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REPORT NO. MGA-98-N03

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

1998 TOYOTA CAMRY 4 DOOR
NHTSA NO. MW5100

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: November 7, 1997

Report Date: December 1, 1997

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY PERFORMANCE STANDARDS
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE NPS-10
400 SEVENTH STREET, SW, ROOM 5313
WASHINGTON, D.C. 20590

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. MGA-98-N03	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle NHTSA New Car Assessment Program (NCAP) Testing of a 1998 Toyota Camry 4 Door NHTSA No. MW5100		5. Report Date December 1, 1997 6. Performing Organization Code MGA
7. Author(s) John Fleck, Facility Director, Gary Strassburg, Project Engineer		8. Performing Organization Report No. MGA-DOT-03
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No. 11. Contract or Grant No. DTNH22-96-D-12010
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (Mail Code: NPS-10) 400 Seventh St., S.W., Room 5315 Washington, D.C. 20590		13. Type of Report and Period Covered Final Report November 7 - December 1, 1997 14. Sponsoring Agency Code NRM-10

15. Supplementary Notes

16. Abstract

A 56 kph (35 mph) frontal barrier impact into a rigid barrier was conducted on a 1998 Toyota Camry 4 Door in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure No. TP-NCAP090196 for the determination of vehicle crashworthiness on November 7, 1997.

The barrier impact velocity was 56.5 kph (35.1 mph), and the ambient temperature at the time of impact was 21°C. The post-test maximum static crush was 563 mm.

The test vehicle appeared to comply with the requirements of the following Federal Motor Vehicle Safety Standards:

1. FMVSS 212, "Windshield Mounting"
2. FMVSS 219 (partial), "Windshield Zone Intrusion"
3. FMVSS 301, "Fuel System Integrity"

With regard to "Occupant Crash Protection" injury criteria, the driver's HIC was 525 and the 3 msec. Clip (Chest g's) was 46 g's. The left and right femur loads for the driver were 4246 and 2342 Newtons, respectively. The passenger's HIC was 480 and the 3 msec Clip was 38 g's. The left and right femur maximum loads were 3368 and 1107 Newtons respectively.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (partial) Indicant Testing FMVSS 301 Indicant Testing	Copies of this report are available from: Technical Ref. Division, NHTSA, NASSIF Building, Room 5108 400 Seventh Street, S.W. Washington, D.C. 20590

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 271	22. Price

Form DOT F 1700.7 (8-69)

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This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-96-D-12010. This document is disseminated under the sponsorship of the U.S. Dept. of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

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Date of Report Acceptance

_____

Contracting Officer's Tech. Rep. (COTR)

_____

Date of Report Acceptance

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SECTION 1

PURPOSE AND SUMMARY OF NCAP TEST

This 35 mph frontal barrier impact test is part of the Composite FY'98 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-96-D-12010. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48 kph (30 mph) FMVSS 208/212/219/301-75 requirements.

The 56 kph (35 mph) frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test Procedure for New Car Assessment Program (NCAP) dated January 1, 1990. Data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

A rigid barrier was impacted by a 1998 Toyota Camry 4 Door at a velocity of 56.5 kph (35.1 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on November 7, 1997. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, a chest displacement transducer, a six axis neck

load cell, right/left femur load cells, right/left lower leg sensors, and right/left feet accelerometers. Seat belt load cells were also on the driver and passenger shoulder and lap belts to measure dummy torso and pelvic section loading. Calibrated ATDs, driver (Serial No. 065), and the right front passenger (Serial No. 066), were used for this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 111 channels of data were recorded on 10 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 525 and the maximum chest (CLIP) deceleration over 3 milliseconds was 46 g's. The maximum chest compression was 14 mm. The left and right femur loads were 4246 and 2342 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 480 and maximum chest (CLIP) deceleration over 3 milliseconds was 38 g's. The maximum chest compression was 30 mm. The left and right femur loads were 3368 and 1107 Newtons respectively.

SECTION 2

OCCUPANT AND VEHICLE

INFORMATION/DATA SHEETS

DATA SHEET NO. 1

CRASH TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 1998/Toyota/Camry/4 Door

NHTSA No.: MW5100 VIN.: 4T1BG22K6WU224675

Vehicle Test Weight: 1632.5 kgs.

Impact Velocity: 56.5 kph Maximum Static Crush: 564 mm

Vehicle Rebound: 340 mm

DUMMIES:	DRIVER	PASSENGER
Serial Number:	065	066
Restraint System:	Type II with pretensioners and frontal airbag	Type II with pretensioners and frontal airbag
No. Data Channels:	43	43

Number of Cameras: 1 Real Time

16 High Speed

Door Opening Data: Yes LF Yes RF Yes LR Yes RR
(without use of tools)

FRONT SEAT(S) DATA	DRIVER	FRONT PASSENGER
Seat Shift:	0 mm	0 mm
Seat Back Movement:	None	None

VISIBLE DUMMY

CONTACT POINTS:	DRIVER	PASSENGER
Head	to airbag	to airbag
Chest	to belts	to belts
Left Knee	to steering column & instrument panel	to glove box & airbag
Right Knee	to steering column & instrument panel	to glove box & airbag

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Vehicle Yr/Make/Model/Body Style: 1998/Toyota/Camry/4 Door

NHTSA No.: CW5100 VIN.: 4T1BG22K6WU224675

Body color: Beige Date of Manufacture: 10/97

Engine: 4 Cylinders; ___ C.I.D.; 2.2 Liters;

X Gas; ___ Diesel; ___Turbocharged

___ Longitudinal; X Transverse

Transmission: 4 Speed; ___ Manual; X Automatic; ___ Overdrive

Final Drive: X Front Wheel; ___ Rear Wheel; ___ Four Wheel

Odometer Reading: 64 miles

Major Option:

X A/C; X P/S; X P/B; X P/wdo;

___ P/locks; X Tilt Wheel; X Cruise Control; ___ABS

Other: Driver and right front passenger airbags with type II belts

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 207 kPa (30 Psi) Rear 207 kPa (30 Psi)

Recommended Tire Size: P195/70R14

Recommended Cold Tire Pressure: Front 207 kPa (30 Psi) Rear 207 kPa (30 Psi)

Tires on Vehicle: P195/70R14 Manufacturer: Dunlop

Number of Occupants: 2 Front; 3 Rear; ___ 3rd Seat; 5 TOTAL

Type of Front Seats: X Bucket; ___ Bench; ___Split Bench

Type of Front Seat Back: ___Fixed; X Adj. With; ___ Power; X Lever

Vehicle Capacity Weight (VCW) = 410.5 kg. (A)

No. of Occupants x 68.0 kg. = 340.0 kg. (B)

Rated Cargo Weight (RCW) A-B = 70.5 kg.

GVWR 1896.0 kg. GAWR: Front 1088.6 kg.; Rear 1088.6 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW:

Right Front = 424.1 kg Right Rear = 281.8 kg

Left Front = 443.2 kg Left Rear = 266.3 kg

TOTAL FRONT WEIGHT = 867.3 kg (61 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 548.1 kg (39 % of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1415.4 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1415.4 kg

VCW = Vehicle Capacity Weight 410.5 kg

DSC = Designated Seating Capacity 5 RCW = VCW - 68 (DSC) = 70.5 kg*

Target Test Weight = UDW + RCW + (2 dummies x 78.0 kg/dummy)

Target Test Weight = 1641.9 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 476.7 kg Right Rear = 347.9 kg

Left Front = 481.3 kg Left Rear = 326.6 kg

TOTAL FRONT WEIGHT = 958.0 kg (59 % of Total Vehicle Weight)

TOTAL REAR WEIGHT = 674.5 kg (41 % of Total Vehicle Weight)

TOTAL TEST WEIGHT = 1632.5 kg

Weight of ballast secured in vehicle trunk area = 0 kg

Vehicle components removed to meet target weight: Rear seat, rear door panels, rear bumper cover, spare and jack, tail lights

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude:	RF 692	LF 689	RR 682	LR 682
Test Attitude:	RF 667	LF 668	RR 641	LR 643
Post Test	RF 737	LF 744	RR 632	LR 635

Wheel Base: 2664 mm; C.G. = 1101 mm rearward of front wheel C/L

Remarks: None

* light trucks and MPVs RCW is 136 kgs or manufacturer's value, whichever is less

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

Location of Vehicle's C.G. = _____ (if required)

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 70 liters

Usable Capacity Figure Furnished by COTR = 70 liters

Test Volume Range (92 to 94% of Usable Capacity) = 64.4 to 65.8 liters

ACTUAL TEST VOLUME = 65.1 liters

Test Fluid Type: Stoddard Solvent; Spec. Grav. = 0.77

Kinematic Viscosity = 1.788 centistrokes; Color = Purple

Type of Fuel Pump; Electric X; Mechanical _____

Does Electric Pump operate with ignition switch "ON" & engine "Off"?

Yes X No _____

DATA SHEET NO. 3

POST-IMPACT DATA

Vehicle Yr/Make/Model/Body Style: 1998/Toyota/Camry/4 Door

NHTSA No.: MW5100 VIN.: 4T1BG22K6WU224675

Type of Test: 35 mph Frontal Impact Impact Angle: 0°

Date of Test: November 7, 1997 Time of Test: 4:47 p.m.

Ambient Temperature: 21°C (70 °F) (Spec. Range = 18.8 to 25.6°C)

Temperature in Occupant Compartment: 21° C

Windshield Molding Temperature: 21° C

Required Impact Velocity Range: 55.5 to 57.1 kph

Impact Velocity: primary = 56.5 kph; secondary = 56.7 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 1270 mm

Exiting Speed Trap: 270 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length:						
	Pre-test	= Right	4515	C/L	4760	Left 4515
	Post-test	= Right	4125	C/L	4197	Left 4142
	Crush	= Right	390	C/L	563	Left 373

Distance from front of test vehicle to point of impact (rebound):

R 352 mm C_L 298 mm L 369 mm

Average = 340 mm

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

	Front		Rear	
Post-Test Door Opening	Left	Right	Left	Right
(without use of tools)	Yes	Yes	Yes	Yes

	Driver	Front Passenger
Seat Movement		
Seat Back Movement	None	N/A
Seat Shift (mm)	0 mm	0 mm

Glazing Damage

Backlight/Windshield None

Other Notable Impact Effects: Fuel filler door opened upon impact

SECTION 3

SUMMARY OF RESULTS FOR-------

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

DATA SHEET 5

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

Details of windshield mounting such as retention method, trim type, etc.:

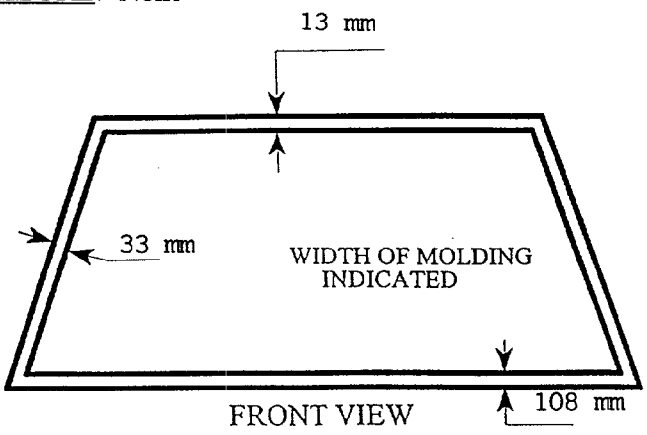
Windshield set in rubber molding with glue

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	2045	2045	100%
LEFT SIDE	2045	2045	100%
TOTAL	4090	4090	100%

AREA OF RETENTION FAILURE: None



FRONT VIEW

FAILURE DETAILS: None

DATA SHEET 6

FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the surface of the instrument panel, including padding, and drawing the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contact points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and ½" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:

A= 1140 mm

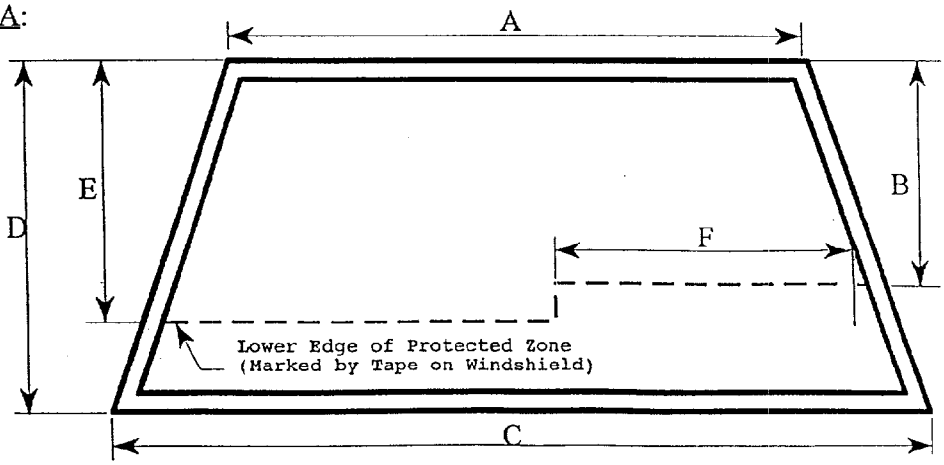
B= 425 mm

C= 1510 mm

D= 720 mm

E= 470 mm

F= 720 mm



FRONT VIEW

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration)

NONE

DATA SHEET 7

FMVSS NO. 301-75, FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MW5100 Test Date: November 7, 1997

Vehicle Mfgr./Make/Model: Toyota/Camry/4 Door

Usable Capacity of Vehicle's Fuel Tank: 70 Liters
(figure furnished by vehicle manufacturer)

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.

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

65 Liters which is 93.3 % of the stated USABLE CAPACITY.

TEST VEHICLE IMPACT TYPE: X Frontal (35 mph)

___ Oblique (30 mph) with __° barrier face first contacting (driver/passenger) side

___ Rear Moving Barrier (30 mph)

___ Side Impact MDB (33.2 mph)

FUEL SPILLAGE MEASUREMENT:

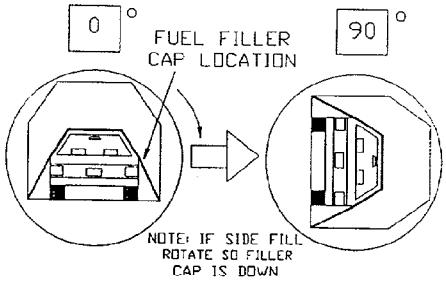
	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 OZ
2. For 5 minute period after vehicle motion ceases	0	5 OZ
3. For next 25 minutes	0	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS: None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0° - 90° Vehicle NHTSA ID No.: MW5100



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 40 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 40 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 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	0

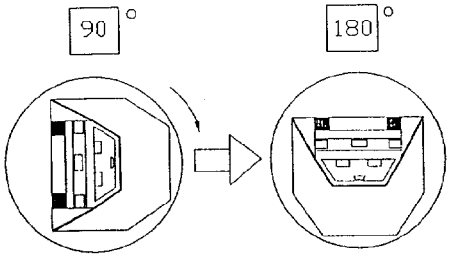
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 90° - 180° Vehicle NHTSA ID No.: MW5100



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 21 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 21 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 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	0

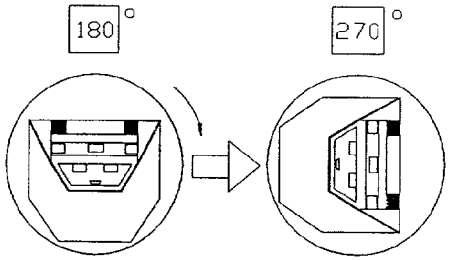
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 180° - 270° Vehicle NHTSA ID No.: MW5100



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 27 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 27 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 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	0

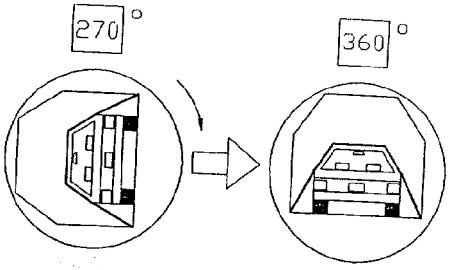
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

DATA SHEET 8

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST PHASE: 270° - 360° Vehicle NHTSA ID No.: MW5100



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 52 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 52 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 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	0

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

SECTION 4

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Camera Locations
6. Vehicle Target Locations

II. OVR DATA

1. Vehicle Accelerometer Data
2. Post-Test Airbag Data
3. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

DATA SHEET 9

DUMMY INJURY CRITERIA VALUES DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1998/Toyota/Camry/4 Door

VEH. NHTSA NO.: MW5100 TEST DATE: November 7, 1997

ACCELERATION VALUES: (g's)	DRIVER # 065		PASSENGER # 066	
	Min.	Max.	Min.	Max.
Head Channel X	-59.3 @ 77 msec.	5.6 @ 180 msec.	-52.5 @ 83 msec.	1.8 @ 198 msec.
Head Channel Y	-2.5 @ 101 msec.	6.0 @ 76 msec.	-12.6 @ 40 msec.	23.2 @ 90 msec.
Head Channel Z	-19.1 @ 73 msec.	2.1 @ 17 msec.	-17.4 @ 68 msec.	3.1 @ 119 msec.
HEAD RESULTANT	62.0 @ 76 msec.		56.7 @ 83 msec.	
Chest Channel X	-48.8 @ 60 msec.	3.1 @ 180 msec.	-38.3 @ 76 msec.	4.3 @ 153 msec.
Chest Channel Y	-5.7 @ 82 msec.	3.8 @ 47 msec.	-3.7 @ 48 msec.	7.4 @ 92 msec.
Chest Channel Z	-5.0 @ 42 msec.	6.9 @ 85 msec.	-5.6 @ 84 msec.	5.2 @ 119 msec.
CLIP	45.9		37.6	
TIME INTERVAL (msec) [3. msec. minimum]	$t_1 = 58.6$ $t_2 = 61.7$		$t_1 = 68.1$ $t_2 = 71.2$	

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	525		480	
t_1 = (msec)	56.8		63.9	
t_2 = (msec)	92.8		99.9	
Avg. Accel. t_1 to t_2 (g's)	46.3		44.7	

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

COMPRESSIVE FEMUR FORCES:

Left Side (N)	-4246 @ 59 msec.	674 @ 50 msec.	-3368 @ 59 msec.	672 @ 88 msec.
Right Side (N)	-2342 @ 60 msec.	495 @ 55 msec.	-1107 @ 69 msec.	287 @ 48 msec.

SEAT BELT FORCES:

Lap Belt (N)	5370 @ 58 msec.	5271 @ 62 msec.
Shoulder Belt (N)	5731 @ 61 msec.	5267 @ 85 msec.
Belt Spoolout	NR	NR

DATA SHEET 9
DUMMY INJURY CRITERIA VALUES DATA SHEET (Cont'd)

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

	DRIVER DUMMY #065		PASSENGER DUMMY #066	
	Min.	Max.	Min.	Max.
Neck Load X (N)	-274 @ 51 msec.	608 @ 73 msec.	-320 @ 128 msec.	211 @ 40 msec.
Neck Load Y (N)	-199 @ 97 msec.	216 @ 156 msec.	-150 @ 76 msec.	145 @ 116 msec.
Neck Load Z (N)	-1258 @ 62 msec.	78 @ 134 msec.	-1182 @ 70 msec.	256 @ 129 msec.
Neck Moment X (NM)	-4.7 @ 70 msec.	6.5 @ 122 msec.	-15.2 @ 75 msec.	10.0 @ 93 msec.
Neck Moment Y (NM)	-53.1 @ 67 msec.	18.3 @ 49 msec.	-24.9 @ 142 msec.	17.4 @ 88 msec.
Neck Moment Z (NM)	-6.9 @ 92 msec.	5.5 @ 15 msec.	-26.4 @ 98 msec.	10.4 @ 160 msec.
Chest Deflection X (mm)	34 @ 79 msec.		31 @ 87 msec.	
Pelvis X Acceleration (g's)	-86.8 @ 59 msec.	4.6 @ 154 msec.	-54.8 @ 60	5.0 @ 143 msec.
Pelvis Y Acceleration (g's)	-7.9 @ 54 msec.	6.0 @ 58 msec.	-7.7 @ 56 msec.	6.7 @ 66 msec.
Pelvis Z Acceleration (g's)	-31.0 @ 62 msec.	3.8 @ 153 msec.	-25.0 @ 62 msec.	3.2 @ 188 msec.
Pelvis Resultant (g's)	91.3 @ 59 msec.		59.0 @ 60 msec.	

DATA SHEET 10

DUMMY POSITIONING IN VEHICLE

Vehicle NHTSA No.: MW5100 Vehicle: Toyota/Camry/4 Door

SEAT TYPE:	ADJUSTER TYPE:		BUCKET SEAT BACK TYPE:
____Bench	Driver:	_X_ Manual	___Fixed
_X_Bucket		___ Power	_X_Adjustable Reclining
____Split Bench			
	Passenger:	_X_ Manual	____Fixed
		___ Power -	_X_Adjustable Reclining

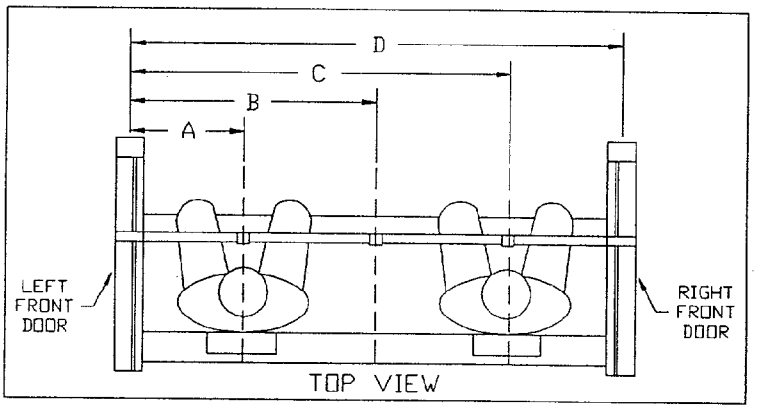
DRIVER SEAT POSITION
9th detent out of 16 detents

Seat back angle 69° measured on headrest

PASSENGER SEAT POSITION
9th detent of 16 detents

Seat back angle 69° measured on headrest

Steering column set to mid position. Steering column angle 24.4°



065 DUMMY ID 066

A	= Left Door to Driver Centerline	398 mm
B	= Left Door to Center Passenger Centerline	776 mm
C	= Left Door to Right Passenger Centerline	1152 mm
D	= Left Door to Right Door	1552 mm

DATA SHEET 10

DUMMY POSITIONING IN VEHICLE (Cont'd)

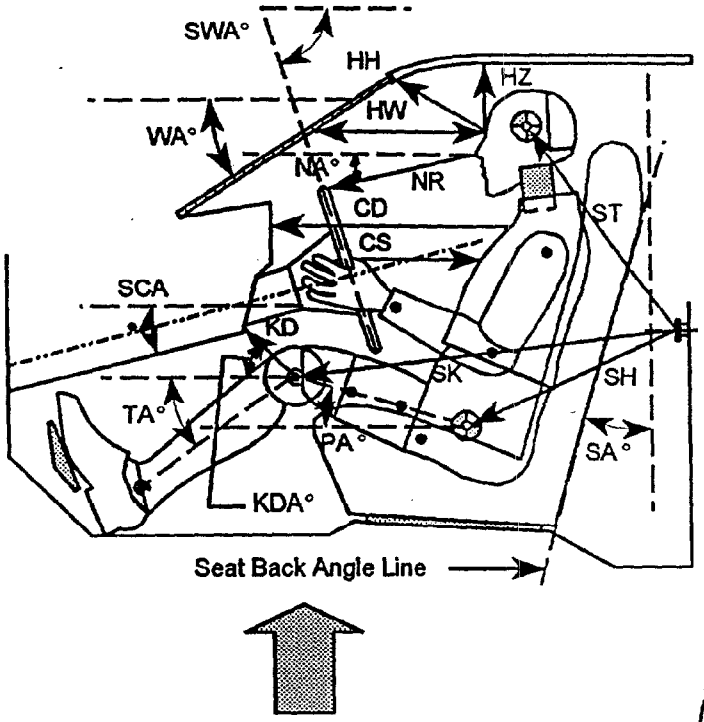
Units (mm)

	DRIVER (Serial #065)	PASSENGER (Serial #066)
WA°	29.5°	
SWA°	24.0°	N/A
SCA°	24.4°	N/A
SA°	68.9°	68.9°
HZ	164	138
HH	334	340
HW	543	533
HR	234	221
NR	389 Angle 9.3°	N/A
CD	552	540
CS	318	NA
RA	193	NA
KDL	178 Angle (KDA) 27.8°	155
KDR	188	148 Angle 33.0°
PA°	22.7°	23.4°
TA°	36.3°	39.8°
KK	326	250
ST*	487 Angle 10.4°	486 Angle 9.6°
SK*	598 Angle 99.2°	617 Angle 98.3°
SH*	276 Angle 130°	266 Angle 134.7°
SHY	264	267
HS	196	275
HD	140	132
AD	96	99

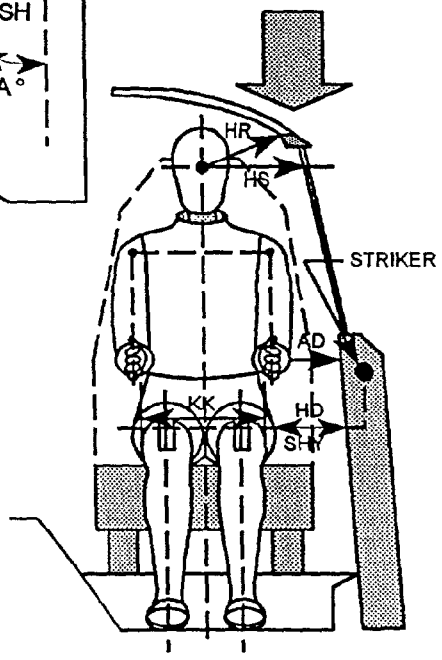
N/A = Not Applicable

* Angles measured from vertical

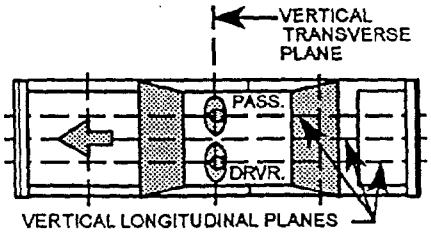
FRONT SEAT MEASUREMENTS



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

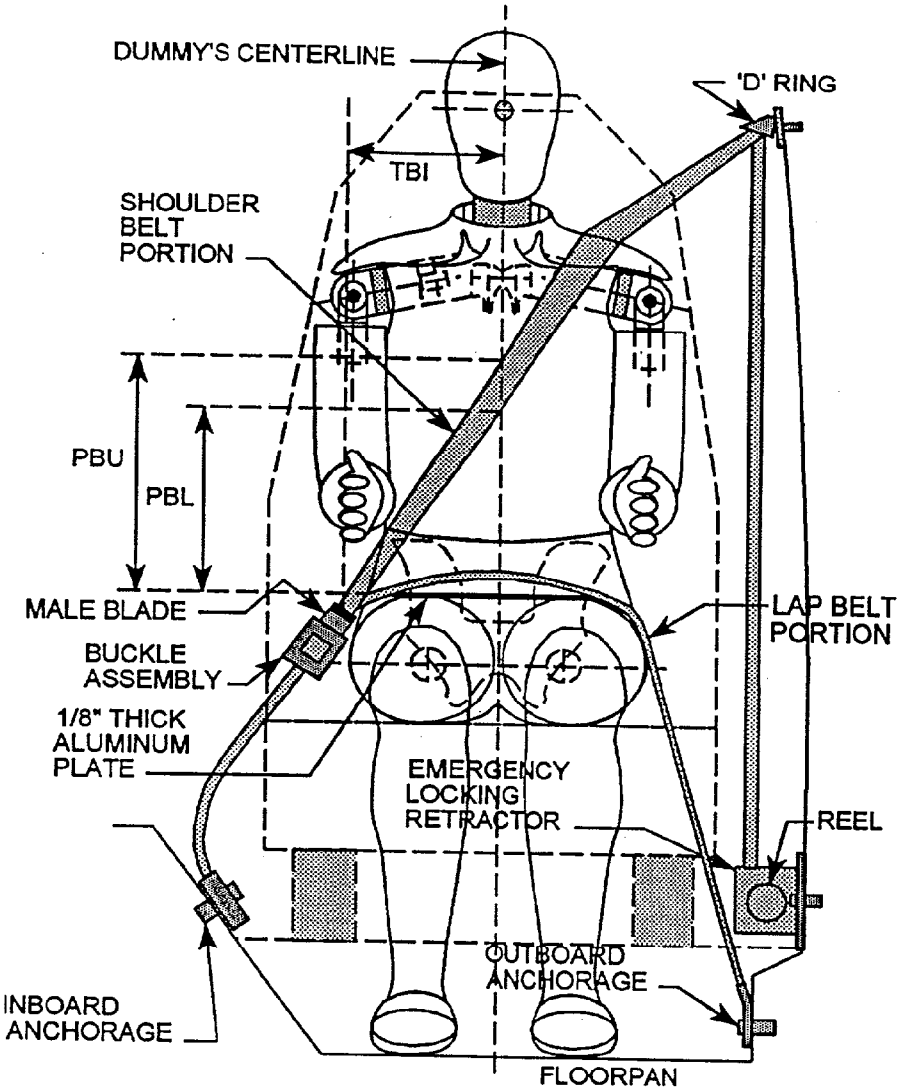


CD - Chest to Dash
CS - Steering Wheel to Chest
HH - Head to Header
HW- Head to Windshield
HZ - Head to Roof
KDA- Knee to Dash Angle
KDL- Left Knee to Dash
KDR - Right Knee to Dash
NA - Nose to Rim Angle
NR - Nose to Rim
PA - Pelvic Angle
RA - Rim to Abdomen
SA - Seat Back Angle
SCA- Steering Column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



DATA SHEET 11

SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

(illustration)

Dimension = mm

	DRIVER DUMMY	PASSENGER DUMMY
PBU -- Top surface of alum. plate to upper edge	321	358
PBL -- Top surface of alum. plate to belt lower edge	240	280

DATA SHEET 12

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger
Length from trim above retractor reel to "D" ring as measured on dummy.	199 mm	201 mm
Shoulder belt length as measured on Part 572 Dummy.	885 mm	892 mm
Lap belt length as measured on Part 572 Dummy.	824 mm	867 mm

SHOULDER BELT SPOOL-OFF DATA:		
As determined by film analysis	36 mm at shoulder	73 mm at shoulder
As determined mechanically	47 mm at retractor	59 mm at retractor

BELT STRETCH DATA:		
Measured electronically between shoulder belt load cell and the "D" ring.	N/A	N/A
Measured mechanically	0	0

RETRACTOR LOCK-UP TIME:		
As determined by shoulder belt spool-off observed in on-board cameras	82 msec.	89 msec.

DATA SHEET 13

CAMERA LOCATIONS

Veh. NHTSA NO.: MW5100 ; Test Date: November 7, 1997

Veh. Year/Make/Model/Body Style: 1998/Toyota/Camry/4 Door

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-		
2	Left Front View	-1050	-7720	1520	90	7260	25	962
3	Steering Column Top	-2050	-7630	1560	90	7170	25	1008
4	Steering Column Bottom	-2040	-7620	1030	90	7160	25	1165
5	Driver Close-up	-1450	-10000	1410	90	9540	75	1149
6	Driver Angle	-4470	-5070	2040			50	1081
7	Onboard Driver						35	1005
8	Onboard Passenger						35	889
9	Right Overall	-2250	7120	1430	90	6690	13	1036
10	Right Passenger Half	-1100	7770	1330	90	7340	25	971
11	Right Close-up	-1560	9840	1380	90	9410	75	1136
12	Right Angle	-4600	5580	1950			50	1243
13	Top Overall	380	0	2700			13	1130
14	Top Driver	-100	-460	1770			13	1005
15	Top Passenger	-100	465	1760			13	855
16	Pit Front	-1230	0	-3165			13	1015
17	Pit Rear	-3160	0	-3175			13	943

* COORDINATES:

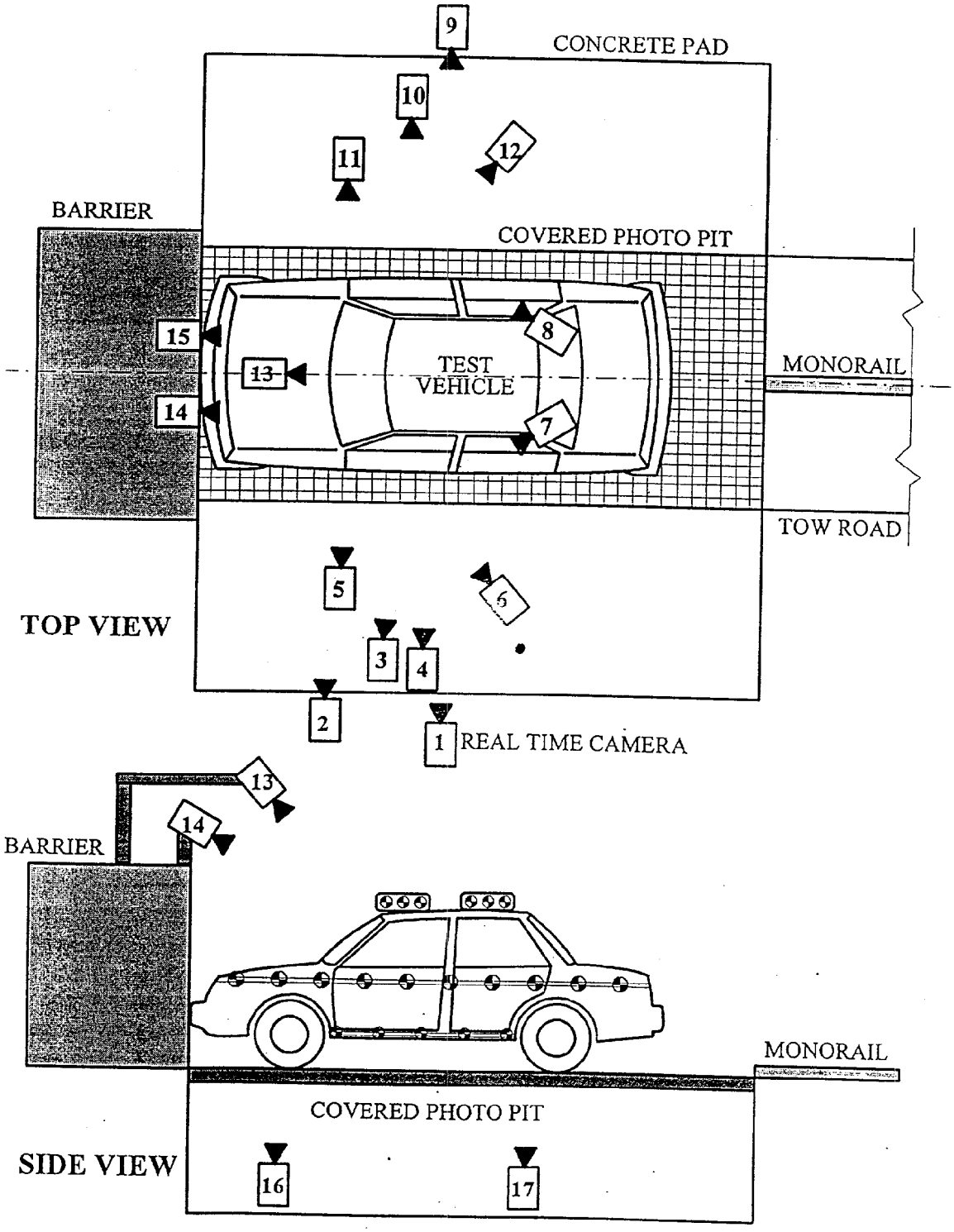
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

+Z = film plane to above ground level

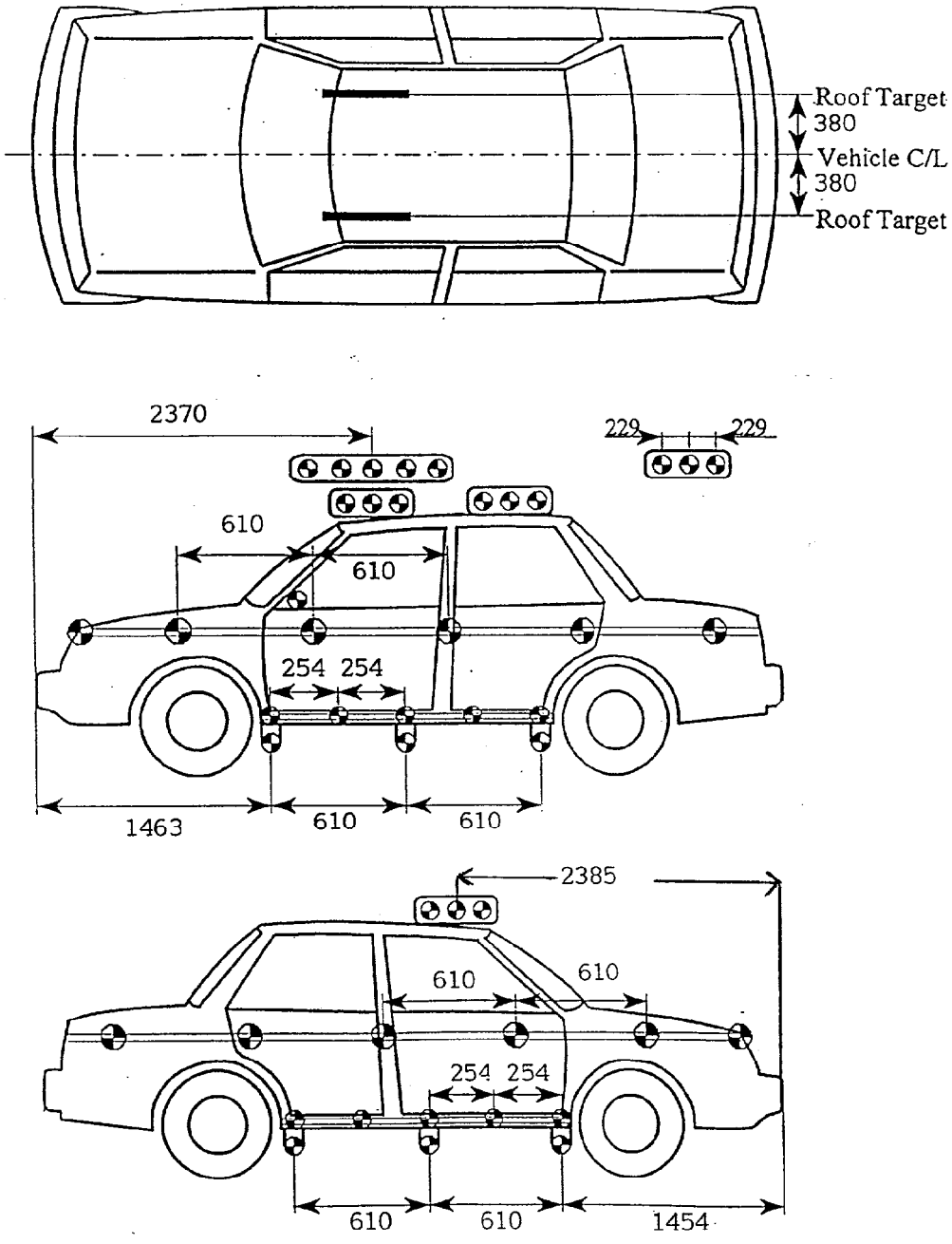
ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



DATA SHEET 14

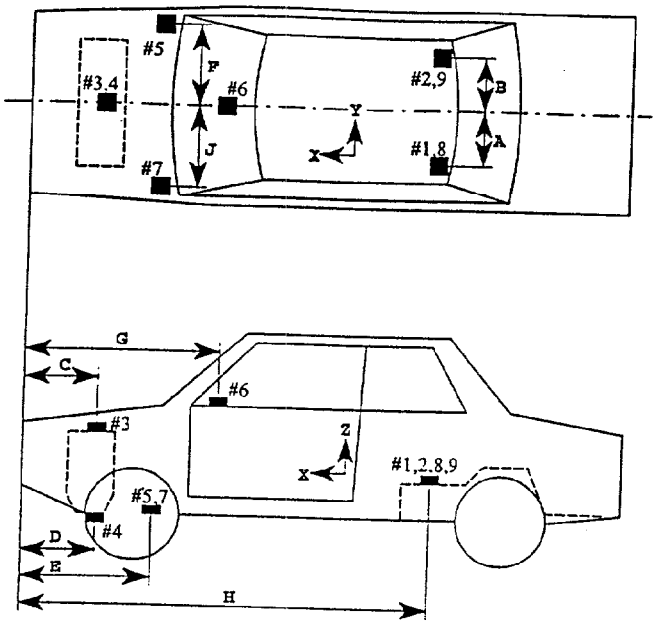
VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

DATA SHEET 15

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (mm)

Dimension	Length
A	345
B	345
C	3885
D	3978
E	3911
F	665
G	3062
H	1863
J	665

ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Side Brake Caliper	X

DATA SHEET 16

POST TEST AIRBAG DATA

A. Number of Vent Holes: Driver 2 ; Passenger 0

B. Size of Vent Holes: Driver 25 mm dia;. Passenger 0 mm dia;

C. Total Vent Area; Driver 9.8 cm^2 Passenger 0 cm^2

D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter

Driver; Length 558 mm, Width 686 mm, Diameter____ mm (Oval)

Passenger; Length 533 mm, Width 508 mm, Diameter ____ mm

E. Is the Airbag Tethered?

Driver; X Yes; __ No; If yes, record length of tether 228 mm

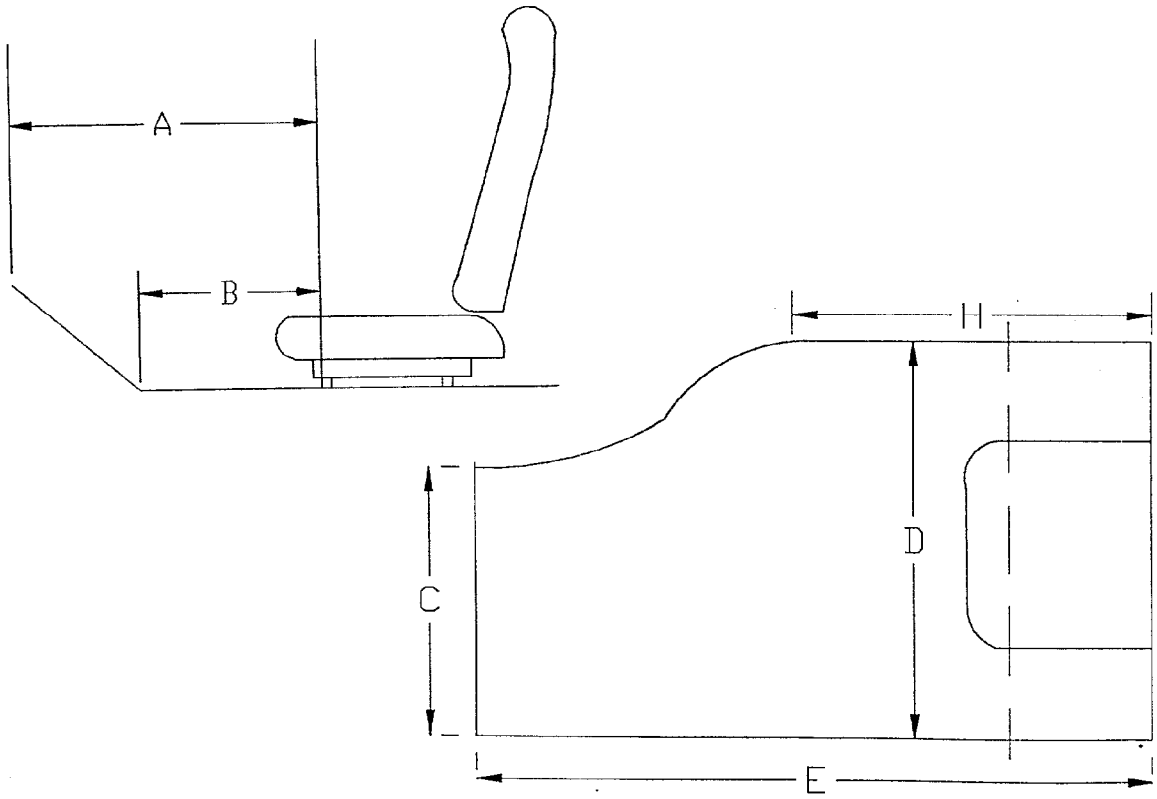
Passenger; X Yes; ___ No, If yes, record length of tether 533 mm

DATA SHEET 17

TEST VEHICLE MEASUREMENTS

STATIC FOOTWELL DEFORMATION

Driver's Side



Units = mm

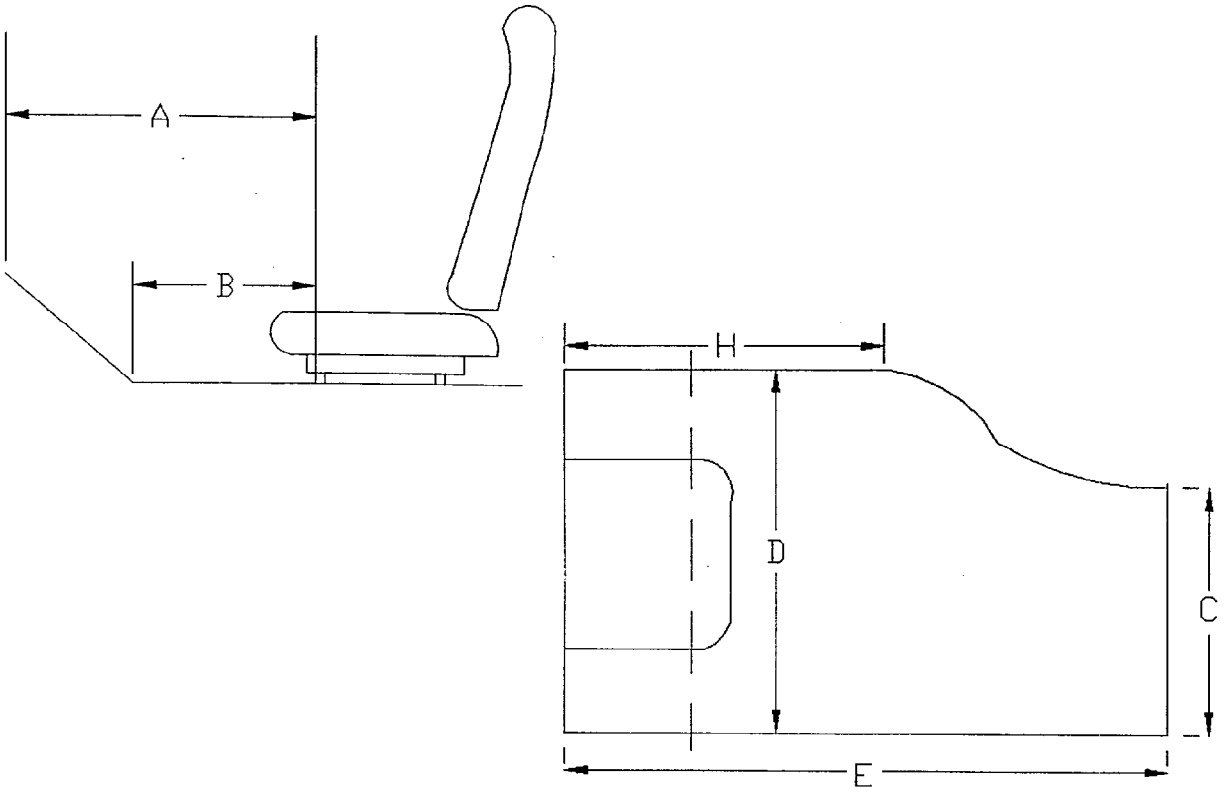
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	810	723	87
B	541	510	31
C	479	462	17
D	494	492	2
E	1831	1795	36
H	1799	1775	24

DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC FOOTWELL DEFORMATION

Passenger's Side



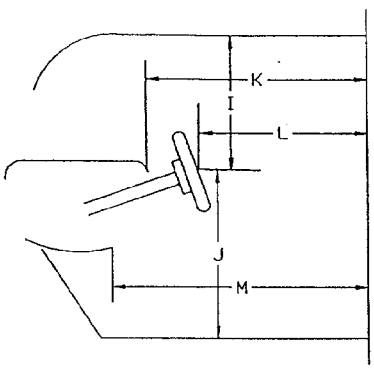
Units = mm

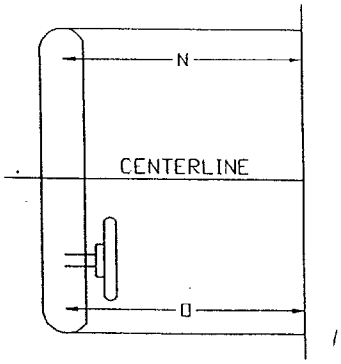
MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	807	678	129
B	544	515	29
C	441	446	-5
D	491	503	-12
E	1770	1745	25
H	1861	1785	76

DATA SHEET 17

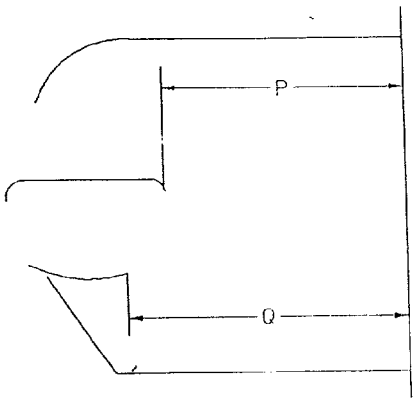
TEST VEHICLE MEASUREMENTS (Cont'd)

STATIC PASSENGER COMPARTMENT INTRUSION





MEASUREMENTS
FROM C-PILLAR
BELT ANCHORAGE



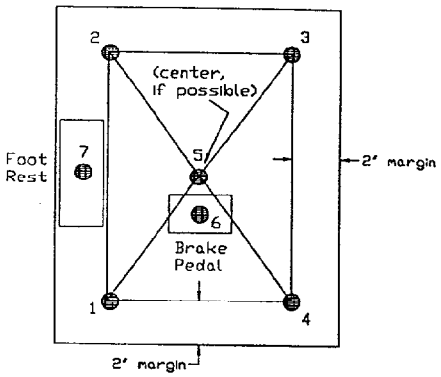
Units = mm

MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
I	412	402	10
J	623	698	-75
K	1554	1523	31
L	1329	1310	19
M	1736	1710	26
N	1809	1801	8
O	1802	1798	4
P	1545	1527	18
Q	1748	1710	38

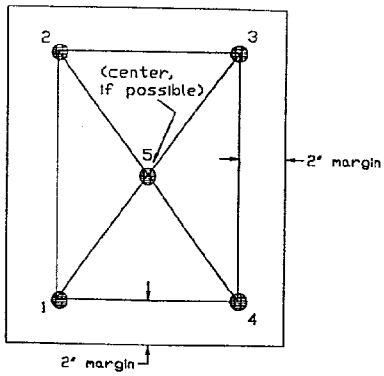
DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

TOE PAN MEASUREMENTS



DRIVER



PASSENGER

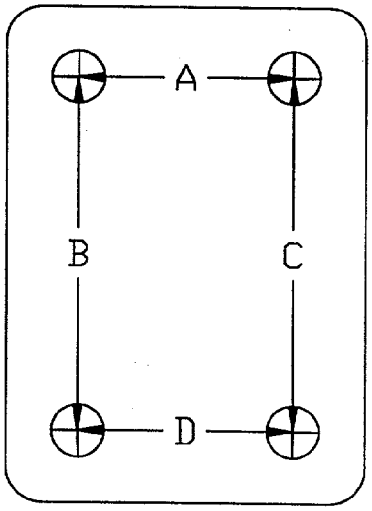
Driver						
Location	**X**			**Z**		
	Pre-Test	Post-Test	Def.	Pre-Test	Post-Test	Def.
1	574	532	42	-42	-33	-9
2	742	702	40	104	127	-23
3	727	687	40	59	97	-38
4	588	522	66	-72	-45	-27
5	651	584	67	29	70	-41
6	586	505	81	123	158	-35
7	610	592	18	46	44	2
Passenger						
Location	**X**			**Z**		
	Pre-Test	Post-Test	Def.	Pre-Test	Post-Test	Def.
1	599	512	87	-8	-13	-21
2	762	618	144	147	163	-16
3	686	606	80	147	172	-25
4	584	563	21	-22	-10	-12
5	662	558	104	47	67	-20

DATA SHEET 17

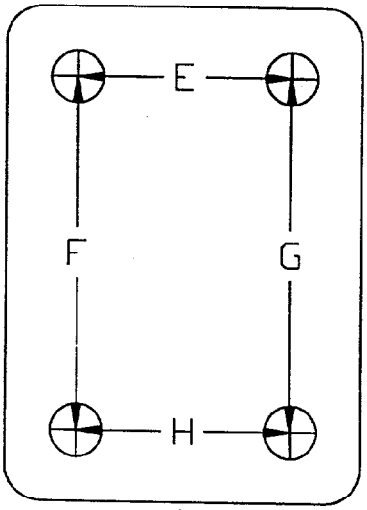
TEST VEHICLE MEASUREMENTS (Cont'd)

UNDERBODY FLOORBOARD DEFORMATION

DRIVER'S SIDE



PASSENGER'S SIDE



MEASUREMENT	PRE TEST	POST TEST	DIFFERENCE
A	298	281	17
B	297	296	1
C	294	292	2
D	284	275	9
E	317	297	20
F	307	301	6
G	306	304	2
H	318	314	4

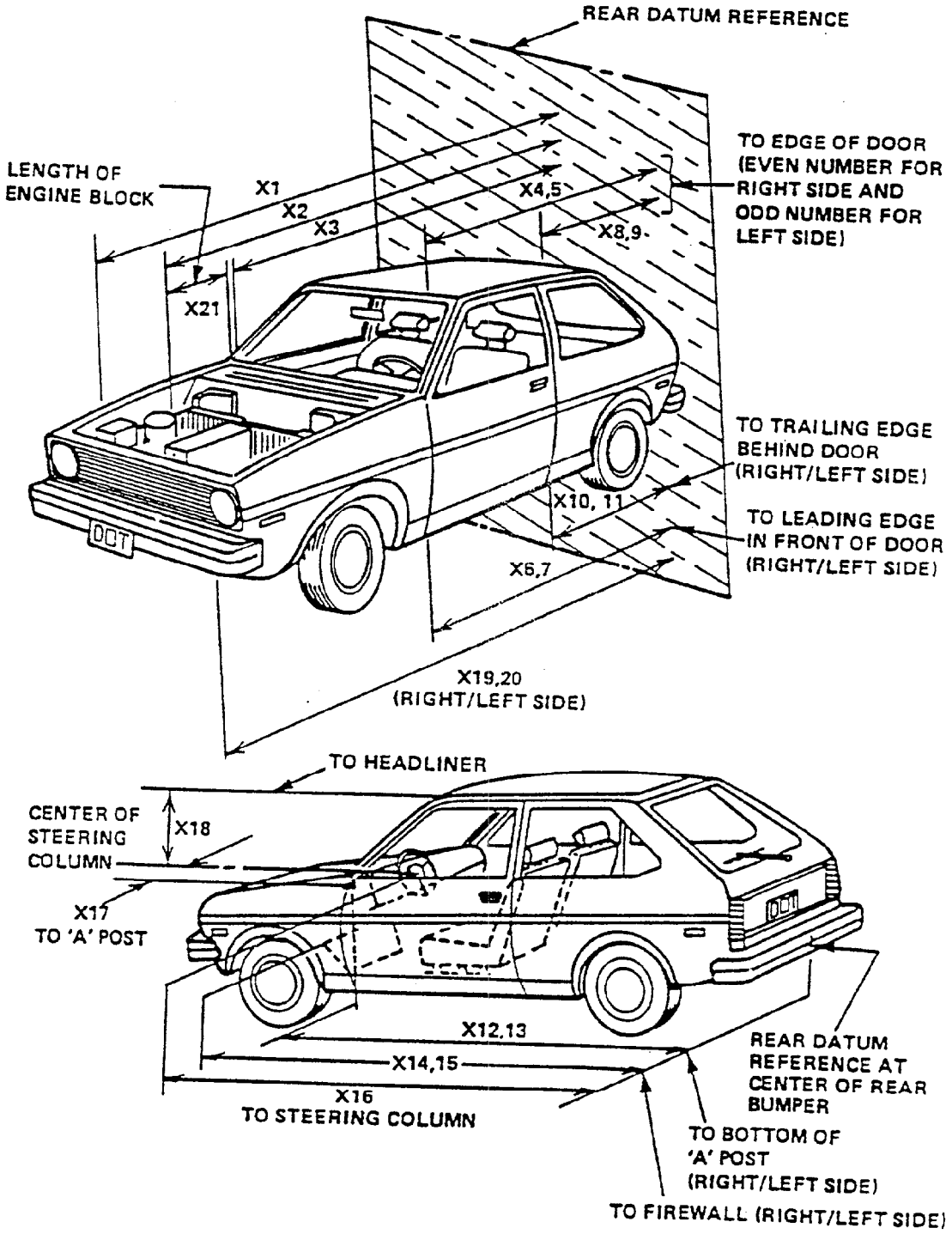
DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4760	4197	563
X2	Rear Surface of Vehicle to Front of Engine	3920	3691	229
X3	Rear Surface of Vehicle to Firewall	3580	3367	213
X4	Rear Surface to Upr. Leading Edge of Rt. Door	3252	3259	7
X5	Rear Surface to Upr. Leading Edge of Left Door	3249	3260	11
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	3236	3250	14
X7	Rear Surface to Lwr. Leading Edge of Left Door	3235	3244	9
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	2196	2204	8
X9	Rear Surface to Upr. Trailing Edge of Left Door	2186	2206	20
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	2193	2198	5
X11	Rear Surface to Lwr. Trailing Edge of Left Door	2190	2200	10
X12	Rear Surface to Bottom of A-Post on Rt. Side	3236	3244	8
X13	Rear Surface to Bottom of A-Post on Left Side	3235	3244	9
X14	Rear Surface to Firewall on Right Side	3528	3454	74
X15	Rear Surface to Firewall on Left Side	3538	3522	16
X16	Rear Surface to Steering Column	2778	2804	26
X17	Center of Steering Column to A-Post	357	348	9
X18	Center of Steering Column to Headlining	404	408	4
X19	Rear Surface to Right Side of Front Bumper	4514	4125	389
X20	Rear Surface to Left Side of Front Bumper	4514	4142	372
X21	Length of Engine Block	440	440	0

DATA SHEET 17

TEST VEHICLE MEASUREMENTS (Cont'd)



DATA SHEET 18

ACCIDENT INVESTIGATION DIVISION DATA

FOR 35 MPH FRONTAL BARRIER IMPACT

Vehicle Make/Model/Body Style: Toyota/Camry/4 Door

Veh. NHTSA No.: MW5100 ; VIN: 4T1BG22K6WU224675

Model Year: 1998 ; Build Date: 10-97 ; Test Date: November 7, 1997

Veh. Size Category: Mid ; TEST WEIGHT: 1632.5 kg

Veh. Wheelbase: 2664 mm; Front Overhang: 985 mm; Overall Width: 1784 mm

Accelerometer Data:

Location: As per measurements on pages 4-13

Calibration Procedure: As per MGA Calibration Procedure

Linearity: >99.9% ; Integration Algorithm: Trapezoidal

Vehicle Impact Speed: 56.5 kph ; Time Of Separtion: 173 msec

Velocity Change: 65.2 kph

Collision Deformation Classification (CDC) Code: F (Frontal)

Crush Depth Dimensions:

C1 = 373 mm

C2 = 483 mm

C3 = 543 mm

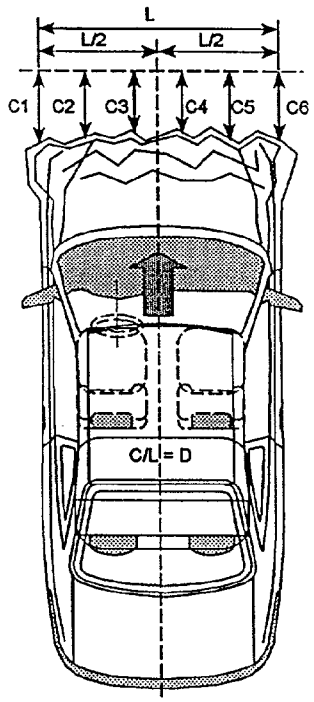
C4 = 564 mm

C5 = 509 mm

C6 = 390 mm

Midpoint Of Damage: D = Vehicle Centerline (Longitude)

Length Of Damaged Region: L = 1727 mm



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (Cont'd)

