



BTA204W-600B

3Q Hi-Com Triac

15 August 2014

Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a SOT223 surface mountable plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This triac will commute the full rated RMS current at the maximum rated junction temperature without the aid of a snubber.

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

Less sensitive gate for very high noise immunity

Planar passivated for voltage ruggedness and reliability

Surface mountable package

3. Applications

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

4. Quick reference data

Table 1. Quick reference data

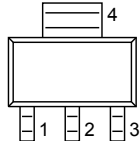
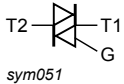
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	600	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	-	10	A



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 108\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	1	A
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 9	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 9	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 9	-	-	50	mA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 SC-73 (SOT223)	 sym051
2	T2	main terminal 2		
3	G	gate		
4	mb	mounting base; connected to T2		

6. Ordering information

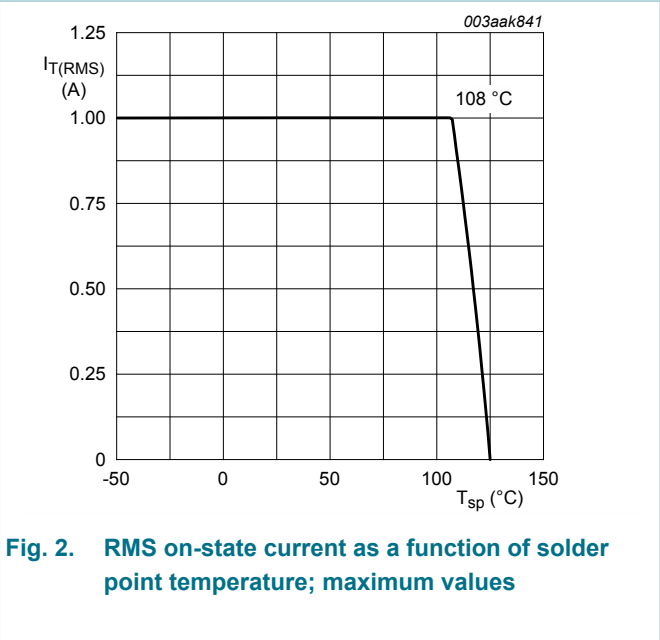
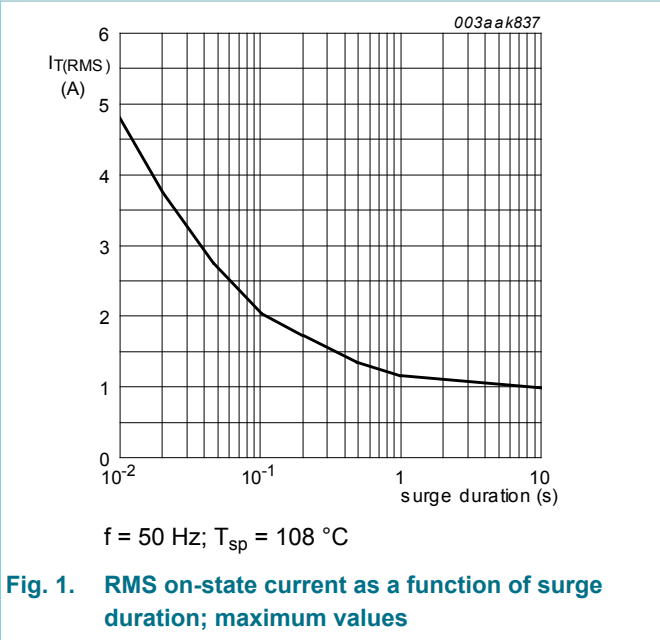
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA204W-600B	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. 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 _{T(RMS)}	RMS on-state current	full sine wave; T _{sp} ≤ 108 °C; Fig. 1; Fig. 2; Fig. 3	-	1	A
I _{TSM}	non-repetitive peak on-state current	full sine wave; T _{j(init)} = 25 °C; t _p 16.7 ms	-	11	A
		full sine wave; T _{j(init)} = 25 °C; t _p = 20 ms; Fig. 4; Fig. 5	-	10	A
I ² t	I ² t for fusing	t _p = 10 ms; SIN	-	0.5	A ² s
dI _T /dt	rate of rise of on-state current	I _T = 1.5 A; I _G = 0.2 A; dI _G /dt = 0.2 A/μs	-	100	A/μs
I _{GM}	peak gate current		-	2	A
P _{GM}	peak gate power		-	5	W
P _{G(AV)}	average gate power	over any 20ms period	-	0.5	W
T _{stg}	storage temperature		-40	150	°C
T _j	junction temperature		-	125	°C



