BT136B series E

GENERAL DESCRIPTION

Passivated, sensitive gate triacs in a plastic envelope suitable for surface mounting, intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants.

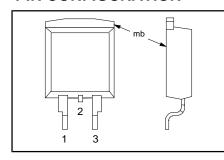
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | UNIT |
|---|---|--------------------|--------------------|--------|
| V_{DRM} | BT136B- Repetitive peak off-state voltages | 600E 600 | 800E 800 | V |
| I _{T(RMS)} I _{TSM} | RMS on-state current Non-repetitive peak on-state current | 4 25 | 4 25 | A A |

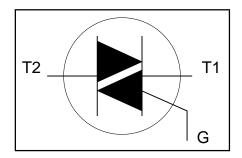
PINNING - SOT404

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

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 | | - | -600 600 ¹ | -800 800 | V |
| I _{T(RMS)} I _{TSM} | RMS on-state current Non-repetitive peak on-state current | full sine wave; $T_{mb} \le 107 ^{\circ}\text{C}$ full sine wave; $T_{j} = 25 ^{\circ}\text{C}$ prior to surge | - | | 1 | A |
| | | t = 20 ms t = 16.7 ms | - | 2 2 | 5 7 | A A |
| l²t dl _⊤ /dt | I ² t for fusing Repetitive rate of rise of on-state current after | t = 10 ms $I_{TM} = 6 \text{ A}; I_{G} = 0.2 \text{ A};$ $dI_{G}/dt = 0.2 \text{ A}/\mu\text{s}$ | - | 3 | | A A ² s |
| | triggering | T2+ G+ T2+ G- T2- G- T2- G+ | - - - | 5 5 | 0 0 0 0 | A/μs A/μs A/μs |
| I _{GM} V _{GM} P _{GM} | Peak gate current Peak gate voltage Peak gate power | 12-0+ | - - - | 2 | 2 | A/μs A V W |
| P _{G(AV)} T _{stg} T _j | Average gate power Storage temperature Operating junction temperature | over any 20 ms period | -40 - | 0 15 | .5 60 25 | ,C ,C |

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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 |
|---------------------------------------|---|--|------|--------------|------------|-------------------|
| $R_{th j-mb}$ $R_{th i-a}$ | Thermal resistance junction to mounting base Thermal resistance | full cycle half cycle minimum footprint, FR4 board | | - - 55 | 3.0 3.7 | K/W K/W K/W |
| · · · · · · · · · · · · · · · · · · · | junction to ambient | The state of the s | | | | ' ' ' ' |

STATIC CHARACTERISTICS

T_i = 25 °C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|--|---------------------------|--|----------|------|------|------|------|
| I _{GT} | Gate trigger current | $V_D = 12 \text{ V}; I_T = 0.1 \text{ A}$ | | | | | |
| | | | Г2+ G+ | - | 2.5 | 10 | mΑ |
| | | | Г2+ G- | - | 4.0 | 10 | mΑ |
| | | | Г2- G- | - | 5.0 | 10 | mΑ |
| | | | Г2- G+ | - | 11 | 25 | mΑ |
| I _L | Latching current | $V_D = 12 \text{ V}; I_{GT} = 0.1 \text{ A}$ | | | | | |
| | _ | | Г2+ G+ | - | 3.0 | 15 | mΑ |
| | | - | Г2+ G- | - | 10 | 20 | mΑ |
| | | | Г2- G- 📗 | - | 2.5 | 15 | mΑ |
| | | | Г2- G+ | - | 4.0 | 20 | mΑ |
| I _H | Holding current | $V_D = 12 \text{ V}; I_{GT} = 0.1 \text{ A}$ | | - | 2.2 | 15 | mΑ |
| V_{T} | On-state voltage | $I_T = 5 A$ | | - | 1.4 | 1.70 | V |
| $egin{array}{c} oldsymbol{I}_H \ oldsymbol{V}_T \ oldsymbol{V}_GT \end{array}$ | Gate trigger voltage | $V_D = 12 \text{ V}; I_T = 0.1 \text{ A}$ | _ | - | 0.7 | 1.5 | V |
| | | $V_D = 400 \text{ V}; I_T = 0.1 \text{ A}; T_j = 125 \text{ °C}$ $V_D = V_{DRM(max)}; T_j = 125 \text{ °C}$ | 0 | 0.25 | 0.4 | - | V |
| I_D | Off-state leakage current | $V_D = V_{DRM(max)}$; $T_j = 125 \degree C$ | | - | 0.1 | 0.5 | mA |

DYNAMIC CHARACTERISTICS

 $T_i = 25$ °C unless otherwise stated

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------------|--|---|------|------|------|------|
| dV _D /dt | Critical rate of rise of | $V_{DM} = 67\% V_{DRM(max)}; T_j = 125 \text{ °C};$ | - | 50 | - | V/μs |
| t _{gt} | off-state voltage Gate controlled turn-on time | exponential waveform, gate open circuit $I_{TM} = 6 \text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1 \text{ A}$; $dI_G/dt = 5 \text{ A}/\mu\text{s}$ | - | 2 | - | μs |

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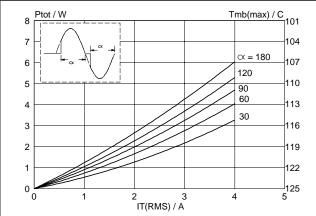


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where $\alpha =$ conduction angle.

