

REPORT NO. MCW-DOT-02SN06

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TESTING**

TOYOTA MOTOR CORPORATION
2003 TOYOTA MATRIX 4-DOOR SEDAN

NHTSA NUMBER: M3 5106

MEDICAL COLLEGE OF WISCONSIN
5000 WEST NATIONAL AVENUE
MILWAUKEE, WI 53295



11 APRIL 2002

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Performance Standards
Office of Crashworthiness Standards
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Washington, DC 20590

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16. Abstract A 55/28 km/h 90° Impact Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2003 Toyota Matrix 4-Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for generation of consumer information on vehicle side crash protection. This test was conducted at the Medical College of Wisconsin Vehicle Crashworthiness Lab in Milwaukee, Wisconsin, on 11 April 2002. The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 km/h, and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 22.1° C. The target vehicle post-test maximum crush was 288 mm at Level 3. The test vehicle's performance follows: <table border="1"> <thead> <tr> <th></th><th><u>DRIVER</u></th><th><u>PASSENGER</u></th></tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration G</td><td>40.6</td><td>43.3</td></tr> <tr> <td>Left Lower Rib Acceleration G</td><td>49.8</td><td>57.1</td></tr> <tr> <td>Lower Spine Acceleration G</td><td>57.8</td><td>60.0</td></tr> <tr> <td>Thoracic Trauma Index TTI</td><td>54</td><td>59</td></tr> <tr> <td>Pelvis Acceleration G</td><td>65</td><td>73</td></tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches, and the opposite doors did not open during the side impact event.					<u>DRIVER</u>	<u>PASSENGER</u>	Left Upper Rib Acceleration G	40.6	43.3	Left Lower Rib Acceleration G	49.8	57.1	Lower Spine Acceleration G	57.8	60.0	Thoracic Trauma Index TTI	54	59	Pelvis Acceleration G	65	73
	<u>DRIVER</u>	<u>PASSENGER</u>																			
Left Upper Rib Acceleration G	40.6	43.3																			
Left Lower Rib Acceleration G	49.8	57.1																			
Lower Spine Acceleration G	57.8	60.0																			
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Pelvis Acceleration G	65	73																			
17. Key Words New Car Assessment Program (NCAP) Side Impact MDB Side Impact Dummy (SID) NHTSA No. M3 5106		18. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division, Room 5108(NAD-52) 400 Seventh Street, S.W. Washington, D.C. 20590																			
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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test was part of the FY02 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-01-D-02003. The purpose of this test was to evaluate side impact protection of a 2003 Toyota Matrix 4-Door Sedan. This side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated May 1999.

The Medical College of Wisconsin does not endorse or certify products. The manufacturer's name appears solely for identification purposes only.

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A 2003 Toyota Matrix 4-Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) that was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.8 km/h (38.4 mph). The target vehicle was stationary and positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by the Medical College of Wisconsin in Milwaukee, Wisconsin, on 11 April 2002.

Two restrained Side Impact Dummies (SIDs) were placed in the driver and left rear designated seating positions, according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated May 1999. The side impact event was documented by nine high-speed cameras, one real-time camera, and one high-speed video. Camera locations and other pertinent camera information can be found in this report.

The SIDs were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T₁₂) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-direction)
5. Head Center of Gravity triaxial accelerometers (X-, Y-, and Z-direction)

Pre- and post-test photographs of the test vehicle, the MDB, and the side impact dummies (SIDs) are included in Appendix A. Appendix B contains the vehicle, MDB, and dummy response data traces. A summary of the side impact dummy (SID) 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.

The following table summarizes the results of this test.

Injury Criteria	Front SID	Rear SID
TTI (G)	54	59
PELVIS (G)	65	73
HIC36	207	703

SECTION 3
SUMMARY OF TEST RESULTS

DATA SHEET NO. 1

GENERAL VEHICLE TEST PARAMETER DATA

TEST VEHICLE INFORMATION

Year/ Make/ Model/ Body Style		<u>2003 Toyota Matrix 4-Door Sedan</u>			
Vehicle NHTSA NO.		<u>M3 5106</u>	VIN	<u>2T1LR32E83C009312</u>	
Vehicle Body Color		<u>Red</u>	Build Date	<u>February 2002</u>	
Engine Data	<u>4</u> Cylinders	<u>CID</u>	<u>1.8</u> Liter	<u>cc</u>	
Placement	<u>Longitudinal</u>	<u>X</u> Lateral			
Transmission	<u>4</u> Speed	<u>Manual</u>	<u>X</u> Automatic	<u>X</u>	Overdrive
Final Drive	<u>Rear Wheel Drive</u>	<u>Front Wheel Drive</u>	<u>X</u>	Four Wheel Drive	
Odometer Reading	<u>70</u>	Date	<u>12 March 2002</u>		
Options	<u>X</u> A/C	<u>X</u> Power Steering	<u>X</u> Power Brakes	<u>X</u>	Power Windows
	<u>X</u> Cruise Control	<u>X</u> Tilt Wheel	<u>X</u> Power Locks		

DATA FROM TIRE PLACARD:

Tire Pressure (at Capacity)	<u>35</u> PSI Front
	<u>35</u> PSI Rear
Recommended Tire Size	<u>P 205/55R16 894</u>
Tires on Test Vehicle	<u>P 205/55R16 894</u> Manufacturer <u>Goodyear</u>

TEST VEHICLE AIRBAG INFORMATION:

	<u>Frontal</u>	<u>Side-Torso</u>	<u>Side-Torso/Head</u>	<u>Side-Head</u>
Driver	Yes-Steering Wheel	None	None	None
Left Rear Passenger	None	None	None	None

VEHICLE CAPACITY DATA:

Number of Occupants:	<u>2</u> Front	<u>3</u> Rear	<u>3rd</u> Seat	<u>5</u> Total
Type of Front Seats	<u>X</u> Bucket	<u>Bench</u>	<u>Split Bench</u>	
Type of Front Seat Back	<u>Fixed</u>	<u>X</u> Adjustable w/	<u>X</u> Lever	<u>Knob</u>
Vehicle Max Capacity Loading	<u>390</u> kg		(A)	
No. of Occupants X 68.04 kg	<u>340.2</u> kg		(B)	
Cargo Capacity (A) – (B)	<u>49.9</u> kg			

TEST VEHICLE DELIVERED WEIGHT WITH MAXIMUM FLUIDS:

Left Front	=	<u>383.7</u> kg	Left Rear	=	<u>291.7</u> kg
Right Front	=	<u>376.5</u> kg	Right Rear	=	<u>286.7</u> kg
TOTAL FRONT	=	<u>760.2</u> kg	TOTAL REAR	=	<u>578.4</u> kg
% Total Weight	=	<u>56.8</u> %	%Total Weight	=	<u>43.2</u> %
TOTAL WEIGHT	=	<u>1338.6</u> kg			

DATA SHEET 1 (continued)**GENERAL VEHICLE TEST PARAMETER DATA**Vehicle: 2003 Toyota Matrix 4-Door SedanNHTSA No.: M3 5106**CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:**

Total Test Vehicle Delivered Weight with Max Fluids	=	<u>1338.6</u>	kg	(A)
Maximum Cargo Carrying Capacity of Test Vehicle	=	<u>49.9</u>	kg	(B)
Weight of (2) instrumented Side Impact Dummies	=	<u>161.3</u>	kg	(C)
TEST VEHICLE TARGET WEIGHT	=	<u>1549.8</u>	kg	(A+B+C)

FULLY LOADED TEST VEHICLE (UDVW + 1 OR 2 SID(s) + CARGO)

Left Front	=	<u>426.3</u>	kg	Left Rear	=	<u>385.6</u>	kg
Right Front	=	<u>395</u>	kg	Right Rear	=	<u>342.9</u>	kg
TOTAL FRONT	=	<u>821.3</u>	kg	TOTAL REAR	=	<u>728.5</u>	kg
% Total Weight	=	<u>53.0</u>	%	%Total Weight	=	<u>47.0</u>	%
TOTAL WEIGHT	=	<u>1549.8</u>	kg				

AS TESTED WEIGHT OF TEST VEHICLE (UDVW+ 1 OR 2 SID(s)+CARGO+EQUIPMENT & INSTRUMENTATION)

Left Front	=	<u>425</u>	kg	Left Rear	=	<u>382.8</u>	kg
Right Front	=	<u>393.3</u>	kg	Right Rear	=	<u>339.7</u>	kg
TOTAL FRONT	=	<u>818.3</u>	kg	TOTAL REAR	=	<u>722.5</u>	kg
% Total Weight	=	<u>53.1</u>	%	%Total Weight	=	<u>46.9</u>	%
TOTAL WEIGHT	=	<u>1540.8</u>	kg				

TEST VEHICLE ATTITUDE (all dimensions in millimeters):**AS DELIVERED**

Left Front	<u>753</u>	Right Front	<u>756</u>	Left Rear	<u>769</u>	Right Rear	<u>766</u>
------------	------------	-------------	------------	-----------	------------	------------	------------

FULLY LOADED

Left Front	<u>733</u>	Right Front	<u>740</u>	Left Rear	<u>731</u>	Right Rear	<u>742</u>
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AS TESTED

Left Front	<u>734</u>	Right Front	<u>741</u>	Left Rear	<u>733</u>	Right Rear	<u>744</u>
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Test Vehicle Wheelbase 2600 mmAs Tested CG = 1219 mm rearward of front wheel centerline**TOTAL VEHICLE LENGTH:**

Right Side	=	<u>4005</u>	mm
Left Side	=	<u>4005</u>	mm
Centerline	=	<u>4352</u>	mm

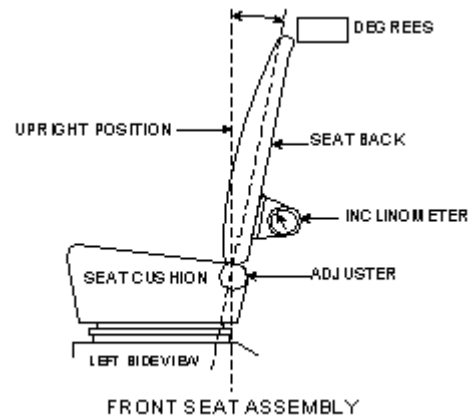
DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

Nominal Design Riding Position for adjustable driver and passenger seats. Please describe how to position the inclinometer to measure the seat back angle. Include a description of the adjustment latch detent if applicable



FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel		<u>240 mm</u>	
Total Number of Detents	<u>17</u>	Test Position	<u>Detent number 9</u>

FRONT SEAT BACK ADJUSTMENT:

Seat Back Angle	<u>88.5 degrees measured at headrest bar relative to side sill</u>
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SECOND POSITION SEAT:

Total Length Fore/Aft Adjustment	<u>N/a</u>
Seat Back Adjustment Position	<u>N/a</u>

ADJUSTABLE STEERING COLUMN POSITION:

Mid-position

WINDOW POSITIONS:

Left Front	<u>Up</u>	Right Front	<u>Down</u>
Left Rear	<u>Up</u>	Right Rear	<u>Down</u>

AMOUNT OF STODDARD SOLVENT IN FUEL TANK:

Fuel System usable Capacity	<u>45.0 L</u>	
Test Volume	<u>41.9 L</u>	<u>93.1% usable capacity</u>

LOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase	<u>2600 mm</u>	
Impact Point is	<u>360 mm rearward</u>	of front axle centerline
Actual Impact Point is	<u>380 mm rearward</u>	of front axle centerline

DATA SHEET 2
TEST VEHICLE SUMMARY

VEHICLE IDENTIFICATION:

Year/Make/Model/Body Style	2003 Toyota Matrix 4-Door Sedan		
Body Color	Red	VIN	2T1LR32E83C009312
NHTSA No.	M3 5106	Test Date	11 April 2002
Overall Length	4352 mm	Overall Width	1705 mm

VEHICLE TEST WEIGHT (Pre-Test):

Left Front	=	425	kg	Left Rear	=	382.8	kg
Right Front	=	393.3	kg	Right Rear	=	339.7	kg
TOTAL FRONT	=	818.3	kg	TOTAL REAR	=	722.5	kg
% Total Weight	=	53.1	%	%Total Weight	=	46.9	%
TOTAL WEIGHT	=	1540.8	kg				
Wheelbase				=		2600	mm
Longitudinal CG from Center of Front Axle				=		1219	mm rearward
Impact Angle with Respect to Impactor				=		90	

ACTUAL IMPACT POINT

Actual Impact Point is 20 mm rearward of nominal impact reference line (lateral)

Actual Impact Point is 5 mm below nominal impact line (vertical)

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1	(278 mm above ground)	=	166	mm
2. LEVEL 2	(607 mm above ground)	=	275	mm
3. LEVEL 3	(653 mm above ground)	=	288	mm
4. LEVEL 4	(1007 mm above ground)	=	113	mm
5. LEVEL 5	(1432 mm above ground)	=	20	mm

Maximum Post-Test intrusion at Level 3 is 288 mm

<u>OCCUPANTS</u>	<u>Left Front Passenger</u>	<u>Left Rear Passenger</u>
Dummy Identification	SID/058	SID/056
Restraints Used	3-Point Belt	3-Point Belt

INSTRUMENTATION:

Number of Vehicle Data Channels		48
Number of Cameras	Onboard	3
	Off board	5
	MDB	2
	TOTAL	10

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

MDB FACE MANUFACTURER AND SERIAL NUMBER:

Plascore Serial Number 058C0901-4 020C1001

POSITION OF IMPACT (MDB) ON TOW SYSTEM

Crabbed 27° to the left

MDB DETAILS:

Overall Width of Framework Carriage	=	<u>1250 mm</u>
Overall Length of MDB (incl. honeycomb impact face)	=	<u>4116 mm</u>
Wheelbase of Framework Carriage	=	<u>2578 mm</u>
Tread of Framework Carriage (Front & Rear)	=	<u>1880 mm</u>
C.G. Location Rearward of Front Axle	=	<u>1109.3 mm</u>
C.G. Location From Center Line	=	<u>-1.9 mm</u>
C.G. Location Above Ground Level	=	<u>477.2 mm</u>

MDB WEIGHT:

Left Front	=	<u>495.2</u>	kg	Left Rear	=	<u>184.8</u>	kg
Right Front	=	<u>278</u>	kg	Right Rear	=	<u>399.2</u>	kg
TOTAL FRONT	=	<u>773.2</u>	kg	TOTAL REAR	=	<u>584</u>	kg
% Total Weight	=	<u>57.0</u>	%	%Total Weight	=	<u>43.0</u>	%
TOTAL WEIGHT	=	<u>1357.2</u>	kg				

MDB IMPACT:

Impact Angle (MDB C/L to Target Vehicle)		<u>90°</u>	
Impact Speed	Primary	<u>61.8 km/h</u>	<u>38.4 mph</u>
	Secondary	<u>61.6 km/h</u>	<u>38.3 mph</u>
	Radar	<u>61.3 km/h</u>	<u>38.1 mph</u>
	On-Board	<u>61.8 km/h</u>	<u>38.4 mph</u>

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A Center of Bumper	=	<u>173</u>	mm
2. Row B Top of Bumper	=	<u>116</u>	mm
3. Row C Mid-Level	=	<u>90</u>	mm
4. Row D Top of Stack	=	<u>582</u>	mm

INSTRUMENTATION:

Number of MDB Data Channels = 5

DATA SHEET NO. 4**POST-TEST OBSERVATIONS**Vehicle: 2003 Toyota Matrix 4-Door SedanNHTSA No.: M3 5106**VISIBLE DUMMY CONTACT POINTS:**

	<u>LEFT FRONT SID</u>	<u>LEFT REAR SID</u>
Head	No visible contact	Top of head to C-Pillar
Upper Torso	To left front door panel below window sill	To left rear door panel 120 mm below window sill
Lower Torso	To left front door panel at arm rest	To left rear door panel above arm rest
Left Knee	To left front door panel 350 mm above sill panel	To left rear door panel in front of window switch
Right Knee	To left front door panel below arm rest	To left rear door panel 180 mm below arm rest

DOOR OPENING:

	<u>LEFT DOOR</u>	<u>RIGHT DOOR</u>
Front	Closed/Inoperable/Remained Latched	Closed/Operable/ Remained Latched
Rear	Closed/Inoperable/ Remained Latched	Closed/Operable/ Remained Latched

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal	<u>5 mm below</u>	Vertical	<u>20 mm rearward</u>
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ARM REST LOCATIONS:

Front	<u>240 mm below window opening</u>
Rear	<u>270 mm below window opening</u>

SEAT MOVEMENT:

Front	<u>Seat cushion crush 50 mm; seat back crush 95 mm</u>
Rear	<u>Seat cushion crush 100 mm; seat back crush 50 mm</u>

GLAZING DAMAGE

Windshield	<u>None</u>
Window	<u>Left rear window shattered on impact</u>

PILLAR PERFORMANCE:

<u>None noted</u>

SILL SEPARATION

<u>None noted</u>

AIRBAG DEPLOYMENT STATUS:

	<u>DRIVER</u>	<u>FRONT PASSENGER</u>	<u>REAR PASSENGER</u>
<u>FRONT</u>	<u>Did not deploy</u>	<u>Did not deploy</u>	<u>N/a</u>
<u>SIDE</u>	<u>N/a</u>	<u>N/a</u>	<u>N/a</u>

OTHER NOTABLE IMPACT EFFECTS:

<u>None noted</u>

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET 5

SID INSTRUMENTATION DATA

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

	Front Dummy ID 058 Accelerations				Rear Dummy ID 056 Accelerations			
	Max		Min		Max		Min	
	G's	msec	G's	msec	G's	msec	G's	msec
HEAD ACCELERATIONS								
Longitudinal (X)	6.7	177.3	-21.2†	83.0†	4.5†	31.0†	-14.5	77.6
Lateral (Y)	26.6	55.4	-18.2†	38.9†	137.4	53.2	-9.8	81.2
Vertical (Z)	49.9	64.3	-11.5†	81.2†	18.1†	51.3†	-40.7	59.6
Resultant (R)	51.1	64.3			137.4	53.2		
HIC36	206.5				702.8			
RIB ACCELERATIONS								
Upper Rib Lateral (Y)	40.6	48.1	-8.7	95.0	43.3	43.1	-2.5	188.1
Upper Rib Lateral (Y _R)	39.5	48.1	-8.9	95.0	41.6	43.1	-2.4	174.4
Lower Rib Lateral (Y)	49.8	40.0	-6.5	112.5	57.1	46.9	-4.3	71.3
Lower Rib Lateral (Y _R)	50.5	39.4	-6.6	112.5	55.7	46.9	-4.1	71.3
SPINE ACCELERATIONS								
Lower Lateral (Y)	57.8	40.0	-6.8	89.4	60.0	45.6	-6.2	71.9
Lower Lateral (Y _R)	57.9	40.0	-7.3	88.8	59.3	45.6	-6.1	71.3
PELVIS ACCELERATIONS								
Lateral (Y)	64.5	35.6	-10.7	56.3	73.2	40.6	-8.8	69.4
Lateral (Y _R)	77.0	32.5	-10.6	56.3	75.2	40.6	-9.0	69.4

REFERENCE:

Positive Direction -	Anterior/Posterior	+(X) = anterior
	Lateral	+(Y)= right
	Superior/Inferior	+(Z)= inferior
Negative Direction	Anterior/Posterior	-(X) = posterior
	Lateral	-(Y)= left
	Superior/Inferior	-(Z)= superior

All the above data (except head accelerations) has been filtered using FIR (Version 1.0; July 16, 1990)

Head Accelerations have been filtered at SAE Class 1000

Y_R denotes redundant Y-direction accelerometer

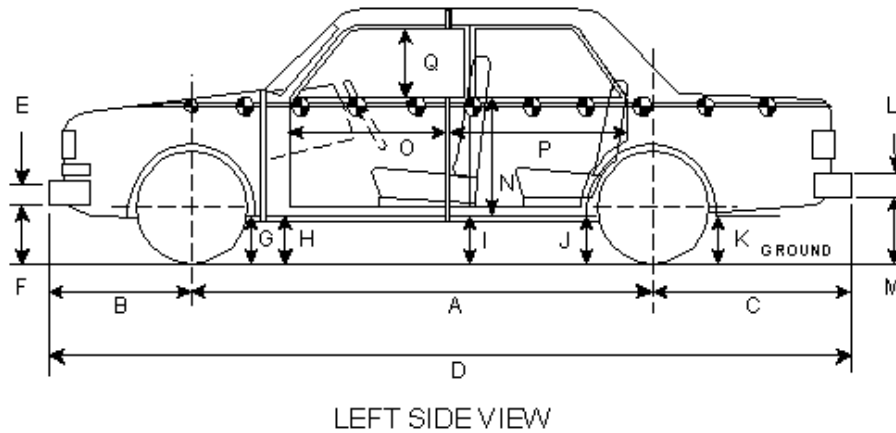
† Relative min/max tabular display does not include transient data spike 31 msec after impact

DATA SHEET 6

VEHICLE PRE- AND POST- MEASUREMENTS

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



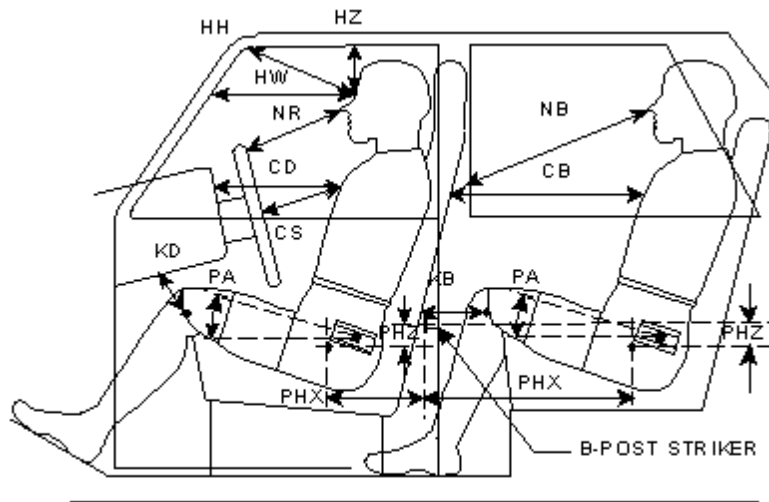
	PRE-TEST As delivered (mm)	PRE-TEST As Tested (mm)	POST-TEST (mm)	Δ CHANGE (mm)
A	2600	-	2578	-22
B	697	-	708	11
C	708	-	712	4
D	4352	-	4348	-4
E	274	-	273	-1
F	308	292	311	19
G	192	170	320	150
H	194	171	317	146
I	207	183	300	117
J1	235	202	219	17
J2	204	170	277	107
K	334	294	282	-12
L	246	-	247	1
M	372	330	311	-19
N	796	-	700	-96
O	1040	-	985	-55
P	866	-	827	-39
Q	469	-	585	116
R	4005	-	4015	10
S	4005	-	3998	-7
T	1705	-	1420	-285

DATA SHEET 7

SID LONGITUDINAL CLEARANCE DIMENSIONS

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



LEFT SIDE VIEW

NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

	DRIVER ID# 058	LEFT REAR PASSENGER ID# 056
HH	355	N/a
HW	653	N/a
HZ	246	235
NR/NB	500	632
CD/CB	553	544
CS	336	N/a
KDL(KDA°)/KBL(KDA°)	159/24°	191/14.8°
KDR(KDA°)/KBR(KDA°)	149/25°	181/16.2°
PA°	23.7°	23.8°
PHX	200 forward	235 forward
PHZ	213 below	324 below

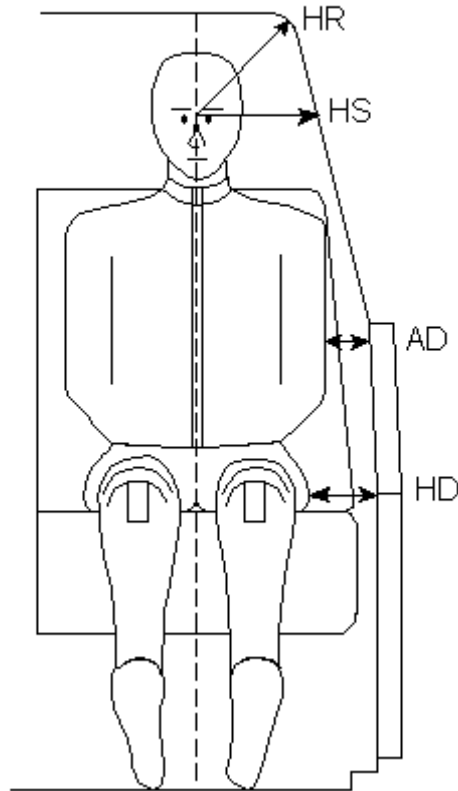
Note: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-Pillar striker as a reference point

DATASHEET 8

SID LATERAL CLEARANCE DIMENSIONS

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



NOTE: All dimensions are in millimeters with tolerance of ± 3 mm

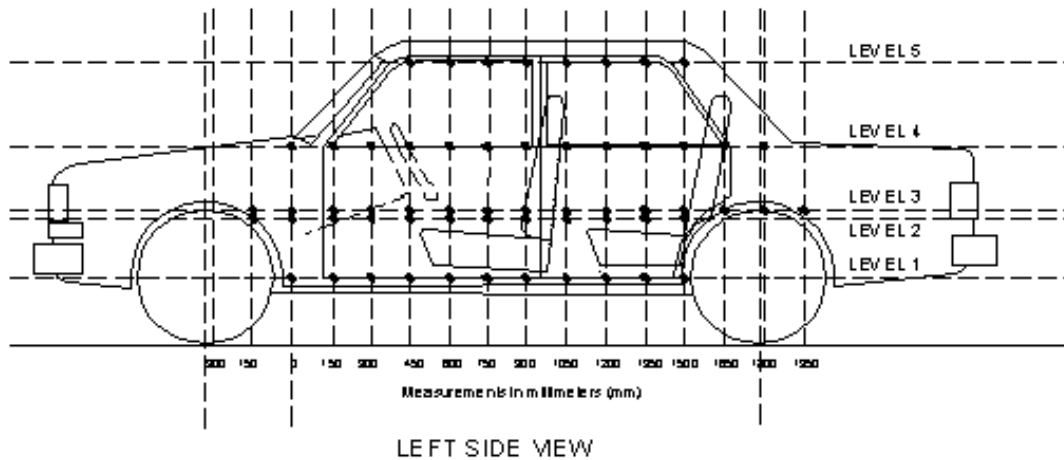
	DRIVER ID# 058		LEFT REAR PASSENGER ID# 056	
HR	219		223	
HS	332		327	
AD	Upper 99	Lower 76	Upper 94	Lower 81
HD	152		136	

DATA SHEET 9

VEHICLE SIDE MEASUREMENTS

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



LEVEL 5 = WINDOW TOP
 LEVEL 4 = WINDOW SILL
 LEVEL 3 = MID-DOOR
 LEVEL 2 = OCCUPANT H-POINT
 LEVEL 1 = AXLE CENTERLINE HEIGHT OR SILL TOP HEIGHT

MEASUREMENTS ARE TAKEN WHEN THE VEHICLE IS IN THE “AS TESTED” CONFIGURATION
 Measurements along the Vertical 750 mm line as shown

Level 5 @ Window Top	1432 mm
Level 4 @ Window Sill	1007 mm
Level 3 @ Mid-Door	653 mm
Level 2 @ Occupant H-Point	607 mm
Level 1 @ Axle Centerline or Sill Top Height	278 mm

DATA SHEET 10

VEHICLE EXTERIOR CRUSH PROFILES – ALL LEVELS

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

Note: All Dimensions are in millimeters with a tolerance of ± 3 mm

			DISTANCE IN MILLIMETERS (mm) FROM IMPACT POINT																												
HEIGHT			-900	-750	-600	-450	-300	-150	0	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000		
LEVEL 1	278	PRE								230	236	235	234	233	232	232	233	235	235	235	228										
		POST								352	365	373	376	383	388	393	399	390	387	372	350										
		CRUSH								122	129	138	142	150	156	161	166	155	152	137	122										
LEVEL 2	607	PRE	247	211					185	195	200	203	204	205	206	207	209	210	210	204	187	180					214	242			
		POST	251	220						265	432	465	475	470	458	460	471	475	478	482	479	445	314					223	247		
		CRUSH	4	9						80	237	265	272	266	253	254	264	266	268	272	275	258	134					9	5		
LEVEL 3	653	PRE	255	218					189	192	202	204	204	205	206	207	209	210	211	209	195	185	180	183	195	221	254				
		POST	253	218						259	405	464	477	465	465	475	490	497	496	488	468	434	327	262	235	230	230	260			
		CRUSH	-2	0						70	213	262	273	261	260	269	283	288	286	277	259	239	142	82	52	35	9	6			
LEVEL 4	1007	PRE		340	319	302	292	288	283	275	292	294	296	298	300	302	304	307	310	315	318	323	327	337	346	359	379				
		POST		335	316	305	299	298	300	310	350	366	374	372	384	406	417	408	393	380	345	317	360	356	356	359	375				
		CRUSH		-5	-3	3	7	10	17	35	58	72	78	74	84	104	113	101	83	65	27	-6	33	19	10	0	-4				
LEVEL 5	1432	PRE											476	479	480	492	493	492	490	486	482	477	472	469	469						
		POST											482	487	500	510	508	509	506	503	501	488	4780	470	466						
		CRUSH											6	8	20	18	15	17	16	17	19	11	6	1	-3						

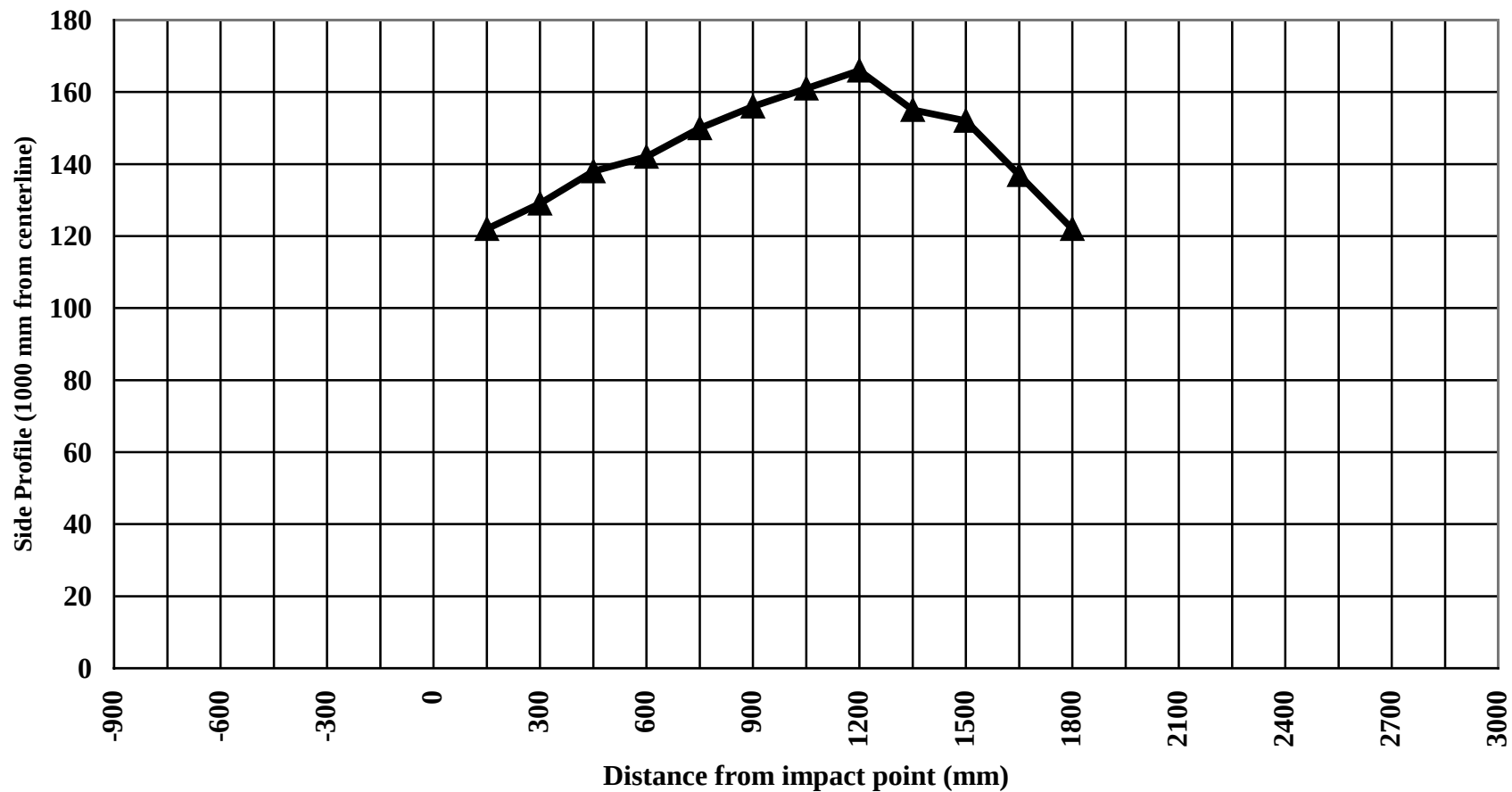
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

SIDE PROFILE LEVEL 1 -278 mm above ground



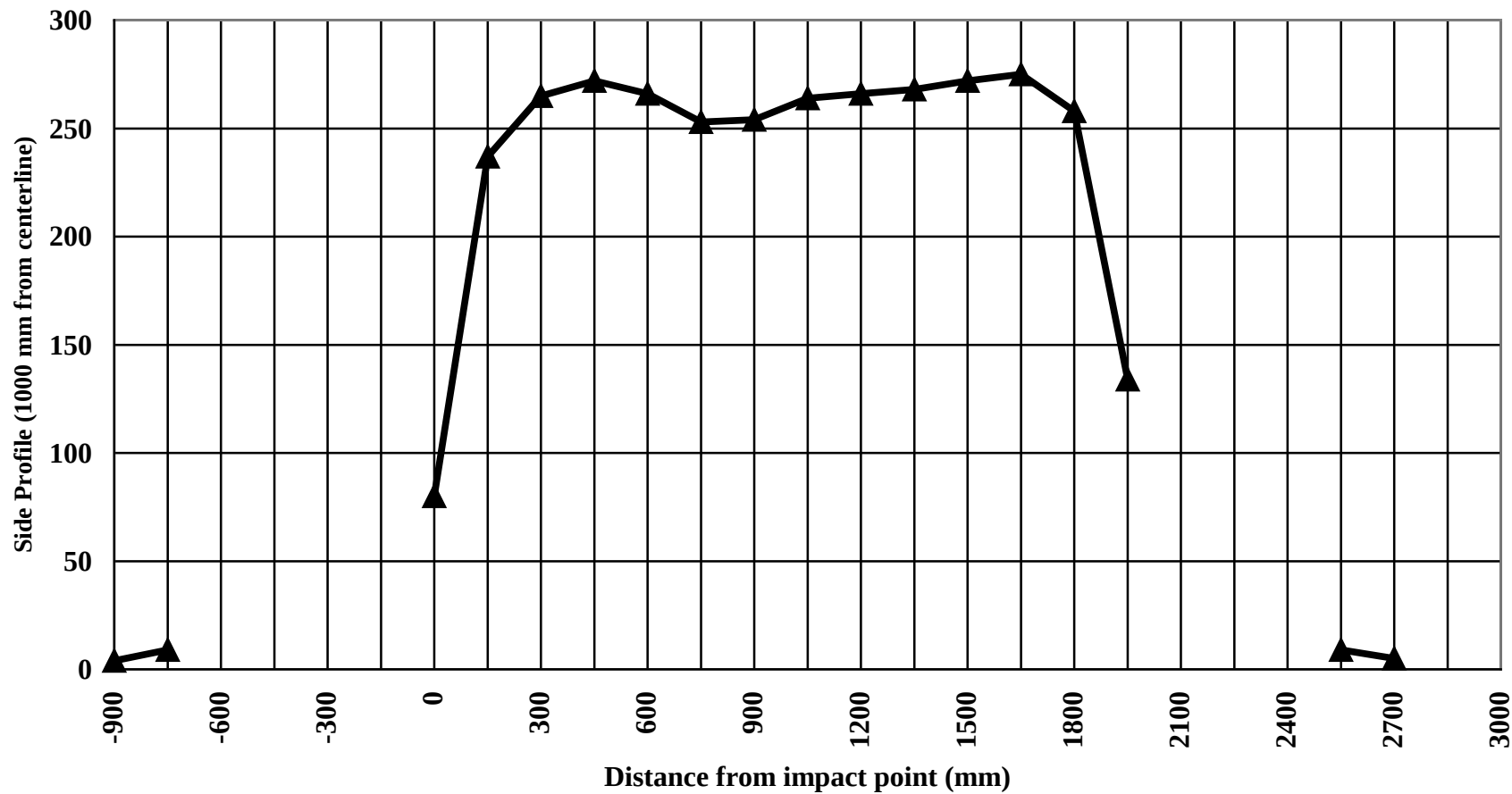
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

SIDE PROFILE LEVEL 2 - 607 mm above ground



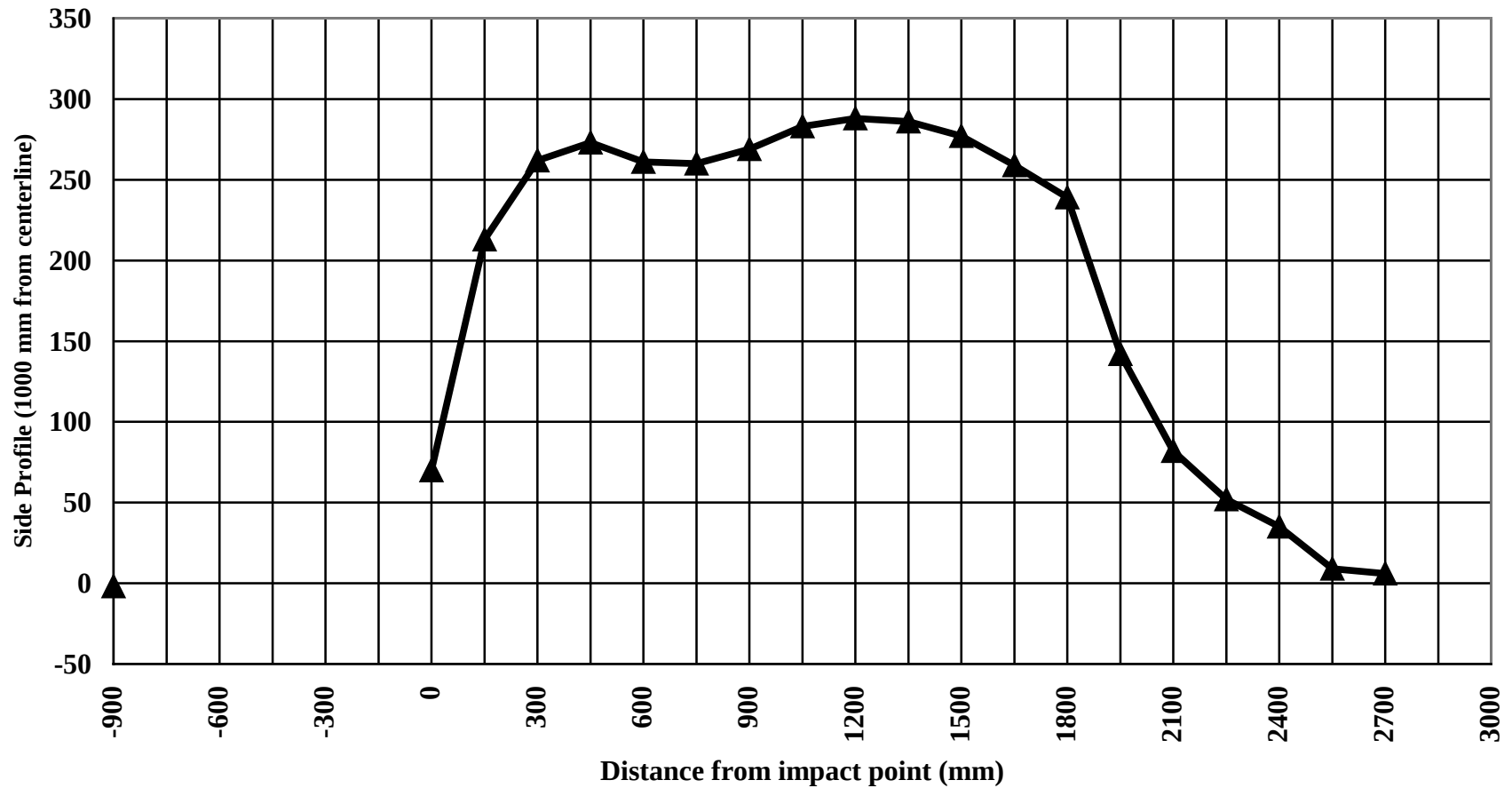
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

SIDE PROFILE LEVEL 3 - 653 mm above ground



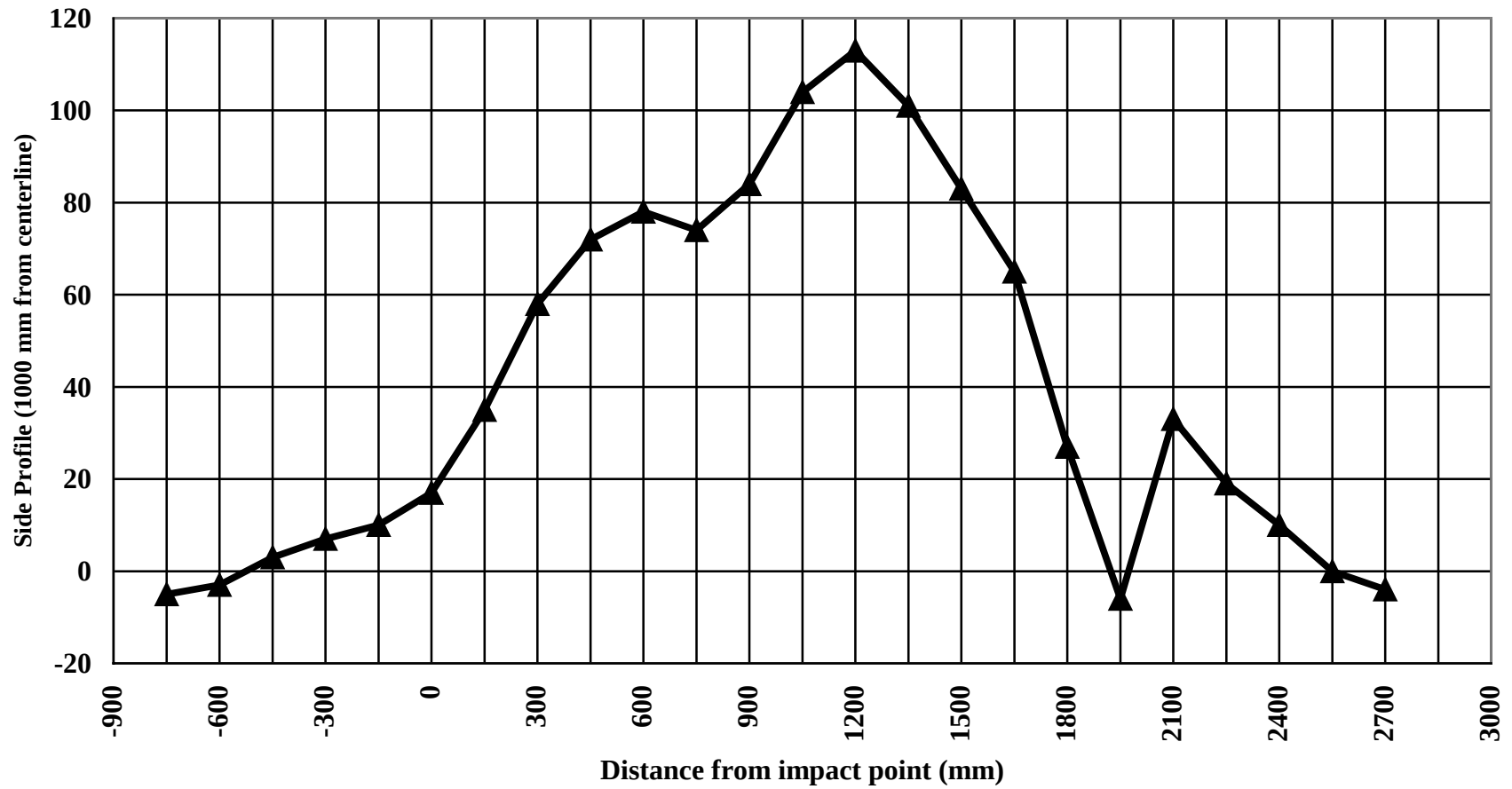
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

SIDE PROFILE LEVEL 4 - 930 mm above ground



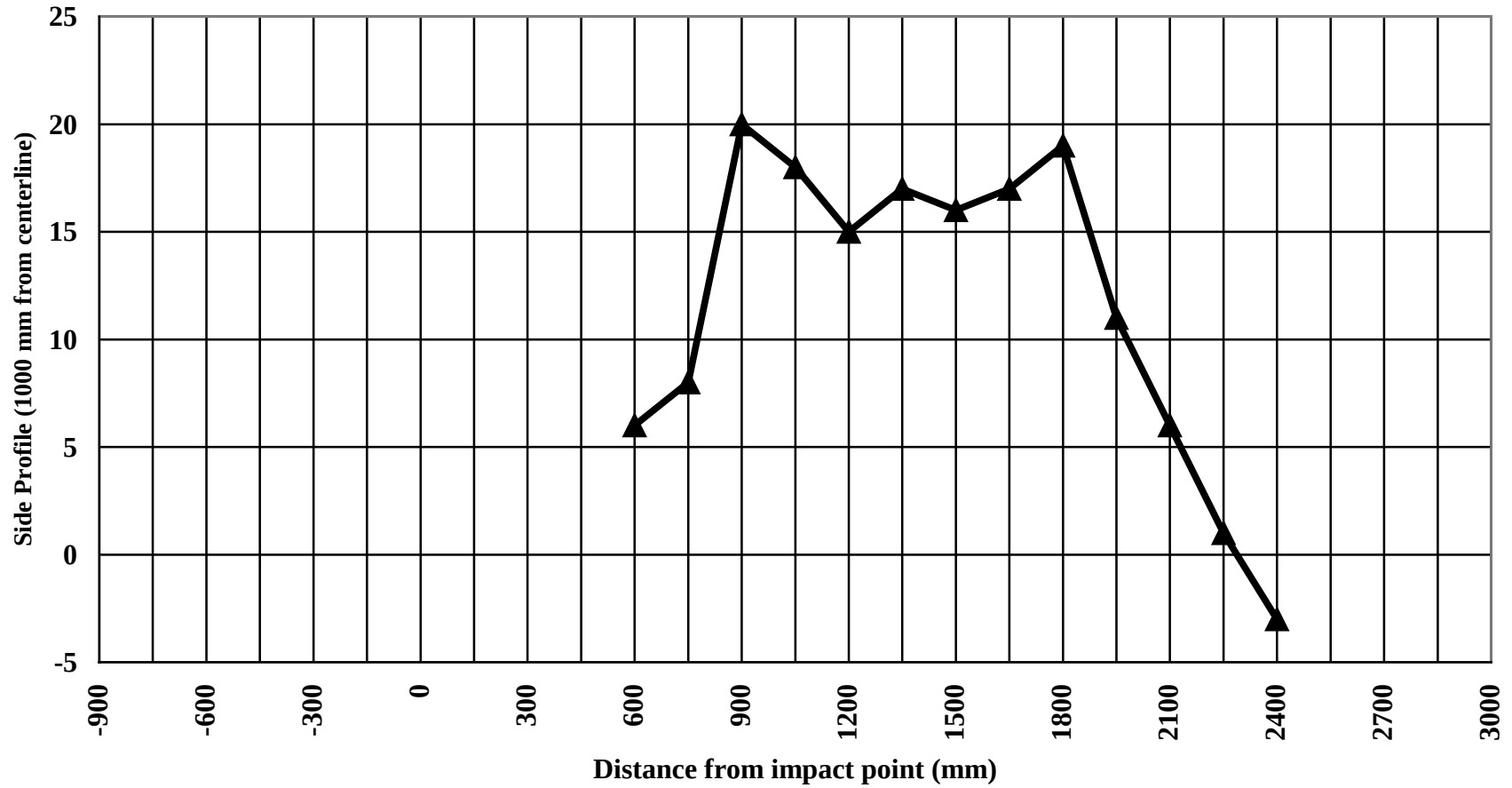
DATA SHEET 10 (continued)

VEHICLE EXTERIOR CRUSH PROFILES

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

SIDE PROFILE LEVEL 5 - 1933 mm above ground

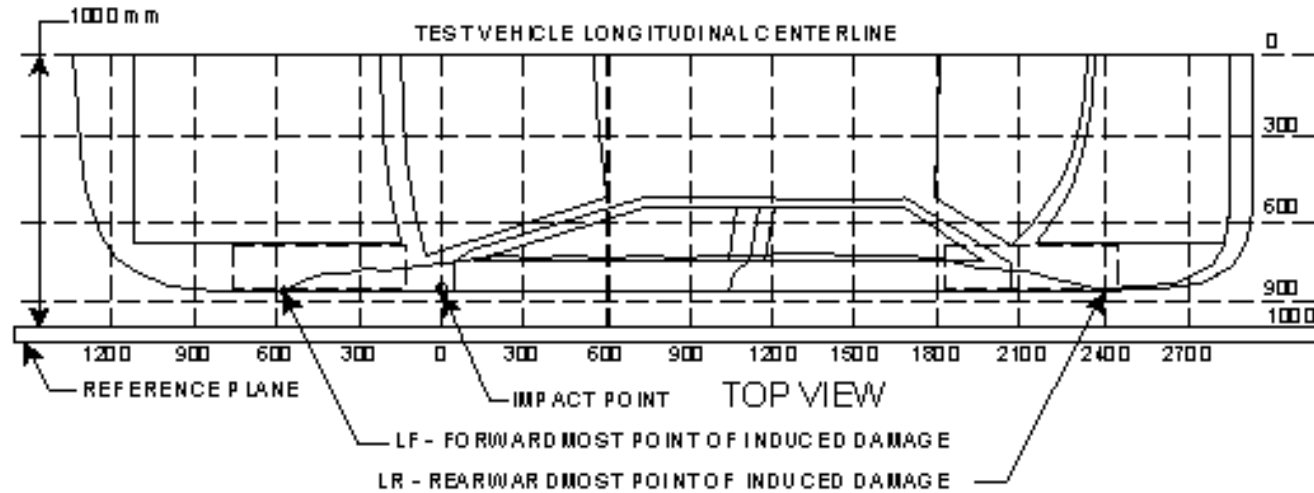


DATA SHEET 11

VEHICLE DAMAGE PROFILE DISTANCES

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



DPD MEASUREMENTS (mm)		POST-TEST (mm)	PRE-TEST (mm)	STATIC CRUSH (mm)
1	-450	200	200	0
2	120	335	204	131
3	690	463	210	253
4	1260	493	215	278
5	1830	433	221	212
6	2400	230	230	0

DATA SHEET 12

STATIC CRUSH OF IMPACTOR FACE (Grid as looking at MDB from front)

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

Note: All Dimensions are in millimeters with a tolerance of ± 3 mm

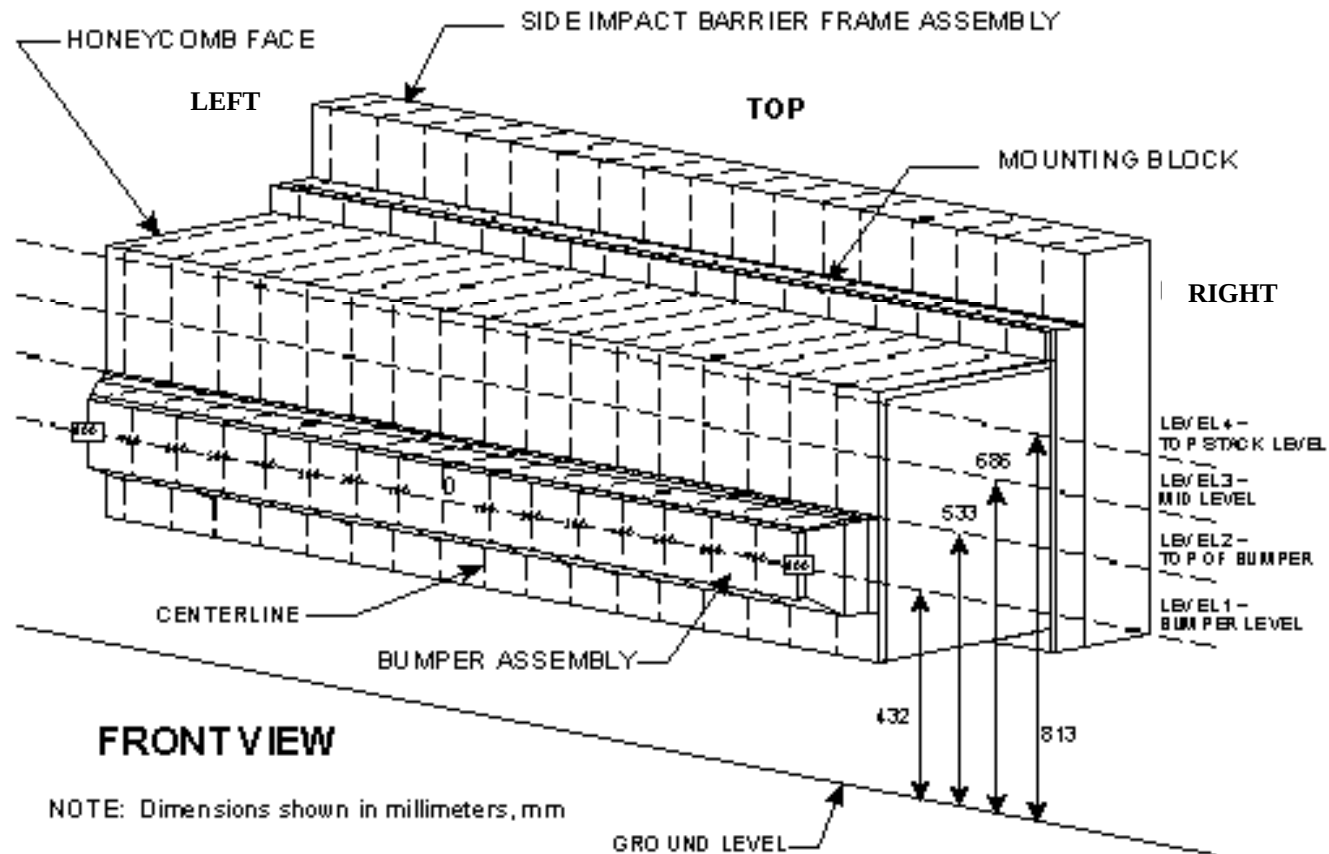
LEVEL	HEIGHT AT CL (mm)		DISTANCE LEFT OF CENTER								0	DISTANCE RIGHT OF CENTER							
			800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
LEVEL 4 TOP STACK	810	PRE-	524	524	524	524	524	524	524	525	524	525	525	525	525	526	526	527	528
		POST-	657	613	582	555	541	552	578	579	570	570	572	575	577	585	602	616	604
		CRUSH	133	89	582	31	17	28	54	54	46	45	47	50	52	59	76	89	76
LEVEL 3 MID- LEVEL	685	PRE-	523	522	523	523	523	523	523	523	523	523	524	524	525	525	525	525	526
		POST-	599	572	554	544	540	542	543	541	542	544	545	547	550	555	562	575	616
		CRUSH	76	50	31	21	17	19	20	18	19	21	21	23	25	30	37	50	90
LEVEL 2 TOP BUMPER	560	PRE-	521	521	521	521	521	521	521	521	522	522	522	522	523	523	523	523	524
		POST-	637	633	616	600	584	573	573	572	570	574	581	587	583	580	592	594	595
		CRUSH	116	112	95	79	63	52	52	51	48	52	59	65	60	57	69	71	71
LEVEL 1 MID- BUMPER	432	PRE-	430	418	418	418	418	418	418	419	418	419	419	419	420	420	420	421	432
		POST-	603	580	566	551	538	533	533	536	538	539	542	544	543	547	550	553	575
		CRUSH	173	162	148	133	120	115	115	117	120	120	123	125	123	127	130	132	143

DATA SHEET 12 (continued)

STATIC CRUSH OF IMPACTOR FACE

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

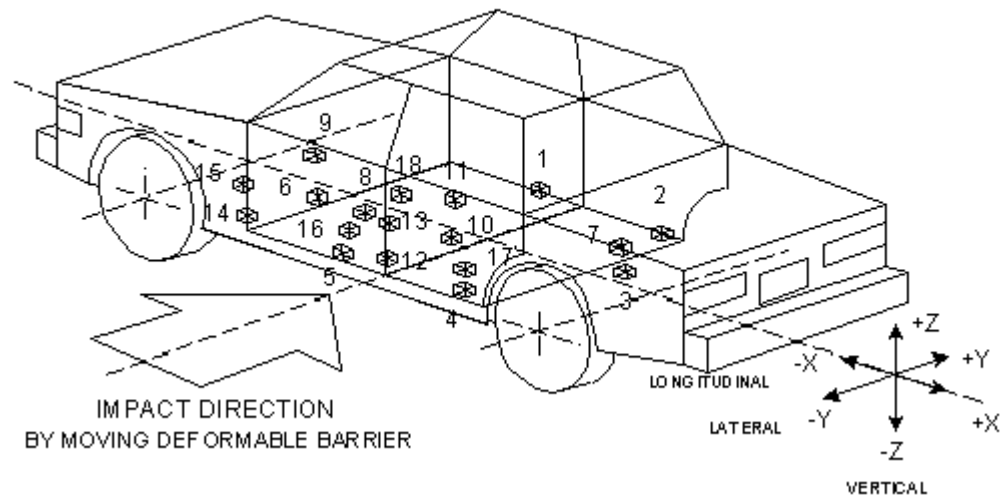


DATA SHEET 13

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



1. Right Side Sill at Front Seat	10. Mid-rear of Left Rear Door
2. Right Side Sill at Rear Seat	11. Left Rear Door Upper Centerline
3. Rear Floorpan Above Axle	12. Left Lower B-Pillar
4. Left Side Sill at Rear Seat	13. Left Middle B-Pillar
5. Left Side Sill at Front Seat	14. Left Lower A-Pillar
6. Left Front Door on Centerline	15. Left Middle A-Pillar
7. Right Rear Occupant Compartment	16. Front Seat Track
8. Mid-rear of Left Front Door	17. Rear Seat Track
9. Left Front Door Upper Centerline	18. Vehicle CG

DATASHEET 13

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z mm	Max		Min		Max		Min		Max		Min		Max	
					G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
1	Right Side Sill at Front Seat	2540	620	360	4.8	62.2	-5.3	17.0	19.7	6.6	-3.3	138.9	4.1	75.9	-7.8	13.4	19.8	6.6
2	Right Side Sill at Rear Seat	1530	600	330	5.6	62.3	-4.1	17.0	22.1	32.2	-2.8	90.9	4.0	31.6	-8.4	13.9	22.8	31.7
3	Rear Floorpan Above Axle	985	20	80	4.8	31.5	-11.4	50.2	27.9	31.8	-2.3‡	103.6‡	7.2	7.2	-6.2	56.8	29.5	31.8
4	Left Side Sill at Rear Seat	1540	-700	346					44.6	8.6	-5.9	54.3						
5	Left Side Sill at Front Seat	2466	-646	323					41.2	8.5	-9.4	17.7						
6	Left Front Door on Centerline	2370	-740	-120					102.7	7.9	-70.1	26.5						
7	Right Rear Occupant Compartment	1425	351	122					23.4	35.4	-7.1	30.3						
8	Midrear of Left Front Door	2363	-827	-50					113.8†	9.2†	-73.4†	29.4†						
9	Left Front Door Upper Centerline	2082	-837	-381					122.6	19.5	-95.2	29						
10	Midrear of Left Rear Door	1155	-840	-300					99.2	6.5	-54.7	38.2						

Axis Origin
 X – Rear Bumper
 Y – Vehicle Centerline
 Z – Middle of rear bumper

Axis Orientation
 +(X) Forward
 +(Y) Right
 +(Z) Down

† Wire broken approximately 31 msec after impact

‡ Data not valid between 50-53 msec

DATASHEET 13 (continued)

VEHICLE ACCELEROMETER LOCATIONS AND SUMMARY DATA

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z mm	Max		Min		Max		Min		Max		Min		Max	
					G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
11	Left Rear Door Upper Centerline	1405	-790	-385					91.8	19.4	-48.2	29.4						
12	Left Lower B-Pillar	1985	-705	160					193.6	5.7	-33.1	11.2						
13	Left Middle B-Pillar	1904	-705	-308					164.3	5.6	-34.8	22.9						
14	Left Lower A-Pillar	3011	-706	160					98.0	3.5	-17.7	21.7						
15	Left Middle A-Pillar	3000	-707	-175					41.2	3.0	-33.7	6.9						
16	Front Seat Track	1425	-356	120					111.5	19.2	-70.8	26.4						
17	Rear Seat Track	204	-570	225					22.6	35.7	-31.8	7.4						
18	Vehicle CG	2400	3	207	3.9	5.5	-8.8	16.9	24.8	21.8	-2.1	134.2	19.3	14.0	-19.4	10.2	26.6	21.8

Axis Origin

X – Rear Bumper

Y – Vehicle Centerline

Z – Middle of rear bumper

Axis Orientation

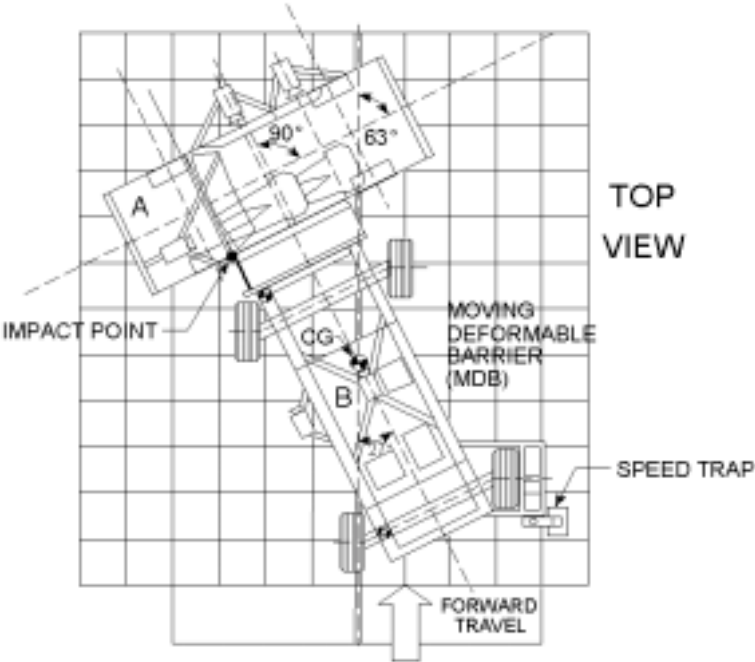
+(X) Forward

+(Y) Right

+(Z) Down

DATA SHEET 14

MDB ACCELEROMETER LOCATIONS AND DATA SUMMARY



Location		Coordinates			Longitudinal (X)				Lateral (Y)				Vertical (Z)				Resultant	
		X mm	Y mm	Z mm	Max		Min		Max		Min		Max		Min		Max	
					G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec	G's	msec
1	MDB Center of Gravity	1113	-1	311	1.6	129.0	-21.0	32.7	4.0	59.0	-7.9	23.4	7.0	55.7	-5.8	18.5	22.3	32.5
2	MDB Rear Frame Member	2812	-614	585	2.2	93.1	-22.8	35.0	4.3	22.3	-1.5	62.2						

Axis Origin

X –Rear Plate
Y – Vehicle Centerline
Z – Top of Rear Plate

Axis Orientation

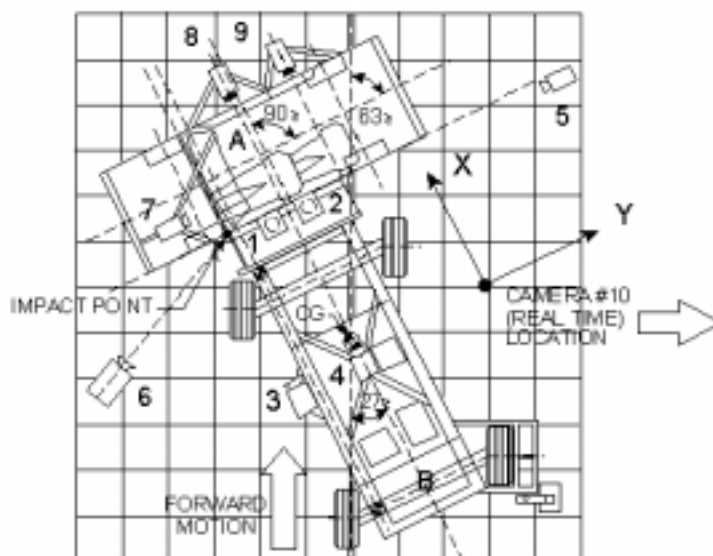
+(X) Forward
+(Y) Right
+(Z) Down

DATA SHEET 15

HIGH-SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



Camera No.	View	Coordinates (mm)*			Angle wrt Horiz.	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead view of test vehicle	110	990	4623	-90	7	1000
2	Overhead close-up view of impact plane	30	305	4629	-90	12	1000
3	MDB onboard close-up view of impact point	-2333	-60	-32	0.4	13	1000
4	MDB onboard view of driver dummy	-2262	840	468	-3.9	13	1000
5	Right side ground level overall view	3900	13577	620	-4.2	45	1000
6	Left side ground level overall view	-401	-4447	820	-13.1	8	1000
7	Test vehicle onboard driver front view	430	-530	371	-15	10	1000
8	Test vehicle onboard driver side view	1790	810	114	-5	7.5	1000
9	Test vehicle onboard passenger side view	1797	1520	121	-5	7.5	1000
10	Real-time film coverage of test	-	-	-	-	-	-

* Reference: (from point of impact)
 + X = Forward
 + Y = To Right
 + Z = Upward

SECTION 5
FUEL SYSTEM INTEGRITY

DATA SHEET 16

FUEL SYSTEM INTEGRITY DATA

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106

TEST REQUIREMENTS:

Drain the test vehicle's fuel system and operate the engine until the fuel system is dry. Add Stoddard solvent, which has been dyed purple, until 92-94% of the stated usable capacity is reached. Operate the engine to assure the Stoddard solvent is present throughout the entire fuel system.

TEST VEHICLE IMPACT TYPE: Side impacting Moving Deformable Barrier contacting the driver side.

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0	29.6 ml
2. For 5 minute period after vehicle motion ceases	0	147.9 ml
3. For next 25 minutes	0	29.6 ml / 1 min.

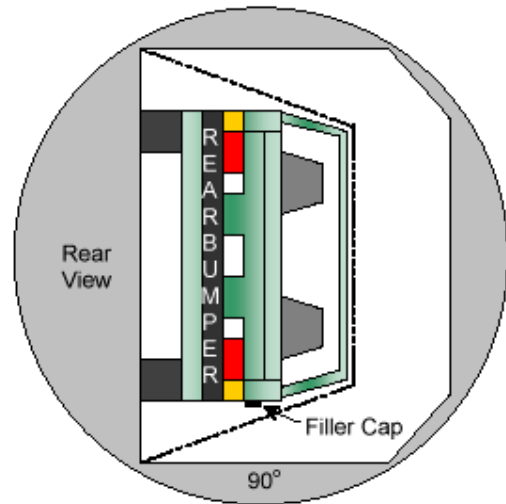
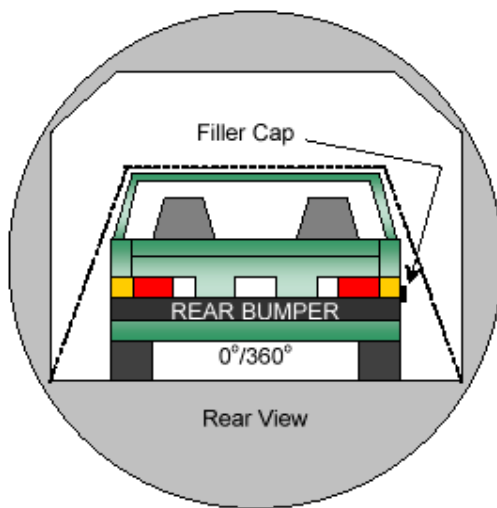
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17

ROLLOVER DATA

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



0° TO 90°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	1	minutes	5	seconds
(Spec Range =1 to 3 minutes)				
FMVSS 301 Position Hold Time	5	minutes	0	seconds
TOTAL	6	minutes	5	seconds
Next whole minute interval	7	minutes		

FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

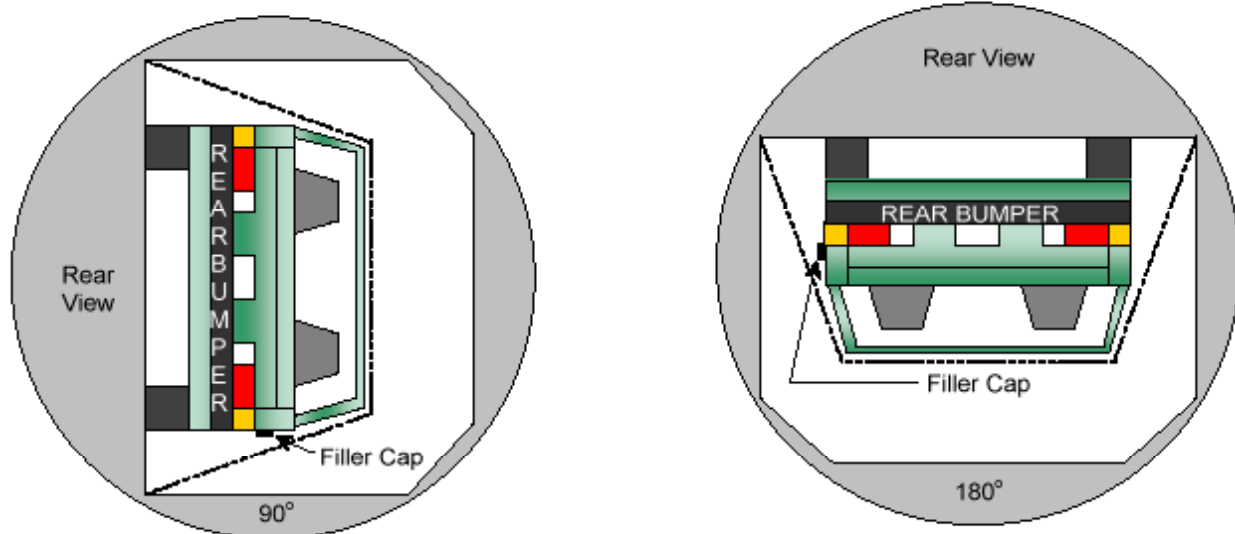
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



90° TO 180°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>6</u> seconds
(Spec Range =1 to 3 minutes)		
FMVSS 301 Position Hold Time	<u>5</u> minutes	<u>0</u> seconds
TOTAL	<u>6</u> minutes	<u>6</u> seconds
Next whole minute interval	<u>7</u> minutes	

FUEL SPILLAGE MEASUREMENT:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

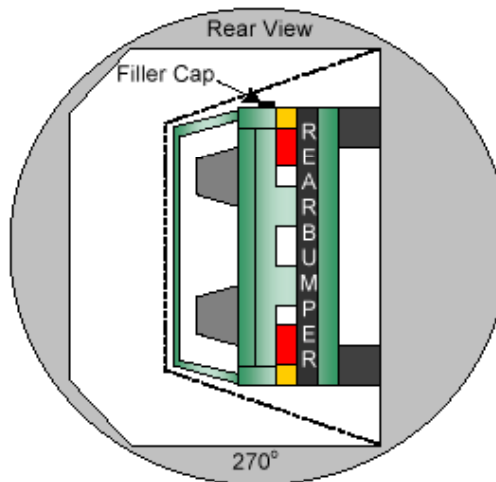
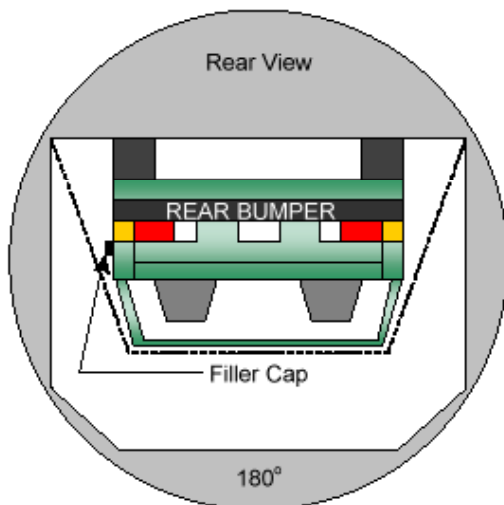
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



180° TO 270°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>6</u> seconds
(Spec Range =1 to 3 minutes)		
FMVSS 301 Position Hold Time	<u>5</u> minutes	<u>0</u> seconds
TOTAL	<u>6</u> minutes	<u>5</u> seconds
Next whole minute interval	<u>7</u> minutes	

FUEL SPILLAGE MEASUREMENT:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute From Onset of Rotation	-	29.6 ml

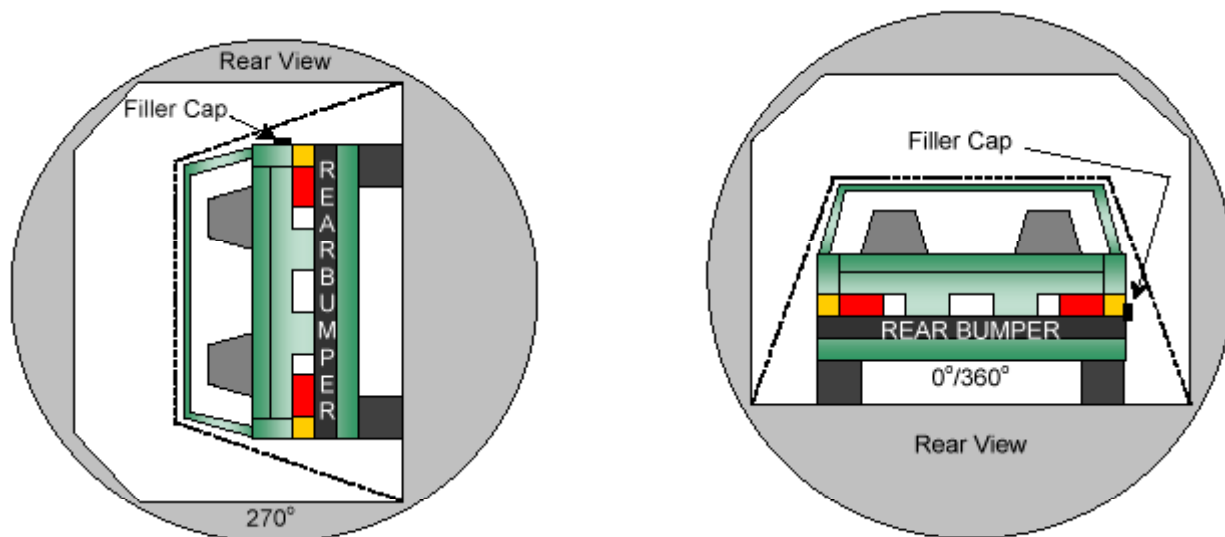
FUEL SPILLAGE LOCATION(S): None

DATA SHEET 17 (continued)

ROLLOVER VEHICLE

Vehicle: 2003 Toyota Matrix 4-Door Sedan

NHTSA No.: M3 5106



270° TO 360°

DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time	<u>1</u> minutes	<u>9</u> seconds
(Spec Range =1 to 3 minutes)		
FMVSS 301 Position Hold Time	<u>5</u> minutes	<u>0</u> seconds
TOTAL	<u>6</u> minutes	<u>14</u> seconds
Next whole minute interval	<u>7</u> minutes	

FUEL SPILLAGE MEASUREMENT:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0	147.9 ml.
2. Sixth Minute From Onset of Rotation	0	29.6 ml.
3. Seventh Minute From Onset of Rotation	0	29.6 ml
4. Eighth Minute if Required	-	29.6 ml

FUEL SPILLAGE LOCATION(S): None

APPENDIX A
PHOTOGRAPHS

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Figure A-11 PRE-TEST RIGHT REAR VIEW OF TEST VEHICLE

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Figure A-13: PRE-TEST RIGHT SIDE VIEW OF TEST VEHICLE



Figure A-14: POST-TEST RIGHT SIDE VIEW OF TEST VEHICLE



Figure A-15: PRE-TEST FRONT RIGHT VIEW OF TEST VEHICLE



Figure A-16: POST-TEST FRONT RIGHT VIEW OF TEST VEHICLE



Figure A-17: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-18: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-19: PRE-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-20: POST-TEST RIGHT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-21: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-22: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF FRONT SID



Figure A-23: PRE-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID



Figure A-24: POST-TEST LEFT OCCUPANT COMPARTMENT VIEW OF REAR SID

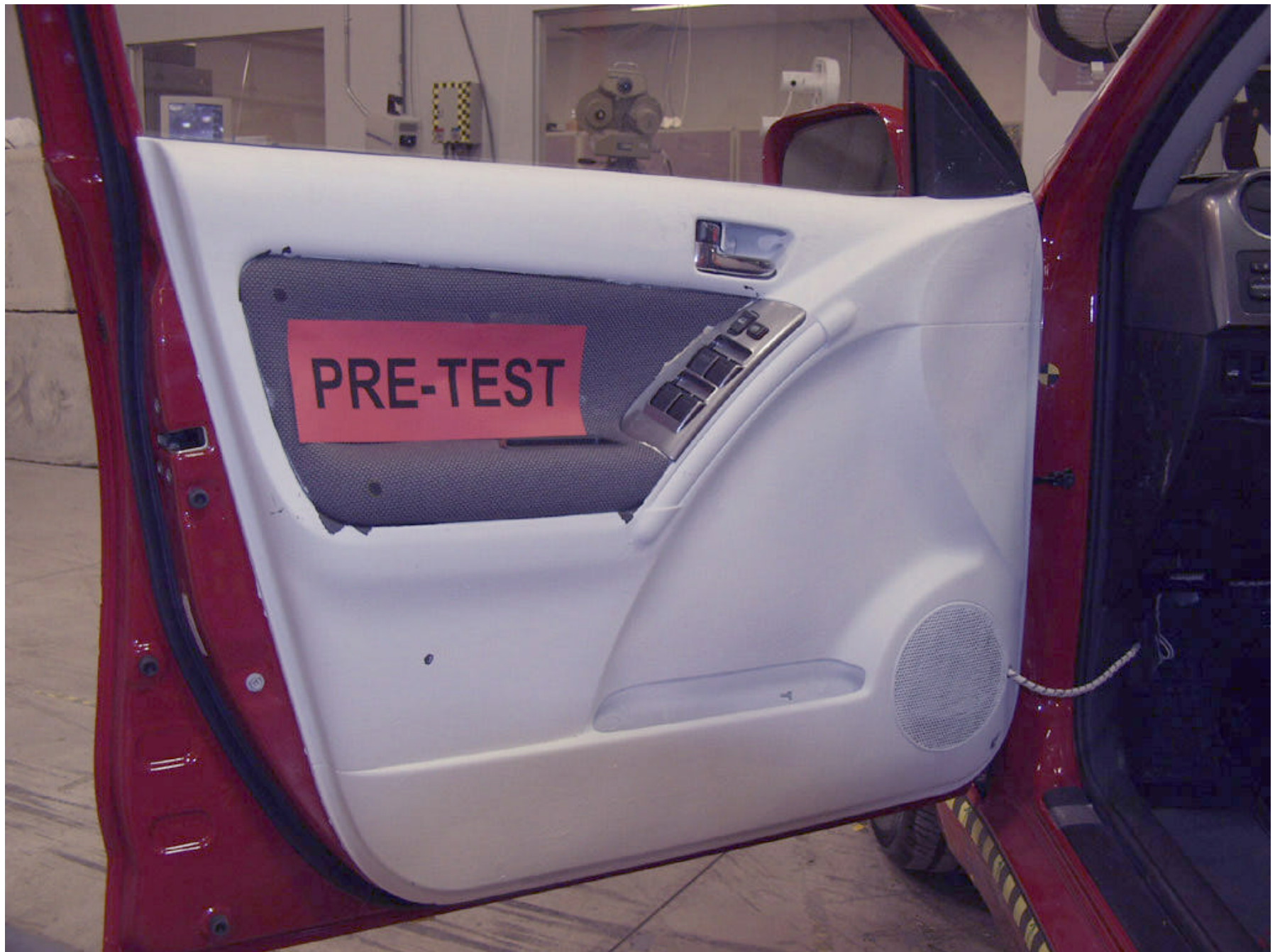


Figure A-25: PRE-TEST INTERIOR OF FRONT DOOR



Figure A-26: POST-TEST INTERIOR OF FRONT DOOR SHOWING SID IMPACT LOCATIONS



Figure A-27: PRE-TEST INTERIOR OF REAR DOOR



Figure A-28: POST-TEST INTERIOR OF REAR DOOR SHOWING SID IMPACT LOCATIONS



Figure A-29: PRE-TEST LEFT SIDE VIEW OF MDB IN IMPACT POSITION



Figure A-30: POST-TEST LEFT SIDE VIEW OF MDB



Figure A-31: PRE-TEST RIGHT SIDE VIEW OF MDB IN IMPACT POSITION



Figure A-32: POST-TEST FRONT RIGHT VIEW OF MDB

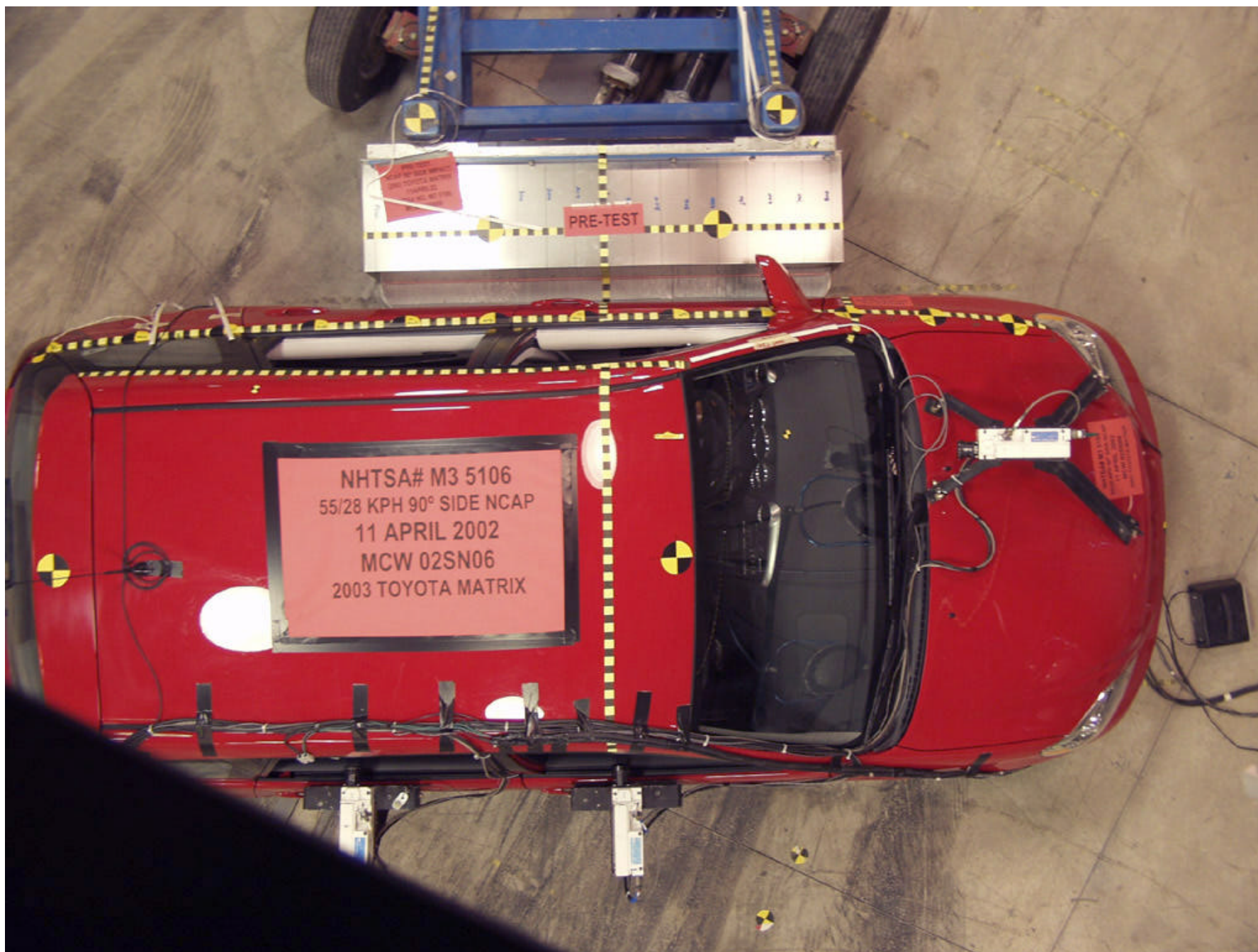


Figure A-33: PRE-TEST OVERHEAD VIEW OF MDB IN IMPACT POSITION

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Figure A-35: PRE-TEST CLOSE-UP OF IMPACT POINT TARGET SHOWING WELDING ROD



Figure A-36: POST-TEST CLOSE-UP OF IMPACT POINT TARGET

MFD.BY:TOYOTA MOTOR MANUFACTURING
CANADA INC. 02/02

GVWR 3935LB GAWR FR 1970LB RR 1985LB
THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND
THEFT PREVENTION STANDARDS IN EFFECT ON
THE DATE OF MANUFACTURE SHOWN ABOVE.