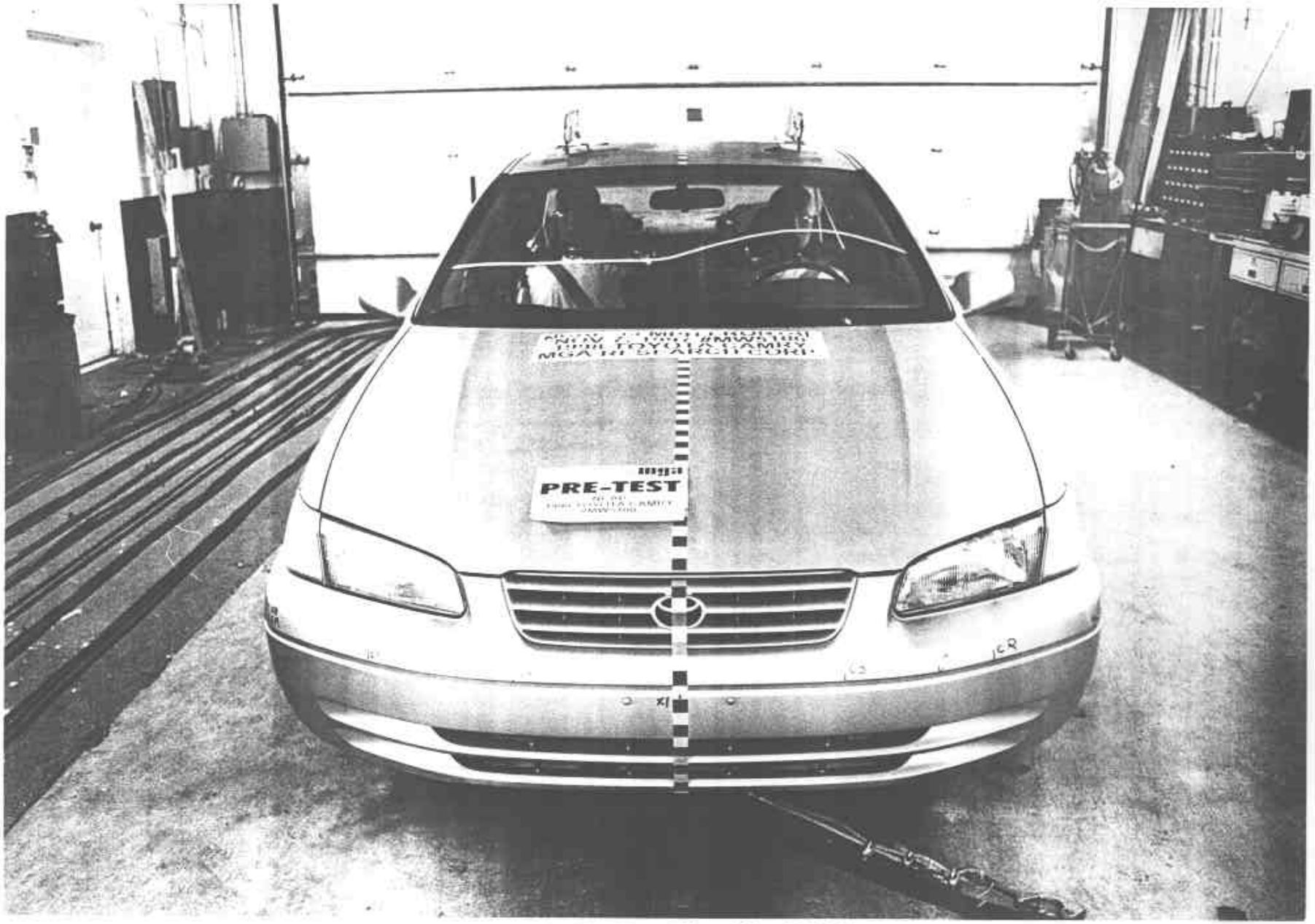


Photo No. A-1 - Pre-Test Front View of Test Vehicle

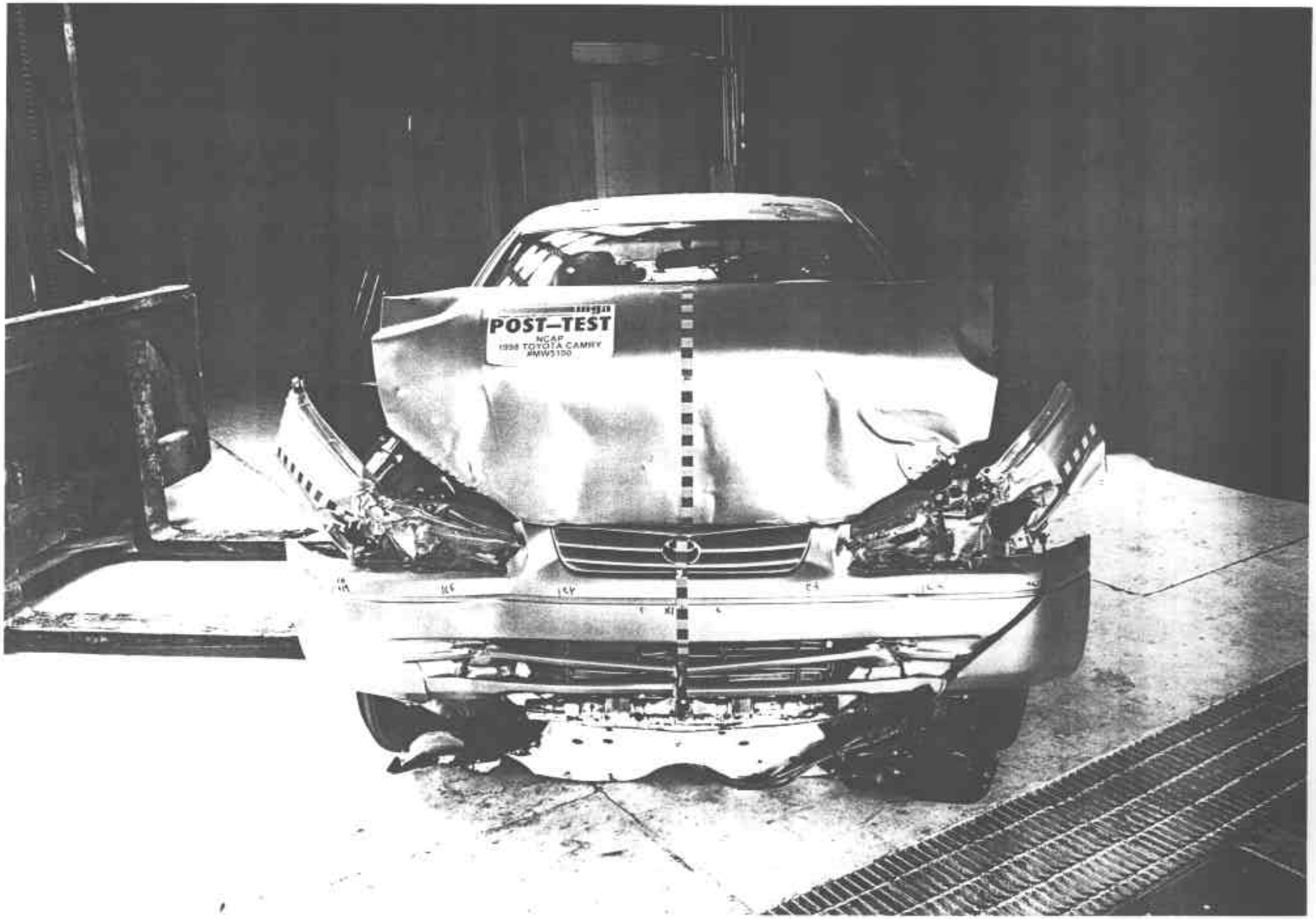


Photo No. A-2 - Post-Test Front View of Test Vehicle

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

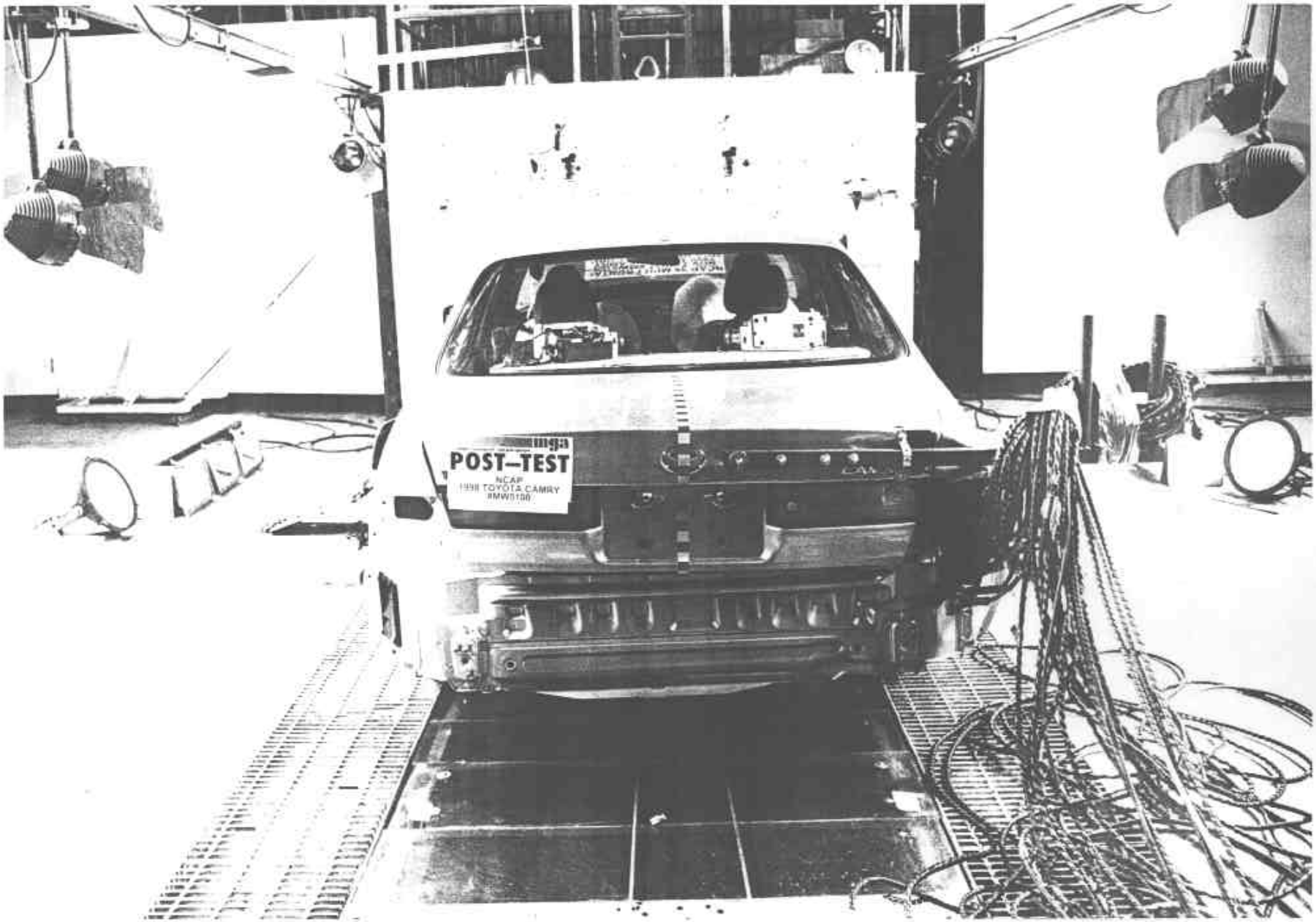


Photo No. A-4 - Post-Test Rear View of Test Vehicle

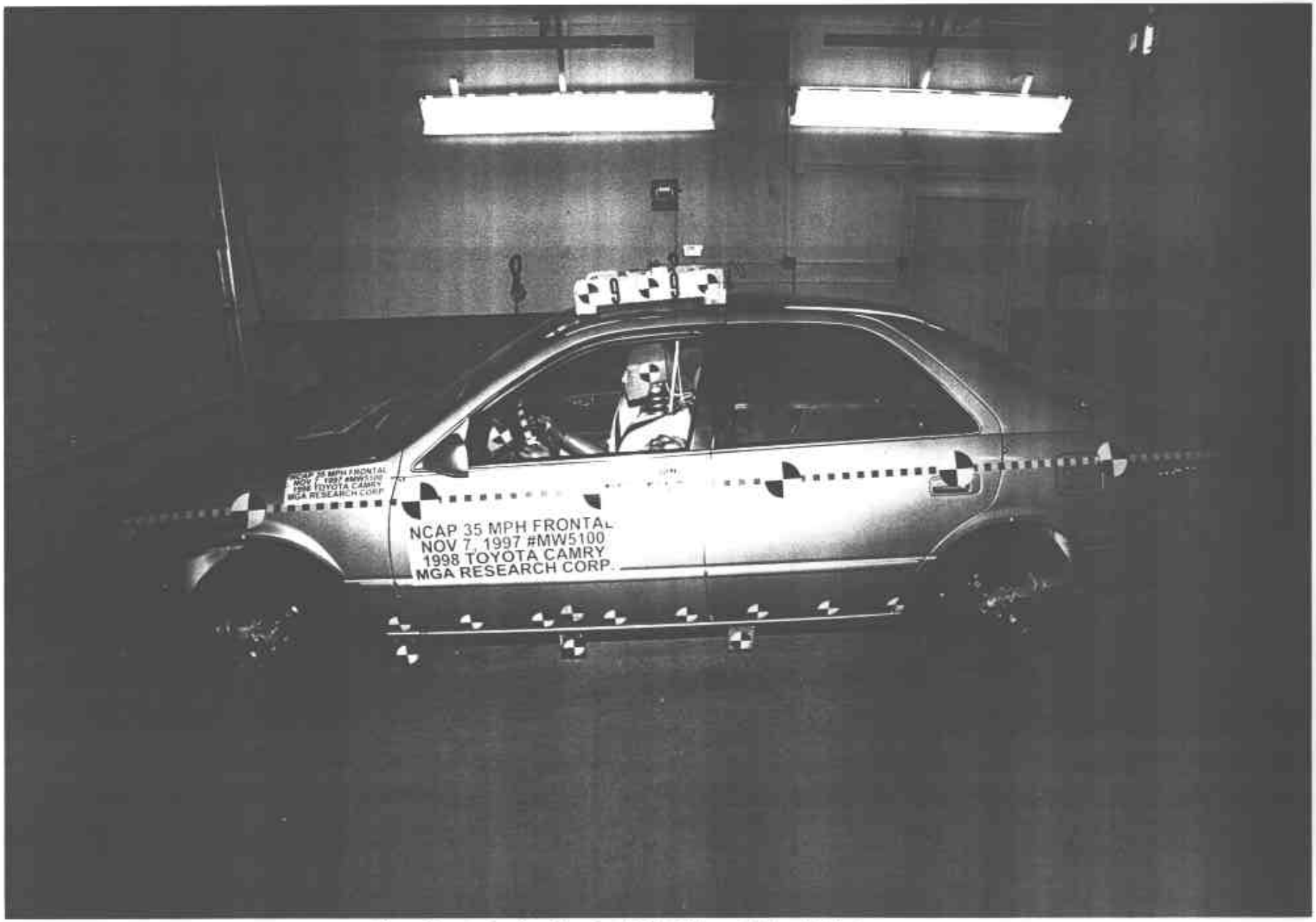


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

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

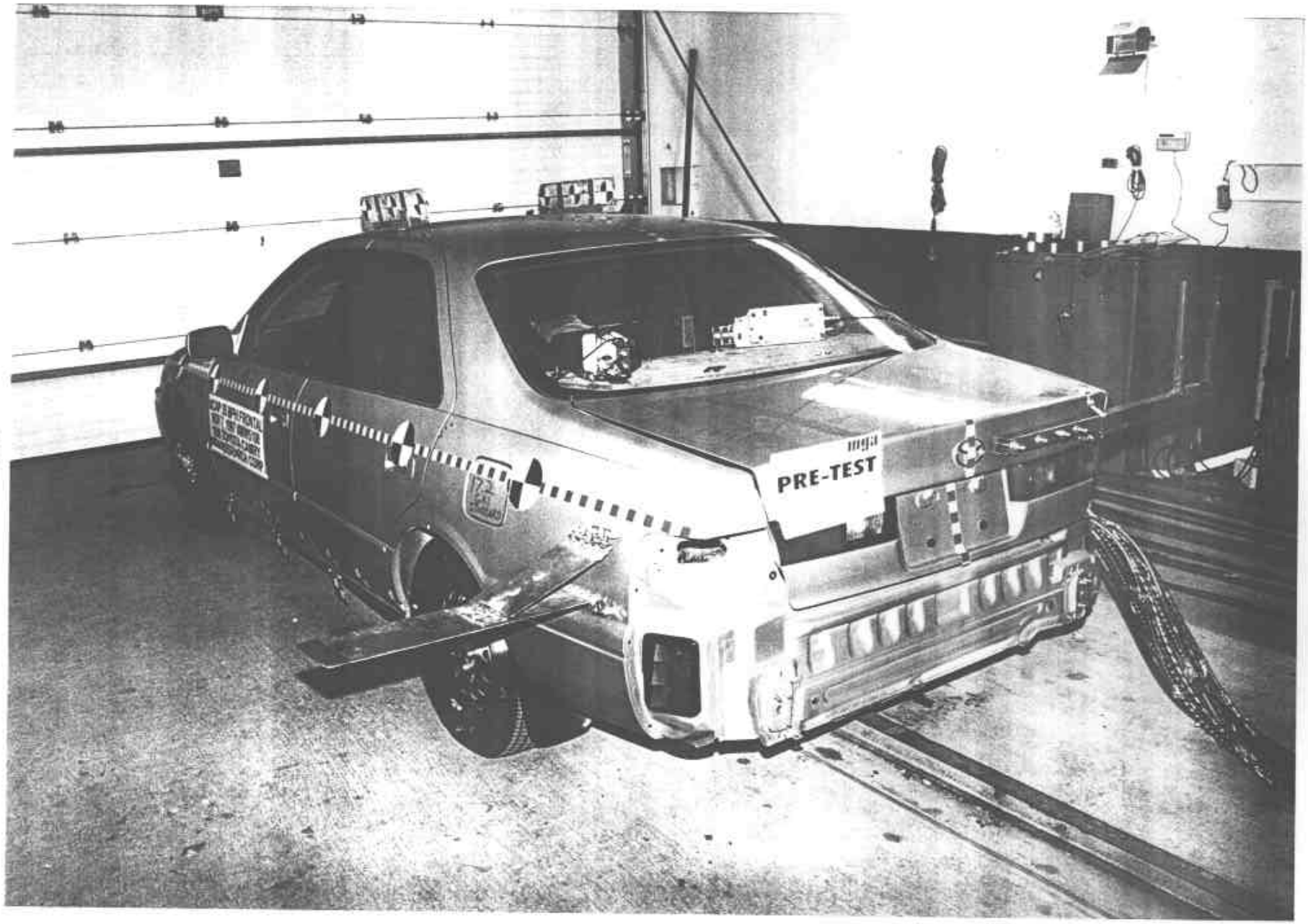


Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

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

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

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

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

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

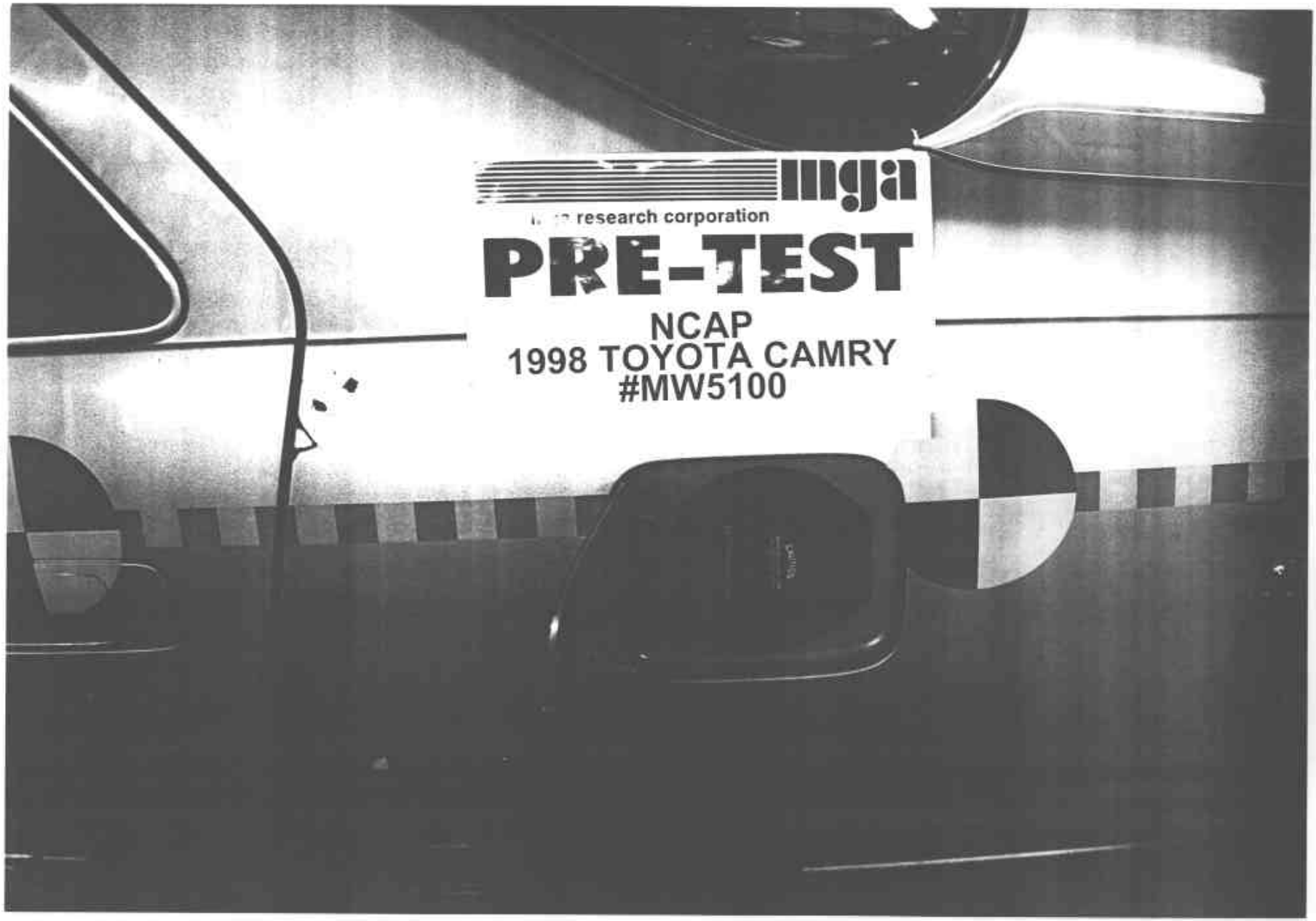


Photo No. A-13 - Pre-Test Fuel Filler Cap View

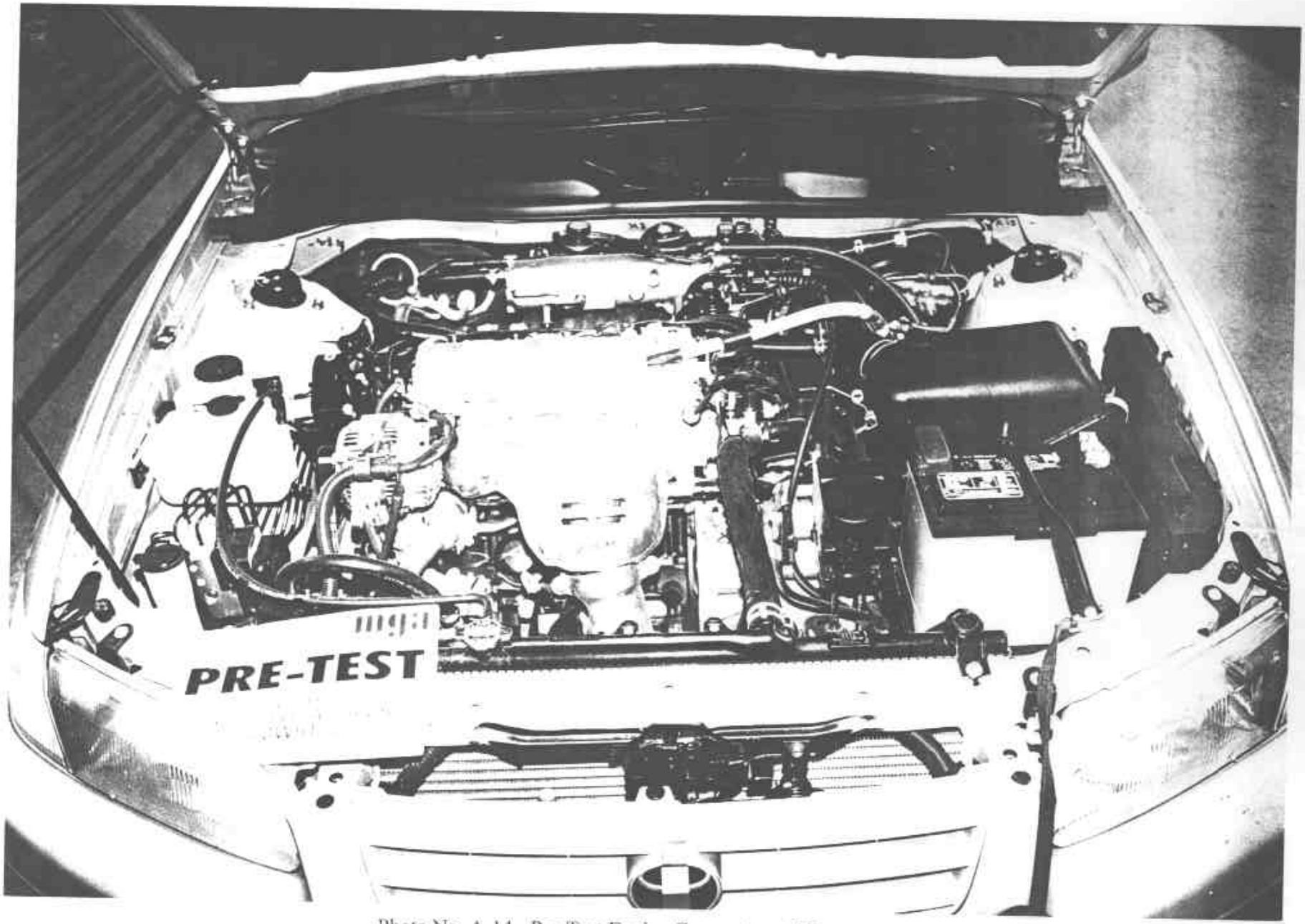


Photo No. A-14 - Pre-Test Engine Compartment View

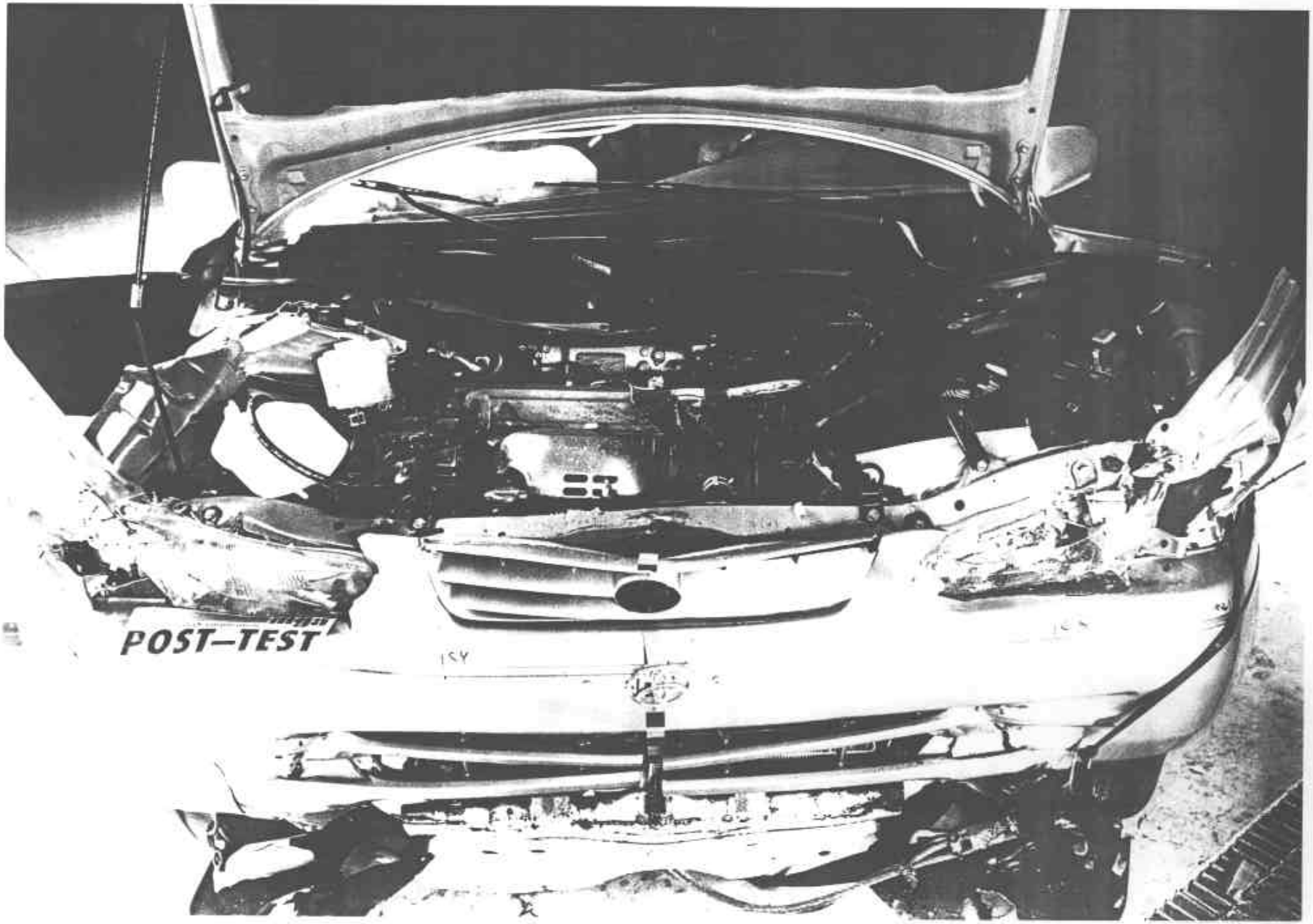


Photo No. A-15 - Post-Test Engine Compartment View

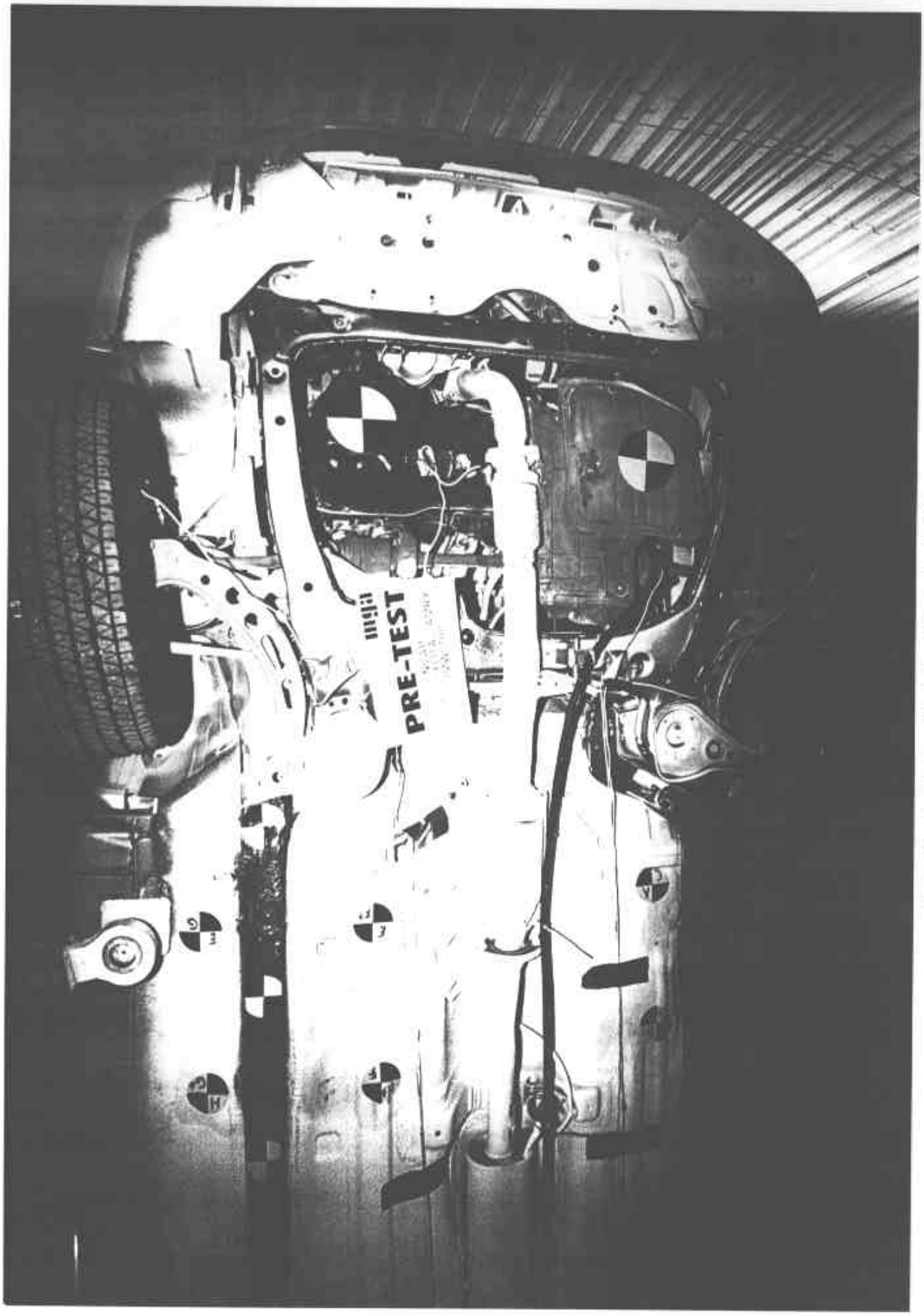


Photo No. A-16 - Pre-Test Front Underbody View

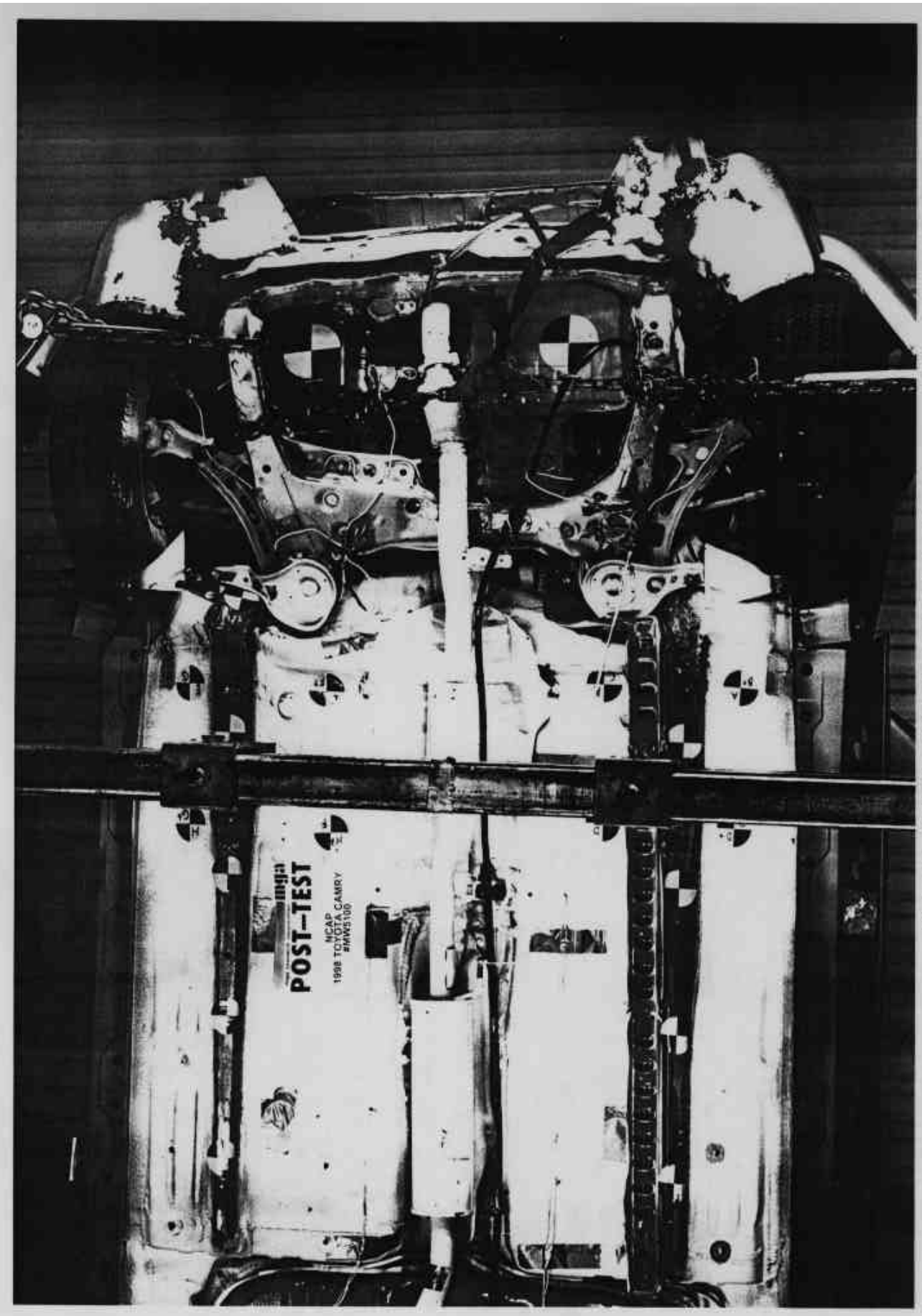


Photo No. A-17 - Post-Test Front Underbody View

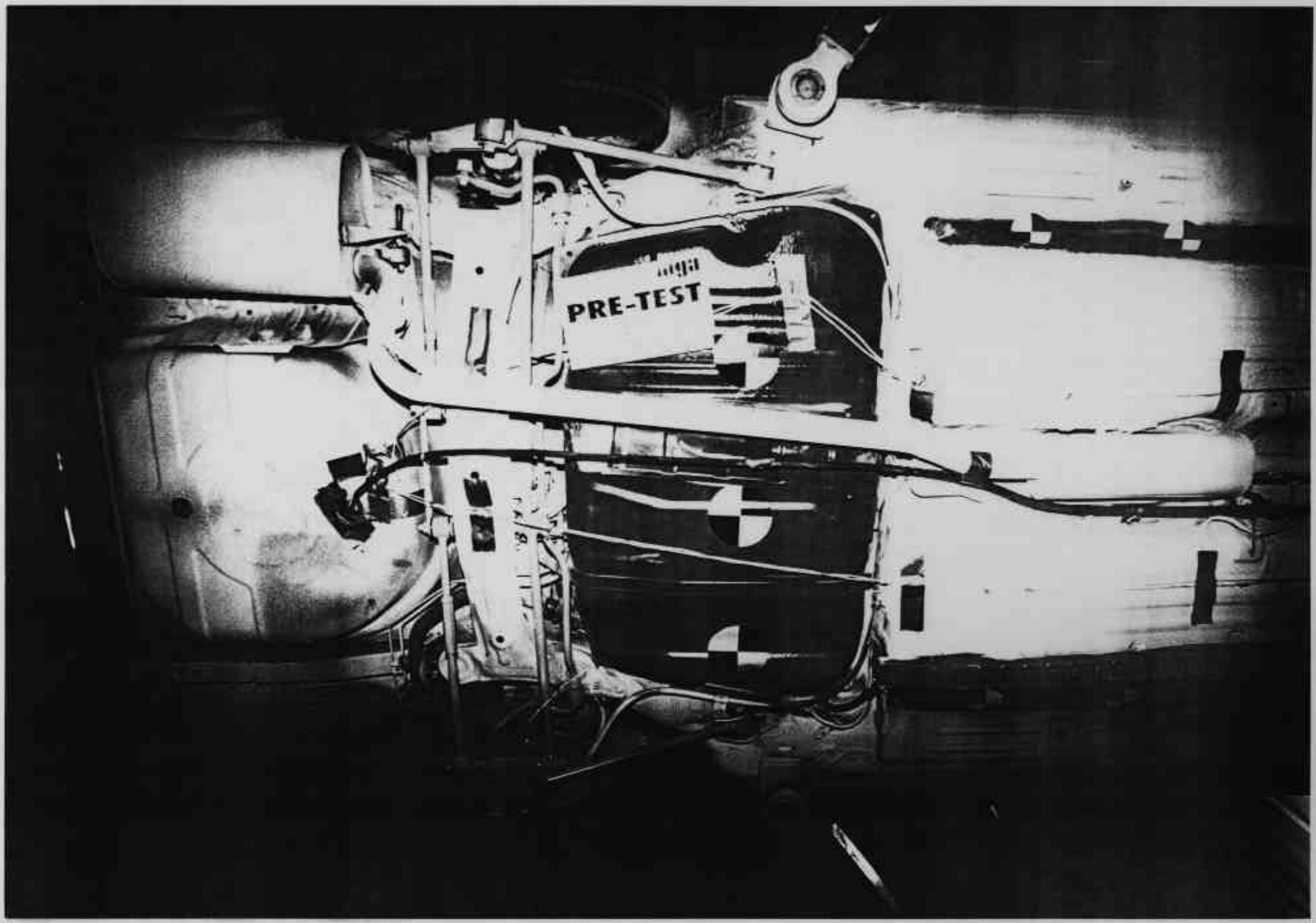


Photo No. A-18 - Pre-Test Rear Underbody View

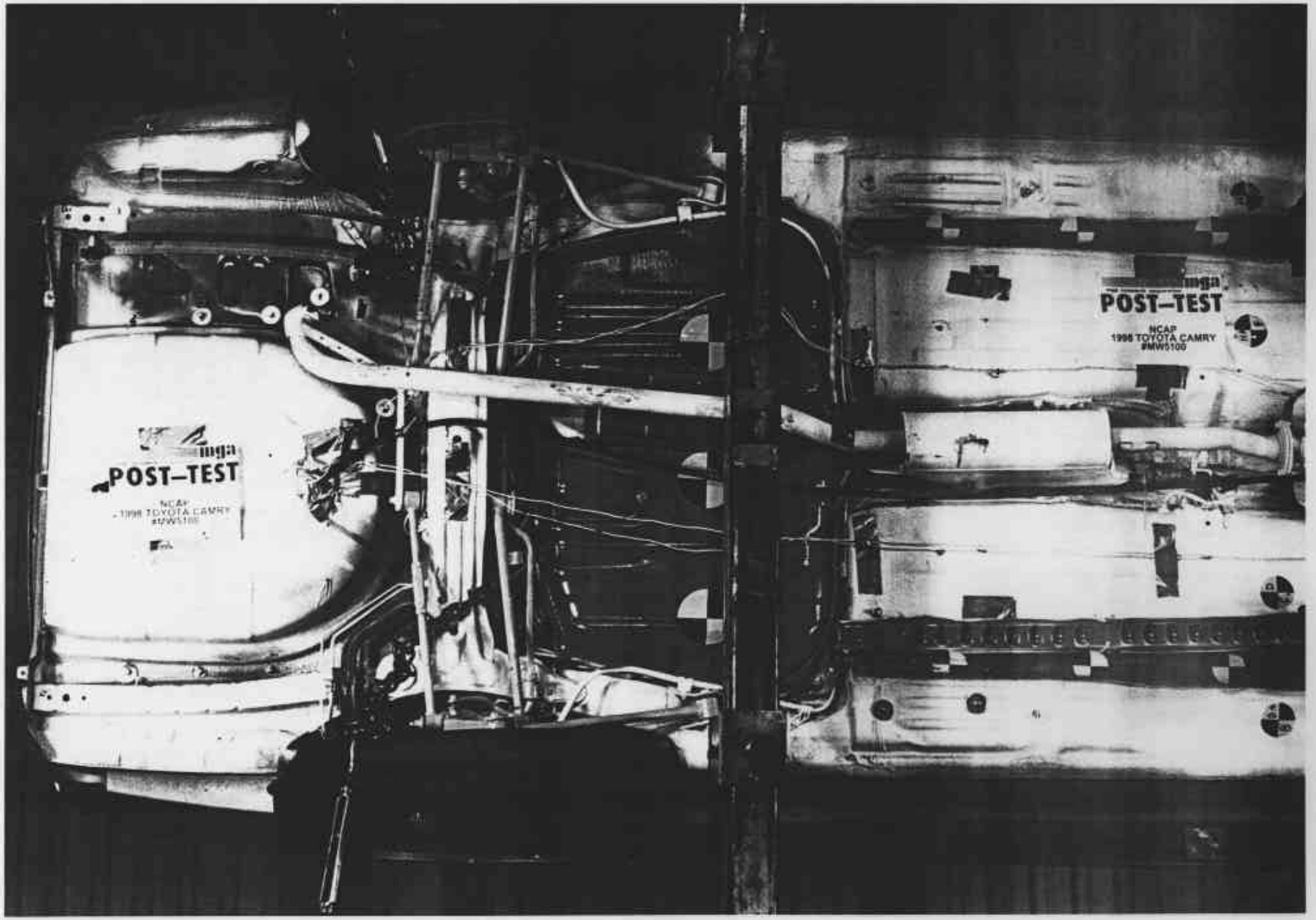


Photo No. A-19 - Post-Test Rear Underbody View

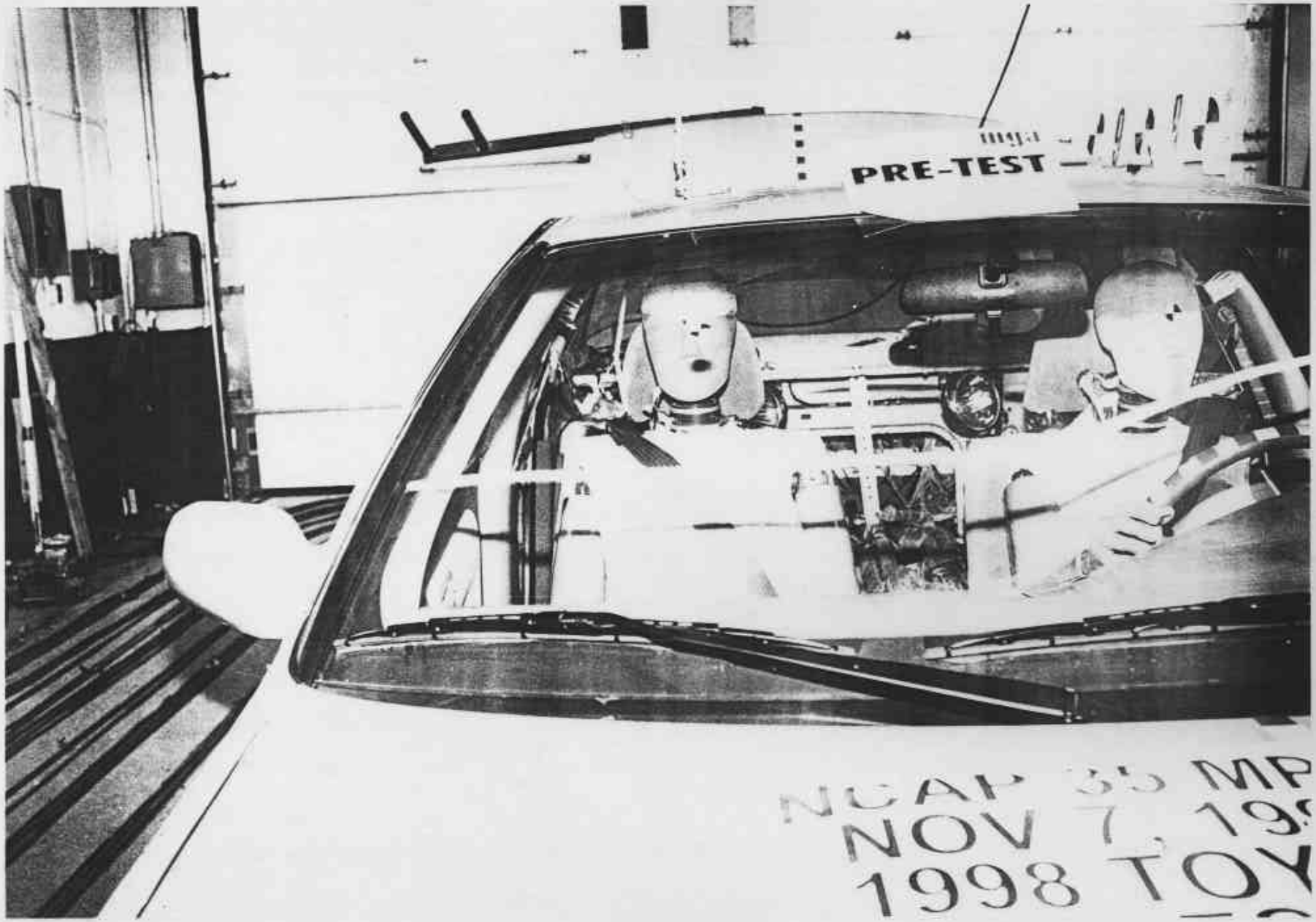
Photo No. A-20 - Pre-Test Windshield View

A-21

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

Photo No. A-22 - Pre-Test Driver Windshield View

Photo No. A-23 - Post-Test Driver Windshield View



A-24

Photo No. A-24 - Pre-Test Passenger Windshield View

Photo No. A-25 - Post-Test Passenger Windshield View

Photo No. A-26 - Pre-Test Driver Dummy Position Left Side View

Photo No. A-27 - Post-Test Driver Dummy Position Left Side View

Photo No. A-28 - Pre-Test Driver Dummy Position Left Side View (Door Open)

Photo No. A-29 - Post-Test Driver Dummy Position Left Side View (Door Open)

A-30

Photo No. A-30 - Pre-Test Driver Seat Position View

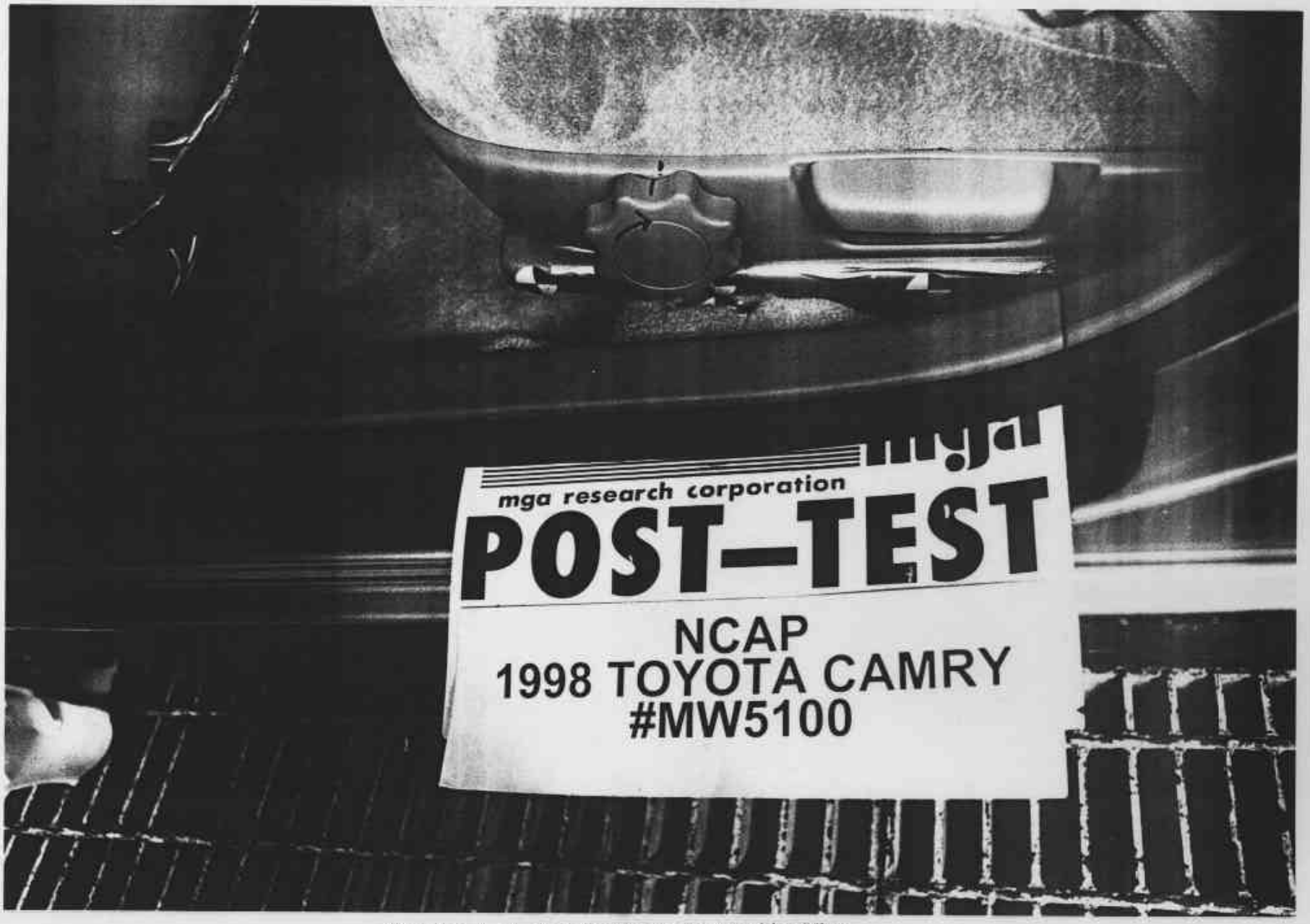


Photo No. A-31 - Post-Test Driver Seat Position View

Photo No. A-32 - Pre-Test Driver Dummy Knee Position

Photo No. A-33 - Post-Test Driver Dummy Knee Position

Photo No. A-34 - Post-Test Driver Airbag Contact

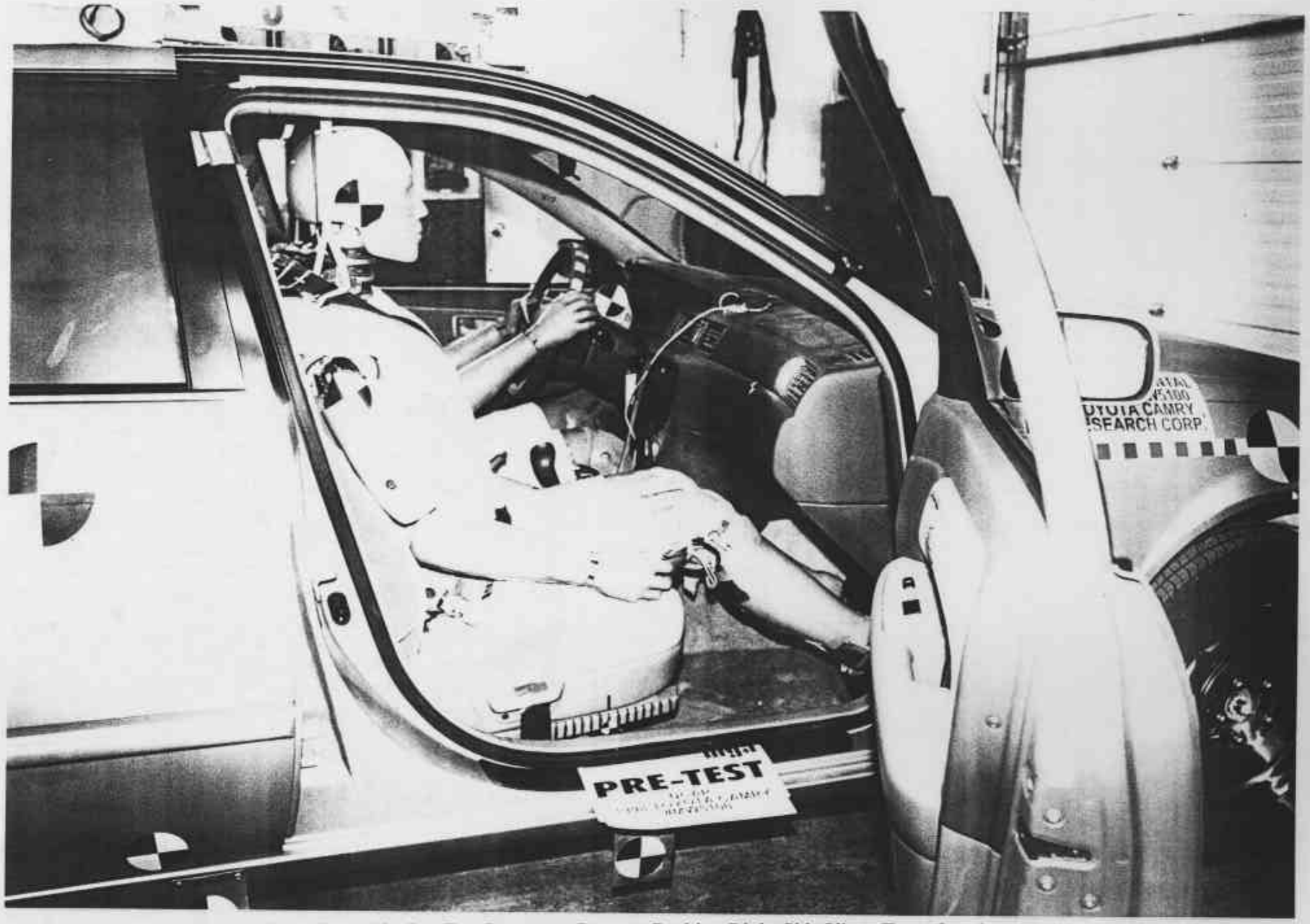
Photo No. A-35 - Post-Test Driver Knee Contact View

A-36

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

A-37

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



A-38

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

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

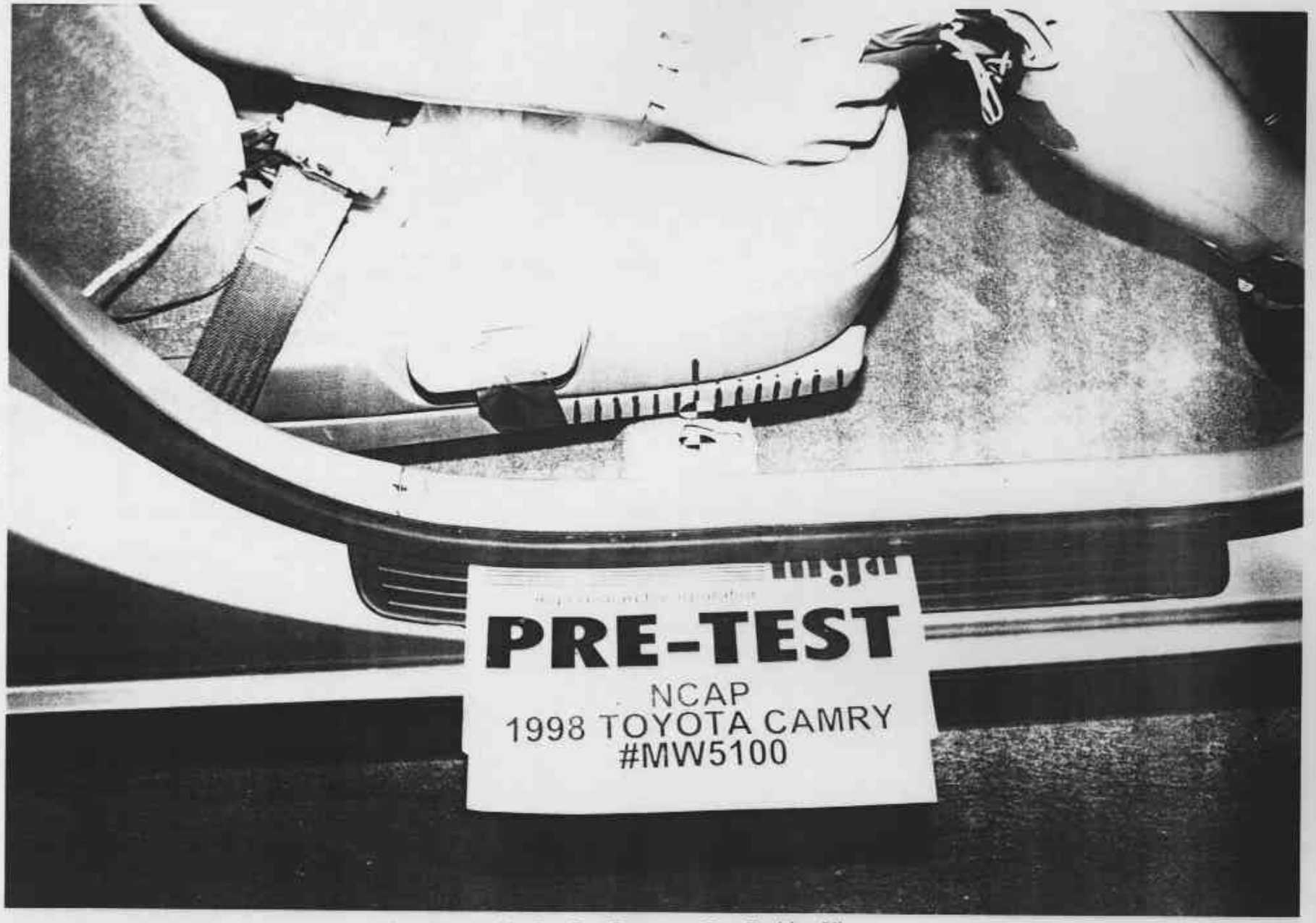


Photo No. A-40 - Pre-Test Passenger Seat Position View

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

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

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

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

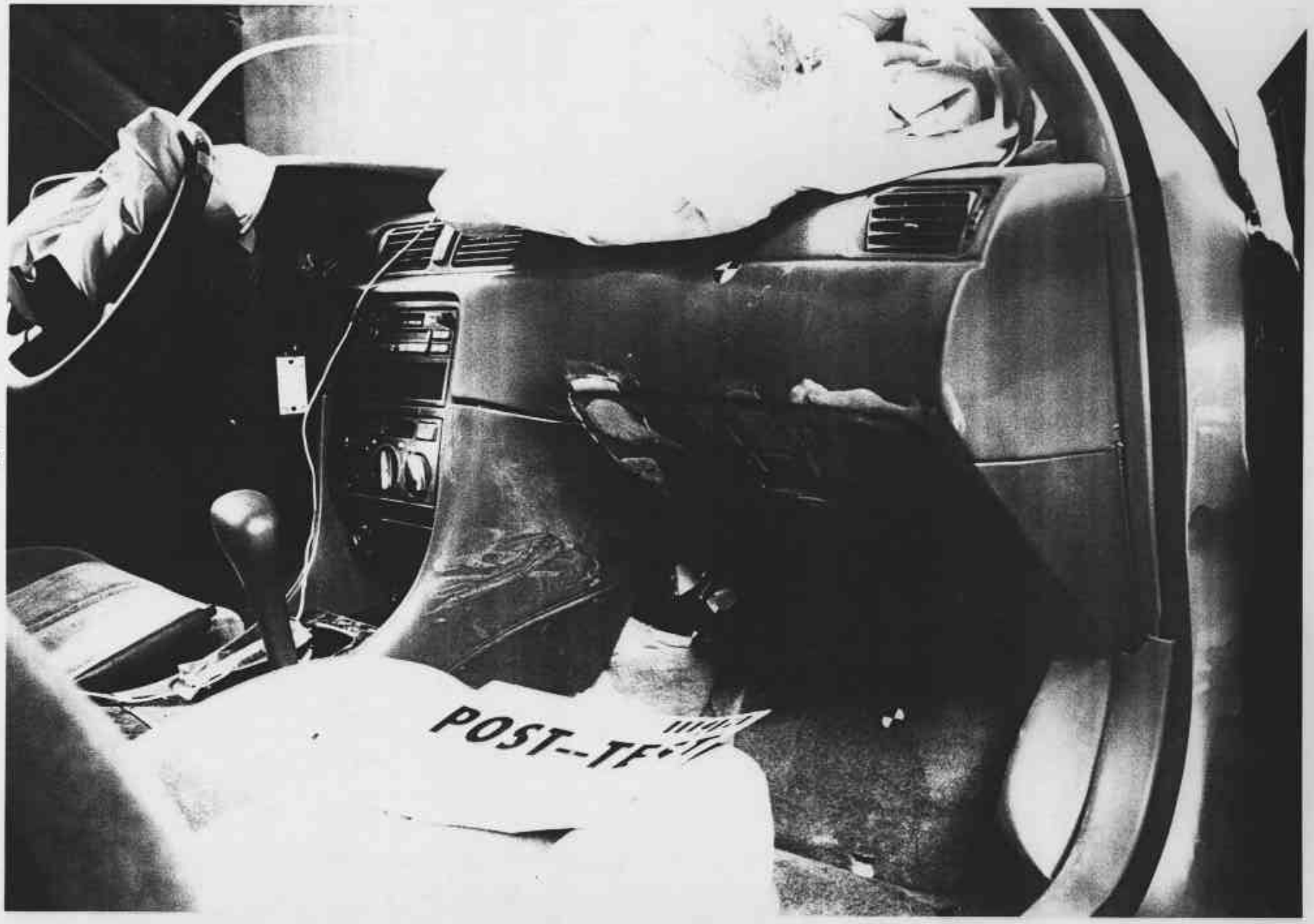
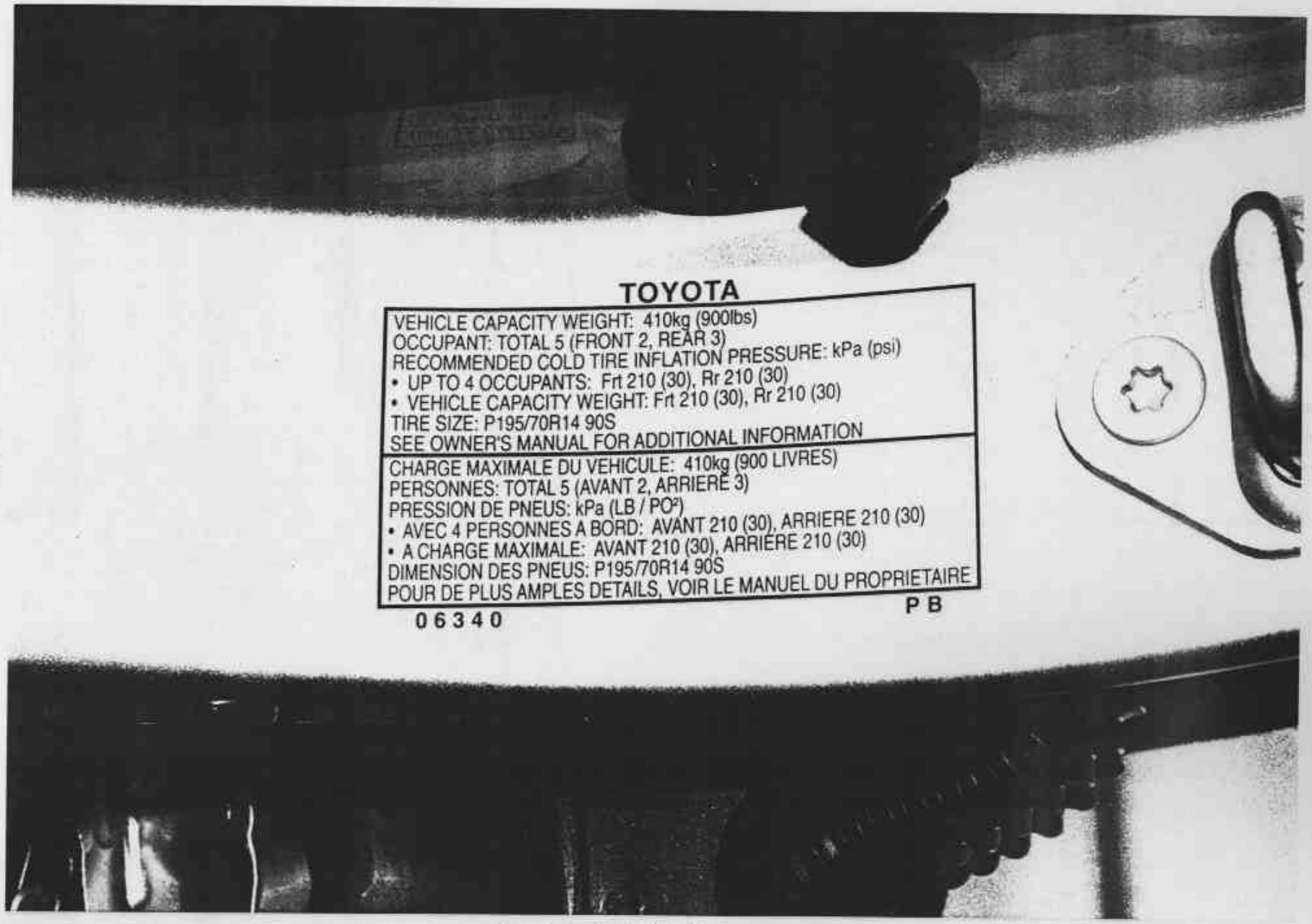


Photo No. A-45 - Post-Test Passenger Knee Contact View

A-46

Photo No. A-46 - Vehicle Certification Label



A-47

Photo No. A-47 - Tire Placard

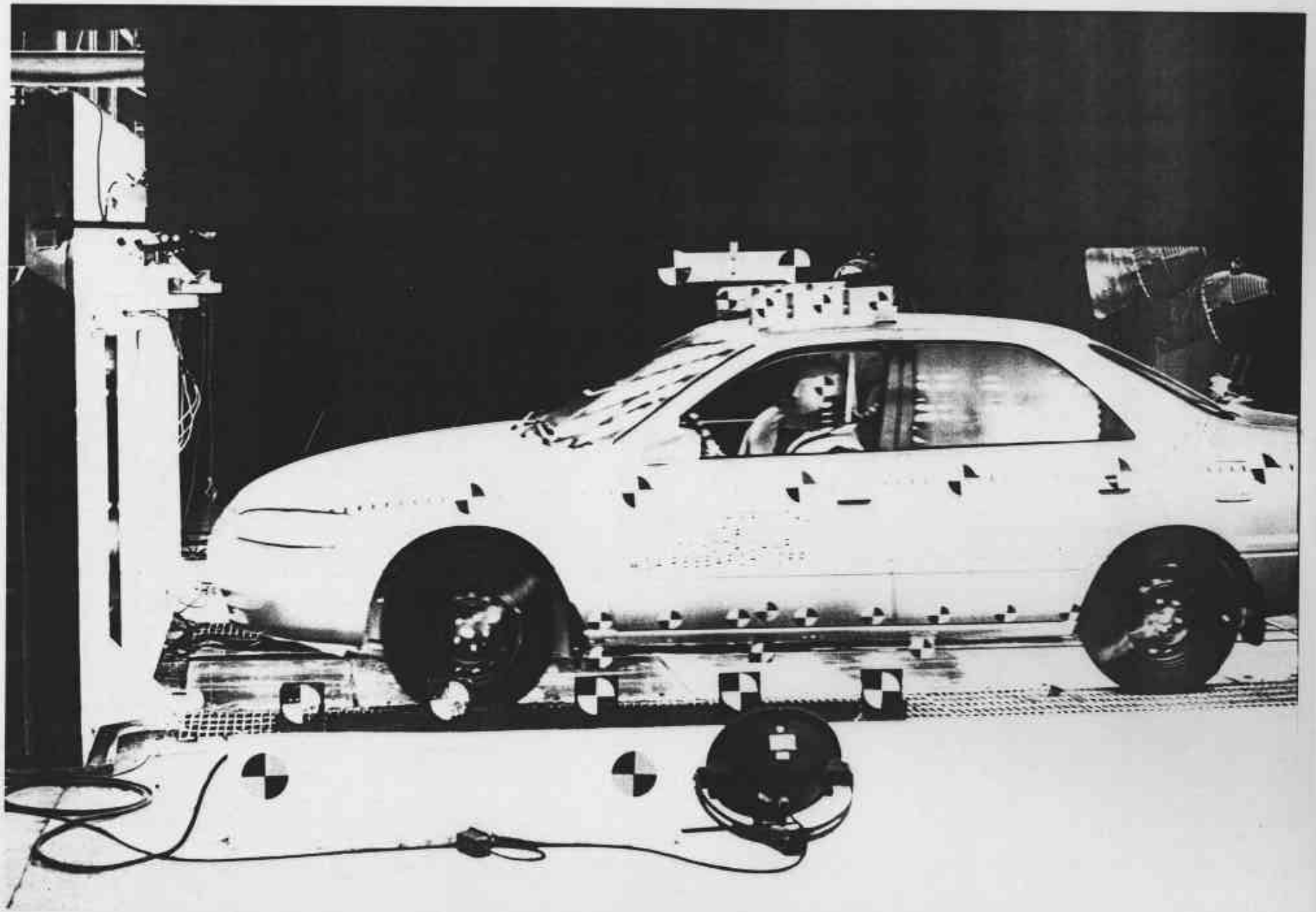


Photo No. A-48 - Vehicle Pre Impact

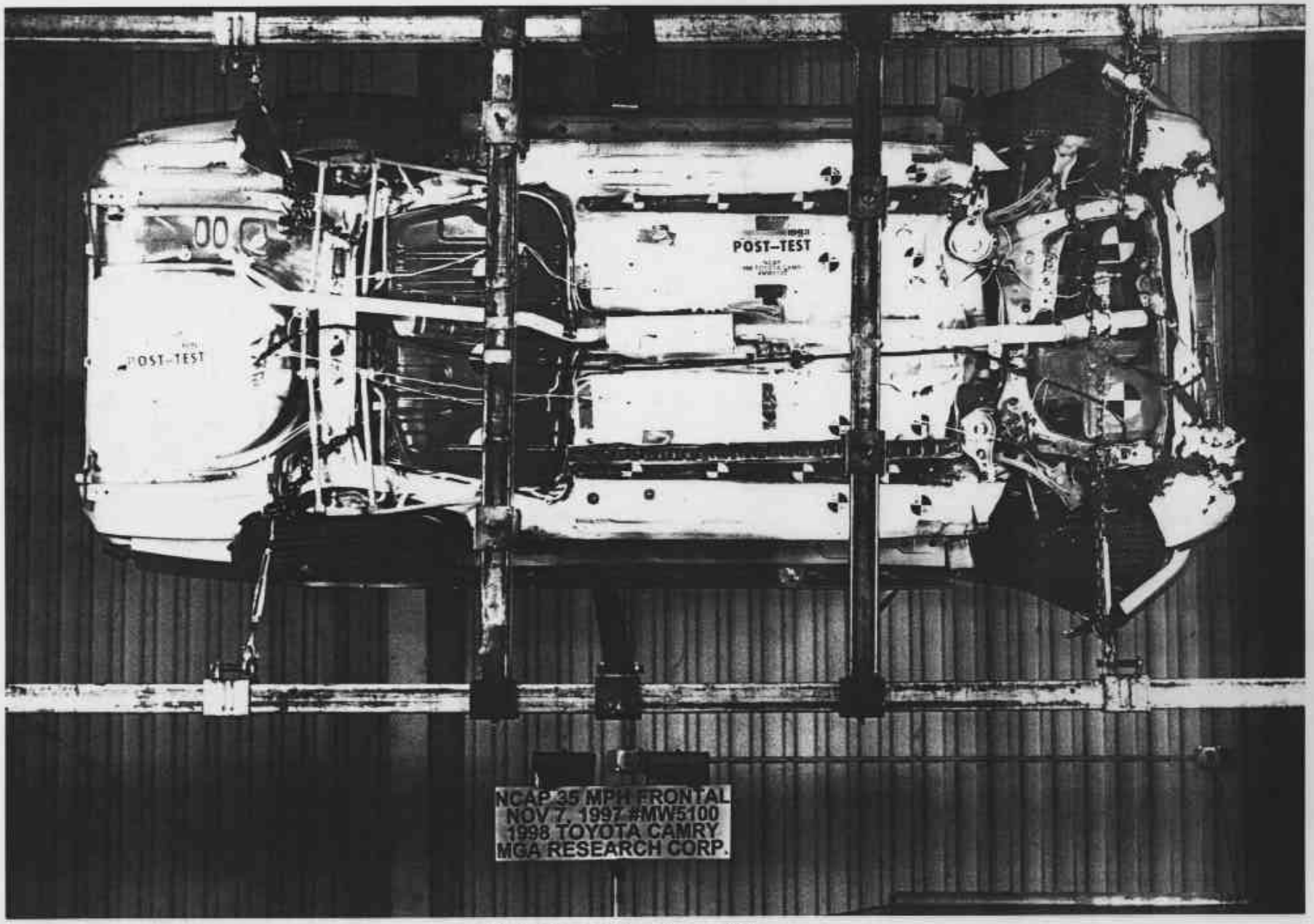


Photo No. A-49 - Rollover 90°

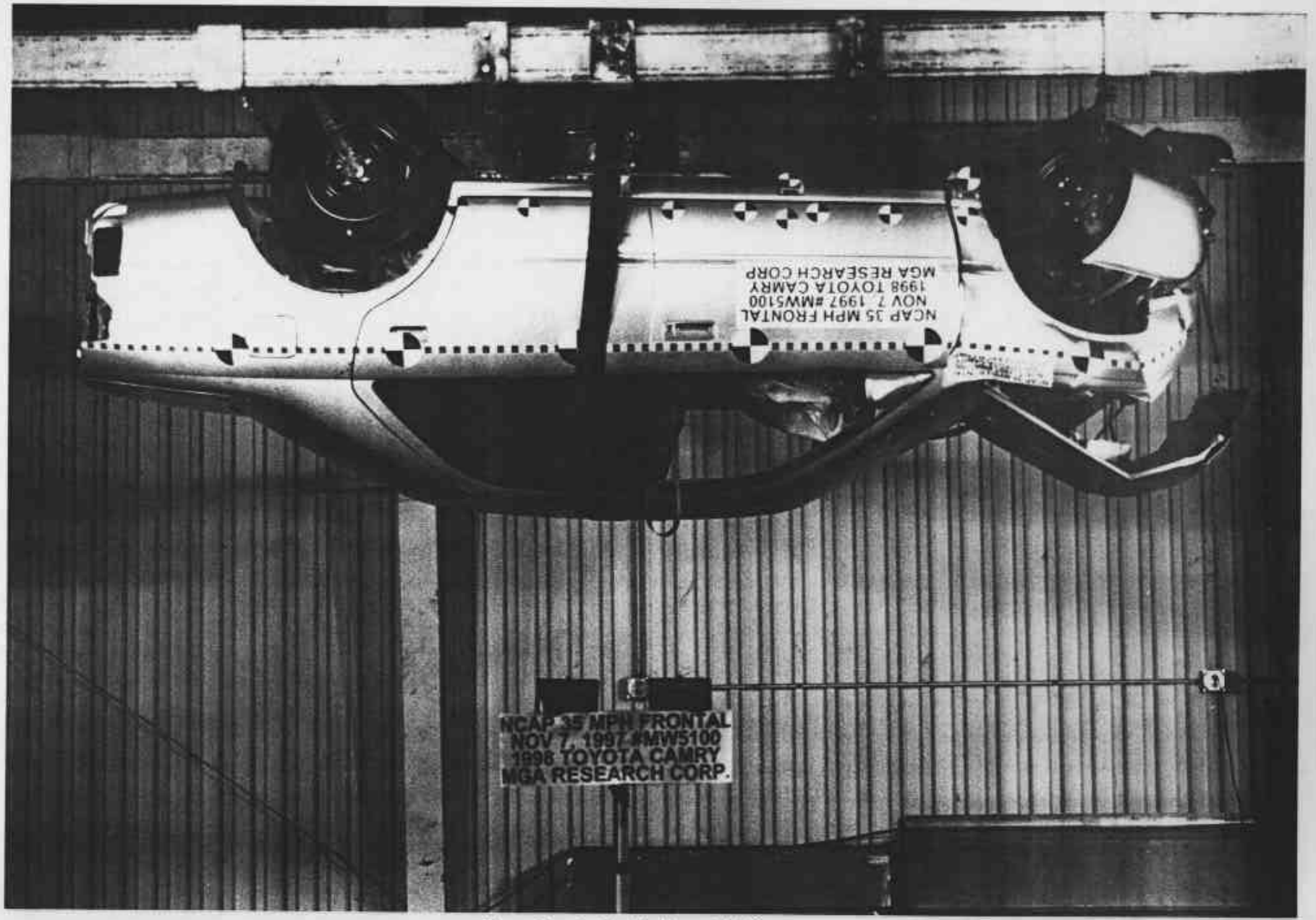


Photo No. A-50 - Rollover 180°

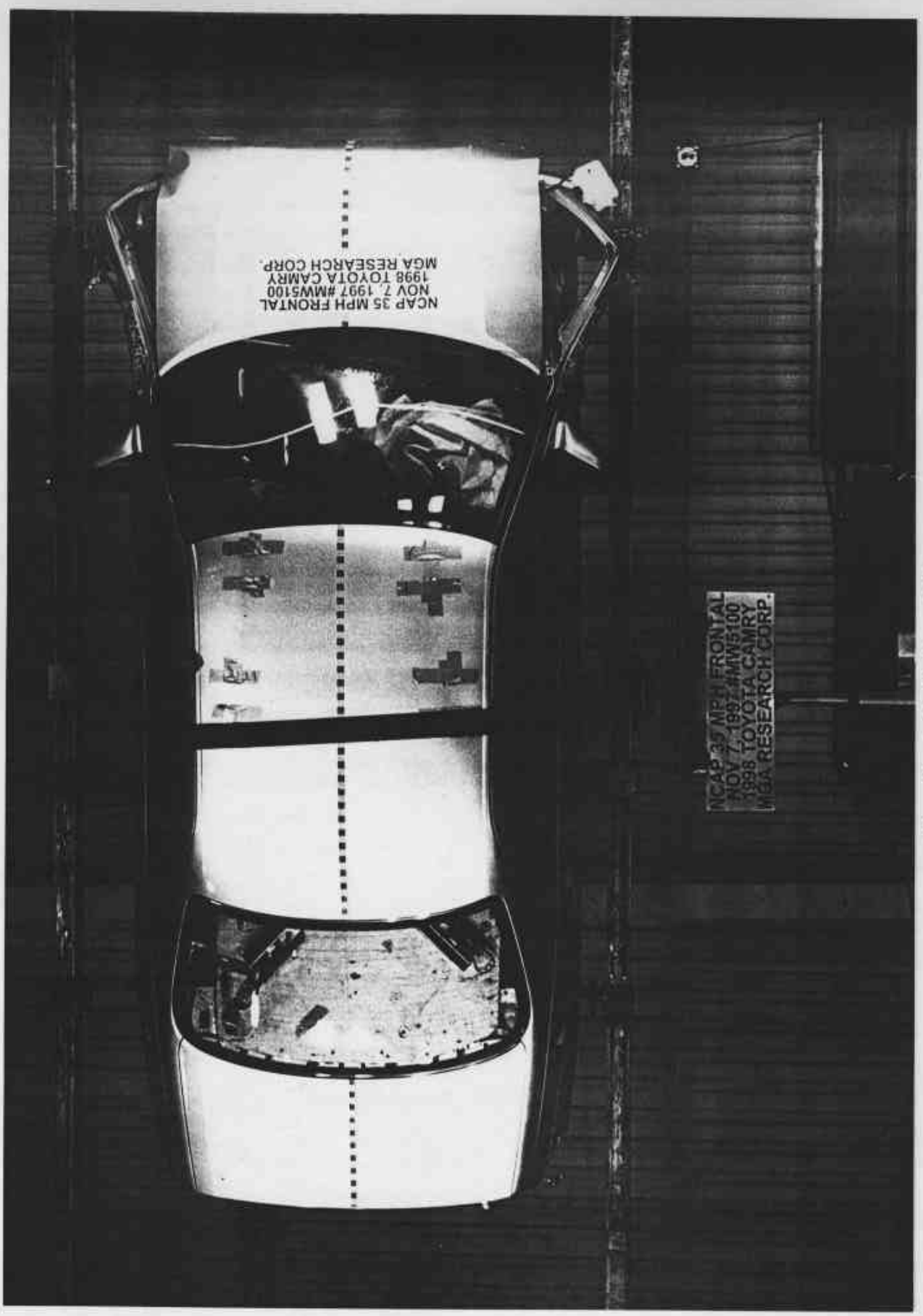


Photo No. A-51 - Rollover 270°

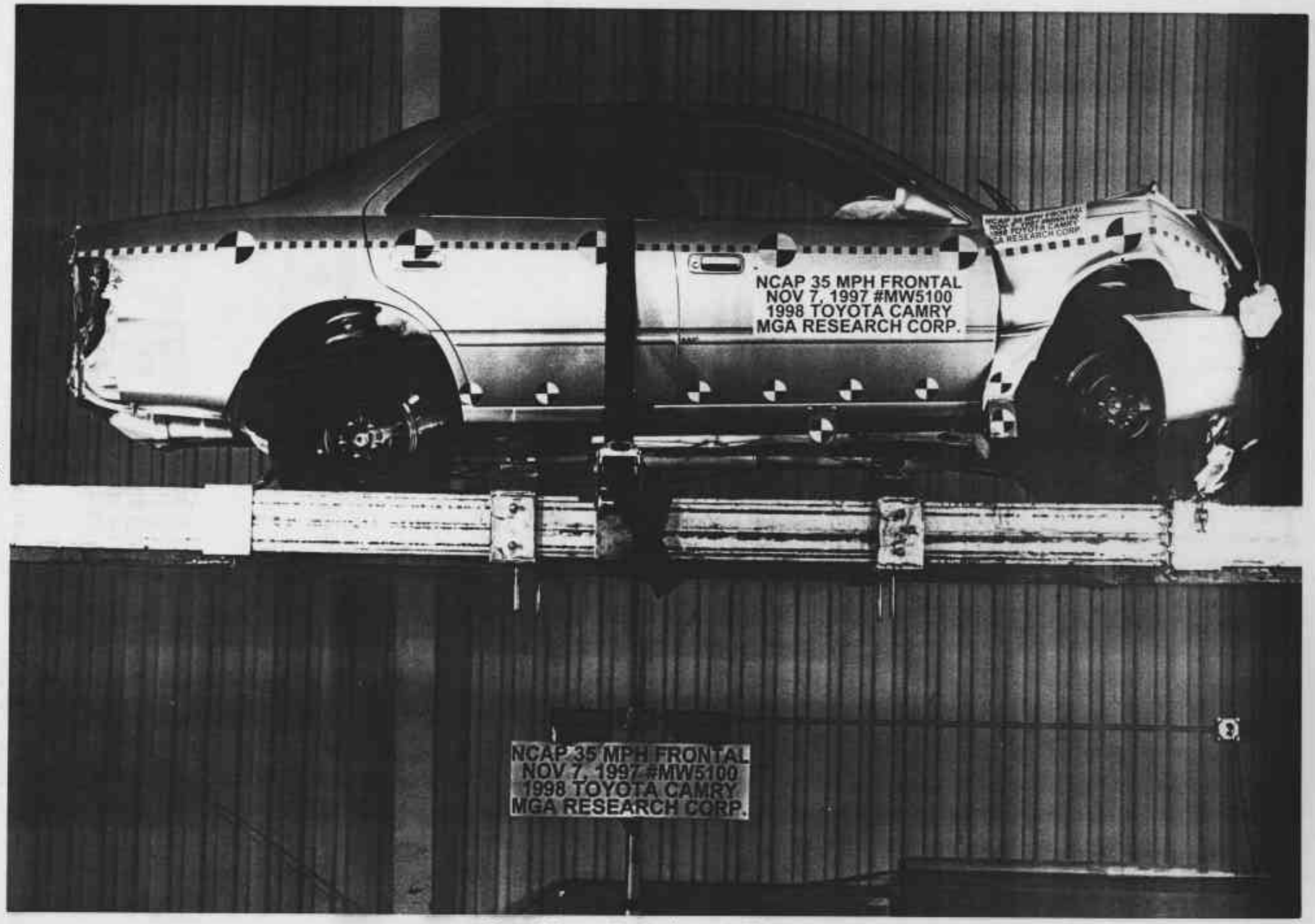


Photo No. A-52 - Rollover 360°

APPENDIX B

Vehicle and Dummy Response Data

1998 Toyota Camry 4 Door

NHTSA NO.: MW5100

VEHICLE DATA FILTER CHANNEL CLASS

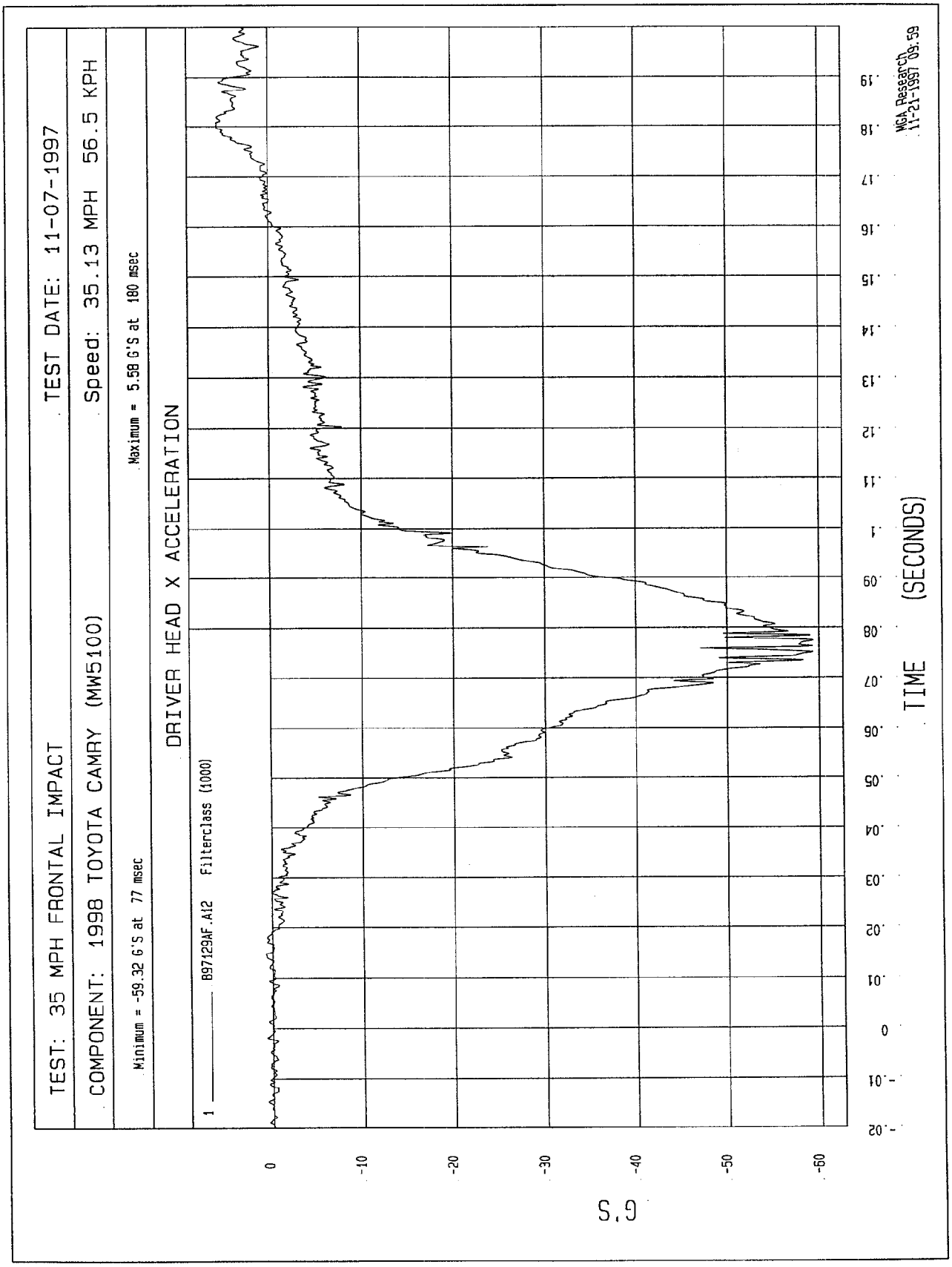
Head Accelerations 1000 (1650 Hz)

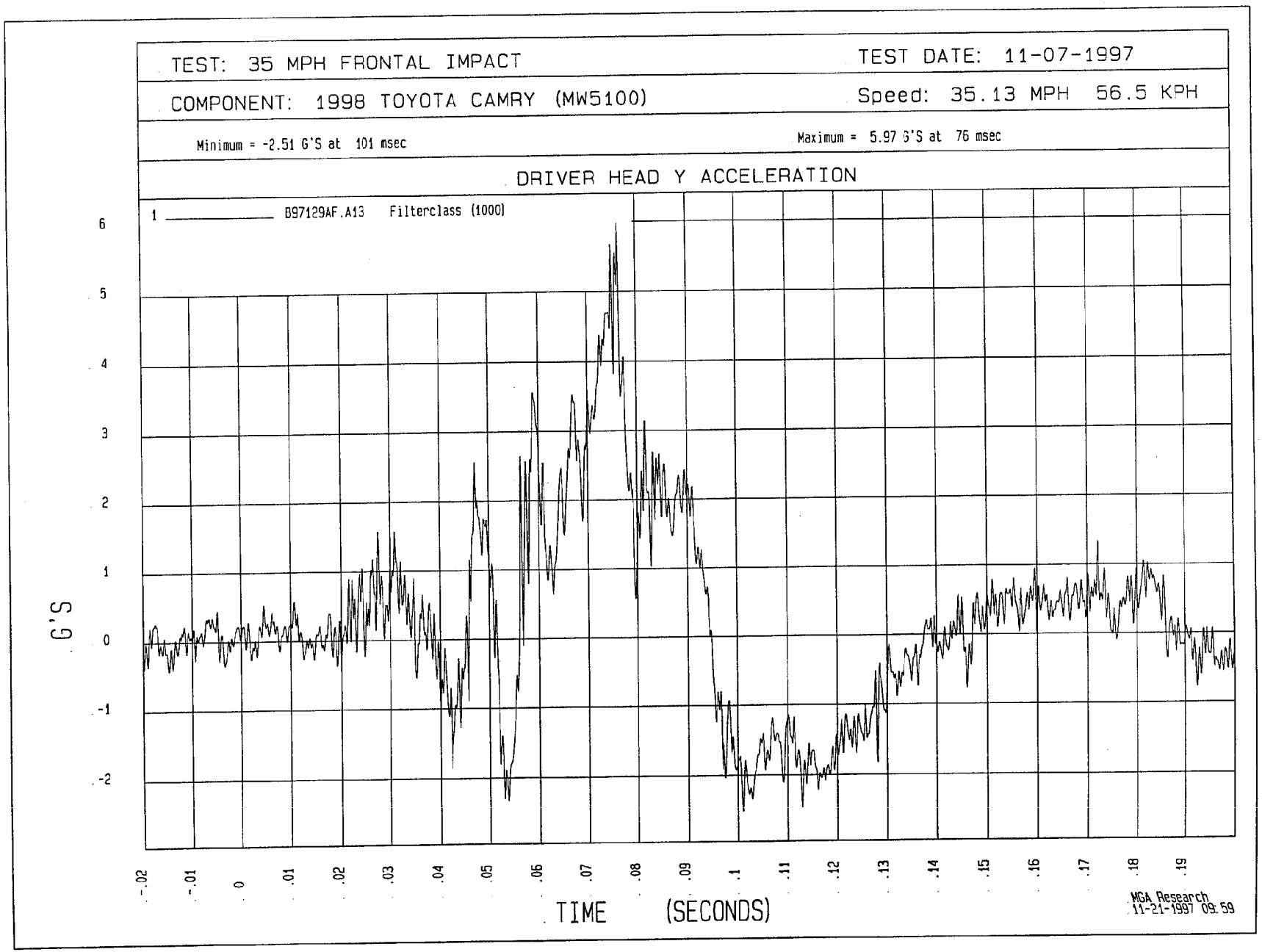
Chest Accelerations 180 (300 Hz)

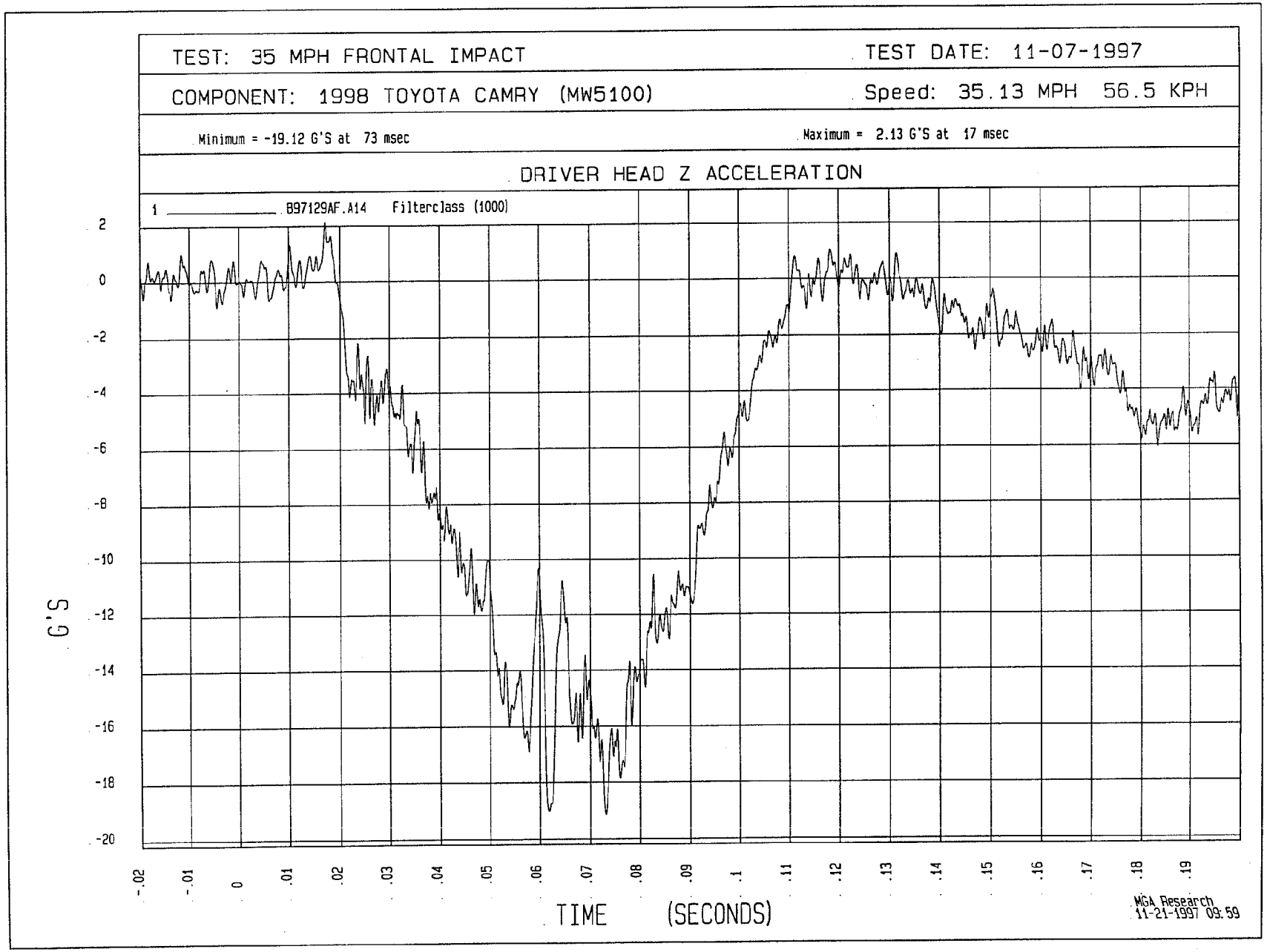
Femur Load Cells 600 (1000 Hz)

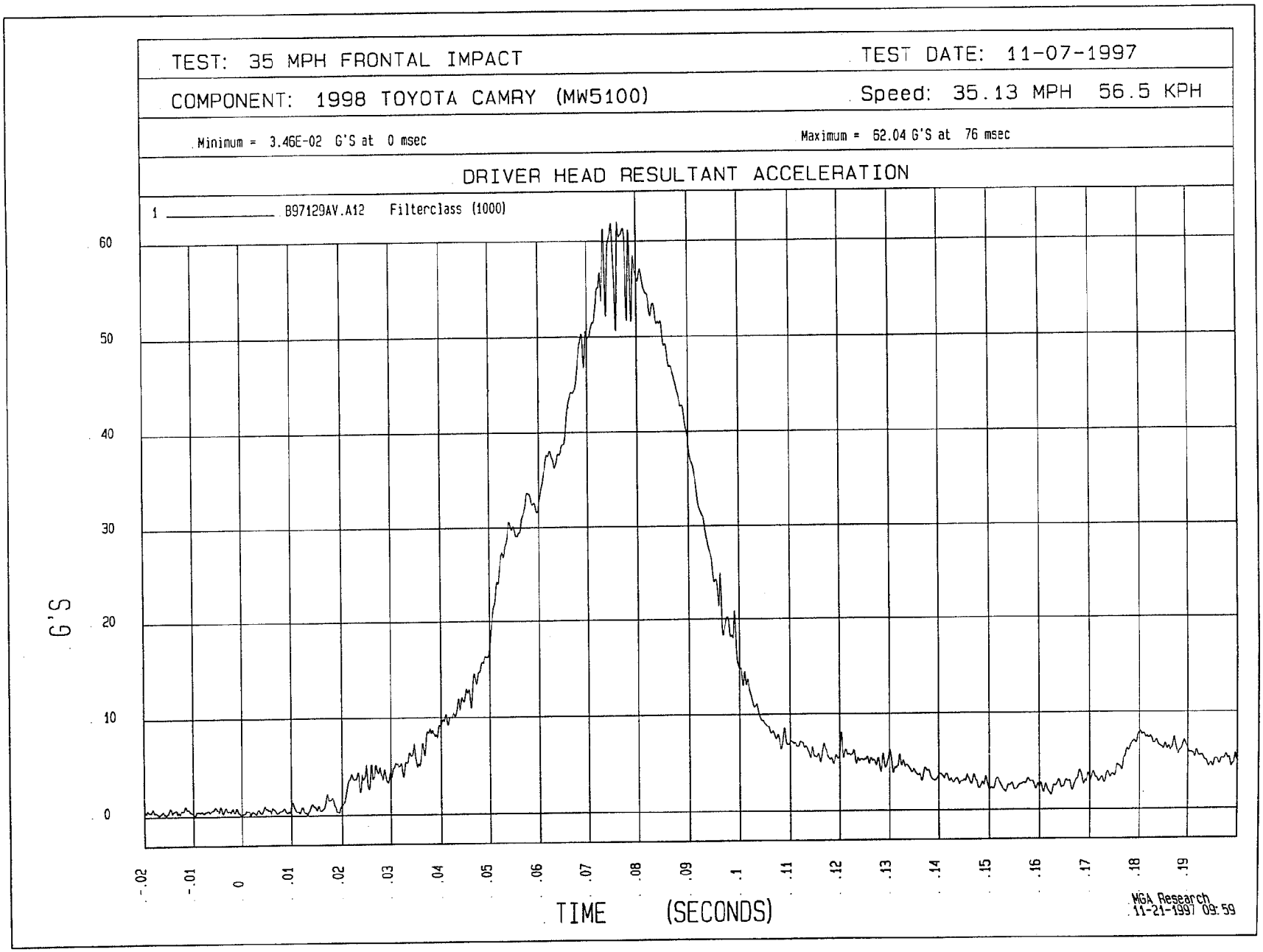
Lap and Torso Belts 60 (100 Hz)

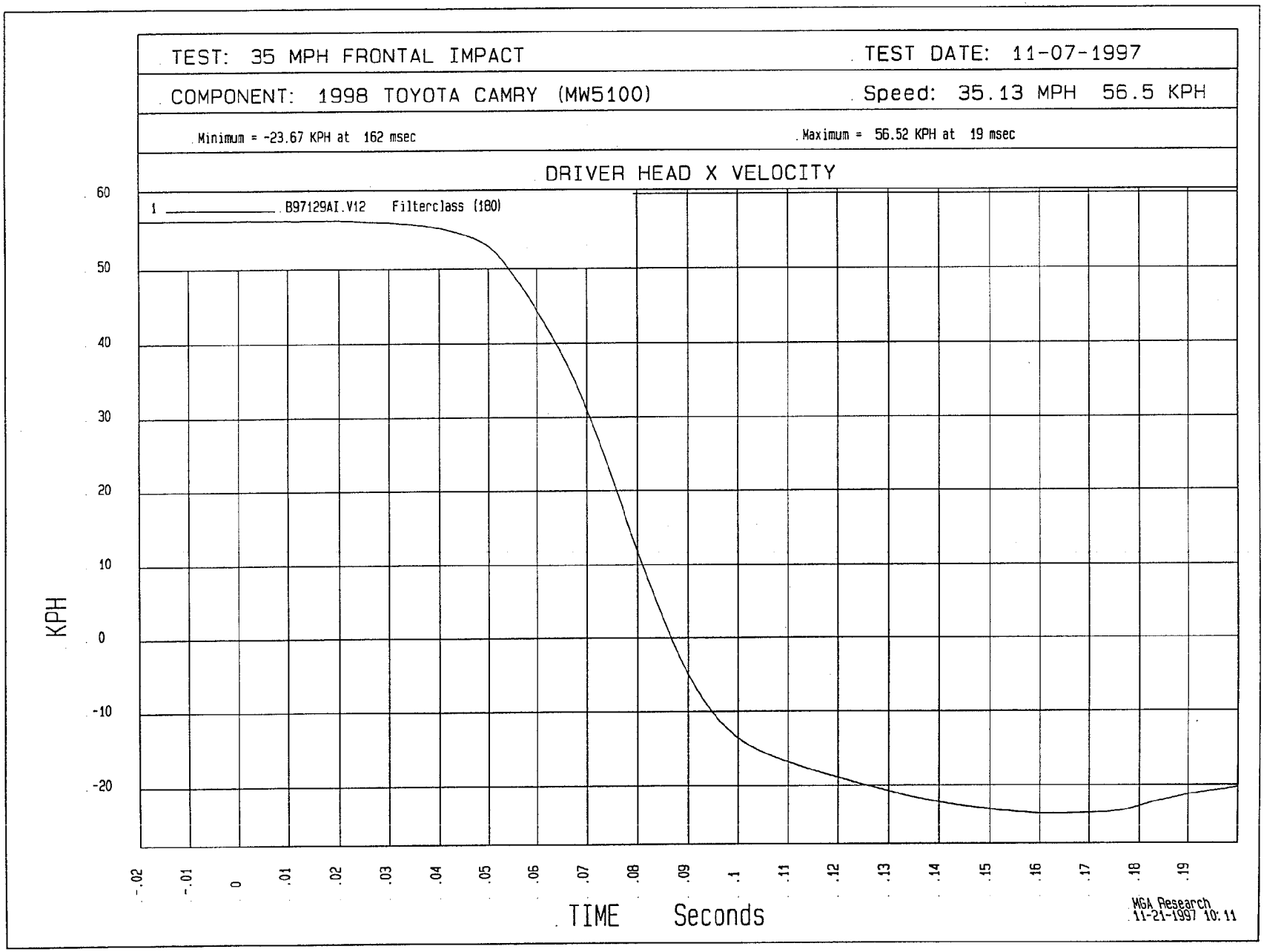
Vehicle Accelerations 60 (100 Hz)

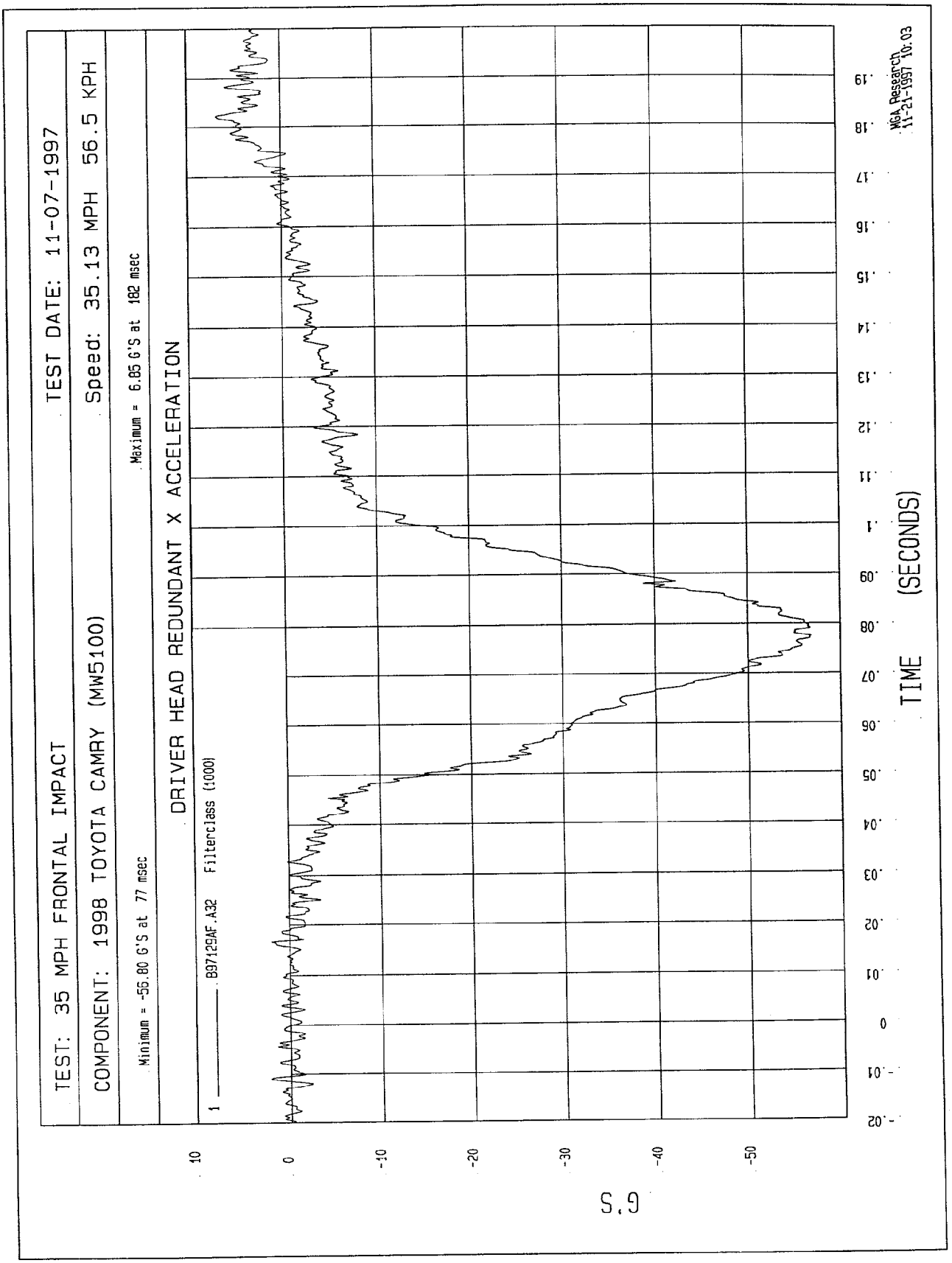

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -59.32 G'S at 77 msec
Maximum = 5.58 G'S at 180 msec
DRIVER HEAD X ACCELERATION
1 B97129AF.A12 Filterclass (1000)
0
-10
-20
-30
-40
-50
-60
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-21-1997 09:59

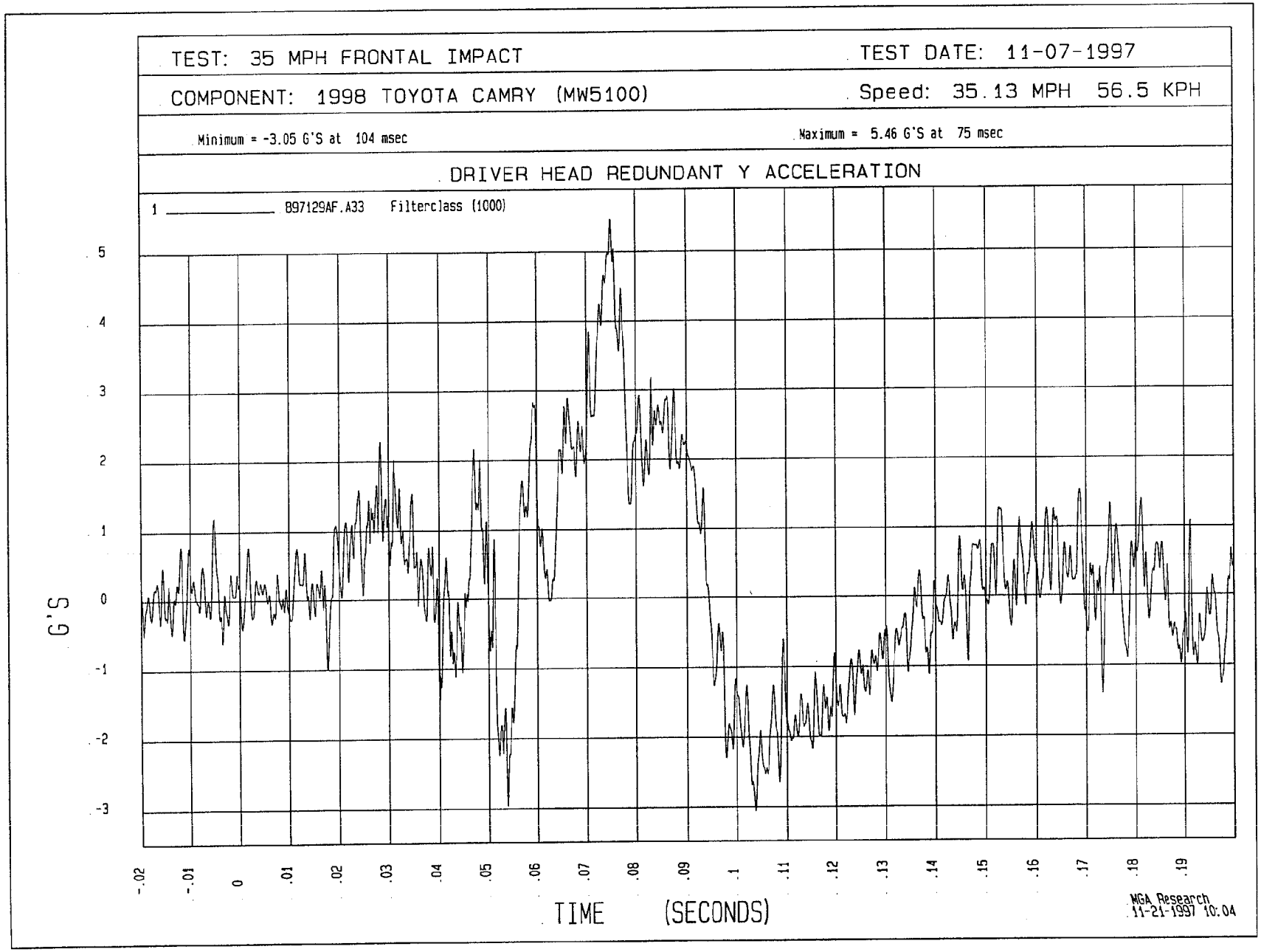

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -2.51 G'S at 101 msec
Maximum = 5.97 G'S at 76 msec
DRIVER HEAD Y ACCELERATION
1 B97129AF.A13 Filterclass (1000)
G'S
6
5
4
3
2
1
0
-1
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 09:59

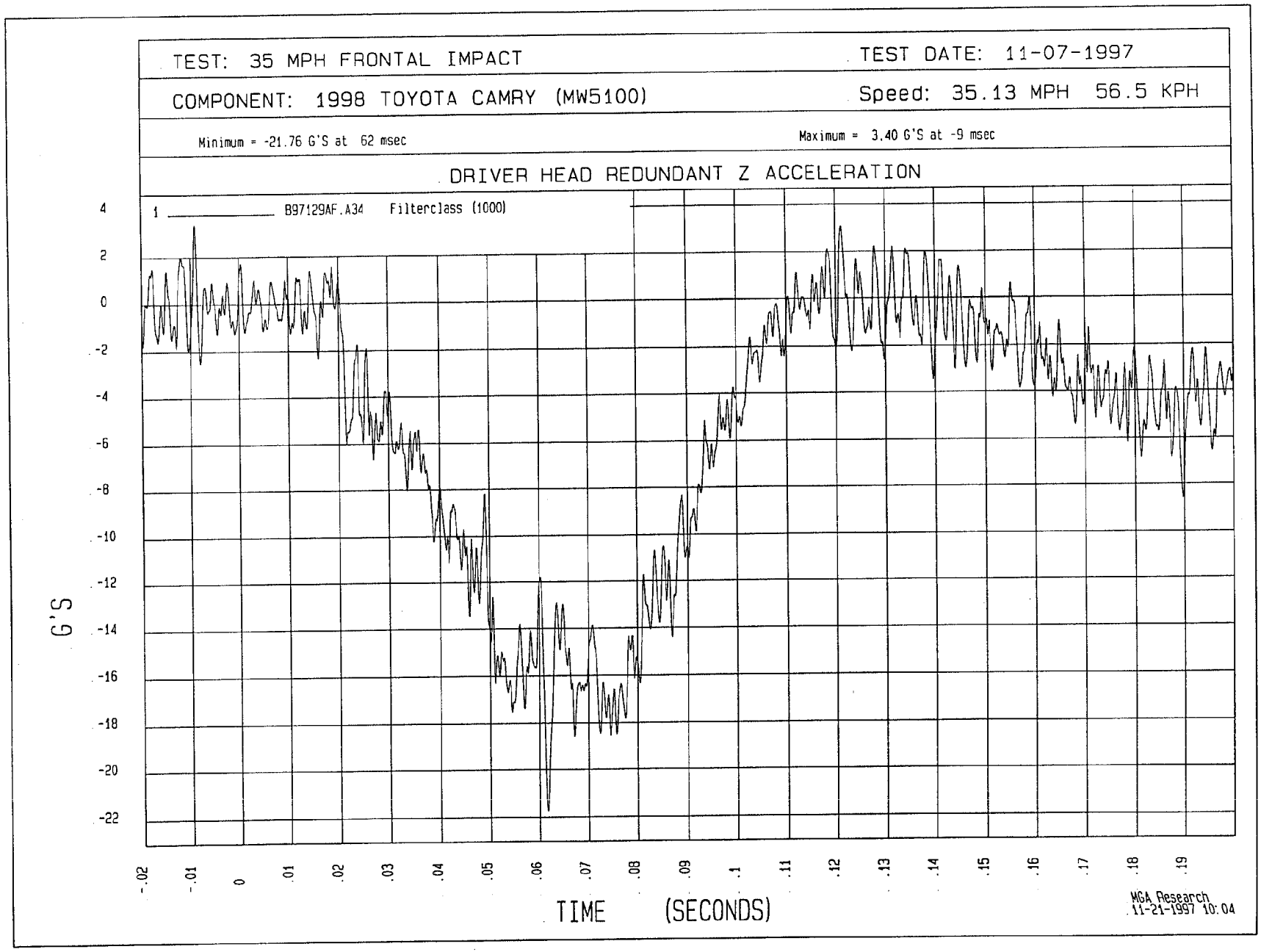

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -19.12 G'S at 73 msec
Maximum = 2.13 G'S at 17 msec
DRIVER HEAD Z ACCELERATION
1 B97129AF.A14 Filterclass (1000)
G'S
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 09:59

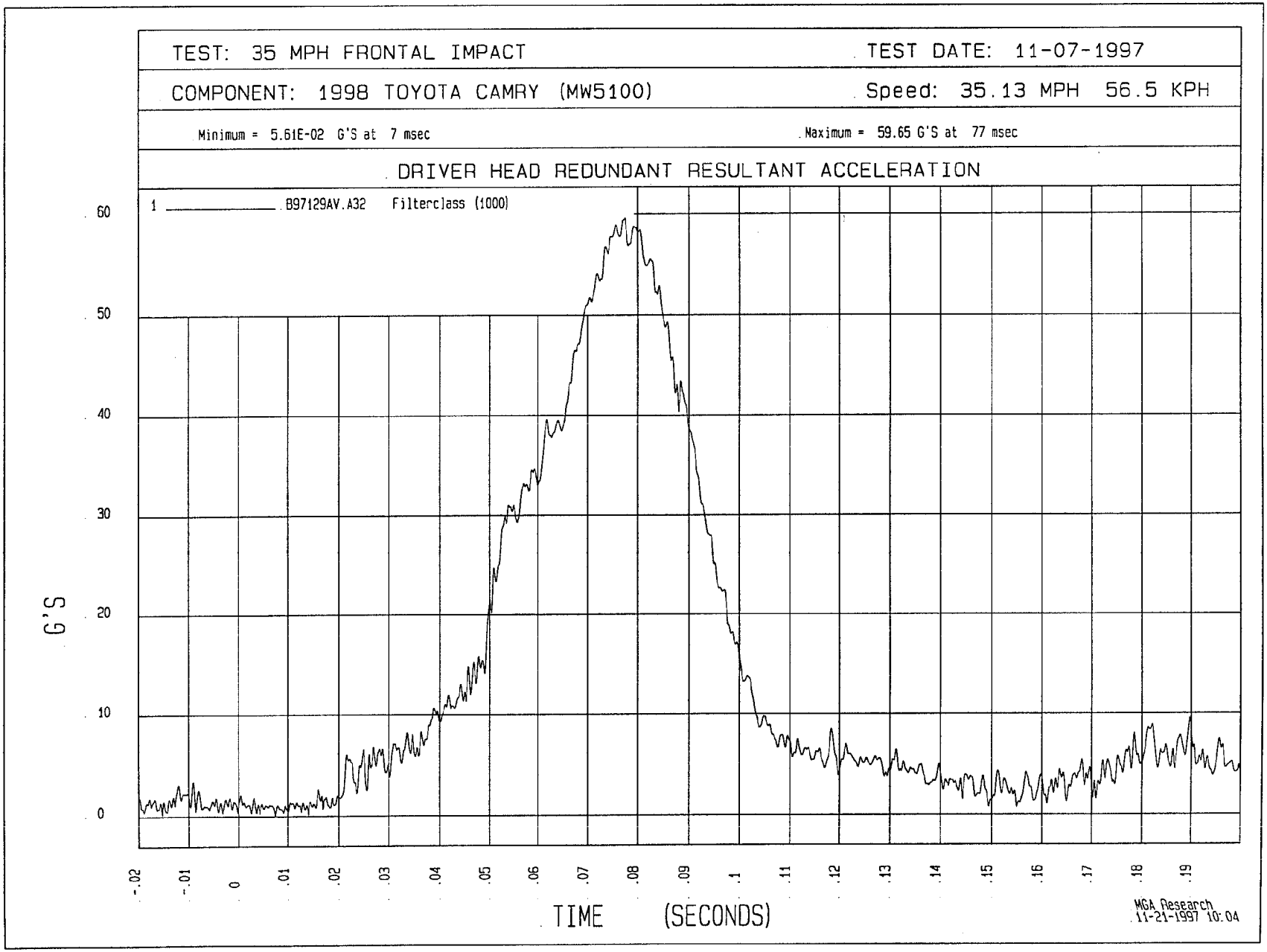

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 3.46E-02 G'S at 0 msec
Maximum = 62.04 G'S at 76 msec
DRIVER HEAD RESULTANT ACCELERATION
1 B97129AV.A12 Filterclass (1000)
G'S
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 09:59

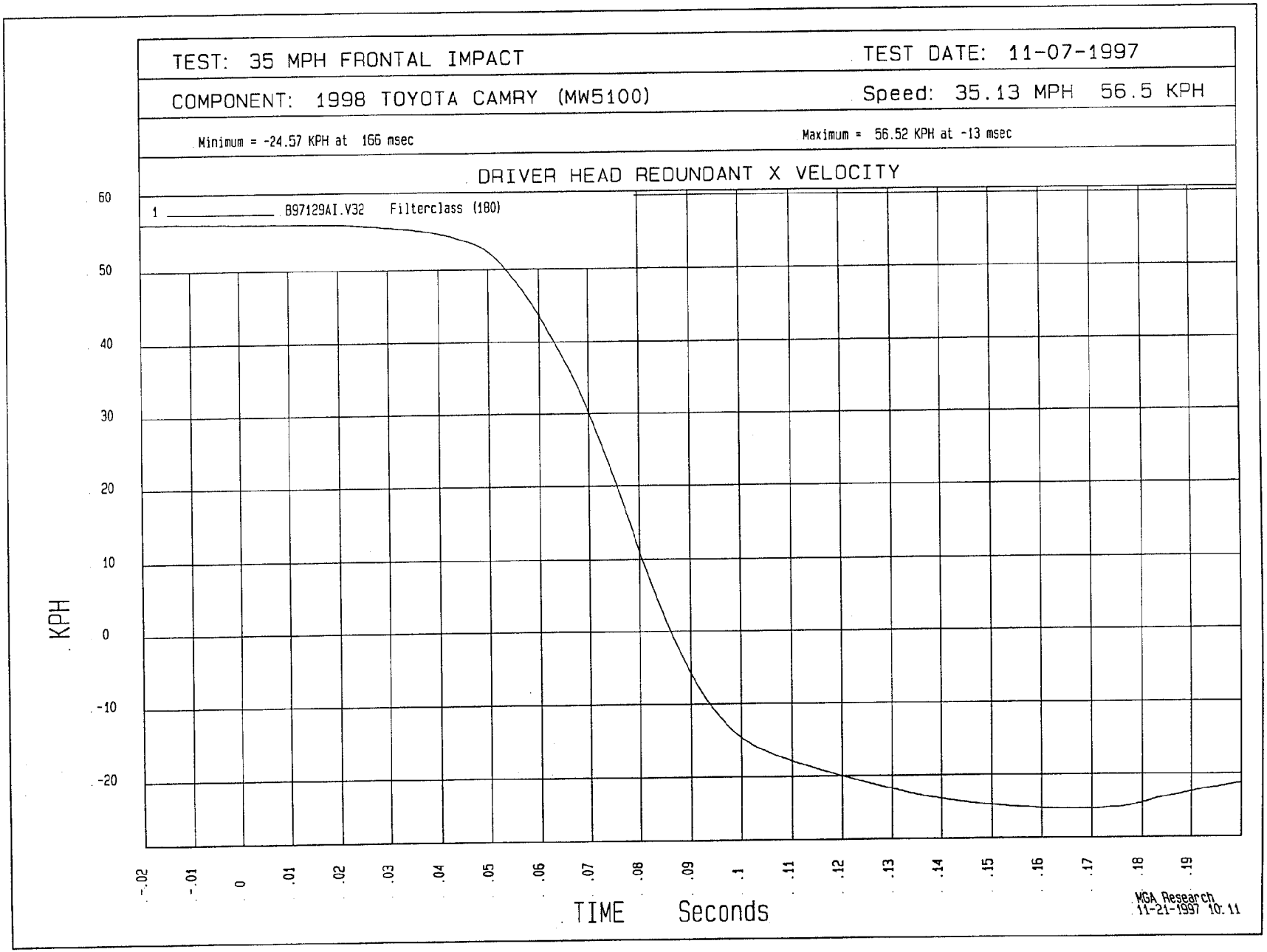

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -23.67 KPH at 162 msec
Maximum = 56.52 KPH at 19 msec
DRIVER HEAD X VELOCITY
1 B97129AI.V12 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:11