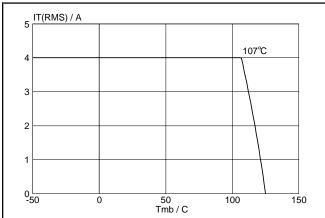


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

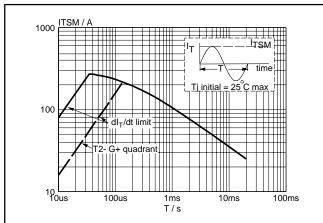


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \le 20$ ms.

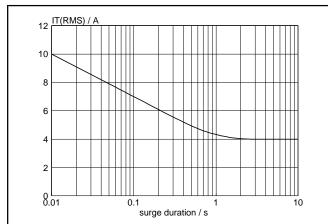


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{mb} \le 107$ °C.

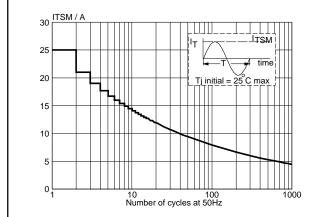


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, f = 50 Hz.

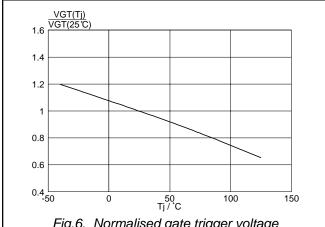
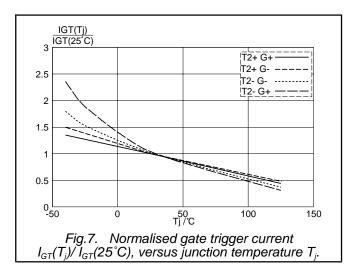
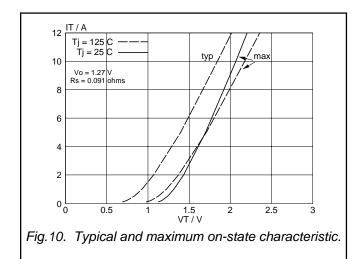
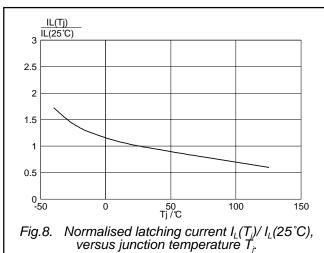


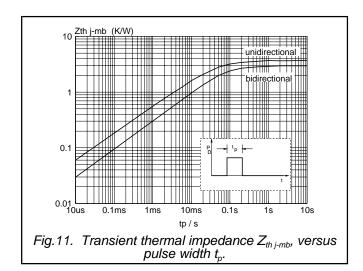
Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^{\circ}C)$, versus junction temperature T_j .

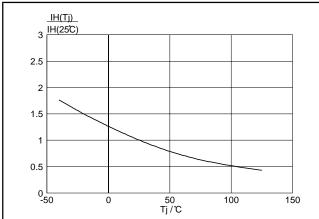
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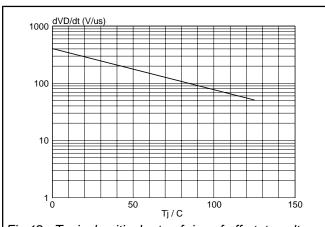
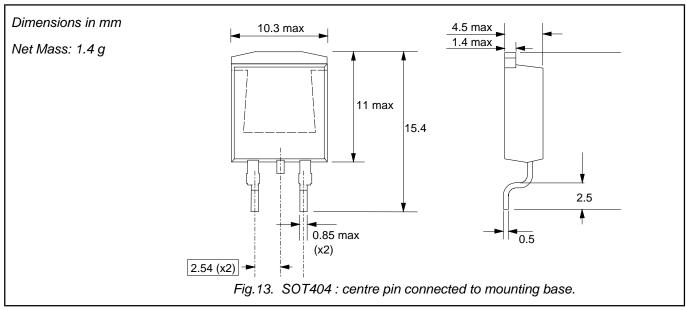


Fig.9. Normalised holding current $I_H(T_i)/I_H(25^{\circ}\text{C})$, versus junction temperature T_j .

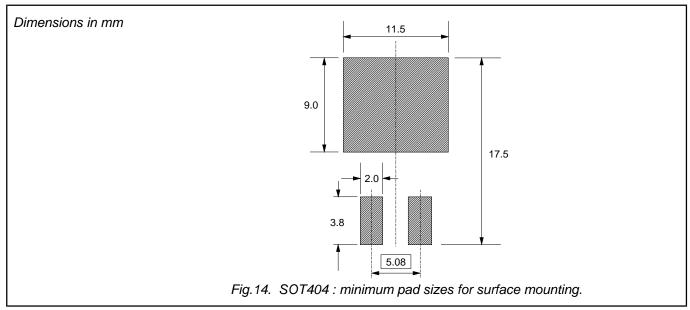
Fig.12. Typical, critical rate of rise of off-state voltage, dV_D/dt versus junction temperature T_j.

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MECHANICAL DATA



MOUNTING INSTRUCTIONS



Notes

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

Philips Semiconductors Product specification

Triacs sensitive gate

BT136B series E

DEFINITIONS

| DATA SHEET STATU | DATA SHEET STATUS | | | | | |
|-----------------------------------|--------------------------------|---|--|--|--|--|
| DATA SHEET STATUS ² | PRODUCT STATUS ³ | DEFINITIONS | | | | |
| Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice | | | | |
| Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in ordere to improve the design and supply the best possible product | | | | |
| Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A | | | | |
| Limiting values | | | | | | |

Limiting values

Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information

Where application information is given, it is advisory and does not form part of the specification.

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³ The product status of the device(s) described in this datasheet may have changed since this datasheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.