2T1LR32E83C009312 PASS.CAR



C/TR:3L5/FB13
A/TM:-04A/U341F

MODEL:ZZE134L - DHPNKA
MADE IN CANADA

104

AA01946800

Figure A-37: CLOSE-UP OF VEHICLE'S CERTIFICATION LABELS

VEHICLE CAPACITY WEIGHT: 8601bs (390kg)
DESIGNATED SEATING CAPACITY: TOTAL 5 (FRONT 2, REAR 3)
RECOMMENDED COLD TIRE INFLATION PRESSURE: psi (kPa)
UP TO VEHICLE CAPACITY WEIGHT FRONT 35 (240), REAR 32 (220)
RECOMMENDED TIRE SIZE: P205/55R16 89H
COMPACT SPARE TIRE
RECOMMENDED COLD TIRE INFLATION PRESSURE: 60psi (420kPa)
RECOMMENDED TIRE SIZE: T135/80R16 101M
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION

CHARGE MAXIMALE DU VEHICULE: 860LIVRES (390kg)
NOMBRE DESIGNÉ DE PLACES ASSISES: TOTAL 5
(AVANT 2, ARRIERE 3)
PRESSION RECOMMANDEE DE GONFLAGE A FROID DES PNEUS
AU POIDS MAXIMAL DU VEHICULE CHARGE: LB/PO² (kPa)
AVANT 35 (240), ARRIERE 32 (220)
DIMENSION RECOMMANDEE DES PNEUS: P205/55R16 89H
PNEU DE RECHANGE COMPACT
DIMENSION RECOMMANDEE DU PNEU: T135/80R16 101M
PRESSION RECOMMANDEE DE GONFLAGE A FROID: 60LB/PO² (420kPa)
POUR DE PLUS AMPLES DETAILS, VOIR LE MANUEL DU PROPRIETAIRE

01140 **B3**

Figure A-38: CLOSE-UP OF VEHICLE'S TIRE PLACARD LABELS



Figure A-39: IMPACT



Figure A-40: ROLLOVER 0 DEGREES

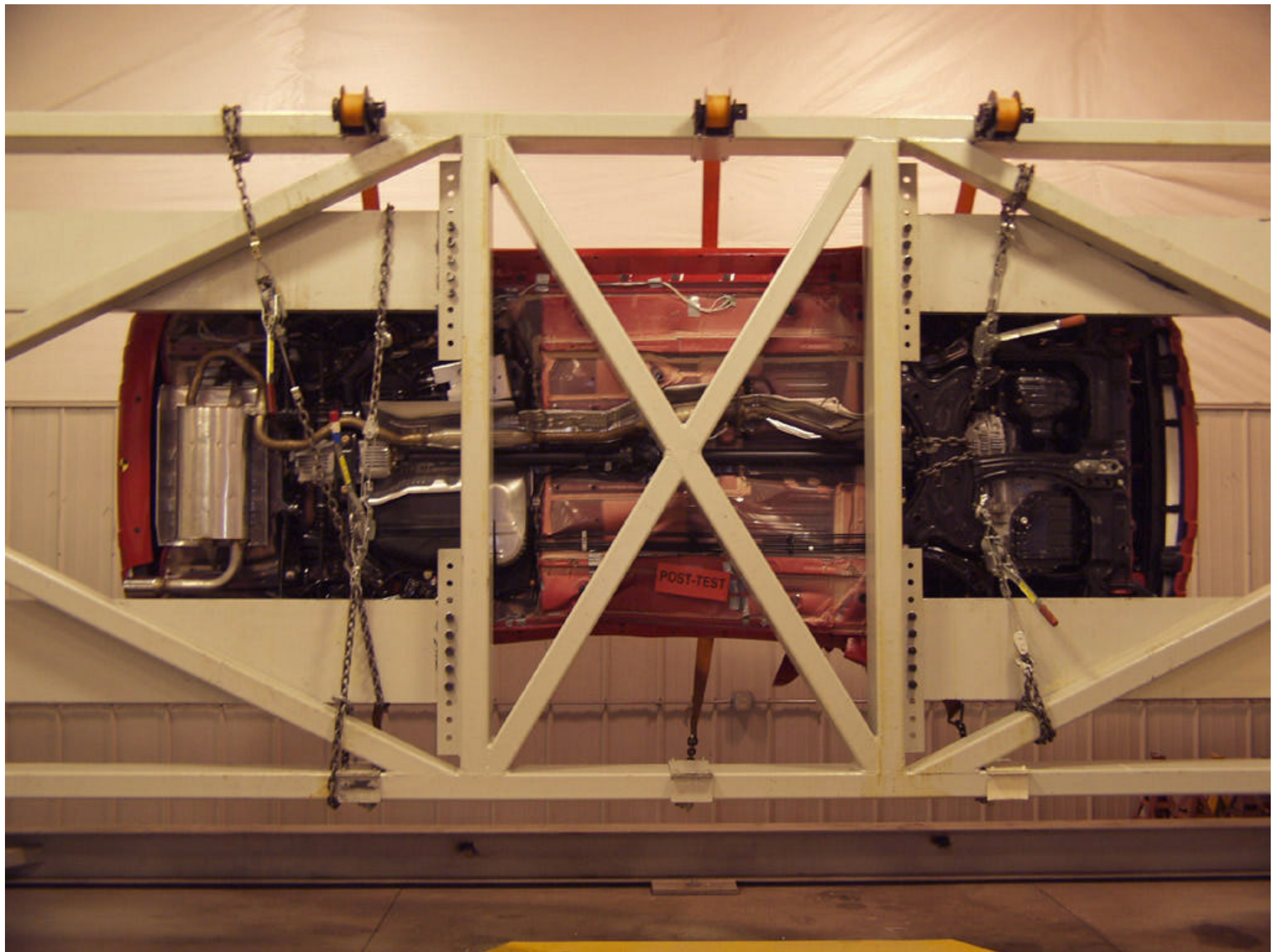


Figure A-41: ROLLOVER 90 DEGREES

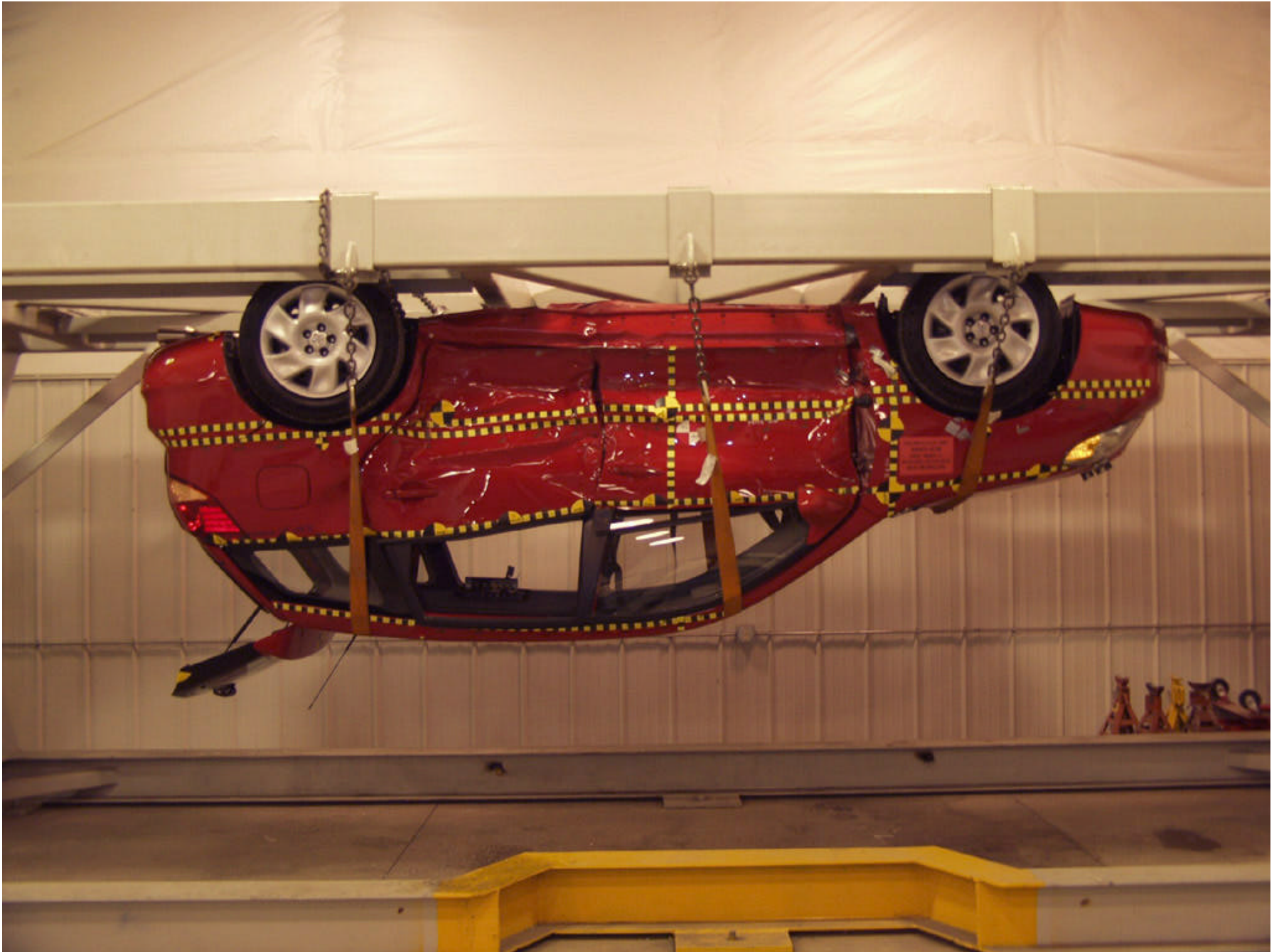


Figure A-42: ROLLOVER 180 DEGREES



Figure A-43: ROLLOVER 270 DEGREES



Figure A-44: ROLLOVER 360 DEGREES



Figure A-45: PRE-TEST ALUMINUM BARRIER FRONT



Figure A-46: POST-TEST ALUMINUM BARRIER FRONT



Figure A-47: PRE-TEST ALUMINUM BARRIER LEFT SIDE



Figure A-48: POST-TEST ALUMINUM BARRIER LEFT SIDE



Figure A-49: PRE-TEST ALUMINUM BARRIER RIGHT SIDE



Figure A-50: POST-TEST ALUMINUM BARRIER RIGHT SIDE



Figure A-51: PRE-TEST ALUMINUM BARRIER OVERHEAD



Figure A-52: POST-TEST ALUMINUM BARRIER OVERHEAD

APPENDIX B

VEHICLE, MDB, AND SID RESPONSE DATA

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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS ACCELERATION DATA – FIR FILTERED

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MDB INSTRUMENTATION PLOTS
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOTS (REDUNDANT)
ACCELERATION DATA – FILTER CLASS 1000, LOWER SPINE FILTER CLASS 180
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DRIVER AND PASSENGER DUMMY INSTRUMENTATION PLOT (REDUNDANT)
ACCELERATION DATA – FIR FILTERED

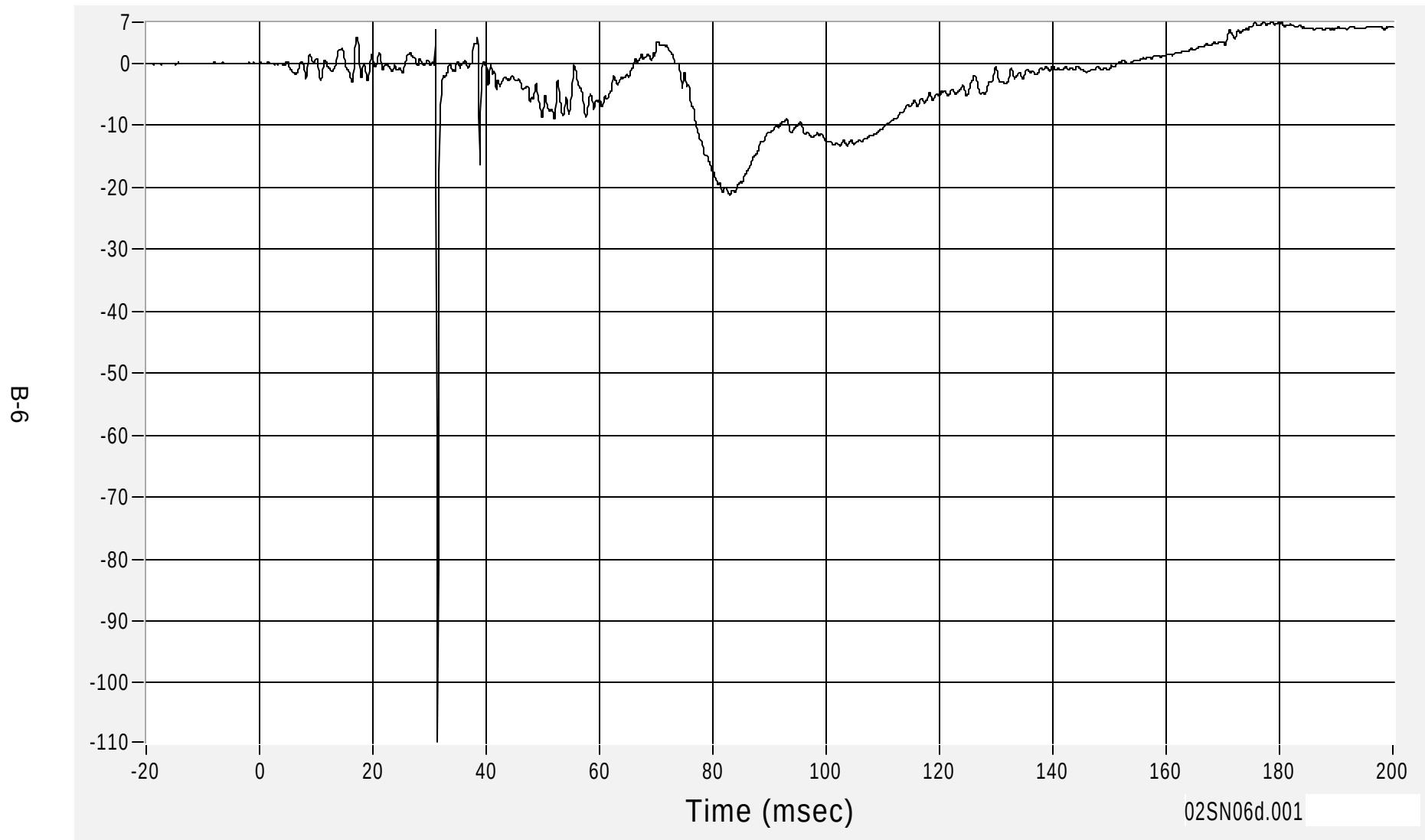
<u>Plot No.</u>	<u>Data Plot Title</u>	<u>Page</u>
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129	PASSENGER PELVIS (Y) ACCELERATION-REDUNDANT	B-134

Driver Head CG (X) Acceleration

Max 6.6 G's at 177.3 msec

Acceleration (G's) CFC1000

Min -109.5 G's at 31.4 msec



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11 April 2002

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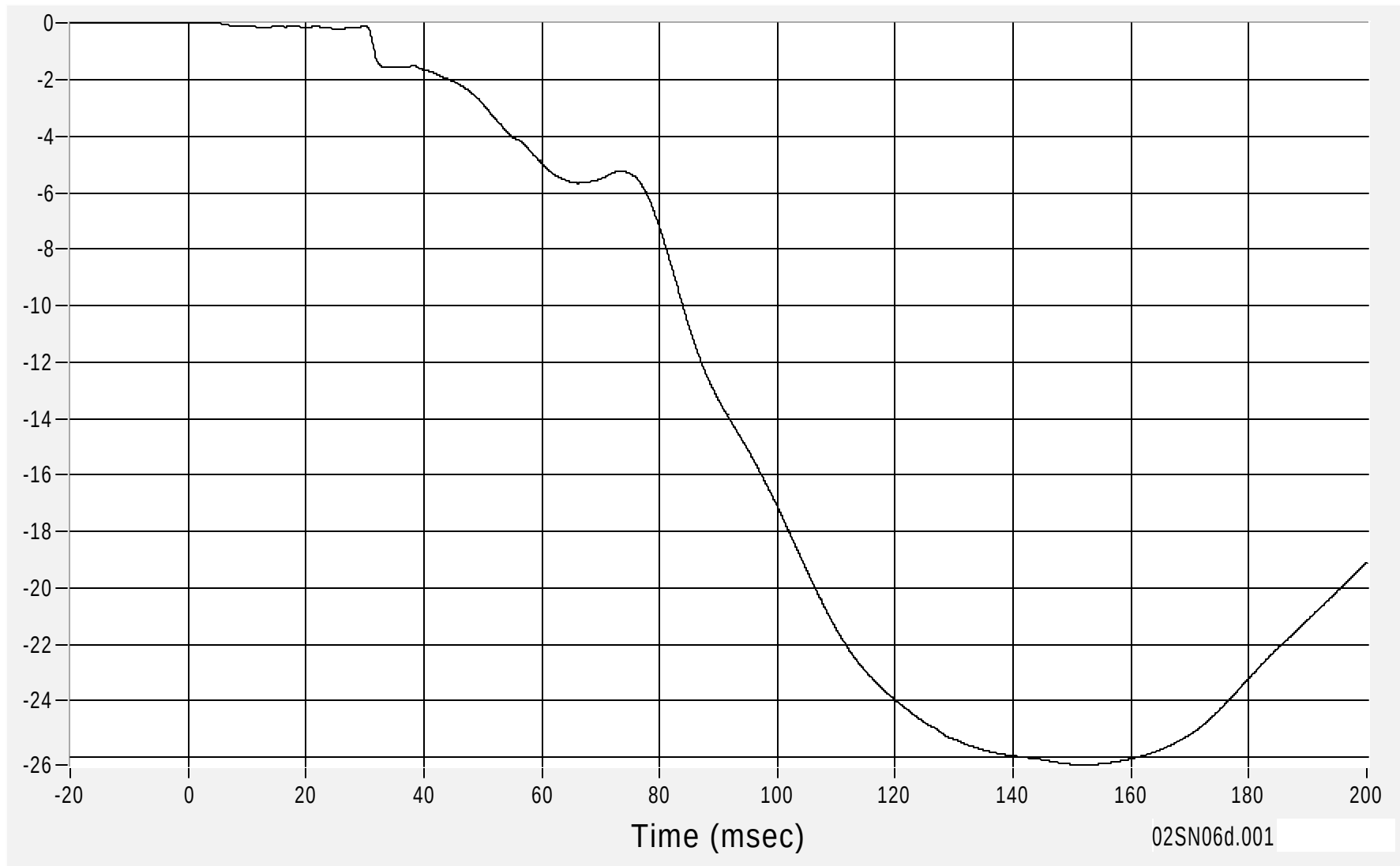
Driver Head CG (X) Velocity

Velocity (km/h) CFC180

Max 0.0 km/h at 2.0 msec

Min -26.3 km/h at 151.3 msec

B-7



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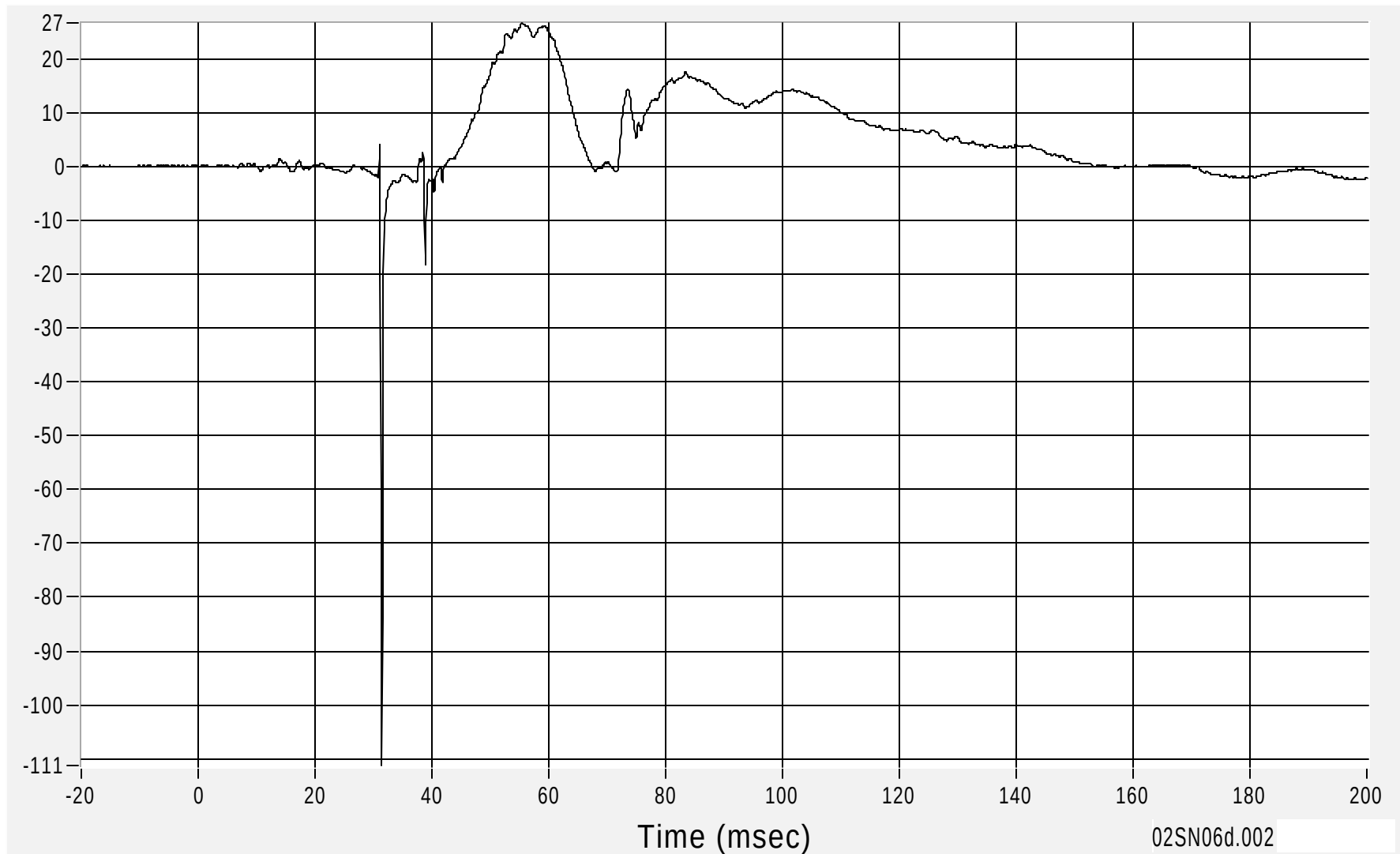
Driver Head CG (Y) Acceleration

Max 26.6 G's at 55.4 msec

Acceleration (G's) CFC1000

Min -111.3 G's at 31.4 msec

B-8



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11 April 2002

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Vehicle Crashworthiness Lab

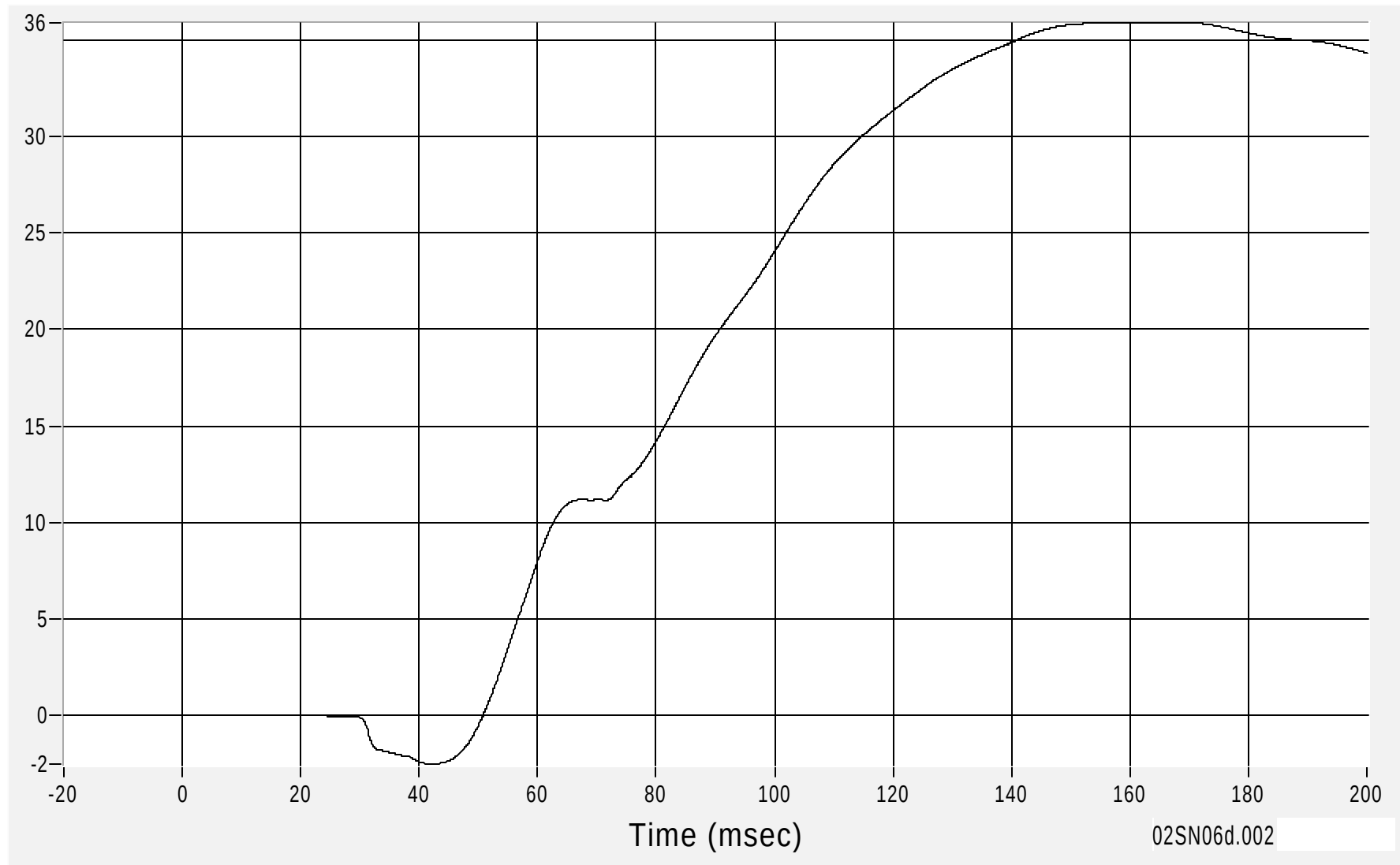
Driver Head CG (Y) Velocity

Max 35.9 km/h at 169.8 msec

Velocity (km/h) CFC180

Min -2.5 km/h at 42.2 msec

B-9



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11 April 2002

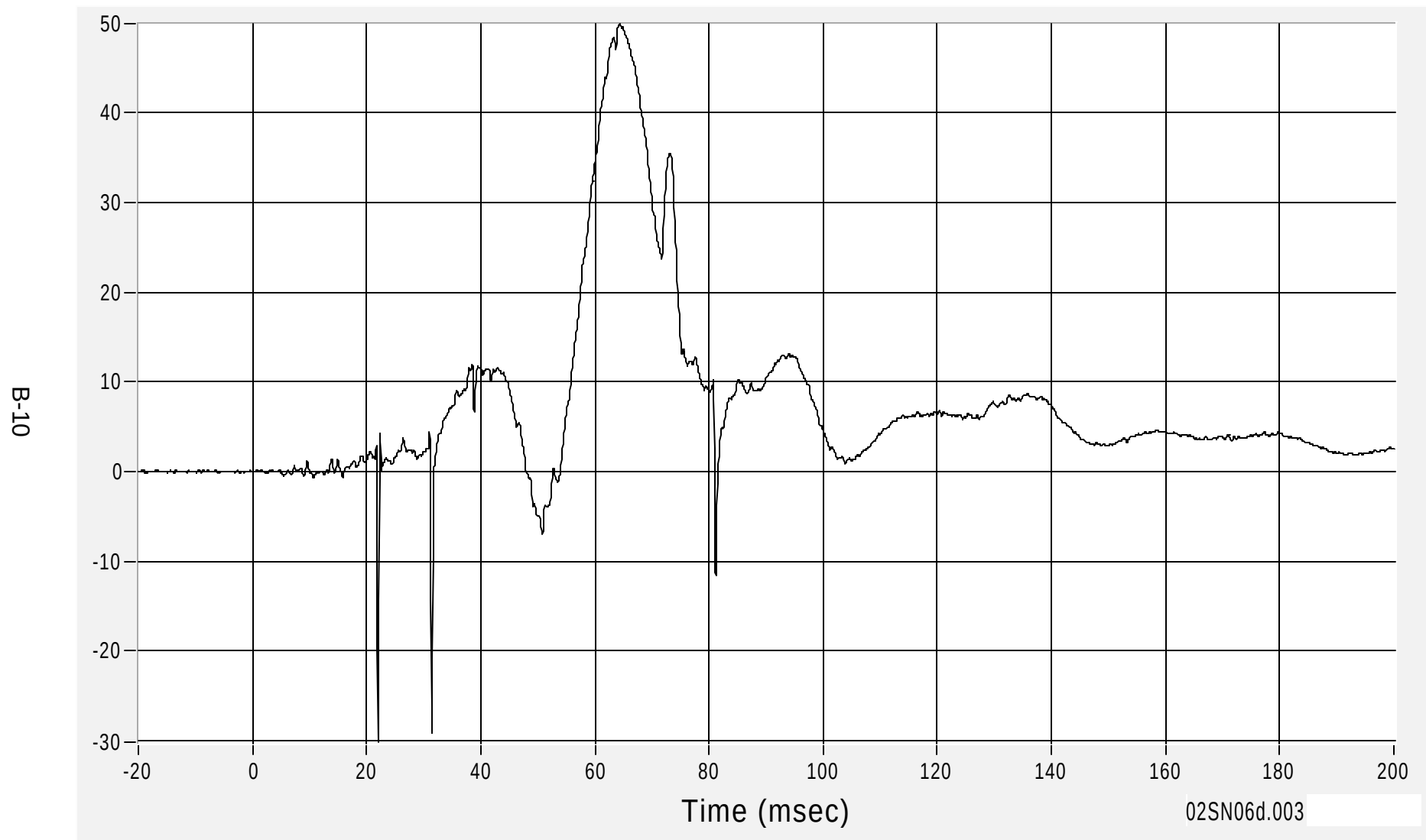
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Driver Head CG (Z) Acceleration

Max 49.9 G's at 64.3 msec

Acceleration (G's) CFC1000

Min -30.2 G's at 22.0 msec



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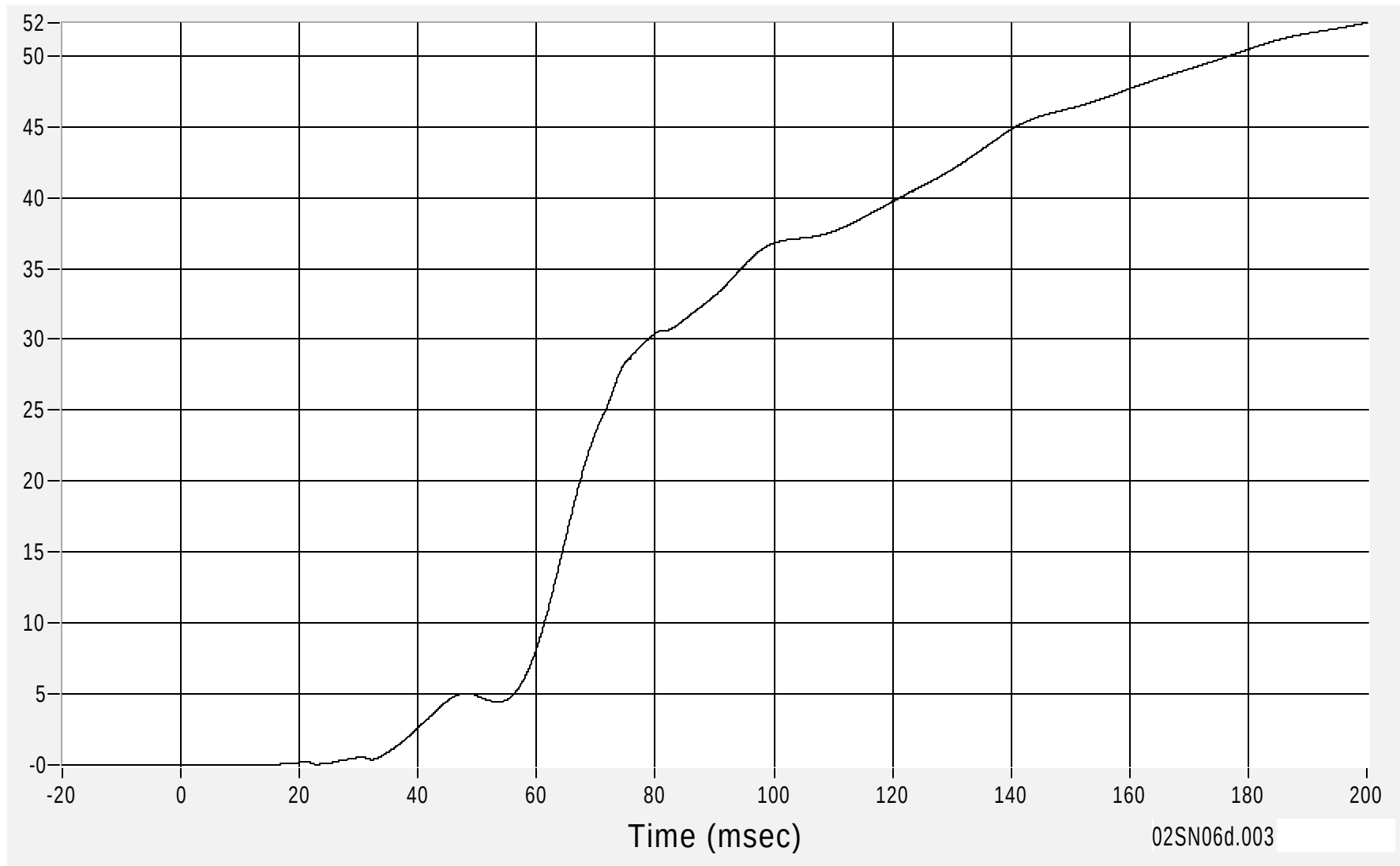
Driver Head CG (Z) Velocity

Velocity (km/h) CFC180

Max 52.3 km/h at 199.9 msec

Min 0.0 km/h at 6.8 msec

B-11



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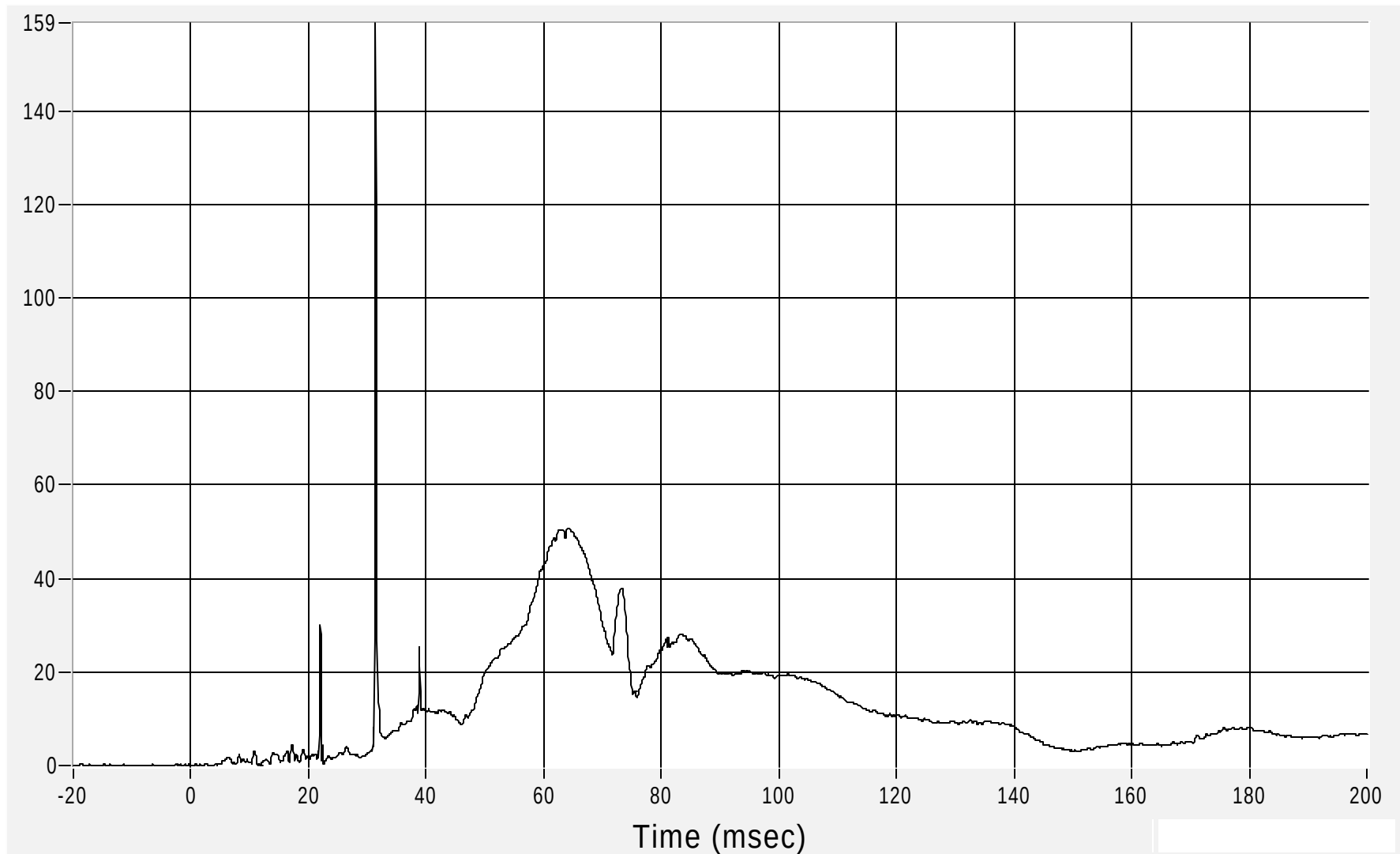
Driver Head Resultant Acceleration

Max 158.8 G's at 31.4 msec

Acceleration (G's) CFC1000

Min 0.0 G's at 1.3 msec

B-12



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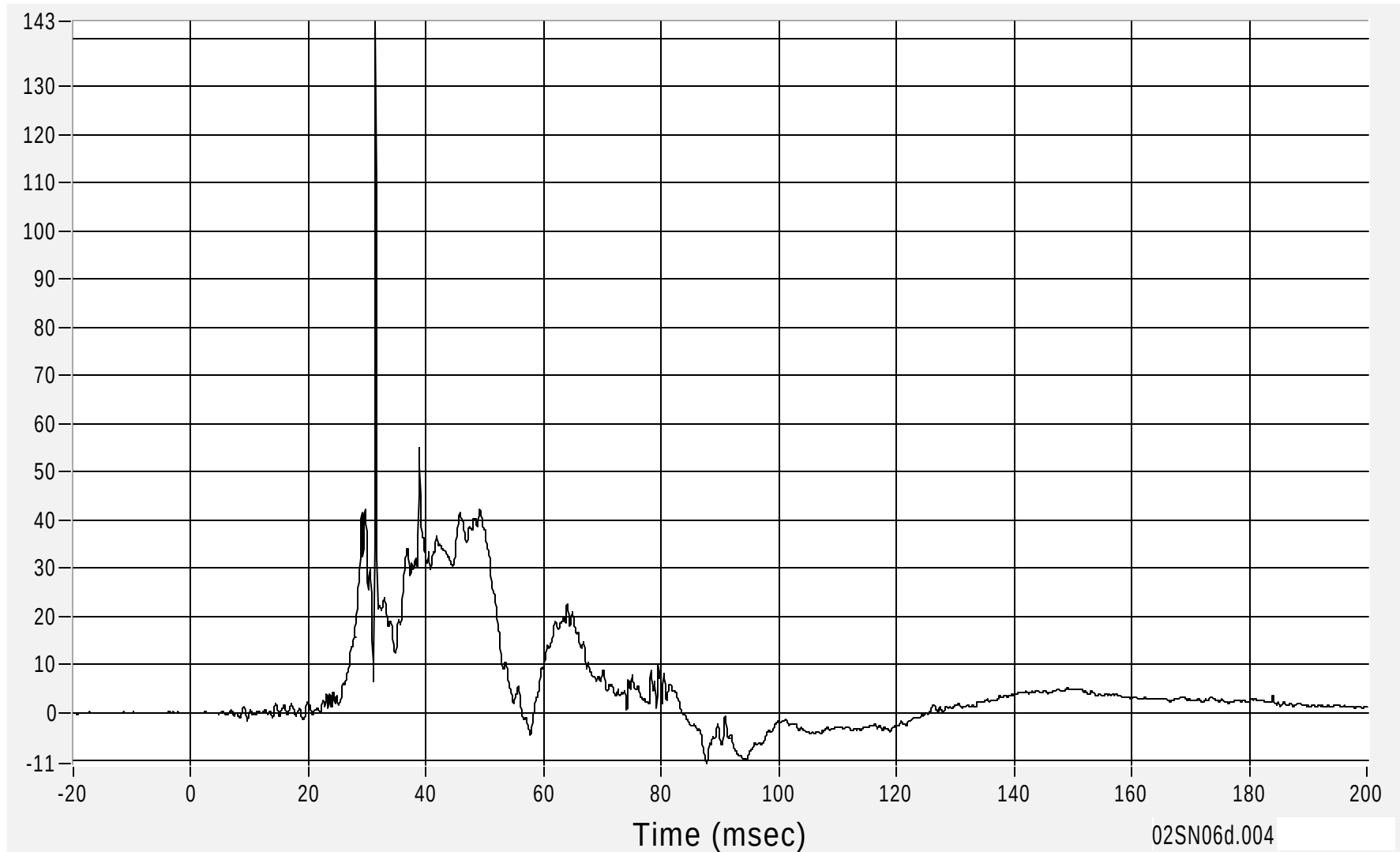
Driver Upper Rib (Y) Acceleration

Max 143.5 G's at 31.4 msec

Acceleration (G's) CFC1000

Min -10.5 G's at 87.7 msec

B-13



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11 April 2002

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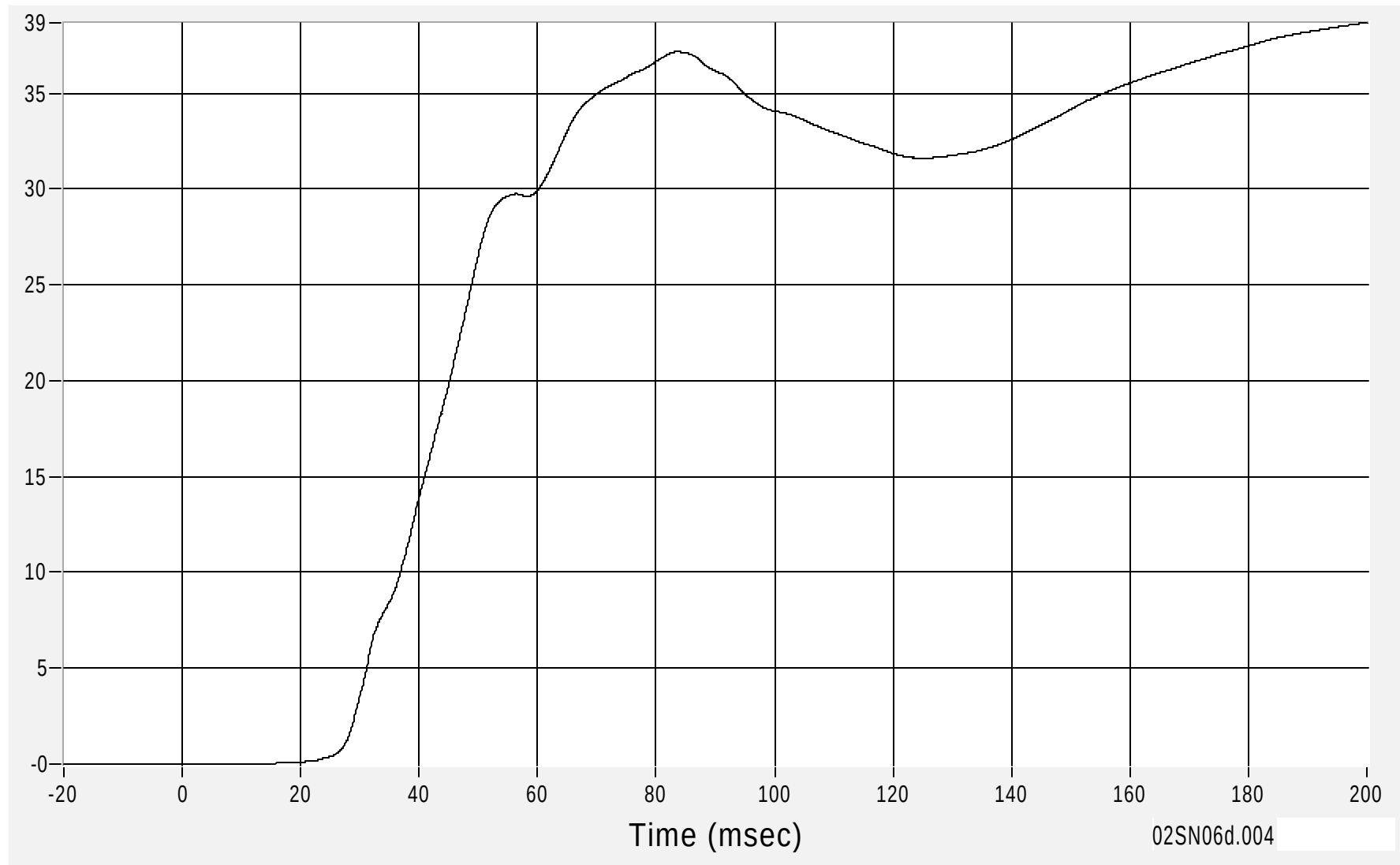
Driver Upper Rib (Y) Velocity

Max 38.7 km/h at 199.9 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 11.0 msec

B-14



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11 April 2002

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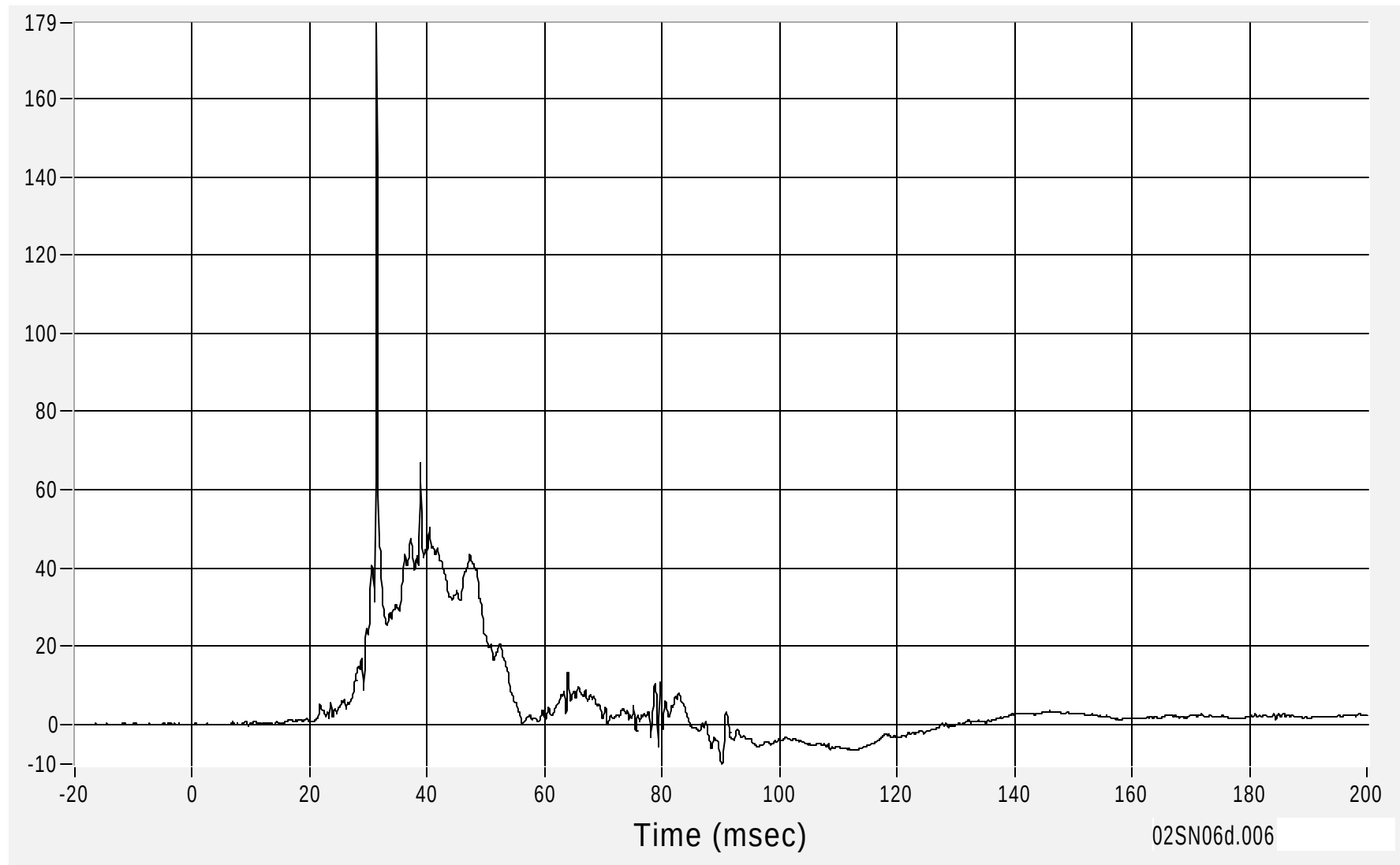
Driver Lower Rib (Y) Acceleration

Max 179.4 G's at 31.4 msec

Acceleration (G's) CFC1000

Min -10.1 G's at 90.2 msec

B-15



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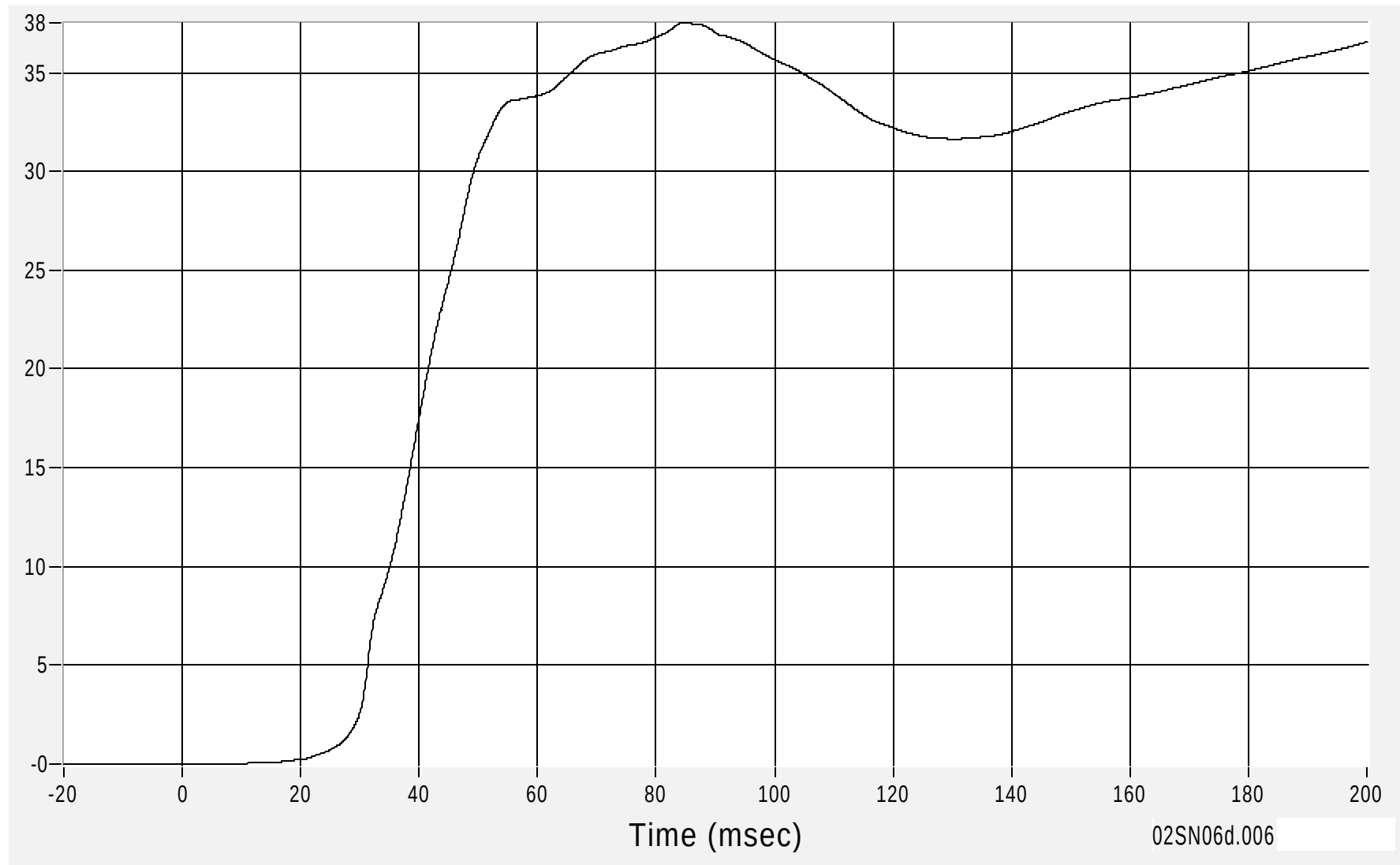
Driver Lower Rib (Y) Velocity

Max 37.5 km/h at 84.8 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 5.4 msec

B-16



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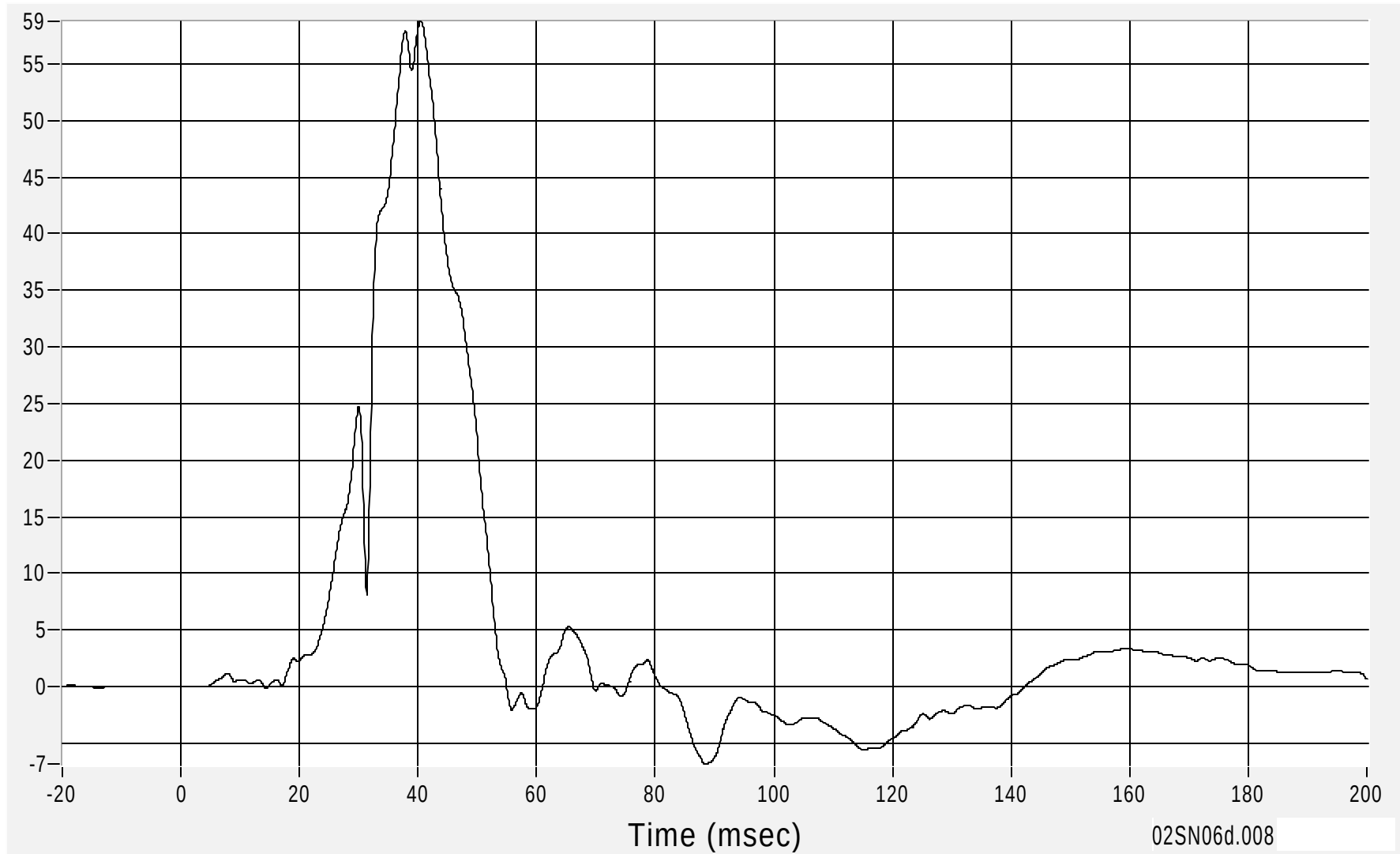
Driver Lower Spine (Y) Acceleration

Max 58.7 G's at 40.4 msec

Acceleration (G's) CFC180

Min -6.8 G's at 88.6 msec

B-17



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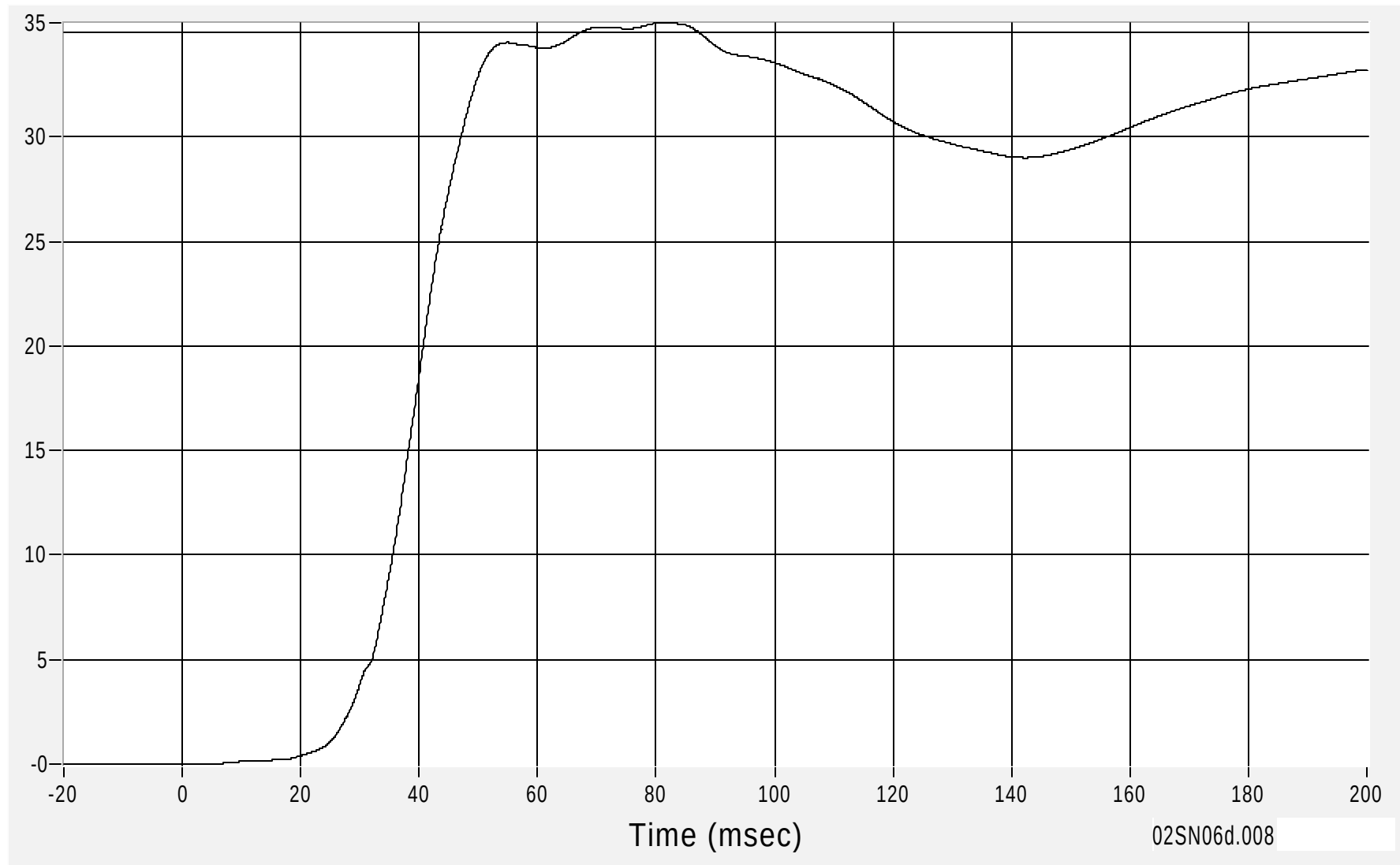
Driver Lower Spine (Y) Velocity

Max 35.5 km/h at 81.0 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 4.4 msec

B-18



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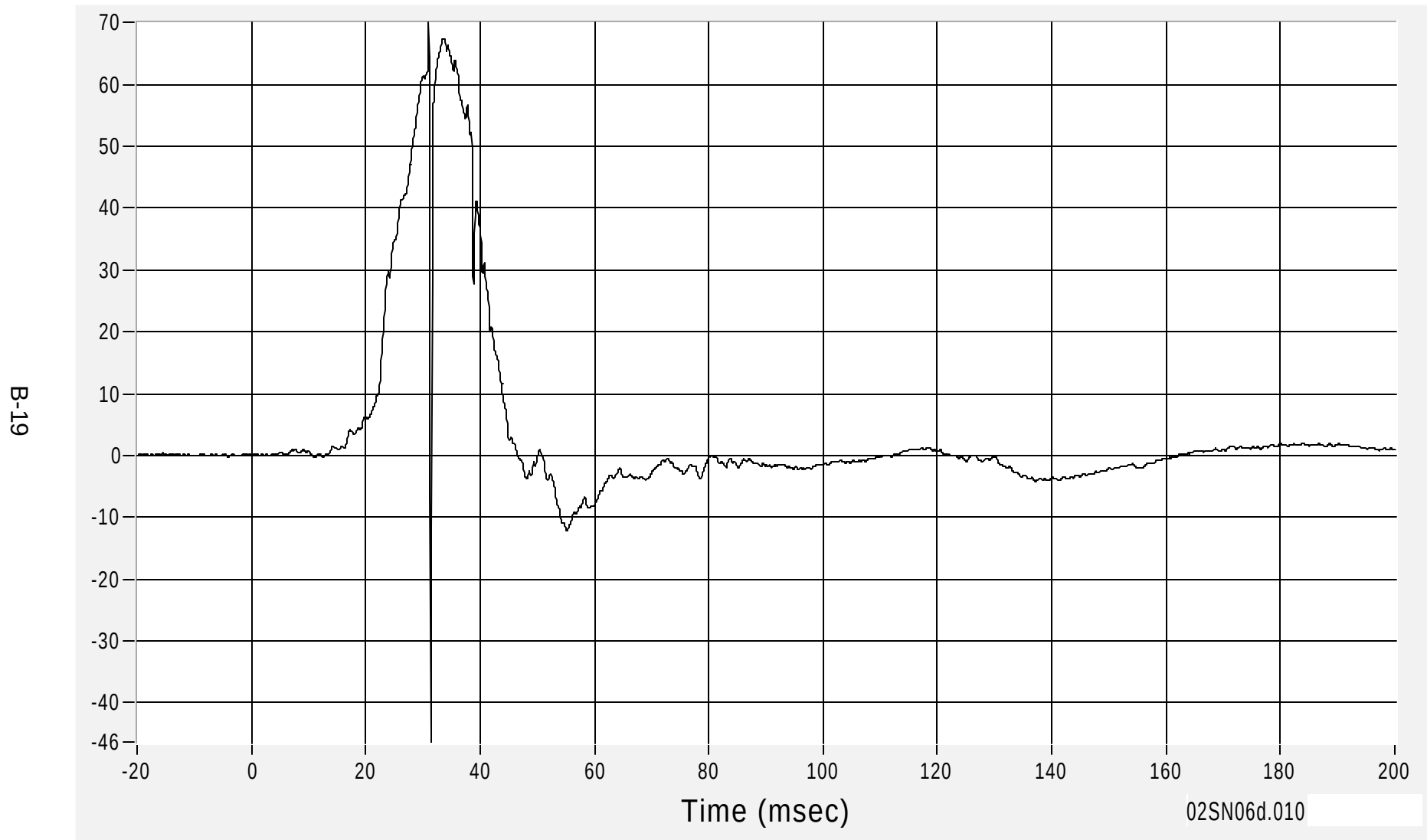
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Driver Pelvic (Y) Acceleration

