

BTA2008W-800D

3Q Hi-Com Triac

Rev. 1 — 21 March 2012

Product data sheet

1. Product profile

1.1 General description

Planar passivated high commutation three quadrant triac in a SOT223 surface mountable plastic package. This "series D" triac balances the requirements of commutation performance and gate sensitivity and is intended for interfacing with low power drivers and logic ICs including microcontrollers.

1.2 Features and benefits

- 3Q technology for improved noise immunity
- Direct gate triggering from low power drivers and logic ICs
- High commutation capability
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- Surface mountable package
- Triggering in three quadrants only
- Very sensitive gate for easy logic level triggering

1.3 Applications

- Low power motor controls
- Small inductive loads e.g. solenoids, door locks, water valves
- Small loads in large white goods

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	800	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{j(Init)}} = 25\text{ °C}$; $t_{\text{p}} = 20\text{ ms}$; see Figure 4 ; see Figure 5	-	-	9	A
T_{j}	junction temperature		-	-	125	°C
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 108\text{ °C}$; see Figure 1 ; see Figure 2 ; see Figure 3	-	-	0.8	A

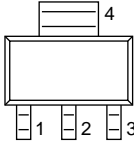
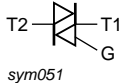


Table 1. Quick reference data ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; see Figure 9	0.25	-	5	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; see Figure 9	0.25	-	5	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; see Figure 9	0.25	-	5	mA
Dynamic characteristics						
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 536 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit	200	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 0.8 A; dV _{com} /dt = 10 V/μs; gate open circuit	0.5	-	-	A/ms

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		
4	T2	main terminal 2		

SOT223 (SC-73)

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA2008W-800D	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

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		-	800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 108\text{ °C}$; see Figure 1 ; see Figure 2 ; see Figure 3	-	0.8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{J(init)}} = 25\text{ °C}$; $t_{\text{p}} = 20\text{ ms}$; see Figure 4 ; see Figure 5	-	9	A
		full sine wave; $T_{\text{J(init)}} = 25\text{ °C}$; $t_{\text{p}} = 16.7\text{ ms}$	-	9.9	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$; sine-wave pulse	-	0.41	A ² s
dI_{T}/dt	rate of rise of on-state current	$I_{\text{T}} = 1.5\text{ A}$; $I_{\text{G}} = 20\text{ mA}$; $dI_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$	-	100	A/ μs
I_{GM}	peak gate current		-	2	A
P_{GM}	peak gate power		-	5	W
$P_{\text{G(AV)}}$	average gate power	over any 20ms period	-	0.1	W
T_{stg}	storage temperature		-40	150	°C
T_{j}	junction temperature		-	125	°C

