

# MJF3055 (NPN), MJF2955 (PNP)

## Complementary Silicon Power Transistors

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 Volts
- 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)<br>(t = 0.3 sec, R.H. ≤ 30%, $T_A = 25^\circ\text{C}$ )<br>Per Figure 5 | $V_{ISOL}$     | 4500           | $V_{RMS}$                |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ (Note 2)<br>Derate above $25^\circ\text{C}$         | $P_D$          | 30<br>0.25     | W<br>W/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$                  | $P_D$          | 2.0<br>0.016   | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Temperature Range                                                                | $T_J, T_{stg}$ | -55 to<br>+150 | $^\circ\text{C}$         |

### THERMAL CHARACTERISTICS

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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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.

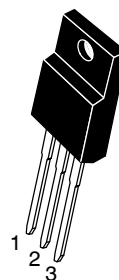
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

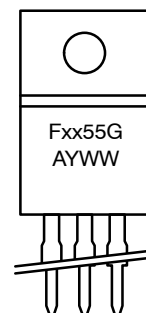
<http://onsemi.com>

## 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<br>(Pb-Free) | 50 Units/Rail |
| MJF3055  | TO-220 FULLPACK              | 50 Units/Rail |
| MJF3055G | TO-220 FULLPACK<br>(Pb-Free) | 50 Units/Rail |

## MJF3055 (NPN), MJF2955 (PNP)

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

#### OFF CHARACTERISTICS (Note 4)

|                                                                               |                |    |     |               |
|-------------------------------------------------------------------------------|----------------|----|-----|---------------|
| Collector–Emitter Sustaining Voltage<br>( $I_C = 200\text{ mA}$ , $I_B = 0$ ) | $V_{CEO(sus)}$ | 90 | –   | Vdc           |
| Collector Cutoff Current<br>( $V_{CE} = 90\text{ Vdc}$ , $V_{BE} = 0$ )       | $I_{CES}$      | –  | 1.0 | $\mu\text{A}$ |
| Collector Cutoff Current<br>( $V_{CE} = 90\text{ Vdc}$ , $I_E = 0$ )          | $I_{CBO}$      | –  | 1.0 | $\mu\text{A}$ |
| Emitter–Base Leakage<br>( $V_{EB} = 5.0\text{ Vdc}$ , $I_C = 0$ )             | $I_{EBO}$      | –  | 1.0 | $\mu\text{A}$ |

#### ON CHARACTERISTICS (Note 4)

|                                                                                                                                           |               |           |            |     |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|------------|-----|
| DC Current Gain<br>( $I_{CE} = 4.0\text{ A}$ , $V_{CE} = 4.0\text{ Vdc}$ )<br>( $I_{CE} = 10\text{ A}$ , $V_{CE} = 4.0\text{ Vdc}$ )      | $h_{FE}$      | 20<br>5.0 | 100<br>–   | –   |
| Collector–Emitter Saturation Voltage<br>( $I_C = 4.0\text{ A}$ , $I_B = 0.4\text{ A}$ )<br>( $I_C = 10\text{ A}$ , $I_B = 3.3\text{ A}$ ) | $V_{CE(sat)}$ | –<br>–    | 1.0<br>2.5 | Vdc |
| Base–Emitter On Voltage<br>( $I_C = 4.0\text{ A}$ , $V_{BE} = 4.0\text{ Vdc}$ )                                                           | $V_{BE(on)}$  | –         | 1.5        | Vdc |

#### DYNAMIC CHARACTERISTICS

|                                                                                                                     |       |     |   |     |
|---------------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|
| Current–Gain–Bandwidth Product<br>( $V_{CE} = 10\text{ Vdc}$ , $I_C = 0.5\text{ A}$ , $f_{test} = 500\text{ kHz}$ ) | $f_T$ | 2.0 | – | MHz |
|---------------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|

4. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle  $\leq 10\%$ .

