

REPORT NUMBER: TO5-MGA-2002-002

**RIGID POLE SIDE IMPACT TEST AT 285 DEGREES
2001 SATURN L200 WITHOUT HEAD CURTAIN AIRBAG**

ES-2 DRIVER POSITION

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May 8, 2002

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**PREPARED FOR:
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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, without 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.

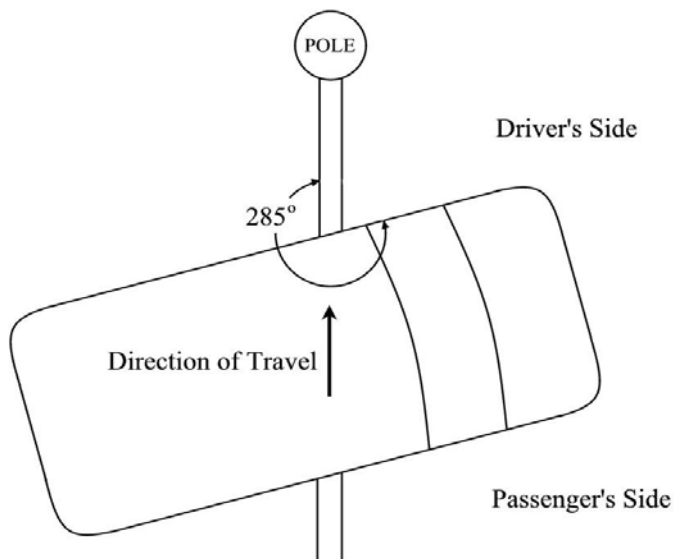
SECTION 2 SUMMARY OF SIDE IMPACT TEST

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 32.2 km/h. The weight of the vehicle as tested was 1598.5 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on May 8, 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)	56.4
	T2 (msec)	56.9
	HPC	15152
2) Thorax Performance Criteria		
2.1) Chest Deflection < 42 mm	Upper Rib Deflection	-49.7
	Mid Rib Deflection	-38.7
	Lower Rib Deflection	-26.2
2.2) Viscous Criteria < 1.0 (m/sec)	Upper Rib	0.88
	Mid Rib	0.80
	Lower Rib	0.55
3) Abdominal Protection Criterion		
Sum < 2500 N	Front Abdominal Force	264.7
	Mid Abdominal Force	630.6
	Rear Abdominal Force	802.5
	Sum of Abdominal Force	1622.3
4) Pelvis Performance Criterion		
< 6000 N	Pubic Symphysis Force	2783.6

		Left Front
HIC	T1 (msec)	56.4
	T2 (msec)	56.9
	T2 - T1 (msec)	0.5
	HIC	15152

Fir Filtered	Left Front
Upper Rib Y (g's)	77.4
Mid Rib Y (g's)	142.8
Lower Rib Y (g's)	173.3
Lower Spine Y (g's)	68.7
Pelvis Y (g's)	54.7
TTI (g's)	121

Contacts	Left Front
Rib (msec)	36.4
Pelvis (msec)	22.9

TEST NOTES

The dummy and vehicle X and Y velocities presented in this report do not contain the correct initial velocity. The correct initial velocities should be:

X - Test Speed * Sine 15 Degrees

Y - Test Speed * Cosine 15 Degrees

There was no valid data collected:

Left Mid A Post Y Acceleration

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: May 8, 2002

TEST VEHICLE INFORMATION

Make	Saturn
Model	L200
Body Style	4 door
VIN	1G8JU52FX1Y577915
Color	Painted Orange
Odometer Reading	24,495
Transmission	automatic
Final Drive	front
Number of Cylinders	4
Engine Displacement	2.2 Liters
Engine Placement	lateral

TEST VEHICLE OPTIONS

Front Airbags	yes
Side Airbags	no
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)	1806
Date of Manufacture	04/01	GAWR Front (kg)	887
		GAWR Rear (kg)	919

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: May 8, 2002

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	411.9	267.6		431.8	374.7	
Right	kg	396.0	272.6		421.4	370.6	
Ratio	%	59.9	40.1		53.4	46.6	
Totals	kg	807.9	540.2	1348.1	853.2	745.3	1598.5

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	1.1 ND	0.6 ND	0.7 ND
Left Door Sill Angle	deg	0.7 ND	0.2 ND	0.4 ND
Front Bumper Angle	deg	0.0	0.1 LD	0.1 LD
Rear Bumper Angle	deg	0.1 LD	0.4 LD	0.2 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	4003
Total Vehicle Length at Centerline	mm	4809
Total Vehicle Length at Right Side	mm	4003
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	5 forward

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

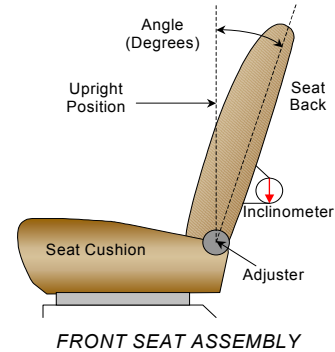
Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 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

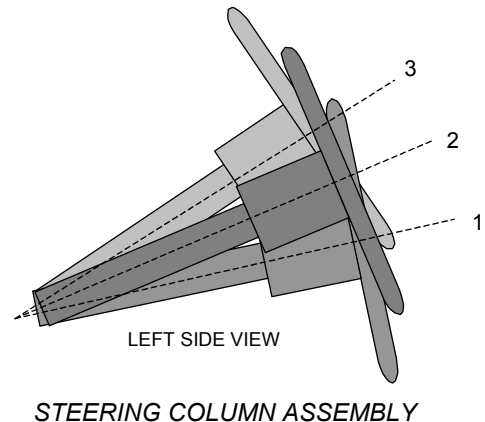
SEAT BELT UPPER ANCHORAGE

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: May 8, 2002

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	ES-2
Head Contact	Pole, headrest
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	Left Front	Left 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

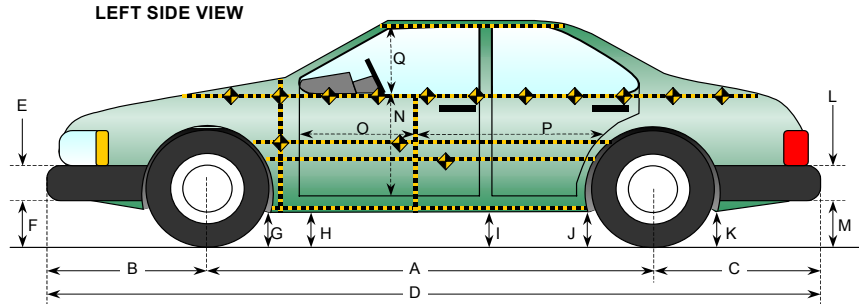
	Driver	Left Front	Left Rear
Front	no	no	
Side			
Curtain			

**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: May 8, 2002



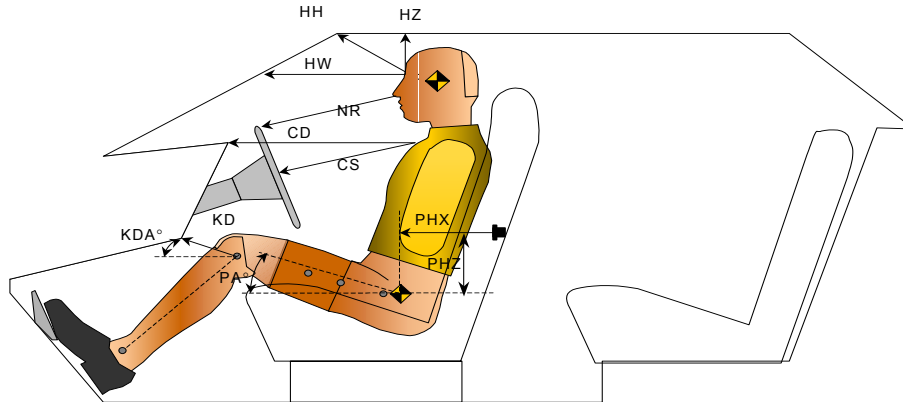
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2700	2420	280
B	Front Axle to FSOV	972	1096	124
C	Rear Axle to RSOV	1105	1204	99
D	Total Length at Centerline	4777	4720	57
E	Front Bumper Thickness	100	100	0
F	Front Bumper Bottom to Ground	589	639	50
G	Sill Height at Front Wheel Well	335	309	26
H	Sill Height at Front Door Leading Edge	348	308	40
I	Sill Height at "B" Pillar	331	255	76
J1	Sill Height at Rear Wheel Well	342	367	25
J2	Pinch Weld Height at Rear Wheel Well	340	365	25
K	Sill Height Aft of Rear Wheel Well	356	354	2
L	Rear Bumper Thickness	230	230	0
M	Rear Bumper Bottom to Ground	560	497	63
N	Sill Height to Window Bottom Sill	620	632	12
O	Front Door Leading Edge to Impact CL	698	702	4
P	Rear Door Trailing Edge to Impact CL	1435	1208	227
Q	Front Window Opening	432	395	37
R	Right Side Length	3877	3915	38
S	Left Side Length	3877	3568	309
T	Vehicle Width at "B" Post	1742	1324	418

DATA SHEET NO. 4
ES-2 LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 2002



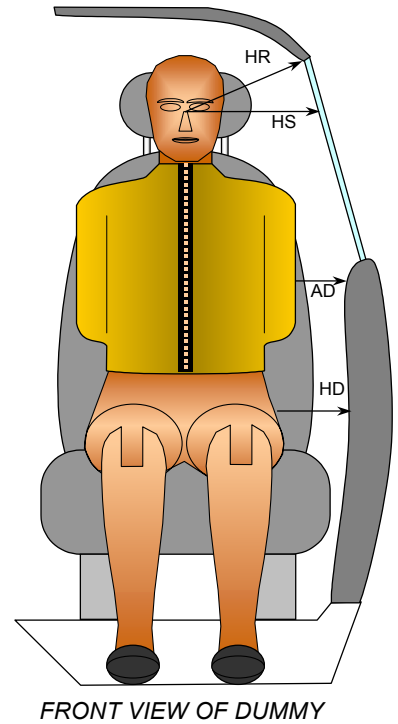
Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	292	
HW	Head to Windshield	491	
HZ	Head to Roof	159	
NR	Nose to Rim	389	
CD	Chest to Dash	491	
CS	Chest to Steering Wheel	300	
KDL	Left Knee to Dash	174	0
KDR	Right Knee to Dash	172	0
PA	Pelvic Angle (Longitudinal)		23.2
PA	Pelvic Angle (Lateral)		0.9
SA	Spine Angle (Longitudinal)		24.1
SA	Spine Angle (Lateral)		0.7
PHX	H-Point to Striker (X-Axis)	250	
PHZ	H-Point to Striker (Z-Axis)	147	

DATA SHEET NO. 5
ES-2 LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 2002

Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	195
HS	Head to Side Window	mm	304
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: May 8, 2002

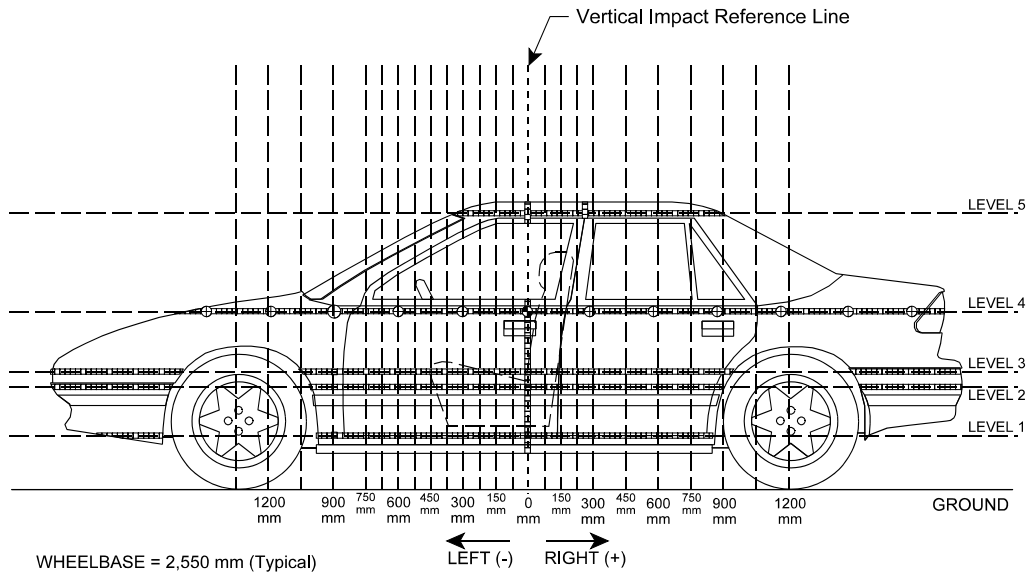
	Left Front	
	H-Point Machine	Dummy H Point after seat back adjustment
HP to Floor Z (mm)	148	155
HP to Hinge X (mm)	745	709
HP to Sill Y (mm)	211	210
HP to Striker X (mm)	353	377
HP to Dash X (mm)	553	520
HP to Header Z (mm)	781	765
H-POINT MACHINE (deg)		
Left Knee	126	
Right Knee	125	
Left Foot	124	
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: May 8, 2002

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



LEFT SIDE VIEW

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	1472
4	Window Sill	mm	1006
3	Mid Door	mm	736
2	Occupant H-Point	mm	633
1	Sill Top	mm	452

DATA SHEET NO. 8
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 2002

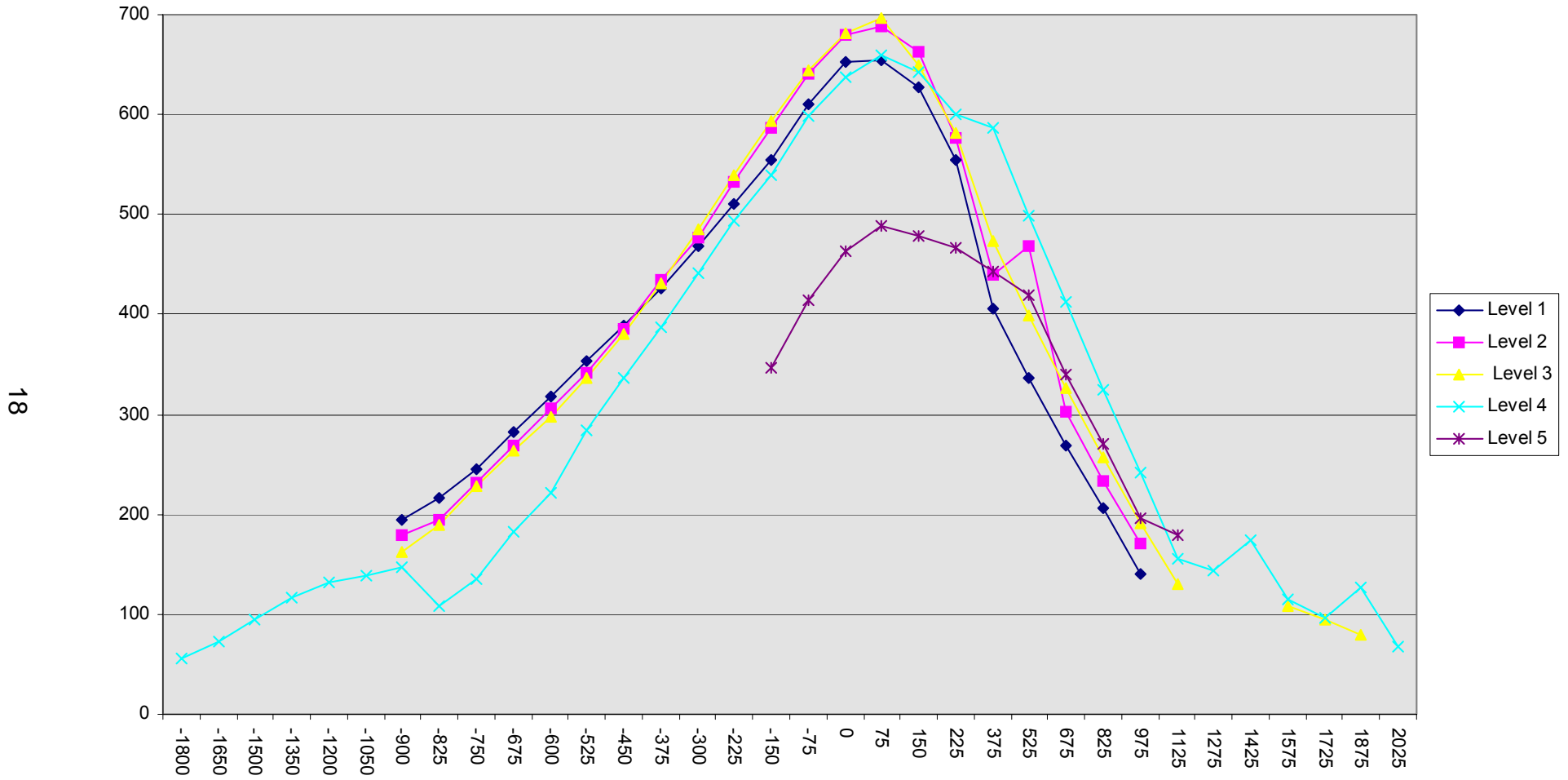
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1950															
-1800				372					427					55	
-1650				347					420					73	
-1500				328					423					95	
-1350				311					427					116	
-1200				300					432					132	
-1050				295					434					139	
-900	254	227	225	288		448	406	388	435		194	179	163	147	
-825	254	231	228	283		470	425	417	391		216	194	189	108	
-750	254	230	227	283		500	461	455	418		246	231	228	135	
-675	253	228	225	281		535	496	488	464		282	268	263	183	
-600	252	227	224	279		570	533	522	501		318	306	298	222	
-525	250	227	223	278		604	569	559	562		354	342	336	284	
-450	249	225	223	278		638	610	603	614		389	385	380	336	
-375	249	225	220	276		675	659	652	664		426	434	432	388	
-300	249	225	220	274		718	701	705	716		469	476	485	442	
-225	248	225	219	273		759	758	759	767		511	533	540	494	
-150	248	224	218	270	483	803	810	812	810	830	555	586	594	540	347
-75	247	222	218	268	479	858	862	862	866	893	611	640	644	598	414
0	247	222	218	267	477	899	901	900	905	940	652	679	682	638	463
75	247	222	218	264	475	902	911	914	924	964	655	689	696	660	489
150	245	222	218	263	473	873	885	868	905	951	628	663	650	642	478
225	245	222	218	262	472	800	799	800	863	939	555	577	582	601	467
375	244	222	218	261	471	649	661	691	848	914	405	439	473	587	443
525	244	221	217	258	471	581	689	616	756	891	337	468	399	498	420
675	245	220	217	260	471	514	523	544	672	811	269	303	327	412	340
825	245	219	218	260	473	451	453	475	585	744	206	234	257	325	271
975	245	220	221	264	475	385	391	412	506	671	140	171	191	242	196
1125			218	270	478			349	426	658			131	156	180
1275				277					421					144	
1425				285					460					175	
1575			222	298				331	413				109	115	
1725			247	315				342	412				95	97	
1875			268	333				347	460				79	127	
2050				356					424					68	

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

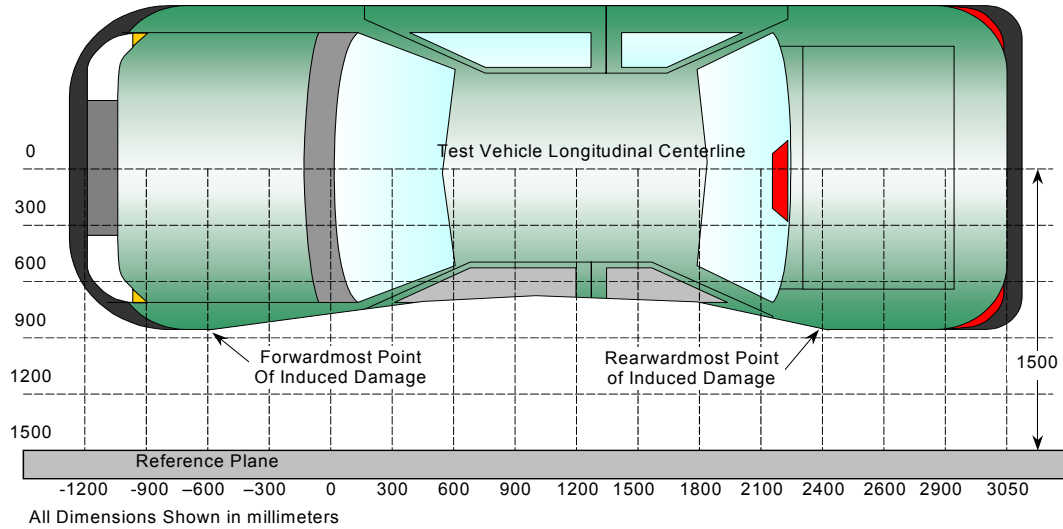
Test Date: May 8, 2002



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

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 2002



TOP VIEW

Damage Profile Distances

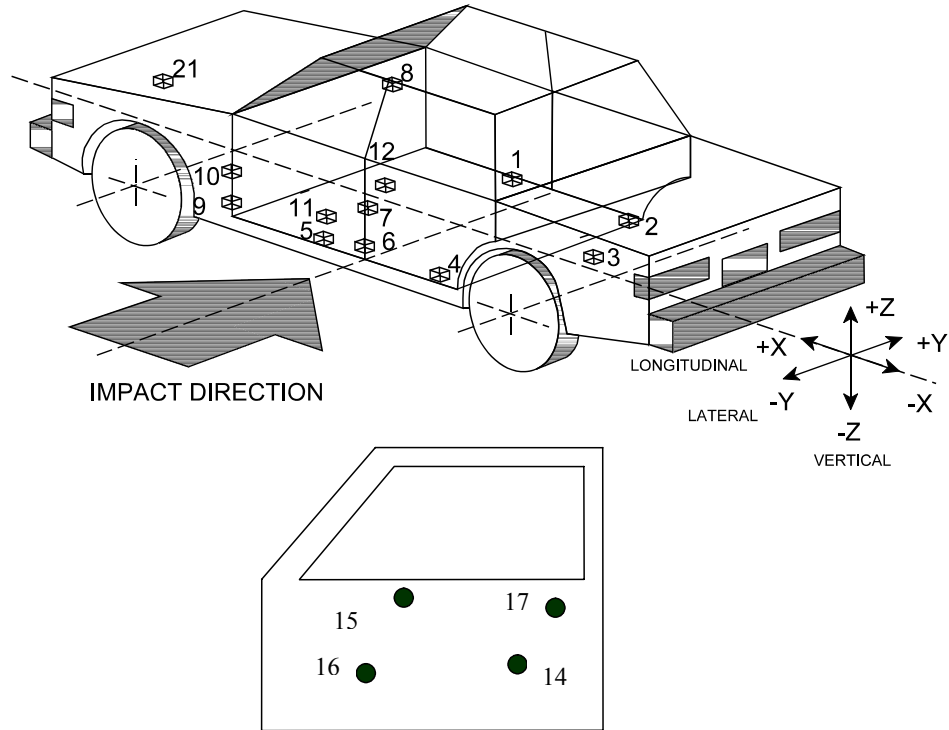
DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	1875 mm	4	356	424	68
2	1165 mm	4	280	449	169
3	341 mm	4	262	777	515
4	-537 mm	1	249	631	382
5	-1155 mm	4	439	523	84
6	-1950 mm	4	372	427	55

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: May 8, 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: May 8, 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) (CFC 60)		Vert. (Z) Maximums (g's) (CFC 60)		Resultant (g's) (CFC 60)
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Right Side Sill at Front Seat	1.9	2.2	10.6	0.2	4.9	4.7	10.7
2	Right Side Sill at Rear Seat	0.9	3.6	10.0	0.4	3.1	3.7	10.6
3	Rear Floorpan Above Axle	2.6	3.9	8.8	0.1	5.0	4.5	9.2
4	Left Side Sill at Rear Door			14.0	0.5			
5	Left Side Sill at Front Door *			87.9	29.1			
6	Left Lower B Post			79.7	10.5			
7	Left Mid B Post			66.7	9.4			
8	Left Upper B Post			53.1	7.9			
9	Left Lower A Post			28.6	13.5			
10	Left Mid A Post			**	**			
11	Driver Left Seat Track			104.8	8.3			
12	Vehicle CG	***	***	***	***	***	***	***
13	Left A Pillar @ Roof			31.3	3.8			
14	Left Front Door @ Pelvis			129.7	45.9			
15	Left Front Door @ Arm			110.2	49.2			
16	Left Rear Door @ Knee			89.6	66.5			
17	Left Rear Door @ Pelvis			135.7	13.2			
19	Left Driver Seat Frame			79.4	16.1			
20	Right Driver Seat Frame			74.1	15.1			
21	Lower Center Radiator Support	0.4	6.3	8.1	9.7	7.8	4.0	10.9

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

* No valid data after 80 msec

** No valid data collected

*** No valid data collected after 30 msec

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

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 2002

VEHICLE ACCELEROMETER COORDINATES

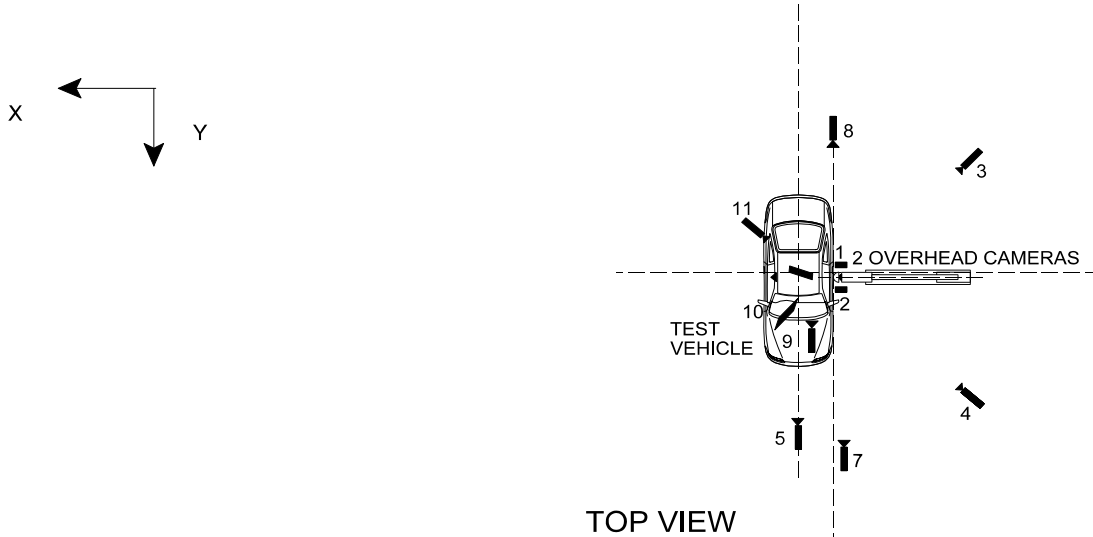
Loc. No.	Description	Coordinates (mm)*		
		X	Y	Z
1	Right Side Sill at Front Seat	2510	693	316
2	Right Side Sill at Rear Seat	1562	661	318
3	Rear Floorpan Above Axle	1044	0	615
4	Left Side Sill at Rear Door	1564	-661	317
5	Left Side Sill at Front Door	2495	-670	314
6	Left Lower B Post	2142	-680	375
7	Left Mid B Post	2083	-740	935
8	Left Upper B Post	2071	-532	1420
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	2685	-515	1325
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 @ Pelvis	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)

DATA SHEET NO. 11
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2001/Saturn/L200/4 door

Test Date: May 8, 2002



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	-810	0	5000	8	1015
2	Overhead Close-up	0	0	5000	13	1005
3	Left Side 45° Rearward Pole View	3650	-7530	1268	50	1005
4	Left Side 45° Forward Pole View	3640	5010	1370	50	873
5	Real Time					
7	Front Ground Level Vehicle/Pole Impact	-750	9440	1421	25	1010
8	Rear Ground Level Vehicle/Pole Impact	-1000	-9410	1445	25	741
9	Test Vehicle Onboard Hood				8	508
10	Test Vehicle Onboard Driver Hip				13	524
11	Test Vehicle Onboard Driver Head Contact				13	505

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

A-4.



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.



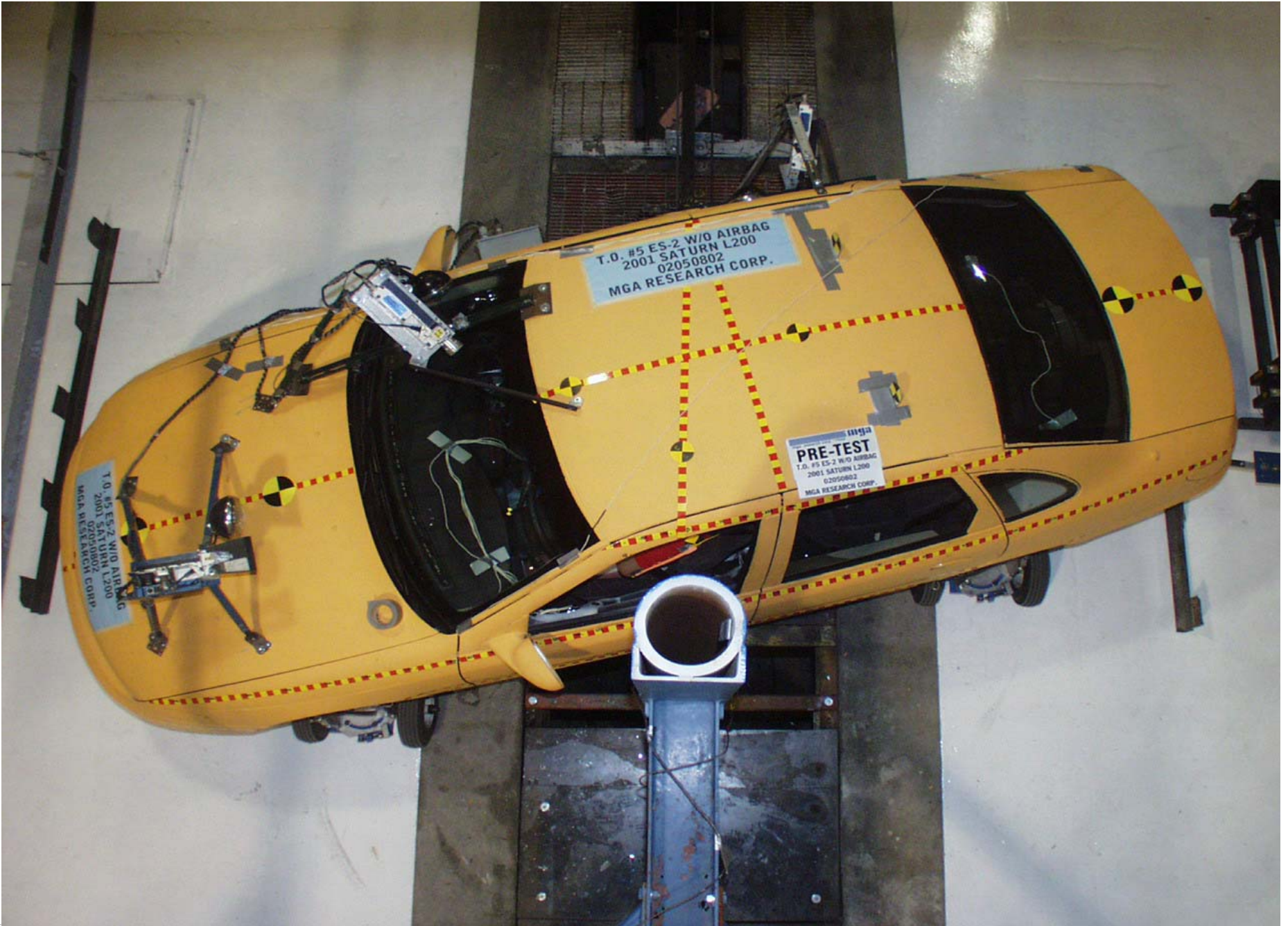
Pre-Test Left Rear View

A-10.



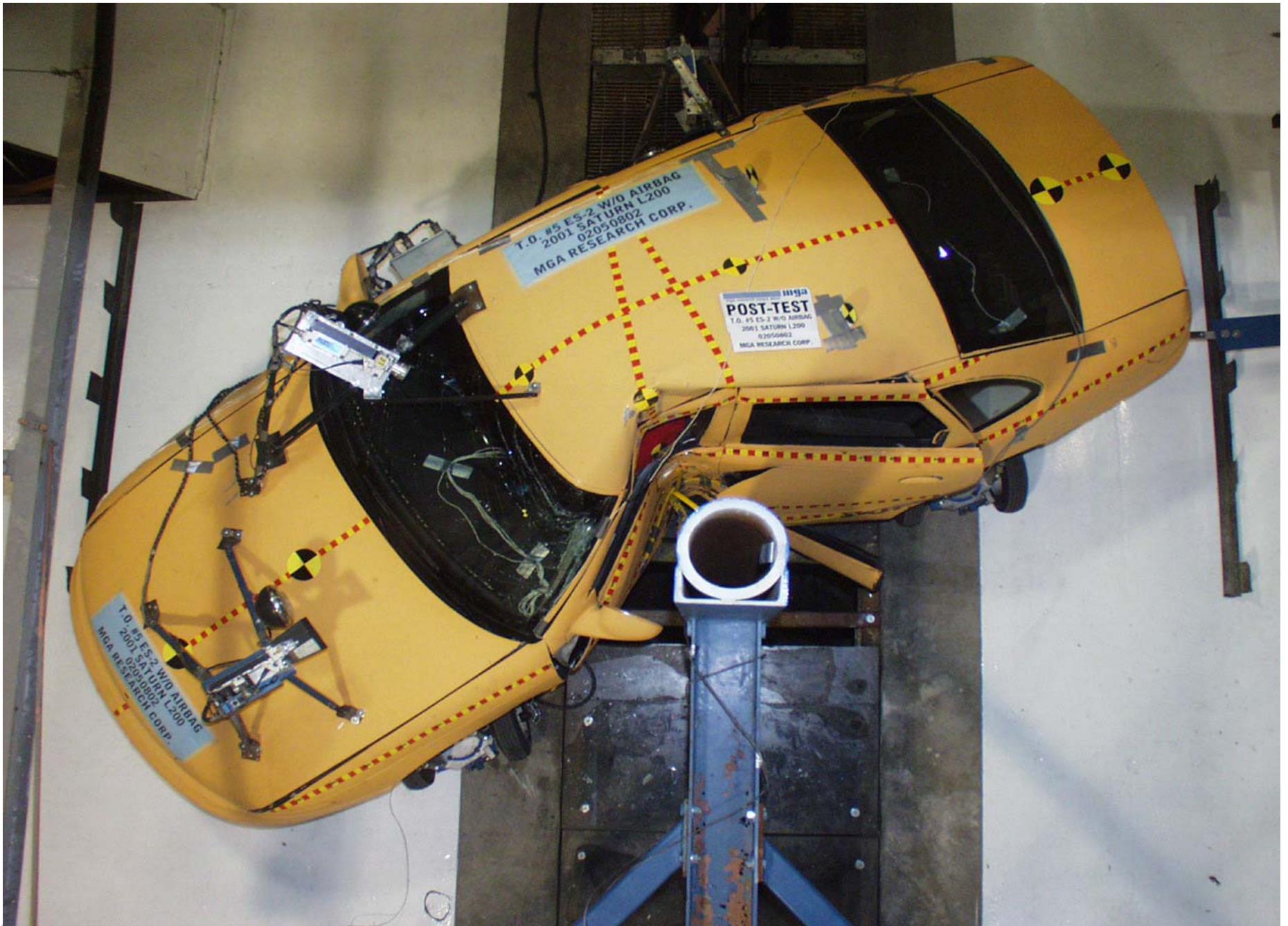
Post-Test Left Rear View

A-11.



Pre-Test Overhead View

A-12.



Post-Test Overhead View



Pre-Test Left Rear Vehicle against Pole View



Post-Test Left Rear Vehicle against Pole

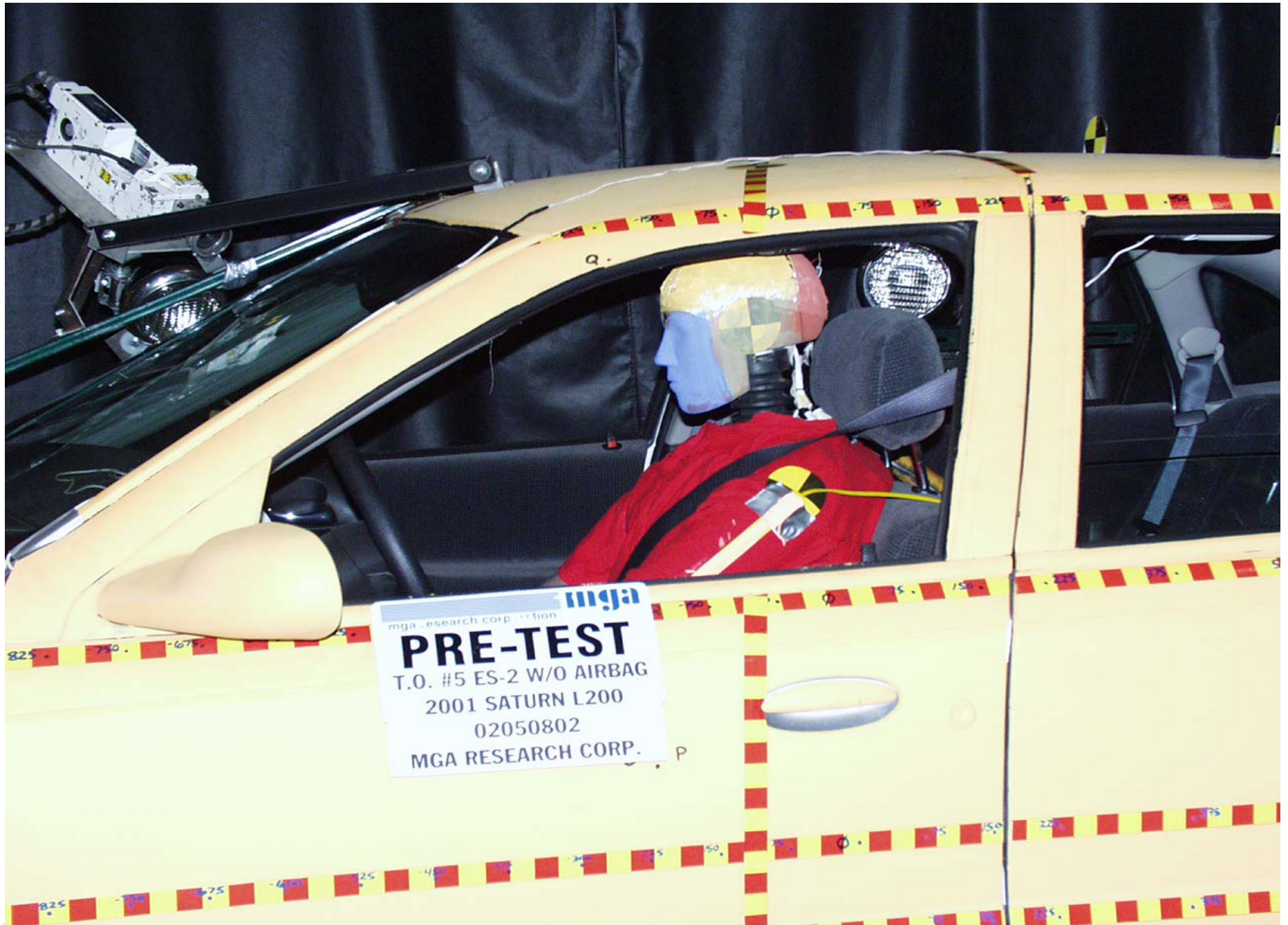
A-15.



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



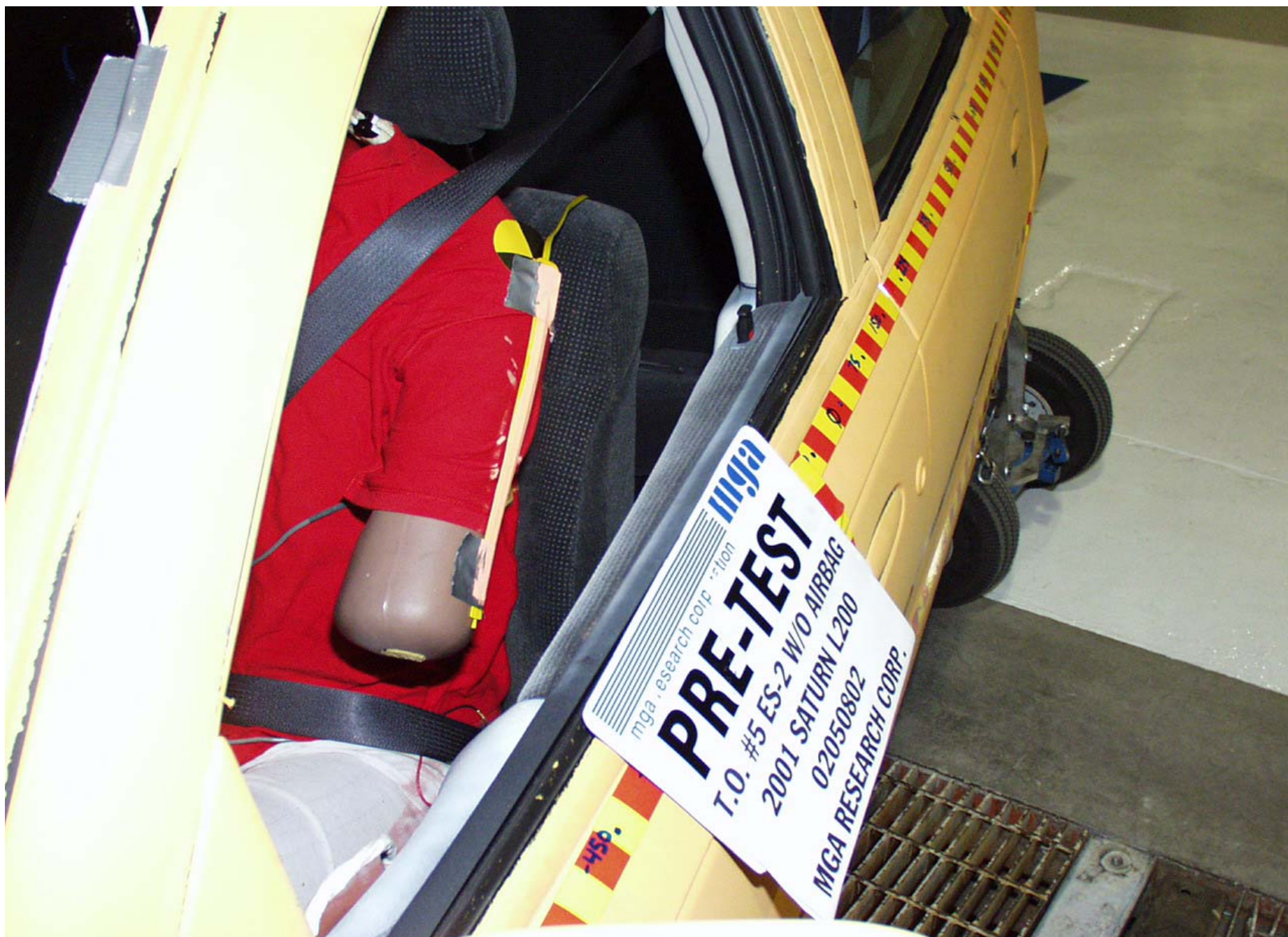
Pre-Test Driver Dummy Left Side View



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
04/01

GVWR
1806 KG
3982 LB

GAWR FRT
887 KG
1956 LB

GAWR RR
919 KG
2026 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.

1G8JU52FX1Y577915

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.

1G8JU52FX1Y577915

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



Pre-Test Impact Point on Vehicle



Post-Test Impact Point on Vehicle



Post-Test Driver Dummy Head Contact with Pole



Post-Test Pole Contact View



Post-Test Driver Dummy Contact

A-30.



Impact

APPENDIX B
VEHICLE AND ES-2 RESPONSE DATA TRACES

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The dummy and vehicle X and Y velocities presented in this report do not contain the correct initial velocity. The correct initial velocities should be:

X - Test Speed * Sine 15 Degrees

Y - Test Speed * Cosine 15 Degrees

Occupant:

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* No Valid Data After Approximately 80 msec.

** No Valid Data After Approximately 30 msec.

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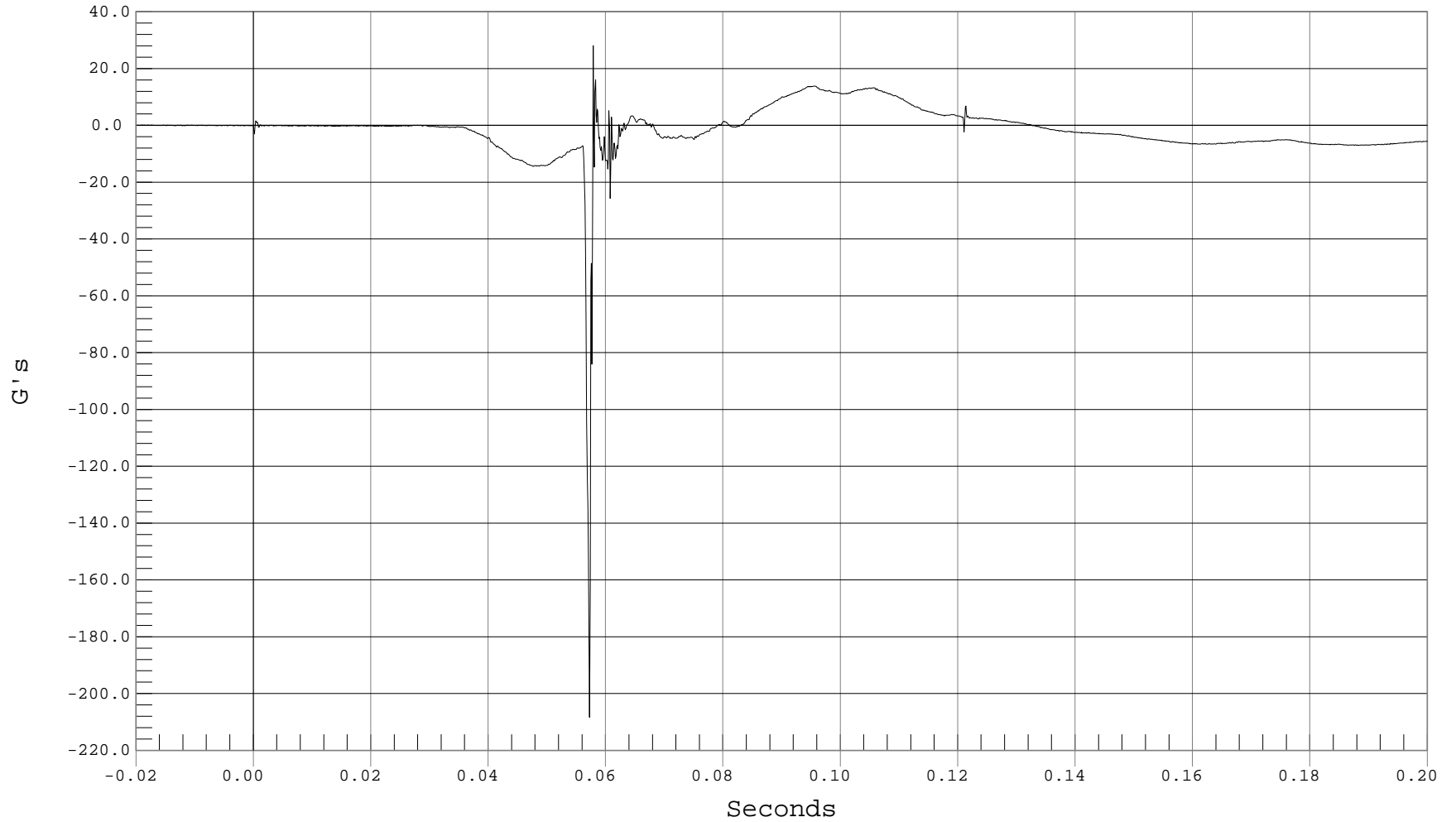
DRIVER HEAD X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER HEAD X, B02037AT.A01

Ymin = -208.4 G's @ 0.0572 Seconds, Ymax = 28.1 G's @ 0.0578 Seconds





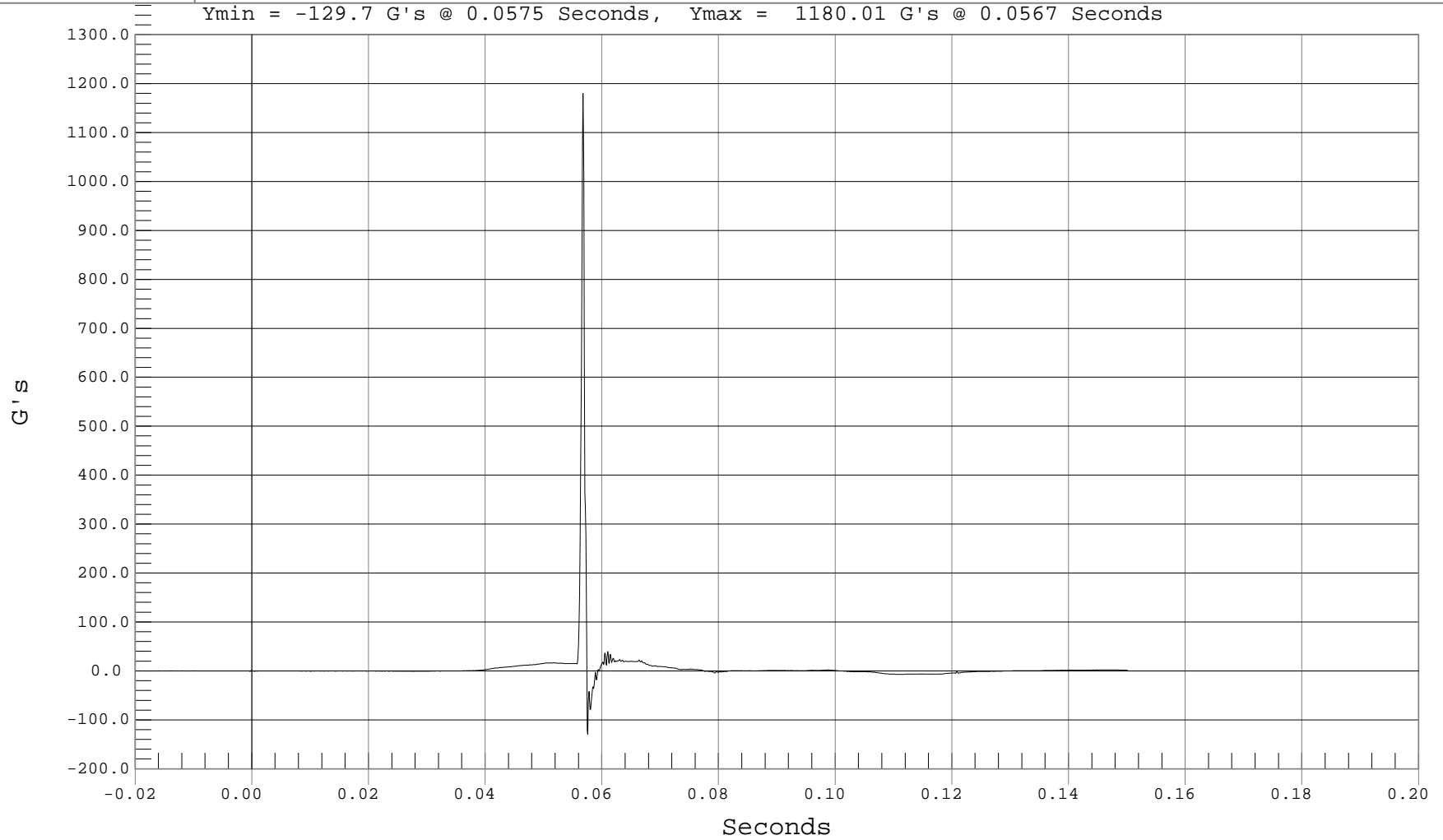
DRIVER HEAD Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER HEAD Y, B02037AT.A02

Ymin = -129.7 G's @ 0.0575 Seconds, Ymax = 1180.01 G's @ 0.0567 Seconds



B-2



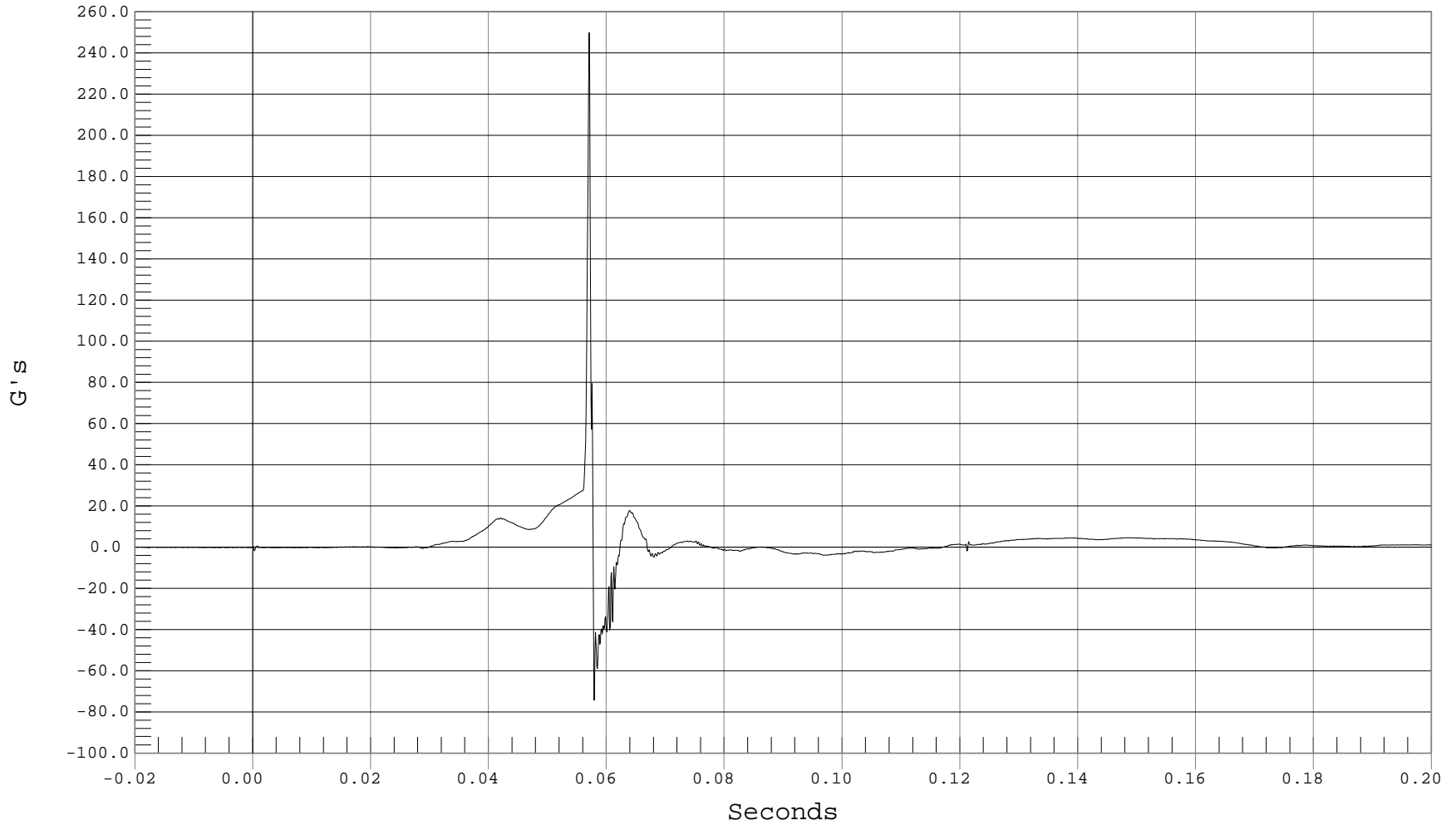
DRIVER HEAD Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER HEAD Z, B02037AT.A03

Ymin = -74.38 G's @ 0.0579 Seconds, Ymax = 249.87 G's @ 0.0570 Seconds





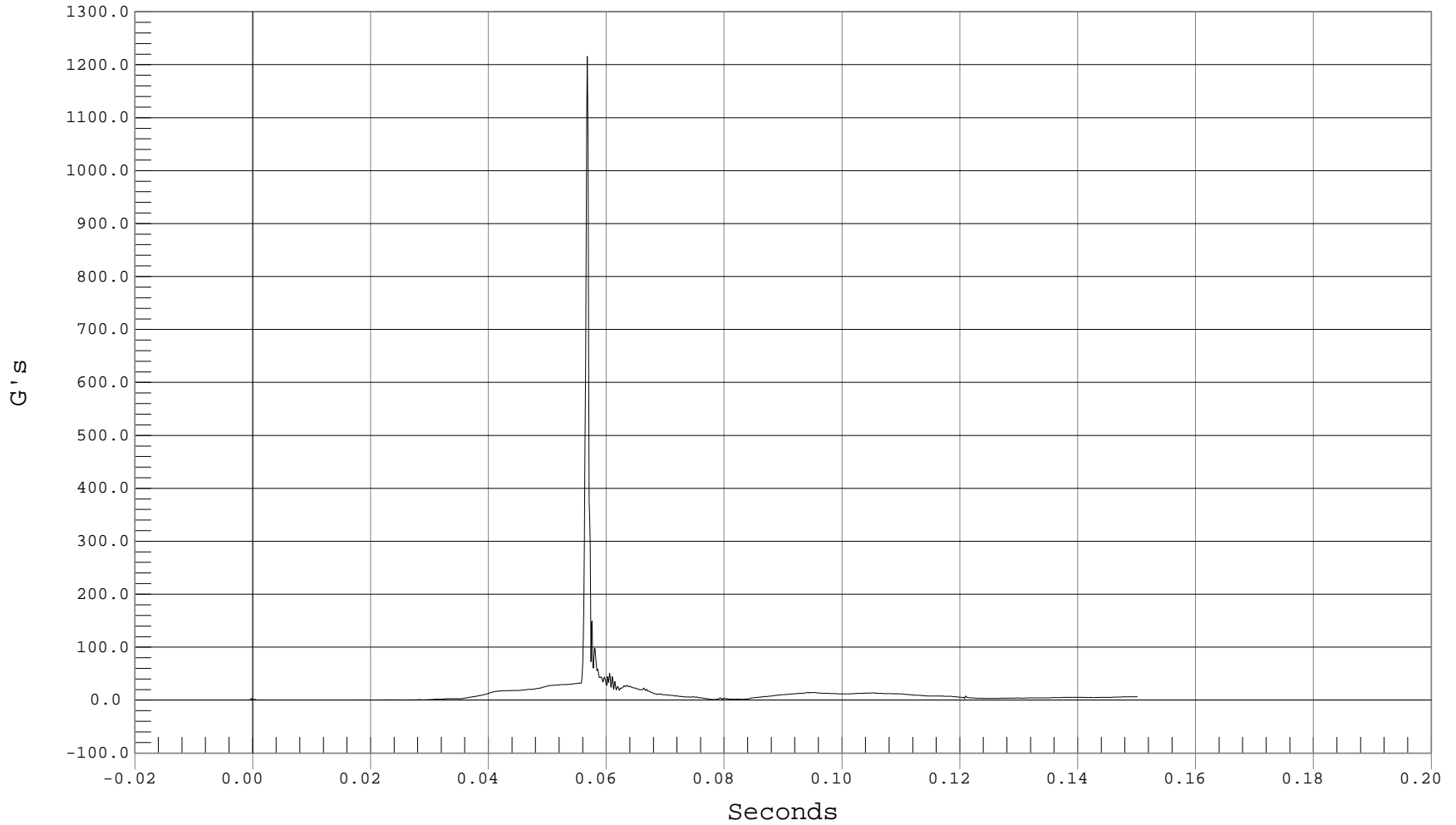
DRIVER HEAD RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER HEAD RESULTANT, B02037AV.A01

Ymin = .01 G's @ -0.0150 Seconds, Ymax = 1215.9 G's @ 0.0567 Seconds



B-4



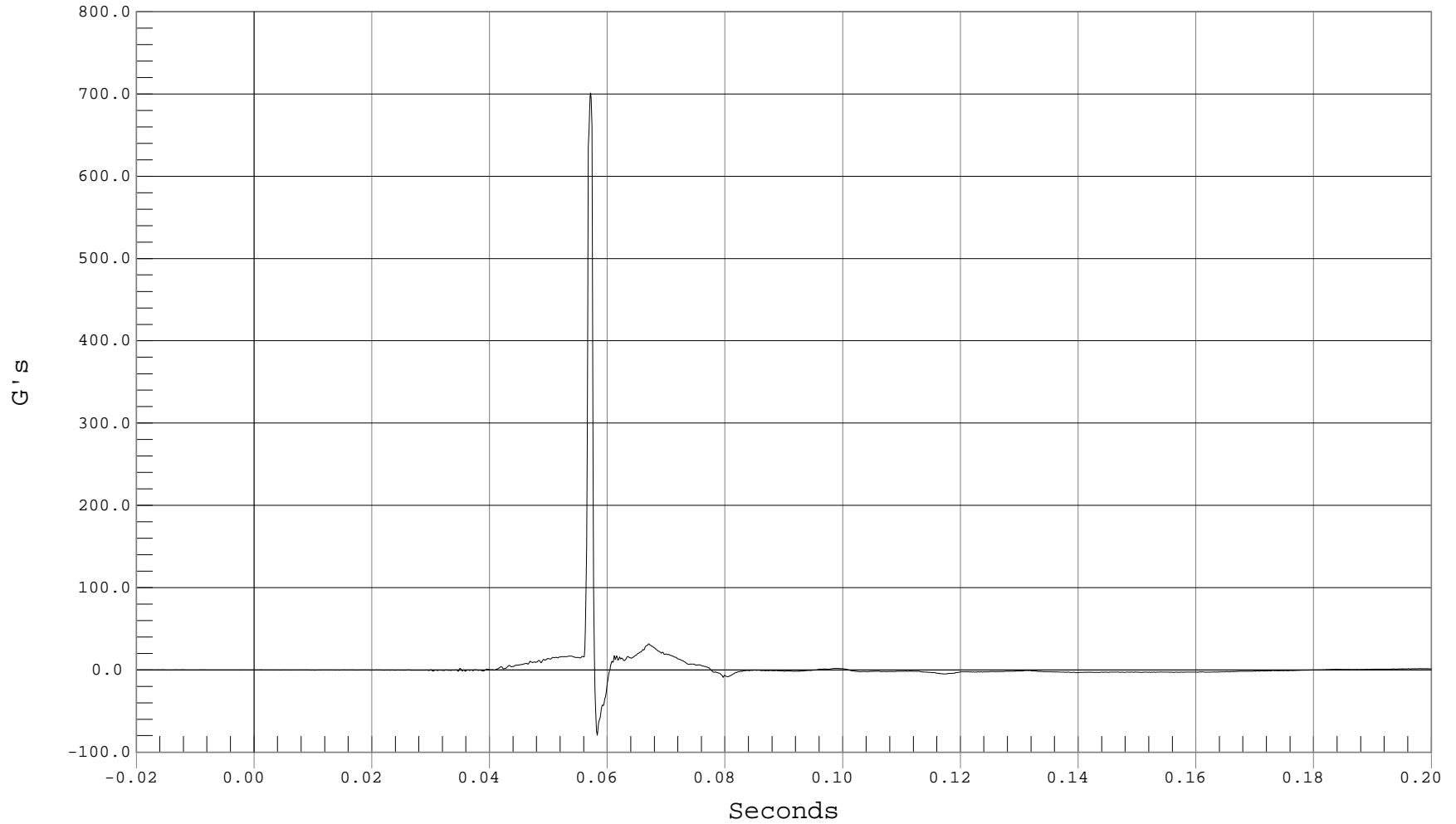
DRIVER HEAD FRONT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER HEAD FRONT Y, B02037AT.A75

Ymin = -79.59 G's @ 0.0582 Seconds, Ymax = 701.33 G's @ 0.0571 Seconds



B-5



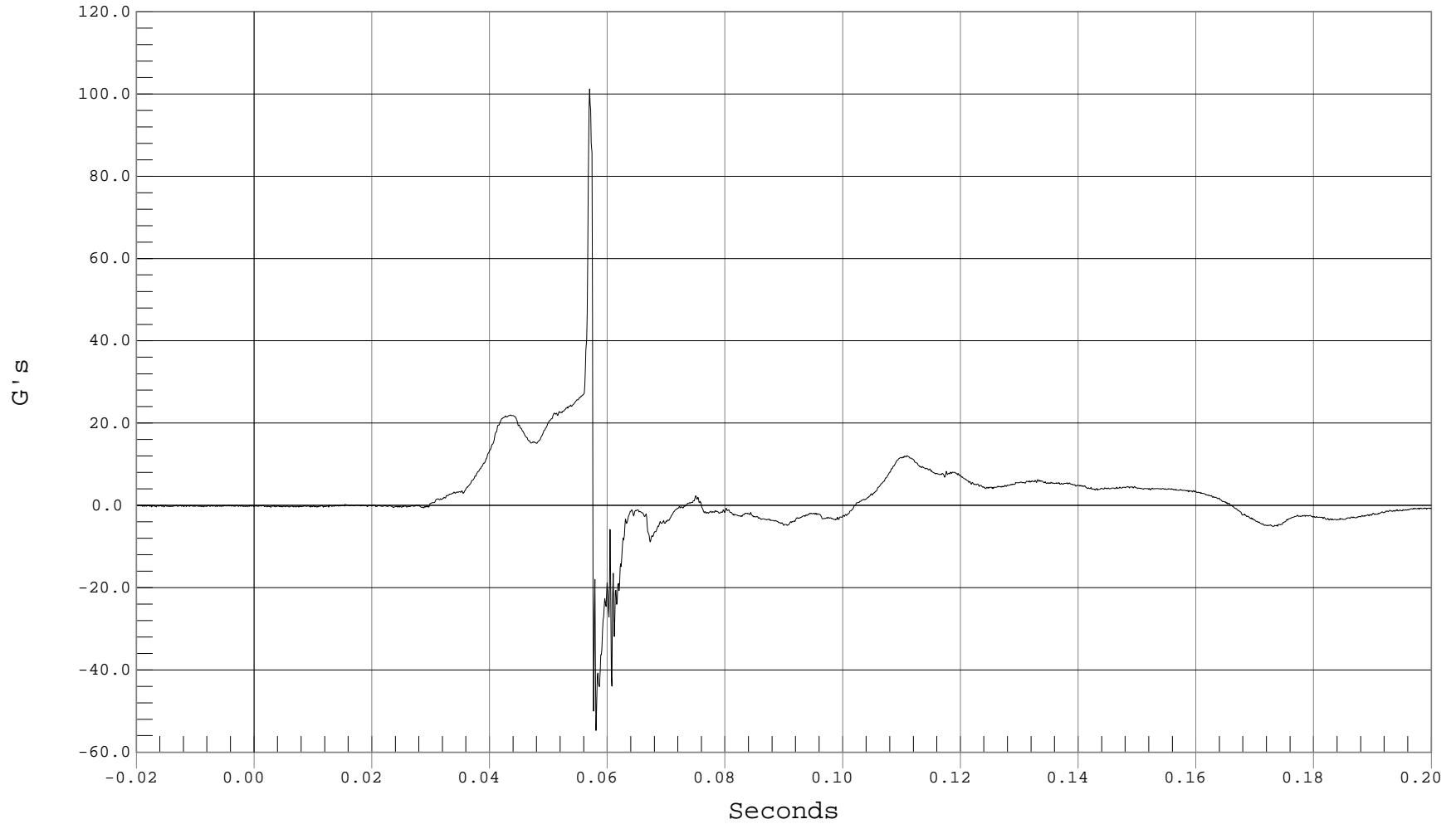
DRIVER HEAD FRONT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER HEAD FRONT Z, B02037AT.A76

Ymin = -54.76 G's @ 0.0580 Seconds, Ymax = 101.24 G's @ 0.0569 Seconds



B-6



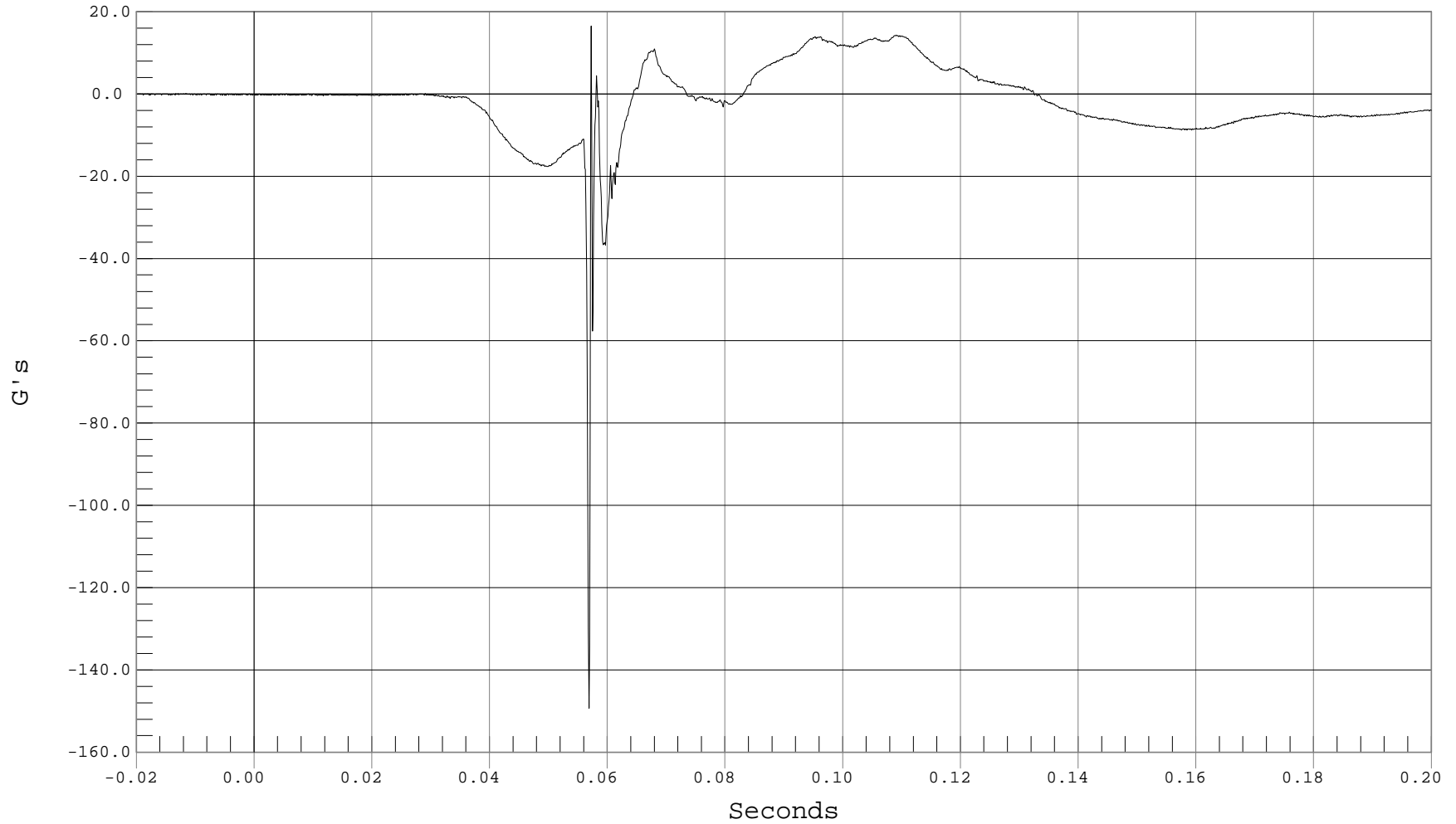
DRIVER HEAD LEFT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER HEAD LEFT X, B02037AT.A77

Ymin = -149.32 G's @ 0.0568 Seconds, Ymax = 16.55 G's @ 0.0572 Seconds





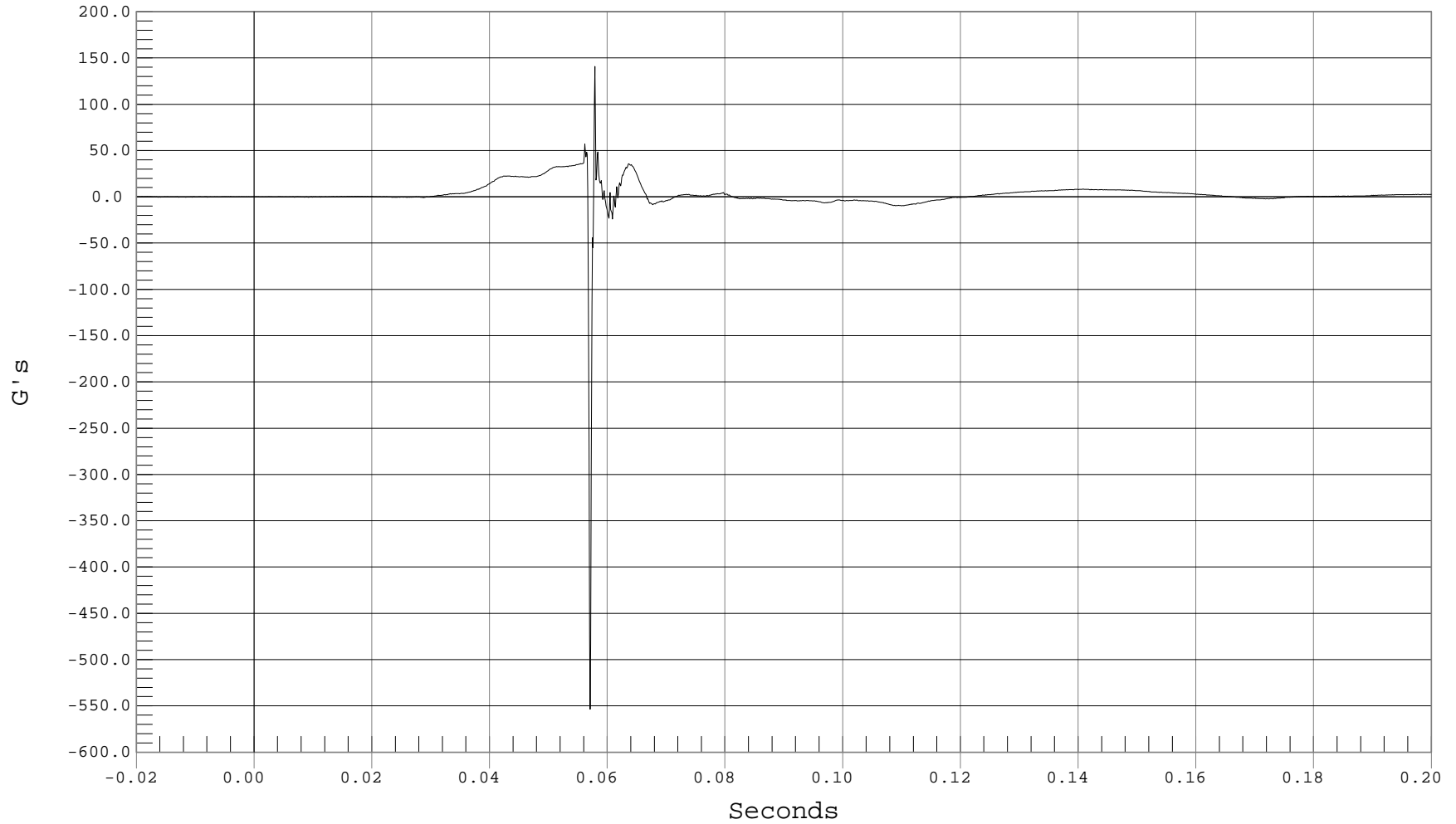
DRIVER HEAD LEFT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER HEAD LEFT Z, B02037AT.A78

Ymin = -553.75 G's @ 0.0570 Seconds, Ymax = 140.79 G's @ 0.0578 Seconds



B-8



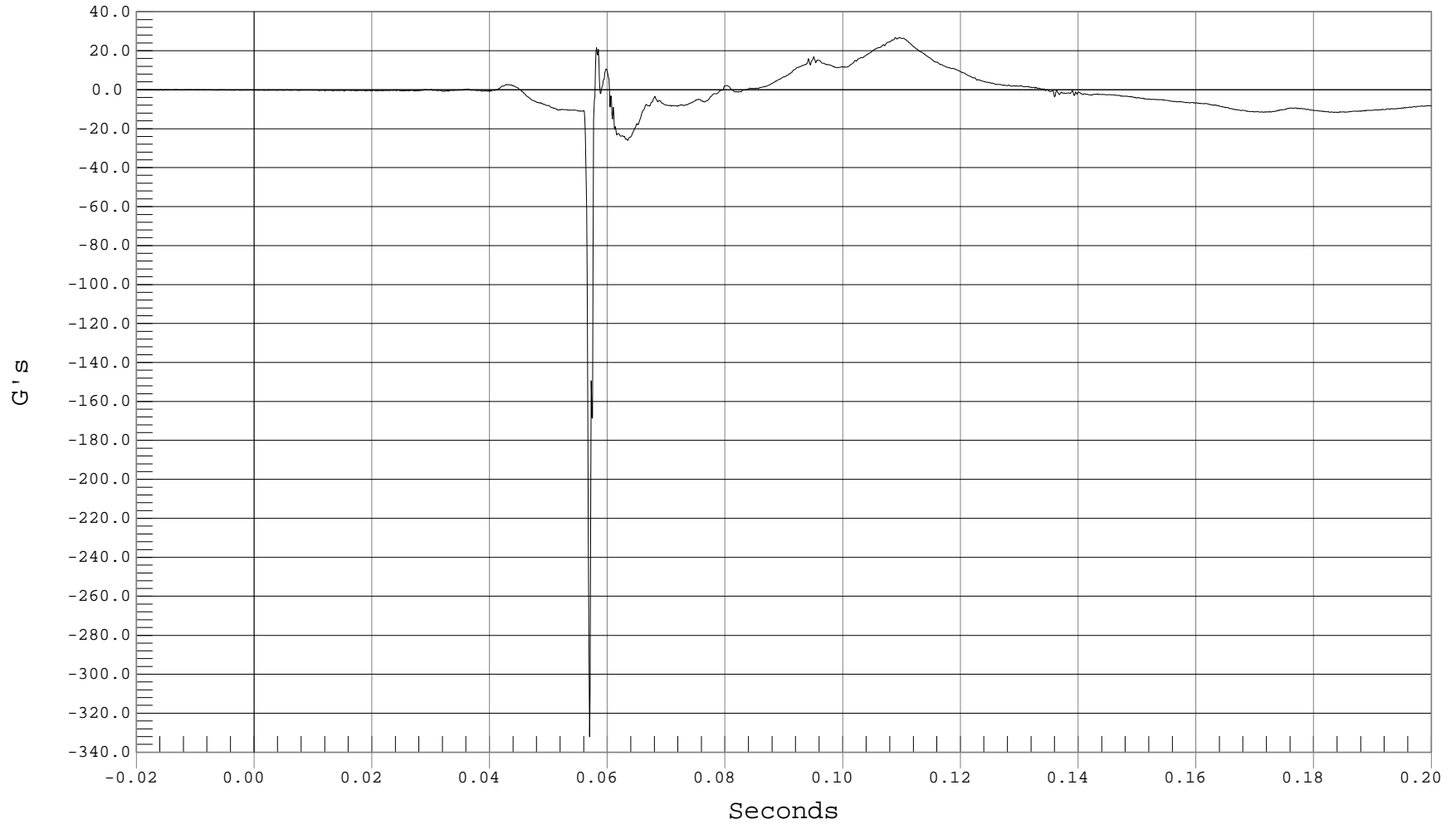
DRIVER HEAD TOP X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER HEAD TOP X, B02037AT.A79

Ymin = -332.1 G's @ 0.0569 Seconds, Ymax = 26.8 G's @ 0.1096 Seconds



B-9



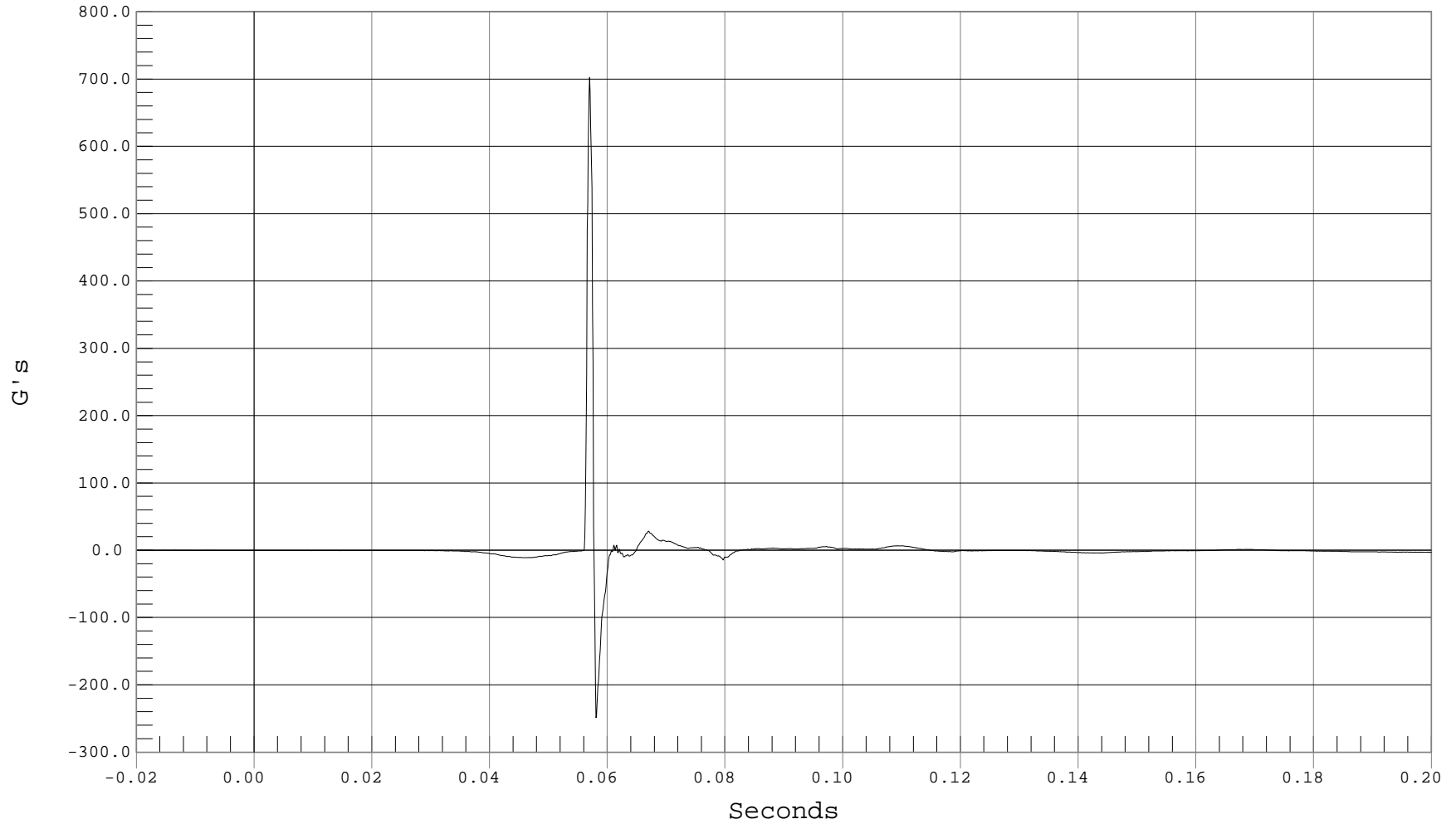
DRIVER HEAD TOP Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER HEAD TOP Y, B02037AT.A80

Ymin = -248.95 G's @ 0.0580 Seconds, Ymax = 702.39 G's @ 0.0569 Seconds



B-10



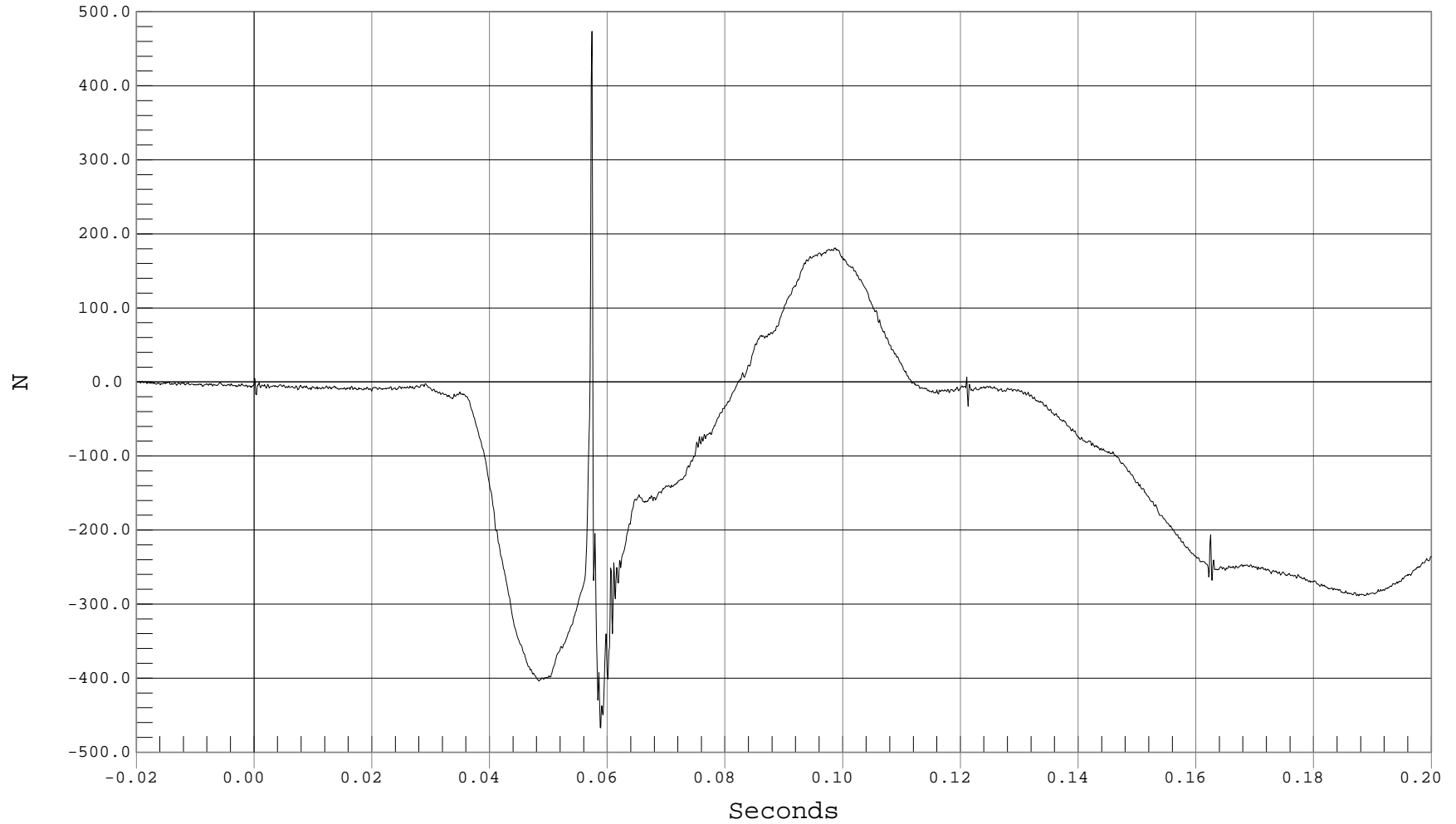
DRIVER UPPER NECK FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER UPPER NECK FX, B02037FT.F15