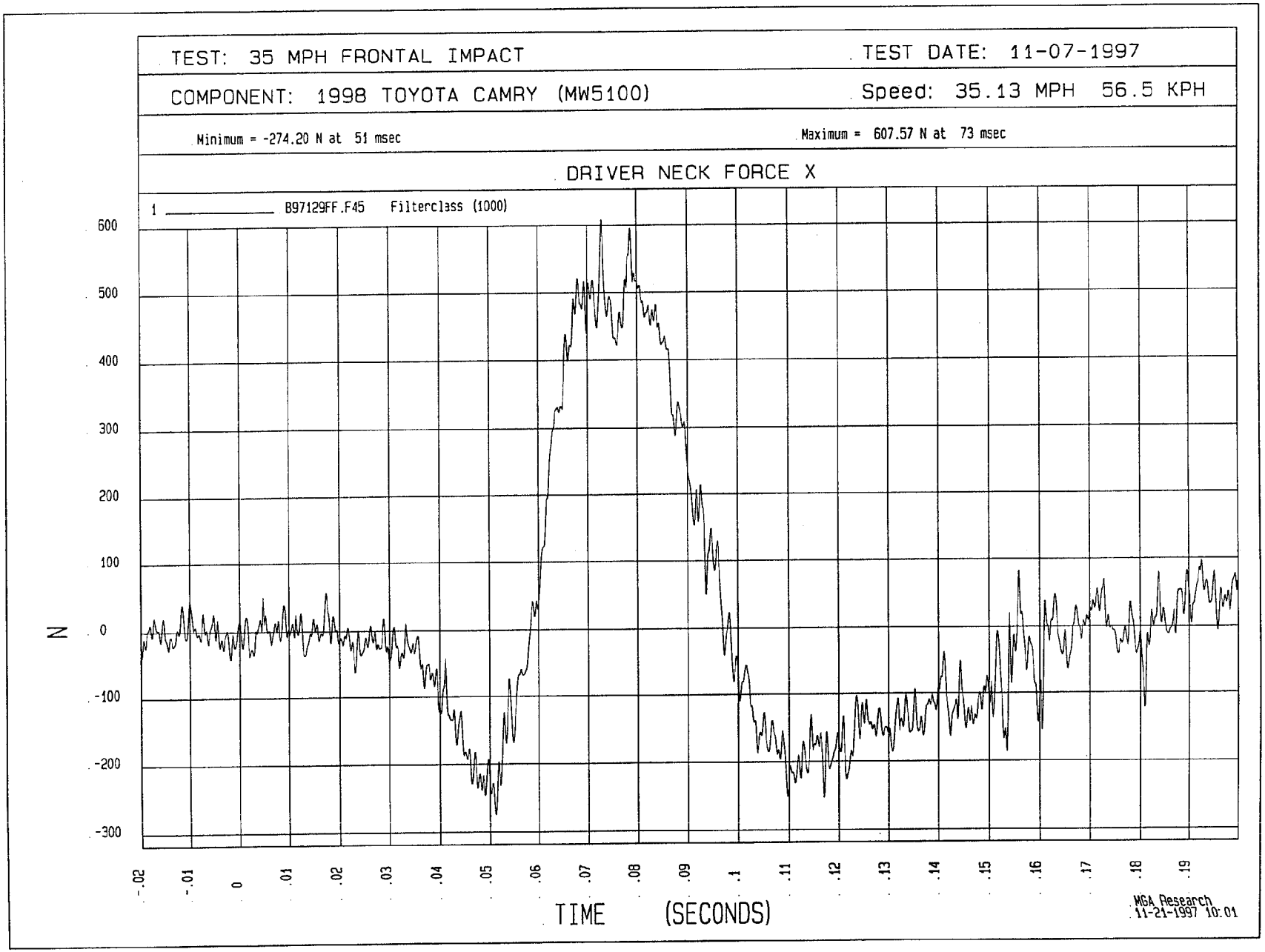

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -56.80 G'S at 77 msec
Maximum = 6.85 G'S at 182 msec
DRIVER HEAD REDUNDANT X ACCELERATION
1 B97129AF.A32 Filterclass (1000)
10
0
-10
-20
-30
-40
-50
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
MGA Research
11-21-1997 10:03

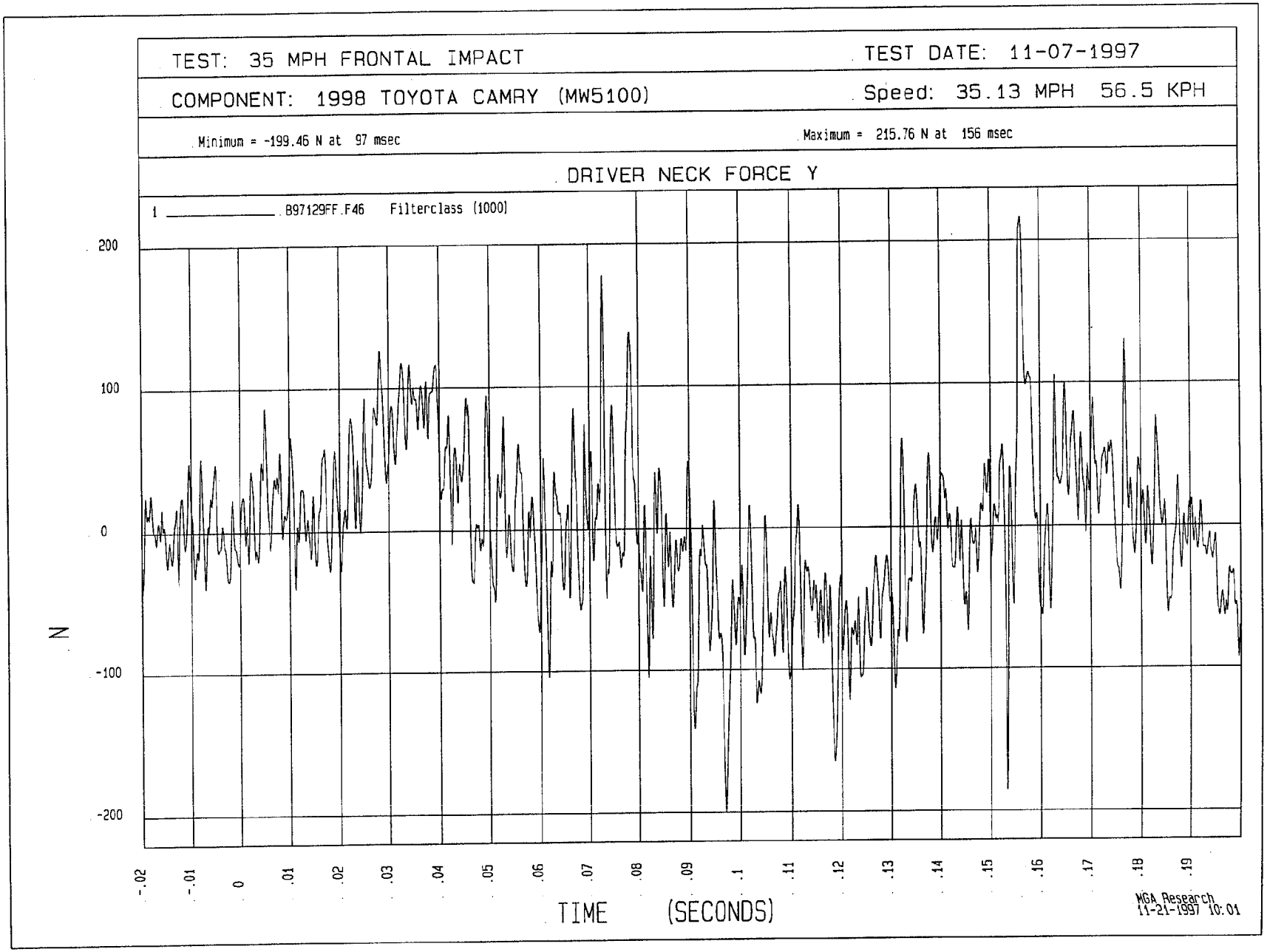

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -3.05 G'S at 104 msec
Maximum = 5.46 G'S at 75 msec
DRIVER HEAD REDUNDANT Y ACCELERATION
1 B97129AF.A33 Filterclass (1000)
G'S
5
4
3
2
1
0
-1
-2
-3
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

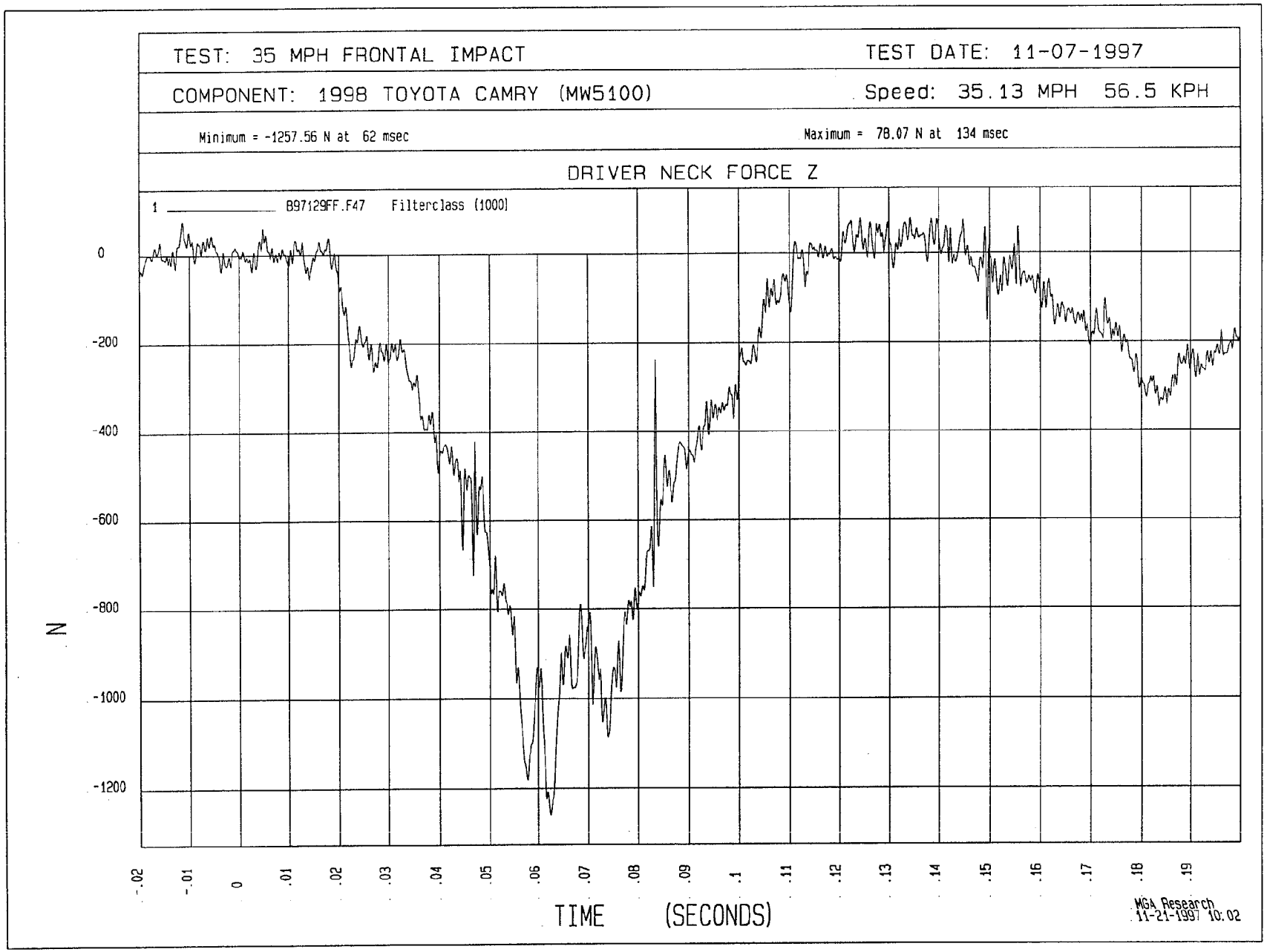

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -21.76 G'S at 62 msec
Maximum = 3.40 G'S at -9 msec
DRIVER HEAD REDUNDANT Z ACCELERATION
1 B97129AF.A34 Filterclass (1000)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

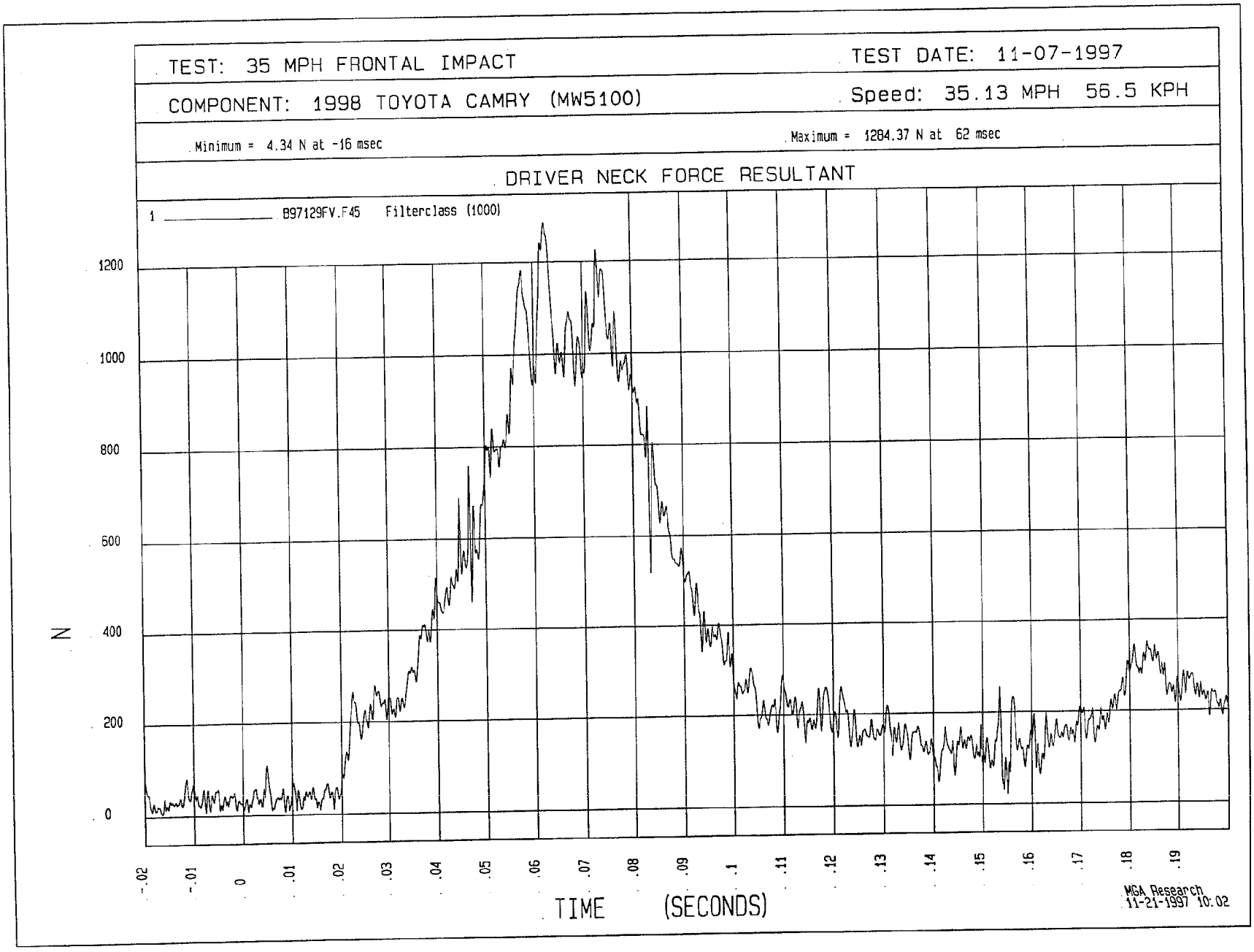

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 5.61E-02 G'S at 7 msec
Maximum = 59.65 G'S at 77 msec
DRIVER HEAD REDUNDANT RESULTANT ACCELERATION
1 B97129AV.A32 Filterclass (1000)
G'S
60
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

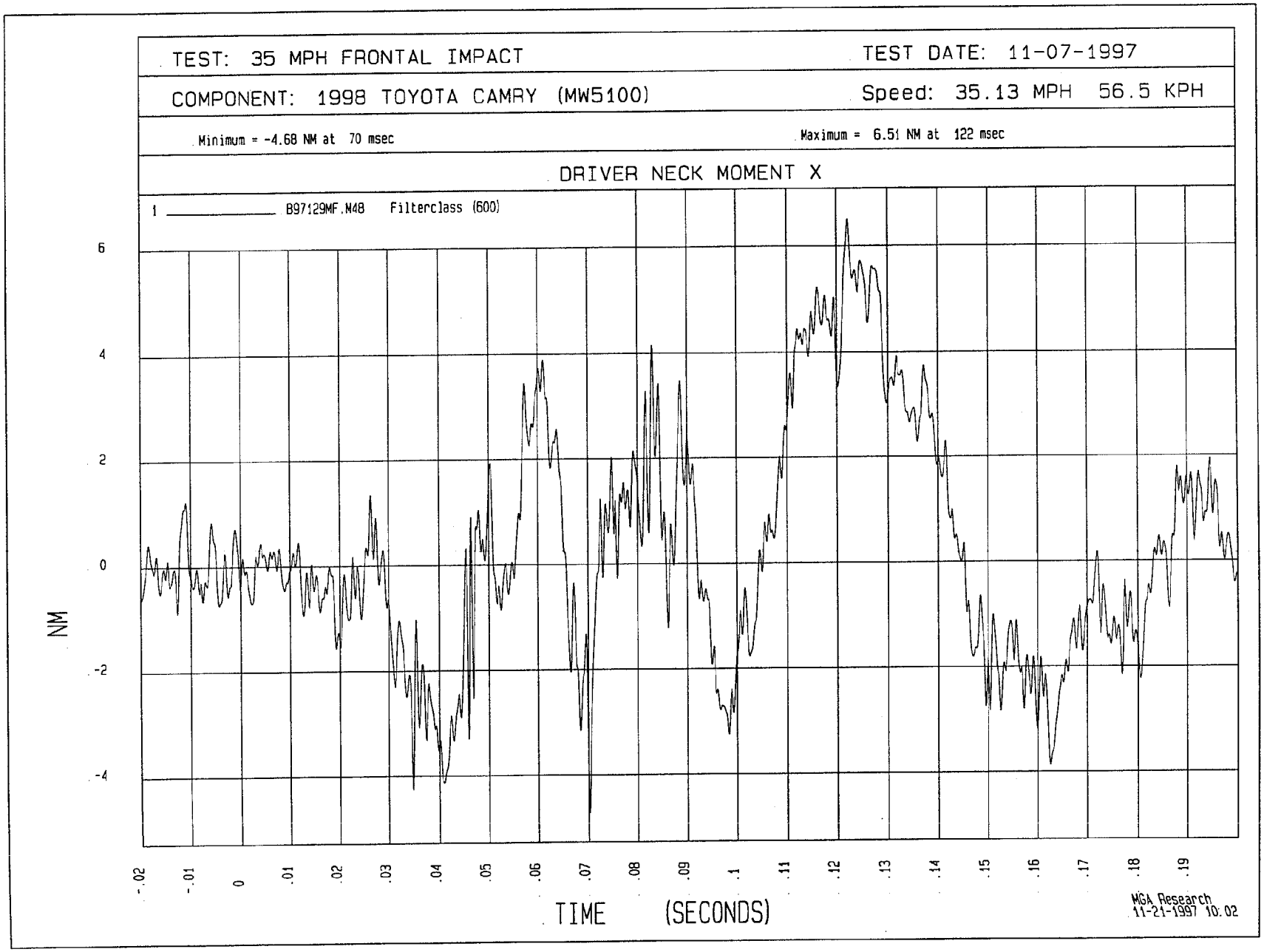

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -24.57 KPH at 165 msec
Maximum = 56.52 KPH at -13 msec
DRIVER HEAD REDUNDANT X VELOCITY
1 B97129AI.V32 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:11

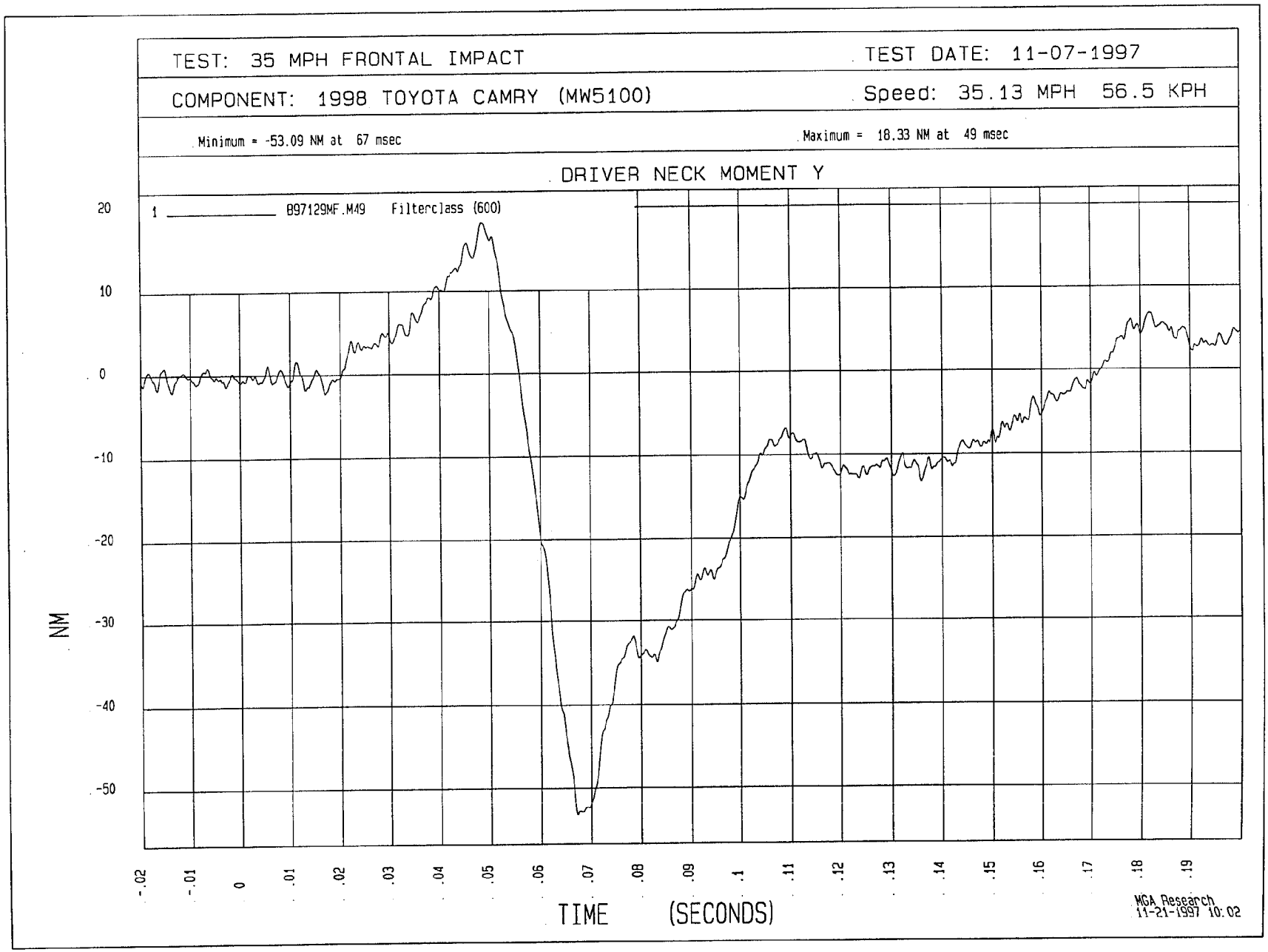

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -274.20 N at 51 msec
Maximum = 607.57 N at 73 msec
DRIVER NECK FORCE X
1 B97129FF.F45 Filterclass (1000)
600
500
400
300
200
100
0
-100
-200
-300
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:01

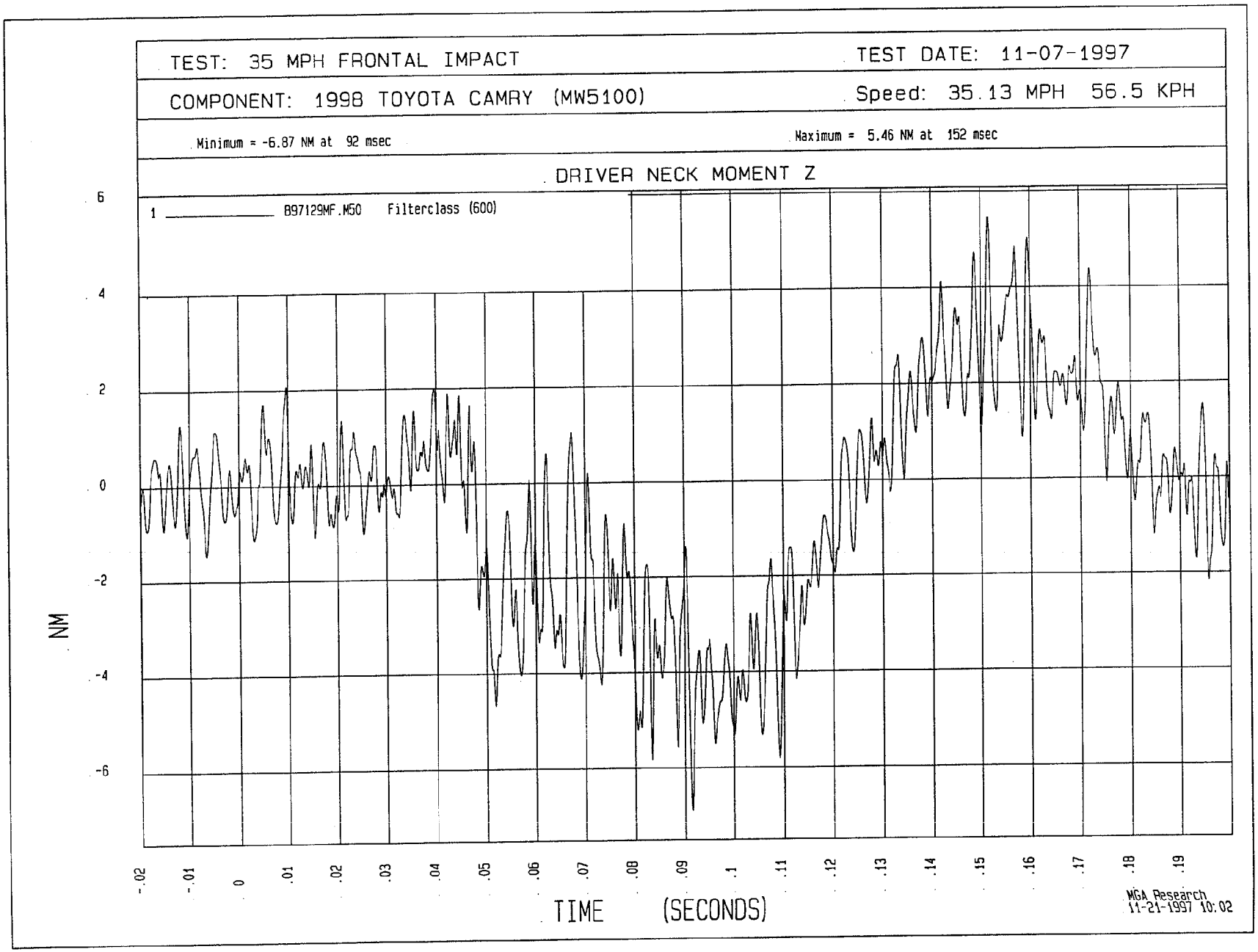

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -199.46 N at 97 msec
Maximum = 215.76 N at 156 msec
DRIVER NECK FORCE Y
1 B97129FF.F46 Filterclass (1000)
200
100
0
-100
-200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:01

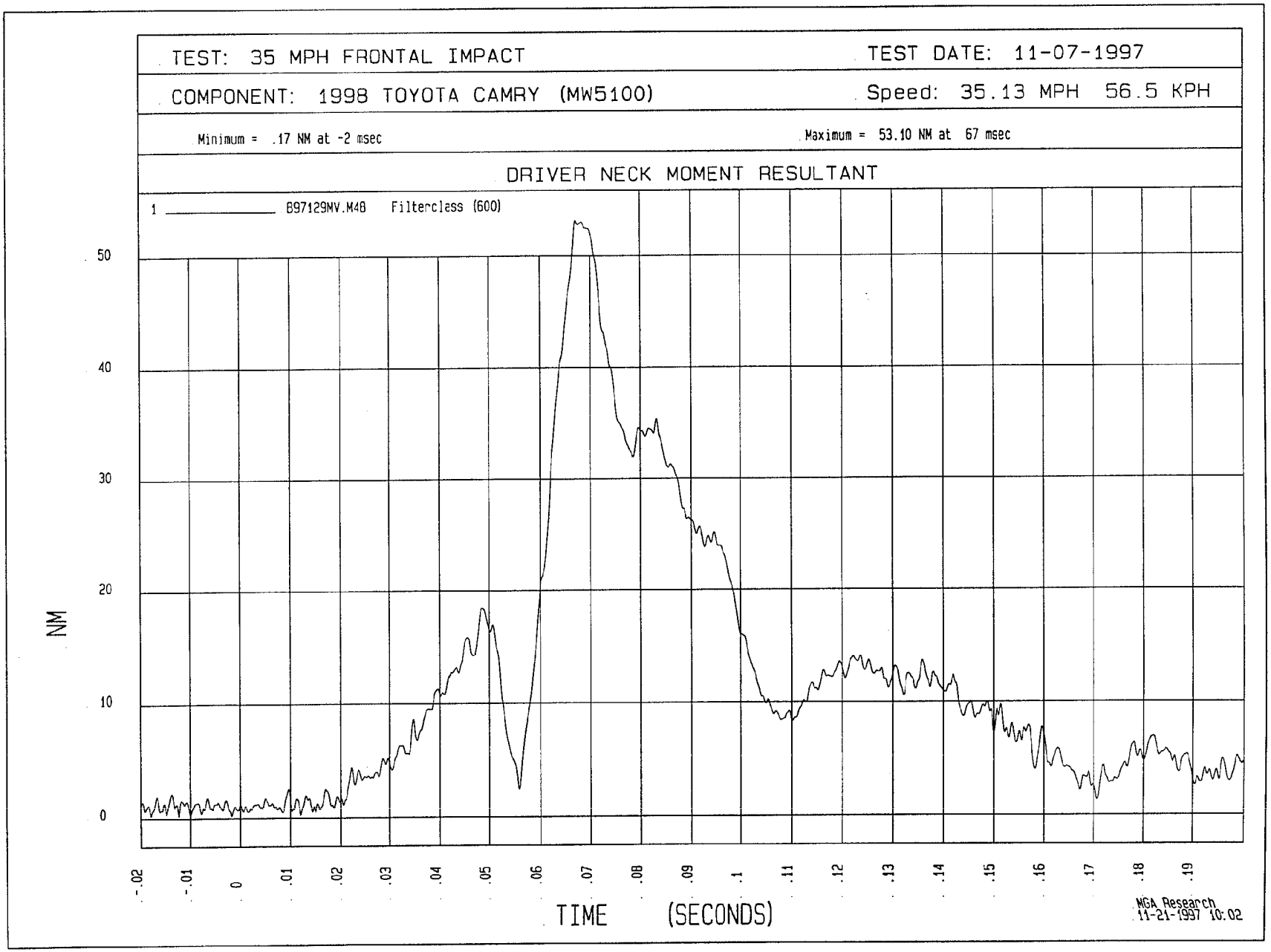

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1257.56 N at 62 msec
Maximum = 78.07 N at 134 msec
DRIVER NECK FORCE Z
1 B97129FF.F47 Filterclass (1000)
0
-200
-400
-600
-800
-1000
-1200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:02


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 4.34 N at -16 msec
Maximum = 1284.37 N at 62 msec
DRIVER NECK FORCE RESULTANT
1 B97129FV.F45 Filterclass (1000)
N
1200
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:02


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -4.68 NM at 70 msec
Maximum = 6.51 NM at 122 msec
DRIVER NECK MOMENT X
1 B97129MF.M48 Filterclass (600)
NM
6
4
2
0
-2
-4
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:02


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -53.09 NM at 67 msec
Maximum = 18.33 NM at 49 msec
DRIVER NECK MOMENT Y
1 B97129MF.M49 Filterclass (600)
20
10
0
-10
-20
-30
-40
-50
NM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:02


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -6.87 NM at 92 msec
Maximum = 5.46 NM at 152 msec
DRIVER NECK MOMENT Z
1 B97129MF.M50 Filterclass (600)
NM
6
4
2
0
-2
-4
-6
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:02


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = .17 NM at -2 msec
Maximum = 53.10 NM at 67 msec
DRIVER NECK MOMENT RESULTANT
1 B97129NV.M48 Filterclass (600)
NM
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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.16
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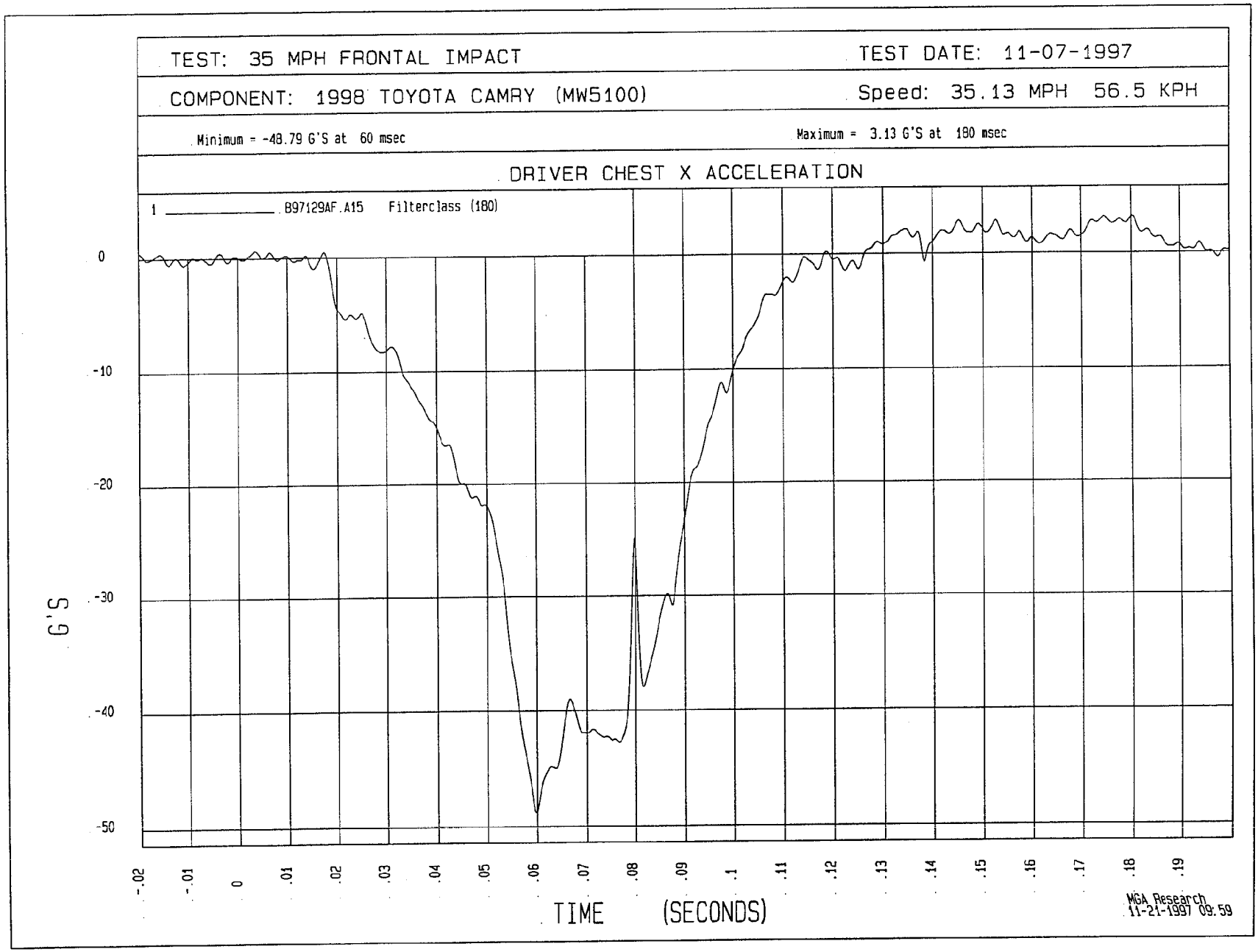
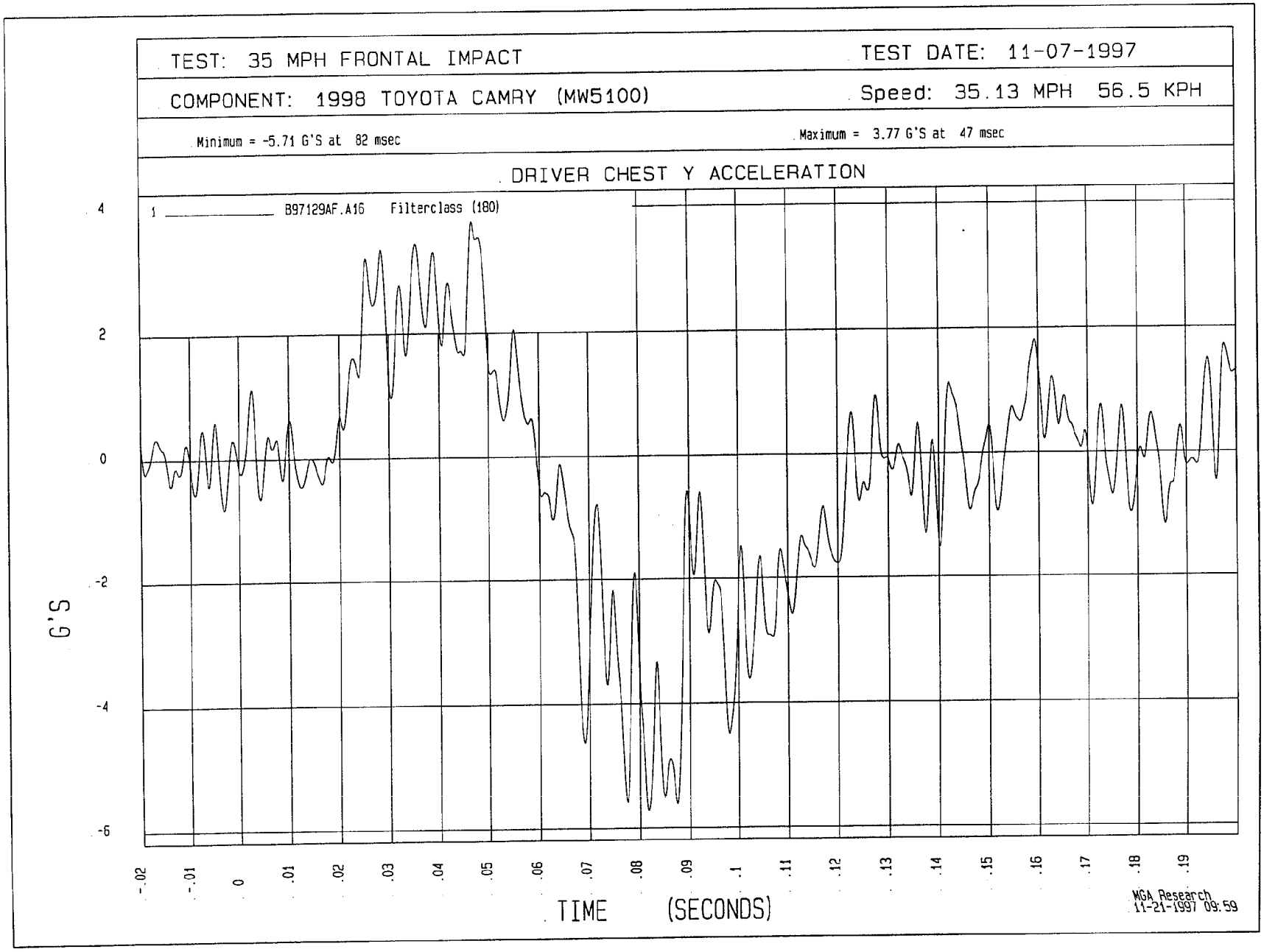
TIME (SECONDS)
MGA Research
11-21-1997 10:02


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -48.79 G'S at 60 msec
Maximum = 3.13 G'S at 180 msec
DRIVER CHEST X ACCELERATION
1 B97129AF.A15 Filterclass (180)
0
-10
-20
-30
-40
-50
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 09:59


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -5.71 G'S at 82 msec
Maximum = 3.77 G'S at 47 msec
DRIVER CHEST Y ACCELERATION
1 B97129AF.A16 Filterclass (180)
4
2
0
-2
-4
-6
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
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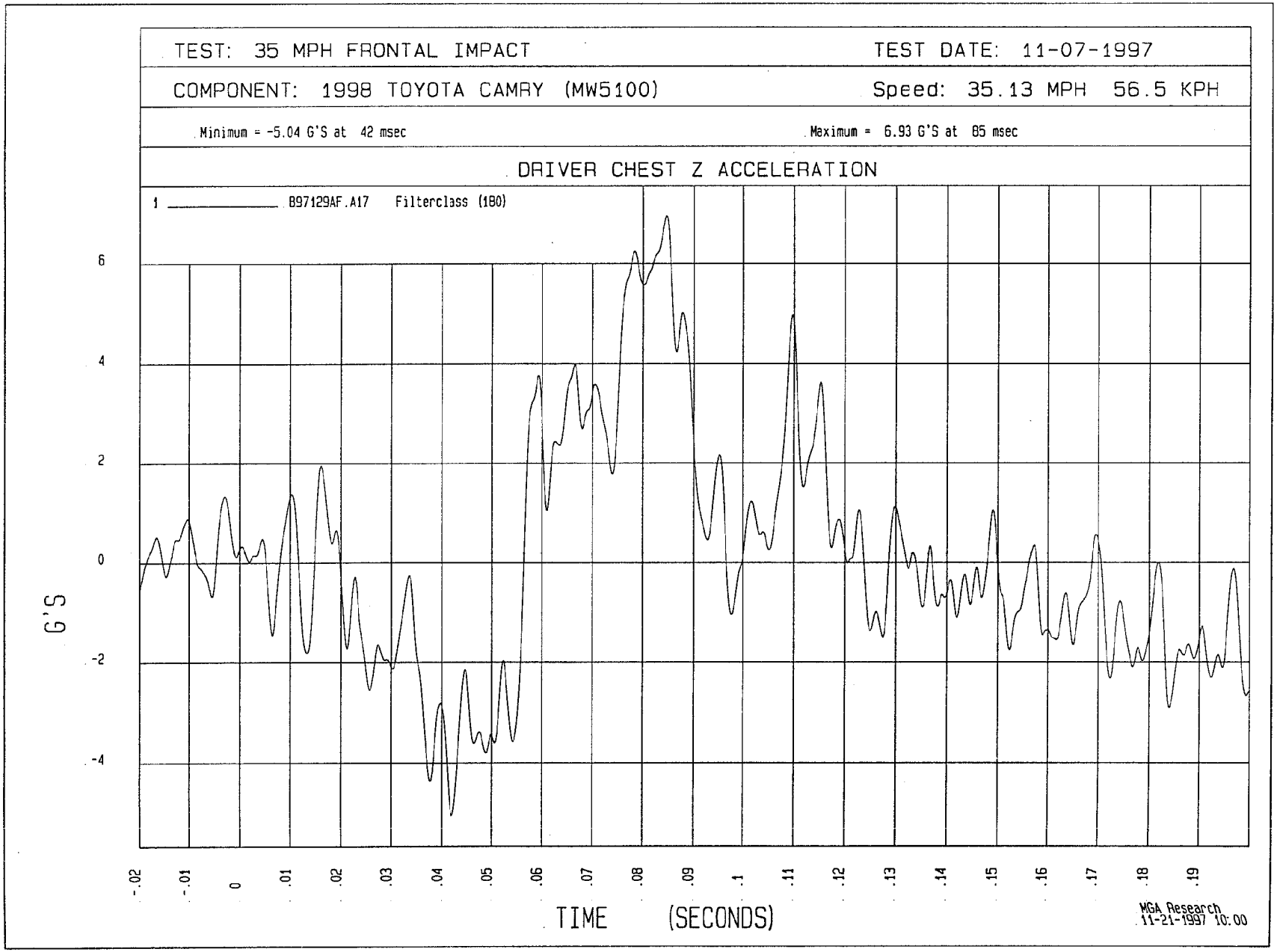
TIME (SECONDS)
MGA Research
11-21-1997 09:59


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -5.04 G'S at 42 msec
Maximum = 6.93 G'S at 85 msec
DRIVER CHEST Z ACCELERATION
1 B97129AF.A17 Filterclass (180)
6
4
2
0
-2
-4
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
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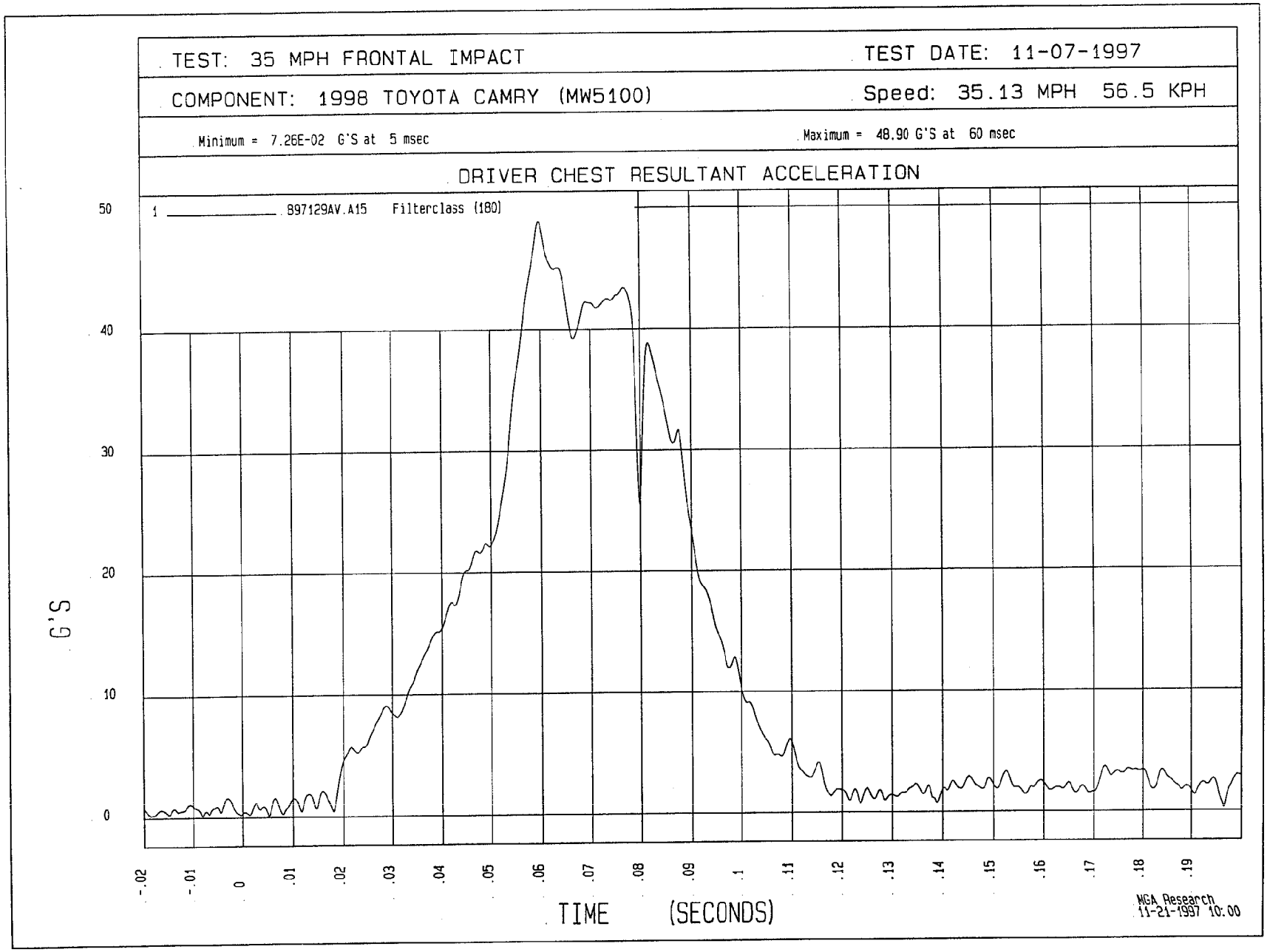
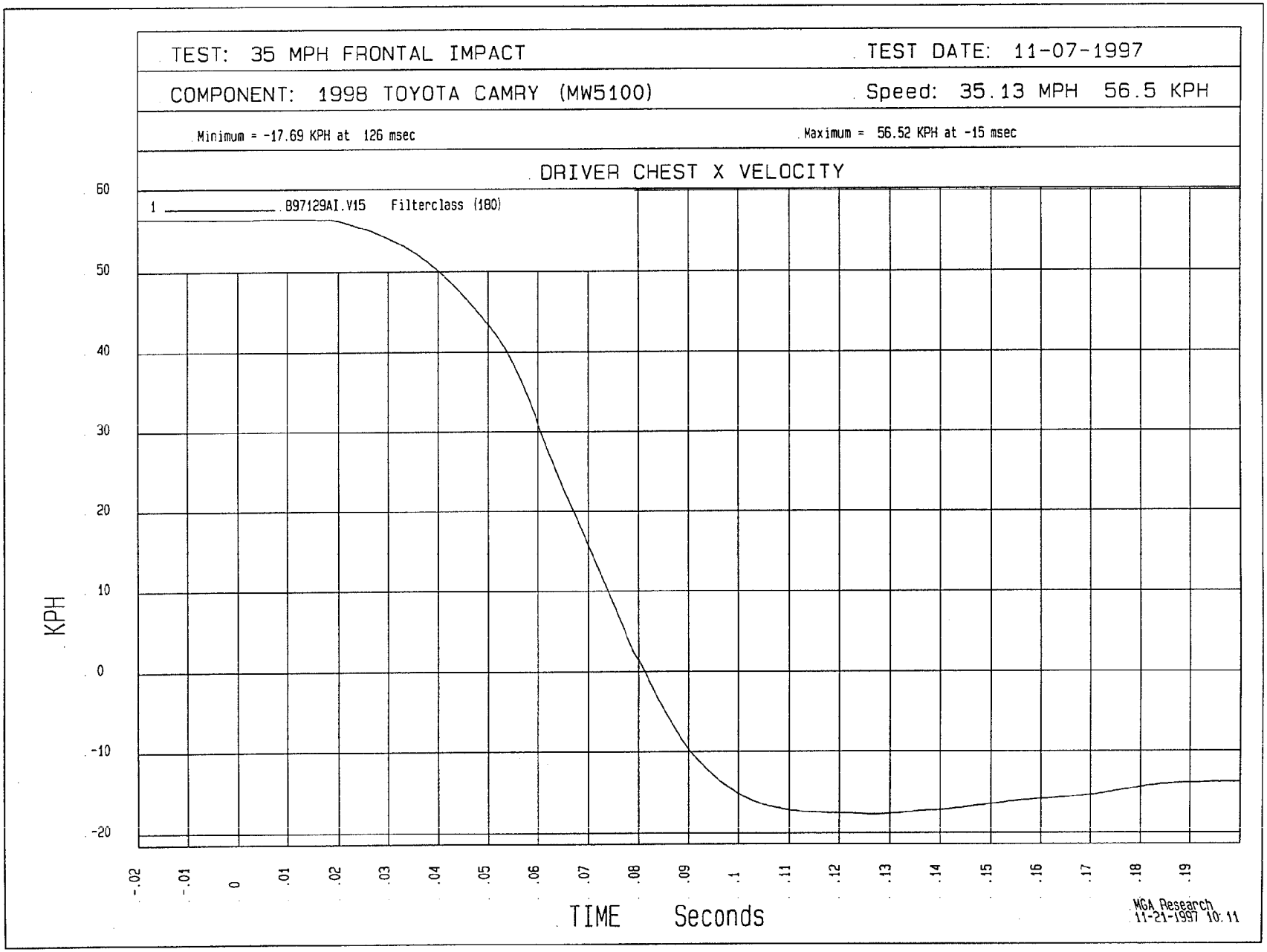
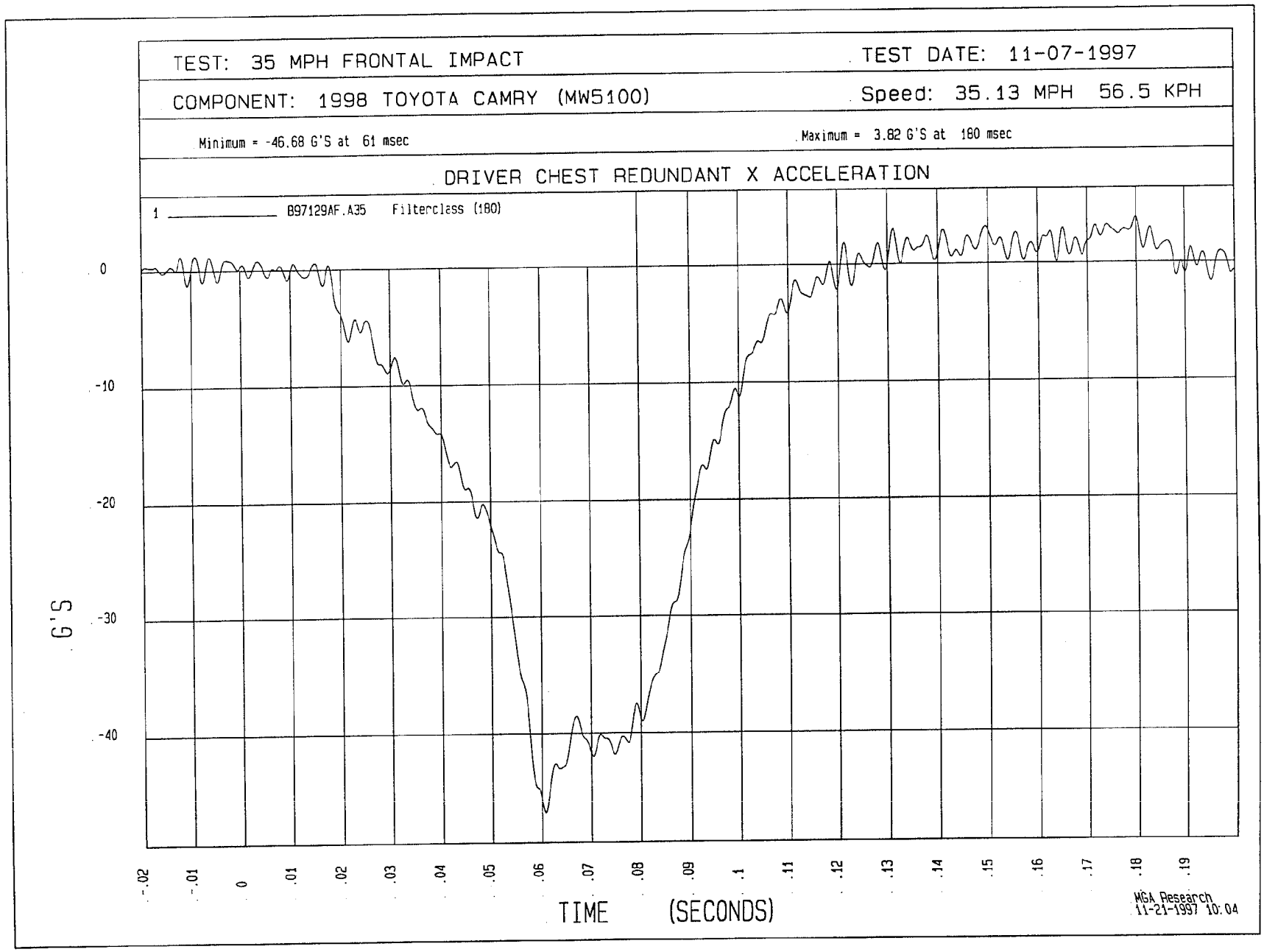
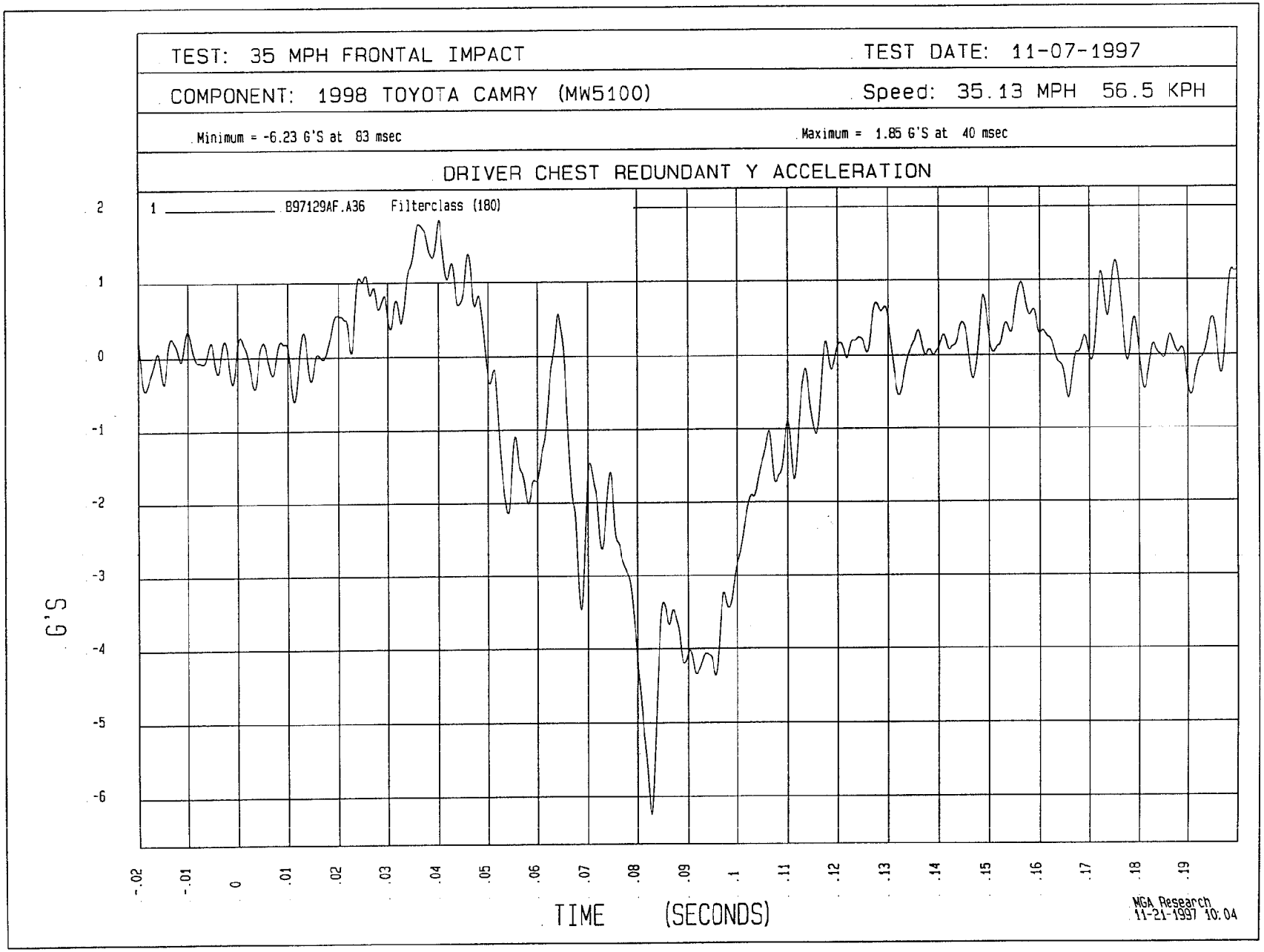
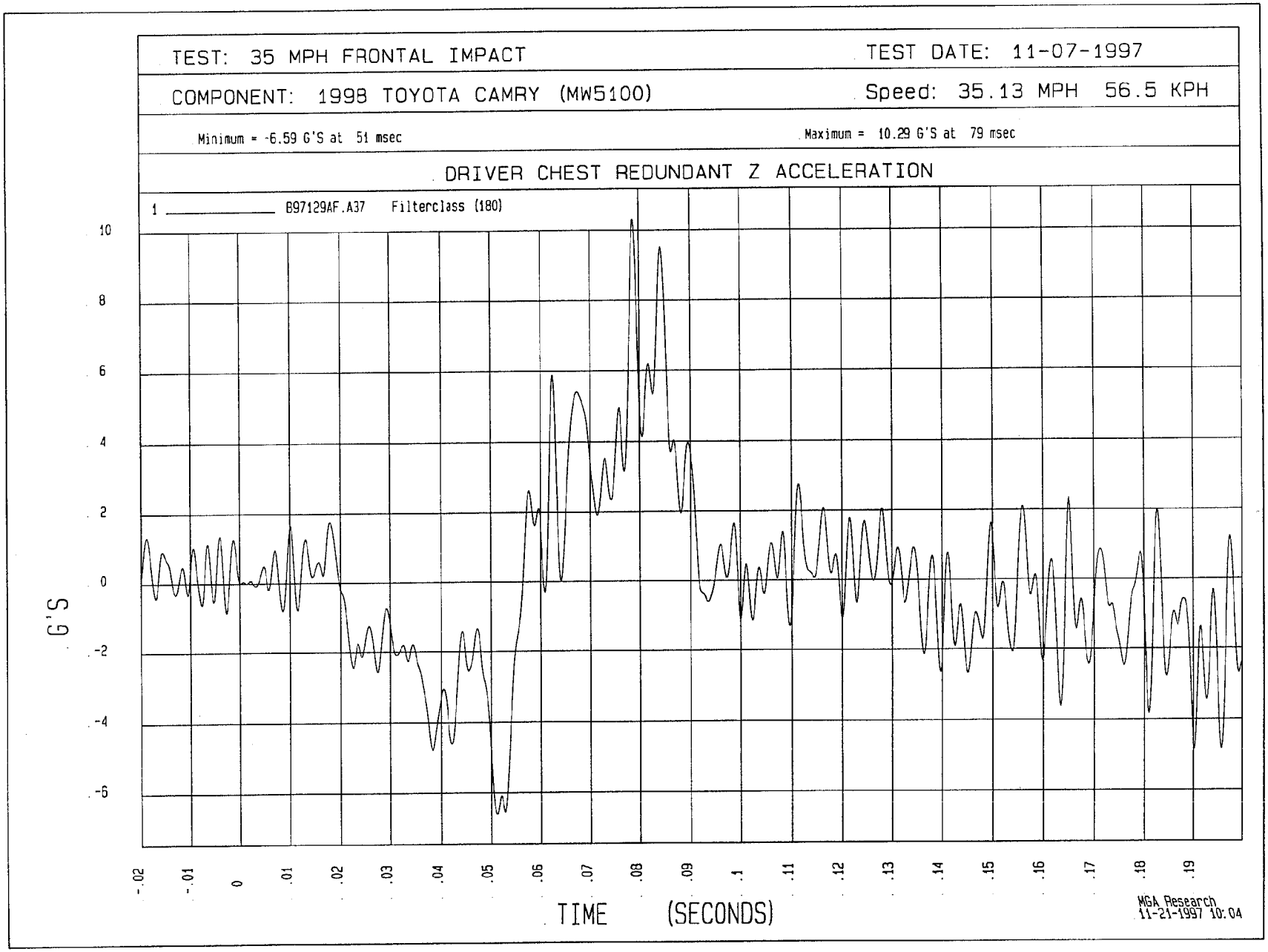
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:00

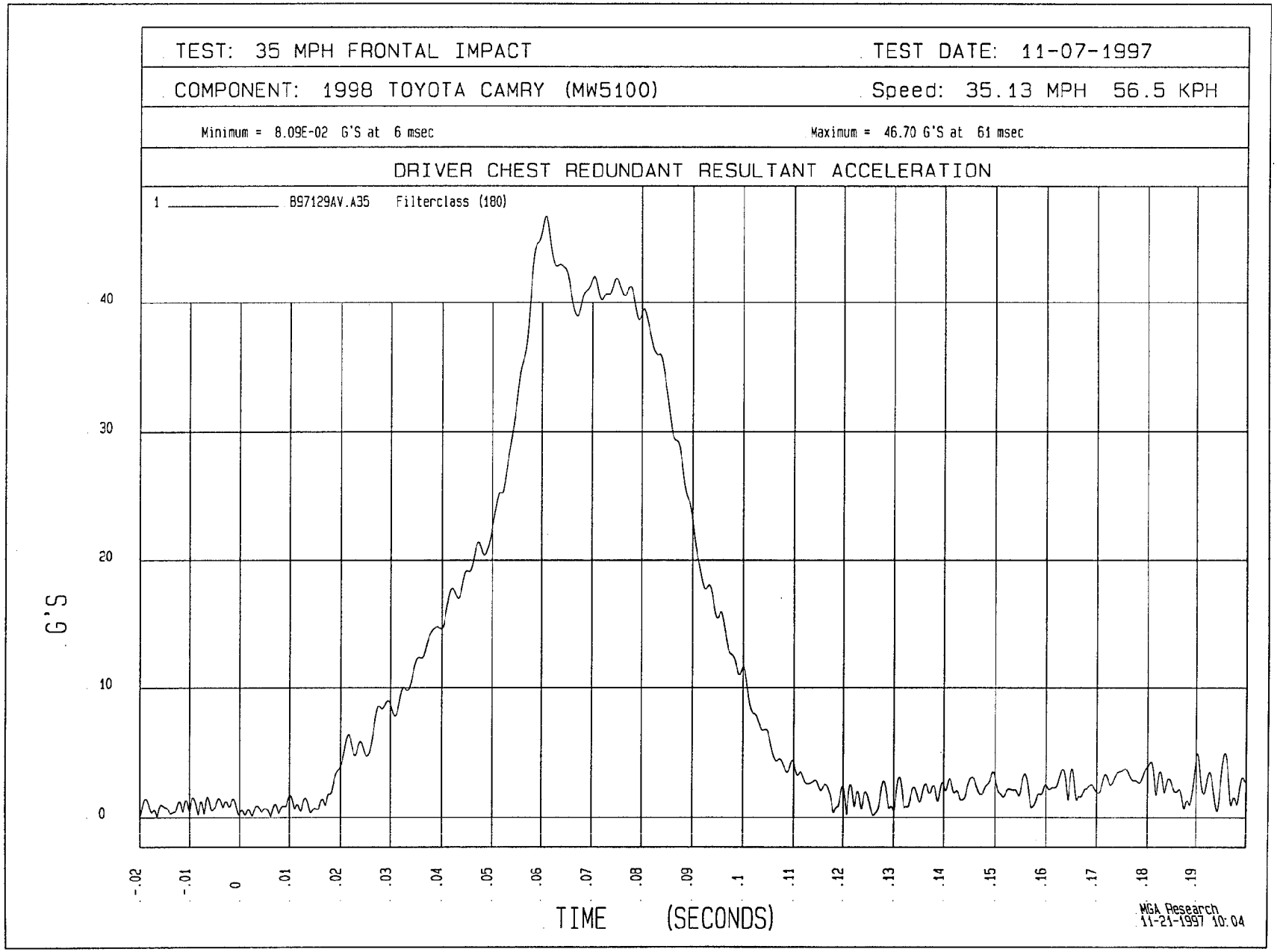

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 7.26E-02 G'S at 5 msec
Maximum = 48.90 G'S at 60 msec
DRIVER CHEST RESULTANT ACCELERATION
1 897129AV.A15 Filterclass (180)
G'S
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:00

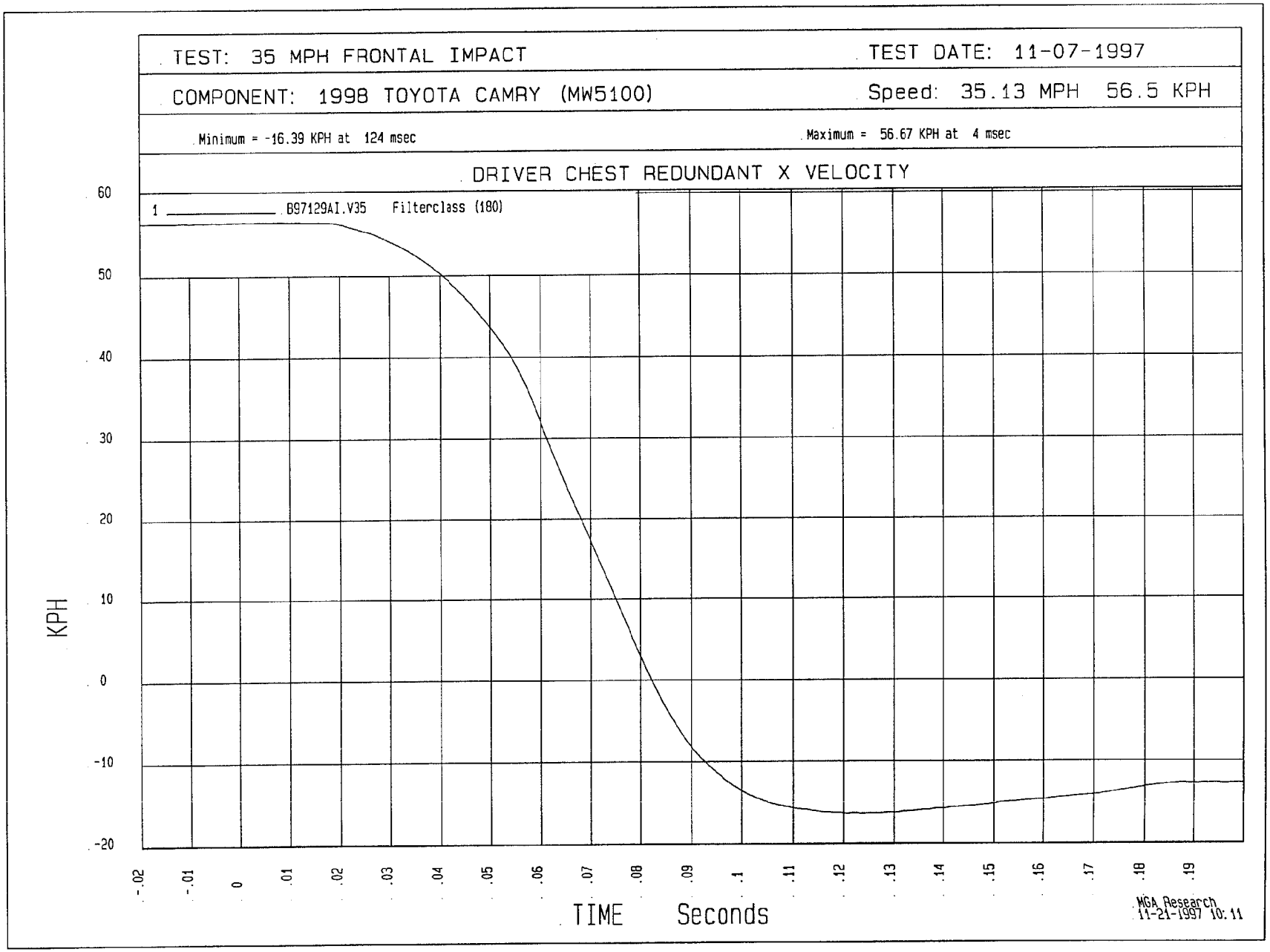

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -17.69 KPH at 126 msec
Maximum = 56.52 KPH at -15 msec
DRIVER CHEST X VELOCITY
1 B97129AI.V15 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:11

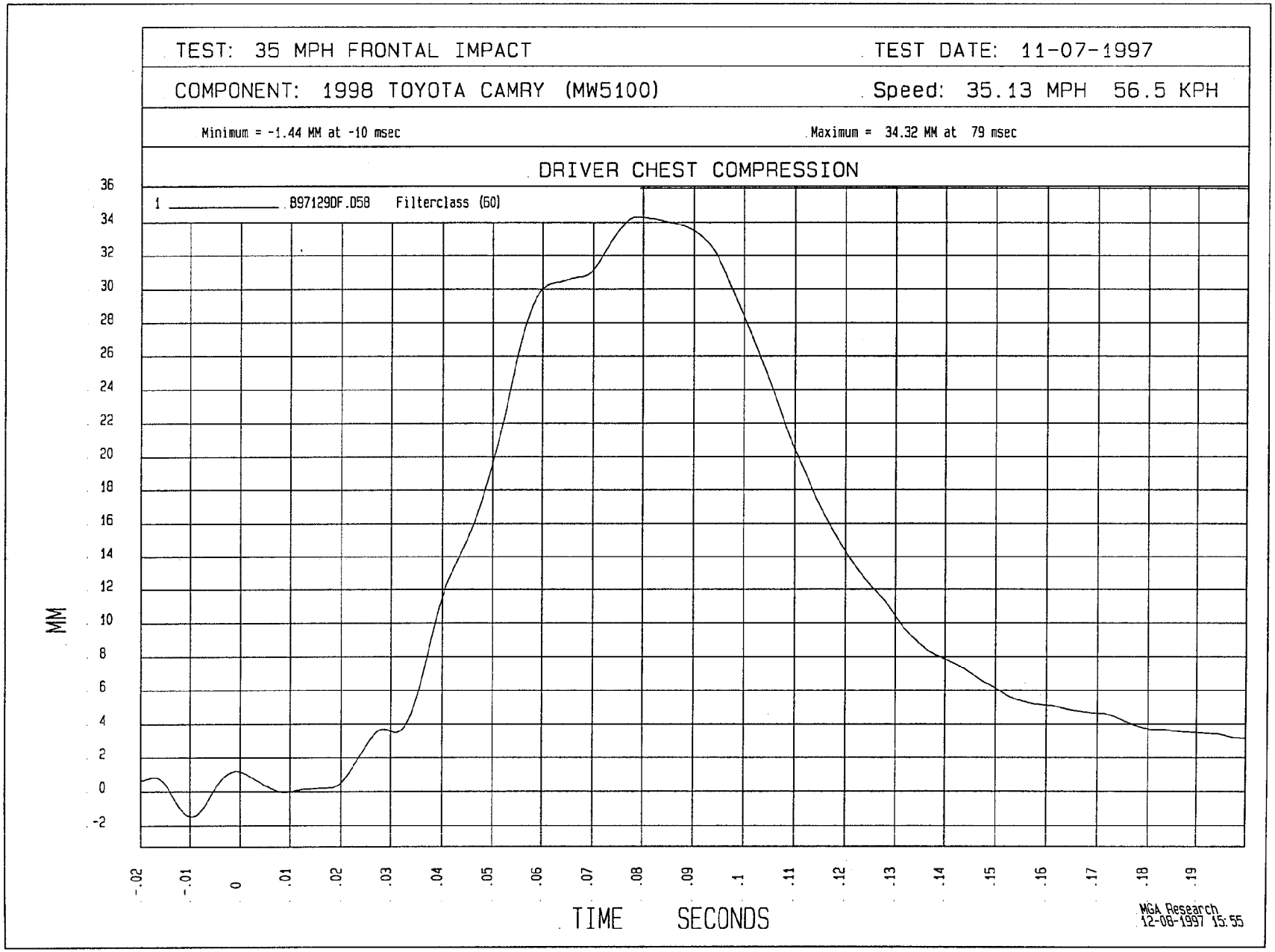

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -46.68 G'S at 61 msec
Maximum = 3.82 G'S at 180 msec
DRIVER CHEST REDUNDANT X ACCELERATION
1 B97129AF.A35 Filterclass (180)
0
-10
-20
-30
-40
G's
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

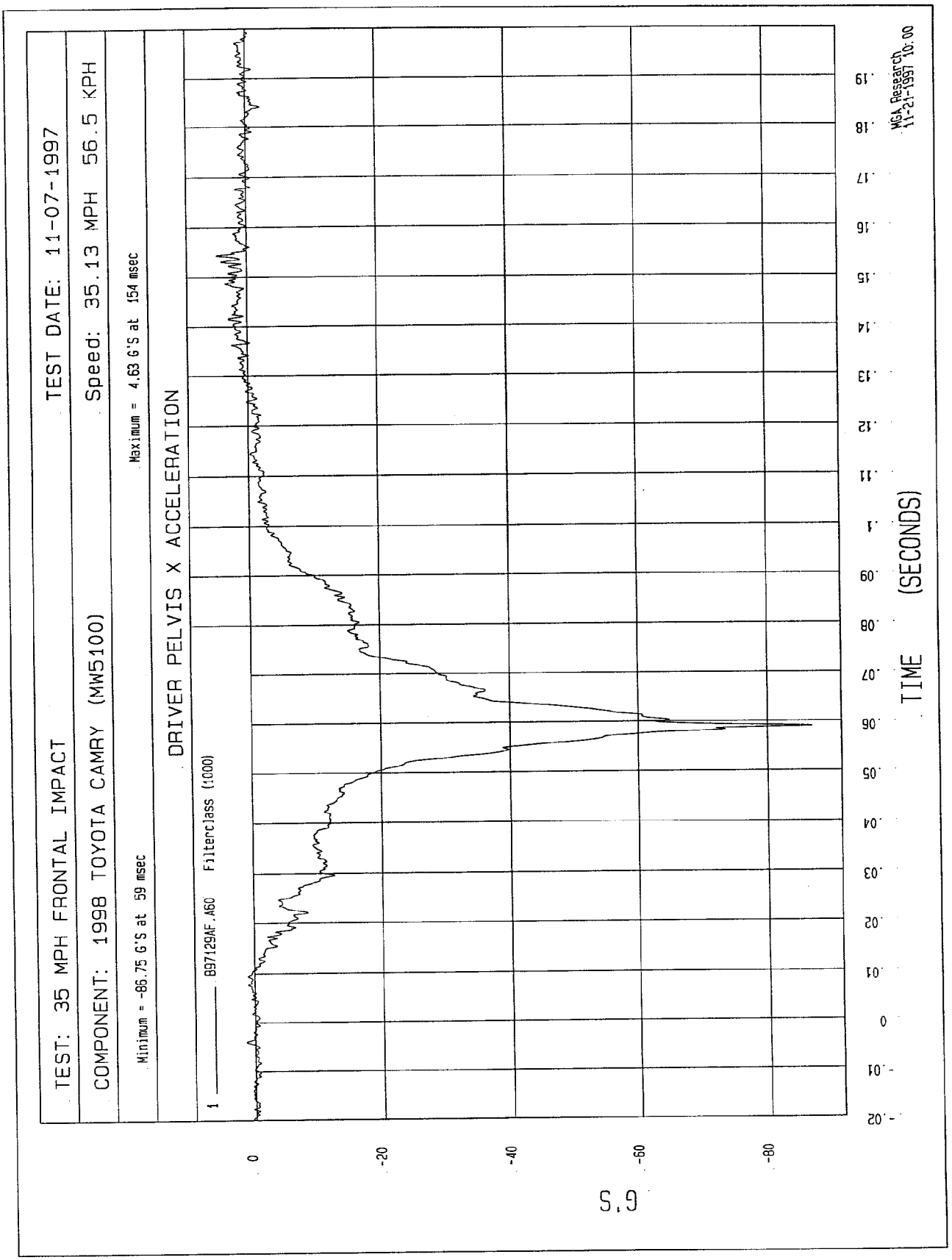

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -6.23 G'S at 83 msec
Maximum = 1.85 G'S at 40 msec
DRIVER CHEST REDUNDANT Y ACCELERATION
1 B97129AF.A36 Filterclass (180)
2
1
0
-1
-2
-3
-4
-5
-6
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

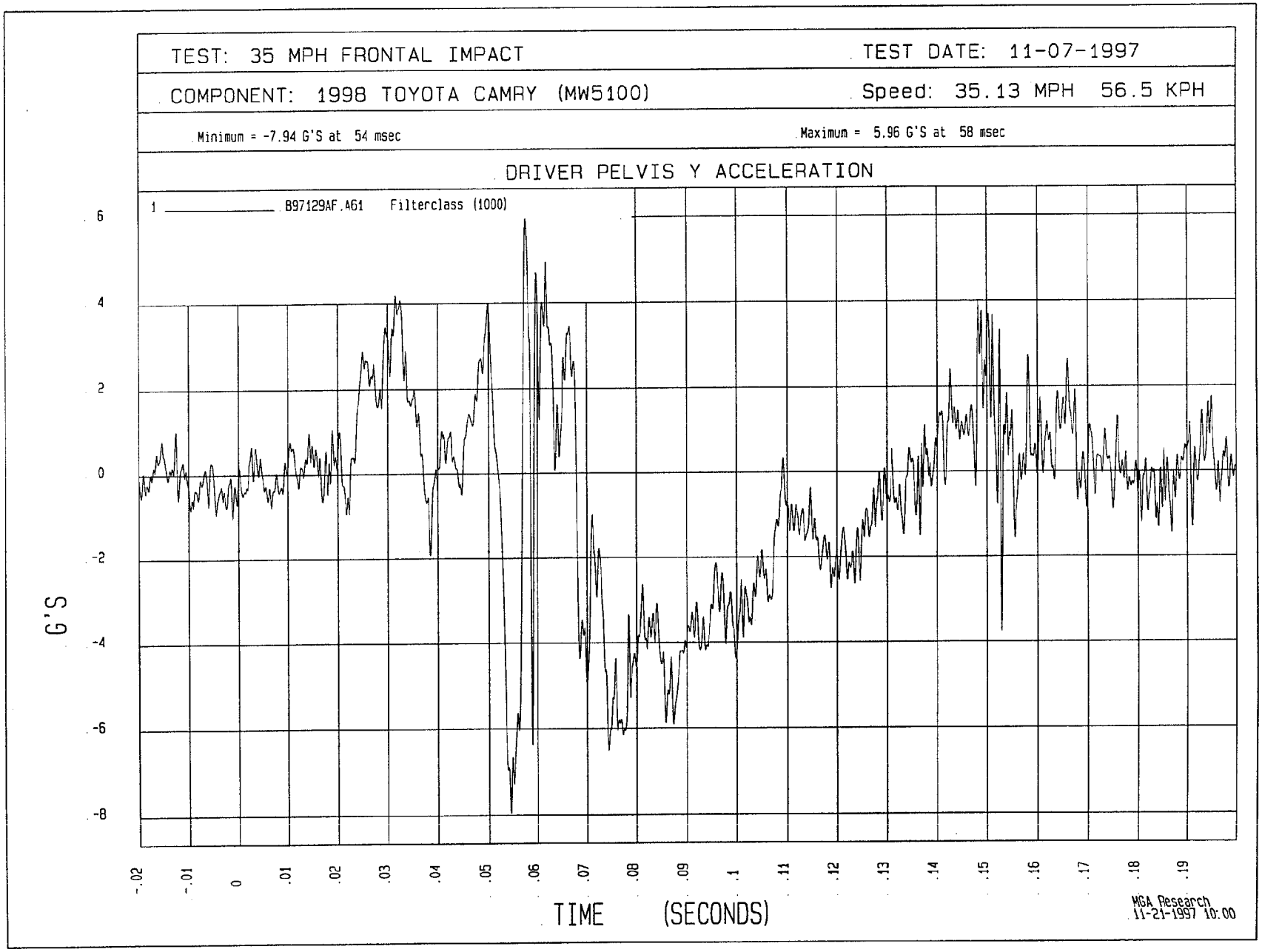

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -6.59 G'S at 51 msec
Maximum = 10.29 G'S at 79 msec
DRIVER CHEST REDUNDANT Z ACCELERATION
1 B97129AF.A37 Filterclass (180)
10
8
6
4
2
0
-2
-4
-6
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

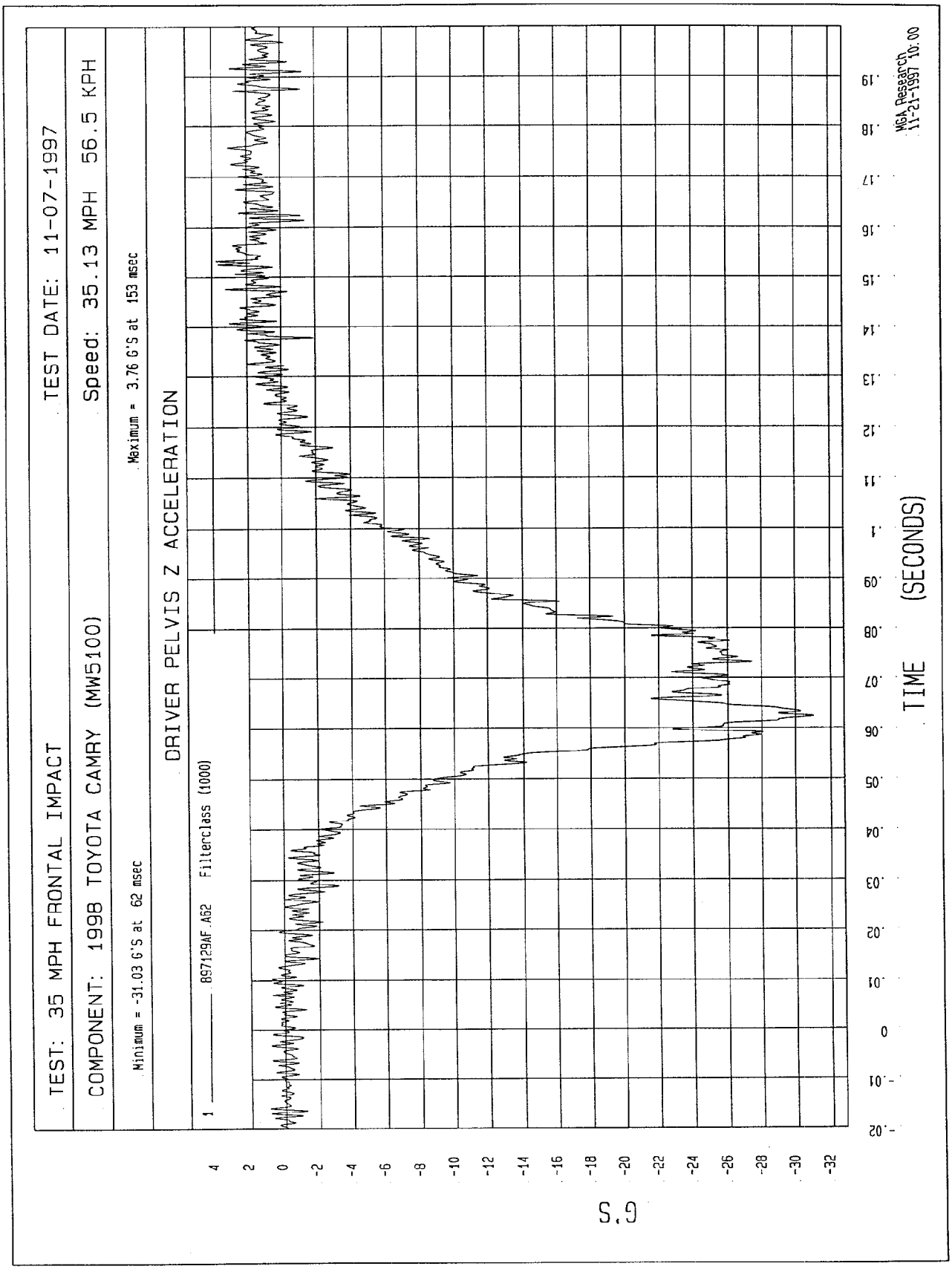

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 8.09E-02 G'S at 6 msec
Maximum = 46.70 G'S at 61 msec
DRIVER CHEST REDUNDANT RESULTANT ACCELERATION
1 B97129AV.A35 Filterclass (180)
G'S
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

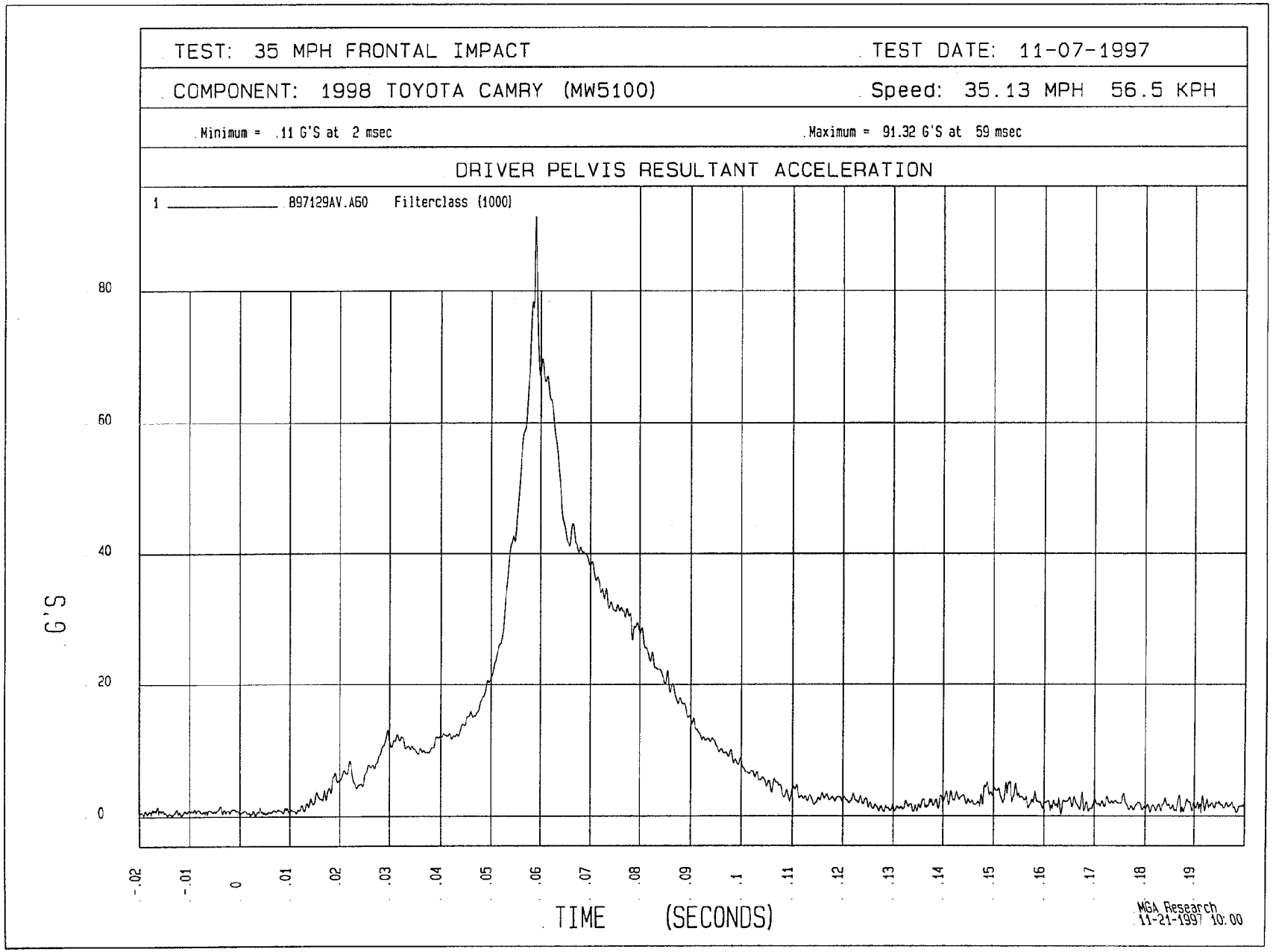

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -16.39 KPH at 124 msec
Maximum = 56.67 KPH at 4 msec
DRIVER CHEST REDUNDANT X VELOCITY
1 B97129AI.V35 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:11

