

## 1. General description

Planar passivated four quadrant triac in a SOT223 surface-mountable plastic package intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance.

## 2. Features and benefits

- High blocking voltage capability
- Planar passivated for voltage ruggedness and reliability
- Surface-mountable package
- Triggering in all four quadrants
- Very sensitive gate

## 3. Applications

- General purpose low power motor control
- General purpose switching and phase control

## 4. Quick reference data

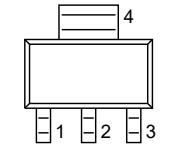
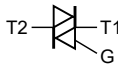
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage		-	-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 110\text{ °C}$ ; <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; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	-	-	12.5	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 16.7\text{ ms}$	-	-	13.8	A
$T_j$	junction temperature		-	-	125	°C
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	0.4	3	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	1.3	3	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	1.4	3	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	3.8	7	mA

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I <sub>H</sub>	holding current	V <sub>D</sub> = 12 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 11</a>		-	1.3	5	mA
V <sub>T</sub>	on-state voltage	I <sub>T</sub> = 1.4 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 12</a>		-	1.2	1.5	V
Dynamic characteristics							
dV <sub>D</sub> /dt	rate of rise of off-state voltage	V <sub>DM</sub> = 402 V; T <sub>j</sub> = 125 °C; (V <sub>DM</sub> = 67% of V <sub>DRM</sub> ); exponential waveform; R <sub>GT1(ext)</sub> = 1 kΩ; <a href="#">Fig. 14</a>		10	20	-	V/μs
dV <sub>com</sub> /dt	rate of change of commutating voltage	V <sub>D</sub> = 400 V; T <sub>j</sub> = 125 °C; dI <sub>com</sub> /dt = 0.5 A/ms; I <sub>T</sub> = 1 A; gate open circuit		2	-	-	V/μs

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	T2	mainterminal 2		

6. Ordering information

Table 3. Ordering information

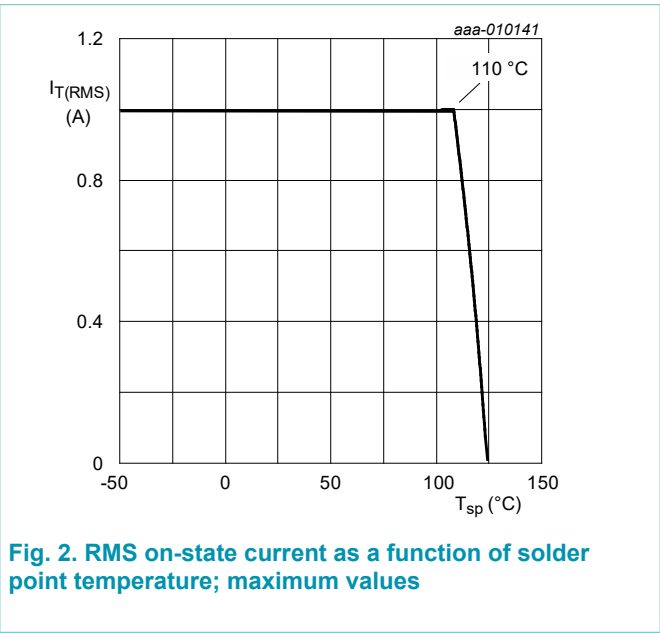
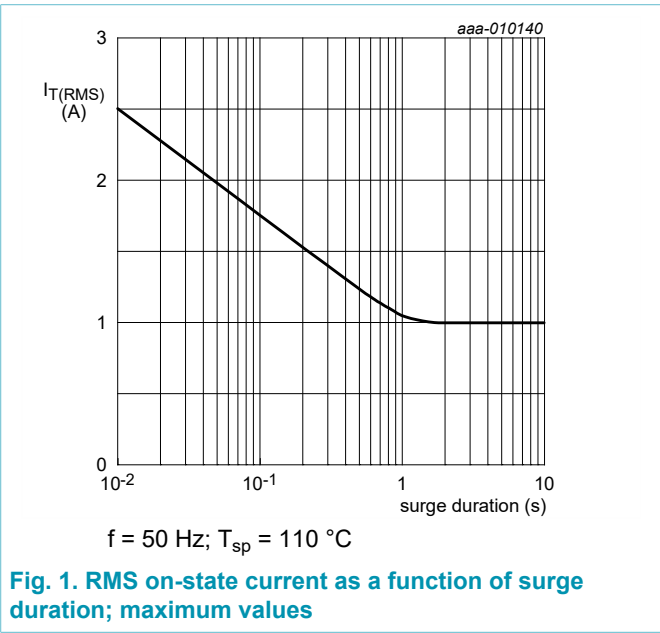
Type number	Package		
	Name	Description	Version
BT131W-600	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

