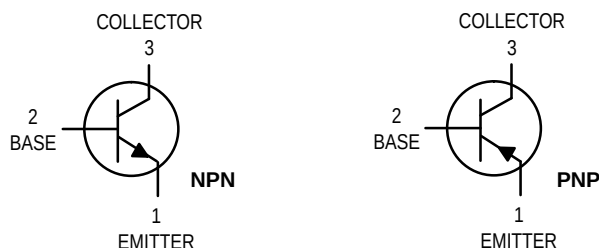


Amplifier Transistors



NPN
MPS8098
MPS8099*
PNP
MPS8598
MPS8599*

Voltage and current are negative
for PNP transistors

*Motorola Preferred Device

MAXIMUM RATINGS

Rating	Symbol	MPS8098 MPS8598	MPS8099 MPS8599	Unit
Collector–Emitter Voltage	V_{CEO}	60	80	Vdc
Collector–Base Voltage	V_{CBO}	60	80	Vdc
		MPS8099	MPS8598 MPS8599	
Emitter–Base Voltage	V_{EBO}	6.0	5.0	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/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12		Watts 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	$R_{\theta JA}$	200	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$

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

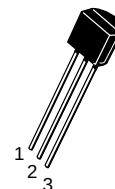
Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 10 \text{ mAdc}$, $I_B = 0$)	MPS8098, MPS8598 MPS8099, MPS8599	$V_{(BR)CEO}$	60 80	— —	Vdc
Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $I_E = 0$)	MPS8098, MPS8598 MPS8099, MPS8599	$V_{(BR)CBO}$	60 80	— —	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}$, $I_C = 0$)	MPS8098, MPS8099 MPS8598, MPS8599	$V_{(BR)EBO}$	6.0 5.0	— —	Vdc
Collector Cutoff Current ($V_{CE} = 60 \text{ Vdc}$, $I_B = 0$)		I_{CES}	—	0.1	μAdc
Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$)	MPS8098, MPS8598 MPS8099, MPS8599	I_{CBO}	— —	0.1 0.1	μAdc
Emitter Cutoff Current ($V_{EB} = 6.0 \text{ Vdc}$, $I_C = 0$) ($V_{EB} = 4.0 \text{ Vdc}$, $I_C = 0$)	MPS8098, MPS8099 MPS8598, MPS8599	I_{EBO}	— —	0.1 0.1	μAdc

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle = 2.0%.

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



CASE 29-04, STYLE 1
TO-92 (TO-226AA)

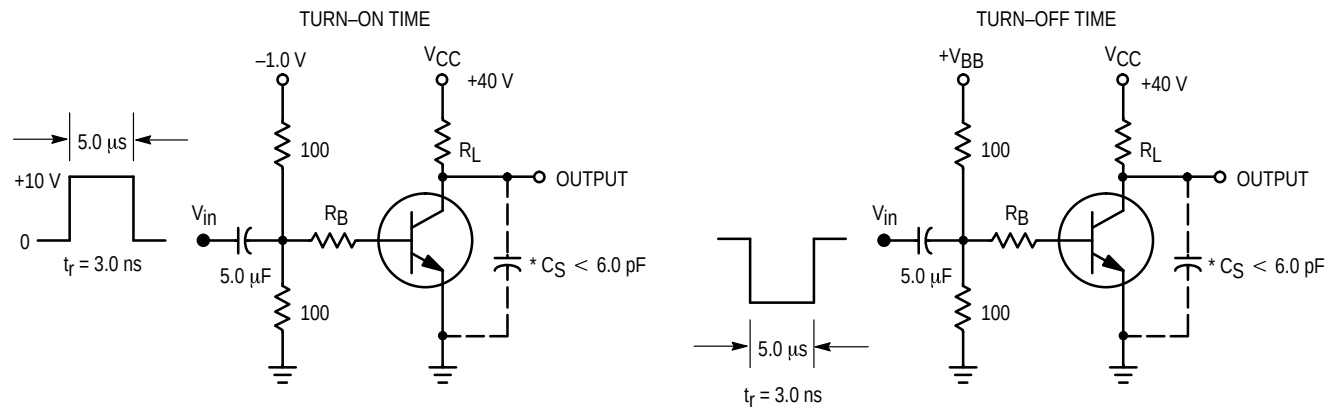
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS(1)				
DC Current Gain (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 100 mA _{dc} , V _{CE} = 5.0 V _{dc})	h _{FE}	100 100 75	300 — —	—
Collector–Emitter Saturation Voltage (I _C = 100 mA _{dc} , I _B = 5.0 mA _{dc}) (I _C = 100 mA _{dc} , I _B = 10 mA _{dc})	V _{CE(sat)}	— —	0.4 0.3	V _{dc}
Base–Emitter On Voltage (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc})	V _{BE(on)}	0.5 0.6	0.7 0.8	V _{dc}
		MPS8098, MPS8598 MPS8099, MPS8599		

