

# 2N6344A, 2N6348A, 2N6349A

Preferred Device

## Triacs

### Silicon Bidirectional Thyristors

Designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering.

- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in all Four Quadrants
- For 400 Hz Operation, Consult Factory
- 8 Ampere Devices Available as 2N6344 thru 2N6349
- Device Marking: Logo, Device Type, e.g., 2N6344A, Date Code

#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

| Rating   | Symbol                                 | Value          | Unit             |
|--|--|----------------|------------------|
| *Peak Repetitive Off-State Voltage <sup>(1)</sup><br>(Gate Open, T <sub>J</sub> = -40 to +110°C,<br>Sine Wave 50 to 60 Hz, Gate Open)<br>2N6344A, 2N6348A<br>2N6349A | V <sub>DRM</sub> ,<br>V <sub>RRM</sub> | 600<br>800     | Volts            |
| *On-State RMS Current<br>(Full Cycle Sine Wave 50 to 60 Hz)<br>(T <sub>C</sub> = +80°C)<br>(T <sub>C</sub> = +95°C)  | I <sub>T(RMS)</sub>                    | 12<br>6.0      | A                |
| *Peak Non-repetitive Surge Current<br>(One Full Cycle, 60 Hz, T <sub>C</sub> = +80°C)<br>Preceded and followed by rated current                                      | I <sub>TSM</sub>                       | 100            | A                |
| Circuit Fusing Consideration (t = 8.3 ms)  | I <sup>2</sup> t                       | 59             | A <sup>2</sup> s |
| *Peak Gate Power (T <sub>C</sub> = +80°C,<br>Pulse Width = 2.0 μs)   | P <sub>GM</sub>                        | 20             | Watts            |
| *Average Gate Power<br>(T <sub>C</sub> = +80°C, t = 8.3 ms)  | P <sub>G(AV)</sub>                     | 0.5            | Watt             |
| *Peak Gate Current<br>(Pulse Width = 2.0 μs; T <sub>C</sub> = +80°C)   | I <sub>GM</sub>                        | 2.0            | A                |
| *Peak Gate Voltage<br>(Pulse Width = 2.0 μs; T <sub>C</sub> = +80°C)   | V <sub>GM</sub>                        | ± 10           | Volts            |
| *Operating Junction Temperature Range  | T <sub>J</sub>                         | -40 to<br>+125 | °C               |
| *Storage Temperature Range   | T <sub>stg</sub>                       | -40 to<br>+150 | °C               |

\*Indicates JEDEC Registered Data.

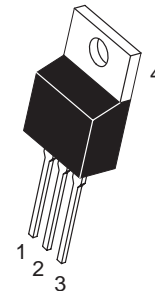
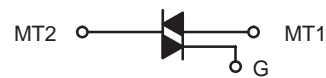
(1) V<sub>DRM</sub> and V<sub>RRM</sub> for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



ON Semiconductor

<http://onsemi.com>

**TRIACS**  
**12 AMPERES RMS**  
**600 thru 800 VOLTS**



TO-220AB  
CASE 221A  
STYLE 4

| PIN ASSIGNMENT |                 |
|----------------|-----------------|
| 1              | Main Terminal 1 |
| 2              | Main Terminal 2 |
| 3              | Gate            |
| 4              | Main Terminal 2 |

#### ORDERING INFORMATION

| Device  | Package | Shipping |
|---------|---------|----------|
| 2N6344A | TO220AB | 500/Box  |
| 2N6348A | TO220AB | 500/Box  |
| 2N6349A | TO220AB | 500/Box  |

Preferred devices are recommended choices for future use and best overall value.

## 2N6344A, 2N6348A, 2N6349A

### THERMAL CHARACTERISTICS

| Characteristic  | Symbol          | Max | Unit |
|---|-----------------|-----|------|
| *Thermal Resistance, Junction to Case   | $R_{\theta JC}$ | 2.0 | °C/W |
| Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds | $T_L$           | 260 | °C   |

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted; Electricals apply in either direction)

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

### OFF CHARACTERISTICS

|  |                    |   |   |    |               |
|--|--------------------|---|---|----|---------------|
| *Peak Repetitive Blocking Current<br>( $V_D = \text{Rated } V_{DRM}, V_{RRM}; \text{ Gate Open}$ ) | $I_{DRM}, I_{RRM}$ | — | — | 10 | $\mu\text{A}$ |
| $T_J = 25^\circ\text{C}$<br>$T_J = 110^\circ\text{C}$  |                    |   |   |    |               |

