

BTA208S-600B; BTA208S-800B

Three-quadrant triacs high commutation

Rev. 02 — 31 May 2005

Product data sheet

1. Product profile

1.1 General description

Passivated high commutation triac in a plastic envelope, suitable for surface mounting, intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. These devices will commute the full rated RMS current at the maximum rated junction temperature, without the aid of a snubber.

1.2 Features

- High maximum junction temperature
- High commutation capability
- Surface mounting package
- Low thermal resistance

1.3 Quick reference data

- $V_{DRM} \leq 600$ V (BTA208S-600B)
- $V_{DRM} \leq 800$ V (BTA208S-800B)
- $I_{T(RMS)} \leq 8$ A
- $I_{TSM} \leq 65$ A

2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline	Symbol
1	main terminal 1 (T1)	<p>SOT428 (DPAK)</p>	
2	main terminal 2 (T2)		
3	gate (G)		
mb	mounting base		

[1] Connected to main terminal 2 (T2).

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3. Ordering information

Table 2: Ordering information

Type number	Package		Version
	Name	Description	
BTA208S-600B	TO-252	plastic single-ended surface mounted package (DPAK); 3 leads (one lead cropped)	SOT428
BTA208S-800B			

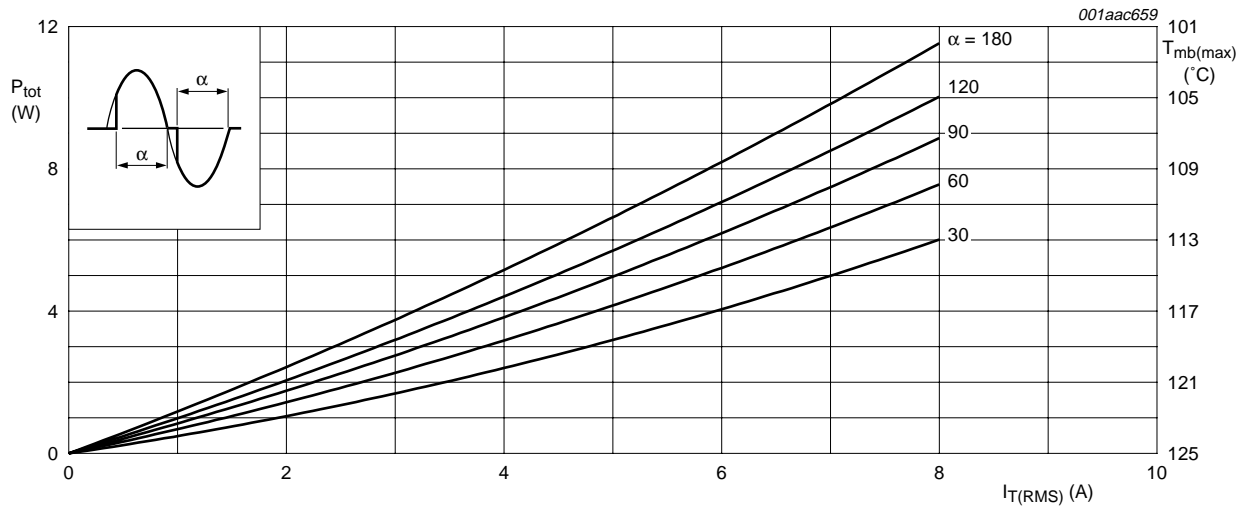