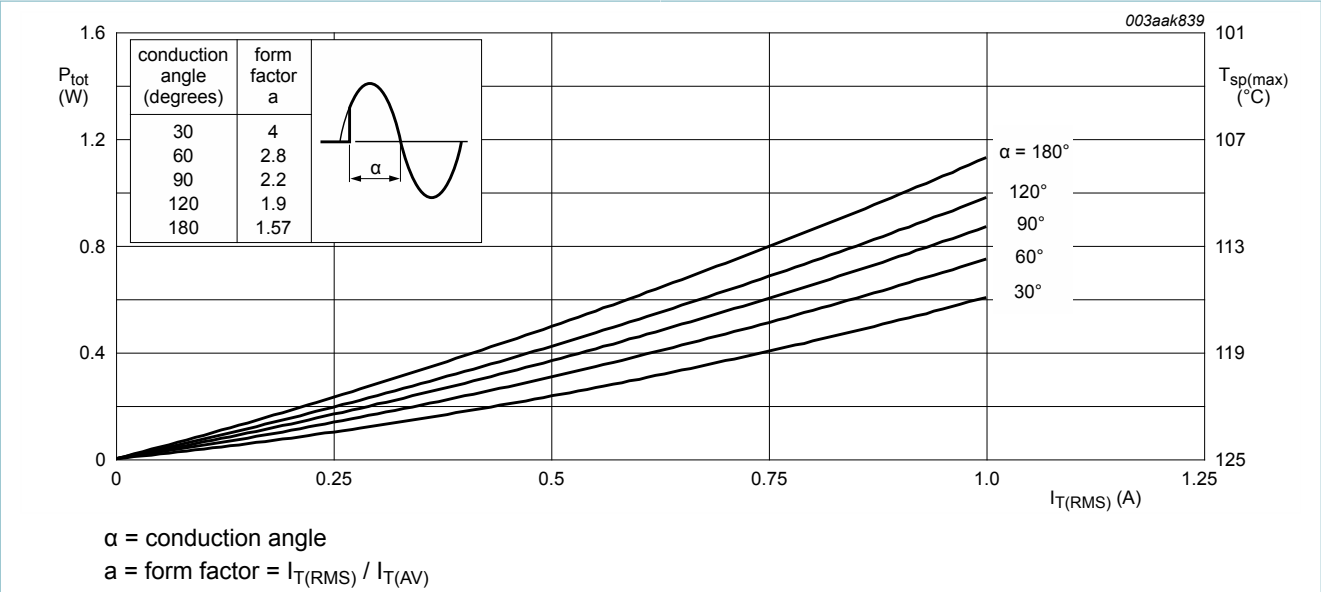


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

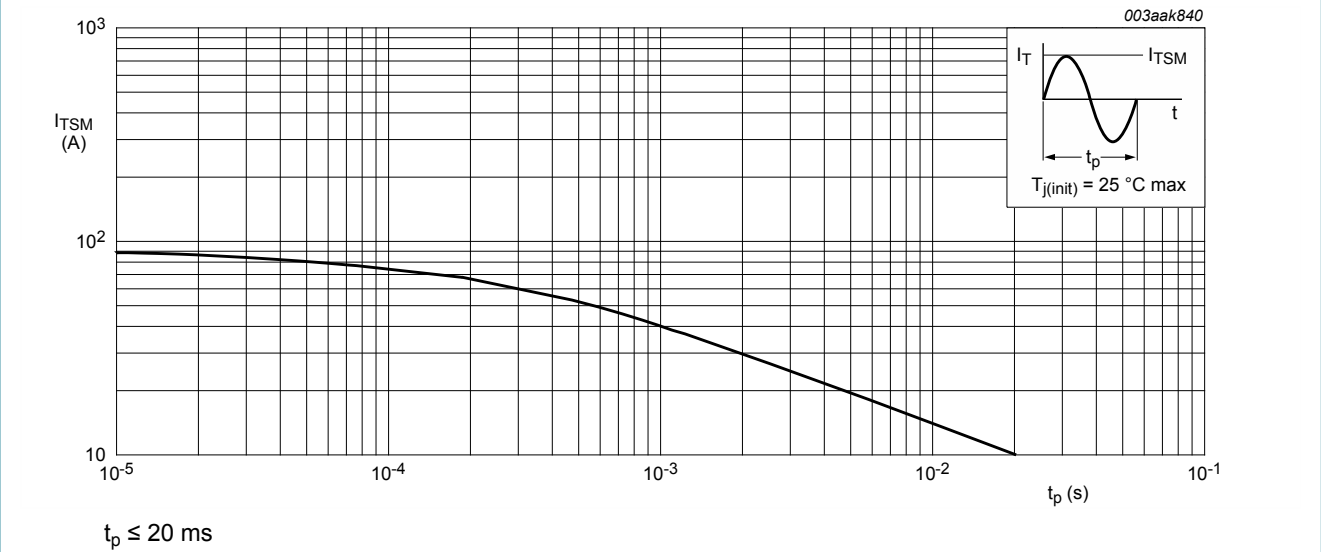
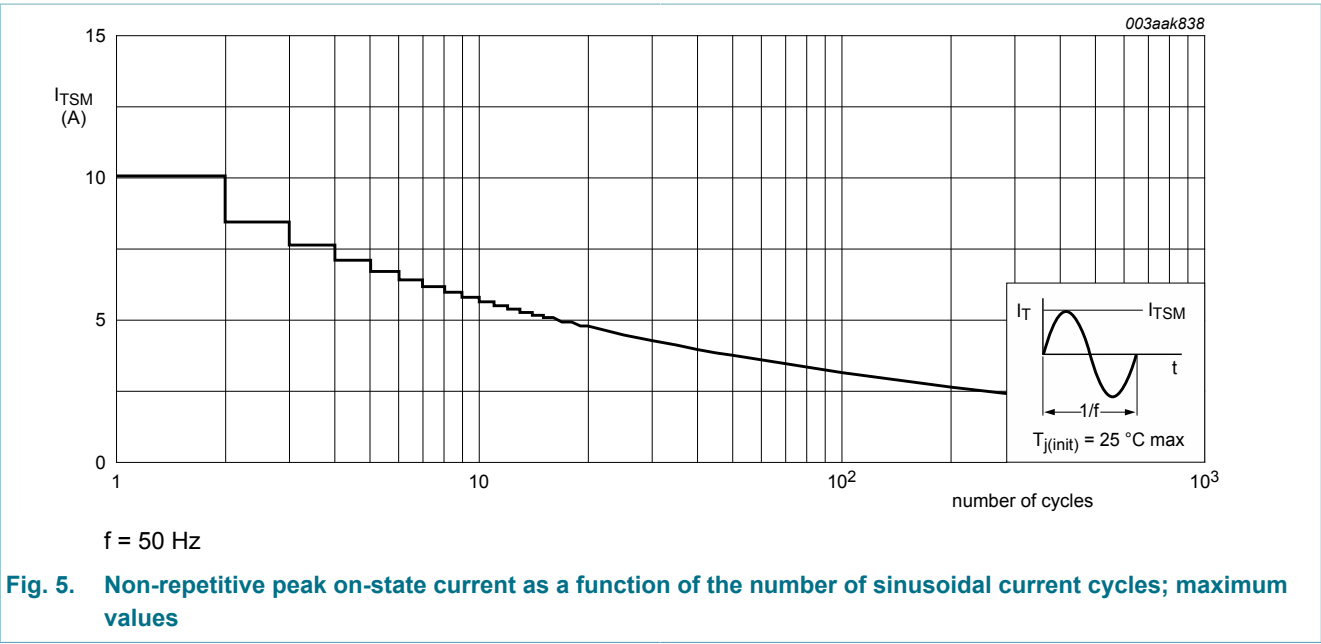


Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values



8. 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 and half cycle; Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	printed circuit board mounted: minimum pad area; Fig. 7	-	70	-	K/W
		printed circuit board mounted: minimum footprint; Fig. 8	-	156	-	K/W