### ON CHARACTERISTICS

|   |          |     |     |      |               |
|---|----------|-----|-----|------|---------------|
| *Peak On-State Voltage<br>( $I_{TM} = \pm 17 \text{ A Peak}; \text{ Pulse Width} = 1 \text{ to } 2 \text{ ms}, \text{ Duty Cycle} \leq 2\%$ )                             | $V_{TM}$ | —   | 1.3 | 1.75 | Volts         |
| Gate Trigger Current (Continuous dc)<br>( $V_D = 12 \text{ Vdc}, R_L = 100 \text{ Ohms}$ )  | $I_{GT}$ | —   | 6.0 | 50   | mA            |
| MT2(+), G(+)  |          |     |     |      |               |
| MT2(+), G(-)  |          |     |     |      |               |
| MT2(-), G(-)  |          |     |     |      |               |
| MT2(-), G(+)  |          |     |     |      |               |
| *MT2(+), G(+); MT2(-), G(-) $T_C = -40^\circ\text{C}$   | —        | —   | 100 |      |               |
| *MT2(+), G(-); MT2(-), G(+), $T_C = -40^\circ\text{C}$  | —        | —   | 125 |      |               |
| Gate Trigger Voltage (Continuous dc)<br>( $V_D = 12 \text{ Vdc}, R_L = 100 \text{ ohms}$ )  | $V_{GT}$ | —   | 0.9 | 2.0  | Volts         |
| MT2(+), G(+)  |          |     |     |      |               |
| MT2(+), G(-)  |          |     |     |      |               |
| MT2(-), G(-)  |          |     |     |      |               |
| MT2(-), G(+)  |          |     |     |      |               |
| *MT2(+), G(+); MT2(-), G(-) $T_C = -40^\circ\text{C}$   | —        | —   | 2.5 |      |               |
| *MT2(+), G(-); MT2(-), G(+), $T_C = -40^\circ\text{C}$  | —        | —   | 3.0 |      |               |
| Gate Non-Trigger Voltage<br>( $V_D = \text{Rated } V_{DRM}, R_L = 10 \text{ k ohms}, T_J = 110^\circ\text{C}$ )   | $V_{GD}$ | 0.2 | —   | —    | Volts         |
| *MT2(+), G(+); MT2(-), G(-); MT2(+), G(-); MT2(-), G(+)   |          |     |     |      |               |
| Holding Current<br>( $V_D = 12 \text{ Vdc}, \text{ Gate Open}$ )<br>Initiating Current = $\pm 200 \text{ mA}$   | $I_H$    | —   | 6.0 | 40   | mA            |
| $T_C = 25^\circ\text{C}$<br>* $T_C = -40^\circ\text{C}$   |          |     |     |      |               |
| *Turn-On Time<br>( $V_D = \text{Rated } V_{DRM}, I_{TM} = 17 \text{ A}, I_{GT} = 120 \text{ mA},$<br>Rise Time = $0.1 \mu\text{s}, \text{ Pulse Width} = 2 \mu\text{s}$ ) | $t_{gt}$ | —   | 1.5 | 2.0  | $\mu\text{s}$ |

### DYNAMIC CHARACTERISTICS

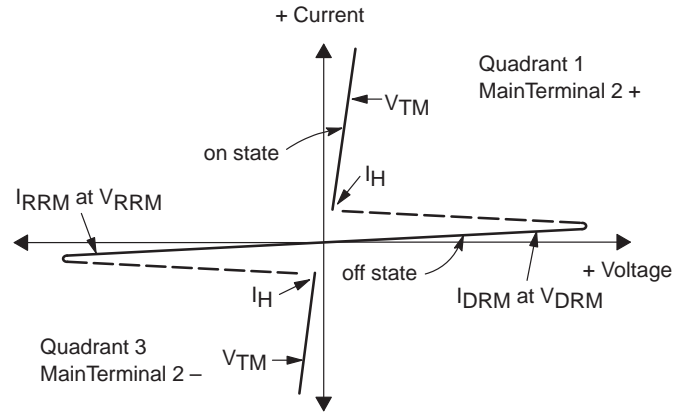
|  |            |   |     |   |                        |
|--|------------|---|-----|---|------------------------|
| Critical Rate of Rise of Commutation Voltage<br>( $V_D = \text{Rated } V_{DRM}, I_{TM} = 17 \text{ A}, \text{ Commutating } di/dt = 6.1 \text{ A/ms},$<br>Gate Unenergized, $T_C = 80^\circ\text{C}$ ) | $dv/dt(c)$ | — | 5.0 | — | $\text{V}/\mu\text{s}$ |
|--|------------|---|-----|---|------------------------|

\*Indicates JEDEC Registered Data.

