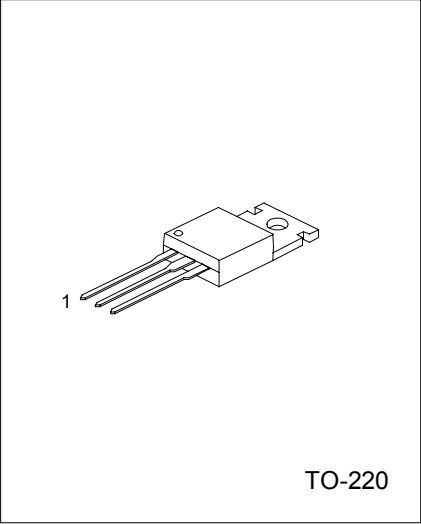
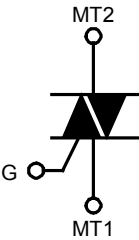


# TRIACS

## DESCRIPTION

Passivated , sensitive gate triacs in a plastic envelope, intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants.

## SYMBOL



1:MT1 2:MT2 3:GATE

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                                                                                                                      | SYMBOL      | RATINGS              | UNIT        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|-------------|
| Repetitive Peak Off-State Voltage<br>UT137E-5<br>UT137E-6<br>UT137E-8                                                                                          | $V_{DRM}$   | 500*<br>600*<br>800  | V           |
| RMS On-state Current<br>Full sine wave; $T_{mb} \leq 102^{\circ}C$                                                                                             | $I_T(RMS)$  | 8                    | A           |
| Non-Repetitive Peak. On-State Current<br>Full sine wave; $T_j = 25^{\circ}C$ prior to surge<br>$t = 20ms$<br>$t = 16.7ms$                                      | $I_{TSM}$   | 65<br>71             | A           |
| $I^2t$ For Fusing ( $t = 10ms$ )                                                                                                                               | $I^2t$      | 21                   | $A^2s$      |
| Repetitive Rate of Rise of On-state Current after Triggering<br>$I_{TM} = 12A$ ; $I_G = 0.2A$ ; $dI_G/dt = 0.2A/\mu s$<br>T2+ G+<br>T2+ G-<br>T2- G-<br>T2- G+ | $dI_T/dt$   | 50<br>50<br>50<br>10 | $A/\mu s$   |
| Peak Gate Voltage                                                                                                                                              | $V_{GM}$    | 5                    | V           |
| Peak Gate Current                                                                                                                                              | $I_{GM}$    | 2                    | A           |
| Peak Gate Power                                                                                                                                                | $P_{GM}$    | 5                    | W           |
| Average Gate Power (Over any 20ms period)                                                                                                                      | $P_{G(AV)}$ | 0.5                  | W           |
| Operating Junction Temperature                                                                                                                                 | $T_j$       | 125                  | $^{\circ}C$ |
| Storage Temperature                                                                                                                                            | $T_{stg}$   | -40~150              | $^{\circ}C$ |

\*Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed  $6A/\mu s$ .

## THERMAL RESISTANCES

| PARAMETER                                                                | SYMBOL   | MIN | TYP | MAX        | UNIT |
|--------------------------------------------------------------------------|----------|-----|-----|------------|------|
| Thermal Resistance Junction to Mounting Base<br>Full cycle<br>Half cycle | Rth j-mb |     |     | 2.0<br>2.4 | K/W  |
| Thermal Resistance Junction to Ambient<br>In free air                    | Rth j-a  |     | 60  |            | K/W  |

## STATIC CHARACTERISTICS (Tj=25°C, unless otherwise specified)

| PARAMETER                 | SYMBOL          | TEST CONDITIONS                                                                    | MIN  | TYP                     | MAX                  | UNIT |
|---------------------------|-----------------|------------------------------------------------------------------------------------|------|-------------------------|----------------------|------|
| Gate Trigger Current      | IGT             | V <sub>D</sub> =12V, I <sub>T</sub> =0.1A<br>T2+ G+<br>T2+ G-<br>T2- G-<br>T2- G+  |      | 2.5<br>4.0<br>5.0<br>11 | 10<br>10<br>10<br>25 | mA   |
| Latching Current          | IL              | V <sub>D</sub> =12V, I <sub>GT</sub> =0.1A<br>T2+ G+<br>T2+ G-<br>T2- G-<br>T2- G+ |      | 3.0<br>14<br>3.0<br>4.0 | 25<br>35<br>25<br>35 | mA   |
| Holding Current           | I <sub>H</sub>  | V <sub>D</sub> =12V, I <sub>GT</sub> =0.1A                                         |      | 2.5                     | 20                   | mA   |
| On-State Voltage          | V <sub>T</sub>  | I <sub>T</sub> =10A                                                                |      | 1.3                     | 1.65                 | V    |
| Gate Trigger Voltage      | V <sub>GT</sub> | V <sub>D</sub> =12V, I <sub>T</sub> =0.1A                                          |      | 0.7                     | 1.5                  | V    |
|                           |                 | V <sub>D</sub> =400V, I <sub>T</sub> =0.1A, T <sub>j</sub> =125°C                  | 0.25 | 0.4                     |                      | V    |
| Off-state Leakage Current | I <sub>D</sub>  | V <sub>D</sub> =V <sub>DRM(max)</sub> , T <sub>j</sub> =125°C                      |      | 0.1                     | 0.5                  | mA   |