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 100 MHz)	f _T	150	—	MHz
Output Capacitance (V _{CB} = 5.0 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{obo}	— —	6.0 8.0	pF
Input Capacitance (V _{EB} = 0.5 V _{dc} , I _C = 0, f = 1.0 MHz)	C _{ibo}	— —	25 30	pF
		MPS8098, MPS8099 MPS8598, MPS8599		

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle = 2.0%.



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

Figure 1. Switching Time Test Circuits

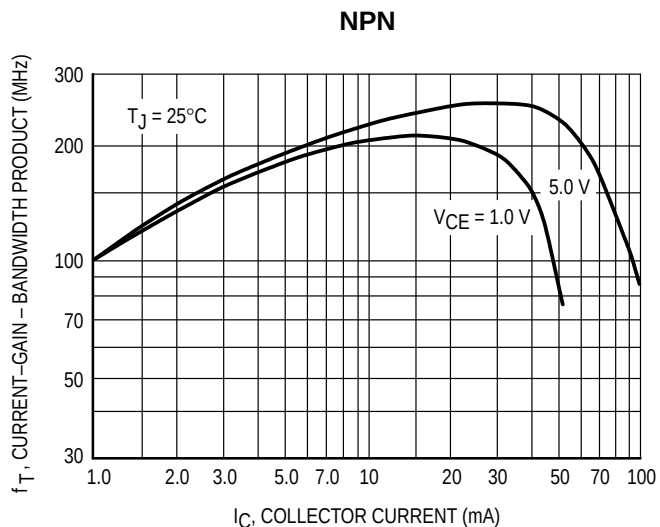


Figure 2. MPS8098/99 Current-Gain — Bandwidth Product

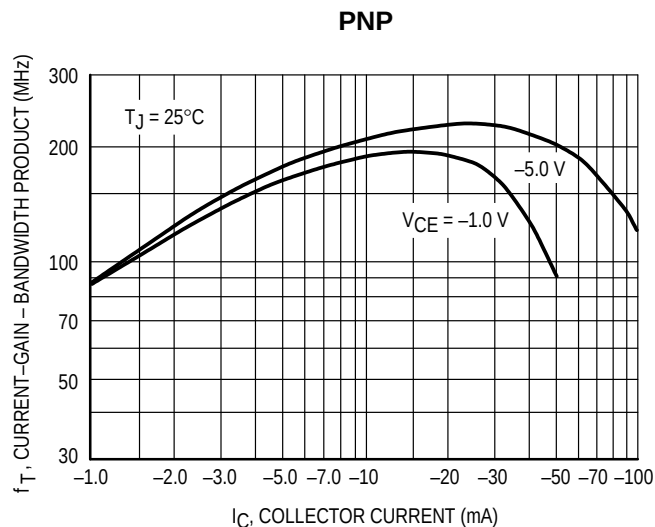


Figure 3. MPS8598/99 Current-Gain — Bandwidth Product

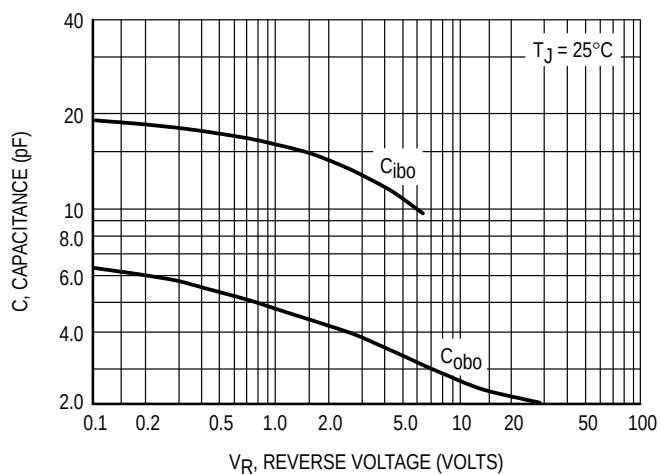


Figure 4. MPS8098/99 Capacitance

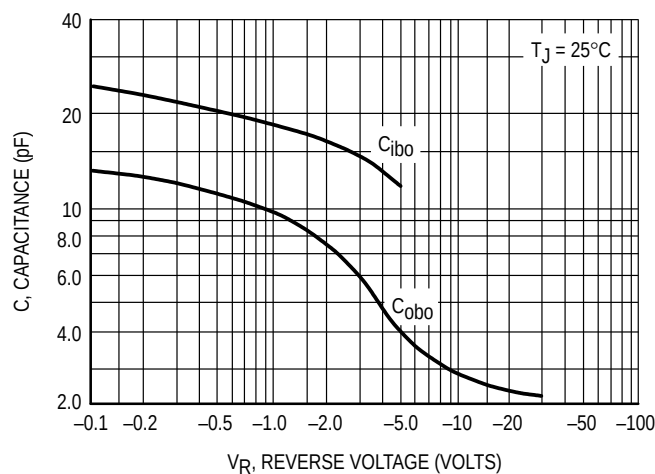


Figure 5. MPS8598/99 Capacitance

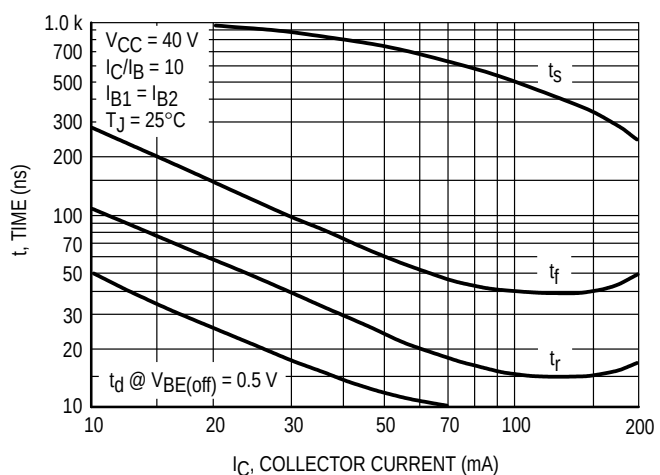


Figure 6. MPS8098/99 Switching Times

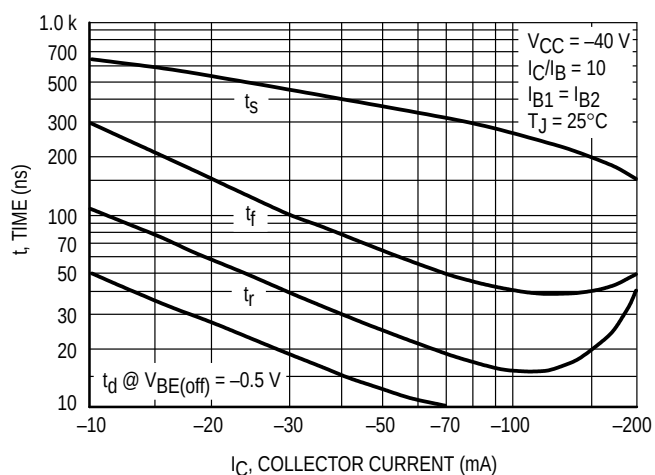


