

# T2800D

## Triacs

### Silicon Bidirectional Thyristors

Designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies.

- Blocking Voltage to 400 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
- Four Quadrant Gating
- Device Marking: Logo, Device Type, e.g., T2800D, Date Code

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

| Rating                                                                                                 | Symbol                                 | Value           | Unit                 |
|--------------------------------------------------------------------------------------------------------|----------------------------------------|-----------------|----------------------|
| Peak Repetitive Off-State Voltage <sup>(1)</sup><br>( $T_J = -40$ to $+125^\circ\text{C}$ , Gate Open) | $V_{\text{DRM}}$ ,<br>$V_{\text{RRM}}$ | 400             | Volts                |
| On-State RMS Current<br>(All Conduction Angles, $T_C = +80^\circ\text{C}$ )                            | $I_{\text{T(RMS)}}$                    | 8.0             | Amps                 |
| Peak Non-Repetitive Surge Current<br>(One Full Cycle Sine Wave, 60 Hz,<br>$T_J = +80^\circ\text{C}$ )  | $I_{\text{TSM}}$                       | 100             | Amps                 |
| Circuit Fusing Consideration ( $t = 8.3$ ms)                                                           | $I^2t$                                 | 40              | $\text{A}^2\text{s}$ |
| Peak Gate Power<br>(Pulse Width = 10 $\mu\text{s}$ , $T_C = +80^\circ\text{C}$ )                       | $P_{\text{GM}}$                        | 16              | Watts                |
| Average Gate Power ( $t = 8.3$ ms,<br>$T_C = +80^\circ\text{C}$ )                                      | $P_{\text{G(AV)}}$                     | 0.35            | Watt                 |
| Peak Gate Current<br>(Pulse Width = 10 $\mu\text{s}$ , $T_C = +80^\circ\text{C}$ )                     | $I_{\text{GM}}$                        | 4.0             | Amps                 |
| Operating Junction Temperature Range                                                                   | $T_J$                                  | $-40$ to $+125$ | $^\circ\text{C}$     |
| Storage Temperature Range                                                                              | $T_{\text{stg}}$                       | $-40$ to $+150$ | $^\circ\text{C}$     |

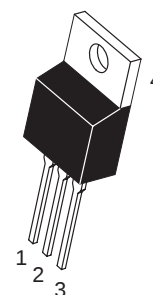
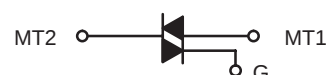
(1)  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



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**TRIACS**  
**8 AMPERES RMS**  
**400 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 |
|--------|---------|----------|
| T2800D | TO220AB | 500/Box  |

# T2800D

## THERMAL CHARACTERISTICS

| Characteristic                                                                | Symbol          | Value | Unit          |
|-------------------------------------------------------------------------------|-----------------|-------|---------------|
| Thermal Resistance, Junction to Case                                          | $R_{\theta JC}$ | 2.2   | $^{\circ}C/W$ |
| 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<br>( $V_D = \text{Rated } V_{DRM}, V_{RRM}; \text{ Gate Open}$ ) | $I_{DRM}, I_{RRM}$ | — | — | 10  | $\mu A$ |
|                                                                                                   |                    | — | — | 2.0 | mA      |

## ON CHARACTERISTICS

|                                                                                                                                                            |          |     |      |     |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----|------|-----|---------|
| Peak On-State Voltage <sup>(1)</sup><br>( $I_T = \pm 30 \text{ A Peak}$ )                                                                                  | $V_{TM}$ | —   | 1.7  | 2.0 | Volts   |
| Gate Trigger Current (Continuous dc)<br>( $V_D = 12 \text{ Vdc}, R_L = 100 \text{ Ohms}$ )<br>MT2(+), G(+)<br>MT2(+), G(–)<br>MT2(–), G(–)<br>MT2(–), G(+) | $I_{GT}$ | —   | 10   | 25  | mA      |
|                                                                                                                                                            |          | —   | 20   | 60  |         |
|                                                                                                                                                            |          | —   | 15   | 25  |         |
|                                                                                                                                                            |          | —   | 30   | 60  |         |
| Gate Trigger Voltage (Continuous dc) (All Quadrants)<br>( $V_D = 12 \text{ Vdc}, R_L = 100 \text{ Ohms}$ )                                                 | $V_{GT}$ | —   | 1.25 | 2.5 | Volts   |
| Gate Non-Trigger Voltage (Continuous dc)<br>( $V_D = 12 \text{ V}, R_L = 100 \text{ Ohms}, T_C = 100^{\circ}C$ )                                           | $V_{GD}$ | 0.2 | —    | —   | Volts   |
| Holding Current<br>( $V_D = 12 \text{ Vdc}, \text{ Initiating Current} = \pm 200 \text{ mA}, \text{ Gate Open}$ )                                          | $I_H$    | —   | 15   | 30  | mA      |
| Gate Controlled Turn-On Time<br>( $V_D = \text{Rated } V_{DRM}, I_T = 10 \text{ A}, I_{GT} = 80 \text{ mA}, \text{ Rise Time} = 0.1 \mu s$ )               | $t_{gt}$ | —   | 1.6  | —   | $\mu s$ |

