

2N6071A/B Series



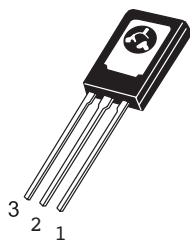
Description

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

- Sensitive Gate Triggering Uniquely Compatible for Direct Coupling to TTL, HTL, CMOS and Operational Amplifier Integrated Circuit Logic Functions
- Gate Triggering: 4 Mode - 2N6071A, B; 2N6073A, B; 2N6075A, B
- Blocking Voltages to 600 V
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermopad Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Device Marking: Device Type, e.g., 2N6071A, Date Code

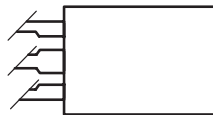
Pin Out



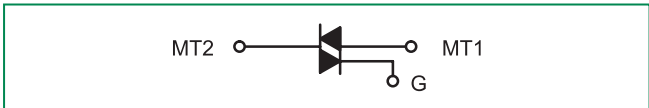
**REAR VIEW
SHOW TAB**

**TO-225
CASE 077
STYLE 5**

- 1. Cathode
- 2. Anode
- 3. Gate



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} | 200 400 600 | |
| 2N6071A,B | | | |
| 2N6073A,B | | | |
| 2N6075A,B | | | |
| *On-State RMS Current ($T_C = 85^\circ\text{C}$) Full Cycle Sine Wave 50 to 60 Hz | $I_{\text{T(RMS)}}$ | 4.0 | A |
| *Peak Non-repetitive Surge Current (One Full cycle, 60 Hz, $T_J = +110^\circ\text{C}$) | I_{TSM} | 30 | A |
| Circuit Fusing Considerations ($t = 8.3$ ms) | I_{2t} | 3.7 | A2s |
| *Peak Gate Power (Pulse Width " 1.0 μs , $T_C = 85^\circ\text{C}$) | P_{GM} | 10 | W |
| *Average Gate Power ($t = 8.3$ ms, $T_C = 85^\circ\text{C}$) | $P_{\text{G(AV)}}$ | 0.5 | W |
| *Peak Gate Voltage (Pulse Width " 1.0 μs , $T_C = 85^\circ\text{C}$) | V_{GM} | 5.0 | V |
| *Operating Junction Temperature Range | T_J | -40 to +110 | $^\circ\text{C}$ |
| *Storage Temperature Range | T_{stg} | -40 to +150 | $^\circ\text{C}$ |
| Mounting Torque (6-32 Screw) (Note 2) | – | 8.0 | in. lb. |

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.

- 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.
- Torque rating applies with use of a compression washer. Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Main terminal 2 and heatsink contact pad are common.

Thermal Characteristics

| Rating | Symbol | Value | Unit |
|--|------------------|-------|--------------------|
| *Thermal Resistance, Junction to Case | R_{BJC} | 3.5 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Ambient (Note 1) | R_{BJA} | 75 | $^\circ\text{C/W}$ |
| 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} | - | - | 10 | μA |
| | $T_J = 110^\circ\text{C}$ I_{RRM} | - | - | 2 | 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 (Note 3) ($I_{TM} = \pm 6.0$ A Peak) | C | - | - | 2 | V | |
| *Gate Trigger Voltage (Continuous DC), All Quadrants (Main Terminal Voltage = 12 Vdc, $R_L = 100 \Omega$, $T_J = -40^\circ\text{C}$) | V_{GT} | - | 1.4 | 2.5 | V | |
| Gate Non-Trigger Voltage, All Quadrants (Main Terminal Voltage = 12 Vdc, $R_L = 100 \Omega$, $T_J = 110^\circ\text{C}$) | V_{GD} | .02 | - | - | V | |
| *Holding Current (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = ± 1 Adc) | $T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ I_H | - | - | 30 | mA | |
| | | - | - | 15 | | |
| Turn-On Time ($I_{TM} = 14$ Adc, $I_{GT} = 100$ mAdc) | t_{gt} | - | 1.5 | - | μs | |
| | | QUADRANT (Maximum Value) | | | | |
| Gate Trigger Current (Continuous DC) (Main Terminal Voltage = 12 Vdc, $R_L = 100 \Omega$) | Type | I_{GT} @ T_J | I mA | II mA | III mA | IV mA |
| | 2N6071A | +25 $^\circ\text{C}$ | 5 | 5 | 5 | 10 |
| | 2N6073A | -40 $^\circ\text{C}$ | 20 | 20 | 20 | 30 |
| | 2N6075A | | | | | |
| | 2N6071B | +25 $^\circ\text{C}$ | 3 | 3 | 3 | 5 |
| | 2N6073B | -40 $^\circ\text{C}$ | 15 | 15 | 15 | 20 |
| 2N6075B | | | | | | |

