

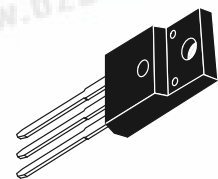
# Complementary Silicon Power Transistors

... specifically designed for general purpose amplifier and switching applications.

- Isolated Overmold Package (1500 Volts RMS Min)
- Electrically Similar to the Popular MJE3055T and MJE2955T
- Collector-Emitter Sustaining Voltage —  $V_{CEO(sus)}$  90 Volts
- 10 Amperes Rated Collector Current
- No Isolating Washers Required
- Reduced System Cost
- UL Recognized, File #E69369, to 3500  $V_{RMS}$  Isolation

**NPN**  
**MJF3055**  
**PNP**  
**MJF2955**

**COMPLEMENTARY SILICON POWER TRANSISTORS**  
**10 AMPERES**  
**90 VOLTS**  
**30 WATTS**



**CASE 221D-02**  
**TO-220 TYPE**

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	90	Vdc
Collector-Emitter Breakdown Voltage	$V_{CES}$	90	Vdc
Base-Emitter Voltage	$V_{EBO}$	5	Vdc
Collector Current — Continuous	$I_C$	10	Adc
Base Current — Continuous	$I_B$	6	Adc
RMS Isolation Voltage (3) (for 1 sec, R.H. < 30%, $T_A = 25^\circ\text{C}$ )	$V_{ISOL}$	4500 3500 1500	$V_{RMS}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ (2) Derate above $25^\circ\text{C}$	$P_D$	30 0.25	Watts $W/^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	2 0.016	Watts $W/^\circ\text{C}$
Operating and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance — Junction to Case (2)	$R_{\theta JC}$	4	$^\circ\text{C/W}$
Thermal Resistance — Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Lead Temperature for Soldering Purposes	$T_L$	260	$^\circ\text{C}$

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle  $\leq 10\%$ .

(2) Measurement made with thermocouple contacting the bottom insulated surface (in a location beneath the die), the devices mounted on a heatsink with thermal grease and a mounting torque of  $\geq 6$  in. lbs.

(3) Proper strike and creepage distance must be provided.



# MJF3055 MJF2955

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS (1)</b>				
Collector–Emitter Sustaining Voltage (I <sub>C</sub> = 200 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>CEO(sus)</sub>	90	—	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 90 V <sub>dc</sub> , V <sub>BE</sub> = 0)	I <sub>CES</sub>	—	1	μA <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 90 V <sub>dc</sub> , I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	1	μA <sub>dc</sub>
Emitter–Base Leakage (V <sub>EB</sub> = 5 V <sub>dc</sub> , I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	1	μA <sub>dc</sub>
<b>ON CHARACTERISTICS (1)</b>				
DC Current Gain (I <sub>CE</sub> = 4 A <sub>dc</sub> , V <sub>CE</sub> = 4 V <sub>dc</sub> ) (I <sub>CE</sub> = 10 A <sub>dc</sub> , V <sub>CE</sub> = 4 V <sub>dc</sub> )	h <sub>FE</sub>	20 5	100 —	—
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 4 A <sub>dc</sub> , I <sub>B</sub> = 0.4 A <sub>dc</sub> ) (I <sub>C</sub> = 10 A <sub>dc</sub> , I <sub>B</sub> = 3.3 A <sub>dc</sub> )	V <sub>CE(sat)</sub>	— —	1 2.5	V <sub>dc</sub>
Base–Emitter On Voltage (I <sub>C</sub> = 4 A <sub>dc</sub> , V <sub>BE</sub> = 4 V <sub>dc</sub> )	V <sub>BE(on)</sub>	—	1.5	V <sub>dc</sub>
<b>DYNAMIC CHARACTERISTICS</b>				
Current–Gain–Bandwidth Product (V <sub>CE</sub> = 10 V <sub>dc</sub> , I <sub>C</sub> = 0.5 A <sub>dc</sub> , f <sub>test</sub> = 500 kHz)	f <sub>T</sub>	2	—	MHz

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle ≤ 10%.

