NPN - MPSA05, MPSA06*; PNP - MPSA55, MPSA56*

*Preferred Devices

Amplifier Transistors

Voltage and Current are Negative for PNP Transistors



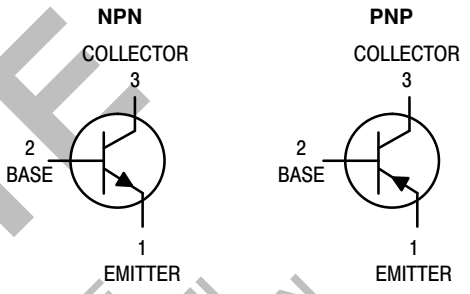
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Features

- Pb−Free Packages are Available*



MAXIMUM RATINGS

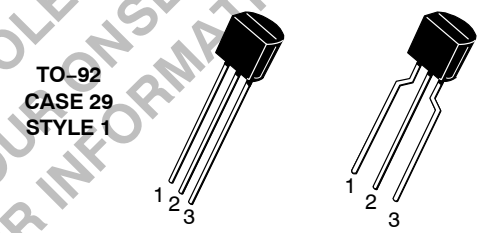
Rating	Symbol	Value	Unit
Collector − Emitter Voltage MPSA05, MPSA55 MPSA06, MPSA56	V_{CEO}	 60 80	Vdc
Collector − Base Voltage MPSA05, MPSA55 MPSA06, MPSA56	V_{CBO}	 60 80	Vdc
Emitter − Base Voltage	V_{EBO}	4.0	Vdc
Collector Current − Continuous	I_C	500	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0	W mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

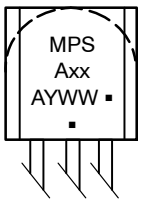
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	83.3	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.



MARKING DIAGRAM



xx = 05, 06, 55, or 56
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

Preferred devices are recommended choices for future use and best overall value.

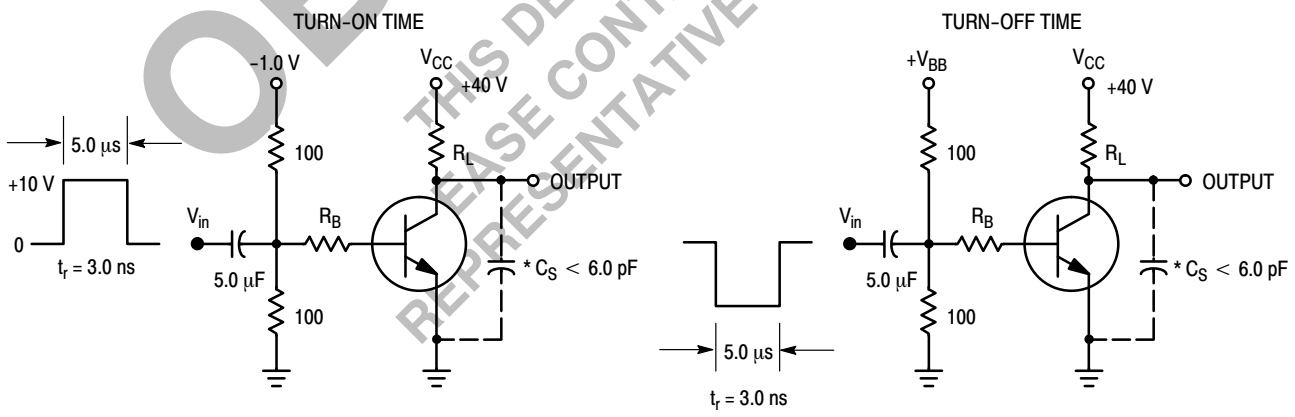
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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (Note 2)		$V_{(BR)CEO}$			Vdc
(I_C = 1.0 mAdc, I_B = 0)	MPSA05, MPSA55		60	–	
	MPSA06, MPSA56		80	–	
Emitter – Base Breakdown Voltage		$V_{(BR)EBO}$	4.0	–	Vdc
(I_E = 100 μAdc, I_C = 0)					
Collector Cutoff Current		I_{CES}	–	0.1	μAdc
(V_{CE} = 60 Vdc, I_B = 0)					
Collector Cutoff Current		I_{CBO}			μAdc
(V_{CB} = 60 Vdc, I_E = 0)	MPSA05, MPSA55		–	0.1	
(V_{CB} = 80 Vdc, I_E = 0)	MPSA06, MPSA56		–	0.1	
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			–
(I_C = 10 mAdc, V_{CE} = 1.0 Vdc)			100	–	
(I_C = 100 mAdc, V_{CE} = 1.0 Vdc)			100	–	
Collector – Emitter Saturation Voltage		$V_{CE(sat)}$	–	0.25	Vdc
(I_C = 100 mAdc, I_B = 10 mAdc)					
Base–Emitter On Voltage		$V_{BE(on)}$	–	1.2	Vdc
(I_C = 100 mAdc, V_{CE} = 1.0 Vdc)					
SMALL–SIGNAL CHARACTERISTICS					
Current – Gain – Bandwidth Product (Note 3)		f_T			MHz
(I_C = 10 mA, V_{CE} = 2.0 V, f = 100 MHz)	MPSA05 MPSA06		100	–	
(I_C = 100 mAdc, V_{CE} = 1.0 Vdc, f = 100 MHz)	MPSA55 MPSA56		50	–	