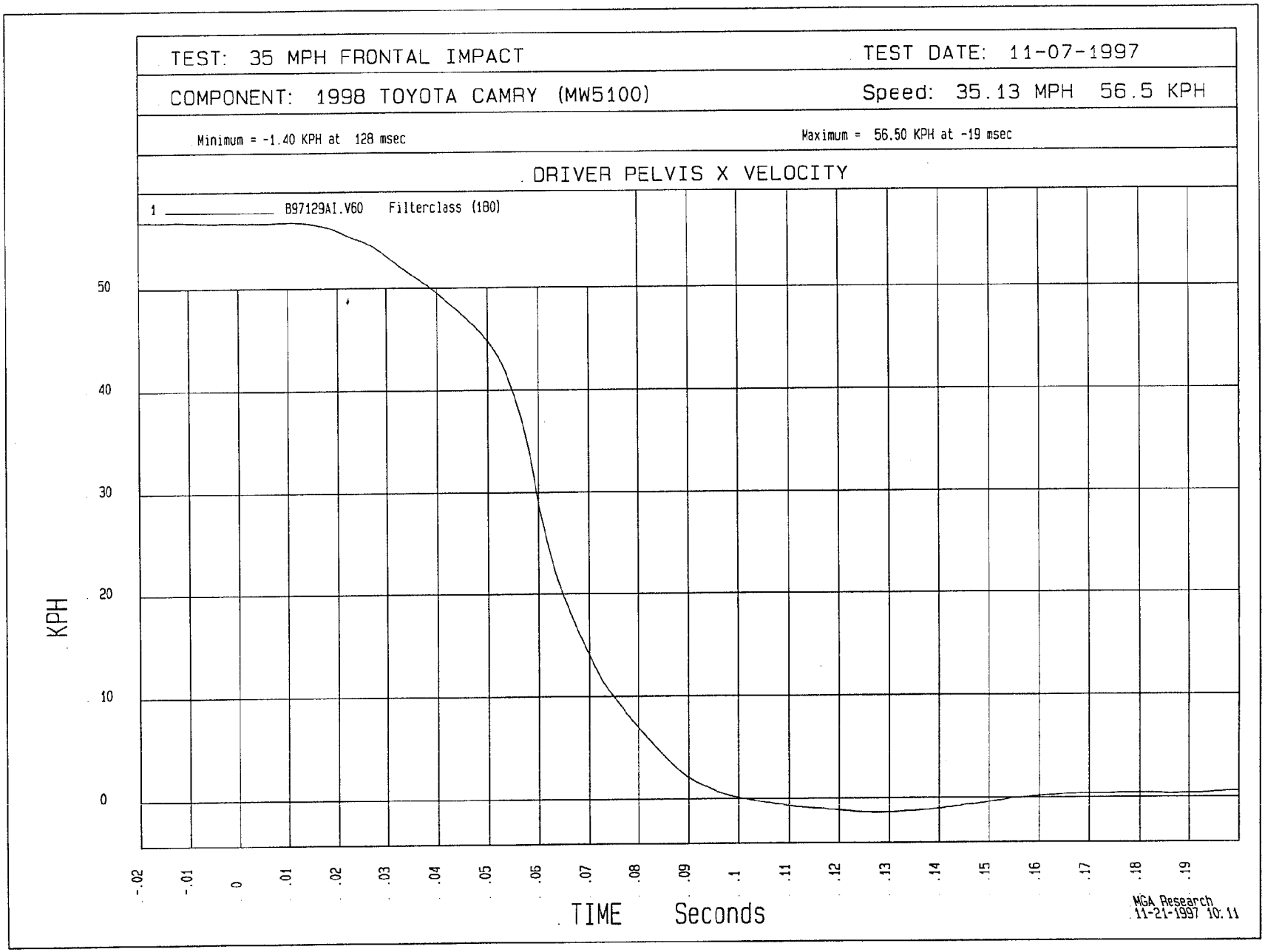

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1.44 MM at -10 msec
Maximum = 34.32 MM at 79 msec
DRIVER CHEST COMPRESSION
1 B97129DF.058 Filterclass (60)
MM
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME SECONDS
MGA Research
12-08-1997 15:55

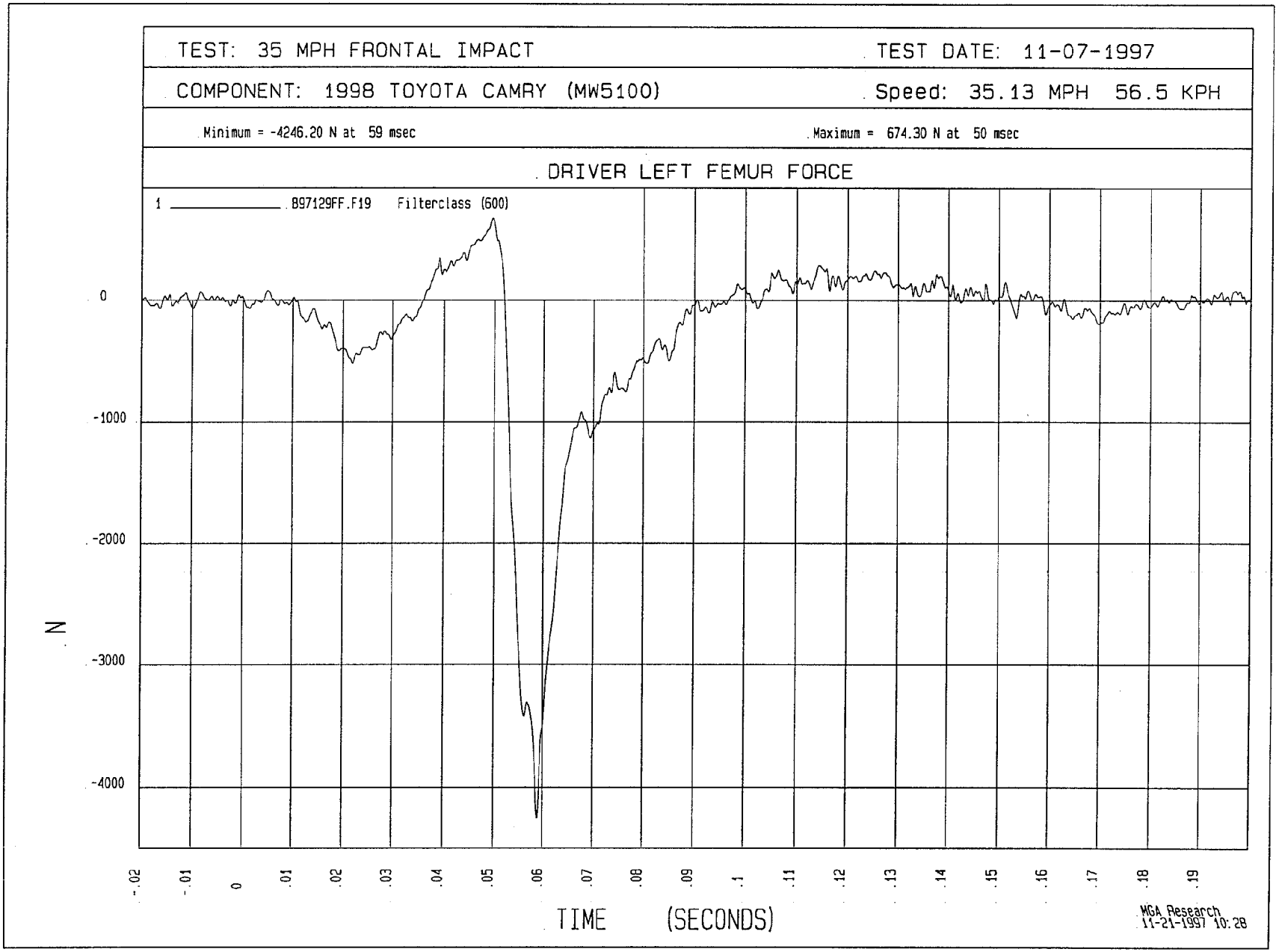

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -86.75 G'S at 59 msec
Maximum = 4.63 G'S at 154 msec
DRIVER PELVIS X ACCELERATION
1 B97129AF.A60 Filterclass (1000)
0
-20
-40
-60
-80
G'S
TIME (SECONDS)
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
MGA Research
11-21-1997 10:00

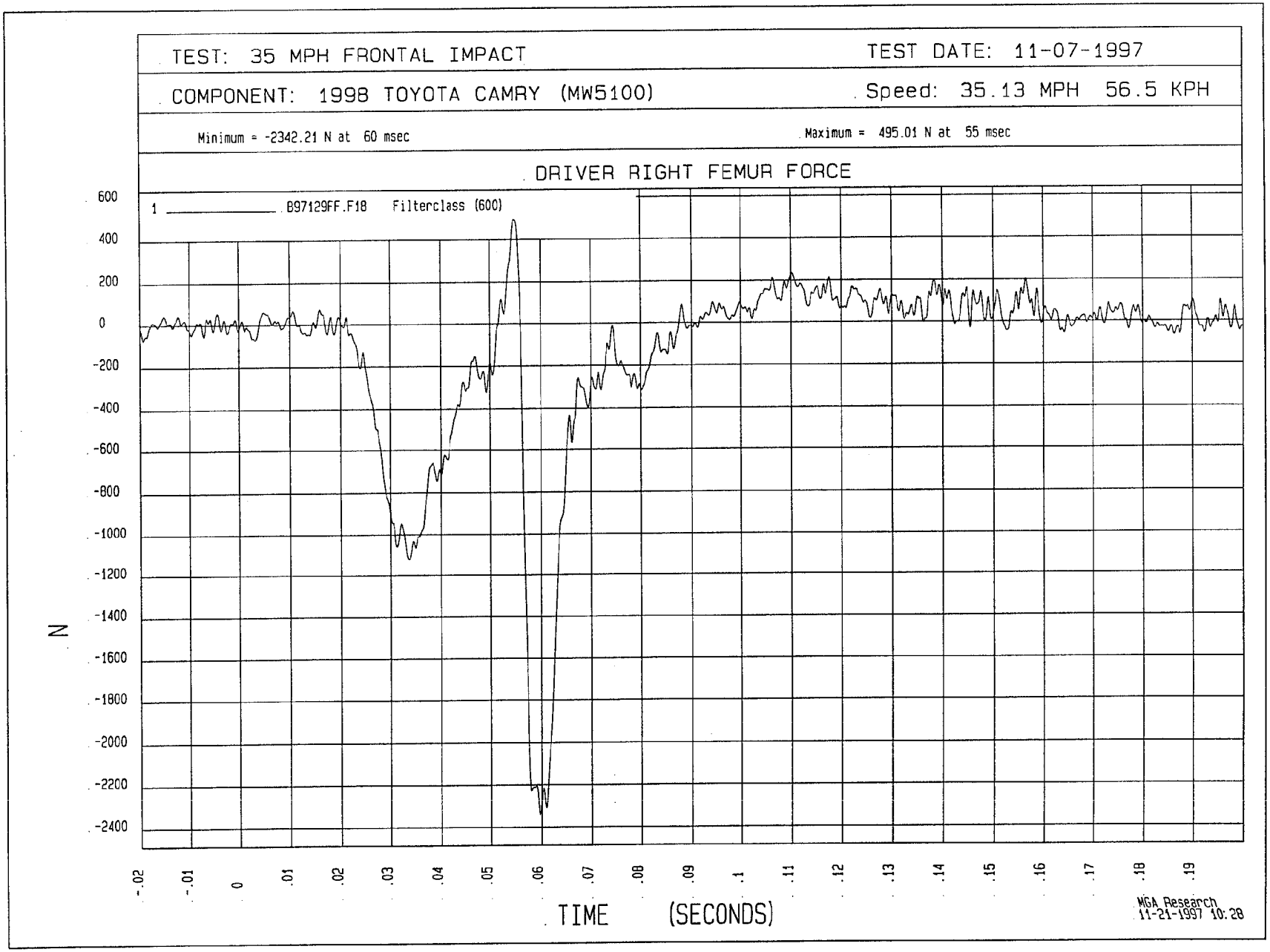

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -7.94 G'S at 54 msec
Maximum = 5.96 G'S at 58 msec
DRIVER PELVIS Y ACCELERATION
1 B97129AF.A61 Filterclass (1000)
6
4
2
0
-2
-4
-6
-8
G's
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:00

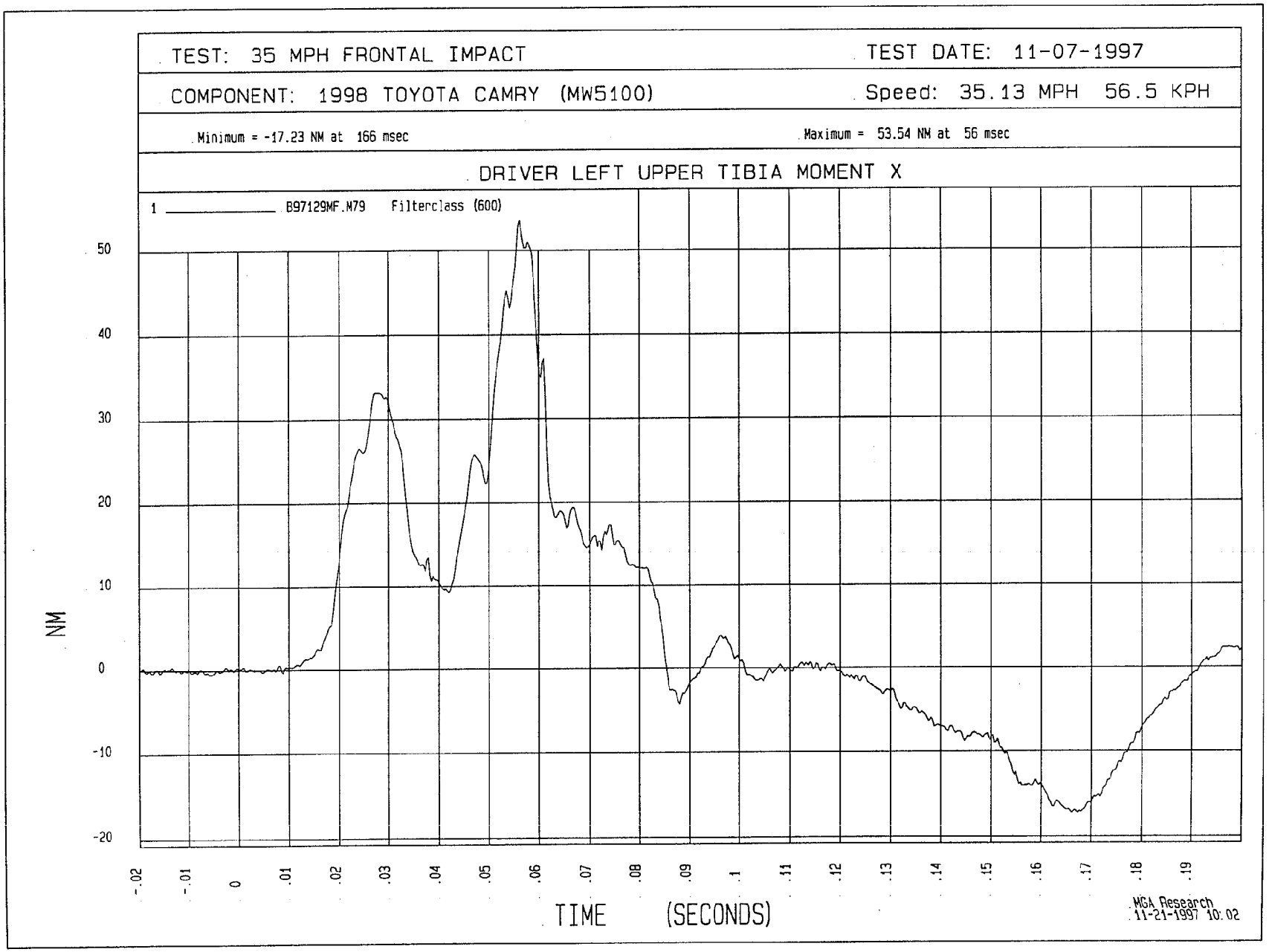

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -31.03 G'S at 62 msec
Maximum = 3.76 G'S at 153 msec
DRIVER PELVIS Z ACCELERATION
1 _____ 897129AF.A62 Filterclass (1000)
4 2 0 -2 -4 -6 -8 -10 -12 -14 -16 -18 -20 -22 -24 -26 -28 -30 -32
G'S
-.02 -.01 0 .01 .02 .03 .04 .05 .06 .07 .08 .09 .1 .11 .12 .13 .14 .15 .16 .17 .18 .19
TIME (SECONDS)
MGA Research
11-21-1997 10:00


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = .11 G'S at 2 msec
Maximum = 91.32 G'S at 59 msec
DRIVER PELVIS RESULTANT ACCELERATION
1 B97129AV.A60 Filterclass (1000)
80
60
40
20
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:00


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1.40 KPH at 128 msec
Maximum = 56.50 KPH at -19 msec
DRIVER PELVIS X VELOCITY
1 B97129AI.V60 Filterclass (180)
KPH
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:11


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -4246.20 N at 59 msec
Maximum = 674.30 N at 50 msec
DRIVER LEFT FEMUR FORCE
1 B97129FF.F19 Filterclass (600)
0
-1000
-2000
-3000
-4000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:28


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -2342.21 N at 60 msec
Maximum = 495.01 N at 55 msec
DRIVER RIGHT FEMUR FORCE
1 B97129FF.F18 Filterclass (600)
600
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
-2200
-2400
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:28


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -17.23 NM at 166 msec
Maximum = 53.54 NM at 56 msec
DRIVER LEFT UPPER TIBIA MOMENT X
1 B97129MF.M79 Filterclass (600)
NM
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
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.09
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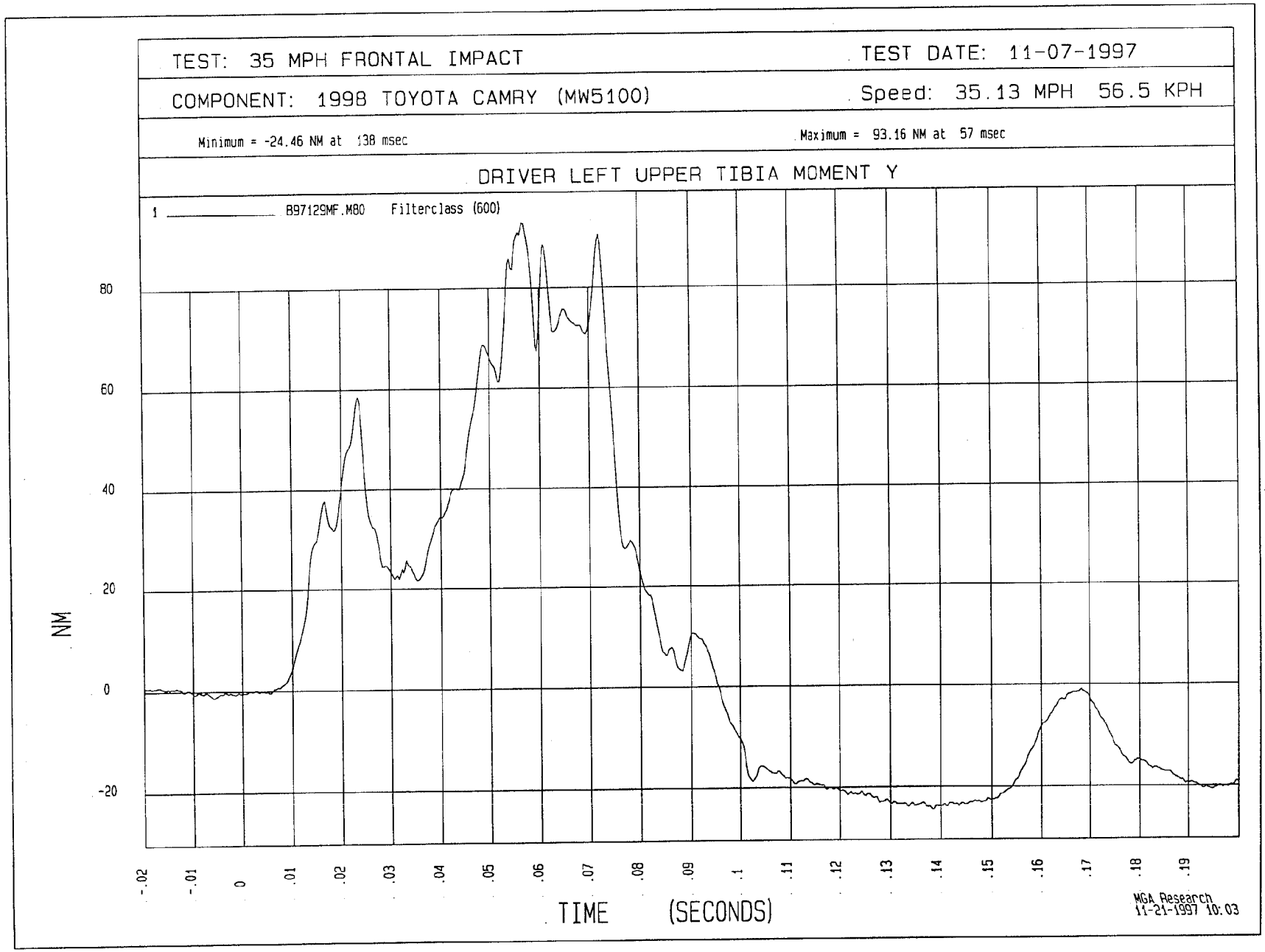
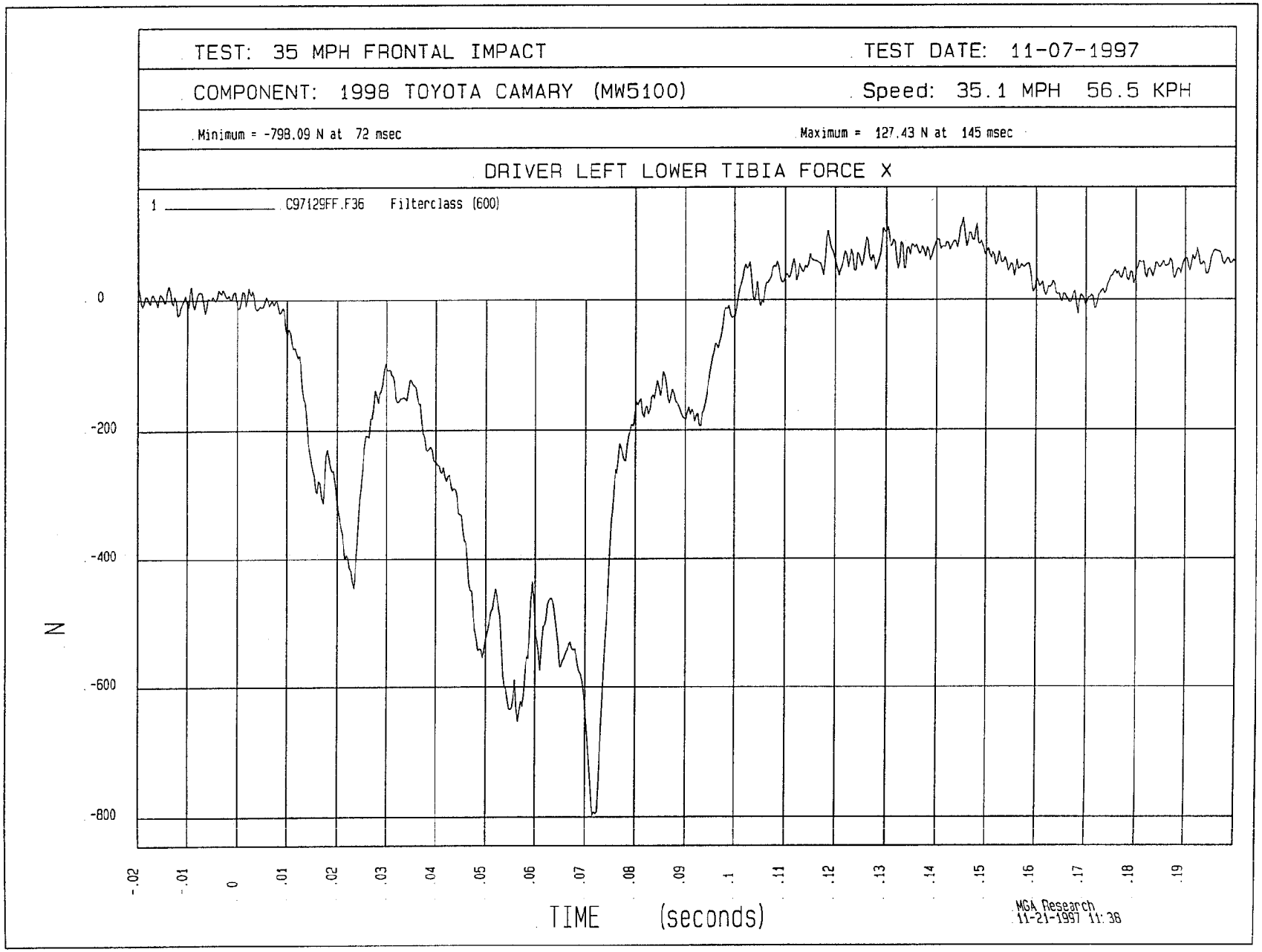
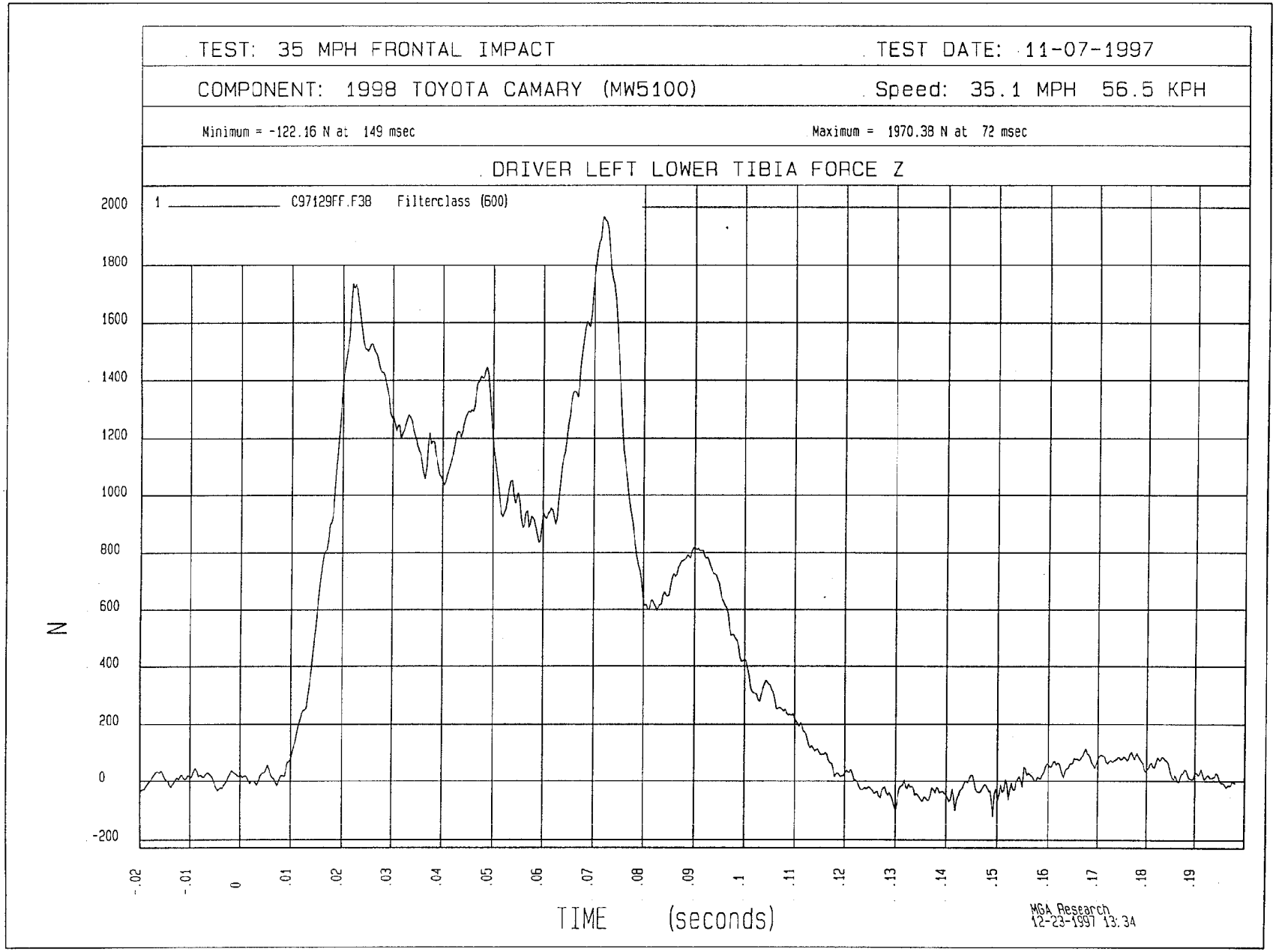
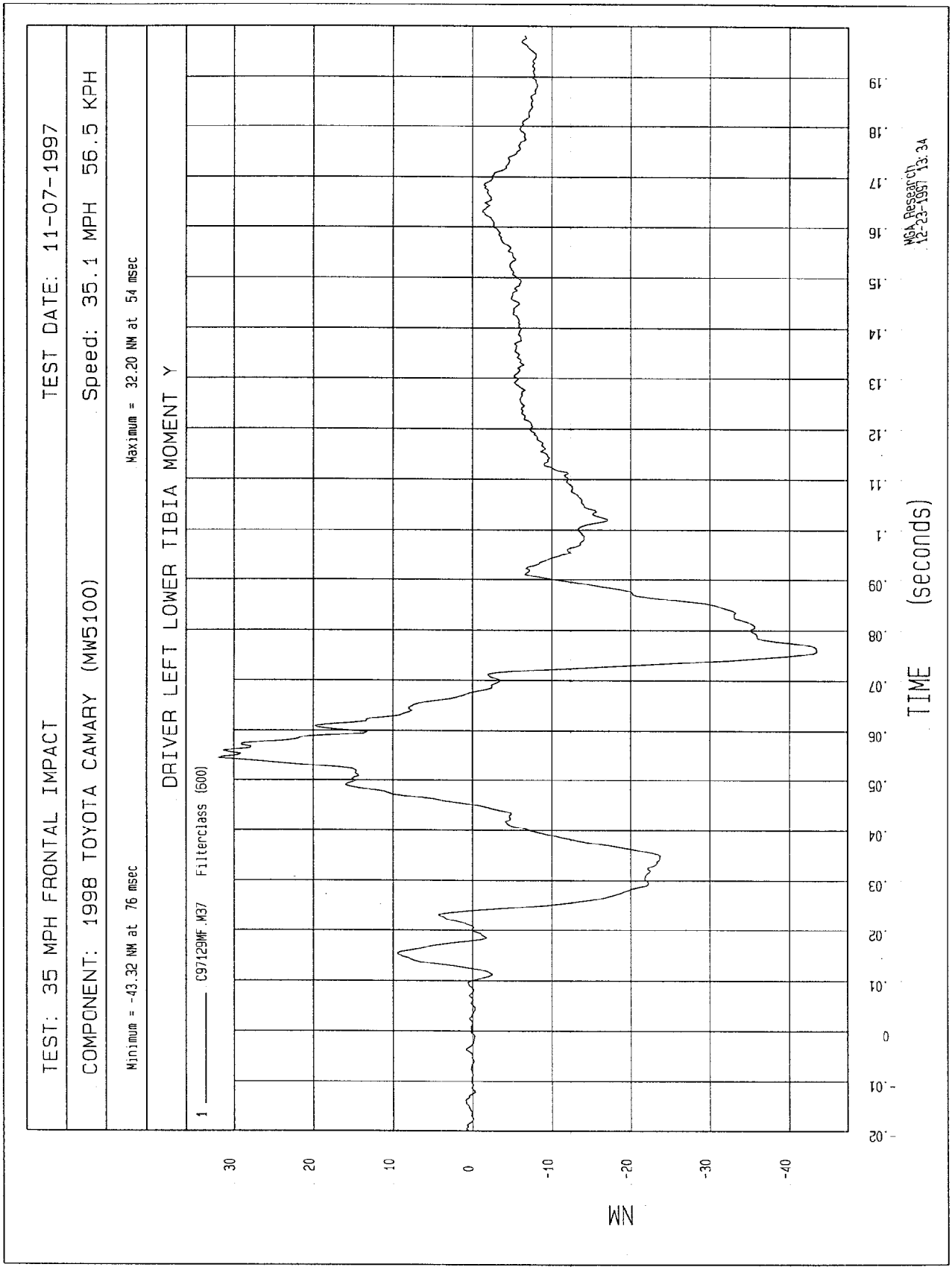
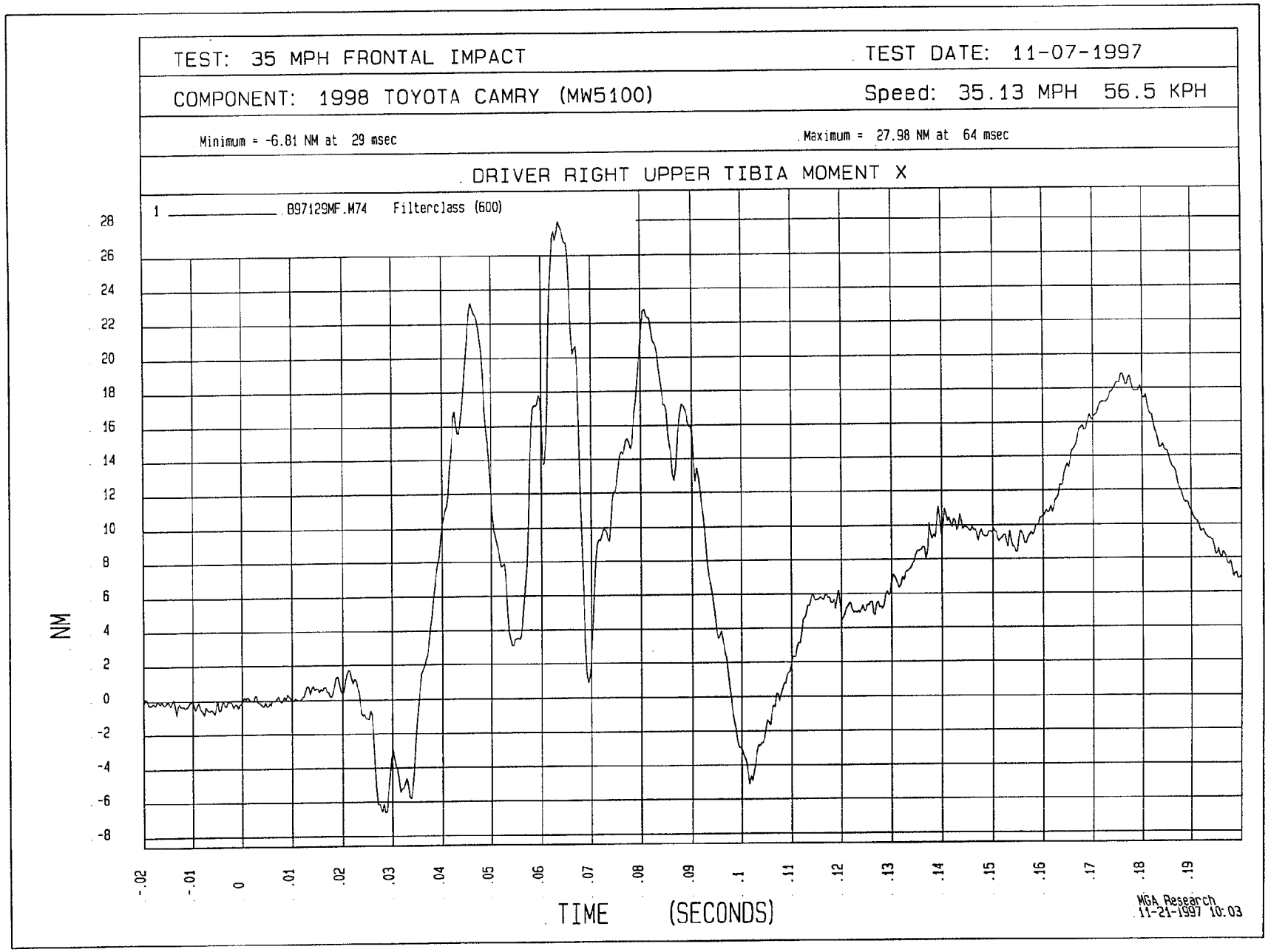
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:02

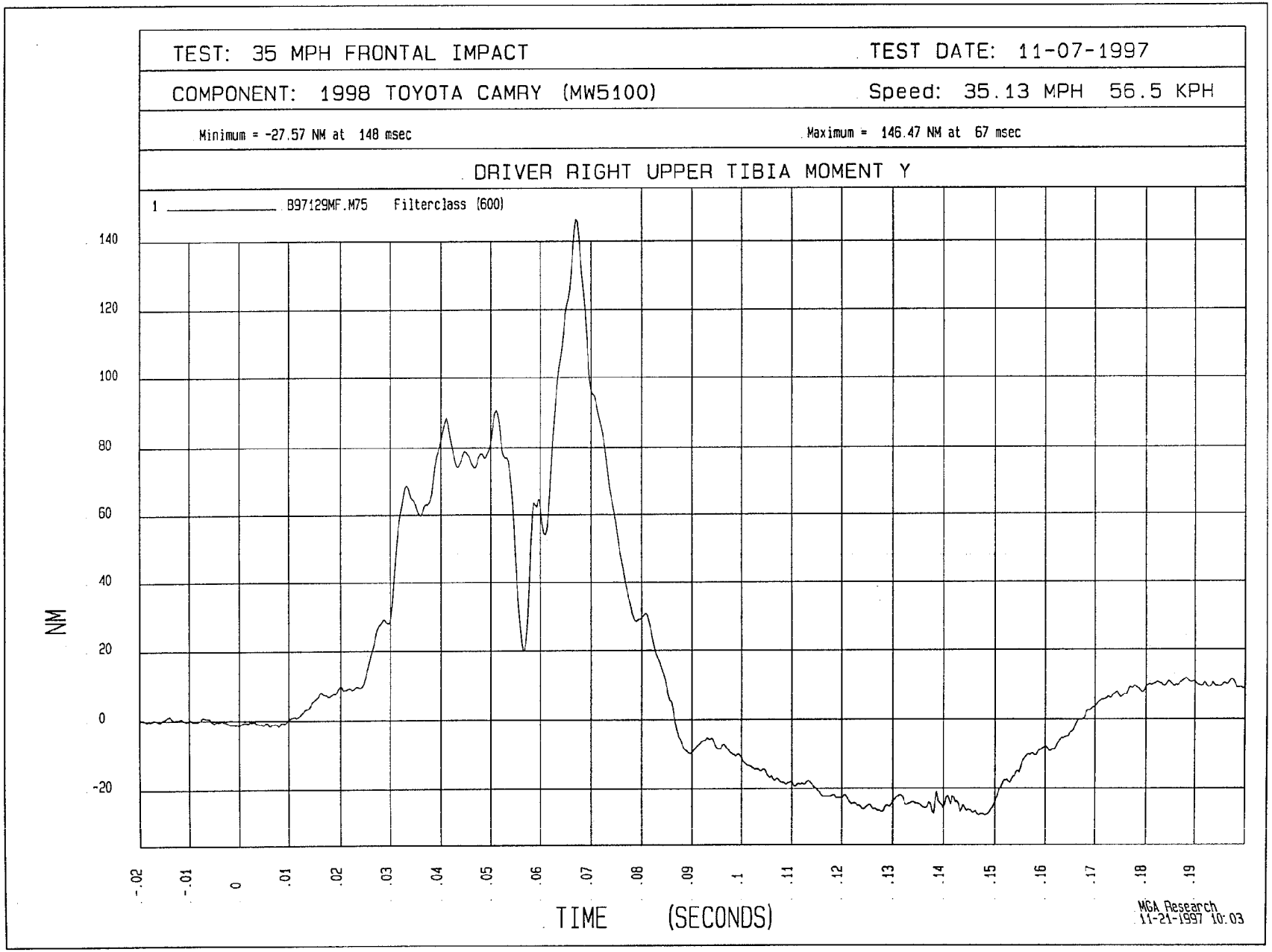

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -24.46 NM at 138 msec
Maximum = 93.16 NM at 57 msec
DRIVER LEFT UPPER TIBIA MOMENT Y
1 B97129MF.M80 Filterclass (600)
80
60
40
20
0
-20
NM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:03

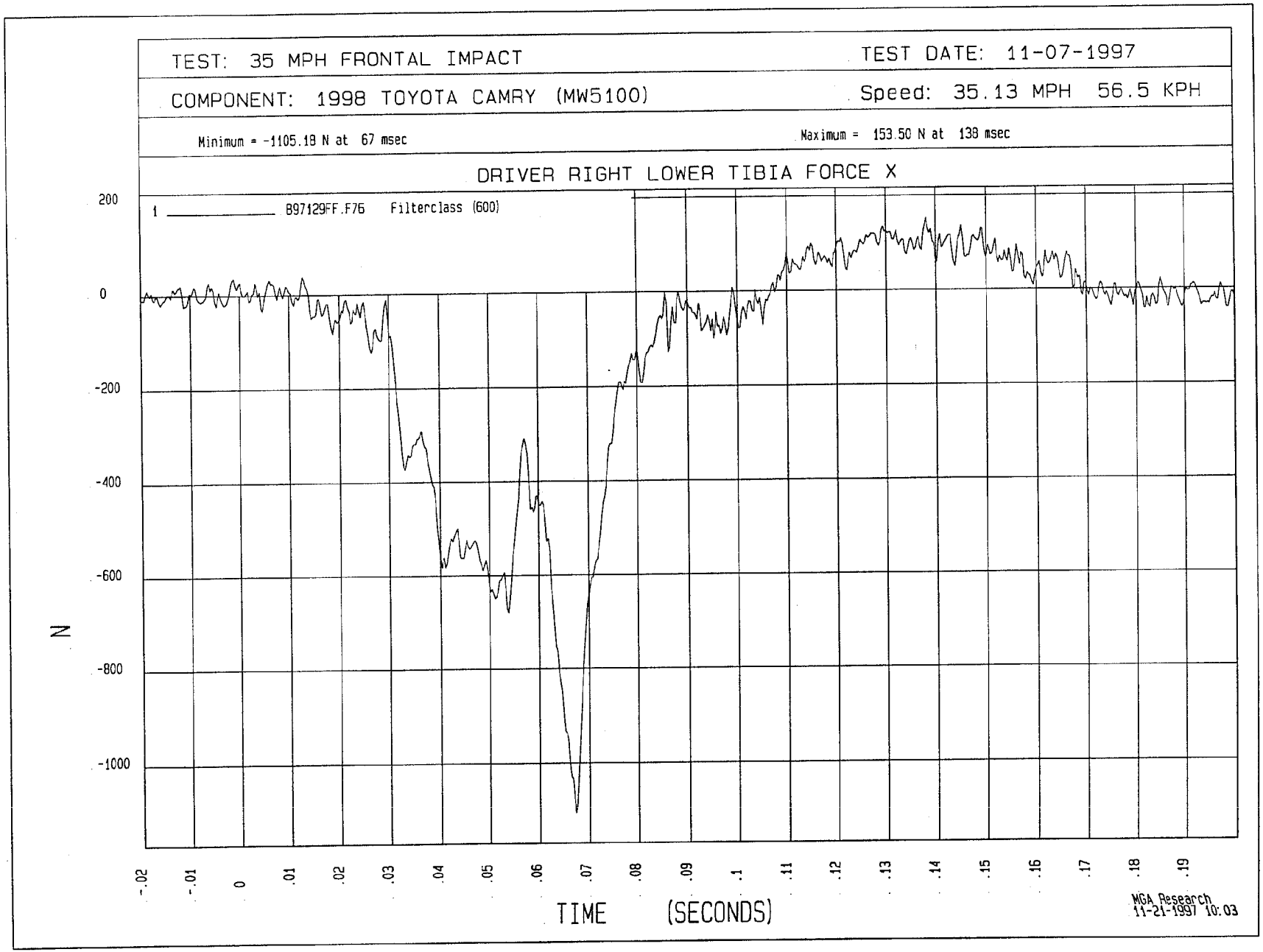

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -798.09 N at 72 msec
Maximum = 127.43 N at 145 msec
DRIVER LEFT LOWER TIBIA FORCE X
1 C97I29FF.F36 Filterclass (600)
0
-200
-400
-600
-800
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-21-1997 11:38

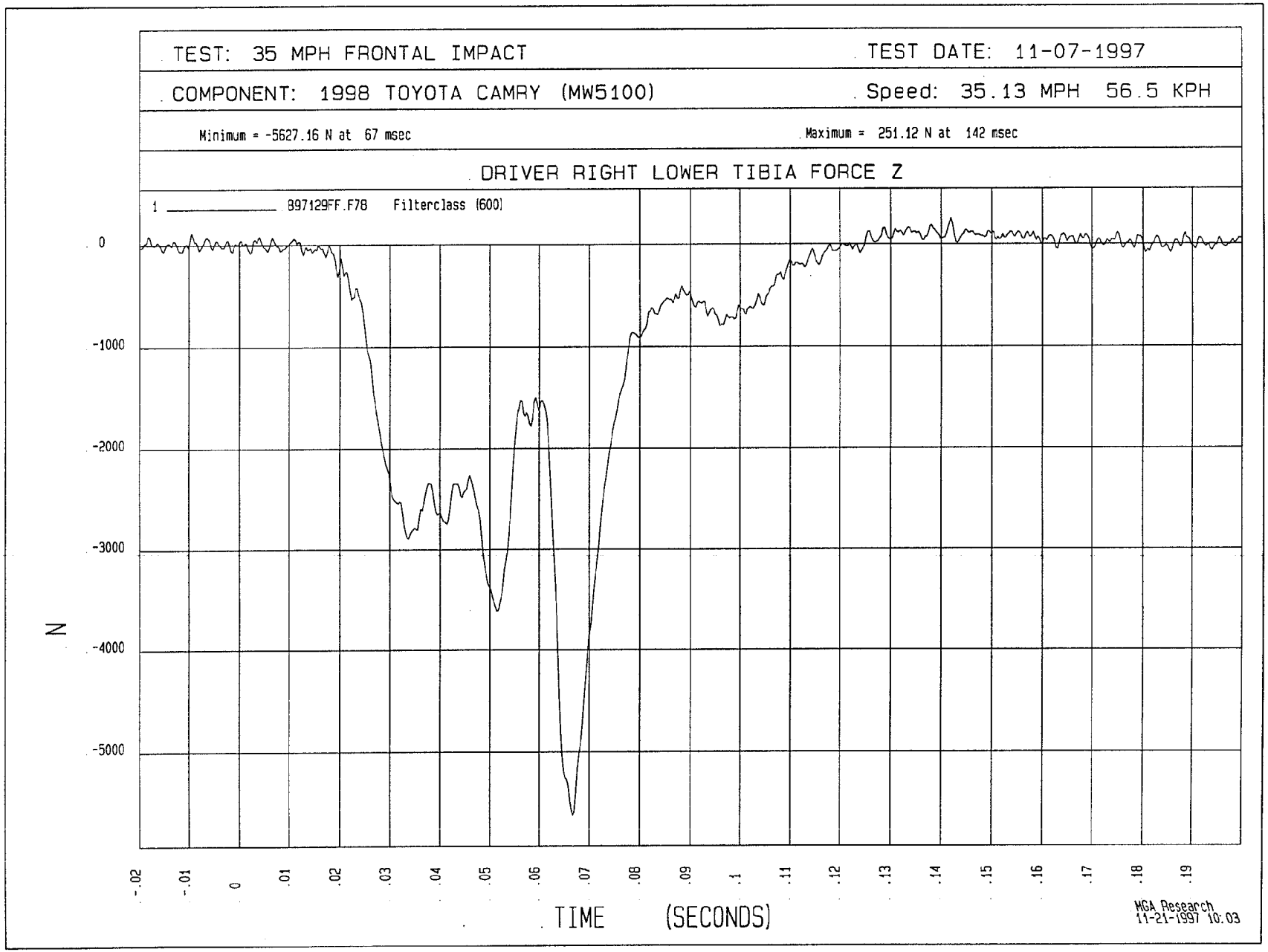

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -122.16 N at 149 msec
Maximum = 1970.38 N at 72 msec
DRIVER LEFT LOWER TIBIA FORCE Z
1 C97129ff.F38 Filterclass (600)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:34

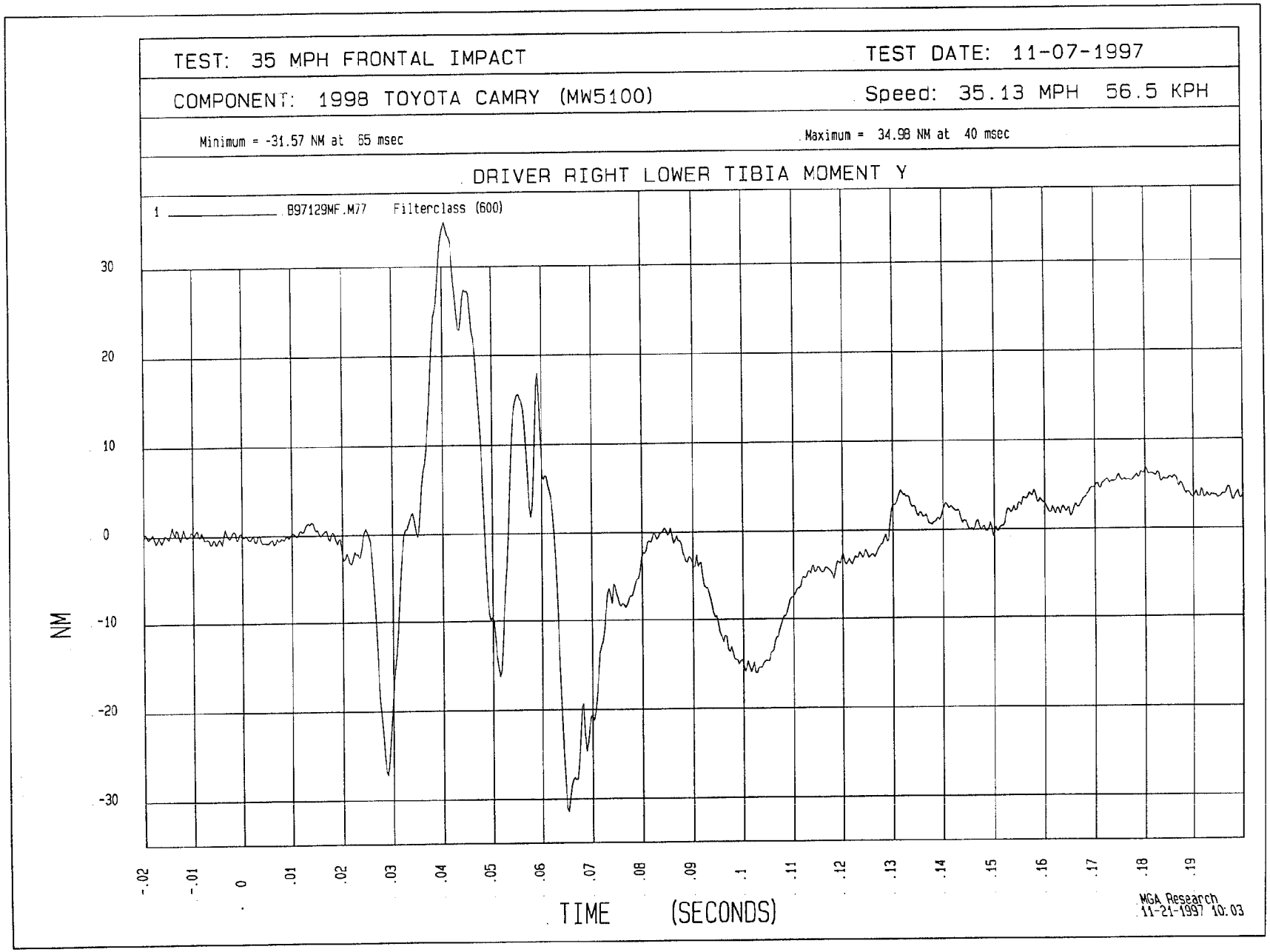

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -43.32 NM at 76 msec
Maximum = 32.20 NM at 54 msec
DRIVER LEFT LOWER TIBIA MOMENT Y
1 C97129MF.M37 Filterclass (600)
NM
TIME (seconds)
MGA Research
12-23-1997 13:34

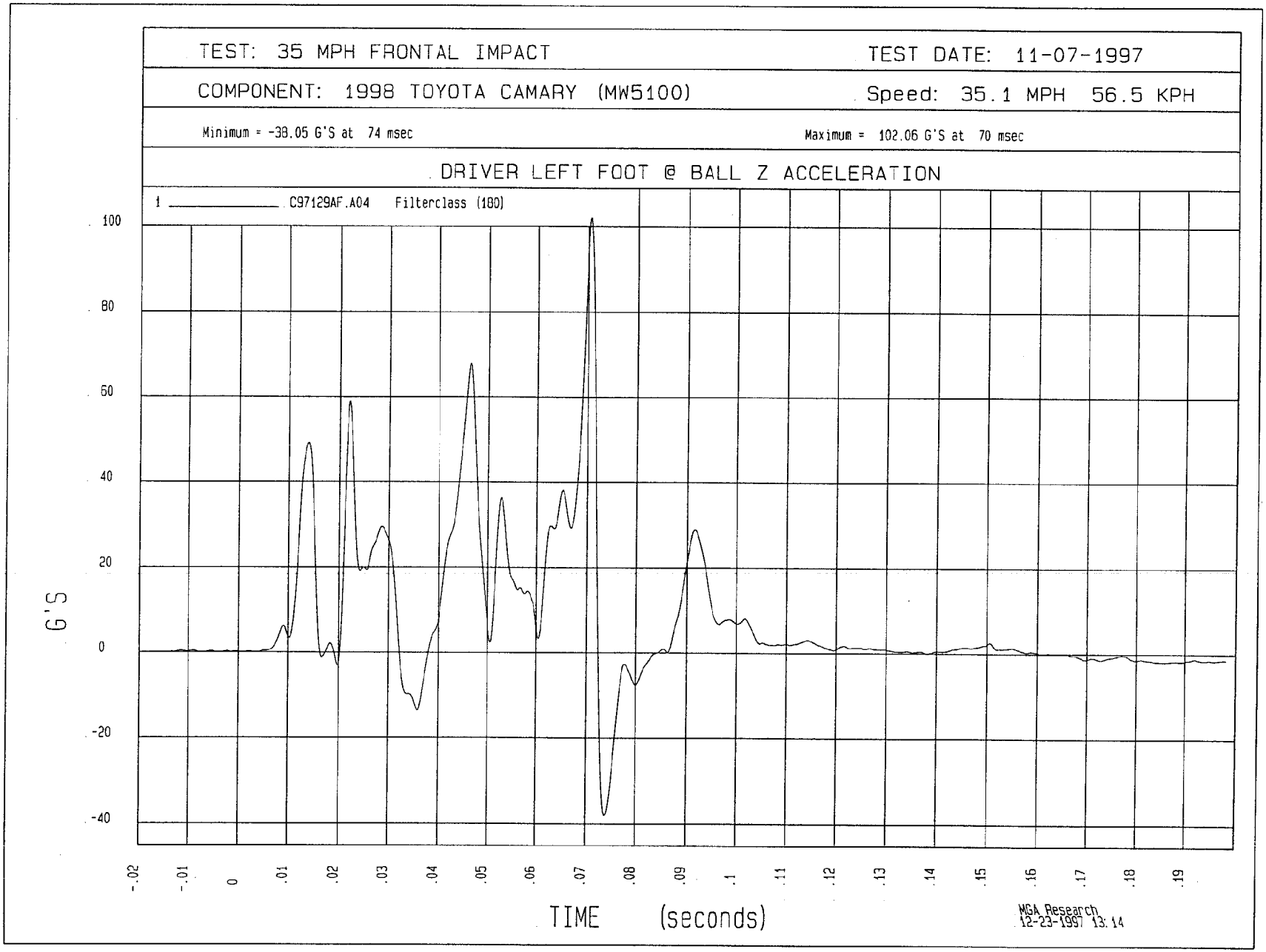

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -6.81 NM at 29 msec
Maximum = 27.98 NM at 64 msec
DRIVER RIGHT UPPER TIBIA MOMENT X
1 B97129MF.M74 Filterclass (600)
NM
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:03

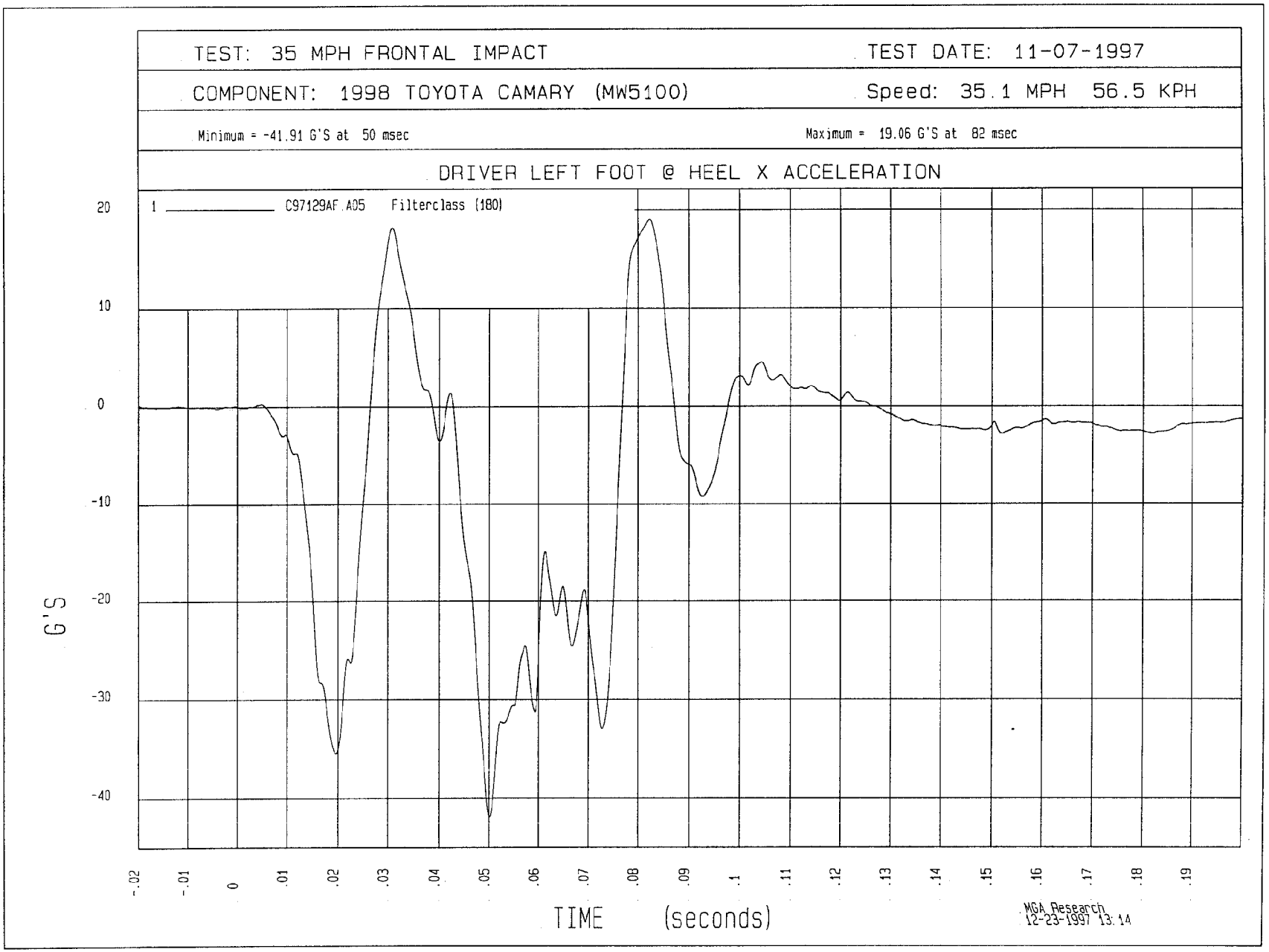

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -27.57 NM at 148 msec
Maximum = 146.47 NM at 67 msec
DRIVER RIGHT UPPER TIBIA MOMENT Y
1 B97129MF.M75 Filterclass (600)
NM
140
120
100
80
60
40
20
0
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:03

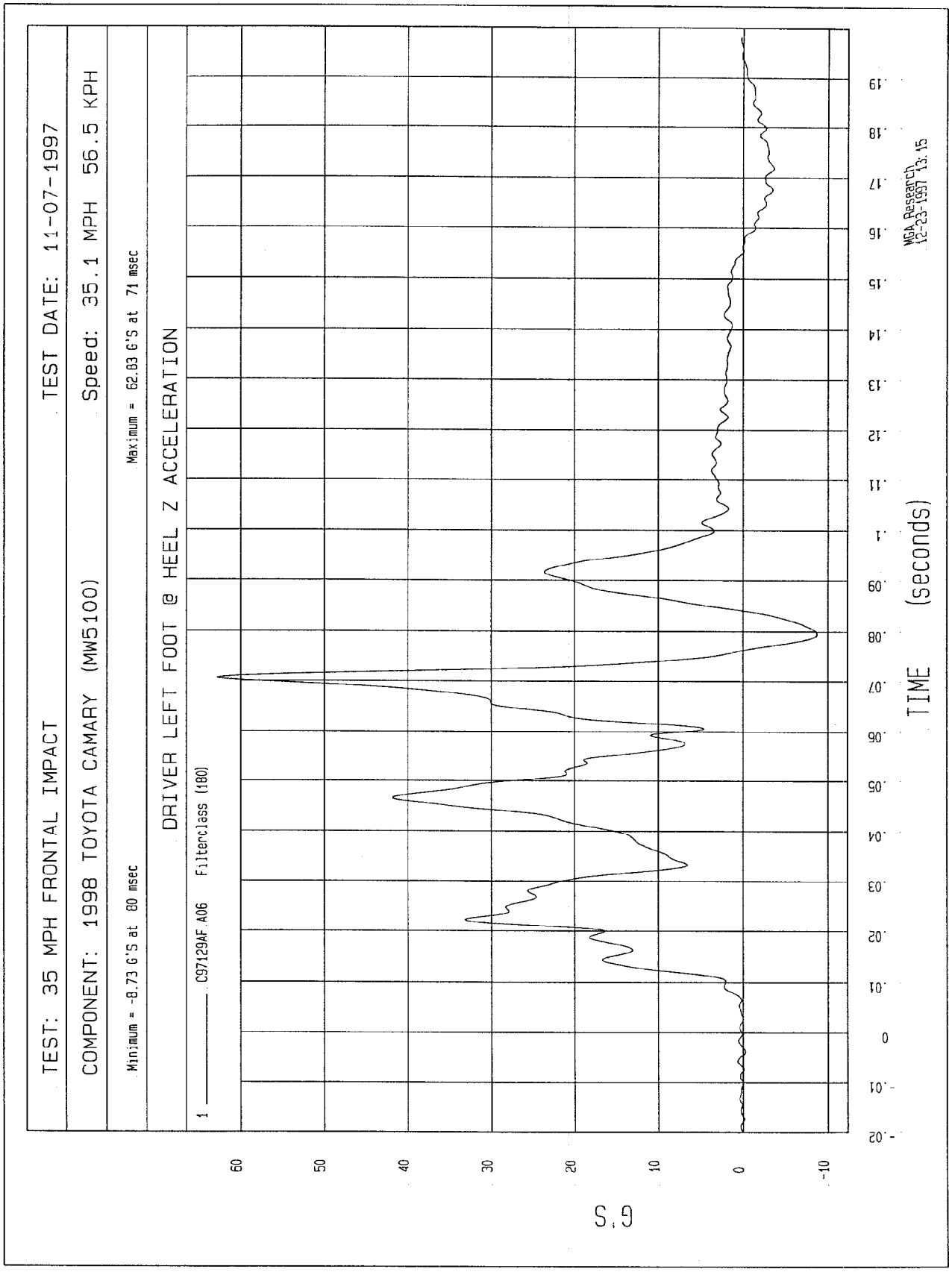

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1105.18 N at 67 msec
Maximum = 153.50 N at 138 msec
DRIVER RIGHT LOWER TIBIA FORCE X
1 B97129FF.F76 Filterclass (600)
200
0
-200
-400
-600
-800
-1000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:03

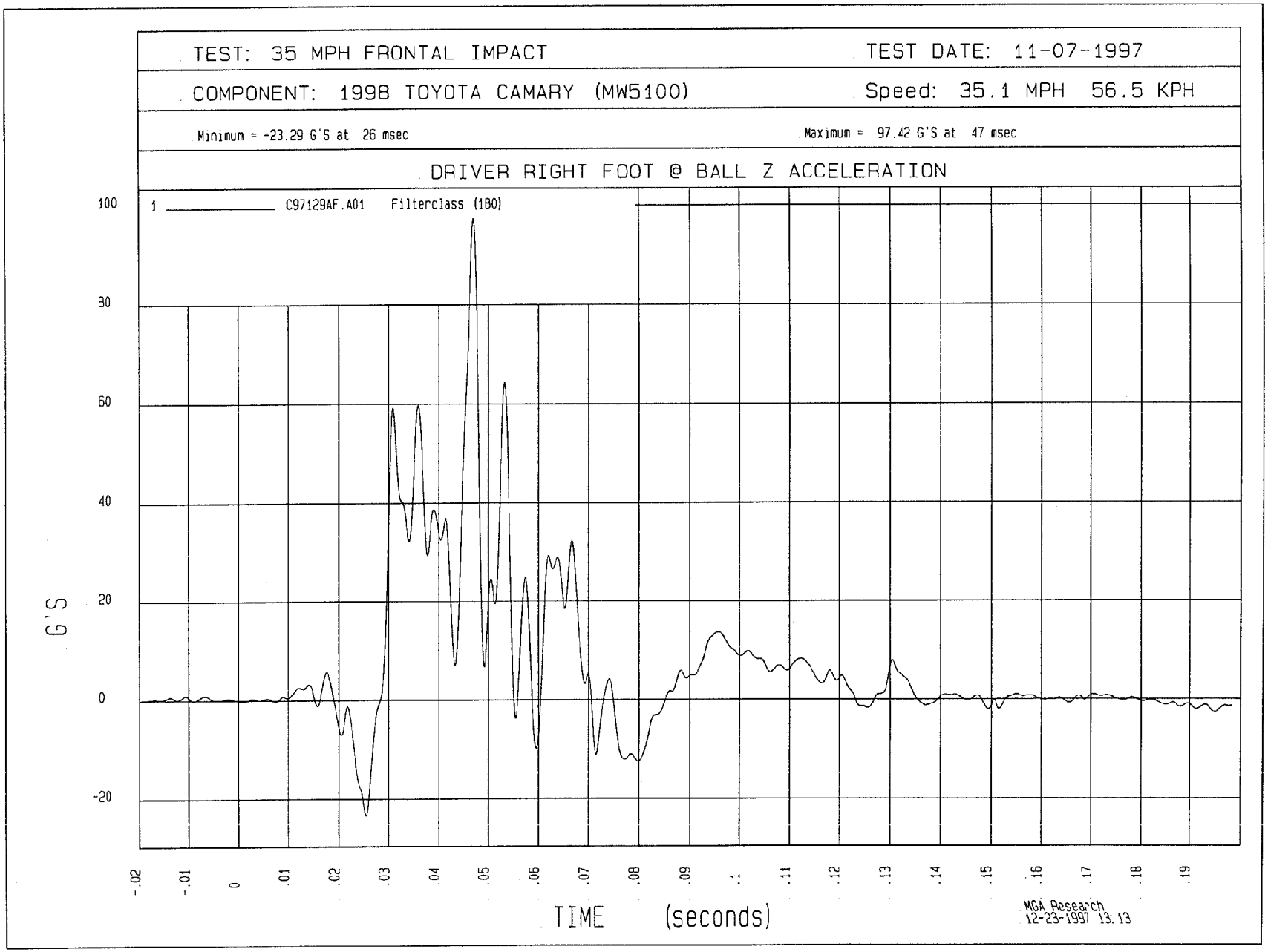

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -5627.16 N at 67 msec
Maximum = 251.12 N at 142 msec
DRIVER RIGHT LOWER TIBIA FORCE Z
1 B97129FF.F78 Filterclass (600)
0
-1000
-2000
-3000
-4000
-5000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:03

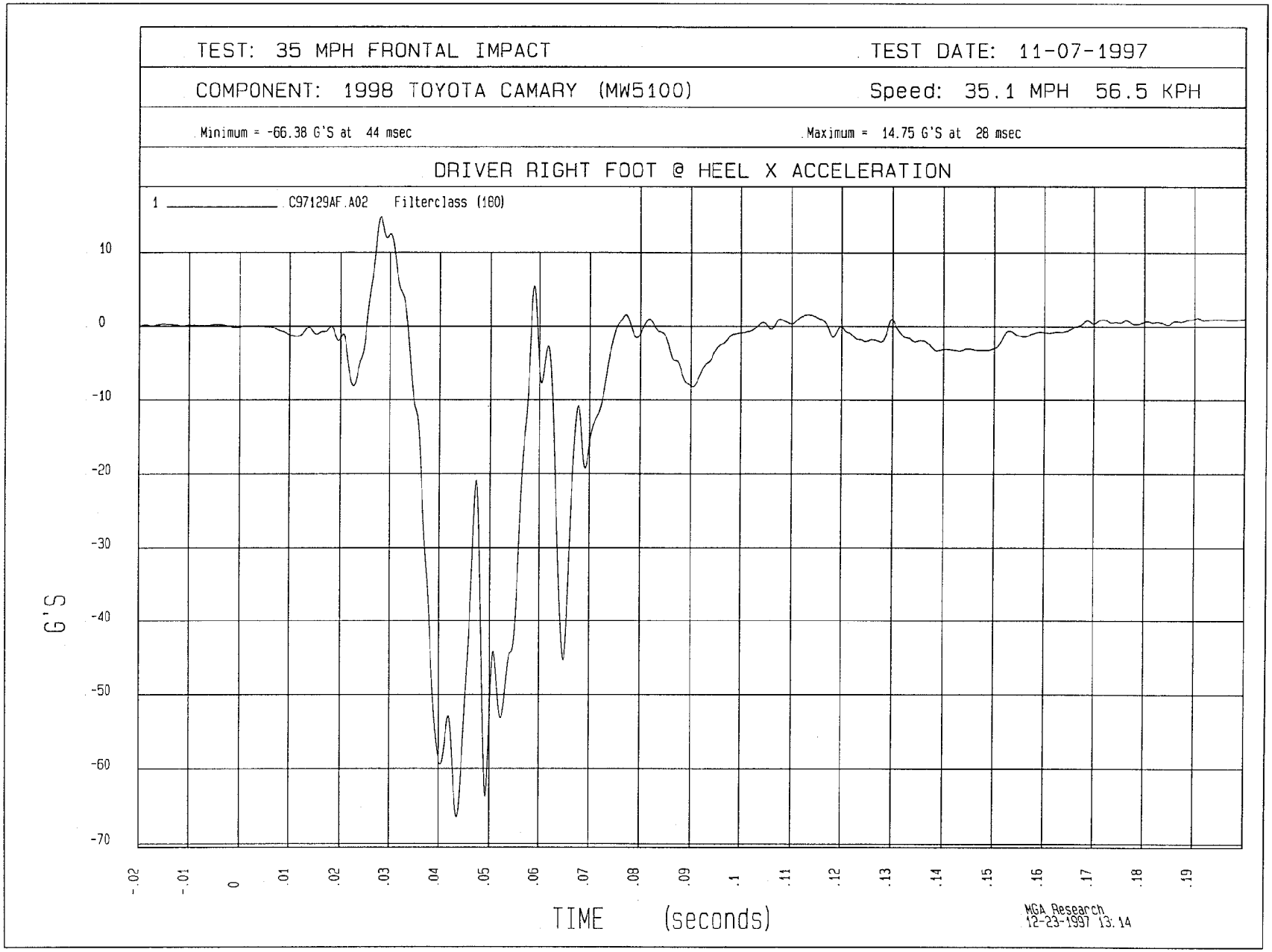

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -31.57 NM at 65 msec
Maximum = 34.98 NM at 40 msec
DRIVER RIGHT LOWER TIBIA MOMENT Y
1 B97129MF.M77 Filterclass (600)
NM
30
20
10
0
-10
-20
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:03

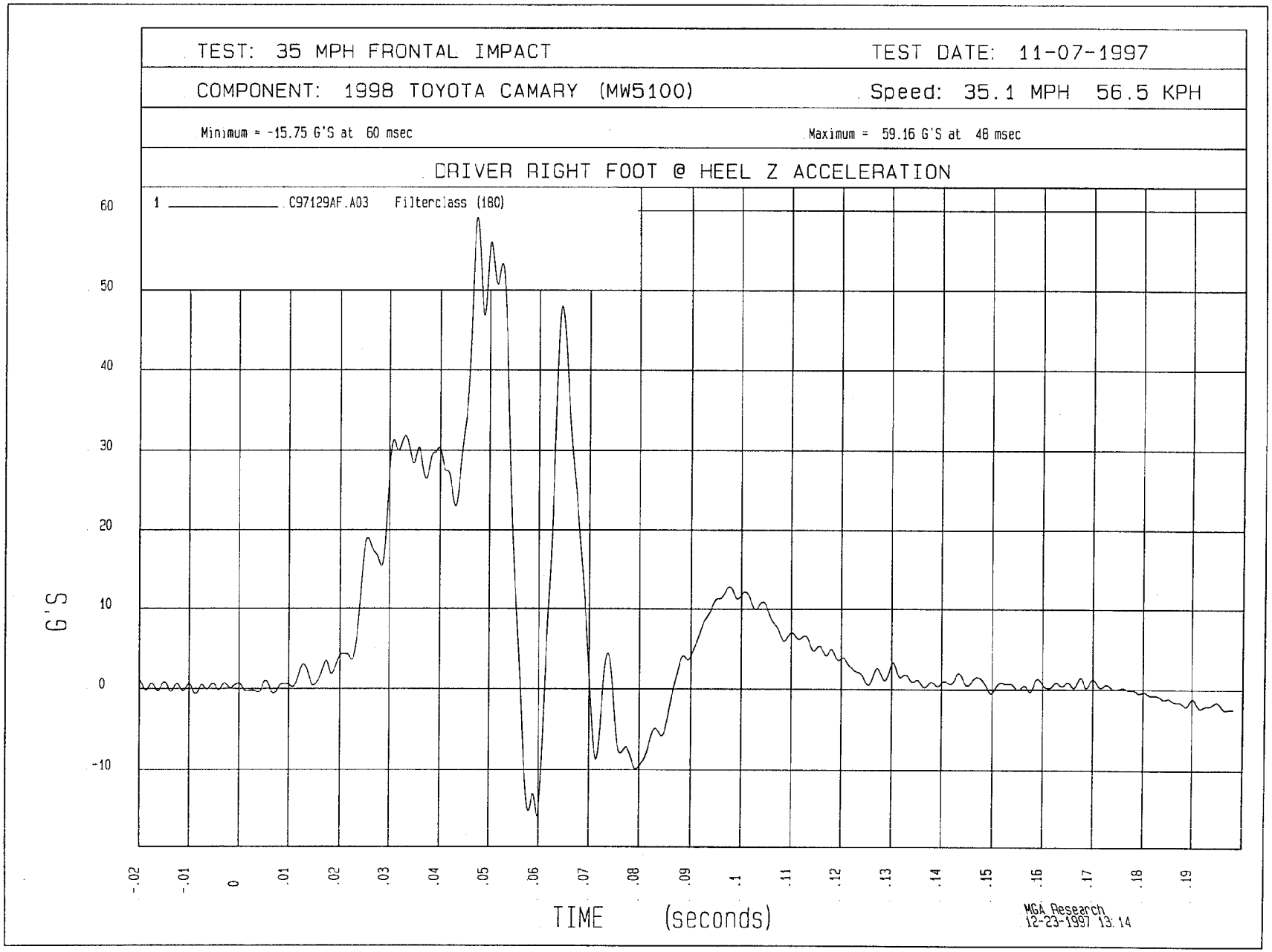

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -38.05 G'S at 74 msec
Maximum = 102.06 G'S at 70 msec
DRIVER LEFT FOOT @ BALL Z ACCELERATION
1 C97129AF.A04 Filterclass (180)
100
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:14

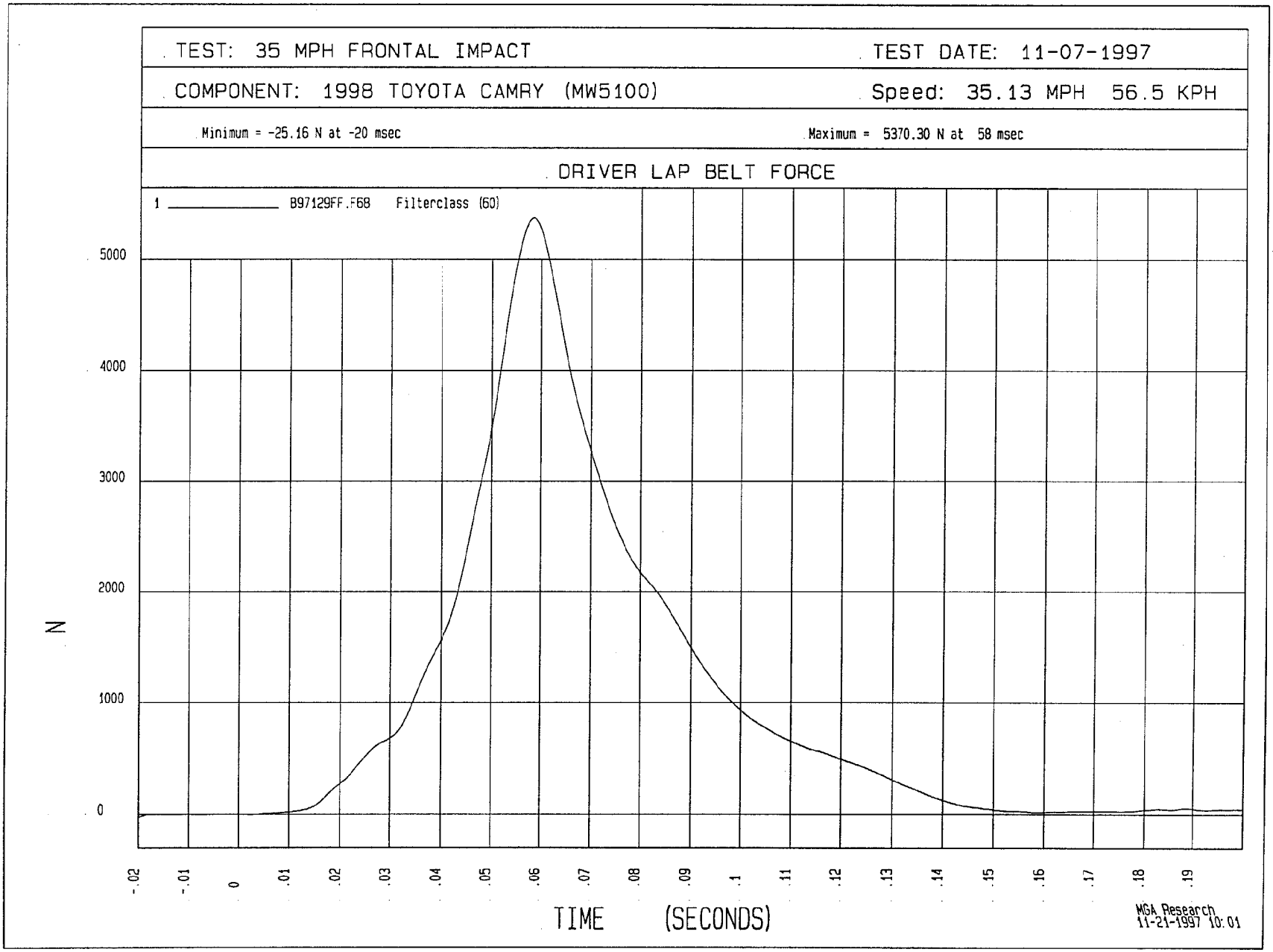

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -41.91 G'S at 50 msec
Maximum = 19.06 G'S at 82 msec
DRIVER LEFT FOOT @ HEEL X ACCELERATION
1 C97129AF.A05 Filterclass (180)
20
10
0
-10
-20
-30
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:14

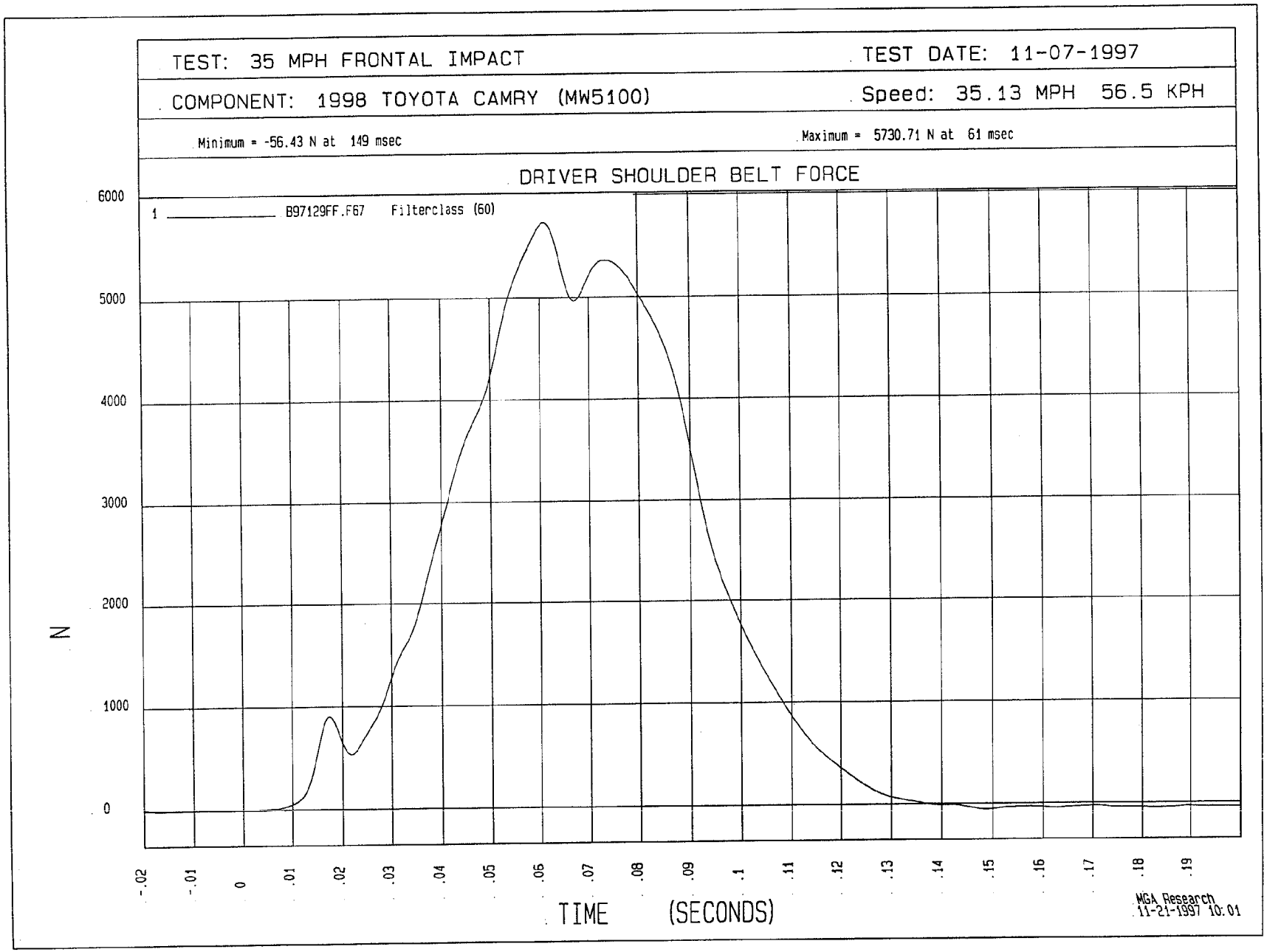

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -8.73 G'S at 80 msec
Maximum = 62.83 G'S at 71 msec
DRIVER LEFT FOOT @ HEEL Z ACCELERATION
1 C97129AF A06 Filterclass (180)
G'S
TIME (seconds)
MGA Research
12-23-1997 13:15

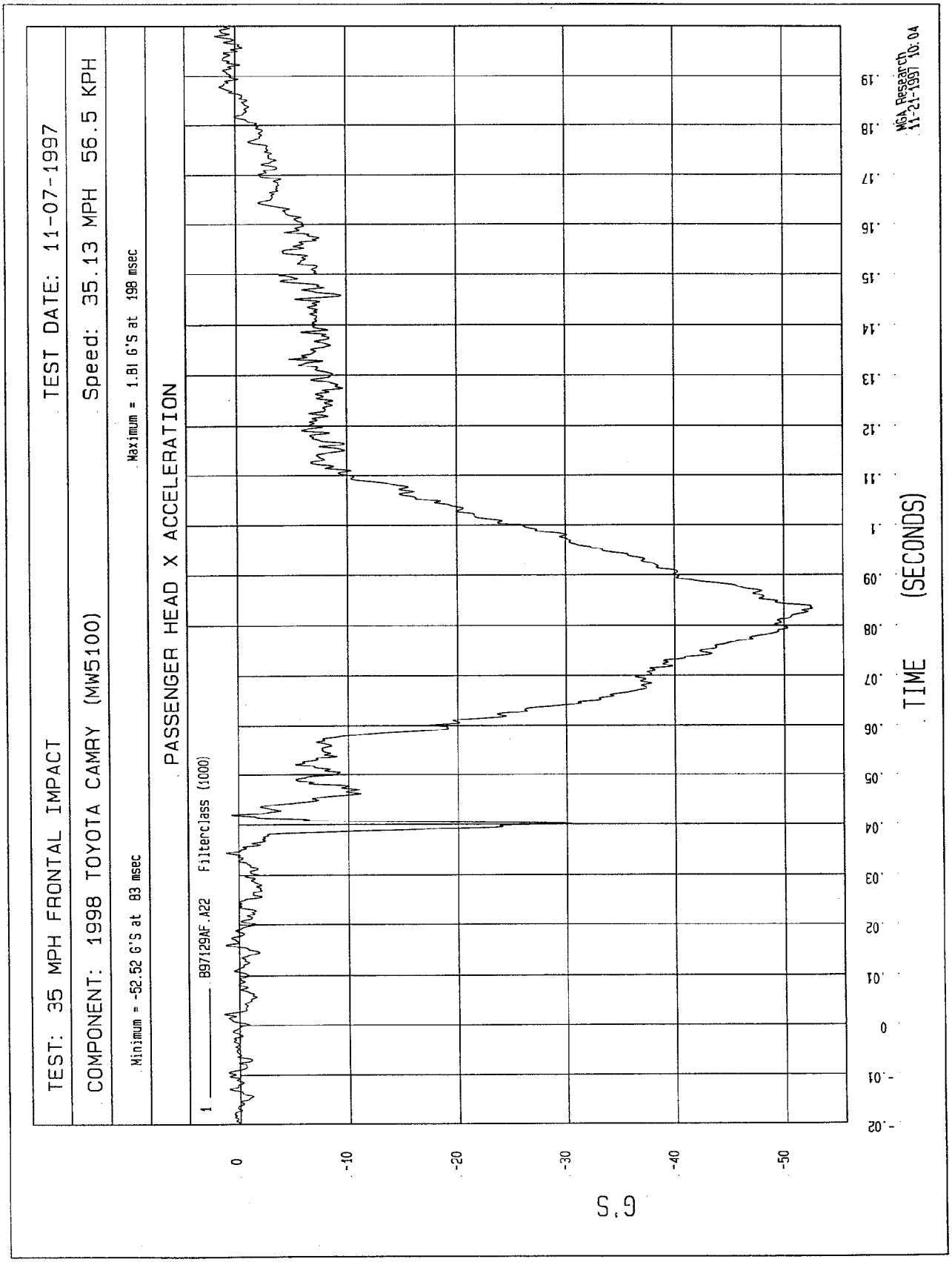

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -23.29 G'S at 26 msec
Maximum = 97.42 G'S at 47 msec
DRIVER RIGHT FOOT @ BALL Z ACCELERATION
1 C97129AF.A01 Filterclass (180)
100
80
60
40
20
0
-20
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:13

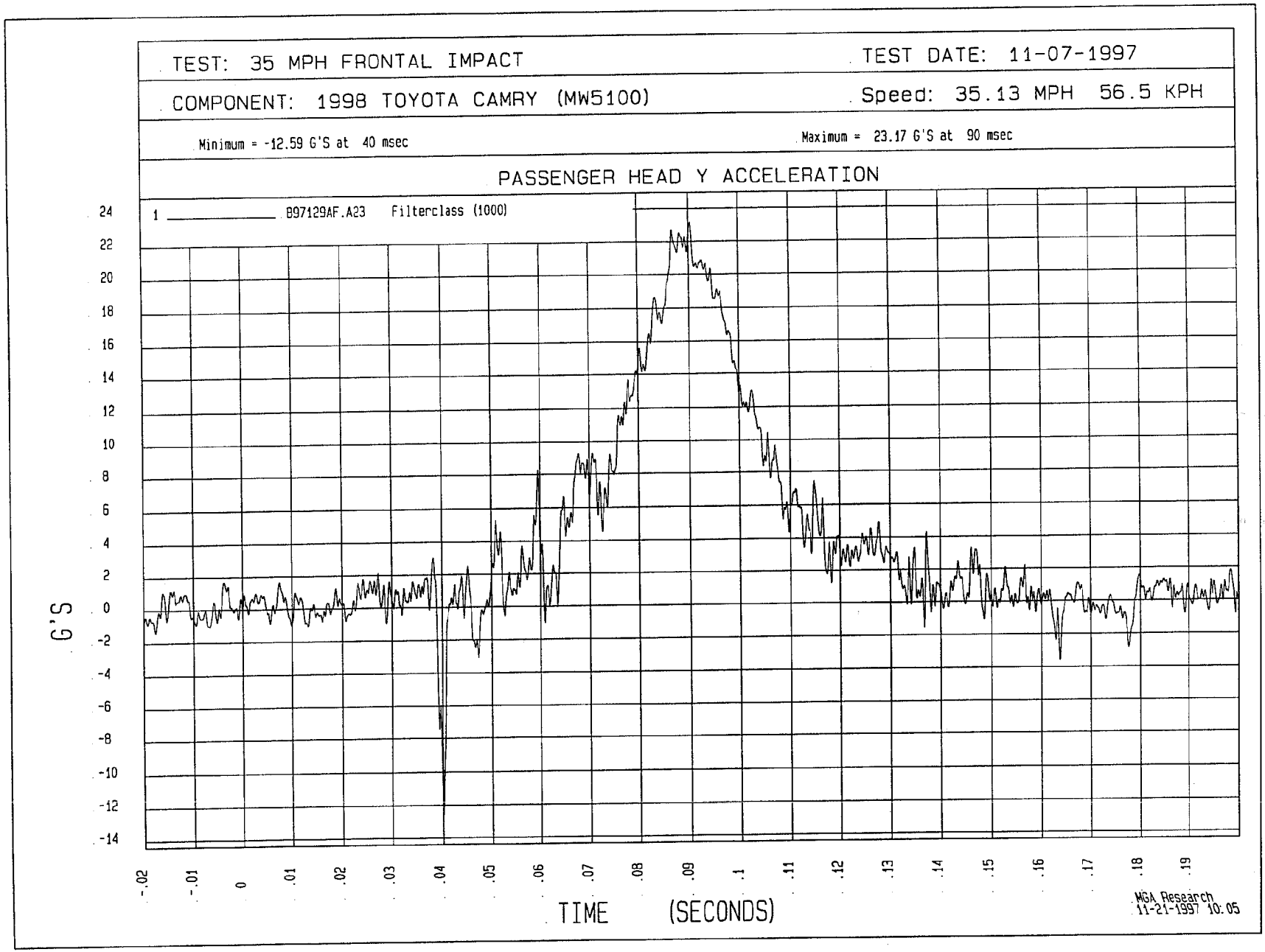

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -66.38 G'S at 44 msec
Maximum = 14.75 G'S at 28 msec
DRIVER RIGHT FOOT @ HEEL X ACCELERATION
1 C97129AF.A02 Filterclass (180)
10
0
-10
-20
-30
-40
-50
-60
-70
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:14

