*New Jersey Semi-Conductor Products, Inc.*

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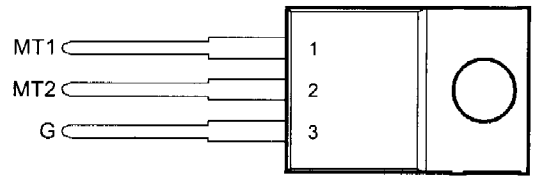
# TIC206 SERIES
# SILICON TRIACS

- **Sensitive Gate Triacs**
- **4 A RMS**
- **Glass Passivated Wafer**
- **400 V to 800 V Off-State Voltage**
- **Max $I_{GT}$ of 5 mA (Quadrants 1 - 3)**

**TO-220 PACKAGE**
**(TOP VIEW)**




Pin 2 is in electrical contact with the mounting base

## absolute maximum ratings over operating case temperature (unless otherwise noted)

| RATING | | SYMBOL | VALUE | UNIT |
|---|---|---|---|---|
| Repetitive peak off-state voltage (see Note 1) | TIC206D | $V_{DRM}$ | 400 | V |
| | TIC206M | | 600 | |
| | TIC206S | | 700 | |
| | TIC206N | | 800 | |
| Full-cycle RMS on-state current at (or below) 85°C case temperature (see Note 2) | | $I_{T(RMS)}$ | 4 | A |
| Peak on-state surge current full-sine-wave (see Note 3) | | $I_{TSM}$ | 25 | A |
| Peak on-state surge current half-sine-wave (see Note 4) | | $I_{TSM}$ | 30 | A |
| Peak gate current | | $I_{GM}$ | ±0.2 | A |
| Peak gate power dissipation at (or below) 85°C case temperature (pulse width ≤ 200 μs) | | $P_{GM}$ | 1.3 | W |
| Average gate power dissipation at (or below) 85°C case temperature (see Note 5) | | $P_{G(AV)}$ | 0.3 | W |
| Operating case temperature range | | $T_C$ | -40 to +110 | °C |
| Storage temperature range | | $T_{stg}$ | -40 to +125 | °C |
| Lead temperature 1.6 mm from case for 10 seconds | | $T_L$ | 230 | °C |

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 160 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.

## electrical characteristics at 25°C case temperature (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|---|
| $I_{DRM}$ | Repetitive peak off-state current | $V_D$ = rated $V_{DRM}$ | $I_G$ = 0 | $T_C$ = 110°C | | | ±1 | mA |
| $I_{GTM}$ | Peak gate trigger current | $V_{supply}$ = +12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | 0.5 | 5 | mA |
| | | $V_{supply}$ = +12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | -1.5 | -5 | |
| | | $V_{supply}$ = -12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | -2 | -5 | |
| | | $V_{supply}$ = -12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | 3.6 | 10 | |
| $V_{GTM}$ | Peak gate trigger voltage | $V_{supply}$ = +12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | 0.7 | 2 | V |
| | | $V_{supply}$ = +12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | -0.7 | -2 | |
| | | $V_{supply}$ = -12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | -0.8 | -2 | |
| | | $V_{supply}$ = -12 V† | $R_L$ = 10 Ω | $t_{p(g)}$ > 20 μs | | 0.8 | 2 | |

† All voltages are with respect to Main Terminal 1.

## electrical characteristics at 25°C case temperature (unless otherwise noted) (continued)

| PARAMETER | | TEST CONDITIONS | | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|---|
| $V_{TM}$ | Peak on-state voltage | $I_{TM}$ = ±4.2 A | $I_G$ = 50 mA | (see Note 6) | | ±1.3 | ±2.2 | V |
| $I_H$ | Holding current | $V_{supply}$ = +12 V† | $I_G$ = 0 | Init' $I_{TM}$ = 100 mA | | 2 | 15 | mA |
| | | $V_{supply}$ = -12 V† | $I_G$ = 0 | Init' $I_{TM}$ = -100 mA | | -4 | -15 | |
| $I_L$ | Latching current | $V_{supply}$ = +12 V† | (see Note 7) | | | | 30 | mA |
| | | $V_{supply}$ = -12 V† | | | | | -30 | |
| dv/dt | Critical rate of rise of off-state voltage | $V_{DRM}$ = Rated $V_{DRM}$ | $I_G$ = 0 | $T_C$ = 110°C | | ±50 | | V/µs |
| $dv/dt_{(c)}$ | Critical rise of commutation voltage | $V_{DRM}$ = Rated $V_{DRM}$ | $I_{TRM}$ = ±4.2 A | $T_C$ = 85°C | ±1 | ±1.3 | ±2.5 | V/µs |

† All voltages are with respect to Main Terminal 1.

NOTES: 6. This parameter must be measured using pulse techniques, $t_p$ = ≤ 1 ms, duty cycle ≤ 2 %. Voltage-sensing contacts separate from the current carrying contacts are located within 3.2 mm from the 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 Ω, $t_{p(g)}$ = 20 µs, $t_r$ = ≤ 15 ns, f = 1 kHz.

## thermal characteristics

| PARAMETER | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction to case thermal resistance | | | 7.8 | °C/W |
| $R_{\theta JA}$ | Junction to free air thermal resistance | | | 62.5 | °C/W |

## TYPICAL CHARACTERISTICS

### GATE TRIGGER CURRENT vs TEMPERATURE

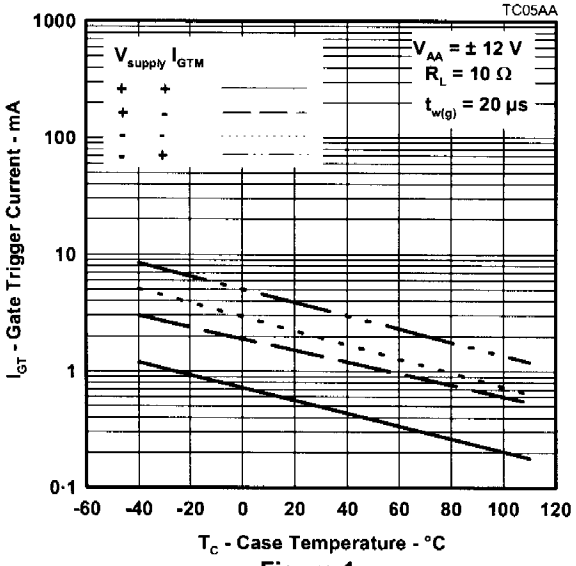



Figure 1.

### GATE TRIGGER VOLTAGE vs TEMPERATURE

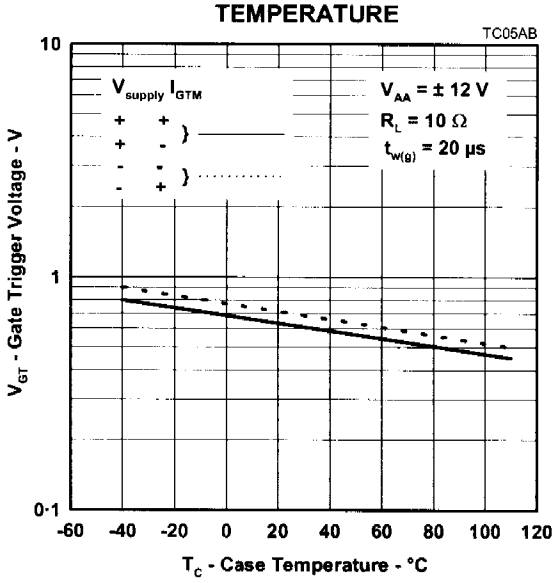



Figure 2.