

DATA SHEET

BTA212B series D, E and F Three quadrant triacs guaranteed commutation

Product specification

August 2018

Three quadrant triacs guaranteed commutation

BTA212B series D, E and F

GENERAL DESCRIPTION

Passivated guaranteed commutation triacs in a plastic envelope suitable for surface mounting intended for use in motor control circuits or with other highly inductive loads. These devices balance the requirements of commutation performance and gate sensitivity. The "sensitive gate" E series and "logic level" D series are intended for interfacing with low power drivers, including micro controllers.

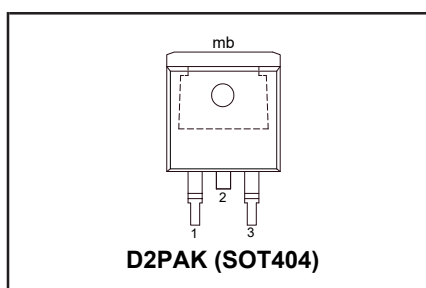
QUICK REFERENCE DATA

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

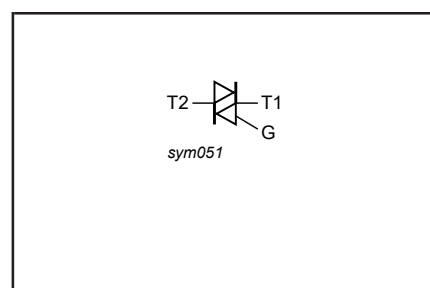
PINNING - SOT404

| 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 |
|--------------|--|--|------|--------------------------|-------------|--------------------|
| | | | | -600 600 ¹ | -800 800 | |
| V_{DRM} | Repetitive peak off-state voltages | | - | | | V |
| $I_{T(RMS)}$ | RMS on-state current | full sine wave; $T_{mb} \leq 99\text{ }^{\circ}\text{C}$ | - | 12 | | A |
| I_{TSM} | Non-repetitive peak on-state current | full sine wave; $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge $t = 20\text{ ms}$ | - | 95 | | A |
| I^2t | I^2t for fusing | $t = 16.7\text{ ms}$ | - | 105 | | A |
| dl_T/dt | Repetitive rate of rise of on-state current after triggering | $t = 10\text{ ms}$ | - | 45 | | A ² s |
| I_{GM} | Peak gate current | $I_{TM} = 20\text{ A}; I_G = 0.2\text{ A}; dl_G/dt = 0.2\text{ A}/\mu\text{s}$ | - | 100 | | A/ μs |
| P_{GM} | Peak gate power | | - | 2 | | A |
| $P_{G(AV)}$ | Average gate power | over any 20 ms period | - | 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 triac may switch to the on-state. The rate of rise of current should not exceed 15 A/ μs .

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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 | - | - | 2.0 | K/W |
| | | | - | 55 | - | K/W |

STATIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | | | UNIT |
|----------|-----------------------------------|---|-------------|-------------|-------------|-------------|------|
| | | BTA212B- | ...D | ...D | ...E | ...F | |
| I_{GT} | Gate trigger current ² | $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G- | - | 5 | 10 | 25 | mA |
| I_L | Latching current | $V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ T2+ G+ T2+ G- T2- G- | - | 15 | 25 | 30 | mA |
| I_H | Holding current | $V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$ | - | 15 | 25 | 30 | mA |
| V_T | On-state voltage | $I_T = 17\text{ A}$ | - | 1.6 | | | V |
| V_{GT} | Gate trigger voltage | $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A};$ $T_j = 125\text{ °C}$ | 0.25 | 1.5 | | | V |
| I_D | Off-state leakage current | $V_D = V_{DRM(max)}; T_j = 125\text{ °C}$ | - | 0.5 | | | mA |