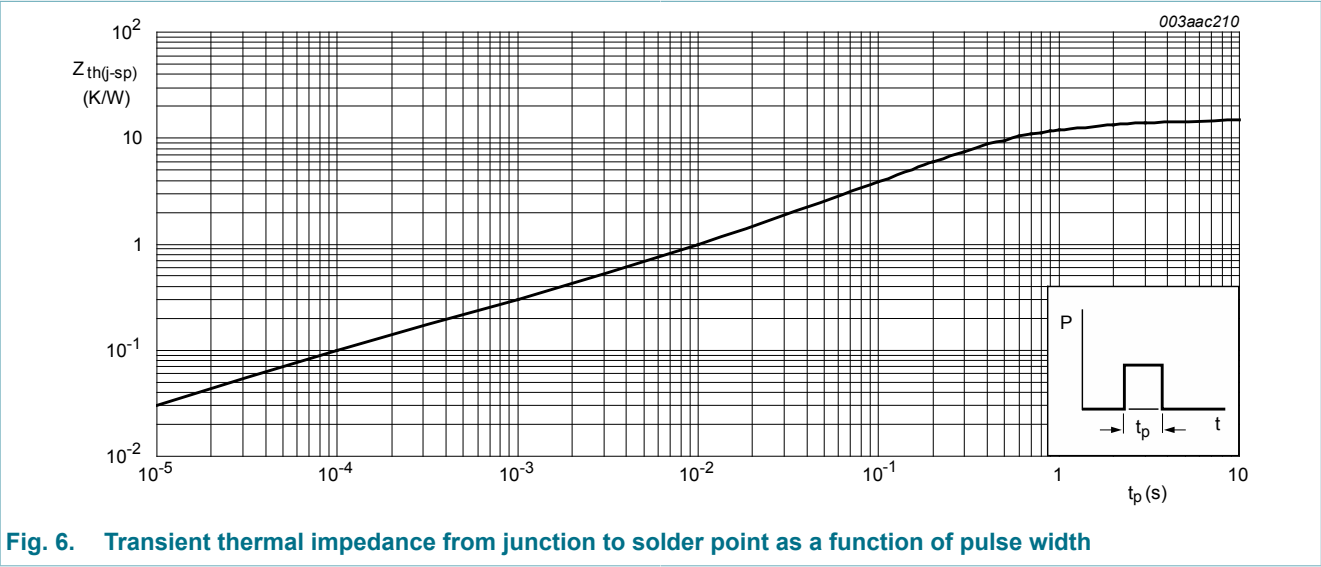
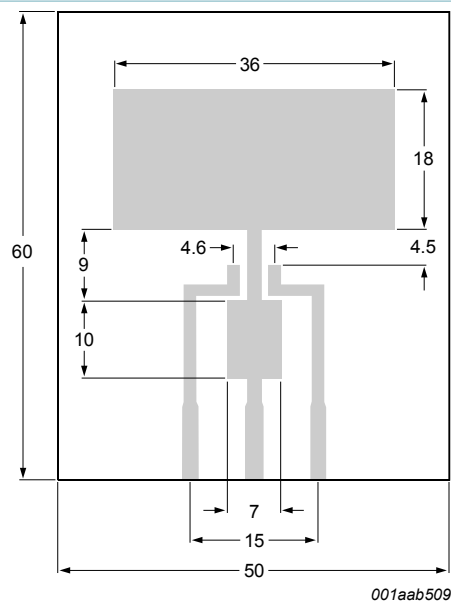


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width

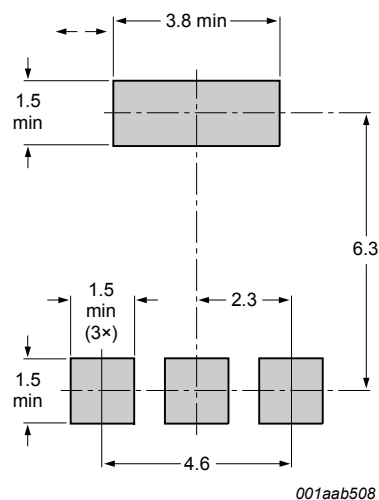


All dimensions are in mm

Printed circuit board:

FR4 epoxy glass (1.6 mm thick), copper laminate
(35 µm thick)