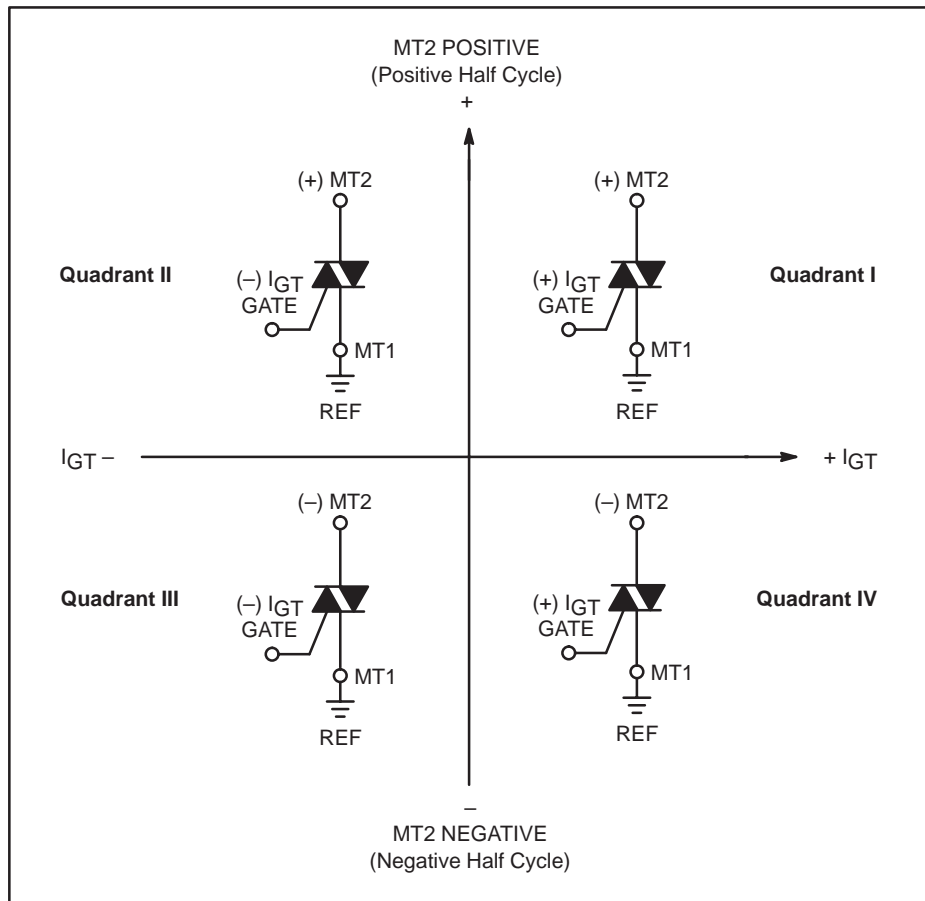
# 2N6344A, 2N6348A, 2N6349A

## Voltage Current Characteristic of Triacs (Bidirectional Device)

| Symbol    | Parameter                                 |
|-----------|---|
| $V_{DRM}$ | Peak Repetitive Forward Off State Voltage |
| $I_{DRM}$ | Peak Forward Blocking Current             |
| $V_{RRM}$ | Peak Repetitive Reverse Off State Voltage |
| $I_{RRM}$ | Peak Reverse Blocking Current             |
| $V_{TM}$  | Maximum On State Voltage                  |
| $I_H$     | Holding Current                           |

