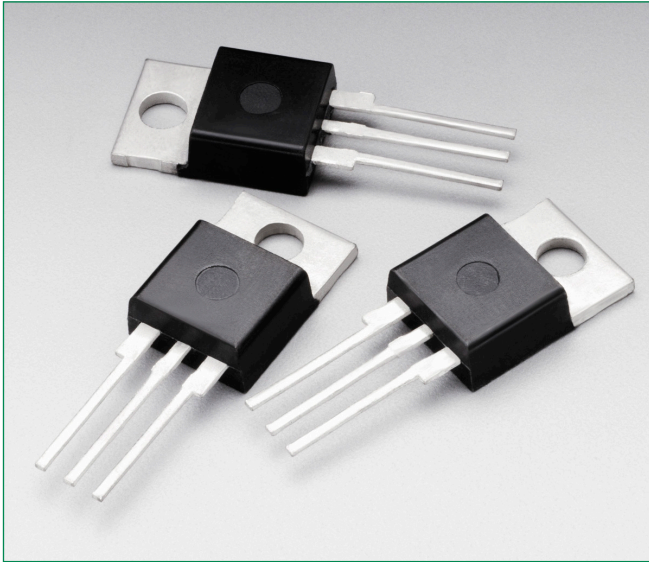


2N6344



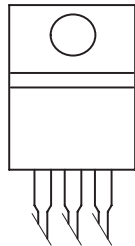
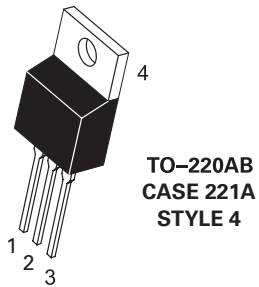
Description

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.

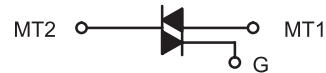
Features

- Blocking Voltage to 800 V
- 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
- Pb-Free Package is Available

Pin Out



Functional Diagram



Additional Information



Datasheet



Resources



Samples

Maximum Ratings and Thermal Characteristics ($T_j = 25^\circ\text{C}$ unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|--------------------------------------|-------------|------------------|
| *Peak Repetitive Off-State Voltage (Note 1) ($T_j = -40$ to 110°C , Sine Wave, 50 to 60 Hz, Gate Open) | V_{DRM} V_{RRM} | 600 800 | V |
| † On-State RMS Current ($T_c = +80^\circ\text{C}$) Full Cycle Sine Wave 50 to 60 Hz ($T_c = +90^\circ\text{C}$) | $I_{\text{T (RMS)}}$ | 8.0 4.0 | A |
| † Peak Non-Repetitive Surge Current (One Full Cycle, Sine Wave 60 Hz, $T_c = +25^\circ\text{C}$) Preceded and followed by rated current | I_{TSM} | 100 | A |
| Circuit Fusing Considerations ($t = 8.3$ ms) | I_{2t} | 40 | A ² s |
| †Peak Gate Power ($T_c = +80^\circ\text{C}$, Pulse Width = 2 μs) | P_{GM} | 20 | W |
| †Average Gate Power ($T_c = +80^\circ\text{C}$, $t = 8.3$ ms) | $P_{\text{G(AV)}}$ | 0.5 | W |
| †Peak Gate Current ($T_c = +80^\circ\text{C}$, Pulse Width = 2.0 μs) | I_{GM} | 2.0 | A |
| †Peak Gate Voltage ($T_c = +80^\circ\text{C}$, Pulse Width = 2.0 μs) | V_{GM} | 10 | V |
| †Operating Junction Temperature Range | T_j | -40 to +150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -40 to +150 | $^\circ\text{C}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

† Indicates JEDEC Registered Data.

1. V_{DRM} and V_{RRM} 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.

Thermal Characteristics

| Rating | Symbol | Value | Unit |
|--|------------------|-------|--------------------|
| † Thermal Resistance, Junction to Case | $R_{\text{θJC}}$ | 2.2 | $^\circ\text{C/W}$ |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds | T_L | 260 | $^\circ\text{C}$ |

† Indicates JEDEC Registered Data..