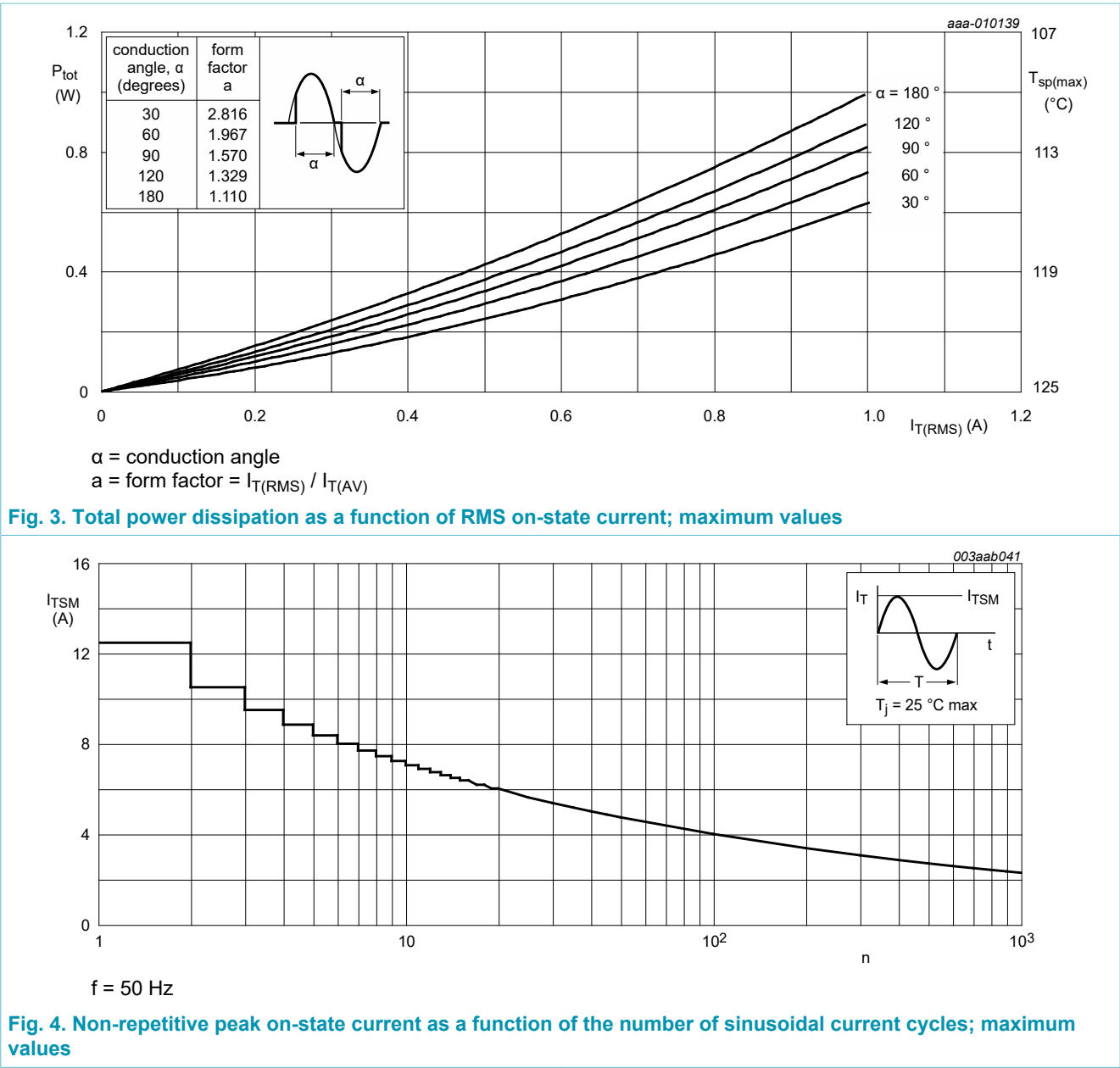
7. Limiting values

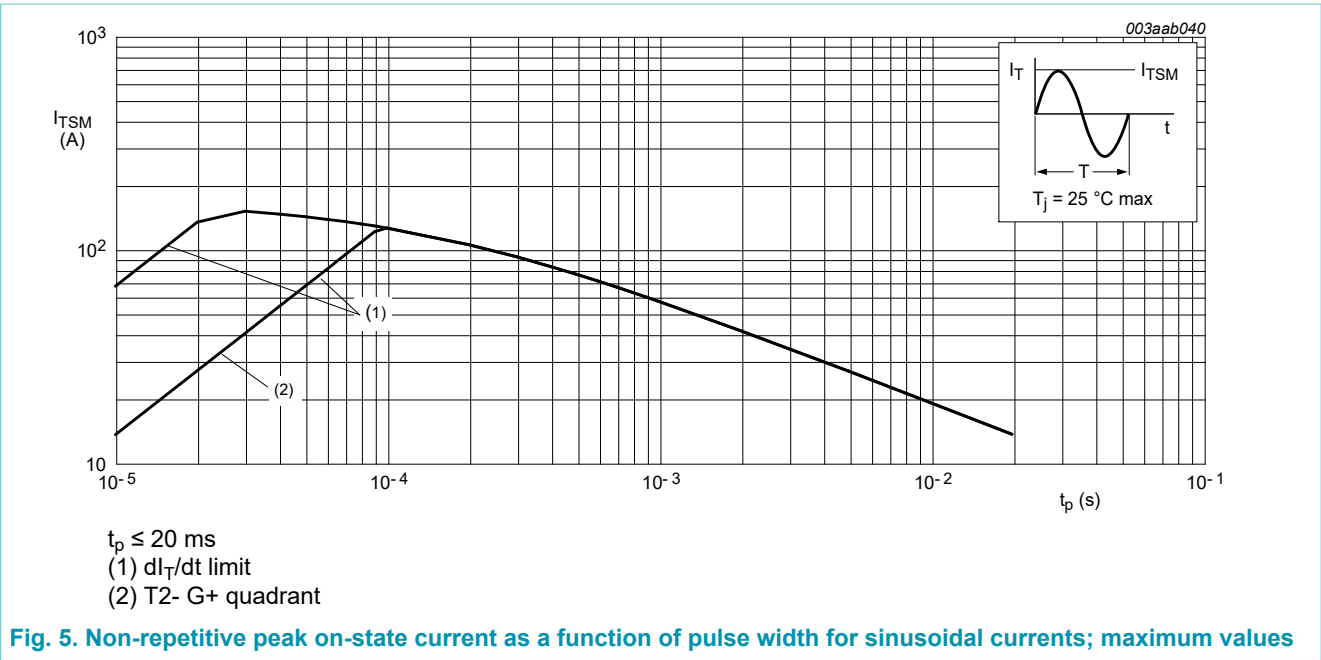
Table 4. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
$V_{\text{DRM}}$	repetitive peak off-state voltage [1]			-	600	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 110\text{ }^{\circ}\text{C}$ ; Fig. 1; Fig. 2; Fig. 3		-	1	A
$I_{\text{TSM}}$	non-repetitive peak on-state current	full sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$ ; $t_{\text{p}} = 20\text{ ms}$ ; Fig. 4; Fig. 5		-	12.5	A
		full sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$ ; $t_{\text{p}} = 16.7\text{ ms}$		-	13.8	A
$I^2t$	$I^2t$ for fusing	$t_{\text{p}} = 10\text{ ms}$ ; SIN		-	0.78	$\text{A}^2\text{s}$
$di_{\text{T}}/dt$	rate of rise of on-state current	$I_{\text{G}} = 6\text{ mA}$		-	50	$\text{A}/\mu\text{s}$
				-	50	$\text{A}/\mu\text{s}$
		$I_{\text{G}} = 14\text{ mA}$		-	10	$\text{A}/\mu\text{s}$
		$I_{\text{G}} = 6\text{ mA}$		-	50	$\text{A}/\mu\text{s}$
$I_{\text{GM}}$	peak gate current			-	2	A
$P_{\text{GM}}$	peak gate power			-	5	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period		-	0.5	W
$T_{\text{stg}}$	storage temperature			-40	150	$^{\circ}\text{C}$
$T_{\text{j}}$	junction temperature			-	125	$^{\circ}\text{C}$

[1] Although not recommended, off-state voltage up to  $V_{\text{DRM}}$  may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed  $3\text{ A}/\mu\text{s}$ .