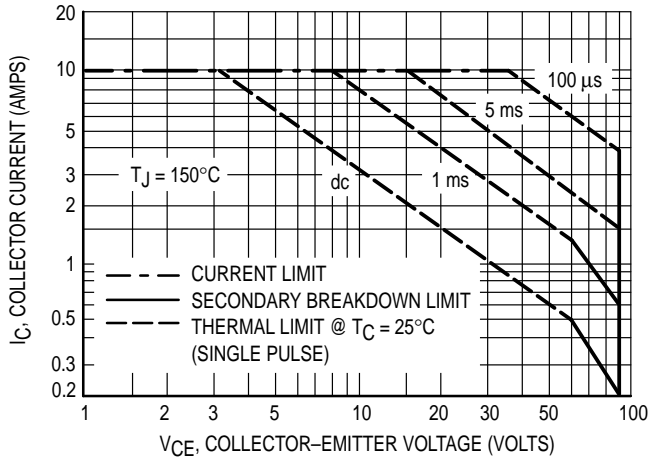


Figure 1. Maximum Forward Bias Safe Operating Area

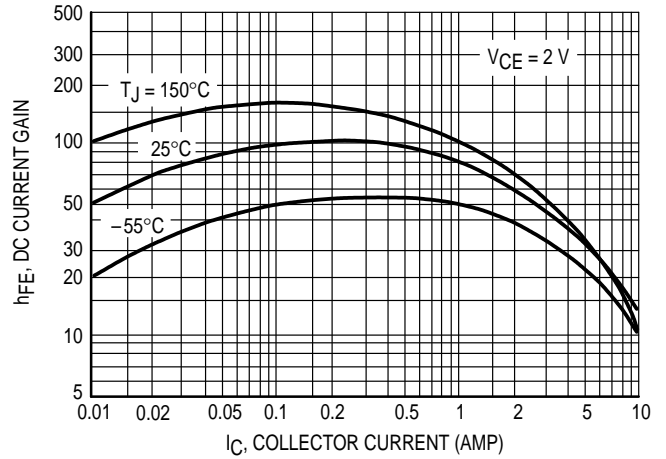


Figure 2. DC Current Gain

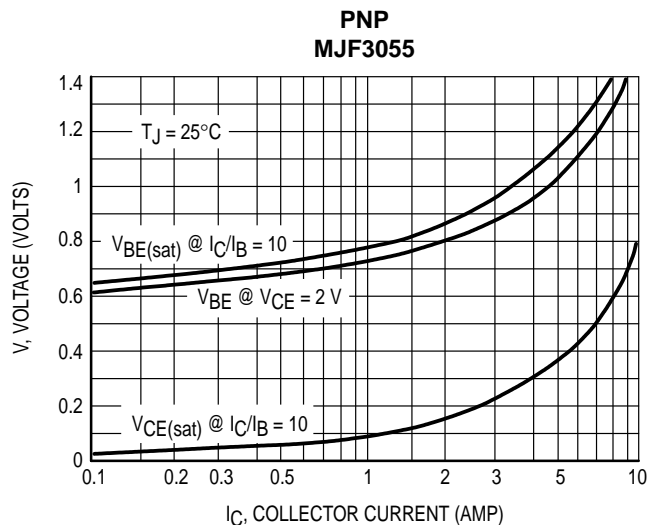
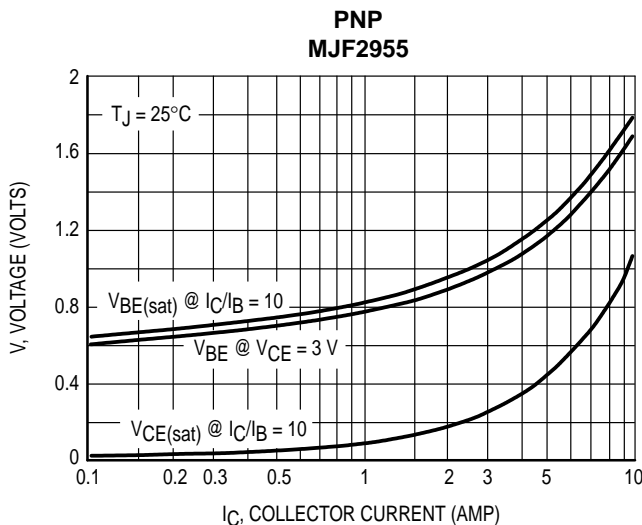