## MJF3055 (NPN), MJF2955 (PNP)

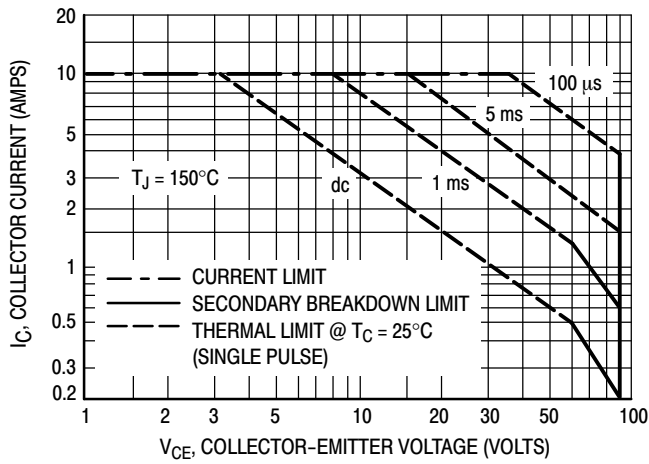


Figure 1. Maximum Forward Bias Safe Operating Area

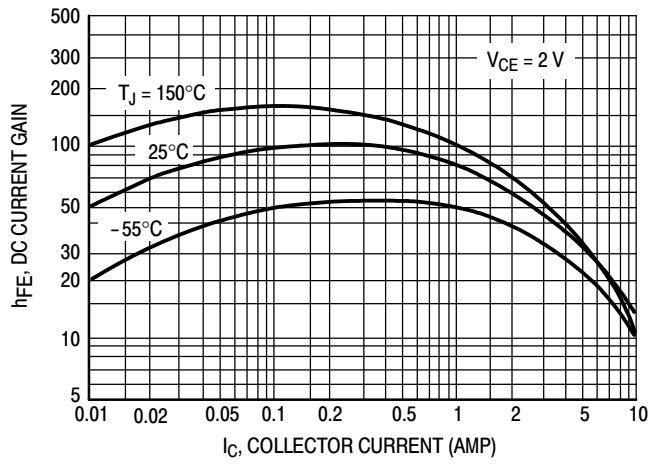


Figure 2. DC Current Gain

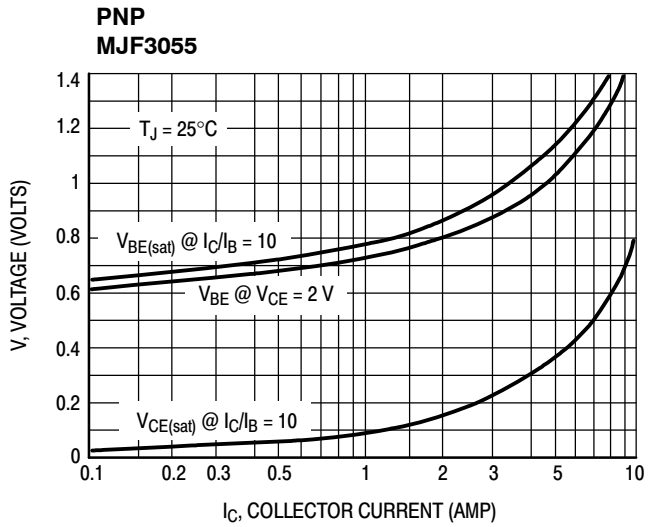
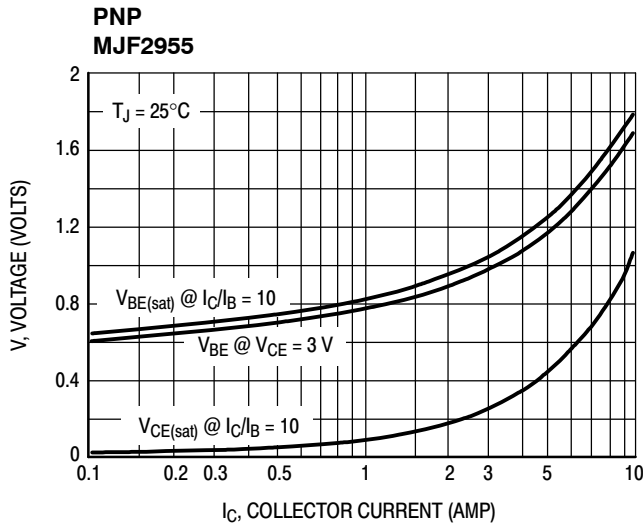


