



# THE DATASHEET OF MJE521G



# 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.

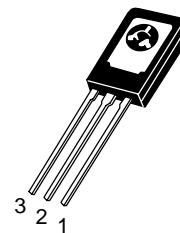
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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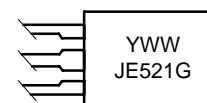
<http://onsemi.com>

**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 |

# 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  $\leq 2.0\%$ .

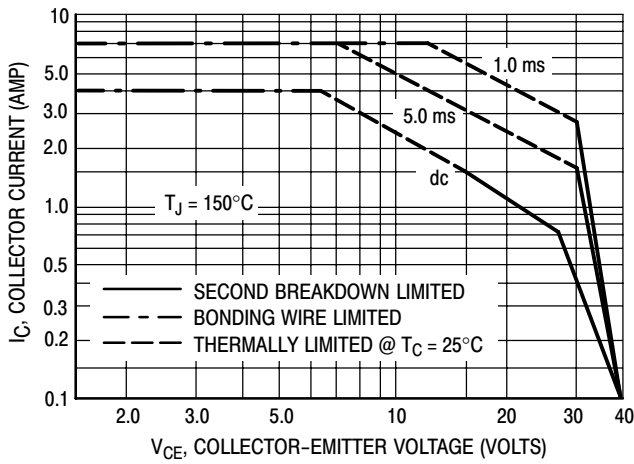


Figure 1. Active-Region Safe Operating Area

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.

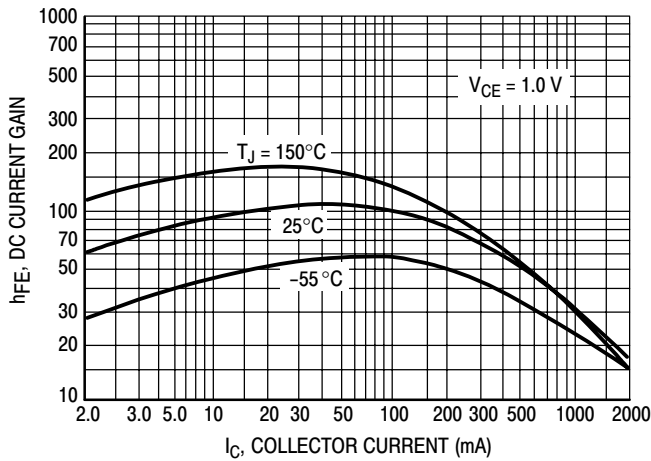


Figure 2. DC Current Gain

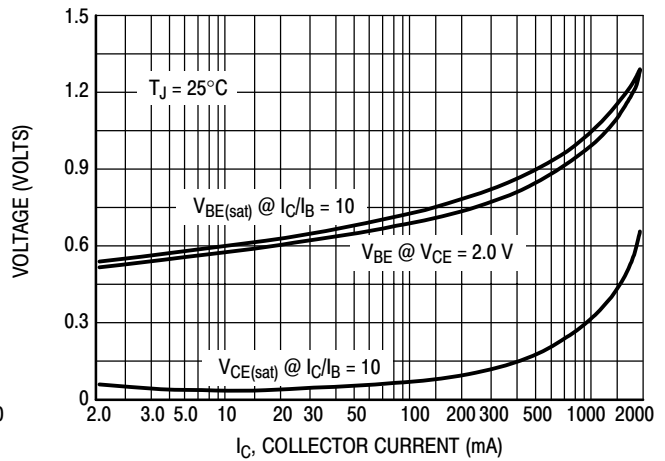


Figure 3. "On" Voltage

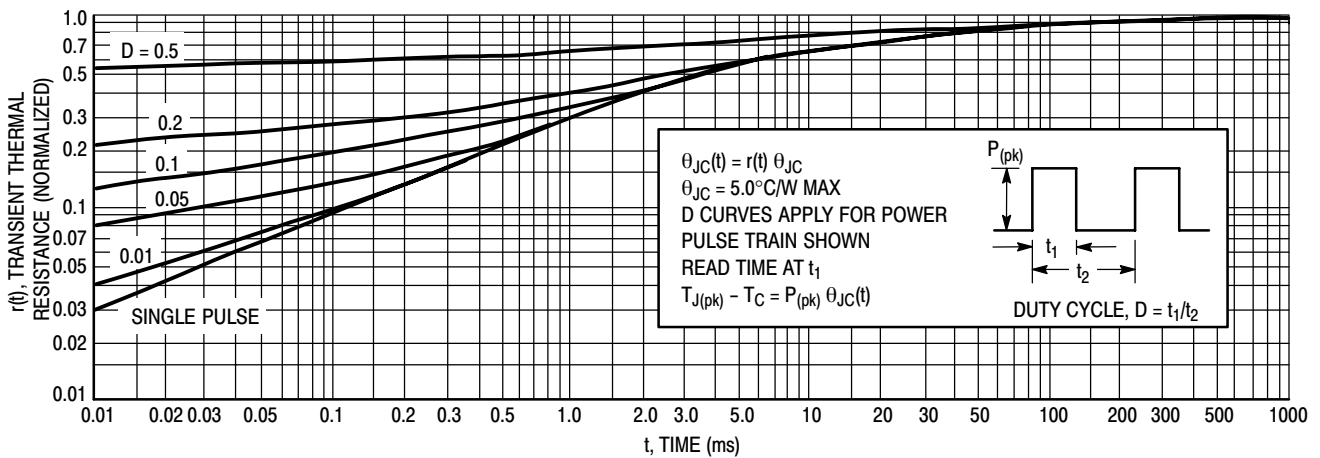
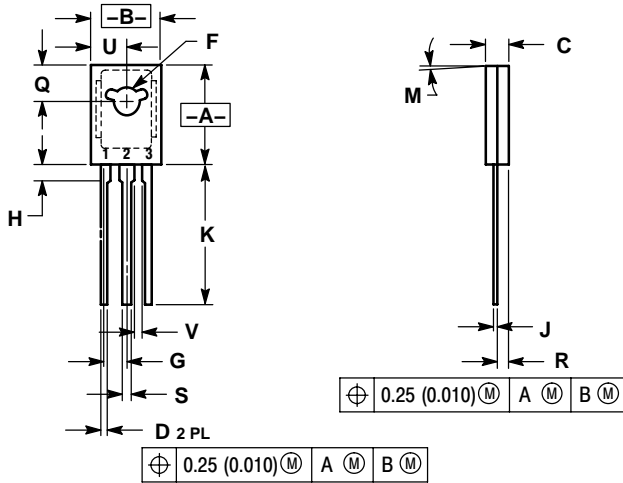


Figure 4. Thermal Response

# 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

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