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
3. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

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*Total Shunt Capacitance of Test Jig and Connectors For PNP Test Circuits, Reverse All Voltage Polarities

Figure 1. Switching Time Test Circuits

NPN

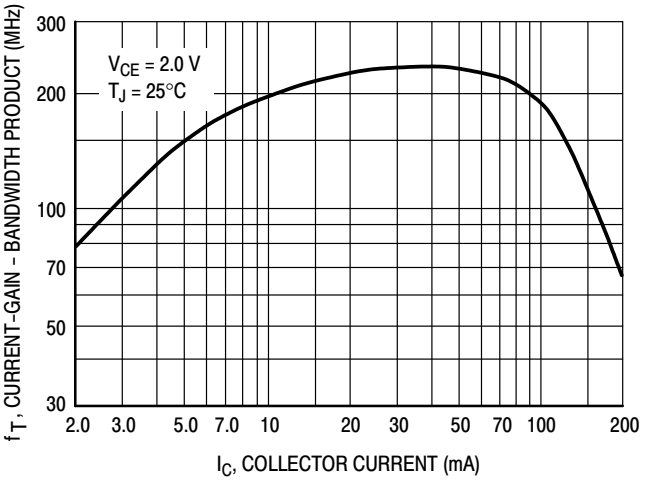


Figure 2. MPSA05/06 Current–Gain — Bandwidth Product

PNP

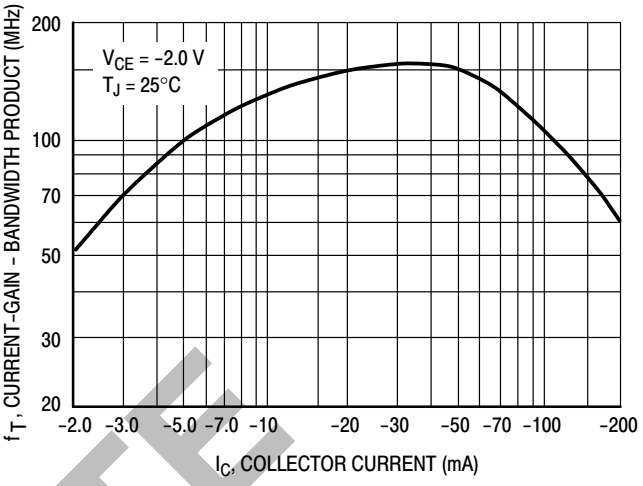


Figure 3. MPSA55/56 Current–Gain — Bandwidth Product

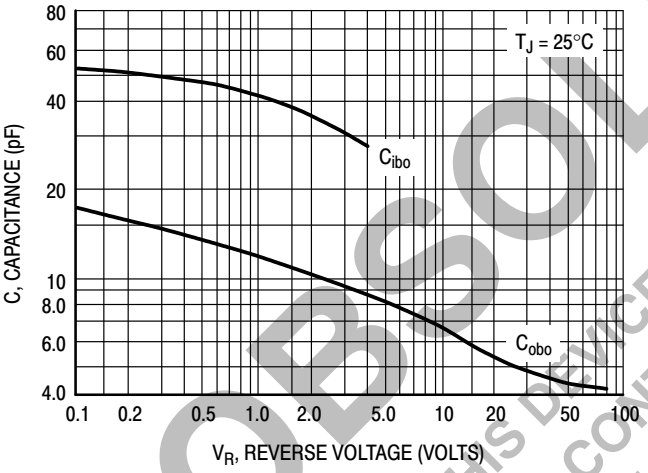


Figure 4. MPSA05/06 Capacitance

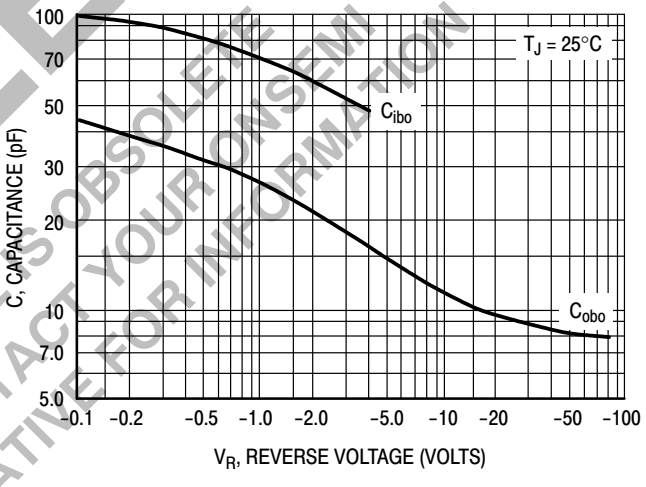