Electrical Characteristics - OFF ($T_c = 25^\circ\text{C}$ unless otherwise noted; Electricals apply in both directions)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|--|-----|-----|-----|---------------|
| *Peak Repetitive Blocking Current ($V_D = V_{DRM} = V_{RRM}$; Gate Open) | $T_J = 25^\circ\text{C}$ I_{DRM} | - | - | 1.0 | μA |
| | $T_J = 100^\circ\text{C}$ I_{RRM} | - | - | 2.0 | mA |

Electrical Characteristics - ON ($T_c = 25^\circ\text{C}$ unless otherwise noted; Electricals apply in both directions)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------|-----|-----|------|------|
| †Peak On-State Voltage ($I_{TM} = \pm 11\text{ A Peak}$; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$) | V_{TM} | - | 1.3 | 1.55 | V |

Gate Trigger Current (Continuous dc) ($V_D = 12\text{ Vdc}$, $R_L = 100\ \Omega$)

| Quadrant | Symbol | Min | Typ | Max | Unit |
|---|--------|-----|-----|-----|------|
| Quadrant I: MT2(+), G(+) | Both | - | 12 | 50 | mA |
| Quadrant II: MT2(+), G(-) | 2N6349 | - | 12 | 75 | |
| Quadrant III: MT2(-), G(-) | Both | - | 20 | 50 | |
| Quadrant IV: MT2(-), G(+) | 2N6349 | - | 35 | 75 | |
| †MT2(+), G(+); MT2(-), G(-) TC = -40°C | - | - | - | 100 | |
| †MT2(+), G(-); MT2(-), G(+), TC = -40°C | - | - | - | 125 | |

Gate Trigger Voltage (Continuous dc) ($V_D = 12\text{ Vdc}$, $R_L = 100\ \Omega$)

| Quadrant | Symbol | Min | Typ | Max | Unit |
|---|--------|-----|-----|-----|------|
| Quadrant I: MT2(+), G(+) | Both | - | C | 2.0 | V |
| Quadrant II: MT2(+), G(-) | 2N6349 | - | - | 2.5 | |
| Quadrant III: MT2(-), G(-) | Both | - | - | 2.0 | |
| Quadrant IV: MT2(-), G(+) | 2N6349 | - | - | 2.5 | |
| †MT2(+), G(+); MT2(-), G(-) TC = -40°C | - | - | - | 2.5 | |
| †MT2(+), G(-); MT2(-), G(+), TC = -40°C | - | - | - | 3.0 | |

Gate Non-Trigger Voltage (Continuous dc) ($V_D = \text{Rated } V_{DRM}$, $R_L = 10\text{ k}\ \Omega$, $T_J = 100^\circ\text{C}$)

| Symbol | Min | Typ | Max | Unit |
|----------|-----|-----|-----|------|
| V_{GD} | .02 | - | - | V |

†Turn-On Time ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 11\text{ A}$, $I_{GT} = 120\text{ mA}$, Rise Time = $0.1\ \mu\text{s}$, Pulse Width = $2\ \mu\text{s}$)

| Symbol | Min | Typ | Max | Unit |
|----------|-----|-----|-----|---------------|
| t_{gt} | - | 1.5 | 2.0 | μs |

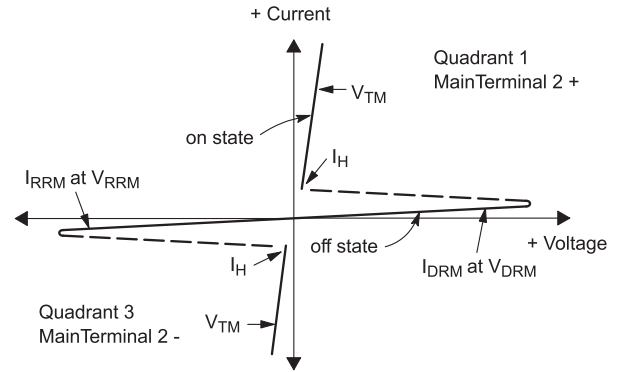
†Indicates JEDEC Registered Data.

