



BTA208S-600B

3Q Hi-Com Triac

Rev. 3 — 13 April 2011

Product data sheet

1. Product profile

1.1 General description

Planar passivated high commutation three quadrant triac in a SOT428 surface-mountable plastic package. This "series B" triac is intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. The "series B" will commute the full rated RMS current at the maximum rated junction temperature, without the aid of a snubber.

1.2 Features and benefits

- 3Q technology for improved noise immunity
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- Surface-mountable package
- Triggering in three quadrants only

1.3 Applications

- Electronic thermostats
- General purpose motor controls
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

1.4 Quick reference data

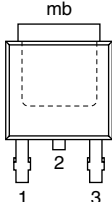
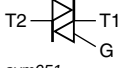
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	600	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 20\text{ ms}$; see Figure 4 ; see Figure 5	-	-	65	A
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102\text{ °C}$; see Figure 1 ; see Figure 2 ; see Figure 3	-	-	8	A
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ °C}$; see Figure 7	2	18	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ °C}$; see Figure 7	2	21	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ °C}$; see Figure 7	2	34	50	mA



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		
2	T2	main terminal 2		
3	G	gate		
mb	T2	mounting base; main terminal 2		

SOT428 (DPAK)

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA208S-600B	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	600	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{mb}} \leq 102\text{ }^{\circ}\text{C}$; see Figure 1 ; see Figure 2 ; see Figure 3	-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{J(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 20\text{ ms}$; see Figure 4 ; see Figure 5	-	65	A
		full sine wave; $T_{\text{J(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 16.7\text{ ms}$	-	72	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$; sine-wave pulse	-	21	A ² s
di_{T}/dt	rate of rise of on-state current	$I_{\text{T}} = 12\text{ A}$; $I_{\text{G}} = 0.2\text{ A}$; $di_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$	-	100	A/ μs
I_{GM}	peak gate current		-	2	A
V_{GM}	peak gate voltage		-	5	V
P_{GM}	peak gate power		-	5	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period	-	0.5	W
T_{stg}	storage temperature		-40	150	$^{\circ}\text{C}$
T_{j}	junction temperature		-	125	$^{\circ}\text{C}$

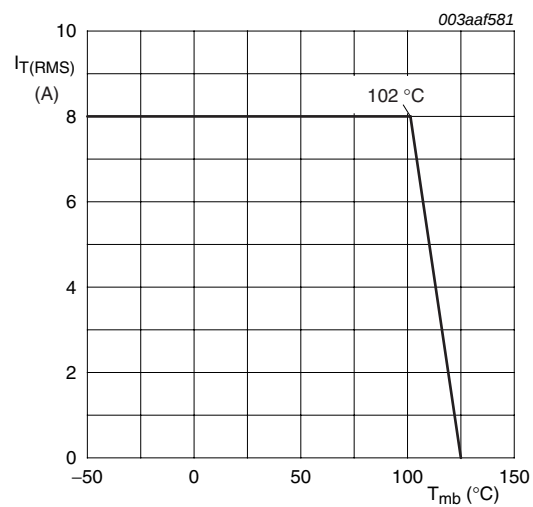
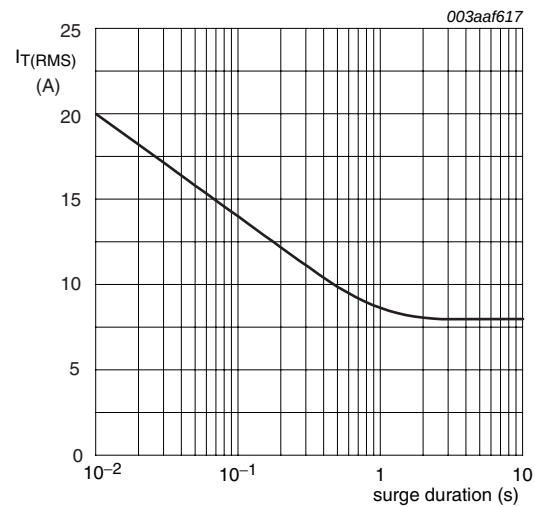


