

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

## 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	$P_{D†}$	75 0.6	Watts W/°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 Case	$\theta_{JC}$	1.67	°C/W

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

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

\*ON Semiconductor Preferred Device

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

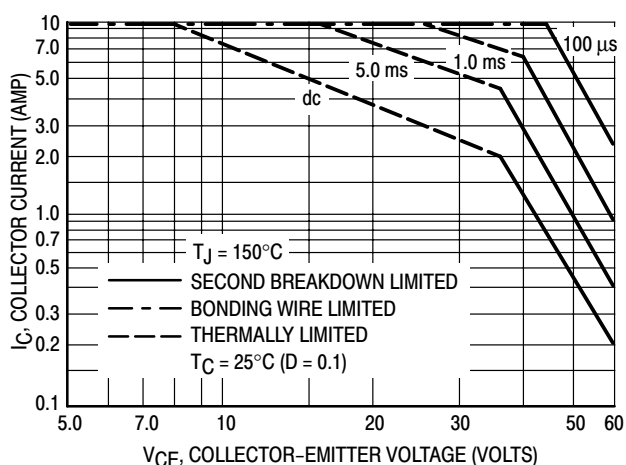
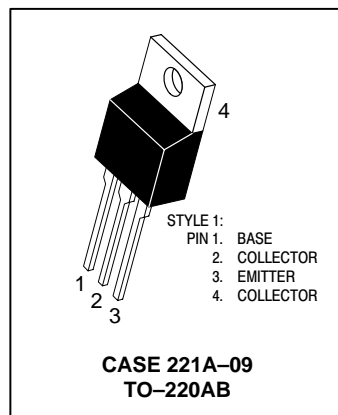


Figure 1. Active-Region Safe Operating Area

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)

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

# 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) ( $I_C = 200\text{ mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	60	—	Vdc
Collector Cutoff Current ( $V_{CE} = 30\text{ Vdc}$ , $I_B = 0$ )	$I_{CEO}$	—	700	$\mu\text{A}$
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 ( $I_C = 500\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 500\text{ kHz}$ )	$f_T$	2.0	—	MHz

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

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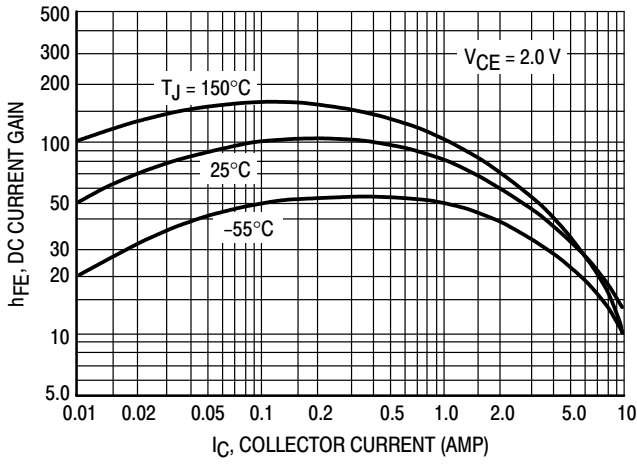


Figure 2. DC Current Gain

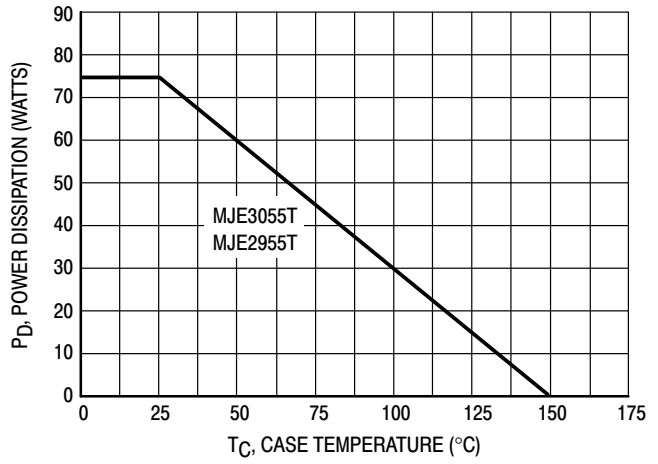


Figure 3. Power Derating

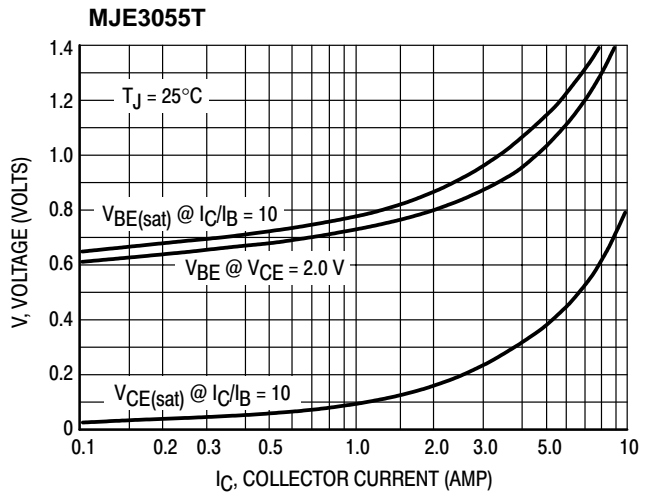
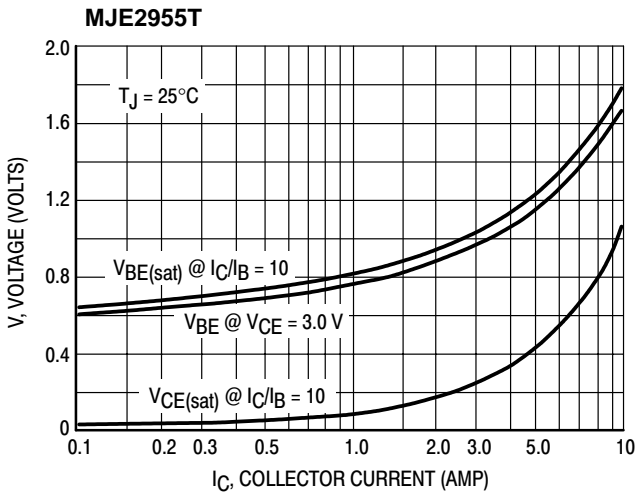
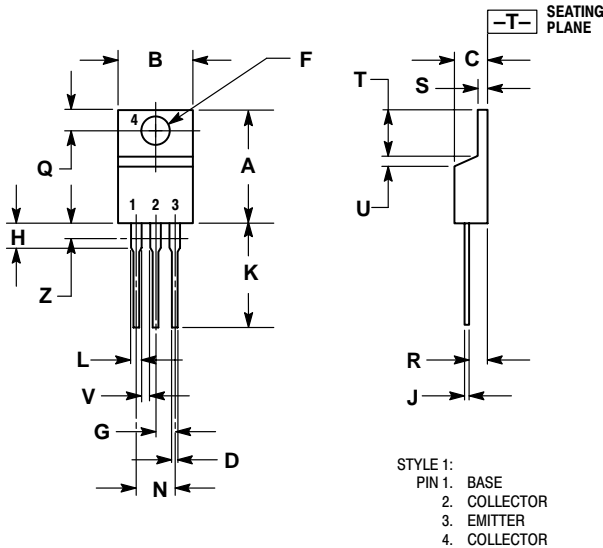


Figure 4. "On" Voltages

# MJE2955T MJE3055T

## PACKAGE DIMENSIONS


TO-220AB  
CASE 221A-09  
ISSUE AA



### 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	0.562	12.70	14.27
L	0.045	0.060	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

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