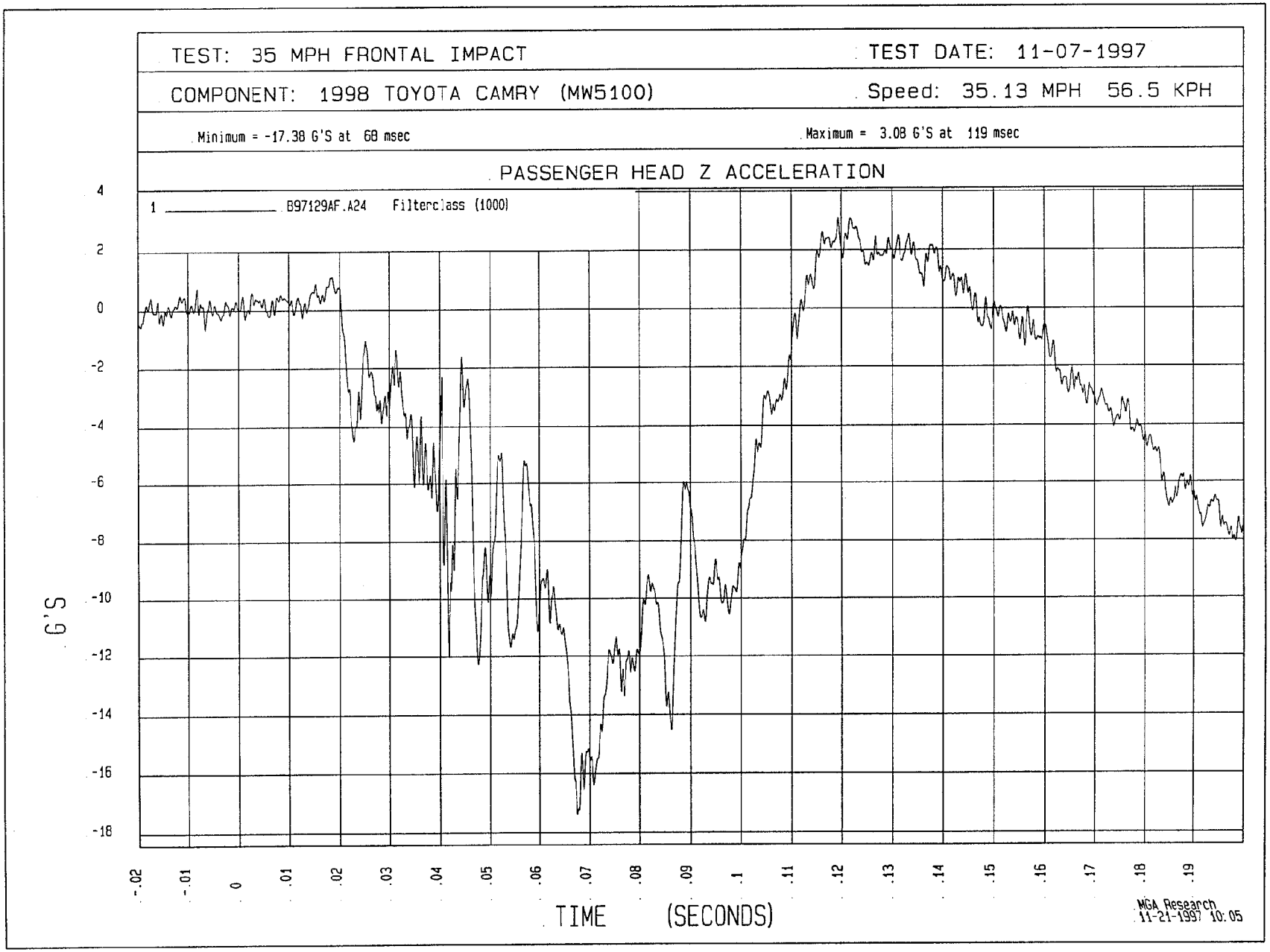

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -15.75 G'S at 60 msec
Maximum = 59.16 G'S at 48 msec
DRIVER RIGHT FOOT @ HEEL Z ACCELERATION
1 C97129AF.A03 Filterclass (180)
60
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:14

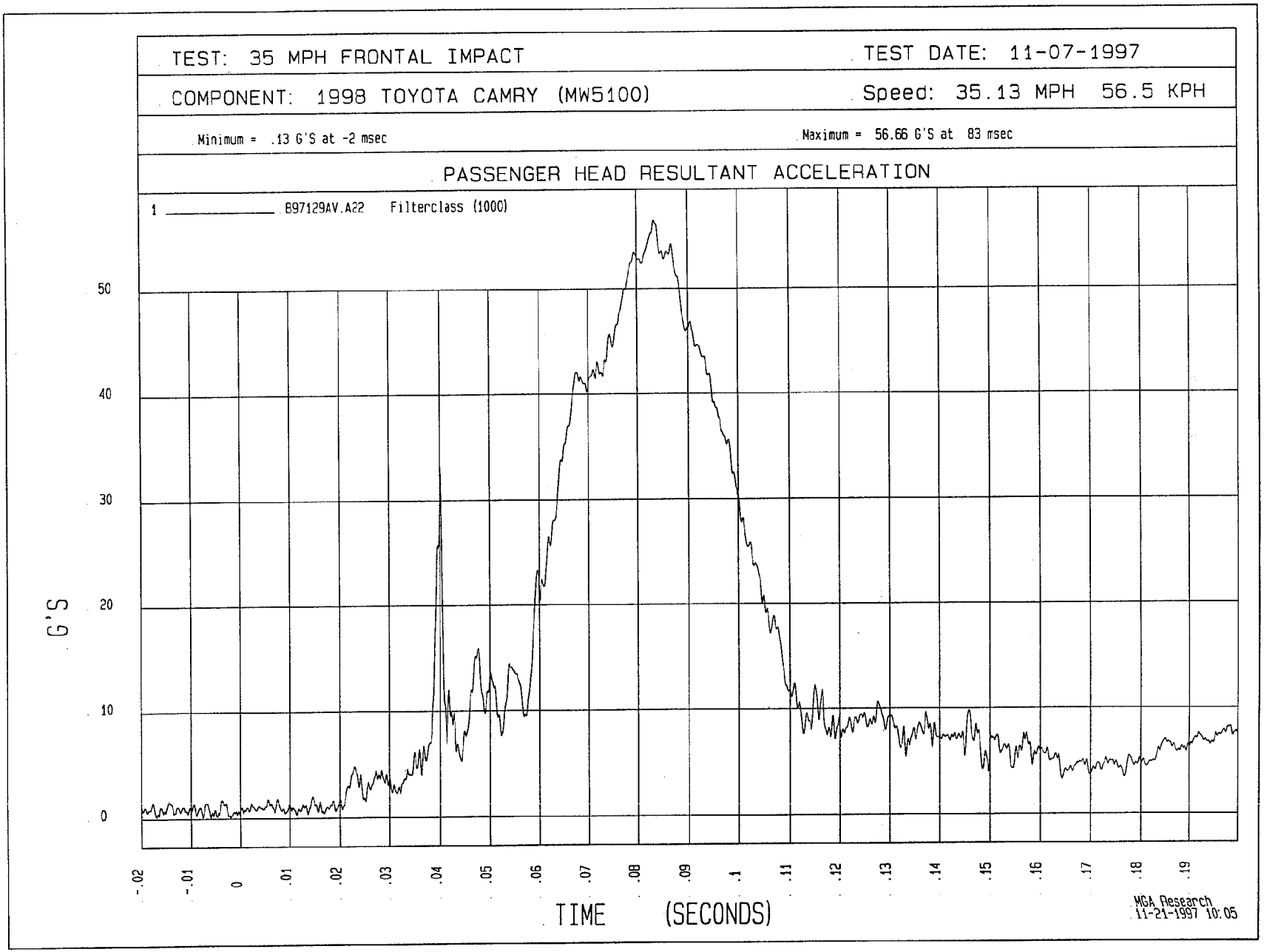

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -25.16 N at -20 msec
Maximum = 5370.30 N at 58 msec
DRIVER LAP BELT FORCE
1 B97129FF.F68 Filterclass (60)
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:01

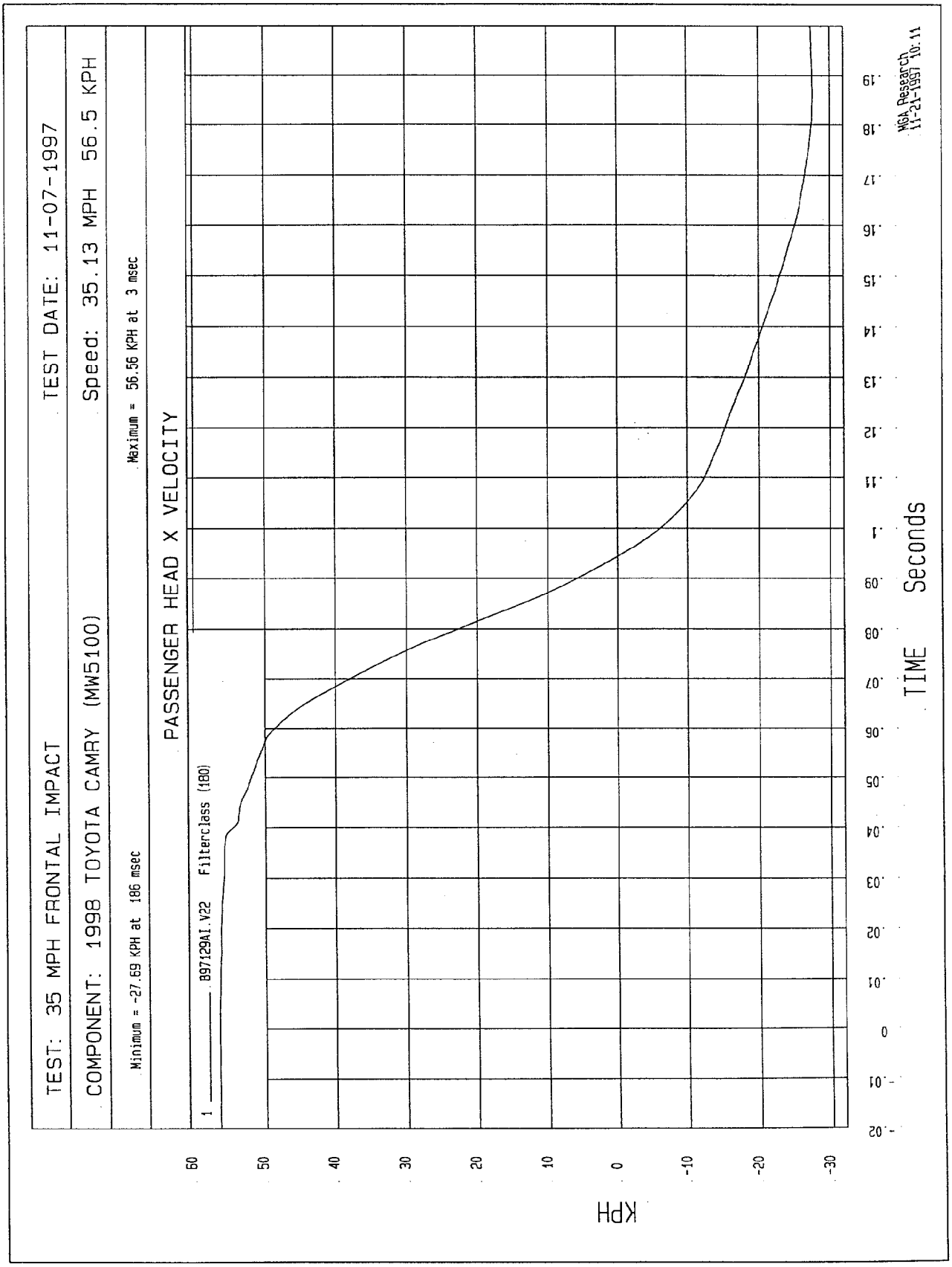

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -56.43 N at 149 msec
Maximum = 5730.71 N at 61 msec
DRIVER SHOULDER BELT FORCE
1 B97129FF.F67 Filterclass (60)
6000
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:01

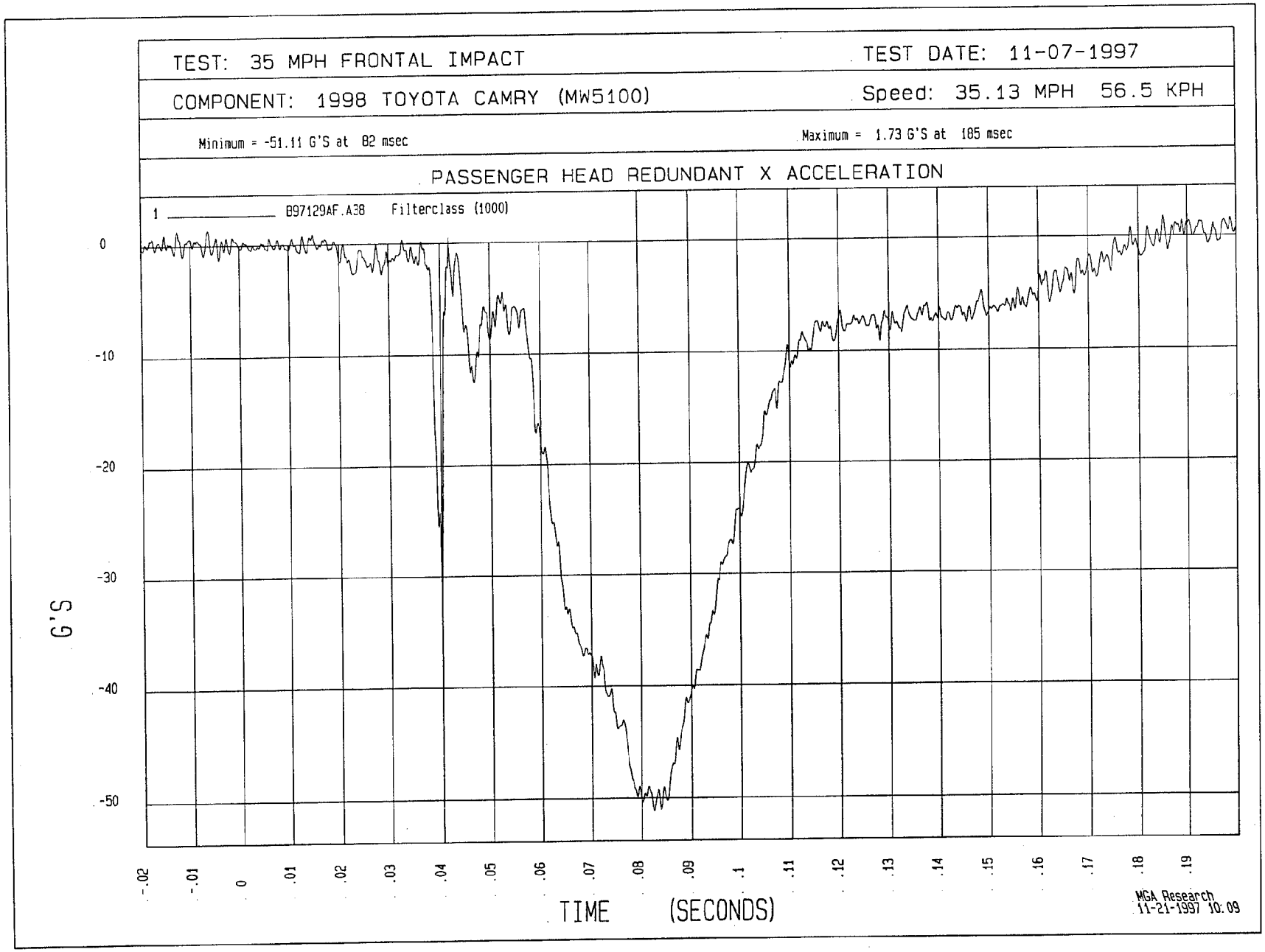

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -52.52 G'S at 83 msec
Maximum = 1.81 G'S at 198 msec
PASSENGER HEAD X ACCELERATION
1 B97129NF.A22 Filterclass (1000)
0
-10
-20
-30
-40
-50
G'S
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:04

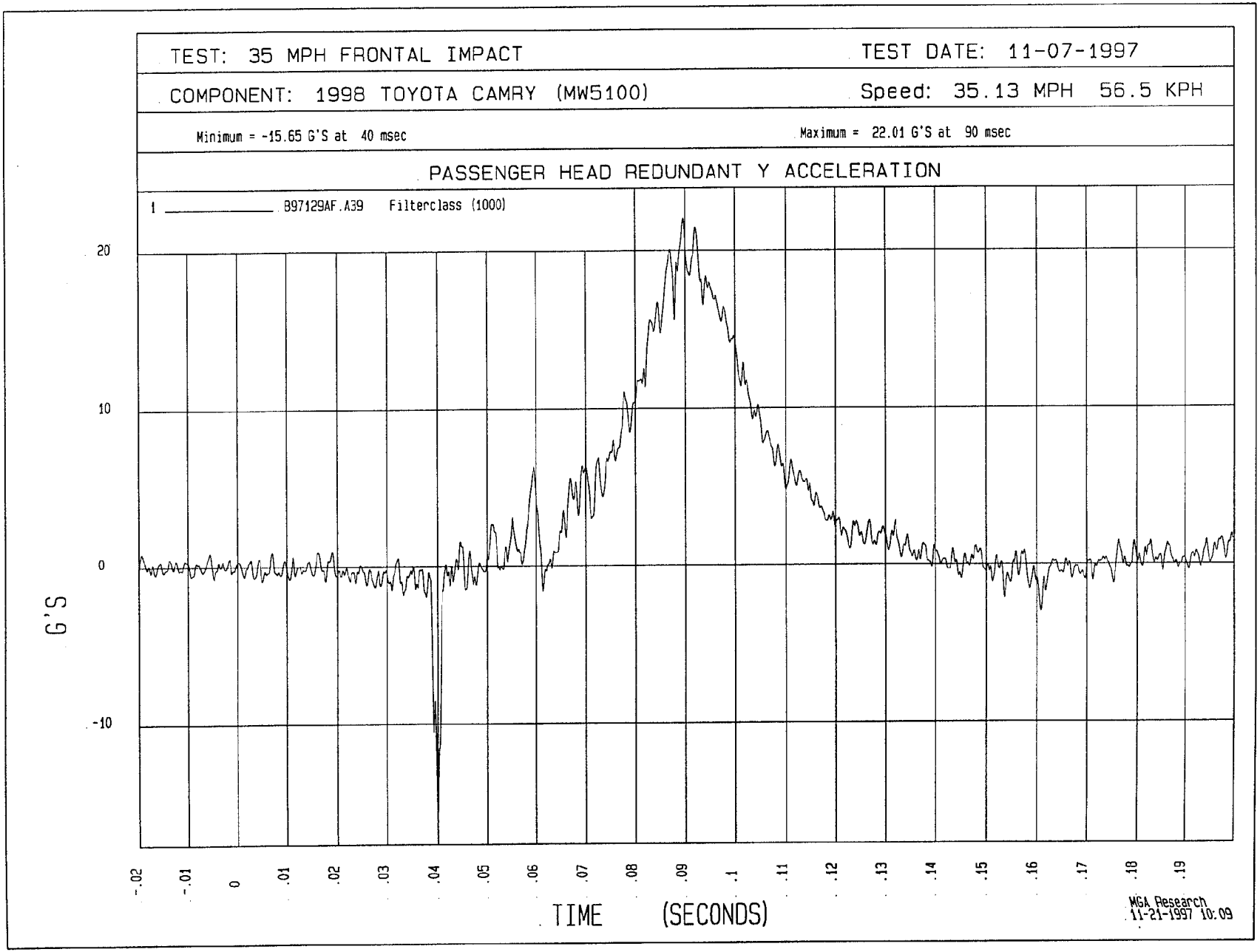

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -12.59 G'S at 40 msec
Maximum = 23.17 G'S at 90 msec
PASSENGER HEAD Y ACCELERATION
1 B97129AF.A23 Filterclass (1000)
24
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:05

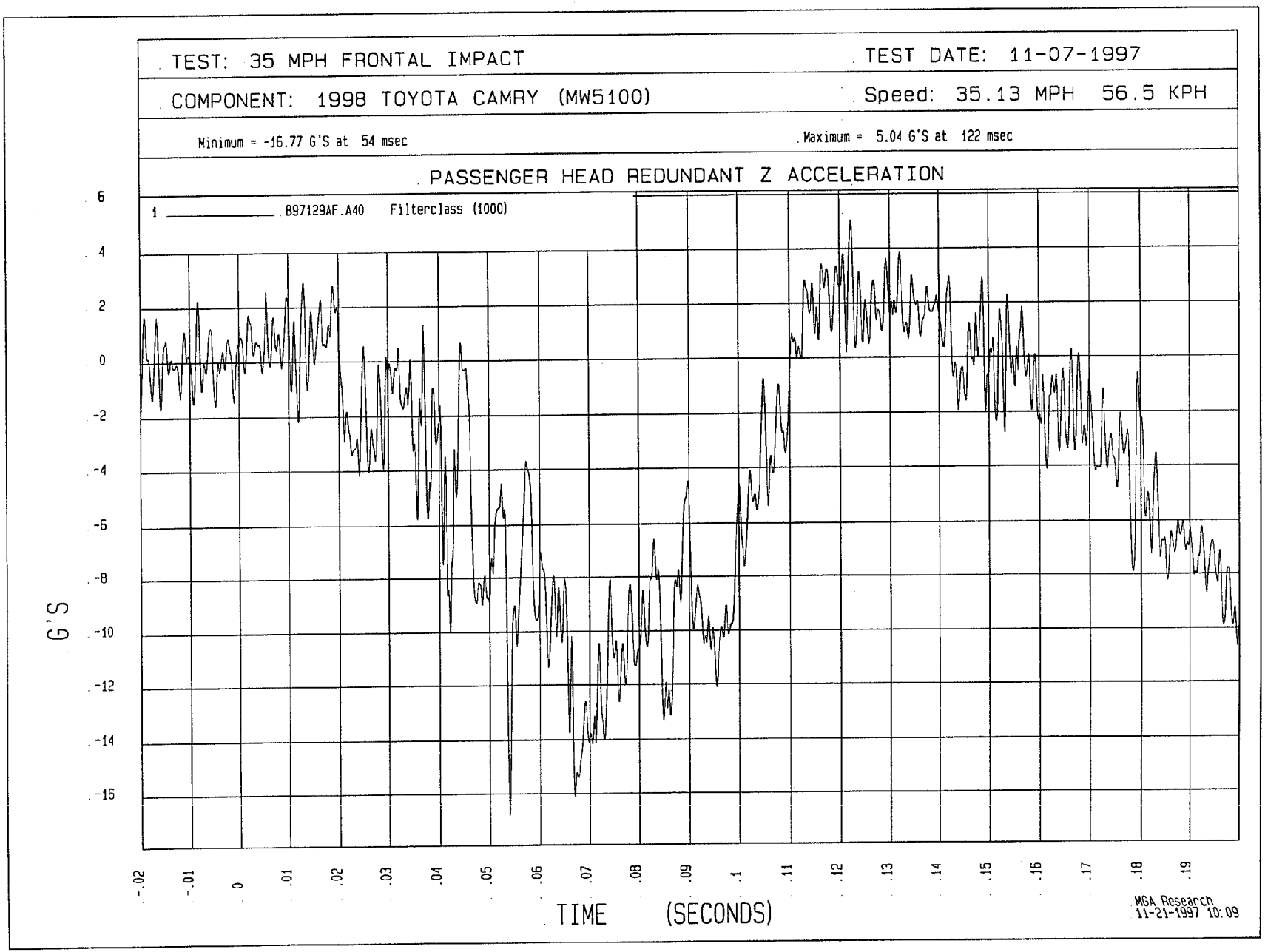

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -17.38 G'S at 68 msec
Maximum = 3.08 G'S at 119 msec
PASSENGER HEAD Z ACCELERATION
1 B97129AF.A24 Filterclass (1000)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:05

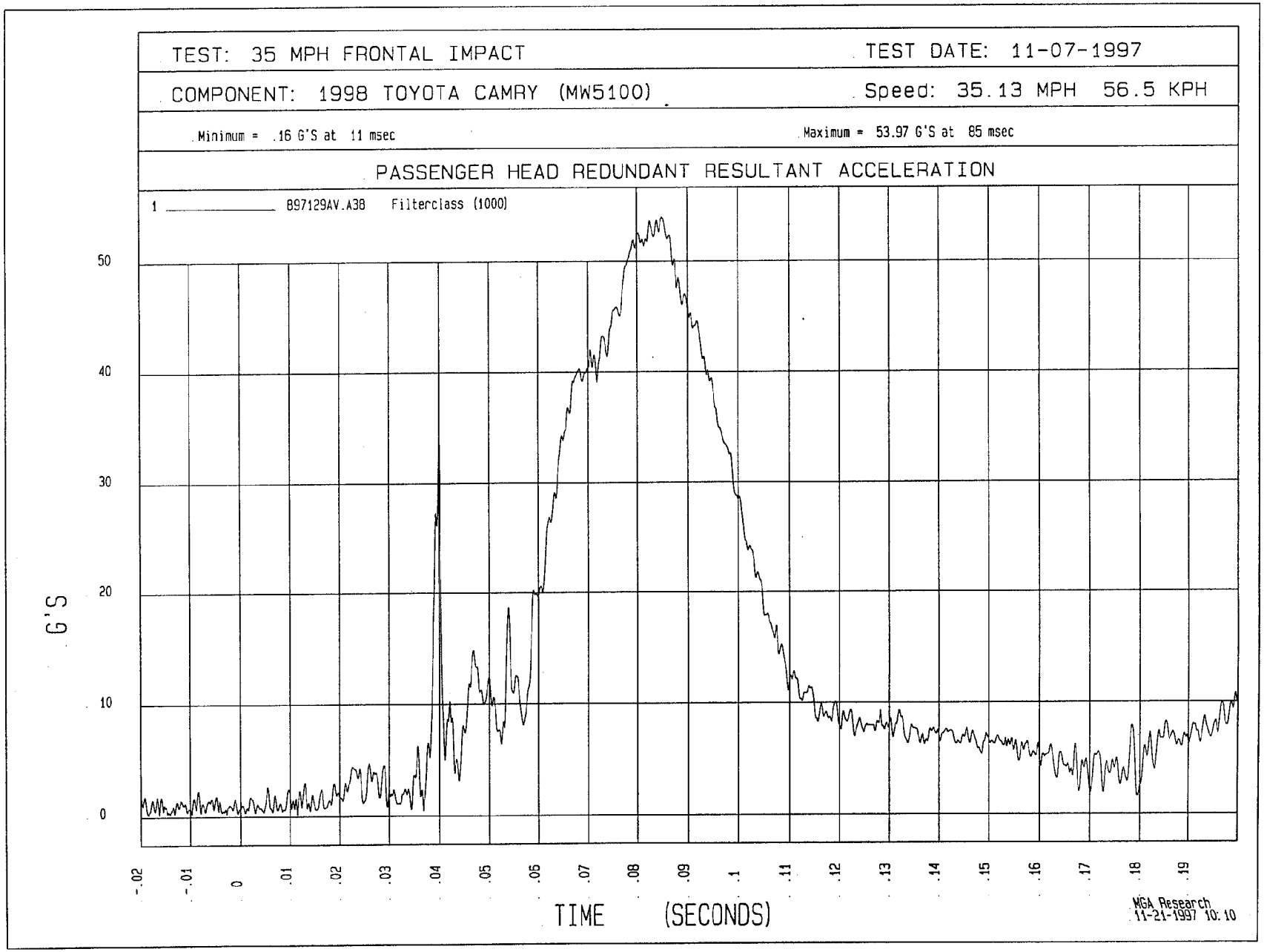

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = .13 G'S at -2 msec
Maximum = 56.66 G'S at 83 msec
PASSENGER HEAD RESULTANT ACCELERATION
1 B97129AV.A22 Filterclass (1000)
G'S
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:05

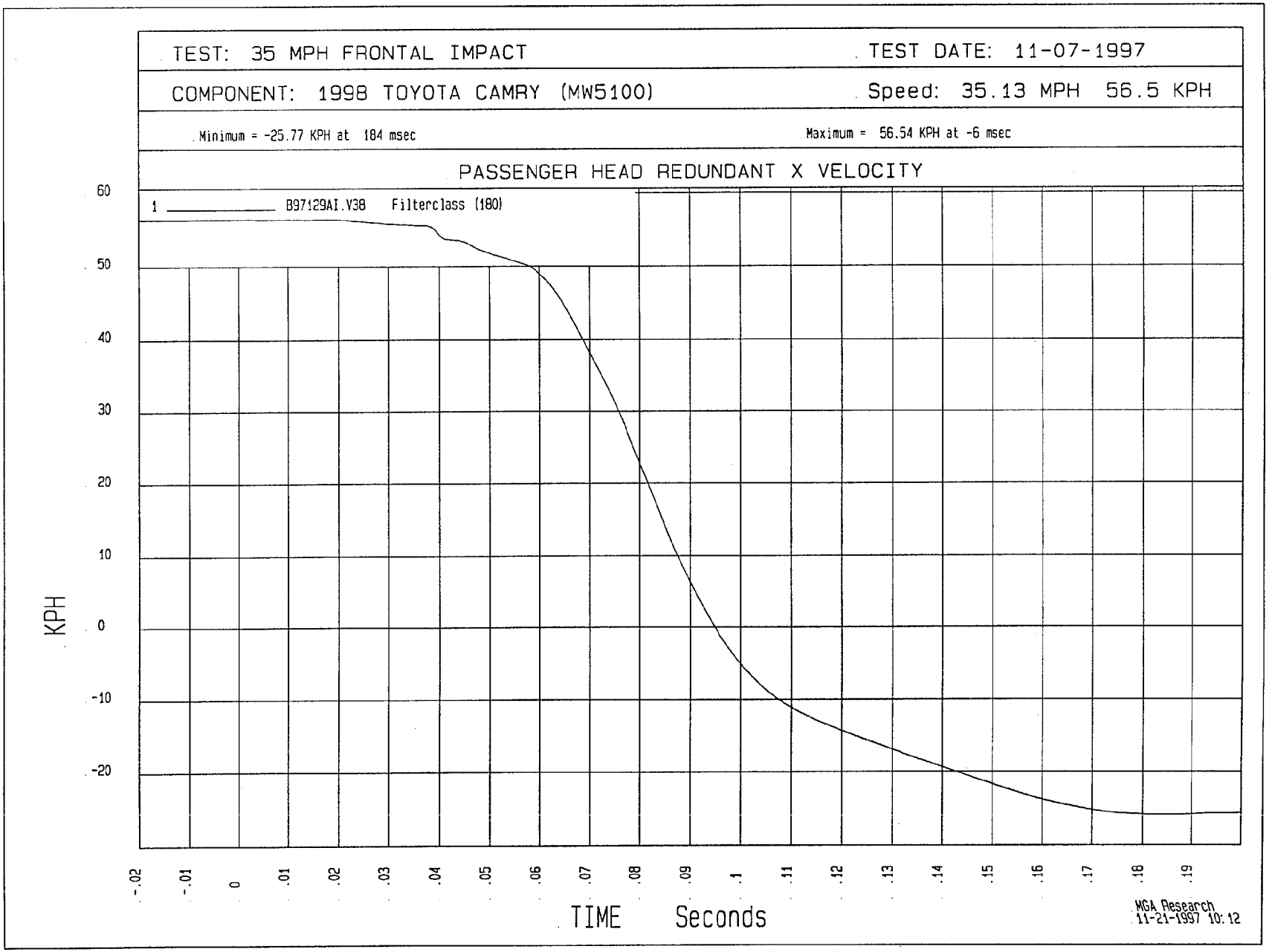

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -27.69 KPH at 186 msec
Maximum = 56.56 KPH at 3 msec
PASSENGER HEAD X VELOCITY
1 B97129AI.V22 Filterclass (180)
KPH
TIME Seconds
NHSA Research
11-21-1997 10:11

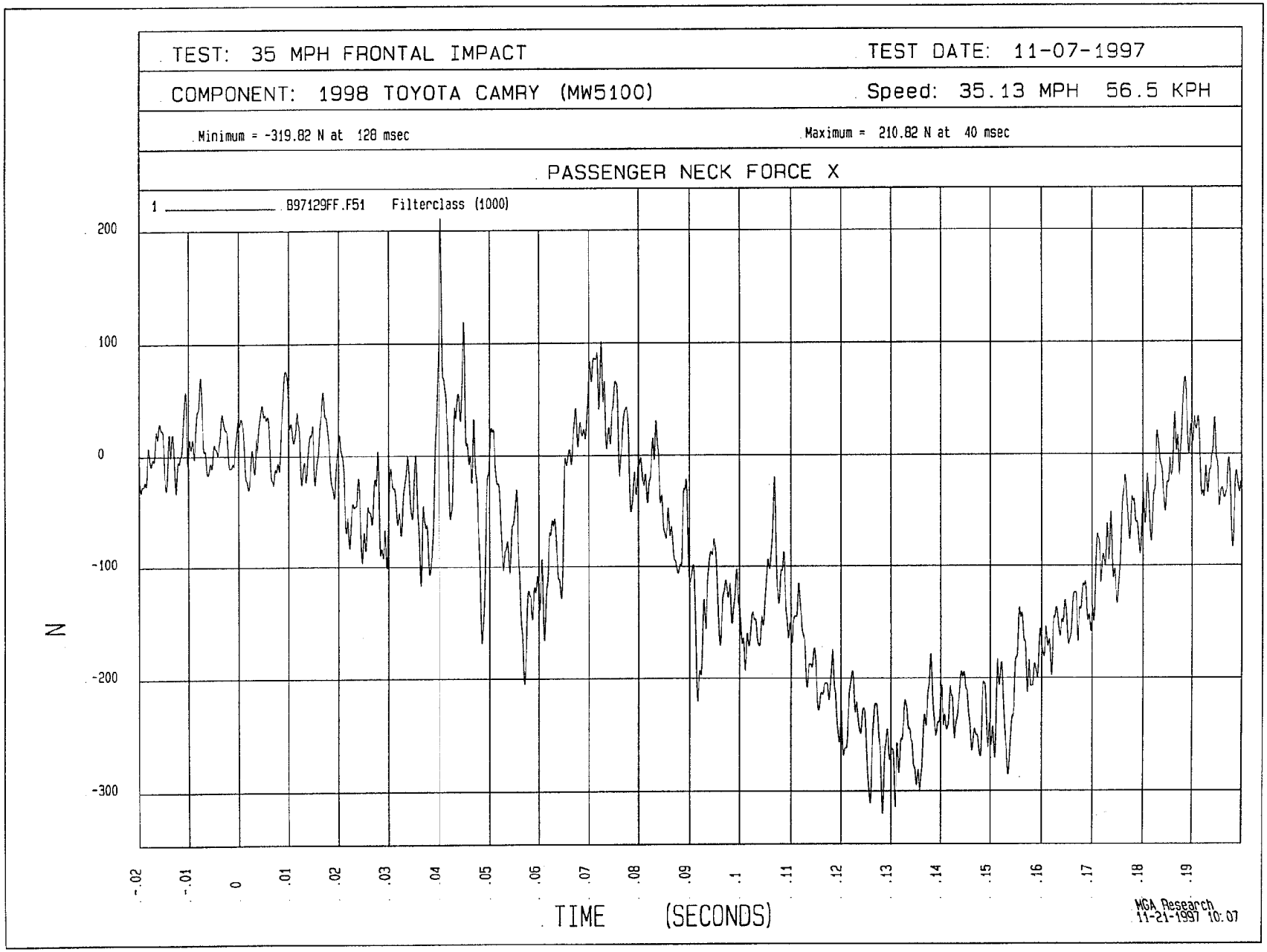

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -51.11 G'S at 82 msec
Maximum = 1.73 G'S at 185 msec
PASSENGER HEAD REDUNDANT X ACCELERATION
1 B97129AF.A38 Filterclass (1000)
0
-10
-20
-30
-40
-50
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:09

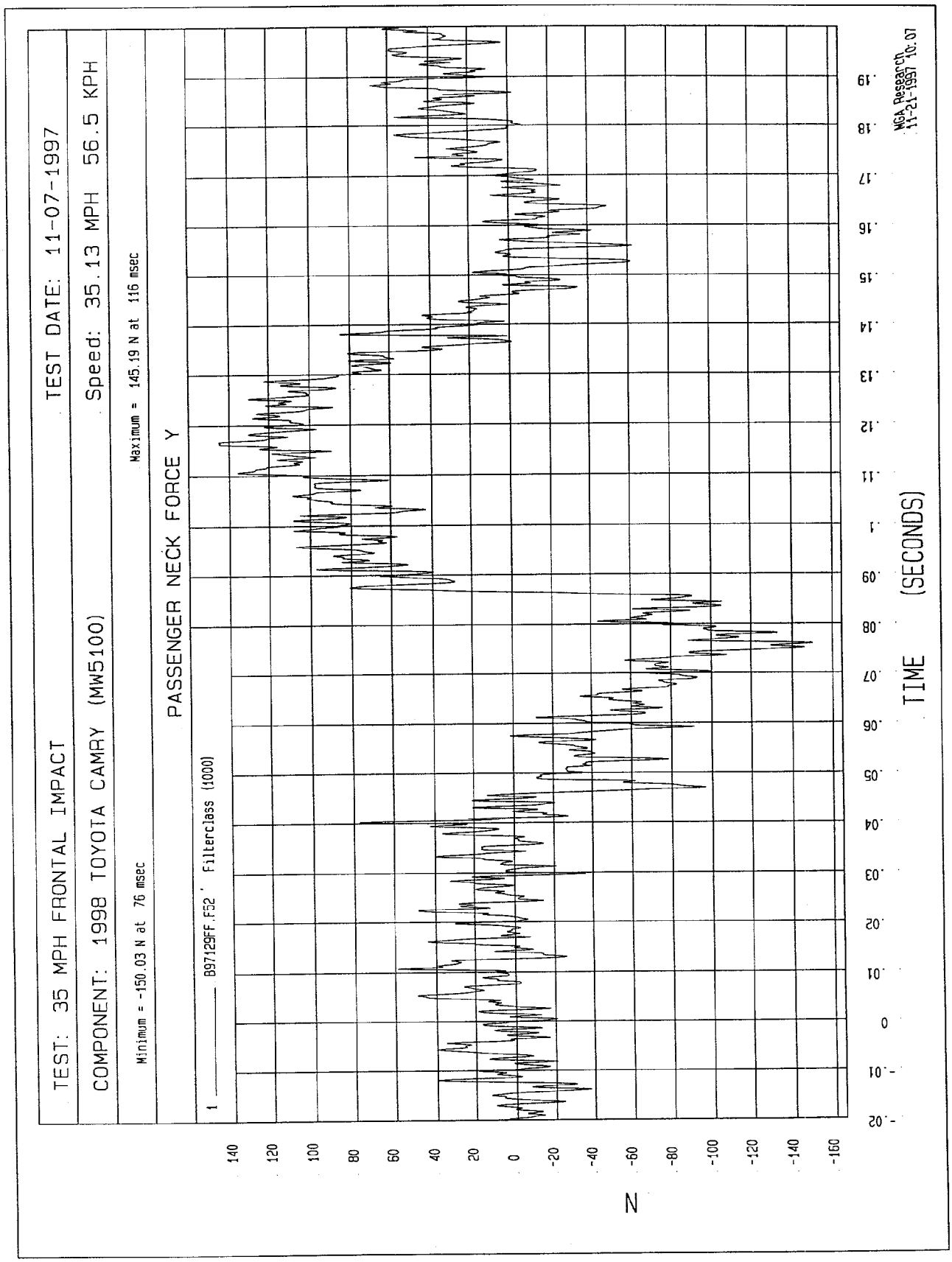

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -15.65 G'S at 40 msec
Maximum = 22.01 G'S at 90 msec
PASSENGER HEAD REDUNDANT Y ACCELERATION
1 B97129AF.A39 Filterclass (1000)
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:09

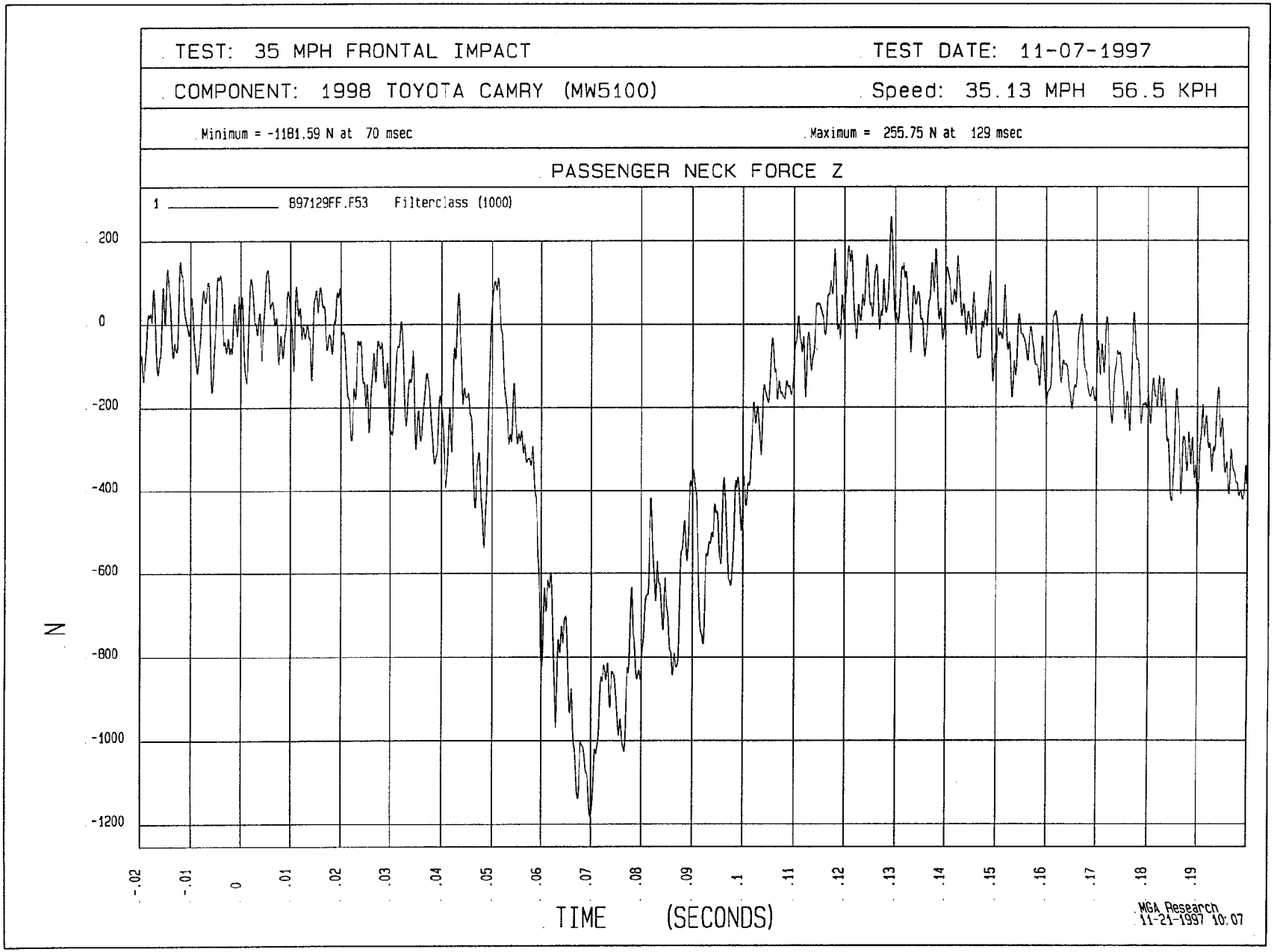

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -16.77 G'S at 54 msec
Maximum = 5.04 G'S at 122 msec
PASSENGER HEAD REDUNDANT Z ACCELERATION
1 B97129AF.A40 Filterclass (1000)
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:09

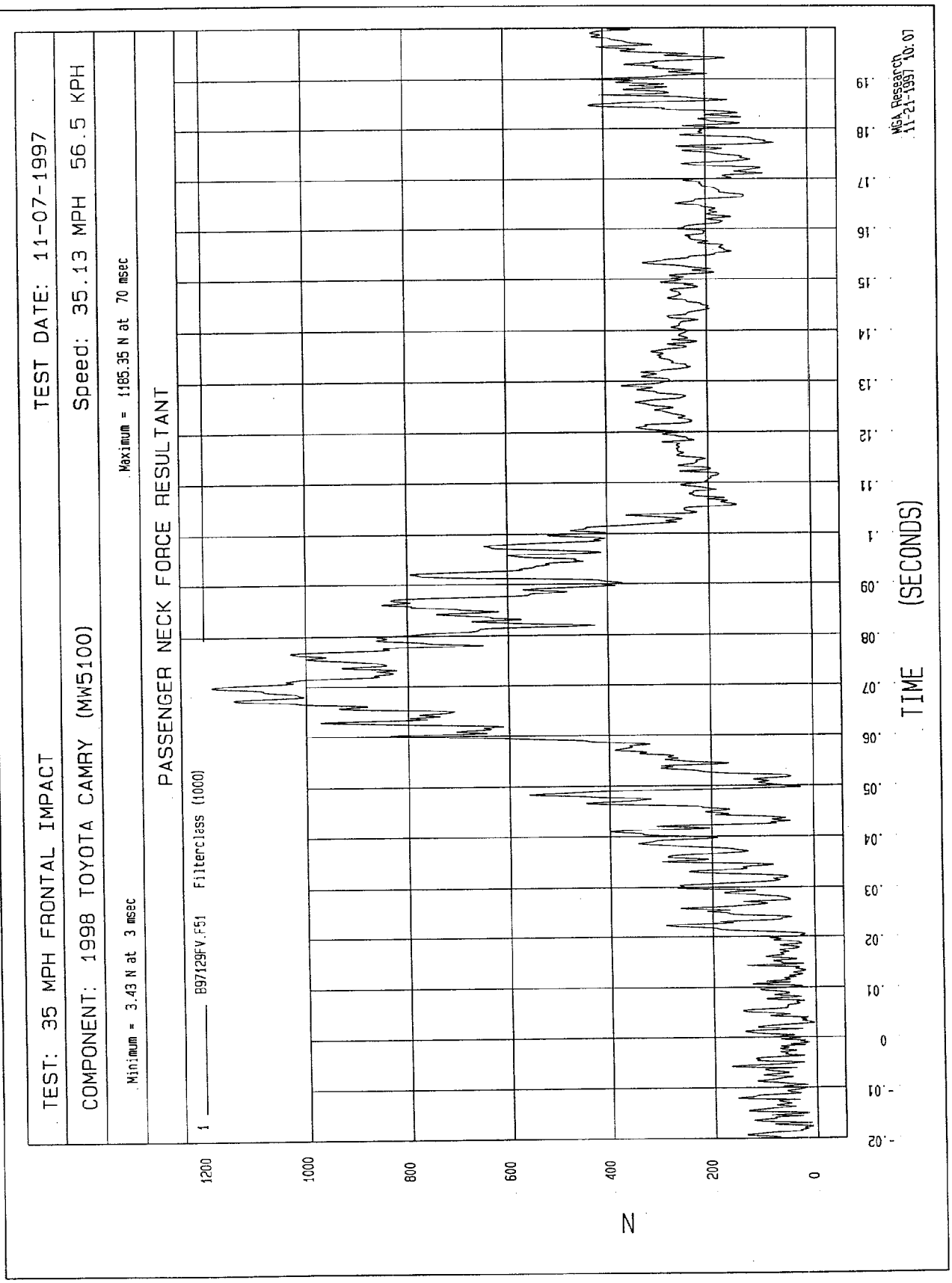

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = .16 G'S at 11 msec
Maximum = 53.97 G'S at 85 msec
PASSENGER HEAD REDUNDANT RESULTANT ACCELERATION
1 B97129AV.A38 Filterclass (1000)
G'S
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:10

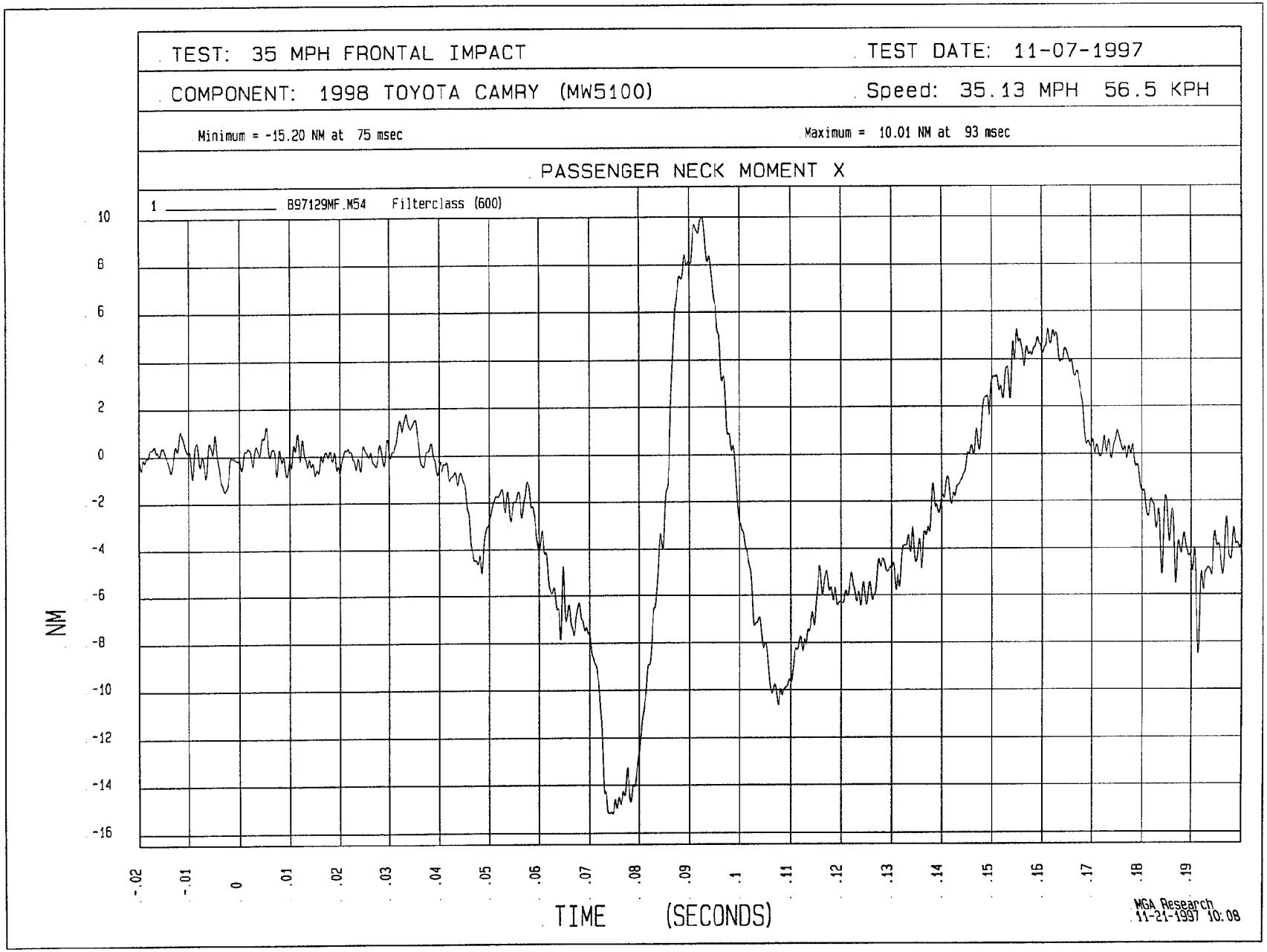

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -25.77 KPH at 184 msec
Maximum = 56.54 KPH at -6 msec
PASSENGER HEAD REDUNDANT X VELOCITY
1 B97129AI.V38 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:12

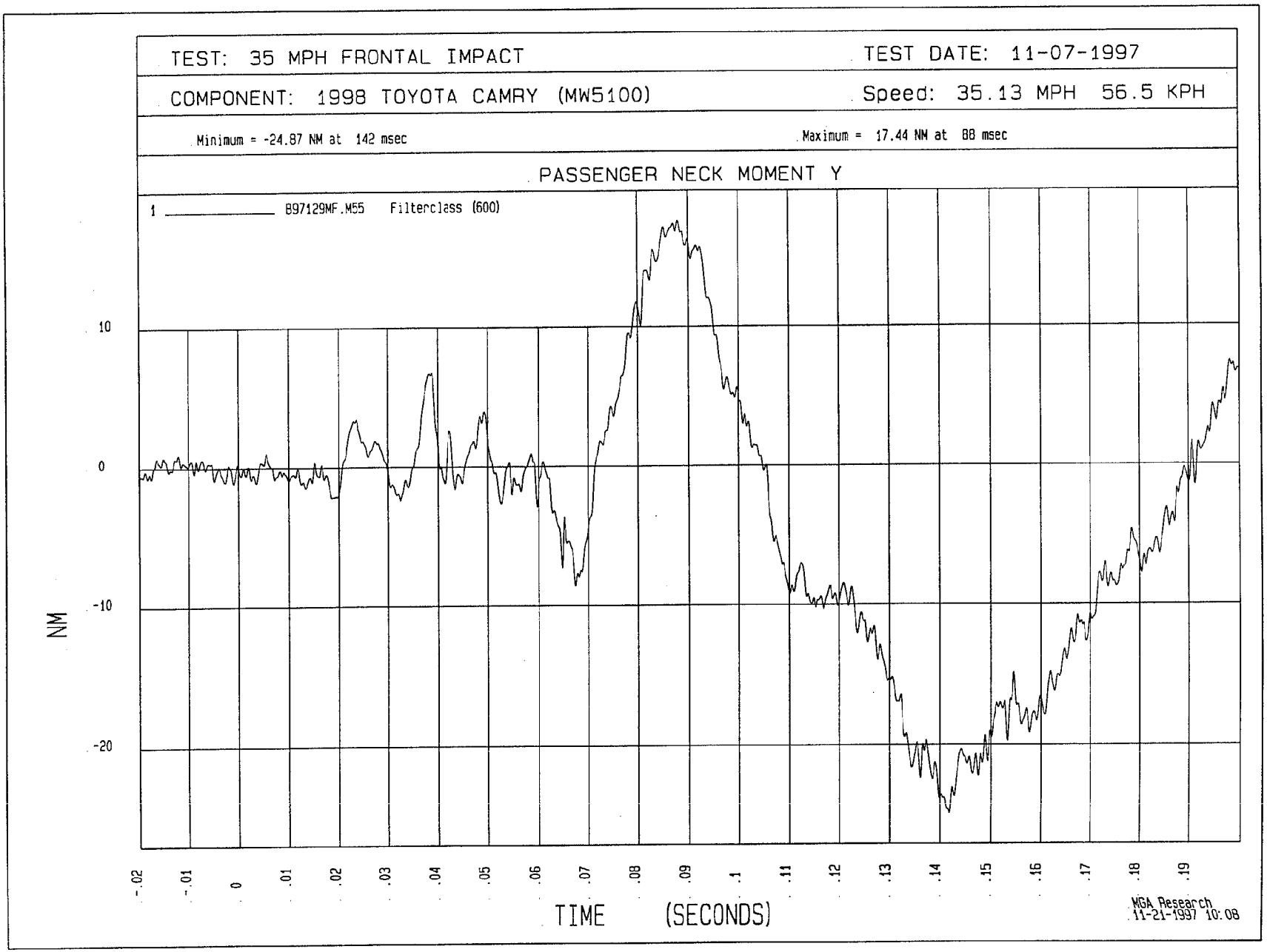

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -319.82 N at 128 msec
Maximum = 210.82 N at 40 msec
PASSENGER NECK FORCE X
1 B97129FF.F51 Filterclass (1000)
200
100
0
-100
-200
-300
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:07

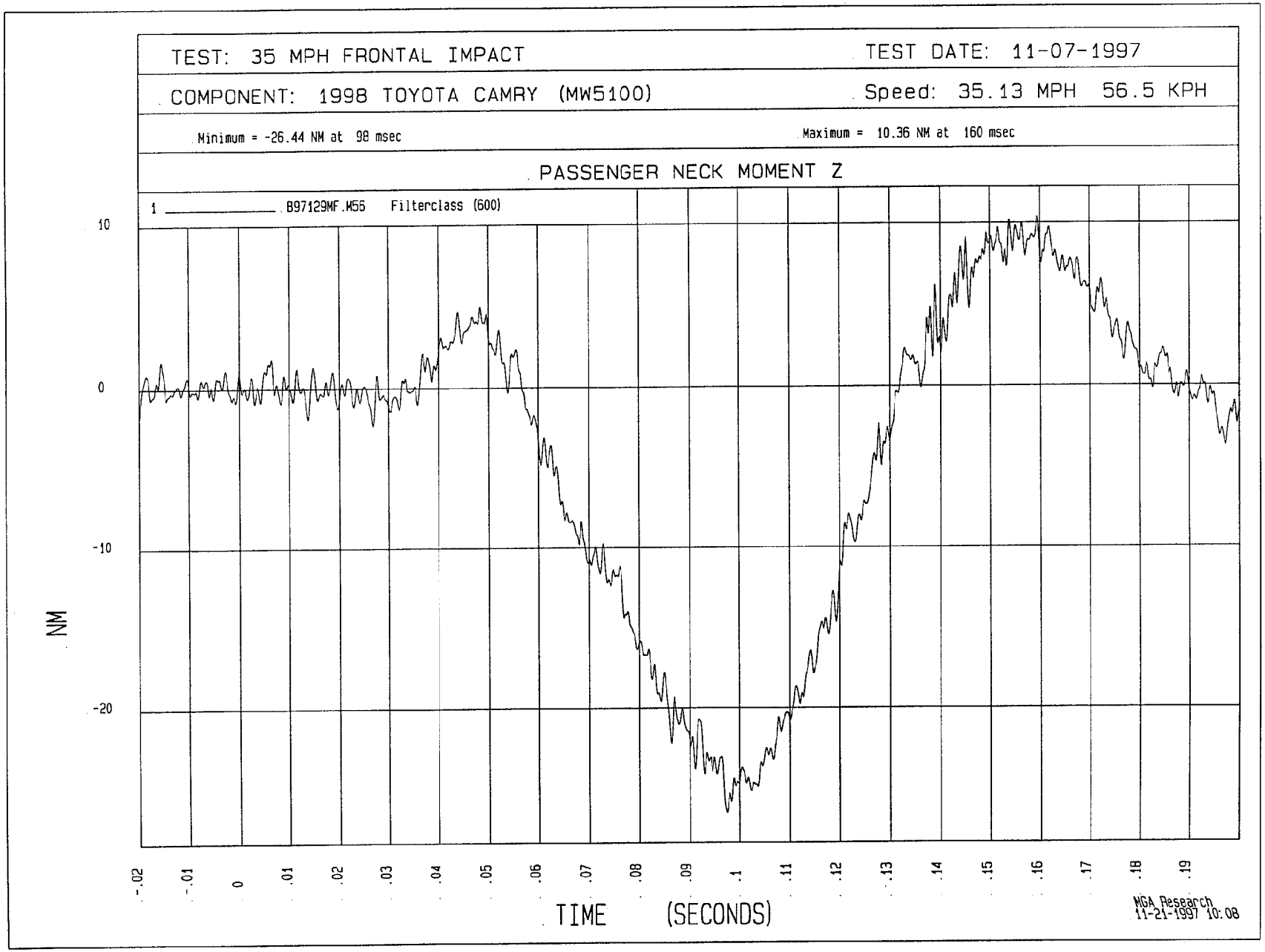

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -150.03 N at 76 msec
Maximum = 145.19 N at 116 msec
PASSENGER NECK FORCE Y
1 B97129FF.F52 ' Filterclass (1000)
N
TIME (SECONDS)
NGA Research
11-21-1997 10:07

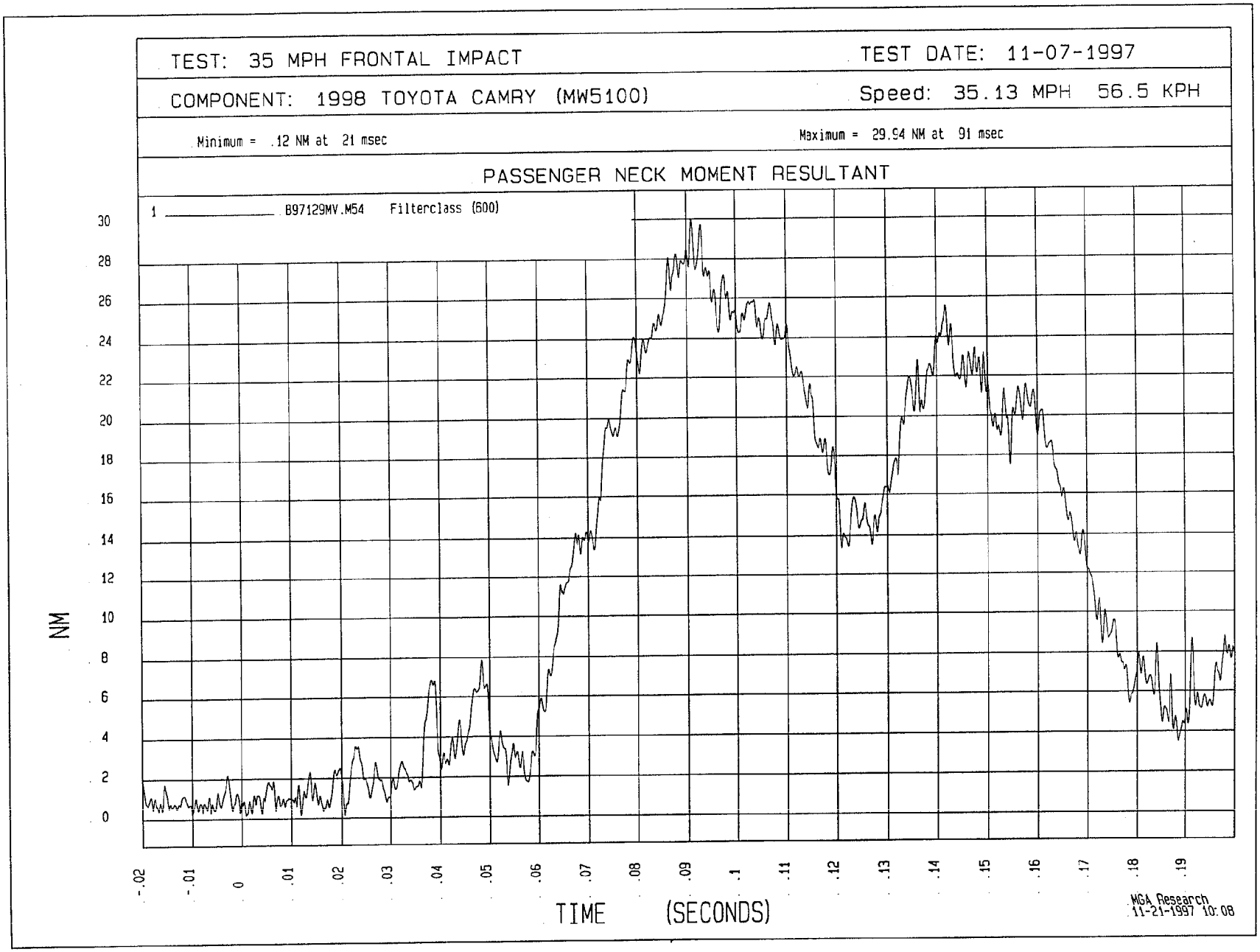

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1181.59 N at 70 msec
Maximum = 255.75 N at 129 msec
PASSENGER NECK FORCE Z
1 B97129FF.F53 Filterclass (1000)
200
0
-200
-400
-600
-800
-1000
-1200
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:07

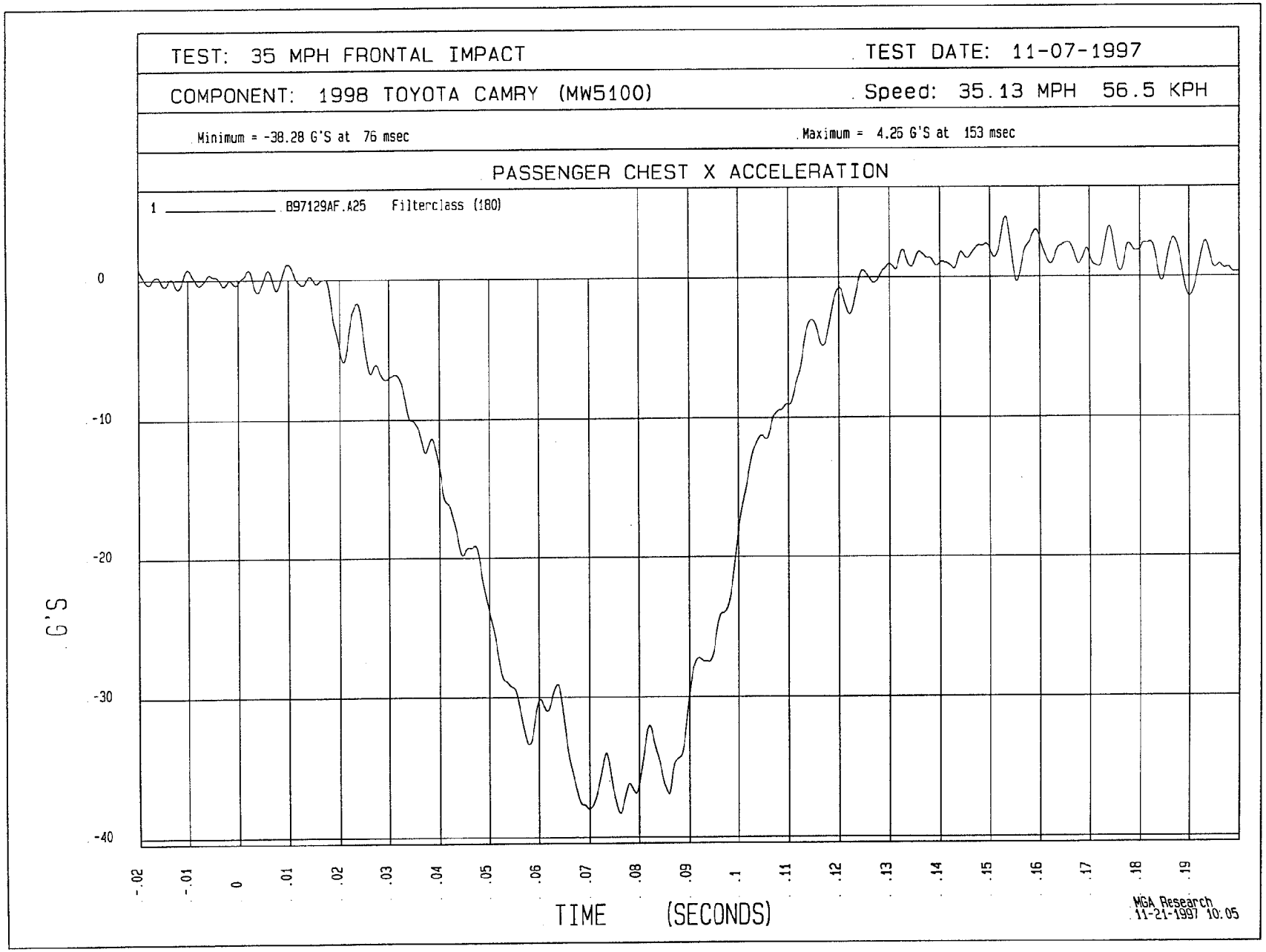

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 3.43 N at 3 msec
Maximum = 1185.35 N at 70 msec
PASSENGER NECK FORCE RESULTANT
1 B97129FV.F51 Filterclass (1000)
1200
1000
800
600
400
200
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:07

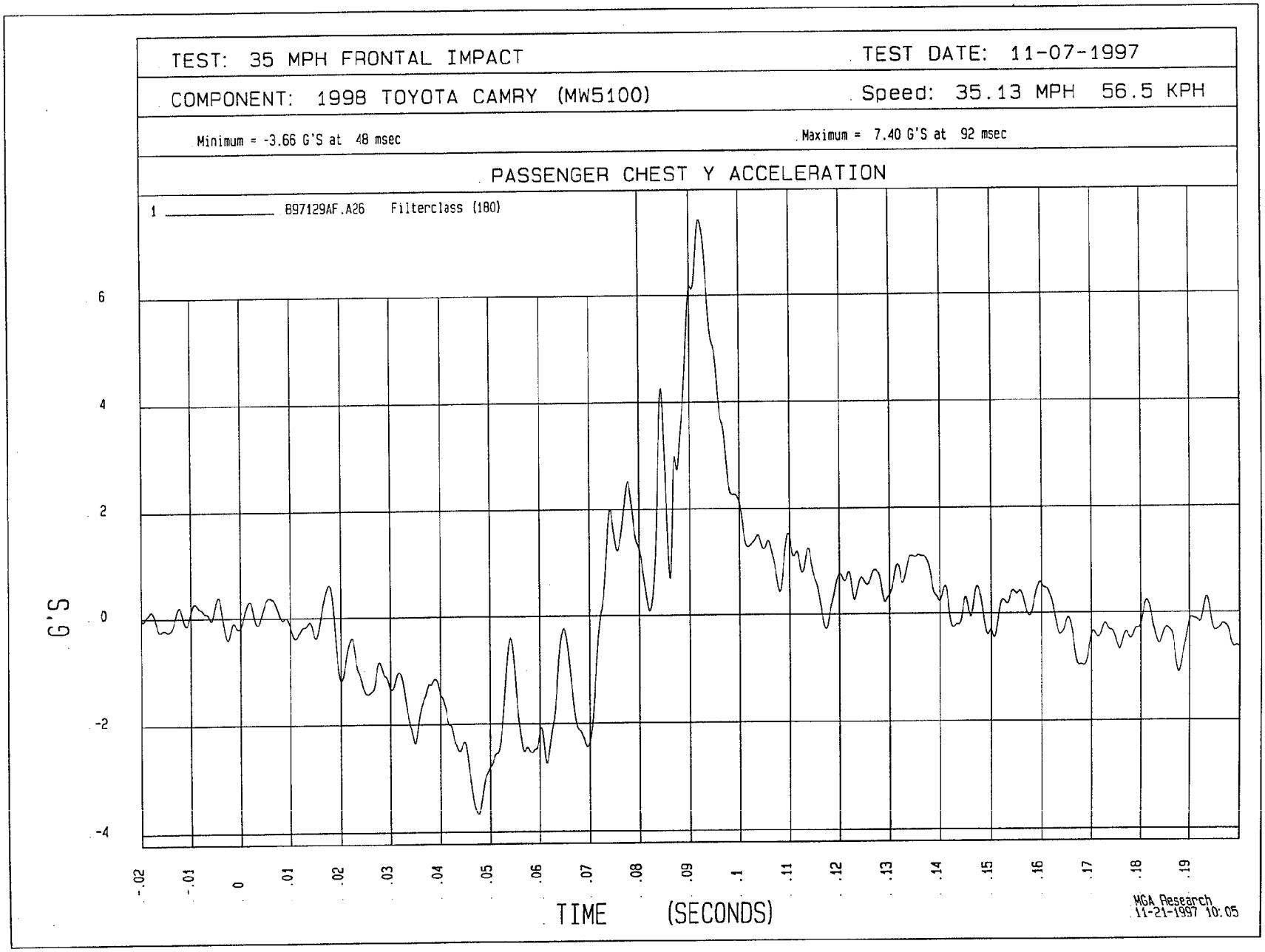

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -15.20 NM at 75 msec
Maximum = 10.01 NM at 93 msec
PASSENGER NECK MOMENT X
1 B97129MF.M54 Filterclass (600)
NM
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

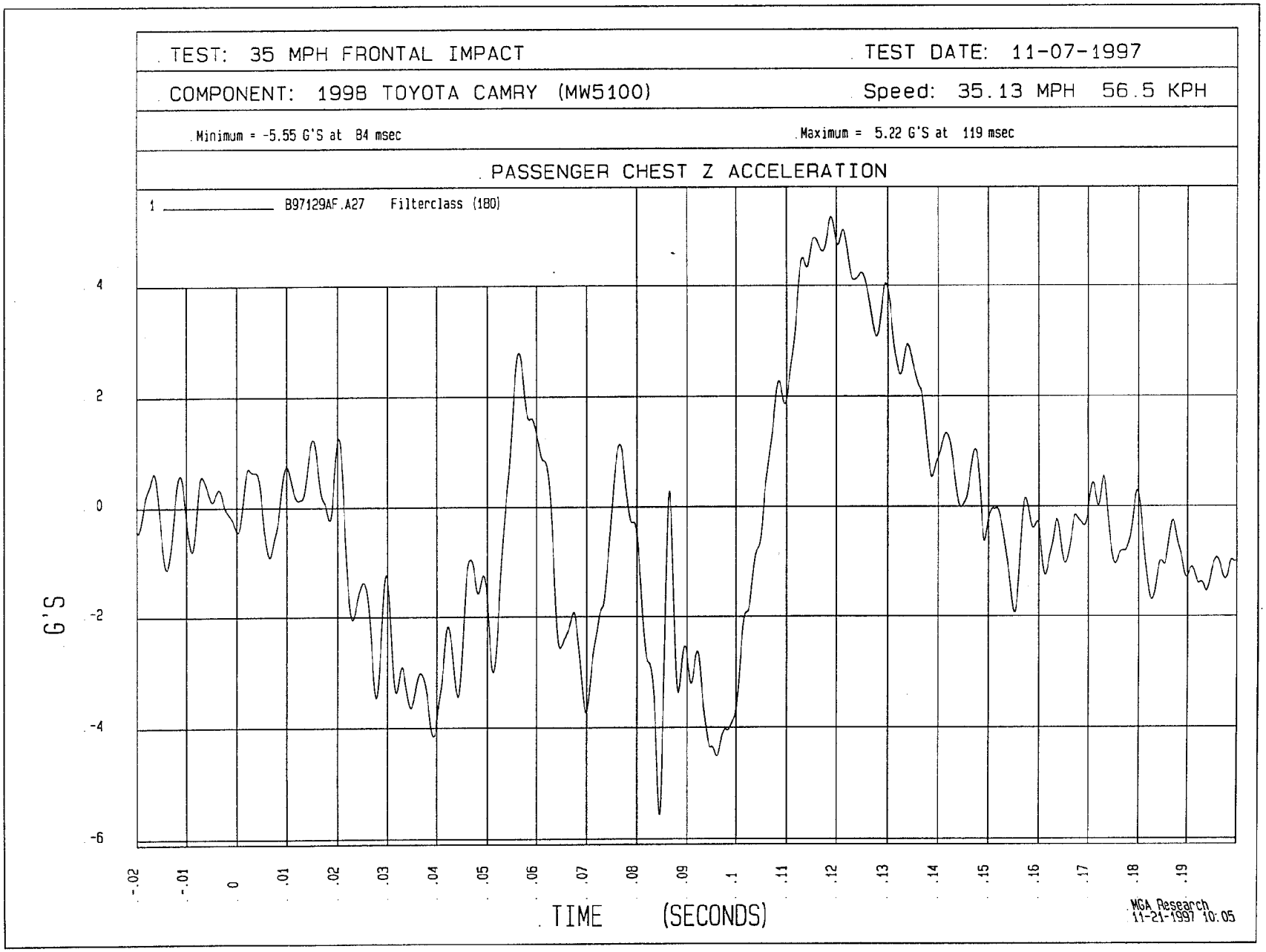

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -24.87 NM at 142 msec
Maximum = 17.44 NM at 88 msec
PASSENGER NECK MOMENT Y
1 B97129MF.M55 Filterclass (600)
10
0
-10
-20
NM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

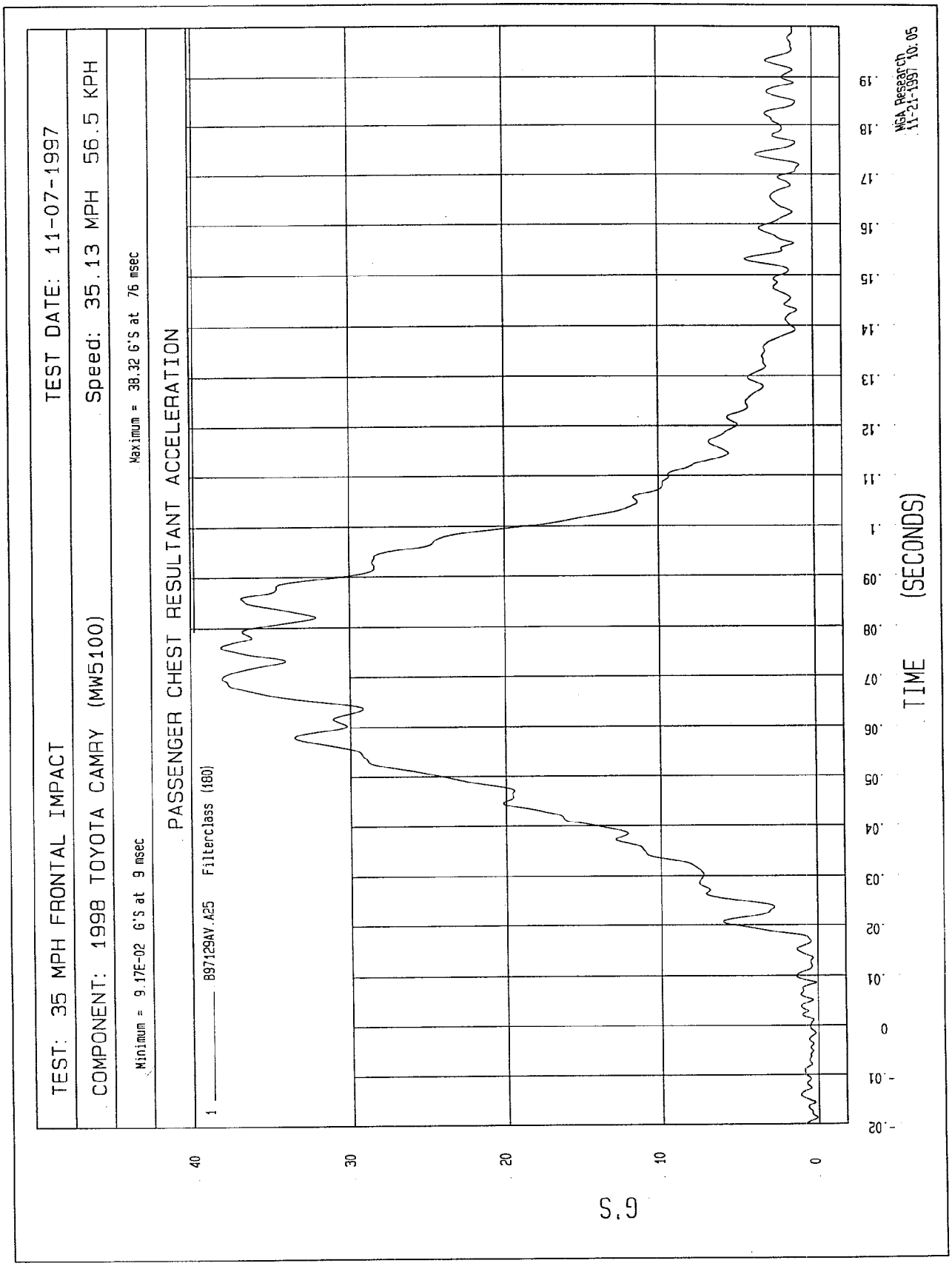

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -26.44 NM at 98 msec
Maximum = 10.36 NM at 160 msec
PASSENGER NECK MOMENT Z
1 B97129MF.M55 Filterclass (600)
10
0
-10
-20
NM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

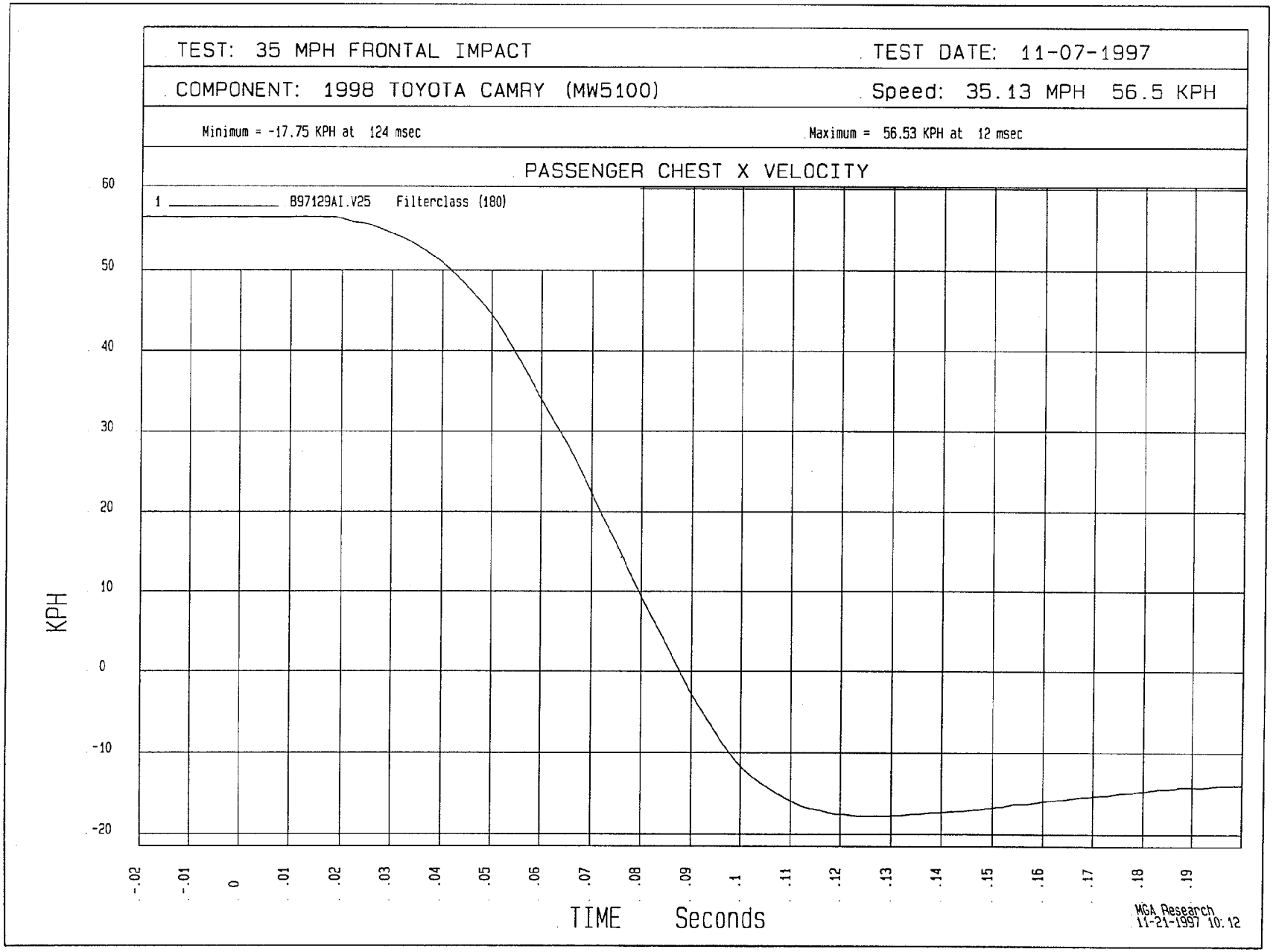

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = .12 NM at 21 msec
Maximum = 29.94 NM at 91 msec
PASSENGER NECK MOMENT RESULTANT
1 B97129MV.M54 Filterclass (600)
NM
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

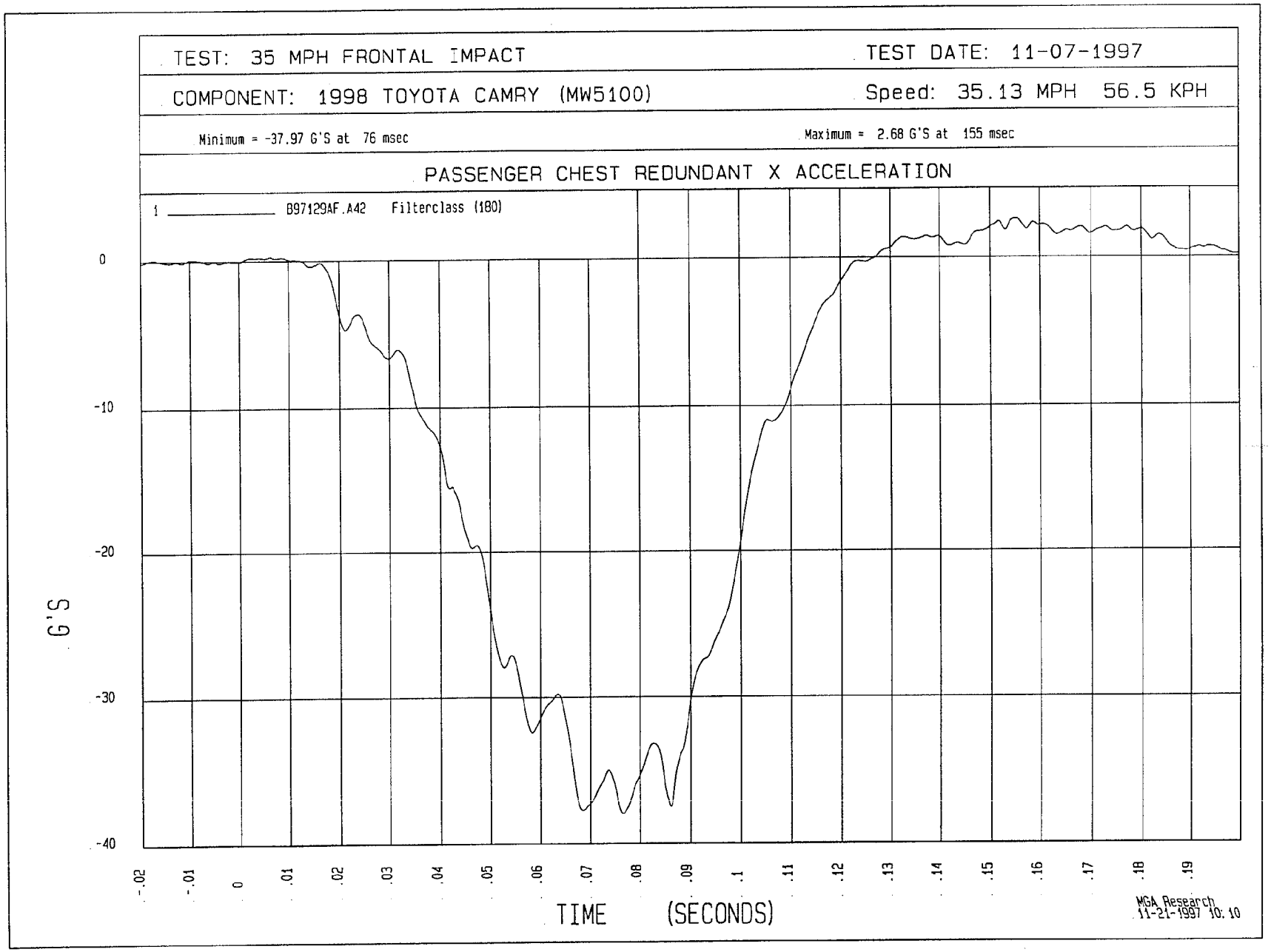

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -38.28 G'S at 76 msec
Maximum = 4.25 G'S at 153 msec
PASSENGER CHEST X ACCELERATION
1 B97129AF.A25 Filterclass (180)
0
-10
-20
-30
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:05

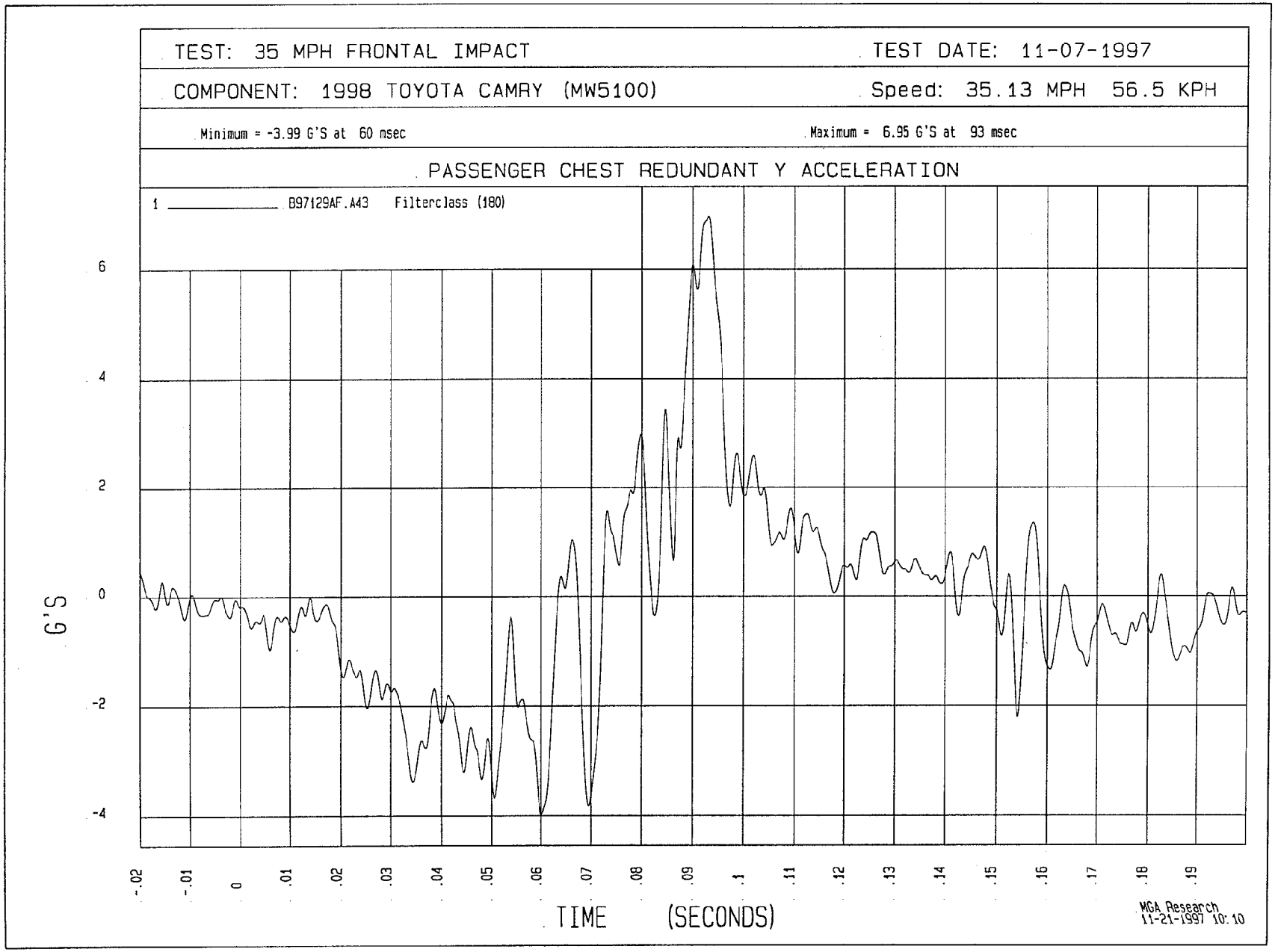

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -3.66 G'S at 48 msec
Maximum = 7.40 G'S at 92 msec
PASSENGER CHEST Y ACCELERATION
1 B97129AF.A26 Filterclass (180)
6
4
2
0
-2
-4
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:05

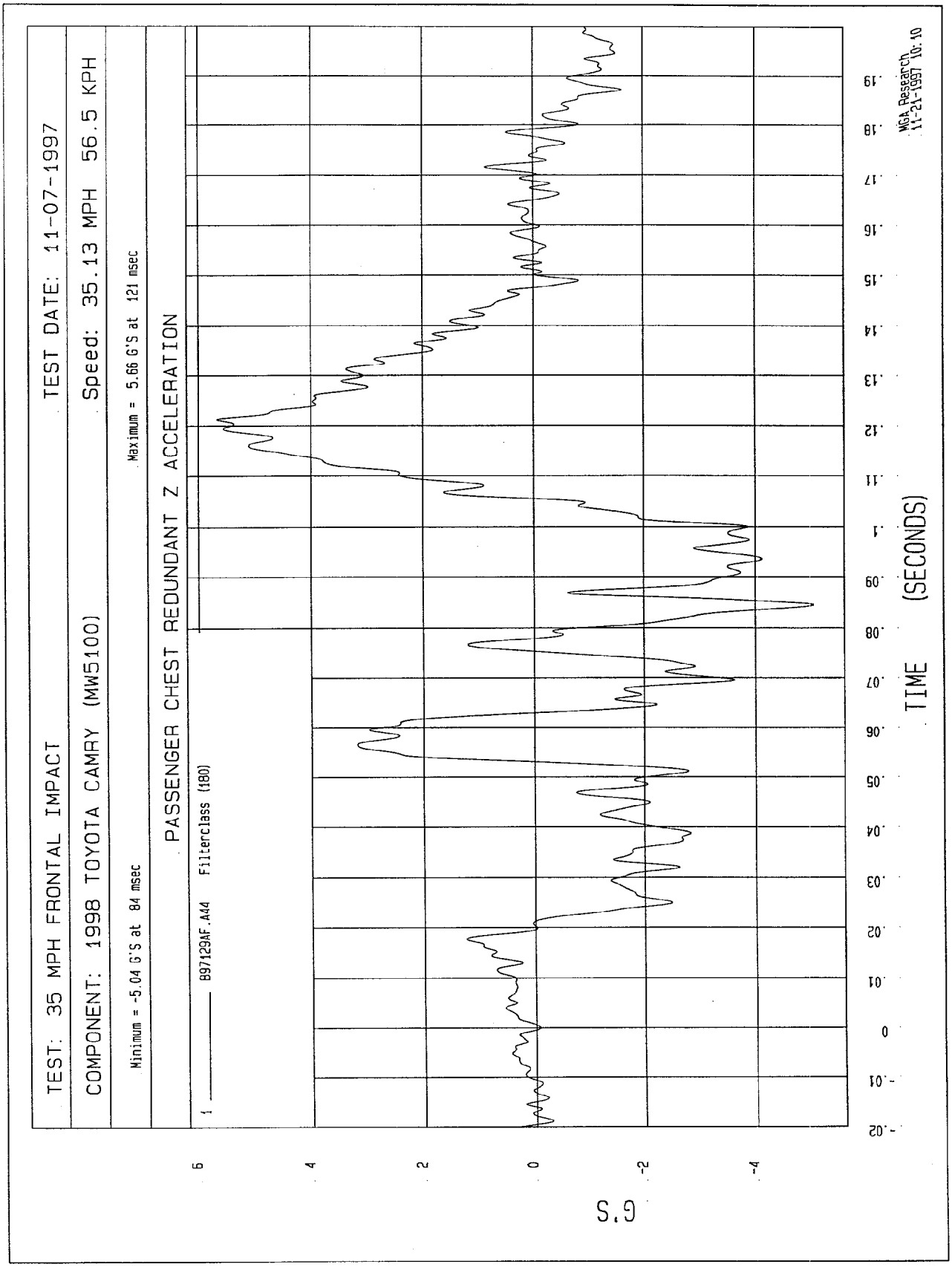

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -5.55 G'S at 84 msec
Maximum = 5.22 G'S at 119 msec
PASSENGER CHEST Z ACCELERATION
1 B97129AF.A27 Filterclass (180)
G'S
4
2
0
-2
-4
-6
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:05