Fig 1. RMS on-state current as a function of heatsink temperature; maximum values



$f = 50\text{ Hz}; T_{mb} = 102\text{ °C}$

Fig 2. RMS on-state current as a function of surge duration; maximum value

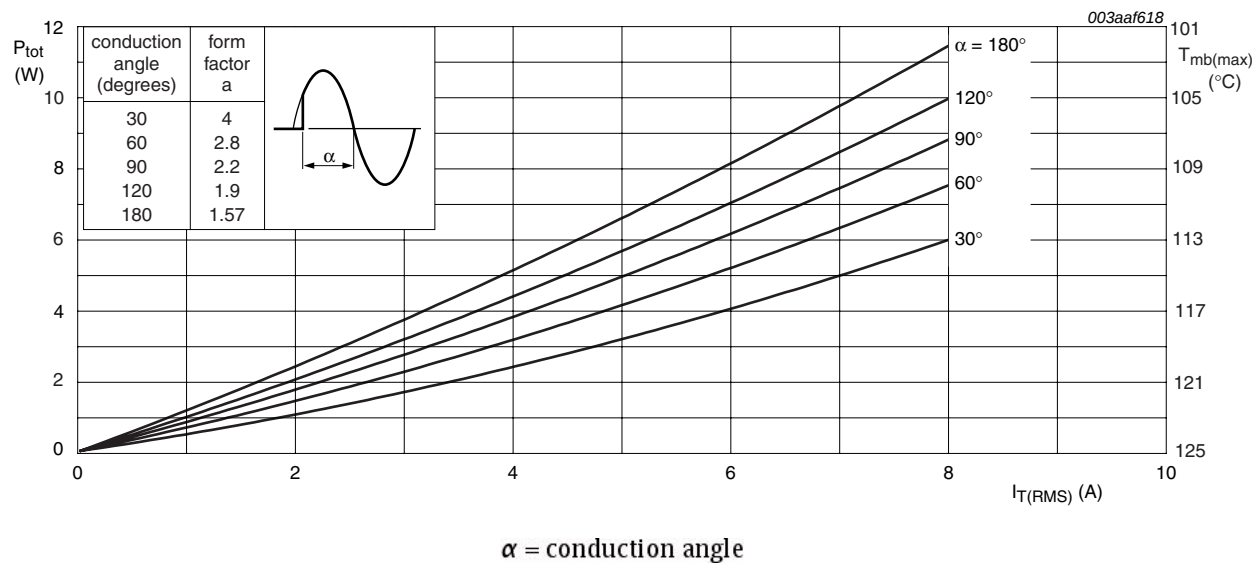


Fig 3. Total power dissipation as a function of RMS on-state current; maximum values

