

# MJE521

## Plastic Medium-Power NPN Silicon Transistor

These devices are designed for use in general-purpose amplifier and switching circuits. Recommended for use in 5 to 10 Watt audio amplifiers utilizing complementary symmetry circuitry.

### Features

- DC Current Gain –  $h_{FE} = 40$  (Min) @  $I_C = 1.0$  Adc
- Complementary to PNP MJE371
- Pb-Free Package is Available\*

### MAXIMUM RATINGS

| Rating  | Symbol         | Value       | Unit                      |
|---|----------------|-------------|---------------------------|
| Collector-Emitter Voltage   | $V_{CEO}$      | 40          | Vdc                       |
| Collector-Base Voltage  | $V_{CB}$       | 40          | Vdc                       |
| Emitter Base Voltage  | $V_{EB}$       | 4.0         | Vdc                       |
| Collector Current – Continuous<br>– Peak  | $I_C$          | 4.0<br>8.0  | Adc                       |
| Base Current – Continuous   | $I_B$          | 2.0         | Adc                       |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 40<br>0.32  | W<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{stg}$ | -65 to +150 | $^\circ\text{C}$          |

### THERMAL CHARACTERISTICS

| Characteristic                       | Symbol        | Max  | Unit               |
|--------------------------------------|---------------|------|--------------------|
| Thermal Resistance, Junction-to-Case | $\theta_{JC}$ | 3.12 | $^\circ\text{C/W}$ |

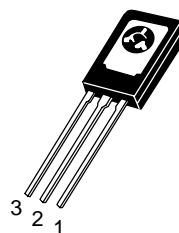
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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



ON Semiconductor®

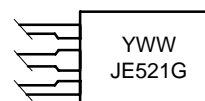
<http://onsemi.com>

**4 AMPERES  
POWER TRANSISTORS  
NPN SILICON  
40 VOLTS, 40 WATTS**



TO-225  
CASE 77  
STYLE 1

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
JE521 = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

| Device  | Package             | Shipping      |
|---------|---------------------|---------------|
| MJE521  | TO-225              | 500 Units/Box |
| MJE521G | TO-225<br>(Pb-Free) | 500 Units/Box |

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

# MJE521

## 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 1)<br>( $I_C = 100\text{ mA}_{dc}$ , $I_B = 0$ ) | $V_{CEO(sus)}$ | 40  | –   | Vdc                |
| Collector–Base Cutoff Current<br>( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ )                   | $I_{CBO}$      | –   | 100 | $\mu\text{A}_{dc}$ |
| Emitter–Base Cutoff Current<br>( $V_{EB} = 4.0\text{ Vdc}$ , $I_C = 0$ )                    | $I_{EBO}$      | –   | 100 | $\mu\text{A}_{dc}$ |
| <b>ON CHARACTERISTICS</b>   |                |     |     |                    |
| DC Current Gain (Note 1)<br>( $I_C = 1.0\text{ A}_{dc}$ , $V_{CE} = 1.0\text{ Vdc}$ )       | $h_{FE}$       | 40  | –   | –                  |

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

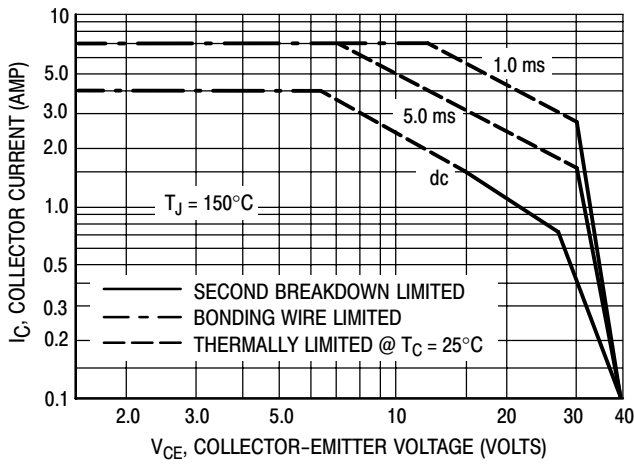


Figure 1. Active-Region Safe Operating Area

The data of Figure 1 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  $(T_{Jpk}) \leq 150^{\circ}\text{C}$ . At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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.

