R3049-005

REPORT NO. 212-MSE-84-005
301-MSE-84-005

DOT#703

NHTSA NEW VEHICLE ASSESSMENT AND STANDARDS ENFORCEMENT INDICANT TESTING FMVSS 212 & 301-75

CHRYSLER CORPORATION
1984 DODGE CARAVAN
NHTSA NO. CE0635

APRIL 1984

FINAL REPORT

Prepared Under Contract No. DTNH22-82-D-21140

For

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
Washington, D.C. 20590

BY

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Prepared by M. Poindexter

Approved by 05/07/84

Date

Report Accepted by:

TOM GRUBBS

Contract Technical Manager
Office of Vehicle Safety Compliance

MAY 09 1984

Date

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16. Abstract

A 35 mph frontal barrier impact assessment test was performed on the vehicle named below at the Mobility Systems and Equipment Co. Automotive Research Center in Mira Loma, California. This crash test was performed as part of the New Vehicle Assessment and Standards Enforcement Indicant Testing of

FMVSS NO. 212, "Windshield Mounting"
FMVSS NO. 301, "Fuel System Integrity"

for the Office of Vehicle Safety Compliance, Office of Market Incentives, Office of Vehicle Research, and National Center for Statistics and Analysis.

Veh. Yr./Make/Model - 1984 Dodge Caravan — Impact Speed -35.13 mph
Veh. Body Style - Van — Test Date -03/13/84
Veh. NHTSA I.D. NO. - CE0635 — Ambient Temp.-73 °F

The test vehicle appeared to comply with the following performance standards:

FMVSS 212 and 301.

The following FMVSS No. 208 Head Injury Data was generated during the crash:

Driver Dummy HIC = 973

Passenger Dummy HIC = 1200

17. Key Words	18. Distribution Statement
New Vehicle Assessment Stds. Enforcement Indicant Testing 35 mph Frontal Impact Testing 1984 Dodge Caravan	Copies Available From: Technical Ref. Division, NHTSA 400 Seventh St., S.W. Rm. 5108 Washington, D.C. 20590 Attn: B. Hornickle NAD-52

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TABLE OF CONTENTS

SECTION 1

INTRODUCTION

The test was conducted as part of the 1984 Composite Test Program being conducted for the National Highway Traffic Safety Administration (NHTSA) by Mobility Systems and Equipment Company (MSE) under Contract DTNH22-82-D-21140. The composite tests provide data for evaluation of FMVSS 212 and 301-75; occupant response, and vehicle acceleration environment, at impact speeds in excess of those specified in the current FMVSS requirements. The test was conducted in accordance with the NHTSA test procedure IP-212-02.

A summary of the test conditions is presented in Section 2, the FMVSS 212, 301 compliance data are presented in Section 3, the occupant data are presented in Section 4, and the vehicle data are presented in Section 5. All photographs are shown in Appendix A, results of ATD certification test data in Appendix B, test data plots in Appendix C, and the Owner's Manual Seat and Seatbelt Information in Appendix D.

SECTION 2

SUMMARY OF TEST CONDITIONS

A composite test was conducted on a 1984 Dodge Caravan, NHTSA No. CE0635 on 13 March 1984. The vehicle was impacted into a flat rigid load-cell barrier. The general test and vehicle descriptive information are presented in Table 1. The camera location data are presented in Table 2 and Figure 1. (The list of measurements recorded during the test is presented in Table 3.) Pretest and posttest photographs of the vehicle and occupants are presented in Appendix A.

Two certified (see Appendix B) fully instrumented Part 572, 50th percentile male anthropomorphic test devices (ATD's) were installed in the driver and right front passenger designated seating positions (DSP's). The ATD's were restrained with the standard production 3-point lap and shoulder belt system.

The test event was photographed with one real-time camera, and 16 high-speed cameras. All of the cameras functioned properly.

Sixty-four channels of data were recorded on six FM tape recorders. One data channel, the acceleration of the bottom of the engine block, was lost due to a transducer mount breaking. Time history plots of all recorded channels and appropriate resultants, and HIC and chest peak acceleration values are presented in Appendix C.

TABLE 1 - CRASH TEST SUMMARY

PROJECT: FY-84 Composite Test Program TEST NO. N07054

DATE: 03/13/84 TIME: 3:04 PM TEMP. 73 °F

VEHICLE	Dodge Caravan
TEST WEIGHT (lbs)	3,791
IMPACT ANGLE (deg)	0
IMPACT VELOCITY (mph)	35.13
MAX. CRUSH (in)	23 5/16
FIREWALL INTRUSION (in)	Right Side: 2 1/8 Left Side: 2

ATD'S

TYPE	Part 572 50th Percentile Male	Part 572 50th Percentile Male
LOCATION	Left Front	Right Front
RESTRAINT	Production 3-Point Restraint	Production 3-Point Restraint

NUMBER OF DATA CHANNELS	64
NUMBER OF HIGH SPEED CAMERAS	16
BARRIER	Load Cell

TABLE 2 SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS

Loc. No.	Location	Field of View	Lens Size	Frame Rate	Timing Speed	Mfg./ Serial Number	Impact Dist-X	Center-line Dist-Y	Camera Height	Film Quality
1	Ground Based (left)	Left Side (documentary)	Zoom	24 fps	None	Arriflex NR6837	528	-553	58 1/2	Good
2	Ground Based (right)	Right Side	12 mm	489 fps	None	Fastax 1250	91 1/2	244 1/2	53	Good
3	Ground Based (left)	Left Side Front Half	50 mm	683 fps	120 Hz	Fastax 41650	50	66	50 3/4	Good
4	Above Windshield	Windshield	13 mm	425 fps	120 Hz	Fairchild 276	29	0	100	Good
5	Pit	Front of Vehicle Underside	13 mm	500 fps	1000 Hz	Photosonic 45	12	0	-49	Good
6	Pit	Fuel Tank	25 mm	567 fps	None	Photosonic 573	35	0	-57	Good
7	Above Barrier	Windshield Passenger Side	25 mm	670 fps	None	Fastax 16-332	- 9	10 1/2	109	Good
8	Above Barrier	Windshield Driver Side	25 mm	1442 fps	120 Hz	Fastax 16-421	- 9	- 10 1/2	109	Good
9	Ground Based (left)	Driver	35 mm	593 fps	120 Hz	Fairchild 283	176	-221	62 1/2	Good
10	Ground Based (right)	Passenger	28 mm	696 fps	1000 Hz	Himac 143	112	132 1/2	88 1/4	Good

TABLE 2 SUMMARY OF CAMERA LOCATIONS AND DESCRIPTIONS (CONT'D.)

Loc. No.	Location	Field of View	Lens Size	Frame Rate	Timing Speed	Mfg./ Serial Number	Impact Dist-X	Center-line Dist-Y	Camera Height	Film Quality
11	Ground Based (right)	Right 'A' Post	20 mm	773 fps	None	Himac 138	40	126 1/2	51 1/2	Good
12	Ground Based (left)	Left 'A' Post	25 mm	280 fps	120 Hz	Fastax 641	39	-174	35 1/4	Good
13	On Board	Driver Belt	13 mm	570 fps	None	Fairchild 305	125	7 3/4	27	Good
14	On Board	Passenger Belt	13 mm	750 fps	None	Fairchild 141	125	- 7 3/4	27	Good
15	Ground Based (left)	Steering Wheel	25 mm	593 fps	120 Hz	Fairchild 345	123	-306	90	Good
16	Ground Based (left)	Steering Wheel	25 mm	721 fps	120 Hz	Fairchild 219	123	-306	71	Good
17	Ground Based (right)	Passenger	16 mm	644 fps	1000 Hz	Himac 135	73	142	52	Good

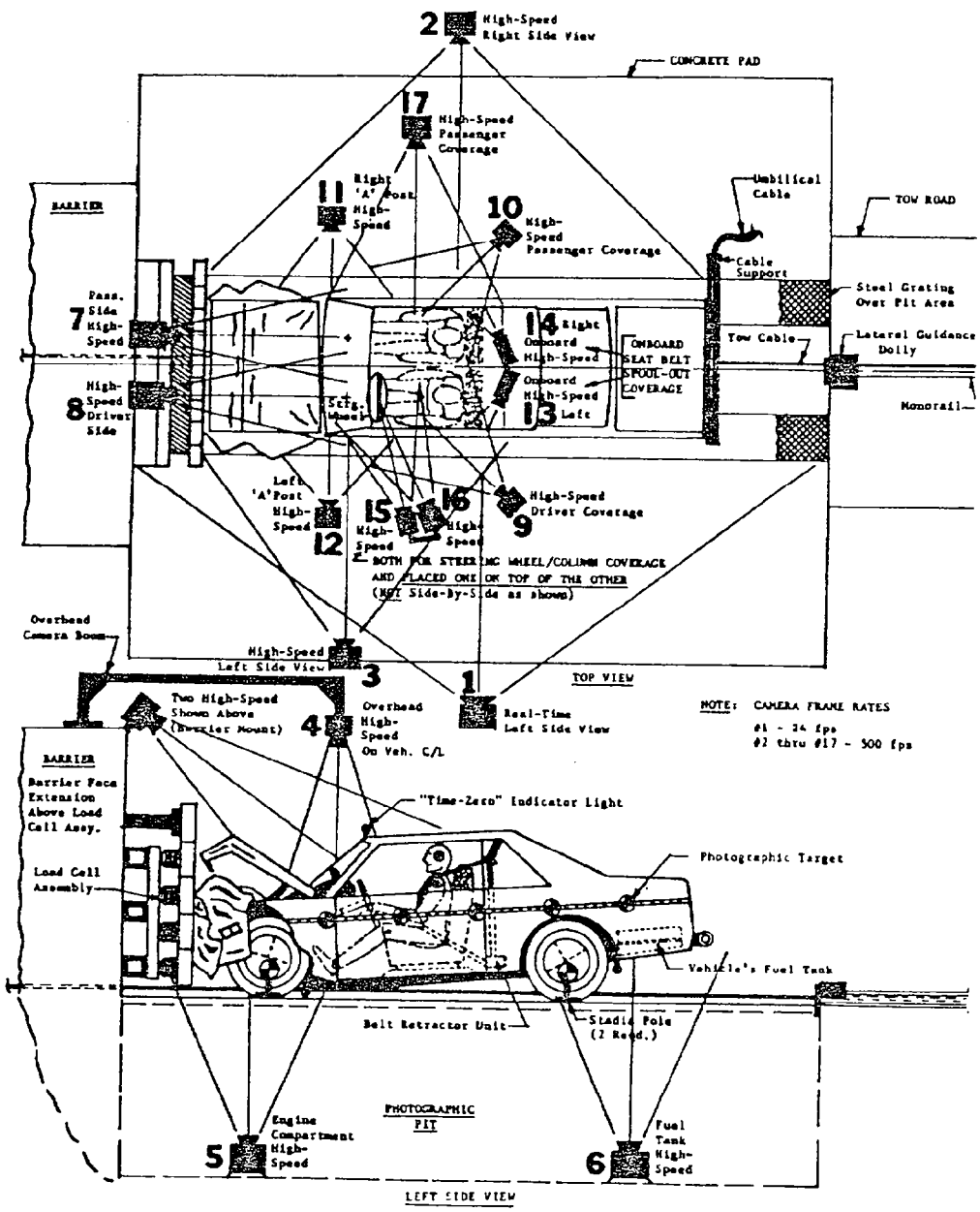


FIGURE 1

CAMERA LOCATIONS

TABLE 3 MEASUREMENT SYSTEM CHANNEL DESIGNATION

DIGITAL TAPE CHANNEL NO.	SENSOR	CHANNEL DESCRIPTION	DATA QUALITY
01	AC	DR HED X	Good
02	AC	DR HED Y	Good
03	AC	DR HED Z	Good
04	AC	DR CST X	Good
05	AC	DR CST Y	Good
06	AC	DR CST Z	Good
07	AC	PA HED X	Good
08	AC	PA HED Y	Good
09	AC	PA HED Z	Good
10	AC	PA CST X	Good
11	AC	PA CST Y	Good
12	AC	PA CST Z	Good
13	LC	DR FEMUR L	Good
14	LC	DR FEMUR R	Good
15	LC	PA FEMUR L	Good
16	LC	PA FEMUR R	Good
17	LC	DR LBO	Good
18	LC	DR SHB	Good
19	LC	PA LBO	Good
20	LC	PA SHB	Good
21	AC	VEH. BCL X	Good
22	AC	VEH. BCR X	Good
23	AC	VEH. ENG. TOP X	Good
24	AC	VEH. ENG. BOT. X	Invalid After 50ms
25	AC	VEH. RFF X	Good
26	AC	VEH. LRF X	Good
27	DT	DR SHB	Good
28	DT	PA SHB	Good
29-64	LC	BA	Good

2.1 GENERAL COMMENTS

The 1984 Dodge Caravan was equipped with a 2.6 liter 4 cylinder engine, 3 speed automatic transmission, power steering, and air conditioning. The test weight of the Dodge Caravan with two 50th percentile male dummies and instrumentation was 3,791 pounds.

The Dodge Caravan was involved in a frontal load cell barrier crash at a velocity of 35.13 mph. The vehicle appears to comply with FMVSS No. 212, "Windshield Mounting", and FMVSS No. 301-75, "Fuel System Integrity". There was 98% windshield retention, no fuel leakage after impact or during the subsequent rollover test.

A maximum static crush for the vehicle of 23 5/16 inches occurred at the center of the front bumper. The windshield was cracked. All other vehicle glazing remained intact. The doors were opened without the use of tools. There was very little exterior deformation aft of the 'A' pillars. The dash panel was pushed inward and upward.

The driver ATD's head hit the steering wheel hub and lower rim. His knees hit the dash panel. The driver ATD HIC value of 973, maximum chest acceleration (resultant clipped) of 43.8 g, and maximum femur loads of 457 and 864 pounds satisfy the FMVSS No. 208 requirements.

The passenger ATD's head did not appear to make contact with any part of the vehicle. His knees hit the dash panel. The HIC value for the passenger ATD of 1200 does not meet the requirements of FMVSS No. 208, "Head Injury Criteria". His maximum chest acceleration (resultant clipped) of 42.4 g, and maximum femur loads of 546 and 304 pounds satisfy the FMVSS No. 208 requirements.

Seat belt spoolouts as measured with a linear potentiometer attached to the shoulder belt between the retractor and D-ring were 3.0 inches for the driver, and 2.1 inches for the passenger. High speed films of the shoulder belt spoolouts showed that the driver's belt pulled out 3 inches, and the passenger's belt 2 1/2 inches before the camera's view of the belt was blocked by the seatback.

SECTION 3

COMPLIANCE DATA

FMVSS 212, 301-75

Compliance data for FMVSS No.'s 212 and 301-75 were acquired during the test. The results are presented in Tables 4 and 5.

TABLE 4 SUMMARY OF FMVSS 212 DATA

TEST VEHICLE NHTSA NO. CE0635 TEST DATE: 03/13/84

VEH. MFR/MAKE/MODEL Chrysler Corp./Dodge/Caravan

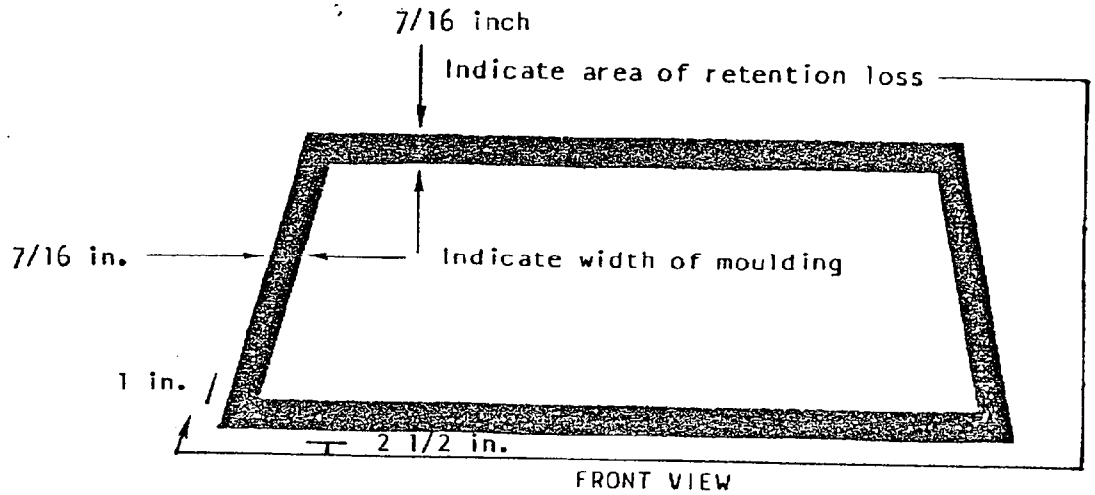
Details of windshield mounting (method of retention, type of trim, etc.)

Windshield is bonded to a rubber perimeter moulding with adhesive. The top and sides of the windshield are surrounded by a rubber moulding.

	WINDSHIELD PERIPHERY	
	PRETEST	POSTTEST
RIGHT SIDE	82 1/2 inches	81 1/4 inches
LEFT SIDE	82 inches	79 1/2 inches
TOTAL	164 1/2 inches	160 3/4 inches

The standard requires that POSTTEST be a minimum of 75 percent of the PRETEST total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles which are equipped with occupant passive restraints.

AREA OF RETENTION FAILURE:



FRONT VIEW

TABLE 5 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET

TEST VEHICLE NHTSA NO. CE0635 TEST DATE 03/13/84

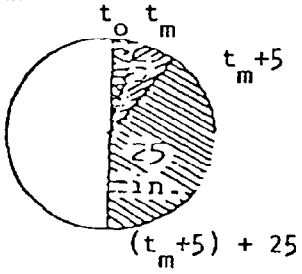
VEH. MFR/MAKE/MODEL Chrysler Corp./Dodge/Caravan

Test vehicle fuel tank filled to 90-95% of capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

A. TEST VEHICLE IMPACT TYPE

- [X] Frontal (35 mph)
- [ ] Oblique (35 mph) with ° barrier face first contacting (driver/passenger) side
- [ ] Rear Moving Barrier (35 mph)
- [ ] Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT



1. From impact until vehicle motion ceases - - - - - -
2. For 5 minute period after veh. motion ceases - - -
3. For next 25 minutes - - -

ACTUAL	MAX. ALLOW.
0	1 oz.
0	5 oz.
0	1 oz/1 min.

B. TEST VEHICLE STATIC ROLLOVER

Detail test results are recorded on the following data sheets:

(1) Rollover data for 0° to 90° test phase.

(2) Rollover data for 90° to 180° test phase.

(3) Rollover data for 180° to 270° test phase.

(4) Rollover data for 270° to 360° test phase..

C. SOLVENT SPILLAGE DETAILS

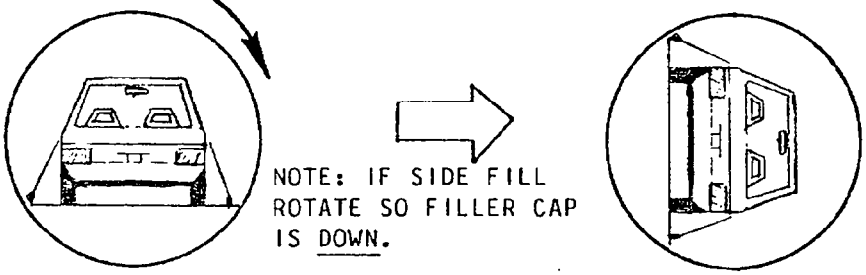
None.

TABLE 5 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT'D.)

TEST VEHICLE NHTSA NO. CE0635 TEST DATE 03/13/84

VEH. MFR/MAKE/MODEL Chrysler Corp./Dodge/Caravan

TEST PHASE: 0° 90°



NOTE: IF SIDE FILL ROTATE SO FILLER CAP IS DOWN.

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	= 1	minutes	2 0	seconds
FMVSS 301-75 Position Hold Time	= 5	minutes	0 0	seconds
	+			
TOTAL	= 6	minutes	2 9	seconds
Next Whole Minute Interval	= 7	minutes		

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period

First 5 min. FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	- -

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

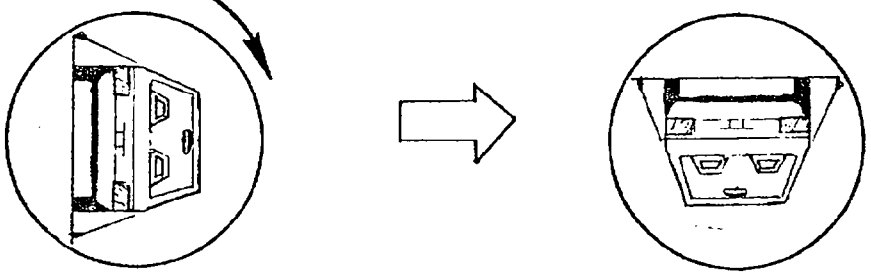
None.

TABLE 5 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT'D.)

TEST VEHICLE NHTSA NO. CE0635 TEST DATE 03/13/84

VEH. MFR/MAKE/MODEL Chrysler Corp./Dodge/Caravan

TEST PHASE: 90° 180°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	= 1	minutes	1 9	seconds
FMVSS 301-75 Position Hold Time	= 5	minutes	0 0	seconds
	+			
TOTAL	= 6	minutes	1 9	seconds
Next Whole Minute Interval	= 7	minutes		

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period

First 5 min. FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	- -

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

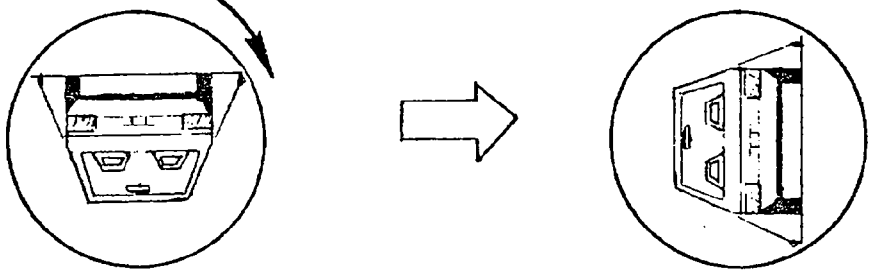
None.

TABLE 5 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT'D.)

TEST VEHICLE NHTSA NO. CE0635 TEST DATE 03/13/84

VEH. MFR/MAKE/MODEL Chrysler Corp./Dodge/Caravan

TEST PHASE: 180° 270°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	= 1	minutes	25	seconds
FMVSS 301-75 Position Hold Time	= 5	minutes	00	seconds
	+			
TOTAL	= 6	minutes	25	seconds
Next Whole Minute Interval	= 7	minutes		

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period

First 5 min. FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	- -

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

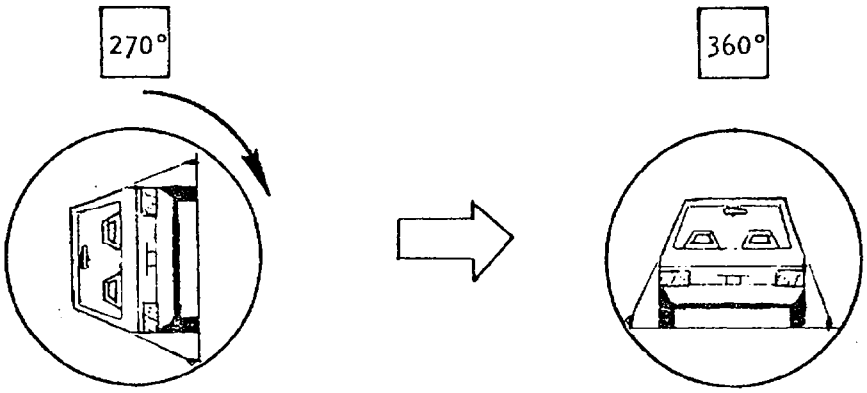
None.

TABLE 5 FMVSS NO. 301-75 STATIC ROLLOVER DATA SHEET (CONT'D.)

TEST VEHICLE NHTSA NO. CE0635 TEST DATE 03/13/84

VEH. MFR/MAKE/MODEL Chrysler Corp./Dodge/Caravan

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time (Spec. Range = 1 to 3 minutes)	=	1	minutes	2 3 seconds
FMVSS 301-75 Position Hold Time	=	5	minutes	0 0 seconds
	+			
TOTAL	=	6	minutes	2 3 seconds
Next Whole Minute Interval	=	7	minutes	

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period

First 5 min. FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	- -

NOTE: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

None.

SECTION 4

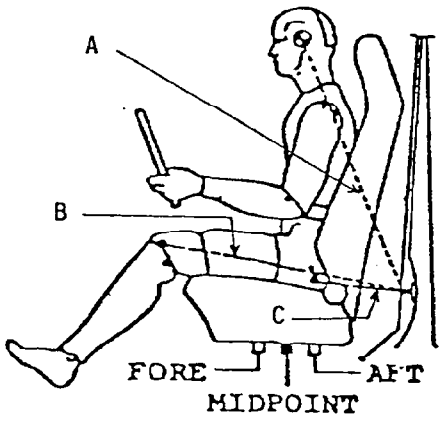
OCCUPANT DATA

Two Part 572 50th percentile male ATD's were installed in the test vehicle. One was positioned in the driver's DSP, and one in the right front passenger's DSP. Both ATD's were fully instrumented with three accelerometers mounted in the head and chest, and load cells mounted in each femur.

The pretest position of each ATD is shown in Tables 6 and 7. Safety belt and steering column data is presented in Table 8. A summary of the ATD measurements is shown in Table 9. A description of the posttest ATD positions is presented in Table 10.

TABLE 6 - DUMMY IN-VEHICLE POSITION RECORDING

DRIVER ATD

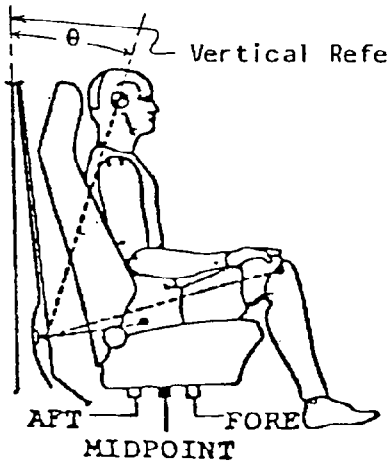


Dimension	(in.)	(θ°)
A	26 3/8	4
B	23 15/16	85
C	6 3/8	85

Torso Angle = -17°

Seat Back Angle = -30°

PASSENGER ATD

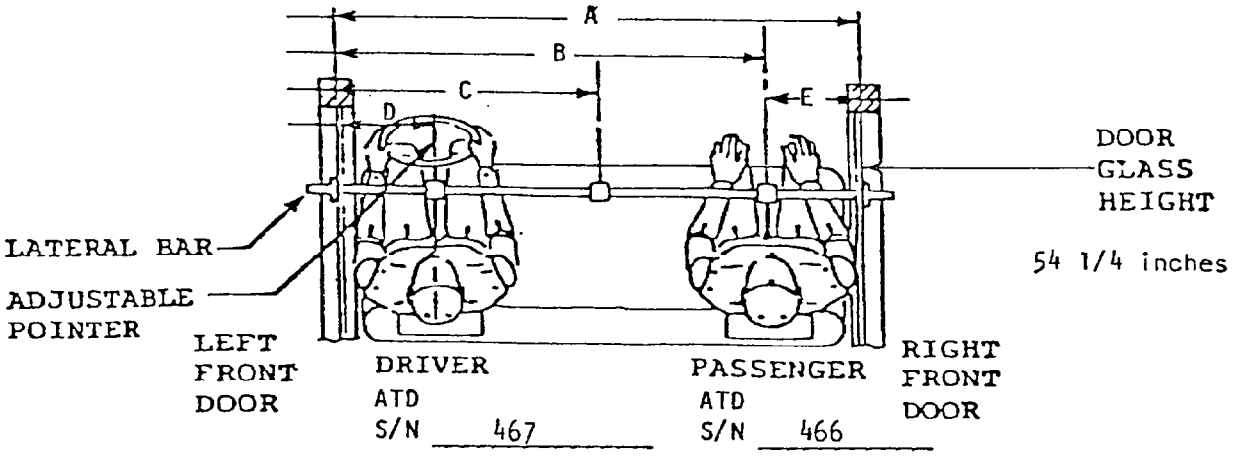


Dimension	(in.)	(θ°)
A	25	2
B	22 3/8	90
C	5 7/8	85

Torso Angle = -17°

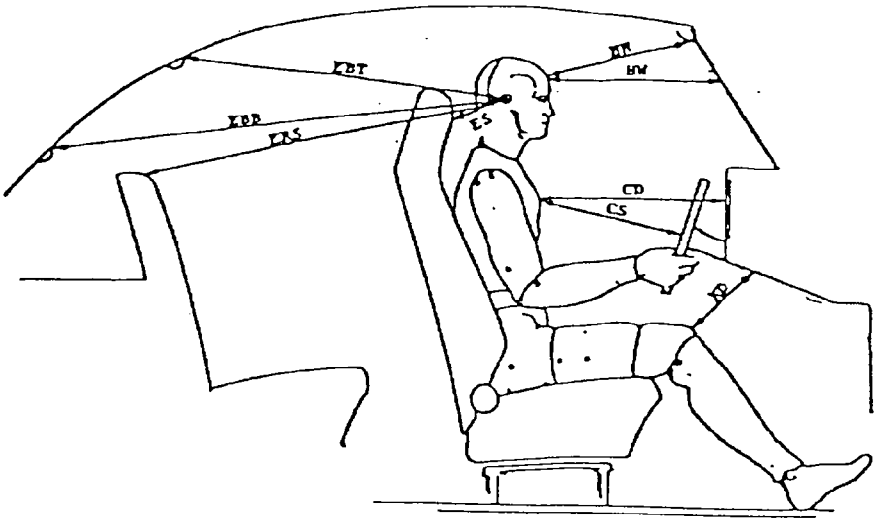
Seat Back Angle = -32°

All angles are relative to the vertical plane.

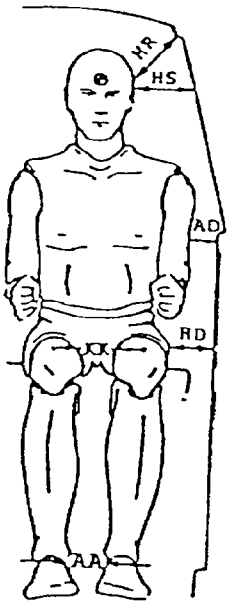


A = 58 3/16
B = 45 1/4
C = 29 1/8
D = 14 1/8
E = 12 15/16

TABLE 7 PART 572 ATD IN-VEHICLE POSITION



	DRIVER	PASSENGER
HH	19 7/8	20 3/4
HW	24 3/4	25 1/2
CD	22 3/4	27 3/4
CS	14 3/8	—
KD L	4 3/8	11 1/4
KD R	5 3/8	11 1/8



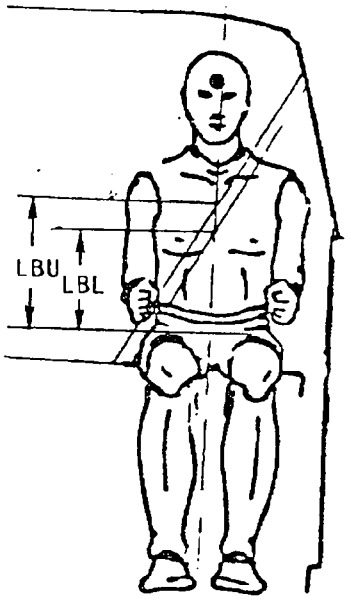
	DRIVER	PASSENGER
HR	10 3/8	9 7/8
HS	10 1/4	9 5/8
AD	3 3/4	3 3/8
HD	6	6 1/4
KK	14 1/2	11 1/4
AA	14 1/8	9 1/2

HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD = Knees to Dash
HR = Head to Side Roof
HS = Head to Side Window
AD = Arm to Door
HD = Hip to Door
KK = Knee to Knee
AA = Ankle to Ankle

TABLE 8 SAFETY BELT AND STEERING COLUMN DATA

SAFETY BELT POSITIONING

	Driver	Passenger
LBU	8 3/8 in.	8 5/16 in.
LBL	11 1/2 in.	11 1/2 in.
LBT	4 lb.	4 lb.
SBT	2 3/8 lb.	2 1/4 lb.



LBU – Lap to Belt Upper Edge – Distance from plate on lap to upper edge of shoulder belt.

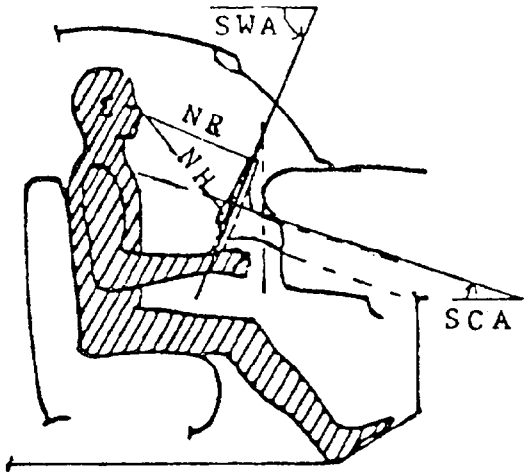
LBL – Lap to Belt Lower Edge – Distance from plate on lap to lower edge of shoulder belt.

LBT – Lap Belt Tension.

SBT – Shoulder Belt Tension.

STEERING COLUMN REFERENCE DIMENSIONS

	Driver Measurements
NR	18 3/4 in.
NH	18 7/8 in.
SCA	32°
SWA	58°



NR – Nose to Rim – Distance from tip of nose to surface of steering wheel rim.

NH – Nose to Hub – Distance from tip of nose to center of steering column hub.

SCA – Steering Column Angle – Angle of steering column in degrees relative to horizontal x axis.

SWA – Steering Wheel Rim Angle – Angle of steering wheel in degrees relative to horizontal x axis.

TABLE 9 PART 572 ATD DATA SUMMARY

Test Vehicle: 1984 Dodge Caravan	Driver ATD				Passenger ATD			
	Positive Direction*		Negative Direction**		Positive Direction*		Negative Direction**	
	Peak (g)	Time (msec)	Peak (g)	Time (msec)	Peak (g)	Time (msec)	Peak (g)	Time (msec)
Head Acceleration Longitudinal	29	80	103	73	9	198	33	118
Lateral	16	79	33	68	20	114	3	190
Vertical	64	73	41	80	65	95	1	24
Resultant	122	74	—	—	71	83	—	—
HIC	973 btwn 68 and 98 msec				1200 btwn 50 and 131 msec			
Chest Acceleration Longitudinal	5	194	36	80	6	260	42	65
Lateral	12	57	32	81	20	102	4	252
Vertical	17	46	14	104	22	50	14	93
Resultant (Max)	48	81	- -	- - -	43	64	- -	- - -
Resultant (clip)	43.8	- - -	- -	- - -	42.4	- - -	- -	- - -
	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)	Peak (lb)	Time (msec)
Femur Loads Left	457	56	124	44	546	46	390	45
Right	864	59	298	48	285	55	304	69
Belt Loads Lap	1499	61	—	—	1521	62	—	—
Torso	1613	68	—	—	1818	74	—	—
	Peak (in.)	Time (msec)			Peak (in.)	Time (msec)		
Belt Spoolout: Potentiometer	3.0	75	—	—	2.1	125	—	—
Film Data	3	—	—	—	2 1/2	—	—	—

Vehicle Impact Speed (mph): 35.13

* Longitudinal: Forward
Lateral: Rightward
Vertical: Downward

** Longitudinal: Rearward
Lateral: Leftward
Vertical: Upward

TABLE 10 GENERAL POSTTEST DESCRIPTIONS

ATD Positions

Driver: Same as pretest except left hand at side, and right arm extended forward.

Passenger: Leaning to the left with right hand out of the side window.

Visible ATD Contact Areas

Component	Driver	Passenger
Head	Steering wheel hub & upper rim	None
Chest	None	None
Abdomen	None	None
Left Knee	Dash panel	Dash panel
Right Knee	Dash panel	Dash panel

Seat And Seatbelt Position Changes

Seat Forward Displacement	0	0
Lap Belt Pullout	N/A	N/A
Shoulder Belt Pullout	0	0

SECTION 5

VEHICLE DATA

The test vehicle is a 1984 Dodge Caravan. General vehicle descriptive information presented in Table 11.

The pretest and posttest vehicle dimensional data are presented in Table 12. Fifteen reference targets were attached to the vehicle, and three to the barrier to aid in the film analysis of the test. The locations of these targets are shown in Figure 2. Pretest and posttest locations of these targets are presented in Table 13. Seat and steering wheel positioning data are presented in Table 14.

The accelerometer locations, and a summary of the measured peak amplitudes are presented in Table 15.

Both of the front seat belts as installed by the manufacturer had a twist in the belt. It was determined that the plate attached to the end of the lap belt was installed upside down. These plates were turned over, and the bolts holding them and the shoulder belt retractors to the body were retightened to a torque of 30 ft.-lb. All plastic trim around the seatbelt system was carefully replaced.

Photographs of the twisted seatbelts in their as-delivered configuration are shown at the end of Appendix A.

TABLE 11 TEST VEHICLE INFORMATION

Vehicle Manufacturer: Chrysler Corporation

Make/Model: Dodge Caravan

Body Style: MPV Model Year: 1984

VIN: 2B4FK21G7ER105432 Build Date: 11/83

NHTSA No.: CE0635 Color: Light Brown

Engine Data: 4 Cylinders: 2600 cc Displacement

Transmission Data: 3 Speed ( ) Manual/ (X) Automatic

Date Vehicle Received by Laboratory: 1/23/84

Dealer's Name & Address: Jerry Goodwin Dodge, 110 W. Orangethorpe Ave., Fullerton, CA

DATA FROM CERTIFICATION LABEL ON LEFT DOOR REAR FACE OR 'B' POST

Vehicle Manufactured By: Chrysler Corporation

Date of Manufacture: 11/83 VIN: 2B4FK21G7ER105432

GVWR: 4,250 lb, GAWR: Front = 2,300 lb Rear = 2,100 lb

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVE BOX. ETC.

Vehicle Load: FRONT REAR
Up to Capacity 35 psi 35 psi

RECOMMENDED TIRE SIZE:	LOAD RANGE:
P185/75 14	(B) C D

Vehicle Capacity:
Type of seats [R] Bench
[F] Bucket
[ ] Split Bench

RECOMMENDED COLD TIRE PRESSURE	F 35 : R 35

CARGO LOAD = NA lb

TOTAL = NA lb

Number of Occupants = 2 Front
(Designated Seating Capacity) 2 Rear
4 Total

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with max. fluids): UDW 3,176

Right Front = 973 lb Right Rear = 624 lb

Left Front = 979 lb Left Rear = 600 lb

TOTAL FRONT WEIGHT = 1952 lb (61.5 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1224 lb (38.5 % of Total Vehicle Weight)

TOTAL DELV. WEIGHT = 3176 lb

CALCULATION FOR TARGET TEST WEIGHT

RCLW = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (3,176 lb)

VCW = Vehicle Capacity Weight (1,074 lb) *

DSC = Designated Seating Capacity (4)

RCLW = VCW - 150 (DSC) = 300 lb *

Target Test Weight = UDW + RCLW + (2 dummies X 164 lbs/dummy)

Target Test Weight = 3,804 lb

* GVWR-UDW
** For MPV's smaller of 300 lb. and (GVWR-UDW)

TABLE 11 TEST VEHICLE INFORMATION (CONT'D)

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 287 lb CARGO: 3,791 lb.

Right Front = 1057 lb — Right Rear = 0850 lb

Left Front = 1052 lb — Left Rear = 0832 lb

TOTAL FRONT WEIGHT = 2109 lb (55.6 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1682 lb (44.4 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 3791 lb

Weight of ballast secured in vehicle cargo area = 0210 lb

VEHICLE ATTITUDE: (all dimensions in inches)

Delivered Attitude: RF 29 1/4 LF 29 1/16 RR 29 15/16 LR 30 9/16

Test Attitude: RF 28 5/8 LF 29 1/8 RR 28 1/16 LR 28 5/8

Wheelbase: 122 1/8 ; Distance from c.g. to front axle: 54.2

TEST FLUID DATA:

Test Fluid Type: Red Stoddard Solvent Spec. Grav.: 0.764

Viscosity: 0.96 Centistokes

Fuel System Capacity (data from NHTSA): 15.0 gal.

Fuel System Capacity (data from Owners Manual): 15 gal.

Test Volume: 14.0 Gallons (92 to 94% of NHTSA capacity)

Electric Fuel Pump: ___ Yes: X No; Fuel Injection: ___ Yes X No

Does electric fuel pump operate with ignition switch "on" and the engine not operating: ___ Yes ___ No N/A

Details of Fuel System: The fuel tank is located beneath the vehicle forward of the rear axle. The filler tube is on the left side of the vehicle. Three metal fuel lines run from the rear of the fuel tank along the inner side of the right frame rail to the engine compartment. One line goes to a canister at the right front corner of the engine compartment. The others go to a filter and fuel pump at the upper front center of the engine block. The carburetor is located forward of the fuel pump.

TABLE 11. TEST VEHICLE INFORMATION (CONT'D)

TEST CONDITIONS:

Date of Test: 03/13/84 Time of Test: 3:04 am/(pm)

Ambient Temperature: 73 °F at impact area

Temp. In Occ. Compart.: 73 °F: W/Shld. Mldg. Temp.: 73 °F

IMPACT VELOCITY:

Trap No. 1 = 35.13 mph; Trap No. 2 = 35.12 mph

Distance from the vehicle's front bumper to the barrier face entering the vehicle velocity measurement device = 54 inches

Exiting the vehicle velocity measurement device = 6 inches

VEHICLE REBOUND

Distance from front of test vehicle to the barrier after impact: Ave. = 25 7/16 ; R = 25 ; L = 25 7/8

VEHICLE MAXIMUM CRUSH:

Left Side : 21 5/8 inches

Right Side: 21 5/8 inches

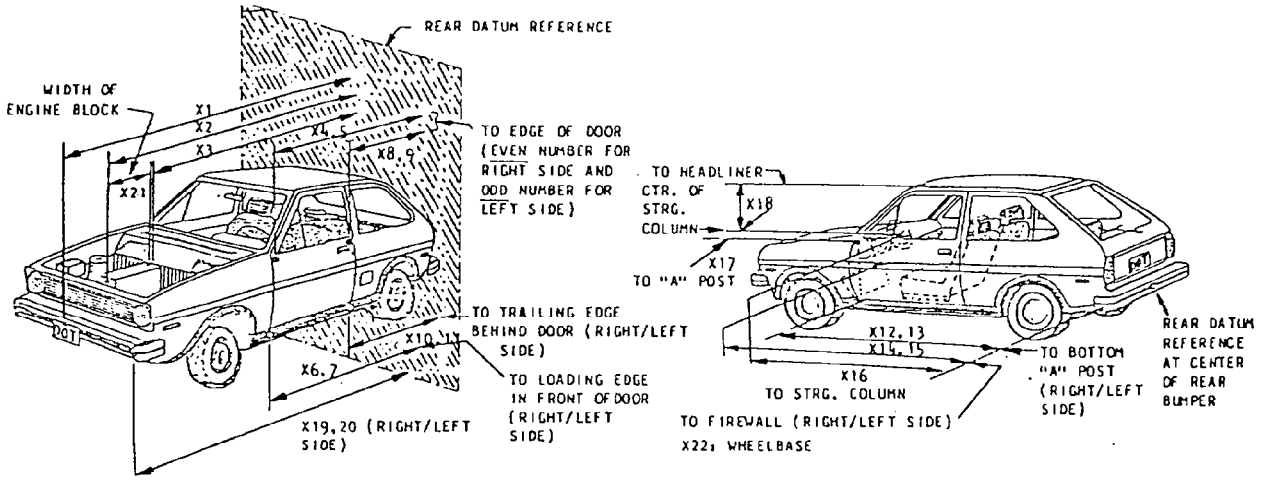
Centerline: 23 5/16 inches

FIREWALL INTRUSION:

Left Side: 2 inches

Right Side: 2 1/8 inches

TABLE 12 PRE/POST-TEST STATIC MEASUREMENT DATA



VEHICLE: 1984 Dodge Caravan NHTSA NO.: CE0635

TEST DATE: 03/13/84

REFERENCE DIMENSION	PRE-TEST MEASUREMENT	POST-TEST MEASUREMENT	CHANGE
X1	176 1/16	152 3/4	-23 5/16
X2	163 1/4	145 3/4	-17 1/2
X3	139	135 1/8	- 3 7/8
X4	127 7/16	127 1/4	- 3/16
X5	127 7/16	127 1/4	- 3/16
X6	124 3/4	124 1/2	- 1/4
X7	124 3/4	124 7/16	- 5/16
X8	85 5/16	84 15/16	- 3/8
X9	85 3/8	85 5/16	- 1/16
X10	83 7/8	83 7/16	- 7/16
X11	83 15/16	84	+ 1/16
X12	124 5/16	123 5/8	- 11/16
X13	124 3/16	123 7/8	- 5/16
X14	136 3/4	134 5/8	- 2 1/8
X15	136 1/2	134 1/2	- 2
X16	108 1/4	106 7/8	- 1 3/8
X17	19	17 7/8	- 1 1/8
X18	18	11 3/4	- 6 1/4
X19	173	151 3/8	-21 5/8
X20	173	151 3/8	-21 5/8
X21	24	24	0
X22	112 1/8	108 3/4	- 3 3/8

TABLE 13 PRE/POSTTEST TARGET LOCATION DIMENSIONS

	X From Barrier		Y From Rail		Z Above Ground	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
A1	49 3/4	49 3/4	42 1/2	42 1/2	74 7/8	74 7/8
A2	53 3/4	53 3/4	42 1/2	42 1/2	74 7/8	74 7/8
A3	57 3/4	57 3/4	42 1/2	42 1/2	74 5/8	74 7/8

	X From Rearmost Point of Vehicle		Y From Centerline		Z Above Ground	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
B1	103 3/4	103 3/4	14	14	67 1/16	67 1/4
B2	99 3/4	99 3/4	13 15/16	13 15/16	67 1/16	67 3/8
B3	95 3/4	95 3/4	13 7/8	13 7/8	67 1/8	67 1/2
C1	35 13/16	35 13/16	13 5/8	13 5/8	67 1/2	68 1/2
C2	31 13/16	31 13/16	13 5/8	13 5/8	67 3/8	68 9/16
C3	27 13/16	27 13/16	13 5/8	13 5/8	67 5/16	68 5/8
D	44 3/8	44 13/16	27 1/2	27 1/2	60 1/8	61 1/2
E	114 5/8	114 7/16	16 3/16	15	43 9/16	49 1/8
F	124 13/16	124 3/16*	31	31 7/8*	11 1/8	11 3/16*
G	86 5/8	86 7/16	32 9/16	31 7/8	10 7/8	11 1/2
H	124 3/8	48	32 5/8	31 1/4	10 7/8	12 1/4
J	48 3/8	48	32 5/8	31 1/4	10 1/8	10 3/4
K	86 5/16	86 5/16	32 9/16	31 7/8	10 3/16	10
L	124 13/16	124 3/4	31	31 7/8	10 1/2	9 5/8
M	45 5/16	44 7/8	27 5/8	27 5/8	58 15/16	60

* Target fell off during impact. Measurement was made after target was reattached to vehicle.

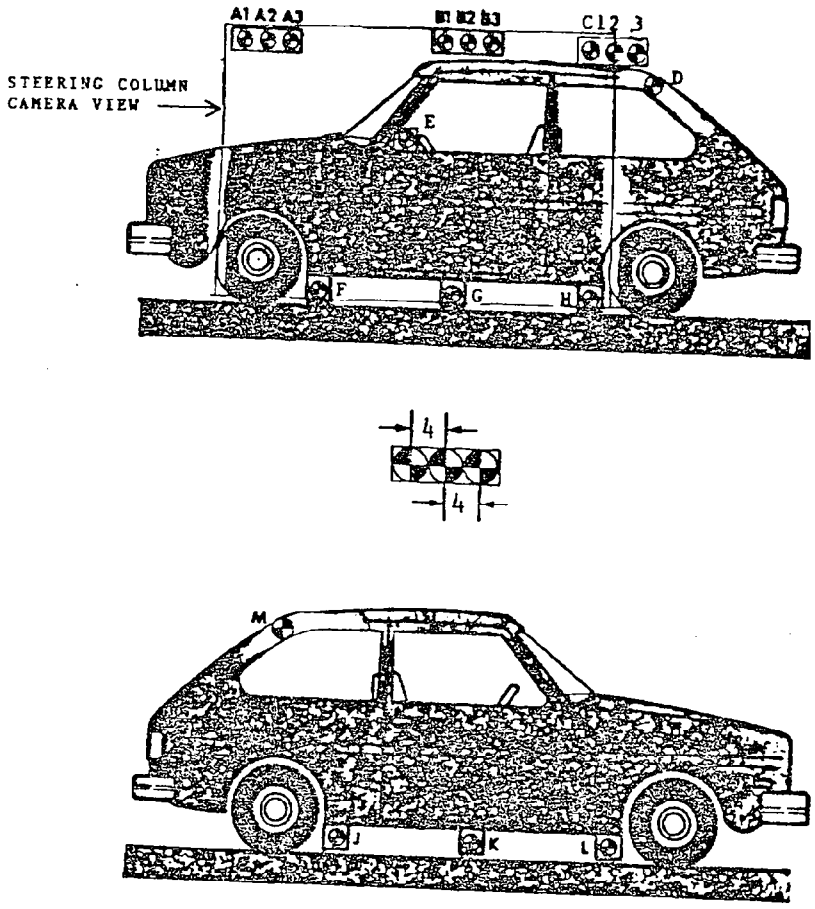


FIGURE 2

LOCATIONS OF VEHICLE TARGETS

TABLE 14 SEAT AND STEERING WHEEL POSITIONING

Vehicle: 1984 Dodge Caravan
NHTSA No.: CE0628
VIN: 2B4FK21G7ER105432

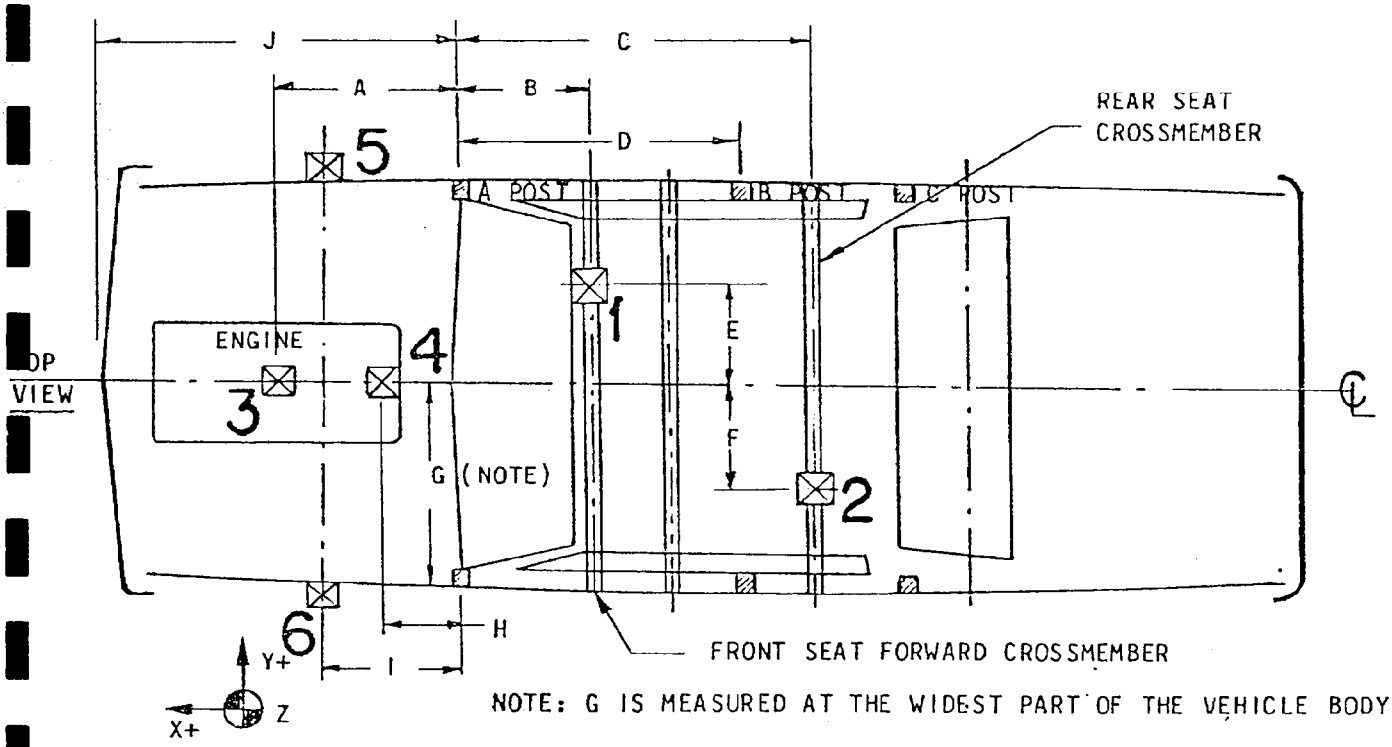
Type of Seat(s): Bucket

SEAT POSITION	DRIVER	PASSENGER
Longitudinal Position		
Range of travel	6 3/4 in.	None
Number of positions	11	1
Test position	6th from front	N/A
Seatback Angle (measured relative to vertical)		
Range of travel	None	None
Number of positions	1	1
Test position	N/A	N/A
Headrest		
Range of travel	N/A	N/A
Number of positions	N/A	N/A
Test position	N/A	N/A
Vertical Position		
Range of travel	NOT	ADJUSTABLE
Number of positions	1	1
Test position	N/A	N/A

Steering Column Angle (measured relative to vertical)

Range of travel	21° to 43°
Number of positions	5
Test position	3rd

TABLE 15 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



NOTE: G IS MEASURED AT THE WIDEST PART OF THE VEHICLE BODY.

