

BT1308W series D

Triacs logic level

Rev. 01 — 27 February 2008

Product data sheet

1. Product profile

1.1 General description

Passivated sensitive gate triacs in a SOT223 surface-mountable plastic package

1.2 Features

- Sensitive gate
- Direct interfacing to logic level ICs
- Gate triggering in four quadrants
- Direct interfacing to low-power gate drive circuits

1.3 Applications

- General purpose switching and phase control
- Low-power AC fan speed controllers

1.4 Quick reference data

- $V_{DRM} \leq 400$ V (BT1308W-400D)
- $V_{DRM} \leq 600$ V (BT1308W-600D)
- $I_{TSM} \leq 9$ A ($t = 20$ ms)
- $I_{GT} \leq 5$ mA
- $I_{GT} \leq 7$ mA (T2– G+)
- $I_{T(RMS)} \leq 0.8$ A

2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	main terminal 1 (T1)	<p>SOT223</p>	<p>sym051</p>
2	main terminal 2 (T2)		
3	gate (G)		
4	mounting base; main terminal 2 (T2)		

3. Ordering information

Table 2. Ordering information

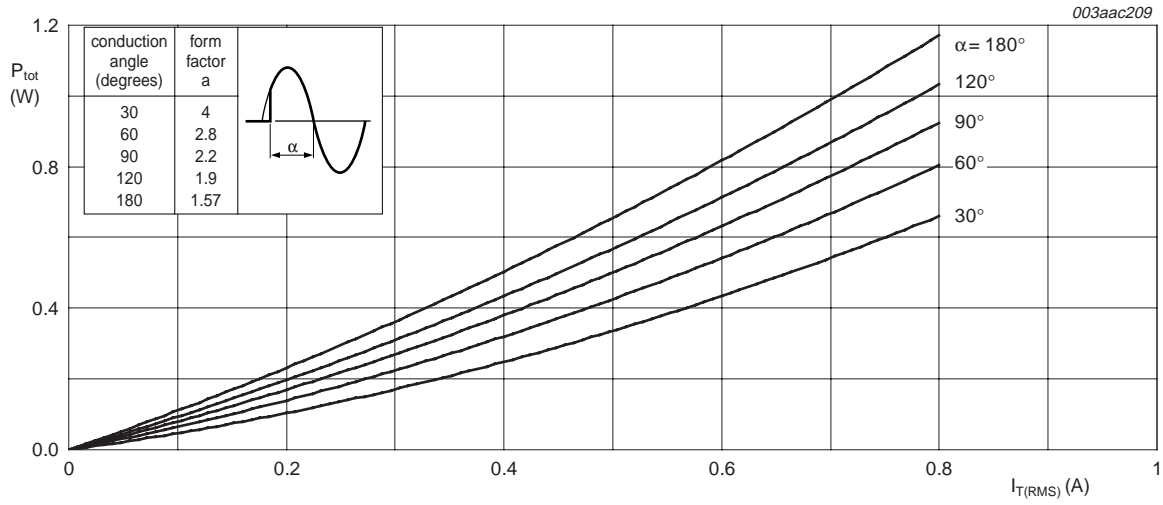
Type number	Package		Version
	Name	Description	
BT1308W-400D	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223
BT1308W-600D			