Figure 7. MPS8598/99 Switching Times

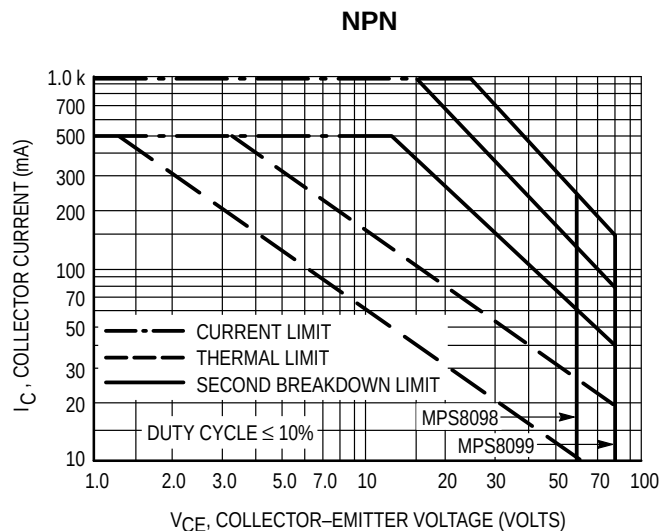


Figure 8. MPS8098/99 Active-Region Safe Operating Area

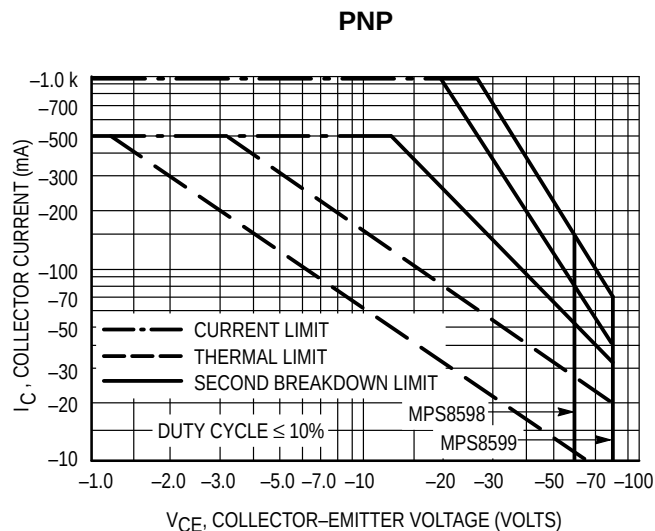


Figure 9. MPS8598/99 Active-Region Safe Operating Area

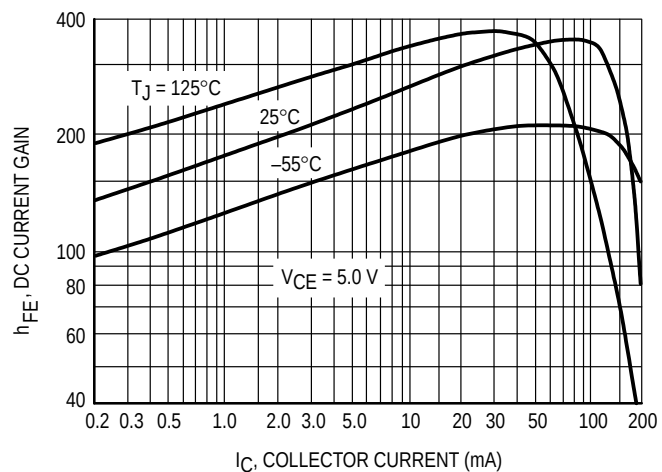


Figure 10. MPS8098/99 DC Current Gain

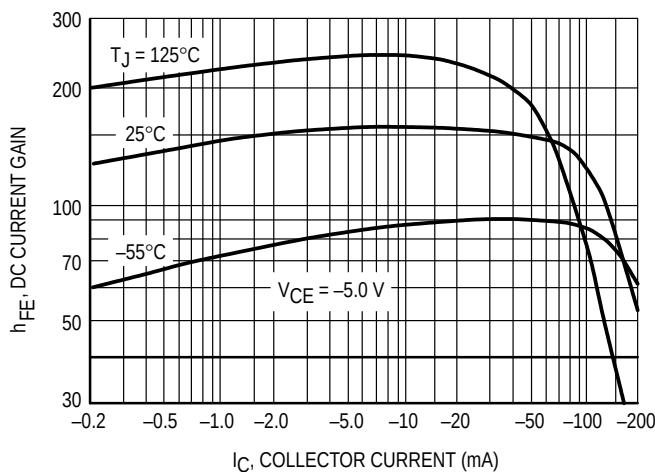


Figure 11. MPS8598/99 DC Current Gain

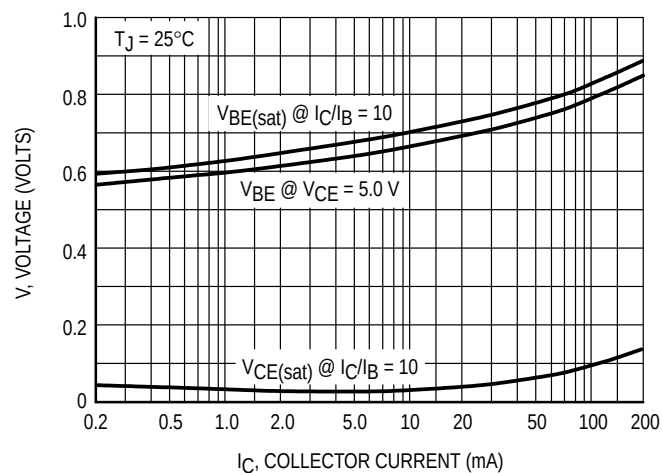


