.M96

Ymin = -39.9 Nm @ 0.0614 Seconds, Ymax = 9.76 Nm @ 0.0890 Seconds



B-80



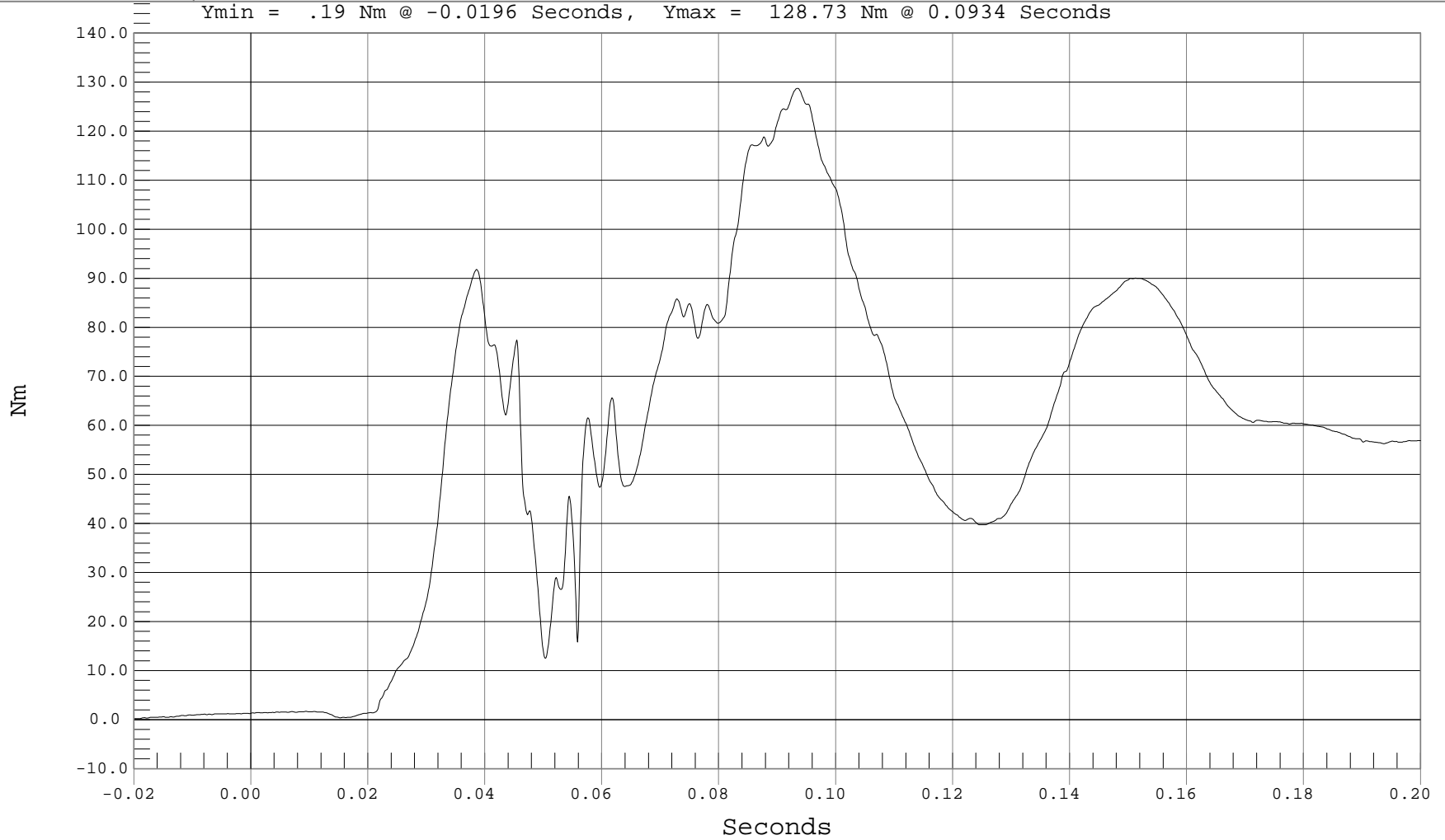
DRIVER RIGHT FEMUR MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MOMENT RESULTANT, B02055MV.M94

Ymin = .19 Nm @ -0.0196 Seconds, Ymax = 128.73 Nm @ 0.0934 Seconds





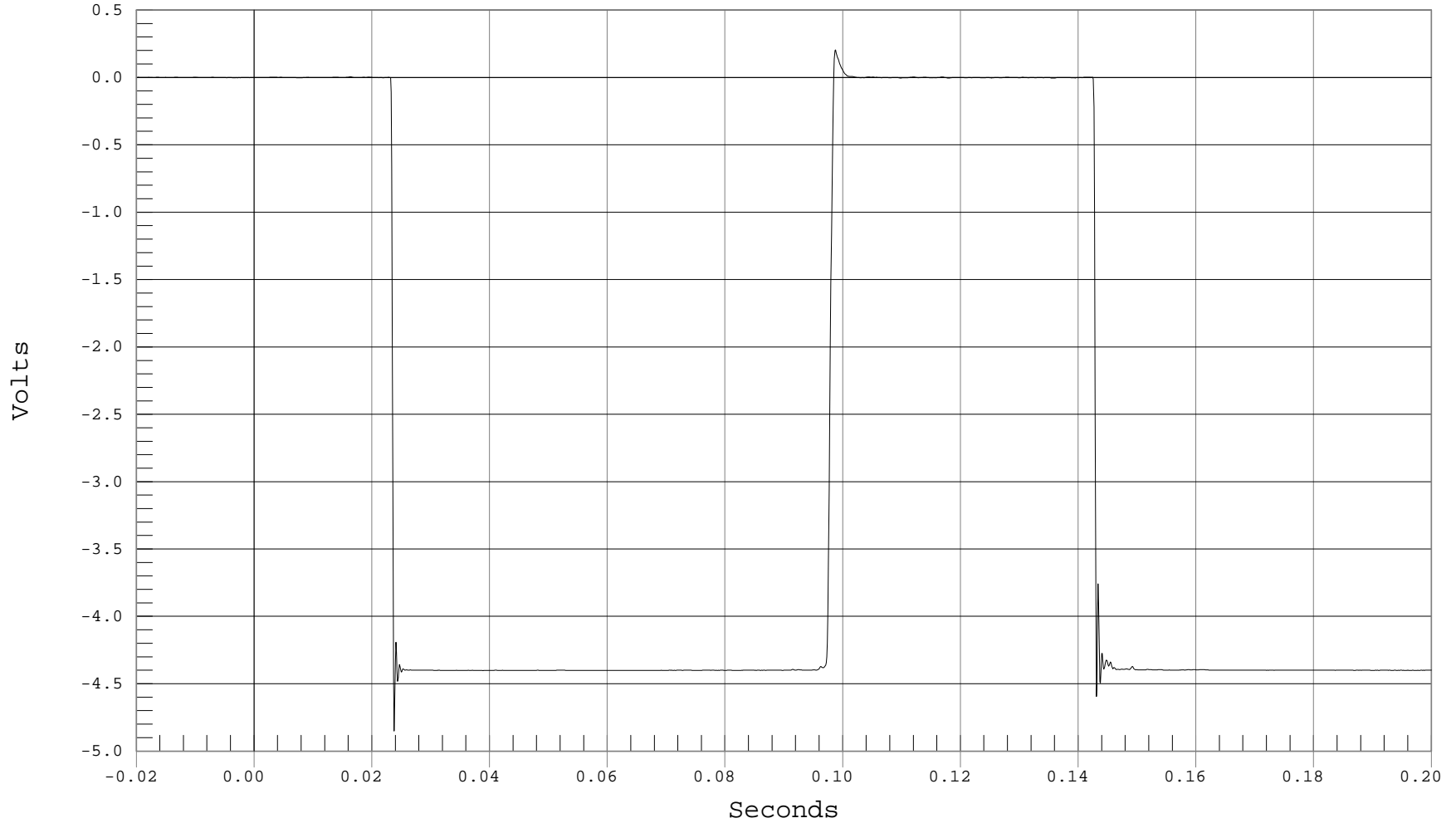
DRIVER ARM CONTACT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER ARM CONTACT, B020550T.048

Ymin = -4.85 Volts @ 0.0237 Seconds, Ymax = .2 Volts @ 0.0987 Seconds





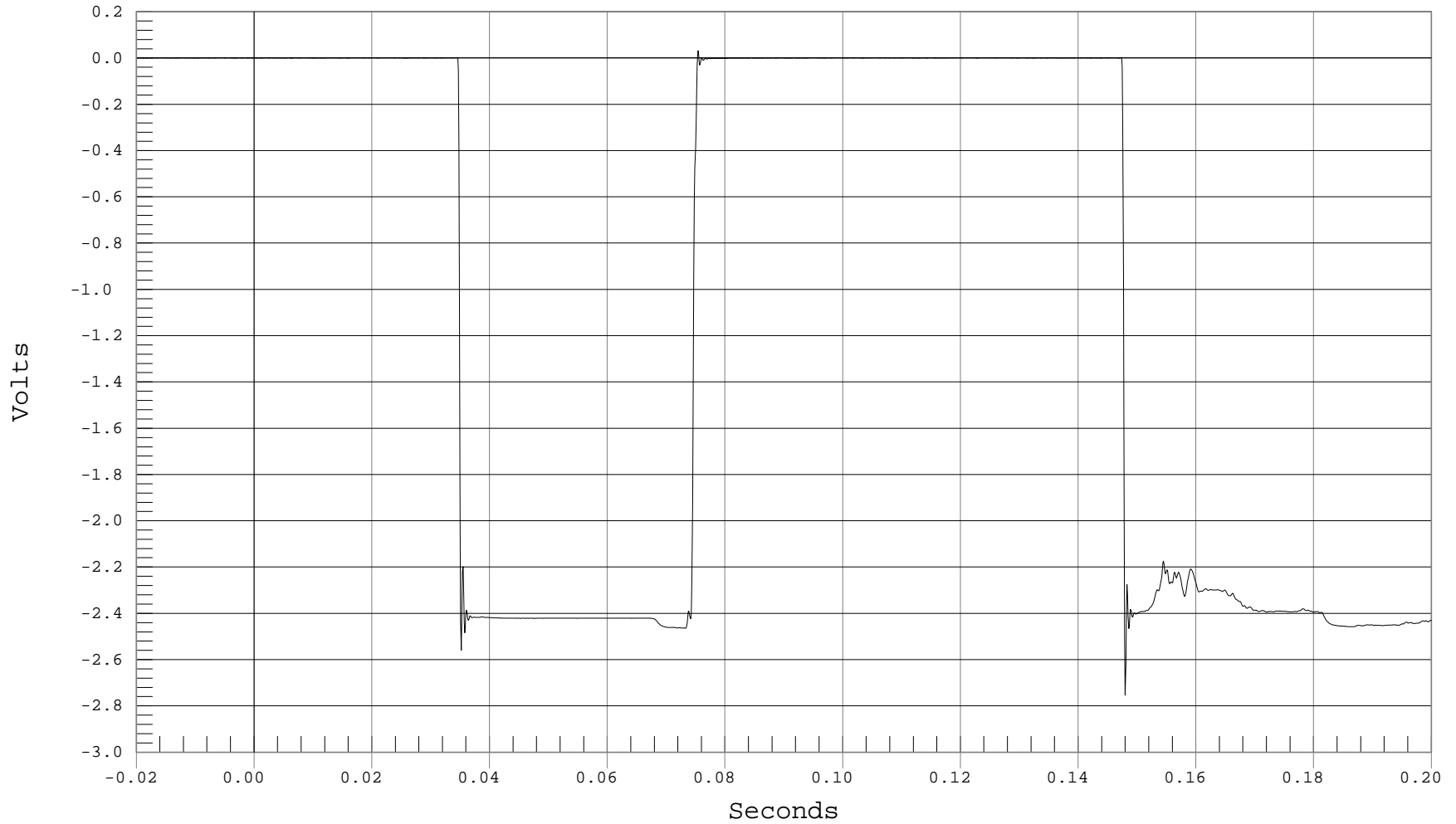
DRIVER RIB CONTACT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

1 DRIVER RIB CONTACT, B020550T.031

Ymin = -2.75 Volts @ 0.1479 Seconds, Ymax = .03 Volts @ 0.0753 Seconds





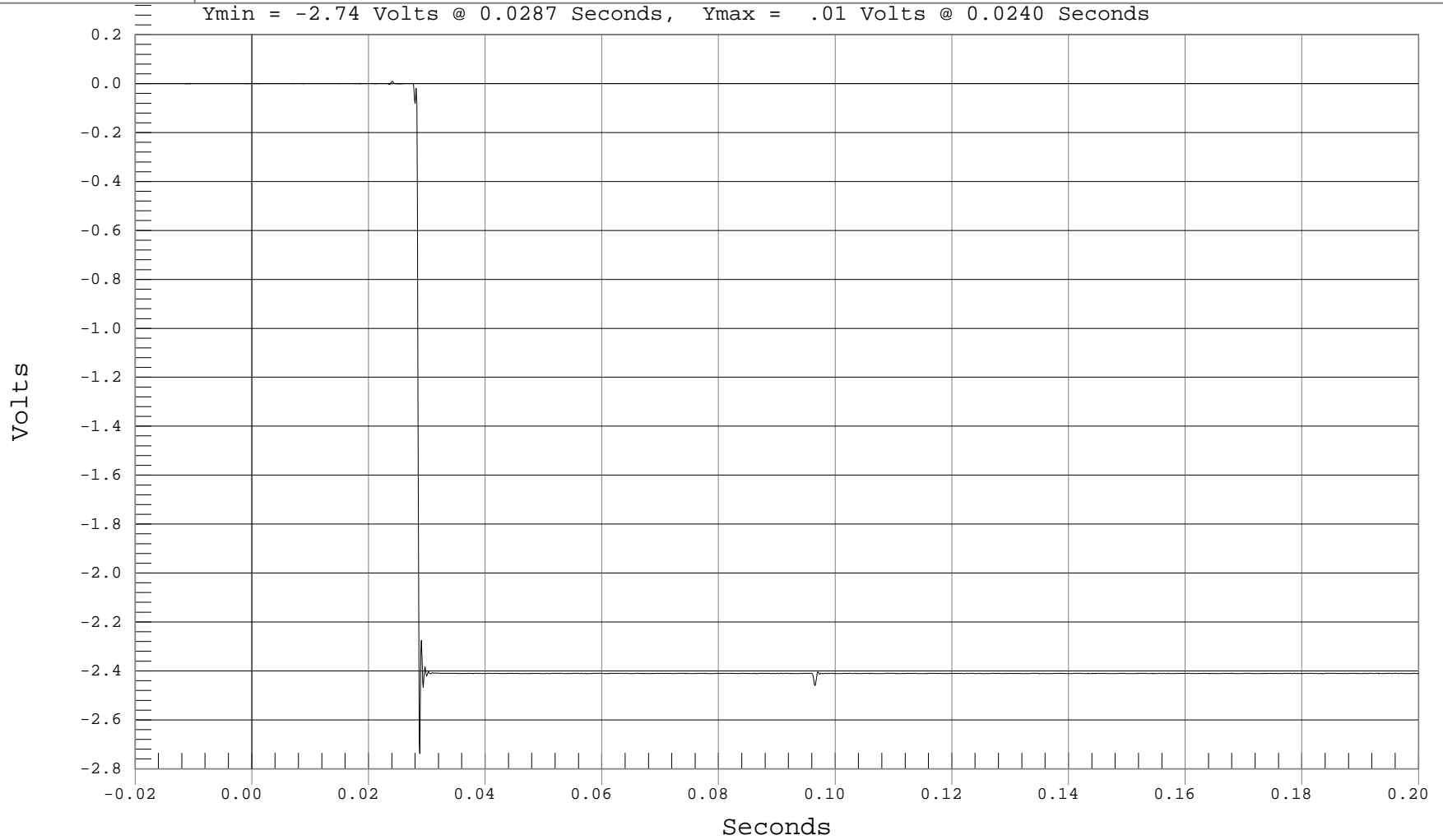
DRIVER PELVIS CONTACT

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 1000

— 1 DRIVER PELVIS CONTACT, B020550T.O63

Ymin = -2.74 Volts @ 0.0287 Seconds, Ymax = .01 Volts @ 0.0240 Seconds





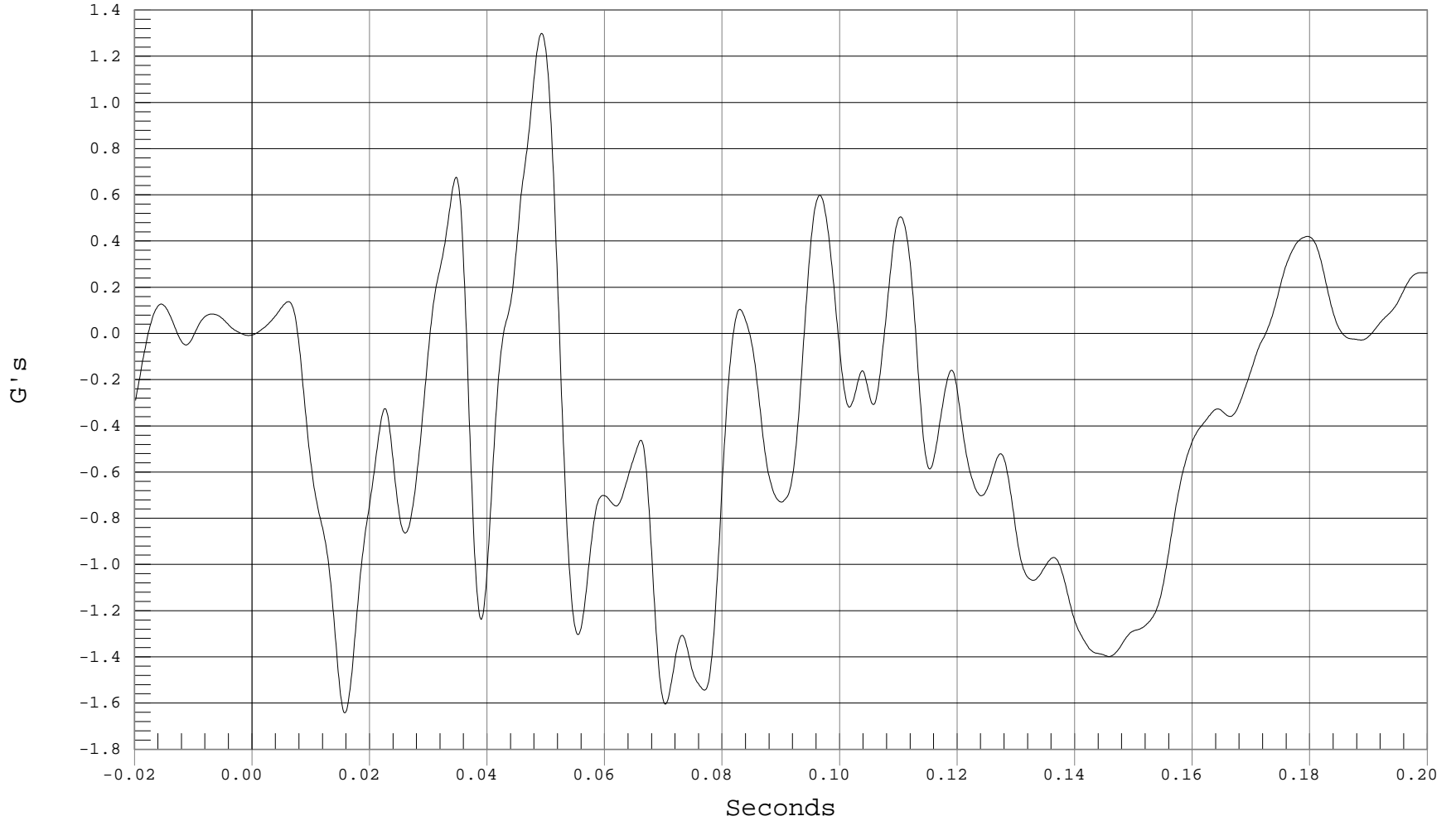
RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL X, B02055AF.A36

Ymin = -1.64 G's @ 0.0157 Seconds, Ymax = 1.3 G's @ 0.0492 Seconds



B-85



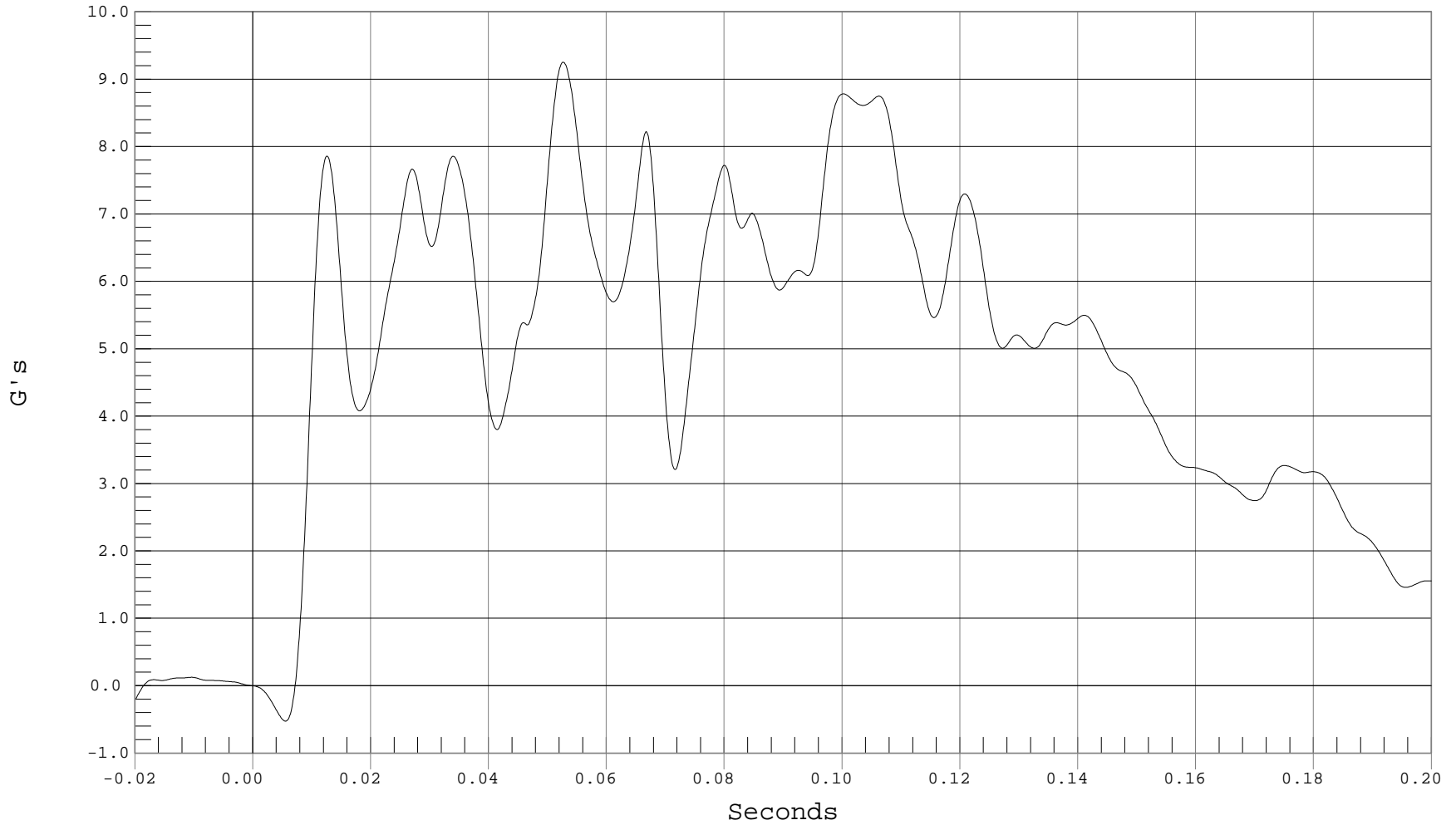
RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL Y, B02055AF.A37

Ymin = -.53 G's @ 0.0055 Seconds, Ymax = 9.25 G's @ 0.0526 Seconds





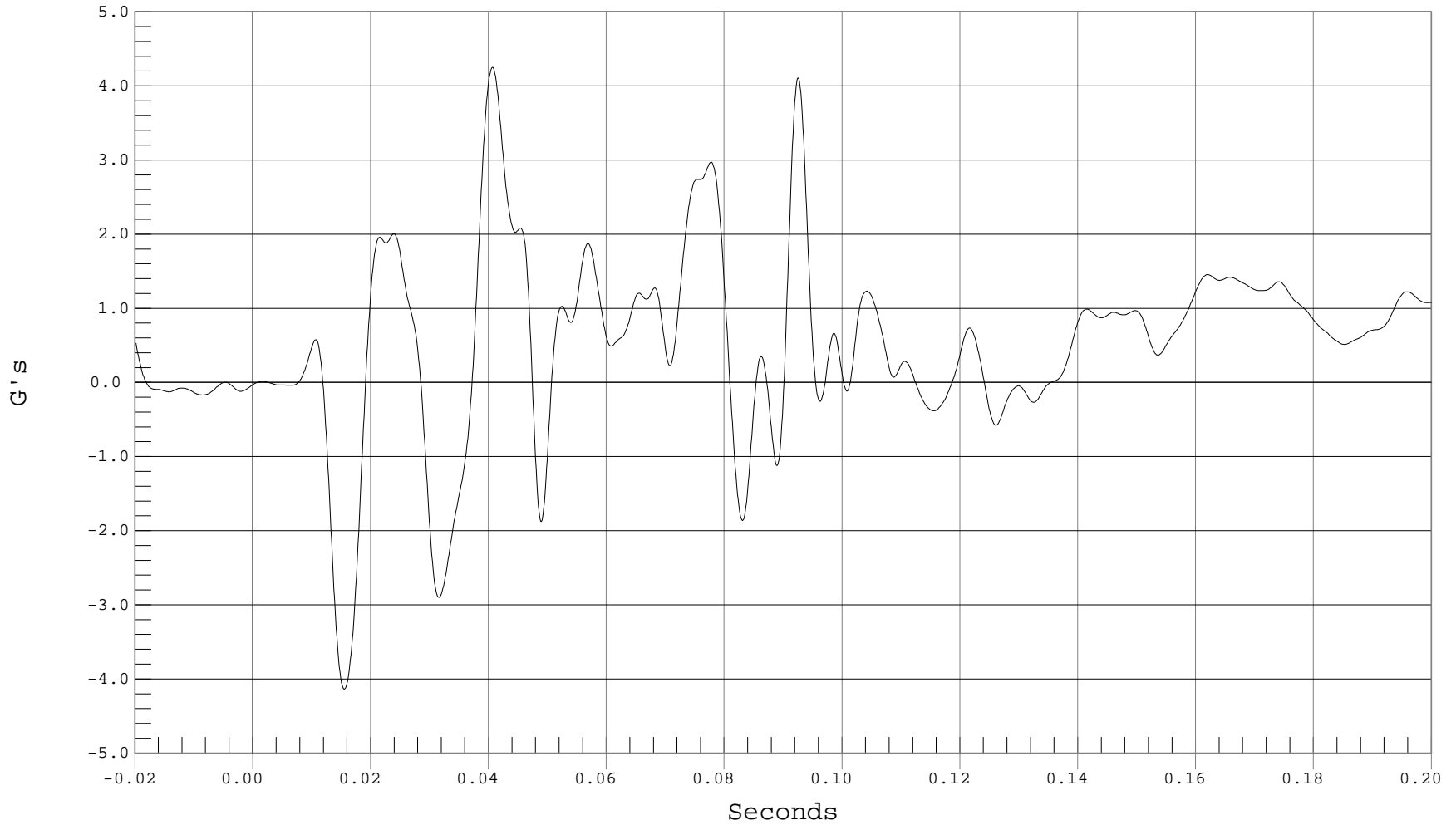
RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL Z, B02055AF.A38

Ymin = -4.14 G's @ 0.0155 Seconds, Ymax = 4.25 G's @ 0.0406 Seconds



B-87



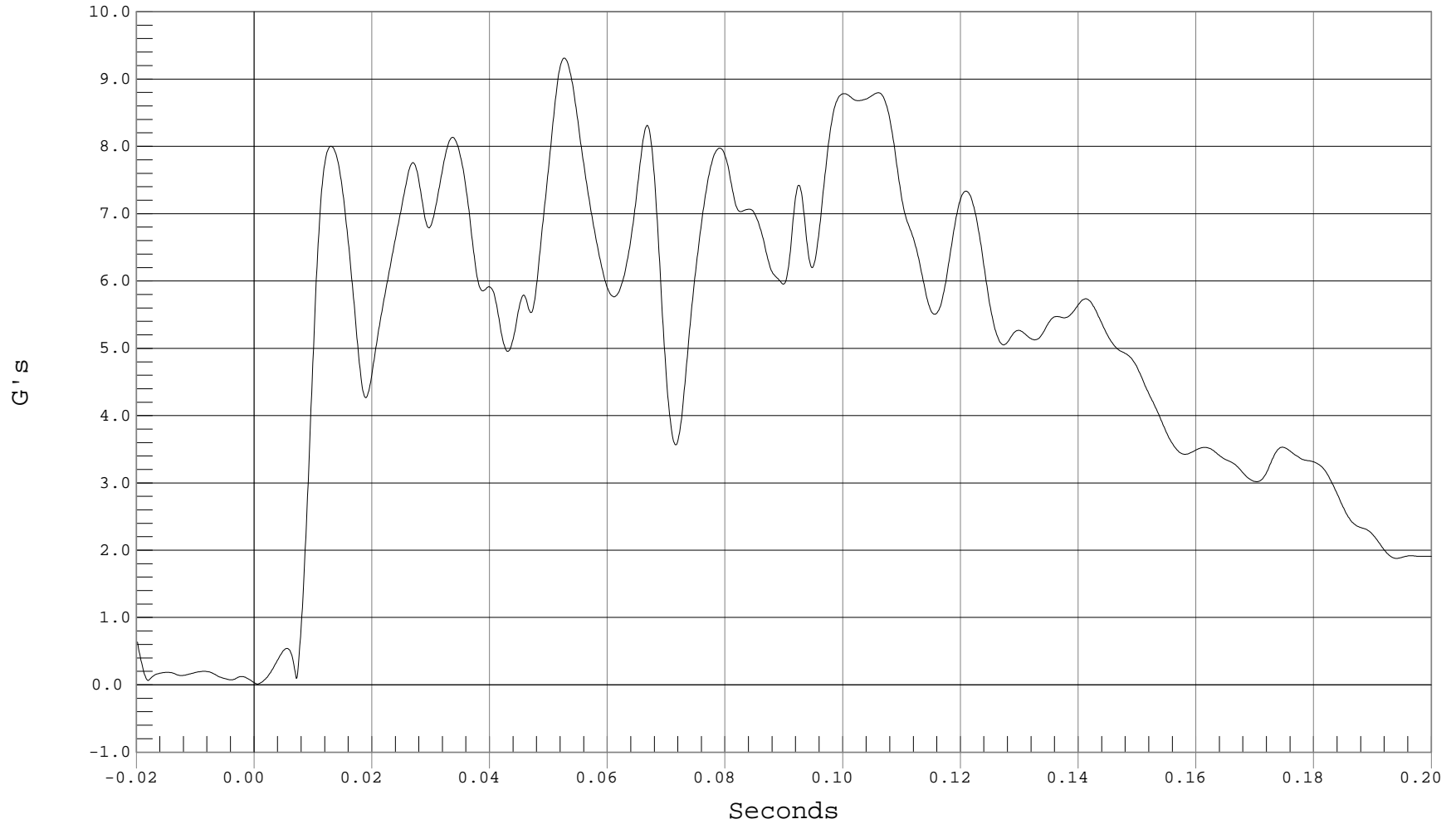
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL RESULTANT ACCELERATION, B02055AV.A36

Ymin = .01 G's @ 0.0005 Seconds, Ymax = 9.31 G's @ 0.0526 Seconds





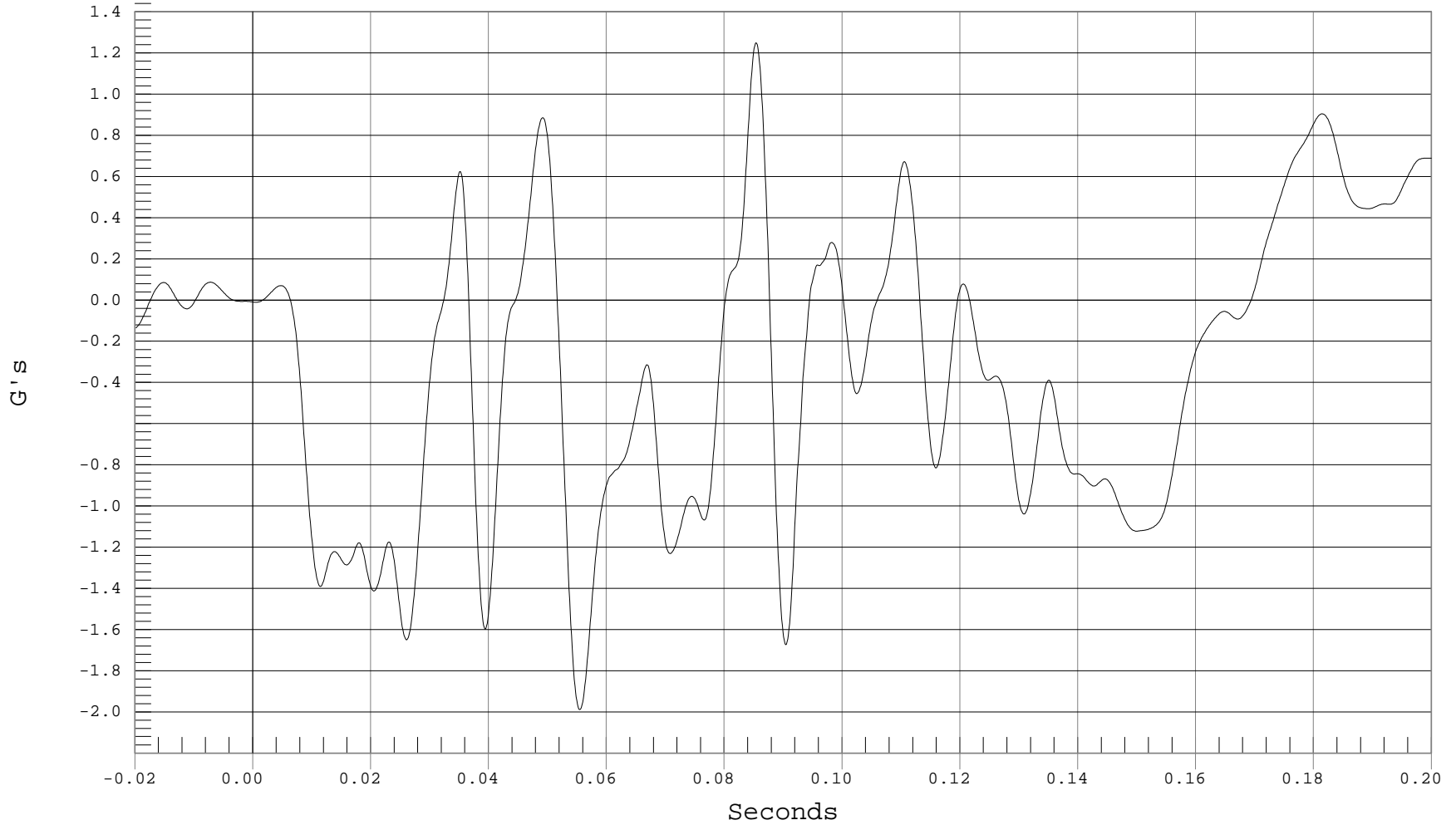
RIGHT SIDE SILL AT REAR SEAT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT REAR SILL X, B02055AF.A39

Ymin = -1.99 G's @ 0.0554 Seconds, Ymax = 1.25 G's @ 0.0853 Seconds





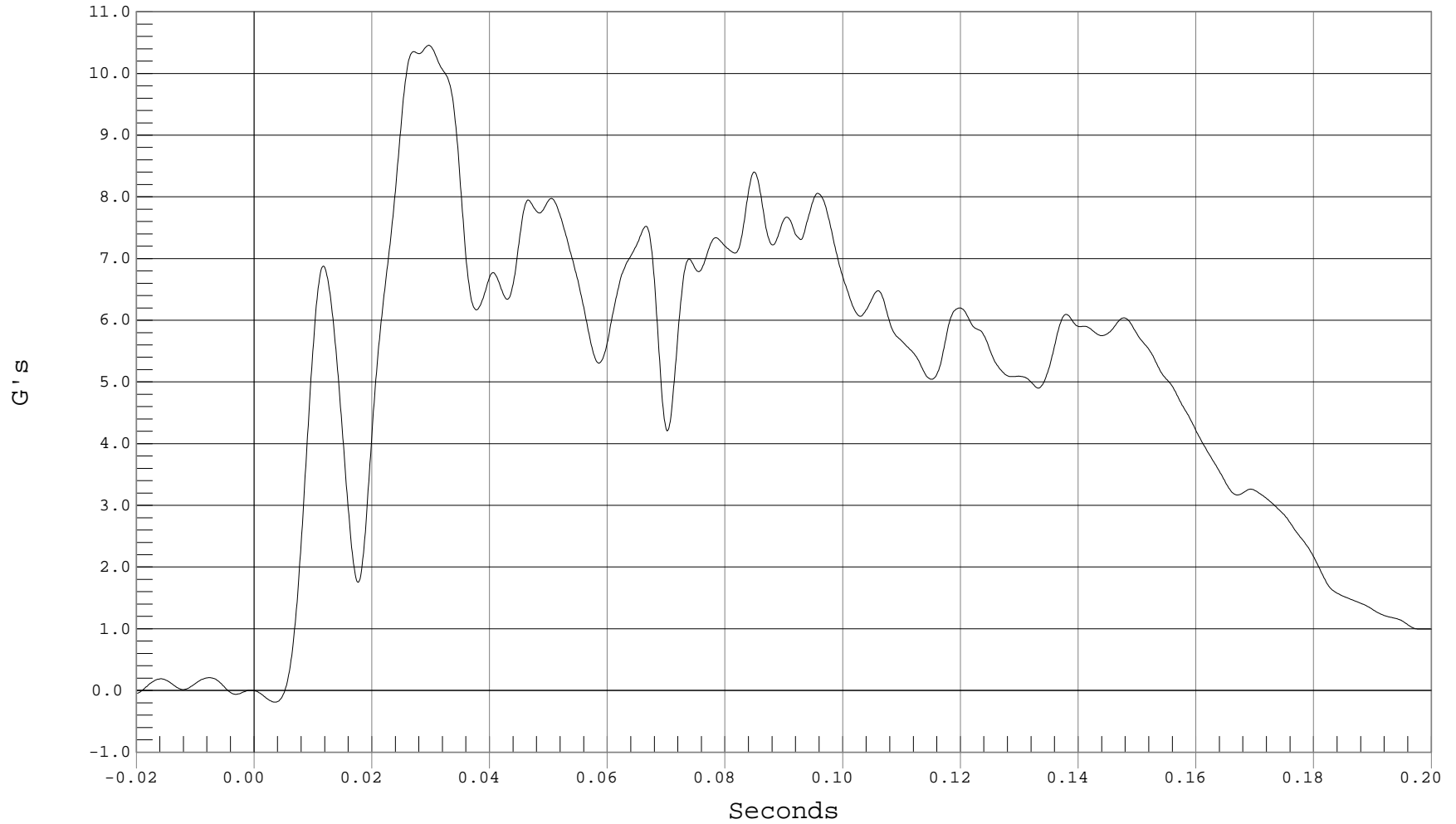
RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT REAR SILL Y, B02055AF.A40

Ymin = -.19 G's @ 0.0035 Seconds, Ymax = 10.46 G's @ 0.0296 Seconds



B-90



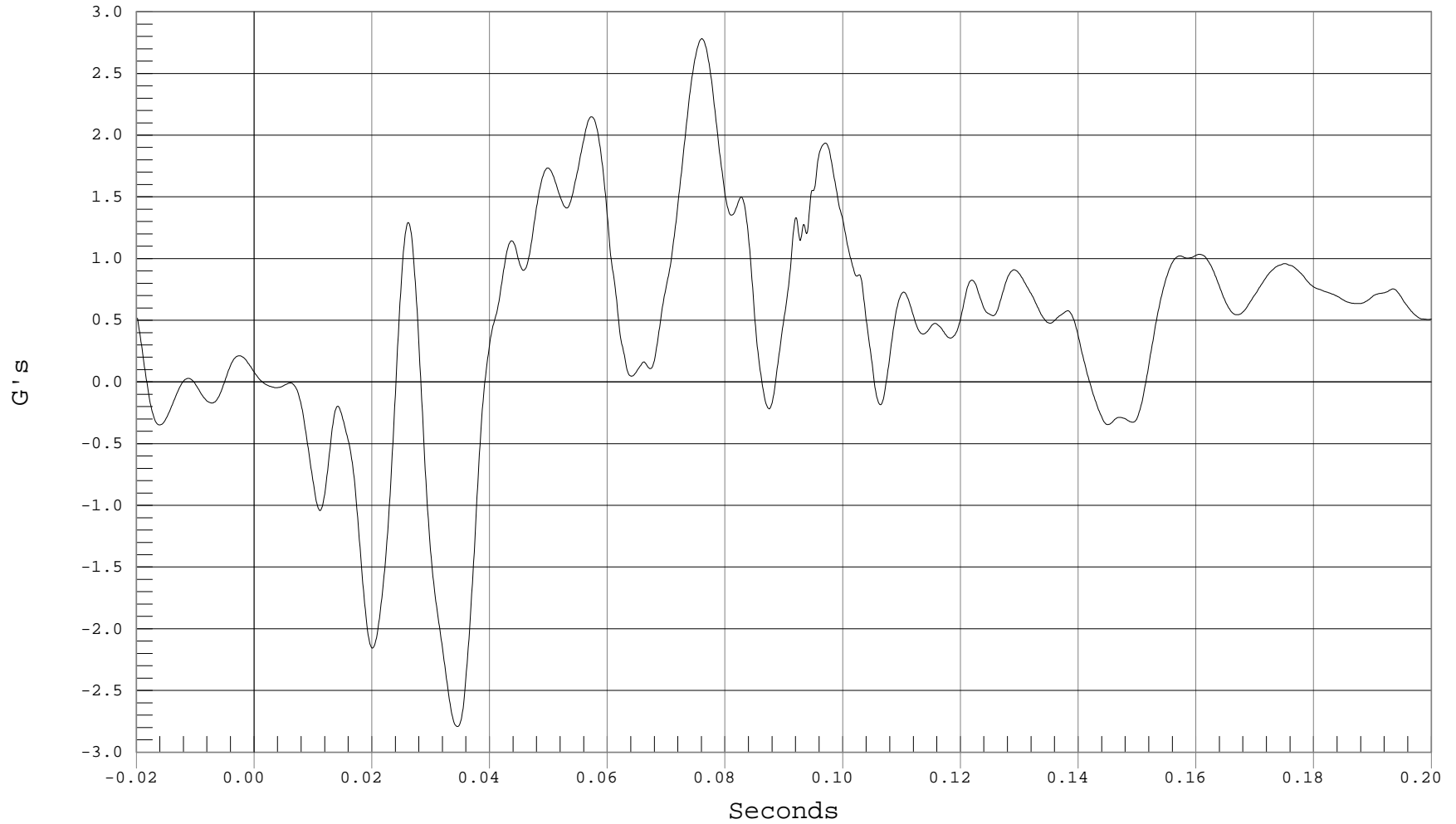
RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT REAR SILL Z, B02055AF.A41