## DYNAMIC CHARACTERISTICS (Tj=25°C, unless otherwise specified)

| PARAMETER                                  | SYMBOL              | TEST CONDITIONS                                                                                                 | MIN | TYP | MAX | UNIT |
|--------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| Critical Rate of Rise of off-state Voltage | dV <sub>D</sub> /dt | V <sub>DM</sub> =67% V <sub>DRM(max)</sub> , T <sub>j</sub> =125°C<br>Exponential waveform, Gate open circuit   |     | 50  |     | V/μs |
| Gate Controlled Turn-on Time               | t <sub>gt</sub>     | I <sub>TM</sub> =12A, V <sub>D</sub> =V <sub>DRM(max)</sub> , I <sub>G</sub> =0.1A<br>dI <sub>G</sub> /dt=5A/μs |     | 2   |     | μs   |

## TYPICAL CHARACTERISTICS

Figure 1. Maximum on-state Dissipation.  $P_{tot}$  vs RMS On-state Current,  $I_T(RMS)$ , Where  $\alpha$  = conduction Angle.

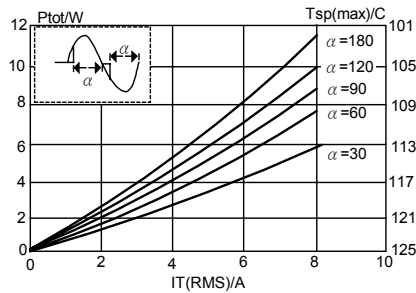


Figure 4. Maximum Permissible RMS Current  $I_T(RMS)$  vs mounting base Temperature  $T_{mb}$

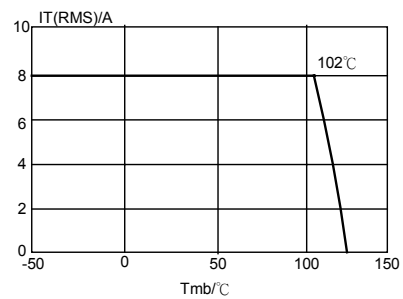


Figure 2. Maximum Permissible Non-repetitive Peak On-state Current  $I_{TSM}$ , vs Pulse Width  $t_p$ , for Sinusoidal Currents,  $t_p \leq 20\text{ms}$

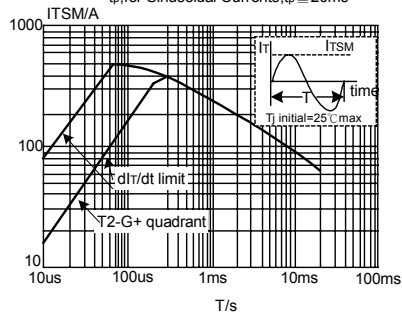


Figure 5. Maximum Permissible Repetitive RMS on-state Current  $I_T(RMS)$ , vs Surge Duration, for Sinusoidal Currents,  $f=50\text{Hz}$ ;  $T_{mb} \leq 102^\circ\text{C}$

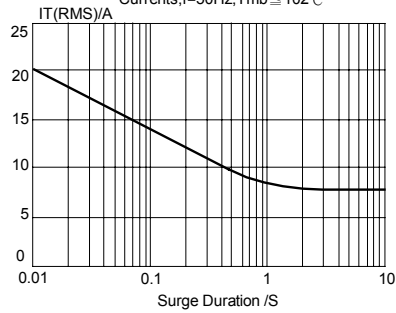


Figure 3. Maximum Permissible Non-Repetitive peak on-state Current  $I_{TSM}$ , vs Number of Cycles, for Sinusoidal Currents,  $f=50\text{Hz}$

