

# 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<sub>J</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> (T <sub>J</sub> = -40 to +125°C, Gate Open)	V <sub>DRM</sub> , V <sub>RRM</sub>	400	Volts
On-State RMS Current (All Conduction Angles, T <sub>C</sub> = +80°C)	I <sub>T(RMS)</sub>	8.0	Amps
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, T <sub>J</sub> = +80°C)	I <sub>TSM</sub>	100	Amps
Circuit Fusing Consideration (t = 8.3 ms)	I <sup>2</sup> t	40	A <sup>2</sup> s
Peak Gate Power (Pulse Width = 10 μs, T <sub>C</sub> = +80°C)	P <sub>GM</sub>	16	Watts
Average Gate Power (t = 8.3 ms, T <sub>C</sub> = +80°C)	P <sub>G(AV)</sub>	0.35	Watt
Peak Gate Current (Pulse Width = 10 μs, T <sub>C</sub> = +80°C)	I <sub>GM</sub>	4.0	Amps
Operating Junction Temperature Range	T <sub>J</sub>	-40 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C

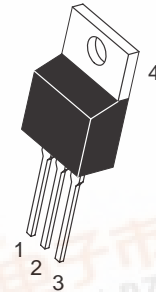
(1) V<sub>DRM</sub> and V<sub>RRM</sub> for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



**ON Semiconductor**

<http://onsemi.com>

**TRIACS**  
**8 AMPERES RMS**  
**400 VOLTS**



**TO-220AB**  
**CASE 221A**  
**STYLE 4**

#### PIN ASSIGNMENT

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
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## OFF CHARACTERISTICS

Peak Repetitive Blocking Current ( $V_D = \text{Rated } V_{DRM}, V_{RRM}; \text{ Gate Open}$ )	$I_{DRM}, I_{RRM}$	—	—	10	$\mu A$
		—	—	2.0	mA

## ON CHARACTERISTICS

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

## DYNAMIC CHARACTERISTICS

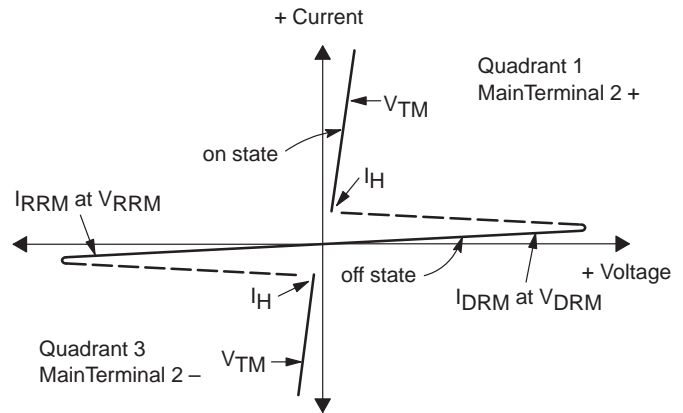
Critical Rate-of-Rise of Commutation Voltage ( $V_D = \text{Rated } V_{DRM}, I_T(\text{RMS}) = 8 A, \text{ Commutating } di/dt = 4.1 A/ms, \text{ Gate Unenergized}, T_C = 80^{\circ}C$ )	$dv/dt(c)$	—	10	—	$V/\mu s$
Critical Rate-of-Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}, \text{ Exponential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