4. Limiting values

Table 3: Limiting values

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

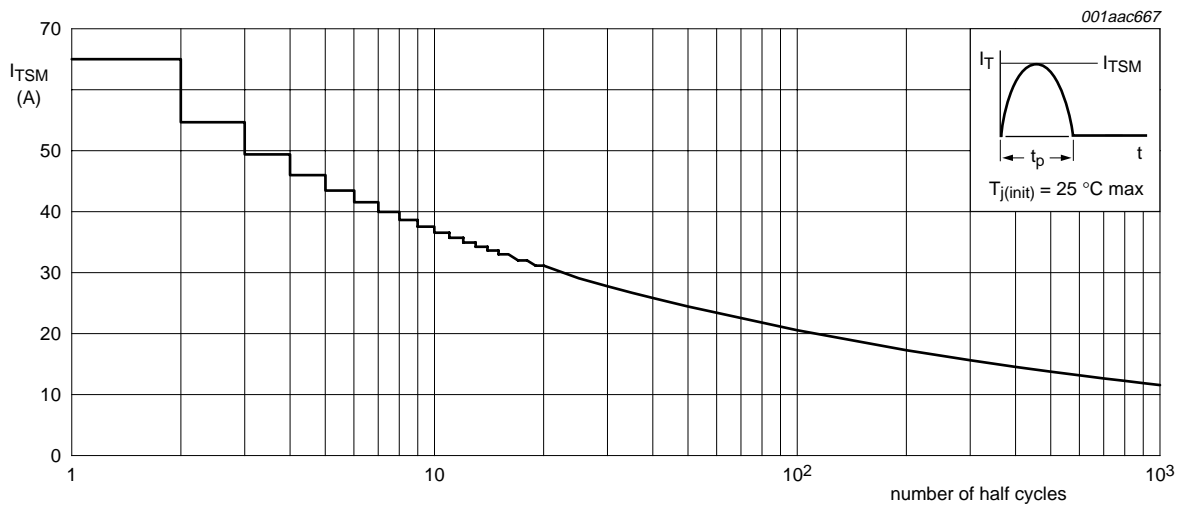
Symbol	Parameter	Conditions	Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage				
	BTA208S-600B		[1] -	600	V
	BTA208S-800B		-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102\text{ °C}$; see Figure 4 and 5	-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_j = 25\text{ °C}$ prior to surge; see Figure 2 and 3			
		$t = 20\text{ ms}$	-	65	A
		$t = 16.7\text{ ms}$	-	71	A
I^2t	I^2t for fusing	$t = 10\text{ ms}$	-	21	A ² s
dl_T/dt	rate of rise of on-state current	$I_{TM} = 12\text{ A}$; $I_G = 0.2\text{ A}$; $dl_G/dt = 0.2\text{ A}/\mu\text{s}$	-	100	A/ μs
I_{GM}	peak gate current		-	2	A
V_{GM}	peak gate voltage		-	5	V
P_{GM}	peak gate power		-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	0.5	W
T_{stg}	storage temperature		-40	+150	°C
T_j	junction temperature		-	125	°C

[1] Although not recommended, off-state voltages up to 800 V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 6 A/ μs .



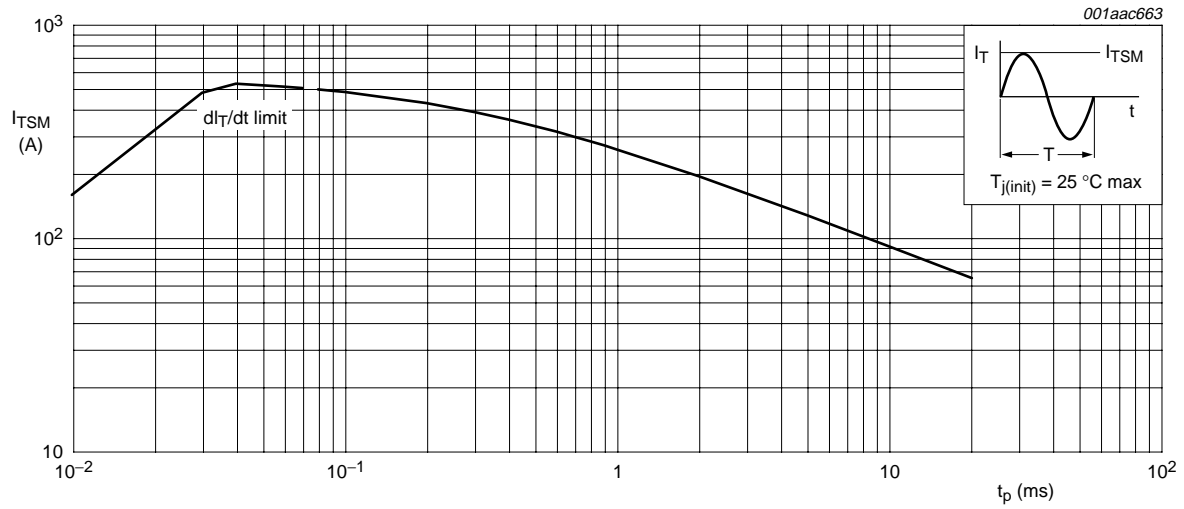
α = conduction angle

Fig 1. On-state power dissipation as a function of RMS on-state current; maximum values