Fig. 7. Printed circuit board pad area: SOT223



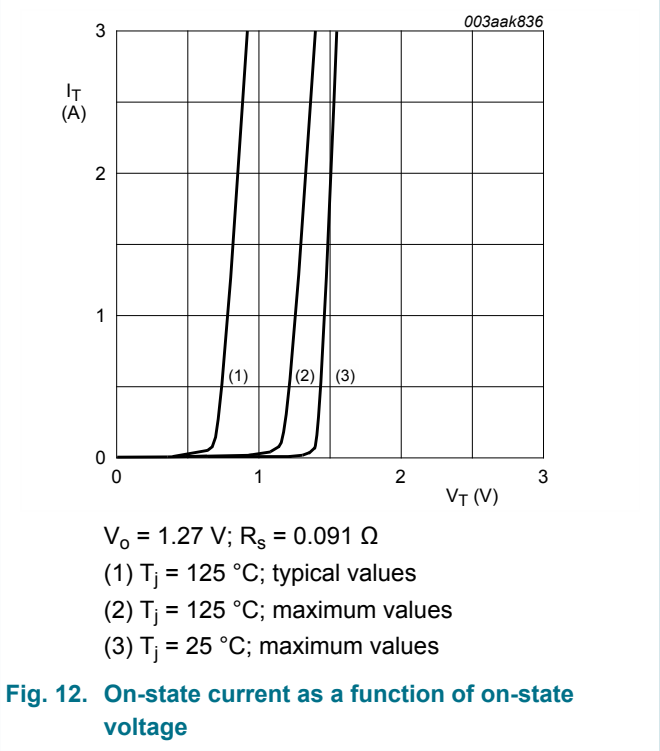
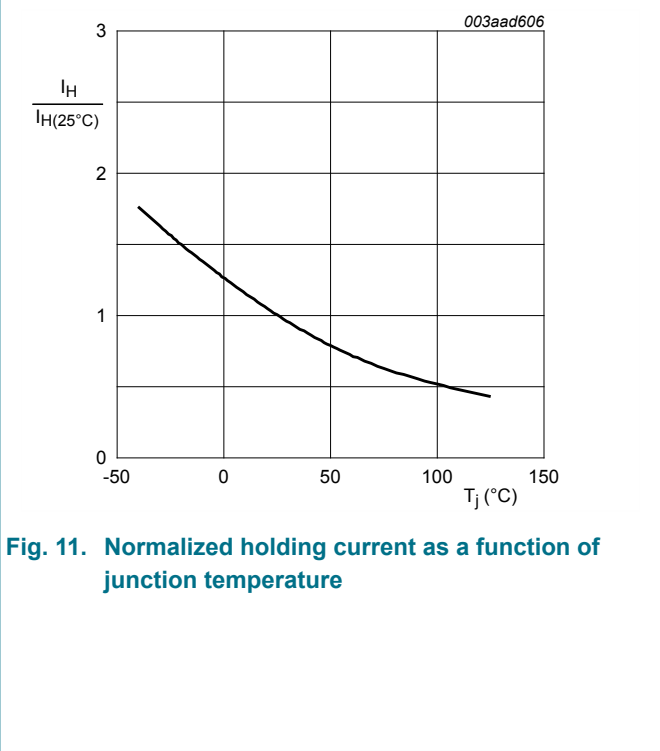