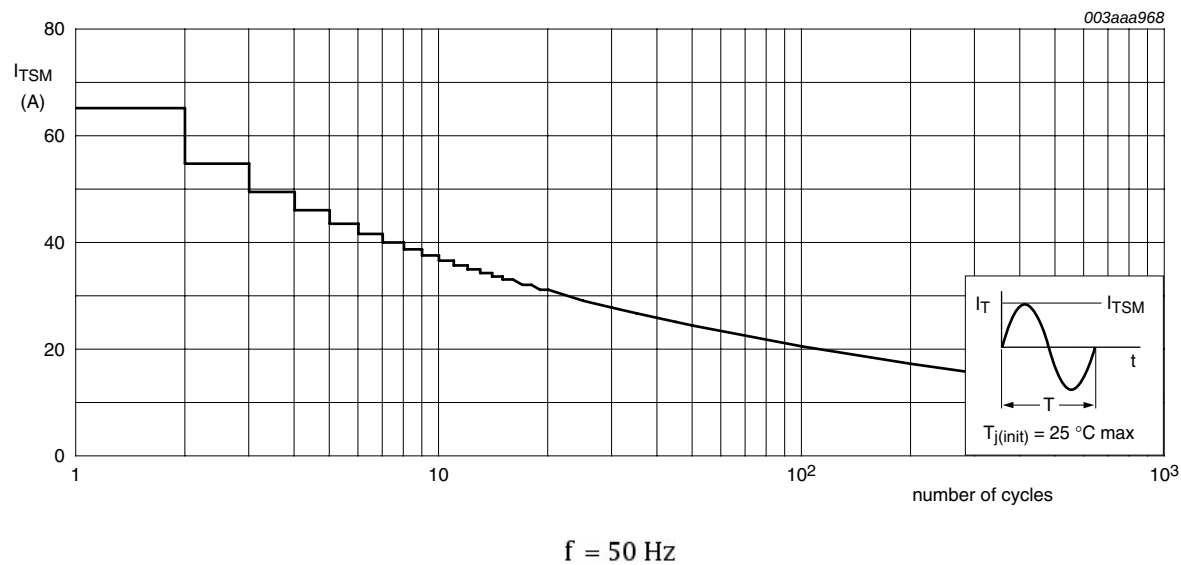


Fig 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

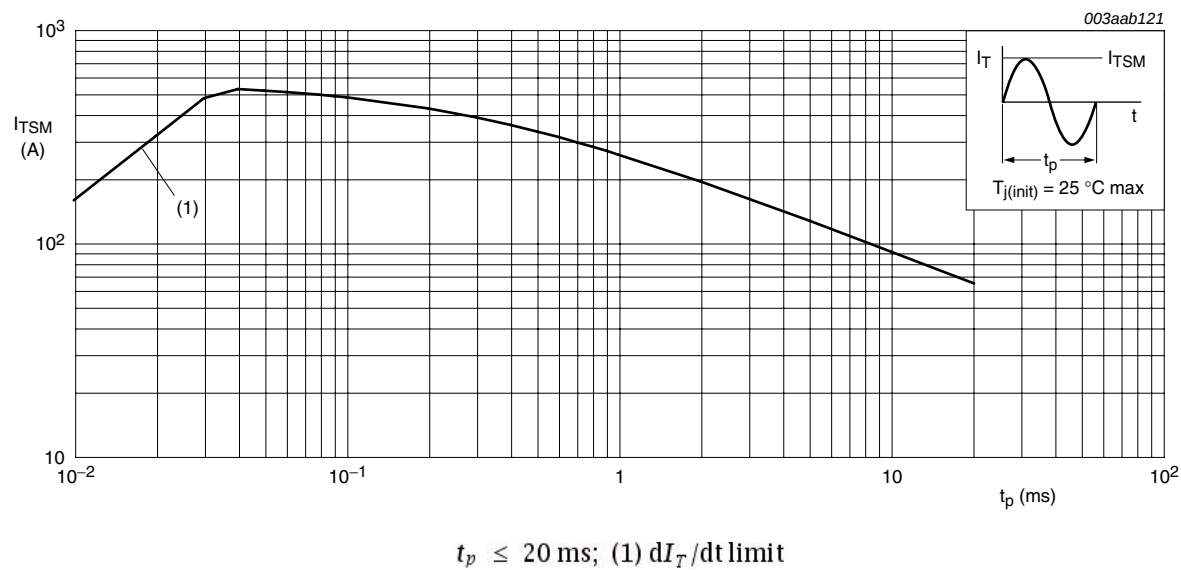


Fig 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	full cycle; see Figure 6	-	-	2	K/W
		half cycle; see Figure 6	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; printed circuit board (FR4) mounted	-	75	-	K/W