Figure 3. "On" Voltages

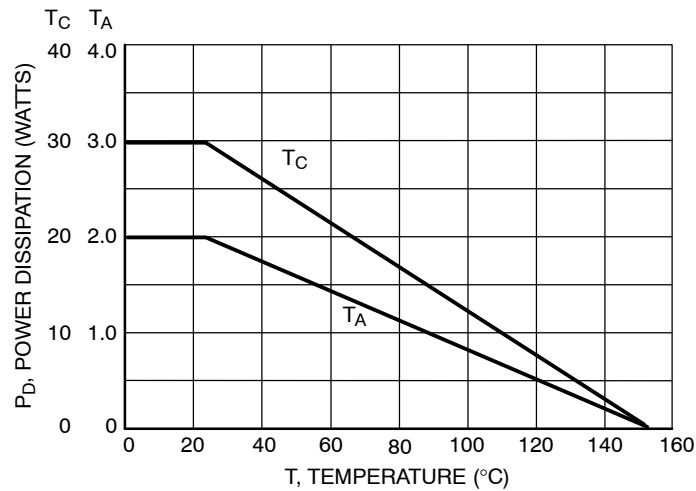


Figure 4. Power Derating

## MJF3055 (NPN), MJF2955 (PNP)

### TEST CONDITIONS FOR ISOLATION TESTS\*

#### FULLY ISOLATED PACKAGE

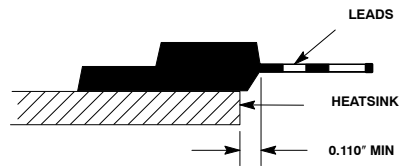


Figure 5. Mounting Position

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

### MOUNTING INFORMATION

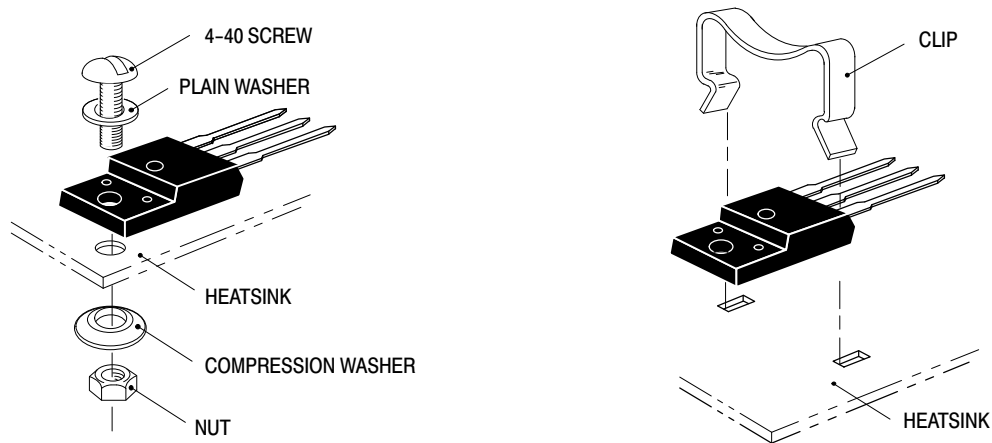


Figure 6. Typical Mounting Techniques\*

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.

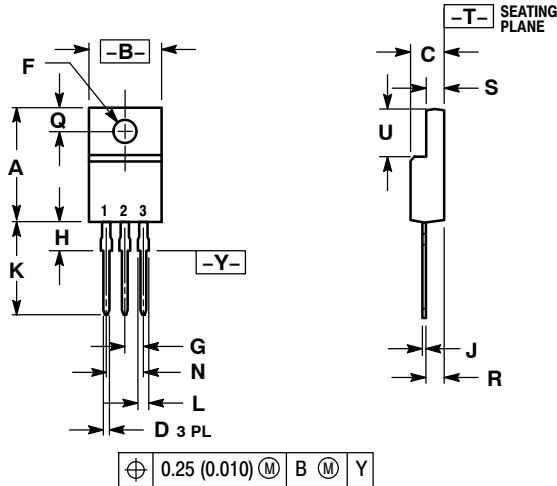
Additional tests on slotted 4-40 screws indicate that the screw slot fails between 15 to 20 in · lbs without adversely affecting the package. However, in order to positively ensure the package integrity of the fully isolated device, ON Semiconductor does not recommend exceeding 10 in · lbs of mounting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

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

# MJF3055 (NPN), MJF2955 (PNP)

## PACKAGE DIMENSIONS

### TO-220 FULLPAK CASE 221D-03 ISSUE J



#### 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.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | 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 2:

1. BASE
2. COLLECTOR
3. EMITTER

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA  
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada  
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your  
local Sales Representative.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А