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IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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If you have any questions related to this document, please contact our nearest sales office via e-mail or phone (details via salesaddresses@ween-semi.com).

Thank you for your cooperation and understanding,

WeEn Semiconductors



DATA SHEET

BT258X series

Thyristors
logic level

Product specification

October 2002



Thyristors logic level

BT258X series

GENERAL DESCRIPTION

Passivated, sensitive gate thyristors in a full pack, plastic envelope, intended for use in general purpose 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.

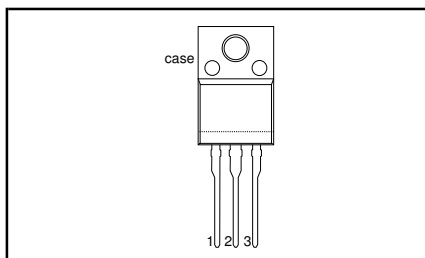
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|--------------------|--------------------------------------|--------------------|--------------------|--------------------|------|
| V_{DRM}, V_{RRM} | Repetitive peak off-state voltages | 500R 500 | 600R 600 | 800R 800 | V |
| $I_{T(AV)}$ | Average on-state current | 5 | 5 | 5 | A |
| $I_{T(RMS)}$ | RMS on-state current | 8 | 8 | 8 | A |
| I_{TSM} | Non-repetitive peak on-state current | 75 | 75 | 75 | A |

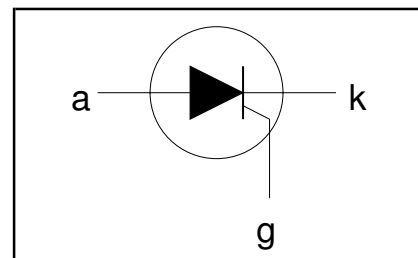
PINNING - SOT186A

| 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 |
|--------------------|--|--|------|---------------------------|---------------------------|--------------|------------------|
| | | | | -500R 500 ¹ | -600R 600 ¹ | -800R 800 | |
| V_{DRM}, V_{RRM} | Repetitive peak off-state voltages | | - | | | | V |
| $I_{T(AV)}$ | Average on-state current | half sine wave; $T_{HS} \leq 90^\circ\text{C}$ | - | 5 | | | A |
| $I_{T(RMS)}$ | RMS on-state current | all conduction angles | - | 8 | | | A |
| I_{TSM} | Non-repetitive peak on-state current | half sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 10\text{ ms}$ | - | 75 | | | A |
| I^2t | I^2t for fusing | $t = 8.3\text{ ms}$ | - | 82 | | | A |
| dl_T/dt | Repetitive rate of rise of on-state current after triggering | $t = 10\text{ ms}$ $I_{TM} = 10\text{ A}; I_G = 50\text{ mA}; dl_G/dt = 50\text{ mA}/\mu\text{s}$ | - | 28 | | | A ² s |
| I_{GM} | Peak gate current | | - | 50 | | | A/ μs |
| V_{RGM} | Peak reverse gate voltage | | - | 2 | | | A |
| P_{GM} | Peak gate power | | - | 5 | | | V |
| $P_{G(AV)}$ | Average gate power | over any 20 ms period | - | 5 | | | W |
| T_{stg} | Storage temperature | | -40 | 0.5 | | | W |
| T_j | Operating junction temperature | | - | 150 | | | $^\circ\text{C}$ |
| | | | | 125 ² | | | $^\circ\text{C}$ |

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 .

2 Note: Operation above 110 $^\circ\text{C}$ may require the use of a gate to cathode resistor of 1k Ω or less.

Thyristors
logic level

BT258X series

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 | - | - | 5.0 | K/W |
| $R_{th\ j\text{-}a}$ | Thermal resistance junction to ambient | without heatsink compound in free air | - | 55 | 6.9 | K/W |

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|------------|---------------------------|--|------|------|------|---------------|
| I_{GT} | Gate trigger current | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | - | 50 | 200 | μA |
| I_L | Latching current | $V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ | - | 0.4 | 10 | mA |
| I_H | Holding current | $V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ | - | 0.3 | 6 | mA |
| V_T | On-state voltage | $I_T = 16\text{ A}$ | - | 1.3 | 1.6 | V |
| V_{GT} | Gate trigger voltage | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | - | 0.4 | 1.5 | V |
| I_D, I_R | Off-state leakage current | $V_D = V_{DRM(max)}$; $I_T = 0.1\text{ A}$; $T_j = 110\text{ °C}$ $V_D = V_{DRM(max)}$; $V_R = V_{RRM(max)}$; $T_j = 125\text{ °C}$ | 0.1 | 0.2 | - | V |
| | | | - | 0.1 | 0.5 | 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; $R_{GK} = 100\ \Omega$ | 50 | 100 | - | V/ μs |
| t_{gt} | Gate controlled turn-on time | $I_{TM} = 10\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 5\text{ mA}$; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$ | - | 2 | - | μs |
| t_q | Circuit commutated turn-off time | $V_D = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; $I_{TM} = 12\text{ A}$; $V_R = 24\text{ V}$; $dI_{TM}/dt = 10\text{ A}/\mu\text{s}$; $dV_D/dt = 2\text{ V}/\mu\text{s}$; $R_{GK} = 1\text{ k}\Omega$ | - | 100 | - | μs |