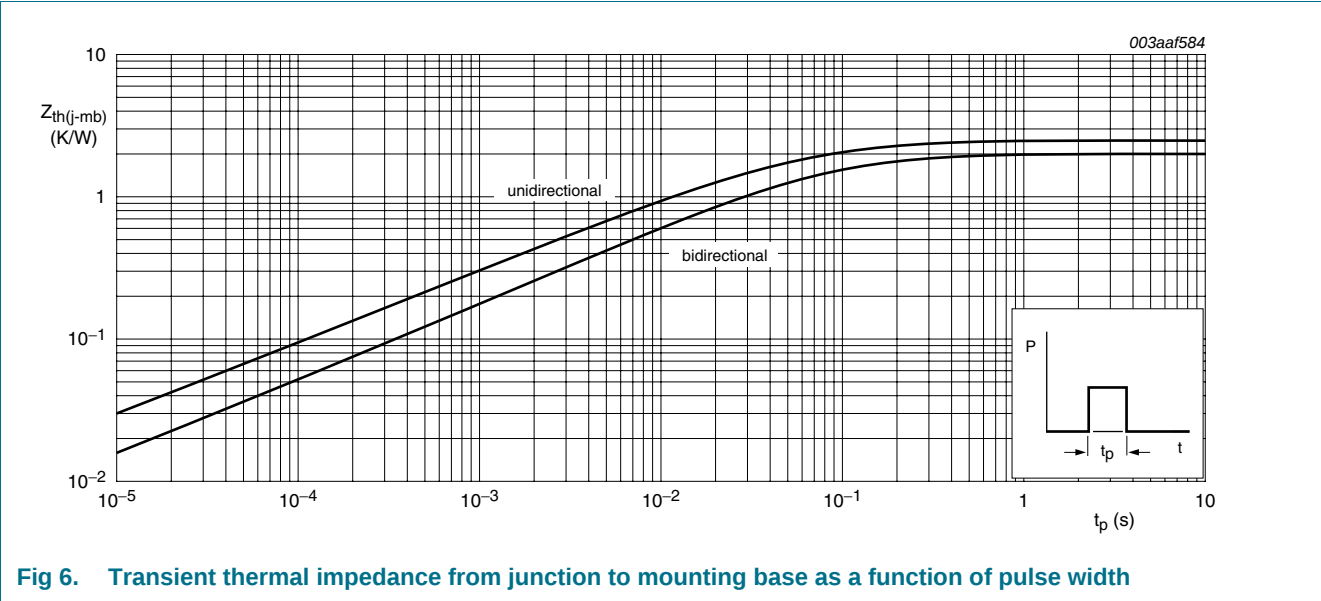
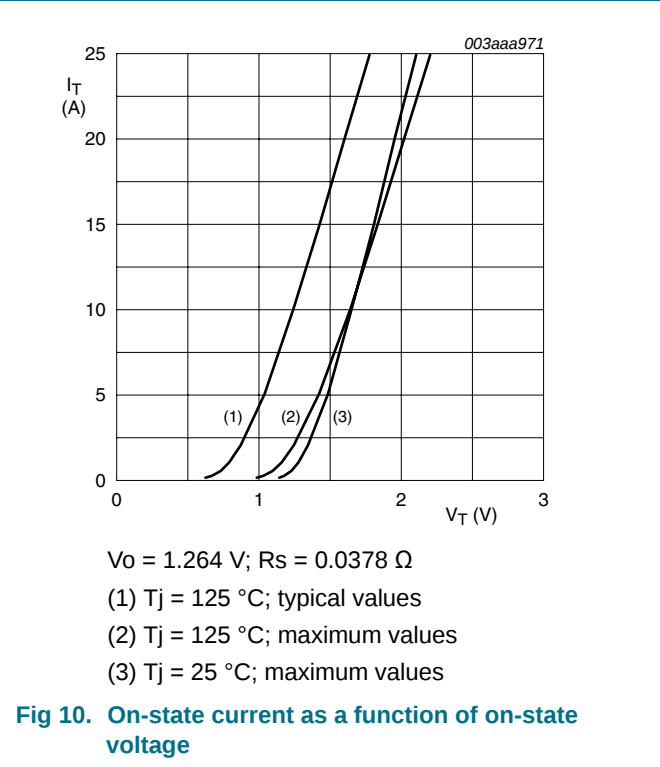
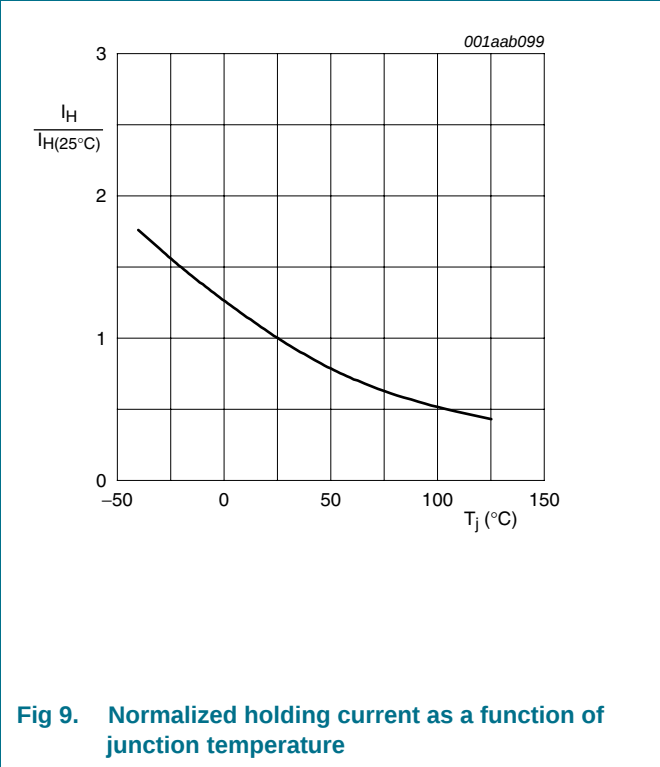