LOCATION NO. AND DESCRIPTION	LOCATION DIMENSION (IN.)	AXIS	PEAK (G'S)		TIME TO PEAK(MSEC)	
			POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
1 - Below Front Seat Area	E - 9 1/4 B - 12 3/8	X	2	42	155	33
2 - Below Rear Seat Area	F - 20 1/4 C - 47 3/4	X	2	40	150	68
3 - Top of Engine	A - 26 3/8	X	69	211	34	25
4 - Bottom of Engine at Oil Pan	H - 20 5/8	X	INVALID DATA		AFTER 52 MSEC.	
5 - Right Front Brake Caliper	I - 17 1/4	X	21	82	65	38
6 - Left Front Brake Caliper	I - 17 1/4	X	38	70	62	43
- Vehicle Half Width	G - 37 1/8	NOTE: NEGATIVE ACCELERATION IS REARWARD				
- Forward Most Point At ℄ to A Post	J - 51 5/16					
- Distance from 'A' post to 'B' post	D - 42 3/4					

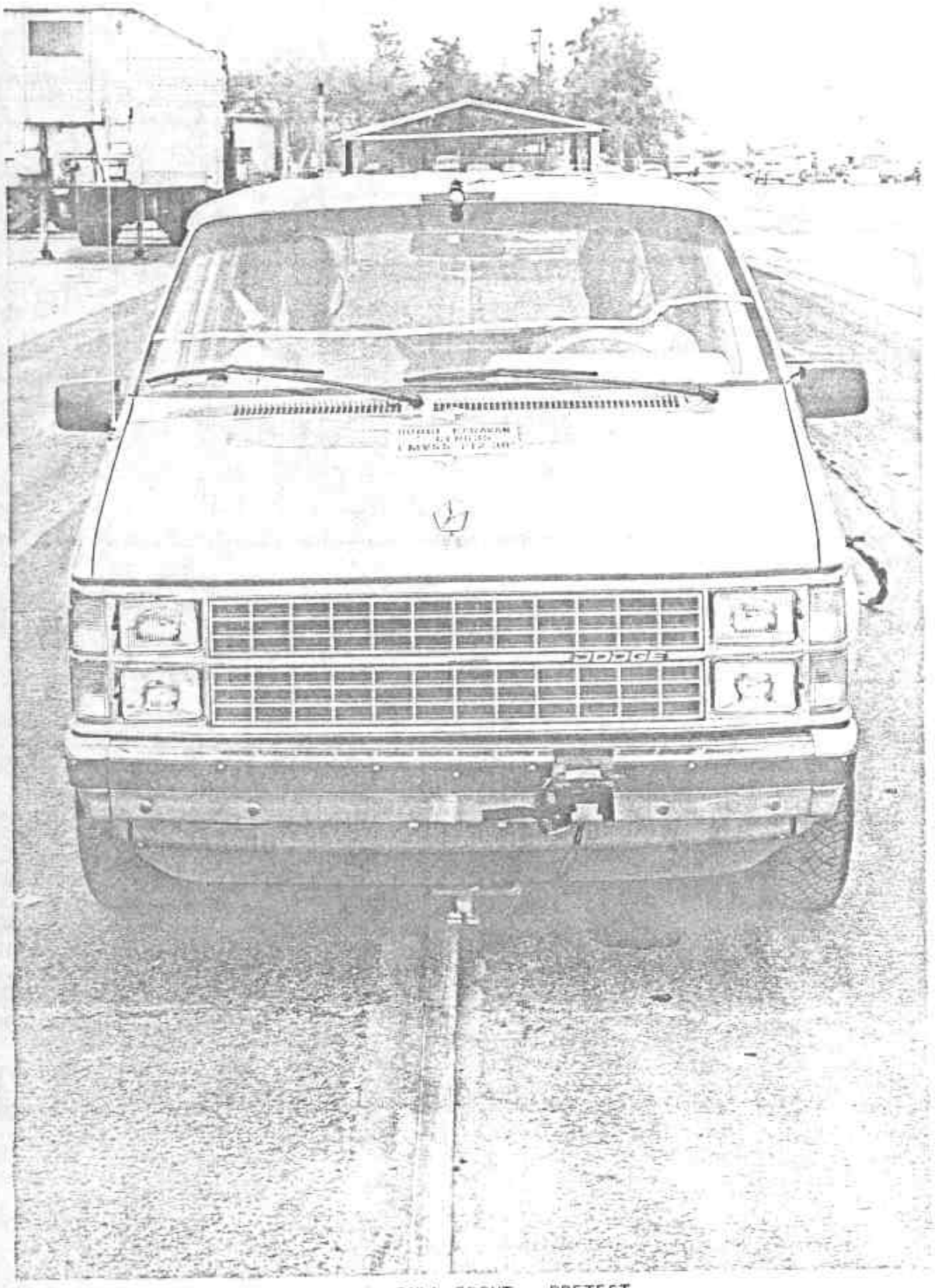
APPENDIX A

PHOTOGRAPHIC COVERAGE

LIST OF PHOTOGRAPHS

A-1 FULL LEFT SIDE - PRETEST

A-2 HALF LEFT SIDE – PRETEST

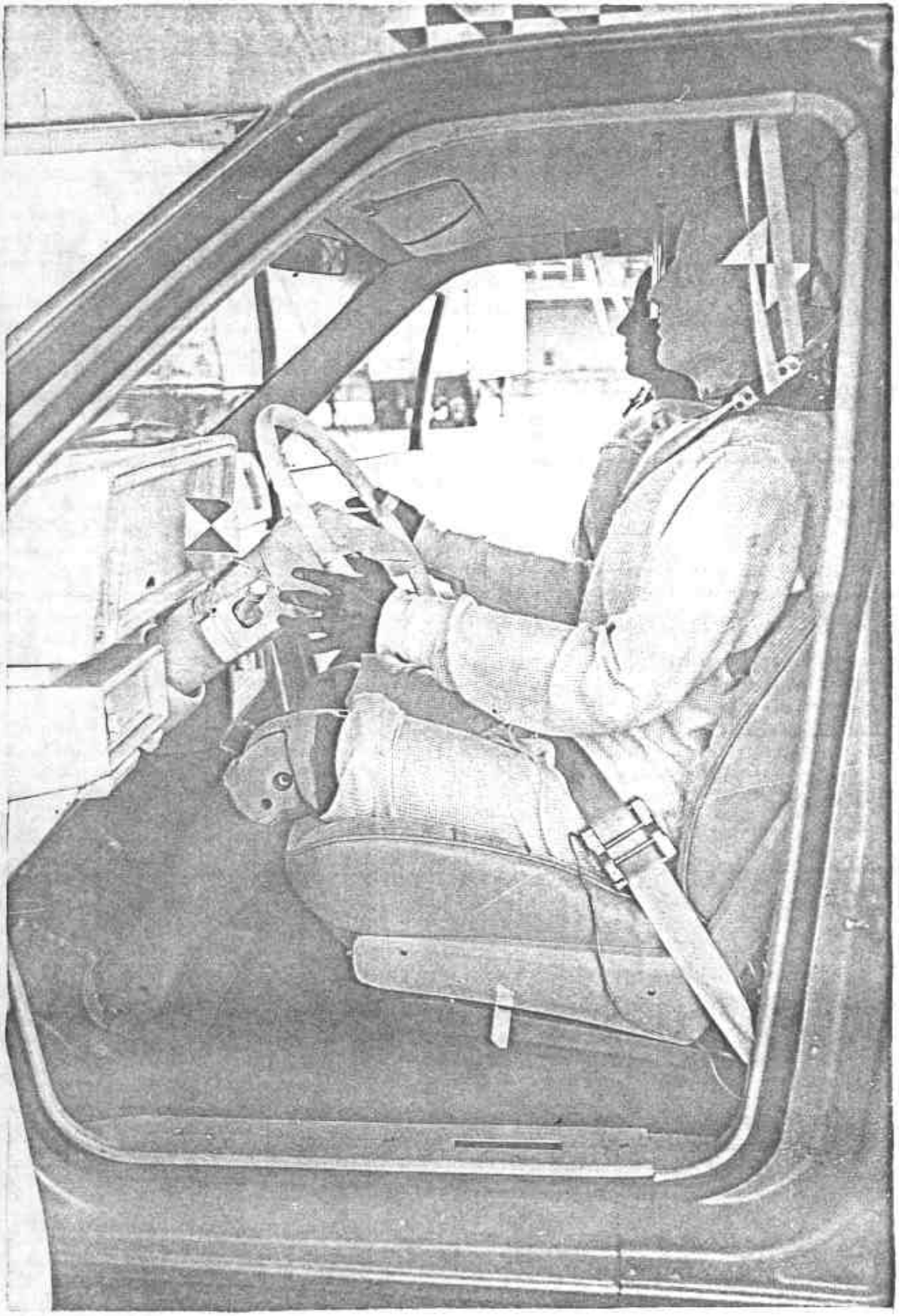


A-3 FULL FRONT - PRETEST

A-4 LEFT FRONT 3/4 - PRETEST

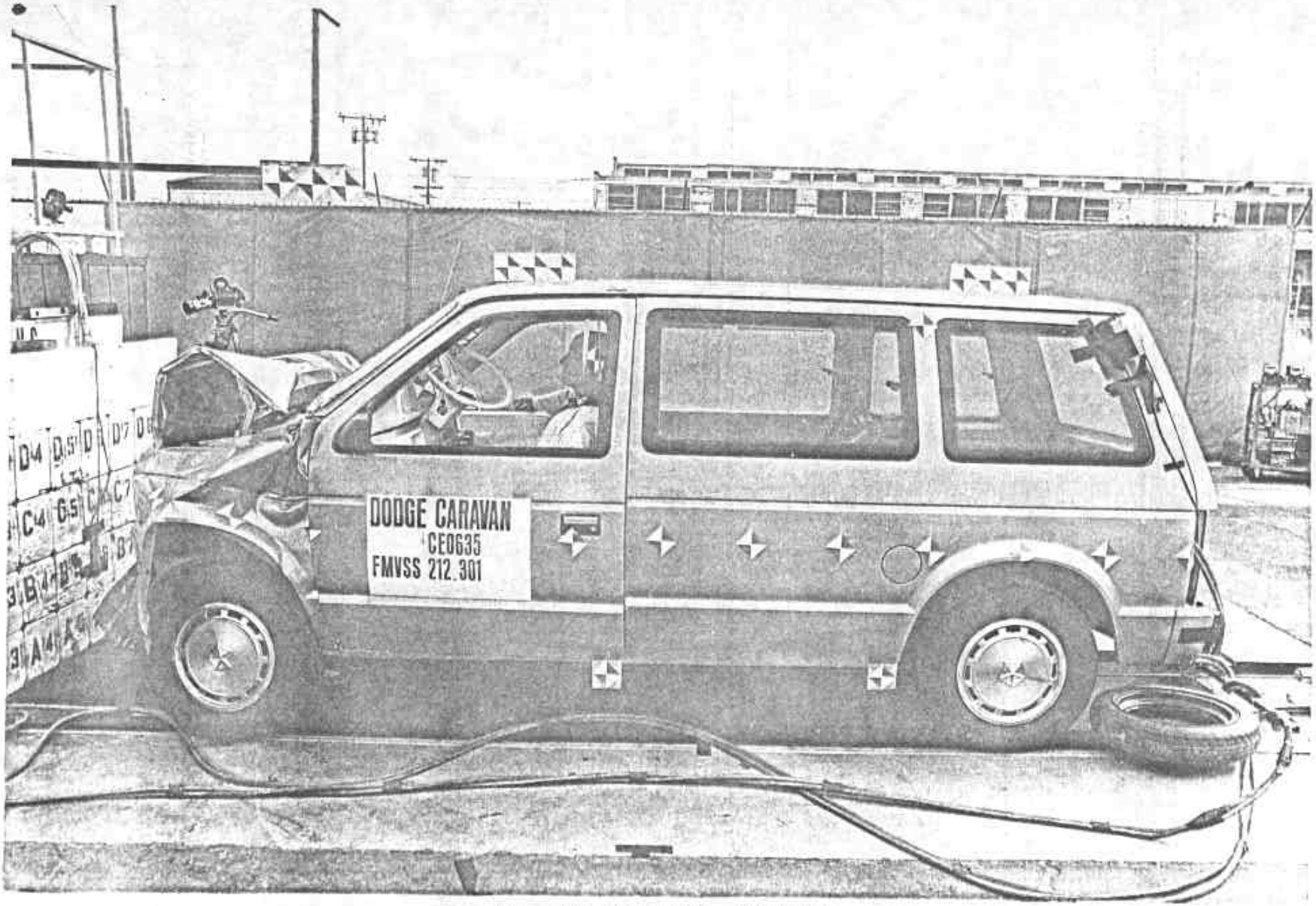
A-5 RIGHT REAR 3/4 - PRETEST

A-6 FULL FRONT WINDSHIELD – PRETEST



A-7 DRIVER ATD GENERAL POSITION – PRETEST

A-8 PASSENGER ATD GENERAL POSITION – PRETEST

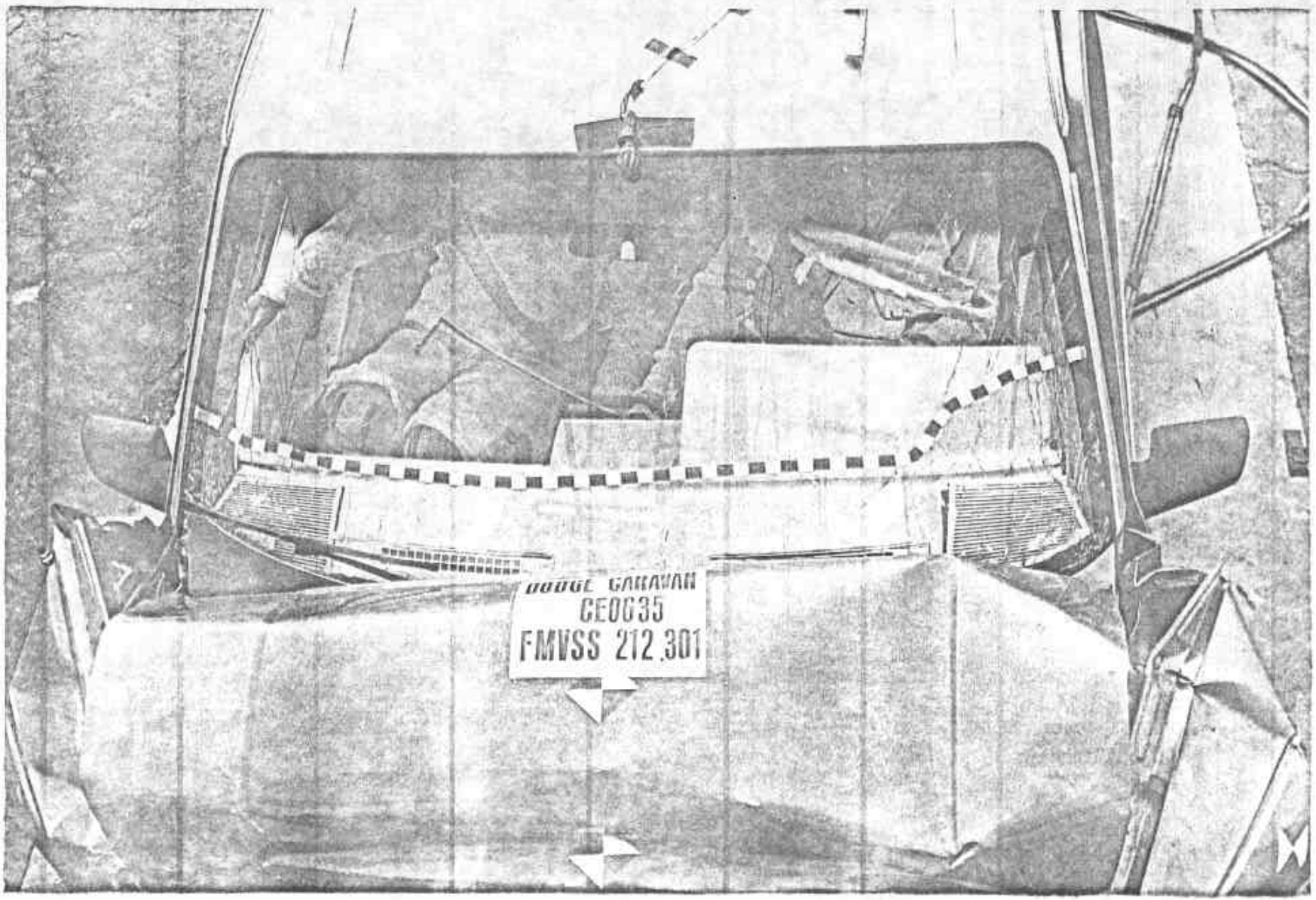


A-9 FULL LEFT SIDE – POSTTEST

A-10 HALF LEFT SIDE – POSTTEST

A-11 HALF RIGHT SIDE - POSTTEST

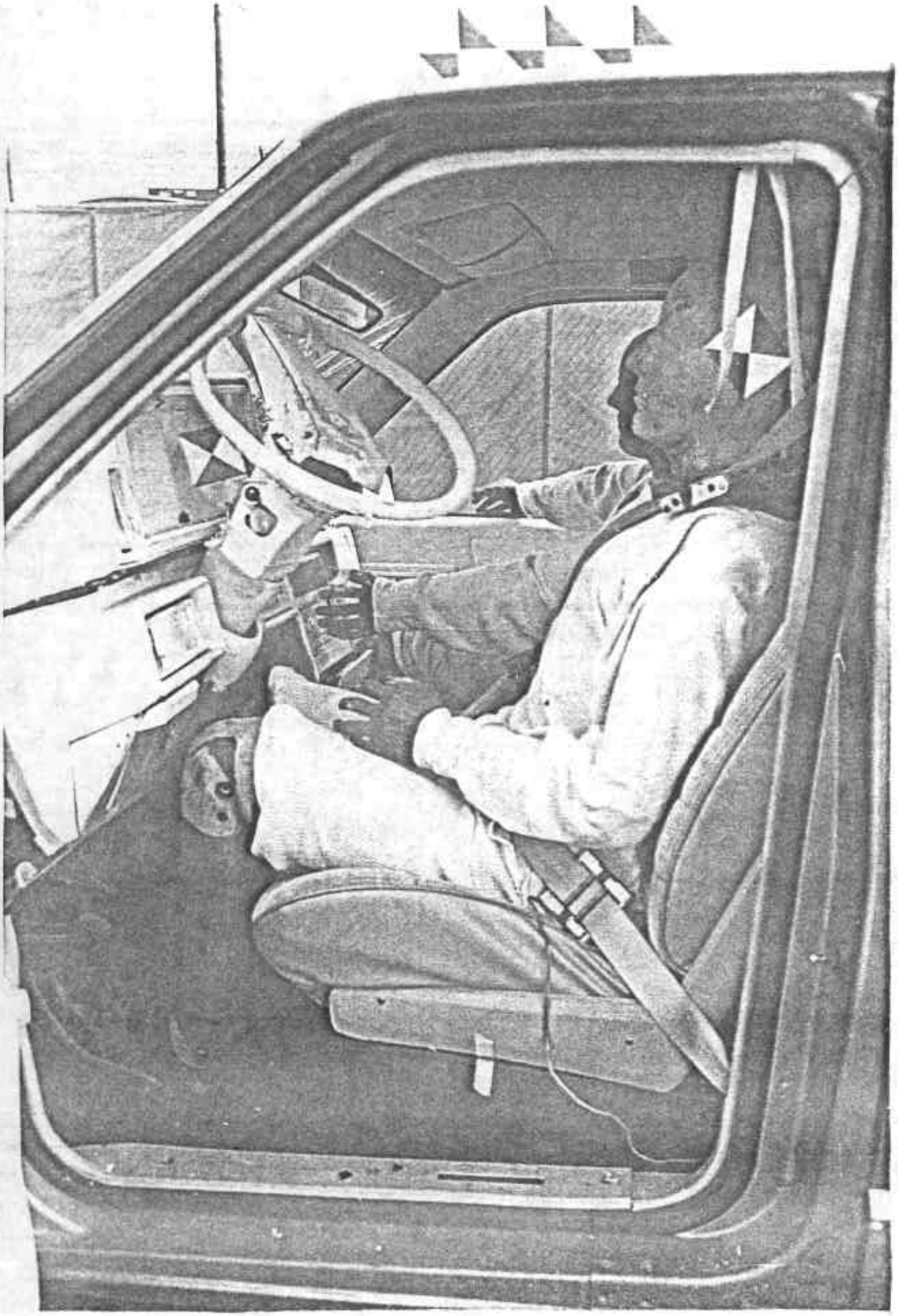
A-12 LEFT FRONT 3/4 – POSTTEST



A-13 FULL FRONT WINDSHIELD - POSTTEST

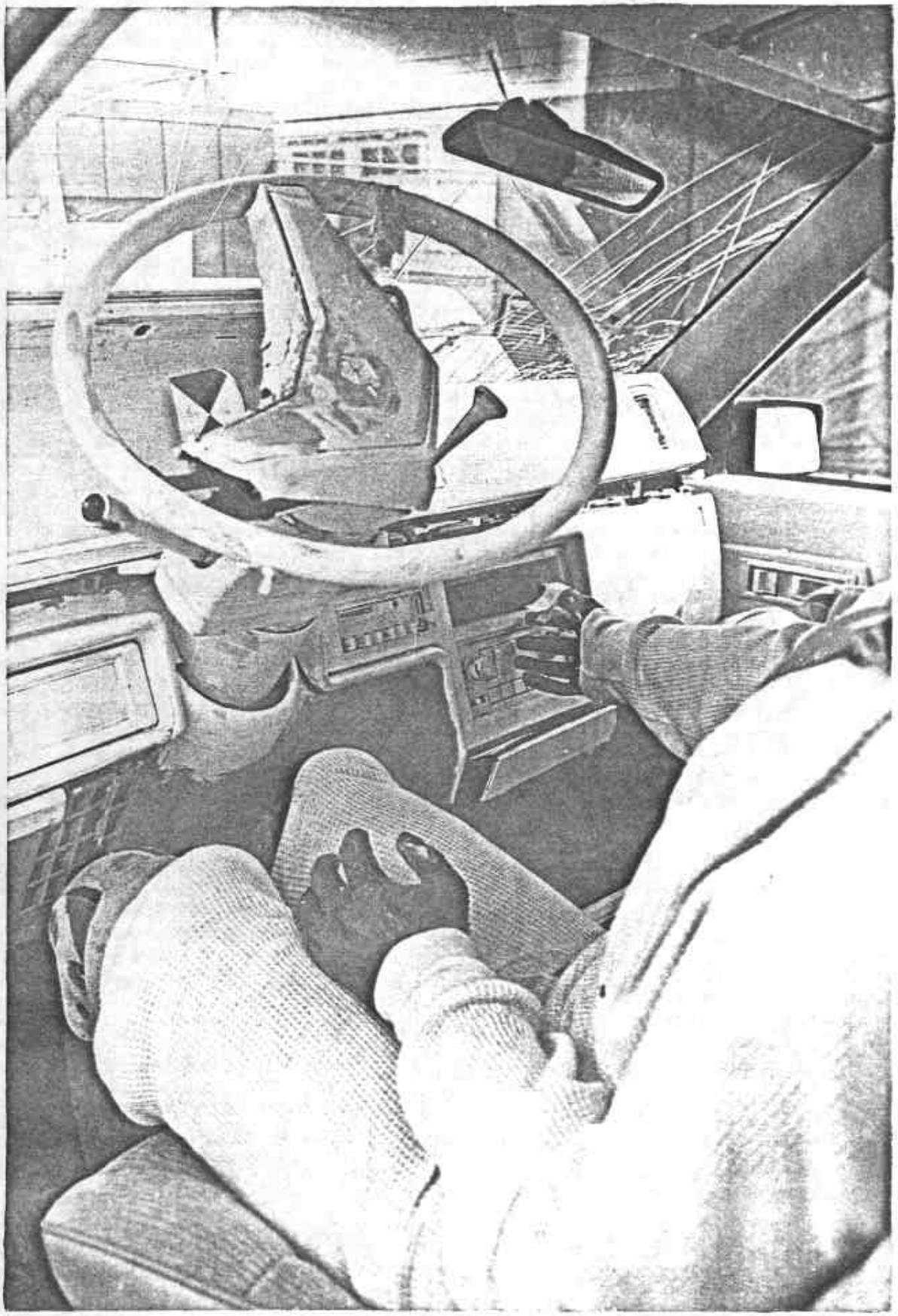
A-14 FULL FRONT - POSTTEST

A-15 FULL UNDERBODY - POSTTEST

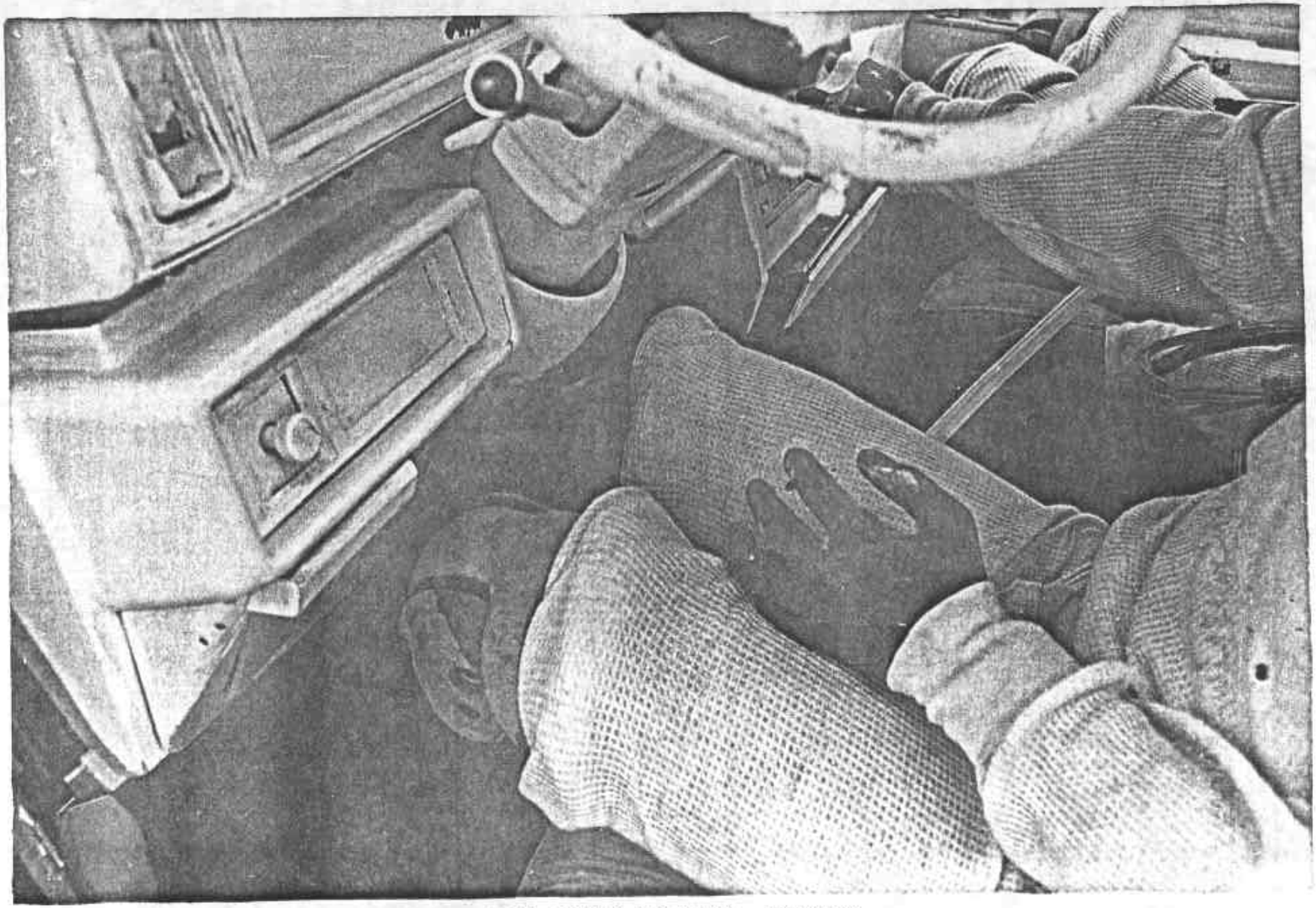


A-16 DRIVER ATD GENERAL POSITION – POSTTEST

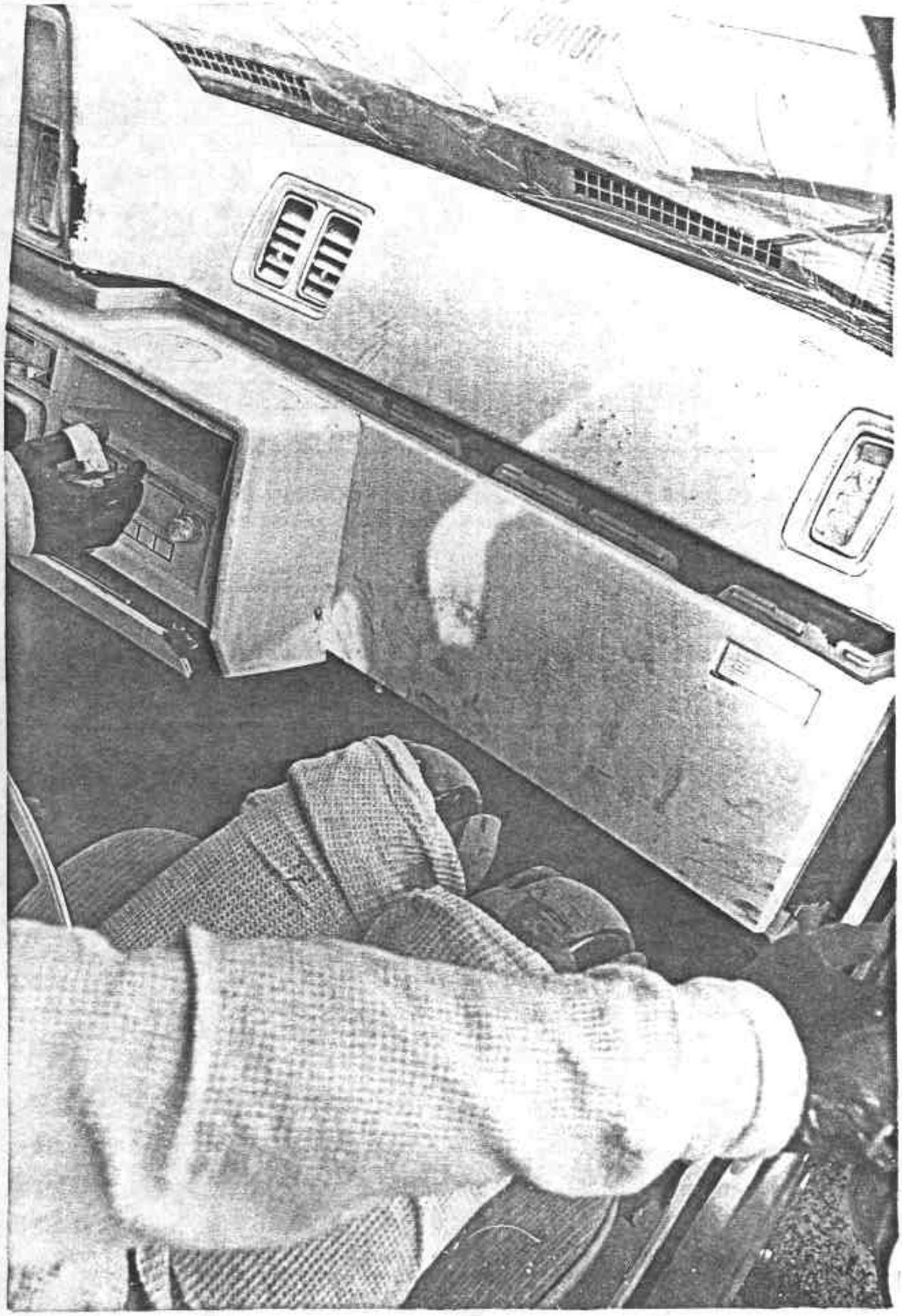
A-17 PASSENGER ATD GENERAL POSITION – POSTTEST



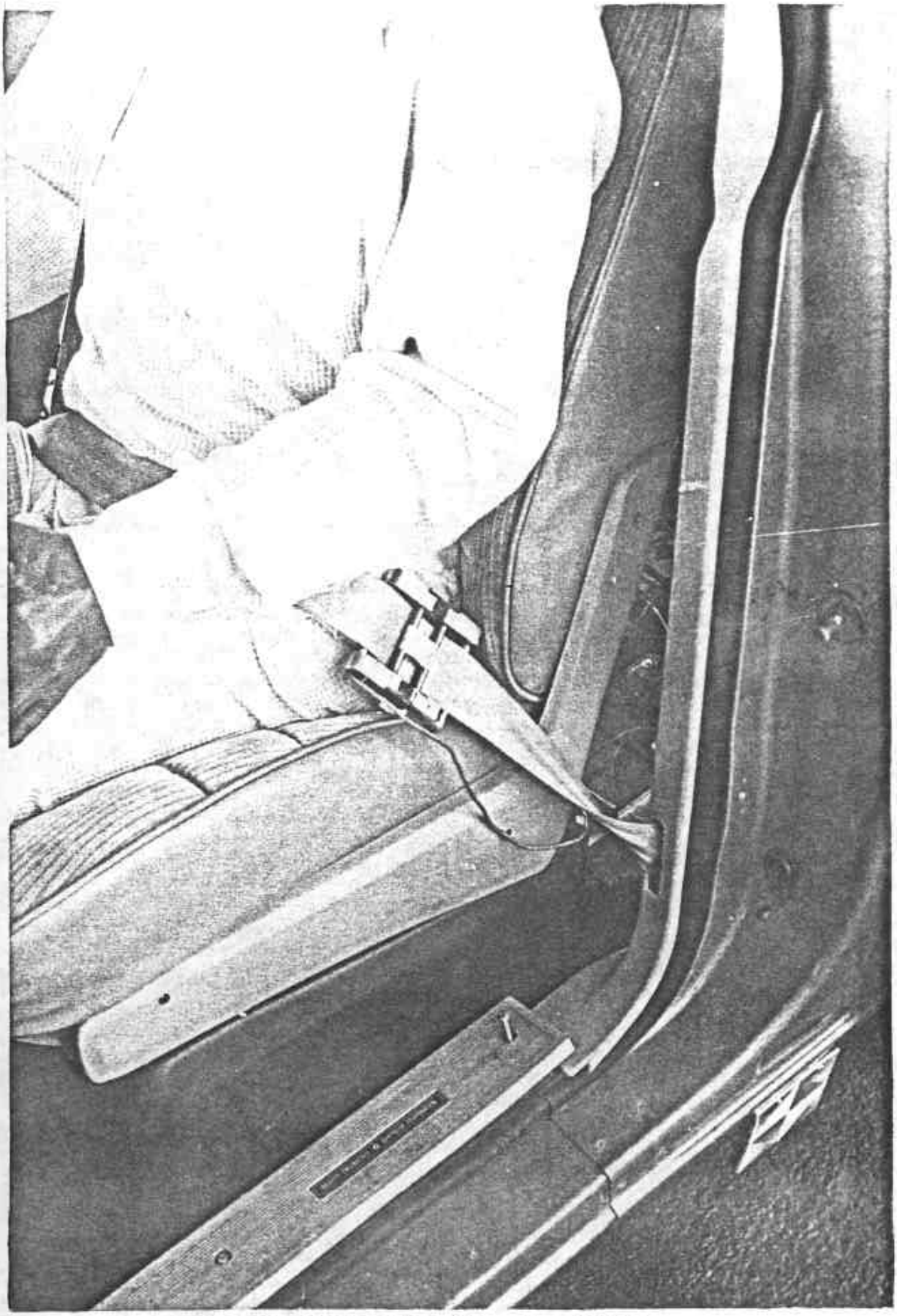
A-18 DRIVER ATD STEERING WHEEL - POSTTEST



A-19 DRIVER ATD KNEES – POSTTEST



A-20 PASSENGER ATD KNEES – POSTTEST



A-21 DRIVER SEAT BELT - AS DELIVERED

A–22 PASSENGER SEAT BELT – AS DELIVERED

APPENDIX B

SUMMARY OF RESULTS

CERTIFICATION TESTS ON

PART 572 ANTHROPOMORPHIC TEST DEVICES

HUMANOID MODEL 572

SERIAL NO'S. 466 and 467

TABLE B1 - PART 572 ATD CERTIFICATION TEST DATA, SUMMARY

NHTSA ATD I.D. NO.: 466

LABORATORY TECHNICIAN: M. Poindexter

Sheet 1 of 3			Pre-Test Calibration	Post-Test Calibration
Date of ATD Calibration - - - - - - - - - - - -			02/25-02/29/84	03/28-03/29/84
Calibration Sequential Number For Dummy - - -			5	6
Temperature in Lab. (Spec. = 66 to 78° F) - -			68-75 °F	67-76 °F
Relative Humidity in Lab. (Spec. = 10 to 70%)			10-30%	24-38%
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST:				
a. Peak Resultant Accel. -		210 to 260g	260	250
b. Peak Lateral Accel. - -		≤10g	4	9.5
c. Time above 100G - - - -		0.9 to 1.5 ms	1.5	1.3
2. NECK BENDING TEST:				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	23.09	23.04
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - - -		20 to 24G	23.1	23.7
c. Peak Resultant Head Acceleration - - - - -		26G maximum	21.6	25.4
d. Pendulum Decel. (t_2-t_1)		≤3 ms	1.9	2.1
e. Pendulum Decel. (t_3-t_2)		25 to 30 ms	27.7	29.7
f. Pendulum Decel. (t_4-t_3)		≤ 10 ms	9.5	8.4
g. Pendulum Direction Reversal Time - - - - -		≥123 ms	N/A	N/A
h. Max. Head Rotation - -		63 to 73°	63°	66°
i. Chordal Displacement: Head Rotation Angle - -				
0°	Time	-2 to 2 ms	0	0
	Displ.	-.5 to .5 in.	0	0
30°	Time	25.6 to 34.4 ms	32	31.8
	Displ.	2.1 to 3.1 in.	2.62	2.71
60°	Time	40.3 to 51.7 ms	50.7	49.1
	Displ.	4.3 to 5.3 in.	5.18	5.20
Maximum (63°)	Time	53.2 to 66.8 ms	60.2	59.8
	Displ.	5.0 to 6.0 in.	5.43	5.68

TABLE B1 - PART 572 ATD CERTIFICATION TEST DATA, SUMMARY (CONT'D)

NHTSA ATD I.D. NO.: 466

Sheet 2 of 3					
TEST PARAMETER			SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST Continued:					
i. Chordal Displacement:					
Head Rotation Angle -					
	60°	Time	67.0 to 83.0 ms	68.8	70.3
		Disp.	4.3 to 5.3 in.	5.11	5.10
	30°	Time	85.4 to 104.6 ms	89.6	88.6
		Displ.	2.1 to 3.1 in.	2.42	2.30
	0°	Time	101.0 to 123.0 ms	104	102
		Displ.	-.5 to 0.5 in.	0.29	0.22
3. ABDOMINAL COMPRESSION TEST:					
(Preload = 10 pounds)					
a. Force @ .5" - - - - -			23 - 36 lbs.	27	26
b. Force @ .75" - - - -			36 - 50 lbs.	40	39
c. Force @ 1.0" - - - -			50 - 63 lbs.	59	54
d. Force @ 1.3" - - - -			73 - 88 lbs.	88	82
4. LUMBAR FLEXION TEST:					
a. Force @ 20° - - - - -			22 to 34 lbs.	32.4	29
b. Force @ 30° - - - - -			34 to 46 lbs.	42.8	40
d. Force @ 40° - - - - -			46 to 58 lbs.	54	50
e. Return Angle - - - -			12° maximum	10°	12°
5. CHEST IMPACT TESTS:					
a. High Speed					
(1) Probe Speed - - -			21.78-22.22 fps	22.14	22.04
(2) Peak Deflection -			1.7" maximum	1.68	1.50
(3) Peak Resistive Force - - - - - -			2250 lbs. maximum	2178	1988
(4) Internal Hysteresis - - -			50 to 70%	54	65

TABLE B1 - PART 572 ATD CERTIFICATION TEST DATA, SUMMARY (CONT'D)

NHTSA ATD I.D. NO.: 466

Sheet 3 of 3 TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
5. CHEST IMPACT TESTS: Continued:			
b. Low Speed			
(1) Probe Speed - - -	13.86-14.14 fps	14.12	13.87
(2) Peak Deflection -	1.1" maximum	0.99	0.77
(3) Peak Resistive Force - - - - - -	1450 lbs. maximum	1236	1205
(4) Internal Hysteresis - - -	50 to 70%	54	53
6. KNEE IMPACT TESTS:			
a. Right Side			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.82	6.90
(2) Maximum Force - -	1850 to 2500 lbs.	2100	2290
(3) Time Above 1000#-	1.7 ms minimum	1.8	1.7
b. Left Side			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.81	6.93
(2) Maximum Force - -	1850 to 2500 lbs.	2350	2470
(3) Time Above 1000#-	1.7 ms. minimum	1.7	1.8

TABLE B2 - PART 572 ATD CERTIFICATION TEST DATA, SUMMARY

NHTSA ATD I.D. NO.: 467

LABORATORY TECHNICIAN: M. Poindexter

Sheet 1 of 3			Pre-Test Calibration	Post-Test Calibration
Date of ATD Calibration - - - - - - - - - - - -			03/08-03/10/84	03/28-03/30/84
Calibration Sequential Number For Dummy - - -			7	8
Temperature in Lab. (Spec. = 66 to 78° F) - -			69-77 °F	67-76 °F
Relative Humidity in Lab. (Spec. = 10 to 70%)			24-45%	28-38%
TEST PARAMETER		SPECIFICATION		
1. HEAD DROP TEST:				
a. Peak Resultant Accel. -		210 to 260g	243	232
b. Peak Lateral Accel. - -		≤10g	7.5	6
c. Time above 100G - - - -		0.9 to 1.5 ms	1.3	1.4
2. NECK BENDING TEST:				
a. Pendulum Speed - - - -		21.5 to 25.5 fps	22.98	23.03
b. Pendulum Avg. Decel. (over $t_3 - t_2$) - - - -		20 to 24G	24	23.8
c. Peak Resultant Head Acceleration - - - - -		26G maximum	25.2	24.3
d. Pendulum Decel. (t_2-t_1)		≤3 ms	2.1	1.8
e. Pendulum Decel. (t_3-t_2)		25 to 30 ms	29.0	29.2
f. Pendulum Decel. (t_4-t_3)		≤ 10 ms	7.6	7.4
g. Pendulum Direction Reversal Time - - - - -		≥123 ms	N/A	N/A
h. Max. Head Rotation - -		63 to 73°	65°	71°
i. Chordal Displacement: Head Rotation Angle - -				
0°	Time	-2 to 2 ms	0	0
	Displ.	-.5 to .5 in.	0	0
30°	Time	25.6 to 34.4 ms	31.8	30.3
	Displ.	2.1 to 3.1 in.	2.66	2.71
60°	Time	40.3 to 51.7 ms	49.6	44.4
	Displ.	4.3 to 5.3 in.	5.15	4.98
Maximum (65°)	Time	53.2 to 66.8 ms	59.5	60.8
	Displ.	5.0 to 6.0 in.	5.69	5.87

TABLE B2 - PART 572 ATD CERTIFICATION TEST DATA, SUMMARY (CONT'D)

NHTSA ATD I.D. NO.: 467

Sheet 2 of 3 TEST PARAMETER			SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
2. NECK BENDING TEST Continued:					
I. Chordal Displacement:					
Head Rotation Angle -					
	60°	Time	67.0 to 83.0 ms	71.3	75.3
		Disp.	4.3 to 5.3 in.	5.13	4.87
	30°	Time	85.4 to 104.6 ms	89.8	90.7
		Displ.	2.1 to 3.1 in.	2.46	2.19
	0°	Time	101.0 to 123.0 ms	102	103
		Displ.	-.5 to 0.5 in.	-0.23	0.16
3. ABDOMINAL COMPRESSION TEST:					
(Preload = 10 pounds)					
a. Force @ .5" - - - - -			23 - 36 lbs.	25	27
b. Force @ .75" - - - -			36 - 50 lbs.	38	38
c. Force @ 1.0" - - - -			50 - 63 lbs.	54	56
d. Force @ 1.3" - - - -			73 - 88 lbs.	81	79
4. LUMBAR FLEXION TEST:					
a. Force @ 20° - - - - -			22 to 34 lbs.	32	31
b. Force @ 30° - - - - -			34 to 46 lbs.	41	43
d. Force @ 40° - - - - -			46 to 58 lbs.	53	53
e. Return Angle - - - -			12° maximum	11°	10°
5. CHEST IMPACT TESTS:					
a. High Speed					
(1) Probe Speed - - -			21.78-22.22 fps	22.17	21.84
(2) Peak Deflection -			1.7" maximum	1.55	1.54
(3) Peak Resistive Force - - - - - -			2250 lbs. maximum	2081	2075
(4) Internal Hysteresis - - -			50 to 70%	60	60

TABLE B2 - PART 572 ATD CERTIFICATION TEST DATA, SUMMARY (CONT'D)

NHTSA ATD I.D. NO.: 467

Sheet 3 of 3 TEST PARAMETER	SPECIFICATION	Pre-Test Calibration	Post-Test Calibration
5. CHEST IMPACT TESTS: Continued:			
b. Low Speed			
(1) Probe Speed - - -	13.86-14.14 fps	13.86	13.94
(2) Peak Deflection -	1.1" maximum	0.87	1.03
(3) Peak Resistive Force - - - - - -	1450 lbs. maximum	1215	1226
(4) Internal Hysteresis - - -	50 to 70%	61	66
6. KNEE IMPACT TESTS:			
a. Right Side			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.85	6.90
(2) Maximum Force - -	1850 to 2500 lbs.	2480	1950
(3) Time Above 1000#-	1.7 ms minimum	1.8	1.9
b. Left Side			
(1) Probe Speed - - -	6.76 to 7.04 fps	6.90	6.88
(2) Maximum Force - -	1850 to 2500 lbs.	2030	2240
(3) Time Above 1000#-	1.7 ms. minimum	1.8	1.7

