



**THE DATASHEET OF  
MJE3439**



# MJE3439G

## NPN Silicon High-Voltage Power Transistor

This device is designed for use in line-operated equipment requiring high  $f_T$ .

### Features

- High DC Current Gain
- High Current-Gain – Bandwidth Product
- Low Output Capacitance
- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                      |
|--|----------------|-------------|---------------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | 350         | Vdc                       |
| Collector-Base Voltage   | $V_{CB}$       | 450         | Vdc                       |
| Emitter-Base Voltage   | $V_{EB}$       | 5.0         | Vdc                       |
| Collector Current – Continuous   | $I_C$          | 0.3         | Adc                       |
| Base Current   | $I_B$          | 150         | mAdc                      |
| Total Power Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 15<br>0.12  | W<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                      | $T_J, T_{stg}$ | -65 to +150 | $^\circ\text{C}$          |

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.

### THERMAL CHARACTERISTICS

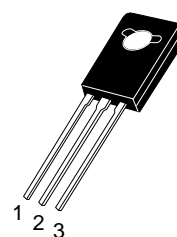
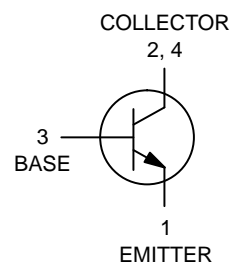
| Characteristic                       | Symbol        | Max  | Unit               |
|--------------------------------------|---------------|------|--------------------|
| Thermal Resistance, Junction-to-Case | $\theta_{JC}$ | 8.33 | $^\circ\text{C/W}$ |



**ON Semiconductor**<sup>®</sup>

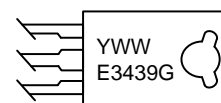
<http://onsemi.com>

**0.3 AMPERE  
POWER TRANSISTOR  
NPN SILICON  
350 VOLTS, 15 WATTS**



**TO-225  
CASE 77-09  
STYLE 1**

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
E3439 = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

| Device   | Package             | Shipping      |
|----------|---------------------|---------------|
| MJE3439G | 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.

# MJE3439G

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

| Characteristic   | Symbol                | Min      | Max      | Unit             |
|--|-----------------------|----------|----------|------------------|
| <b>OFF CHARACTERISTICS</b>   |                       |          |          |                  |
| Collector–Emitter Sustaining Voltage<br>(I <sub>C</sub> = 5.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)   | V <sub>CEO(sus)</sub> | 350      | –        | V <sub>dc</sub>  |
| Collector Cutoff Current<br>(V <sub>CE</sub> = 300 V <sub>dc</sub> , I <sub>B</sub> = 0)   | I <sub>CEO</sub>      | –        | 20       | μA <sub>dc</sub> |
| Collector Cutoff Current<br>(V <sub>CE</sub> = 450 V <sub>dc</sub> , V <sub>EB(off)</sub> = 1.5 V <sub>dc</sub> )  | I <sub>CEX</sub>      | –        | 500      | μA <sub>dc</sub> |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 350 V <sub>dc</sub> , I <sub>E</sub> = 0)   | I <sub>CBO</sub>      | –        | 20       | μA <sub>dc</sub> |
| Emitter Cutoff Current<br>(V <sub>BE</sub> = 5.0 V <sub>dc</sub> , I <sub>C</sub> = 0)   | I <sub>EBO</sub>      | –        | 20       | μA <sub>dc</sub> |
| <b>ON CHARACTERISTICS</b>  |                       |          |          |                  |
| DC Current Gain<br>(I <sub>C</sub> = 2.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )<br>(I <sub>C</sub> = 20 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> ) | h <sub>FE</sub>       | 30<br>15 | –<br>200 | –                |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 4.0 mA <sub>dc</sub> )  | V <sub>CE(sat)</sub>  | –        | 0.5      | V <sub>dc</sub>  |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 4.0 mA <sub>dc</sub> )   | V <sub>BE(sat)</sub>  | –        | 1.3      | V <sub>dc</sub>  |
| Base–Emitter On Voltage<br>(I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )  | V <sub>BE(on)</sub>   | –        | 0.8      | V <sub>dc</sub>  |
| <b>DYNAMIC CHARACTERISTICS</b>   |                       |          |          |                  |
| Current–Gain – Bandwidth Product<br>(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 5.0 MHz)  | f <sub>T</sub>        | 15       | –        | MHz              |
| Output Capacitance<br>(V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)   | C <sub>ob</sub>       | –        | 10       | pF               |
| Small–Signal Current Gain<br>(I <sub>C</sub> = 5.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 1.0 kHz)  | h <sub>fe</sub>       | 25       | –        | –                |

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.

