

# BTA204W-800C

3Q Hi-Com Triac

28 March 2013

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

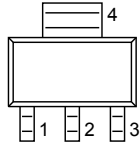
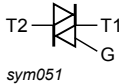
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage		-	-	800	V
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	-	-	10	A



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 108\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	1	A
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 9</a>	-	-	35	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 9</a>	-	-	35	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 9</a>	-	-	35	mA

## 5. Pinning information

Table 2. Pinning information

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

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA204W-800C	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

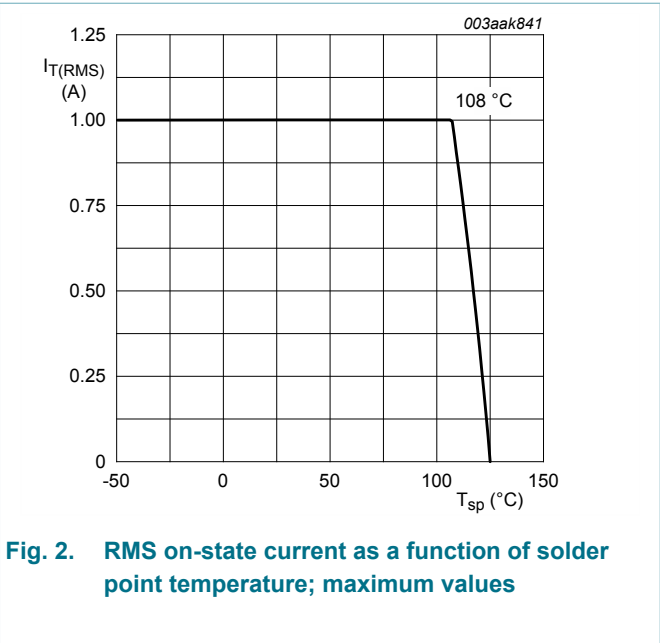
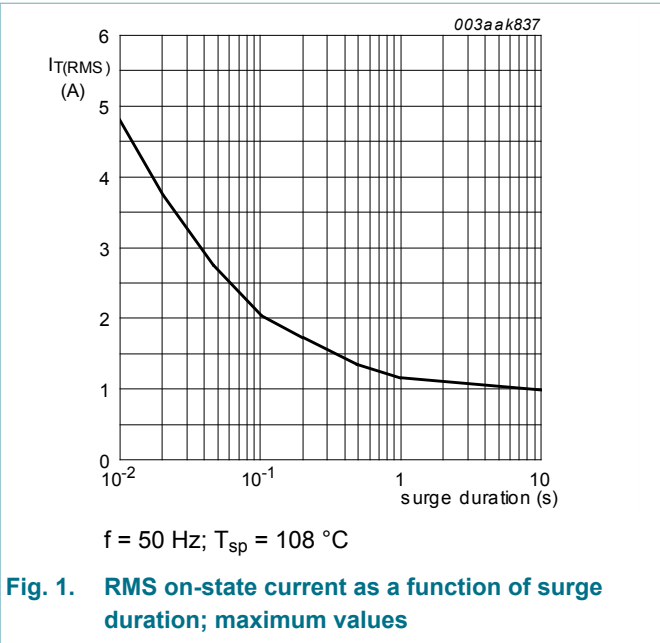
## 7. Limiting values

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		-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 108\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	1	A
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p$ 16.7 ms	-	11	A

Symbol	Parameter	Conditions		Min	Max	Unit
		full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		-	10	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN		-	0.5	$\text{A}^2\text{s}$
$dl_T/dt$	rate of rise of on-state current	$I_T = 1.5\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dl_G/dt = 0.2\text{ A}/\mu\text{s}$		-	100	$\text{A}/\mu\text{s}$
$I_{GM}$	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	$^{\circ}\text{C}$
$T_j$	junction temperature			-	125	$^{\circ}\text{C}$