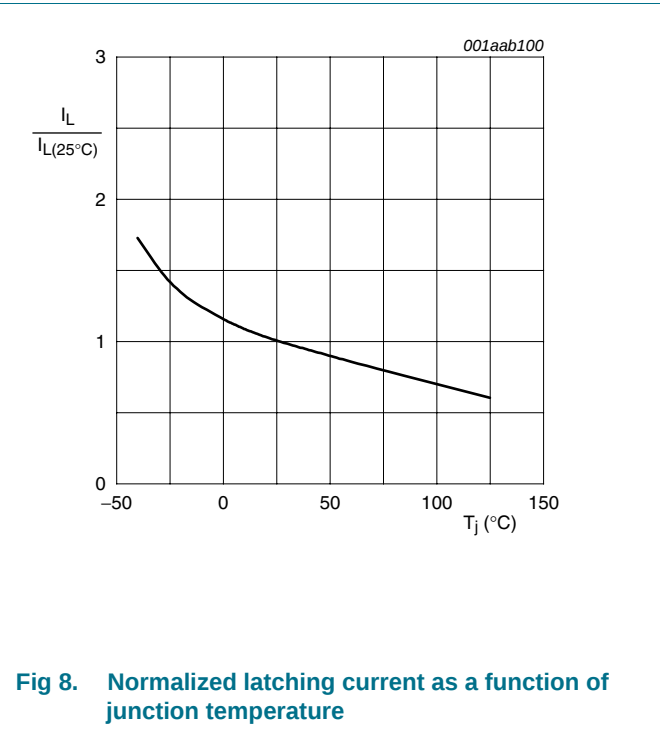
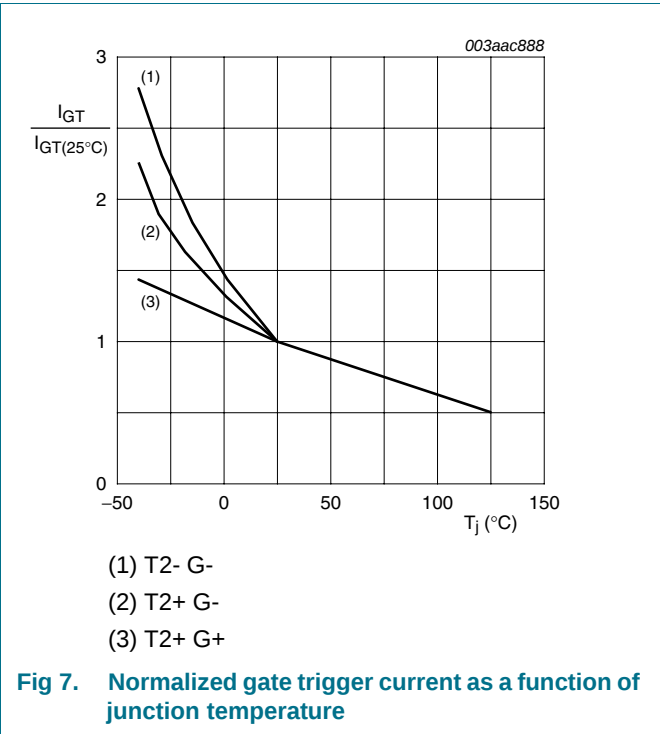


