

## 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 —  
 $f_T = 2.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$

### 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	Adc
Base Current	$I_B$	6.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ MJE3055T, MJE2955T	$P_{DT}$	75 0.6	Watts W/ $^\circ\text{C}$
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	$\theta_{JC}$	1.67	$^\circ\text{C/W}$

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

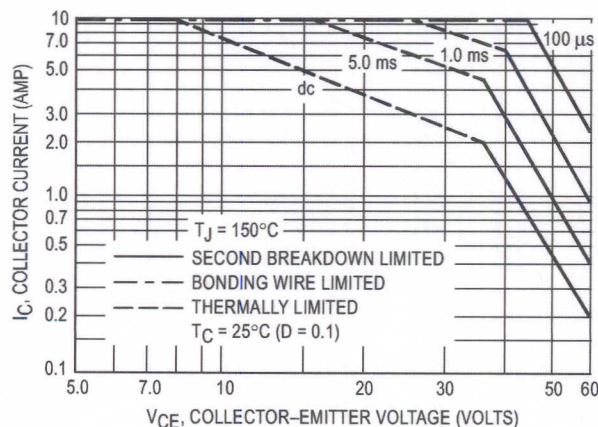


Figure 1. Active-Region Safe Operating Area

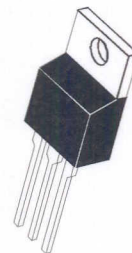
There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater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

The data of Figure 1 is based on  $T_{J(pk)} = 150^\circ\text{C}$ .  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown. (See AN415A)

**PNP**  
**MJE2955T\***  
**NPN**  
**MJE3055T\***

\*Motorola Preferred Device

**10 AMPERE**  
**COMPLEMENTARY**  
**SILICON**  
**POWER TRANSISTORS**  
**60 VOLTS**  
**75 WATTS**



**CASE 221A-06**  
**TO-220AB**

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

REV 1

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# MJE2955T MJE3055T

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Sustaining Voltage (1) ( $I_C = 200\text{ mAdc}$ , $I_B = 0$ )	$V_{CEO(sus)}$	60	—	Vdc
Collector Cutoff Current ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ )	$I_{CEO}$	—	700	$\mu\text{Adc}$
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	mAdc
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	mAdc
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	5.0	mAdc
<b>ON CHARACTERISTICS</b>				
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
<b>DYNAMIC CHARACTERISTICS</b>				
Current-Gain-Bandwidth Product ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 500\text{ kHz}$ )	$f_T$	2.0	—	MHz

(1) Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 20\%$ .

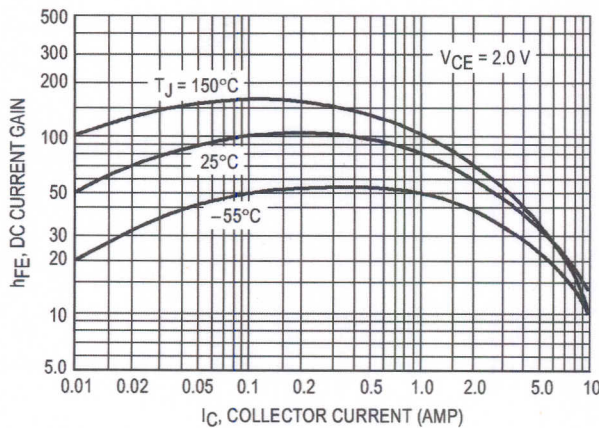


Figure 2. DC Current Gain

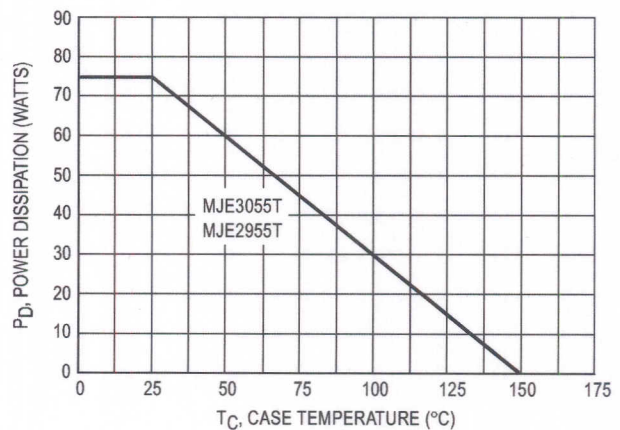


Figure 3. Power Derating

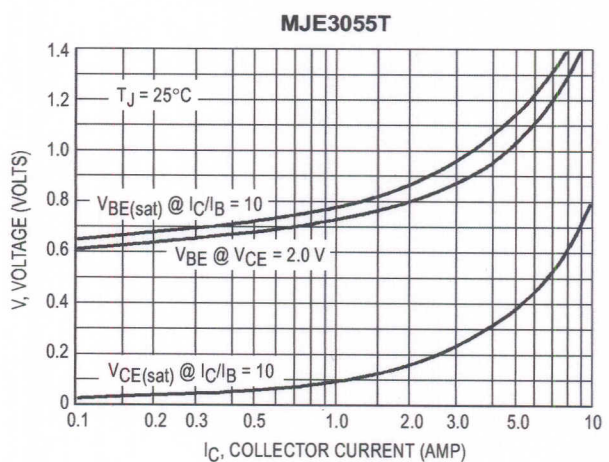
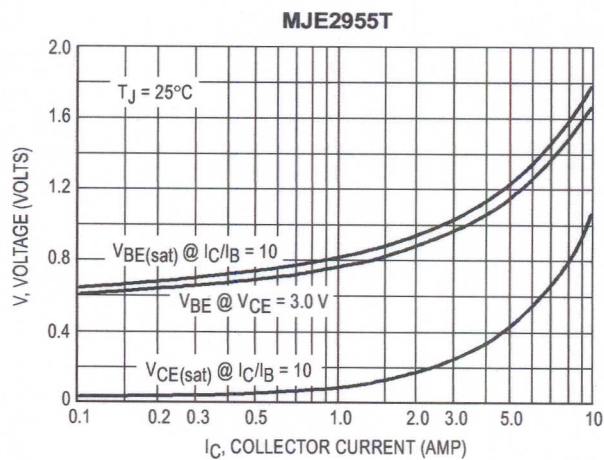
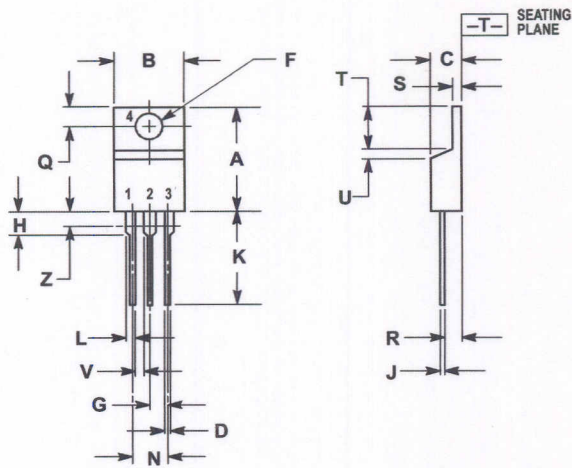


Figure 4. "On" Voltages



## PACKAGE DIMENSIONS




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.582	12.70	14.27
L	0.045	0.080	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

- STYLE 1:
- PIN 1. BASE
  - COLLECTOR
  - EMITTER
  - COLLECTOR

CASE 221A-06  
TO-220AB  
ISSUE Y

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**MOTOROLA**



**MJE2955T/D**