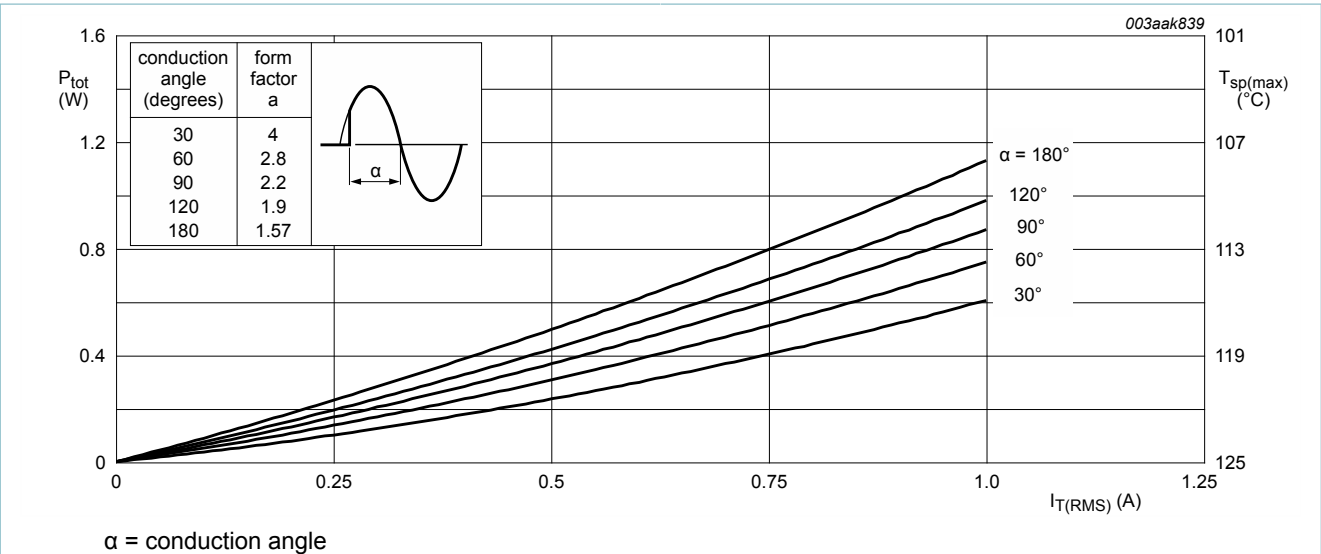


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