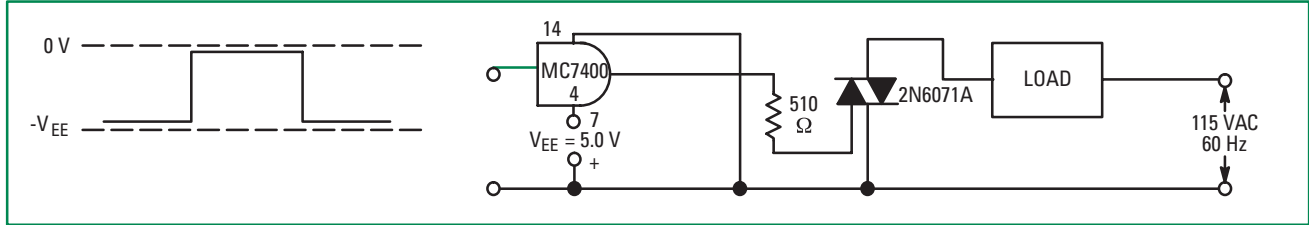
3. Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle $\leq 2\%$.

*Indicates JEDEC Registered Data.

Dynamic Characteristics

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|------------|-----|-----|-----|------------------|
| Critical Rate of Rise of Commutation Voltage @ V_{DRM} , $T_J = 85^\circ\text{C}$, Gate Open, $I_{TM} = 5.7$ A, Exponential Waveform, Commutating $di/dt = 2.0$ A/ms | $dv/dt(c)$ | - | 5 | 10 | V/ μs |

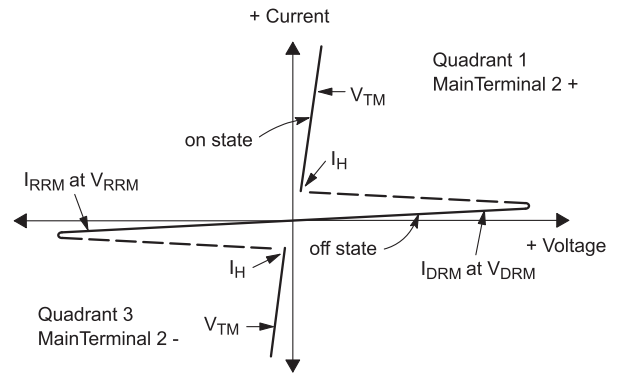
SAMPLE APPLICATION: TTL-Sensitive Gate 4 Ampere Triac Triggers in Modes II and III



- Trigger devices are recommended for gating on Triacs. They provide:
1. Consistent predictable turn-on points.
 2. Simplified circuitry.
 3. Fast turn-on time for cooler, more efficient and reliable operation.

Voltage Current Characteristic of Triacs (Bidirectional Device)

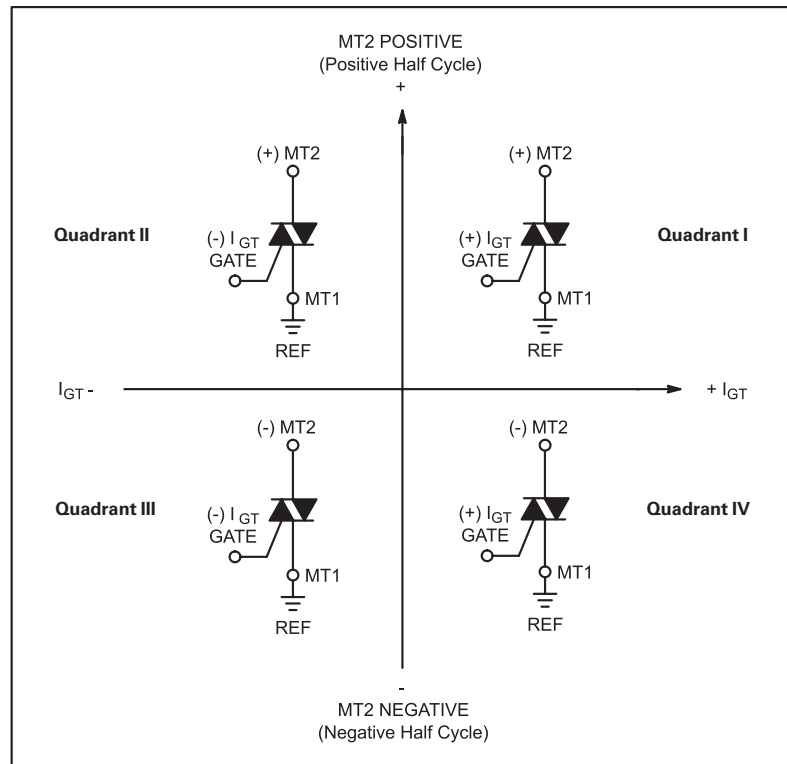
| Symbol | Parameter |
|-----------|---|
| V_{DRM} | Peak Repetitive Forward Off State Voltage |
| I_{DRM} | Peak Forward Blocking Current |
| V_{RRM} | Peak Repetitive Reverse Off State Voltage |
| I_{RRM} | Peak Reverse Blocking Current |
| V_{TM} | Maximum On State Voltage |
| I_H | Holding Current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