Thyristors
logic level

BT258X series

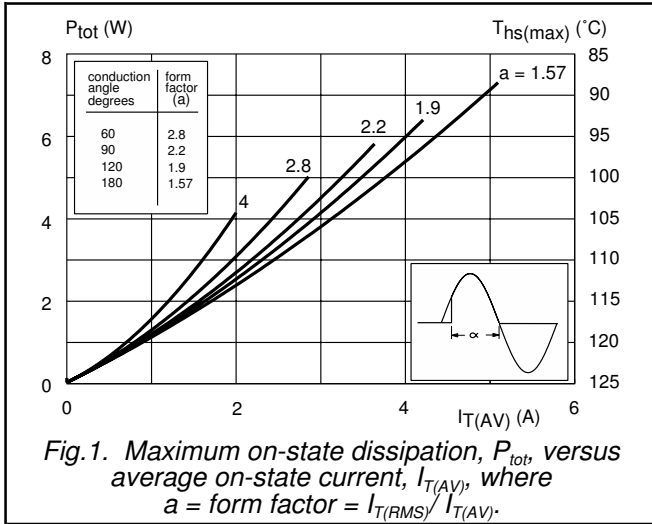


Fig. 1. Maximum on-state dissipation, P_{tot} , versus average on-state current, $I_{T(AV)}$, where $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$.

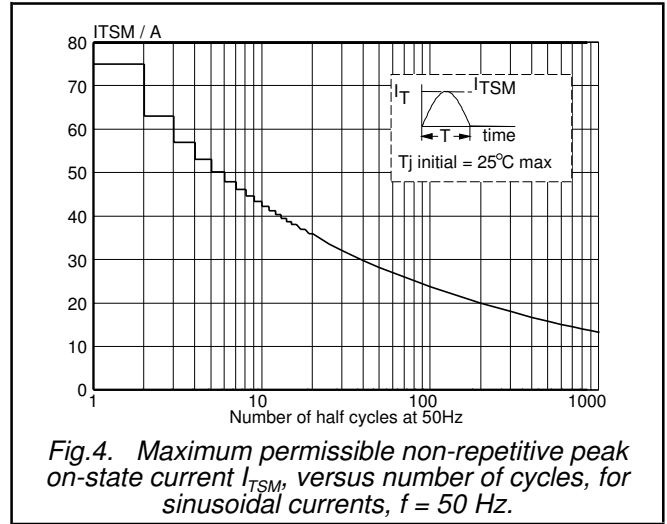


Fig. 4. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50 \text{ Hz}$.

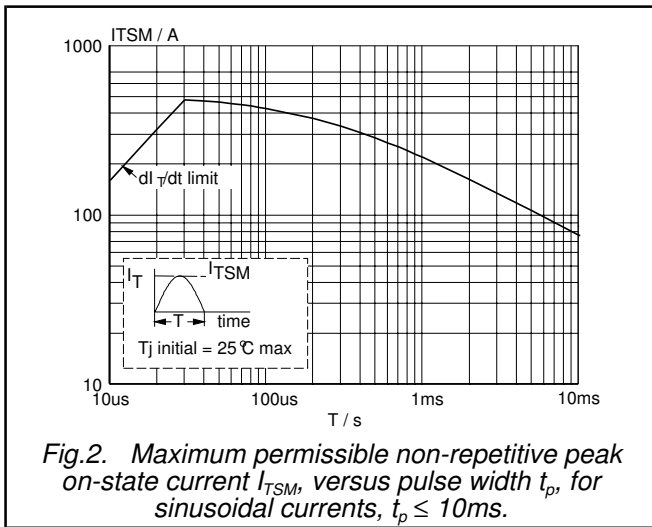


Fig. 2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 10 \text{ ms}$.

