onsemi

DATA SHEET
www.onsemi.com

Complementary Silicon Power Transistors MJF3055 (NPN), MJF2955 (PNP)

Specifically designed for general purpose amplifier and switching applications.

Features

- Isolated Overmold Package (1500 Volts RMS Min)
- Electrically Similar to the Popular MJE3055T and MJE2955T
- Collector−Emitter Sustaining Voltage − $V_{CEO(sus)}$ 90 V
- 10 Amperes Rated Collector Current
- No Isolating Washers Required
- Reduced System Cost
- UL Recognized, File #E69369, to 3500 V_{RMS} Isolation
- Epoxy Meets UL 94 V−0 at 0.125 in
- ESD Ratings: Machine Model, C; > 400 V
  Human Body Model, 3B; > 8000 V
- Pb−Free Packages are Available*

MAXIMUM RATINGS

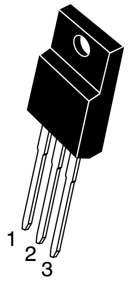
Rating	Symbol	Value	Unit
Collector−Emitter Sustaining Voltage	$V_{CEO(sus)}$	90	Vdc
Collector−Emitter Breakdown Voltage	V_{CES}	90	Vdc
Base−Emitter Voltage	V_{EBO}	5.0	Vdc
Collector Current − Continuous	I_C	10	Adc
Base Current − Continuous	I_B	6.0	Adc
RMS Isolation Voltage (Note 3) (t = 0.3 sec, R.H. ≤ 30%, T_A = 25°C) Per Figure 5	V_{ISOL}	4500	V_{RMS}
Total Power Dissipation @ T_C = 25°C (Note 2) Derate above 25°C	P_D	30 0.25	W W/°C
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	2.0 0.016	W W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case (Note 2)	$R_{\theta JC}$	4.0	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	62.5	°C/W
Lead Temperature for Soldering Purposes	T_L	260	°C

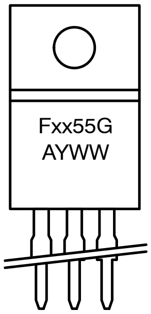
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

COMPLEMENTARY SILICON POWER TRANSISTORS 10 AMPERES 90 VOLTS, 30 WATTS



TO−220 FULLPACK
CASE 221D
STYLE 2

MARKING DIAGRAM



Fxx55 = Specific Device Code
xx= 29 or 30
G = Pb−Free Package
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
MJF2955	TO−220 FULLPACK	50 Units/Rail
MJF2955G	TO−220 FULLPACK (Pb−Free)	50 Units/Rail
MJF3055	TO−220 FULLPACK	50 Units/Rail
MJF3055G	TO−220 FULLPACK (Pb−Free)	50 Units/Rail

1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle ≤ 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 ≥ 6 in. lbs.
3. Proper strike and creepage distance must be provided.

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

May, 2024 − Rev. 8

Publication Order Number:
MJF3055/D

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS (Note 4)				
Collector−Emitter Sustaining Voltage (I_C = 200 mAdc, I_B = 0)	$V_{CEO(sus)}$	90	–	Vdc
Collector Cutoff Current (V_{CE} = 90 Vdc, V_{BE} = 0)	I_{CES}	–	1.0	µAdc
Collector Cutoff Current (V_{CE} = 90 Vdc, I_E = 0)	I_{CBO}	–	1.0	µAdc
Emitter−Base Leakage (V_{EB} = 5.0 Vdc, I_C = 0)	I_{EBO}	–	1.0	µAdc
ON CHARACTERISTICS (Note 4)				
DC Current Gain (I_{CE} = 4.0 Adc, V_{CE} = 4.0 Vdc) (I_{CE} = 10 Adc, V_{CE} = 4.0 Vdc)	h_{FE}	20 5.0	100 –	–
Collector−Emitter Saturation Voltage (I_C = 4.0 Adc, I_B = 0.4 Adc) (I_C = 10 Adc, I_B = 3.3 Adc)	$V_{CE(sat)}$	– –	1.0 2.5	Vdc
Base−Emitter On Voltage (I_C = 4.0 Adc, V_{BE} = 4.0 Vdc)	$V_{BE(on)}$	–	1.5	Vdc
DYNAMIC CHARACTERISTICS				
Current−Gain−Bandwidth Product (V_{CE} = 10 Vdc, I_C = 0.5 Adc, f_{test} = 500 kHz)	f_T	2.0	–	MHz

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle ≤ 10%.