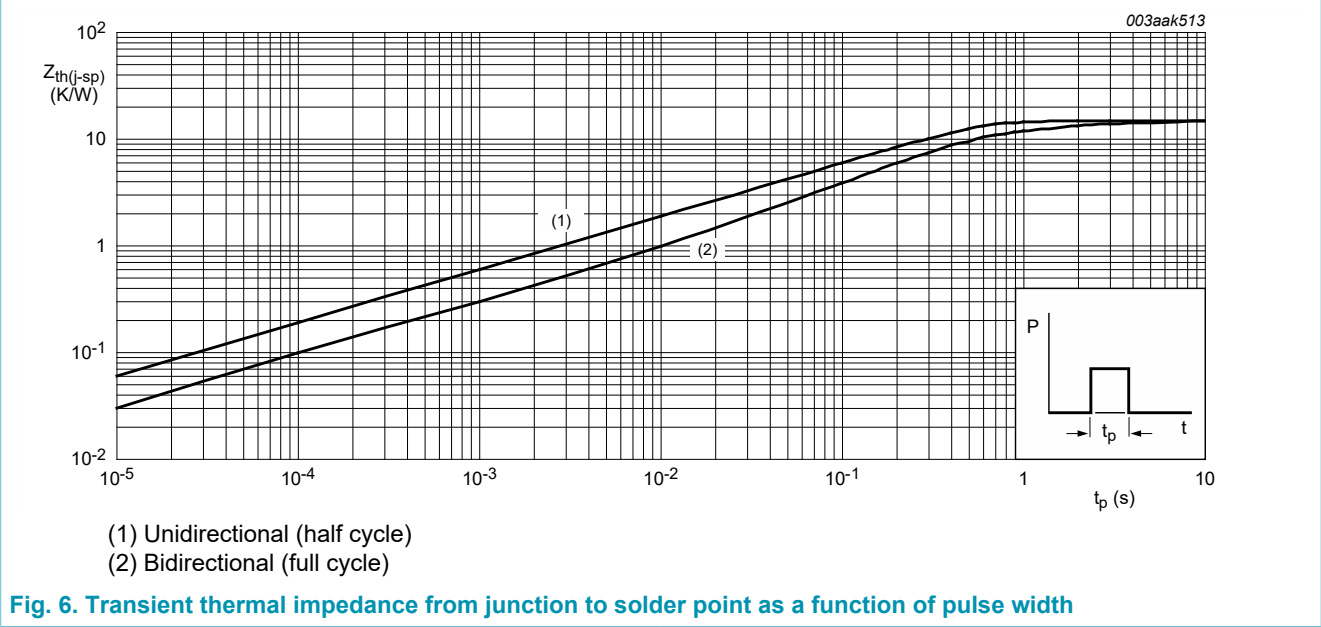


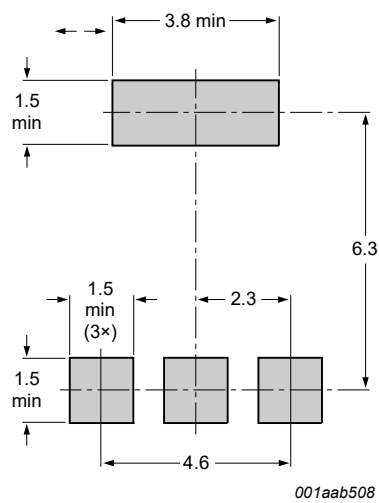


## 8. Thermal characteristics

Table 5. Thermal characteristics

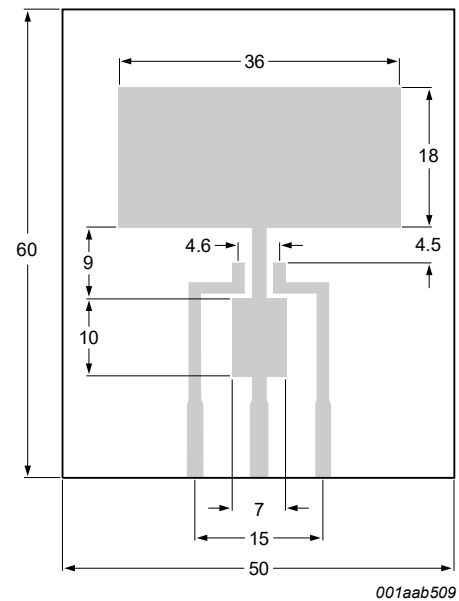
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	full cycle; Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air; printed circuit board mounted; minimum footprint; Fig. 7	-	156	-	K/W
		in free air;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