Max 70.1 G's at 31.0 msec

Acceleration (G's) CFC1000

Min -46.3 G's at 31.4 msec



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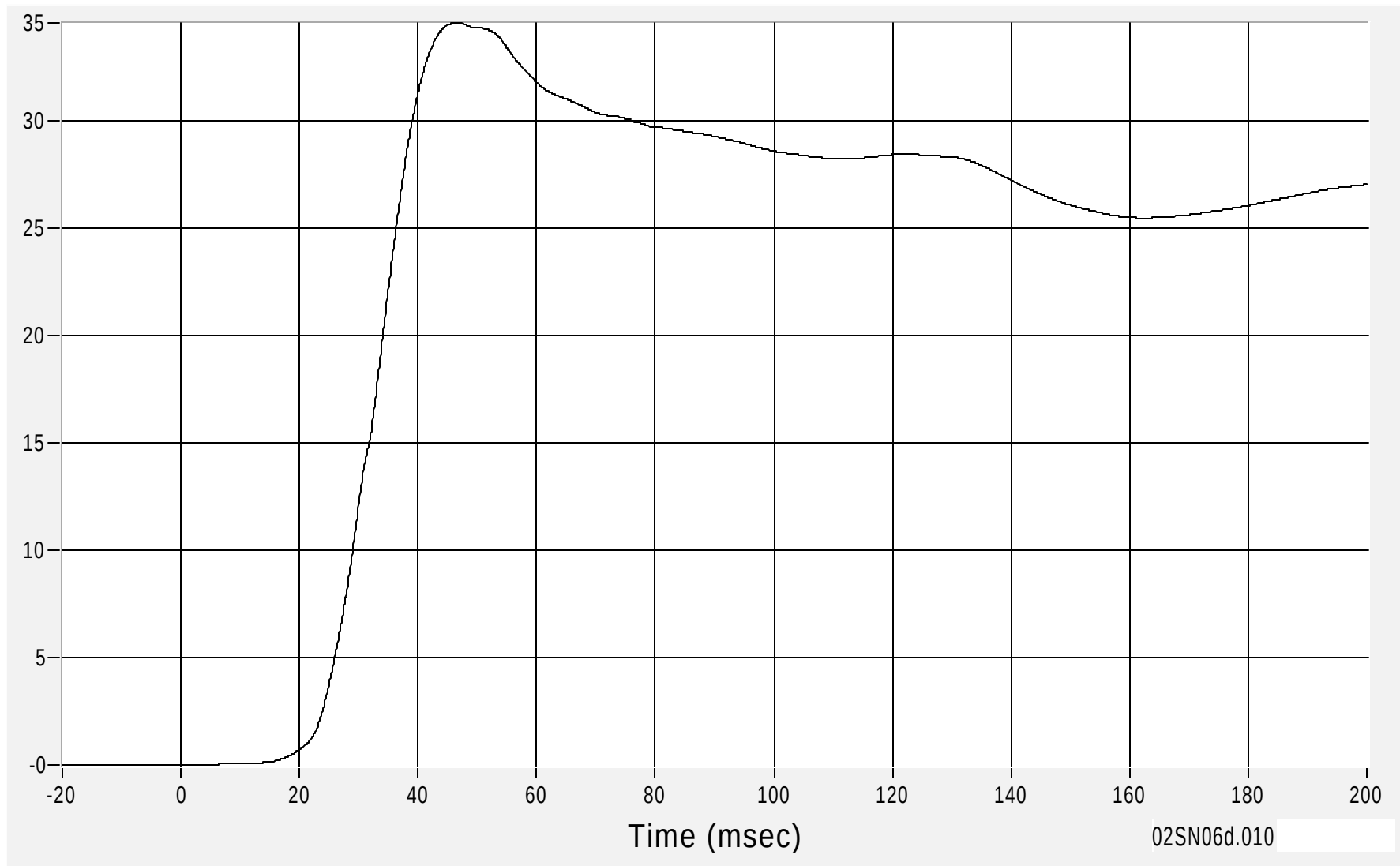
Driver Pelvic (Y) Velocity

Velocity (km/h) CFC180

Max 34.5 km/h at 46.6 msec

Min 0.0 km/h at 0.0 msec

B-20



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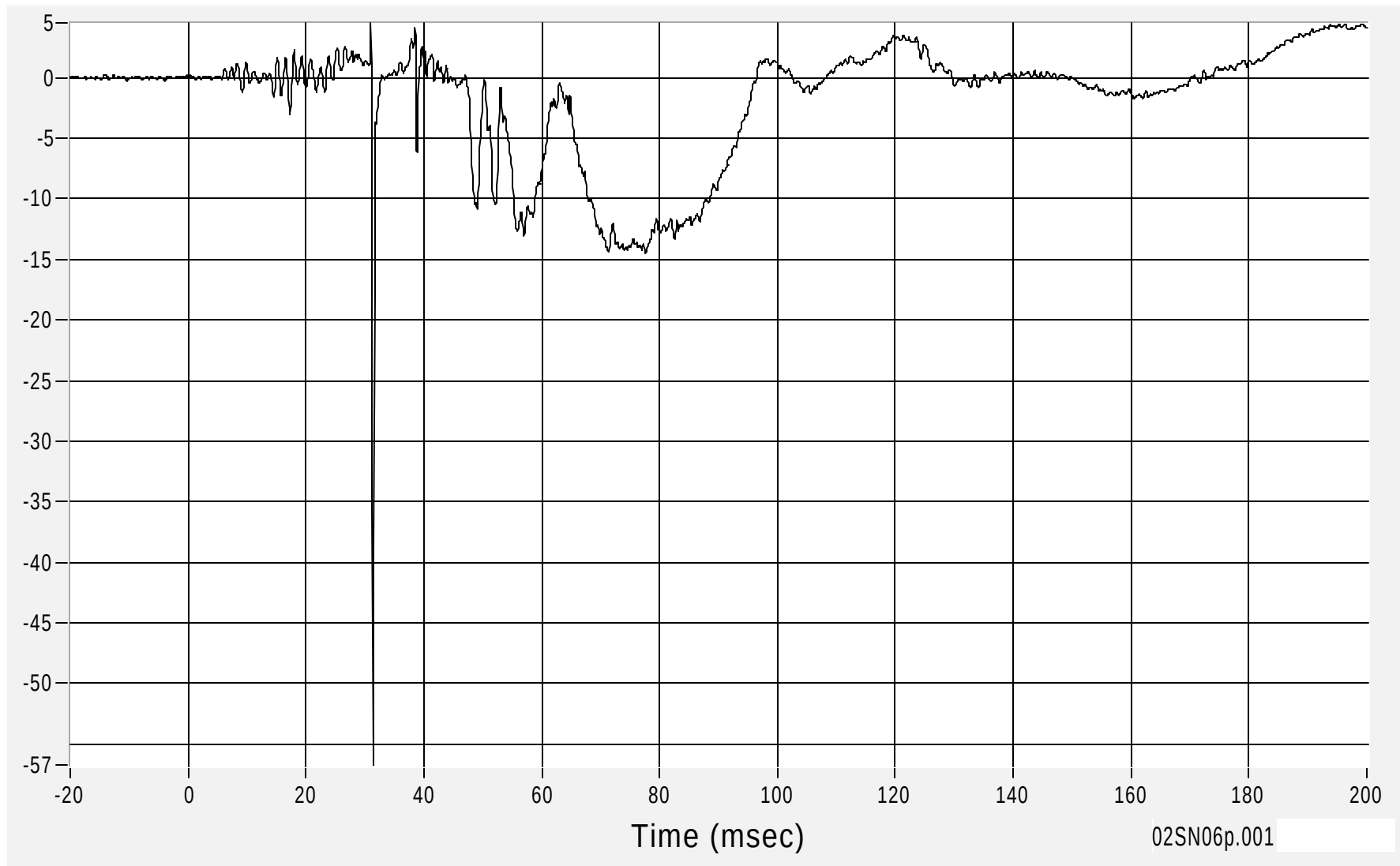
Passenger Head CG (X) Acceleration

Max 4.5 G's at 31.0 msec

Acceleration (G's) CFC1000

Min -56.7 G's at 31.4 msec

B-21



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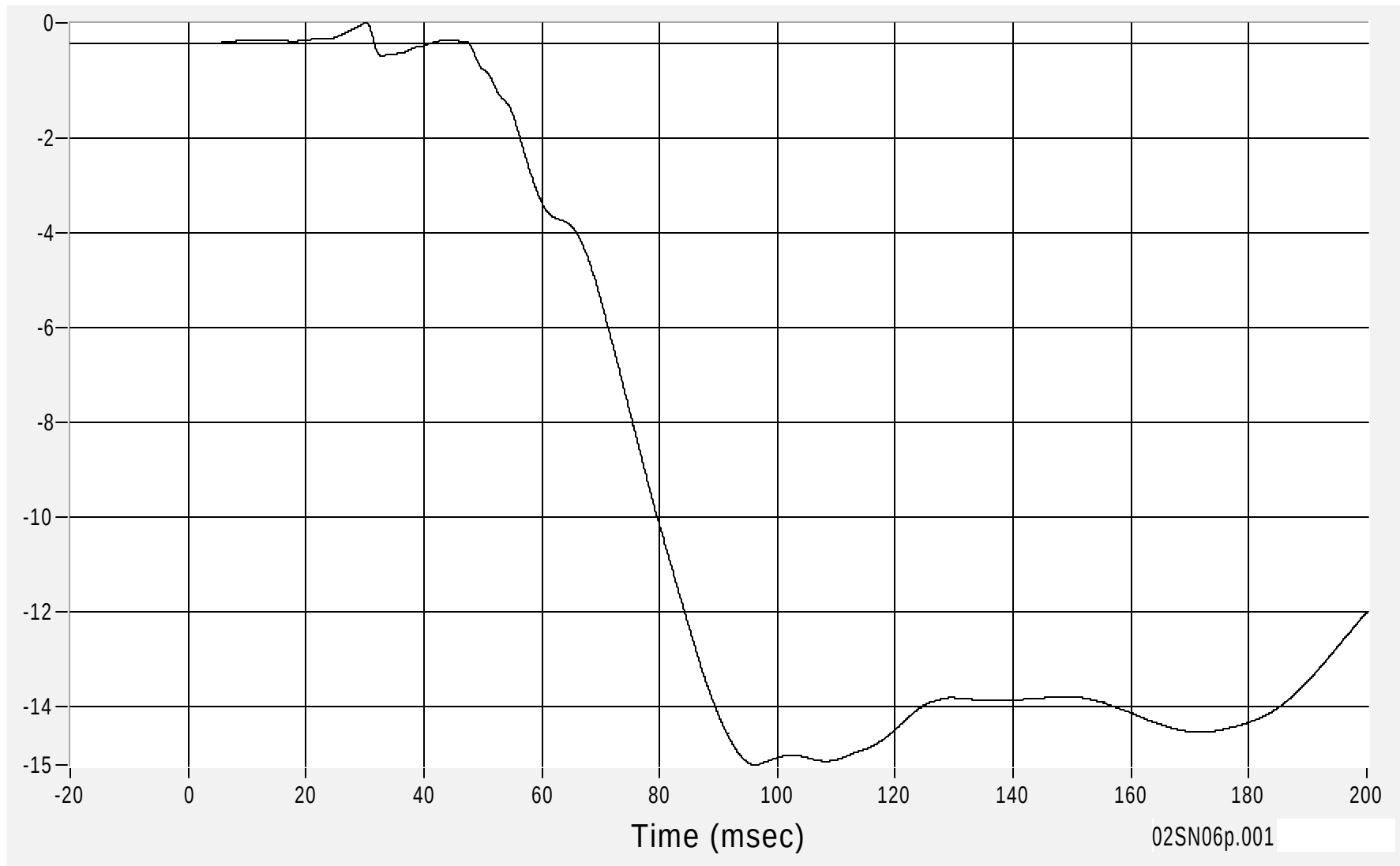
Passenger Head CG (X) Velocity

Max 0.4 km/h at 30.2 msec

Velocity (km/h) CFC180

Min -15.2 km/h at 96.2 msec

B-22



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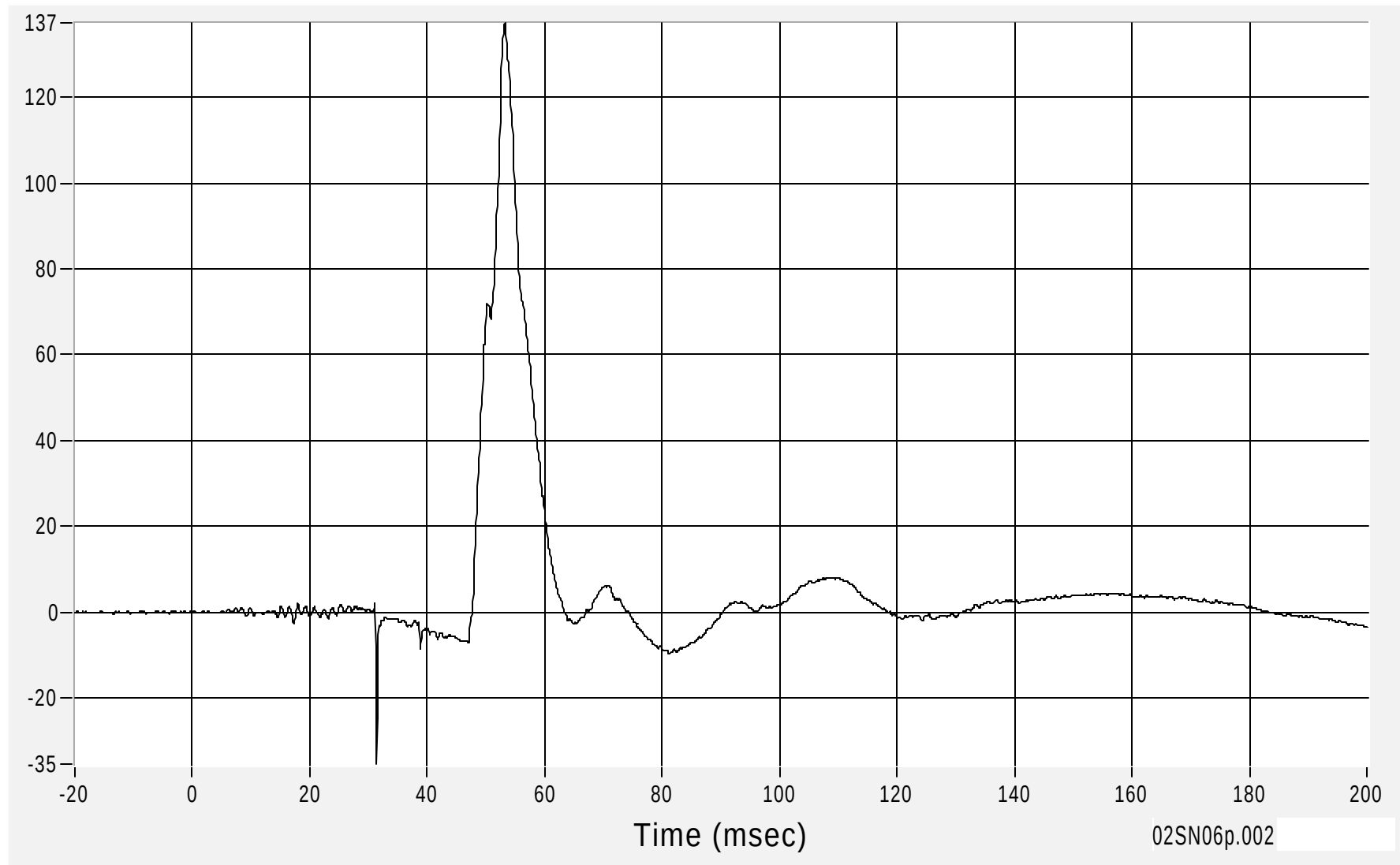
Passenger Head CG (Y) Acceleration

Max 137.3 G's at 53.2 msec

Acceleration (G's) CFC1000

Min -35.4 G's at 31.4 msec

B-23



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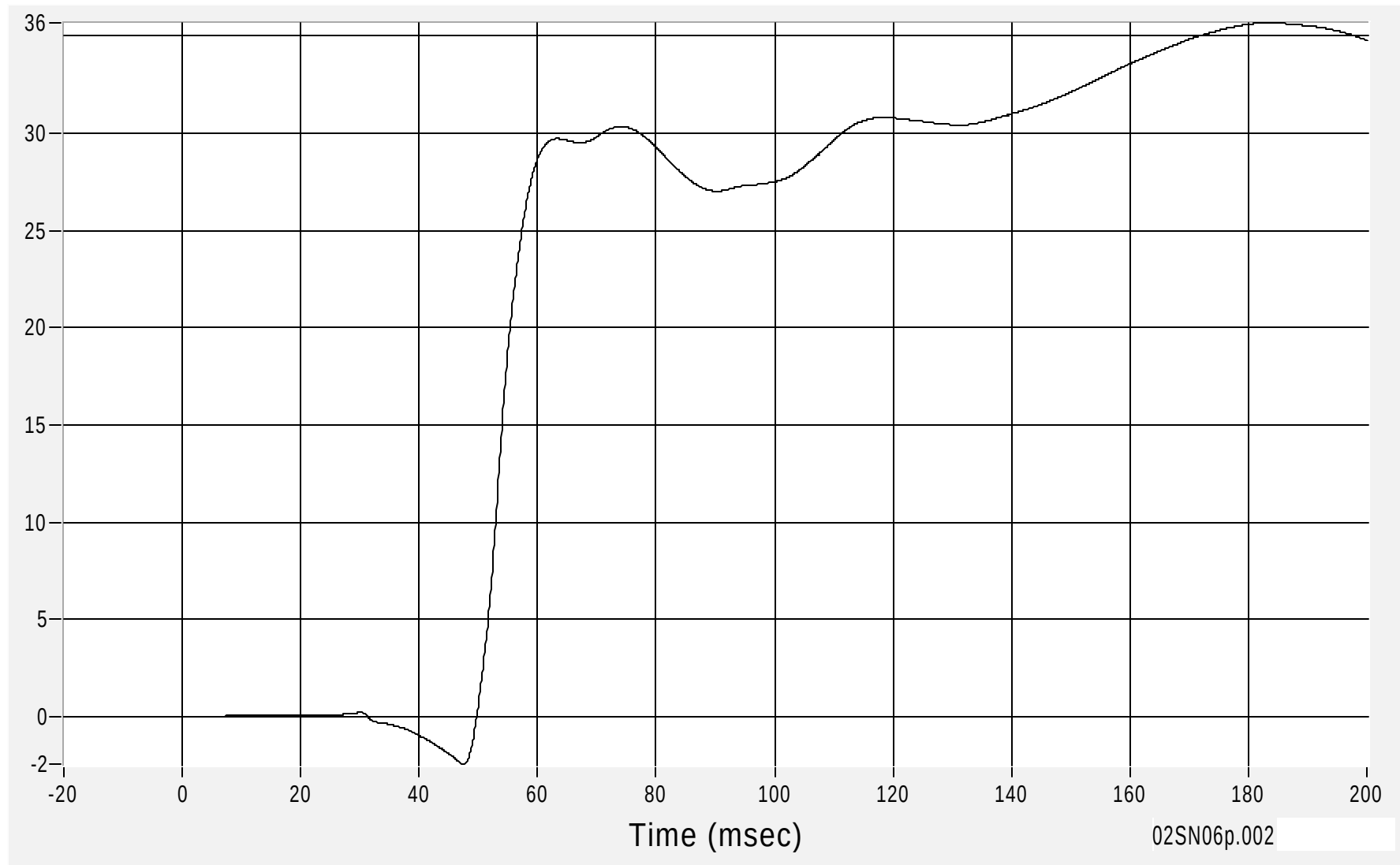
Passenger Head CG (Y) Velocity

Max 35.7 km/h at 183.4 msec

Velocity (km/h) CFC180

Min -2.4 km/h at 47.4 msec

B-24



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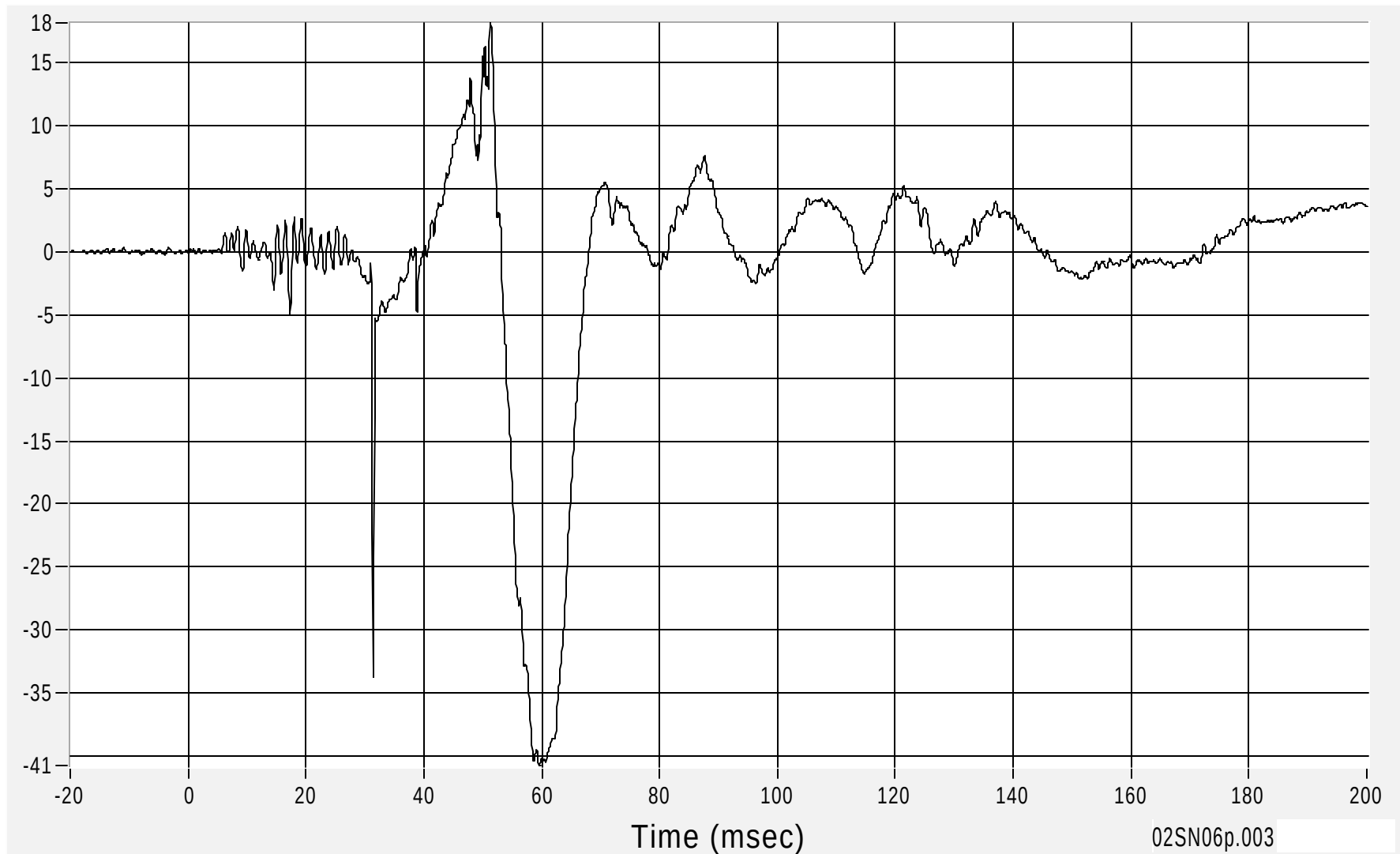
Passenger Head CG (Z) Acceleration

Max 18.1 G's at 51.3 msec

Acceleration (G's) CFC1000

Min -40.7 G's at 59.6 msec

B-25



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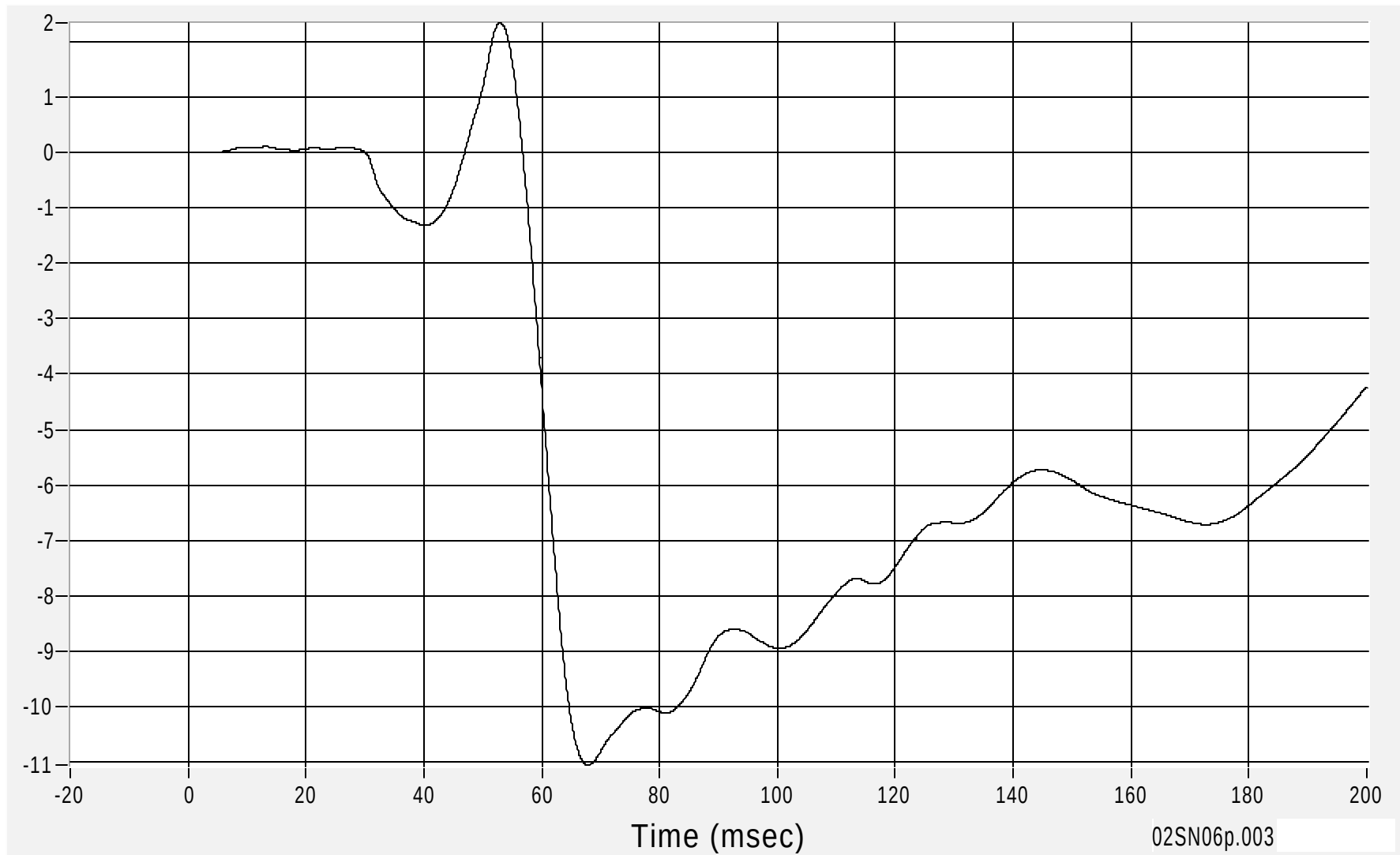
Passenger Head CG (Z) Velocity

Max 2.3 km/h at 53.0 msec

Velocity (km/h) CFC180

Min -11.0 km/h at 67.8 msec

B-26



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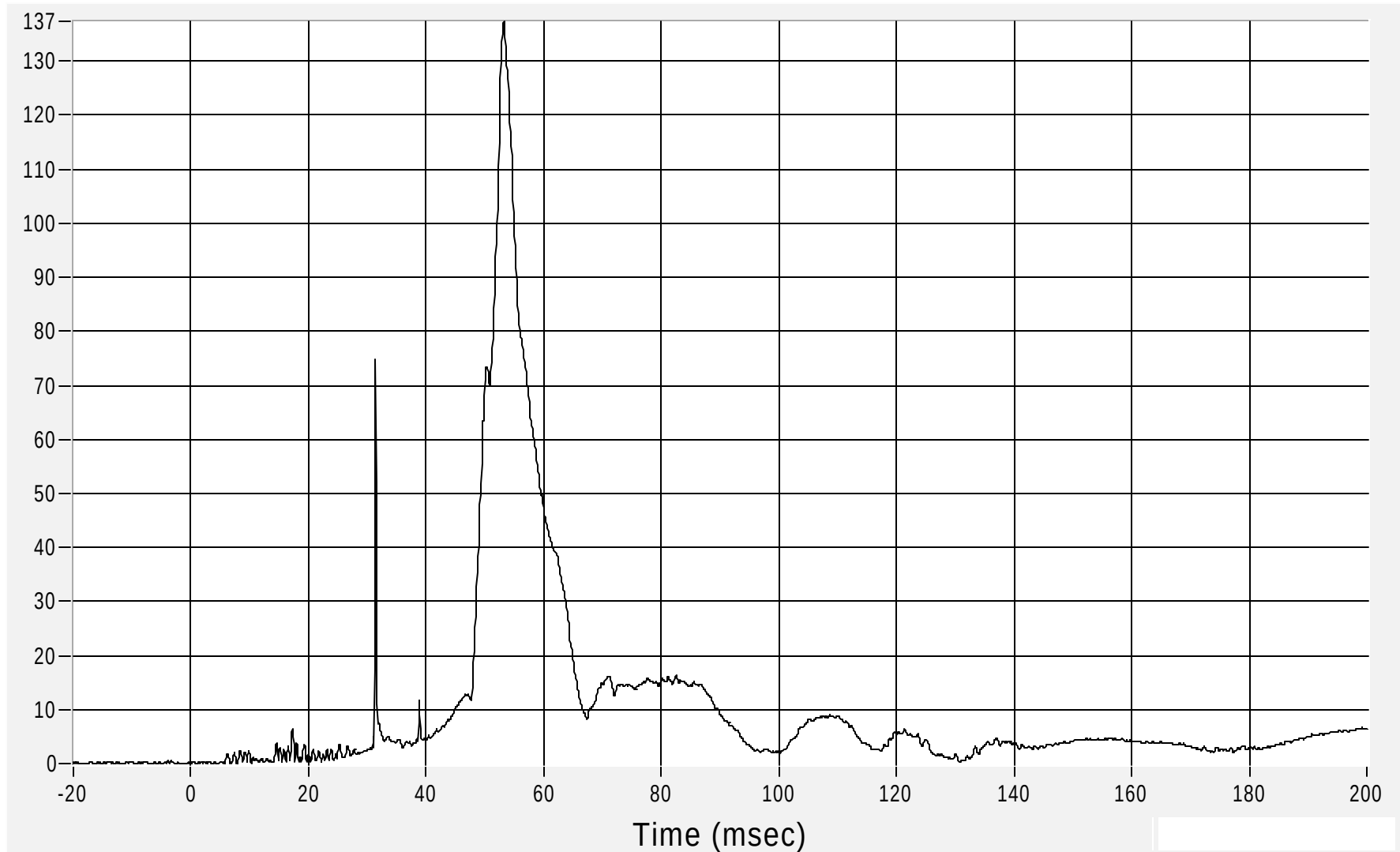
Passenger Head Resultant Acceleration

Max 137.4 G's at 53.2 msec

Acceleration (G's) CFC1000

Min 0.0 G's at 2.0 msec

B-27



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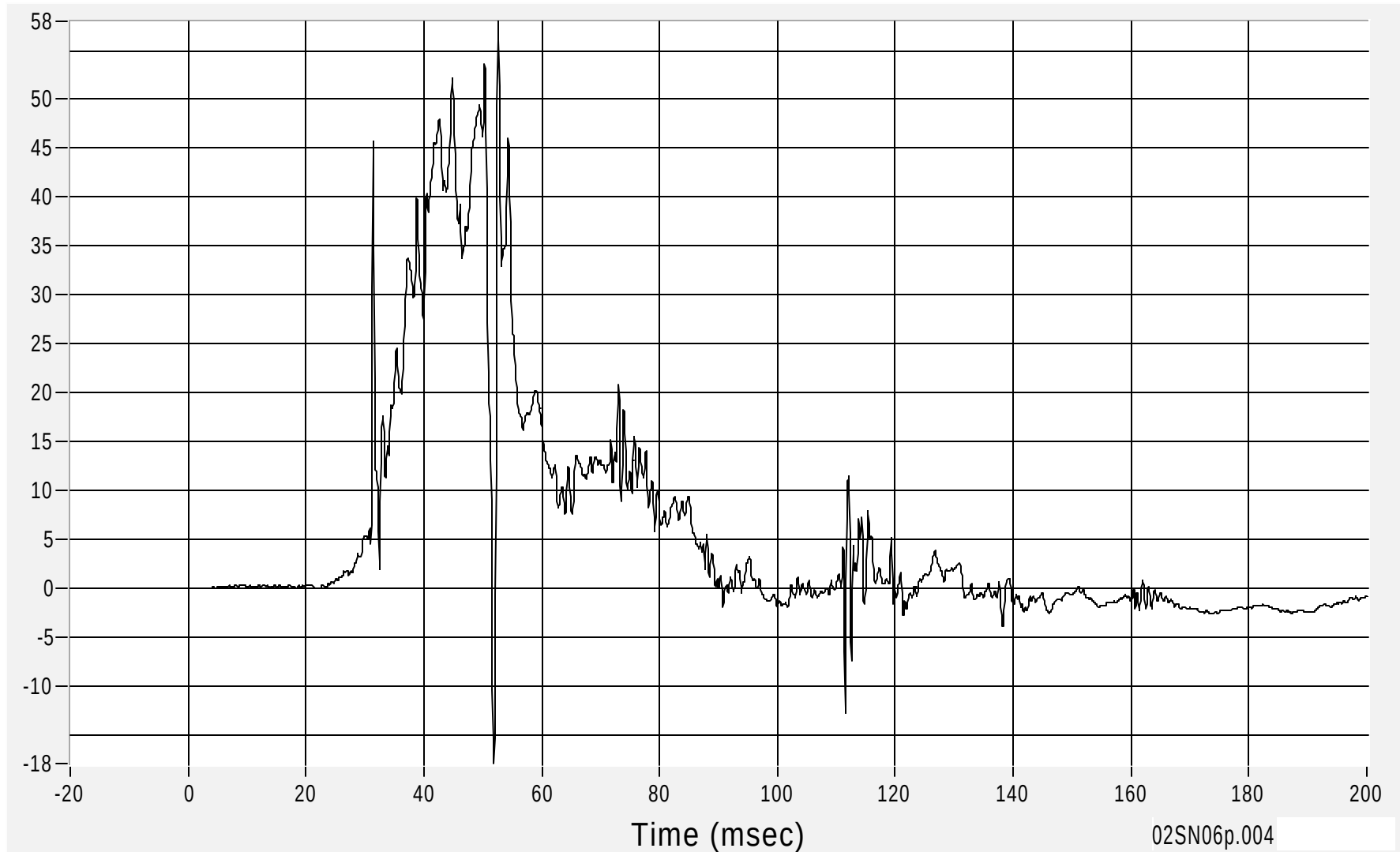
Passenger Upper Rib (Y) Acceleration

Max 58.0 G's at 52.6 msec

Acceleration (G's) CFC1000

Min -17.9 G's at 51.9 msec

B-28



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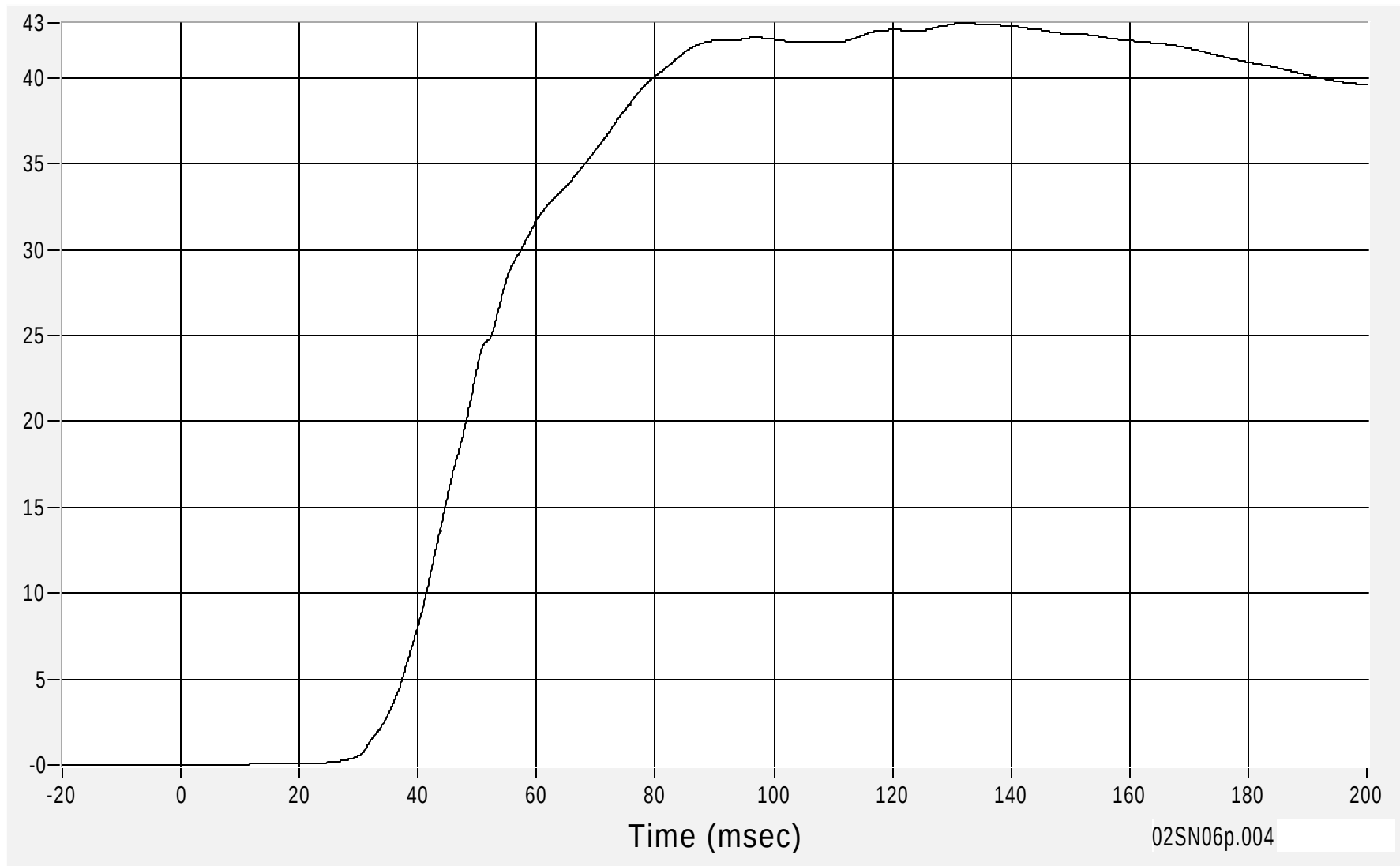
Passenger Upper Rib (Y) Velocity

Max 43.2 km/h at 131.7 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 1.1 msec

B-29



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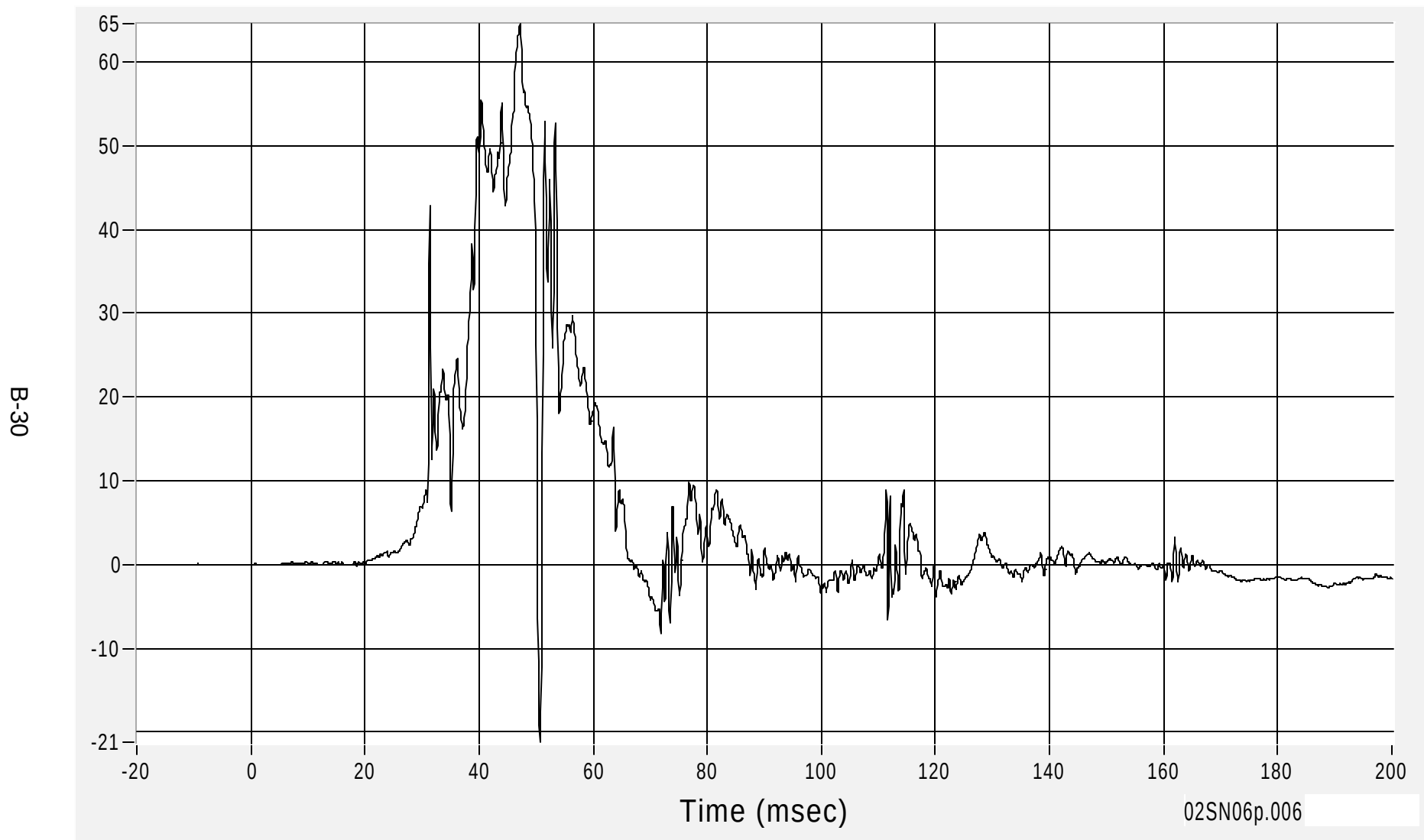
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Passenger Lower Rib (Y) Acceleration

Max 64.5 G's at 47.2 msec

Acceleration (G's) CFC1000

Min -21.2 G's at 50.6 msec



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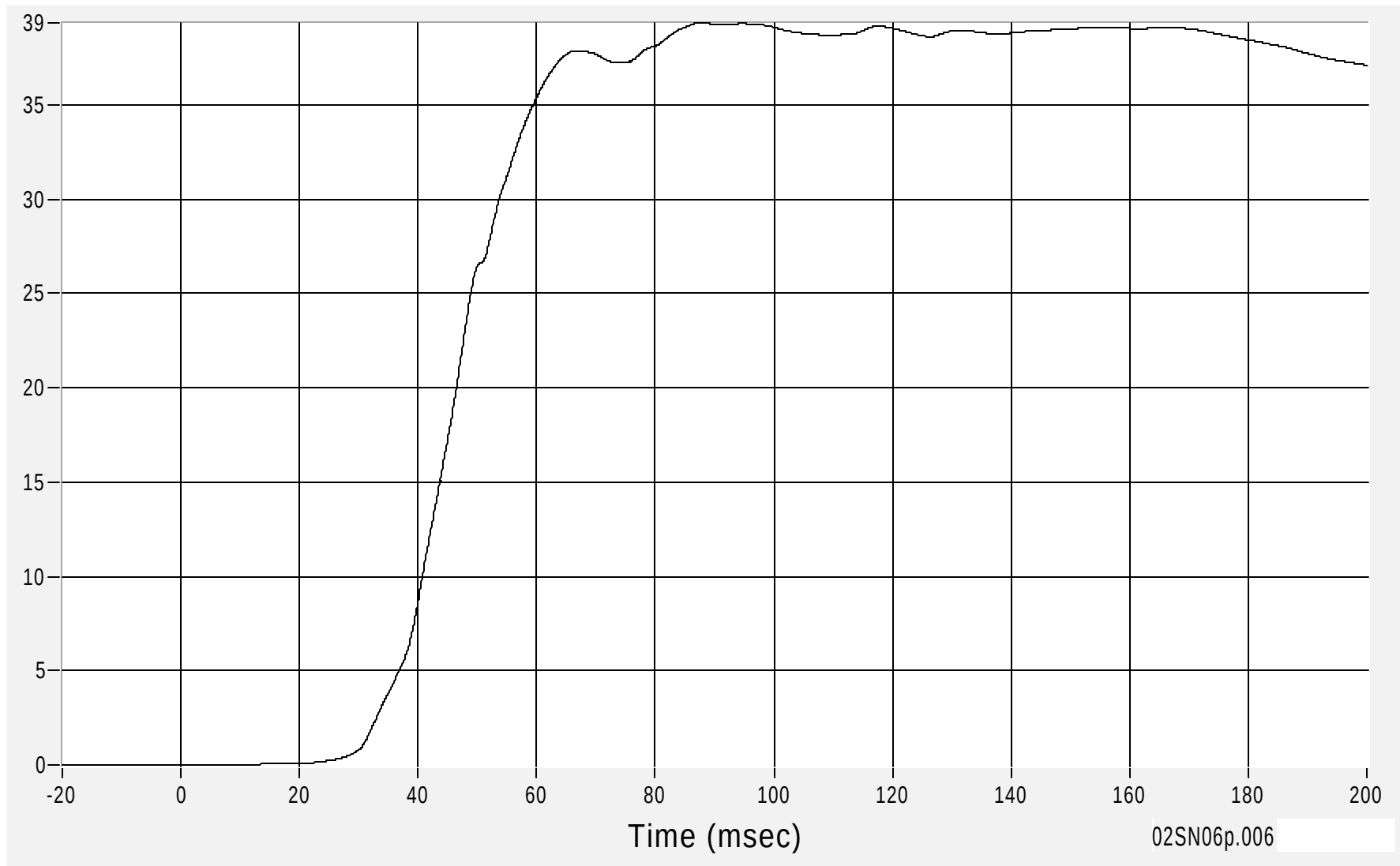
Passenger Lower Rib (Y) Velocity

Velocity (km/h) CFC180

Max 39.4 km/h at 87.6 msec

Min 0.0 km/h at 0.0 msec

B-31



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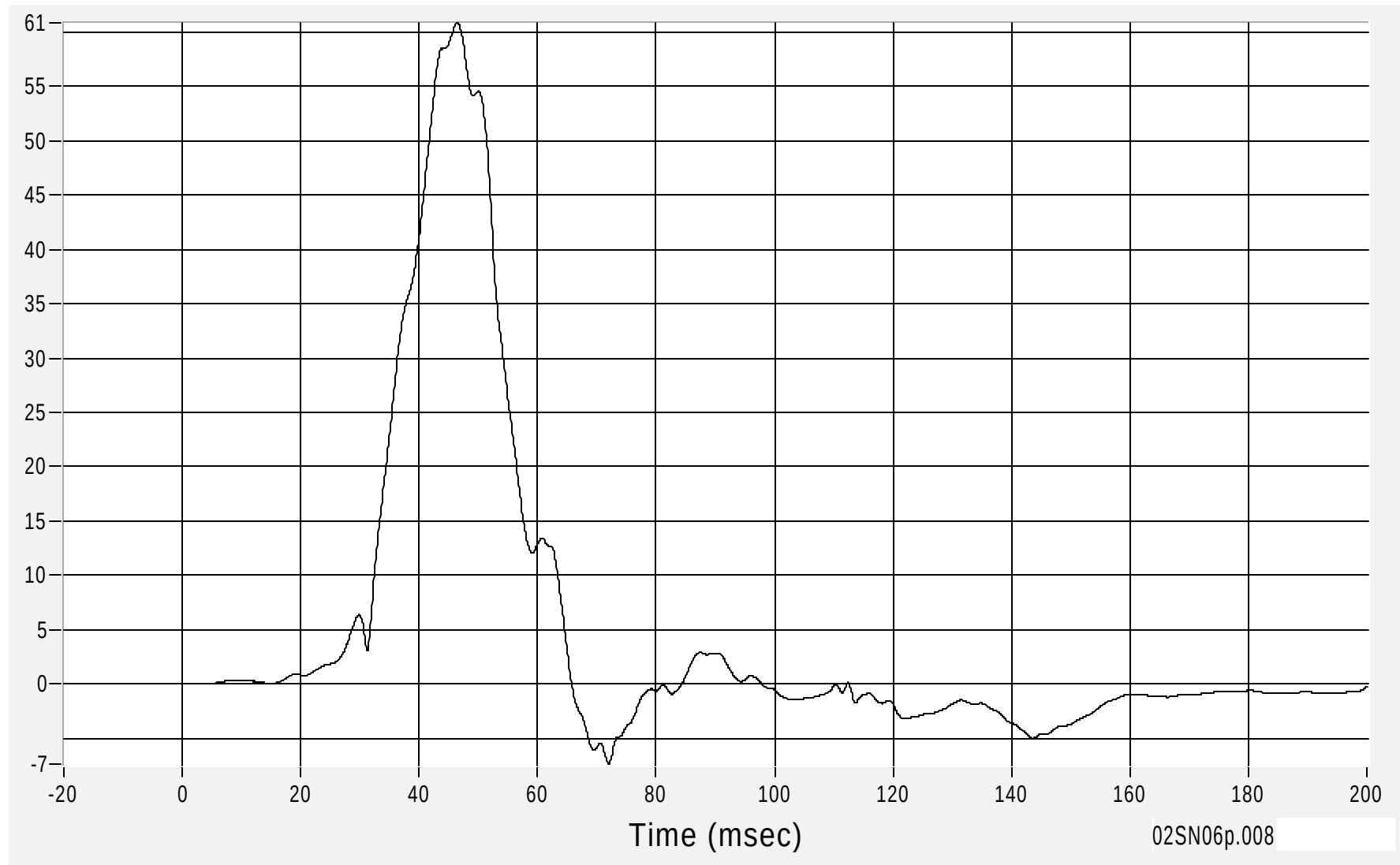
Passenger Lower Spine (Y) Acceleration

Max 60.9 G's at 46.4 msec

Acceleration (G's) CFC180

Min -7.4 G's at 71.9 msec

B-32



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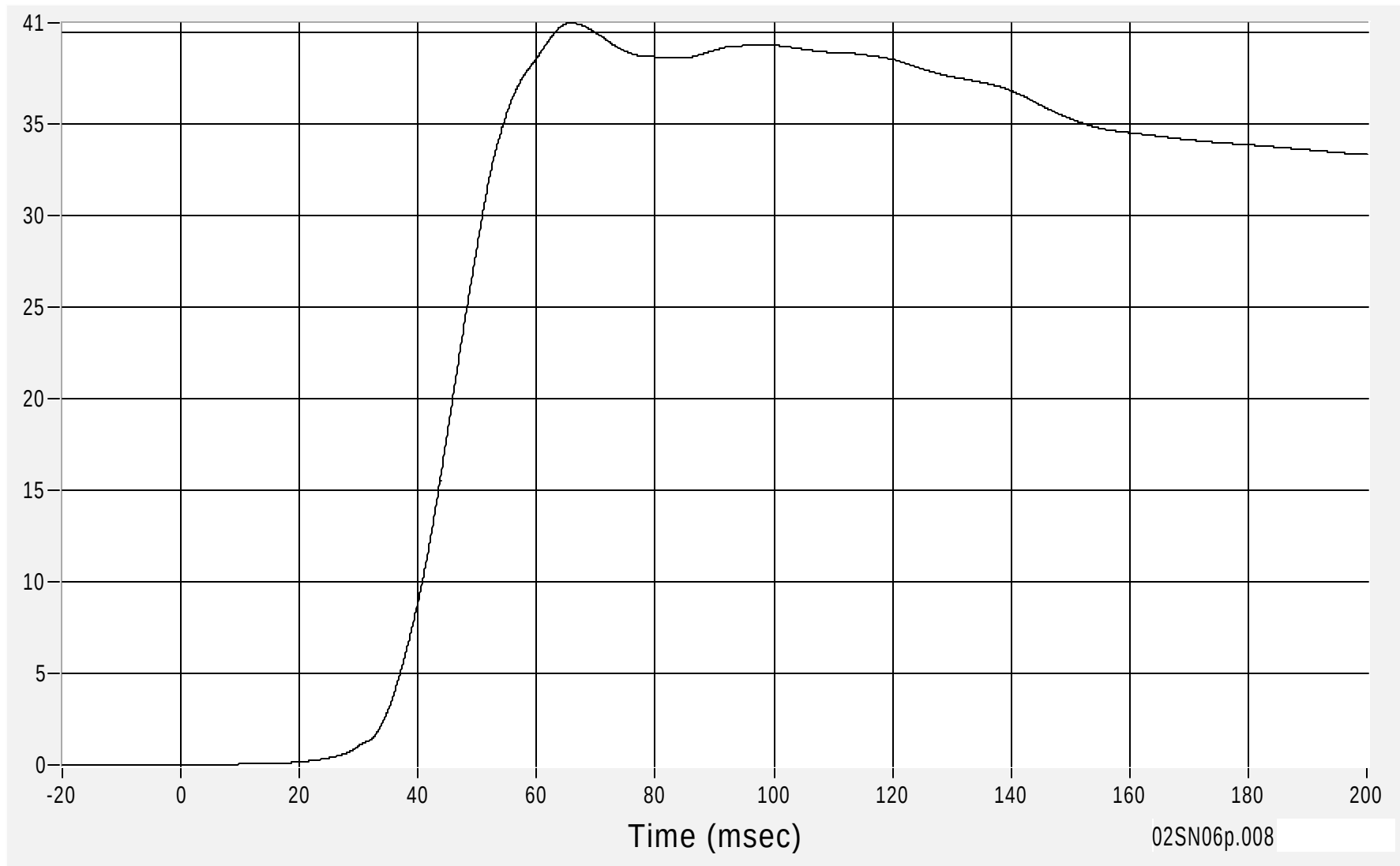
Passenger Lower Spine (Y) Velocity

Max 40.5 km/h at 65.8 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.0 msec

B-33



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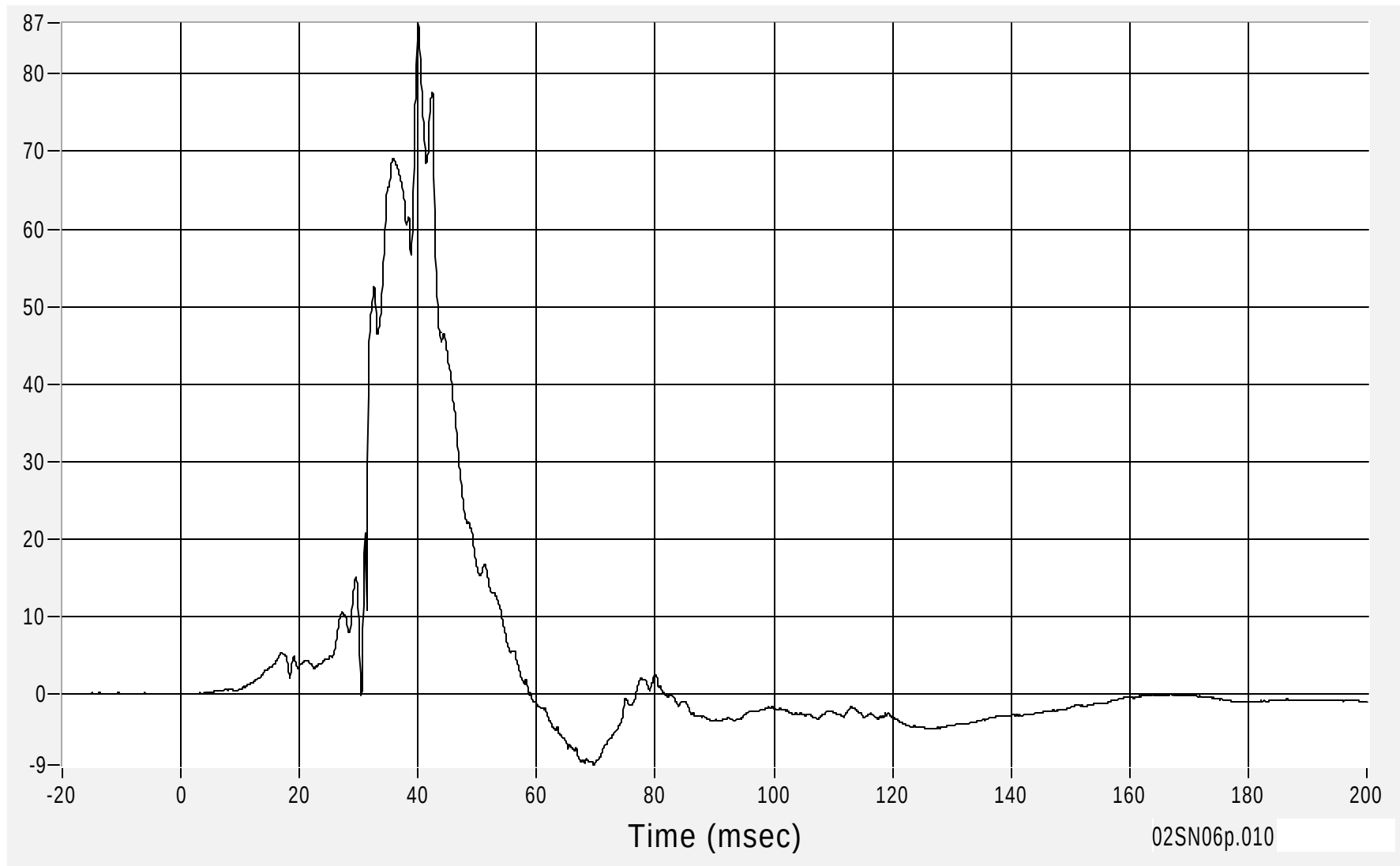
Passenger Pelvic (Y) Acceleration

Max 86.6 G's at 40.0 msec

Acceleration (G's) CFC1000

Min -9.2 G's at 69.7 msec

B-34



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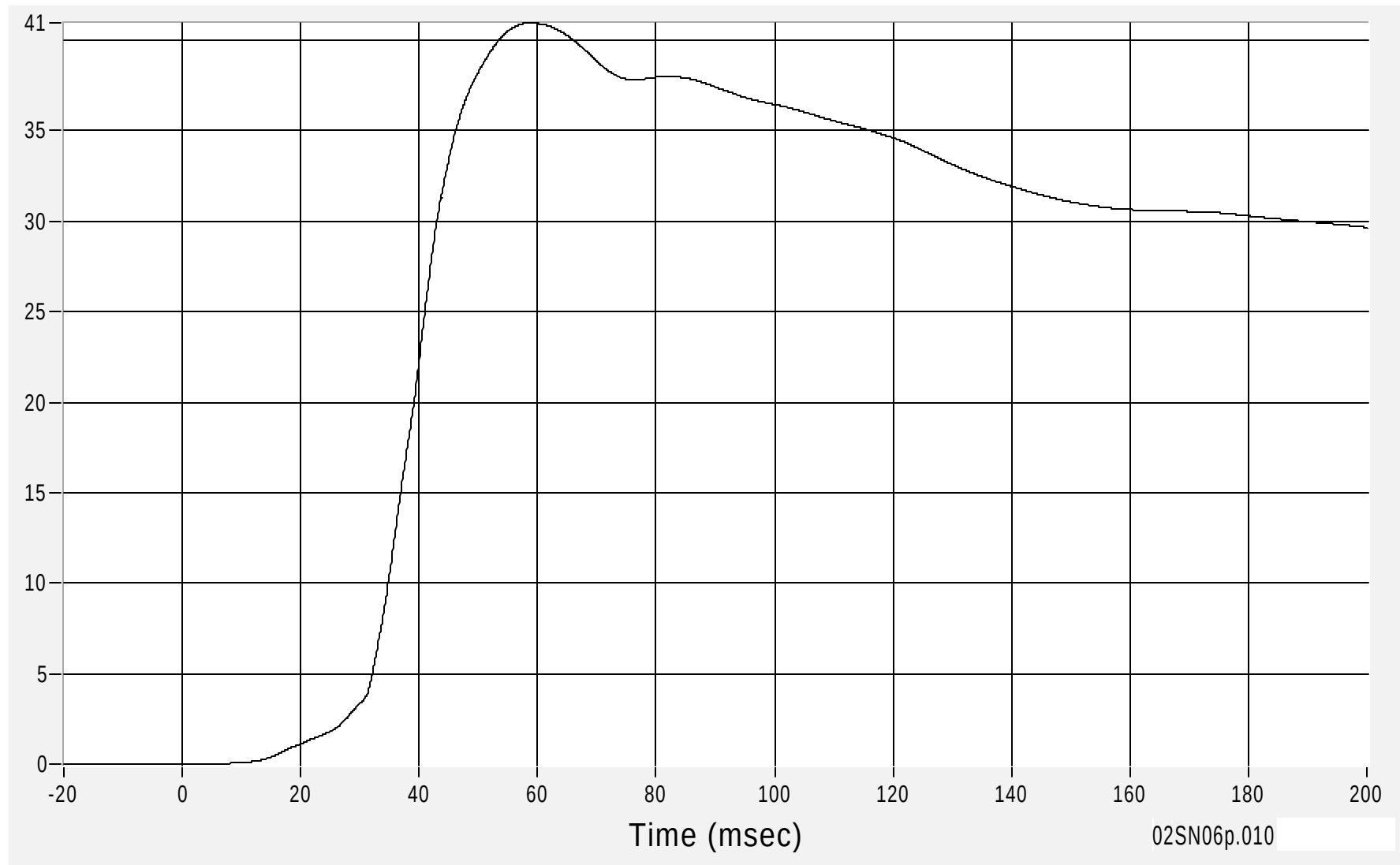
Passenger Pelvic (Y) Velocity

Max 41.0 km/h at 58.8 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.0 msec

B-35



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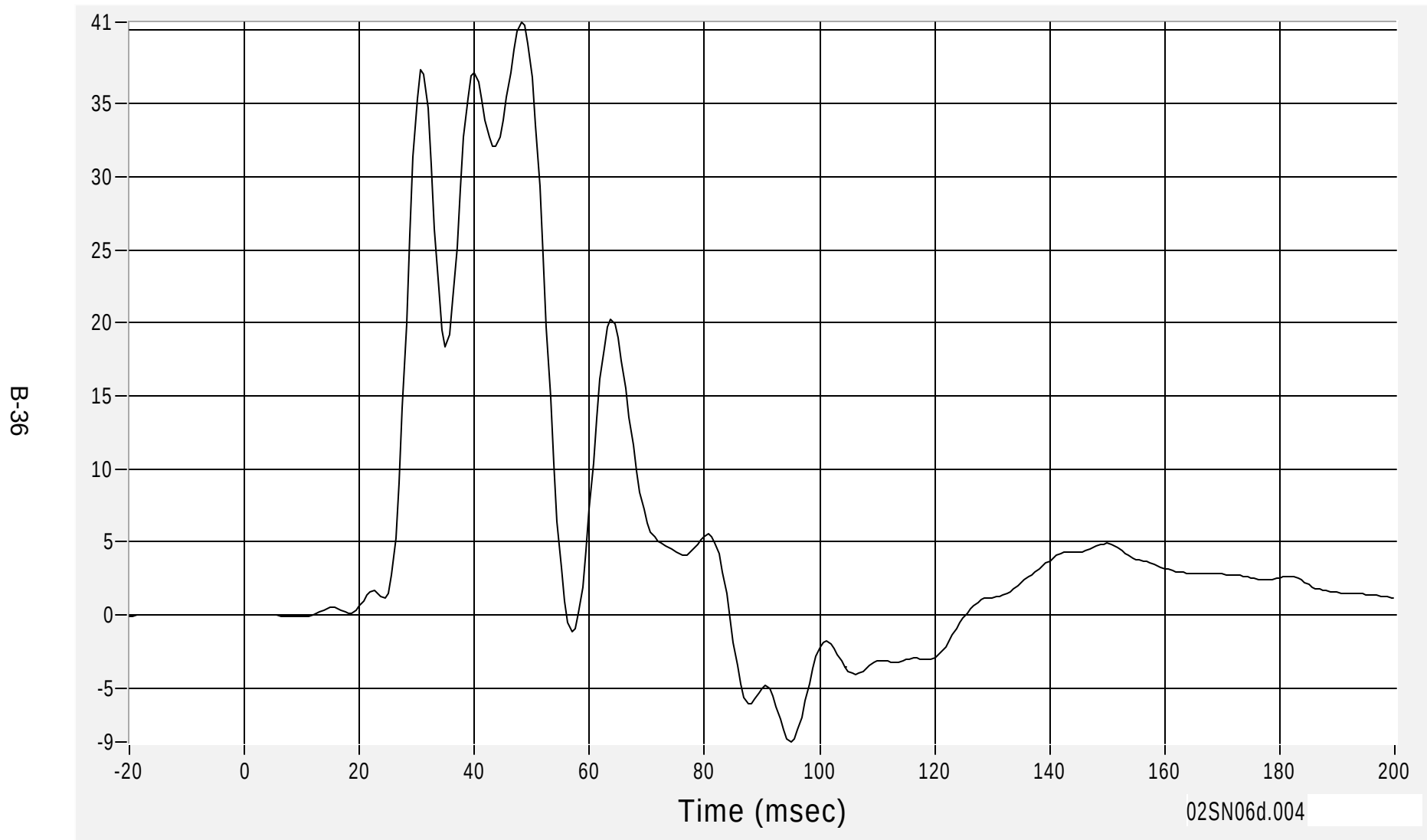
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Driver Upper Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 40.6 G's at 48.1 msec

Min -8.7 G's at 95.0 msec



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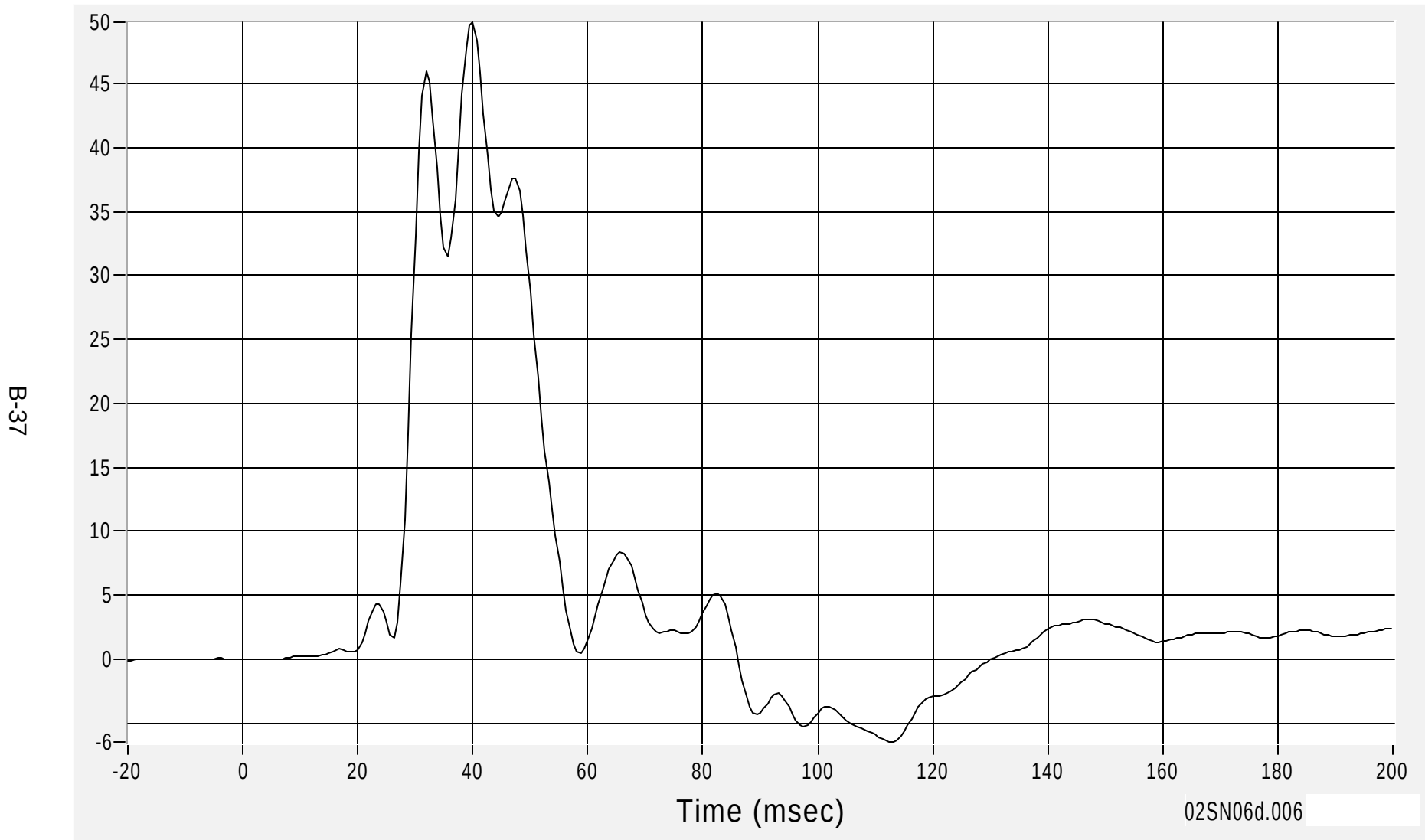
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Driver Lower Rib (Y) Acceleration

Max 49.8 G's at 40.0 msec

Acceleration (G's) FIR100

Min -6.5 G's at 112.5 msec



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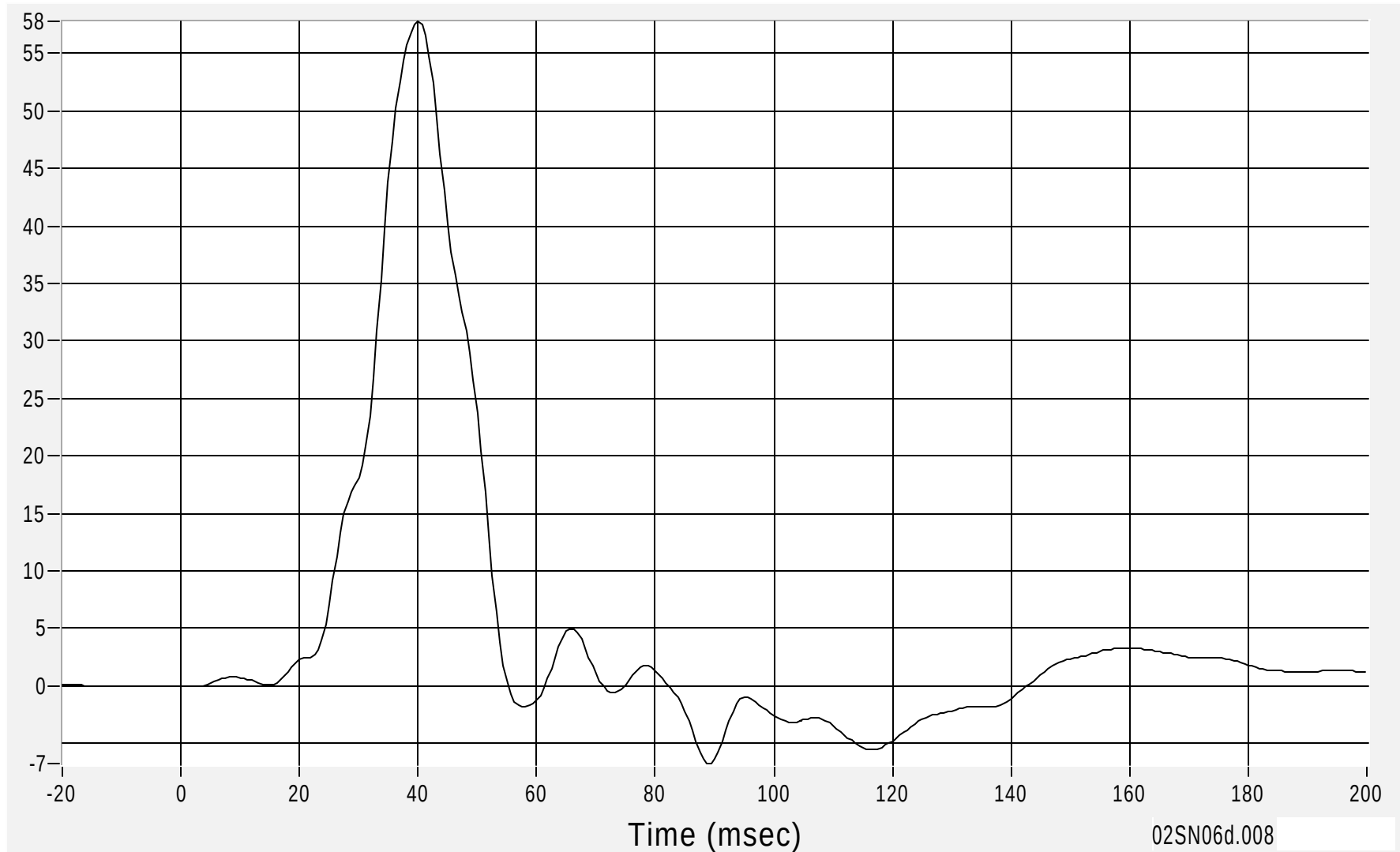
Driver Lower Spine (Y) Acceleration

Max 57.8 G's at 40.0 msec

Acceleration (G's) FIR100

Min -6.8 G's at 89.4 msec

B-38



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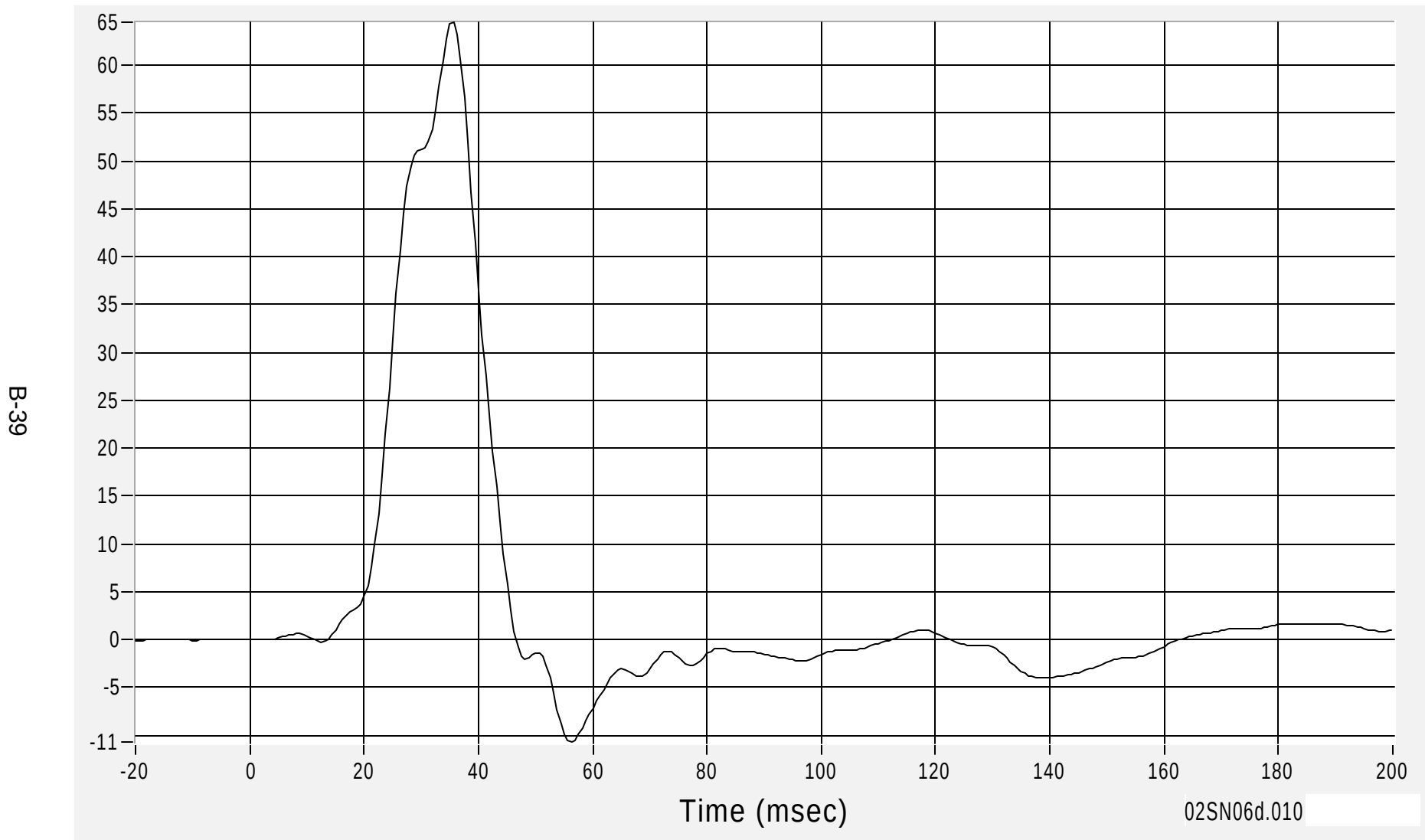
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Driver Pelvic (Y) Acceleration