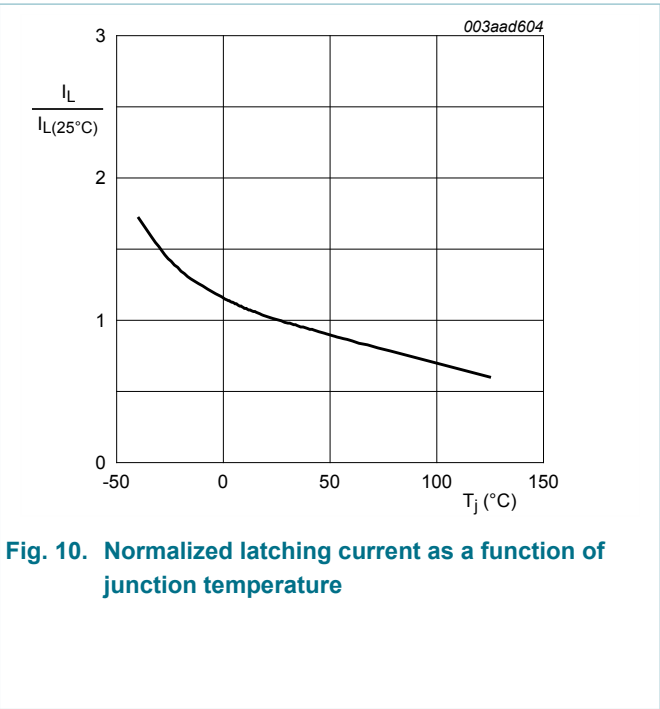
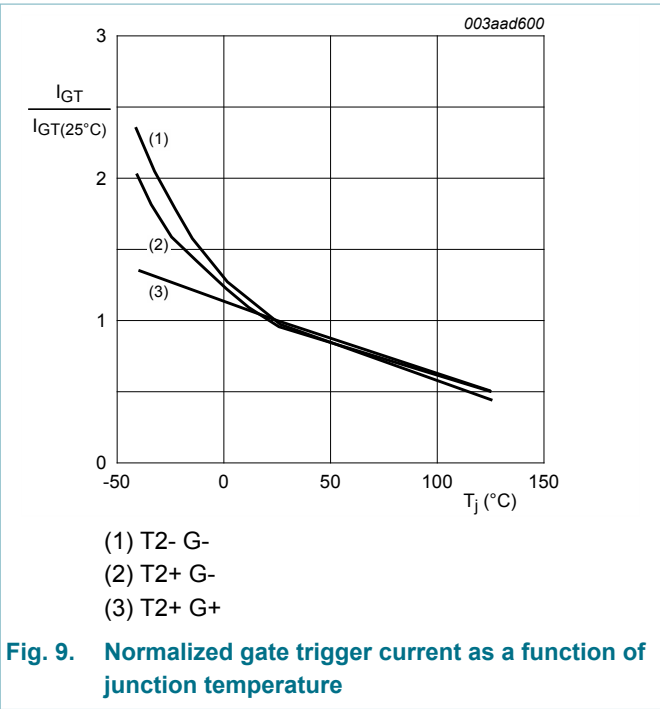
All dimensions are in mm

