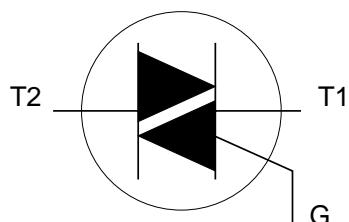


GENERAL DESCRIPTION

Glass passivated triacs in a plastic envelope suitable for surface mounting, 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.

SYMBOL

SOT-223

QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|--------------|--------------------------------------|------|------|------|------|
| | BT134W- | 500 | 600 | 800 | |
| | BT134W- | 500F | 600F | 800F | |
| | BT134W- | 500G | 600G | 800G | |
| V_{DRM} | Repetitive peak off-state voltages | 500 | 600 | 800 | V |
| $I_{T(RMS)}$ | RMS on-state current | 1 | 1 | 1 | A |
| I_{TSM} | Non-repetitive peak on-state current | 10 | 10 | 10 | A |

LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | UNIT |
|--------------|--|---|------|--------------------------|--------------------------|-------------|------------------|
| | | | | -500 500 ¹ | -600 600 ¹ | -800 800 | |
| V_{DRM} | Repetitive peak off-state voltages | | - | | | | V |
| $I_{T(RMS)}$ | RMS on-state current | full sine wave; $T_{sp} \leq 108^\circ C$ | - | | | | A |
| I_{TSM} | Non-repetitive peak on-state current | full sine wave; $T_j = 25^\circ C$ prior to surge | | | 1 | | |
| I^2t | I^2t for fusing | $t = 20$ ms | - | | | 10 | A |
| dI_T/dt | Repetitive rate of rise of on-state current after triggering | $t = 16.7$ ms | - | | | 11 | A |
| | | $t = 10$ ms | - | | | 0.5 | A ² s |
| | | $I_{TM} = 1.5$ A; $I_G = 0.2$ A; | | | | | |
| | | $dI_G/dt = 0.2$ A/ μ s | | | | | |
| I_{GM} | Peak gate current | T2+ G+ | - | | | 50 | A/ μ s |
| V_{GM} | Peak gate voltage | T2+ G- | - | | | 50 | A/ μ s |
| P_{GM} | Peak gate power | T2- G- | - | | | 50 | A/ μ s |
| $P_{G(AV)}$ | Average gate power | T2- G+ | - | | | 10 | A/ μ s |
| T_{stg} | Storage temperature | over any 20 ms period | - | | | 2 | A |
| T_j | Operating junction temperature | | -40 | | | 5 | V |
| | | | | | | 5 | W |
| | | | | | | 0.5 | W |
| | | | | | | 150 | °C |
| | | | | | | 125 | °C |

¹ 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 3 A/ μ s.

THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------|---|--|------|-----------|--------|------------|
| $R_{th\ j-sp}$ | Thermal resistance junction to solder point | full or half cycle | - | - | 15 | K/W |
| $R_{th\ j-a}$ | Thermal resistance junction to ambient | pcb mounted; minimum footprint pcb mounted; pad area as in fig:14 | - | 156 70 | - - | K/W K/W |

STATIC CHARACTERISTICS

$T_j = 25^\circ C$ unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | | UNIT |
|-------------------|--|--|------|------|------|----|------|
| I_{GT} | Gate trigger current | $V_D = 12 V; I_T = 0.1 A$ $T2+ G+$ $T2+ G-$ $T2- G-$ $T2- G+$ | - | 5 | 35 | 25 | mA |
| | | | - | 8 | 35 | 25 | mA |
| | | | - | 11 | 35 | 25 | mA |
| | | | - | 30 | 70 | 70 | mA |
| I_L | Latching current | $V_D = 12 V; I_{GT} = 0.1 A$ $T2+ G+$ $T2+ G-$ $T2- G-$ $T2- G+$ | - | 7 | 20 | 20 | mA |
| | | | - | 16 | 30 | 30 | mA |
| | | | - | 5 | 20 | 20 | mA |
| | | | - | 7 | 30 | 30 | mA |
| I_H | Holding current | $V_D = 12 V; I_{GT} = 0.1 A$ | - | 5 | 15 | 15 | mA |
| | | | - | 5 | 15 | 30 | mA |
| V_T V_{GT} | On-state voltage Gate trigger voltage | $I_T = 2 A$ $V_D = 12 V; I_T = 0.1 A$ $V_D = 400 V; I_T = 0.1 A;$ $T_j = 125^\circ C$ | - | 1.2 | 1.50 | V | |
| | | | - | 0.7 | 1.5 | V | |
| I_D | Off-state leakage current | $V_D = V_{DRM(max)}$ $T_j = 125^\circ C$ | 0.25 | 0.4 | - | V | |
| | | | - | 0.1 | 0.5 | mA | |

