

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

*Preferred Devices

Amplifier Transistors

Voltage and Current are Negative
for PNP Transistors

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	mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	W mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

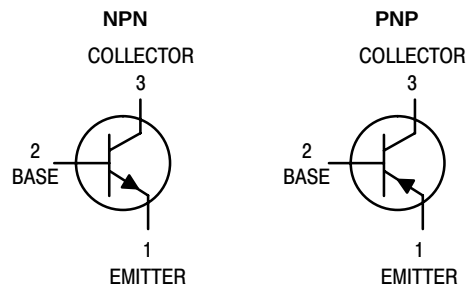
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

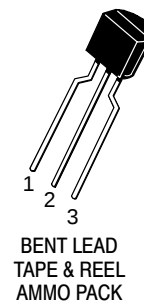
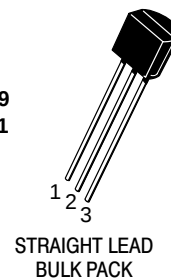


ON Semiconductor®

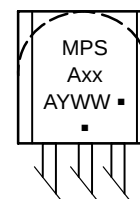
<http://onsemi.com>



TO-92
CASE 29
STYLE 1



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.

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

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

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

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector – Emitter Breakdown Voltage (Note 2) ($I_C = 1.0 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	60 80	– –	Vdc
Emitter – Base Breakdown Voltage ($I_E = 100 \text{ } \mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	–	Vdc
Collector Cutoff Current ($V_{CE} = 60 \text{ Vdc}$, $I_B = 0$)	I_{CES}	–	0.1	μAdc
Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	– –	0.1 0.1	μAdc

ON CHARACTERISTICS

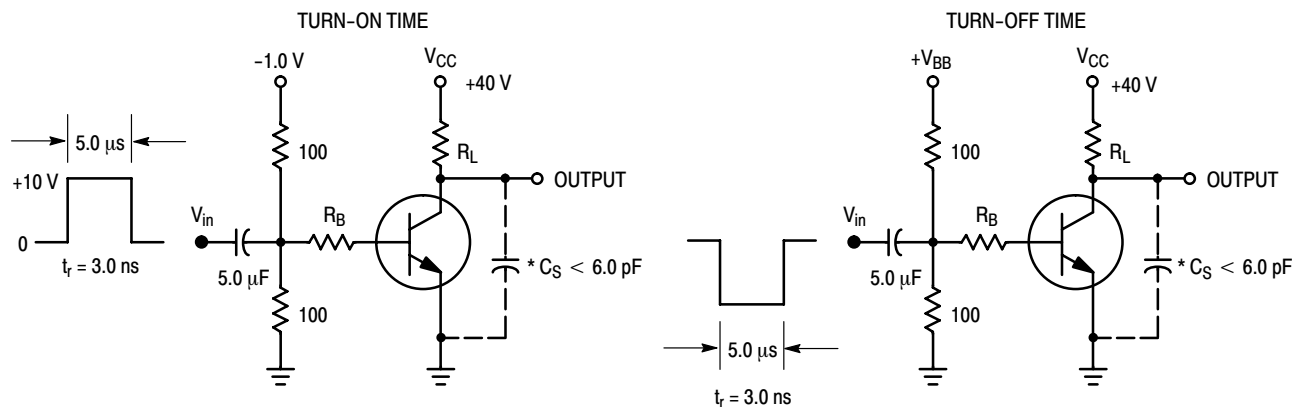
DC Current Gain ($I_C = 10 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$) ($I_C = 100 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$)	h_{FE}	100 100	– –	–
Collector–Emitter Saturation Voltage ($I_C = 100 \text{ mAdc}$, $I_B = 10 \text{ mAdc}$)	$V_{CE(sat)}$	–	0.25	Vdc
Base–Emitter On Voltage ($I_C = 100 \text{ mAdc}$, $V_{CE} = 1.0 \text{ Vdc}$)	$V_{BE(on)}$	–	1.2	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		100	–	
	MPSA06				
(I _C = 100 mAdc, V _{CE} = 1.0 Vdc, f = 100 MHz)	MPSA55		50	–	
	MPSA56				

2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$

3. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.



