

2N6071A/B Series

Preferred Device

Sensitive Gate 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.

- 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 Volts
- 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

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|--------------------------|-------------------|----------------------|
| *Peak Repetitive Off-State Voltage ⁽¹⁾ ($T_J = -40$ to 110°C , Sine Wave, 50 to 60 Hz, Gate Open) | V_{DRM} , V_{RRM} | 200 400 600 | Volts |
| *On-State RMS Current ($T_C = 85^\circ\text{C}$) Full Cycle Sine Wave 50 to 60 Hz | $I_T(\text{RMS})$ | 4.0 | Amps |
| *Peak Non-repetitive Surge Current (One Full cycle, 60 Hz, $T_J = +110^\circ\text{C}$) | I_{TSM} | 30 | Amps |
| Circuit Fusing Considerations ($t = 8.3$ ms) | I^2t | 3.7 | A^2s |
| *Peak Gate Power (Pulse Width ≤ 1.0 μs , $T_C = 85^\circ\text{C}$) | P_{GM} | 10 | Watts |
| *Average Gate Power ($t = 8.3$ ms, $T_C = 85^\circ\text{C}$) | $P_{G(AV)}$ | 0.5 | Watt |
| *Peak Gate Voltage (Pulse Width ≤ 1.0 μs , $T_C = 85^\circ\text{C}$) | V_{GM} | 5.0 | Volts |
| *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) ⁽²⁾ | — | 8.0 | in. lb. |

*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.

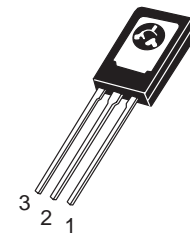
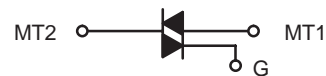
(2) Torque rating applies with use of a compression washer. Mounting torque in excess of 6 in. lb. does not appreciably lower case-to-sink thermal resistance. Main terminal 2 and heatsink contact pad are common.



ON Semiconductor

<http://onsemi.com>

TRIACS
4 AMPERES RMS
200 thru 600 VOLTS



TO-225AA
(formerly TO-126)
CASE 077
STYLE 5

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

ORDERING INFORMATION

| Device | Package | Shipping |
|---------|---------|----------|
| 2N6071A | TO225AA | 500/Box |
| 2N6071B | TO225AA | 500/Box |
| 2N6073A | TO225AA | 500/Box |
| 2N6073B | TO225AA | 500/Box |
| 2N6075A | TO225AA | 500/Box |
| 2N6075B | TO225AA | 500/Box |

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

2N6071A/B Series

THEMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|-----|---------------|
| *Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 3.5 | $^{\circ}C/W$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 75 | $^{\circ}C/W$ |
| Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds | T_L | 260 | $^{\circ}C$ |

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$ unless otherwise noted; Electricals apply in both directions)

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

OFF CHARACTERISTICS

| | | | | | |
|--|--------------------|---|---|----|---------|
| *Peak Repetitive Blocking Current ($V_D = \text{Rated } V_{DRM}, V_{RRM}$; Gate Open) | I_{DRM}, I_{RRM} | — | — | 10 | μA |
| $T_J = 25^{\circ}C$ | | — | — | 2 | mA |
| $T_J = 110^{\circ}C$ | | — | — | | |

ON CHARACTERISTICS

| | | | | | | |
|---|-----------------|---|-------------------------------------|------------------|-------------------|------------------|
| *Peak On-State Voltage ⁽¹⁾ ($I_{TM} = \pm 6$ A Peak) | V_{TM} | — | — | 2 | Volts | |
| *Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100$ Ohms, $T_J = -40^{\circ}C$) All Quadrants | V_{GT} | — | 1.4 | 2.5 | Volts | |
| Gate Non-Trigger Voltage (Main Terminal Voltage = 12 Vdc, $R_L = 100$ Ohms, $T_J = 110^{\circ}C$) All Quadrants | V_{GD} | 0.2 | — | — | Volts | |
| *Holding Current (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = ± 1 Adc) | I_H | — | — | 30 | mA | |
| $(T_J = -40^{\circ}C)$ | | — | — | 15 | | |
| $(T_J = 25^{\circ}C)$ | | | | | | |
| 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, $R_L = 100$ ohms) | Type | I_{GT} @ T_J | I mA | II mA | III mA | IV mA |
| | 2N6071A | +25 $^{\circ}C$ | 5 | 5 | 5 | 10 |
| | 2N6073A | -40 $^{\circ}C$ | 20 | 20 | 20 | 30 |
| | 2N6075A | | | | | |
| | 2N6071B | +25 $^{\circ}C$ | 3 | 3 | 3 | 5 |
| 2N6073B | -40 $^{\circ}C$ | 15 | 15 | 15 | 20 | |
| 2N6075B | | | | | | |

