

1、Description

Designed primarily for industrial and consumer applications for full wave control of ac loads such as appliance controls, heater controls, motor controls, and other power switching applications.

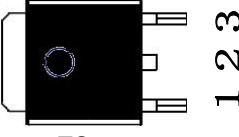

2、Applications

- Power gate Switching
- appliance control
- heater control
- motor control

3、Features

- Blocking voltage to 800V
- On-state RMS current to 8A
- Ultra low gate trigger current
- Low cost package.

4、Pinning information

| PIN | Description | Simplified outline | Symbol |
|-----|------------------------|---|---|
| 1 | main terminal 1 (T1) |  TO-252 |  |
| 2 | main terminal 2 (T2) | | |
| 3 | gate (G) | | |
| tab | main terminal | | |

5、Quick reference data

| SYMBOL | PARAMETER | MAX | UNIT |
|---------------------|--------------------------------------|-----|------|
| V_{DRM} V_{RRM} | Repetitive peak off-state voltages | 800 | V |
| $I_{T(RMS)}$ | RMS on-state current | 8 | A |
| I_{TSM} | Non-repetitive peak on-state current | 80 | A |

6、Thermal characteristics

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------------|---|-------------|-----|-----|------|------|
| $R_{\theta JC}$ | Thermal resistance junction to case | | - | - | 2.0 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | | - | - | 62.5 | °C/W |
| T_L | Maximum Lead Temperature for Soldering Purposes 1/8" from case for 10 Seconds | in free air | | - | 260- | °C |

7、Limiting value

Limiting values in accordance with the Maximum System(IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------|--|---|-----|-----|-----------|------------------------|
| V_{DRM} V_{RRM} | Repetitive peak off-state voltages | | - | | 800 | V |
| $I_{T(RMS)}$ | RMS on-state current | Full Cycle Sine Wave 50 to 60 Hz ($T_C = 80^\circ\text{C}$) | - | | 8 | A |
| I_{TSM} | Non-repetitive peak Surge Current | One Full Cycle Sine Wave, 60 Hz, $T_J = 110^\circ\text{C}$ | - | - | 80 | A |
| I^2t | I^2t for fusing | $t = 8.3\text{ ms}$ | - | - | 26 | A^2s |
| di_T/dt | Repetitive rate of rise of on-state current after triggering | $I_{TM} = 12\text{ A}$; $I_G = 0.2\text{ A}$; $di_G/dt = 0.2\text{ A/s}$ | | | | |
| | | | - | - | 50 | $\text{A}/\mu\text{s}$ |
| | | | - | - | 50 | $\text{A}/\mu\text{s}$ |
| | | | - | - | 50 | $\text{A}/\mu\text{s}$ |
| | | T2+ G+ T2+ G- T2- G- T2- G+ | - | - | 10 | $\text{A}/\mu\text{s}$ |
| I_{GM} | Peak gate current | $t \leq 2\text{ s}$, $T_C = 80^\circ\text{C}$ | - | - | ± 2.0 | A |
| V_{GM} | Peak gate voltage | $t \leq 2\text{ s}$, $T_C = 80^\circ\text{C}$ | - | - | ± 10 | V |
| P_{GM} | Peak gate power | $t \leq 2\text{ s}$, $T_C = 80^\circ\text{C}$ | - | - | 20 | W |
| $P_{G(AV)}$ | Average gate power | $t \leq 8.3\text{ ms}$, $T_C = 80^\circ\text{C}$ | - | - | 0.5 | W |
| T_{stg} | Storage temperature | | -40 | - | 150 | $^\circ\text{C}$ |
| T_J | Operating junction temperature | | -40 | - | 110 | $^\circ\text{C}$ |

