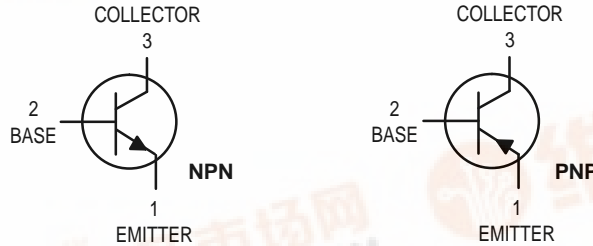


Amplifier Transistors



NPN
MPSA05
MPSA06*
PNP
MPSA55
MPSA56*

Voltage and current are negative for PNP transistors

*Motorola Preferred Device

MAXIMUM RATINGS

Rating	Symbol	MPSA05 MPSA55	MPSA06 MPSA56	Unit
Collector–Emitter Voltage	V_{CEO}	60	80	Vdc
Collector–Base Voltage	V_{CBO}	60	80	Vdc
Emitter–Base Voltage	V_{EBO}	4.0		Vdc
Collector Current – Continuous	I_C	500		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625	5.0	mW mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5	12	Watts 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	$R_{\theta JA}^{(1)}$	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽²⁾ ($I_C = 1.0 \text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	60 80	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	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

- $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.
- Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.



NPN MPSA05 MPSA06 PNP MPSA55 MPSA56

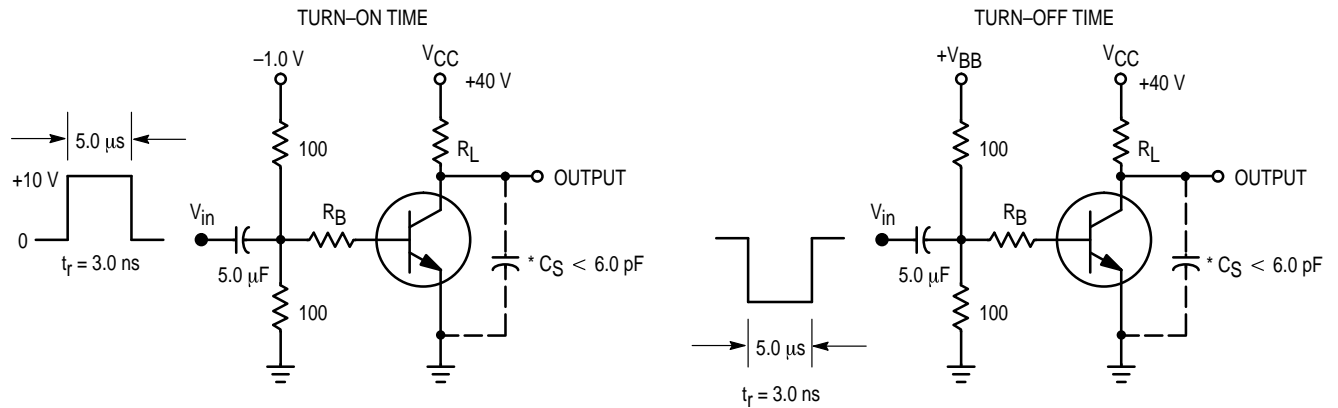
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
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 ⁽³⁾ ($I_C = 10\text{ mA}$, $V_{CE} = 2.0\text{ V}$, $f = 100\text{ MHz}$)	MPSA05 MPSA06	f_T	100	—	MHz
($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$, $f = 100\text{ MHz}$)	MPSA55 MPSA56		50	—	

