

DATA SHEET

BT152X series Thyristors

Product specification

October 1997



Thyristors

BT152X series

GENERAL DESCRIPTION

Glass passivated thyristors in a full pack, plastic envelope, intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

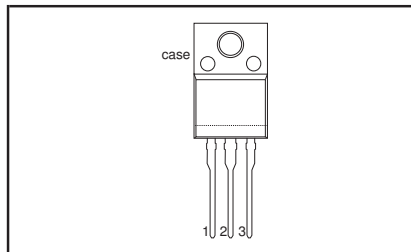
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|--------------------------|--------------------------------------|--------------------|--------------------|--------------------|------|
| V_{DRM} , V_{RRM} | Repetitive peak off-state voltages | 400R 450 | 600R 650 | 800R 800 | V |
| $I_{T(AV)}$ | Average on-state current | 13 | 13 | 13 | A |
| $I_{T(RMS)}$ | RMS on-state current | 20 | 20 | 20 | A |
| I_{TSM} | Non-repetitive peak on-state current | 200 | 200 | 200 | A |

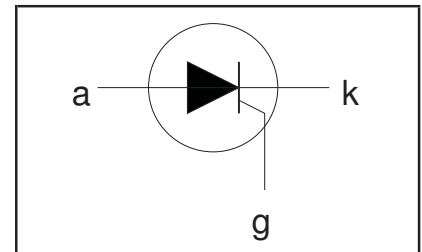
PINNING - SOT186A

| PIN | DESCRIPTION |
|------|-------------|
| 1 | cathode |
| 2 | anode |
| 3 | gate |
| case | isolated |

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | UNIT |
|--------------|--|---|------|---------------------------|---------------------------|--------------|--|
| | | | | -400R 450 ¹ | -600R 650 ¹ | -800R 800 | |
| V_{DRM} | Repetitive peak off-state voltages | | - | | | | V |
| $I_{T(AV)}$ | Average on-state current | half sine wave; $T_{hs} \leq 43\text{ }^\circ\text{C}$ | - | 13 | | | A |
| $I_{T(RMS)}$ | RMS on-state current | all conduction angles | - | 20 | | | A |
| I_{TSM} | Non-repetitive peak on-state current | half sine wave; $T_j = 25\text{ }^\circ\text{C}$ prior to surge $t = 10\text{ ms}$ | - | 200 | | | A |
| I^2t | I^2t for fusing | $t = 8.3\text{ ms}$ | - | 220 | | | A |
| di_T/dt | Repetitive rate of rise of on-state current after triggering | $t = 10\text{ ms}$ $I_{TM} = 50\text{ A}$; $I_G = 0.2\text{ A}$; $di_G/dt = 0.2\text{ A}/\mu\text{s}$ | - | 200 | | | A^2s $\text{A}/\mu\text{s}$ |
| I_{GM} | Peak gate current | | - | 5 | | | A |
| V_{GM} | Peak gate voltage | | - | 5 | | | V |
| V_{RGM} | Peak reverse gate voltage | | - | 5 | | | V |
| P_{GM} | Peak gate power | | - | 20 | | | W |
| $P_{G(AV)}$ | Average gate power | over any 20 ms period | - | 0.5 | | | W |
| T_{stg} | Storage temperature | | -40 | 150 | | | $^\circ\text{C}$ |
| T_j | Operating junction temperature | | - | 125 | | | $^\circ\text{C}$ |

¹ Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed 15 A/μs.

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ISOLATION LIMITING VALUE & CHARACTERISTIC $T_{hs} = 25\text{ °C}$ unless otherwise specified

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------|--|--|------|------|------|------|
| V_{isol} | R.M.S. isolation voltage from all three terminals to external heatsink | $f = 50\text{-}60\text{ Hz}$; sinusoidal waveform; $R.H. \leq 65\%$; clean and dustfree | - | | 2500 | V |
| C_{isol} | Capacitance from T2 to external heatsink | $f = 1\text{ MHz}$ | - | 10 | - | pF |

THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-----------------------|---|---------------------------|------|------|------|------|
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | with heatsink compound | - | - | 4.0 | K/W |
| $R_{th\ j\text{-}hs}$ | Thermal resistance junction to heatsink | without heatsink compound | - | - | 5.5 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | in free air | - | 55 | - | K/W |