8、Characteristics

$T_J = 25^\circ\text{C}$ unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------|--|--|-----|-----|-----|------------------------|
| Static characteristics | | | | | | |
| I_{GT} | Gate trigger current | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | | | | |
| | | | - | 5 | 10 | mA |
| | | | - | 7 | 10 | mA |
| | | | - | 7 | 10 | mA |
| | | T2+ G+ T2+ G- T2- G- T2- G+ | - | 15 | 25 | mA |
| I_H | Holding current | $V_D = 12\text{ Vdc}$, Initiating Current = $\pm 200\text{ mA}$, Gate Open | - | - | 25 | mA |
| V_{TM} | On-state voltage | $I_{TM} = \pm 11\text{ A}$ Peak, Pulse Width $\leq 2\text{ ms}$, Duty Cycle $\leq 2\%$ | - | 1.3 | 1.8 | V |
| V_{GT} | Gate trigger voltage | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ MT2(+), G(+); MT2(+), G(-); MT2(-), G(-) MT2(-), G(+) | - | - | 2.0 | V |
| | | | - | - | 2.5 | V |
| V_{GD} | Gate Non-Trigger Voltage (Continuous dc) | $V_D = 12\text{ V}$, $T_C = 110^\circ\text{C}$, $R_L = 100\text{ }\Omega$) All Four Quadrants | 0.2 | - | - | V |
| Dynamic Characteristics | | | | | | |
| dv_D/dt | Critical rate of rise of off-state voltage | $V_D = \text{Rated } V_{DRM}$, Exponential Waveform, $T_C = 110^\circ\text{C}$ | - | 25 | - | $\text{V}/\mu\text{s}$ |
| $dv_D/dt(c)$ | Critical Rate of Rise of Commutation Voltage | $V_D = \text{Rated } V_{DRM}$, $I_{TM} = 11.3\text{ A}$, Commutating $di/dt = 4.1\text{ A/ms}$, Gate Unenergized, $T_C = 80^\circ\text{C}$ | | 5.0 | - | $\text{V}/\mu\text{s}$ |
| t_{gt} | Gate controlled turn-on time | $V_D = \text{Rated } V_{DRM}$, $I_{TM} = 16\text{ A}$ Peak, $I_G = 30\text{ mA}$ | - | 1.5 | - | μs |

9. Electrical Characteristics Curve

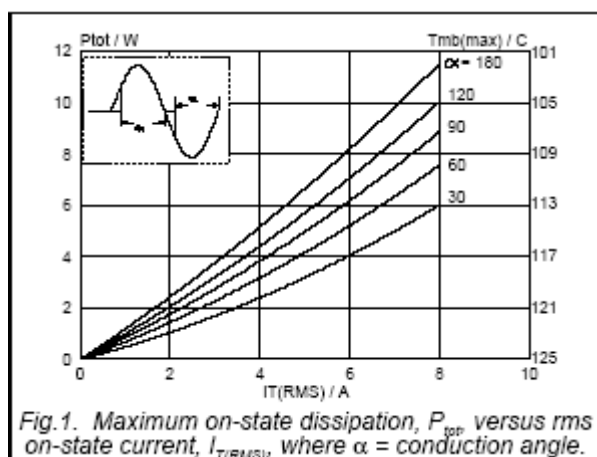


Fig.1. Maximum on-state dissipation, P_{top} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

