

T-33-17

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

**MPS-U55
MPS-U56**

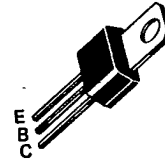
NOT RECOMMENDED FOR NEW DESIGNS

PNP SILICON ANNULAR AMPLIFIER TRANSISTORS

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

- High Collector-Emitter Breakdown Voltage --
V(BR)CEO = 60 Vdc (Min) @ IC = 1.0 mAdc — MPS-U55
80 Vdc (Min) @ IC = 1.0 mAdc — MPS-U56
- High Power Dissipation — PD = 10 W @ TC = 25°C
- Complements to NPN MPS-U05 and MPS-U06

PNP SILICON AMPLIFIER TRANSISTORS



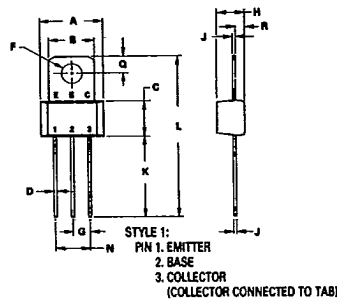
MAXIMUM RATINGS

Rating	Symbol	MPS-U55	MPS-U56	Unit
Collector-Emitter Voltage	V _{CEO}	60	80	Vdc
Collector-Base Voltage	V _{CB}	60	80	Vdc
Emitter-Base Voltage	V _{EB}	4.0		Vdc
Collector Current — Continuous	I _C	2.0		Adc
Total Power Dissipation @ T _A = 25°C	P _D	1.0	8.0	Watt
Derate above 25°C		8.0		mW/°C
Total Power Dissipation @ T _C = 25°C	P _D	10	80	Watts
Derate above 25°C		80		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 _{θJA} (1)	125	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	12.5	°C/W

(1) R_{θJA} is measured with the device soldered into a typical printed circuit board.



NOTE:
1. LEADS WITHIN 0.15 mm(0.006) TOTAL OF TRUE POSITION AT CASE, AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.14	9.53	0.360	0.375
B	6.60	7.24	0.260	0.285
C	5.41	5.66	0.213	0.223
D	0.38	0.53	0.015	0.021
F	3.18	3.33	0.125	0.131
G	2.54 BSC		0.100 BSC	
H	3.94	4.19	0.155	0.165
J	0.36	0.41	0.014	0.016
K	11.63	12.70	0.458	0.500
L	24.58	25.53	0.968	1.005
N	5.08 BSC		0.200 BSC	
Q	2.39	2.69	0.094	0.108
R	1.14	1.40	0.045	0.055

CASE 152-02

3-1062

MPS-U55, MPS-U56

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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}	60 80	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 100 μA, I _C = 0)	V _{(BR)EBO}	4.0	—	—	Vdc
Collector Cutoff Current (V _{CB} = 40 Vdc, I _E = 0) (V _{CB} = 60 Vdc, I _E = 0)	I _{CBO}	—	—	100 100	nAdc
ON CHARACTERISTICS					
DC Current Gain (1) (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}	80 50 —	160 130 80	— — —	—
Collector-Emitter Saturation Voltage (1) (I _C = 250 mA, I _B = 10 mA) (I _C = 250 mA, I _B = 25 mA)	V _{CE(sat)}	— —	0.22 0.15	0.5 —	Vdc
Base-Emitter On Voltage (1) (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%.

FIGURE 1 — DC CURRENT GAIN

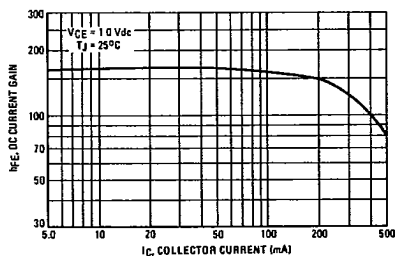


FIGURE 2 — "ON" VOLTAGES

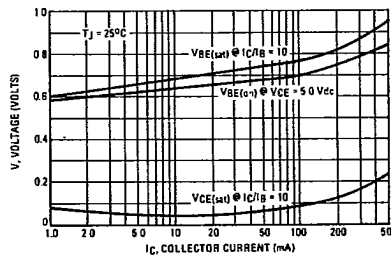


FIGURE 3 — ACTIVE-REGION SAFE OPERATING AREA

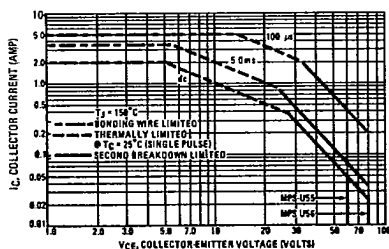
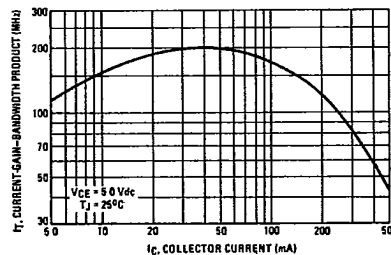


FIGURE 4 — CURRENT-GAIN-BANDWIDTH PRODUCT



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.

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