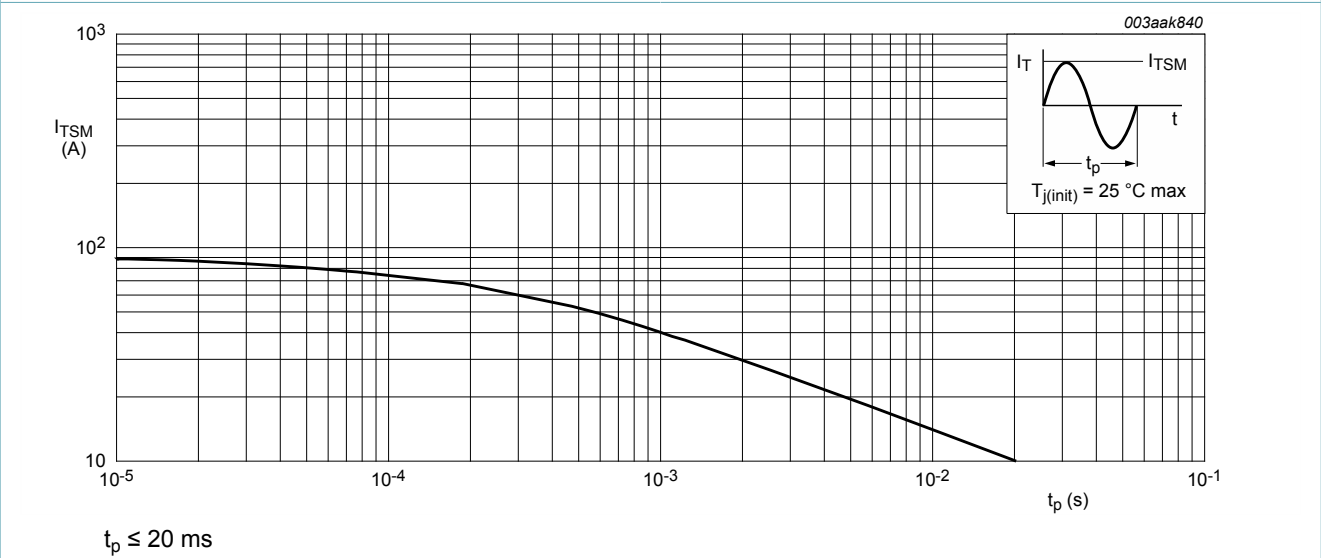
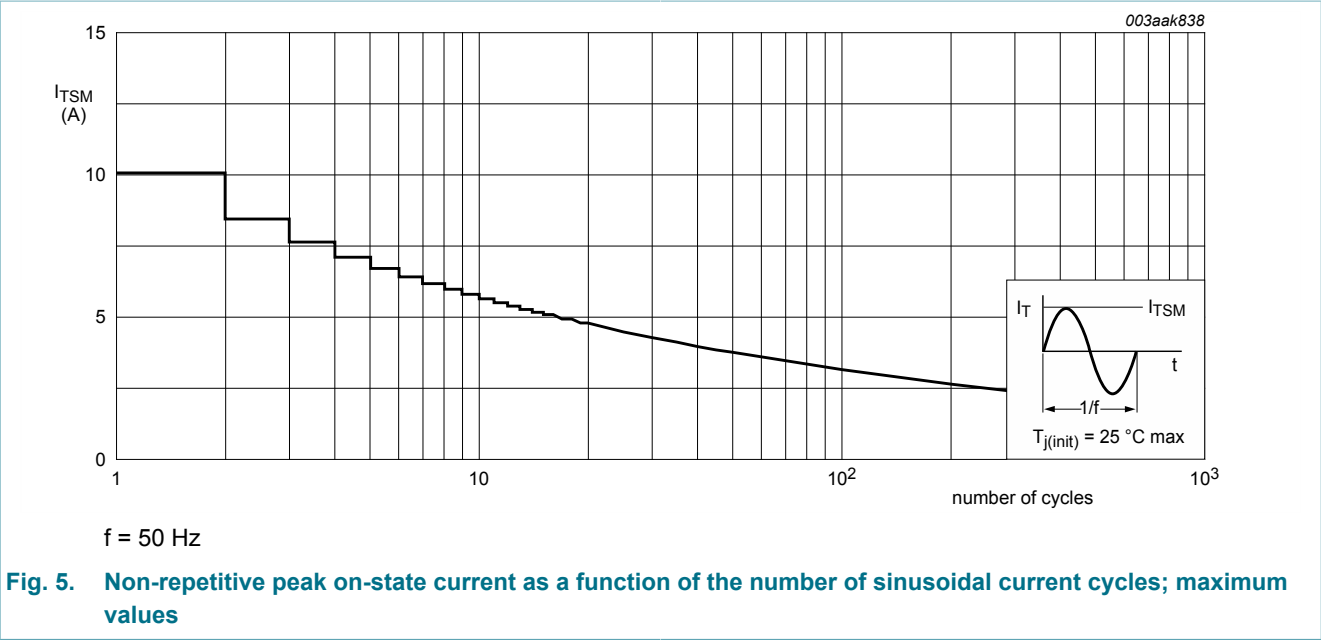