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

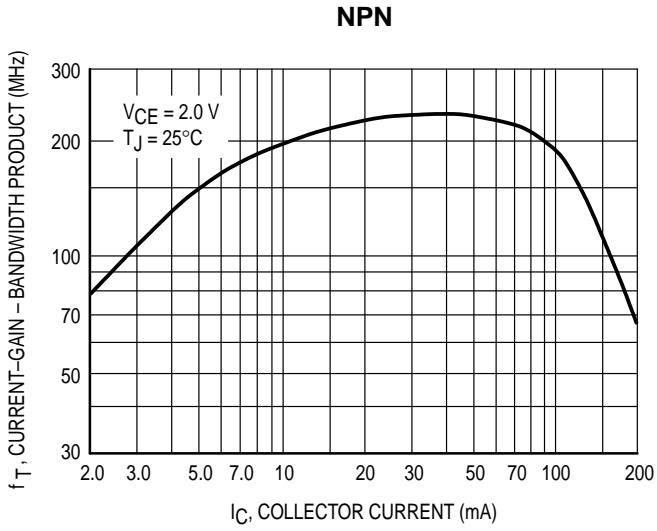


Figure 2. MPSA05/06 Current-Gain — Bandwidth Product

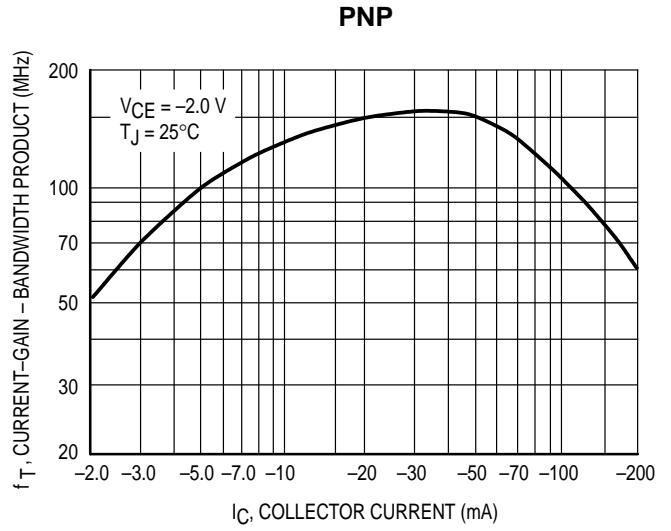


Figure 3. MPSA55/56 Current-Gain — Bandwidth Product

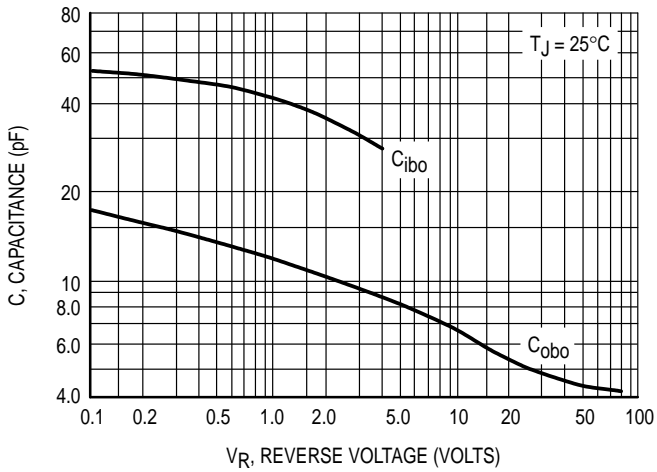


Figure 4. MPSA05/06 Capacitance

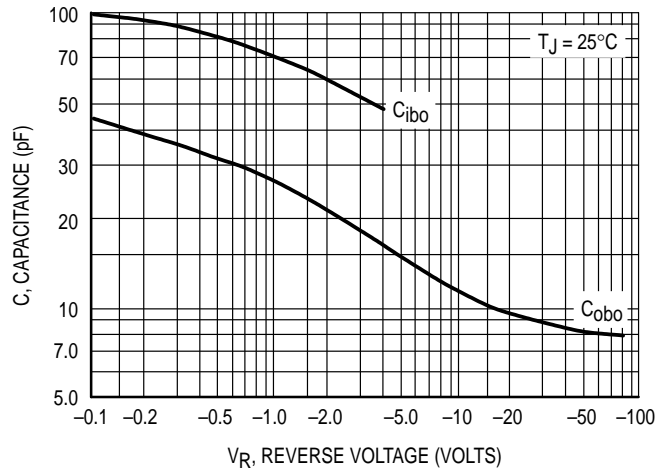


Figure 5. MPSA55/56 Capacitance

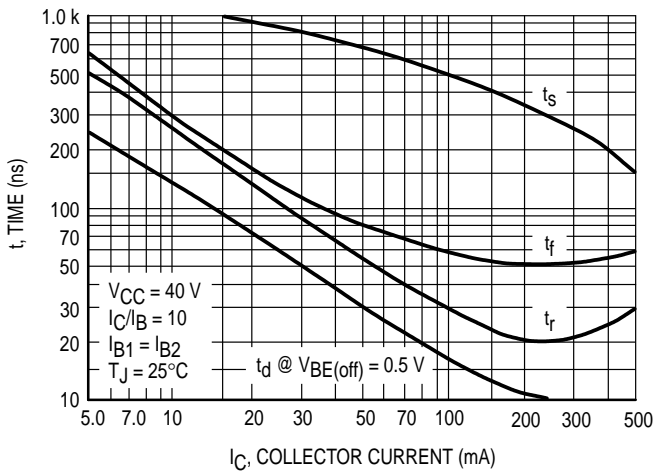