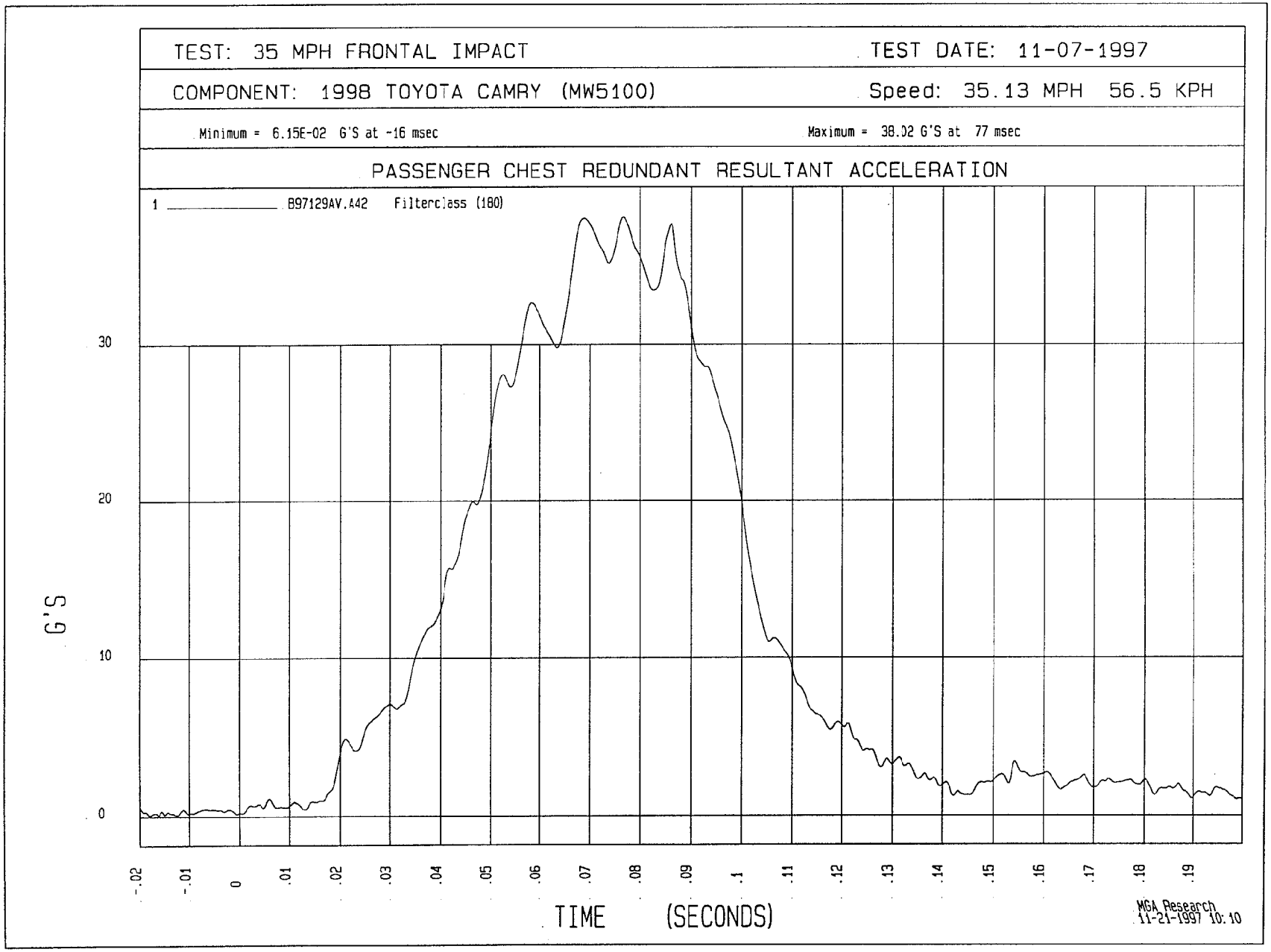

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 9.17E-02 G'S at 9 msec
Maximum = 38.32 G'S at 76 msec
PASSENGER CHEST RESULTANT ACCELERATION
1 B97129AV.A25 Filterclass (180)
NGA Research 11-21-1997 10:05
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
G's


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -17.75 KPH at 124 msec
Maximum = 56.53 KPH at 12 msec
PASSENGER CHEST X VELOCITY
1 B97129AI.V25 Filterclass (180)
60
50
40
30
20
10
0
-10
-20
KPH
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:12


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -37.97 G'S at 76 msec
Maximum = 2.68 G'S at 155 msec
PASSENGER CHEST REDUNDANT X ACCELERATION
1 B97129AF.A42 Filterclass (180)
0
-10
-20
-30
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:10


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -3.99 G'S at 60 msec
Maximum = 6.95 G'S at 93 msec
PASSENGER CHEST REDUNDANT Y ACCELERATION
1 B97129AF.A43 Filterclass (180)
6
4
2
0
-2
-4
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:10


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -5.04 G'S at 84 msec
Maximum = 5.66 G'S at 121 msec
PASSENGER CHEST REDUNDANT Z ACCELERATION
1 B97129AF.A44 Filterclass (180)
6
4
2
0
-2
-4
G'S
.19
.18
.17
.16
.15
.14
.13
.12
.11
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
0
-.01
-.02
TIME (SECONDS)
NGA Research
11-21-1997 10:10


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 6.15E-02 G'S at -16 msec
Maximum = 38.02 G'S at 77 msec
PASSENGER CHEST REDUNDANT RESULTANT ACCELERATION
1 B97129AV.A42 Filterclass (180)
G'S
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
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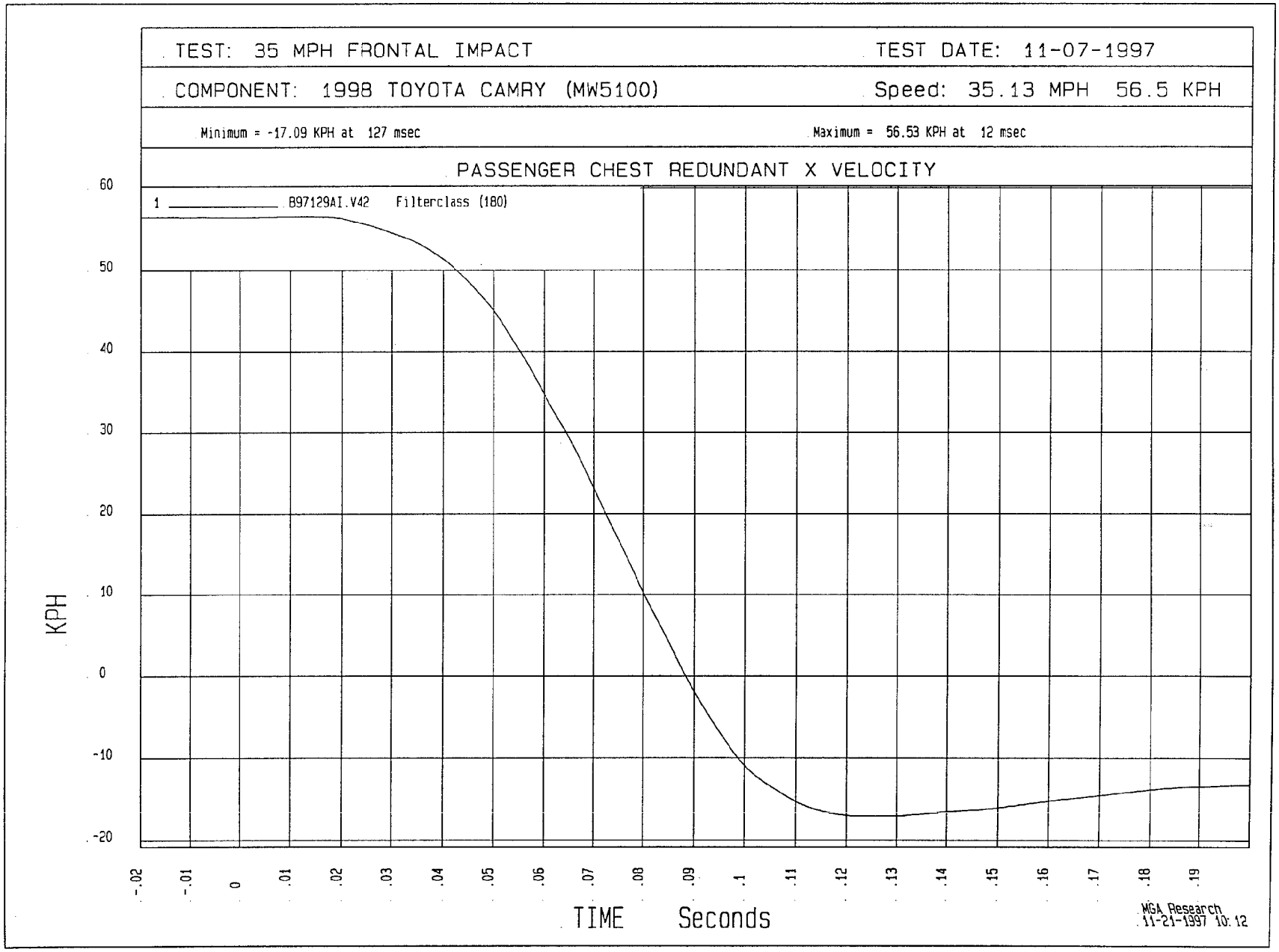
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:10


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -17.09 KPH at 127 msec
Maximum = 56.53 KPH at 12 msec
PASSENGER CHEST REDUNDANT X VELOCITY
1 B97129AI.V42 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
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.17
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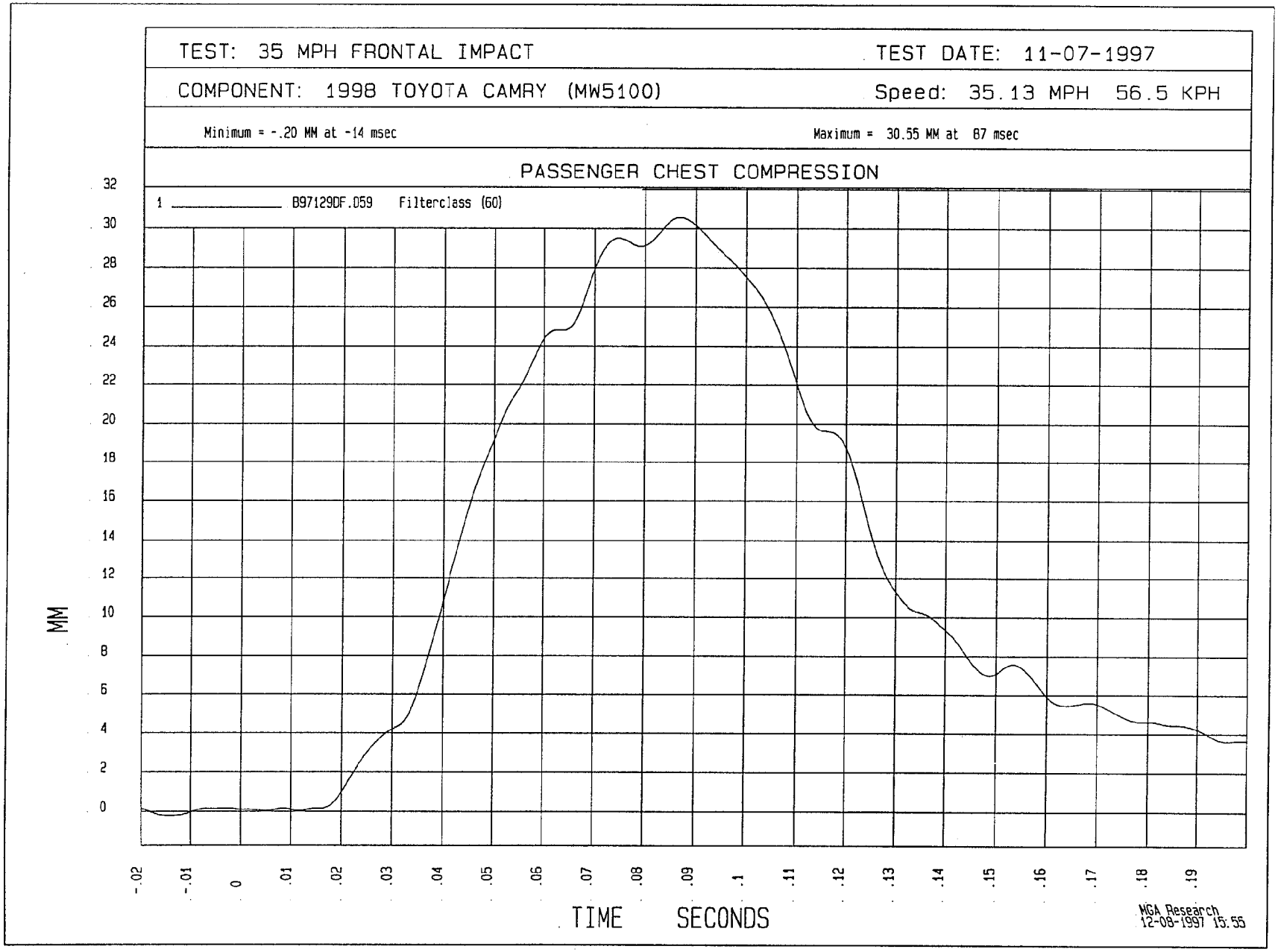
.19
TIME Seconds
MGA Research
11-21-1997 10:12


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -.20 MM at -14 msec
Maximum = 30.55 MM at 87 msec
PASSENGER CHEST COMPRESSION
1 B97129DF.059 Filterclass (60)
MM
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
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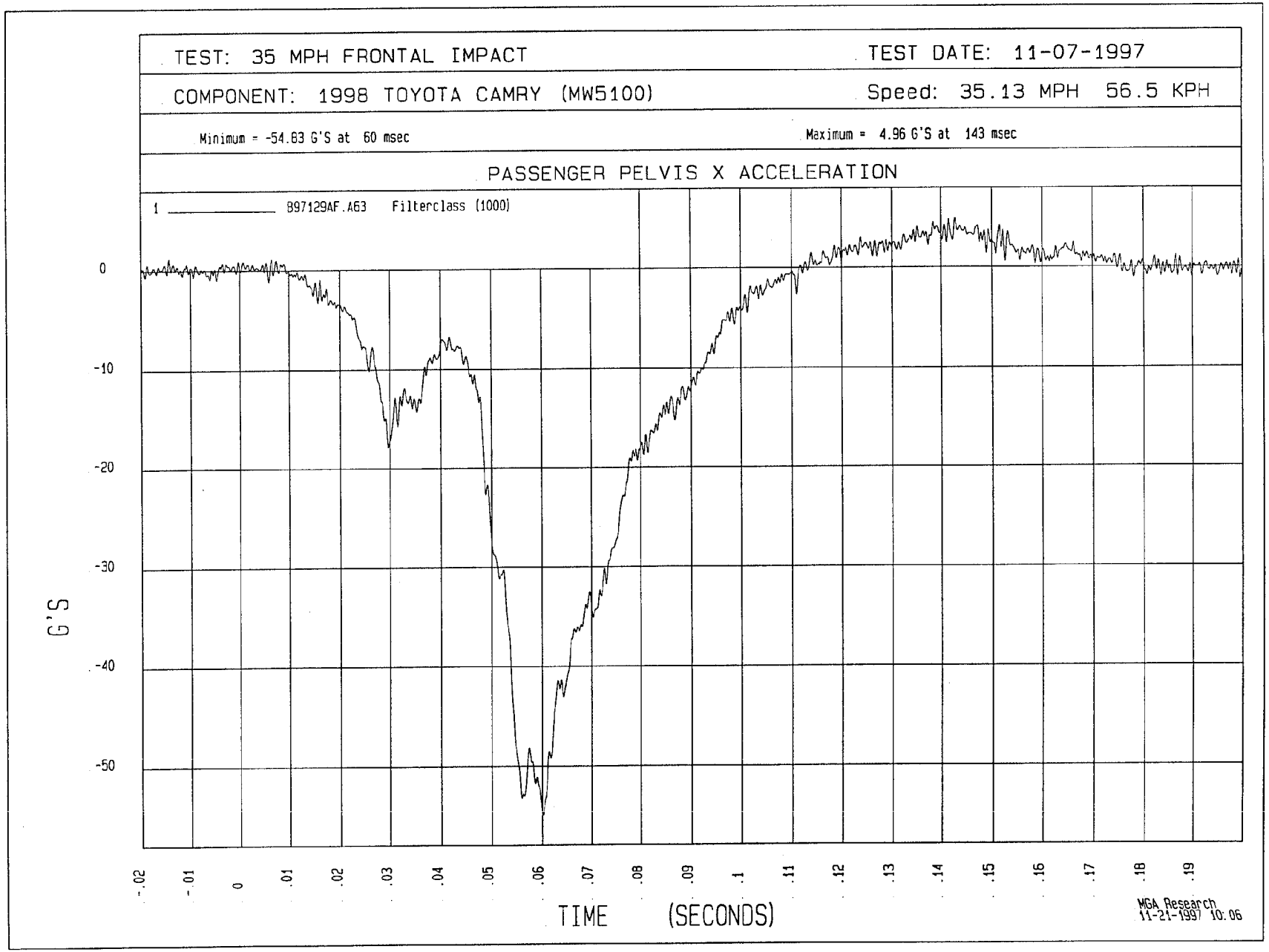
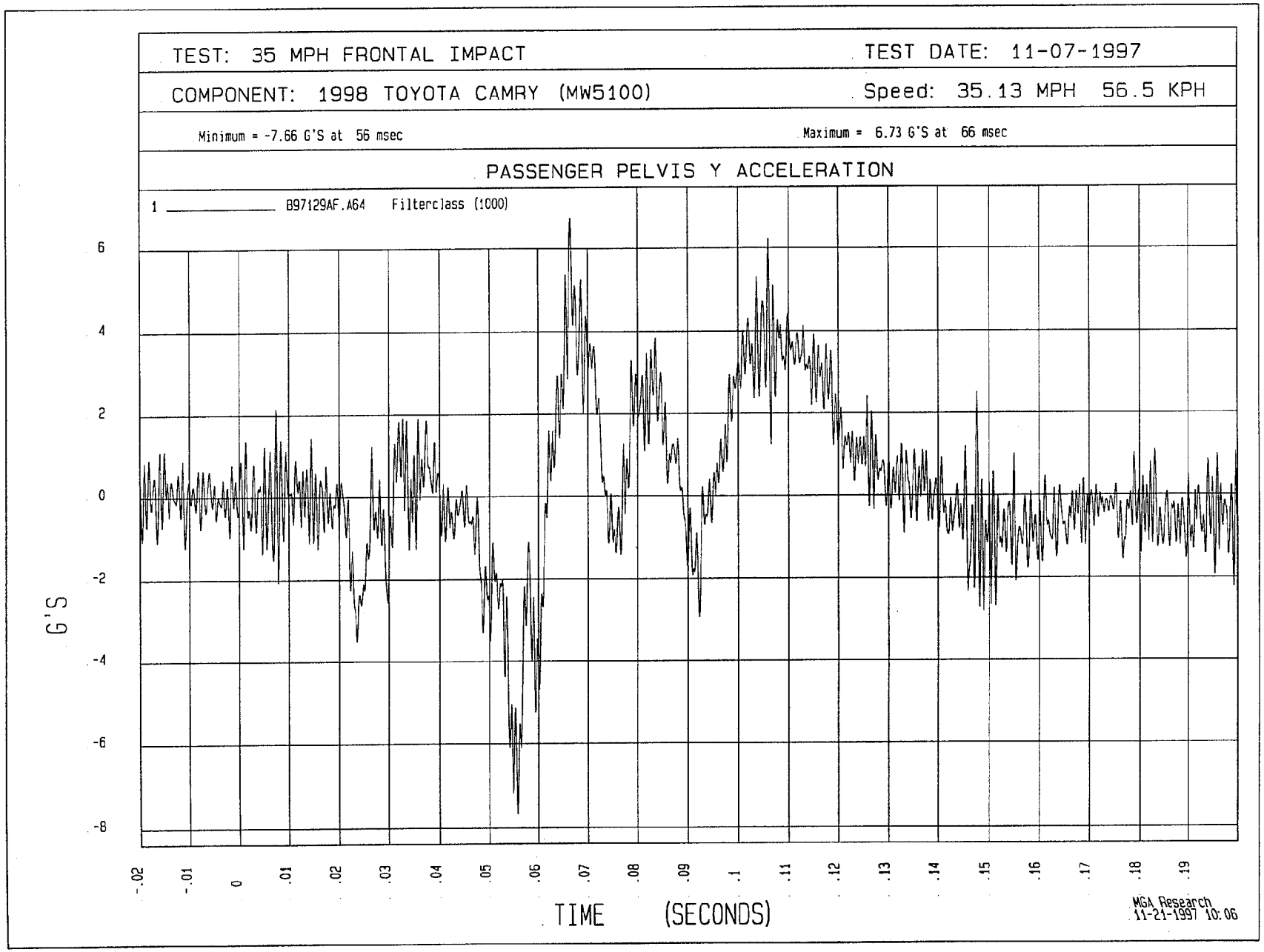
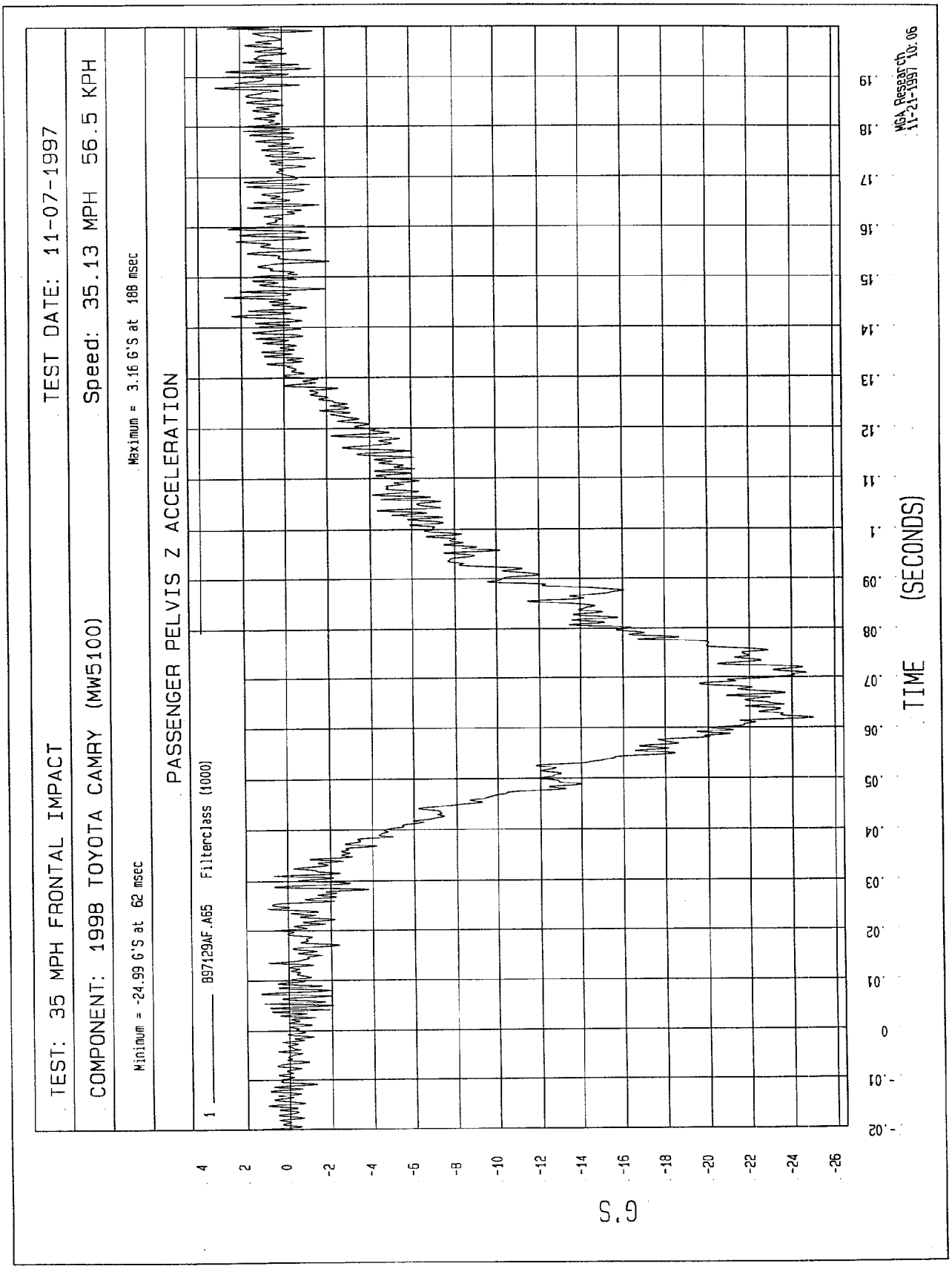
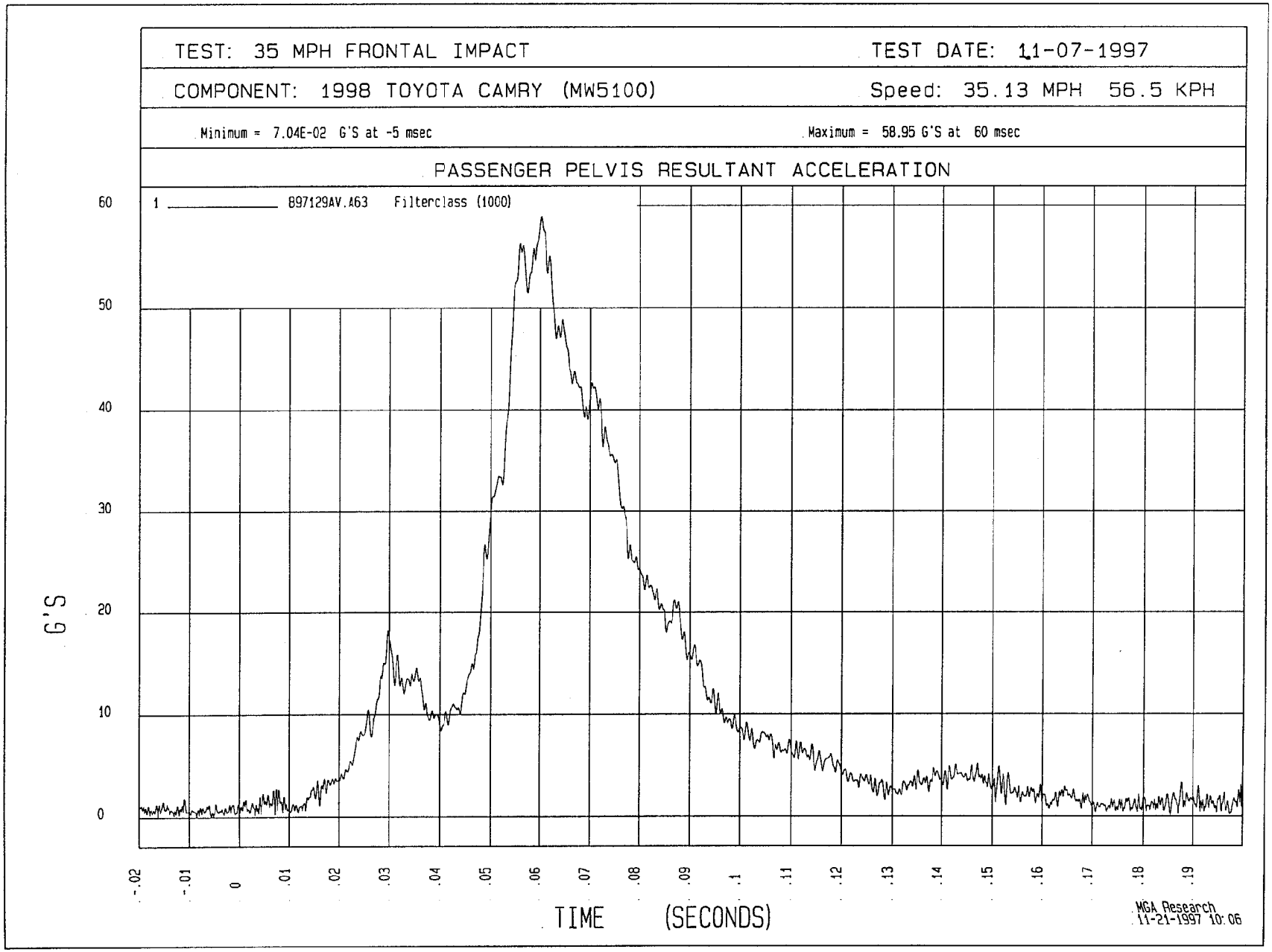
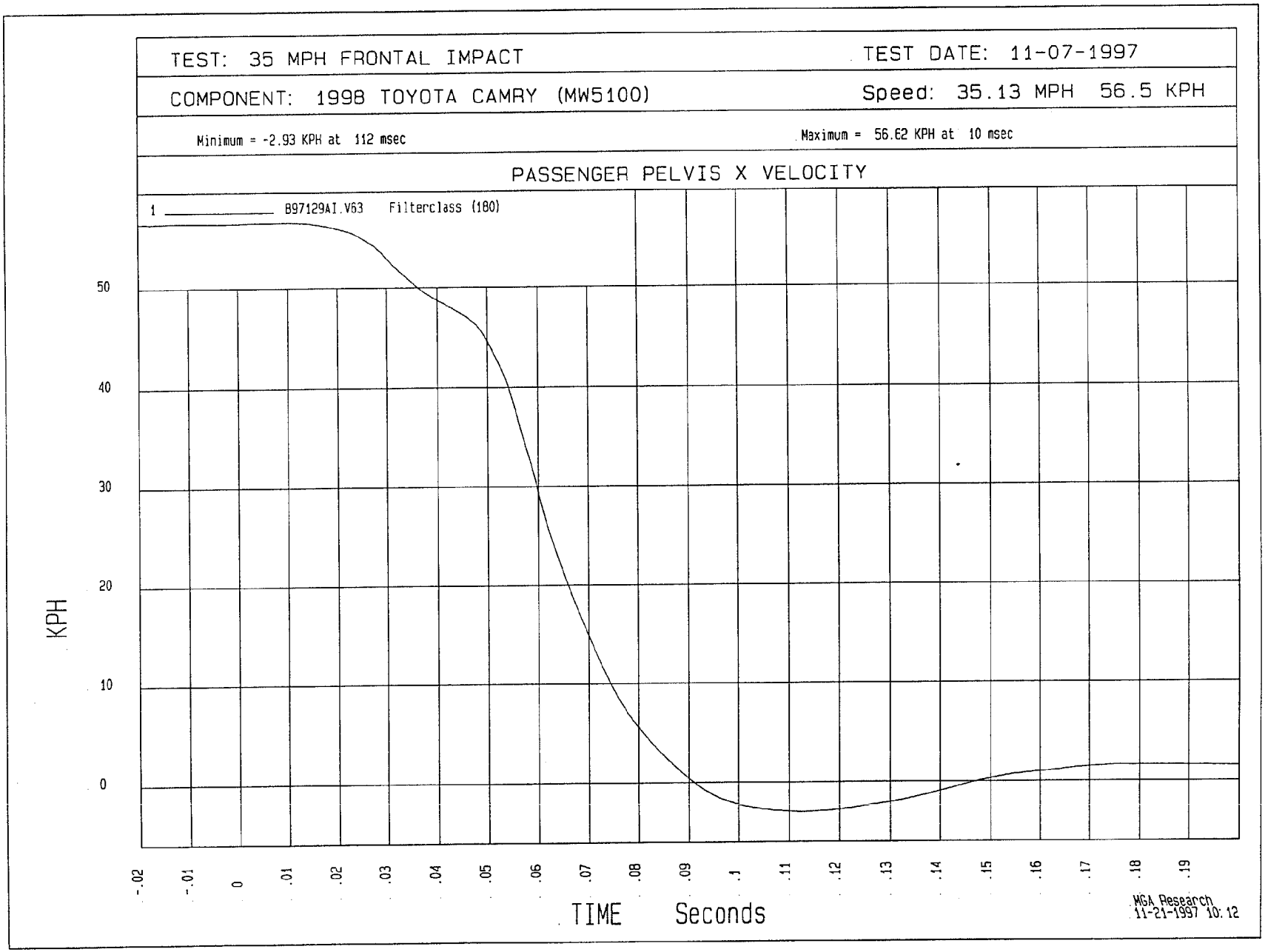
.16
.17
.18
.19
TIME SECONDS
MGA Research
12-08-1997 15:55

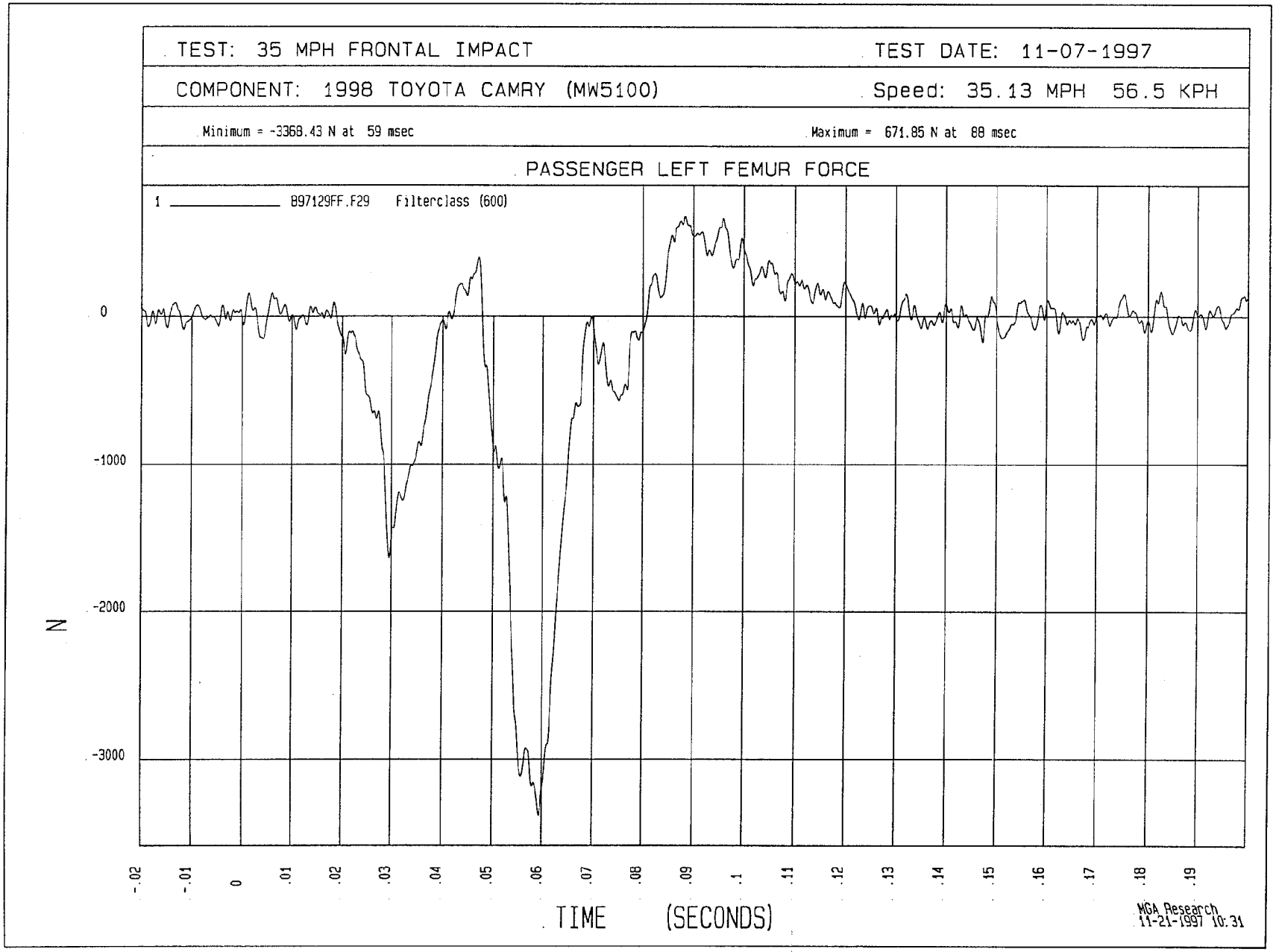

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -54.83 G'S at 60 msec
Maximum = 4.96 G'S at 143 msec
PASSENGER PELVIS X ACCELERATION
1 B97129AF.A63 Filterclass (1000)
0
-10
-20
-30
-40
-50
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:06

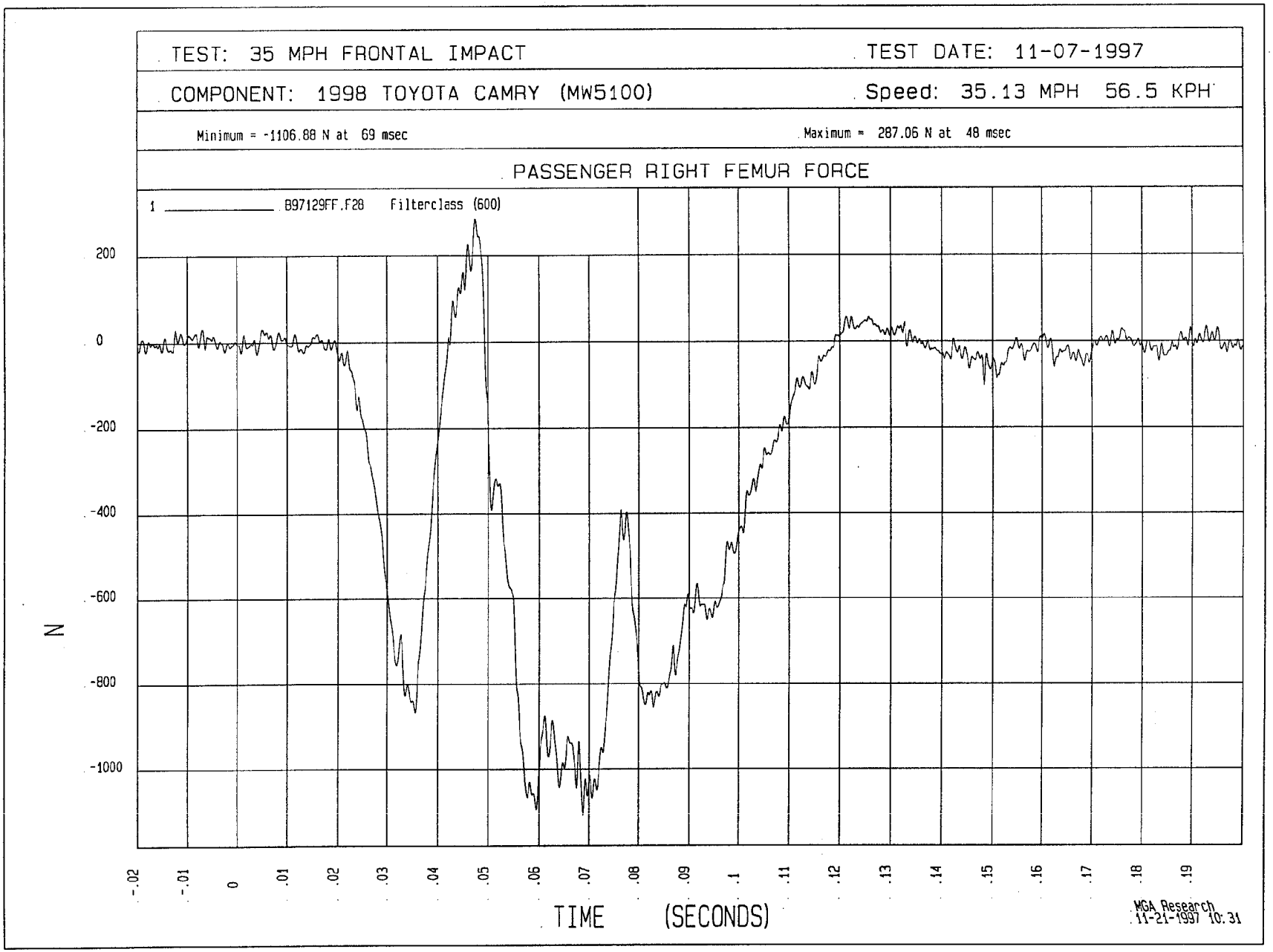

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -7.66 G'S at 56 msec
Maximum = 6.73 G'S at 66 msec
PASSENGER PELVIS Y ACCELERATION
1 B97129AF.A64 Filterclass (1000)
G'S
6
4
2
0
-2
-4
-6
-8
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:06

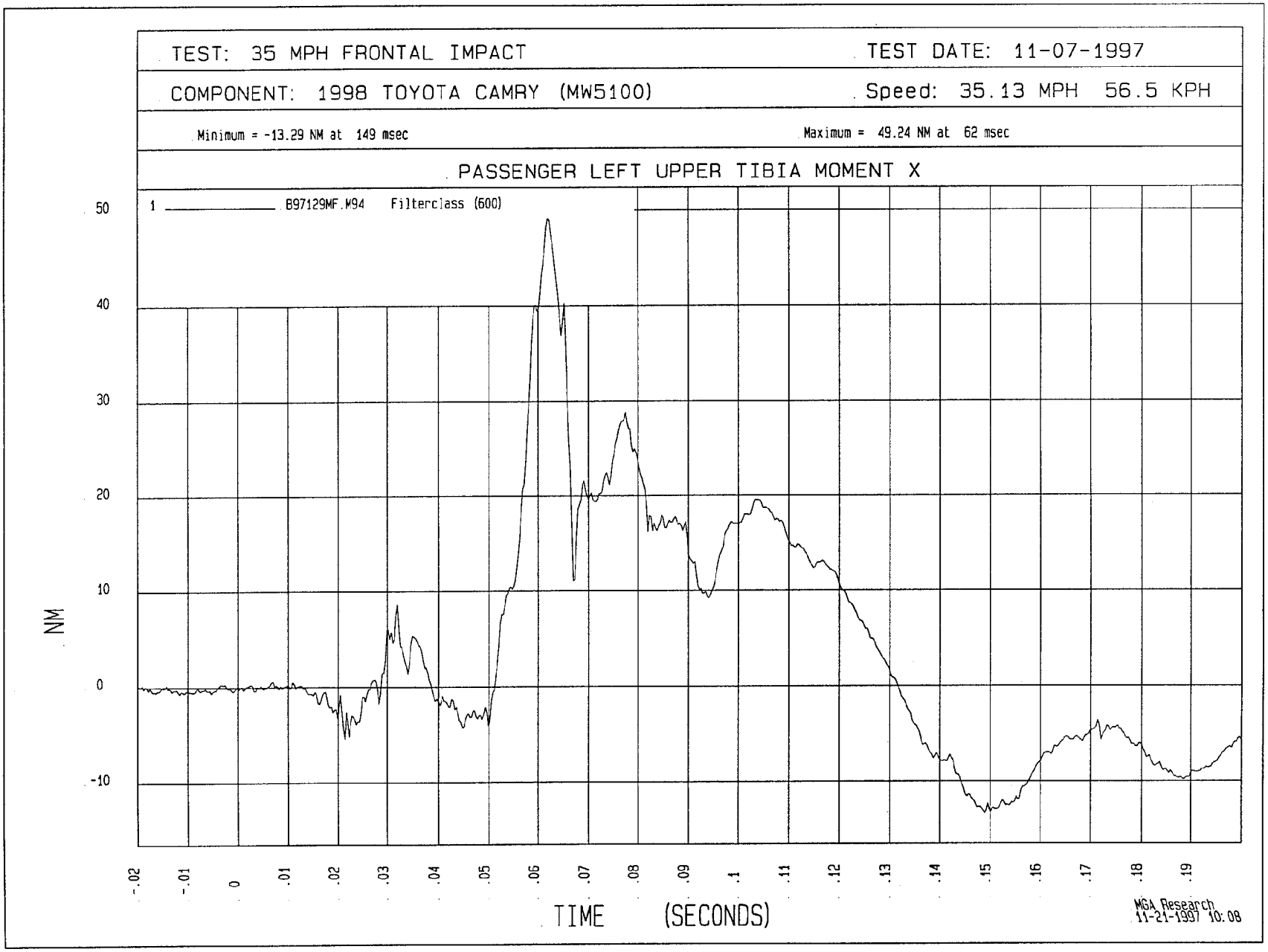

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -24.99 G'S at 62 msec
Maximum = 3.16 G'S at 188 msec
PASSENGER PELVIS Z ACCELERATION
1 B97129AF.A65 Filterclass (1000)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
G's
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:06

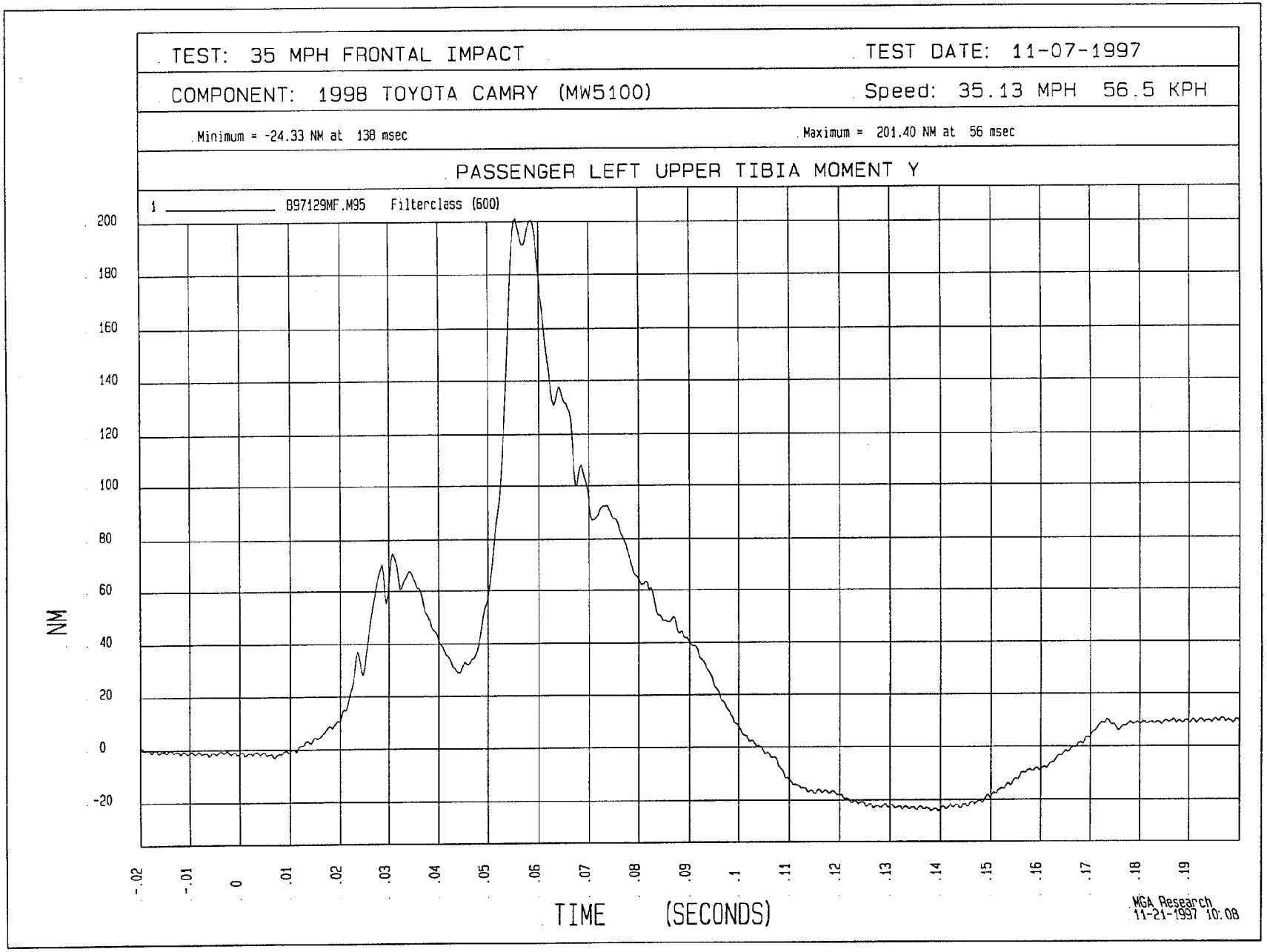

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 7.04E-02 G'S at -5 msec
Maximum = 58.95 G'S at 60 msec
PASSENGER PELVIS RESULTANT ACCELERATION
1 897129AV.A63 Filterclass (1000)
60
50
40
30
20
10
0
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:06

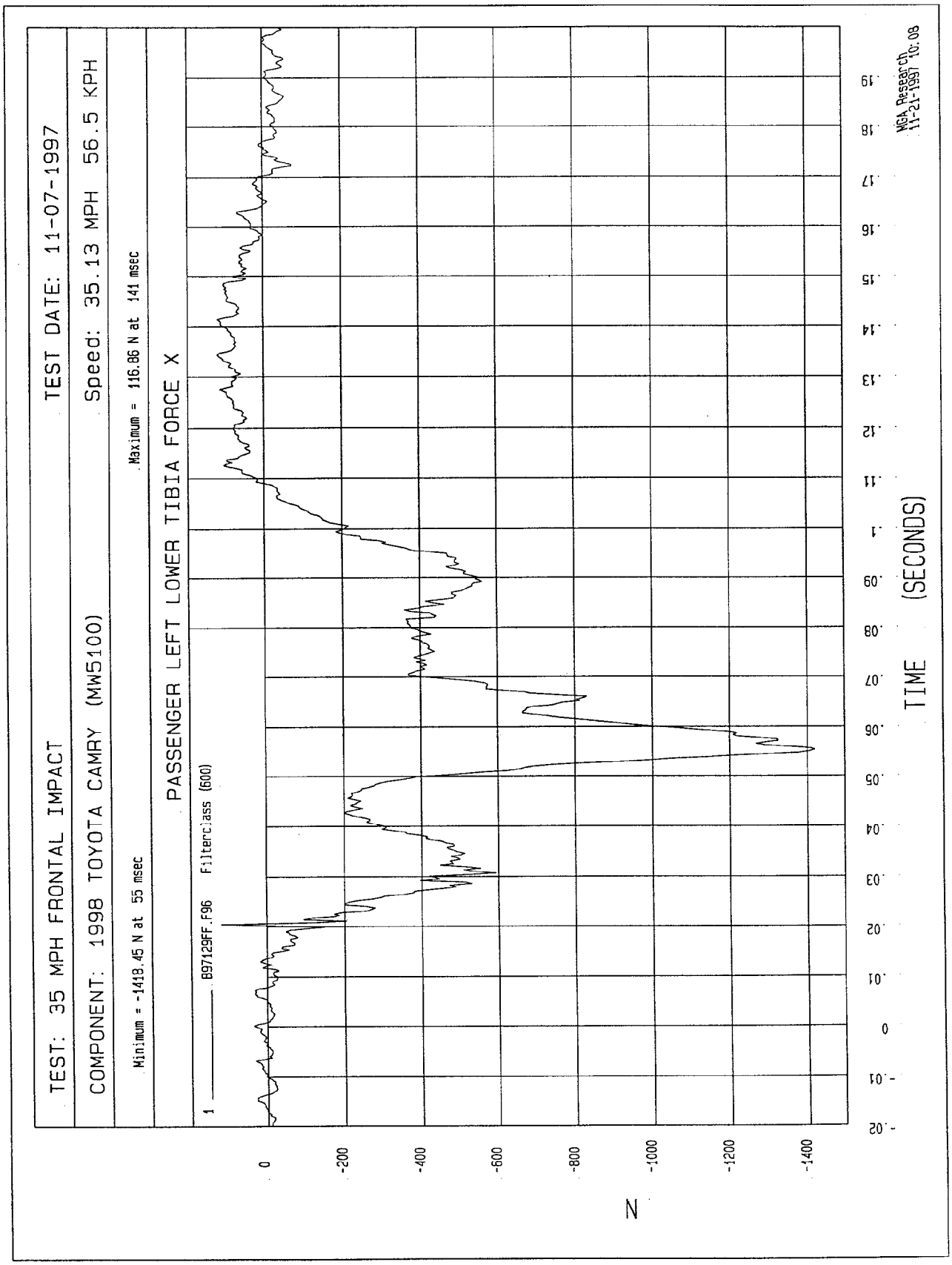

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -2.93 KPH at 112 msec
Maximum = 56.62 KPH at 10 msec
PASSENGER PELVIS X VELOCITY
1 B97129AI.V63 Filterclass (180)
KPH
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:12

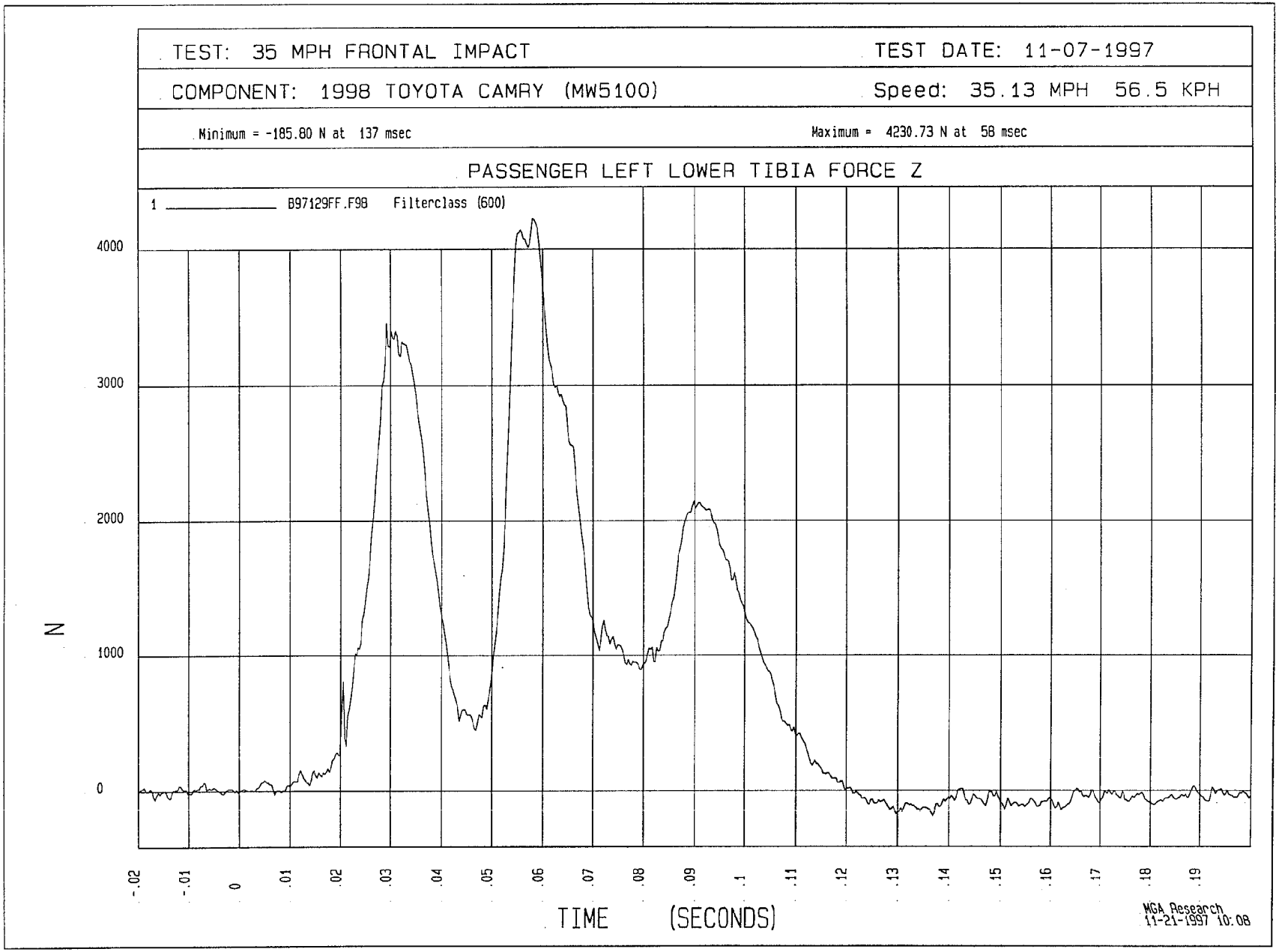

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -3368.43 N at 59 msec
Maximum = 671.85 N at 88 msec
PASSENGER LEFT FEMUR FORCE
1 B97129FF.F29 Filterclass (600)
0
-1000
-2000
-3000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:31

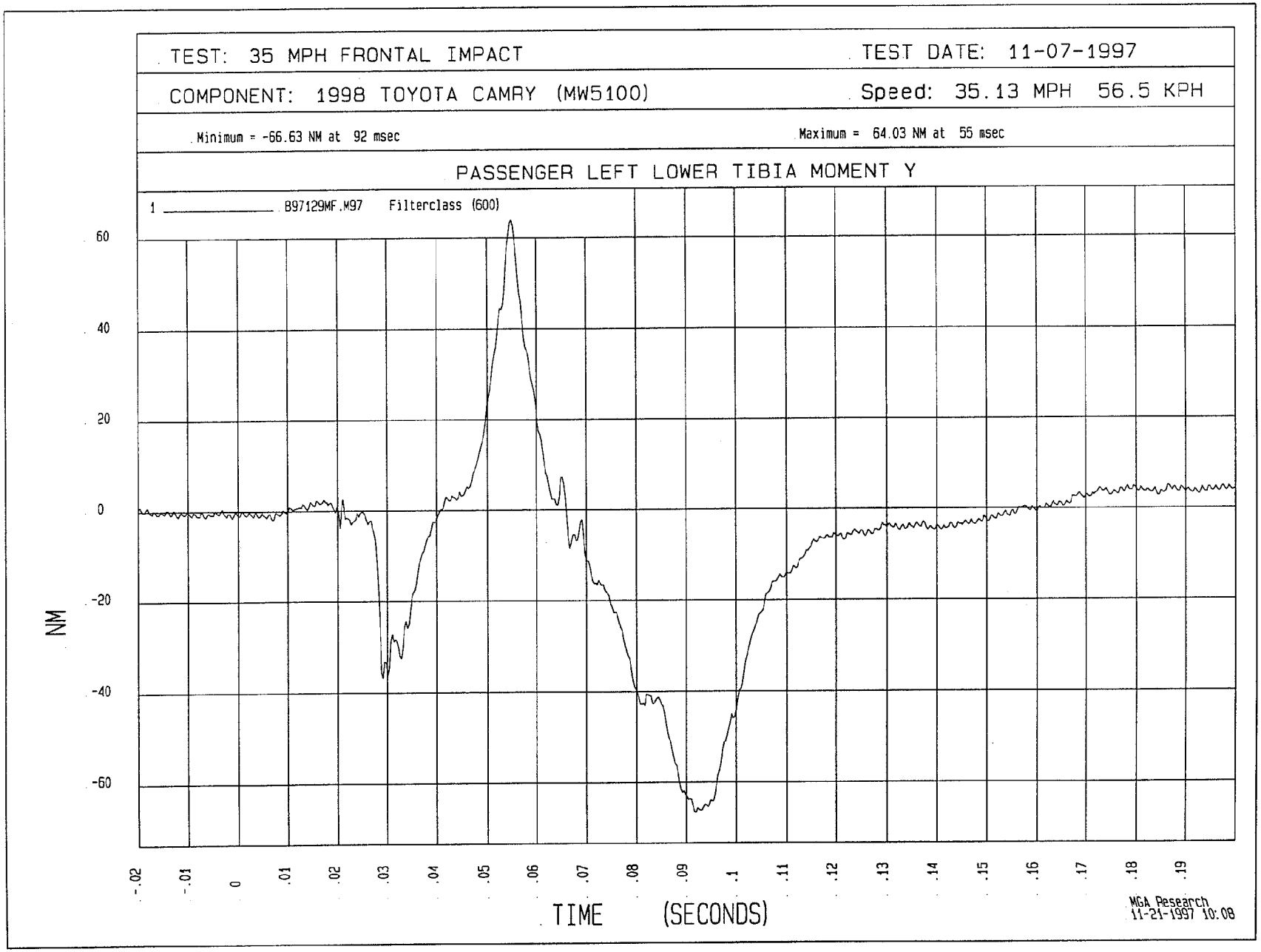

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1106.88 N at 69 msec
Maximum = 287.06 N at 48 msec
PASSENGER RIGHT FEMUR FORCE
1 B97129FF.F28 Filterclass (600)
200
0
-200
-400
-600
-800
-1000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:31

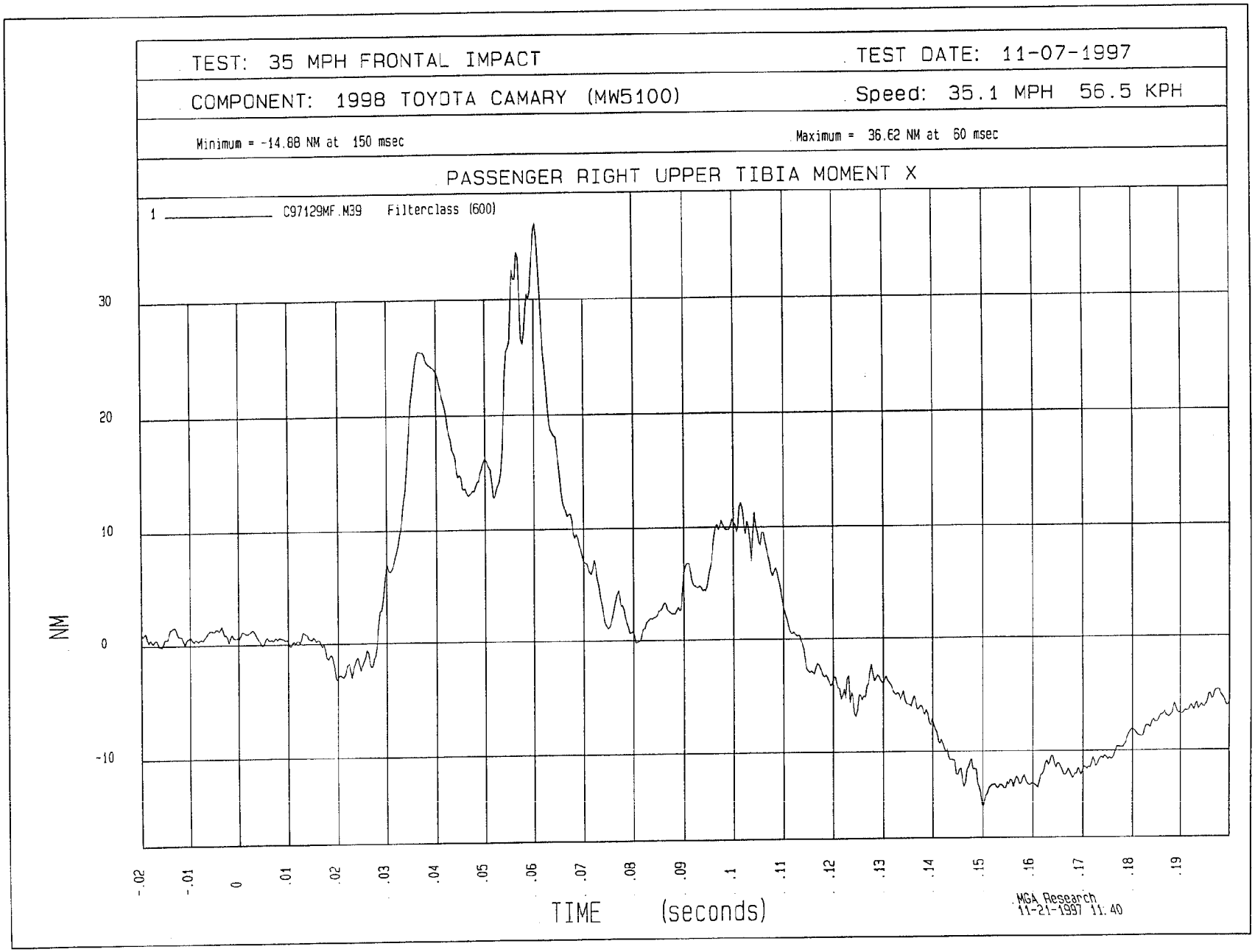

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -13.29 NM at 149 msec
Maximum = 49.24 NM at 62 msec
PASSENGER LEFT UPPER TIBIA MOMENT X
1 B97129MF.M94 Filterclass (600)
NM
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

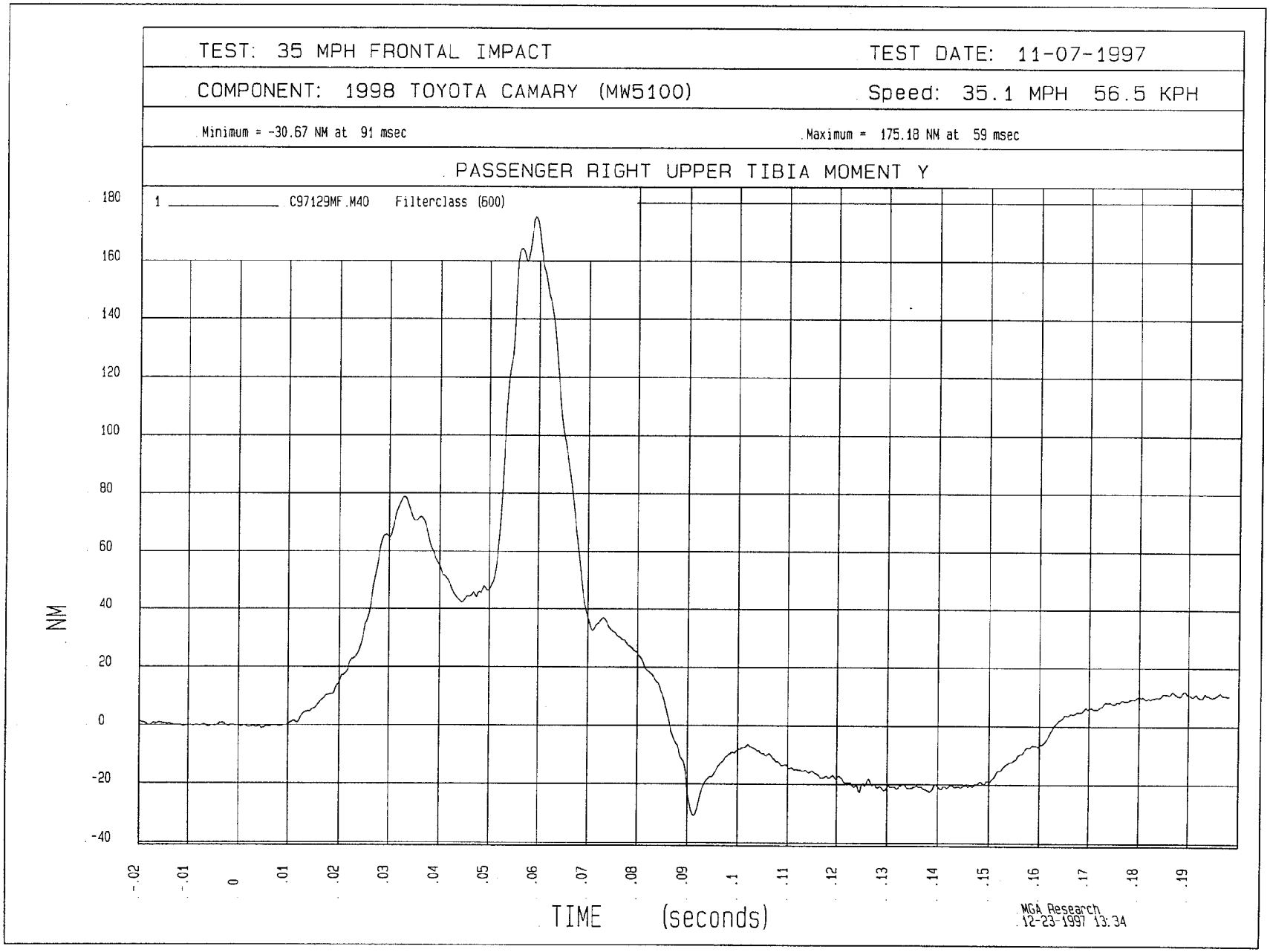

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -24.33 NM at 138 msec
Maximum = 201.40 NM at 56 msec
PASSENGER LEFT UPPER TIBIA MOMENT Y
1 B97129MF.M95 Filterclass (600)
NM
200
180
160
140
120
100
80
60
40
20
0
-20
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

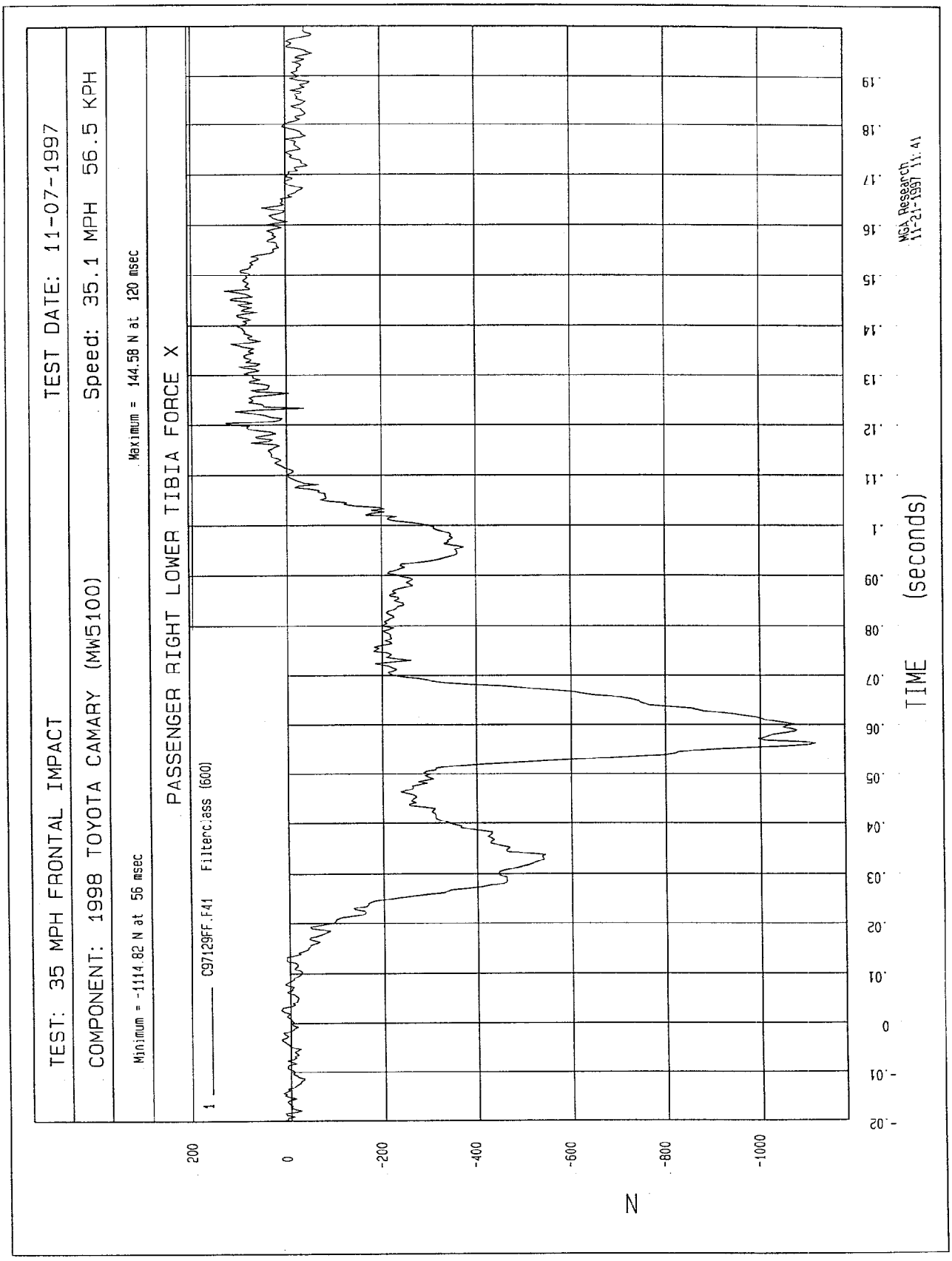

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -1418.45 N at 55 msec
Maximum = 116.86 N at 141 msec
PASSENGER LEFT LOWER TIBIA FORCE X
1 897129FF.F96 Filterclass (600)
0
-200
-400
-600
-800
-1000
-1200
-1400
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

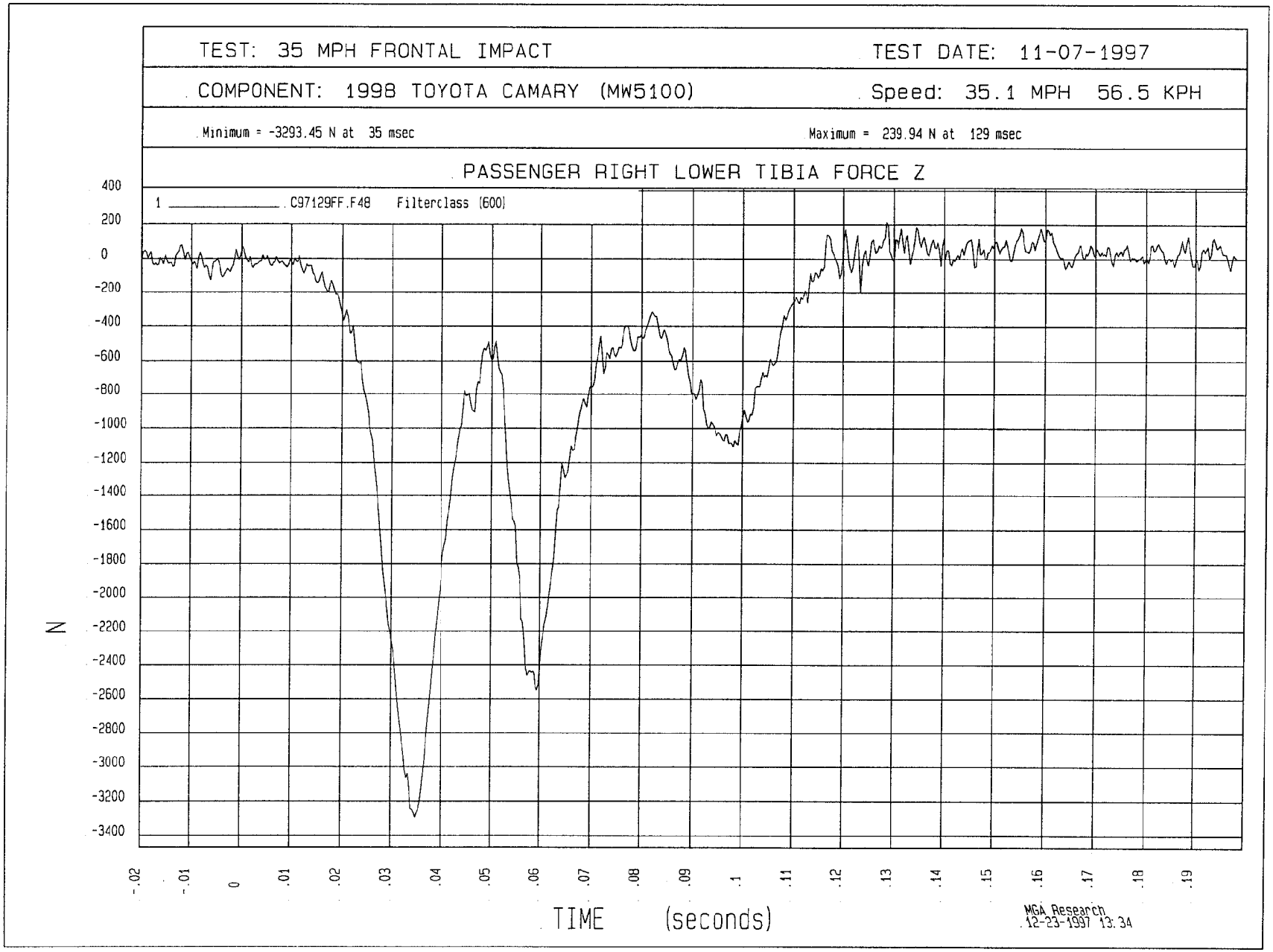

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -185.80 N at 137 msec
Maximum = 4230.73 N at 58 msec
PASSENGER LEFT LOWER TIBIA FORCE Z
1 B97129FF.F98 Filterclass (600)
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

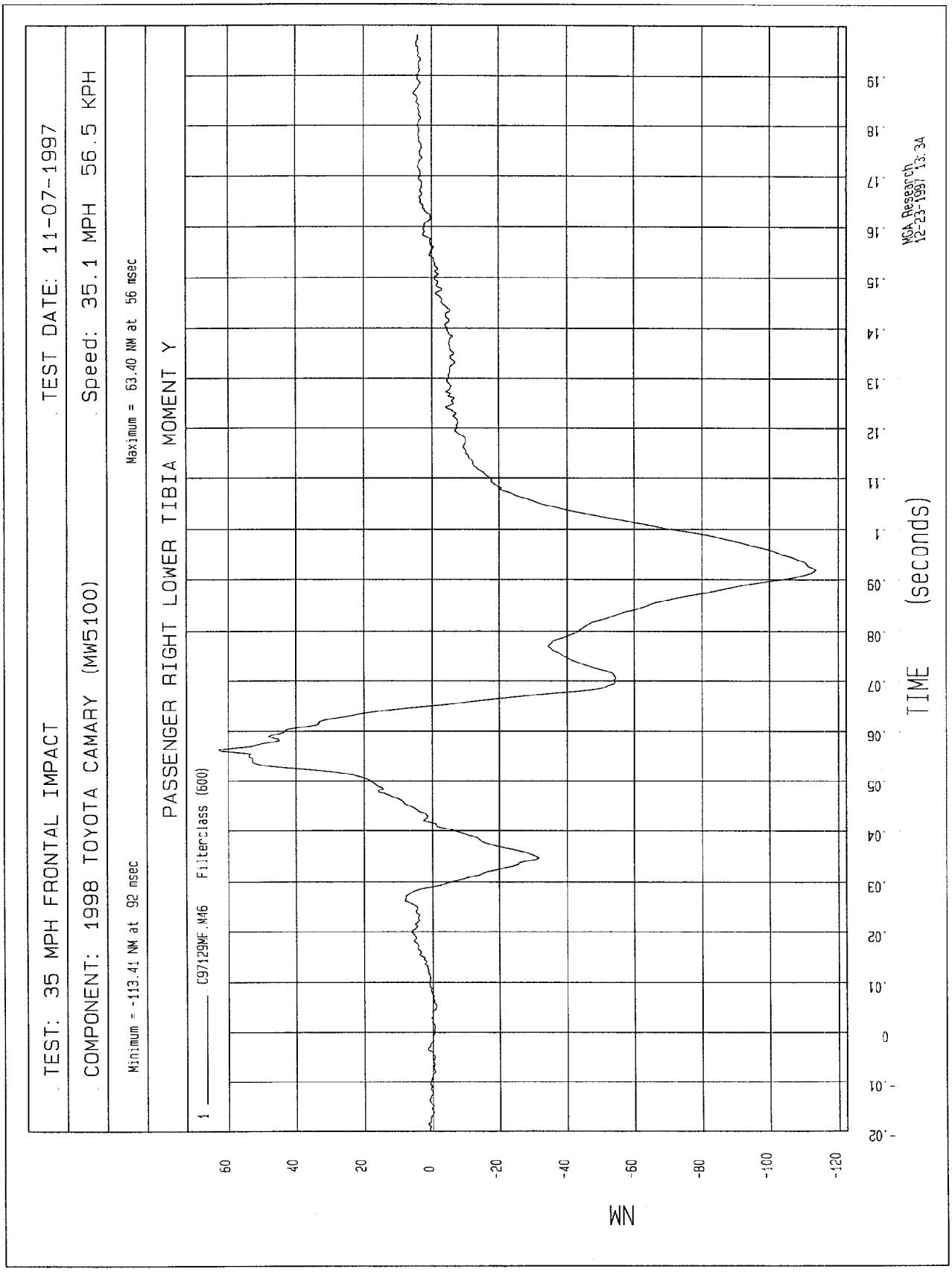

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -66.63 NM at 92 msec
Maximum = 64.03 NM at 55 msec
PASSENGER LEFT LOWER TIBIA MOMENT Y
1 B97129MF.M97 Filterclass (600)
NM
60
40
20
0
-20
-40
-60
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:08

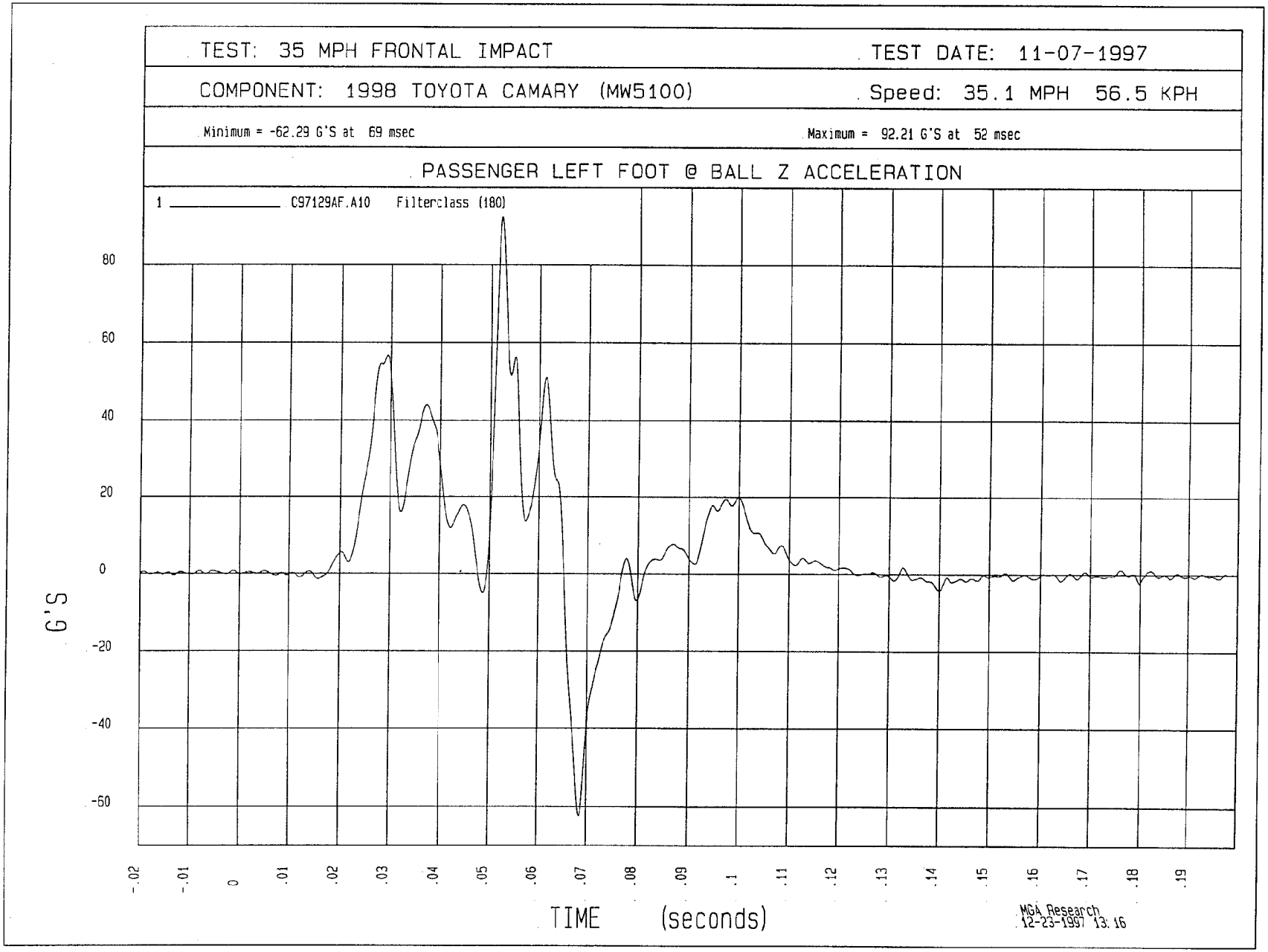

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -14.88 NM at 150 msec
Maximum = 36.62 NM at 60 msec
PASSENGER RIGHT UPPER TIBIA MOMENT X
1 C97129MF.M39 Filterclass (600)
NM
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-21-1997 11:40


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -30.67 NM at 91 msec
Maximum = 175.18 NM at 59 msec
PASSENGER RIGHT UPPER TIBIA MOMENT Y
1 C97129MF.M40 Filterclass (600)
NM
180
160
140
120
100
80
60
40
20
0
-20
-40
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:34


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -1114.82 N at 56 msec
Maximum = 144.58 N at 120 msec
PASSENGER RIGHT LOWER TIBIA FORCE X
1 C97129FF.F41 Filter:ass (600)
200
0
-200
-400
-600
-800
-1000
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-21-1997 11:41


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -3293.45 N at 35 msec
Maximum = 239.94 N at 129 msec
PASSENGER RIGHT LOWER TIBIA FORCE Z
1 C97129FF.F48 Filterclass (600)
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
-2200
-2400
-2600
-2800
-3000
-3200
-3400
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:34


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -113.41 NM at 92 msec
Maximum = 63.40 NM at 56 msec
PASSENGER RIGHT LOWER TIBIA MOMENT Y
1 C97129MF.M46 Filterclass (600)
NM
TIME (seconds)
MGA Research
12-23-1997 13:34