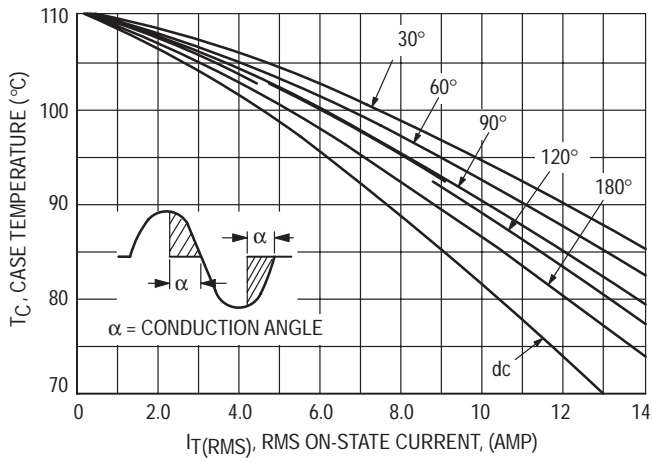


### Quadrant Definitions for a Triac

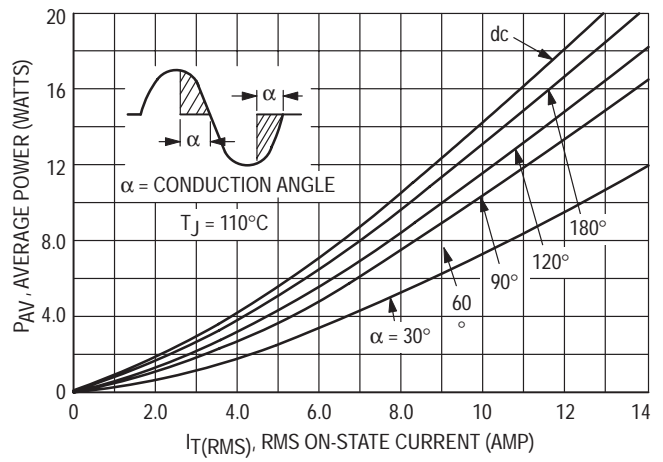


All polarities are referenced to MT1.  
With in-phase signals (using standard AC lines) quadrants I and III are used.