Ymin = -467.2 N @ 0.0588 Seconds, Ymax = 473.53 N @ 0.0573 Seconds



B-11



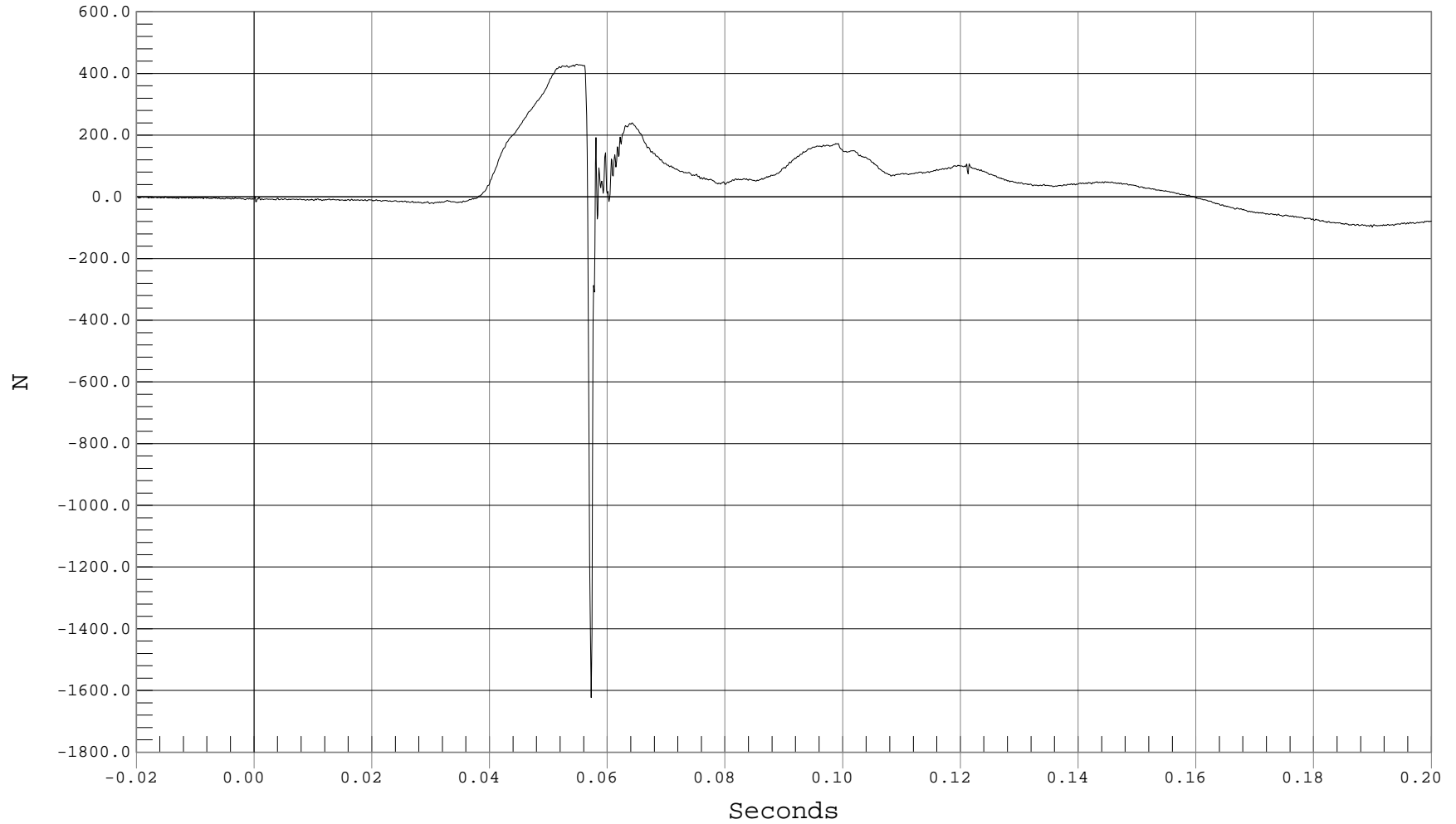
DRIVER UPPER NECK FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER UPPER NECK FY, B02037FT.F16

Ymin = -1622.98 N @ 0.0572 Seconds, Ymax = 430.12 N @ 0.0548 Seconds



B-12



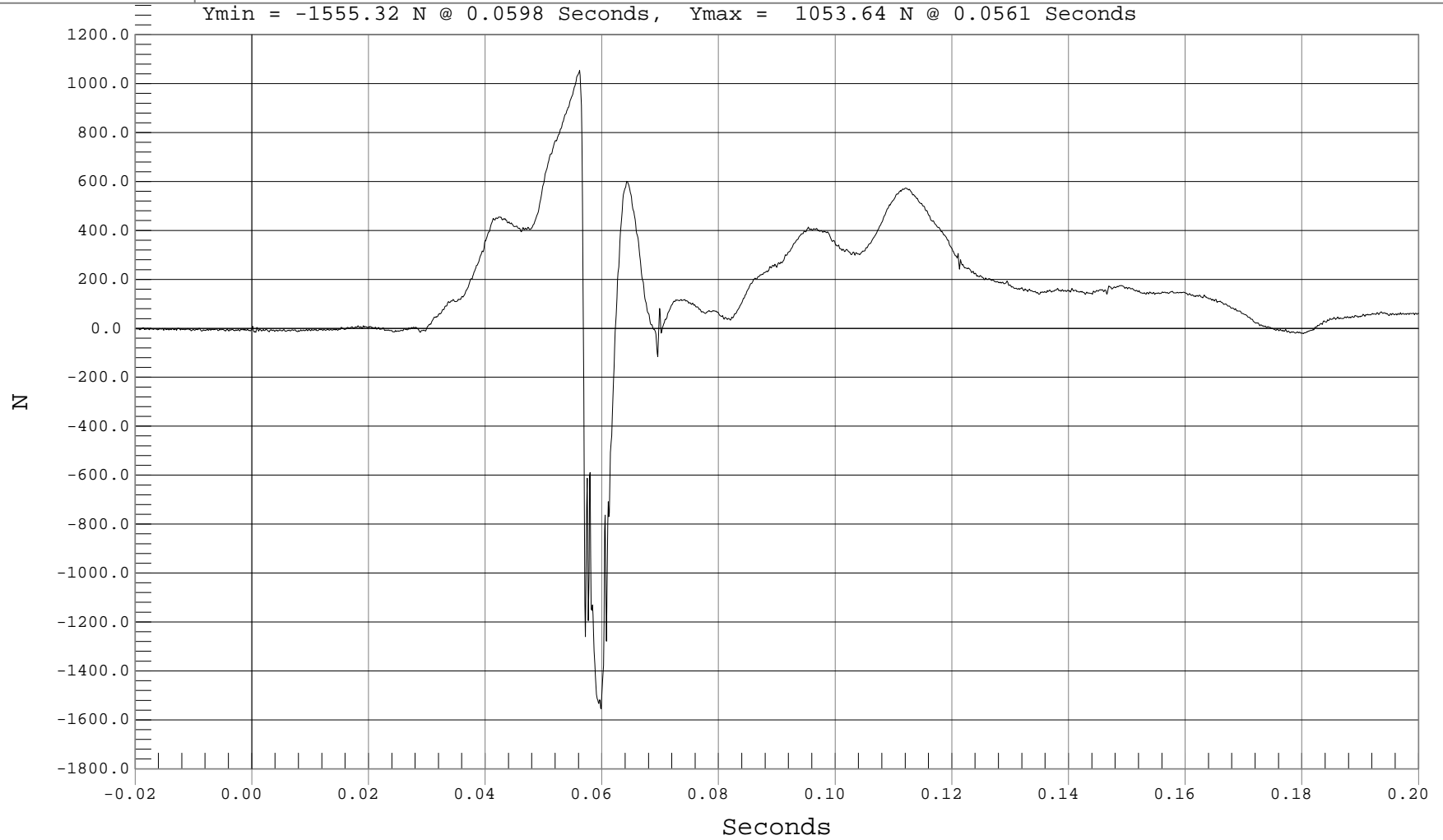
DRIVER UPPER NECK FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER UPPER NECK FZ, B02037FT.F17

Ymin = -1555.32 N @ 0.0598 Seconds, Ymax = 1053.64 N @ 0.0561 Seconds



B-13



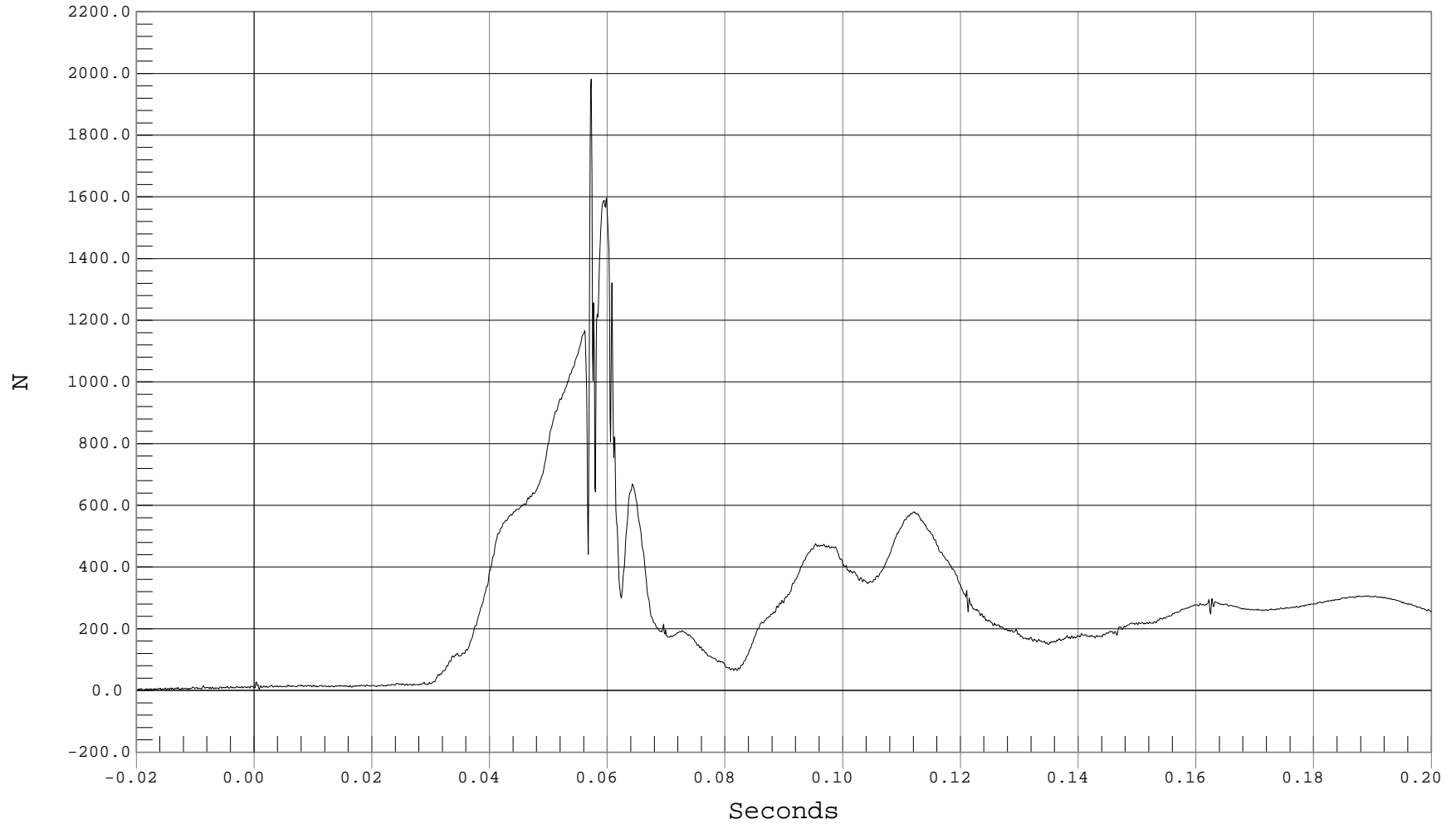
DRIVER UPPER NECK FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER UPPER NECK FORCE RESULTANT, B02037FV.F15

Ymin = .53 N @ -0.0186 Seconds, Ymax = 1981.2 N @ 0.0572 Seconds



B-14



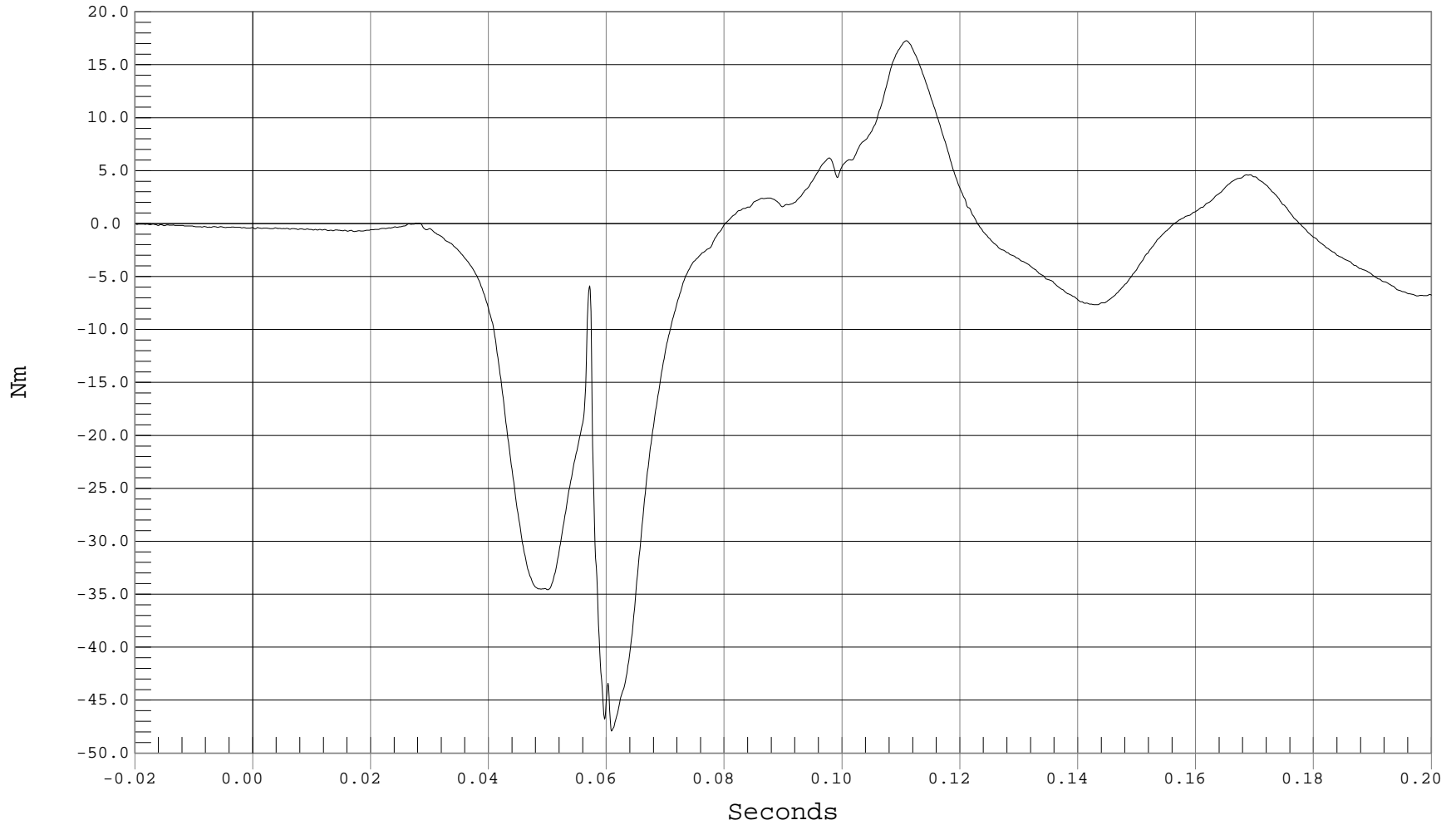
DRIVER UPPER NECK MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER NECK MX, B02037MF.M18

Ymin = -47.93 Nm @ 0.0608 Seconds, Ymax = 17.27 Nm @ 0.1108 Seconds





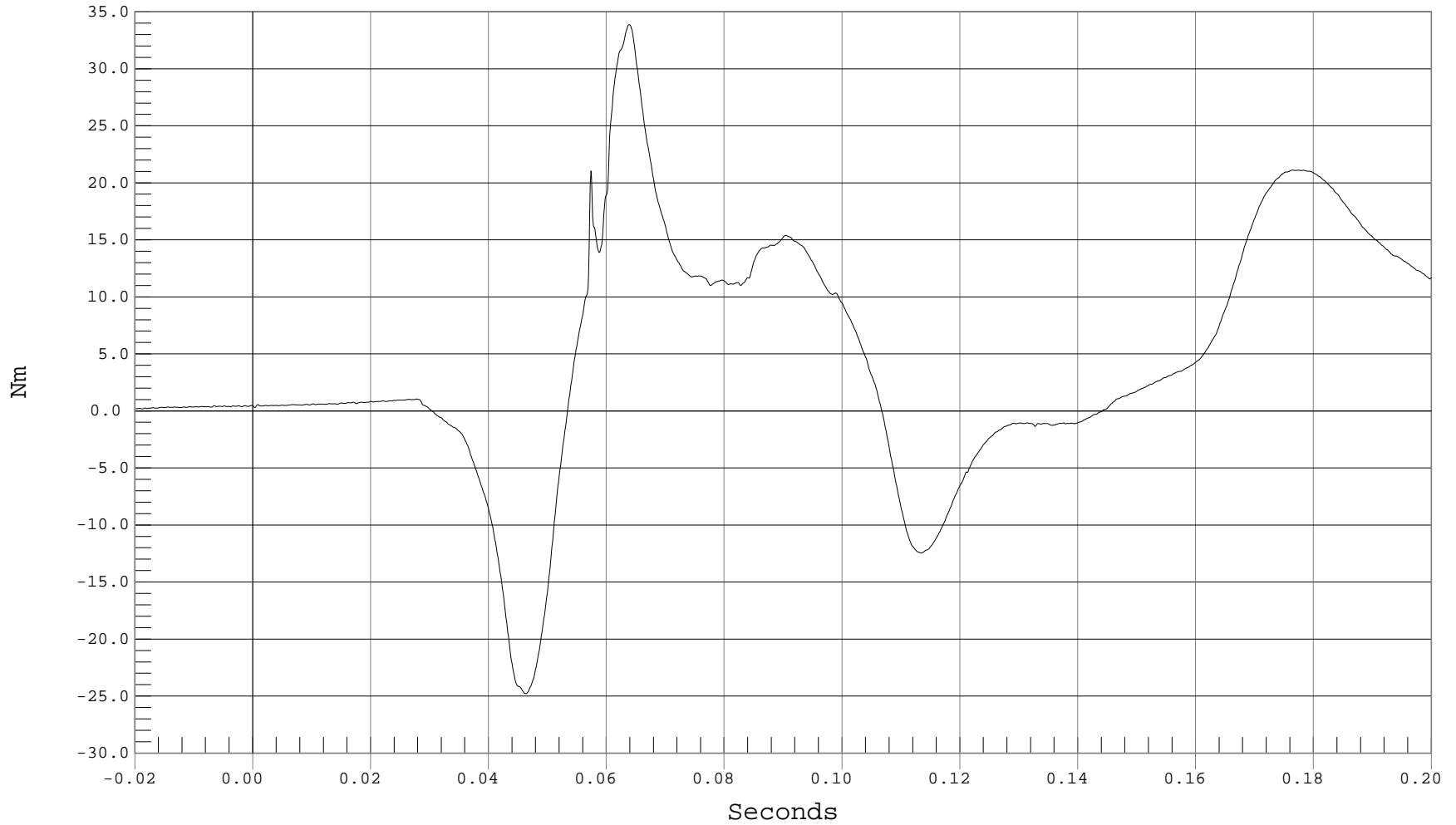
DRIVER UPPER NECK MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER NECK MY, B02037MF.M19

Ymin = -24.79 Nm @ 0.0462 Seconds, Ymax = 33.87 Nm @ 0.0638 Seconds





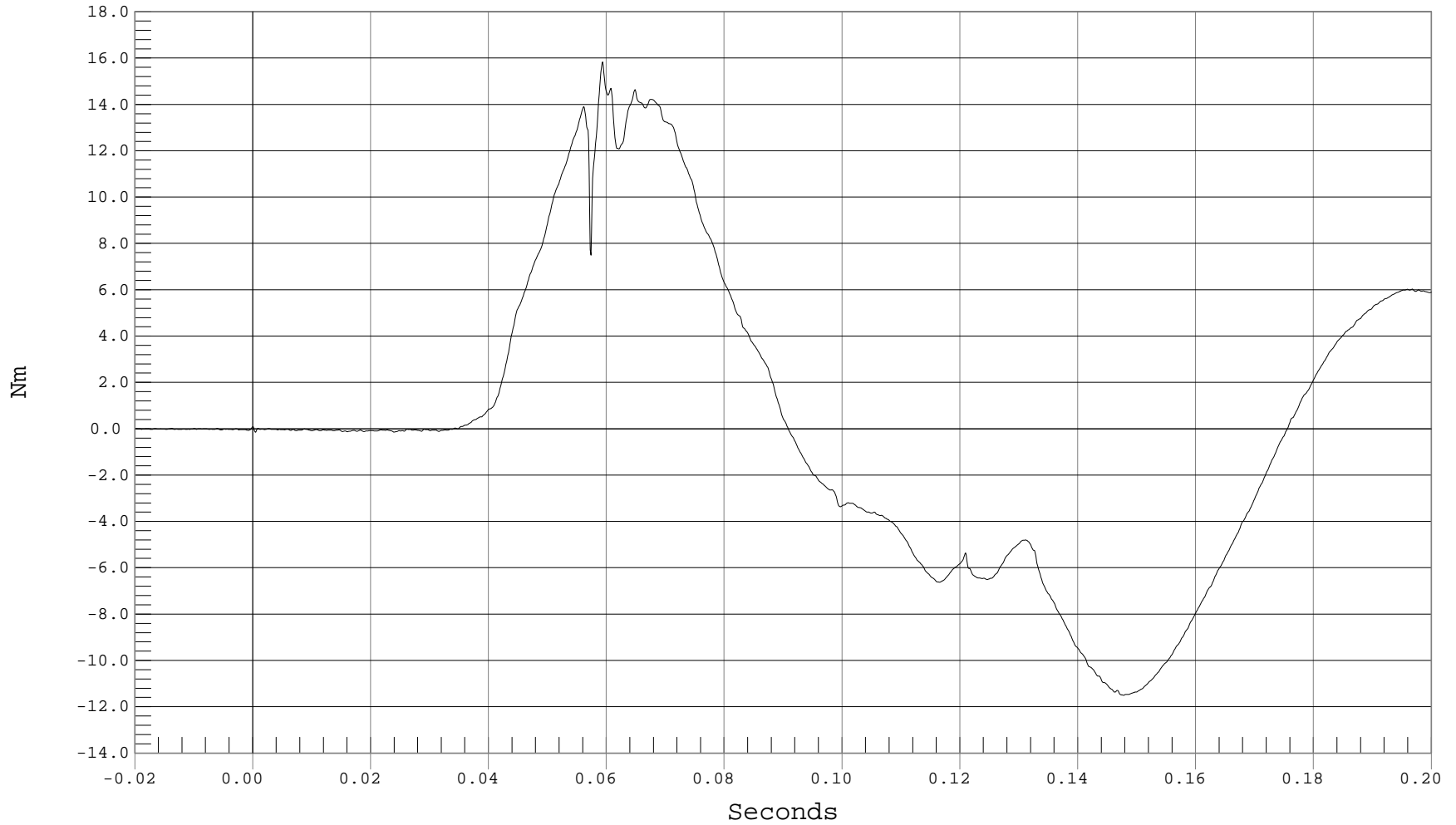
DRIVER UPPER NECK MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER NECK MZ, B02037MF.M20

Ymin = -11.51 Nm @ 0.1477 Seconds, Ymax = 15.83 Nm @ 0.0593 Seconds





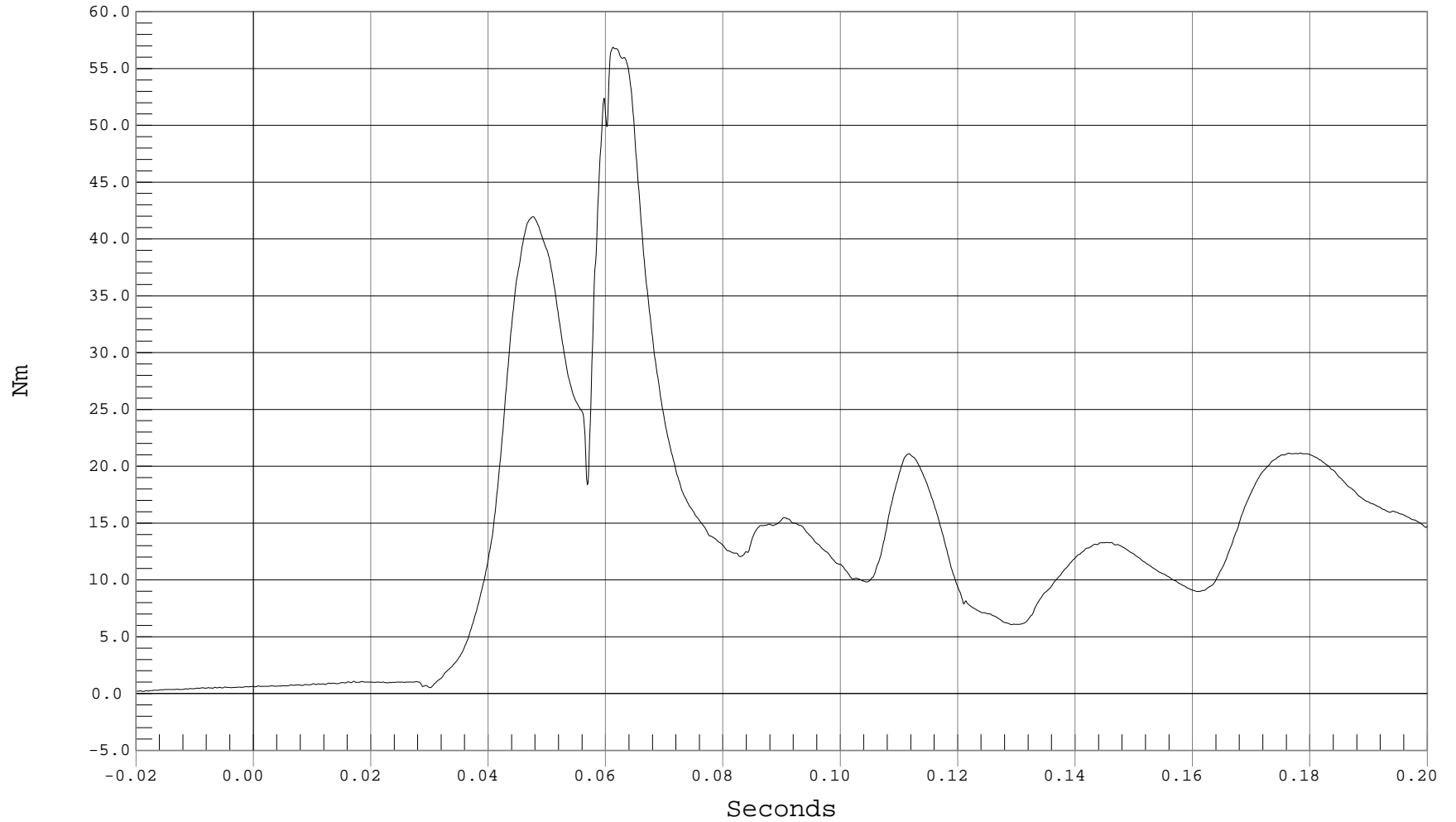
DRIVER UPPER NECK MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER UPPER NECK MOMENT RESULTANT, B02037MV.M18

Ymin = .18 Nm @ -0.0188 Seconds, Ymax = 56.88 Nm @ 0.0612 Seconds



B-18



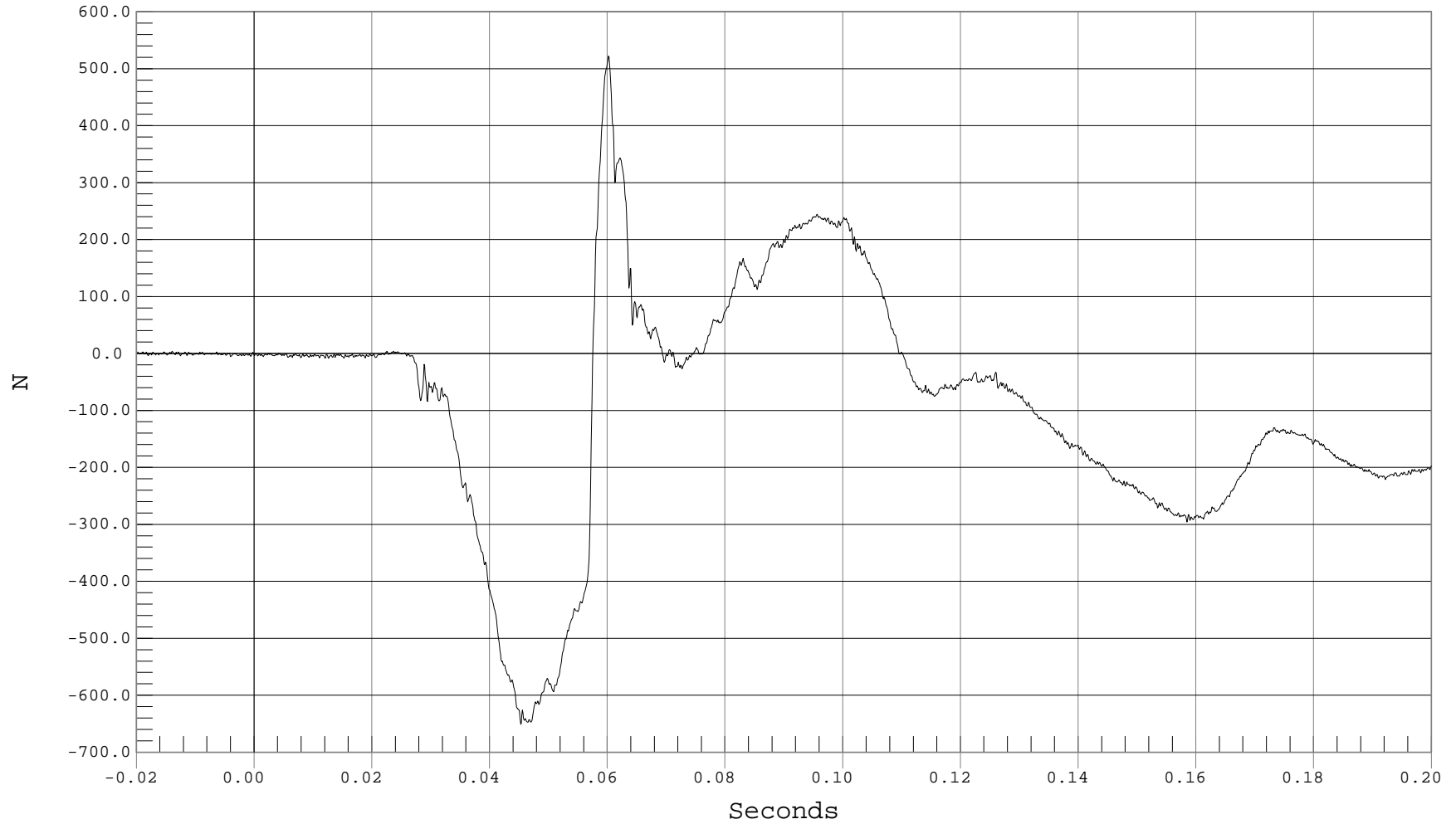
DRIVER LOWER NECK FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FX, B02037FT.F69

Ymin = -651.38 N @ 0.0452 Seconds, Ymax = 522.23 N @ 0.0601 Seconds



B-19



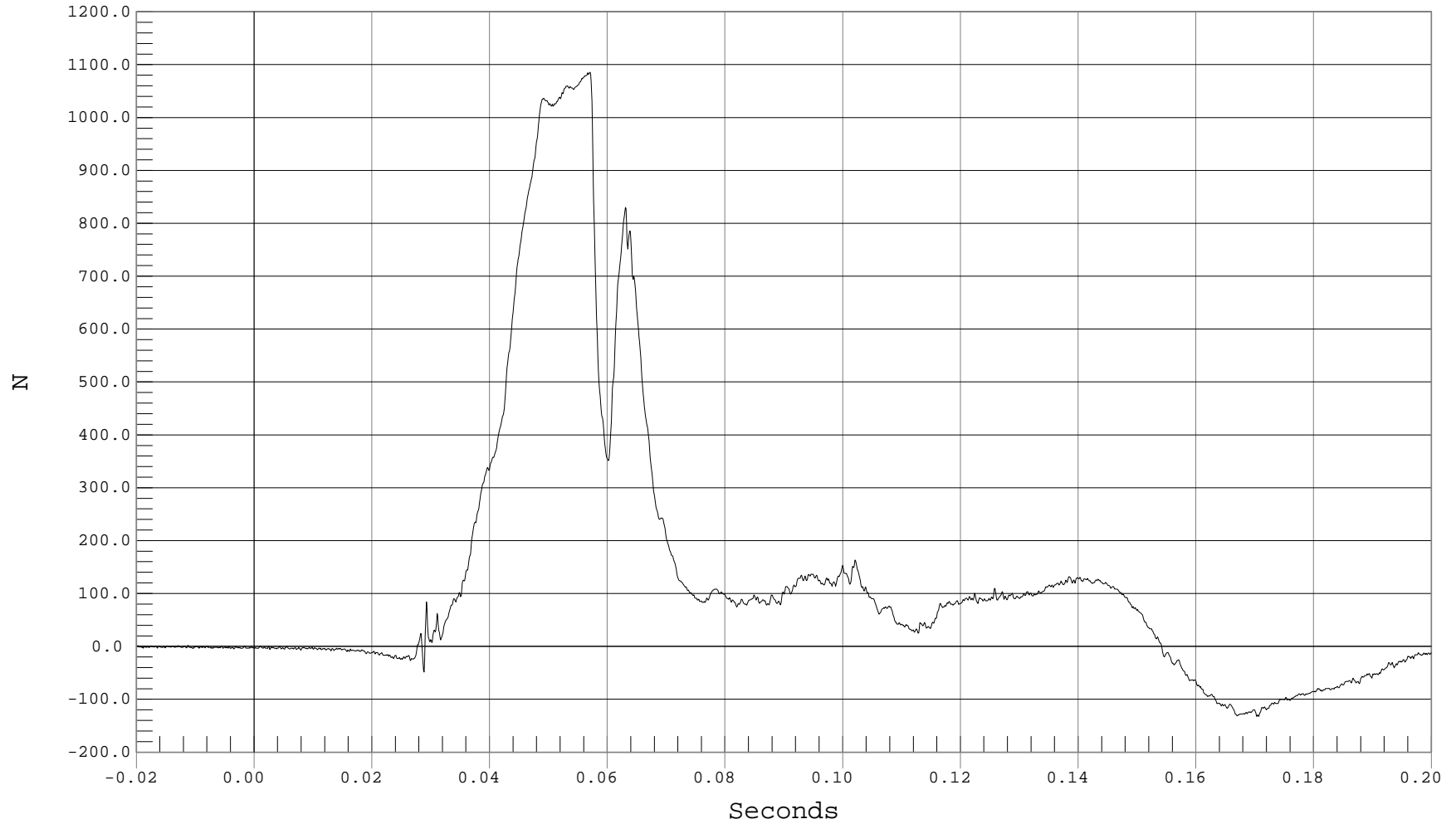
DRIVER LOWER NECK FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FY, B02037FT.F70

Ymin = -132.48 N @ 0.1706 Seconds, Ymax = 1085.53 N @ 0.0570 Seconds



B-20



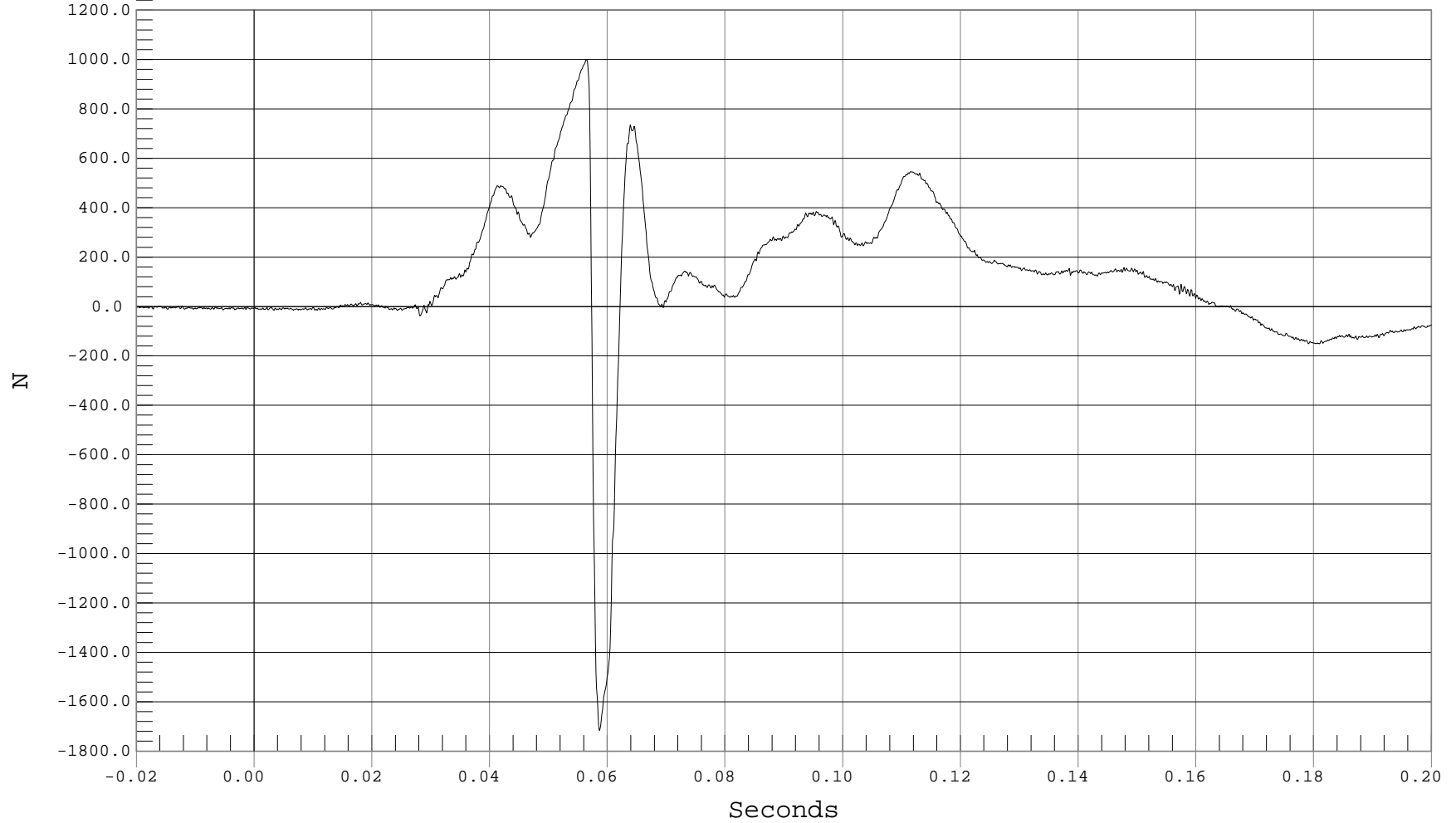
DRIVER LOWER NECK FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FZ, B02037FT.F71

Ymin = -1715.91 N @ 0.0586 Seconds, Ymax = 1000.08 N @ 0.0564 Seconds



B-21



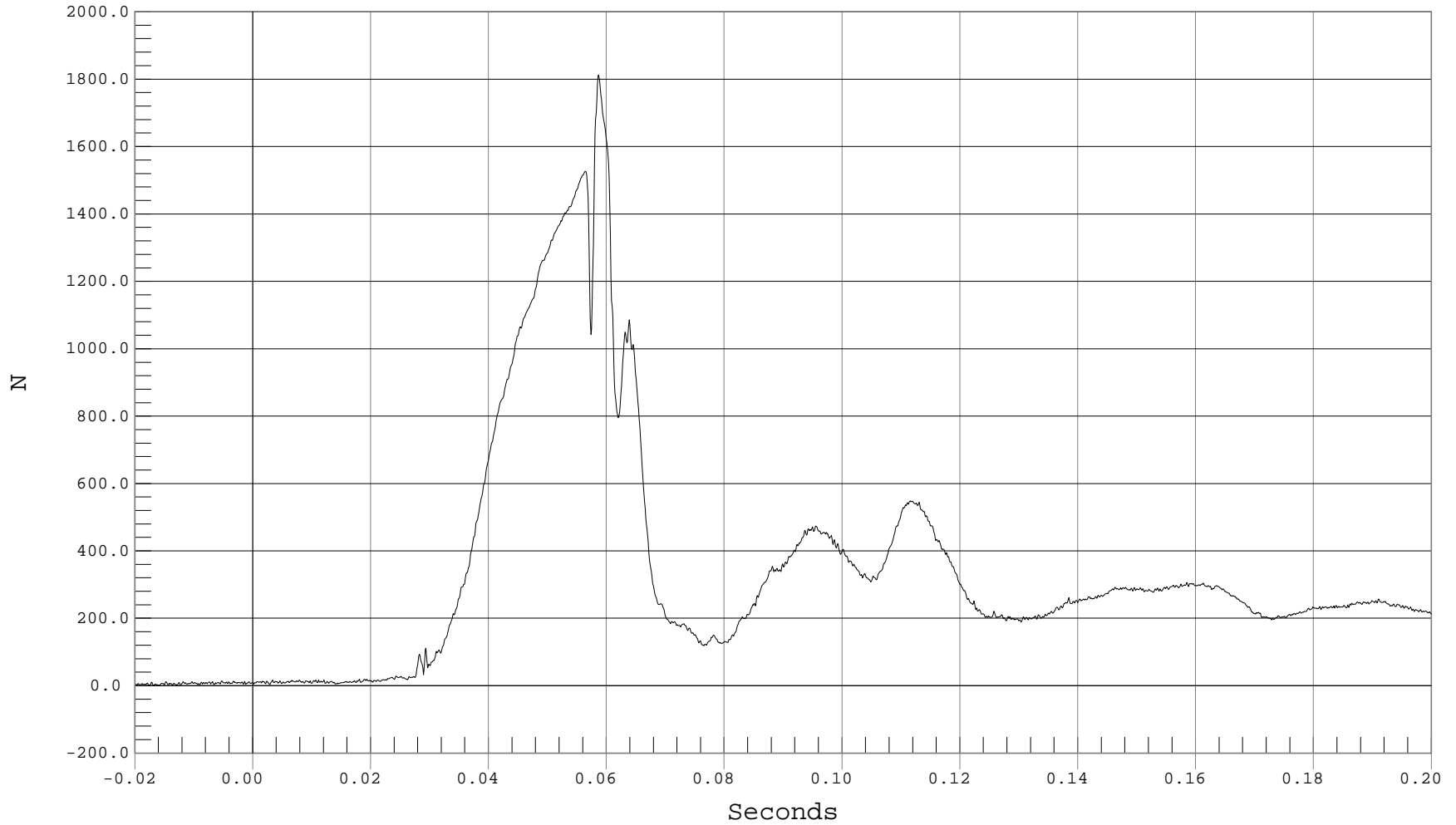
DRIVER LOWER NECK FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LOWER NECK FORCE RESULTANT, B02037FV.F69

Ymin = .93 N @ -0.0161 Seconds, Ymax = 1812.2 N @ 0.0586 Seconds





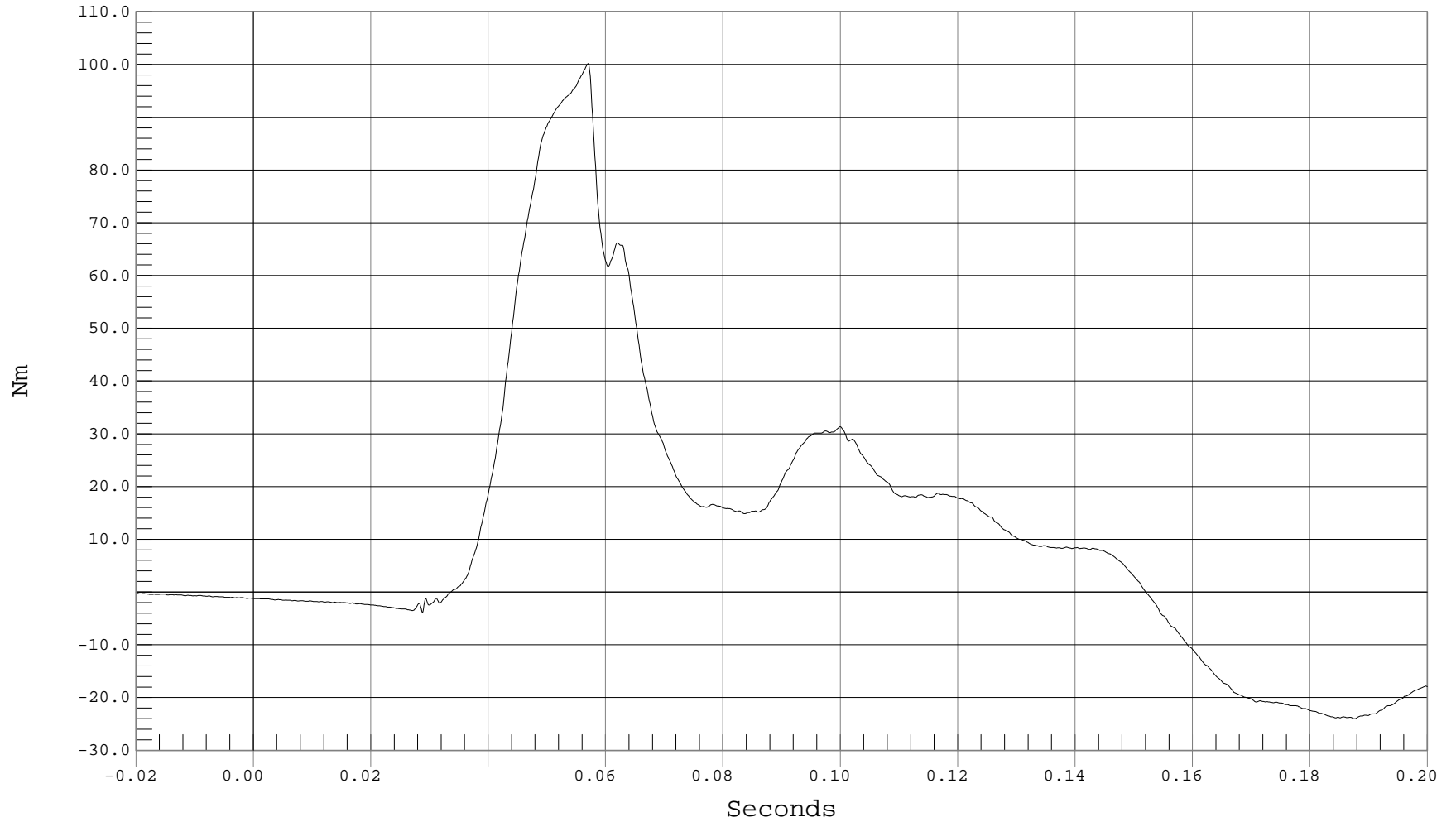
DRIVER LOWER NECK MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MX, B02037MF.M72

Ymin = -23.99 Nm @ 0.1876 Seconds, Ymax = 100.16 Nm @ 0.0569 Seconds





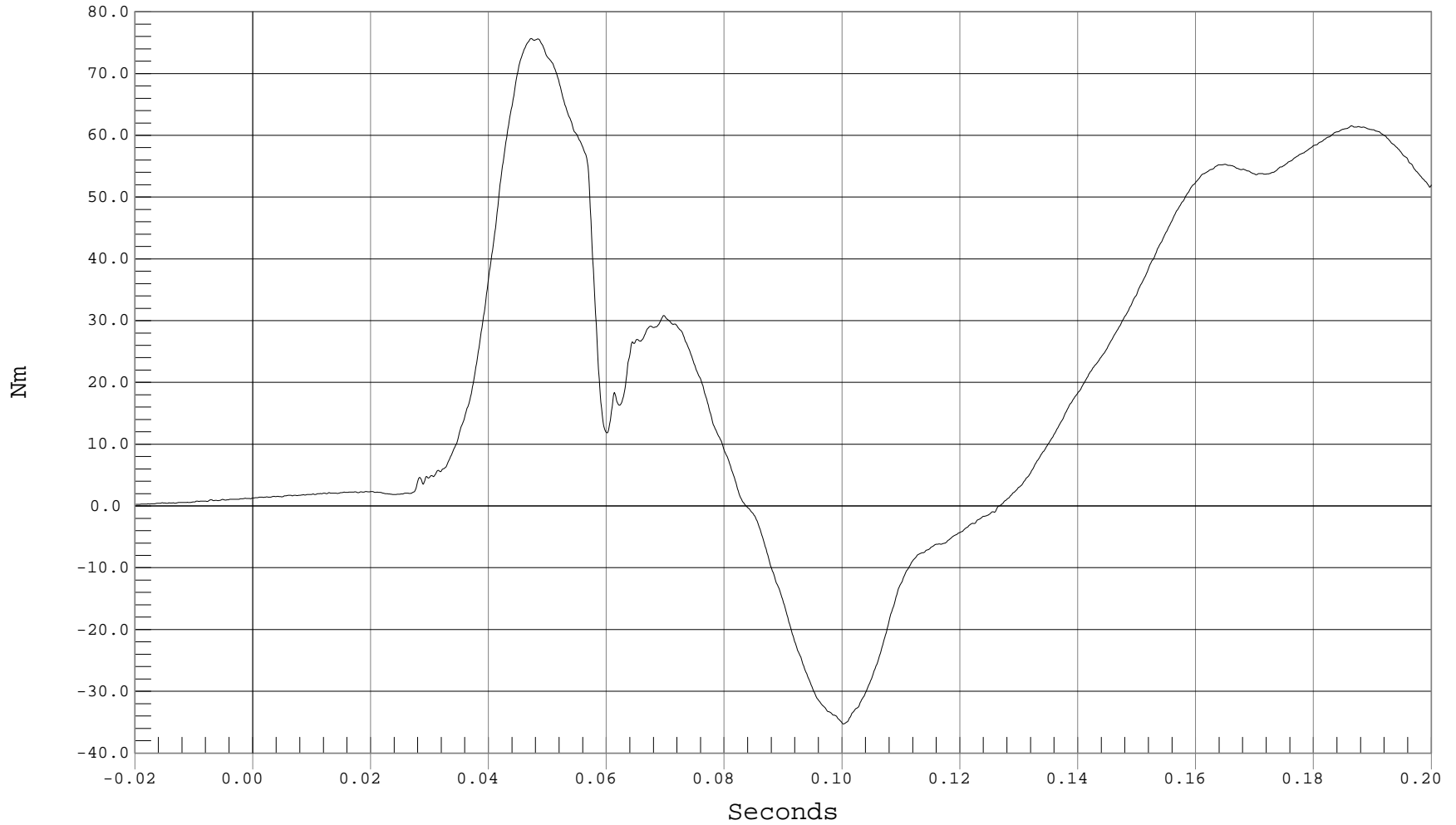
DRIVER LOWER NECK MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MY, B02037MF.M73

Ymin = -35.29 Nm @ 0.1002 Seconds, Ymax = 75.66 Nm @ 0.0472 Seconds





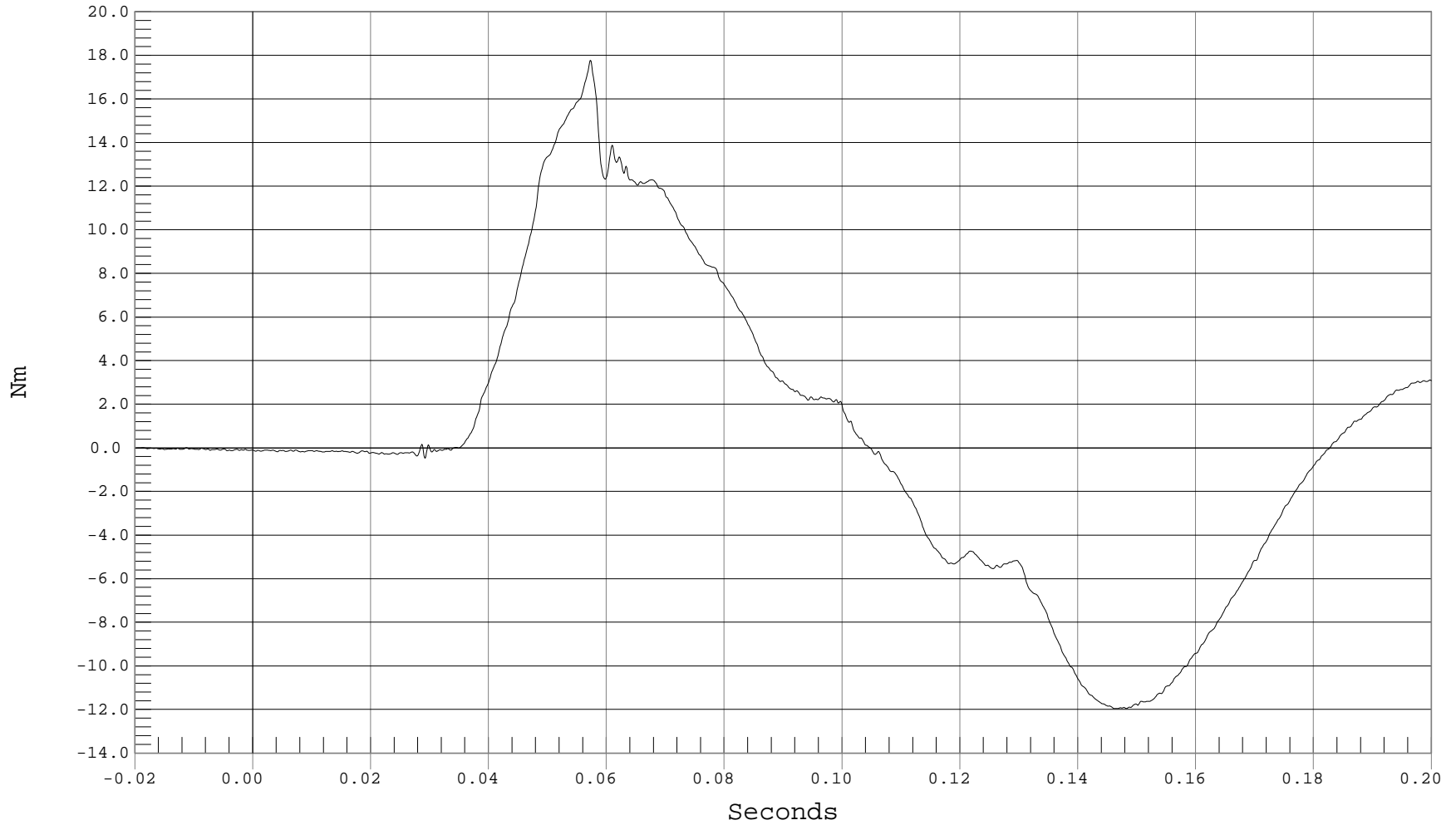
DRIVER LOWER NECK MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LOWER NECK MZ, B02037MF.M74

Ymin = -11.96 Nm @ 0.1465 Seconds, Ymax = 17.77 Nm @ 0.0572 Seconds



B-25



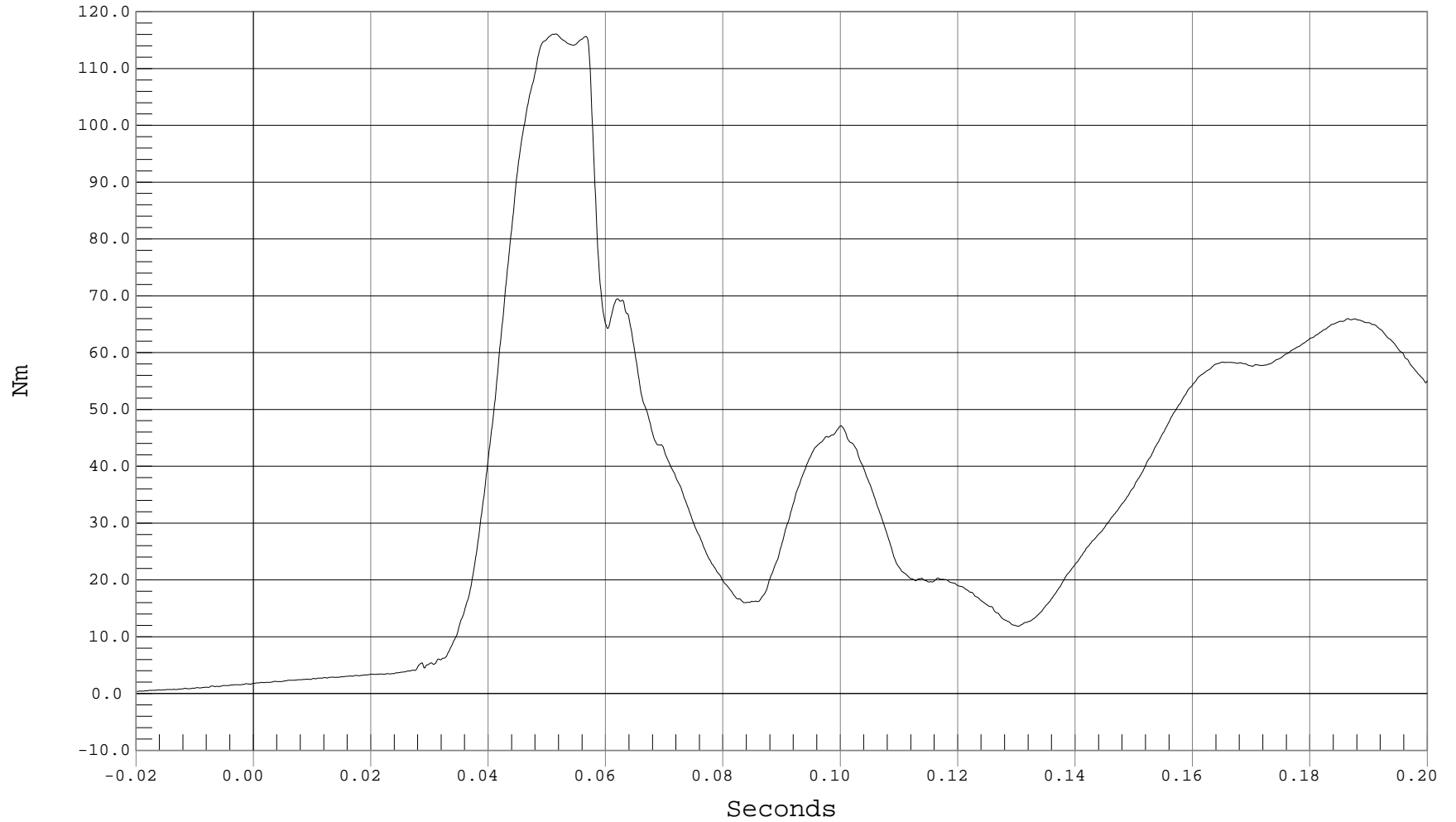
DRIVER LOWER NECK MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

1 DRIVER LOWER NECK MOMENT RESULTANT, B02037MV.M72

Ymin = .37 Nm @ -0.0199 Seconds, Ymax = 116.08 Nm @ 0.0515 Seconds





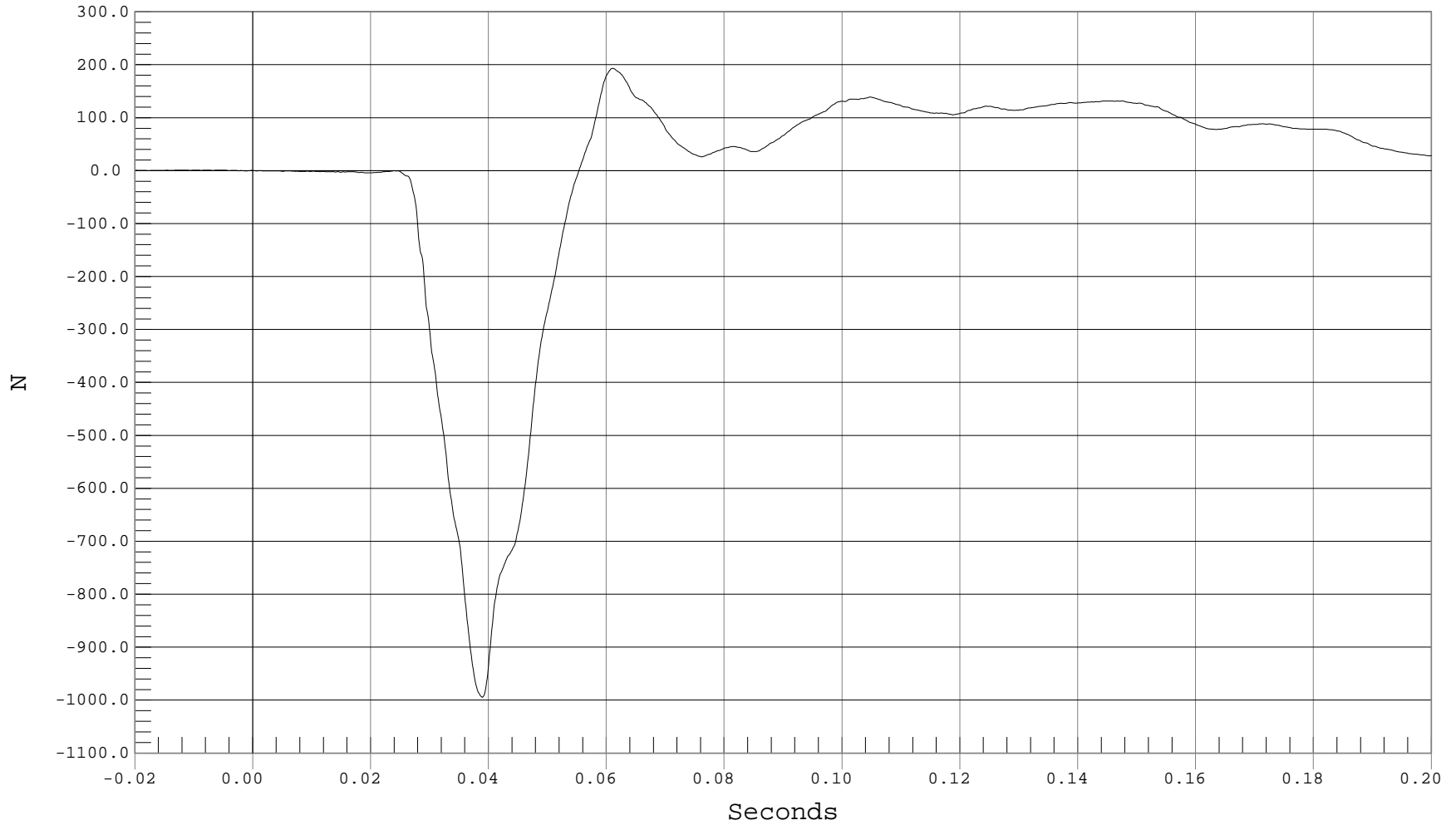
DRIVER SHOULDER FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER SHOULDER FX, B02037FF.F81

Ymin = -994.52 N @ 0.0389 Seconds, Ymax = 193.35 N @ 0.0609 Seconds





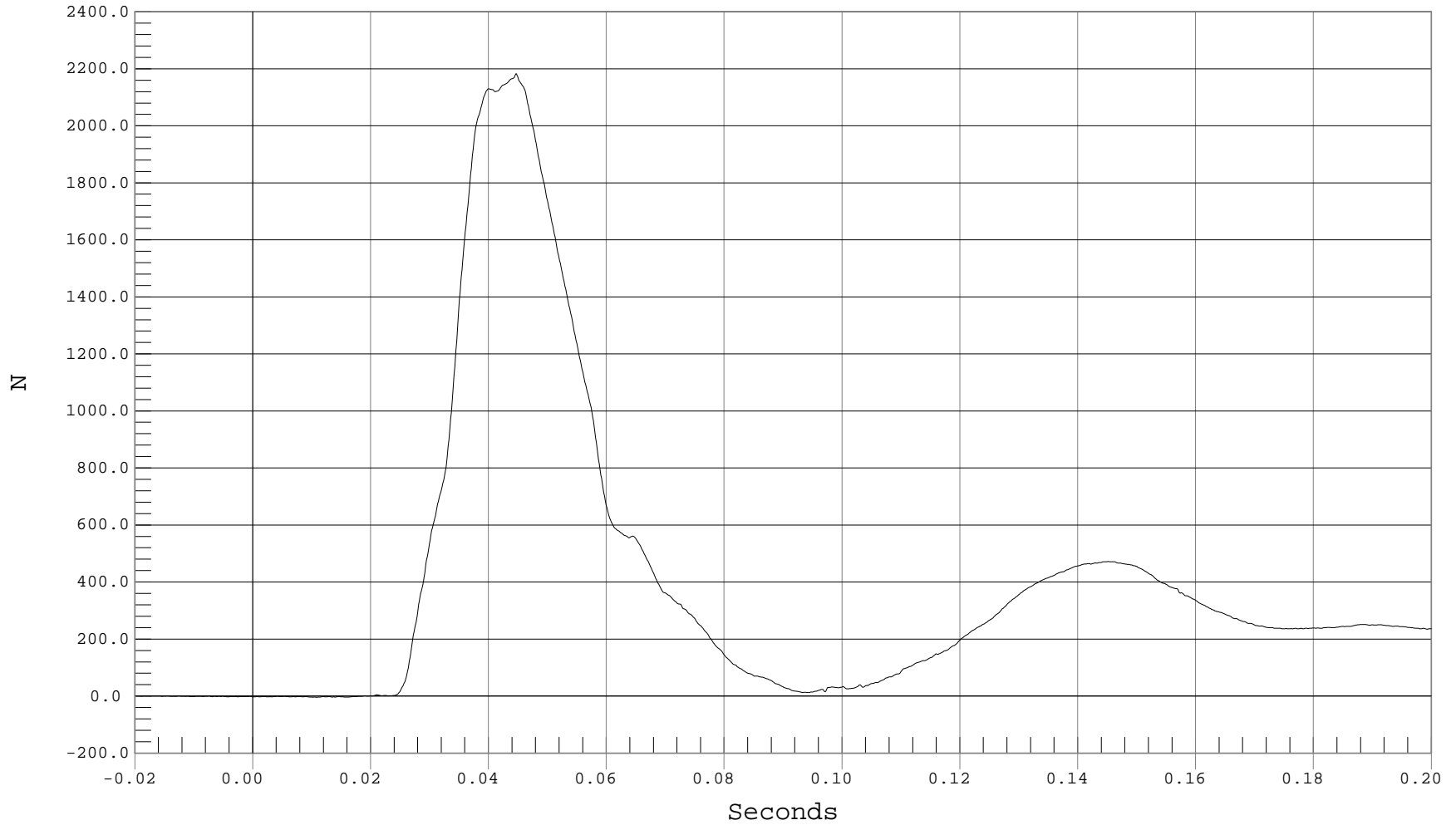
DRIVER SHOULDER FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER SHOULDER FY, B02037FF.F82

Ymin = -3.96 N @ 0.0101 Seconds, Ymax = 2182.95 N @ 0.0446 Seconds



B-28



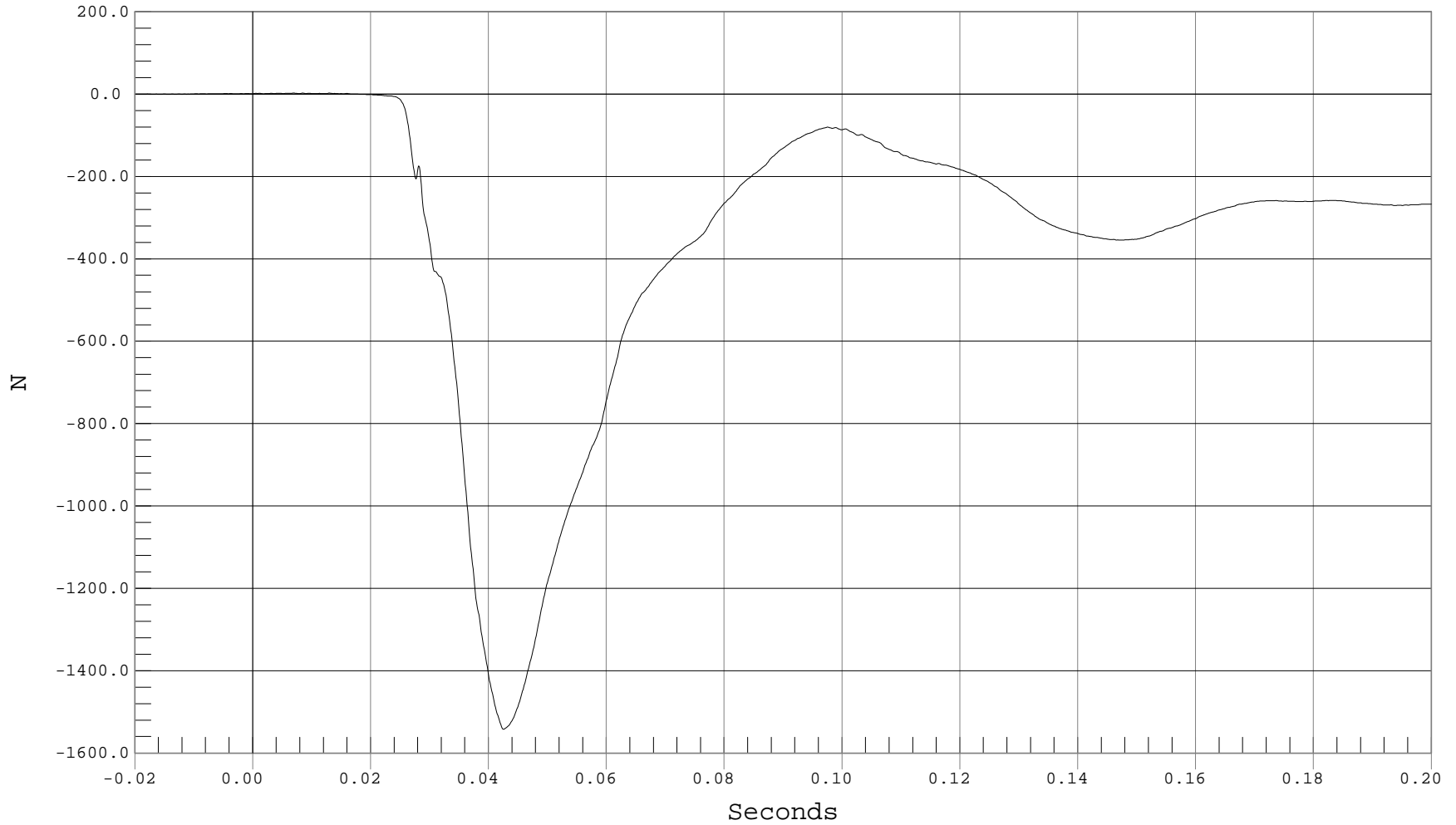
DRIVER SHOULDER FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER SHOULDER FZ, B02037FF.F83

Ymin = -1542.27 N @ 0.0425 Seconds, Ymax = 2.42 N @ 0.0129 Seconds





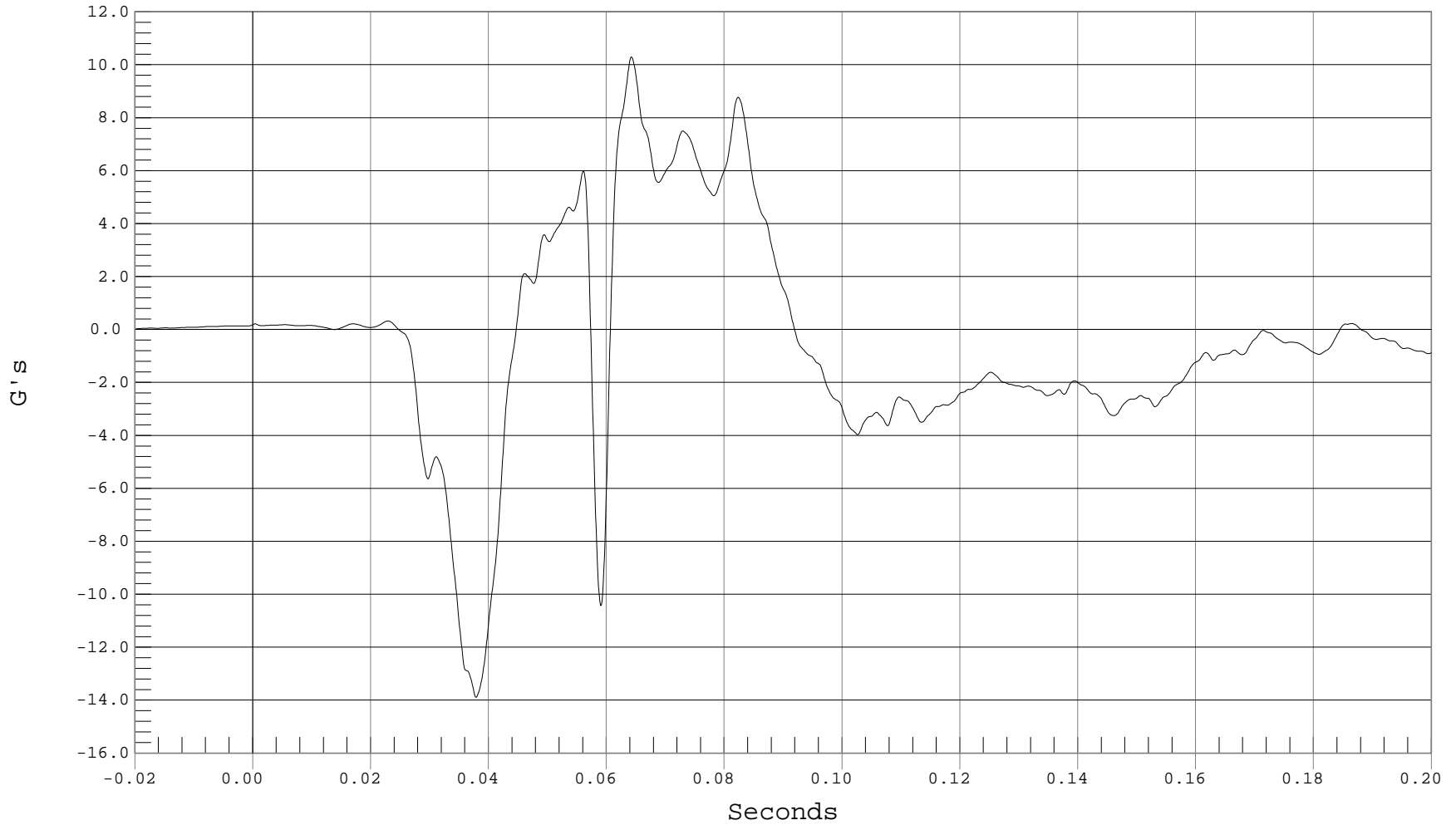
UPPER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE X, B02037AF.A06

Ymin = -13.89 G's @ 0.0378 Seconds, Ymax = 10.29 G's @ 0.0642 Seconds



B-30



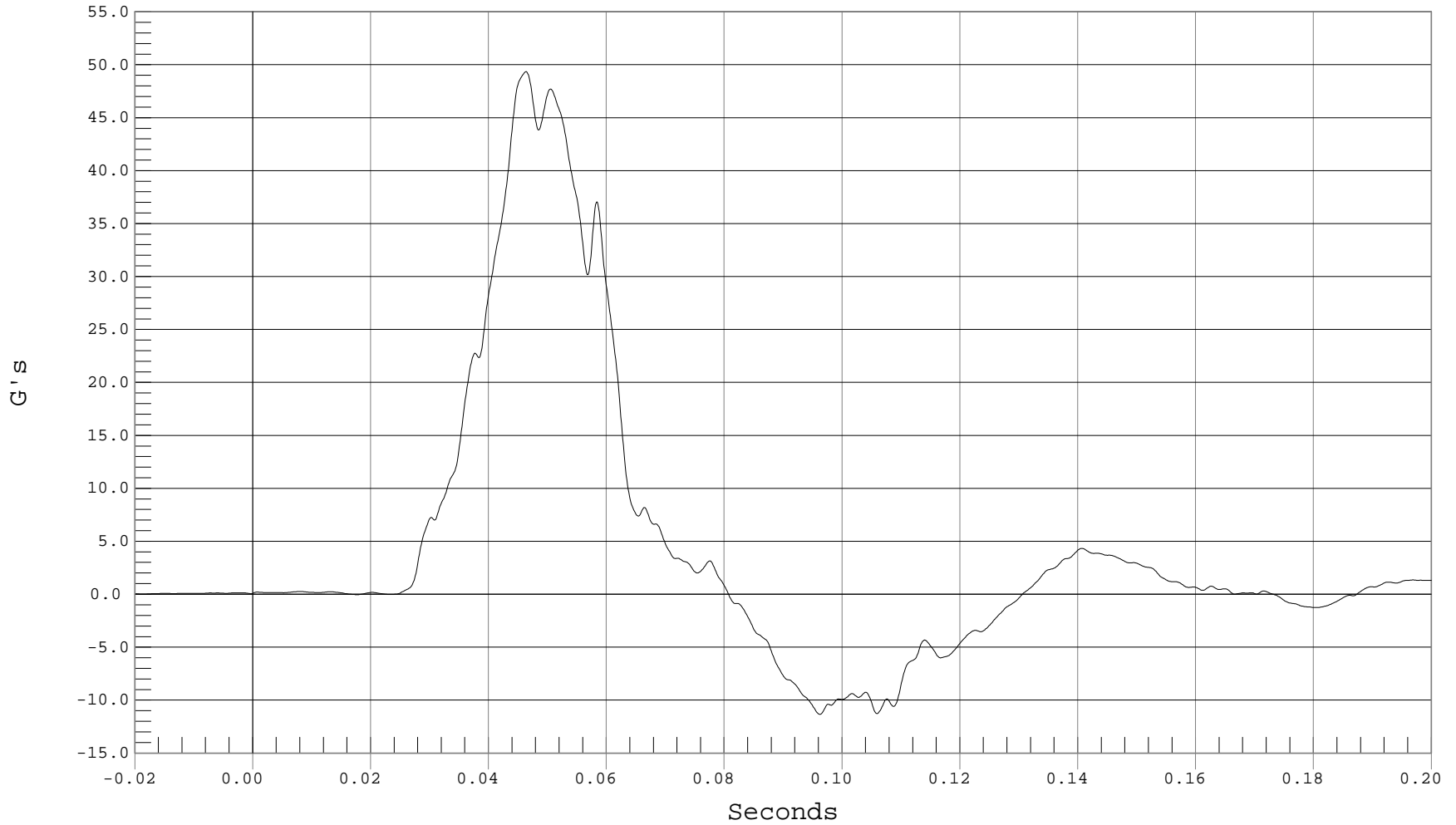
UPPER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE Y, B02037AF.A07

Ymin = -11.33 G's @ 0.0962 Seconds, Ymax = 49.36 G's @ 0.0463 Seconds





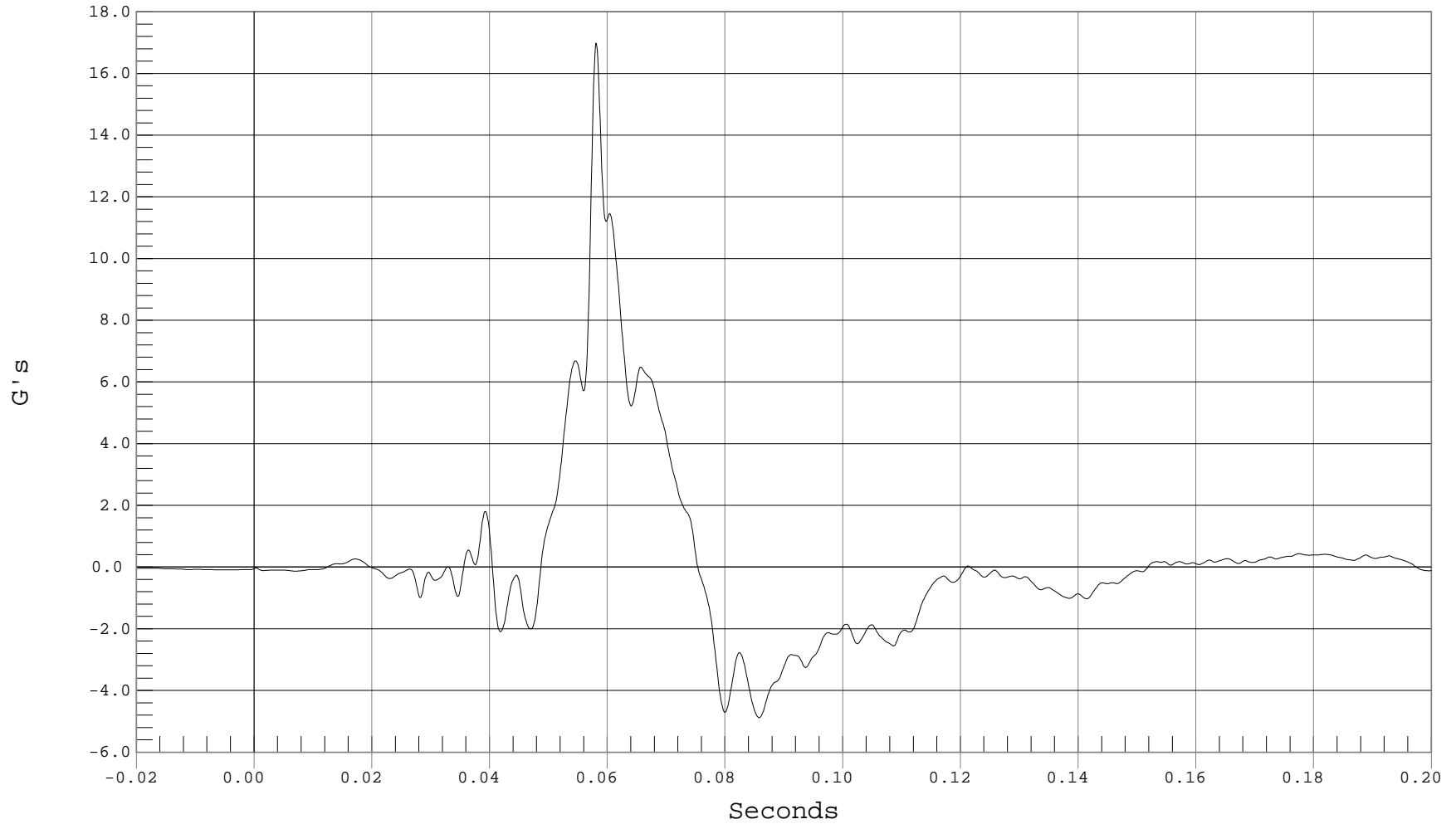
UPPER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE Z, B02037AF.A08

Ymin = -4.89 G's @ 0.0857 Seconds, Ymax = 16.99 G's @ 0.0580 Seconds





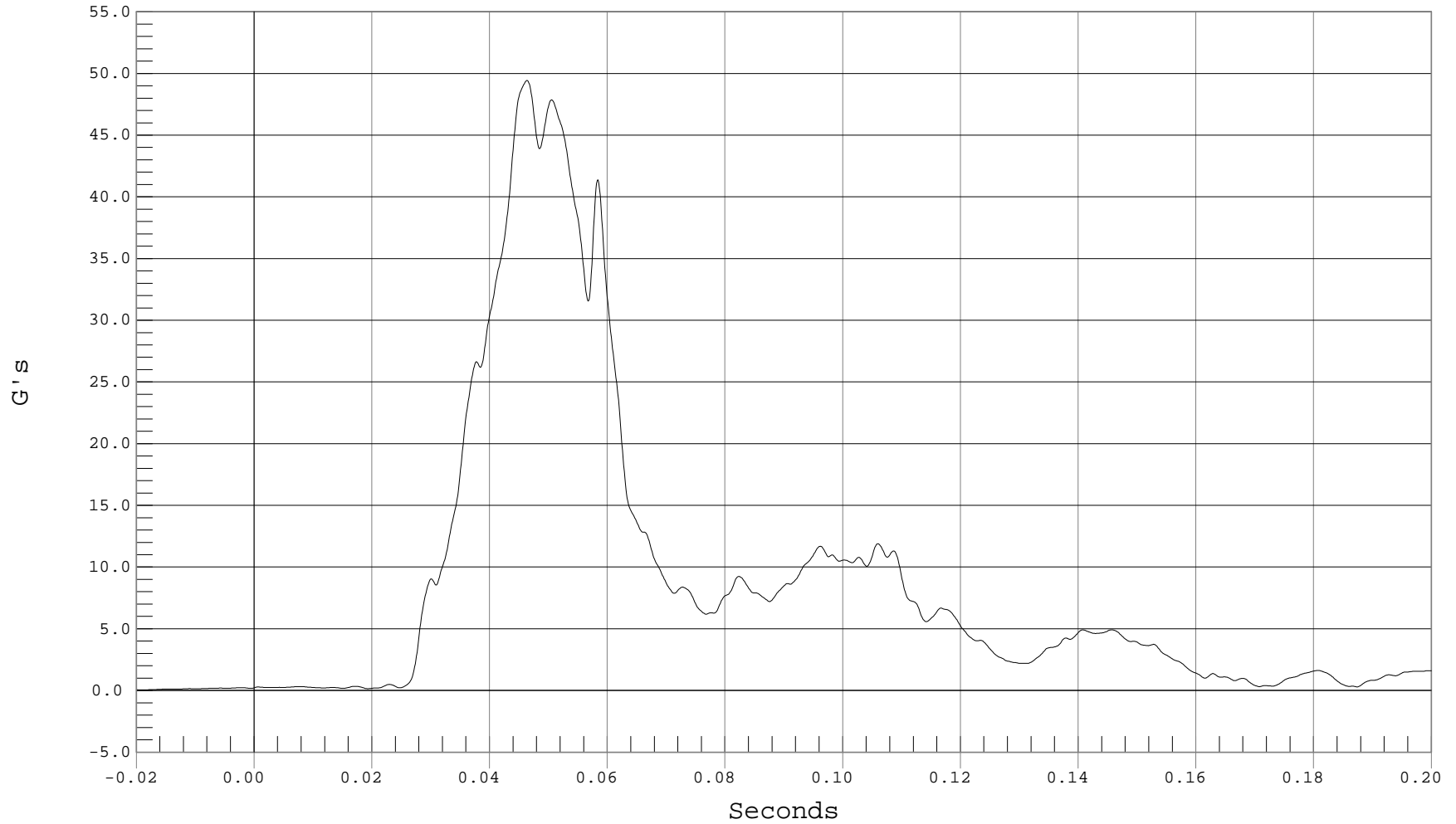
UPPER SPINE RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER UPPER SPINE RESULTANT, B02037AV.A06

Ymin = .05 G's @ -0.0192 Seconds, Ymax = 49.44 G's @ 0.0463 Seconds



B-33



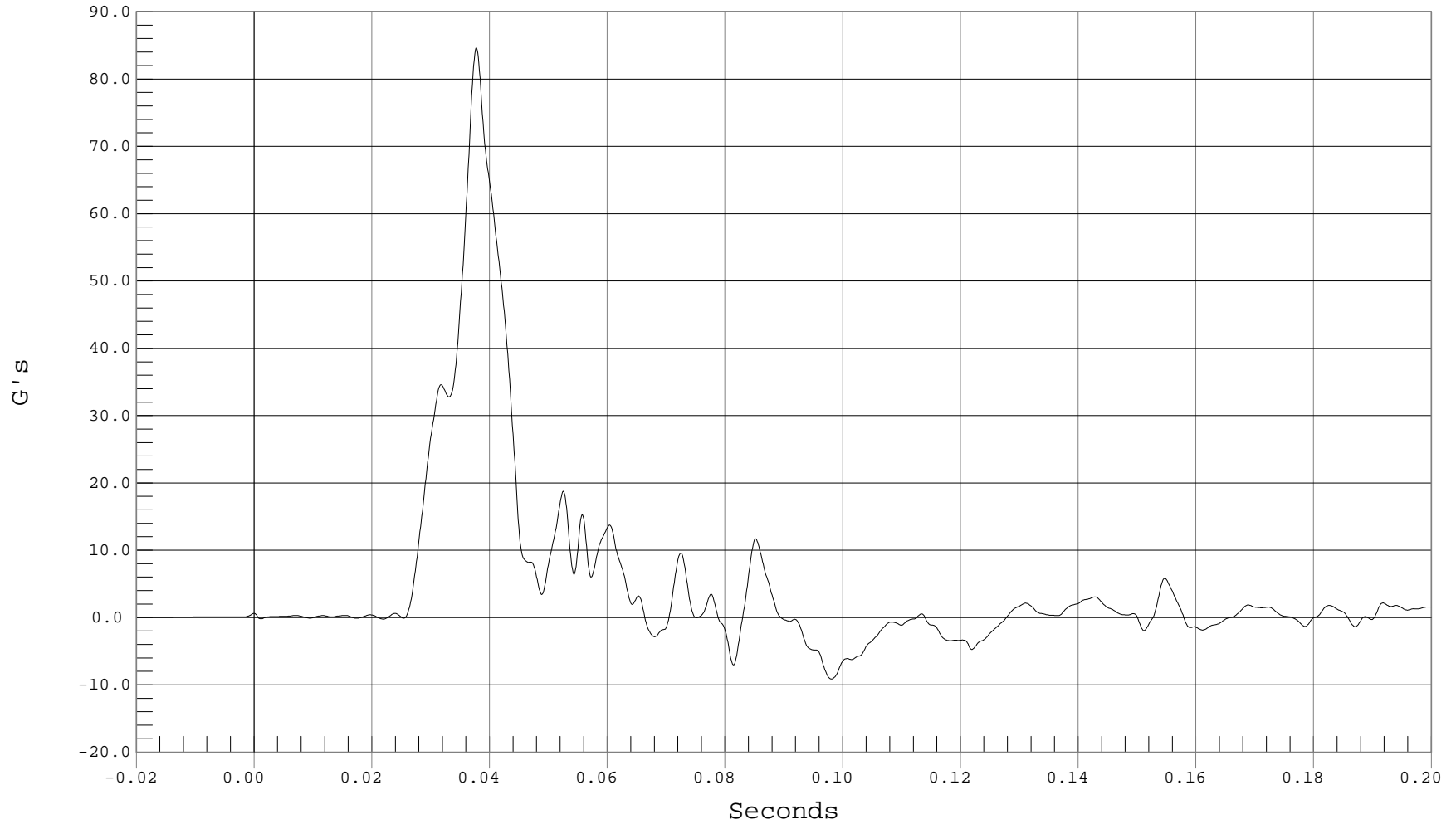
DRIVER UPPER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER UPPER RIB Y, B02037AF.A04