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -62.29 G'S at 69 msec
Maximum = 92.21 G'S at 52 msec
PASSENGER LEFT FOOT @ BALL Z ACCELERATION
1 C97129AF.A10 Filterclass (180)
80
60
40
20
0
-20
-40
-60
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
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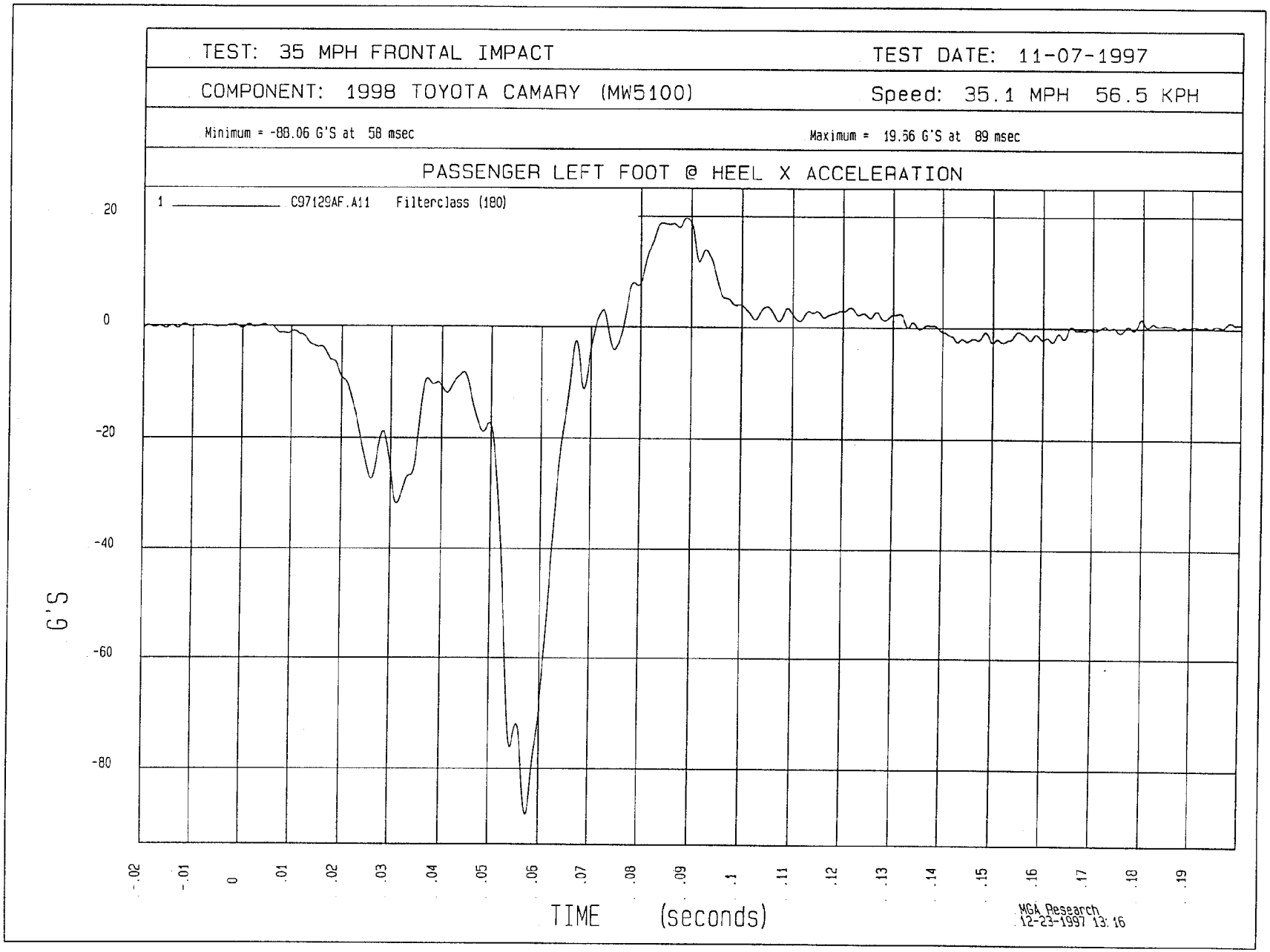
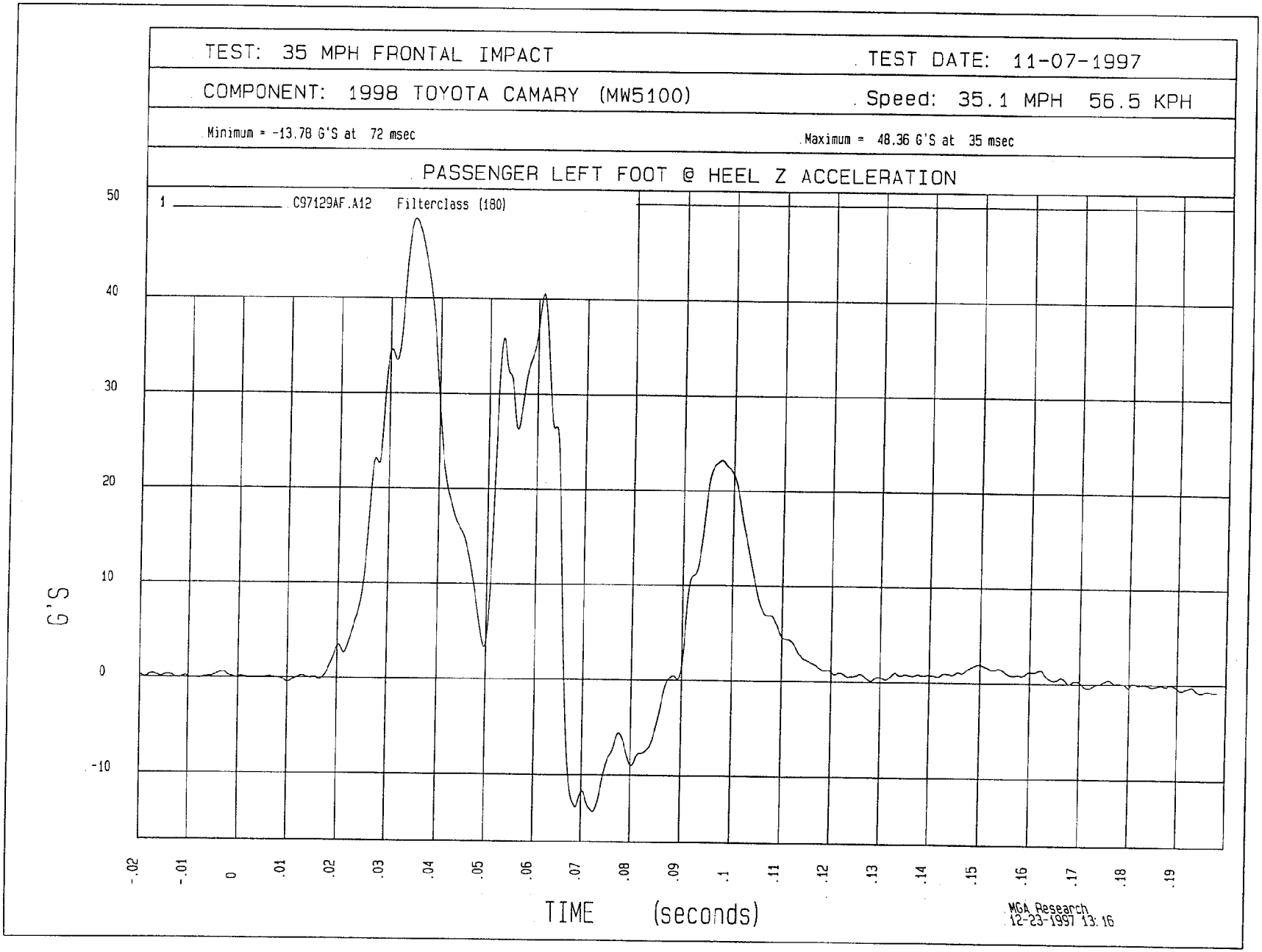
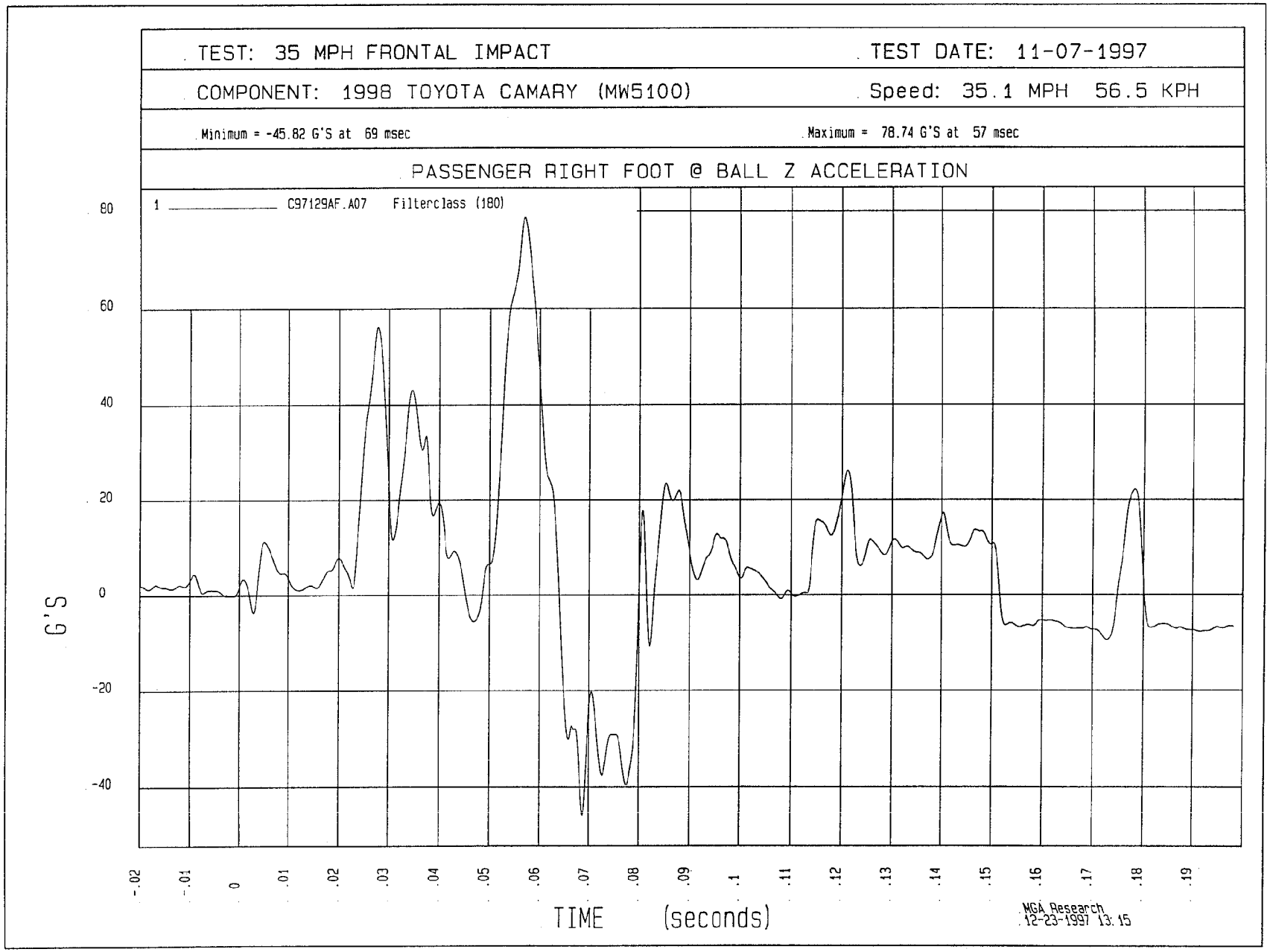
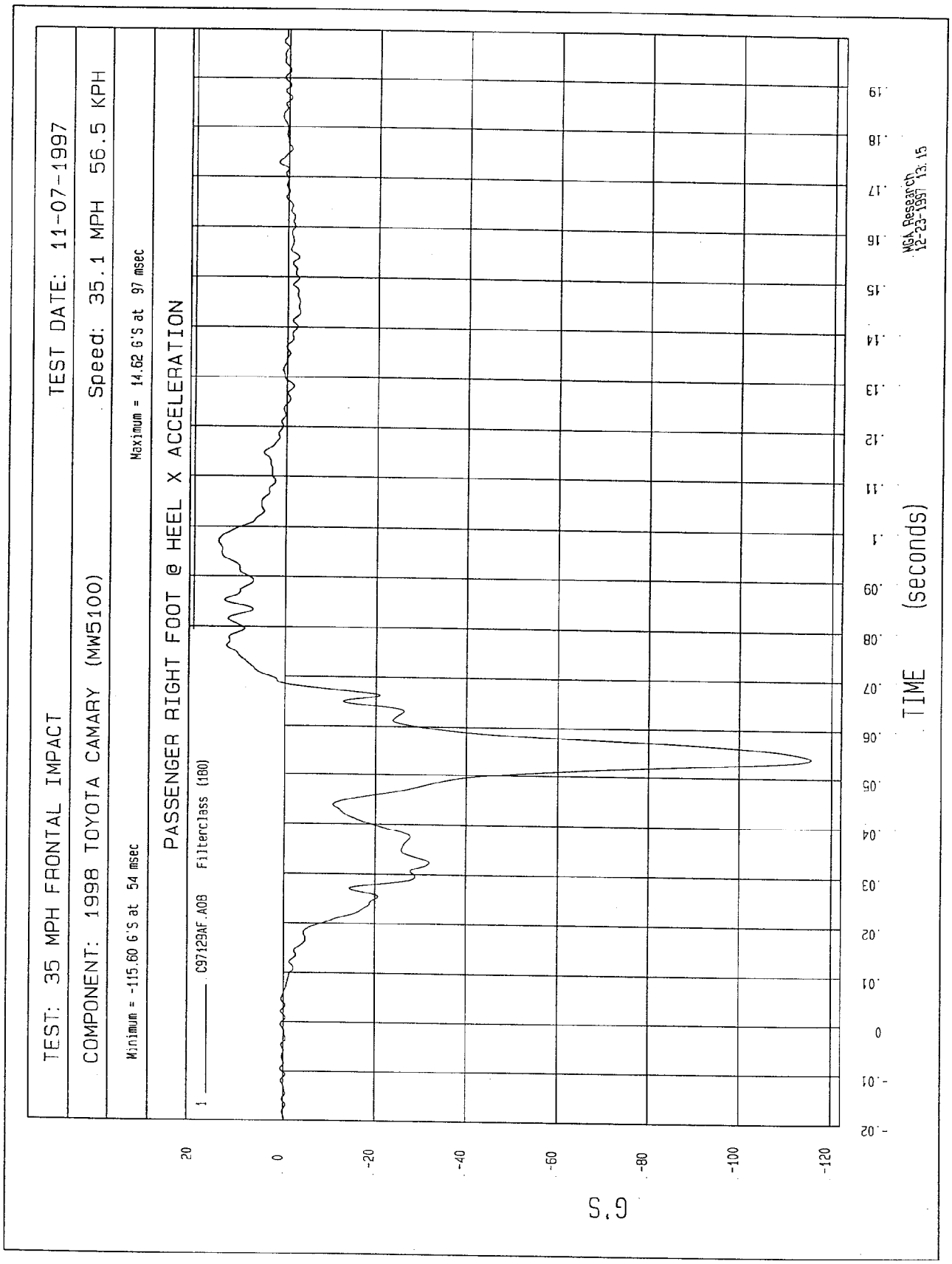
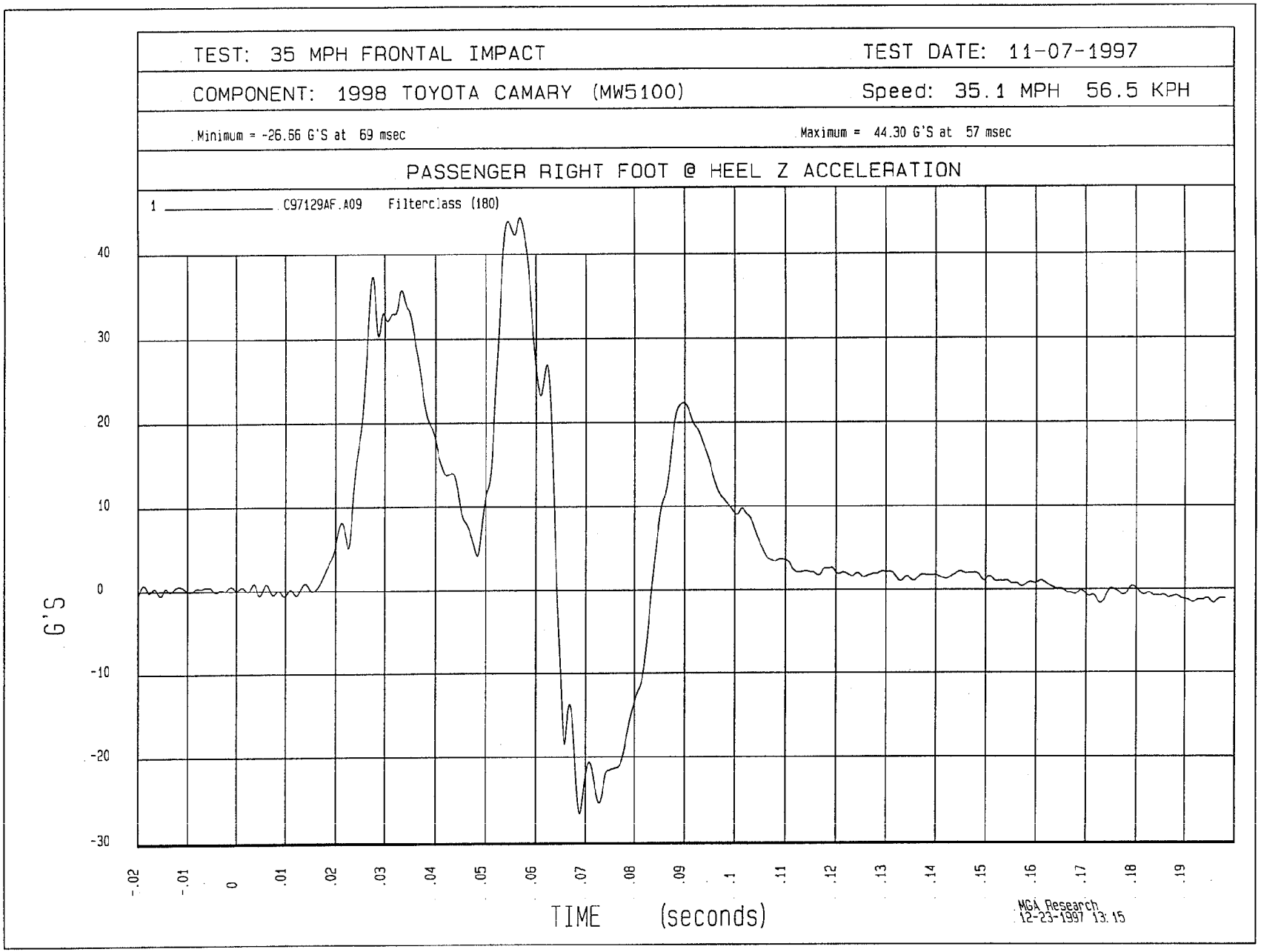
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:16

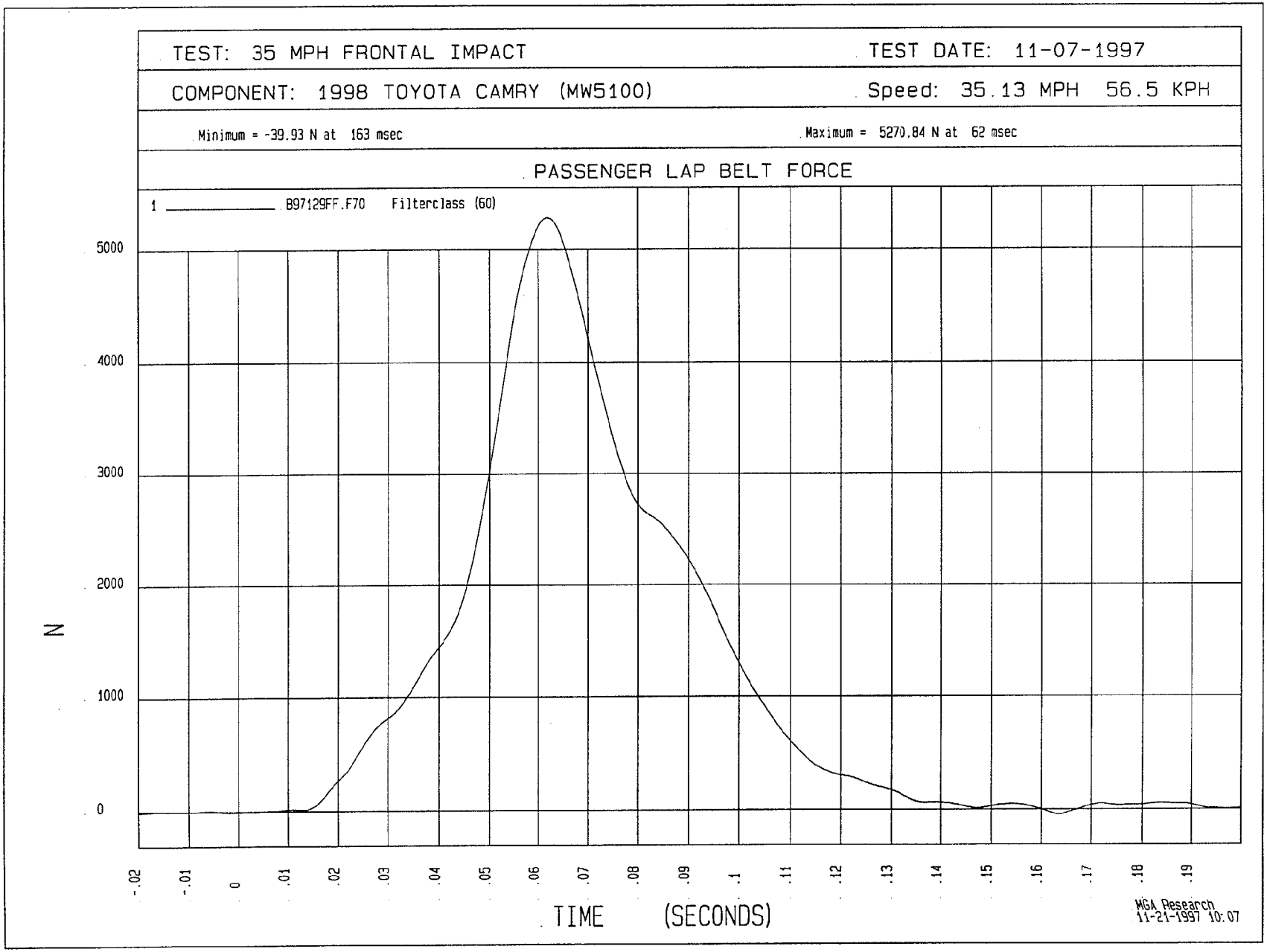

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -88.06 G'S at 58 msec
Maximum = 19.56 G'S at 89 msec
PASSENGER LEFT FOOT @ HEEL X ACCELERATION
1 C97129AF.A11 Filterclass (180)
20
0
-20
-40
-60
-80
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:16

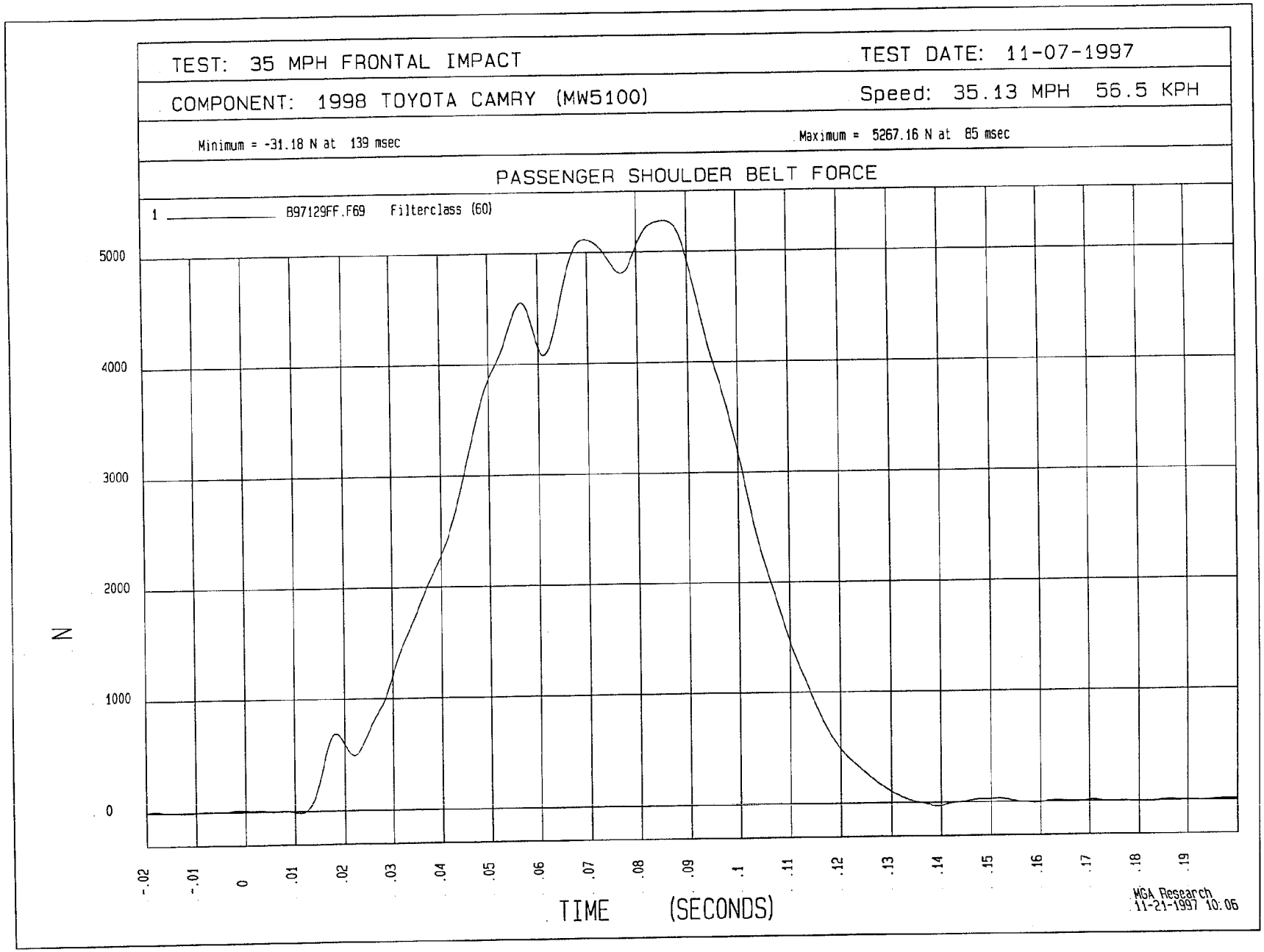

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -13.78 G'S at 72 msec
Maximum = 48.36 G'S at 35 msec
PASSENGER LEFT FOOT @ HEEL Z ACCELERATION
1 C97129AF.A12 Filterclass (180)
50
40
30
20
10
0
-10
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:16

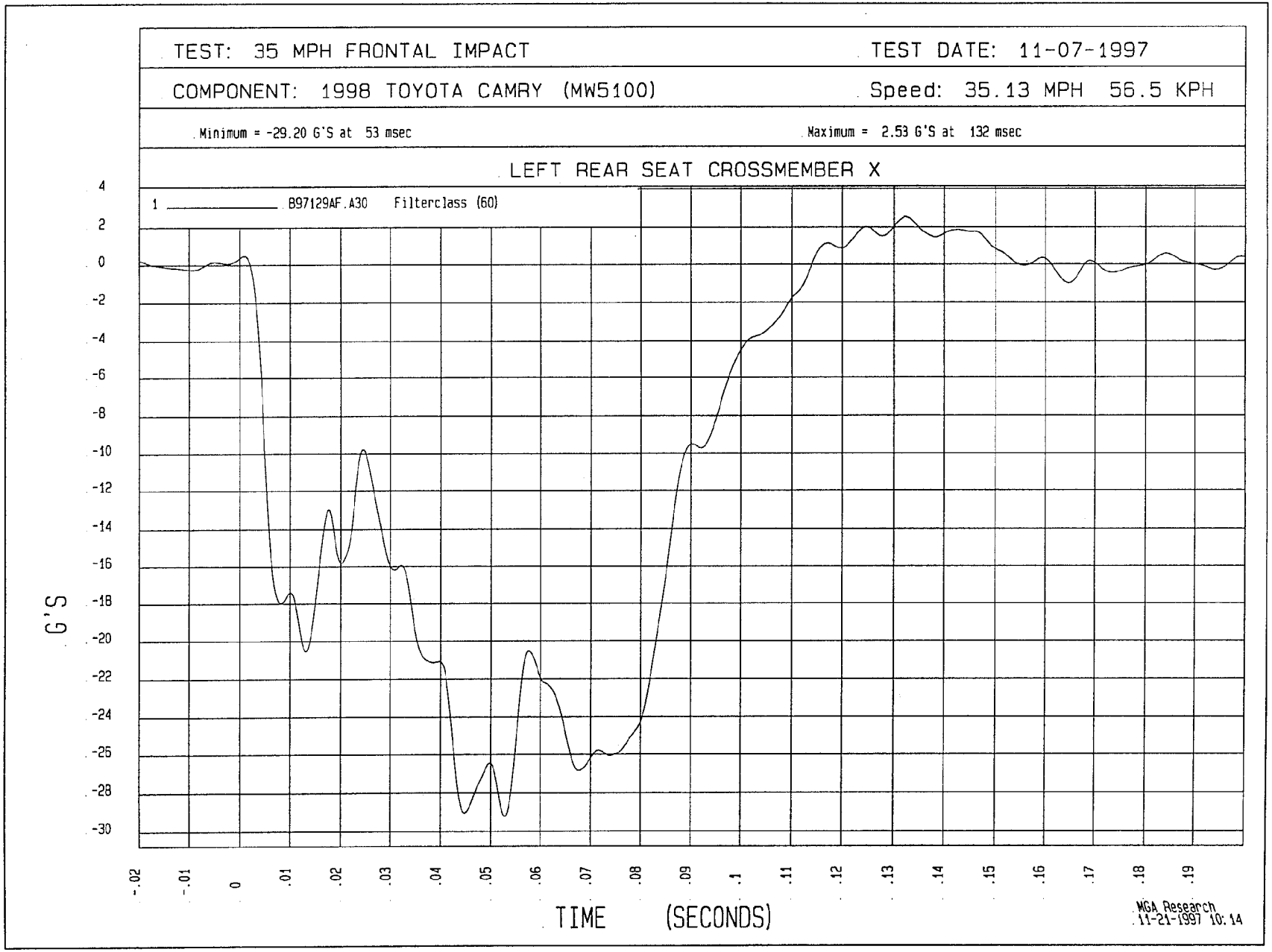

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -45.82 G'S at 69 msec
Maximum = 78.74 G'S at 57 msec
PASSENGER RIGHT FOOT @ BALL Z ACCELERATION
1 C97129AF.A07 Filterclass (180)
80
60
40
20
0
-20
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
NGA Research
12-23-1997 13:15

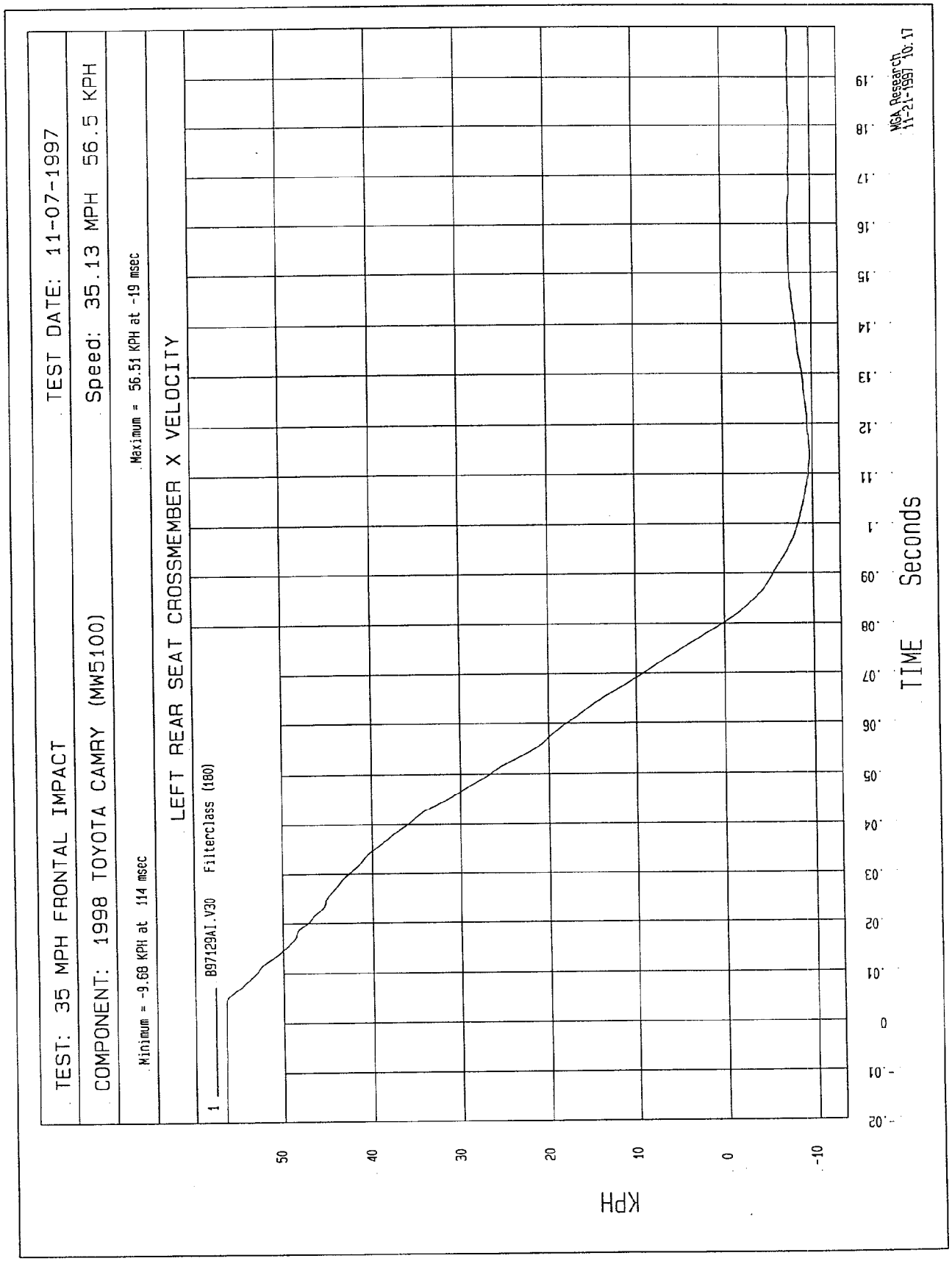

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -115.60 G'S at 54 msec
Maximum = 14.62 G'S at 97 msec
PASSENGER RIGHT FOOT @ HEEL X ACCELERATION
1 C97129AF.A0B Filterclass (180)
MGA Research
12-23-1997 13:15
G'S
TIME (seconds)

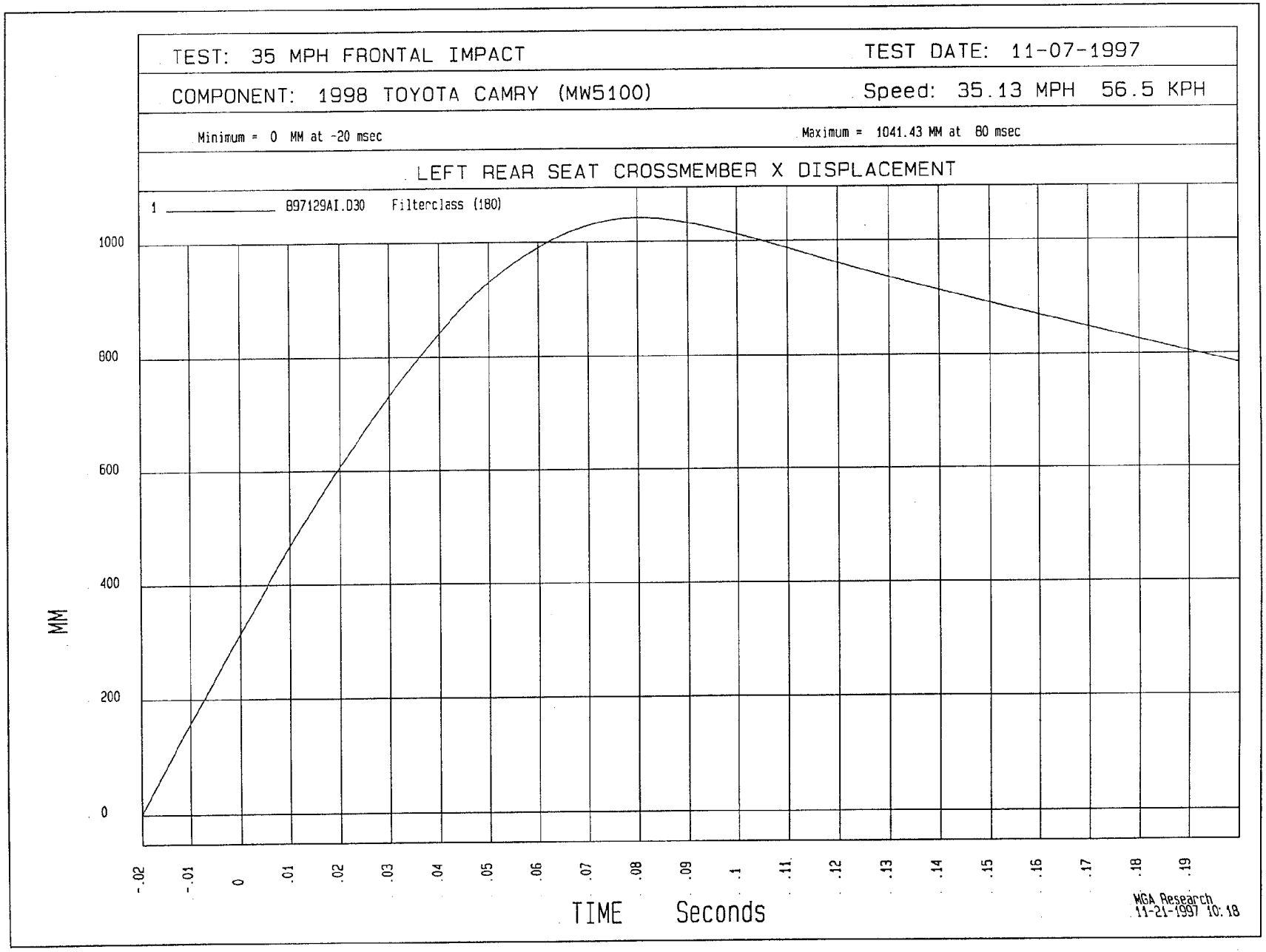

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -26.66 G'S at 69 msec
Maximum = 44.30 G'S at 57 msec
PASSENGER RIGHT FOOT @ HEEL Z ACCELERATION
1 C97129AF.A09 Filterclass (180)
40
30
20
10
0
-10
-20
-30
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
12-23-1997 13:15

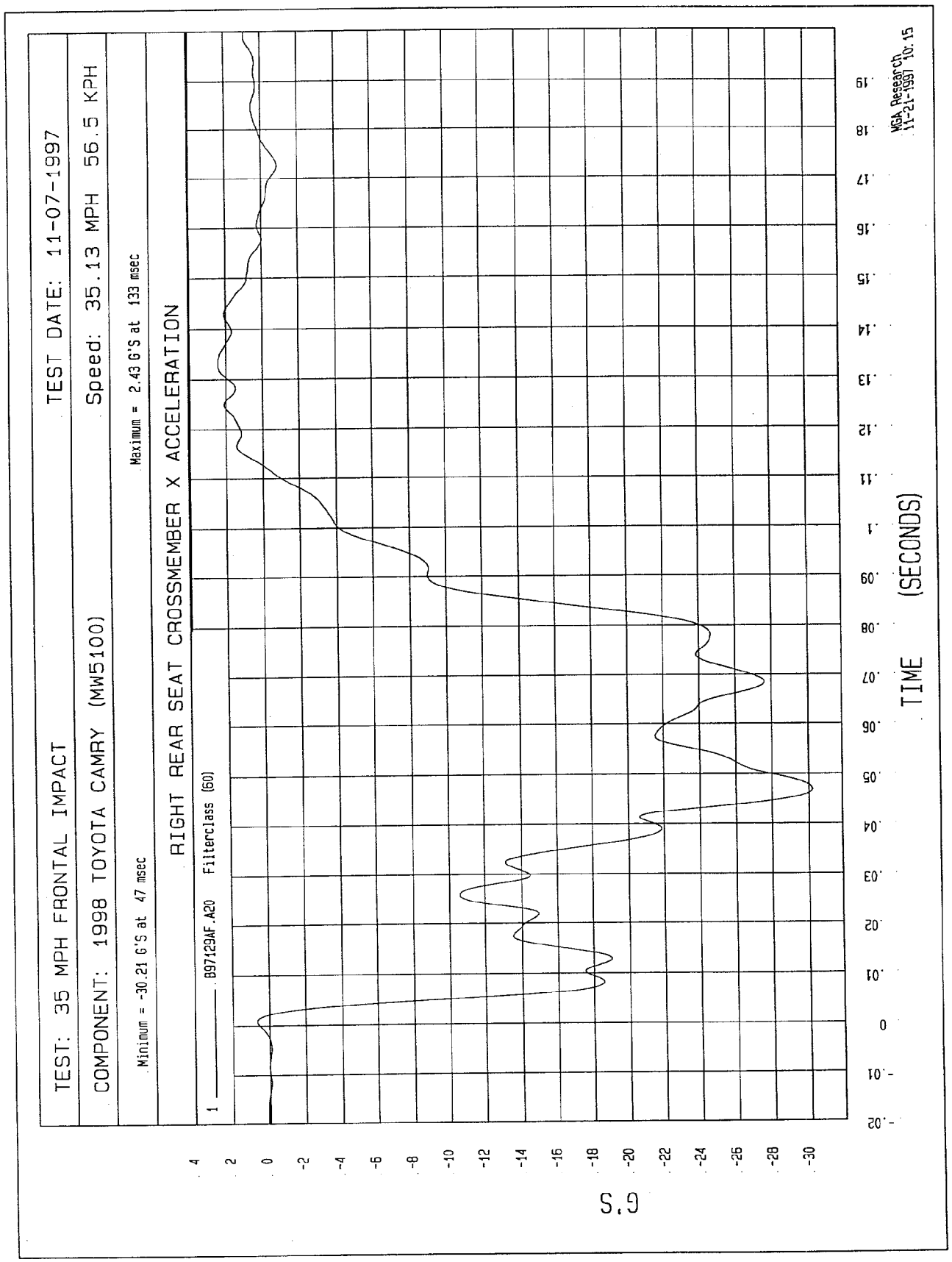

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -39.93 N at 163 msec
Maximum = 5270.84 N at 62 msec
PASSENGER LAP BELT FORCE
1 B97129FF.F70 Filterclass (60)
N
5000
4000
3000
2000
1000
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:07

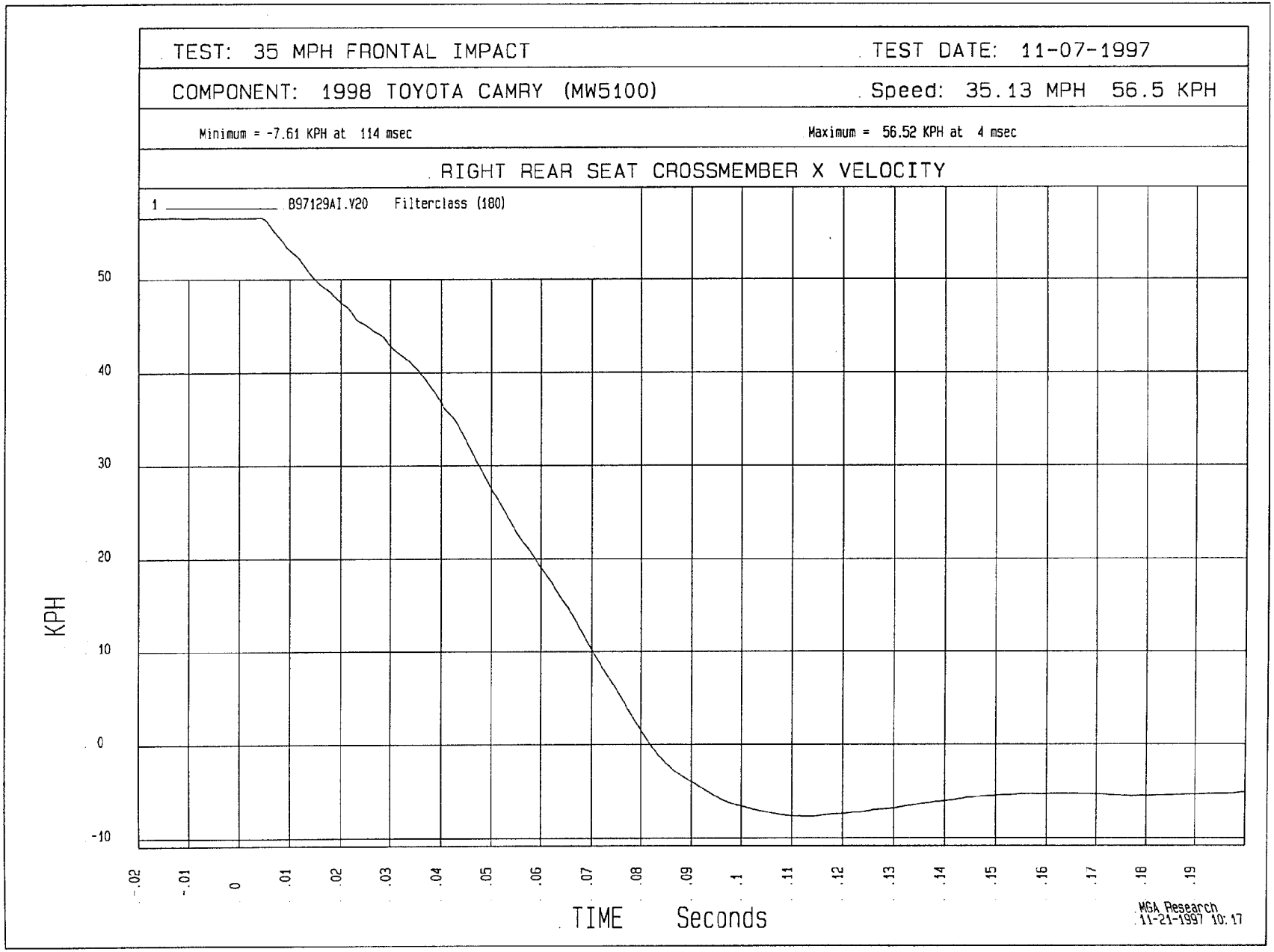

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -31.18 N at 139 msec
Maximum = 5267.16 N at 85 msec
PASSENGER SHOULDER BELT FORCE
1 B97129FF.F69 Filterclass (60)
5000
4000
3000
2000
1000
0
N
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:06

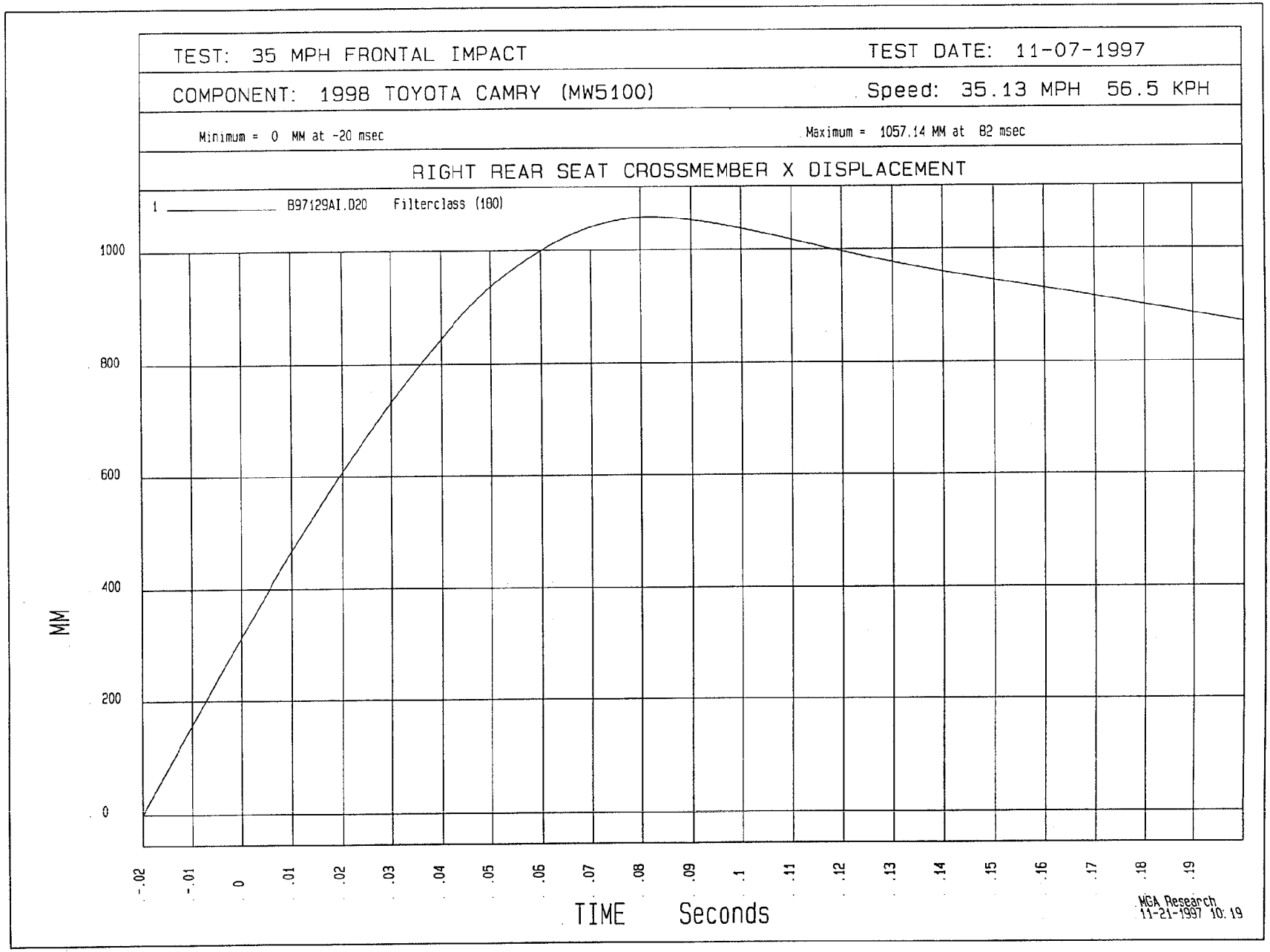

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -29.20 G'S at 53 msec
Maximum = 2.53 G'S at 132 msec
LEFT REAR SEAT CROSSMEMBER X
1 B97129AF.A30 Filterclass (60)
G'S
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:14

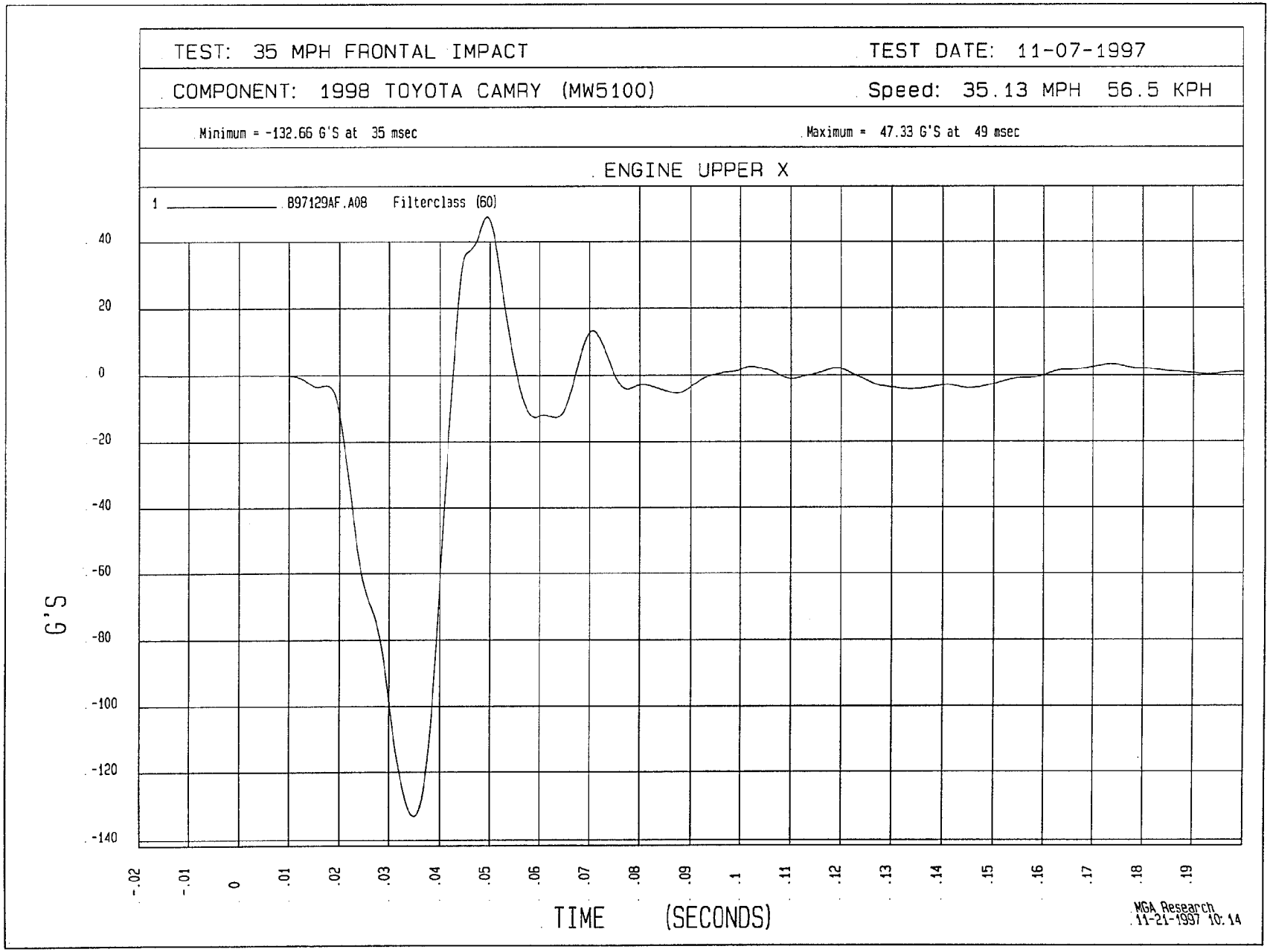

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -9.68 KPH at 114 msec
Maximum = 56.51 KPH at -19 msec
LEFT REAR SEAT CROSSMEMBER X VELOCITY
1 B97129AI.V30 Filterclass (180)
KPH
50
40
30
20
10
0
-10
.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
NGA Research
11-21-1997 10.17

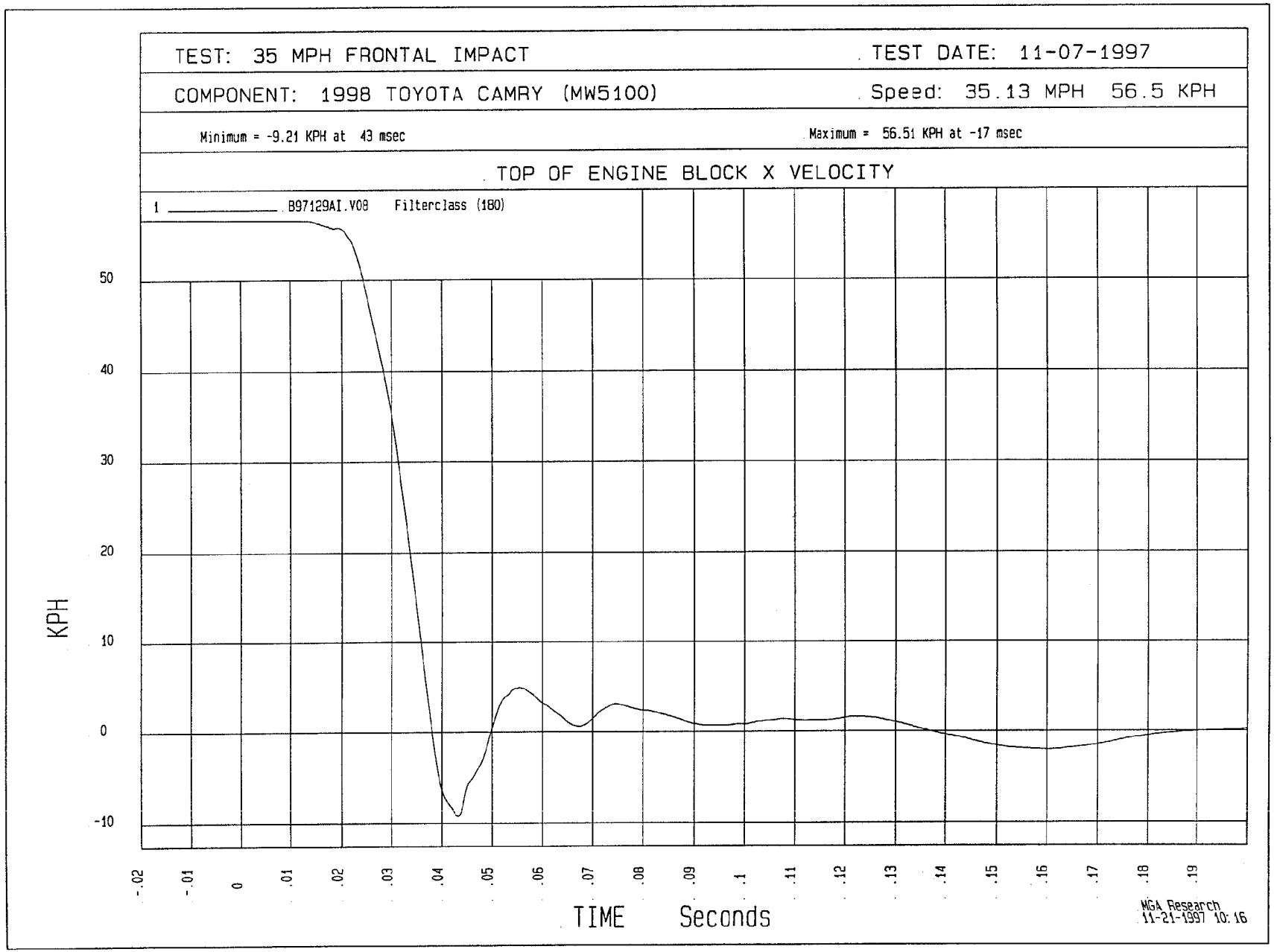

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 1041.43 MM at 80 msec
LEFT REAR SEAT CROSSMEMBER X DISPLACEMENT
1 B97129AI.D30 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:18

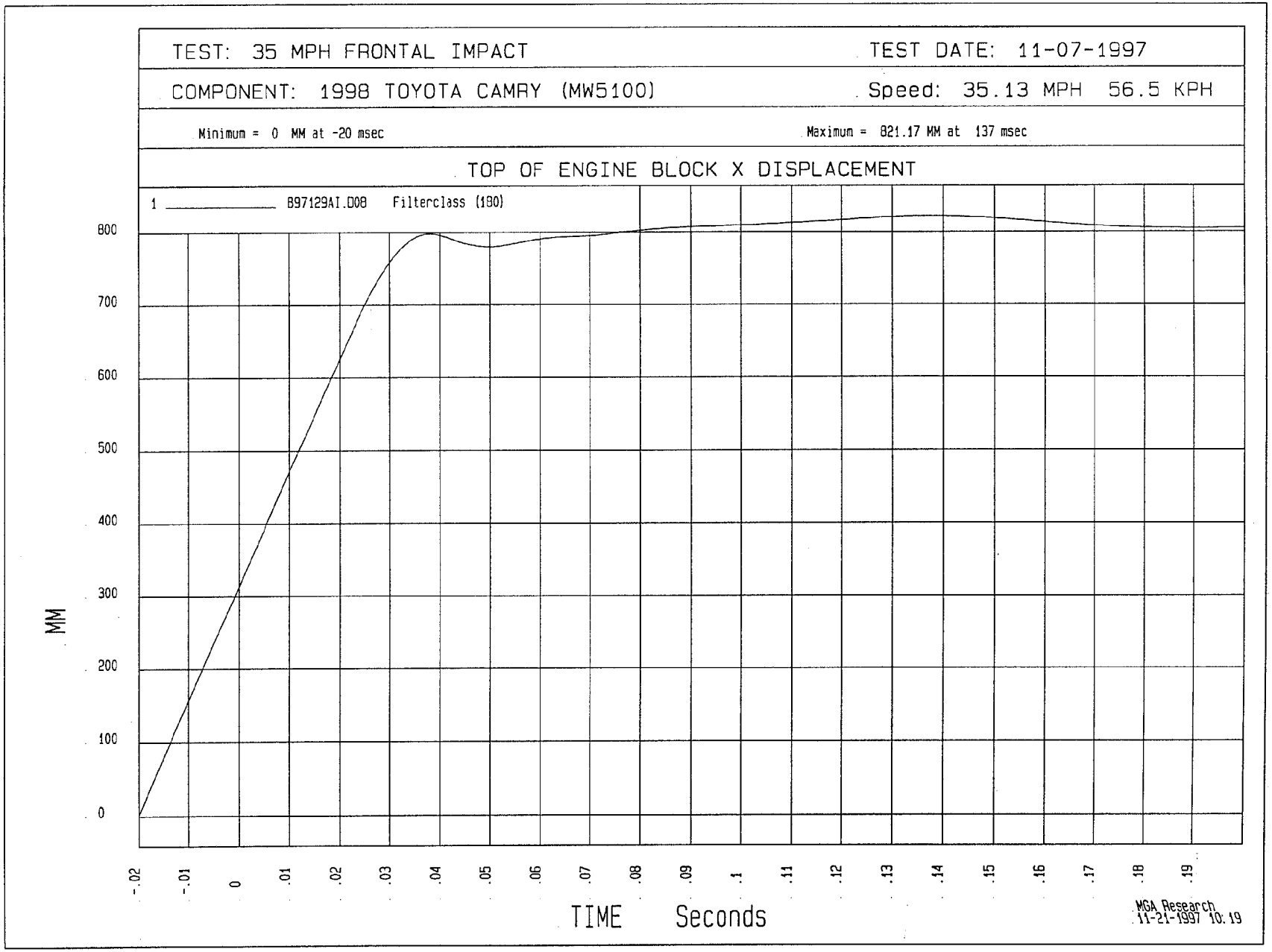

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -30.21 G'S at 47 msec
Maximum = 2.43 G'S at 133 msec
RIGHT REAR SEAT CROSSMEMBER X ACCELERATION
1 B97129AF.A20 Filterclass (60)
G'S
TIME (SECONDS)
MGA Research
11-21-1997 10: 15

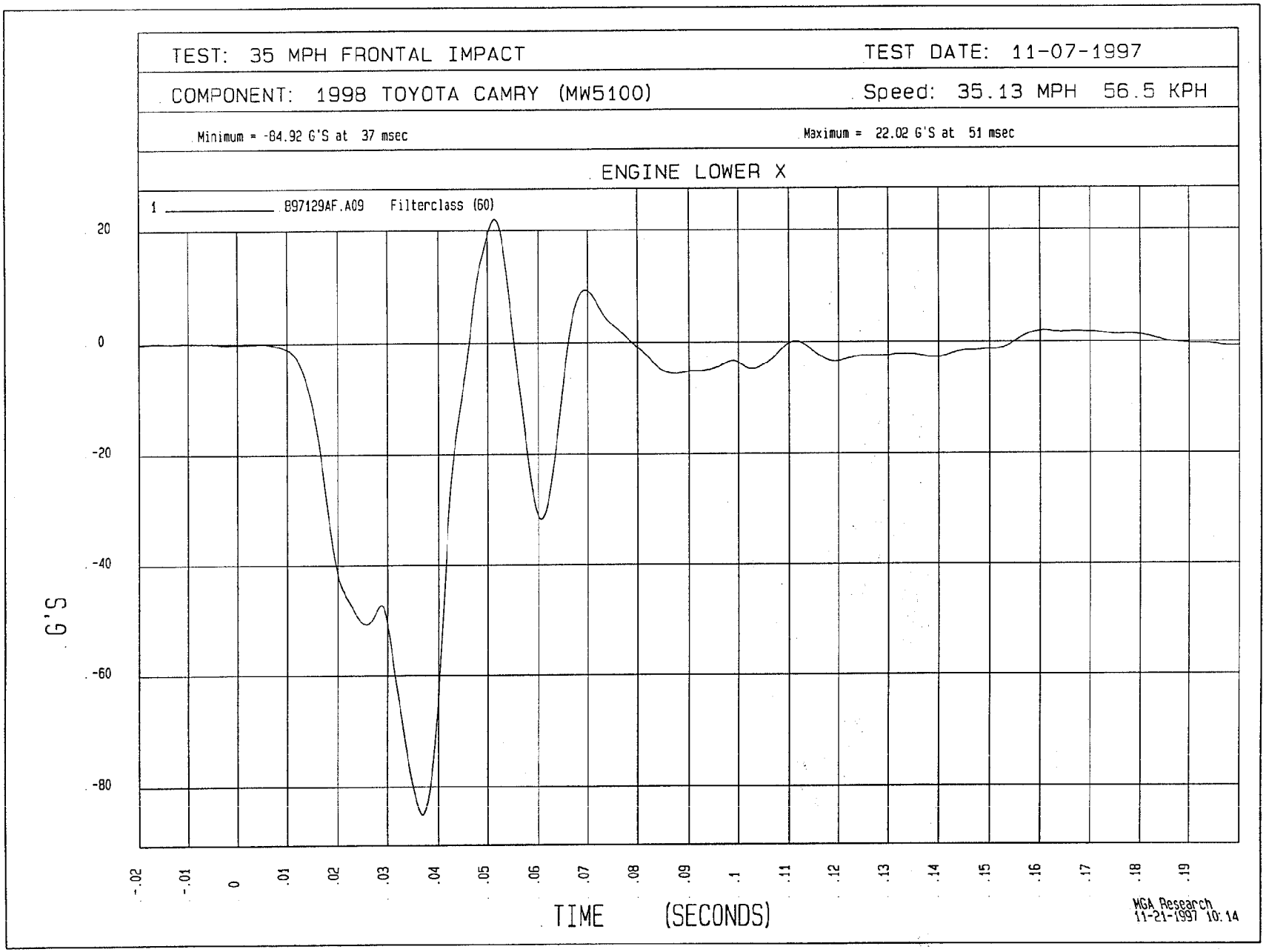

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -7.61 KPH at 114 msec
Maximum = 56.52 KPH at 4 msec
RIGHT REAR SEAT CROSSMEMBER X VELOCITY
1 B97129AI.V20 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:17

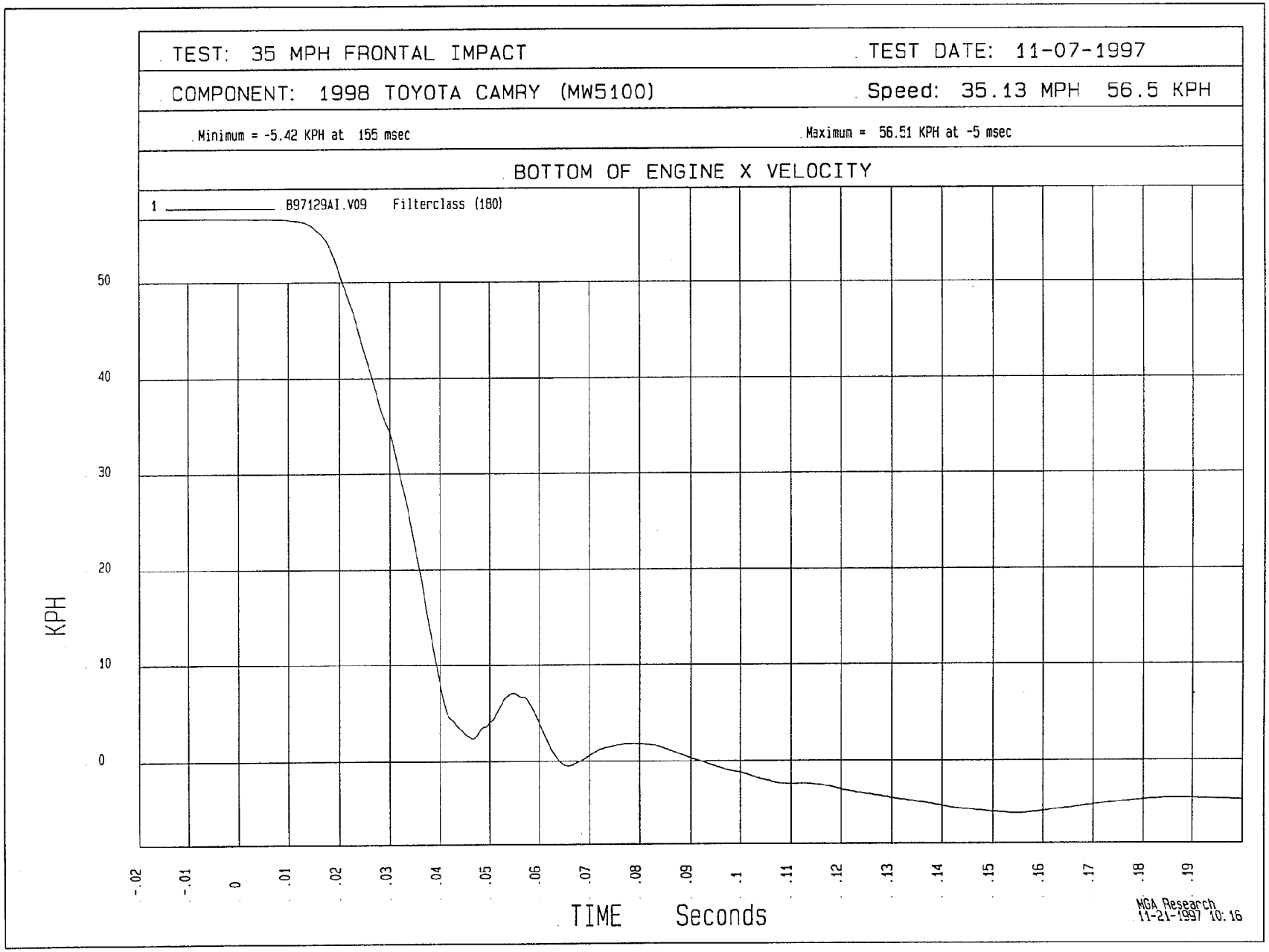

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 1057.14 MM at 82 msec
RIGHT REAR SEAT CROSSMEMBER X DISPLACEMENT
1 B97129AI.020 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:19

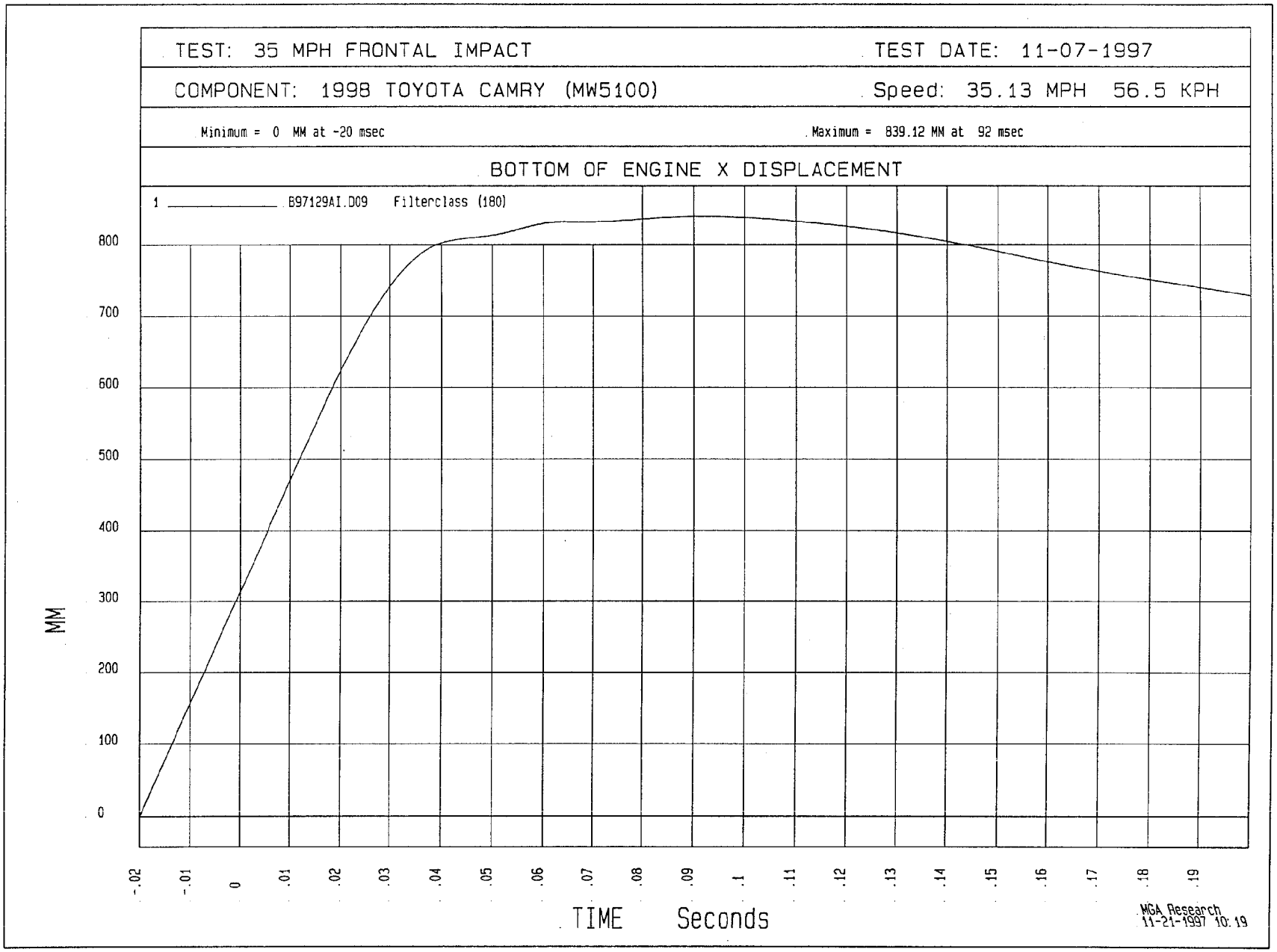

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -132.66 G'S at 35 msec
Maximum = 47.33 G'S at 49 msec
ENGINE UPPER X
1 B97129AF.A08 Filterclass (60)
40
20
0
-20
-40
-60
-80
-100
-120
-140
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:14

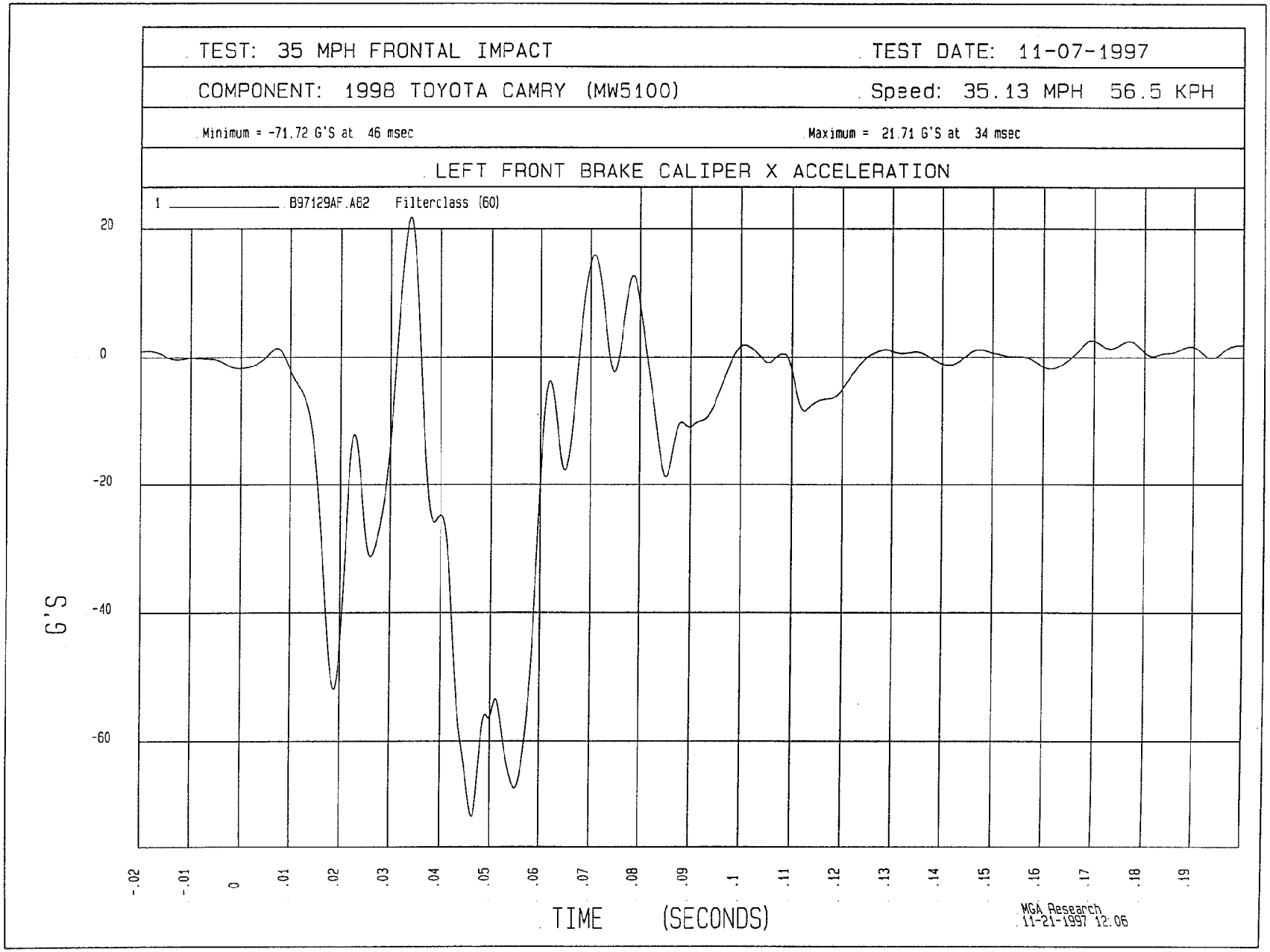

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -9.21 KPH at 43 msec
Maximum = 56.51 KPH at -17 msec
TOP OF ENGINE BLOCK X VELOCITY
1 B97129AI.V08 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:16

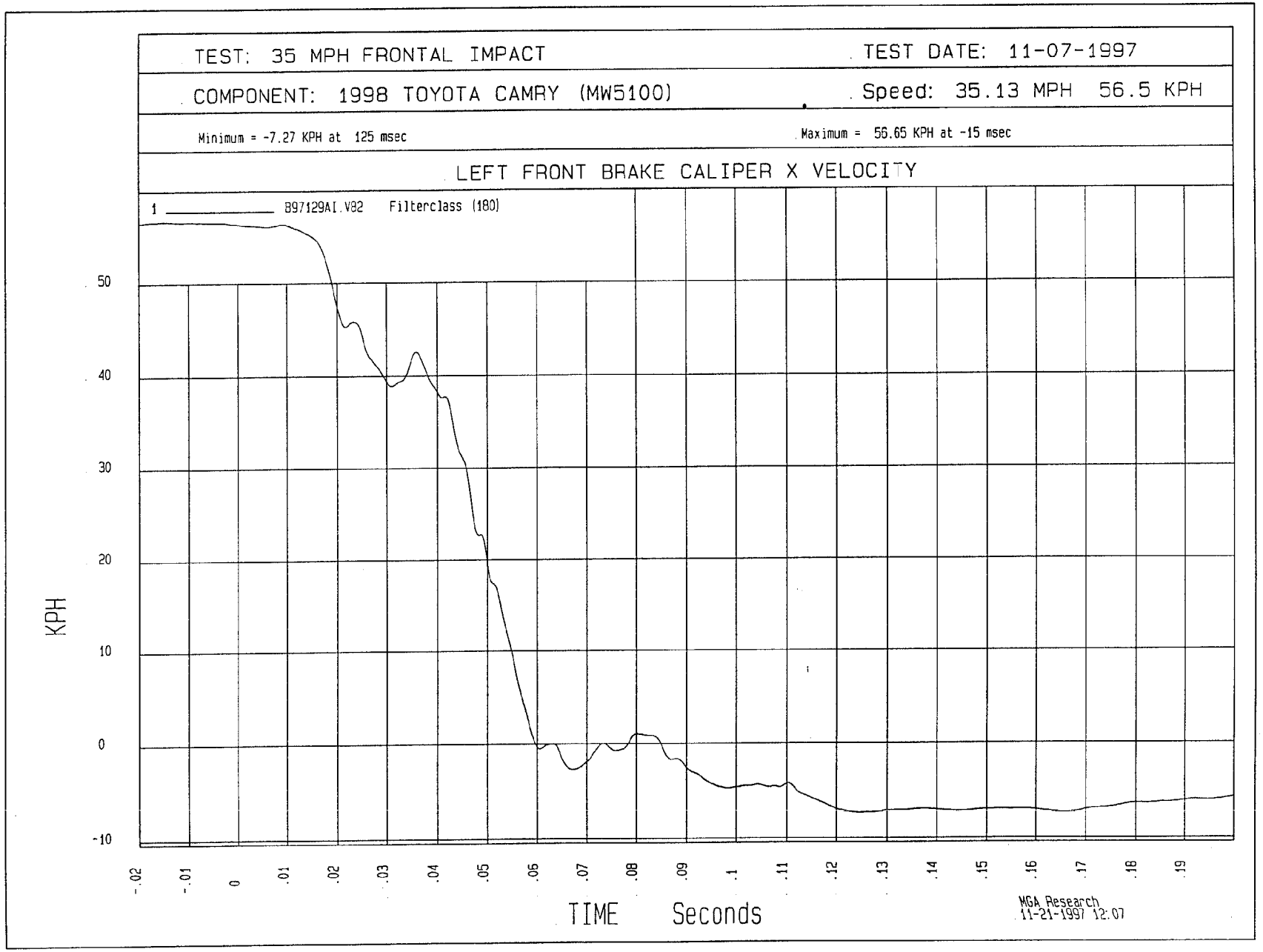

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 821.17 MM at 137 msec
TOP OF ENGINE BLOCK X DISPLACEMENT
1 B97129AI.D08 Filterclass (180)
MM
800
700
600
500
400
300
200
100
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:19

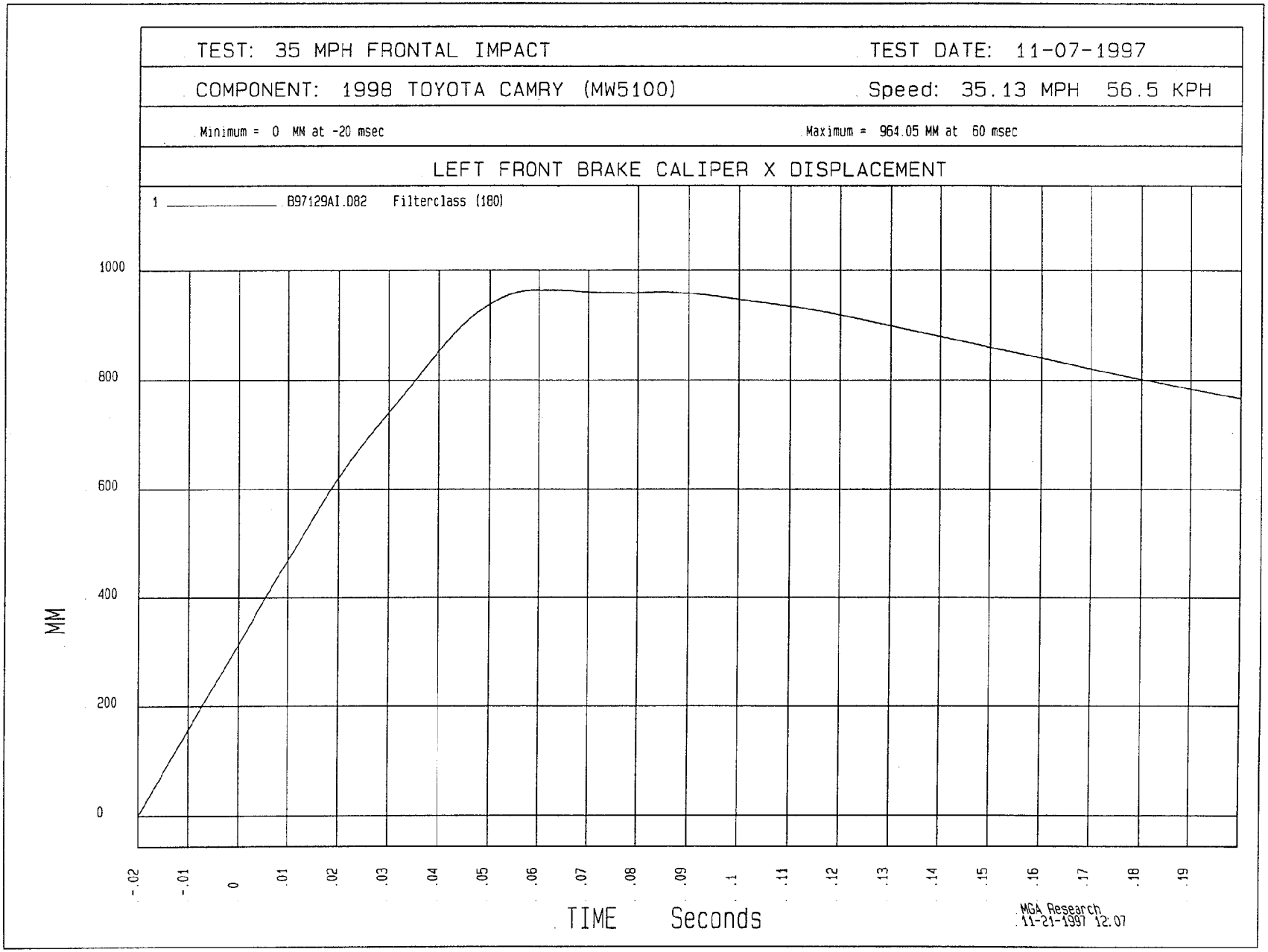

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -84.92 G'S at 37 msec
Maximum = 22.02 G'S at 51 msec
ENGINE LOWER X
1 B97129AF.A09 Filterclass (60)
20
0
-20
-40
-60
-80
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:14

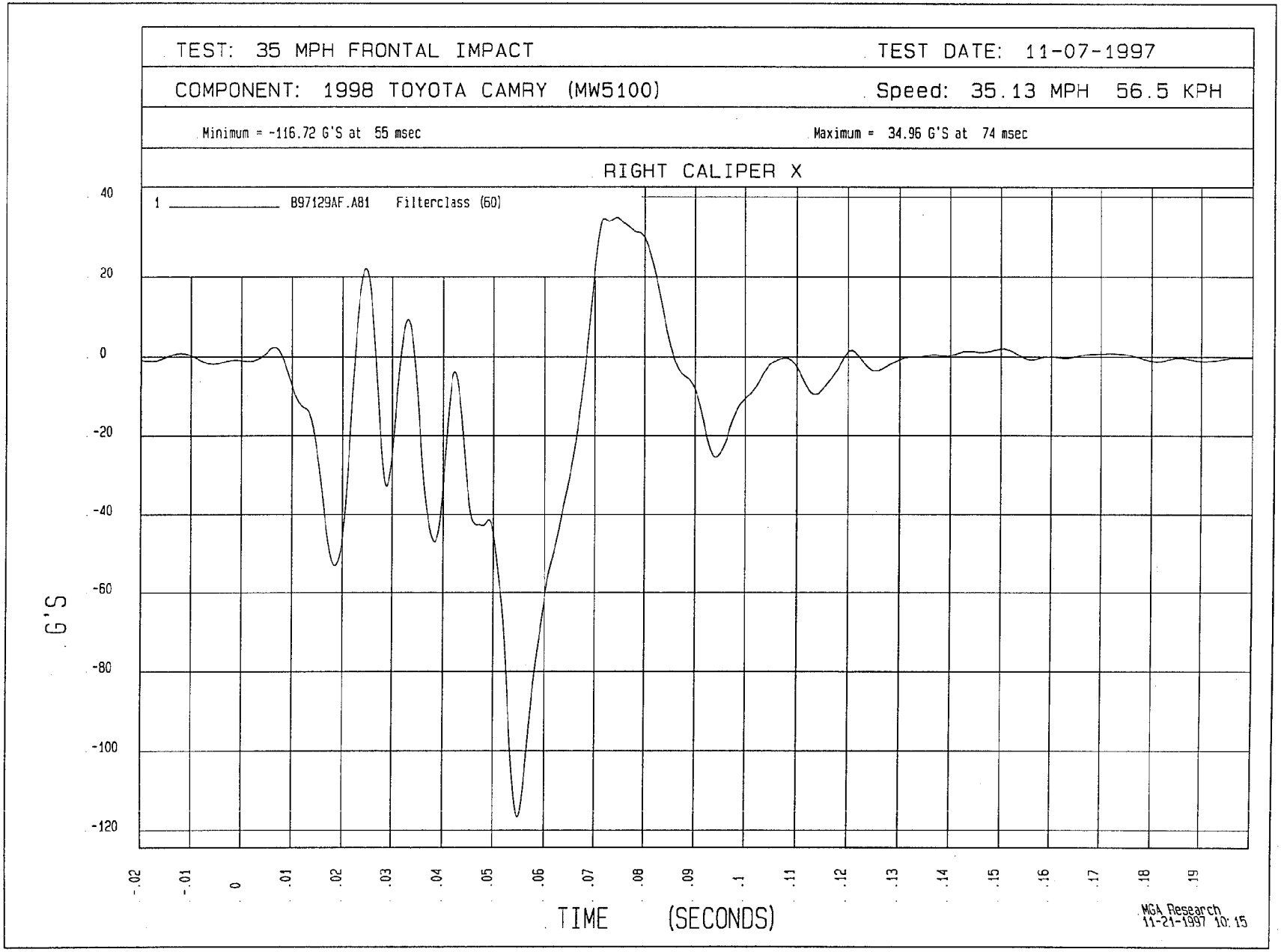

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -5.42 KPH at 155 msec
Maximum = 56.51 KPH at -5 msec
BOTTOM OF ENGINE X VELOCITY
1 B97129AI.V09 Filterclass (180)
KPH
50
40
30
20
10
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:16

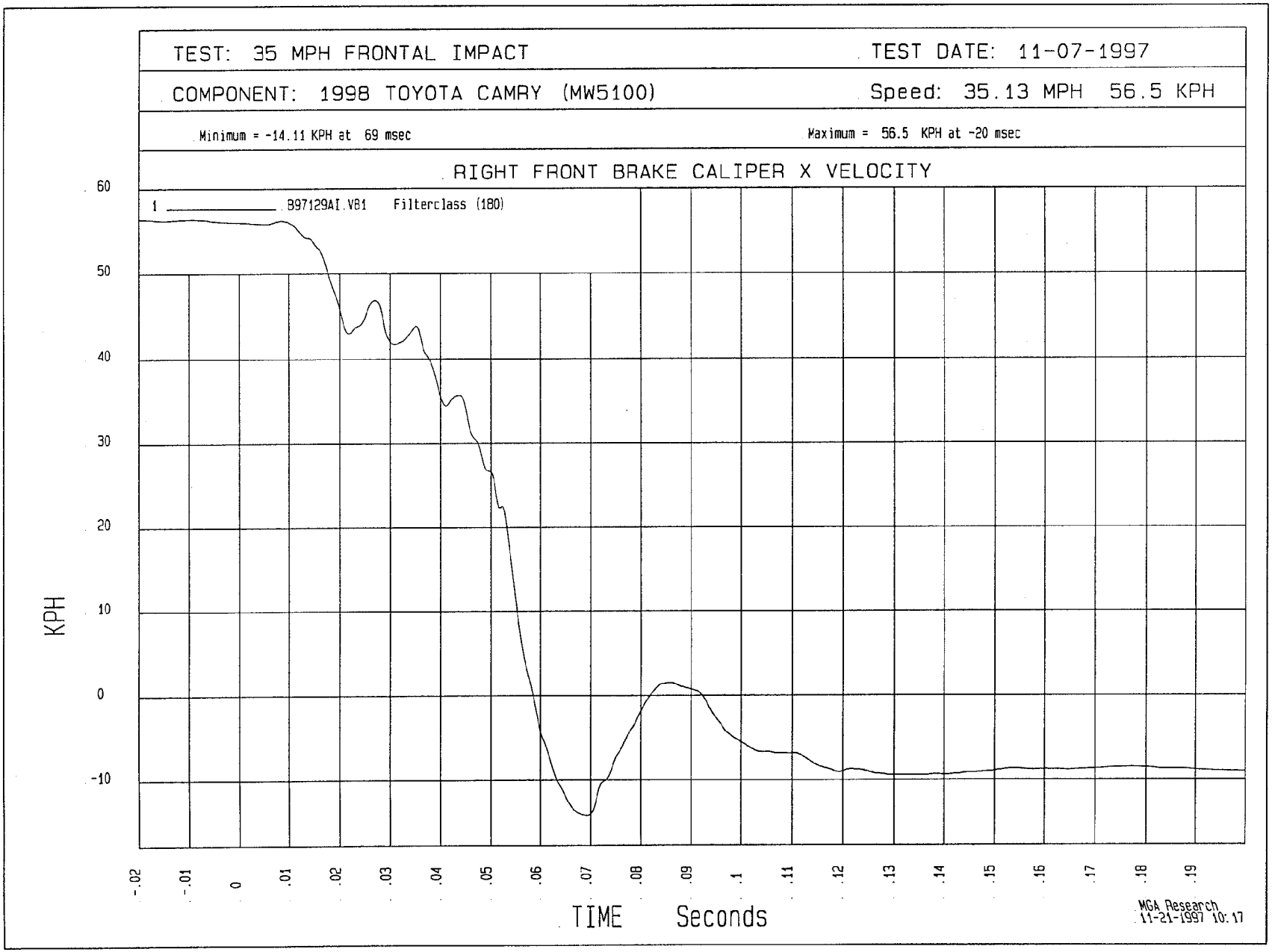

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 839.12 MM at 92 msec
BOTTOM OF ENGINE X DISPLACEMENT
1 B97129AI.D09 Filterclass (180)
MM
800
700
600
500
400
300
200
100
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:19

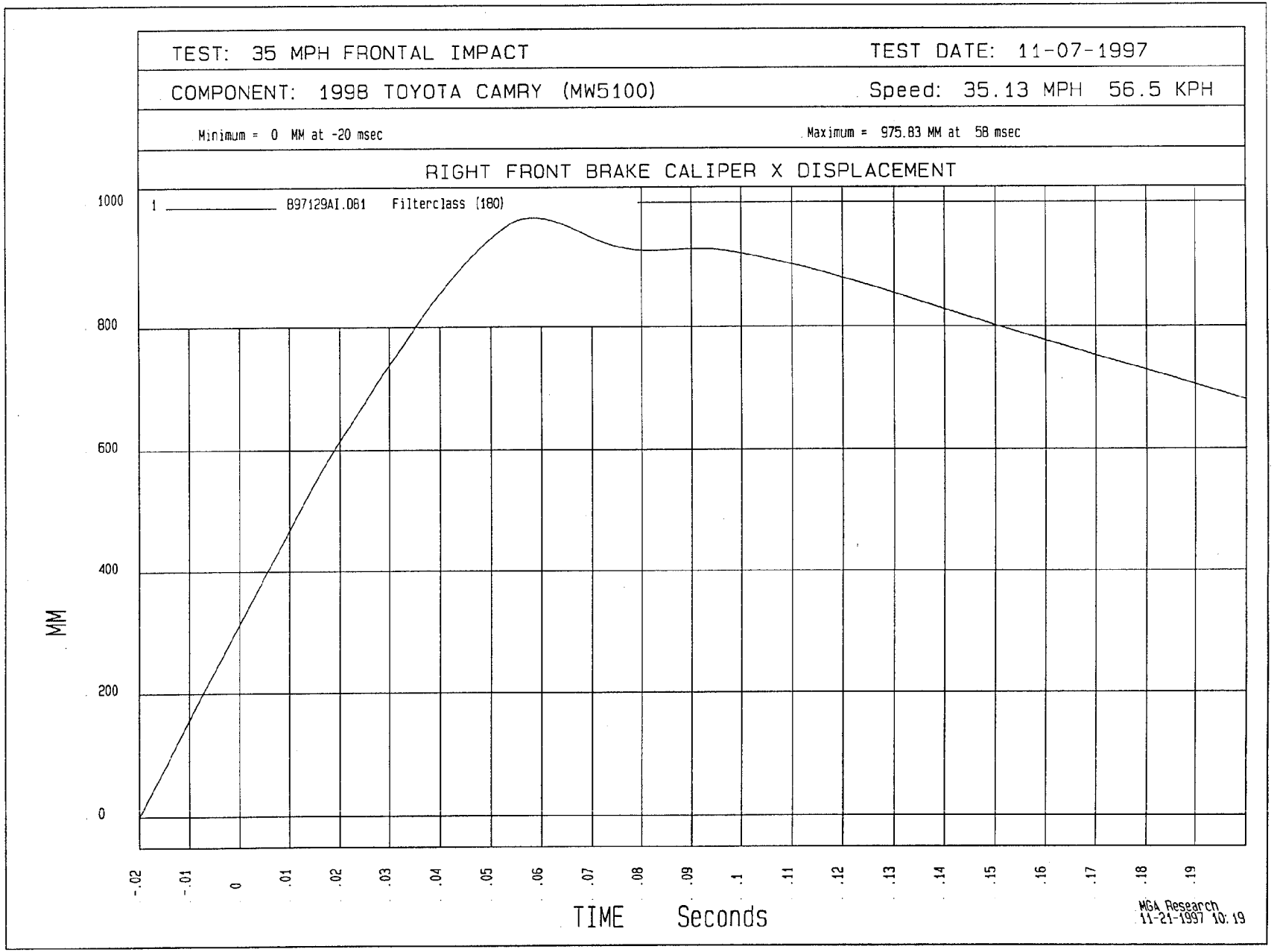

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -71.72 G'S at 46 msec
Maximum = 21.71 G'S at 34 msec
LEFT FRONT BRAKE CALIPER X ACCELERATION
1 B97129AF.A62 Filterclass (60)
20
0
-20
-40
-60
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 12:06

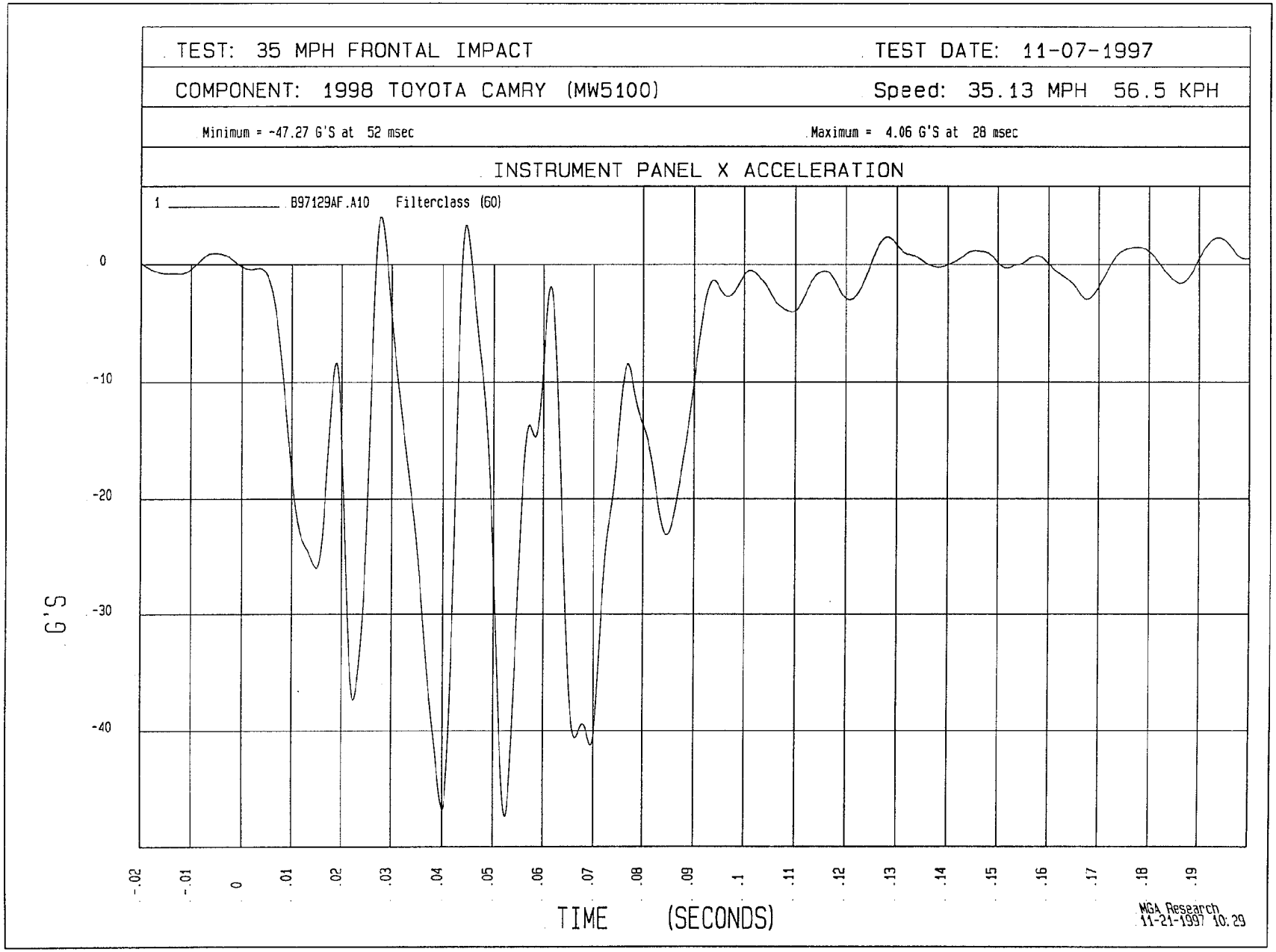

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -7.27 KPH at 125 msec
Maximum = 56.65 KPH at -15 msec
LEFT FRONT BRAKE CALIPER X VELOCITY
1 B97129AI.V82 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 12:07