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

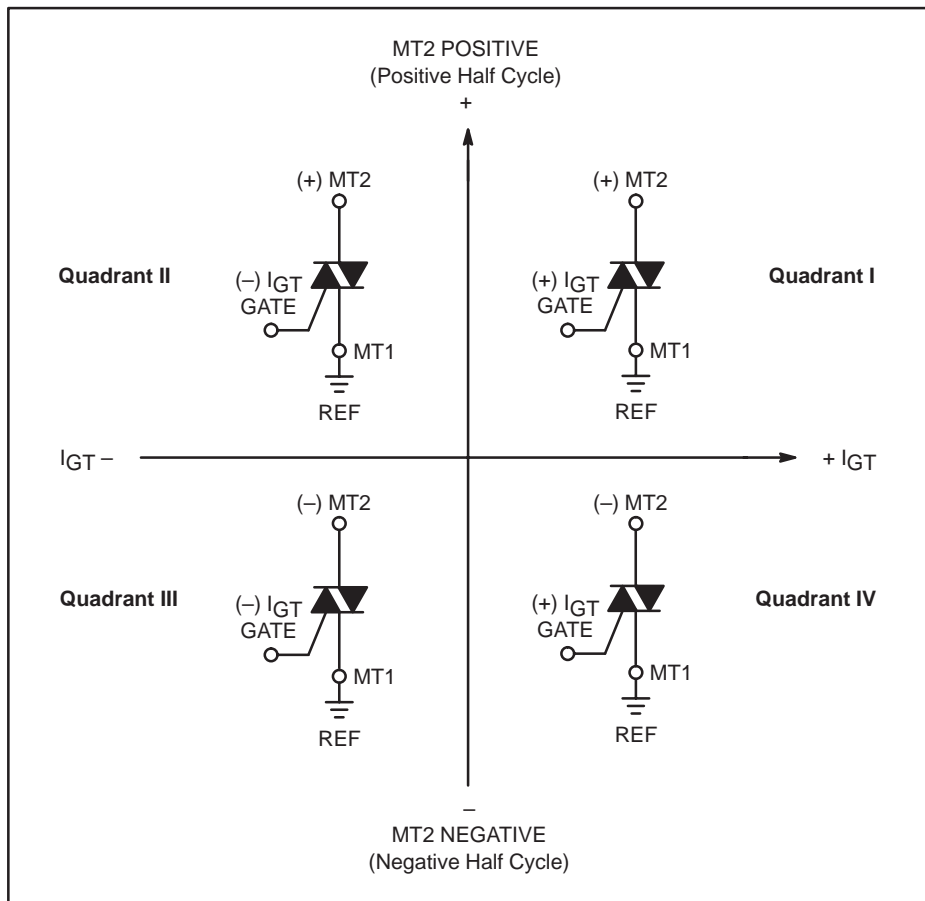
# T2800D

## 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.

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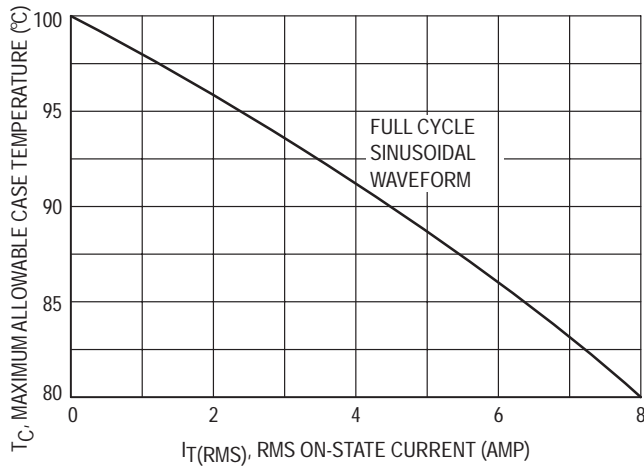


Figure 1. Current Derating

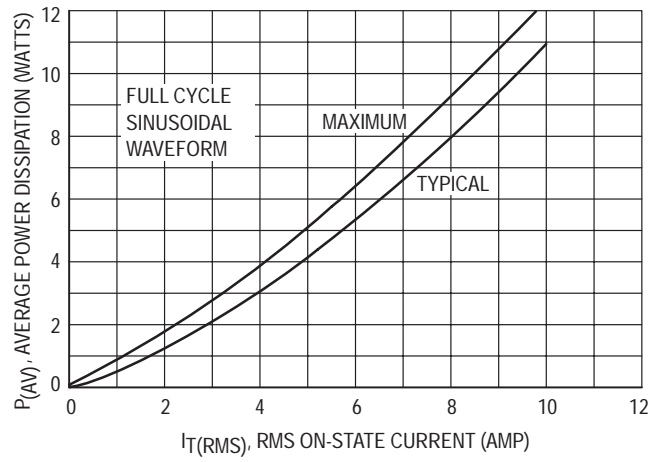
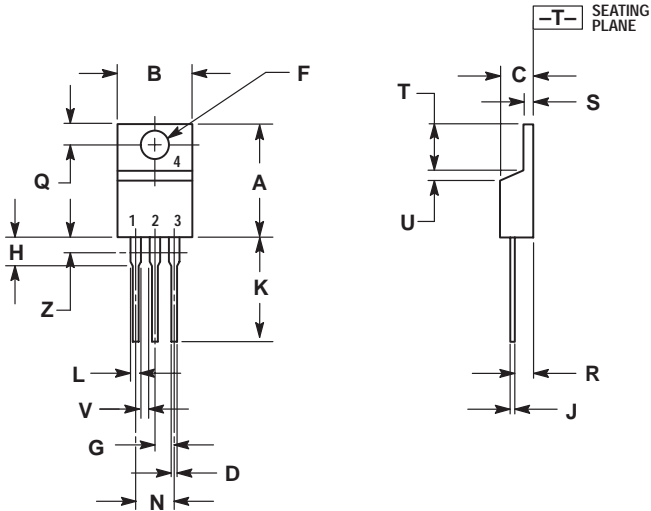


Figure 2. Power Dissipation

# 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
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

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

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## Notes

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