Max 64.5 G's at 35.6 msec

Acceleration (G's) FIR100

Min -10.7 G's at 56.2 msec



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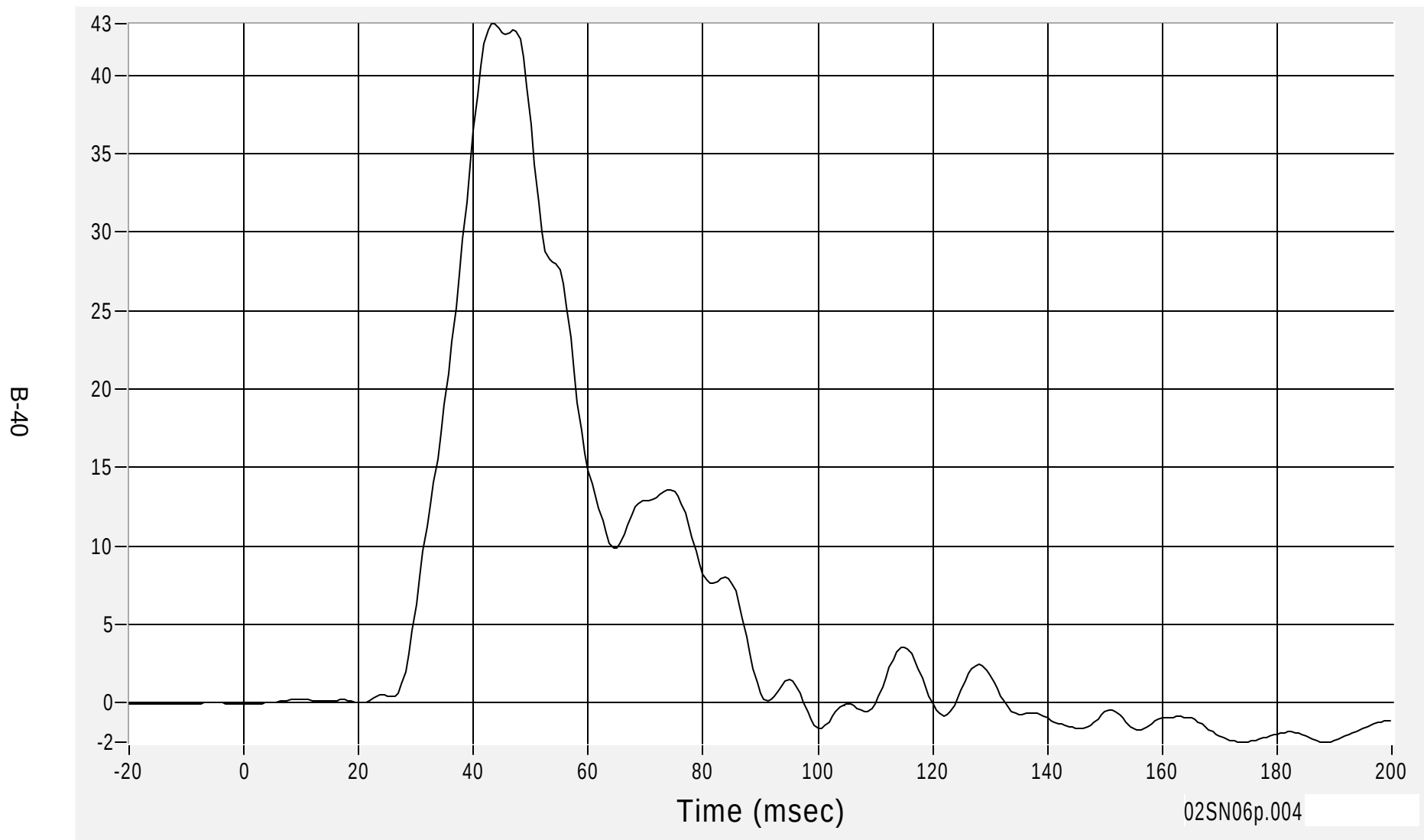
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Passenger Upper Rib (Y) Acceleration

Max 43.3 G's at 43.1 msec

Acceleration (G's) FIR100

Min -2.5 G's at 188.1 msec



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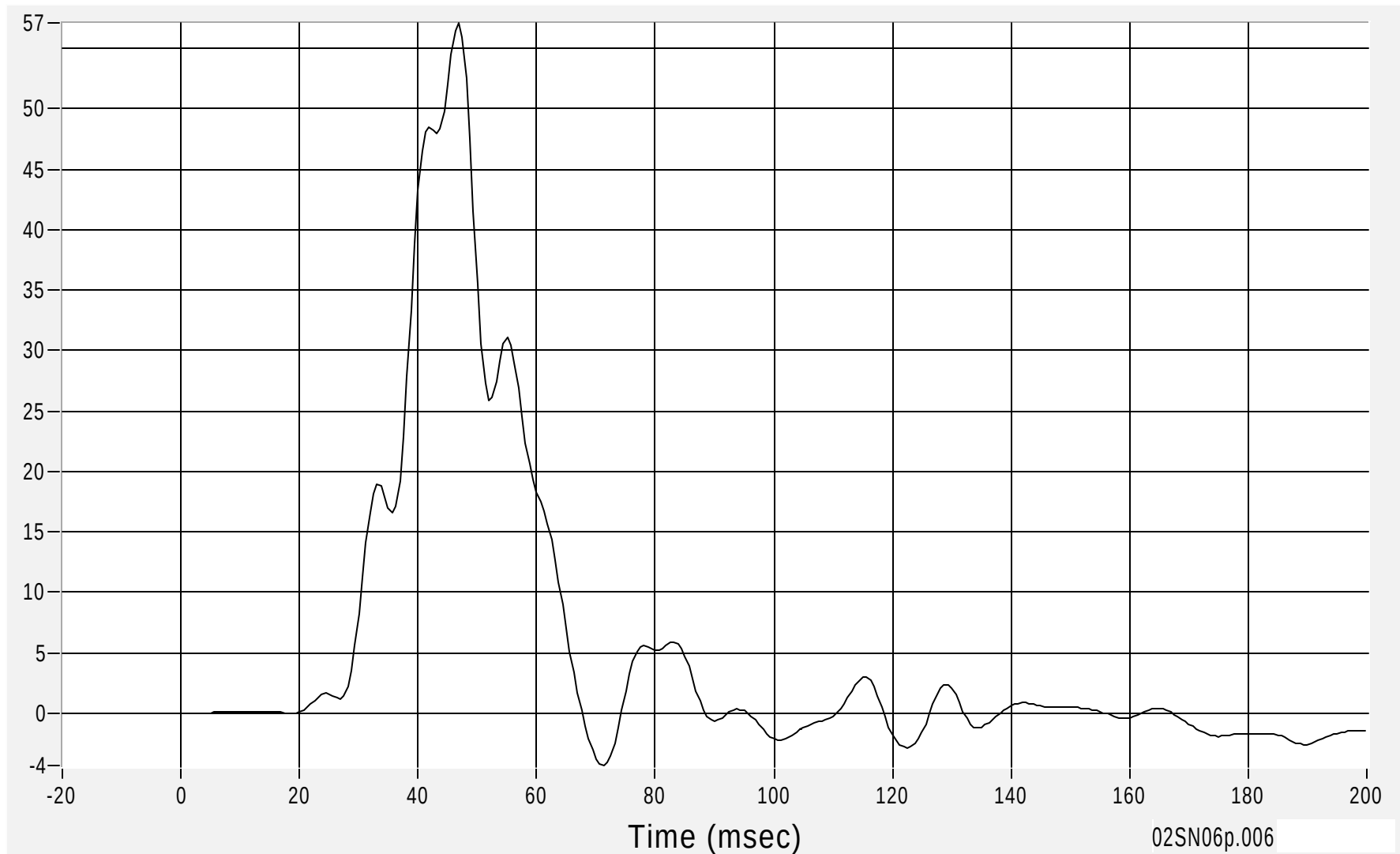
Passenger Lower Rib (Y) Acceleration

Acceleration (G's) FIR100

Max 57.1 G's at 46.9 msec

Min -4.3 G's at 71.2 msec

B-41



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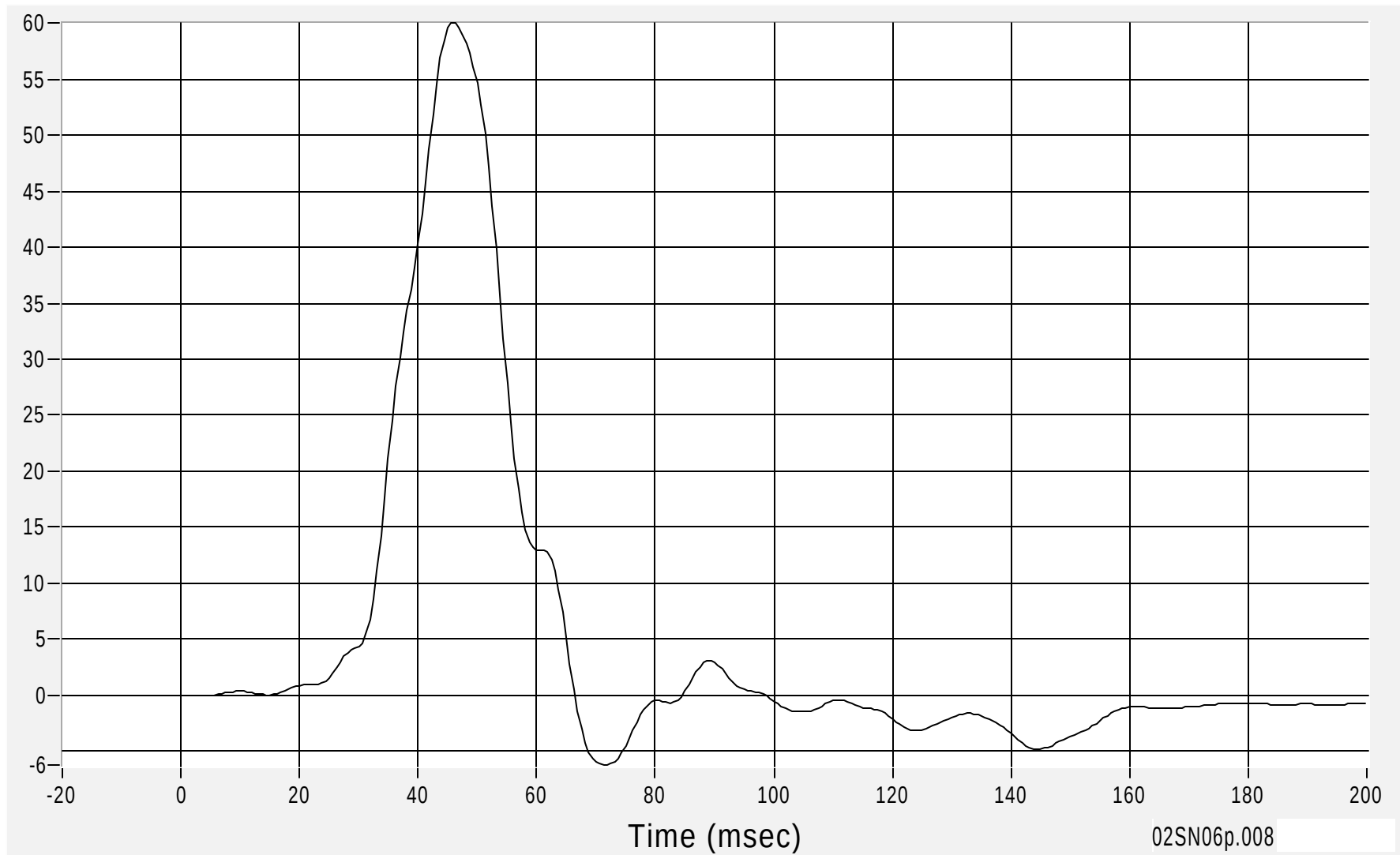
Passenger Lower Spine (Y) Acceleration

Acceleration (G's) FIR100

Max 60.0 G's at 45.6 msec

Min -6.2 G's at 71.9 msec

B-42



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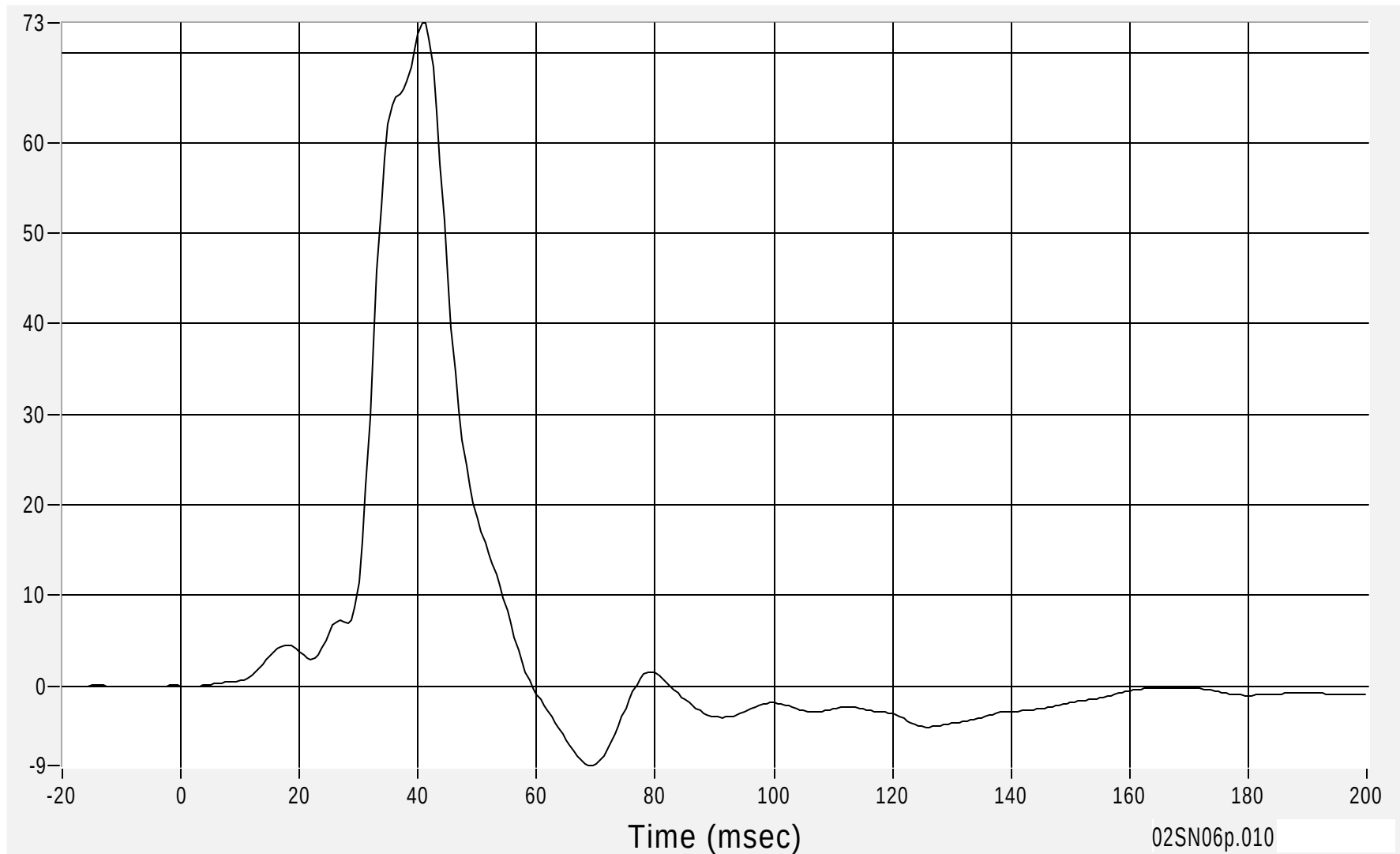
Passenger Pelvic (Y) Acceleration

Max 73.2 G's at 40.6 msec

Acceleration (G's) FIR100

Min -8.8 G's at 69.4 msec

B-43



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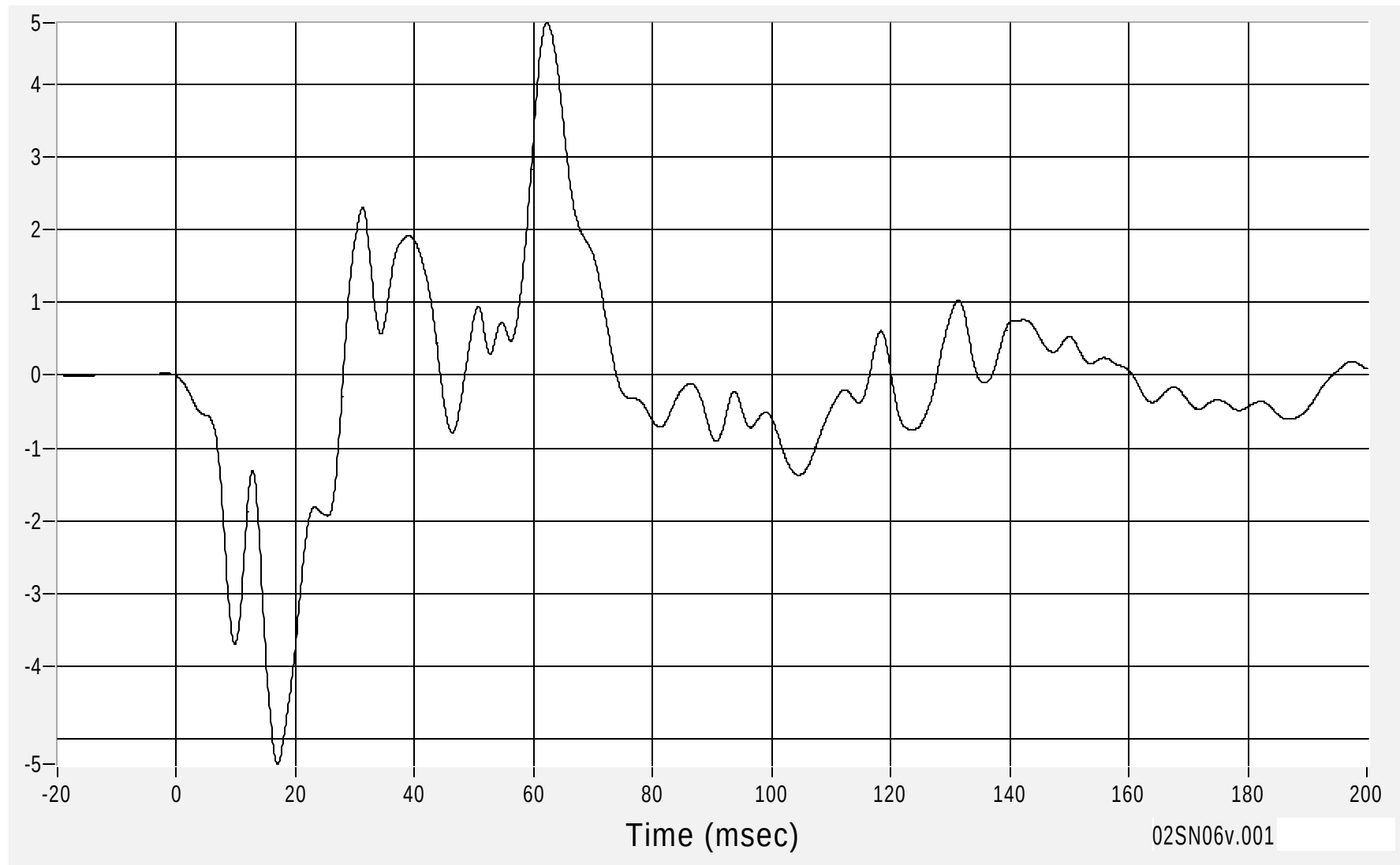
Right Side Sill at Front Seat (X) Acceleration

Max 4.8 G's at 62.2 msec

Acceleration (G's) CFC60

Min -5.3 G's at 17.0 msec

B-44



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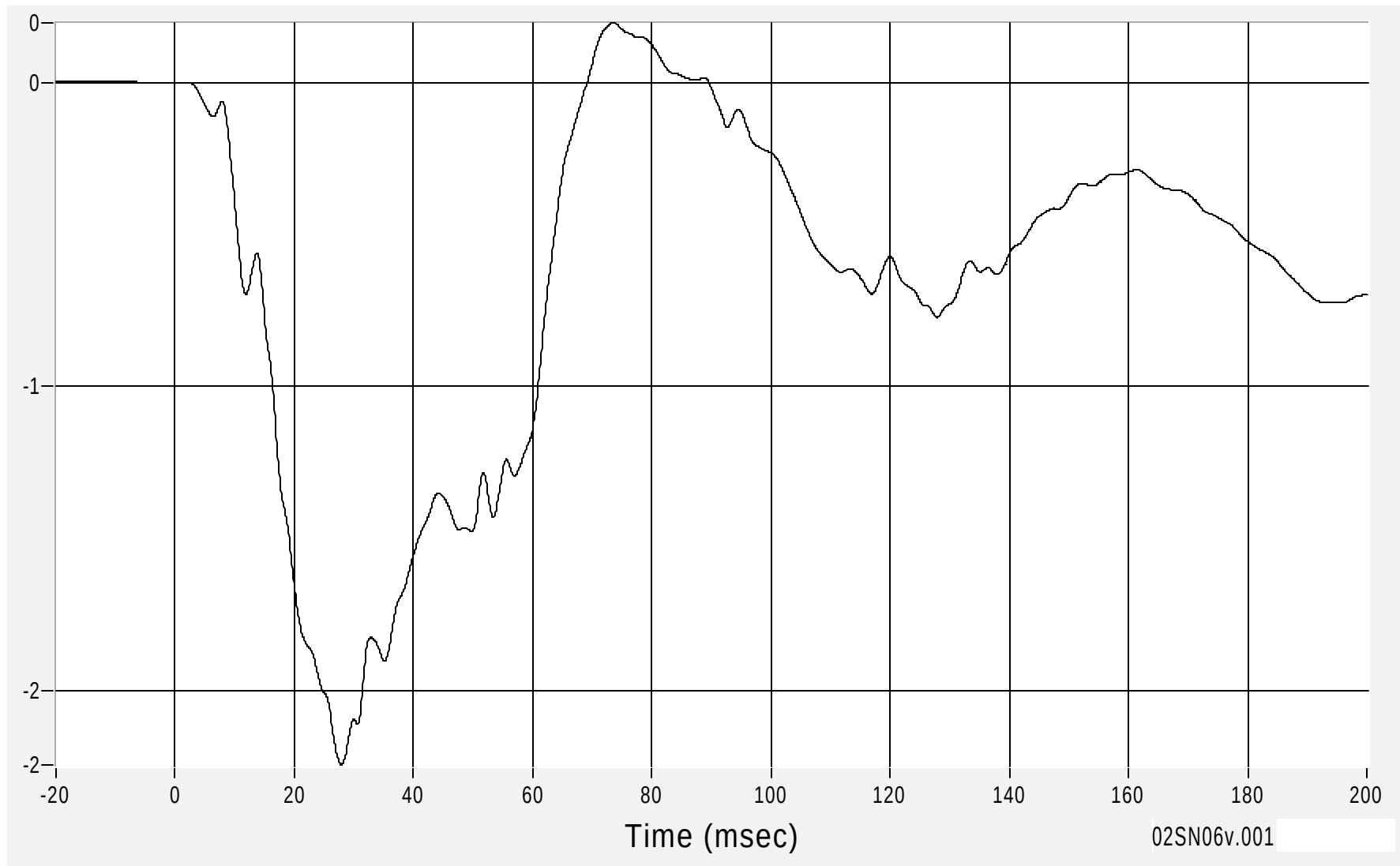
Right Side Sill at Front Seat (X) Velocity

Max 0.2 km/h at 73.5 msec

Velocity (km/h) CFC180

Min -2.2 km/h at 27.8 msec

B-45



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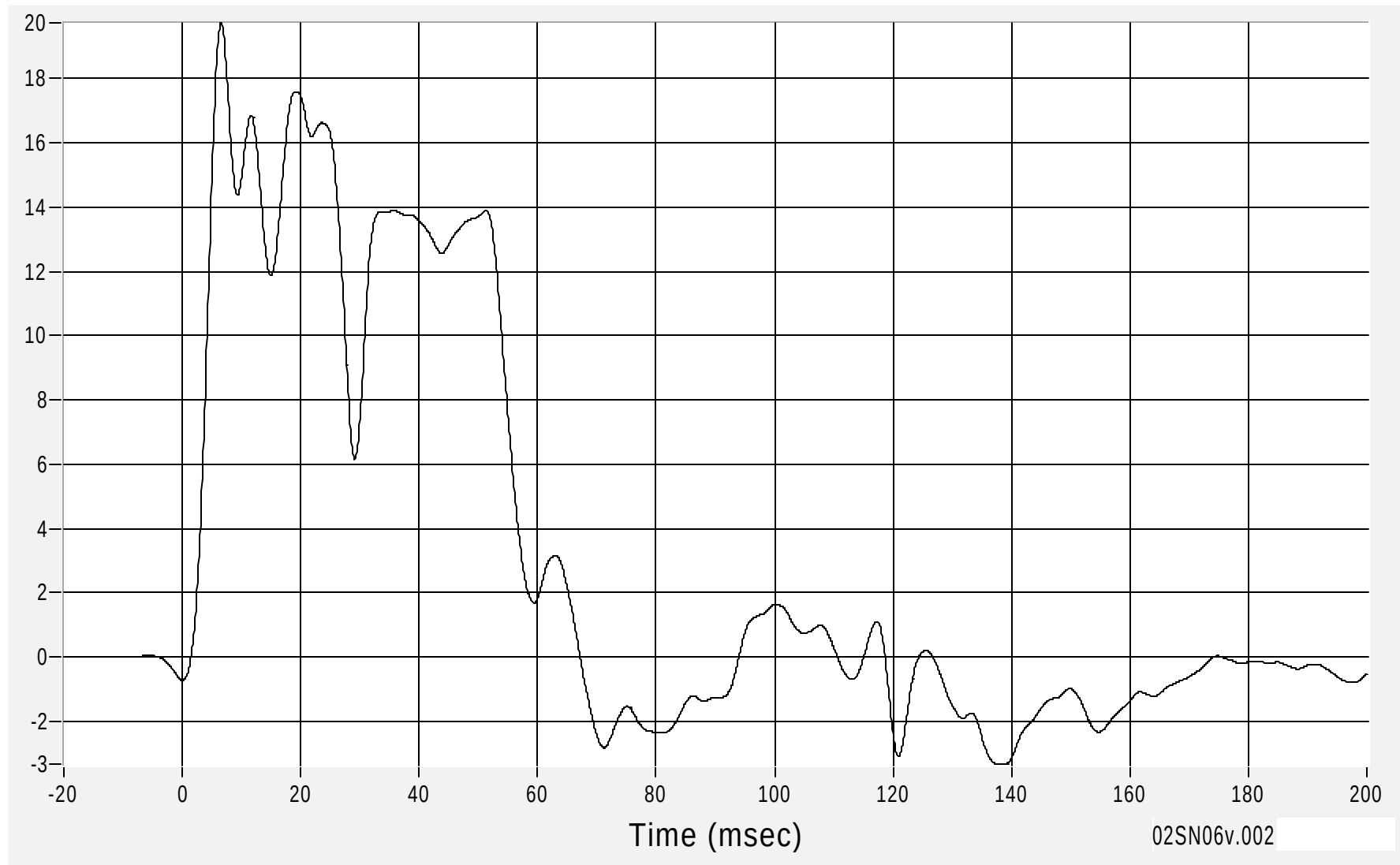
Right Side Sill at Front Seat (Y) Acceleration

Max 19.7 G's at 6.6 msec

Min -3.3 G's at 138.9 msec

Acceleration (G's) CFC60

B-46



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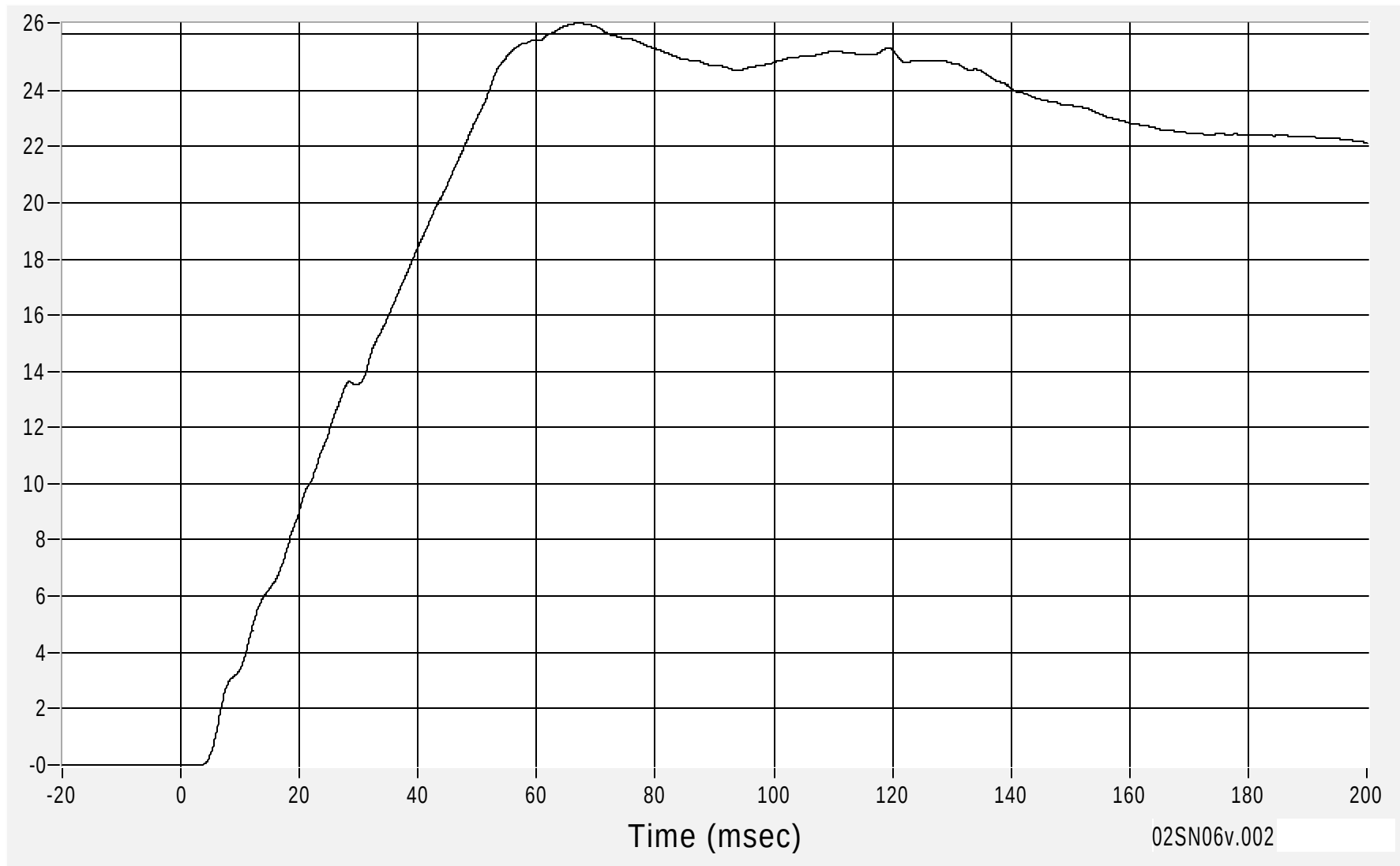
Right Side Sill at Front Seat (Y) Velocity

Velocity (km/h) CFC180

Max 26.4 km/h at 67.1 msec

Min 0.0 km/h at 3.1 msec

B-47



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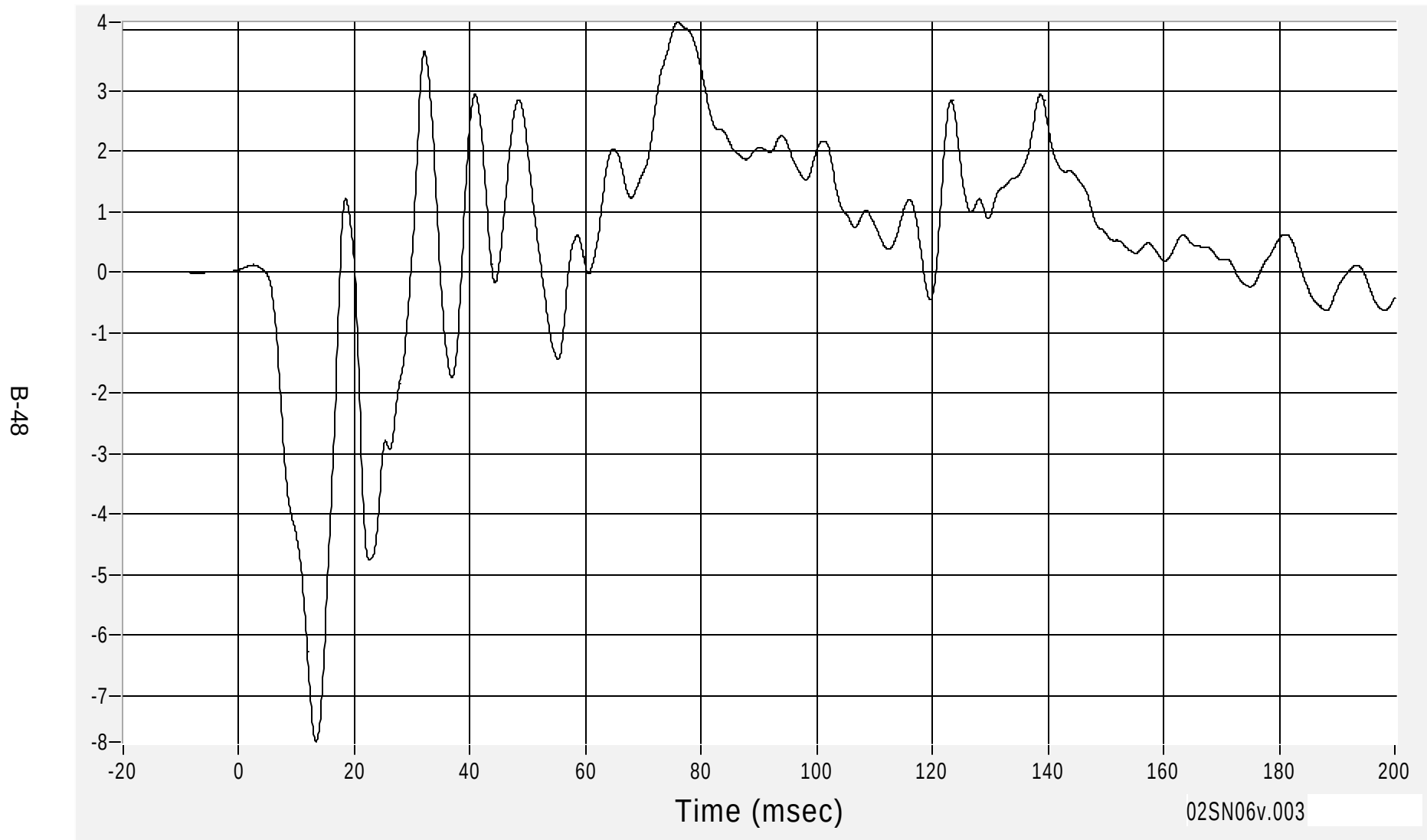
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Right Side Sill at Front Seat (Z) Acceleration

Max 4.1 G's at 75.9 msec

Acceleration (G's) CFC60

Min -7.8 G's at 13.4 msec



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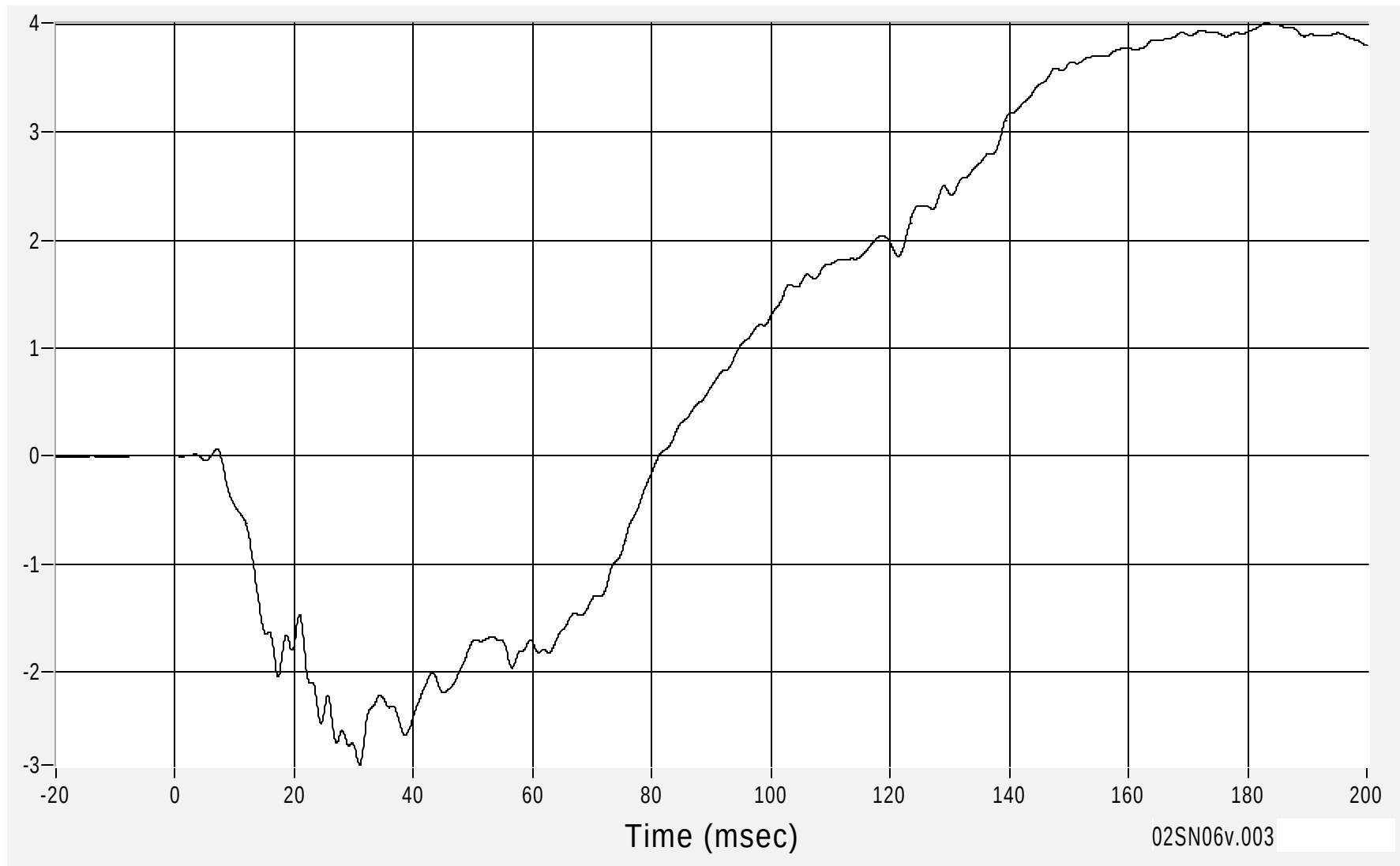
Right Side Sill at Front Seat (Z) Velocity

Max 4.0 km/h at 183.0 msec

Velocity (km/h) CFC180

Min -2.9 km/h at 31.0 msec

B-49



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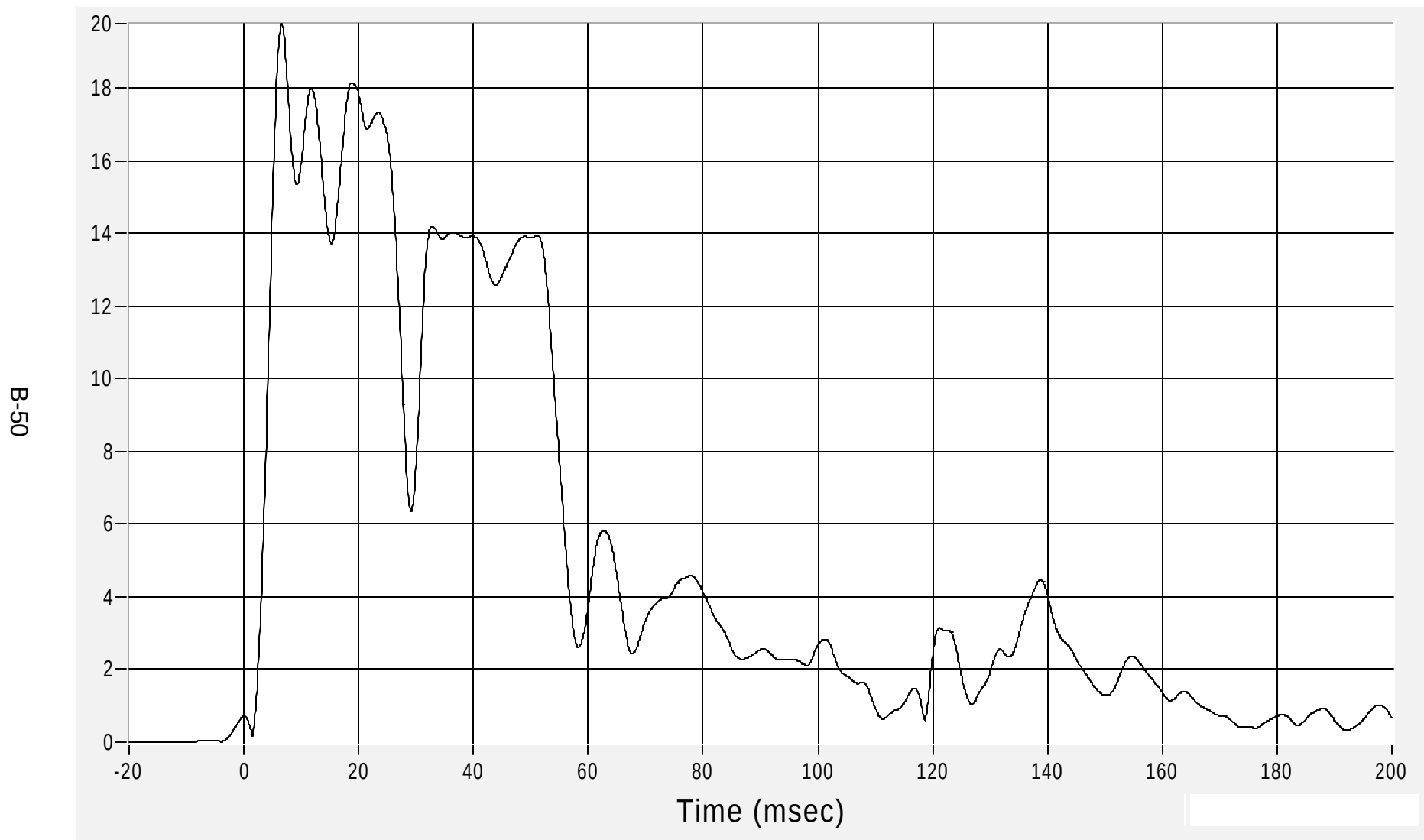
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Right Side Sill at Front Seat Resultant Acceleration

Max 19.8 G's at 6.6 msec

Acceleration (G's) CFC60

Min 0.2 G's at 1.4 msec



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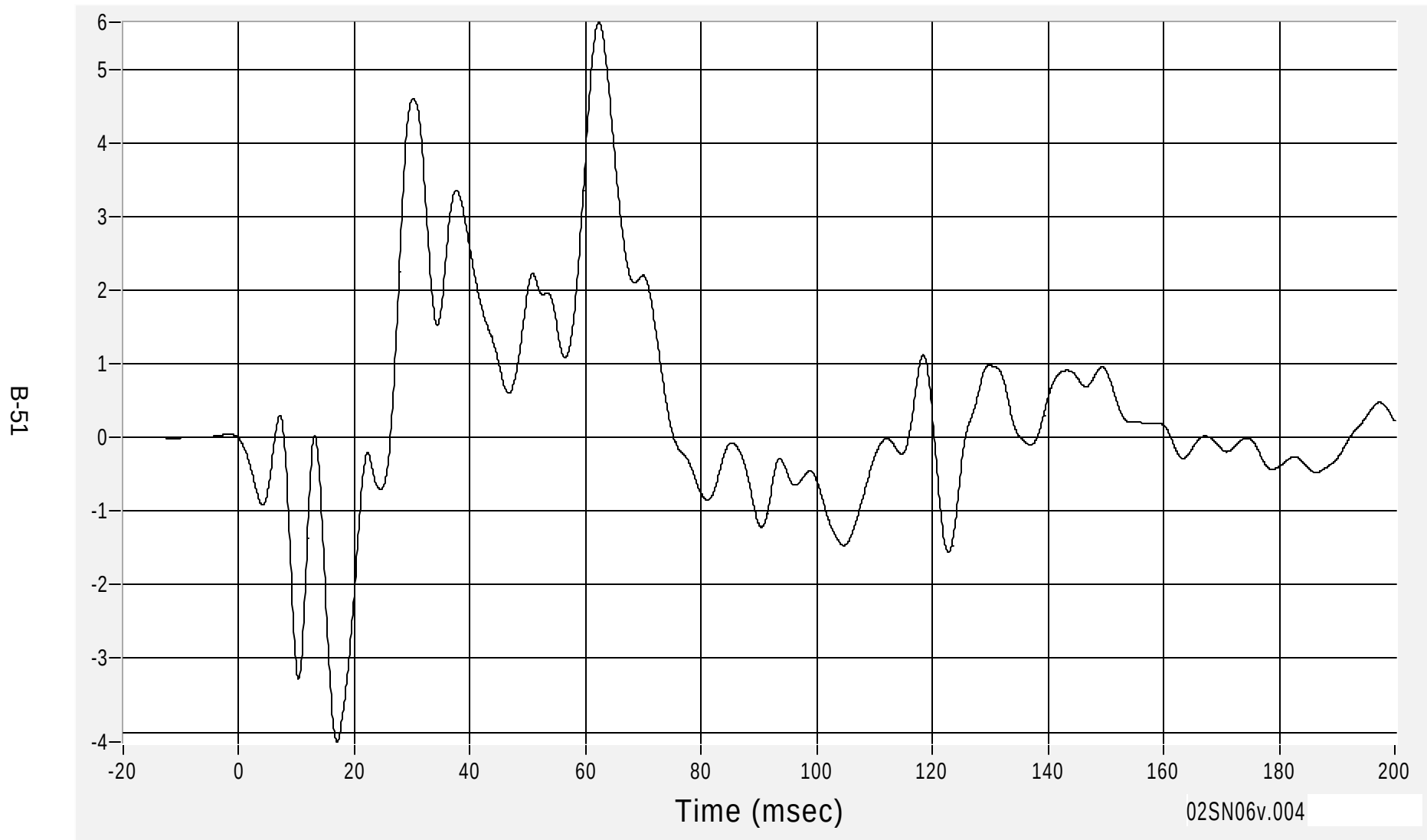
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Right Side Sill at Rear Seat (X) Acceleration

Max 5.6 G's at 62.3 msec

Acceleration (G's) CFC60

Min -4.1 G's at 17.0 msec



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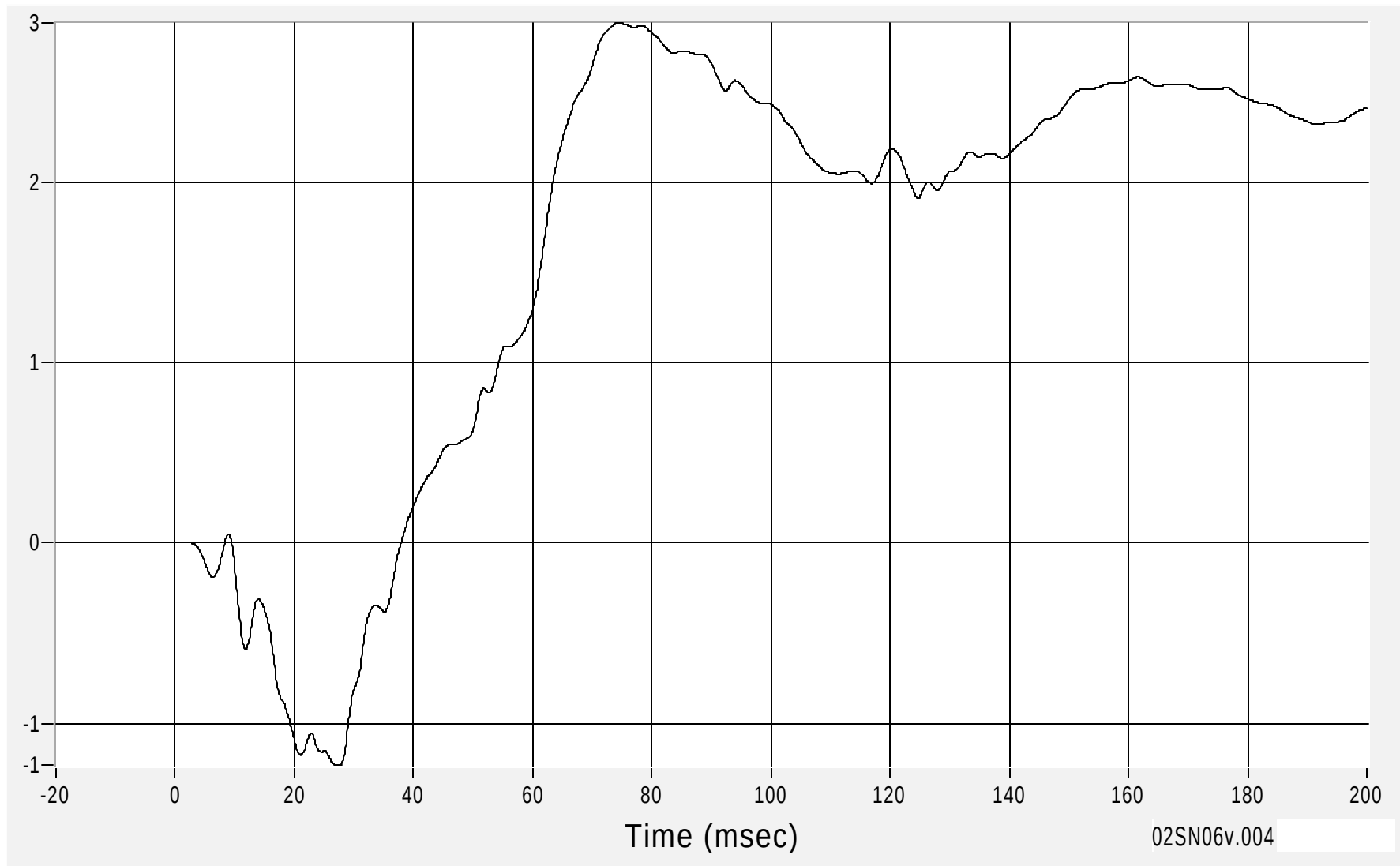
Right Side Sill at Rear Seat (X) Velocity

Max 2.9 km/h at 74.4 msec

Min -1.2 km/h at 27.6 msec

Velocity (km/h) CFC180

B-52



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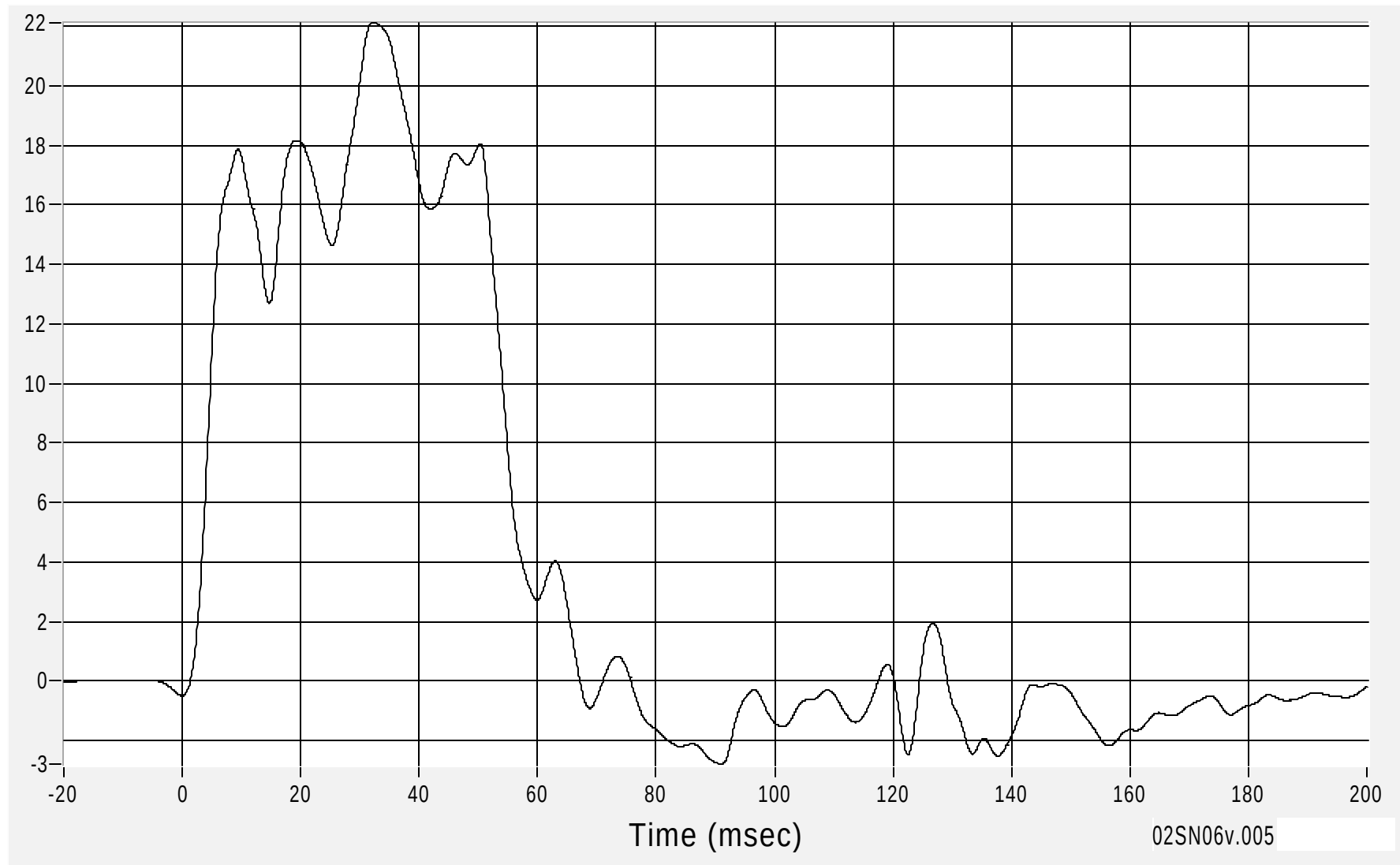
Right Side Sill at Rear Seat (Y) Acceleration

Max 22.1 G's at 32.2 msec

Min -2.8 G's at 90.9 msec

Acceleration (G's) CFC60

B-53



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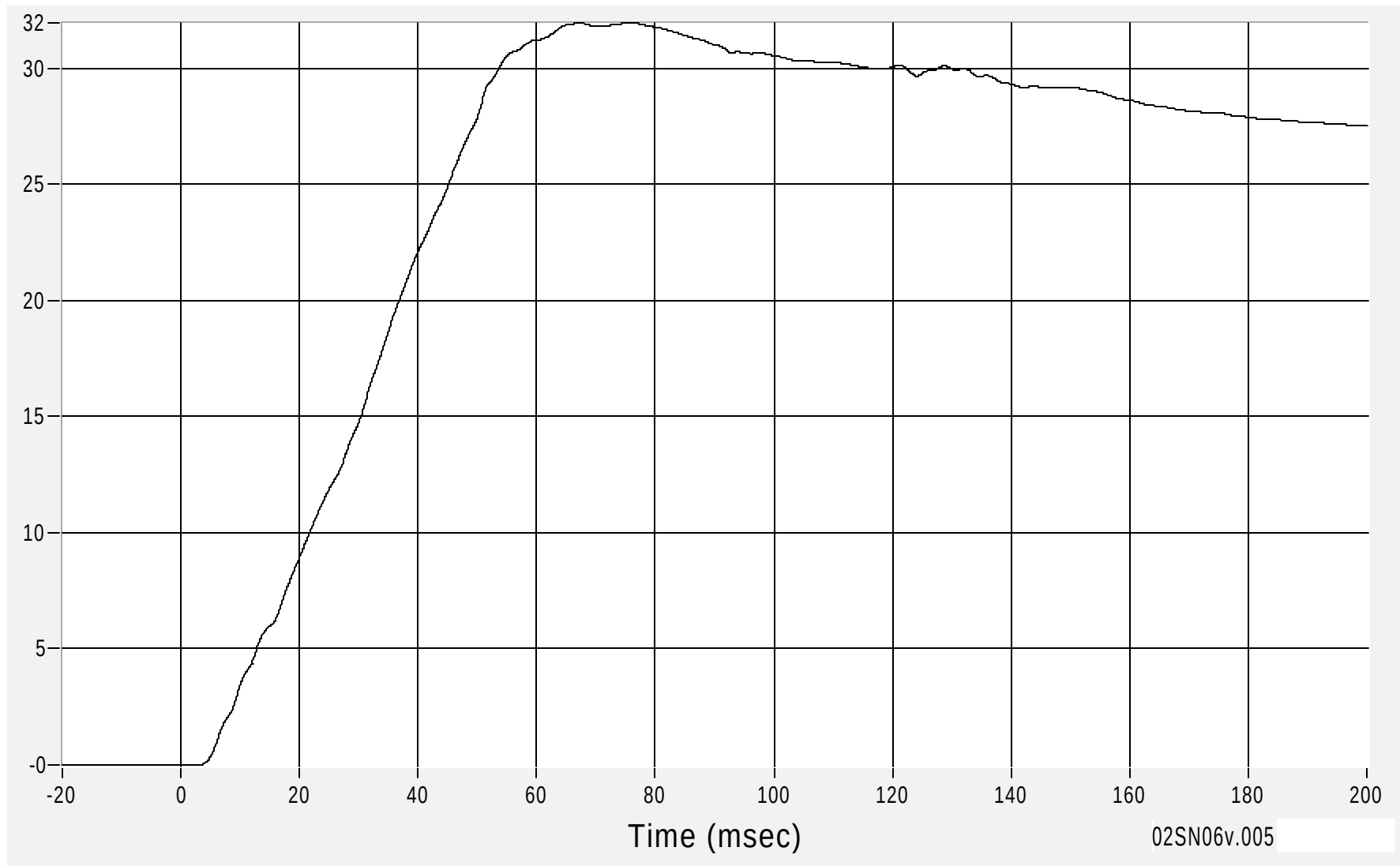
Right Side Sill at Rear Seat (Y) Velocity

Velocity (km/h) CFC180

Max 32.0 km/h at 75.9 msec

Min 0.0 km/h at 2.6 msec

B-54



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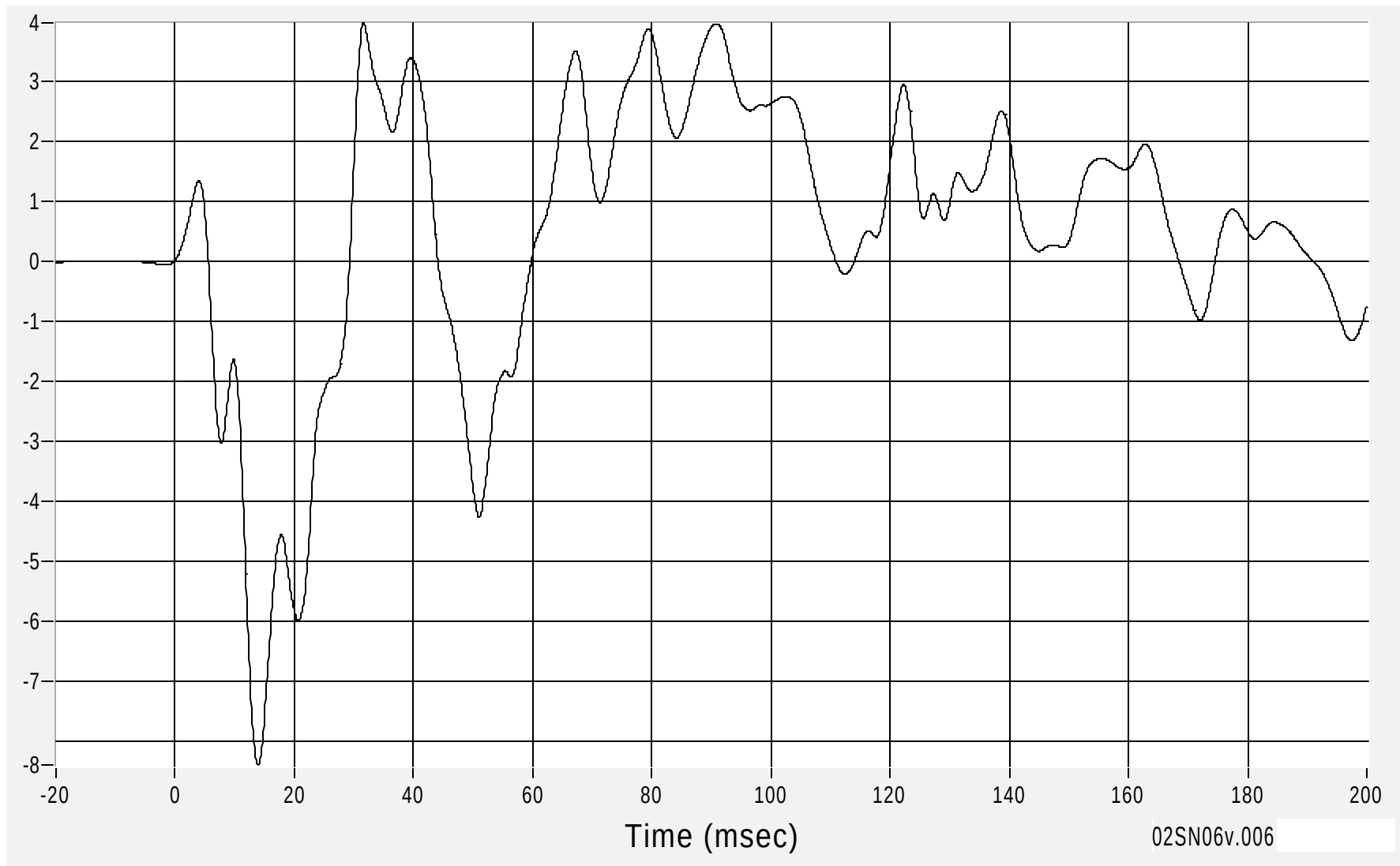
Right Side Sill at Rear Seat (Z) Acceleration

Max 4.0 G's at 31.6 msec

Acceleration (G's) CFC60

Min -8.4 G's at 13.9 msec

B-55



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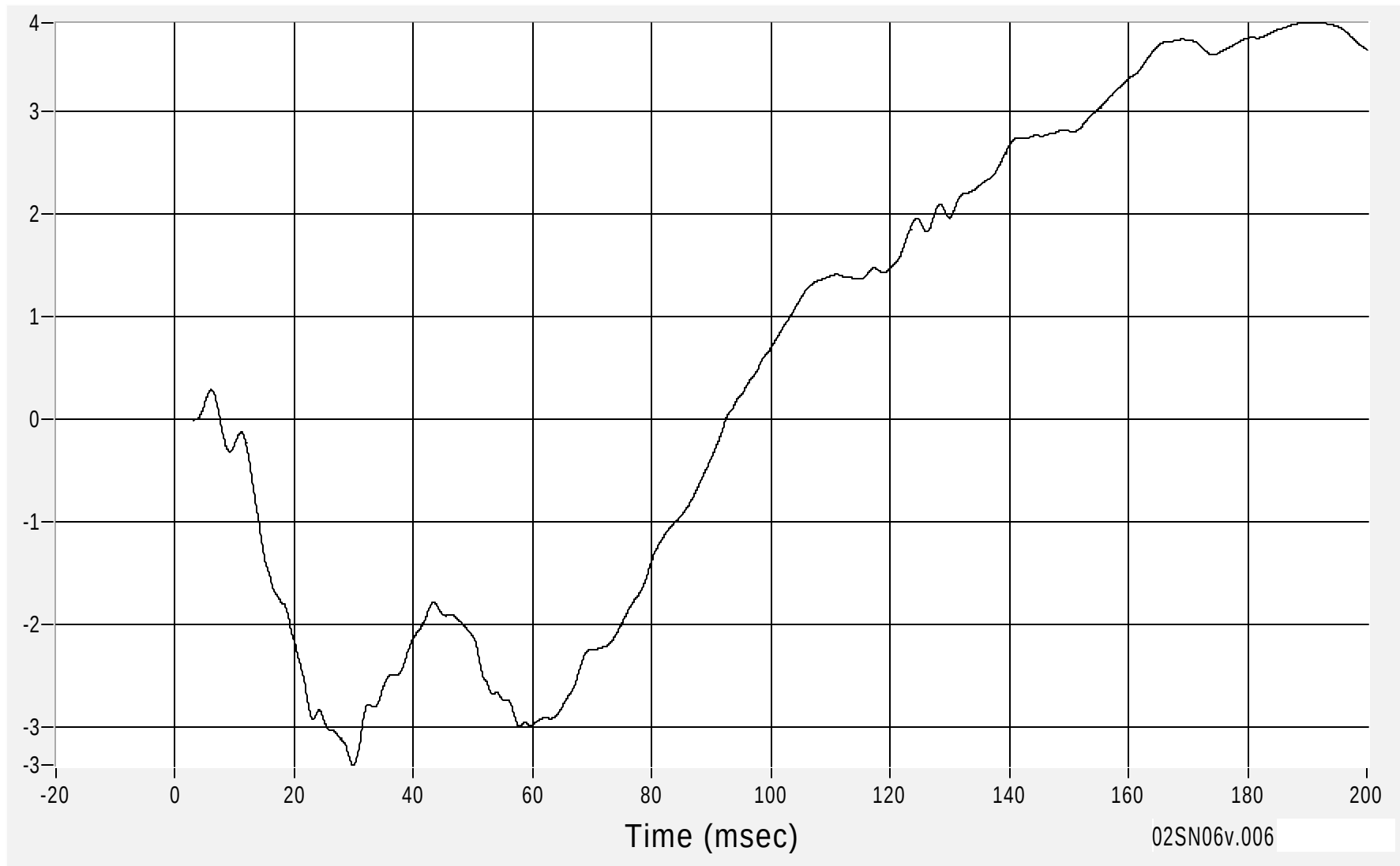
Right Side Sill at Rear Seat (Z) Velocity

Max 3.9 km/h at 190.6 msec

Velocity (km/h) CFC180

Min -3.4 km/h at 29.8 msec

B-56



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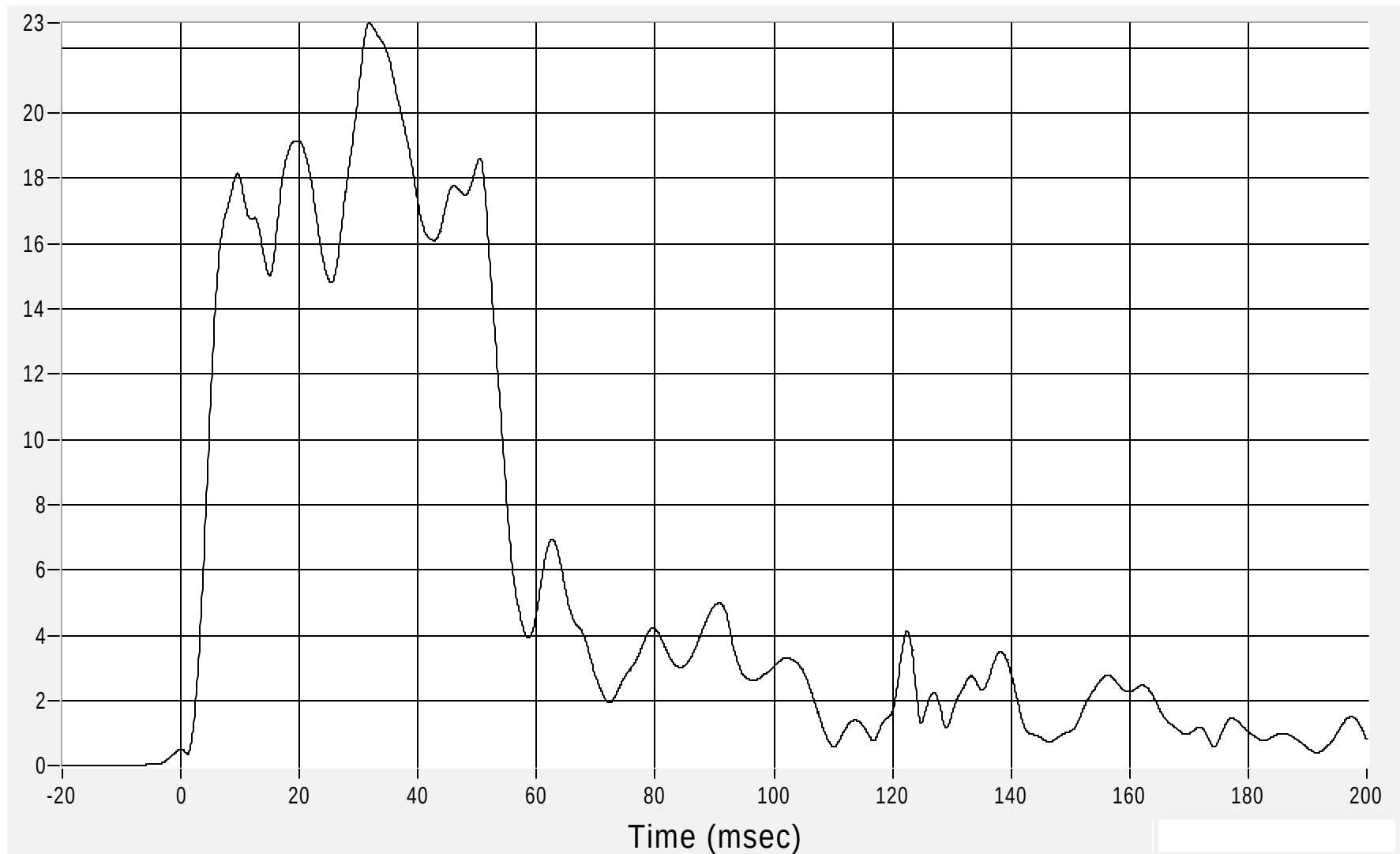
Right Side Sill at Rear Seat Resultant Acceleration

Max 22.8 G's at 31.7 msec

Min 0.4 G's at 1.1 msec

Acceleration (G's) CFC60

B-57



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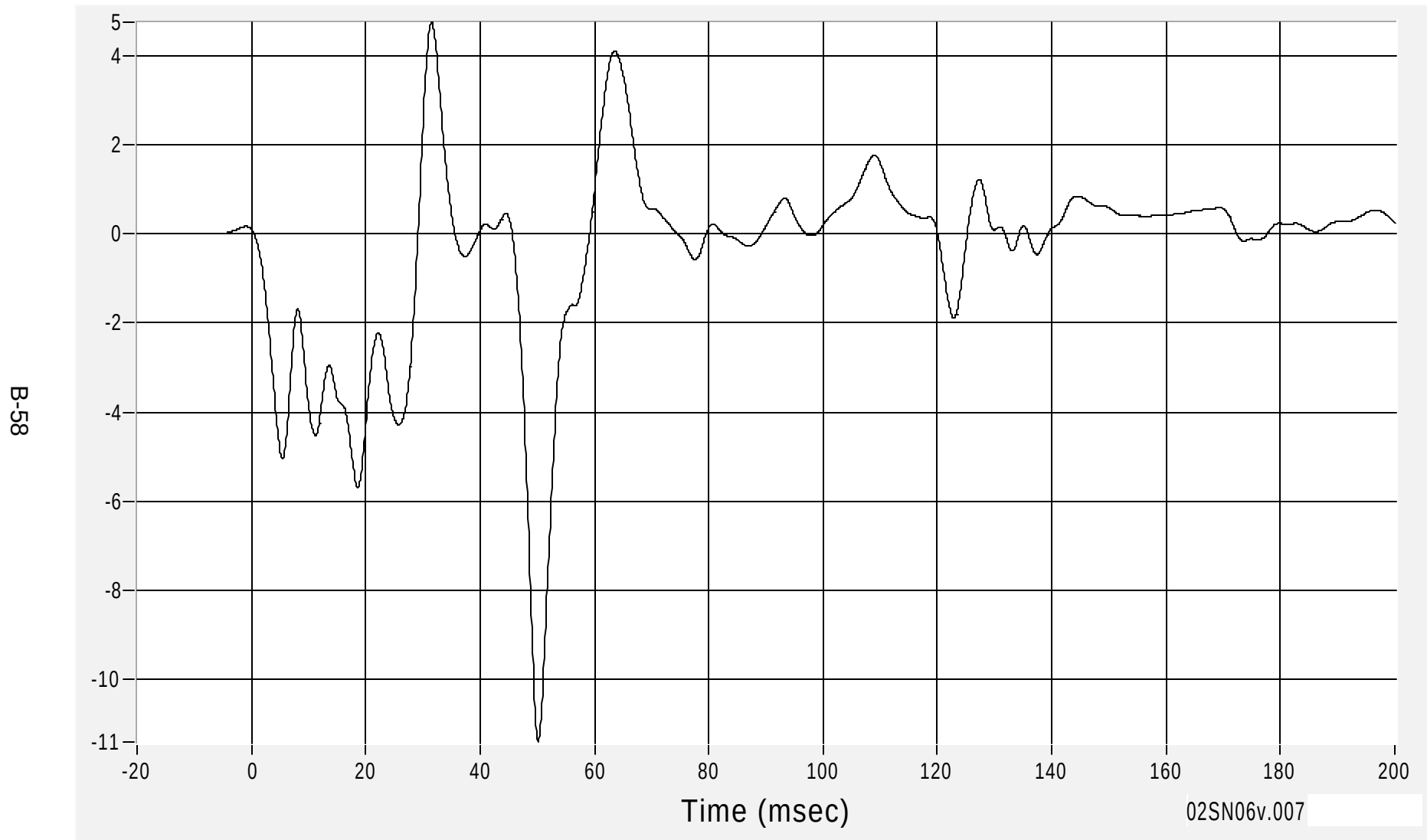
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Rear Floorpan Above Axle (X) Acceleration

Max 4.8 G's at 31.5 msec

Min -11.4 G's at 50.2 msec

Acceleration (G's) CFC60



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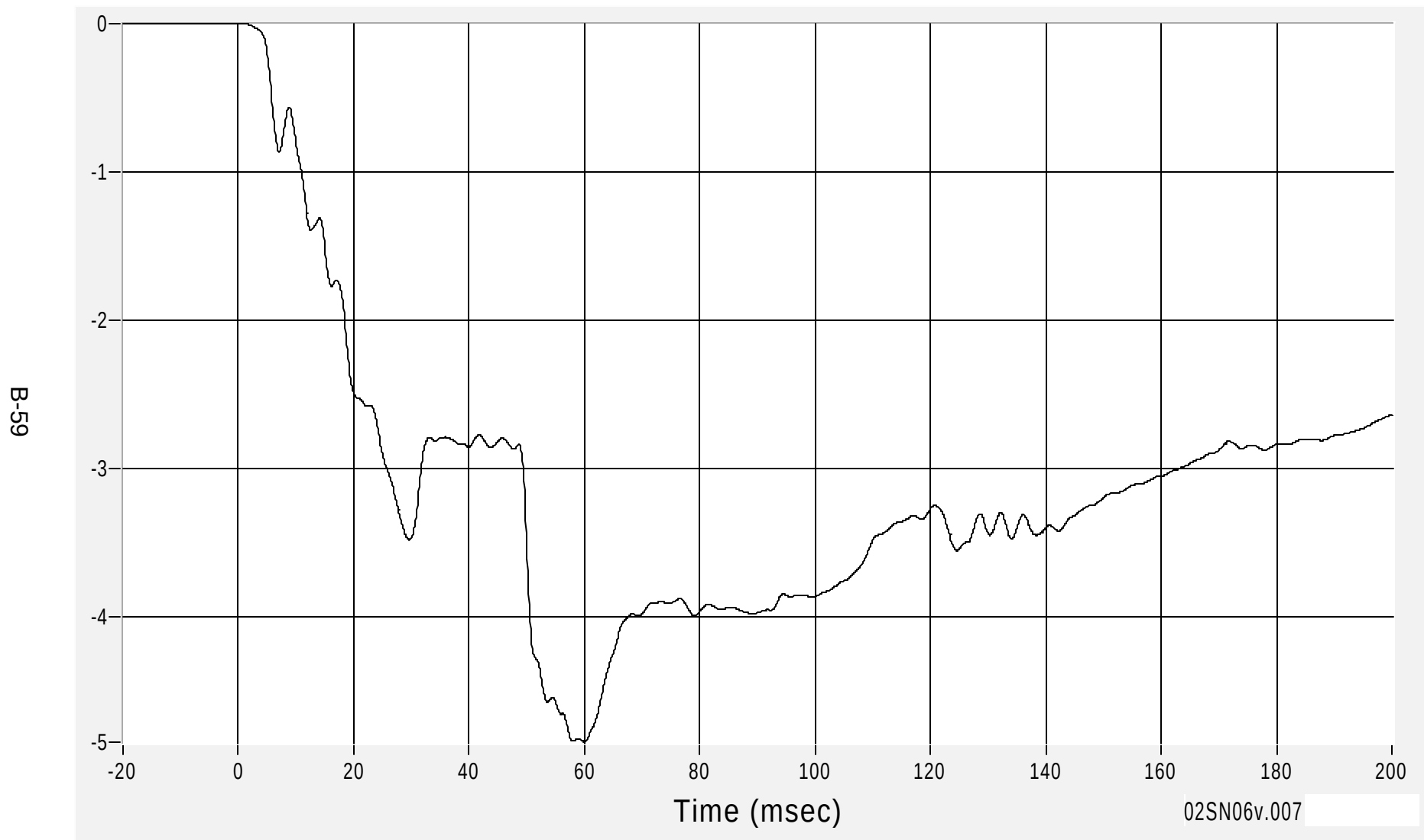
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Rear Floorpan Above Axle (X) Velocity

