



**TIC225A, TIC225B, TIC225C, TIC225D, TIC225E, TIC225M,  
TIC225N, TIC225S**

**SILICON BIDIRECTIONAL TRIODE THYRISTOR**

- Sensitive gate triacs
- 8 A RMS
- 70 A Peak
- Glass Passivated Wafer
- 100 V to 800 V Off-State Voltage
- Max I<sub>GT</sub> of 50 mA (Quadrants 1)
- **Compliance to ROHS**

**DESCRIPTION**

This device is a bidirectional triode thyristor (triac) which may be triggered from the off-state to the on-state by either polarity of gate signal with main Terminal 2 at either polarity.

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Ratings	Value								Unit
		A	B	C	D	E	M	S	N	
V <sub>DRM</sub>	Repetitive peak off-state voltage (see Note1)	100	200	300	400	500	600	700	800	V
I <sub>T(RMS)</sub>	Full-cycle RMS on-state current at (or below) 70°C case temperature (see note2)	8								A
I <sub>TSM</sub>	Peak on-state surge current full-sine-wave (see Note3)	70								A
I <sub>TSM</sub>	Peak on-state surge current half-sine-wave (see Note4)	8								A
I <sub>GM</sub>	Peak gate current	± 1								A
P <sub>GM</sub>	Peak gate power dissipation at (or below) 85°C case temperature (pulse width ≤200 μs)	2.2								W
P <sub>G(AV)</sub>	Average gate power dissipation at (or below) 85°C case (see Note5)	0.9								W
T <sub>C</sub>	Operating case temperature range	-40 to +110								°C
T <sub>stg</sub>	Storage temperature range	-40 to +125								°C
T <sub>L</sub>	Lead temperature 1.6 mm from case for 10 seconds	230								°C



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Notes:

1. These values apply bidirectionally for any value of resistance between the gate and Main Terminal 1.
2. This value applies for 50-Hz full-sine-wave operation with resistive load. Above 70°C derate linearly to 110°C case temperature at the rate of 200 mA/°C.
3. This value applies for one 50-Hz full-sine-wave when the device is operating at (or below) the rated value of on-state current. Surge may be repeated after the device has returned to original thermal equilibrium. During the surge, gate control may be lost.
4. This value applies for one 50-Hz half-sine-wave when the device is operating at (or below) the rated value of on-state current. Surge may be repeated after the device has returned to original thermal equilibrium. During the surge, gate control may be lost.
5. This value applies for a maximum averaging time of 20 ms.

## THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
$R_{\theta JC}$	Junction to case thermal resistance	$\leq 2.5$	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance	$\leq 62.5$	

## ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Mx	Unit
$I_{DRM}$	Repetitive peak off-state current	$V_D = \text{Rated } V_{DRM}, I_G = 0, T_C = 110^\circ\text{C}$	-	-	$\pm 2$	mA
$I_{GT}$	Gate trigger current	$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	0.8	5	mA
		$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	-4.5	-20	
		$V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	-3.5	-10	
		$V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	11.7	30	
$V_{GT}$	Gate trigger voltage	$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	0.7	2	V
		$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	-0.8	-2	
		$V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	-0.8	-2	
		$V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	0.9	2	
$I_H$	Holding current	$V_{supply} = +12\text{ V}\dagger, I_G = 0, \text{initiating } I_{TM} = 100\text{ mA}$	-	3	20	mA
		$V_{supply} = -12\text{ V}\dagger, I_G = 0, \text{initiating } I_{TM} = -100\text{ mA}$	-	-4.7	-20	
$I_L$	Latching current	$V_{supply} = +12\text{ V}\dagger \text{ (see Note 7)}$	-	-	30	mA
		$V_{supply} = -12\text{ V}\dagger \text{ (see Note 7)}$	-	-	-30	
$V_{TM}$	Peak on-state voltage	$I_{TM} = \pm 12\text{ A}, I_G = 50\text{ mA}$ (see Note 6)	-	$\pm 1.6$	$\pm 2.1$	V
$dv/dt$	Critical rate of rise of off-state voltage	$V_{DRM} = \text{Rated } V_{DRM}, I_G = 0, T_C = 110^\circ\text{C}$	-	$\pm 50$	-	V/ $\mu\text{s}$
$dv/dt_{\text{c}}$	Critical rise of communication voltage	$V_{DRM} = \text{Rated } V_{DRM}, I_{TRM} = \pm 12\text{ A}, T_C = 70^\circ\text{C}$	$\pm 1$	$\pm 1.5$	$\pm 4.5$	

† All voltages are with respect to Main Terminal 1.

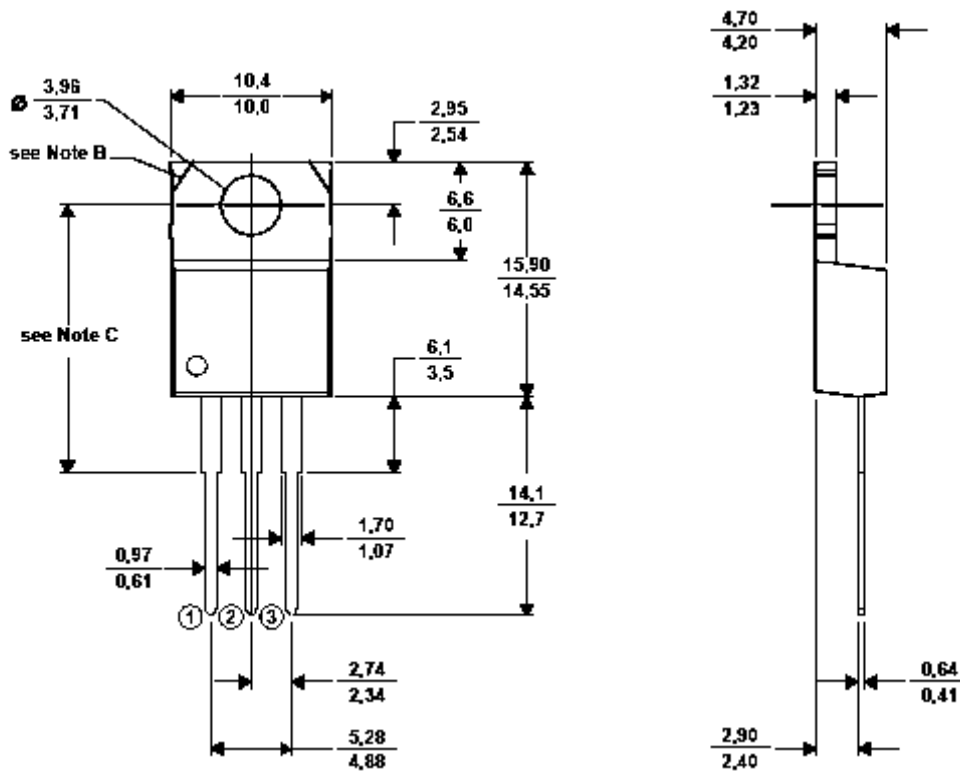
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Note 6: This parameters must be measured using pulse techniques,  $t_w = \leq 1\text{ms}$ , duty cycle  $\leq 2\%$ , voltage-sensing contacts, separate from the current-carrying contacts are located within 3.2mm (1/8 inch) from the device body.

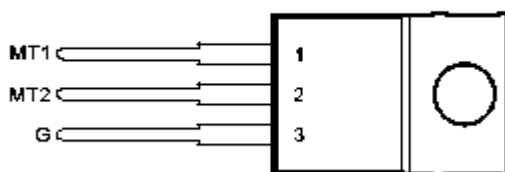
Note 7: The triacs are triggered by a 15-V (open circuit amplitude) pulse supplied by a generator with the following characteristics :  $R_G = 100\Omega$ ,  $t_{p(g)} = 20\ \mu\text{s}$ ,  $t_r = \leq 15\text{ns}$ ,  $f = 1\ \text{kHz}$ .

**MECHANICAL DATA CASE TO-220**

TO220



TO-220 PACKAGE  
(TOP VIEW)



Pin 1 :	Main Terminal 1
Pin 2 :	Main Terminal 2
Pin 3 :	Gate

Pin 2 is in electrical contact with the mounting base.