Amplifier Transistors

NPN
MPS8098
MPS8099*
PNP
MPS8598
MPS8599*

Voltage and current are negative for PNP transistors

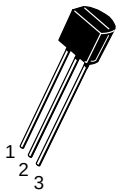
***ON Semiconductor Preferred Device**

MAXIMUM RATINGS

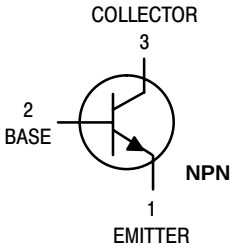
Rating	Symbol	MPS8098 MPS8598	MPS8099 MPS8599	Unit
Collector–Emitter Voltage	V_{CEO}	60	80	Vdc
Collector–Base Voltage	V_{CBO}	60	80	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	5.0	Vdc
Collector Current – Continuous	I_C	500		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Device Dissipation @ T_C = 25°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

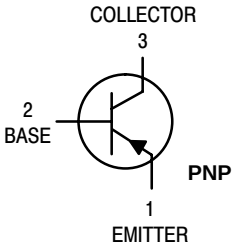
THERMAL CHARACTERISTICS

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



CASE 29–11, STYLE 1
TO–92 (TO–226AA)





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

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage[1]		$V_{(BR)CEO}$			Vdc
(I_C = 10 mAdc, I_B = 0)	MPS8098, MPS8598		60	—	
	MPS8099, MPS8599		80	—	
Collector–Base Breakdown Voltage		$V_{(BR)CBO}$			Vdc
(I_C = 100 μAdc, I_E = 0)	MPS8098, MPS8598		60	—	
	MPS8099, MPS8599		80	—	
Emitter–Base Breakdown Voltage		$V_{(BR)EBO}$			Vdc
(I_E = 10 μAdc, I_C = 0)	MPS8098, MPS8099		6.0	—	
	MPS8598, MPS8599		5.0	—	
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)	MPS8098, MPS8598		—	0.1	
(V_{CB} = 80 Vdc, I_E = 0)	MPS8099, MPS8599		—	0.1	
Emitter Cutoff Current		I_{EBO}			μAdc
(V_{EB} = 6.0 Vdc, I_C = 0)	MPS8098, MPS8099		—	0.1	
(V_{EB} = 4.0 Vdc, I_C = 0)	MPS8598, MPS8599		—	0.1	

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

ON CHARACTERISTICS[1]

DC Current Gain		h_{FE}			—
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)			100	300	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)			100	—	
(I_C = 100 mAdc, V_{CE} = 5.0 Vdc)			75	—	
Collector–Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 100 mAdc, I_B = 5.0 mAdc)			—	0.4	
(I_C = 100 mAdc, I_B = 10 mAdc)			—	0.3	
Base–Emitter On Voltage		$V_{BE(on)}$			Vdc
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	MPS8098, MPS8598		0.5	0.7	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	MPS8099, MPS8599		0.6	0.8	

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product		f_T	150	—	MHz
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)					
Output Capacitance		C_{obo}			pF
(V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)	MPS8098, MPS8099		—	6.0	
	MPS8598, MPS8599		—	8.0	
Input Capacitance		C_{ibo}			pF
(V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	MPS8098, MPS8099		—	25	
	MPS8598, MPS8599		—	30	