Figure 5. MPSA55/56 Capacitance

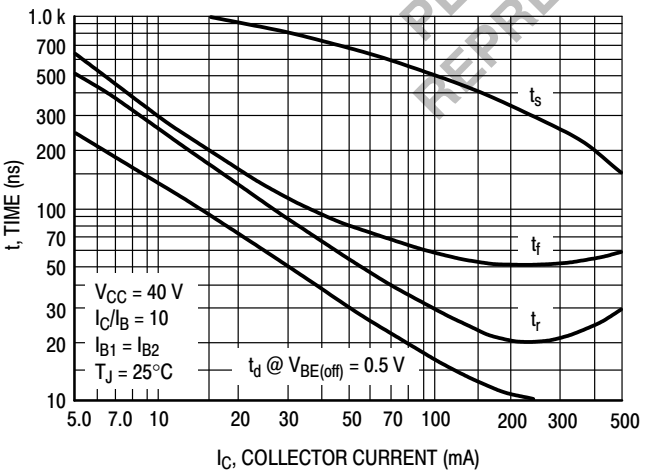


Figure 6. MPSA05/06 Switching Time

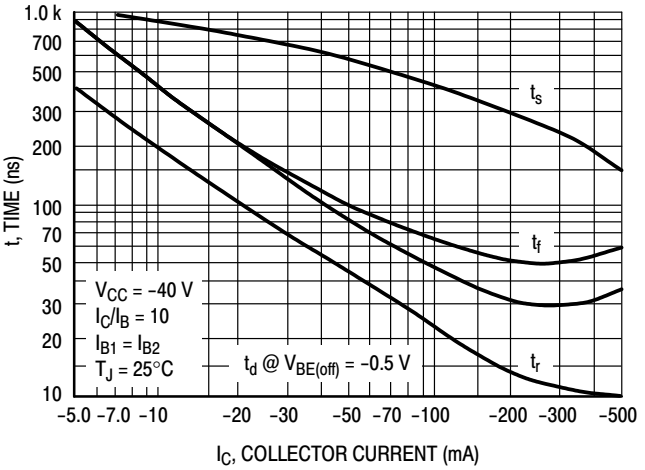


Figure 7. MPSA55/56 Switching Time

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NPN

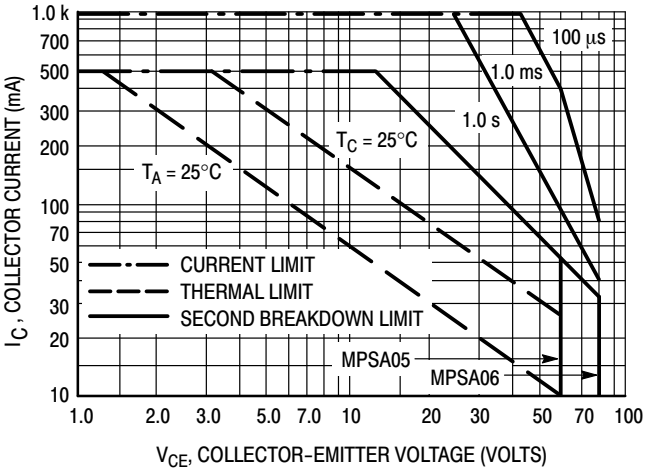


Figure 8. MPSA05/06 Active−Region Safe Operating Area

PNP

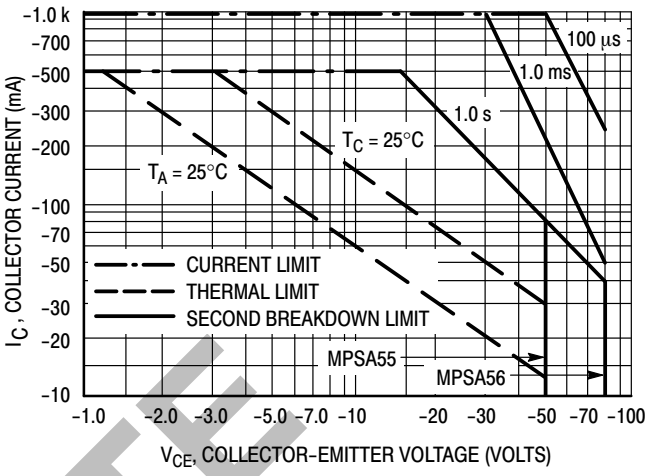


Figure 9. MPSA55/56 Active−Region Safe Operating Area

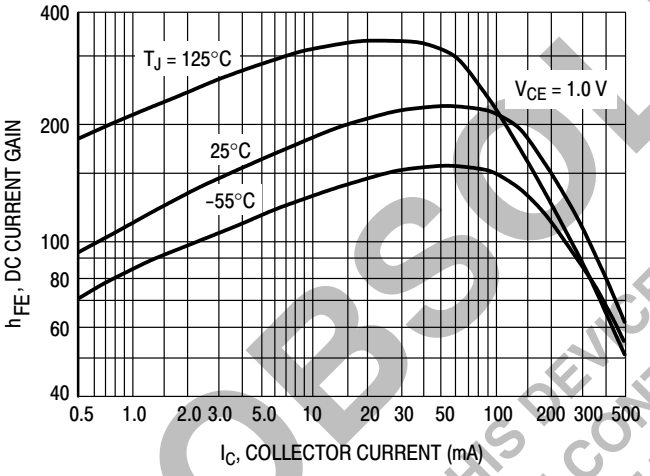


Figure 10. MPSA05/06 DC Current Gain

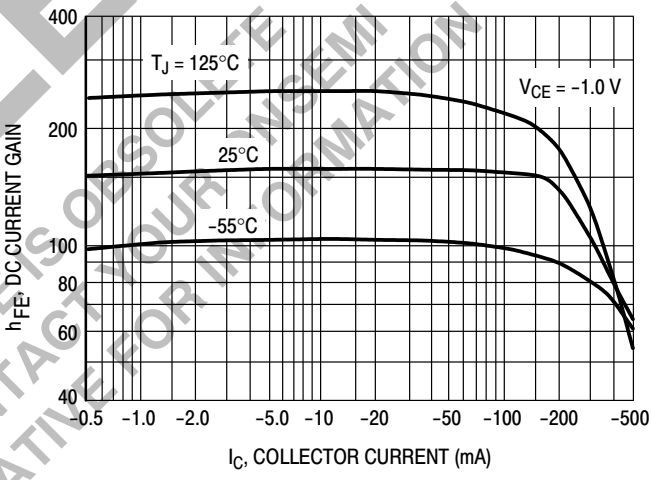


Figure 11. MPSA55/56 DC Current Gain

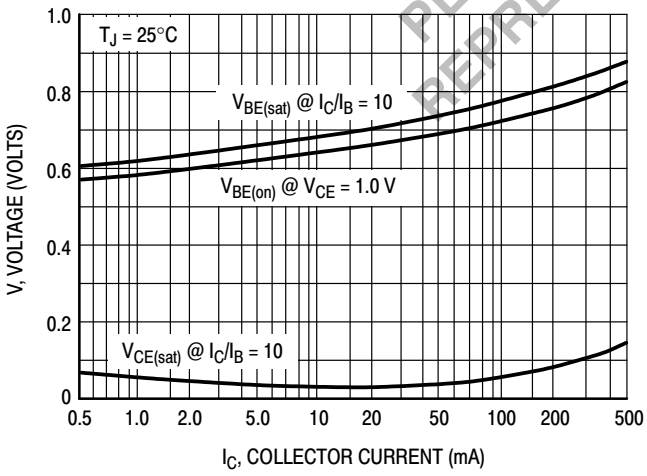