4. Limiting values

Table 3. Limiting values

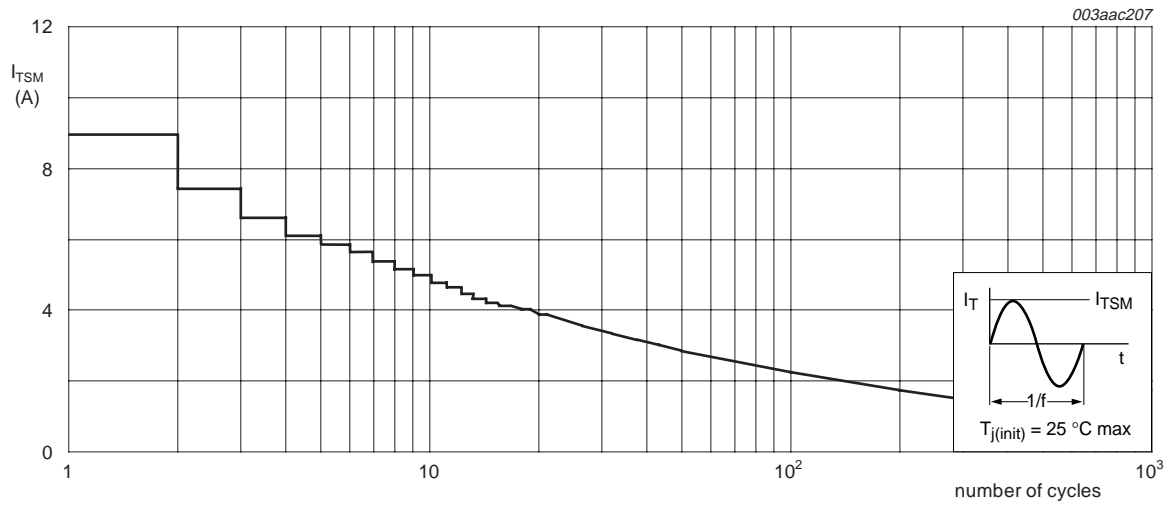
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DRM}	repetitive peak off-state voltage	BT1308W-400D	-	400	V
		BT1308W-600D	-	600	V
I _{T(RMS)}	RMS on-state current	full sine wave; T _{sp} ≤ 107.4 °C; see Figure 4 and 5	-	0.8	A
I _{TSM}	non-repetitive peak on-state current	full sine wave; T _j = 25 °C prior to surge; see Figure 2 and 3			
		t = 20 ms	-	9	A
		t = 16.7 ms	-	10	A
I ² t	I ² t for fusing	t _p = 10 ms	-	0.32	A ² s
dI _T /dt	rate of rise of on-state current	I _{TM} = 1 A; I _G = 20 mA; dI _G /dt = 0.2 A/μs			
		T2+ G+	-	50	A/μs
		T2+ G-	-	50	A/μs
		T2- G-	-	50	A/μs
		T2- G+	-	10	A/μs
I _{GM}	peak gate current		-	1	A
P _{GM}	peak gate power		-	5	W
P _{G(AV)}	average gate power	over any 20 ms period	-	0.1	W
T _{stg}	storage temperature		-40	+150	°C
T _j	junction temperature		-	125	°C