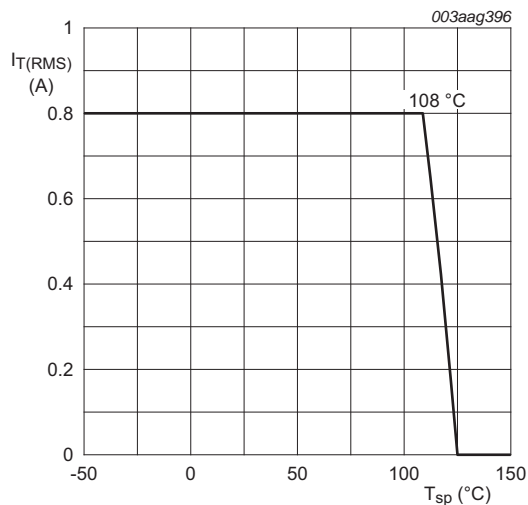


Fig 1. RMS on-state current as a function of lead temperature; maximum values

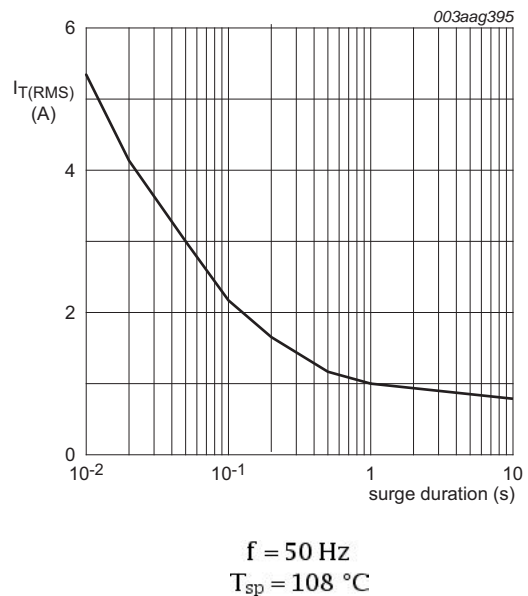


Fig 2. RMS on-state current as a function of surge duration; maximum values

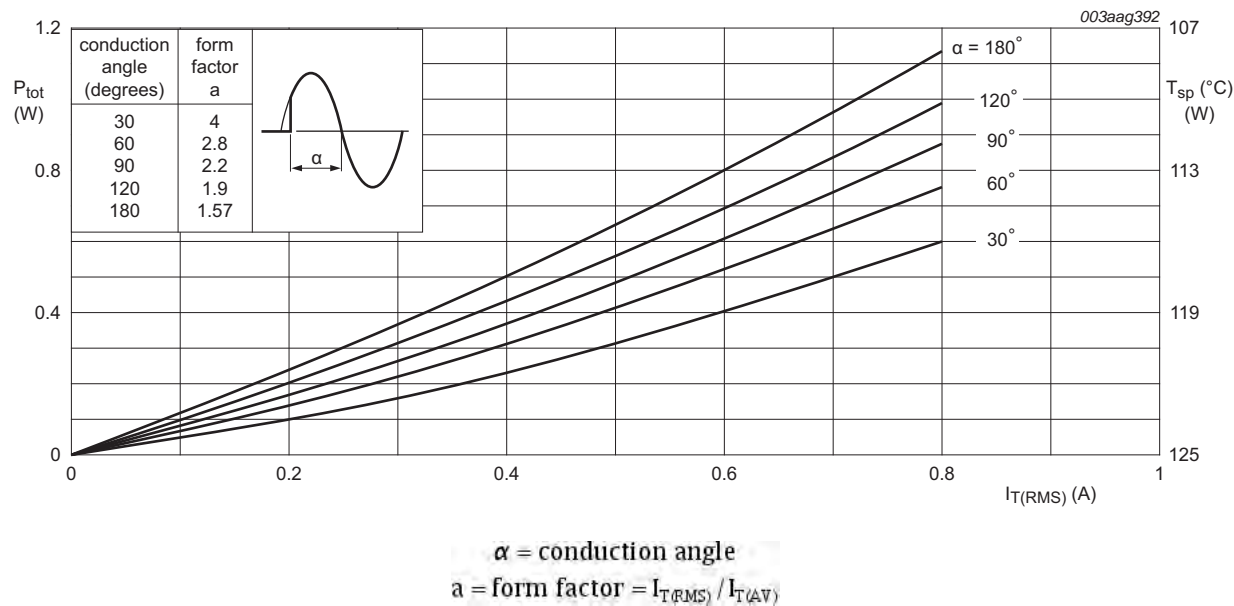


Fig 3. Total power dissipation as a function of RMS on-state current; maximum values