Figure 3. “On” Voltages

TEST CONDITIONS FOR ISOLATION TESTS\*

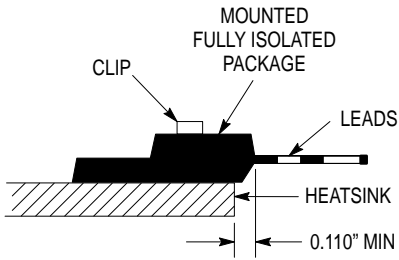


Figure 4. Clip Mounting Position for Isolation Test Number 1

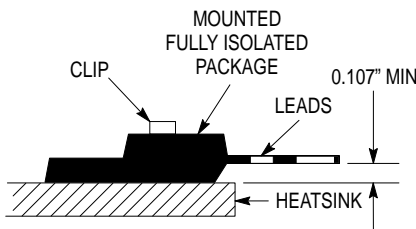


Figure 5. Clip Mounting Position for Isolation Test Number 2

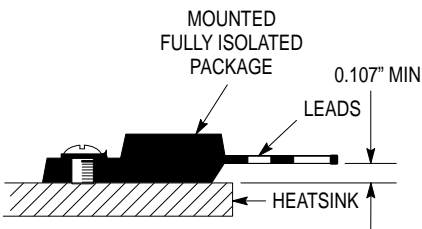


Figure 6. Screw Mounting Position for Isolation Test Number 3

\* Measurement made between leads and heatsink with all leads shorted together

MOUNTING INFORMATION

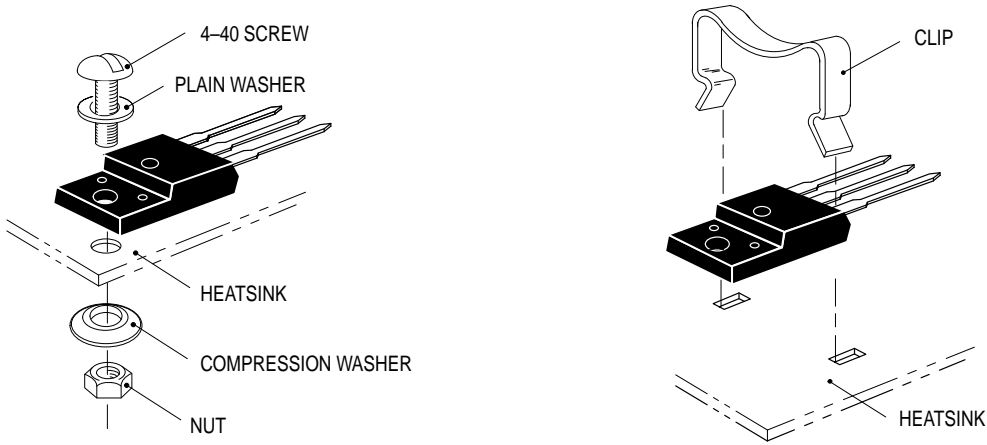


Figure 7. Typical Mounting Techniques\*

Laboratory tests on a limited number of samples indicate, when using the screw and compression washer mounting technique, a screw torque of 6 to 8 in · lbs is sufficient to provide maximum power dissipation capability. The compression washer helps to maintain a constant pressure on the package over time and during large temperature excursions.

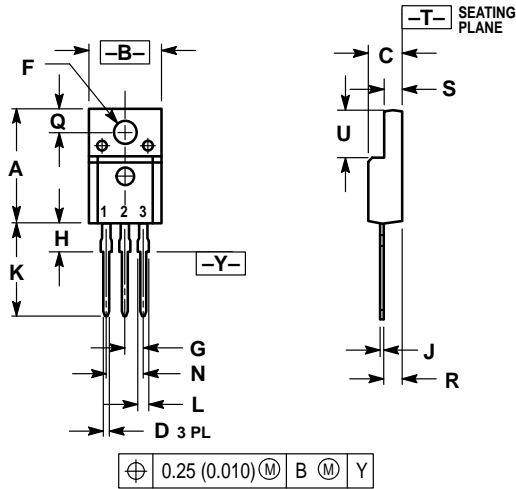
Destructive laboratory tests show that using a hex head 4-40 screw, without washers, and applying a torque in excess of 20 in · lbs will cause the plastic to crack around the mounting hole, resulting in a loss of isolation capability.

Additional tests on slotted 4-40 screws indicate that the screw slot fails between 15 to 20 in · lbs without adversely affecting the package. However, in order to positively ensure the package integrity of the fully isolated device, Motorola does not recommend exceeding 10 in · lbs of mounting torque under any mounting conditions.

\*\* For more information about mounting power semiconductors see Application Note AN1040.

**MJF3055 MJF2955**

**PACKAGE DIMENSIONS**




- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.621	0.629	15.78	15.97
B	0.394	0.402	10.01	10.21
C	0.181	0.189	4.60	4.80
D	0.026	0.034	0.67	0.86
F	0.121	0.129	3.08	3.27
G	0.100 BSC		2.54 BSC	
H	0.123	0.129	3.13	3.27
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.14	1.52
N	0.200 BSC		5.08 BSC	
Q	0.126	0.134	3.21	3.40
R	0.107	0.111	2.72	2.81
S	0.096	0.104	2.44	2.64
U	0.259	0.267	6.58	6.78

- STYLE 2:  
 PIN 1. BASE  
 2. COLLECTOR  
 3. EMITTER

**CASE 221D-02  
 TO-220 TYPE  
 ISSUE D**

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