

# 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 –  
 $f_T = 2.0 \text{ MHz (Min) @ } I_C$   
 $= 500 \text{ mAdc}$
- Pb-Free Packages are Available\*

### 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 Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$<br>(Note 1) | 75<br>0.6   | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$    | –55 to +150 | $^\circ\text{C}$         |

### THERMAL CHARACTERISTICS

| Characteristics                      | Symbol        | Max  | Unit               |
|--------------------------------------|---------------|------|--------------------|
| Thermal Resistance, Junction–to–Case | $\theta_{JC}$ | 1.67 | $^\circ\text{C/W}$ |

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.

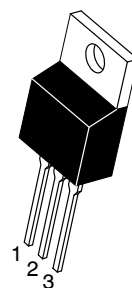
1. Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.



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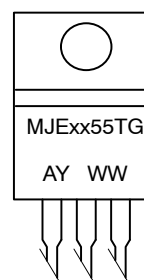
<http://onsemi.com>

## 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 30

G = 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.

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

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

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

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

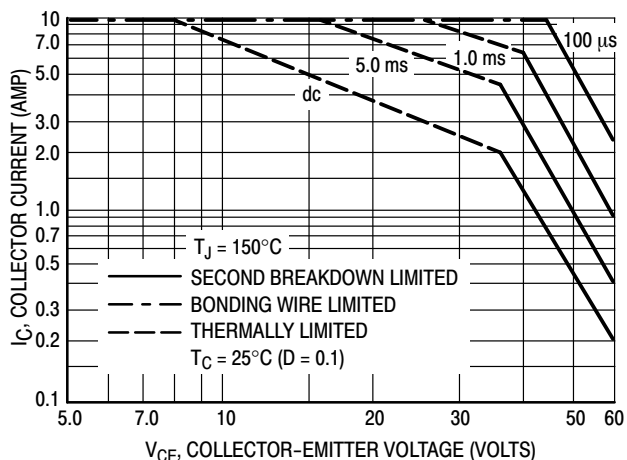


Figure 1. Active-Region Safe Operating Area

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)

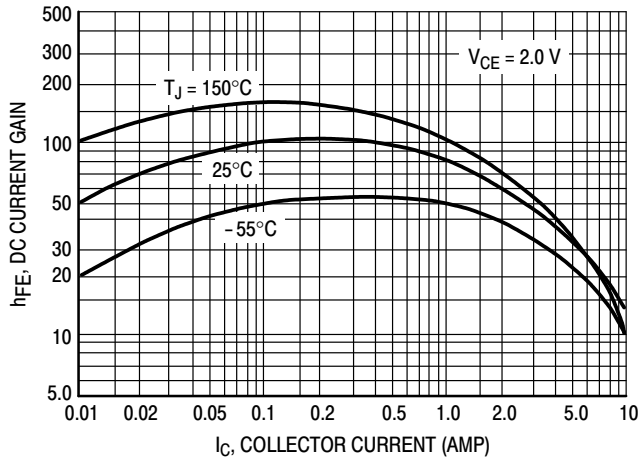


Figure 2. DC Current Gain

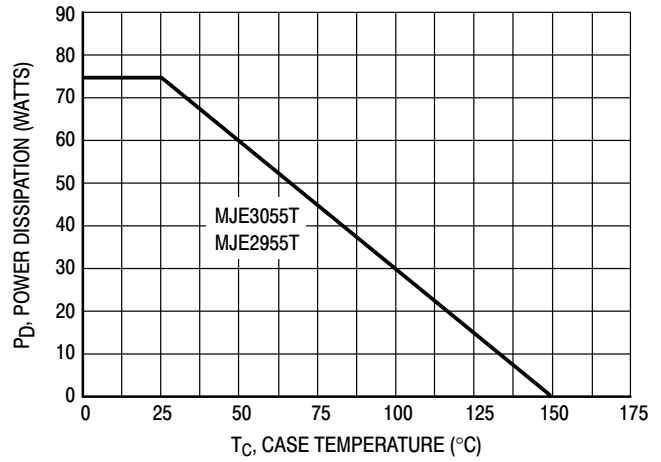


Figure 3. Power Derating

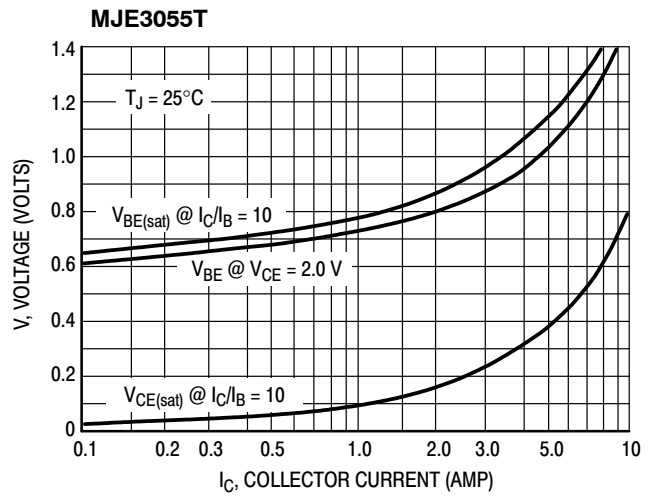
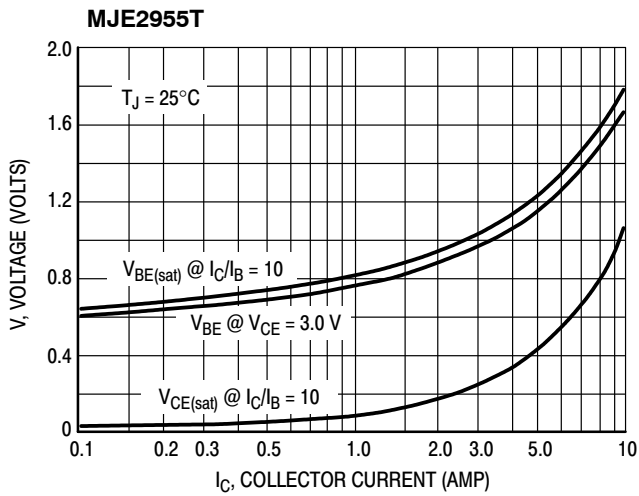


Figure 4. "On" Voltages

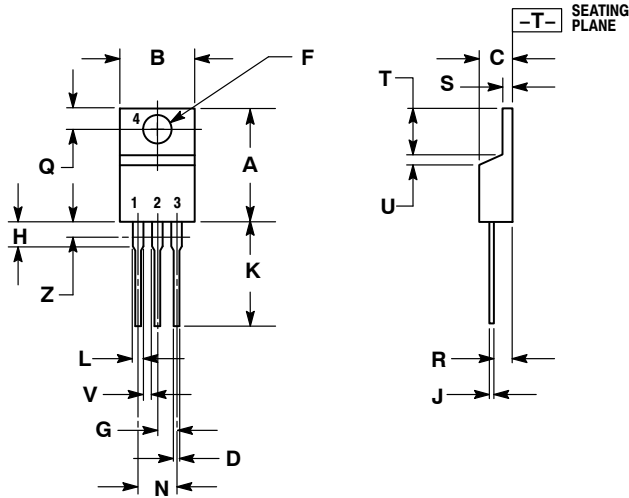
### ORDERING INFORMATION

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

# MJE2955T (PNP) MJE3055T (NPN)

## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AG



- 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  | 0.036 | 0.64        | 0.91  |
| F   | 0.142  | 0.161 | 3.61        | 4.09  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.161 | 2.80        | 4.10  |
| J   | 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  |
| 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

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