DYNAMIC CHARACTERISTICS

$T_j = 25^\circ C$ unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | | | TYP. | MAX. | UNIT |
|---------------|--|---|------|----|-----|------|------|------------|
| dV_D/dt | Critical rate of rise of off-state voltage | $V_{DM} = 67\% V_{DRM(max)}$ $T_j = 125^\circ C$; exponential waveform; gate open circuit | 100 | 50 | 200 | 250 | - | V/ μ s |
| dV_{com}/dt | Critical rate of change of commutating voltage | $V_{DM} = 400 V$; $T_j = 95^\circ C$ $I_{T(RMS)} = 1 A$ $dl_{com}/dt = 1.8 A/ms$; gate open circuit | - | - | 10 | 50 | - | V/ μ s |
| t_{gt} | Gate controlled turn-on time | $I_{TM} = 1.5 A$ $V_D = V_{DRM(max)}$; $I_G = 0.1 A$ $dl_G/dt = 5 A/\mu s$ | - | - | - | 2 | - | μ s |

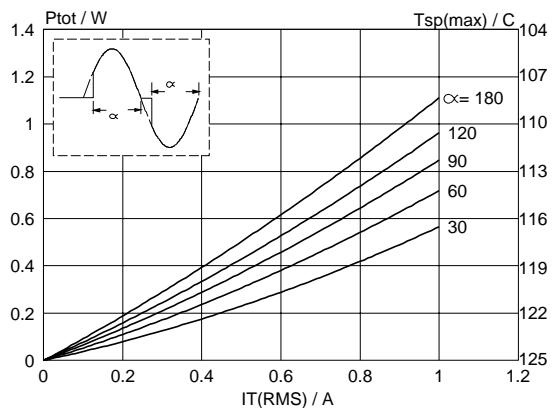


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

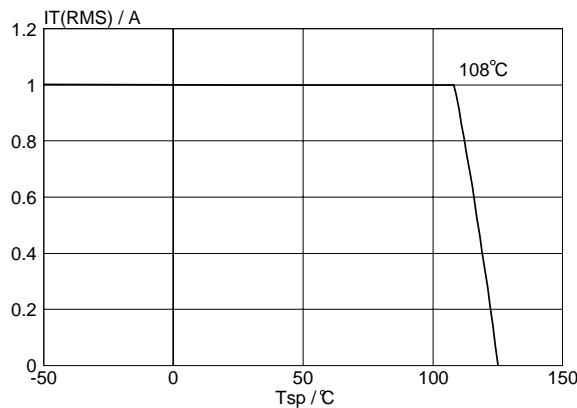


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus solder point temperature T_{sp} .