APPENDIX C

TEST DATA PLOTS

DIGITAL TAPE HEADER INFORMATION

```
1COMB. TEST OMI,212,301    03/13/84MSEDTNH2282D21140N0705416ACQUIRE OMI DATA PLUS EVALUATE COMPLIANCE TO FMVSS 212 & 301
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210799844-TVF2600 C.C.   AFVN3791122.1176.174.254.2SOTHP CARAVAN
35.1000000012FDAW6999061.621.620.924.624.721.021.600.024.7
3LCB    00        R
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503AC011HED060000 1600000.728600360000125G'SZ00.0GOOD
504AC011CST060000 1600000.728600360000125G'SX35.1GOOD
505AC011CST028000 1600000.728600360000125G'SY00.0GOOD
506AC011CST060000 1600000.728600360000125G'SZ00.0GOOD
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509AC012HED060000 1600000.728600360000125G'SZ00.0GOOD
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511AC012CST028000 1600000.728600360000125G'SY00.0GOOD
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519LC012LBO-99990 1600999.928600360000125LBS0    GOOD
520LC012SHB-99990 1600999.928600360000125LBS0    GOOD
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522AC01NBCR028000 1600000.728600360000125G'SX35.1GOOD
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OCCUPANT RESPONSE COMPARISON TO FMVSS REQUIREMENTS 03/13/84

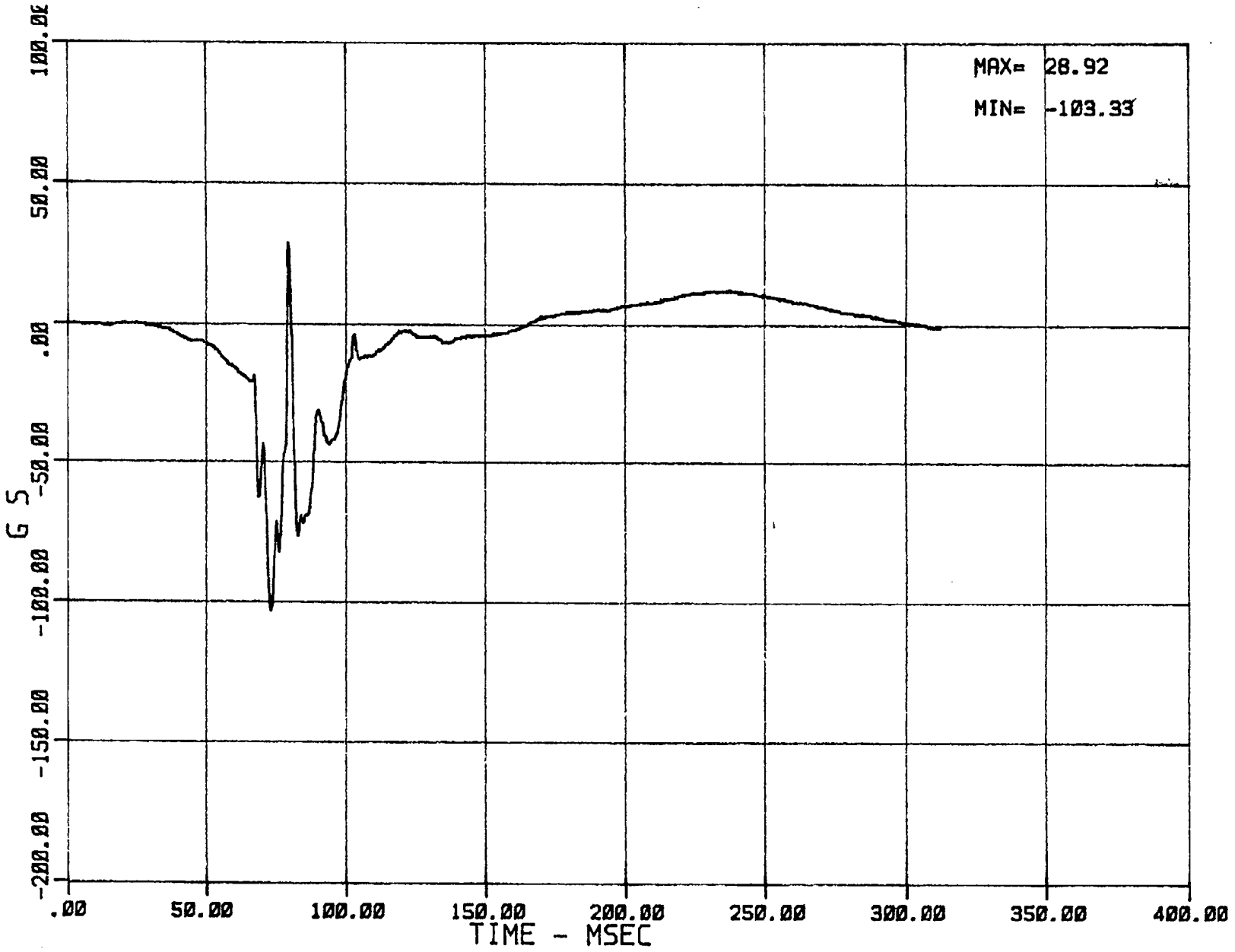
HIC

VEHICLE	OCCUPANT	HIC	T1	T2	T2-T1	*COMP. MARG.
1984 Dodge Caravan	Driver	973.39	67.75	98.12	30.37	0.97
1984 Dodge Caravan	Passenger	1199.99	50.25	131.38	81.13	1.20

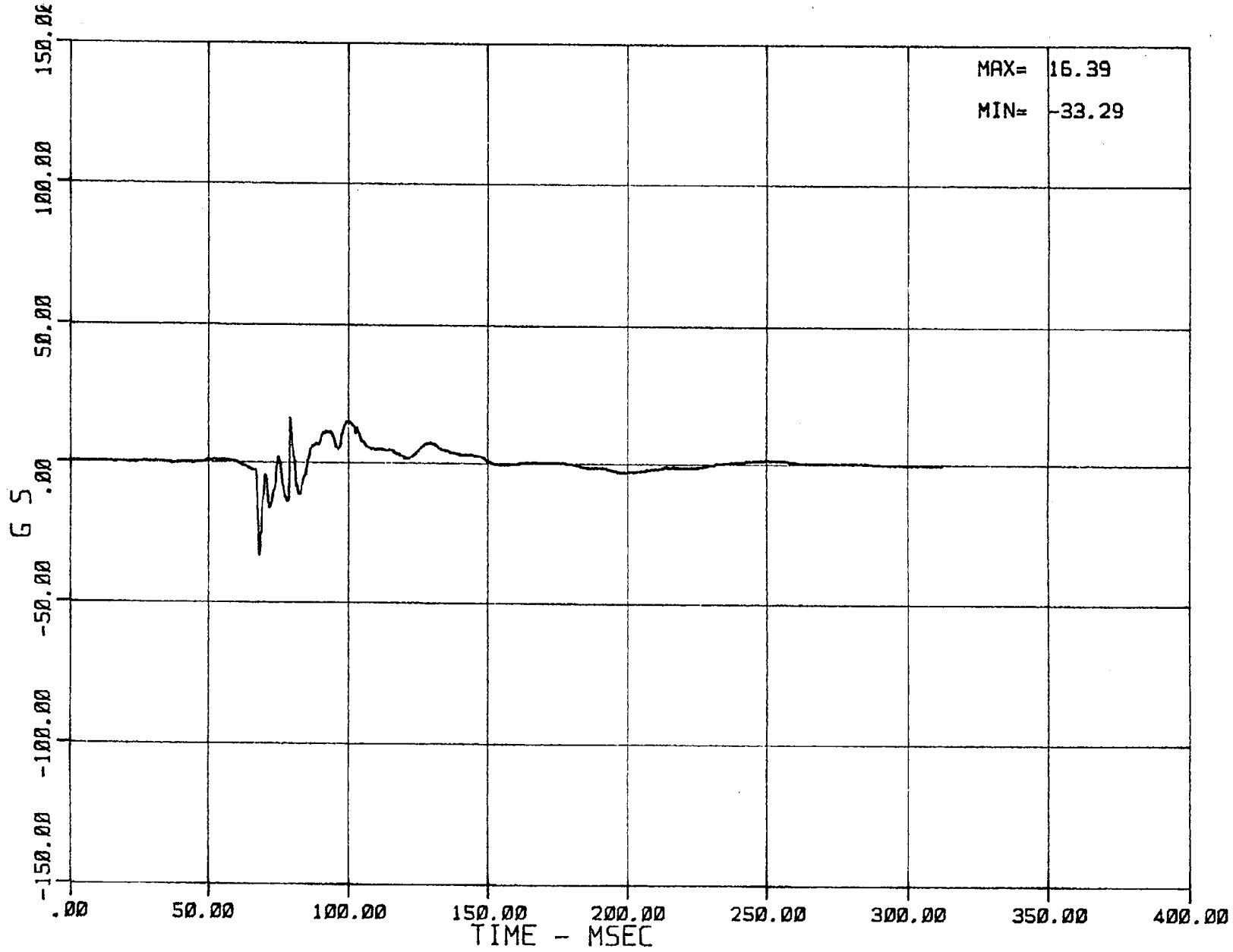
CHEST RESULTANT ACCELERATION, 3 MSEC CLIPPED PEAK

VEHICLE	OCCUPANT	REQUIREMENT	RESPONSE	*COMP. MARG.
1984 Dodge Caravan	Driver	60.0	43.8	0.73
1984 Dodge Caravan	Passenger	60.0	42.4	0.71

*Values Greater Than 1 Represent Non-Compliance.



Ø1 AC Ø1 1 HED X (DRIVER HEAD ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



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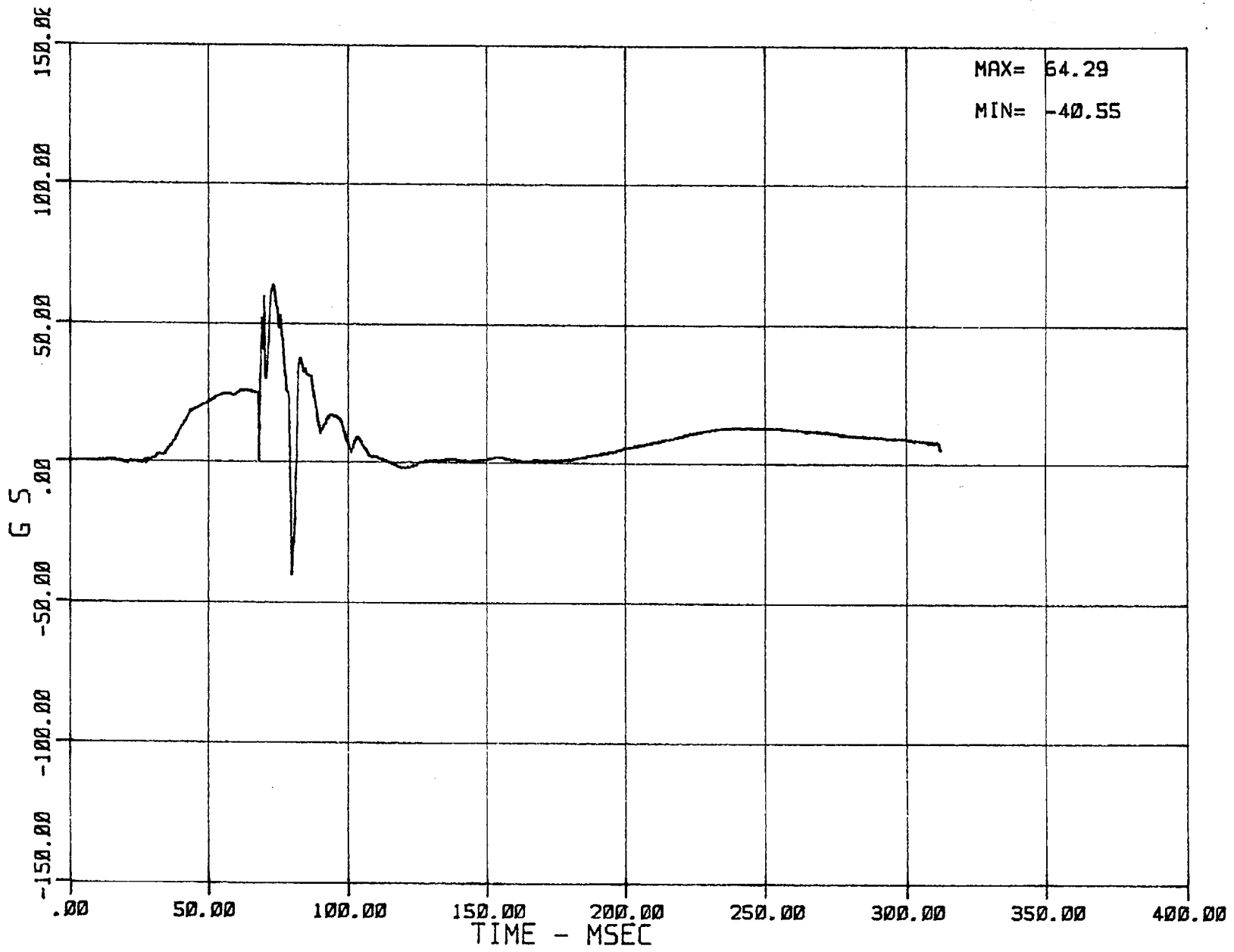
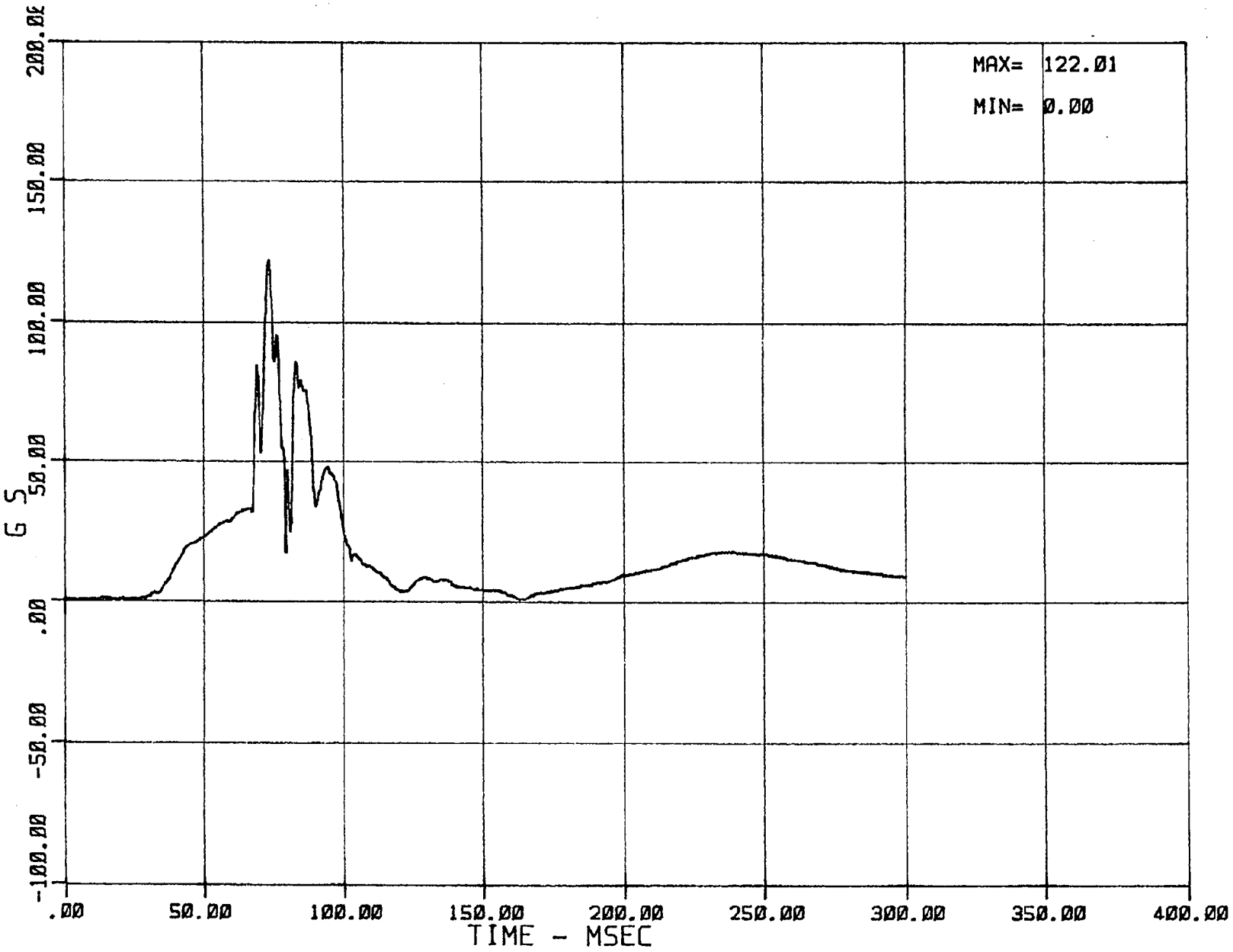
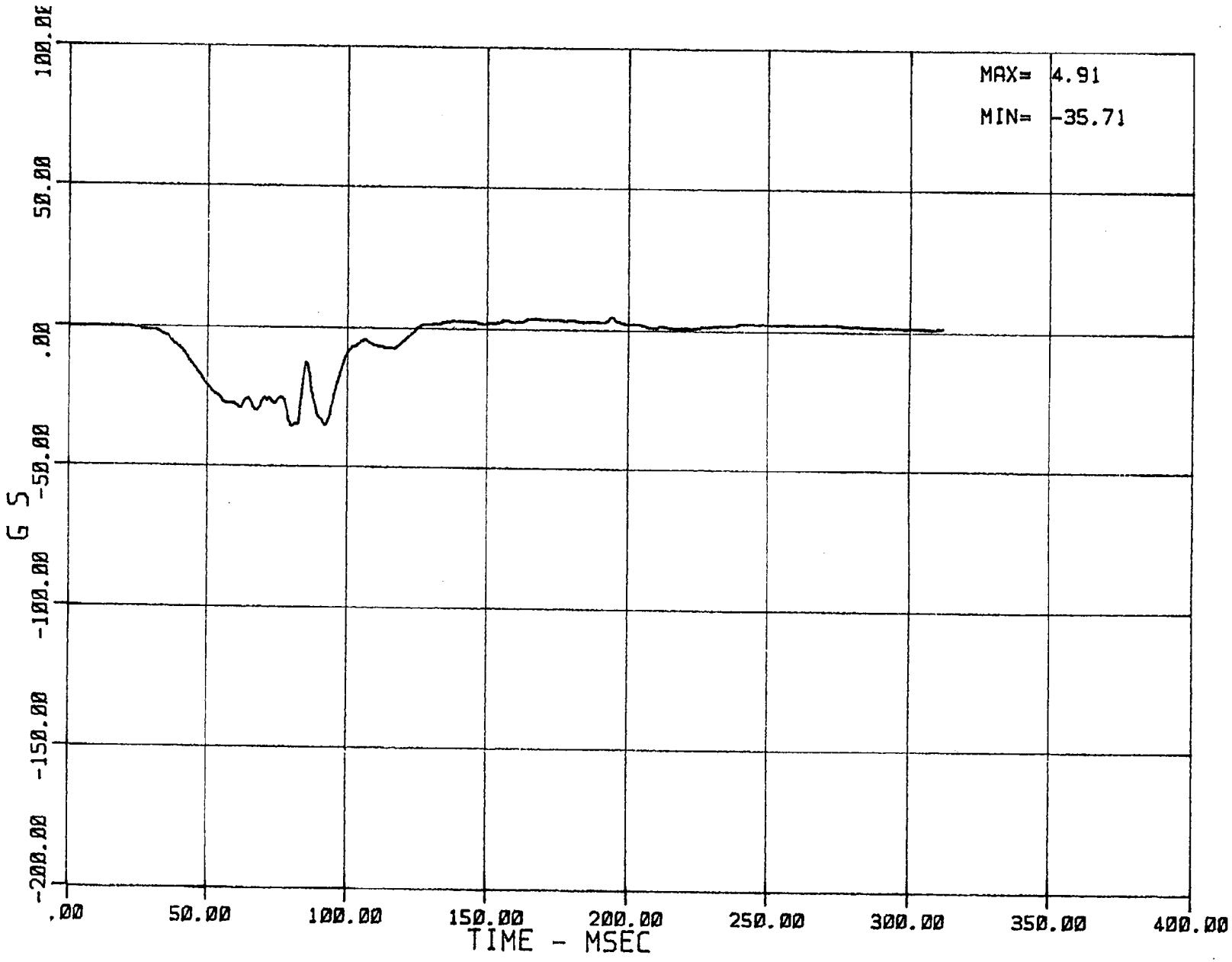
MSE N07054 1984 DODGE CARAVAN Ø3/13/84



Ø3 AC Ø1 1 HED Z (DRIVER HEAD ACCEL. -- Z AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84

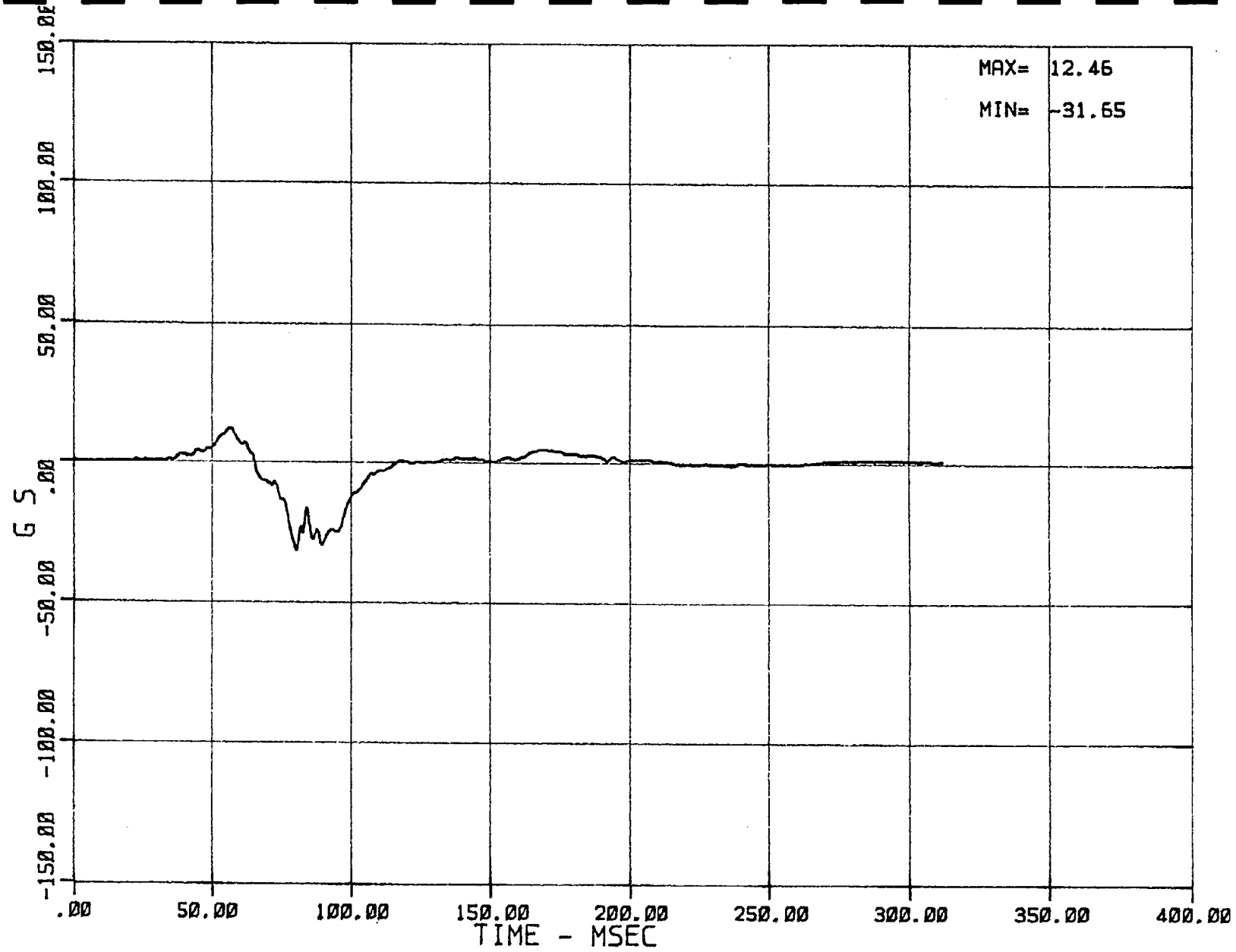


DRIVER HEAD RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN 03/13/84



Ø4 AC Ø1 1 CST X (DRIVER CHEST ACCEL. -- X AXIS)
MSE NØ7Ø54 1984 DODGE CARAVAN

Ø3/13/84



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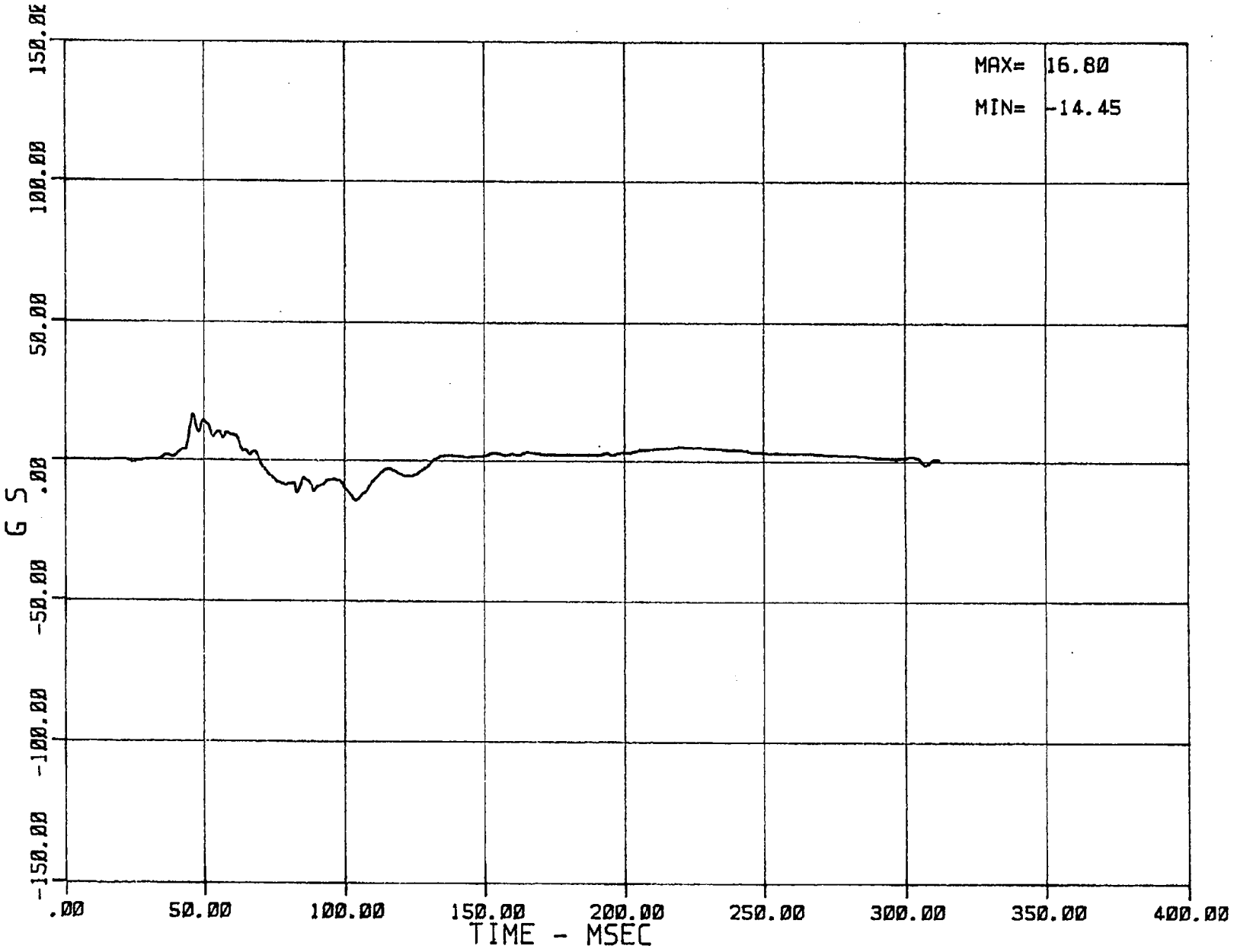
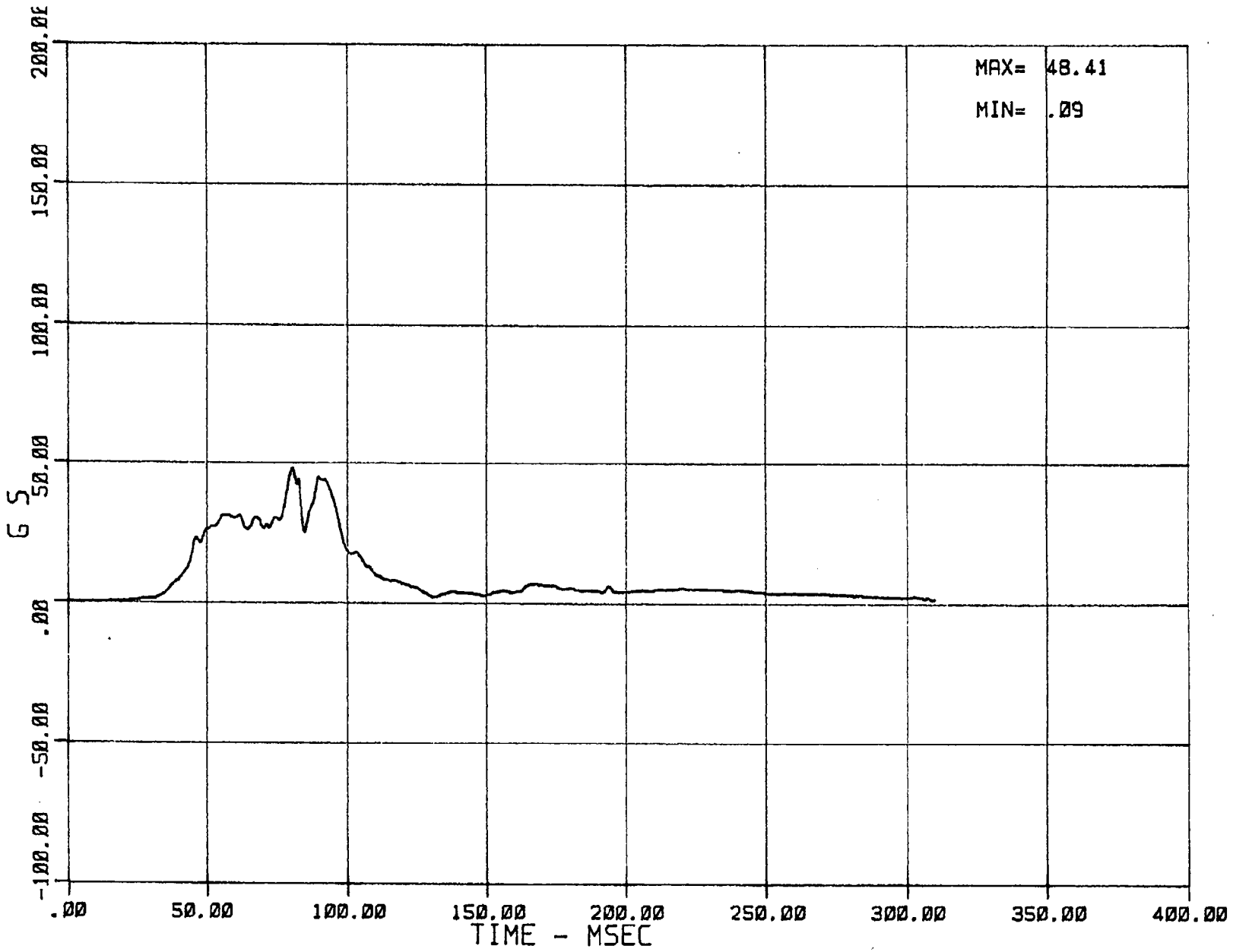
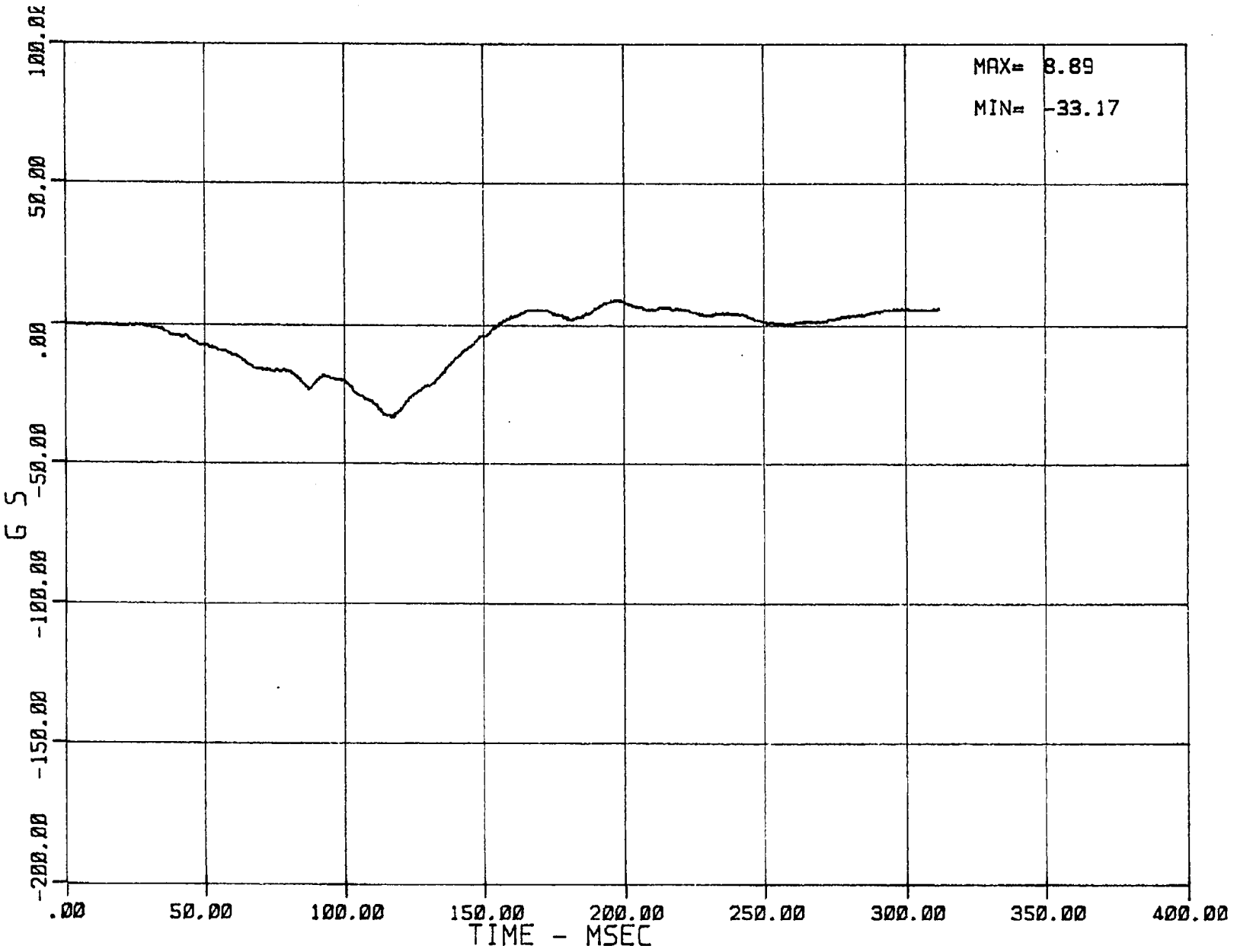
MSE N07054 1984 DODGE CARAVAN 03/13/84



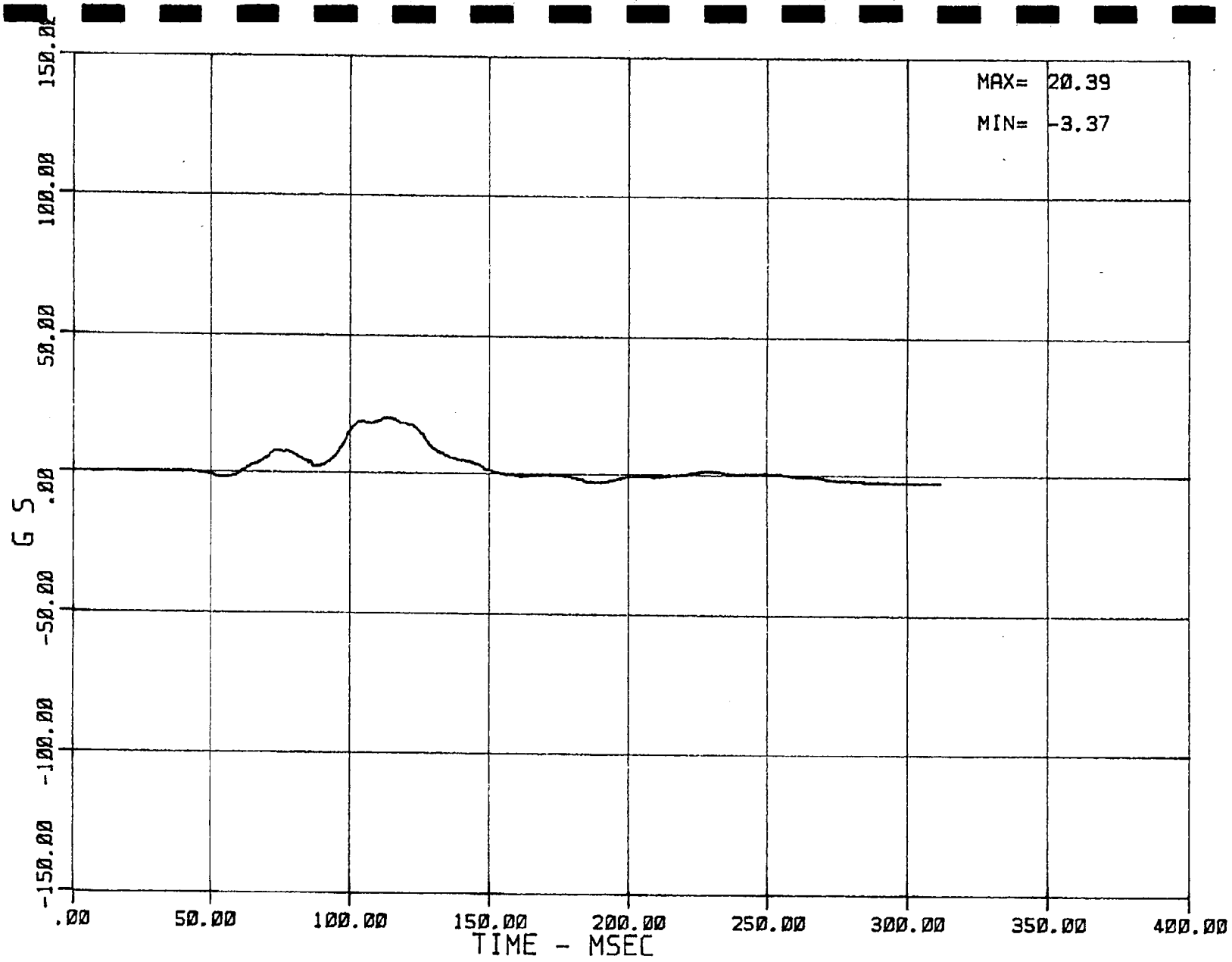
Ø6 AC Ø1 1 CST Z (DRIVER CHEST ACCEL. -- Z AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



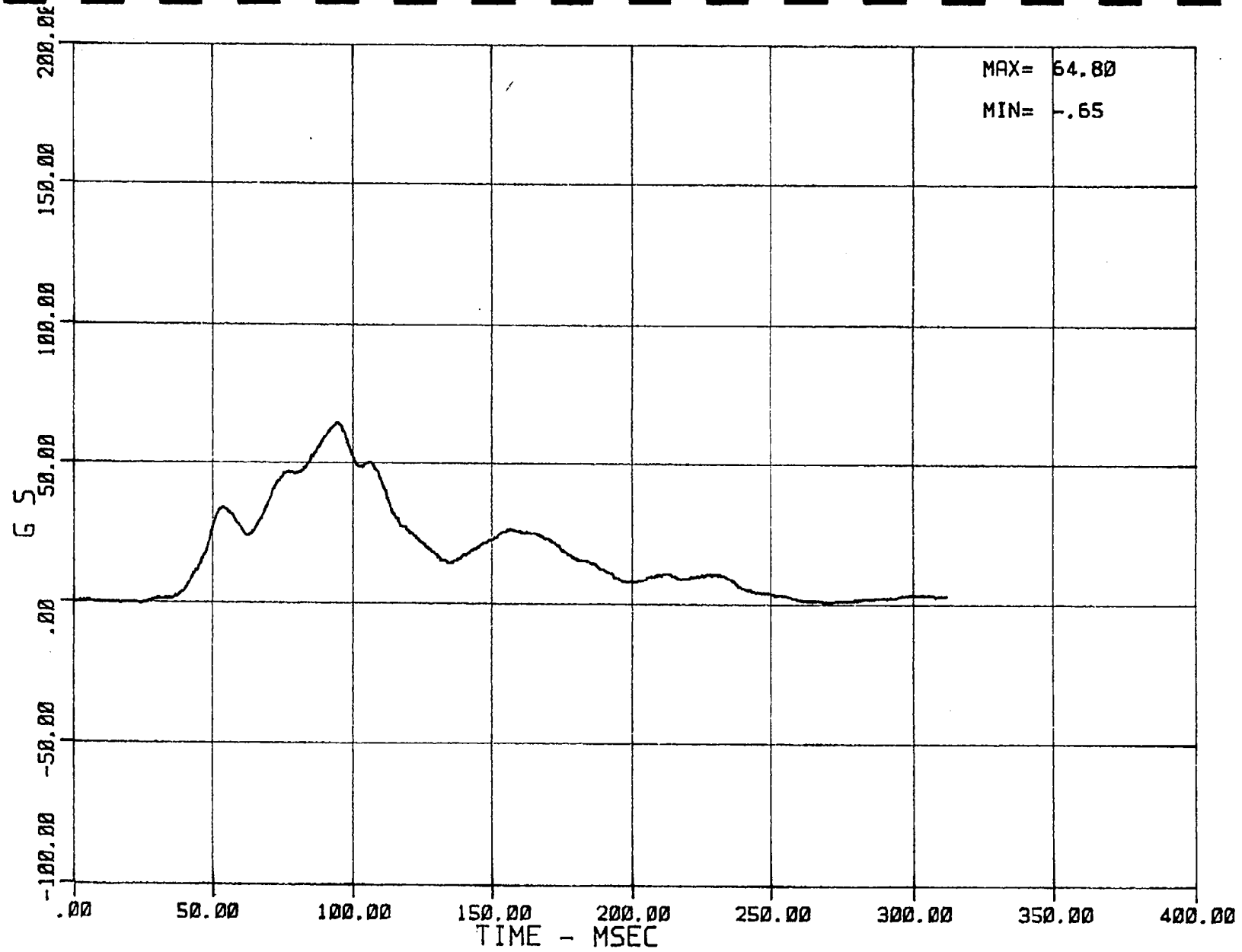
DRIVER CHEST RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN 03/13/84



Ø7 AC Ø1 2 HED X (PASSENGER HEAD ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



08 AC 01 2 HED Y (PASSENGER HEAD ACCEL. -- Y AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



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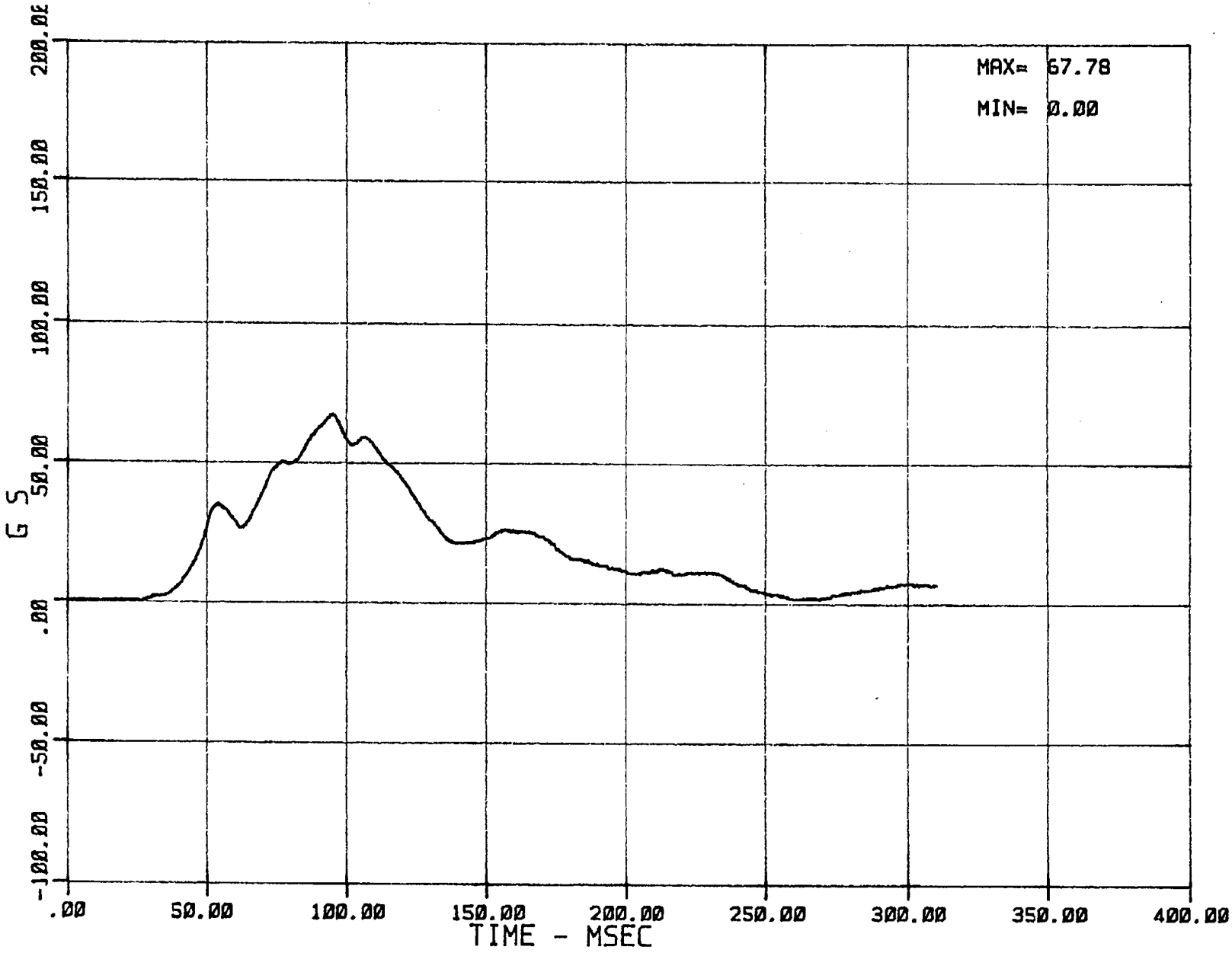
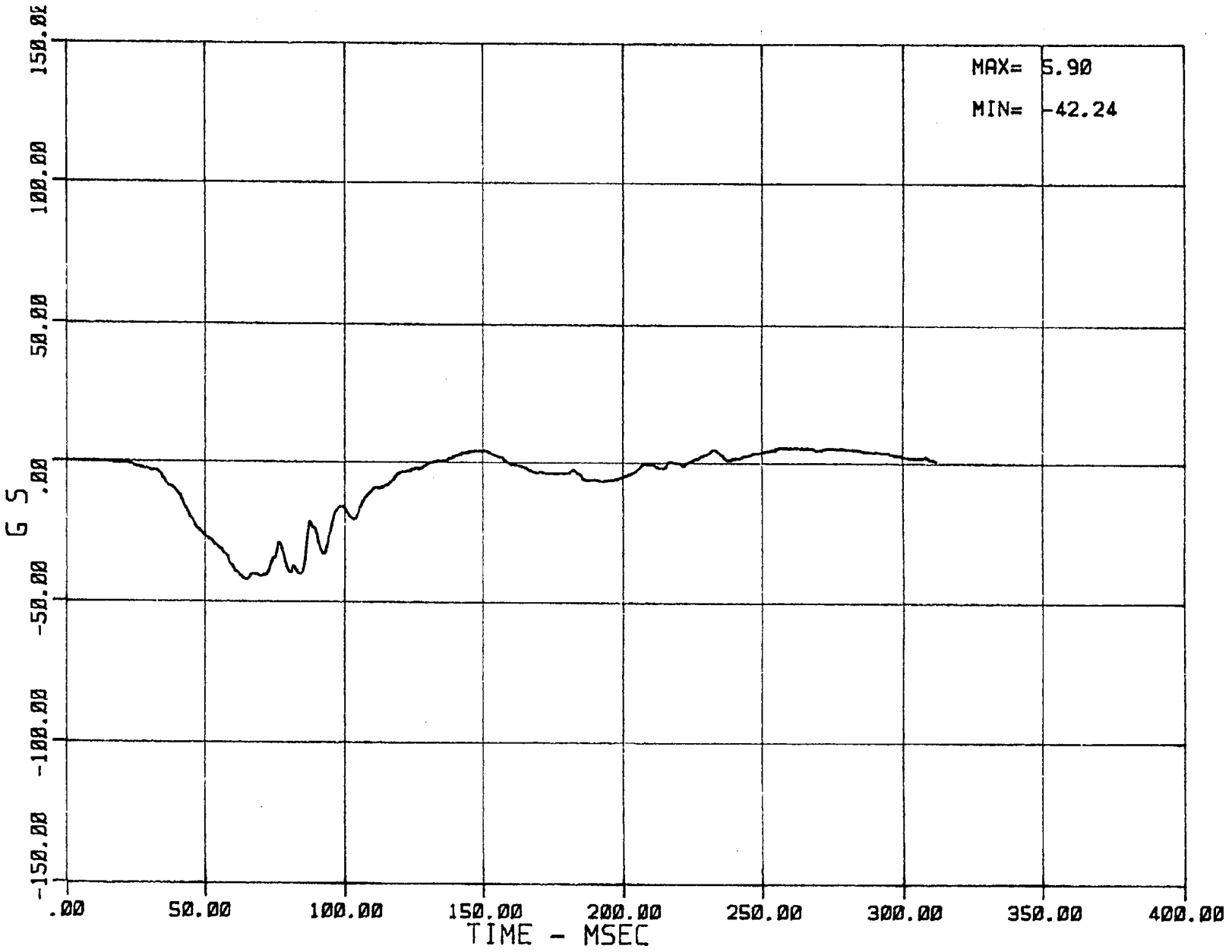
MSE N07054 1984 DODGE CARAVAN 03/13/84



PASSENGER HEAD RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN 03/13/84



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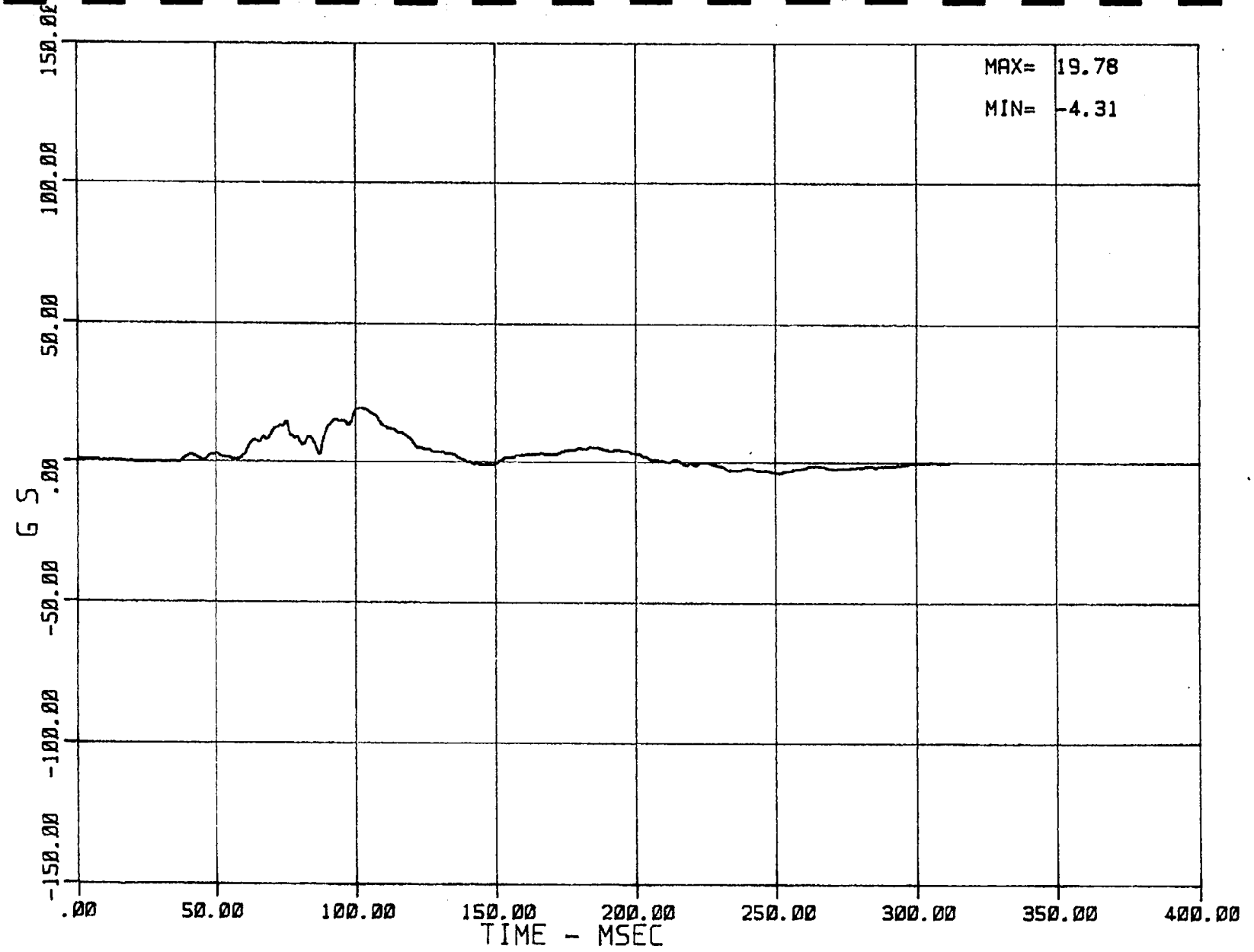
MSE N07054 1984 DODGE CARAVAN 03/13/84



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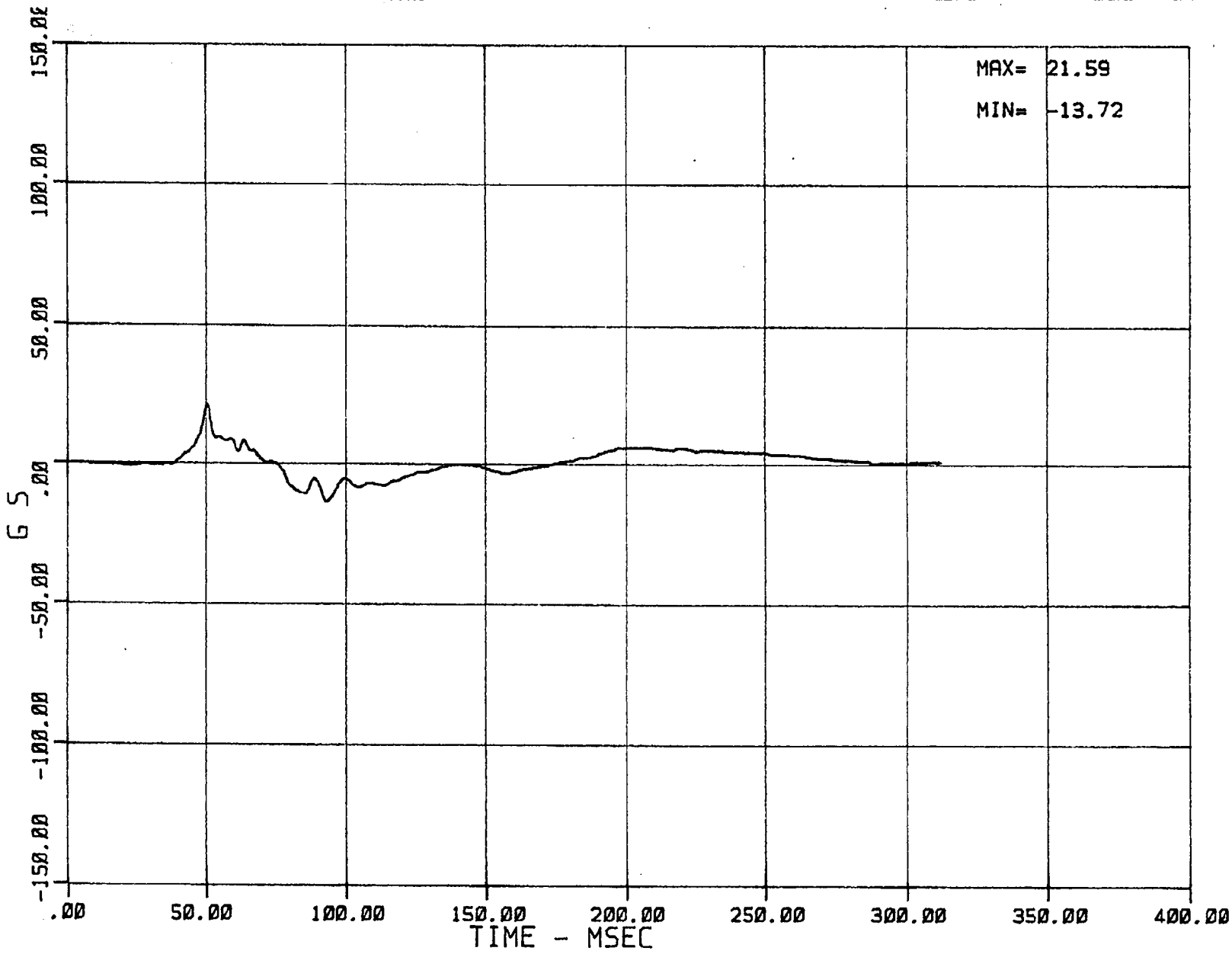
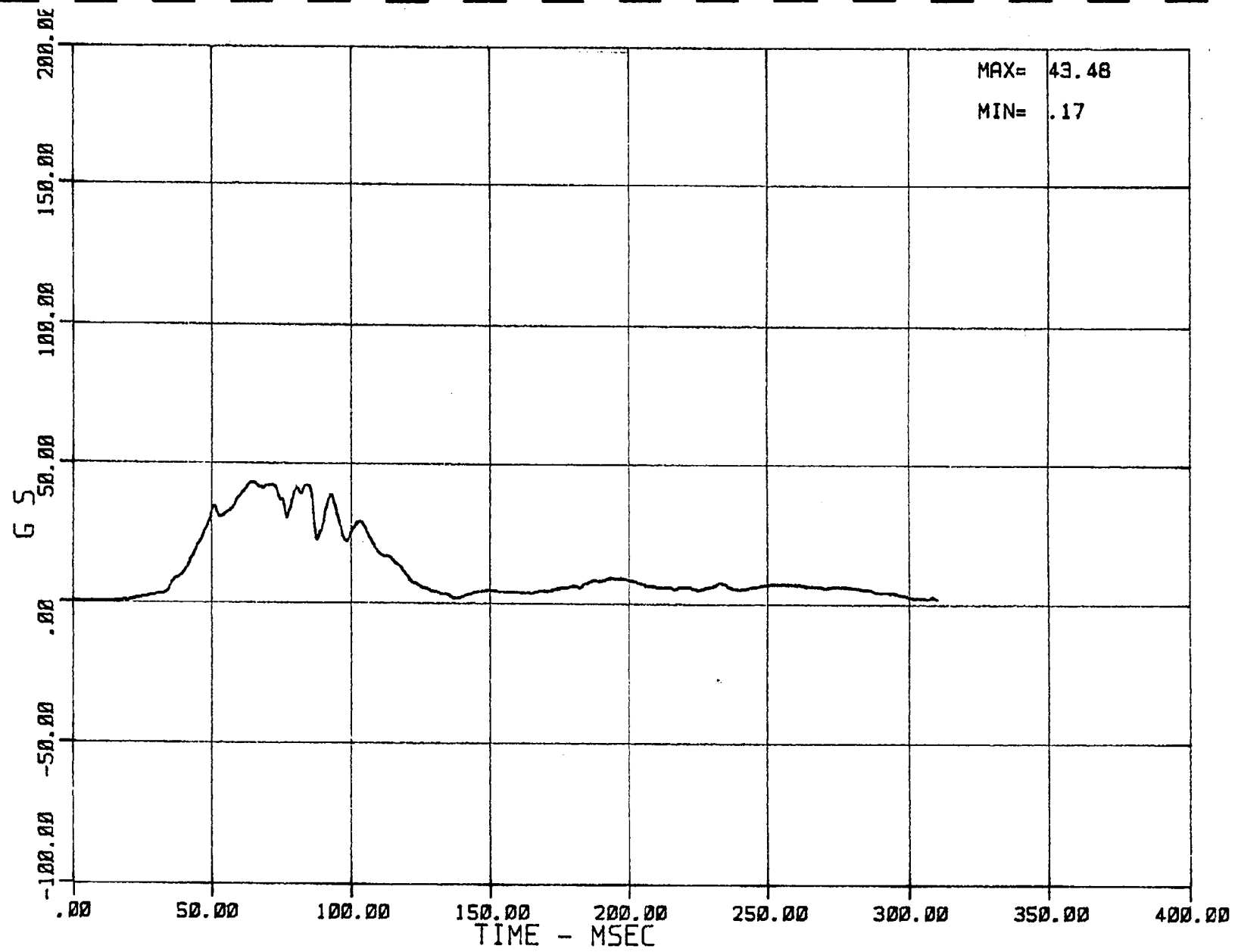
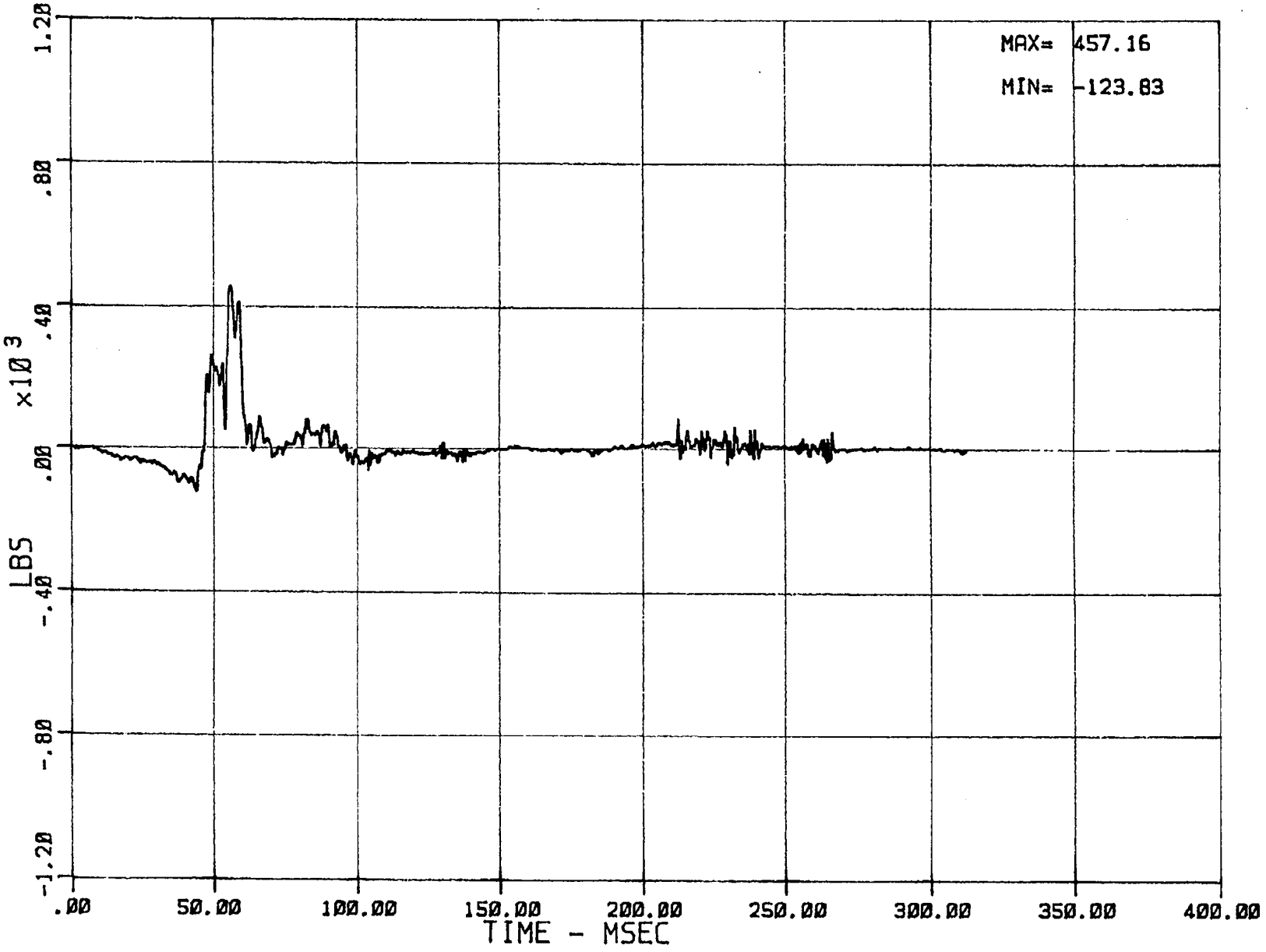
MSE N07054 1984 DODGE CARAVAN 03/13/84



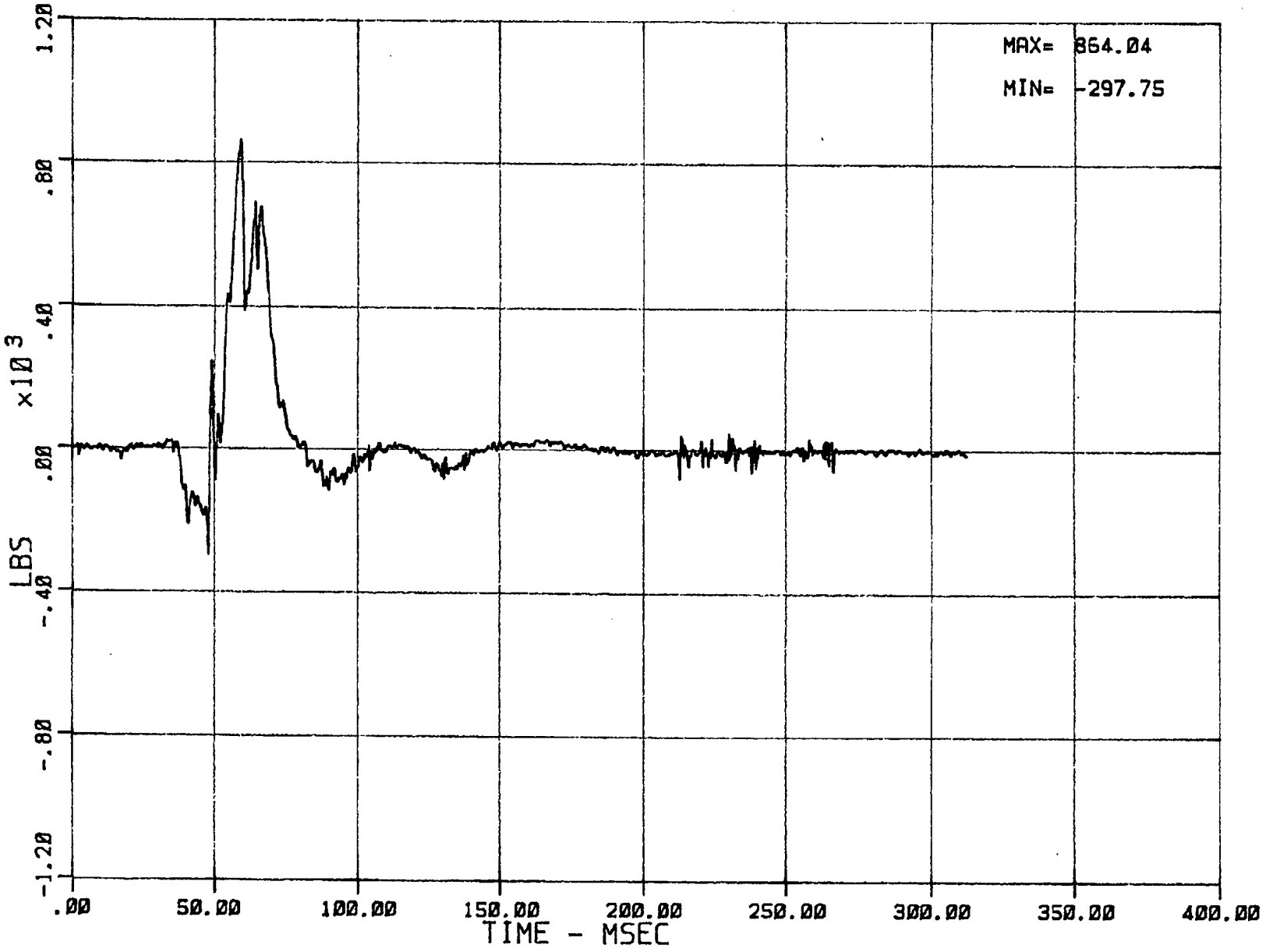
12 AC Ø1 2 CST Z (PASSENGER CHEST ACCEL. -- Z AXIS)
MSE NØ7054 1984 DODGE CARAVAN 03/13/84