DYNAMIC CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | | | MAX. | UNIT |
|---------------|---|--|-------------|-------------|-------------|------|------------|
| | | BTA212B- | ...D | ...E | ...F | | |
| dV_D/dt | Critical rate of rise of off-state voltage | $V_{DM} = 67\% V_{DRM(max)};$ $T_j = 110\text{ °C};$ exponential waveform; gate open circuit | 20 | 60 | 70 | - | V/ μ s |
| dI_{com}/dt | Critical rate of change of commutating current | $V_{DM} = 400\text{ V}; T_j = 125\text{ °C};$ $I_{T(RMS)} = 12\text{ A};$ $dV_{com}/dt = 10\text{ V}/\mu\text{s};$ gate open circuit | 1.0 | 8 | 21 | - | A/ms |
| dI_{com}/dt | Critical rate of change of commutating current | $V_{DM} = 400\text{ V}; T_j = 125\text{ °C};$ $I_{T(RMS)} = 12\text{ A};$ $dV_{com}/dt = 0.1\text{ V}/\mu\text{s};$ gate open circuit | 3.5 | 16 | 32 | - | A/ms |

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

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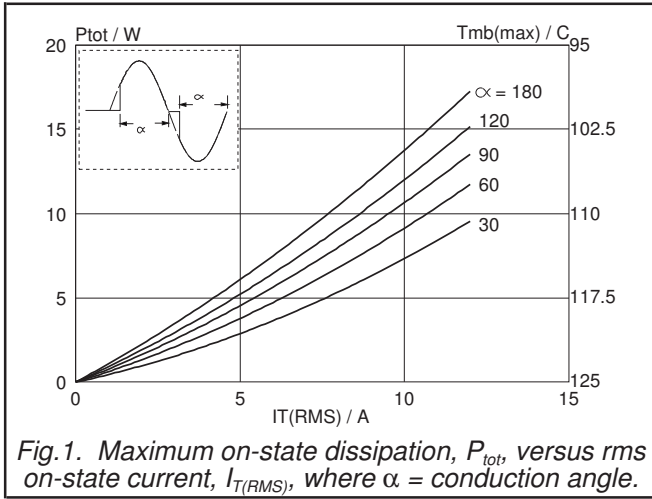


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where $\alpha =$ conduction angle.

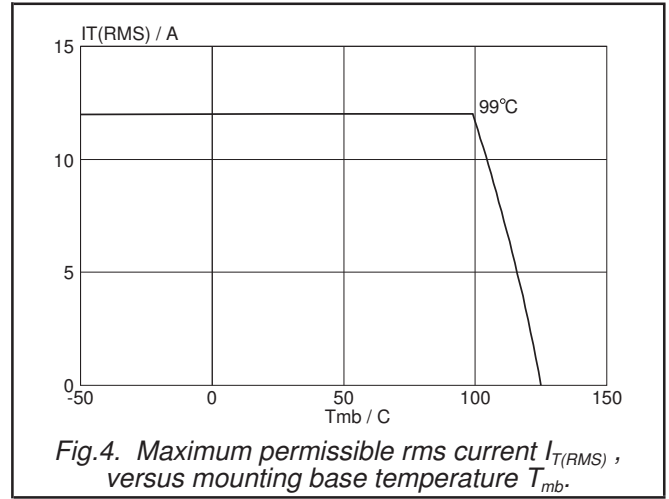


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

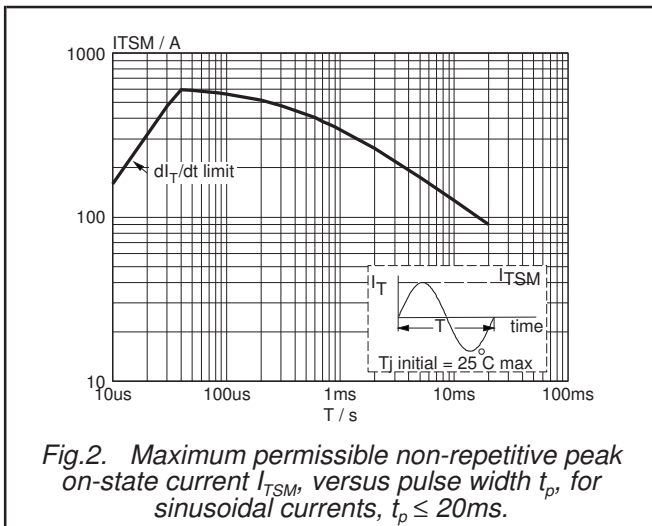


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20ms$.