All dimensions are in mm

Fig. 7. Minimum footprint SOT223



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

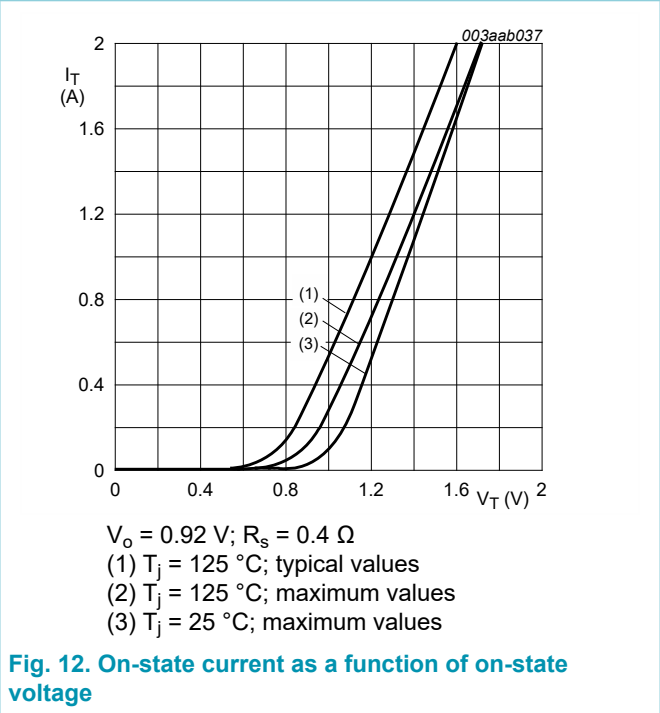
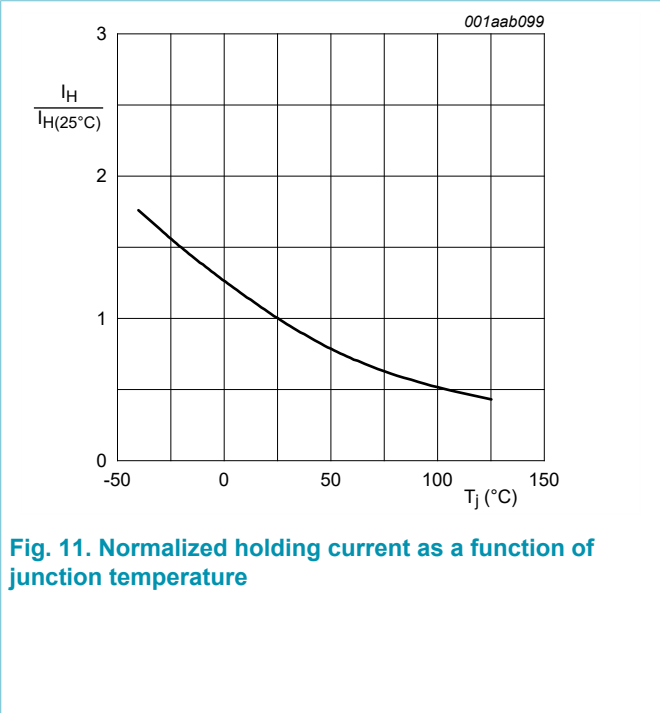
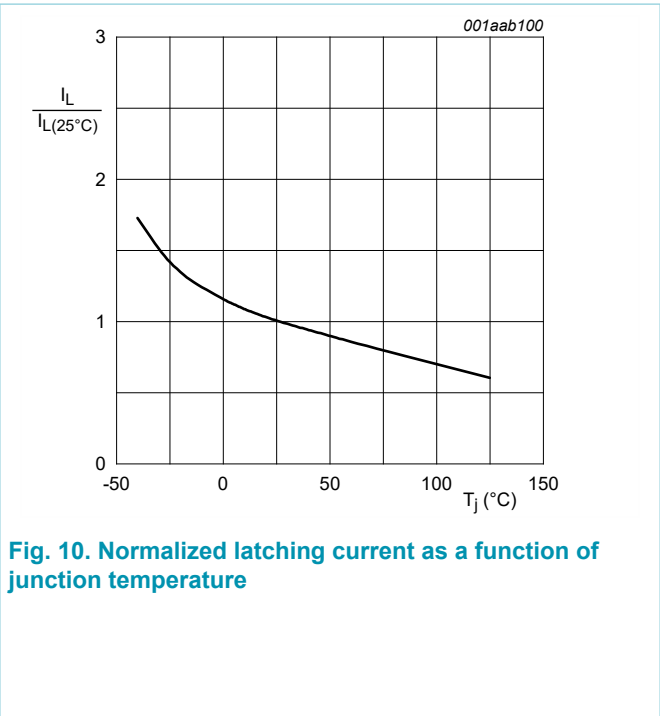
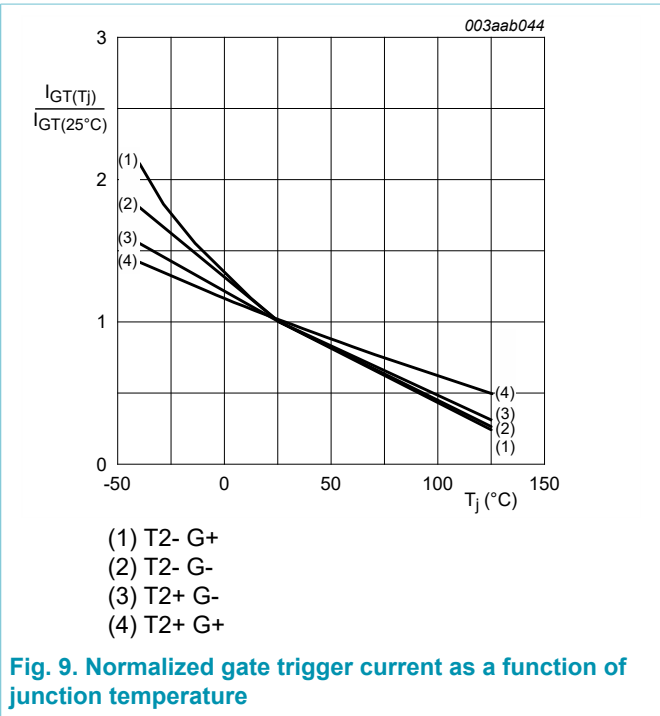
Fig. 8. Printed circuit board pad area: SOT223