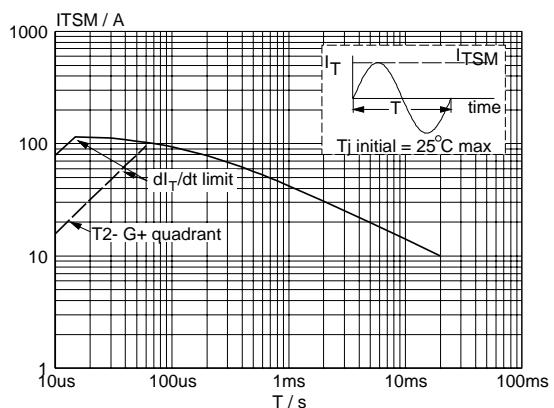


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

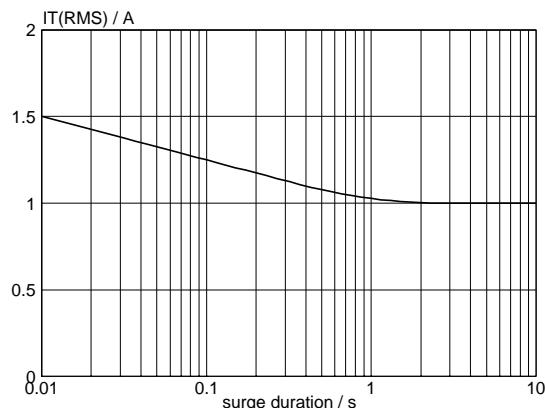


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{Hz}$; $T_{sp} \leq 108^\circ\text{C}$.

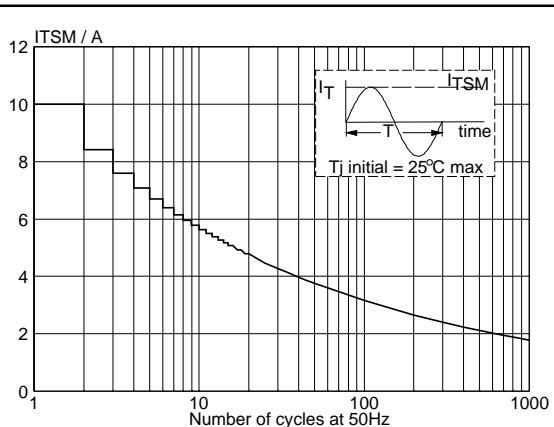


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{Hz}$.

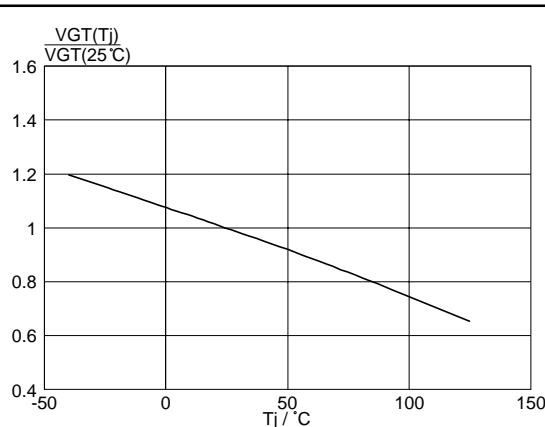


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

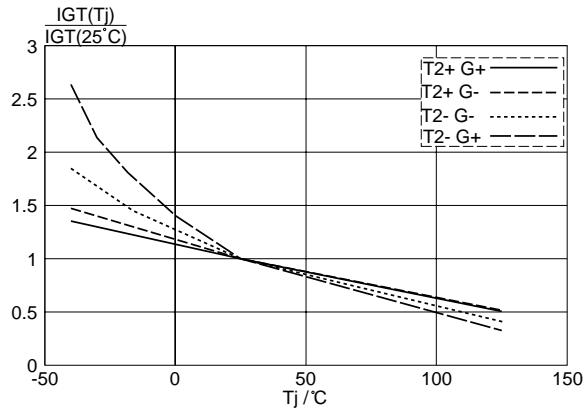


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

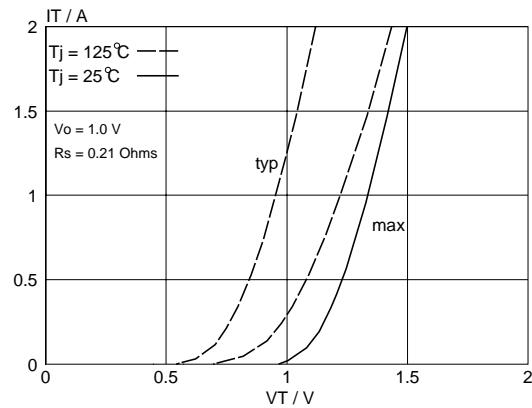


Fig.10. Typical and maximum on-state characteristic.

