

DATA SHEET

BTA212 series B Three quadrant triacs high commutation

Product specification

September 2018



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Three quadrant triacs high commutation

BTA212 series B

GENERAL DESCRIPTION

Glass passivated high commutation triacs in a plastic envelope intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. These devices will commutate the full rated rms current at the maximum rated junction temperature, without the aid of a snubber.

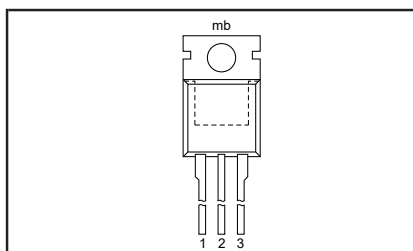
QUICK REFERENCE DATA

| SYMBOL | PARAMETER | MAX. | MAX. | MAX. | UNIT |
|--------------|--------------------------------------|--------------------|------------|-------------|------------|
| V_{DRM} | Repetitive peak off-state voltages | BTA212-500B | 500 | 600B | 600 |
| | | 800B | 800 | | |
| | | | | | |
| $I_{T(RMS)}$ | RMS on-state current | 12 | 12 | 12 | A |
| I_{TSM} | Non-repetitive peak on-state current | 95 | 95 | 95 | A |

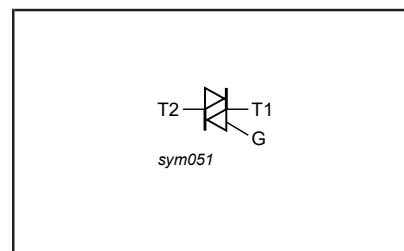
PINNING - TO220AB

| PIN | DESCRIPTION |
|-----|-----------------|
| 1 | main terminal 1 |
| 2 | main terminal 2 |
| 3 | gate |
| tab | 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 |
|--------------|--|---|------|------------------|------------------|------|------------------|
| | | | | -500 | -600 | -800 | |
| V_{DRM} | Repetitive peak off-state voltages | | - | 500 ¹ | 600 ¹ | 800 | V |
| $I_{T(RMS)}$ | RMS on-state current | full sine wave; $T_{mb} \leq 99^\circ C$ | - | 12 | | | A |
| I_{TSM} | Non-repetitive peak on-state current | full sine wave; $T_j = 25^\circ C$ prior to surge | - | 95 | | | A |
| I^2t | I^2t for fusing | $t = 20$ ms | - | 105 | | | A |
| dI_T/dt | Repetitive rate of rise of on-state current after triggering | $t = 16.7$ ms | - | 45 | | | A ² s |
| | | $t = 10$ ms | - | 100 | | | A/ μ s |
| | | $I_{TM} = 20$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/ μ s | | | | | |
| I_{GM} | Peak gate current | | - | 2 | | | A |
| V_{GM} | Peak gate voltage | | - | 5 | | | V |
| P_{GM} | Peak gate power | | - | 5 | | | W |
| $P_{G(AV)}$ | Average gate power | over any 20 ms period | - | 0.5 | | | W |
| T_{stg} | Storage temperature | | -40 | 150 | | | $^\circ C$ |
| T_j | Operating junction temperature | | - | 125 | | | $^\circ C$ |

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 15 A/ μ s.

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THERMAL RESISTANCES

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------|---|---------------------------|------|------|------|------|
| $R_{th\ j-mb}$ | Thermal resistance junction to mounting base | full cycle | - | - | 1.5 | K/W |
| $R_{th\ j-a}$ | Thermal resistance junction to ambient | half cycle in free air | - | 60 | 2.0 | K/W |

STATIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------|-----------------------------------|---|------|------|------|------|
| I_{GT} | Gate trigger current ² | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | | | | |
| | | T2+ G+ | 2 | 18 | 50 | mA |
| | | T2+ G- | 2 | 21 | 50 | mA |
| | | T2- G- | 2 | 34 | 50 | mA |
| I_L | Latching current | $V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ | | | | |
| | | T2+ G+ | - | 31 | 60 | mA |
| | | T2+ G- | - | 34 | 90 | mA |
| | | T2- G- | - | 30 | 60 | mA |
| I_H | Holding current | $V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$ | - | 31 | 60 | mA |
| V_T | On-state voltage | $I_T = 17\text{ A}$ | - | 1.3 | 1.6 | V |
| V_{GT} | Gate trigger voltage | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$ | - | 0.7 | 1.5 | V |
| I_D | Off-state leakage current | $V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$ | 0.25 | 0.4 | - | V |
| | | $V_D = V_{DRM(max)}$; $T_j = 125\text{ °C}$ | - | 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; gate open circuit | 1000 | 4000 | - | V/ μ s |
| dI_{com}/dt | Critical rate of change of commutating current | $V_{DM} = 400\text{ V}$; $T_j = 125\text{ °C}$; $I_{T(RMS)} = 12\text{ A}$; without snubber; gate open circuit | - | 24 | - | A/ms |
| t_{gt} | Gate controlled turn-on time | $I_{TM} = 12\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu$ s | - | 2 | - | μ s |

² Device does not trigger in the T2-, G+ quadrant.

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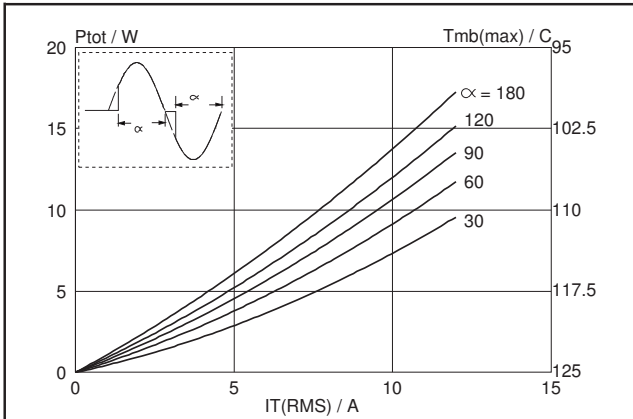


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where $\alpha =$ conduction angle.

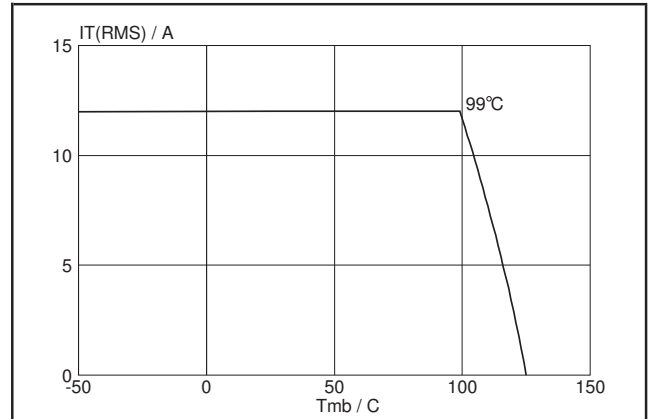


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

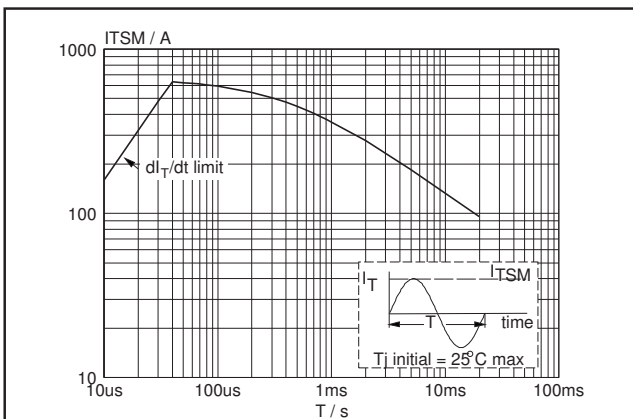


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20$ ms.

