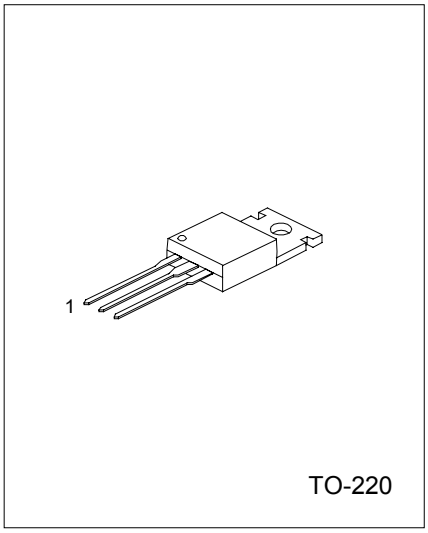
## TRIACS

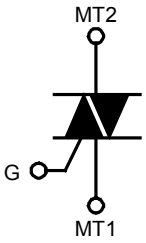
### DESCRIPTION

Passivated triacs in a plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.




1:MT1 2:MT2 3:GATE

### SYMBOL




### ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Repetitive peak off-state voltages | | | |
| UT136F/G-5 | $V_{DRM}$ | 500* | V |
| UT136F/G-6 | | 600* | |
| UT136F/G-8 | | 800 | |
| RMS on-state current full sine wave, $T_{mb} \leqslant 107$ °C | $I_{T(RMS)}$ | 4 | A |
| Non-repetitive peak on-state current full sine wave, $T_j$ = 25 °C prior to surge | | | |
| t = 20ms | $I_{TSM}$ | 25 | A |
| t = 16.7 ms | | 27 | |
| $I^2t$ for fusing (t = 10 ms) | $I^2t$ | 3.1 | $A^2s$ |
| Repetitive rate of rise of on-state current after triggering $I_{TM}$ = 6 A, $I_G$ = 0.2A, $dI_G/dt$ = 0.2A/μs | | | |
| T2+ G+ | $dI_T/dt$ | 50 | A/μs |
| T2+ G- | | 50 | |
| T2- G- | | 50 | |
| T2- G+ | | 10 | |
| 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 20 ms period) | $P_{G(AV)}$ | 0.5 | W |
| Storage temperature | $T_{stg}$ | -40 ~ 150 | ℃ |
| Operating junction temperature | $T_j$ | 125 | ℃ |

*Although not recommended, off-state voltages up to 800V may be applied without damage, but the traic may switch to the on-state. The rate of rise of current should not exceed 3A/μs.

## THERMAL RESISTANCES

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Thermal resistance, Junction to mounting base<br>full cycle<br>half cycle | $R_{th\ j\text{-}mb}$ | | | <br>3.0<br>3.7 | K/W |
| Thermal resistance, Junction to ambient<br>(In free air) | $R_{th\ j\text{-}a}$ | | 60 | | K/W |

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

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | | UT136F | UT136G | |
| Gate trigger current | $I_{GT}$ | $V_D$=12V, $I_T$=0.1A | | | | | mA |
| | | T2+ G+ | | 5 | 25 | 50 | |
| | | T2+ G- | | 8 | 25 | 50 | |
| | | T2- G- | | 11 | 25 | 50 | |
| | | T2- G+ | | 30 | 70 | 100 | |
| Latching current | $I_L$ | $V_D$=12V, $I_{GT}$=0.1A | | | | | mA |
| | | T2+ G+ | | 7 | 20 | 30 | |
| | | T2+ G- | | 16 | 30 | 45 | |
| | | T2- G- | | 5 | 20 | 30 | |
| | | T2- G+ | | 7 | 30 | 45 | |
| Holding current | $I_H$ | $V_D$ = 12 V, $I_{GT}$ = 0.1 A | | 5 | 15 | 30 | mA |
| On-state voltage | $V_T$ | $I_T$=5A | | 1.4 | 1.70 | | V |
| Gate trigger voltage | $V_{GT}$ | $V_D$=12V, $I_T$=0.1A | | 0.7 | 1.5 | | V |
| | | $V_D$=400V, $I_T$=0.1A, Tj=125°C | 0.25 | 0.4 | | | V |
| Off-state leakage current | $I_D$ | $V_D$=$V_{DRM(max)}$ , Tj=125°C | | 0.1 | 0.5 | | mA |