Figure 6. MPSA05/06 Switching Time

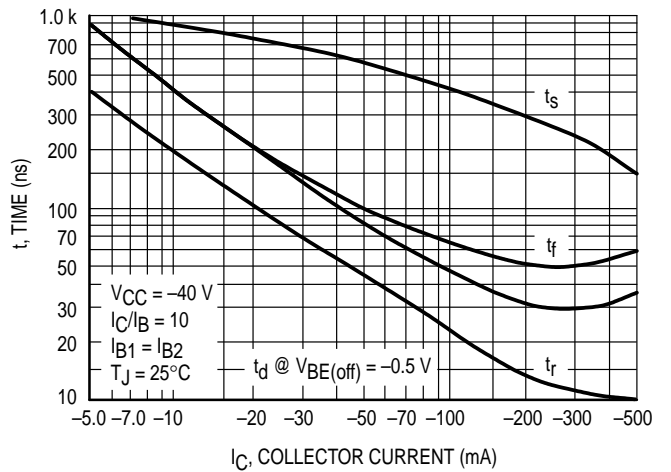


Figure 7. MPSA55/56 Switching Time

NPN MPSA05 MPSA06 PNP MPSA55 MPSA56

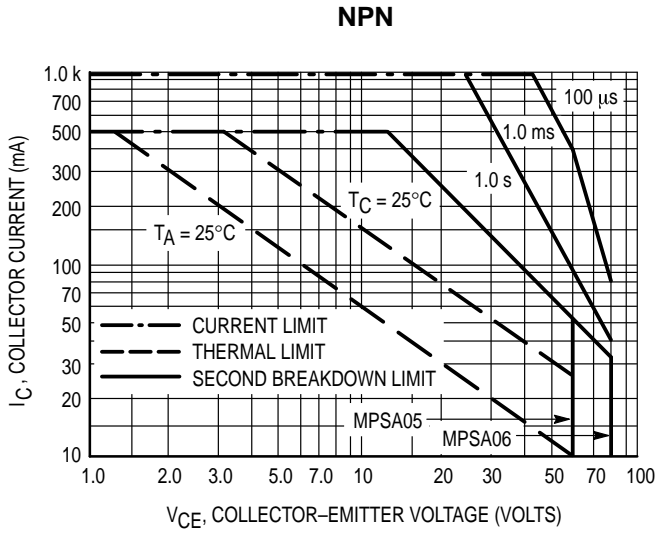


Figure 8. MPSA05/06 Active-Region Safe Operating Area

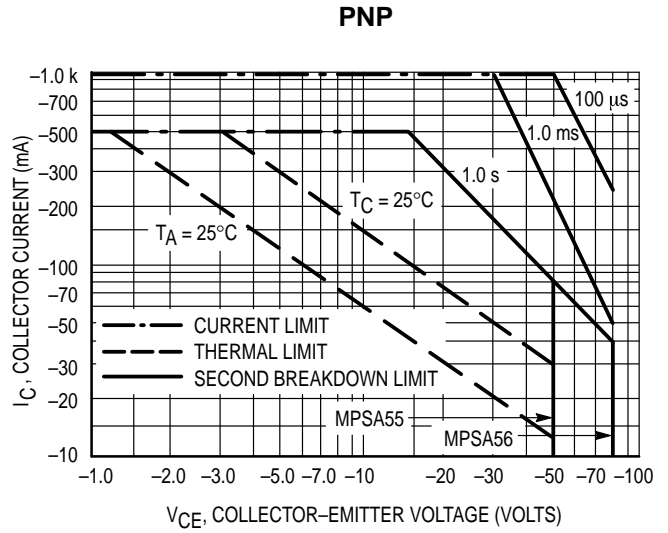


Figure 9. MPSA55/56 Active-Region Safe Operating Area

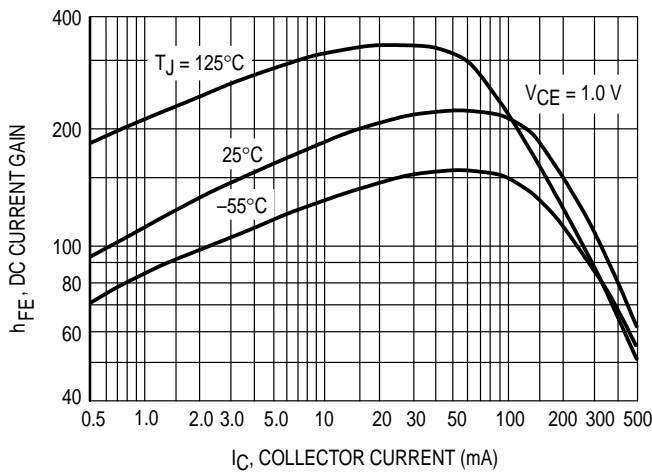


Figure 10. MPSA05/06 DC Current Gain