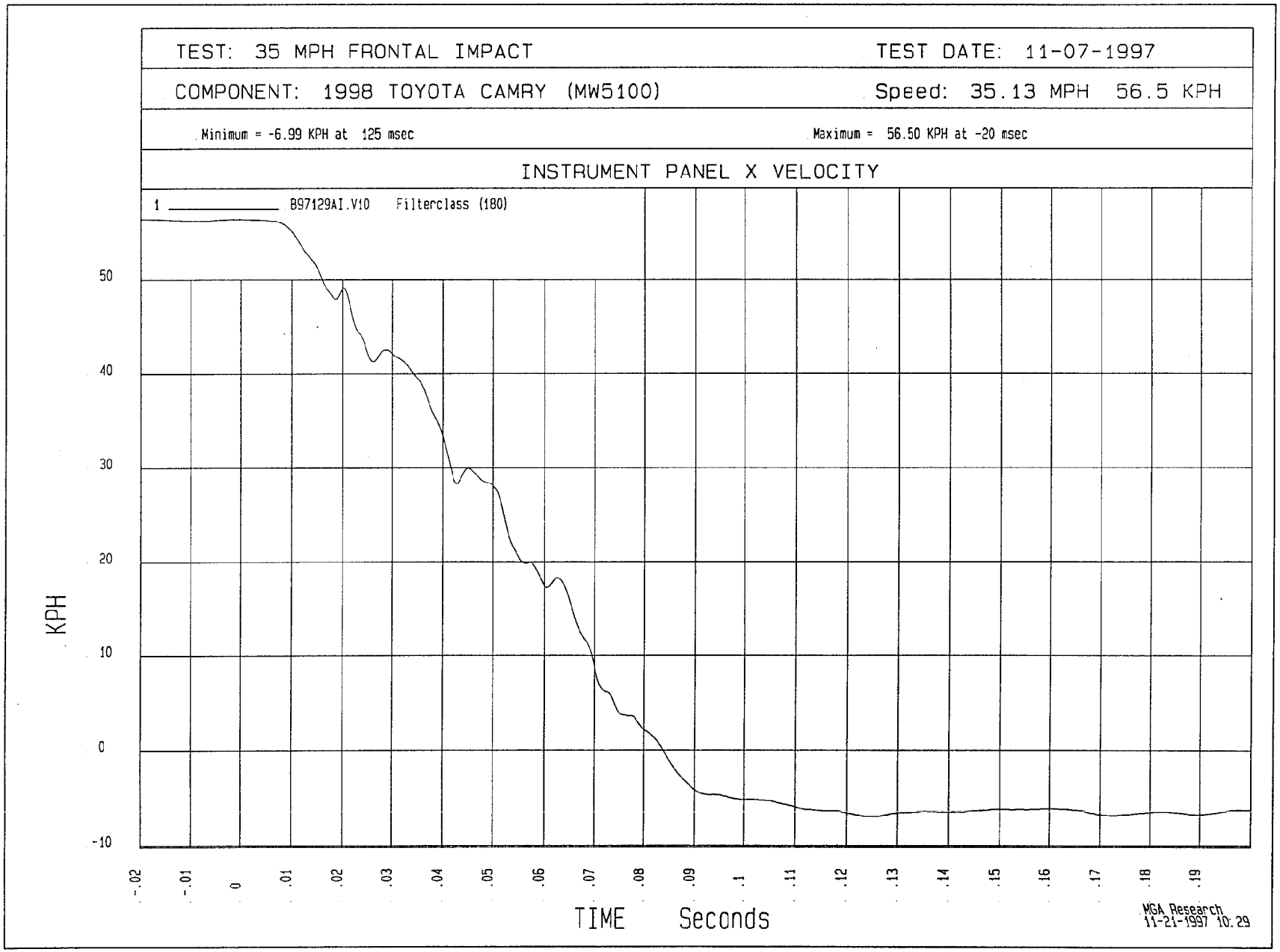

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 964.05 MM at 60 msec
LEFT FRONT BRAKE CALIPER X DISPLACEMENT
1 B97129AI.D82 Filterclass (180)
1000
800
600
400
200
0
MM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 12:07

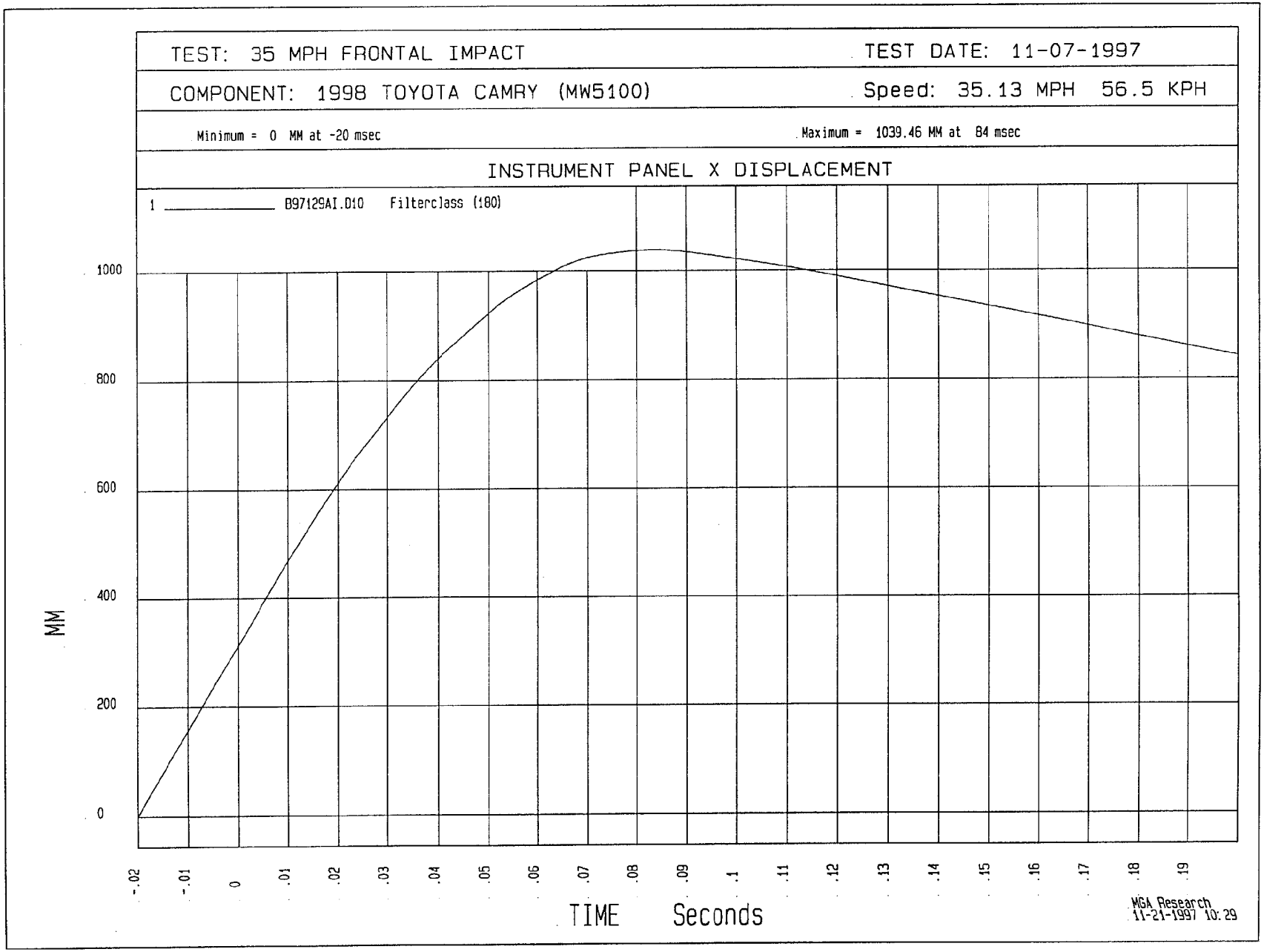

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -116.72 G'S at 55 msec
Maximum = 34.96 G'S at 74 msec
RIGHT CALIPER X
1 B97129AF.A81 Filterclass (60)
40
20
0
-20
-40
-60
-80
-100
-120
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:15

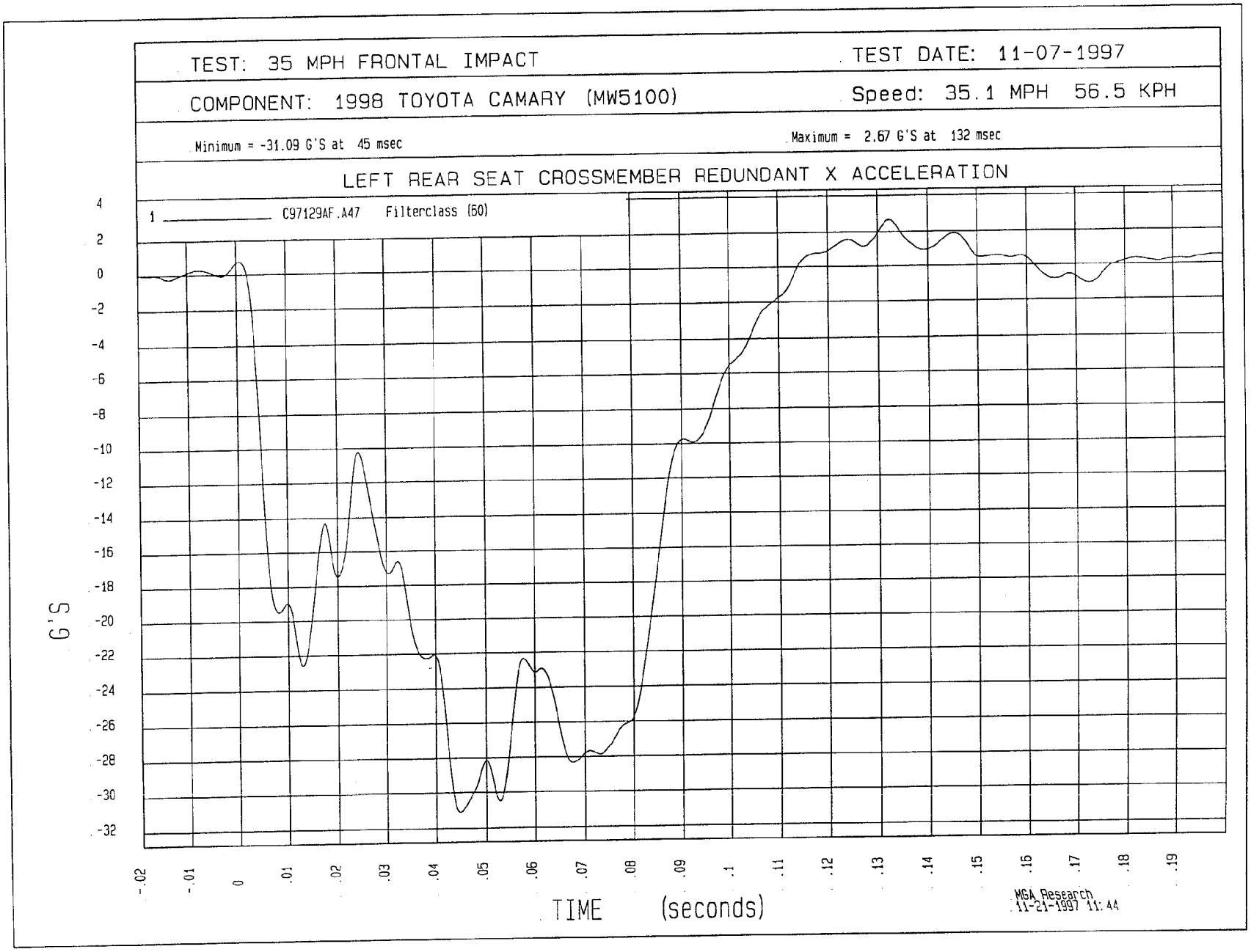

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -14.11 KPH at 69 msec
Maximum = 56.5 KPH at -20 msec
RIGHT FRONT BRAKE CALIPER X VELOCITY
1 B97129AI.V81 Filterclass (180)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:17

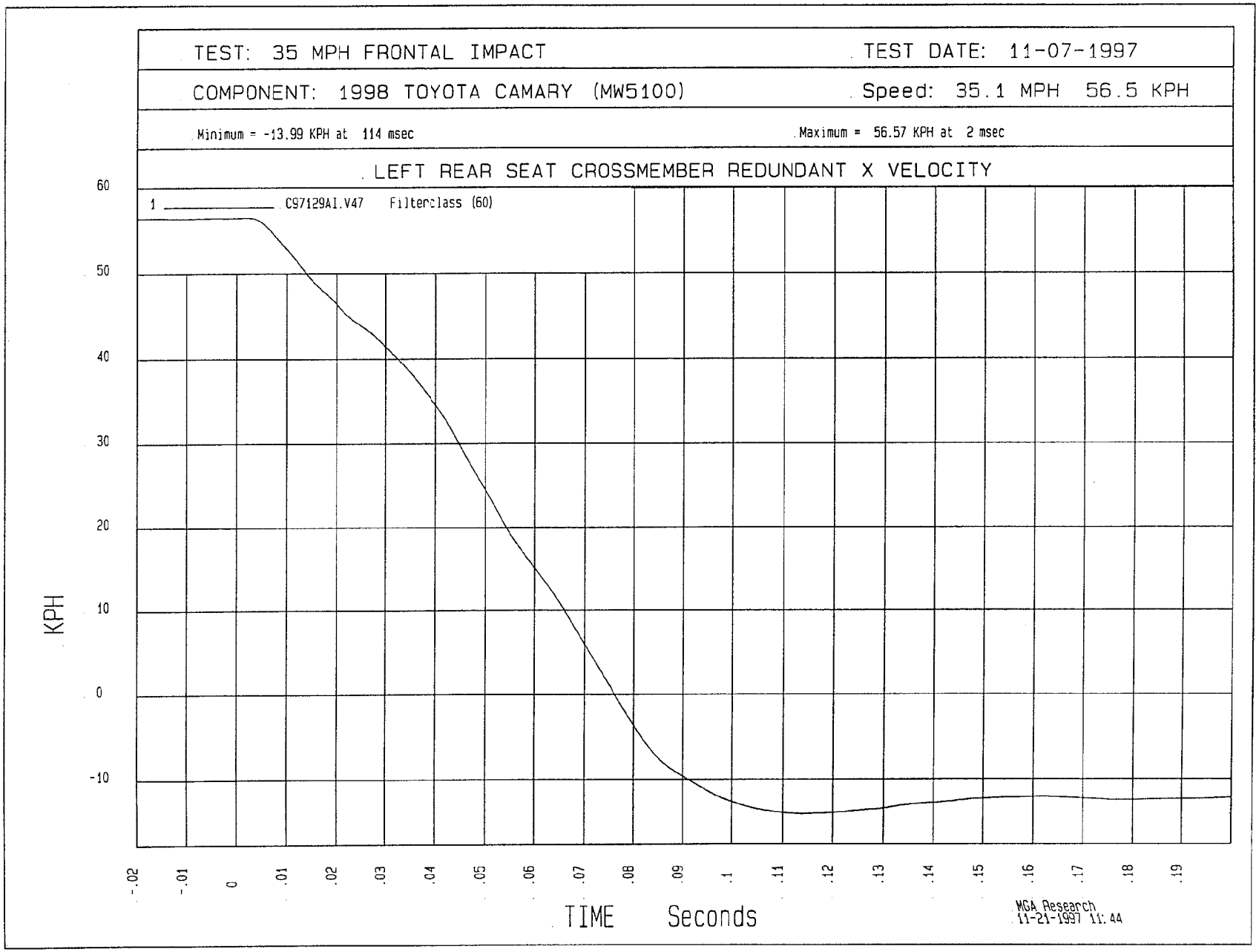

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 975.83 MM at 58 msec
RIGHT FRONT BRAKE CALIPER X DISPLACEMENT
1 B97129AI.081 Filterclass (180)
1000
800
600
400
200
0
MM
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:19

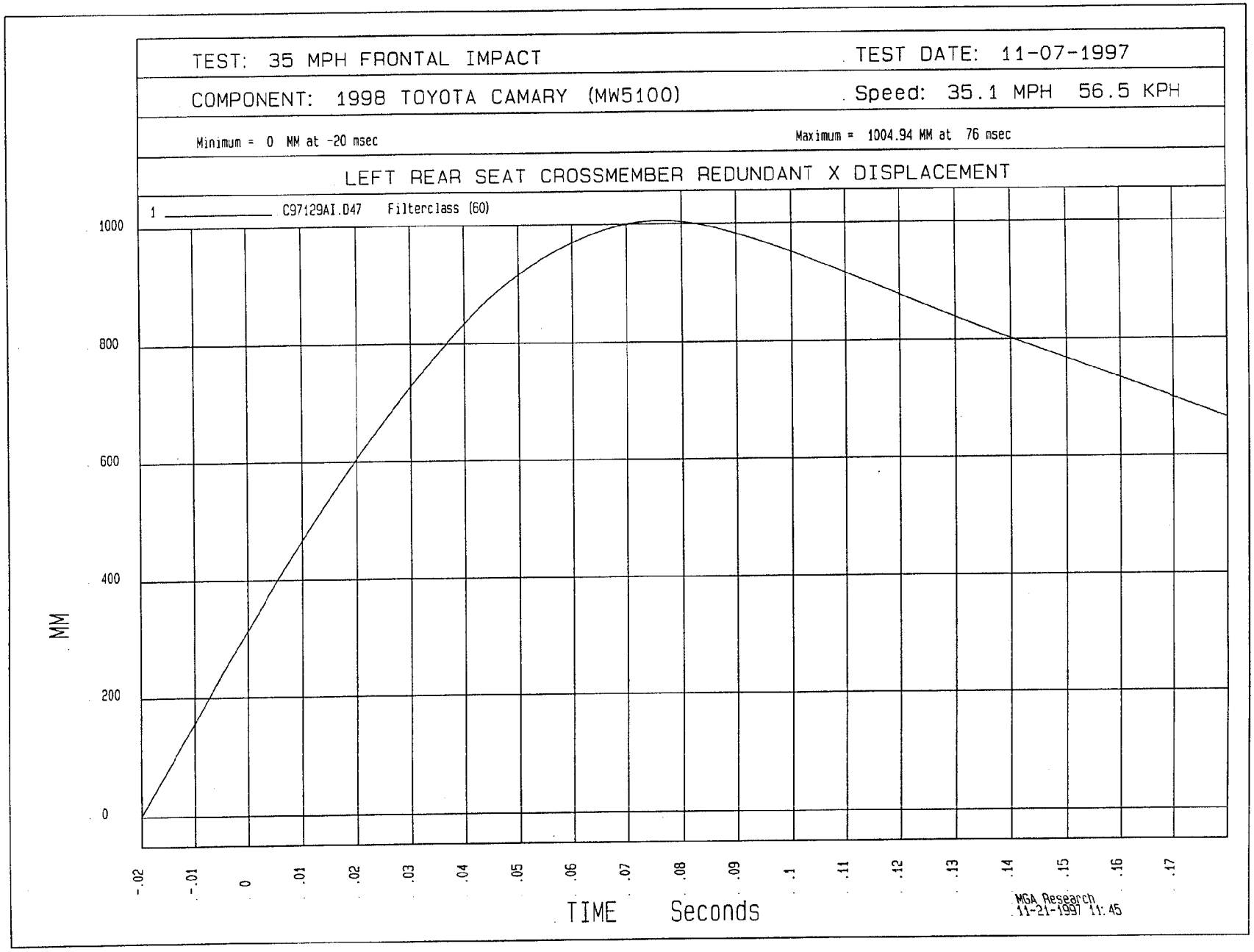

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -47.27 G'S at 52 msec
Maximum = 4.06 G'S at 28 msec
INSTRUMENT PANEL X ACCELERATION
1 B97129AF.A10 Filterclass (60)
0
-10
-20
-30
-40
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:29

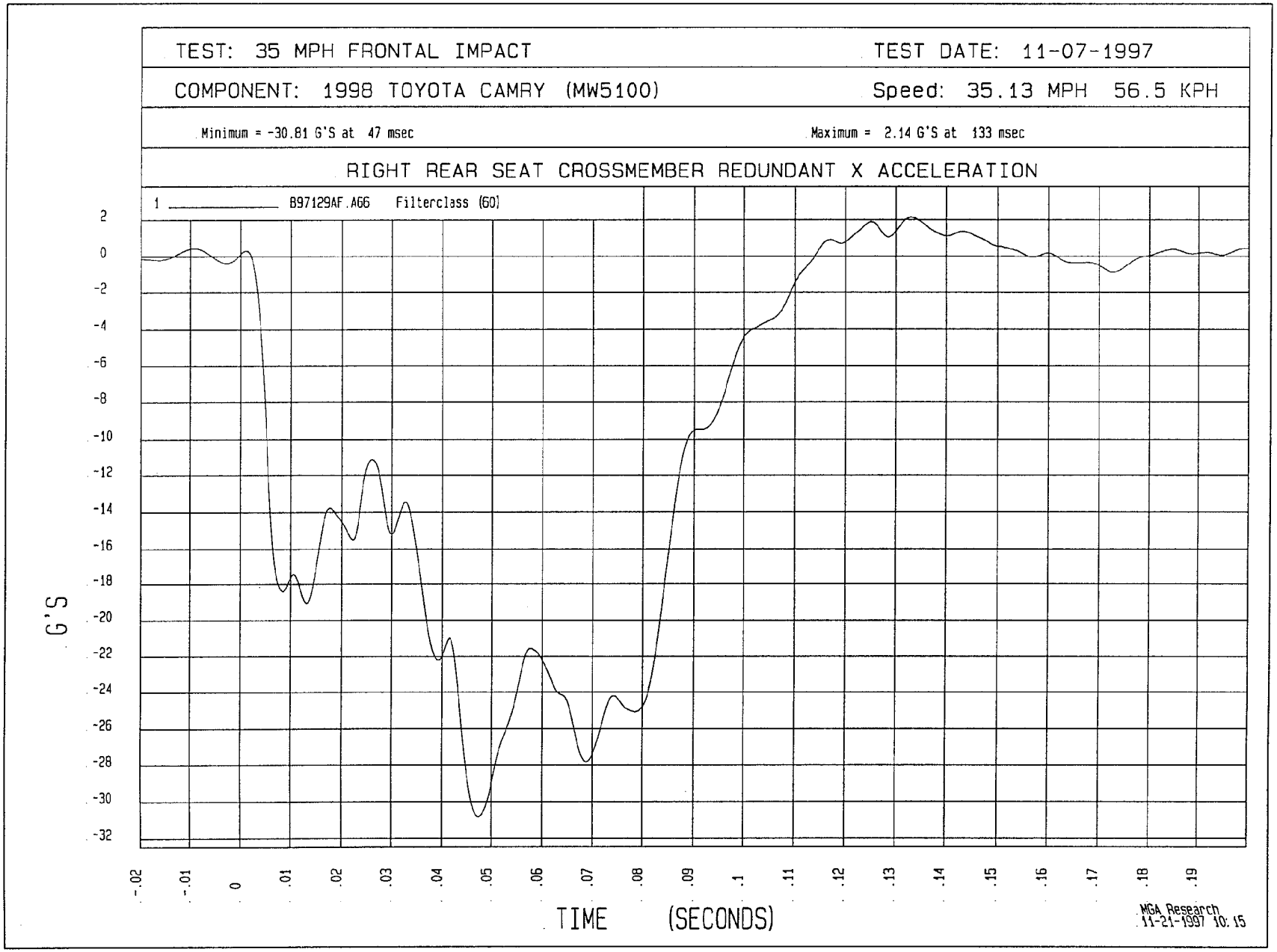

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -6.99 KPH at 125 msec
Maximum = 56.50 KPH at -20 msec
INSTRUMENT PANEL X VELOCITY
1 B97129AI.V10 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:29

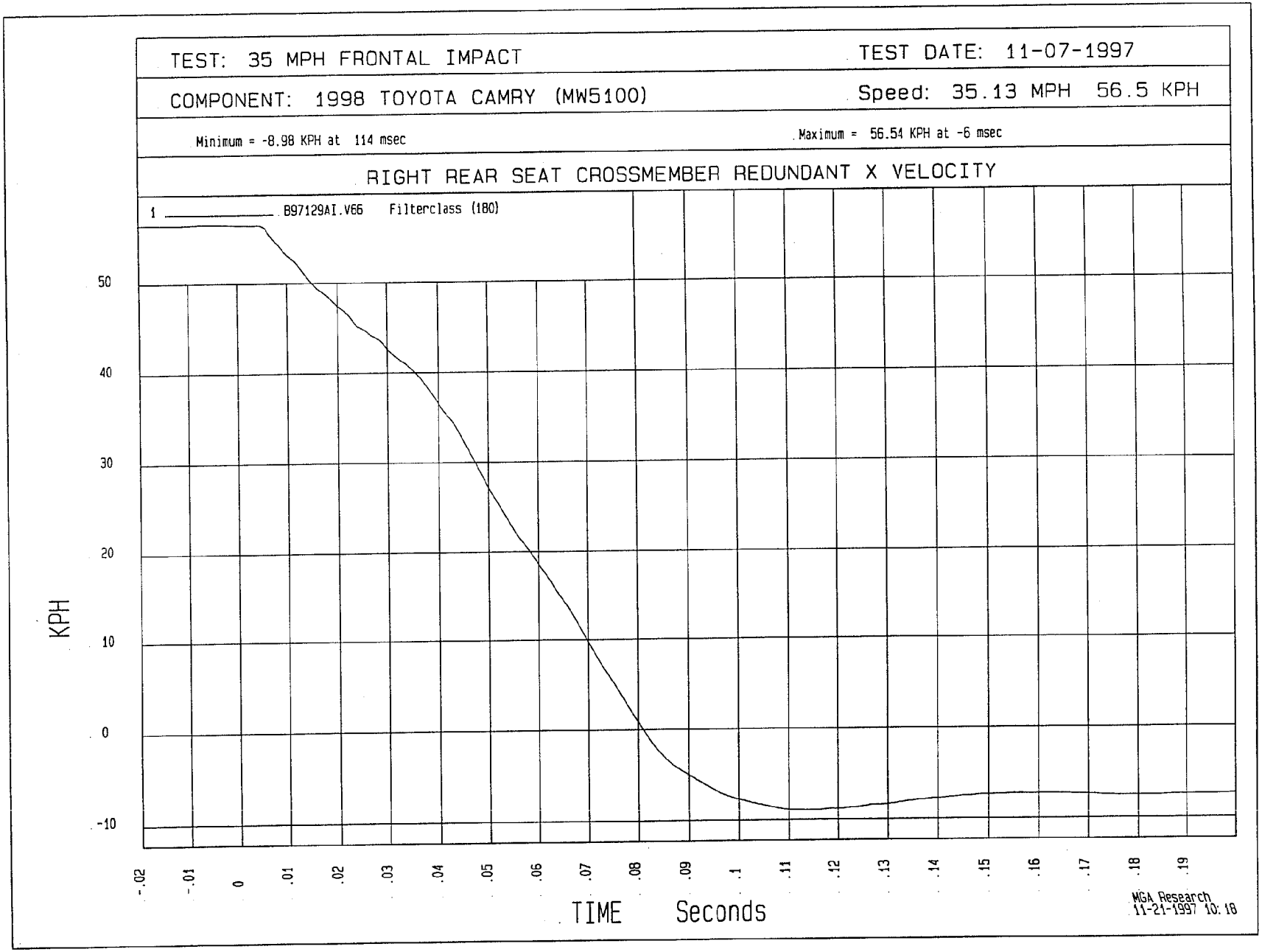

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 1039.46 MM at 84 msec
INSTRUMENT PANEL X DISPLACEMENT
1 B97129AI.D10 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:29

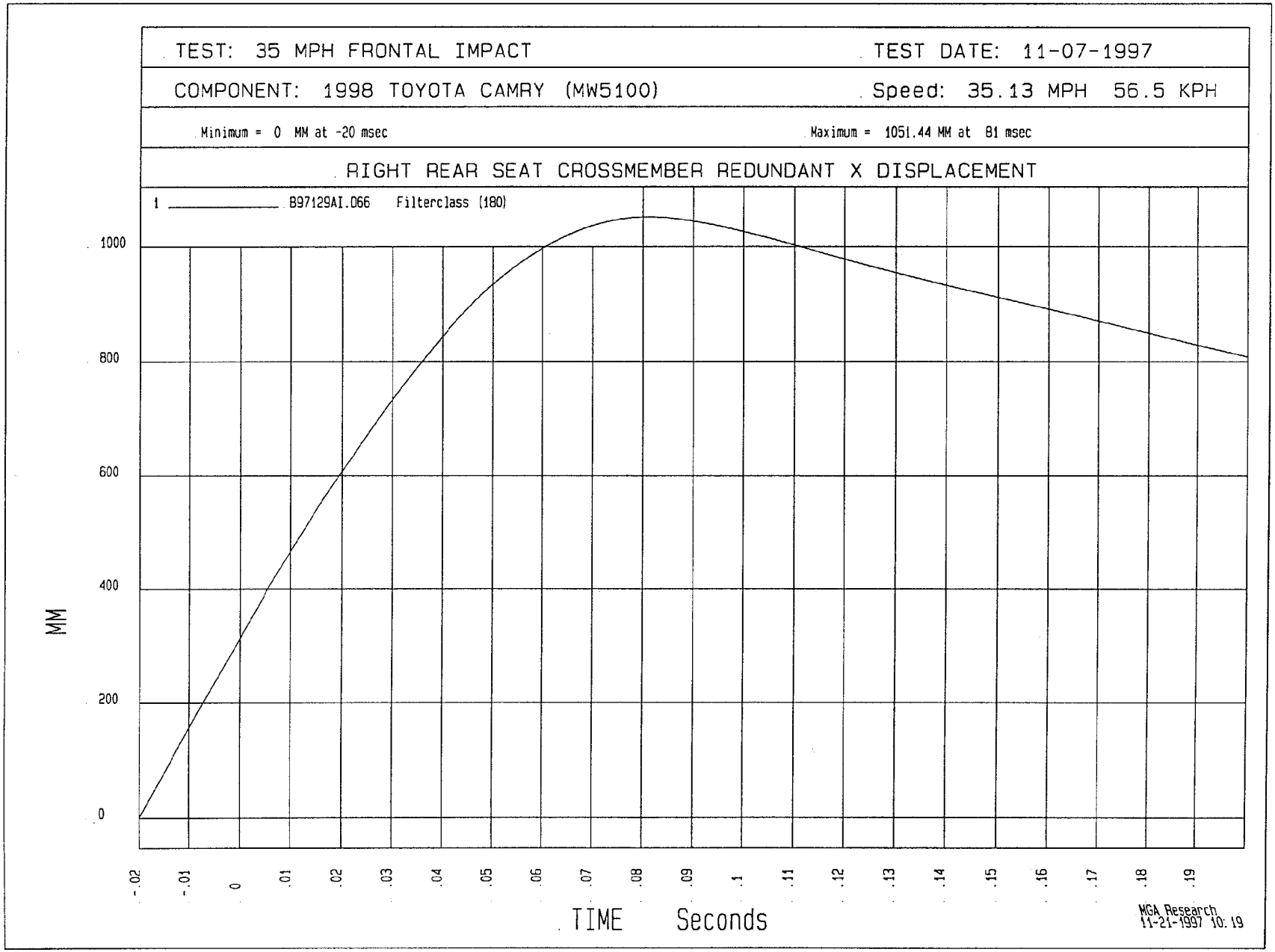

TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -31.09 G'S at 45 msec
Maximum = 2.67 G'S at 132 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION
1 C97129AF.A47 Filterclass (60)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
G's
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (seconds)
MGA Research
11-21-1997 11:44


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = -13.99 KPH at 114 msec
Maximum = 56.57 KPH at 2 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY
1 C97129AI.V47 Filterclass (60)
KPH
60
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 11:44


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMARY (MW5100)
Speed: 35.1 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 1004.94 MM at 76 msec
LEFT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT
1 C97129AI.D47 Filterclass (60)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
TIME Seconds
MGA Research
11-21-1997 11:45


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -30.81 G'S at 47 msec
Maximum = 2.14 G'S at 133 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X ACCELERATION
1 B97129AF.A66 Filterclass (60)
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
G'S
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME (SECONDS)
MGA Research
11-21-1997 10:15


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = -8.98 KPH at 114 msec
Maximum = 56.54 KPH at -6 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X VELOCITY
1 B97129AI.V66 Filterclass (180)
KPH
50
40
30
20
10
0
-10
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:18


TEST: 35 MPH FRONTAL IMPACT
TEST DATE: 11-07-1997
COMPONENT: 1998 TOYOTA CAMRY (MW5100)
Speed: 35.13 MPH 56.5 KPH
Minimum = 0 MM at -20 msec
Maximum = 1051.44 MM at 81 msec
RIGHT REAR SEAT CROSSMEMBER REDUNDANT X DISPLACEMENT
1 B97129AI.066 Filterclass (180)
MM
1000
800
600
400
200
0
-.02
-.01
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
.12
.13
.14
.15
.16
.17
.18
.19
TIME Seconds
MGA Research
11-21-1997 10:19

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Tim Michnay

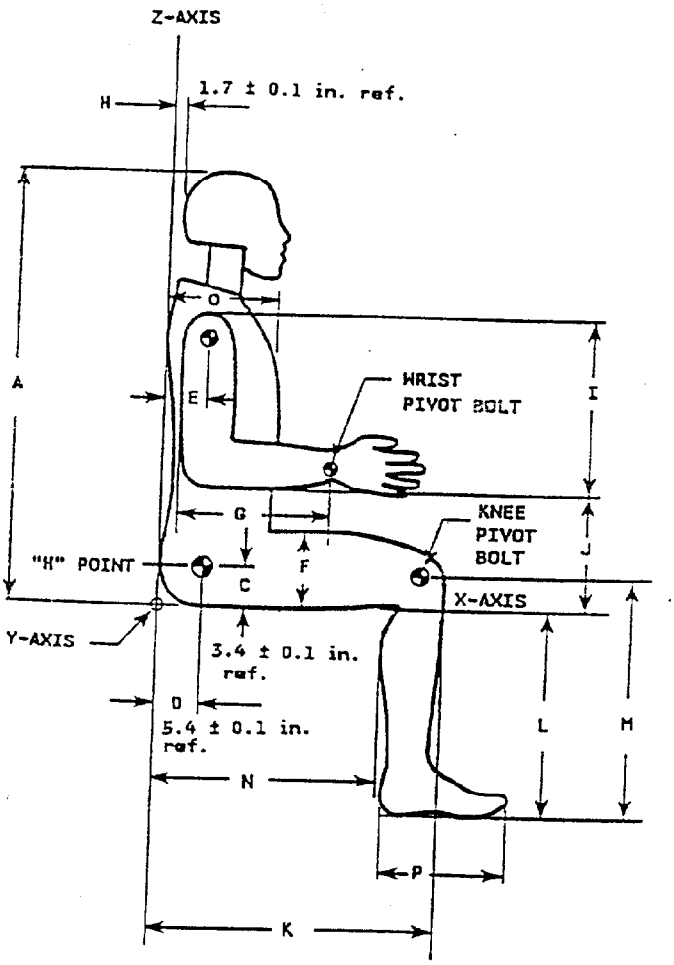
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: November 6, 1997

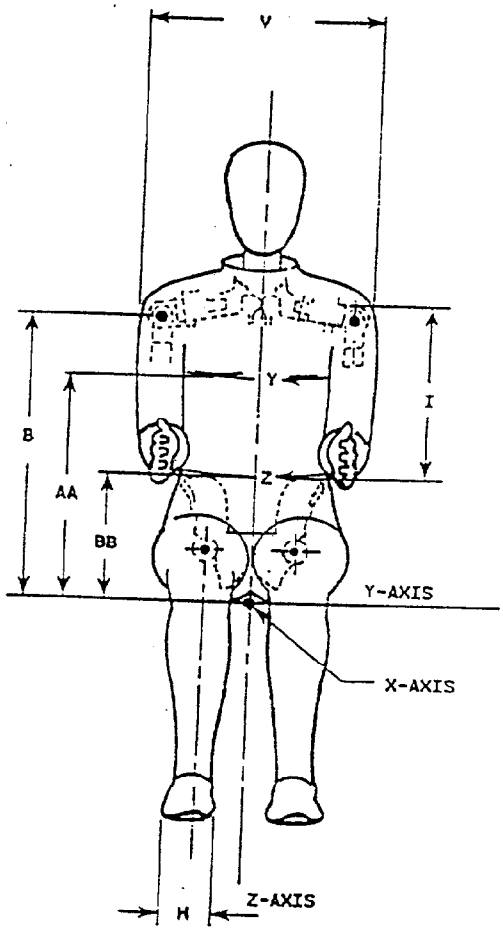
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.8
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 065 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: November 6, 1997

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	30%
Peak Resultant Acceleration	225 - 275 G	239
Peak Lateral Acceleration	15 G. MAX	-14
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	30%
Pendulum Speed		22.6 - 23.4 FT/SEC	23.0
Pendulum Deceleration	10 MS	22.50 - 27.50 G	24.43
	20 MS	17.60 - 22.60 G	20.83
	30 MS	12.50 - 18.50 G	13.57
Max. Pendulum G Above 30 MS		29.0 G MAX	13.5
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	76
	TIME	57 - 64 MS	58
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	114
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	73
	TIME	47 - 58 MS	52
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	102

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	30%
Pendulum Speed		19.50 - 20.30 F/S	19.76
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.93
	20 MS	14.00 - 19.00 G	17.31
	30 MS	11.00 - 16.00 G	14.11
Max. Pendulum G Above 30 MS		22 G Max	14
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	38
D Plane Rotation	MAX	81 - 106 DEG.	99
	TIME	72 - 82 MS	74
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	153
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-54.0
	TIME	65 - 79 MS	69
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	138

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	30%
Probe Speed	21.6 to 22.4 F/S	21.8
Peak Deflection	2.50 to 2.86 IN.	2.72
Peak Resistive Force	1160 to 1325 LBS.	1280
Internal Hysteresis	69 to 85%	70%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	28%
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1161

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	28%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1244

6.0 HIP JOINT-FEMUR FLEXION TEST

LEFT KNEE	SPECIFICATION	MEASUREMENT	
		LEFT	RIGHT
Relative Humidity	10 - 70%	28%	
Rotation Rate	5-10 DEG/SEC.	Yes	Yes
70 FT-LBF	30 DEGREE MAX. ROTATION	66	65
150 FT-LBF	40-50 DEGREE MAX. ROTATION	42	43

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Tim Michnay

I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: November 6, 1997

DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See page C-2 for external dimensions)

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 066 DUMMY CALIBRATION BY: Tim Michnay

VERIFICATION DATE: November 6, 1997

VERIFICATION LABORATORY TEMPERATURE (66° - 78°): 70°

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	30%
Peak Resultant Acceleration	225 - 275 G	246
Peak Lateral Acceleration	15 G. MAX	-3
Is Acceleration Curve Unimodel	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	30%
Pendulum Speed		22.6 - 23.4 FT/SEC	22.7
Pendulum Deceleration	10 MS	22.50 - 27.50 G	24.4
	20 MS	17.60 - 22.60 G	20.45
	30 MS	12.50 - 18.50 G	14.85
Max. Pendulum G Above 30 MS		29.0 G MAX	15.5
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	38
D Plane Rotation	MAX	64 - 78 DEG.	74
	TIME	57 - 64 MS	58
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	113
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	71
	TIME	47 - 58 MS	51
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	102

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Relative Humidity		10 - 70%	30%
Pendulum Speed		19.50 - 20.30 F/S	19.9
Pendulum Deceleration	10 MS	17.20 - 21.20 G	20.49
	20 MS	14.00 - 19.00 G	17.76
	30 MS	11.00 - 16.00 G	13.29
Max. Pendulum G Above 30 MS		22 G Max	14.00
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	38
D Plane Rotation	MAX	81 - 106 DEG.	100
	TIME	72 - 82 MS	74
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	153
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-54
	TIME	65 - 79 MS	69
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	139

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	30%
Probe Speed	21.6 to 22.4 F/S	21.7
Peak Deflection	2.50 to 2.86 IN.	2.54
Peak Resistive Force	1160 to 1325 LBS.	1235
Internal Hysteresis	69 to 85%	72%

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	28%
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1215

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Relative Humidity	10 - 70%	28%
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1292

6.0 HIP JOINT-FEMUR FLEXION TEST

LEFT KNEE	SPECIFICATION	MEASUREMENT	
		LEFT	RIGHT
Relative Humidity	10 - 70%	28%	
Rotation Rate	5-10 DEG/SEC.	Yes	Yes
70 FT-LBF	30 DEGREE MAX. ROTATION	56	50
150 FT-LBF	40-50 DEGREE MAX. ROTATION	45	44

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	October 28, 1997
Head Y	ACC61	Endevco	October 28, 1997
Head Z	ACCW9	Endevco	October 28, 1997
Head X Redundant	AJ621	Endevco	October 28, 1997
Head Y Redundant	AJ619	Endevco	October 28, 1997
Head Z Redundant	AHY54	Endevco	October 28, 1997
Neck Load Cell X	442	Endevco	September 22, 1997
Neck Load Cell Y	442	Endevco	September 22, 1997
Neck Load Cell Z	442	Endevco	September 22, 1997
Neck Moment X	442	Endevco	September 22, 1997
Neck Moment Y	442	Endevco	September 22, 1997
Neck Moment Z	442	Endevco	September 22, 1997
Chest X	ACC78	Denton	October 28, 1997
Chest Y	ACCE6	Denton	October 28, 1997
Chest Z	ACCY3	Endevco	October 28, 1997
Chest X Redundant	AJ9J7	Endevco	October 28, 1997
Chest Y Redundant	AJ7A2	Endevco	October 28, 1997
Chest Z Redundant	AJ819	Endevco	October 28, 1997
Chest Displacement	065	Servo	October 30, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Pelvis X	ALB87	Denton	October 28, 1997
Pelvis Y	AHRP5	Denton	October 28, 1997
Pelvis Z	AJ9T6	Denton	October 28, 1997
Right Femur Load Cell	259	Denton	October 31, 1997
Left Femur Load Cell	260	Denton	October 31, 1997
Right Ankle X	J10730	Endevco	October 28, 1997
Right Ankle Z	J11014	Endevco	October 28, 1997
Right Toe Z	J11625	Endevco	October 28, 1997
Left Ankle X	J11047	Endevco	October 28, 1997
Left Ankle Z	J11046	Endevco	October 28, 1997
Left Toe Z	J11784	Endevco	October 28, 1997
Lap Belt Load Cell	212	GSE	June 12, 1997
Torso Belt Load Cell	657	GSE	June 12, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	036	Denton	September 23, 1997
Upper Right Tibia Moment Y	036	Denton	September 23, 1997
Lower Right Tibia Moment Y	040	Denton	September 26, 1997
Lower Right Tibia Force X	040	Denton	September 26, 1997
Lower Right Tibia Force Z	040	Denton	September 26, 1997
Upper Left Tibia Moment X	039	Denton	September 23, 1997
Upper Left Tibia Moment Y	039	Denton	September 23, 1997
Lower Left Tibia Moment Y	033	Denton	September 26, 1997
Lower Left Tibia Force X	033	Denton	September 26, 1997
Lower Left Tibia Force Z	033	Denton	September 26, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	October 28, 1997
Head Y	ACCH1	Endevco	October 28, 1997
Head Z	AAMW5	Endevco	October 28, 1997
Head X Redundant	AJ9D2	Endevco	October 28, 1997
Head Y Redundant	AH1E2	Endevco	October 28, 1997
Head Z Redundant	AJ7K3	Endevco	October 28, 1997
Neck Load Cell X	443	Endevco	September 22, 1997
Neck Load Cell Y	443	Endevco	September 22, 1997
Neck Load Cell Z	443	Endevco	September 22, 1997
Neck Moment X	443	Endevco	September 22, 1997
Neck Moment Y	443	Endevco	September 22, 1997
Neck Moment Z	443	Endevco	September 22, 1997
Chest X	ACCY1	Denton	October 29, 1997
Chest Y	ACCC8	Denton	October 29, 1997
Chest Z	ACCT7	Endevco	October 29, 1997
Chest X Redundant	AJ9D4	Endevco	October 29, 1997
Chest Y Redundant	AJ9F3	Endevco	October 29, 1997
Chest Z Redundant	AJ9D9	Endevco	October 29, 1997
Chest Displacement	066	Servo	October 30, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Pelvis X	ALDY8	Denton	October 28, 1997
Pelvis Y	ALEK9	Denton	October 28, 1997
Pelvis Z	ALE80	Denton	October 28, 1997
Right Femur Load Cell	261	Denton	October 31, 1997
Left Femur Load Cell	262	Denton	October 31, 1997
Right Ankle X	J14006	Endevco	October 30, 1997
Right Ankle Z	J13628	Endevco	October 30, 1997
Right Toe Z	J13652	Endevco	October 30, 1997
Left Ankle X	J13424	Endevco	October 30, 1997
Left Ankle Z	J14007	Endevco	October 30, 1997
Left Toe Z	J13650	Endevco	October 30, 1997
Lap Belt Load Cell	211	GSE	June 12, 1997
Torso Belt Load Cell	624	GSE	June 12, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	040	Denton	September 23, 1997
Upper Right Tibia Moment Y	040	Denton	September 23, 1997
Lower Right Tibia Moment Y	034	Denton	September 26, 1997
Lower Right Tibia Force X	034	Denton	September 26, 1997
Lower Right Tibia Force Z	034	Denton	September 26, 1997
Upper Left Tibia Moment X	023	Denton	September 23, 1997
Upper Left Tibia Moment Y	023	Denton	September 23, 1997
Lower Left Tibia Moment Y	019	Denton	September 26, 1997
Lower Left Tibia Force X	019	Denton	September 26, 1997
Lower Left Tibia Force Z	019	Denton	September 26, 1997

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	L22-G05	Entran	August 5, 1997
Right Rear Seat Crossmember X	B14-R15	Entran	July 14, 1997
Top of Engine Block X	I25-J10	Entran	August 7, 1997
Bottom of Engine X	G08-B07	Entran	July 11, 1997
Left Brake Caliper X	I25-J1	Entran	July 7, 1997
Right Brake Caliper X	A09-G03	Entran	July 7, 1997
Instrument Panel X	F12-G04	Entran	July 14, 1997
Redundant Left Rear Seat Crossmember X	B14-Z05	Entran	August 1, 1997
Redundant Right Rear Seat Crossmember X	C06-G12	Entran	April 23, 1997

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	C12871	Endevco	October 27, 1997
Neck Bending Head Rotary Potentiometer	018	Spectrol	August 7, 1997
Neck Bending Pendulum Rotary Potentiometer	019	Spectrol	August 7, 1997
Chest Probe Accelerometer	J13780	Endevco	September 15, 1997
Knee Impact Accelerometer	J13530	Entran	June 4, 1997

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

Front seats—
—Front seat precautions (with SRS side airbags)

⚠ CAUTION

The SRS side airbags are installed in the driver and front passenger seats. Observe the following precautions.

- **Do not lean against the front door when the vehicle is in use. The side airbag inflates with considerable speed and force; you may be killed or seriously injured.**
- **Do not modify or replace the seats or surface of the front seats with the side airbags. Such changes may disable the system or cause the side airbags to inflate, resulting in death or serious injury. Consult your Toyota dealer.**
- **Do not use accessories for the seats which cover the parts where the side airbags should inflate. Such accessories may prevent the side airbags from activating correctly, causing death or serious injury.**

—Seat adjustment precautions

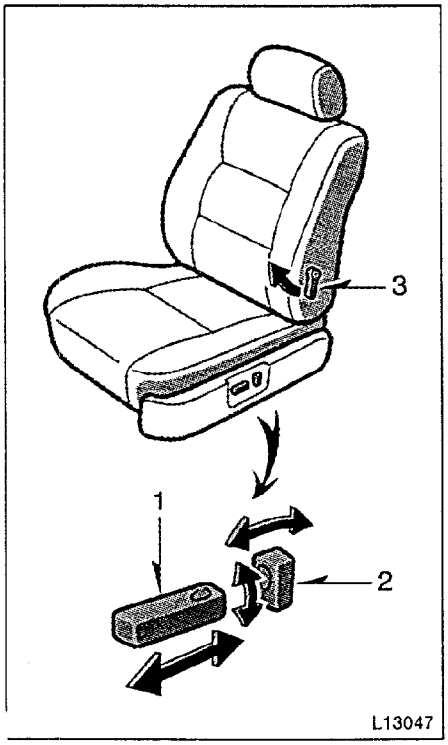
Adjust the driver's seat so that the foot pedals, steering wheel and instrument panel controls are within easy reach of the driver.

⚠ CAUTION

- **Adjustments should not be made while the vehicle is moving, as the seat may unexpectedly move and cause the driver to lose control of the vehicle.**
- **When adjusting the seat, be careful not to hit the seat against a passenger or luggage.**
- **After adjusting the seat position, try sliding it forward and backward to make sure it is locked in position.**
- **After adjusting the seatback, exert body pressure to make sure it is locked in position.**
- **Do not put objects under the seats. The objects may interfere with the seat- lock mechanism or unexpectedly push up the seat position adjusting lever; the seat may suddenly move, causing the driver to lose control of the vehicle.**

- **While adjusting the seat, do not put your hands under the seat or near the moving parts. You may catch and injure your hands or fingers.**

—Adjusting front seats (power seat)



1. SEAT POSITION AND SEAT CUSHION HEIGHT ADJUSTING SWITCH

Move the control switch in the desired direction.

Releasing the switch will stop the seat at that position.

Do not place anything under the front seats. It might interfere with the seat-lock mechanism.

2. SEATBACK ANGLE ADJUSTING SWITCH

Move the control switch in the desired direction.

Releasing the switch will stop the seatback at that position.

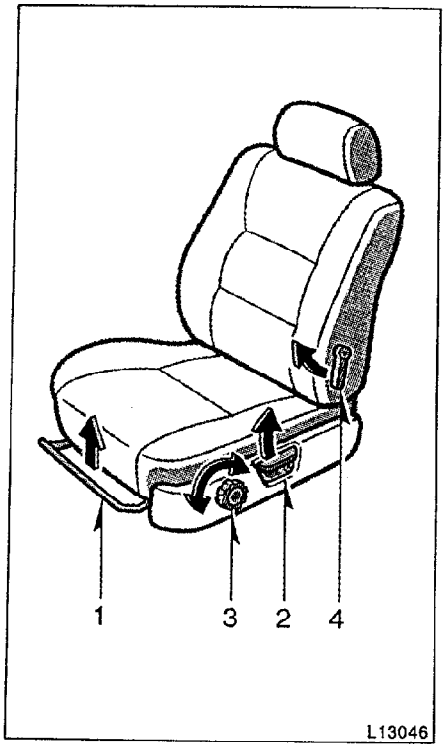
⚠ CAUTION

To reduce the risk of sliding under the lap belt during a collision, avoid reclining the seatback any more than needed. The seat belts provide maximum protection in a frontal or rear collision when the driver and the passenger are sitting up straight and well back in the seats. If you are reclined, the lap belt may slide past your hips and apply restraint forces directly to the abdomen. Therefore, in the event of a formal collision, the risk of personal injury may increase with increasing recline of the seatback.

3. SEAT LUMBAR SUPPORT ADJUSTING LEVER

Pull the lever upward or downward

—Adjusting front seats (manual seat)



1. SEAT POSITION ADJUSTING LEVER

Pull the lever up. Then slide the seat to the desired position with slight body pressure and release the lever.

2. SEATBACK ANGLE ADJUSTING LEVER

Lean forward and pull the lever up. Then lean back to the desired angle and release the lever.

⚠ CAUTION

To reduce the risk of sliding under the lap belt during a collision, avoid reclining the seatback any more than needed. The seat belts provide maximum protection in a frontal or rear collision when the driver and the passenger are sitting up straight and well back in the seats. If you are reclined, the lap belt may slide past your hips and apply restraint forces directly to the abdomen. Therefore, in the event of a frontal collision, the risk of personal injury may increase with increasing recline of the seatback.

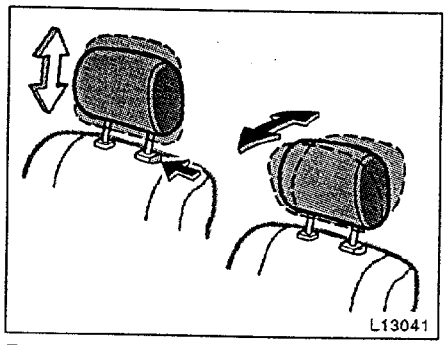
3. SEAT CUSHION HEIGHT ADJUSTING KNOB

Turn the knob either way.

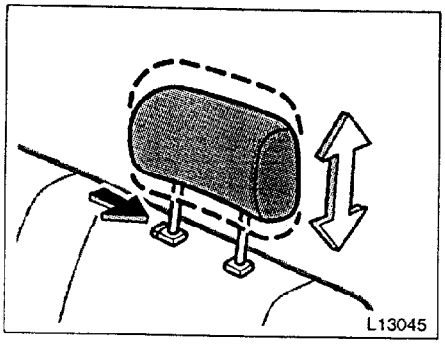
4. SEAT LUMBAR SUPPORT ADJUSTING LEVER

Pull the lever upward or downwar

Head restraints



Front



Rear

For your safety, adjust the head restraint before driving.

To raise: Pull it up.
To lower: Push it down while pressing the lock release button.

On some models, you can also move the head restraint forward or backward. If such adjustment is desired, pull or push the head restraint.

The head restraint is most effective when it is close to your head. Therefore, using a cushion on the seatback is not recommended.

⚠ CAUTION

- **Adjust the center of the head restraint so that it is closest to the top of your ears.**
- **After adjusting the head restraint, make sure it is locked in position.**
- **Do not drive with the head restraints removed.**

Seat belts—
—Seat belt precautions

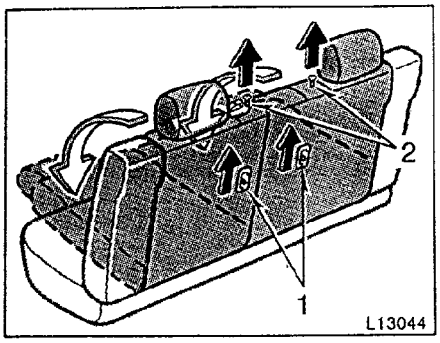
Toyota strongly urges that the driver and passengers in the vehicle be properly restrained at all times with the seat b s provided. Failure to do so could incre e the chance of injury and/or the severity of injury in accidents.

Child. Use a child restraint system ›- propriate for the child until the child ..›- comes large enough to properly wear the vehicle's seat belts. See "Child restrai-t" for details.

If a child is too large for a child restraint system, the child should sit in the rear seat and must be restrained using e vehicle's seat belt. According to accid t statistics, the child is safer when prope y restrained in the rear seat than in the front seat.

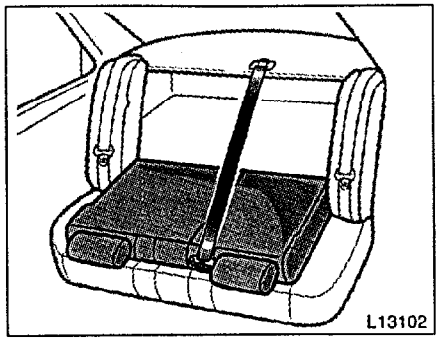
If a child must sit in the front seat, e seat belts should be worn properly. If an accident occurs and the seat belts are not worn properly, the force of the rapid in - tion of the airbag may cause death r serious injury to the child.

Fold-down rear seat



1. **Pull up the seatback security lock lever 1 to the unlock position.**
2. **Pull up the lock release button 2.**
3. **Fold down the seatback.**

Each seatback may be folded separately. On vehicles with built-in child restraint, only the left seatback can be folded down.



This will enlarge the trunk room as far as the seatbacks. See "Luggage stowage precautions" in Part 2 for precautions to observe in loading luggage.

NOTICE

Make sure the luggage loaded in the enlarged trunk room will not damage the webbing of the rear center seat belt when the left seatback is folded down.

⚠ CAUTION

When returning the seatback to the upright position:

- **Make sure the seat belts are not twisted or caught in the seatback and are arranged in the proper position for ready to use.**
- **Make sure the rear center seat belt can be pulled out of the retractor. If it cannot, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.**
- **Make sure the seatback is securely locked by pushing forward and rearward on the top of the seatback.**

do not allow the child to stand up or kneel on either rear or front seats. An unrestrained child could suffer serious injury or death during emergency braking or a collision. Also, do not let the child sit on your lap. It does not provide sufficient restraint.

If the shoulder belt falls across the child's neck or face, have the child sit slightly closer to the buckle side of the seat so that the belt lays across the shoulder.

Pregnant woman. Toyota recommends the use of a seat belt. Ask your doctor for specific recommendations. The lap belt should be worn securely and as low as possible over the hips and not on the waist.

Injured person. Toyota recommends the use of a seat belt. Depending on the injury, first check with your doctor for specific recommendations.

⚠ CAUTION

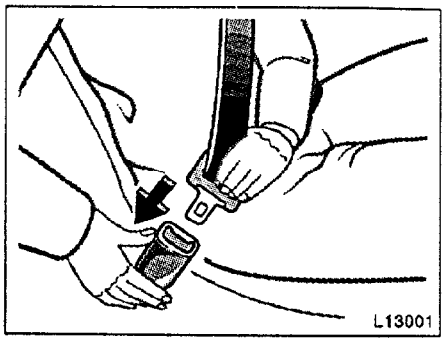
Persons should ride in their seats properly wearing their seat belts whenever the vehicle is moving. Otherwise, they are much more likely to suffer serious bodily injury or death in the event of sudden braking or a collision.

When using the seat belts, observe the following:

- **Use the belt for only one person at a time. Do not use a single belt for two or more people—even children.**
- **Avoid reclining the seatbacks too much. The seat belts provide maximum protection when the seatbacks are in the upright position. (Refer to the seat adjustment instructions.)**
- **Be careful not to damage the belt webbing or hardware. Take care that they do not get caught or pinched in the seat or doors.**
- **Inspect the belt system periodically. Check for cuts, fraying, and loose parts. Damaged parts should be replaced. Do not disassemble or modify the system.**

- **Keep the belts clean and dry. If they need cleaning, use a mild soap solution or lukewarm water. Never use bleach, dye, or abrasive cleaners—they may severely weaken the belts.**
- **Replace the belt assembly (including bolts) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.**

—Front and rear seat belts



Adjust the seat as needed (front seats only) and sit up straight and well back in the seat. To fasten your belt, pull it out of the retractor and insert the tab into the buckle.

You will hear a click when the tab locks into the buckle.

The seat belt length automatically adjusts to your size and the seat position.

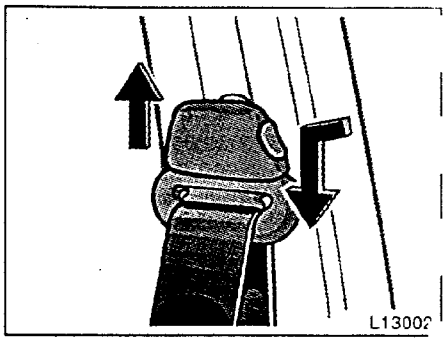
The retractor will lock the belt during a sudden stop or on impact. It also may lock if you lean forward too quickly. A slow, easy motion will allow the belt to extend, and you can move around freely.

If the seat belt cannot be pulled out of the retractor, firmly pull the belt and release it. You will then be able to smoothly pull the belt out of the retractor.

When a passenger's shoulder belt is completely extended and is then retracted even slightly, the belt is locked in that position and cannot be extended. This feature is used to hold the child restraint system securely. (For details, see "Child restraint" in this chapter.) To free the belt again, fully retract the belt and then pull the belt out once more.

⚠ CAUTION

- **After inserting the tab, make sure the tab and buckle are locked and that the belt is not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.**
- **If the seat belt does not function normally, immediately contact your Toyota dealer. Do not use the seat until the seat belt is fixed. It cannot protect an adult occupant or your child from injury.**



Seat belts with an adjustable shoulder anchor—

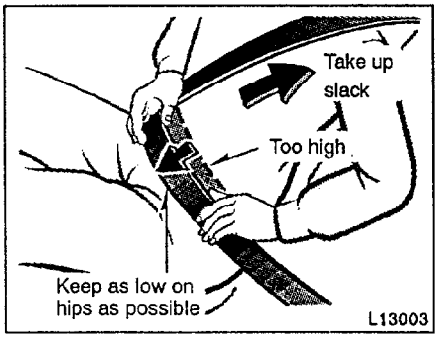
Adjust the shoulder anchor position to your size.

To raise: Slide the anchor up.
To lower: Push in the lock release button and slide the anchor down.

After adjustment make sure the anchor is locked in position.

⚠ CAUTION

Always make sure the shoulder belt is positioned across the center of your shoulder. The belt should be kept away from your neck, but not falling off your shoulder. Failure to do so could reduce the amount of protection in an accident and cause serious injures in a collision.

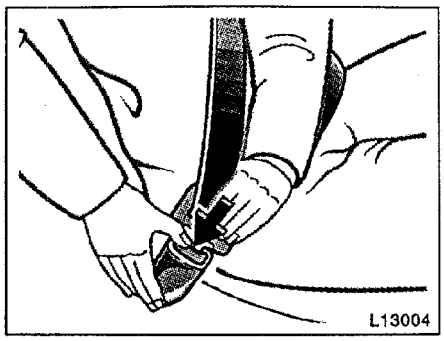


Adjust the position of the lap and shoulder belts.

Position the lap belt as low as possible on your hips—not on your waist, then adjust it to a snug fit by pulling the shoulder portion upward through the latch plate.

⚠ CAUTION

- **High-positioned lap belts and loose-fitting belts both could cause serious injuries due to sliding under the lap belt during a collision or other unintended result. Keep the lap belt positioned as low on hips as possible.**
- **For your safety, do not place the shoulder belt under your arm.**



To release the belt, press the buckle-release button and allow the belt to retract.

If the belt does not retract smoothly, pull it out and check for kinks or twists. Then make sure it remains untwisted as it retracts.

—Seat belt extender

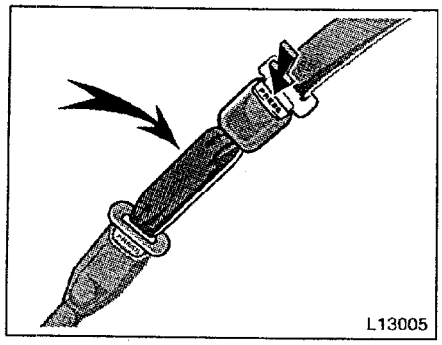
If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Toyota dealer free of charge.

Please contact your local Toyota dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Toyota dealer.

⚠ CAUTION

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- **Never use the seat belt extender if you can fasten the seat belt without it.**
- **Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.**



To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle-release buttons of the extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle.

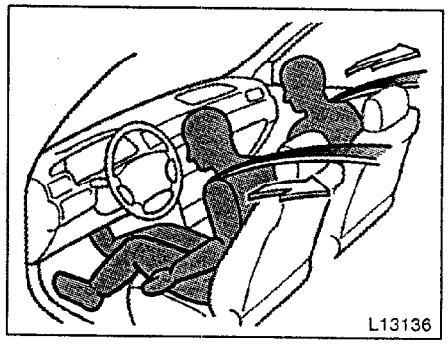
When releasing the seat belt, press on the buckle-release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

⚠ CAUTION

- **After inserting the tab, make sure the tab and buckle are locked and that the seat belt extender is not twisted.**
- **Do not insert coins, clips, etc. in the buckle as this may prevent you from properly latching the tab and buckle.**
- **If the seat belt does not function normally, immediately contact your Toyota dealer. Do not use the seat until the seat belt is fixed. It cannot protect an adult occupant or your child from injury.**

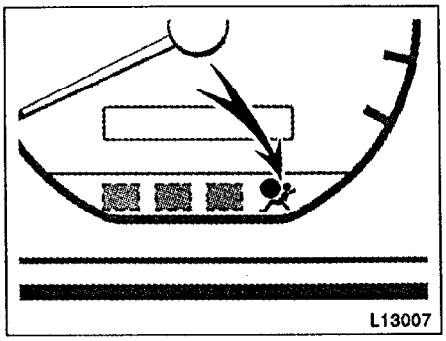
—Front seat belt pretensioners



The driver and front passenger's seat belts are equipped with a pretensioner which is designed to be activated together with the front airbags in response to a severe frontal impact.

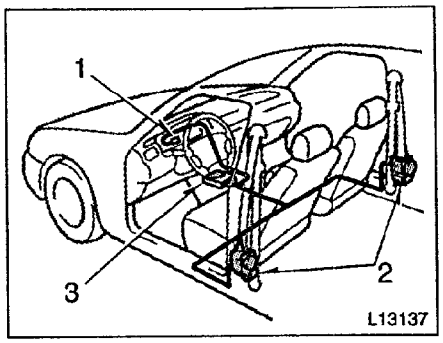
When the airbag sensor detects the shock of a severe frontal impact, the front seat belt is quickly drawn back in by the retractor so that the belt snugly restrains the front seat occupants.

The seat belt pretensioners are activated even with no passenger in the front seat.



This indicator comes on when the ignition key is turned to the "ACC" or "ON" position. It goes off after about 6 seconds. This means the front seat belt pretensioners are operating properly.

This warning light system monitors airbag sensor assembly, seat belt pretensioner assembly, warning light, interconnecting wiring and power sources. (For details, see "Service reminder indicators and warning buzzers" in chapter 1-5.)



The seat belt pretensioner system mainly consists of the following components and their locations are shown in the illustration.

1. SRS airbag warning light
2. Seat belt pretensioner assembly
3. Airbag sensor assembly

The seat belt pretensioner is controlled by the airbag sensor assembly. The airbag sensor assembly consists of a safing sensor and airbag sensor.

When a seat belt pretensioner is activated, an operating noise may be heard and a small amount of smoke-like gas may be released. This gas is harmless and does not indicate that a fire is occurring.

Once the seat belt pretensioner has been activated, the seat belt retractor remains locked.

⚠ CAUTION

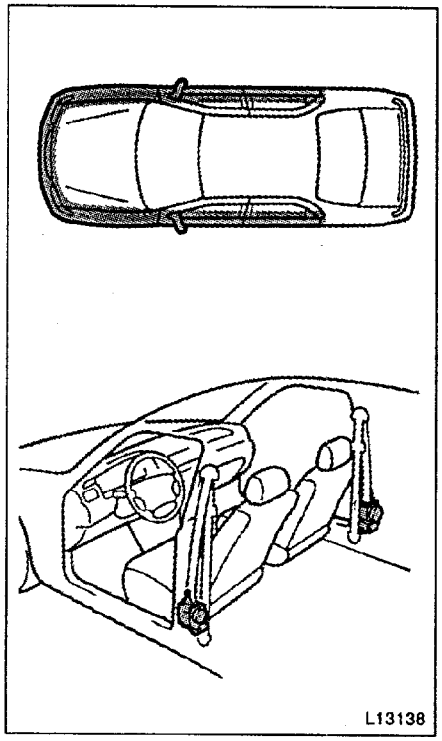
Do not modify, remove, strike or open the front seat belt pretensioner assemblies, airbag sensor or surrounding area or wiring. Doing any of these may cause sudden operation of the front seat belt pretensioners or disable the system, which could result in serious injury.

Failure to follow these instructions can result in serious injuries.

NOTICE

Do not perform any of the following changes without consulting your Toyota dealer. Such changes can interfere with proper operation of the seat belt pretensioners in some cases.

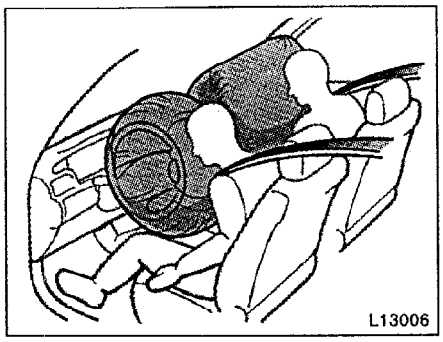
- ***Installation of electronic items such as a mobile two-way radio, cassette tape player or compact disc player***
- ***Repairs on or near the front seat belt retractor assemblies***
- ***Modification of the suspension system***
- ***Modification of the front end structure***
- ***Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end***



This front seat belt pretensioner syste has a service reminder indicator to infor the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags pretensioners. Contact your Toyota deal as soon as possible to service the vehicle.

- The light does not come on when th ignition key is turned to the "ACC" "ON" position, or remains on.
- The light comes on or flashes whil driving.
- If either front seat belt does not retract or can not be pulled out due to a malfunction or activation of the pretensioner.
- The front seat belt pretensioner assembly or surrounding area has been damaged.
- The front and side parts of the vehicle (shaded in the illustration) were involved in an accident that did not cause the seat belt pretensioners to operate.
- The front seat belt pretensioner assembly is scratched, cracked, or otherwis damaged.

SRS driver and front passenger airbags



The SRS (Supplemental Restraint System) airbags are designed to provide further protection for the driver and front passenger when added to the primary protection provided by the seat belts.

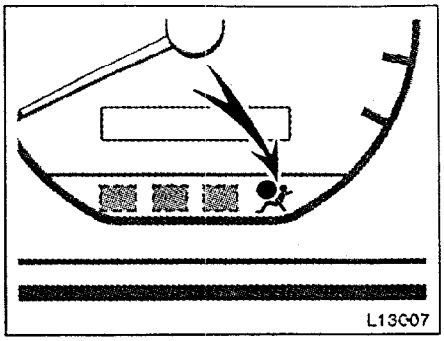
In response to a severe frontal impact, the SRS airbags work together with the seat belts to help prevent or reduce injury by inflating, in order to decrease the likelihood of the driver's or front passenger's head or chest directly hitting the steering wheel or dashboard. The passenger airbag is activated even with no passenger in the front seat.

Be sure to wear your seat belt.

⚠ CAUTION

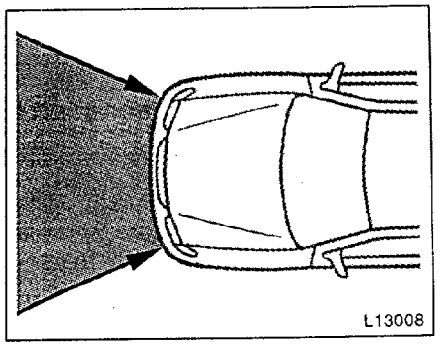
A driver or front passenger too close to the steering wheel or dashboard during airbag deployment can be killed or seriously injured. Toyota strongly recommends that:

- **The driver sit as far back as possible from the steering wheel while still maintaining control of the vehicle.**
- **The front passenger sit as far back as possible from the dashboard.**
- **All vehicle occupants be properly restrained using the available seat belts.**



This indicator comes on when the ignition key is turned to the "ACC" or "ON" position. It goes off after about 6 seconds. This means the SRS airbags are operating properly.

The SRS airbag warning light system monitors the airbag sensor assembly, inflators, warning light, interconnecting wiring and power sources. (For details, see "Service reminder indicators and warning buzzers" in Chapter 1-5.)



The SRS airbag system is designed to activate in response to a severe frontal impact within the shaded area between the arrows in the illustration.

There may be the case that the SRS airbag will not activate with such an impact in which the occupant wearing the seat belt correctly would not get serious injury.

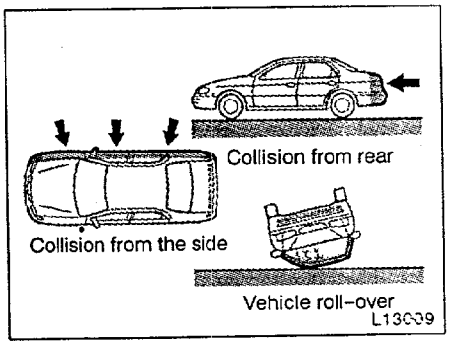
The SRS airbags will deploy if the severity of the impact is above the designed threshold level, comparable to an approximate 20 km/h (14 mph) collision when impacting straight into a fixed barrier that does not move or deform.

If the severity of the impact is below the above threshold level, the SRS airbags may not deploy.

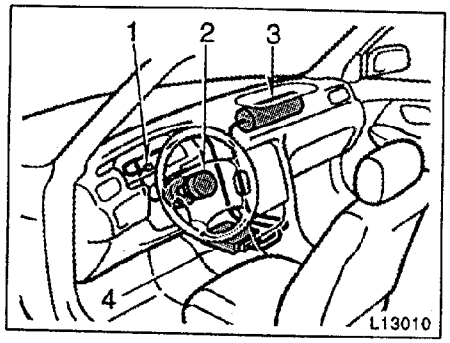
However, this threshold velocity will be considerably higher if the vehicle strikes an object, such as a parked vehicle or sign pole, which can move or deform on impact, or if it is involved in an underride collision (e.g. a collision in which the nose of the vehicle "underrides", or goes under, the bed of a truck).

It is possible with collision severity at the marginal level of airbag sensor detection and activation that only one of your vehicle's two airbags will deploy.

For the safety of all occupants, be sure to always wear seat belts.



The SRS airbags are not designed to inflate if the vehicle is subjected to a side or rear impact, if it rolls over, or if it is involved in a low-speed frontal collision.



The SRS airbag system mainly consists of the following components and their locations are shown in the illustration.

1. SRS airbag warning light
2. Airbag module for driver (airbag and inflator)
3. Airbag module for passenger (airbag and inflator)
4. Airbag sensor assembly

The airbag sensor assembly consists of a safing sensor and airbag sensor.

In a severe frontal impact, sensors detect deceleration and the system triggers the airbag inflators. Then a chemical reaction in the inflators momentarily fills the airbags with non-toxic gas to help restrain the forward motion of the occupants.

When the airbags inflate, they produce a fairly loud noise and release some smoke along with the non-toxic gas. This does not indicate a fire. Be sure to wash off any residue as soon as possible to prevent minor skin irritation.

Deployment of the airbags happen in a fraction of a second, so the airbags must inflate with considerable force. While the system is designed to reduce serious injuries, it may also cause minor burns or abrasions and swellings.

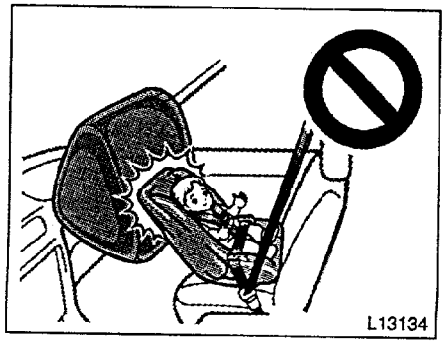
Parts of the airbag module (steering wheel hub, dashboard) may be hot for several minutes, but the airbags themselves will not be hot. The airbags are designed to inflate only once.

A crash severe enough to inflate the airbags may break the windshield as the vehicle buckles. In vehicles with a passenger airbag the windshield may also be damaged by absorbing some of the force of the inflating airbag.

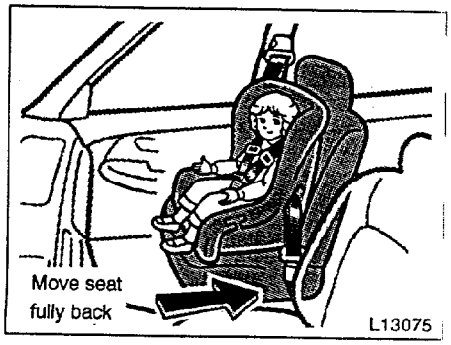
⚠ CAUTION

• The SRS airbag system is designe only as a supplement to the prima ry protection of the driver side an front passenger side seat belt sy tems. The front seat occupants ca be killed or seriously injured by an inflating airbag if they do not wear the available seat belts. During suc den braking just before a collisior an unrestrained driver or front passenger can move forward into direct contact with or close proximity t the airbag which may then deplo during the collision. To obtain maximum protection in an accident, the driver and all passengers in the ve hicle must wear their seat belts Wearing a seat belt during an accident reduces the chances of death or serious injuries or being throwi out of the vehicle. For instruction and precautions concerning the sea belt system, see "Seat belts" in this chapter.

• Improperly seated and/or restrained infants and children can be killed or seriously injured by a deploying airbag. An infant or child who is too small to use a seat belt should be properly secured using a child restraint system. Toyota strongly recommends that all infants and children be placed in the rear seat of the vehicle and properly restrained. The rear seat is the safest for infants and children. For instructions concerning the installation of a child restraint system, see "Child restraint" in this chapter.

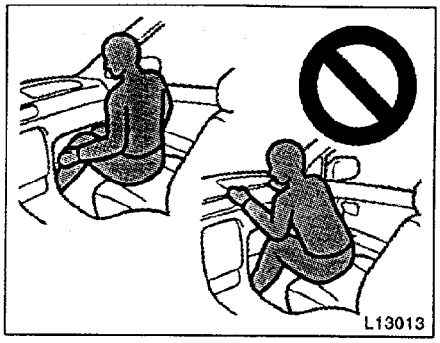


• Never put a rear-facing child restraint system on the front seat because the force of the rapid inflation of the passenger airbag can cause death or serious injury to the child.

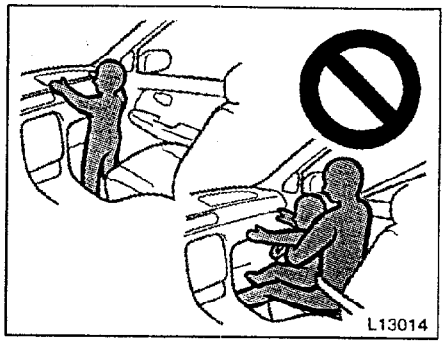


• A forward-facing child restraint system should be allowed to put on the front seat only when it is unavoidable. Always move the seat as far back as possible, because the force of a deploying airbag could cause death or serious injury to the child. On vehicles with side airbags, do not allow the child to lean against the front door or around the front door even if the child is seated in the child restraint system. It is dangerous if the side airbag inflates, and the impact could cause death or serious injury to the child.

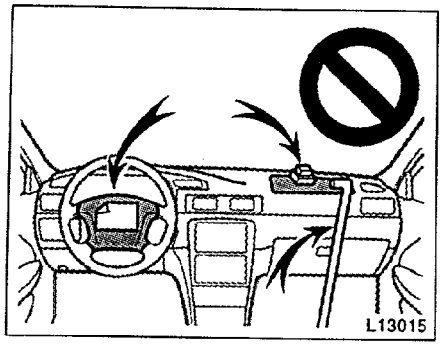
- For instructions concerning the installation of a child restraint system, see "Child restraint" in this chapter.



- Do not sit on the edge of the seat or lean over the dashboard when the vehicle is in use. The airbags inflate with considerable speed and force; you may be killed or seriously injured. Sit up straight and well back in the seat, and always use your seat belt.



- Do not allow a child to stand up, or to kneel on the front passenger seat. The airbag inflates with considerable speed and force; the child may be killed or seriously injured.
- Do not hold a child on your lap or in your arms. Use a child restraint system in the rear seat. For instructions concerning the installation of a child restraint system, see "Child restraint" in this chapter.



- Do not put objects or your pets on or in front of the dashboard or steering wheel pad that houses the airbag system. They might restrict inflation or cause death or serious injury as they are projected rearward by the force of deploying airbags. Likewise, the driver and front passenger should not hold things in their arms or on their knees.

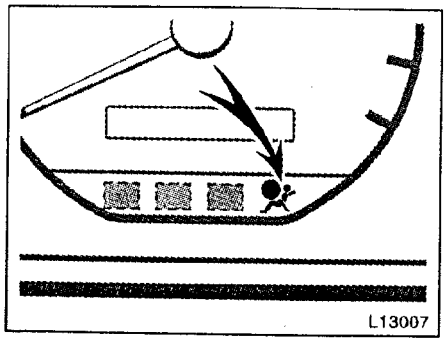
- Do not modify or remove any wiring. Do not modify, remove, strike or open any components such as the steering wheel column cover, front passenger airbag cover, front passenger airbag, airbag sensor assembly. Doing any of these may cause sudden SRS airbag inflation or disable the system, which could result in death or serious injury.

Failure to follow these instructions can result in death or serious injuries.

NOTICE

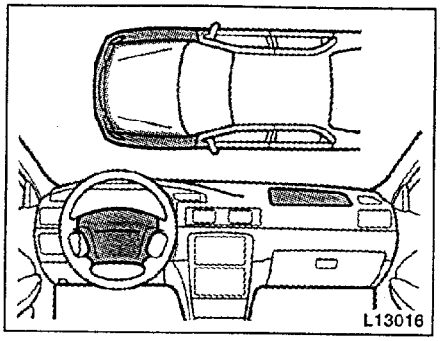
Do not perform any of the following changes without consulting your Toyota dealer. Such changes can interfere with proper operation of the SRS airbag system in some cases.

- *Installation of electronic items such as a mobile two-way radio, cassette tape player or compact disc player*
- *Modification of the suspension system*
- *Modification of the front end structure*
- *Attachment of a grille guard (bull bar, kangaroo bar, etc.), snowplow, winches or any other equipment to the front end*
- *Repairs made on or near the front end structure, console, steering column, steering wheel or dashboard near the front passenger's airbag*



This SRS airbag system has a service reminder indicator to inform the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags. Contact your Toyota dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ACC" or "ON" position, or remains on.
- The light comes on while driving.



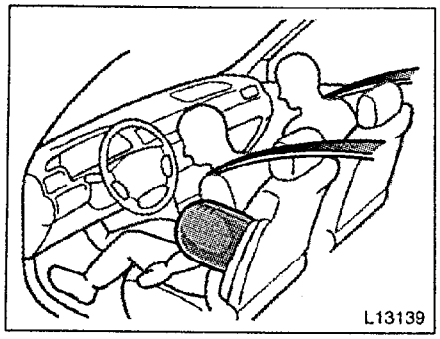
In the following cases, contact your Toyota dealer as soon as possible:

- The SRS airbags have been inflated.
- The front part of the vehicle (shaded in the illustration) were involved in an accident that did not cause the SRS airbags to inflate.
- The pad section of the steering wheel or front passenger airbag cover (shaded in the illustration) is scratched, cracked, or otherwise damaged.

NOTICE

Do not disconnect the battery cabl before contacting your Toyota dealer.

SRS side airbags



The SRS (Supplemental Restraint System) side airbags are designed to provide further protection for the driver and front passenger when added to the primary protection provided by the seat belts.

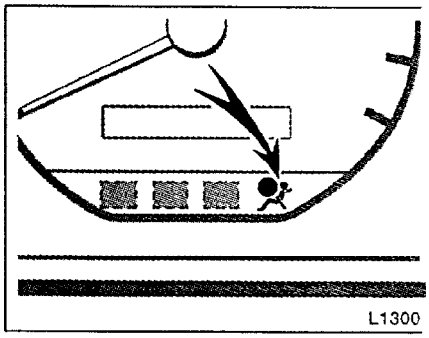
In response to a severe side impact, the SRS side airbags work together with the seat belt to help prevent or reduce injury by inflating, in order to decrease the impact mainly on the driver's or front passenger's chest. The SRS side airbag on the passenger seat is activated even with no passenger in the front seat.

Be sure to wear your seat belt.

⚠ CAUTION

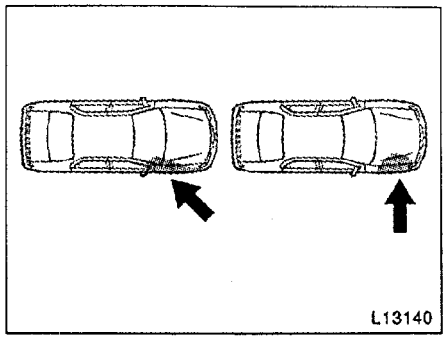
SRS side airbags inflate with considerable force. To avoid potential death or serious injury during inflation of a side airbag, Toyota strongly recommends that the driver and front passenger;

- **Wear their seat belt**
- **Remain properly seated with their back against the seat at all times.**



This indicator comes on when the ig tion key is turned to the "ACC" or "ON" position. It goes off after abc 6 seconds. This means the SRS si airbags are operating properly.

The warning light system monitors the a bag sensor assembly, inflators, warni light, interconnecting wiring and pow sources. (For details, see "Service remin er indicators and warning buzzers" chapter 1-5.)

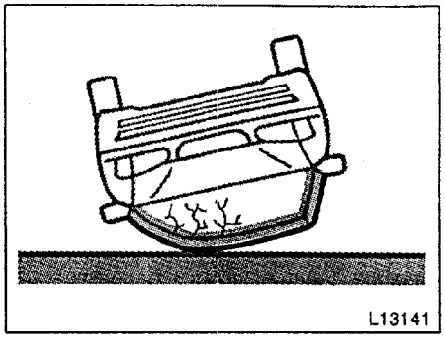


The SRS side airbag system may not inflate if the vehicle is subjected to a collision from the side at an angle, or a collision to the side of the vehicle body other than the passenger compartment shown in the illustration, which impact is not severe enough for the passenger compartment.

There may be the case that the SRS side airbags will not activate with such an impact in which the occupant wearing the seat belt correctly would not get serious injury.

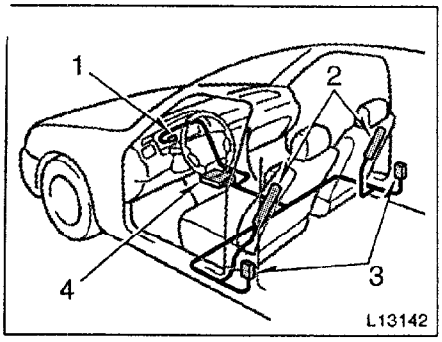
The SRS side airbags are designed to inflate when the passenger compartment gets a severe impact from the side.

For the safety of all occupants, be sure to always wear seat belts.



The SRS side airbags are not designed to inflate if the vehicle is rolled over.

If the impact on the body of the passenger compartment is not strong as illustrated above, the relevant SRS side airbag may not inflate.



The SRS side airbag system mainly consists of the following components and their locations are shown in the illustration.

1. SRS airbag warning light
2. Side airbag module (airbag and inflator)
3. Side airbag sensor assembly
4. Airbag sensor assembly

The SRS side airbag system is controlled by the airbag sensor. The airbag sensor assembly consists of a safing sensor and airbag sensor.

In a severe side impact, the side airbag sensor triggers the side airbag inflators. Then a chemical reaction in the inflators momentarily fills the airbags with non-toxic gas to help restrain the lateral motion of the occupants.

When the airbags inflate, they produce a fairly loud noise and release some smoke along with non-toxic gas. This does not indicate a fire. Be sure to wash off any residue as soon as possible to prevent minor skin irritation.

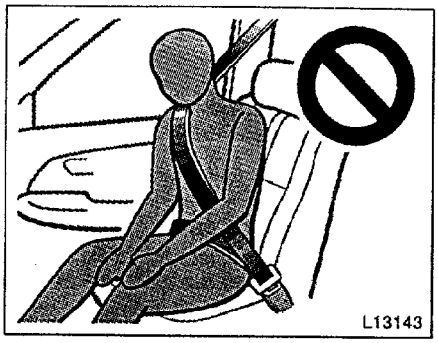
Deployment of the airbags happen in a fraction of a second, so the airbags must inflate with considerable force. While the system is designed to reduce serious injuries, it may also cause minor burns or abrasions and swellings.

Front seats may be hot for several minutes, but the airbags themselves will not be hot. The airbags are designed to inflate only once.

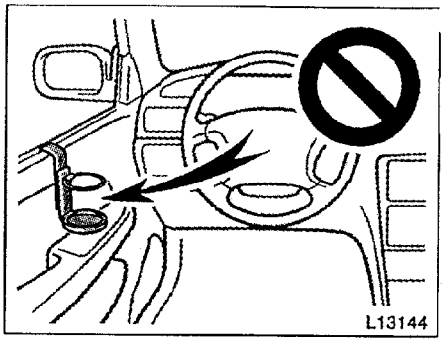
⚠ CAUTION

- **The SRS side airbag system is designed only as a supplement to the primary protection of the driver side and front passenger side seat belt systems. The front seat occupants can be killed or seriously injured by an inflating airbag if they do not wear the available seat belts. During sudden braking just before a collision, an unrestrained driver or front passenger can move sideward into direct contact with or close proximity to the airbag which may then deploy during the collision. To obtain maximum protection in an accident, the driver and all passengers in the vehicle must wear their seat belts. Wearing a seat belt during an accident reduces the chances of death or serious injuries or being thrown out of the vehicle. For instructions and precautions concerning the seat belt system, see "Seat belts" in this chapter.**

- **Improperly seated and/or restrained infants and children can be killed or seriously injured by a deploying airbag. An infant or child who is too small to use a seat belt should be properly secured using a child restraint system. Toyota strongly recommends that all infants and children be placed in the rear seat of the vehicle and properly restrained. The rear seat is the safest for infants and children. For instructions concerning the installation of a child restraint system, see "Child restraint" in this chapter.**
- **Do not allow the child to lean against the front door or around the front door even if the child is seated in the child restraint system. It is dangerous if the side airbag inflates and the impact could cause death or serious injury to the child. For instructors concerning the installation of a child restraint system, see "Child restraint" in this chapter.**


L13143

- **Do not lean against the front door when the vehicle is in use. The side airbag inflates with considerable speed and force; you may be killed or seriously injured.**
- **Do not apply excessive weight to the outer side of the front seats on vehicles with side airbags.**
- **The child head should not be leaned against the vicinity of the part where the side airbag activates.**


L13144

- **Do not attach a cup holder or any other device on or around the door. When the side airbag inflates, the cup holder or any other device will be thrown with great force or the side airbag may not activate correctly, resulting in death or serious injury. Likewise, the driver and front passenger should not hold things in their arms or on their knees.**

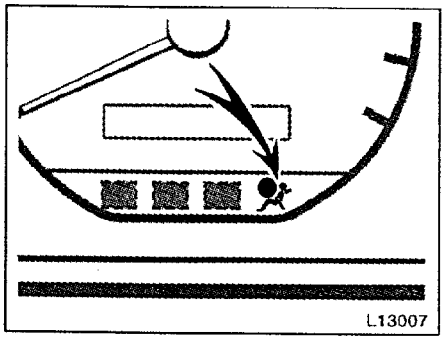
- **Do not use accessories for the seats which cover the parts where the side airbags should inflate. Such accessories may prevent the side airbags from activating correctly, causing death or serious injury.**
- **Do not modify or replace the seats or surface of the front seats with the side airbags. Such changes may disable the system or cause the side airbags to inflate, resulting in death or serious injury. Consult your Toyota dealer.**

Failure to follow these instructions can result in death or serious injuries.

NOTICE

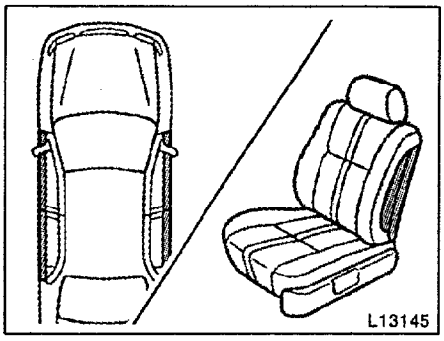
Do not perform any of the following changes without consulting your Toyota dealer. Such changes can interfere with proper operation of the SRS airbag system in some cases.

- ***Installation of electronic items such as a mobile two-way radio, cassette tape player or compact disc player***
- ***Modification of the suspension system***
- ***Modification of the side structure of the passenger compartment***
- ***Repairs made on or near the console or front seat***


L13007

This SRS side airbag system has a service reminder indicator to inform the driver of operating problems. If either of the following conditions occurs, this indicates a malfunction of the airbags. Contact your Toyota dealer as soon as possible to service the vehicle.

- The light does not come on when the ignition key is turned to the "ACC" or "ON" position, or remains on.
- The light comes on or flashes while driving.



In the following cases, contact your Toyota dealer as soon as possible:

- The SRS side airbags have been inflated.
- The portion of the doors (shaded in the illustration) were involved in an accident that did not cause the SRS side airbags to inflate.
- The surface of the seats with the side airbag (shaded in the illustration) is scratched, cracked, or otherwise damaged.

NOTICE
Do not disconnect the battery cables before contacting your Toyota dealer.