Max 0.0 km/h at 0.8 msec

Velocity (km/h) CFC180

Min -4.8 km/h at 60.0 msec



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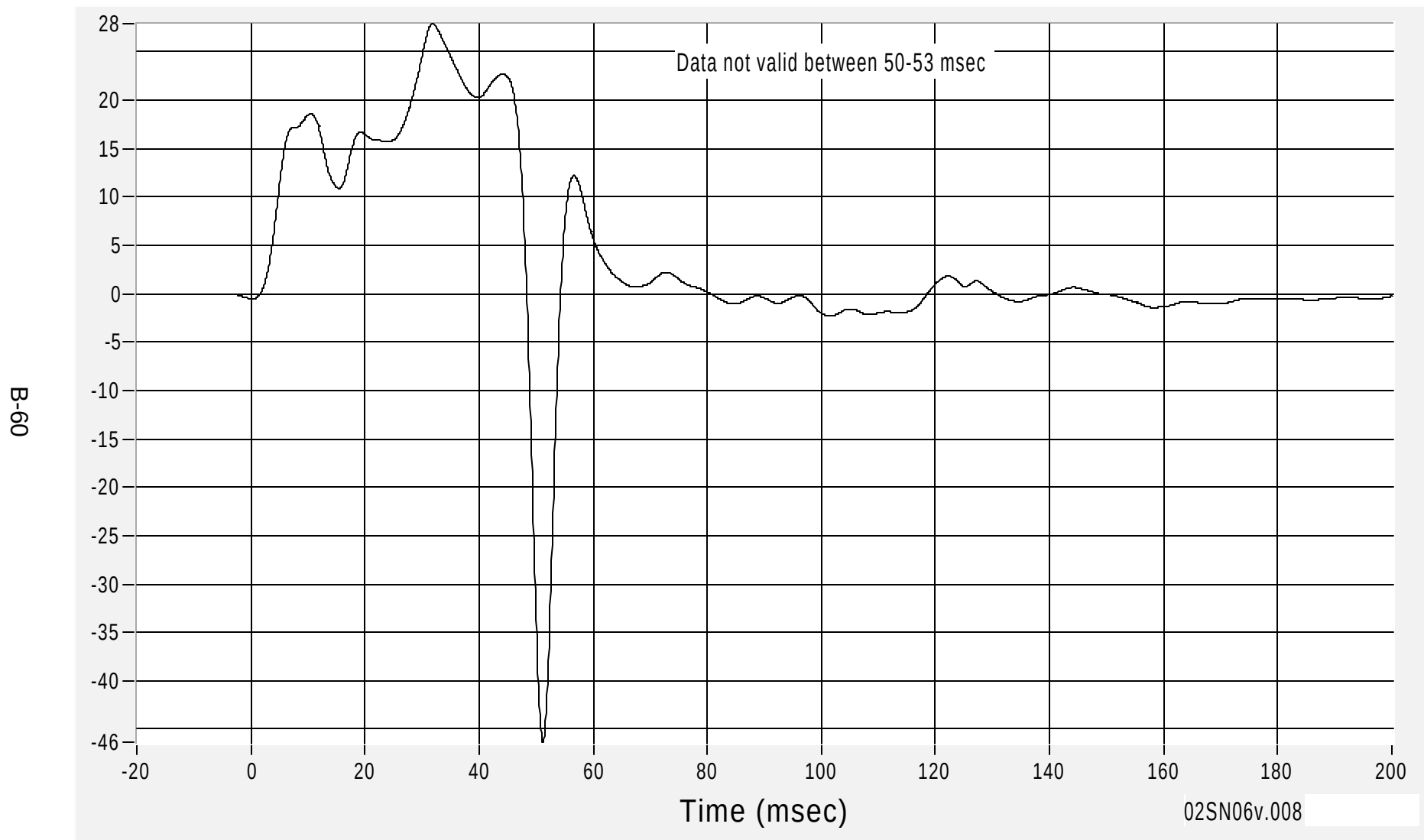
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Rear Floorpan Above Axle (Y) Acceleration

Max 27.9 G's at 31.8 msec

Min -46.3 G's at 51.2 msec

Acceleration (G's) CFC60



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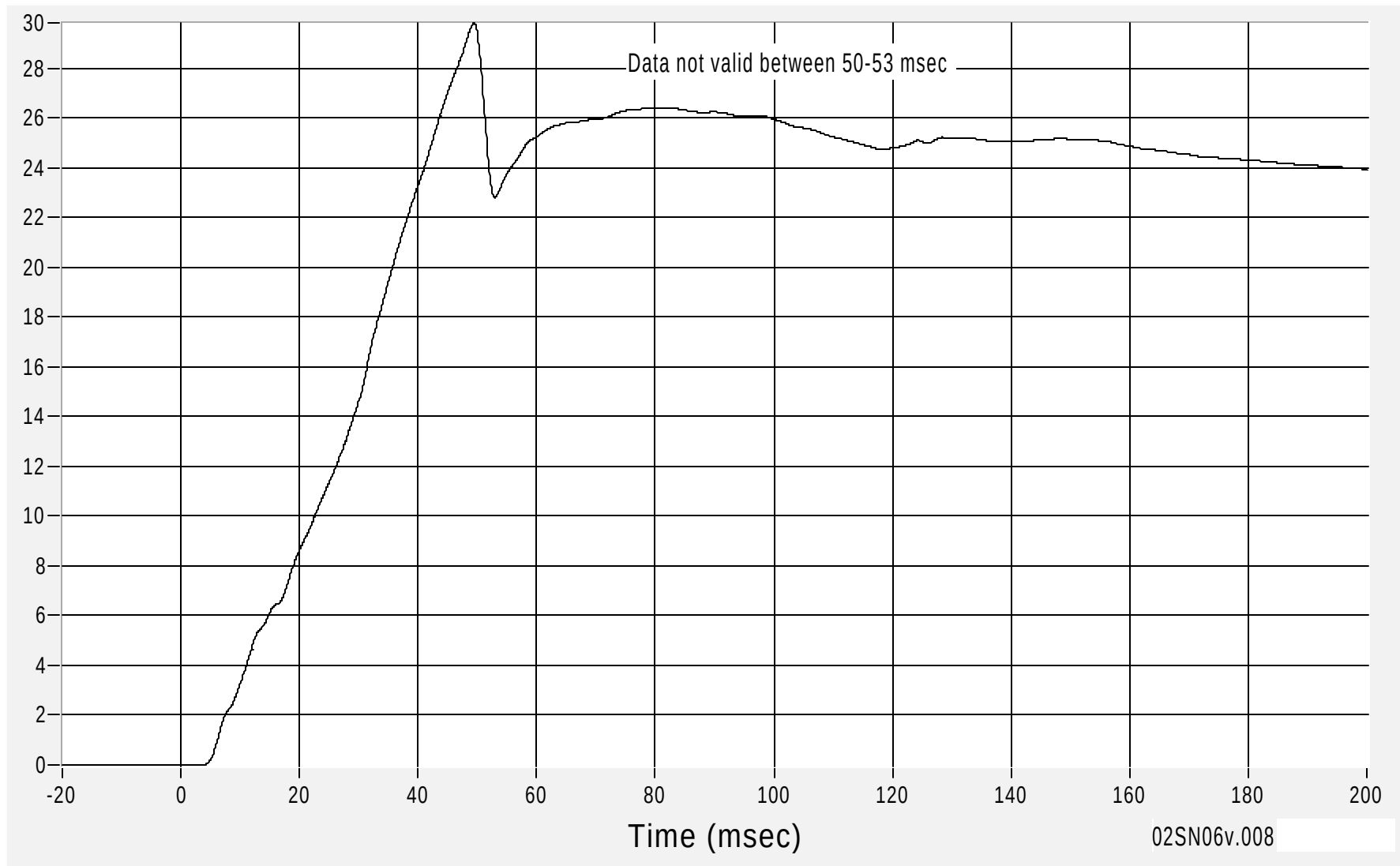
Rear Floorpan Above Axle (Y) Velocity

Velocity (km/h) CFC180

Max 29.8 km/h at 49.4 msec

Min 0.0 km/h at 0.0 msec

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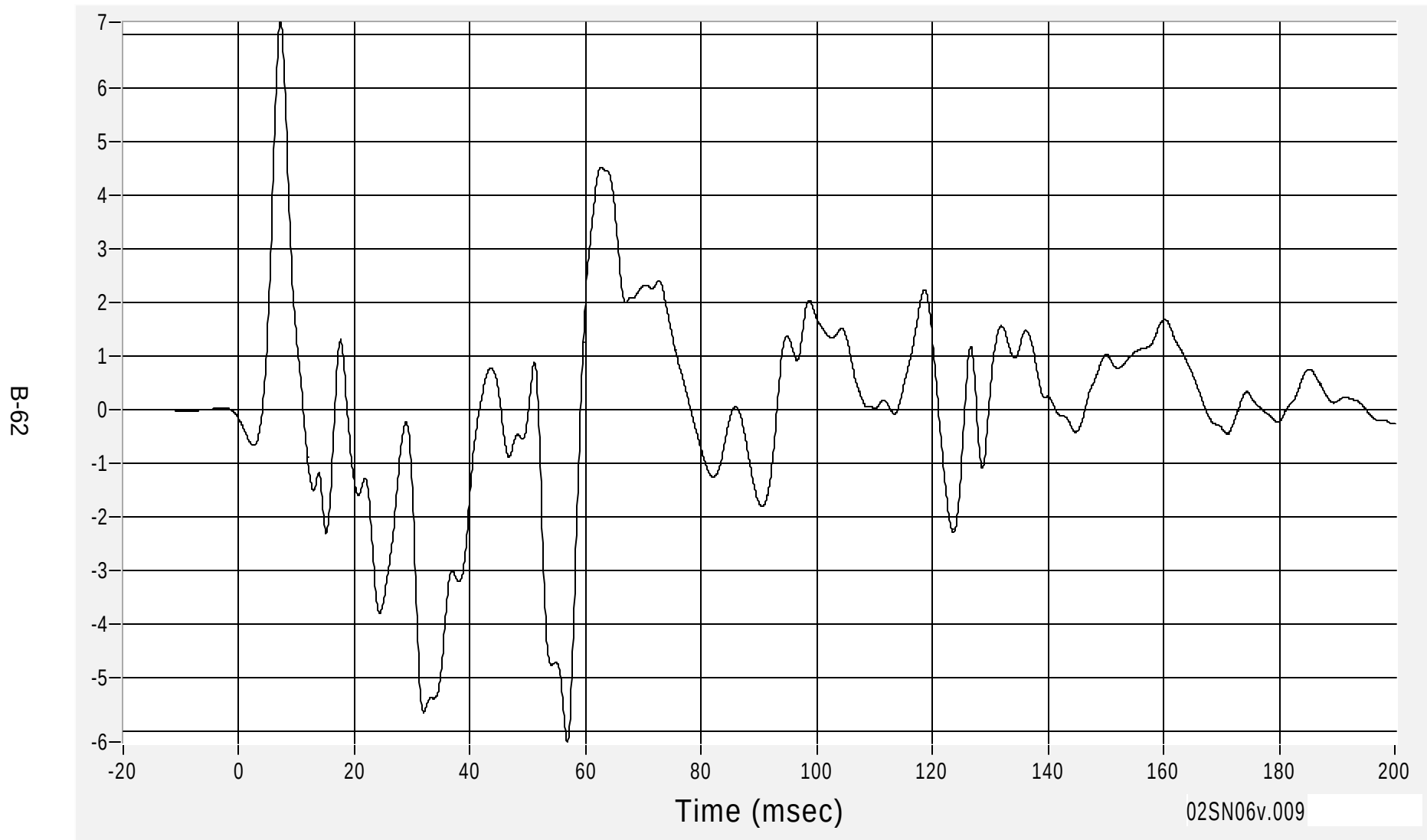
Medical College of Wisconsin
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Rear Floorpan Above Axle (Z) Acceleration

Max 7.2 G's at 7.2 msec

Min -6.2 G's at 56.8 msec

Acceleration (G's) CFC60



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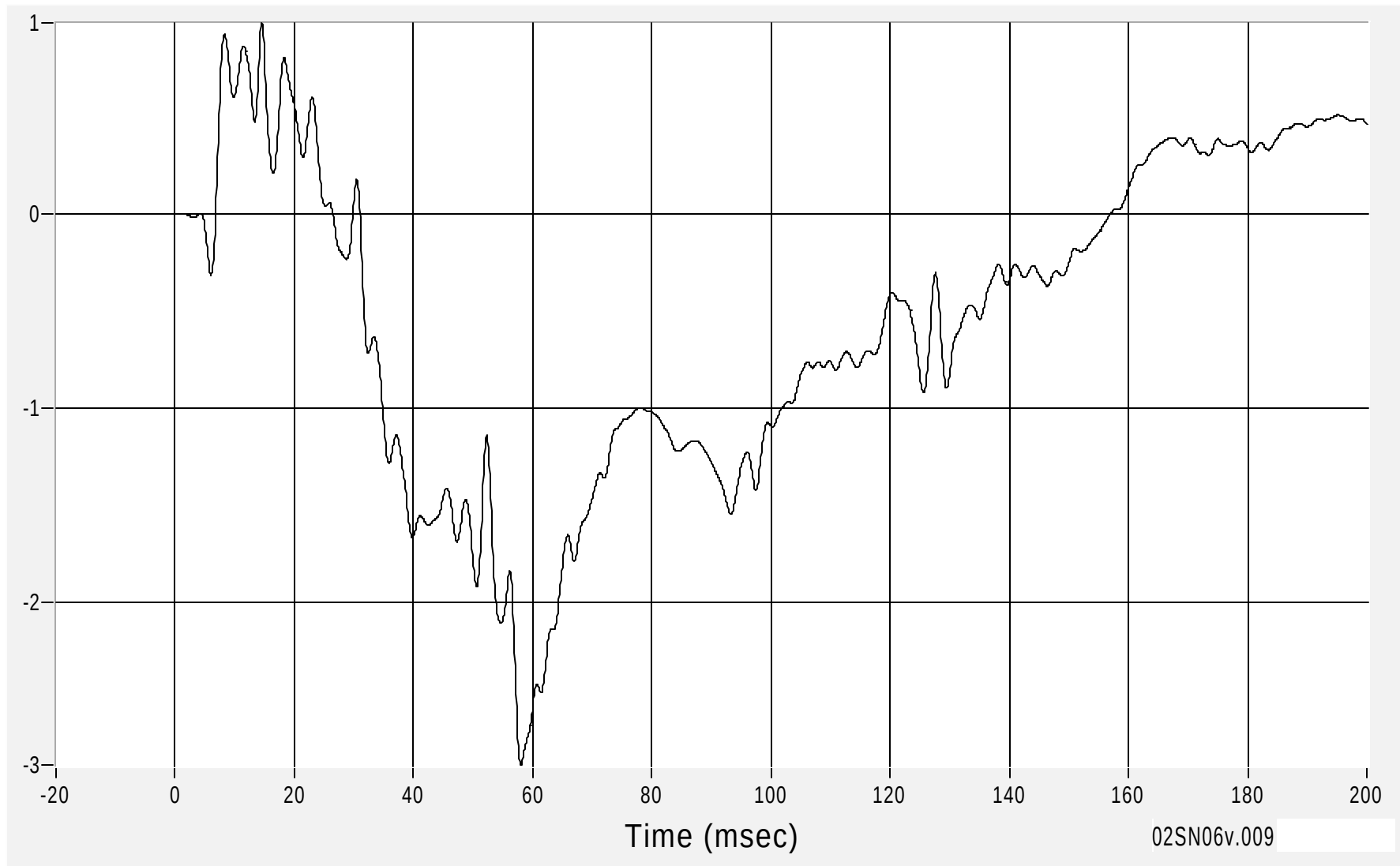
Rear Floorpan Above Axle (Z) Velocity

Max 1.0 km/h at 14.6 msec

Min -2.8 km/h at 58.0 msec

Velocity (km/h) CFC180

B-63



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11 April 2002

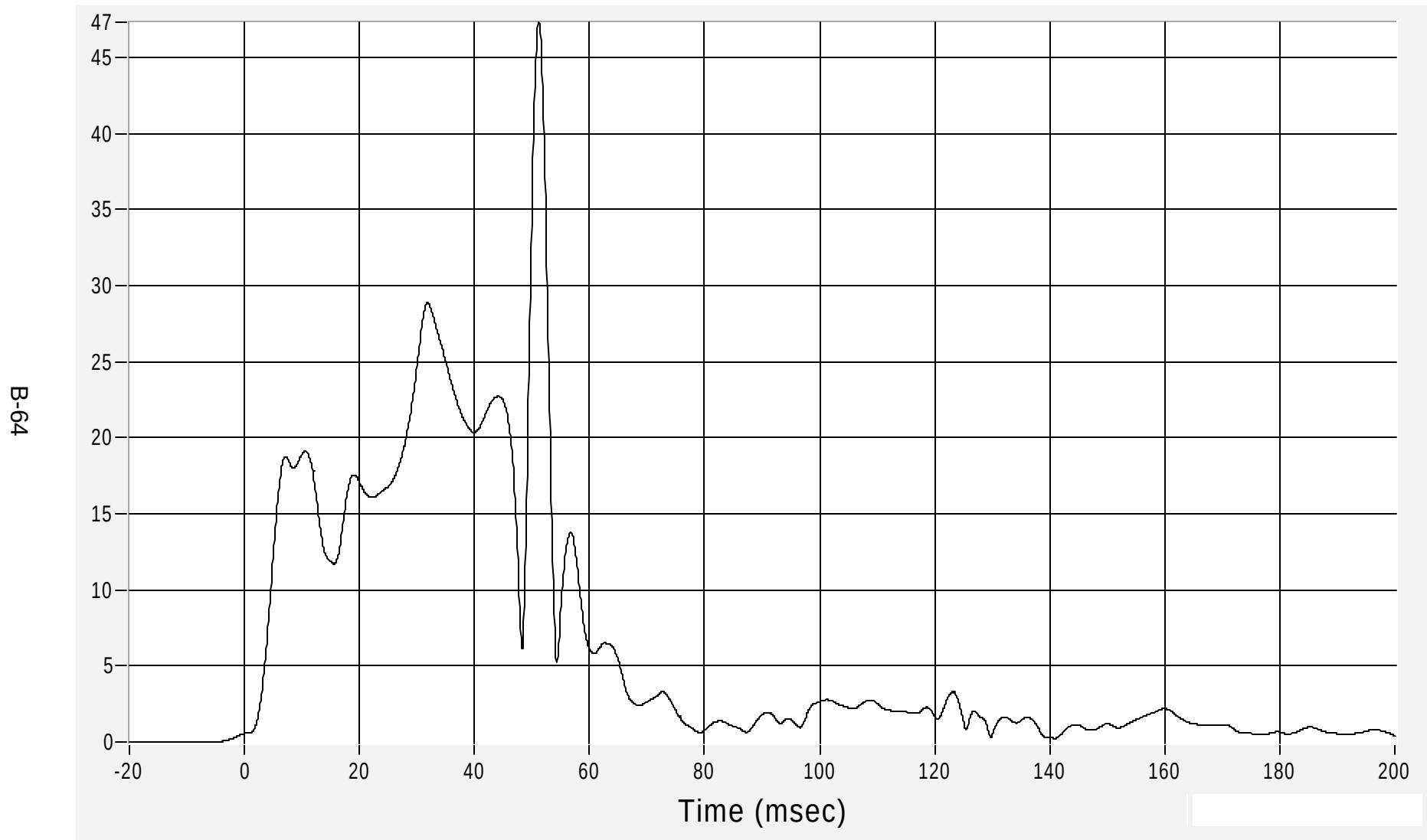
Medical College of Wisconsin
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Rear Floorpan Above Axle Resultant Acceleration

Max 47.3 G's at 51.2 msec

Acceleration (G's) CFC60

Min 0.2 G's at 140.9 msec



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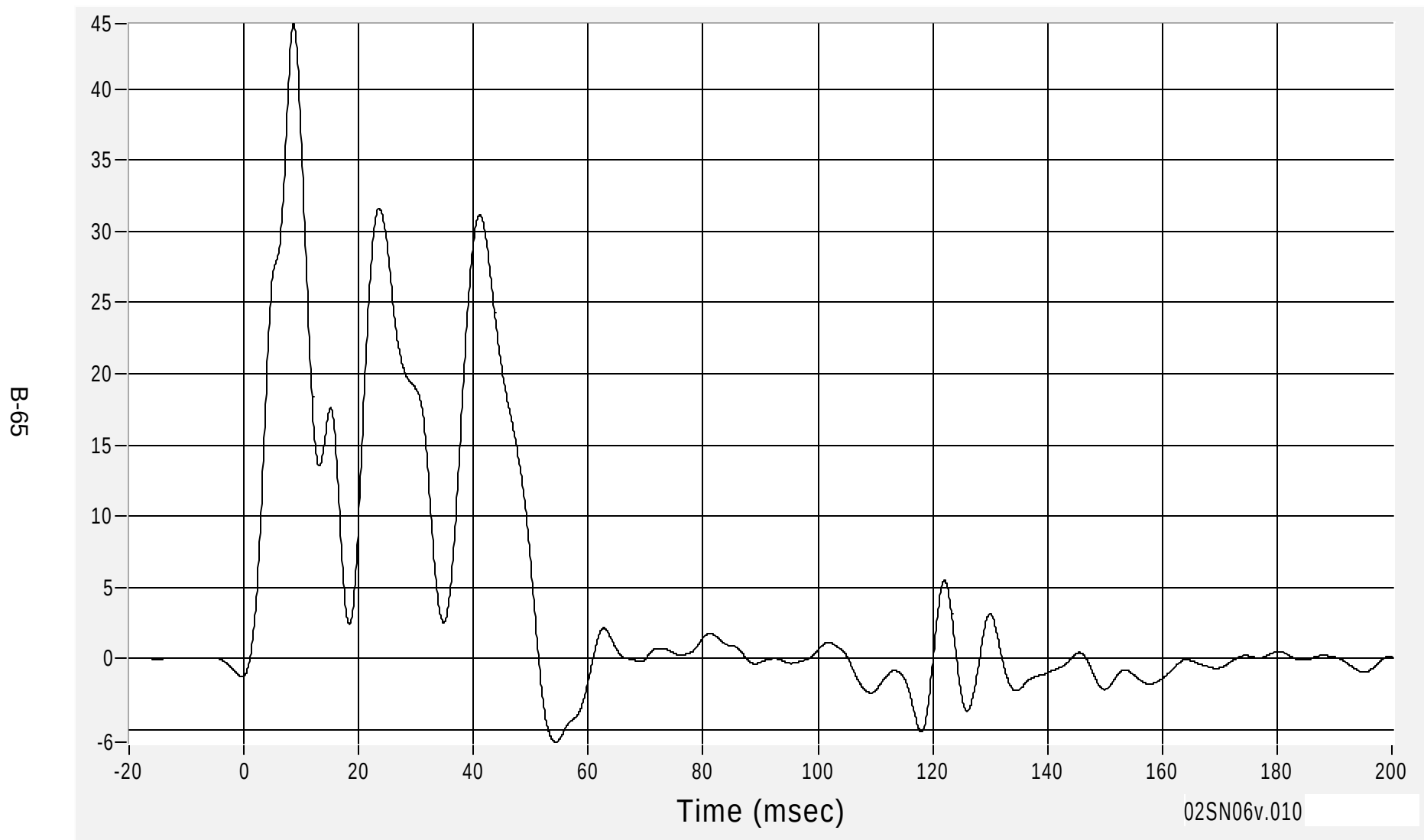
Medical College of Wisconsin
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Left Side Sill at Rear Seat (Y) Acceleration

Max 44.6 G's at 8.6 msec

Acceleration (G's) CFC60

Min -5.9 G's at 54.3 msec



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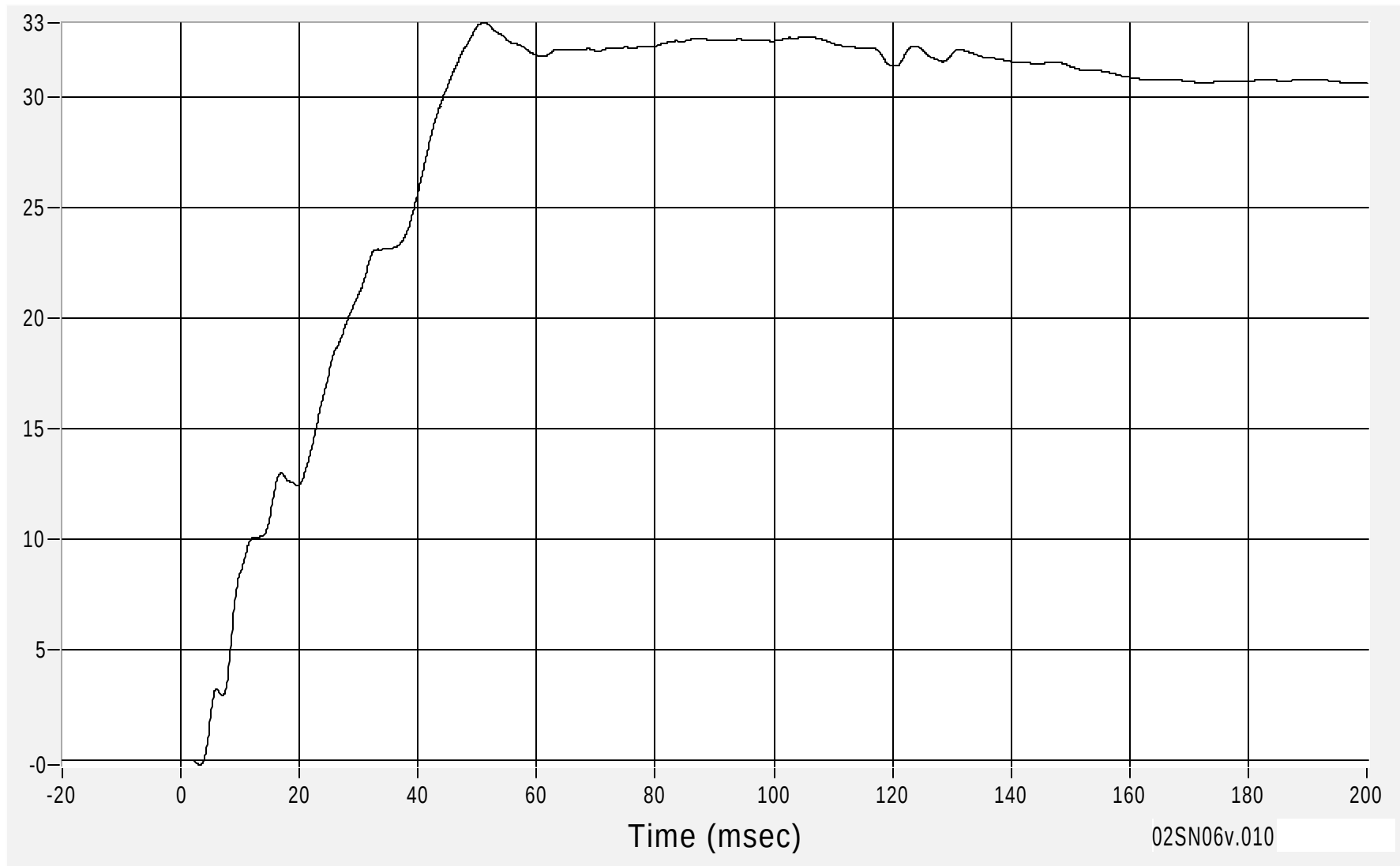
Left Side Sill at Rear Seat (Y) Velocity

Max 33.4 km/h at 51.1 msec

Min -0.2 km/h at 3.2 msec

Velocity (km/h) CFC180

B-66



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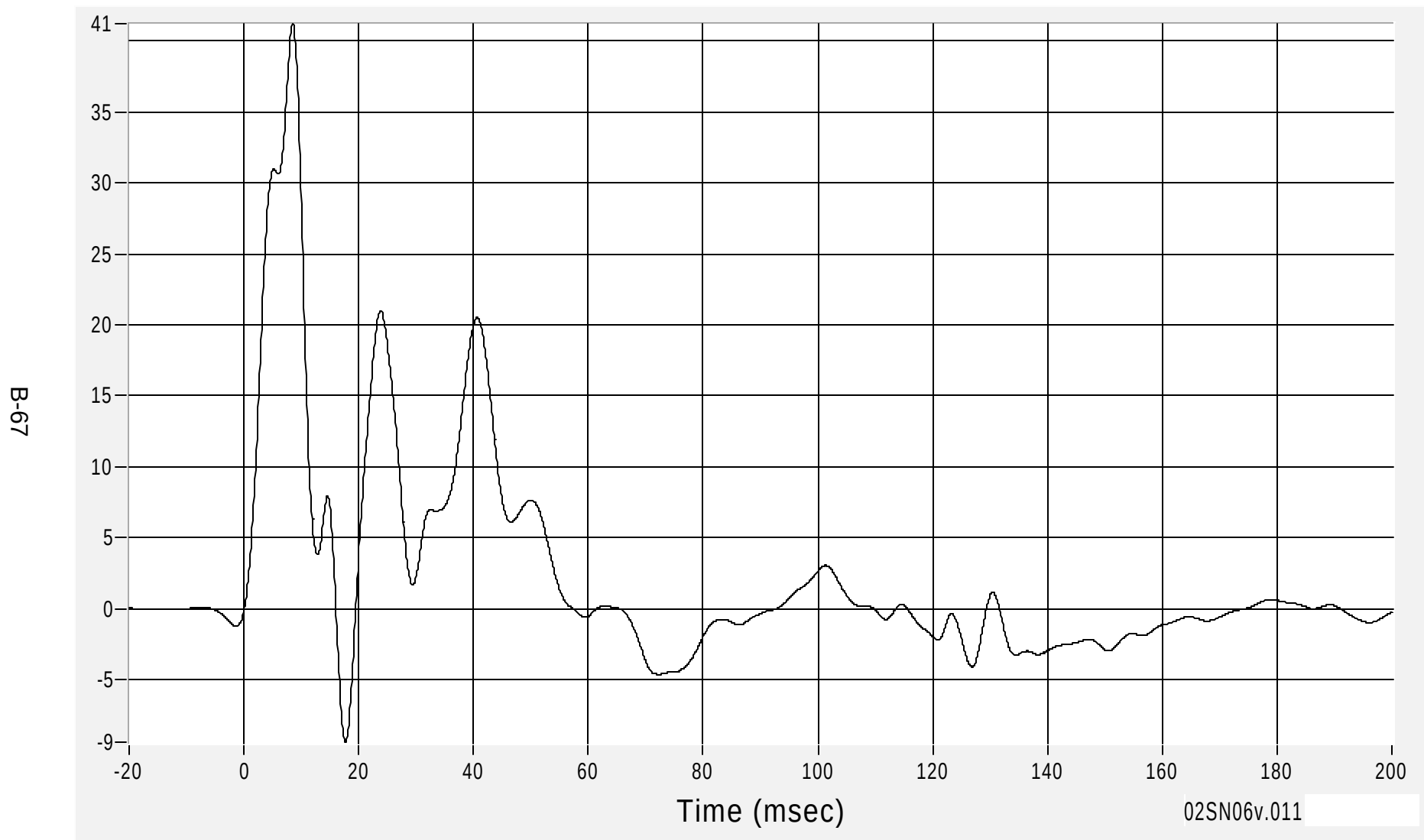
Medical College of Wisconsin
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Left Side Sill at Front Seat (Y) Acceleration

Max 41.2 G's at 8.5 msec

Acceleration (G's) CFC60

Min -9.4 G's at 17.7 msec



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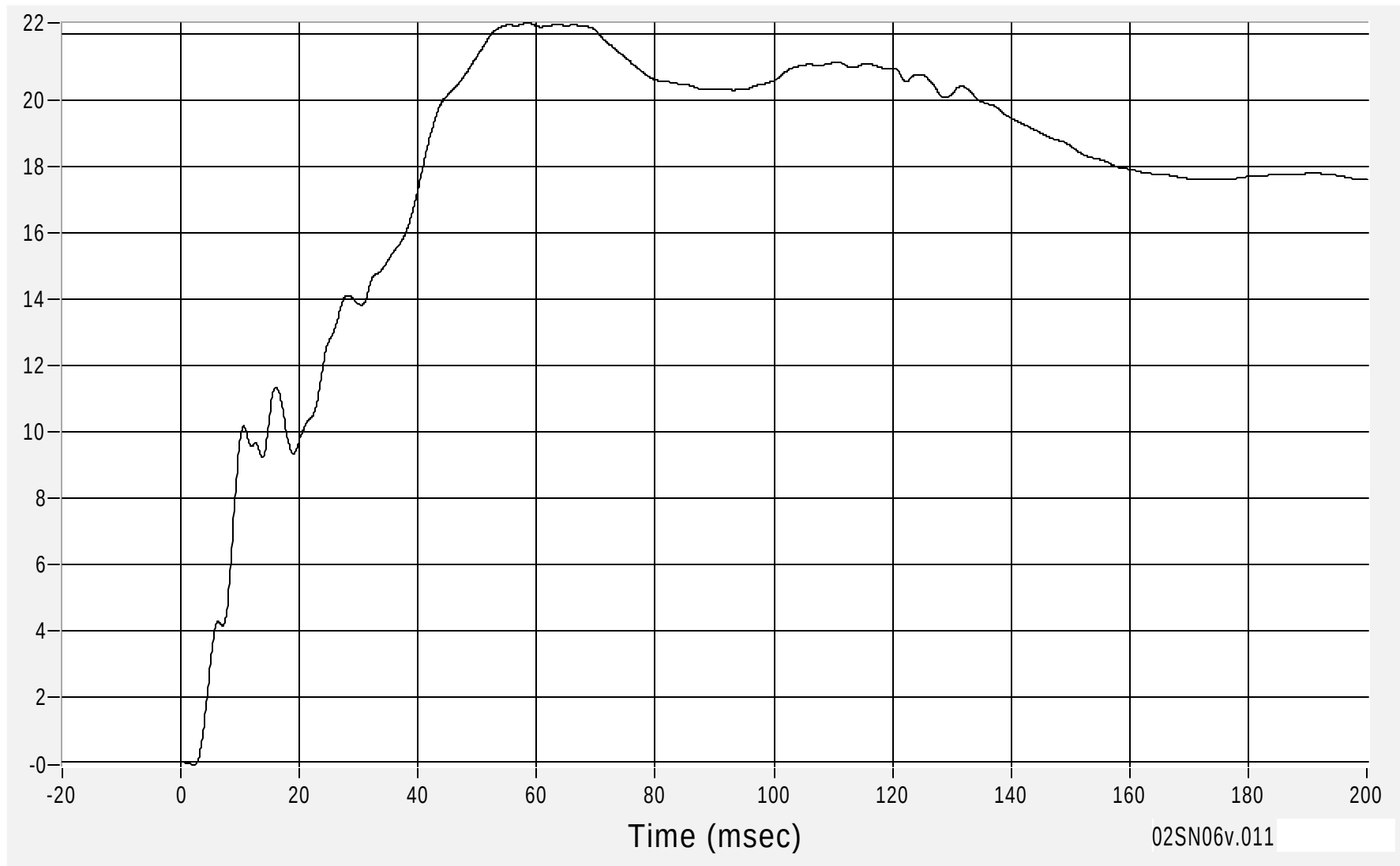
Left Side Sill at Front Seat (Y) Velocity

Max 22.3 km/h at 58.4 msec

Min 0.0 km/h at 2.2 msec

Velocity (km/h) CFC180

B-68



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11 April 2002

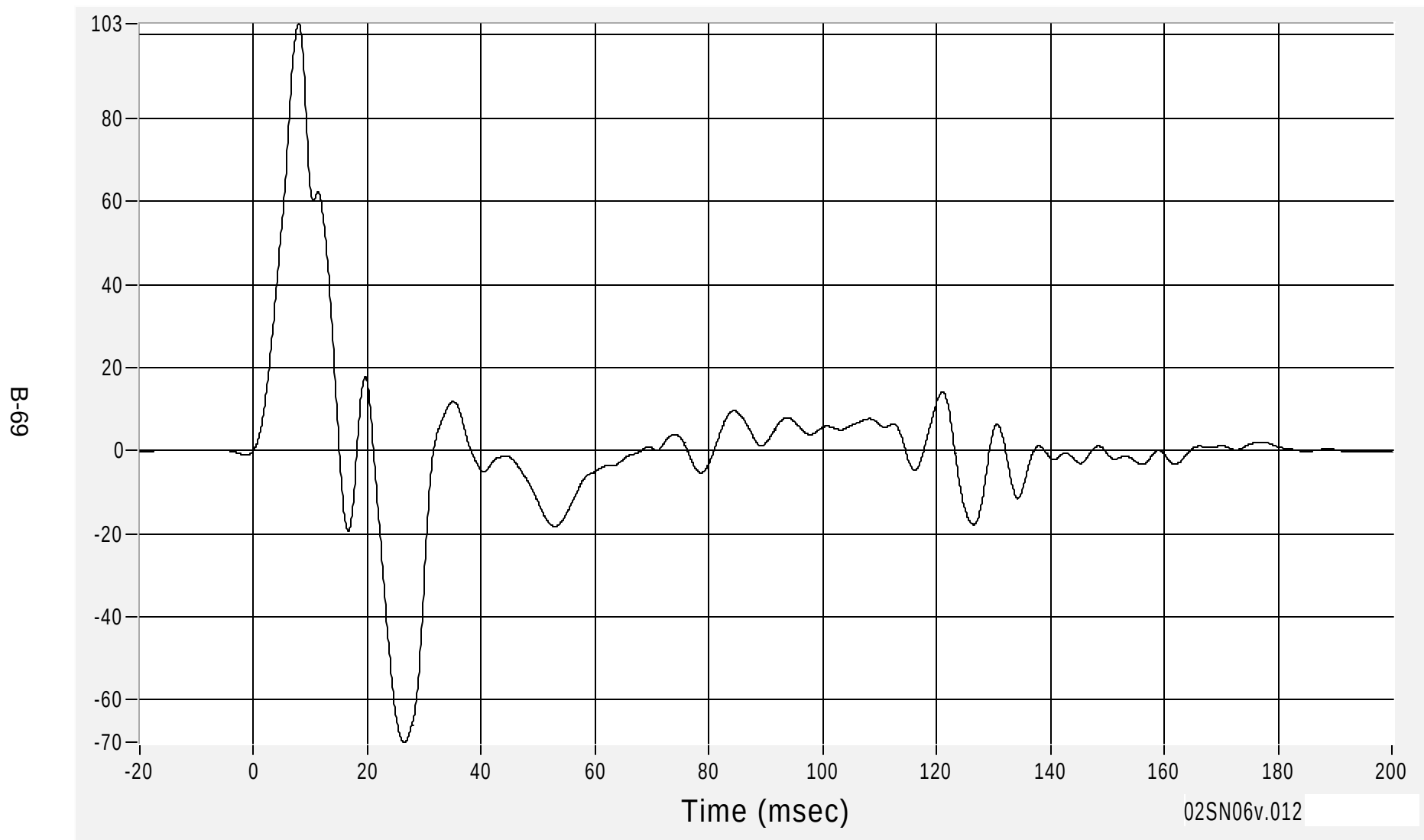
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Acceleration

Max 102.7 G's at 7.9 msec

Min -70.1 G's at 26.5 msec

Acceleration (G's) CFC60



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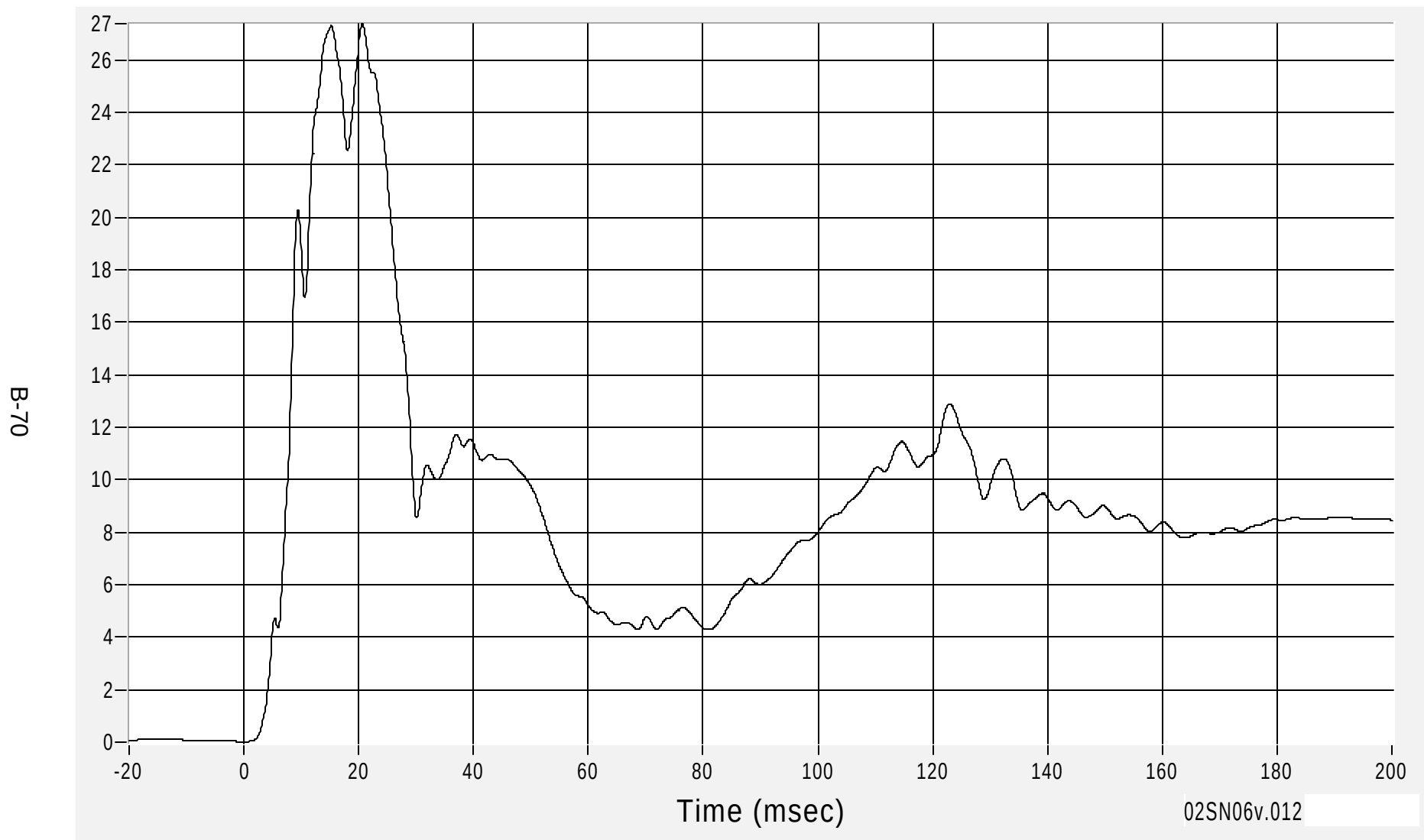
Medical College of Wisconsin
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Left Front Door on Centerline (Y) Velocity

Max 27.4 km/h at 20.6 msec

Min 0.0 km/h at 0.0 msec

Velocity (km/h) CFC180



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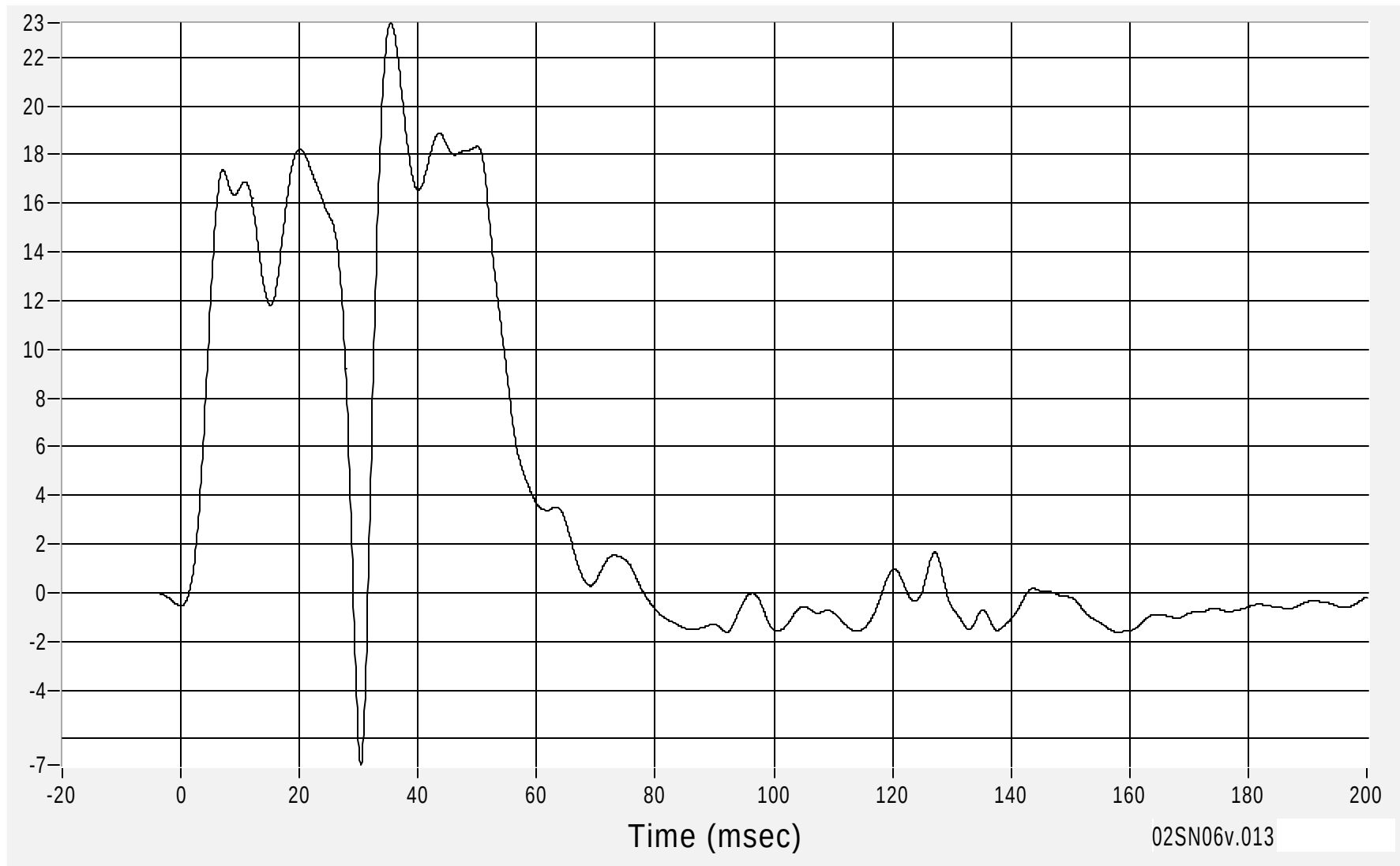
Right Rear Occupant Compartment (Y) Acceleration

Max 23.4 G's at 35.4 msec

Min -7.1 G's at 30.3 msec

Acceleration (G's) CFC60

B-71



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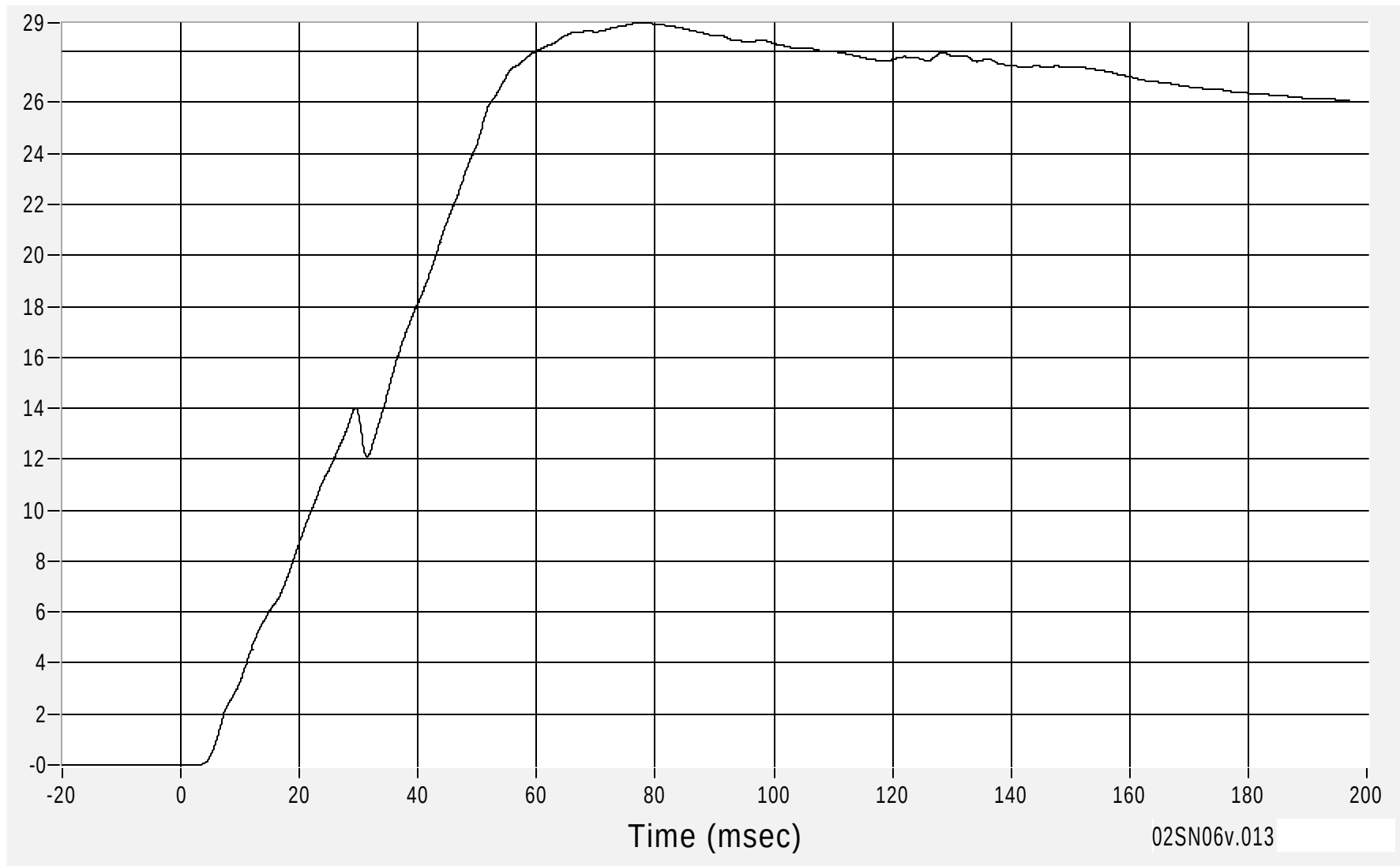
Right Rear Occupant Compartment (Y) Velocity

Max 29.1 km/h at 77.1 msec

Min 0.0 km/h at 2.5 msec

Velocity (km/h) CFC180

B-72



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11 April 2002

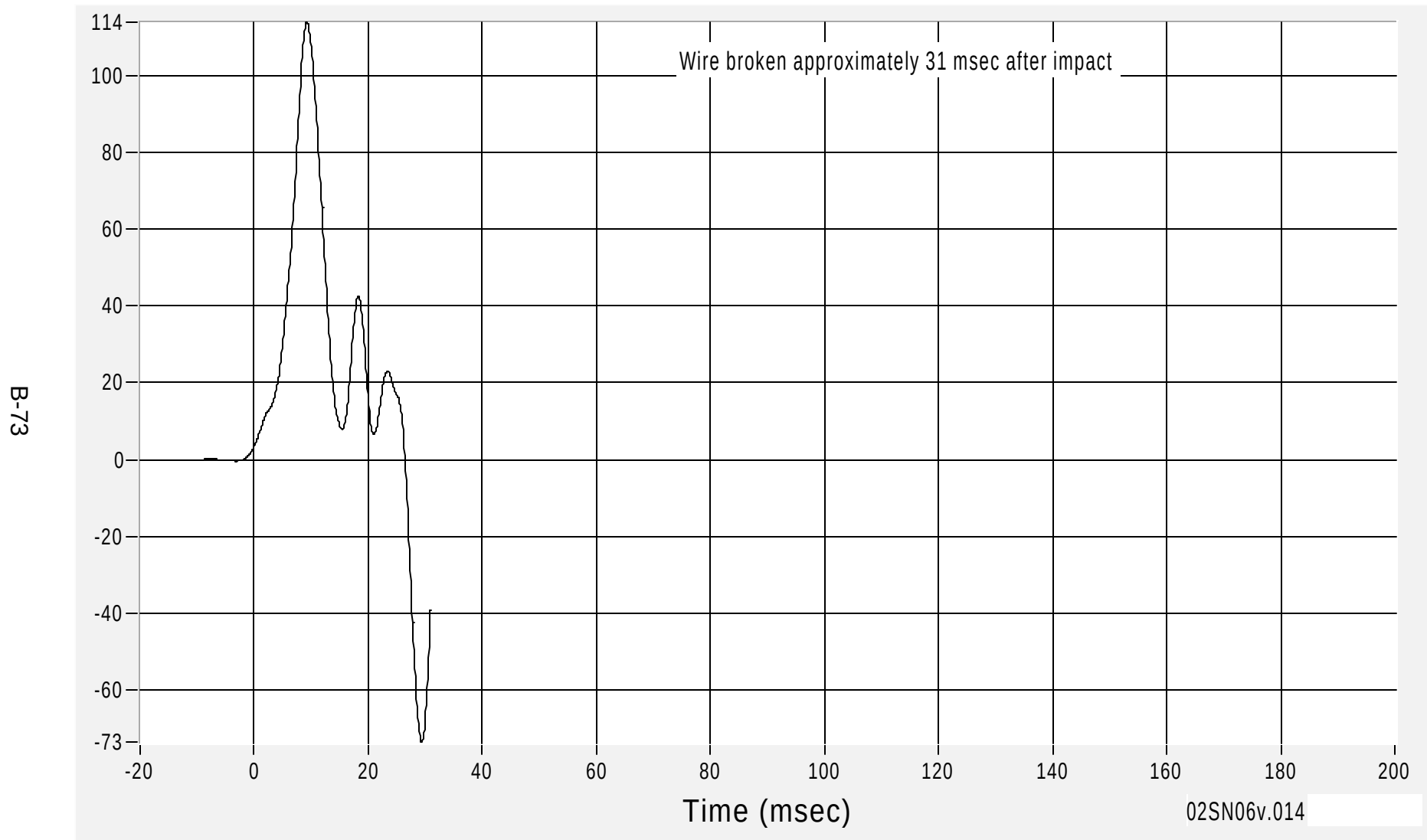
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Mid-Rear of Left Front Door (Y) Acceleration

Max 113.8 G's at 9.2 msec

Min -73.4 G's at 29.4 msec

Acceleration (G's) CFC60



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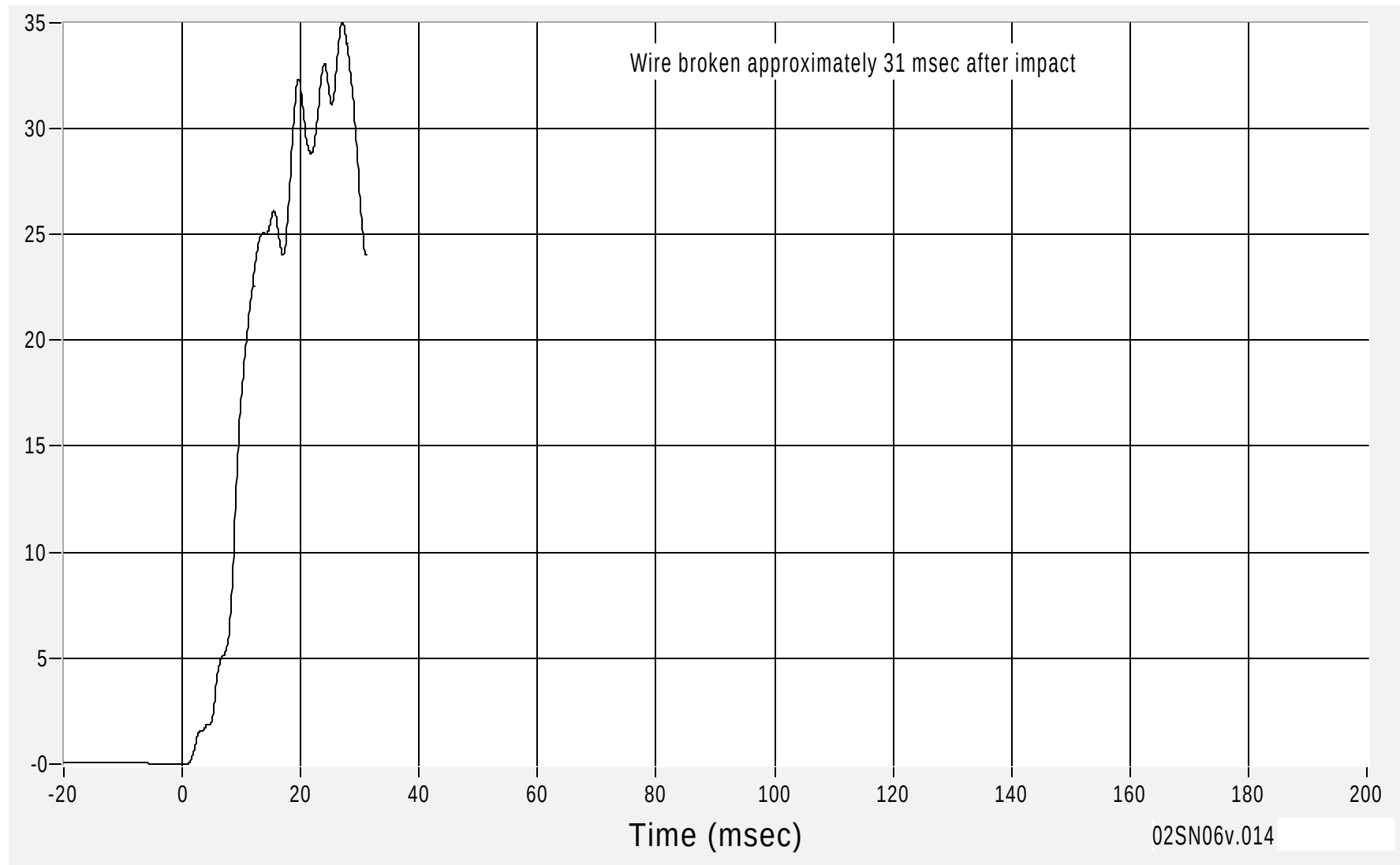
Mid-Rear of Left Front Door (Y) Velocity

Max 35.0 km/h at 27.0 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.6 msec

B-74



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11 April 2002

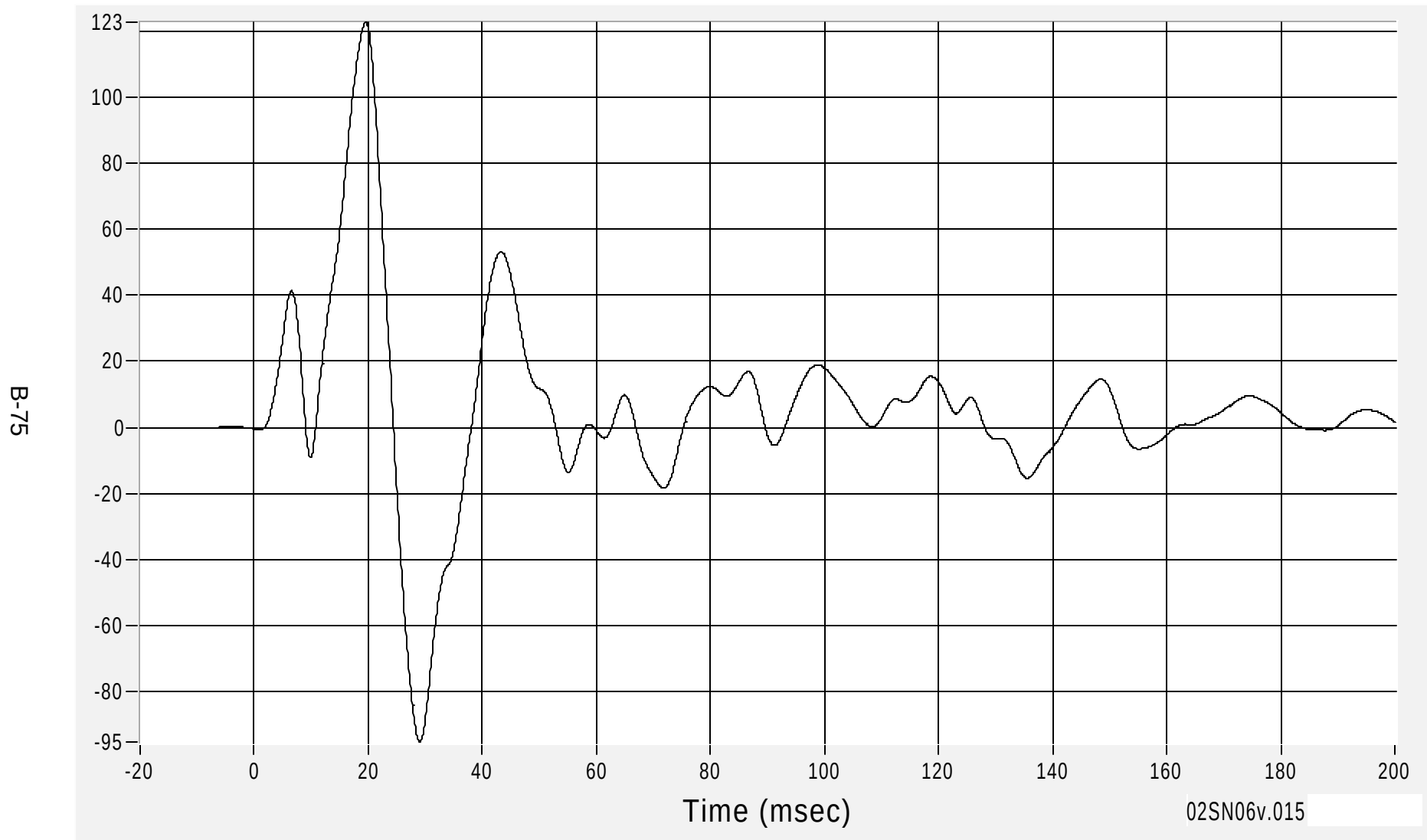
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Left Front Door Upper Centerline (Y) Acceleration

Max 122.6 G's at 19.5 msec

Min -95.2 G's at 29.0 msec

Acceleration (G's) CFC60



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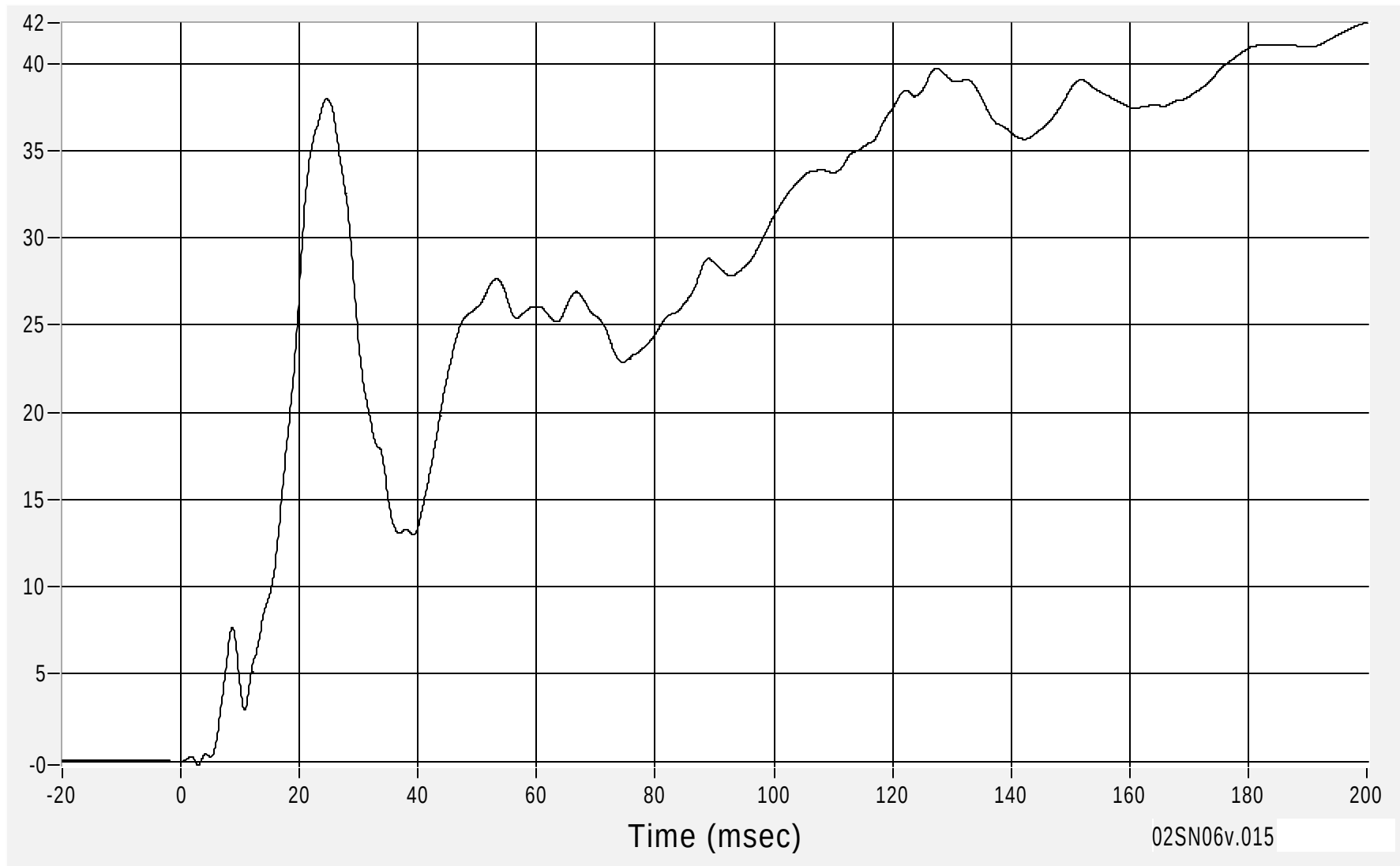
Left Front Door Upper Centerline (Y) Velocity

Max 42.3 km/h at 199.9 msec

Velocity (km/h) CFC180

Min -0.2 km/h at 2.9 msec

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11 April 2002

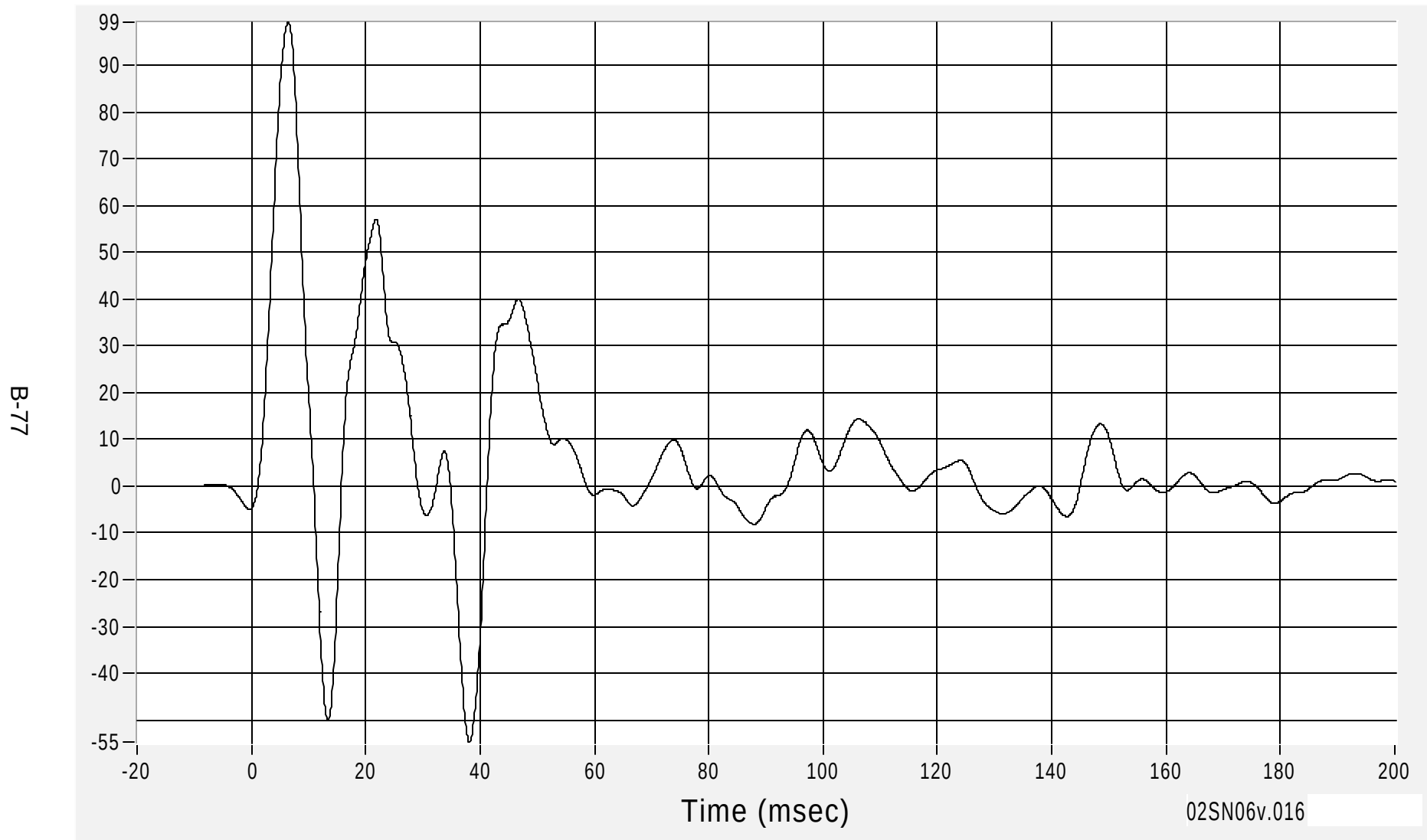
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Mid-Rear of Left Rear Door (Y) Acceleration

Max 99.2 G's at 6.5 msec

Min -54.7 G's at 38.2 msec

Acceleration (G's) CFC60



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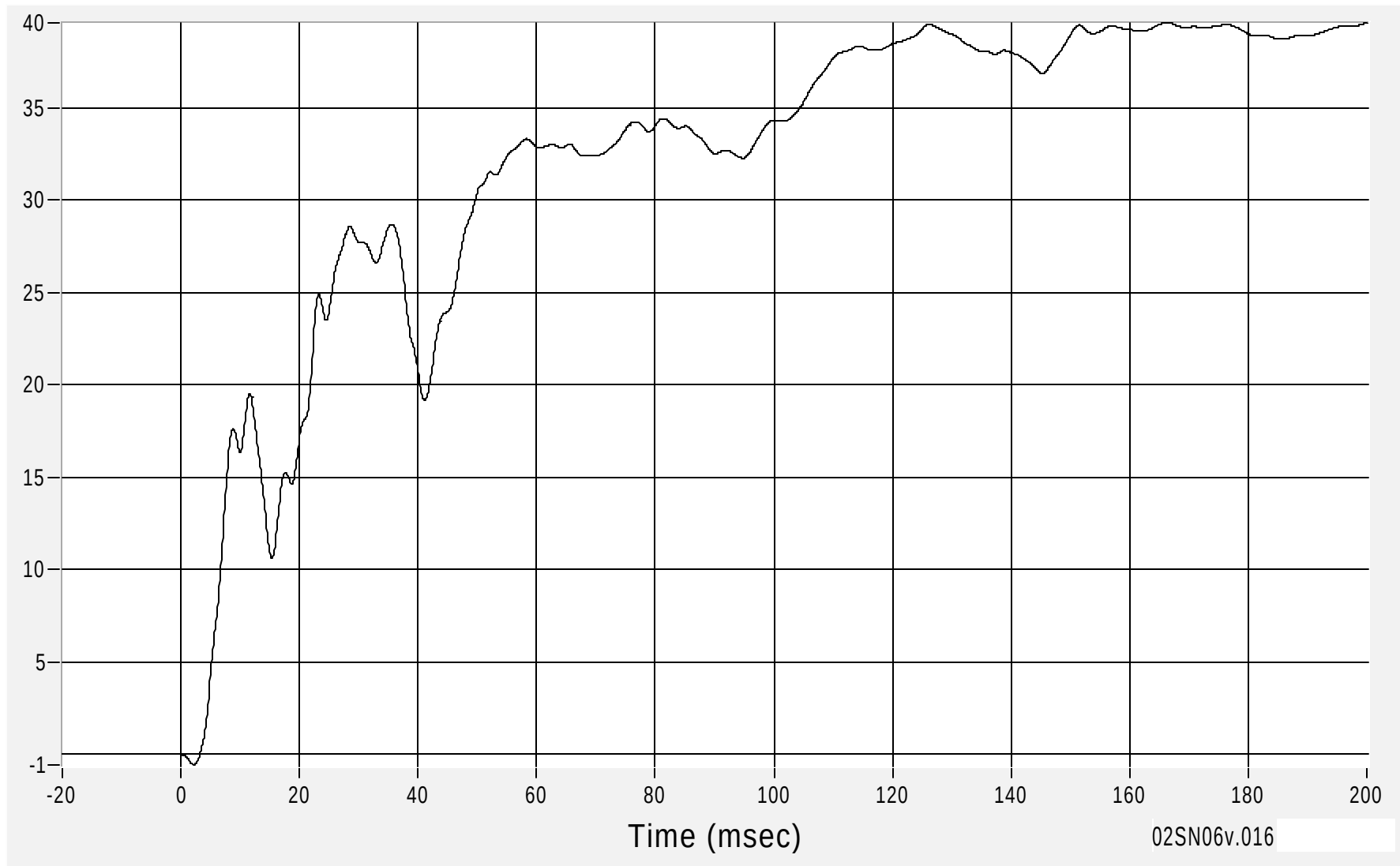
Mid-Rear of Left Rear Door (Y) Velocity