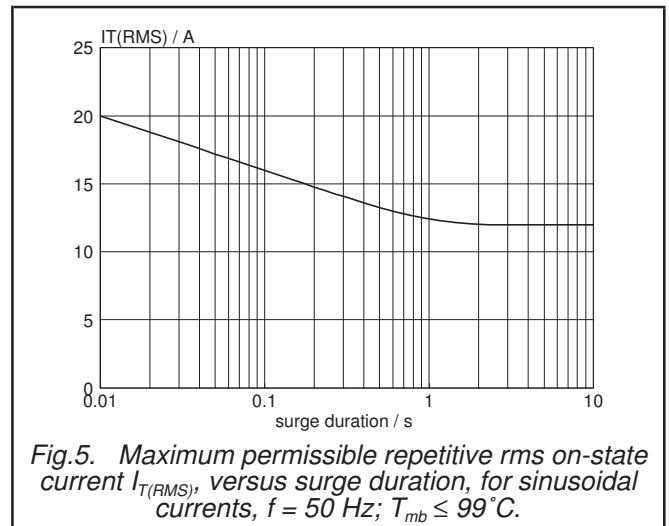


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{mb} \leq 99^\circ C$.

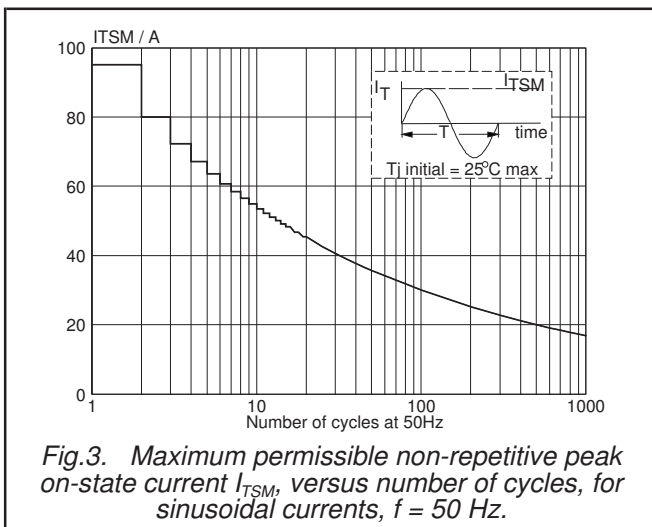


