## MJE2955T (PNP) MJE3055T (NPN)

# **Complementary Silicon Plastic Power Transistors**

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

#### **Features**

- DC Current Gain Specified to 10 A
- High Current Gain Bandwidth Product -

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

• Pb-Free Packages are Available\*

#### **MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	60	Vdc
Collector-Base Voltage	V <sub>CB</sub>	70	Vdc
Emitter-Base Voltage	V <sub>EB</sub>	5.0	Vdc
Collector Current	Ic	10	Adc
Base Current	I <sub>B</sub>	6.0	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub> (Note 1)	75 0.6	W W/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

#### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$\theta_{JC}$	1.67	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



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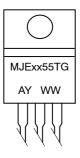
http://onsemi.com

# 10 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS 60 VOLTS – 75 WATTS



TO-220AB CASE 221A-09 STYLE 1

#### **MARKING DIAGRAM**



MJExx55T = Device Code

xx = 29 or 30G = Pb-Free Package

A = Assembly Location
Y = Year
WW = Work Week

#### **ORDERING INFORMATION**

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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<sup>\*</sup>For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

#### **MJE2955T (PNP) MJE3055T (NPN)**

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS	<u> </u>			
Collector–Emitter Sustaining Voltage (Note 2) $(I_C = 200 \text{ mAdc}, I_B = 0)$	V <sub>CEO(sus)</sub>	60	_	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 30 Vdc, I <sub>B</sub> = 0)	I <sub>CEO</sub>	-	700	μAdc
Collector Cutoff Current ( $V_{CE}$ = 70 Vdc, $V_{EB(off)}$ = 1.5 Vdc) ( $V_{CE}$ = 70 Vdc, $V_{EB(off)}$ = 1.5 Vdc, $T_{C}$ = 150°C)	I <sub>CEX</sub>	_ _	1.0 5.0	mAdc
Collector Cutoff Current $(V_{CB} = 70 \text{ Vdc}, I_E = 0)$ $(V_{CB} = 70 \text{ Vdc}, I_E = 0, T_C = 150^{\circ}\text{C})$	Ісво	- -	1.0 10	mAdc
Emitter Cutoff Current $(V_{BE} = 5.0 \text{ Vdc}, I_C = 0)$	I <sub>EBO</sub>	-	5.0	mAdc
ON CHARACTERISTICS				
DC Current Gain (Note 2) $ (I_C = 4.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}) $ $ (I_C = 10 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}) $	h <sub>FE</sub>	20 5.0	100 -	-
Collector-Emitter Saturation Voltage (Note 2) (I <sub>C</sub> = 4.0 Adc, I <sub>B</sub> = 0.4 Adc) (I <sub>C</sub> = 10 Adc, I <sub>B</sub> = 3.3 Adc)	V <sub>CE(sat)</sub>	_ _	1.1 8.0	Vdc
Base–Emitter On Voltage (Note 2) (I <sub>C</sub> = 4.0 Adc, V <sub>CE</sub> = 4.0 Vdc)	V <sub>BE(on)</sub>	-	1.8	Vdc
DYNAMIC CHARACTERISTICS		•	•	
Current–Gain–Bandwidth Product $(I_C = 500 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 500 \text{ kHz})$	f <sub>T</sub>	2.0	-	MHz

<sup>2.</sup> Pulse Test: Pulse Width  $\leq$  300  $\mu s,$  Duty Cycle  $\leq$  20%.

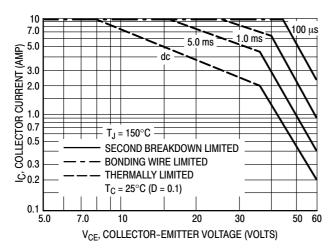
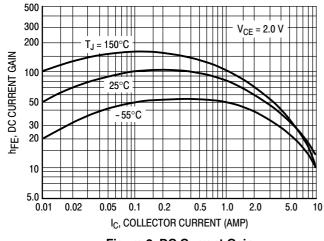


Figure 1. Active-Region Safe Operating Area

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)

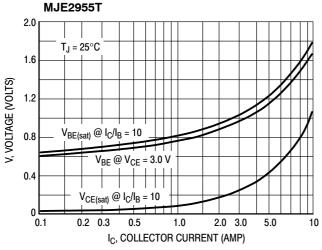
#### **MJE2955T (PNP) MJE3055T (NPN)**



90 80 PD, POWER DISSIPATION (WATTS) 70 60 50 MJE3055T 40 MJE2955T 30 20 10 0 25 75 100 175 T<sub>C</sub>, CASE TEMPERATURE (°C)

Figure 2. DC Current Gain

Figure 3. Power Derating



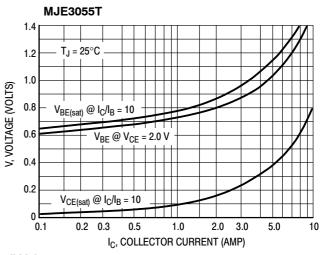


Figure 4. "On" Voltages

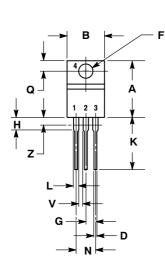
#### ORDERING INFORMATION

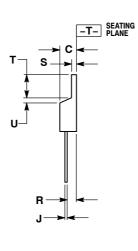
Device	Package	Shipping	
MJE2955T	TO-220		
MJE2955TG	TO-220 (Pb-Free)		
MJE3055T	TO-220	50 Units / Rail	
MJE3055TG	TO-220 (Pb-Free)		

#### **MJE2955T (PNP) MJE3055T (NPN)**

#### PACKAGE DIMENSIONS

TO-220 CASE 221A-09 ISSUE AG





#### NOTES:

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

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.570	0.620	14.48	15.75
В	0.380	0.405	9.66	10.28
С	0.160	0.190	4.07	4.82
D	0.025	0.036	0.64	0.91
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
Н	0.110	0.161	2.80	4.10
7	0.014	0.025	0.36	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
œ	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
٧	0.045		1.15	
Z		0.080		2.04

STYLE 1:

IN 1. BASE

- 2. COLLECTOR
- . EMITTER
- 4. COLLECTOR

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