Max 39.6 km/h at 166.3 msec

Velocity (km/h) CFC180

Min -0.6 km/h at 2.2 msec

B-78



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11 April 2002

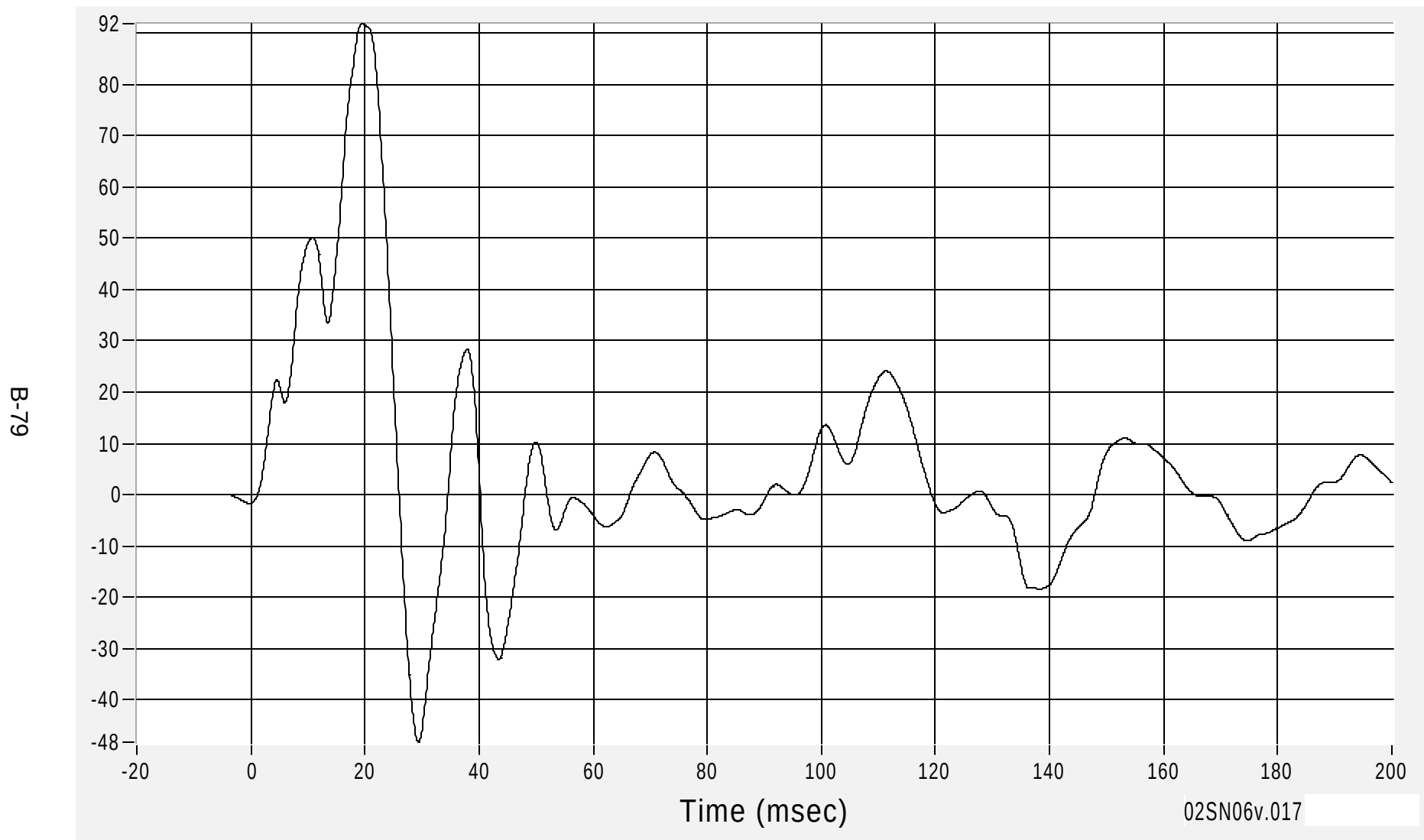
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Left Rear Door Upper Centerline (Y) Acceleration

Max 91.8 G's at 19.4 msec

Min -48.2 G's at 29.4 msec

Acceleration (G's) CFC60



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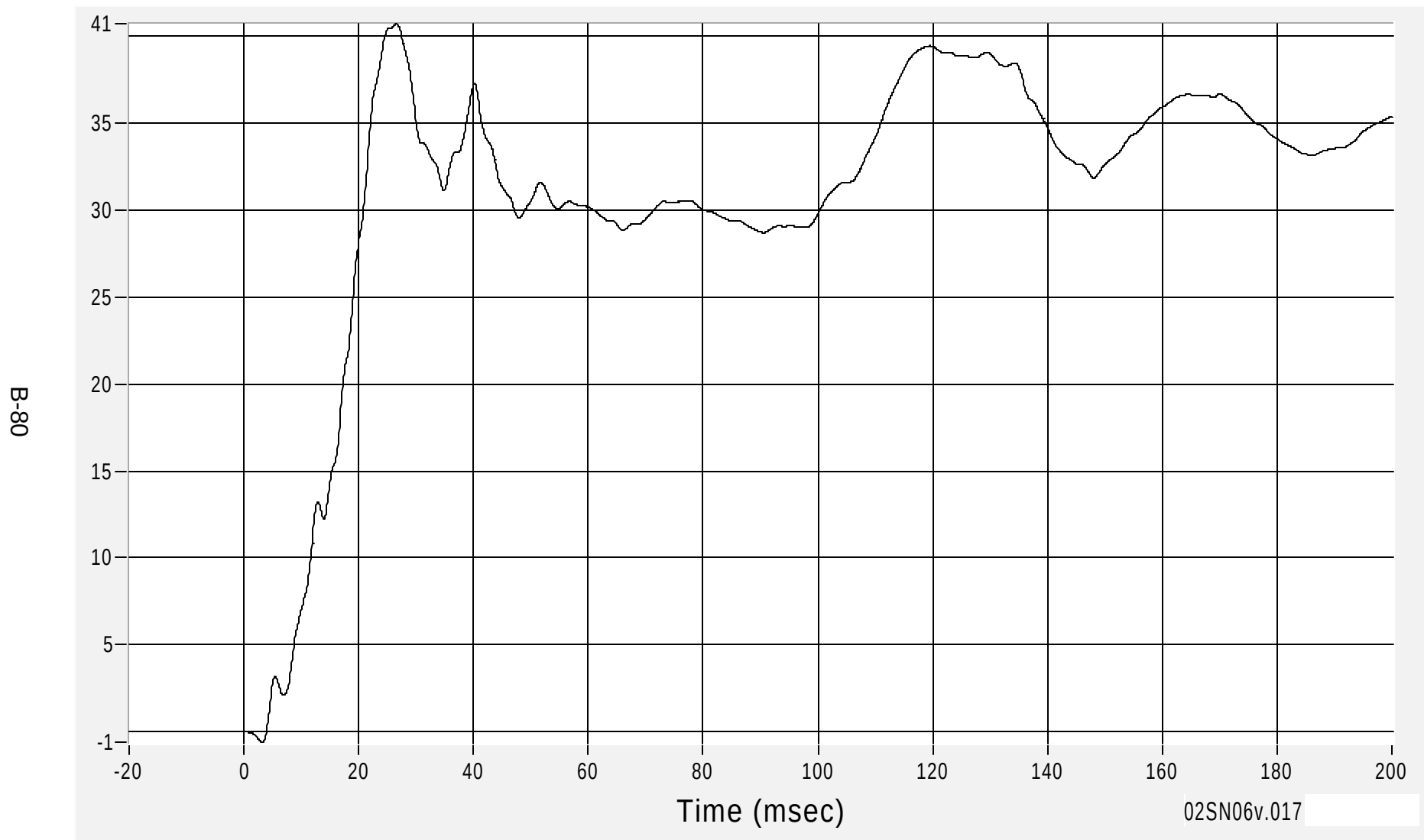
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Left Rear Door Upper Centerline (Y) Velocity

Max 40.7 km/h at 26.5 msec

Min -0.6 km/h at 3.2 msec

Velocity (km/h) CFC180



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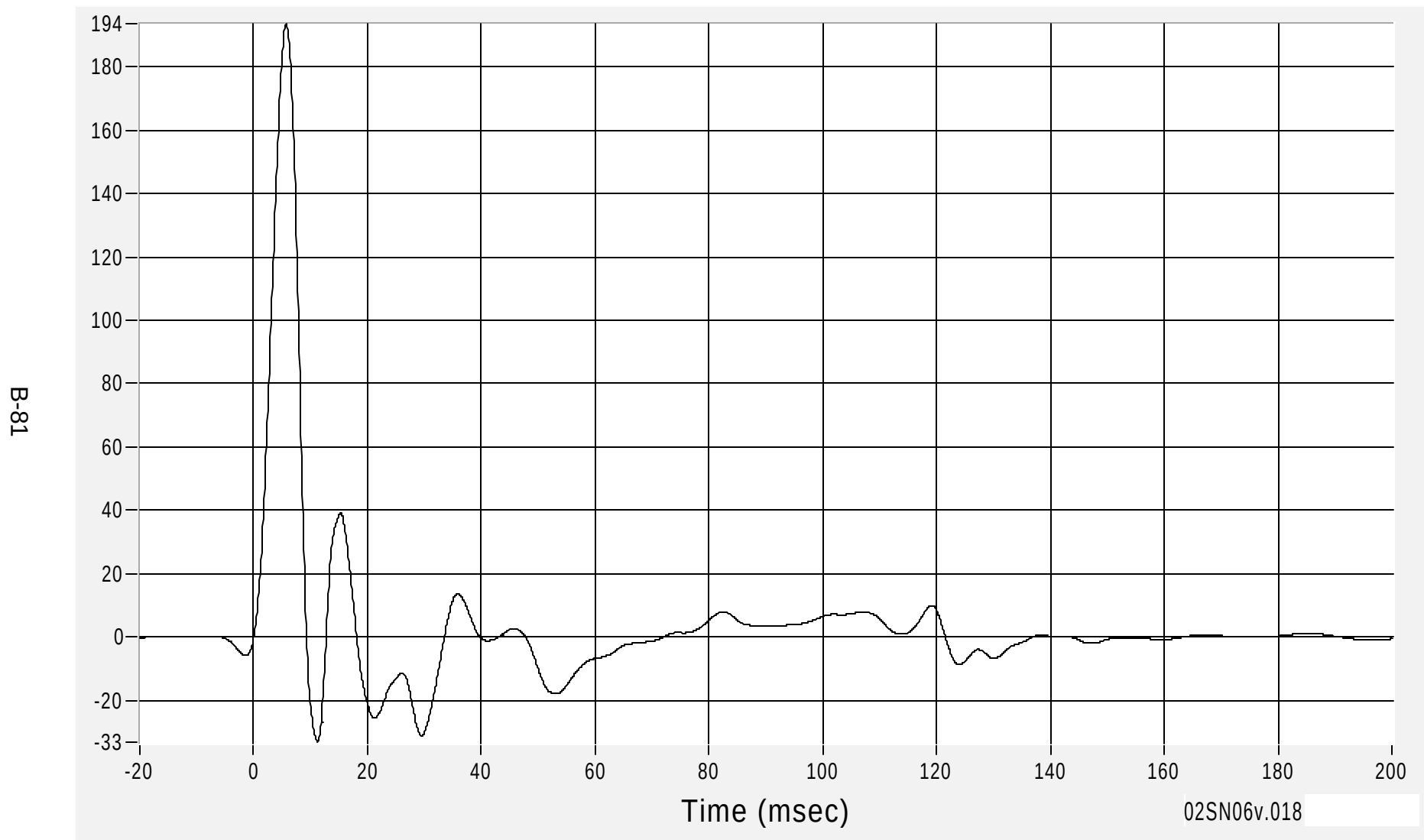
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Left Lower B-Pillar (Y) Acceleration

Max 193.6 G's at 5.7 msec

Acceleration (G's) CFC60

Min -33.1 G's at 11.2 msec



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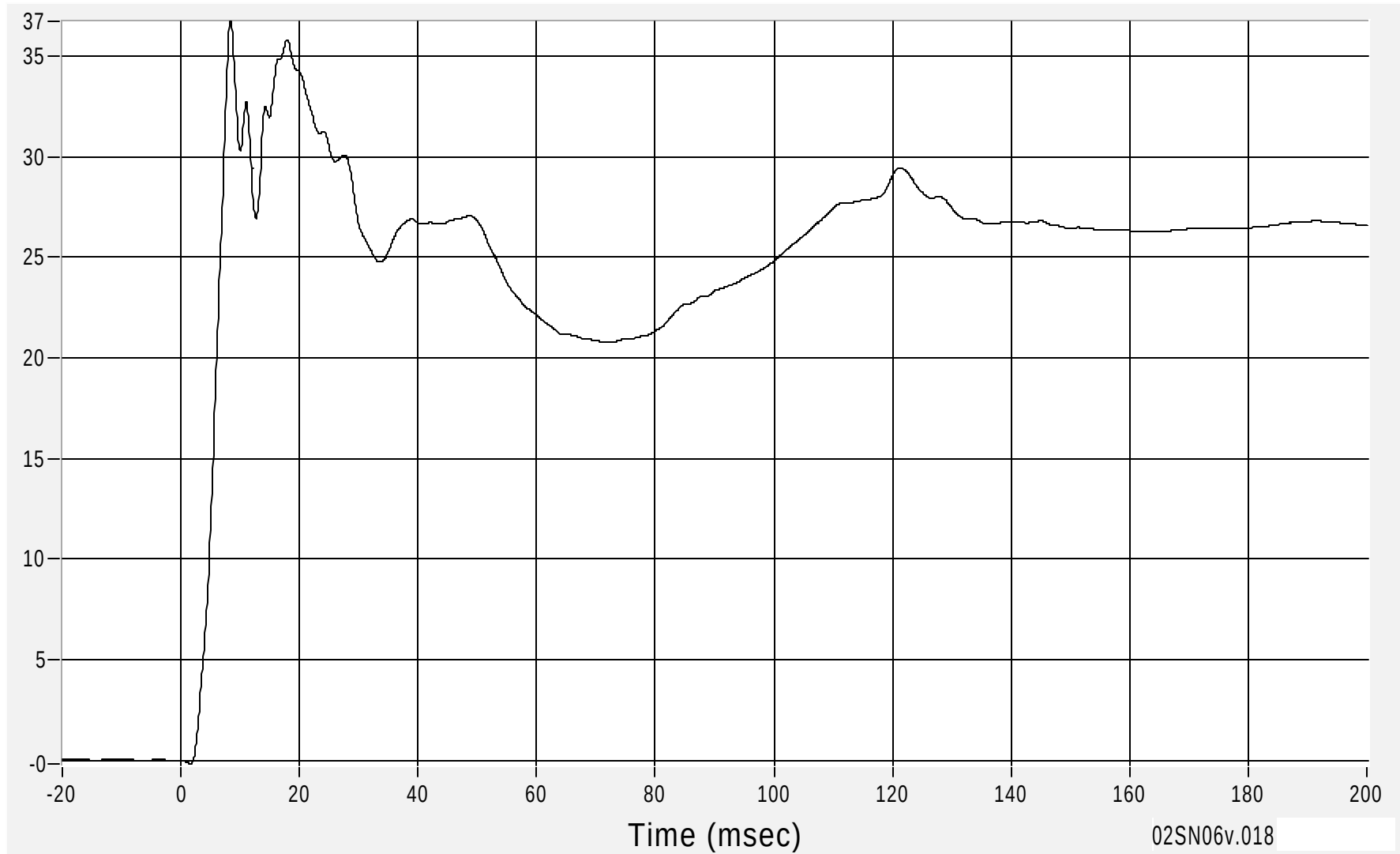
Left Lower B-Pillar (Y) Velocity

Max 36.7 km/h at 8.3 msec

Velocity (km/h) CFC180

Min -0.2 km/h at 1.6 msec

B-82



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11 April 2002

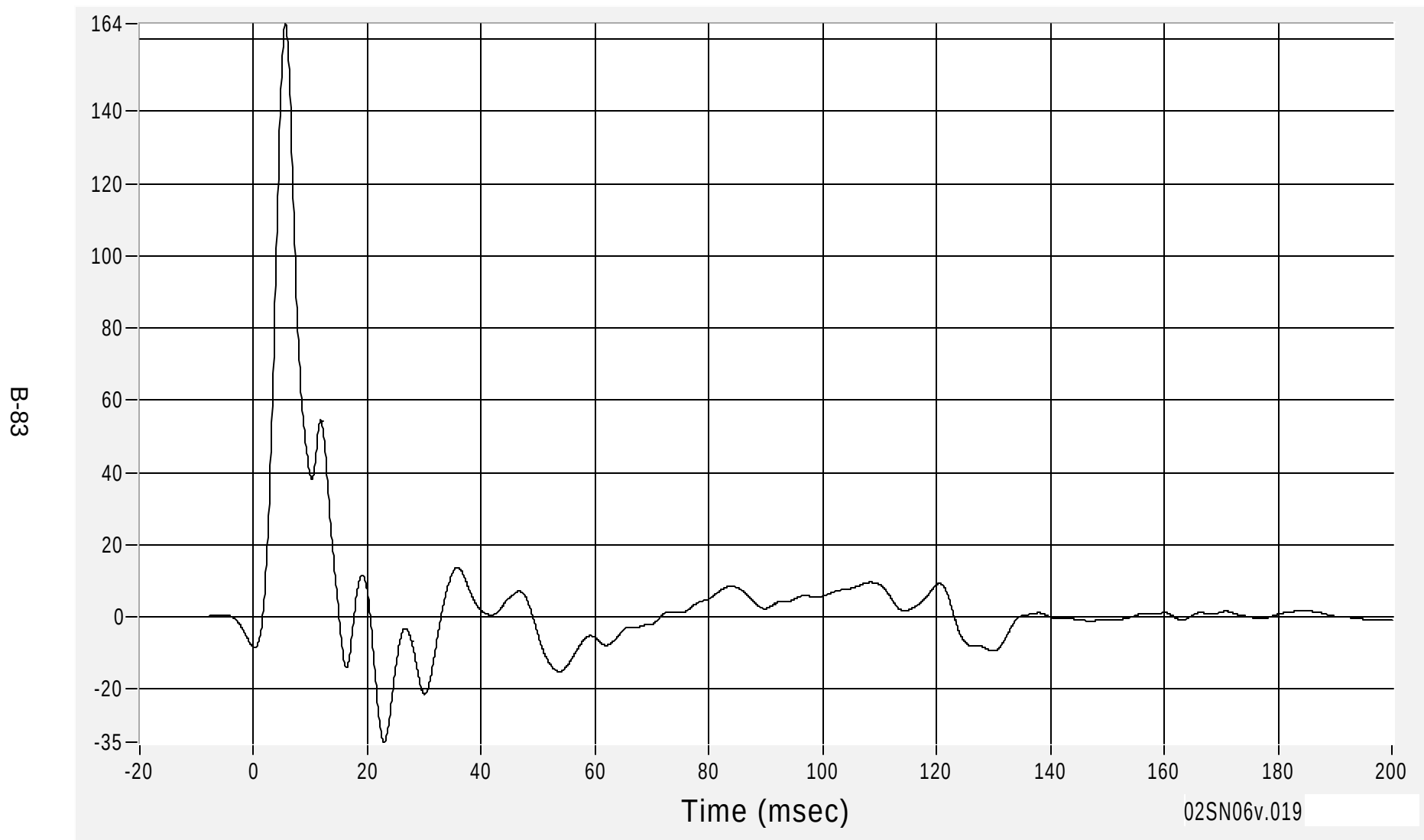
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Left Middle B-Pillar (Y) Acceleration

Max 164.3 G's at 5.6 msec

Acceleration (G's) CFC60

Min -34.8 G's at 22.9 msec



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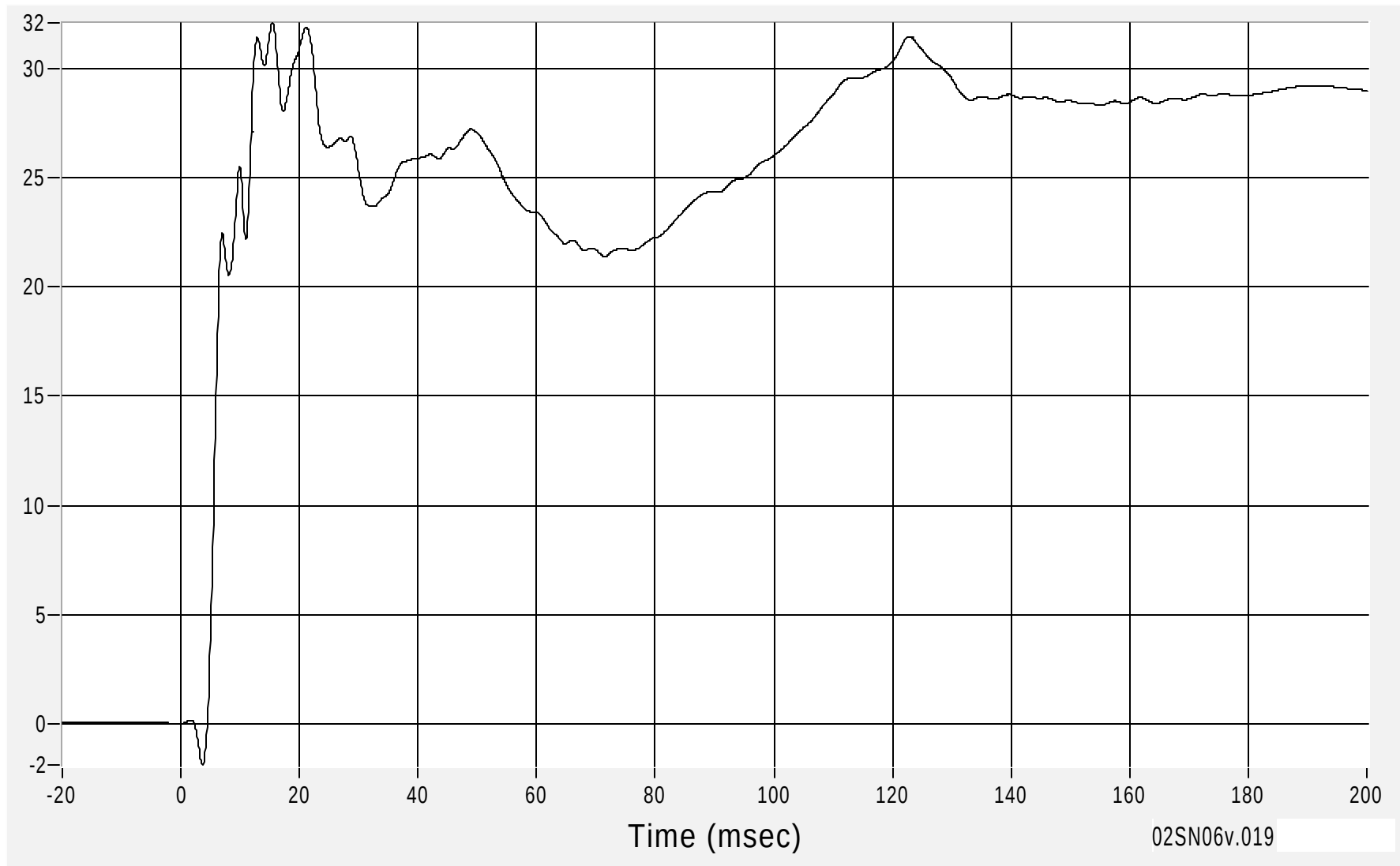
Left Middle B-Pillar (Y) Velocity

Max 32.1 km/h at 15.4 msec

Min -1.9 km/h at 3.7 msec

Velocity (km/h) CFC180

B-84



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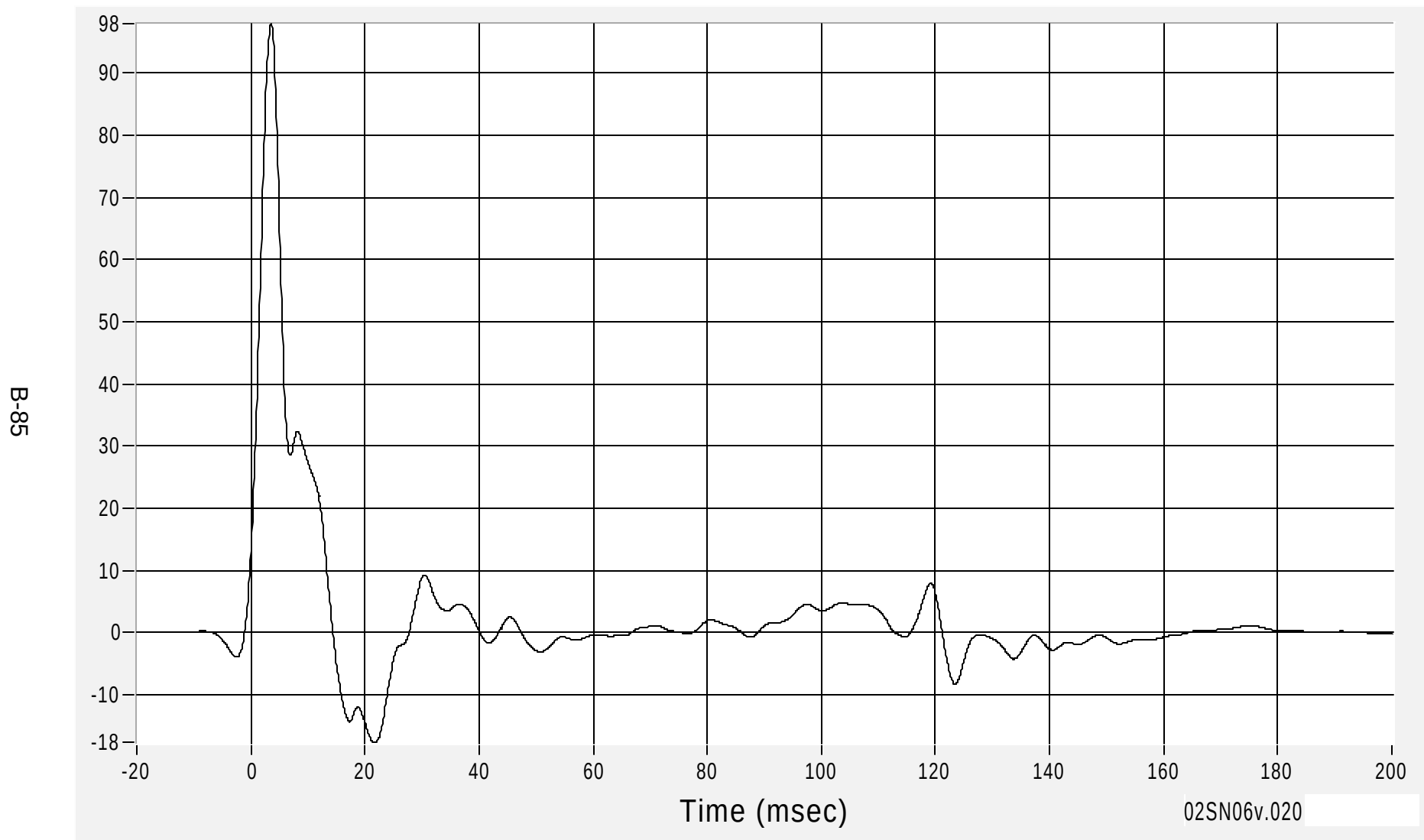
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Left Lower A-Pillar (Y) Acceleration

Max 98.0 G's at 3.5 msec

Acceleration (G's) CFC60

Min -17.7 G's at 21.7 msec



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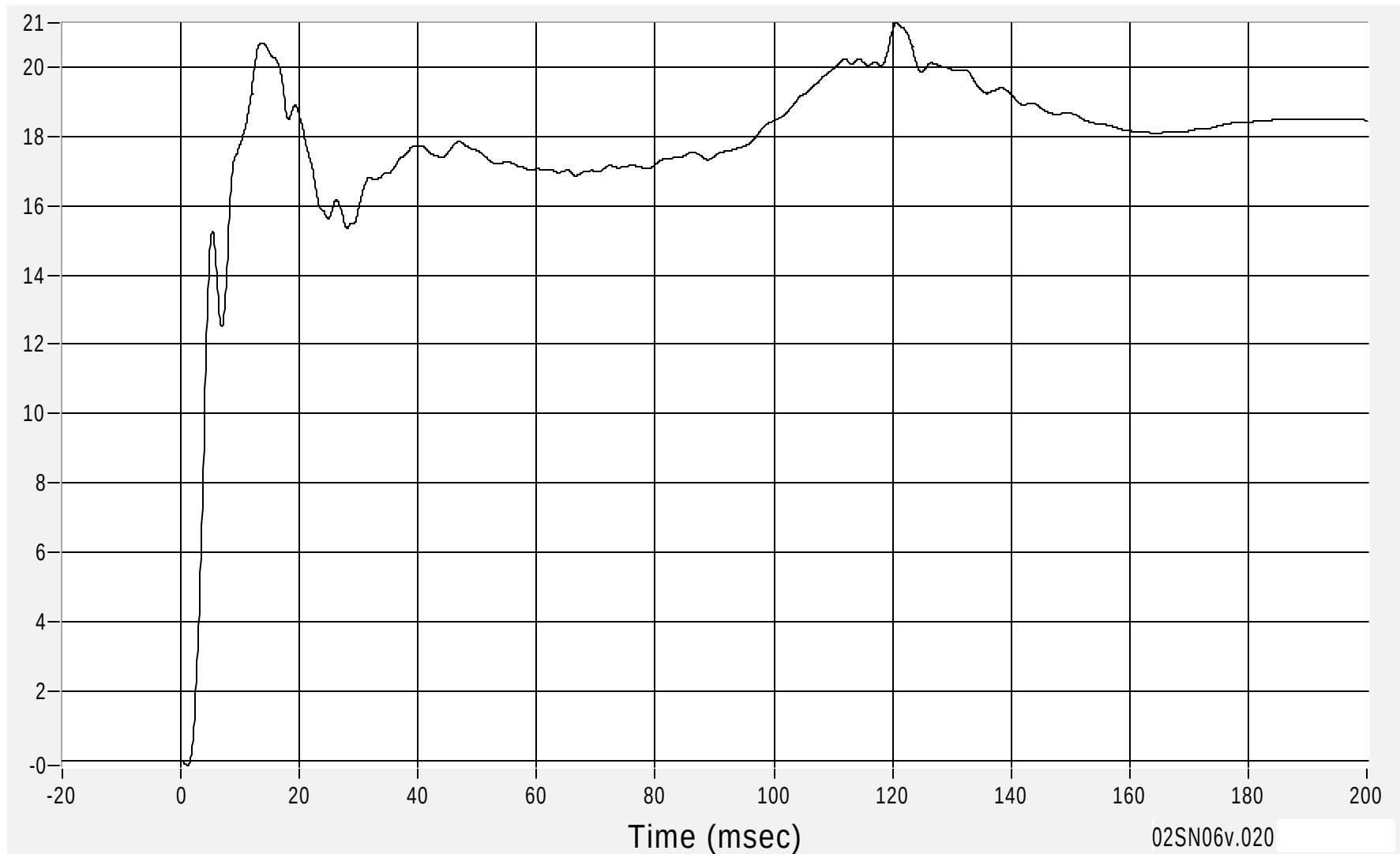
Left Lower A-Pillar (Y) Velocity

Max 21.3 km/h at 120.7 msec

Velocity (km/h) CFC180

Min -0.2 km/h at 1.1 msec

B-86



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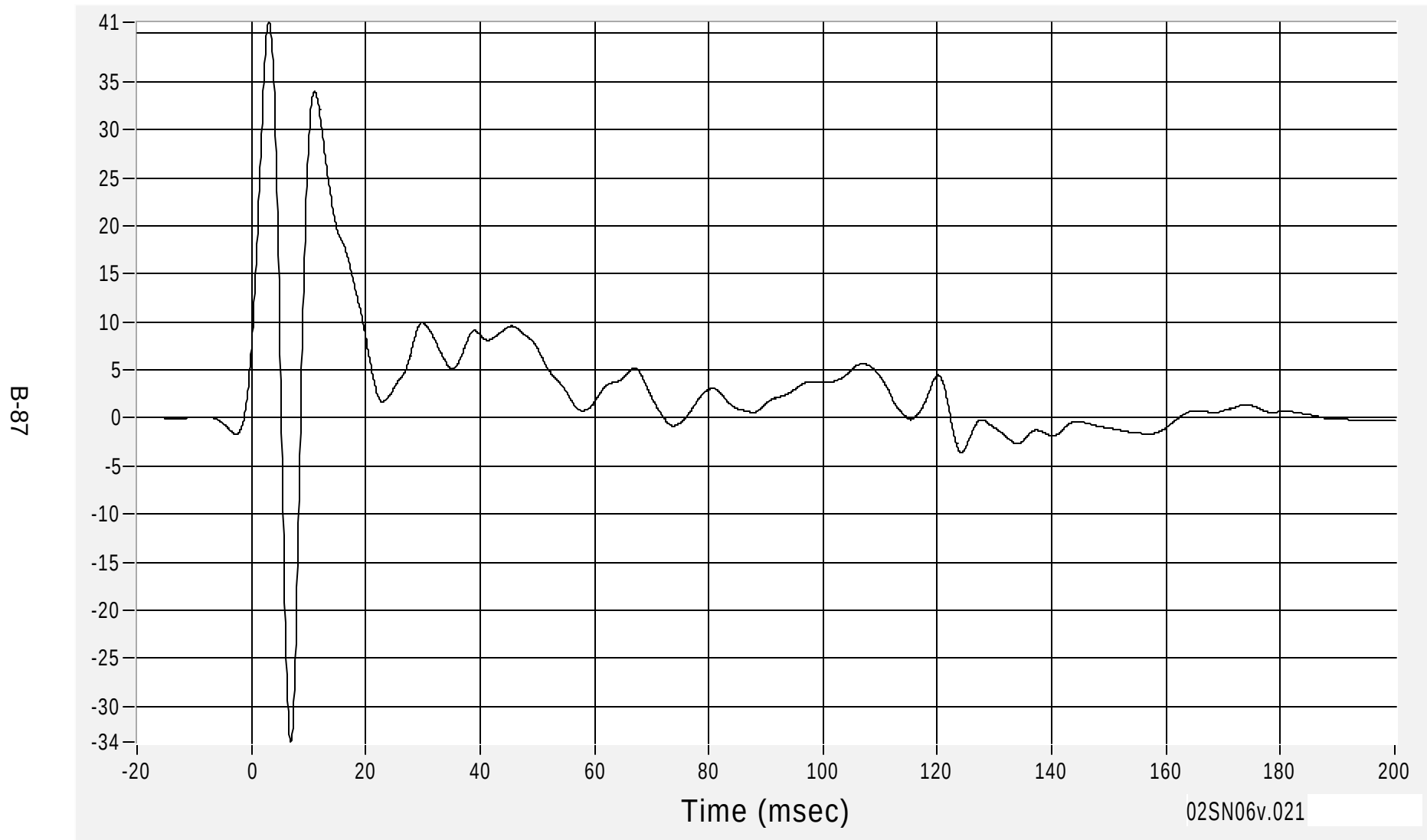
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Left Middle A-Pillar (Y) Acceleration

Max 41.2 G's at 3.0 msec

Acceleration (G's) CFC60

Min -33.7 G's at 6.9 msec



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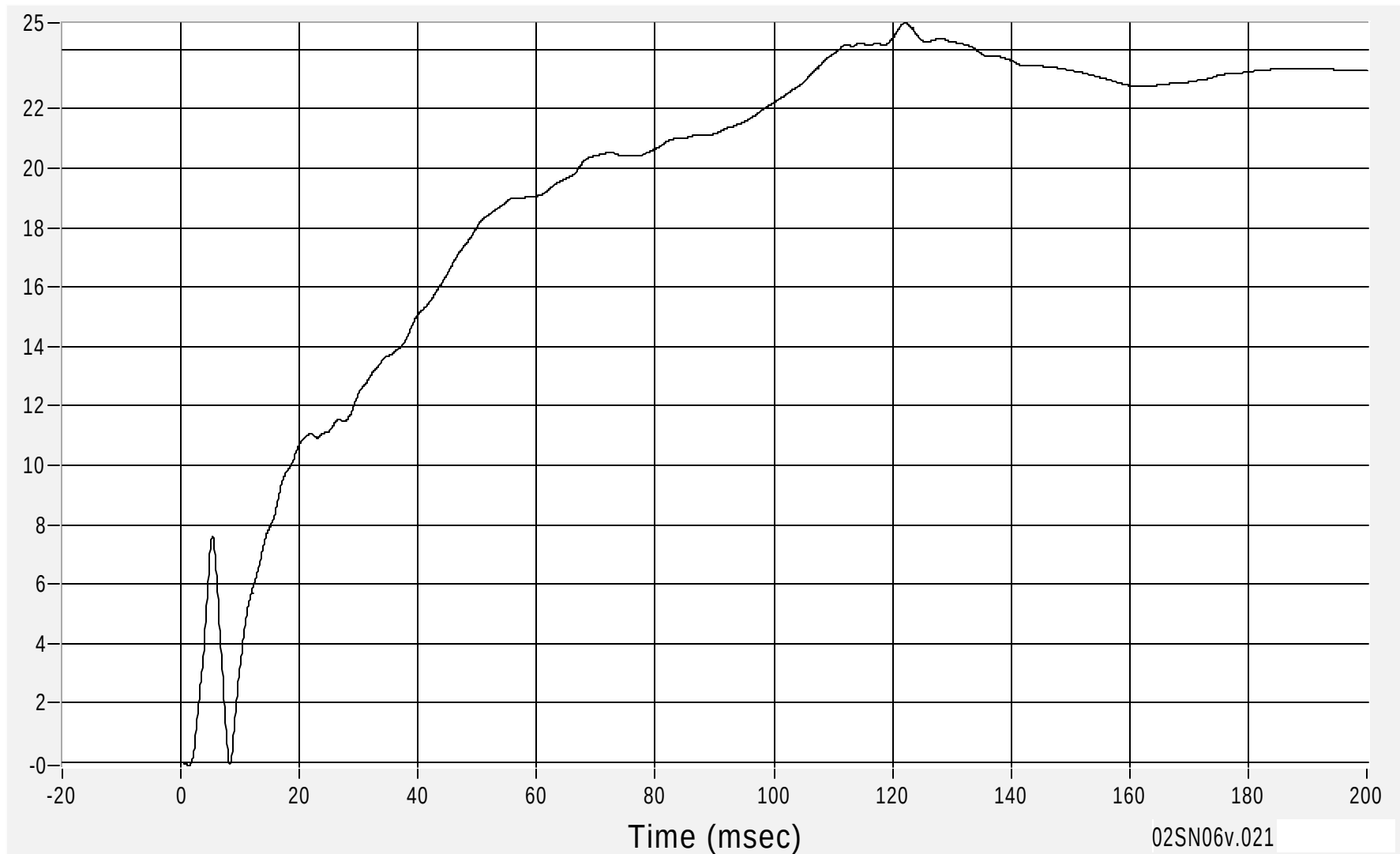
Left Middle A-Pillar (Y) Velocity

Max 24.9 km/h at 122.2 msec

Velocity (km/h) CFC180

Min -0.1 km/h at 1.4 msec

B-88



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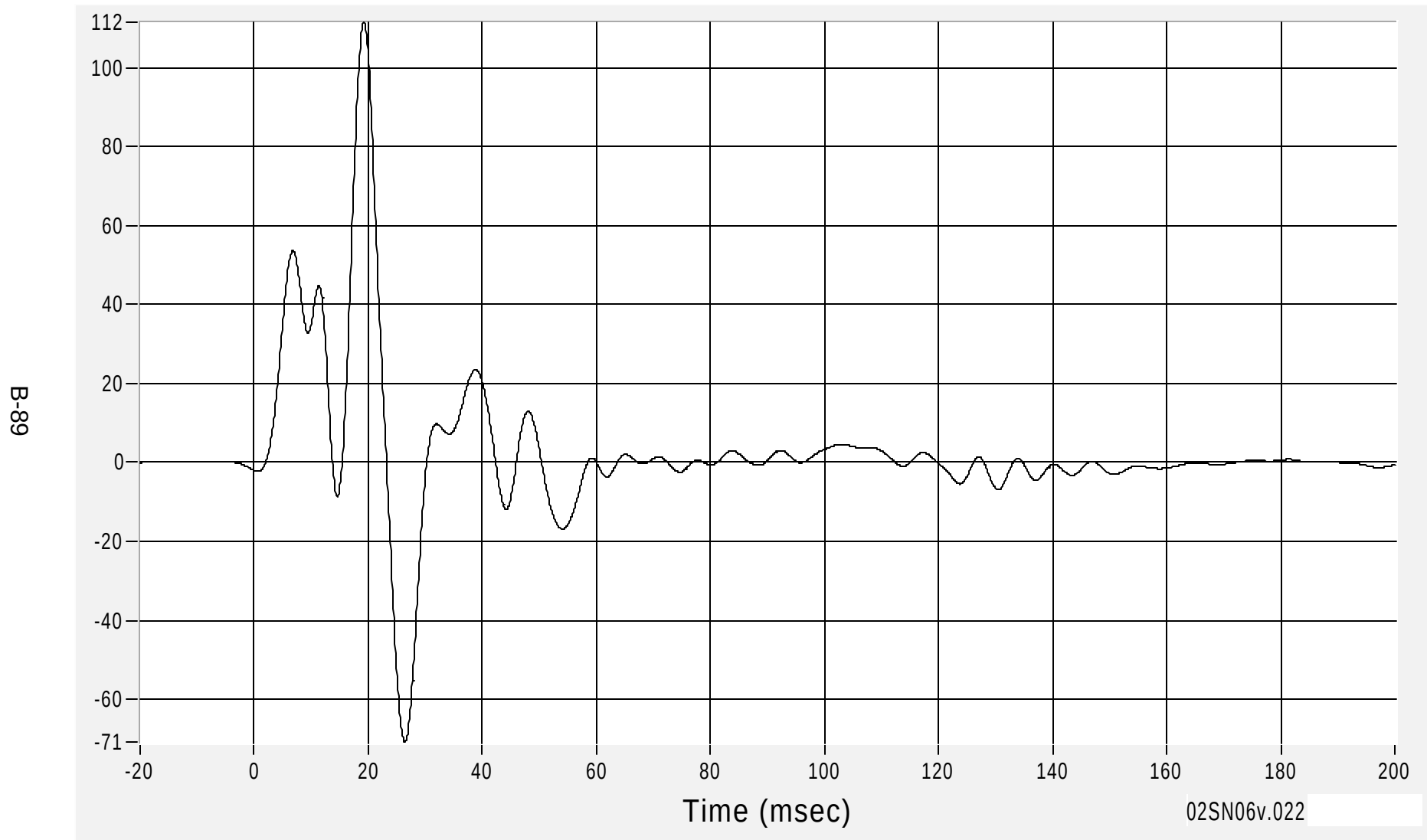
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Front Seat Track (Y) Acceleration

Max 111.5 G's at 19.2 msec

Acceleration (G's) CFC60

Min -70.8 G's at 26.4 msec



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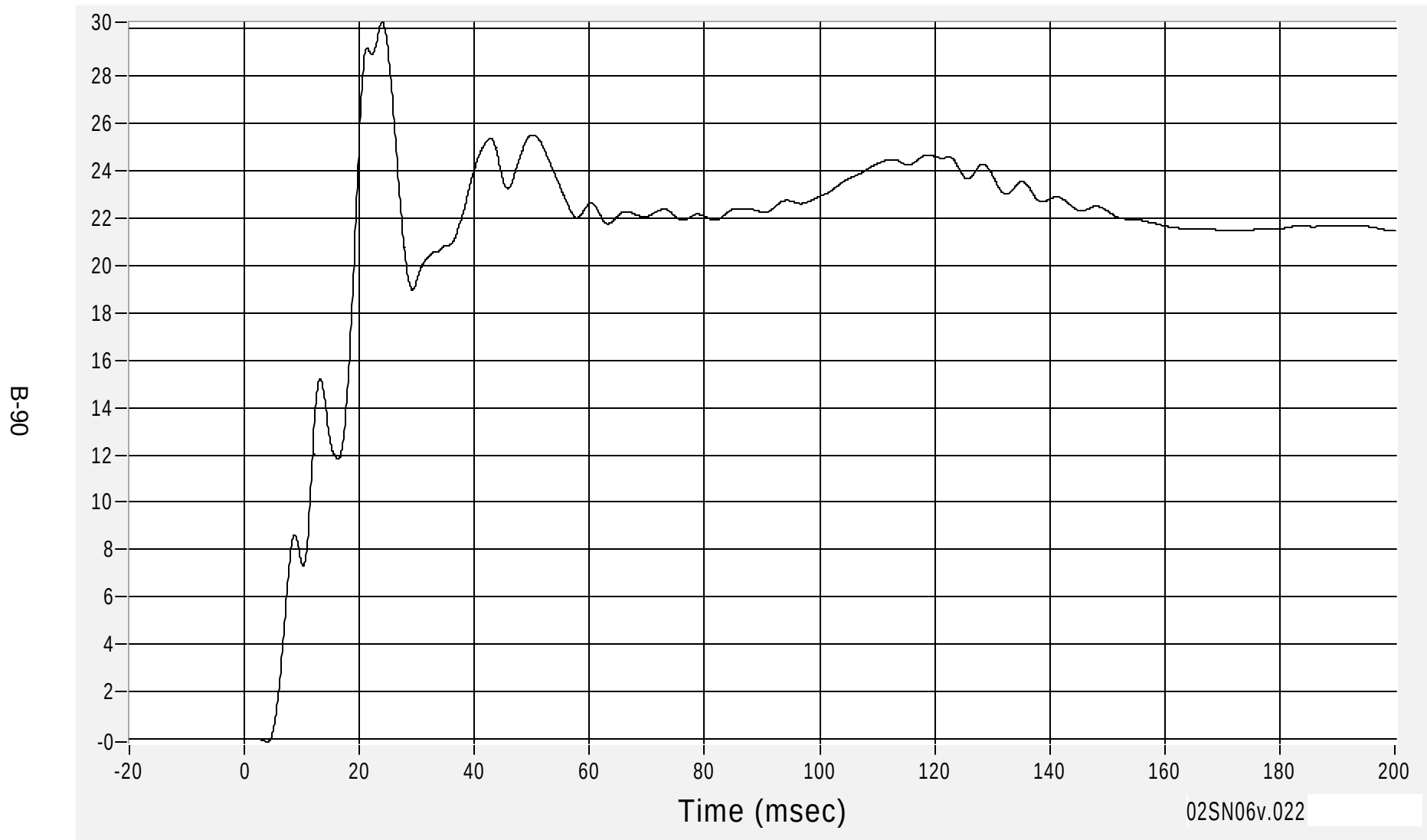
Medical College of Wisconsin
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Front Seat Track (Y) Velocity

Max 30.3 km/h at 23.9 msec

Velocity (km/h) CFC180

Min -0.1 km/h at 3.9 msec



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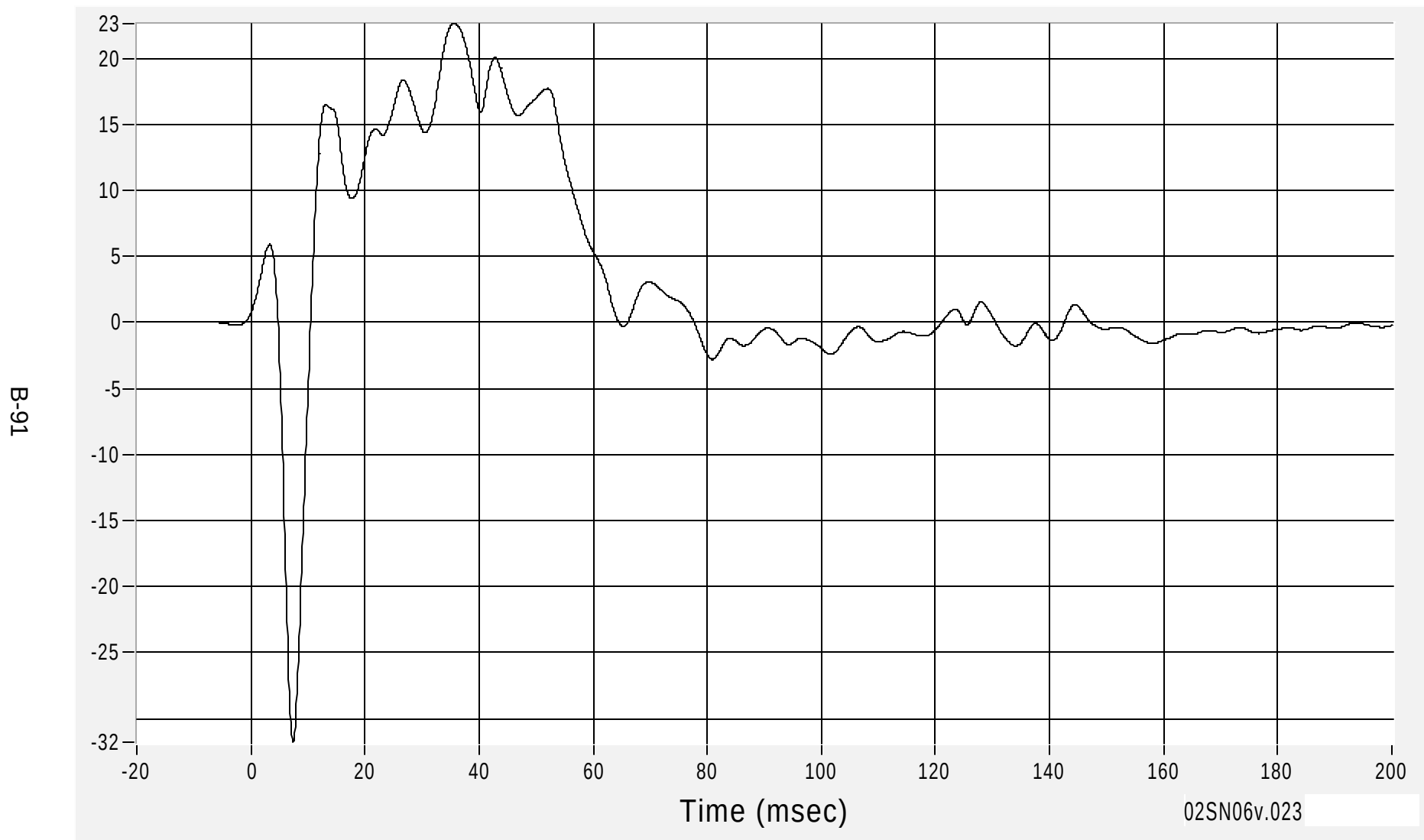
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Rear Seat Track (Y) Acceleration

Max 22.6 G's at 35.7 msec

Acceleration (G's) CFC60

Min -31.8 G's at 7.4 msec



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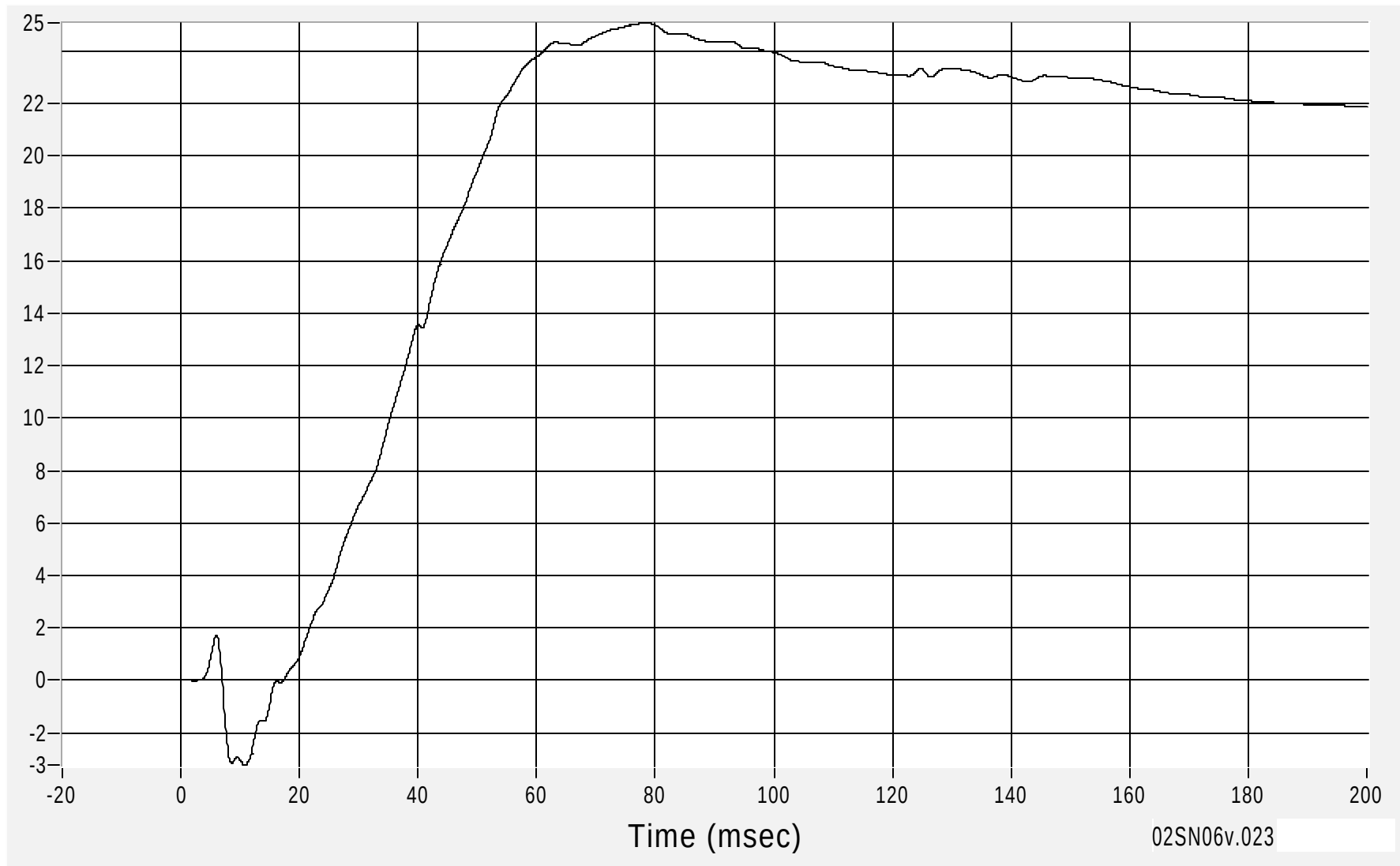
Rear Seat Track (Y) Velocity

Max 25.1 km/h at 78.2 msec

Velocity (km/h) CFC180

Min -3.2 km/h at 10.8 msec

B-92



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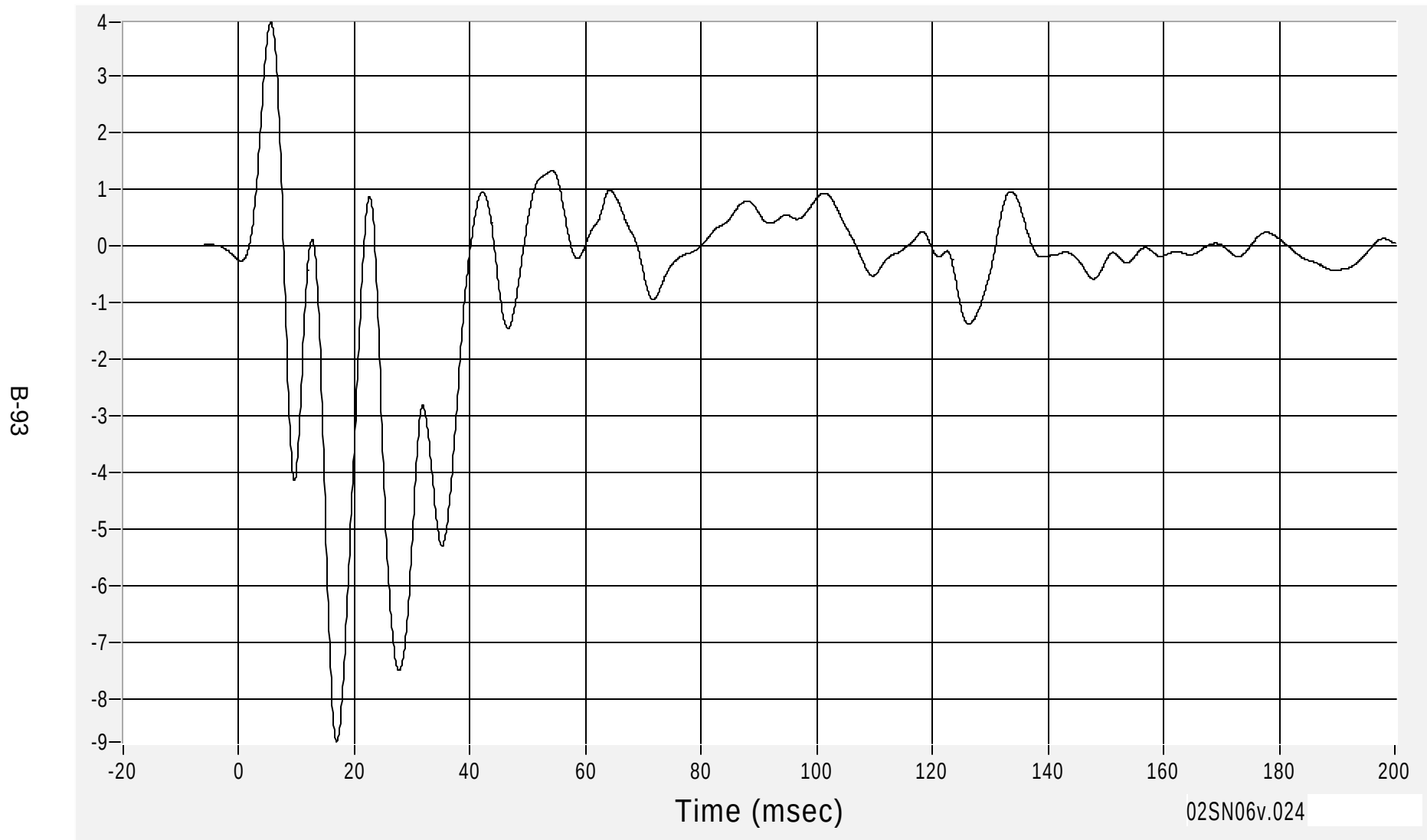
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Vehicle Center of Gravity (X) Acceleration

Max 3.9 G's at 5.5 msec

Acceleration (G's) CFC60

Min -8.8 G's at 16.9 msec



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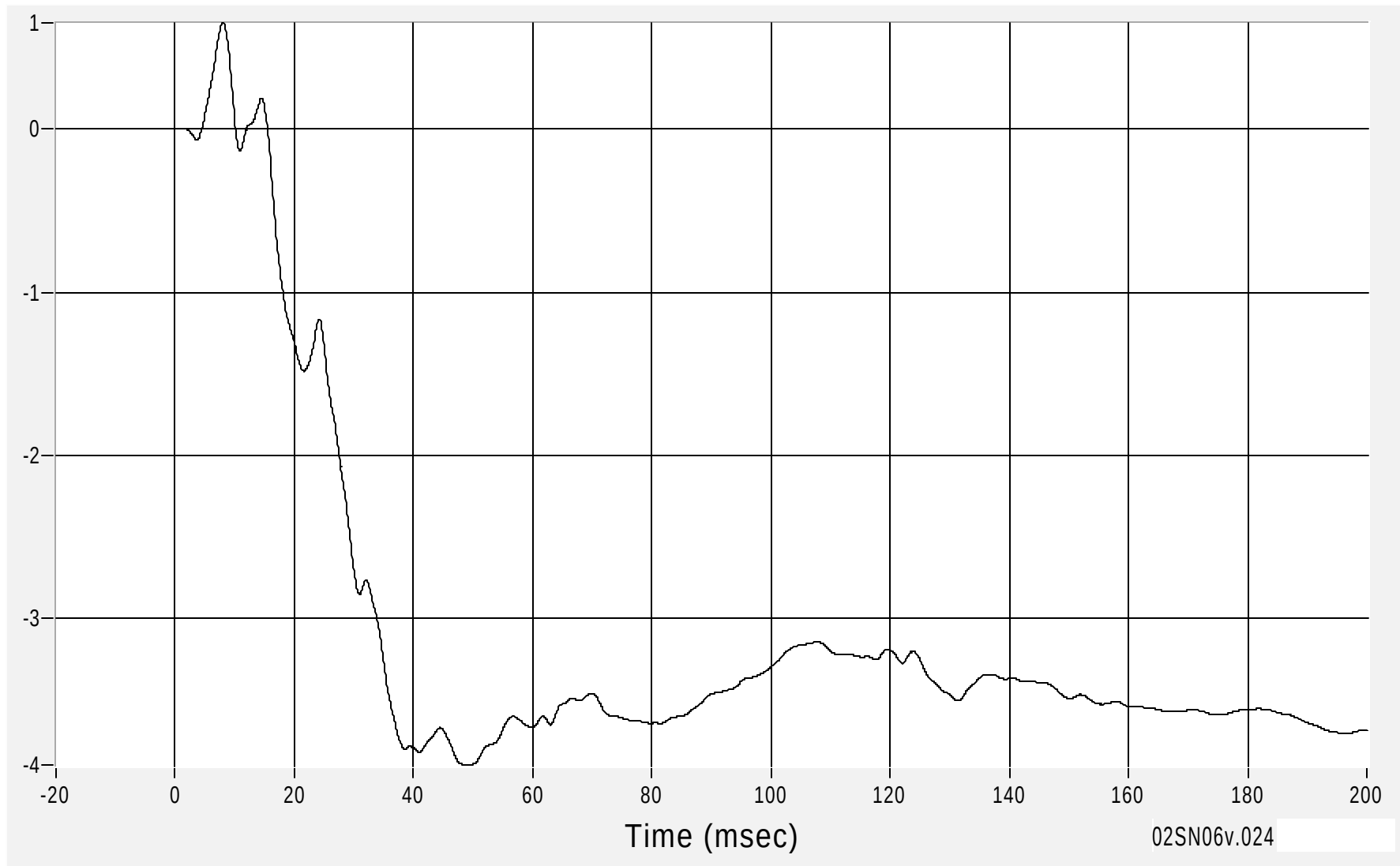
Vehicle Center of Gravity (X) Velocity

Max 0.7 km/h at 8.0 msec

Min -3.9 km/h at 49.4 msec

Velocity (km/h) CFC180

B-94



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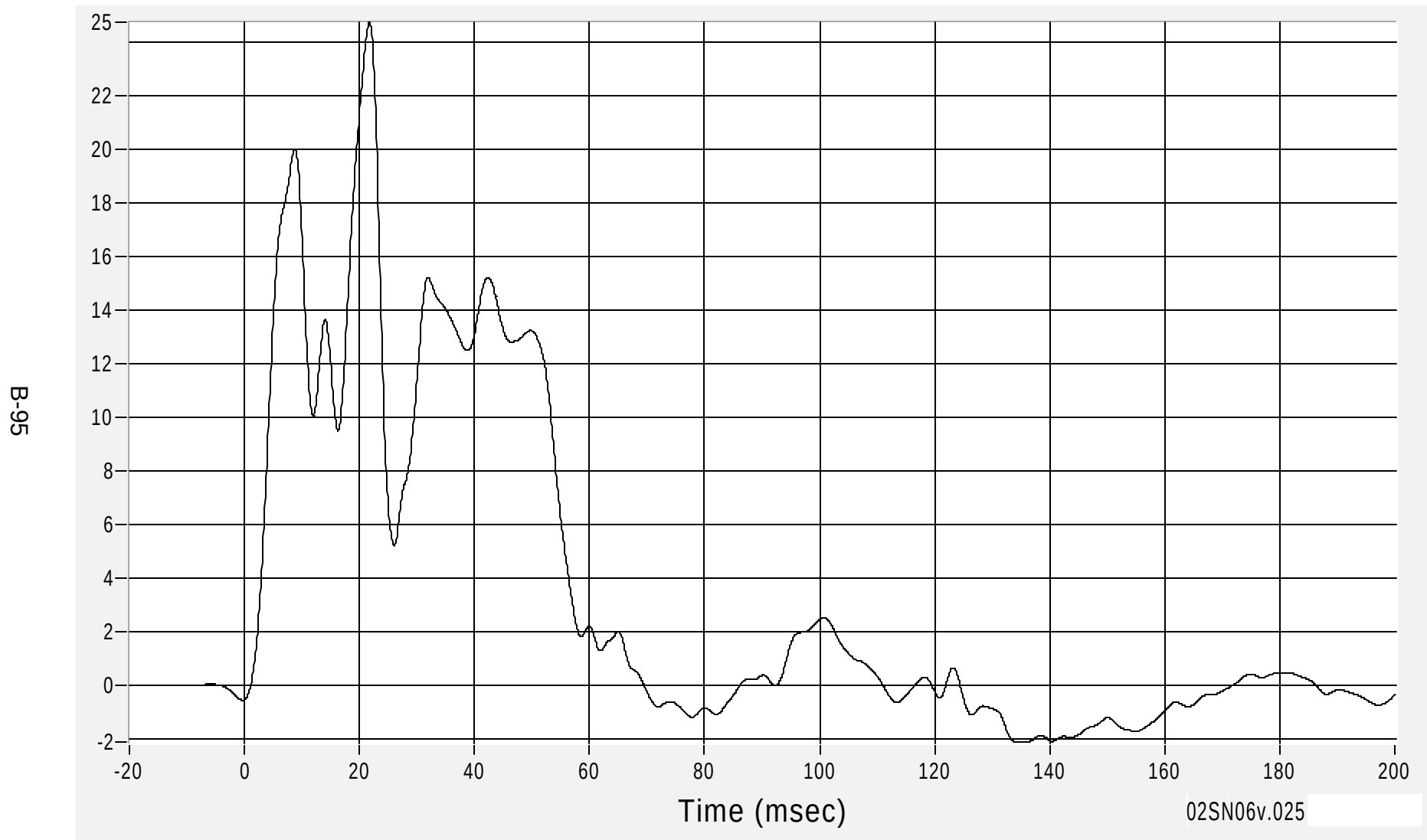
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Vehicle Center of Gravity (Y) Acceleration

Max 24.8 G's at 21.8 msec

Acceleration (G's) CFC60

Min -2.1 G's at 134.2 msec



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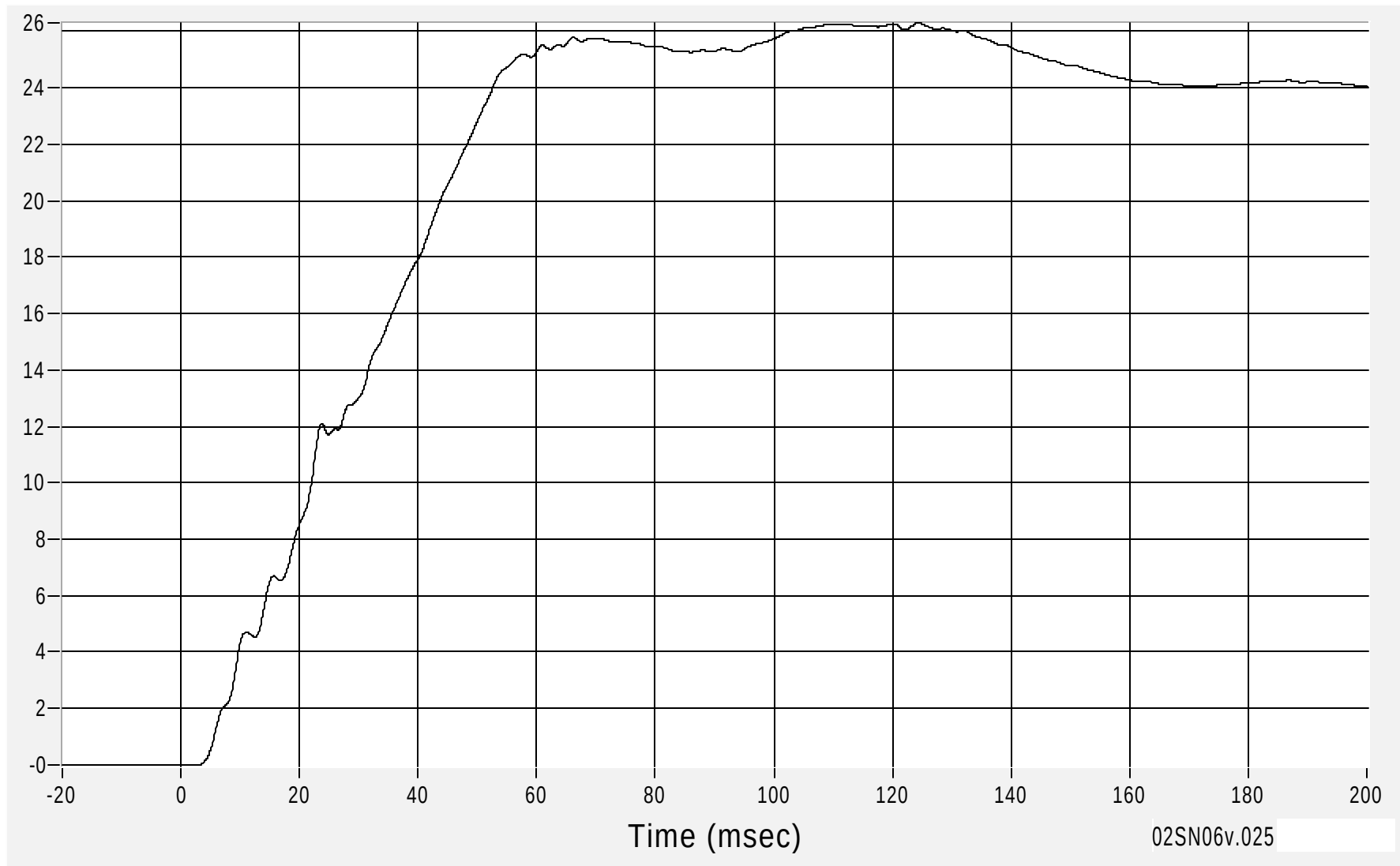
Vehicle Center of Gravity (Y) Velocity

Max 26.3 km/h at 124.4 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 2.6 msec

B-96



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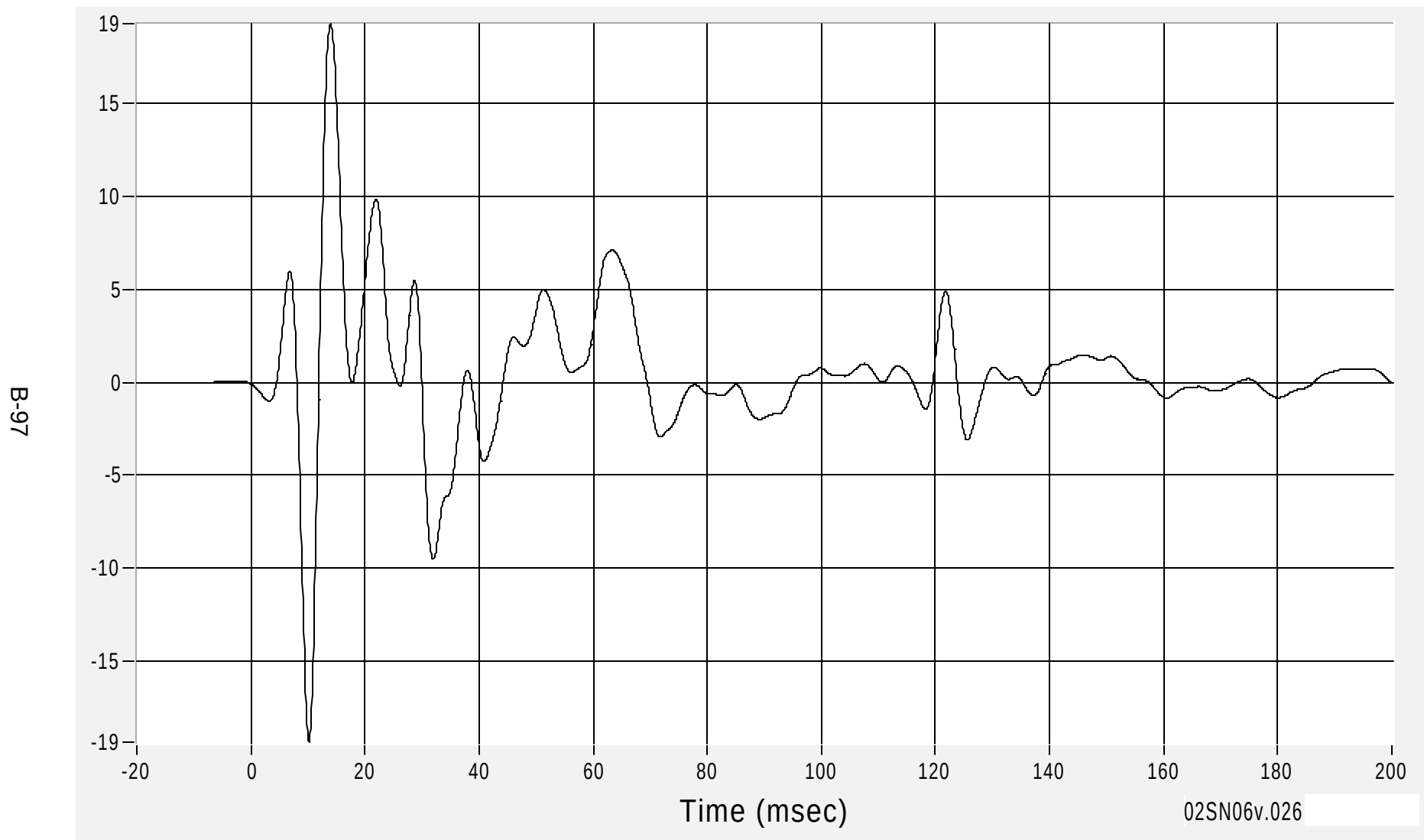
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Vehicle Center of Gravity (Z) Acceleration

Max 19.3 G's at 14.0 msec

Acceleration (G's) CFC60

Min -19.4 G's at 10.2 msec



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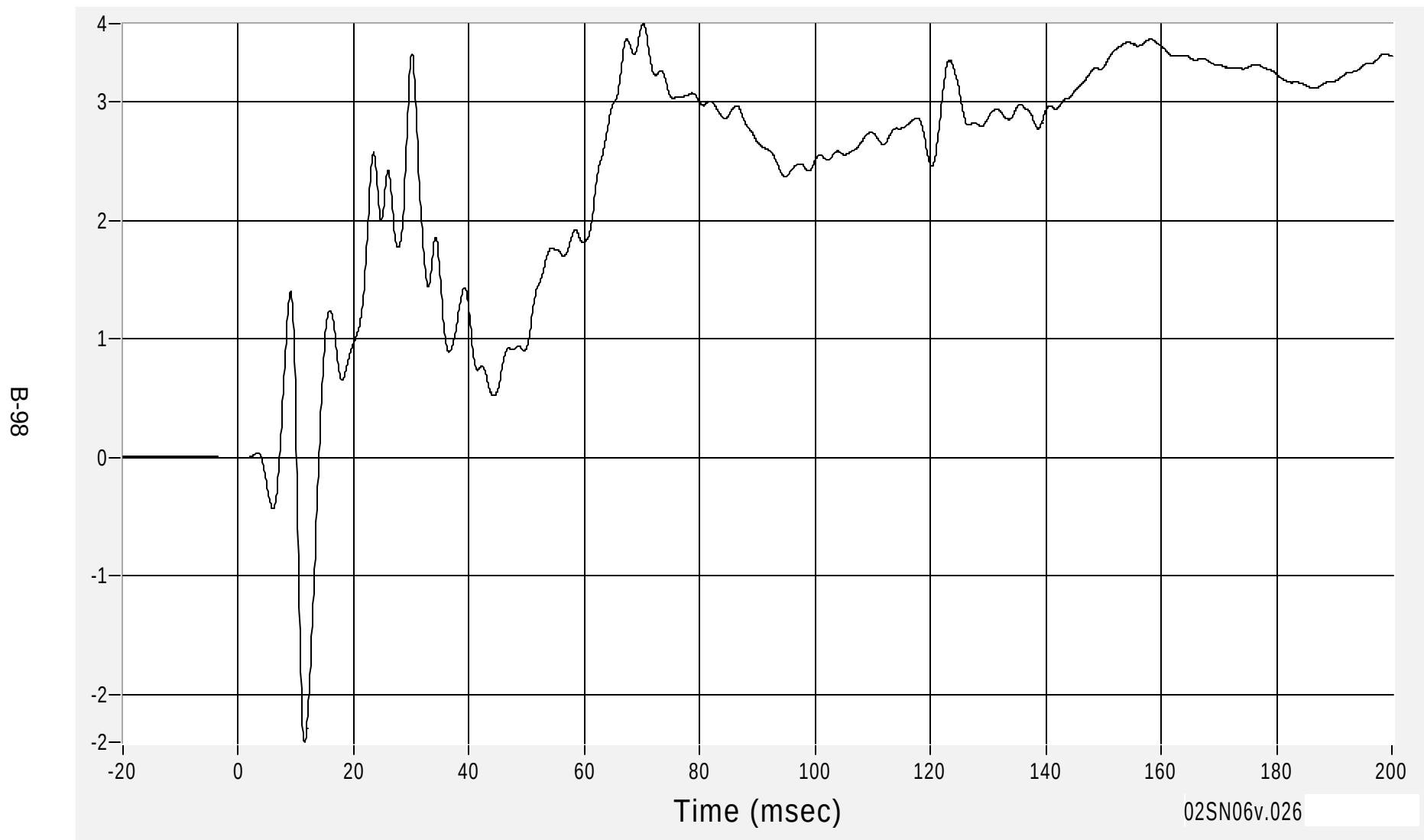
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Vehicle Center of Gravity (Z) Velocity