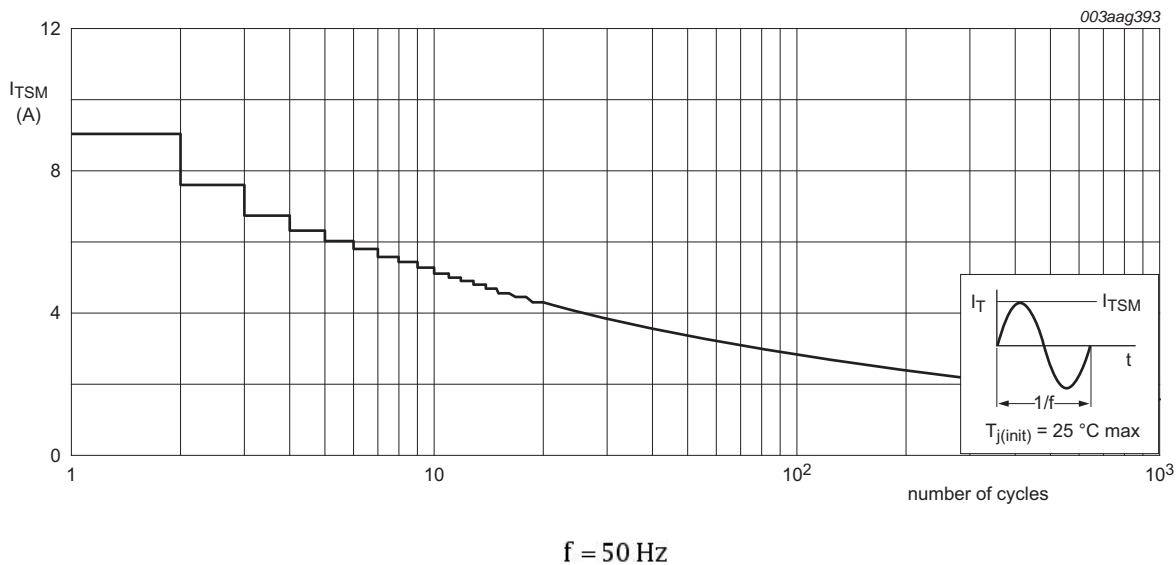


Fig 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

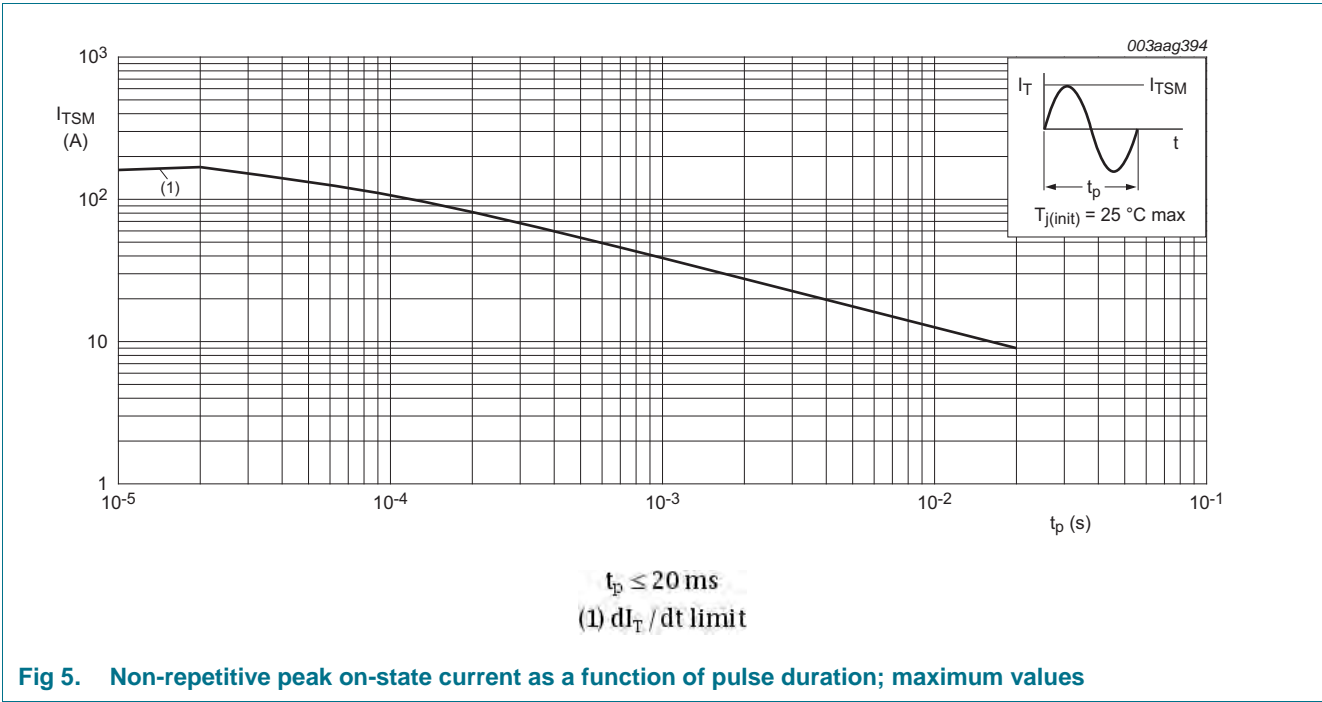


Fig 5. Non-repetitive peak on-state current as a function of pulse duration; maximum values