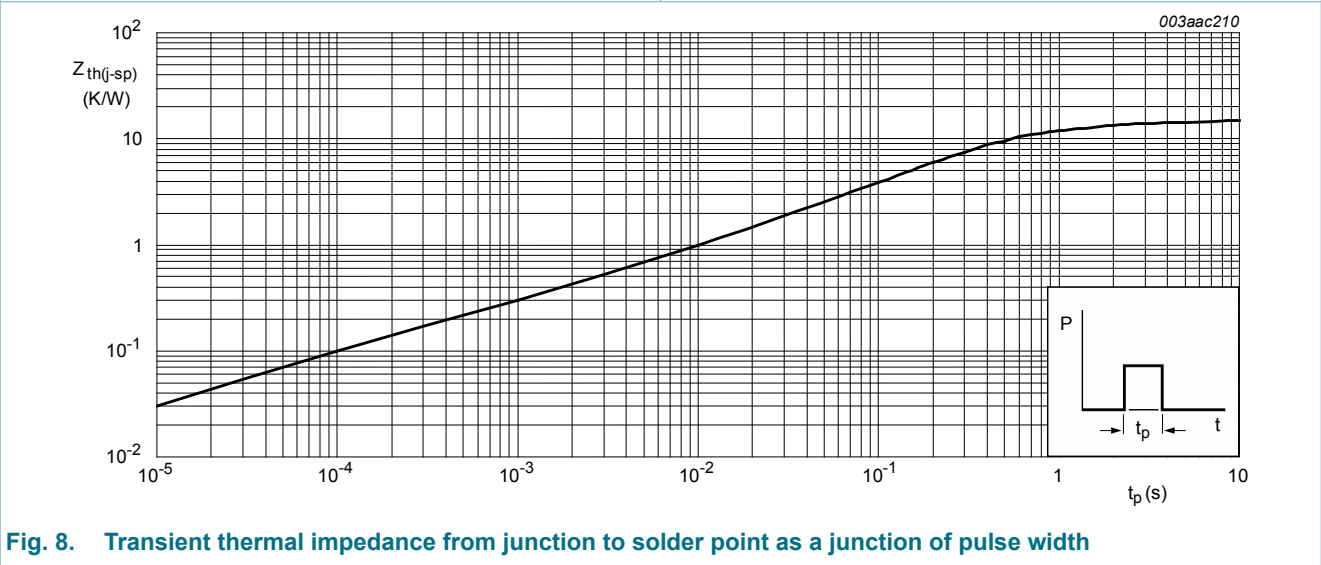
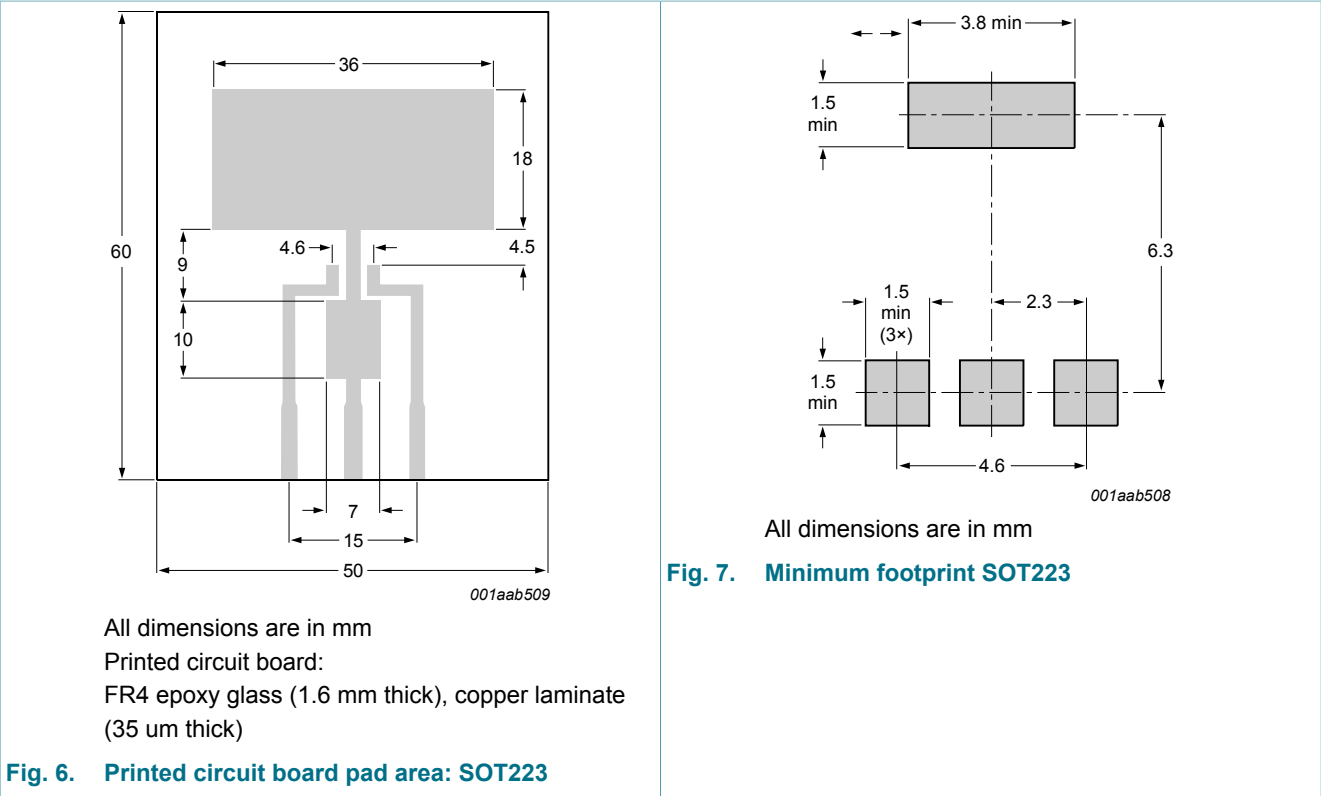
Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values