Max 3.7 km/h at 70.2 msec

Min -2.4 km/h at 11.4 msec

Velocity (km/h) CFC180



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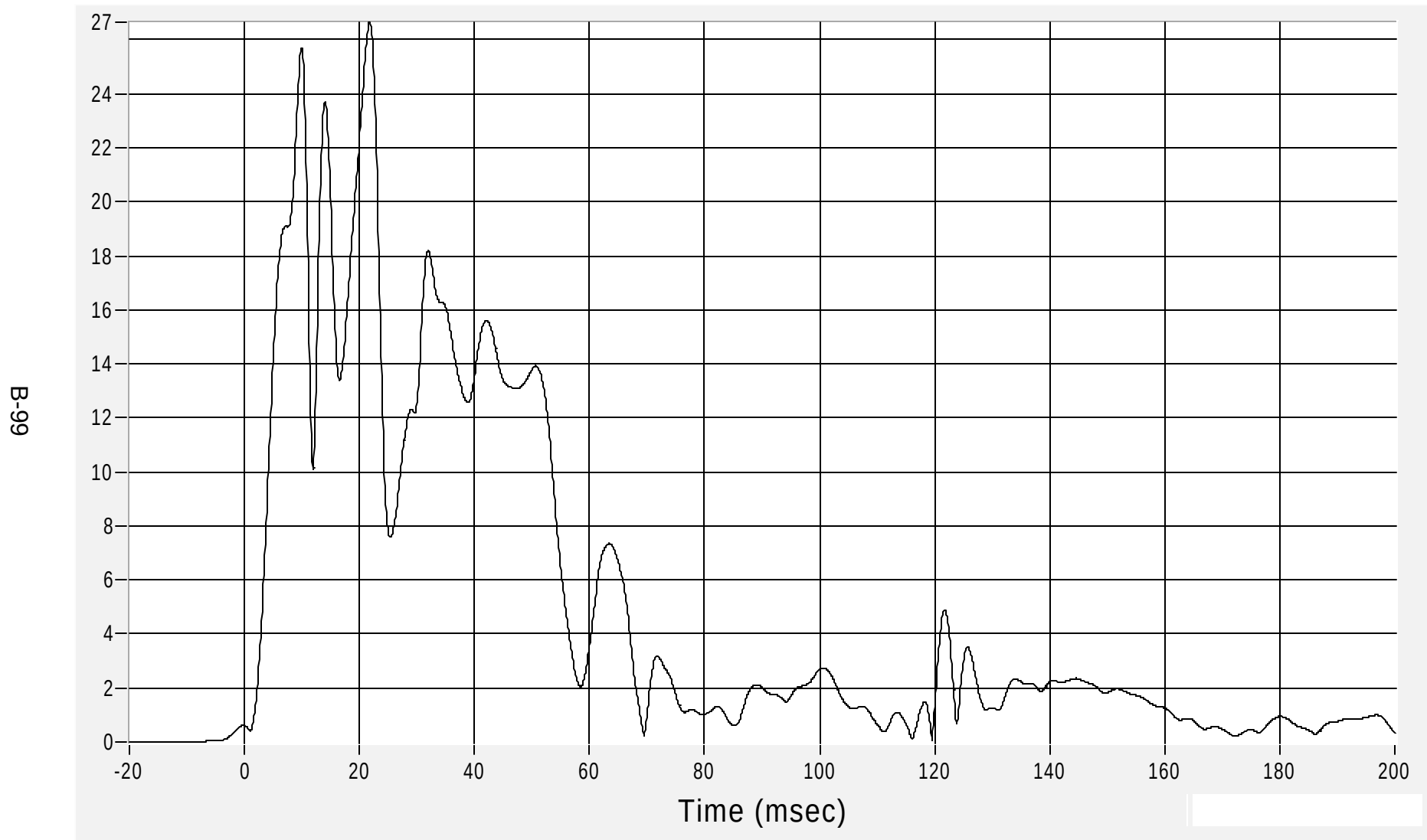
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Vehicle Center of Gravity Resultant Acceleration

Max 26.6 G's at 21.8 msec

Acceleration (G's) CFC60

Min 0.1 G's at 119.5 msec



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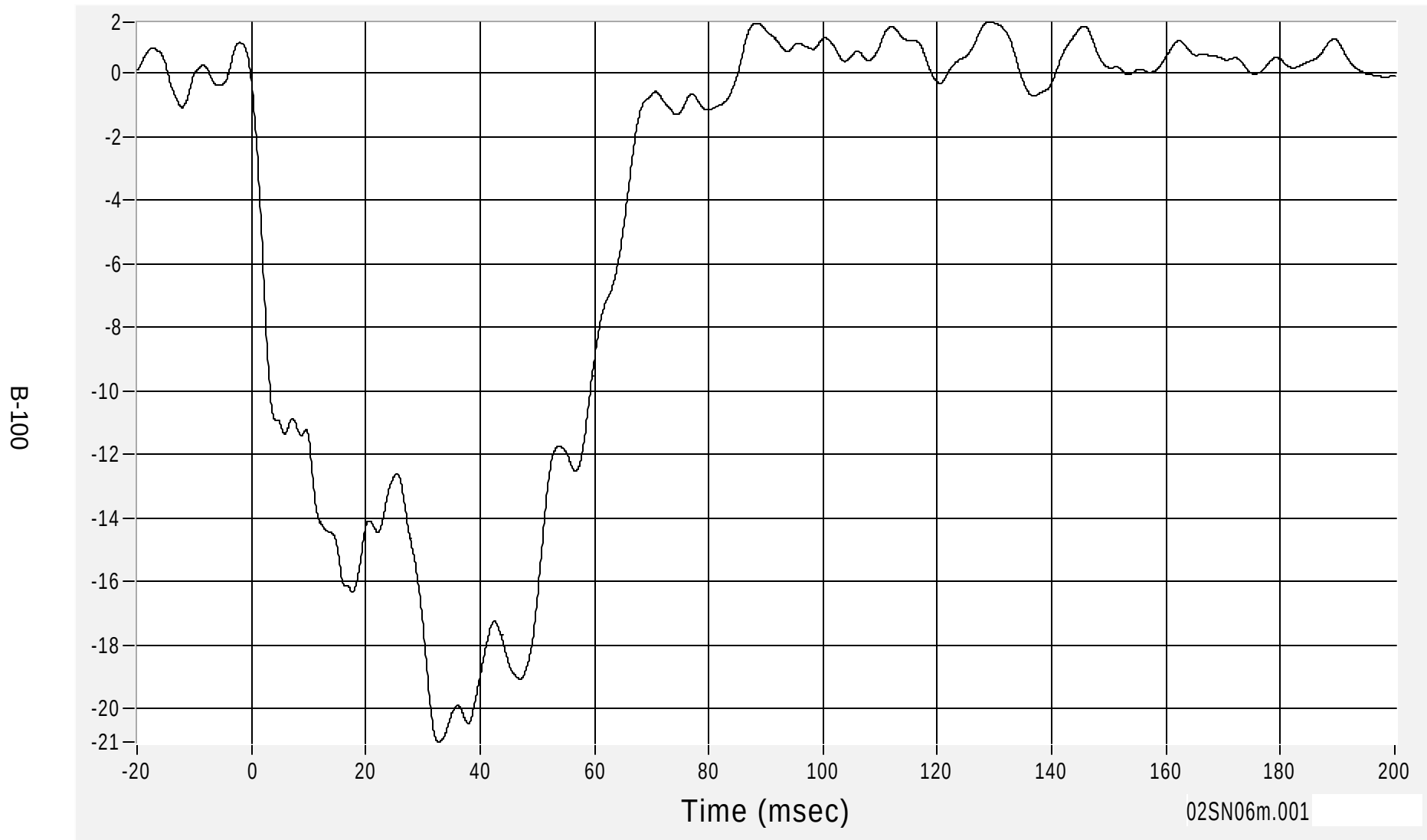
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MDB Center of Gravity (X) Acceleration

Max 1.6 G's at 129.0 msec

Acceleration (G's) CFC60

Min -21.0 G's at 32.7 msec



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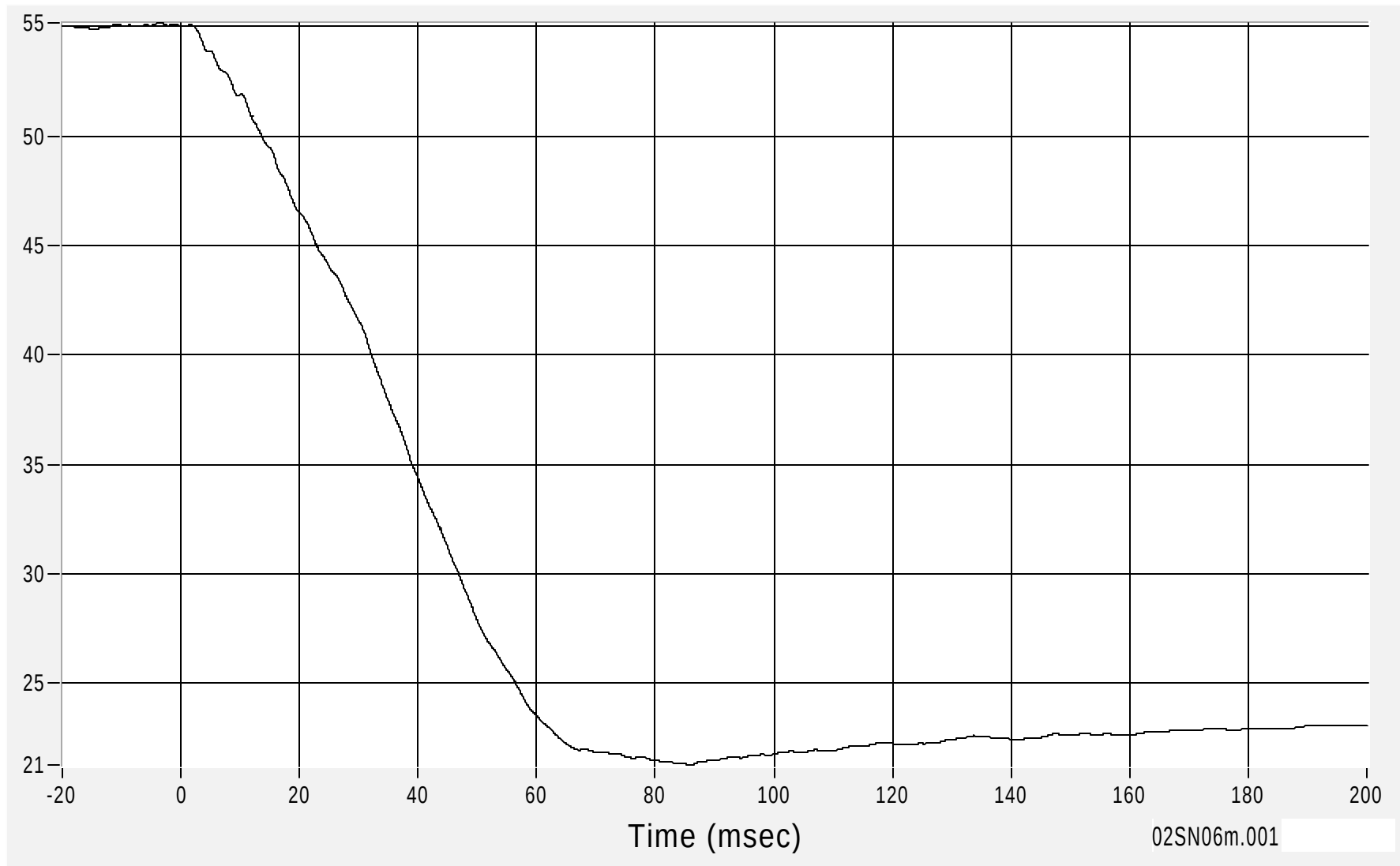
MDB Center of Gravity (X) Velocity

Velocity (km/h) CFC180

Max 55.1 km/h at 1.6 msec

Min 21.3 km/h at 85.8 msec

B-101



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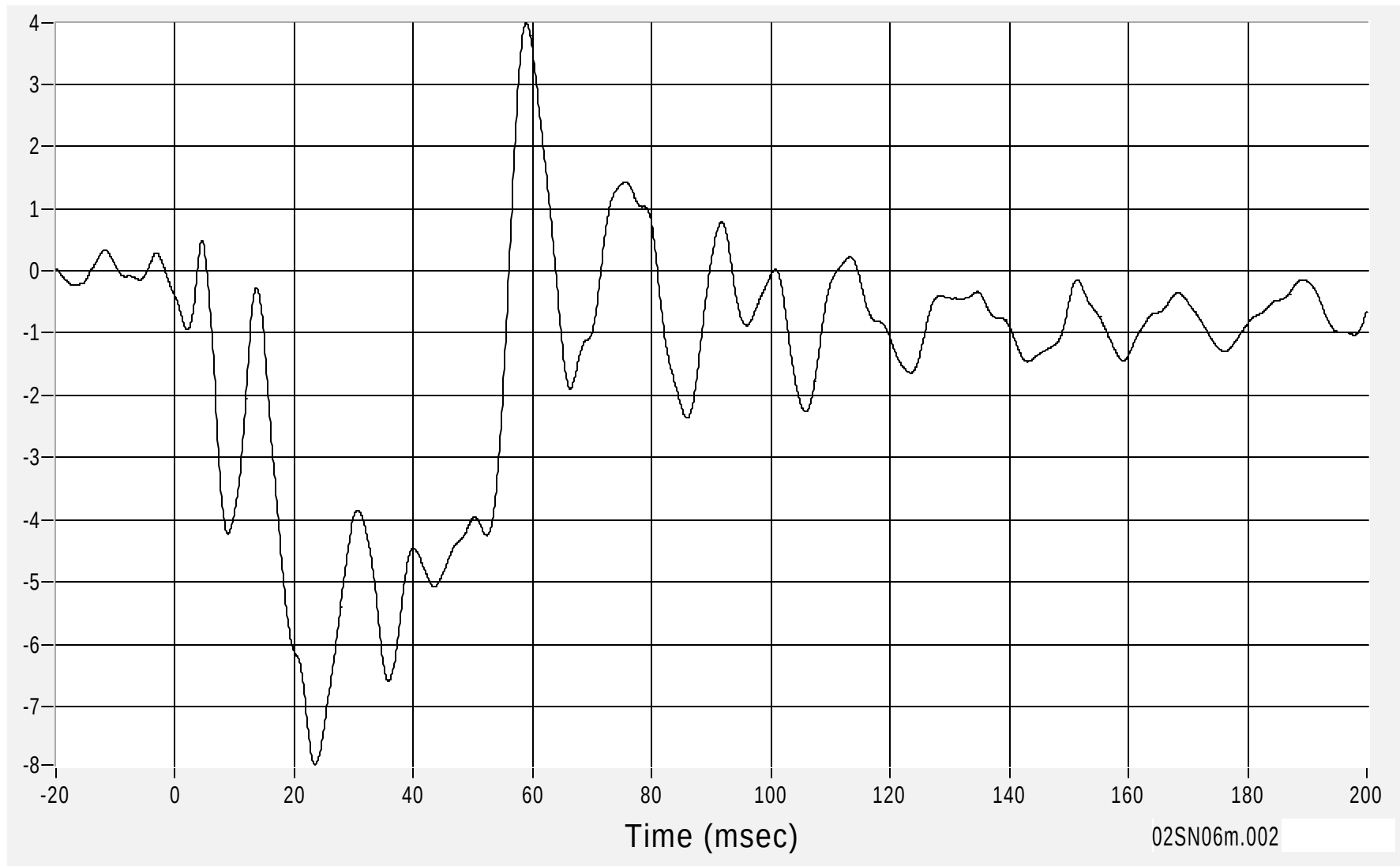
MDB Center of Gravity (Y) Acceleration

Max 4.0 G's at 59.0 msec

Acceleration (G's) CFC60

Min -7.9 G's at 23.4 msec

B-102



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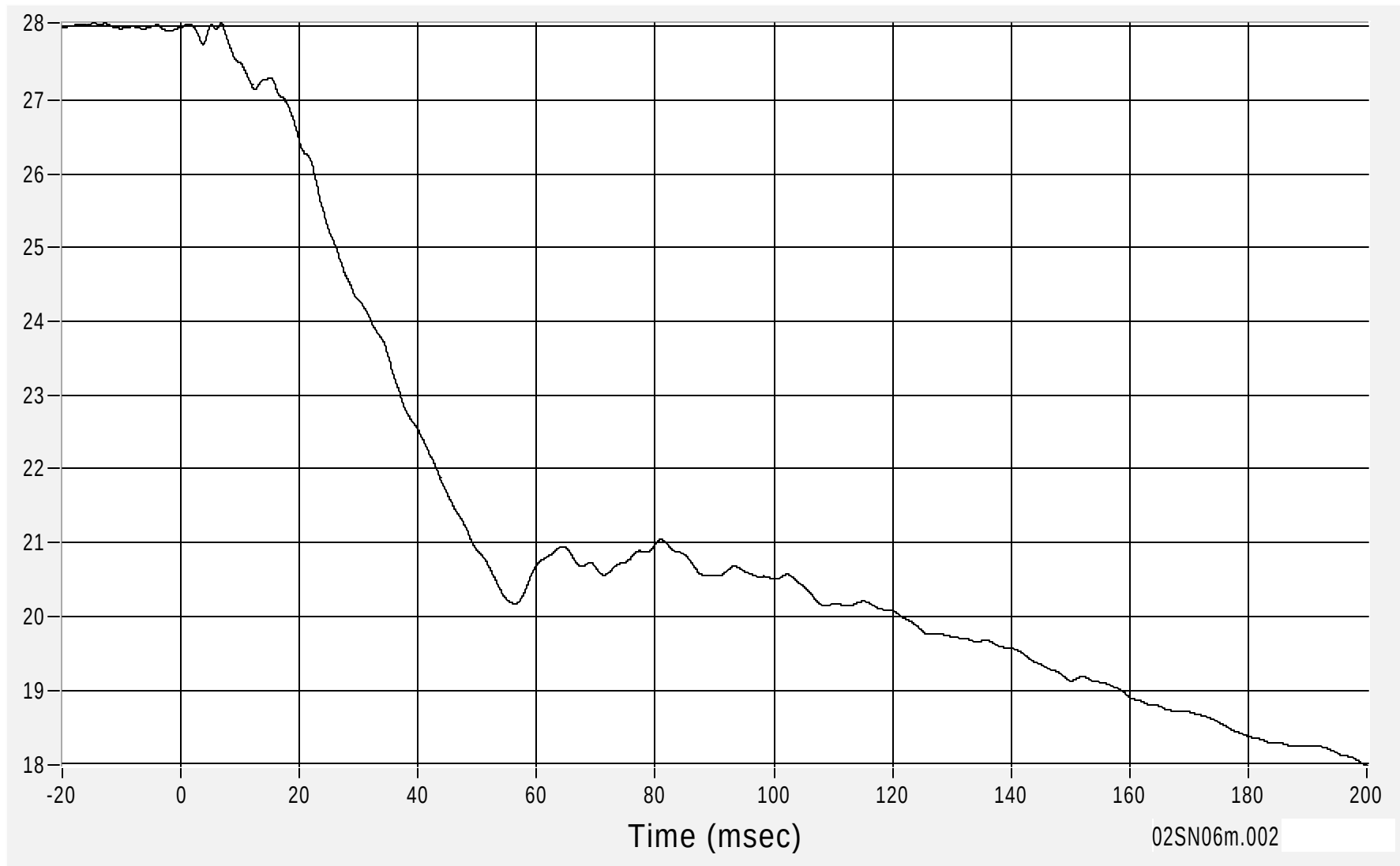
MDB Center of Gravity (Y) Velocity

Max 28.0 km/h at 6.8 msec

Min 18.0 km/h at 199.9 msec

Velocity (km/h) CFC180

B-103



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11 April 2002

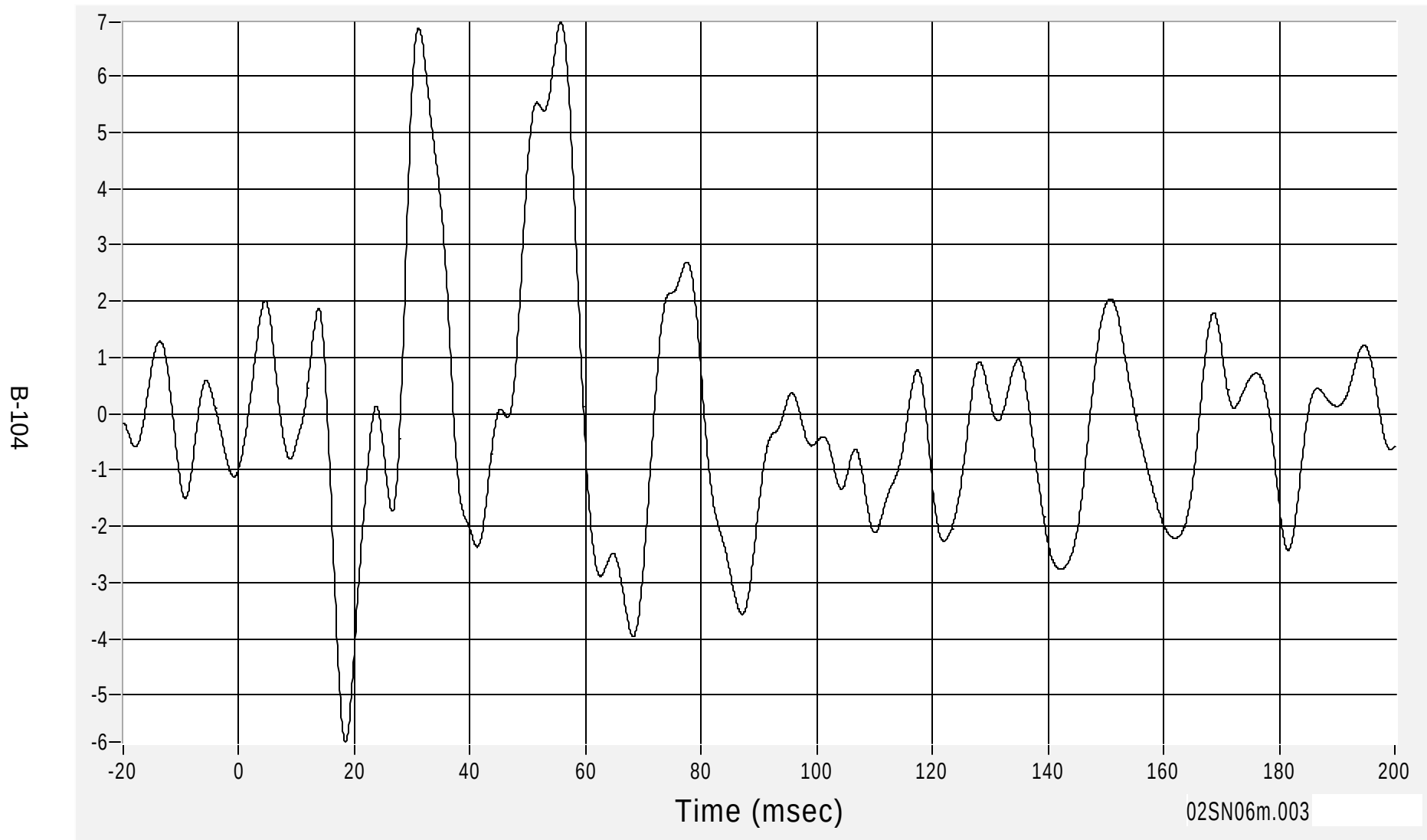
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MDB Center of Gravity (Z) Acceleration

Max 7.0 G's at 55.7 msec

Acceleration (G's) CFC60

Min -5.8 G's at 18.5 msec



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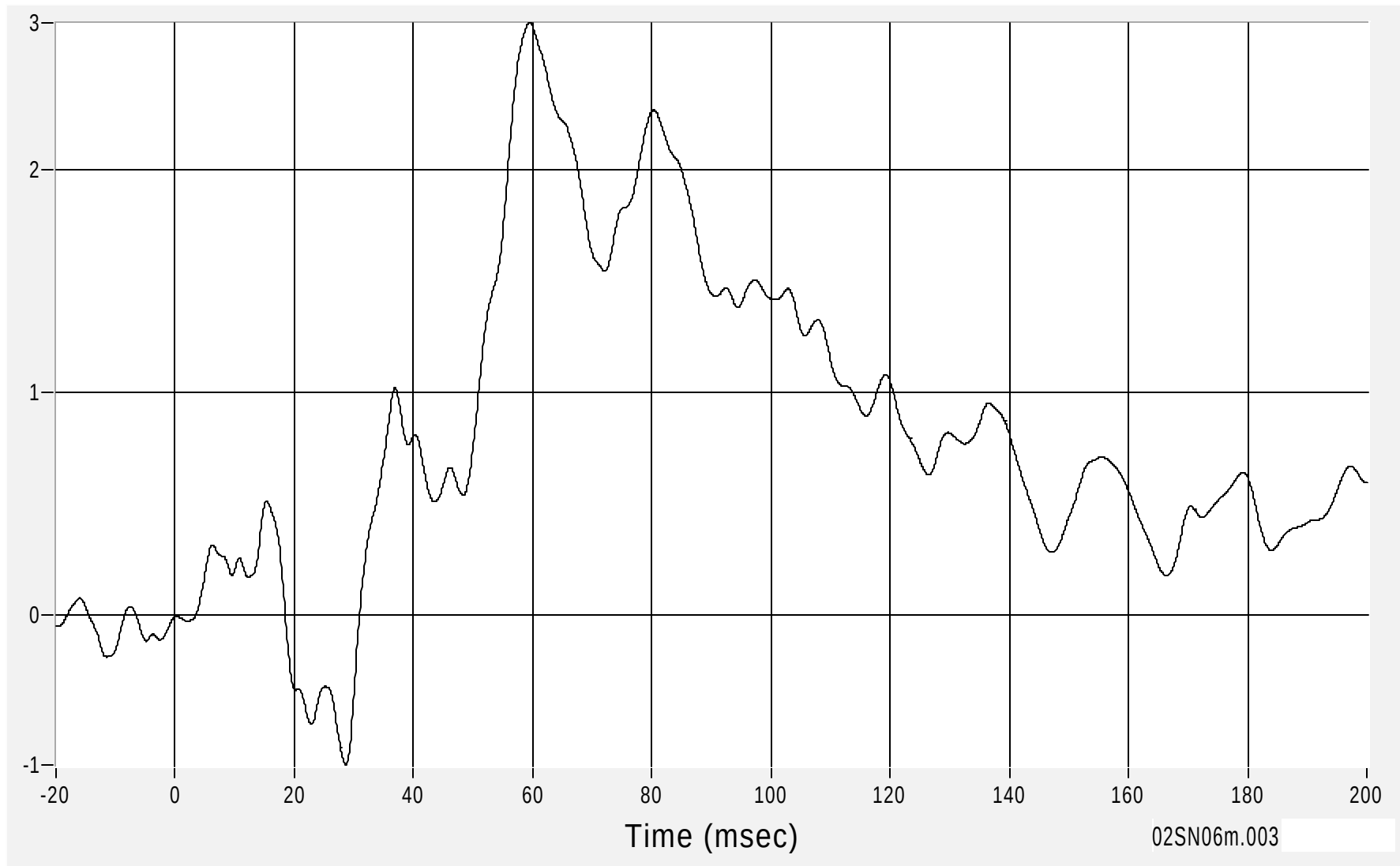
MDB Center of Gravity (Z) Velocity

Velocity (km/h) CFC180

Max 2.7 km/h at 59.5 msec

Min -0.7 km/h at 28.6 msec

B-105



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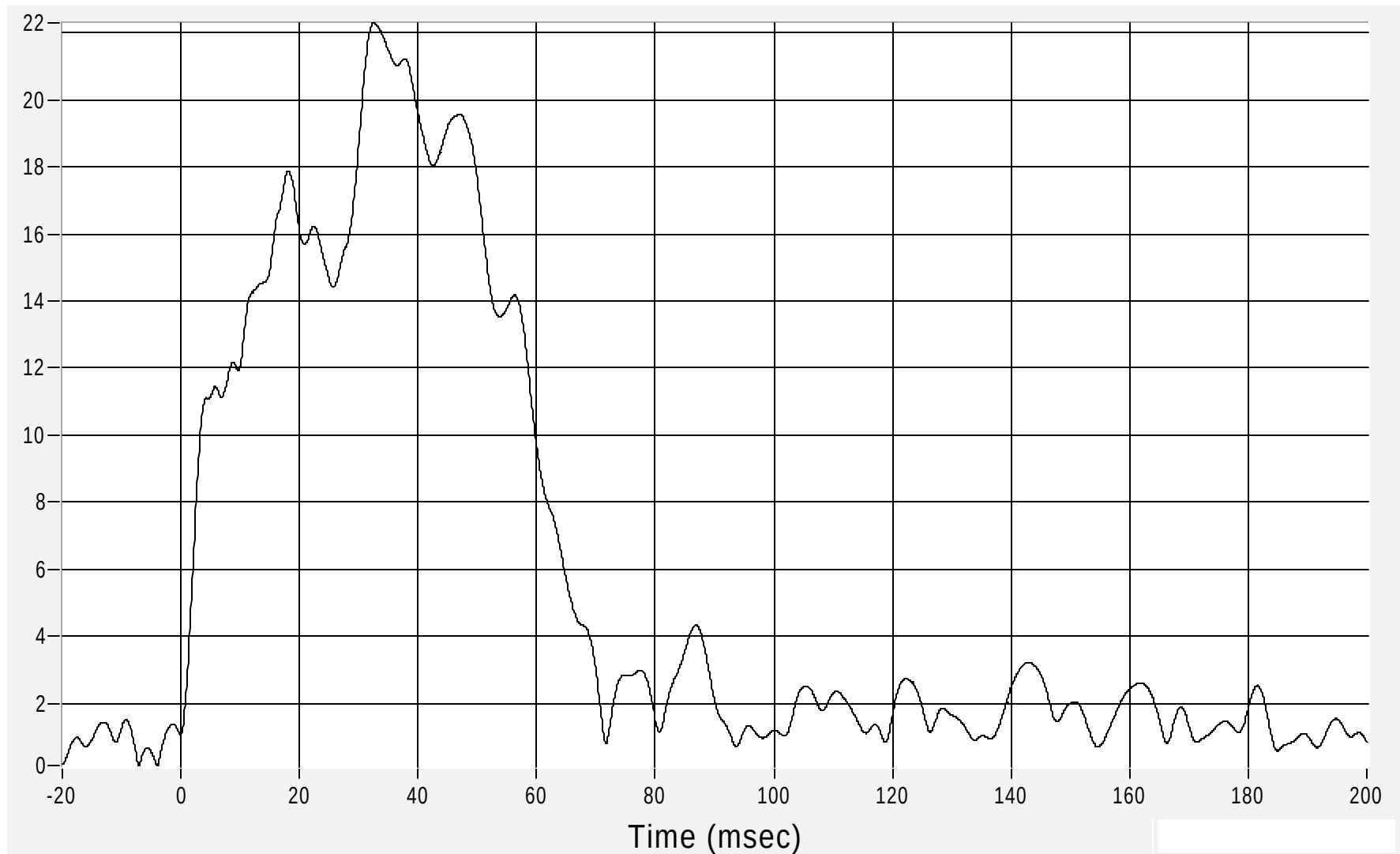
MDB Center of Gravity Resultant Acceleration

Max 22.3 G's at 32.5 msec

Acceleration (G's) CFC60

Min 0.6 G's at 185.0 msec

B-106



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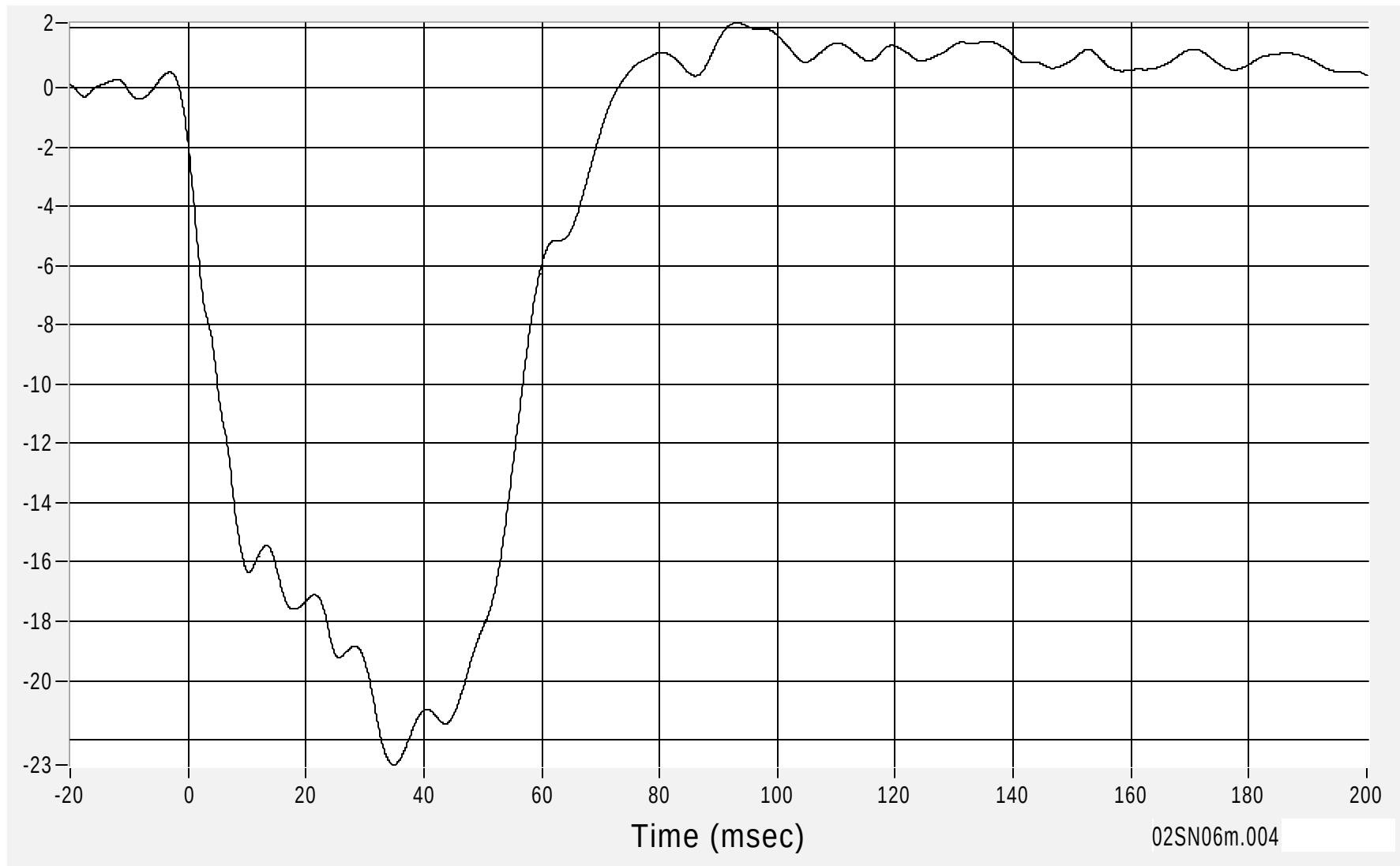
MDB Rear (X) Acceleration

Acceleration (G's) CFC60

Max 2.2 G's at 93.1 msec

Min -22.8 G's at 35.0 msec

B-107



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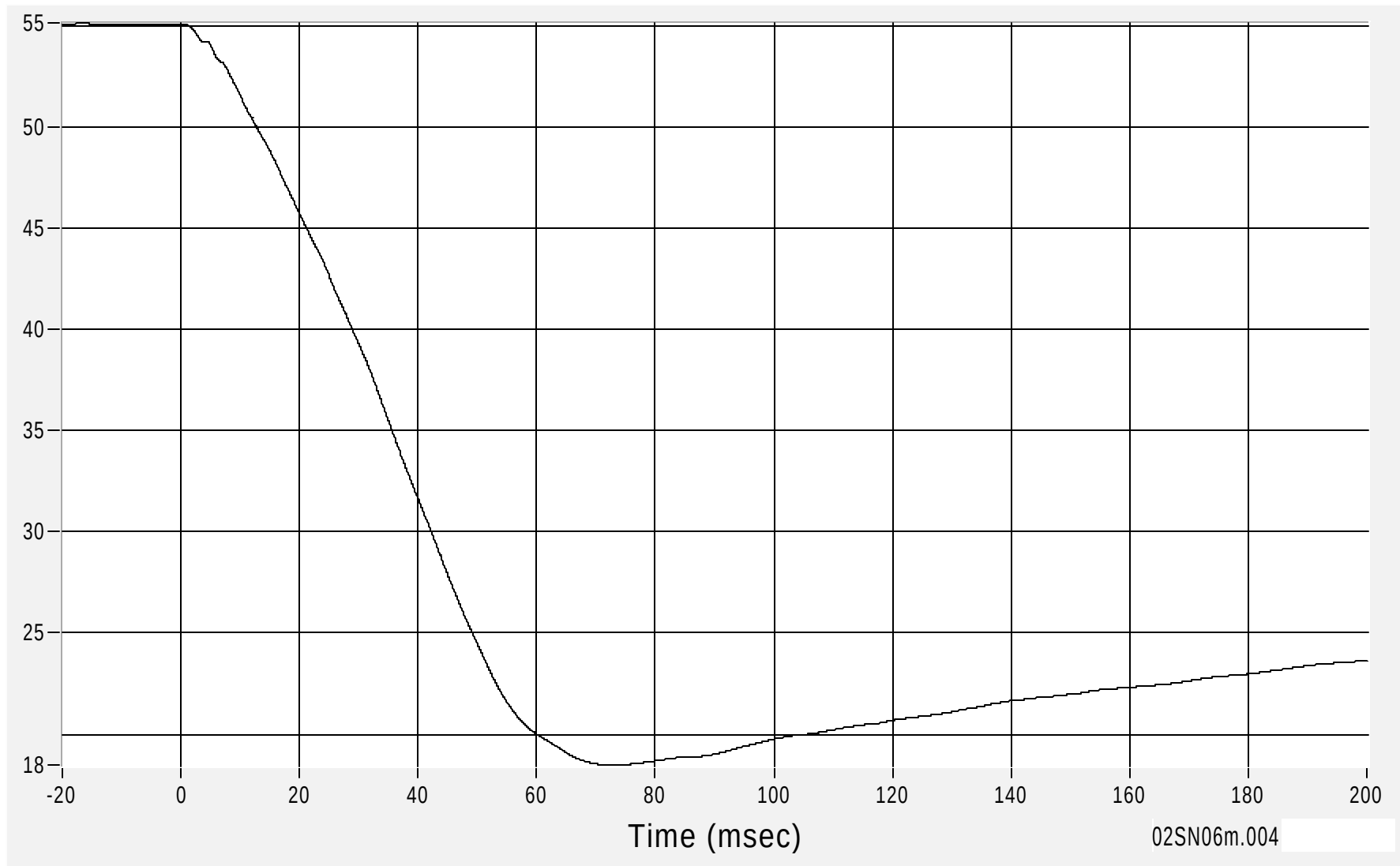
MDB Rear (X) Velocity

Max 55.0 km/h at 0.0 msec

Velocity (km/h) CFC180

Min 18.5 km/h at 72.2 msec

B-108



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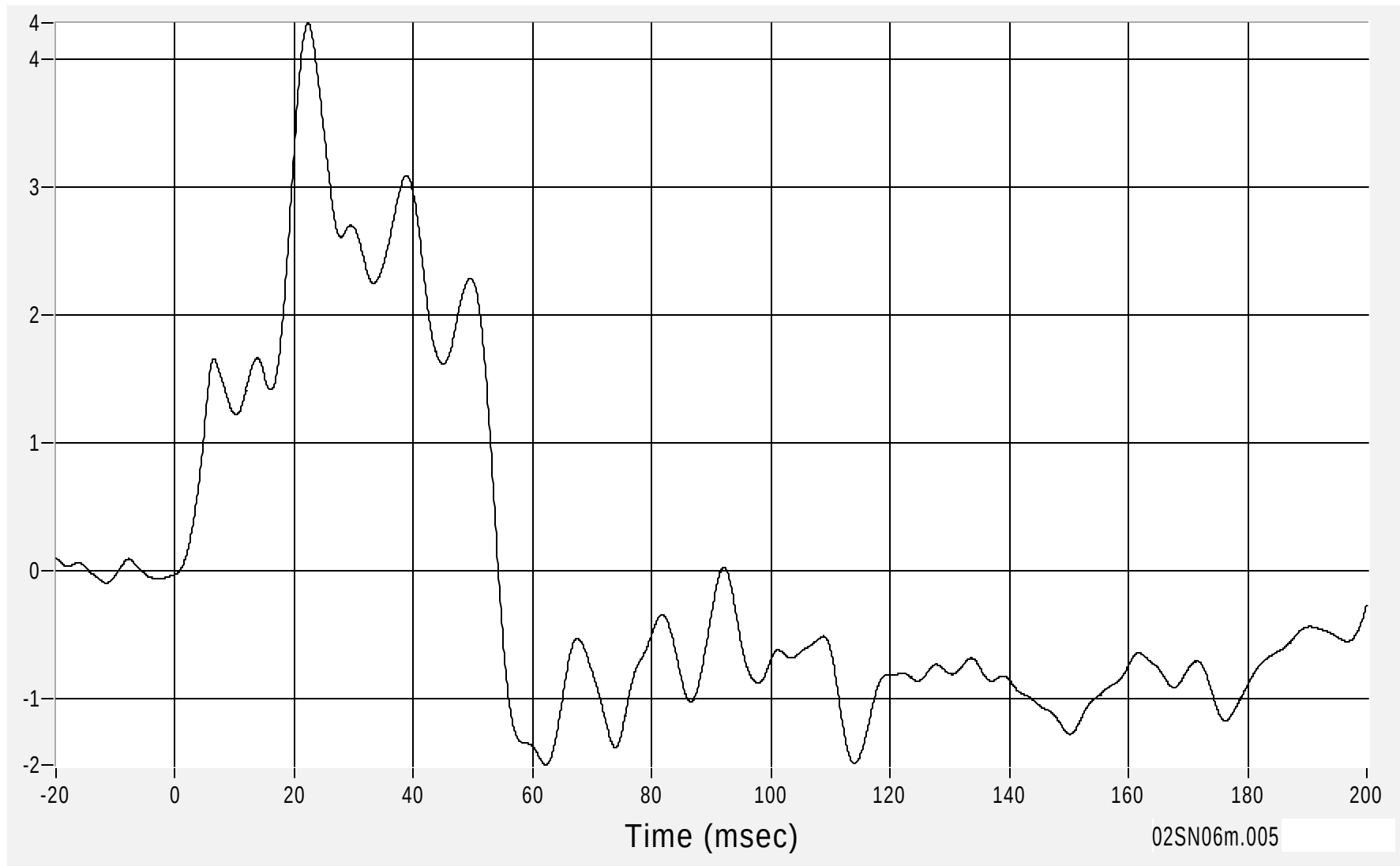
MDB Rear (Y) Acceleration

Max 4.3 G's at 22.3 msec

Acceleration (G's) CFC60

Min -1.5 G's at 62.2 msec

B-109



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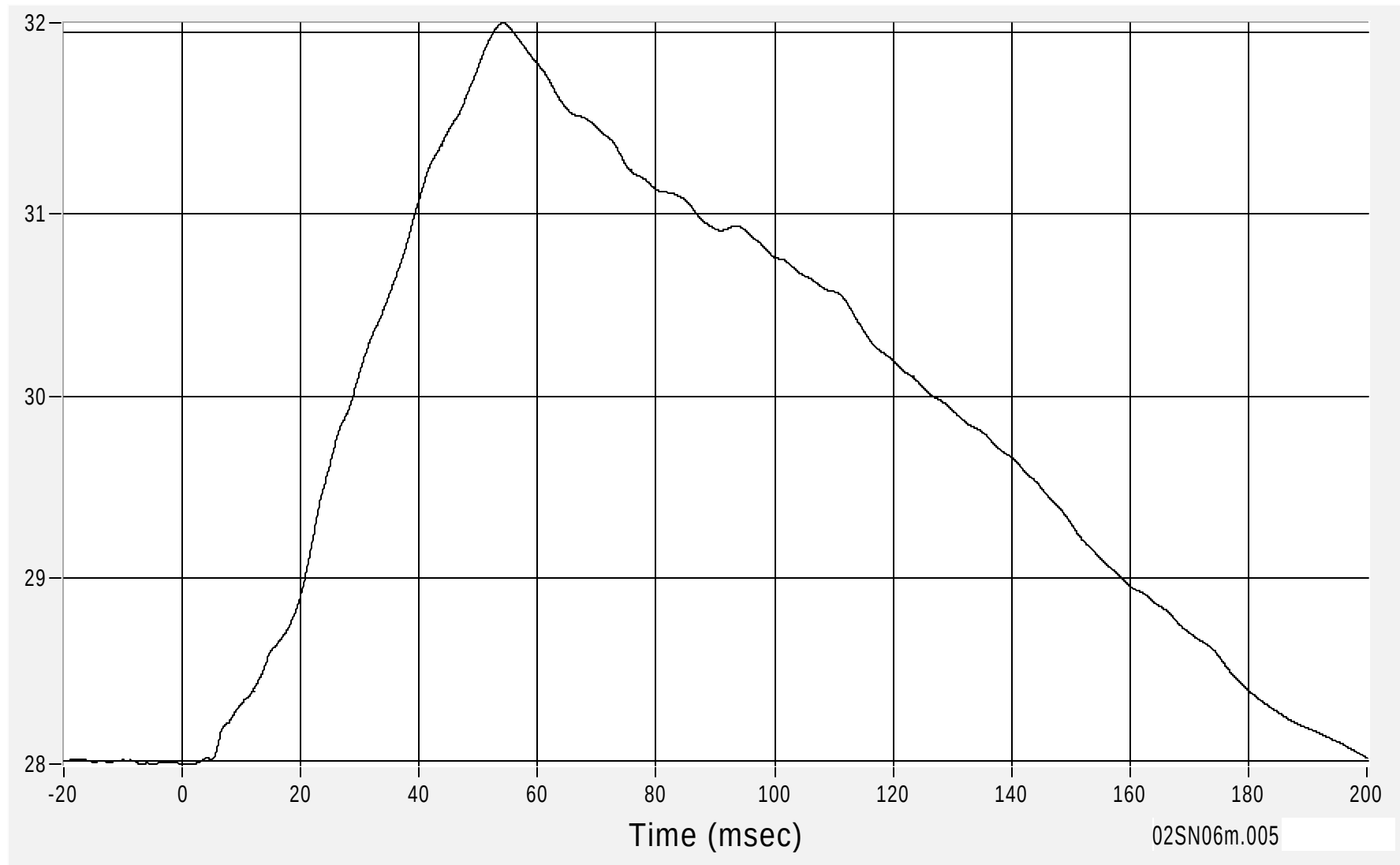
MDB Rear (Y) Velocity

Max 32.1 km/h at 54.2 msec

Velocity (km/h) CFC180

Min 28.0 km/h at 1.4 msec

B-110



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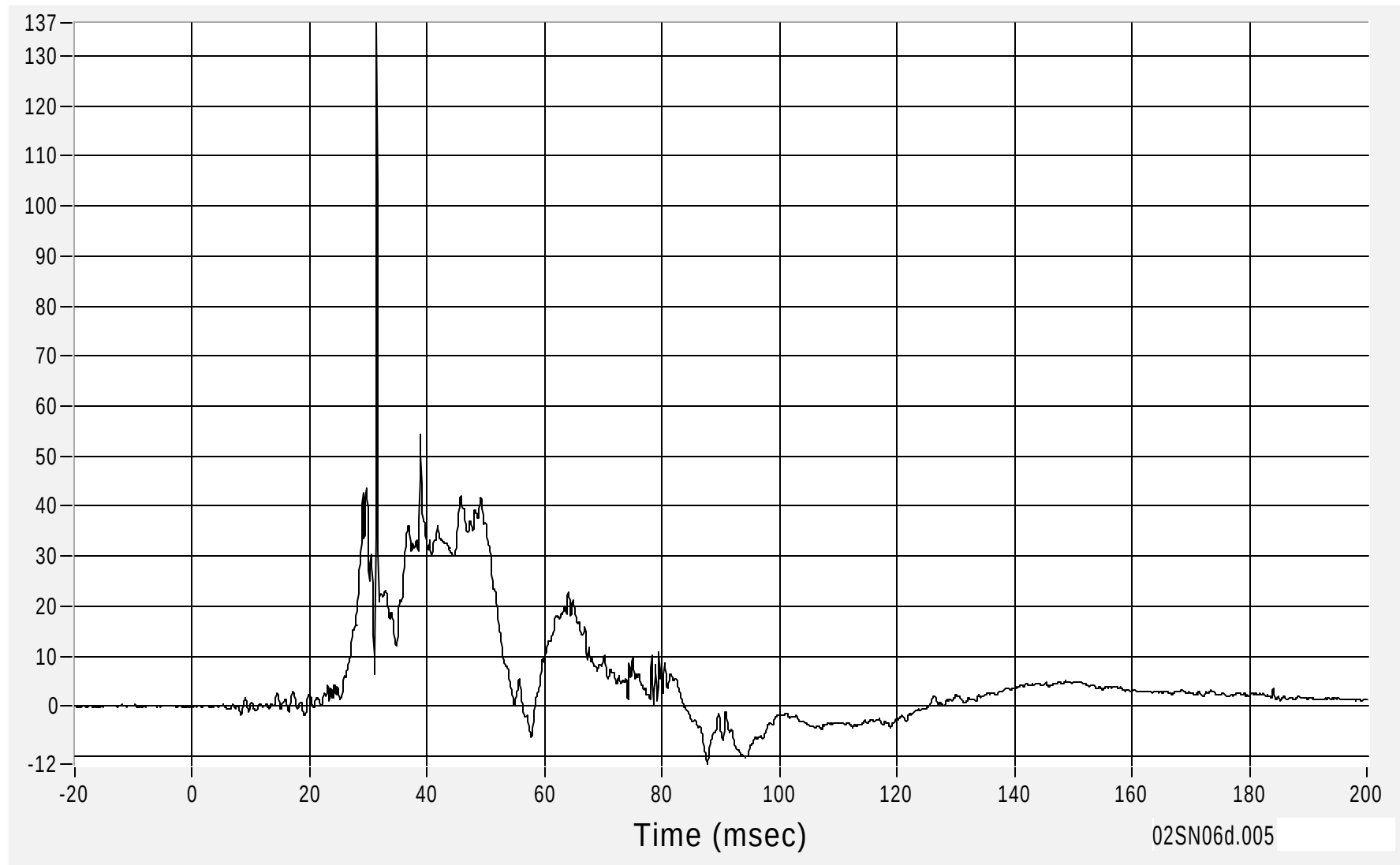
Driver Upper Rib (Y) Acceleration - Redundant

Max 136.6 G's at 31.4 msec

Acceleration (G's) CFC1000

Min -11.6 G's at 87.7 msec

B-111



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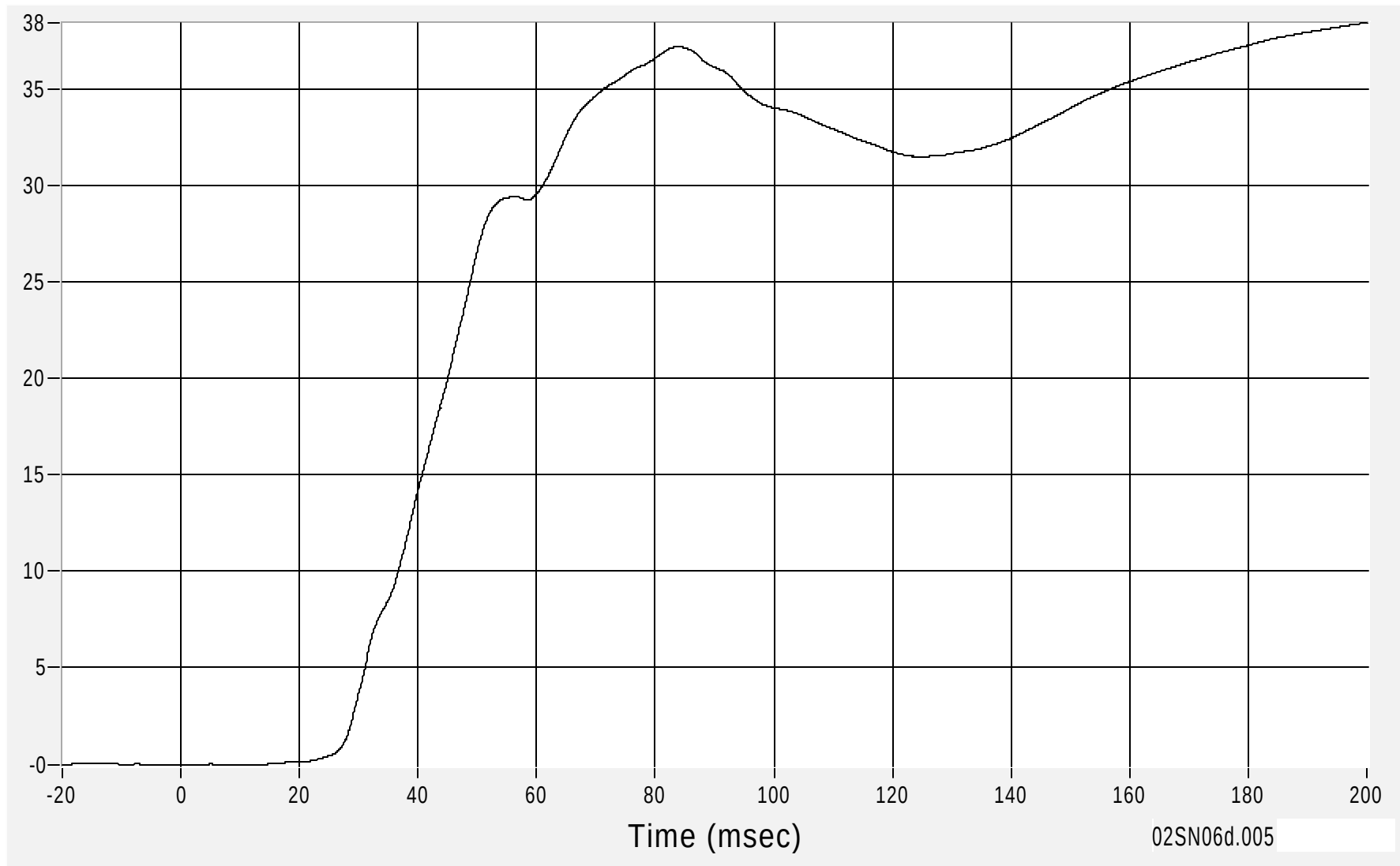
Driver Upper Rib (Y) Velocity - Redundant

Max 38.4 km/h at 199.9 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 11.4 msec

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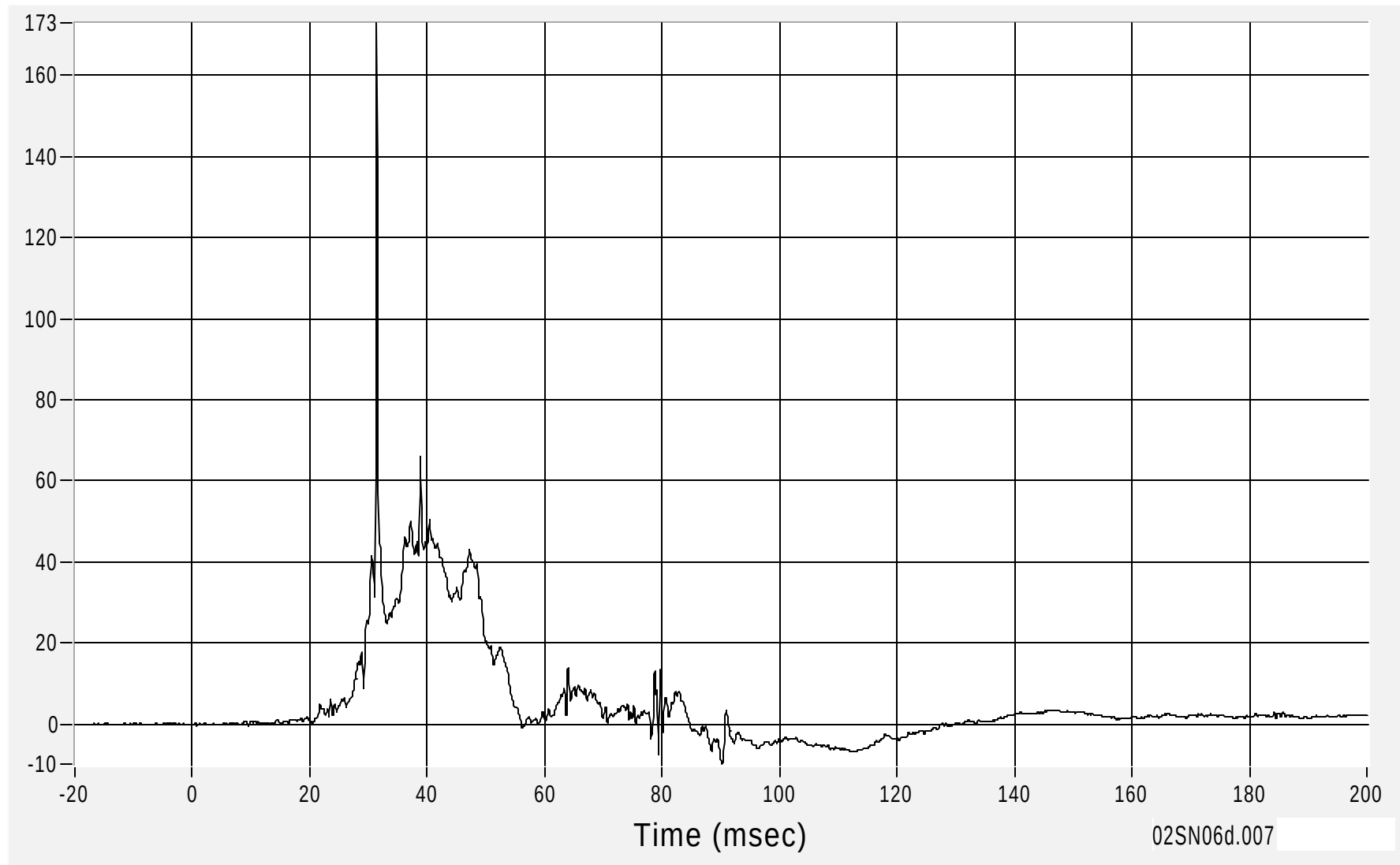
Driver Lower Rib (Y) Acceleration - Redundant

Max 173.0 G's at 31.4 msec

Acceleration (G's) CFC1000

Min -9.8 G's at 90.2 msec

B-113



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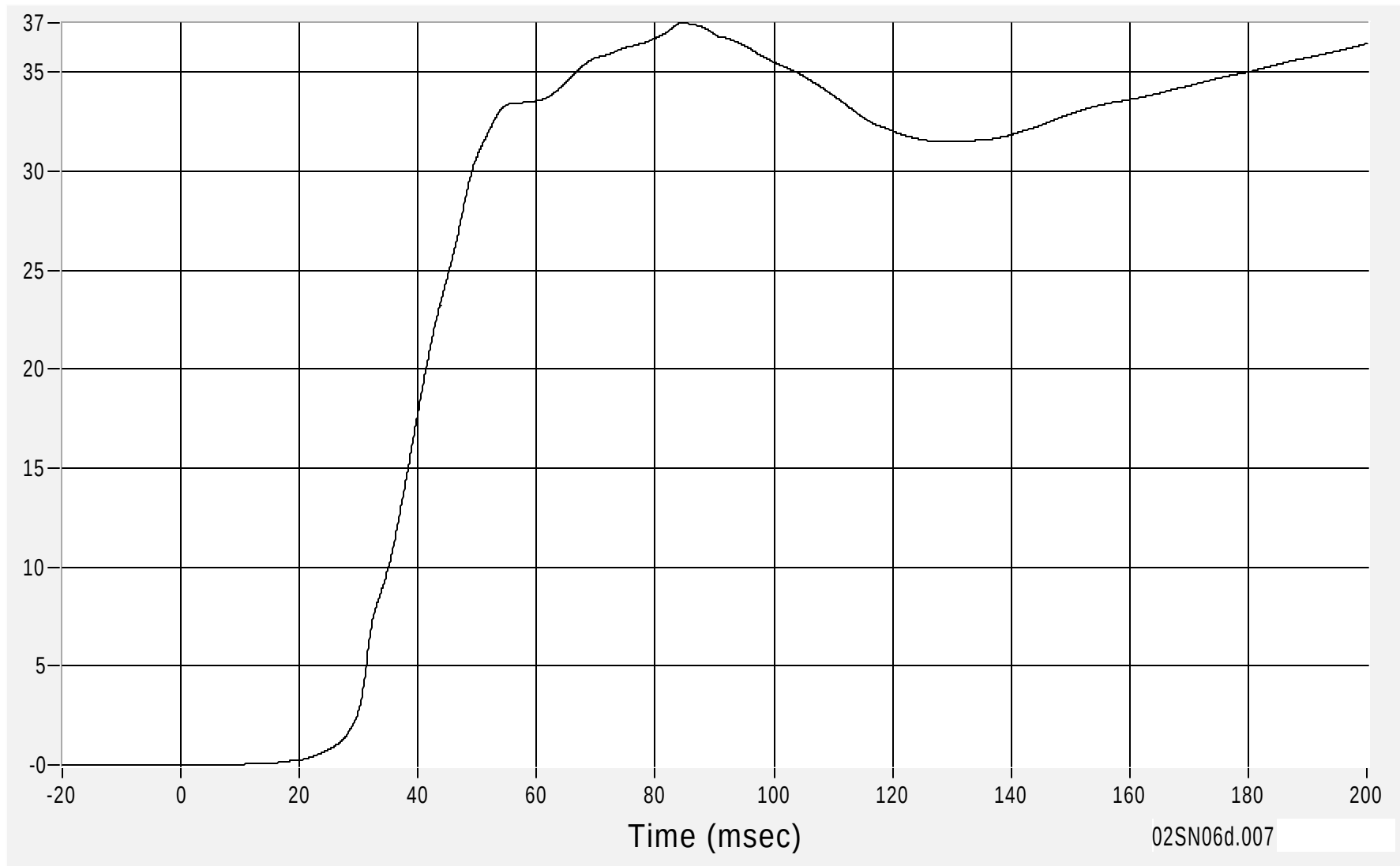
Driver Lower Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 37.5 km/h at 84.7 msec

Min 0.0 km/h at 5.1 msec

B-114



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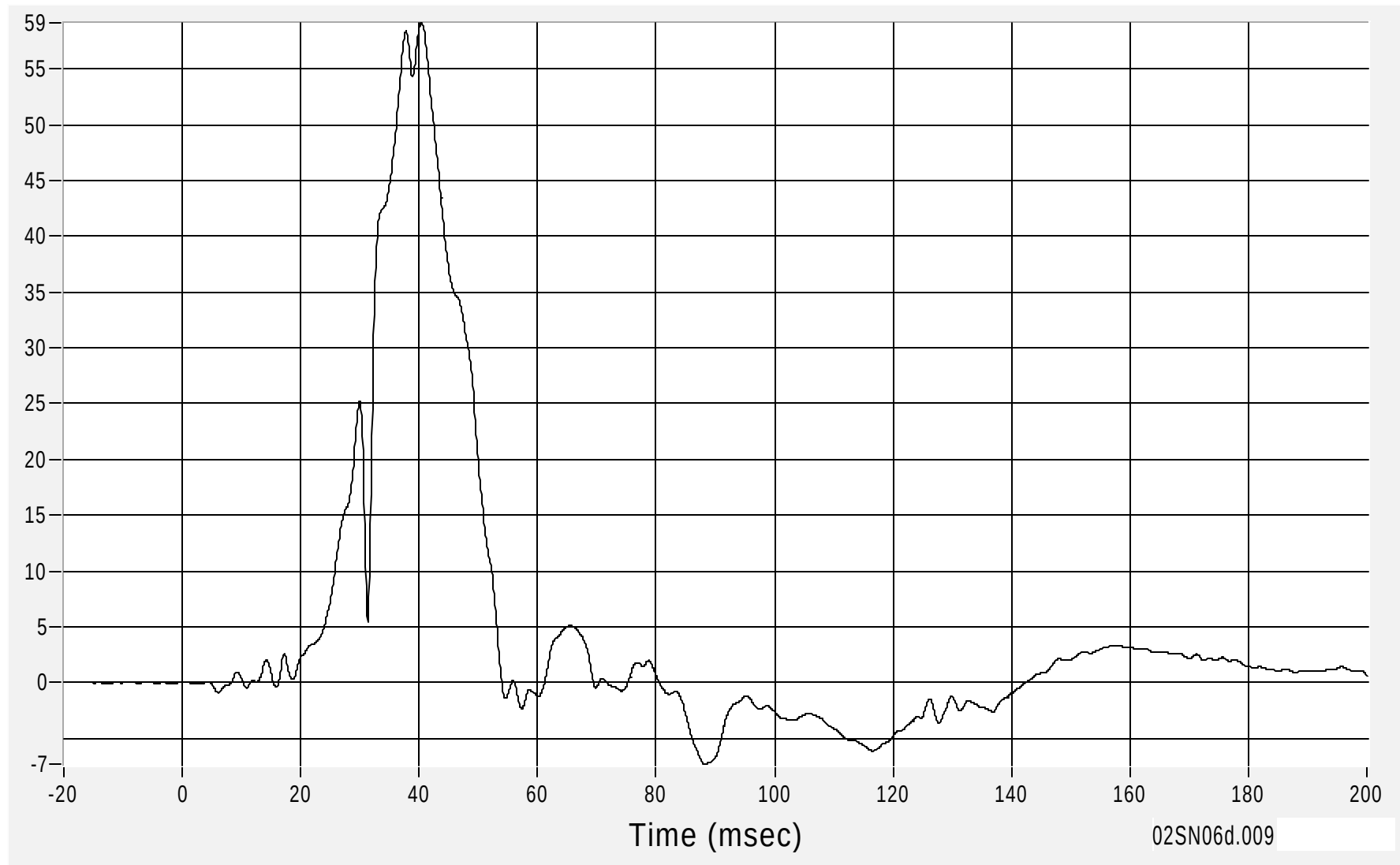
Driver Lower Spine (Y) Acceleration - Redundant

Max 59.1 G's at 40.4 msec

Acceleration (G's) CFC180

Min -7.3 G's at 88.2 msec

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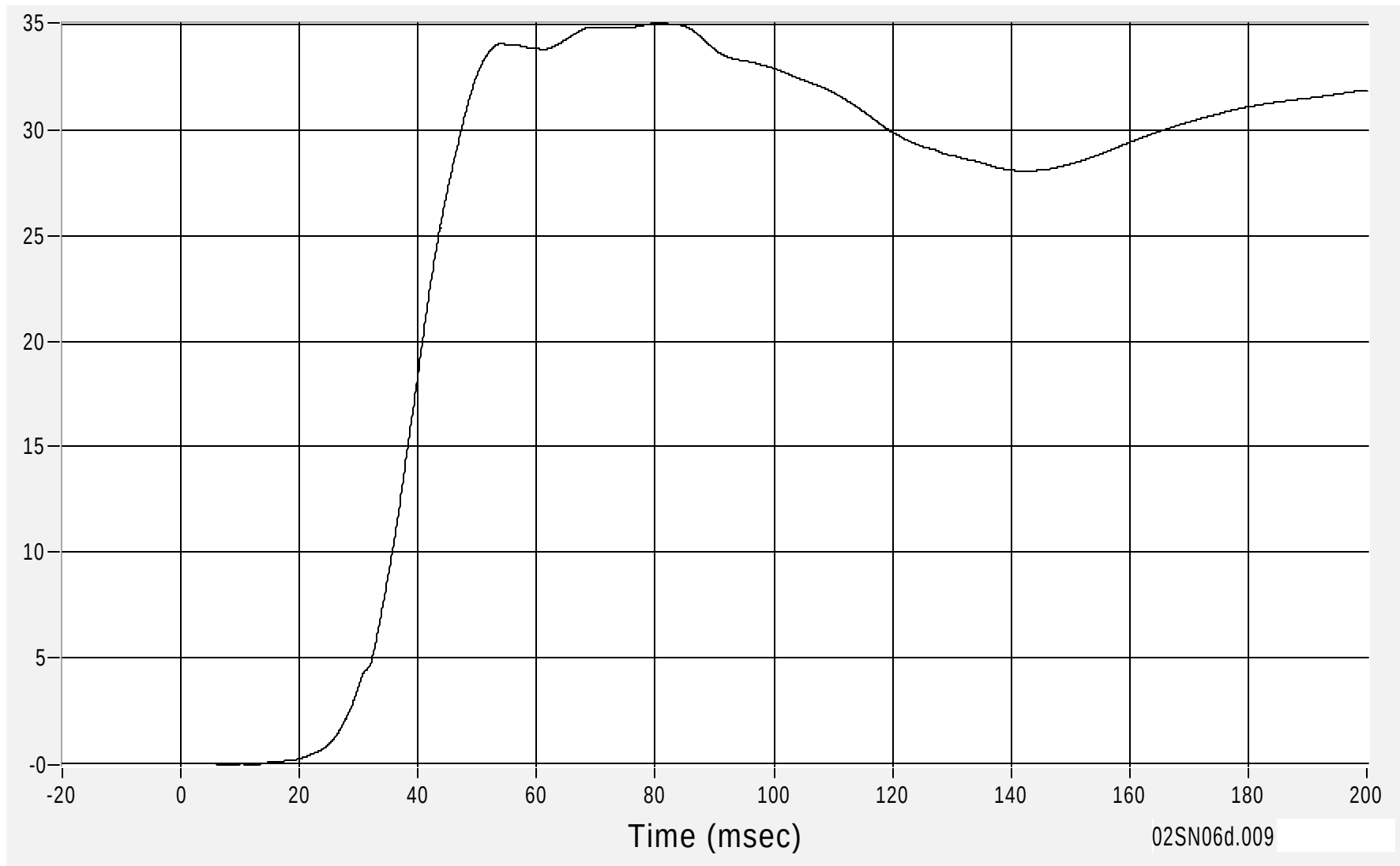
Driver Lower Spine (Y) Velocity - Redundant

Max 35.1 km/h at 80.5 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 8.3 msec

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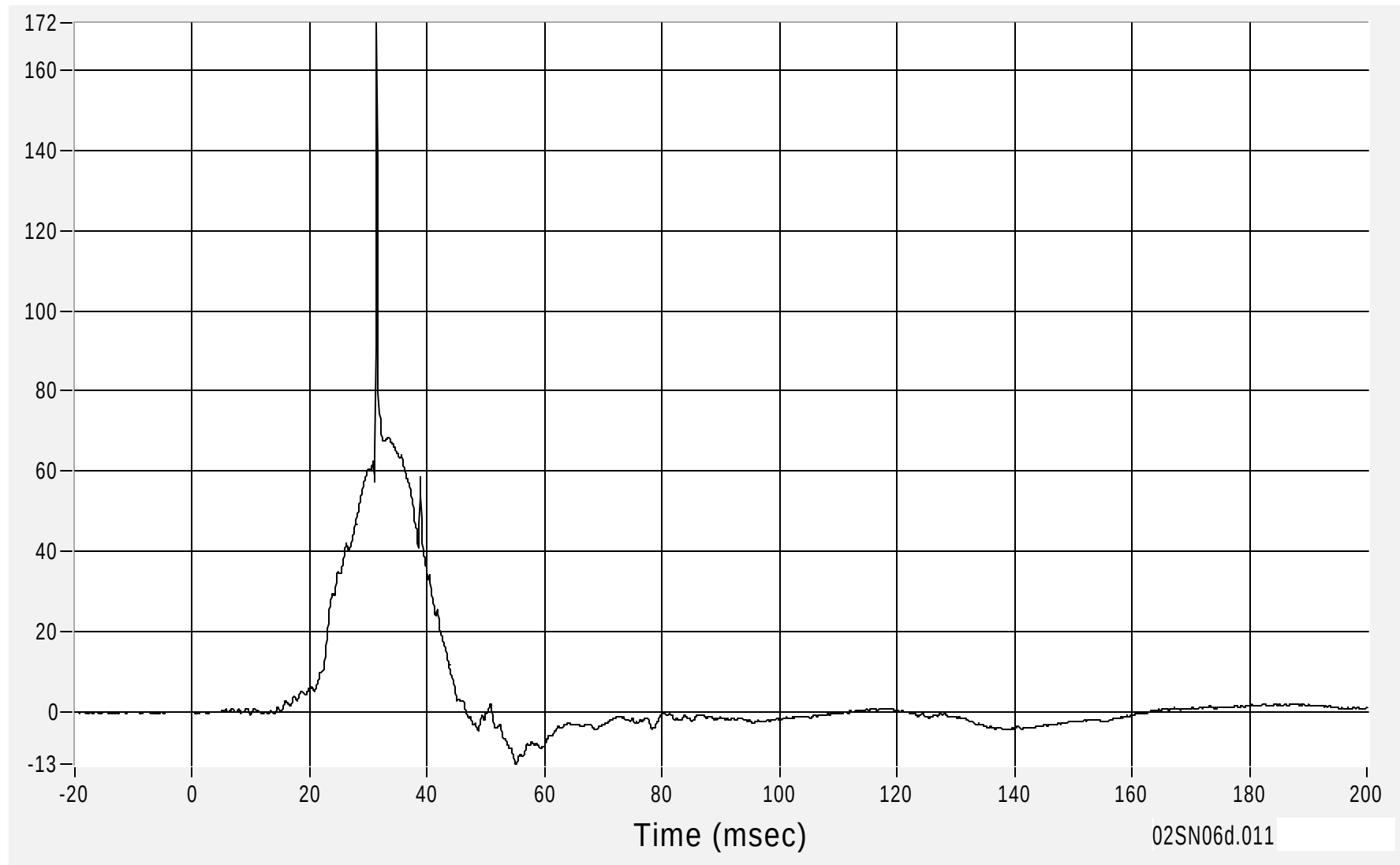
Driver Pelvic (Y) Acceleration - Redundant