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	full cycle; see Figure 8	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; printed-circuit board mounted: minimum footprint; full cycle; see Figure 6	-	156	-	K/W
		in free air; printed-circuit board mounted: pad area; full cycle; see Figure 7	-	70	-	K/W

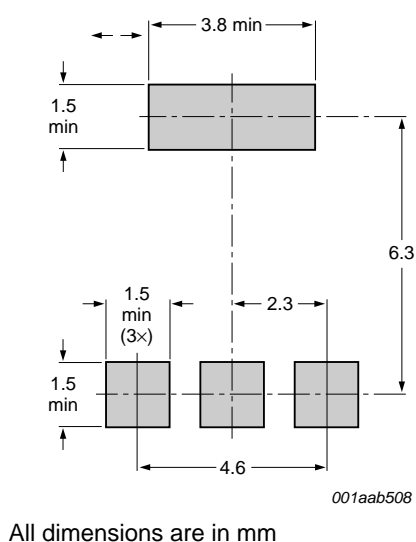
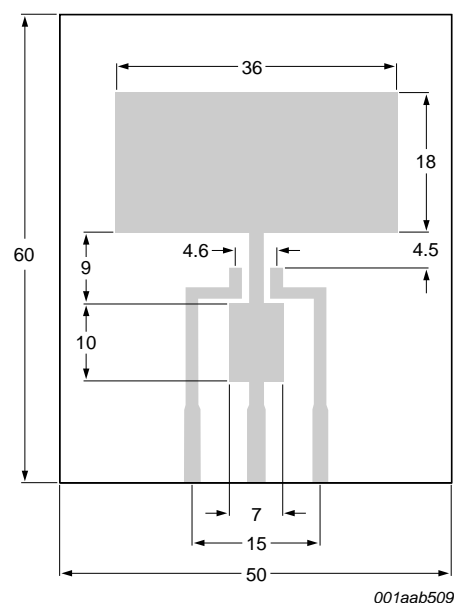


Fig 6. Minimum footprint SOT223



Printed circuit board:
FR4 epoxy glass (1.6 mm thick), copper laminate
(35 um thick)