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

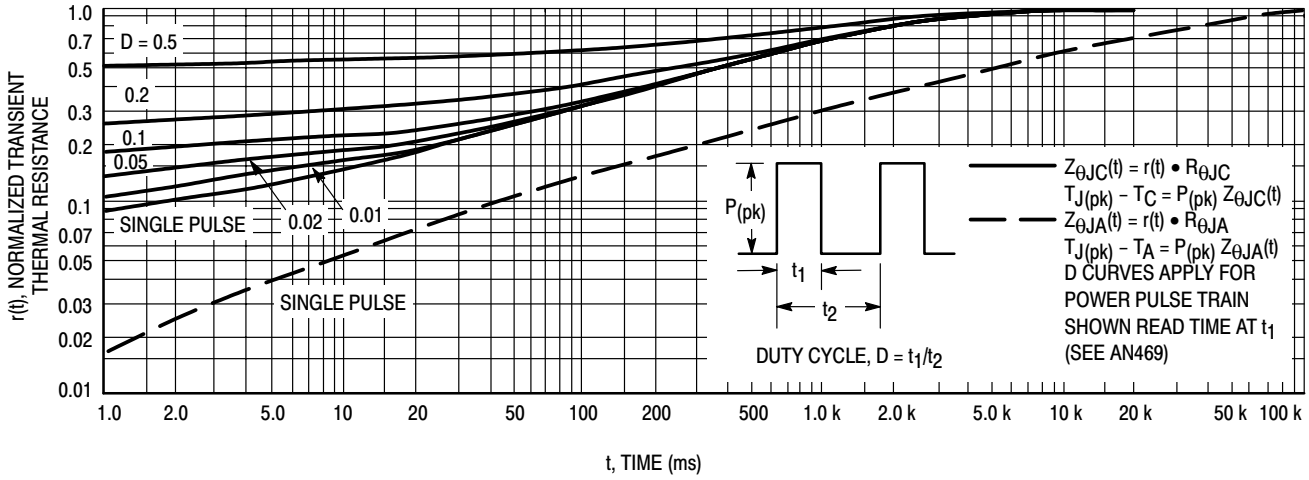
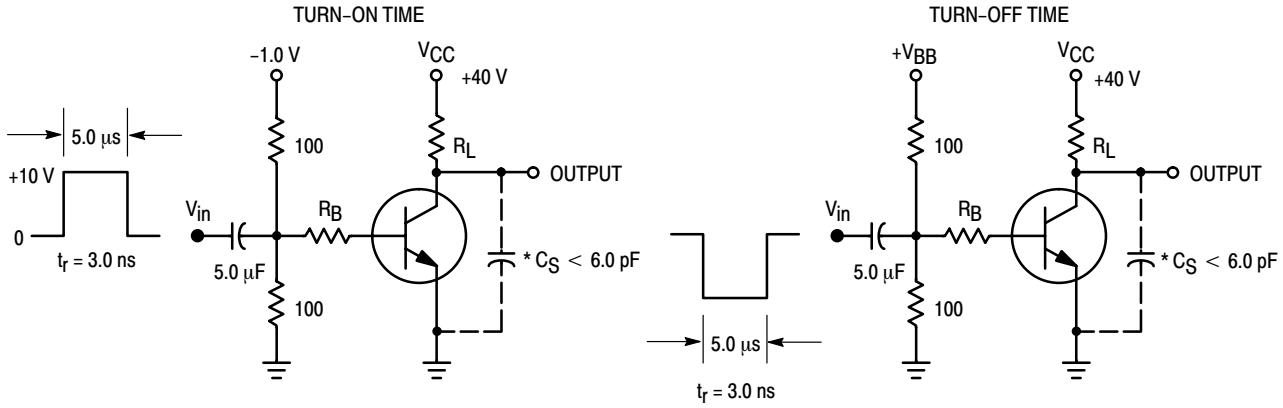