Figure 12. MPSA05/06 “ON” Voltages

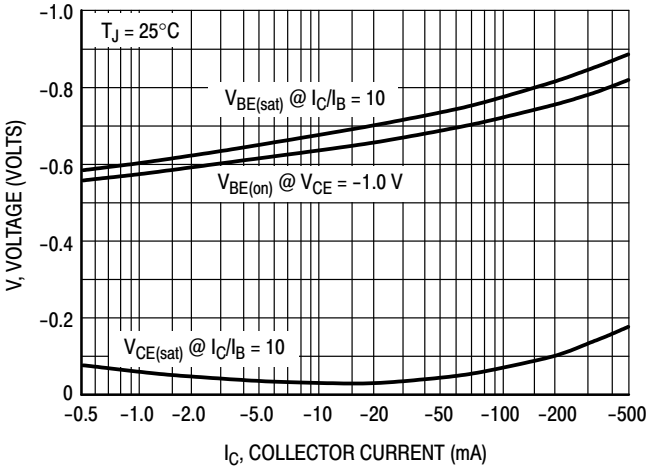


Figure 13. MPSA55/56 “ON” Voltages

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NPN

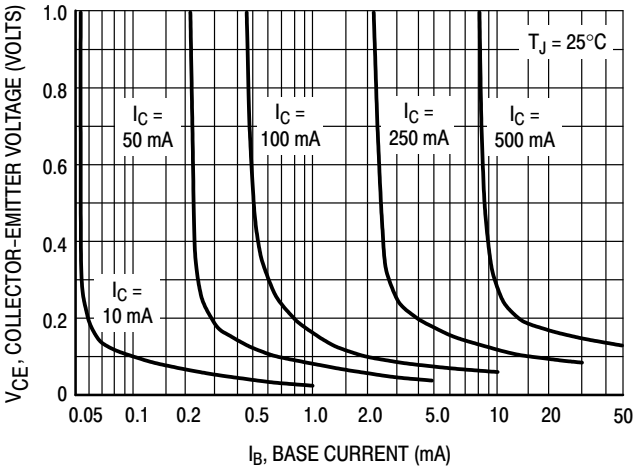


Figure 14. MPSA05/06 Collector Saturation Region

PNP

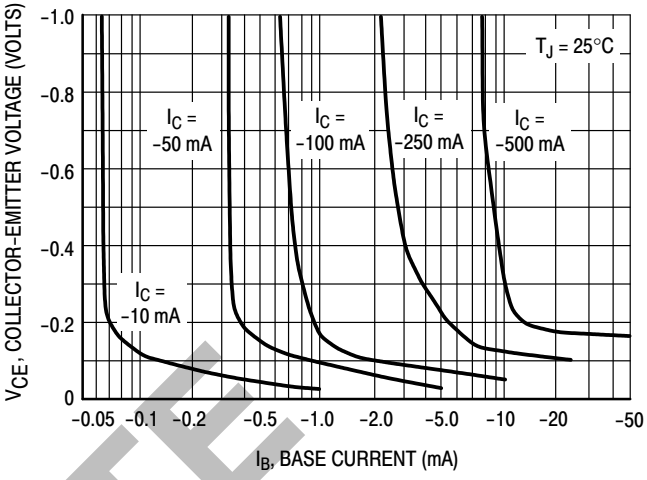


Figure 15. MPSA55/56 Collector Saturation Region

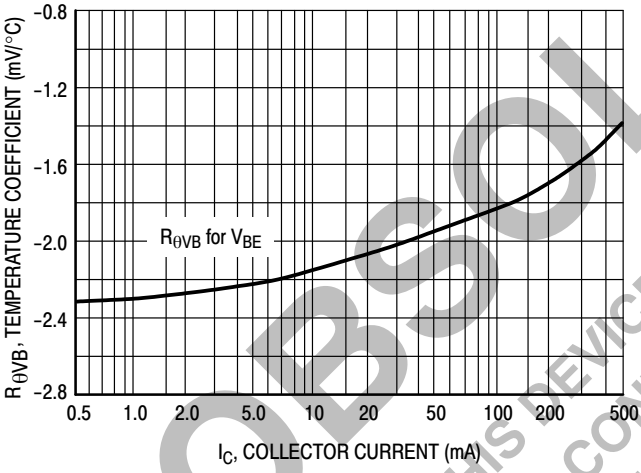


Figure 16. MPSA05/06 Base−Emitter Temperature Coefficient

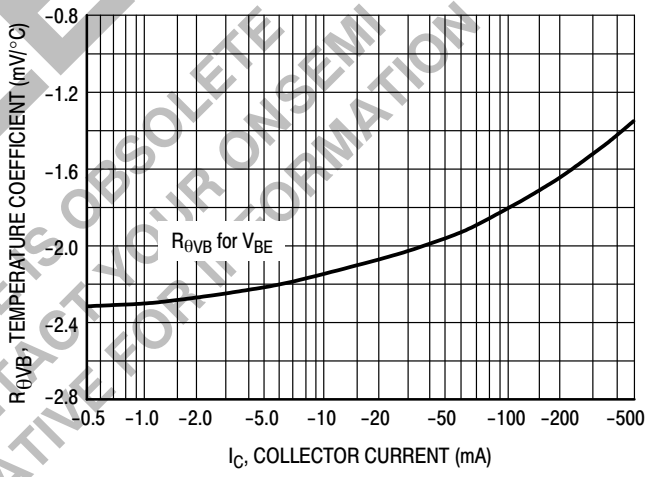


Figure 17. MPSA55/56 Base−Emitter Temperature Coefficient

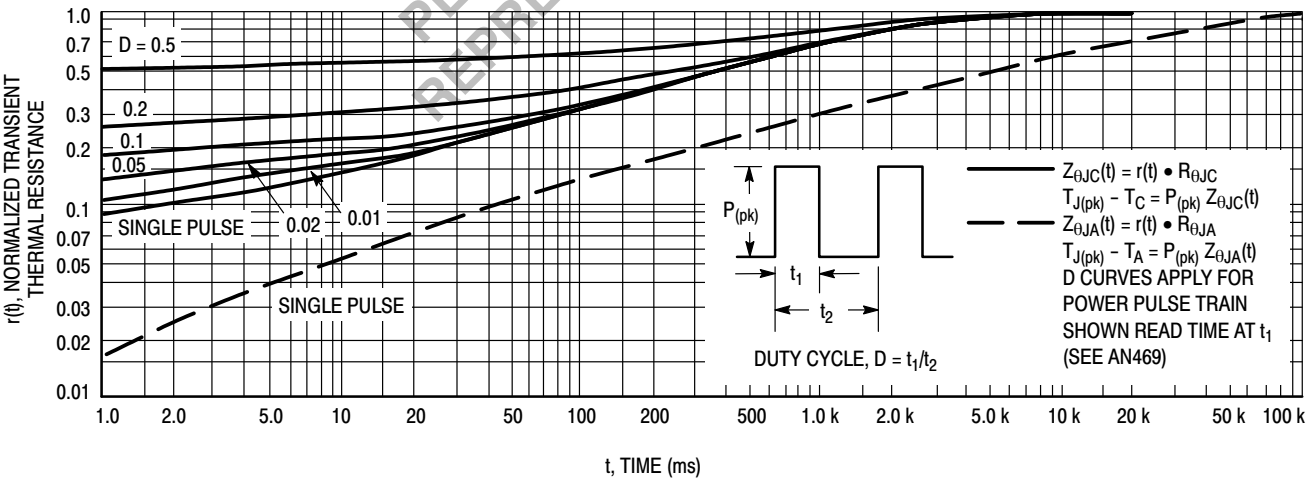


Figure 18. MPSA05, MPSA06, MPSA55 and MPSA56 Thermal Response