PASSENGER CHEST RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN 03/13/84

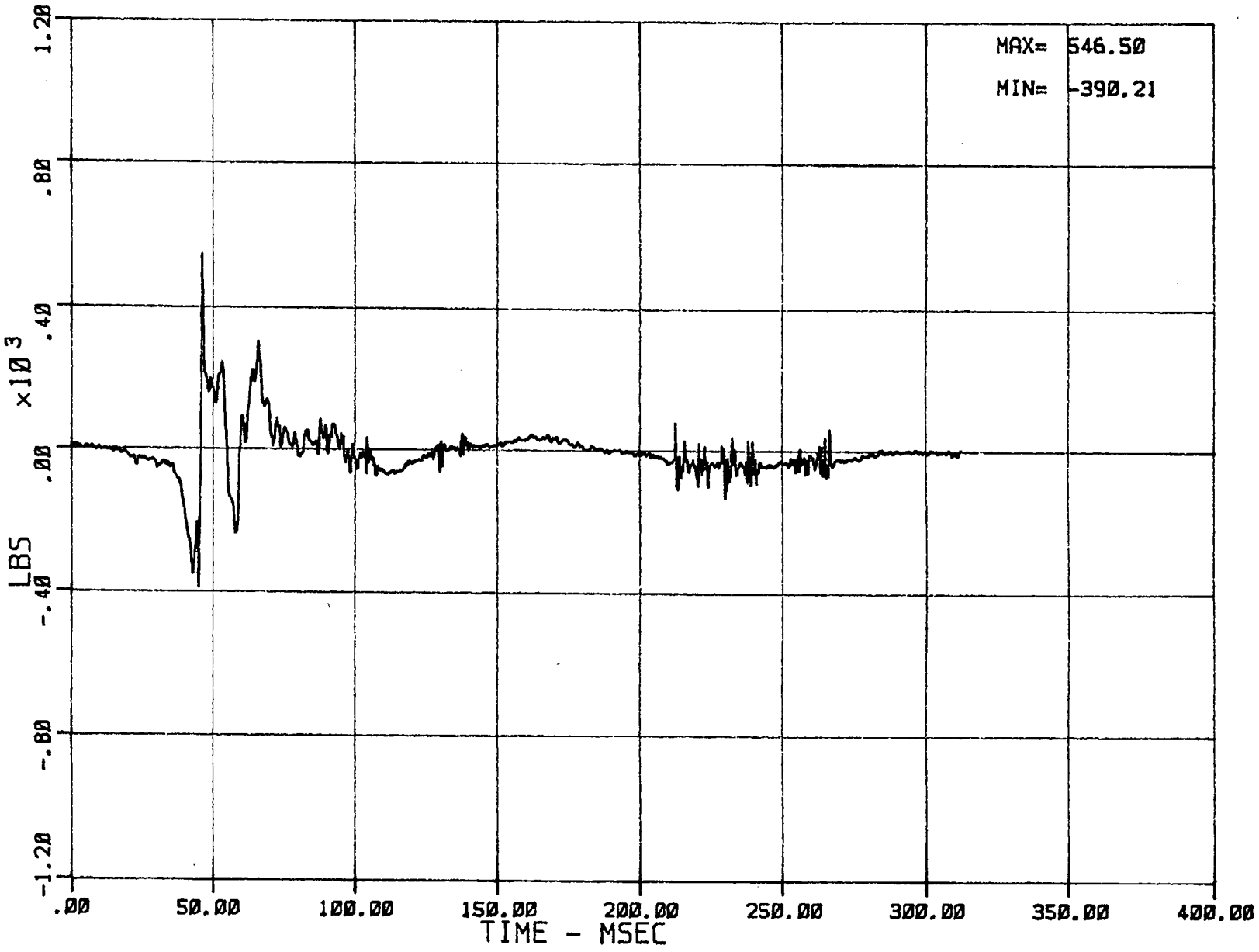


13 LC 01 1 LFM (DRIVER LEFT FEMUR FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84

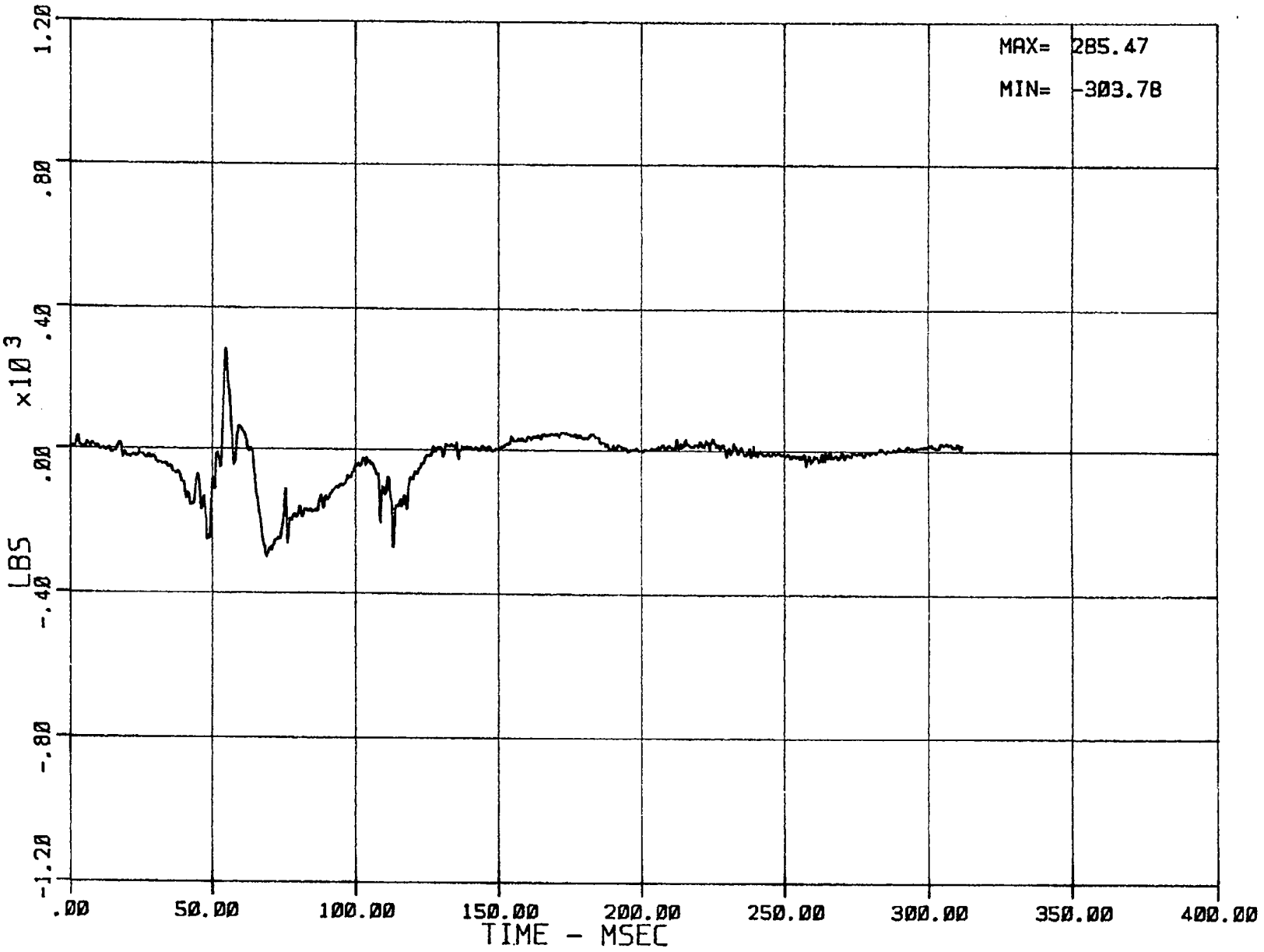


14 LC 01 1 RFM (DRIVER RIGHT FEMUR FORCE)
MSE N07054 1984 DODGE CARAVAN

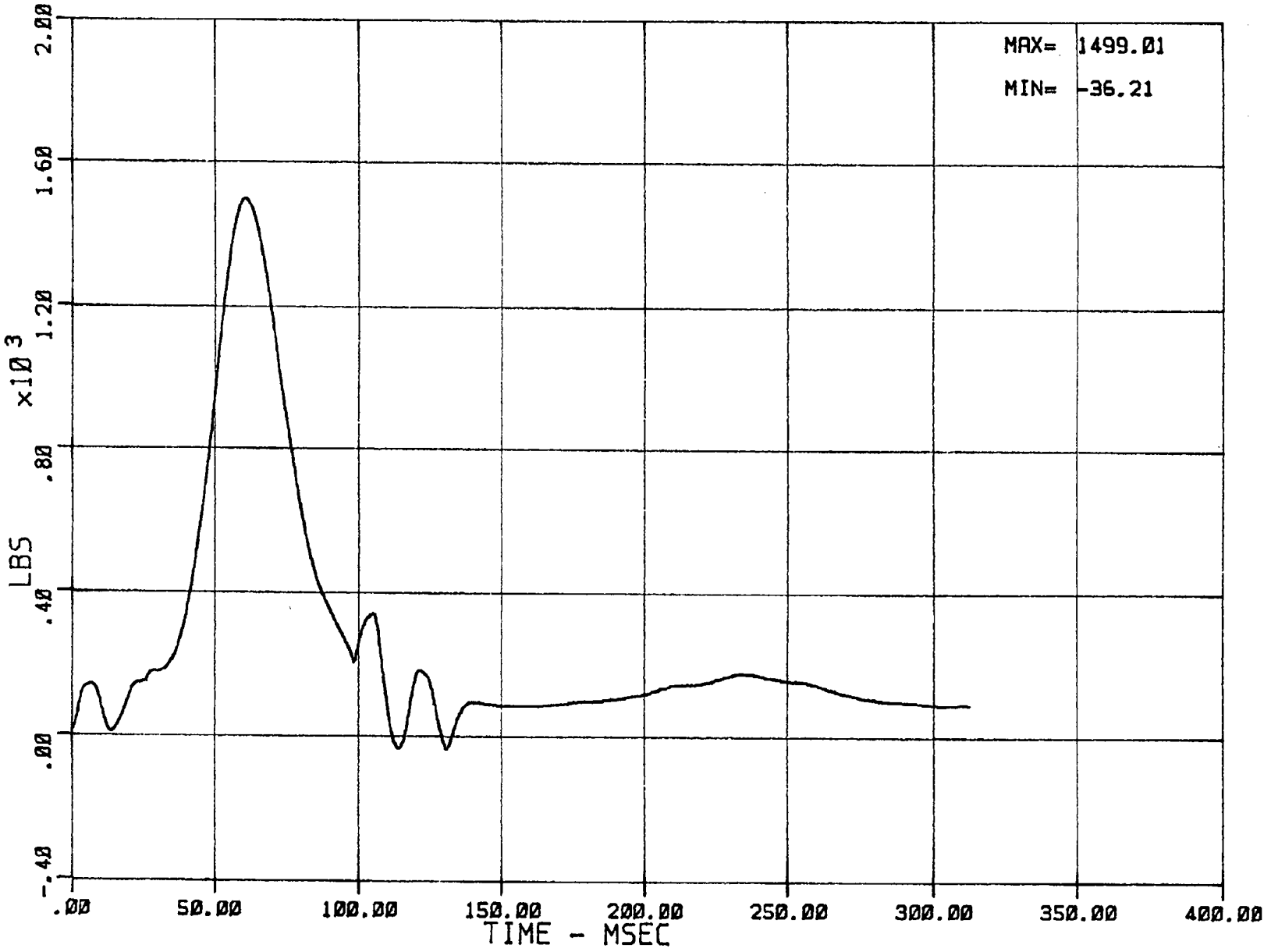
03/13/84



15 LC 01 2 LFM (PASSENGER LEFT FEMUR FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84

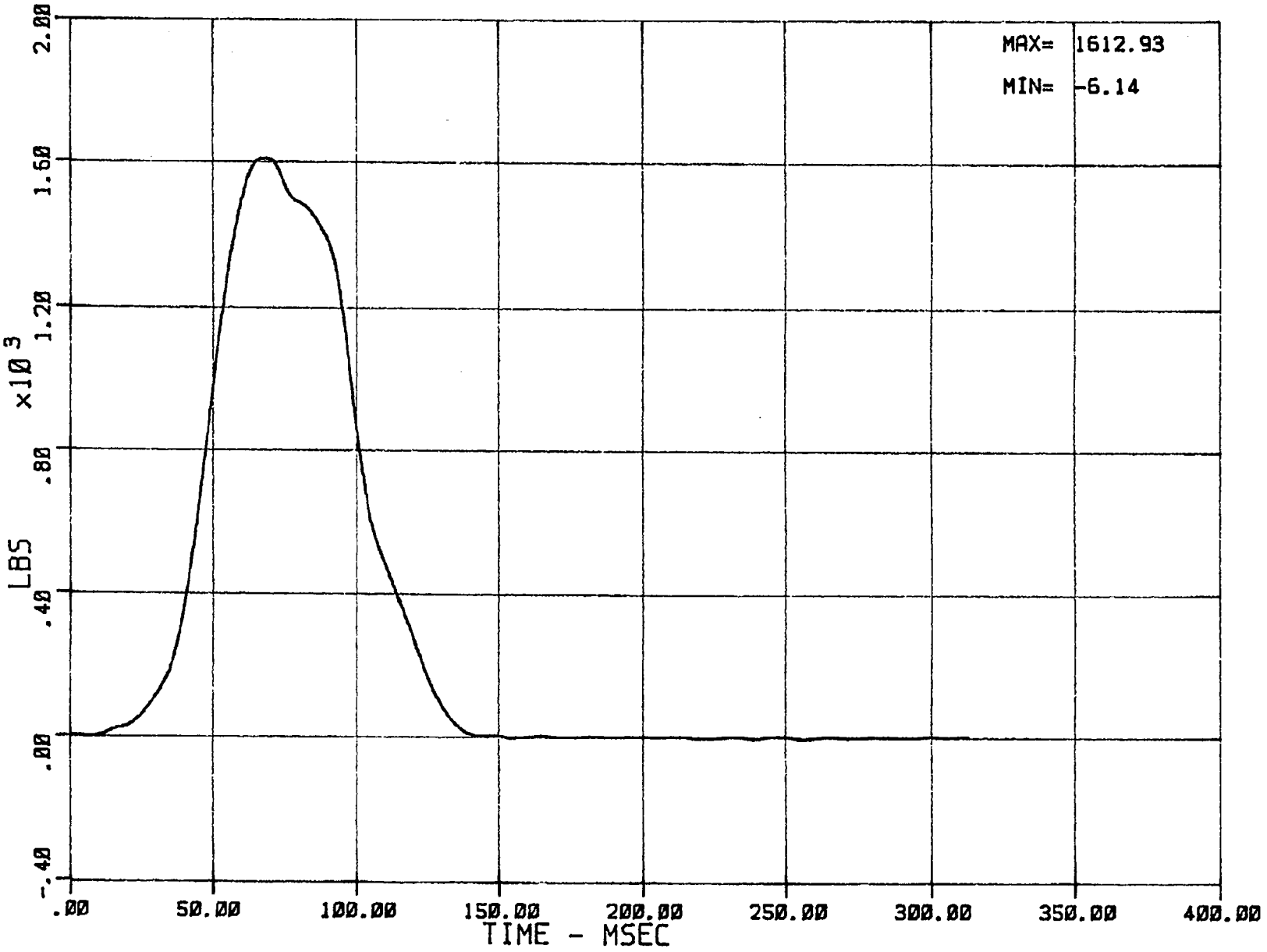


16 LC 01 2 RFM (PASSENGER RIGHT FEMUR FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84

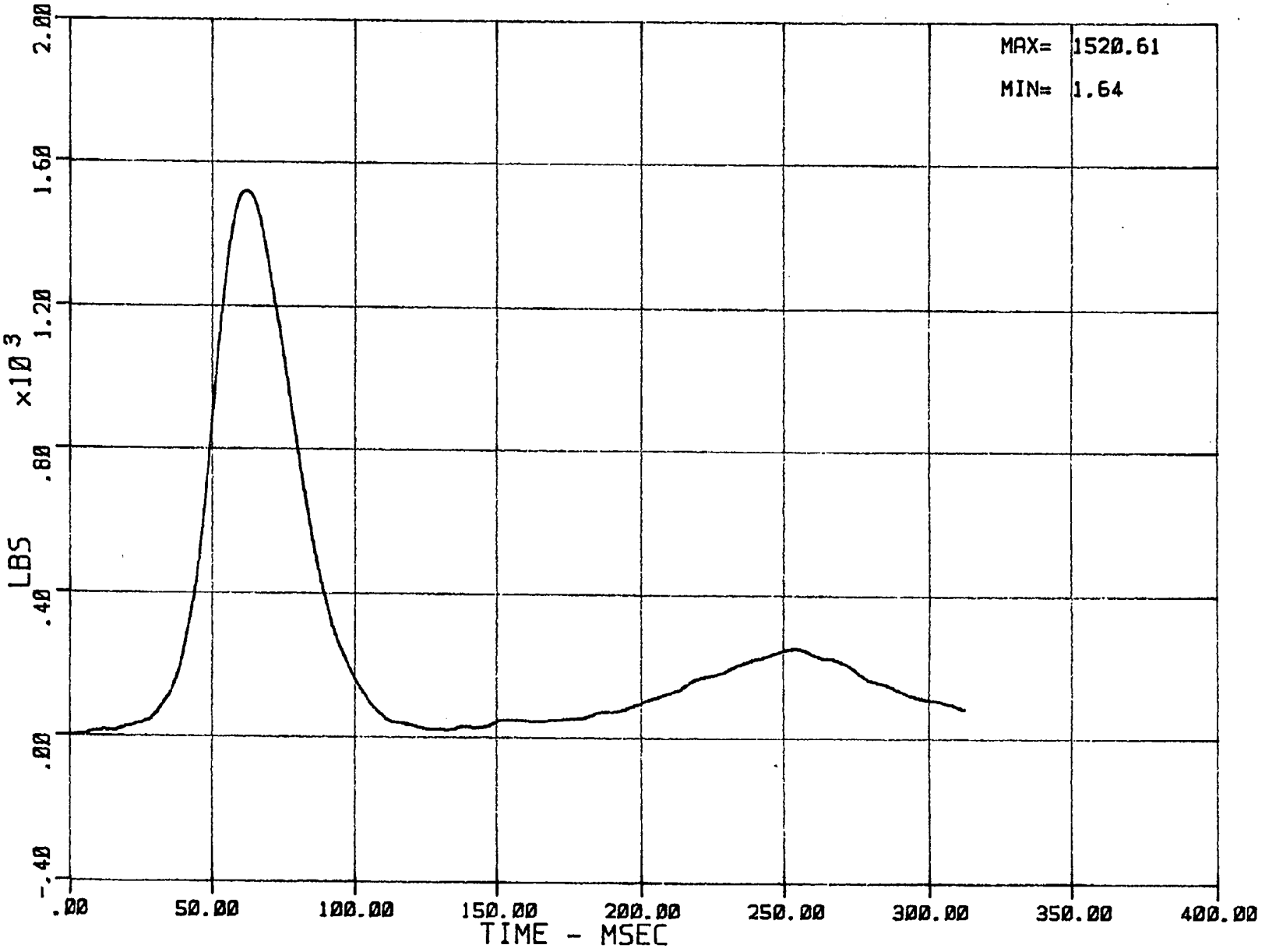


17 LC 01 1 LBO (DRIVER LAP BELT FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

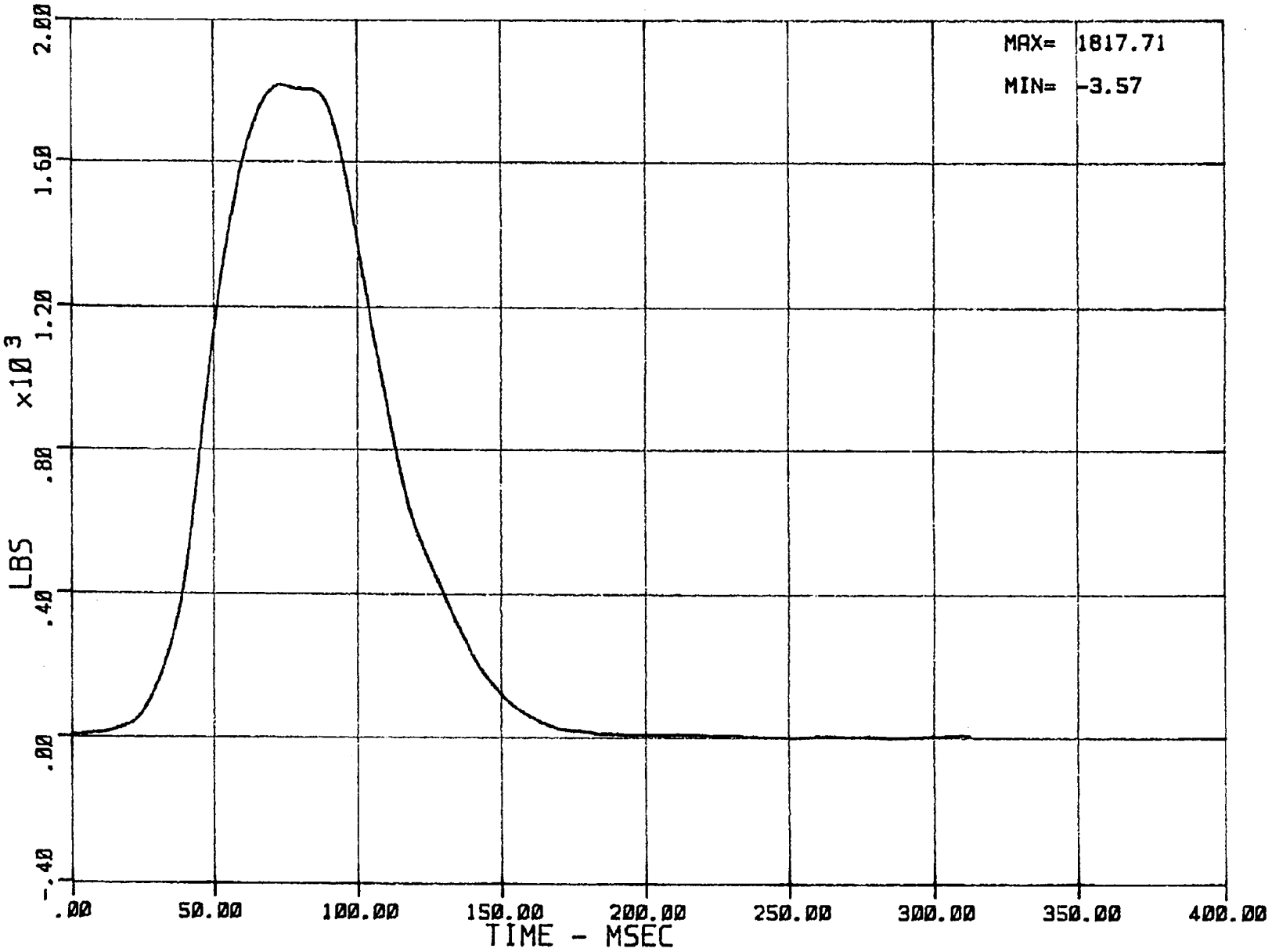


18 LC 01 1 SHB (DRIVER SHOULDER BELT FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84



19 LC 01 2 LBO (PASSENGER LAP BELT FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



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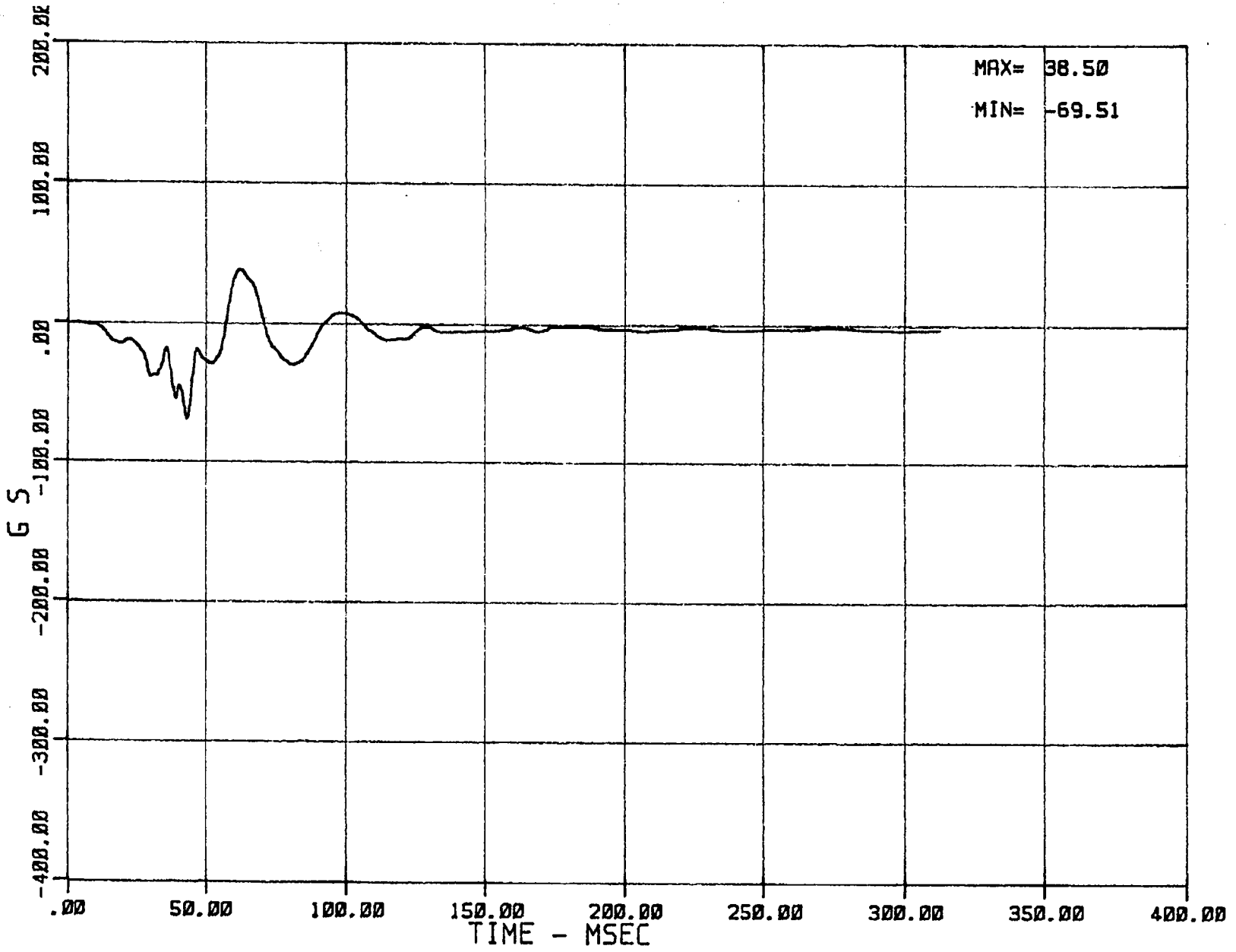
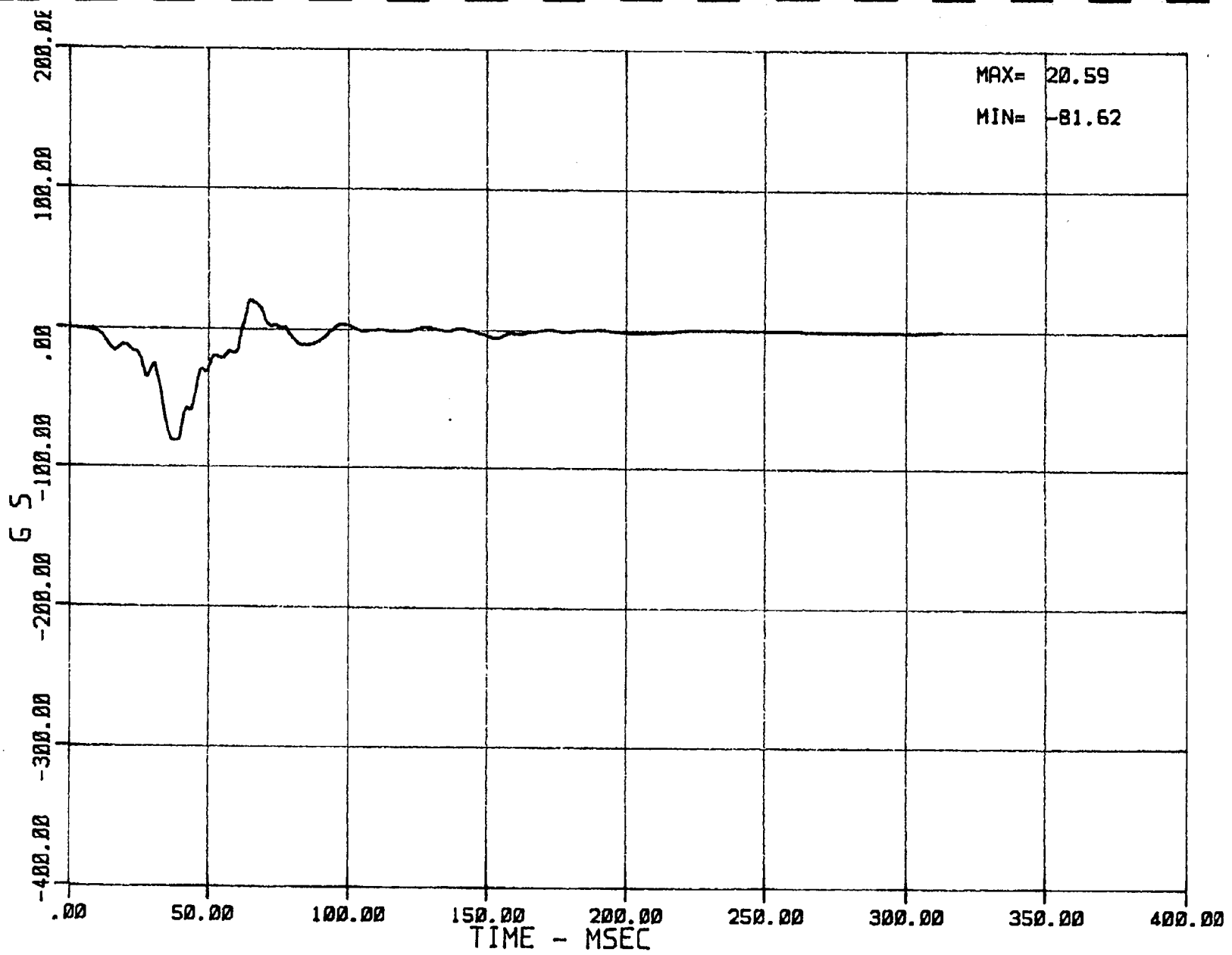
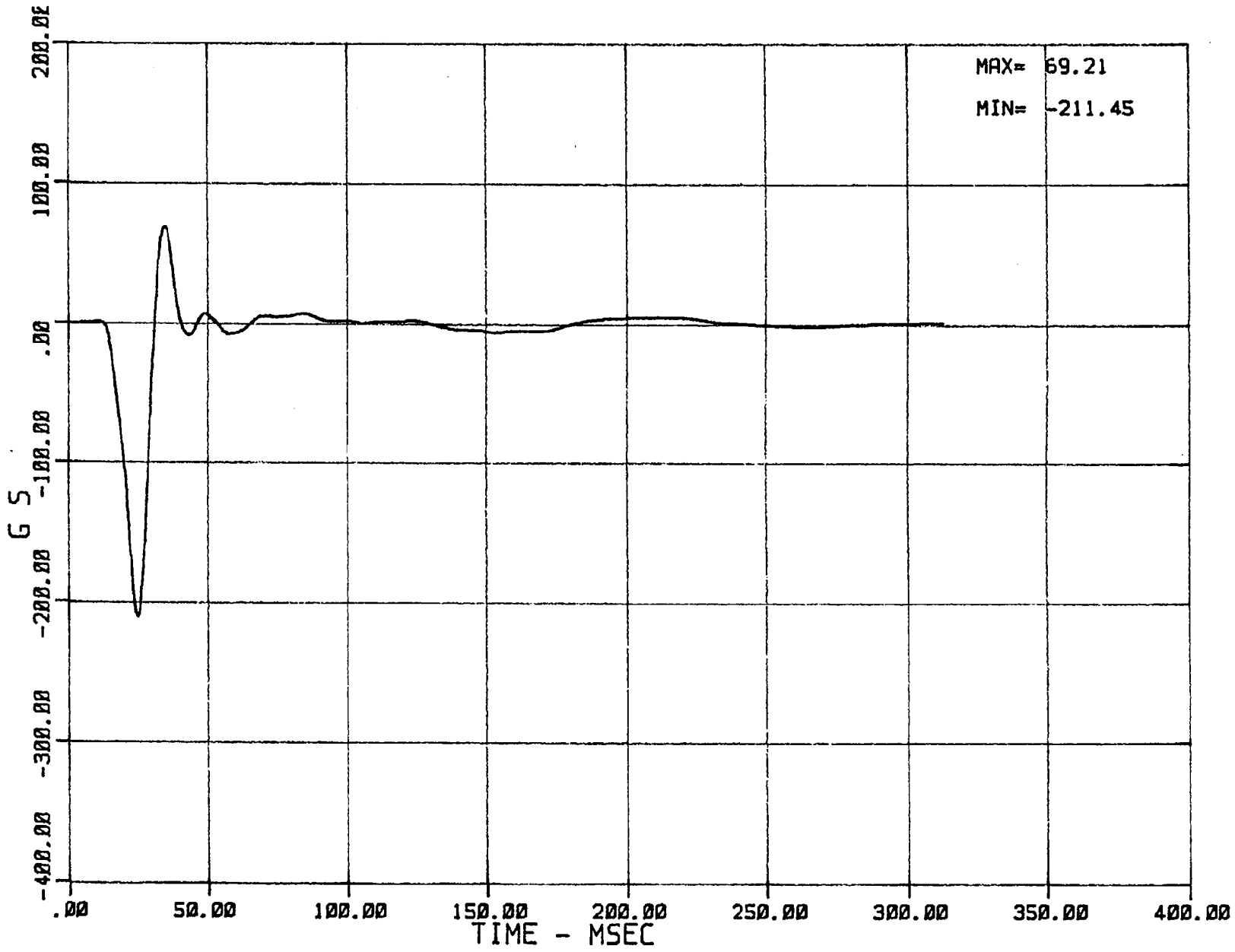
MSE N07054 1984 DODGE CARAVAN 03/13/84



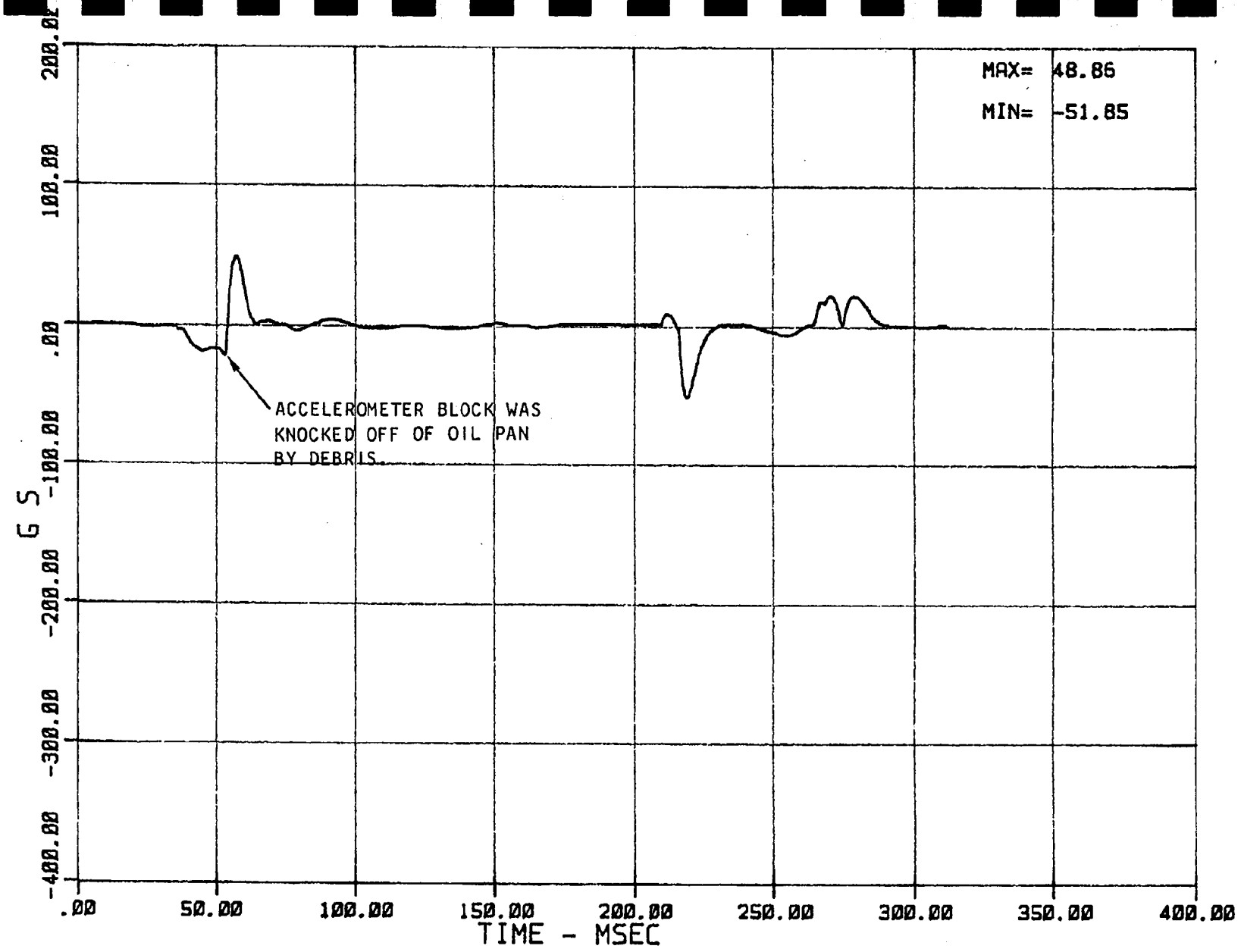
21 AC 01 N BCL X (LEFT FRONT WHEEL ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



22 AC 01 N BCR X (RIGHT FRONT WHEEL ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



23 AC 01 N ENG X (TOP OF ENGINE ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



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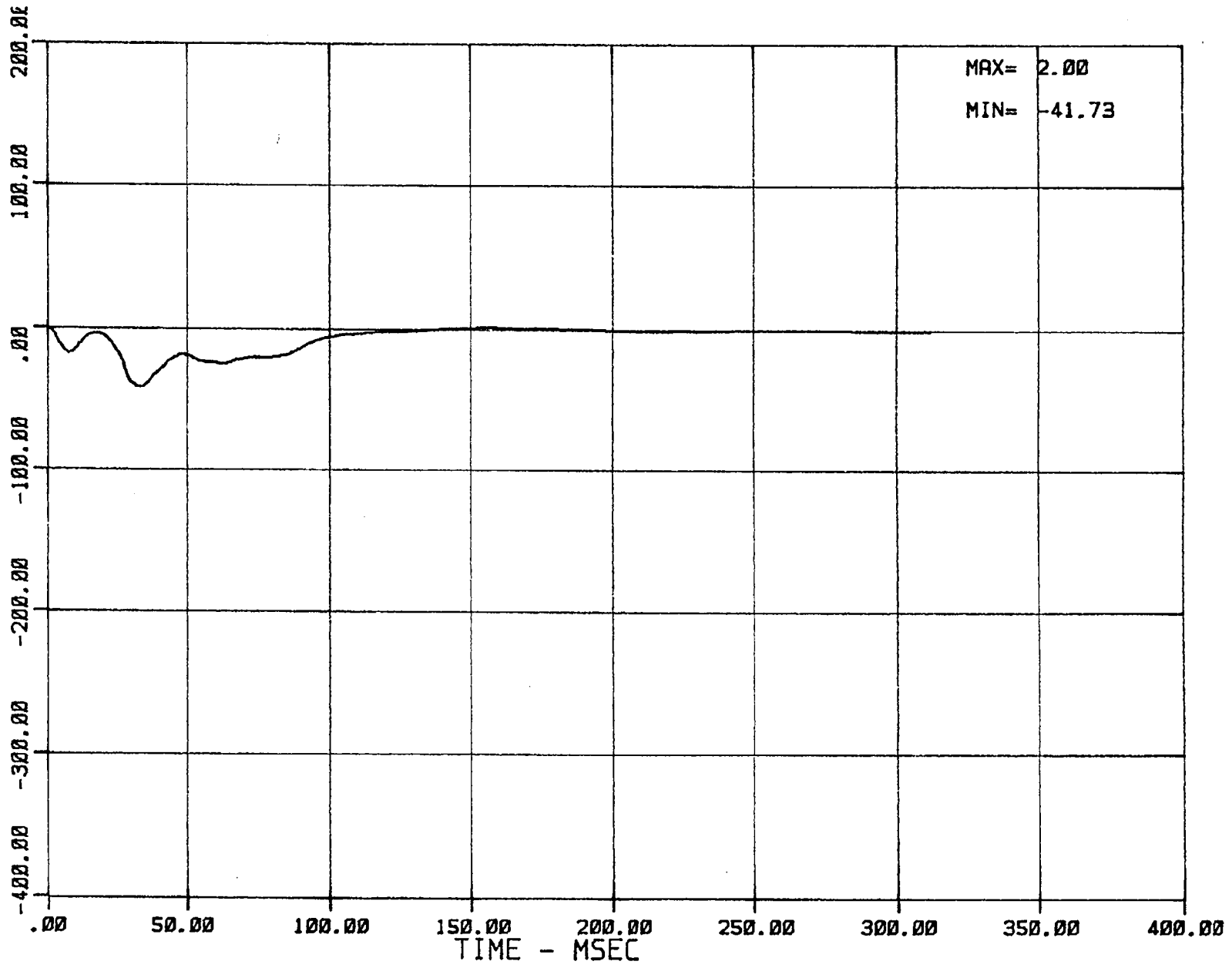
MSE N07054 1984 DODGE CARAVAN 03/13/84



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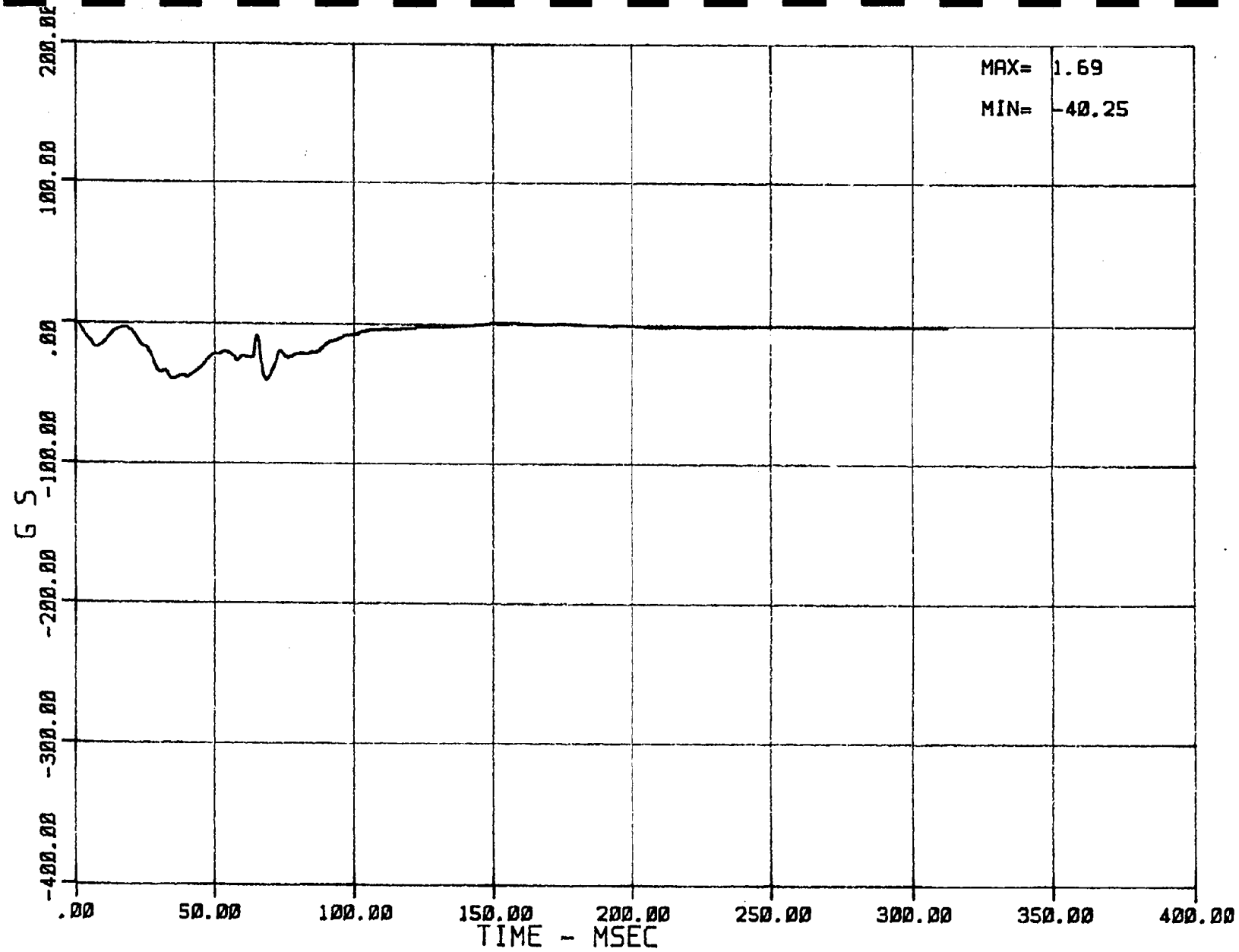
MSE N07054 1984 DODGE CARAVAN 03/13/84



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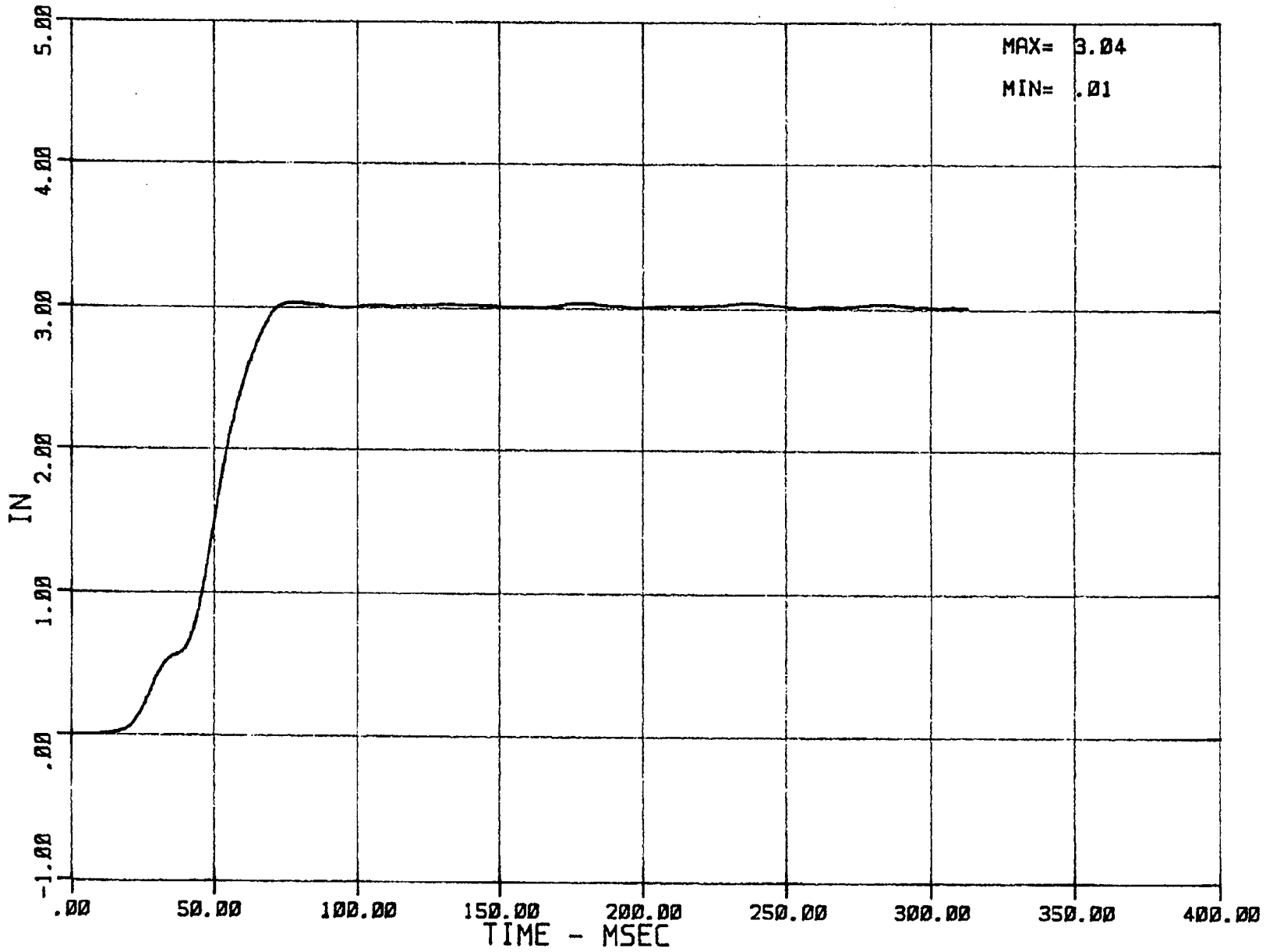
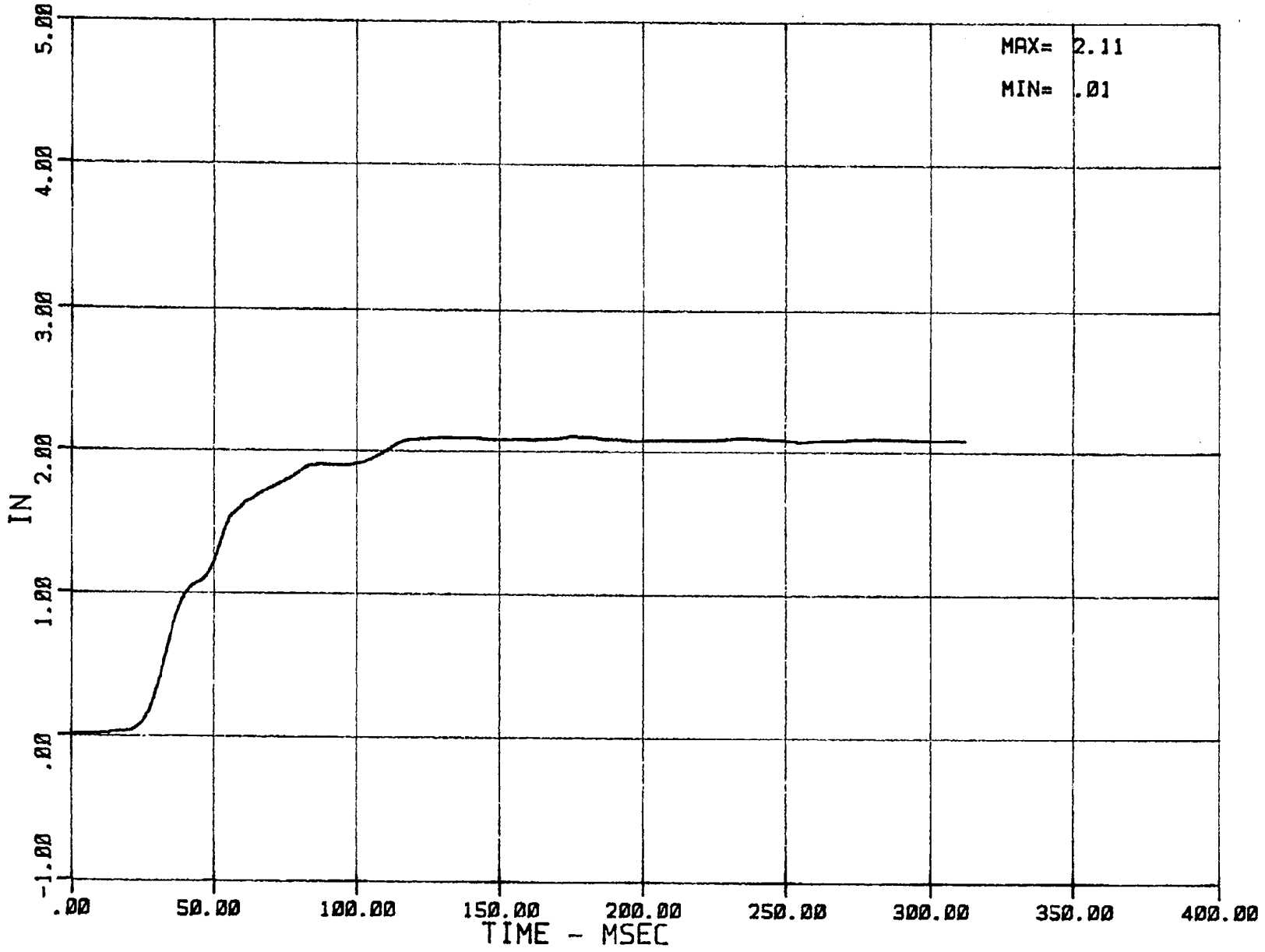
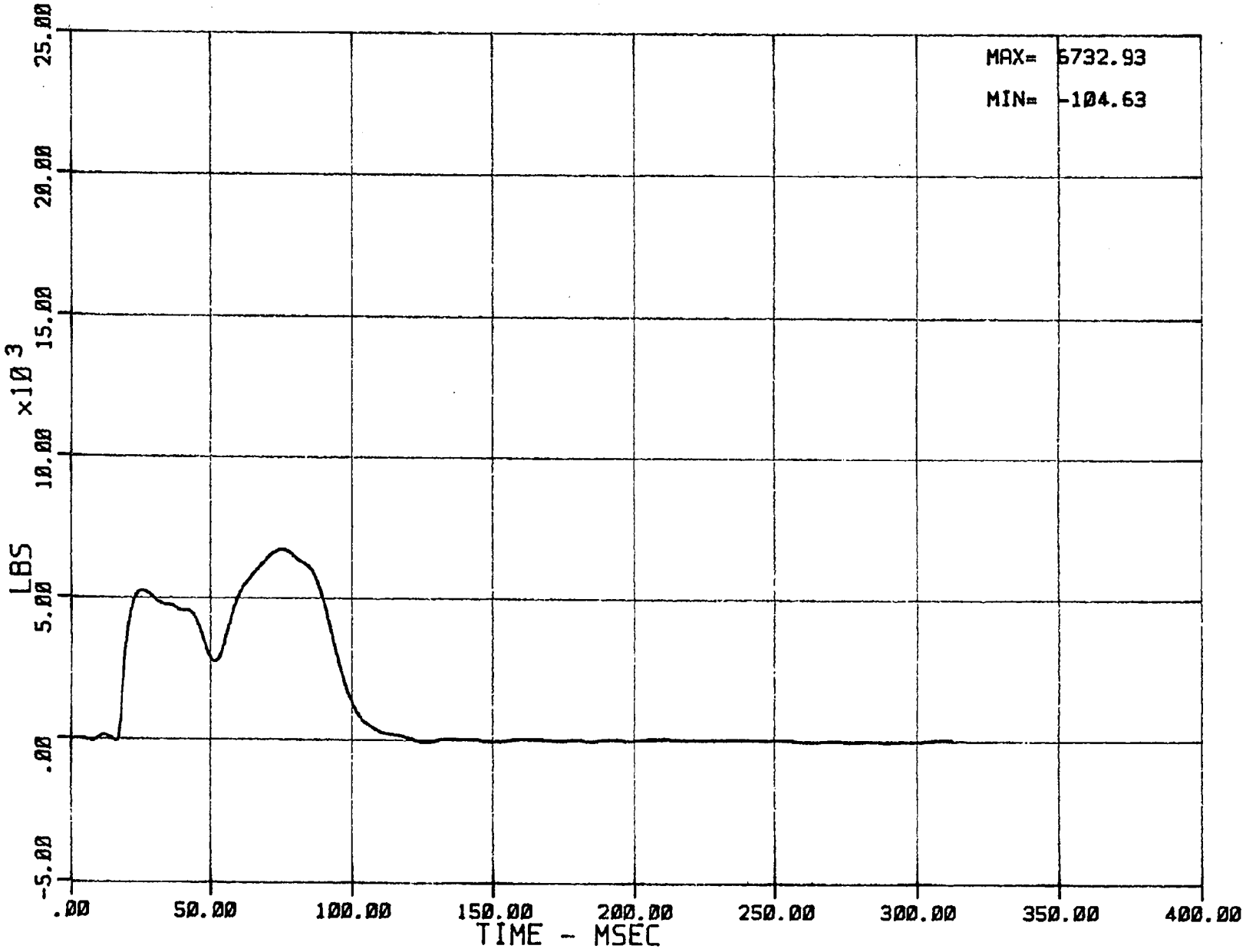
MSE N07054 1984 DODGE CARAVAN 03/13/84



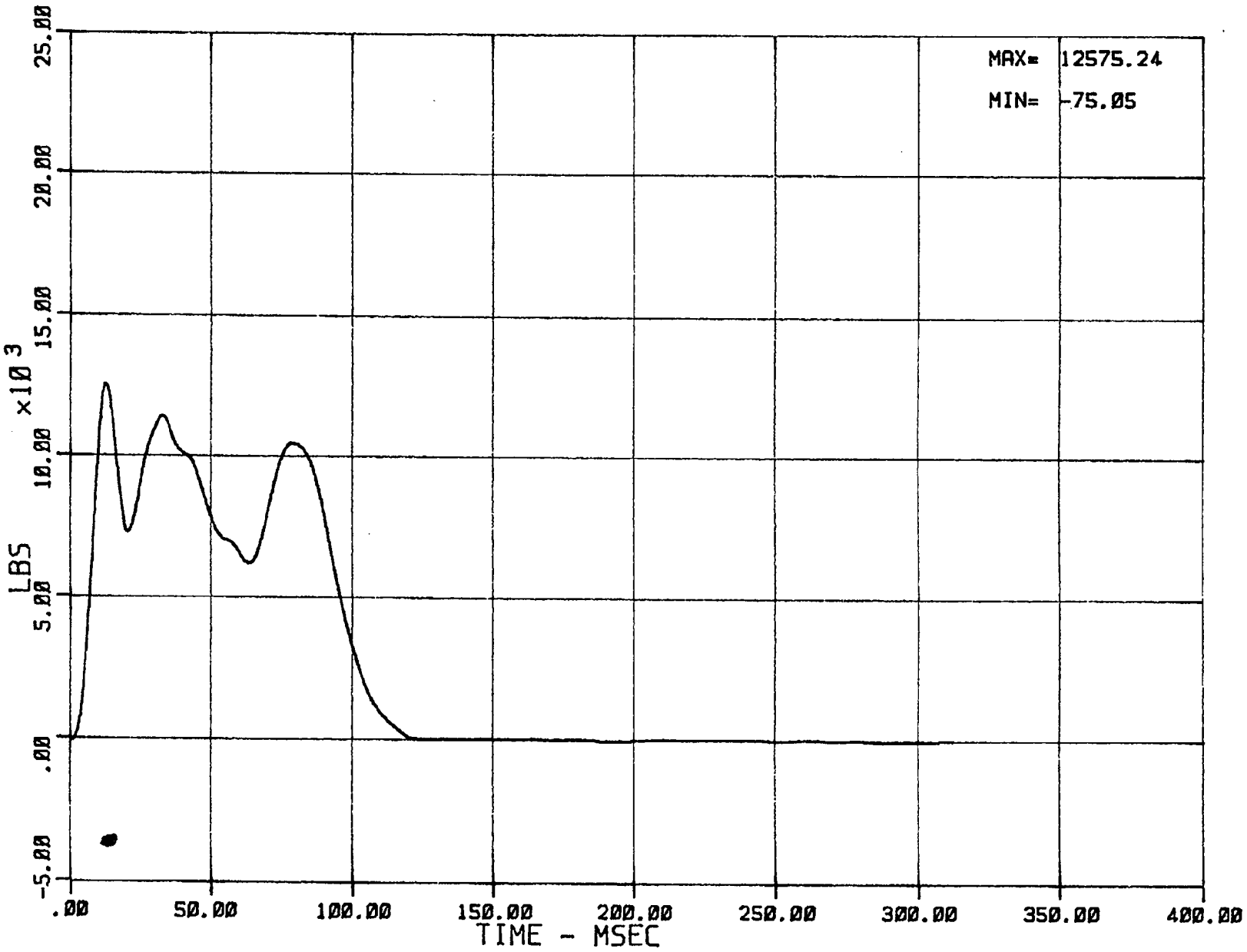
27 DT 01 1 SHB (DRIVER SHOULDER BELT PULLOUT)
MSE N07054 1984 DODGE CARAVAN 03/13/84



28 DT 01 2 SHB (PASSENGER SHOULDER BELT PULLOUT)
MSE N07054 1984 DODGE CARAVAN 03/13/84



33 LC BA N BAS (BARRIER LOAD CELL AS FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84



40 LC BA N BB3 (BARRIER LOAD CELL B3 FORCE)
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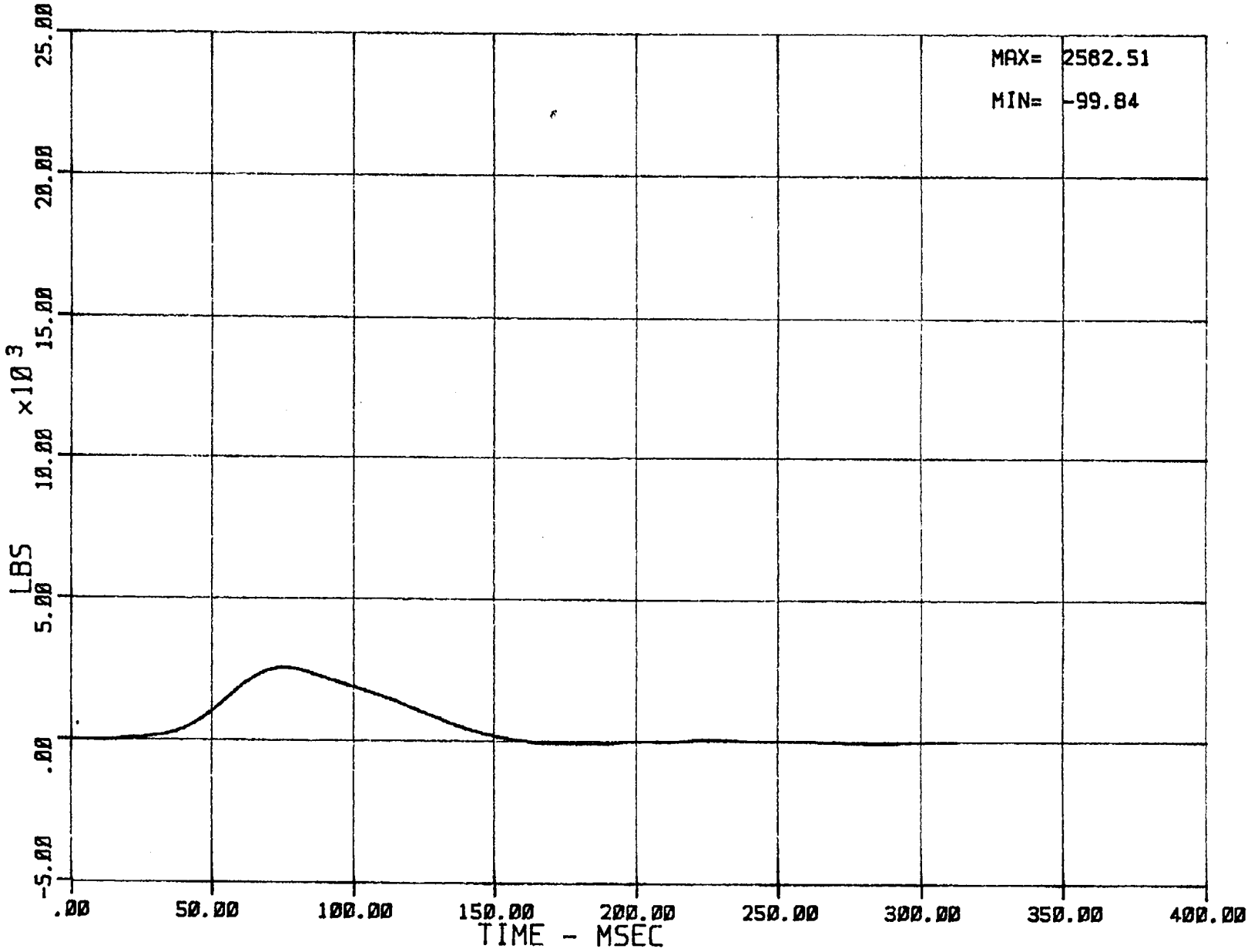

41 LC BA N BB4 (BARRIER LOAD CELL B4 FORCE)
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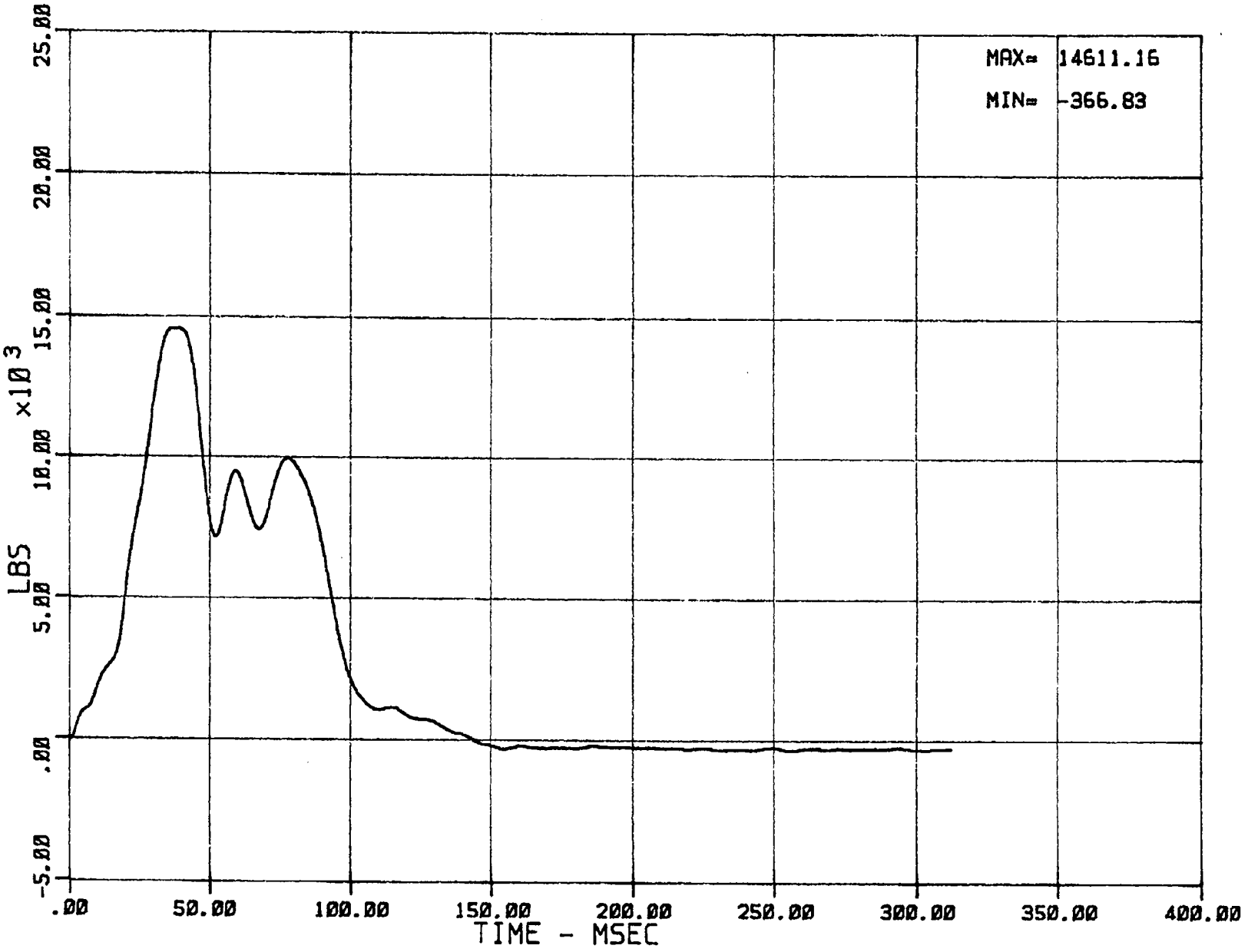

42 LC BA N BB5 (BARRIER LOAD CELL B5 FORCE)
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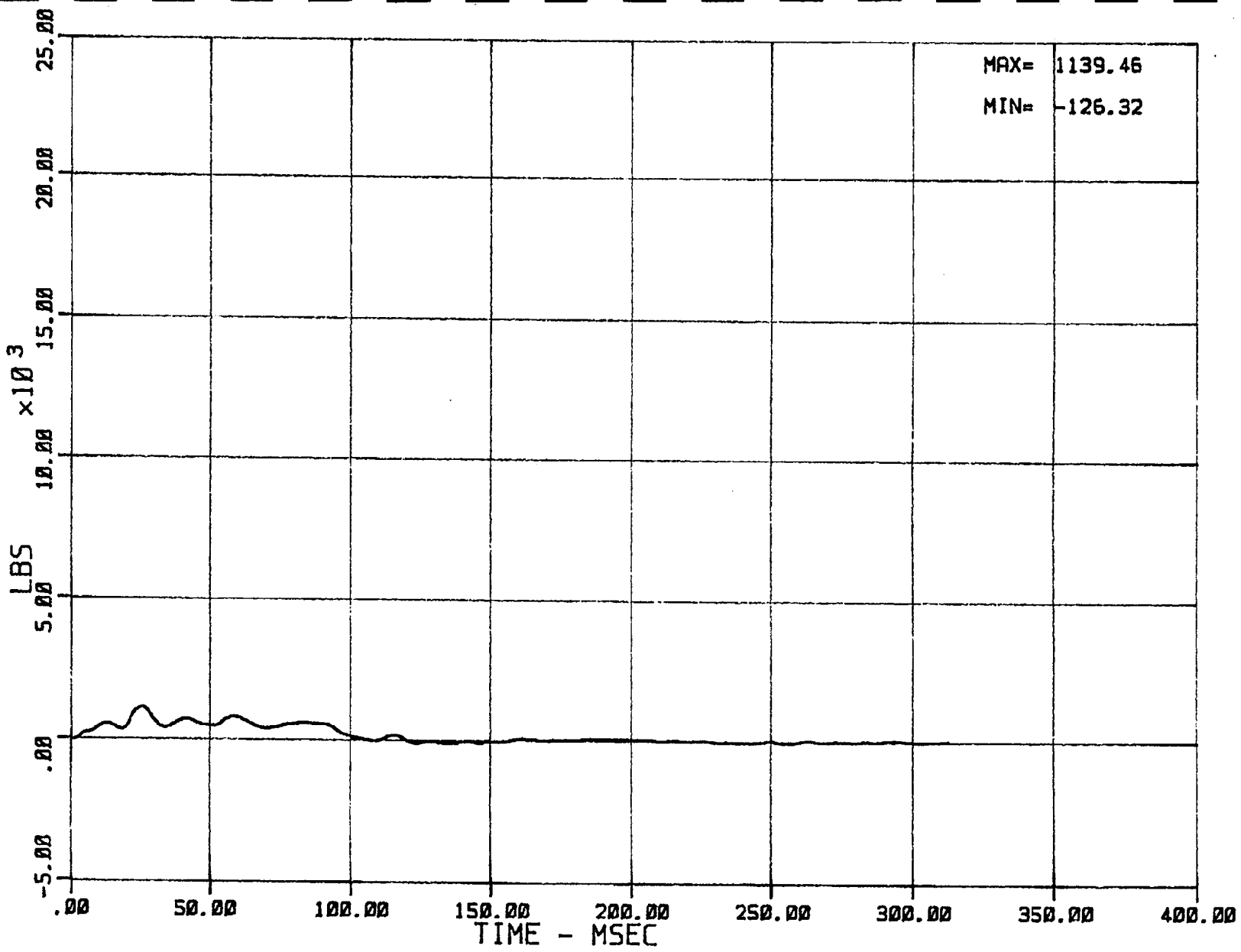
03/13/84



43 LC BA N BB6 (BARRIER LOAD CELL B6 FORCE)
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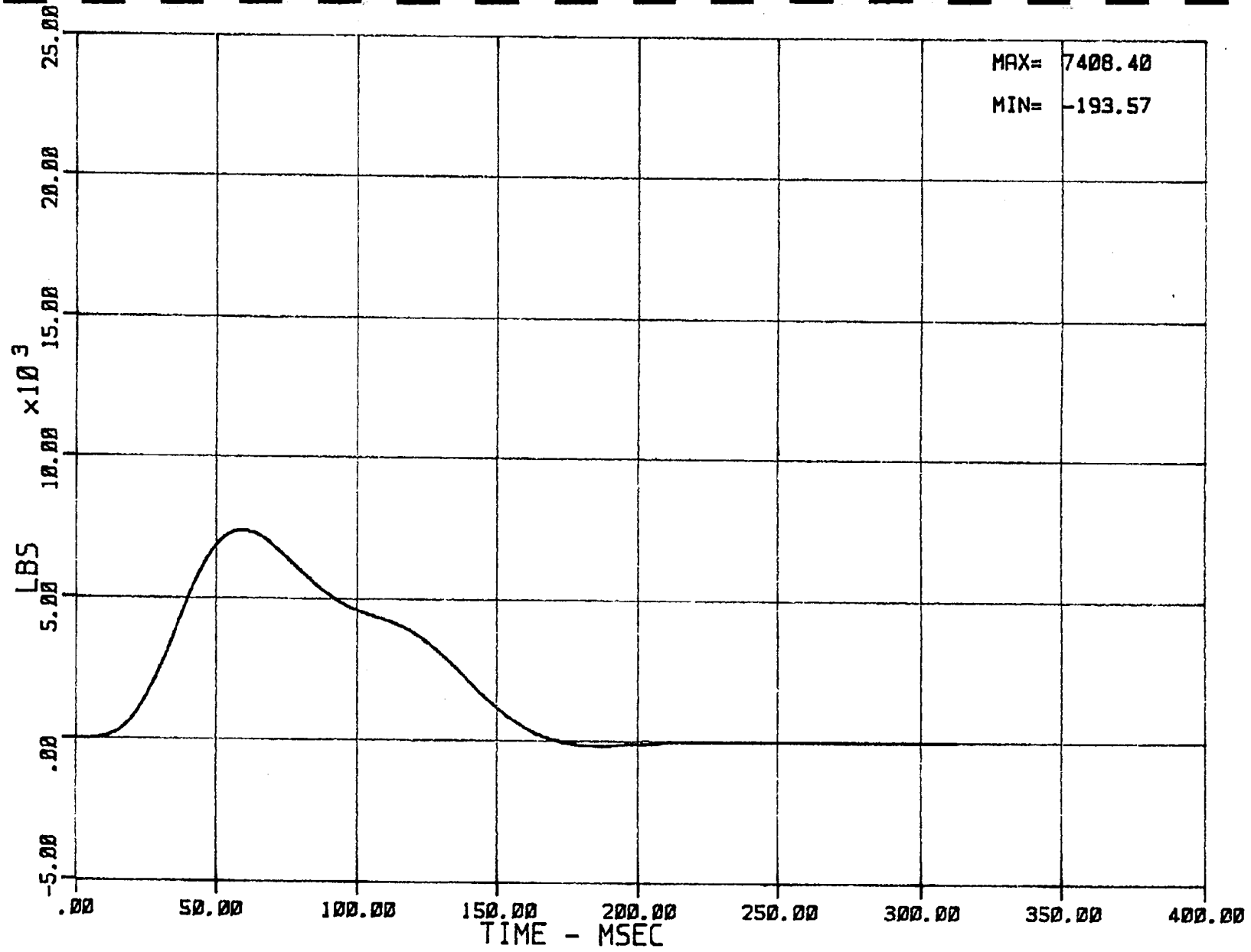
03/13/84



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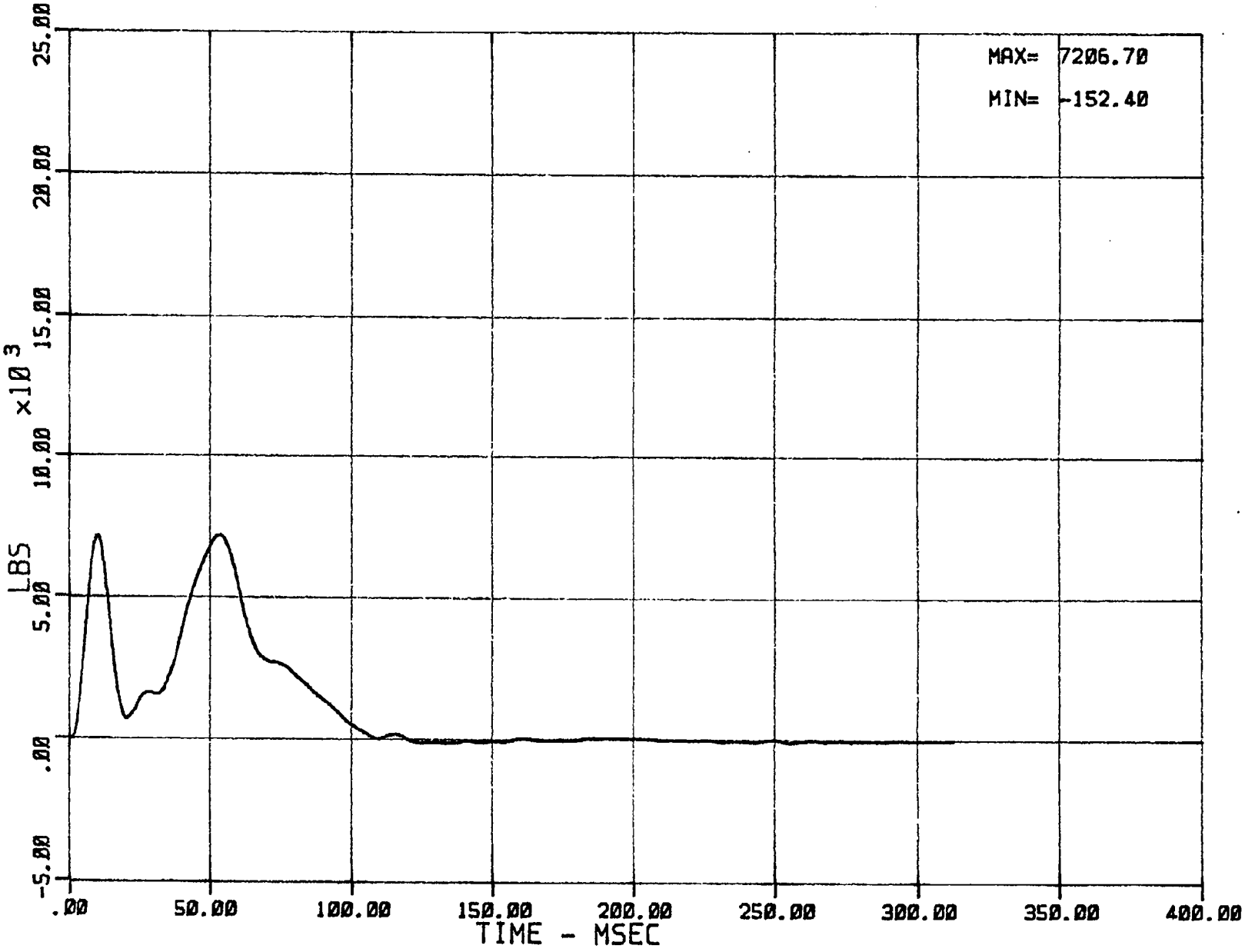
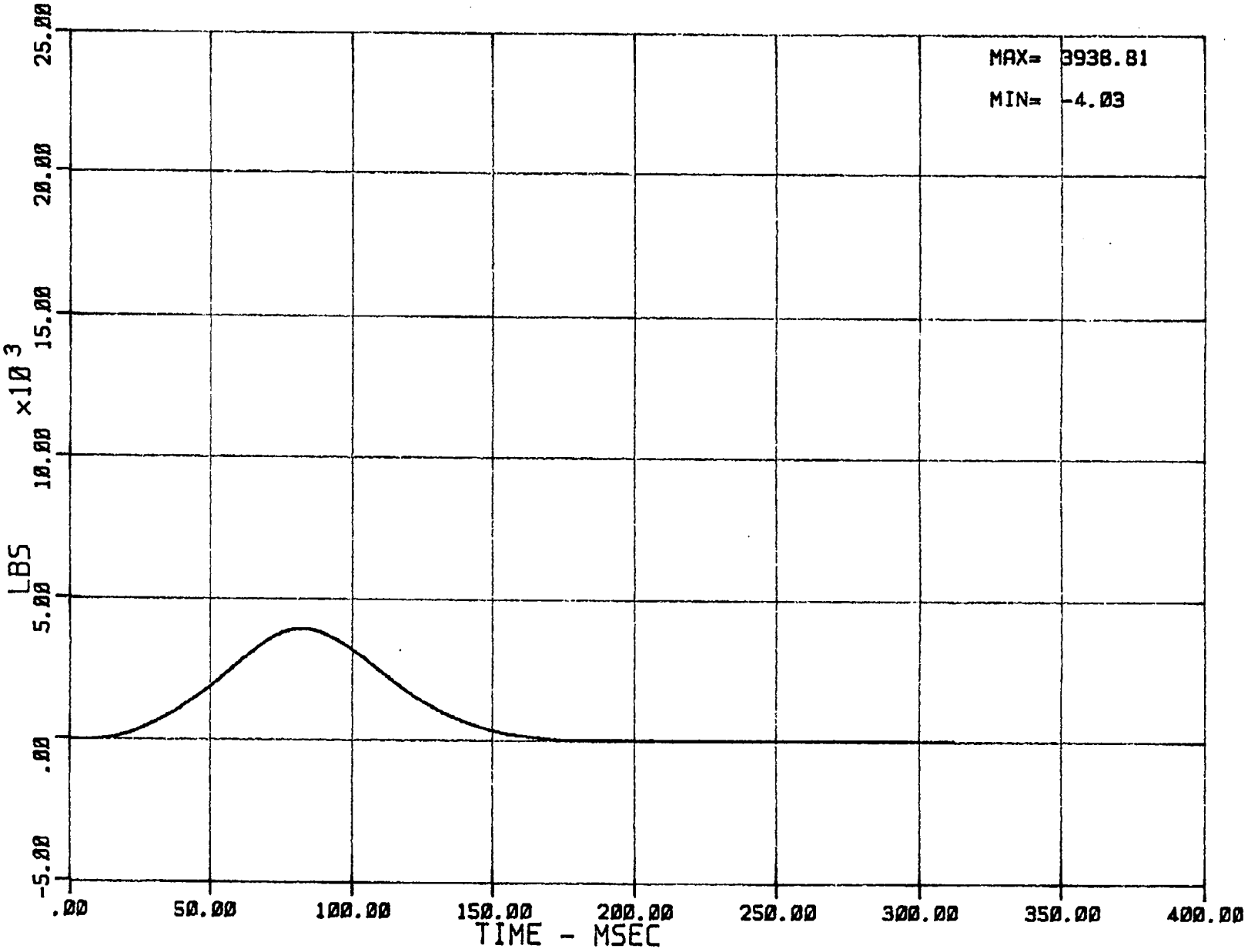
03/13/84



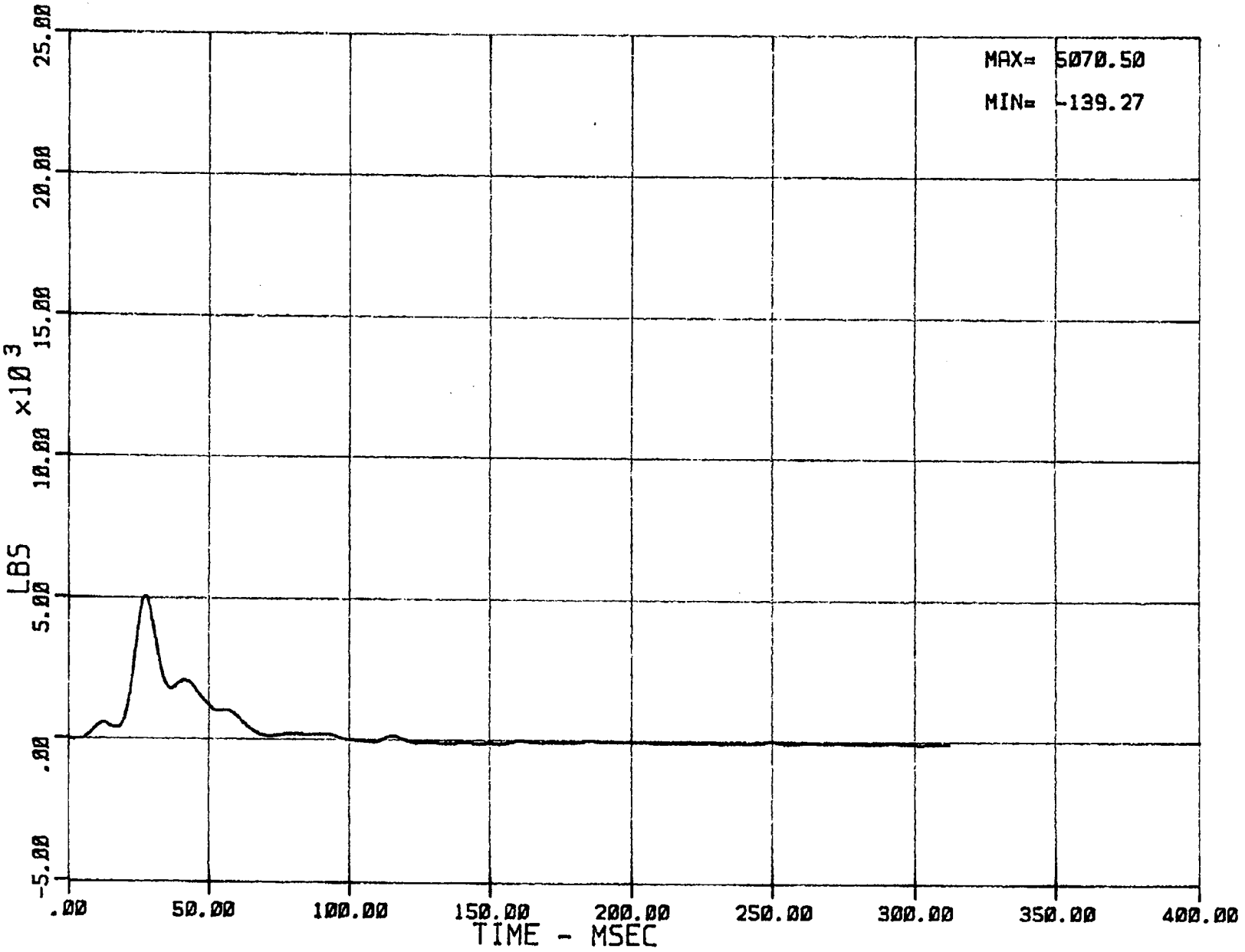
49 LC BA N BC3 (BARRIER LOAD CELL C3 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



50 LC BA N BC4 (BARRIER LOAD CELL C4 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



51 LC BA N BCS (BARRIER LOAD CELL CS FORCE)
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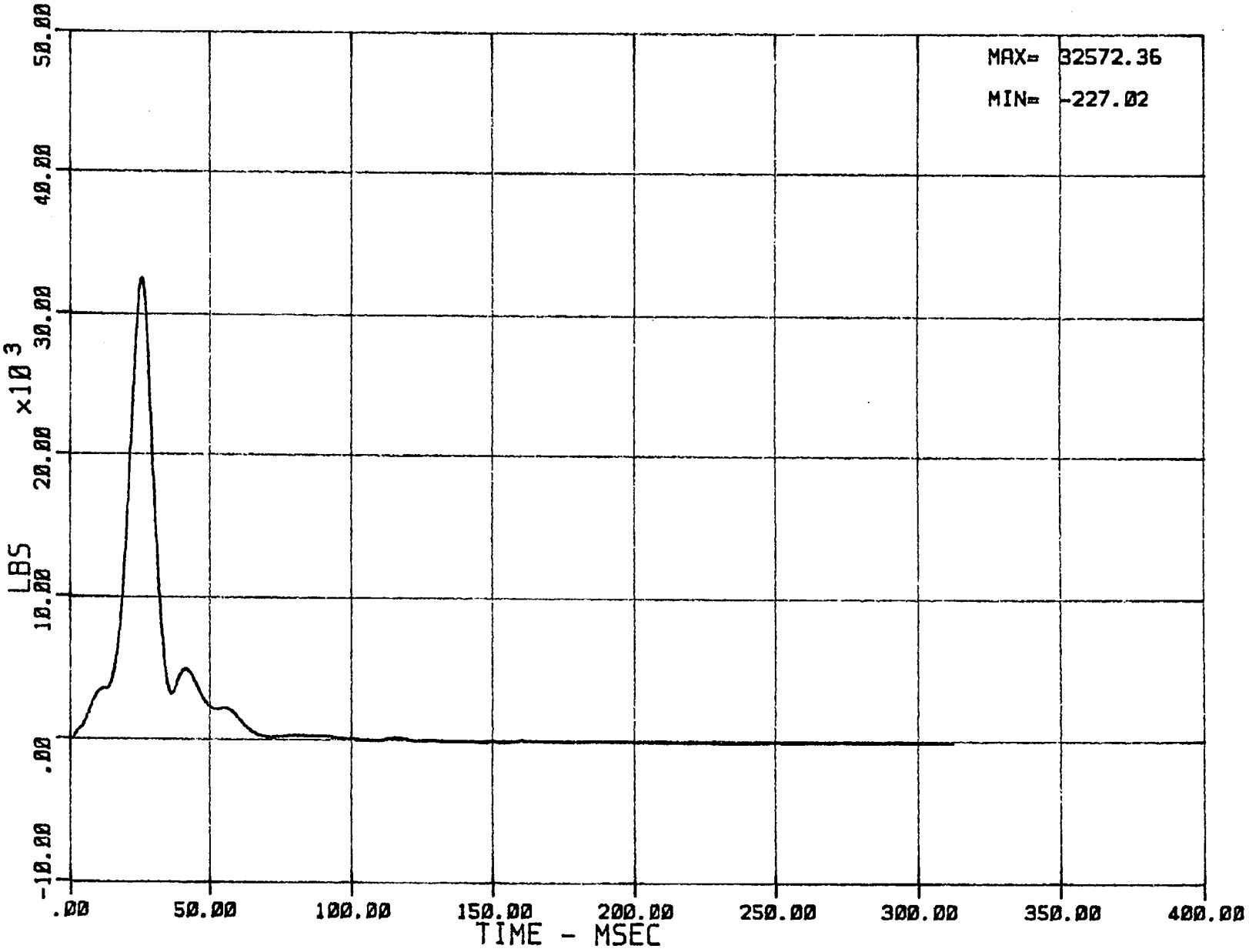
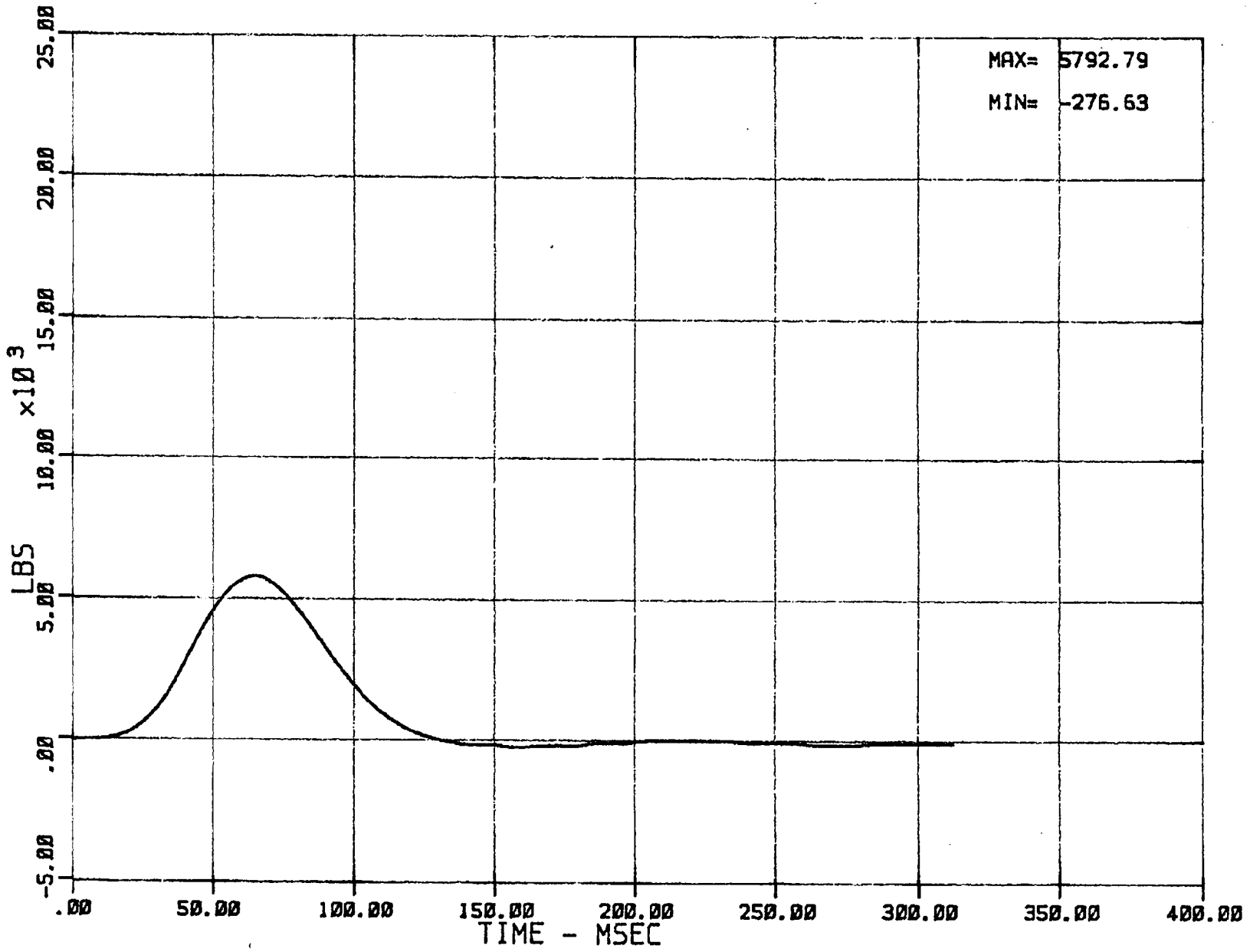


52 LC BA N BC6 (BARRIER LOAD CELL C6 FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84



53 LC BA N BC7 (BARRIER LOAD CELL C7 FORCE)
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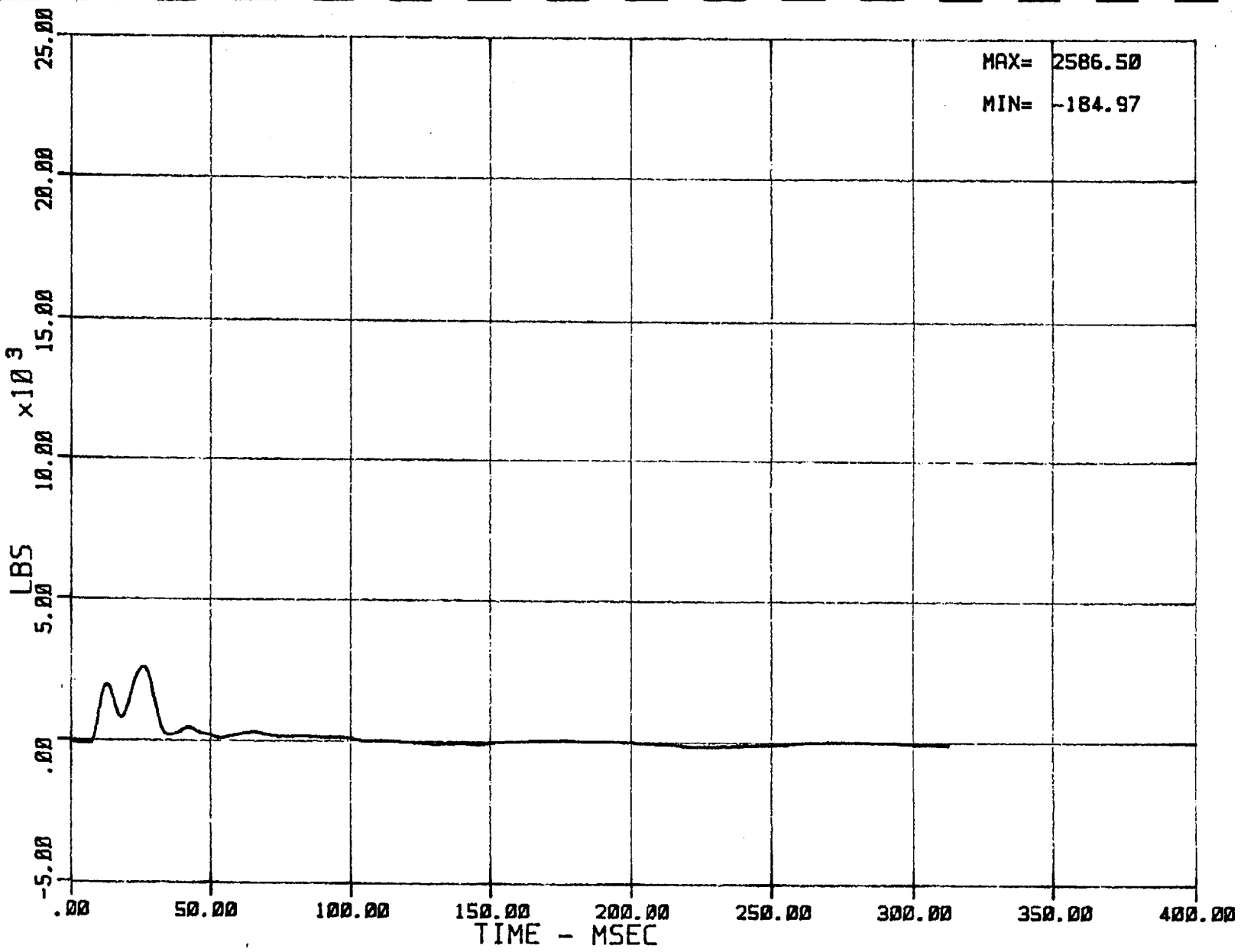


60 LC BA N BDS (BARRIER LOAD CELL DS FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84

APPENDIX D

OWNER'S MANUAL

SEAT AND SEAT BELT INFORMATION

