

DATA SHEET

BT132 series D

Triacs

logic level

Product specification

January 1998



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GENERAL DESCRIPTION

Glass passivated, sensitive gate triacs in a plastic envelope, intended for use in general purpose bidirectional switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

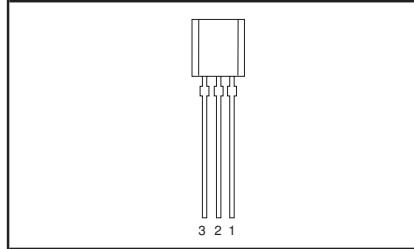
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|--------------|--------------------------------------|------|------|------|
| V_{DRM} | Repetitive peak off-state voltages | 500D | 600D | V |
| $I_{T(RMS)}$ | RMS on-state current | 500 | 600 | A |
| I_{TSM} | Non-repetitive peak on-state current | 1 | 1 | A |
| | | 16 | 16 | A |

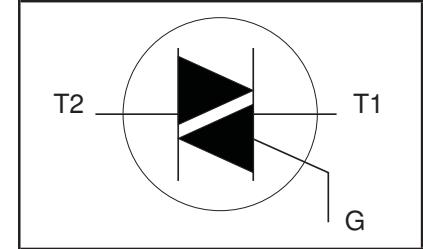
PINNING - TO92

| PIN | DESCRIPTION |
|-----|-----------------|
| 1 | main terminal 2 |
| 2 | gate |
| 3 | main terminal 1 |

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|--|---|------------------------------|----------------------------------|--|
| V_{DRM} | Repetitive peak off-state voltages | | - | -500 500 ¹ | V |
| $I_{T(RMS)}$ I_{TSM} | RMS on-state current Non-repetitive peak on-state current | full sine wave; $T_{lead} \leq 51^\circ\text{C}$ full sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 20\text{ ms}$ $t = 16.7\text{ ms}$ $t = 10\text{ ms}$ $I_{TM} = 1.5\text{ A}; I_G = 0.2\text{ A};$ $dl_G/dt = 0.2\text{ A}/\mu\text{s}$ | - | 1 16 17.6 1.28 | A |
| I^2t dl_T/dt | I^2t for fusing Repetitive rate of rise of on-state current after triggering | $T2+ G+$ $T2+ G-$ $T2- G-$ $T2- G+$ | - | 50 50 50 10 | $\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$ |
| I_{GM} V_{GM} P_{GM} $P_{G(AV)}$ T_{stg} T_j | Peak gate current Peak gate voltage Peak gate power Average gate power Storage temperature Operating junction temperature | over any 20 ms period | - - - - -40 - | 2 5 5 0.5 150 125 | A V W W $^\circ\text{C}$ $^\circ\text{C}$ |

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/ μs .

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THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-------------------------|---|--|------|------|------|------|
| $R_{th\ j\text{-lead}}$ | Thermal resistance junction to lead | full cycle | - | - | 60 | K/W |
| $R_{th\ j\text{-a}}$ | Thermal resistance junction to ambient | half cycle pcb mounted; lead length = 4mm | - | - | 80 | K/W |
| | | | - | 150 | - | K/W |

STATIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------------------|---|---|------|------|------|------|
| I_{GT} | Gate trigger current | $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ | - | 2.0 | 5 | mA |
| | | $T2+ G+$ | - | 2.5 | 5 | mA |
| | | $T2+ G-$ | - | 2.5 | 5 | mA |
| | | $T2- G-$ | - | 5.0 | 10 | mA |
| I_L | Latching current | $V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ | - | 1.6 | 10 | mA |
| | | $T2+ G+$ | - | 4.5 | 15 | mA |
| | | $T2+ G-$ | - | 1.2 | 10 | mA |
| | | $T2- G-$ | - | 2.2 | 15 | mA |
| I_H V_T V_{GT} | Holding current On-state voltage Gate trigger voltage | $V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ | - | 1.2 | 10 | mA |
| | | $I_T = 5\text{ A}$ | - | 1.4 | 1.70 | V |
| | | $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ | - | 0.7 | 1.5 | V |
| I_D | Off-state leakage current | $V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 125^\circ\text{C}$ | 0.25 | 0.4 | - | V |
| | | $V_D = V_{DRM(\text{max})}; T_j = 125^\circ\text{C}$ | - | 0.1 | 0.5 | mA |

DYNAMIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-----------|---|--|------|------|------|------------------|
| dV_D/dt | Critical rate of rise of off-state voltage | $V_{DM} = 67\% V_{DRM(\text{max})}; T_j = 125^\circ\text{C};$ exponential waveform; $R_{GK} = 1\text{ k}\Omega$ | - | 5 | - | V/ μs |
| t_{gt} | Gate controlled turn-on time | $I_{TM} = 6\text{ A}; V_D = V_{DRM(\text{max})}; I_G = 0.1\text{ A};$ $dl_G/dt = 5\text{ A}/\mu\text{s}$ | - | 2 | - | μs |

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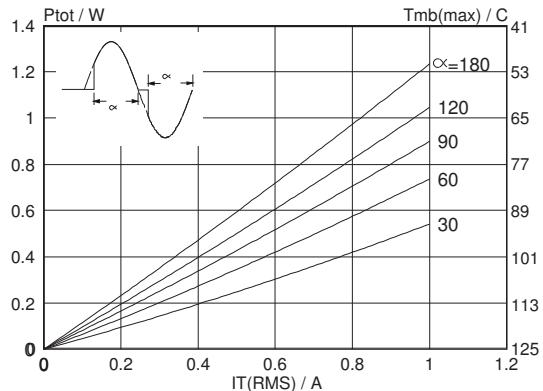


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

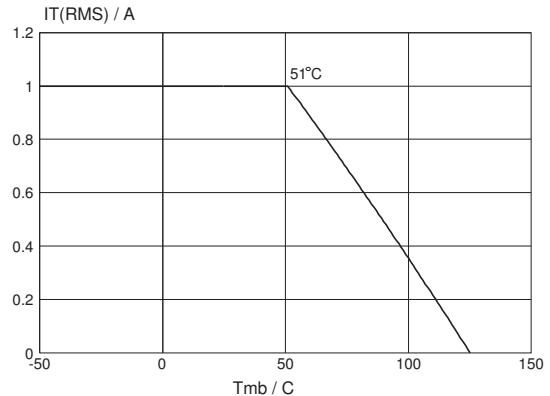


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus lead temperature T_{lead} .

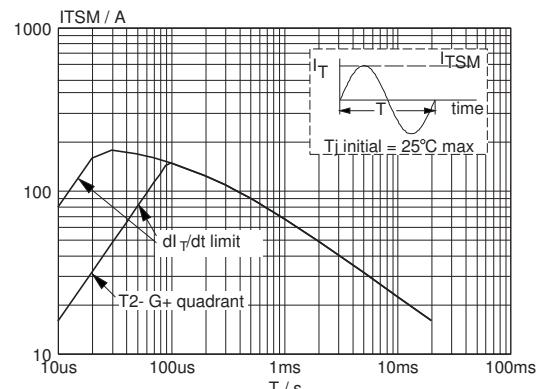


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20ms$.

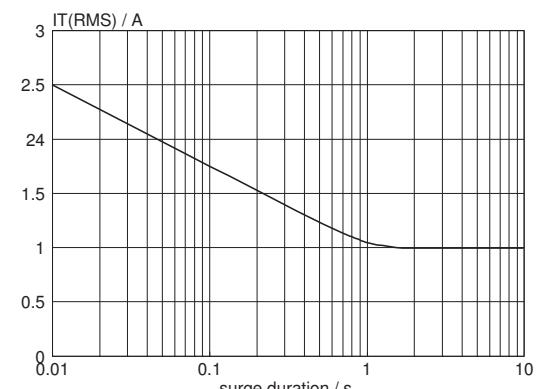


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{lead} \leq 51^\circ C$.