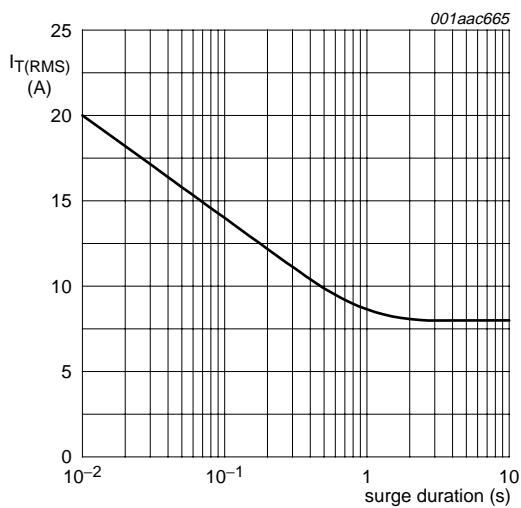
f = 50 Hz

Fig 2. Non-repetitive peak on-state current as a function of number of half cycles; sinusoidal currents; maximum values



$t_p \leq 20 \text{ ms}$

Fig 3. Non-repetitive peak on-state current as a function of pulse width; sinusoidal currents; maximum values



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

Fig 4. RMS on-state current as a function of surge duration; sinusoidal currents; maximum values

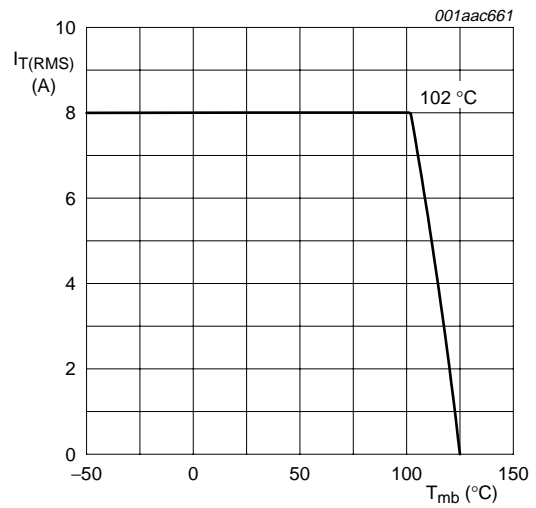
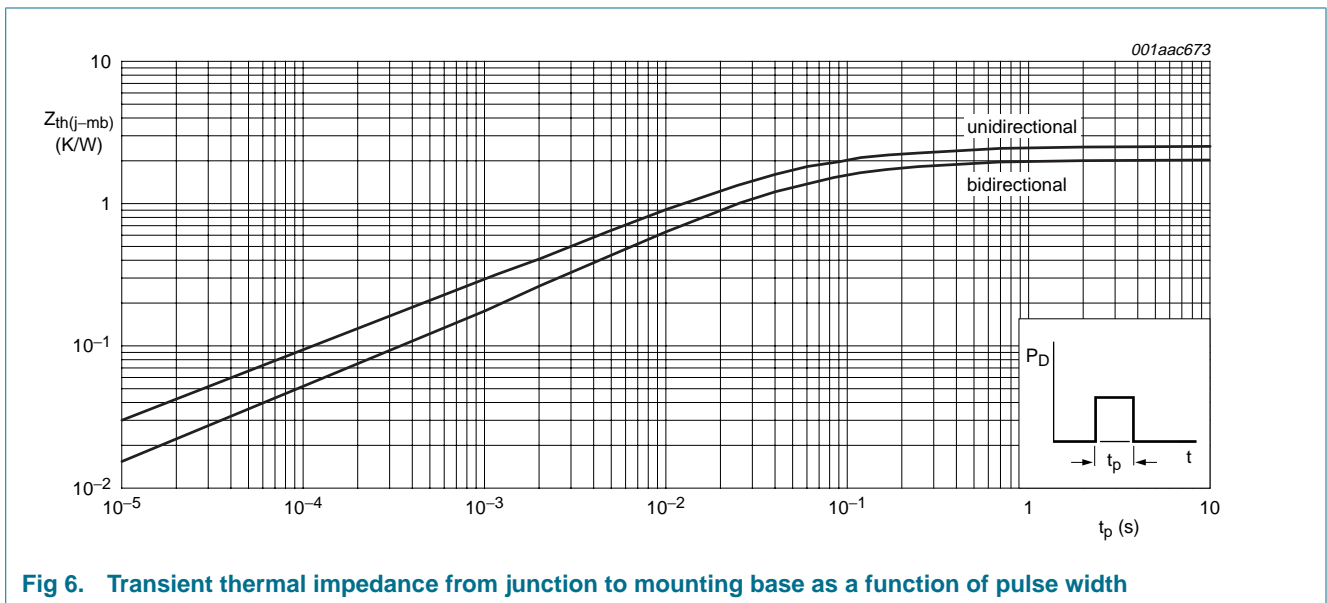