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

Figure 1. Switching Time Test Circuits

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

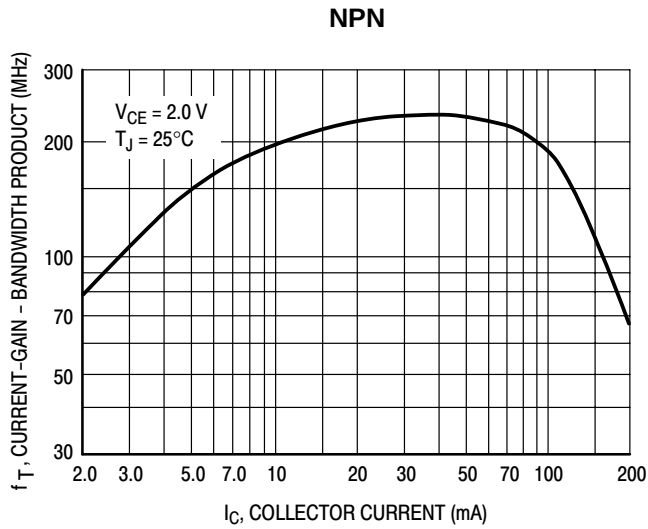


Figure 2. MPSA05/06 Current-Gain — Bandwidth Product

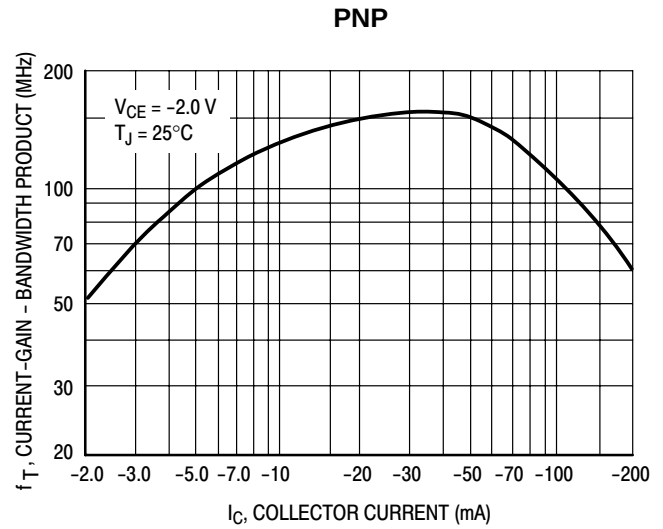


Figure 3. MPSA55/56 Current-Gain — Bandwidth Product

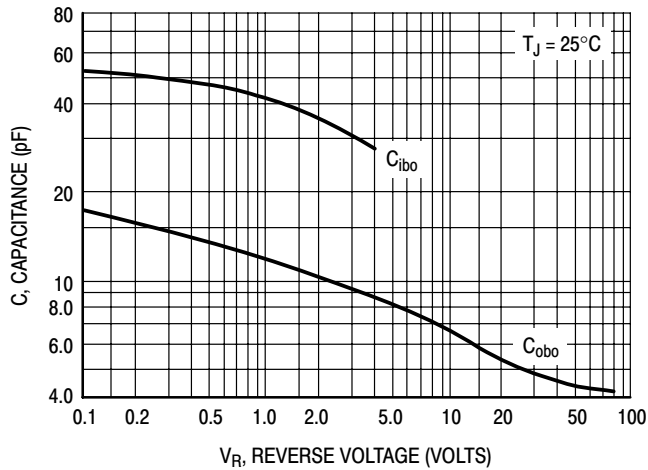


Figure 4. MPSA05/06 Capacitance

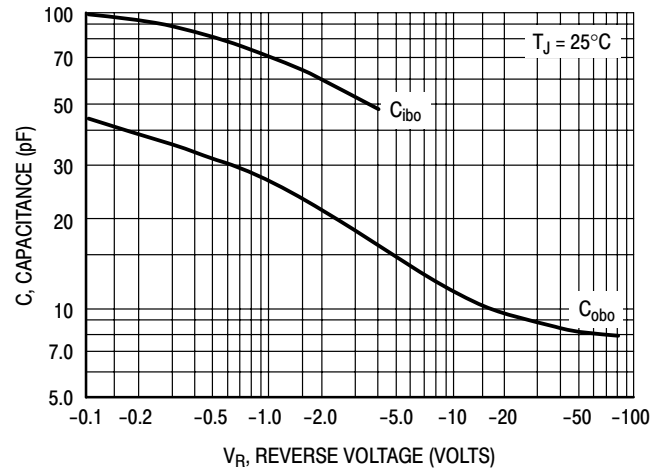


Figure 5. MPSA55/56 Capacitance

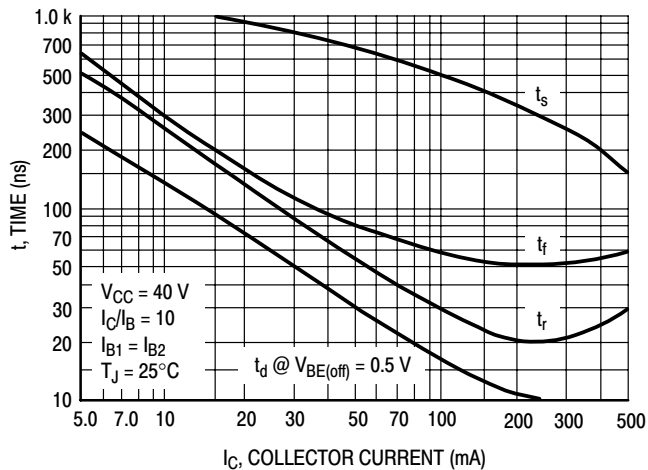


Figure 6. MPSA05/06 Switching Time