Seats, Seat Belts, Mirrors

Seat Belts

Always use the seat belts. The chance of a serious injury is greatly reduced when the seat belts are properly used.

Seat belts provide protection against being thrown from the vehicle as well as reducing the risk of an injury caused by striking the interior of the vehicle.

The following pages contain the recommended procedures for fastening, adjusting and wearing the belts for maximum comfort and safety.

Front Seats

The "UNIBELT", or single continuous-belt restraint system, is installed for the driver and front seat passenger. This system incorporates a vehicle sensitive shoulder belt retractor, designed to lock (i.e. restrict belt travel) **only during very sudden stops or impacts.** This feature allows the shoulder belt to move freely with the wearer. It will not lock by jerking or pulling the webbing.

Rear Lap Belts

All rear seating positions are equipped with lap belts only. The lap belts should be worn with the upper edge of the belt drawn across the thighs and snug against the hips. To reduct the risk of sliding under the belt in a collision, it should be adjusted as tight as comfort will allow WHILE SITTING WELL BACK AND ERECT IN THE SEAT.

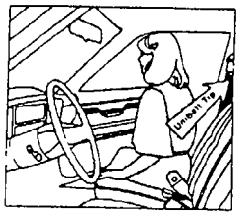
The center rear seat belt is lengthened by tilting the tip (latch plate) relative to the webbing and pulling. To shorten the belt, pull the loose end of the webbing.

The outboard rear seat positions are equipped with automatic locking retractors. Withdraw the belt from the retractor in a continuous motion, forward and upward away from the seat, until the belt is extended as far as possible. Bring the belt across the body and insert the latch plate in the buckle until a "click" is heard. If the belt has not been pulled out far enough to reach the buckle, return the belt

to its stowed position. This will unlock the retractor so that the belt can be pulled out a greater amount. Tighten the belt by pulling the webbing back toward and into the retractor until the belt fits snugly on the hips.

Never use the same lap belt on more than one person at a time.

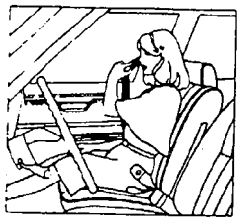
UNIBELT OPERATING INSTRUCTIONS



1

1. Enter the vehicle and close the door. Sit well back and erect and adjust the seat. Note the metal tip of the unibelt in its stowed position.

2. Grasp the metal tip and slide it up the webbing as far as necessary to go around your lap as you pull out the webbing. A couple of tries and this will become an automatic one handed operation.



2

3. As you pull the webbing across your lap and over your shoulder, move the metal tip toward the buckle.

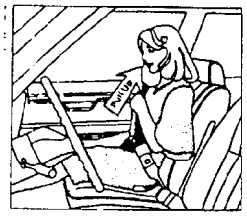
Insert the tip into the buckle until a "click" is heard.

Do not wear the shoulder belt under your arm or otherwise out of position. Such use could increase the chance and/or severity of injury in an accident.

3

4. Position the lap belt with the upper edge of the belt drawn across the thighs and snug against the hips. Slack will automatically be removed due to tension created by the retractor. If a snug fit in the lap belt portion is desired, pull up on the shoulder belt as shown. A snug belt reduces the risk of sliding under the belt in a collision.

5. If the shoulder belt feels too tight, move your shoulder forward slightly, or withdraw an inch or so of webbing by giving a slight tug on the belt.



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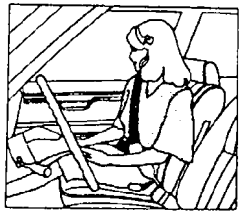

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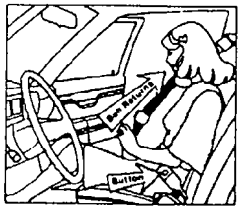


6