## DYNAMIC CHARACTERISTICS

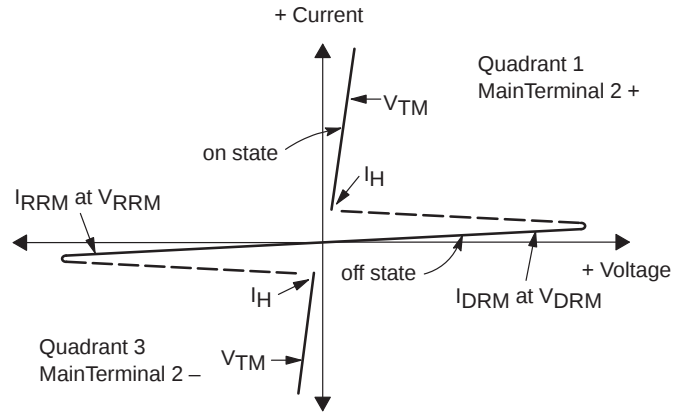
|                                                                                                                                                                                                              |            |    |    |   |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----|----|---|-----------|
| Critical Rate-of-Rise of Commutation Voltage<br>( $V_D = \text{Rated } V_{DRM}, I_T(\text{RMS}) = 8 \text{ A}, \text{ Commutating } di/dt = 4.1 \text{ A/ms}, \text{ Gate Unenergized}, T_C = 80^{\circ}C$ ) | $dv/dt(c)$ | —  | 10 | — | $V/\mu s$ |
| Critical Rate-of-Rise of Off-State Voltage<br>( $V_D = \text{Rated } V_{DRM}, \text{ Exponential Voltage Rise}, \text{ Gate Open}, T_C = 100^{\circ}C$ )                                                     | $dv/dt$    | 60 | —  | — | $V/\mu s$ |