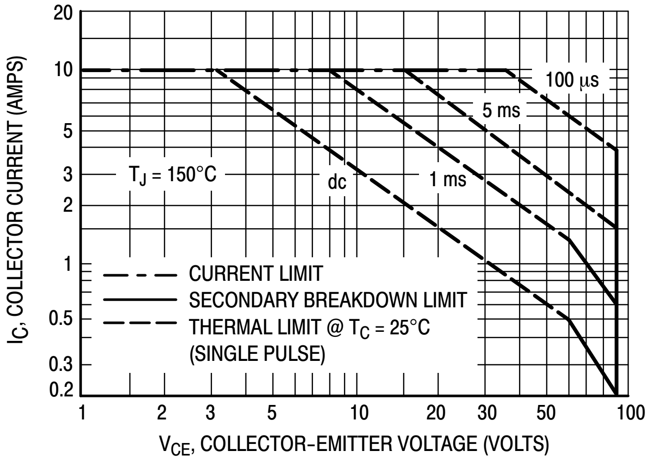


Figure 1. Maximum Forward Bias Safe Operating Area

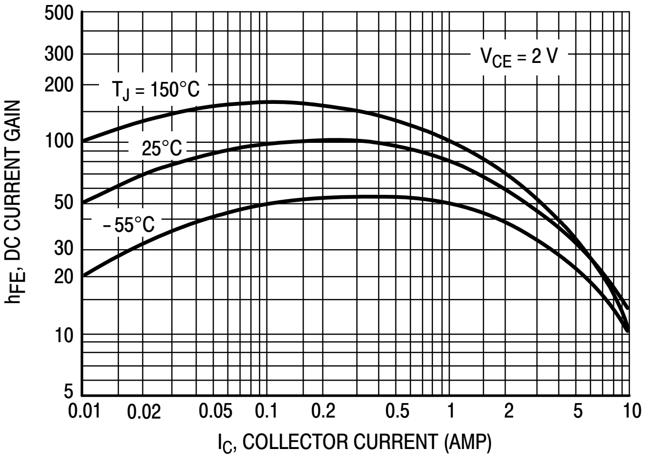
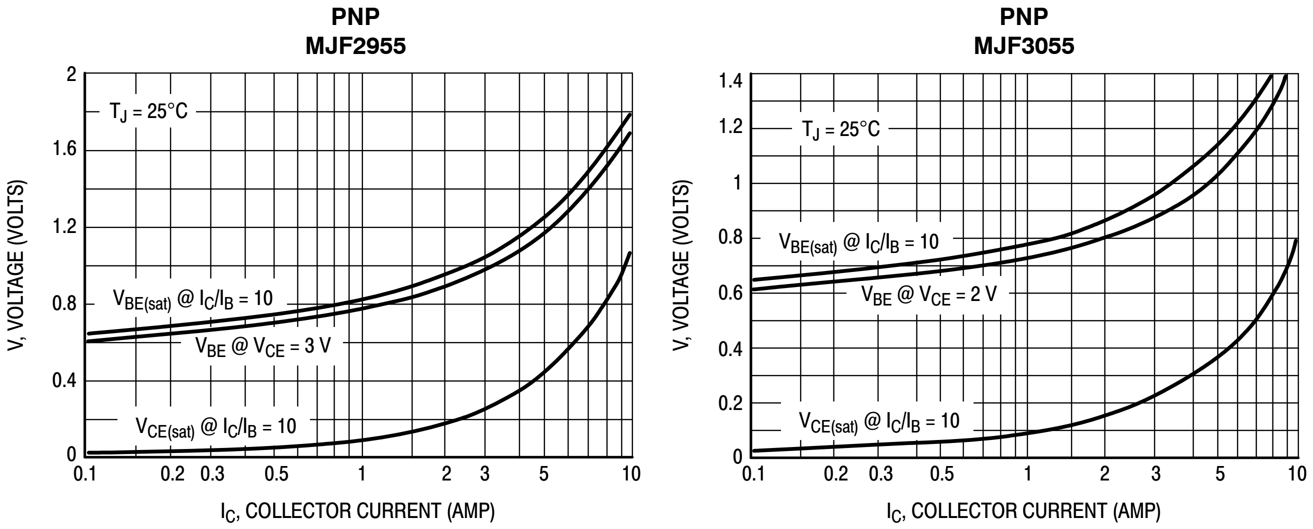