The belt will retain the small amount of slack necessary for comfort when you return to your normal seating position. If the belt is still too tight, pull out 6 to 8 inches of webbing, let it return to your chest and repeat the above motion. However, the amount of slack in the shoulder belt should be kept to a minimum, preferably not more than one inch. Too much slack could reduce the amount of protection because the belt may not be able to properly restrain you in an accident. The shoulder belt will allow unrestricted movement of the upper body under normal conditions. Extreme movements will probably require resetting the slack in the shoulder belt. The belt will lock in the event of an accident.

6. To release the belt, push the button on the buckle. The belt will automatically retract to its stowed position when the door is opened.
If needed, slide the tip down the webbing to allow the belt to fully retract.

Child Restraint

When you are carrying children in your vehicle some type of restraint system should be used, regardless of the size of the child.

For babies weighing up to 20 lbs. (9 kg), an Infant Carrier can be purchased from your dealer. This type of carrier is recommended if the child is unable to sit up alone.

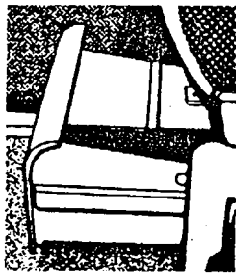
For children weighing less than 50 lbs. (23 kg) but more than 20 lbs. (9 kg), we recommend the purchase of a good Child Seat. This seat may be purchased from your dealer.

The Child Seat or the Infant Carrier should be belted into the center seating position of the rear seat. This provides greater protection in the event your vehicle is struck in the side by another vehicle.

Children weighing over 50 lbs. (23 kg) should wear the seat belts provided in the vehicle. The child should be seated upright in the seat with the lap belt fastened low on the hips and as snug as possible. A child wearing a lap belt can be elevated to see out of the vehicle if the elevating platform is rigid and light in weight. To insure adequate protection in a side impact, we suggest that the platform height not exceed 3 inches (76 mm), and that it should be as wide as the distance between the belts used to secure the seat. Children should be seated in a rear seat.

Storage Bin

The storage bin located under the front passenger's seat can be locked with the round-end (secondary) key. If you must leave your ignition key with a parking attendant, remove this key from your keyholder.



Reclining Bucket Seats (Optional)

The reclining mechanism is operated by a control located on the inboard side of the seatback. To recline, lean forward slightly before lifting the control, then lean back to the desired position and release the control.

To return the seatback to its normal position, lean forward and lift the control.

Note: The seat belt will provide the maximum protection for its wearer if the recliner seatback is placed in its most upright position. When the seatback in reclined, there is a greater risk that the occupant could slide under the belt, especially in a forward impact accident, and may be injured by the belt or by striking the instrument panel.

Power Seat Adjuster (Optional)

The power seat adjuster is located on the inboard side of the seat and consists of three switches which provide six-way adjustment of the driver's seat.

The front and rear switches are used to tilt the seat. The center switch moves the seat up or down, or forward and backward.

Front Seat Adjuster

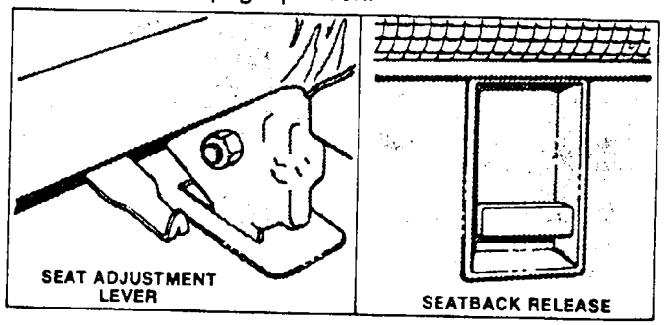
The adjusting lever is located under the driver's seat. Push the lever towards the outside of the vehicle and move the seat to the desired position.

Third Seat (If so equipped)

The seat position can be adjusted fore and aft to any of three positions - normal (rearward), intermediate, and full forward. In this way varying needs for legroom and cargo space behind the seat can be accommodated. If the seat is not occupied it can be moved forward against the second bench seat and the back folded forward to obtain maximum cargo space.