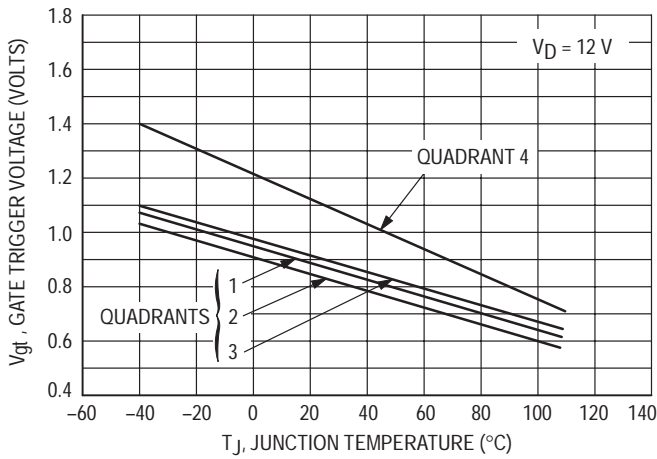
## 2N6344A, 2N6348A, 2N6349A



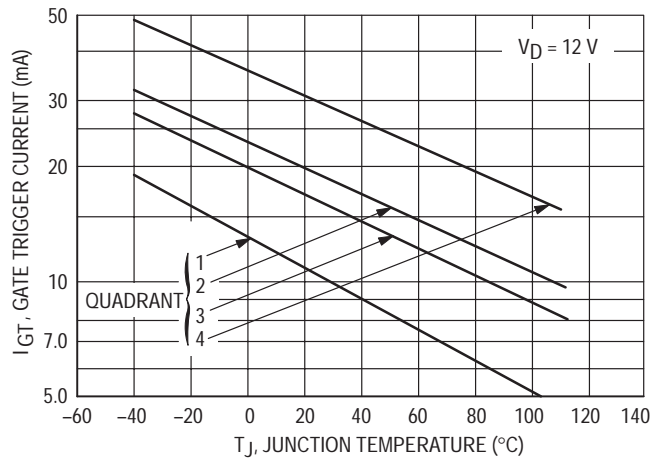
**Figure 1. RMS Current Derating**



**Figure 2. On-State Power Dissipation**



**Figure 3. Typical Gate Trigger Voltage**



**Figure 4. Typical Gate Trigger Current**

2N6344A, 2N6348A, 2N6349A

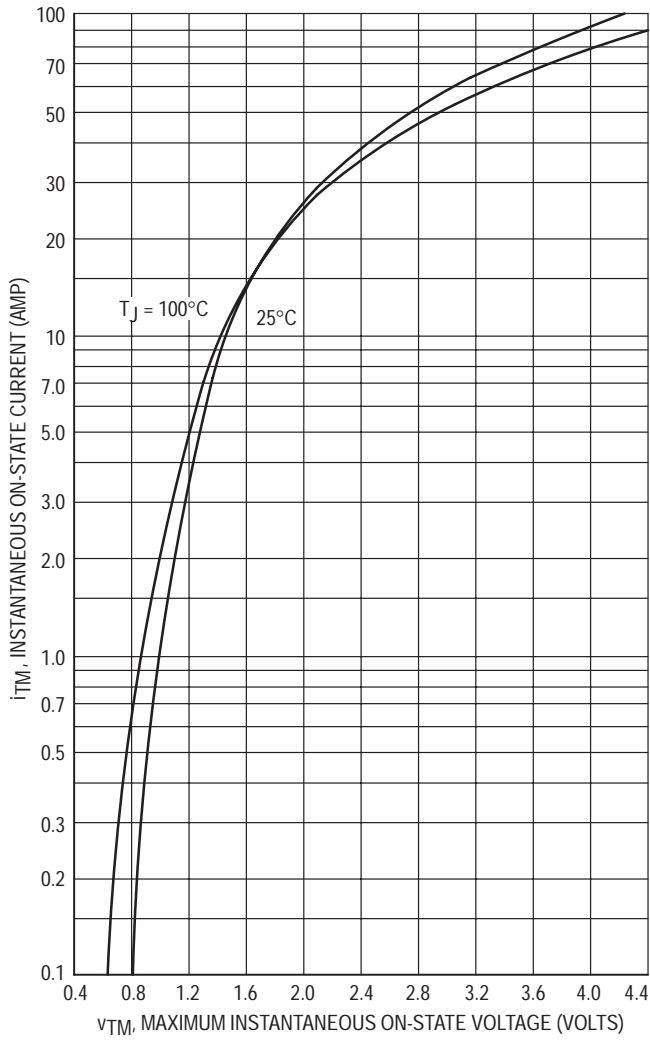


Figure 5. On-State Characteristics

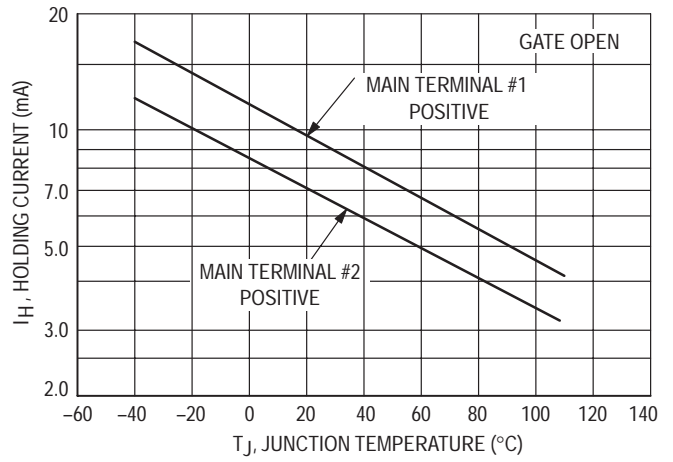


Figure 6. Typical Holding Current

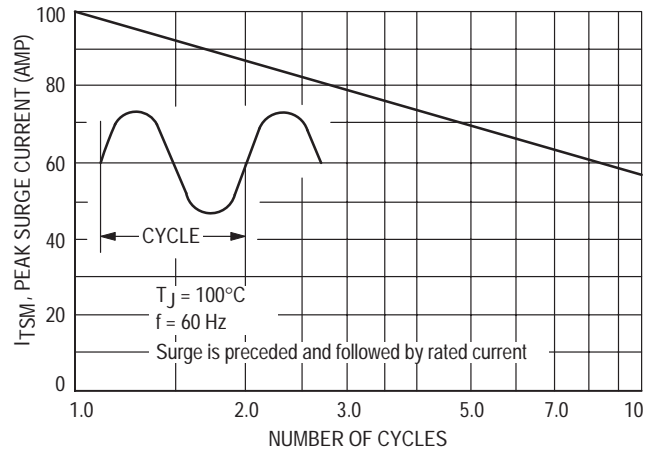


Figure 7. Maximum Non-Repetitive Surge Current

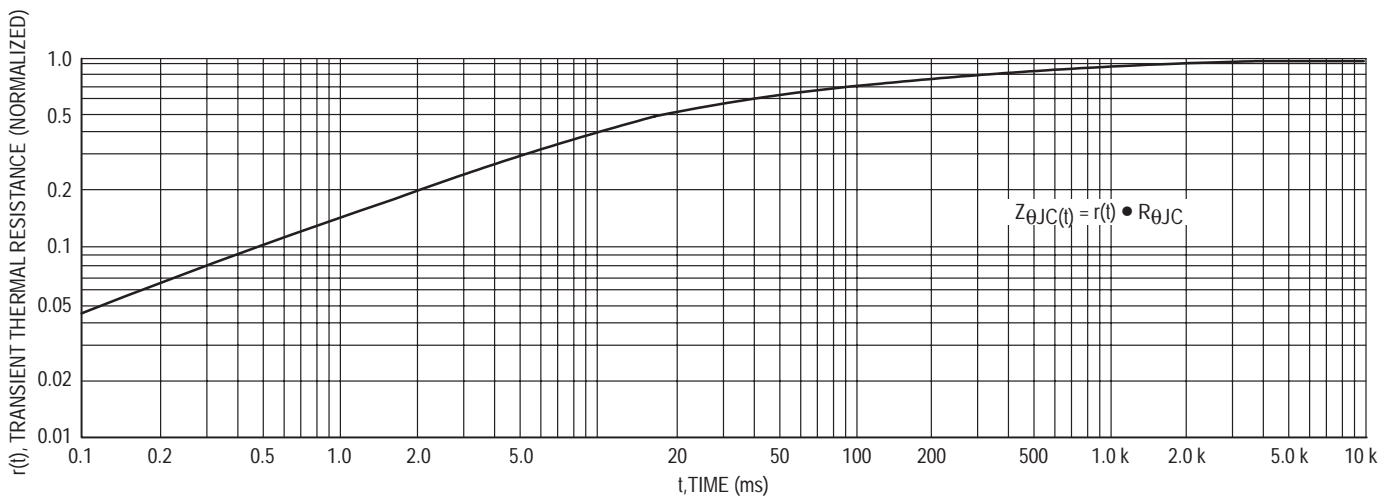
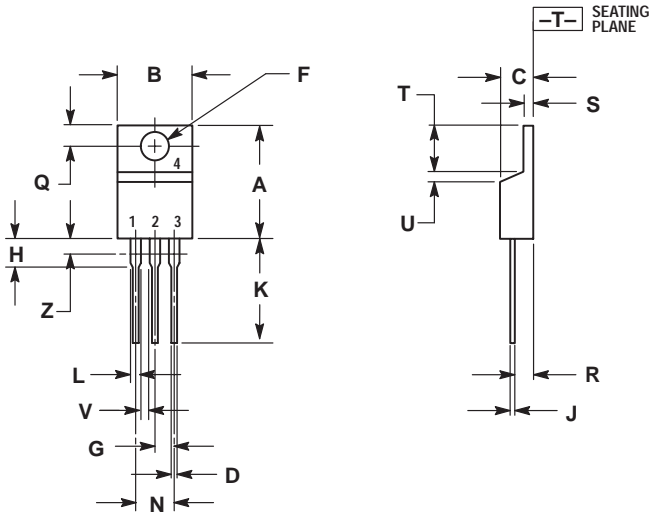


Figure 8. Typical Thermal Response

# 2N6344A, 2N6348A, 2N6349A

## PACKAGE DIMENSIONS

TO-220AB  
CASE 221A-07  
ISSUE Z




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.570  | 0.620 | 14.48       | 15.75 |
| B   | 0.380  | 0.405 | 9.66        | 10.28 |
| C   | 0.160  | 0.190 | 4.07        | 4.82  |
| D   | 0.025  | 0.035 | 0.64        | 0.88  |
| F   | 0.142  | 0.147 | 3.61        | 3.73  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.155 | 2.80        | 3.93  |
| J   | 0.014  | 0.022 | 0.36        | 0.55  |
| K   | 0.500  | 0.562 | 12.70       | 14.27 |
| L   | 0.045  | 0.060 | 1.15        | 1.52  |
| N   | 0.190  | 0.210 | 4.83        | 5.33  |
| O   | 0.100  | 0.120 | 2.54        | 3.04  |
| R   | 0.080  | 0.110 | 2.04        | 2.79  |
| S   | 0.045  | 0.055 | 1.15        | 1.39  |
| T   | 0.235  | 0.255 | 5.97        | 6.47  |
| U   | 0.000  | 0.050 | 0.00        | 1.27  |
| V   | 0.045  | ---   | 1.15        | ---   |
| Z   | ---    | 0.080 | ---         | 2.04  |

- STYLE 4:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. MAIN TERMINAL 2

## Notes

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