DYNAMIC CHARACTERISTICS

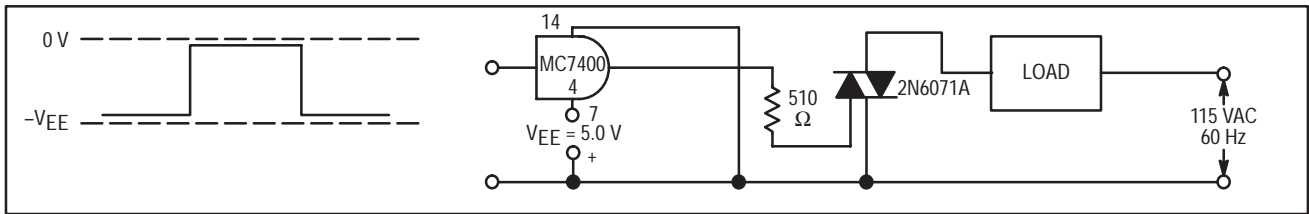
| | | | | | |
|--|------------|---|---|---|------------|
| Critical Rate of Rise of Commutation Voltage @ V_{DRM} , $T_J = 85^{\circ}C$, Gate Open, $I_{TM} = 5.7$ A, Exponential Waveform, Commutating $di/dt = 2.0$ A/ms | $dv/dt(c)$ | — | 5 | — | V/ μs |
|--|------------|---|---|---|------------|

*Indicates JEDEC Registered Data.

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

2N6071A/B Series

SAMPLE APPLICATION: TTL-SENSITIVE GATE 4 AMPERE TRIAC TRIGGERS IN MODES II AND III

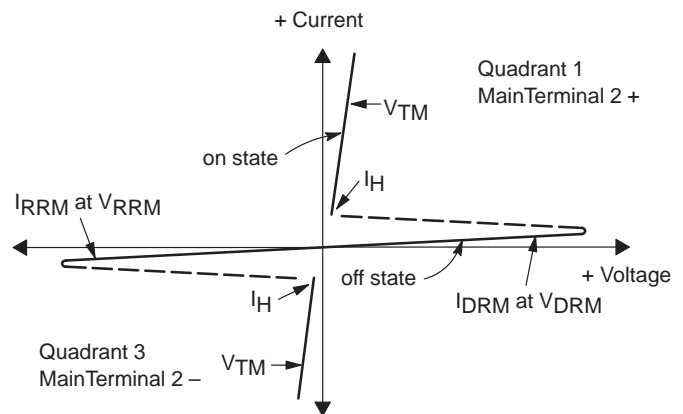


Trigger devices are recommended for gating on Triacs. They provide:

1. Consistent predictable turn-on points.
2. Simplified circuitry.
3. Fast turn-on time for cooler, more efficient and reliable operation.