Dynamic Characteristics

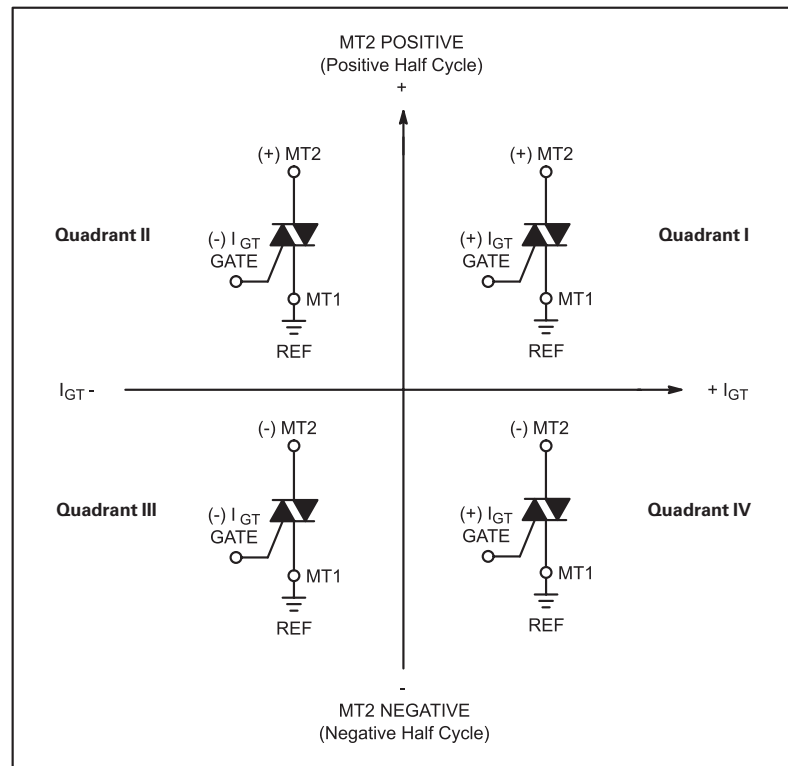
| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|------------|-----|-----|-----|------------------|
| Critical Rate of Rise of Commutation Voltag ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 11\text{ A}$, Commutating $di/dt = 4.0\text{ A/ms}$, Gate Unenergized, TC = 80°C) | $dv/dt(c)$ | - | 5.0 | - | V/ μs |

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.