Ymin = -9.14 G's @ 0.0980 Seconds, Ymax = 84.64 G's @ 0.0377 Seconds





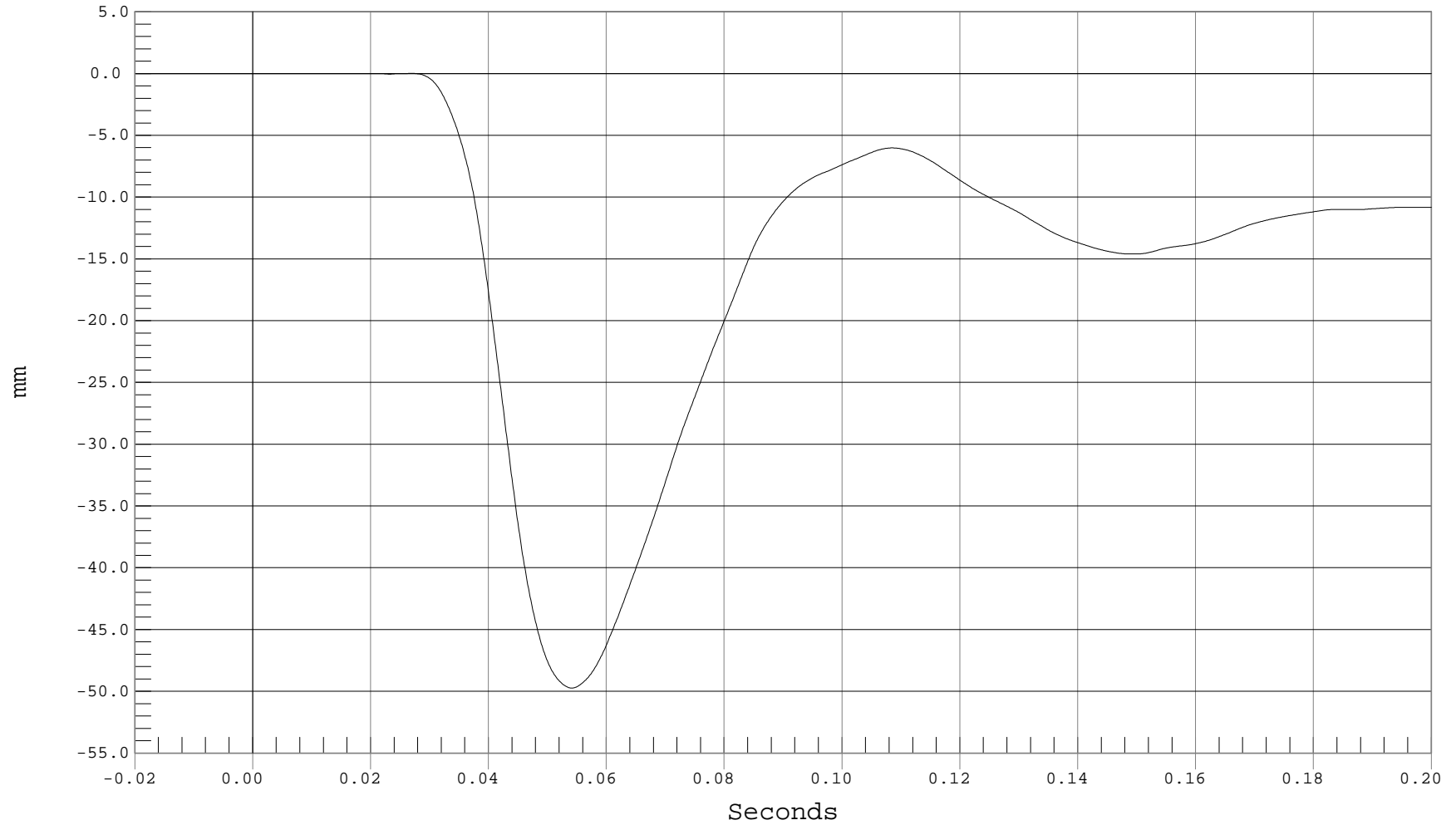
DRIVER UPPER RIB DISPLACEMENT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER UPPER RIB DISP, B02037AF.A55

Ymin = -49.74 mm @ 0.0541 Seconds, Ymax = .01 mm @ 0.0270 Seconds





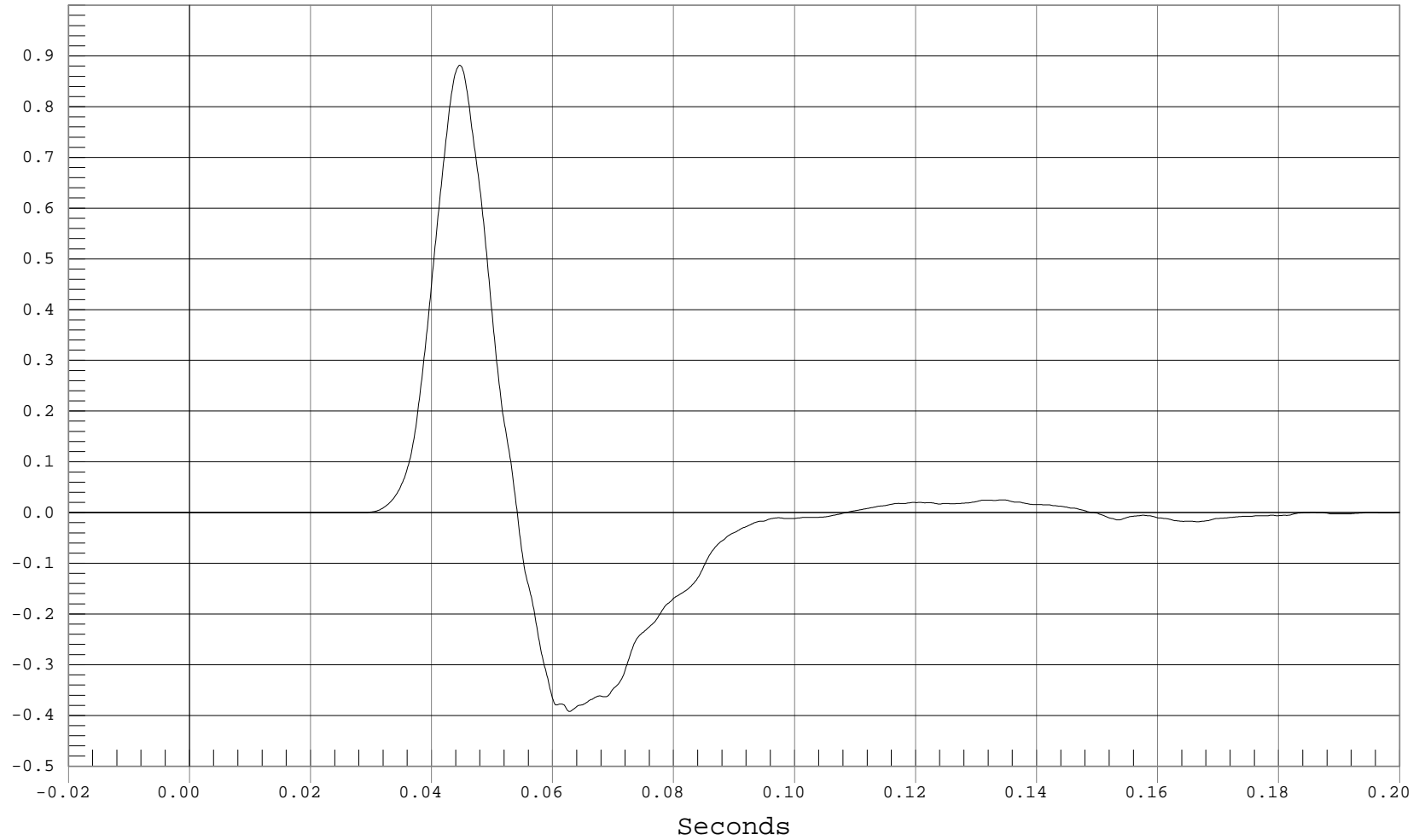
DRIVER UPPER RIB VISCOUS CRITERIA

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 Viscous Criterion, B02037DV.C55

Ymin = -.39 @ 0.0627 Seconds, Ymax = .88 @ 0.0446 Seconds



B-36



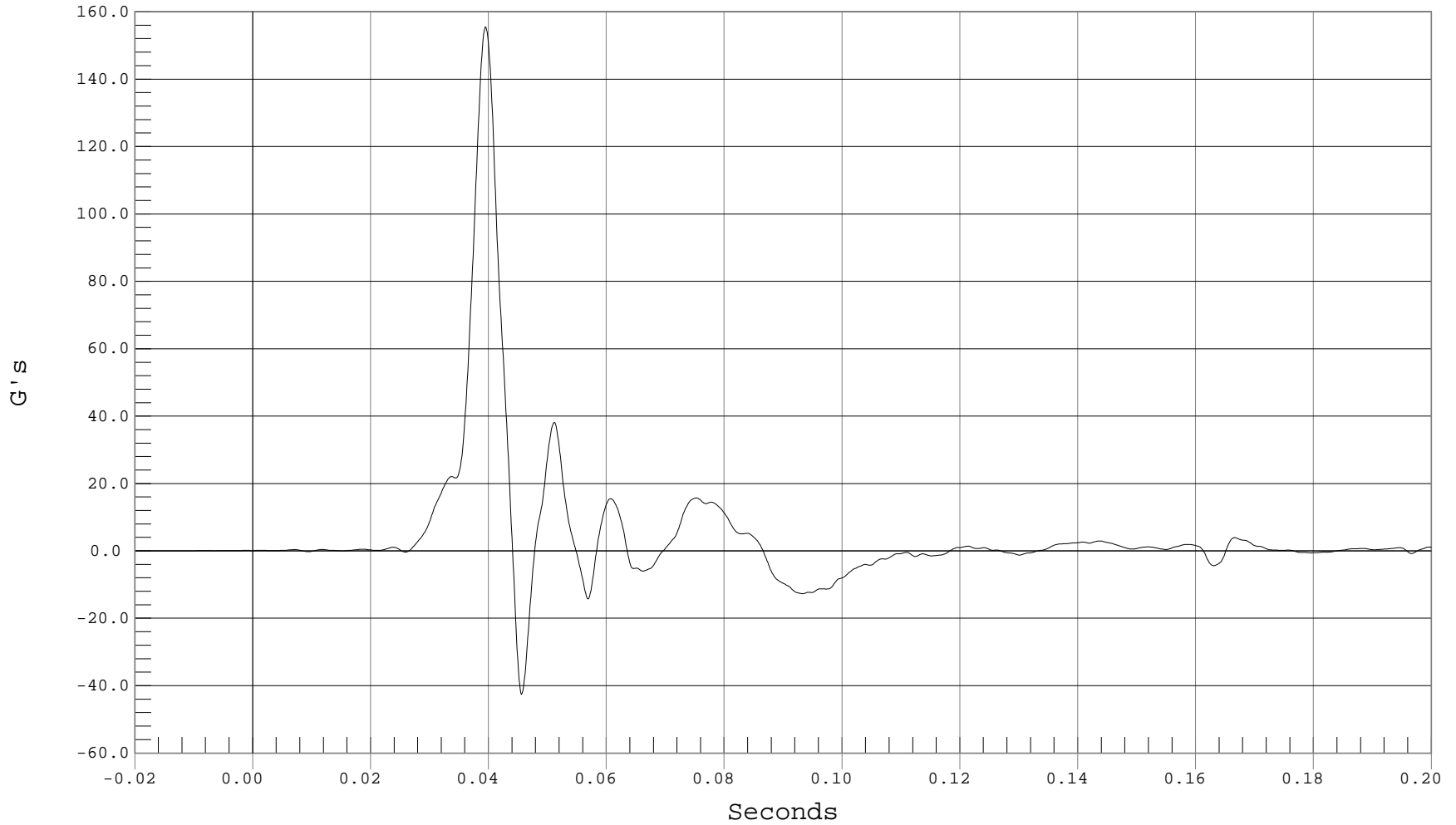
DRIVER MID RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER MID RIB Y, B02037AF.A58

Ymin = -42.56 G's @ 0.0455 Seconds, Ymax = 155.5 G's @ 0.0394 Seconds





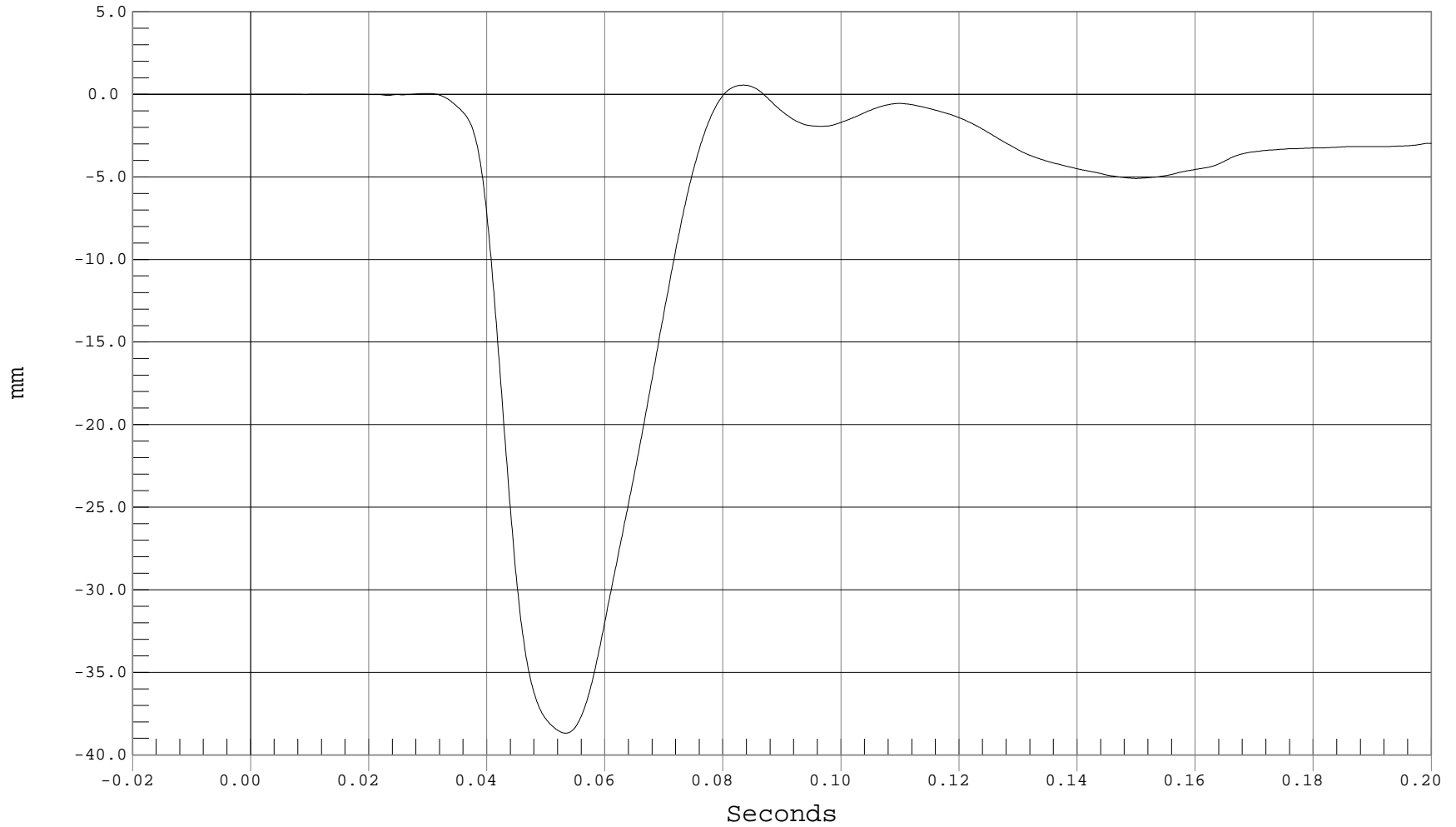
DRIVER MID RIB DISPLACEMENT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER MID RIB DISP, B02037AF.A56

Ymin = -38.69 mm @ 0.0533 Seconds, Ymax = .56 mm @ 0.0834 Seconds





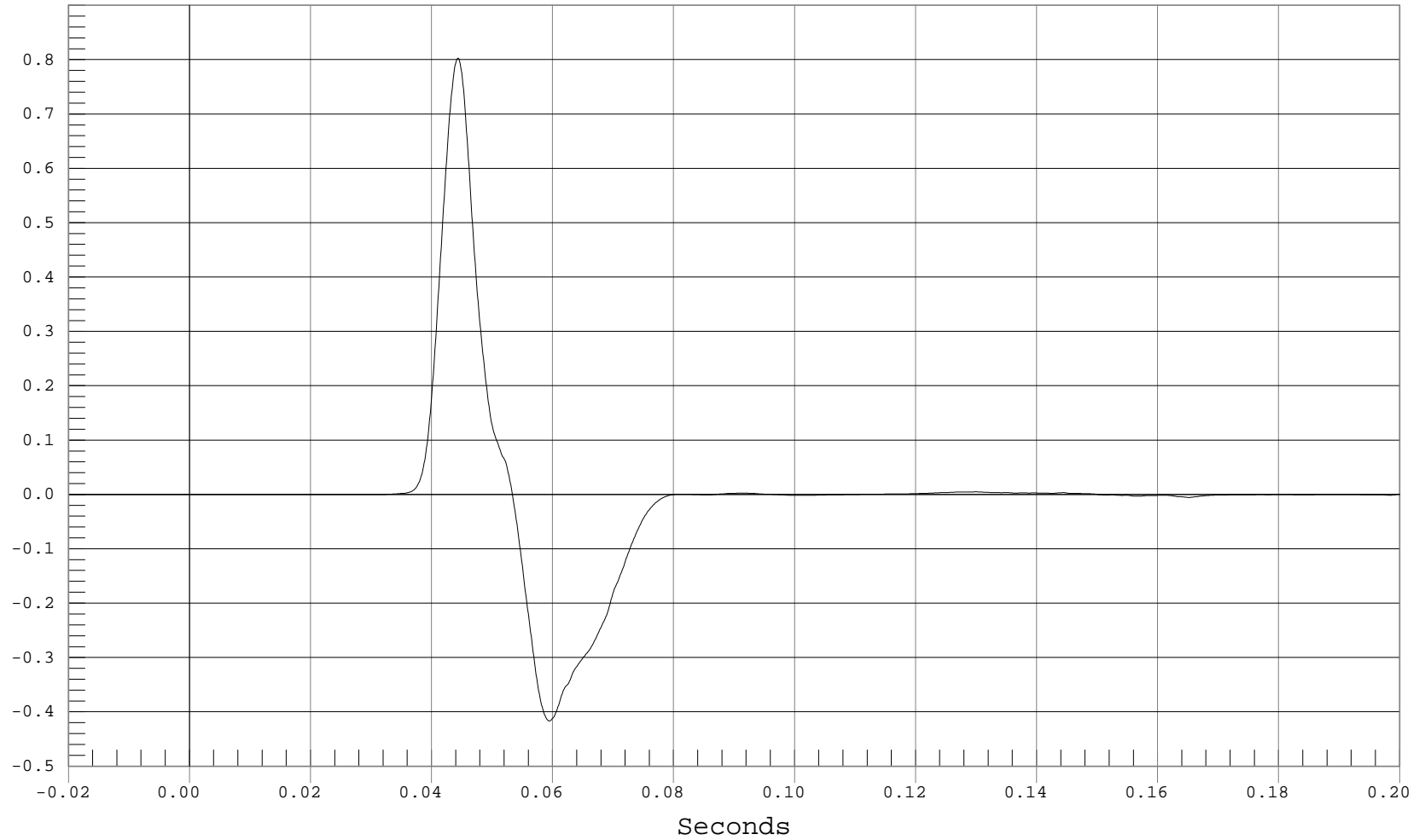
DRIVER MID RIB VISCOUS CRITERIA

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 Viscous Criterion, B02037DV.C56

Ymin = -.42 @ 0.0594 Seconds, Ymax = .8 @ 0.0443 Seconds





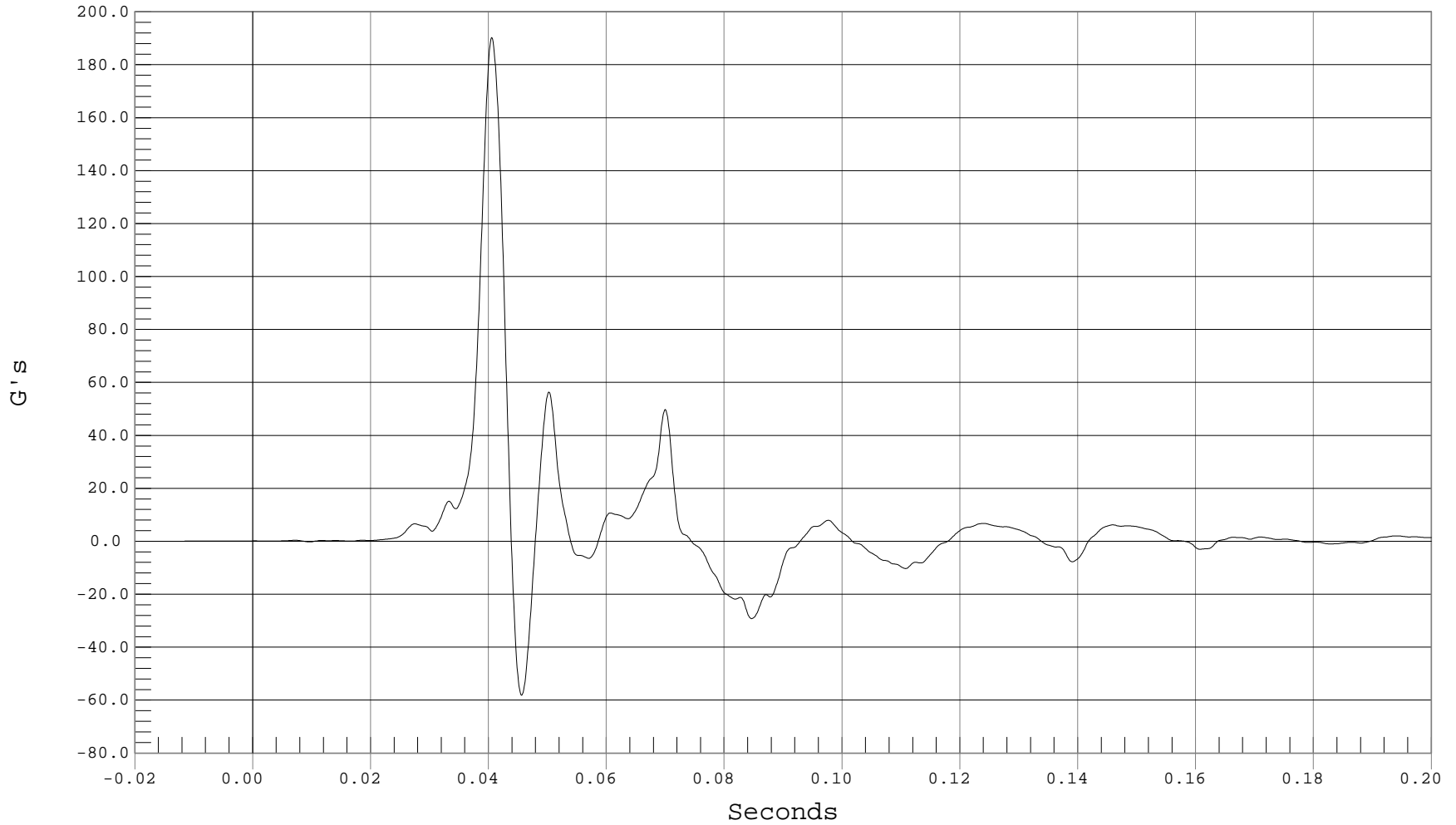
DRIVER LOWER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER LOWER RIB Y, B02037AF.A05

Ymin = -58.2 G's @ 0.0455 Seconds, Ymax = 190.26 G's @ 0.0405 Seconds



B-40



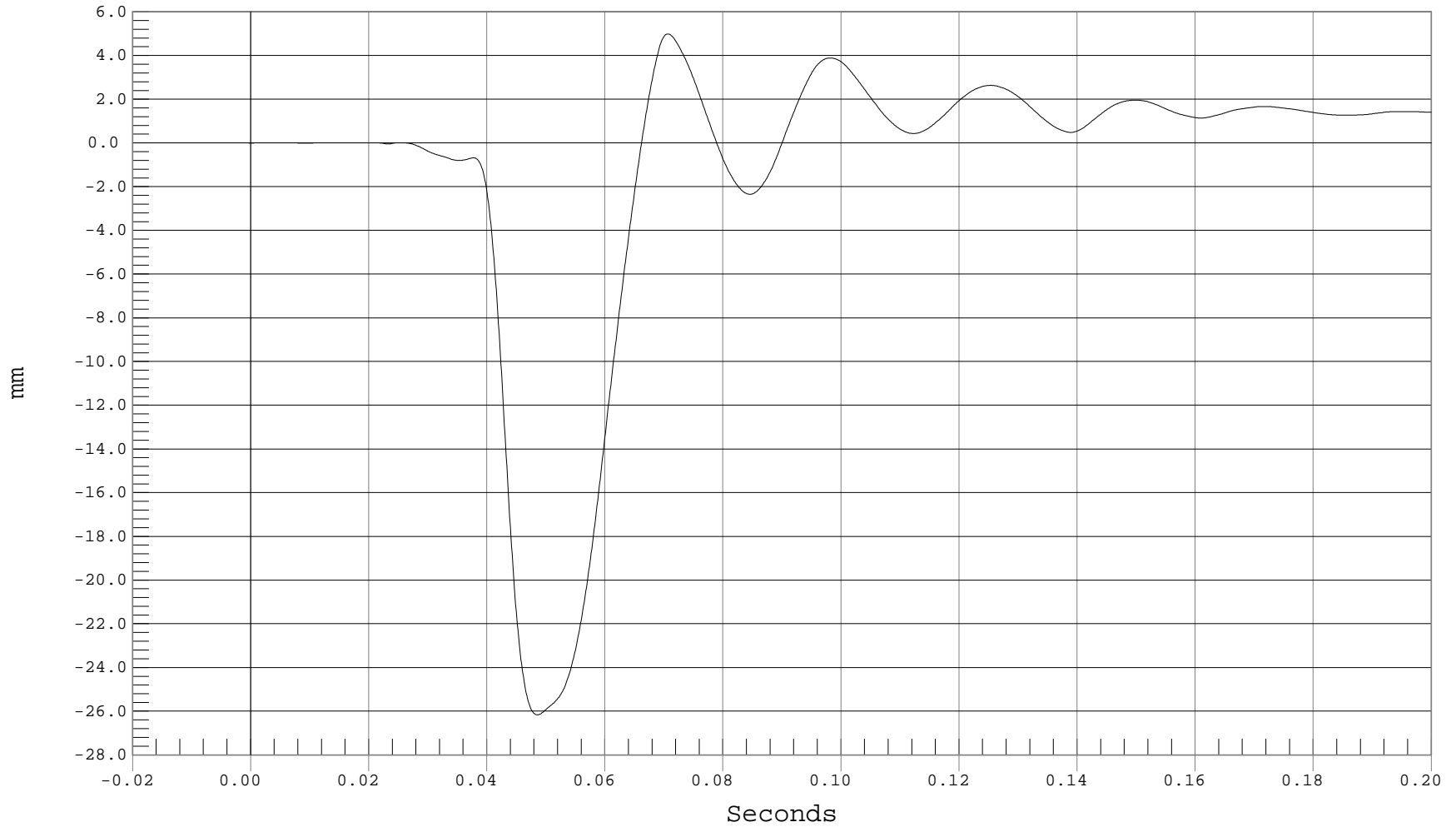
DRIVER LOWER RIB DISPLACEMENT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER LOWER RIB DISP, B02037AF.A57

Ymin = -26.17 mm @ 0.0485 Seconds, Ymax = 4.98 mm @ 0.0706 Seconds



B-41



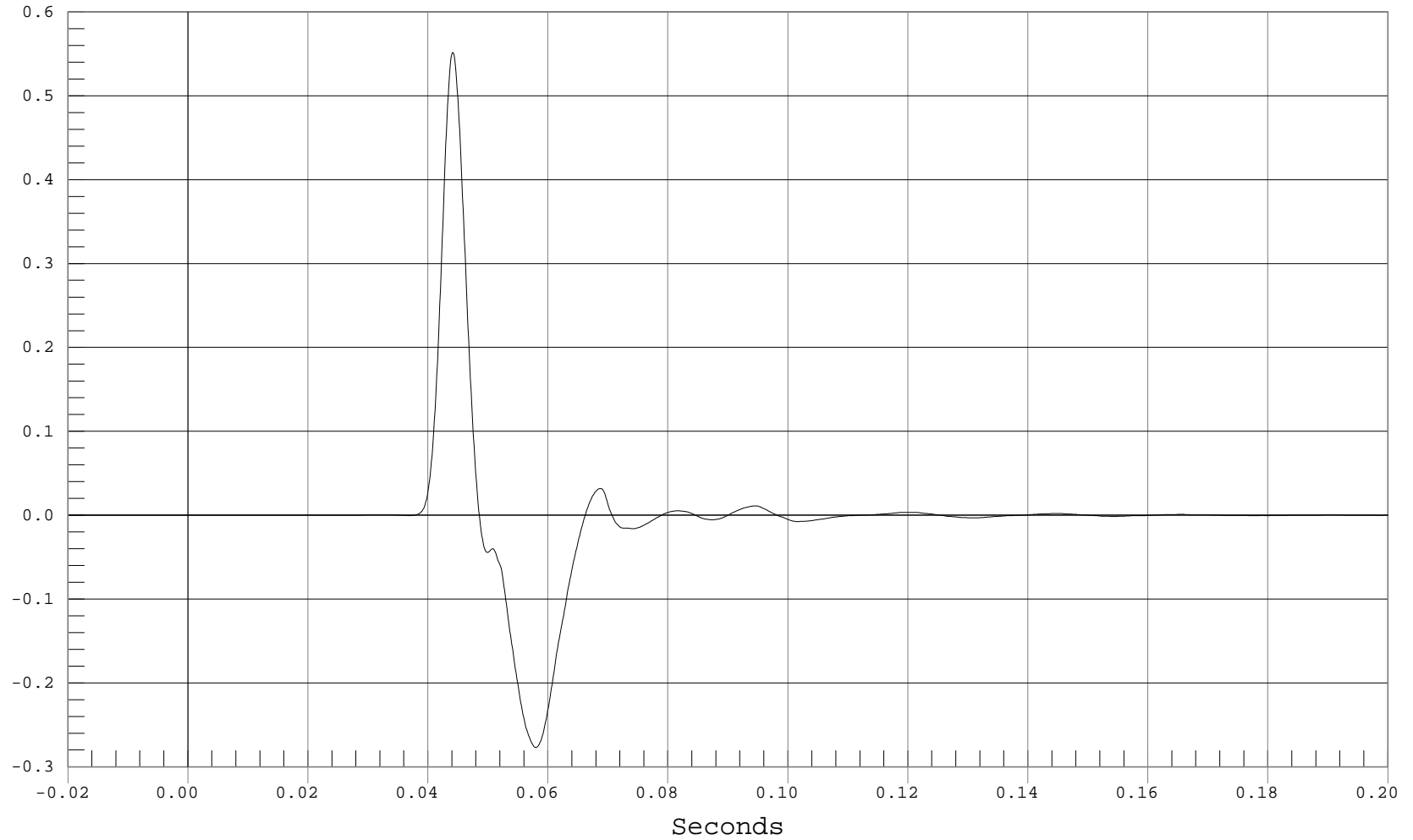
DRIVER LOWER RIB VISCOUS CRITERIA

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 Viscous Criterion, B02037DV.C57

Ymin = -.28 @ 0.0579 Seconds, Ymax = .55 @ 0.0441 Seconds



B-42



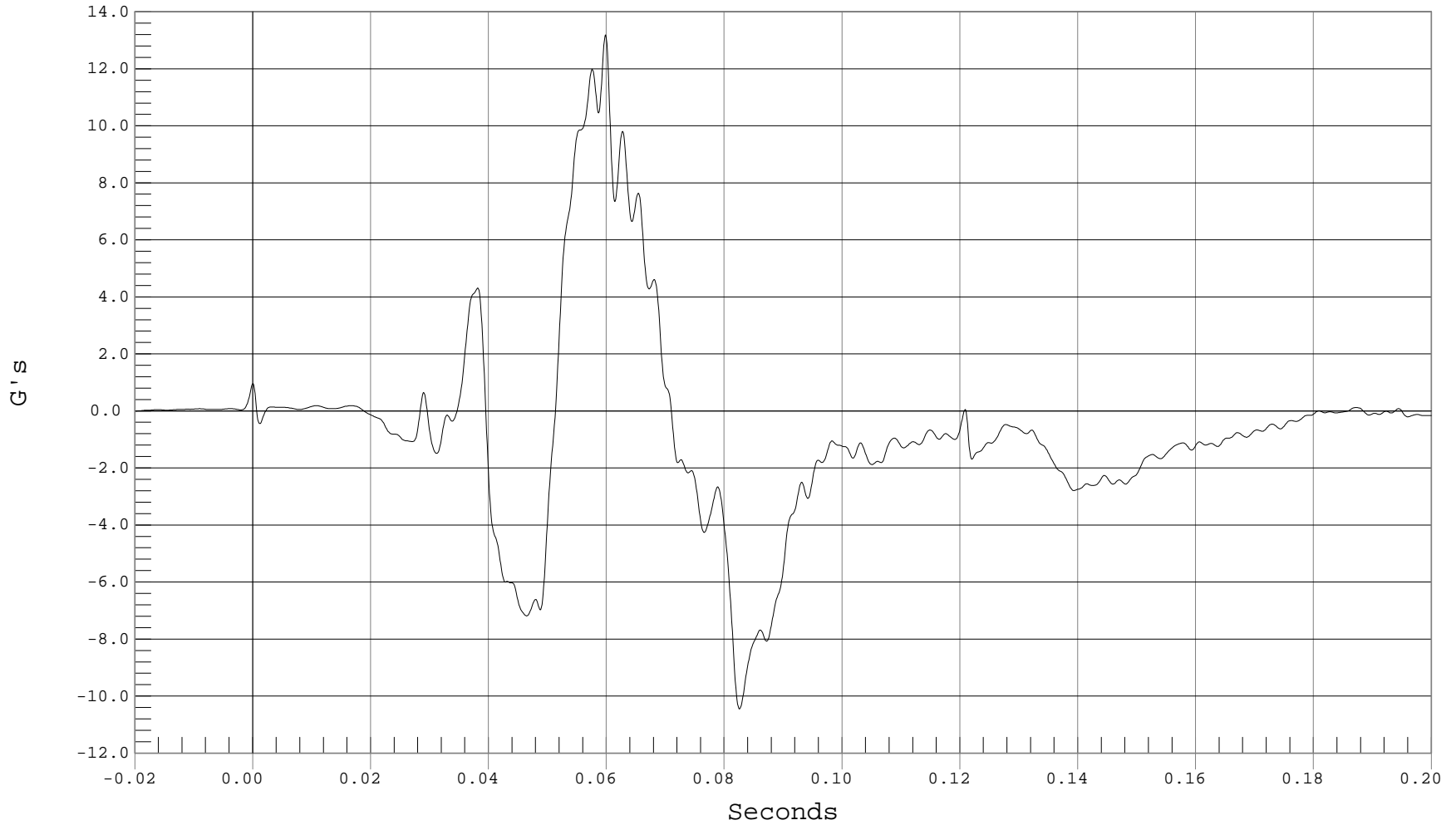
LOWER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE X, B02037AF.A09

Ymin = -10.45 G's @ 0.0825 Seconds, Ymax = 13.19 G's @ 0.0598 Seconds





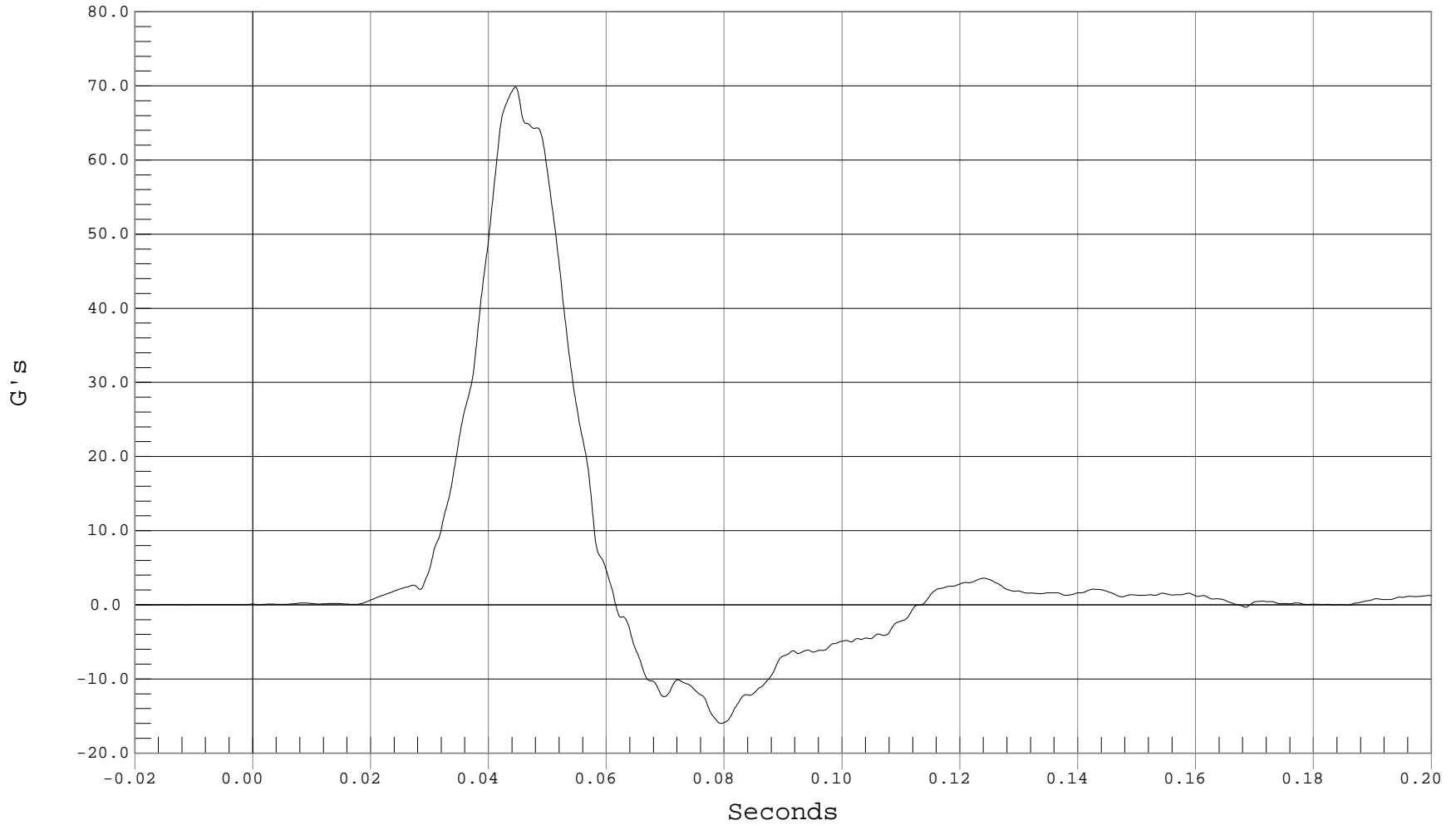
LOWER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE Y, B02037AF.A10

Ymin = -16 G's @ 0.0794 Seconds, Ymax = 69.86 G's @ 0.0445 Seconds





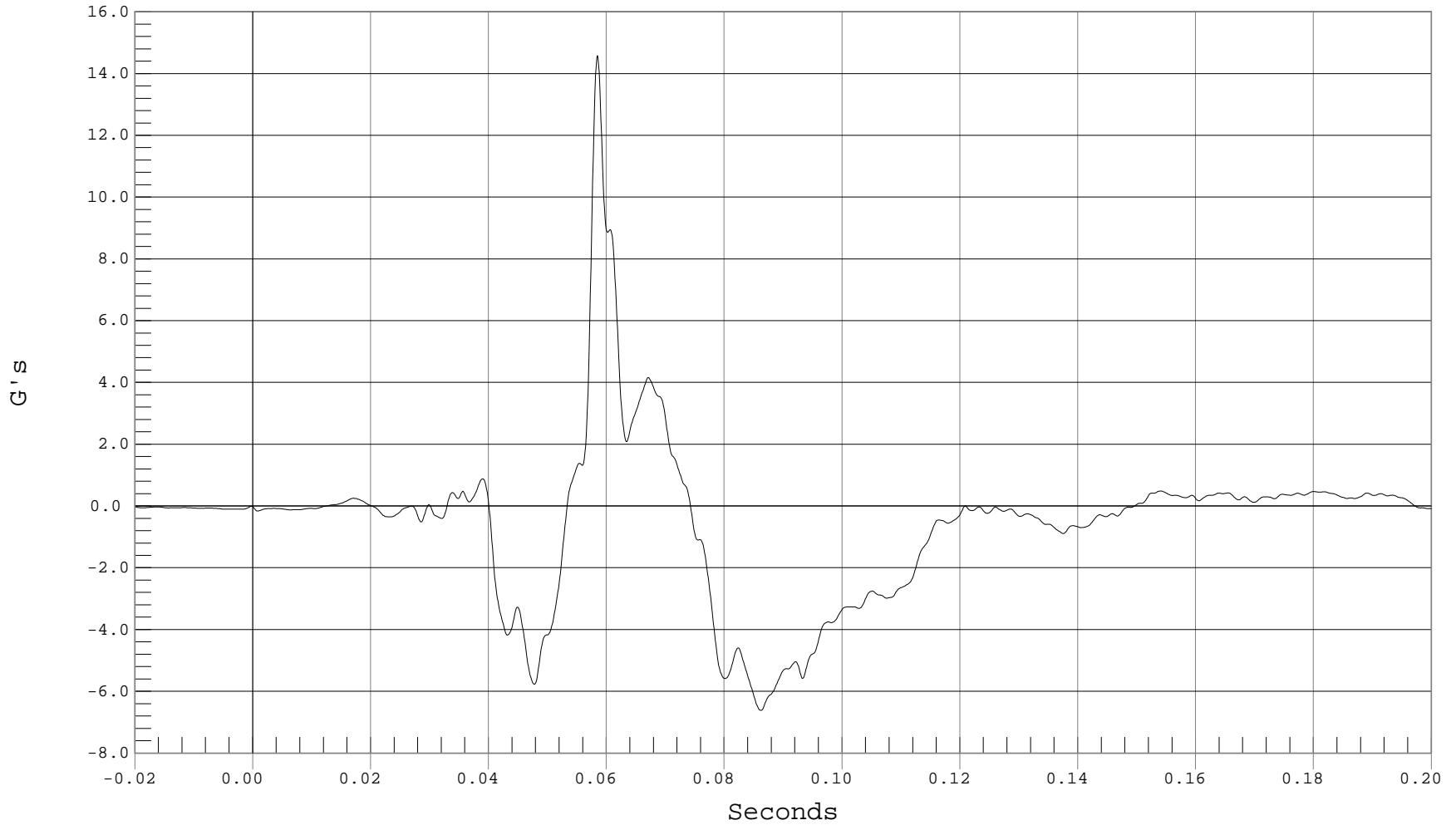
LOWER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE Z, B02037AF.A11

Ymin = -6.62 G's @ 0.0861 Seconds, Ymax = 14.58 G's @ 0.0584 Seconds



B-45



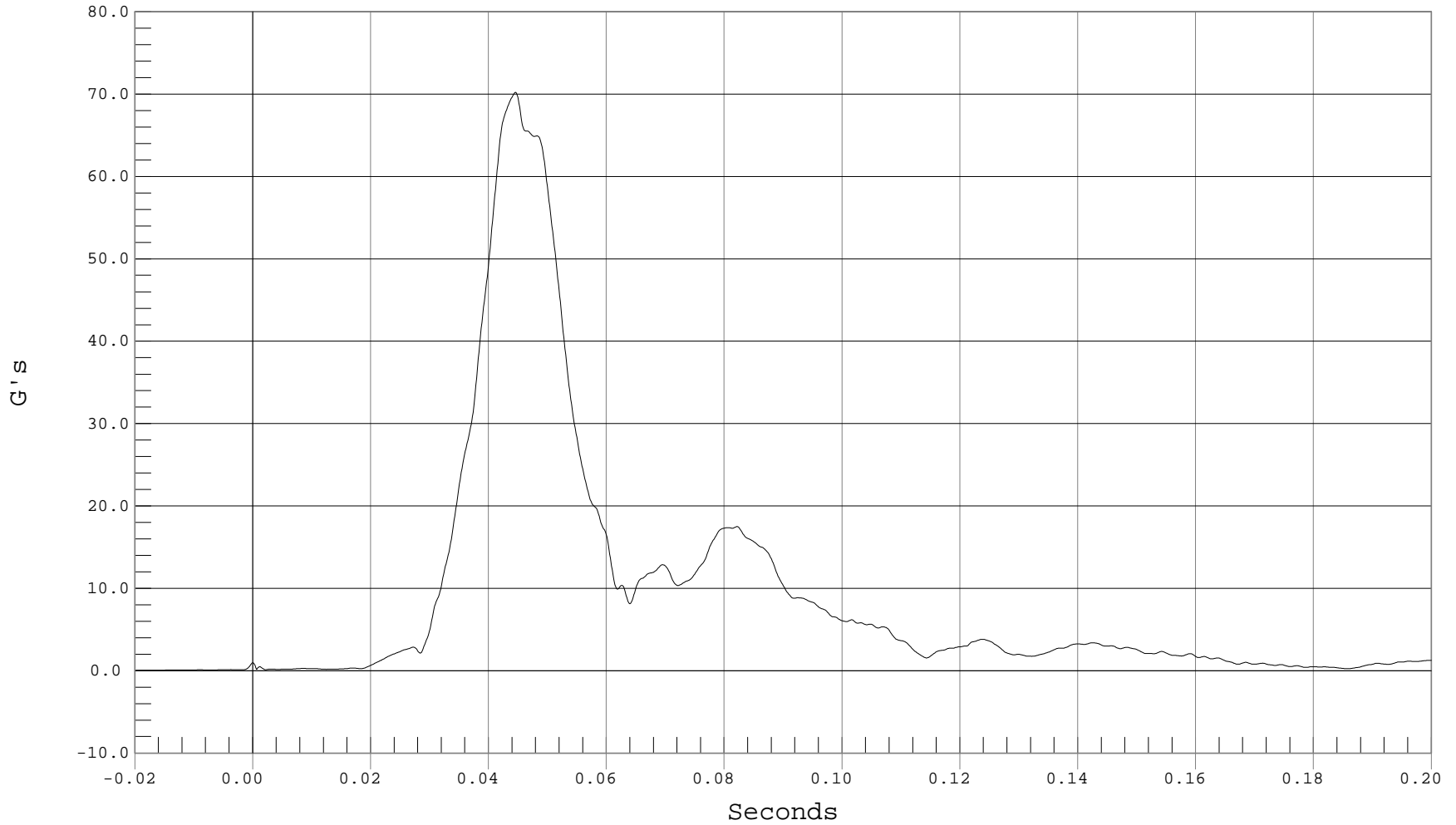
LOWER SPINE RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 180

— 1 DRIVER LOWER SPINE RESULTANT, B02037AV.A09

Ymin = .05 G's @ -0.0199 Seconds, Ymax = 70.22 G's @ 0.0445 Seconds





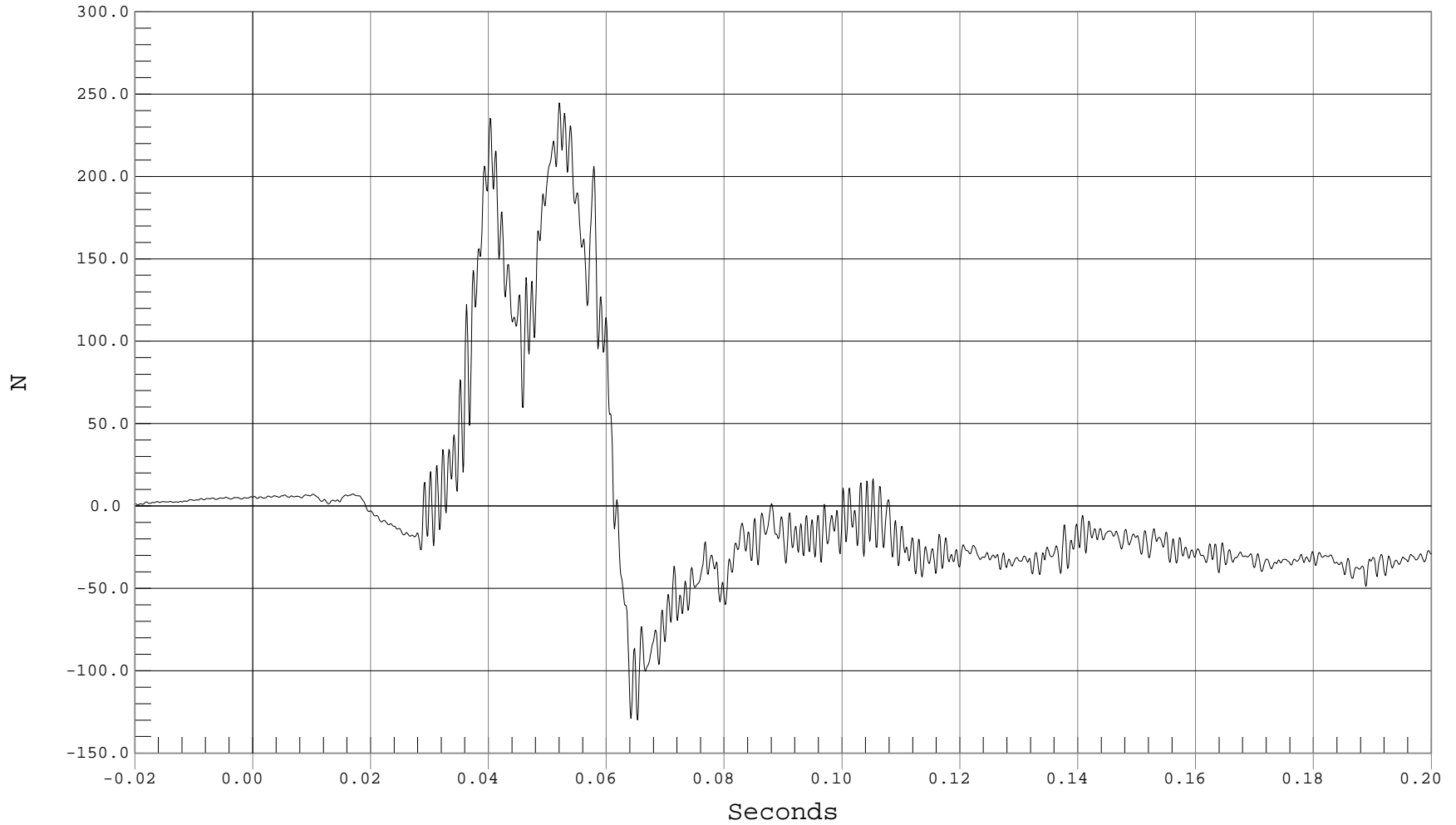
DRIVER TORSO FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER TORSO FX, B02037FF.F59

Ymin = -129.93 N @ 0.0652 Seconds, Ymax = 244.7 N @ 0.0519 Seconds





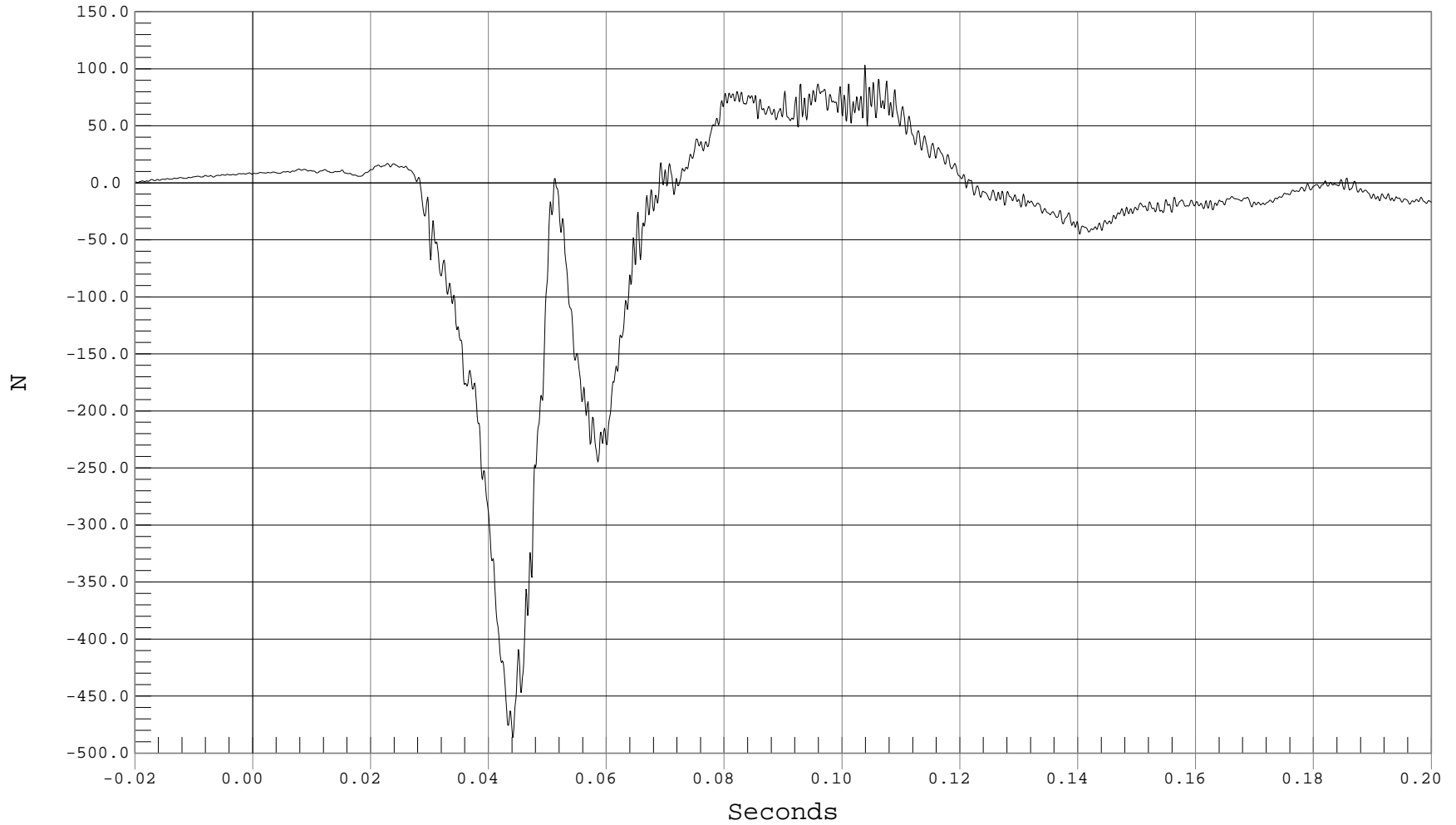
DRIVER TORSO FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER TORSO FY, B02037FF.F60

Ymin = -486.29 N @ 0.0440 Seconds, Ymax = 103.22 N @ 0.1038 Seconds





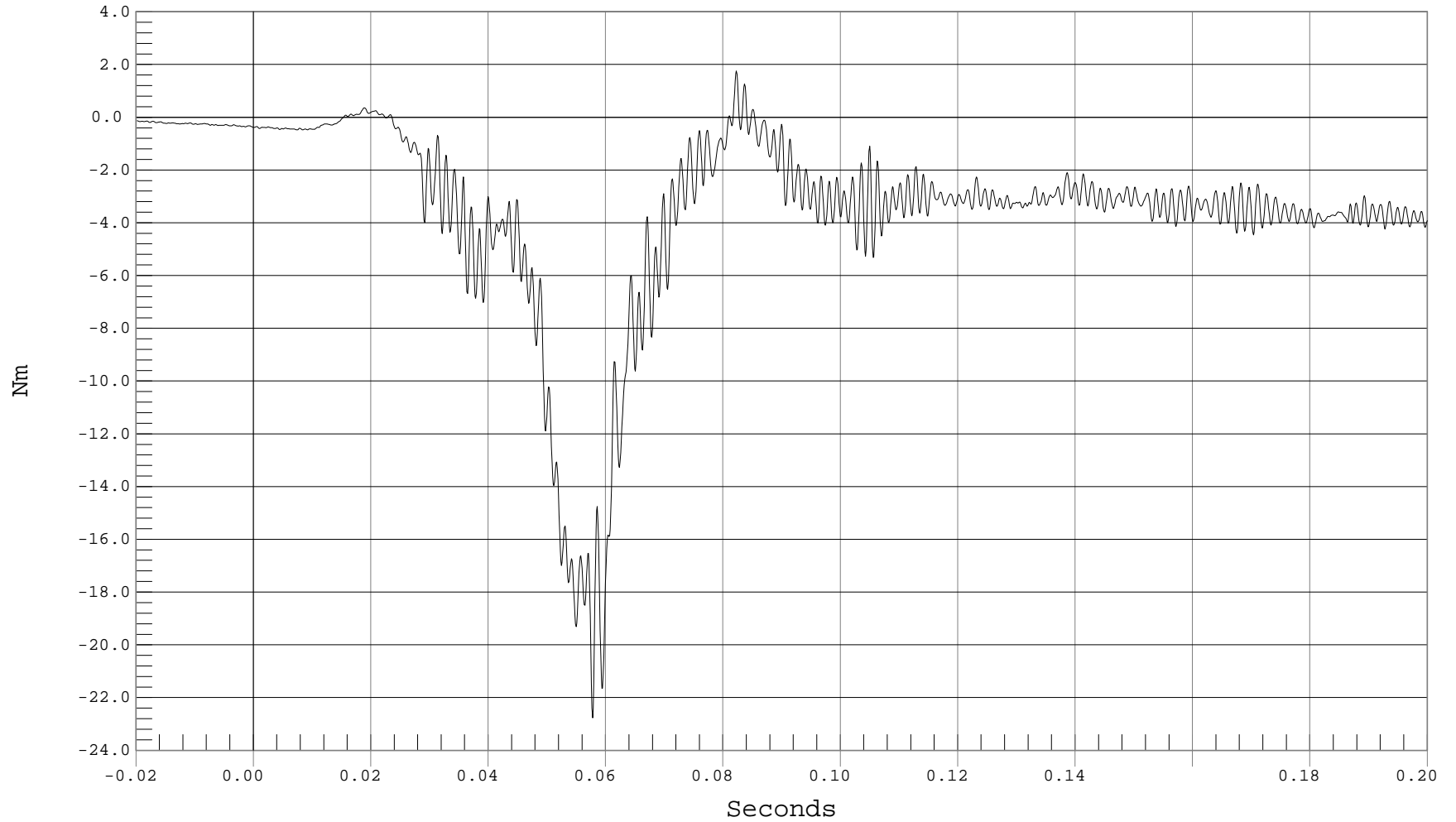
DRIVER TORSO MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER TORSO MY, B02037MF.M61

Ymin = -22.77 Nm @ 0.0577 Seconds, Ymax = 1.75 Nm @ 0.0822 Seconds





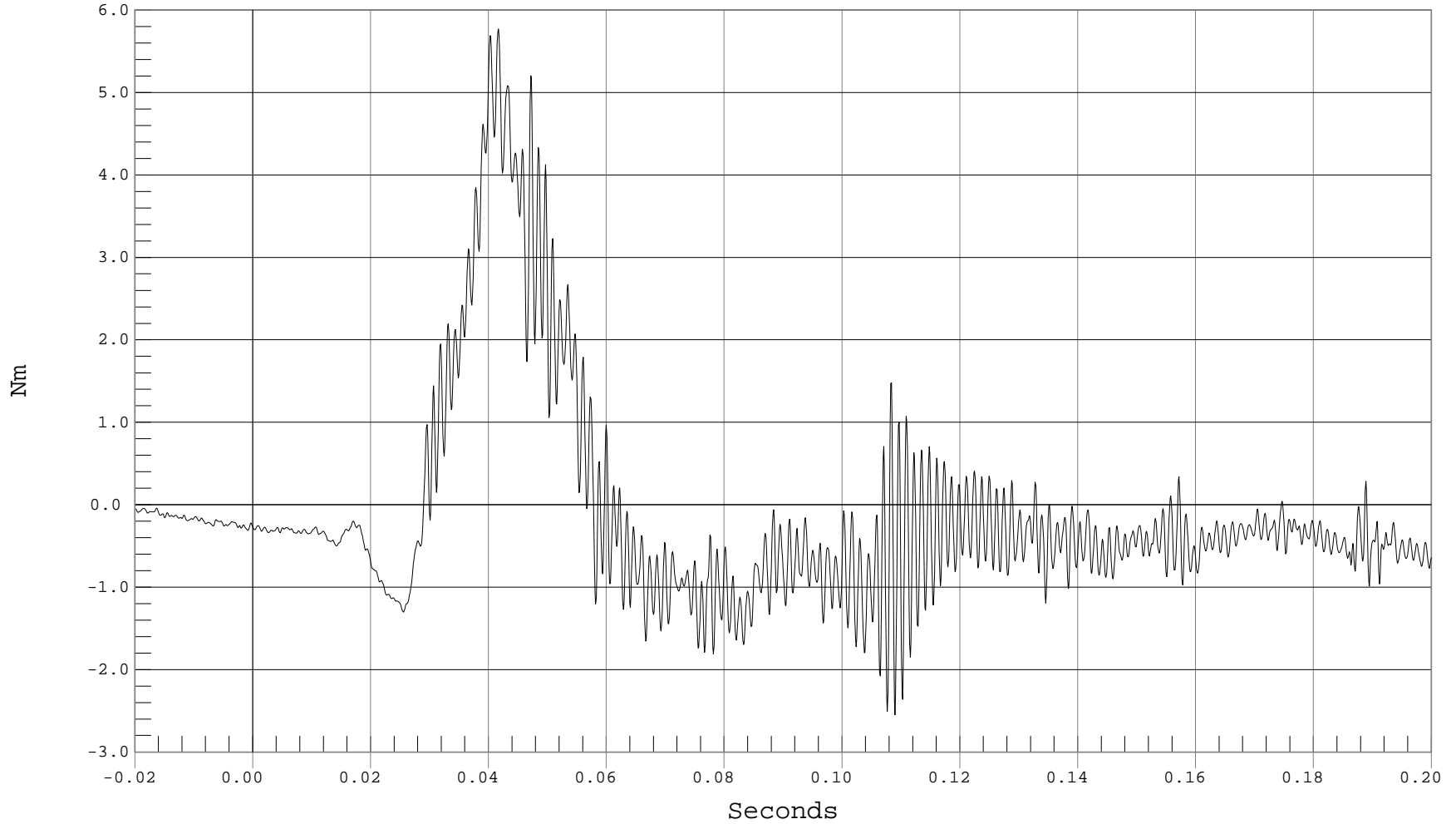
DRIVER TORSO MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER TORSO MZ, B02037MF.M62

Ymin = -2.55 Nm @ 0.1089 Seconds, Ymax = 5.77 Nm @ 0.0416 Seconds



B-50



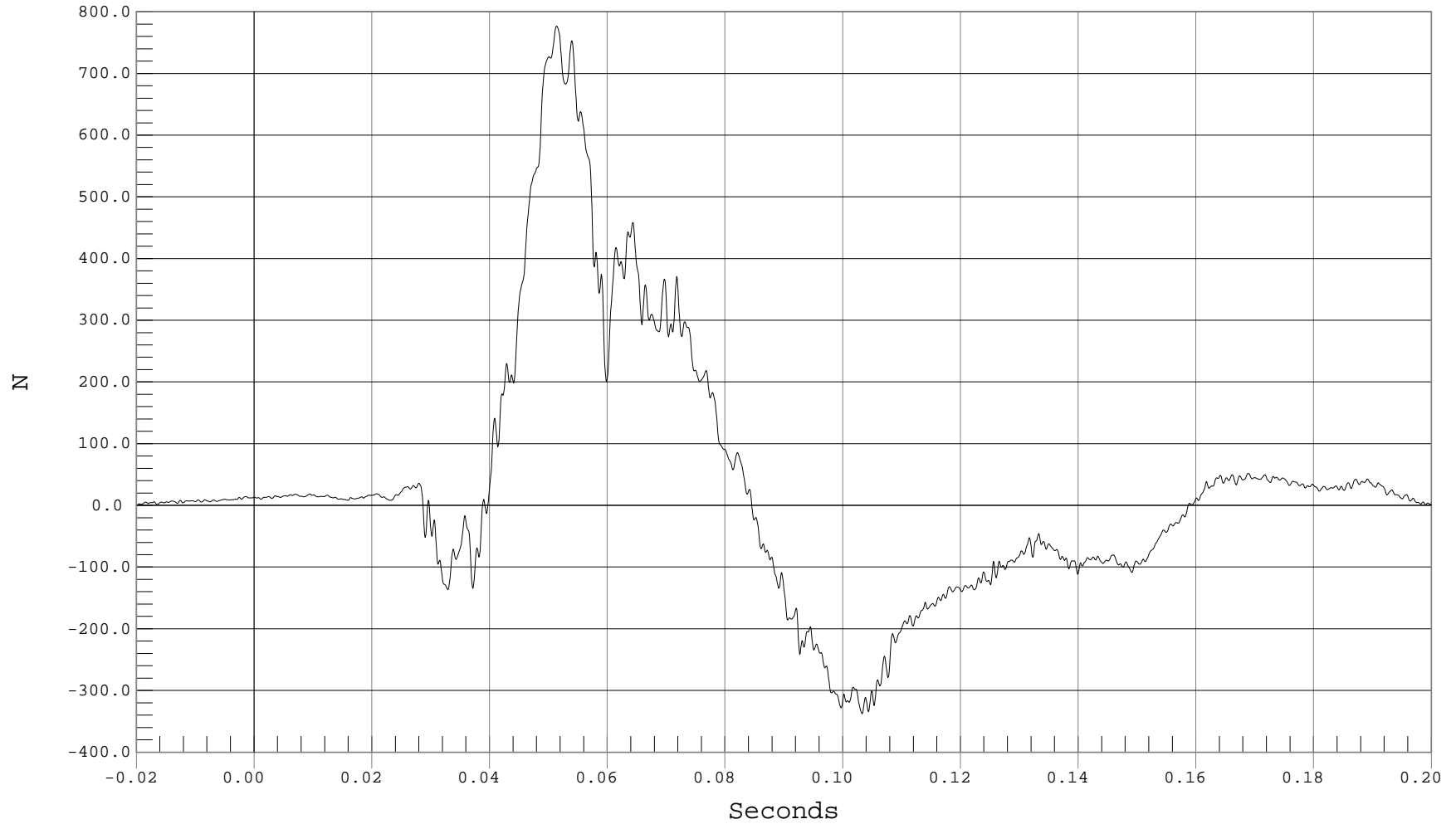
DRIVER T-12 FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

1 DRIVER T-12 FX, B02037FF.F65

Ymin = -337.96 N @ 0.1032 Seconds, Ymax = 776.83 N @ 0.0513 Seconds





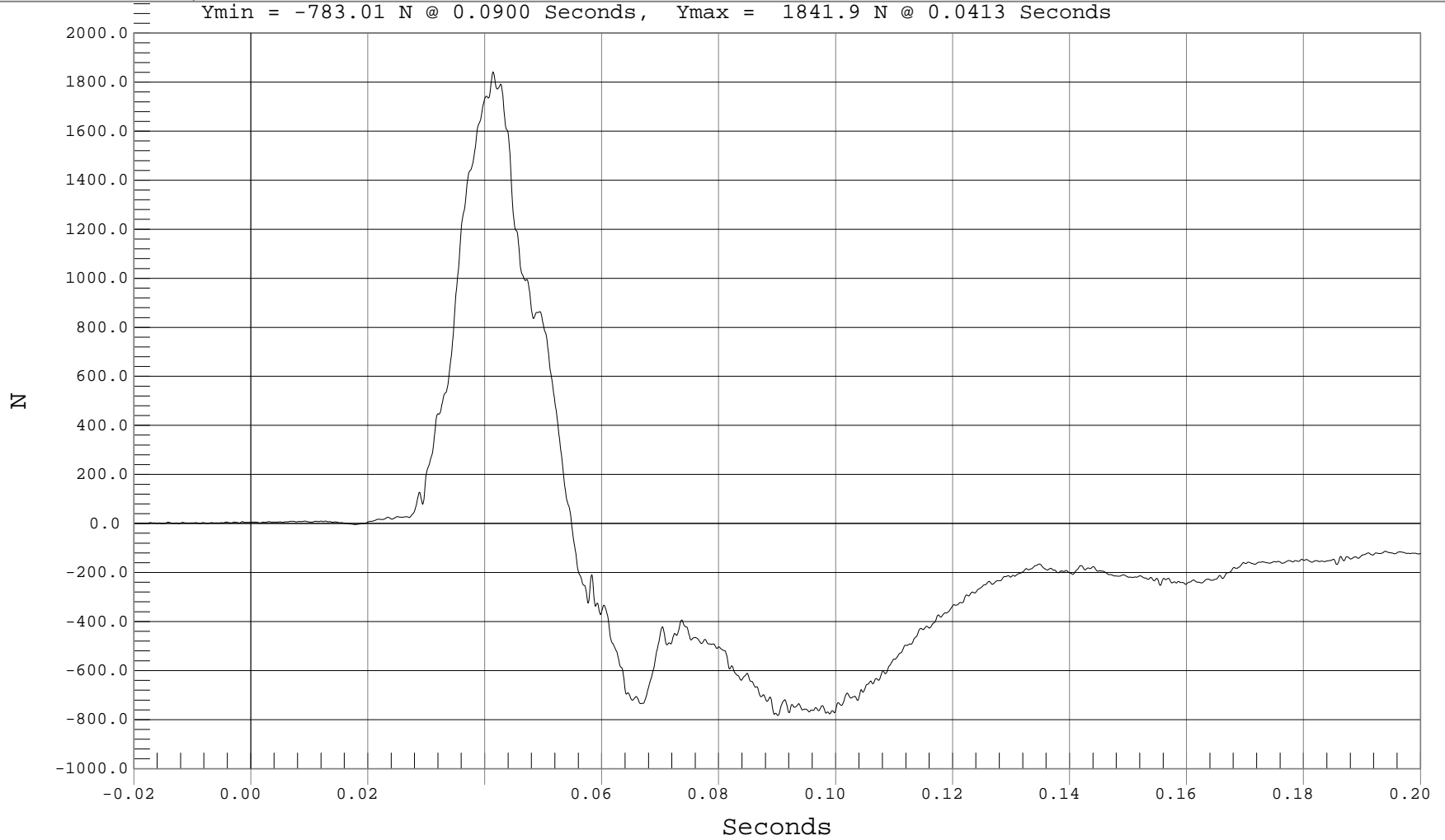
DRIVER T-12 FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER T-12 FY, B02037FF.F66

Ymin = -783.01 N @ 0.0900 Seconds, Ymax = 1841.9 N @ 0.0413 Seconds



B-52



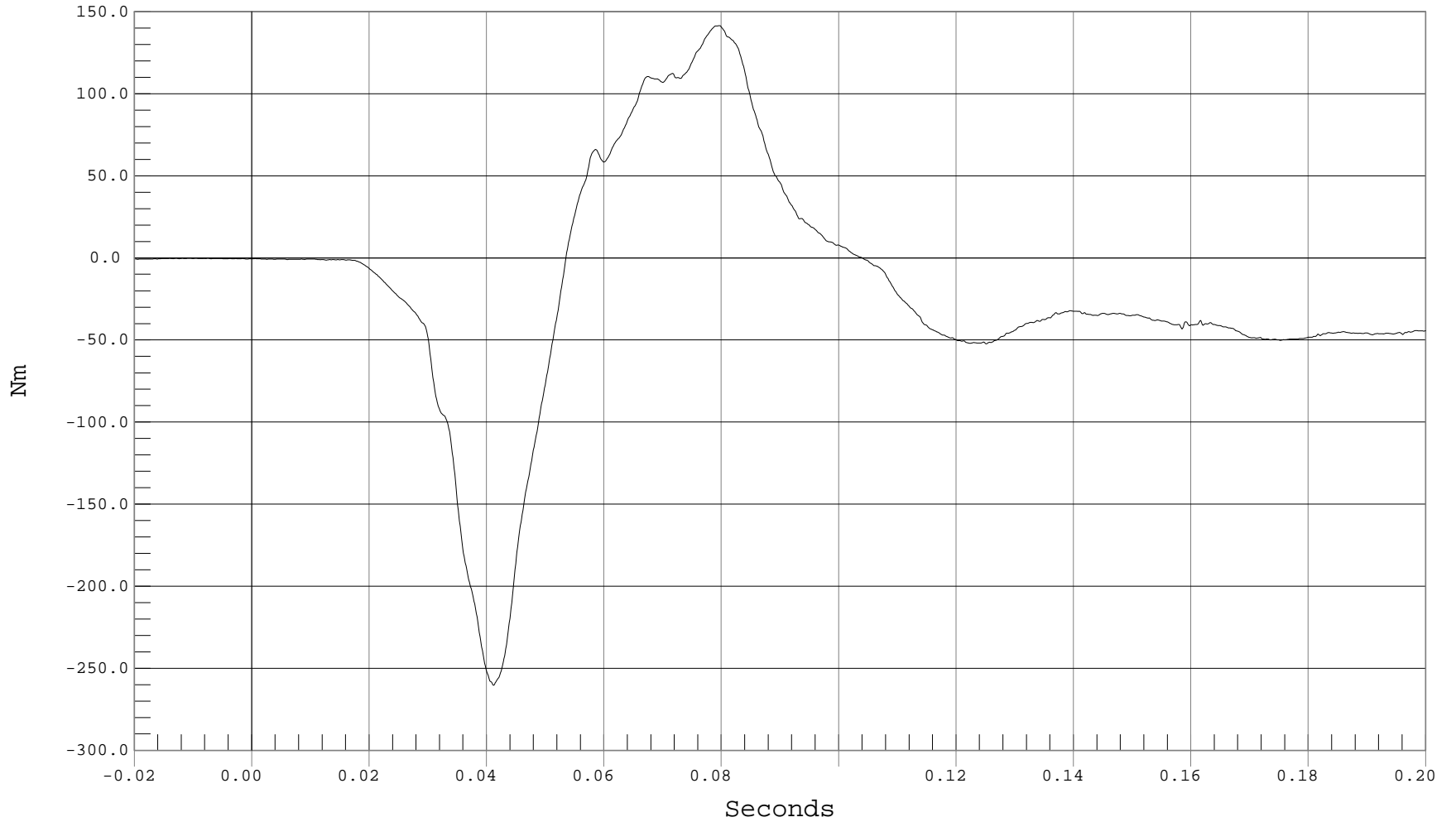
DRIVER T-12 MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

1 DRIVER T-12 MX, B02037MF.M67

Ymin = -260.36 Nm @ 0.0411 Seconds, Ymax = 141.56 Nm @ 0.0796 Seconds





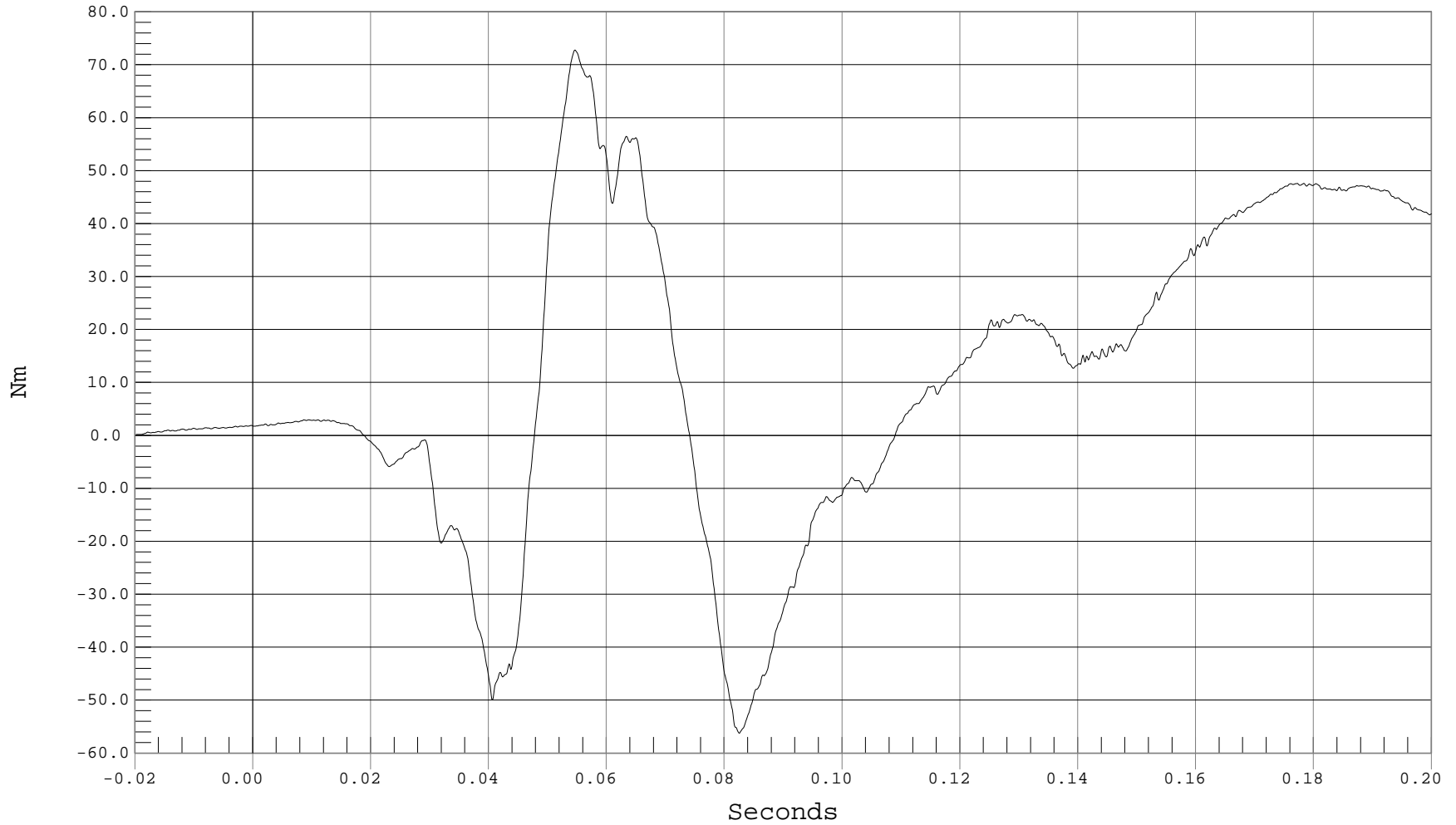
DRIVER T-12 MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER T-12 MY, B02037MF.M68

Ymin = -56.24 Nm @ 0.0825 Seconds, Ymax = 72.78 Nm @ 0.0546 Seconds





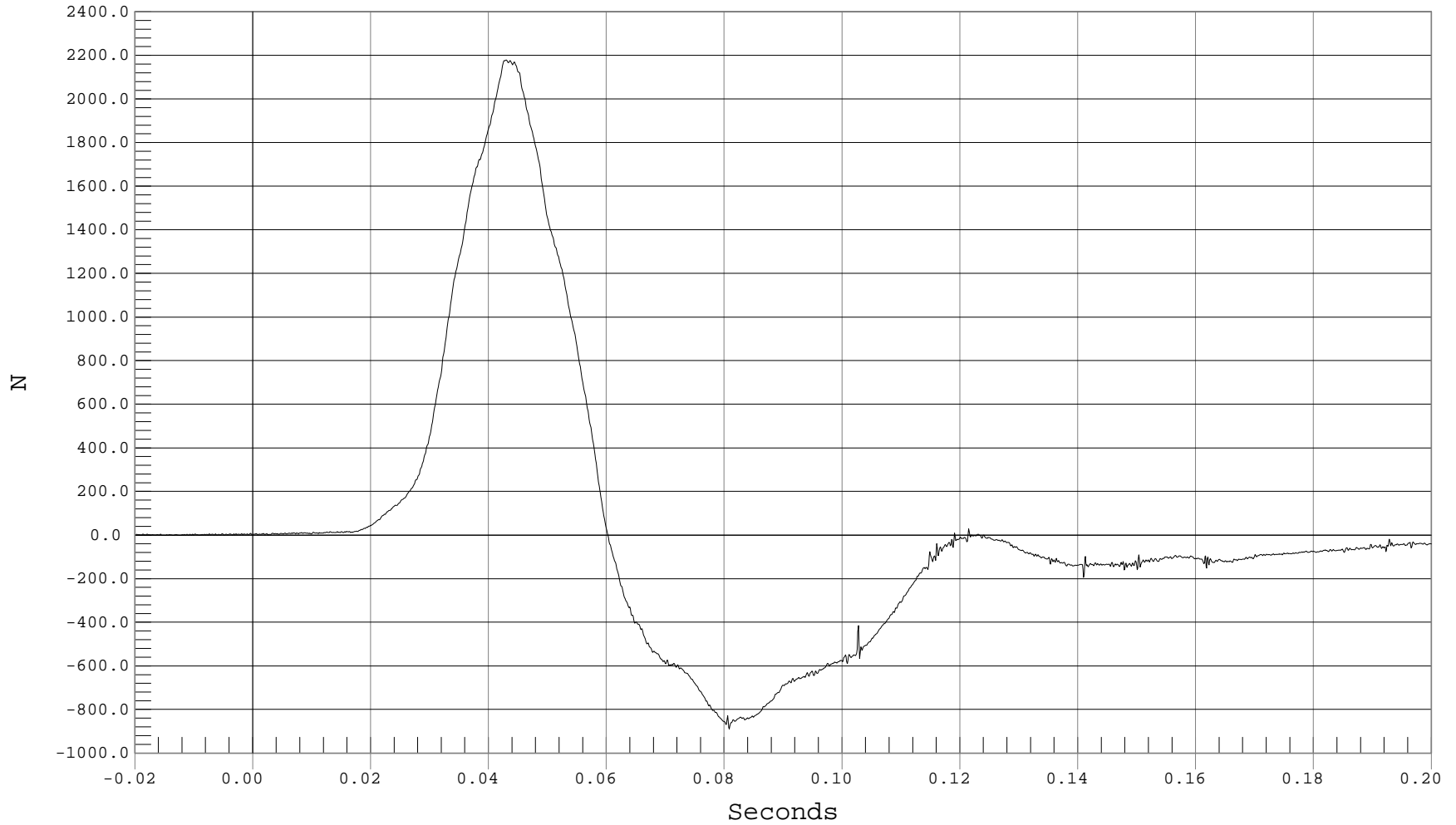
DRIVER LUMBAR FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LUMBAR FY, B02037FT.F84

Ymin = -889.54 N @ 0.0808 Seconds, Ymax = 2178.2 N @ 0.0429 Seconds



B-55



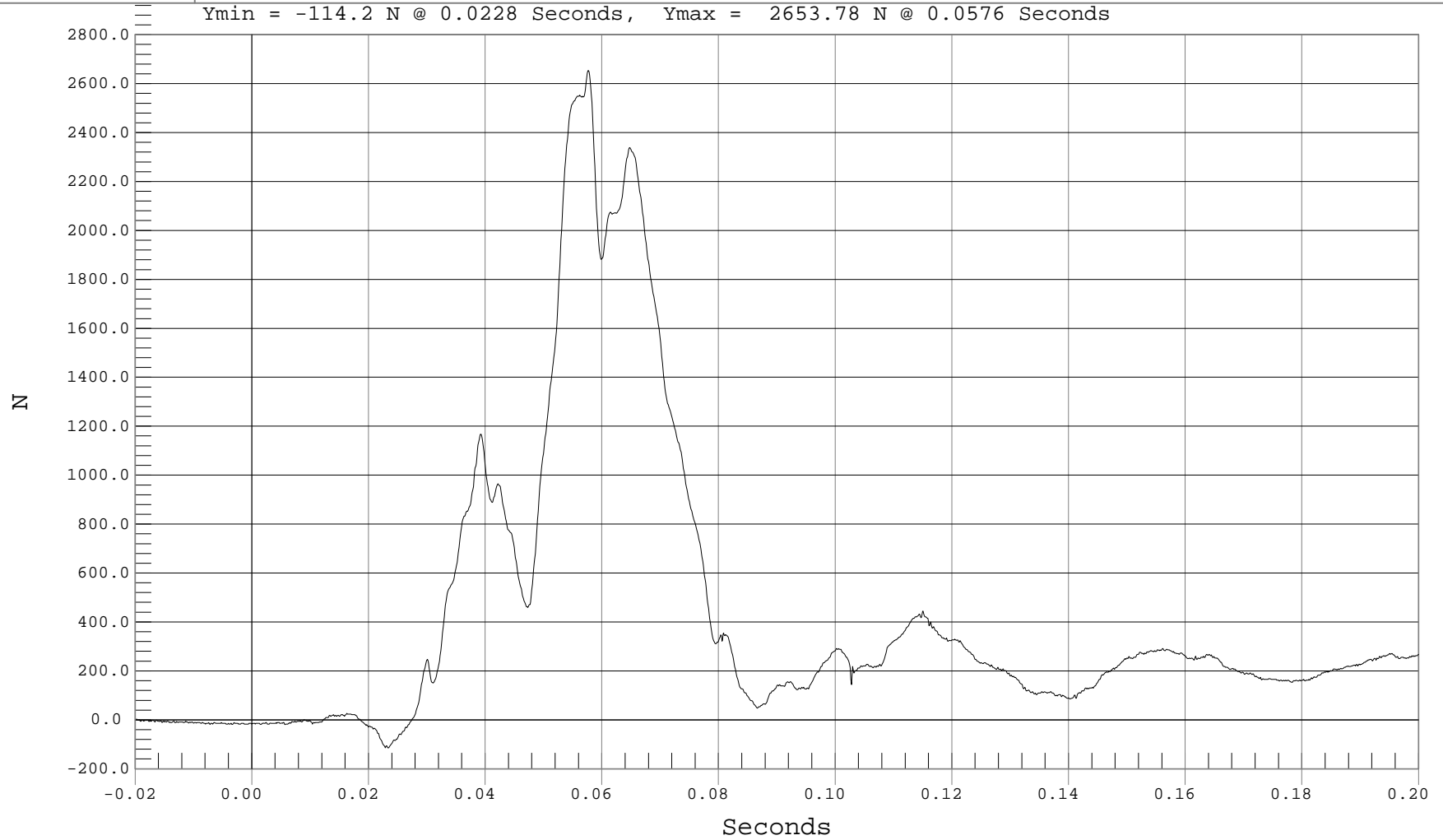
DRIVER LUMBAR FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LUMBAR FZ, B02037FT.F85

Ymin = -114.2 N @ 0.0228 Seconds, Ymax = 2653.78 N @ 0.0576 Seconds





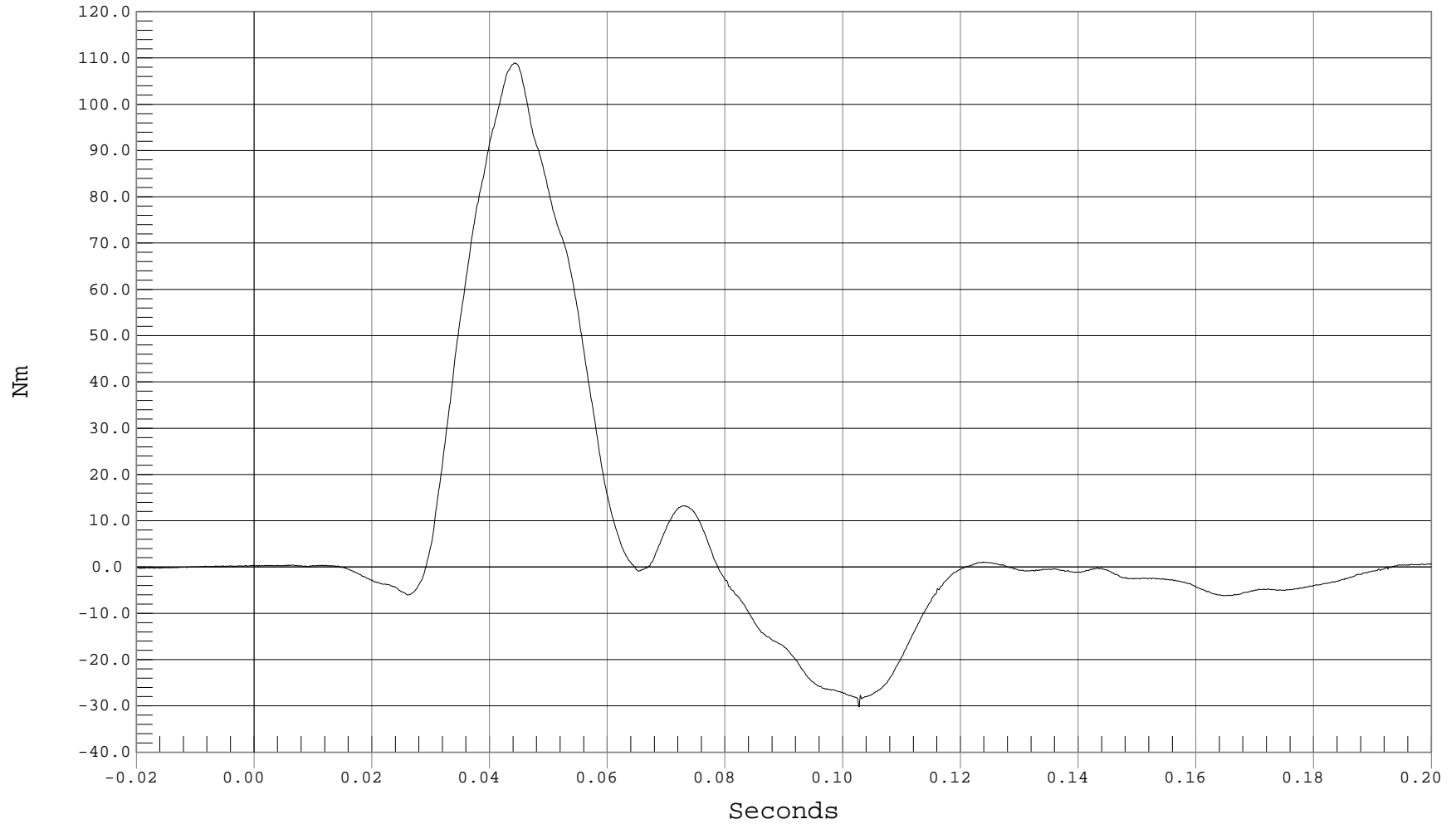
DRIVER LUMBAR MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER LUMBAR MX, B02037MT.M86