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

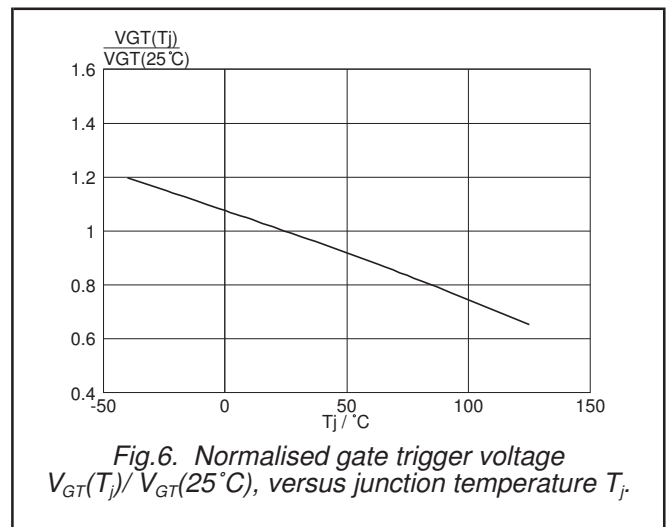
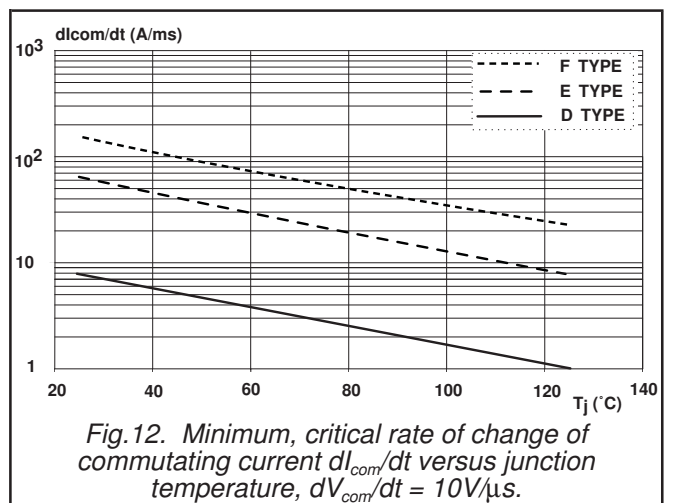
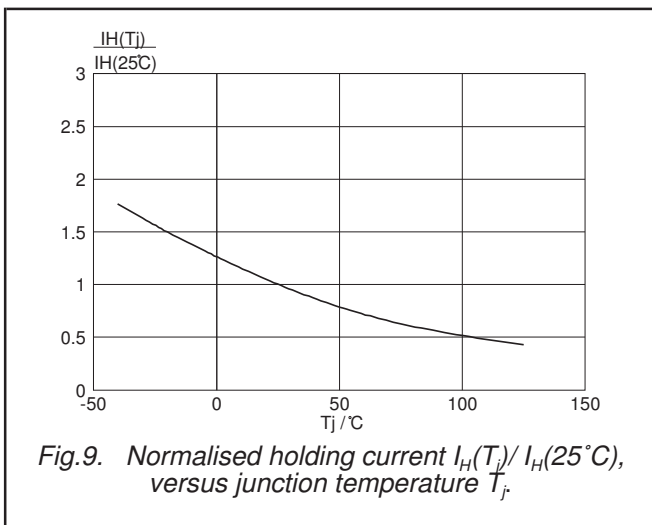