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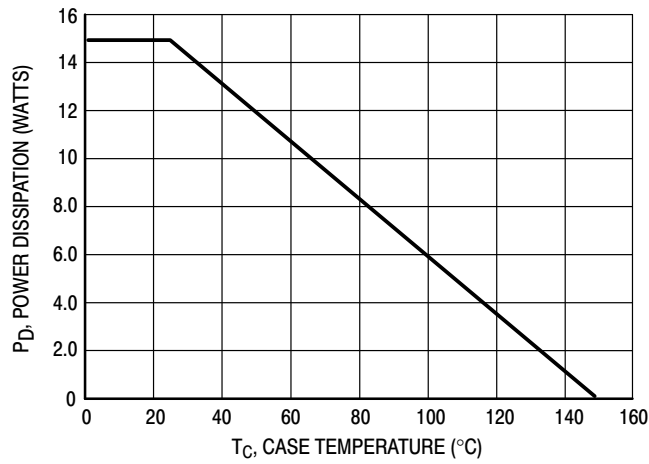


Figure 1. Power-Temperature Derating Curve

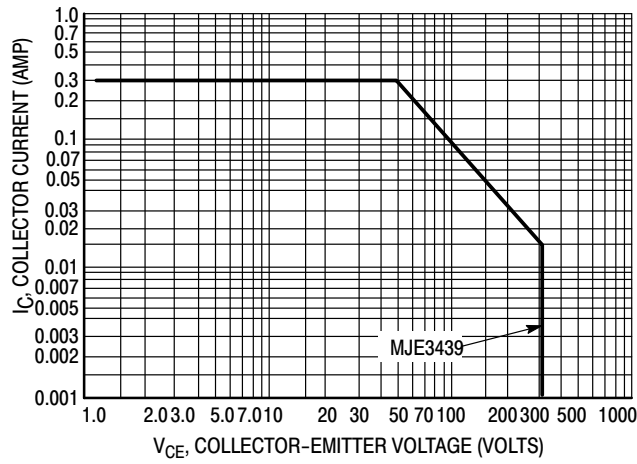


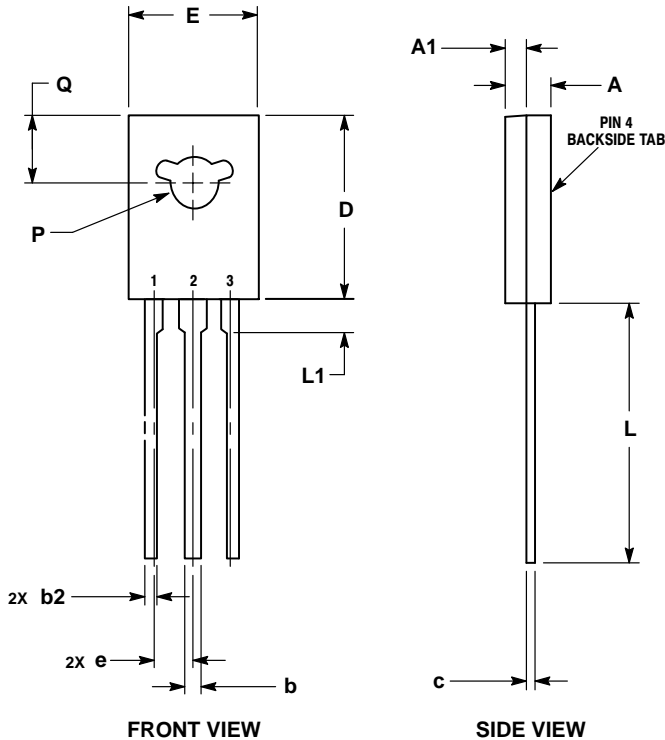
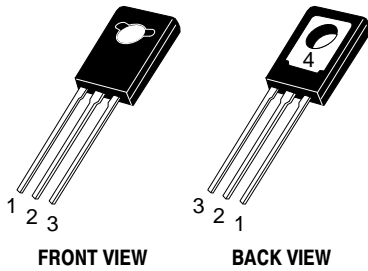
Figure 2. Active-Region Safe Operating Area

The Safe Operating Area Curves indicate  $I_C - V_{CE}$  limits below which the device will not enter secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a catastrophic failure. To insure operation below the maximum  $T_J$ , power-temperature derating must be observed for both steady state and pulse power conditions.

# MJE3439G

## PACKAGE DIMENSIONS


TO-225  
CASE 77-09  
ISSUE AC



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. NUMBER AND SHAPE OF LUGS OPTIONAL.

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 2.40        | 3.00  |
| A1  | 1.00        | 1.50  |
| b   | 0.60        | 0.90  |
| b2  | 0.51        | 0.88  |
| c   | 0.39        | 0.63  |
| D   | 10.60       | 11.10 |
| E   | 7.40        | 7.80  |
| e   | 2.04        | 2.54  |
| L   | 14.50       | 16.63 |
| L1  | 1.27        | 2.54  |
| P   | 2.90        | 3.30  |
| Q   | 3.80        | 4.20  |

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

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