Figure 2. DC Current Gain


PNP
MJF2955

PNP
MJF3055

Figure 3. “On” Voltages

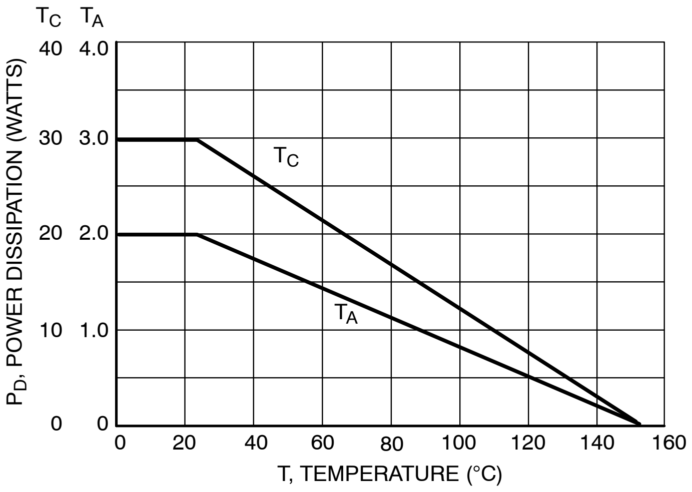


Figure 4. Power Derating

TEST CONDITIONS FOR ISOLATION TESTS*

FULLY ISOLATED PACKAGE

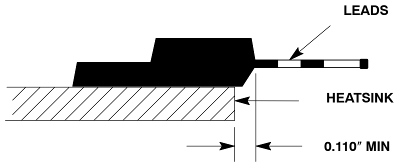


Figure 5. Mounting Position

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

MOUNTING INFORMATION

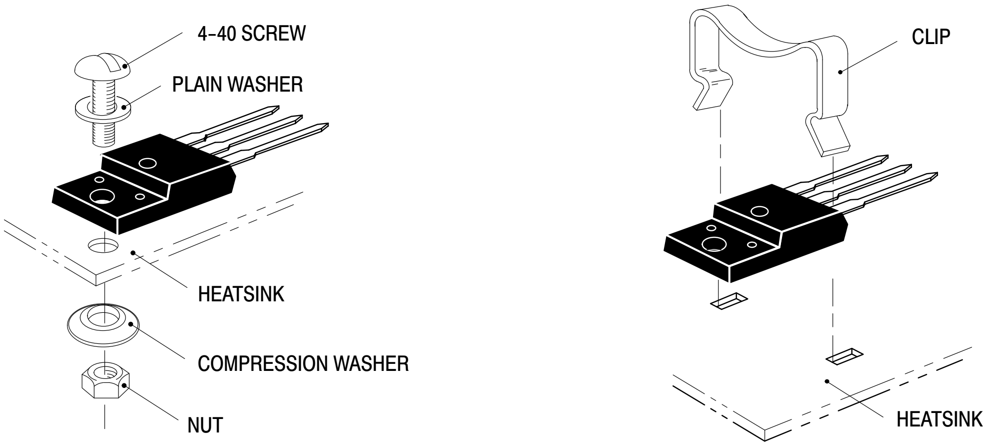


Figure 6. Typical Mounting Techniques*

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.

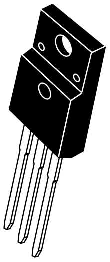
Destructive laboratory tests show that using a hex head 4−40 screw, without washers, and applying a torque in excess of 20 in · lbs will cause the plastic to crack around the mounting hole, resulting in a loss of isolation capability.

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, **onsemi** 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.

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

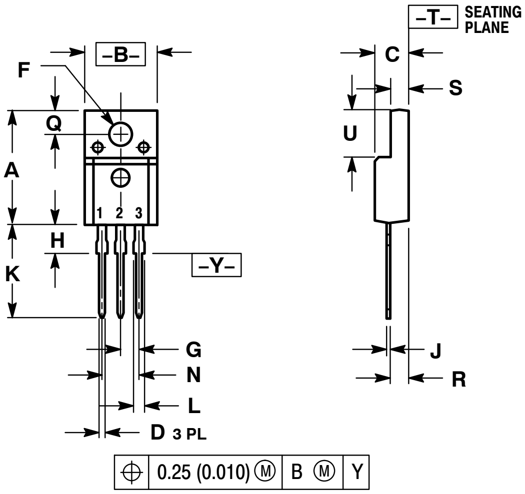
ON Semiconductor®



SCALE 1:1

TO−220 FULLPAK
CASE 221D−03
ISSUE K

DATE 27 FEB 2009



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH
3. 221D−01 THRU 221D−02 OBSOLETE, NEW STANDARD 221D−03.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.617	0.635	15.67	16.12
B	0.392	0.419	9.96	10.63
C	0.177	0.193	4.50	4.90
D	0.024	0.039	0.60	1.00
F	0.116	0.129	2.95	3.28
G	0.100 BSC		2.54 BSC	
H	0.118	0.135	3.00	3.43
J	0.018	0.025	0.45	0.63
K	0.503	0.541	12.78	13.73
L	0.048	0.058	1.23	1.47
N	0.200 BSC		5.08 BSC	
Q	0.122	0.138	3.10	3.50
R	0.099	0.117	2.51	2.96
S	0.092	0.113	2.34	2.87
U	0.239	0.271	6.06	6.88

STYLE 1:
PIN 1. GATE
2. DRAIN
3. SOURCE

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

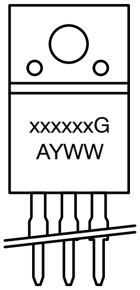
STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE

STYLE 4:
PIN 1. CATHODE
2. ANODE
3. CATHODE

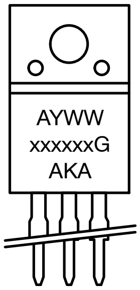
STYLE 5:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 6:
PIN 1. MT 1
2. MT 2
3. GATE

MARKING DIAGRAMS



Bipolar



Rectifier

xxxxxx = Specific Device Code
G = Pb−Free Package
A = Assembly Location
Y = Year
WW = Work Week

A = Assembly Location
Y = Year
WW = Work Week
xxxxxx = Device Code
G = Pb−Free Package
AKA = Polarity Designator

DOCUMENT NUMBER:	**98ASB42514B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**TO−220 FULLPAK**	**PAGE 1 OF 1**

onsemi, onsemi, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales

◊