STATIC CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise stated

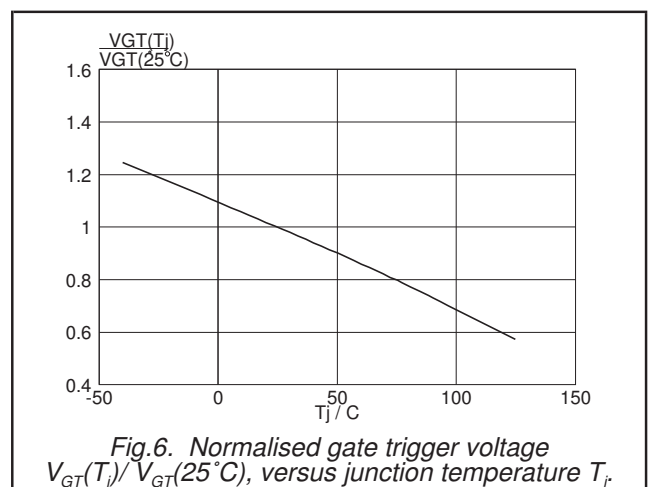
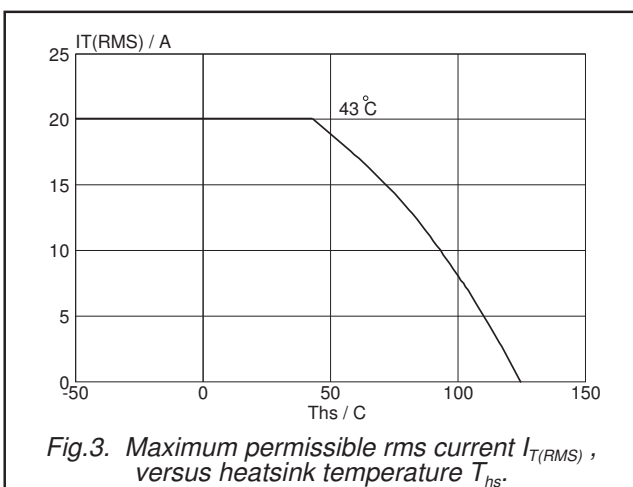
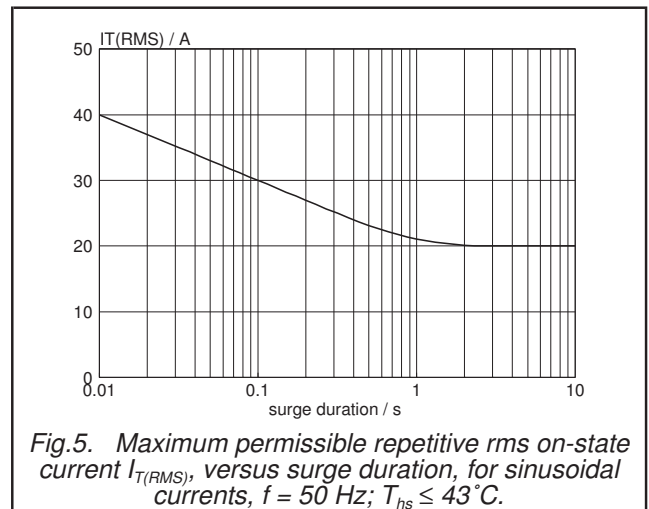
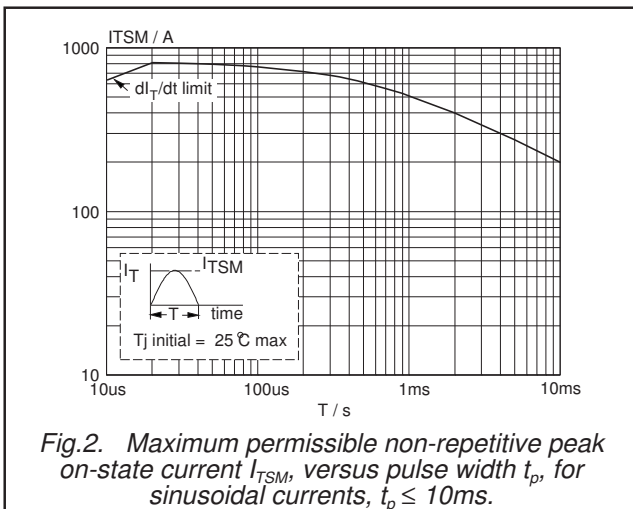
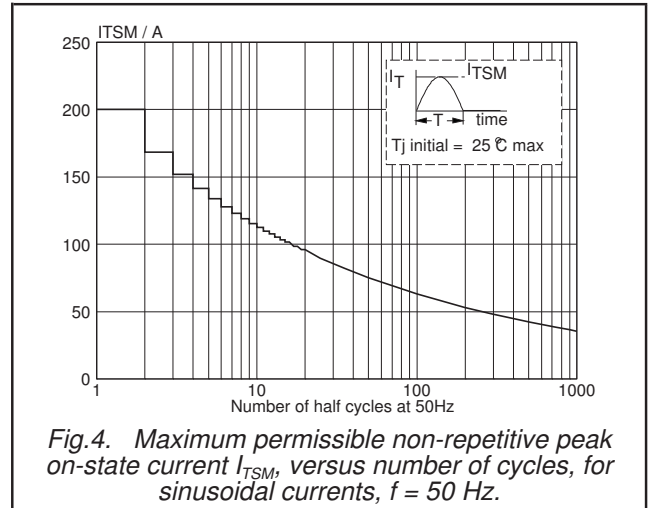
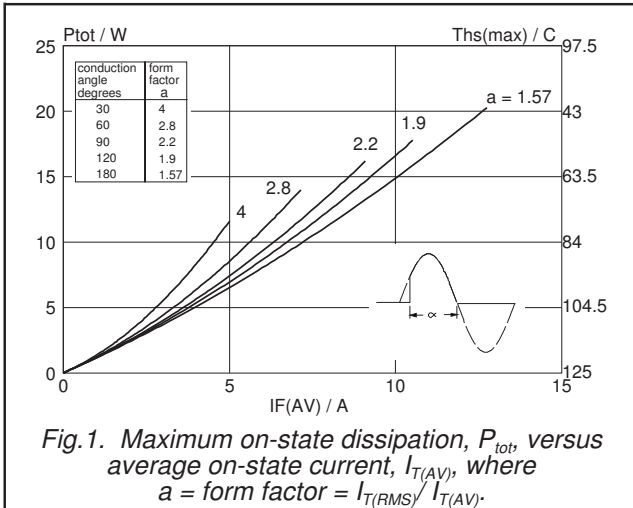
| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------|---------------------------|---|------|------|------|------|
| I_{GT} | Gate trigger current | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | - | 3 | 32 | mA |
| I_L | Latching current | $V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ | - | 25 | 80 | mA |
| I_H | Holding current | $V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ | - | 15 | 60 | mA |
| V_T | On-state voltage | $I_T = 40\text{ A}$ | - | 1.4 | 1.75 | V |
| V_{GT} | Gate trigger voltage | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | - | 0.6 | 1.5 | V |
| I_D, I_R | Off-state leakage current | $V_D = V_{DRM(max)}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$ | 0.25 | 0.4 | - | V |
| | | $V_D = V_{DRM(max)}$; $V_R = V_{RRM(max)}$; $T_j = 125\text{ °C}$ | - | 0.2 | 1.0 | mA |