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

| PARAMETER | SYMBOL | CONDITIONS | MIN | | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| | | | UT136F | UT136G | | | |
| Critical rate of rise of Off-state voltage | $dV_D/dt$ | $V_{DM}$ = 67% $V_{DRM(max)}$ , $T_j$ =125°C, exponential waveform, gate open circuit | 50 | 200 | 250 | | V/μs |
| Critical rate of change of Commutating voltage | $dV_{com}/dt$ | $V_{DM}$=400V, $T_j$=95°C, $I_{T(RMS)}$=4A, $dI_{com}/dt$ =1.8A/ms, gate open circuit | | 10 | 50 | | V/μs |
| Gate controlled turn-on time | $t_{gt}$ | $I_{TM}$ = 6 A, $V_D$= $V_{DRM(max)}$ , $I_G$=0.1A, $dI_G/dt$=5A/μs | | | 2 | | μs |

## TYPICAL CHARACTERISTICS

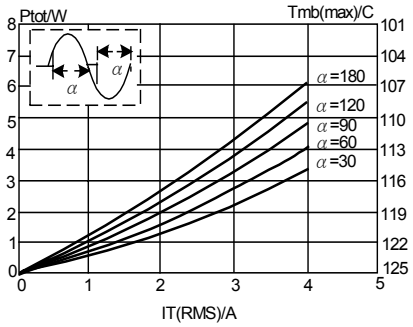



Fig.1. Maximum on-state dissipation,Ptot vs rms on-state current, $I_{T(RMS)}$ where $\alpha$=conduction angle.

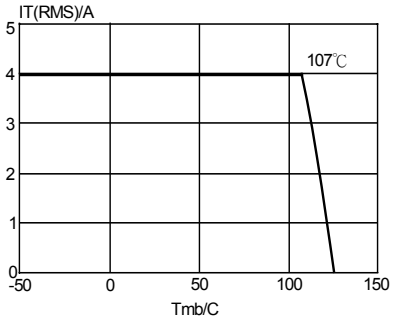



Fig.4. Maximum permissible rms current $I_{T(RMS)}$ vs mounting base Temperature Tmb.

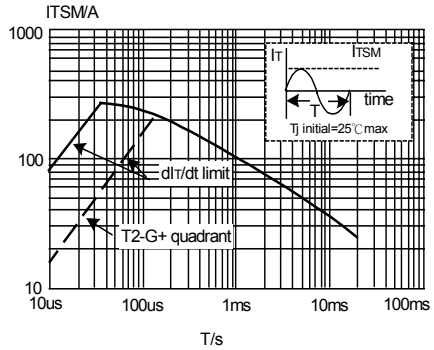



Fig.2.Maximum Permissible non-repetitive peak on-state Current $I_{TSM}$ vs pulse width tp, for sinusoidal currents,tp≦20ms

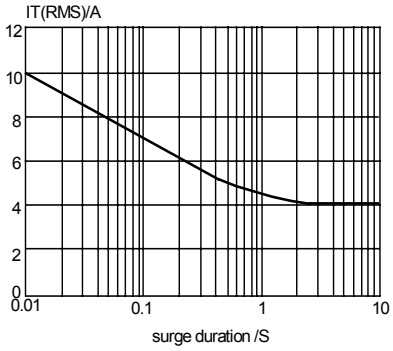



Fig. 5.Maximum permissible repetitive rms on-state current $I_{T(RMS)}$,vs surge duration,for sinusoidal currents,f=50HZ;Tmb≦107℃

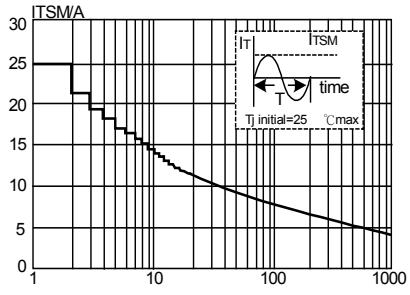



Fig3.Maximum Permissible non-repetitive peak on-state current ITSM,vs number of cycles,for sinusoidal currents,f=50HZ.