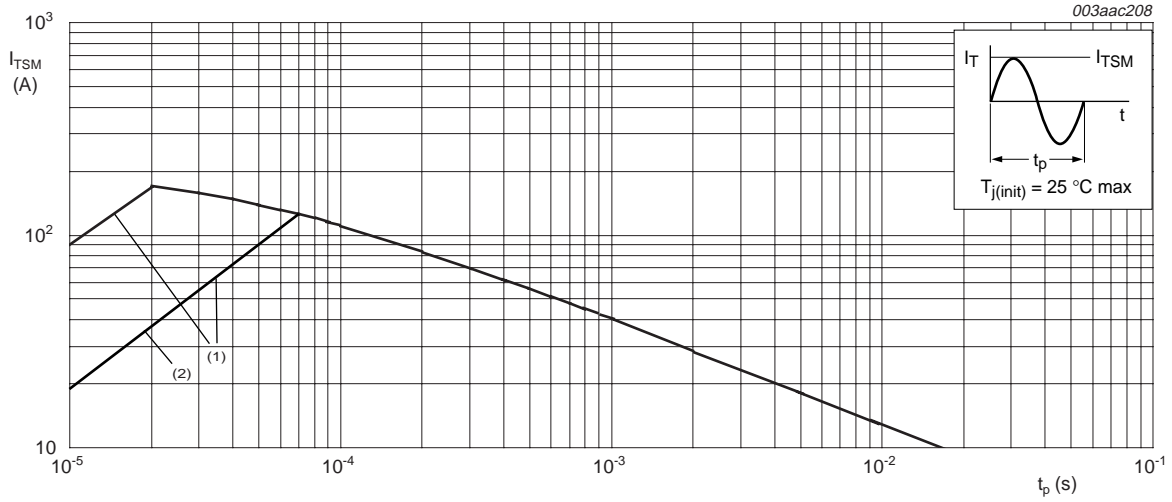
α = conduction angle

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



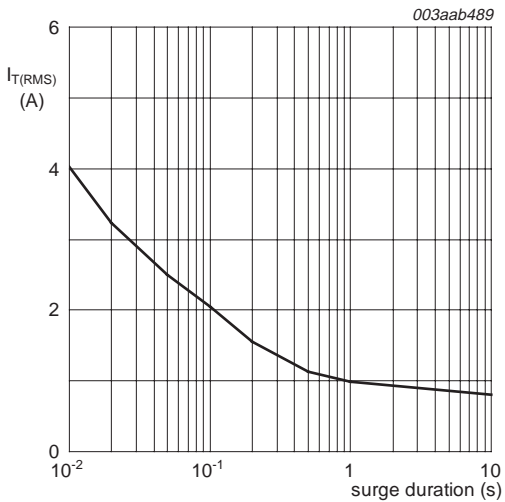
f = 50 Hz

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



- $t_p \leq 20$ ms
- (1) dI_T/dt limit
 - (2) T2- G+ quadrant limit

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



$f = 50$ Hz
 $T_{sp} = 107.4$ °C

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

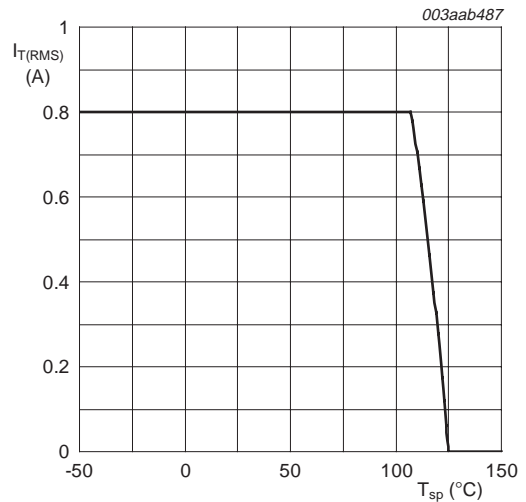


Fig 5. RMS on-state current as a function of solder point temperature; maximum values

5. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	full cycle; see Figure 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	full cycle				
		for minimum footprint; see Figure 13	-	156	-	K/W
		for pad area; see Figure 14	-	70	-	K/W

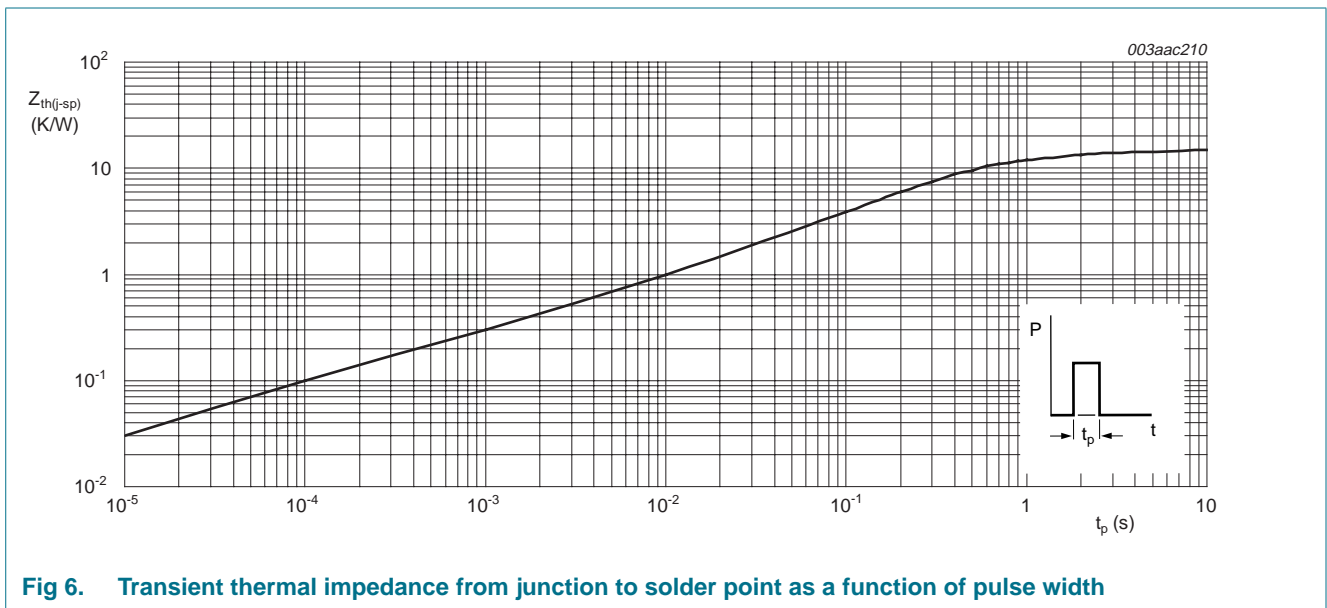


Fig 6. Transient thermal impedance from junction to solder point as a function of pulse width