Ratings and Characteristic Curves

Figure 1. RMS Current Derating

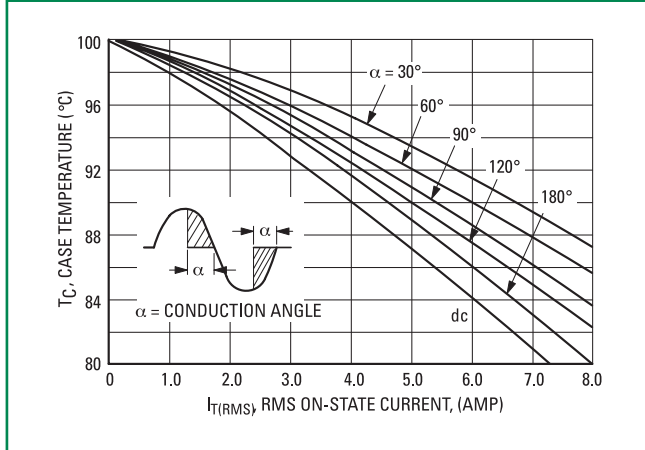


Figure 2. On-State Power Dissipation

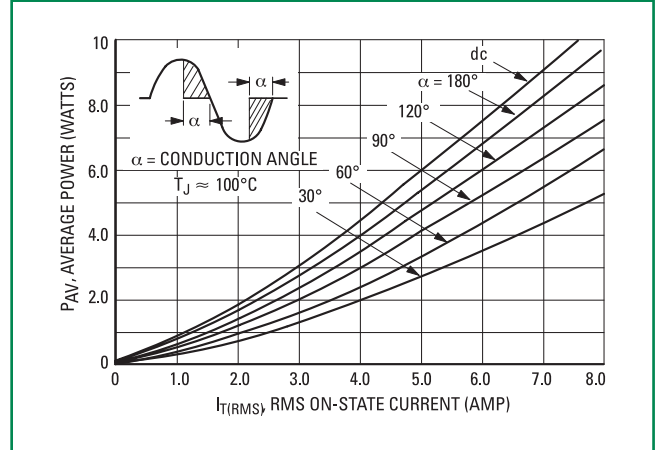


Figure 3. Typical Gate Trigger Voltage

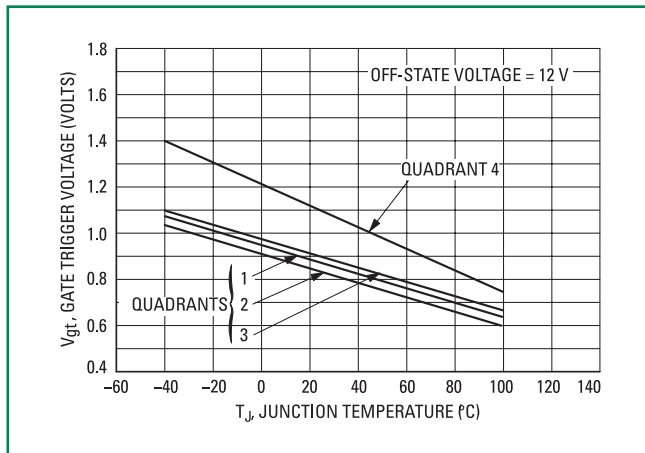


Figure 4. Typical Gate Trigger Current

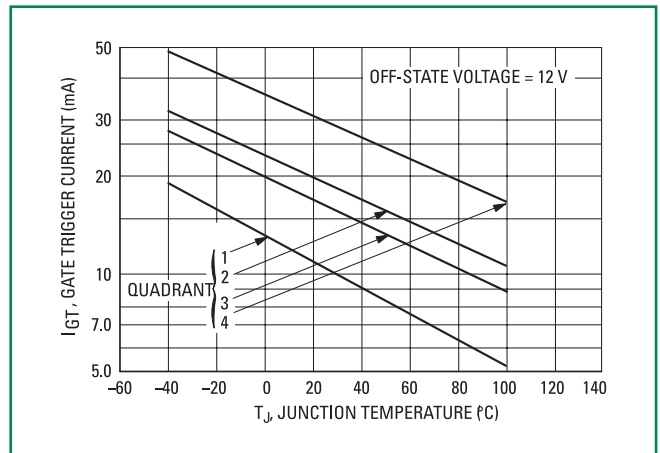


Figure 7. Maximum On-State Characteristics

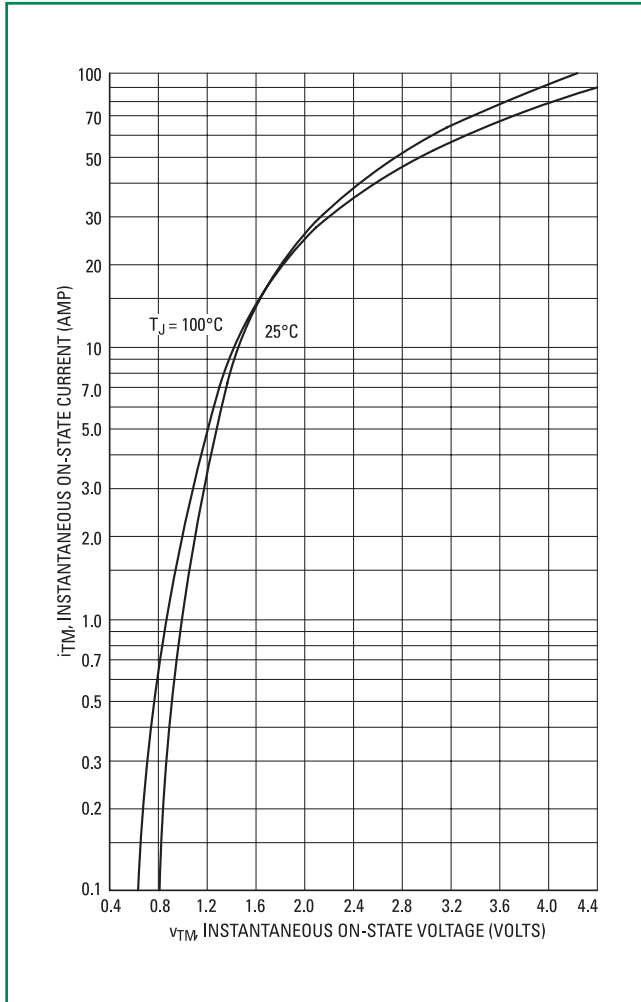


Figure 8. Typical Holding Current

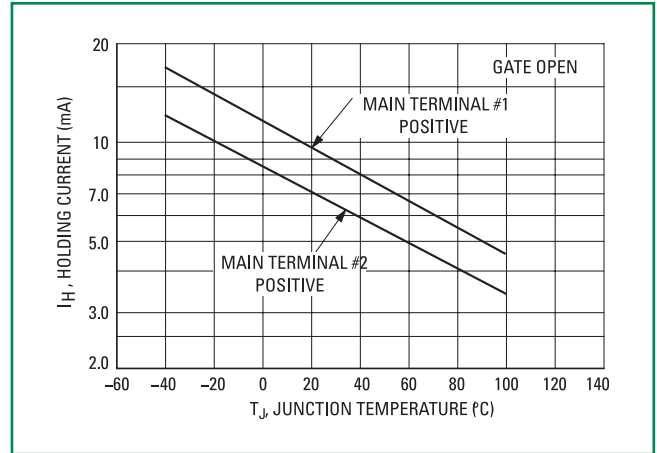


Figure 9. Maximum Allowable Surge Current

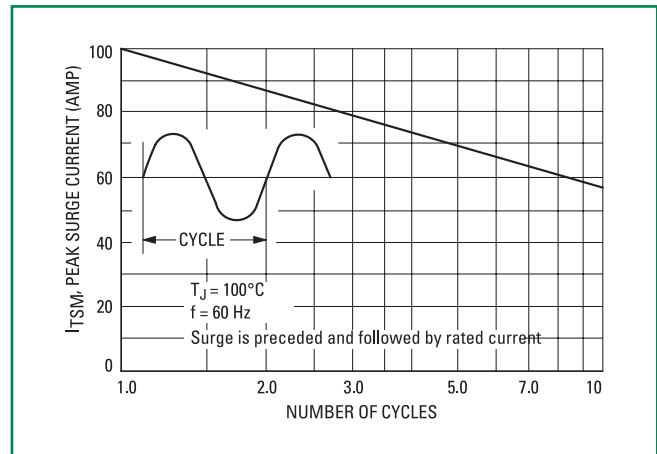
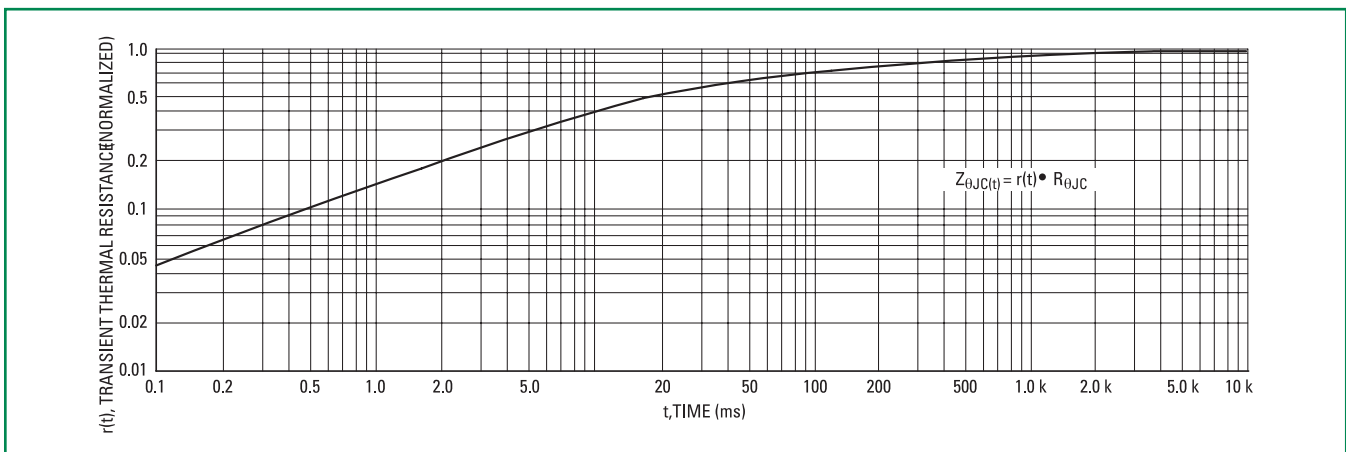
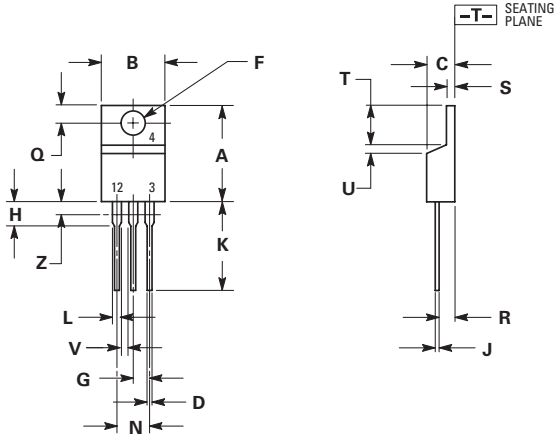


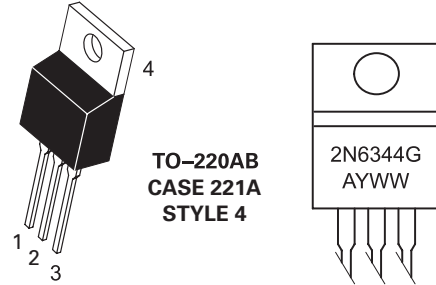
Figure 10. Thermal Response



Dimensions



Part Marking System



A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

| 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 |
| Q | 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 |

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.

Pin Assignment

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

Ordering Information

| Device | Package | Shipping† |
|---------|--------------------|-----------------|
| 2N6344 | TO-220AB | 500 Units / Box |
| 2N6344G | TO-220AB (Pb-Free) | |

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