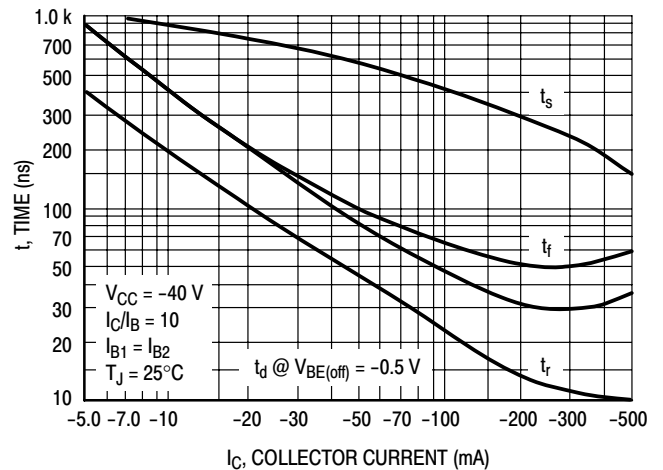


Figure 7. MPSA55/56 Switching Time

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

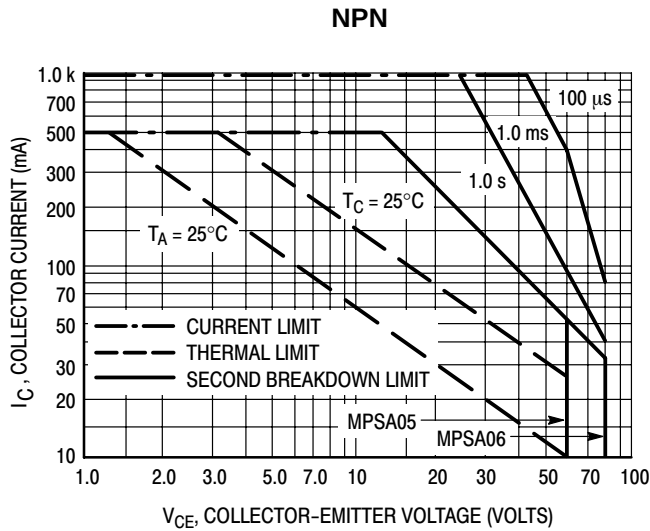


Figure 8. MPSA05/06 Active-Region Safe Operating Area

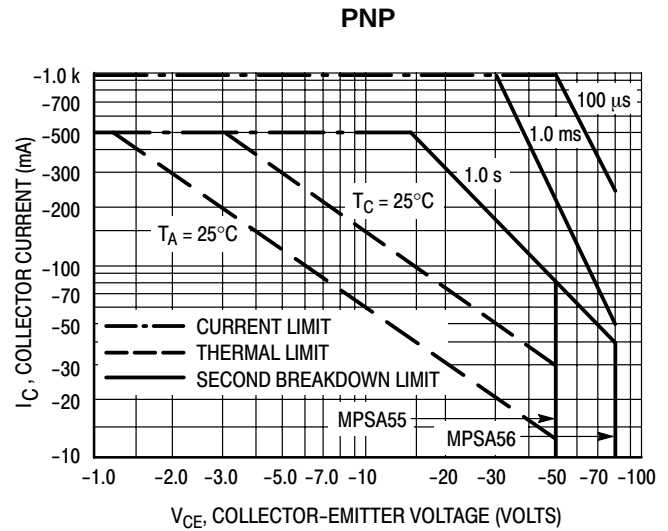


Figure 9. MPSA55/56 Active-Region Safe Operating Area

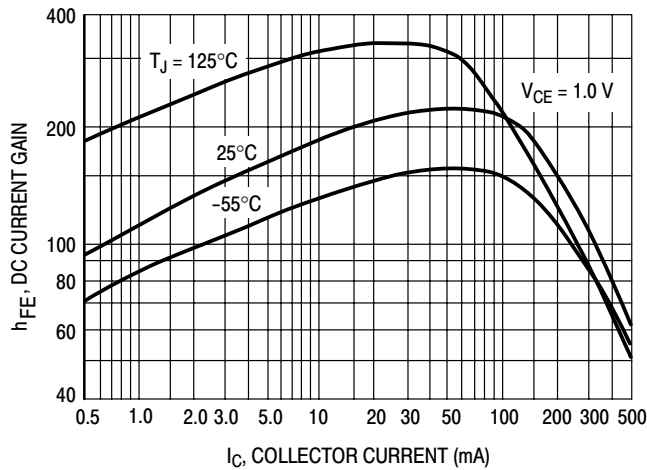


Figure 10. MPSA05/06 DC Current Gain

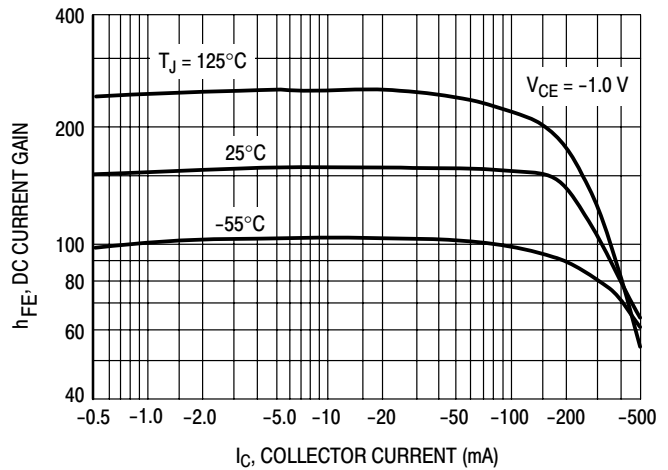


Figure 11. MPSA55/56 DC Current Gain

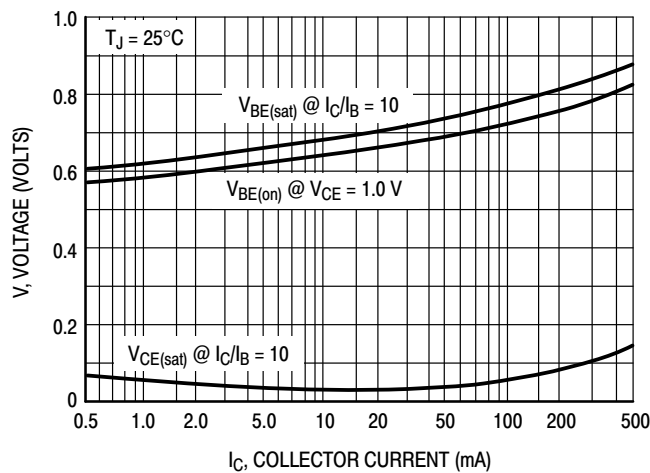


Figure 12. MPSA05/06 "ON" Voltages