Ymin = -2.79 G's @ 0.0345 Seconds, Ymax = 2.78 G's @ 0.0760 Seconds



B-91



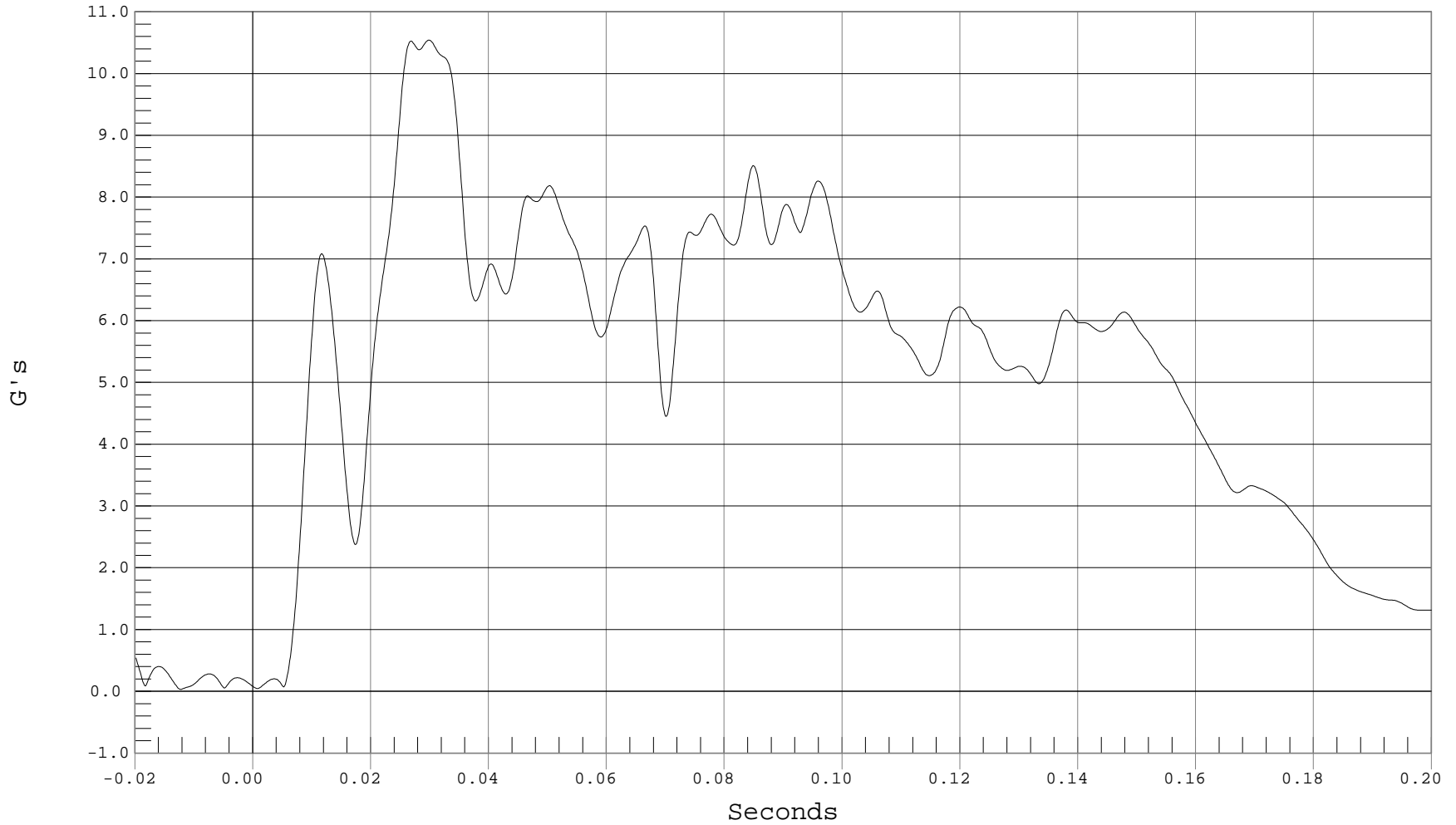
RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT REAR SILL RESULTANT ACCELERATION, B02055AV.A39

Ymin = .03 G's @ -0.0123 Seconds, Ymax = 10.54 G's @ 0.0298 Seconds



B-92



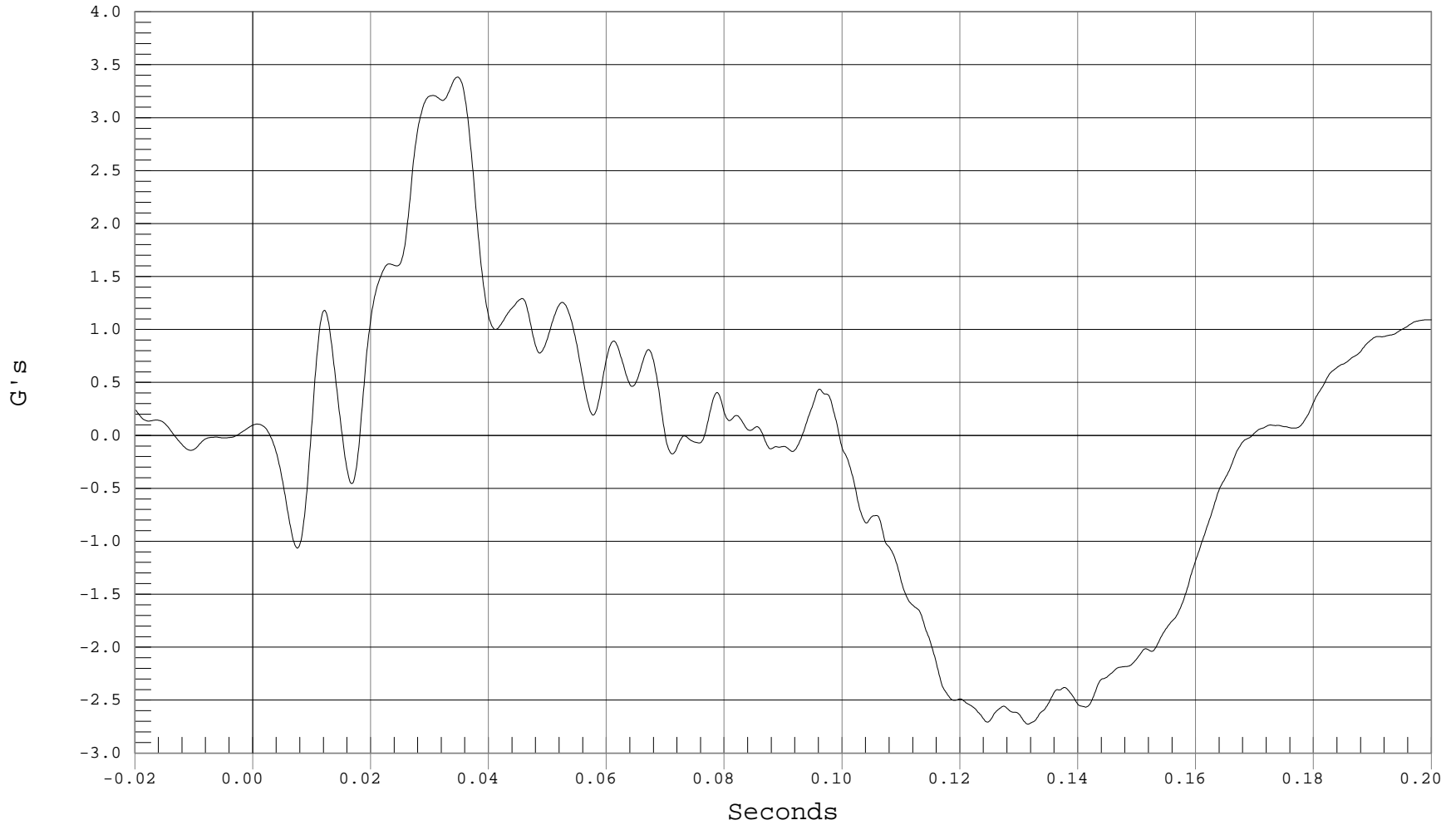
REAR FLOORPAN ABOVE AXLE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE X, B02055AF.A42

Ymin = -2.73 G's @ 0.1315 Seconds, Ymax = 3.38 G's @ 0.0347 Seconds





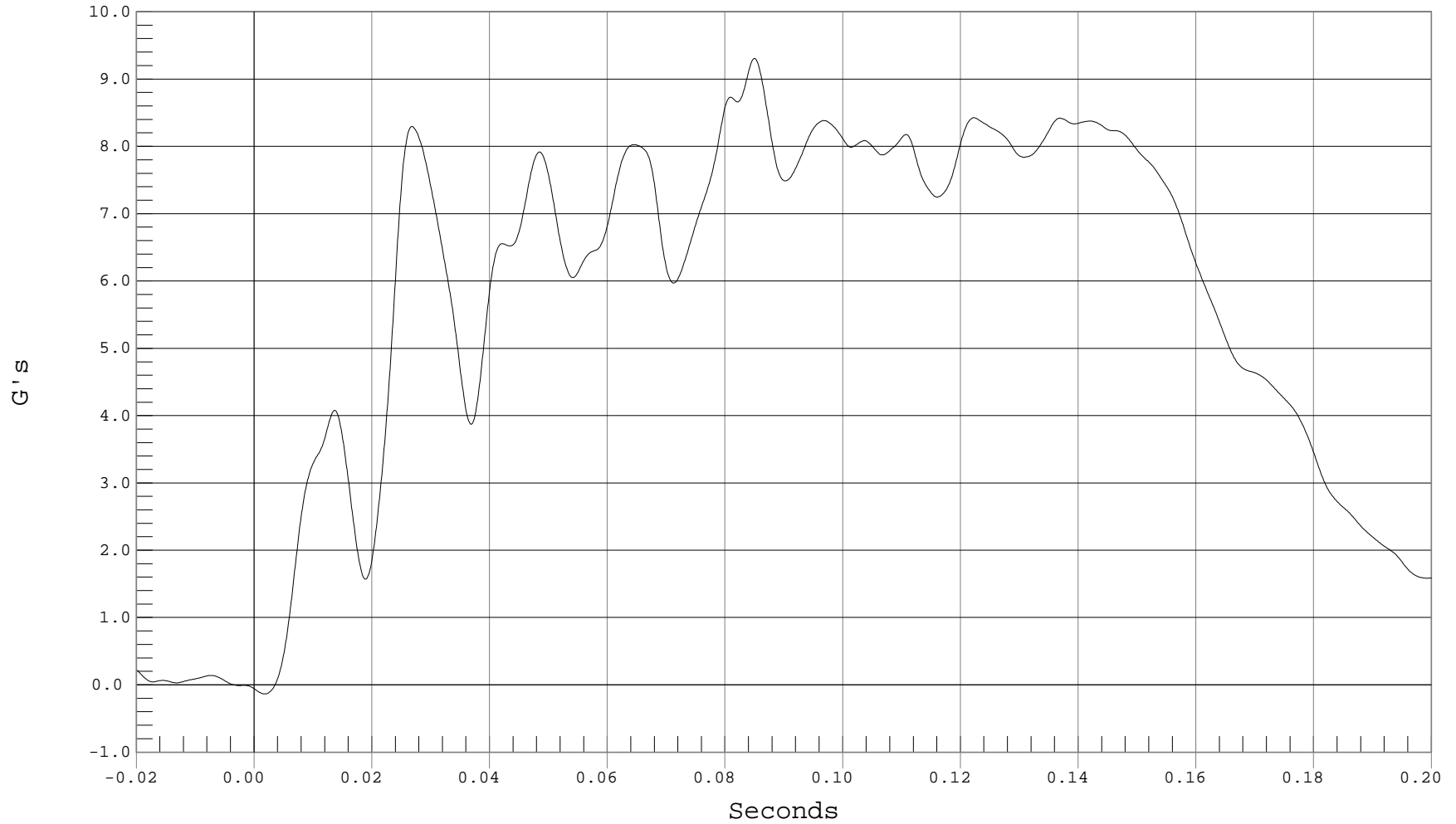
REAR FLOORPAN ABOVE AXLE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE Y, B02055AF.A43

Ymin = -.13 G's @ 0.0017 Seconds, Ymax = 9.31 G's @ 0.0849 Seconds





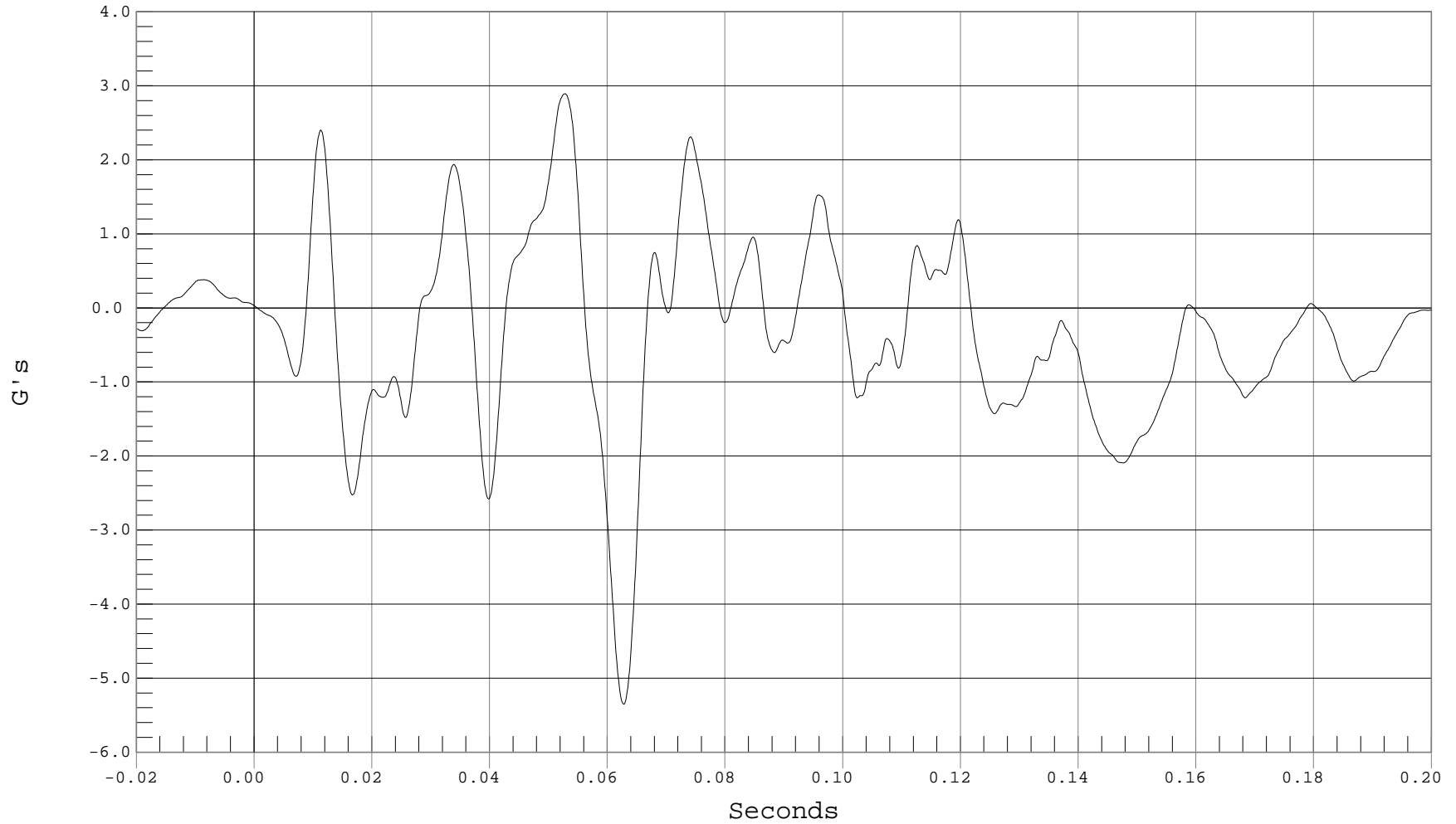
REAR FLOORPAN ABOVE AXLE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE Z, B02055AF.A44

Ymin = -5.35 G's @ 0.0627 Seconds, Ymax = 2.89 G's @ 0.0527 Seconds



B-95



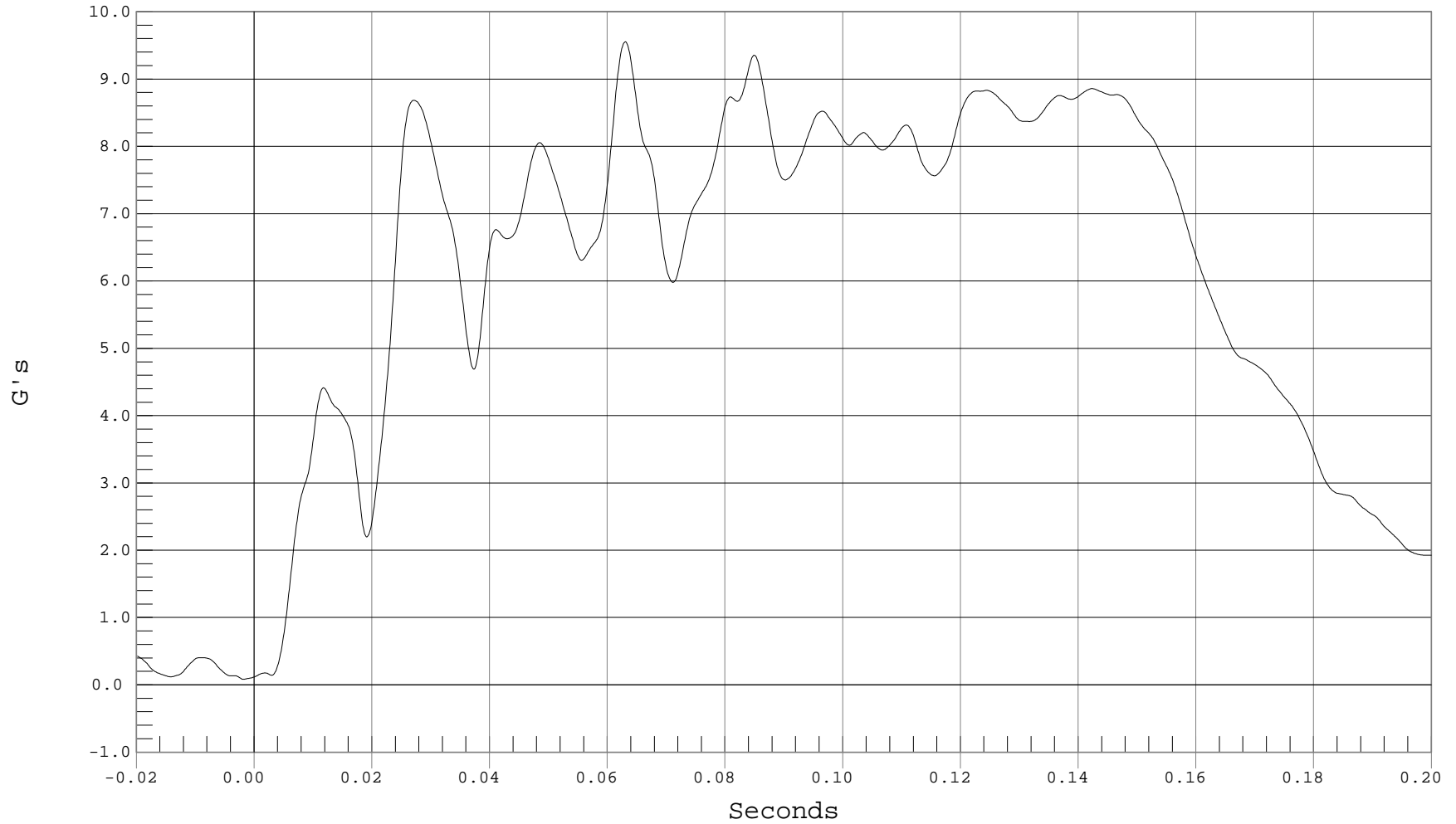
REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE ACCELERATION, B02055AV.A42

Ymin = .08 G's @ -0.0019 Seconds, Ymax = 9.56 G's @ 0.0630 Seconds





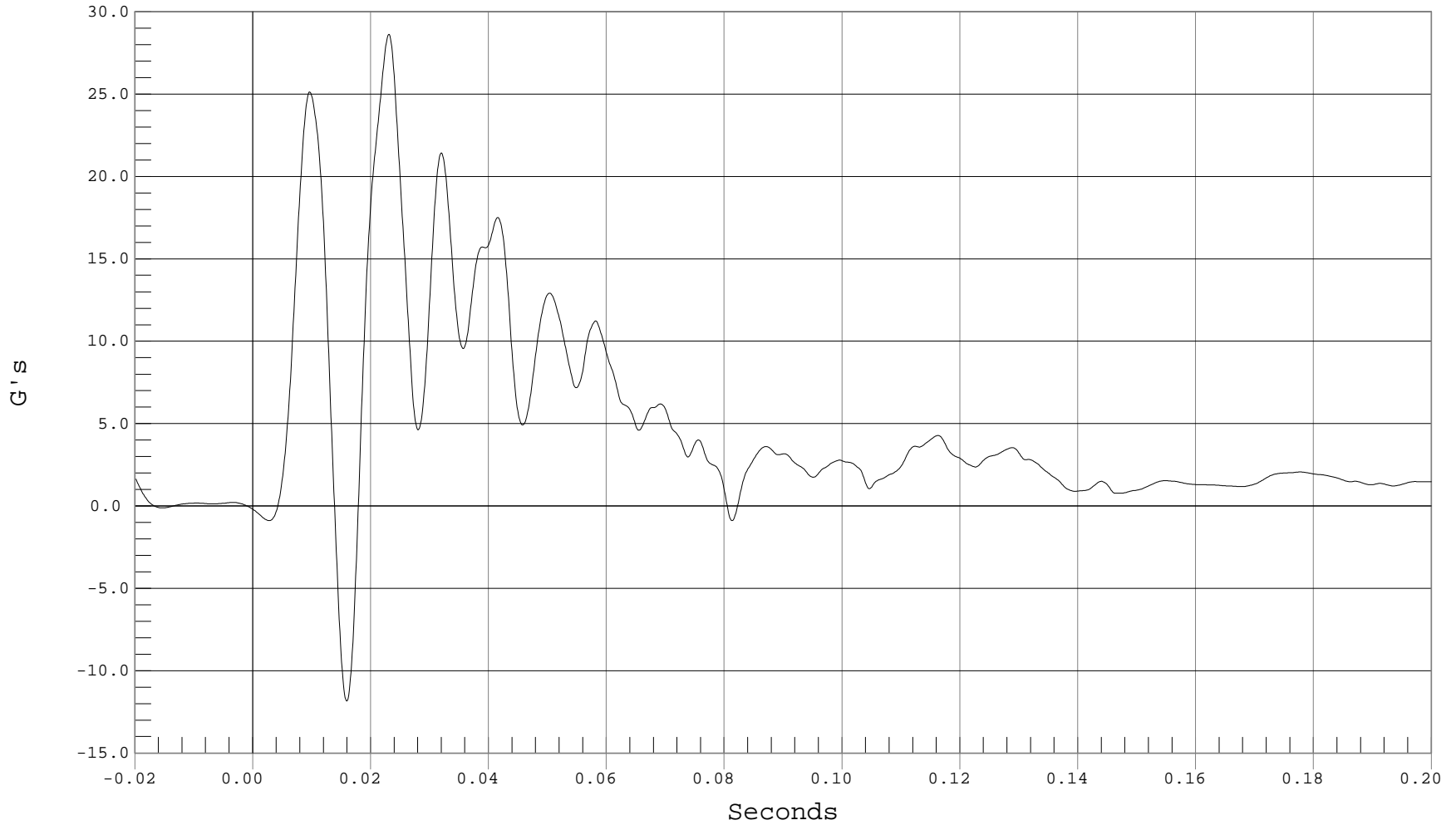
LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT FRONT SILL Y, B02055AF.A46

Ymin = -11.84 G's @ 0.0159 Seconds, Ymax = 28.63 G's @ 0.0230 Seconds



B-97



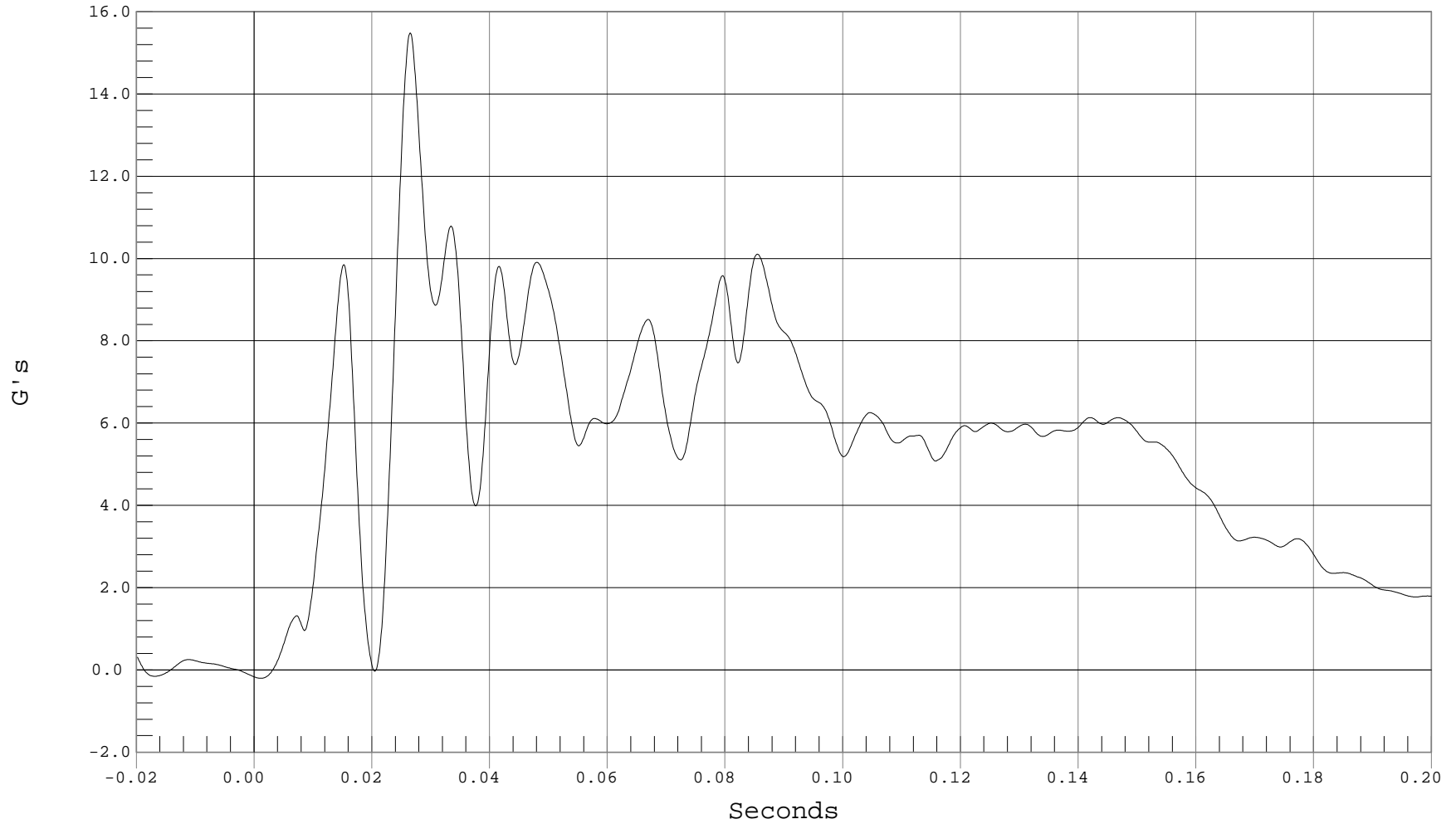
LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT REAR SILL Y, B02055AF.A45

Ymin = -.2 G's @ 0.0010 Seconds, Ymax = 15.49 G's @ 0.0264 Seconds





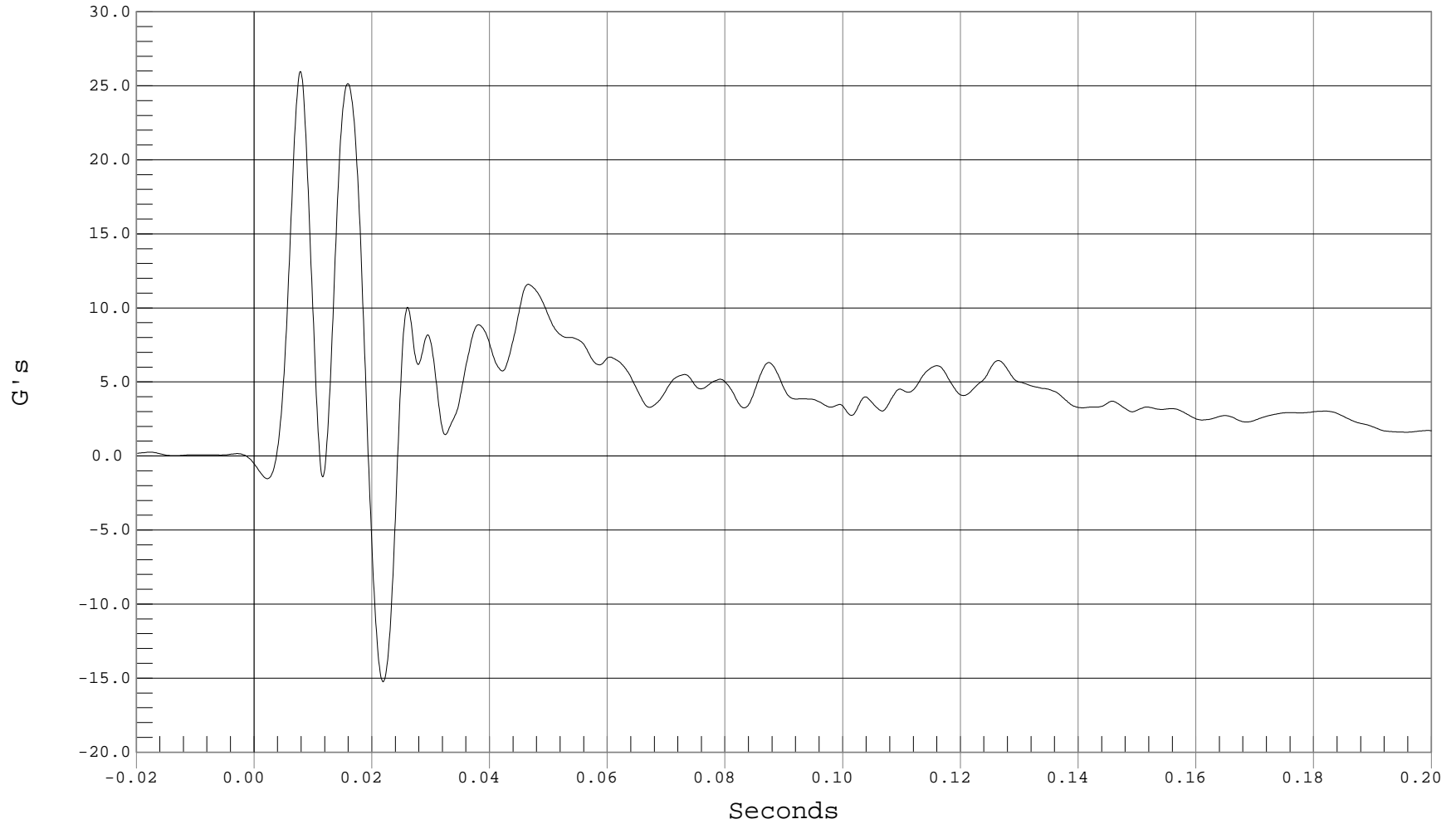
LEFT LOWER A-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

1 LEFT LOWER A-POST Y, B02055AF.A52

Ymin = -15.25 G's @ 0.0218 Seconds, Ymax = 25.96 G's @ 0.0078 Seconds



B-99



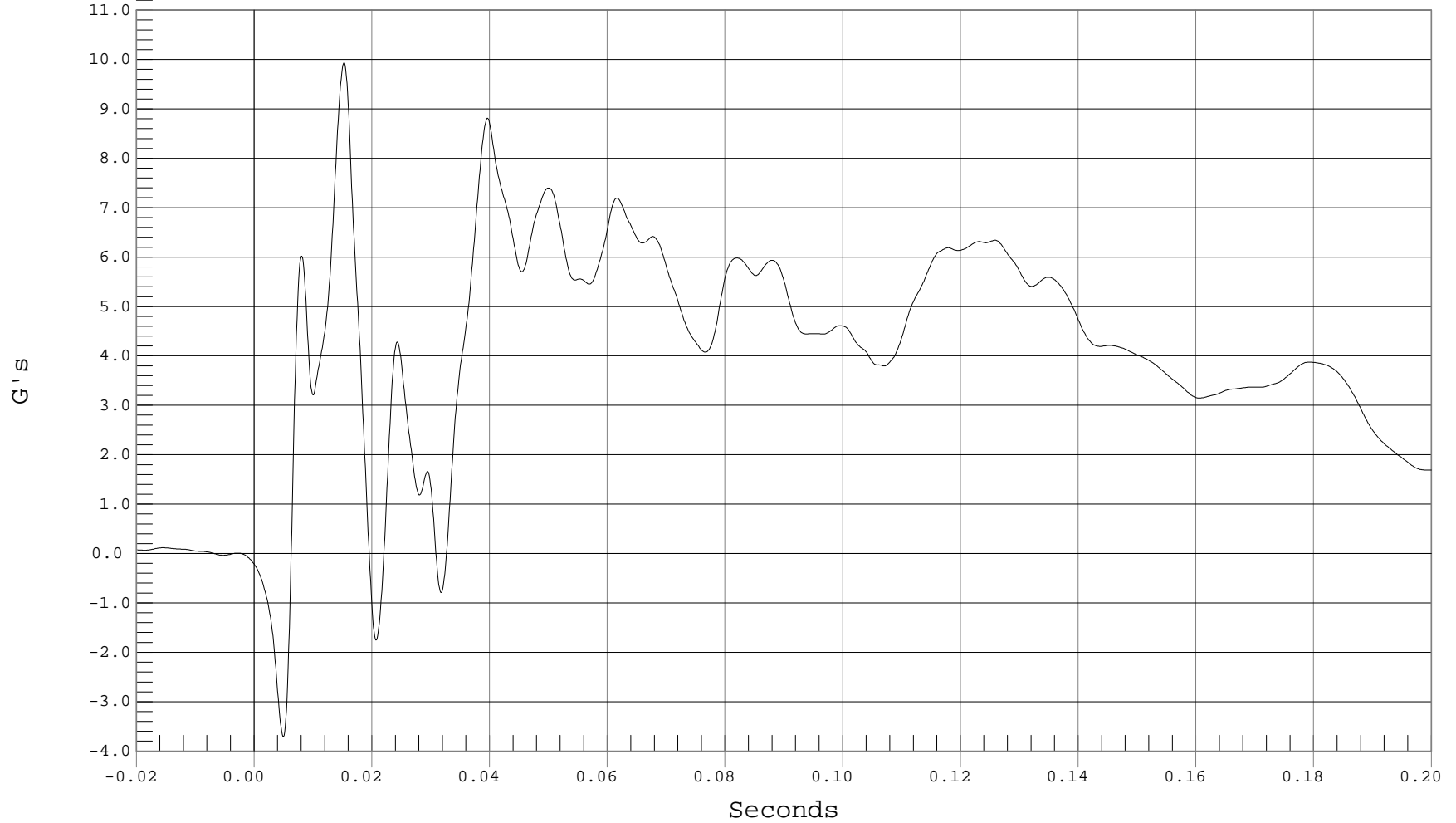
LEFT MID A-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT MID A-POST, B02055AF.A53

Ymin = -3.71 G's @ 0.0049 Seconds, Ymax = 9.94 G's @ 0.0152 Seconds



B-100



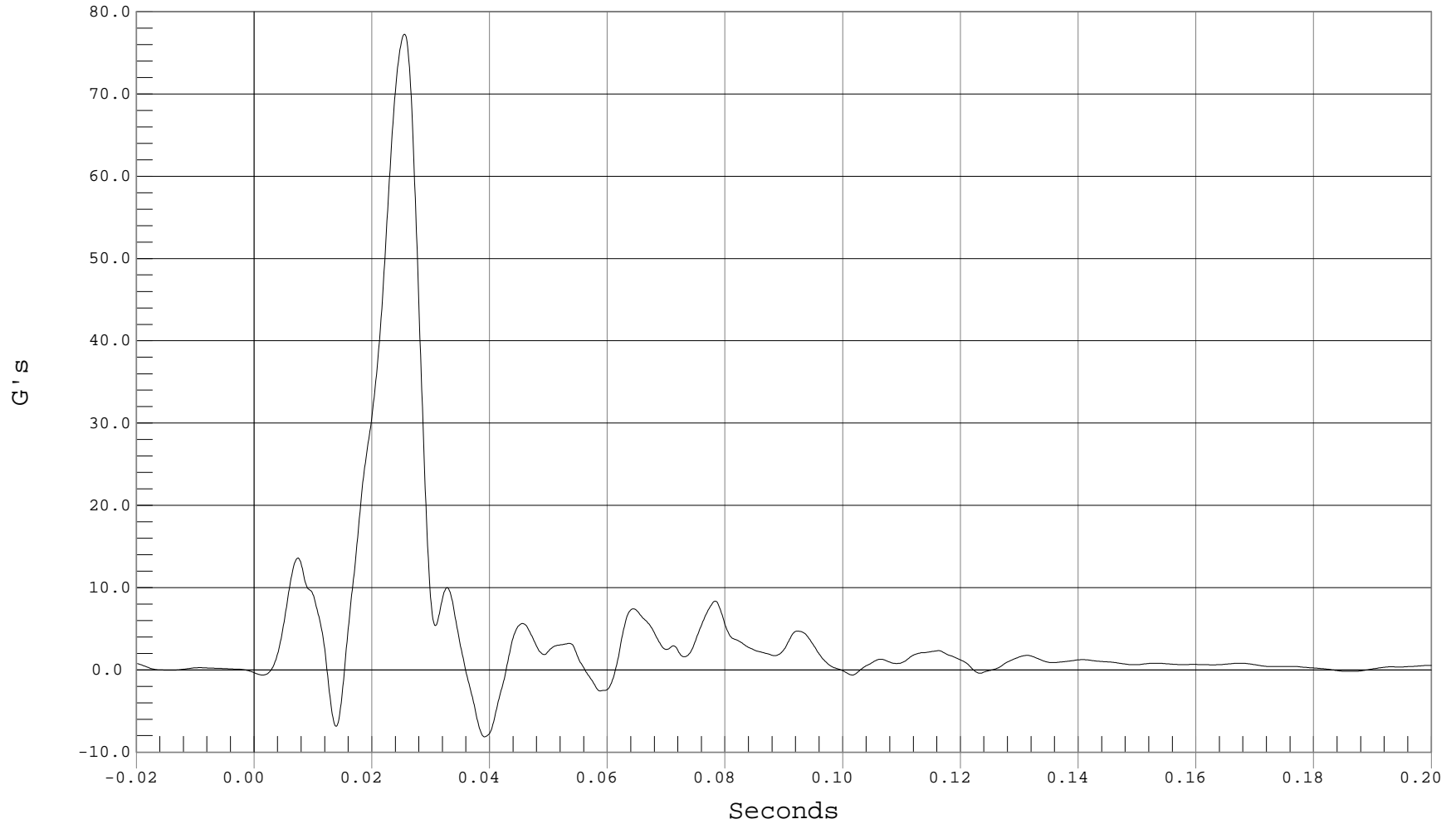
LEFT LOWER B-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT LOWER B-POST Y, B02055AF.A49

Ymin = -8.14 G's @ 0.0391 Seconds, Ymax = 77.26 G's @ 0.0255 Seconds



B-101



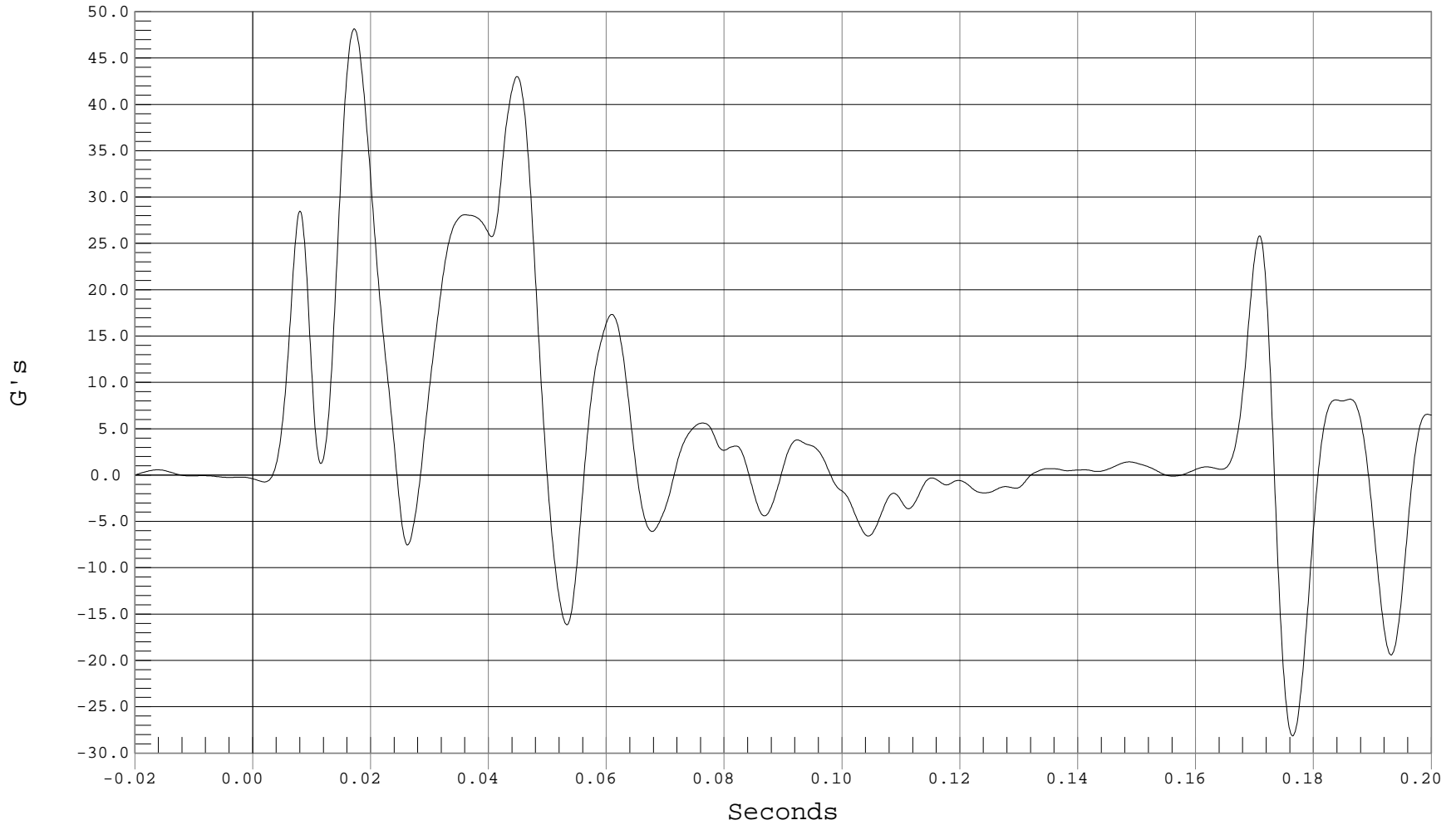
LEFT MID B-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT MID B-POST Y, B02055AF.A50