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ORDERING INFORMATION

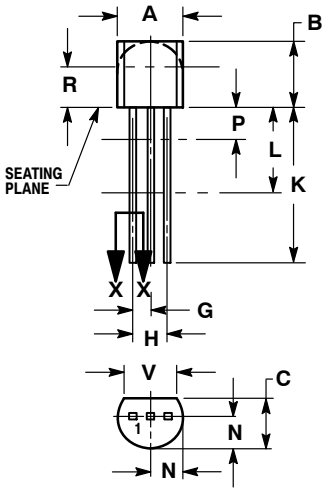
Device	Package	Shipping†
MPSA05	TO–92	5000 Units / Bulk
MPSA05G	TO–92 (Pb–Free)	5000 Units / Bulk
MPSA05RLRA	TO–92	2000 / Tape & Reel
MPSA05RLRAG	TO–92 (Pb–Free)	2000 / Tape & Reel
MPSA05RLRM	TO–92	2000 / Ammo Pack
MPSA05RLRMG	TO–92 (Pb–Free)	2000 / Ammo Pack
MPSA06	TO–92	5000 Units / Bulk
MPSA06G	TO–92 (Pb–Free)	5000 Units / Bulk
MPSA06RL1G	TO–92 (Pb–Free)	2000 / Tape & Reel
MPSA06RLG	TO–92 (Pb–Free)	2000 / Tape & Reel
MPSA06RLRA	TO–92	2000 / Tape & Reel
MPSA06RLRAG	TO–92 (Pb–Free)	2000 / Tape & Reel