Max 171.7 G's at 31.4 msec

Min -12.9 G's at 55.1 msec

Acceleration (G's) CFC1000

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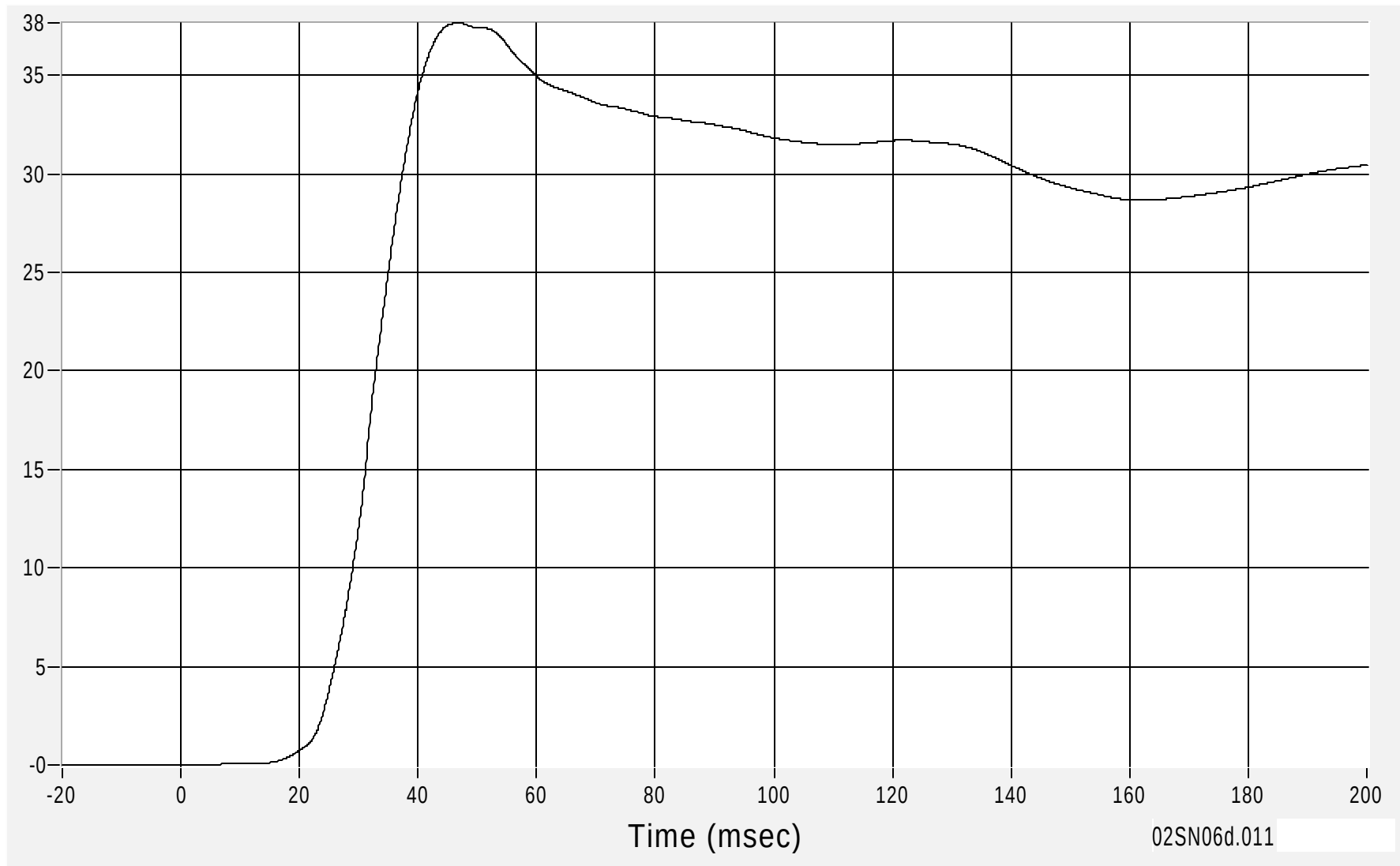
Driver Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 37.7 km/h at 46.7 msec

Min 0.0 km/h at 3.0 msec

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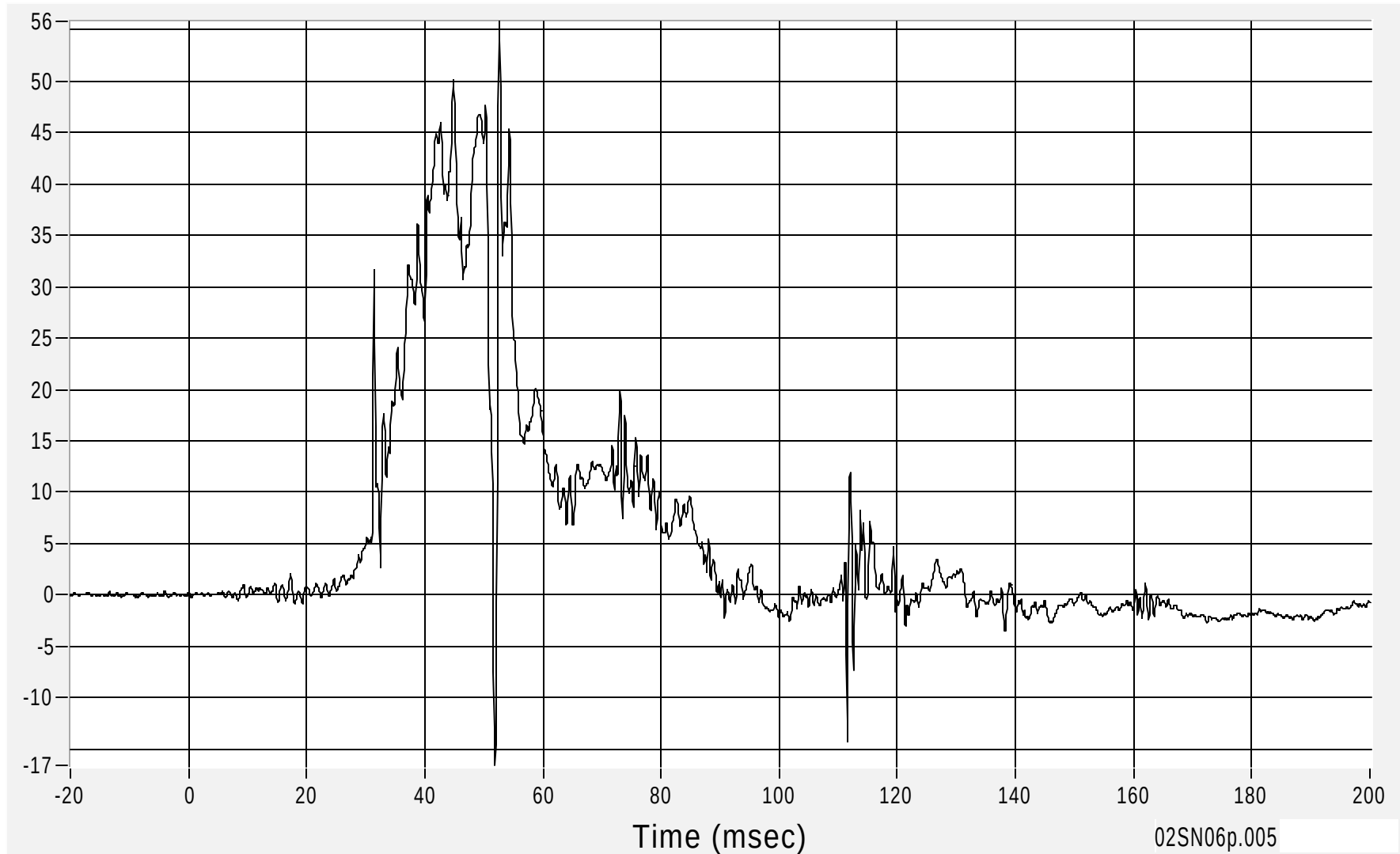
Passenger Upper Rib (Y) Acceleration - Redundant

Max 55.8 G's at 52.6 msec

Acceleration (G's) CFC1000

Min -16.6 G's at 51.9 msec

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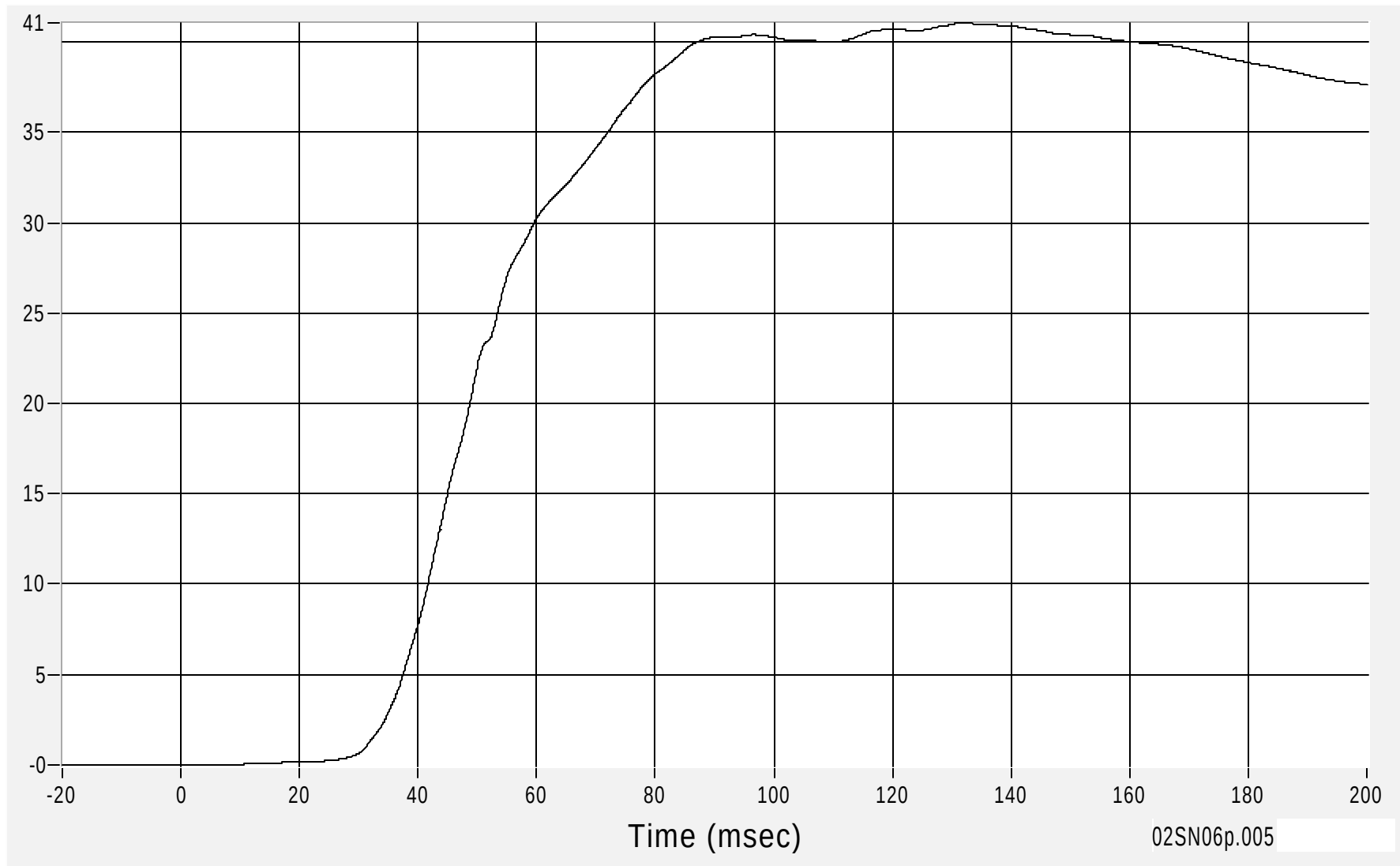
Passenger Upper Rib (Y) Velocity - Redundant

Max 41.1 km/h at 131.7 msec

Velocity (km/h) CFC180

Min 0.0 km/h at 0.6 msec

B-120



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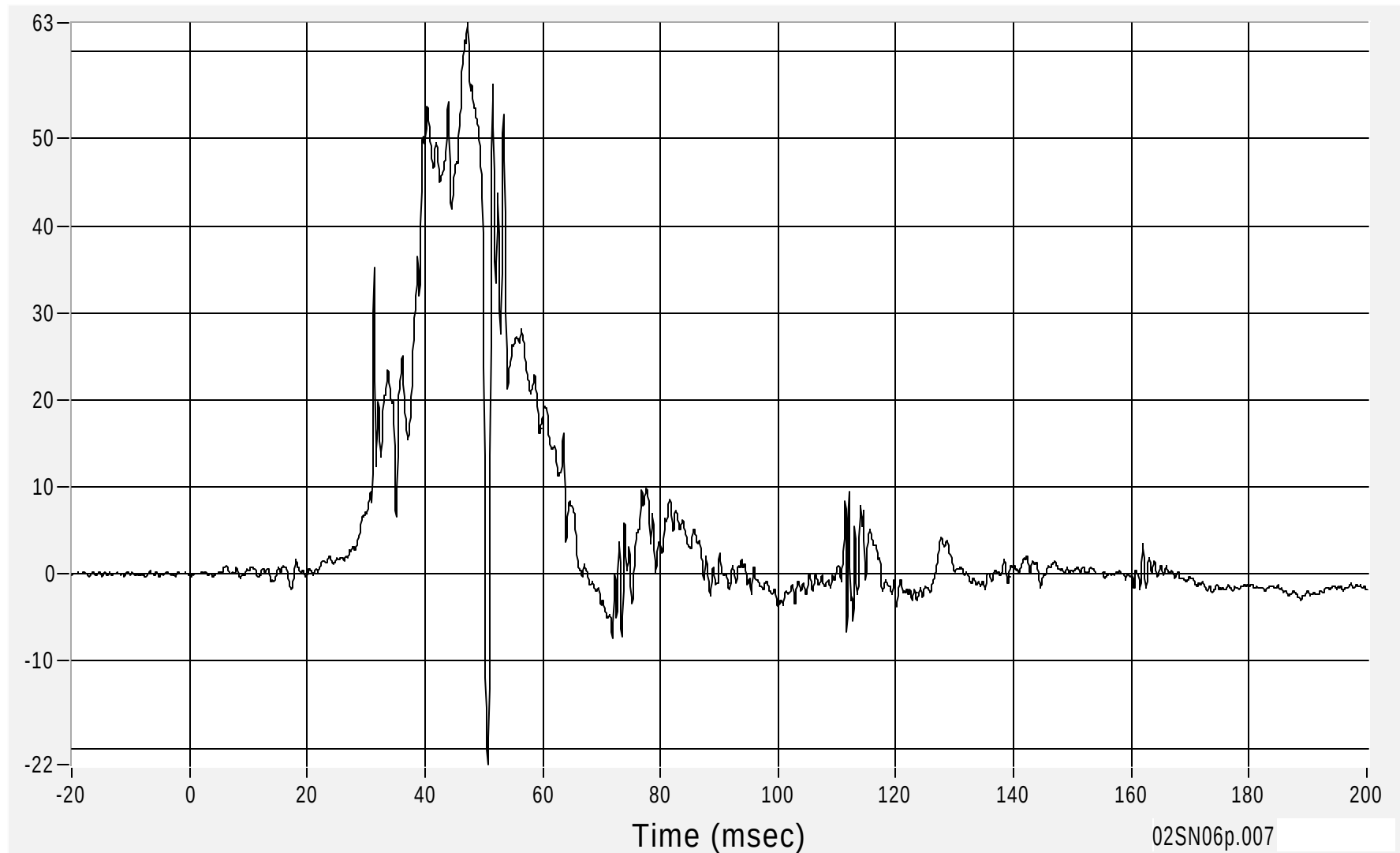
Passenger Lower Rib (Y) Acceleration - Redundant

Max 63.3 G's at 47.3 msec

Acceleration (G's) CFC1000

Min -21.9 G's at 50.6 msec

B-121



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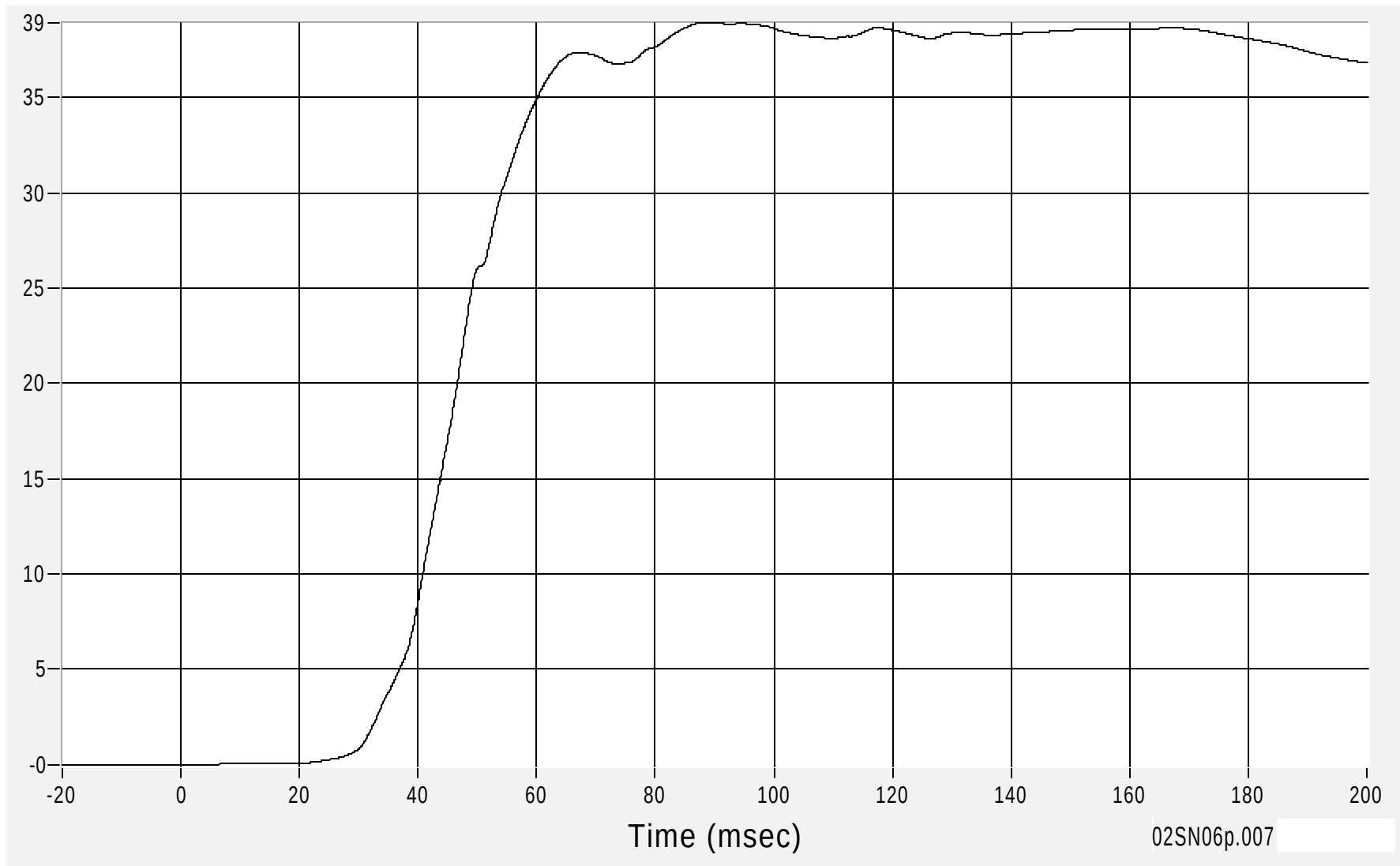
Passenger Lower Rib (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 38.9 km/h at 87.8 msec

Min 0.0 km/h at 4.5 msec

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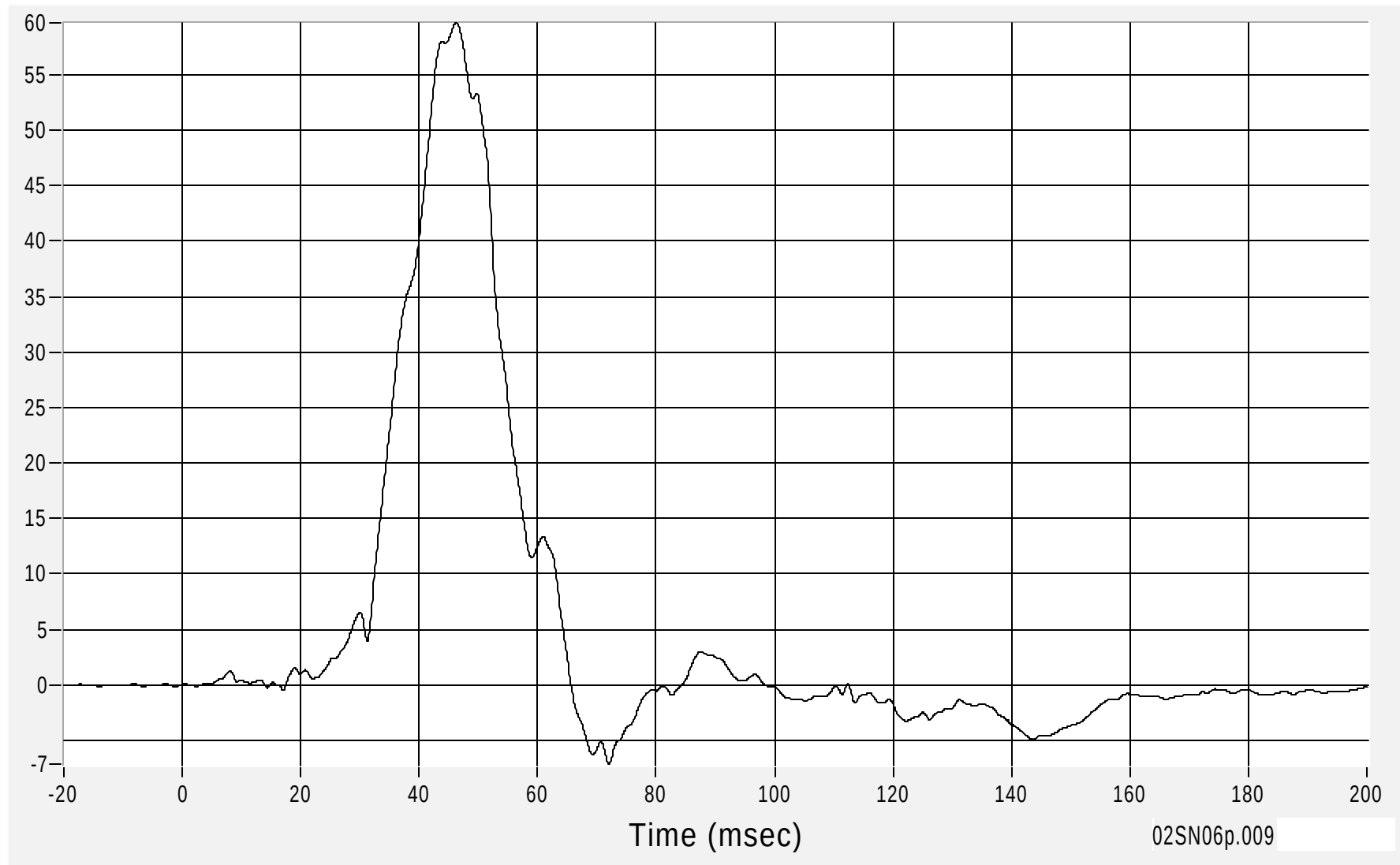
Passenger Lower Spine (Y) Acceleration - Redundant

Max 59.7 G's at 46.2 msec

Min -7.1 G's at 72.0 msec

Acceleration (G's) CFC180

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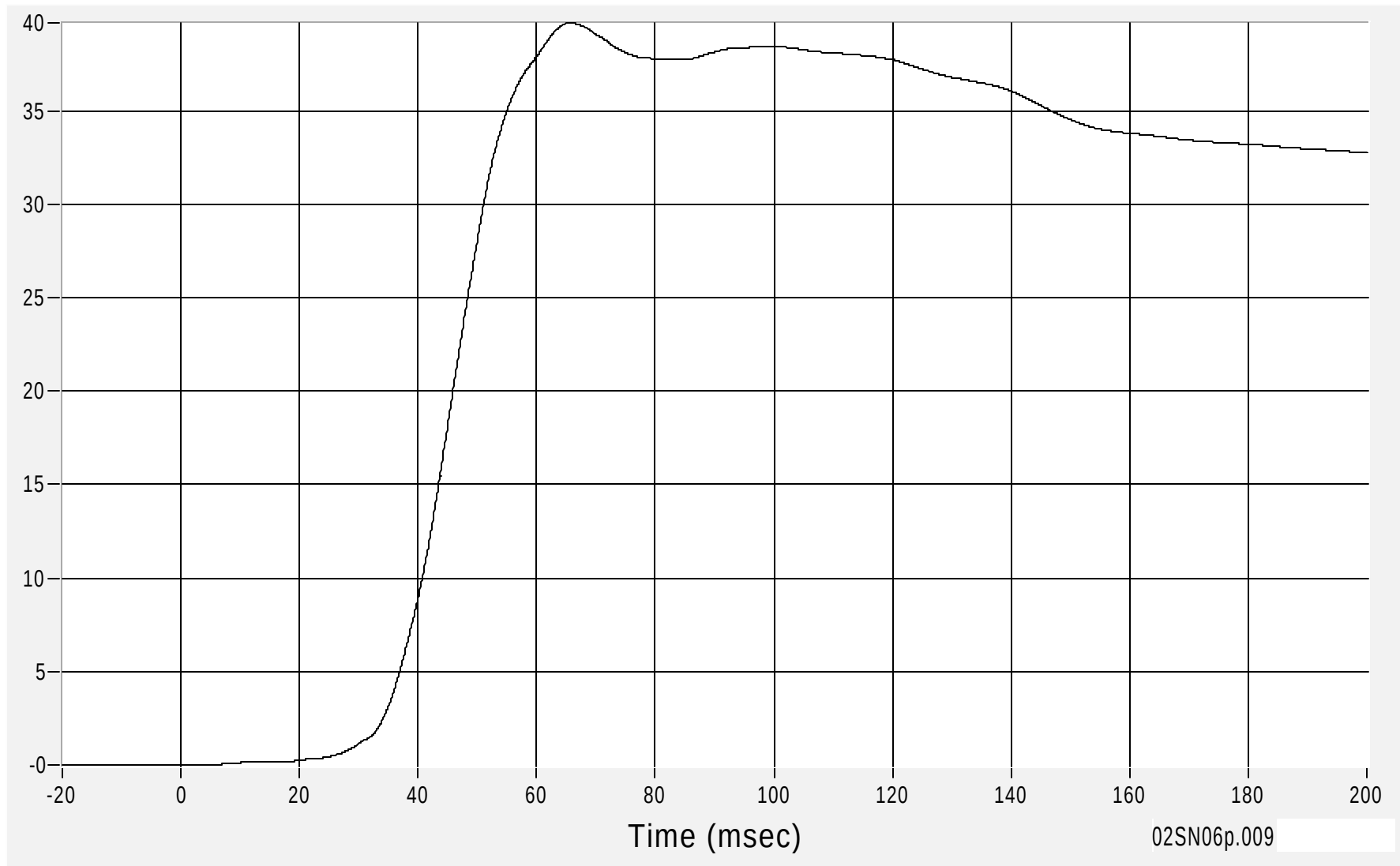
Passenger Lower Spine (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 39.7 km/h at 65.7 msec

Min 0.0 km/h at 3.3 msec

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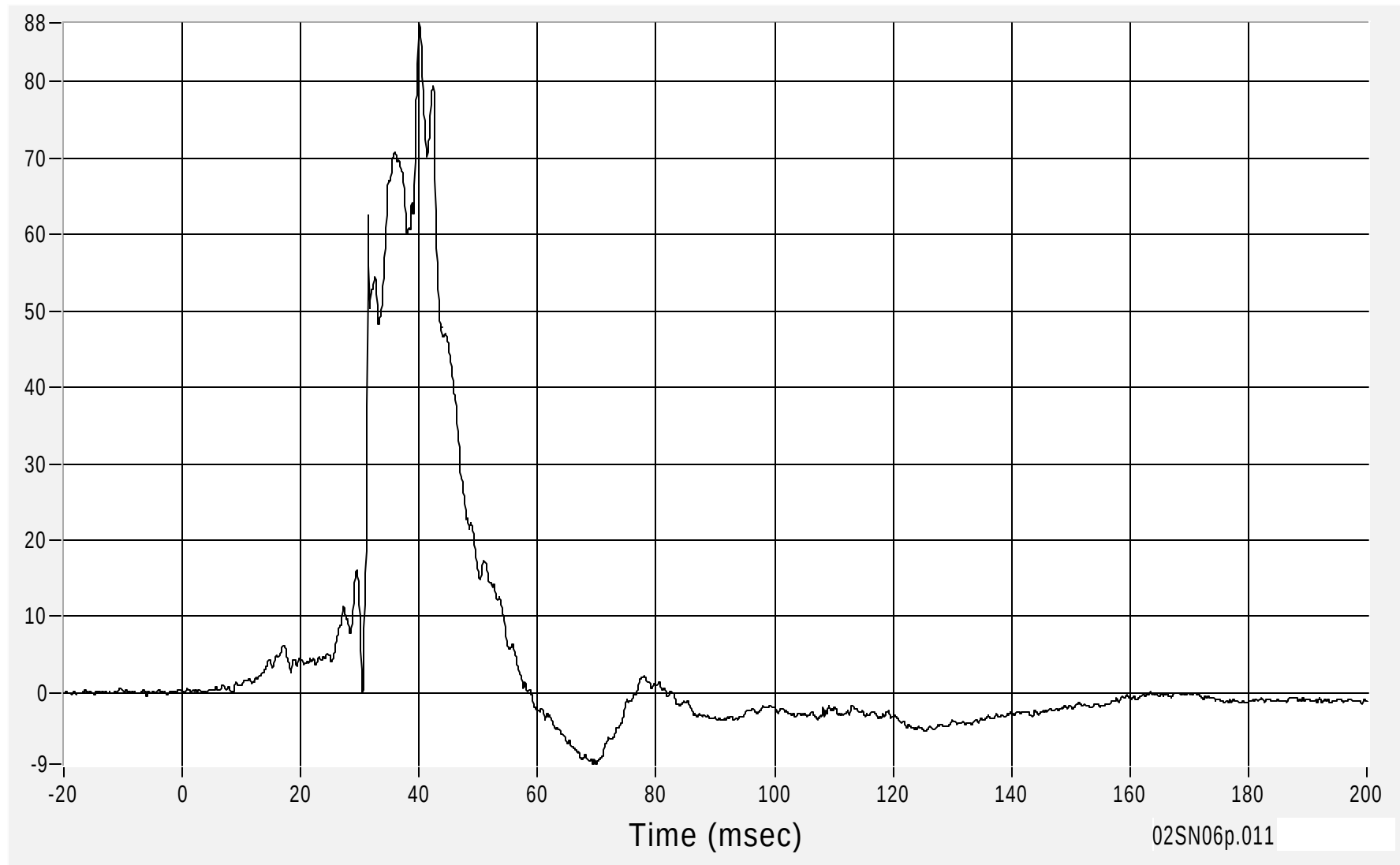
Passenger Pelvic (Y) Acceleration - Redundant

Max 87.7 G's at 40.0 msec

Acceleration (G's) CFC1000

Min -9.3 G's at 69.4 msec

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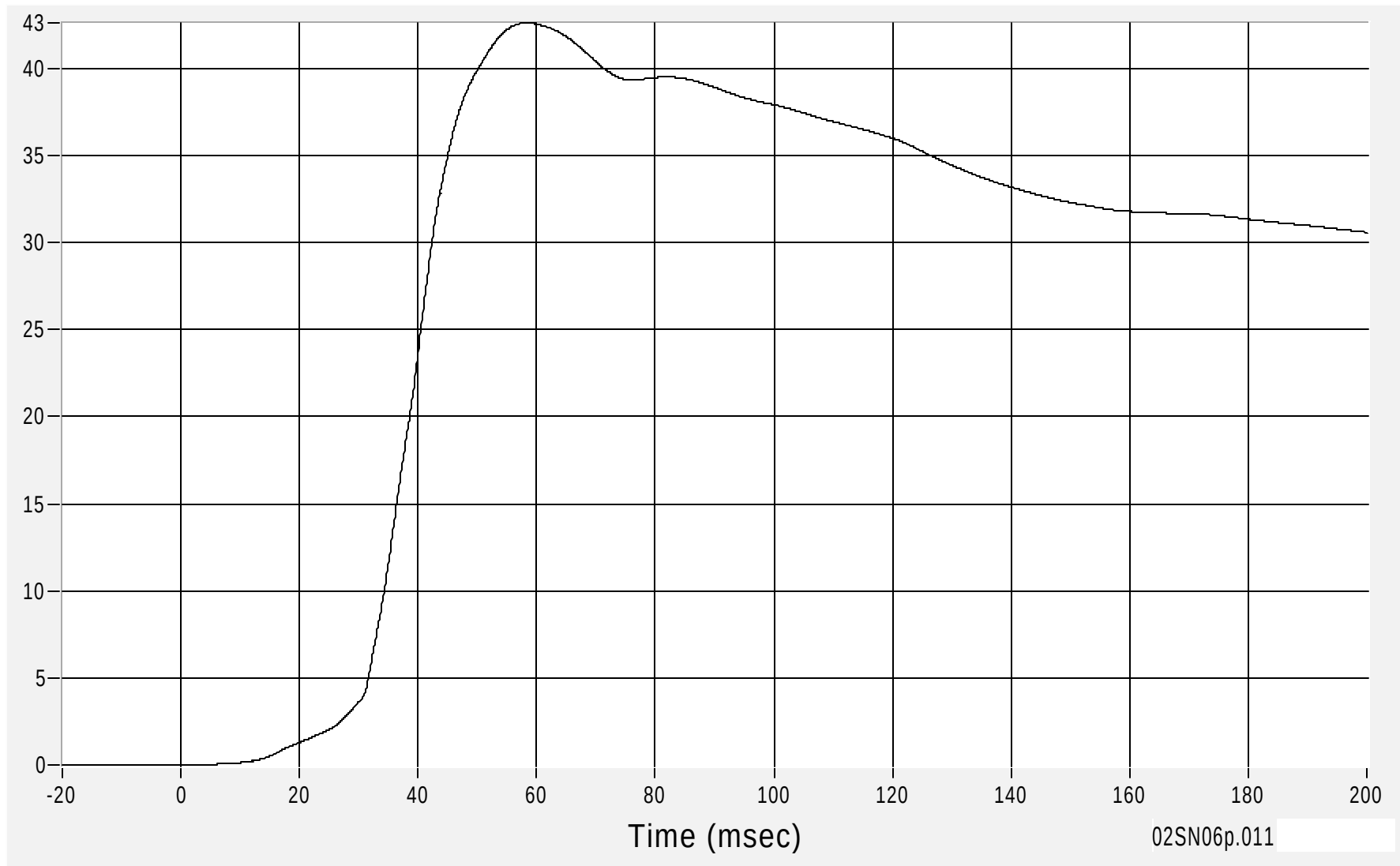
Passenger Pelvic (Y) Velocity - Redundant

Velocity (km/h) CFC180

Max 42.6 km/h at 58.5 msec

Min 0.0 km/h at 0.0 msec

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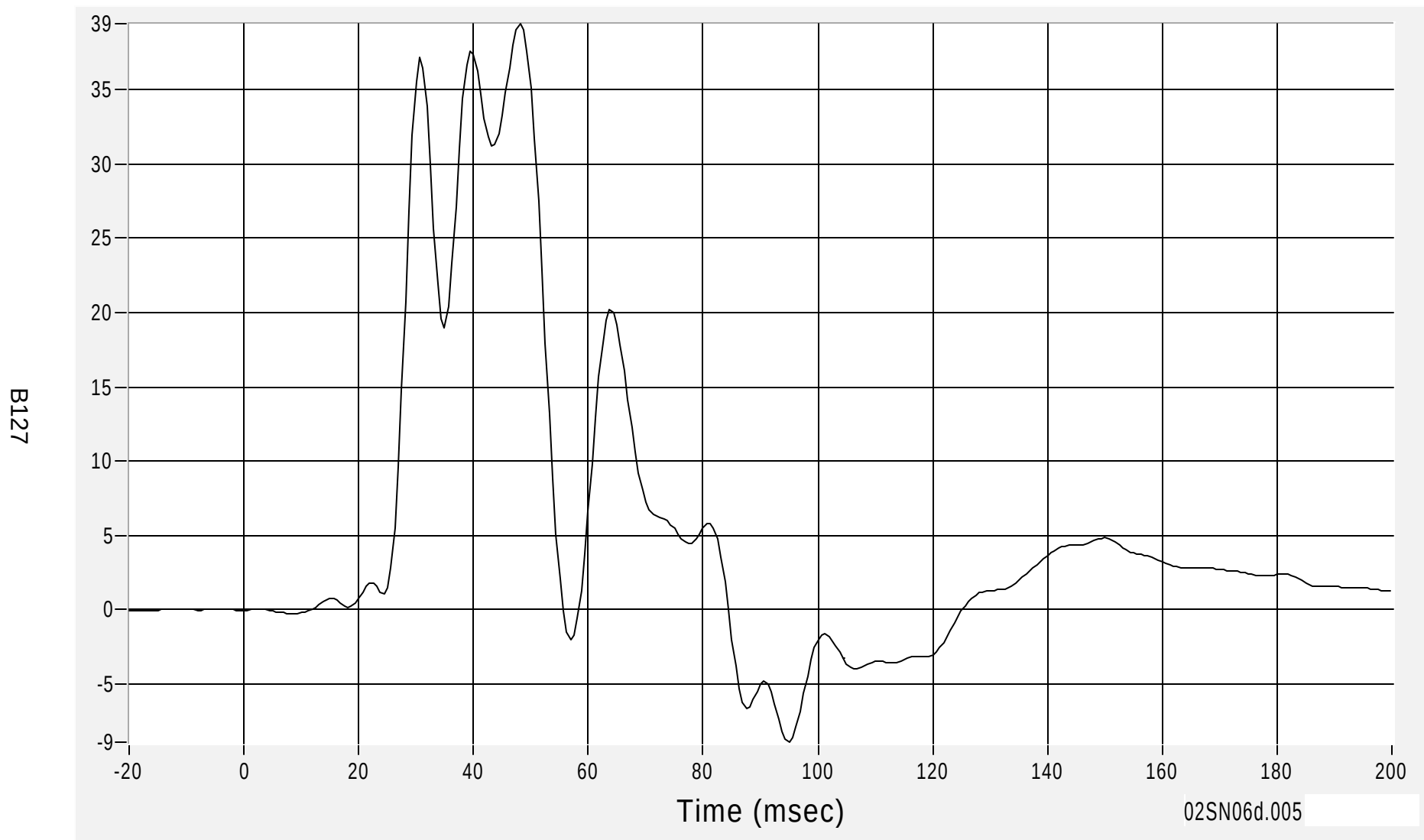
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Driver Upper Rib (Y) Acceleration - Redundant

Max 39.5 G's at 48.1 msec

Acceleration (G's) FIR100

Min -8.9 G's at 95.0 msec



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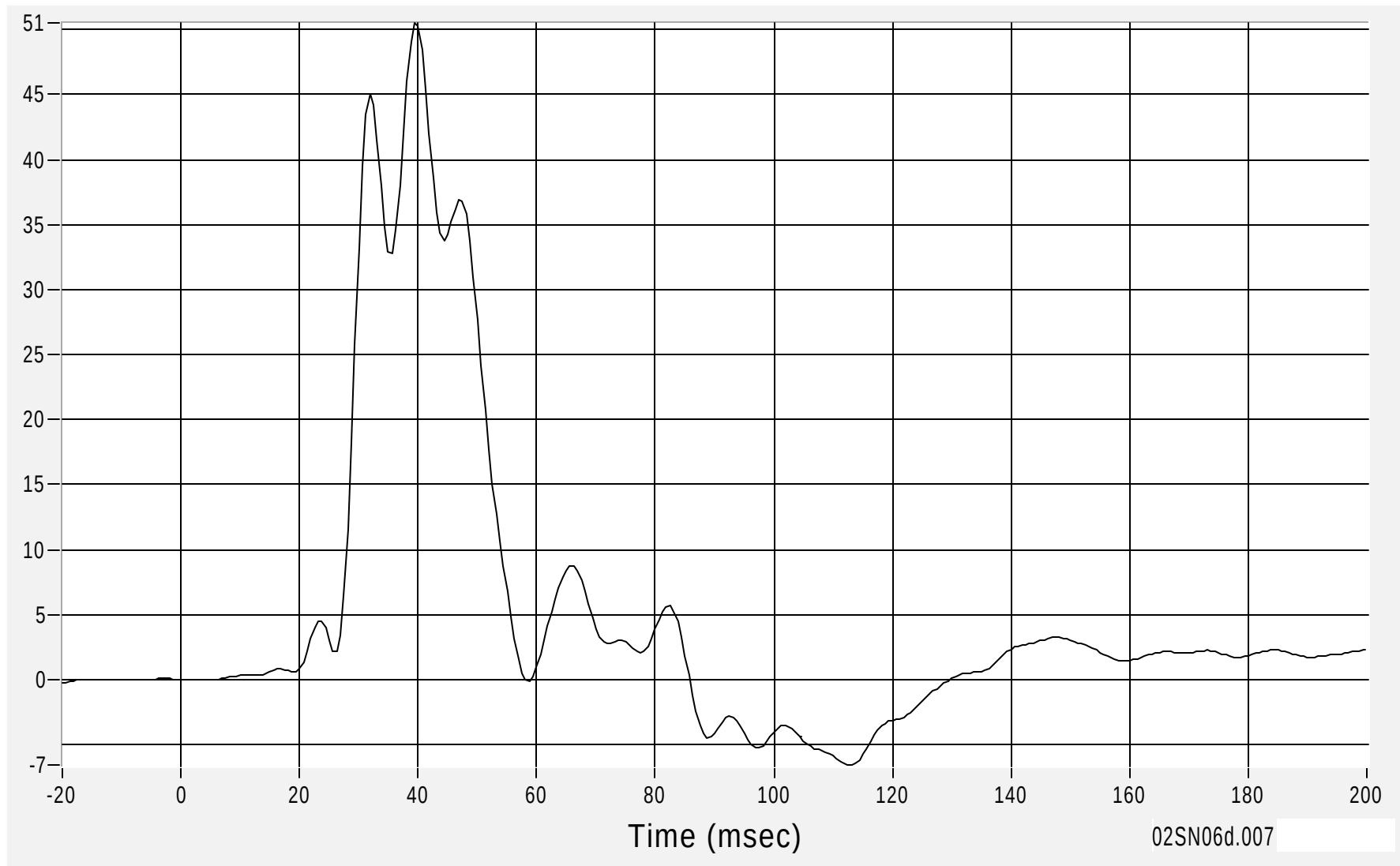
Driver Lower Rib (Y) Acceleration - Redundant

Max 50.5 G's at 39.4 msec

Acceleration (G's) FIR100

Min -6.6 G's at 112.5 msec

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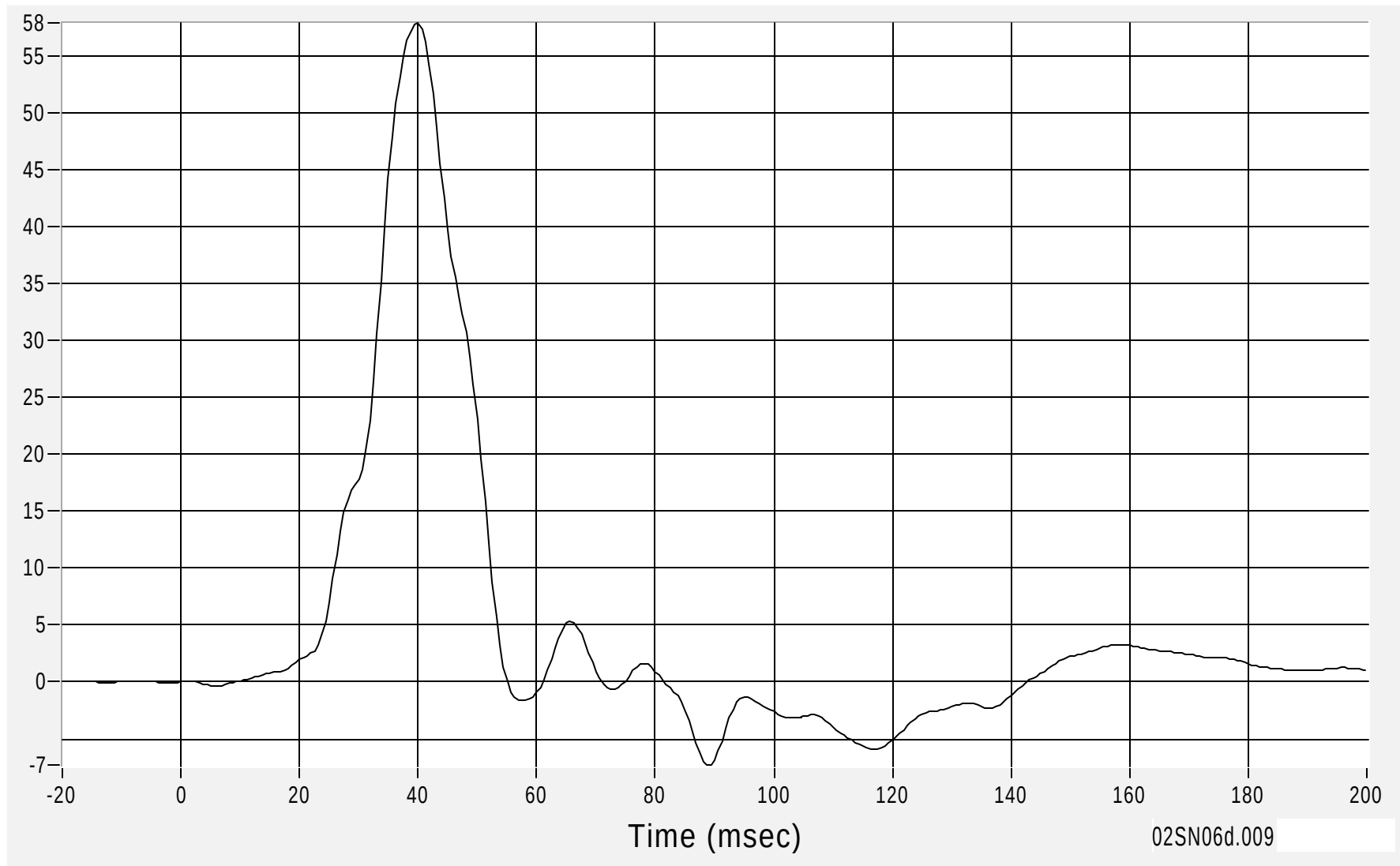
Driver Lower Spine (Y) Acceleration - Redundant

Max 57.9 G's at 40.0 msec

Acceleration (G's) FIR100

Min -7.3 G's at 88.8 msec

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11 April 2002

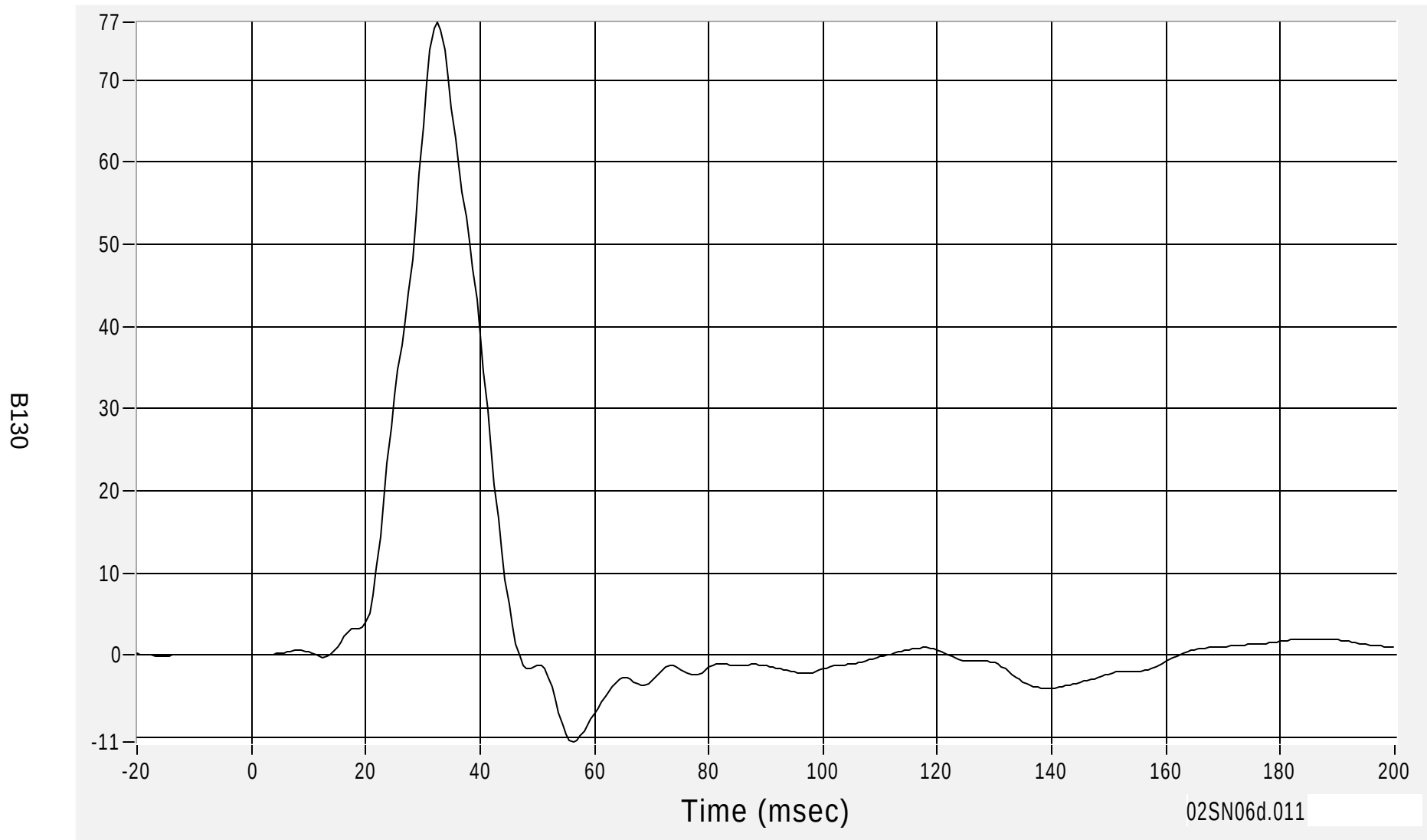
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Driver Pelvic (Y) Acceleration - Redundant

Max 77.0 G's at 32.5 msec

Acceleration (G's) FIR100

Min -10.6 G's at 56.2 msec



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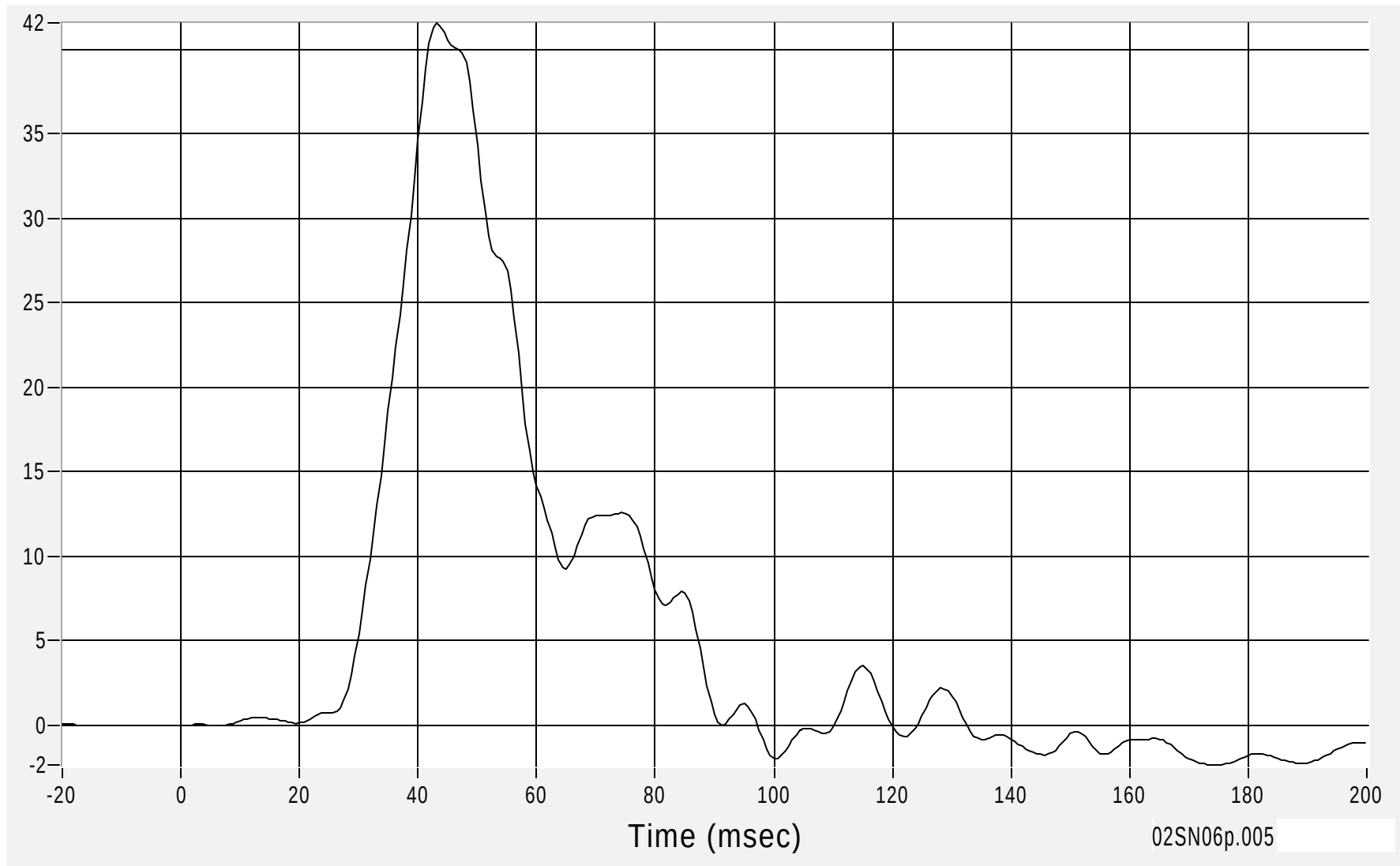
Passenger Upper Rib (Y) Acceleration - Redundant

Max 41.6 G's at 43.1 msec

Acceleration (G's) FIR100

Min -2.4 G's at 174.4 msec

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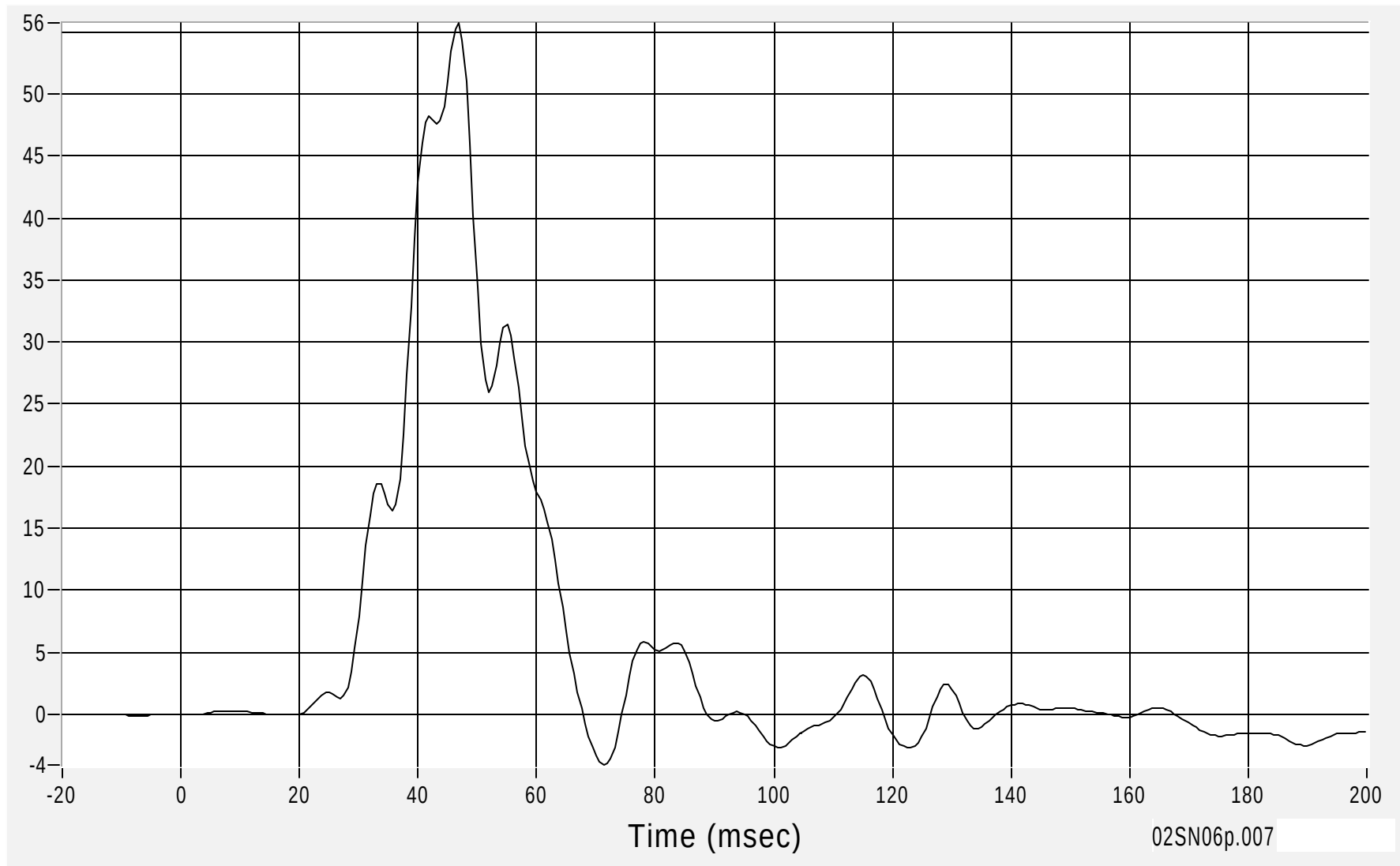
Passenger Lower Rib (Y) Acceleration - Redundant

Max 55.7 G's at 46.9 msec

Acceleration (G's) FIR100

Min -4.1 G's at 71.2 msec

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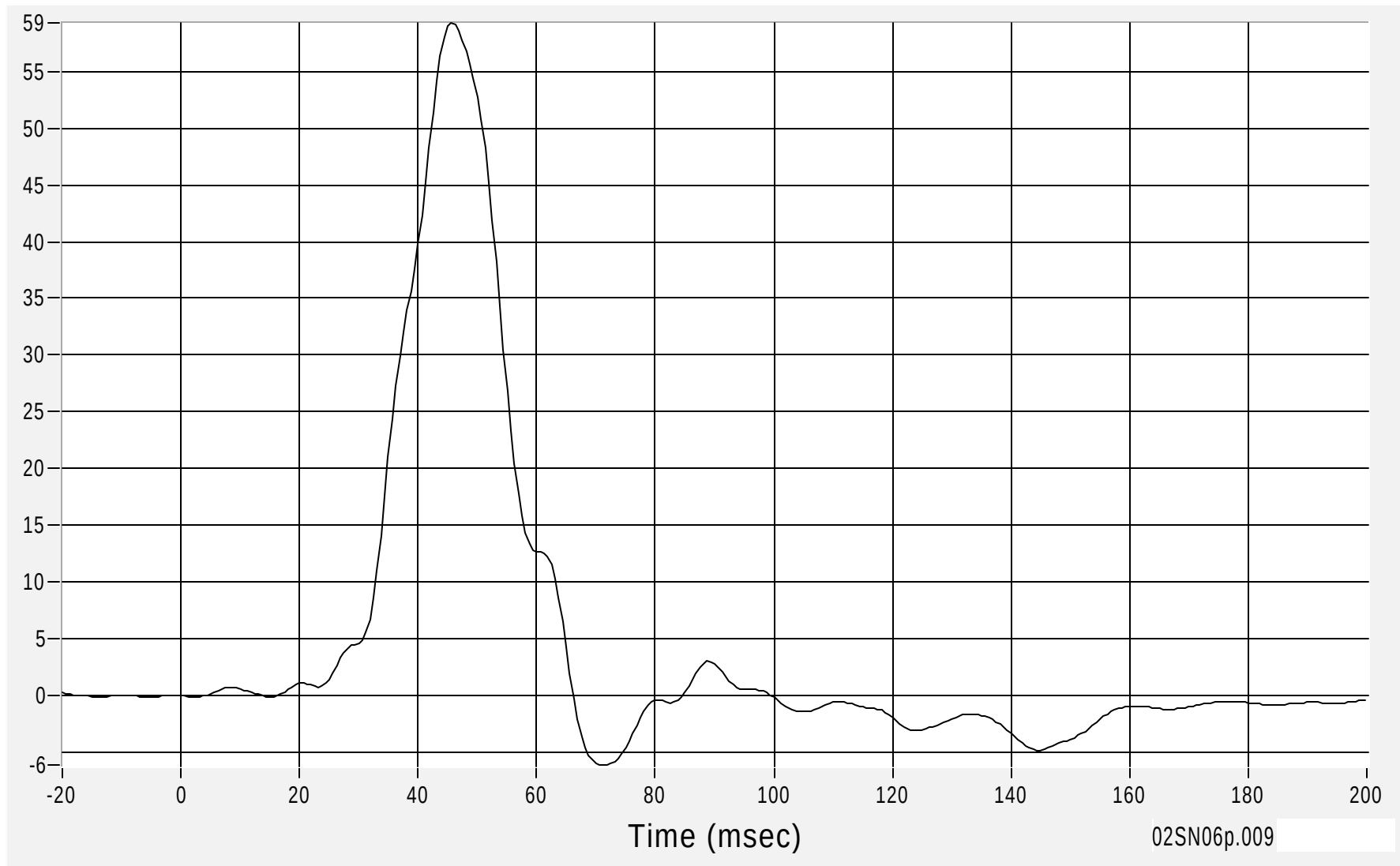
Passenger Lower Spine (Y) Acceleration - Redundant

Max 59.3 G's at 45.6 msec

Acceleration (G's) FIR100

Min -6.1 G's at 71.2 msec

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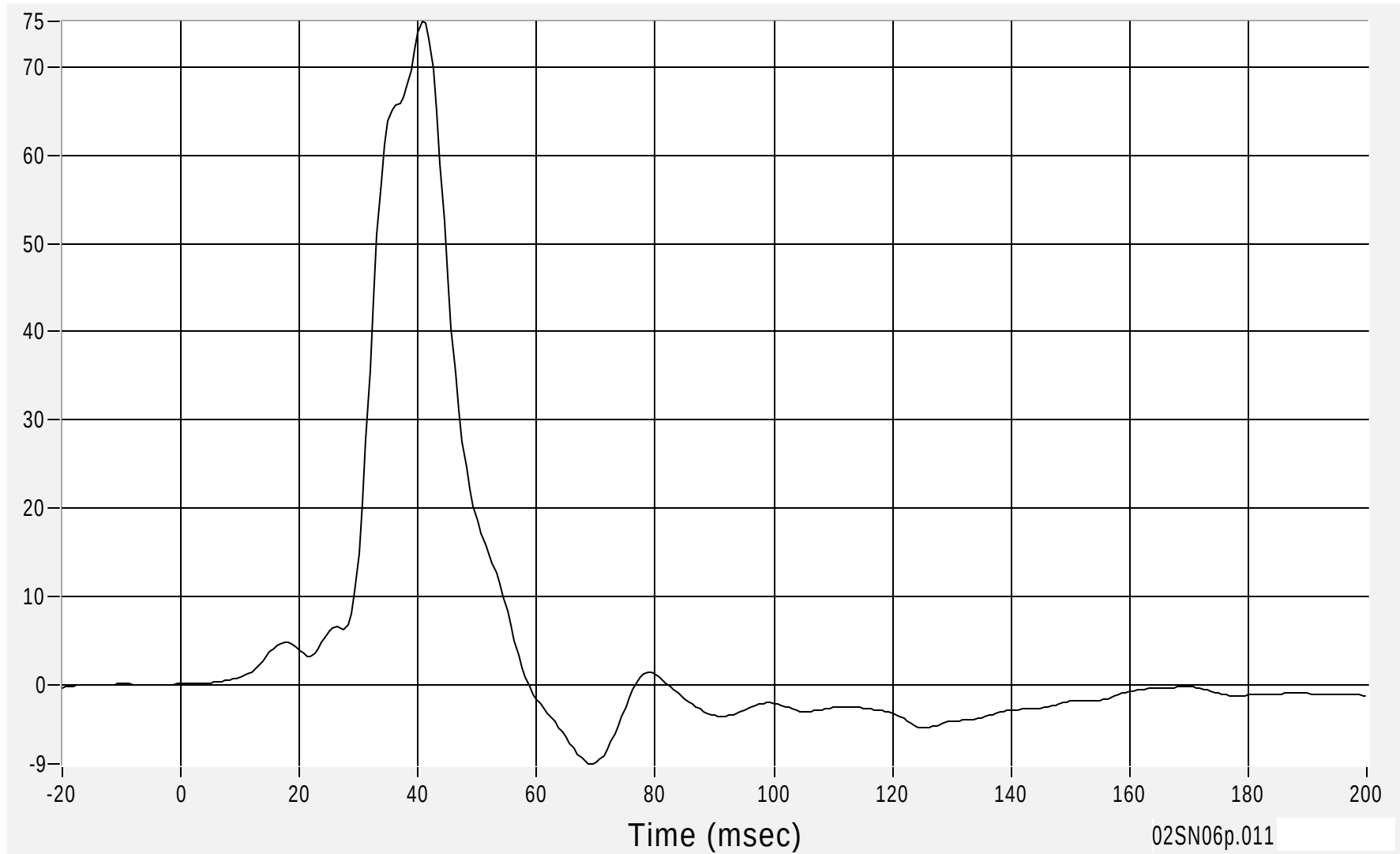
Passenger Pelvic (Y) Acceleration - Redundant

Max 75.2 G's at 40.6 msec

Acceleration (G's) FIR100

Min -9.0 G's at 69.4 msec

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APPENDIX C

SID CONFIGURATION AND VERIFICATION RESULTS

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VERIFICATION TEST RESULTS SUMMARY PRE AND POST TEST	Page No.
SUMMARY SID PRE AND POST VERIFICATION	C-3
DUMMY INSPECTION LIST PRE AND POST TEST	C-4
	C-5

**VERIFICATION TEST RESULTS SUMMARY
PRE AND POST TEST**

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056 Test Sequences 05 and 06

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mark Meyer		
LATERAL THORAX IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
ABDOMINAL COMPRESSION	Pass all requirements	Mark Meyer		
LUMBAR FLEXION	Pass all requirements	Mark Meyer		

SID Serial Number 058 Test Sequences 06 and 07

TEST	PRE		POST	
	COMMENTS	BY	COMMENTS	BY
EXTERNAL DIMENSIONS	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
THORACIC SHOCK ABSORBER TEST	Pass all requirements	Mark Meyer		
LATERAL THORAX IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
LATERAL PELVIS IMPACT TEST	Pass all requirements	Mark Meyer	Pass all requirements	Mark Meyer
ABDOMINAL COMPRESSION	Pass all requirements	Mark Meyer		
LUMBAR FLEXION	Pass all requirements	Mark Meyer		

SUMMARY
SID PRE AND POST VERIFICATION

CONFIGURED FOR LEFT SIDE IMPACT

SID Serial Number 056 and 058

Test Sequences

05 and 06 (056)

06 and 07 (058)

TEST PARAMETER	SPECIFICATION	056		058	
		PRE	POST	PRE	POST
MEASUREMENTS					
Date	-	08Apr02	12Apr02	08Apr02	12Apr02
Sequential Test Number	-	05	06	06	07
Temperature (°C)	18.9-25.5	22.1	23.0	22.1	23.0
Relative Humidity (%)	10-70	32	29	32	29
SH – Seated Height (mm)	889-909	906	901	903	901
RH – Rib Height (mm)	501-521	515	510	505	511
HP – Hip Pivot Height (mm)	99	99/99	99/99	99/99	99/99
RD – Rib From Back Line (mm)	229-241	232	229	229	229
KH – Knee Pivot from Back Line (mm)	511-526	525/520	516/516	521/517	521/517
KV – Knee Pivot to Floor (mm)	490-505	496/499	499/499	503/505	496/496
HW – Hip Width (mm)	356-391	371	365	356	357
THORAX IMPACTS					
Date	-	08Apr02	12Apr02	08Apr02	12Apr02
Sequential Test Number	-	05	06	06	07
Temperature (°C)	18.9-25.5	22.1	23.0	22.1	23.0
Relative Humidity (%)	10-70	32	29	32	29
Probe Speed (m/s)	4.21-4.33	4.26	4.28	4.26	4.28
Upper Rib Acceleration (G)	37-46	41.4	42.0	40.3	41.8
Lower Rib Acceleration (G)	37-46	39.3	40.3	37.8	39.3
Lower Spine Acceleration (G)	15-22	19.0	20.0	17.9	18.9
PELVIS IMPACTS					
Date	-	08Apr02	12Apr02	08Apr02	12Apr02
Sequential Test Number	-	05	06	05	07
Temperature (°C)	18.9-25.5	22.1	23.0	22.1	23.0
Relative Humidity (%)	10-70	32	29	32	29
Probe Speed (m/s)	4.21-4.33	4.26	4.28	4.26	4.28
Pelvis Acceleration (G)	40-60	54.7	45.5	43.7	43.0
THORACIC SHOCK ABSORBER					
Shock Absorber ID Number	-	486	-	03130164	-
Damper Setting	1-10	6	-	5	-
Date	-	14Feb02	-	14Feb02	-
Sequential Test Number	-	02	-	02	-
Temperature	18.9-25.5	22.5	-	22.5	-
Relative Humidity	10-70	30	-	30	-
Probe Speed (m/s) Low	3.05	3.05	-	3.05	-
Force (N)	836 – 1125	1065	-	850	-
Displacement (mm)	30 – 35	30.0	-	30.4	-
Probe Speed (m/s) Middle	4.27	4.27	-	4.27	-
Force (N)	1730 – 2099	1747	-	1739	-
Displacement (mm)	32 – 37	33.7	-	36.3	-
Probe Speed (m/s) High	6.10	6.10	-	6.10	-
Force (N)	3741 – 4448	4216	-	3928	-
Displacement (mm)	33 - 40	36.3	-	37.4	-

TEST PARAMETER	SPECIFICATION	056		058	
		PRE	POST	PRE	POST
ABDOMINAL COMPRESSION					
Date	-	22Feb02	-	22Feb02	-
Sequential Test Number	-	02	-	02	-
Temperature (°C)	18.9-25.5	20.8	-	20.8	-
Relative Humidity (%)	10-70	20	-	20	-
Force at 13 mm (N)	104-162	133	-	143	-
Force at 19 mm (N)	163-221	191	-	190	-
Force at 25 mm (N)	222-280	260	-	248	-
Force at 33 mm (N)	325-391	389	-	363	-
LUMBAR FLEXION					
Date	-	22Feb02	-	22Feb02	-
Sequential Test Number	-	02	-	02	-
Temperature (°C)	18.9-25.5	20.8	-	20.8	-
Relative Humidity (%)	10-70	20	-	20	-
Force at 0° (N)	0-26.7	10	-	0	-
Force at 0° (N)	97.8-151.2	154	-	140	-
Force at 0° (N)	151.2-204.6	180	-	183	-
Force at 0° (N)	204.6-258	230	-	240	-
Return Angle	12° Maximum	3.5	-	3.1	-

DUMMY INSPECTION LIST**PRE AND POST TEST****CONFIGURED FOR LEFT SIDE IMPACT**

SID Serial Number 056 and 058

Test Sequences

05 and 06 (056)

06 and 07 (058)

		SID 056		SID 058	
		PRE	POST	PRE	POST
	Date	08Apr02	12Apr02	08Apr02	12Apr02
	Performed By	Mark Meyer	Mark Meyer	Mark Meyer	Mark Meyer
PART	INSPECTION	Pass	Pass	Pass	Pass
Skin	Visual	Pass	Pass	Pass	Pass
Head	Visual, Ballast, Accelerometer Mount	Pass	Pass	Pass	Pass
Neck	Visual and Palpated, Cable Torque	Pass	Pass	Pass	Pass
Spine Box	Visual, Ballast, Weldment, Accelerometer Mount	Pass	Pass	Pass	Pass
Rib Cage	Visual, Palpated, Measured, Stiffness	Pass	Pass	Pass	Pass
Sternum	Visual	Pass	Pass	Pass	Pass
Lumbar Spine	Visual	Pass	Pass	Pass	Pass
Abdomen	Visual	Pass	Pass	Pass	Pass
Pelvis	Visual, Palpated, Accelerometer Mount	Pass	Pass	Pass	Pass
Upper Legs	Visual	Pass	Pass	Pass	Pass
Knees	Visual, Stops, Inserts	Pass	Pass	Pass	Pass
Lower Legs	Visual, Range of Motion	Pass	Pass	Pass	Pass
Ankles	Visual, Range of Motion	Pass	Pass	Pass	Pass
Feet	Visual, Range of Motion	Pass	Pass	Pass	Pass
Joints	1 to 2 G Range	Pass	Pass	Pass	Pass
Other		None	None	None	None

APPENDIX D

TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

TABLE OF CONTENTS

Section	Page No.
SID INSTRUMENTATION	D-3
VEHICLE INSTRUMENTATION	D-4
MDB INSTRUMENTATION	D-4

SID INSTRUMENTATION**FRONT SID NO. 058**

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X	J35932	ENDEVCO	14Nov01
HEAD Y	J36031	ENDEVCO	14Nov01
HEAD Z	J35641	ENDEVCO	14Nov01
UPPER RIB	J35839	ENDEVCO	14Nov01
LOWER RIB	J32665	ENDEVCO	14Nov01
LOWER SPINE	J35937	ENDEVCO	14Nov01
PELVIS	J36603	ENDEVCO	14Nov01
UPPER RIB REDUNDANT	J36617	ENDEVCO	14Nov01
LOWER RIB REDUNDANT	J32662	ENDEVCO	14Nov01
LOWER SPINE REDUNDANT	J36614	ENDEVCO	14Nov01
PELVIS REDUNDANT	J34364	ENDEVCO	14Nov01

REAR SID NO. 056

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
HEAD X	P22539	ENDEVCO	14Nov01
HEAD Y	P22318	ENDEVCO	14Nov01
HEAD Z	P22323	ENDEVCO	14Nov01
UPPER RIB	P13819	ENDEVCO	14Nov01
LOWER RIB	P13868	ENDEVCO	14Nov01
LOWER SPINE	P12746	ENDEVCO	14Nov01
PELVIS	P13598	ENDEVCO	14Nov01
UPPER RIB REDUNDANT	P13491	ENDEVCO	14Nov01
LOWER RIB REDUNDANT	P13835	ENDEVCO	14Nov01
LOWER SPINE REDUNDANT	P14274	ENDEVCO	14Nov01
PELVIS REDUNDANT	P13837	ENDEVCO	14Nov01

VEHICLE INSTRUMENTATION

	SERIAL NUMBER	MANUFACTURER	CALIBRATION DATE
RIGHT FRONT SILL X	P13869	ENDEVCO	14Nov01
RIGHT FRONT SILL Y	P23573	ENDEVCO	14Nov01
RIGHT FRONT SILL Z	P14233	ENDEVCO	14Nov01
RIGHT REAR SILL X	P22239	ENDEVCO	14Nov01
RIGHT REAR SILL Y	P22230	ENDEVCO	14Nov01
RIGHT REAR SILL Z	P23570	ENDEVCO	14Nov01
REAR FLOORPAN ABOVE AXLE X	P13846	ENTRAN	14Nov01
REAR FLOORPAN ABOVE AXLE Y	P22577	ENTRAN	14Nov01
REAR FLOORPAN ABOVE AXLE Z	P22912	ENTRAN	14Nov01
LEFT REAR SILL Y	J22189	ENDEVCO	14Nov01
LEFT FRONT SILL Y	J35768	ENDEVCO	14Nov01
LEFT FRONT DOOR CENTERLINE Y	B13158	ENDEVCO	14Nov01
RIGHT REAR OCCUPANT COMP Y	P22298	ENDEVCO	14Nov01
MID-REAR OF LEFT FRONT DOOR Y	B12777	ENDEVCO	14Nov01
LEFT FRONT DOOR UPPER C/L Y	B13036	ENDEVCO	14Nov01
MID-REAR OF LEFT REAR DOOR Y	P13842	ENDEVCO	14Nov01
LEFT REAR DOOR UPPER C/L Y	J36018	ENDEVCO	14Nov01
LEFT LOWER B-PILLAR Y	P23413	ENDEVCO	14Nov01
LEFT MIDDLE B-PILLAR Y	J21552	ENDEVCO	14Nov01
LEFT LOWER A-PILLAR Y	P22283	ENDEVCO	14Nov01
LEFT UPPER A-PILLAR	P13725	ENDEVCO	14Nov01
FRONT SEAT TRACK Y	J21367	ENDEVCO	14Nov01
REAR SEAT TRACK Y	P12825	ENDEVCO	14Nov01
VEHICLE CG X	P14223	ENDEVCO	14Nov01
VEHICLE CG Y	P23025	ENDEVCO	14Nov01
VEHICLE CG Z	P16867	ENDEVCO	14Nov01

MDB INSTRUMENTATION

MDB CG X	P19211	ENDEVCO	14Nov01
MDB CG Y	P23595	ENDEVCO	14Nov01
MDB CG Z	P19145	ENDEVCO	14Nov01
MDB REAR FRAME MEMBER X	P21151	ENDEVCO	14Nov01
MDB REAR FRAME MEMBER Y	P22978	ENDEVCO	14Nov01