Ymin = -28.15 G's @ 0.1764 Seconds, Ymax = 48.16 G's @ 0.0171 Seconds



B-102

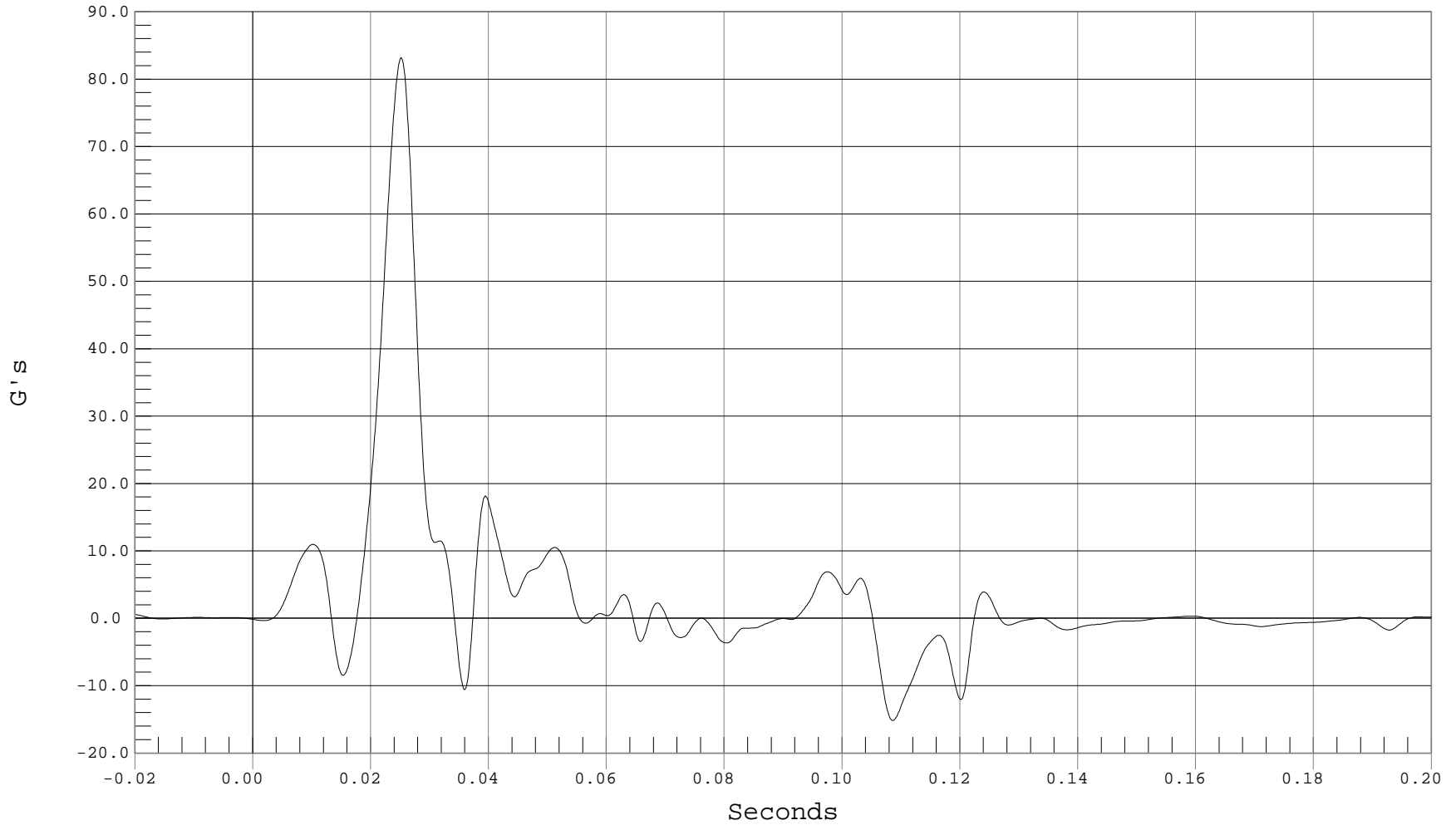


LEFT DRIVER SEAT TRACK Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

Ymin = -15.15 G's @ 0.1085 Seconds, Ymax = 83.18 G's @ 0.0251 Seconds



B-103



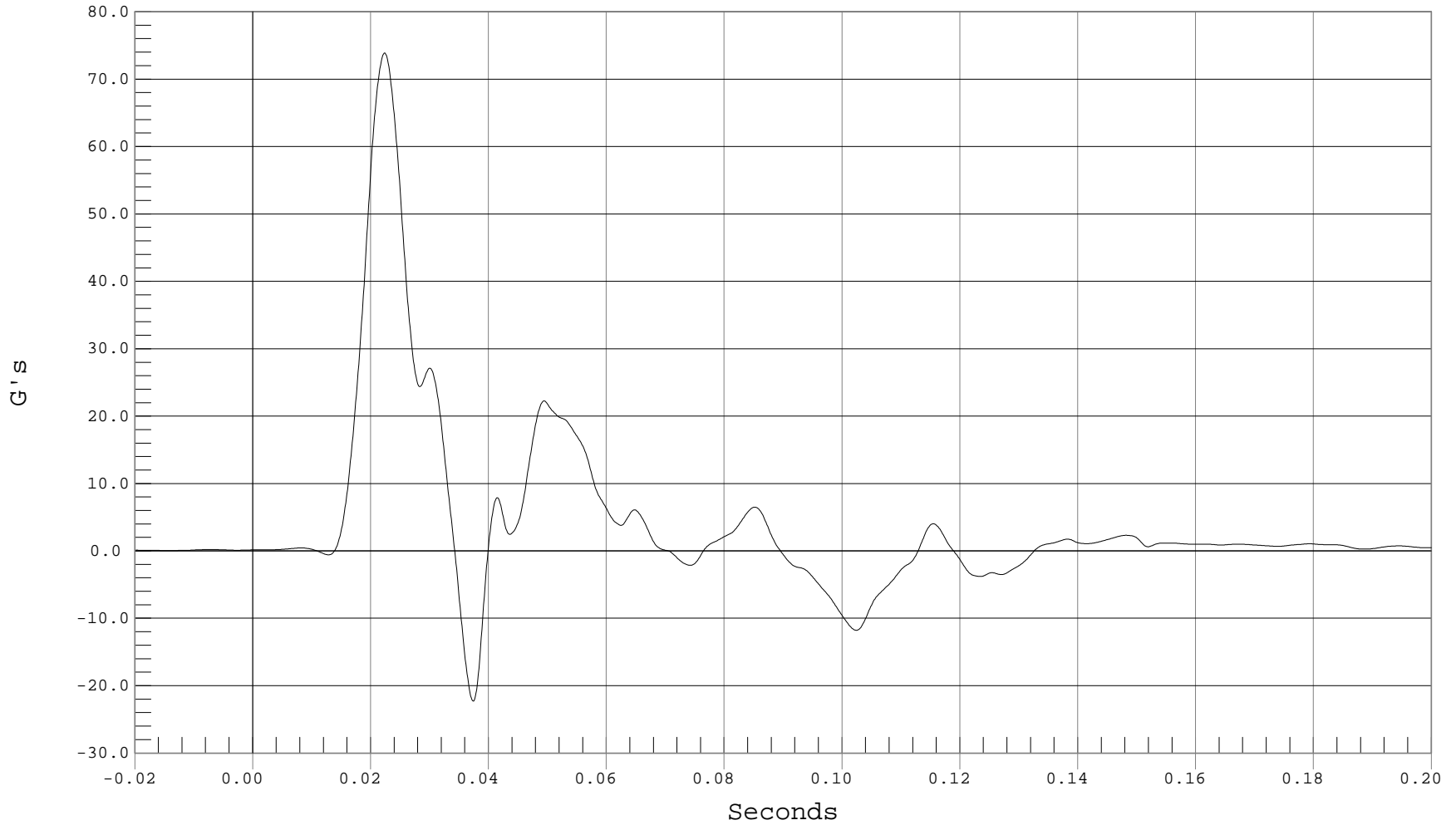
DRIVER LEFT SEAT FRAME Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT DRIVER SEAT FRAME Y, B02055AF.A29

Ymin = -22.29 G's @ 0.0373 Seconds, Ymax = 73.88 G's @ 0.0223 Seconds



B-104



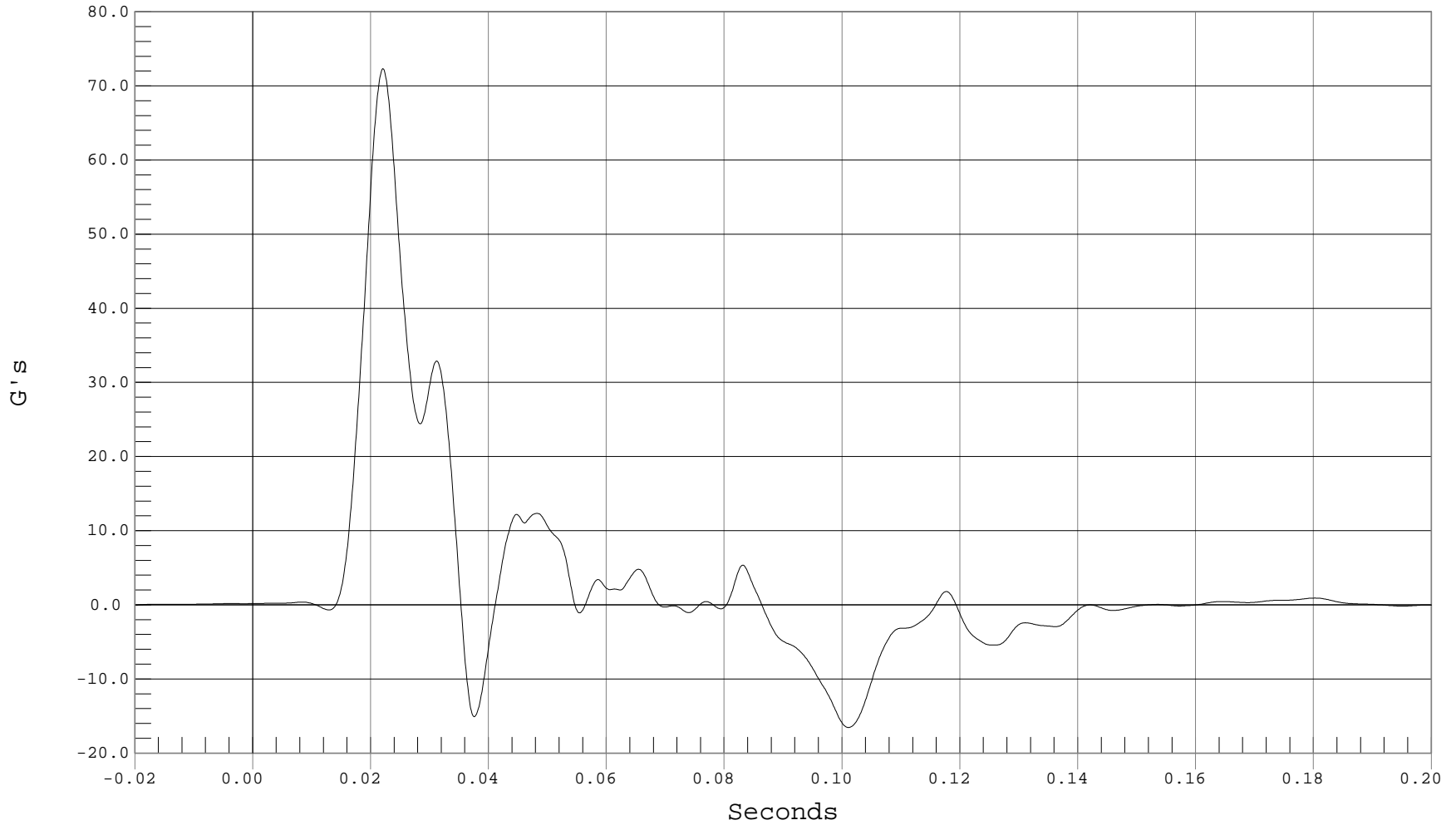
DRIVER RIGHT SEAT FRAME Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 RIGHT DRIVER SEAT FRAME Y, B02055AF.A30

Ymin = -16.55 G's @ 0.1010 Seconds, Ymax = 72.32 G's @ 0.0220 Seconds



B-105



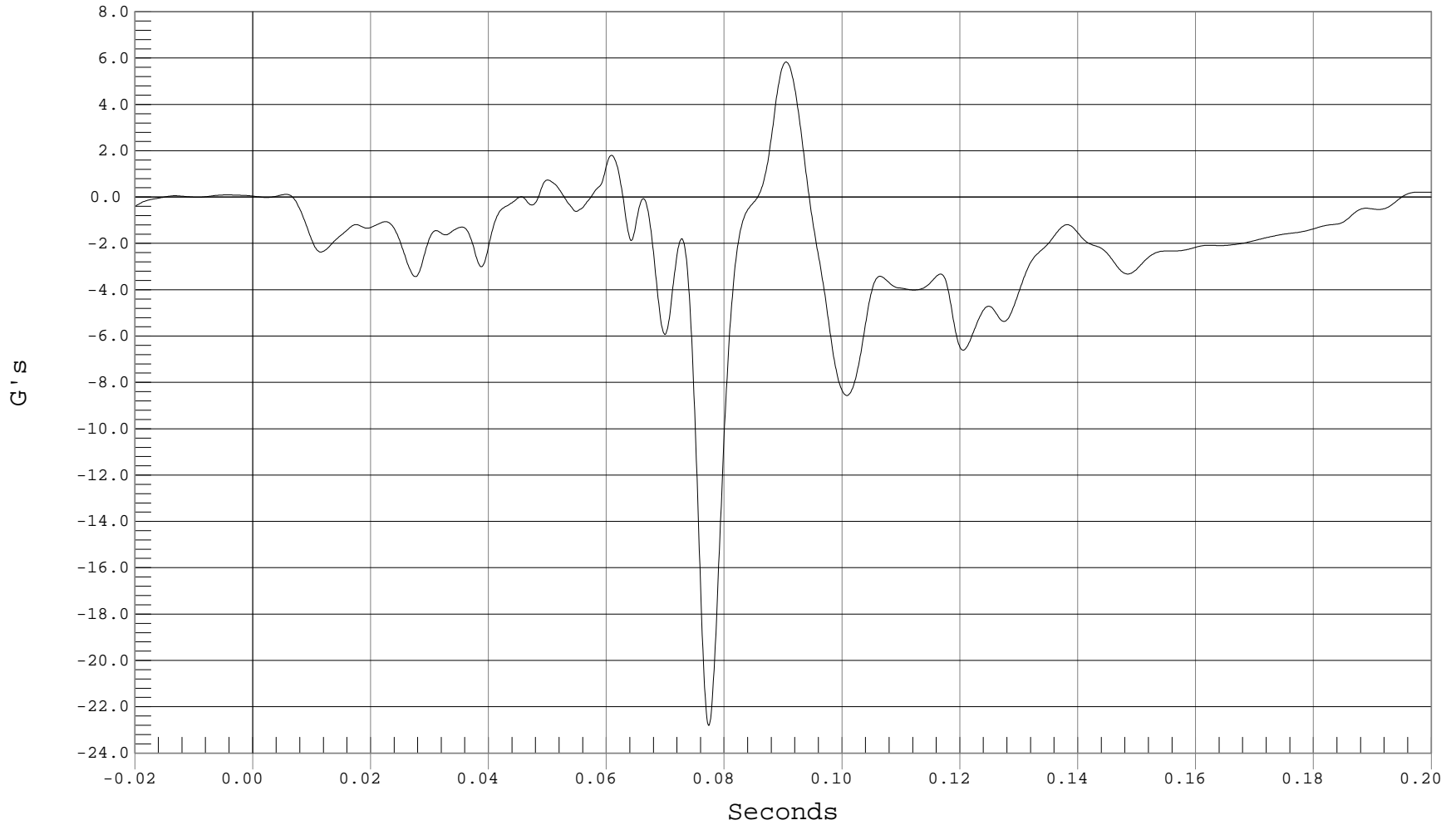
VEHICLE CG X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 VEHICLE CG X, B02055AF.A33

Ymin = -22.81 G's @ 0.0773 Seconds, Ymax = 5.83 G's @ 0.0904 Seconds



B-106



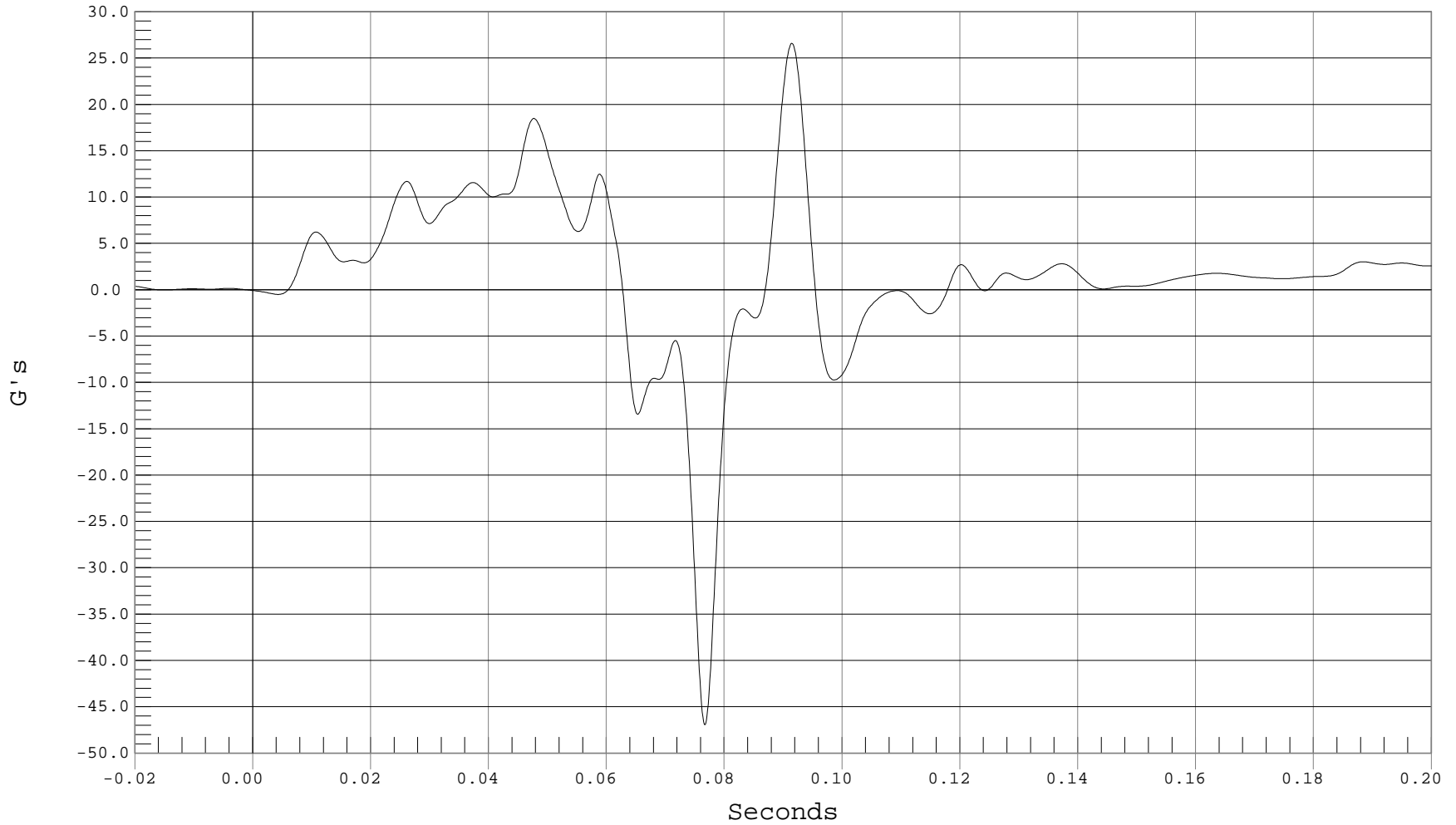
VEHICLE CG Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 VEHICLE CG Y, B02055AF.A34

Ymin = -46.93 G's @ 0.0766 Seconds, Ymax = 26.6 G's @ 0.0914 Seconds



B-107



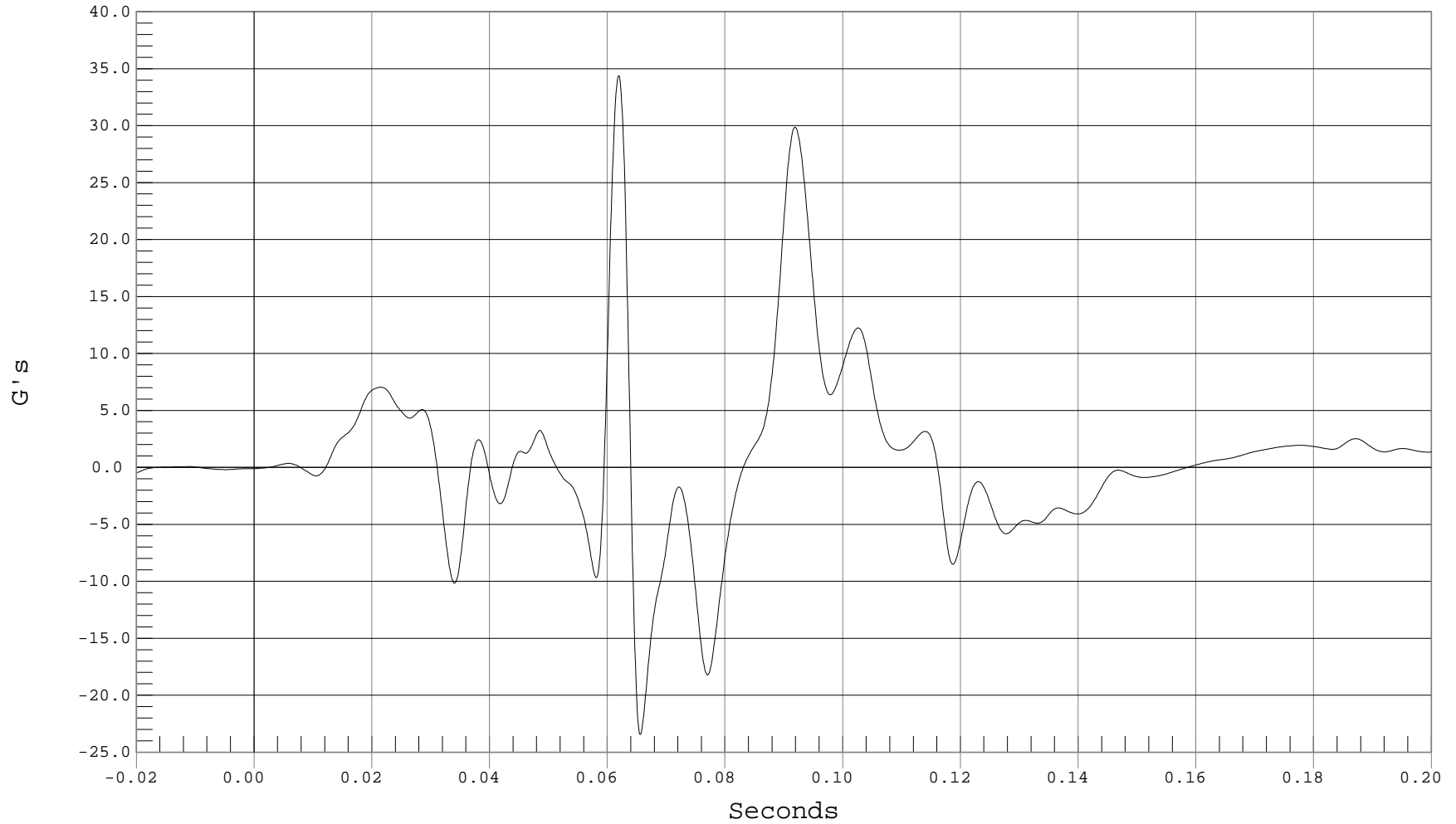
VEHICLE CG Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 VEHICLE CG Z, B02055AF.A35

Ymin = -23.45 G's @ 0.0655 Seconds, Ymax = 34.39 G's @ 0.0619 Seconds



B-108



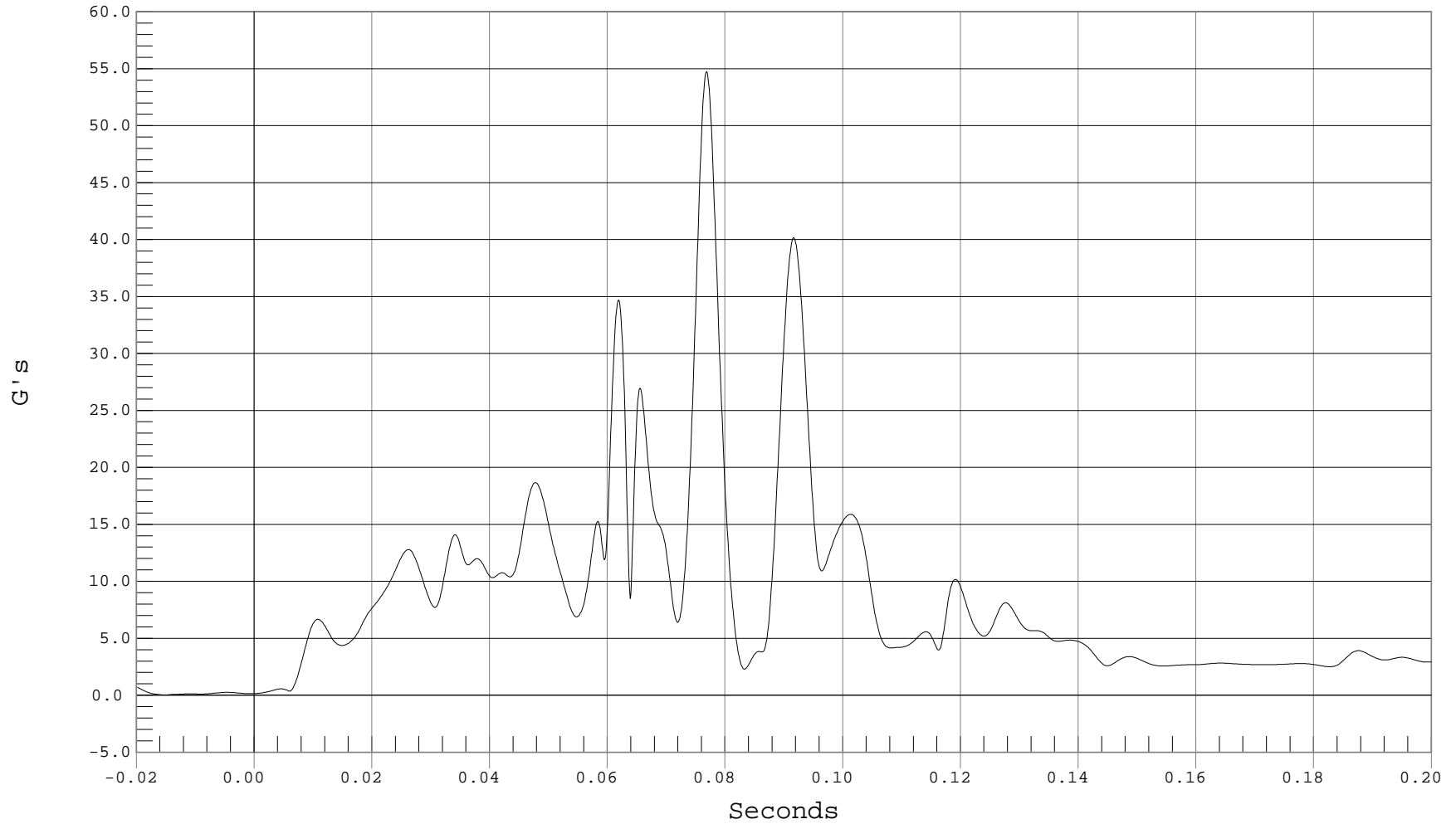
VEHICLE CG RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 VEHICLE CG RESULTANT ACCELERATION, B02055AV.A33

Ymin = .03 G's @ -0.0152 Seconds, Ymax = 54.76 G's @ 0.0768 Seconds



B-109



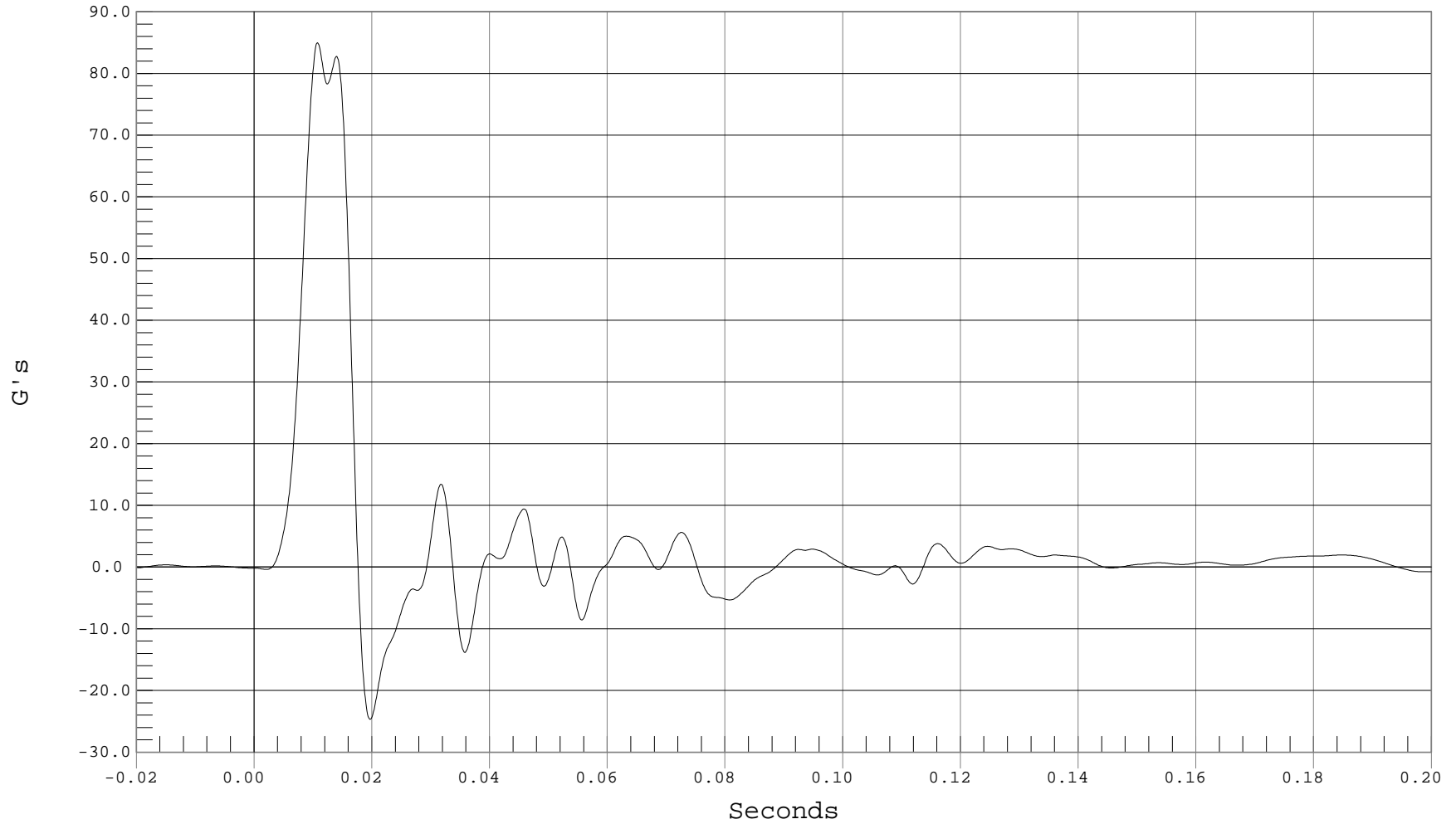
LEFT FRONT DOOR @ ARM Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ ARM Y, B02055AF.A26

Ymin = -24.67 G's @ 0.0196 Seconds, Ymax = 84.96 G's @ 0.0107 Seconds



B-110



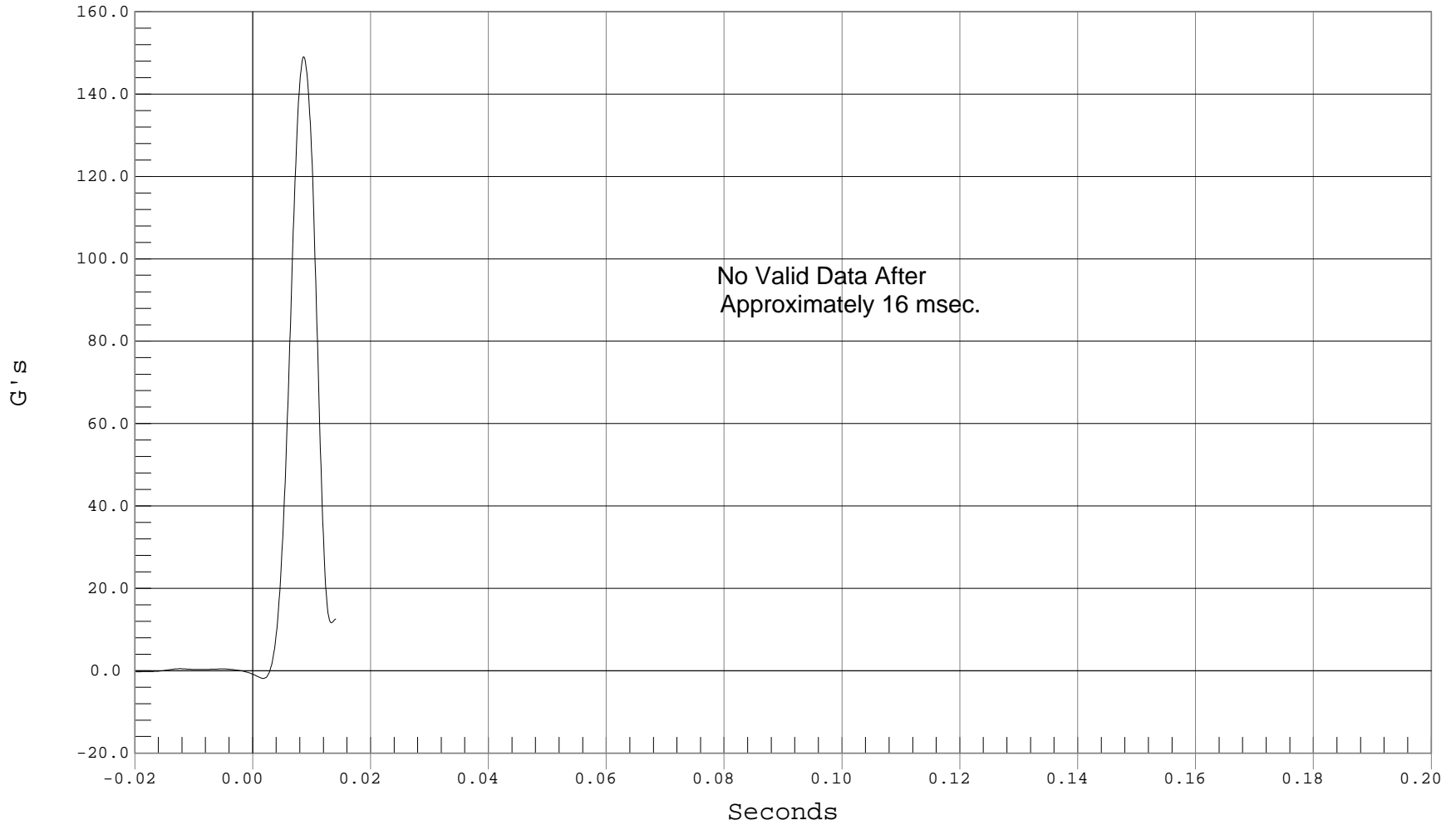
LEFT FRONT DOOR @ PELVIS Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ PELVIS Y, B02055AF.A25

Ymin = -1.88 G's @ 0.0017 Seconds, Ymax = 149.07 G's @ 0.0086 Seconds



B-111



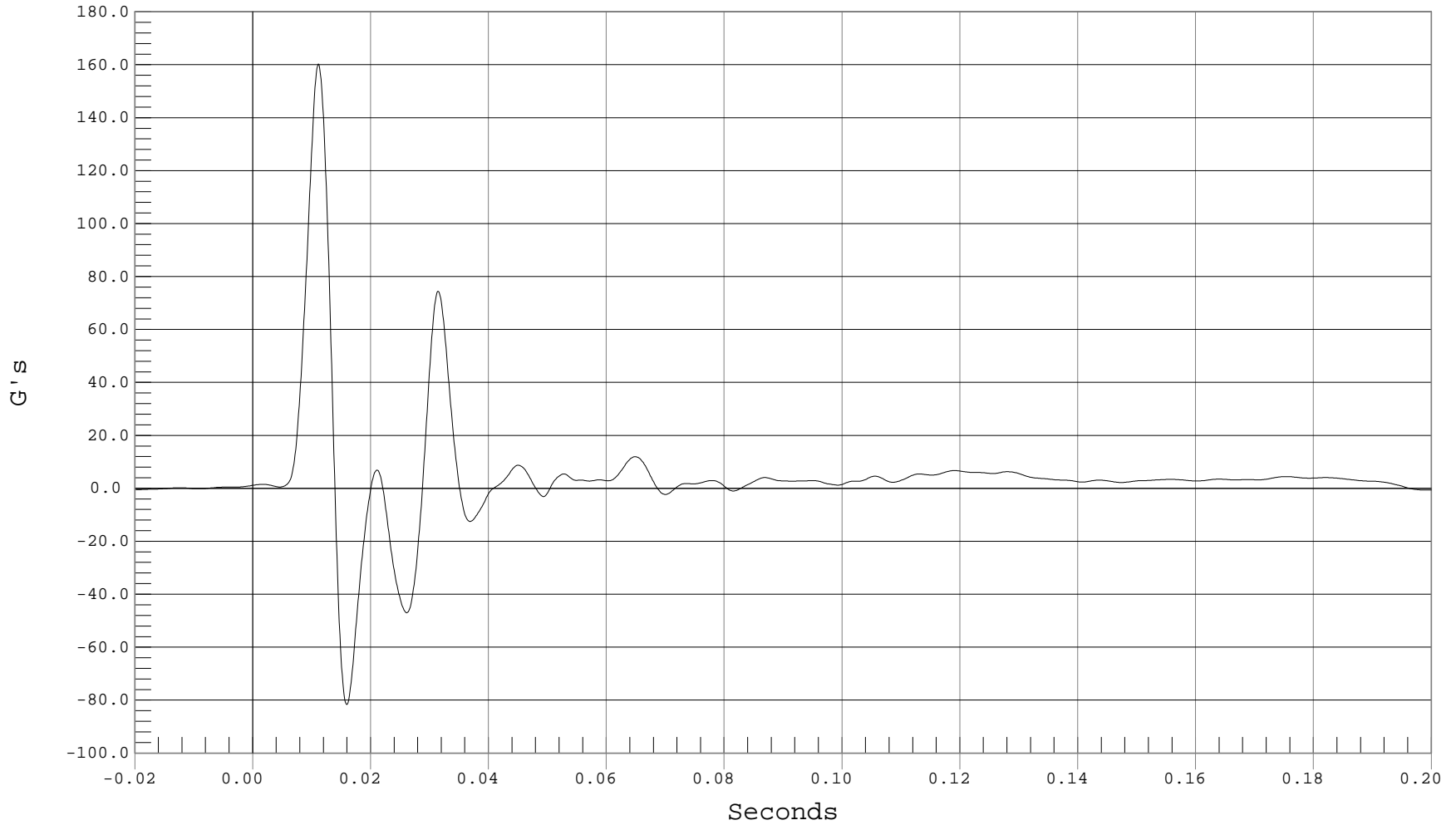
LEFT FRONT DOOR @ KNEE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ KNEE Y, B02055AF.A27

Ymin = -81.62 G's @ 0.0159 Seconds, Ymax = 160.22 G's @ 0.0111 Seconds



B-112



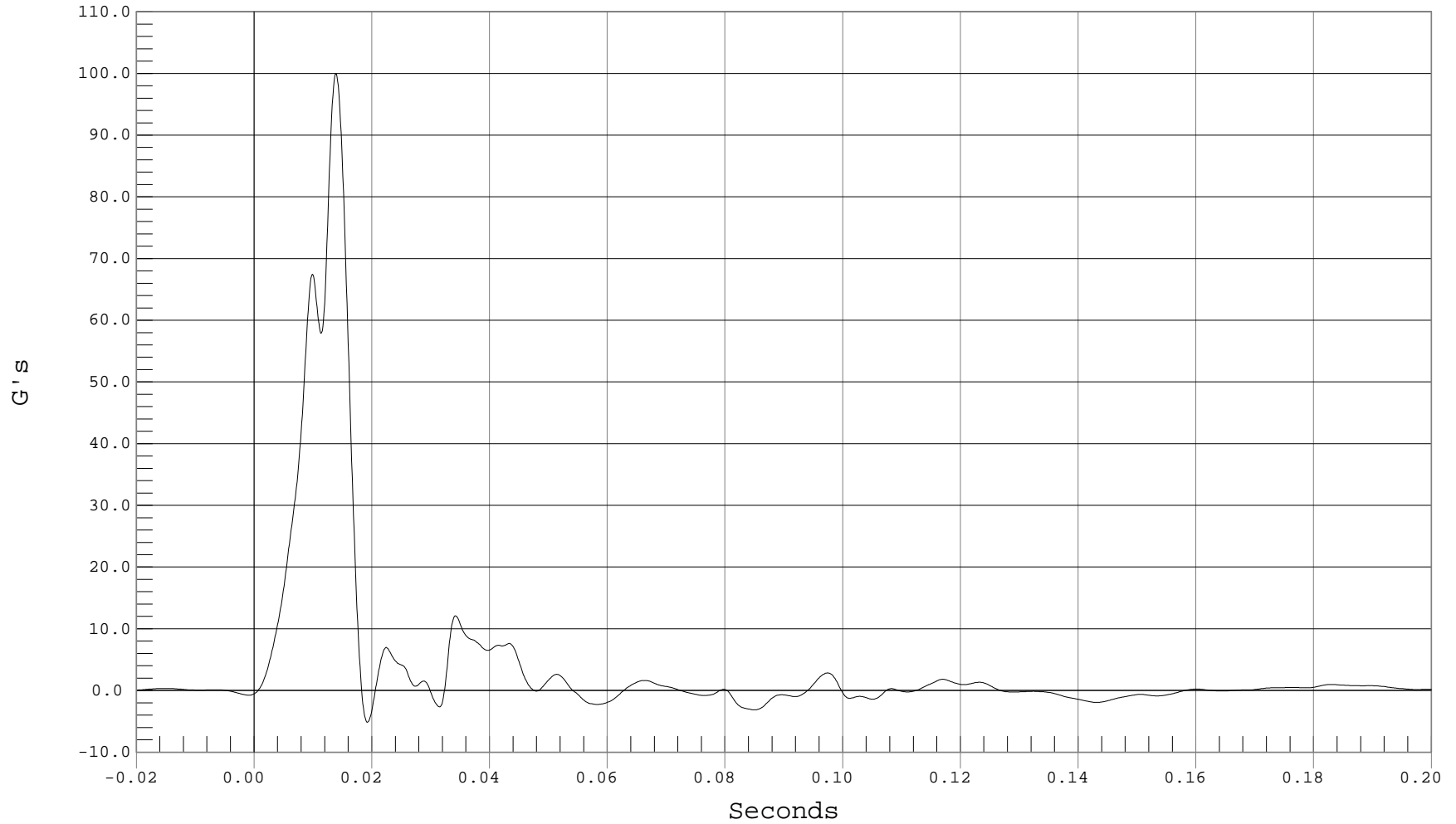
LEFT FRONT DOOR @ RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ RIB Y, B02055AF.A28

Ymin = -5.17 G's @ 0.0192 Seconds, Ymax = 99.99 G's @ 0.0138 Seconds



B-113



LOWER CENTER RADIATOR SUPPORT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG

Test Date: 07-09-02

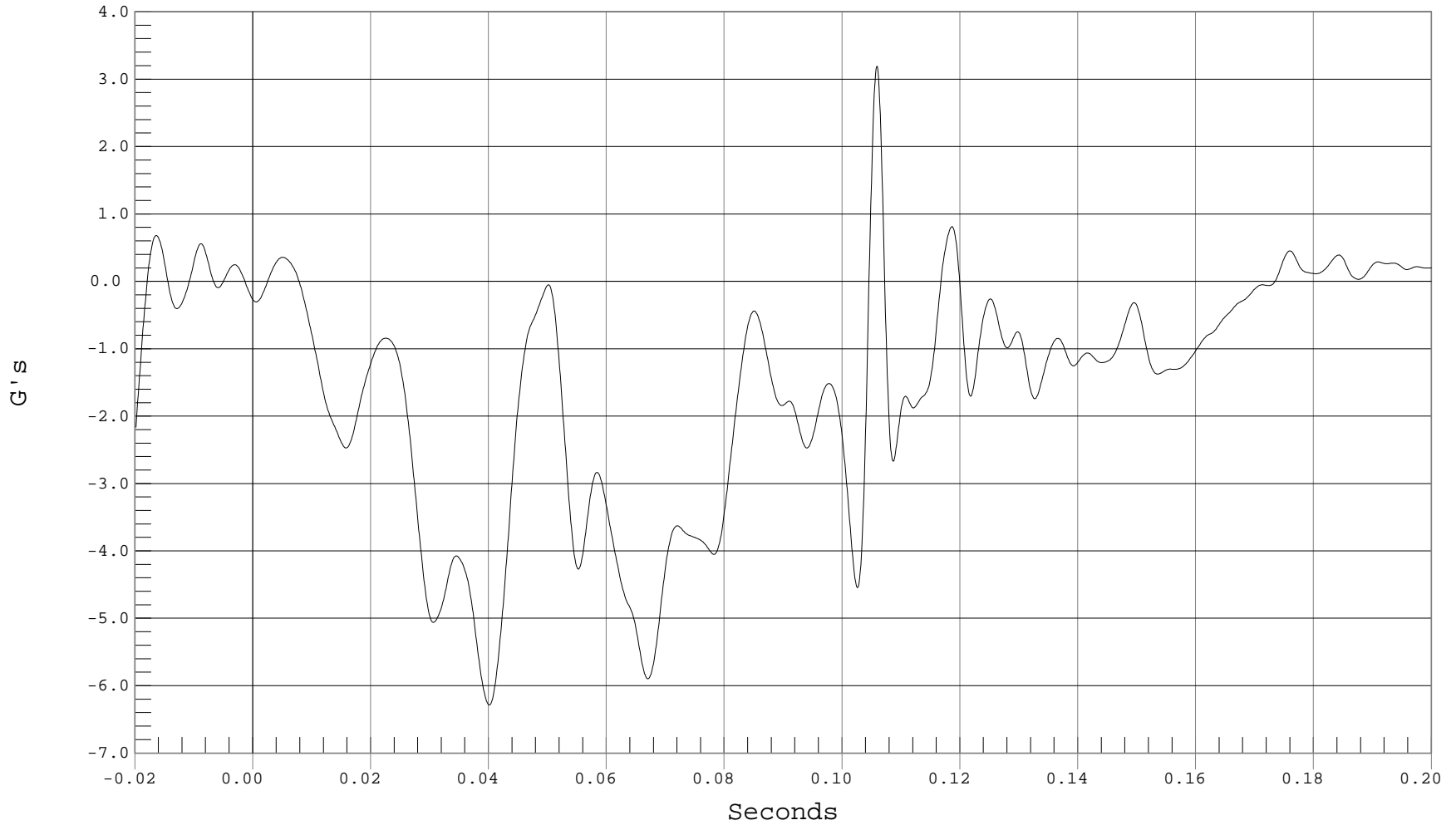
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Speed: 20.1 MPH, 32.3 KPH