Figure 1. MPS8098, MPS8099, MPS8598 and MPS8599 Thermal Response



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

Figure 2. Switching Time Test Circuits

NPN

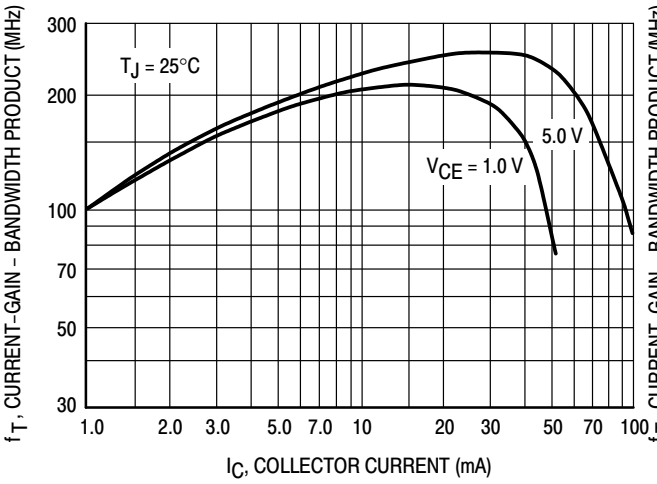


Figure 3. MPS8098/99 Current–Gain — Bandwidth Product

PNP

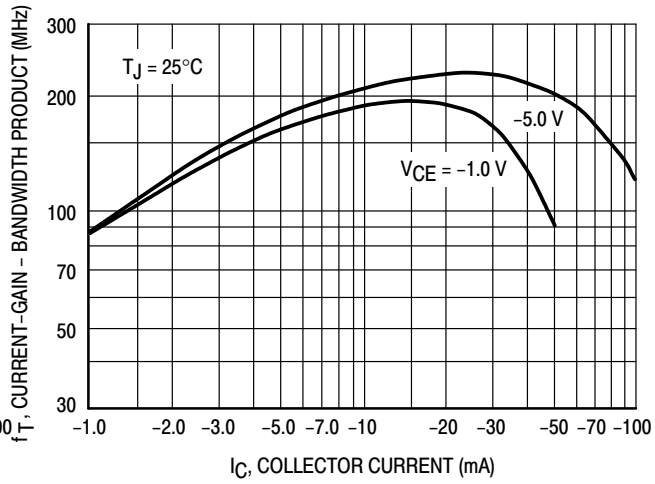


Figure 4. MPS8598/99 Current–Gain — Bandwidth Product

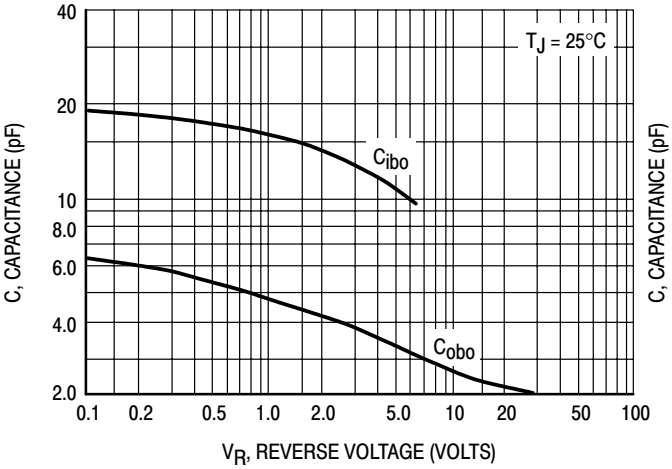


Figure 5. MPS8098/99 Capacitance