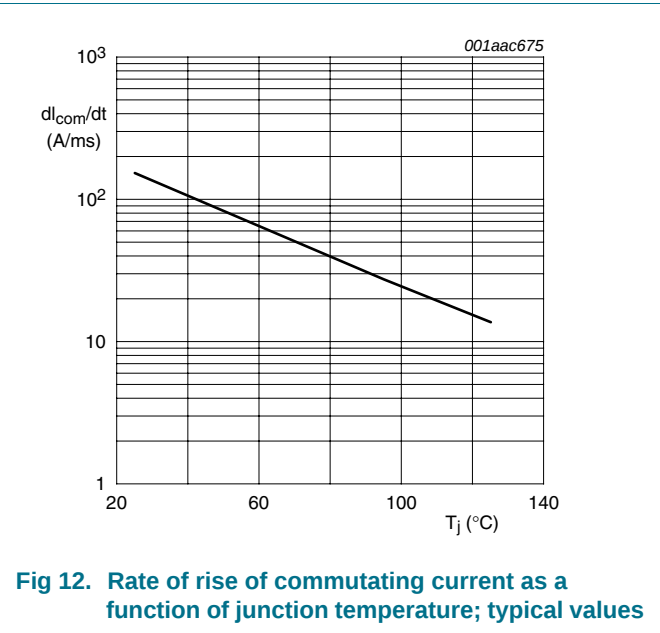
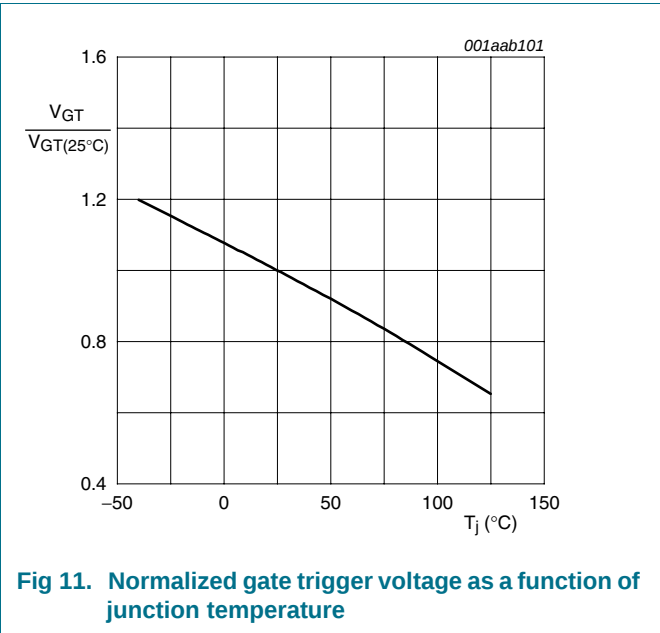
Fig 6. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$; see Figure 7	2	18	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 7	2	21	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 7	2	34	50	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$; see Figure 8	-	31	60	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 8	-	34	90	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 8	-	30	60	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 9	-	31	60	mA
V_T	on-state voltage	$I_T = 10\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 10	-	1.3	1.65	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 11	-	0.7	1.5	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^\circ\text{C}$; see Figure 11	0.25	0.4	-	V
I_D	off-state current	$V_D = 600\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$	-	0.1	0.5	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; exponential waveform; gate open circuit	1000	4000	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 8\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; gate open circuit; snubberless condition; see Figure 12	-	14	-	A/ms
t_{gt}	gate-controlled turn-on time	$I_{TM} = 12\text{ A}$; $V_D = 600\text{ V}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μs