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 or half cycle; <a href="#">Fig. 8</a>	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; printed circuit board mounted: minimum pad area; <a href="#">Fig. 6</a>	-	70	-	K/W
		in free air; printed circuit board mounted: minimum footprint; <a href="#">Fig. 7</a>	-	156	-	K/W

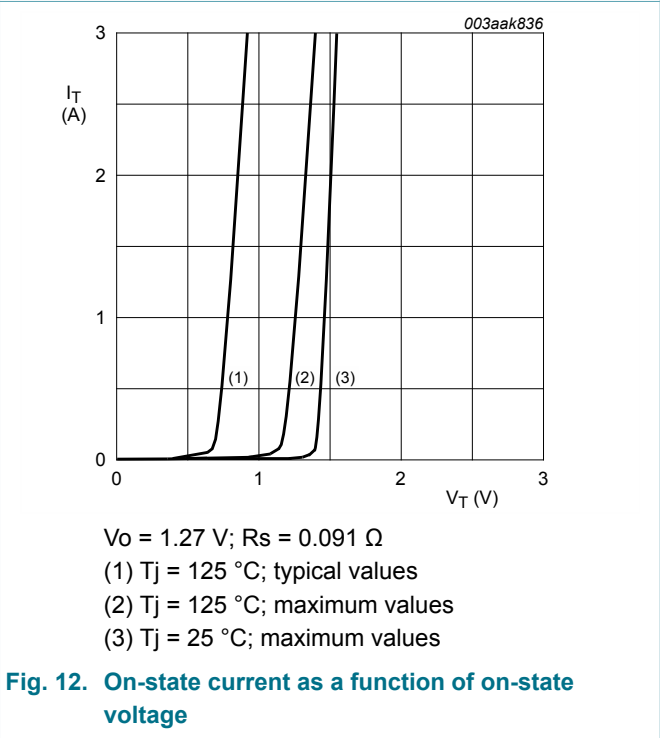
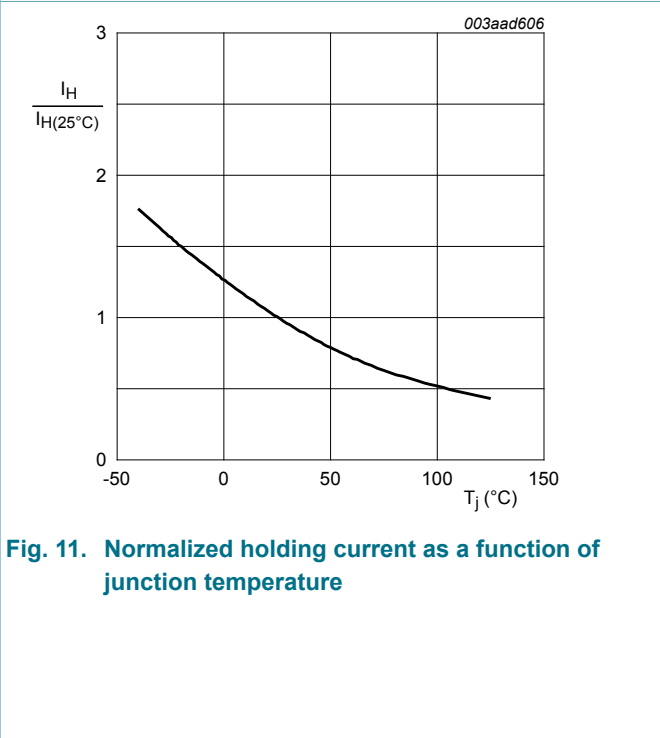
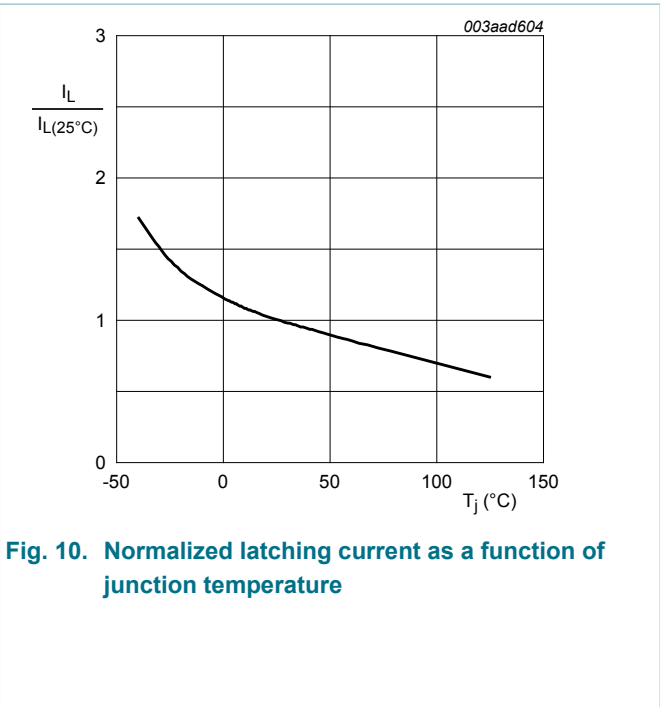
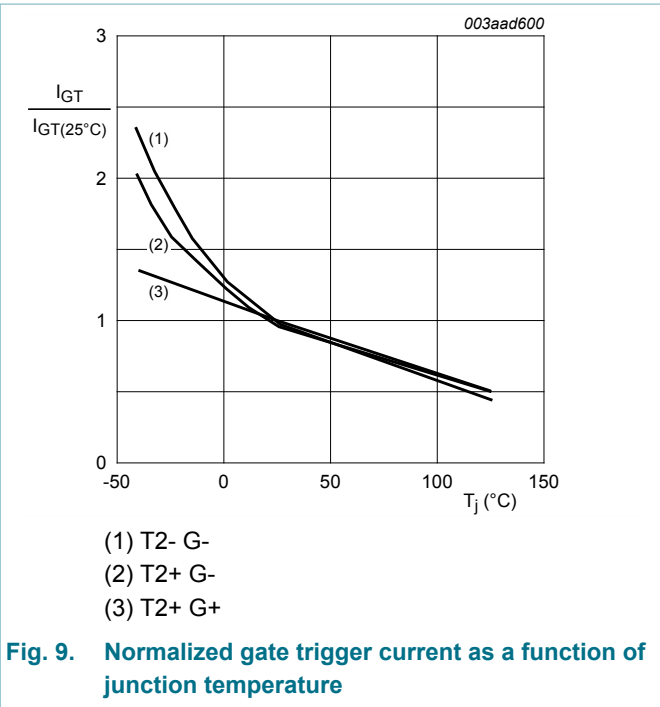