Ymin = -30.22 Nm @ 0.1027 Seconds, Ymax = 108.96 Nm @ 0.0442 Seconds





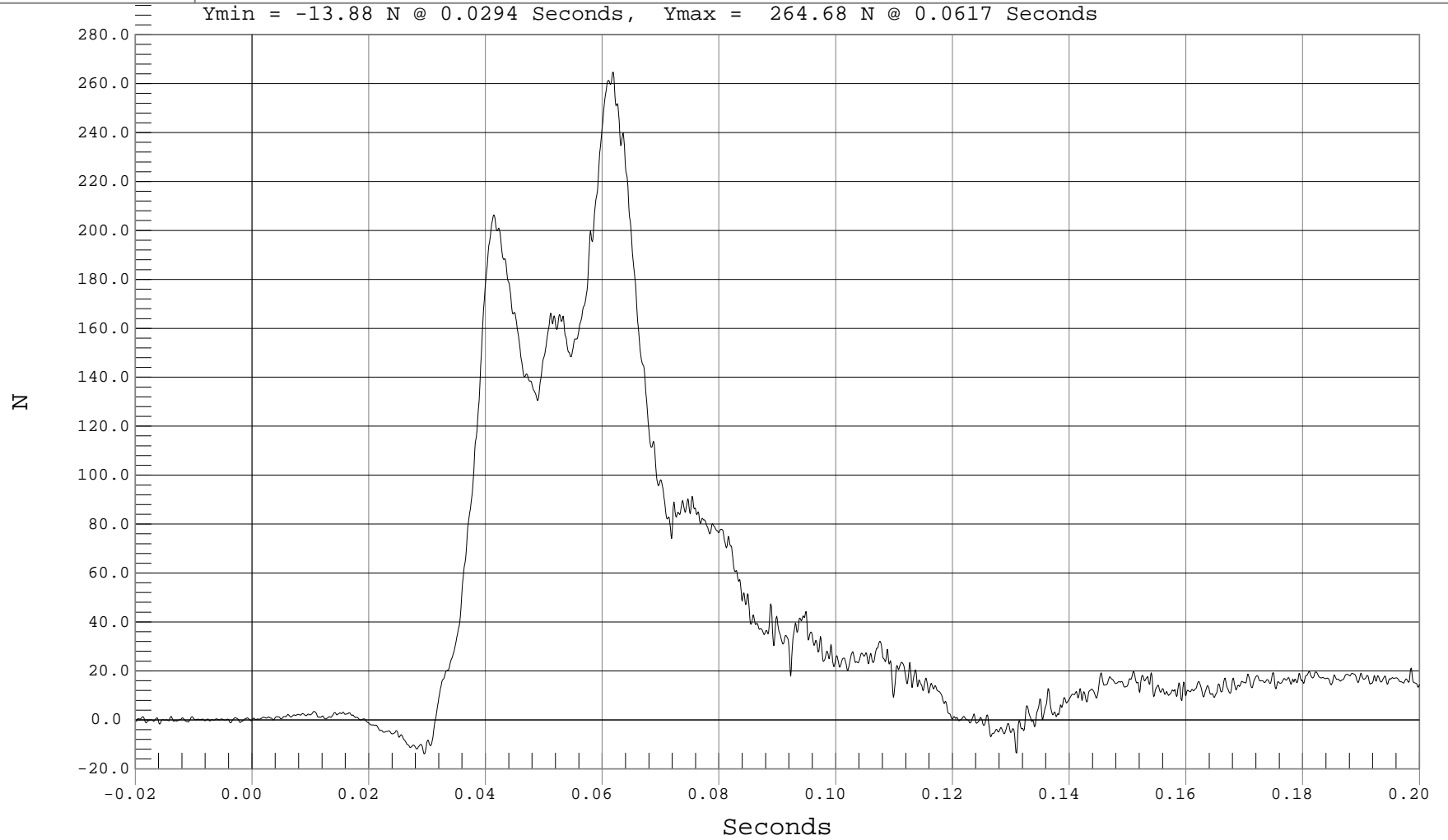
DRIVER ABDOMEN FRONT FORCE

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER FRONT ABDOMEN FY, B02037FF.F87

Ymin = -13.88 N @ 0.0294 Seconds, Ymax = 264.68 N @ 0.0617 Seconds



B-58



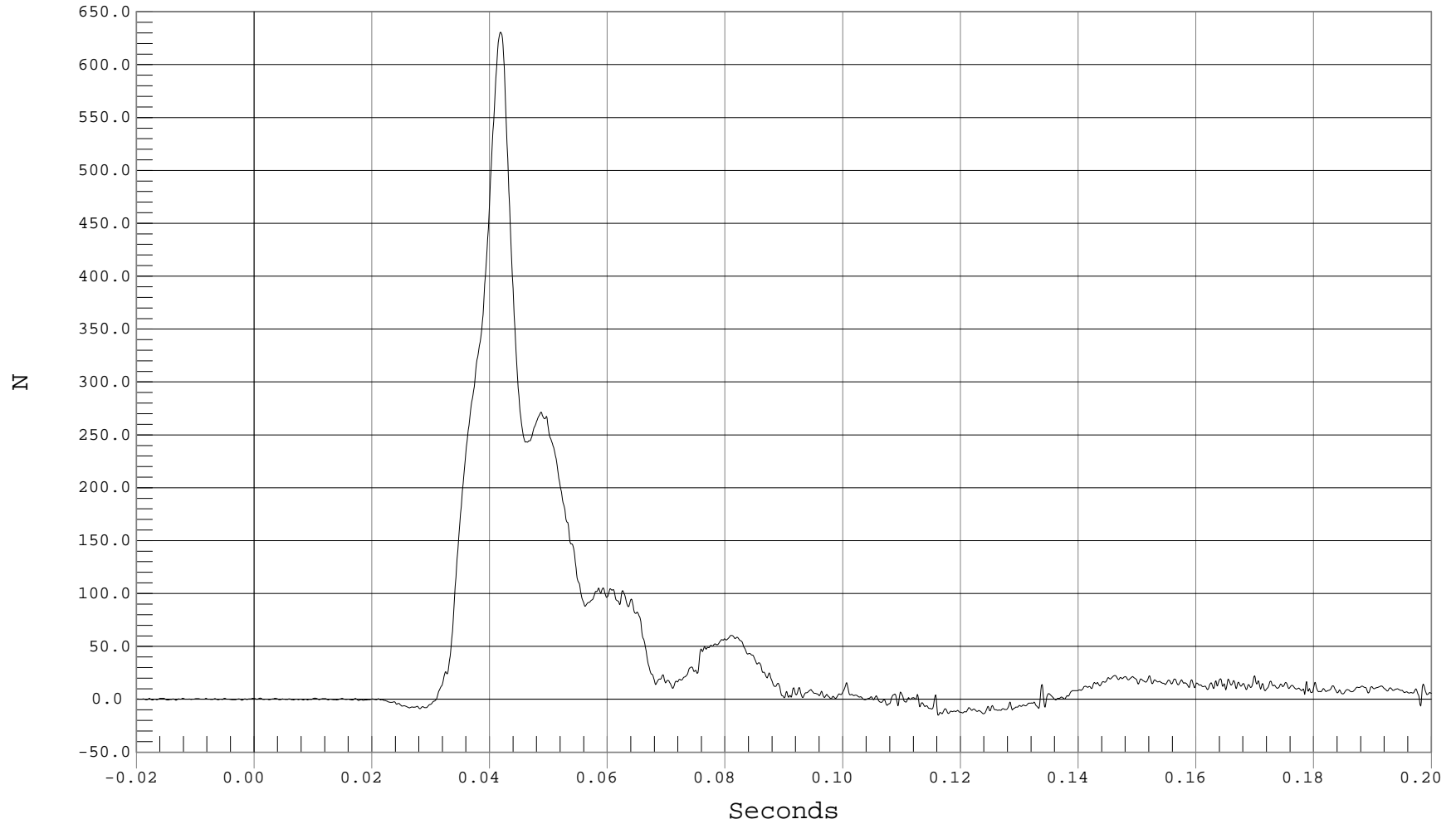
DRIVER ABDOMEN MID FORCE

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER MID ABDOMEN FY, B02037FF.F88

Ymin = -15.01 N @ 0.1161 Seconds, Ymax = 630.62 N @ 0.0418 Seconds





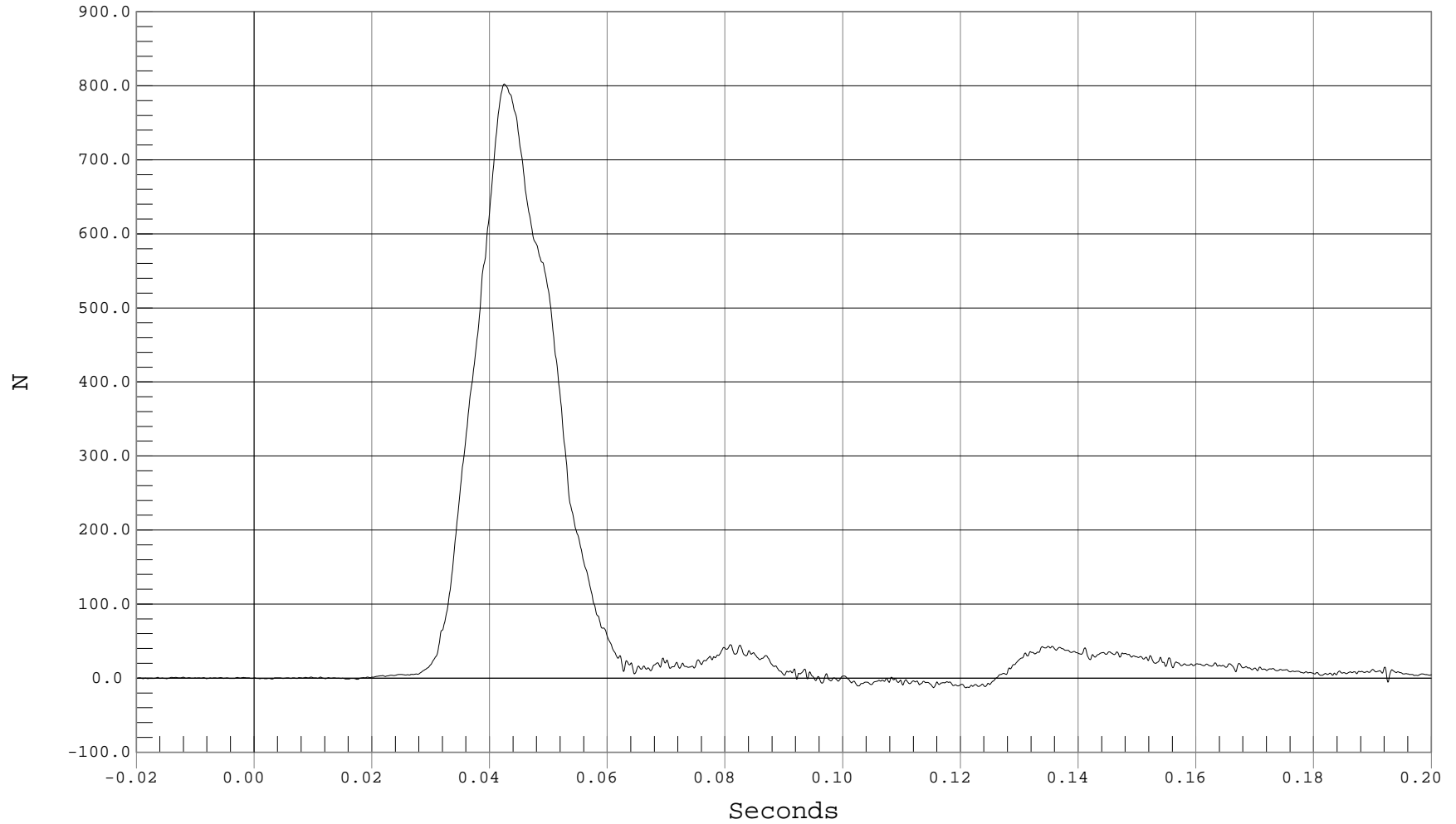
DRIVER ABDOMEN REAR FORCE

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER REAR ABDOMEN FY, B02037FF.F89

Ymin = -13.01 N @ 0.1208 Seconds, Ymax = 802.49 N @ 0.0424 Seconds



B-60



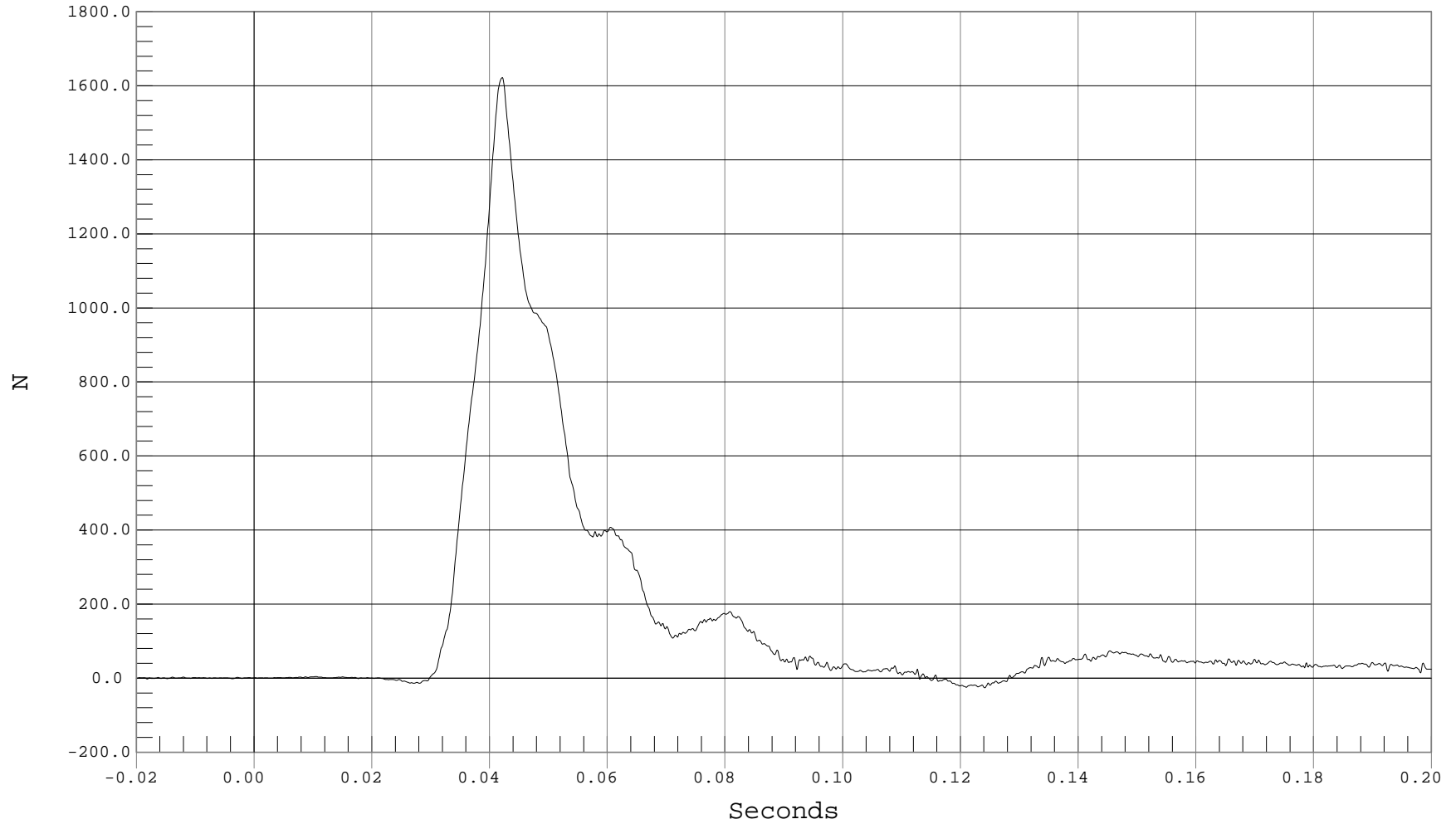
DRIVER SUMMED ABDOMEN FORCE

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER SUMMED ABDOMEN FORCE, B02037FU.F87

Ymin = -25.91 N @ 0.1240 Seconds, Ymax = 1622.31 N @ 0.0421 Seconds



B-61



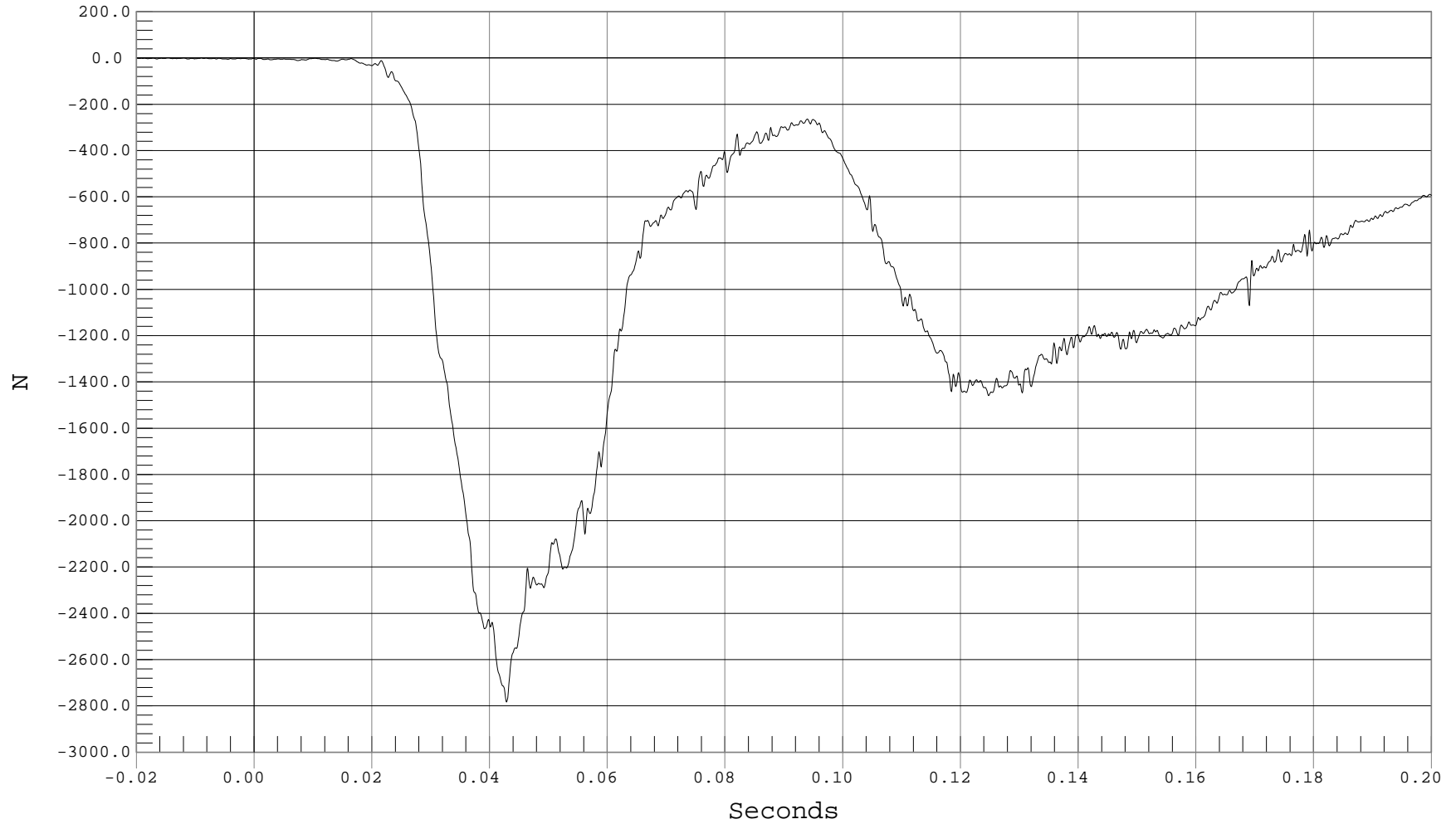
DRIVER PUBIC SYMPHYSIS FORCE

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 PUBIC SYMPHYSIS FORCE, B02037FF.F90

Ymin = -2783.59 N @ 0.0428 Seconds, Ymax = 1.24 N @ -0.0148 Seconds



B-62



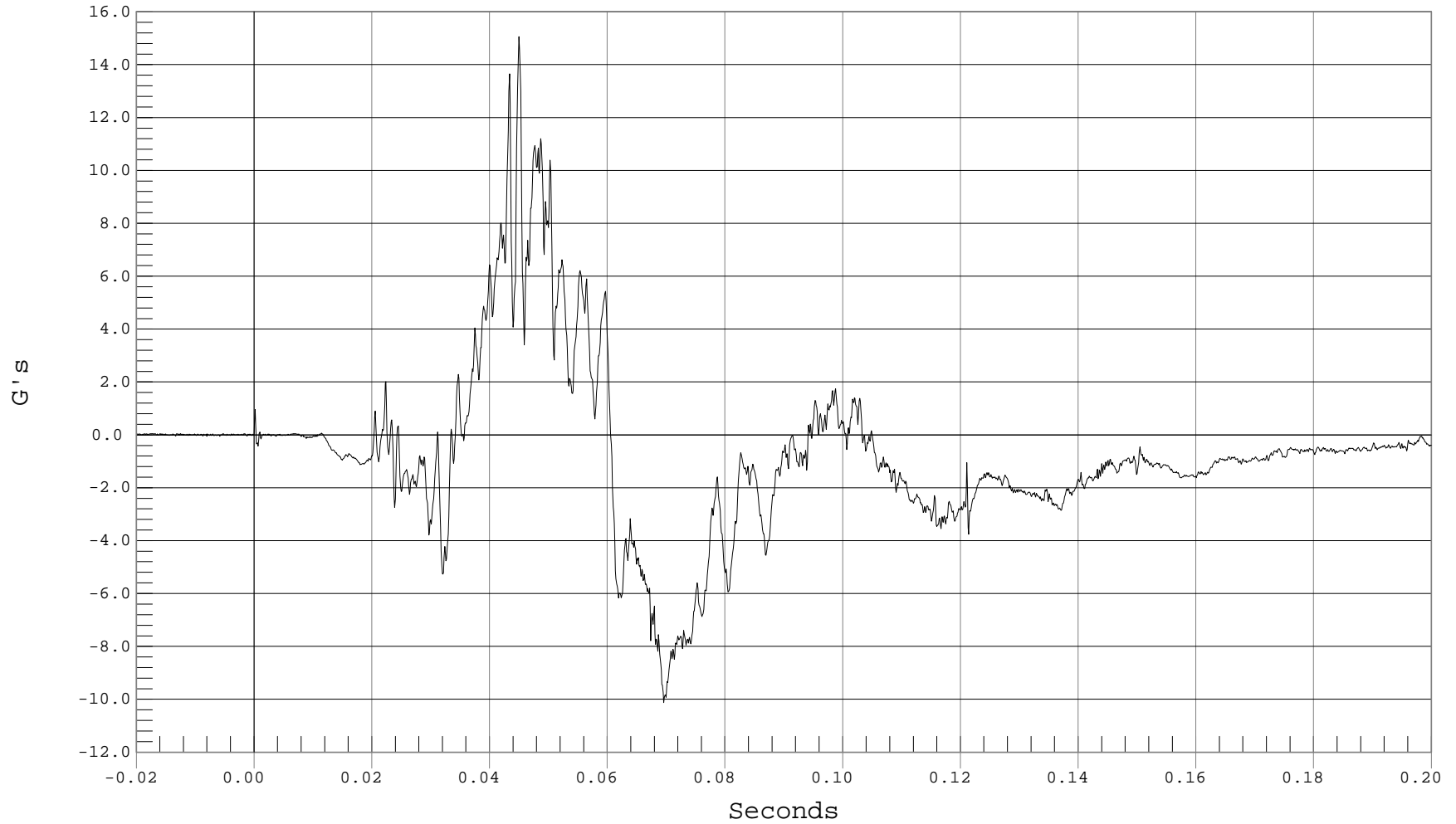
DRIVER PELVIS X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER PELVIS X, B02037AT.A12

Ymin = -10.13 G's @ 0.0695 Seconds, Ymax = 15.06 G's @ 0.0449 Seconds



B-63



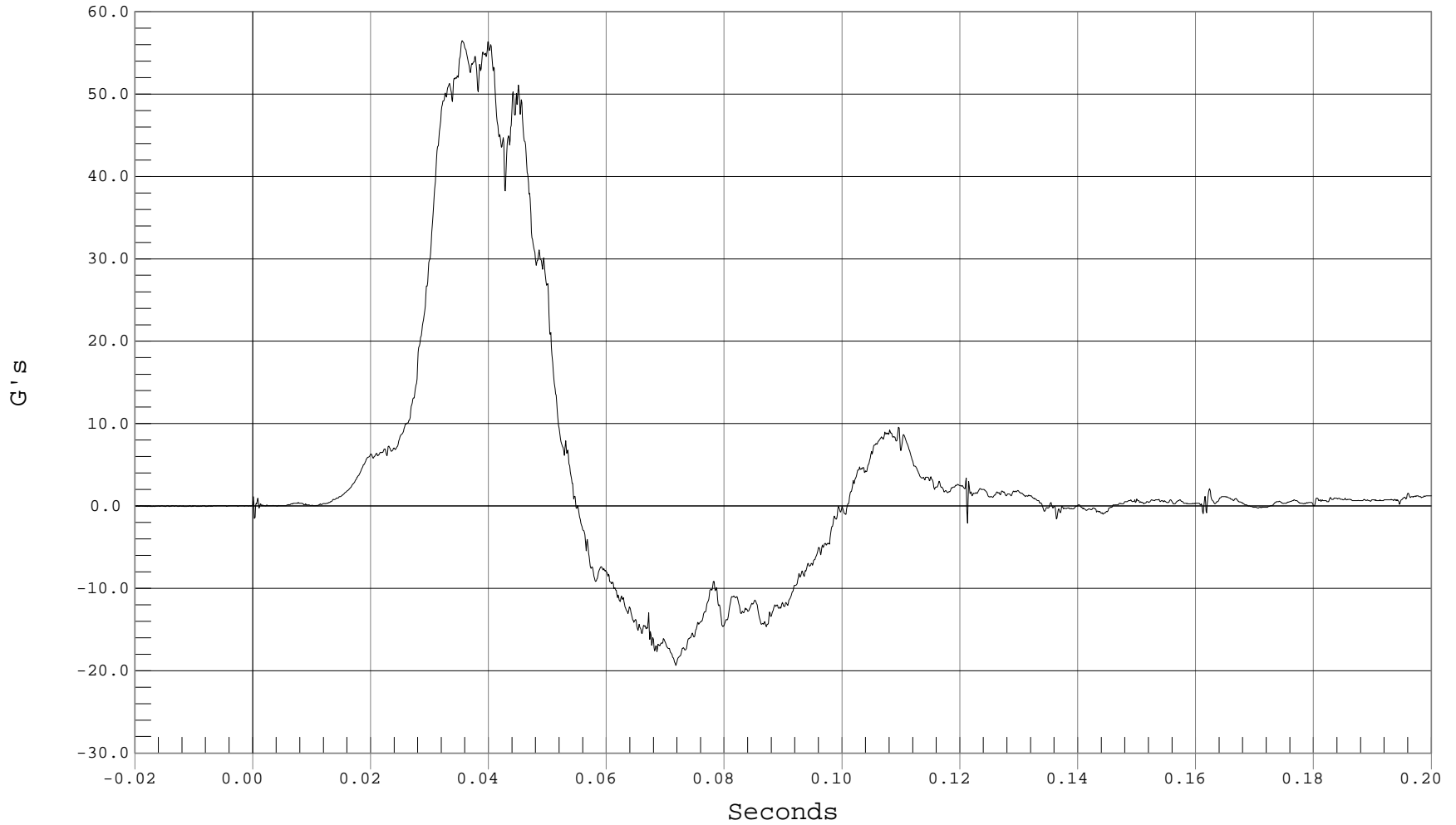
DRIVER PELVIS Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER PELVIS Y, B02037AT.A13

Ymin = -19.34 G's @ 0.0717 Seconds, Ymax = 56.5 G's @ 0.0354 Seconds



B-64



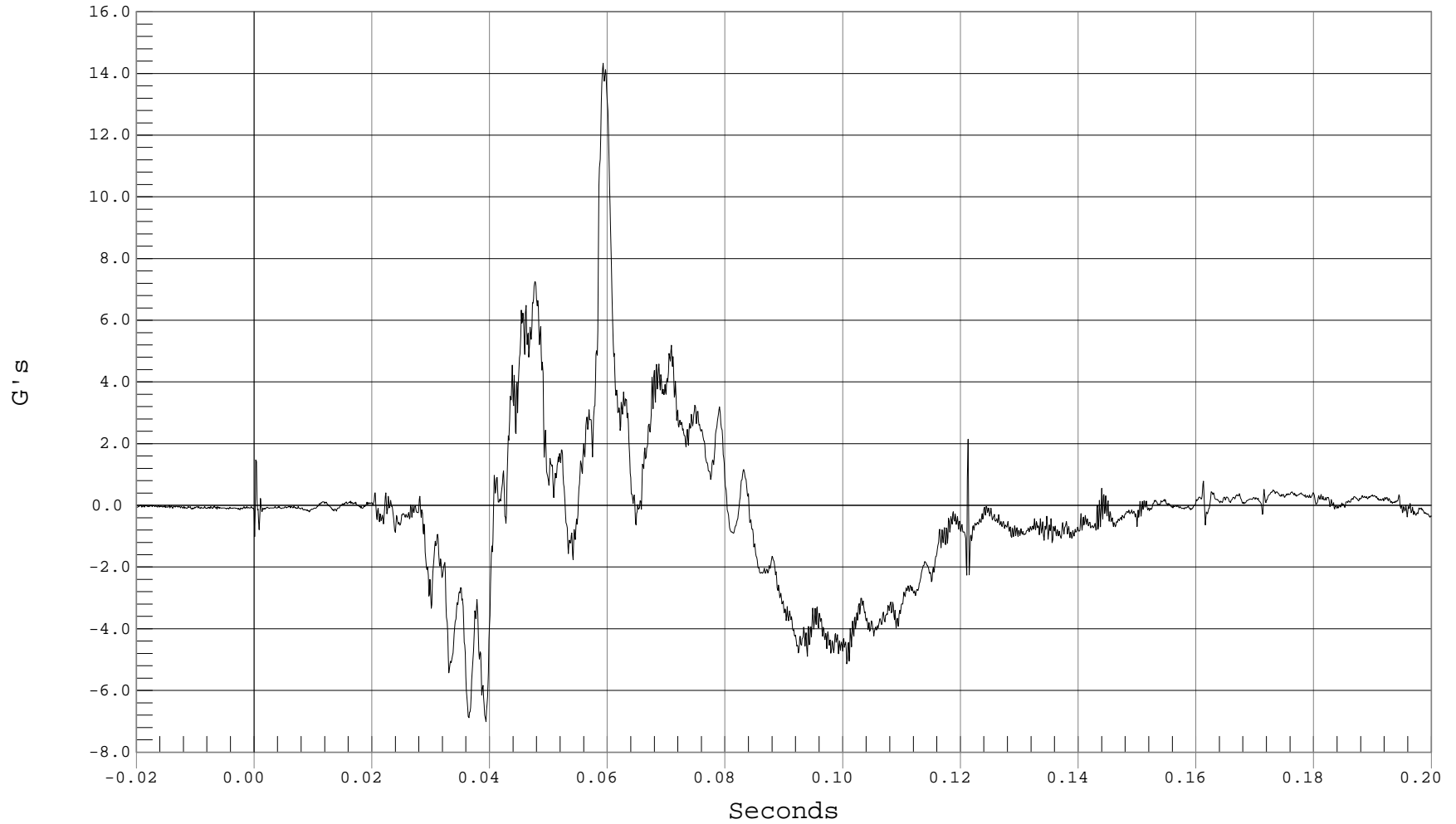
DRIVER PELVIS Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER PELVIS Z, B02037AT.A14

Ymin = -7.01 G's @ 0.0393 Seconds, Ymax = 14.34 G's @ 0.0592 Seconds



B-65



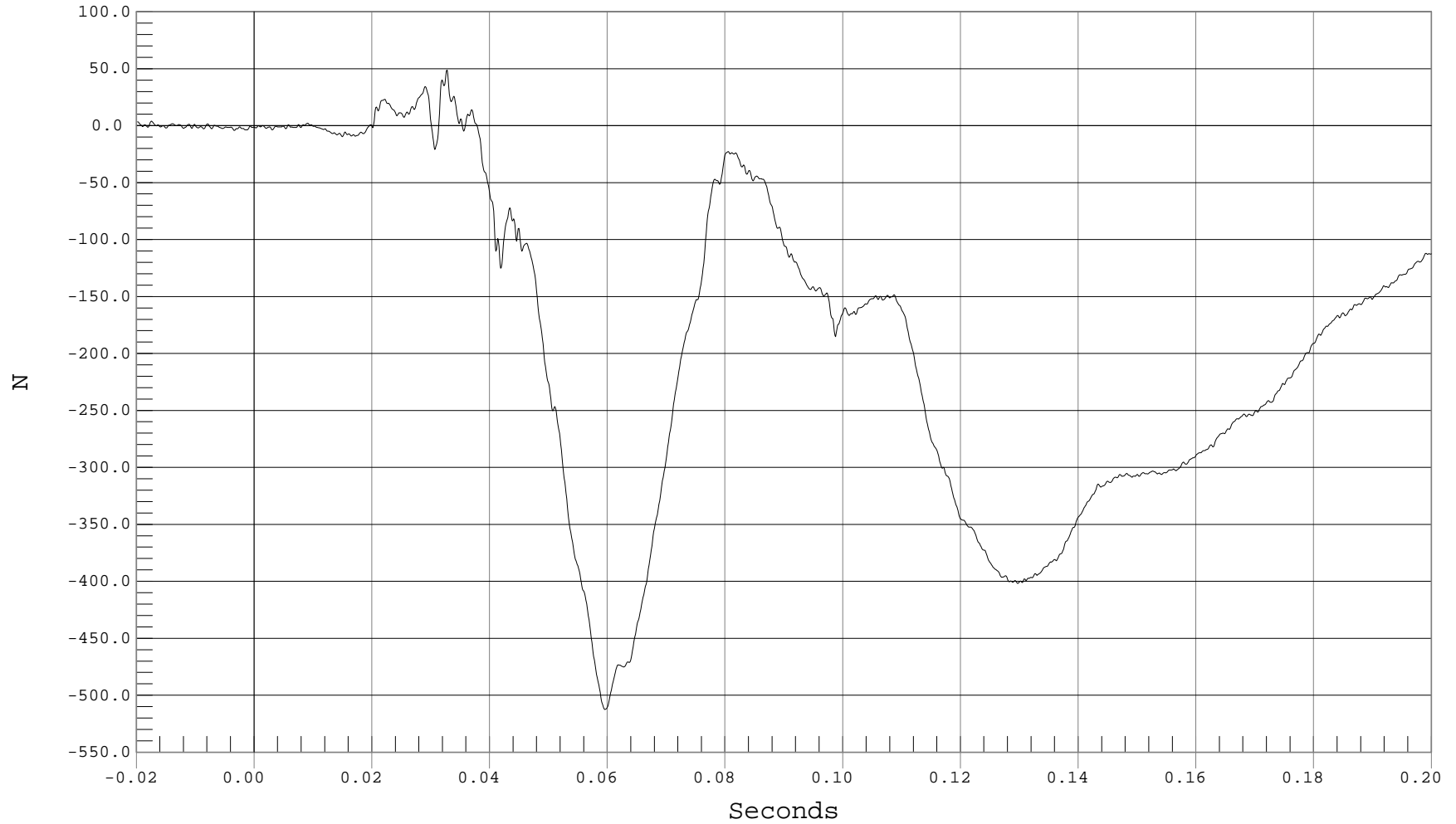
DRIVER LEFT FEMUR FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FX, B02037FF.F01

Ymin = -512.48 N @ 0.0595 Seconds, Ymax = 48.76 N @ 0.0327 Seconds





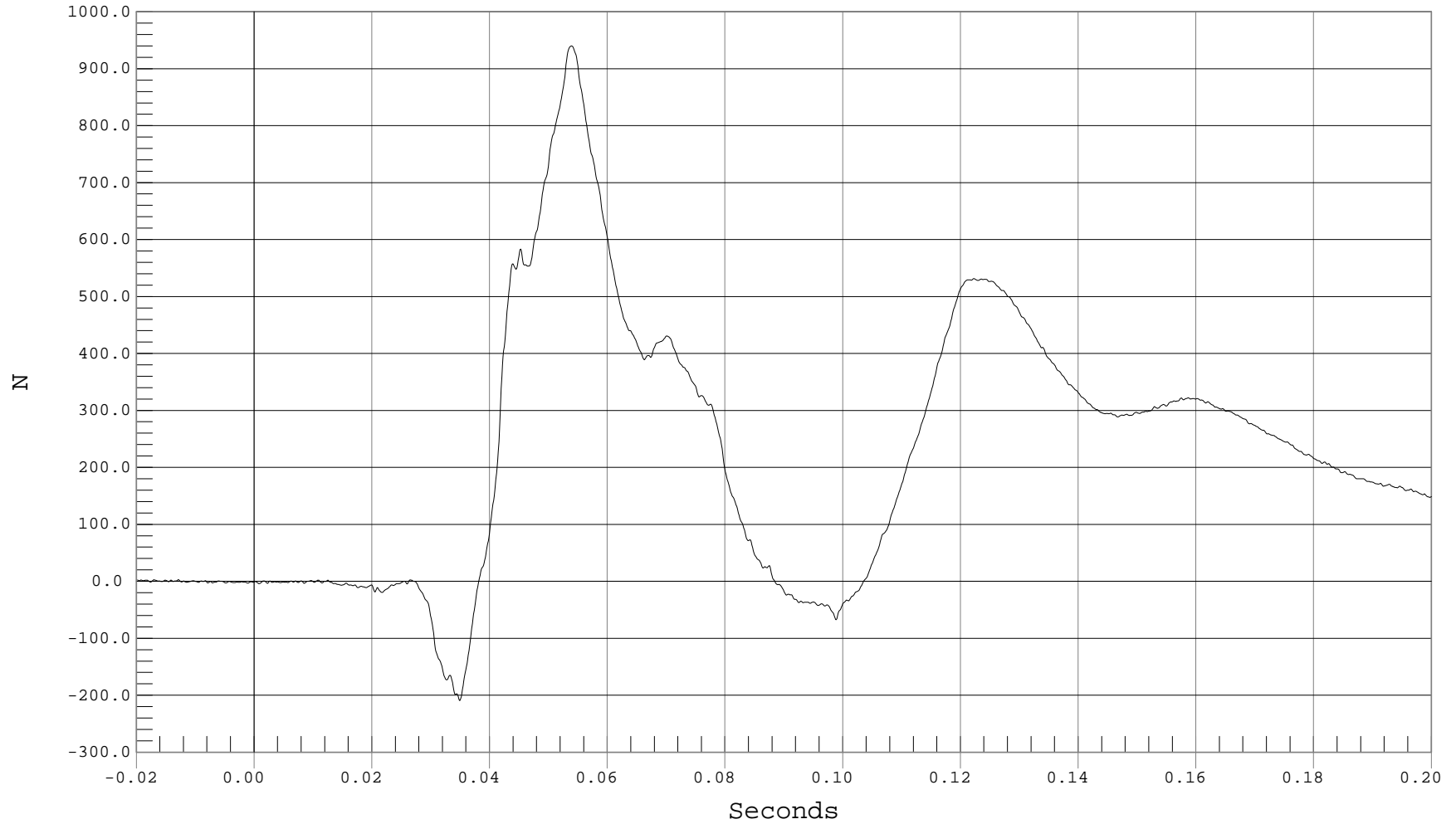
DRIVER LEFT FEMUR FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FY, B02037FF.F02

Ymin = -209.09 N @ 0.0349 Seconds, Ymax = 939.82 N @ 0.0538 Seconds



B-67



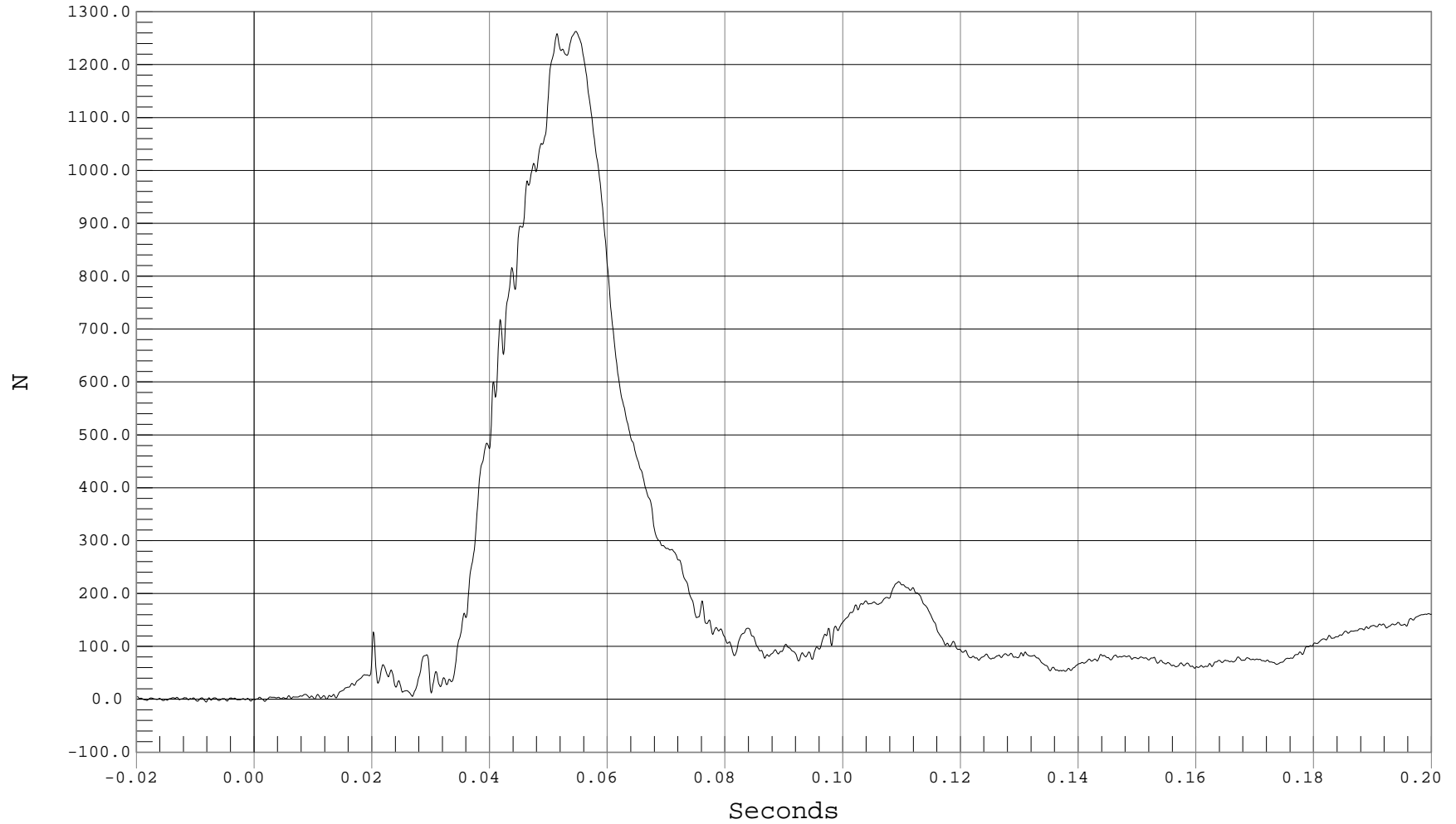
DRIVER LEFT FEMUR FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

1 DRIVER LEFT FEMUR FZ, B02037FF.F03

Ymin = -5.28 N @ -0.0082 Seconds, Ymax = 1262.98 N @ 0.0546 Seconds



B-68



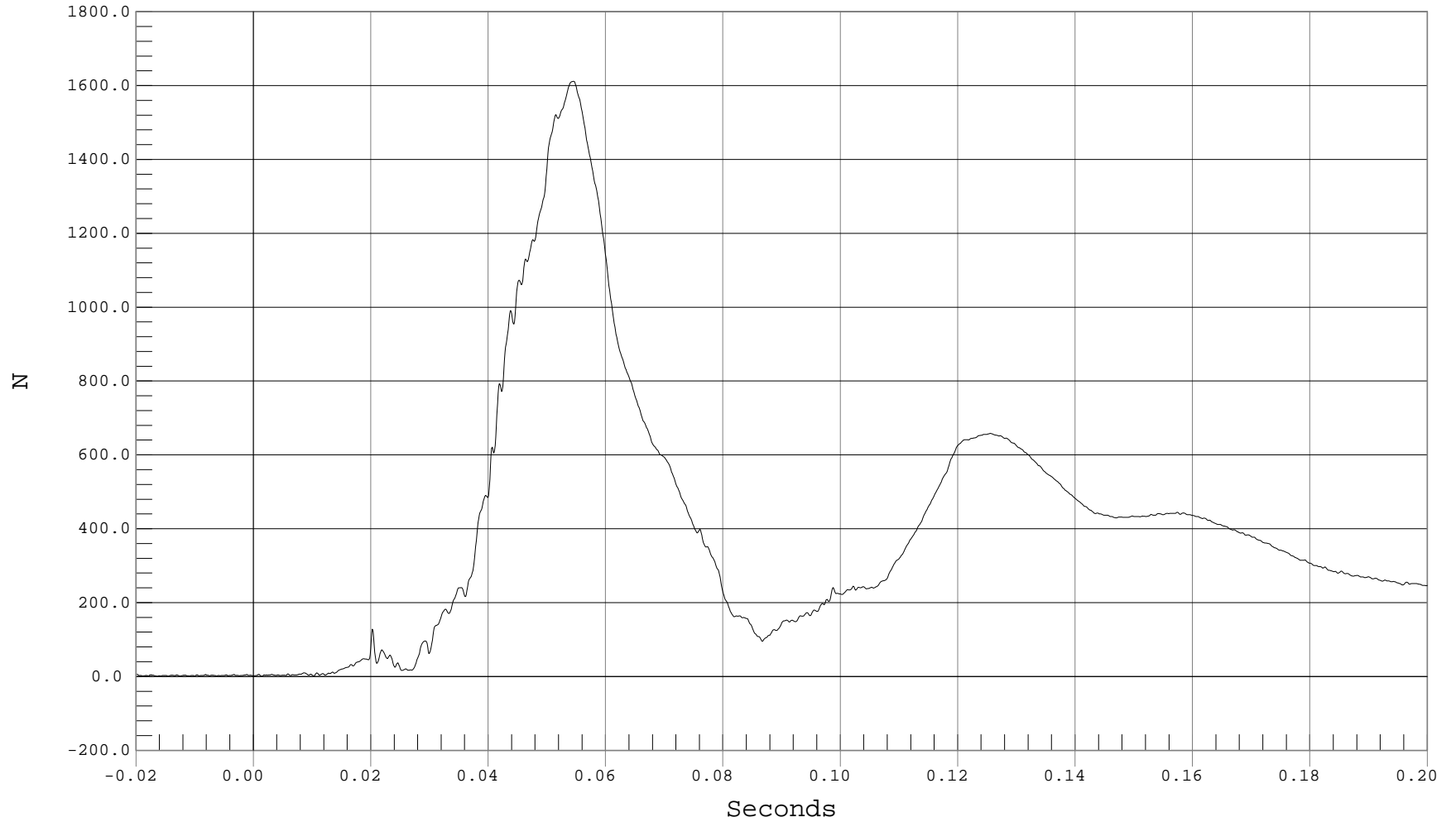
DRIVER LEFT FEMUR FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR FORCE RESULTANT, B02037FV.F01

Ymin = .34 N @ 0.0013 Seconds, Ymax = 1611.77 N @ 0.0545 Seconds



B-69



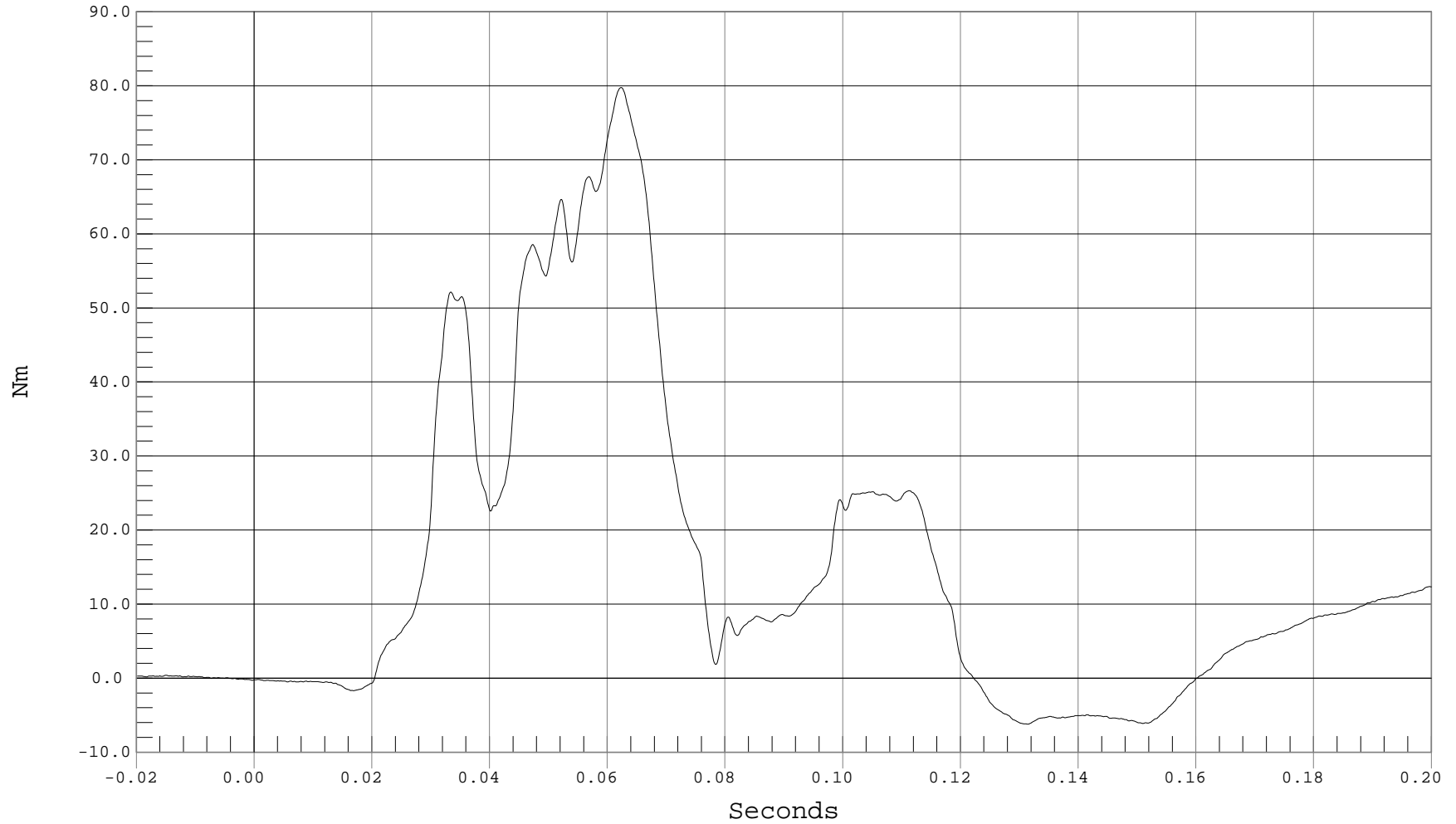
DRIVER LEFT FEMUR MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MX, B02037MF.M04

Ymin = -6.21 Nm @ 0.1314 Seconds, Ymax = 79.76 Nm @ 0.0623 Seconds



B-70



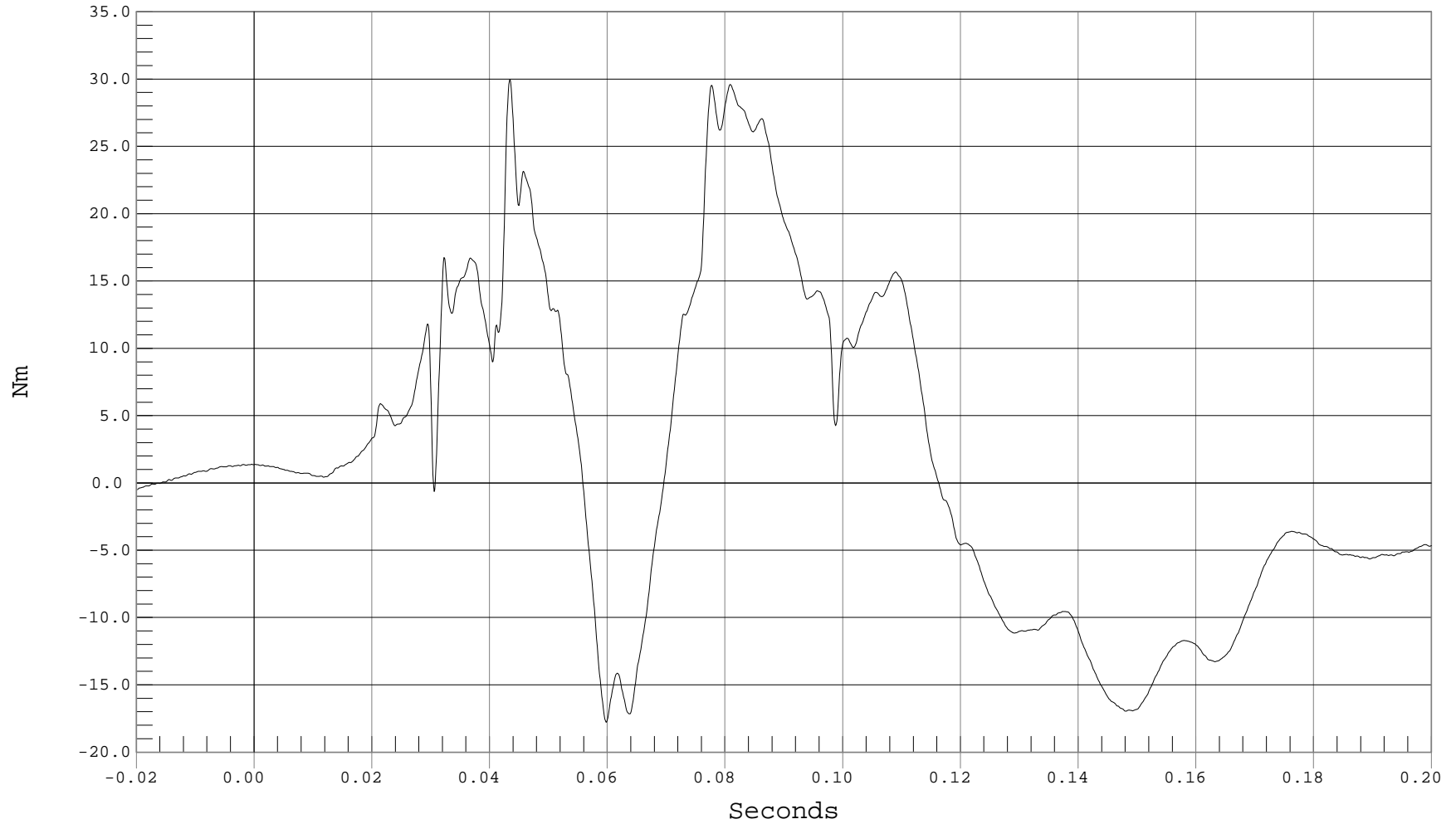
DRIVER LEFT FEMUR MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MY, B02037MF.M05

Ymin = -17.78 Nm @ 0.0597 Seconds, Ymax = 29.97 Nm @ 0.0434 Seconds



B-71



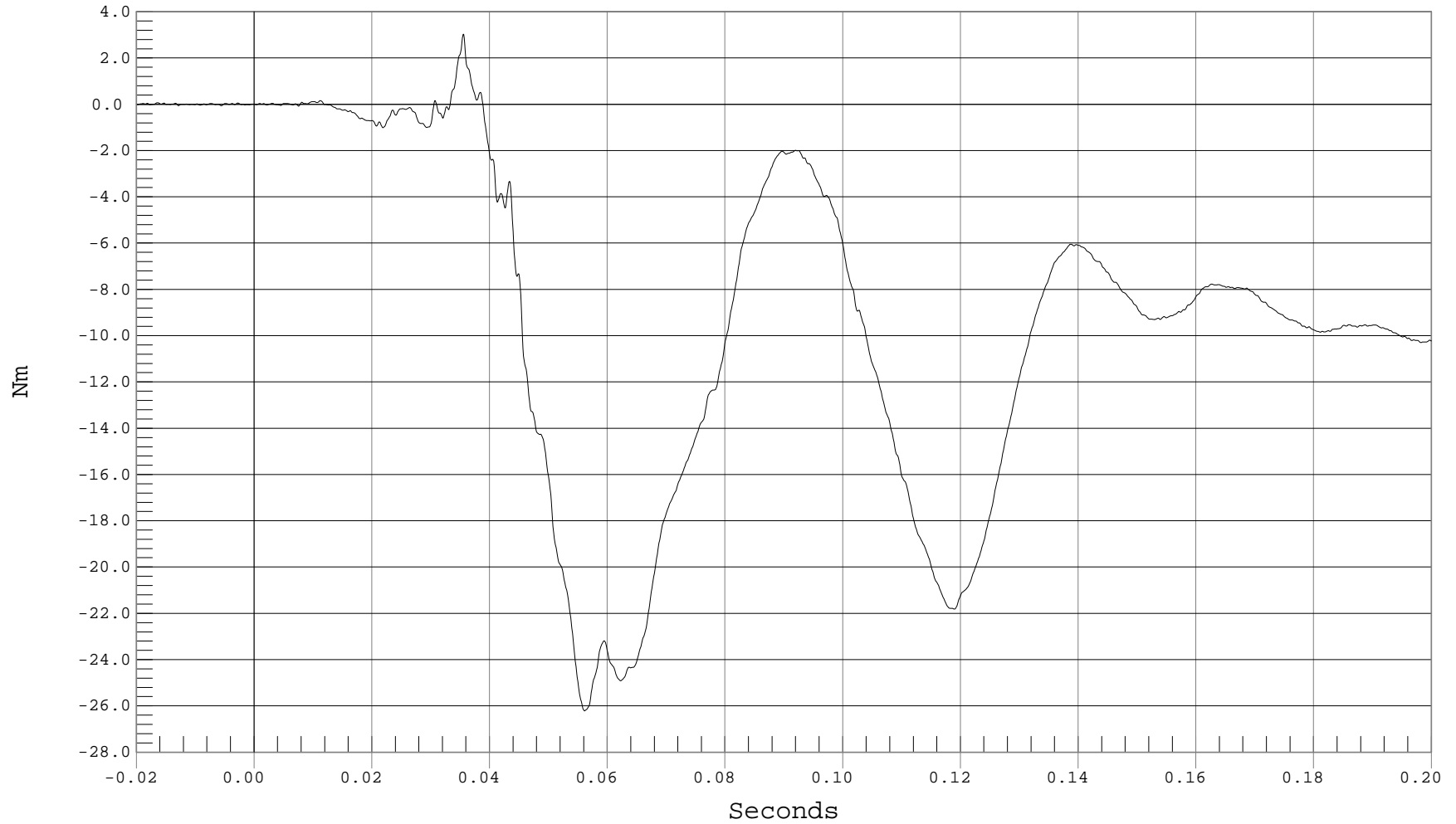
DRIVER LEFT FEMUR MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER LEFT FEMUR MZ, B02037MF.M06

Ymin = -26.21 Nm @ 0.0561 Seconds, Ymax = 3.03 Nm @ 0.0355 Seconds



B-72



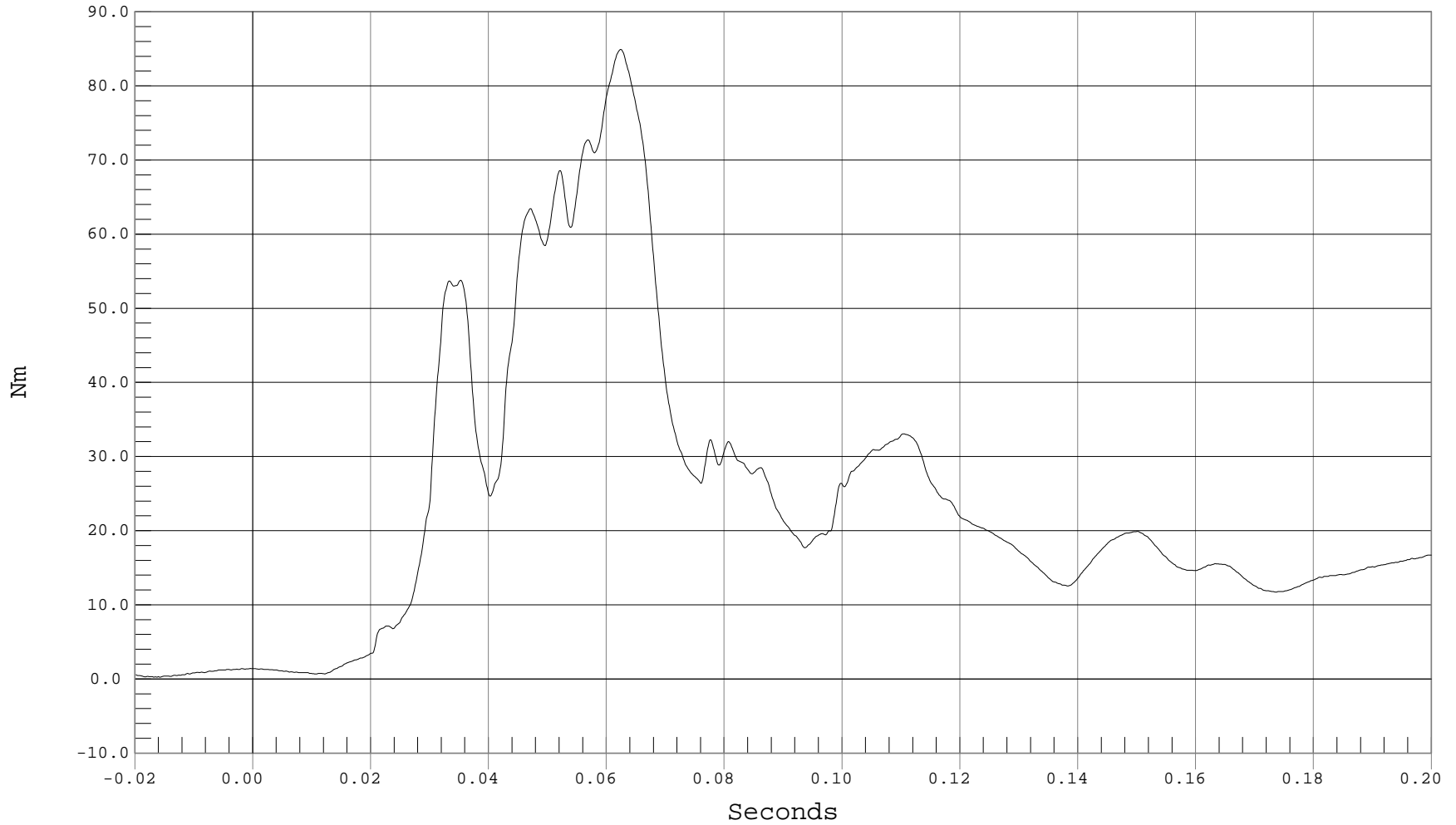
DRIVER LEFT FEMUR MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

1 DRIVER LEFT FEMUR MOMENT RESULTANT, B02037MV.M04

Ymin = .24 Nm @ -0.0158 Seconds, Ymax = 84.93 Nm @ 0.0624 Seconds





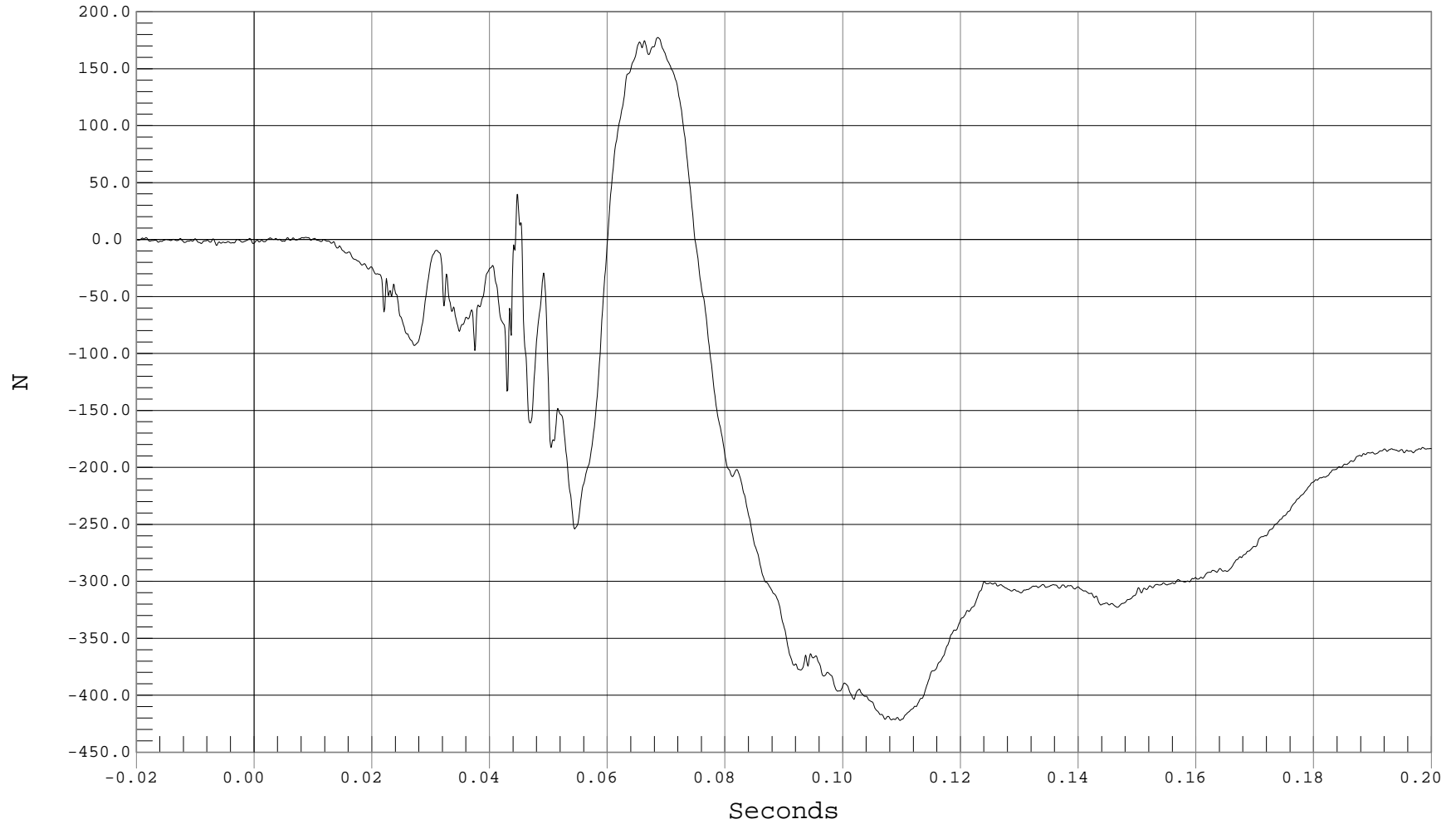
DRIVER RIGHT FEMUR FORCE X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FX, B02037FF.F91

Ymin = -422.06 N @ 0.1096 Seconds, Ymax = 177.38 N @ 0.0685 Seconds



B-74



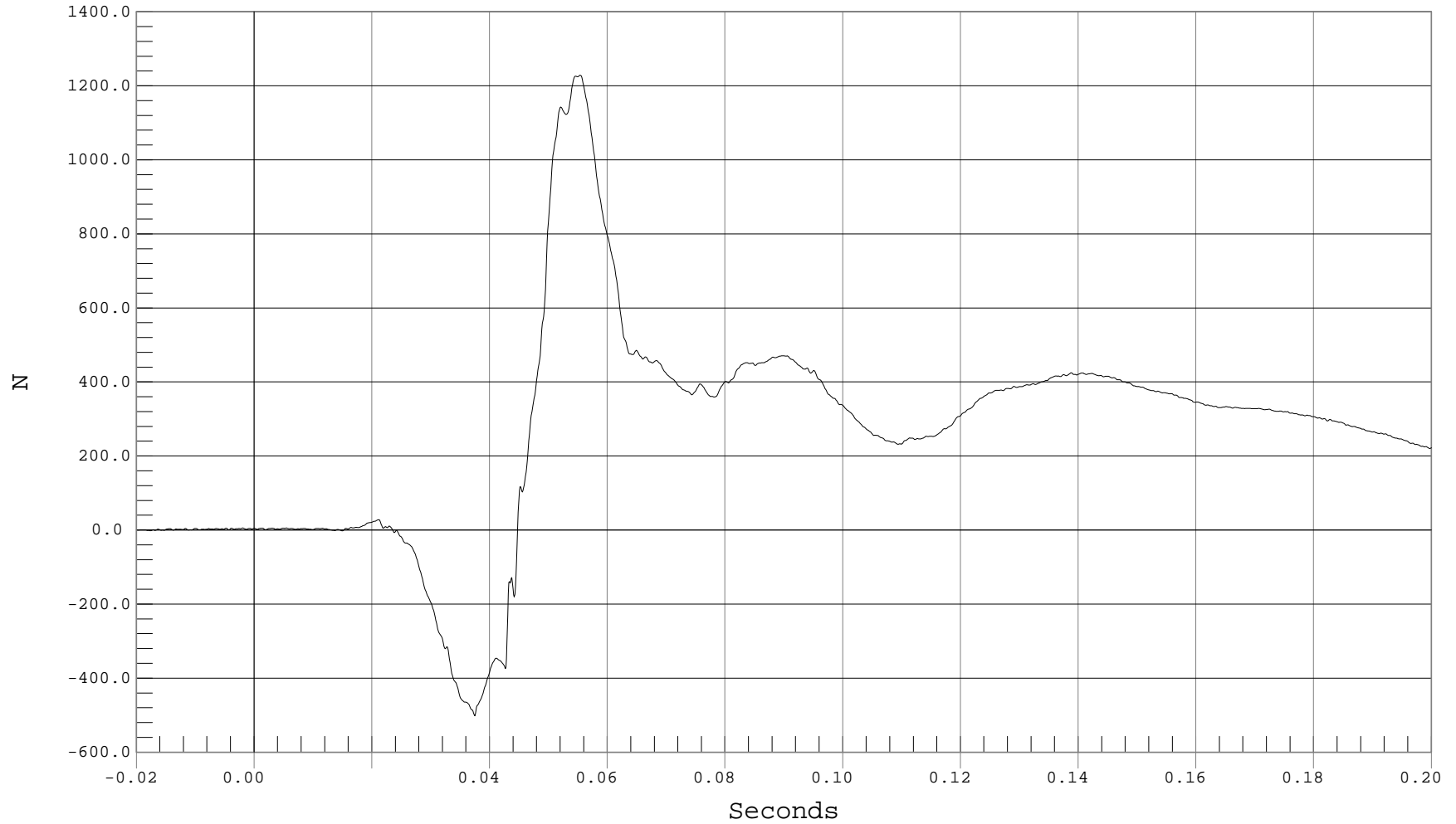
DRIVER RIGHT FEMUR FORCE Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FY, B02037FF.F92

Ymin = -501.87 N @ 0.0374 Seconds, Ymax = 1228.65 N @ 0.0553 Seconds



B-75



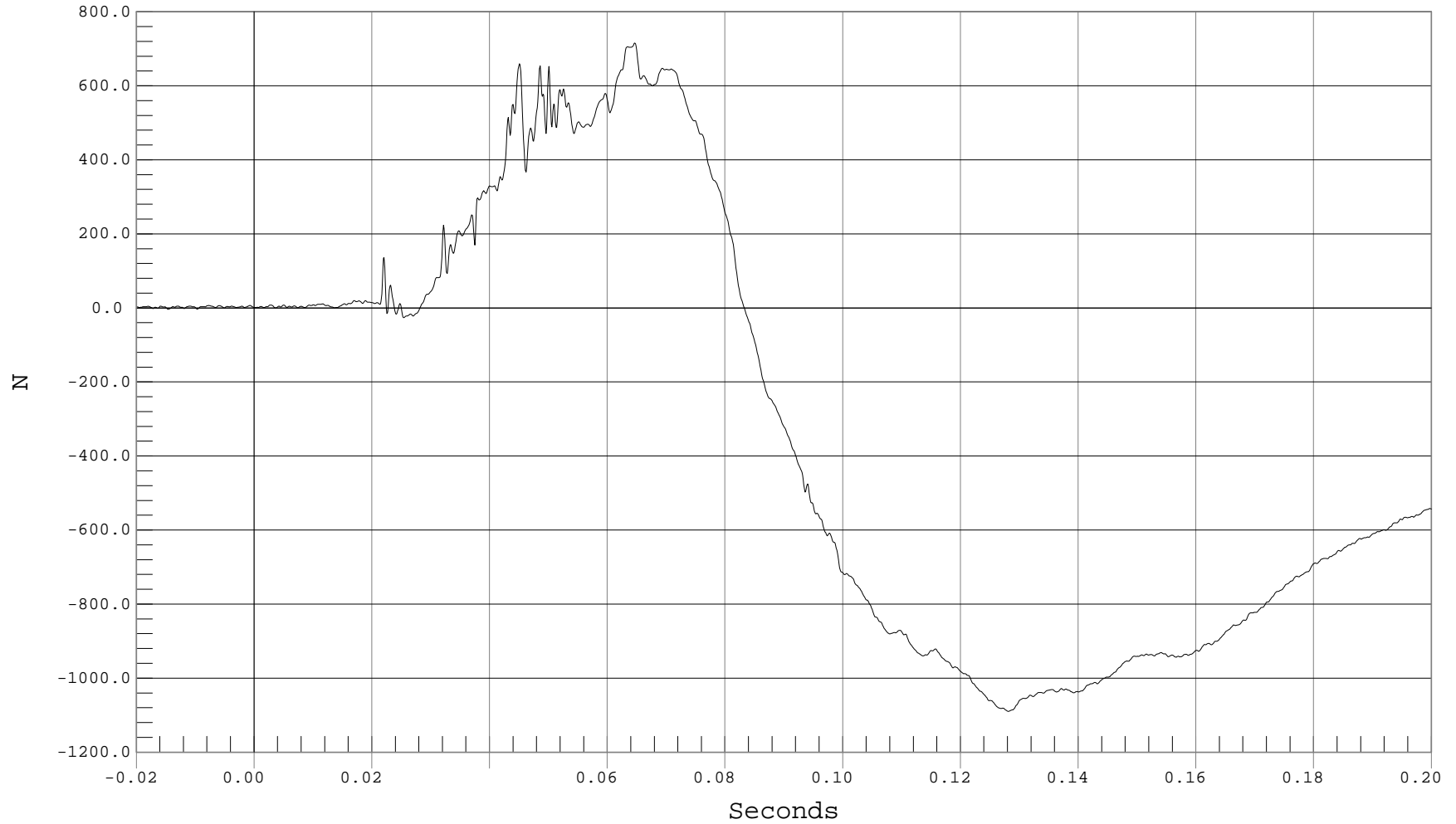
DRIVER RIGHT FEMUR FORCE Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FZ, B02037FF.F93

Ymin = -1089.74 N @ 0.1280 Seconds, Ymax = 715.79 N @ 0.0646 Seconds





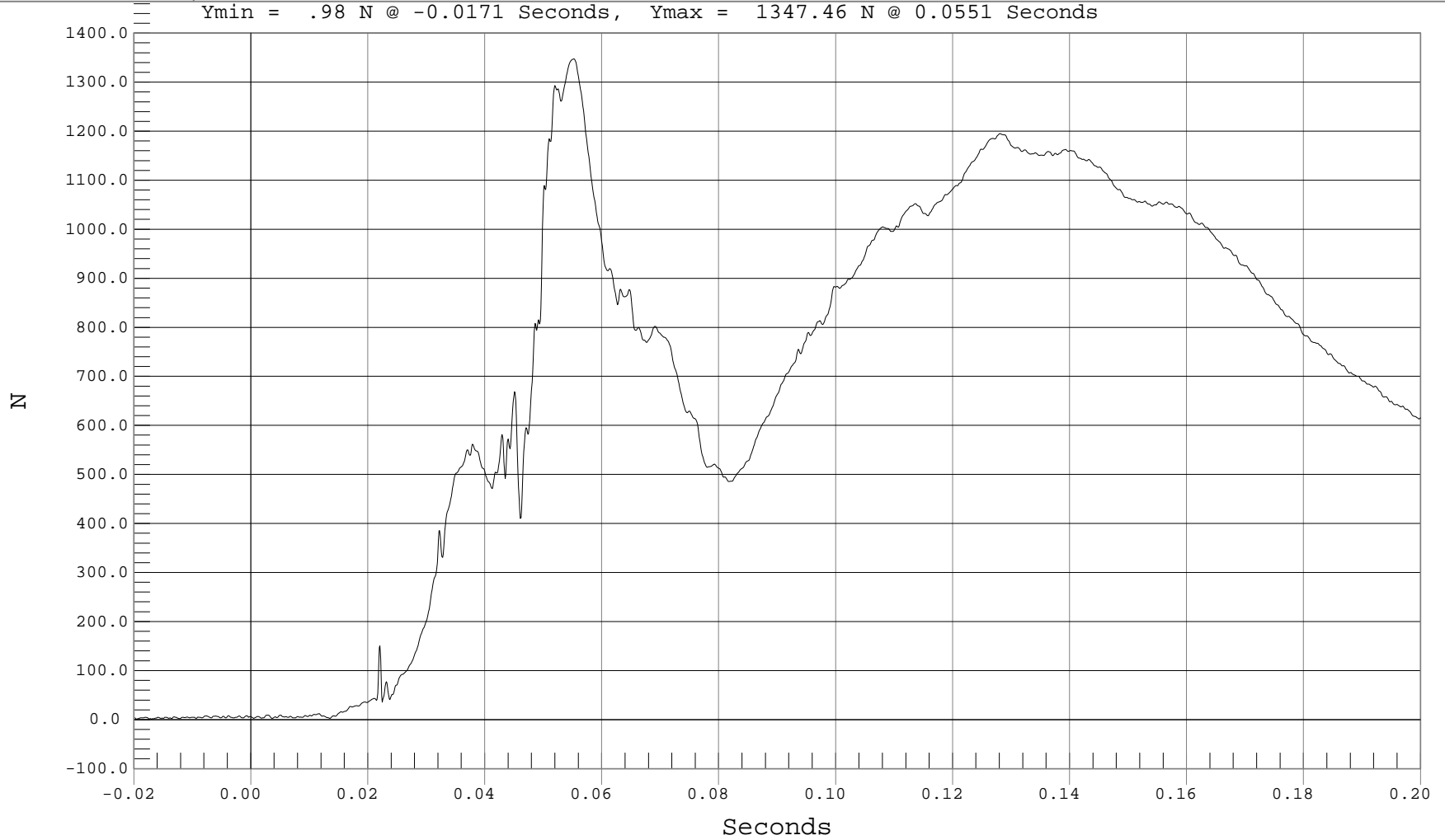
DRIVER RIGHT FEMUR FORCE RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR FORCE RESULTANT, B02037FV.F91

Ymin = .98 N @ -0.0171 Seconds, Ymax = 1347.46 N @ 0.0551 Seconds



B-77



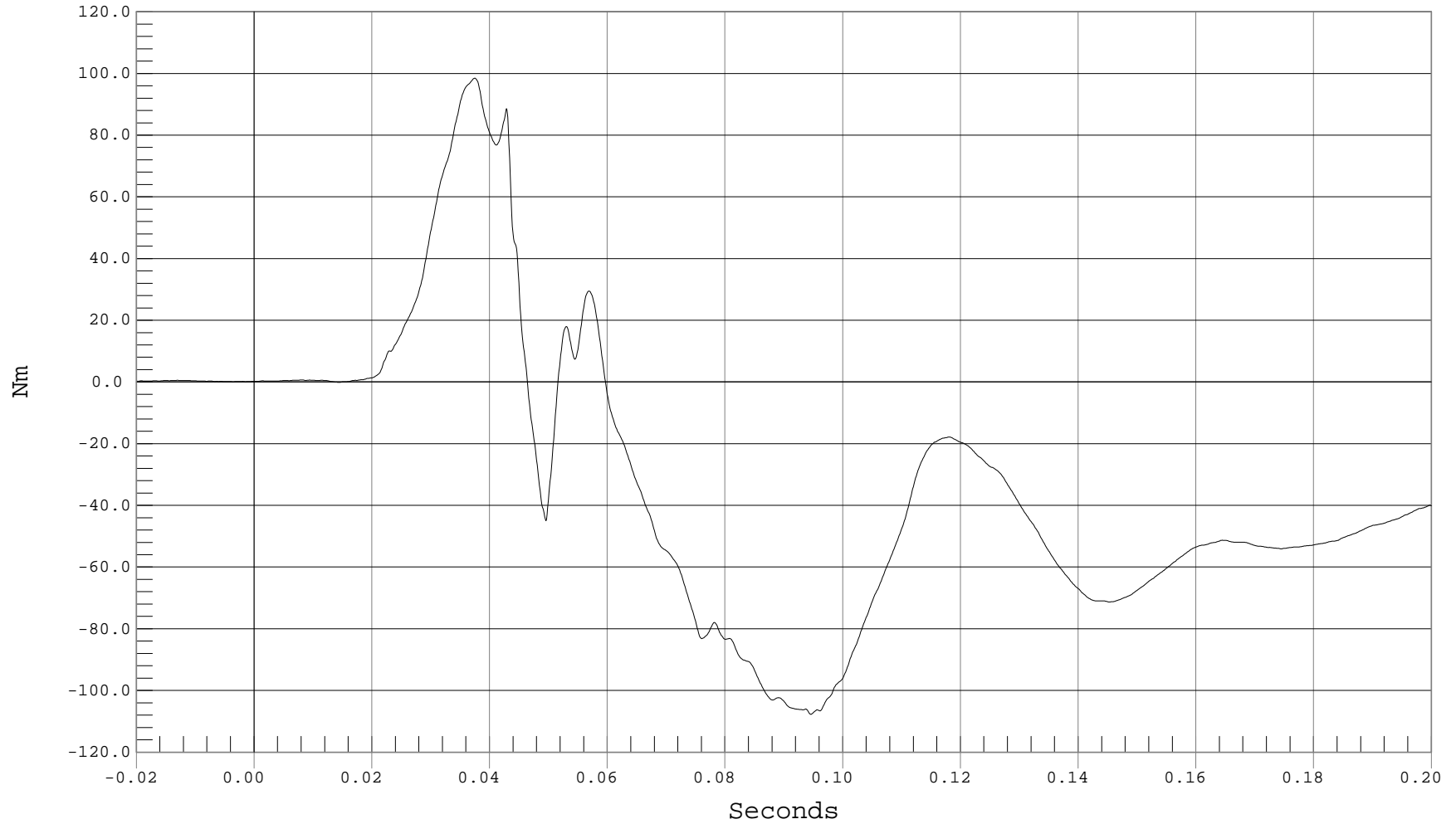
DRIVER RIGHT FEMUR MOMENT X

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MX, B02037MF.M94

Ymin = -107.76 Nm @ 0.0945 Seconds, Ymax = 98.49 Nm @ 0.0374 Seconds





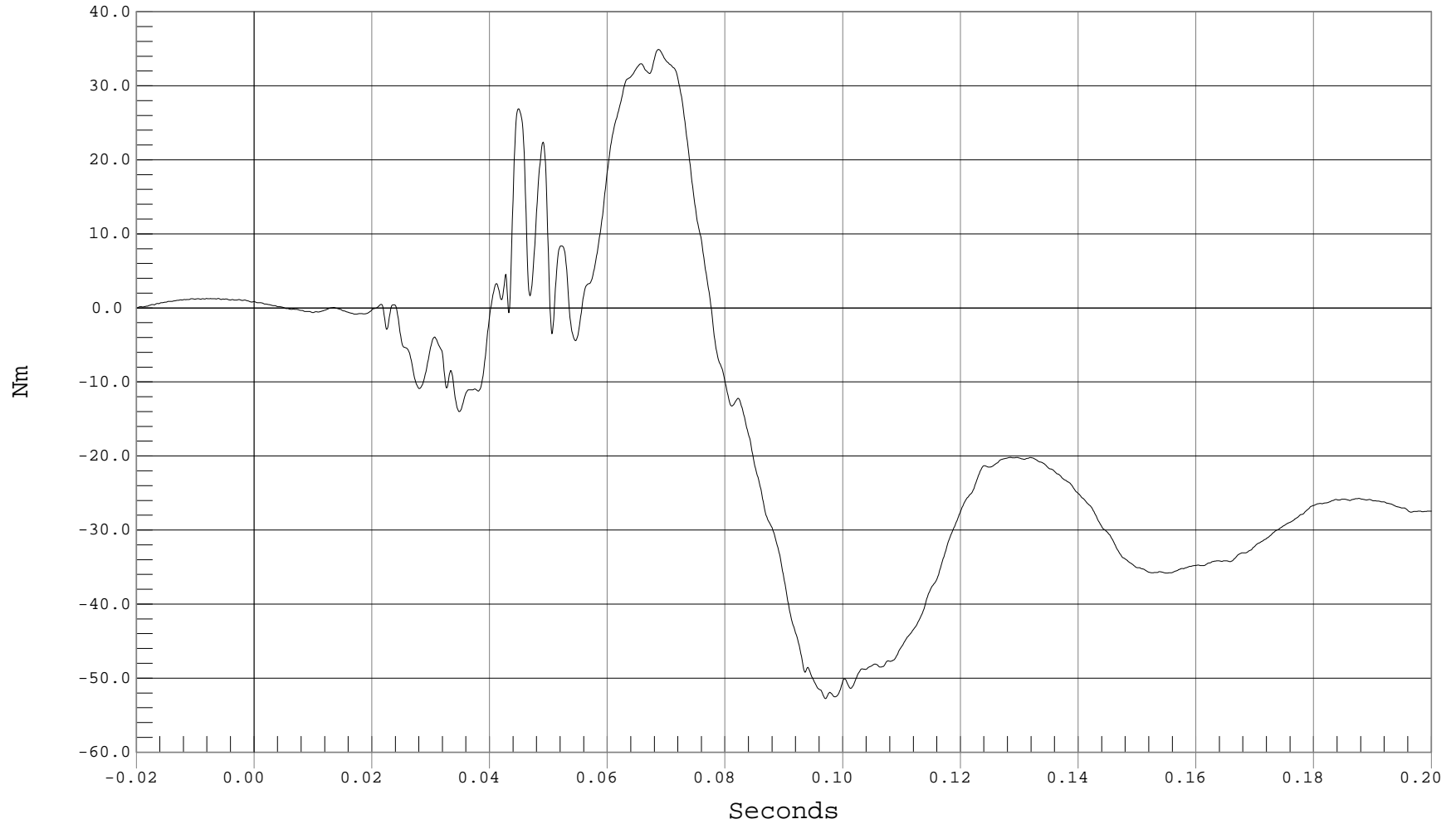
DRIVER RIGHT FEMUR MOMENT Y

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MY, B02037MF.M95

Ymin = -52.76 Nm @ 0.0970 Seconds, Ymax = 34.9 Nm @ 0.0686 Seconds





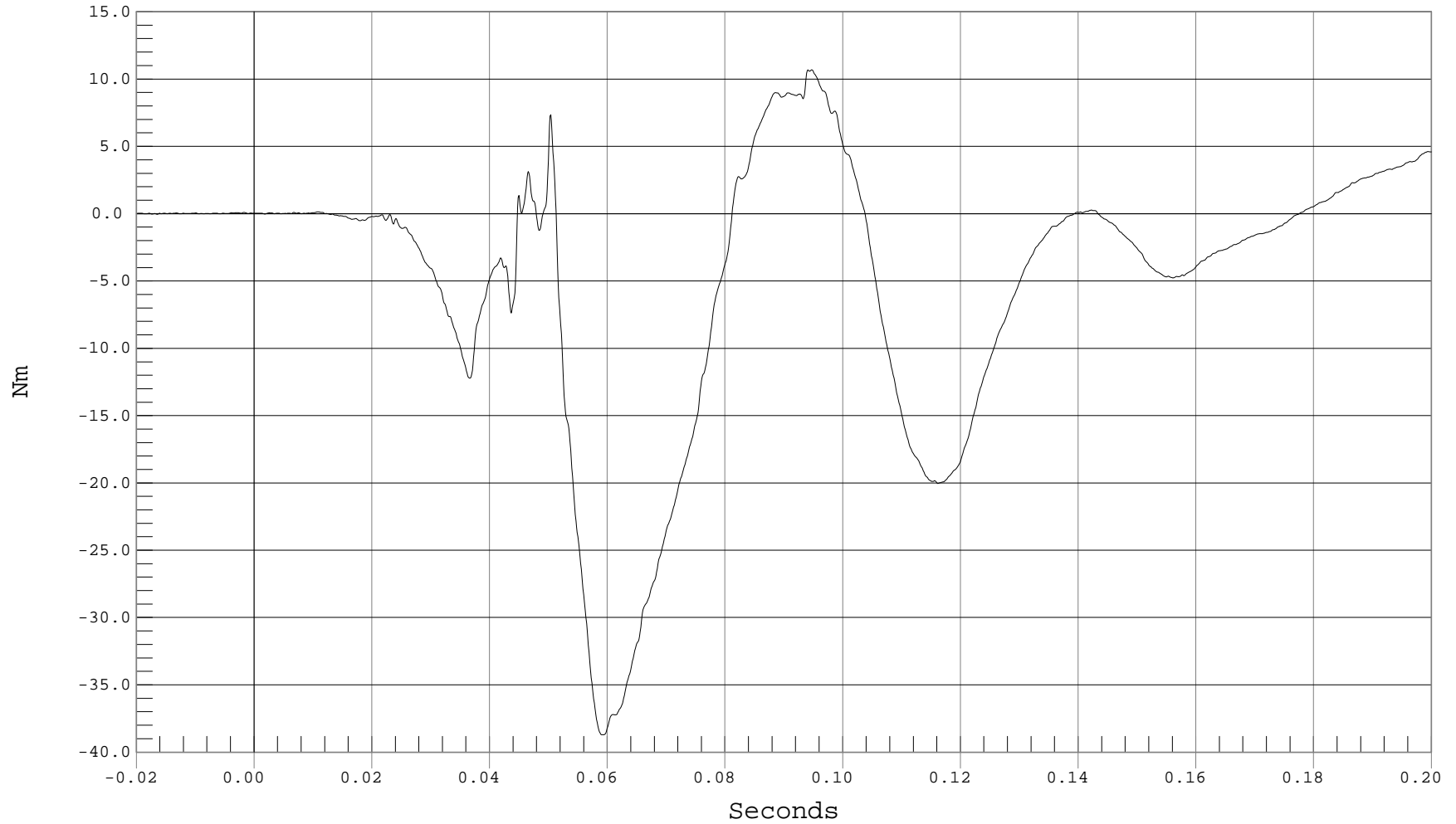
DRIVER RIGHT FEMUR MOMENT Z

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

— 1 DRIVER RIGHT FEMUR MZ, B02037MF.M96

Ymin = -38.71 Nm @ 0.0590 Seconds, Ymax = 10.69 Nm @ 0.0940 Seconds



B-80



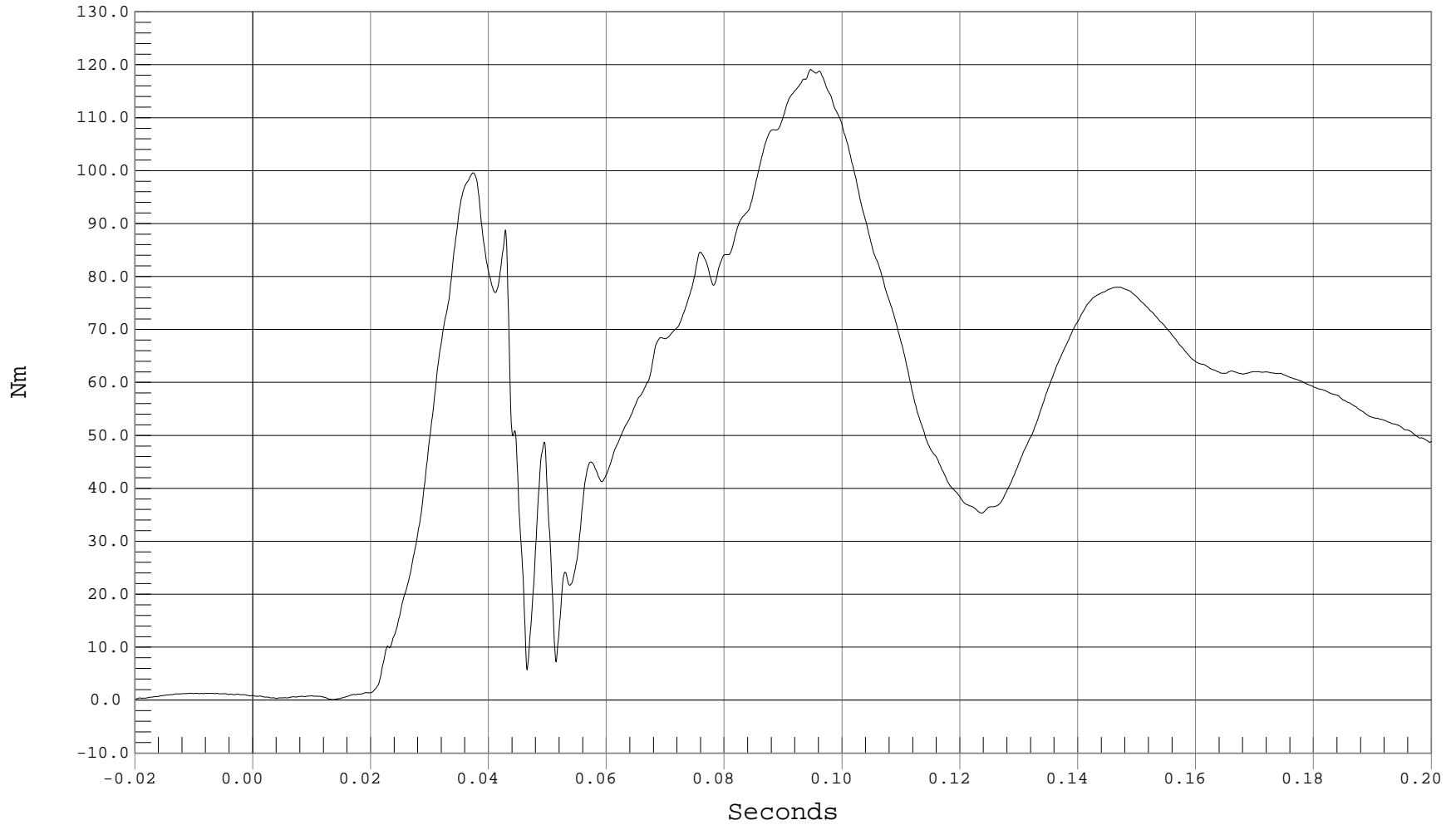
DRIVER RIGHT FEMUR MOMENT RESULTANT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 600