Filter Class: 60

— 1 LOWER CENTER RADIATOR SUPPORT X, B02055AF.A22

Ymin = -6.29 G's @ 0.0401 Seconds, Ymax = 3.19 G's @ 0.1058 Seconds



B-114



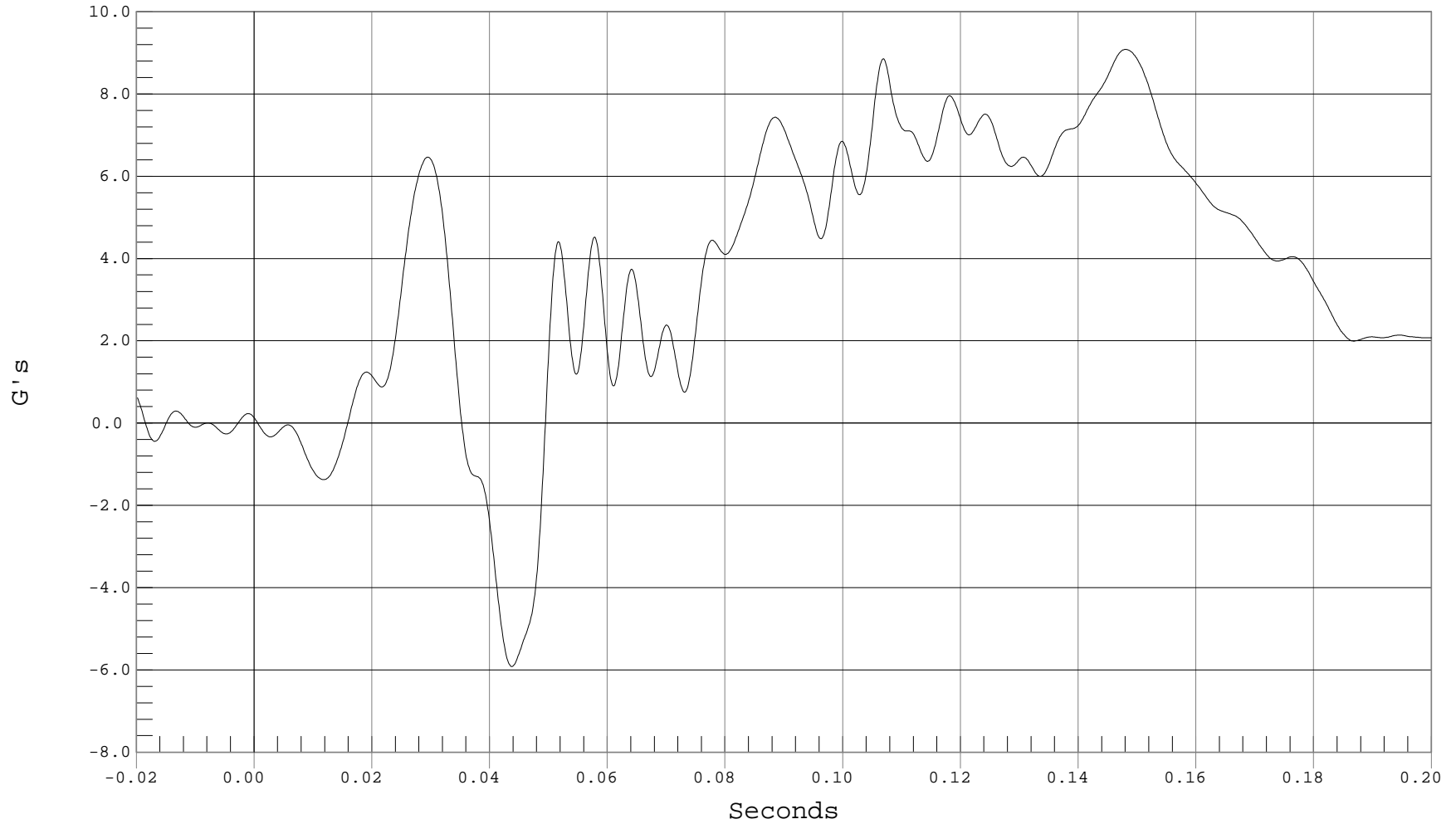
LOWER CENTER RADIATOR SUPPORT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LOWER CENTER RADIATOR SUPPORT Y, B02055AF.A23

Ymin = -5.92 G's @ 0.0437 Seconds, Ymax = 9.08 G's @ 0.1480 Seconds



B-115



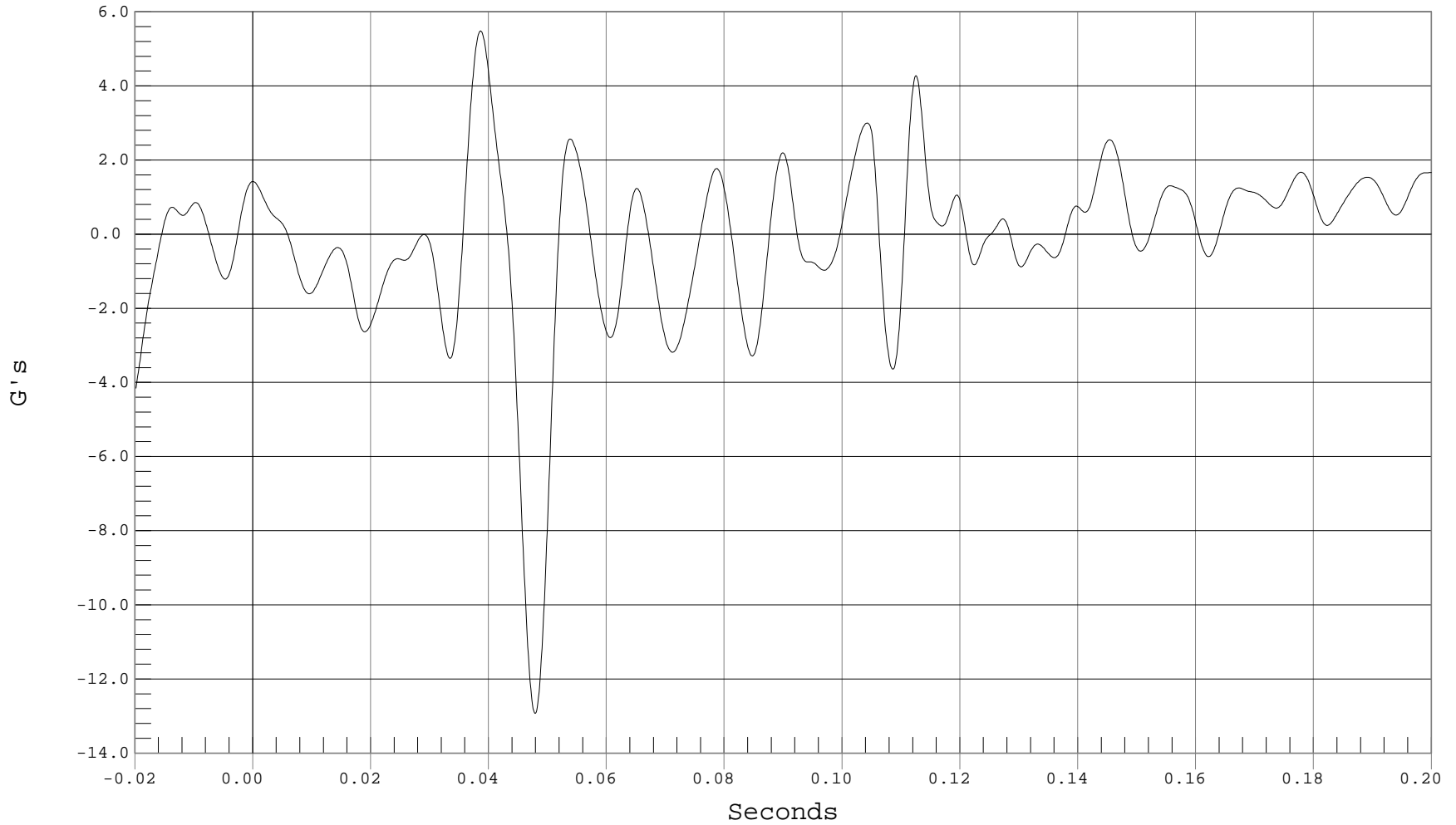
LOWER CENTER RADIATOR SUPPORT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LOWER CENTER RADIATOR SUPPORT Z, B02055AF.A24

Ymin = -12.93 G's @ 0.0478 Seconds, Ymax = 5.48 G's @ 0.0386 Seconds



B-116



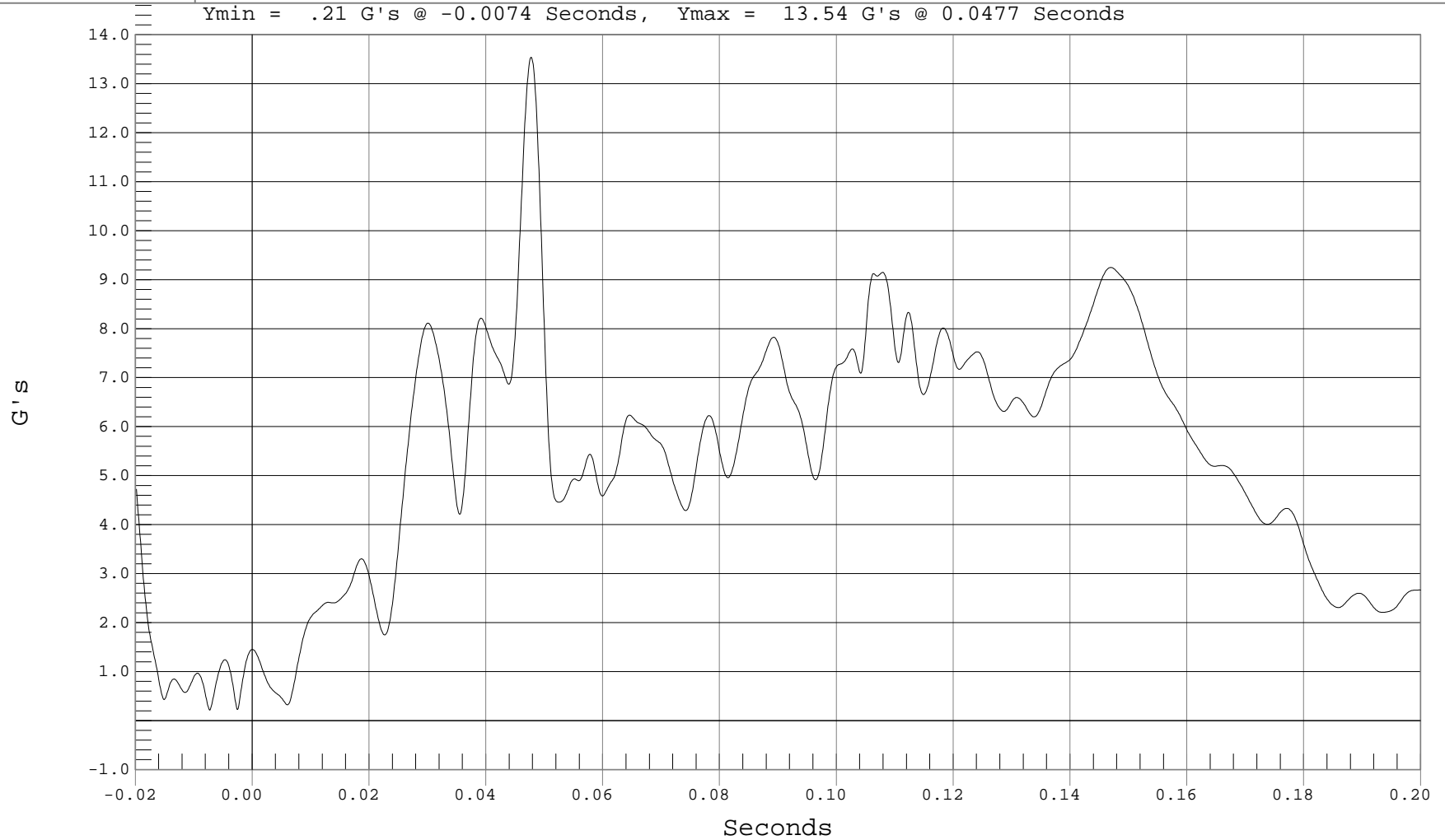
LOWER CENTER RADIATOR SUPPORT RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Filter Class: 60

— 1 LOWER RADIATOR SUPPORT RESULTANT ACCELERATION, B02055AV.A22

Ymin = .21 G's @ -0.0074 Seconds, Ymax = 13.54 G's @ 0.0477 Seconds



B-117



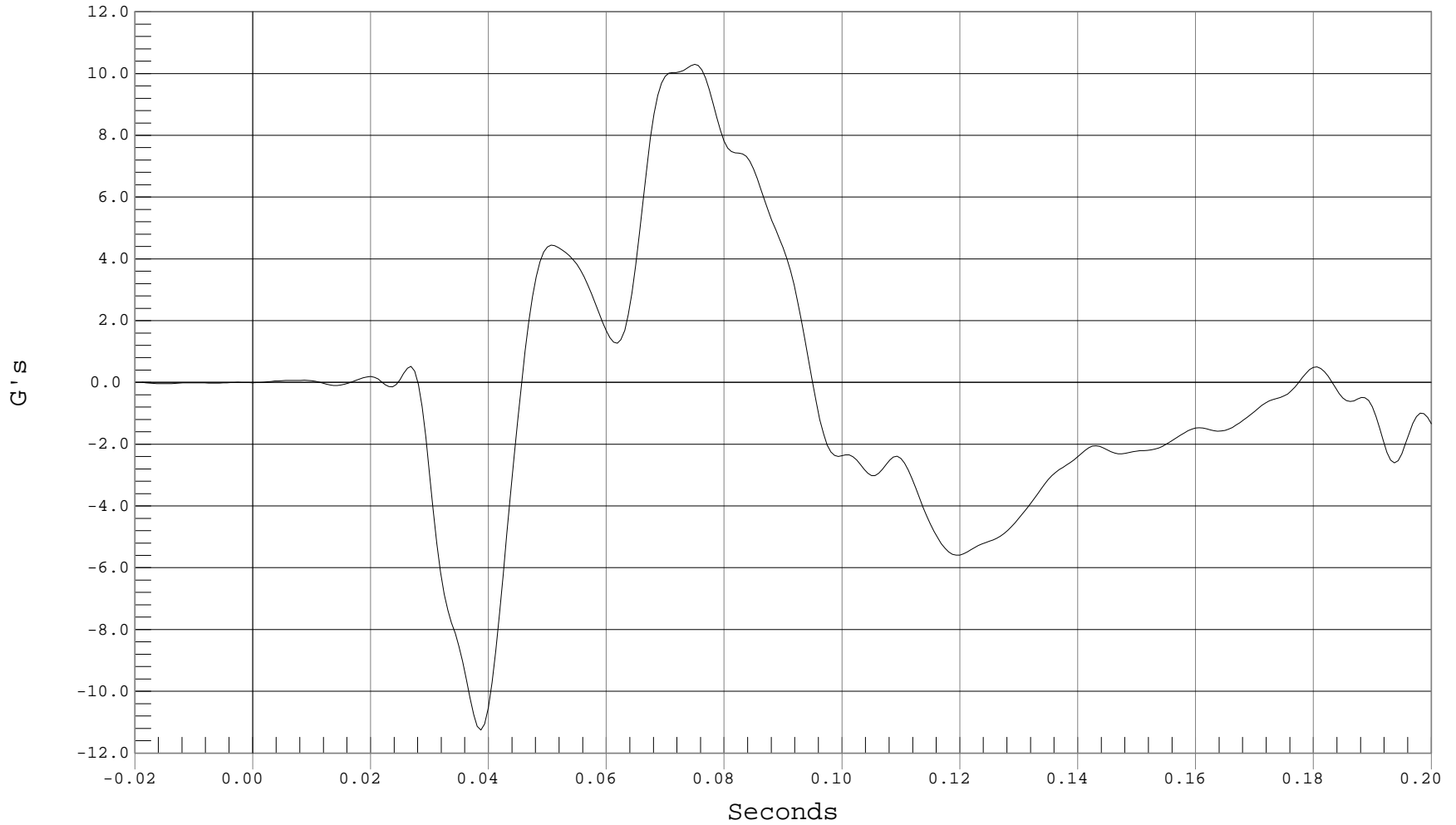
DRIVER UPPER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER UPPER SPINE X, B02055FI.R06

Ymin = -11.25 G's @ 0.0387 Seconds, Ymax = 10.3 G's @ 0.0749 Seconds



B-118



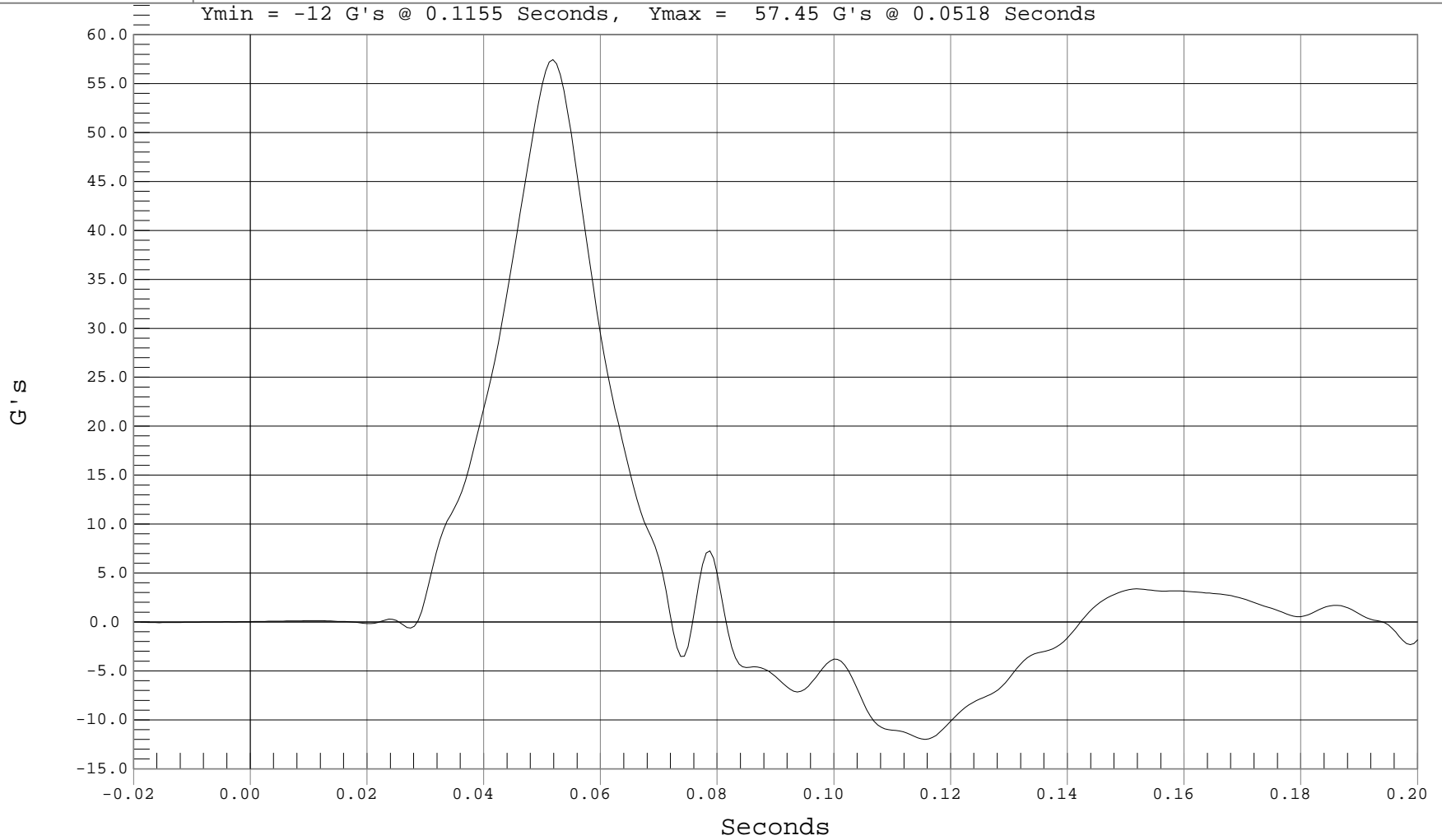
DRIVER UPPER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

1 DRIVER UPPER SPINE Y, B02055FI.R07

Ymin = -12 G's @ 0.1155 Seconds, Ymax = 57.45 G's @ 0.0518 Seconds



B-119



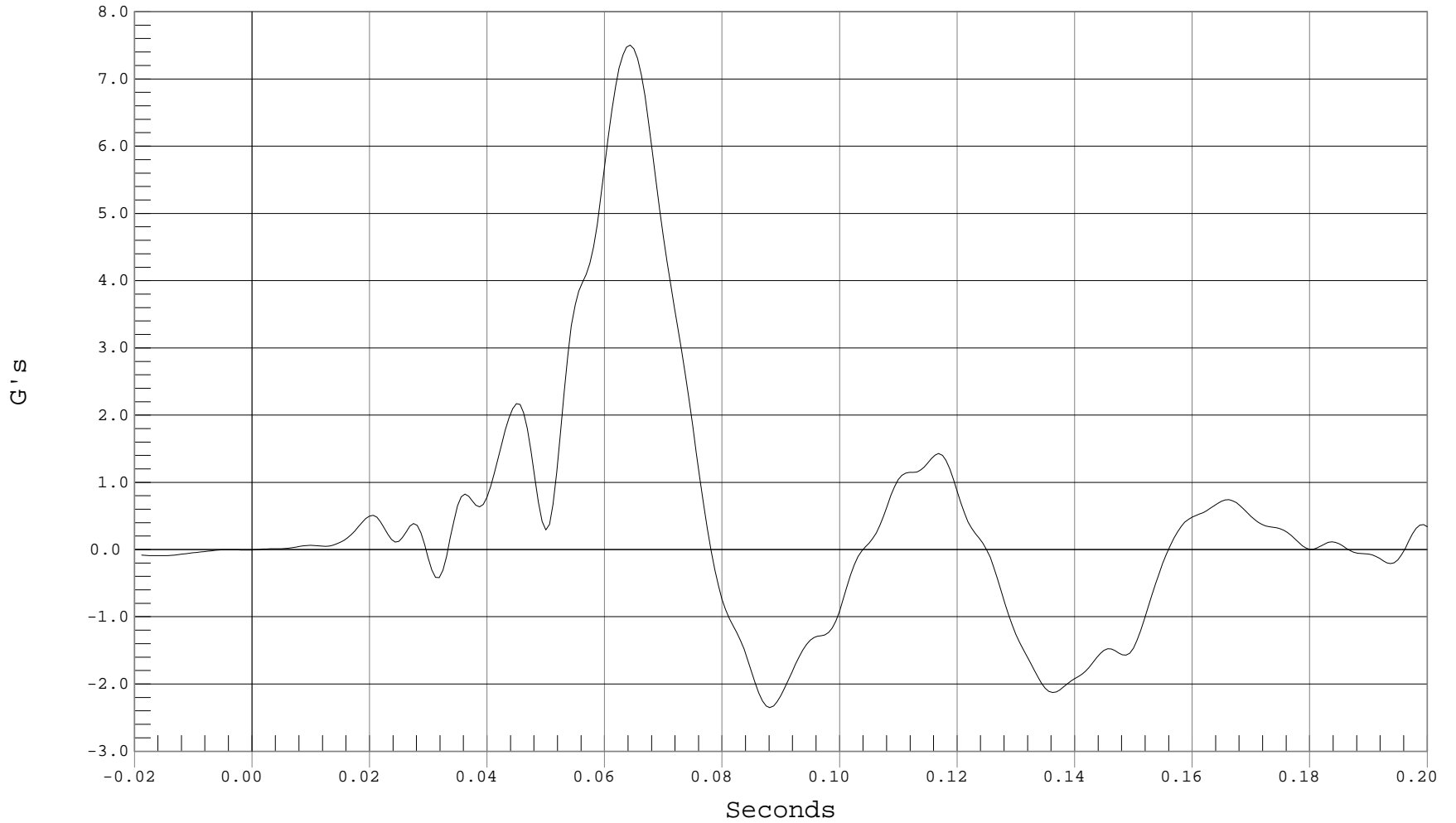
DRIVER UPPER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER UPPER SPINE Z, B02055FI.R08

Ymin = -2.35 G's @ 0.0880 Seconds, Ymax = 7.5 G's @ 0.0643 Seconds



B-120



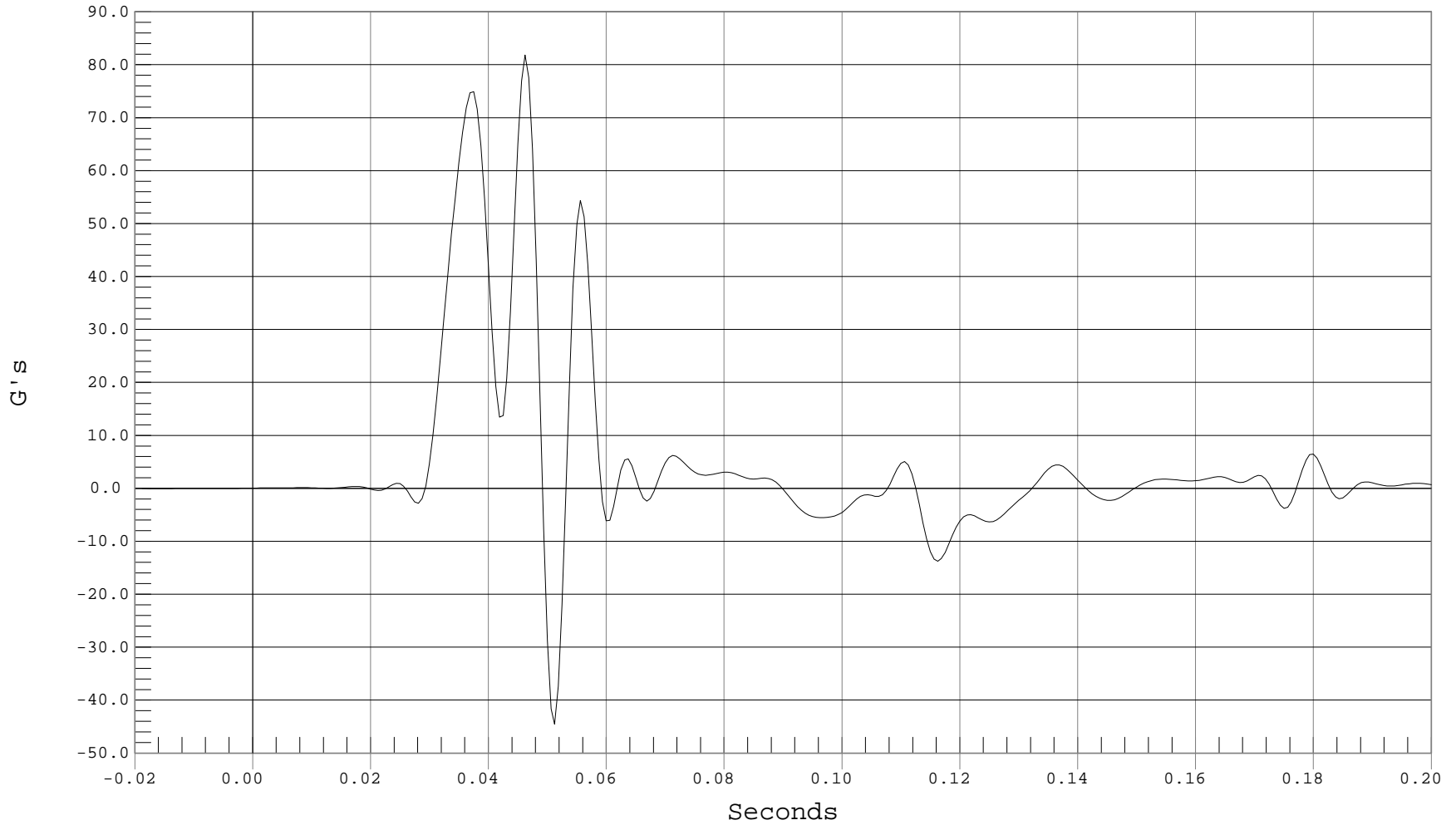
DRIVER UPPER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER UPPER RIB Y, B02055FI.R04

Ymin = -44.55 G's @ 0.0512 Seconds, Ymax = 81.82 G's @ 0.0462 Seconds



B-121



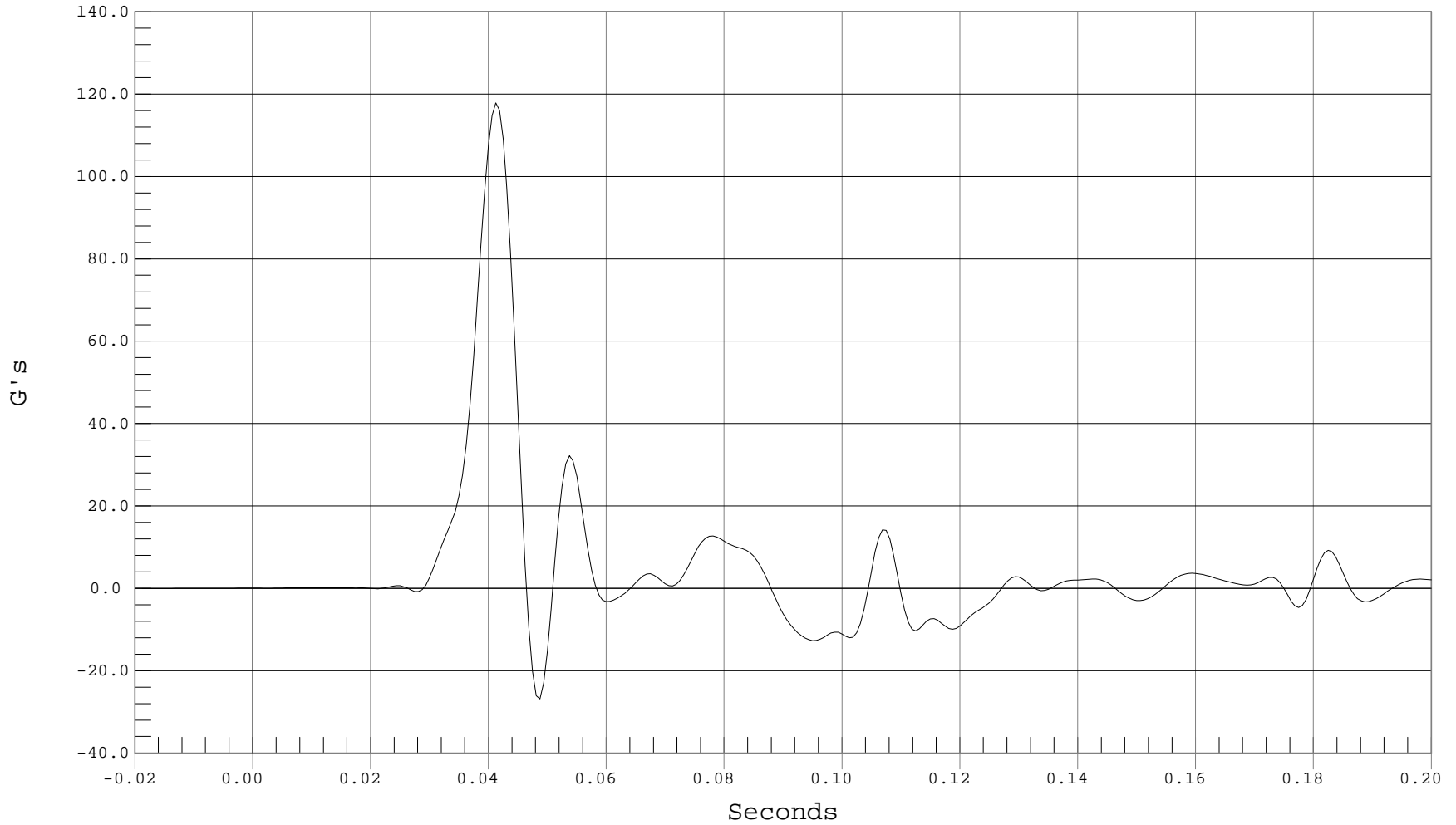
DRIVER MID RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER MID RIB Y, B02055FI.R58

Ymin = -26.88 G's @ 0.0487 Seconds, Ymax = 117.87 G's @ 0.0412 Seconds



B-122



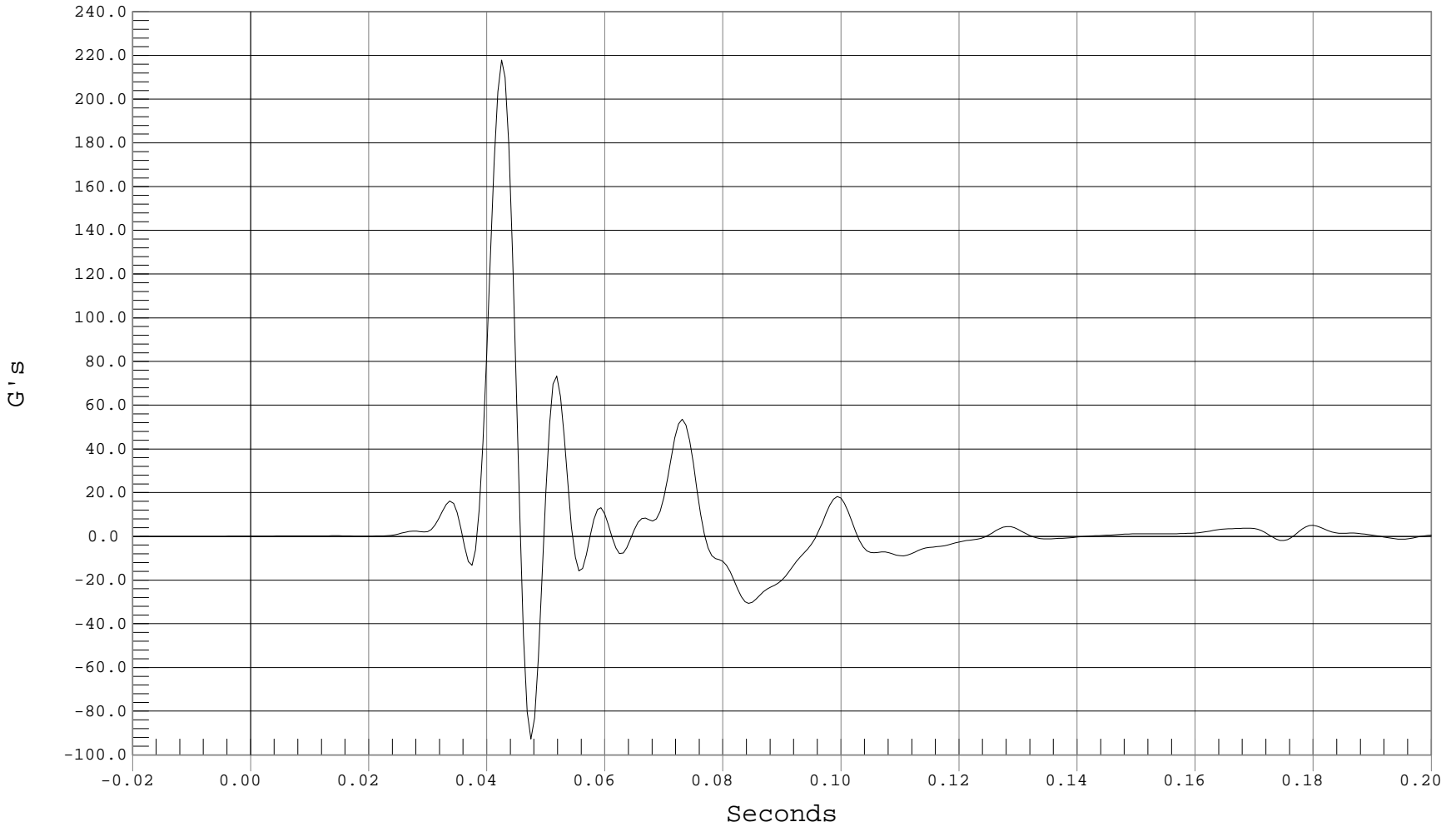
DRIVER LOWER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER LOWER RIB Y, B02055FI.R05

Ymin = -92.68 G's @ 0.0474 Seconds, Ymax = 217.91 G's @ 0.0424 Seconds



B-123



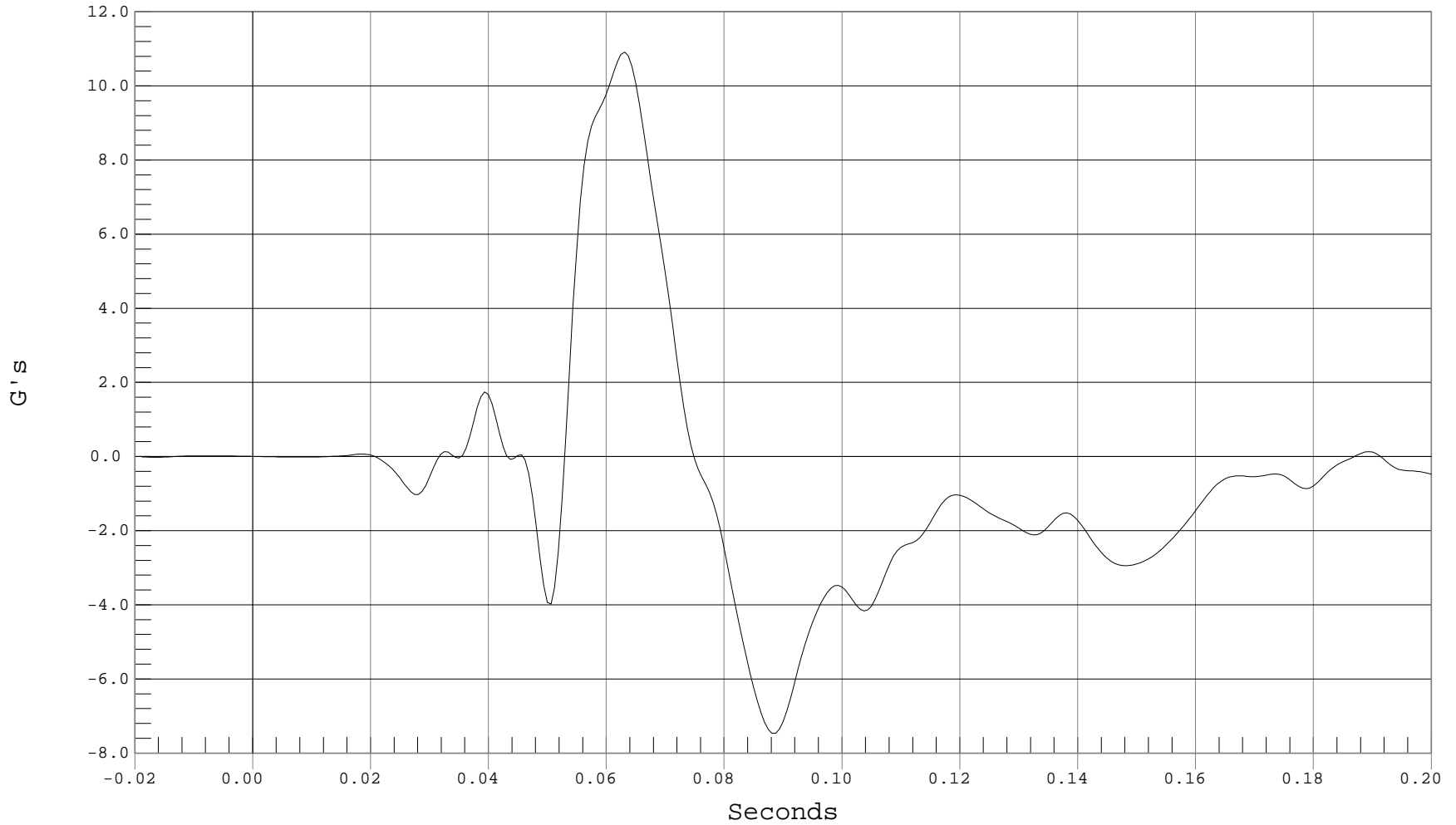
DRIVER LOWER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER LOWER SPINE X, B02055FI.R09

Ymin = -7.46 G's @ 0.0880 Seconds, Ymax = 10.91 G's @ 0.0630 Seconds



B-124



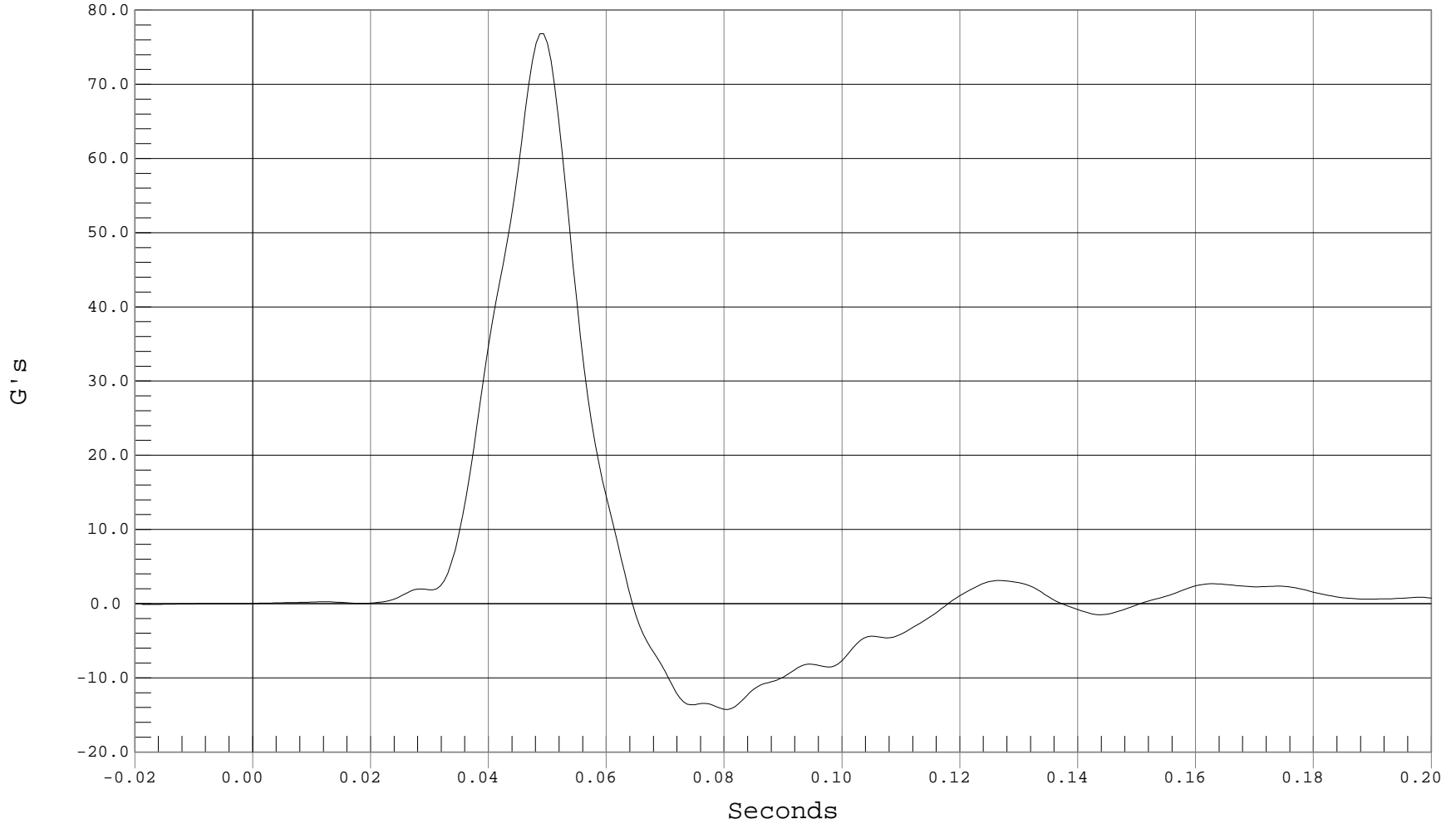
DRIVER LOWER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER LOWER SPINE Y, B02055FI.R10