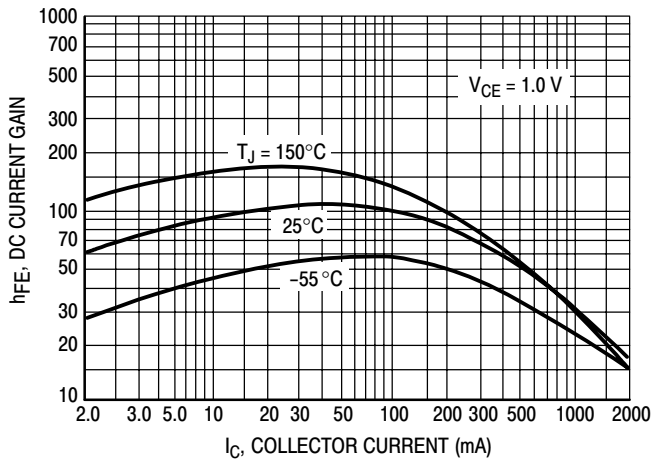


Figure 2. DC Current Gain

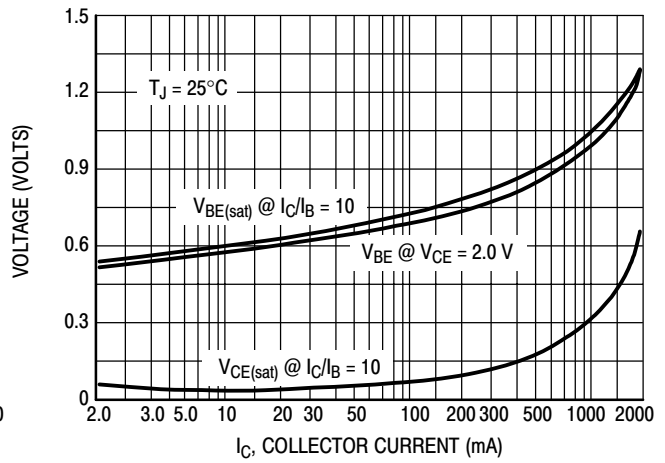


Figure 3. "On" Voltage

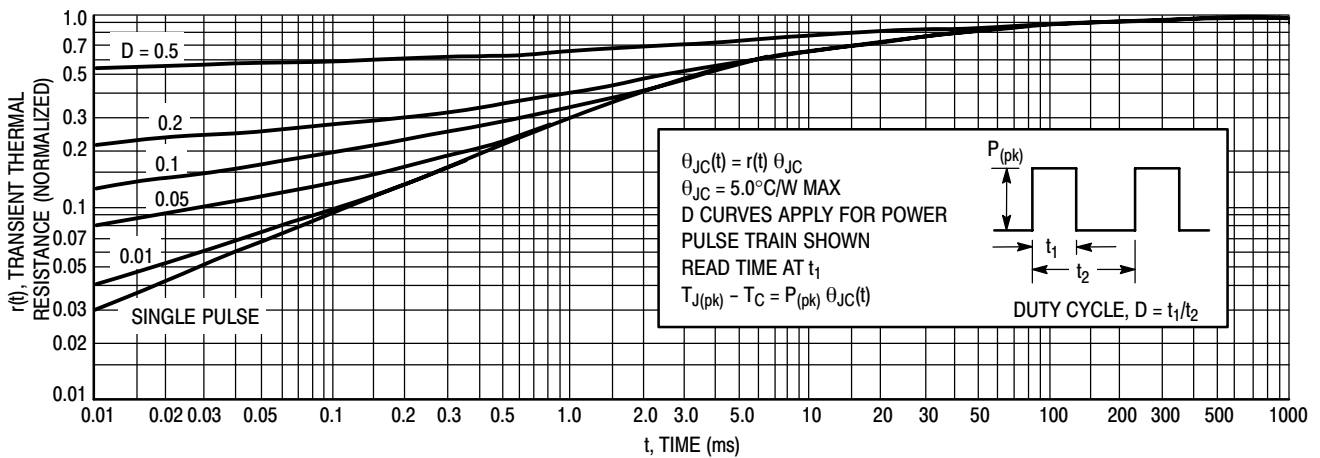
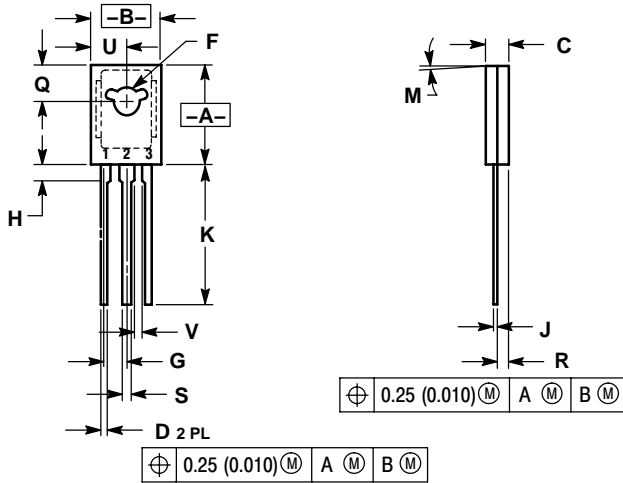


Figure 4. Thermal Response

# MJE521

## PACKAGE DIMENSIONS

TO-225  
CASE 77-09  
ISSUE Z



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.425     | 0.435 | 10.80       | 11.04 |
| B   | 0.295     | 0.305 | 7.50        | 7.74  |
| C   | 0.095     | 0.105 | 2.42        | 2.66  |
| D   | 0.020     | 0.026 | 0.51        | 0.66  |
| F   | 0.115     | 0.130 | 2.93        | 3.30  |
| G   | 0.094 BSC |       | 2.39 BSC    |       |
| H   | 0.050     | 0.095 | 1.27        | 2.41  |
| J   | 0.015     | 0.025 | 0.39        | 0.63  |
| K   | 0.575     | 0.655 | 14.61       | 16.63 |
| M   | 5° TYP    |       | 5° TYP      |       |
| Q   | 0.148     | 0.158 | 3.76        | 4.01  |
| R   | 0.045     | 0.065 | 1.15        | 1.65  |
| S   | 0.025     | 0.035 | 0.64        | 0.88  |
| U   | 0.145     | 0.155 | 3.69        | 3.93  |
| V   | 0.040     | ---   | 1.02        | ---   |

### STYLE 1:

1. EMITTER
2. COLLECTOR
3. BASE

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

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.