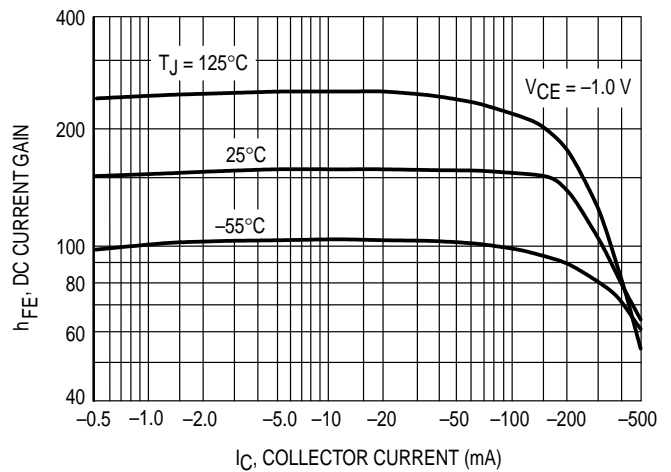


Figure 11. MPSA55/56 DC Current Gain

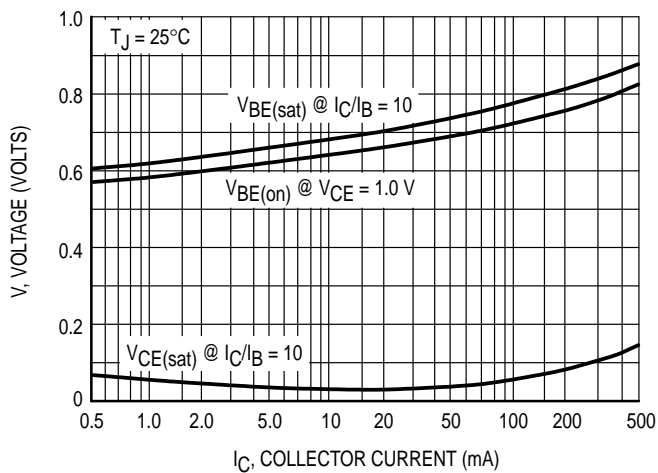


Figure 12. MPSA05/06 "ON" Voltages

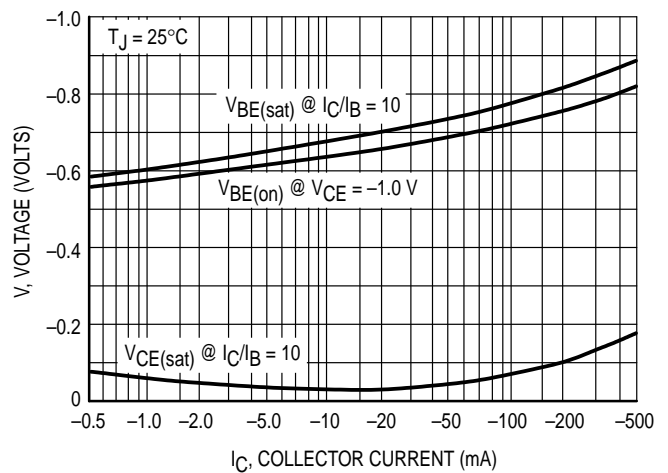


Figure 13. MPSA55/56 "ON" Voltages

NPN MPSA05 MPSA06 PNP MPSA55 MPSA56

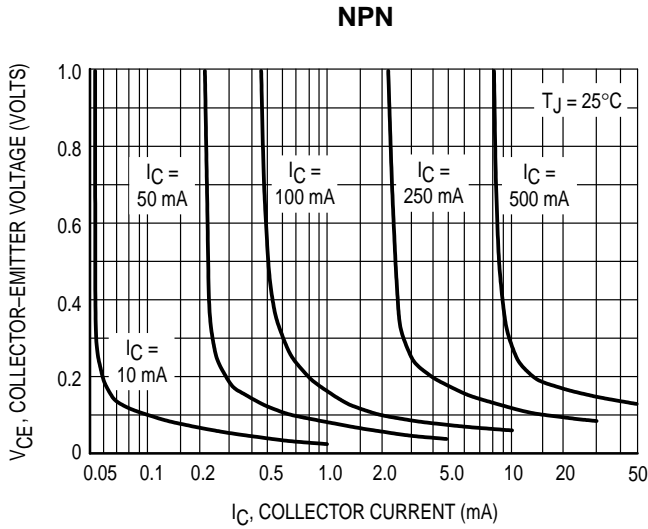


Figure 14. MPSA05/06 Collector Saturation Region

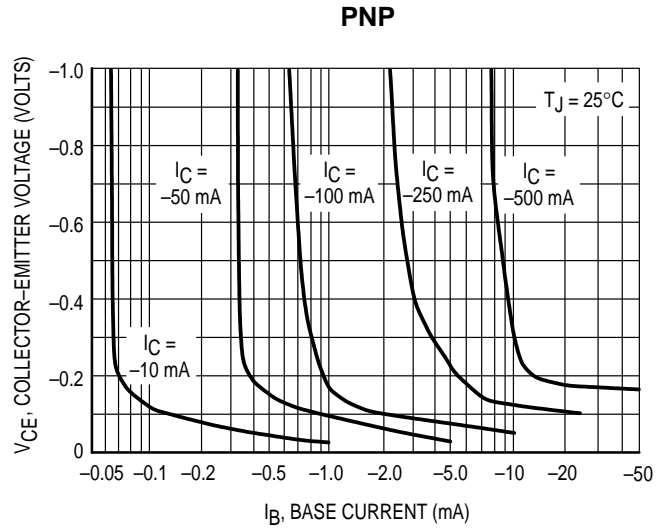