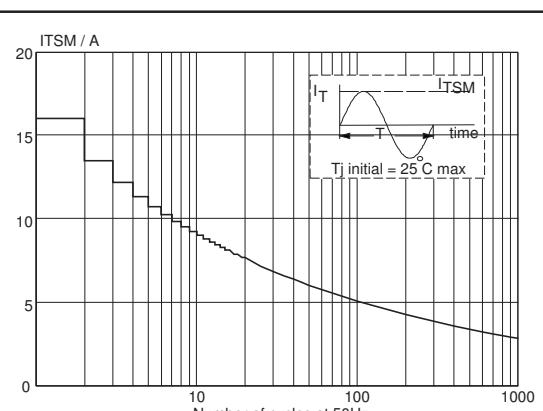


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

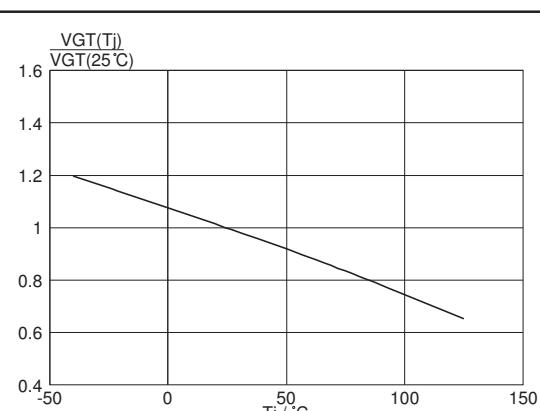


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^\circ C)$, versus junction temperature T_j .

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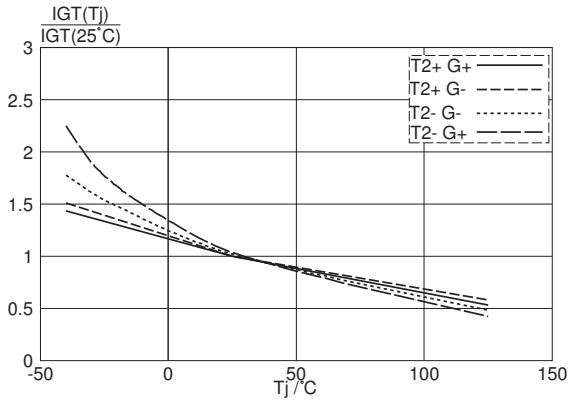


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

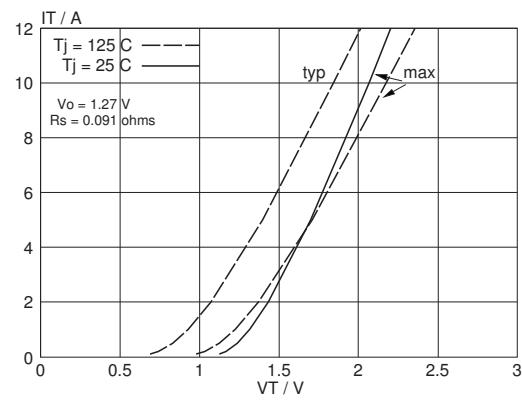


Fig.10. Typical and maximum on-state characteristic.

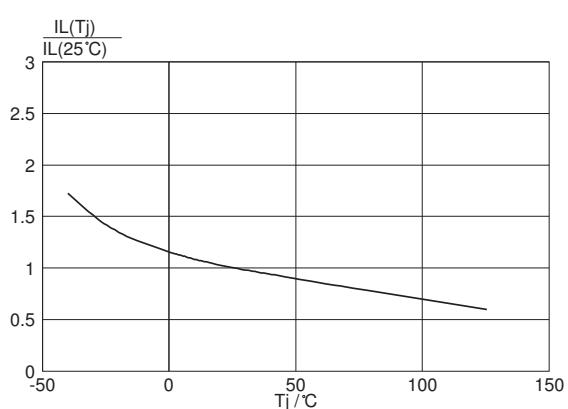


Fig.8. Normalised latching current $I_L(T_j)/I_L(25^\circ\text{C})$, versus junction temperature T_j .

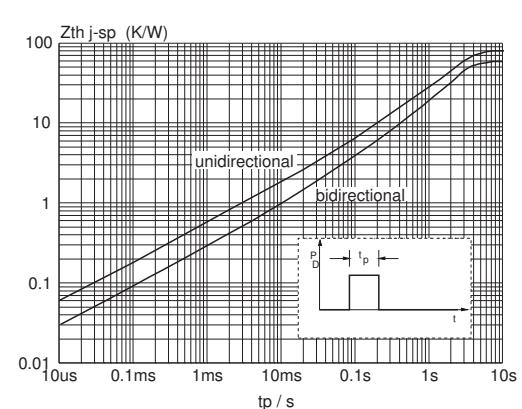


Fig.11. Transient thermal impedance $Z_{th,j\text{-lead}}$, versus pulse width t_p .