Fig 7. Printed circuit board pad area: SOT223

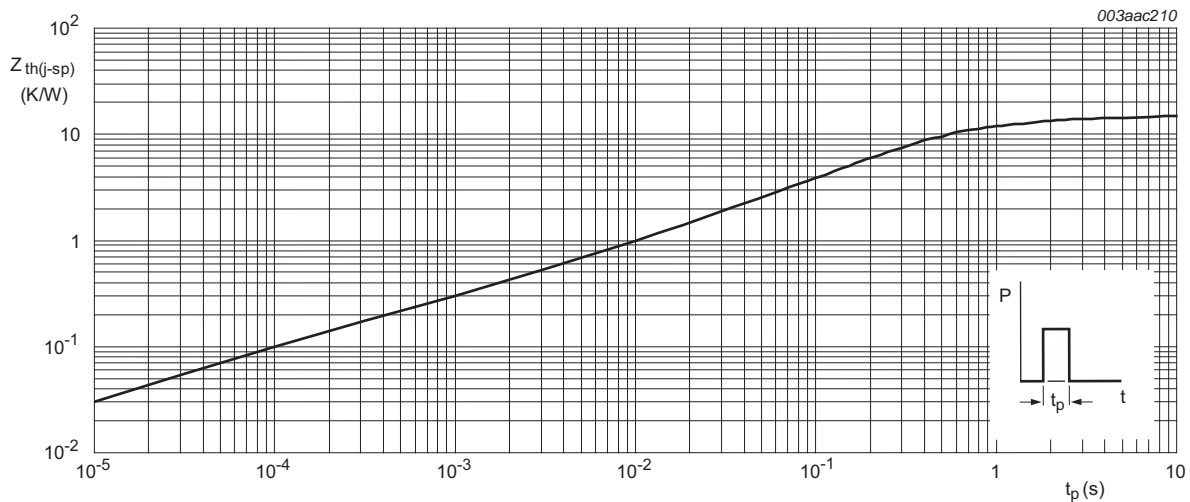
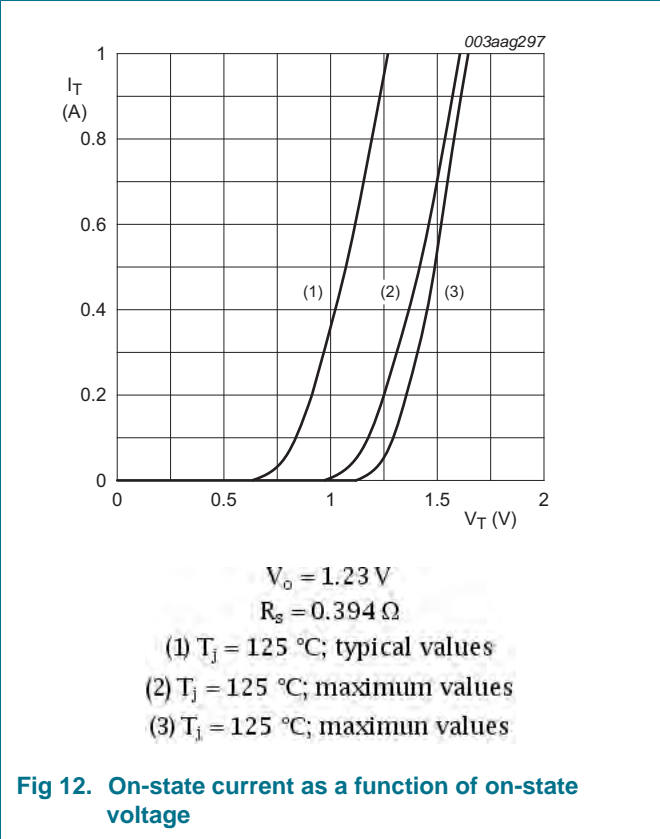