Figure 15. MPSA55/56 Collector Saturation Region

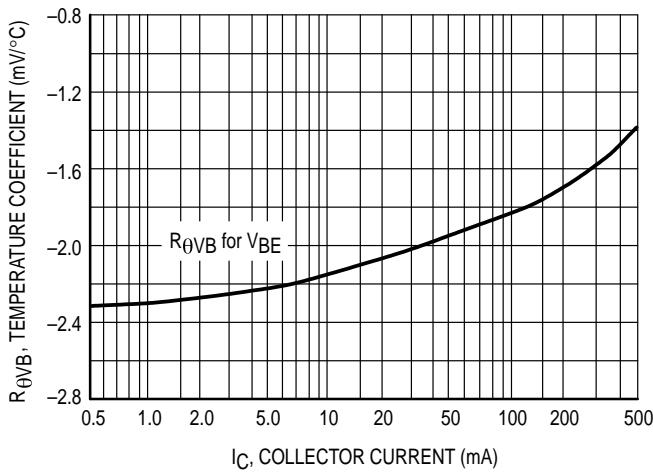


Figure 16. MPSA05/06 Base-Emitter Temperature Coefficient

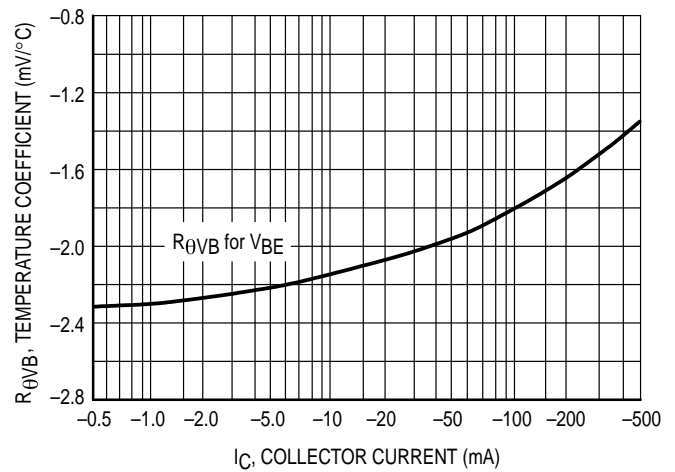


Figure 17. MPSA55/56 Base-Emitter Temperature Coefficient

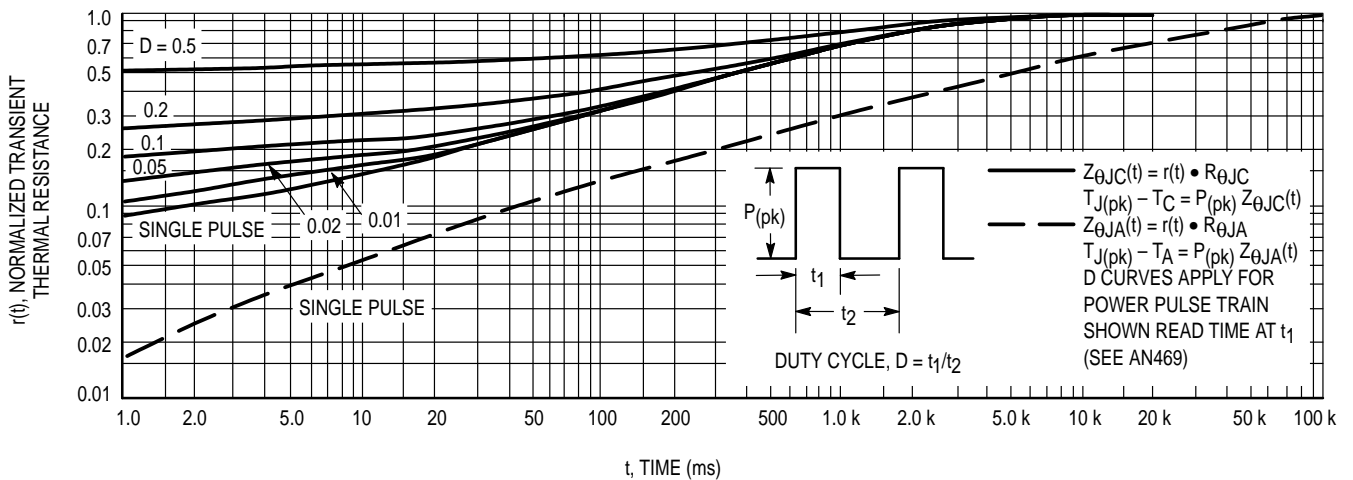
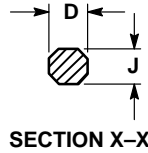
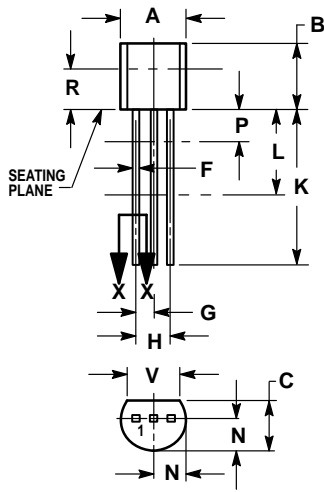


Figure 18. MPSA05, MPSA06, MPSA55 and MPSA56 Thermal Response

NPN MPSA05 MPSA06 PNP MPSA55 MPSA56

PACKAGE DIMENSIONS



**CASE 029-04
(TO-226AA)
ISSUE AD**


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. 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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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	—

STYLE 1:

- PIN 1. EMITTER
2. BASE
3. COLLECTOR

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