Figure 12. MPS8098/99 "ON" Voltages

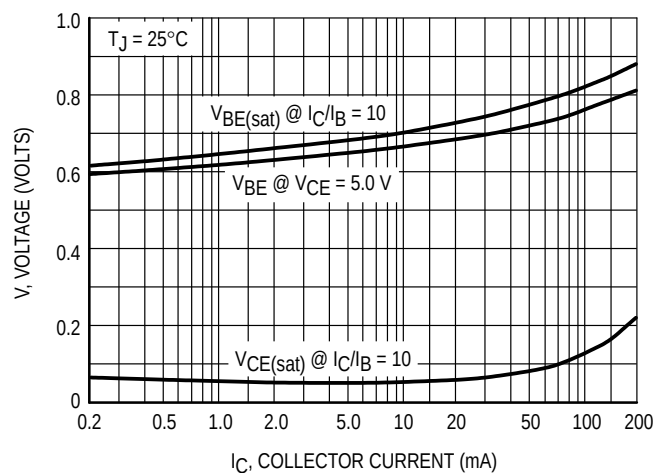


Figure 13. MPS8598/99 "ON" Voltages

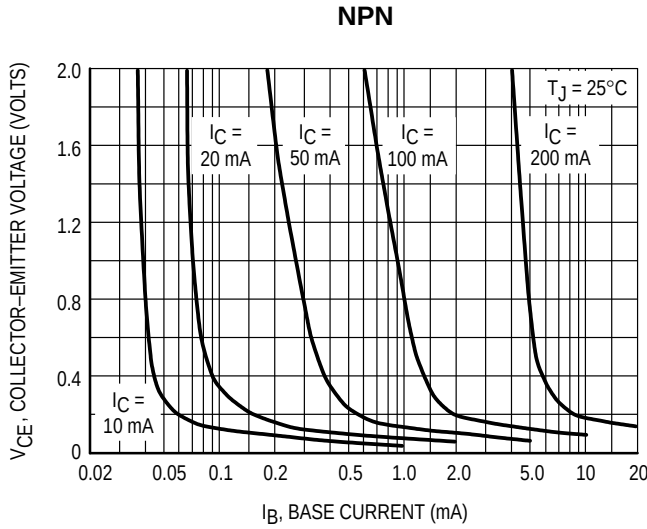


Figure 14. MPS8098/99 Collector Saturation Region

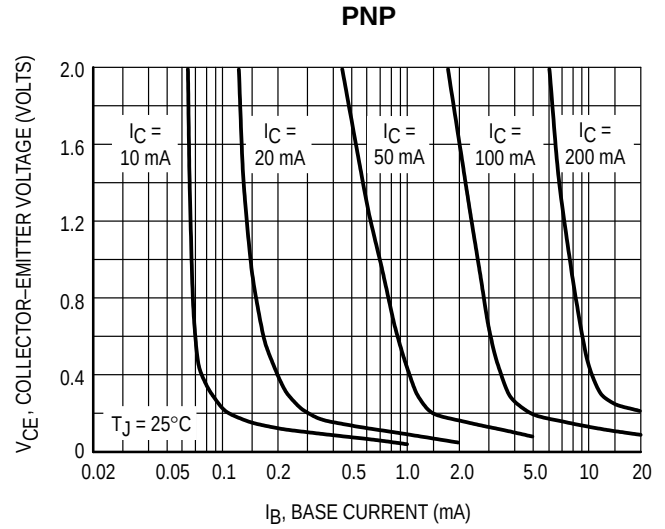


Figure 15. MPS8598/99 Collector Saturation Region

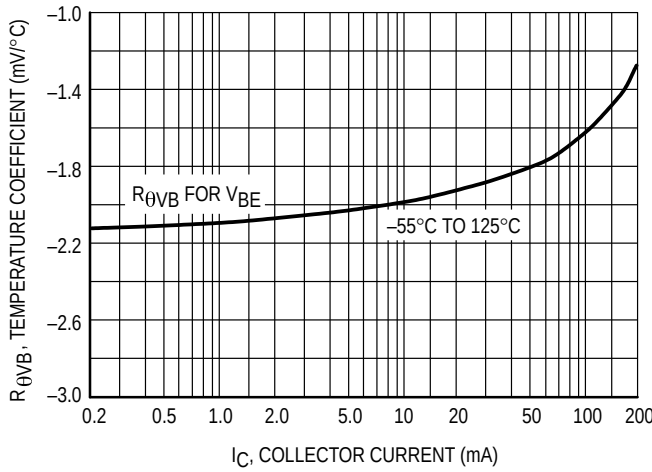


Figure 16. MPS8098/99 Base-Emitter Temperature Coefficient

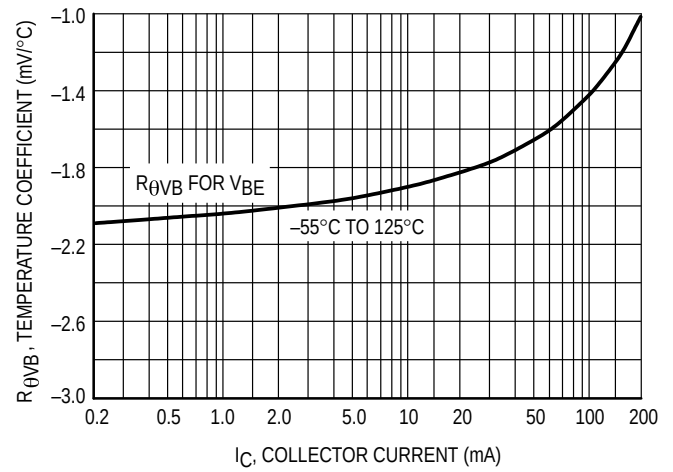