Fig. 8. Minimum footprint SOT223

9. 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+; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9	-	-	50	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10	-	-	30	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10	-	-	45	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10	-	-	30	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 11	-	-	30	mA
V_T	on-state voltage	$I_T = 2\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 12	-	1.2	1.5	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 13	-	0.7	1	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 13	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	$V_{DM} = 402\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; (67% of V_{DRM}); exponential waveform; gate open circuit	1000	-	-	V/ μs
di_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 1\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; (snubberless condition); gate open circuit	6	-	-	A/ms



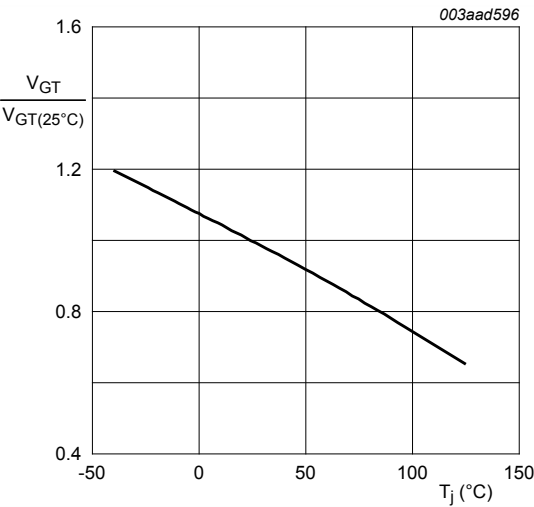


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

10. Package outline

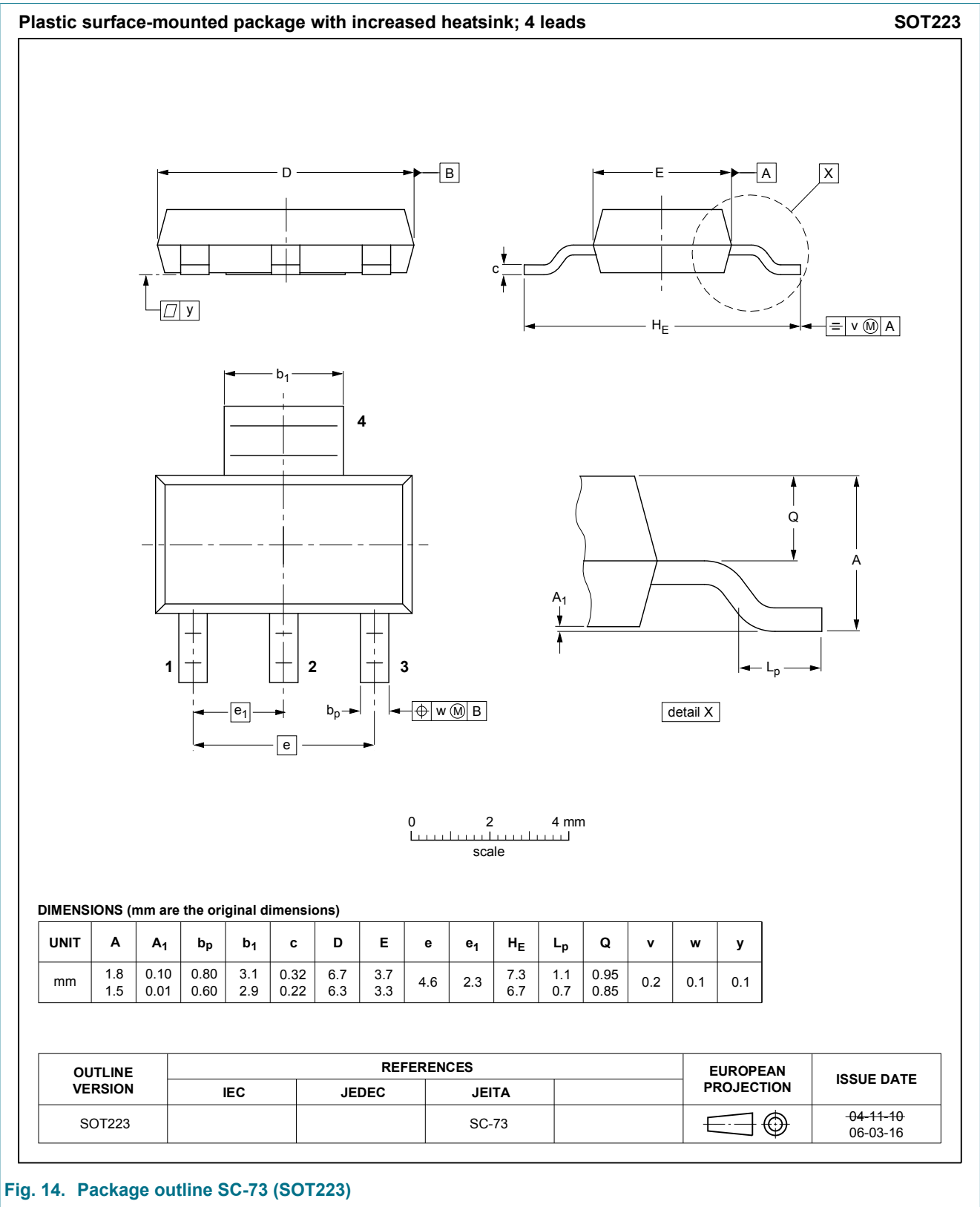


Fig. 14. Package outline SC-73 (SOT223)