9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_2+ G+$ ; $T_J = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 9</a>	-	-	35	mA

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>		-	-	35	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>		-	-	35	mA
$I_L$	latching current	$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>		-	-	20	mA
		$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>		-	-	30	mA
		$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>		-	-	20	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 11</a>		-	-	20	mA
$V_T$	on-state voltage	$I_T = 2\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 12</a>		-	0.7	1.5	V
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 13</a>		-	0.7	1	V
		$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; <a href="#">Fig. 13</a>		0.25	0.4	-	V
$I_D$	off-state current	$V_D = 800\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$		-	0.1	0.5	mA
<b>Dynamic characteristics</b>							
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; (67% of $V_{DRM}$ ); exponential waveform; gate open circuit		1000	-	-	V/ $\mu\text{s}$
$dI_{com}/dt$	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		3	-	-	A/ms





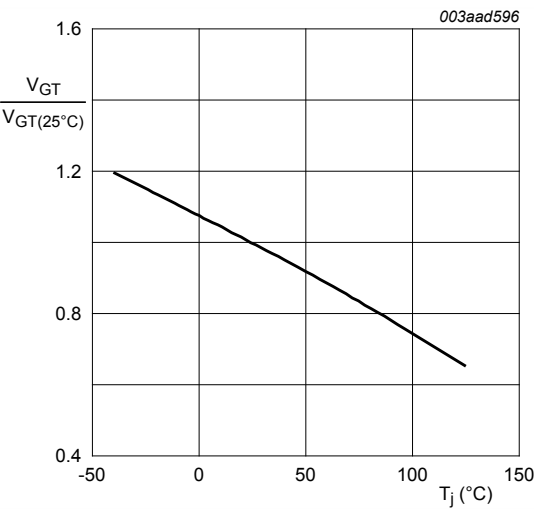


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

10. Package outline

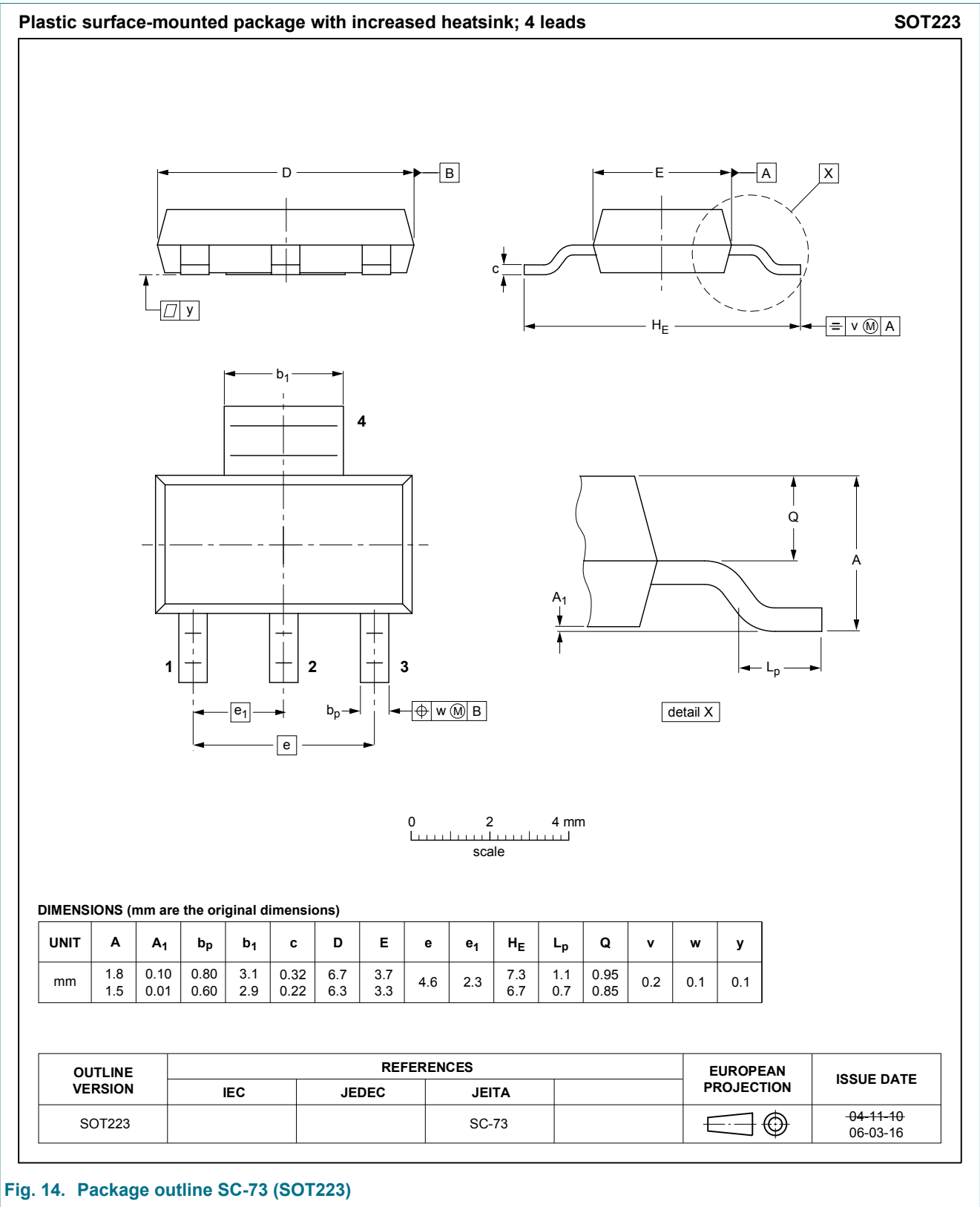


Fig. 14. Package outline SC-73 (SOT223)