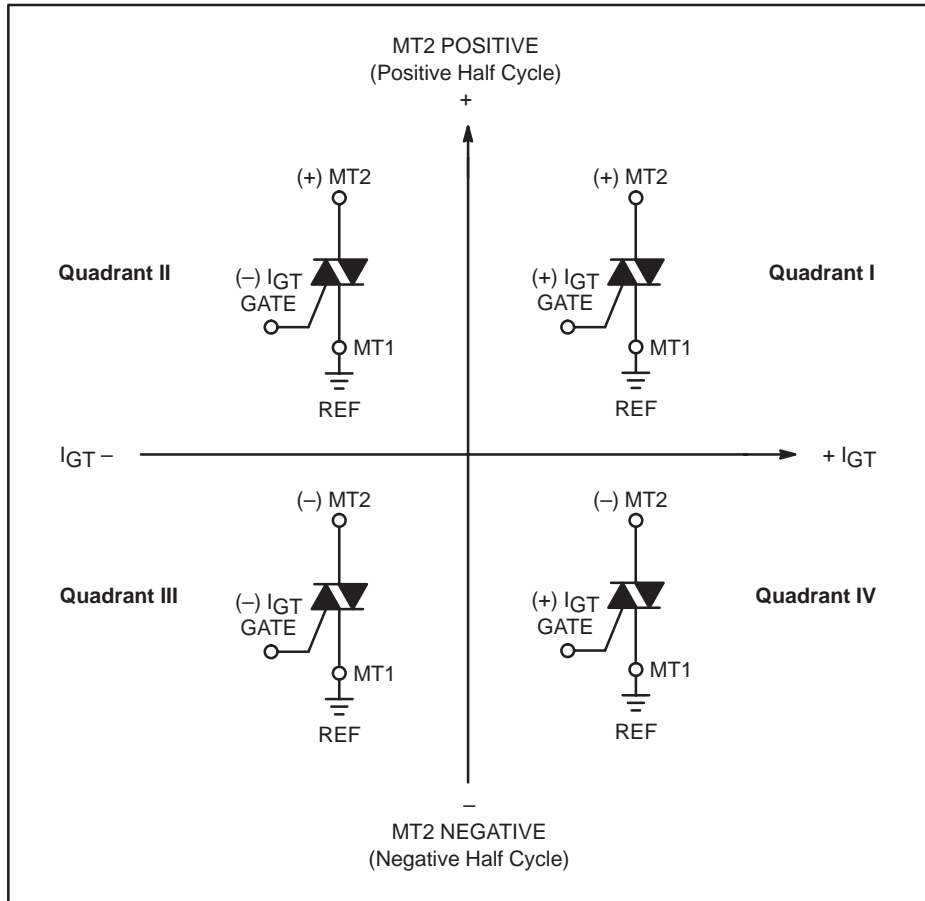
Voltage Current Characteristic of Triacs (Bidirectional Device)

| 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 |



2N6071A/B Series

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.