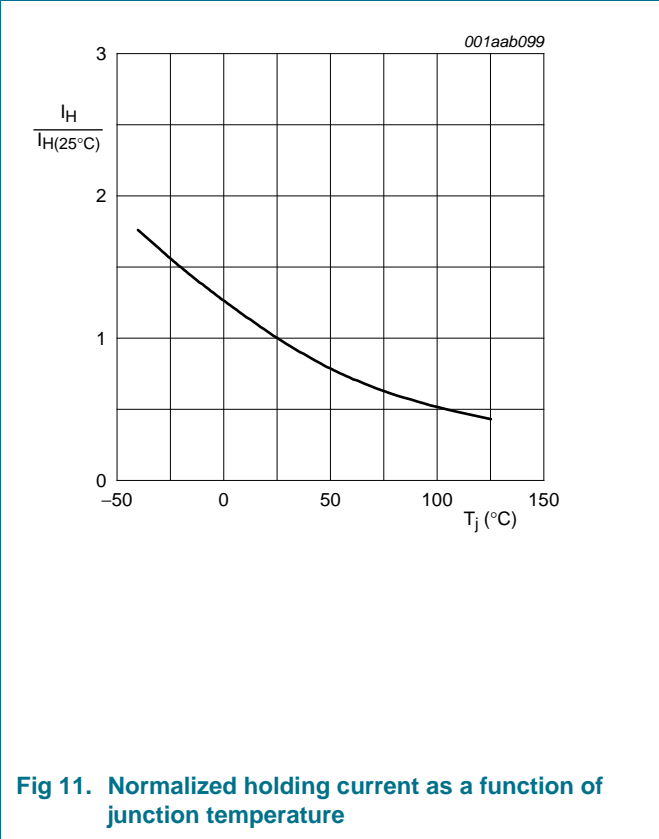
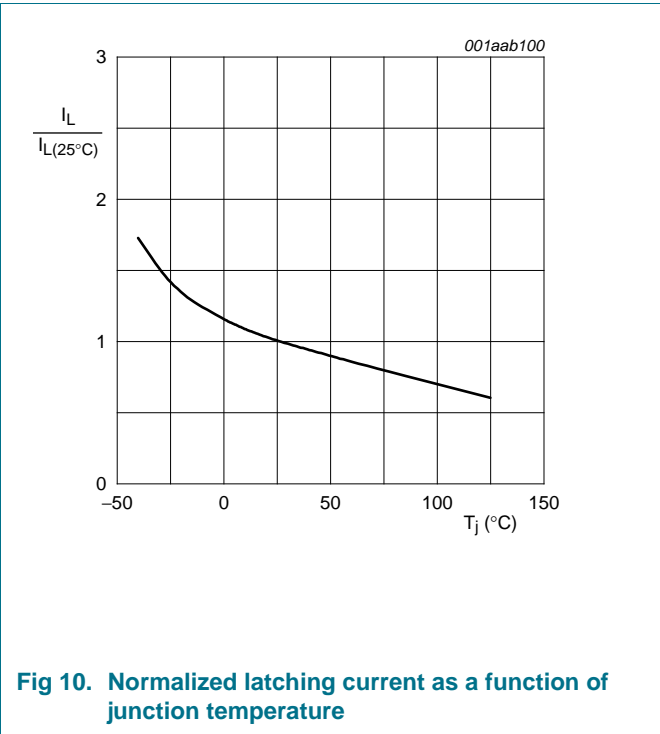
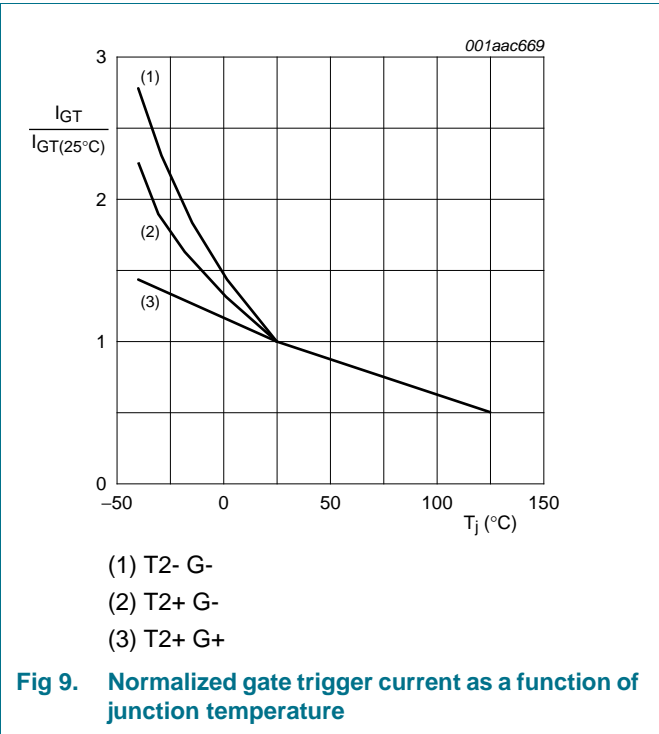


