

## TIC226A, TIC226B, TIC226C, TIC226D, TIC226E, TIC226M, TIC226N, TIC226S

### SILICON BIDIRECTIONAL TRIODE THYRISTOR

- 8 A RMS
- 70 A Peak
- Glass Passivated Wafer
- 100 V to 800 V Off-State Voltage
- Max  $I_{GT}$  of 50 mA (Quadrants 1-3)
- High-temperature, High-current and high-voltage applications
- 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   |      |
| $V_{DRM}$    | Repetitive peak off-state voltage (see Note1)   | 100         | 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)       | 8           |     |     |     |     |     |     |     | A    |
| $I_{TSM}$    | Peak on-state surge current full-sine-wave (see Note3)                                | 70          |     |     |     |     |     |     |     | A    |
| $I_{TSM}$    | Peak on-state surge current half-sine-wave (see Note4)                                | 8           |     |     |     |     |     |     |     | A    |
| $I_{GM}$     | Peak gate current   | ± 1         |     |     |     |     |     |     |     | A    |
| $P_{GM}$     | Peak gate power dissipation at (or below) 85°C case temperature (pulse width ≤200 μs) | 2.2         |     |     |     |     |     |     |     | W    |
| $P_{G(AV)}$  | Average gate power dissipation at (or below) 85°C case (see Note5)                    | 0.9         |     |     |     |     |     |     |     | W    |
| $T_C$        | 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   |

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### THERMAL CHARACTERISTICS

| Symbol          | Ratings                                 | Value       | Unit |
|-----------------|---|-------------|------|
| $R_{\theta JC}$ | Junction to case thermal resistance     | $\leq 1.8$  | °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       | Max       | Unit             |
|-----------------|--|--|---------|-----------|-----------|------------------|
| $I_{DRM}$       | Repetitive peak off-state current          | $V_D = \text{Rated } V_{DRM}, I_G = 0$<br>$T_C = 110^\circ\text{C}$                      | -       | -         | $\pm 2$   | mA               |
| $I_{GT}$        | Gate trigger current                       | $V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$       | -       | 2         | 50        | mA               |
|                 |  | $V_{supply} = +12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$       | -       | -12       | -50       |                  |
|                 |  | $V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$       | -       | -9        | -50       |                  |
|                 |  | $V_{supply} = -12\text{ V}\dagger, R_L = 10\ \Omega, t_{p(g)} = > 20\ \mu\text{s}$       | -       | 20        | -         |                  |
| $V_{GT}$        | 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                            | $V_{supply} = +12\text{ V}\dagger, I_G = 0$<br>initiating $I_{TM} = 100\text{ mA}$       | -       | 5         | 30        | mA               |
|                 |  | $V_{supply} = -12\text{ V}\dagger, I_G = 0$<br>initiating $I_{TM} = -100\text{ mA}$      | -       | -9        | -30       |                  |
| $I_L$           | Latching current                           | $V_{supply} = +12\text{ V}\dagger$ (see Note 7)  | -       | -         | 50        | mA               |
|                 |  | $V_{supply} = -12\text{ V}\dagger$ (see Note 7)  | -       | -         | -50       |                  |
| $V_{TM}$        | 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 | $V_{DRM} = \text{Rated } V_{DRM}, I_G = 0$<br>$T_C = 110^\circ\text{C}$                  | -       | $\pm 100$ | -         | V/ $\mu\text{s}$ |
| $dv/dt_{\odot}$ | Critical rise of communication voltage     | $V_{DRM} = \text{Rated } V_{DRM}, I_{TRM} = \pm 12\text{ A}$<br>$T_C = 85^\circ\text{C}$ | $\pm 5$ | -         | -         |                  |

† All voltages are with respect to Main Terminal 1.

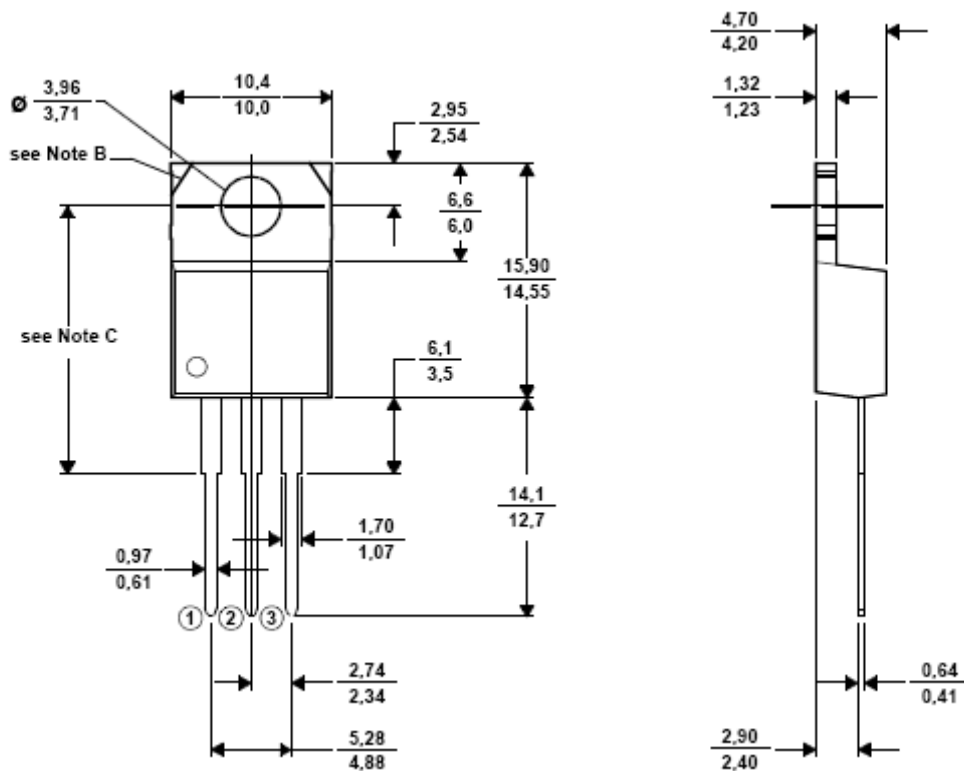
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Notes:

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 85°C derate linearly to 110°C case temperature at the rate of 320 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.
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 de device body.
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

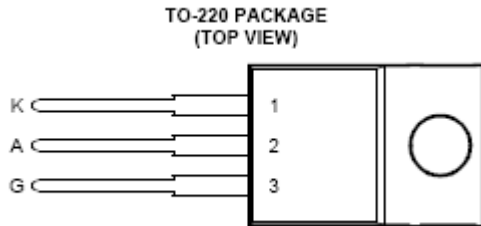
TO220





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**PINNING**



|         |         |
|---------|---------|
| Pin 1 : | kathode |
| Pin 2 : | Anode   |
| Pin 3 : | Gate    |

Pin 2 is in electrical contact with the mounting base.

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