

T-33-17

**MOTOROLA**  
**SEMICONDUCTOR**  
TECHNICAL DATA

**MPS-U55**  
**MPS-U56**

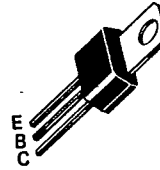
**NOT RECOMMENDED  
FOR NEW DESIGNS**

**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**



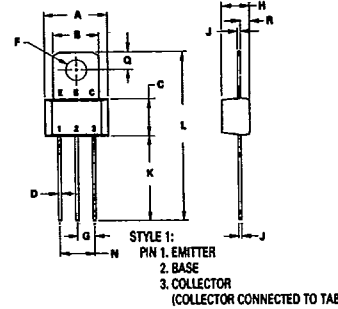
**MAXIMUM RATINGS**

Rating	Symbol	MPS-U55	MPS-U56	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	60	80	Vdc
Collector-Base Voltage	V <sub>CB</sub>	60	80	Vdc
Emitter-Base Voltage	V <sub>EB</sub>	4.0		Vdc
Collector Current -- Continuous	I <sub>C</sub>	2.0		Adc
Total Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	1.0	8.0	Watt mW/°C
Total Power Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	10	80	Watts mW/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150		°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub> (1)	125	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	12.5	°C/W

(1) R<sub>θJA</sub> 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
M	5.08 BSC		0.200 BSC	
O	2.39	2.69	0.094	0.108
R	1.14	1.40	0.045	0.055

CASE 152-02

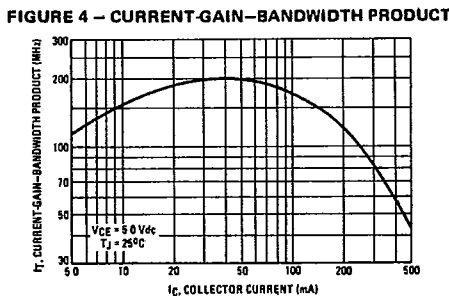
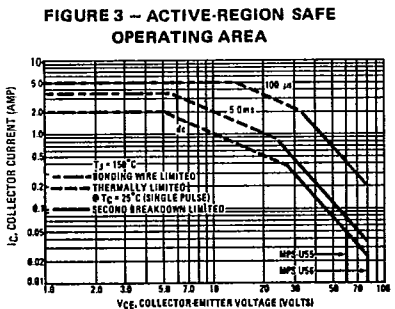
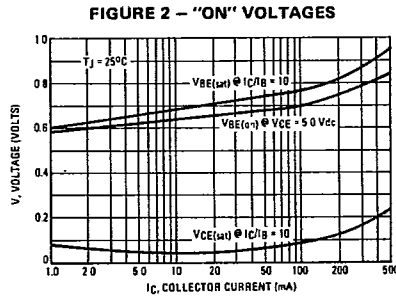
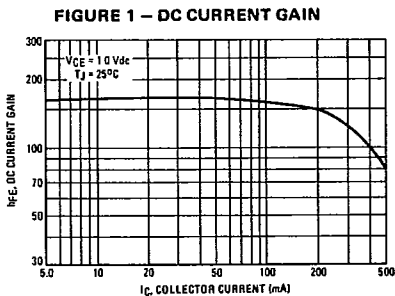
MPS-U55, MPS-U56

T-33-17

ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (1) (I <sub>C</sub> = 1.0 mA, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	60 80	—	—	V <sub>dc</sub>
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μA, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	—	—	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 40 V, I <sub>E</sub> = 0) (V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0)	I <sub>CB0</sub>	—	—	100 100	nA <sub>dc</sub>
<b>ON CHARACTERISTICS</b>					
DC Current Gain (1) (I <sub>C</sub> = 50 mA, V <sub>CE</sub> = 1.0 V) (I <sub>C</sub> = 250 mA, V <sub>CE</sub> = 1.0 V) (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V)	h <sub>FE</sub>	80 50 —	160 130 80	— — —	—
Collector-Emitter Saturation Voltage (1) (I <sub>C</sub> = 250 mA, I <sub>B</sub> = 10 mA) (I <sub>C</sub> = 250 mA, I <sub>B</sub> = 25 mA)	V <sub>CE(sat)</sub>	—	0.22 0.15	0.5 —	V <sub>dc</sub>
Base-Emitter On Voltage (1) (I <sub>C</sub> = 250 mA, V <sub>CE</sub> = 5.0 V)	V <sub>BE(on)</sub>	—	0.78	1.2	V <sub>dc</sub>
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current-Gain-Bandwidth Product (1) (I <sub>C</sub> = 250 mA, V <sub>CE</sub> = 5.0 V, f = 100 MHz)	f <sub>T</sub>	50	100	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 100 kHz)	C <sub>ob</sub>	—	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<sub>C</sub> - V<sub>CE</sub> 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<sub>J(pk)</sub> = 150°C; T<sub>C</sub> 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.