MPSA06RLRM	TO–92	2000 / Ammo Pack
MPSA06RLRMG	TO–92 (Pb–Free)	2000 / Ammo Pack
MPSA06RLRP	TO–92	2000 / Ammo Pack
MPSA06RLRPG	TO–92 (Pb–Free)	2000 / Ammo Pack
MPSA55G	TO–92 (Pb–Free)	5000 Units / Bulk
MPSA55RLRA	TO–92	2000 / Tape & Reel
MPSA55RLRAG	TO–92 (Pb–Free)	2000 / Tape & Reel
MPSA56	TO–92	5000 Units / Bulk
MPSA56G	TO–92 (Pb–Free)	5000 Units / Bulk
MPSA56RLRA	TO–92	2000 / Tape & Reel
MPSA56RLRAG	TO–92 (Pb–Free)	2000 / Tape & Reel
MPSA56RLRM	TO–92	2000 / Ammo Pack
MPSA56RLRMG	TO–92 (Pb–Free)	2000 / Ammo Pack
MPSA56RLRP	TO–92	2000 / Ammo Pack
MPSA56RLRPG	TO–92 (Pb–Free)	2000 / Ammo Pack
MPSA56ZL1	TO–92	2000 / Ammo Pack
MPSA56ZL1G	TO–92 (Pb–Free)	2000 / Ammo Pack

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

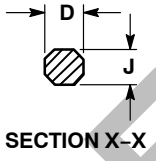
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PACKAGE DIMENSIONS

TO–92 (TO–226)
CASE 29–11
ISSUE AM



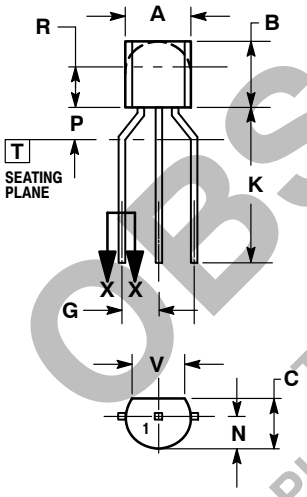
STRAIGHT LEAD
BULK PACK



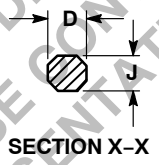
SECTION X–X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---



BENT LEAD
TAPE & REEL
AMMO PACK



SECTION X–X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	MILLIMETERS	
DIM	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

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