Figure 17. MPS8598/99 Base-Emitter Temperature Coefficient

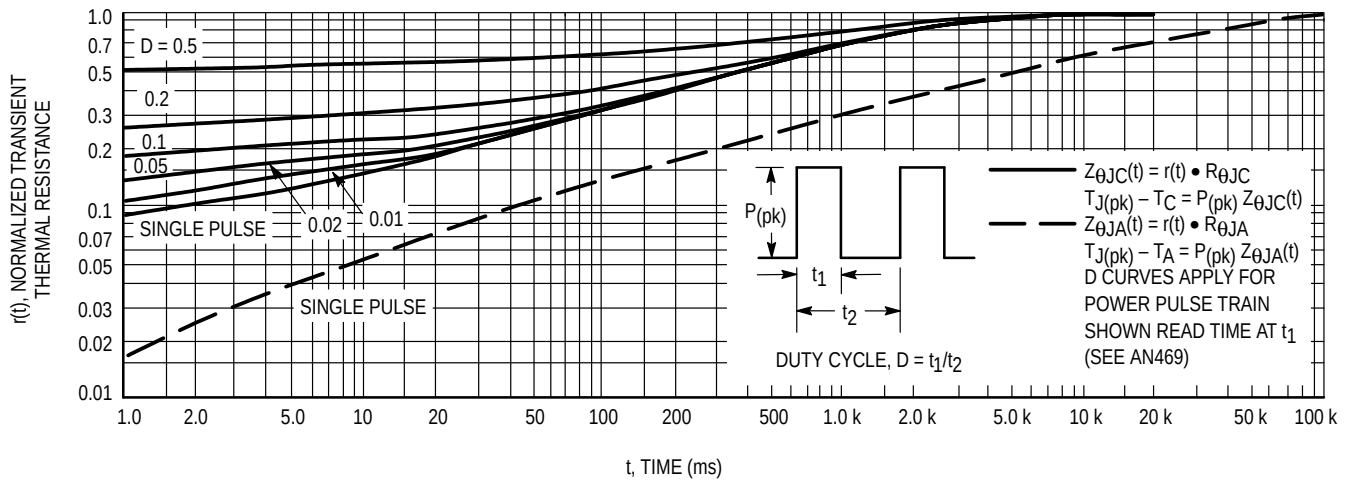
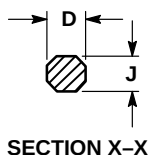
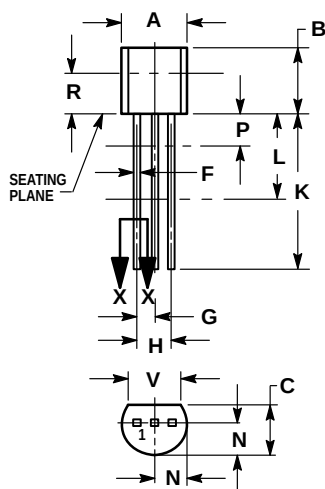


Figure 18. MPS8098, MPS8099, MPS8598 and MPS8599 Thermal Response

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:

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

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MOTOROLA

MPS8098/D



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