The release lever is below the seat and is accessible from the front and back of the seat.

The seatback can be folded forward by lifting the handle located in the center of the seatback. It will latch in the folded position. The same release is used to return the seatback to the upright position.



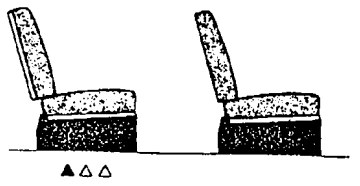
Rear Seat Descriptions

5 Passenger Model — Single 3-passenger bench. Removable for carrying cargo. Provides generous legroom.
7 Passenger Model — 2-passenger bench in second position and 3-passenger bench in third position. Both seats are removable.

The following illustrations show the flexibility provided for varying passenger and cargo needs.

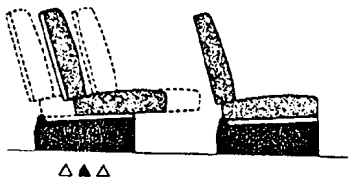
REAR SEATING FLEXIBILITY

1. Normal Seating — The 2nd and 3rd seats are installed. The 3rd seat is in the full rear position on the tracks.



1.

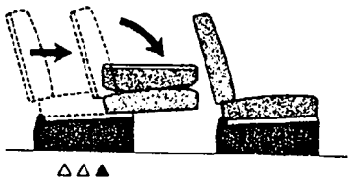
2. Increased storage area is provided by adjusting 3rd seat to the intermediate track position. Rear seating for 3 passengers (children) is still provided.



2.

3. Additional Storage — With 2nd and 3rd seats installed. The 3rd seat is in the full forward position on tracks and the seatback is folded down.

4. Auxiliary Seating — The 2nd seat is removed from vehicle. The 3rd seat is unlatched from the normal position and moved forward to the auxiliary position, providing 5 passenger seating. Extra seat attachments are provided for this purpose. Remove striker bezel covers (2) in floor on sliding door side of vehicle, before moving the 3rd seat to the auxiliary position.



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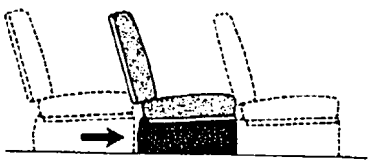
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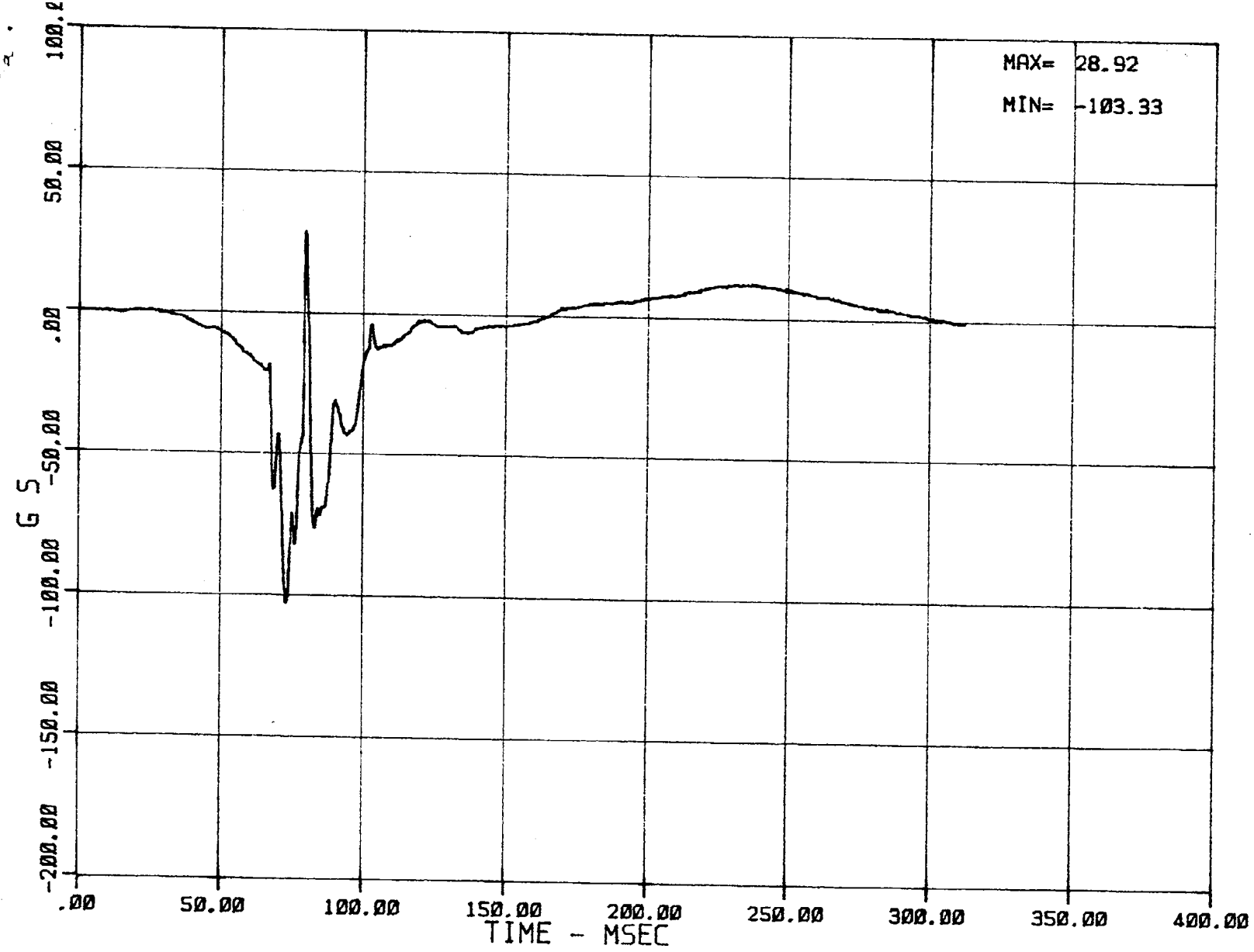
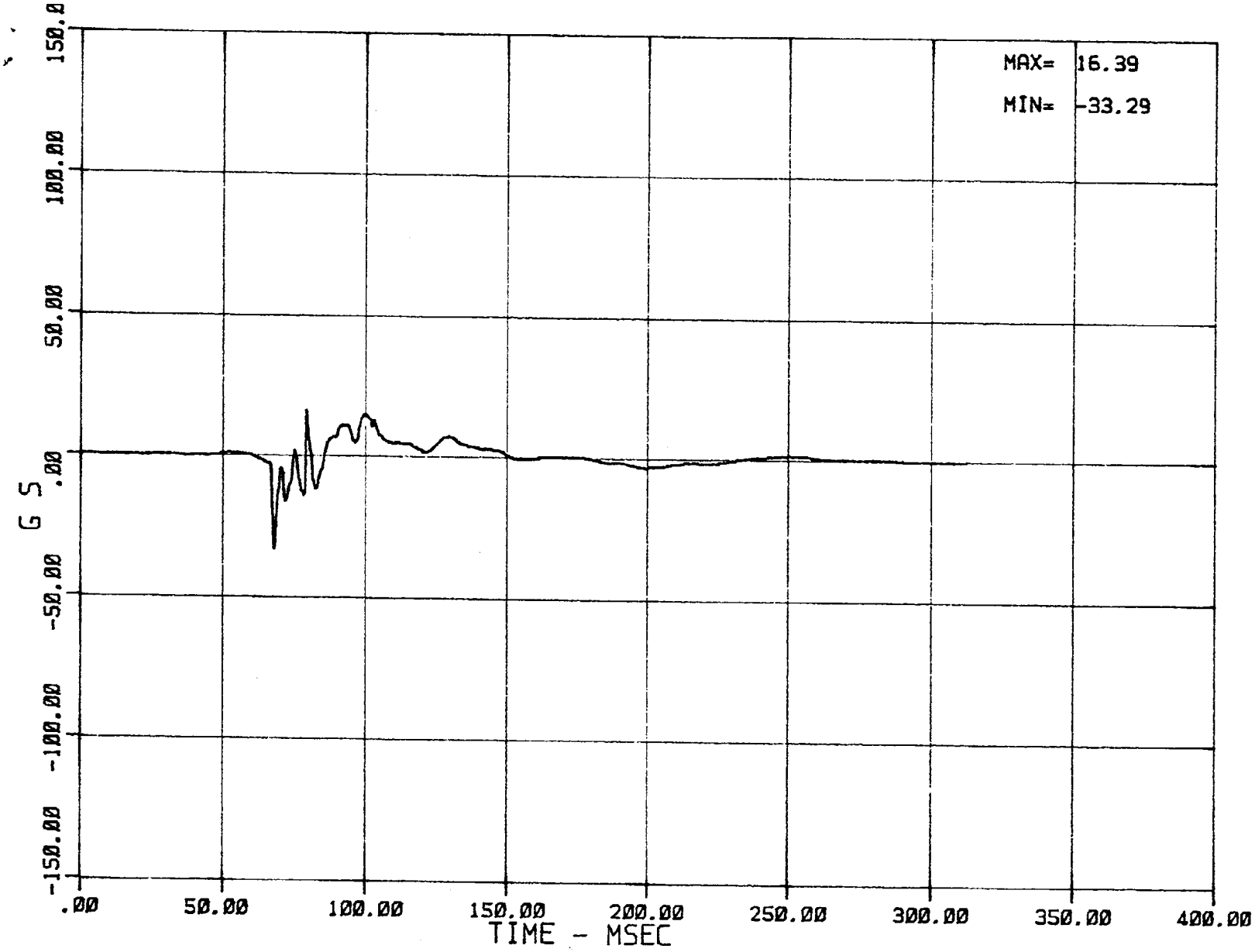


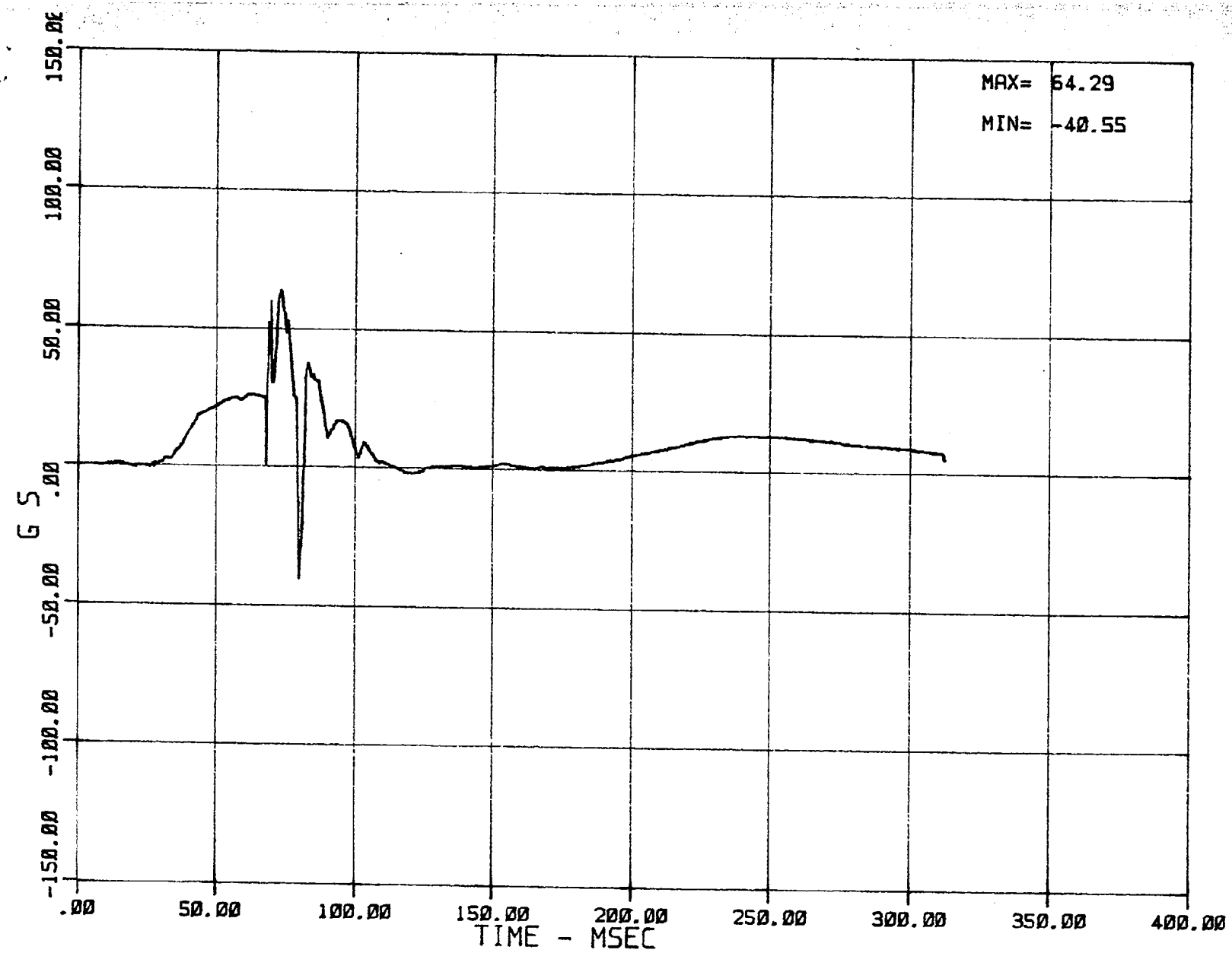
01 AC 01 1 HED X (DRIVER HEAD ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



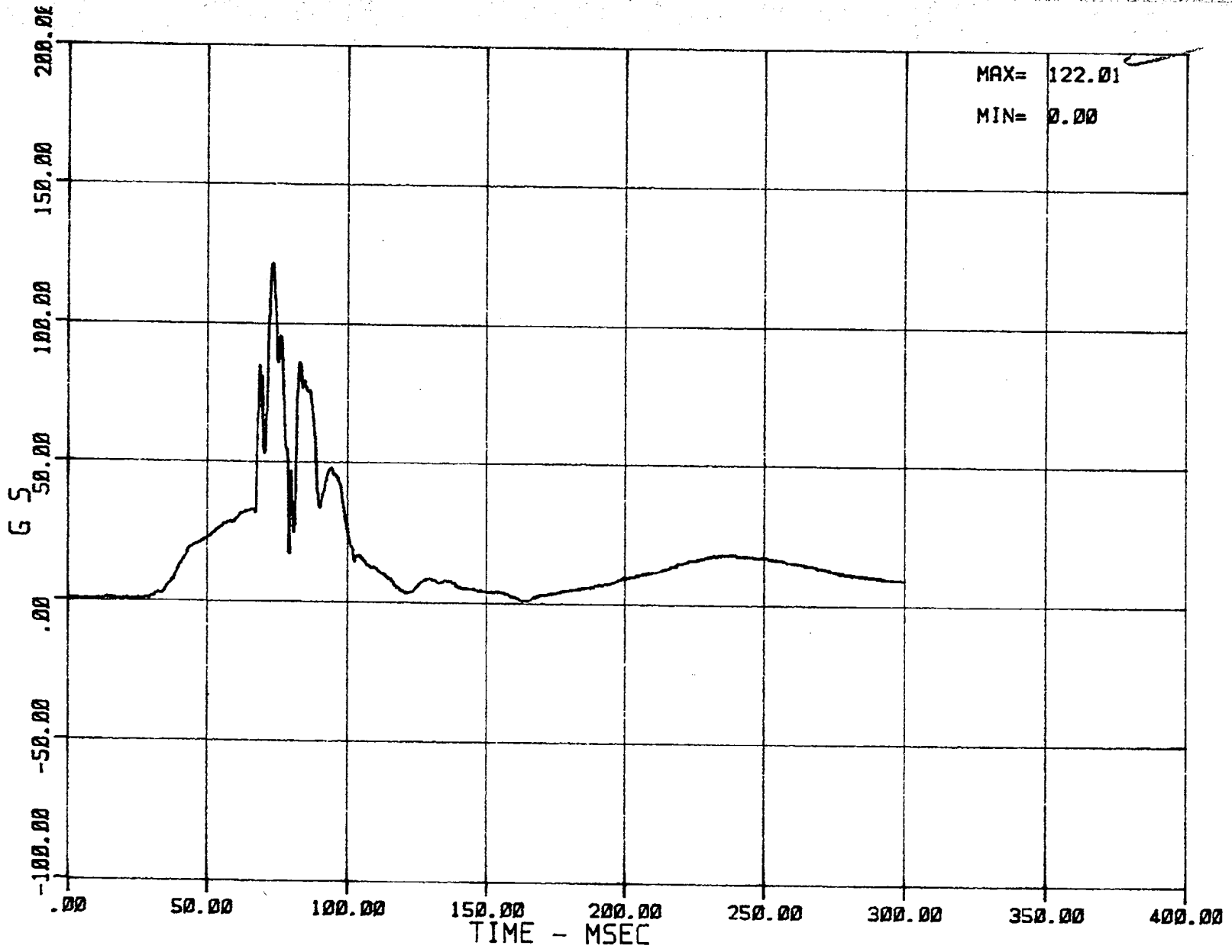
Ø2 AC Ø1 1 HED Y (DRIVER HEAD ACCEL. -- Y AXIS)
MSE NØ7Ø54 1984 DODGE CARAVAN

Ø3/13/84



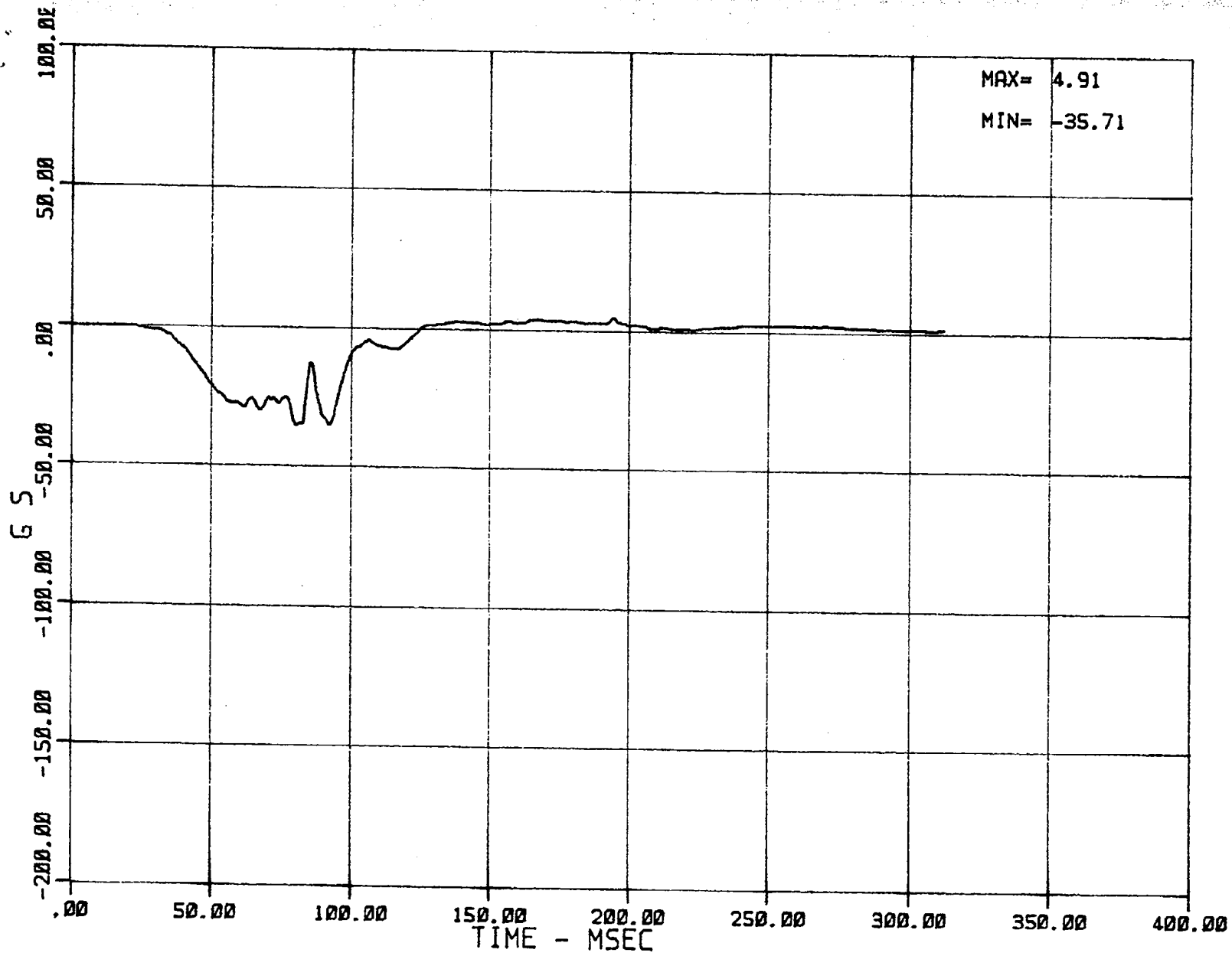
Ø3 AC Ø1 1 HED Z (DRIVER HEAD ACCEL. -- Z AXIS)
MSE N07054 1984 DODGE CARAVAN

Ø3/13/84



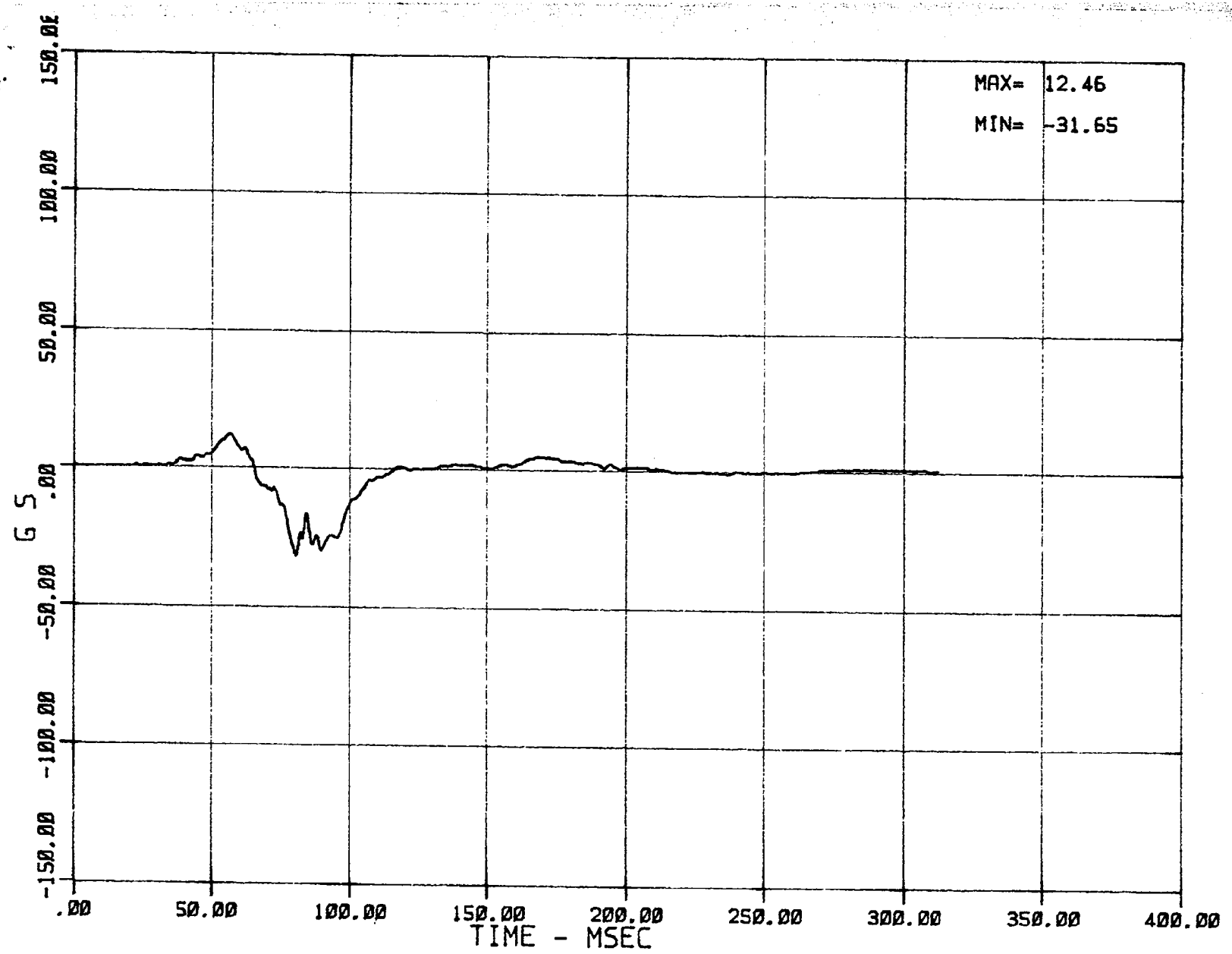
DRIVER HEAD RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN

03/13/84



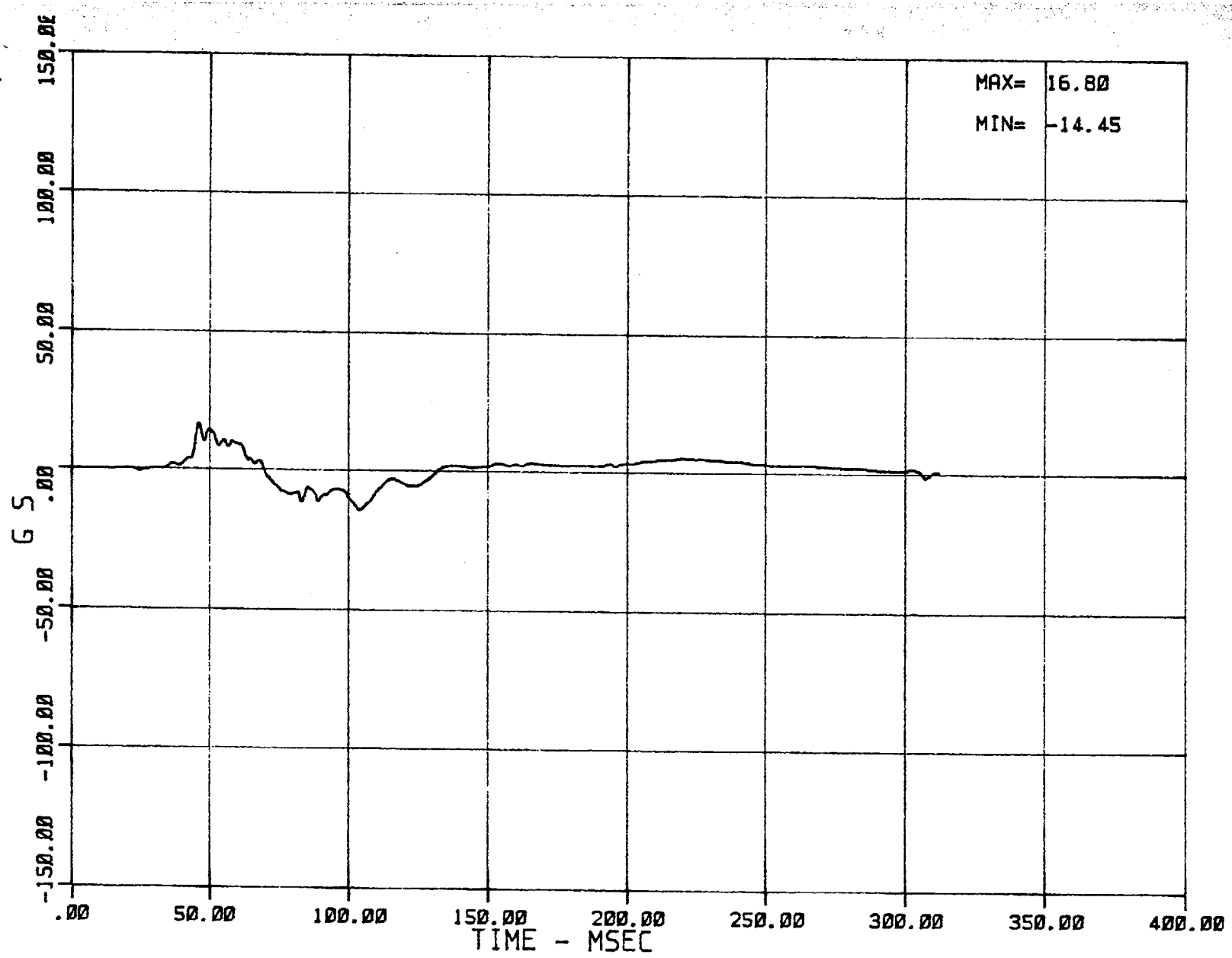
Ø4 AC Ø1 1 CST X (DRIVER CHEST ACCEL. -- X AXIS)
MSE NØ7Ø54 1984 DODGE CARAVAN

Ø3/13/84



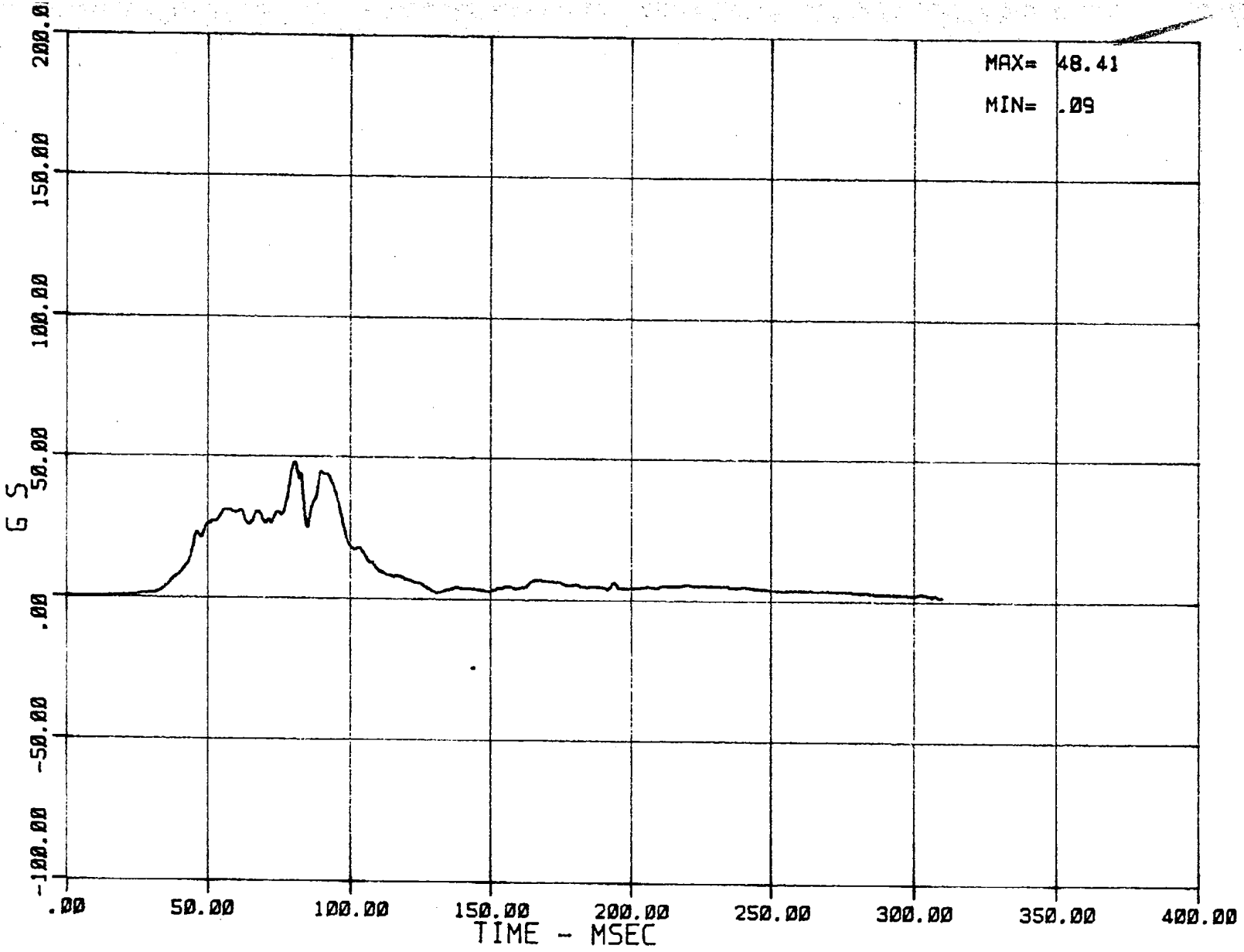
Ø5 AC Ø1 1 CST Y (DRIVER CHEST ACCEL. -- Y AXIS)
MSE N07054 1984 DODGE CARAVAN

Ø3/13/84



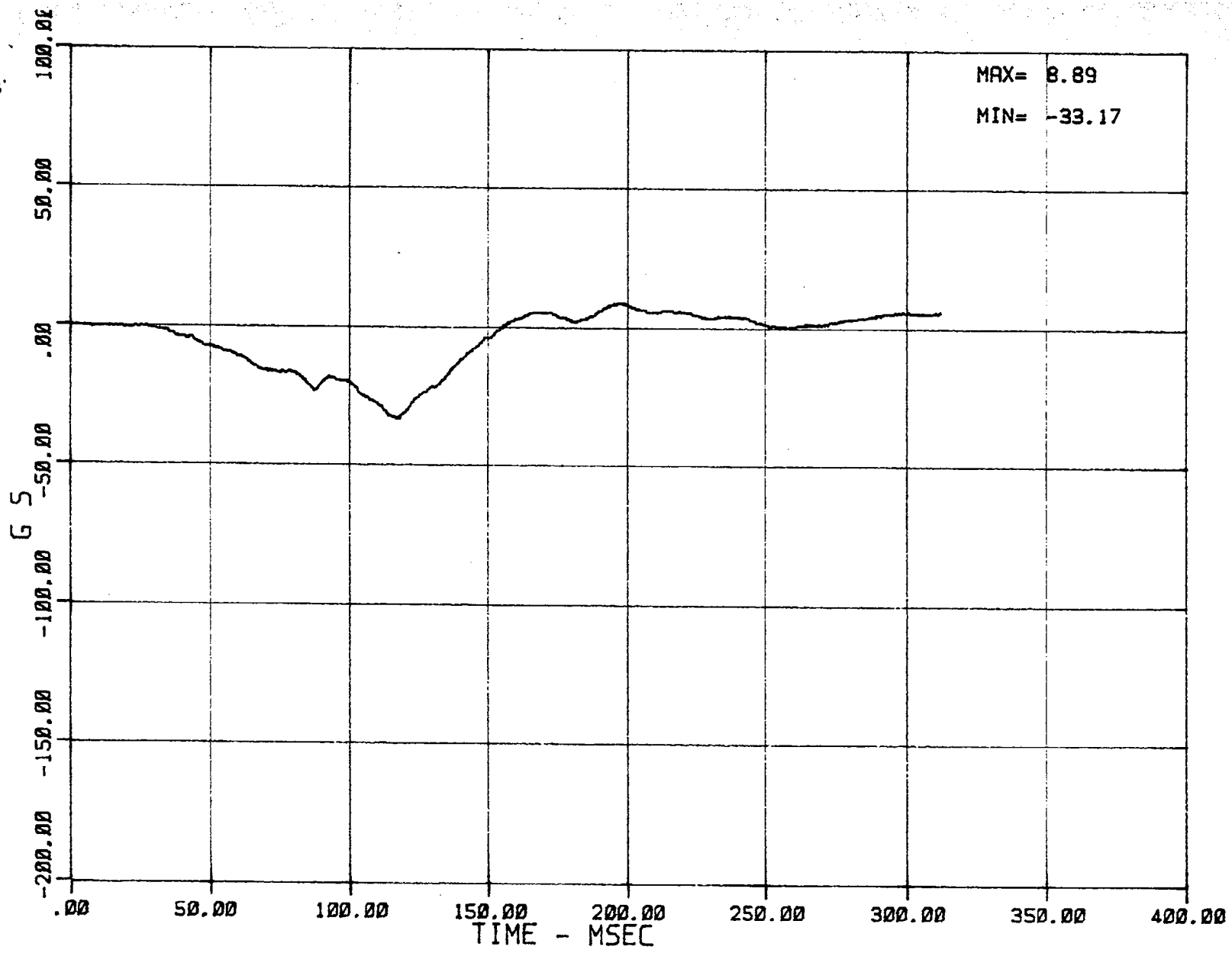
Ø6 AC Ø1 1 CST Z (DRIVER CHEST ACCEL. -- Z AXIS)
MSE N07054 1984 DODGE CARAVAN

Ø3/13/84

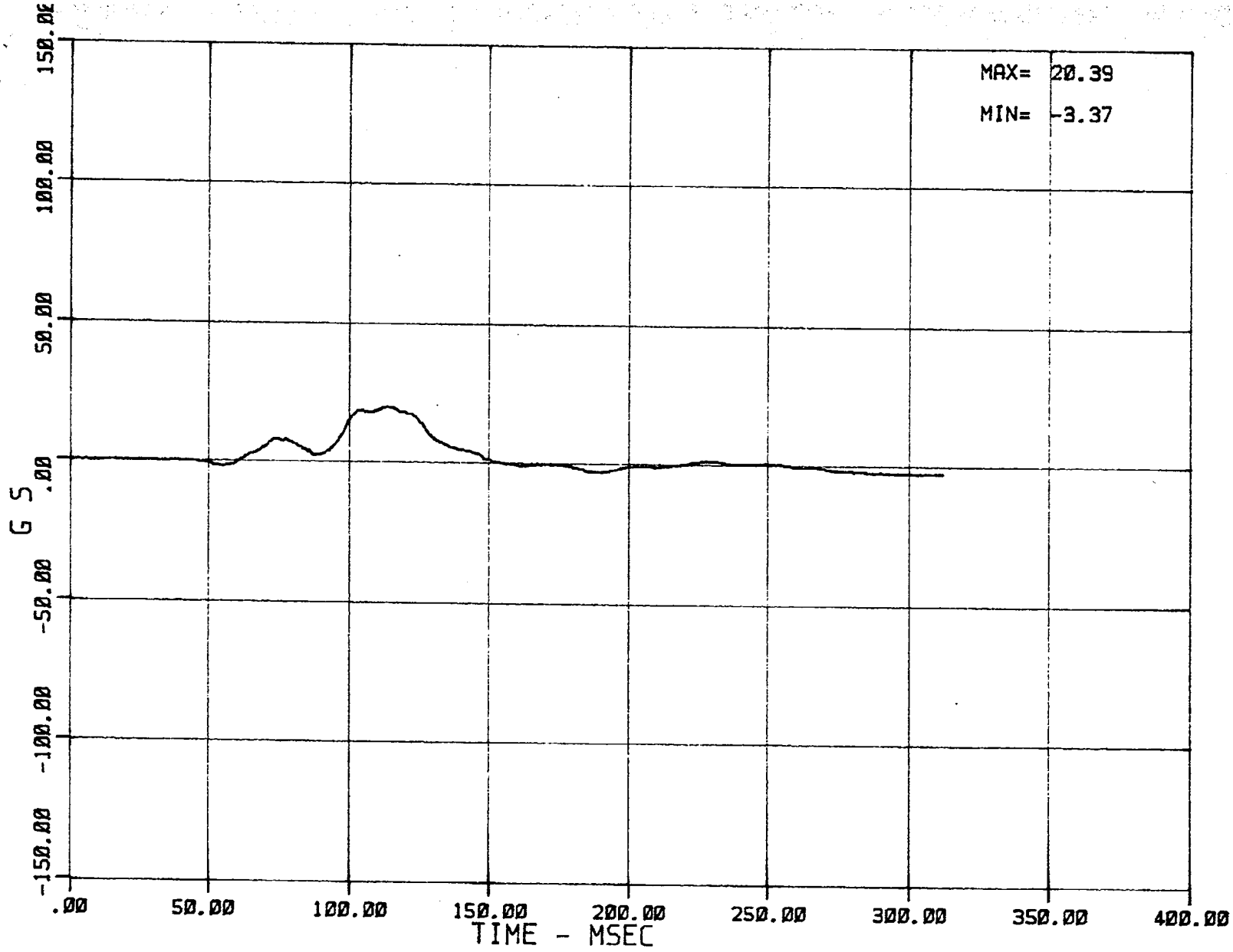


DRIVER CHEST RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN

03/13/84

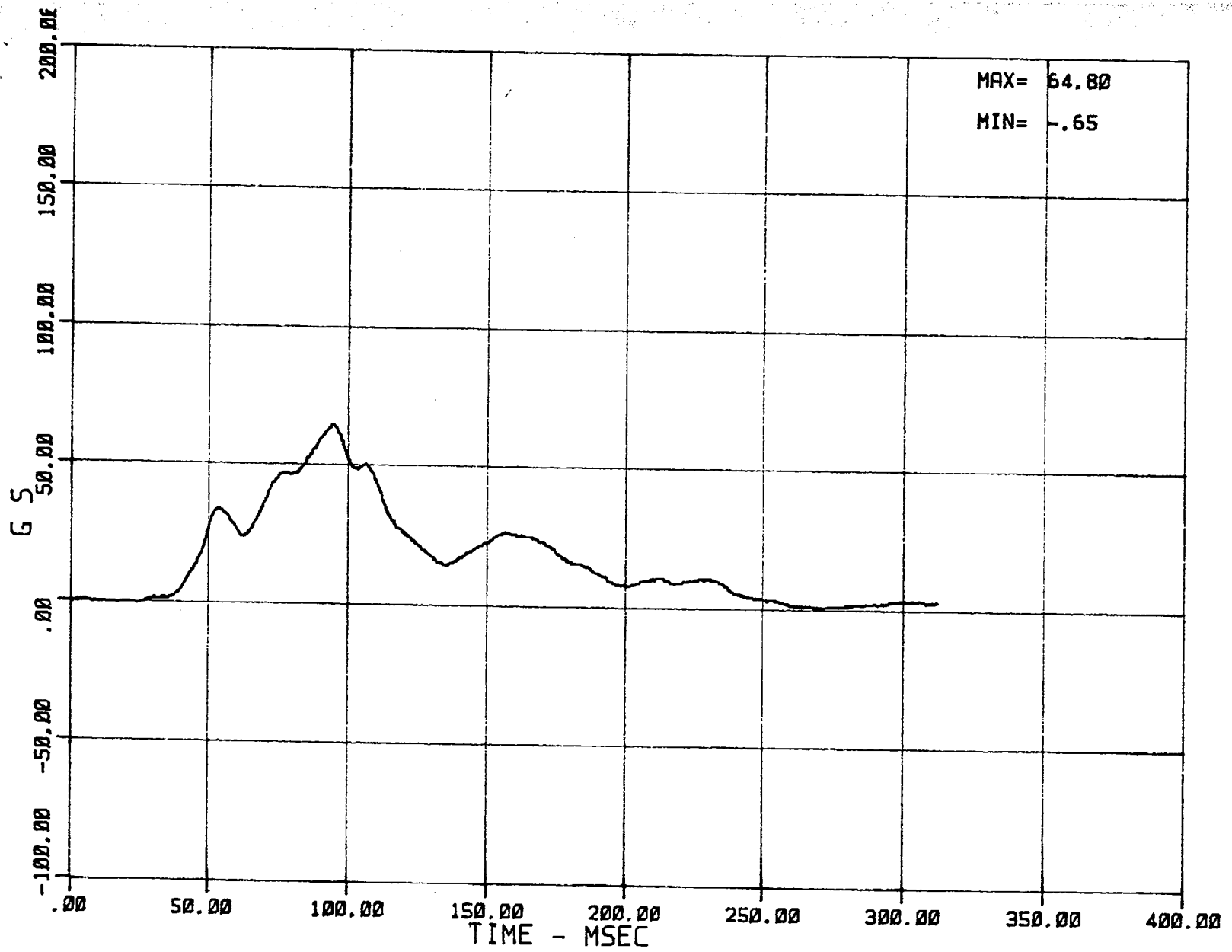


Ø7 AC Ø1 2 HED X (PASSENGER HEAD ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



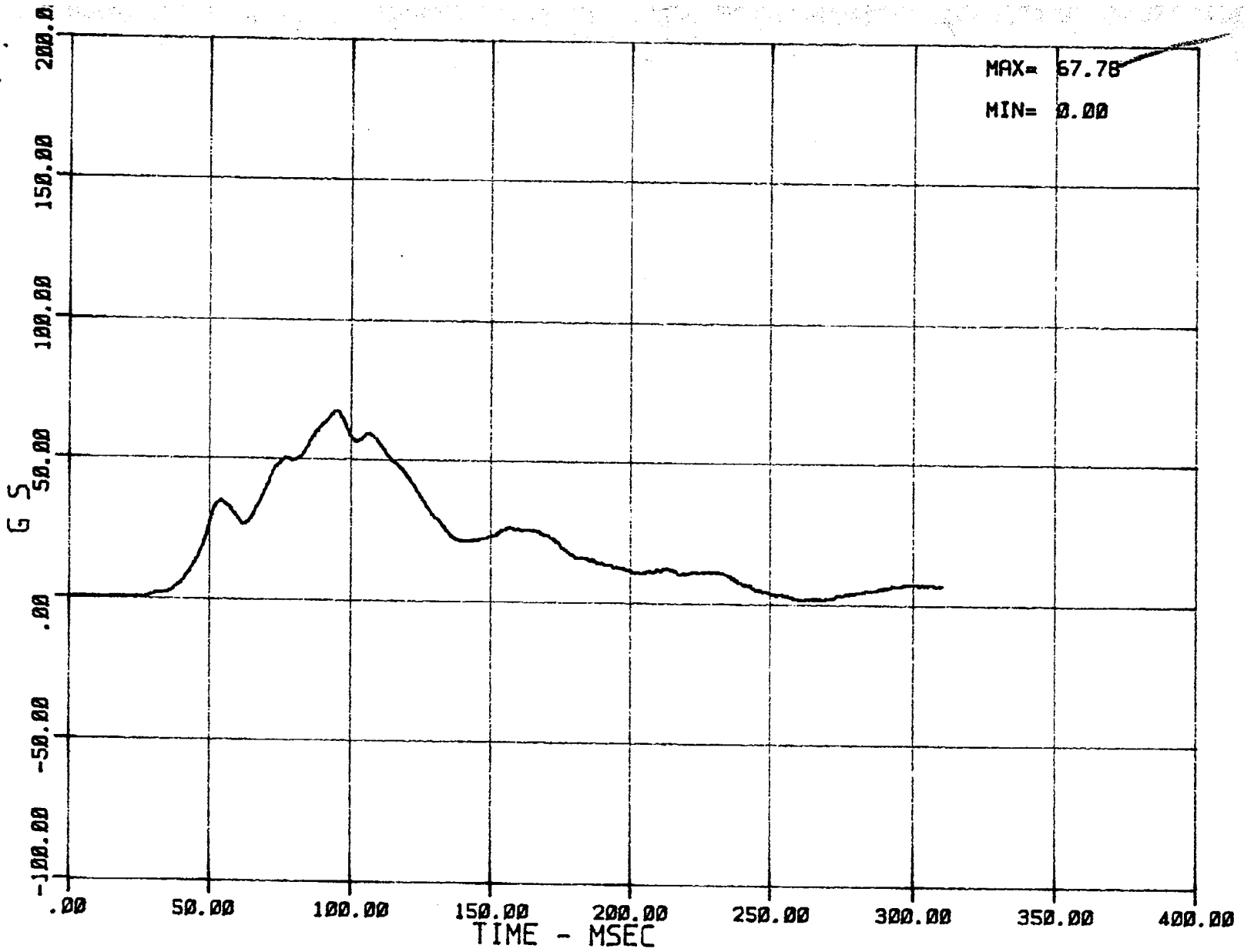
08 AC 01 2 HED Y (PASSENGER HEAD ACCEL. -- Y AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



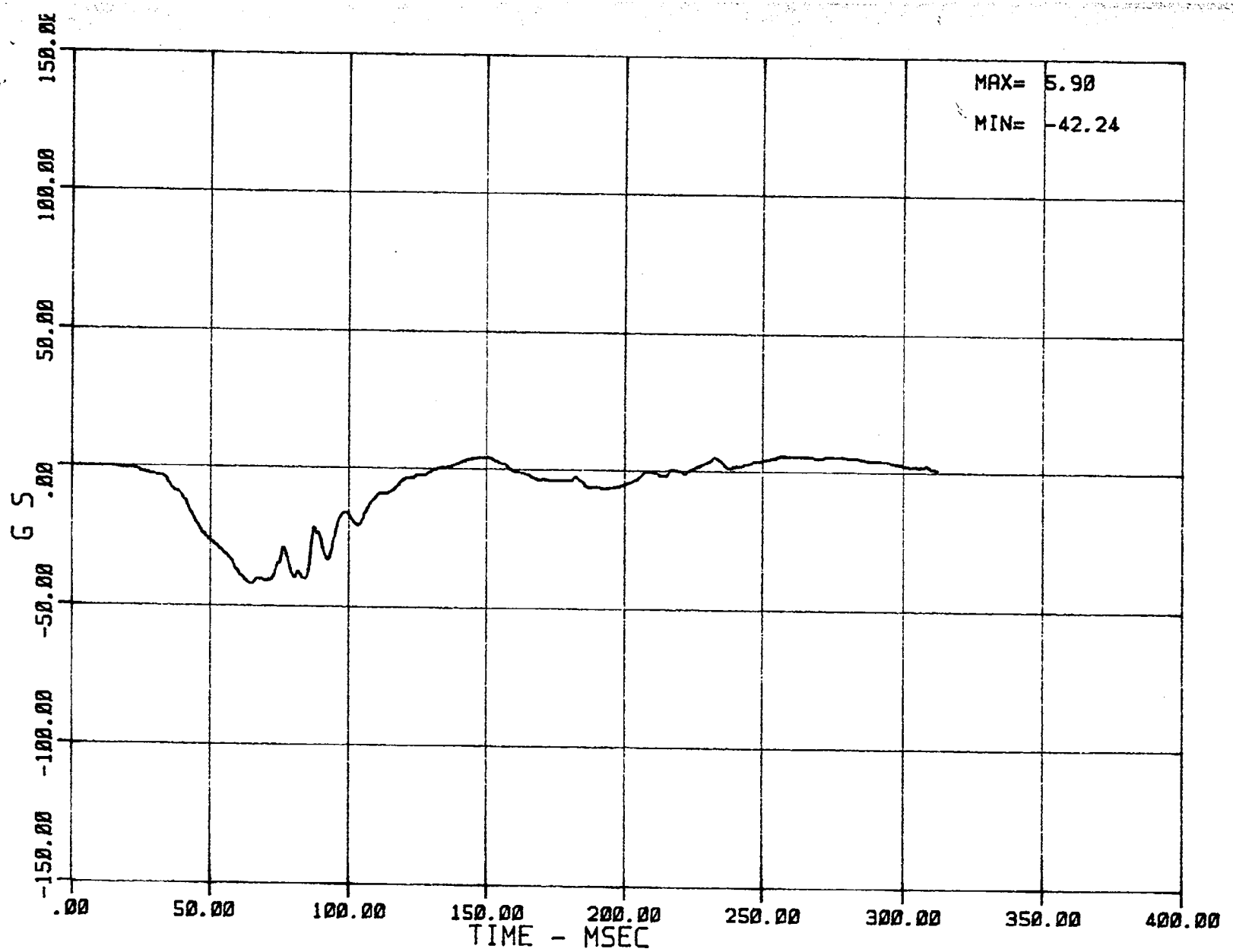
09 AC 01 2 HED Z (PASSENGER HEAD ACCEL. -- Z AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



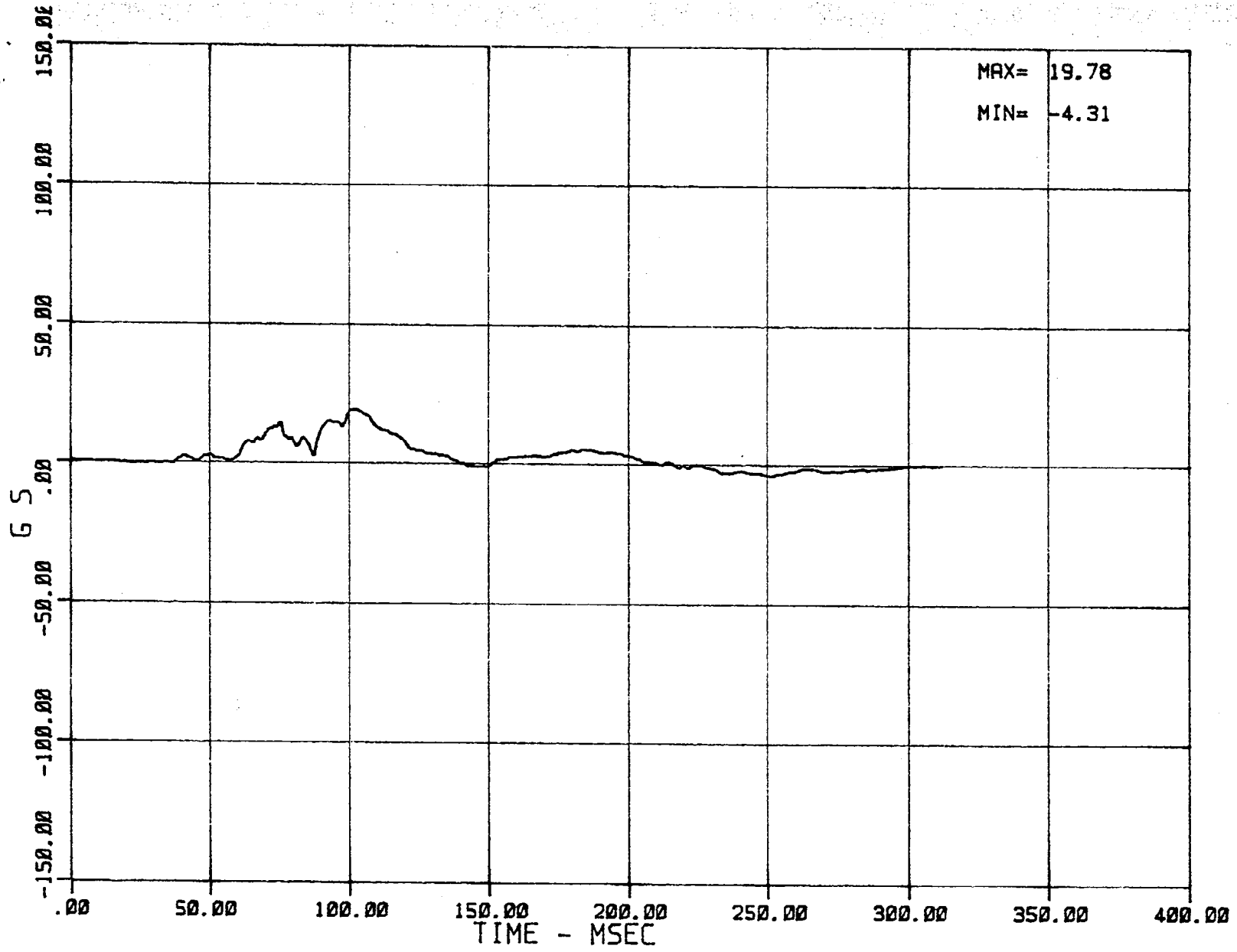
PASSENGER HEAD RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN

03/13/84

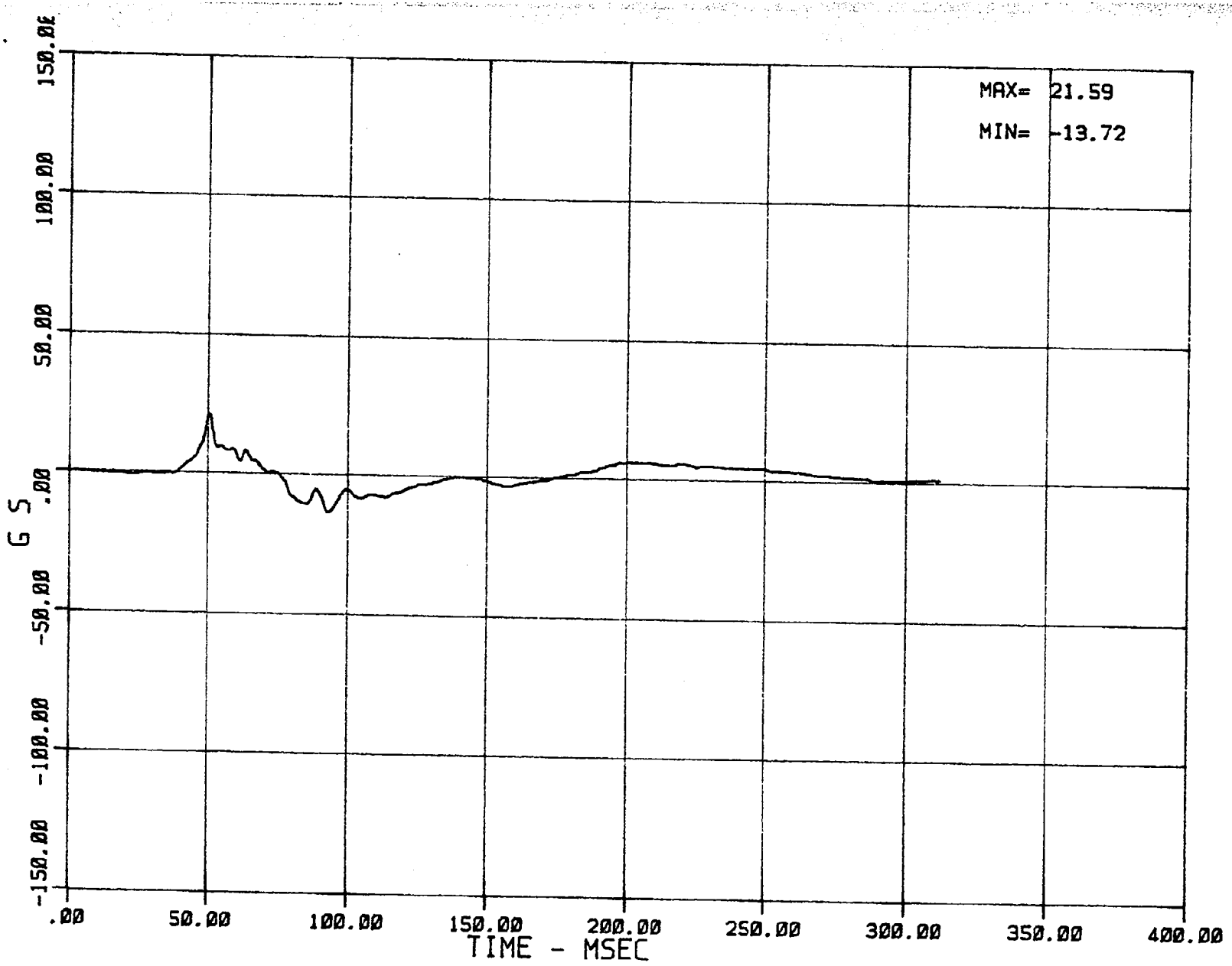


10 AC 01 2 CST X (PASSENGER CHEST ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84

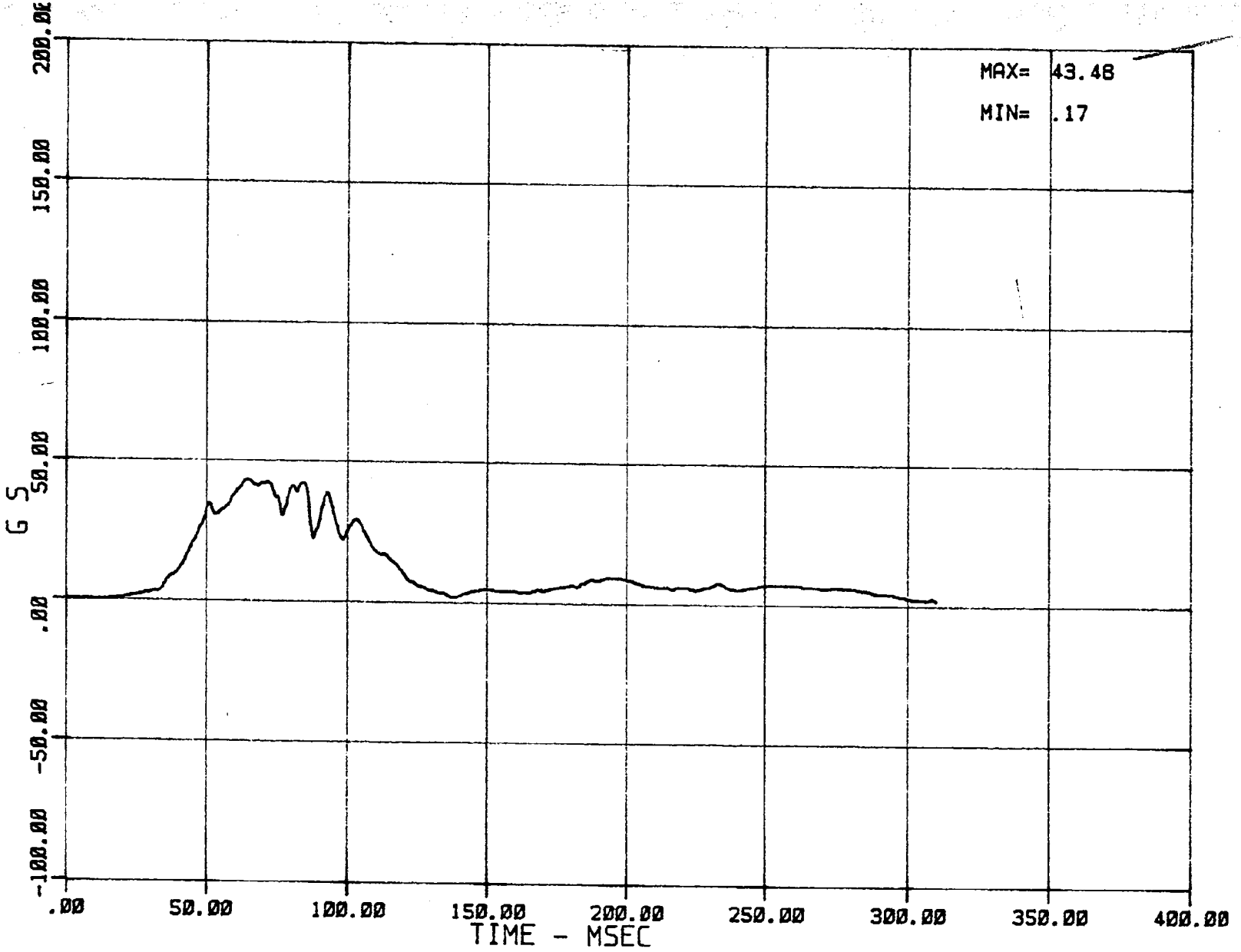


11 AC 01 2 CST Y (PASSENGER CHEST ACCEL. -- Y AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84



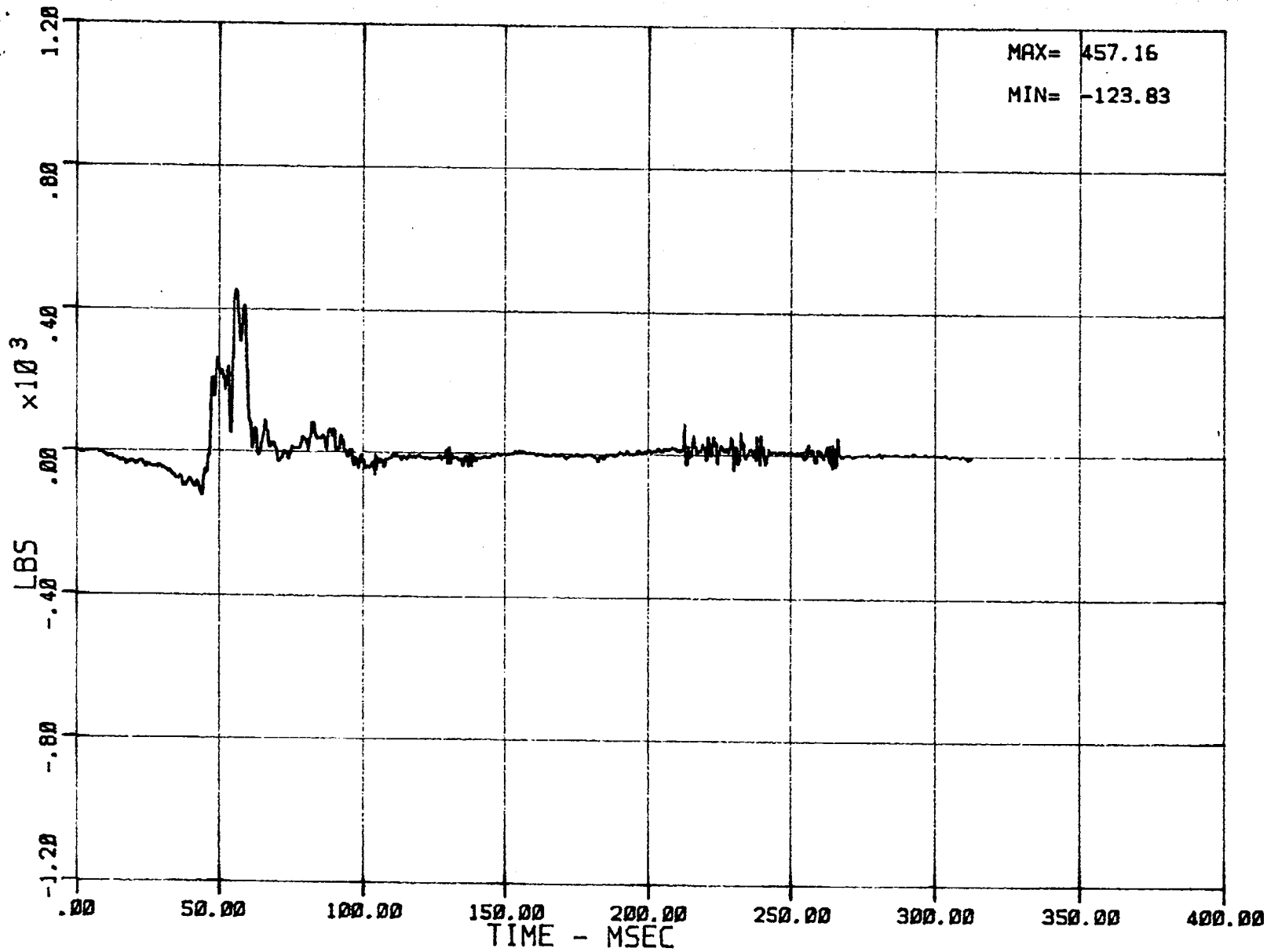
12 AC 01 2 CST Z (PASSENGER CHEST ACCEL. -- Z AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