7. Package outline

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

SOT428

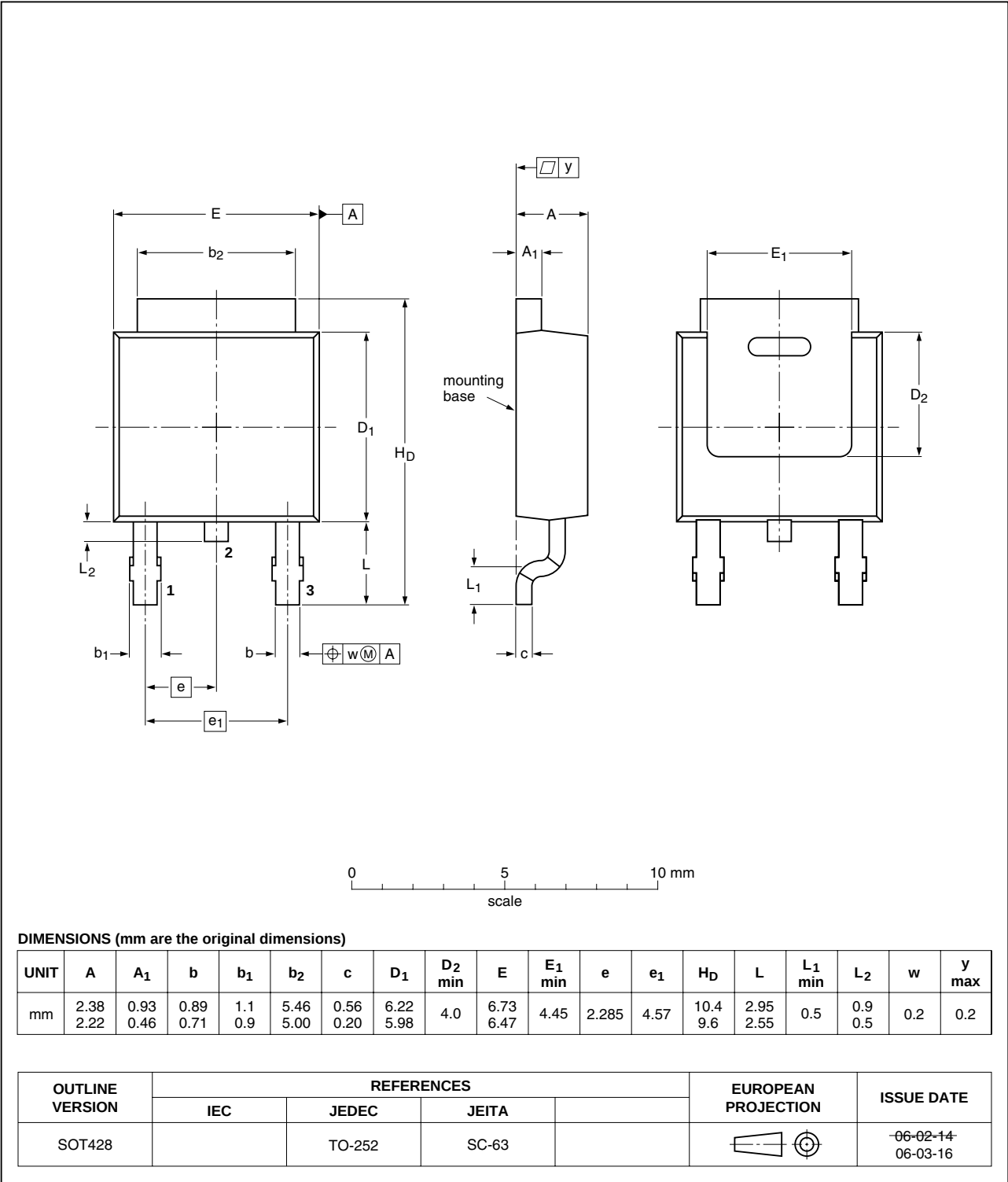


Fig 13. Package outline SOT428 (DPAK)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BTA208S-600B v.3	20110413	Product data sheet	-	BTA208S_SER_B_2
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Type number BTA208S-600B separated from data sheet BTA208S_SER_B_2.			
BTA208S_SER_B_2 (9397 750 14861)	20050531	Product data sheet	-	BTA208S_SER_B_1

9. Legal information

9.1 Data sheet status

Document status ^{[1] [2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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