Sensitive Gate Logic Reference

| IC Logic Functions | Firing Quadrant | | | |
|-----------------------|-----------------|----------------|----------------|----------------|
| | I | II | III | IV |
| TTL | – | 2N6071A Series | 2N6071A Series | – |
| HTL | – | 2N6071A Series | 2N6071A Series | – |
| CMOS (NAND) | 2N6071B Series | – | – | 2N6071B Series |
| CMOS (Buffer) | – | 2N6071B Series | 2N6071B Series | – |
| Operational Amplifier | 2N6071A Series | – | – | 2N6071A Series |
| Zero Voltage Switch | – | 2N6071A Series | 2N6071A Series | – |

Quadrant Definitions for a Triac



Ratings and Characteristic Curves

Figure 1. Average Current Derating

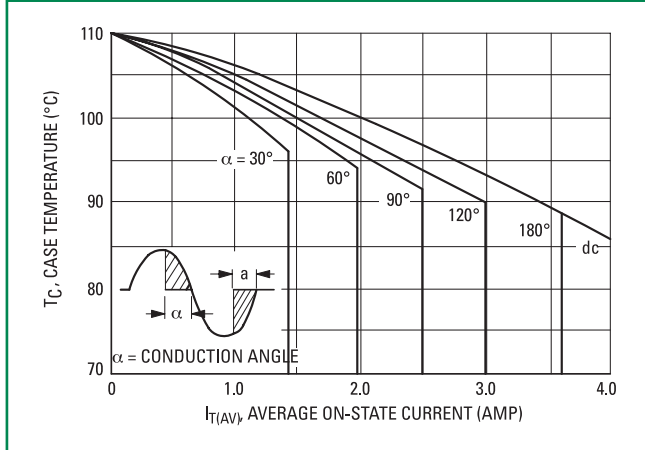


Figure 2. RMS Current Derating