1 DRIVER RIGHT FEMUR MOMENT RESULTANT, B02037MV.M94

Ymin = .1 Nm @ 0.0134 Seconds, Ymax = 119.09 Nm @ 0.0946 Seconds





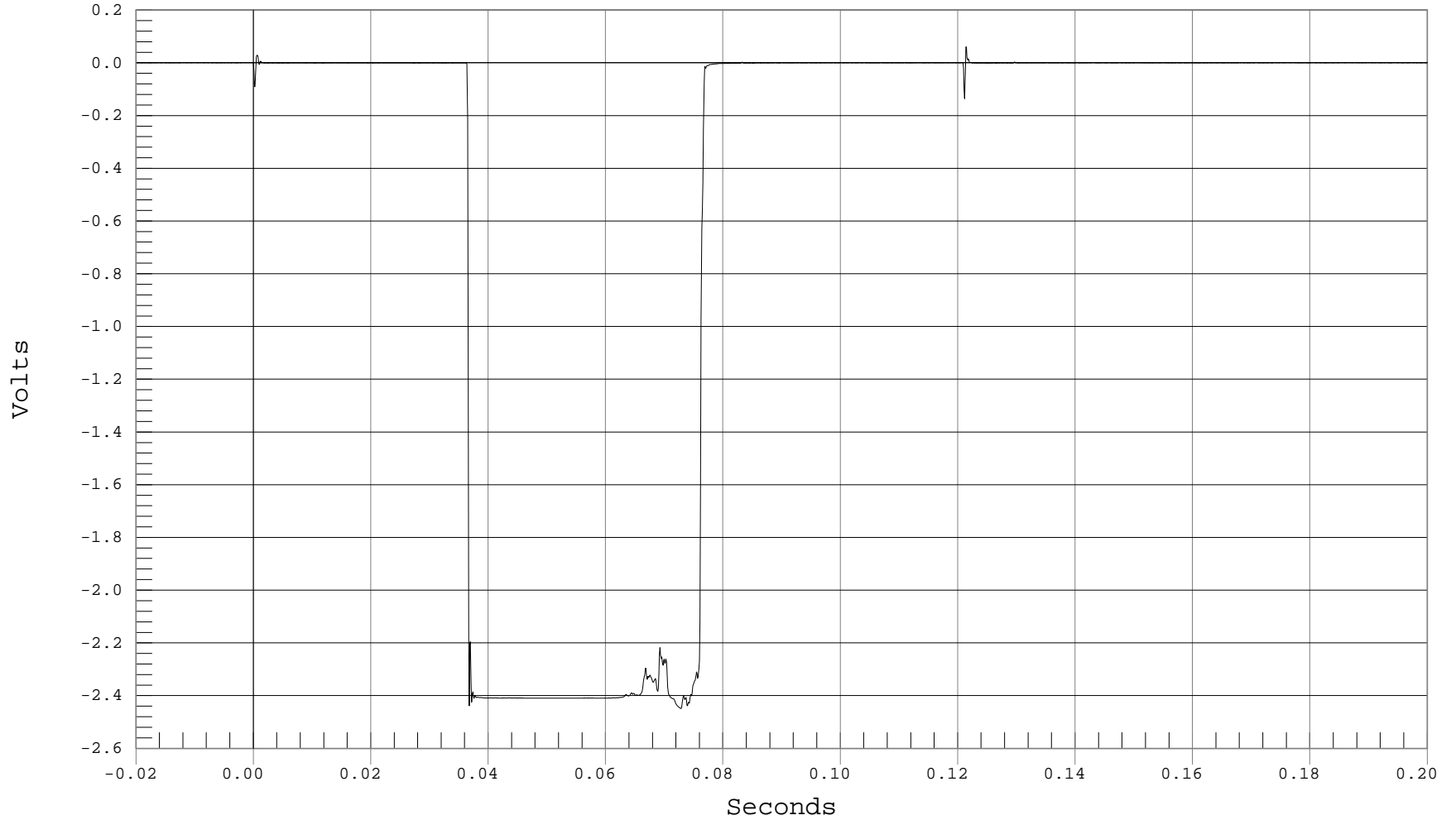
DRIVER RIB CONTACT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

1 DRIVER RIB CONTACT, B020370T.O31

Ymin = -2.45 Volts @ 0.0728 Seconds, Ymax = .06 Volts @ 0.1213 Seconds





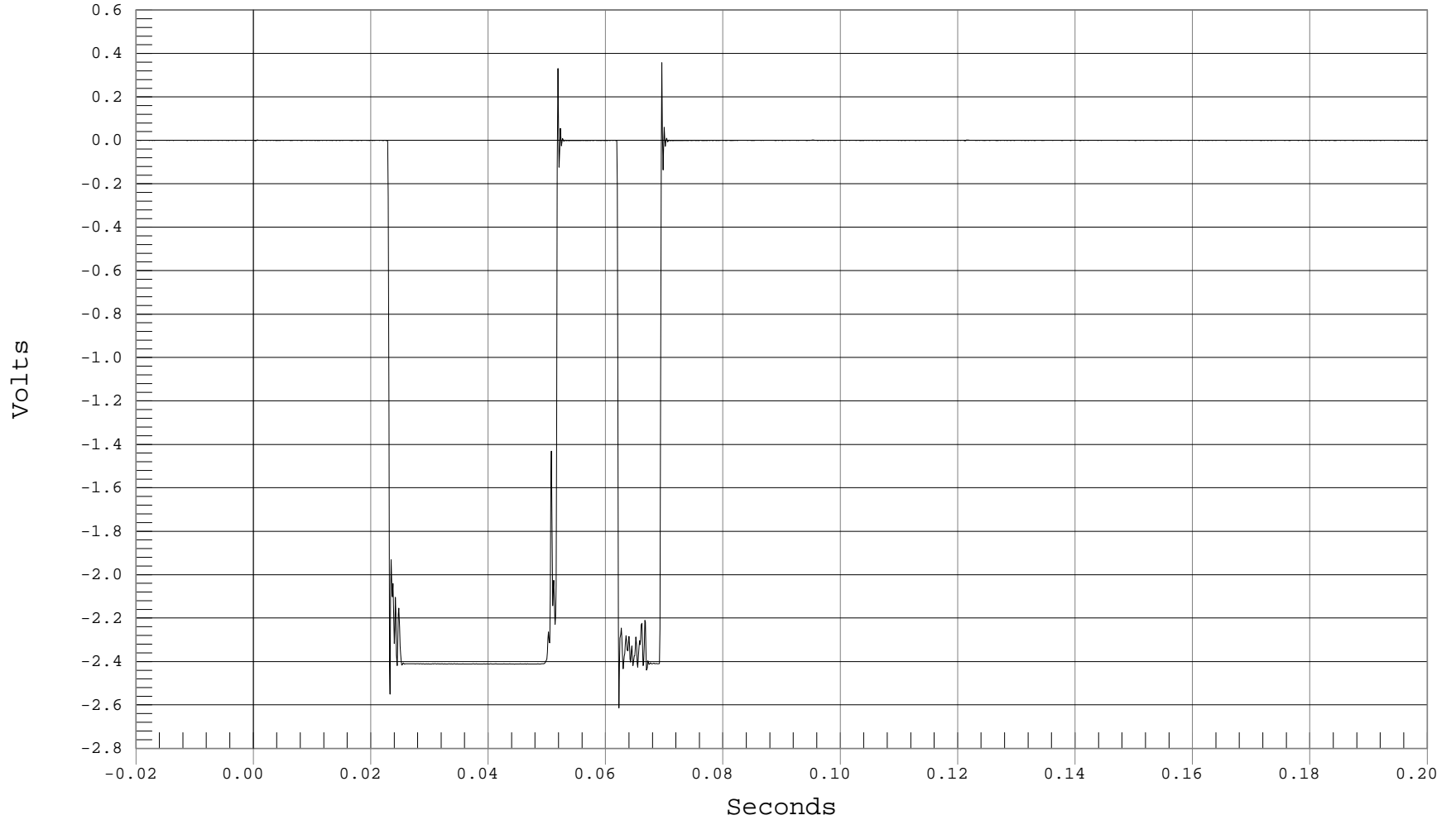
DRIVER PELVIS CONTACT

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 1000

— 1 DRIVER PELVIS CONTACT, B020370T.063

Ymin = -2.61 Volts @ 0.0622 Seconds, Ymax = .36 Volts @ 0.0695 Seconds





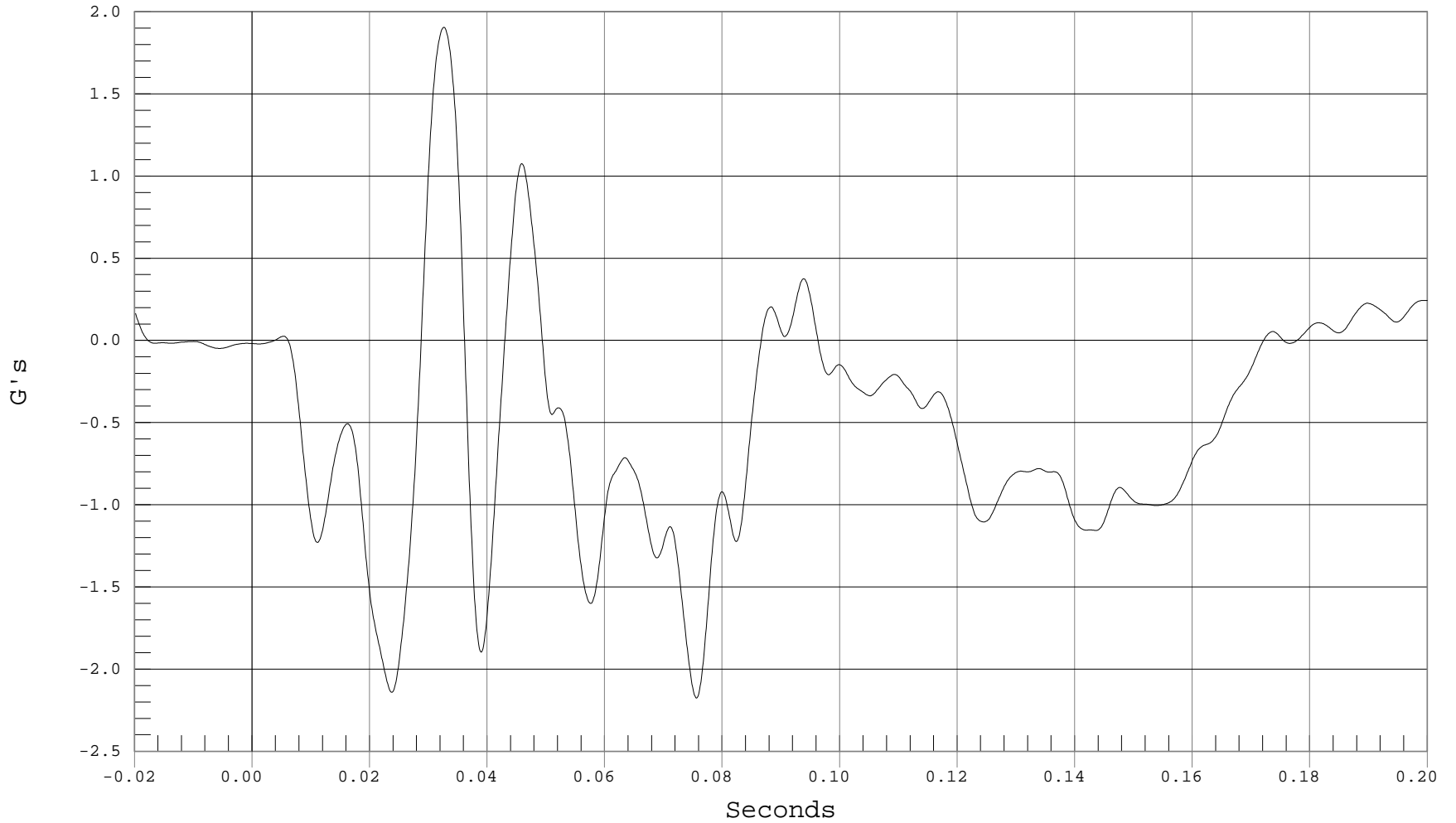
RIGHT SIDE SILL AT FRONT SEAT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL X, B02037AF.A36

Ymin = -2.18 G's @ 0.0756 Seconds, Ymax = 1.91 G's @ 0.0326 Seconds





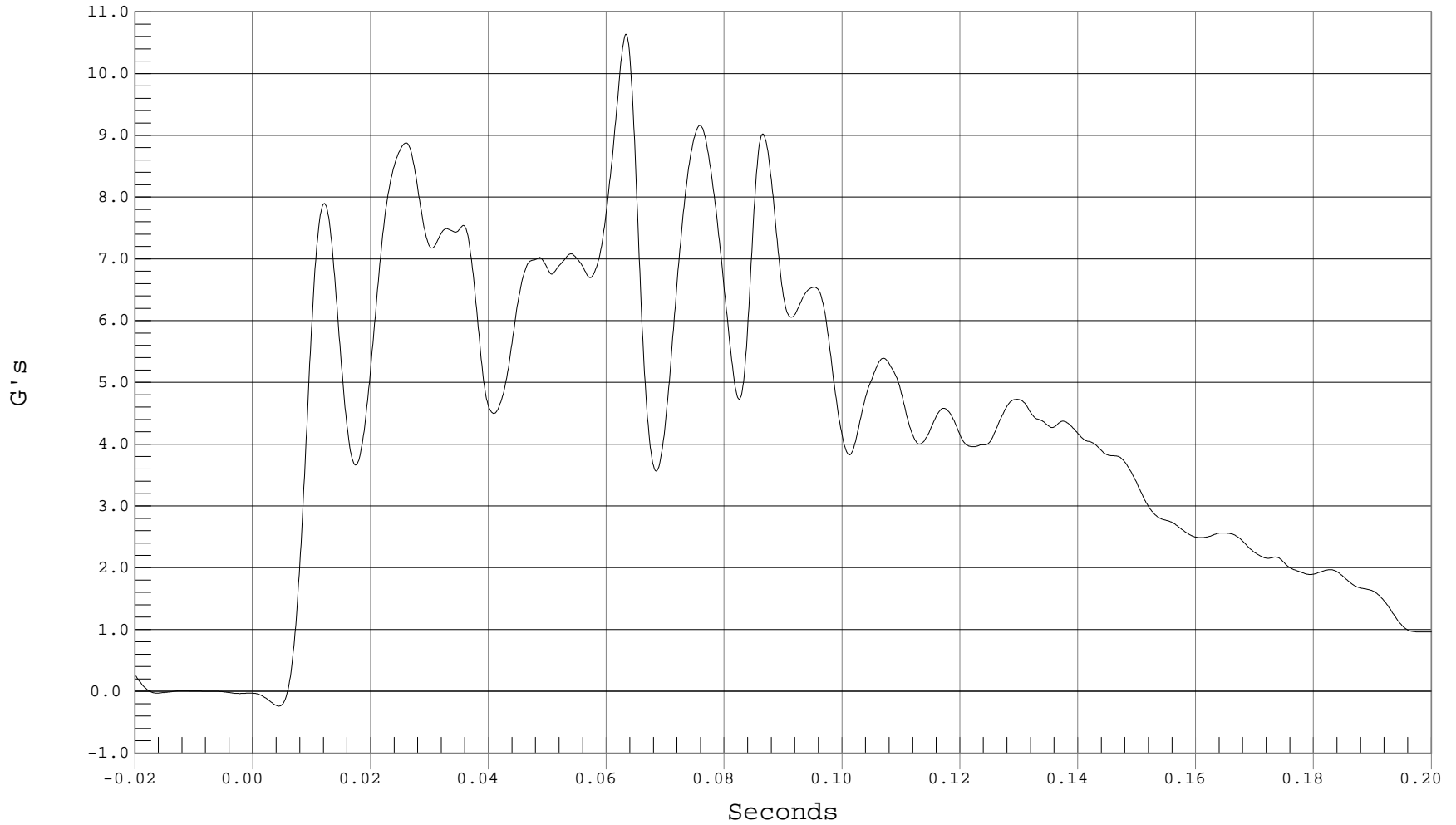
RIGHT SIDE SILL AT FRONT SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL Y, B02037AF.A37

Ymin = -.24 G's @ 0.0043 Seconds, Ymax = 10.64 G's @ 0.0633 Seconds





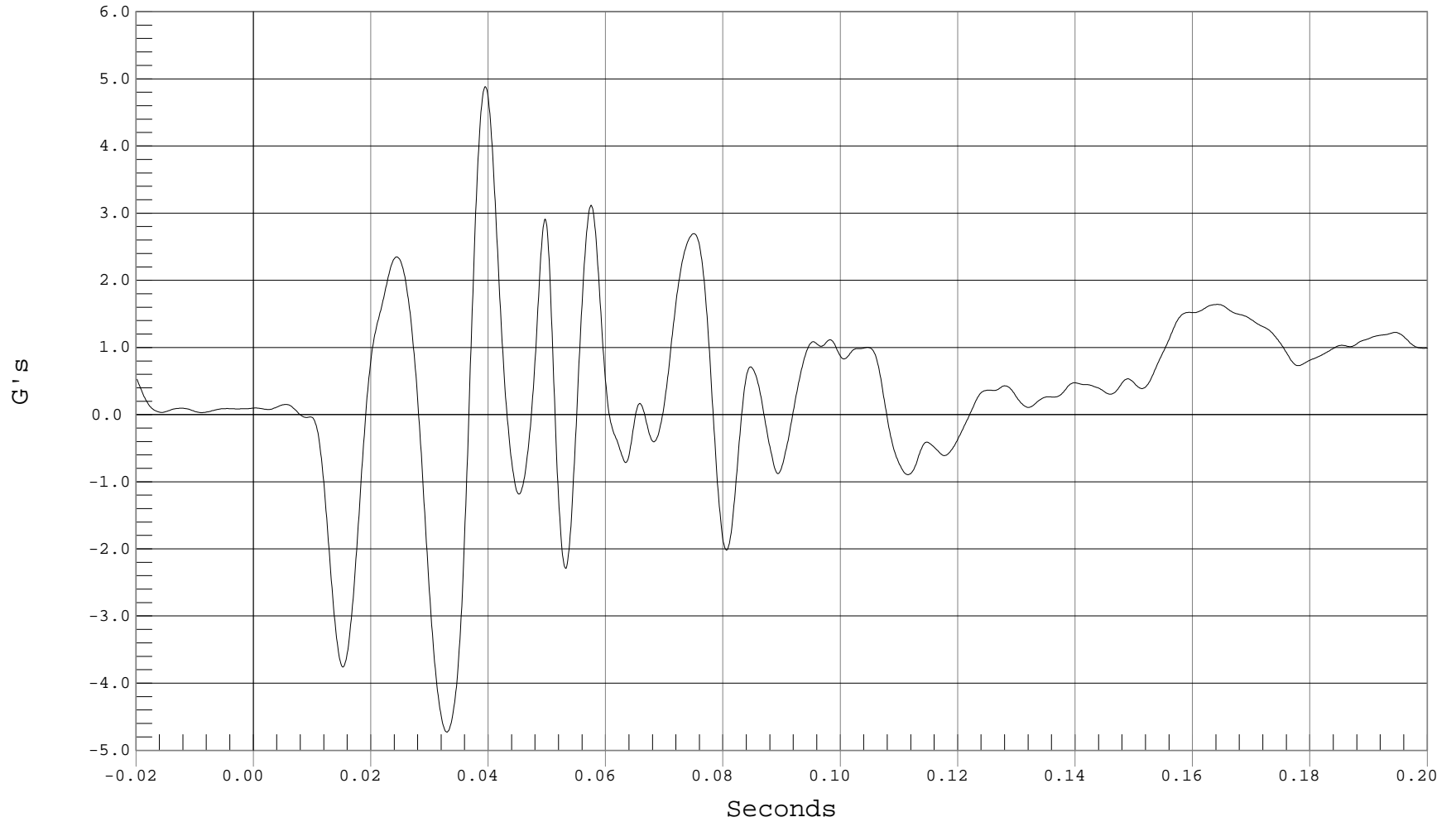
RIGHT SIDE SILL AT FRONT SEAT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL Z, B02037AF.A38

Ymin = -4.73 G's @ 0.0329 Seconds, Ymax = 4.89 G's @ 0.0394 Seconds





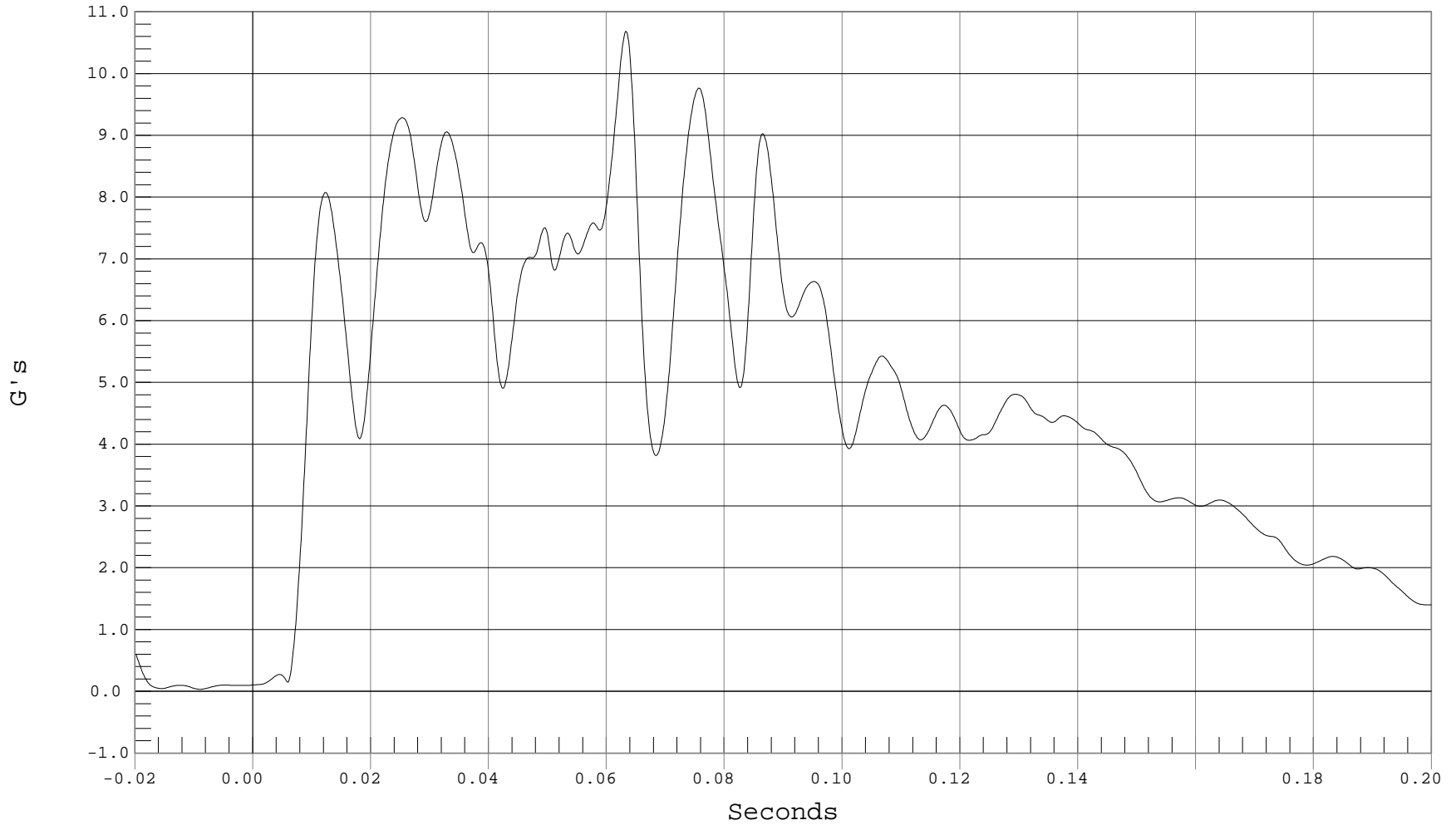
RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT FRONT SILL RESULTANT ACCELERATION, B02037AV.A36

Ymin = .03 G's @ -0.0090 Seconds, Ymax = 10.68 G's @ 0.0633 Seconds





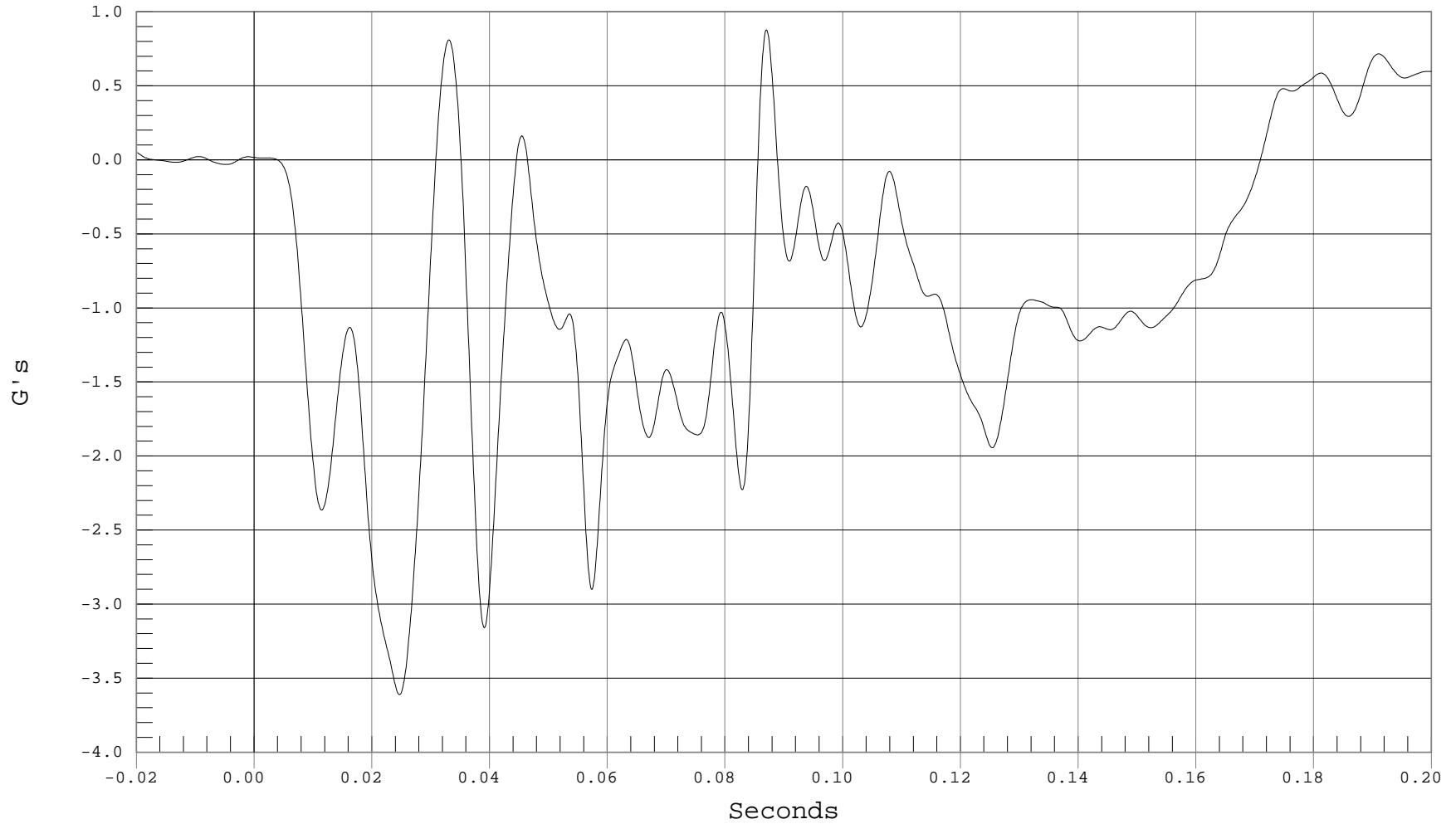
RIGHT SIDE SILL AT REAR SEAT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT REAR SILL X, B02037AF.A39

Ymin = -3.61 G's @ 0.0246 Seconds, Ymax = .88 G's @ 0.0869 Seconds





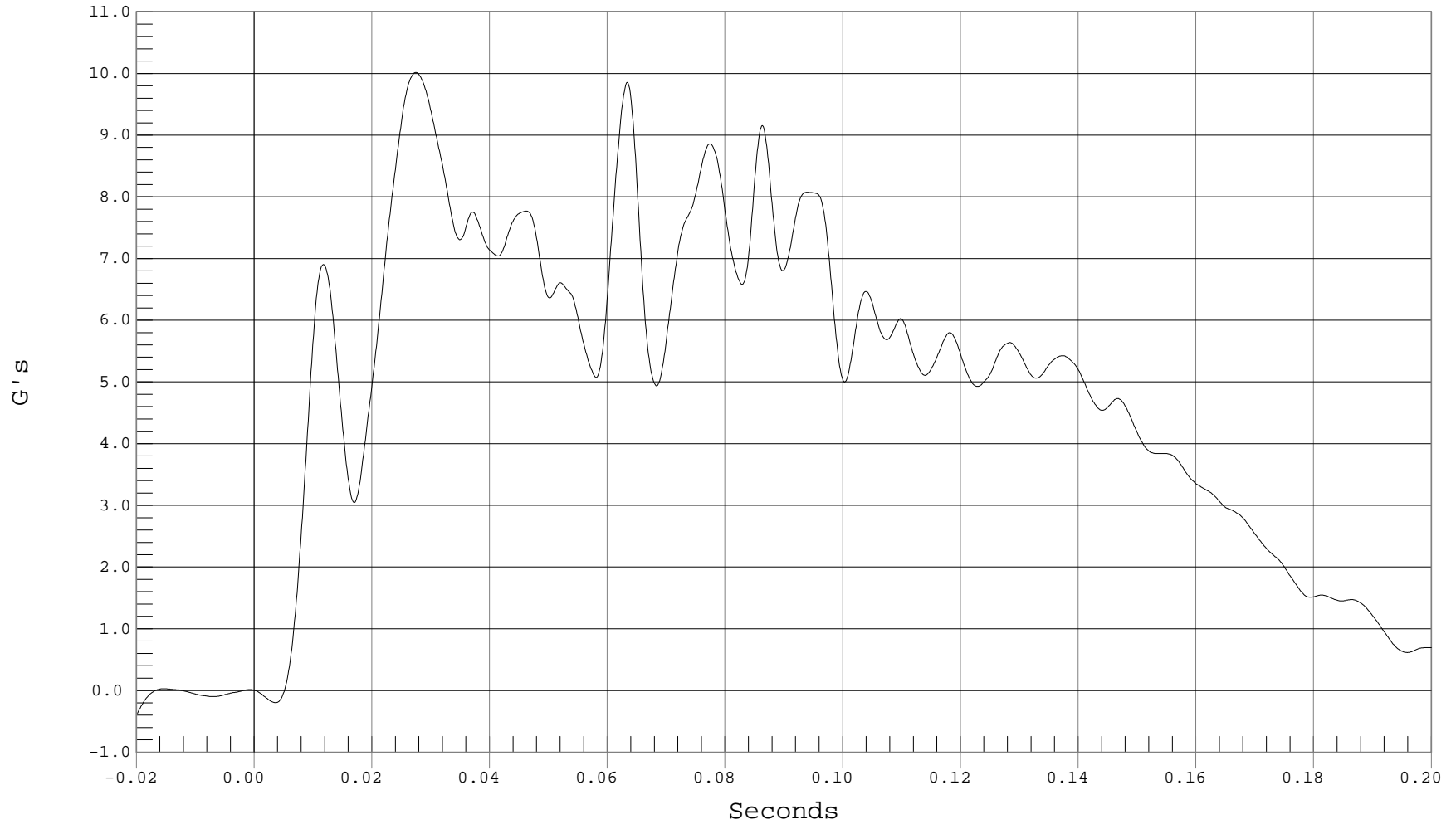
RIGHT SIDE SILL AT REAR SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT REAR SILL Y, B02037AF.A40

Ymin = -0.37 G's @ -0.0199 Seconds, Ymax = 10.02 G's @ 0.0274 Seconds





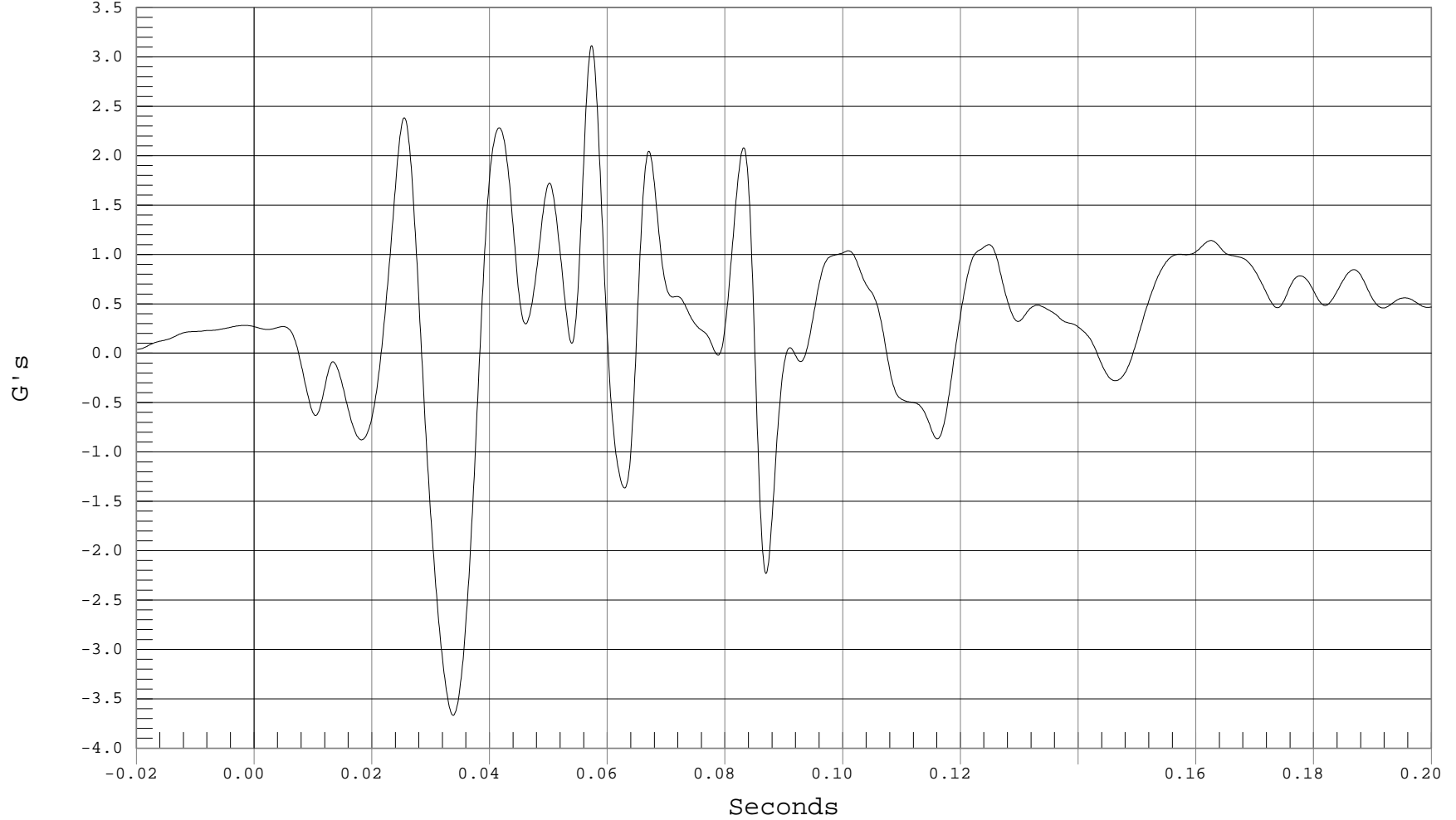
RIGHT SIDE SILL AT REAR SEAT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT REAR SILL Z, B02037AF.A41

Ymin = -3.67 G's @ 0.0337 Seconds, Ymax = 3.11 G's @ 0.0573 Seconds



B-90



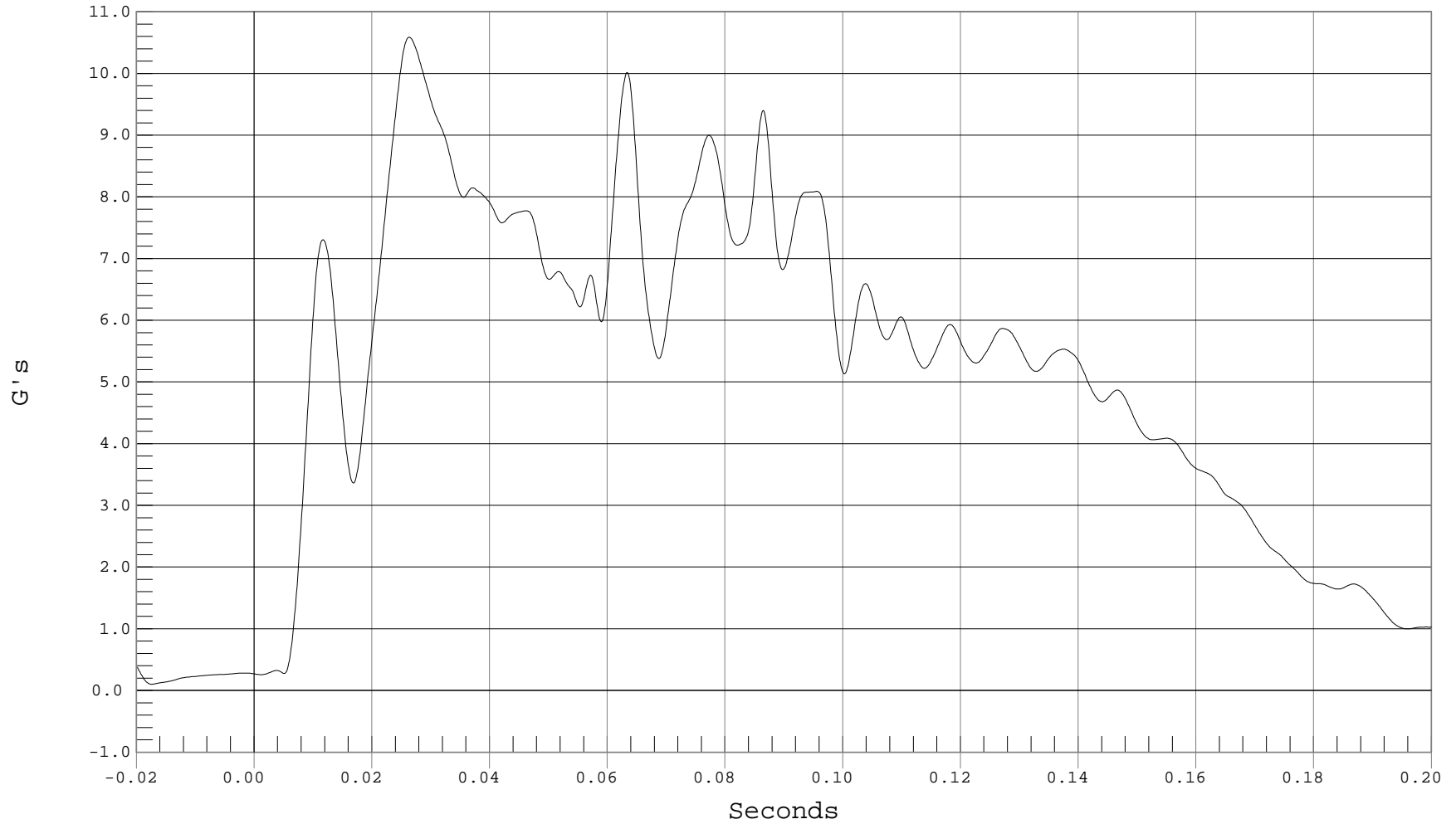
RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT REAR SILL RESULTANT ACCELERATION, B02037AV.A39

Ymin = .1 G's @ -0.0175 Seconds, Ymax = 10.59 G's @ 0.0262 Seconds



B-91



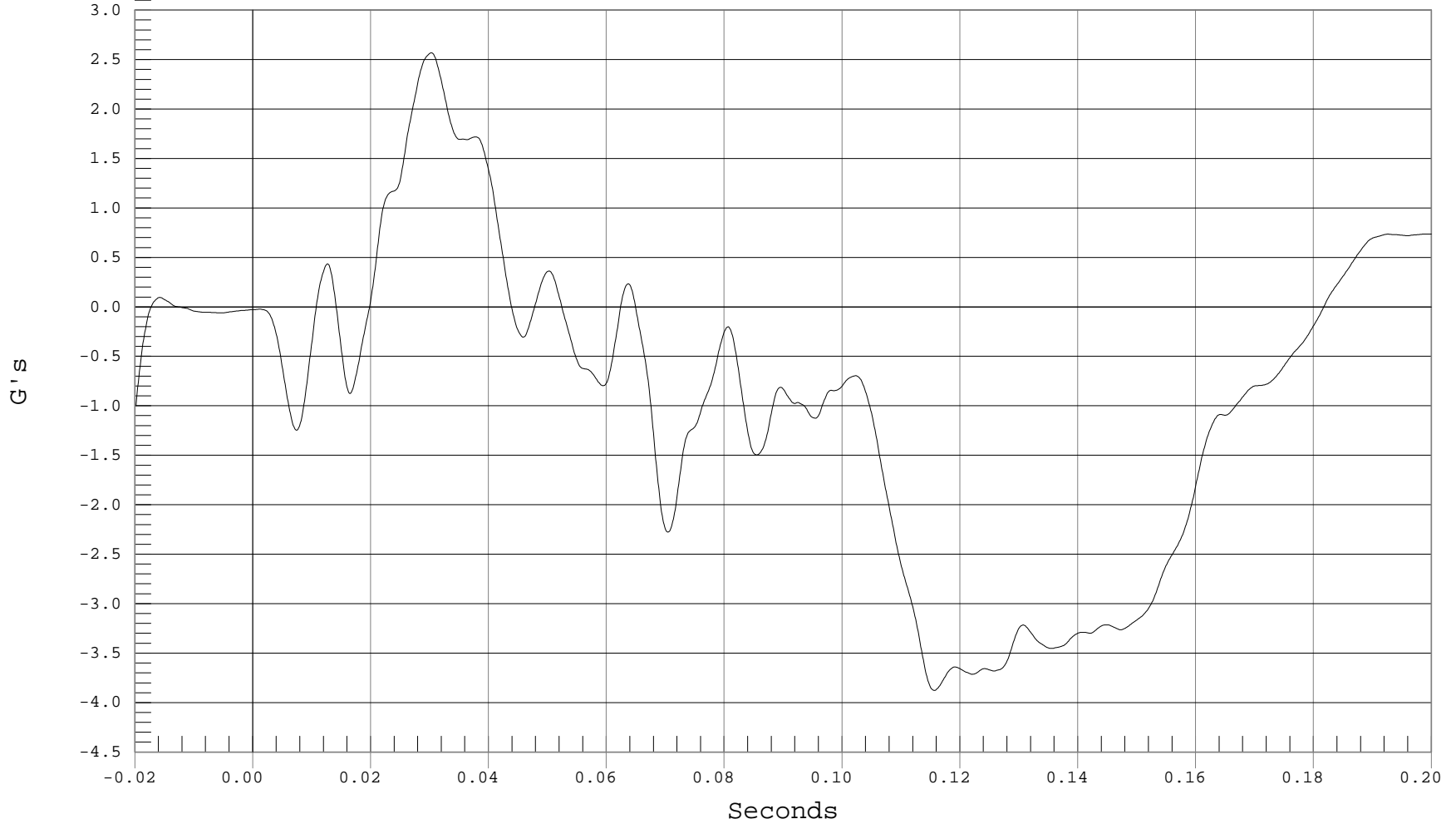
REAR FLOORPAN ABOVE AXLE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE X, B02037AF.A42

Ymin = -3.88 G's @ 0.1156 Seconds, Ymax = 2.57 G's @ 0.0302 Seconds



B-92



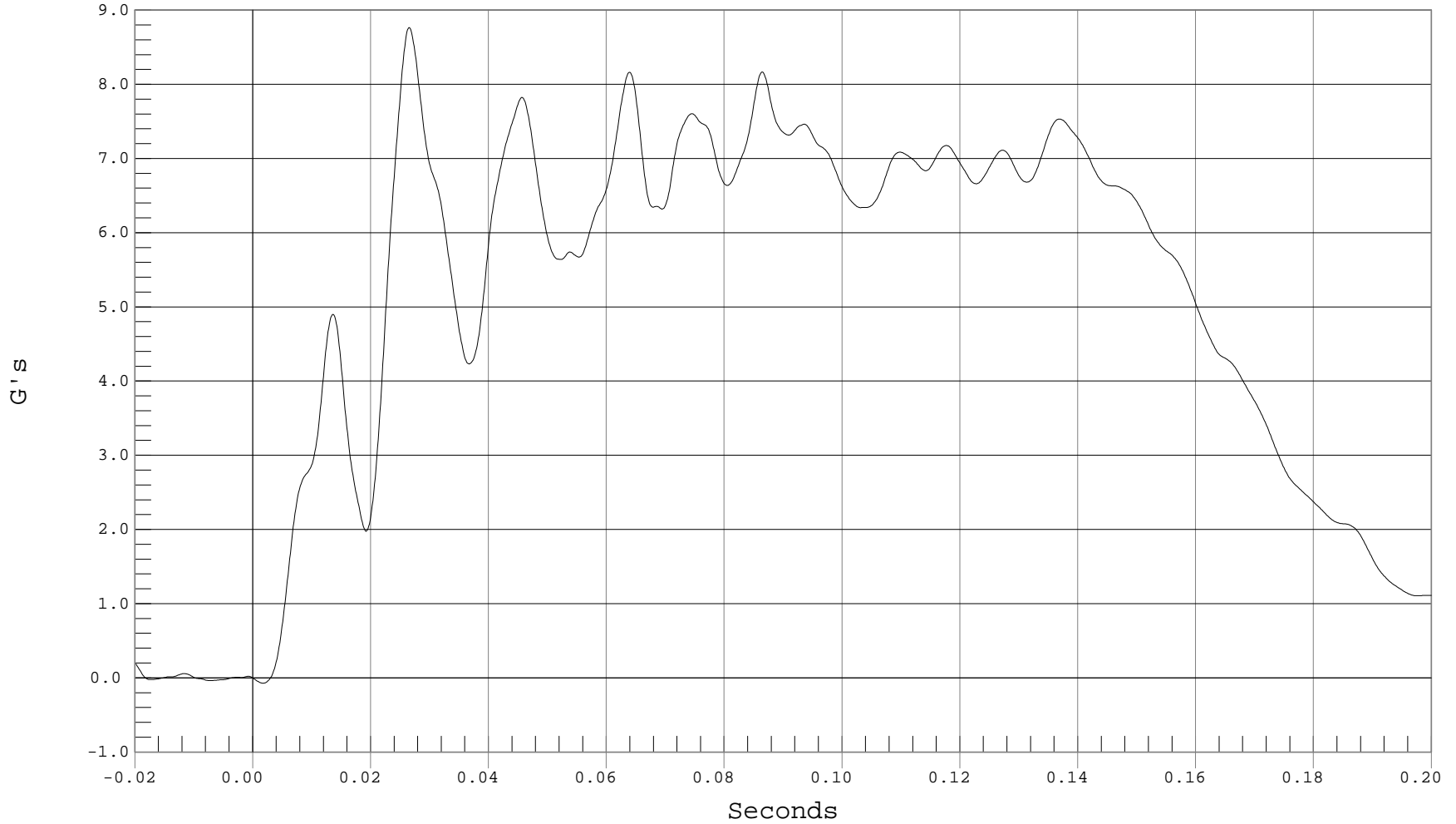
REAR FLOORPAN ABOVE AXLE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE Y, B02037AF.A43

Ymin = -.07 G's @ 0.0016 Seconds, Ymax = 8.76 G's @ 0.0264 Seconds





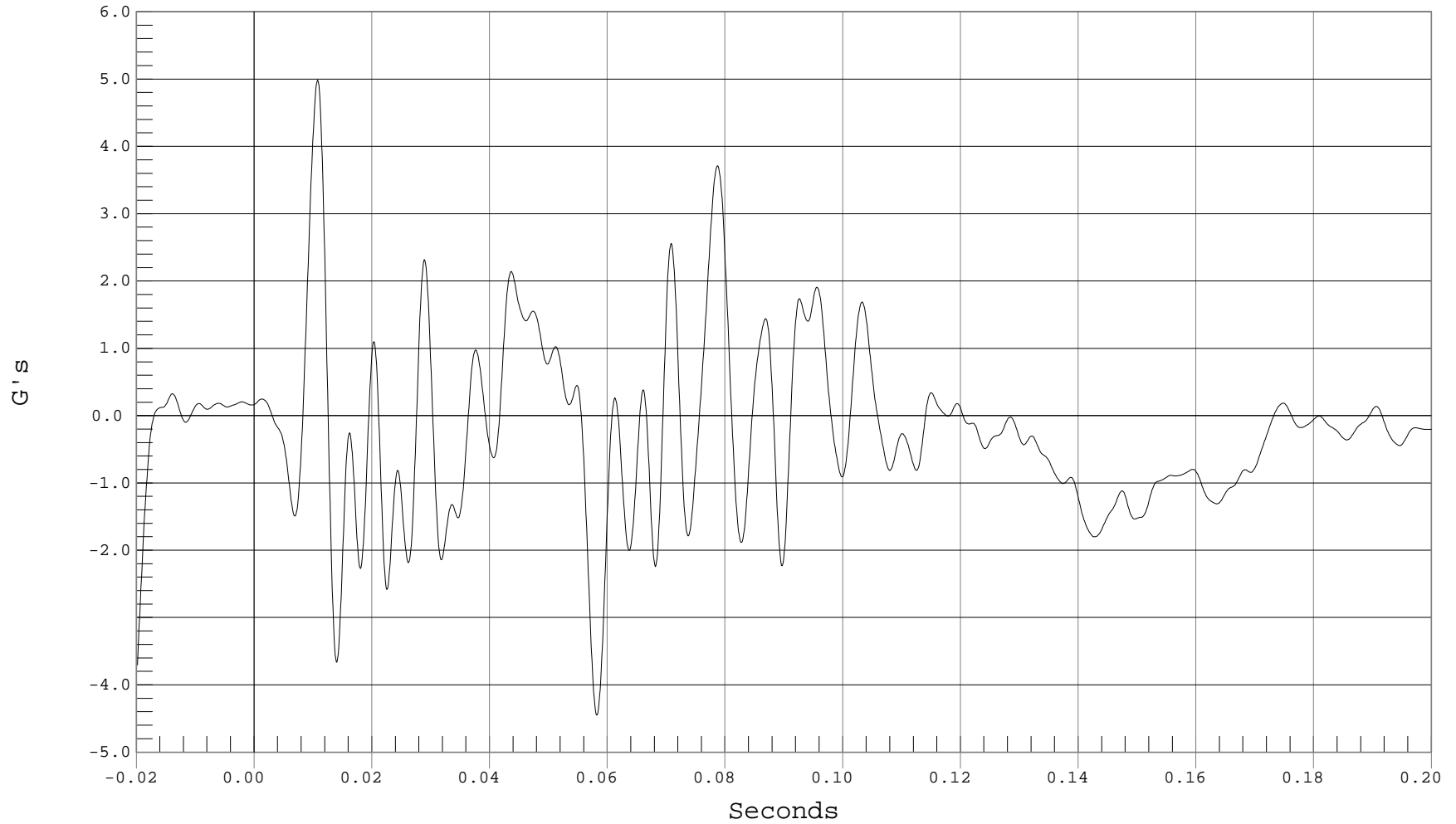
REAR FLOORPAN ABOVE AXLE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE Z, B02037AF.A44

Ymin = -4.45 G's @ 0.0581 Seconds, Ymax = 4.98 G's @ 0.0107 Seconds



B-94



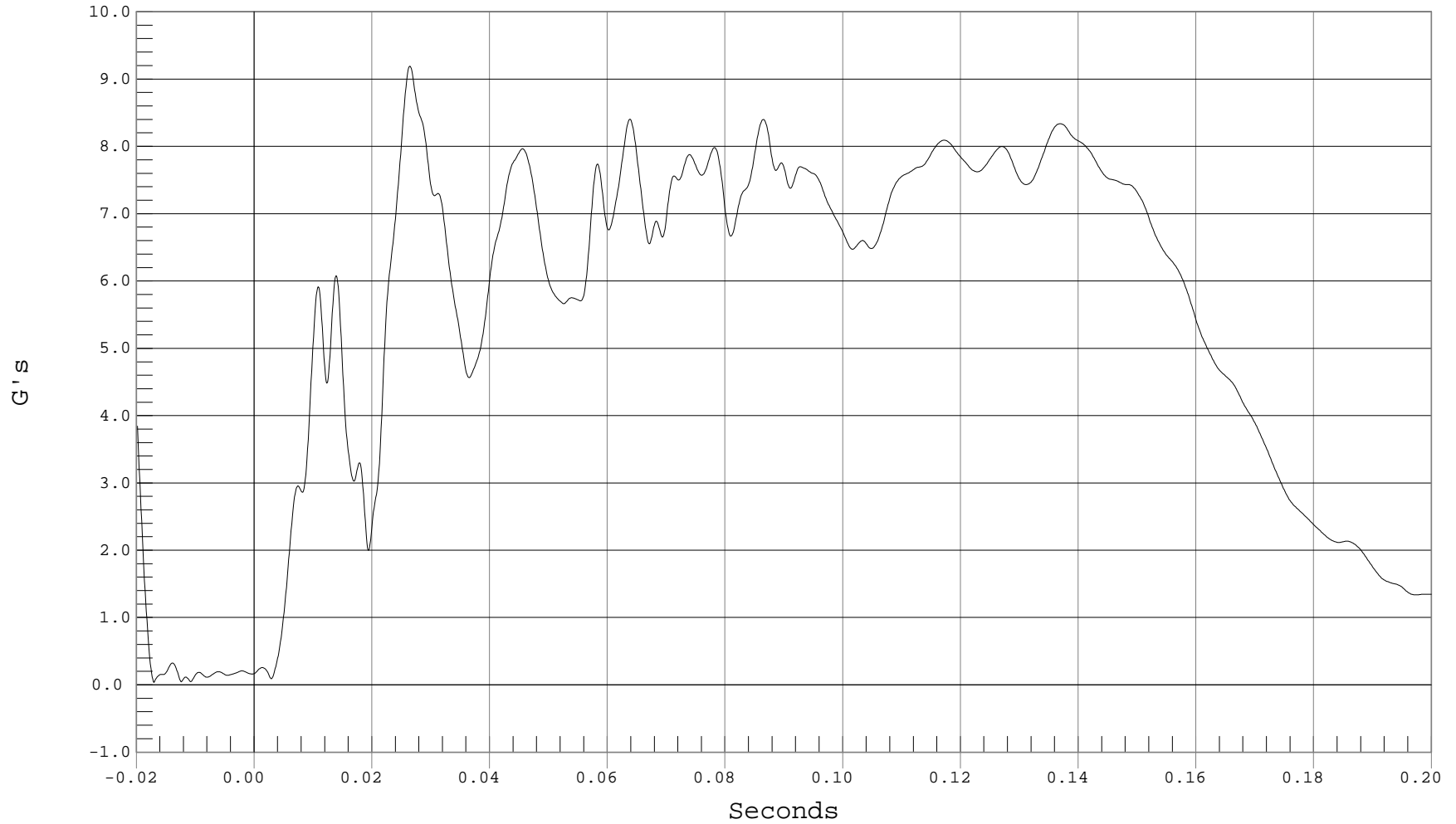
REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 FLOORPAN @ REAR AXLE ACCELERATION, B02037AV.A42

Ymin = .04 G's @ -0.0171 Seconds, Ymax = 9.19 G's @ 0.0264 Seconds



B-95



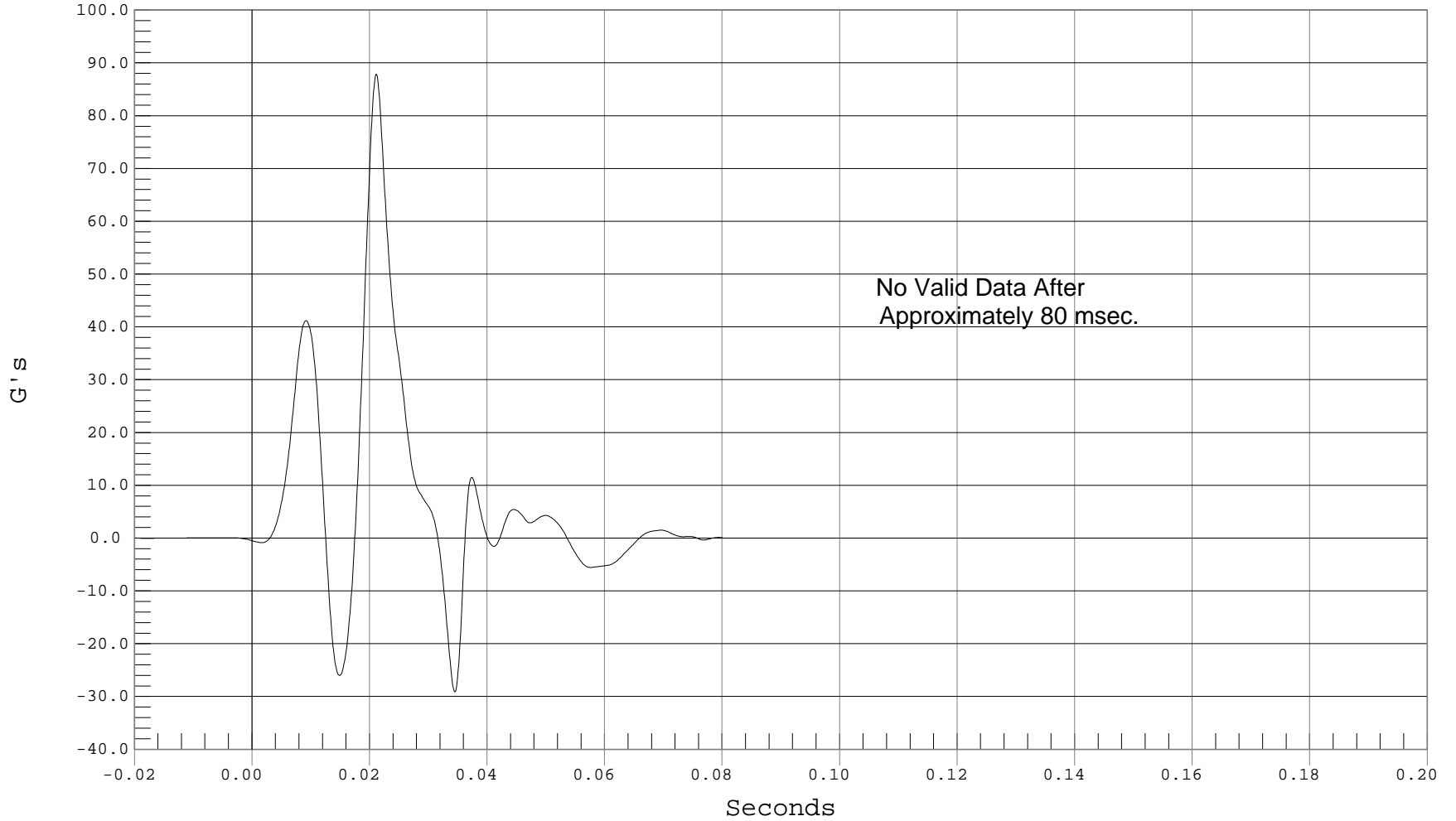
LEFT SIDE SILL AT FRONT SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

1 LEFT FRONT SILL Y, B02037AF.A46

Ymin = -29.12 G's @ 0.0344 Seconds, Ymax = 87.87 G's @ 0.0211 Seconds





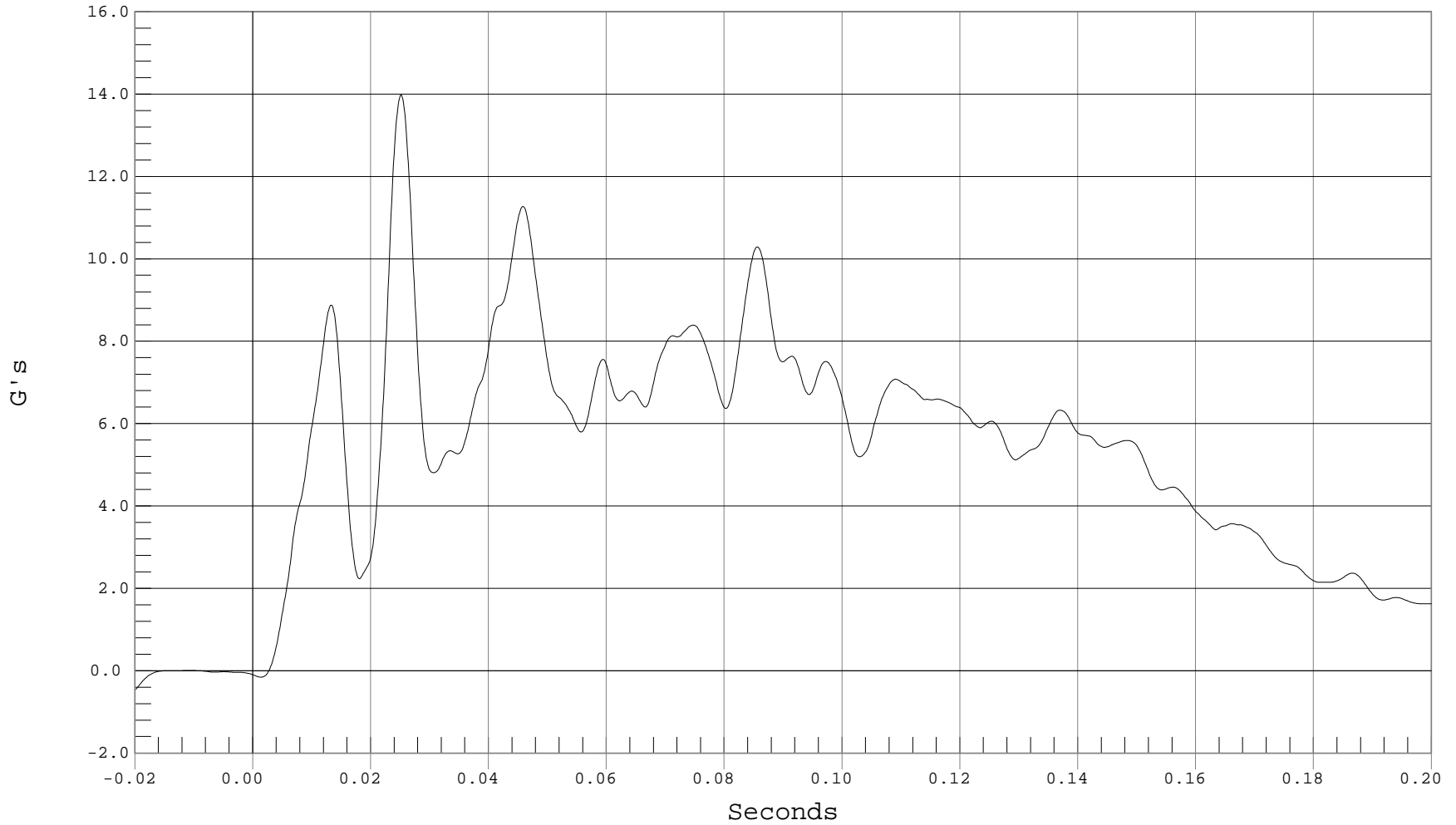
LEFT SIDE SILL AT REAR SEAT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT REAR SILL Y, B02037AF.A45

Ymin = -.46 G's @ -0.0199 Seconds, Ymax = 13.98 G's @ 0.0251 Seconds



B-97



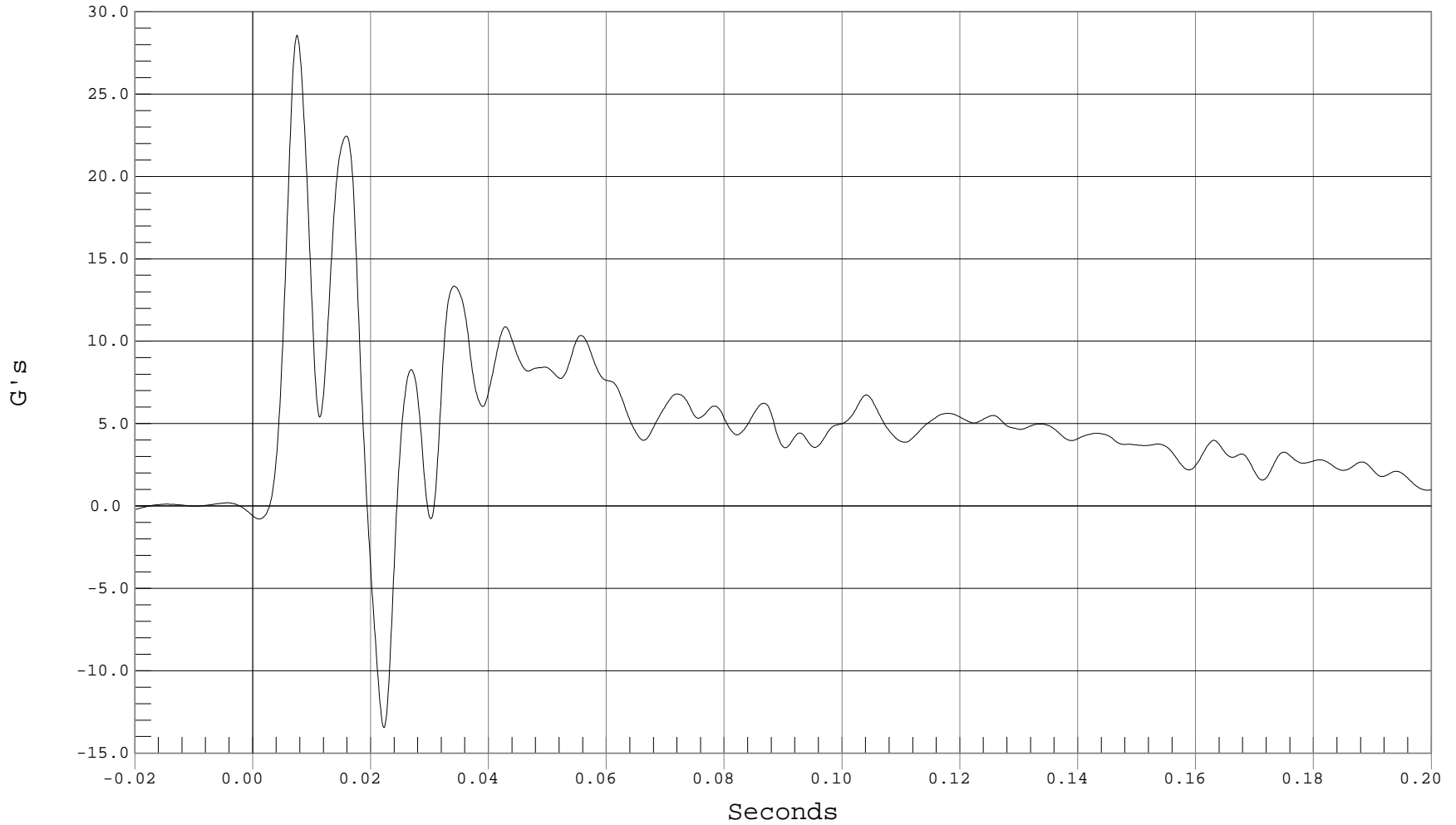
LEFT LOWER A-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

1 LEFT LOWER A-POST Y, B02037AF.A52

Ymin = -13.46 G's @ 0.0222 Seconds, Ymax = 28.58 G's @ 0.0074 Seconds



B-98



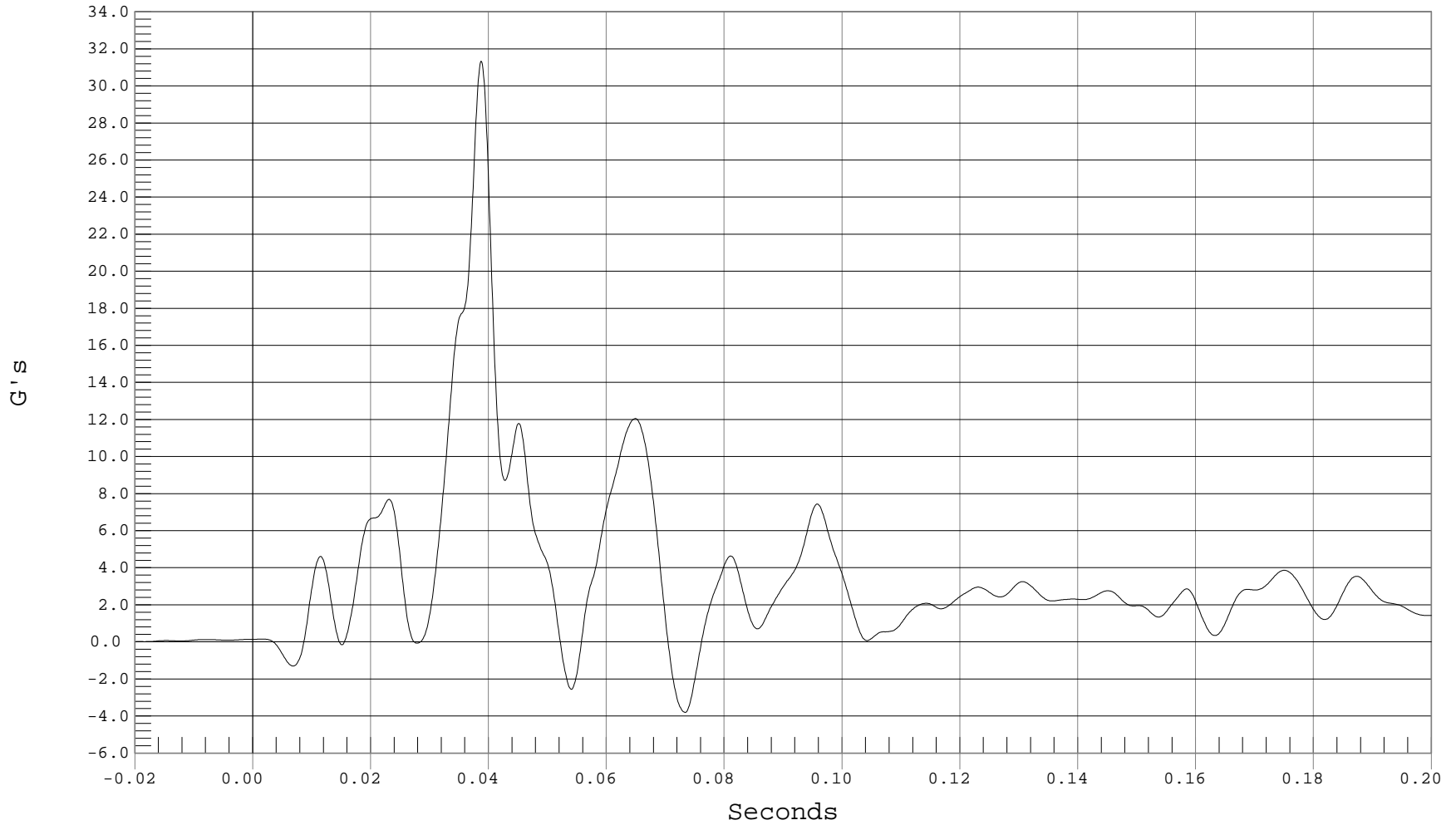
LEFT A-POST @ ROOF Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT A-PILLAR @ ROOF Y, B02037AF.A54

Ymin = -3.81 G's @ 0.0733 Seconds, Ymax = 31.34 G's @ 0.0387 Seconds





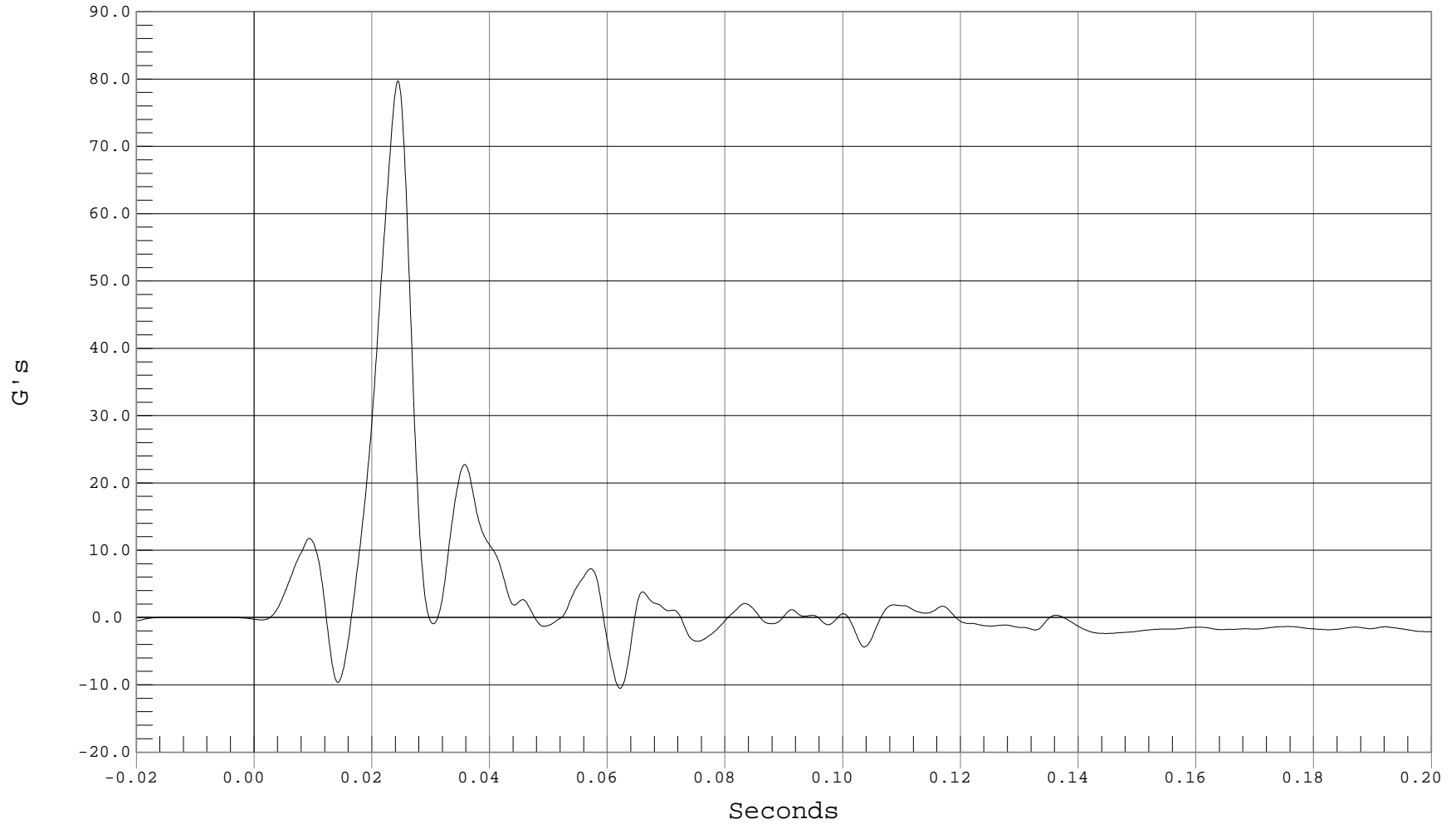
LEFT LOWER B-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT LOWER B-POST Y, B02037AF.A49

Ymin = -10.52 G's @ 0.0621 Seconds, Ymax = 79.7 G's @ 0.0244 Seconds



B-100



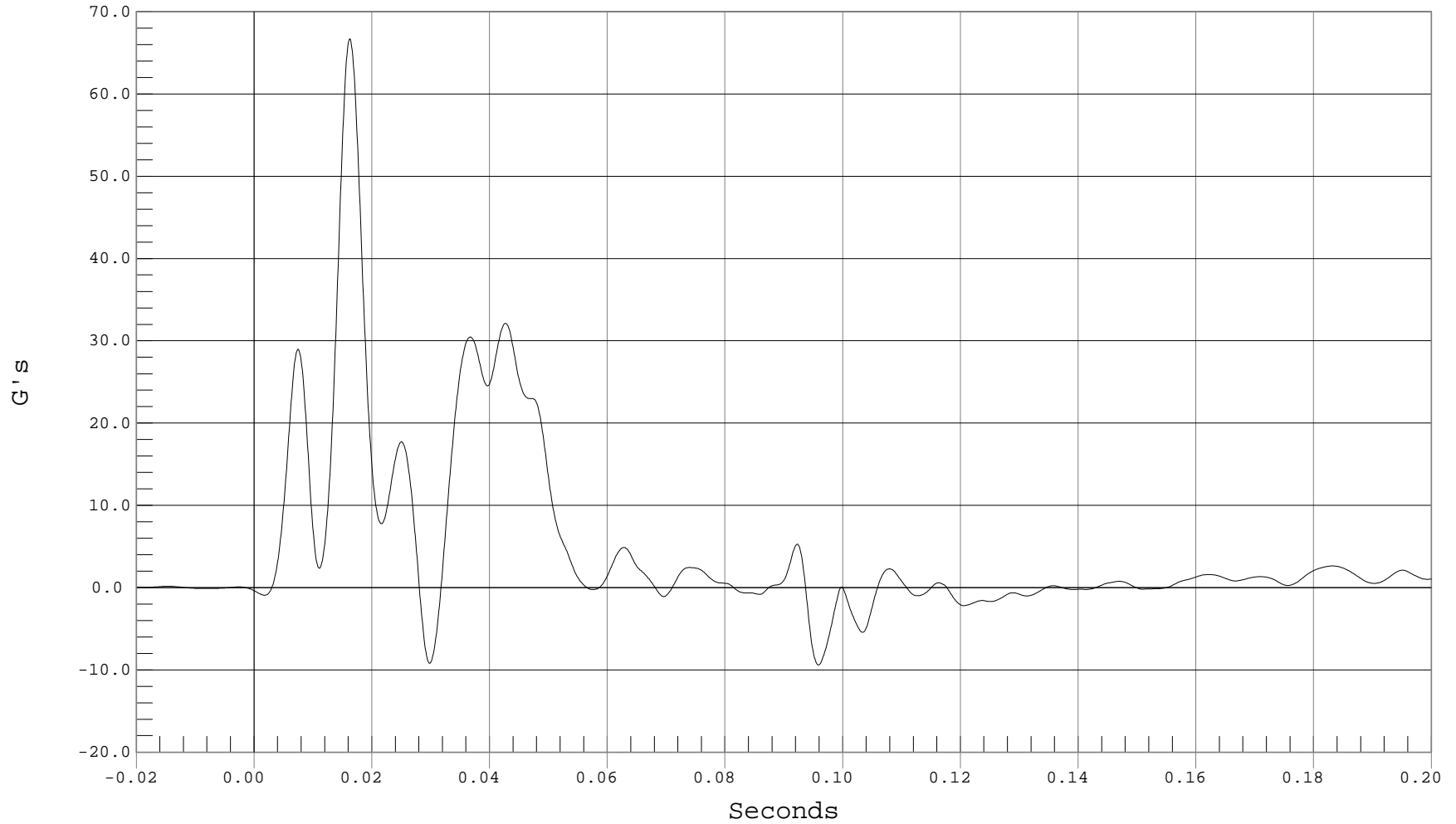
LEFT MID B-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT MID B-POST Y, B02037AF.A50