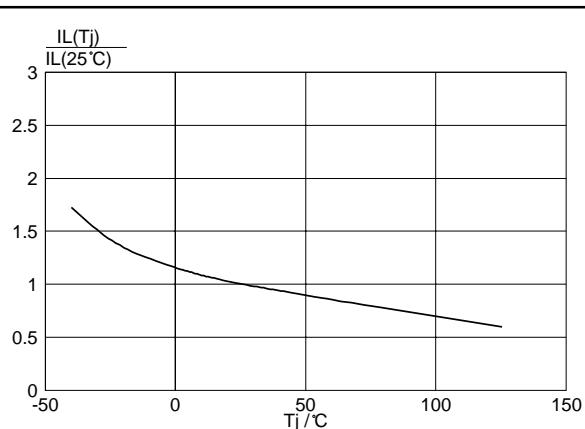


Fig.8. Normalised latching current $I_L(T_j)/I_L(25^\circ\text{C})$, versus junction temperature T_j .

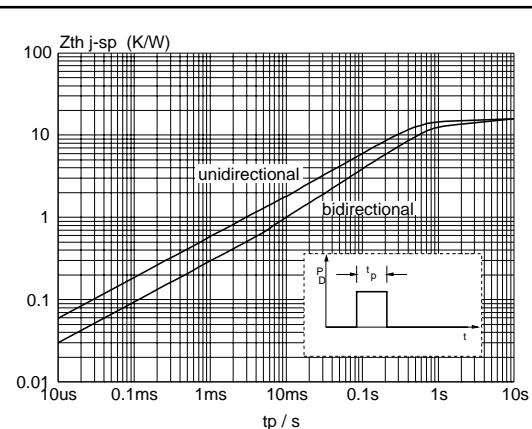


Fig.11. Transient thermal impedance $Z_{th,j-sp}$, versus pulse width t_p .

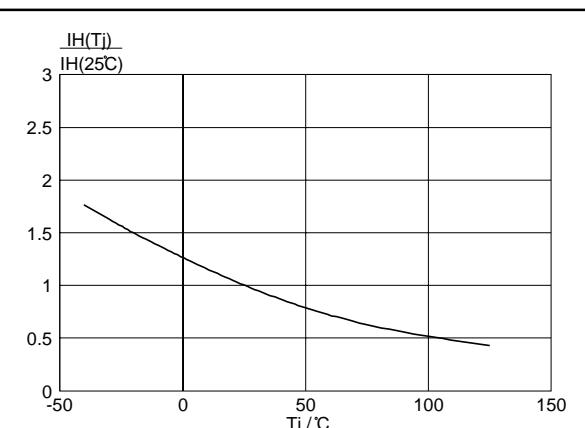


Fig.9. Normalised holding current $I_H(T_j)/I_H(25^\circ\text{C})$, versus junction temperature T_j .

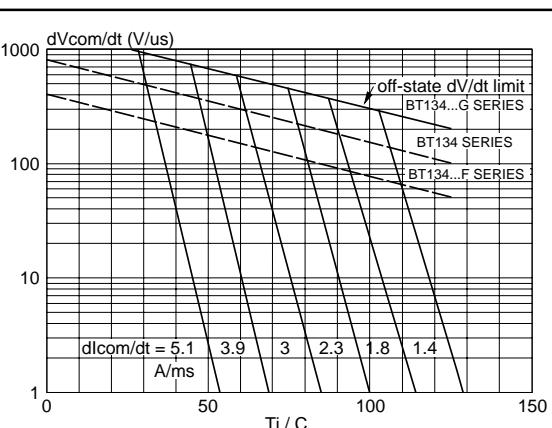


Fig.12. Typical commutation dV/dt versus junction temperature, parameter commutation dl_7/dt . The triac should commutate when the dV/dt is below the value on the appropriate curve for pre-commutation dl_7/dt .

MOUNTING INSTRUCTIONS

Dimensions in mm.