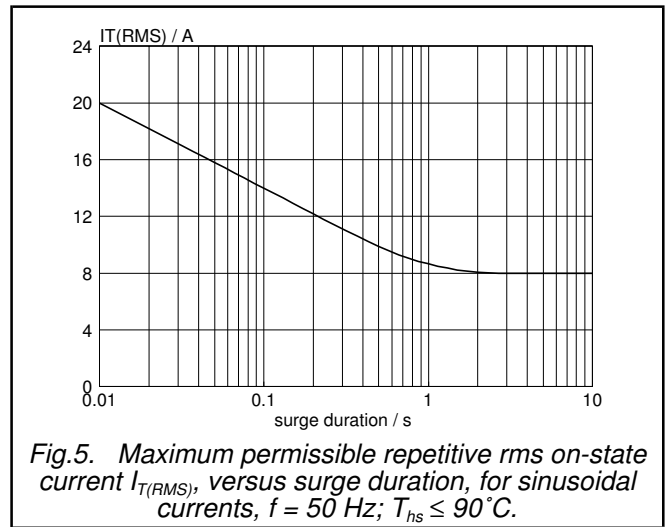


Fig. 5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50 \text{ Hz}$; $T_{hs} \leq 90^\circ\text{C}$.

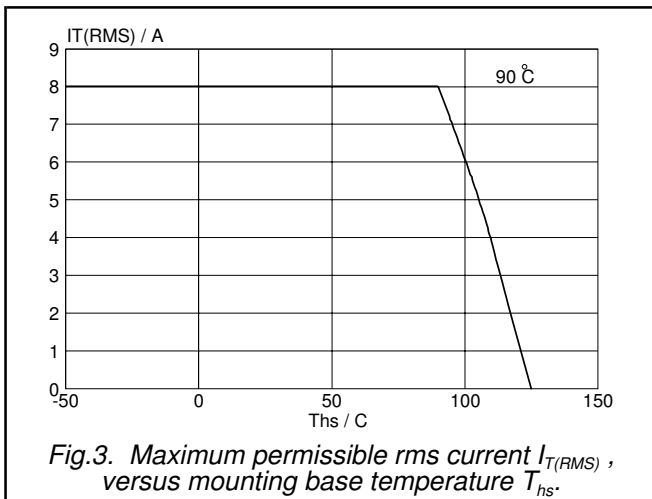


Fig. 3. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{hs} .