Ymin = -9.4 G's @ 0.0958 Seconds, Ymax = 66.72 G's @ 0.0162 Seconds



B-101



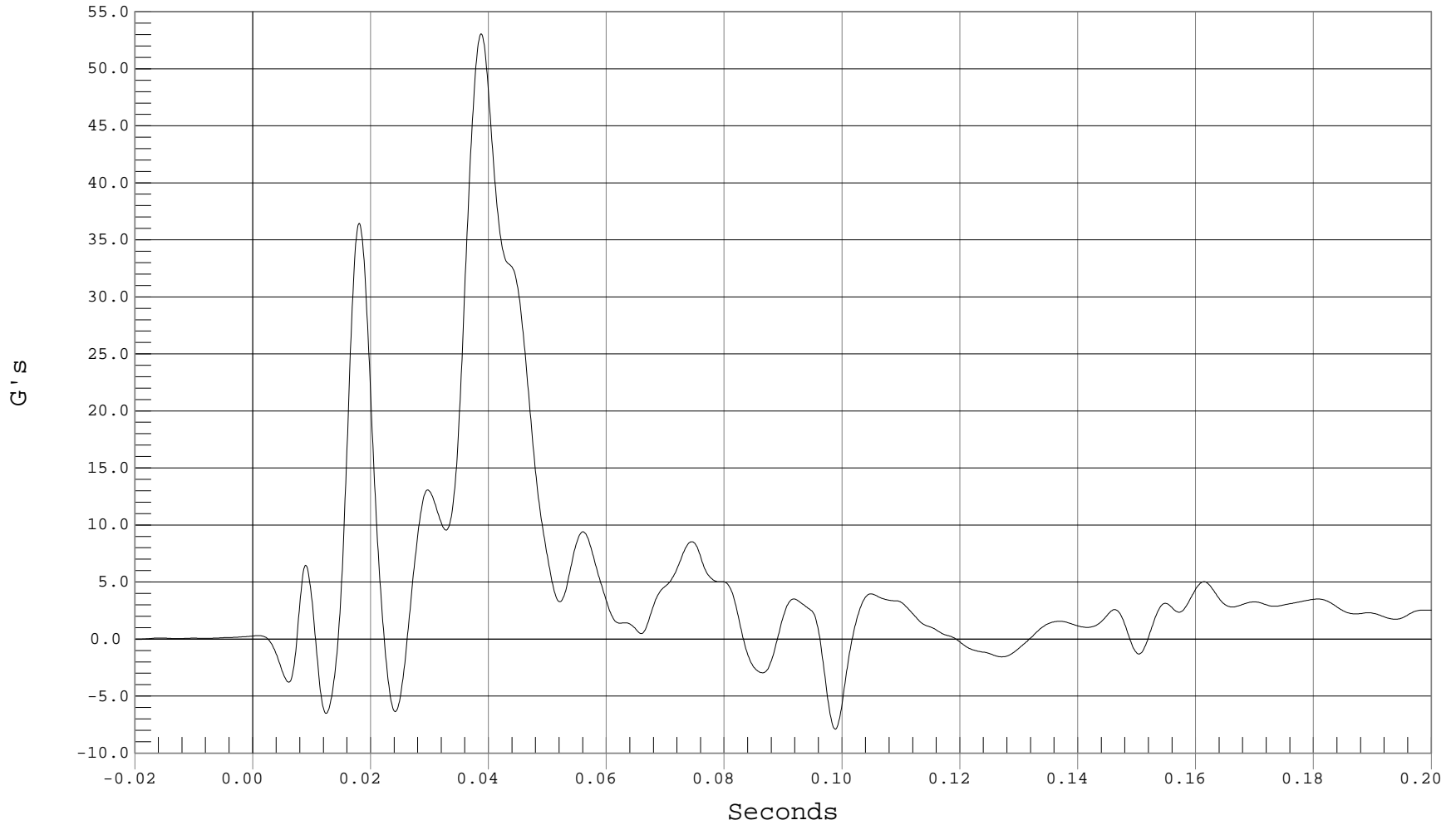
LEFT UPPER B-POST Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT UPPER B-POST Y, B02037AF.A47

Ymin = -7.9 G's @ 0.0988 Seconds, Ymax = 53.06 G's @ 0.0387 Seconds



B-102



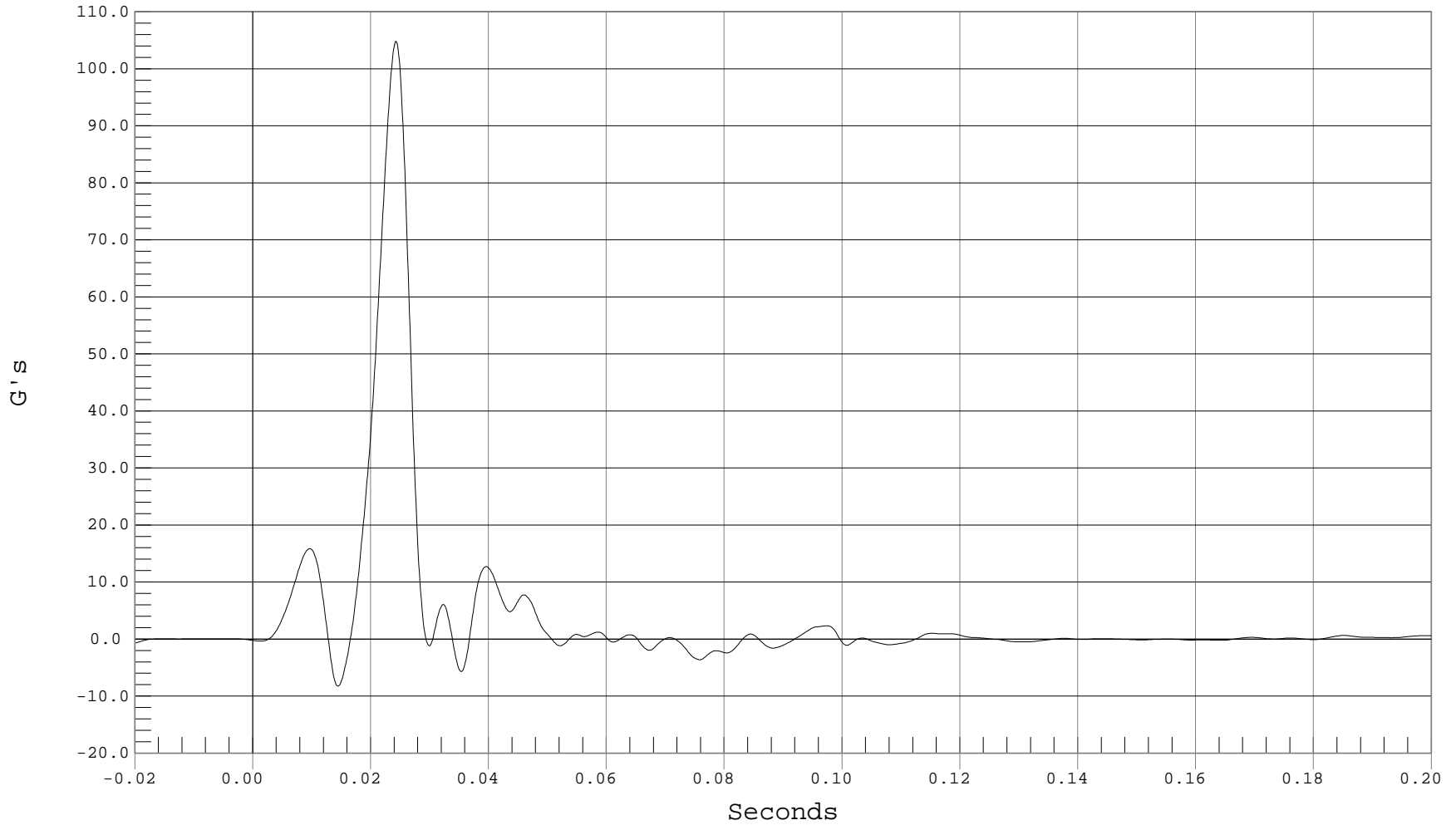
LEFT DRIVER SEAT TRACK Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 DRIVER SEAT TRACK Y, B02037AF.A51

Ymin = -8.27 G's @ 0.0144 Seconds, Ymax = 104.82 G's @ 0.0242 Seconds



B-103



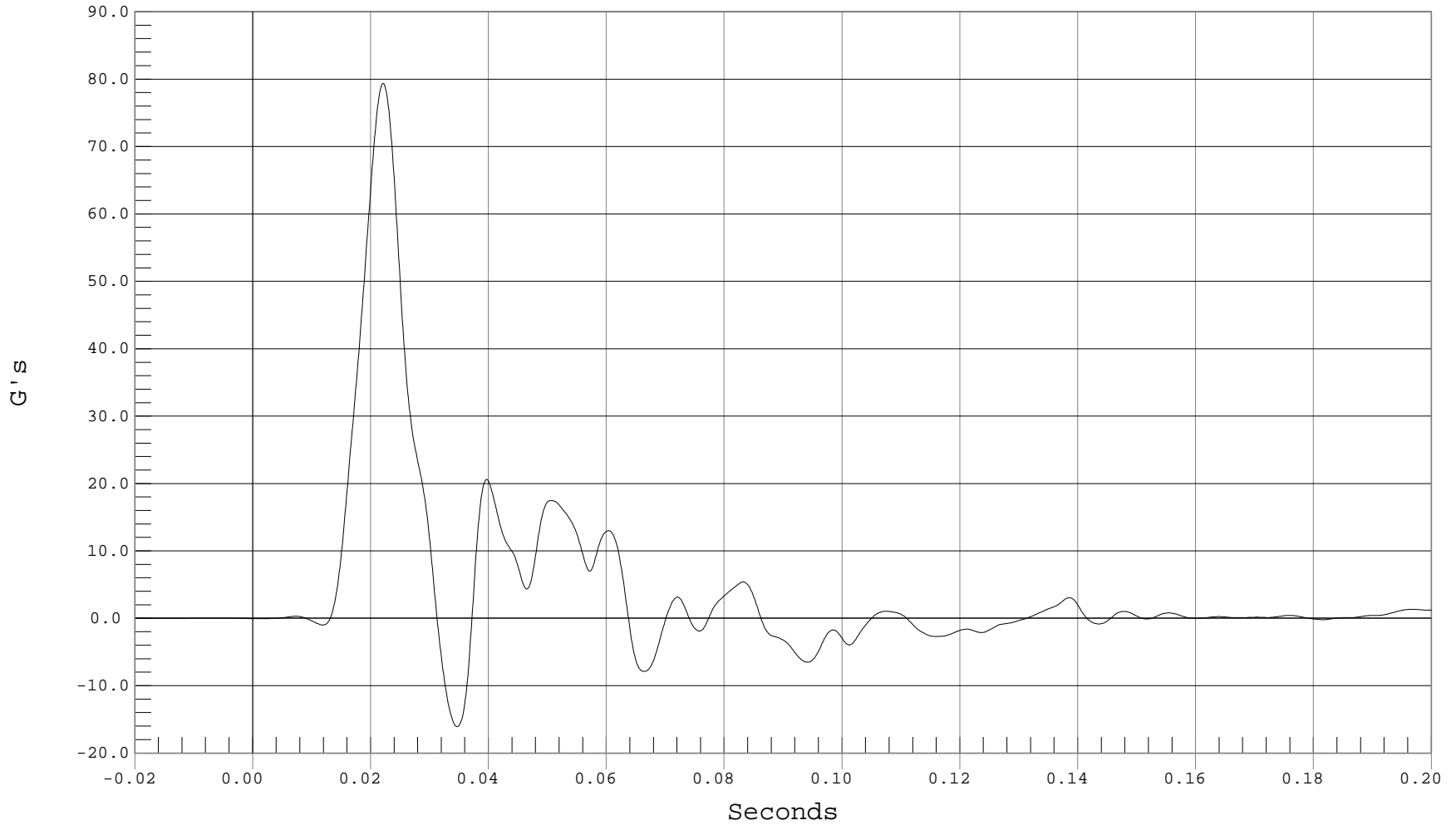
DRIVER LEFT SEAT FRAME Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT DRIVER SEAT FRAME Y, B02037AF.A29

Ymin = -16.08 G's @ 0.0346 Seconds, Ymax = 79.37 G's @ 0.0220 Seconds



B-104



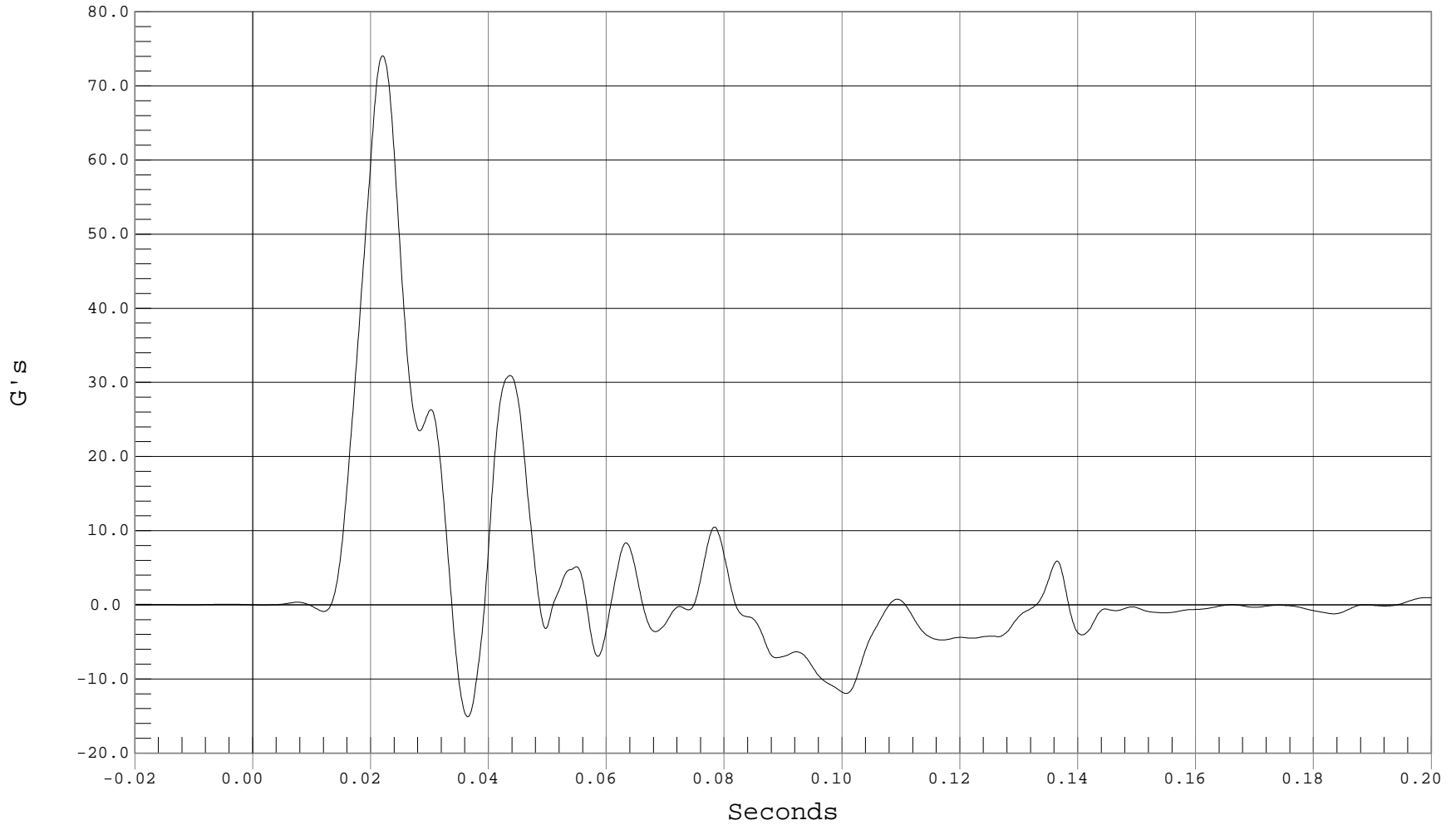
DRIVER RIGHT SEAT FRAME Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 RIGHT DRIVER SEAT FRAME Y, B02037AF.A30

Ymin = -15.1 G's @ 0.0364 Seconds, Ymax = 74.06 G's @ 0.0220 Seconds



B-105



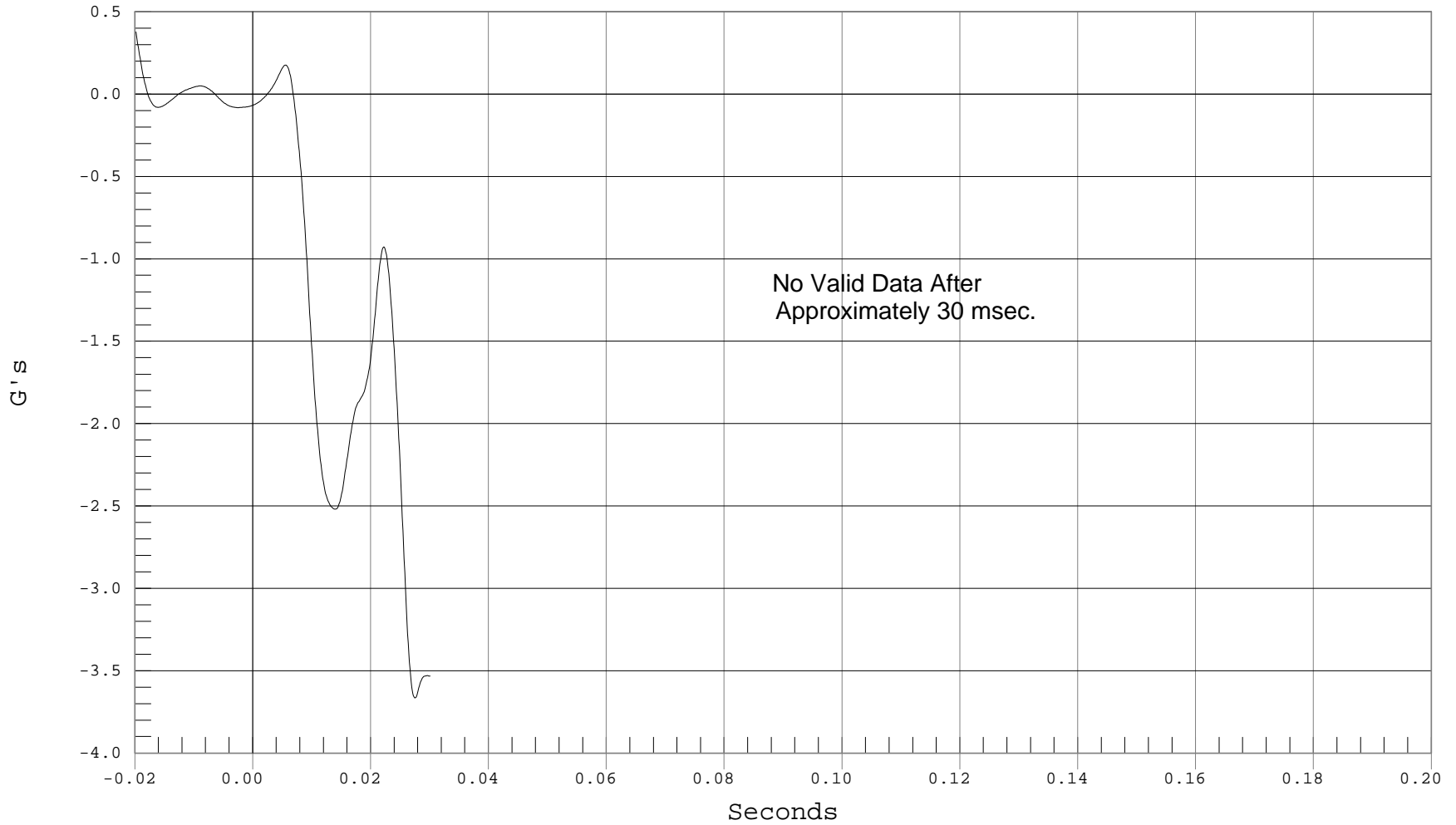
VEHICLE CG X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 VEHICLE CG X, B02037AF.A33

Ymin = -3.66 G's @ 0.0275 Seconds, Ymax = .38 G's @ -0.0199 Seconds



B-106



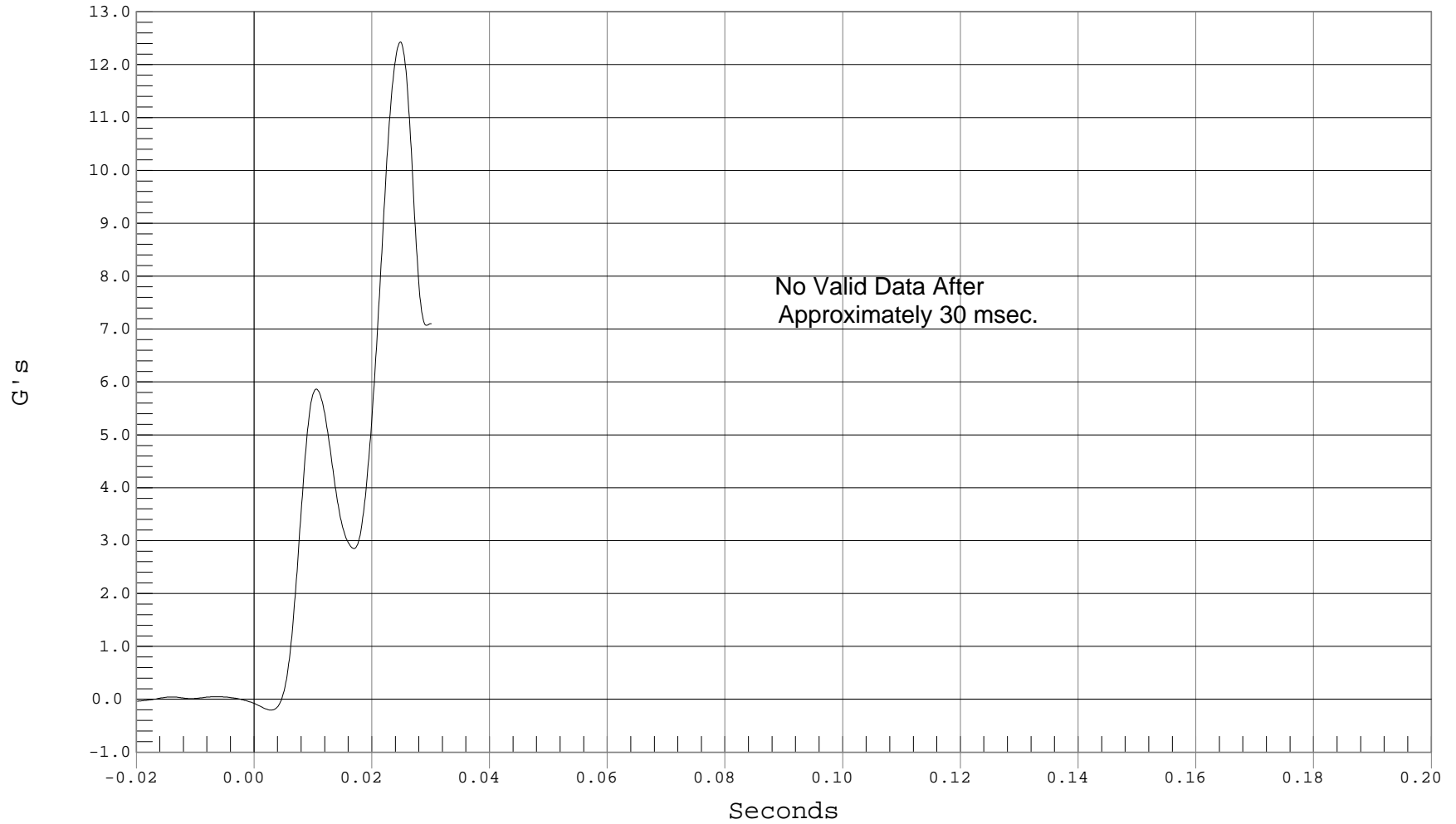
VEHICLE CG Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 VEHICLE CG Y, B02037AF.A34

Ymin = -0.21 G's @ 0.0028 Seconds, Ymax = 12.43 G's @ 0.0248 Seconds



B-107



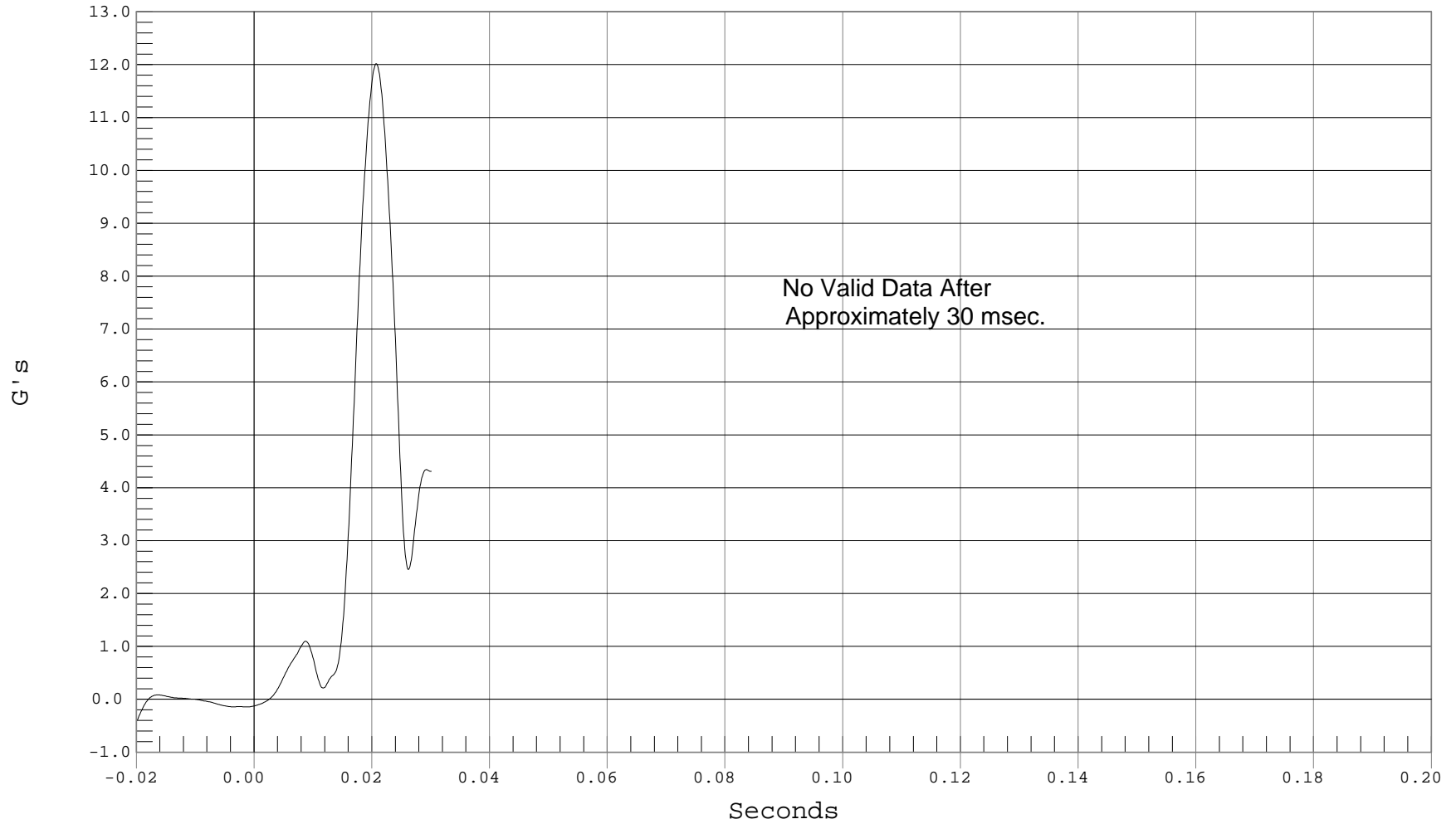
VEHICLE CG Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 VEHICLE CG Z, B02037AF.A35

Ymin = -.39 G's @ -0.0199 Seconds, Ymax = 12.02 G's @ 0.0207 Seconds



B-108



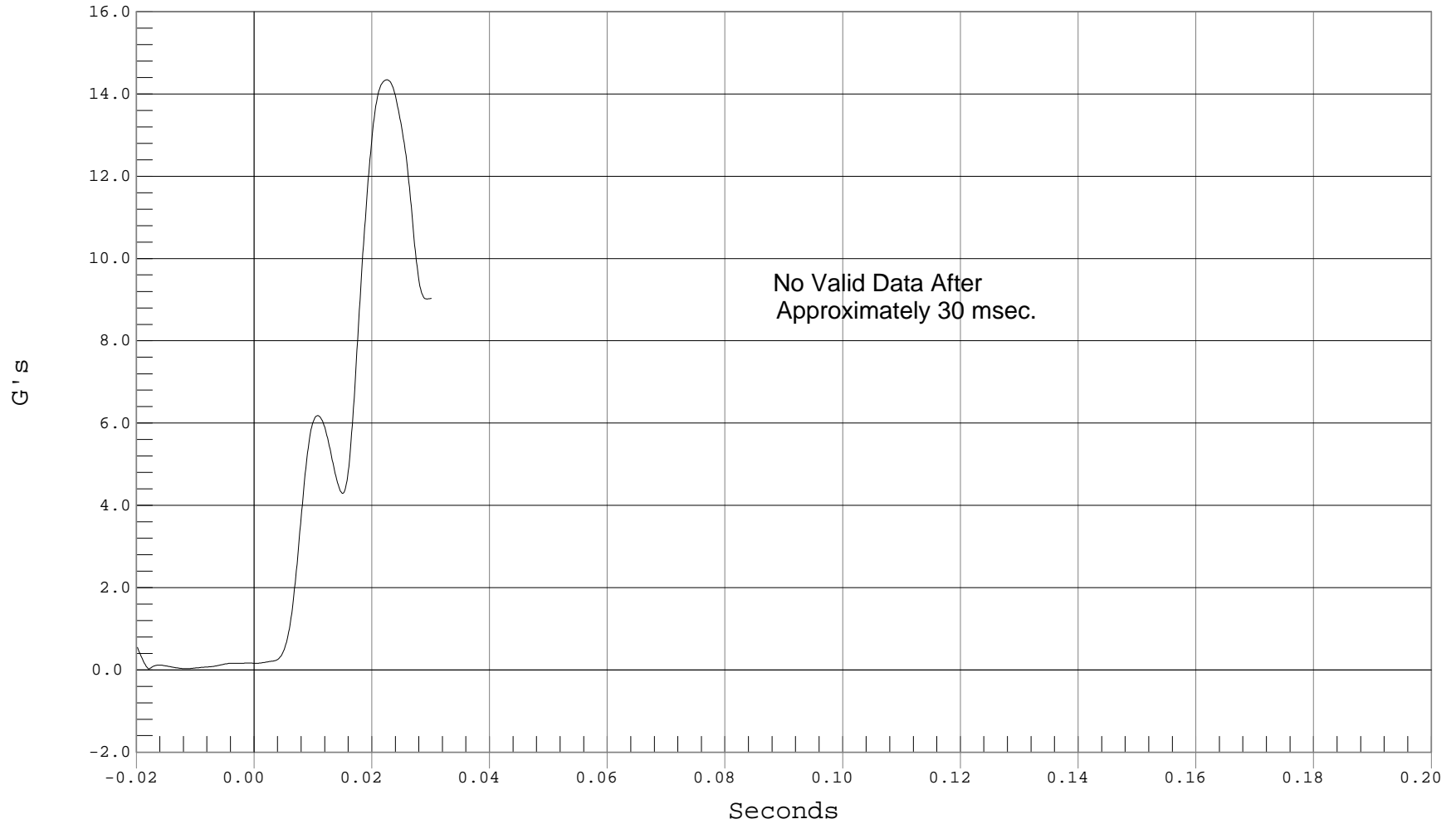
VEHICLE CG RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

1 VEHICLE CG RESULTANT ACCELERATION, B02037AV.A33

Ymin = .02 G's @ -0.0180 Seconds, Ymax = 14.34 G's @ 0.0225 Seconds





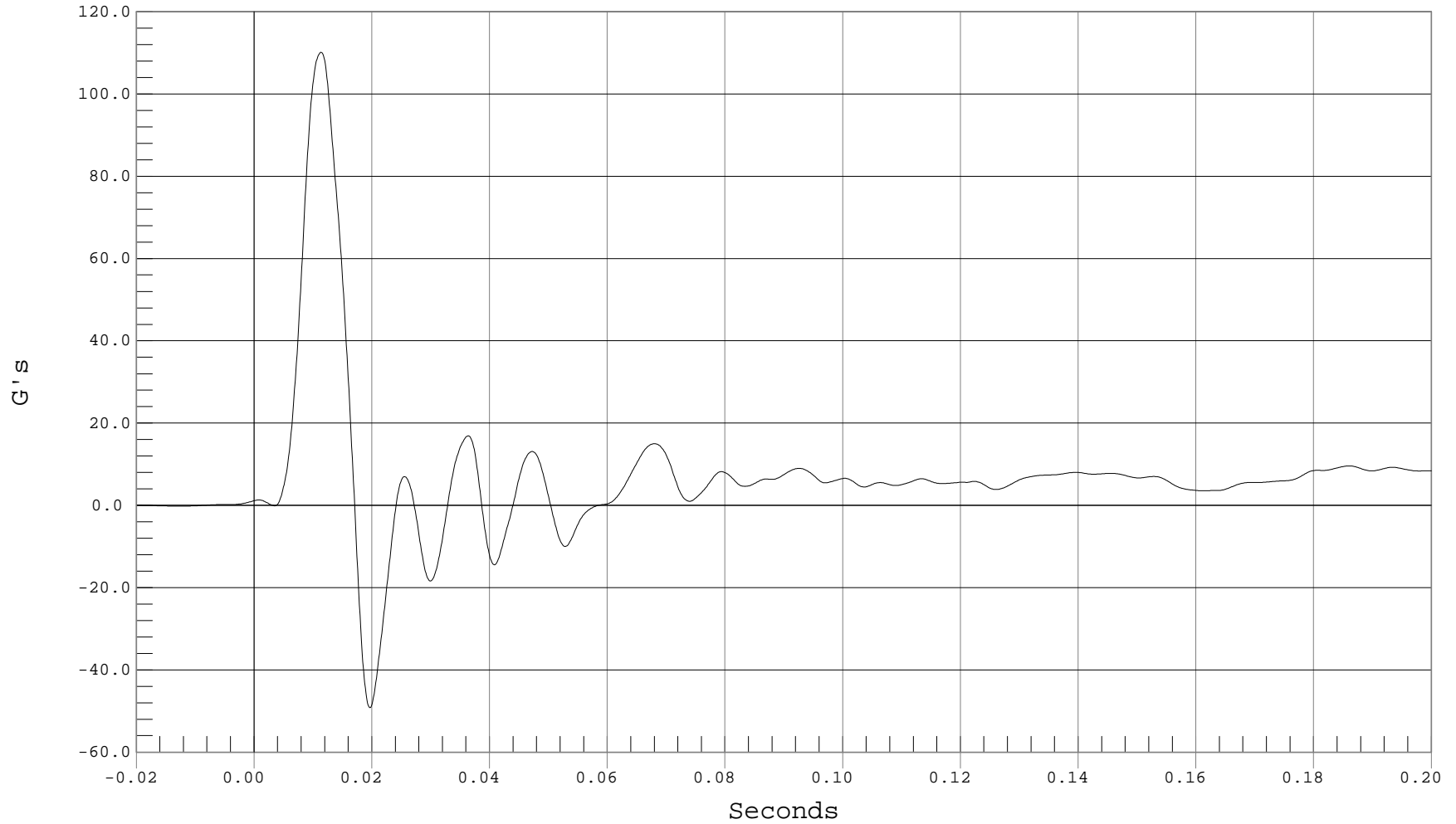
LEFT FRONT DOOR @ ARM Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ ARM Y, B02037AF.A26

Ymin = -49.2 G's @ 0.0196 Seconds, Ymax = 110.16 G's @ 0.0113 Seconds



B-110



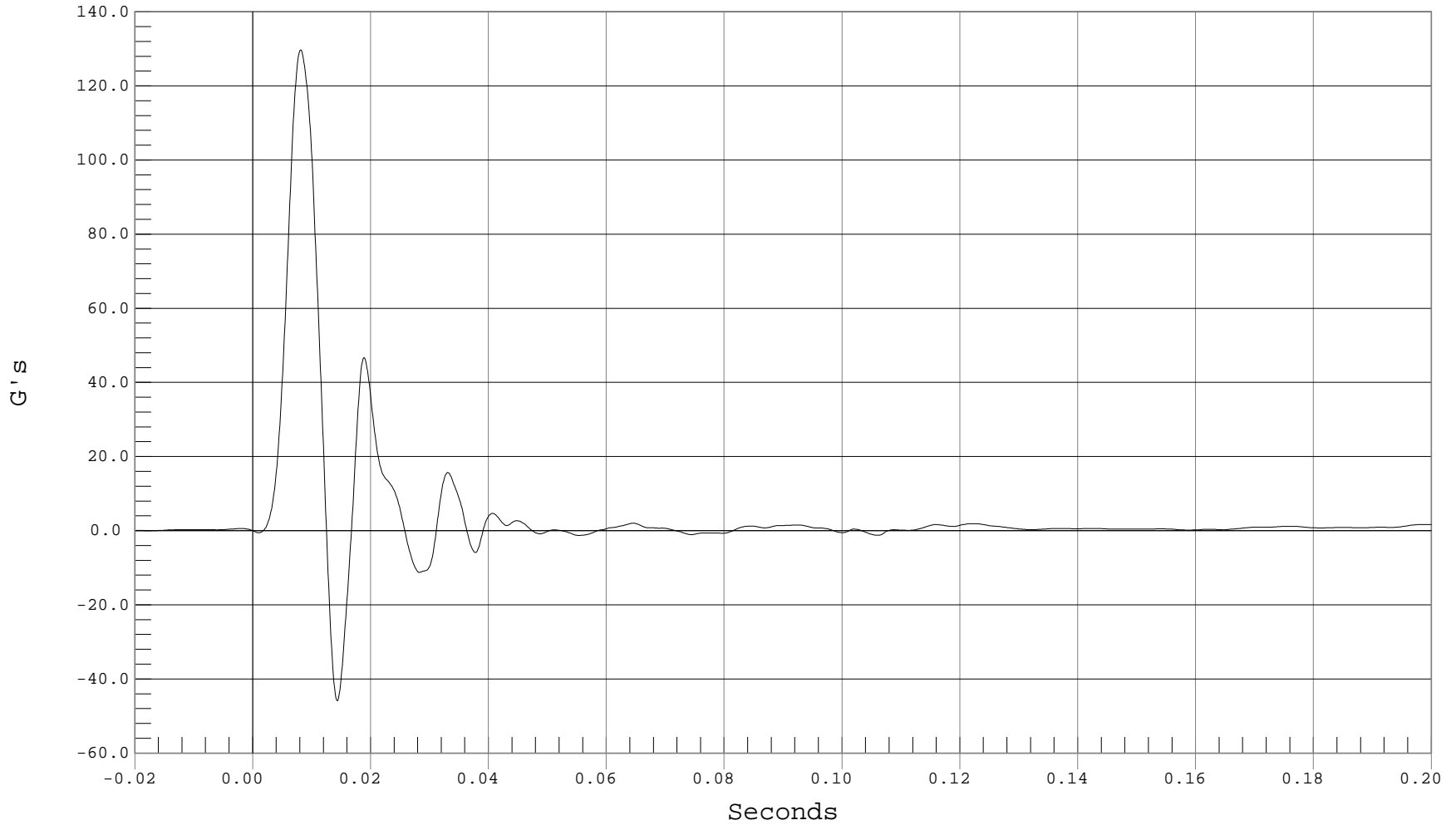
LEFT FRONT DOOR @ PELVIS Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ PELVIS Y, B02037AF.A25

Ymin = -45.89 G's @ 0.0143 Seconds, Ymax = 129.68 G's @ 0.0080 Seconds



B-111



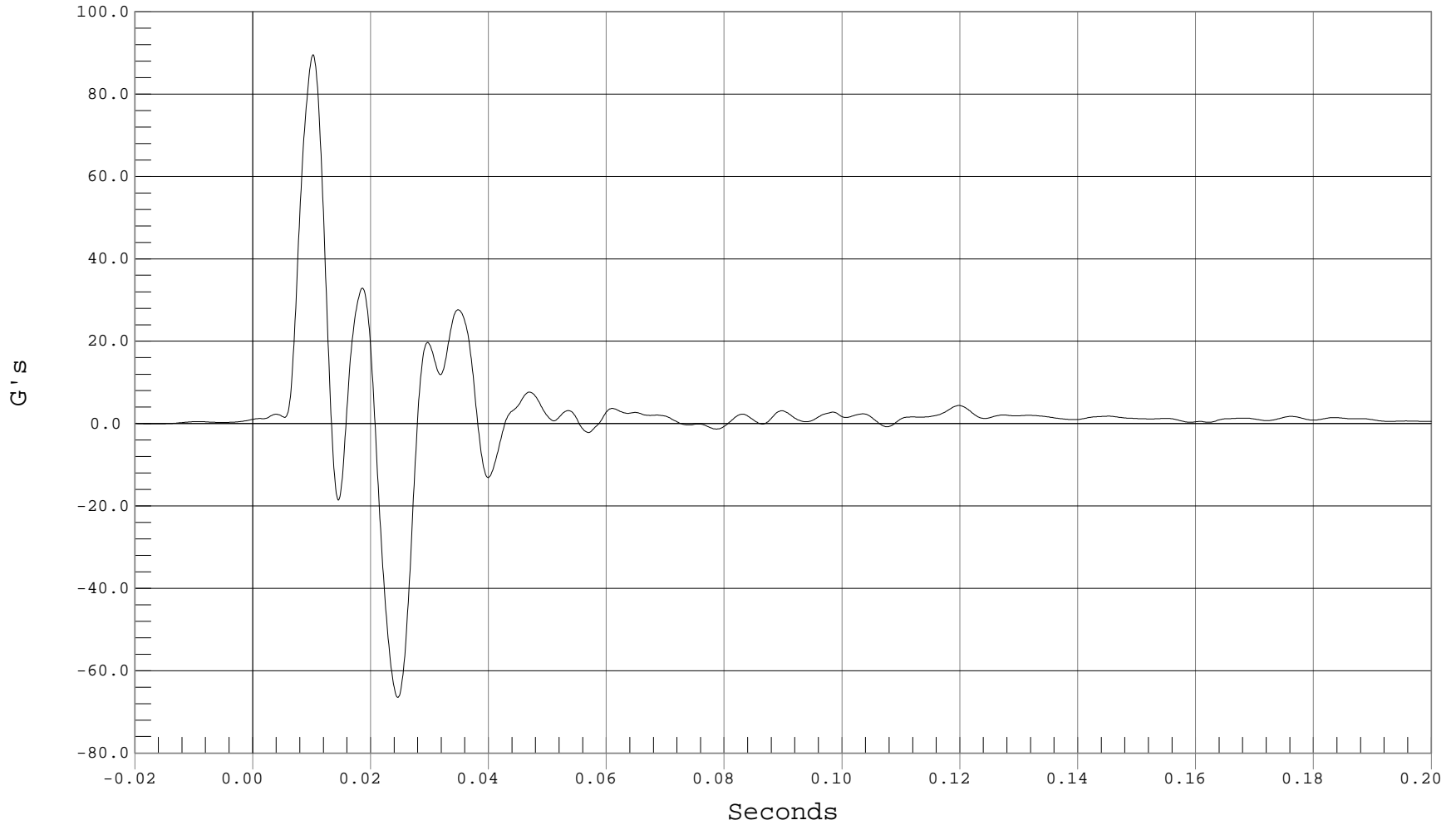
LEFT FRONT DOOR @ KNEE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ KNEE Y, B02037AF.A27

Ymin = -66.49 G's @ 0.0245 Seconds, Ymax = 89.57 G's @ 0.0102 Seconds



B-112



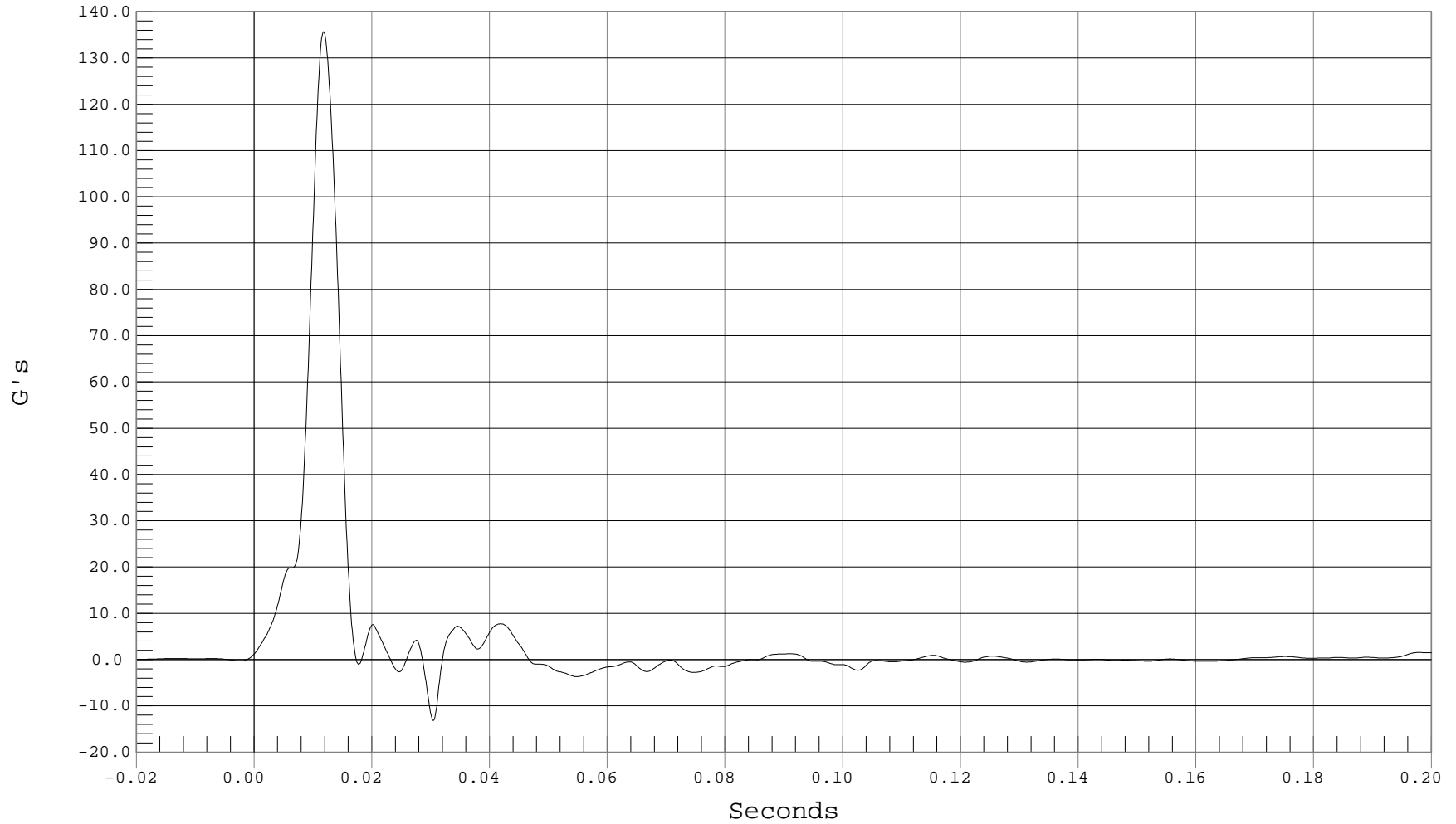
LEFT FRONT DOOR @ RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LEFT FRONT DOOR @ RIB Y, B02037AF.A28

Ymin = -13.17 G's @ 0.0304 Seconds, Ymax = 135.69 G's @ 0.0117 Seconds



B-113



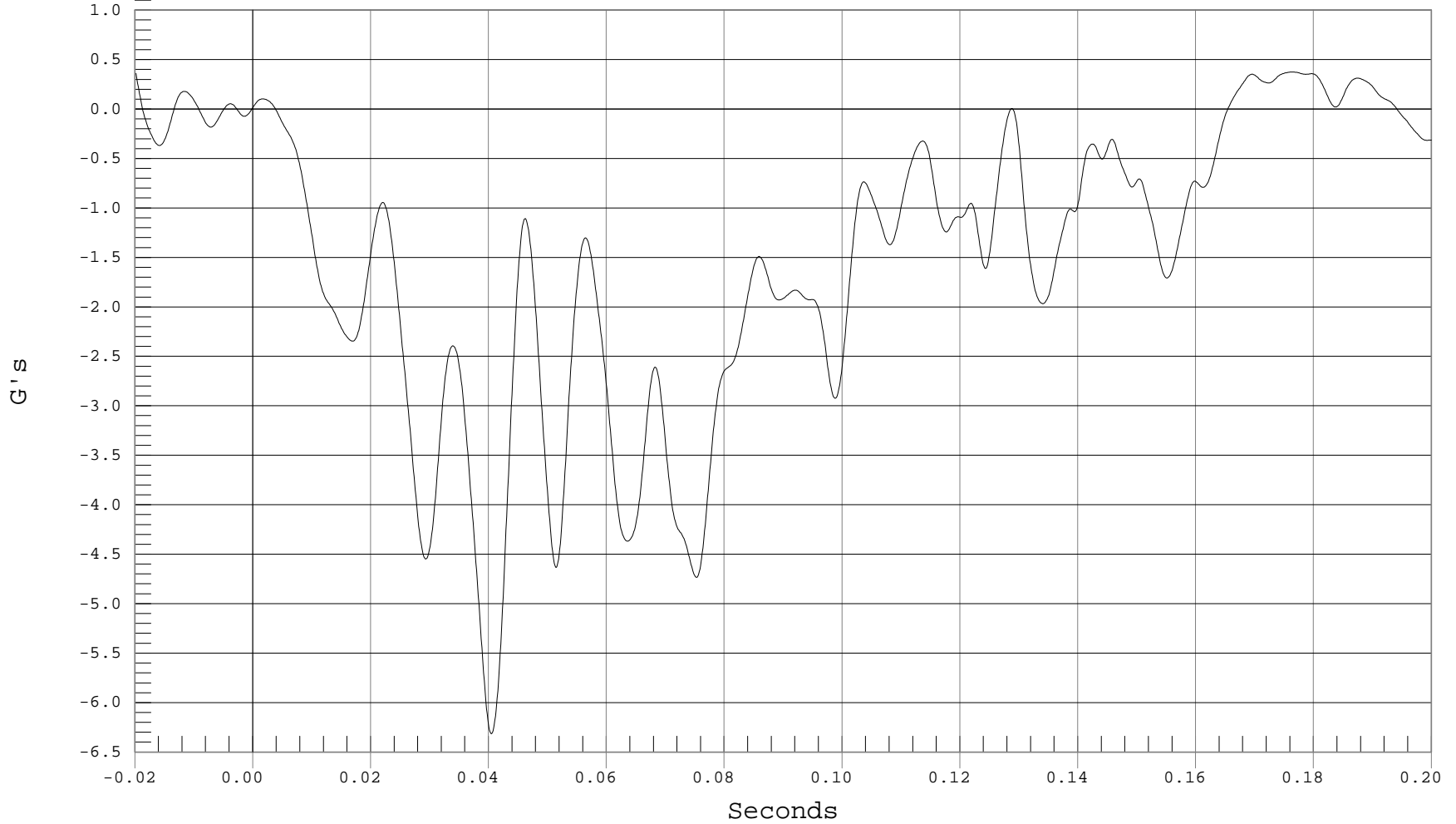
LOWER CENTER RADIATOR SUPPORT X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

1 LOWER CENTER RADIATOR SUPPORT X, B02037AF.A22

Ymin = -6.31 G's @ 0.0404 Seconds, Ymax = .37 G's @ 0.1763 Seconds



B-114



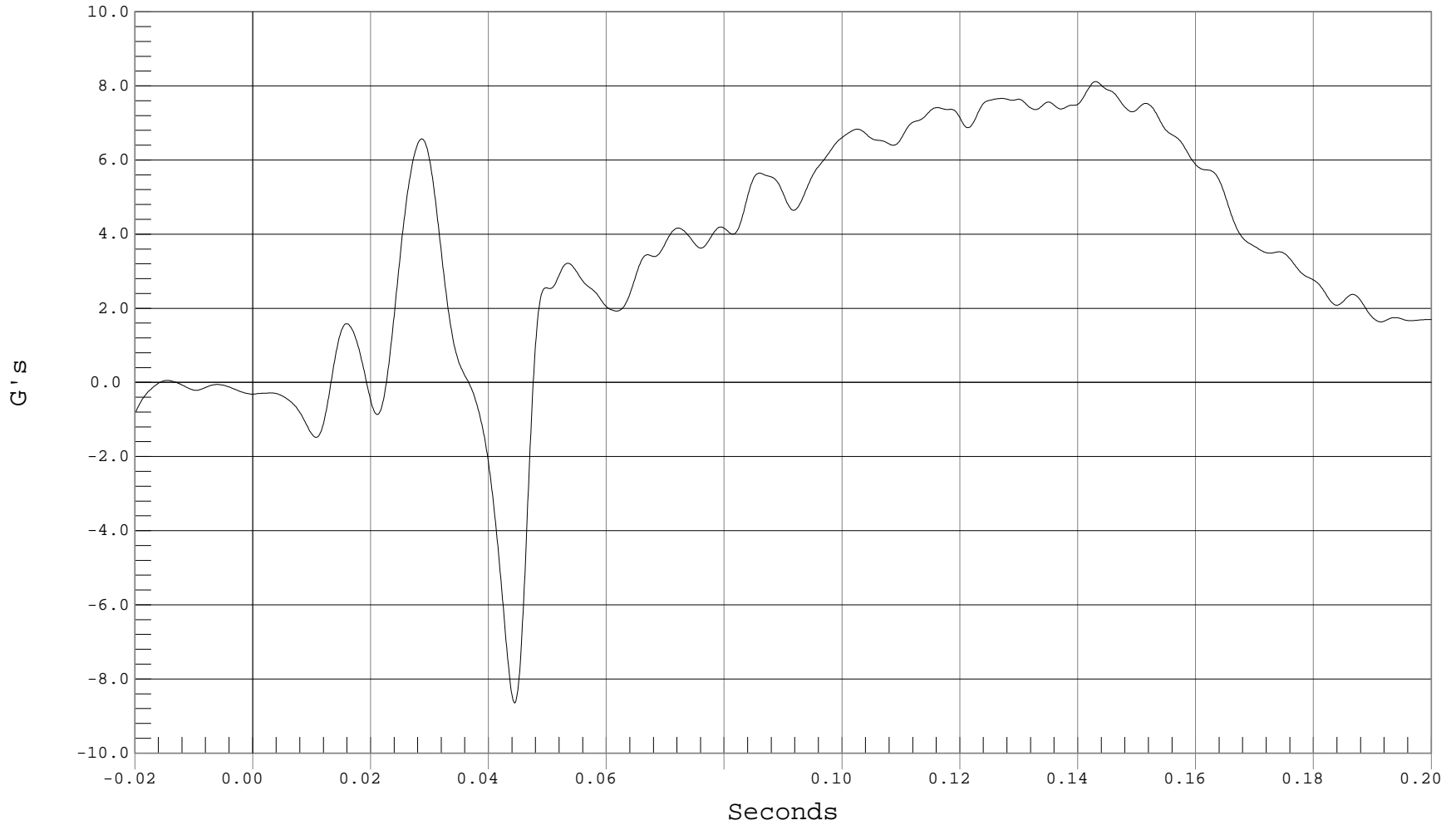
LOWER CENTER RADIATOR SUPPORT Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LOWER CENTER RADIATOR SUPPORT Y, B02037AF.A23

Ymin = -8.65 G's @ 0.0444 Seconds, Ymax = 8.12 G's @ 0.1430 Seconds



B-115



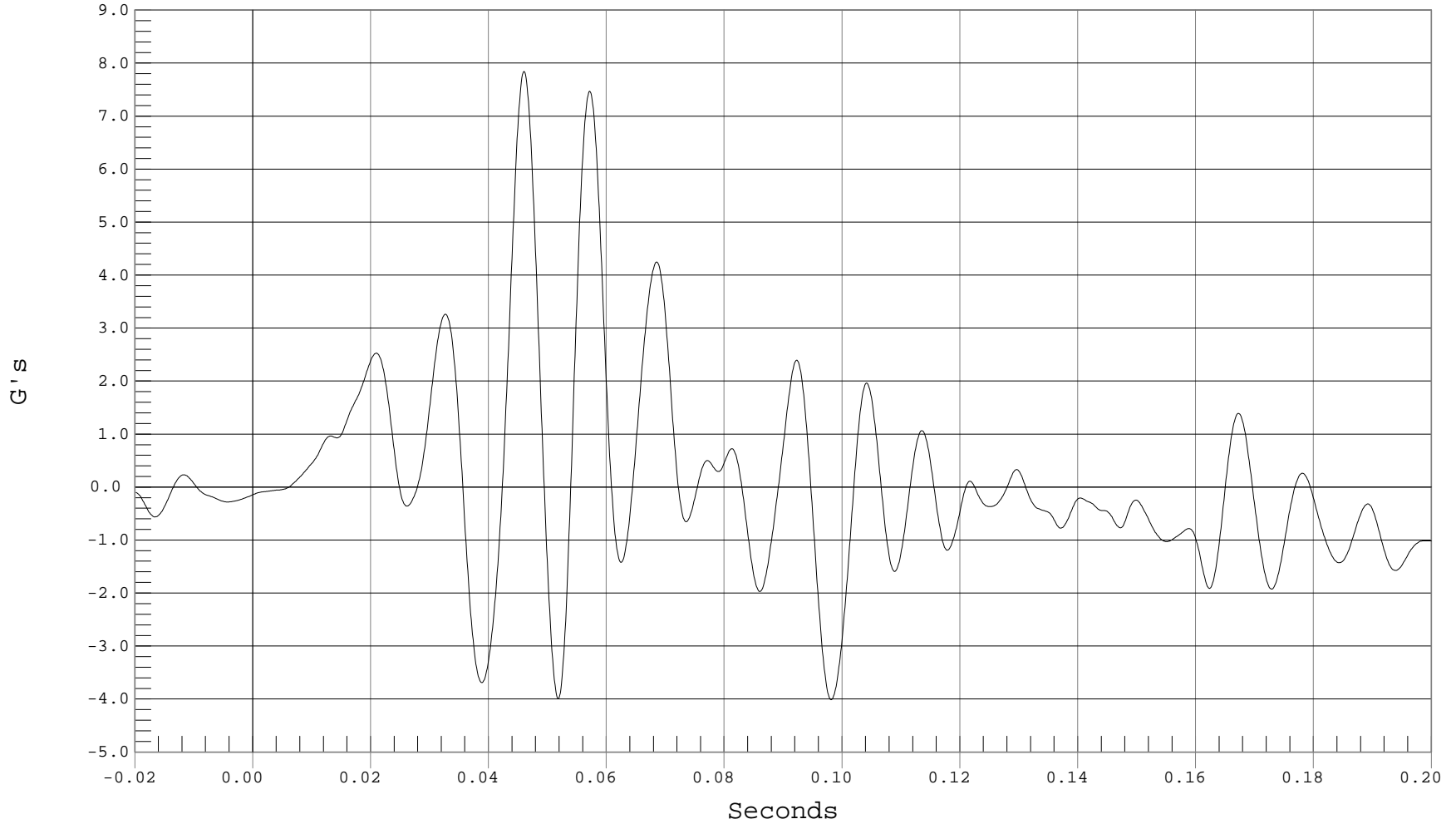
LOWER CENTER RADIATOR SUPPORT Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LOWER CENTER RADIATOR SUPPORT Z, B02037AF.A24

Ymin = -4.02 G's @ 0.0981 Seconds, Ymax = 7.84 G's @ 0.0459 Seconds



B-116



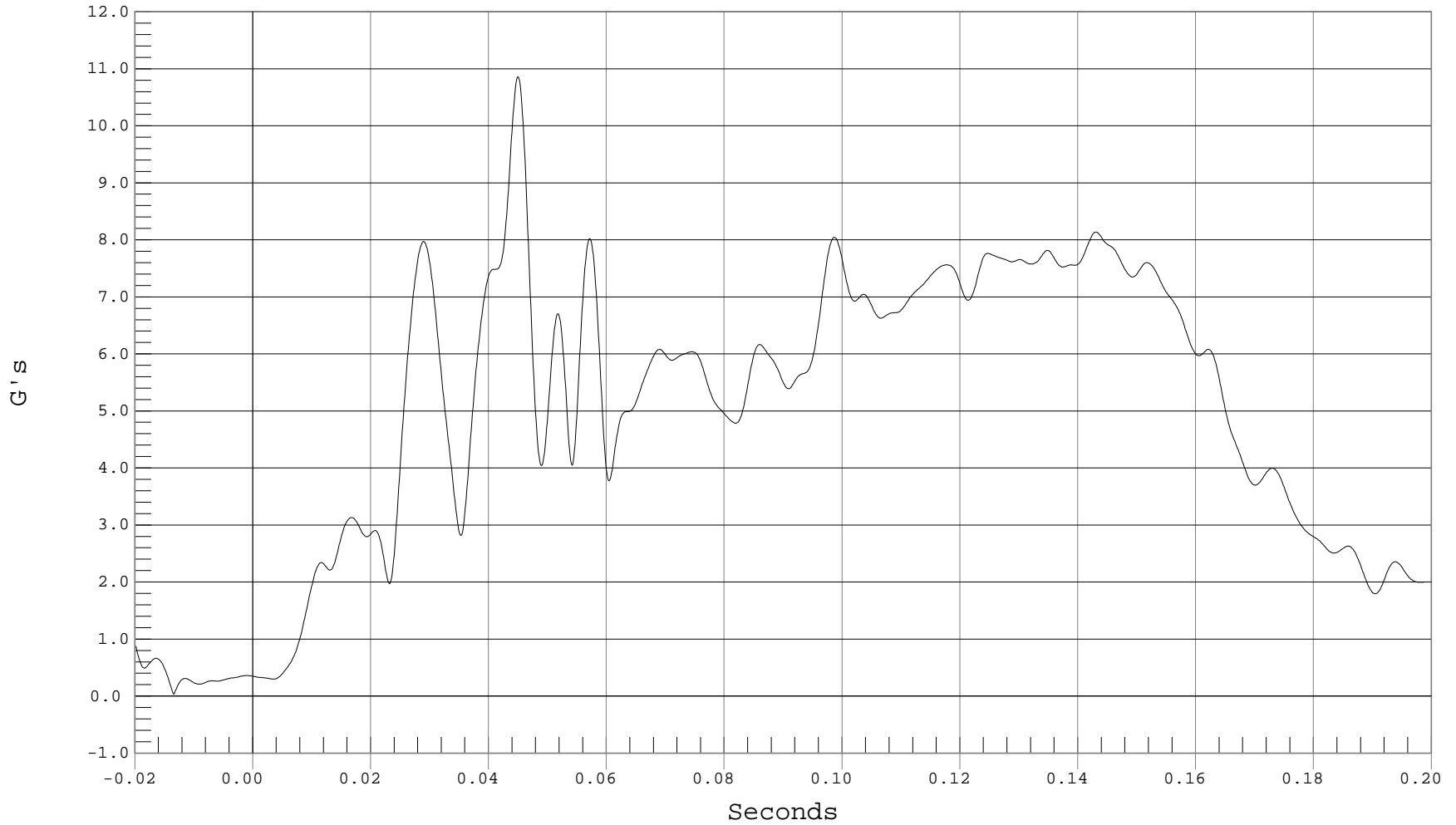
LOWER CENTER RADIATOR SUPPORT RESULTANT ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Filter Class: 60

— 1 LOWER RADIATOR SUPPORT RESULTANT ACCELERATION, B02037AV.A22

Ymin = .03 G's @ -0.0135 Seconds, Ymax = 10.86 G's @ 0.0449 Seconds



B-117



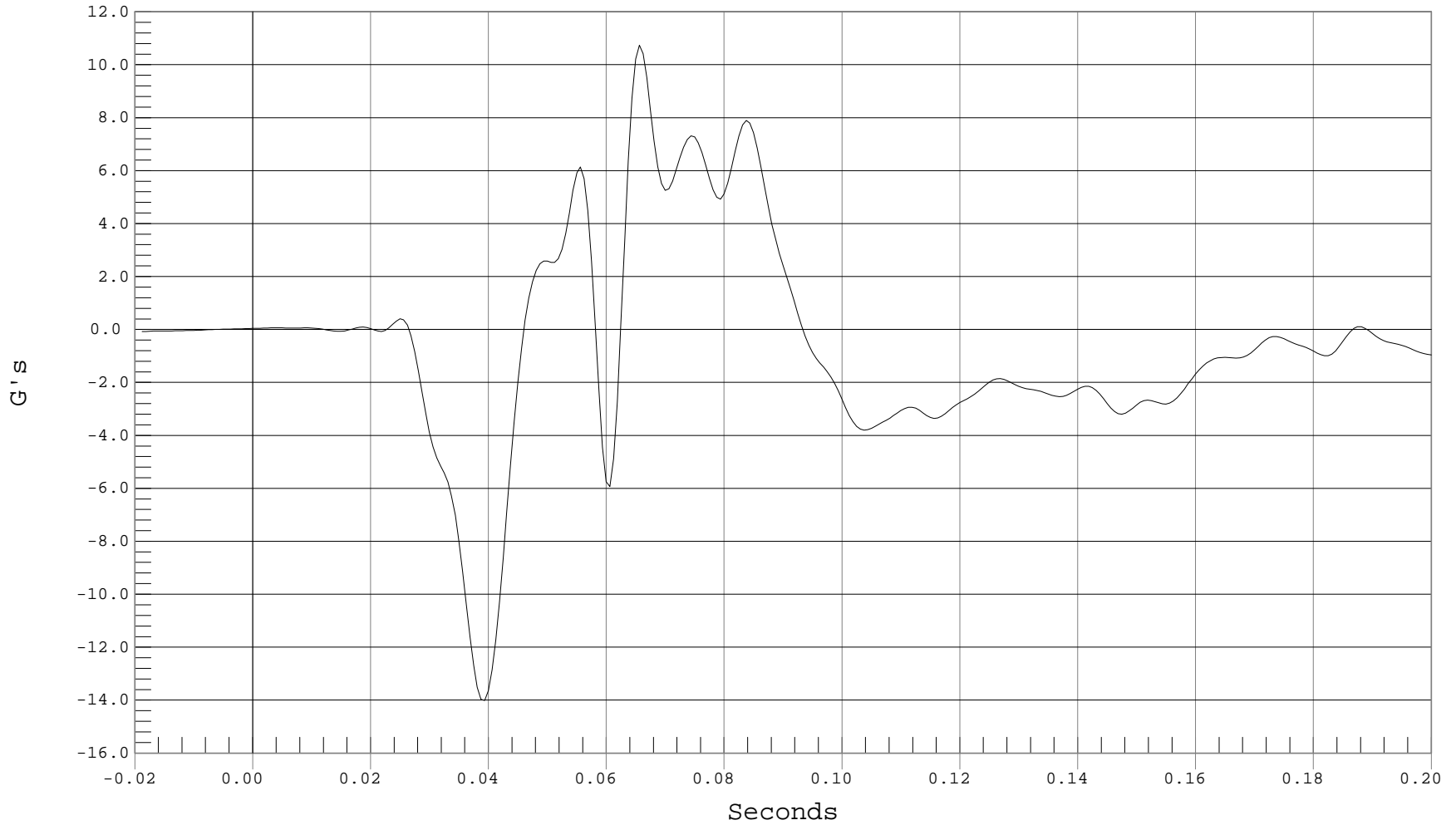
DRIVER UPPER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER UPPER SPINE X, B02037FI.R06

Ymin = -14.02 G's @ 0.0393 Seconds, Ymax = 10.73 G's @ 0.0655 Seconds



B-118



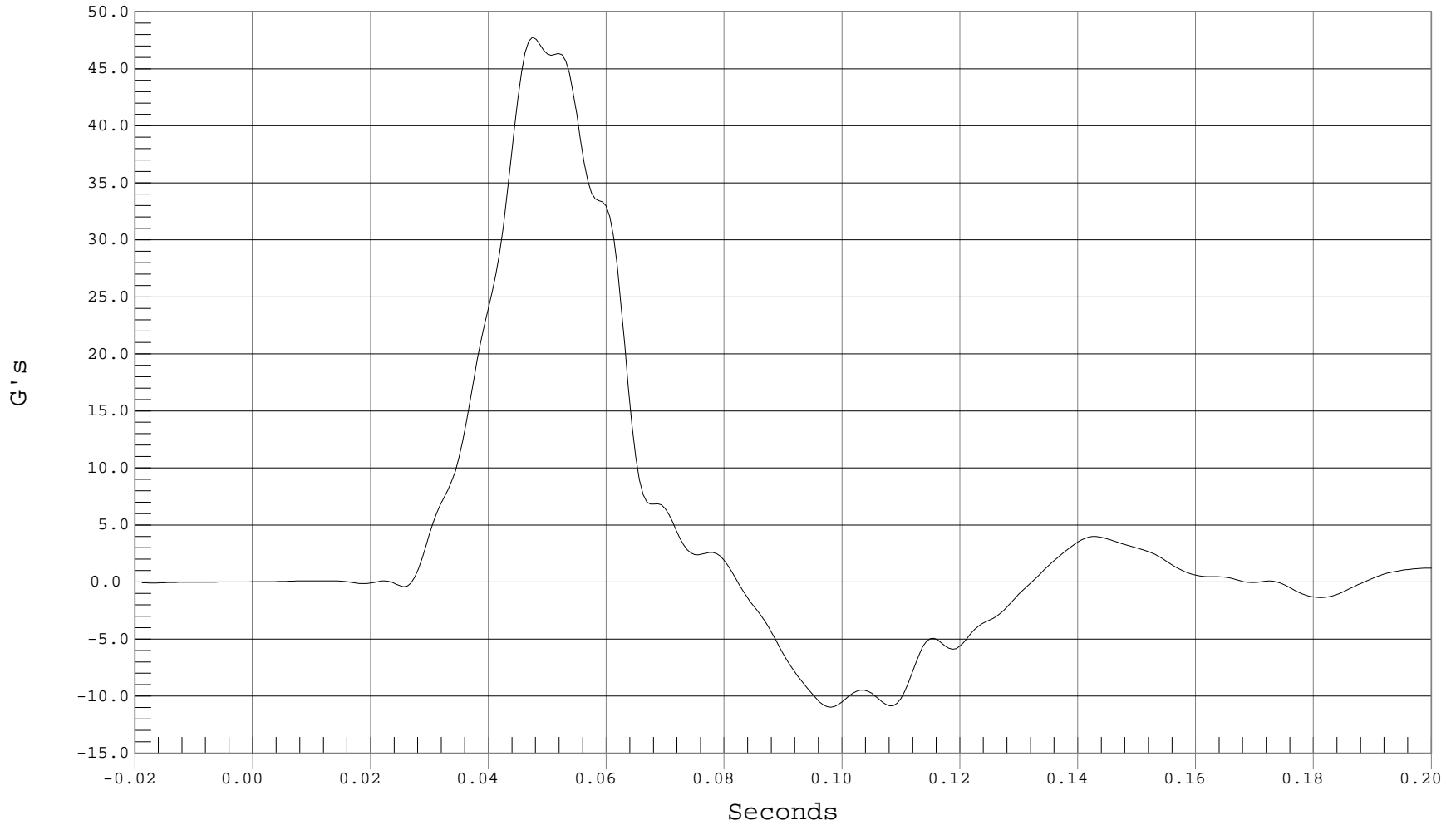
DRIVER UPPER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER UPPER SPINE Y, B02037FI.R07

Ymin = -10.97 G's @ 0.0980 Seconds, Ymax = 47.76 G's @ 0.0474 Seconds



B-119



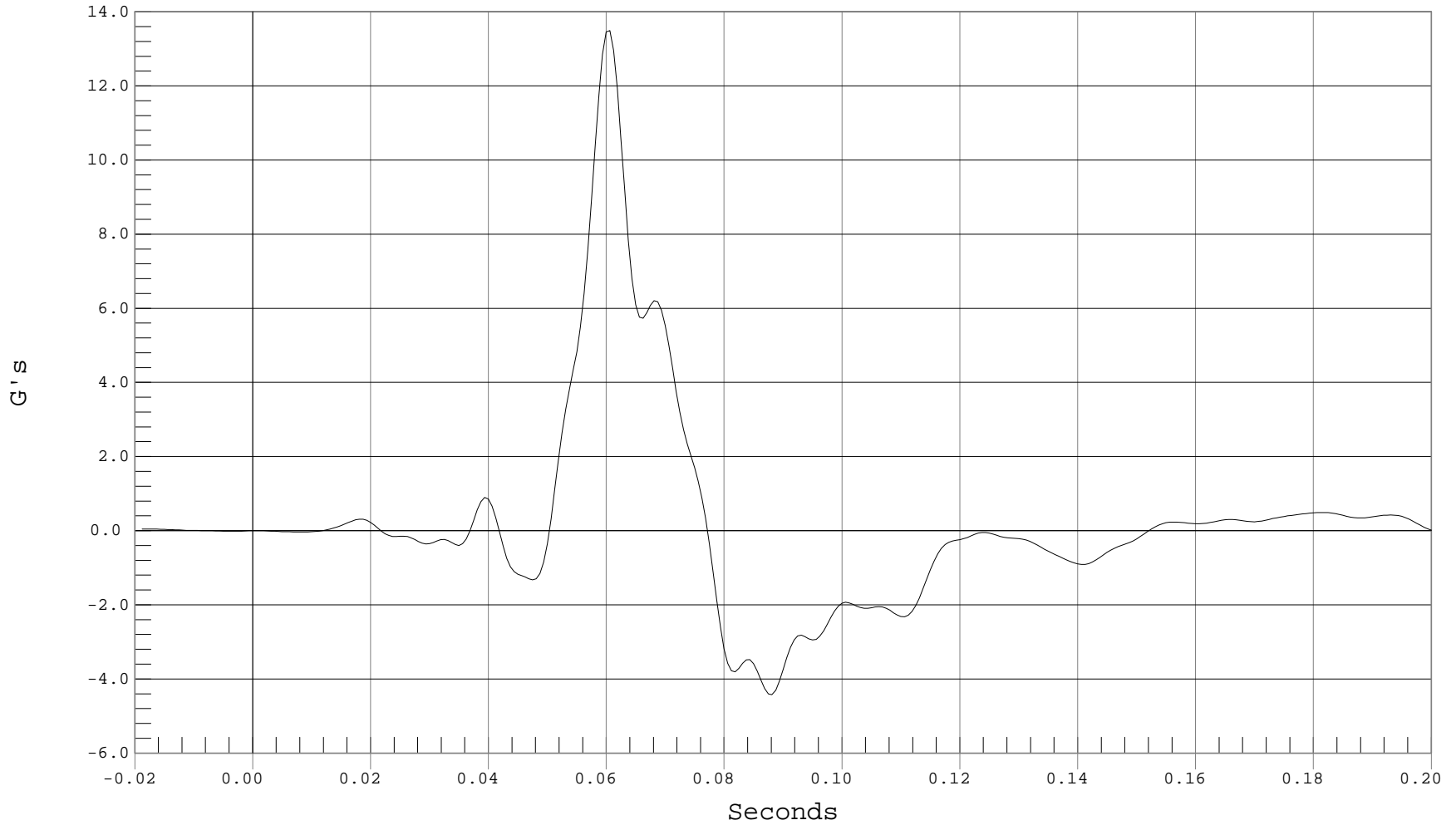
DRIVER UPPER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER UPPER SPINE Z, B02037FI.R08

Ymin = -4.42 G's @ 0.0880 Seconds, Ymax = 13.49 G's @ 0.0605 Seconds



B-120



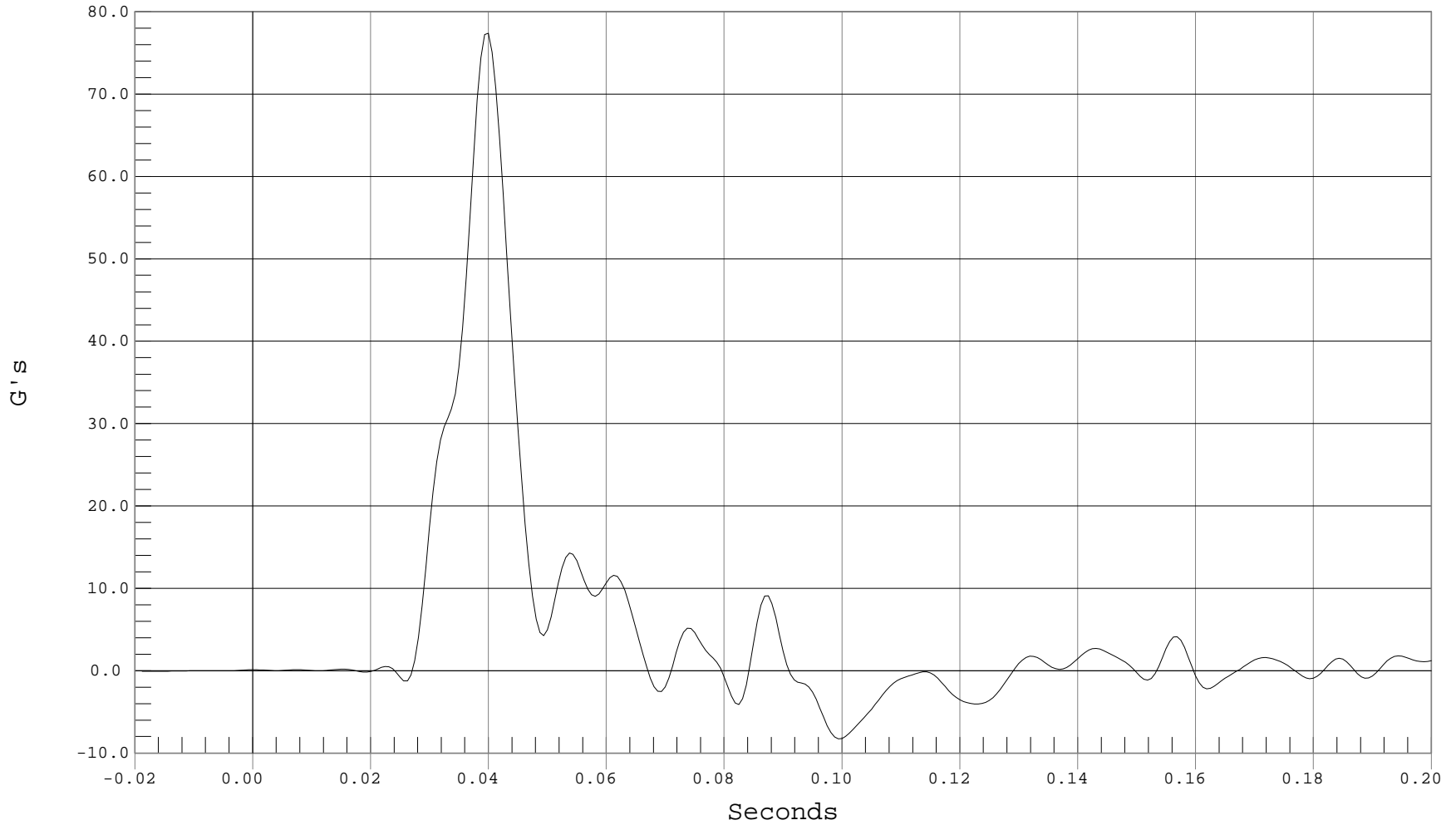
DRIVER UPPER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER UPPER RIB Y, B02037FI.R04

Ymin = -8.28 G's @ 0.0993 Seconds, Ymax = 77.41 G's @ 0.0399 Seconds



B-121



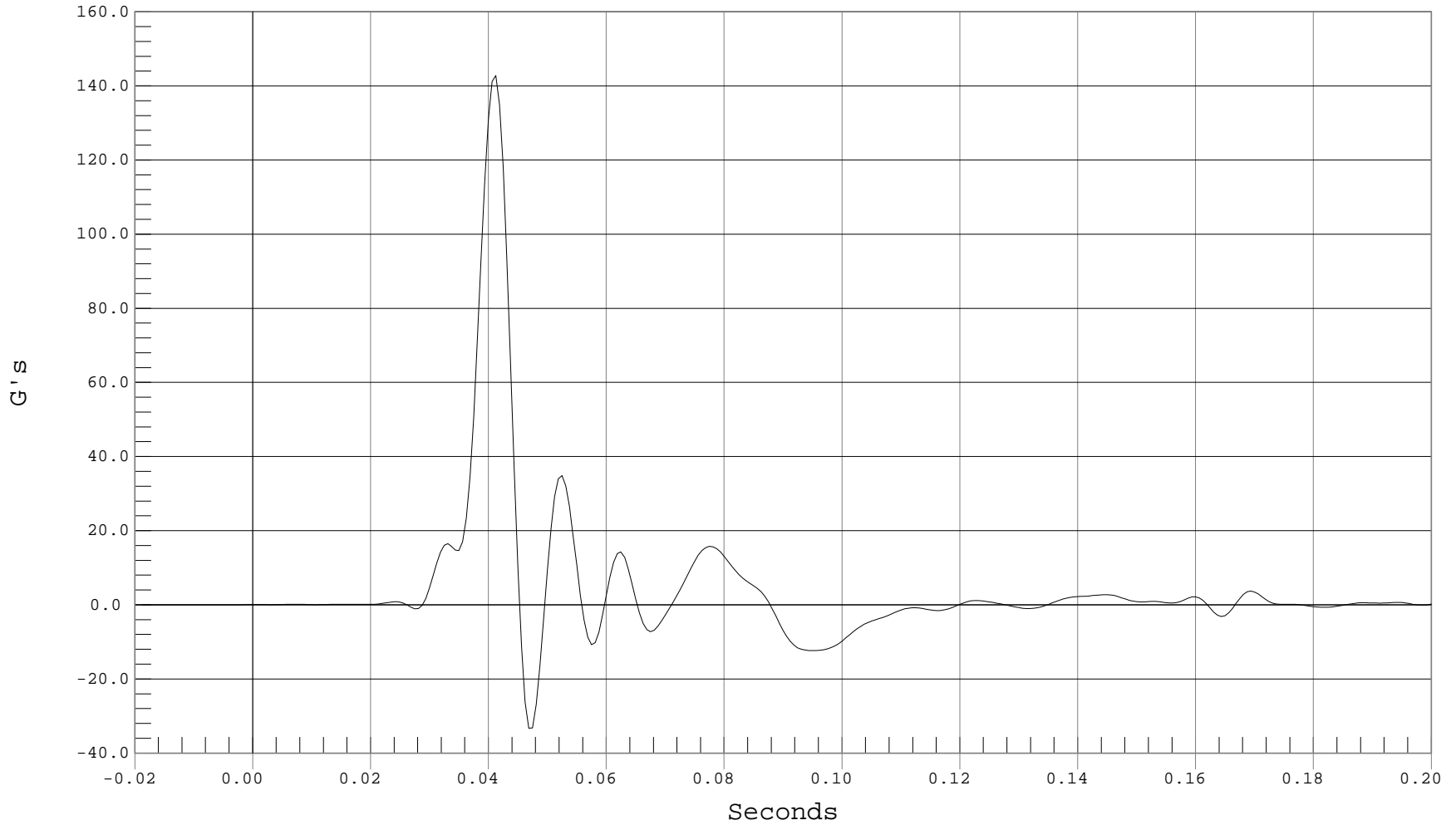
DRIVER MID RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER MID RIB Y, B02037FI.R58

Ymin = -33.3 G's @ 0.0468 Seconds, Ymax = 142.8 G's @ 0.0412 Seconds



B-122



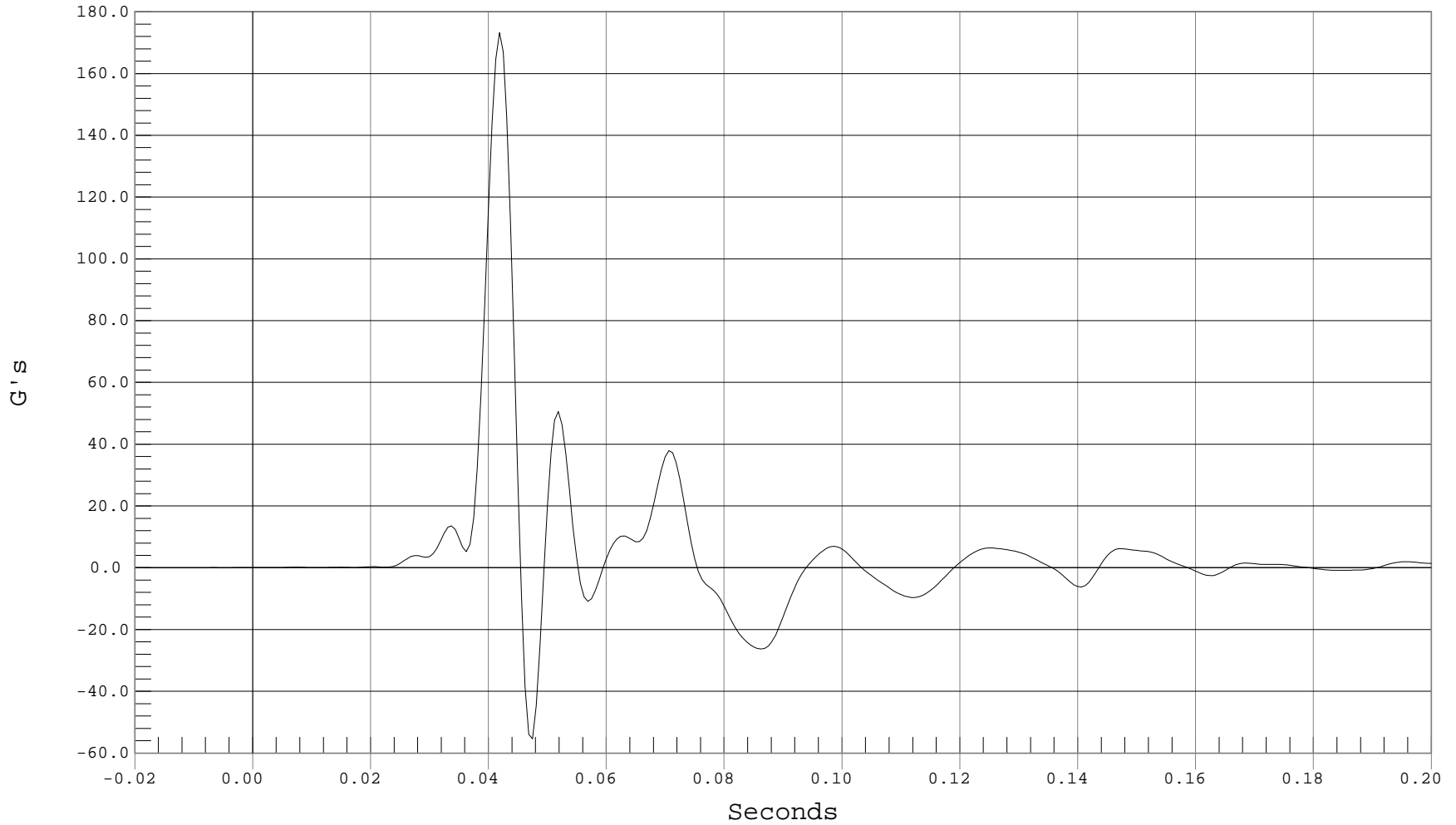
DRIVER LOWER RIB Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

1 DRIVER LOWER RIB Y, B02037FI.R05

Ymin = -55.4 G's @ 0.0474 Seconds, Ymax = 173.25 G's @ 0.0418 Seconds



B-123



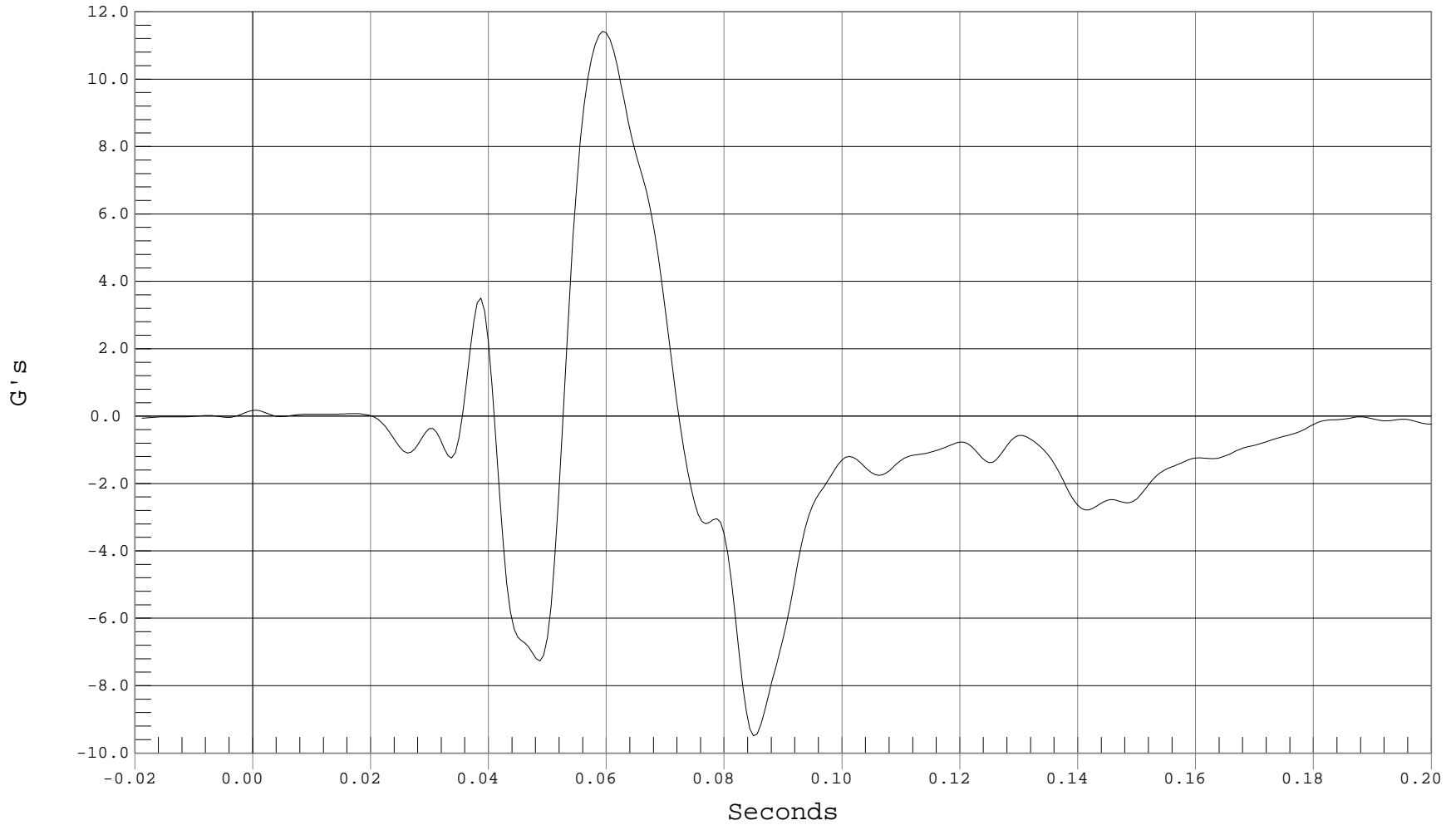
DRIVER LOWER SPINE X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER LOWER SPINE X, B02037FI.R09