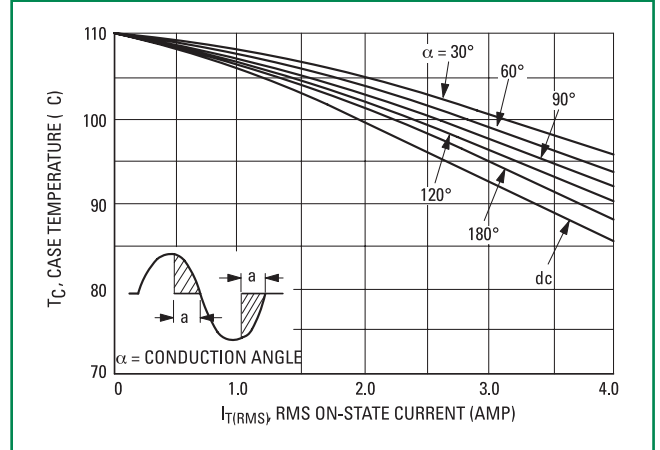


Figure 3. Power Dissipation

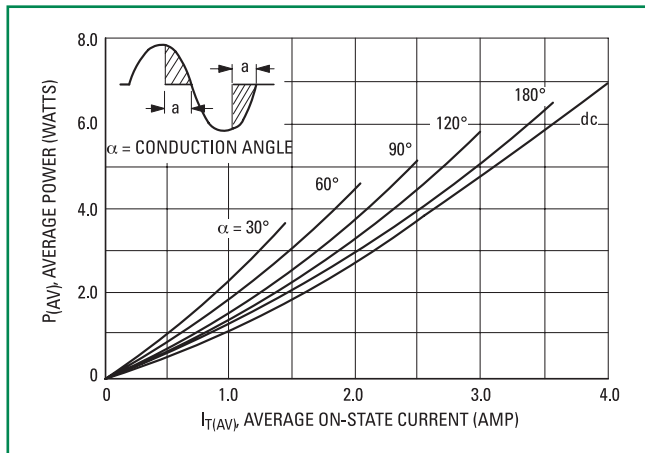


Figure 4. Power Dissipation

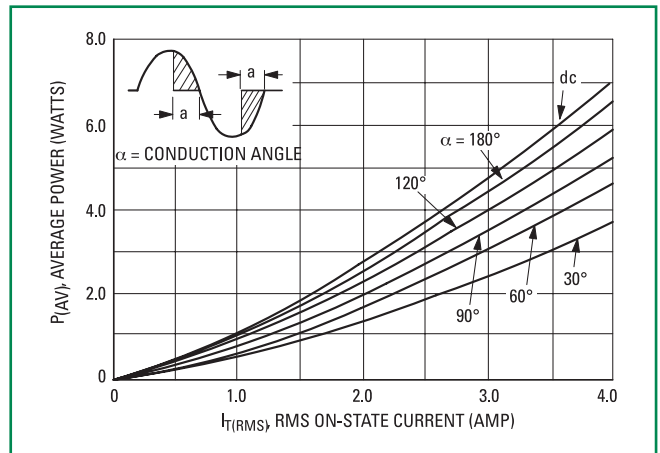


Figure 5. Typical Gate-Trigger Voltage

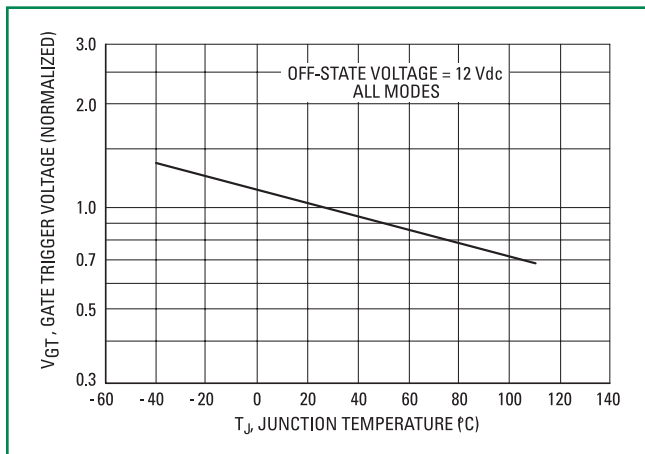


Figure 6. Typical Gate-Trigger Current

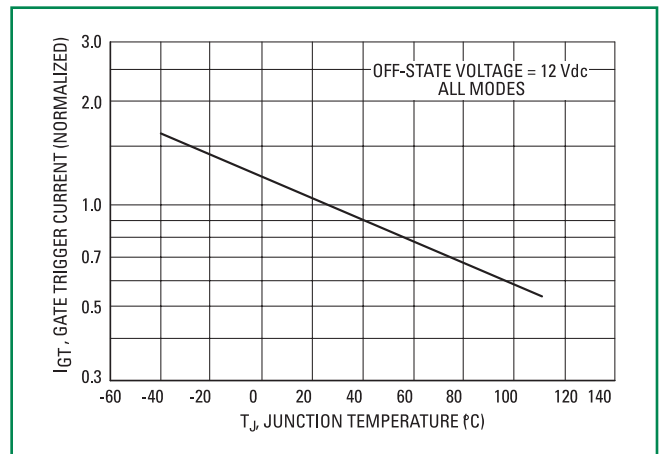


Figure 7. Maximum On-State Characteristics

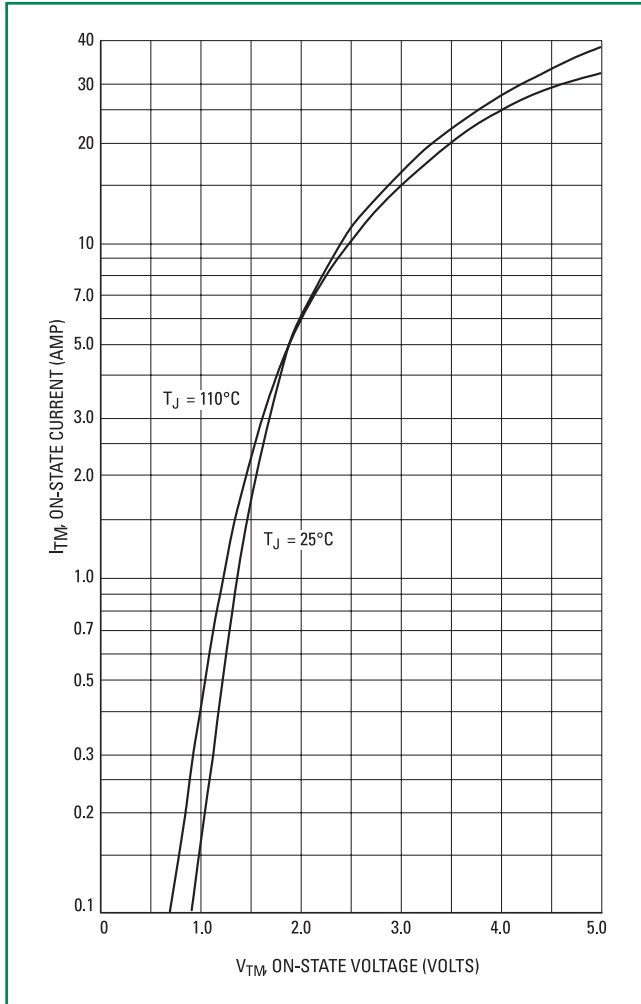


Figure 8. Typical Holding Current

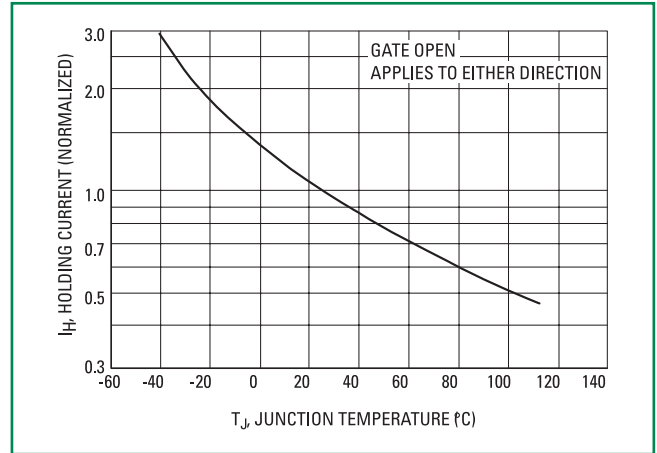


Figure 9. Maximum Allowable Surge Current

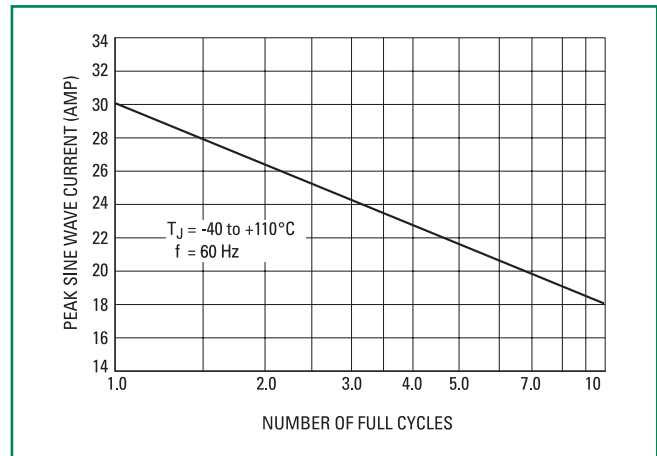
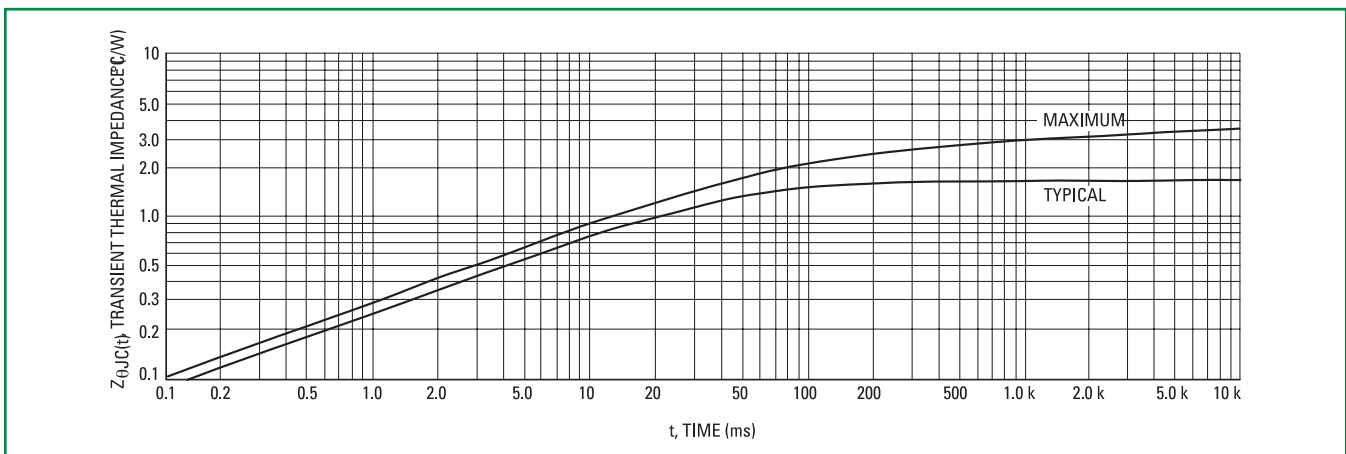
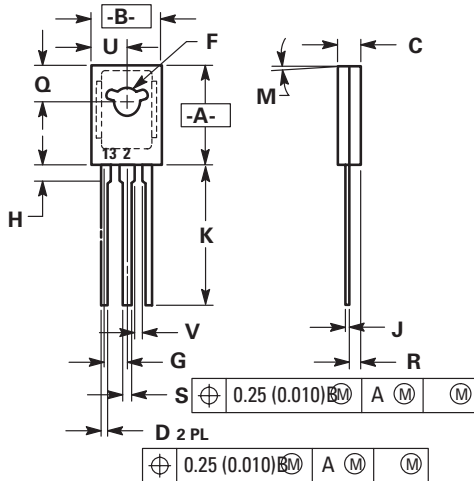


Figure 10. Thermal Response



Dimensions