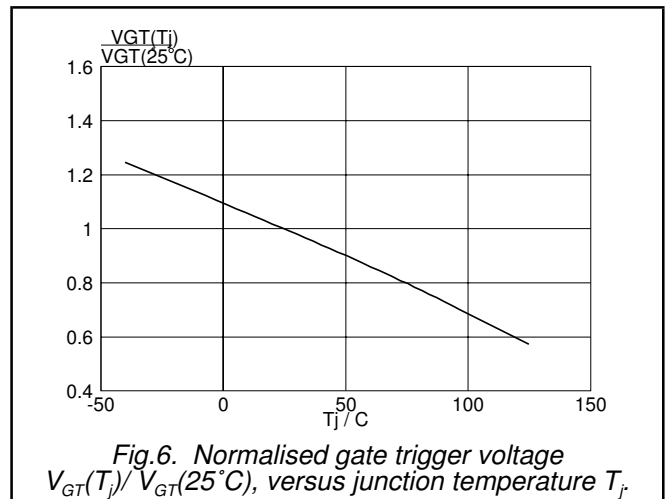
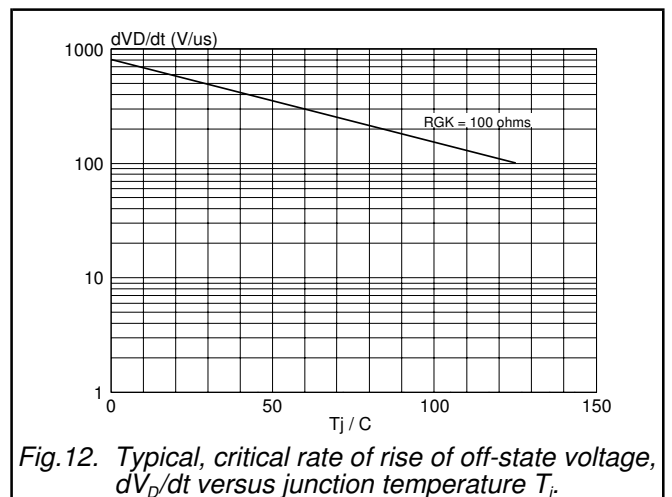
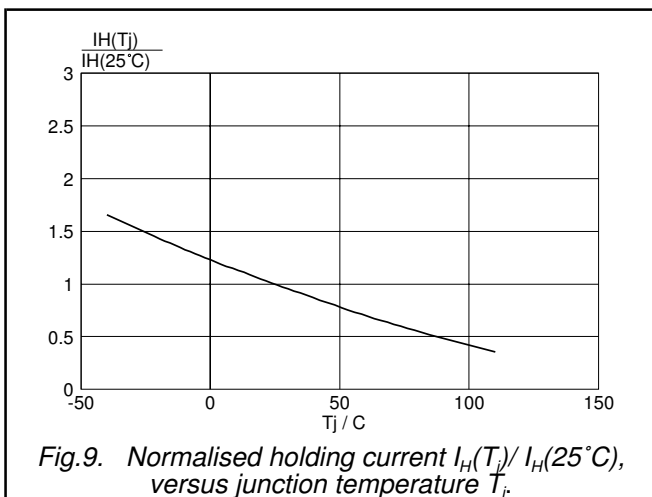
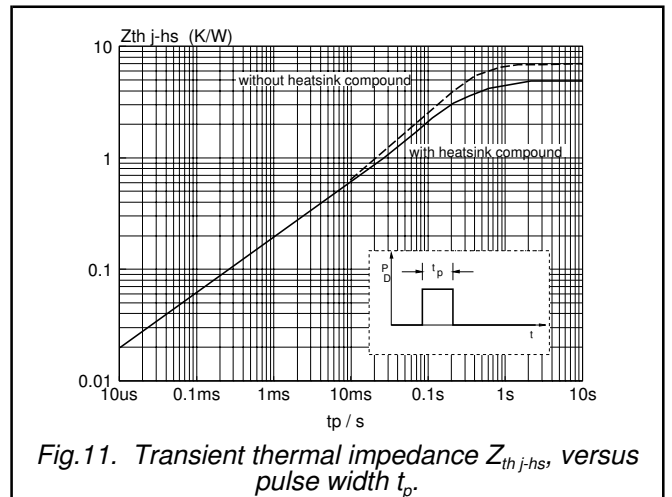
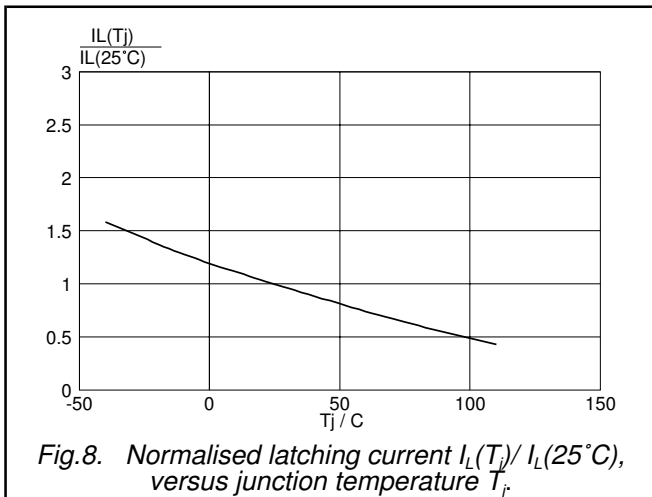
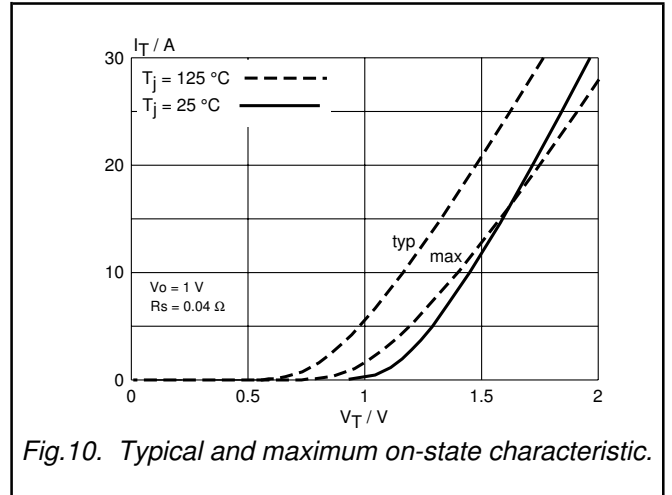
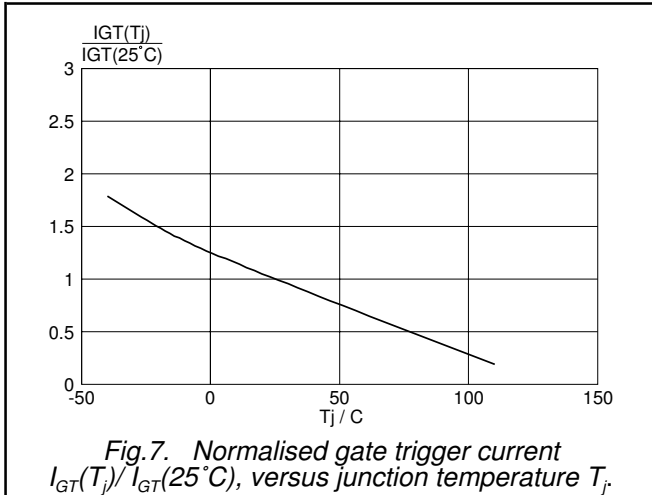