Fig 5. RMS on-state current as a function of mounting base temperature; maximum values

5. Thermal characteristics

Table 4: 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	-	-	2.0	K/W
		half cycle; see Figure 6	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	printed-circuit board (FR4) mounted; footprint as in Figure 14	-	75	-	K/W



6. Static characteristics

Table 5: Static characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 8	[1]			
		T2+ G+	2	18	50	mA
		T2+ G-	2	21	50	mA
		T2- G-	2	34	50	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$; see Figure 10				
		T2+ G+	-	31	60	mA
		T2+ G-	-	34	90	mA
		T2- G-	-	30	60	mA
I_H	holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$; see Figure 11	-	31	60	mA
V_T	on-state voltage	$I_T = 10\text{ A}$; see Figure 9	-	1.3	1.65	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 7	-	0.7	1.5	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$	0.25	0.4	-	V
I_D	off-state current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ °C}$	-	0.1	0.5	mA

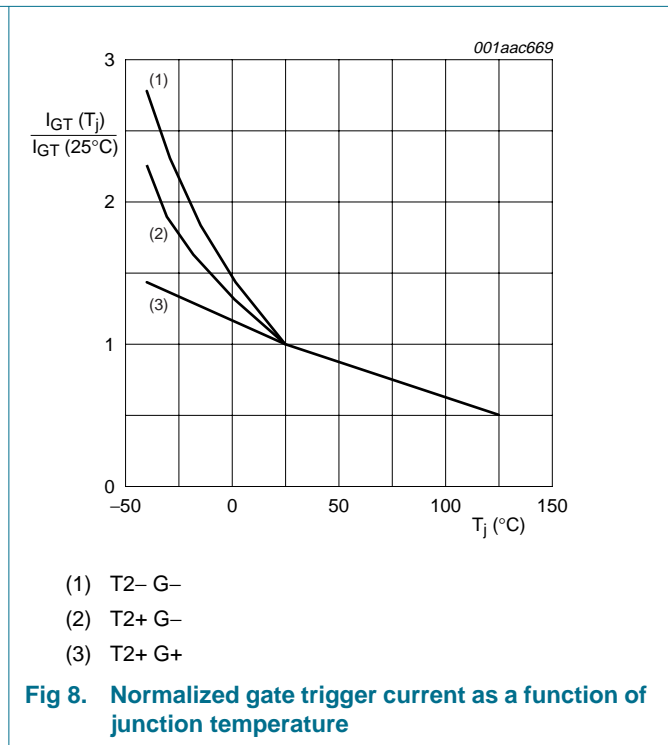
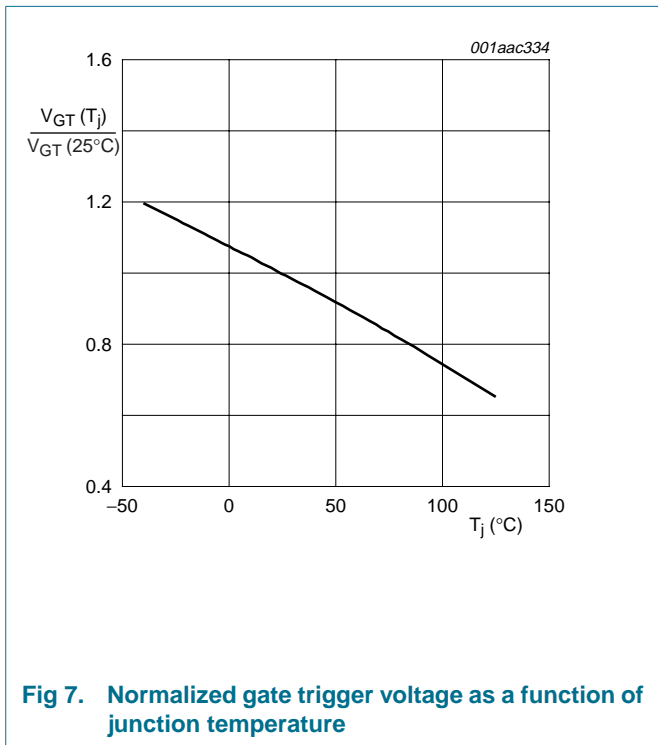
[1] Device does not trigger in the T2- G+ quadrant.