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 | |

2N6071A/B Series

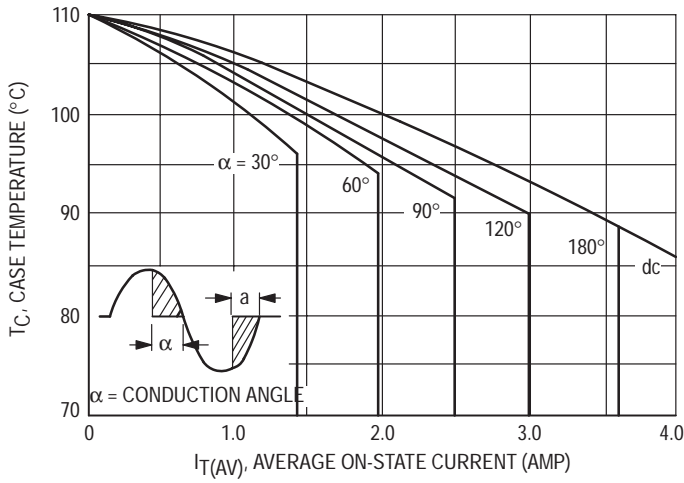


Figure 1. Average Current Derating

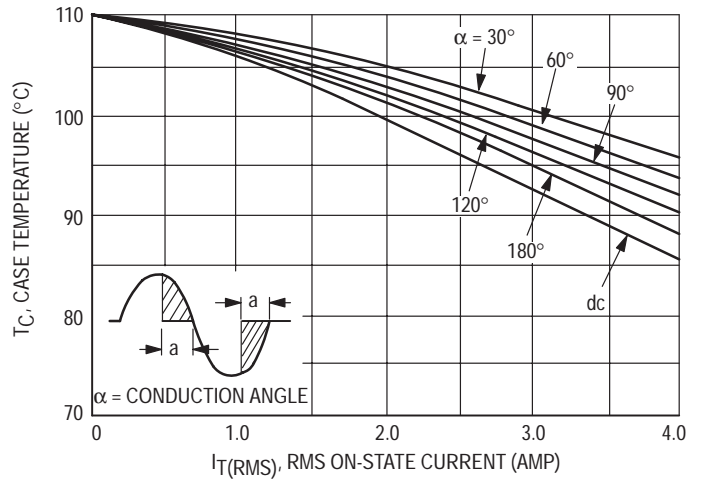


Figure 2. RMS Current Derating

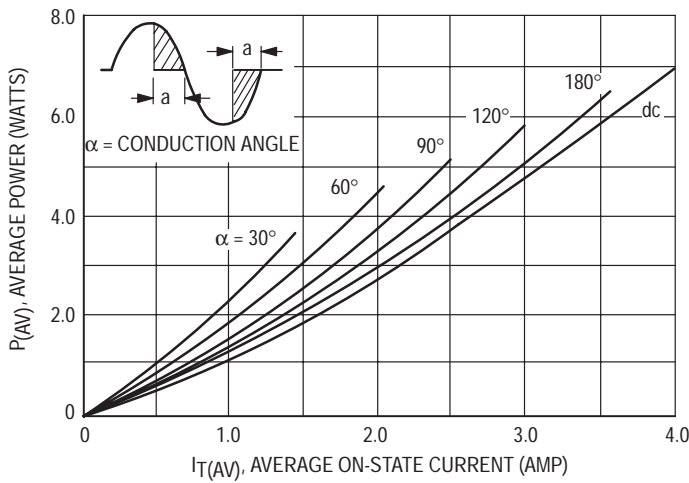


Figure 3. Power Dissipation