6. Characteristics

Table 5. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 8				
		T2+ G+	-	1	5	mA
		T2+ G-	-	2	5	mA
		T2- G-	-	2	5	mA
		T2- G+	-	4	7	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; see Figure 10				
		T2+ G+	-	1	10	mA
		T2+ G-	-	5	10	mA
		T2- G-	-	1	10	mA
		T2- G+	-	2	10	mA
I_H	holding current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; see Figure 11	-	1	10	mA
V_T	on-state voltage	$I_T = 0.85\text{ A}$; see Figure 9	-	1.35	1.6	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 7	-	0.9	2	V
		$V_D = V_{DRM}$; $I_T = 0.1\text{ A}$; $T_j = 110\text{ °C}$	0.1	0.7	-	V
I_D	off-state current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ °C}$	-	0.1	0.5	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 0.67 \times V_{DRM(max)}$; $T_j = 110\text{ °C}$; exponential waveform; gate open circuit	30	45	-	V/ μ s
dV_{com}/dt	rate of change of commutating voltage	$V_{DM} = V_{DRM(max)}$; $T_j = 50\text{ °C}$; $I_{TM} = 0.84\text{ A}$; $dI_{com}/dt = 0.3\text{ A/ms}$	-	5	-	V/ μ s
t_{gt}	gate-controlled turn-on time	$I_{TM} = 1\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 25\text{ mA}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μ s

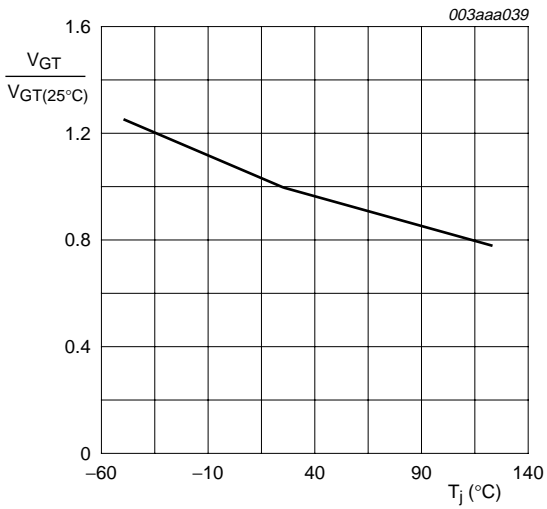
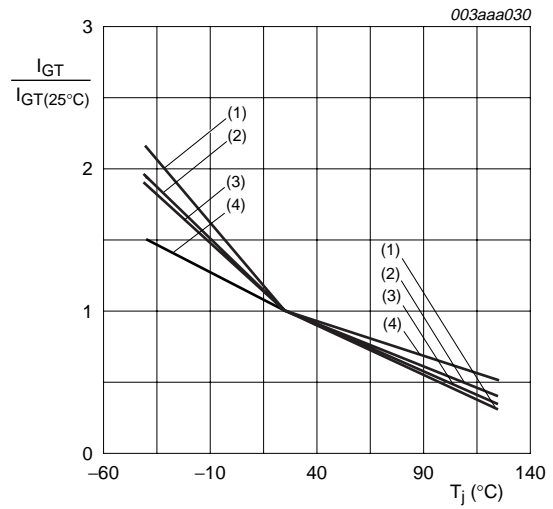
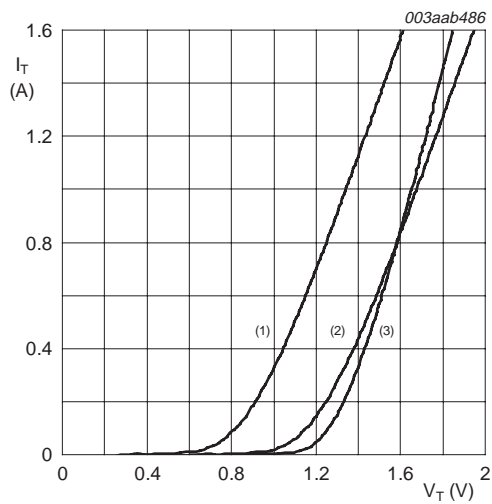