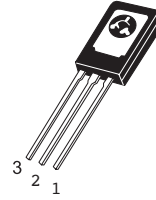


| Dim | Inches | | Millimeters | |
|-----|-----------|-------|-------------|-------|
| | Min | Max | Min | Max |
| A | 0.425 | 0.435 | 10.80 | 11.04 |
| B | 0.295 | 0.305 | 7.50 | 7.74 |
| C | 0.095 | 0.105 | 2.42 | 2.66 |
| D | 0.020 | 0.026 | 0.51 | 0.66 |
| F | 0.115 | 0.130 | 2.93 | 3.30 |
| G | 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 | — |

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

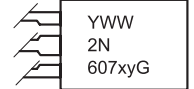
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Part Marking System



REAR VIEW
SHOW TAB

1. Cathode
2. Anode
3. Gate



TO-225
CASE 077
STYLE 5

- x = 1, 3, 5
y = A, B
Y = Year
WW = Work Week
G = Pb-Free Package

Ordering Information

| Device | Package | Shipping† |
|-----------|------------------|-------------------------------------|
| 2N6071A | TO-225 | 500 Units / Box |
| 2N6071AG | TO-225 (Pb-Free) | |
| 2N6071AT | TO-225 | 50 Units / Tube 2000 Units / Box |
| 2N6071ATG | TO-225 (Pb-Free) | |
| 2N6071B | TO-225 | 500 Units / Box |
| 2N6071BG | TO-225 (Pb-Free) | |
| 2N6071BT | TO-225 | 50 Units / Tube 2000 Units / Box |
| 2N6071BTG | TO-225 (Pb-Free) | |
| 2N6073A | TO-225 | 500 Units / Box |
| 2N6073AG | TO-225 (Pb-Free) | |
| 2N6073B | TO-225 | |
| 2N6073BG | TO-225 (Pb-Free) | |
| 2N6075A | TO-225 | |
| 2N6075AG | TO-225 (Pb-Free) | |
| 2N6075B | TO-225 | |
| 2N6075BG | TO-225 (Pb-Free) | |

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