Fig. 6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

Thyristors
logic level

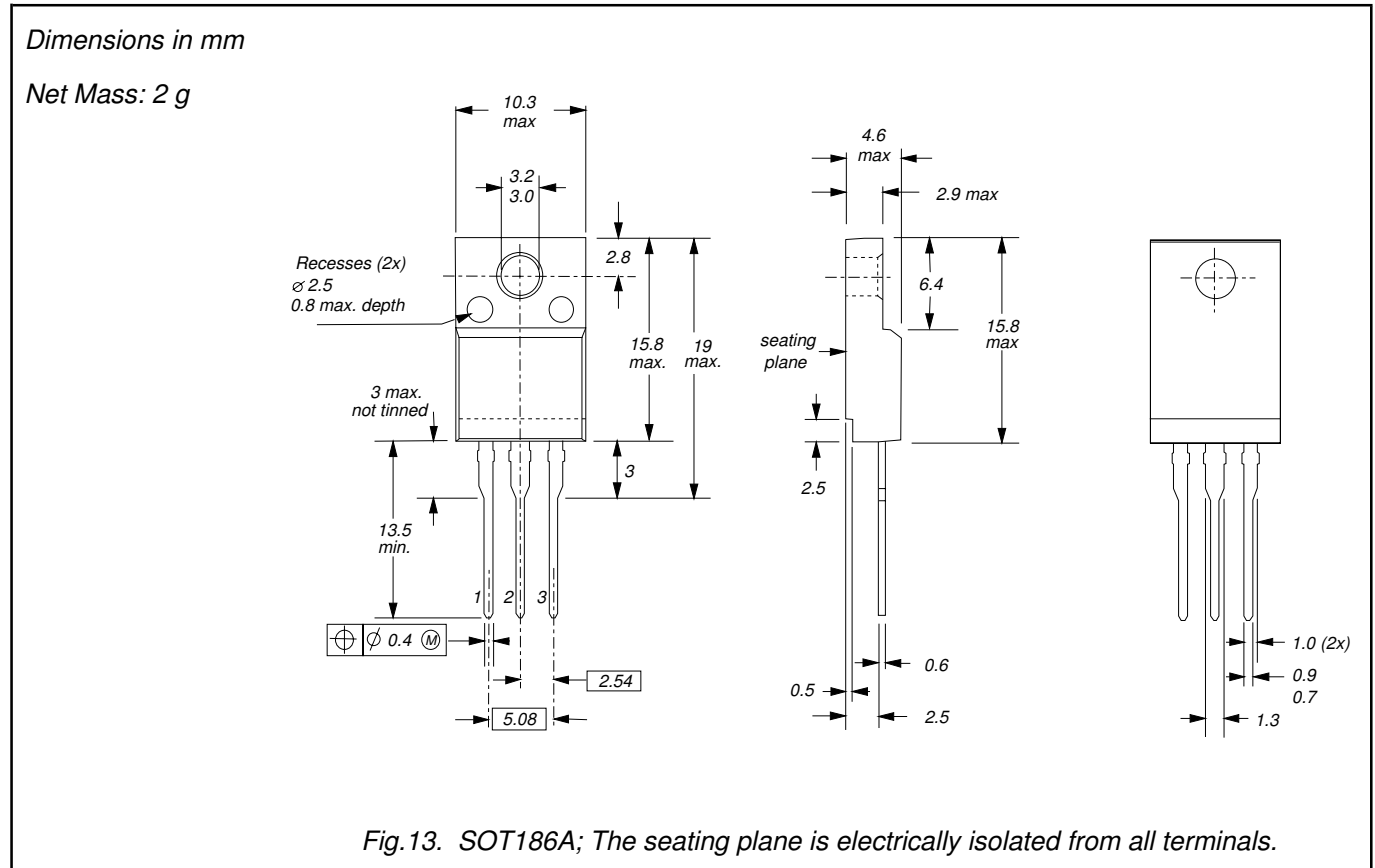
BT258X series



Thyristors
logic level

BT258X series

MECHANICAL DATA



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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