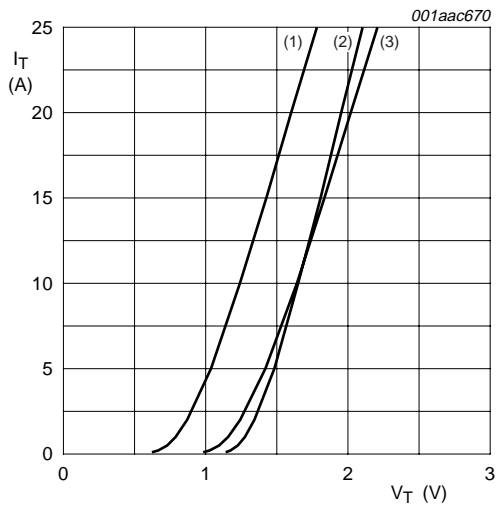
7. Dynamic characteristics

Table 6: Dynamic characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 0.67V_{DRM(max)}$; $T_j = 125\text{ }^\circ\text{C}$; exponential waveform; gate open circuit	1000	4000	-	V/ μs
di_{com}/dt	rate of rise of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 8\text{ A}$; without snubber; gate open circuit; see Figure 12	-	14	-	A/ms
t_{gt}	gate-controlled turn-on time	$I_{TM} = 12\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $di_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μs





$V_O = 1.264 \text{ V}; R_S = 37.8 \text{ m}\Omega$

- (1) $T_j = 125 \text{ }^\circ\text{C}$; typical values
- (2) $T_j = 25 \text{ }^\circ\text{C}$; maximum values
- (3) $T_j = 125 \text{ }^\circ\text{C}$; maximum values