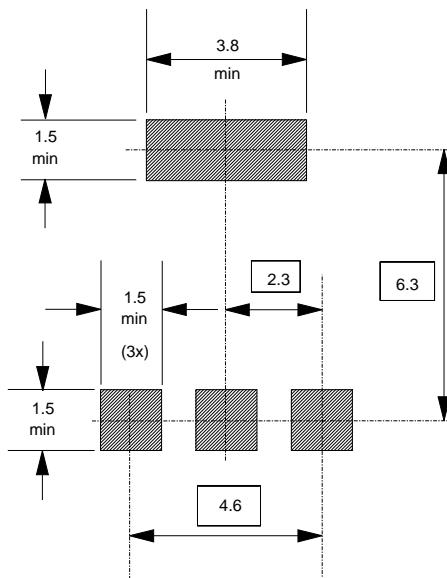


Fig.13. soldering pattern for surface mounting SOT223.

PRINTED CIRCUIT BOARD

Dimensions in mm.

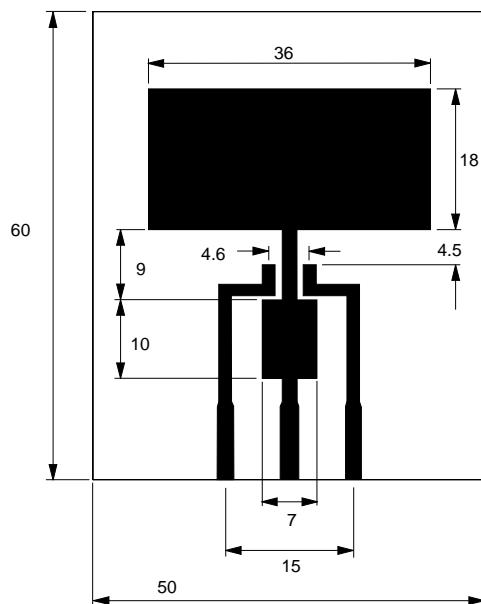


Fig.14. PCB for thermal resistance and power rating for SOT223.
PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35 μm thick).

MECHANICAL DATA

Dimensions in mm

Net Mass: 0.11 g

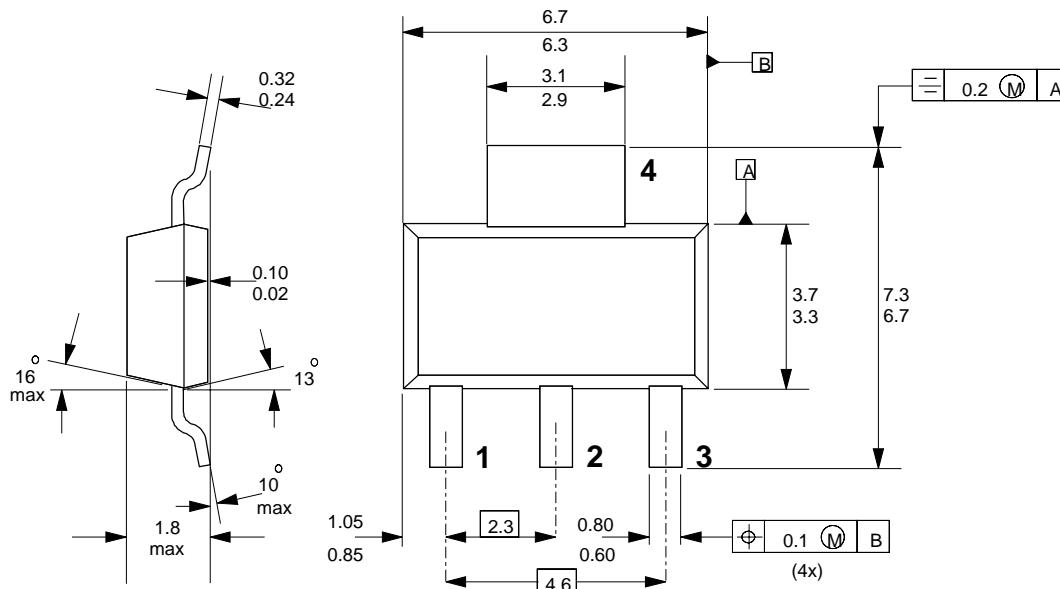


Fig.15. SOT223 surface mounting package.

Notes

1. For further information, refer to Philips publication SC18 " SMD Footprint Design and Soldering Guidelines". Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".