

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

T-33-13
PNP T-33-21
MJE2955, MJE2955T
NPN
MJE3055, MJE3055T

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

... designed for use in general-purpose amplifier and switching applications.

- DC Current Gain Specified to 10 Amperes
- High Current Gain - Bandwidth Product - $f_T = 2.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Choice of Packages - MJE3055, MJE2955 - TO-225AB (TO-127) MJE3055T, MJE2955T - TO-220AB

MAXIMUM RATINGS

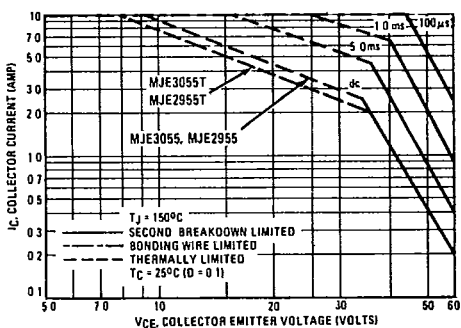
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	60	Vdc
Collector-Base Voltage	V _{CB}	70	Vdc
Emitter-Base Voltage	V _{EB}	5.0	Vdc
Collector Current	I _C	10	A _{dc}
Base Current	I _B	6.0	A _{dc}
Total Power Dissipation @ T _C = 25°C	P _{D†}	90	Watts
MJE3055, MJE2955		75	W/°C
MJE3055T, MJE2955T		0.72	W/°C
Derate above 25°C		0.6	W/°C
MJE3055, MJE2955			
MJE3055T, MJE2955T			
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.39	°C/W
MJE3055, MJE2955		1.67	
MJE3055T, MJE2955T			

†Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed

FIGURE 1 - ACTIVE-REGION SAFE OPERATING AREA

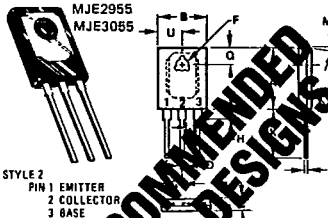


There are two limitations on the power handling ability of a transistor: average junction temperature and second break-down. Safe operating area curves and case I_C V_{CE} limits of the transistor that must be observed for reliable operation, i.e. the transistor must not be subjected to greater dissipation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

The data of Figure 1 is based on T_{J(pk)} = 150°C. T_C is variable depending on conditions. Second break-down pulse limits are valid for duty cycles to 10% provided T_{J(pk)} ≤ 150°C. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second break-down (See AN 415A).

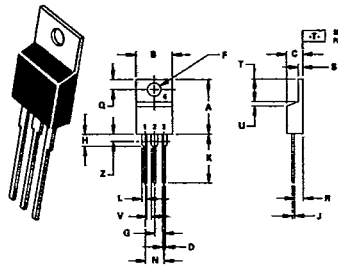
10 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS

**60 VOLTS
75, 90 WATTS**



MILLIMETERS	INCHES		
MIN	MAX	MIN	
A	14.48	15.24	0.570
B	1.27	1.52	0.050
C	4.67	4.83	0.183
D	4.64	4.98	0.183
E	3.18	3.75	0.125
F	2.42	2.68	0.095
G	2.82	3.30	0.110
H	0.48	0.71	0.019
J	12.70	13.17	0.500
K	2.64	3.10	0.104
L	1.13	1.27	0.045
M	5.32	4.41	0.210
N	8.00	7.71	0.315
V	5.18	-	0.204
W	-	2.04	-

**CASE 90-05
TO-225AB TYPE
(TO-127 TYPE)**



MILLIMETERS	INCHES		
MIN	MAX	MIN	
A	14.48	15.24	0.570
B	1.27	1.52	0.050
C	4.67	4.83	0.183
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W	-	2.04	-

**STYLE 1
PIN 1 BASE
2 COLLECTOR
3 EMITTER
4 COLLECTOR**

NOTES:
1 DIMENSIONS AND TOLERANCES PER ANSI Y14.1-1982
2 CONTROLLING DIMENSION IN/OL
3 DIM 2 DETERMINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED

**CASE 221A-04
TO-220AB**

T-33-13

T-33-21

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (1) ($I_C = 200 \text{ mA}$, $I_B = 0$)	$V_{CE(sus)}$	60	-	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$, $I_B = 0$)	I_{CEO}	-	700	μAdc
Collector Cutoff Current ($V_{CE} = 70 \text{ Vdc}$, $V_{EB(off)} = 1.5 \text{ Vdc}$) ($V_{CE} = 70 \text{ Vdc}$, $V_{EB(off)} = 1.5 \text{ Vdc}$, $T_C = 150^\circ\text{C}$)	I_{CEX}	-	1.0 5.0	mA
Collector Cutoff Current ($V_{CB} = 70 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 70 \text{ Vdc}$, $I_E = 0$, $T_C = 150^\circ\text{C}$)	I_{CBO}	-	1.0 10	mA
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	-	5.0	mA
ON CHARACTERISTICS				
DC Current Gain (1) ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 10 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)	h_{FE}	20 5.0	100 -	-
Collector-Emitter Saturation Voltage (1) ($I_C = 4.0 \text{ Adc}$, $I_B = 0.4 \text{ Adc}$) ($I_C = 10 \text{ Adc}$, $I_B = 3.3 \text{ Adc}$)	$V_{CE(sat)}$	-	1.1 8.0	Vdc
Base-Emitter On Voltage (1) ($I_C = 4.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)	$V_{BE(on)}$	-	1.8	Vdc
DYNAMIC CHARACTERISTICS				
Current-Gain-Bandwidth Product ($I_C = 500 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 500 \text{ kHz}$)	f_T	2.0	-	MHz

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

FIGURE 2 - DC CURRENT GAIN

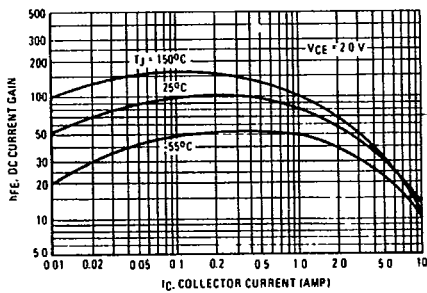
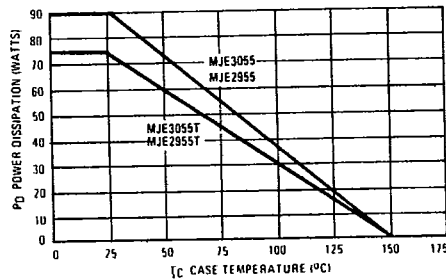


FIGURE 3 - POWER DERATING



3

MJE2955, 2955T

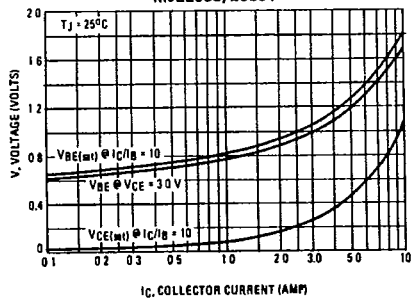


FIGURE 4 - "ON" VOLTAGES

MJE3055, 3055T