Ymin = -9.49 G's @ 0.0849 Seconds, Ymax = 11.42 G's @ 0.0593 Seconds





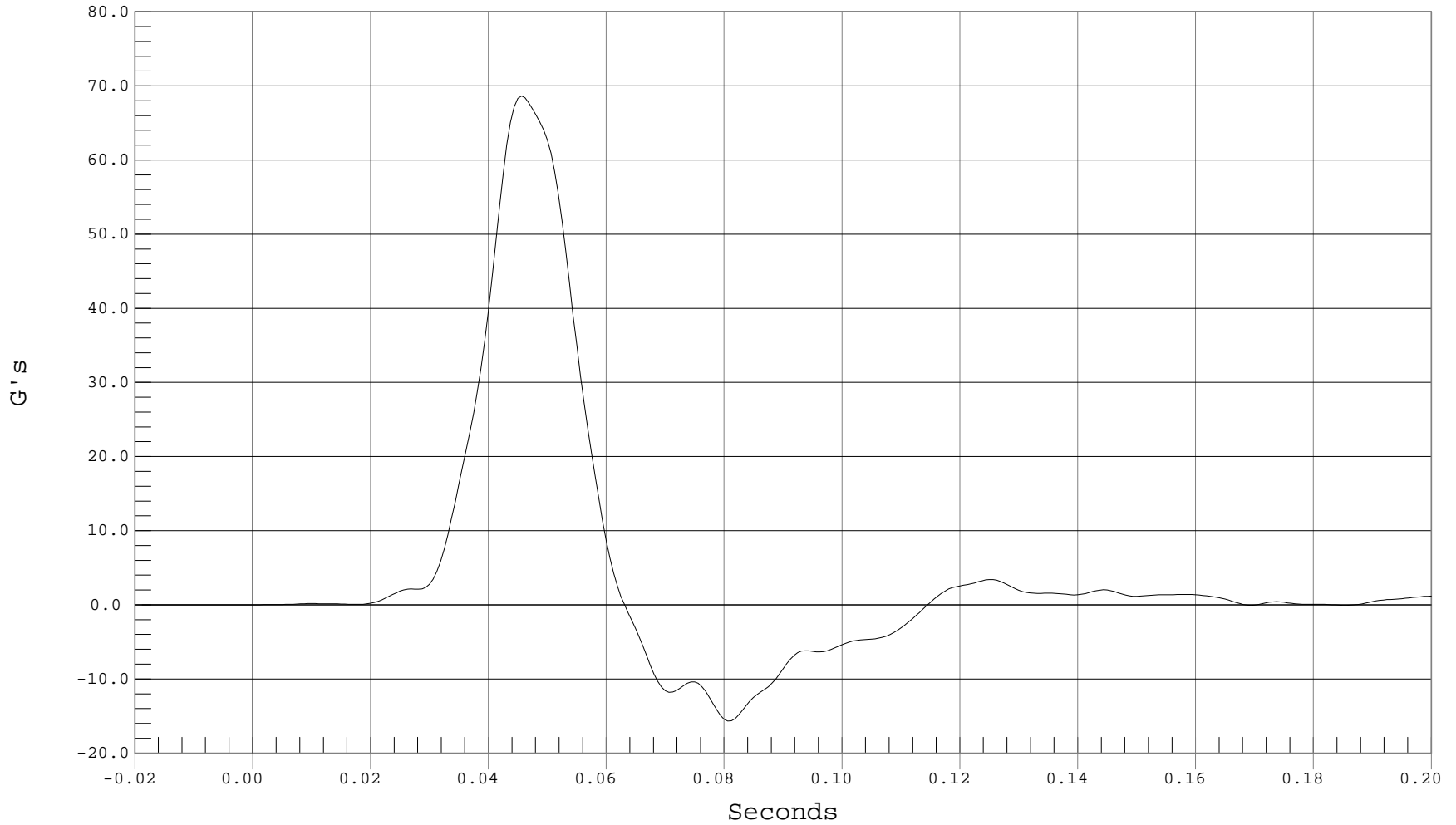
DRIVER LOWER SPINE Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER LOWER SPINE Y, B02037FI.R10

Ymin = -15.67 G's @ 0.0805 Seconds, Ymax = 68.65 G's @ 0.0455 Seconds



B-125



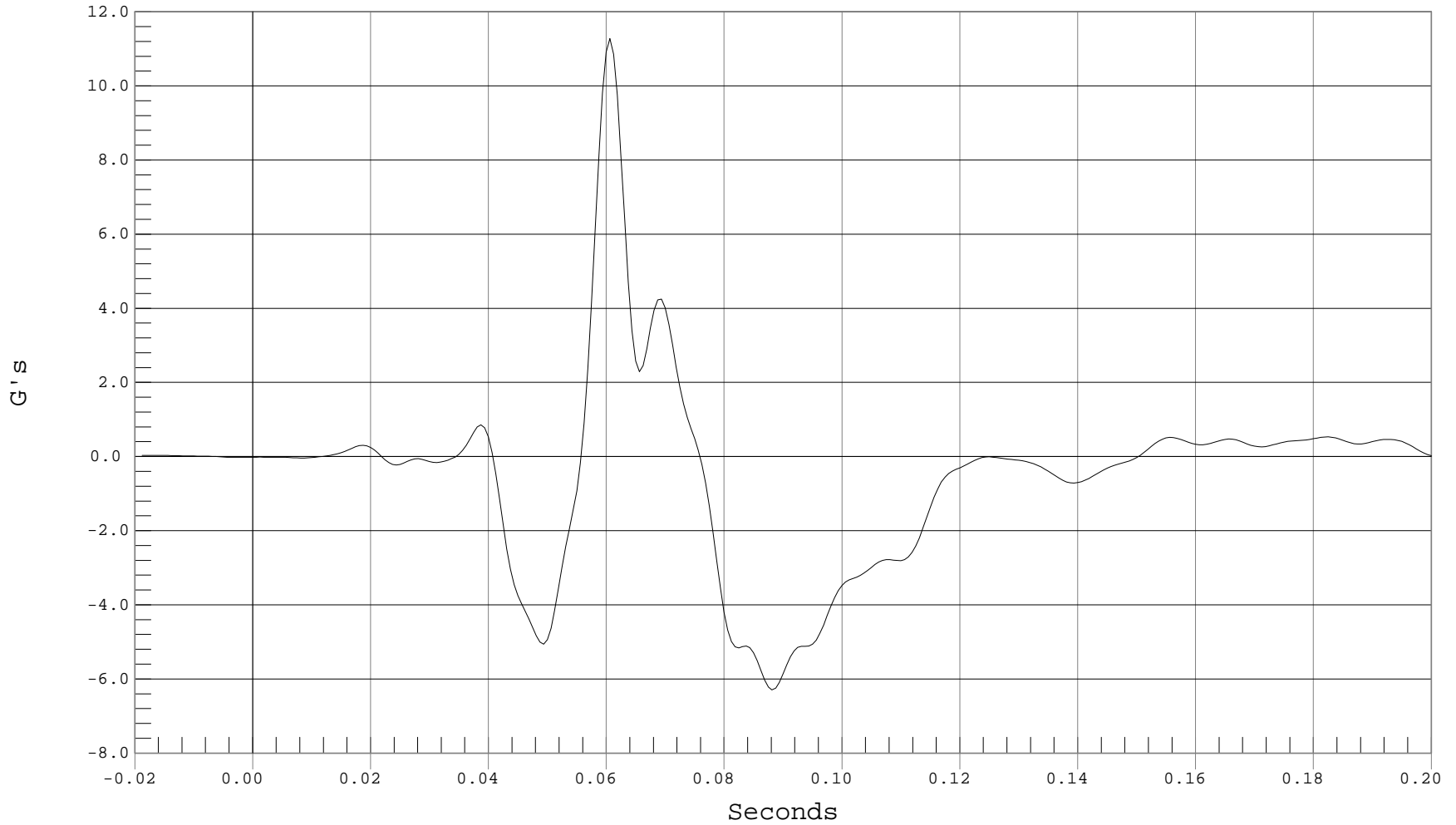
DRIVER LOWER SPINE Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER LOWER SPINE Z, B02037FI.R11

Ymin = -6.29 G's @ 0.0880 Seconds, Ymax = 11.28 G's @ 0.0605 Seconds



B-126



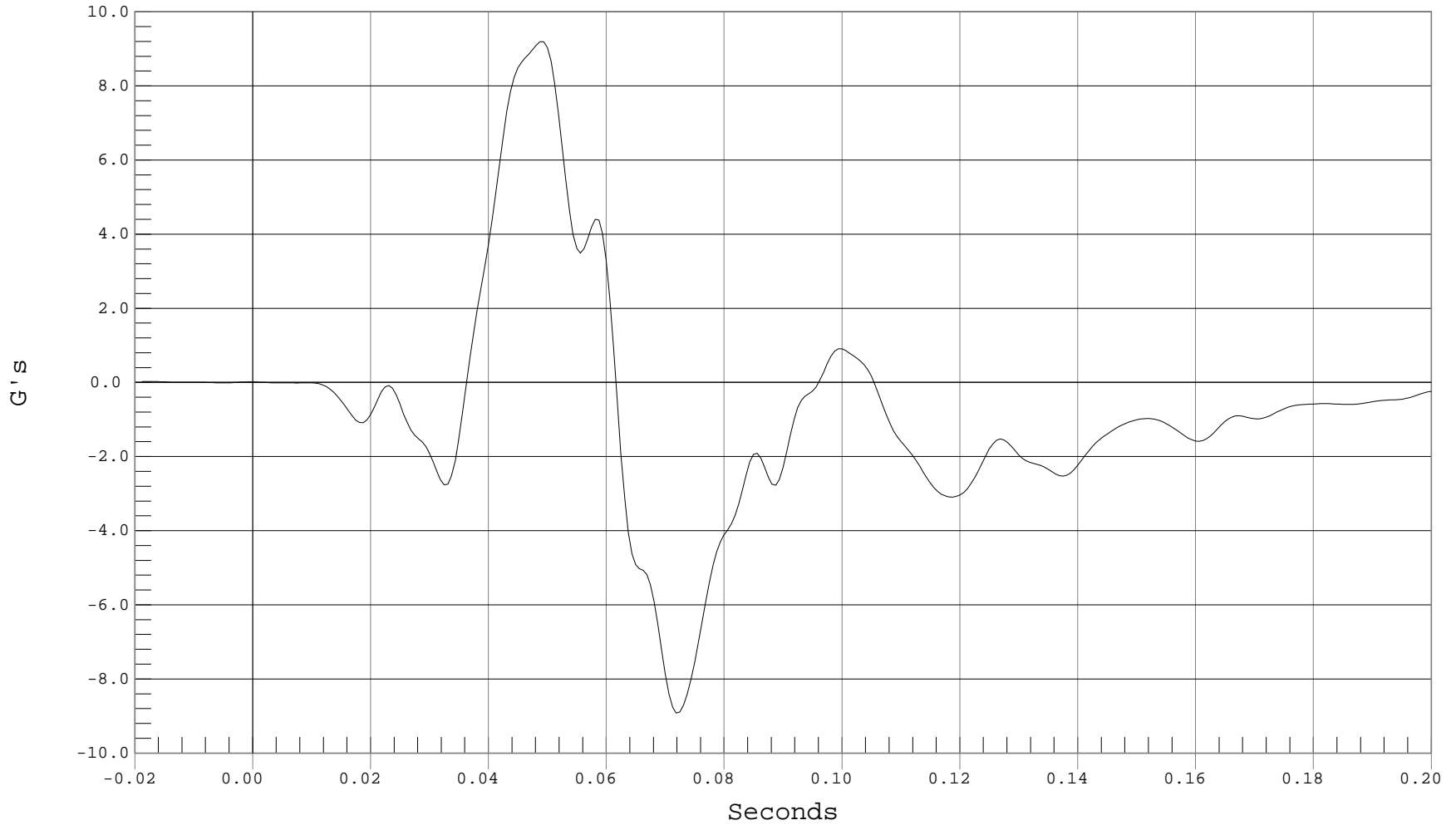
DRIVER PELVIS X ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER PELVIS X, B02037FI.R12

Ymin = -8.92 G's @ 0.0718 Seconds, Ymax = 9.19 G's @ 0.0487 Seconds



B-127



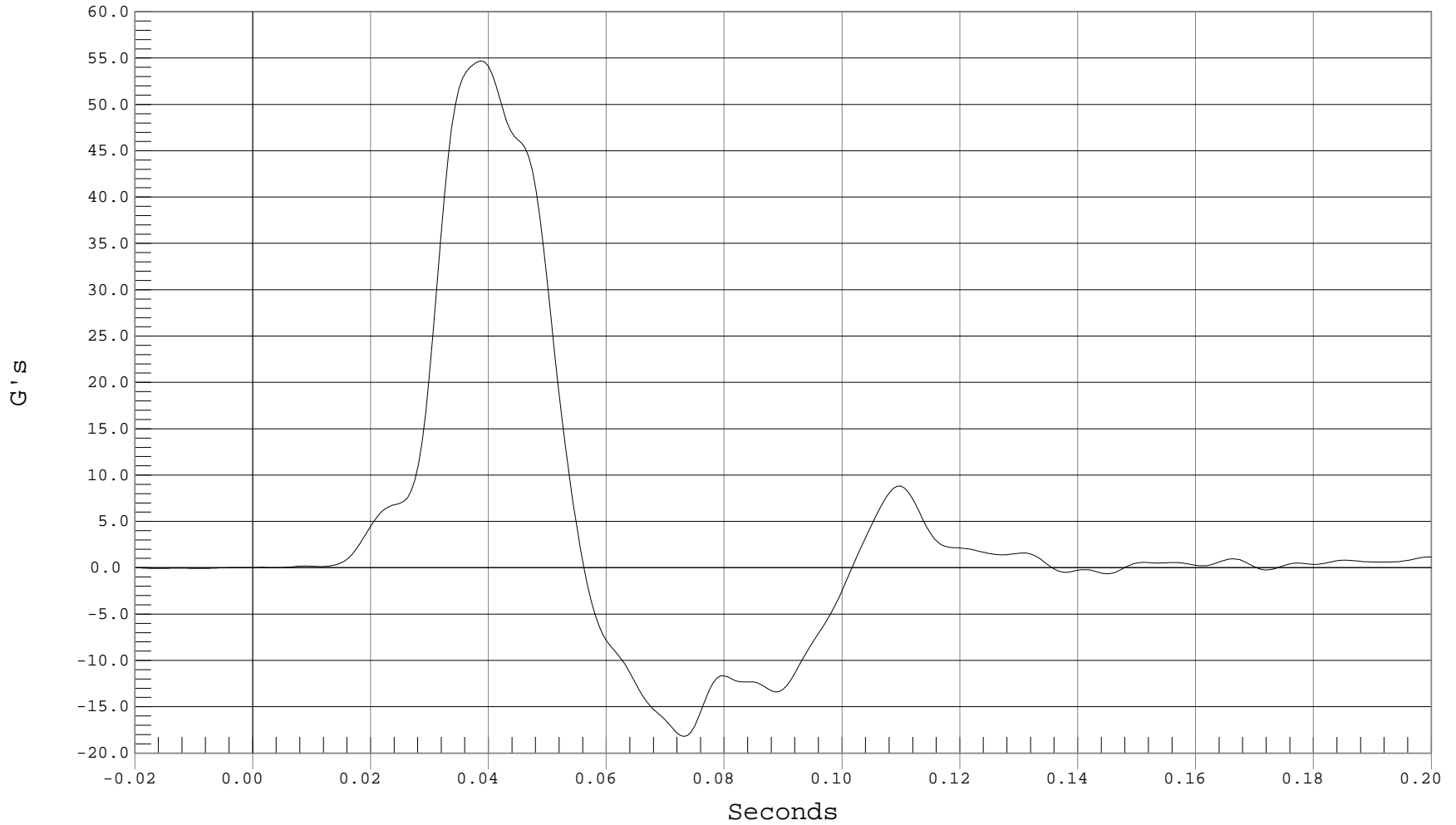
DRIVER PELVIS Y ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER PELVIS Y, B02037FI.R13

Ymin = -18.21 G's @ 0.0730 Seconds, Ymax = 54.7 G's @ 0.0387 Seconds



B-128



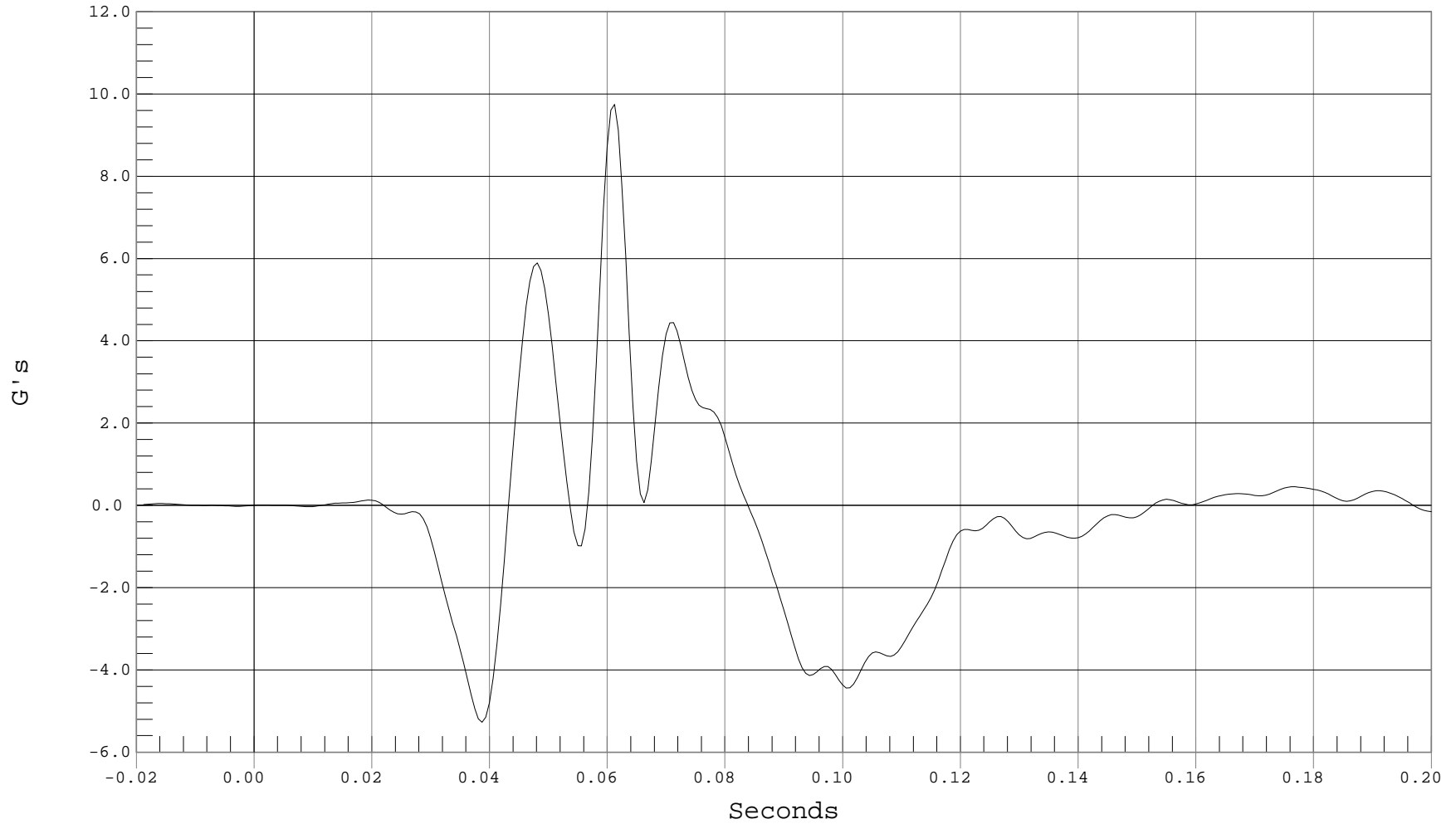
DRIVER PELVIS Z ACCELERATION

Test Desc.: RIGID POLE SIDE IMPACT
Component: 2001 SATURN L200 4 DOOR

Test Date: 05-08-02
Speed: 20.0 MPH, 32.2 KPH
Fir Filtered

— 1 DRIVER PELVIS Z, B02037FI.R14

Ymin = -5.28 G's @ 0.0387 Seconds, Ymax = 9.75 G's @ 0.0612 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: 3/4/02
Dummy Serial Number: 010
Test Number: D02611

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.7
Relative Humidity (%)	10 – 70	16
Peak Resultant Acceleration	100 – 150 g's	136
Time of Max. Res. Acceleration	msec	24.5

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

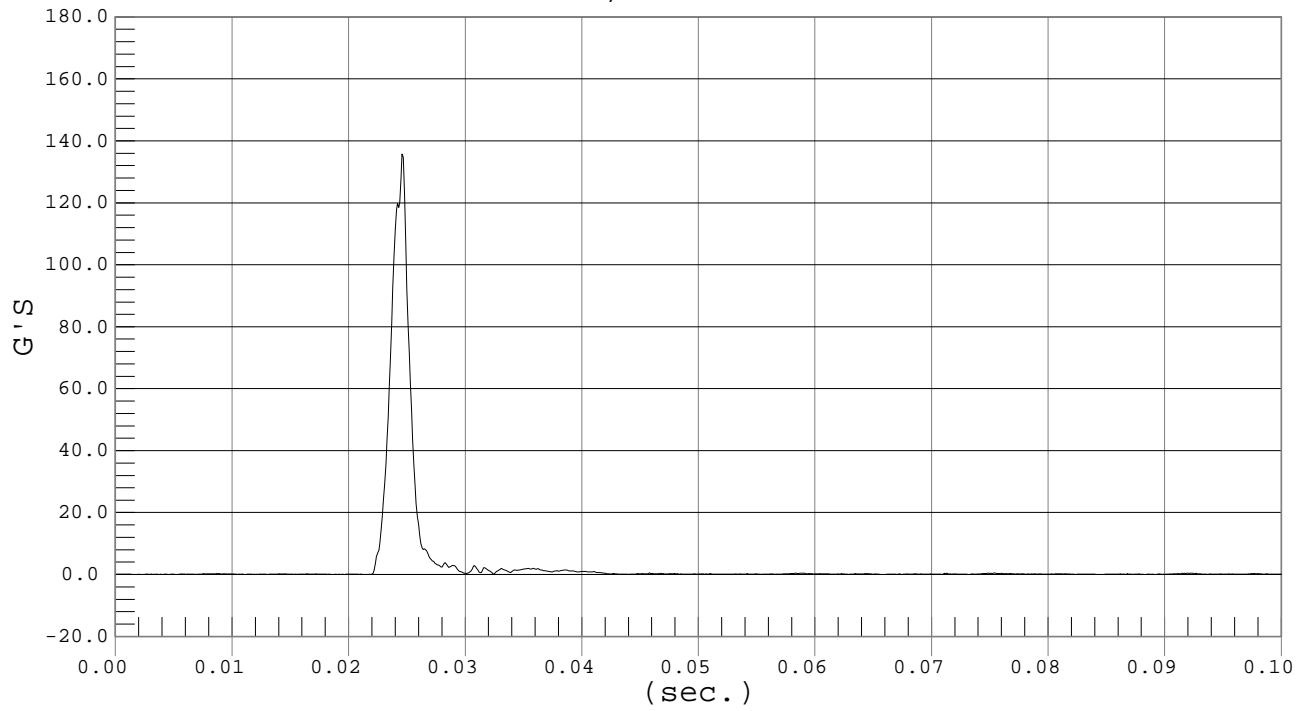


Test Desc.: Head Drop
Component: Dummy #010

Test Date: 03-04-02
Speed: 0.0 fps, 0.00 M/s

PEAK RESULTANT ACCELERATION

Ymin = .04 G'S @ 0.0013 sec., Ymax = 135.74 G'S @ 0.0245 sec.



MGA RESEARCH CORPORATION
 NECK PENDULUM TEST
 EUROSID 2 DUMMY

Date: 3/1/02
 Dummy Serial Number: 010
 Test Number: D01612

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.4
Relative Humidity (%)		10 – 70	19
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.35
	8 msec	~1.59 - ~2.04 m/sec	-1.70
	14 msec	~3.20 - ~3.85 m/sec	-3.32
Maximum Flexion Angle		49.0 – 59.0 deg	53.3
Time of Max. Flexion Angle		54.0 – 66.0 ms	57.2
Maximum Angle Theta (A)		32.0 – 37.0 deg	33.3
Time of Max. Theta (A)		53.0 – 63.0 ms	57.0
Maximum Angle Theta (B)		28.72 – 31.22 deg	29.75
Time of Max. Theta (B)		54.0 – 64.0 ms	56.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

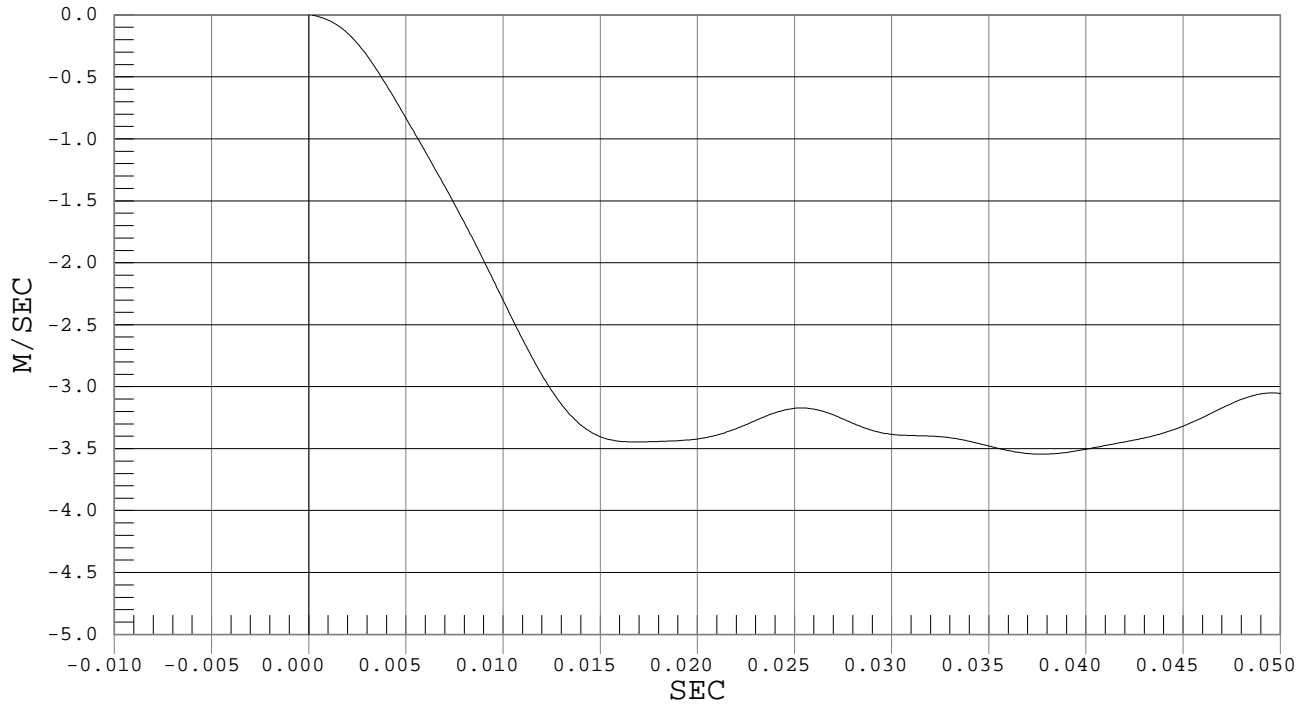


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 03-01-02
Speed: 11.0 fps, 3.36 M/s

Ymin = -4.45 M/SEC @ 0.1899 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

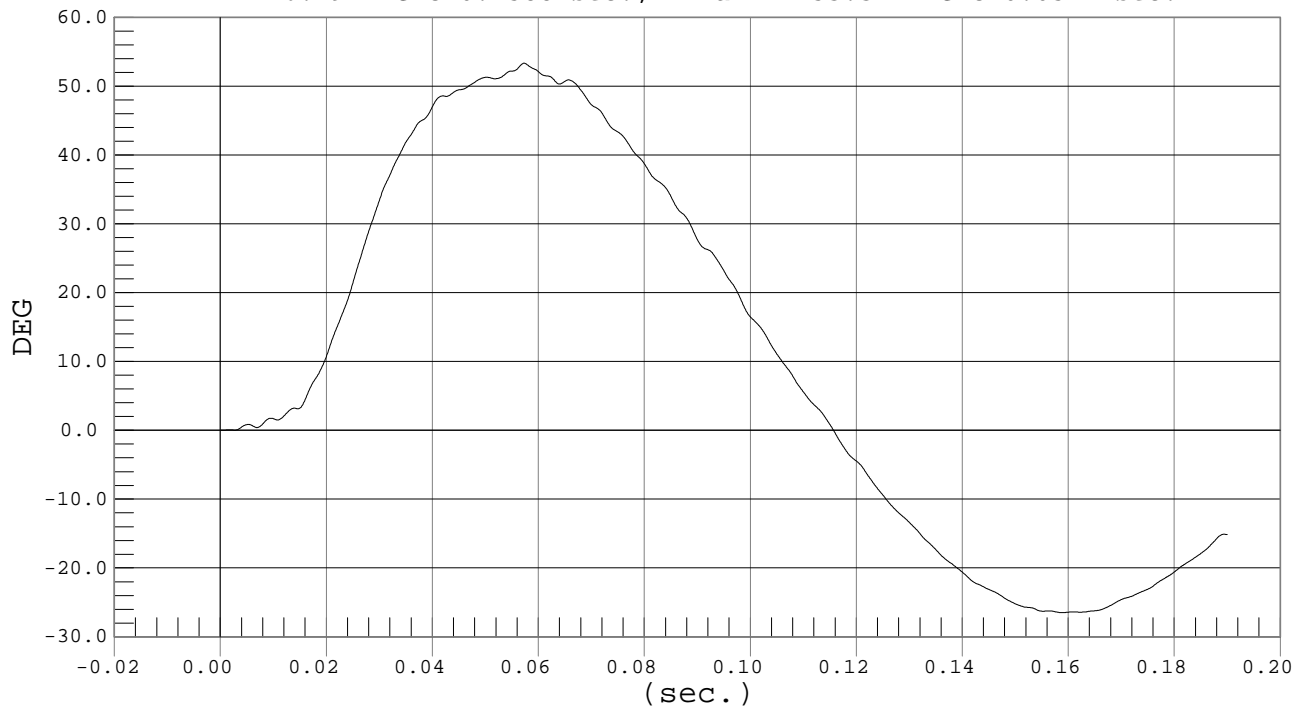


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 03-01-02
Speed: 11.0 fps, 3.36 M/s

Ymin = -26.49 DEG @ 0.1588 sec., Ymax = 53.32 DEG @ 0.0572 sec.



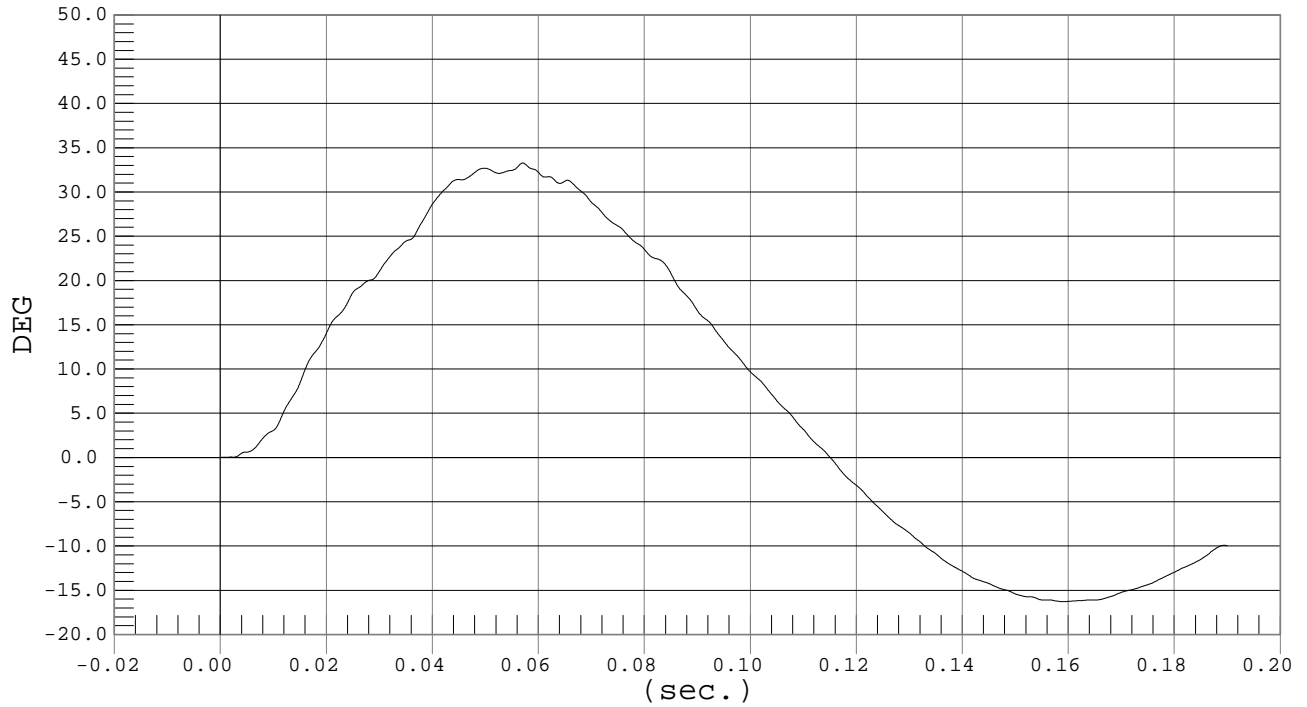


Test Desc.: Neck Bending
Component: Dummy #010

THETA A

Test Date: 03-01-02
Speed: 11.0 fps, 3.36 M/s

Ymin = -16.29 DEG @ 0.1589 sec., Ymax = 33.28 DEG @ 0.0570 sec.

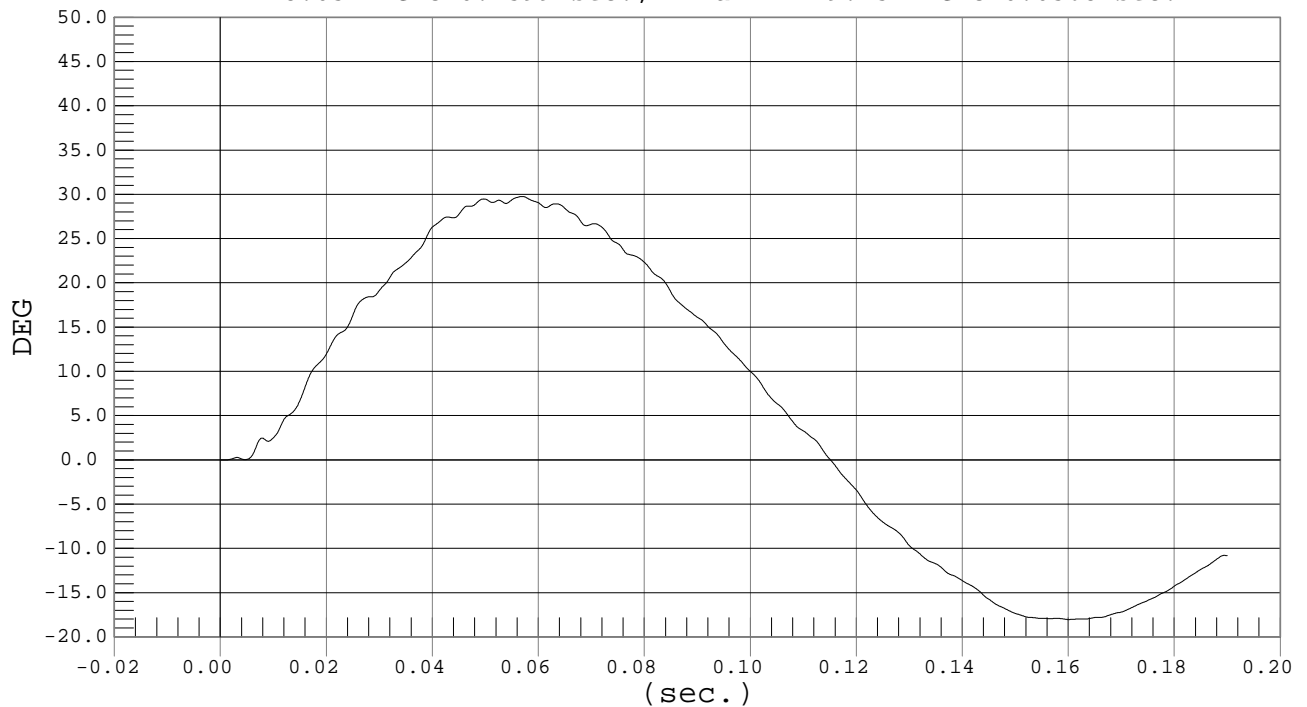


Test Desc.: Neck Bending
Component: Dummy #010

THETA B

Test Date: 03-01-02
Speed: 11.0 fps, 3.36 M/s

Ymin = -18.05 DEG @ 0.1599 sec., Ymax = 29.75 DEG @ 0.0568 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 2/28/02

Dummy Serial Number: 010

Test Number: D02613

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.8
Relative Humidity (%)	10 – 70	19
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	9.8
Time of Max. Pendulum Acceleration	msec	26.9

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

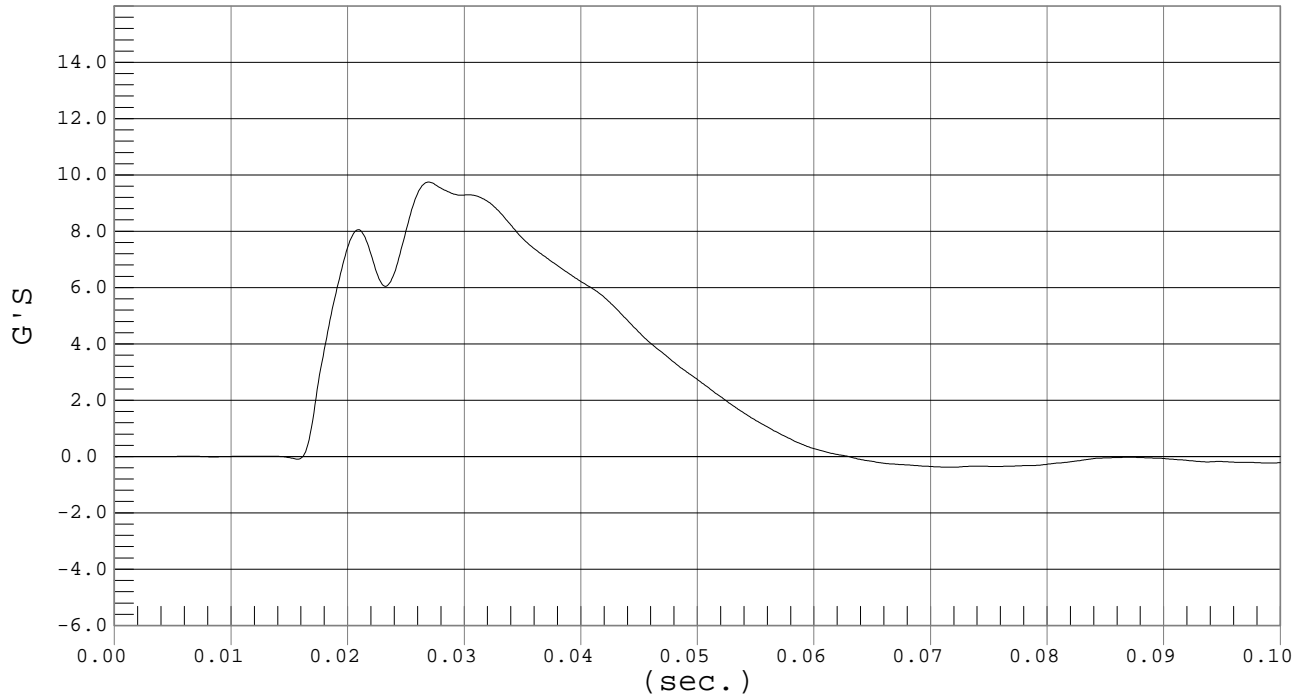


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #010

Test Date: 02-28-02
Speed: 14.1 fps, 4.29 M/s

Ymin = -.45 G'S @ 0.1151 sec., Ymax = 9.75 G'S @ 0.0269 sec.



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

Date: 5/2/02
 Dummy Serial Number: 010
 Test Number: D02614/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	20.6
Relative Humidity (%)	10 – 70	33
Displacement at 2 m/s	23.5 – 27.5 mm	23.6
Displacement at 3 m/s	36.0 – 40.0 mm	36.8
Displacement at 4 m/s	46.0 – 51.0 mm	47.1

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	20.6
Relative Humidity (%)	10 – 70	33
Displacement at 2 m/s	23.5 – 27.5 mm	23.8
Displacement at 3 m/s	36.0 – 40.0 mm	36.4
Displacement at 4 m/s	46.0 – 51.0 mm	49.9

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	20.6
Relative Humidity (%)	10 – 70	33
Displacement at 2 m/s	23.5 – 27.5 mm	23.6
Displacement at 3 m/s	36.0 – 40.0 mm	36.7
Displacement at 4 m/s	46.0 – 51.0 mm	47.2

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

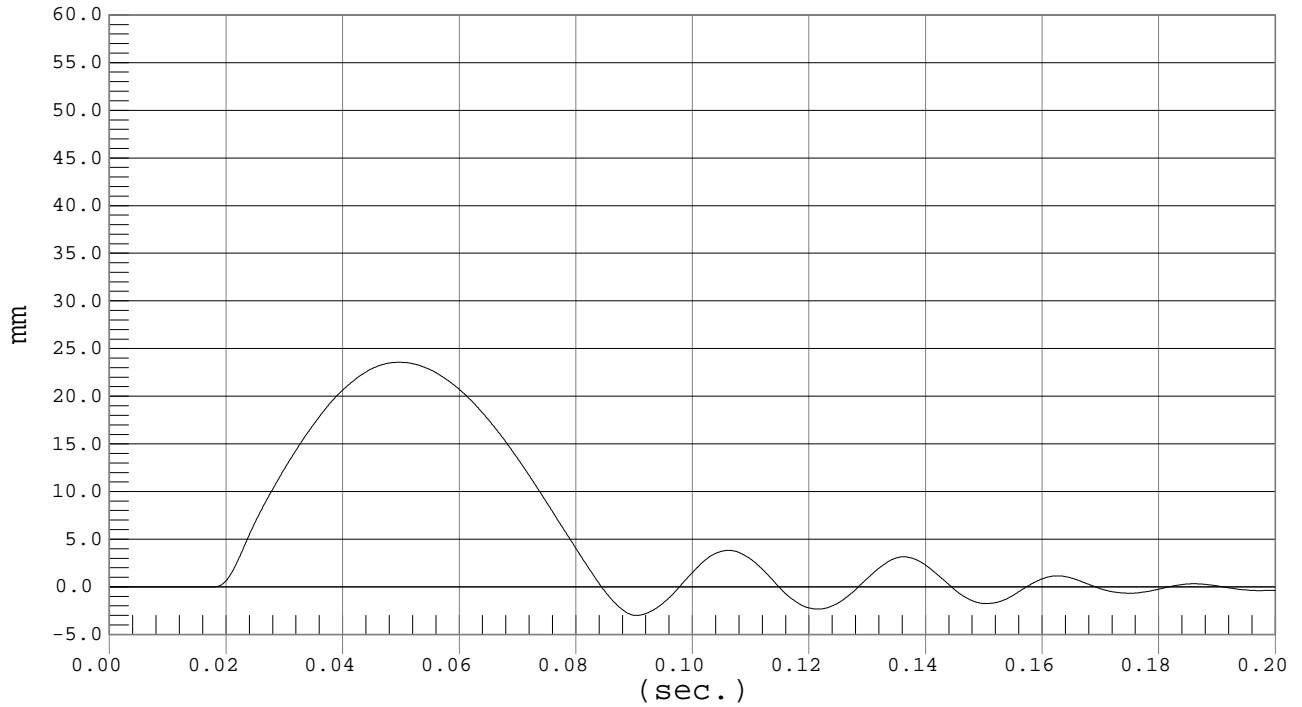


UPPER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.99 mm @ 0.0903 sec., Ymax = 23.56 mm @ 0.0496 sec.

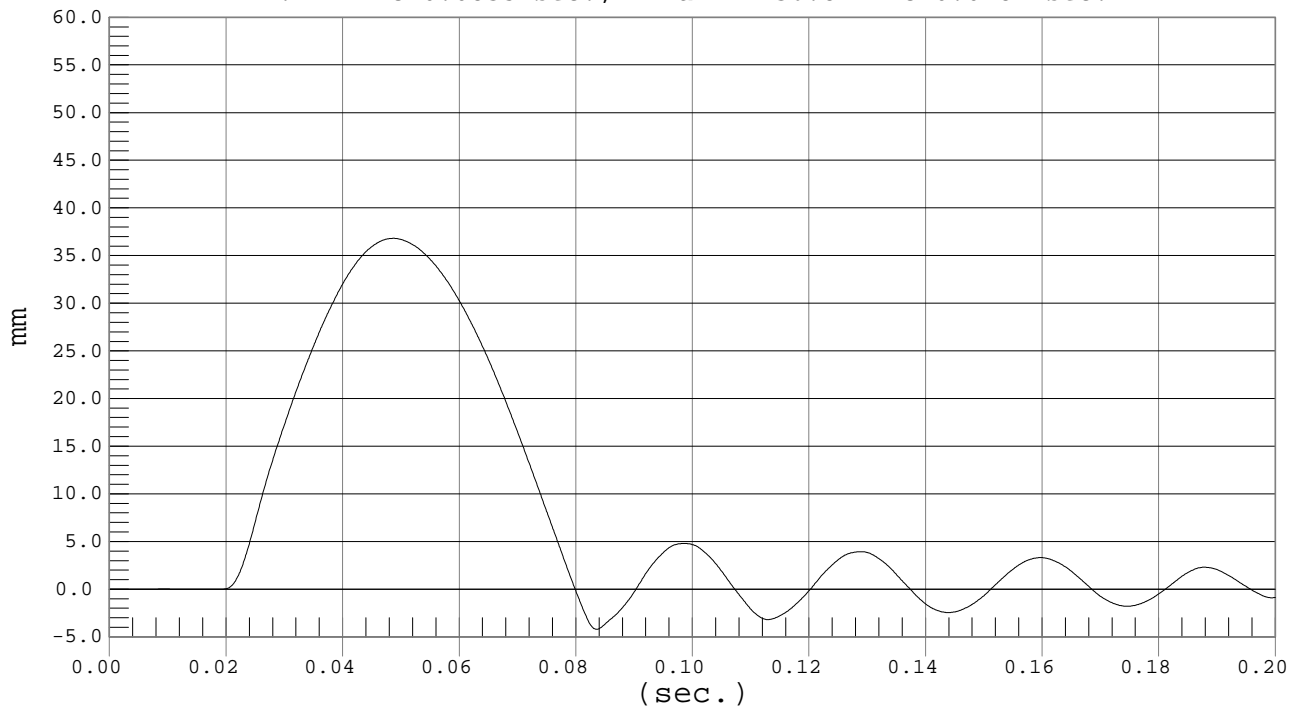


UPPER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.21 mm @ 0.0835 sec., Ymax = 36.8 mm @ 0.0487 sec.



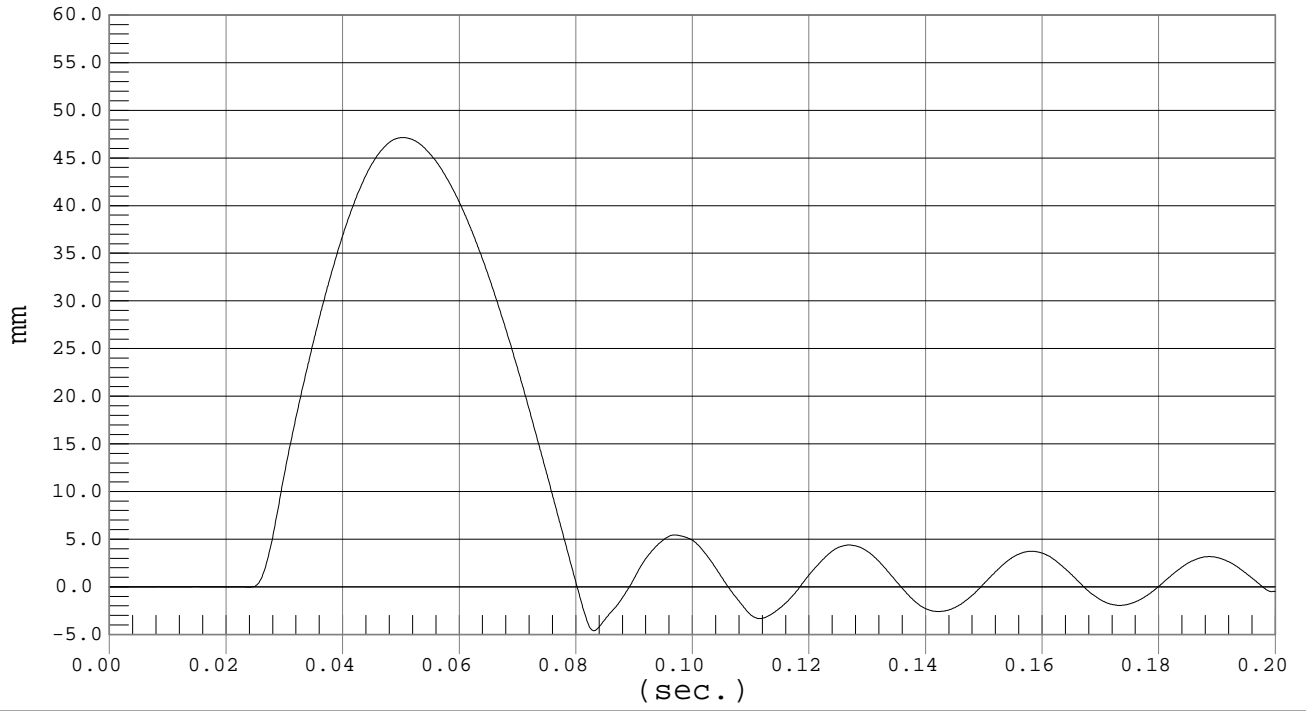


UPPER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.61 mm @ 0.0830 sec., Ymax = 47.13 mm @ 0.0502 sec.



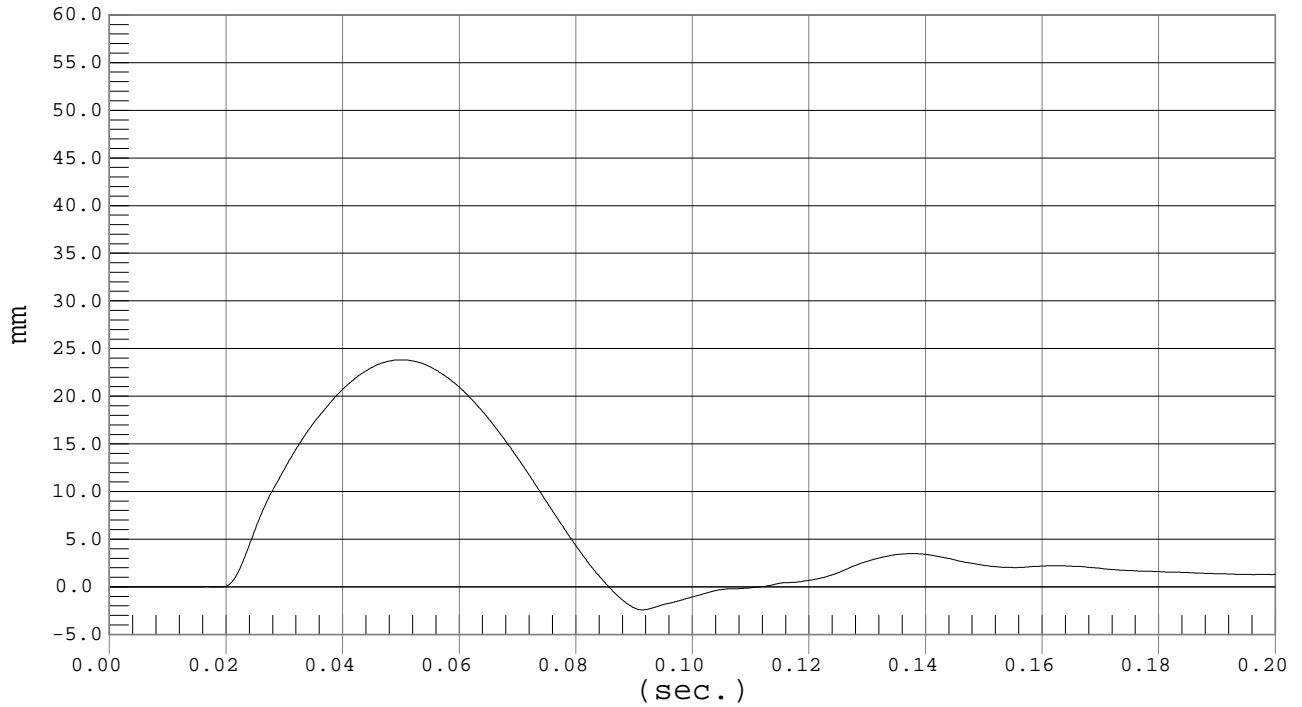


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.42 mm @ 0.0913 sec., Ymax = 23.82 mm @ 0.0500 sec.

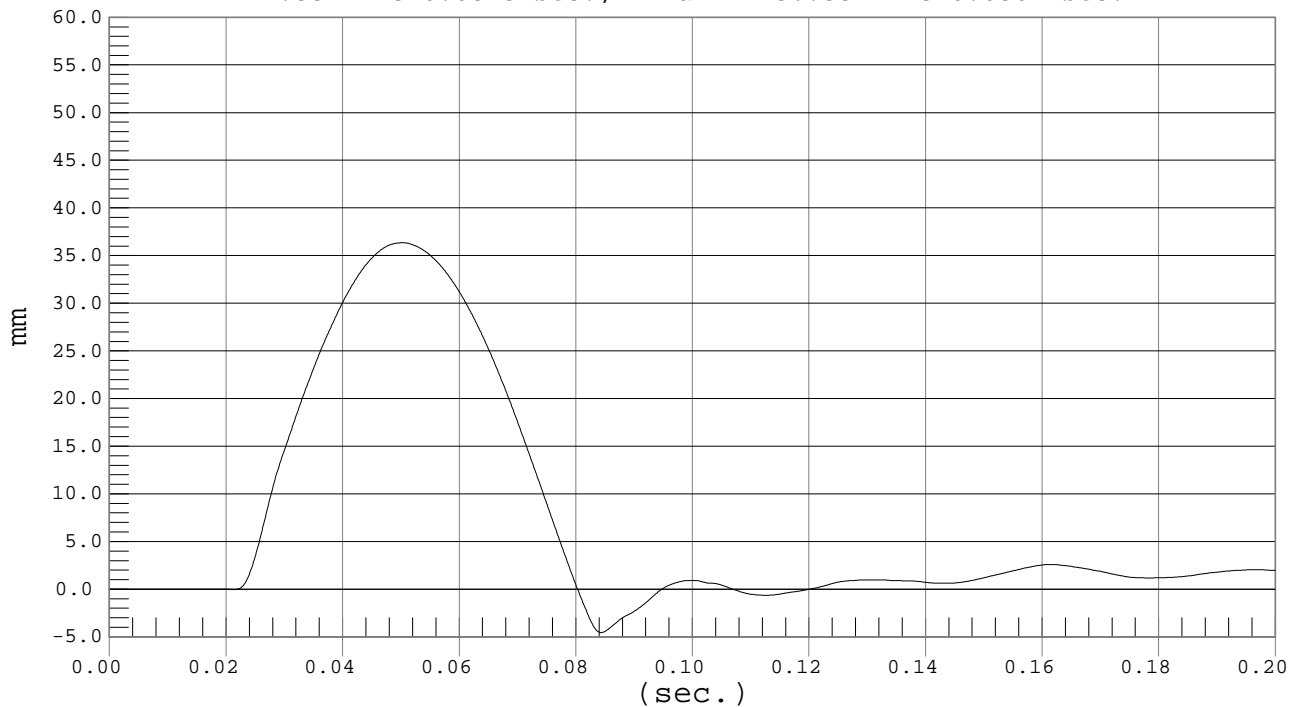


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.55 mm @ 0.0843 sec., Ymax = 36.35 mm @ 0.0502 sec.



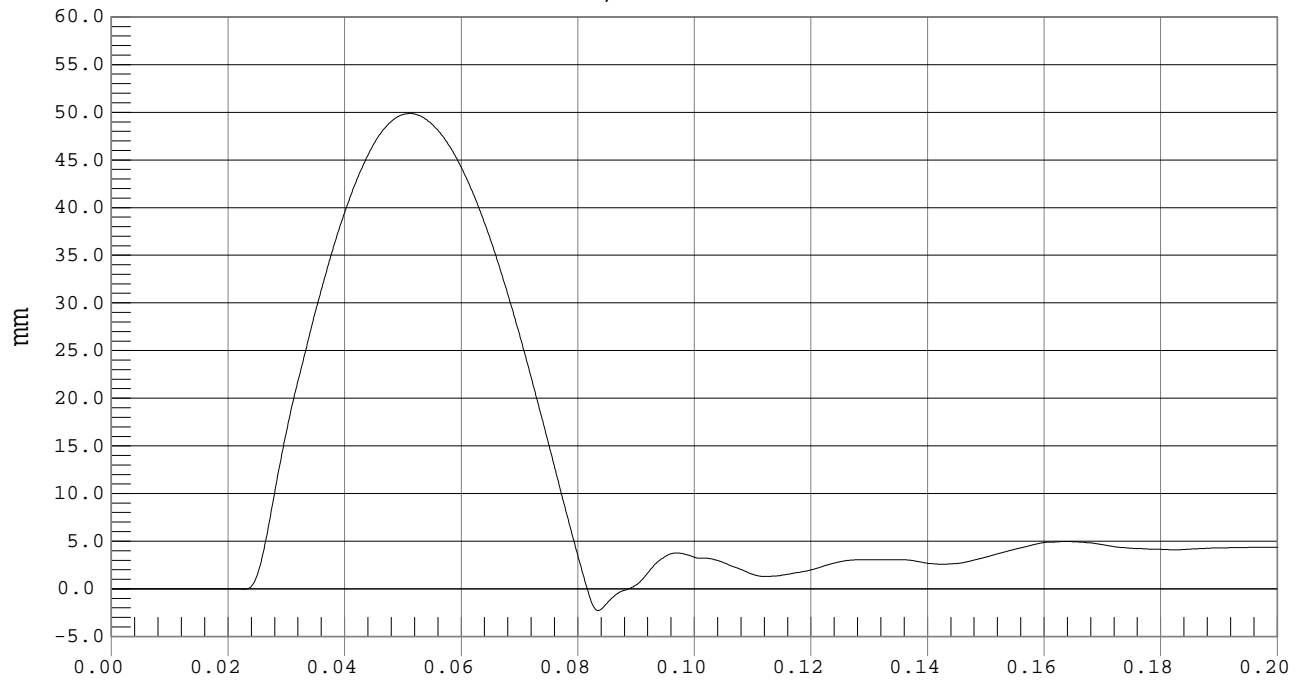


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -2.27 mm @ 0.0834 sec., Ymax = 49.88 mm @ 0.0512 sec.



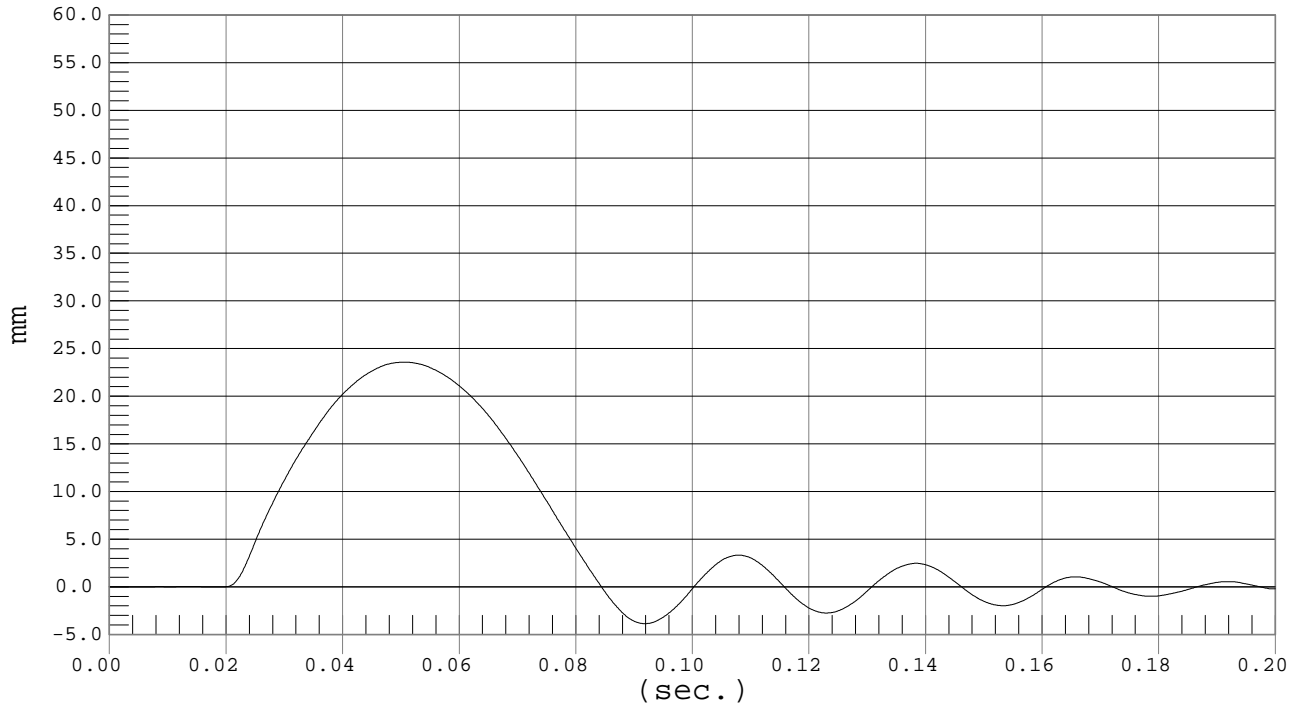


LOWER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.86 mm @ 0.0918 sec., Ymax = 23.58 mm @ 0.0505 sec.

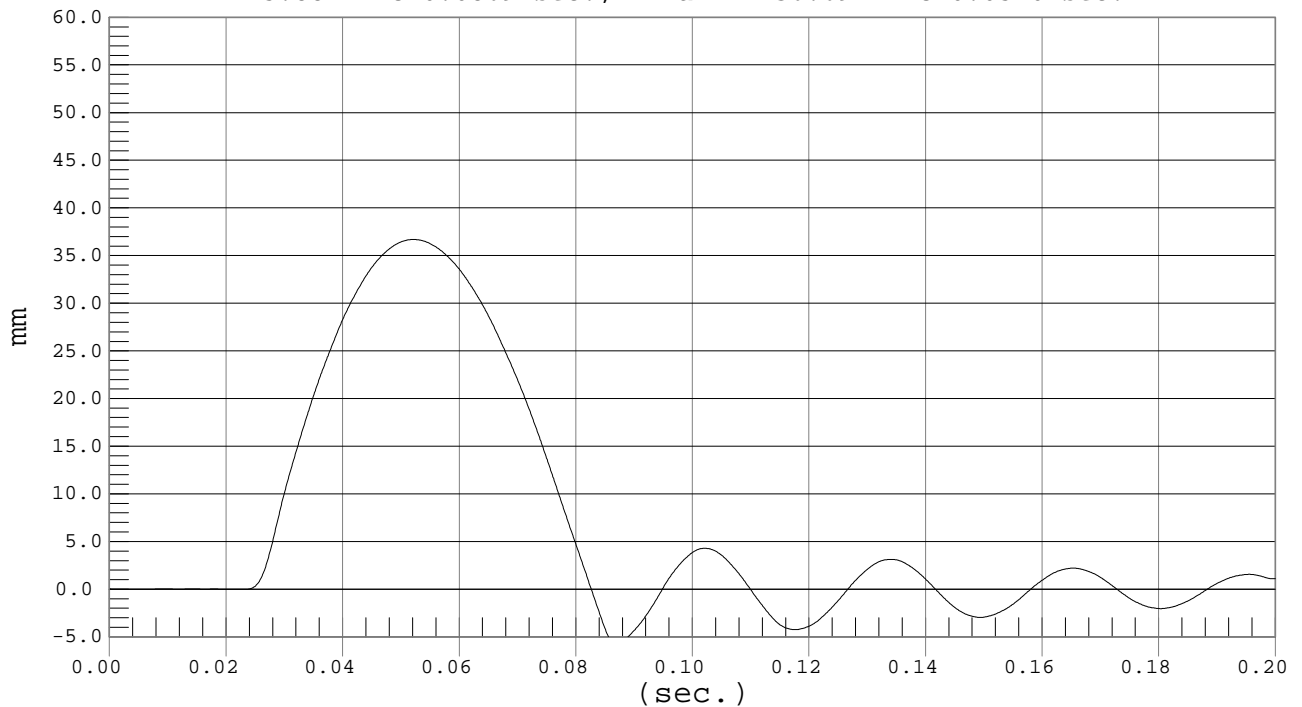


LOWER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -5.88 mm @ 0.0869 sec., Ymax = 36.69 mm @ 0.0520 sec.



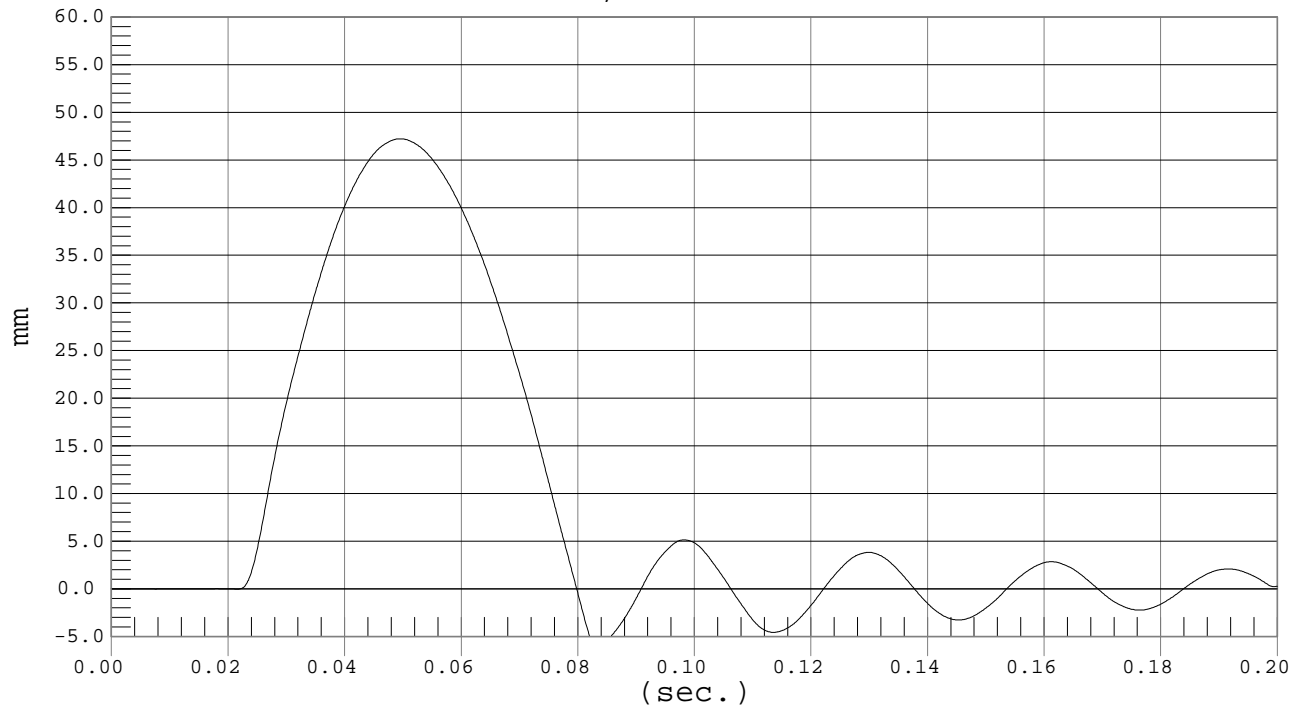


LOWER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #010

Test Date: 05-02-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.39 mm @ 0.0834 sec., Ymax = 47.22 mm @ 0.0495 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 2/28/02

Dummy Serial Number: 010

Test Number: D02617

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.7
Relative Humidity (%)	10 – 70	19
Probe Speed (m/s)	3.90 – 4.10	3.99
Maximum Impact Force	4.00 – 4.80 kN	4.69
Time of Maximum Force	10.60 – 13.00 ms	11.70
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.25
Time of Max. Total Force	10.00 – 12.30 ms	12.00

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

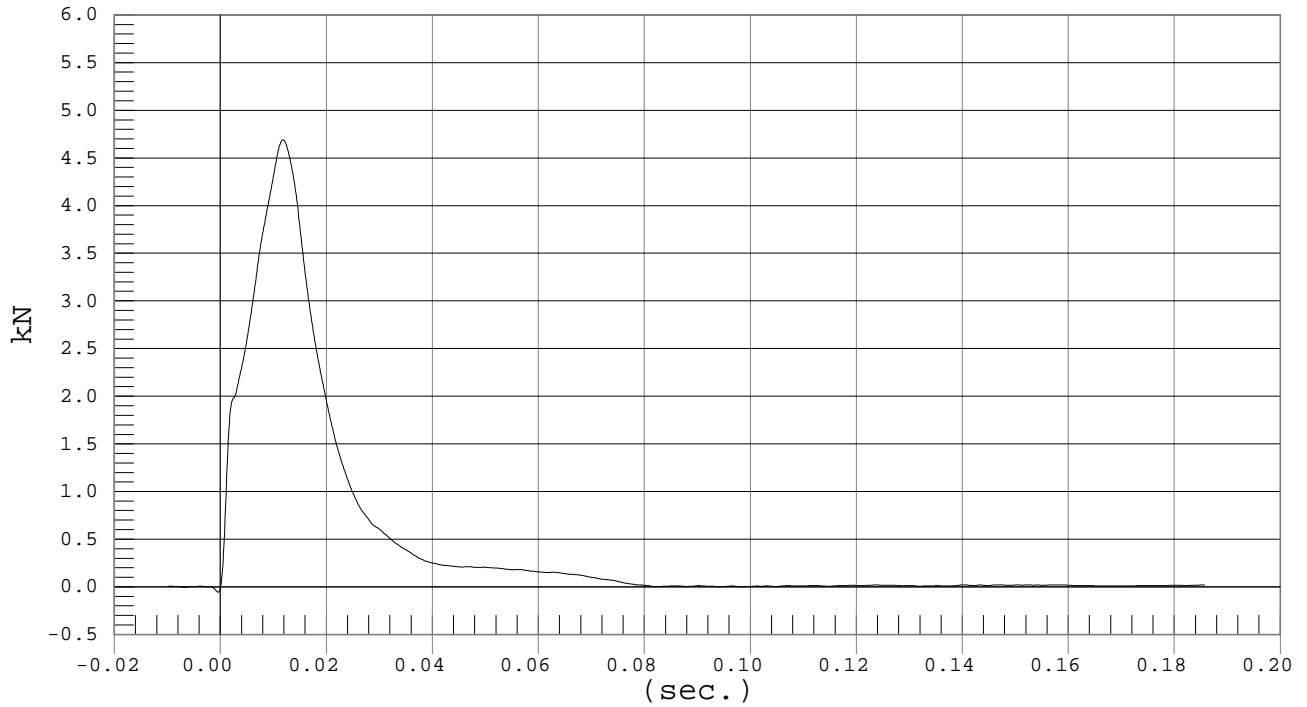


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 02-28-02
Speed: 13.1 fps, 3.99 M/s

Ymin = -.06 kN @ -0.0005 sec., Ymax = 4.69 kN @ 0.0117 sec.

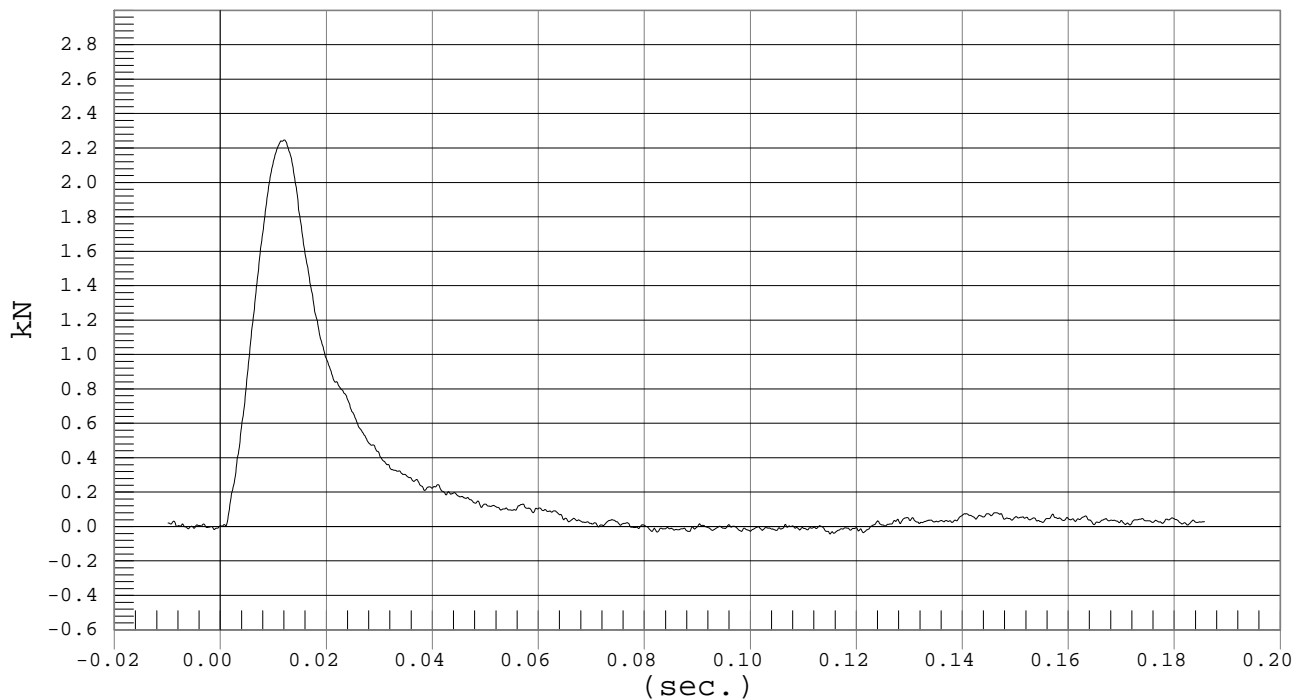


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 02-28-02
Speed: 13.1 fps, 3.99 M/s

Ymin = -.04 kN @ 0.1150 sec., Ymax = 2.25 kN @ 0.0120 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 3/1/02
 Dummy Serial Number: 010
 Test Number: D02618

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.2
Relative Humidity (%)		10 – 70	19
Pendulum Speed		5.95 – 6.15	6.13
Pendulum Deceleration	10 msec	$\bar{2}.46 - \bar{1}.59$ m/sec	-2.08
	20 msec	$\bar{5}.25 - \bar{4}.07$ m/sec	-4.78
	25 msec	$\bar{6}.64 - \bar{5}.30$ m/sec	-5.89
	30 msec	≥ -6.5 m/sec	-6.21
Maximum Flexion Angle		45.0 – 55.0 deg	49.8
Time of Max. Flexion Angle		39.0 – 53.0 ms	43.6
Maximum Angle Theta (A)		31.0 – 35.0 deg	32.6
Time of Max. Theta (A)		44.0 – 52.0 ms	47.9
Maximum Angle Theta (B)		28.08– 30.58 deg	29.41
Time of Max. Theta (B)		44.0 – 52.0 ms	48.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

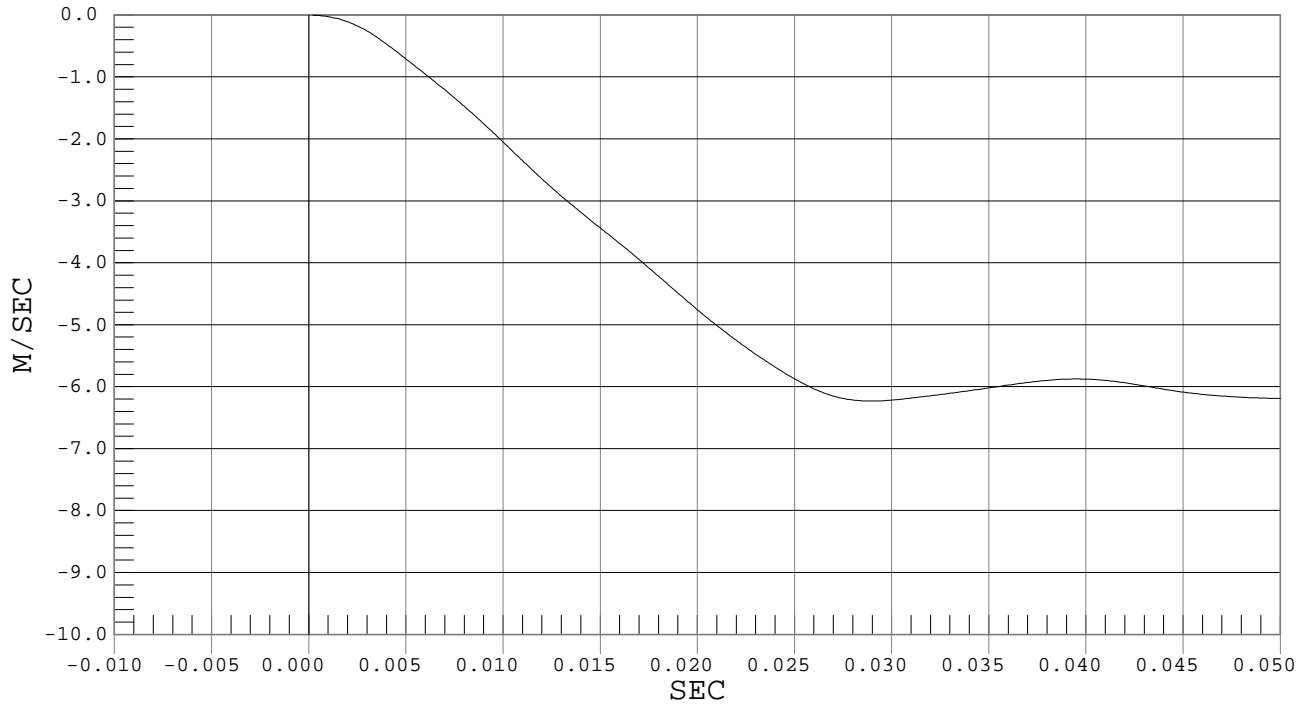


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 03-01-02
Speed: 20.1 fps, 6.13 M/s

Ymin = -7.57 M/SEC @ 0.1394 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

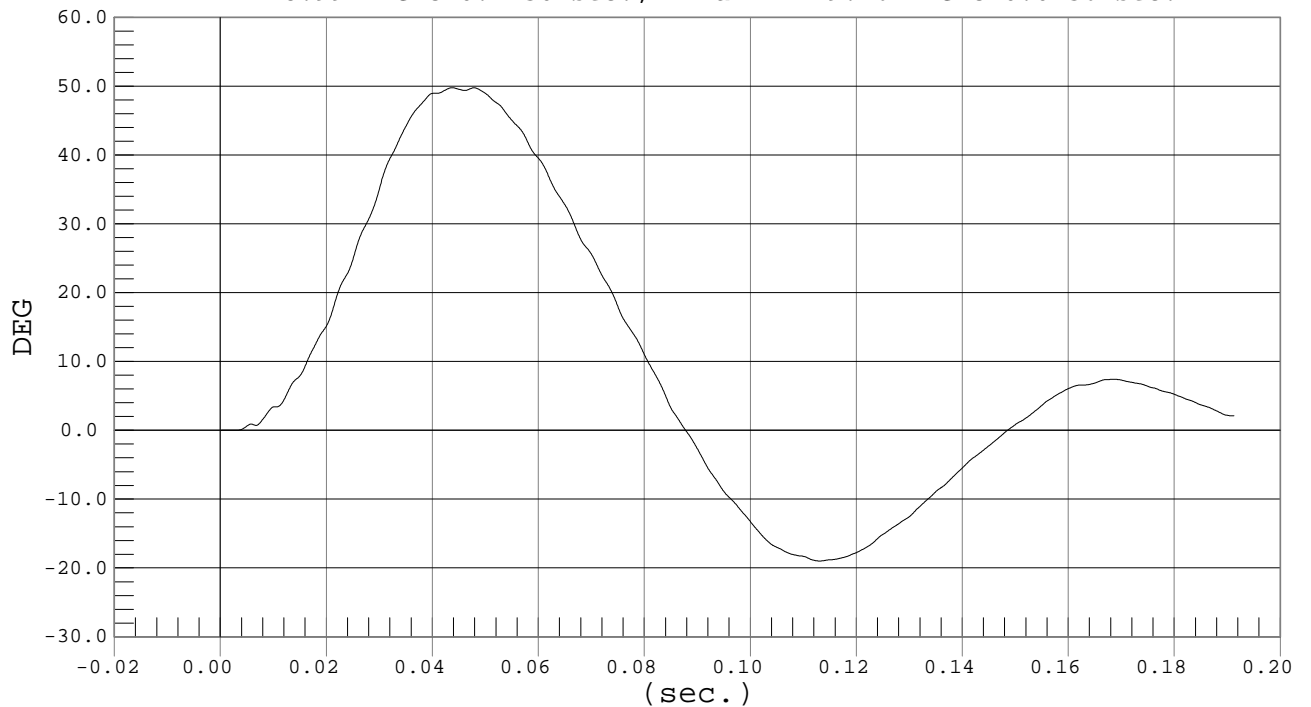


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 03-01-02
Speed: 20.1 fps, 6.13 M/s

Ymin = -18.99 DEG @ 0.1130 sec., Ymax = 49.76 DEG @ 0.0436 sec.



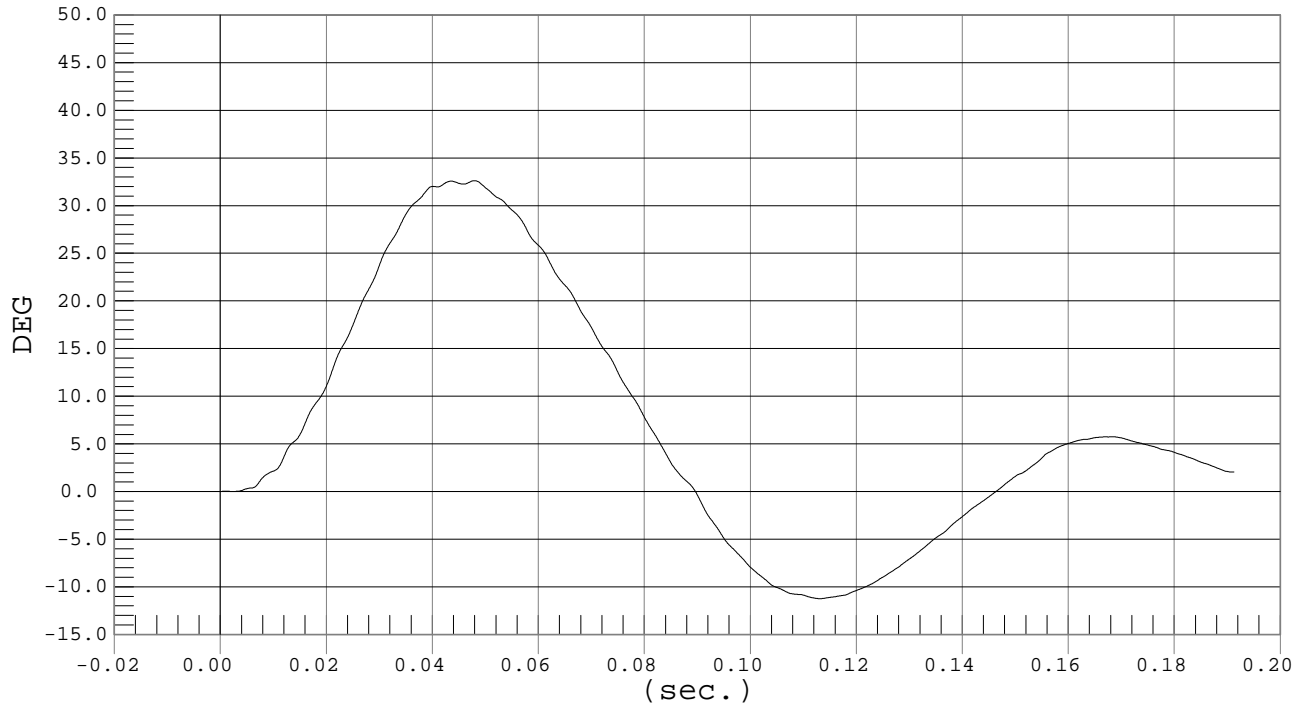


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA A

Test Date: 03-01-02
Speed: 20.1 fps, 6.13 M/s

Ymin = -11.25 DEG @ 0.1131 sec., Ymax = 32.62 DEG @ 0.0479 sec.

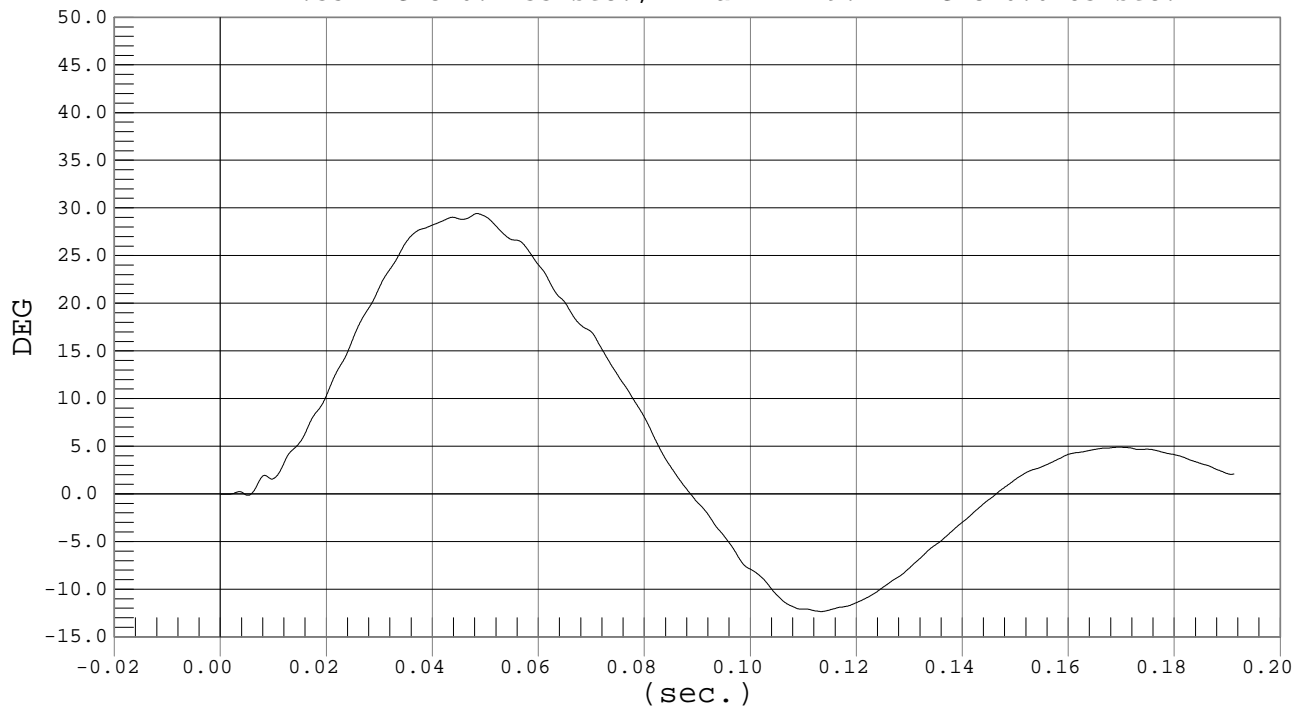


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA B

Test Date: 03-01-02
Speed: 20.1 fps, 6.13 M/s

Ymin = -12.35 DEG @ 0.1133 sec., Ymax = 29.41 DEG @ 0.0483 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 2/28/02

Dummy Serial Number: 010

Test Number: D02619

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.7
Relative Humidity (%)	10 – 70	20
Pendulum Speed	6.20 – 6.30 m/s	6.21
Maximum Impactor Force	9.80 – 12.20 kN	11.03
Time of Max. Impactor Force	9.50 – 12.50 ms	11.40
Maximum Pubic Force	2.65 – 3.35 kN	3.27
Time of Max. Pubic Force	10.00 – 13.00 ms	11.30

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

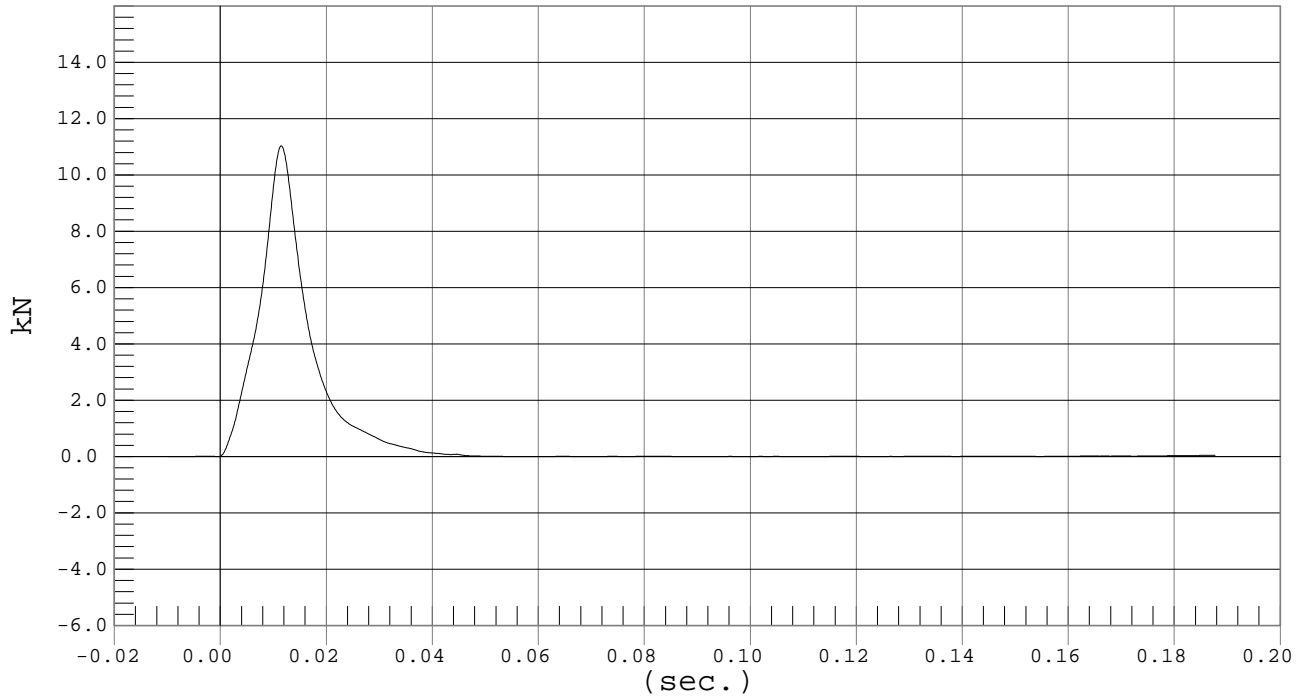


Test Desc.: Pelvis Impact
Component: Dummy #010

IMPACTOR FORCE

Test Date: 02-28-02
Speed: 20.4 fps, 6.21 M/s

Ymin = 0 kN @ -0.0006 sec., Ymax = 11.03 kN @ 0.0114 sec.