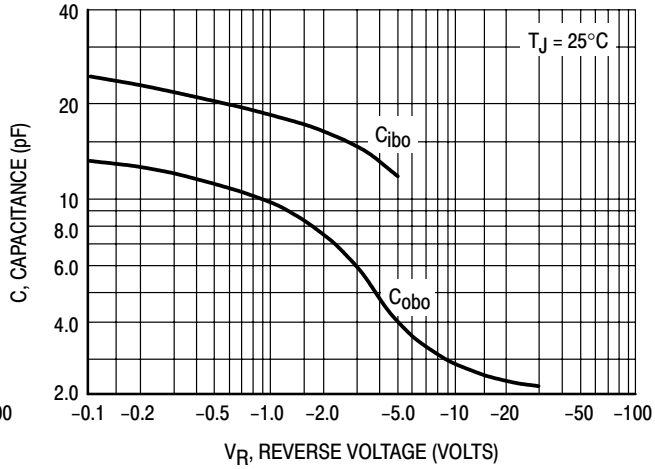


Figure 6. MPS8598/99 Capacitance

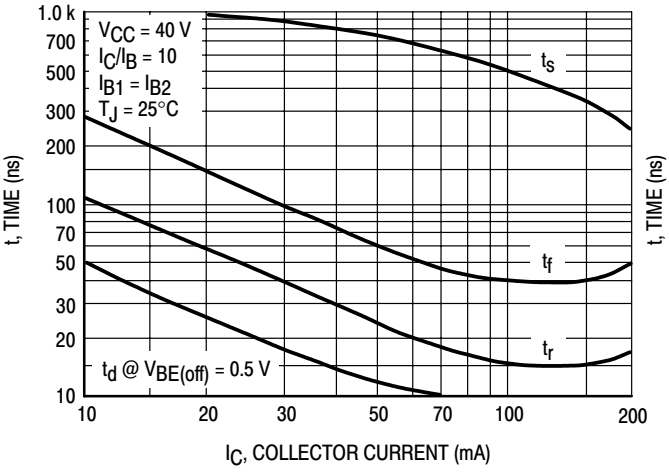


Figure 7. MPS8098/99 Switching Times

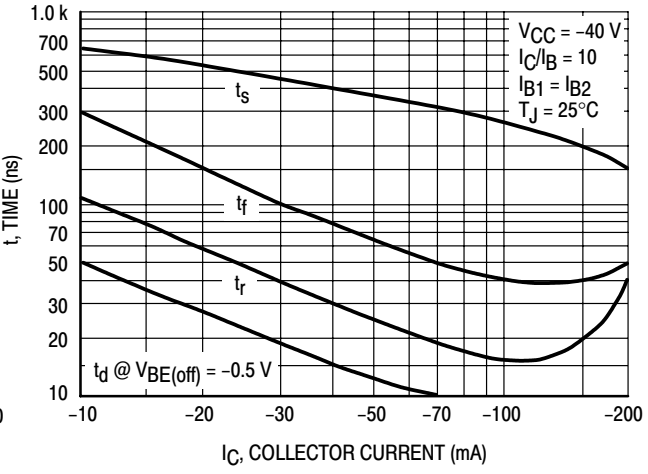


Figure 8. MPS8598/99 Switching Times

NPN

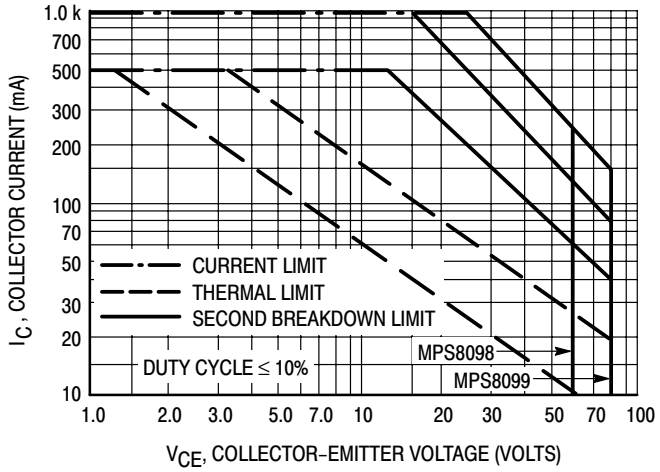


Figure 9. MPS8098/99 Active−Region Safe Operating Area

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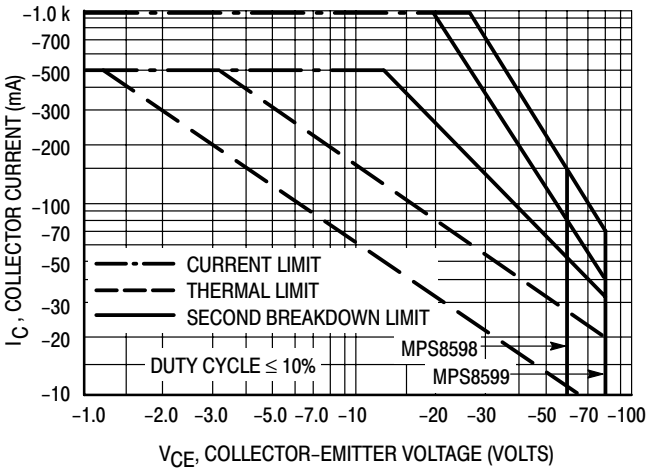