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

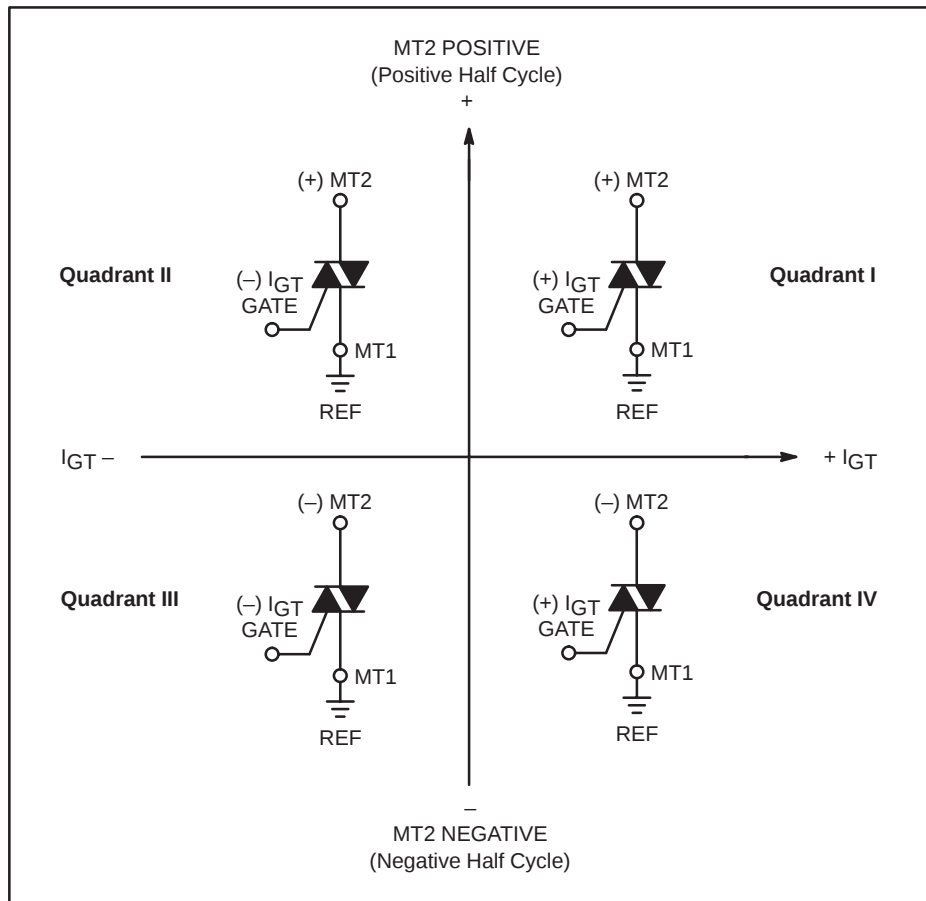
# T2800D

## 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.

# T2800D

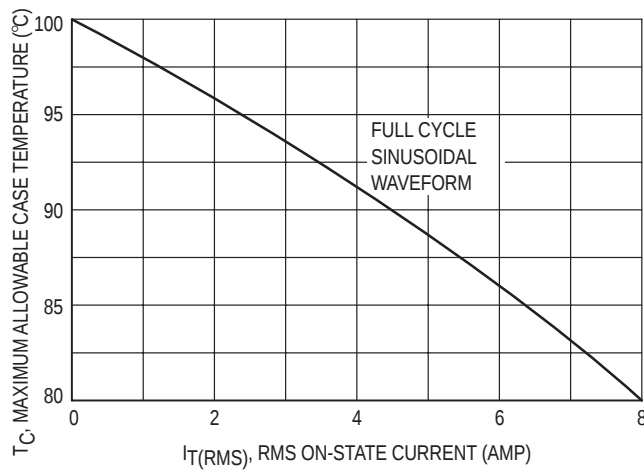


Figure 1. Current Derating

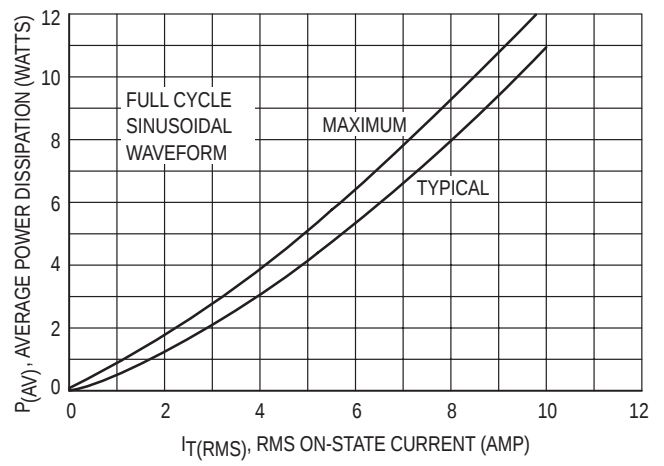
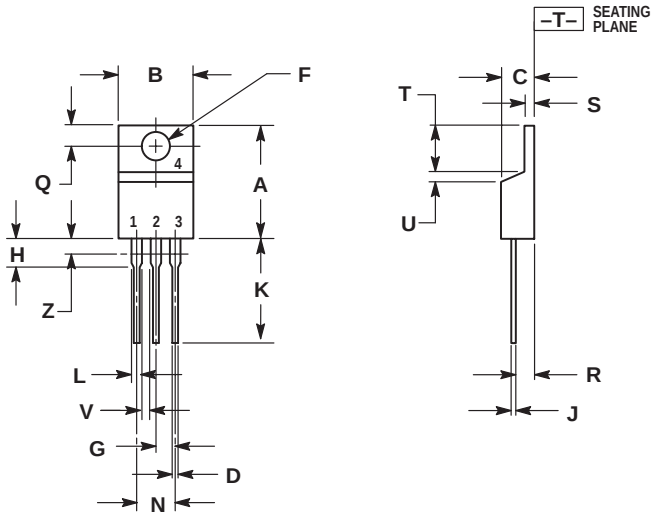


Figure 2. Power Dissipation

# T2800D

## 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
- MAIN TERMINAL 2
- GATE
- MAIN TERMINAL 2

## Notes

## Notes

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