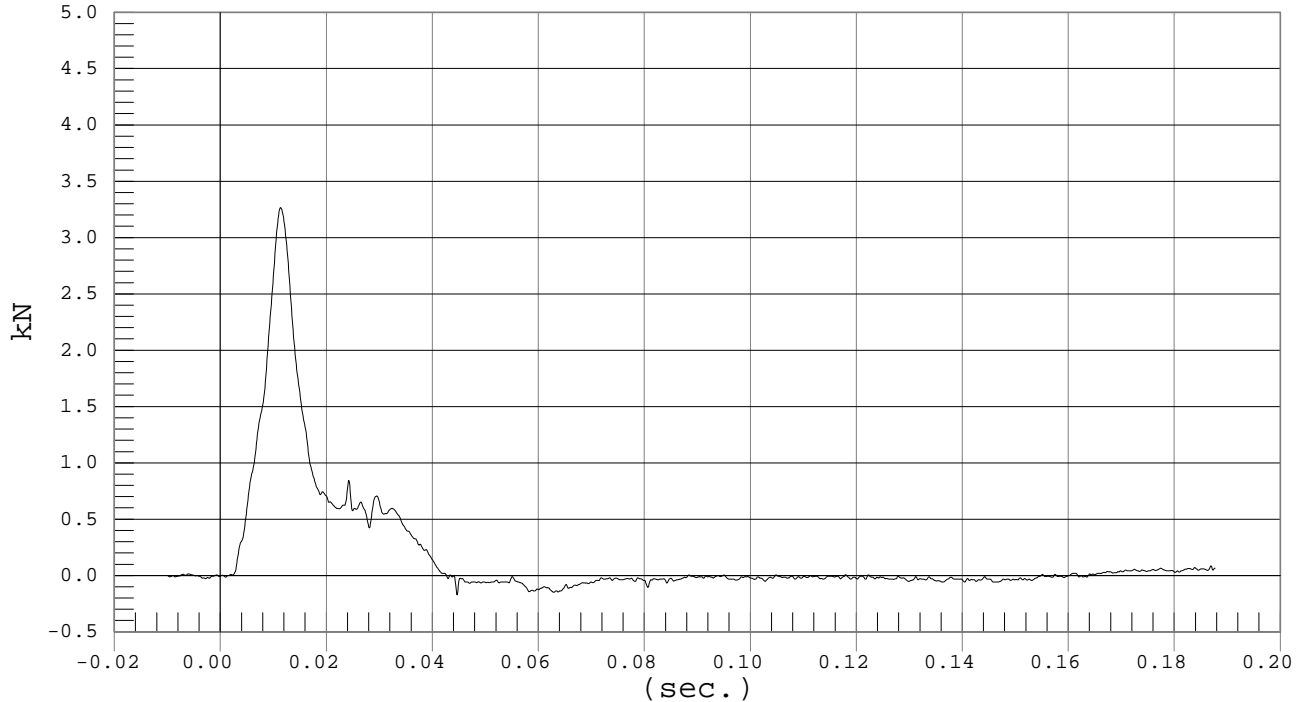


Test Desc.: Pelvis Impact
Component: Dummy #010

PUBIC FORCE

Test Date: 02-28-02
Speed: 20.4 fps, 6.21 M/s

Ymin = -.17 kN @ 0.0446 sec., Ymax = 3.27 kN @ 0.0113 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: 5/15/02

Dummy Serial Number: 010

Test Number: D02641

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.8
Relative Humidity (%)	10 – 70	41
Peak Resultant Acceleration	100 – 150 g's	149
Time of Max. Res. Acceleration	msec	21.7

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

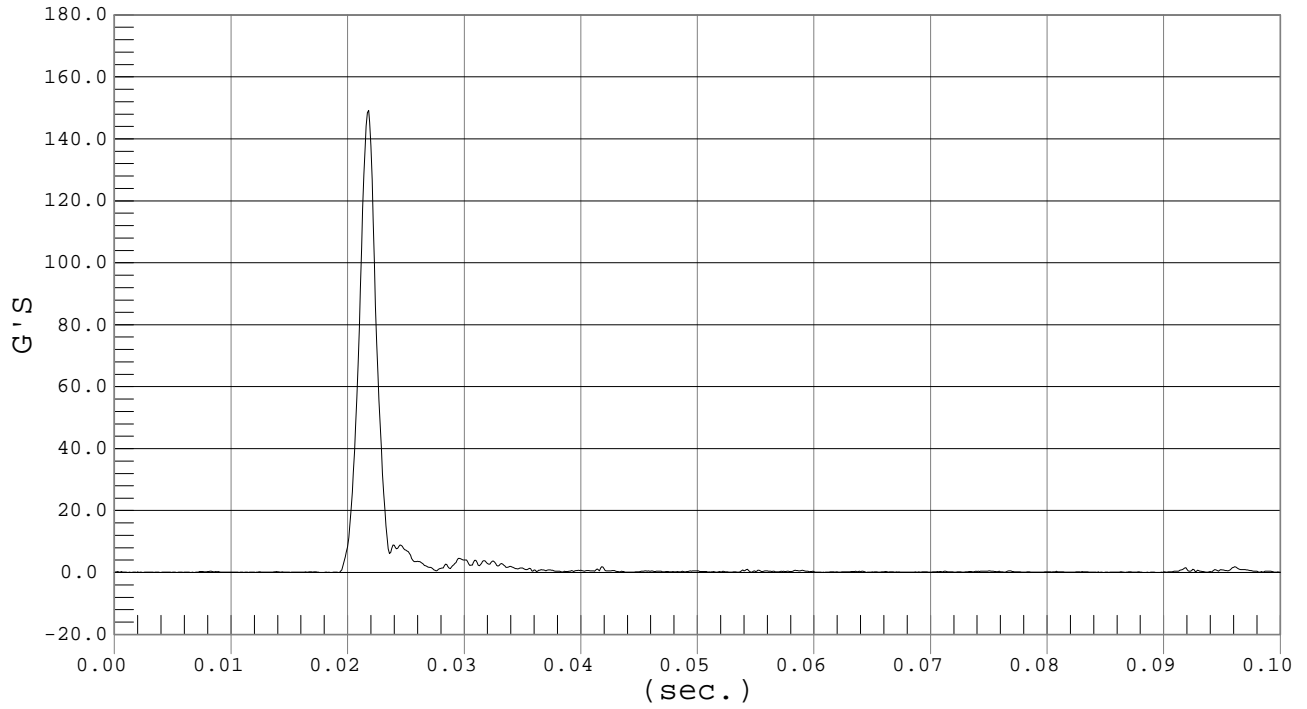


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #010

Test Date: 05-15-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .06 G'S @ 0.0010 sec., Ymax = 149.24 G'S @ 0.0217 sec.



MGA RESEARCH CORPORATION
 NECK PENDULUM TEST
 EUROSID 2 DUMMY

Date: 5/14/02

Dummy Serial Number: 010

Test Number: D02642

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.9
Relative Humidity (%)		10 – 70	35
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.31
	8 msec	~1.59 - ~2.04 m/sec	-1.67
	14 msec	~3.20 - ~3.85 m/sec	-3.34
Maximum Flexion Angle		49.0 – 59.0 deg	54.7
Time of Max. Flexion Angle		54.0 – 66.0 ms	58.2
Maximum Angle Theta (A)		32.0 – 37.0 deg	33.6
Time of Max. Theta (A)		53.0 – 63.0 ms	58.5
Maximum Angle Theta (B)		28.97 – 31.47 deg	30.15
Time of Max. Theta (B)		54.0 – 64.0 ms	59.1

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

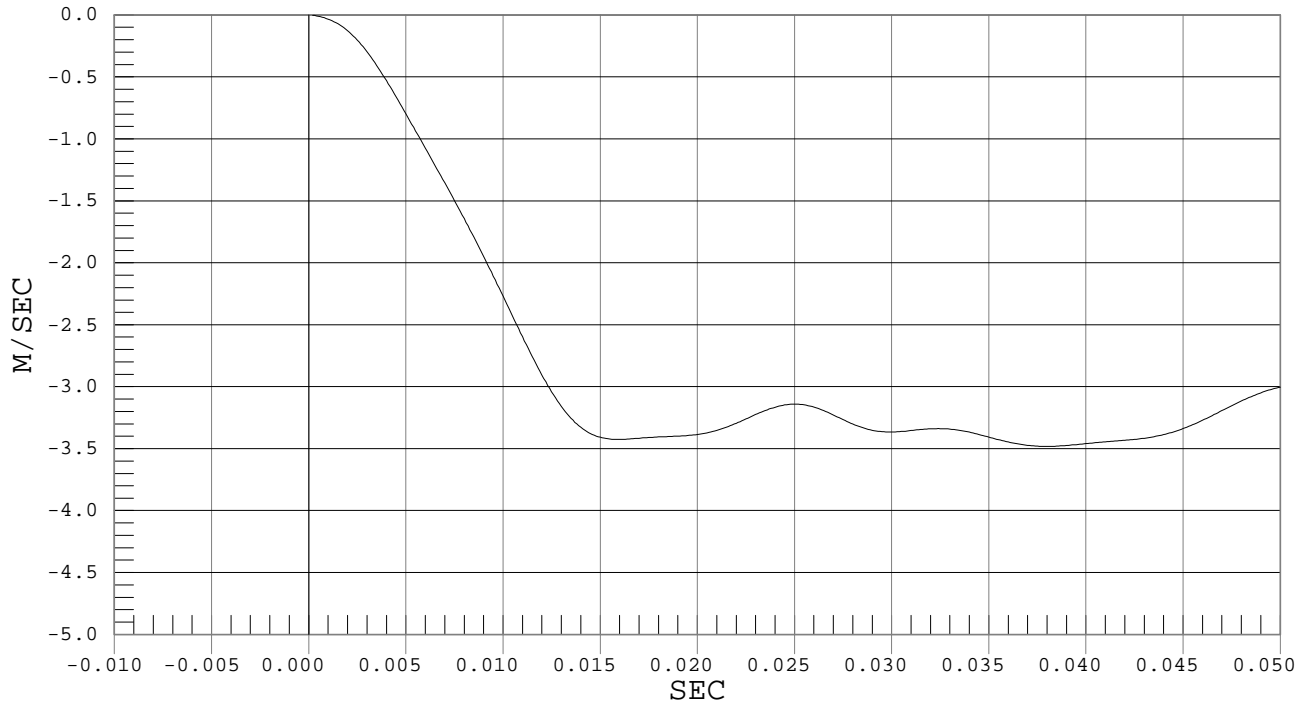


PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 05-14-02
Speed: 11.1 fps, 3.40 M/s

Ymin = -4.23 M/SEC @ 0.1859 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

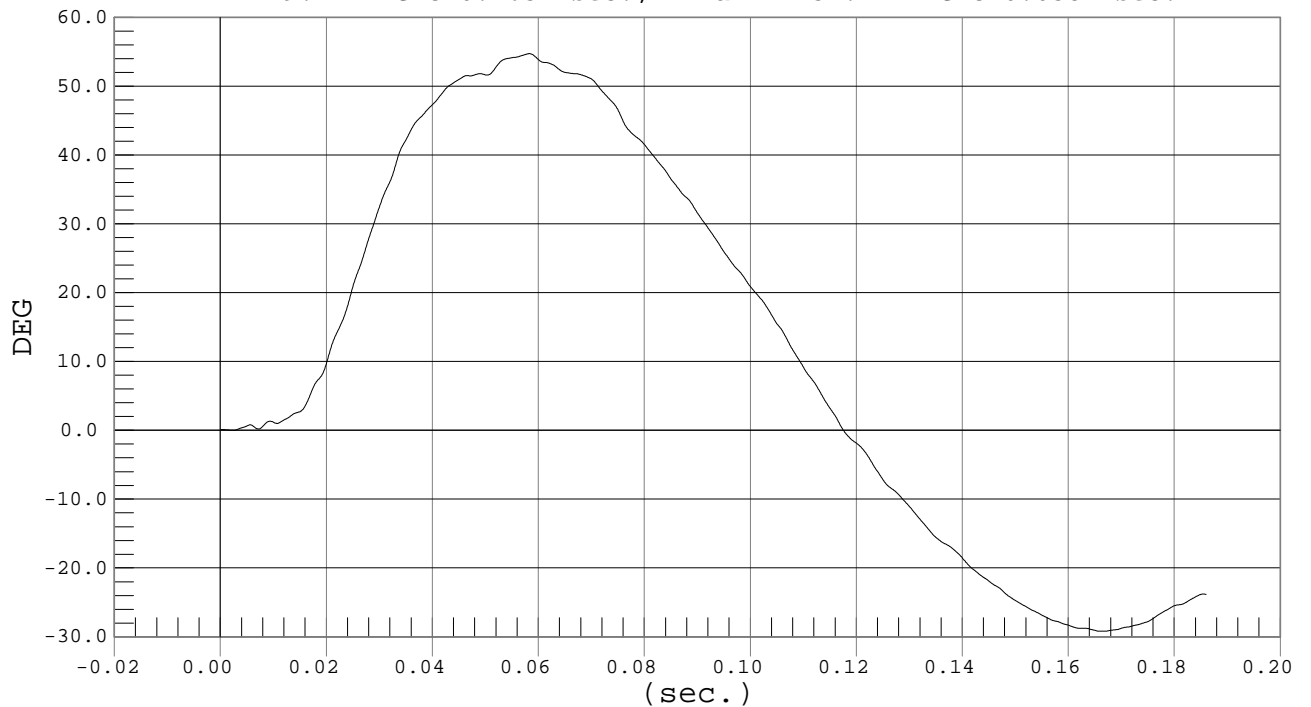


FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #010

Test Date: 05-14-02
Speed: 11.1 fps, 3.40 M/s

Ymin = -29.17 DEG @ 0.1657 sec., Ymax = 54.71 DEG @ 0.0582 sec.



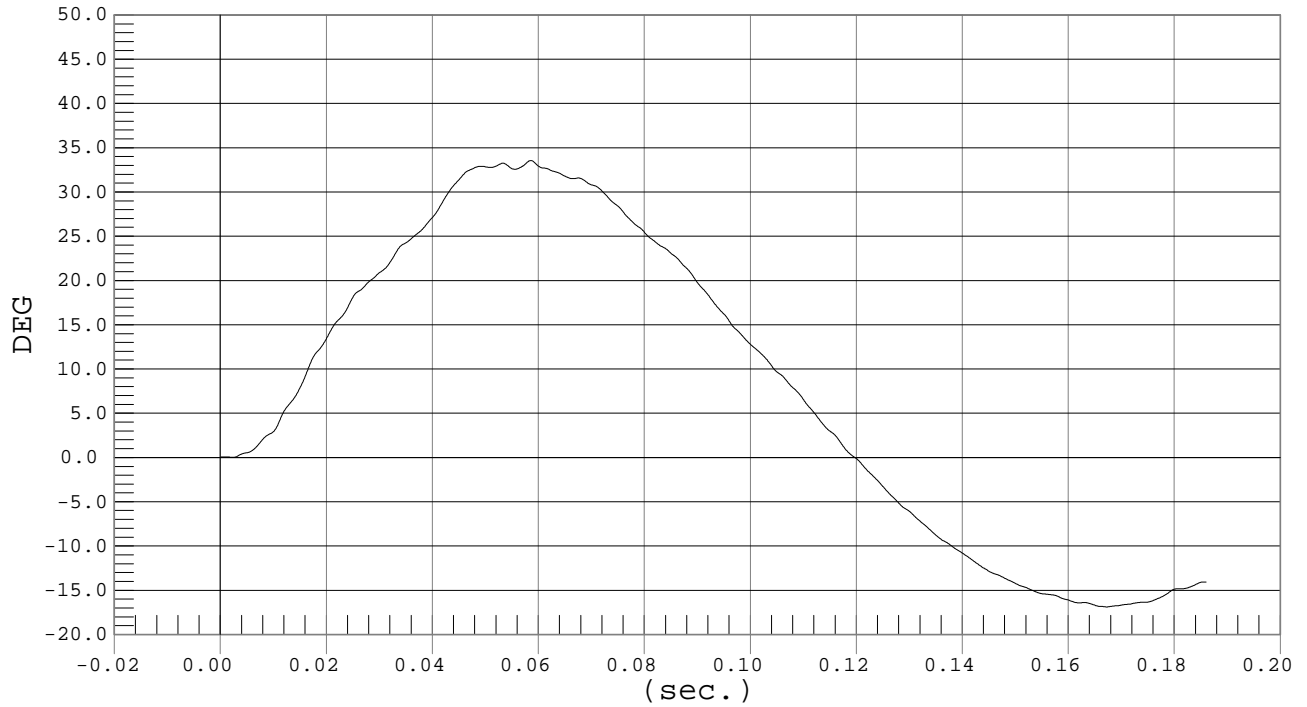


Test Desc.: Neck Bending
Component: Dummy #010

THETA A

Test Date: 05-14-02
Speed: 11.1 fps, 3.40 M/s

Ymin = -16.88 DEG @ 0.1671 sec., Ymax = 33.56 DEG @ 0.0585 sec.

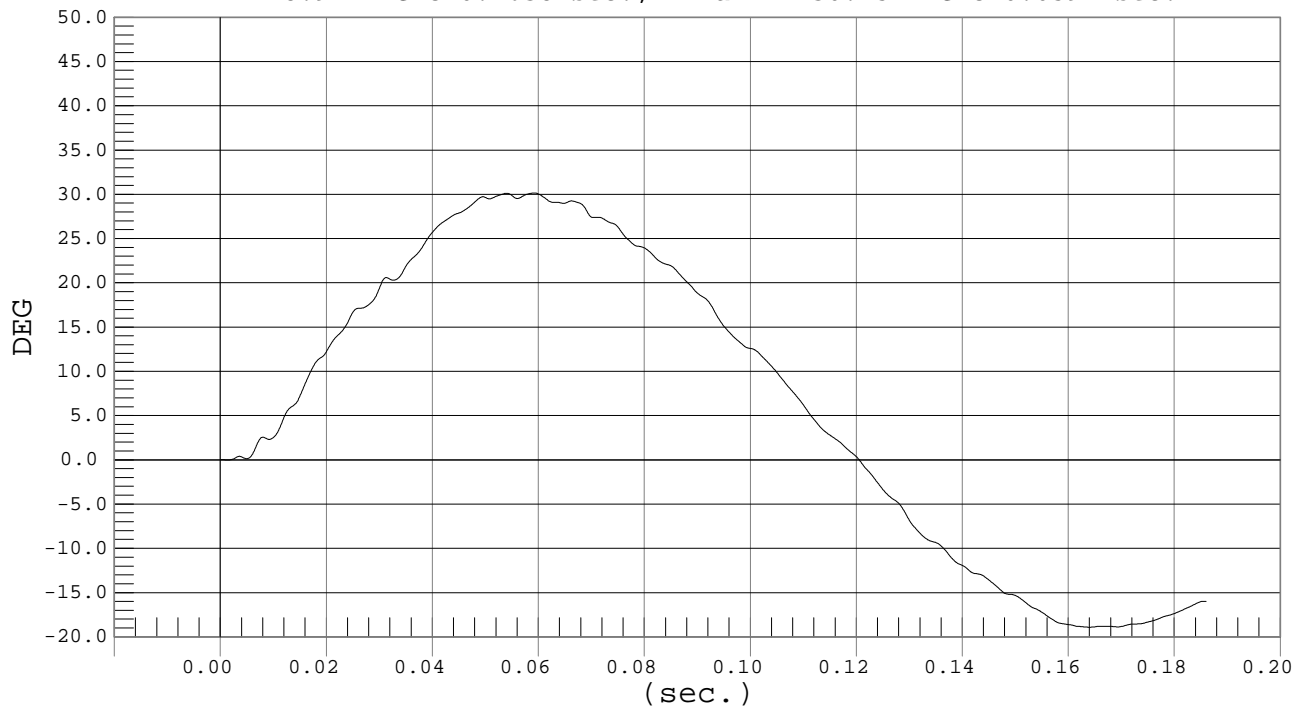


Test Desc.: Neck Bending
Component: Dummy #010

THETA B

Test Date: 05-14-02
Speed: 11.1 fps, 3.40 M/s

Ymin = -18.92 DEG @ 0.1638 sec., Ymax = 30.15 DEG @ 0.0591 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 5/14/02

Dummy Serial Number: 010

Test Number: D02643

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.8
Relative Humidity (%)	10 – 70	35
Pendulum Speed	4.2 – 4.4 m/s	4.2
Max. Resultant Acceleration	7.5 – 10.5 g's	10.1
Time of Max. Pendulum Acceleration	msec	21.7

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

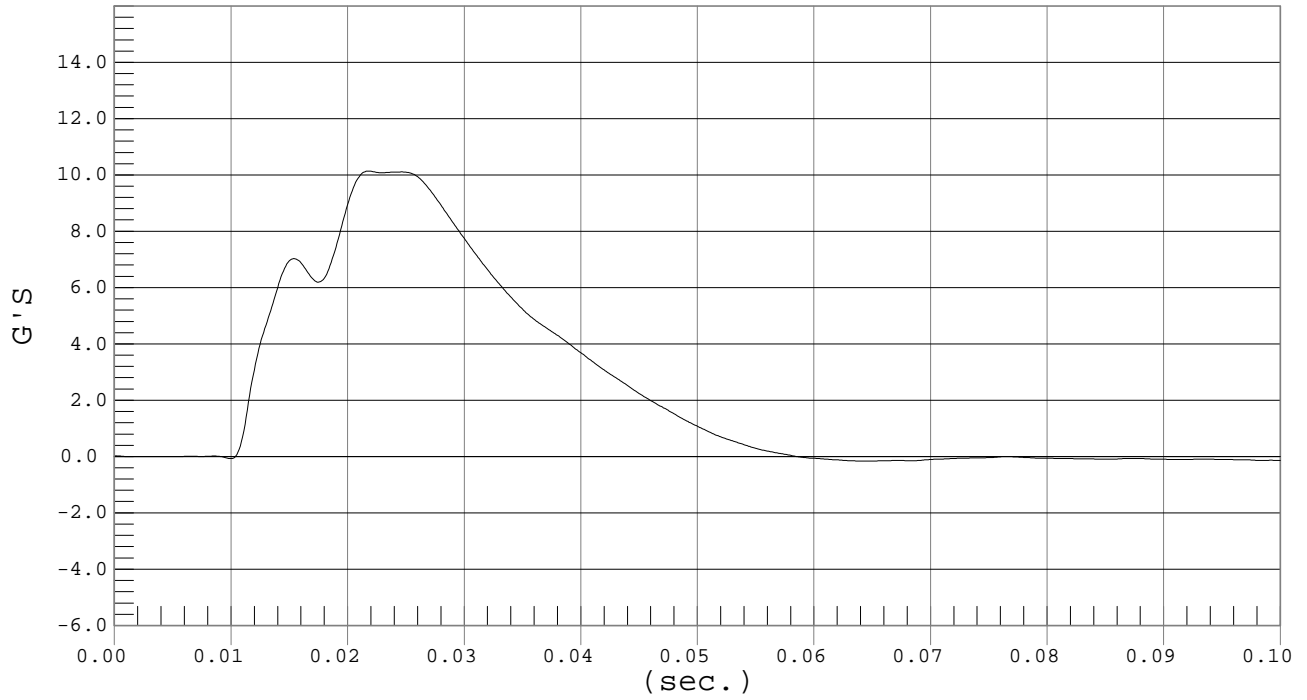


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #010

Test Date: 05-14-02
Speed: 13.9 fps, 4.24 M/s

Ymin = -.29 G'S @ 0.1110 sec., Ymax = 10.14 G'S @ 0.0217 sec.



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

Date: 5/15/02
 Dummy Serial Number: 010
 Test Number: D02644/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.7
Relative Humidity (%)	10 – 70	42
Displacement at 2 m/s	23.5 – 27.5 mm	25.2
Displacement at 3 m/s	36.0 – 40.0 mm	38.4
Displacement at 4 m/s	46.0 – 51.0 mm	50.4

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.7
Relative Humidity (%)	10 – 70	42
Displacement at 2 m/s	23.5 – 27.5 mm	24.3
Displacement at 3 m/s	36.0 – 40.0 mm	36.9
Displacement at 4 m/s	46.0 – 51.0 mm	49.2

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.7
Relative Humidity (%)	10 – 70	42
Displacement at 2 m/s	23.5 – 27.5 mm	24.0
Displacement at 3 m/s	36.0 – 40.0 mm	36.8
Displacement at 4 m/s	46.0 – 51.0 mm	48.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

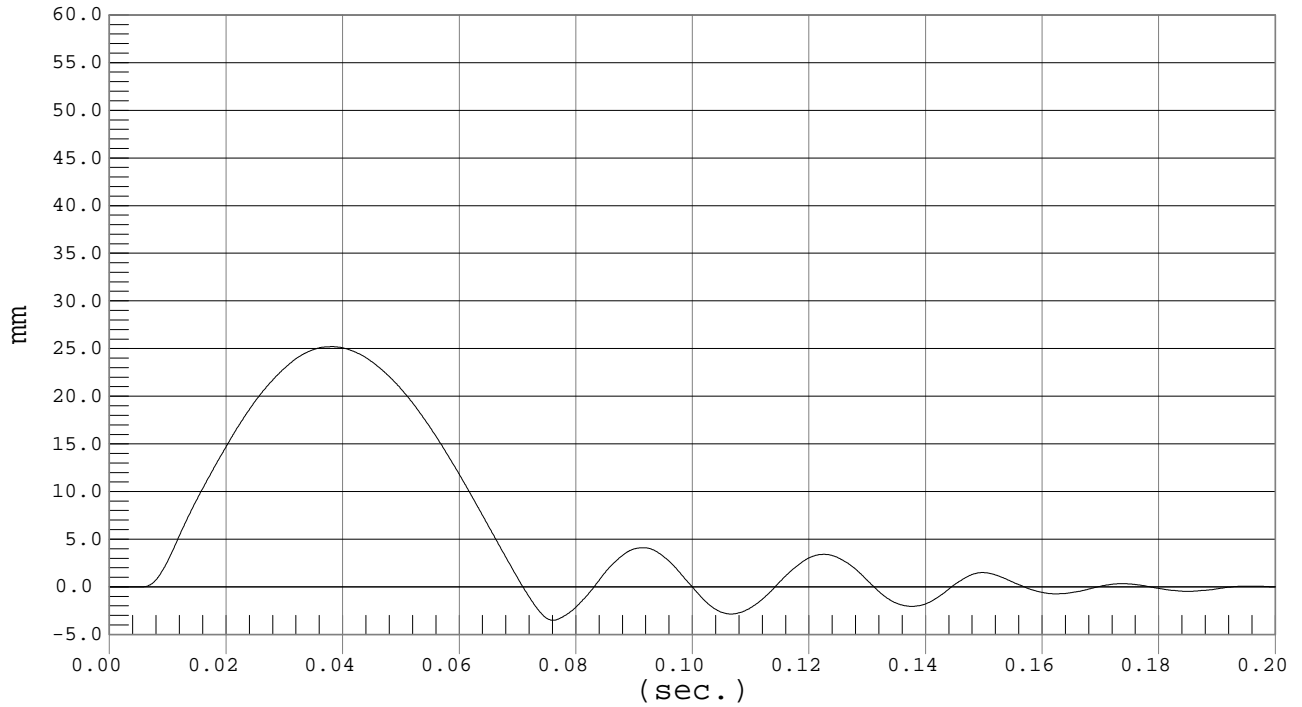


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -3.5 mm @ 0.0760 sec., Ymax = 25.2 mm @ 0.0381 sec.

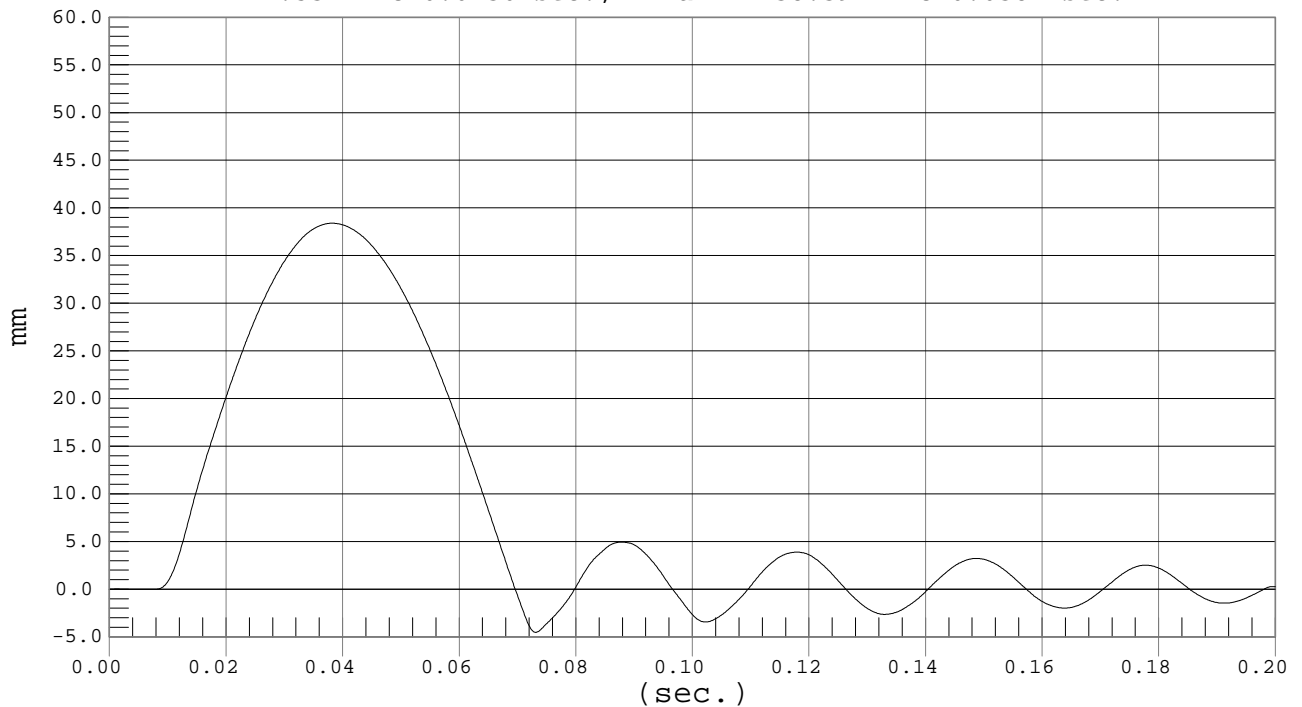


UPPER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -4.53 mm @ 0.0730 sec., Ymax = 38.39 mm @ 0.0381 sec.



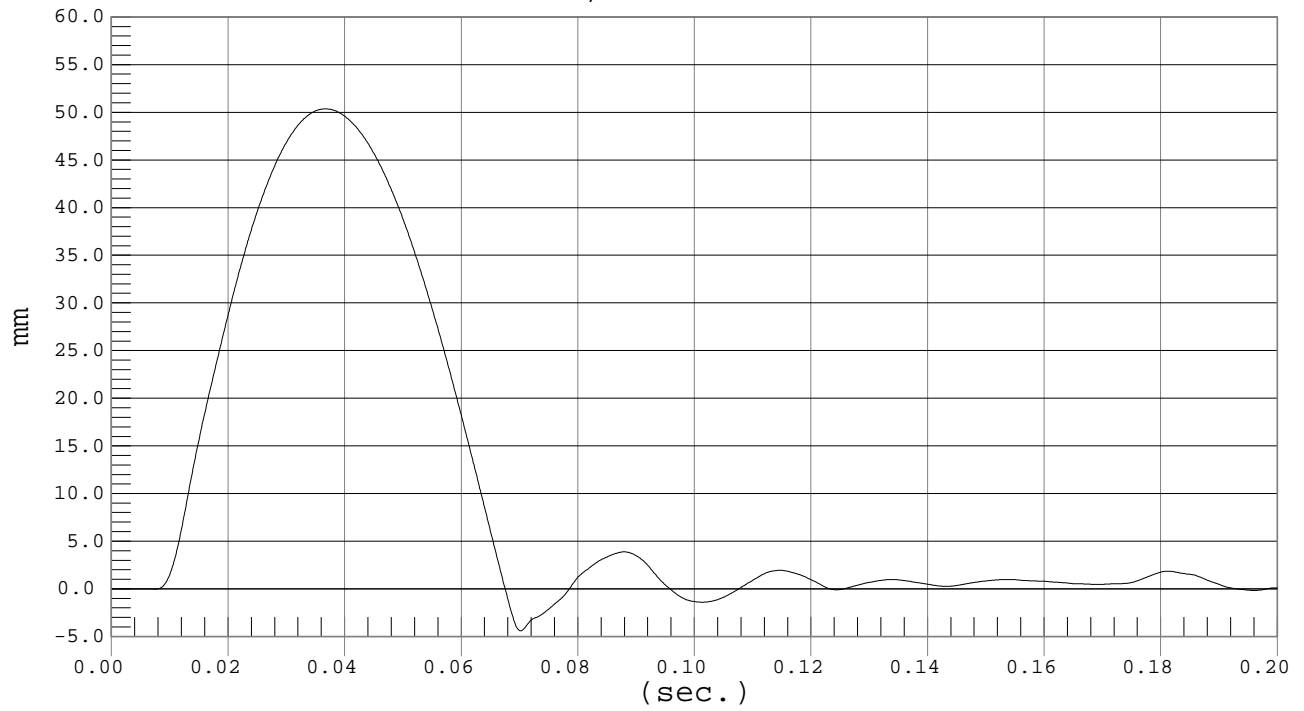


Test Desc.: Rib Module
Component: Dummy #010

UPPER RIB DISPLACEMENT

Test Date: 05-15-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -4.4 mm @ 0.0701 sec., Ymax = 50.36 mm @ 0.0366 sec.



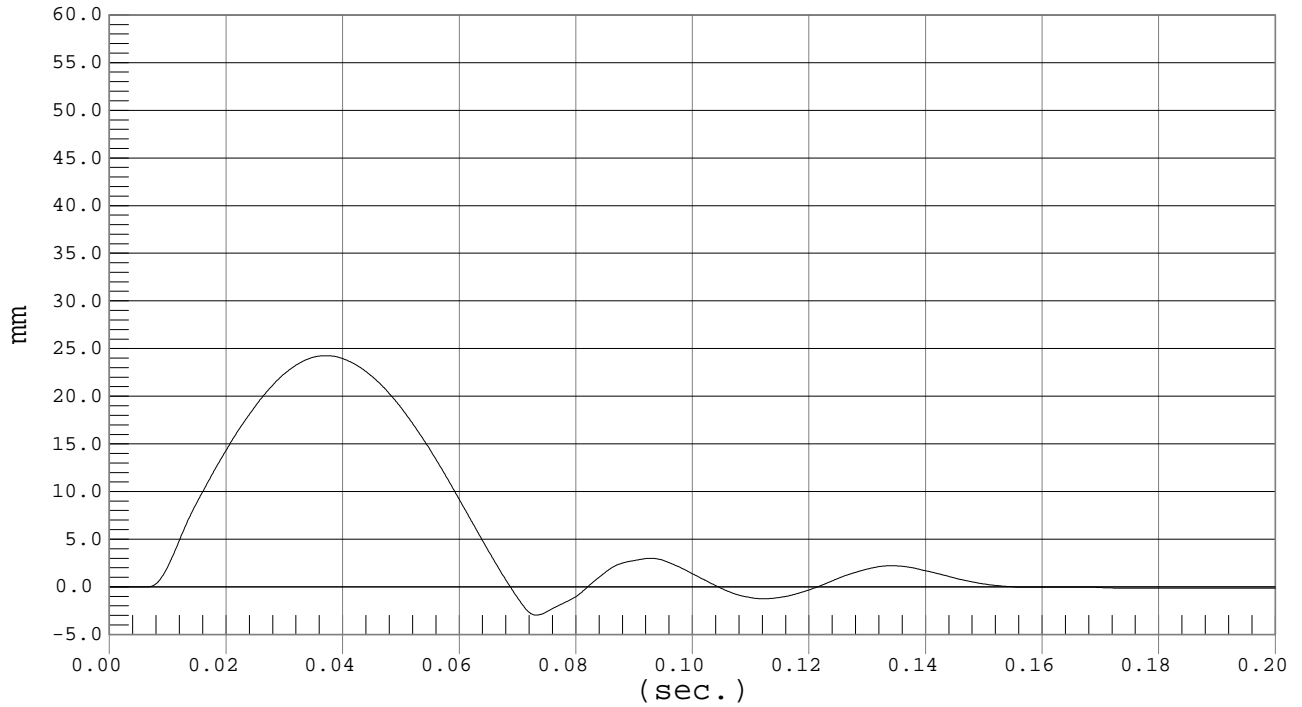


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.97 mm @ 0.0732 sec., Ymax = 24.25 mm @ 0.0370 sec.

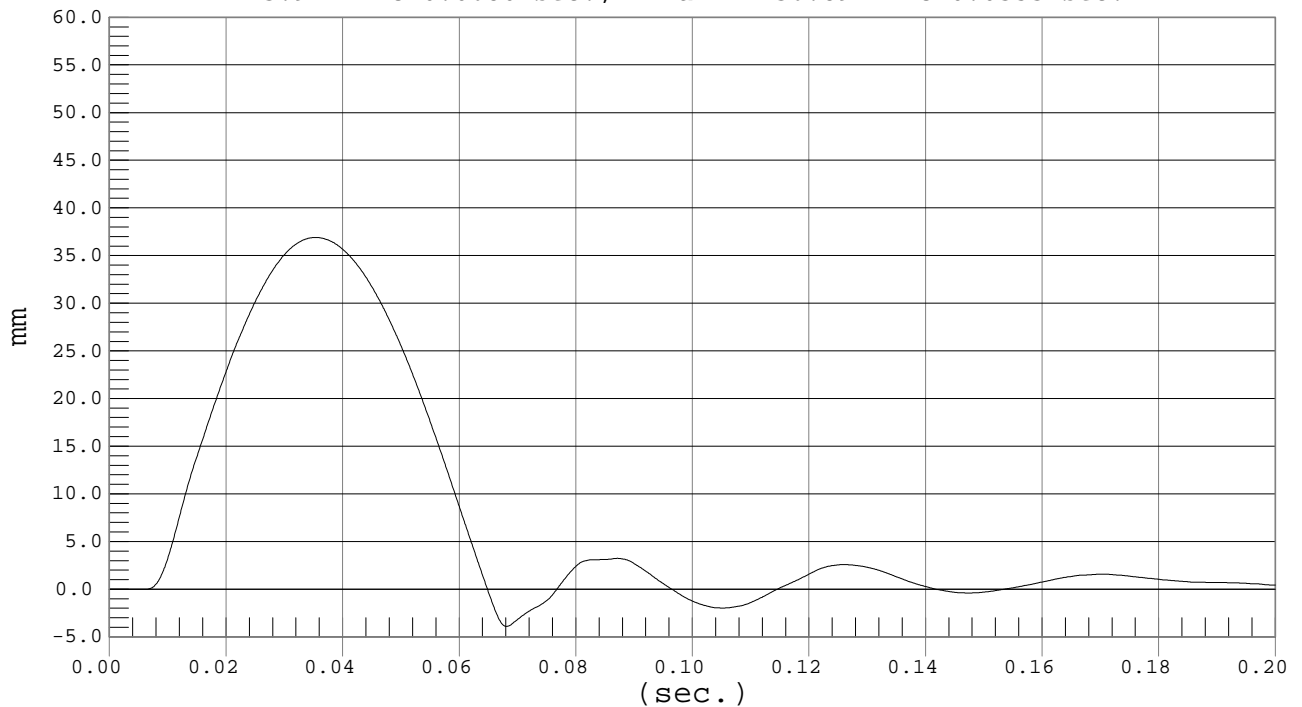


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.91 mm @ 0.0680 sec., Ymax = 36.89 mm @ 0.0353 sec.



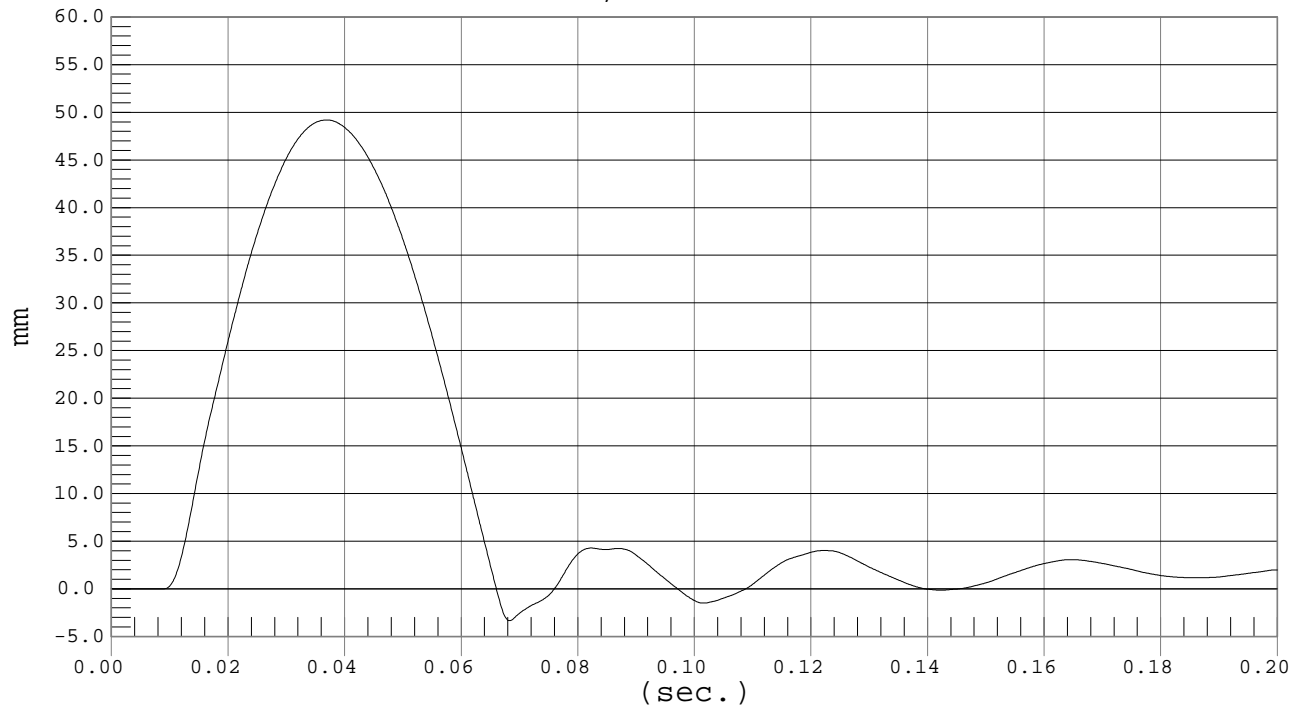


MIDDLE RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.34 mm @ 0.0682 sec., Ymax = 49.2 mm @ 0.0368 sec.



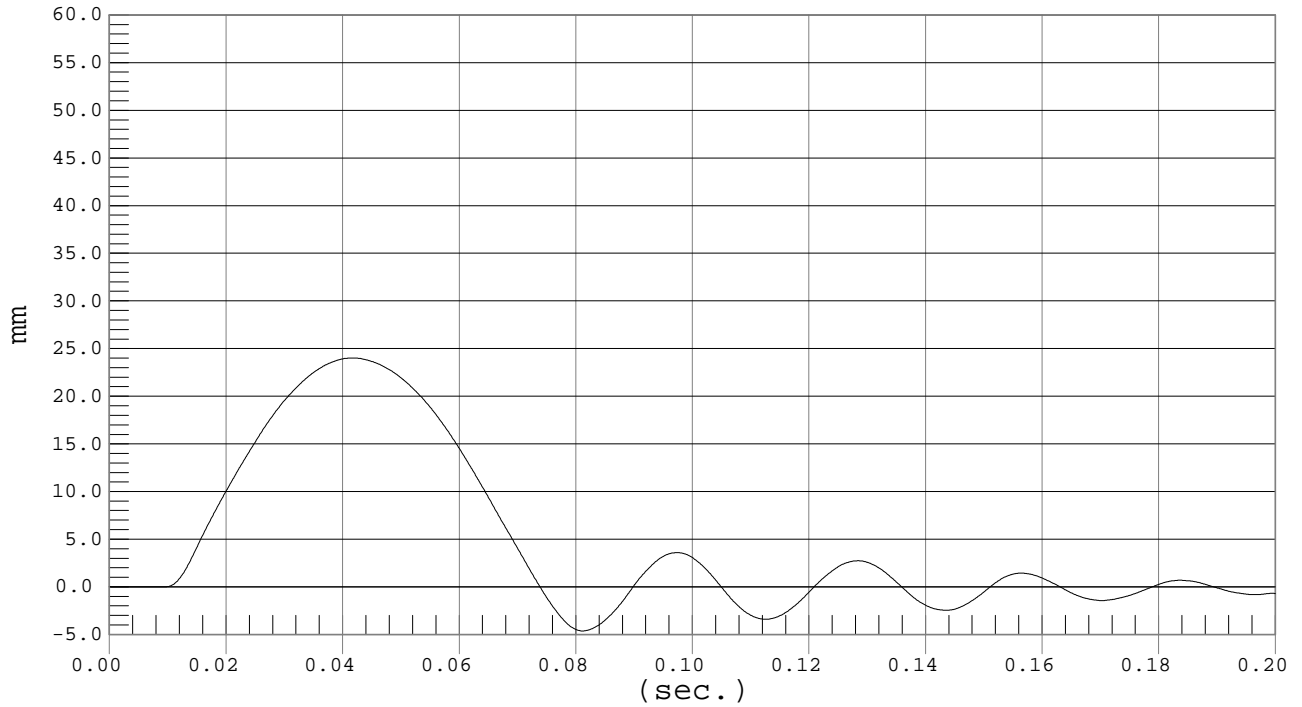


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -4.63 mm @ 0.0811 sec., Ymax = 24.02 mm @ 0.0418 sec.

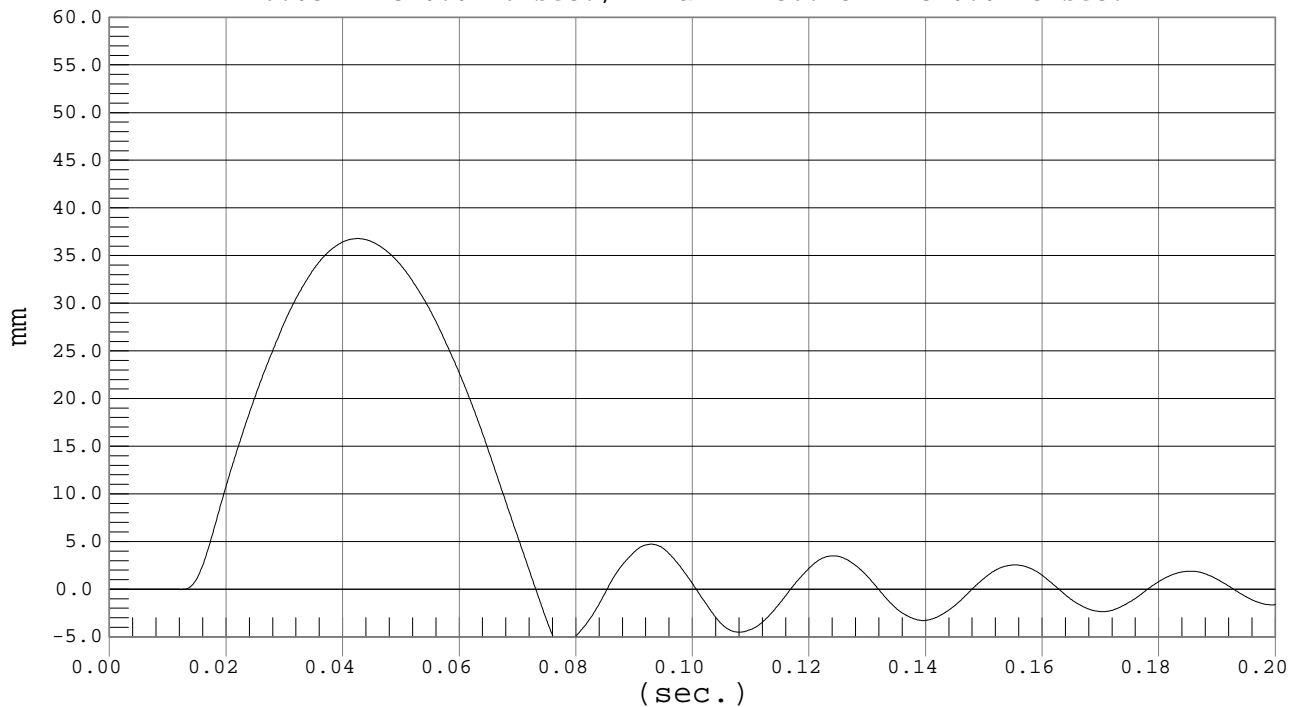


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -6.03 mm @ 0.0776 sec., Ymax = 36.78 mm @ 0.0425 sec.



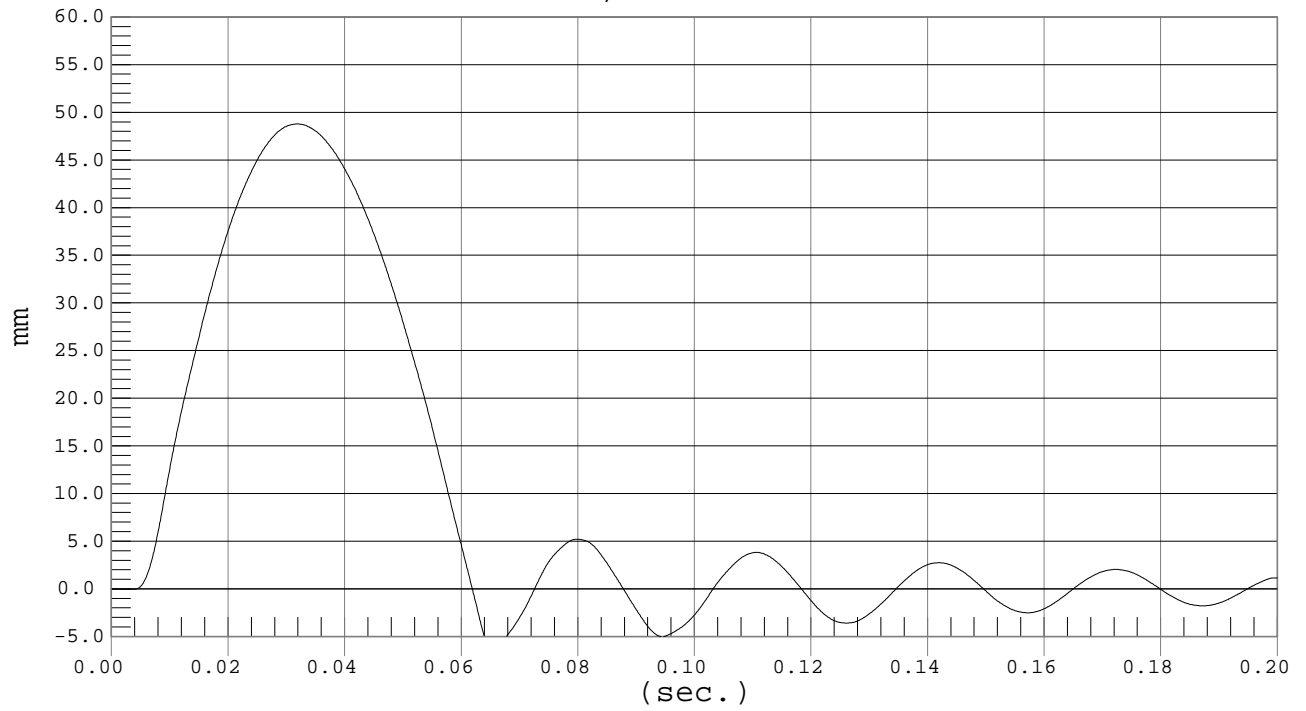


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #010

Test Date: 05-15-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -6.66 mm @ 0.0653 sec., Ymax = 48.77 mm @ 0.0318 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 5/14/02

Dummy Serial Number: 010

Test Number: D02647

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.2
Relative Humidity (%)	10 – 70	35
Probe Speed (m/s)	3.90 – 4.10	4.07
Maximum Impact Force	4.00 – 4.80 kN	4.72
Time of Maximum Force	10.60 – 13.00 ms	12.00
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.44
Time of Max. Total Force	10.00 – 12.30 ms	11.70

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

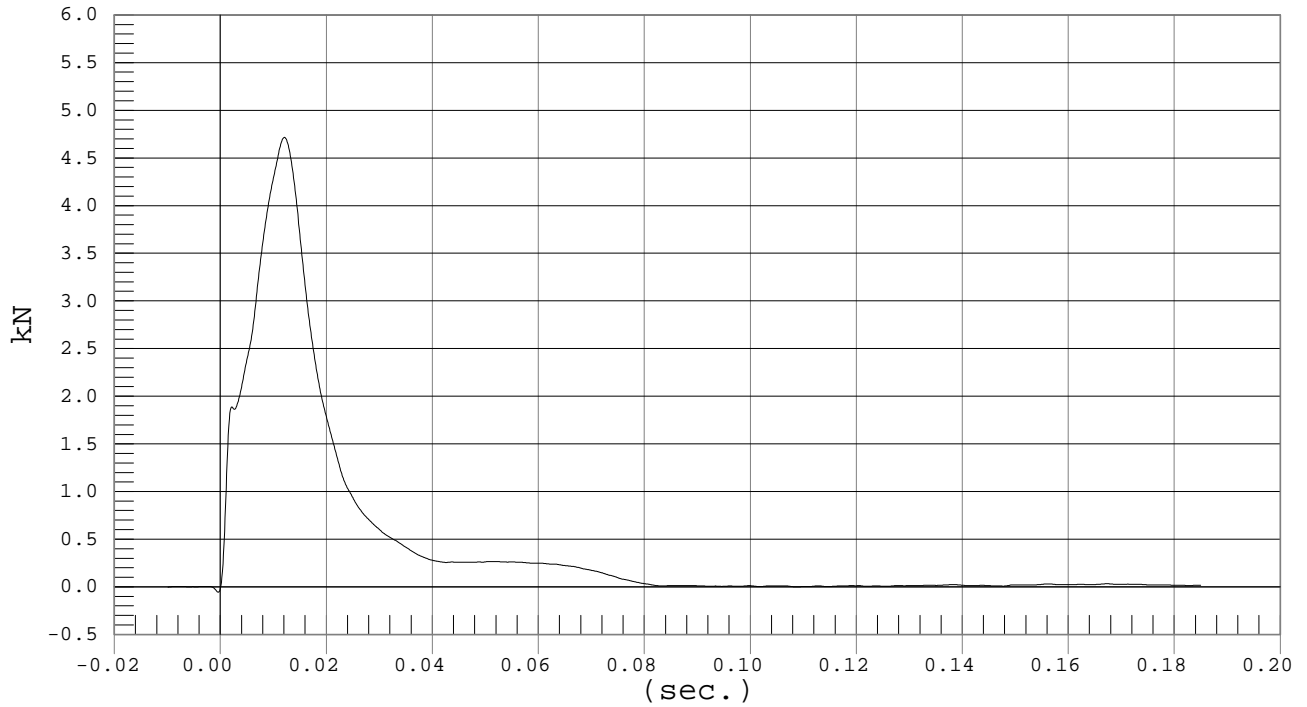


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 05-14-02
Speed: 13.4 fps, 4.07 M/s

Ymin = -.06 kN @ -0.0005 sec., Ymax = 4.72 kN @ 0.0120 sec.

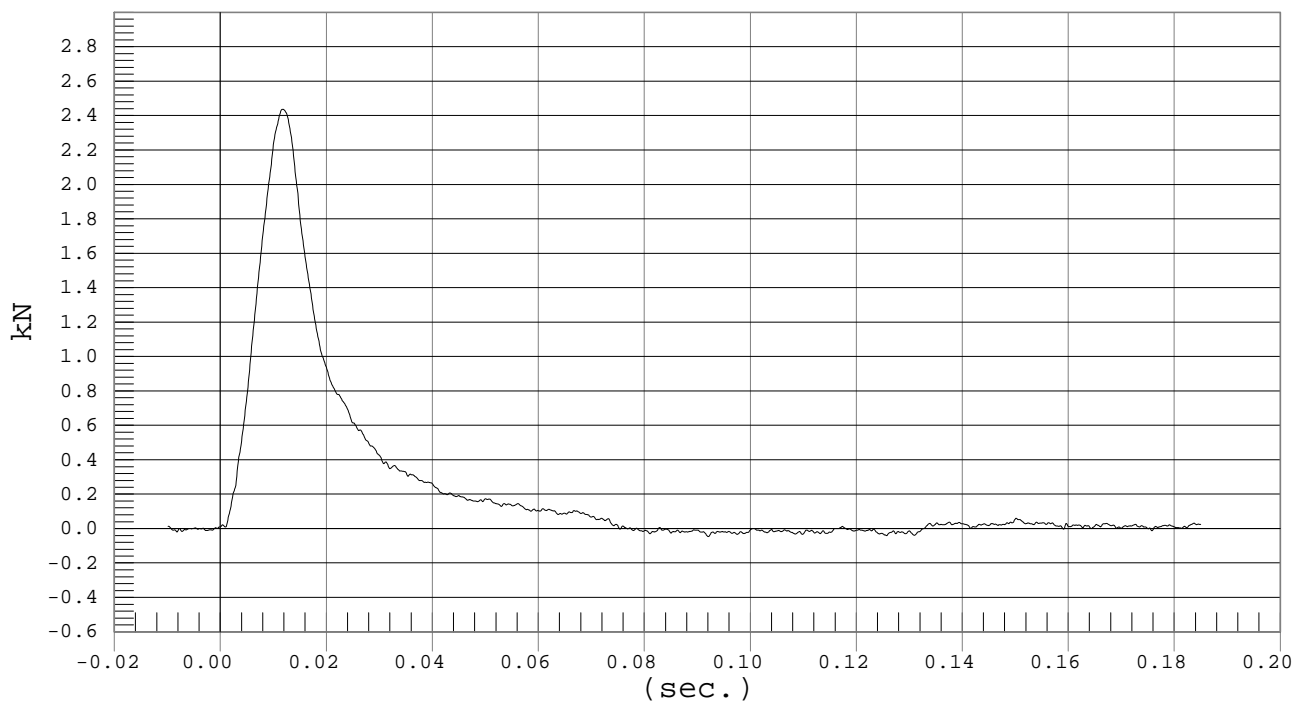


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #010

Test Date: 05-14-02
Speed: 13.4 fps, 4.07 M/s

Ymin = -.05 kN @ 0.0919 sec., Ymax = 2.44 kN @ 0.0117 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 5/14/02

Dummy Serial Number: 010

Test Number: D02648

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.9
Relative Humidity (%)		10 – 70	35
Pendulum Speed		5.95 – 6.15	6.01
Pendulum Deceleration	10 msec	$\bar{2}.46 - \bar{1}.59$ m/sec	-1.99
	20 msec	$\bar{5}.25 - \bar{4}.07$ m/sec	-4.55
	25 msec	$\bar{6}.64 - \bar{5}.30$ m/sec	-5.69
	30 msec	≥ -6.5 m/sec	-6.27
Maximum Flexion Angle		45.0 – 55.0 deg	53.0
Time of Max. Flexion Angle		39.0 – 53.0 ms	44.5
Maximum Angle Theta (A)		31.0 – 35.0 deg	33.6
Time of Max. Theta (A)		44.0 – 52.0 ms	44.2
Maximum Angle Theta (B)		28.88– 31.88 deg	30.38
Time of Max. Theta (B)		44.0 – 52.0 ms	47.3

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

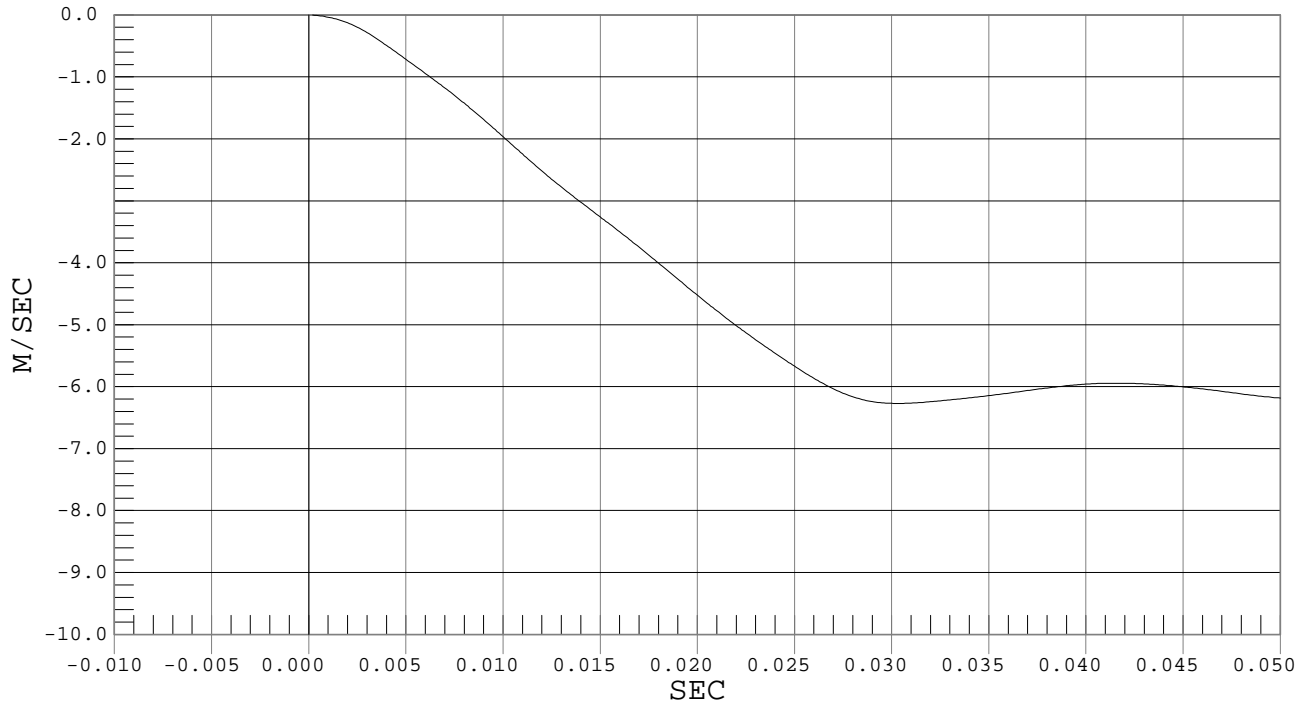


PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 05-14-02
Speed: 19.7 fps, 6.01 M/s

Ymin = -7.53 M/SEC @ 0.1456 SEC, Ymax = 0 M/SEC @ 0.0000 SEC

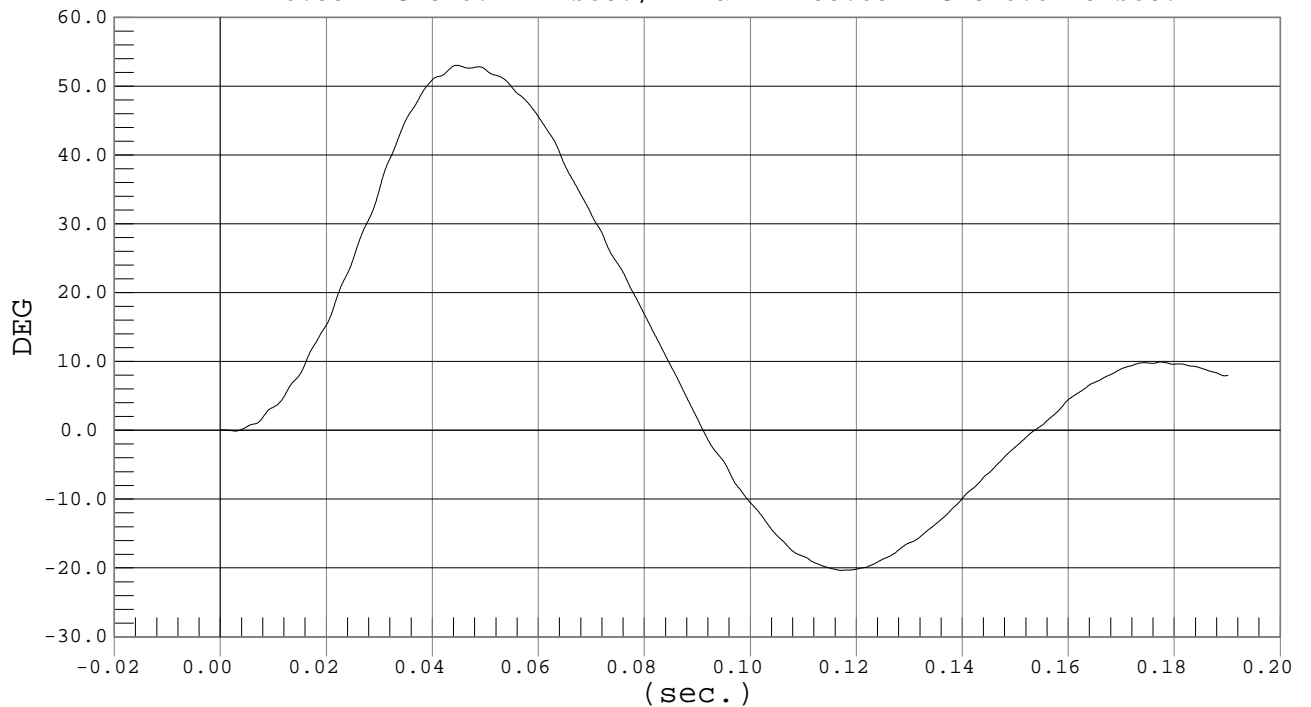


FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #010

Test Date: 05-14-02
Speed: 19.7 fps, 6.01 M/s

Ymin = -20.33 DEG @ 0.1171 sec., Ymax = 53.03 DEG @ 0.0445 sec.



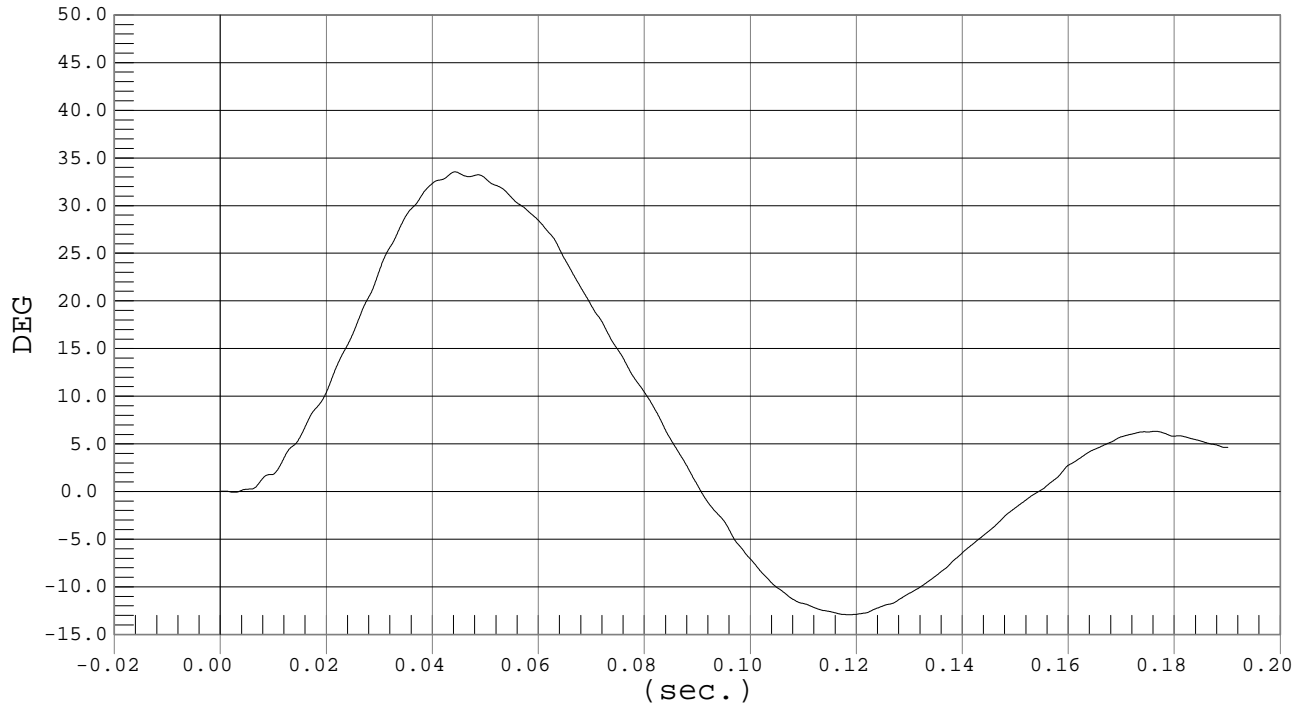


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA A

Test Date: 05-14-02
Speed: 19.7 fps, 6.01 M/s

Ymin = -12.92 DEG @ 0.1187 sec., Ymax = 33.55 DEG @ 0.0442 sec.

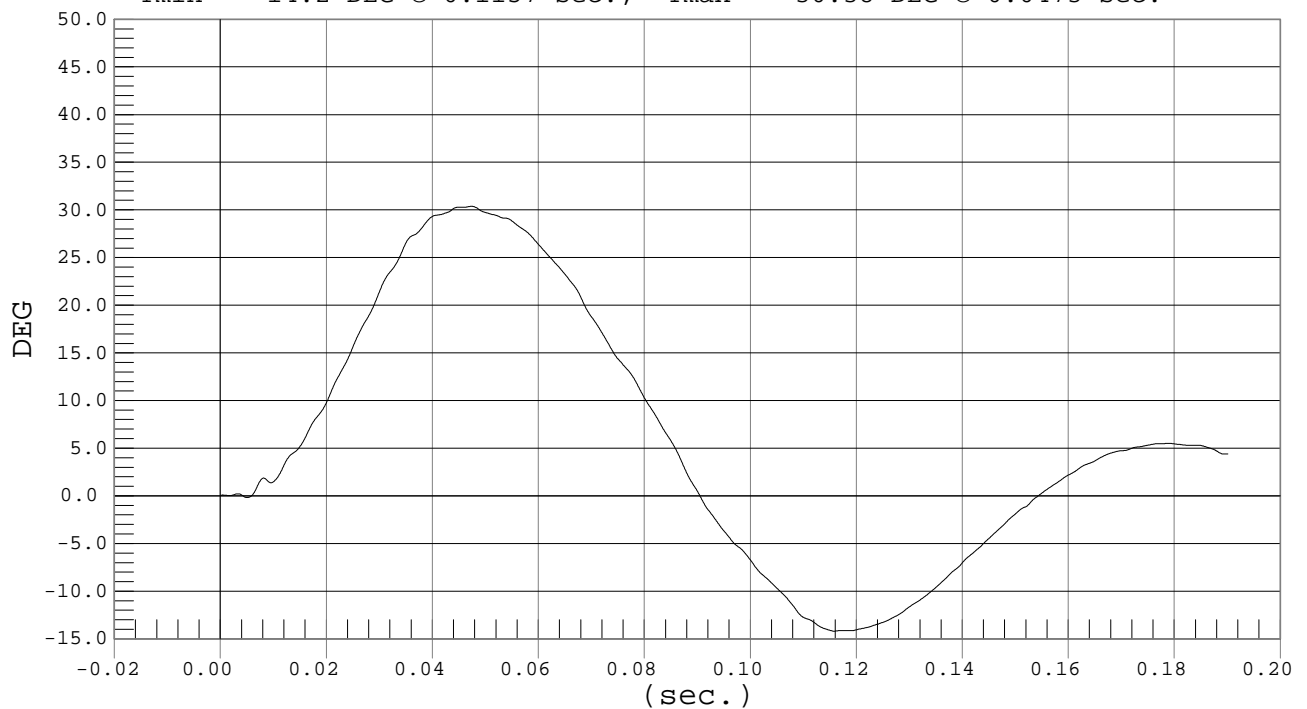


Test Desc.: Lumbar Flexion
Component: Dummy #010

THETA B

Test Date: 05-14-02
Speed: 19.7 fps, 6.01 M/s

Ymin = -14.2 DEG @ 0.1157 sec., Ymax = 30.38 DEG @ 0.0473 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 5/14/02

Dummy Serial Number: 010

Test Number: D02649

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.3
Relative Humidity (%)	10 – 70	35
Pendulum Speed	6.20 – 6.30 m/s	6.23
Maximum Impactor Force	9.80 – 12.20 kN	11.30
Time of Max. Impactor Force	9.50 – 12.50 ms	11.20
Maximum Pubic Force	2.65 – 3.35 kN	3.32
Time of Max. Pubic Force	10.00 – 13.00 ms	11.20

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

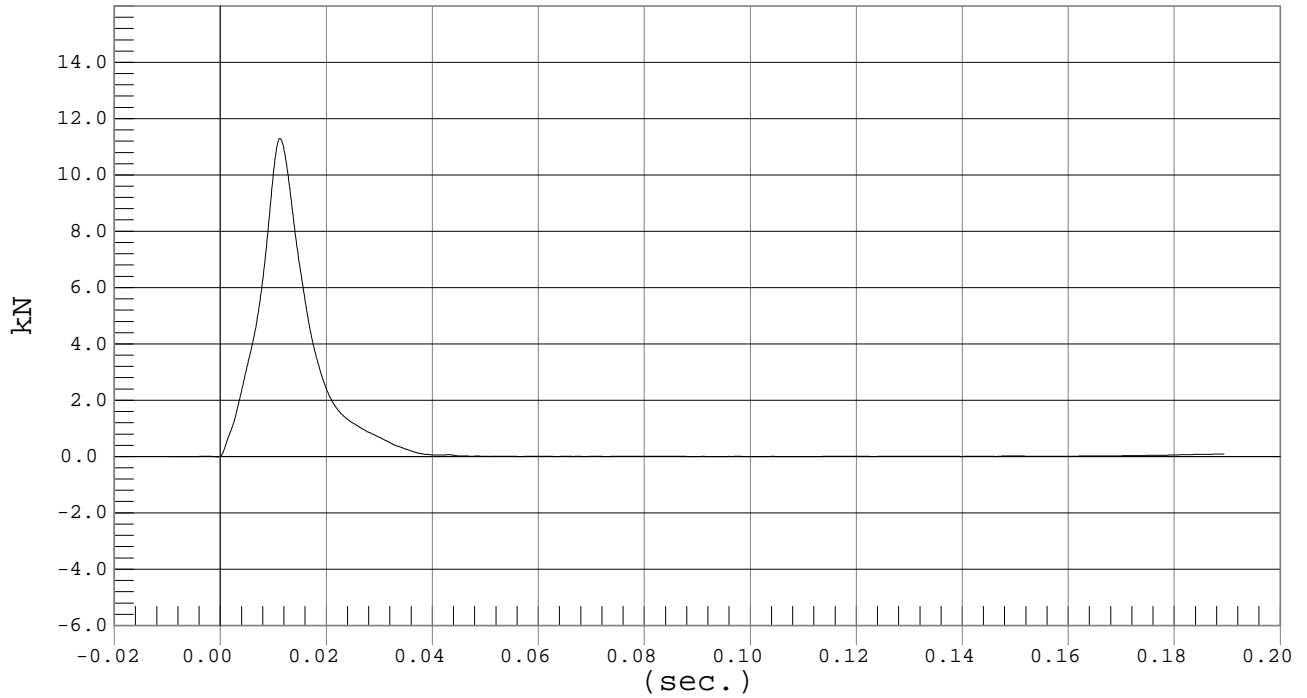


Test Desc.: Pelvis Impact
Component: Dummy #010

IMPACTOR FORCE

Test Date: 05-14-02
Speed: 20.4 fps, 6.23 M/s

Ymin = -.01 kN @ -0.0006 sec., Ymax = 11.3 kN @ 0.0112 sec.

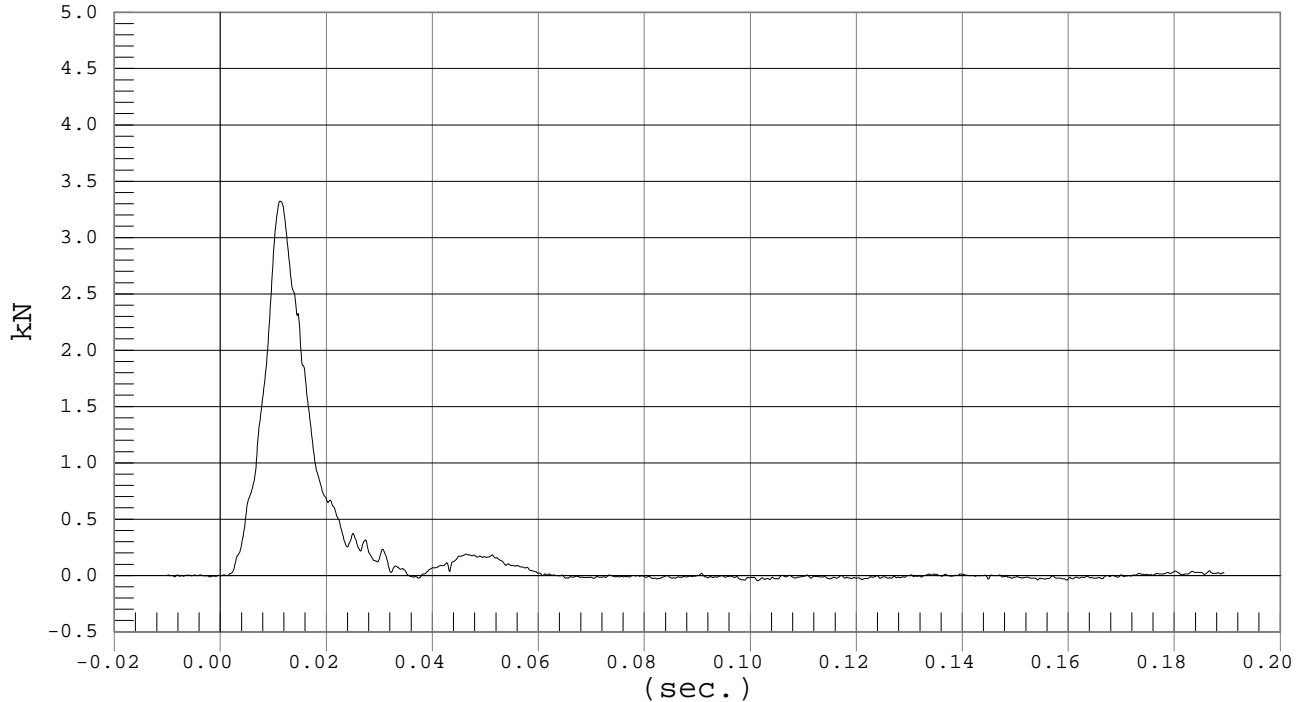


Test Desc.: Pelvis Impact
Component: Dummy #010

PUBIC FORCE

Test Date: 05-14-02
Speed: 20.4 fps, 6.23 M/s

Ymin = -.05 kN @ 0.1013 sec., Ymax = 3.32 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	AC9B7	Endevco	2/12/02
Head Y Accelerometer	AMTB1	Endevco	2/12/02
Head Z Accelerometer	AMR94	Endevco	2/12/02
Upper Neck Load Cell	106	FTSS	3/27/01
Lower Neck Load Cell	111	FTSS	5/8/01
Shoulder Force Load Cell	120	FTSS	4/24/01
Upper Spine X Accelerometer	AJ820	Endevco	3/15/02
Upper Spine Y Accelerometer	AGTG8	Endevco	3/15/02
Upper Spine Z Accelerometer	AJ8Y6	Endevco	3/15/02
Upper Rib Y Accelerometer	J13652	Endevco	4/9/02
Mid Rib Y Accelerometer	J14006	Endevco	4/9/02
Lower Rib Y Accelerometer	J13628	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	10/18/01
Lower Spine X Accelerometer	ACCH1	Endevco	3/4/02
Lower Spine Y Accelerometer	J13984	Endevco	3/4/02
Lower Spine Z Accelerometer	AGM41	Endevco	3/4/02
Torso Load Cell	123	FTSS	1/25/02
T-12 Load Cell	102	FTSS	10/31/01
Front Abdomen Load Cell	119	FTSS	4/26/01
Mid Abdomen Load Cell	120	FTSS	4/26/01
Rear Abdomen Load Cell	121	FTSS	4/26/01
Pubic Symphysis Load Cell	144	Denton	10/10/01
Pelvis X Accelerometer	AHTN3	Endevco	3/1/02
Pelvis Y Accelerometer	AHT12	Endevco	3/1/02
Pelvis Z Accelerometer	AHOC3	Endevco	3/1/02
Right Femur Load Cell	137	FTSS	4/18/01
Left Femur Load Cell	138	FTSS	4/19/01
Lumbar Load Cell	105	FTSS	5/7/01

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left A Post @ Roof Y	D11-F05	Entran	3/8/02
Left Mid A-Post Y	MGA045	Entran	1/15/02
Left Lower A-Post Y	K21-N06	Entran	12/11/01
Left Upper B-Post Y	D11-F06	Entran	3/8/02
Left Mid B-Post Y	K21-N28	Entran	1/17/02
Left Lower B-Post Y	K21-N19	Entran	1/17/02
Rear Floorpan Above Axle X	E03-H16	Entran	1/14/02
Rear Floorpan Above Axle Y	E03-H13	Entran	1/14/02
Rear Floorpan Above Axle Z	I25-J02	Entran	1/14/02
Driver Seat Track Y	K21-N24	Entran	1/17/02
Driver Left Seat Frame	K21-N16	Entran	1/17/02
Driver Right Seat Frame	I25-F09	Entran	1/16/02
Right Side Sill at Front Seat X	K21-N04	Entran	12/11/01
Right Side Sill at Front Seat Y	K21-N03	Entran	12/11/01
Right Side Sill at Front Seat Z	K21-N05	Entran	12/11/01
Right Side Sill at Rear Seat X	K21-N10	Entran	12/11/01
Right Side Sill at Rear Seat Y	K21-N11	Entran	12/11/01
Right Side Sill at Rear Seat Z	K21-N09	Entran	12/11/01
Left Side Sill at Front Seat Y	G03-N09	Entran	1/14/02
Left Side Sill at Rear Seat Y	F04-N10	Entran	1/14/02
Vehicle CG X	G08-B04	Entran	3/6/02
Vehicle CG Y	A08-A09	Entran	3/6/02
Vehicle CG Z	G13-B07	Entran	1/16/02
Left Front Door @ Pelvis Y	I25-J09	Entran	1/16/02
Left Front Door @ End of Arm Y	G03-N13	Entran	1/15/02
Left Front Door @ Knee Y	F04-N04	Entran	1/14/02
Left Front Door @ Rib Y	G03-N10	Entran	1/15/02
Lower Center Radiator Support X	K21-N31	Entran	3/6/02
Lower Center Radiator Support Y	K21-N29	Entran	3/6/02
Lower Center Radiator Support Z	G13-F15	Entran	3/6/02

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 +/- 10mm 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
ES-2 PEAK RESPONSES

DRIVER PEAK RESPONSE TABLE

Location	Peak Values						
				2001 Saturn L200 5/6/02		2001 Saturn L200 5/8/02	
	Class	Axis	Units	Peak	Time	Peak	Time
Head	1000	X	G	-283.1	54	-208.4	57
	1000	Y	G	702.8	54	1180.0	56.7
	1000	Z	G	405.9	54	249.9	57
	1000	RES	G	825.3	54	1215.9	56.7
Head Injury Criteria (HIC)				7493		15152	
t1				53.4		56.4	
t2				54.1		56.9	
Upper Neck Force	1000	X	N	1260	54	474	57
	1000	Y	N	1400	54	-1623	57
	1000	Z	N	4635	54	-1555	60
	1000	RES	N	4726	54	1981	57
Upper Neck Moment	600	X	Nm	-96.4	55	-47.9	61
	600	Y	Nm	-33.2	49	33.9	64
	600	Z	Nm	-19.3	143	15.8	59
	600	RES	Nm	96.6	55	56.9	61
Lower Neck Force	1000	X	N			-651	45
	1000	Y	N			1086	57
	1000	Z	N			-1716	59
	1000	RES	N			1812	59
Lower Neck Moment	600	X	Nm			100.2	57
	600	Y	Nm			75.7	47
	600	Z	Nm			17.8	57
	600	RES	Nm			116.1	52
Shoulder Force	600	X	N			-995	39
	600	Y	N			2183	45
	600	Z	N			-1542	43
Upper Spine	180	X	G	29.5	54	-13.9	38
	180	Y	G	90.7	45	49.4	46
	180	Z	G	-27.1	44	17.0	58
	180	Res	G	95.2	45	49.4	46

DRIVER PEAK RESPONSE TABLE (continued)

Location	Peak Values						
				2001 Saturn L200 5/6/02		2001 Saturn L200 5/8/02	
	Class	Axis	Units	Peak	Time	Peak	Time
Lower Spine	180	X	G	27.7	55	13.2	60
	180	Y	G	105.6	42	69.9	45
	180	Z	G	-33.0	72	14.6	58
	180	Res	G	108.1	42	70.2	45
Upper Rib	180	Y	G	122.6	39	84.6	38
Mid Rib	180	Y	G			155.5	39
Lower Rib	180	Y	G	118.2	39	190.3	41
Upper Rib Deflection	180	Y	mm			-49.7	54
Mid Rib Deflection	180	Y	mm			-38.7	53
Lower Rib Deflection	180	Y	mm			-26.2	49
Upper Rib VC	180	Y	m/sec			0.88	45
Mid Rib VC	180	Y	m/sec			0.80	44
Lower Rib VC	180	Y	m/sec			0.55	44
Torso Force	600	X	N			245	52
	600	Y	N			-486	44
Torso Moment	600	Y	Nm			-22.8	58
	600	Z	Nm			5.8	42
T12 Force	600	X	N			777	51
	600	Y	N			1842	41
T12 Moment	600	X	Nm			-260.4	41
	600	Y	Nm			72.8	55
Pelvis	1000	X		12.3	44	15.1	45
	1000	Y		57.1	43	56.5	35
	1000	Z		23.1	56	14.3	59