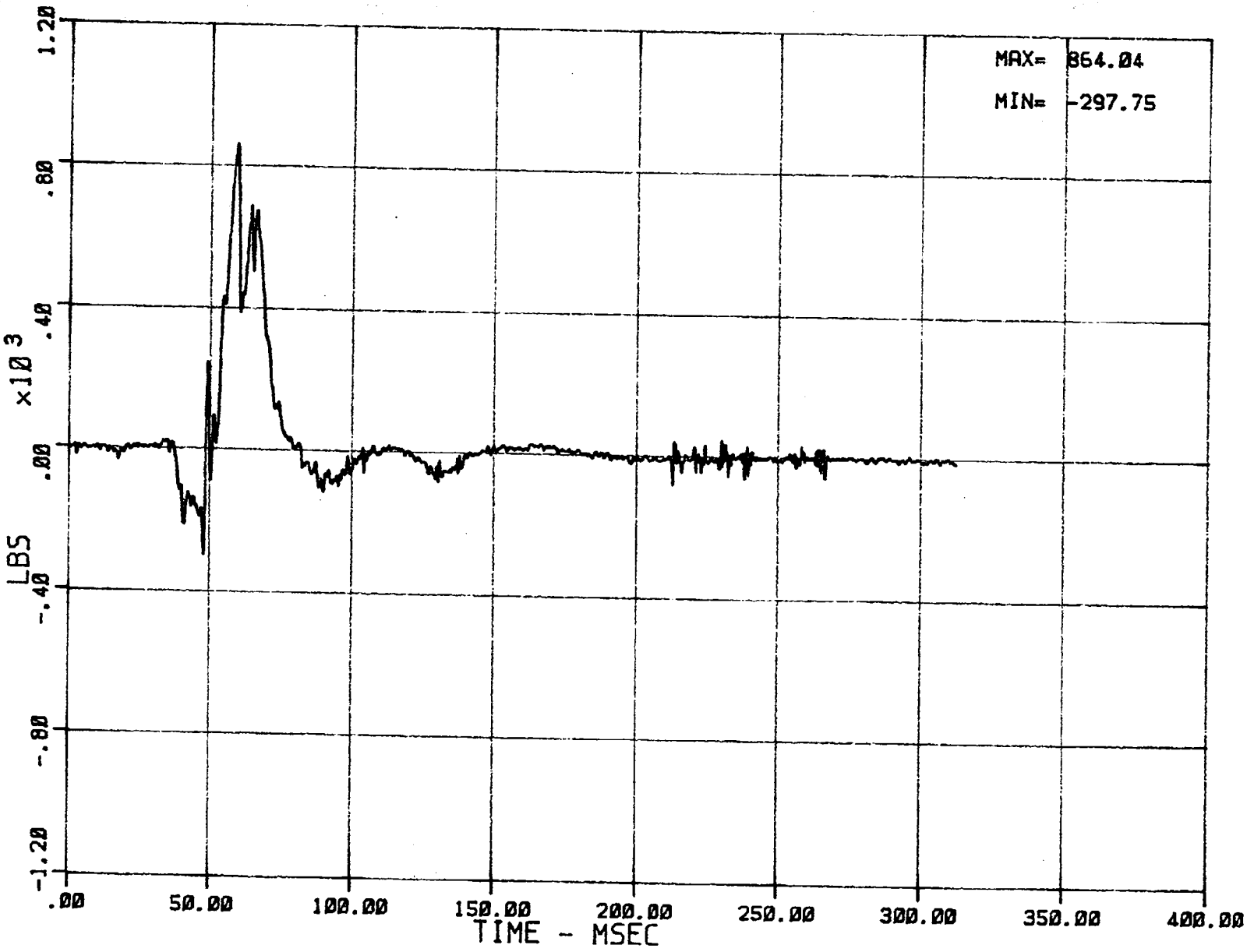
PASSENGER CHEST RESULTANT ACCELERATION
MSE N07054 1984 DODGE CARAVAN

03/13/84



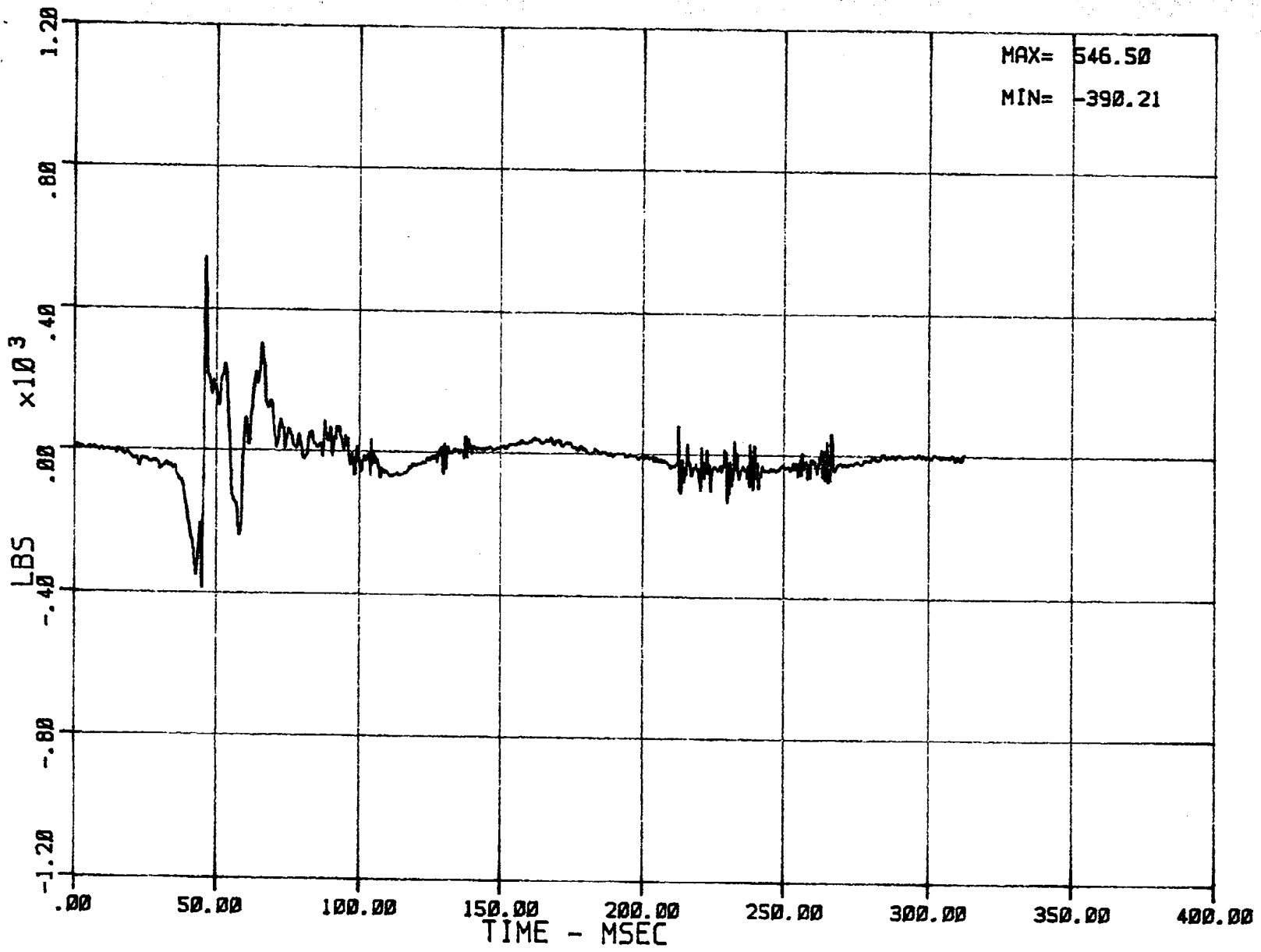
13 LC 01 1 LFM (DRIVER LEFT FEMUR FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



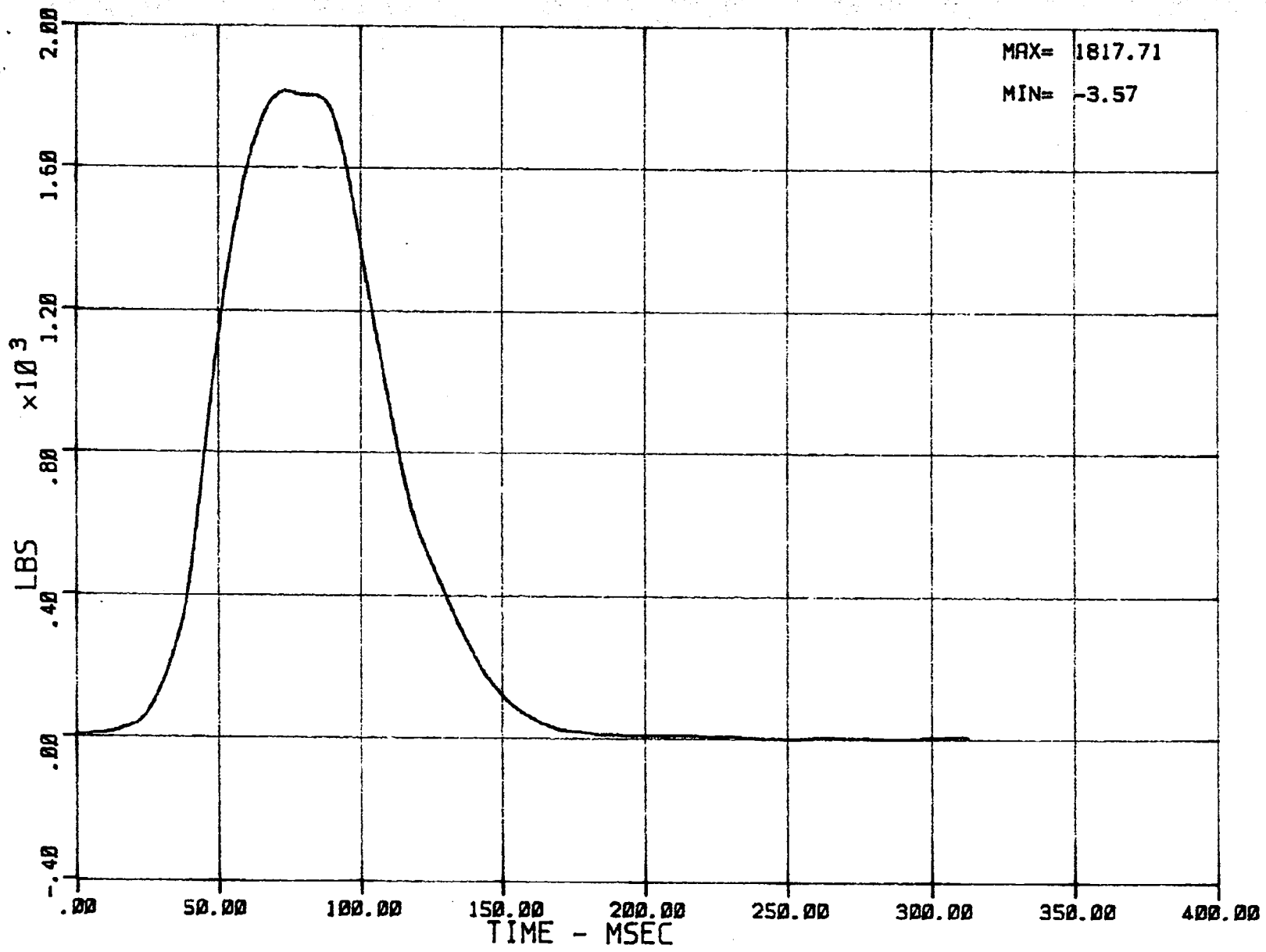
14 LC 01 1 RFM (DRIVER RIGHT FEMER FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

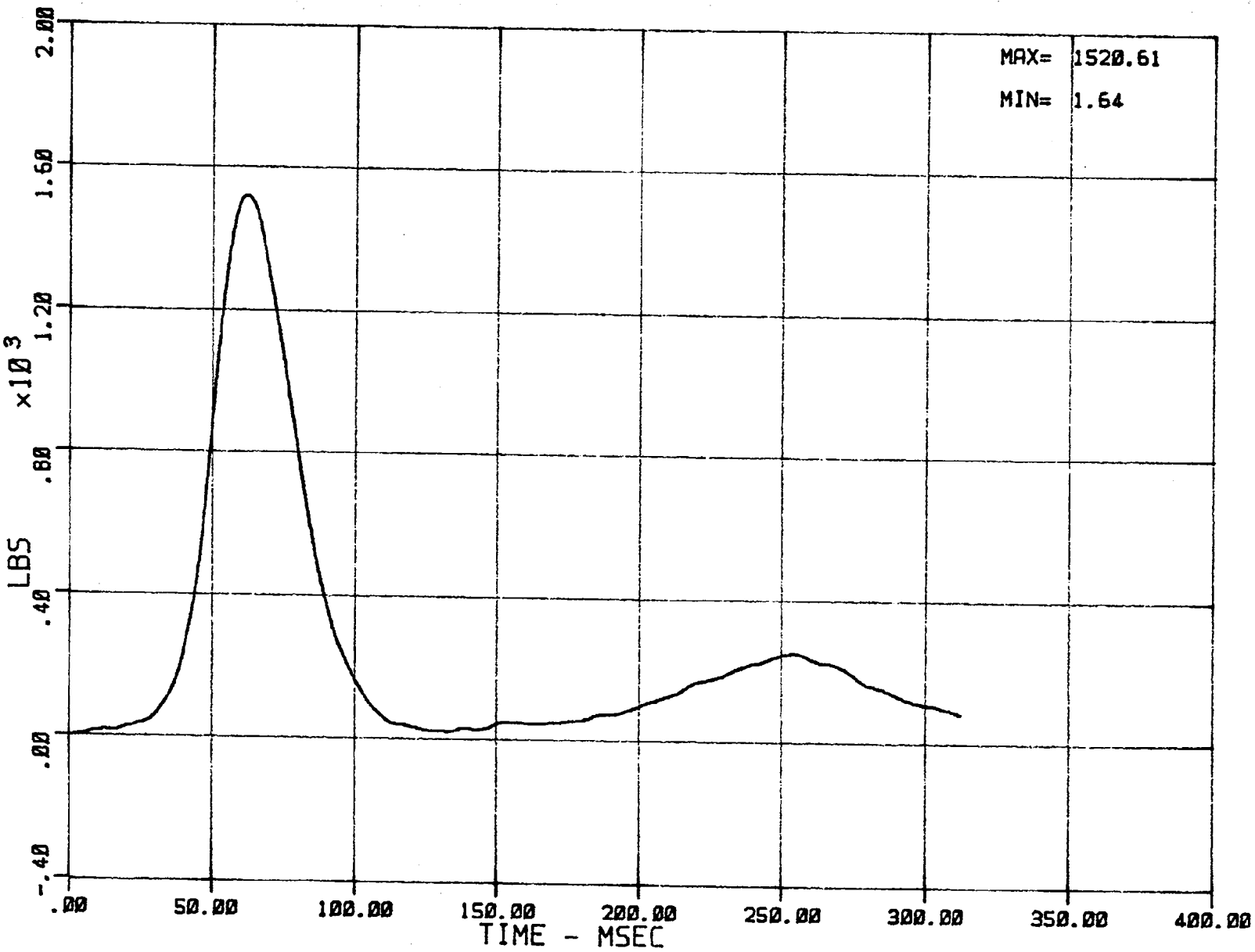


15 LC 01 2 LFM (PASSENGER LEFT FEMER FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

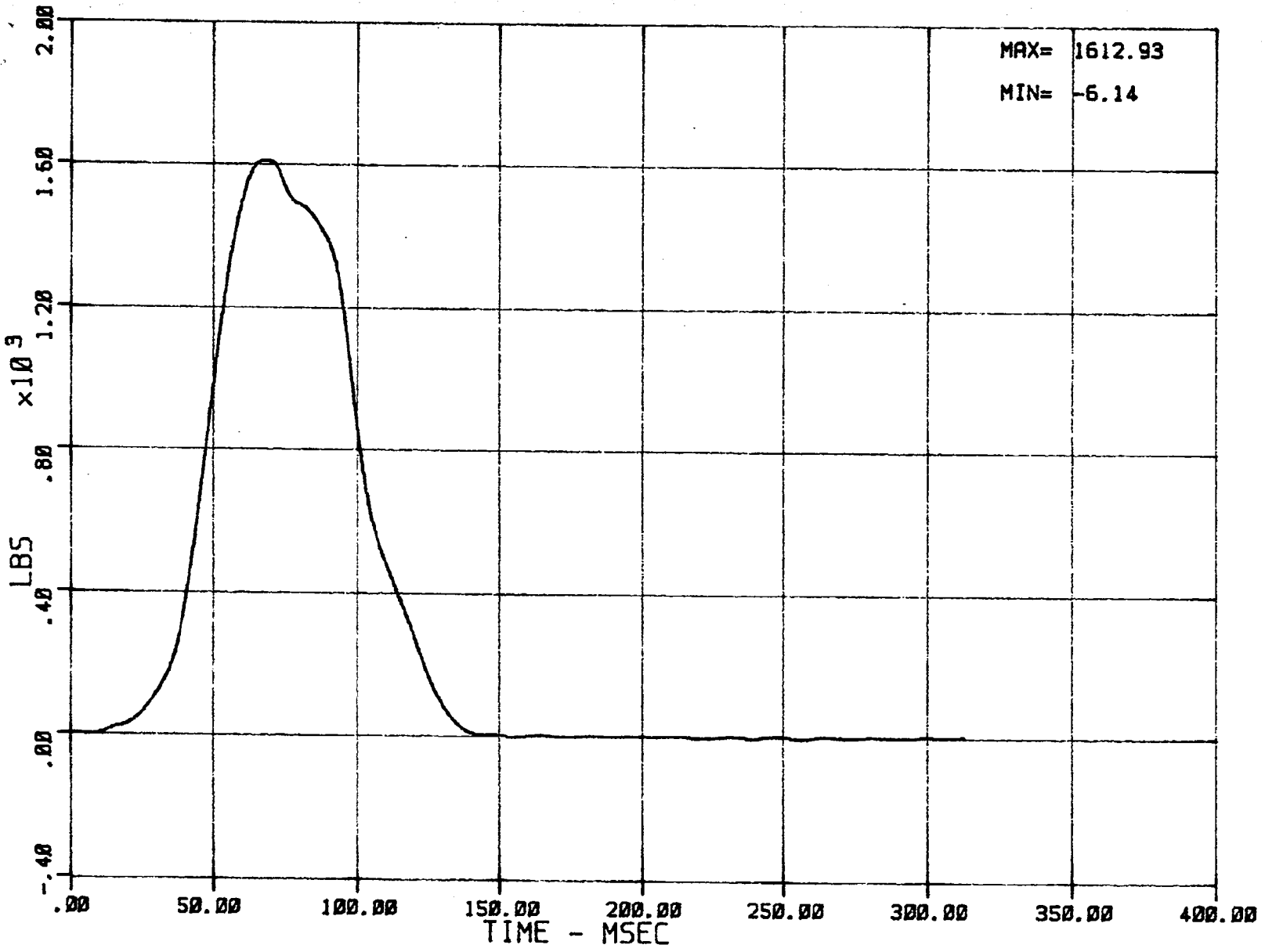


20 LC 01 2 SHB (PASSENGER SHOULDER BELT FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84



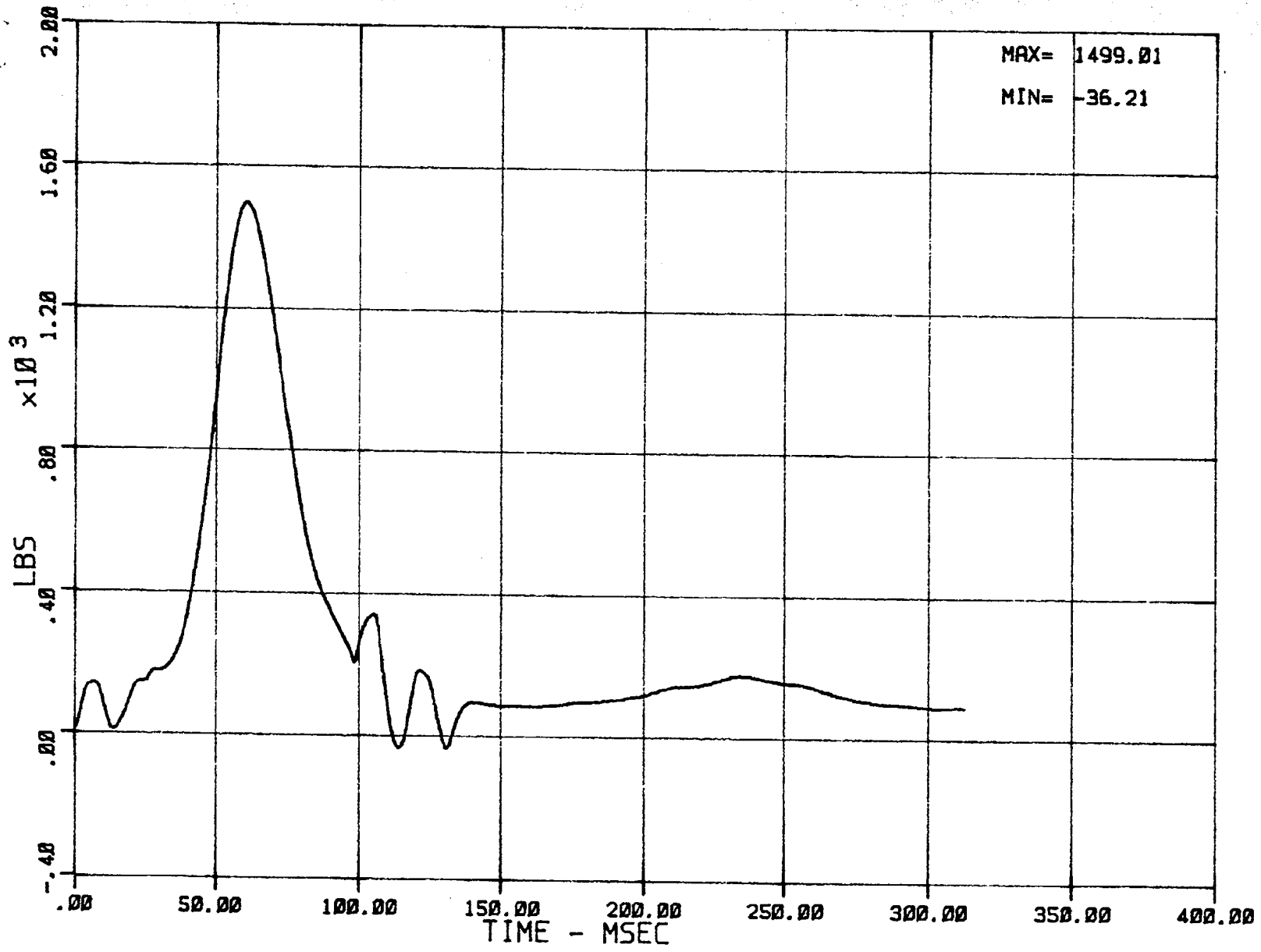
19 LC 01 2 LBO (PASSENGER LAP BELT FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



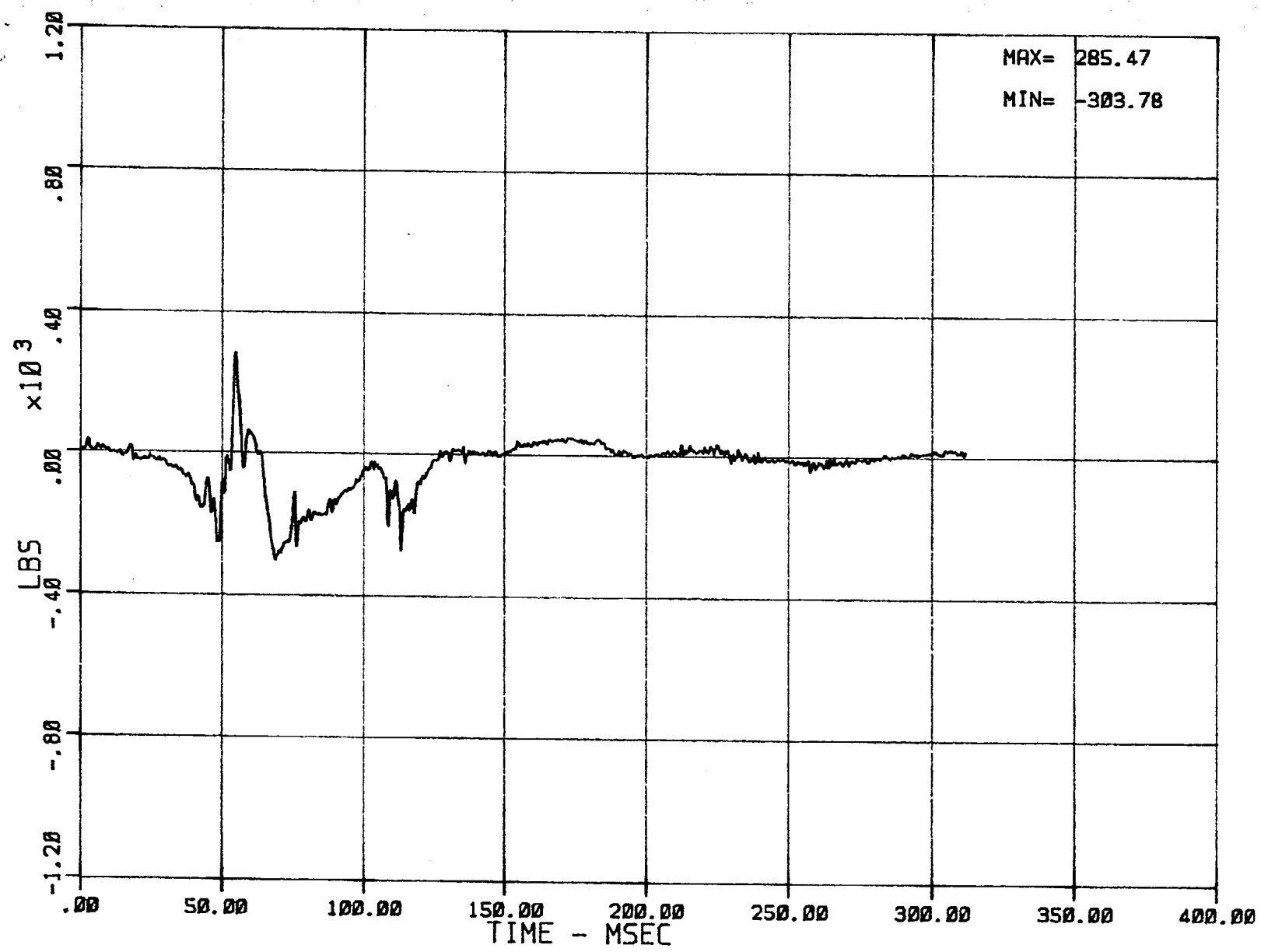
18 LC 01 1 SHB (DRIVER SHOULDER BELT FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



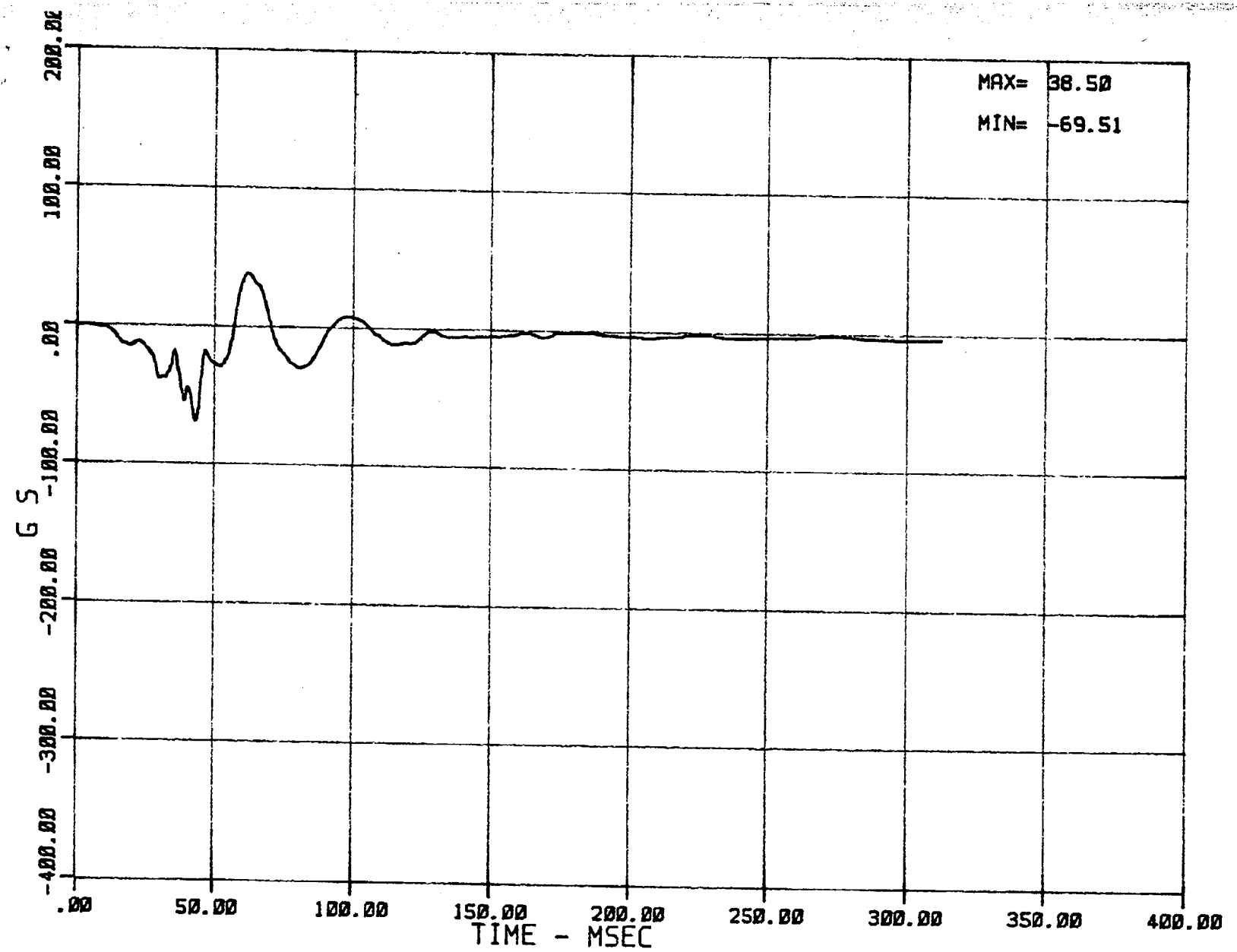
17 LC 01 1 LBO (DRIVER LAP BELT FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



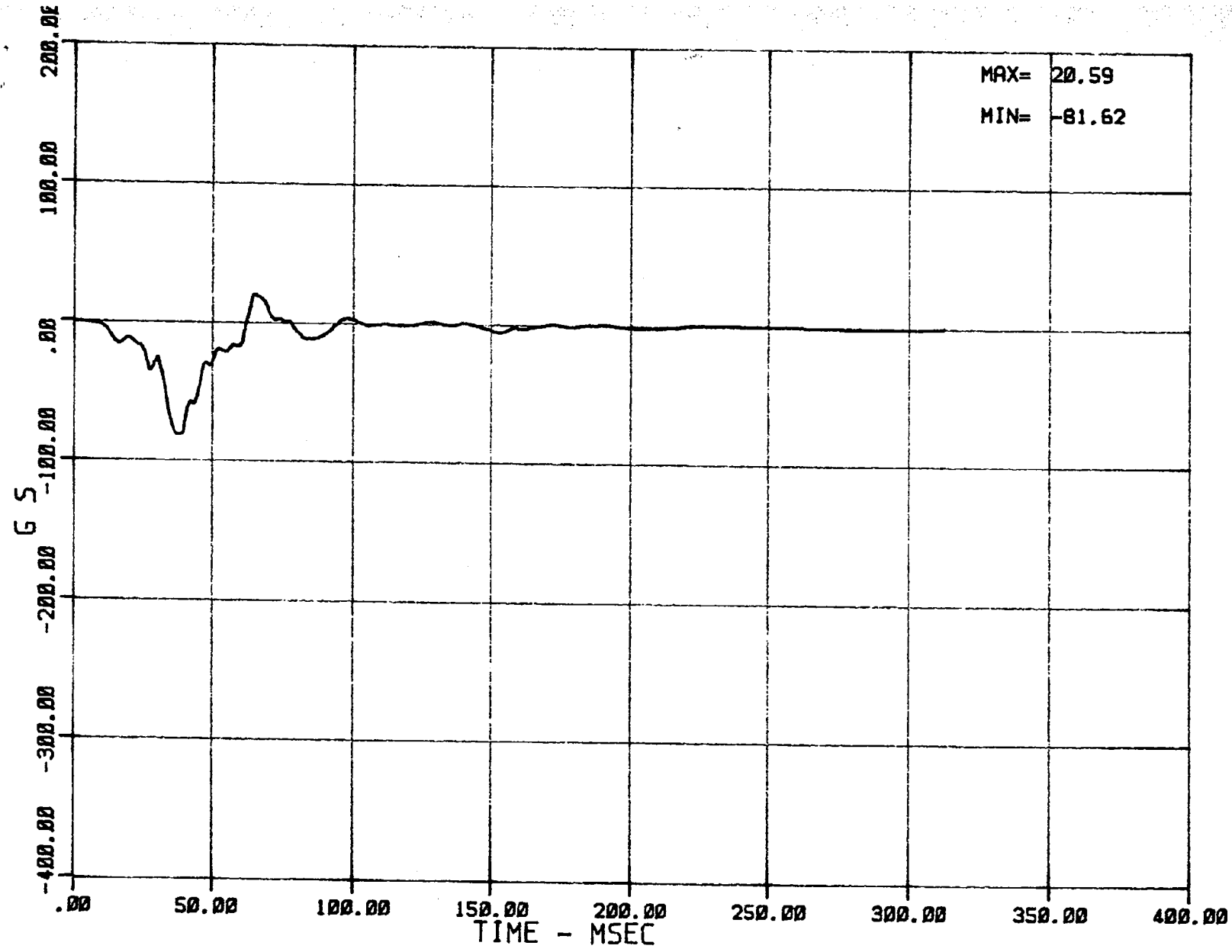
16 LC Ø1 2 RFM (PASSENGER RIGHT FEMUR FORCE)
MSE N07054 1984 DODGE CARAVAN

Ø3/13/84



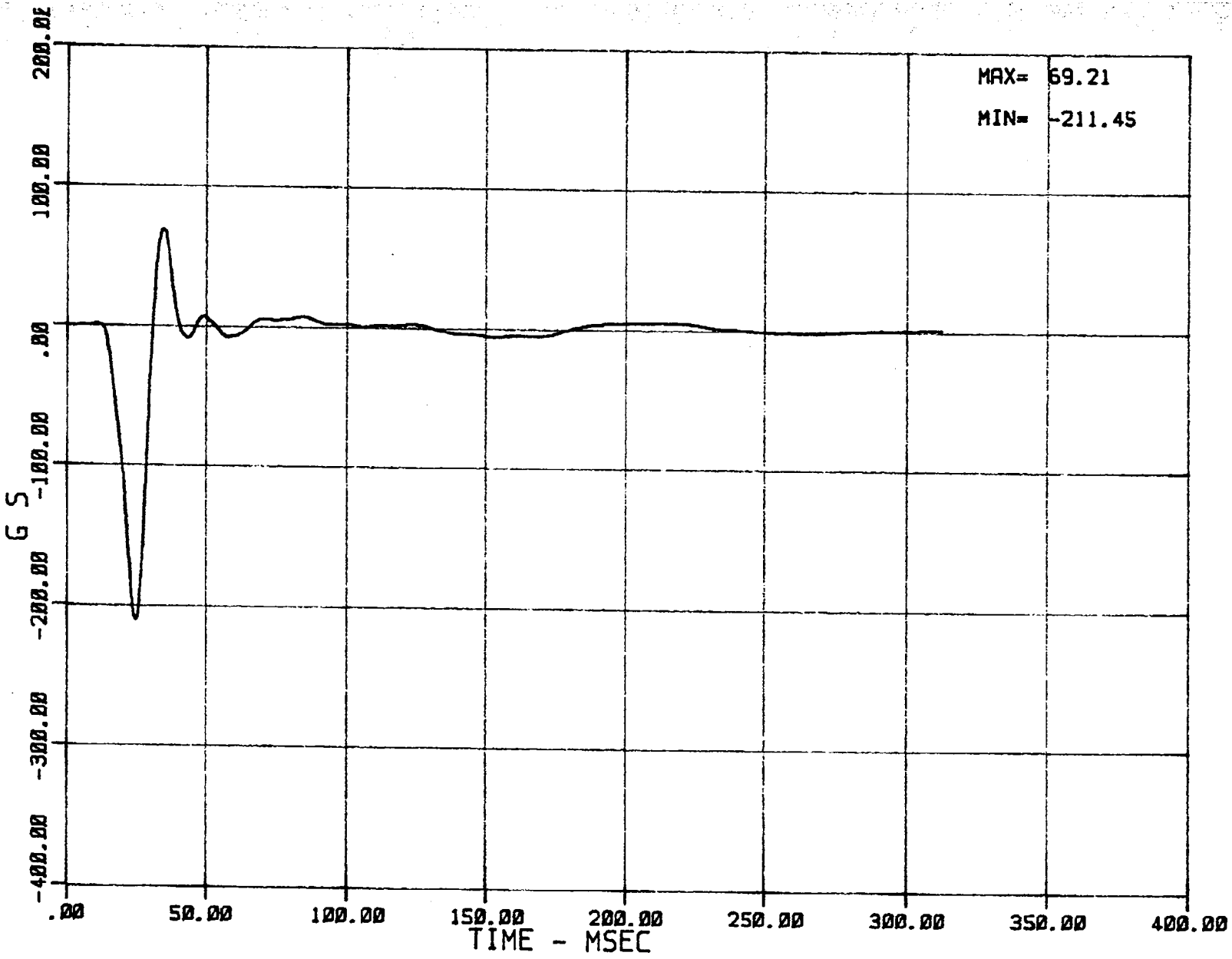
21 AC 01 N BCL X (LEFT FRONT WHEEL ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



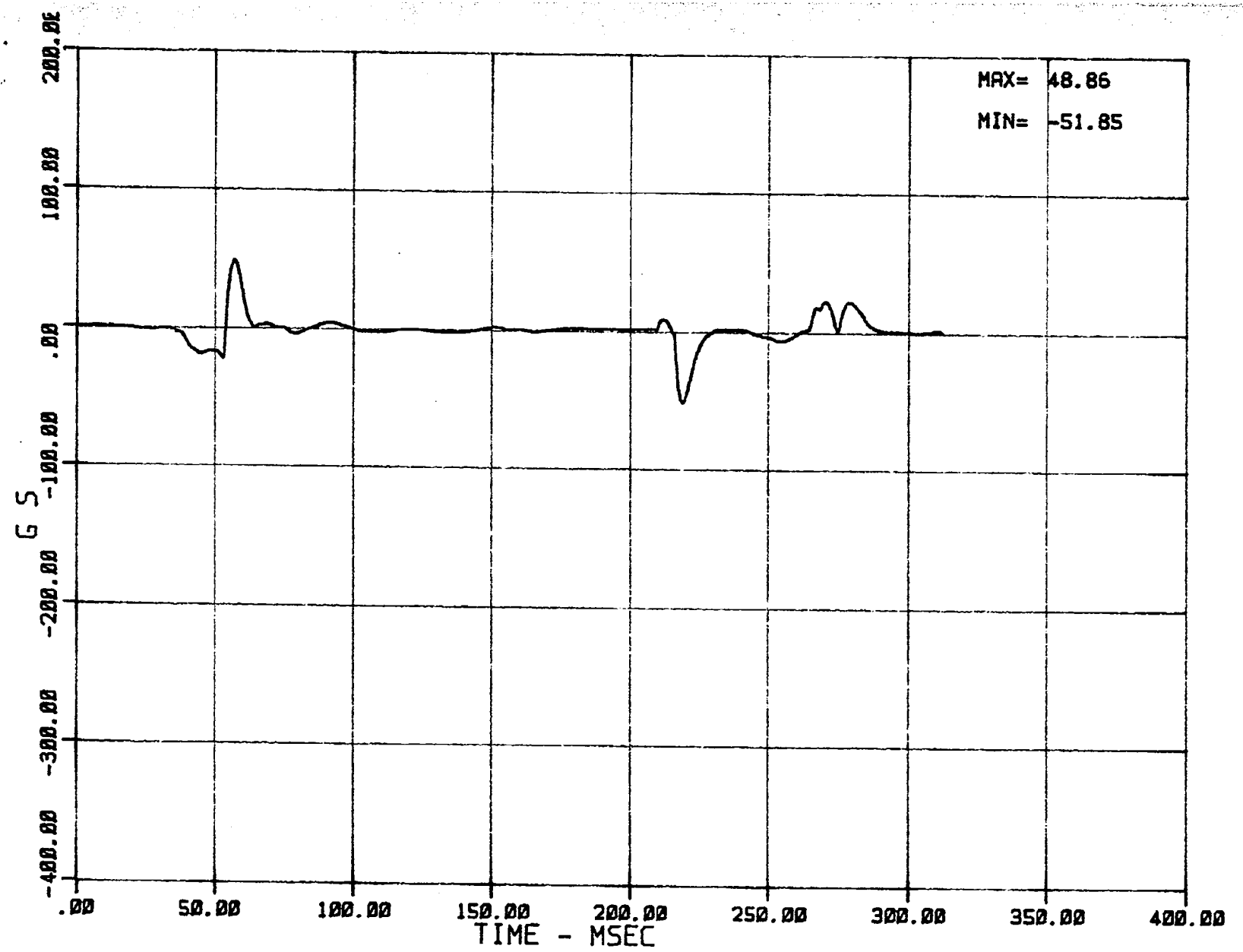
22 AC 01 N BCR X (RIGHT FRONT WHEEL ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



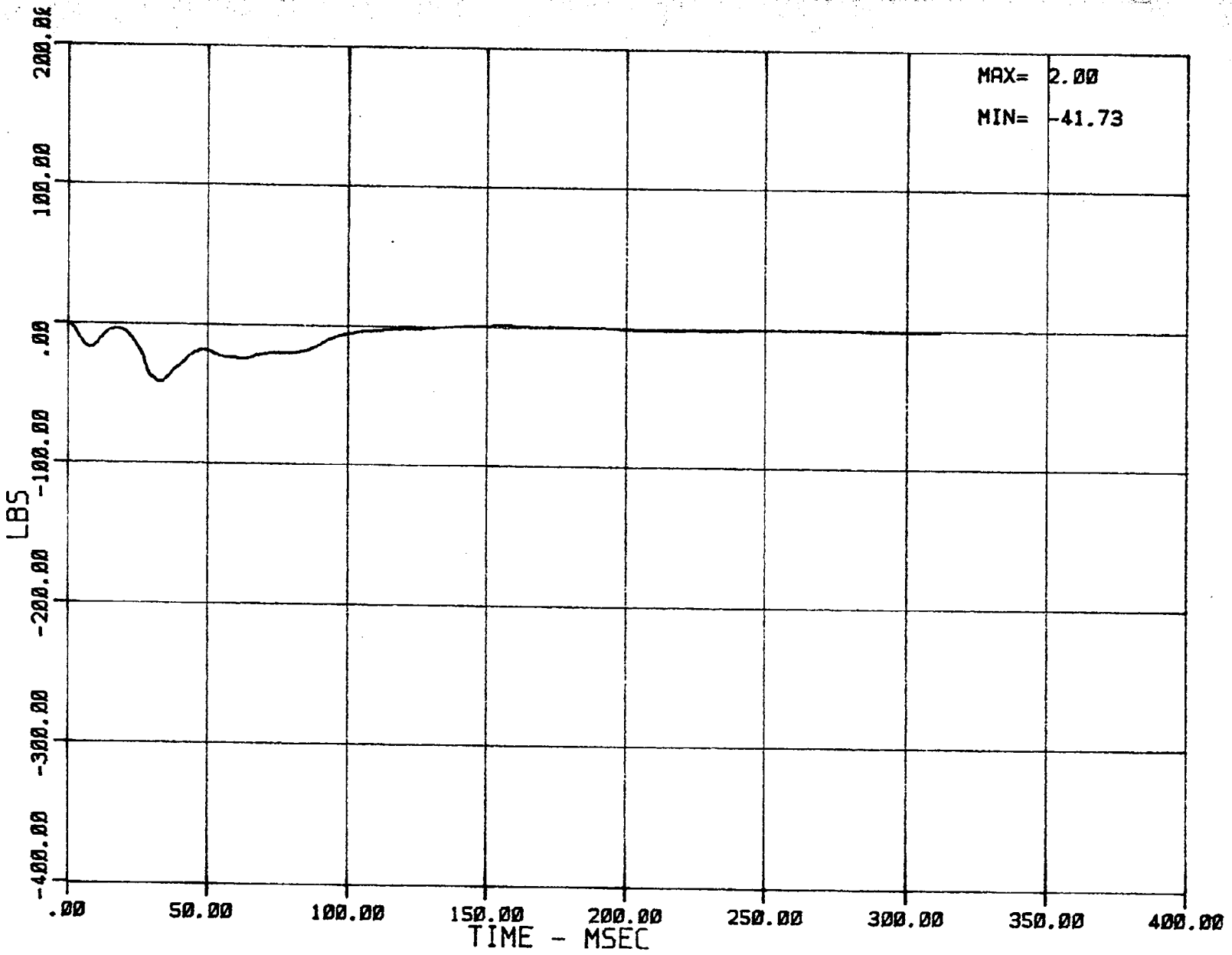
23 RC 01 N ENG X (TOP OF ENGINE ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84



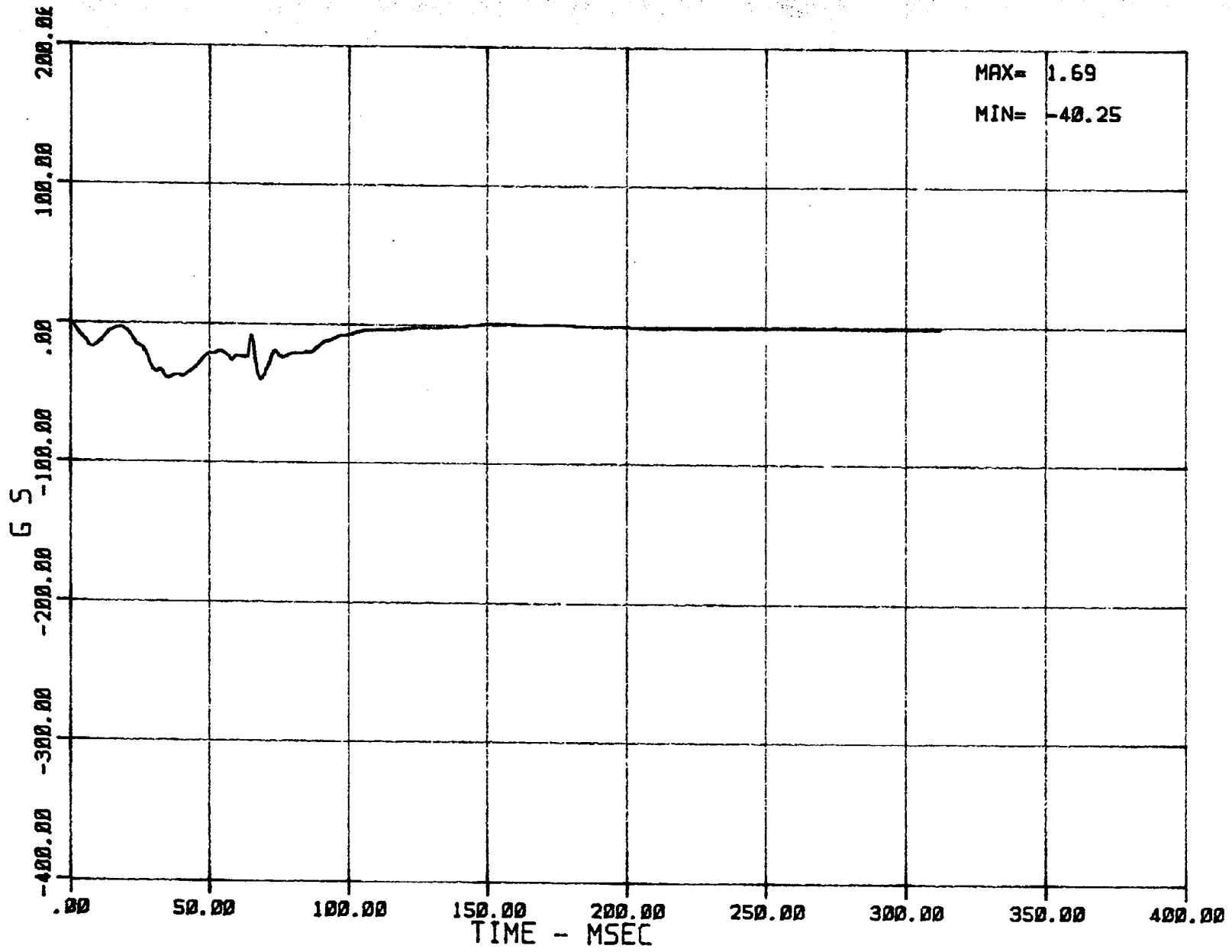
24 AC 01 N ENG X (BOTTOM OF ENGINE ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84

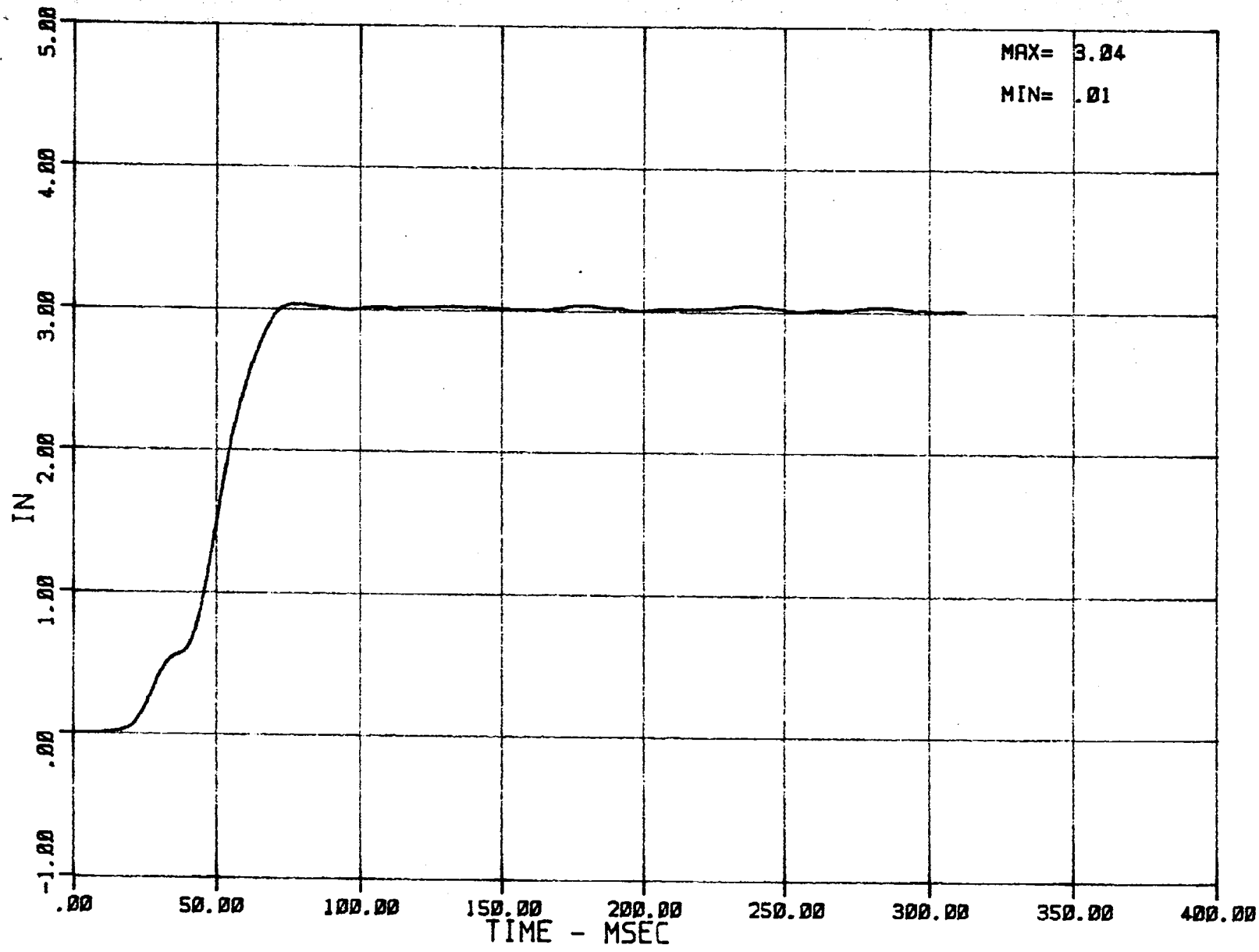


25 AC 01 N RFF X (RIGHT FRONT FLOOR ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN

03/13/84

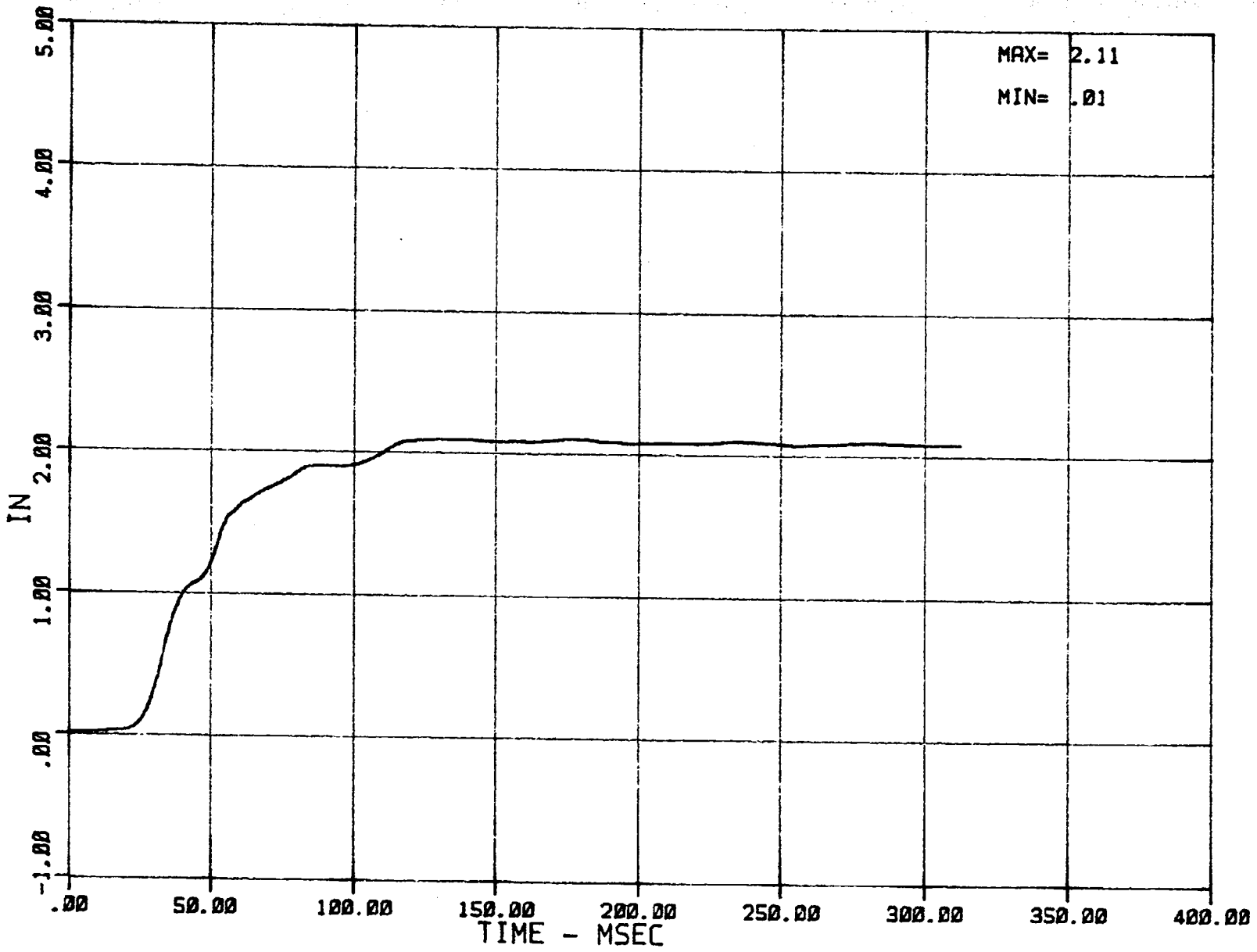


26 AC 01 N LRF X (LEFT REAR FLOOR ACCEL. -- X AXIS)
MSE N07054 1984 DODGE CARAVAN 03/13/84

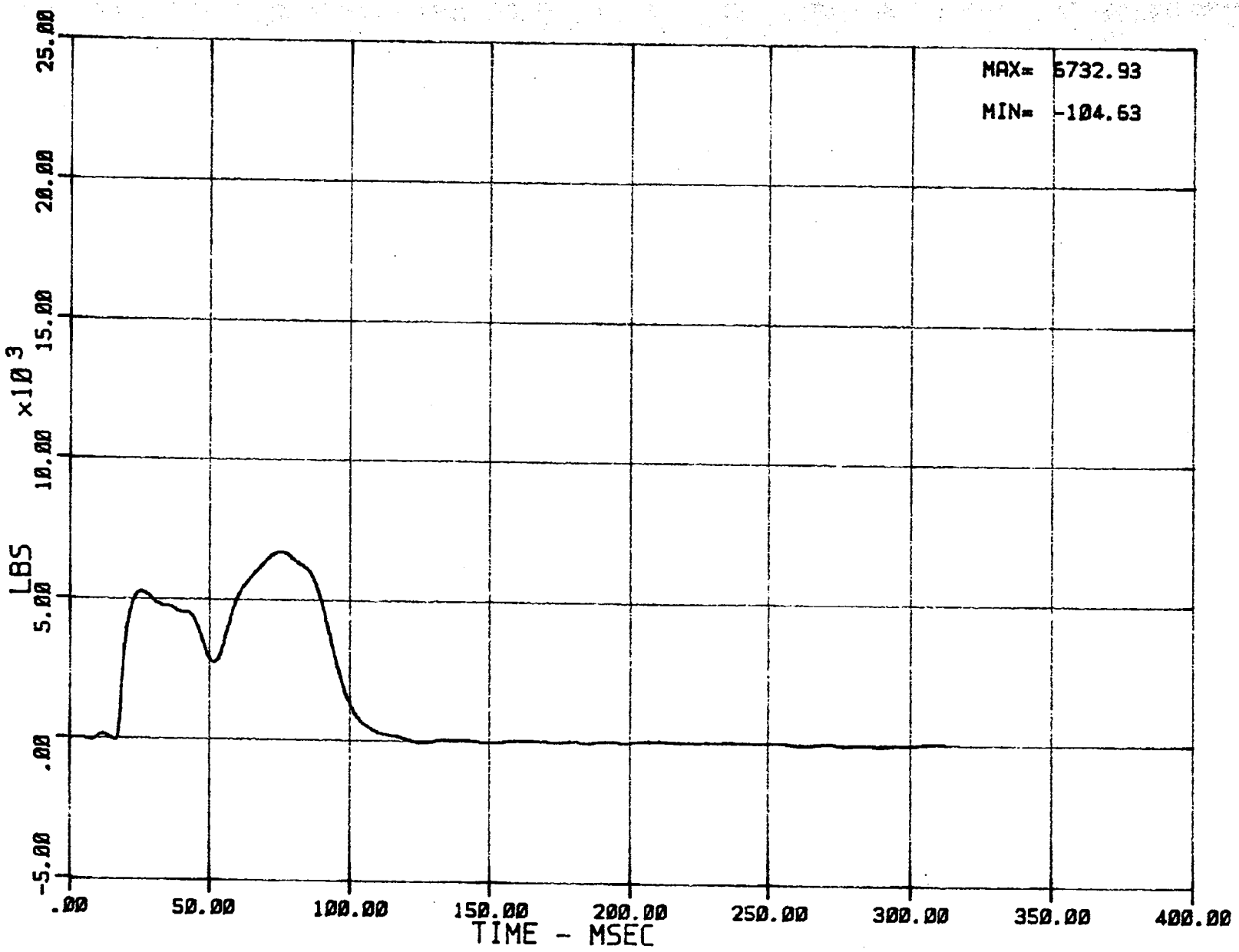


27 DT 01 1 SHB (DRIVER SHOULDER BELT PULLOUT)
MSE N07054 1984 DODGE CARAVAN

03/13/84

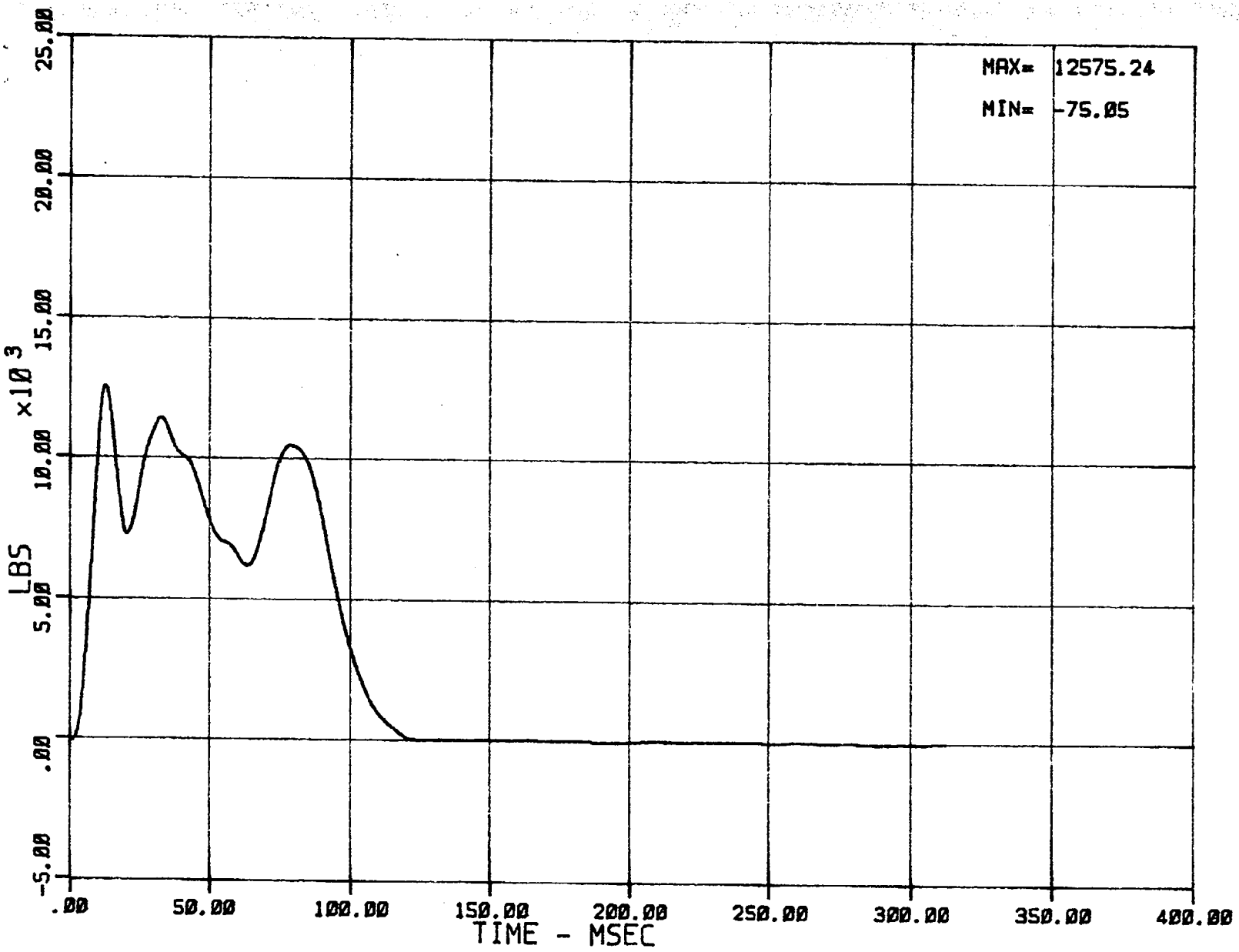


28 DT 01 2 SHB (PASSENGER SHOULDER BELT PULLOUT)
MSE N07054 1984 DODGE CARAVAN 03/13/84



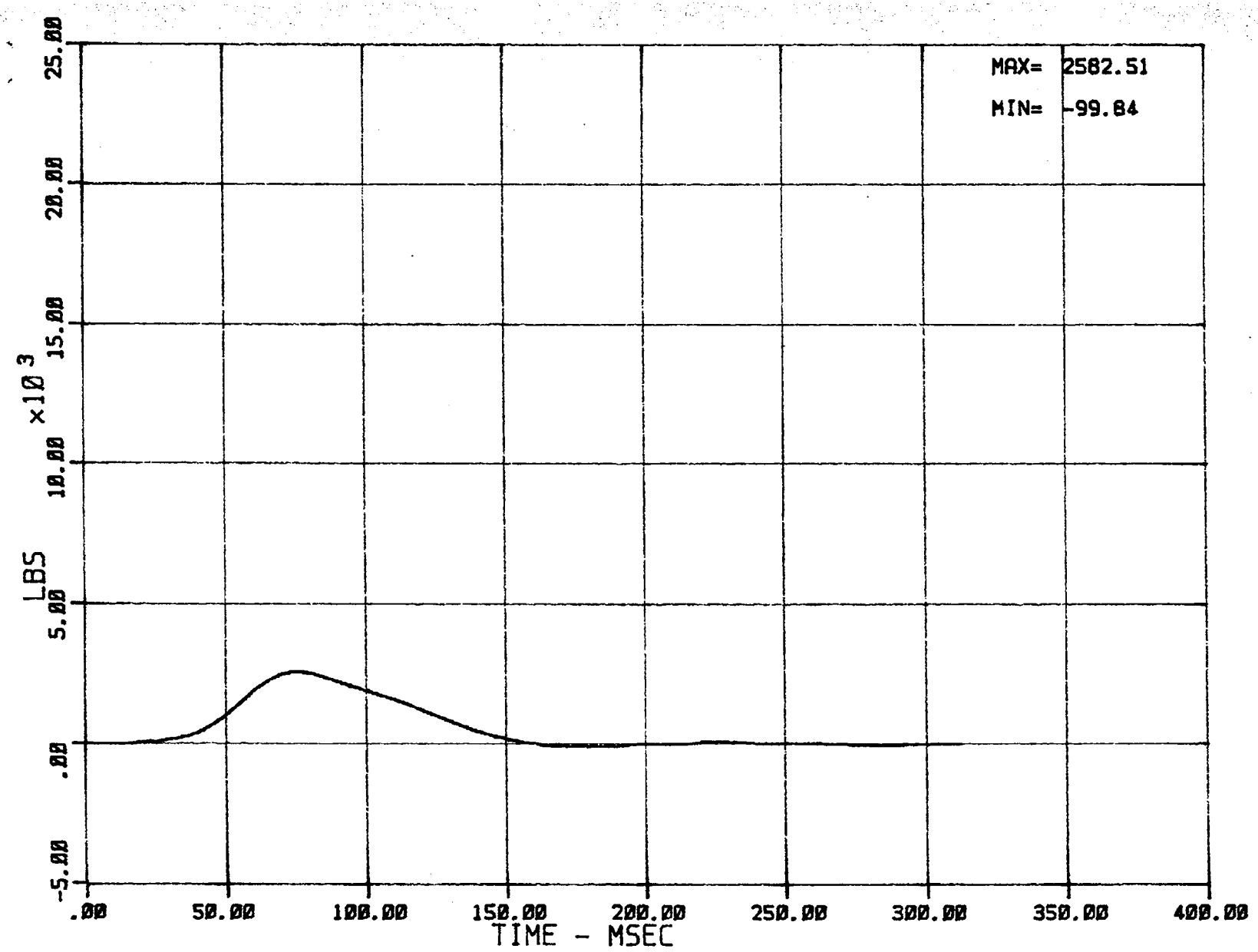
33 LC BA N BAS (BARRIER LOAD CELL AS FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

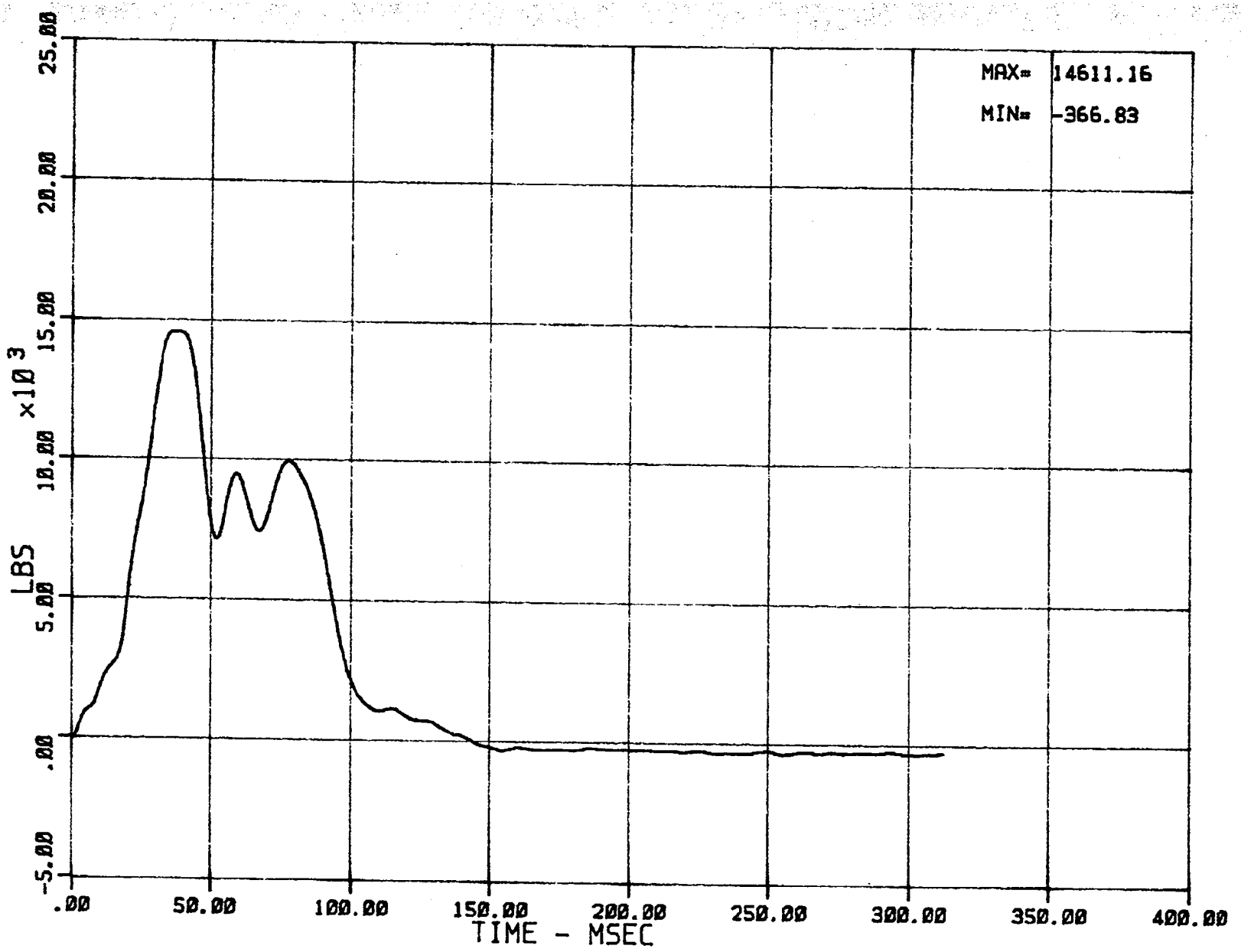


40 LC BA N BB3 (BARRIER LOAD CELL B3 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

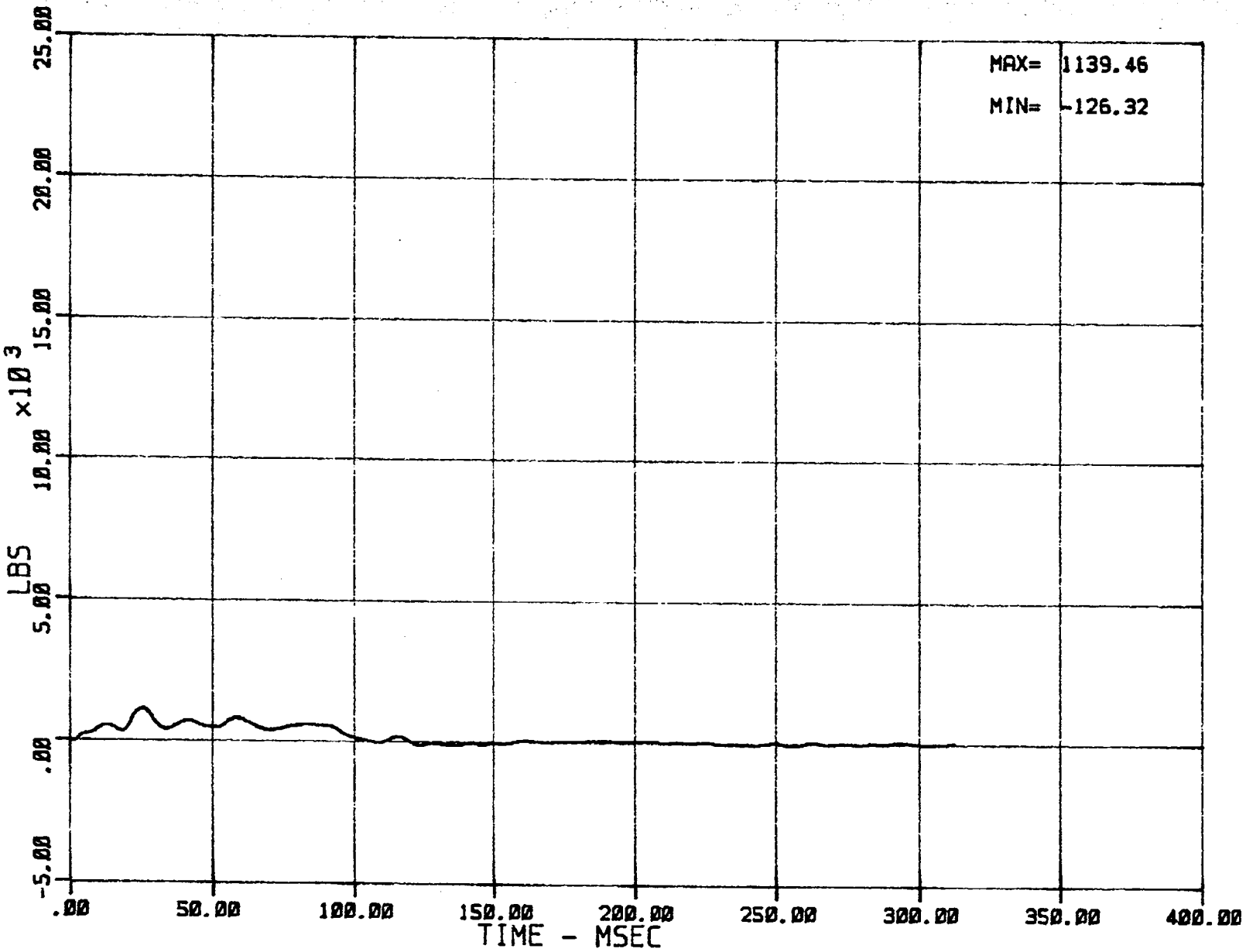


41 LC BA N BB4 (BARRIER LOAD CELL B4 FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84



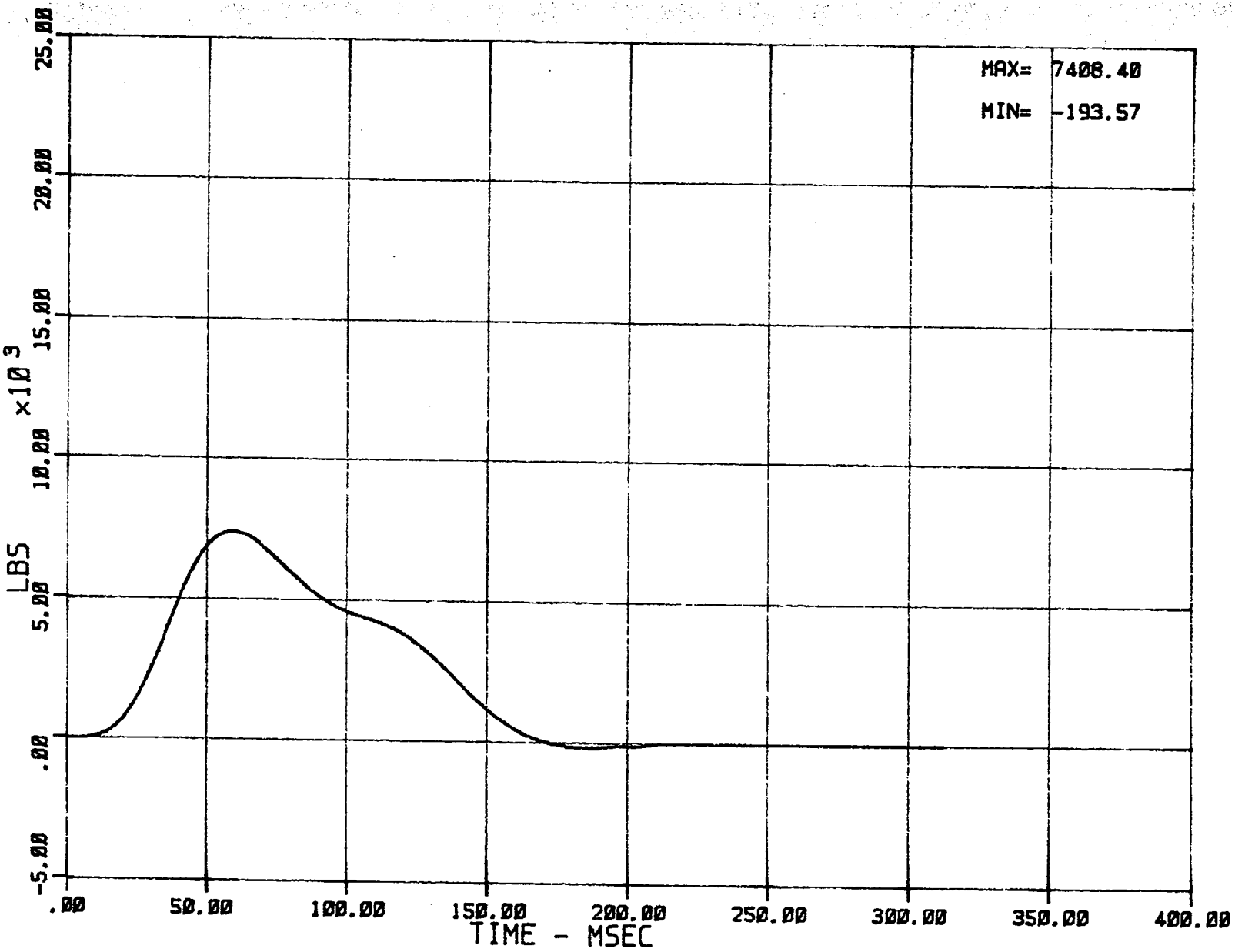
42 LC BA N BB5 (BARRIER LOAD CELL B5 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



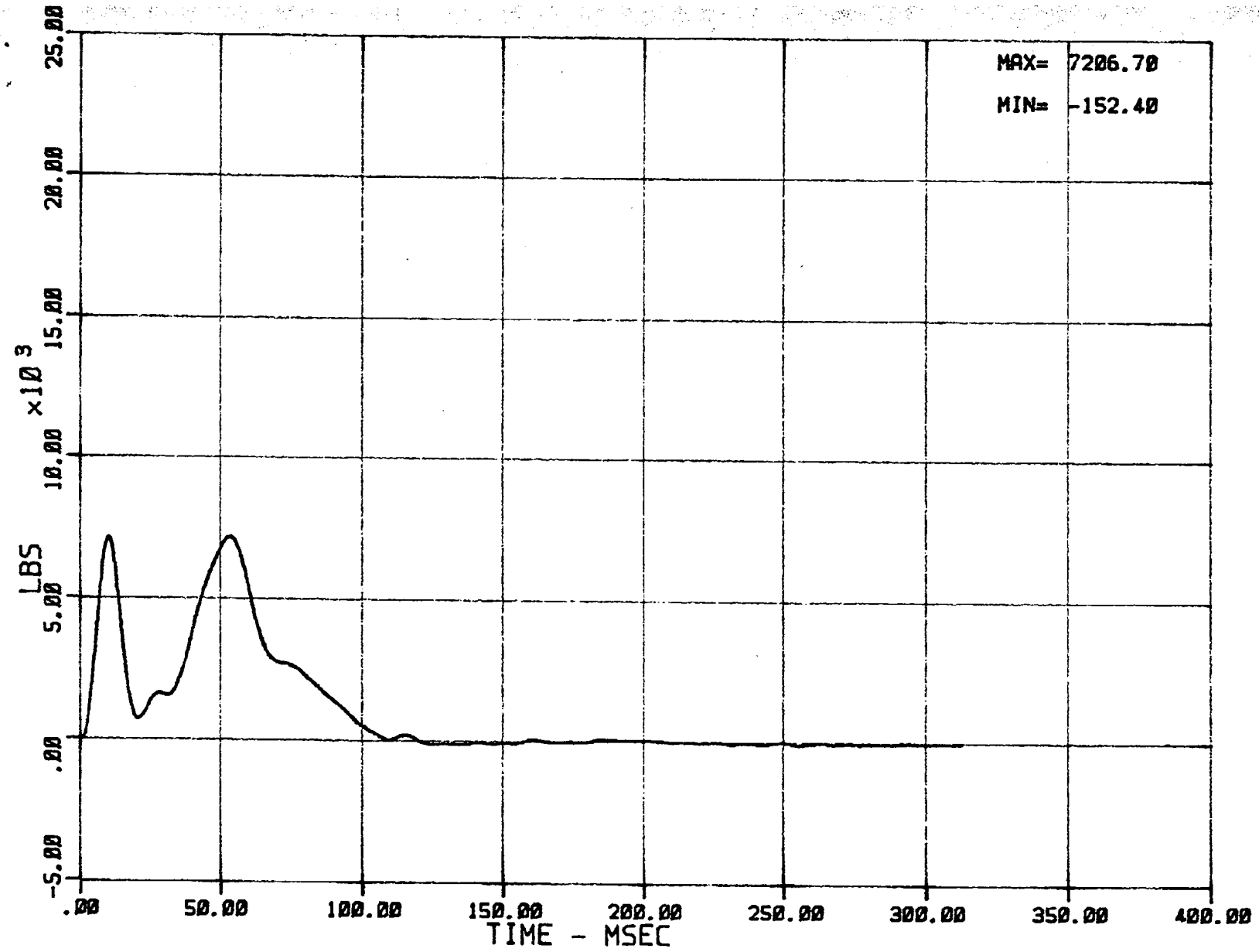
43 LC BA N BB6 (BARRIER LOAD CELL B6 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



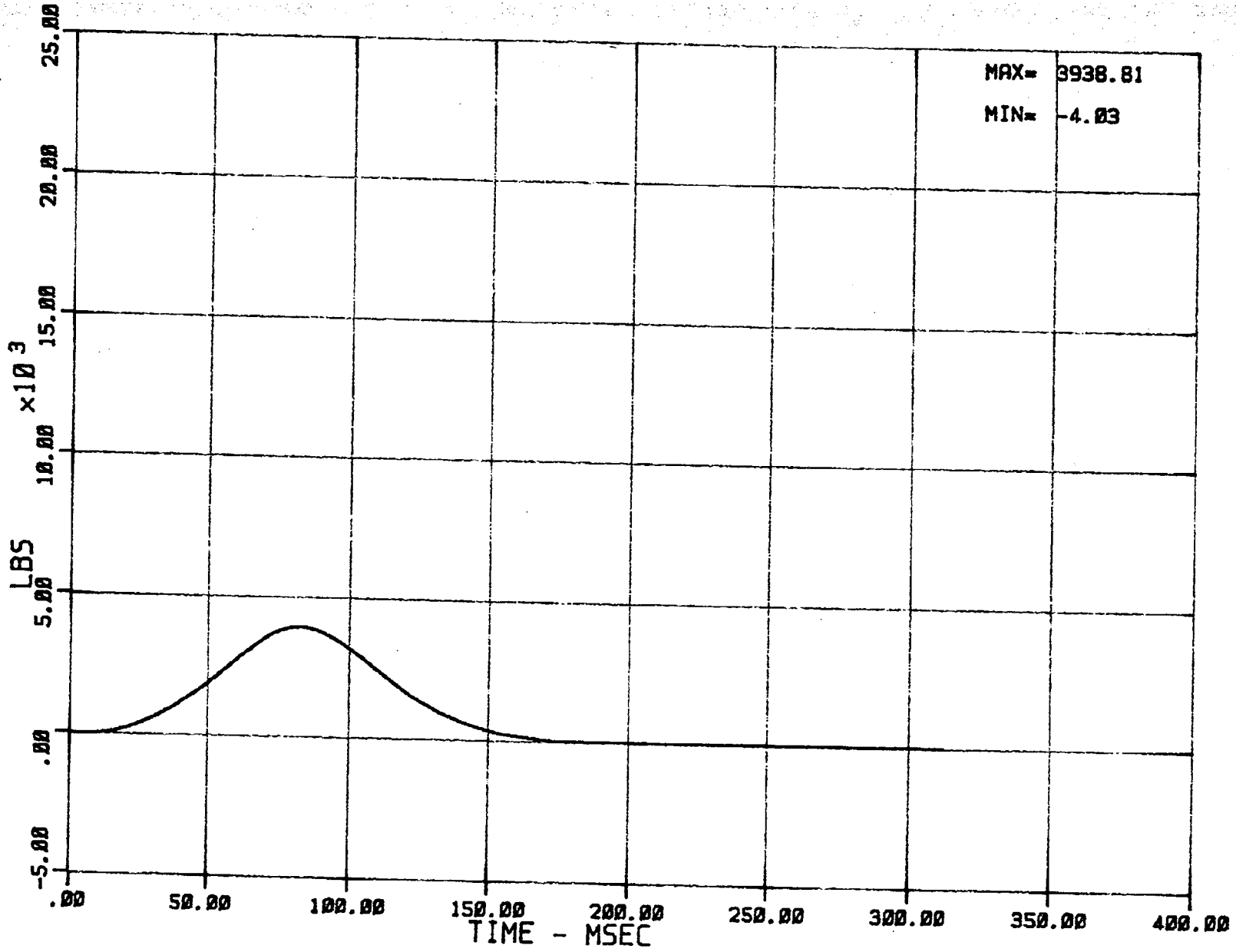
44 LC BA N BB7 (BARRIER LOAD CELL B7 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



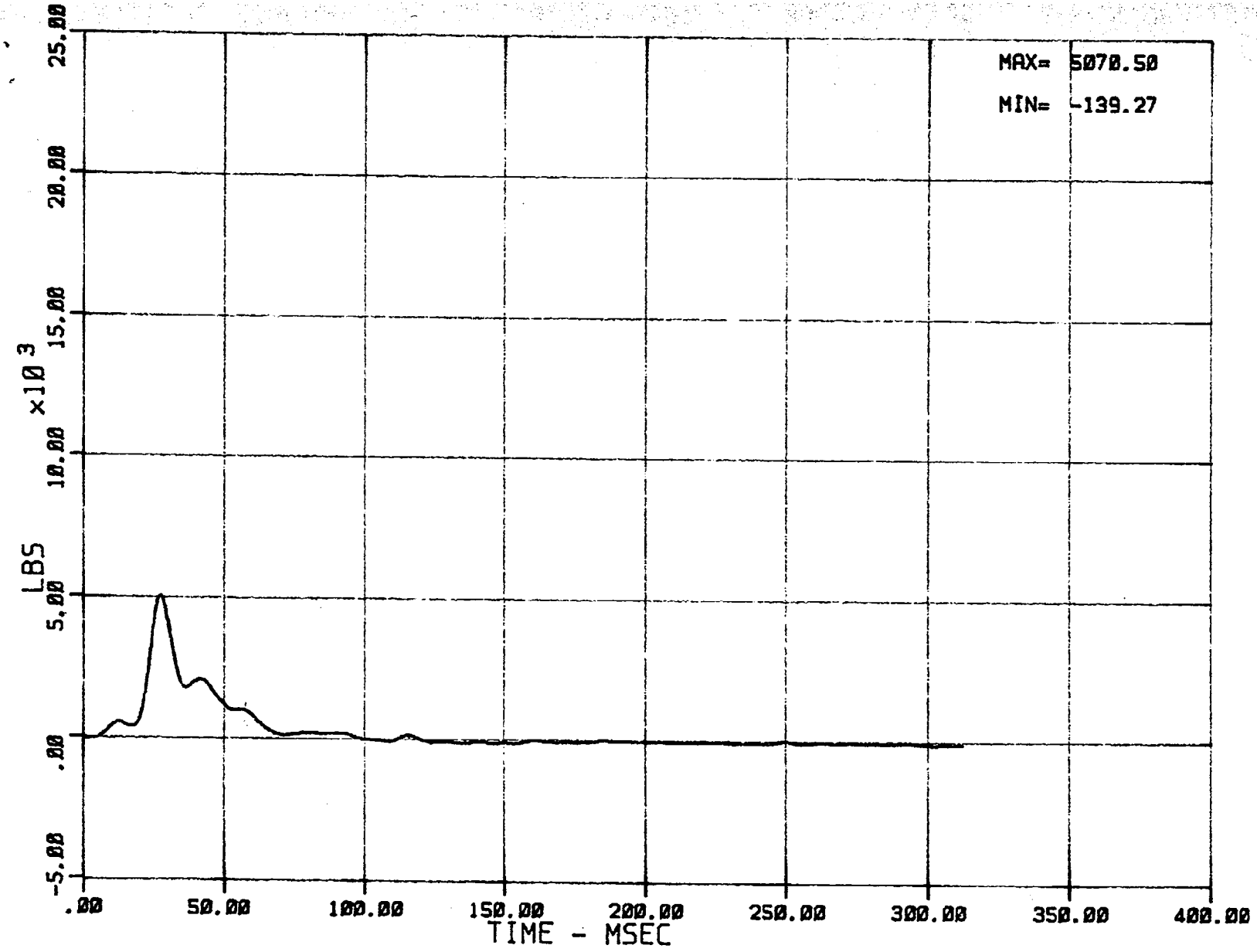
49 LC BA N BC3 (BARRIER LOAD CELL C3 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

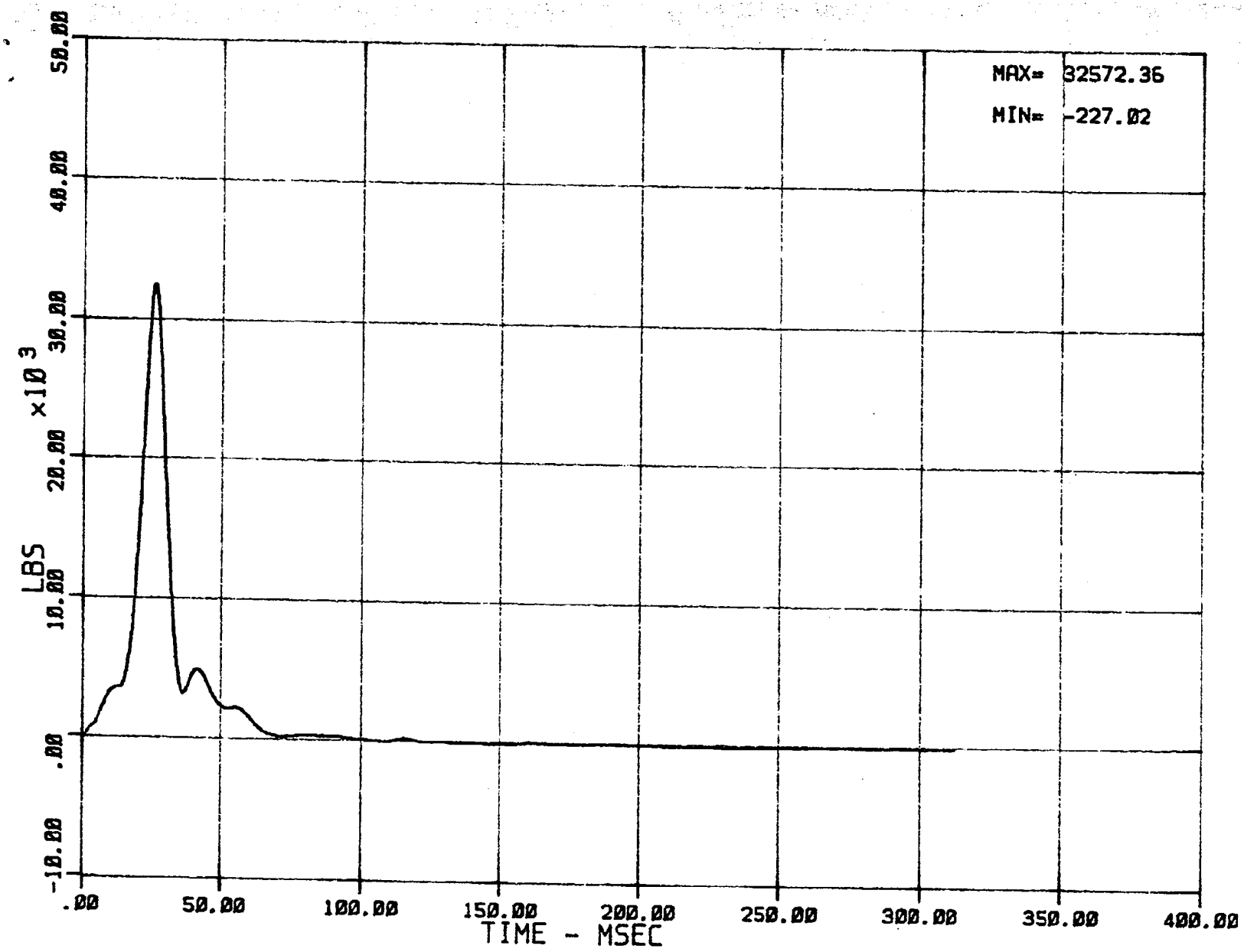


50 LC BA N BC4 (BARRIER LOAD CELL C4 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84

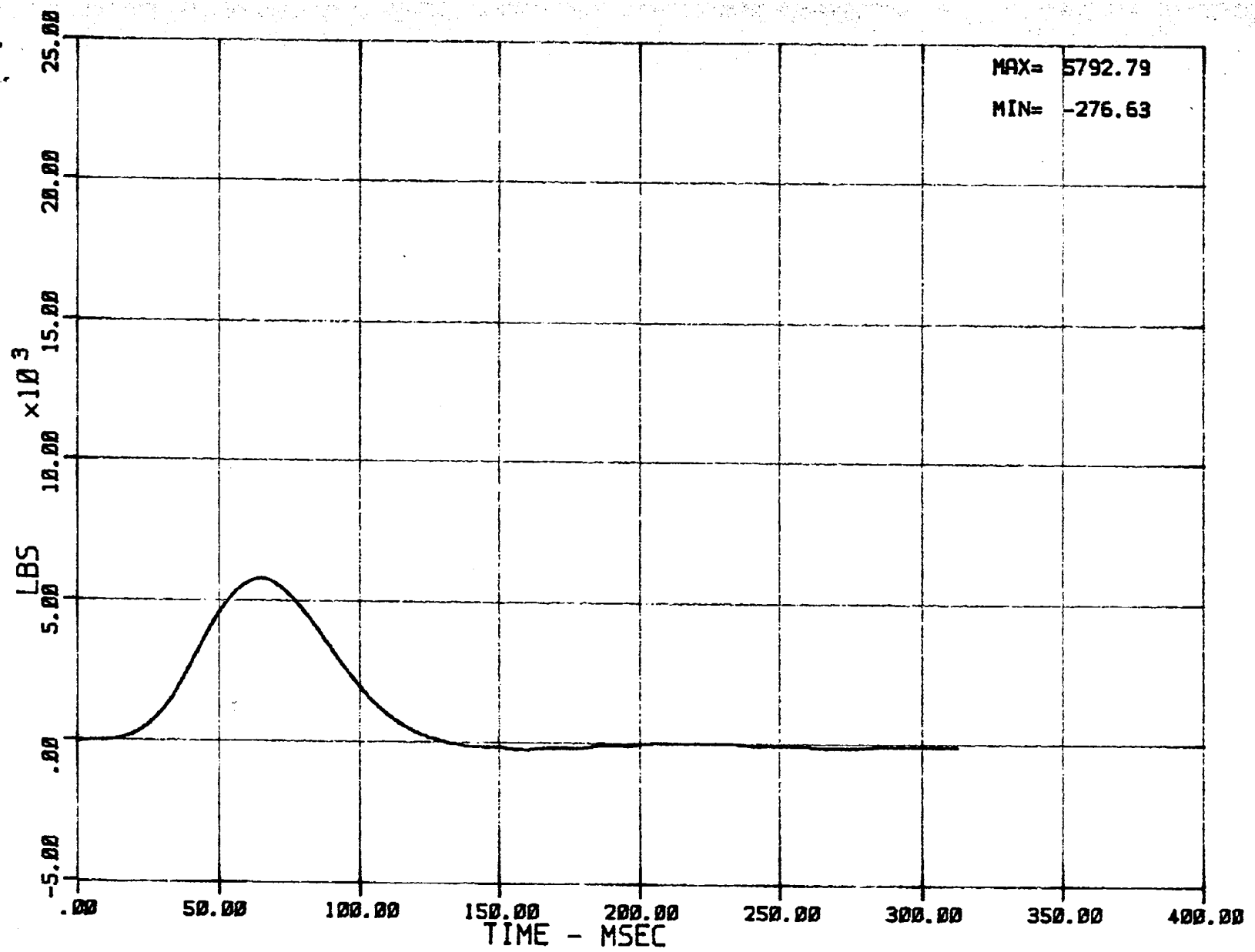


51 LC BA N BC5 (BARRIER LOAD CELL C5 FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84



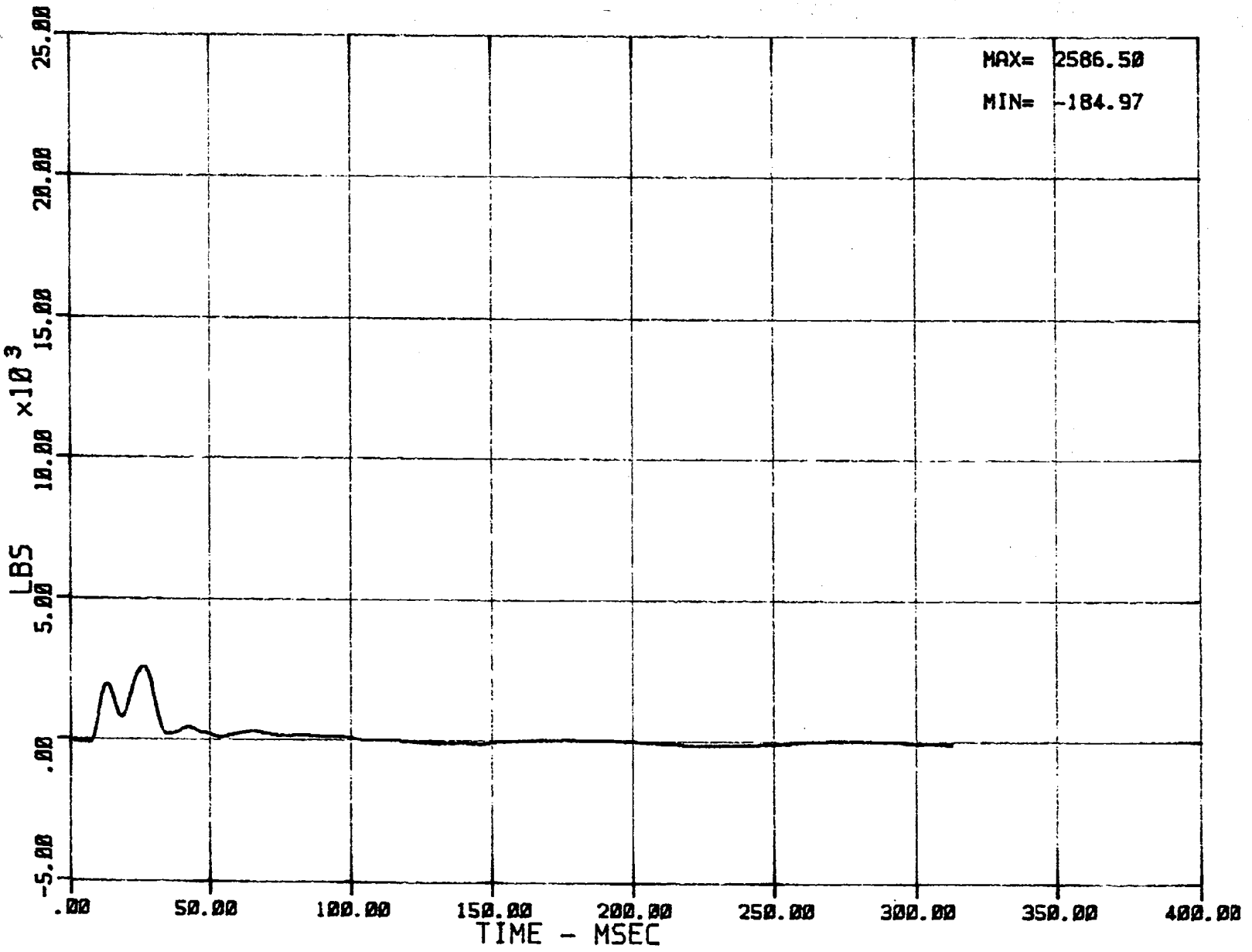
52 LC BA N BC6 (BARRIER LOAD CELL C6 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



53 LC BA N BC7 (BARRIER LOAD CELL C7 FORCE)
MSE N07054 1984 DODGE CARAVAN

03/13/84



60 LC BA N BDS (BARRIER LOAD CELL DS FORCE)
MSE N07054 1984 DODGE CARAVAN 03/13/84