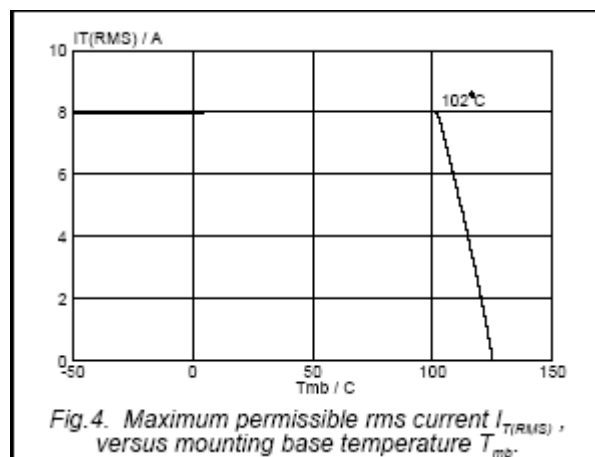


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

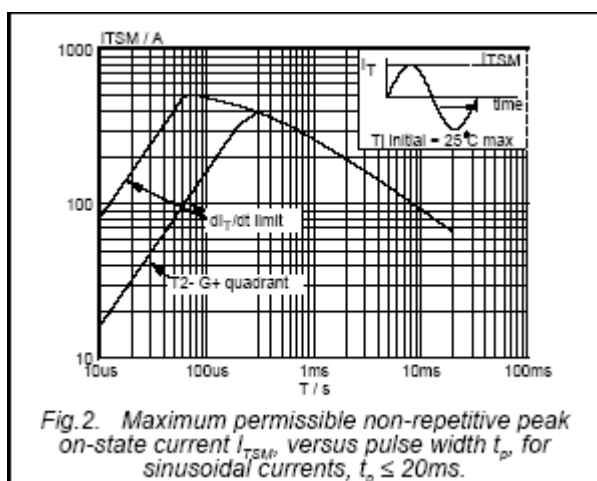


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

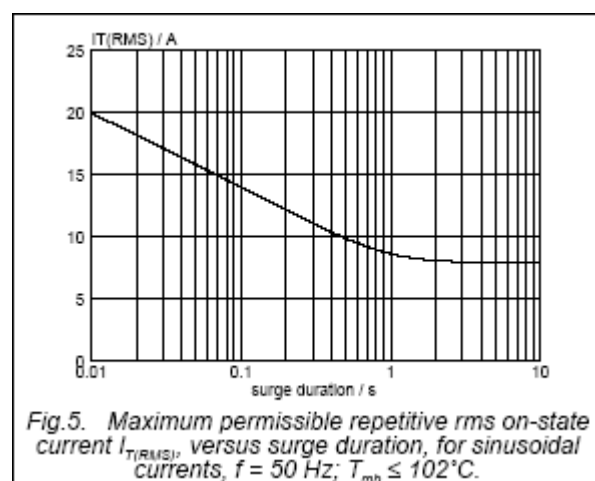


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{ Hz}$, $T_{mb} \leq 102^\circ\text{C}$.

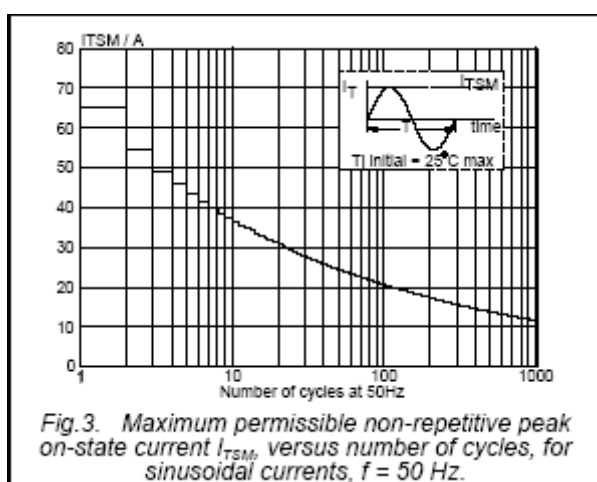


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{ Hz}$.

