

# MJE3439

## 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 –  $h_{FE} = 40-160 @ I_C = 20 \text{ mAdc}$
- Current Gain Bandwidth Product –  $f_T = 15 \text{ MHz (Min) @ } I_C = 10 \text{ mAdc}$
- Low Output Capacitance –  $C_{ob} = 10 \text{ pF (Max) @ } f = 1.0 \text{ MHz}$
- Pb-Free Package is Available\*

### 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 @ $T_C = 25^\circ\text{C}$<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 | $^\circ\text{C}$          |

### THERMAL CHARACTERISTICS

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

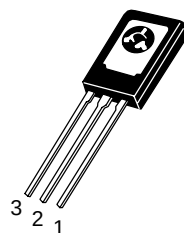
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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



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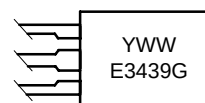
<http://onsemi.com>

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



TO-225  
CASE 77  
STYLE 1

### MARKING DIAGRAM



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

### ORDERING INFORMATION

| Device   | Package             | Shipping      |
|----------|---------------------|---------------|
| MJE3439  | TO-225              | 500 Units/Box |
| MJE3439G | TO-225<br>(Pb-Free) | 500 Units/Box |

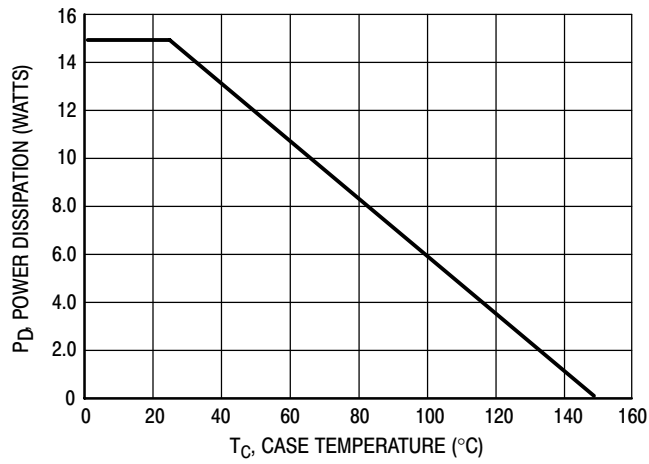
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MJE3439

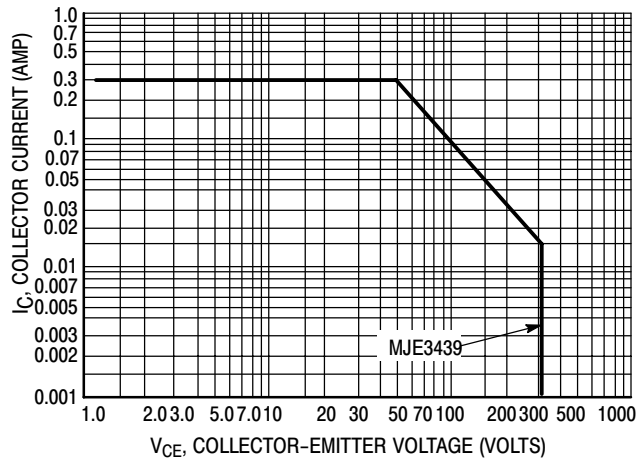
## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic                                                                                                                     | Symbol         | Min      | Max      | Unit            |
|------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|----------|-----------------|
| <b>OFF CHARACTERISTICS</b>                                                                                                         |                |          |          |                 |
| Collector–Emitter Sustaining Voltage<br>( $I_C = 5.0\text{ mAdc}$ , $I_B = 0$ )                                                    | $V_{CEO(sus)}$ | 350      | –        | Vdc             |
| Collector Cutoff Current<br>( $V_{CE} = 300\text{ Vdc}$ , $I_B = 0$ )                                                              | $I_{CEO}$      | –        | 20       | $\mu\text{Adc}$ |
| Collector Cutoff Current<br>( $V_{CE} = 450\text{ Vdc}$ , $V_{EB(off)} = 1.5\text{ Vdc}$ )                                         | $I_{CEX}$      | –        | 500      | $\mu\text{Adc}$ |
| Collector Cutoff Current<br>( $V_{CB} = 350\text{ Vdc}$ , $I_E = 0$ )                                                              | $I_{CBO}$      | –        | 20       | $\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )                                                                | $I_{EBO}$      | –        | 20       | $\mu\text{Adc}$ |
| <b>ON CHARACTERISTICS</b>                                                                                                          |                |          |          |                 |
| DC Current Gain<br>( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 20\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) | $h_{FE}$       | 30<br>15 | –<br>200 | –               |
| Collector–Emitter Saturation Voltage<br>( $I_C = 50\text{ mAdc}$ , $I_B = 4.0\text{ mAdc}$ )                                       | $V_{CE(sat)}$  | –        | 0.5      | Vdc             |
| Base–Emitter Saturation Voltage<br>( $I_C = 50\text{ mAdc}$ , $I_B = 4.0\text{ mAdc}$ )                                            | $V_{BE(sat)}$  | –        | 1.3      | Vdc             |
| Base–Emitter On Voltage<br>( $I_C = 50\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )                                                   | $V_{BE(on)}$   | –        | 0.8      | Vdc             |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                     |                |          |          |                 |
| Current–Gain – Bandwidth Product<br>( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 5.0\text{ MHz}$ )                   | $f_T$          | 15       | –        | MHz             |
| Output Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                                              | $C_{ob}$       | –        | 10       | pF              |
| Small–Signal Current Gain<br>( $I_C = 5.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )                         | $h_{fe}$       | 25       | –        | –               |

## MJE3439



**Figure 1. Power-Temperature Derating Curve**



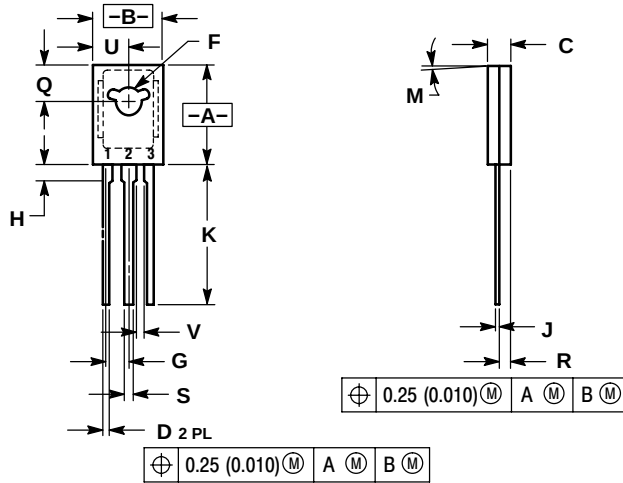
**Figure 2. Active-Region Safe Operating Area**

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.

# MJE3439

## 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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