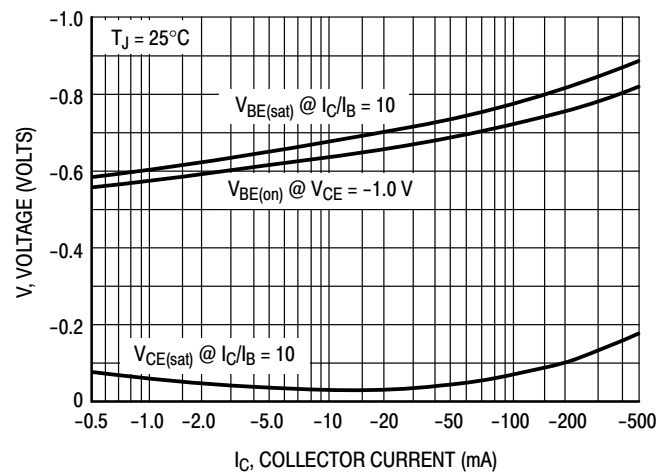


Figure 13. MPSA55/56 "ON" Voltages

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

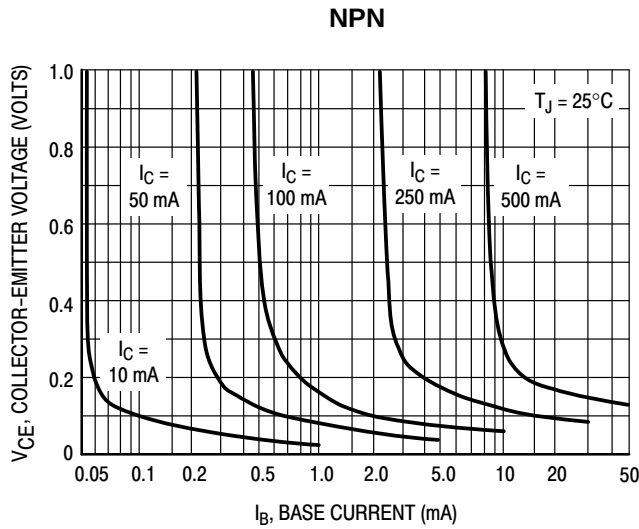


Figure 14. MPSA05/06 Collector Saturation Region

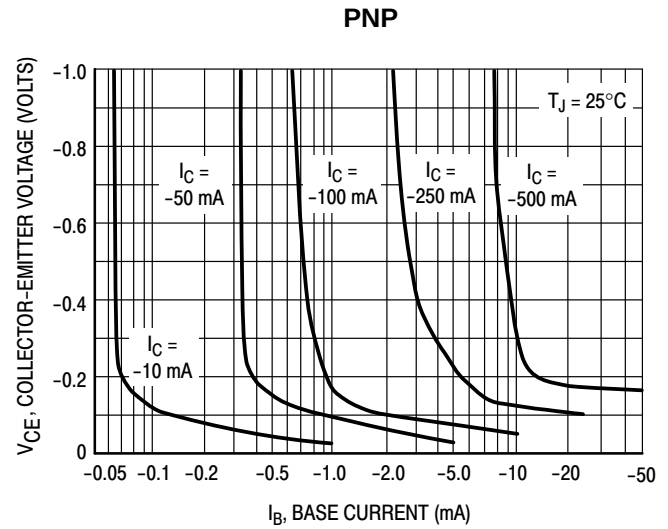


Figure 15. MPSA55/56 Collector Saturation Region

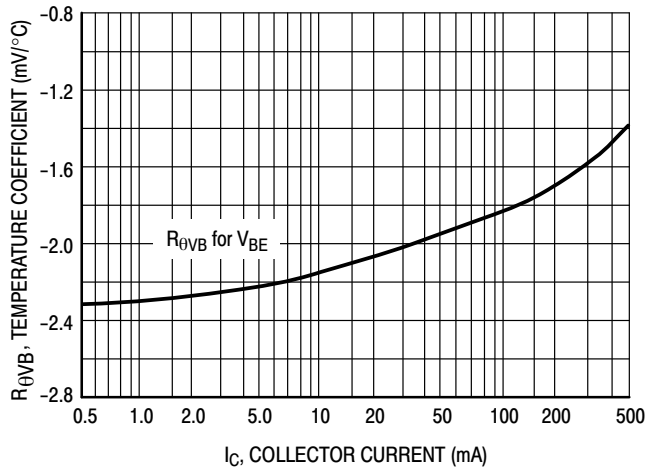


Figure 16. MPSA05/06 Base-Emitter Temperature Coefficient

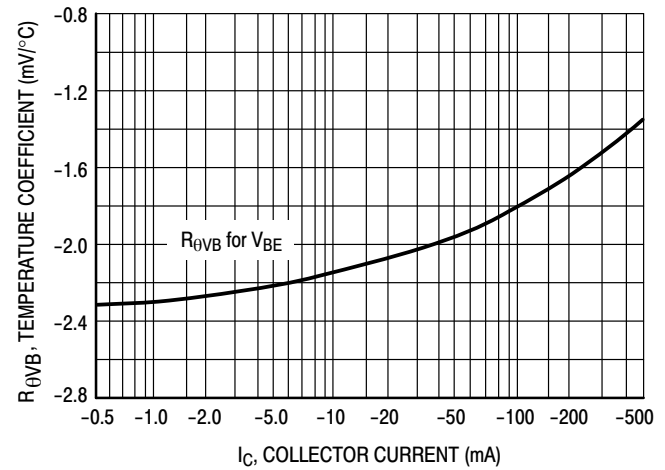


Figure 17. MPSA55/56 Base-Emitter Temperature Coefficient

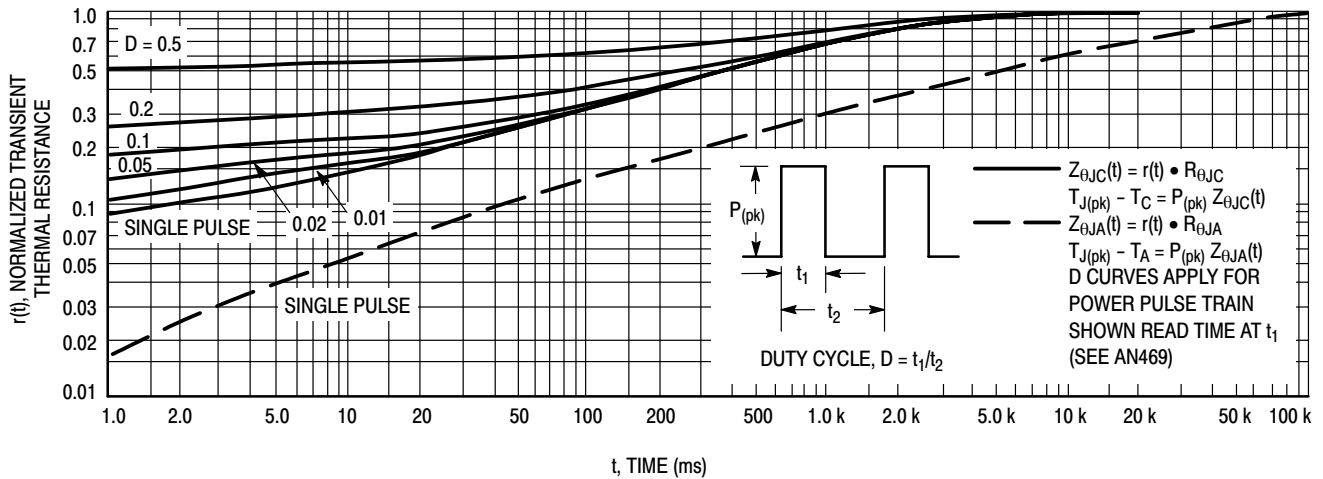