Ymin = -14.27 G's @ 0.0805 Seconds, Ymax = 76.83 G's @ 0.0487 Seconds



B-125



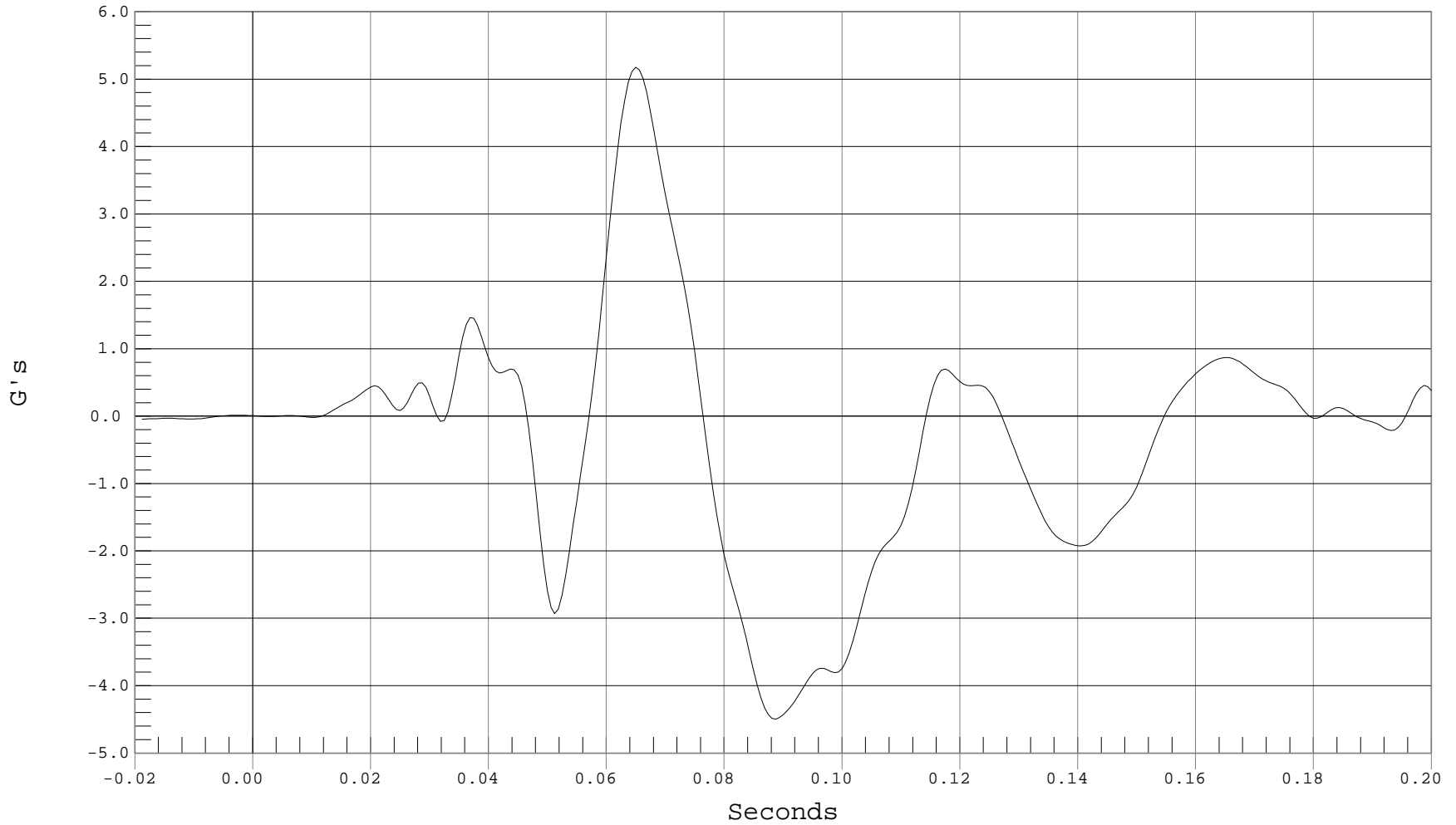
DRIVER LOWER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER LOWER SPINE Z, B02055FI.R11

Ymin = -4.49 G's @ 0.0886 Seconds, Ymax = 5.18 G's @ 0.0649 Seconds



B-126



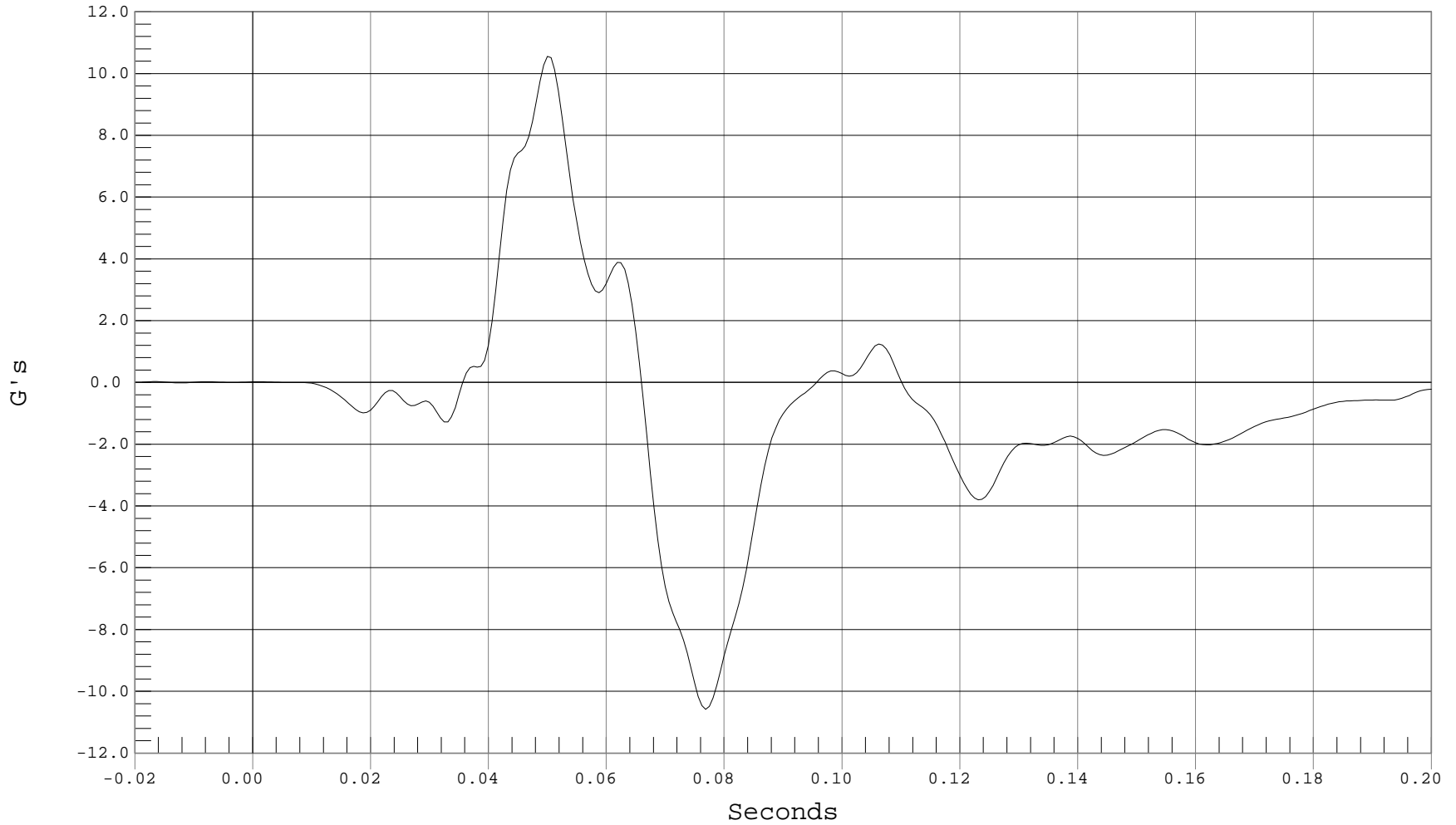
DRIVER PELVIS X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER PELVIS X, B02055FI.R12

Ymin = -10.58 G's @ 0.0768 Seconds, Ymax = 10.56 G's @ 0.0499 Seconds



B-127



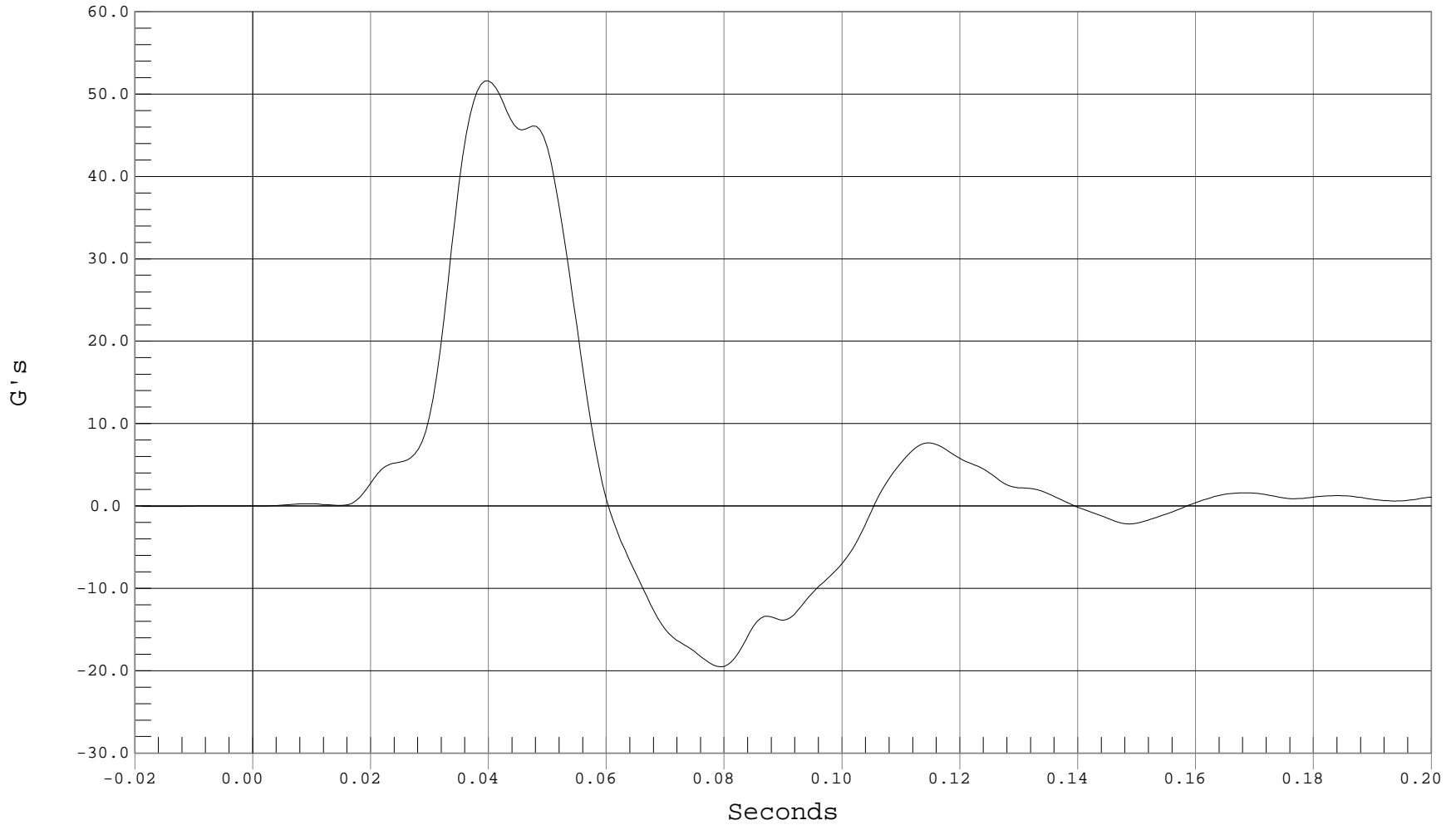
DRIVER PELVIS Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER PELVIS Y, B02055FI.R13

Ymin = -19.53 G's @ 0.0793 Seconds, Ymax = 51.62 G's @ 0.0399 Seconds



B-128



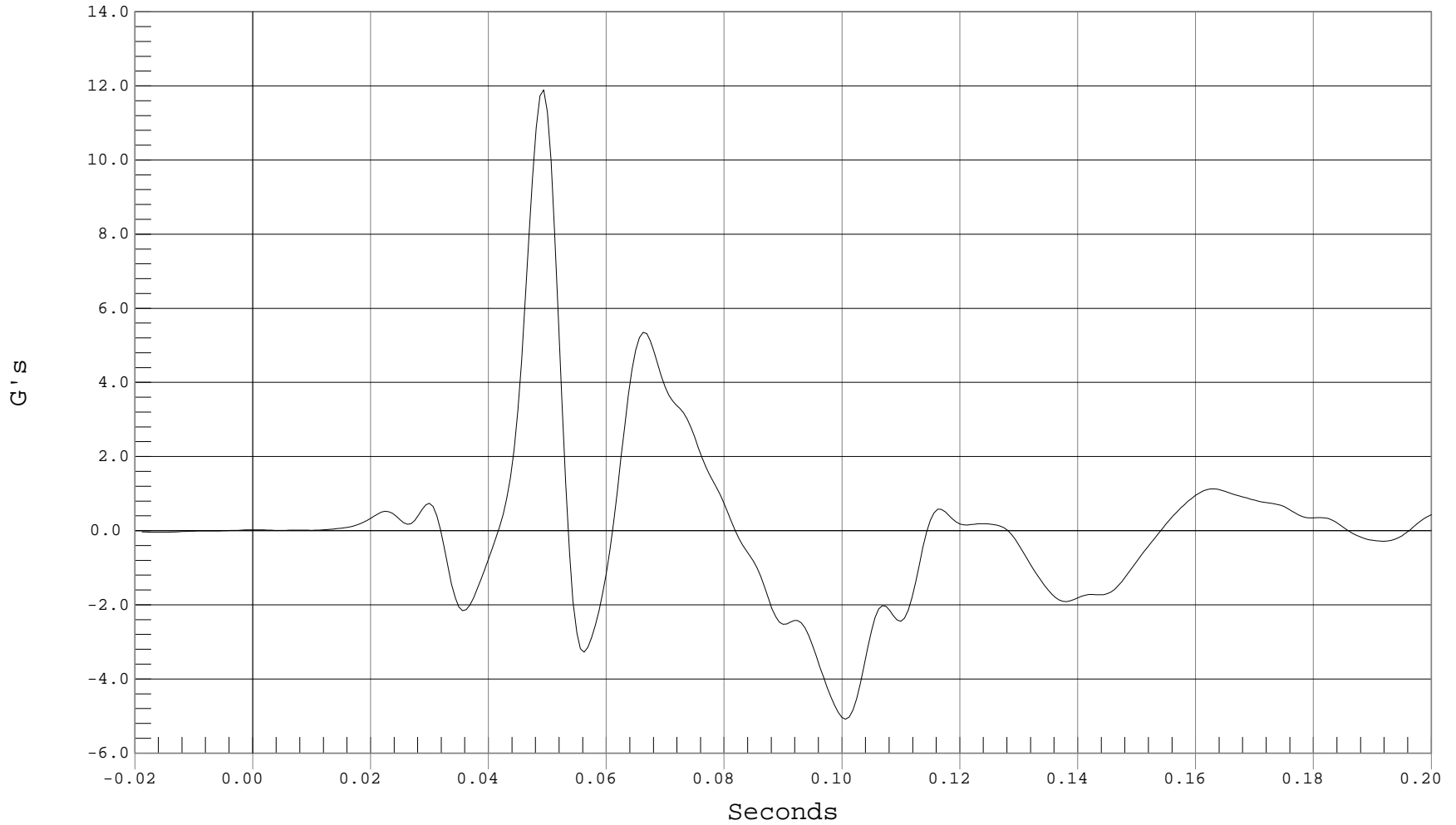
DRIVER PELVIS Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT @ 285 DEG
Component: 2001 SATURN L200 W/CURTAIN AIRBAG

Test Date: 07-09-02
Speed: 20.1 MPH, 32.3 KPH
Fir Filtered

— 1 DRIVER PELVIS Z, B02055FI.R14

Ymin = -5.09 G's @ 0.1005 Seconds, Ymax = 11.9 G's @ 0.0493 Seconds



B-129

APPENDIX C
ES-2 CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 010

Calibration Test Results Summary

Dummy Serial Number: 010

Pre-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 7/8/02
Dummy Serial Number: 010
Test Number: D02871

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	49
Peak Resultant Acceleration	100 – 150 g's	136
Time of Max. Res. Acceleration	msec	24.0

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

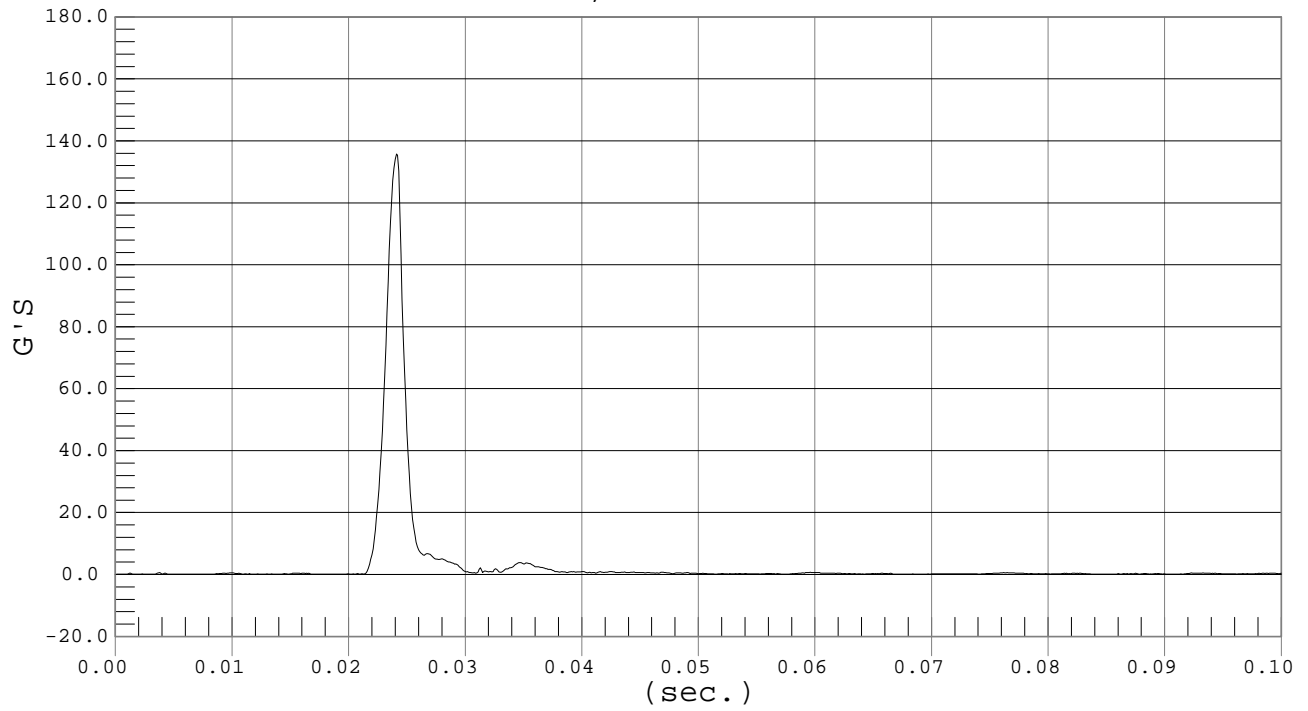


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #010

Test Date: 07-08-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .1 G'S @ 0.0024 sec., Ymax = 135.72 G'S @ 0.0240 sec.



MGA RESEARCH CORPORATION
 NECK PENDULUM TEST
 EUROSID 2 DUMMY

Date: 7/8/02
 Dummy Serial Number: 010
 Test Number: D02872

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.8
Relative Humidity (%)		10 – 70	56
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.33
	8 msec	~1.59 - ~2.04 m/sec	-1.77
	14 msec	~3.20 - ~3.85 m/sec	-3.40
Maximum Flexion Angle		49.0 – 59.0 deg	57.0
Time of Max. Flexion Angle		54.0 – 66.0 ms	59.8
Maximum Angle Theta (A)		32.0 – 37.0 deg	34.7
Time of Max. Theta (A)		53.0 – 63.0 ms	59.8
Maximum Angle Theta (B)		29.86 – 32.36 deg	31.20
Time of Max. Theta (B)		54.0 – 64.0 ms	59.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

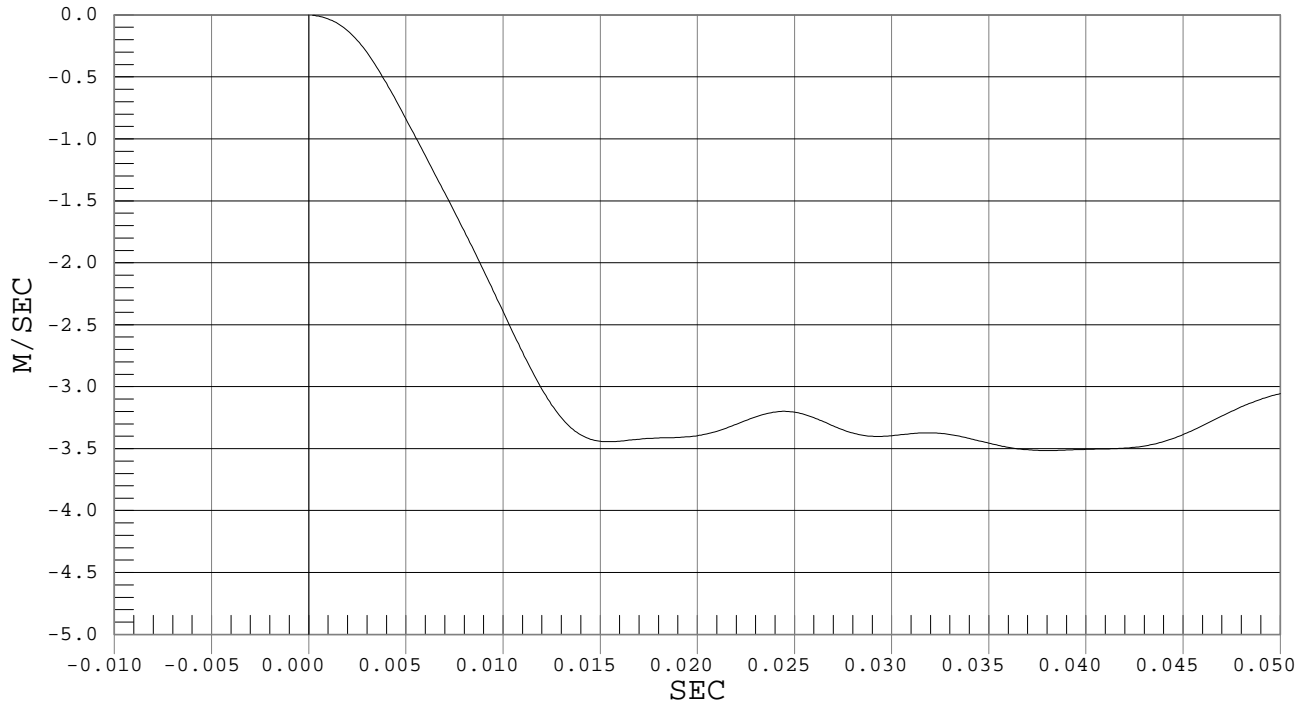


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 07-08-02
Speed: 11.1 fps, 3.39 M/s

Ymin = -4.37 M/SEC @ 0.0198 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

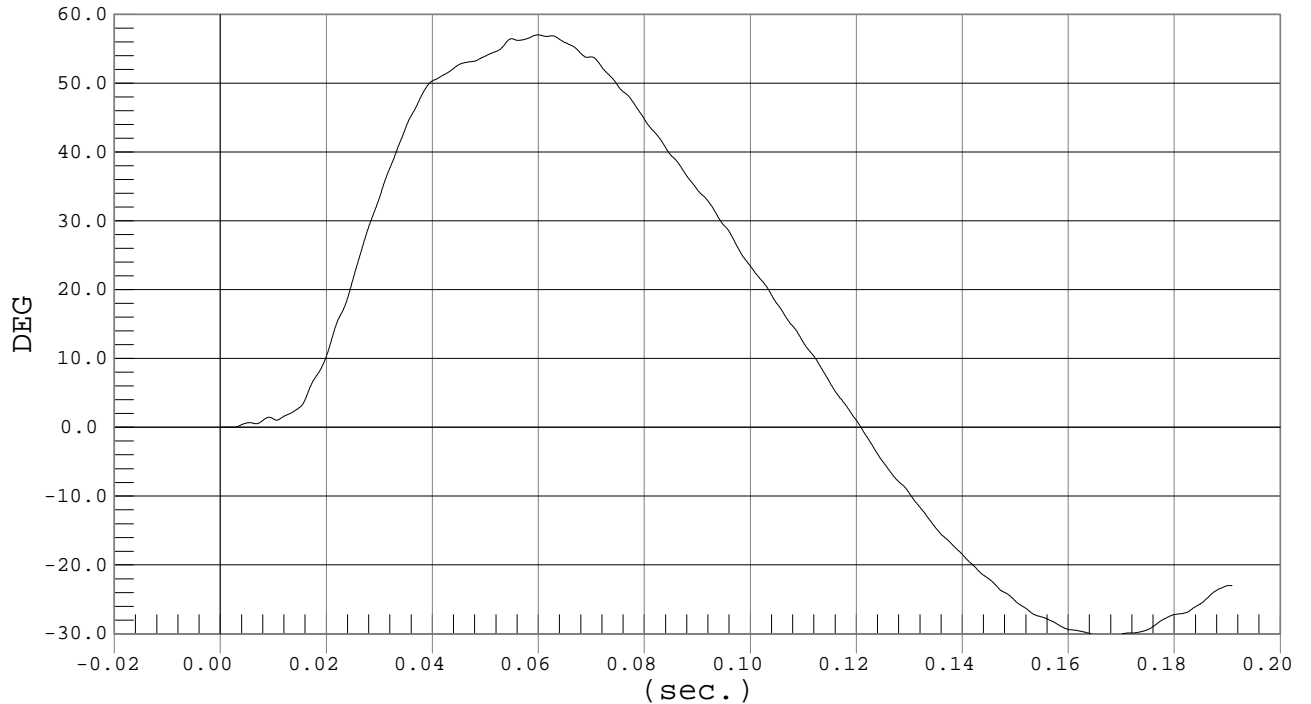


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 07-08-02
Speed: 11.1 fps, 3.39 M/s

Ymin = -30.29 DEG @ 0.1683 sec., Ymax = 57.01 DEG @ 0.0598 sec.



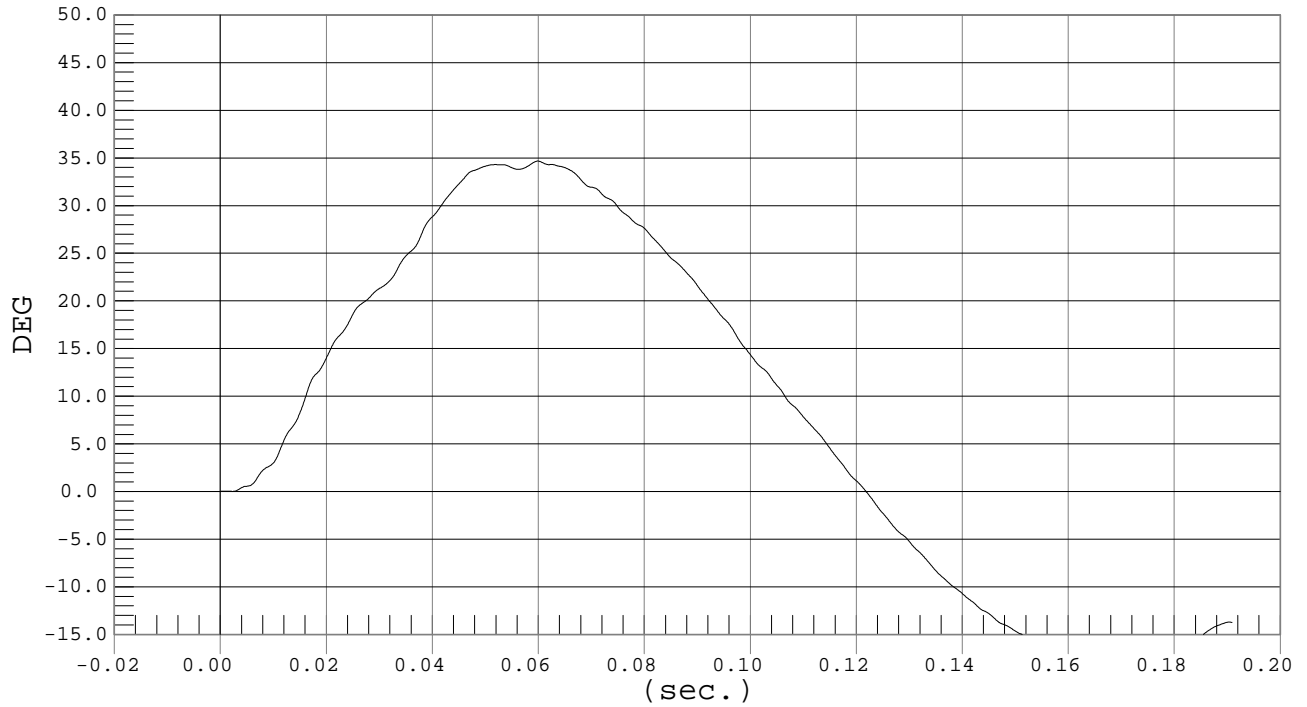


Test Desc.: Neck Bending
Component: Dummy #010

THETA A

Test Date: 07-08-02
Speed: 11.1 fps, 3.39 M/s

Ymin = -17.8 DEG @ 0.1684 sec., Ymax = 34.67 DEG @ 0.0598 sec.

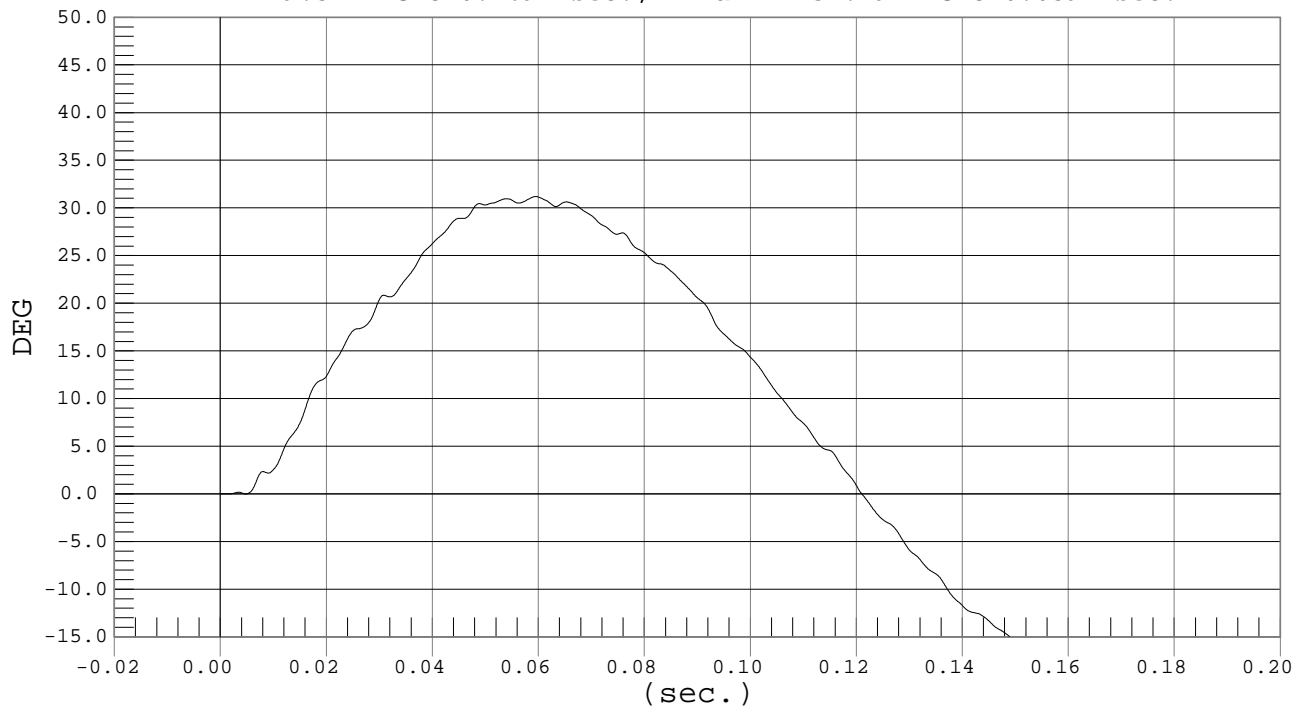


Test Desc.: Neck Bending
Component: Dummy #010

THETA B

Test Date: 07-08-02
Speed: 11.1 fps, 3.39 M/s

Ymin = -19.52 DEG @ 0.1691 sec., Ymax = 31.19 DEG @ 0.0594 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 7/3/02
Dummy Serial Number: 010
Test Number: D02873

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	49
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	10.1
Time of Max. Pendulum Acceleration	msec	26.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

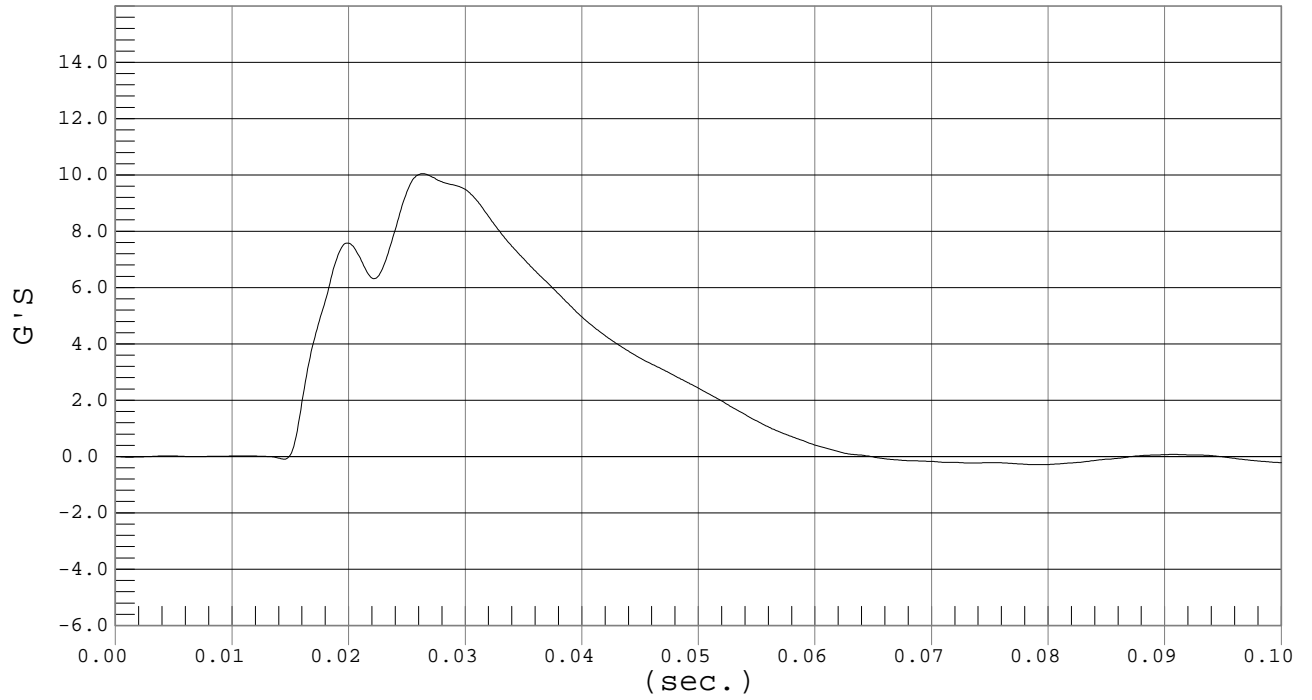


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #010

Test Date: 07-03-02
Speed: 14.0 fps, 4.28 M/s

Ymin = -.36 G'S @ 0.1165 sec., Ymax = 10.05 G'S @ 0.0263 sec.



MGA RESEARCH CORPORATION
 UPPER/MIDDLE/LOWER RIB TESTS
 EUROSID 2 DUMMY

Date: 7/3/02
 Dummy Serial Number: 010
 Test Number: D02874/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.9
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	26.2
Displacement at 3 m/s	36.0 – 40.0 mm	37.9
Displacement at 4 m/s	46.0 – 51.0 mm	49.7

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.9
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	25.2
Displacement at 3 m/s	36.0 – 40.0 mm	38.9
Displacement at 4 m/s	46.0 – 51.0 mm	50.5

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.9
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	25.4
Displacement at 3 m/s	36.0 – 40.0 mm	38.0
Displacement at 4 m/s	46.0 – 51.0 mm	49.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

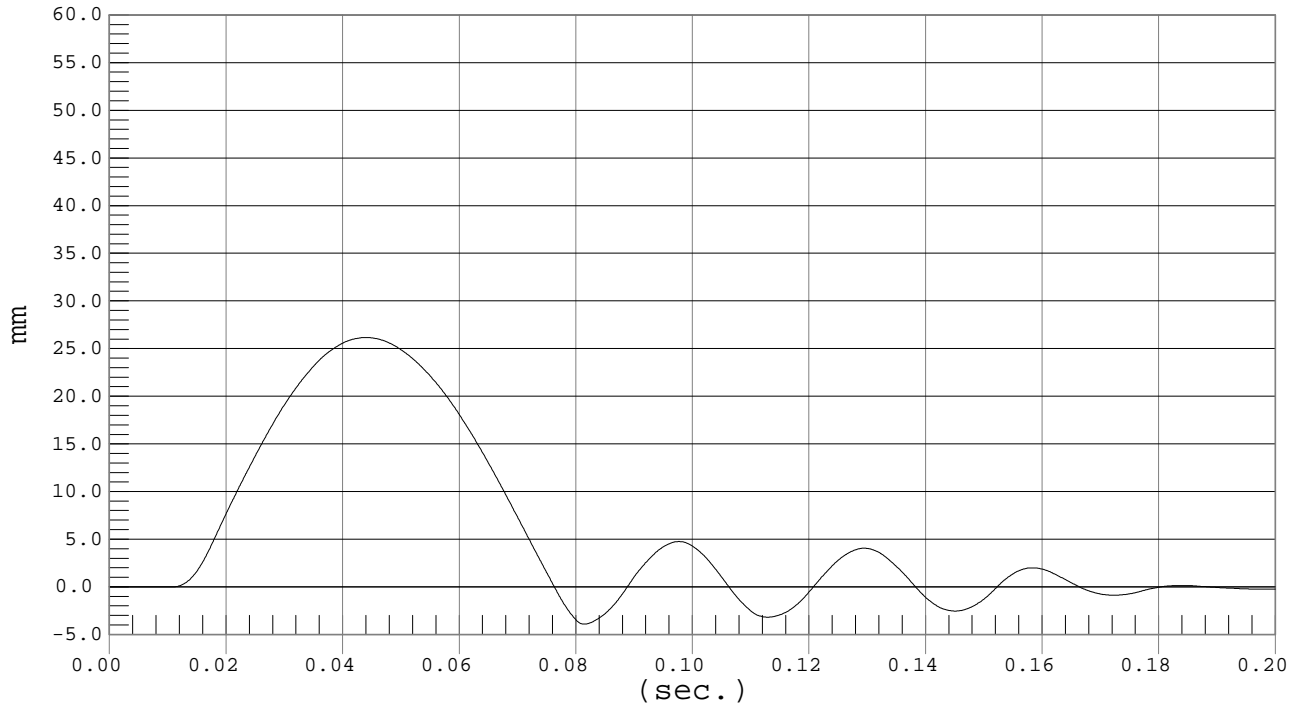


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.92 mm @ 0.0813 sec., Ymax = 26.16 mm @ 0.0439 sec.

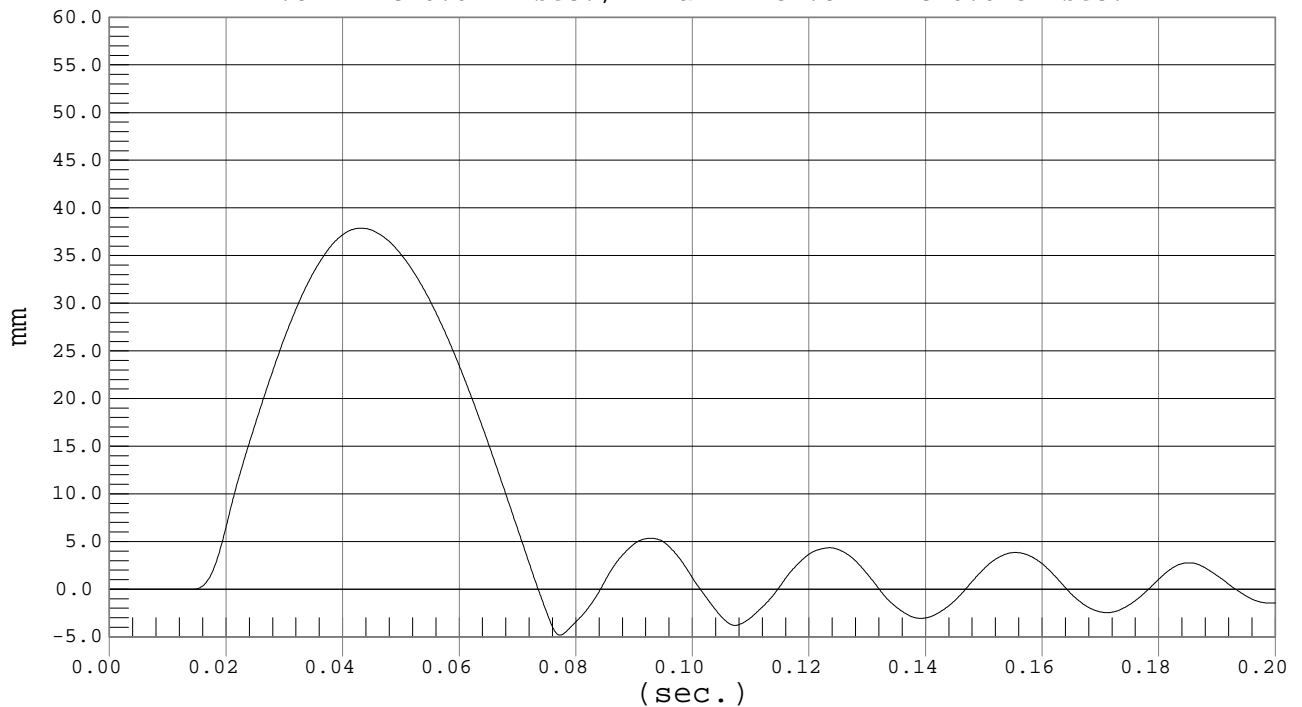


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.82 mm @ 0.0772 sec., Ymax = 37.87 mm @ 0.0431 sec.