Fig 7. Normalized gate trigger voltage as a function of junction temperature



- (1) T2+ G+
- (2) T2- G+
- (3) T2- G-
- (4) T2+ G-

Fig 8. Normalized gate trigger current as a function of junction temperature



- $V_o = 1.171\text{ V}$
 $R_s = 0.5125\ \Omega$
- (1) $T_j = 125\text{ }^\circ\text{C}$; typical values
 - (2) $T_j = 125\text{ }^\circ\text{C}$; maximum values
 - (3) $T_j = 25\text{ }^\circ\text{C}$; maximum values

Fig 9. On-state current as a function of on-state voltage

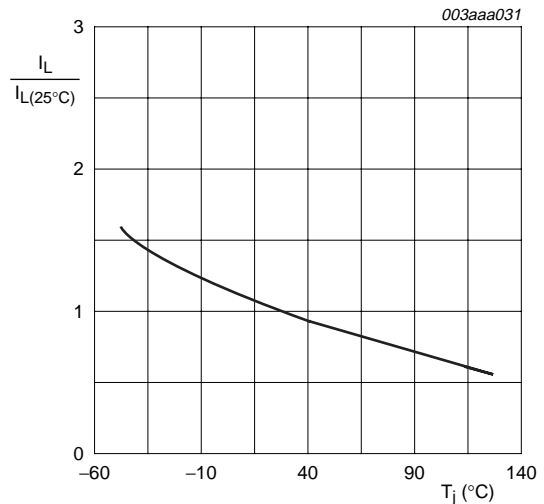


Fig 10. Normalized latching current as a function of junction temperature

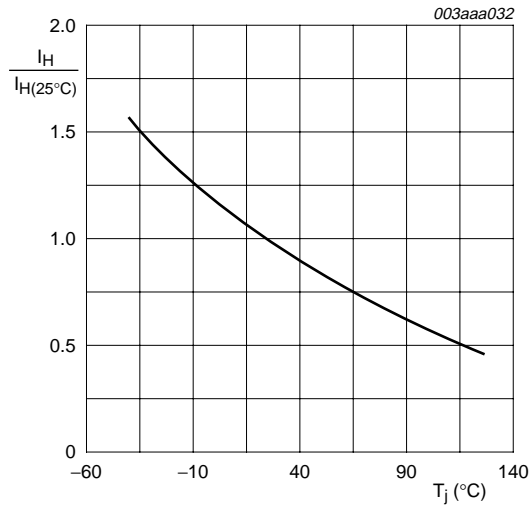


Fig 11. Normalized holding current as a function of junction temperature

7. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads

SOT223

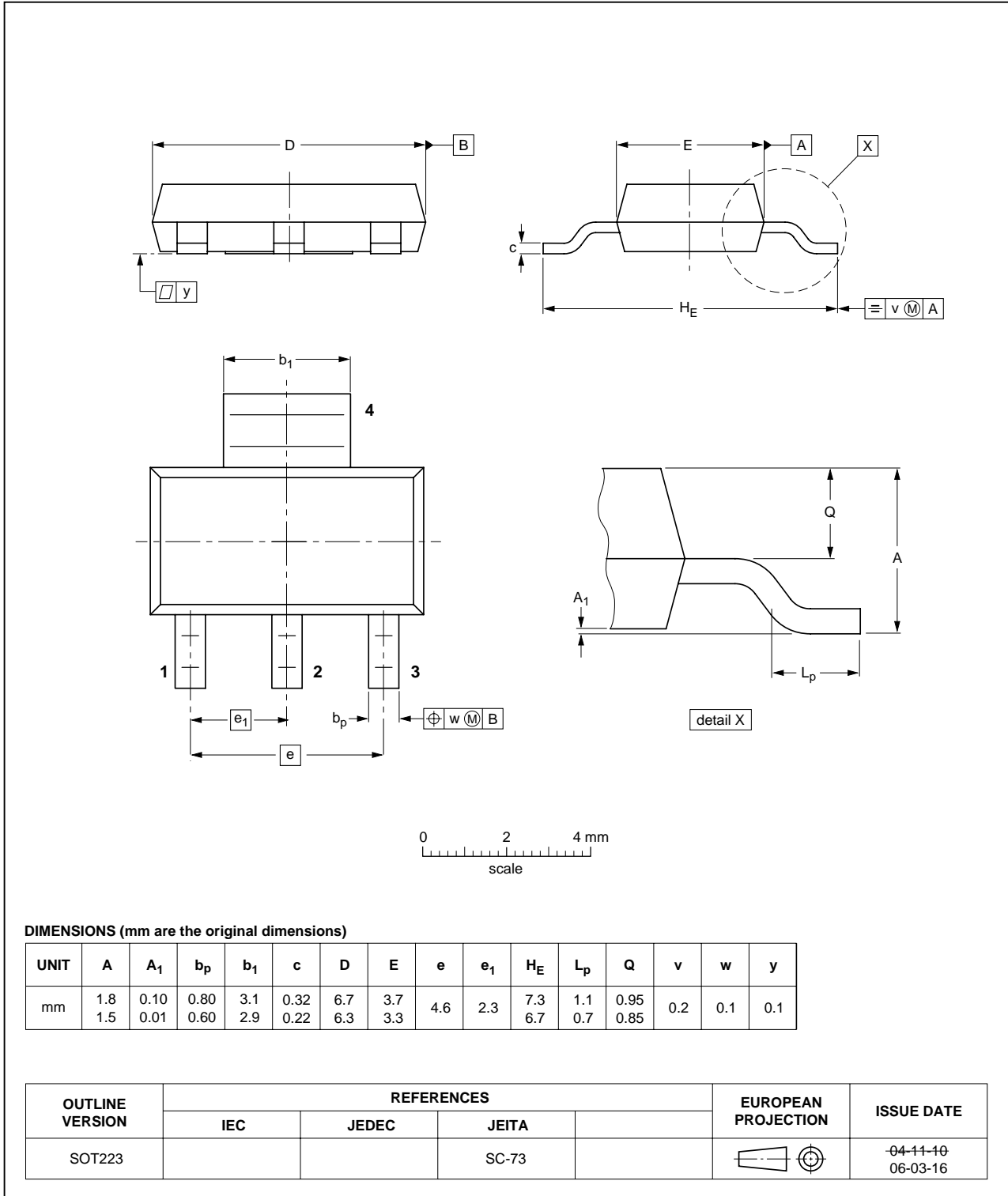
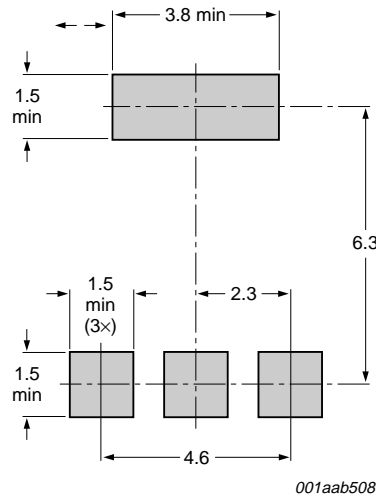


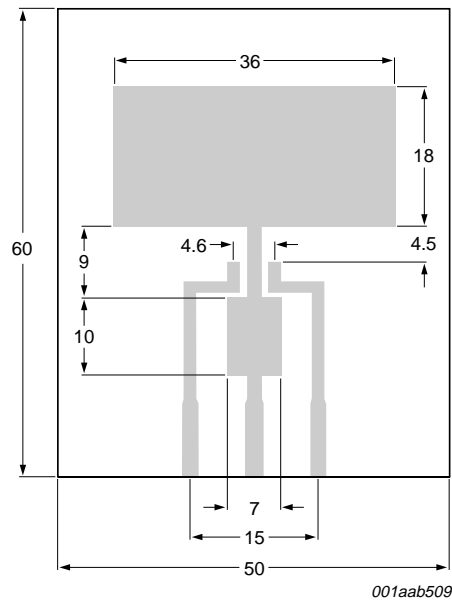
Fig 12. Package outline SOT223 (SC-73)

8. Mounting



All dimensions are in mm.

Fig 13. Minimum footprint SOT223



All dimensions are in mm.

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

Fig 14. Printed circuit board pad area SOT223

9. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BT1308W_SER_D_1	20080227	Product data sheet	-	-

10. Legal information

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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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12. Contents

1 Product profile 1

1.1 General description 1

1.2 Features 1

1.3 Applications 1

1.4 Quick reference data 1

2 Pinning information 1

3 Ordering information 2

4 Limiting values 2

5 Thermal characteristics 5

6 Characteristics 6

7 Package outline 9

8 Mounting 10

9 Revision history 11

10 Legal information 12

10.1 Data sheet status 12

10.2 Definitions 12

10.3 Disclaimers 12

10.4 Trademarks 12

11 Contact information 12

12 Contents 13

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