Fig 9. On-state characteristic

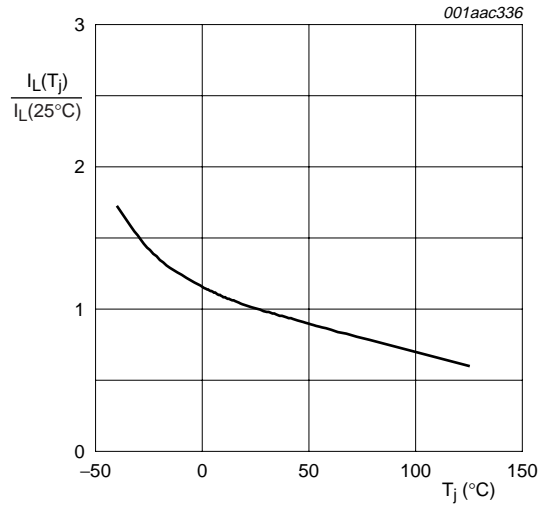


Fig 10. Normalized latching current as a function of junction temperature

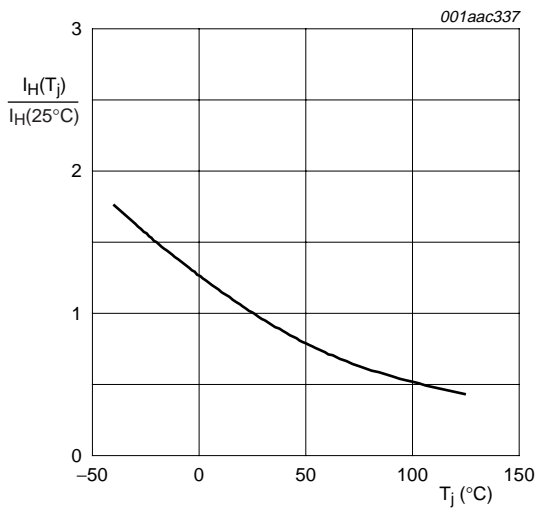


Fig 11. Normalized holding current as a function of junction temperature

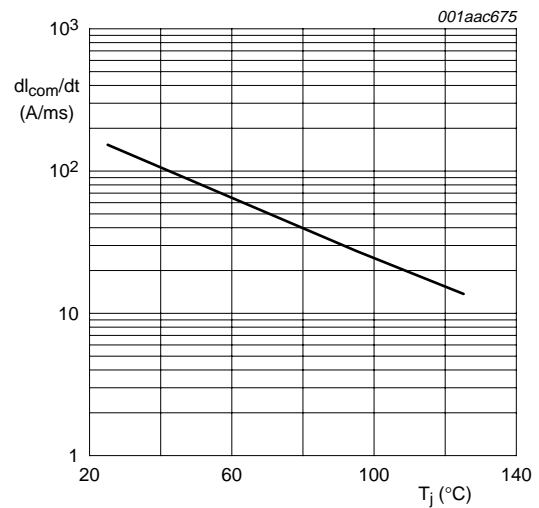


Fig 12. Rate of rise of commutating current as a function of junction temperature; typical values

8. Package information

Plastic meets UL94 V-0 at 1/8 inch.