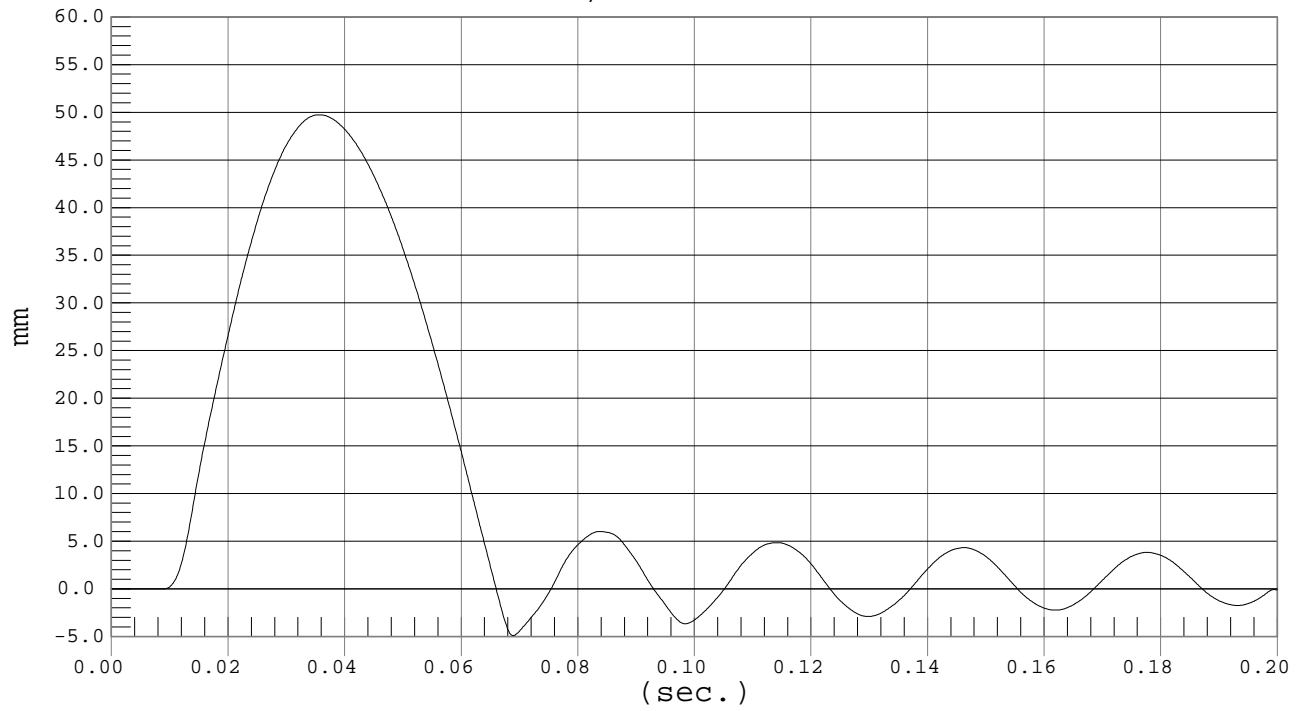


Test Desc.: Rib Module
Component: Dummy #010

UPPER RIB DISPLACEMENT

Test Date: 07-08-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.9 mm @ 0.0688 sec., Ymax = 49.74 mm @ 0.0355 sec.



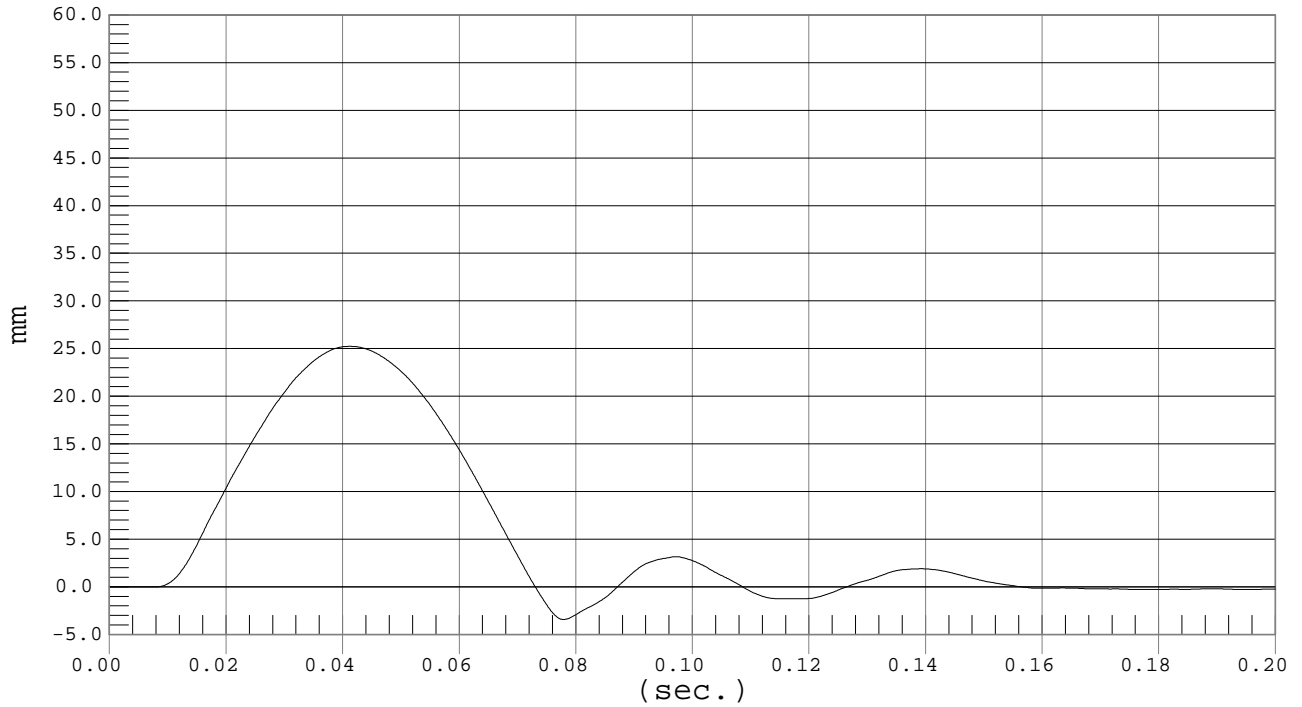


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.43 mm @ 0.0778 sec., Ymax = 25.24 mm @ 0.0411 sec.

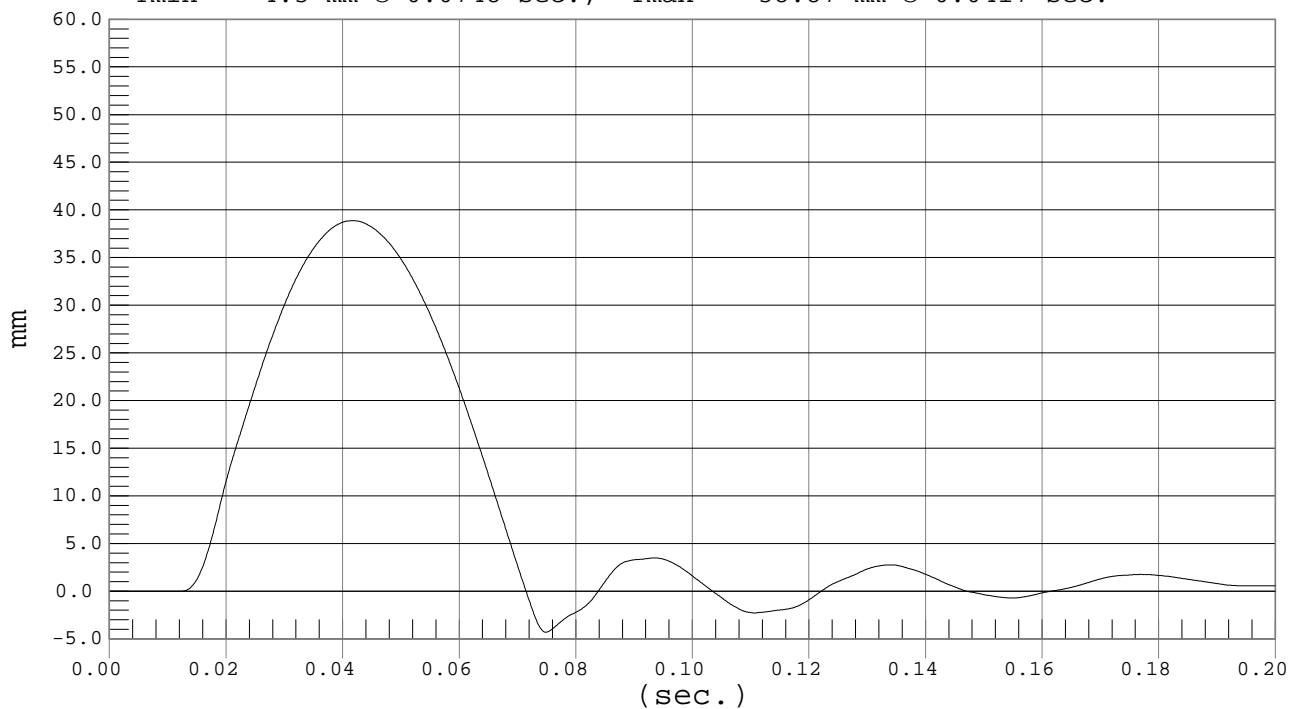


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.3 mm @ 0.0748 sec., Ymax = 38.87 mm @ 0.0417 sec.



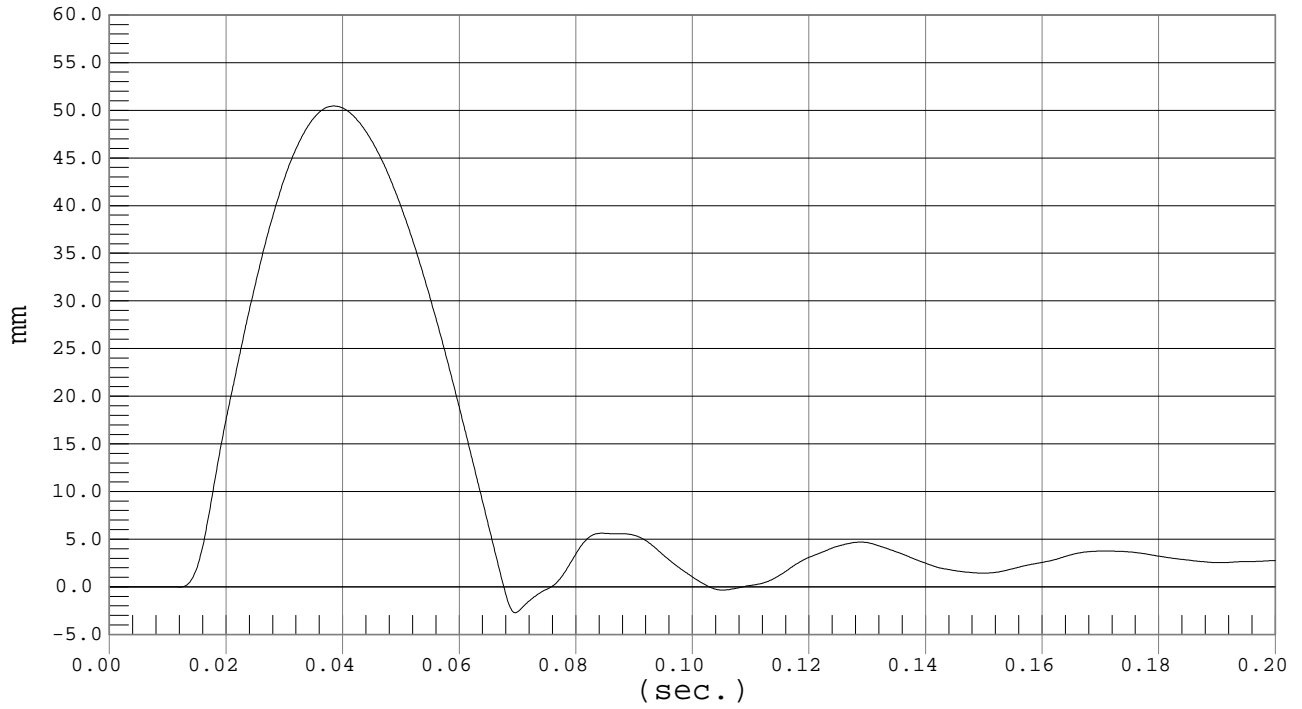


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -2.71 mm @ 0.0695 sec., Ymax = 50.45 mm @ 0.0384 sec.



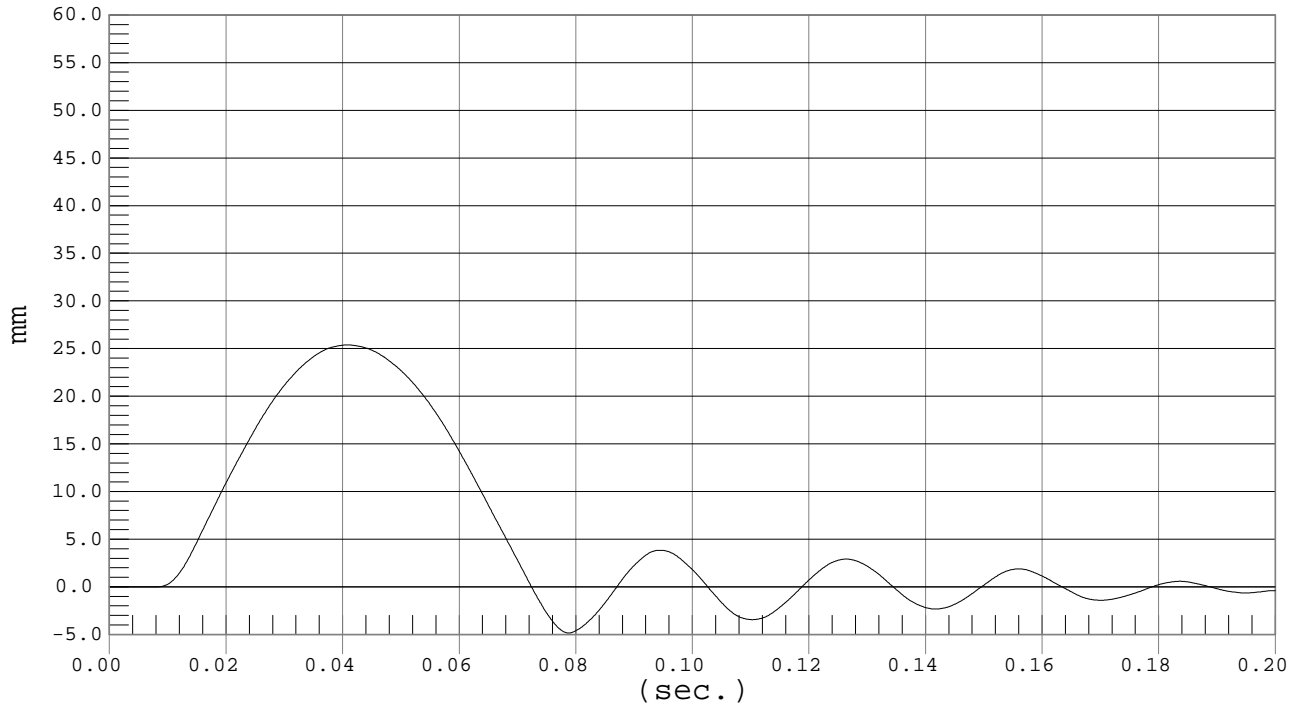


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -4.84 mm @ 0.0787 sec., Ymax = 25.38 mm @ 0.0408 sec.

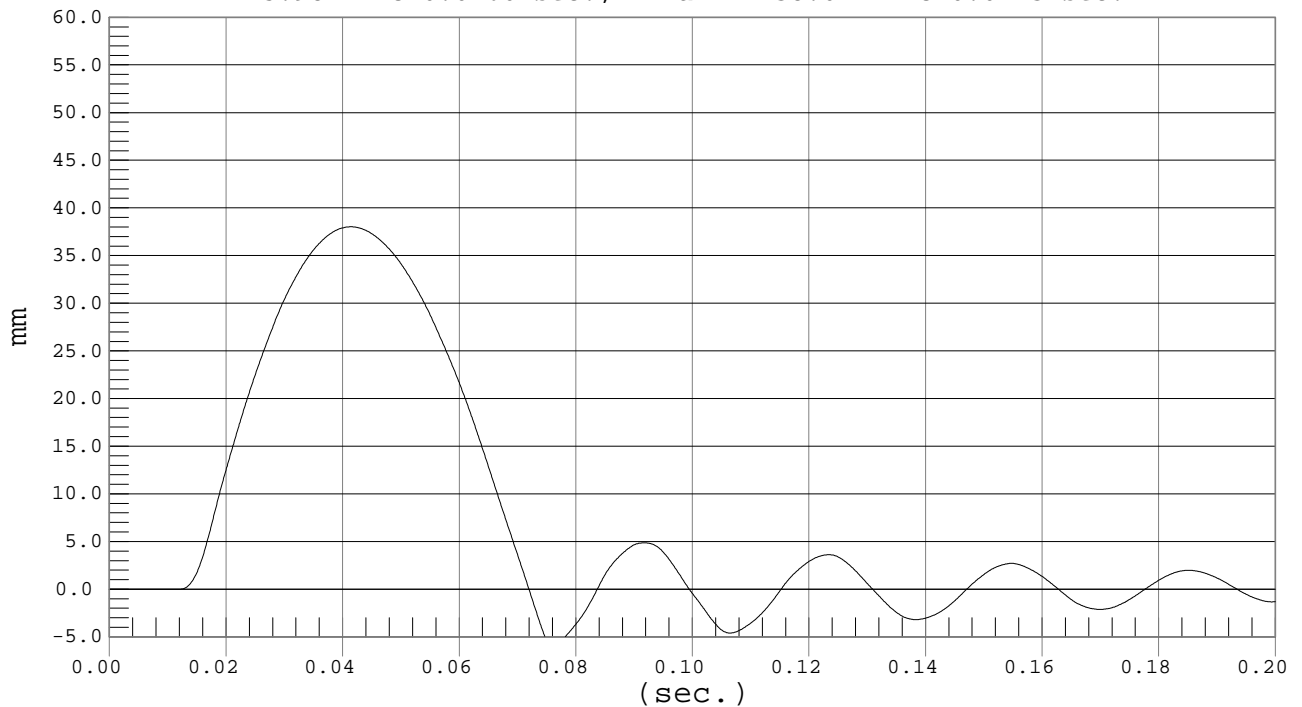


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.98 mm @ 0.0760 sec., Ymax = 38.02 mm @ 0.0413 sec.



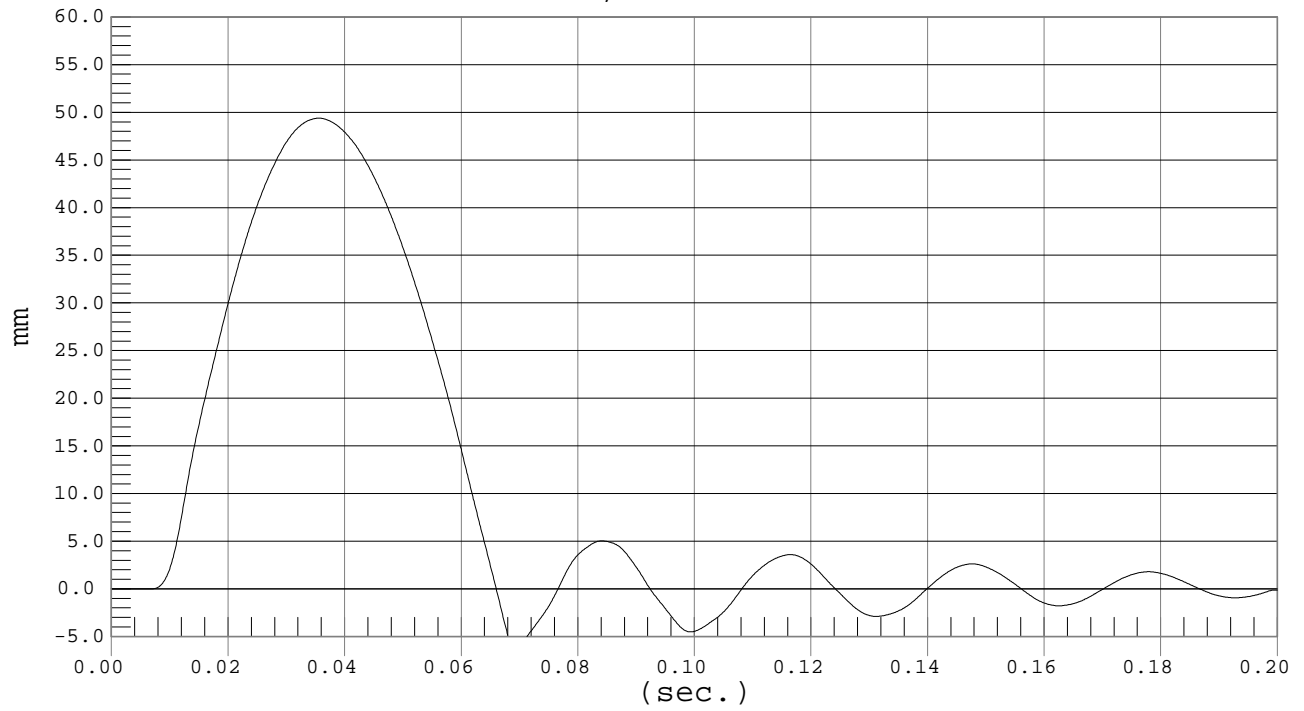


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-08-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.38 mm @ 0.0692 sec., Ymax = 49.39 mm @ 0.0355 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 7/3/02
Dummy Serial Number: 010
Test Number: D02877

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	49
Probe Speed (m/s)	3.90 – 4.10	4.00
Maximum Impact Force	4.00 – 4.80 kN	4.73
Time of Maximum Force	10.60 – 13.00 ms	12.70
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.33
Time of Max. Total Force	10.00 – 12.30 ms	12.10

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

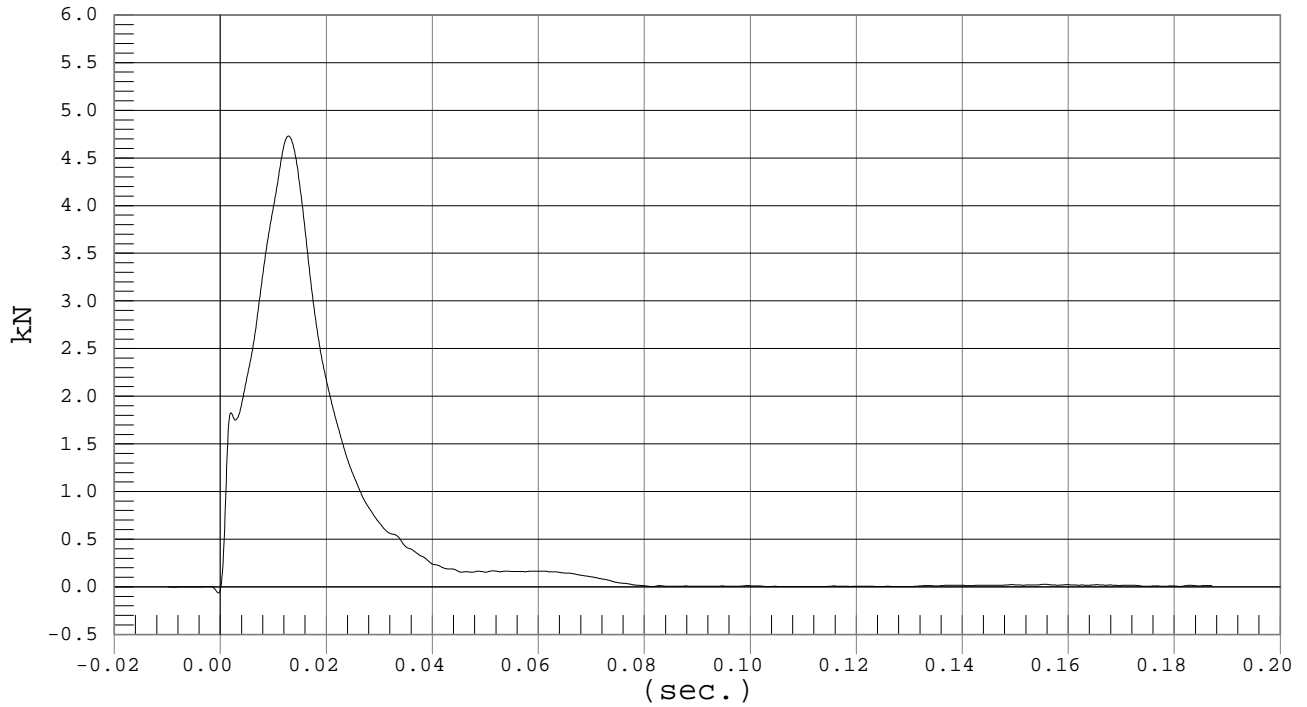


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 07-03-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -.06 kN @ -0.0005 sec., Ymax = 4.73 kN @ 0.0127 sec.

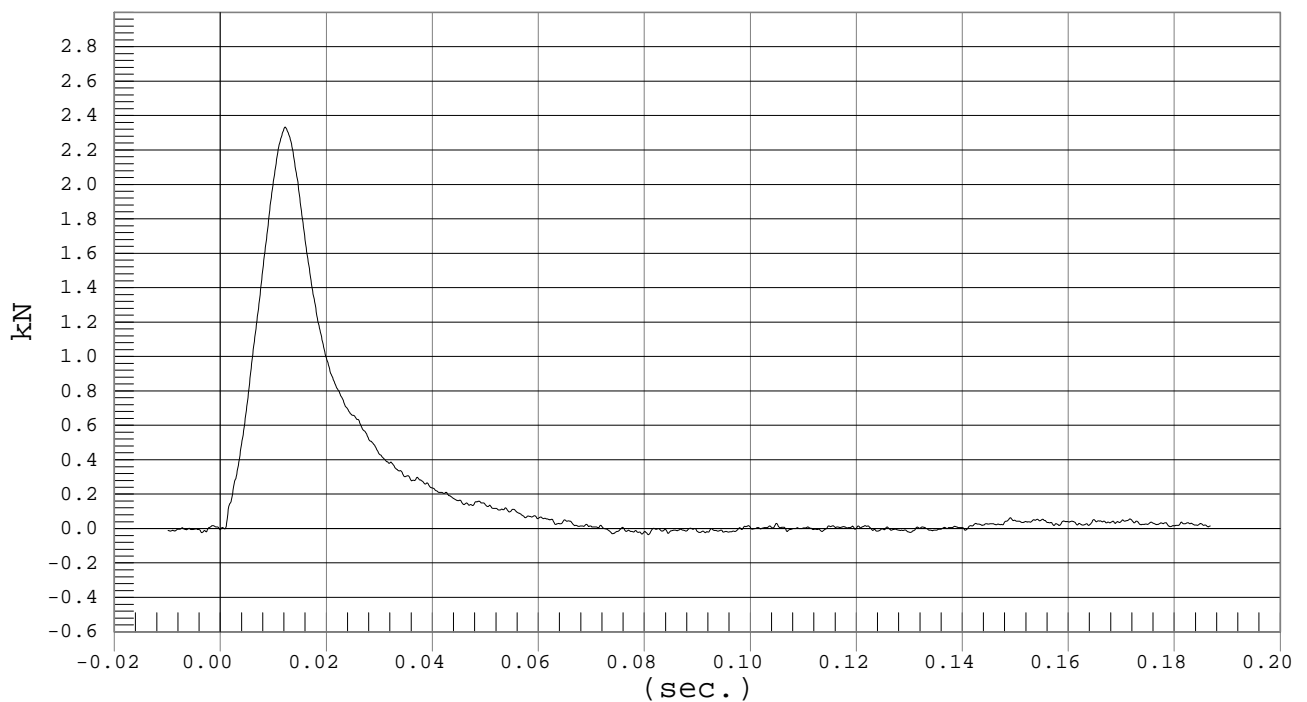


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 07-03-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -.04 kN @ 0.0807 sec., Ymax = 2.33 kN @ 0.0121 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 7/8/02
 Dummy Serial Number: 010
 Test Number: D02878

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.8
Relative Humidity (%)		10 – 70	59
Pendulum Speed		5.95 – 6.15	6.12
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-1.95
	20 msec	-5.25 - -4.07 m/sec	-4.44
	25 msec	-6.64 - -5.30 m/sec	-5.54
	30 msec	≥ -6.5 m/sec	-6.20
Maximum Flexion Angle		45.0 – 55.0 deg	50.4
Time of Max. Flexion Angle		39.0 – 53.0 ms	47.6
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.8
Time of Max. Theta (A)		44.0 – 52.0 ms	47.4
Maximum Angle Theta (B)		27.44– 29.94 deg	28.04
Time of Max. Theta (B)		44.0 – 52.0 ms	48.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

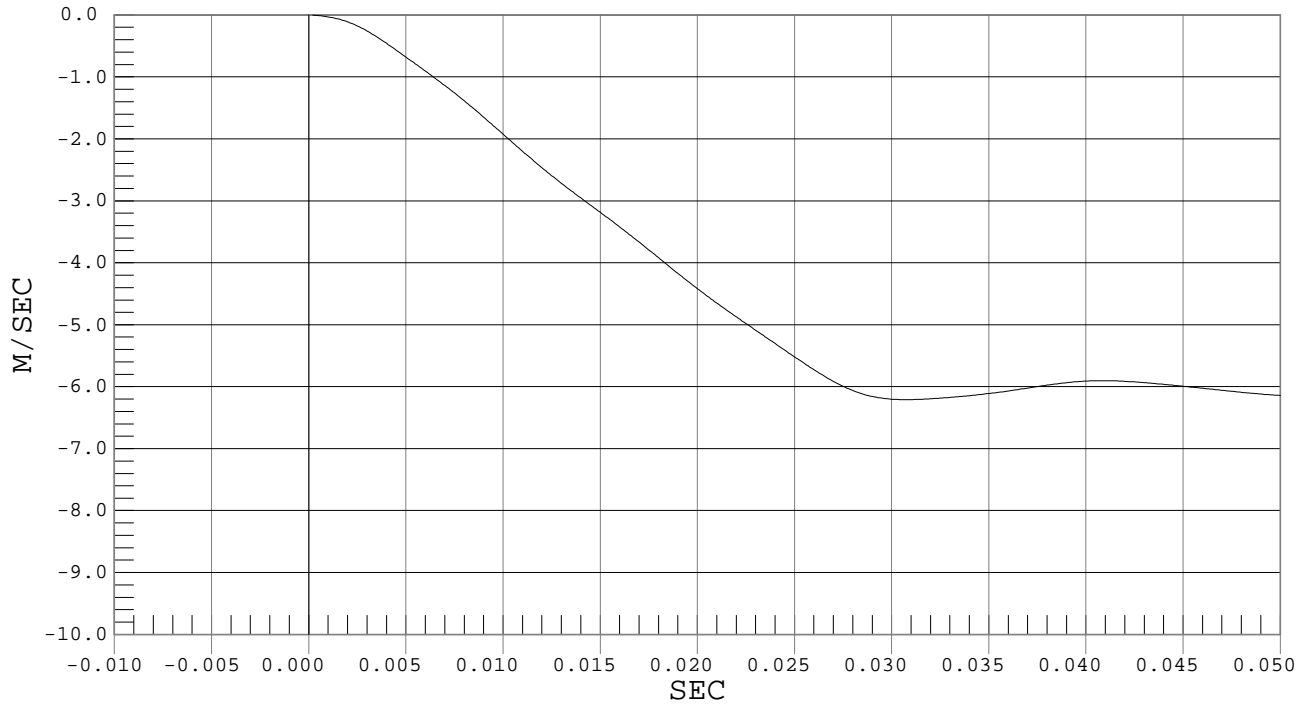


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 07-08-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -7.51 M/SEC @ 0.1445 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

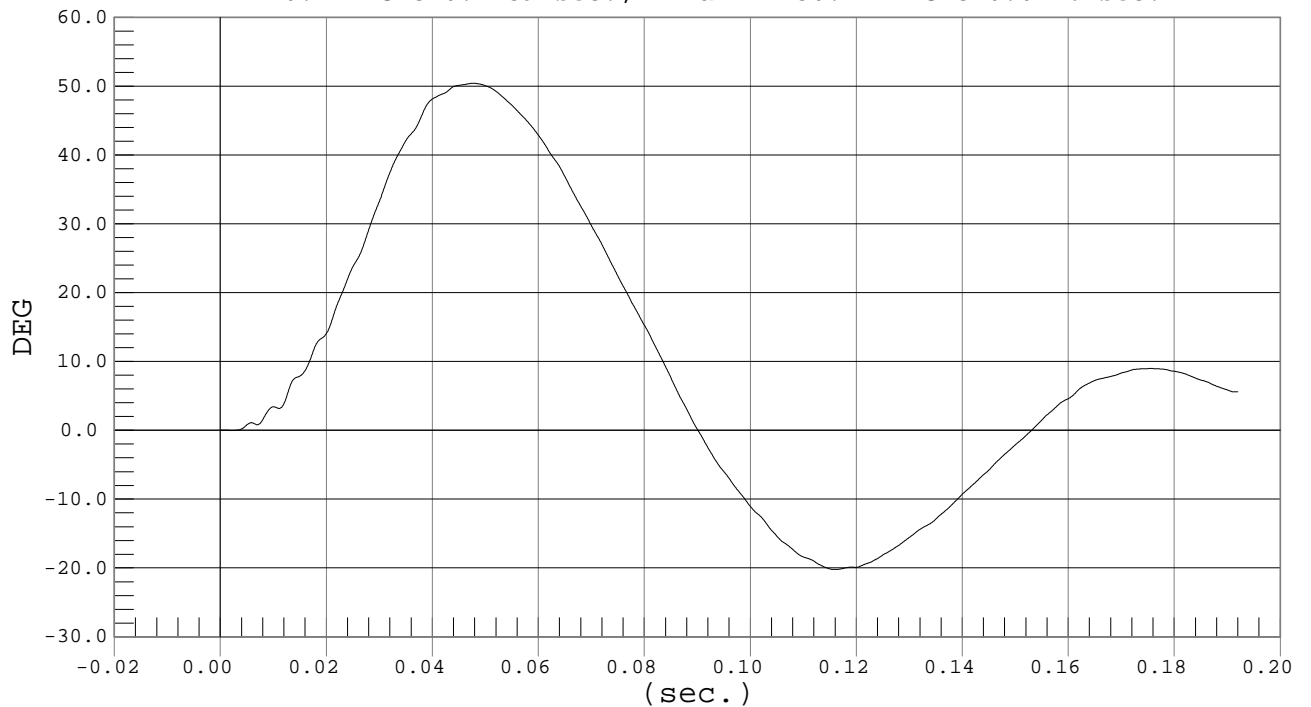


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 07-08-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -20.2 DEG @ 0.1159 sec., Ymax = 50.41 DEG @ 0.0476 sec.



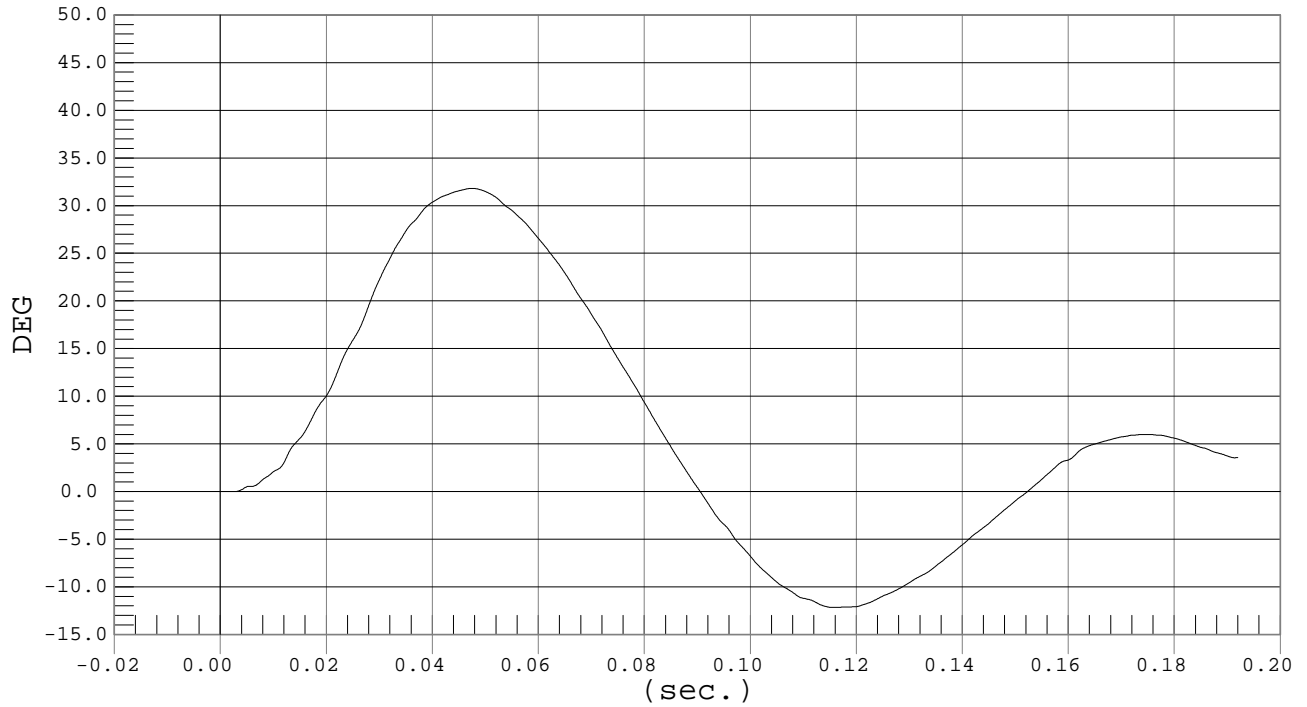


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA A

Test Date: 07-08-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -12.17 DEG @ 0.1154 sec., Ymax = 31.81 DEG @ 0.0474 sec.

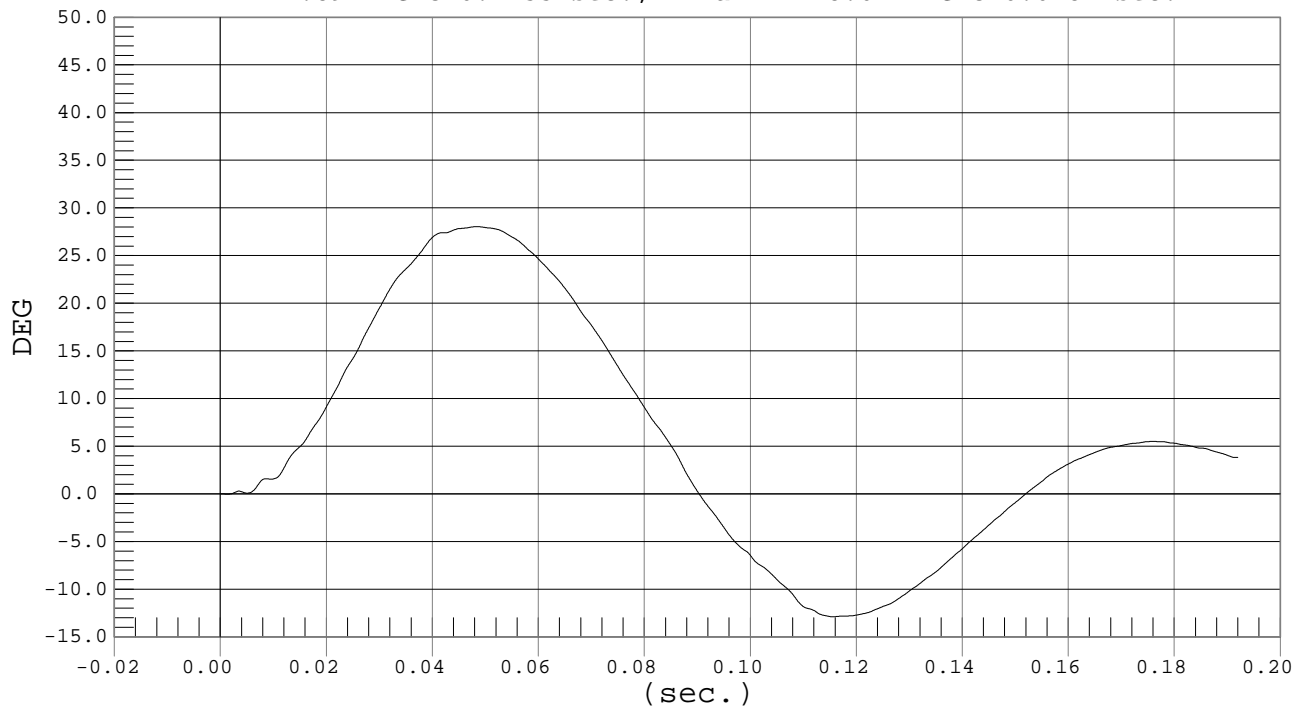


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA B

Test Date: 07-08-02
Speed: 20.1 fps, 6.12 M/s

Ymin = -12.89 DEG @ 0.1155 sec., Ymax = 28.04 DEG @ 0.0484 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 7/3/02
Dummy Serial Number: 010
Test Number: D02869

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	49
Pendulum Speed	6.20 – 6.30 m/s	6.25
Maximum Impactor Force	9.80 – 12.20 kN	10.44
Time of Max. Impactor Force	9.50 – 12.50 ms	11.30
Maximum Pubic Force	2.65 – 3.35 kN	3.06
Time of Max. Pubic Force	10.00 – 13.00 ms	11.60

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

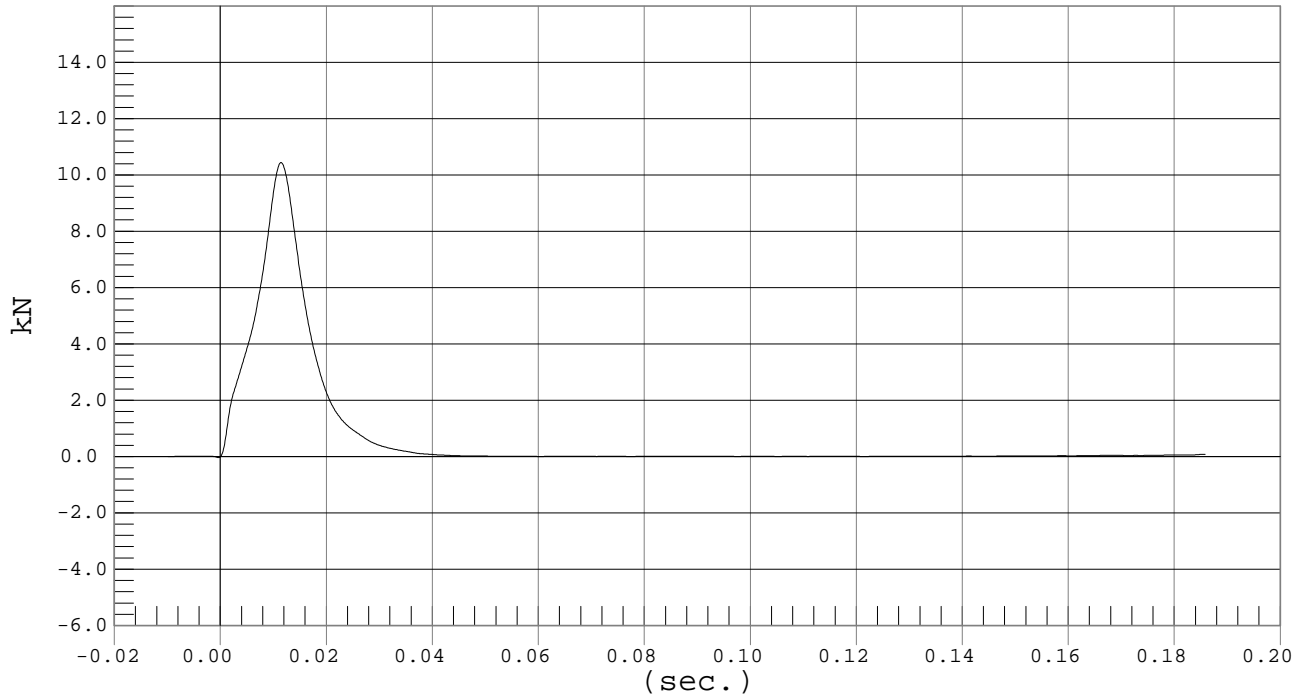


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #010

Test Date: 07-03-02
Speed: 20.5 fps, 6.25 M/s

Ymin = -.03 kN @ -0.0005 sec., Ymax = 10.44 kN @ 0.0113 sec.