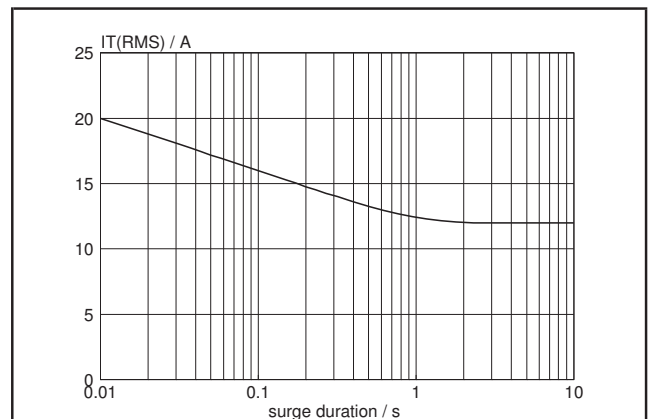


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{mb} \leq 99$ °C.

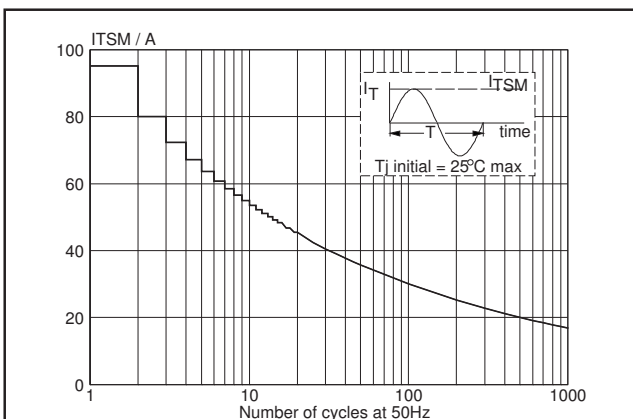


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

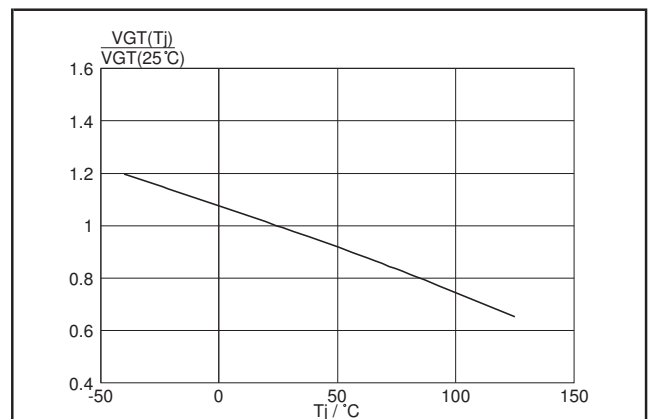