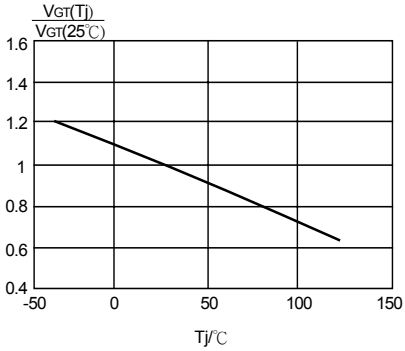



Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25℃)$,vs junction temperature Tj.

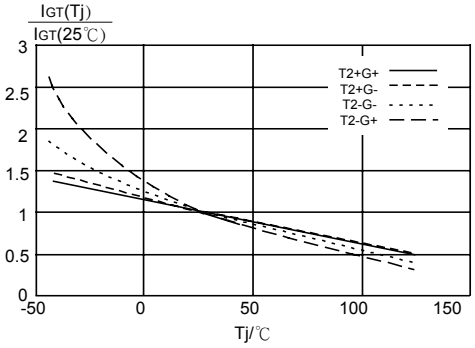



Fig. 7.Normalised gate trigger Current $I_{GT}(Tj)/I_{GT}(25℃)$,vs junction temperature Tj.

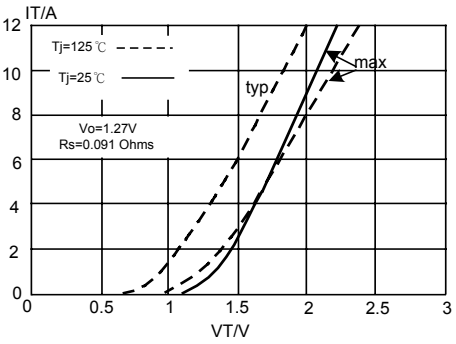



Fig.10.Typical and maximum on-state characteristic.

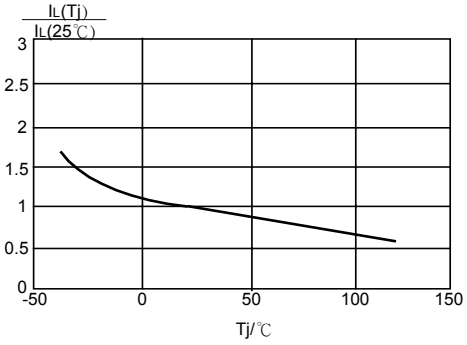



Fig.8.Normalised latching Current $I_L(Tj)/I_L(25℃)$, vs junction temperature Tj.

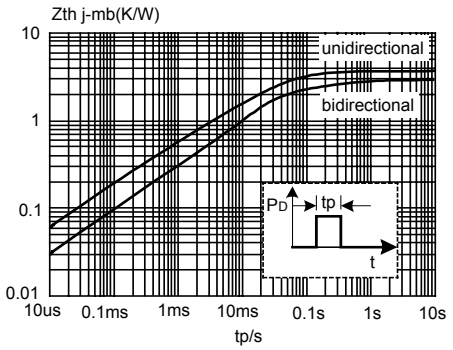



Fig.11.Transient thermal impedance Zthj-mb,vs pulse width tp.

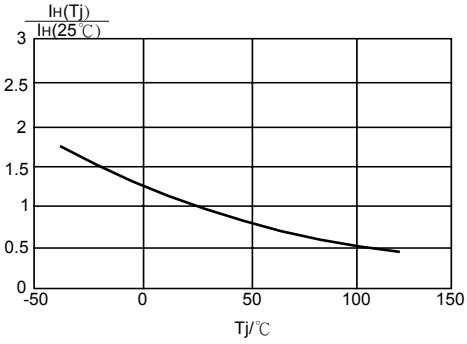



Fig. 9.Normalised holding current $I_H(Tj)/I_H(25℃)$, vs junction temperature Tj.

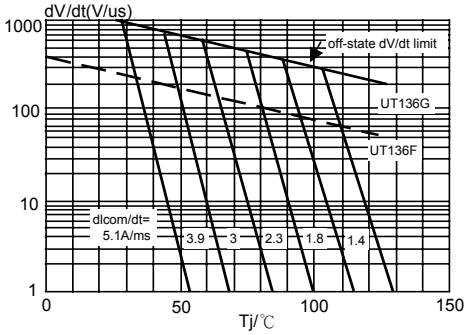



Fig.12.Typical commutation dV/dt vs junction temperature,parameter commutation $dI_T/dt$.The triac should commutate when the dV/dt is below the value on the appropriate curve for pre-commutation $dI_T/dt$.