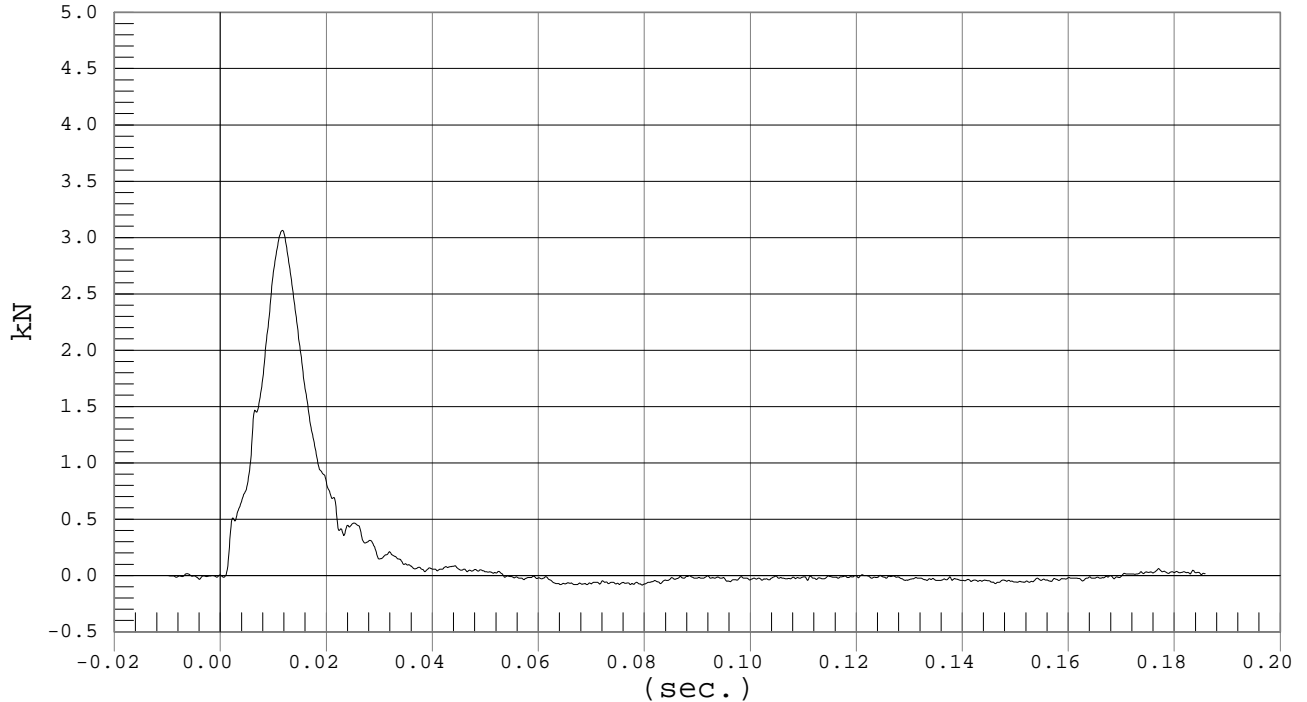


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #010

Test Date: 07-03-02
Speed: 20.5 fps, 6.25 M/s

Ymin = -.08 kN @ 0.0795 sec., Ymax = 3.06 kN @ 0.0116 sec.



CERTIFICATION DATA

Dummy Serial Number: 010

Calibration Test Results Summary

Dummy Serial Number: 010

Post-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 7/10/02

Dummy Serial Number: 010

Test Number: D02881

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.3
Relative Humidity (%)	10 – 70	55
Peak Resultant Acceleration	100 – 150 g's	137
Time of Max. Res. Acceleration	msec	24.1

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

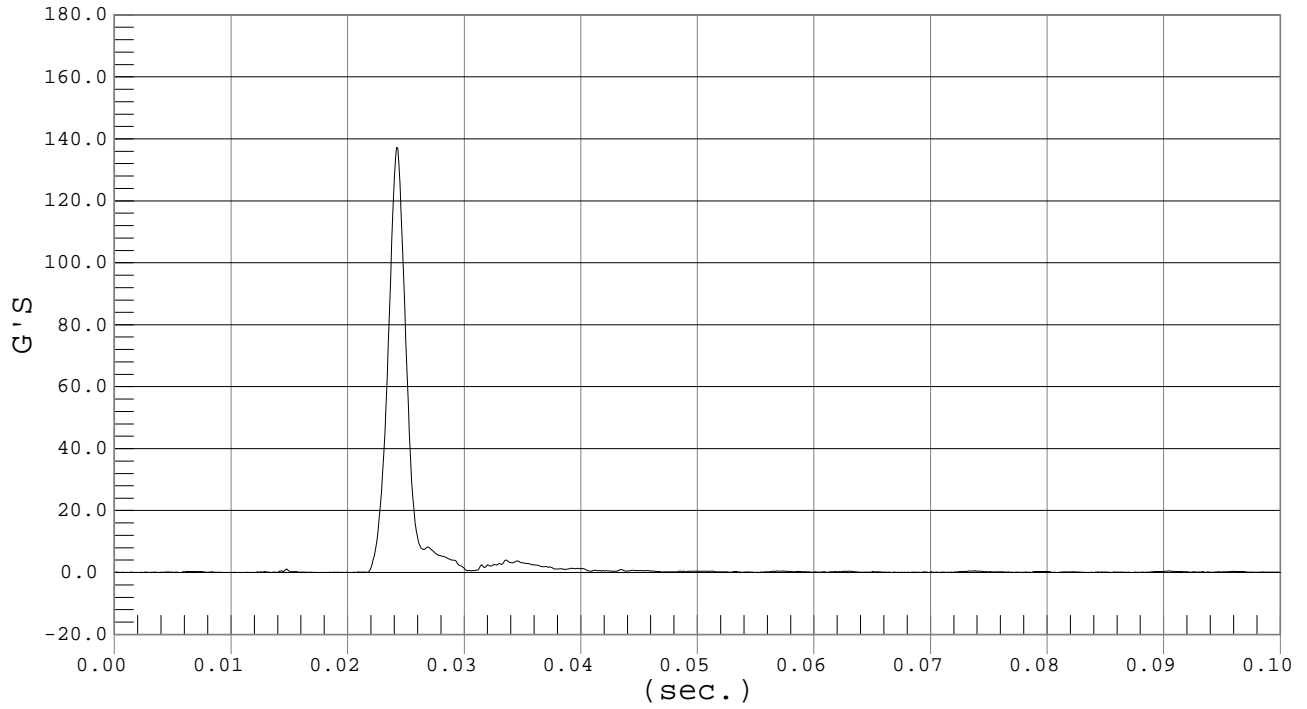


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #010

Test Date: 07-10-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .04 G'S @ 0.0003 sec., Ymax = 137.22 G'S @ 0.0241 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 7/10/02

Dummy Serial Number: 010

Test Number: D02882

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.3
Relative Humidity (%)		10 – 70	56
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.32
	8 msec	~1.59 - ~2.04 m/sec	-1.73
	14 msec	~3.20 - ~3.85 m/sec	-3.46
Maximum Flexion Angle		49.0 – 59.0 deg	57.5
Time of Max. Flexion Angle		54.0 – 66.0 ms	58.8
Maximum Angle Theta (A)		32.0 – 37.0 deg	36.0
Time of Max. Theta (A)		53.0 – 63.0 ms	58.4
Maximum Angle Theta (B)		30.91 – 33.41 deg	31.78
Time of Max. Theta (B)		54.0 – 64.0 ms	57.9

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

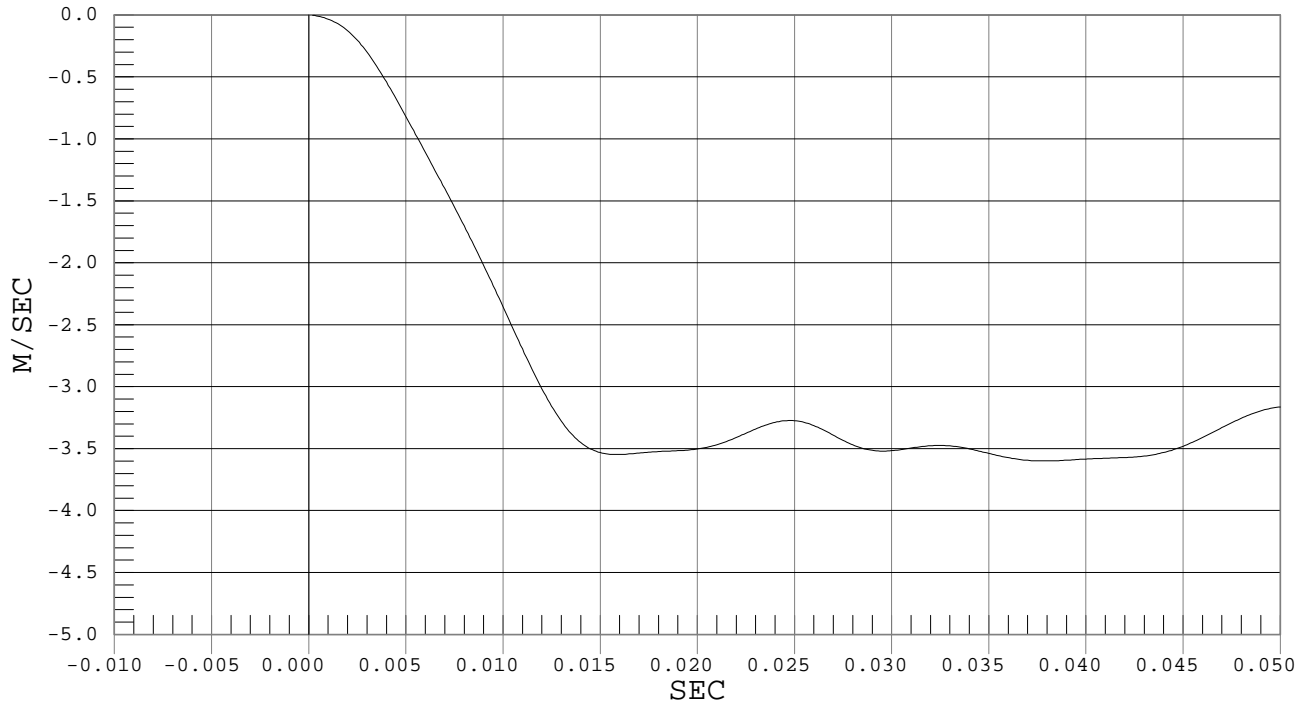


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 07-10-02
Speed: 11.2 fps, 3.40 M/s

Ymin = -4.59 M/SEC @ 0.01905 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

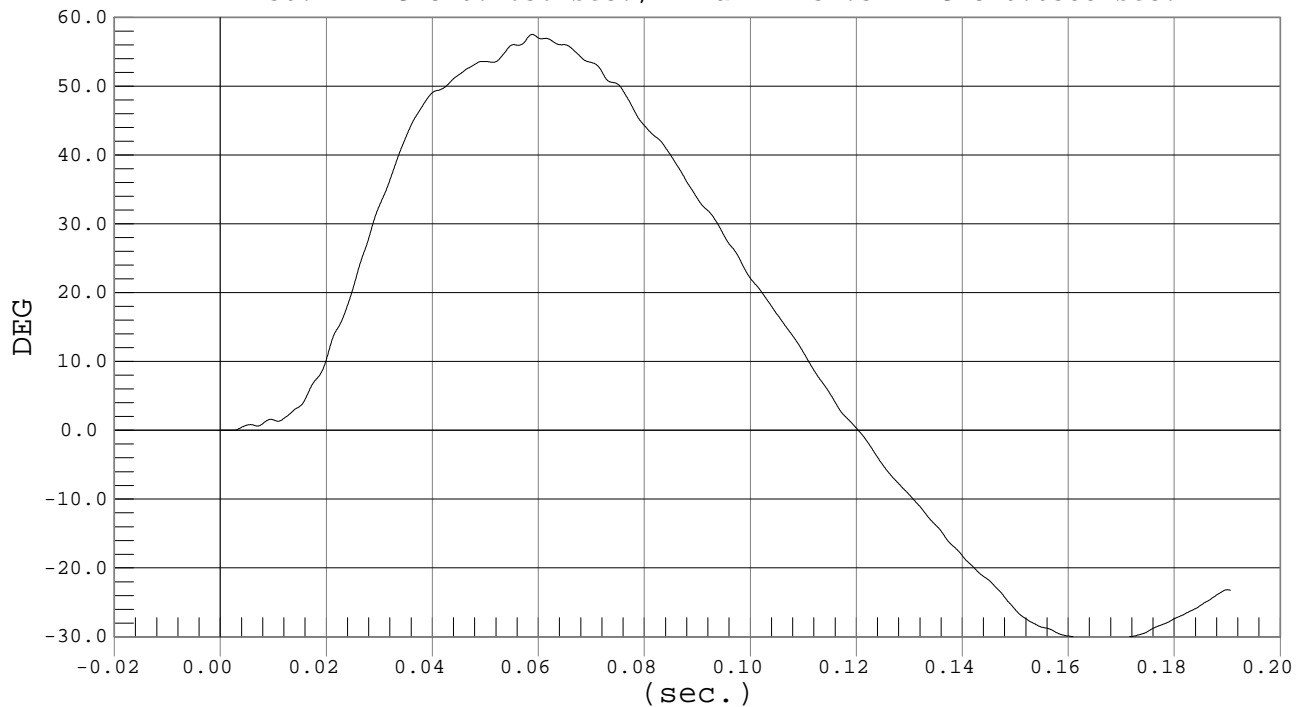


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 07-10-02
Speed: 11.2 fps, 3.40 M/s

Ymin = -30.42 DEG @ 0.1656 sec., Ymax = 57.51 DEG @ 0.0588 sec.



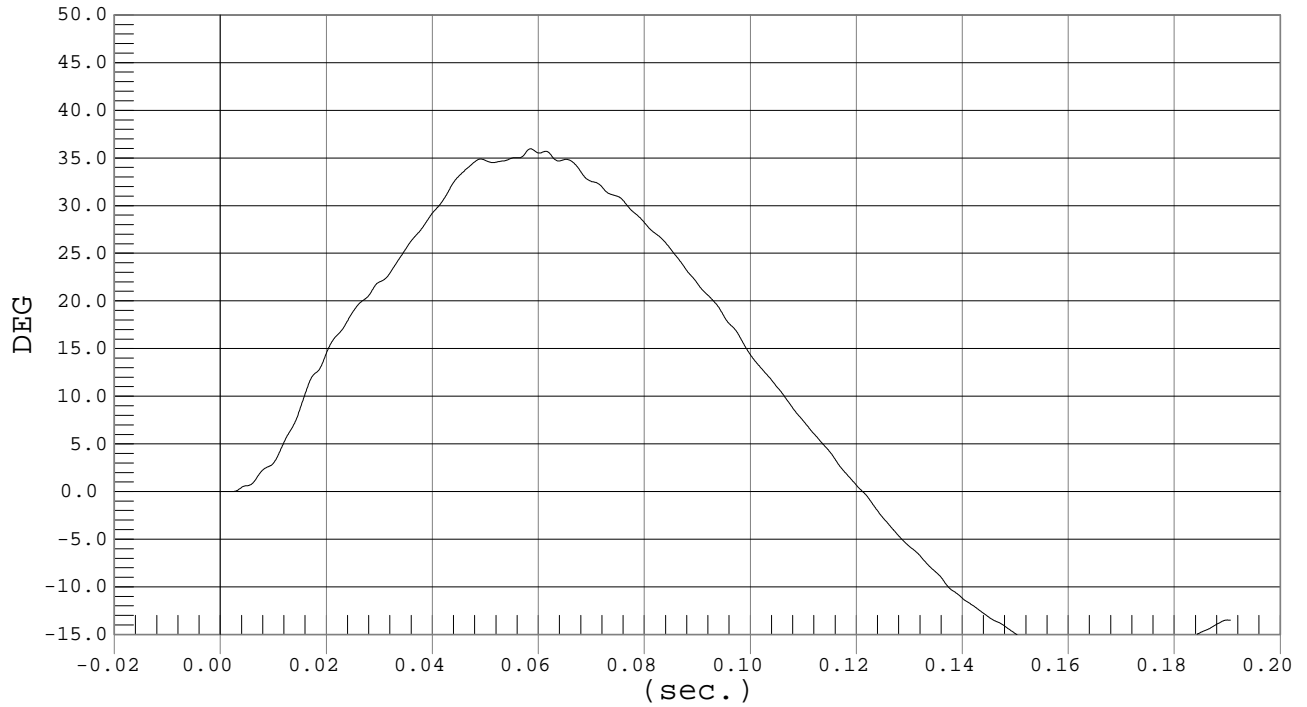


Test Desc.: Neck Bending
Component: Dummy #010

THETA A

Test Date: 07-10-02
Speed: 11.2 fps, 3.40 M/s

Ymin = -17.8 DEG @ 0.1671 sec., Ymax = 35.96 DEG @ 0.0584 sec.

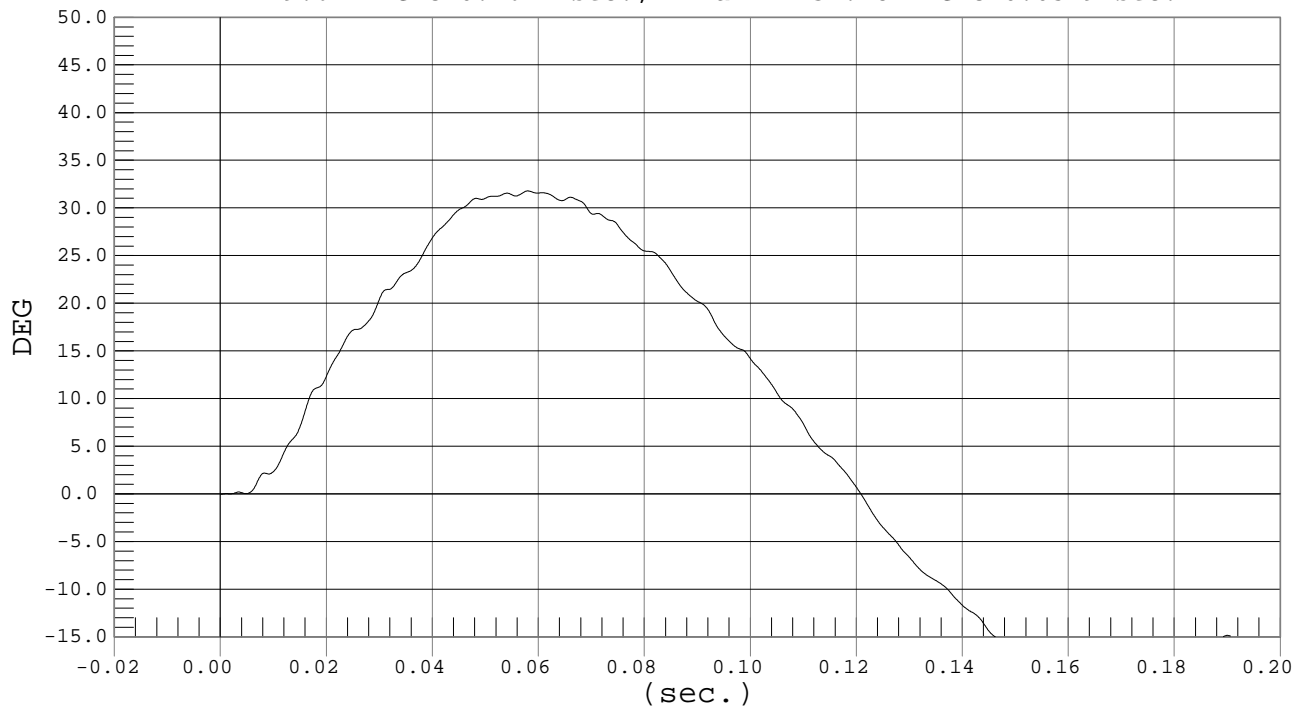


Test Desc.: Neck Bending
Component: Dummy #010

THETA B

Test Date: 07-10-02
Speed: 11.2 fps, 3.40 M/s

Ymin = -19.61 DEG @ 0.1674 sec., Ymax = 31.78 DEG @ 0.0579 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 7/10/02

Dummy Serial Number: 010

Test Number: D02883

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.8
Relative Humidity (%)	10 – 70	50
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	10.0
Time of Max. Pendulum Acceleration	msec	24.6

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

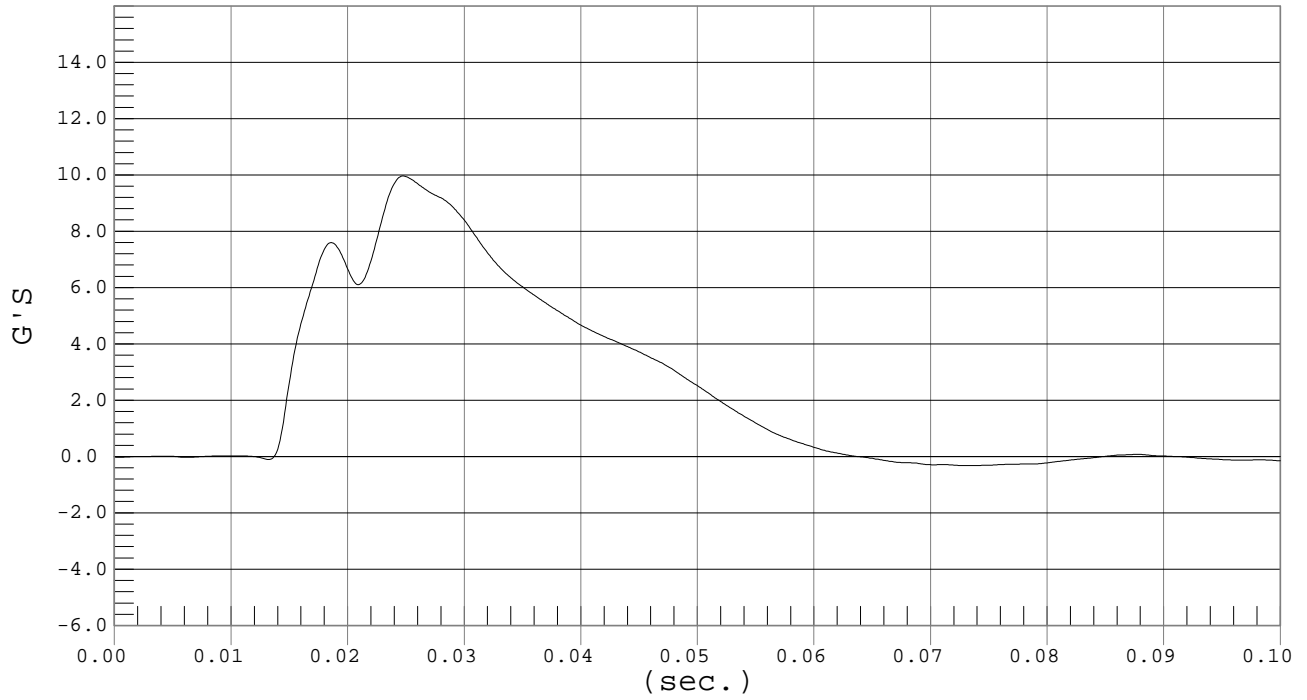


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #010

Test Date: 07-10-02
Speed: 14.1 fps, 4.30 M/s

Ymin = -.32 G'S @ 0.0730 sec., Ymax = 9.96 G'S @ 0.0246 sec.



MGA RESEARCH CORPORATION
 UPPER/MIDDLE/LOWER RIB TESTS
 EUROSID 2 DUMMY

Date: 7/10/02
 Dummy Serial Number: 010
 Test Number: D02884/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.0
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	26.1
Displacement at 3 m/s	36.0 – 40.0 mm	38.1
Displacement at 4 m/s	46.0 – 51.0 mm	51.0

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.0
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	25.3
Displacement at 3 m/s	36.0 – 40.0 mm	38.4
Displacement at 4 m/s	46.0 – 51.0 mm	50.1

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.0
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	24.8
Displacement at 3 m/s	36.0 – 40.0 mm	37.8
Displacement at 4 m/s	46.0 – 51.0 mm	49.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

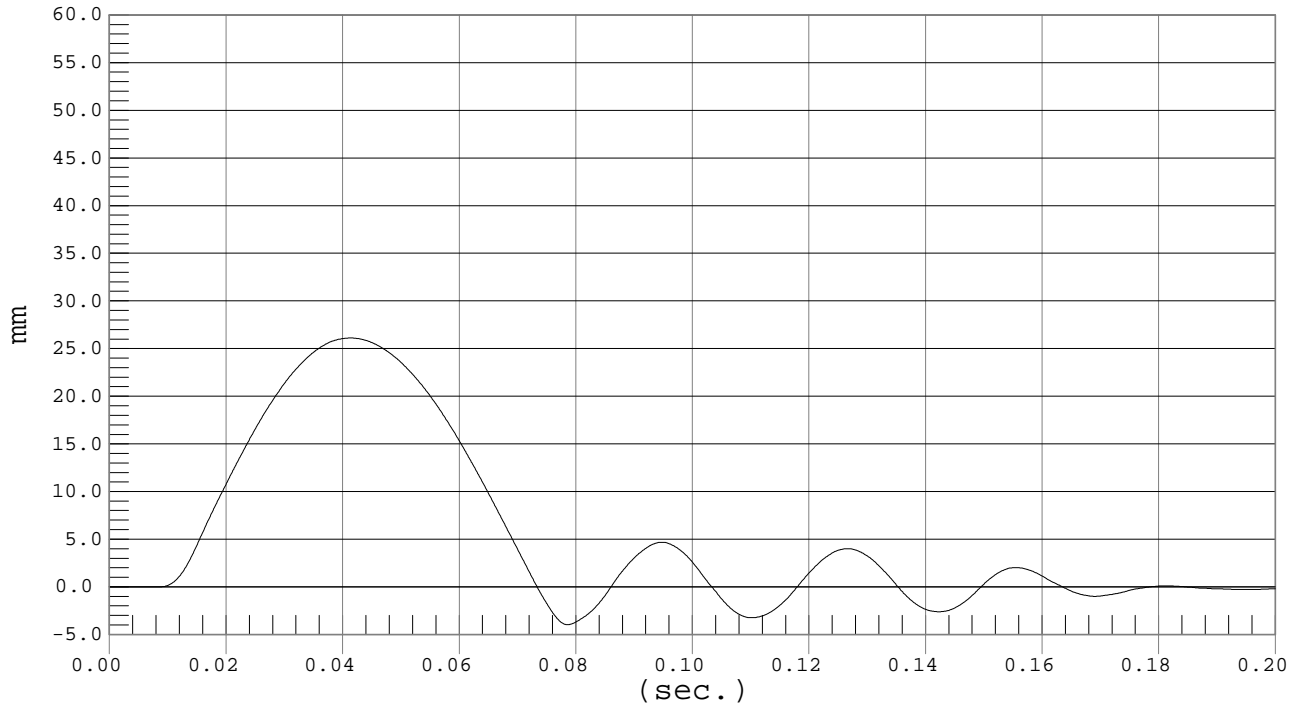


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.97 mm @ 0.0785 sec., Ymax = 26.11 mm @ 0.0413 sec.

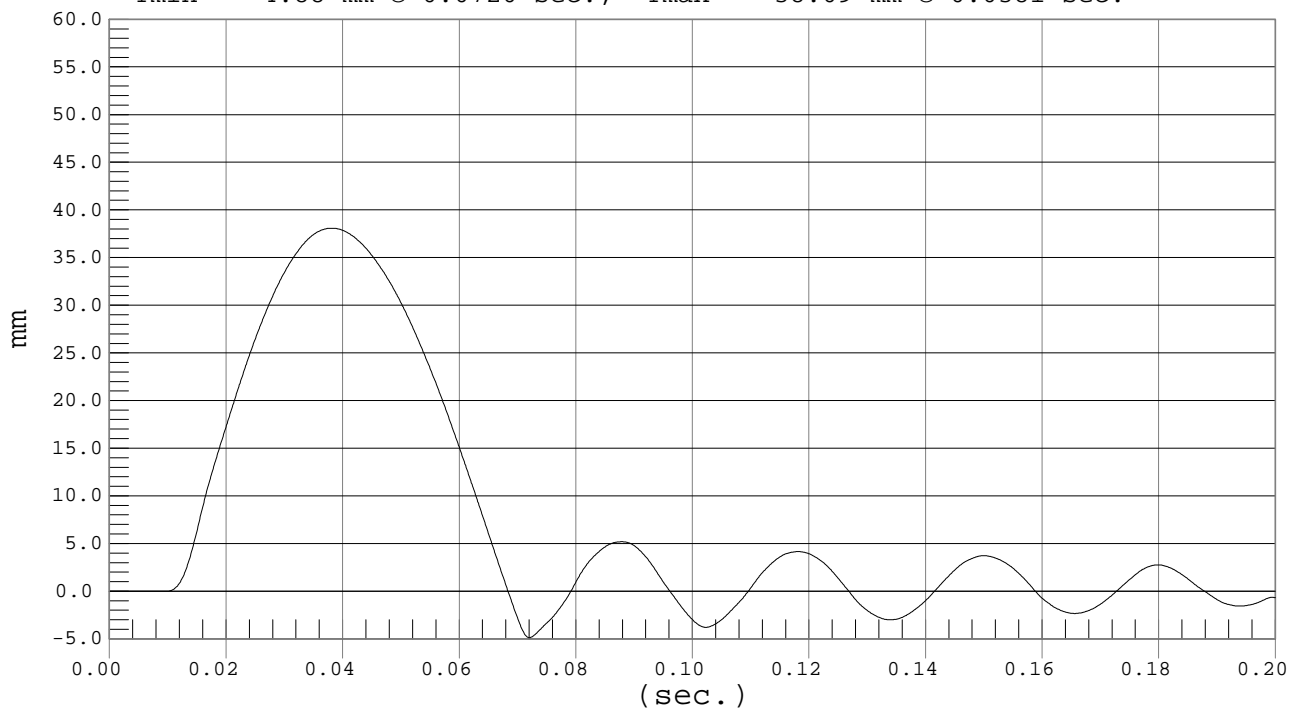


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.88 mm @ 0.0720 sec., Ymax = 38.09 mm @ 0.0381 sec.



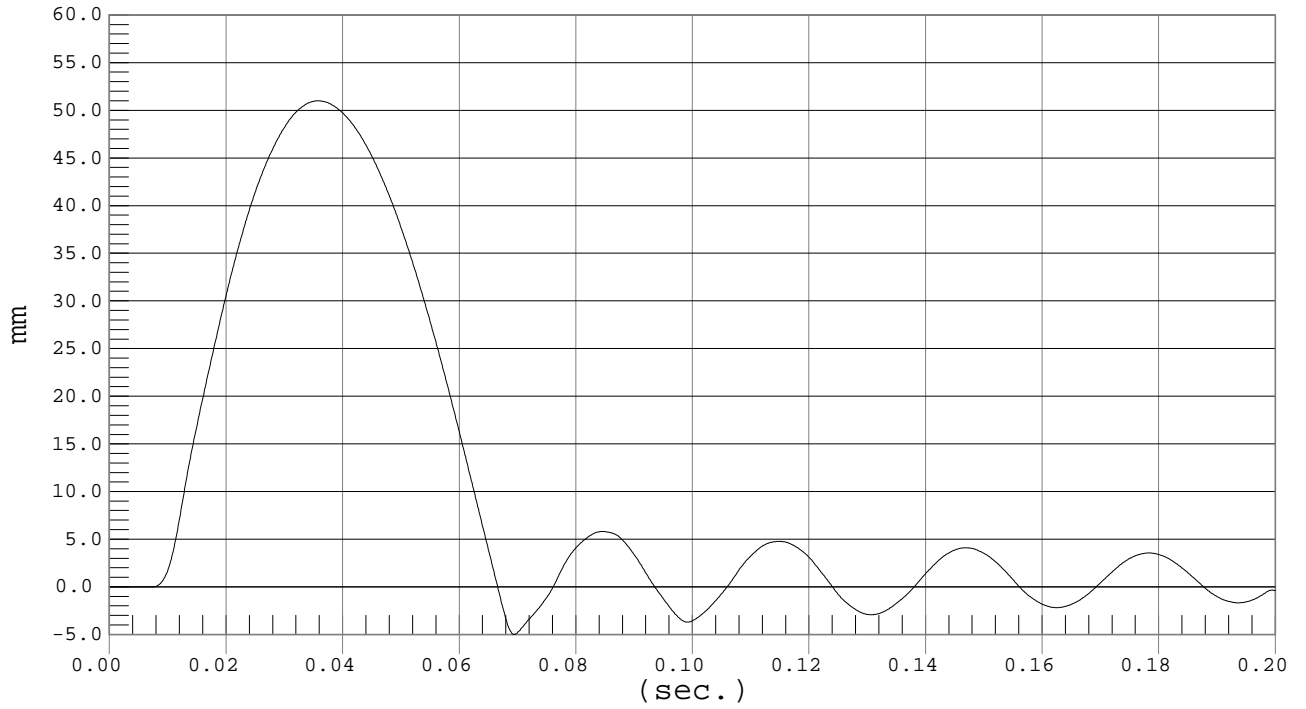


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 13.0 fps, 3.97 M/s

Ymin = -4.98 mm @ 0.0693 sec., Ymax = 50.99 mm @ 0.0357 sec.



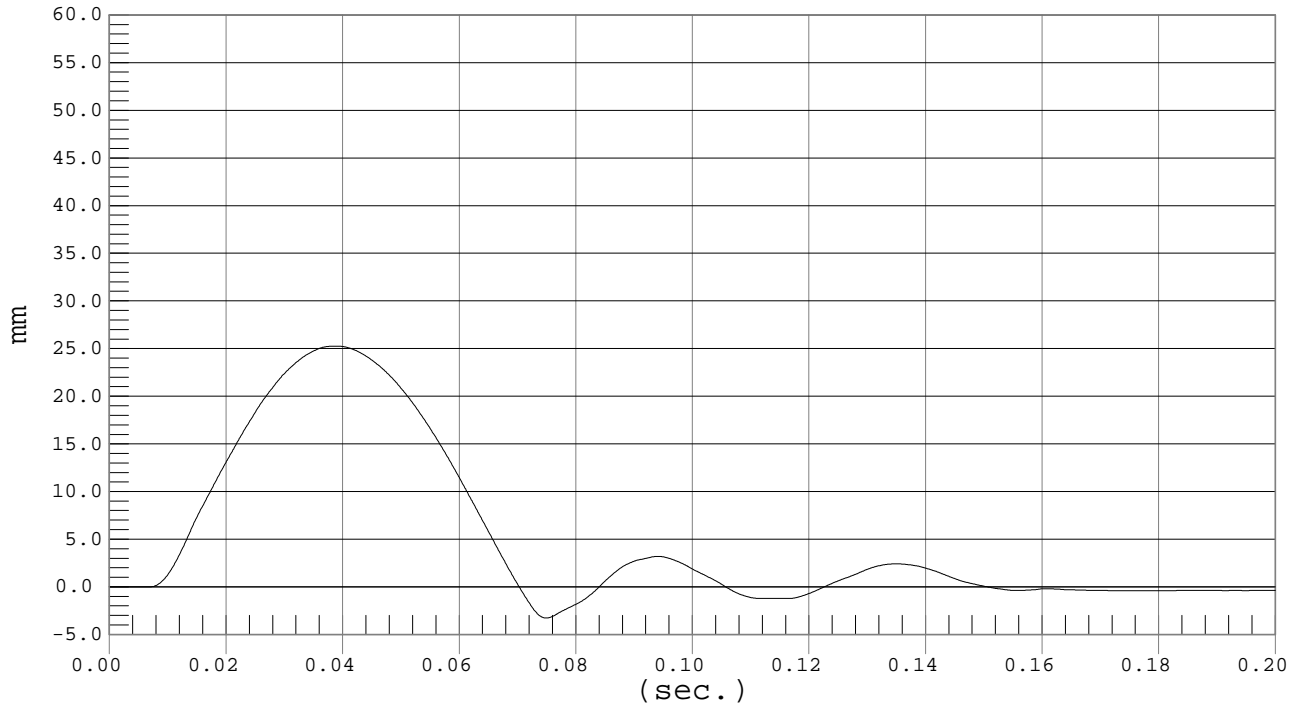


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.27 mm @ 0.0748 sec., Ymax = 25.26 mm @ 0.0385 sec.

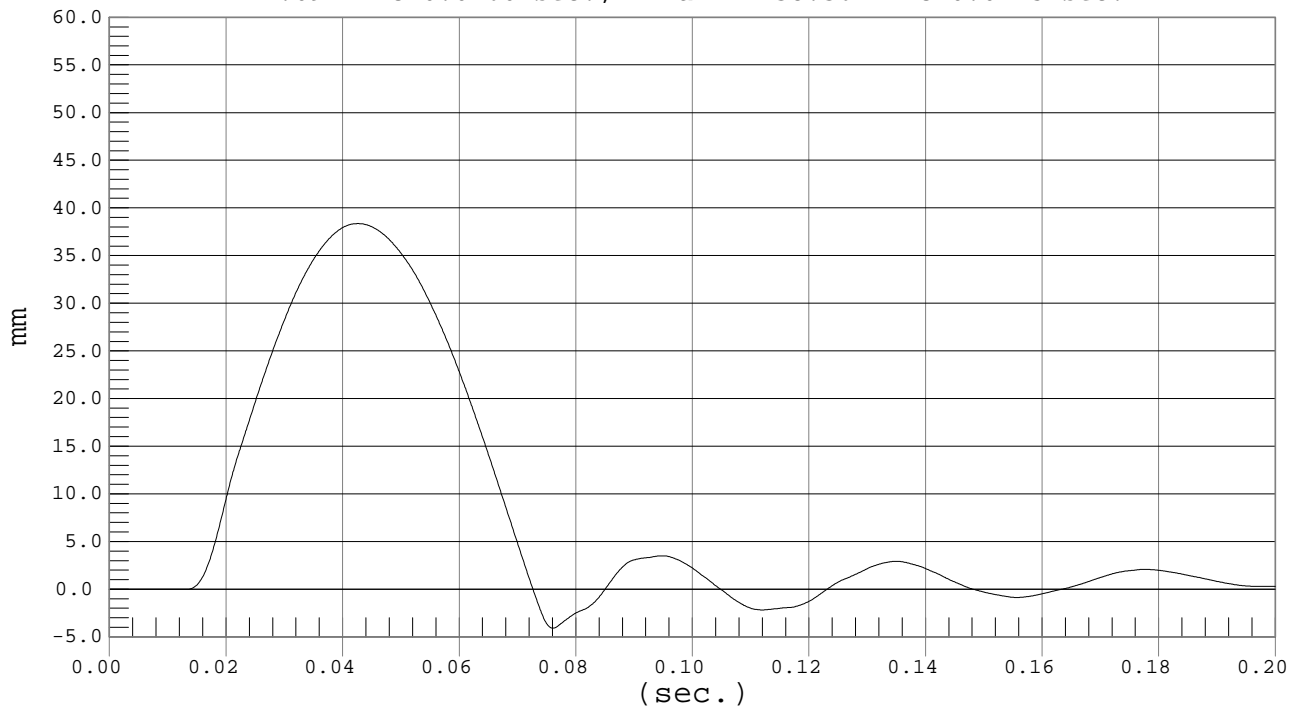


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.09 mm @ 0.0760 sec., Ymax = 38.36 mm @ 0.0425 sec.



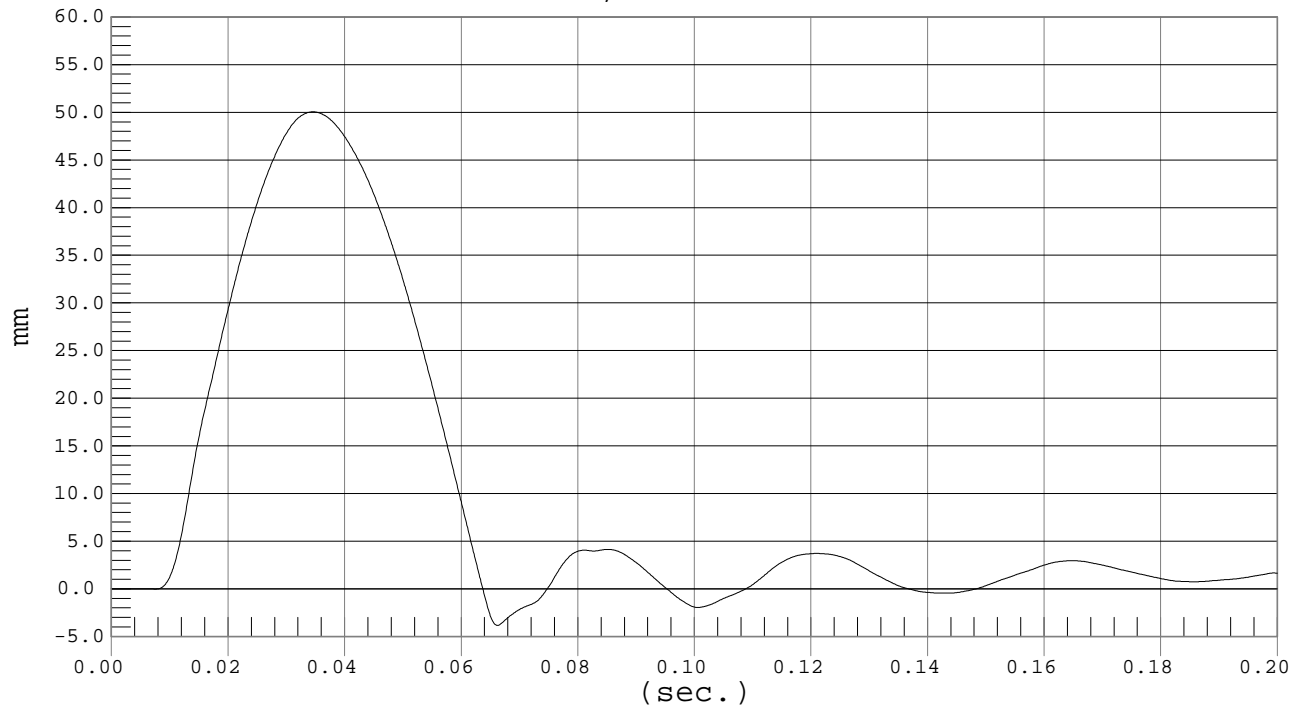


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.83 mm @ 0.0661 sec., Ymax = 50.05 mm @ 0.0345 sec.



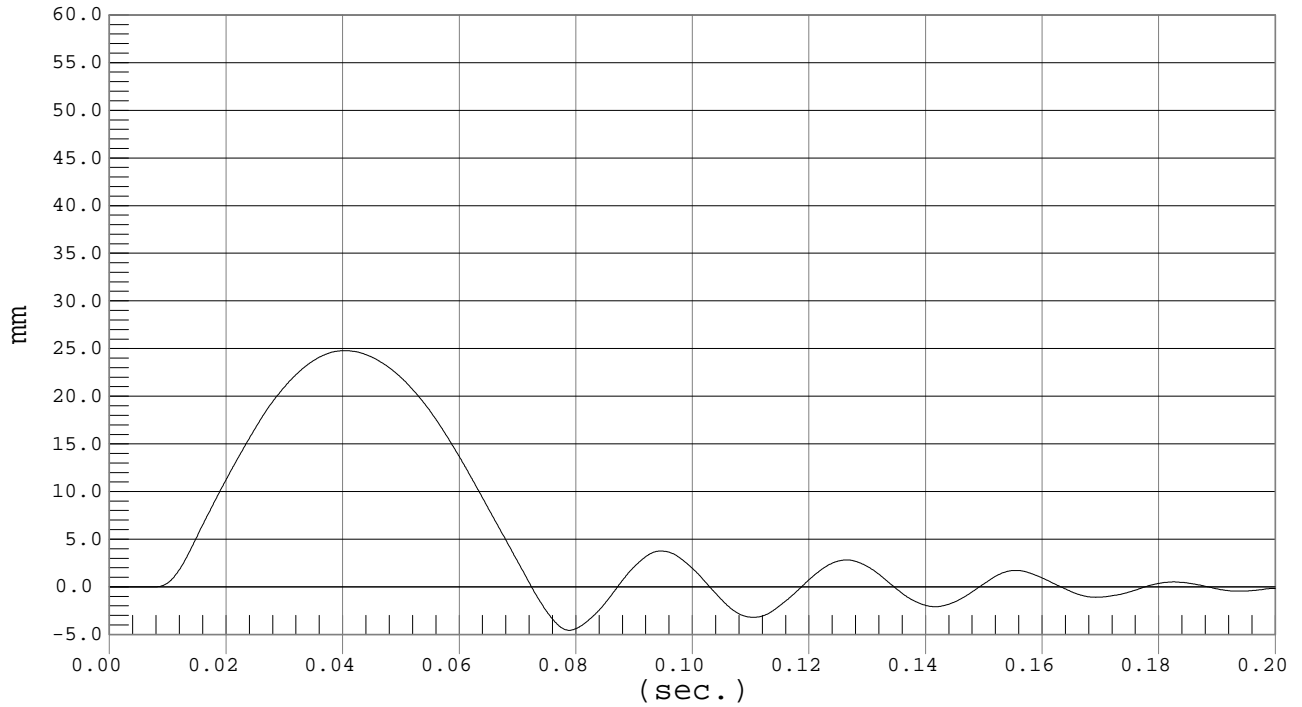


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -4.55 mm @ 0.0788 sec., Ymax = 24.78 mm @ 0.0403 sec.