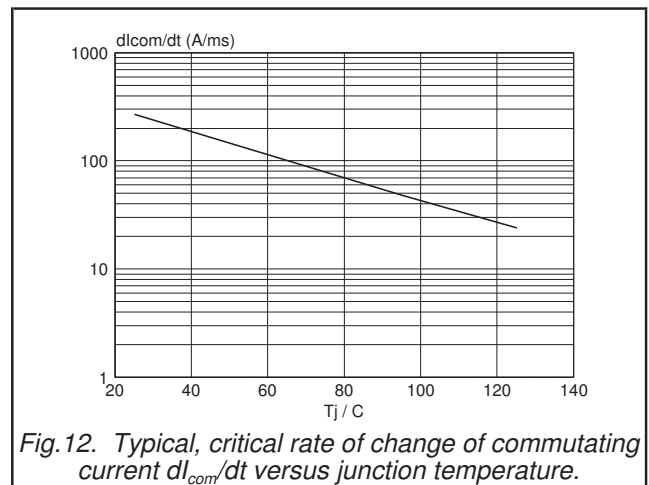
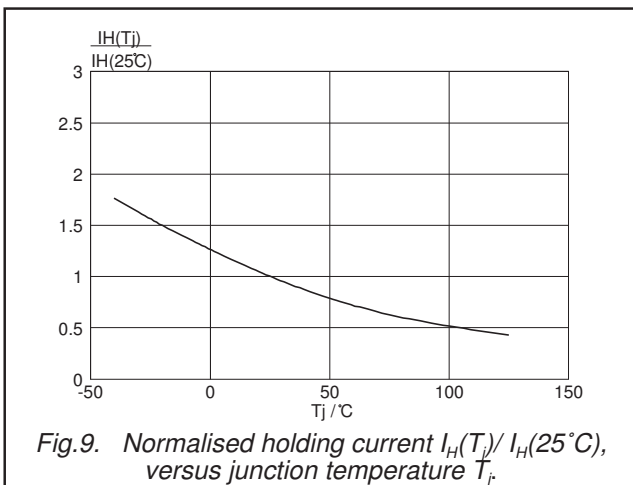
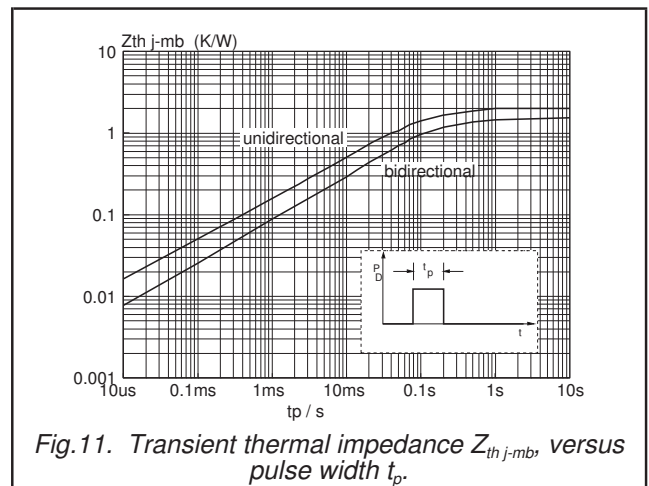
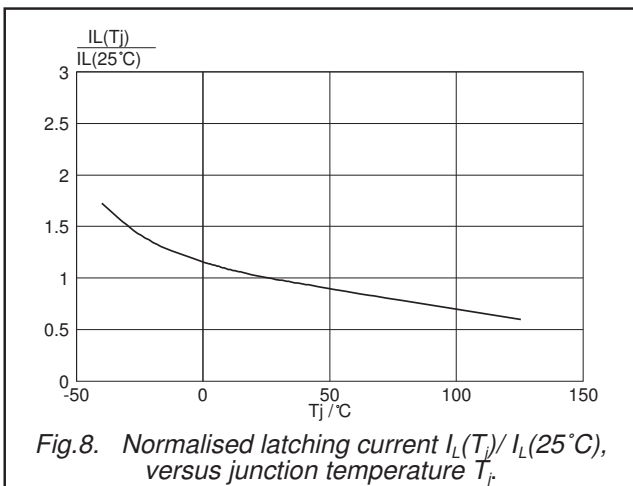
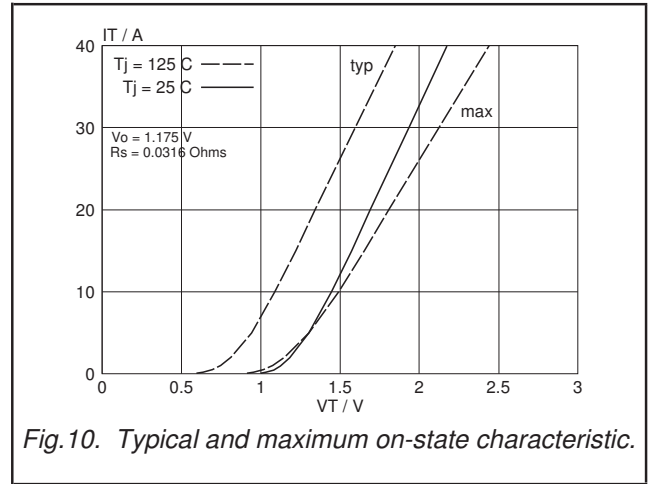
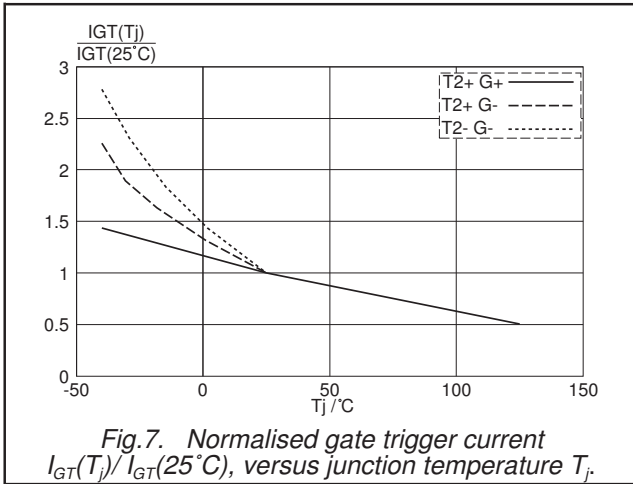