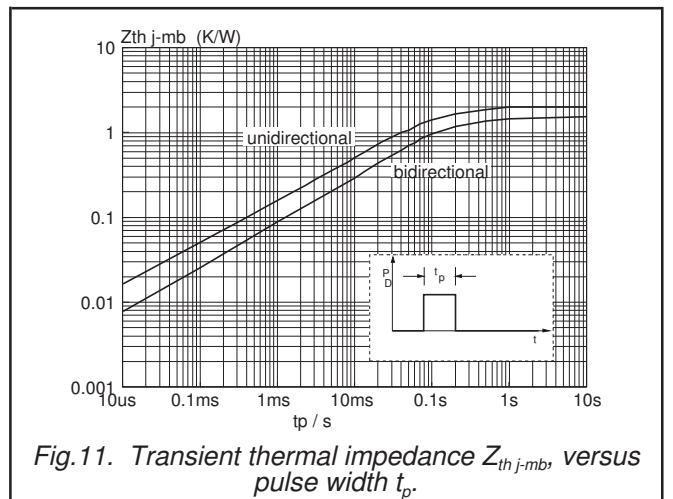
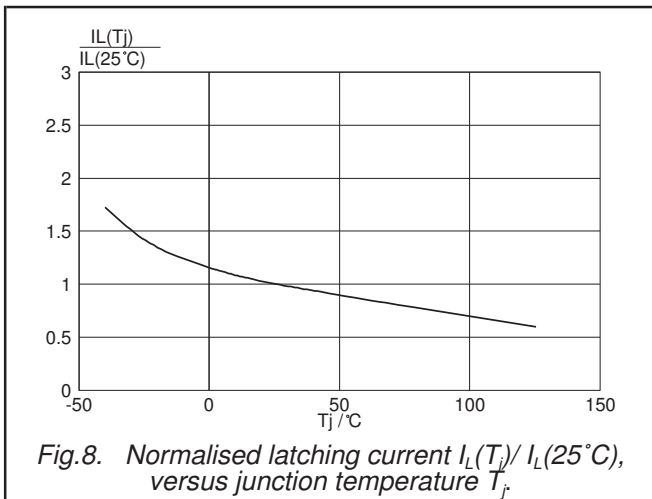
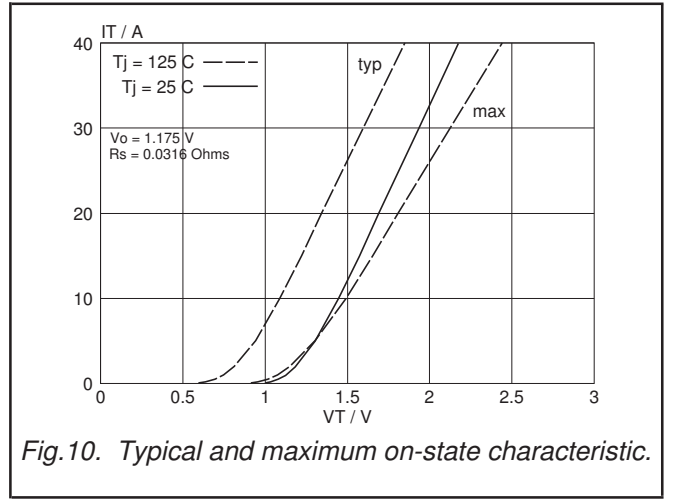
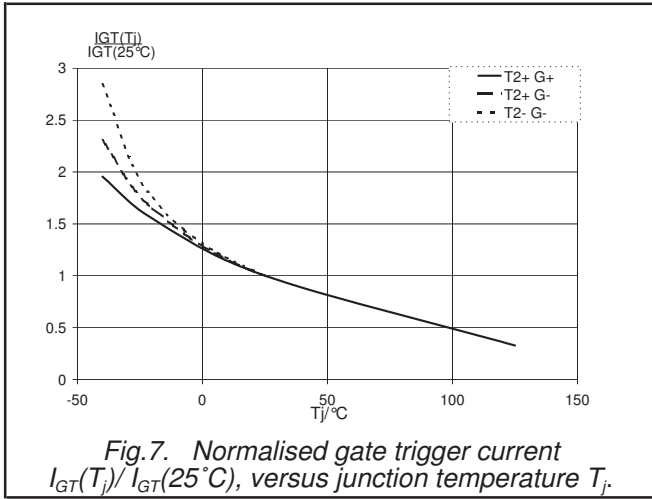