Figure 10. MPS8598/99 Active−Region Safe Operating Area

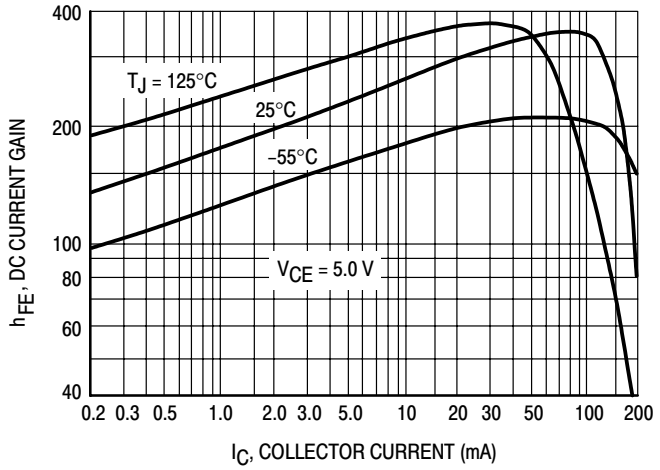

Figure 11. MPS8098/99 DC Current Gain

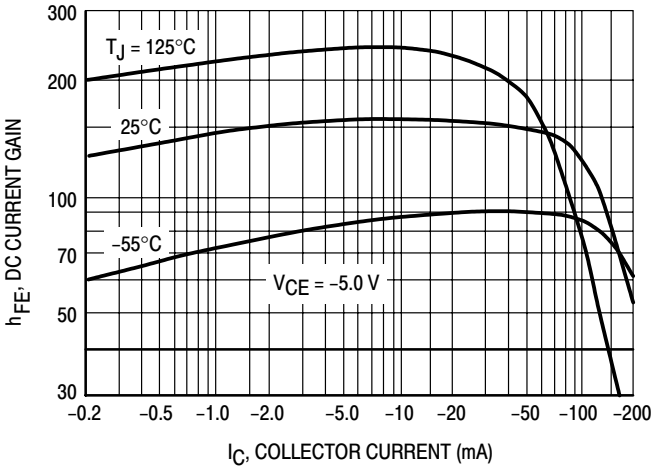

Figure 12. MPS8598/99 DC Current Gain

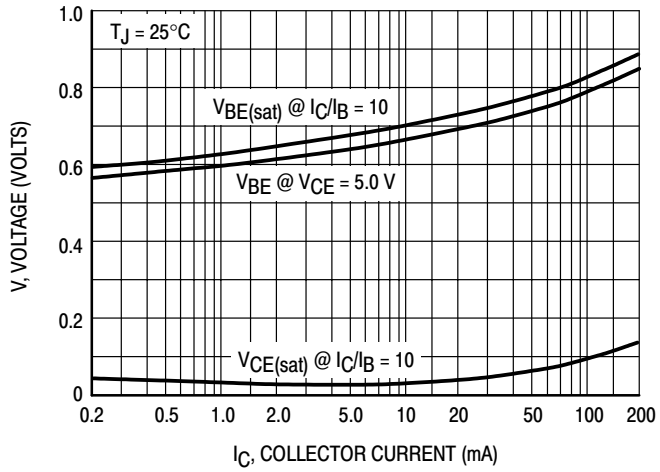

Figure 13. MPS8098/99 “ON” Voltages

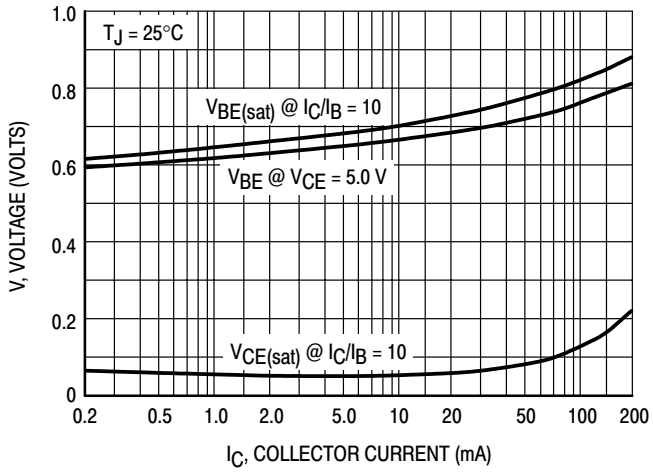

Figure 14. MPS8598/99 “ON” Voltages

NPN

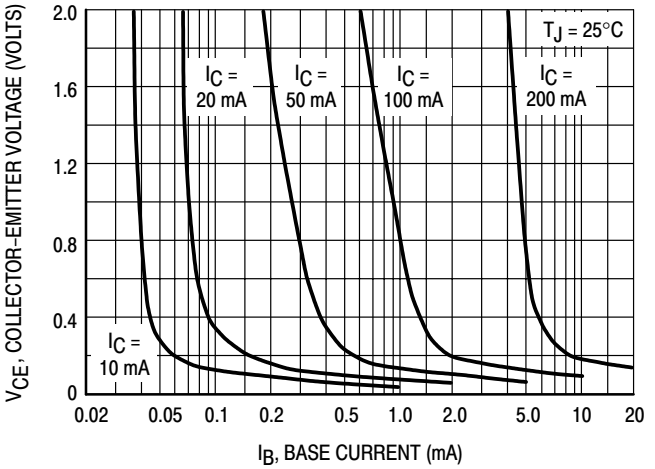

Figure 15. MPS8098/99 Collector Saturation Region

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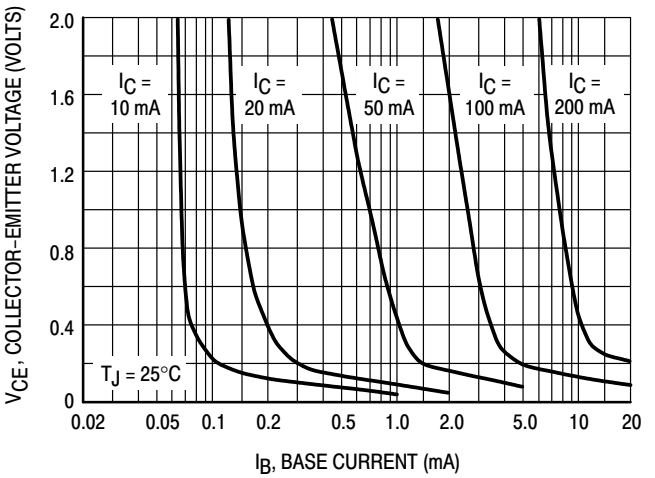


Figure 16. MPS8598/99 Collector Saturation Region

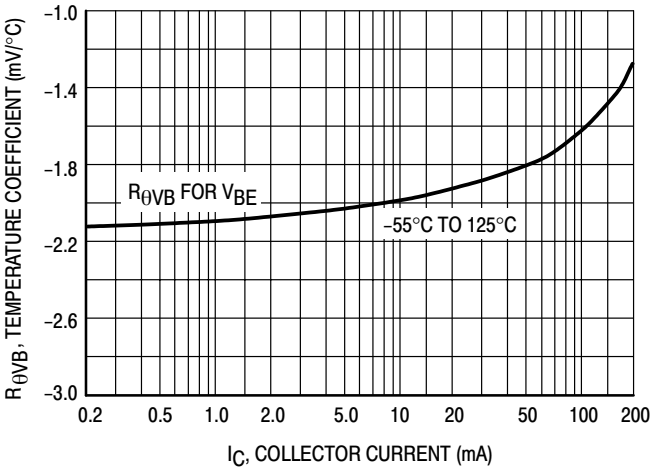