9. Package outline

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

SOT428

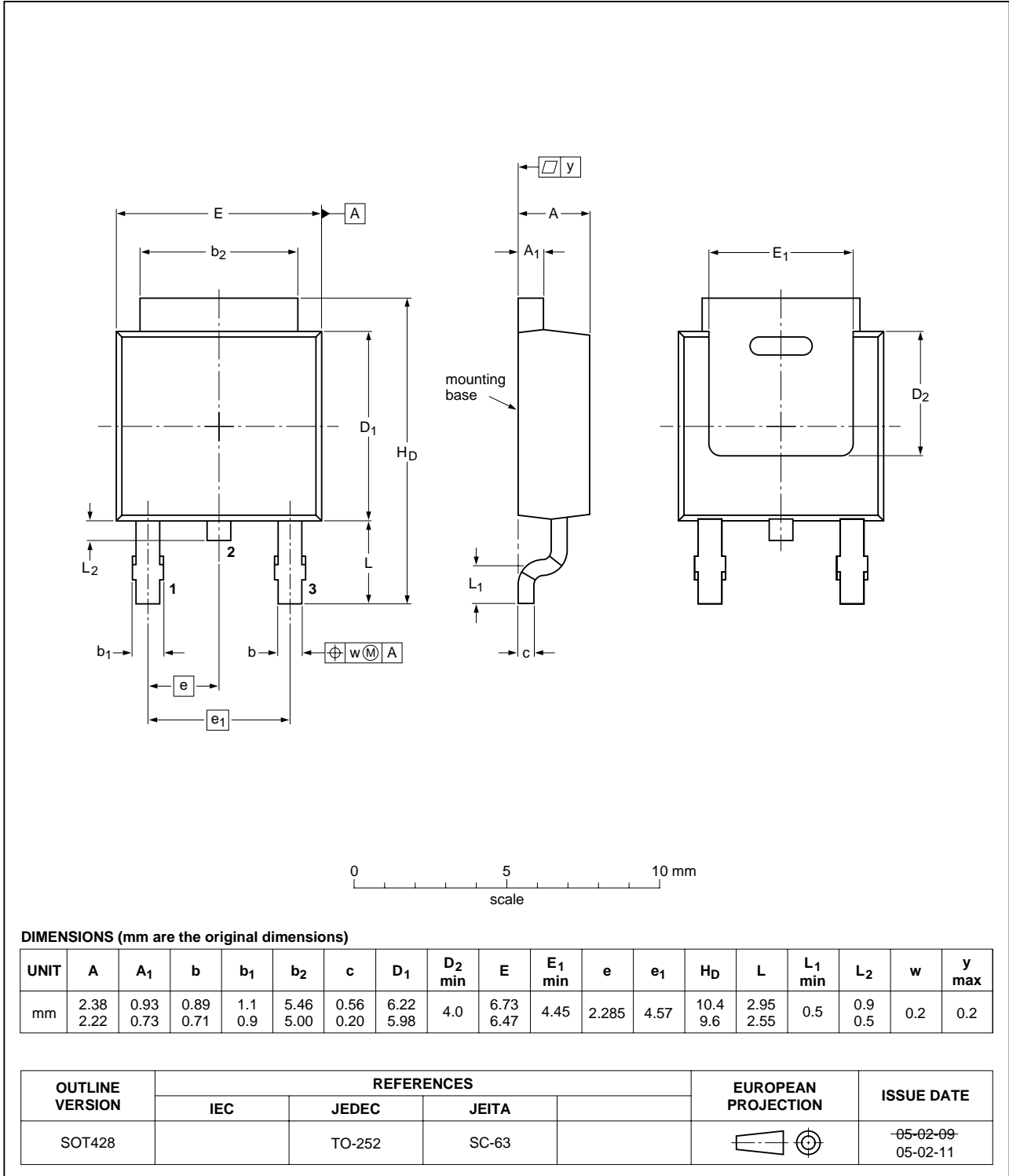
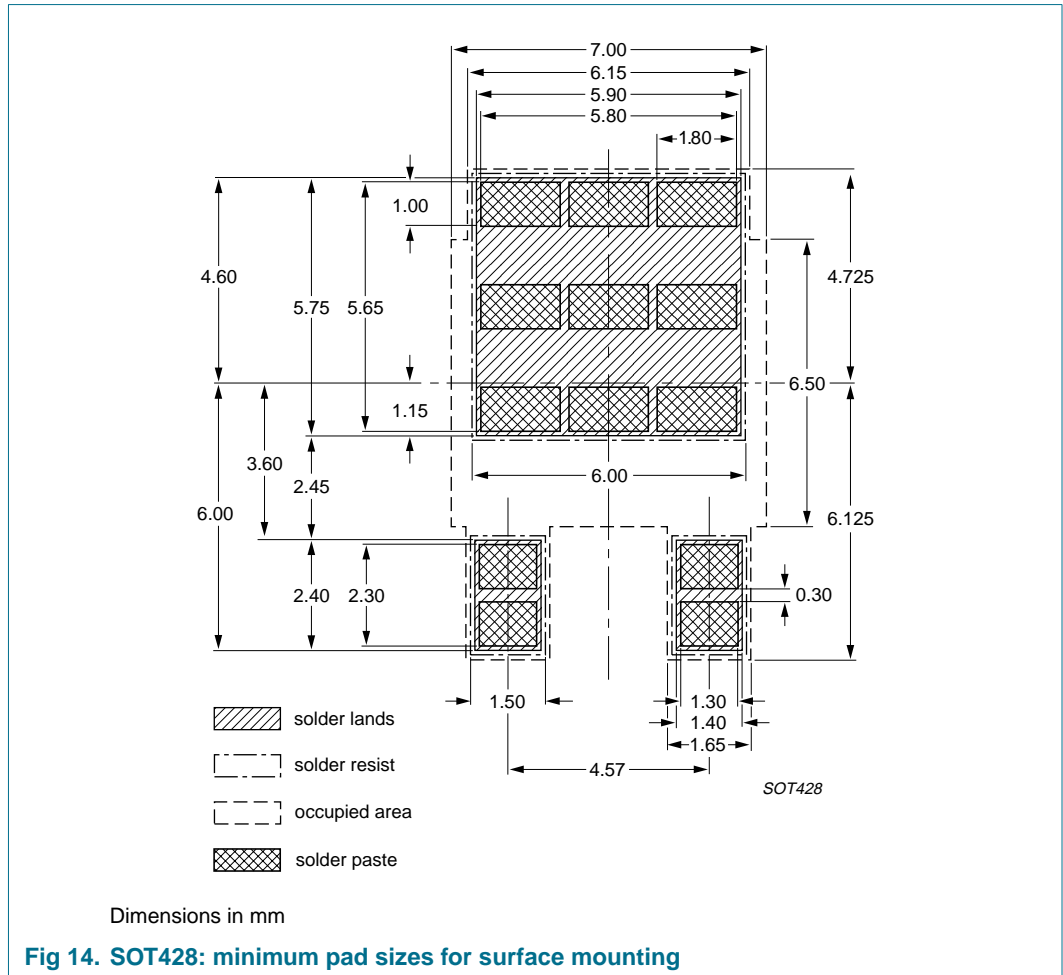


Fig 13. Package outline SOT428 (TO-252)

10. Mounting



11. Revision history

Table 7: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BTA208S_SER_B_2	20050531	Product data sheet	-	9397 750 14861	BTA208S_SERIES_B_1
Modifications:	<ul style="list-style-type: none">• The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.• 500 V types removed.• Alternative pinning types removed.				
BTA208S_SERIES_B_1	19970901	Product specification	-	-	-

12. Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2] [3]}	Definition
I	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.
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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