

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

T-33-17

MPS-U57

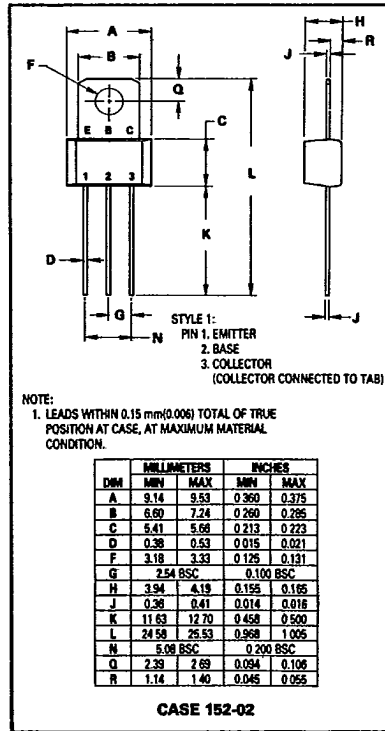
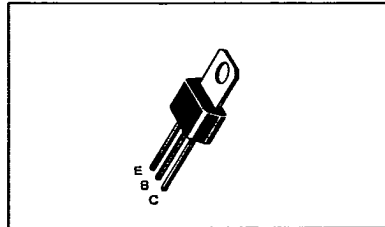
NOT RECOMMENDED FOR NEW DESIGNS

PNP SILICON ANNULAR AMPLIFIER TRANSISTOR

... designed for general-purpose, high-voltage amplifier and driver applications.

- High Collector-Emitter Breakdown Voltage – $V_{(BR)CEO} = 100 \text{ Vdc (Min) @ } I_C = 1.0 \text{ mAdc}$
- High Power Dissipation – $P_D = 10 \text{ W @ } T_C = 25^\circ\text{C}$
- Complement to NPN MPS-U07

**AMPLIFIER TRANSISTOR
PNP SILICON**



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	100	Vdc
Collector-Base Voltage	V_{CB}	100	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current – Continuous	I_C	2.0	Adc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0	Watt mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	10 80	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 Case	$R_{\theta JC}$	12.5	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	$^\circ\text{C/W}$

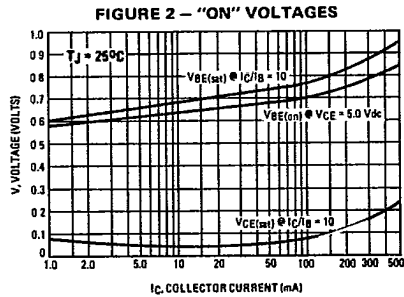
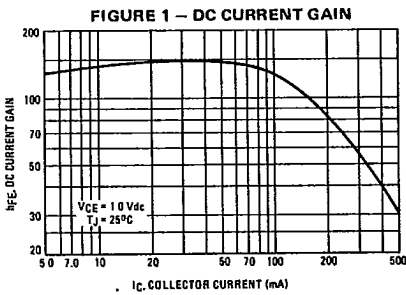
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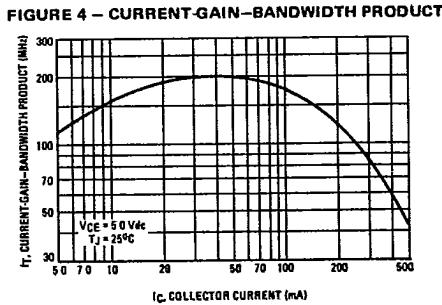
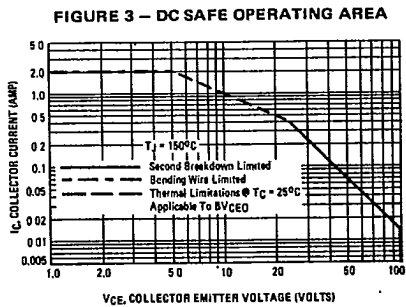
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (1) (I _C = 1.0 mA, I _B = 0)	V _{(BR)CEO}	100	—	—	Vdc
Emitter-Base Breakdown Voltage (I _C = 100 μA, I _E = 0)	V _{(BR)EBO}	4.0	—	—	Vdc
Collector Cutoff Current (V _{CB} = 40 Vdc, I _E = 0)	I _{CBO}	—	—	100	nAdc
ON CHARACTERISTICS (1)					
DC Current Gain (I _C = 50 mA, V _{CE} = 1.0 Vdc) (I _C = 250 mA, V _{CE} = 1.0 Vdc) (I _C = 500 mA, V _{CE} = 1.0 Vdc)	h _{FE}	60 30 —	140 65 30	— — —	—
Collector-Emitter Saturation Voltage (I _C = 250 mA, I _B = 10 mA) (I _C = 250 mA, I _B = 25 mA)	V _{CE(sat)}	— —	0.24 0.15	0.5 —	Vdc
Base-Emitter On Voltage (I _C = 250 mA, V _{CE} = 5.0 Vdc)	V _{BE(on)}	—	0.78	1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain-Bandwidth Product (1) (I _C = 250 mA, V _{CE} = 5.0 Vdc, f = 100 MHz)	f _T	50	100	—	MHz
Output Capacitance (V _{CB} = 10 Vdc, I _E = 0, f = 100 kHz)	C _{ob}	—	10	15	pF

(1) Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%.



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There are two limitations on the power handling ability of a transistor: junction temperature; and second breakdown. Safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 3 is based on T_{J(pk)} = 150°C; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.