Figure 17. MPS8098/99 Base−Emitter Temperature Coefficient

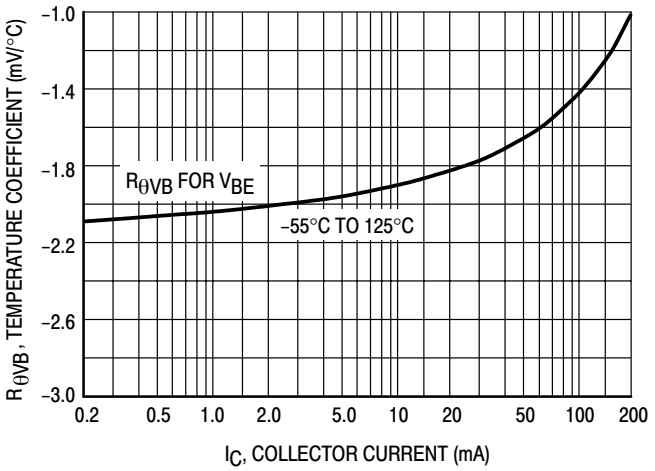
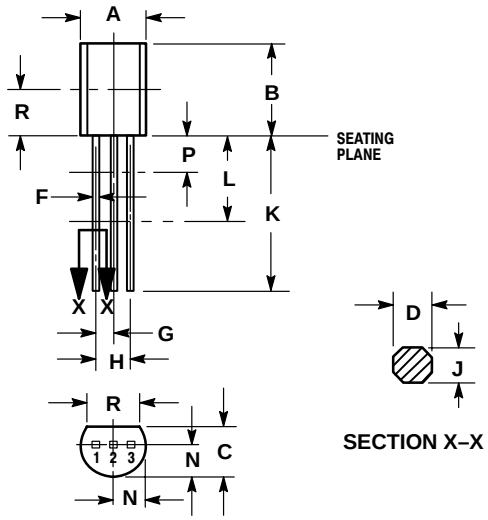


Figure 18. MPS8598/99 Base−Emitter Temperature Coefficient

PACKAGE DIMENSIONS

CASE 029–11
(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. DIMENSIONS D AND J APPLY BETWEEN L AND K MIMIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.457	0.533
F	0.016	0.019	0.407	0.482
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
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	0.135	---	3.43	---

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

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MPS8098/D