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ C)$, versus junction temperature T_j .

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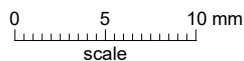
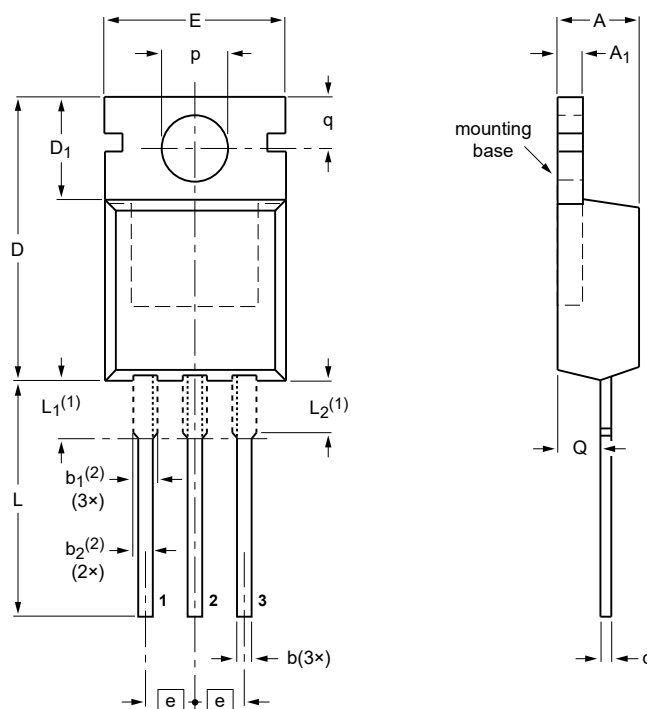
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MECHANICAL DATA

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ | b | b ₁ (2) | b ₂ (2) | c | D | D ₁ | E | e | L | L ₁ (1) | L ₂ (1) max. | p | q | Q |
|------|-----|----------------|-----|--------------------|--------------------|-----|------|----------------|------|------|------|--------------------|----------------------------|-----|-----|-----|
| mm | 4.7 | 1.40 | 0.9 | 1.6 | 1.3 | 0.7 | 16.0 | 6.6 | 10.3 | 2.54 | 15.0 | 3.30 | 3.0 | 3.8 | 3.0 | 2.6 |
| | 4.1 | 1.25 | 0.6 | 1.0 | 1.0 | 0.4 | 15.2 | 5.9 | 9.7 | | 12.8 | 2.79 | | 3.5 | 2.7 | 2.2 |

Notes

- 1. Lead shoulder designs may vary.
- 2. Dimension includes excess dambar.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-----------------|-------|--|------------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT78 | | 3-lead TO-220AB | SC-46 | | | 08-04-23 08-06-13 |

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|--------------------------------|--------------------|---|
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