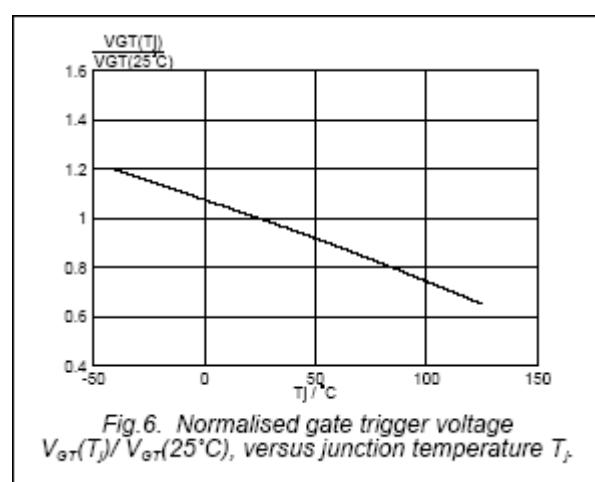
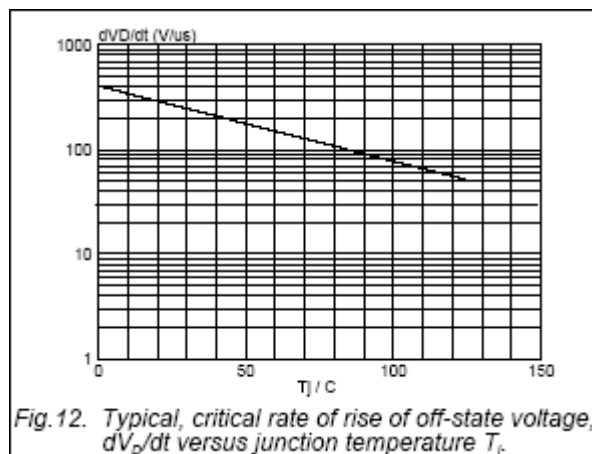
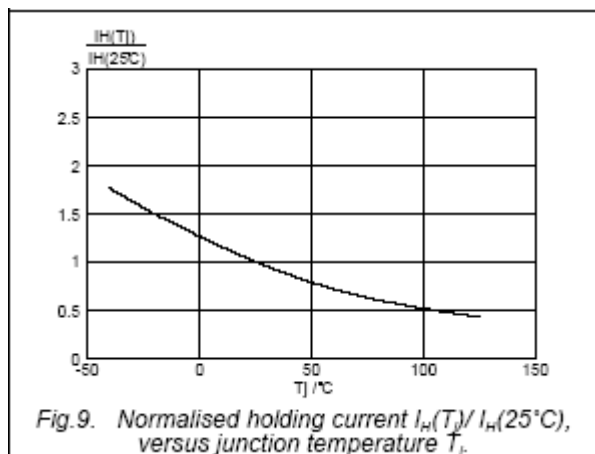
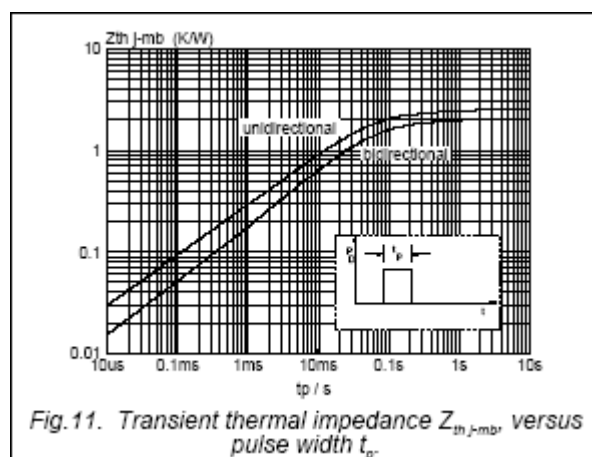
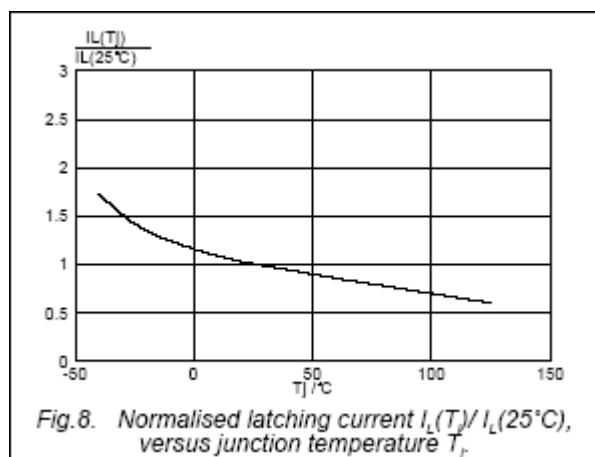
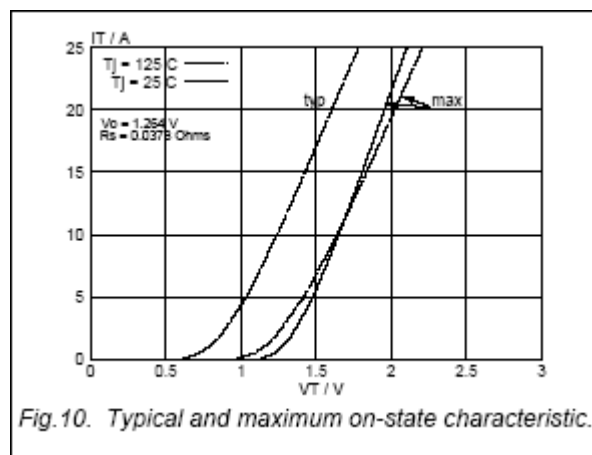
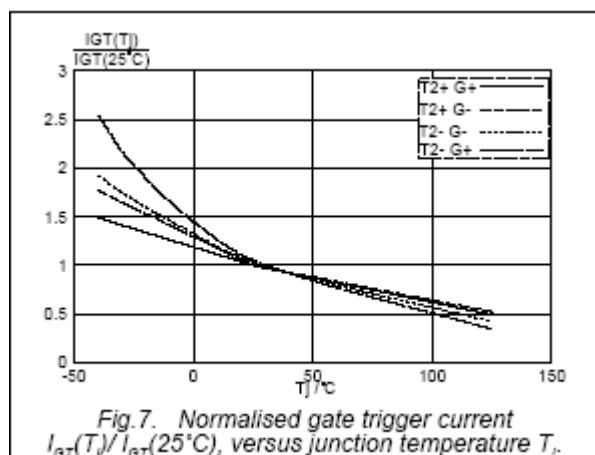
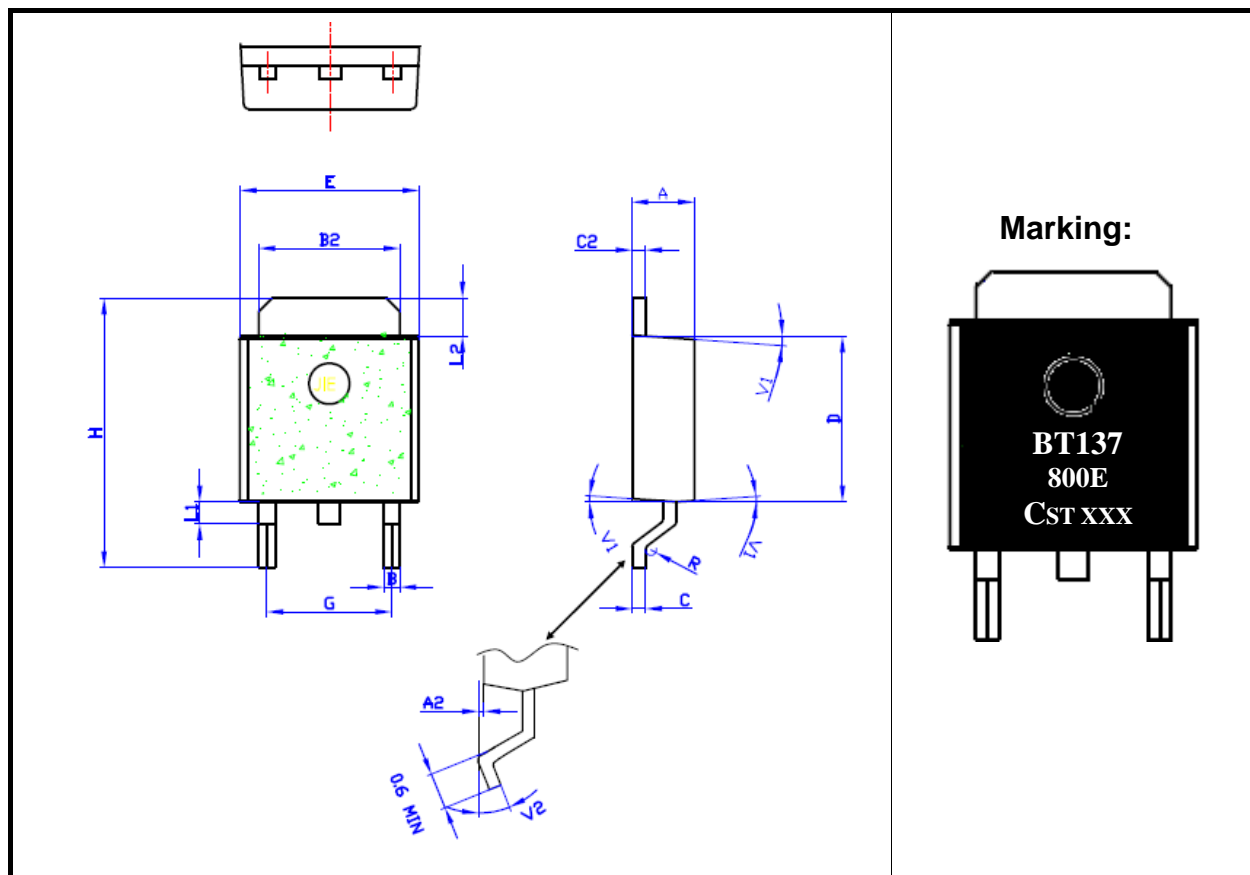