11. Soldering

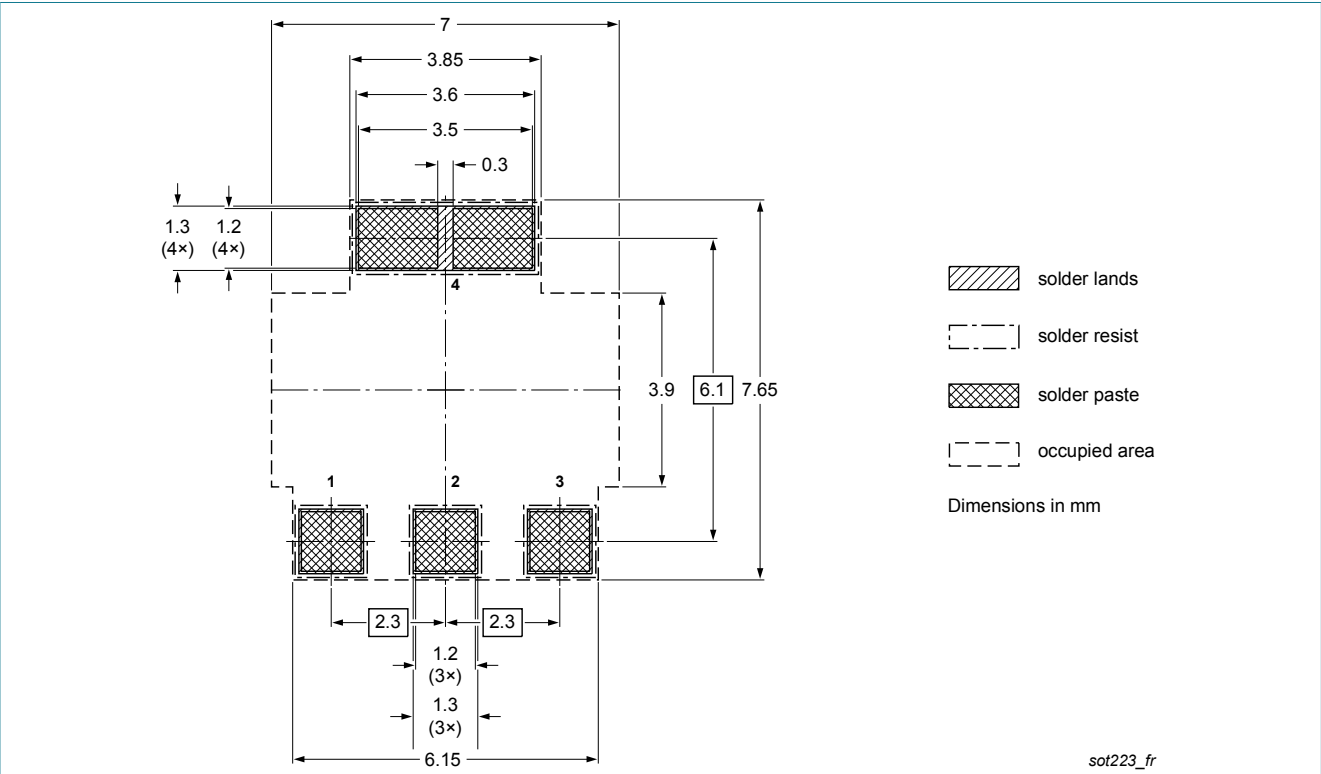


Fig. 15. Reflow soldering footprint for SC-73 (SOT223)

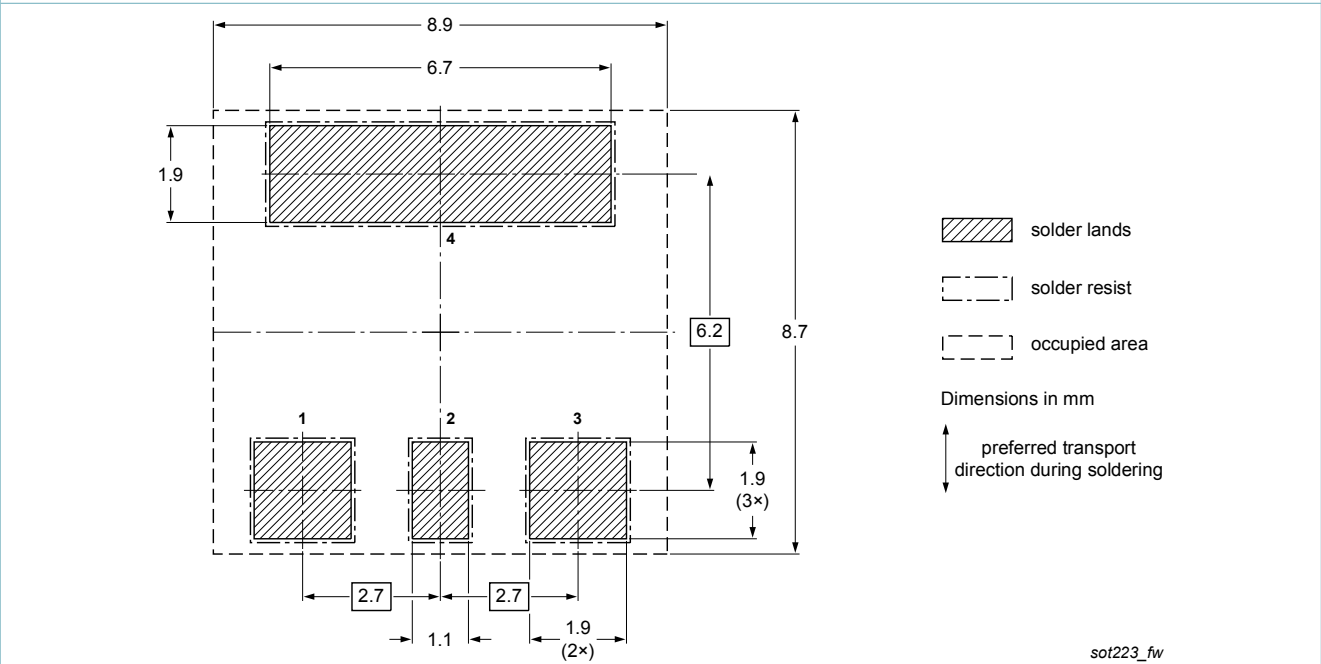


Fig. 16. Wave soldering footprint for SC-73 (SOT223)

## 12. Legal information

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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