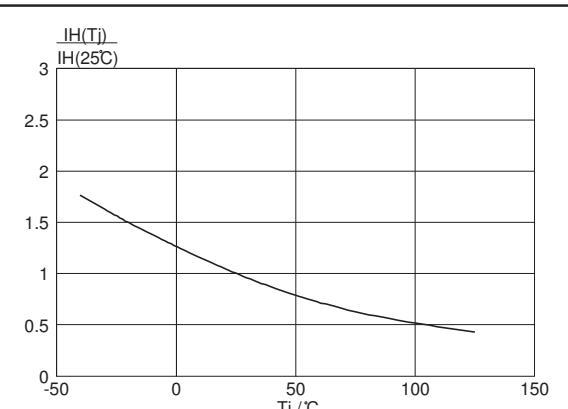


Fig.9. Normalised holding current $I_H(T_j)/I_H(25^\circ\text{C})$, versus junction temperature T_j .

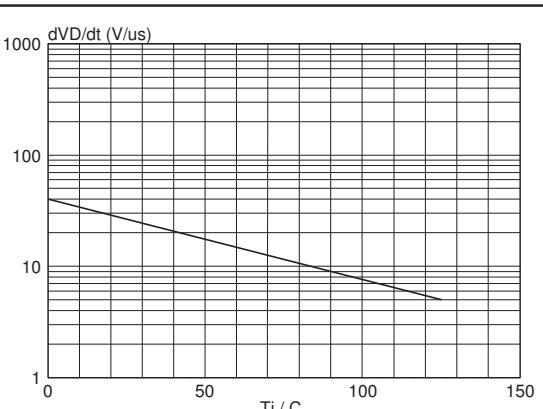


Fig.12. Typical, critical rate of rise of off-state voltage, dV_D/dt versus junction temperature T_j .

MECHANICAL DATA*Dimensions in mm*

Net Mass: 0.2 g

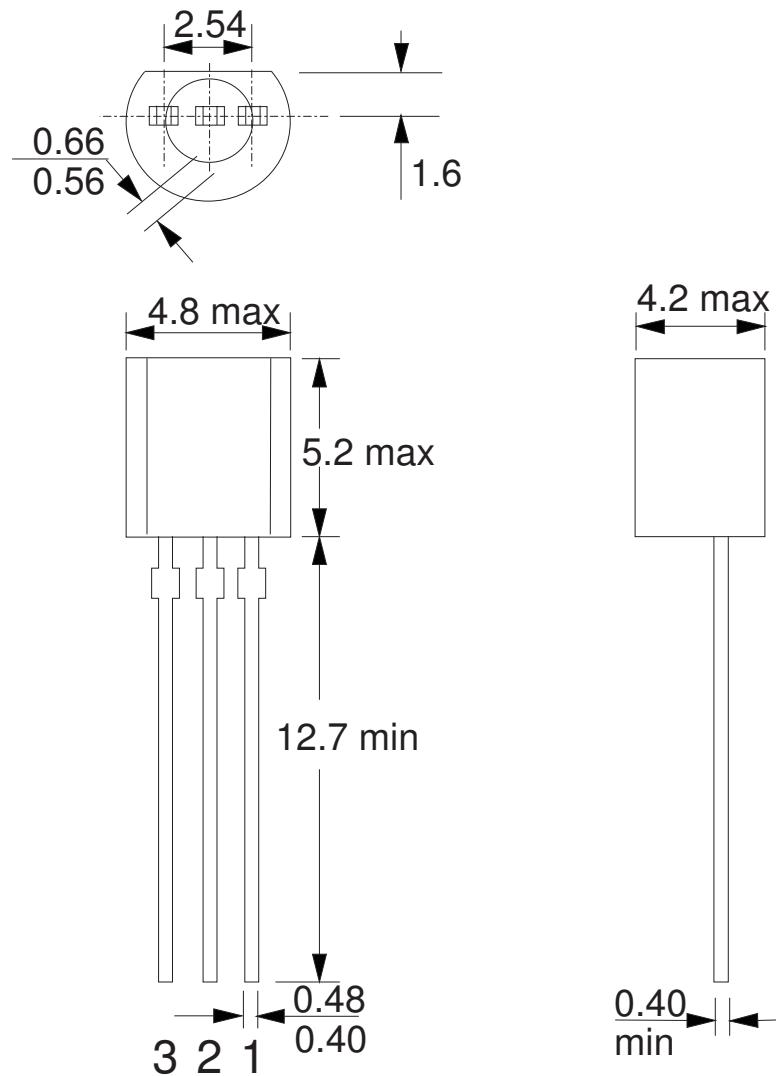


Fig. 13. TO92 Variant; plastic envelope.

Notes

1. Epoxy meets UL94 V0 at 1/8".

Legal information

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|--------------------------------|-------------------------------|---|
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| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
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