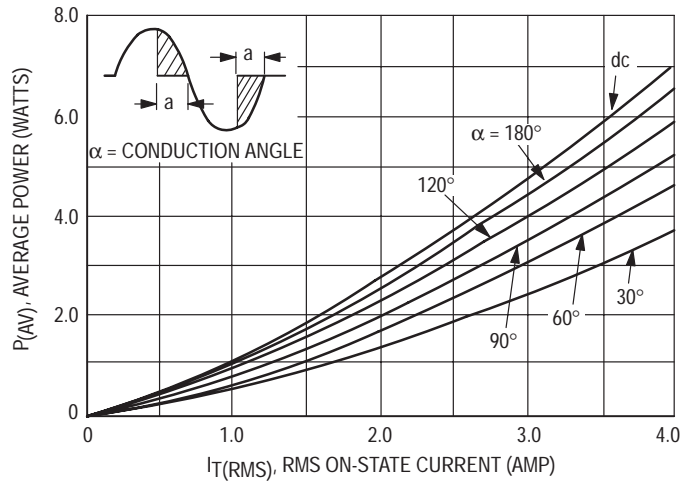


Figure 4. Power Dissipation

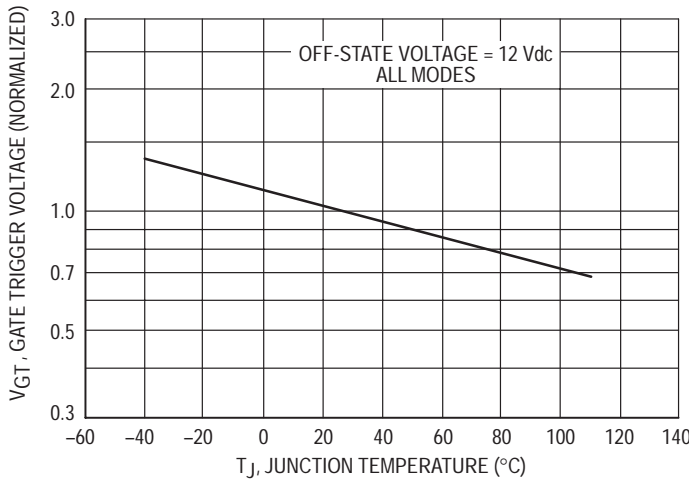


Figure 5. Typical Gate-Trigger Voltage

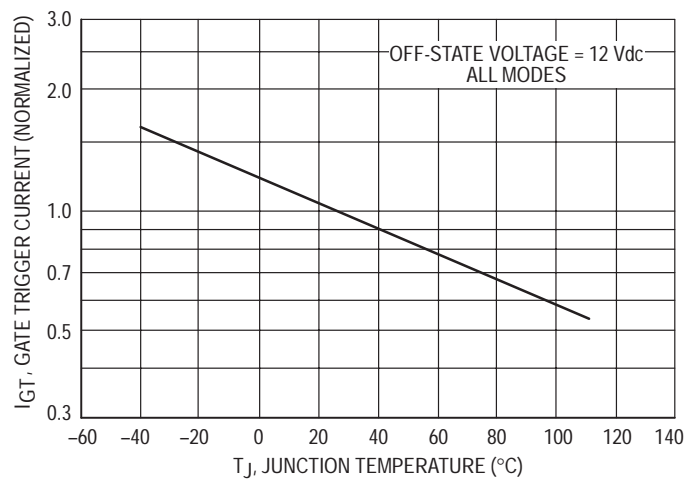


Figure 6. Typical Gate-Trigger Current

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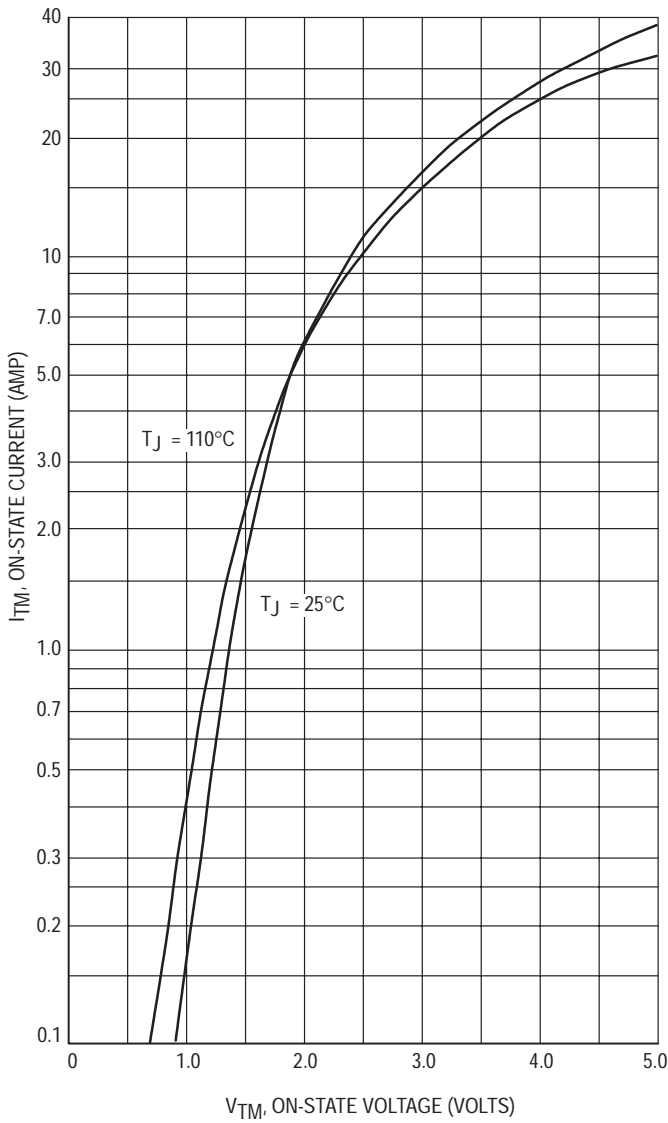