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ C)$, versus junction temperature T_j .

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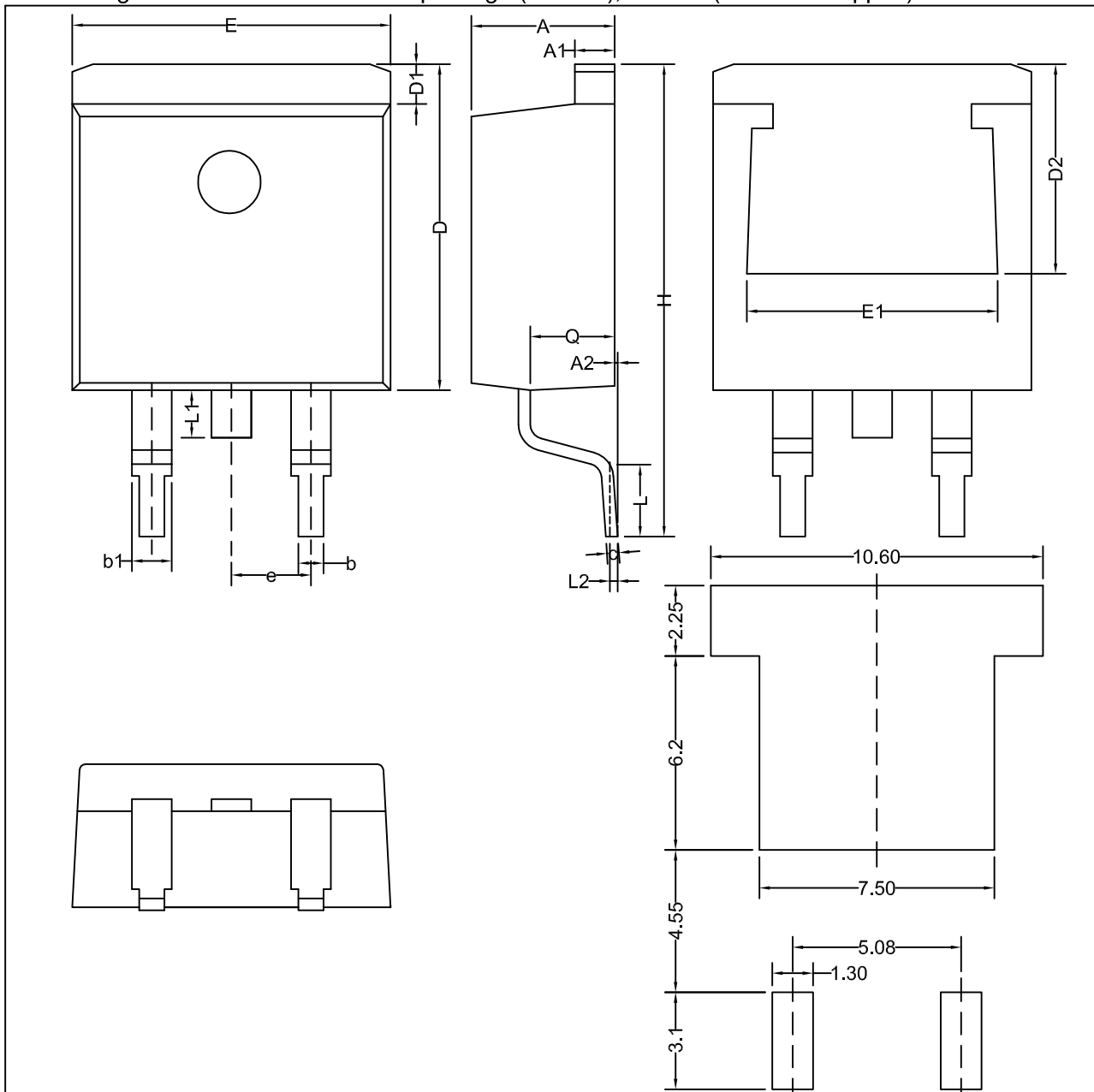
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MECHANICAL DATA

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)

TO263



Recommended Footprint

| | A | A1 | A2 | b | b1 | c | D | D1 | D2 | e | E | E1 | H | L | L1 | L2 | Q |
|-----|------|------|------|------|------|------|-------|------|------|-------|-------|------|-------|------|------|-------|------|
| min | 4.10 | 1.22 | 0.00 | 0.60 | 1.05 | 0.34 | --- | 1.20 | 6.60 | 2.54 | 9.70 | 7.80 | 14.80 | 2.10 | --- | 0.25 | 2.20 |
| max | 4.70 | 1.40 | 0.25 | 0.90 | 1.45 | 0.64 | 11.00 | 1.60 | --- | (BSC) | 10.30 | --- | 15.80 | 2.90 | 1.75 | (BSC) | 2.79 |

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|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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