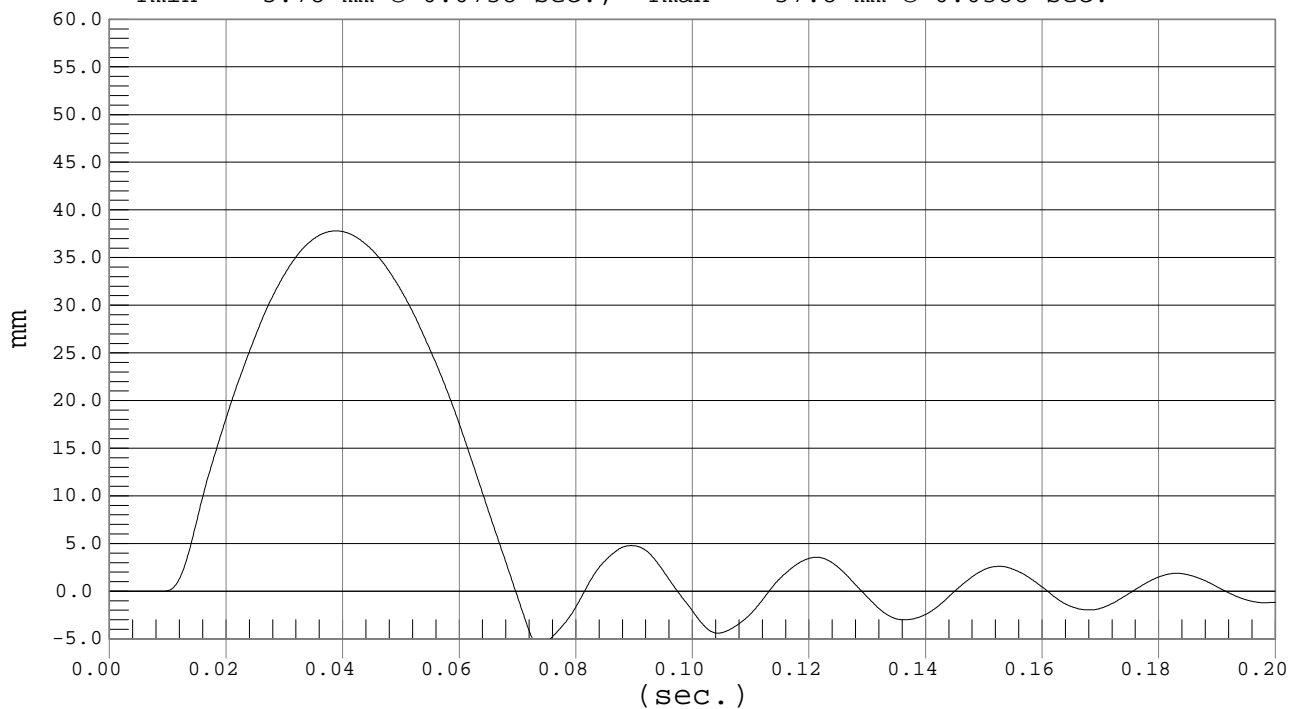


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 07-10-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.78 mm @ 0.0738 sec., Ymax = 37.8 mm @ 0.0388 sec.



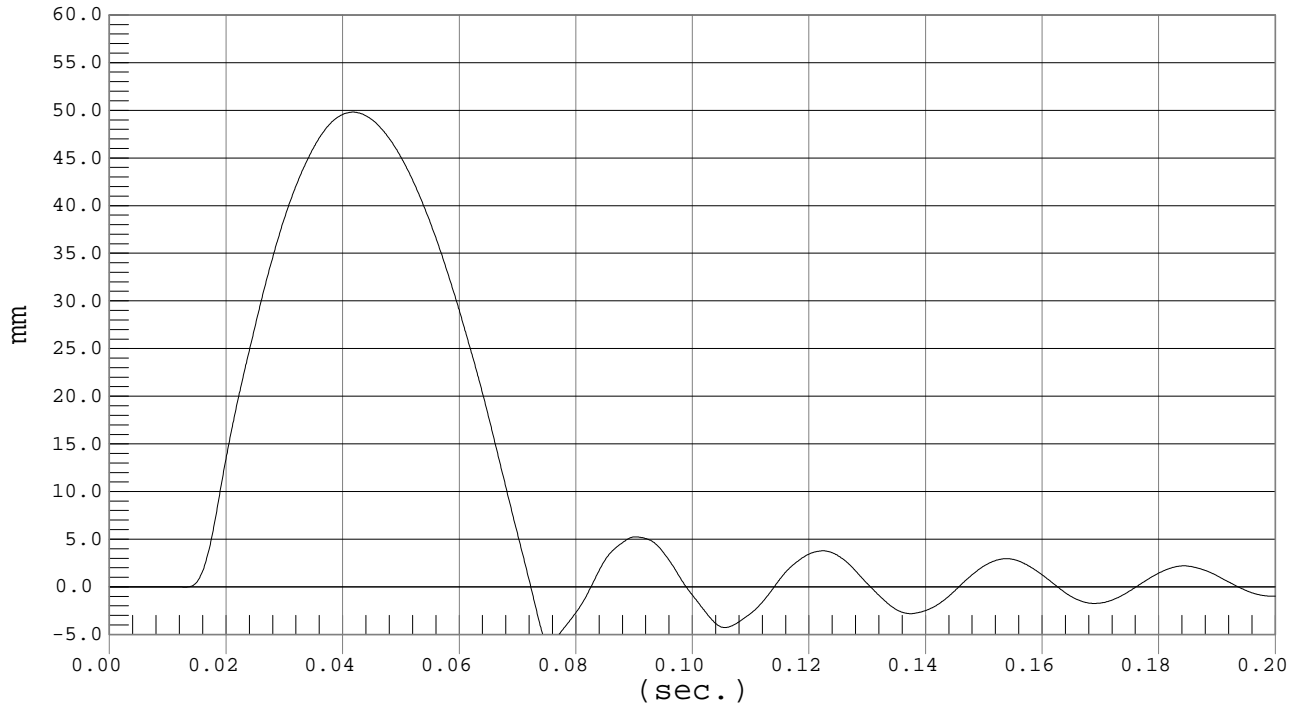


Test Desc.: Rib Module
Component: Dummy #010

LOWER RIB DISPLACEMENT

Test Date: 07-10-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.05 mm @ 0.0754 sec., Ymax = 49.8 mm @ 0.0417 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 7/10/02

Dummy Serial Number: 010

Test Number: D02887

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.8
Relative Humidity (%)	10 – 70	50
Probe Speed (m/s)	3.90 – 4.10	4.05
Maximum Impact Force	4.00 – 4.80 kN	4.74
Time of Maximum Force	10.60 – 13.00 ms	12.50
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.44
Time of Max. Total Force	10.00 – 12.30 ms	12.20

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

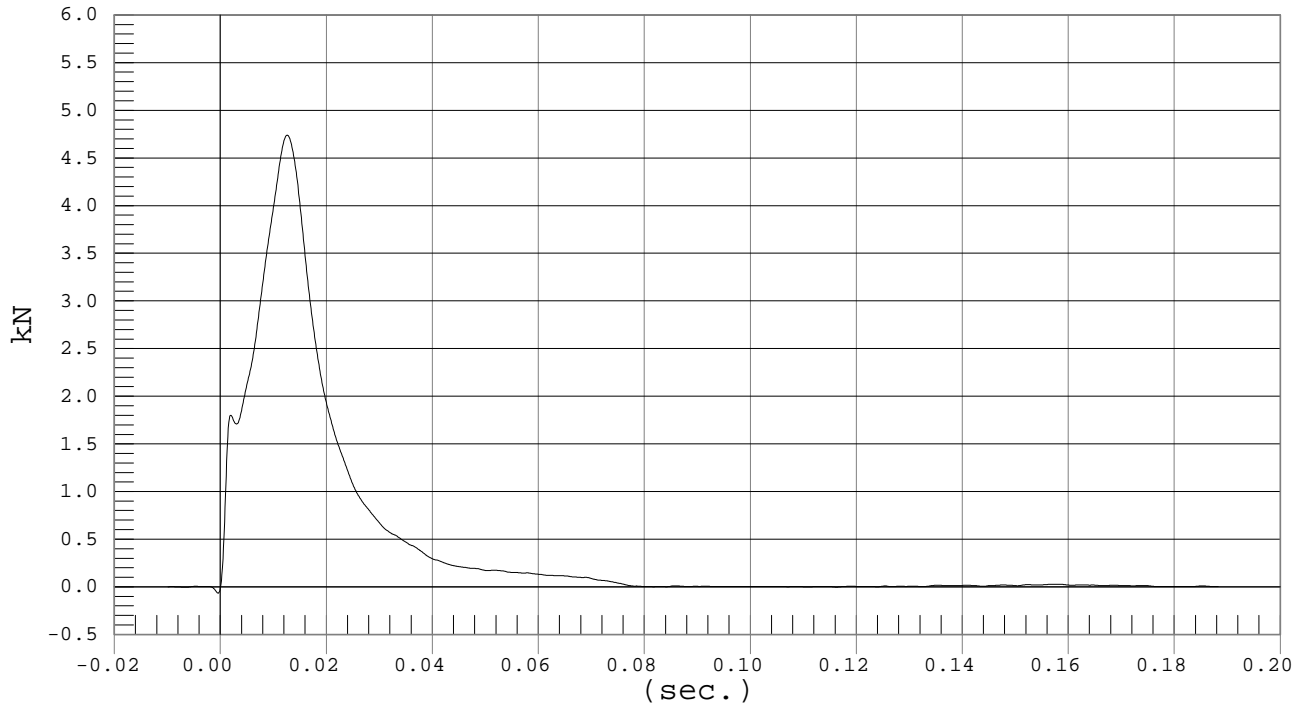


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 07-10-02
Speed: 13.3 fps, 4.05 M/s

Ymin = -.07 kN @ -0.0005 sec., Ymax = 4.74 kN @ 0.0125 sec.

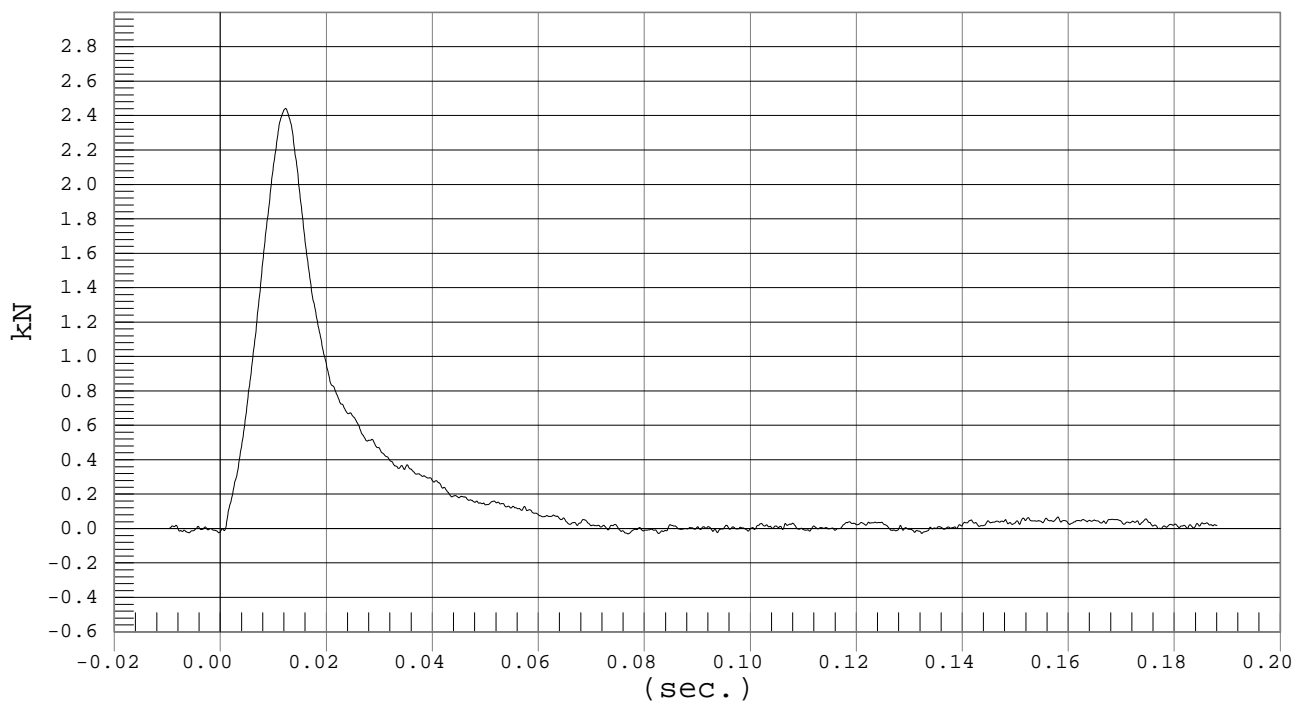


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 07-10-02
Speed: 13.3 fps, 4.05 M/s

Ymin = -.03 kN @ 0.0768 sec., Ymax = 2.44 kN @ 0.0122 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 7/10/02

Dummy Serial Number: 010

Test Number: D02888

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.2
Relative Humidity (%)		10 – 70	57
Pendulum Speed		5.95 – 6.15	6.07
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.10
	20 msec	-5.25 - -4.07 m/sec	-4.71
	25 msec	-6.64 - -5.30 m/sec	-5.82
	30 msec	≥ -6.5 m/sec	-6.17
Maximum Flexion Angle		45.0 – 55.0 deg	52.9
Time of Max. Flexion Angle		39.0 – 53.0 ms	45.1
Maximum Angle Theta (A)		31.0 – 35.0 deg	33.5
Time of Max. Theta (A)		44.0 – 52.0 ms	44.5
Maximum Angle Theta (B)		28.80– 31.30 deg	30.60
Time of Max. Theta (B)		44.0 – 52.0 ms	45.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

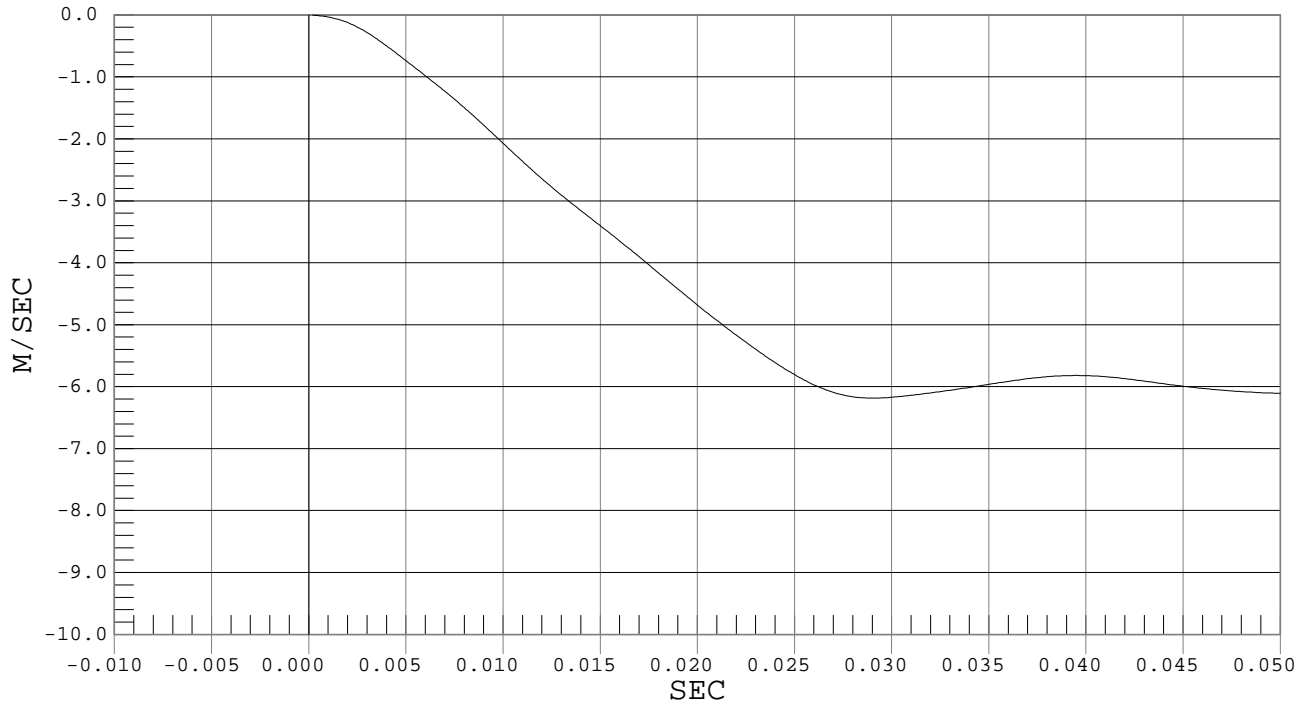


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 07-10-02
Speed: 19.9 fps, 6.07 M/s

Ymin = -7.43 M/SEC @ 0.1454 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

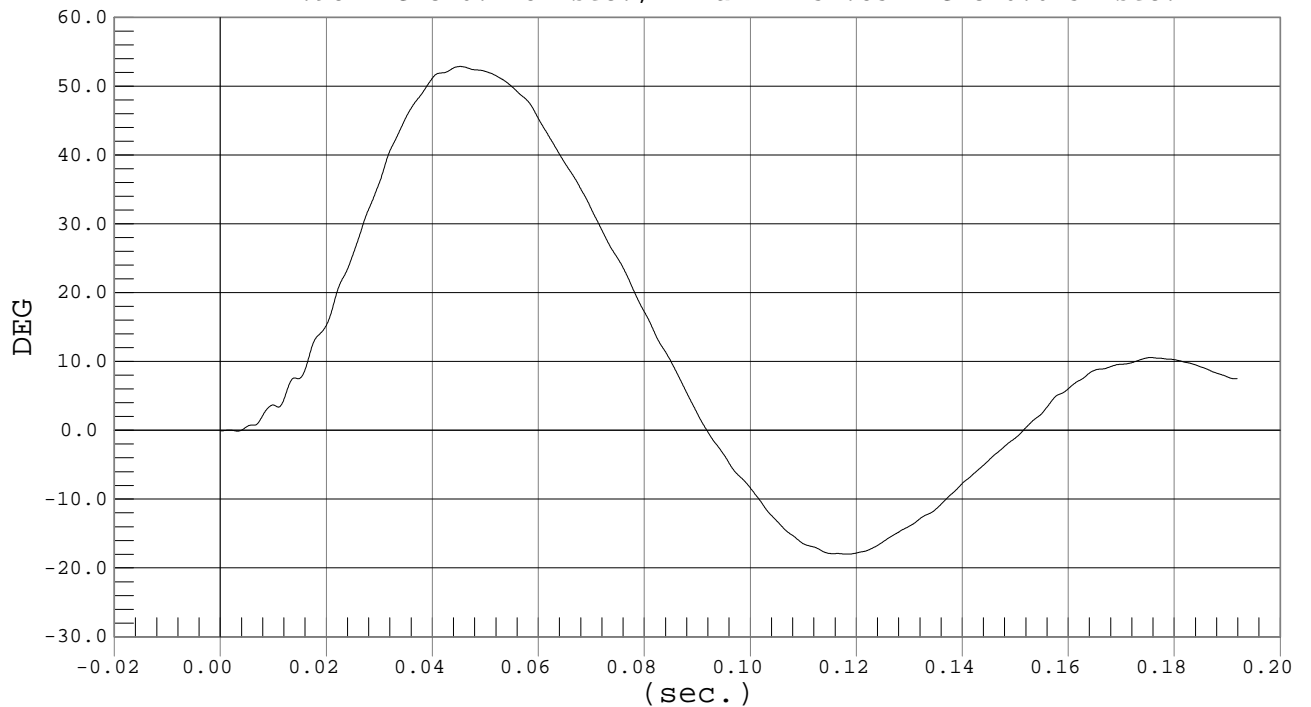


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 07-10-02
Speed: 19.9 fps, 6.07 M/s

Ymin = -17.98 DEG @ 0.1182 sec., Ymax = 52.85 DEG @ 0.0451 sec.



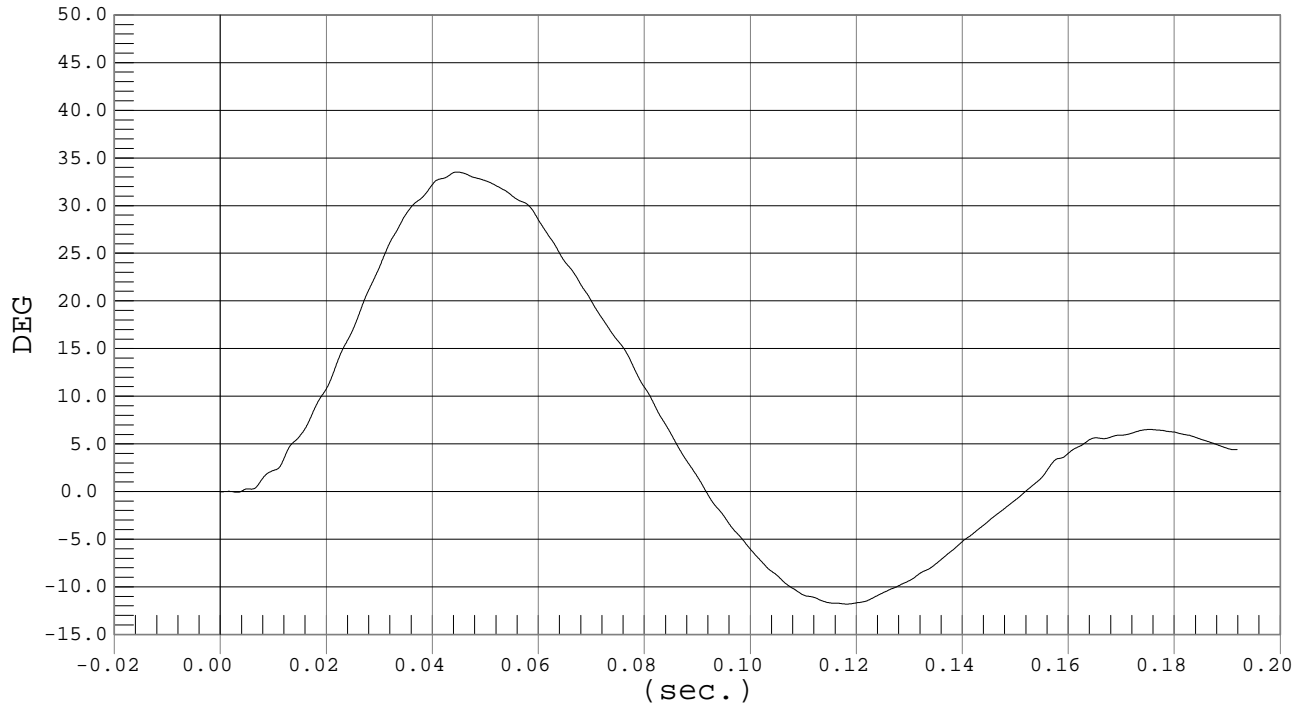


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA A

Test Date: 07-10-02
Speed: 19.9 fps, 6.07 M/s

Ymin = -11.8 DEG @ 0.1181 sec., Ymax = 33.53 DEG @ 0.0445 sec.

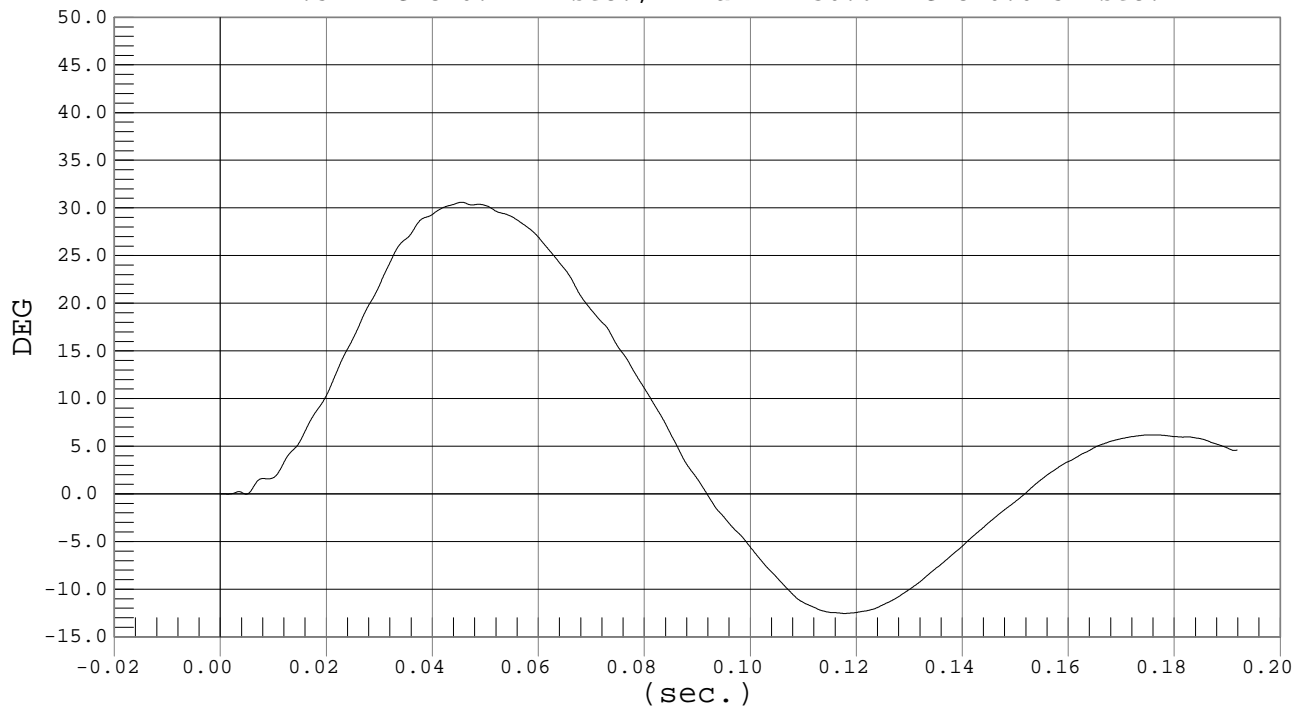


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA B

Test Date: 07-10-02
Speed: 19.9 fps, 6.07 M/s

Ymin = -12.54 DEG @ 0.1177 sec., Ymax = 30.6 DEG @ 0.0454 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 7/10/02

Dummy Serial Number: 010

Test Number: D02889

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.7
Relative Humidity (%)	10 – 70	48
Pendulum Speed	6.20 – 6.30 m/s	6.26
Maximum Impactor Force	9.80 – 12.20 kN	10.63
Time of Max. Impactor Force	9.50 – 12.50 ms	11.30
Maximum Pubic Force	2.65 – 3.35 kN	2.87
Time of Max. Pubic Force	10.00 – 13.00 ms	11.20

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

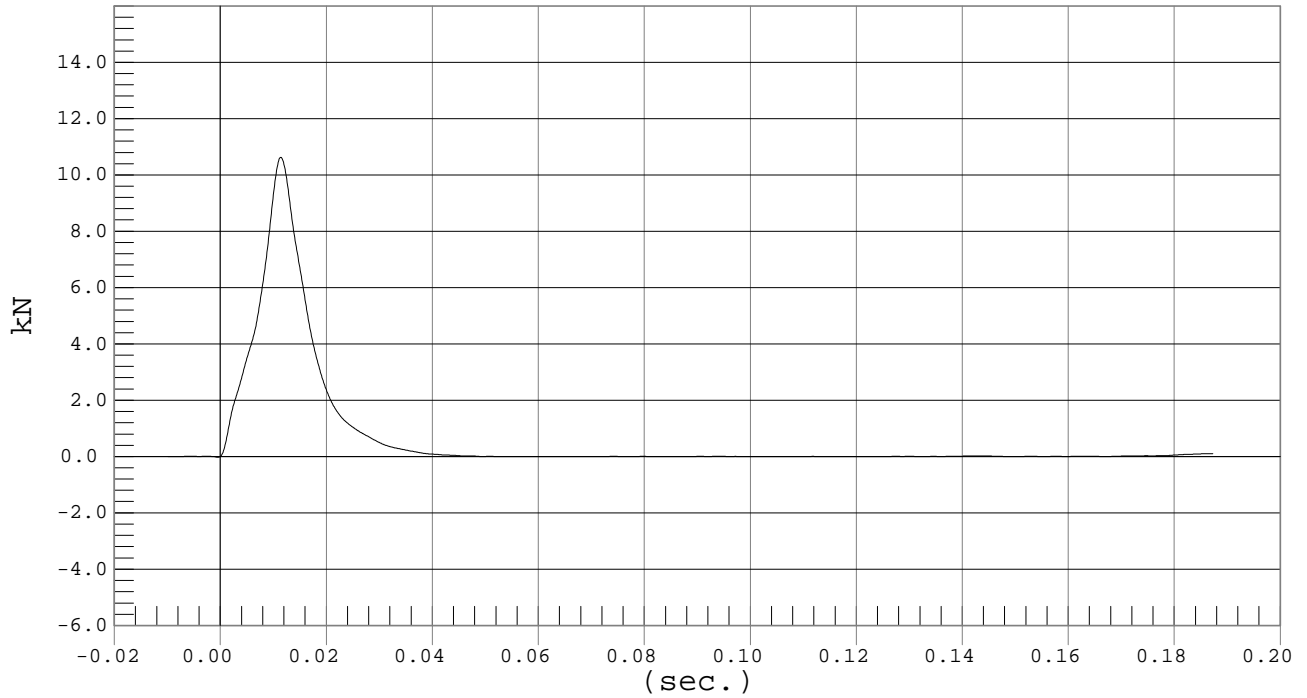


Test Desc.: Pelvis Impact
Component: Dummy #010

IMPACTOR FORCE

Test Date: 07-10-02
Speed: 20.5 fps, 6.26 M/s

Ymin = -.02 kN @ -0.0005 sec., Ymax = 10.63 kN @ 0.0113 sec.

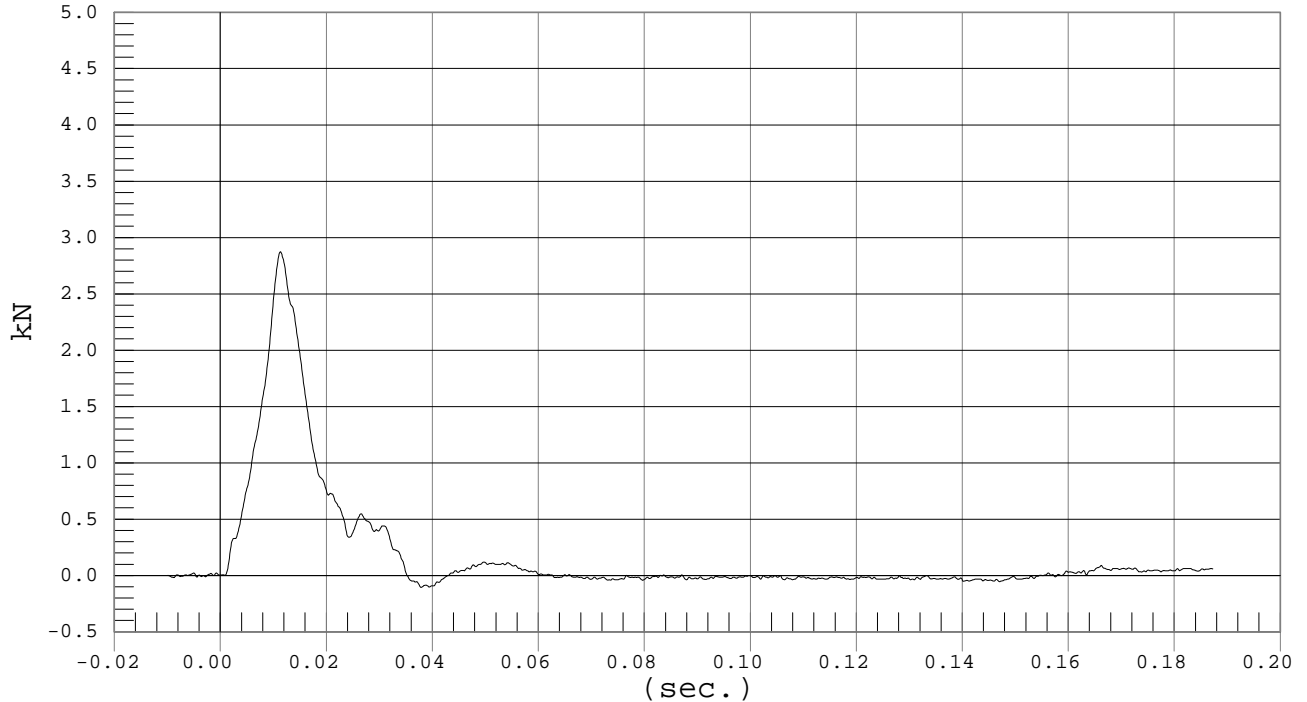


Test Desc.: Pelvis Impact
Component: Dummy #010

PUBIC FORCE

Test Date: 07-10-02
Speed: 20.5 fps, 6.26 M/s

Ymin = -.11 kN @ 0.0378 sec., Ymax = 2.87 kN @ 0.0112 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT ES-2		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	J33415	Endevco	4/8/02
Head Y Accelerometer	J33394	Endevco	4/8/02
Head Z Accelerometer	AHYE2	Endevco	4/8/02
Upper Neck Load Cell	106	FTSS	6/5/02
Lower Neck Load Cell	111	FTSS	6/5/02
Shoulder Force Load Cell	120	FTSS	5/31/02
Upper Spine X Accelerometer	AJ9F3	Endevco	3/15/02
Upper Spine Y Accelerometer	AJ9D4	Endevco	3/15/02
Upper Spine Z Accelerometer	J13942	Endevco	3/15/02
Upper Rib Y Accelerometer	J13652	Endevco	4/9/02
Mid Rib Y Accelerometer	J13628	Endevco	4/9/02
Lower Rib Y Accelerometer	J14006	Endevco	4/9/02
Upper Rib Displacement	010U	Honeywell	5/22/01
Mid Rib Displacement	010M	Honeywell	5/22/01
Lower Rib Displacement	010L	Honeywell	5/22/01
Lower Spine X Accelerometer	AGAL2	Endevco	2/12/02
Lower Spine Y Accelerometer	AGAY0	Endevco	2/12/02
Lower Spine Z Accelerometer	AGM35	Endevco	2/12/02
Torso Load Cell	123	FTSS	5/31/02
T-12 Load Cell	102	FTSS	6/5/02
Front Abdomen Load Cell	119	FTSS	6/3/02
Mid Abdomen Load Cell	120	FTSS	6/3/02
Rear Abdomen Load Cell	121	FTSS	6/3/02
Pubic Symphysis Load Cell	113	Denton	5/16/02
Pelvis X Accelerometer	AMTB1	Endevco	2/12/02
Pelvis Y Accelerometer	AC9B7	Endevco	2/12/02
Pelvis Z Accelerometer	AMR94	Endevco	2/12/02
Right Femur Load Cell	137	FTSS	6/3/02
Left Femur Load Cell	138	FTSS	6/3/02
Lumbar Load Cell	105	FTSS	5/31/02

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Mid A-Post Y	K21-N26	Entran	6/25/02
Left Lower A-Post Y	G13-F18	Entran	6/17/02
Left Mid B-Post Y	K21-N11	Entran	6/25/02
Left Lower B-Post Y	K21-N20	Entran	1/17/02
Rear Floorpan Above Axle X	K21-N09	Entran	6/25/02
Rear Floorpan Above Axle Y	K21-N17	Entran	6/24/02
Rear Floorpan Above Axle Z	K21-N01	Entran	6/25/02
Driver Seat Track Y	I12-F01	Entran	5/29/02
Driver Left Seat Frame	L23-A09	Entran	5/30/02
Driver Right Seat Frame	99F267	Entran	6/17/02
Right Side Sill at Front Seat X	G03-N15	Entran	3/1/02
Right Side Sill at Front Seat Y	G03-N02	Entran	3/1/02
Right Side Sill at Front Seat Z	A08-A13	Entran	3/1/02
Right Side Sill at Rear Seat X	K21-N05	Entran	6/24/02
Right Side Sill at Rear Seat Y	K21-N04	Entran	6/24/02
Right Side Sill at Rear Seat Z	K21-N03	Entran	6/24/02
Left Side Sill at Front Seat Y	K21-N16	Entran	1/17/02
Left Side Sill at Rear Seat Y	L23-A02	Entran	5/30/02
Vehicle CG X	K21-N15	Entran	3/1/02
Vehicle CG Y	K21-N18	Entran	1/17/02
Vehicle CG Z	G13-F02	Entran	3/1/02
Left Front Door @ Pelvis Y	K21-N19	Entran	1/17/02
Left Front Door @ End of Arm Y	99F251	Entran	4/22/02
Left Front Door @ Knee Y	K16-X08	Entran	6/17/02
Left Front Door @ Rib Y	L23-A07	Entran	5/30/02
Lower Center Radiator Support X	99F272	Entran	6/24/02
Lower Center Radiator Support Y	99F261	Entran	6/24/02
Lower Center Radiator Support Z	99F3A5	Entran	6/24/02

Note: All Endevco accelerometers are Model No. 7264-2000

All Entran accelerometers are Model No. EGE-72

APPENDIX E
PROCEDURE USED FOR ES-2 POSITIONING

Installation of the Side Impact Dummy (recommended practice)

1. GENERAL

- 1.1 The dummy to be used for the following installation procedure is described in Annex 6 to this regulation.
- 1.2 Adjust the knee joints so that they just support the leg when it is extended horizontally (1 to 2 g).
- 1.3 Clothe the dummy in form fitting cotton stretch mid-calf length pants. Each foot is equipped with a shoe.

2. INSTALLATION

- 2.1 Place the dummy in the outboard front seat of the impact side as described in the test specifications.
- 2.2 The mid-sagittal plane of the dummy shall coincide with the centerplane of the occupant (as determined according to Annex 3, paragraph 2.8) with a tolerance of 2°.
- 2.3 The pelvis of the dummy shall be positioned according to the following:
 - 2.3.1 The pelvis pitch angle shall be 20.0° +/- 2.5°.
 - 2.3.2 A line passing through the dummy H-points shall pass through an imaginary circle in the mid-sagittal plane of the dummy. This circle has a radius of 10 mm and is located 20 mm horizontally forward and 5 mm vertically above the reference H-point, determined by the 3D H-point machine.
- 2.4 The upper torso of the dummy shall be positioned according to the following:
 - 2.4.1 The upper torso shall be bent forward and then laid back against the seat back. The shoulder of the dummy shall be set fully rearward.
 - 2.4.2 The torso reference line pitch angle shall be 25.0° +/- 2.5°. The torso reference line is defined as the thoracic spine center line.
- 2.5 The arms shall be positioned in such a way that the angle between the projection of the arm centerline on the mid-sagittal plane of the dummy and the torso reference line is 40° +/- 5°.

- 2.6 For the driver's seating position, without inducing pelvis or torso movement, place the right foot of the dummy on the undepressed accelerator pedal with the heel resting as far forward as possible on the floorpan. Set the left foot perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel. Set the knees of the dummy such that their outside surfaces are 150 ± 10 mm from the plane of symmetry of the dummy. If possible, within these constraints, place the thighs of the dummy in contact with the seat cushion.
- 2.7 For other seating positions, without inducing pelvis or torso movement, place the heels of the dummy as far forward as possible on the floorpan without compressing the seat cushion more than the compression due to the weight of the leg. Set the knees of the dummy such that their outside surfaces are 150 ± 10 mm from the plane of symmetry of the dummy.

APPENDIX F
DUMMY PEAK RESPONSES

DRIVER PEAK RESPONSE TABLE

Location	Peak Values								
				2001 Saturn L200 5/6/02		2001 Saturn L200 5/8/02		2001 Saturn L200 7/9/02	
	Class	Axis	Units	Peak	Time	Peak	Time	Peak	Time
Head	1000	X	G	-283.1	54	-208.4	57	-17.4	54
	1000	Y	G	702.8	54	1180.0	57	89.1	56
	1000	Z	G	405.9	54	249.9	57	13.7	110
	1000	RES	G	825.3	54	1215.9	57	90.5	56
Head Injury Criteria (HIC)				7493		15152		670	
t1				53.4		56.4		48.4	
t2				54.1		56.9		64.9	
Upper Neck Force	1000	X	N	1260	54	474	57	-345	181
	1000	Y	N	1400	54	-1623	57	336	47
	1000	Z	N	4635	54	-1555	60	846	57
	1000	RES	N	4726	54	1981	57	878	57
Upper Neck Moment	600	X	Nm	-96.4	55	-47.9	61	-44.4	60
	600	Y	Nm	-33.2	49	33.9	64	-26.8	114
	600	Z	Nm	-19.3	143	15.8	59	-31.1	127
	600	RES	Nm	96.6	55	56.9	61	50.4	60
Lower Neck Force	1000	X	N			-651	45	-662	46
	1000	Y	N			1086	57	1210	48
	1000	Z	N			-1716	59	1160	57
	1000	RES	N			1812	59	1651	57
Lower Neck Moment	600	X	Nm			100.2	57	94.2	52
	600	Y	Nm			75.7	47	80.3	181
	600	Z	Nm			17.8	57	-33.8	119
	600	RES	Nm			116.1	52	114.4	49
Shoulder Force	600	X	N			-995	39	-809	36
	600	Y	N			2183	45	2315	46
	600	Z	N			-1542	43	-1256	41

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values								
				2001 Saturn L200 5/6/02		2001 Saturn L200 5/8/02		2001 Saturn L200 7/9/02	
	Class	Axis	Units	Peak	Time	Peak	Time		
Upper Spine	180	X	G	29.5	54	-13.9	38	-12.2	35
	180	Y	G	90.7	45	49.4	46	58.5	50
	180	Z	G	-27.1	44	17.0	58	8.0	64
	180	Res	G	95.2	45	49.4	46	58.5	50
Lower Spine	180	X	G	-33.0	72	13.2	60	11.4	63
	180	Y	G	105.6	42	69.9	45	78.2	47
	180	Z	G	27.7	55	14.6	58	5.6	63
	180	Res	G	108.1	42	70.2	45	78.2	47
Upper Rib	180	Y	G	122.6	39	84.6	38	89.9	45
Mid Rib	180	Y	G			155.5	39	125.7	40
Lower Rib	180	Y	G	118.2	39	190.3	41	241.2	42
Upper Rib Deflection	180	Y	mm			-49.7	54	-52.3	52
Mid Rib Deflection	180	Y	mm			-38.7	53	-44.4	53
Lower Rib Deflection	180	Y	mm			-26.2	49	-30.1	52
Upper Rib VC	180	Y	m/sec			0.88	45	0.91	47
Mid Rib VC	180	Y	m/sec			0.80	44	0.79	45
Lower Rib VC	180	Y	m/sec			0.55	44	0.61	45
Torso Force	600	X	N			245	52	499	52
	600	Y	N			-486	44	1344	50
Torso Moment	600	Y	Nm			-22.8	58	-15.1	61
	600	Z	Nm			5.8	42	17.3	52

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values								
				2001 Saturn L200 5/6/02		2001 Saturn L200 5/8/02		2001 Saturn L200 7/9/02	
	Class	Axis	Units	Peak	Time	Peak	Time		
T12 Force	600	X	N			777	51	753	49
	600	Y	N			1842	41	144	40
T12 Moment	600	X	Nm			141.6	80	-216.6	40
	600	Y	Nm			72.8	55	87.2	186
Abdomen Front Force	600		N			265	62	178	62
Abdomen Mid Force	600		N			631	42	459	41
Abdomen Rear Force	600		N			803	42	685	48
Abdomen Summed Force	600		N			1622	42	1224	43
Pubic Symphysis Force	600		N			-2783.6	43	-2377.3	46
Right Femur Force	600	X	N			-423	110	357	112
	600	Y	N			1229	55	1052	56
	600	Z	N			-1090	128	-1081	139
	600	Res	N			1348	55	1263	60
Right Femur Moment	600	X	Nm			-107.8	95	124.8	93
	600	Y	Nm			-52.8	97	45.7	71
	600	Z	Nm			-38.7	59	-39.9	61
	600	Res	Nm			119.1	95	128.7	93

DRIVER PEAK RESPONSE TABLE (CONTINUED)

Location	Peak Values								
				2001 Saturn L200 5/6/02		2001 Saturn L200 5/8/02		2001 Saturn L200 7/9/02	
	Class	Axis	Units	Peak	Time	Peak	Time	Peak	Time
Left Femur Force	600	X	N			-514.6	59	462	64
	600	Y	N			940.8	54	1079	58
	600	Z	N			1266.9	55	1995	56
	600	Res	N			1611.8	55	2293	56
Left Femur Moment	600	X	Nm			79.8	62	-70.5	49
	600	Y	Nm			30.0	43	30.7	79
	600	Z	Nm			-26.2	56	-40.6	59
	600	Res	Nm			84.9	62	74.0	49
Pelvis	1000	X	G	12.3	44	15.1	45	14.7	49
	1000	Y	G	57.1	43	56.5	35	54.0	37
	1000	Z	G	23.1	56	14.3	59	14.3	48