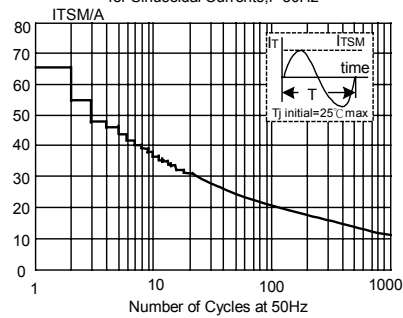


Figure 6. Normalised Gate Trigger Voltage  $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$ , vs Junction Temperature  $T_j$

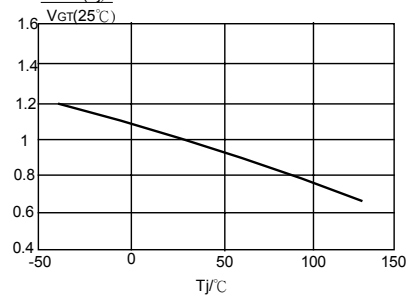


Figure 7. Normalised Gate Trigger Current  
 $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$ , vs Junction Temperature  $T_j$

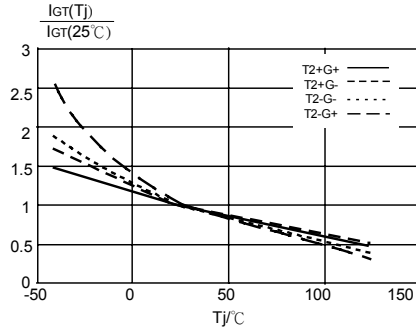


Figure 8. Normalised Latching Current  
 $I_L(T_j)/I_L(25^\circ\text{C})$ , vs Junction Temperature  $T_j$

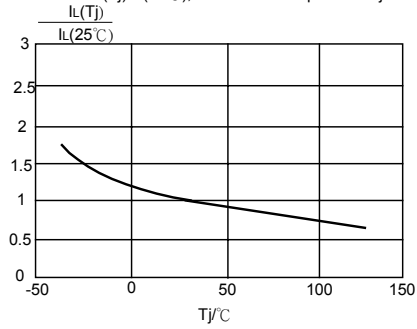


Figure 9. Normalised Holding Current  
 $I_H(T_j)/I_H(25^\circ\text{C})$ , vs Junction Temperature  $T_j$

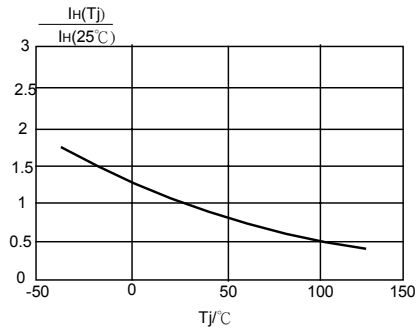


Figure 10. Typical and Maximum  
 On-state Characteristic

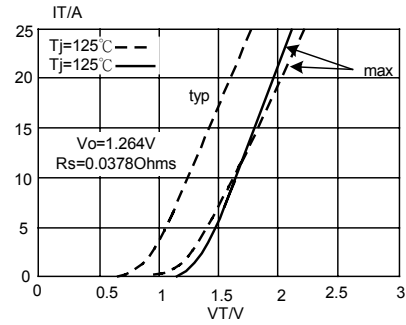


Figure 11. Transient Thermal Impedance  
 $Z_{th j-mb}$ , vs Pulse Width  $t_p$

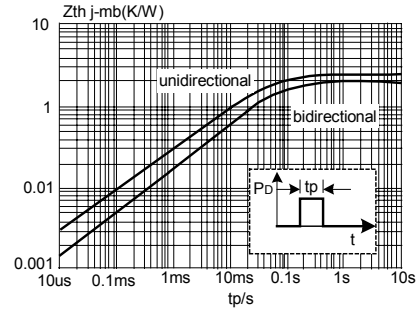
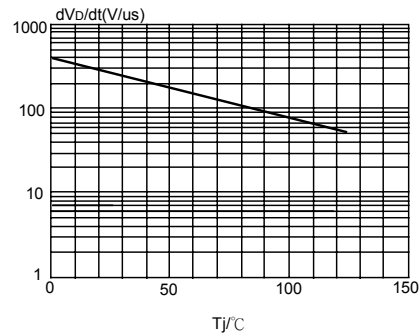


Figure 12. Typical, critical rate of rise of off-state  
 voltage,  $dV_D/dt$  versus junction temperature  $T_j$



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