DYNAMIC CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-----------|--|--|------|------|------|------------|
| dV_D/dt | Critical rate of rise of off-state voltage | $V_{DM} = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; exponential waveform gate open circuit | 200 | 300 | - | V/ μ s |
| t_{gt} | Gate controlled turn-on time | $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu$ s; $I_{TM} = 40\text{ A}$ | - | 2 | - | μ s |
| t_q | Circuit commutated turn-off time | $V_D = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; $I_{TM} = 50\text{ A}$; $V_R = 25\text{ V}$; $dI_{TM}/dt = 30\text{ A}/\mu$ s; $dV_D/dt = 50\text{ V}/\mu$ s; $R_{GK} = 100\ \Omega$ | - | 70 | - | μ s |

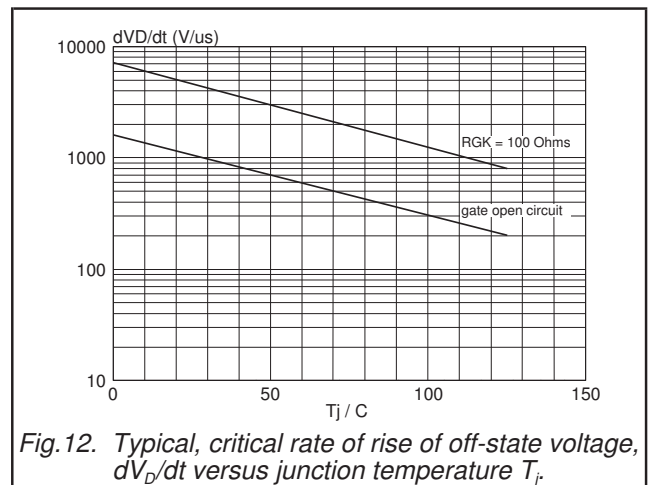
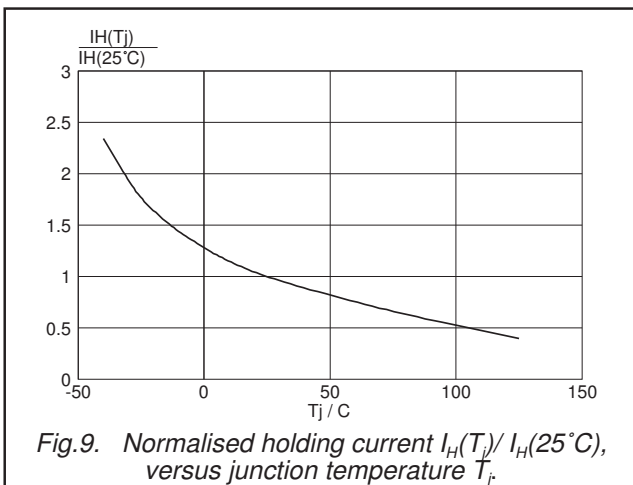
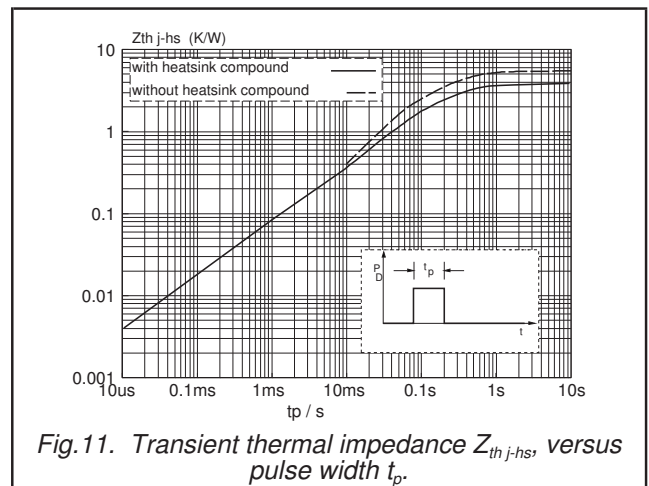
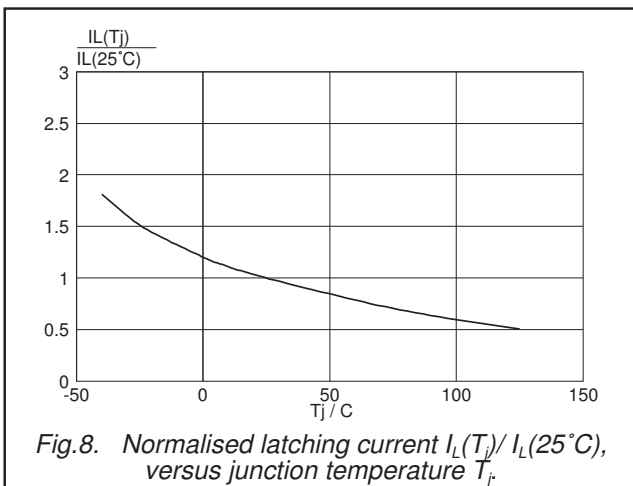
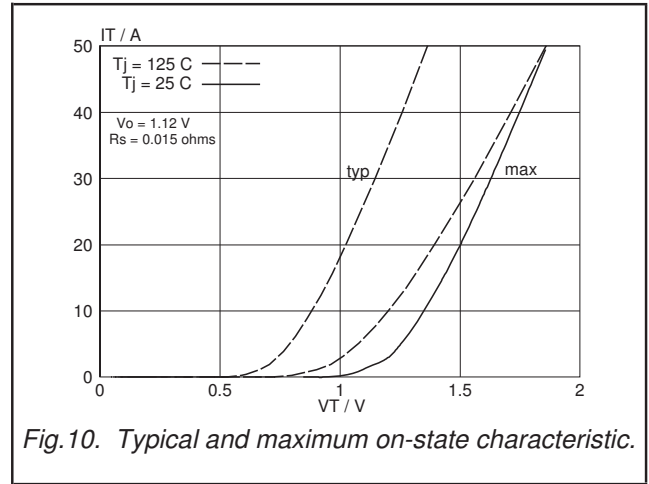
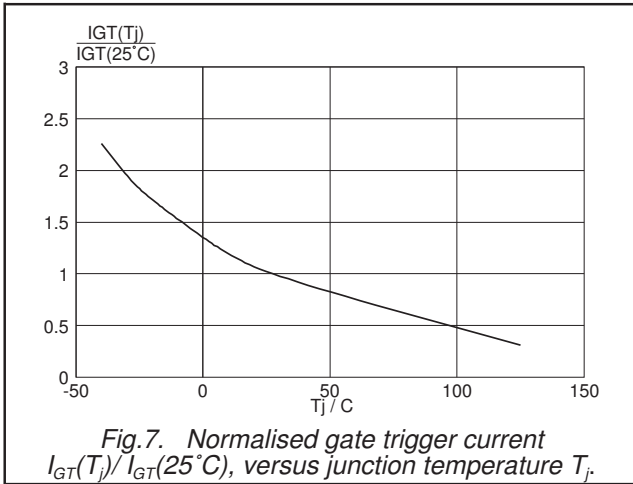
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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