Fig 8. Transient thermal impedance from junction to solder point as a junction of pulse width

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 9	0.25	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$; see Figure 9	0.25	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 9	0.25	-	5	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 10	-	-	10	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 10	-	-	20	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^\circ\text{C}$; see Figure 10	-	-	10	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 11	-	-	10	mA
V_T	on-state voltage	$I_T = 0.85\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 12	-	1.35	1.6	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 13	-	0.9	2	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^\circ\text{C}$	0.2	0.3	-	V
I_D	off-state current	$V_D = 800\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$	-	0.1	0.5	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	200	-	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 0.8\text{ A}$; $dV_{com}/dt = 10\text{ V}/\mu\text{s}$; gate open circuit	0.5	-	-	A/ms



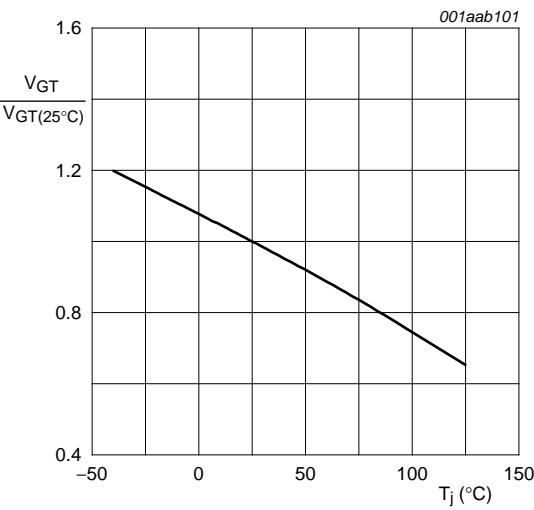


Fig 13. Normalized gate trigger voltage as a function of junction temperature

7. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads

SOT223

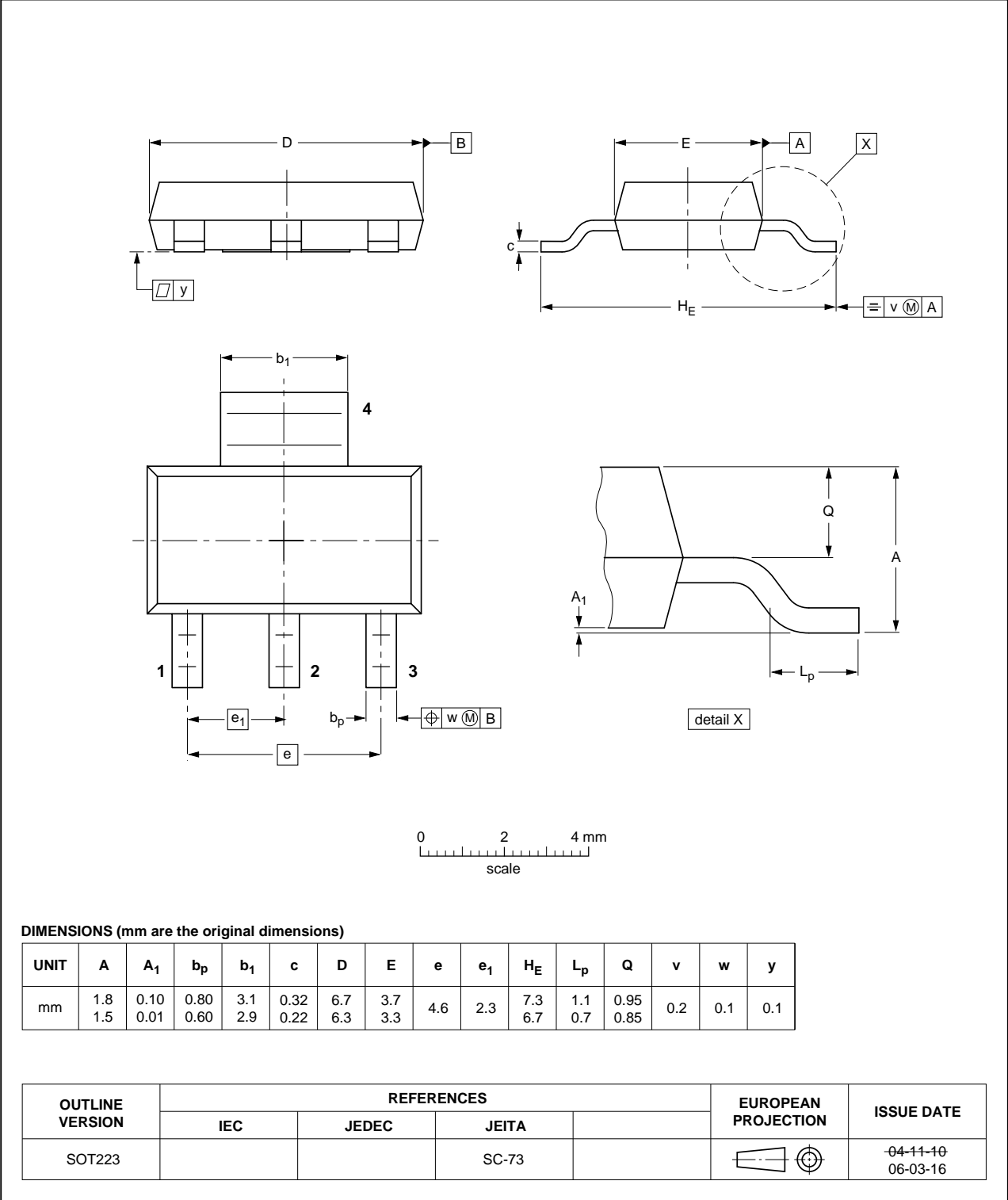


Fig 14. Package outline SOT223 (SC-73)

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BTA2008W-800D v.1	20120321	Product data sheet	-	-

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.
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Product [short] data sheet	Production	This document contains the product specification.

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

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