11. Soldering

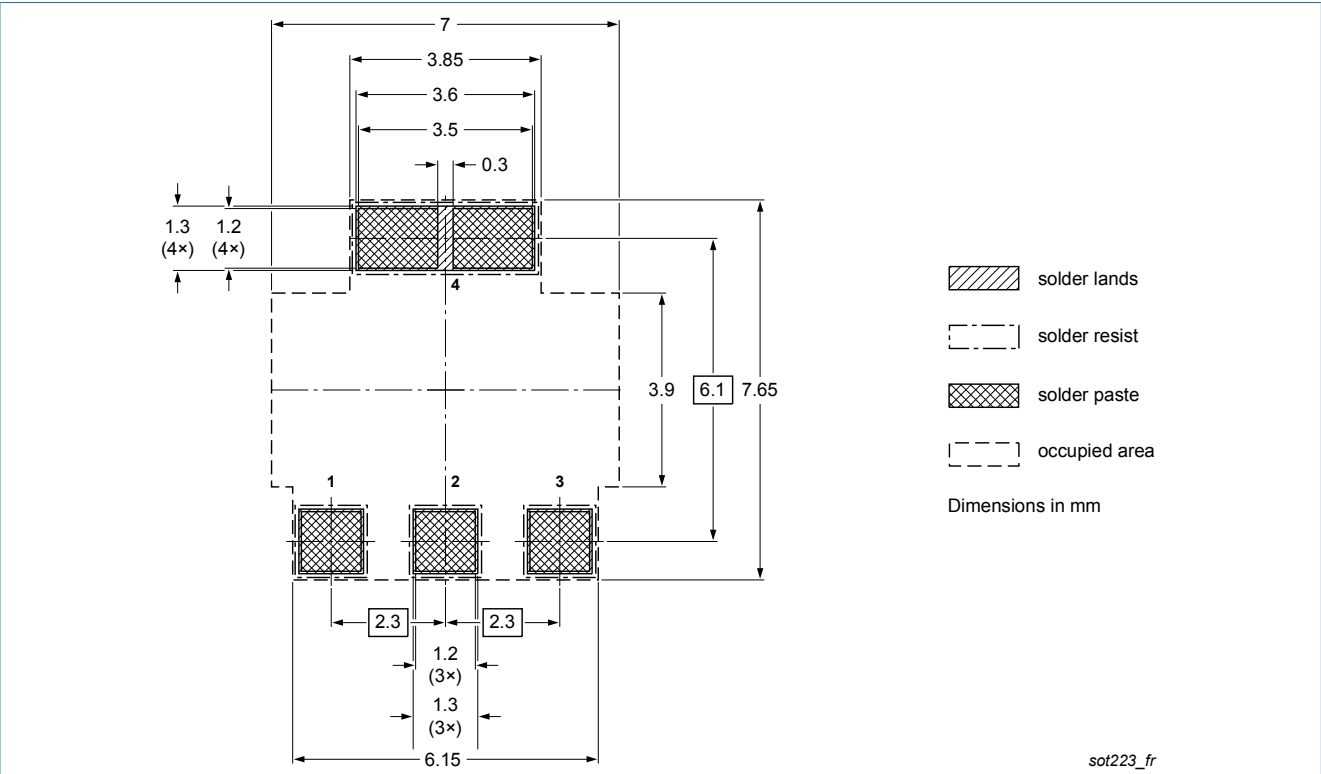


Fig. 15. Reflow soldering footprint for SC-73 (SOT223)

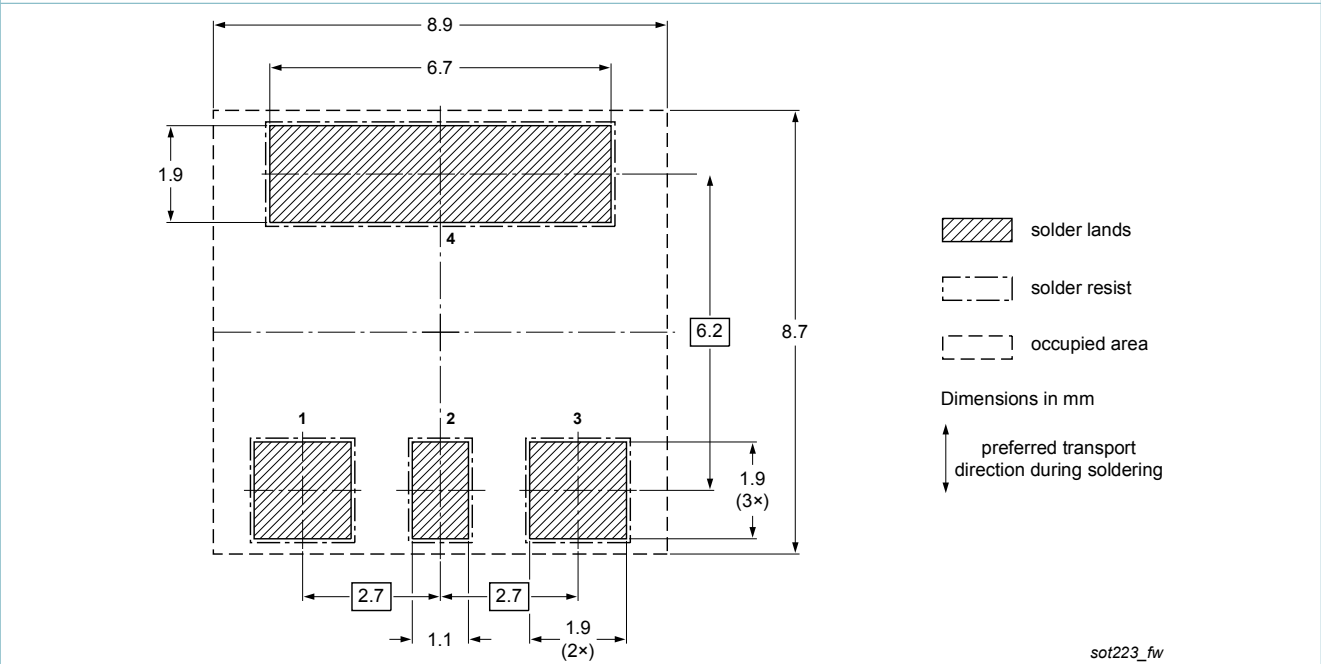


Fig. 16. Wave soldering footprint for SC-73 (SOT223)

12. 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.
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