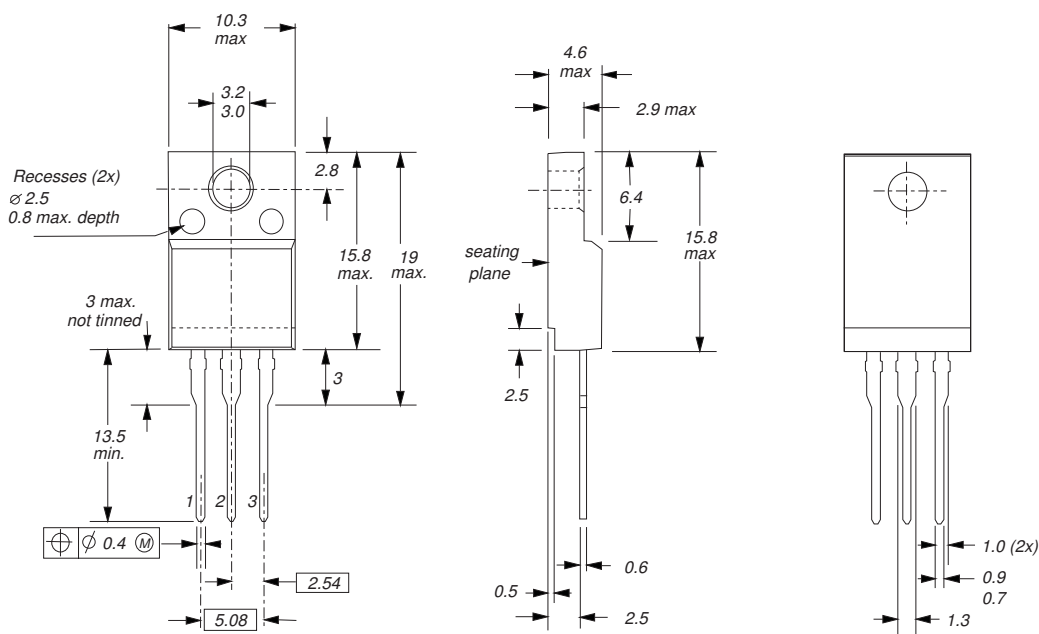


Fig. 13. SOT186A; The seating plane is electrically isolated from all terminals.

Notes

1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

Legal information

DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITION |
|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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