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .



10、Package outline(TO-252)



| DIM | Inches | | | Millimeters | | |
|-----|--------|-------|-------|-------------|------|-------|
| | Min | Type | Max | Min | Type | Max |
| A | 0.087 | - | 0.094 | 2.20 | - | 2.40 |
| A2 | 0.001 | - | 0.009 | 0.03 | - | 0.23 |
| B | 0.022 | - | 0.026 | 0.55 | - | 0.65 |
| B2 | 0.205 | - | 0.213 | 5.20 | - | 5.40 |
| B3 | 0.030 | - | 0.033 | 0.76 | - | 0.85 |
| B4 | - | 0.013 | - | - | 0.32 | - |
| C | 0.018 | - | 0.024 | 0.45 | - | 0.62 |
| C2 | 0.016 | - | 0.021 | 0.40 | - | 0.54 |
| D | 0.236 | - | 0.244 | 6.00 | - | 6.20 |
| E | 0.252 | - | 0.260 | 6.40 | - | 6.60 |
| G | 0.173 | - | 0.181 | 4.40 | - | 4.60 |
| H | 0.384 | - | 0.419 | 9.75 | - | 10.65 |
| L1 | - | 0.031 | - | - | 0.8 | - |
| L2 | 0.071 | - | 0.075 | 1.80 | - | 1.90 |
| V1 | - | 4° | - | - | 4° | - |
| V2 | 0° | - | 8° | 0° | - | 8° |