Figure 18. MPSA05, MPSA06, MPSA55 and MPSA56 Thermal Response

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

ORDERING INFORMATION

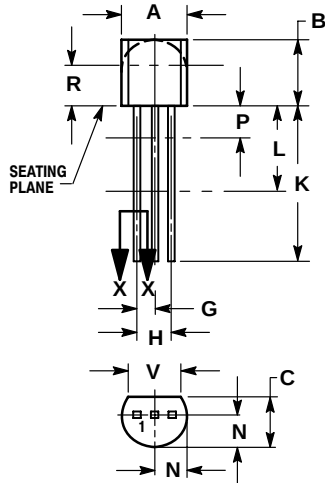
Device	Package	Shipping [†]
MPSA05	TO-92	5000 Units / Bulk
MPSA05G	TO-92 (Pb-Free)	5000 Units / Bulk
MPSA05RLRA	TO-92	2000 / Tape & Reel
MPSA05RLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSA05RLRM	TO-92	2000 / Ammo Pack
MPSA05RLRMG	TO-92 (Pb-Free)	2000 / Ammo Pack
MPSA06	TO-92	5000 Units / Bulk
MPSA06G	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.

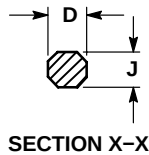
NPN – MPSA05, MPSA06*; PNP – MPSA55, MPSA56*

PACKAGE DIMENSIONS

TO-92 (TO-226) CASE 29-11 ISSUE AM



STRAIGHT LEAD
BULK PACK

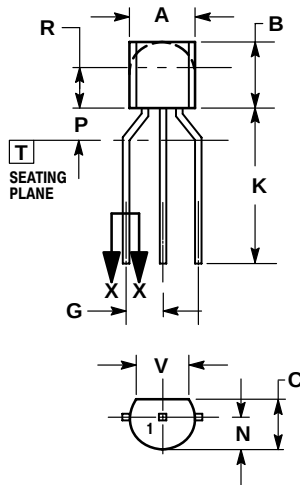


SECTION X-X

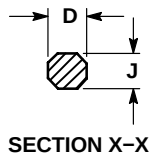
NOTES:

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.

DIM	INCHES		MILLIMETERS	
	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.

DIM	MILLIMETERS	
	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:

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

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative