

## TIC246B, TIC246C, TIC246D, TIC246E, TIC246M, TIC246N, TIC246S

### SILICON BIDIRECTIONAL TRIODE THYRISTOR

- High current triacs
- 16 A RMS
- 70 A Peak
- Glass Passivated Wafer
- 200 V to 800 V Off-State Voltage
- Max  $I_{GT}$  of 50 mA (Quadrants 1-3)
- 125 A peak current
- 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
		B	C	D	E	M	S	N	
$V_{DRM}$	Repetitive peak off-state voltage (see Note1)	200	300	400	500	600	700	800	V
$I_{T(RMS)}$	Full-cycle RMS on-state current at (or below) 70°C case temperature (see note2)	16							A
$I_{TSM}$	Peak on-state surge current full-sine-wave (see Note3)	125							A
$I_{GM}$	Peak gate current	± 1							A
$T_C$	Operating case temperature range	-40 to +110							°C
$T_{stg}$	Storage temperature range	-40 to +125							°C
$T_L$	Lead temperature 1.6 mm from case for 10 seconds	230							°C

#### THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
$R_{\theta JC}$	Junction to case thermal resistance	≤ 1.9	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance	≤ 62.5	

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### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	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	$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	12	50	mA
		$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	-19	-50	
		$V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	-16	-50	
		$V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	34	-	
$V_{GT}$	Gate trigger voltage	$V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$	-	0.8	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	$V_{supply} = +12\text{ V}\dagger, I_G = 0$ initiating $I_{TM} = 100\text{ mA}$	-	22	40	mA
		$V_{supply} = -12\text{ V}\dagger, I_G = 0$ initiating $I_{TM} = -100\text{ mA}$	-	-22	-40	
$I_L$	Latching current	$V_{supply} = +12\text{ V}\dagger$ (see Note 5)	-	-	80	mA
		$V_{supply} = -12\text{ V}\dagger$ (see Note 5)	-	-	-80	
$V_{TM}$	Peak on-state voltage	$I_{TM} = \pm 22.5\text{ A}, I_G = 50\text{ mA}$ (see Note 4)	-	$\pm 1.4$	$\pm 1.7$	V
$dv/dt$	Critical rate of rise of off-state voltage	$V_{DRM} = \text{Rated } V_{DRM}, I_G = 0$ $T_C = 110^\circ\text{C}$	-	$\pm 400$	-	V/ $\mu\text{s}$
$di/dt$	Critical rate of rise of off-state current	$V_{DRM} = \text{Rated } V_{DRM}, I_{GT} = 50\text{ mA}$ $di_G/dt = 50\text{ mA}/\mu\text{s}, T_C = 110^\circ\text{C}$	-	$\pm 100$	-	A/ $\mu\text{s}$
$dv/dt_{\text{c}}$	Critical rise of communication voltage	$V_{DRM} = \text{Rated } V_{DRM}, I_T = 1.4 I_{T(RMS)}$ $di/dt = 0.5 I_{T(RMS)}/\text{ms}, T_C = 80^\circ\text{C}$	$\pm 1.2$	$\pm 9$	-	V/ $\mu\text{s}$

† All voltages are with respect to Main Terminal 1.

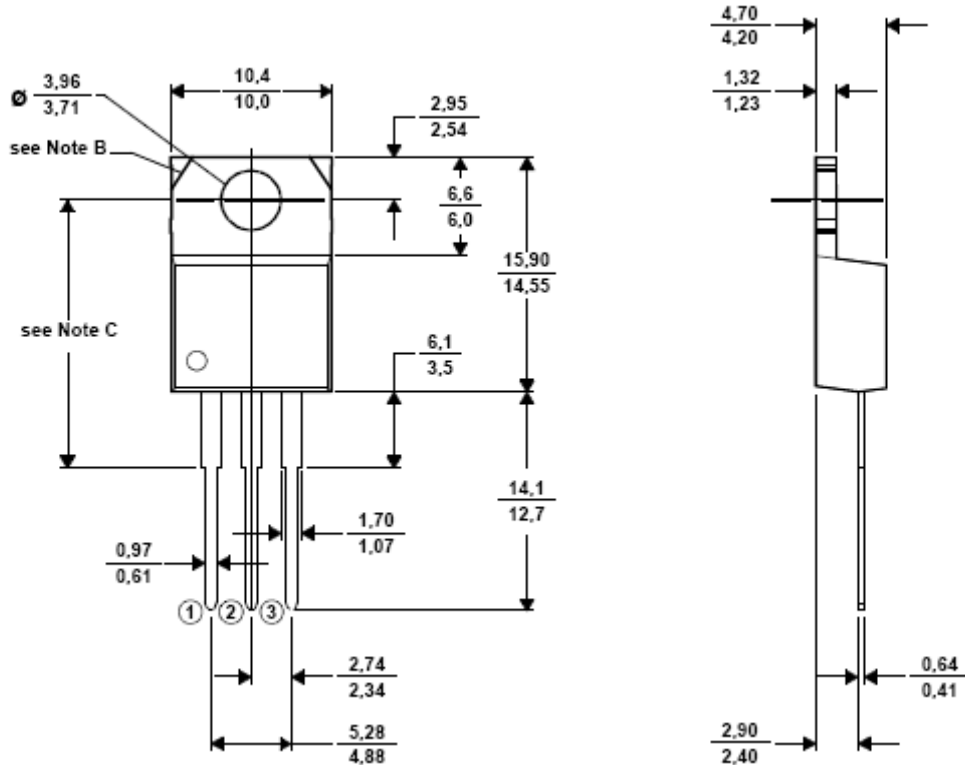
Notes:

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 400 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 peak reverse voltage and on-state current. Surge may be repeated after the device has returned to original thermal equilibrium.
4. 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.
5. The triacs are triggered by a 15-V (open circuit amplitude) pulse supplied by a generator with the following characteristics:  $R_G = 100\ \Omega, t_{p(g)} = 20\ \mu\text{s}, t_r = \leq 15\text{ns}, f = 1\text{ kHz}$ .

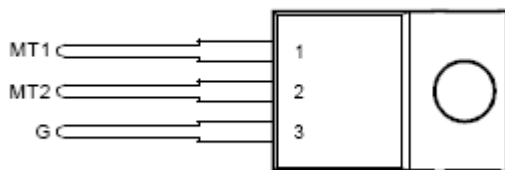
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**MECHANICAL DATA CASE TO-220**

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.

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