Figure 7. Maximum On-State Characteristics

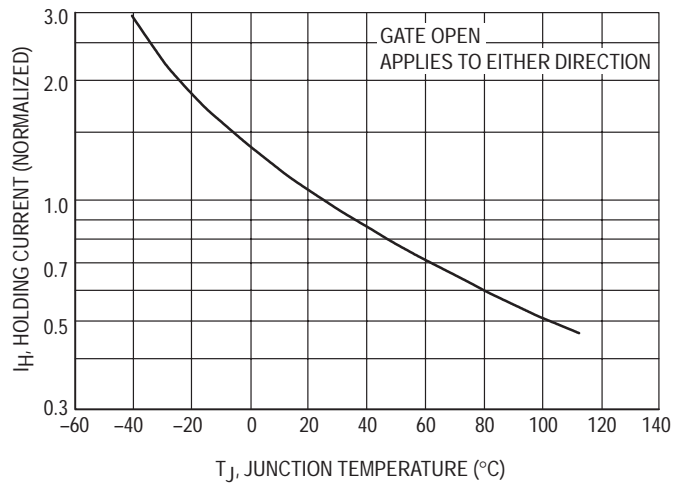


Figure 8. Typical Holding Current

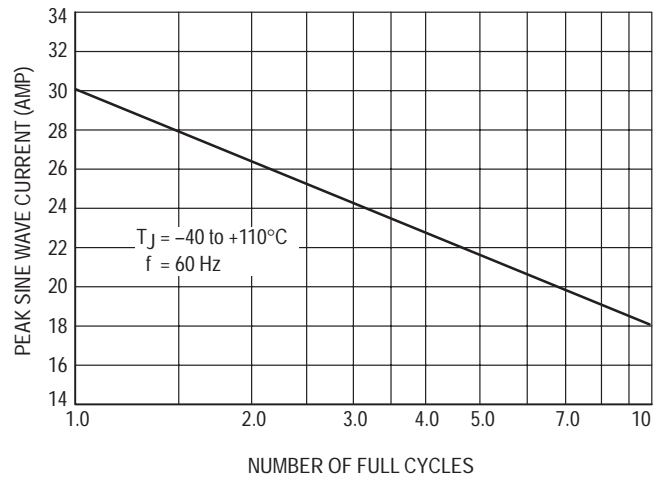


Figure 9. Maximum Allowable Surge Current

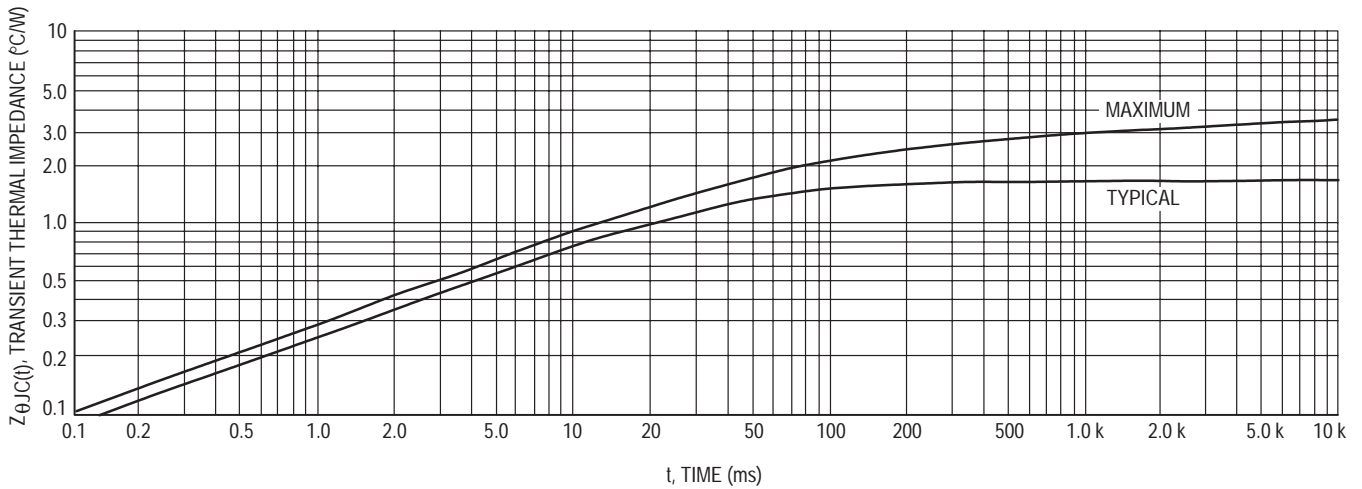
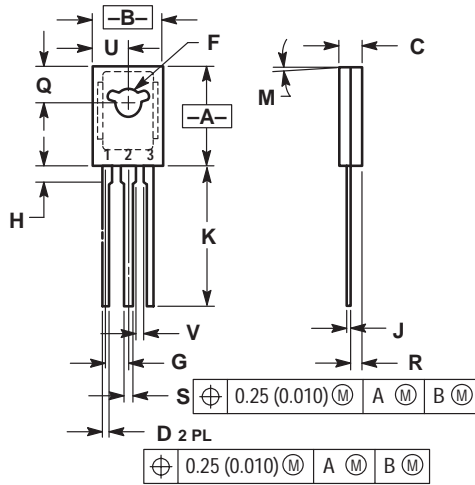


Figure 10. Thermal Response

2N6071A/B Series

PACKAGE DIMENSIONS

TO-225AA
(formerly TO-126)
CASE 077-09
ISSUE W




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

| 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 5:
PIN 1. MT 1
2. MT 2
3. GATE

2N6071A/B Series

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