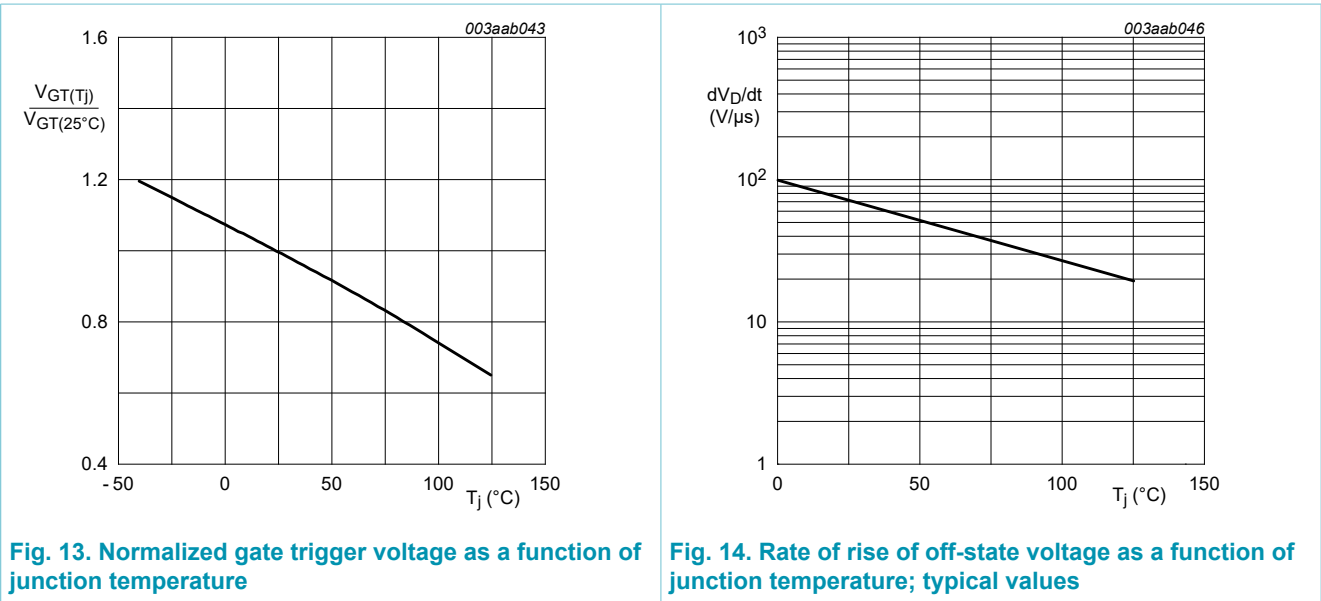
## 9. Characteristics

Table 6. Characteristics

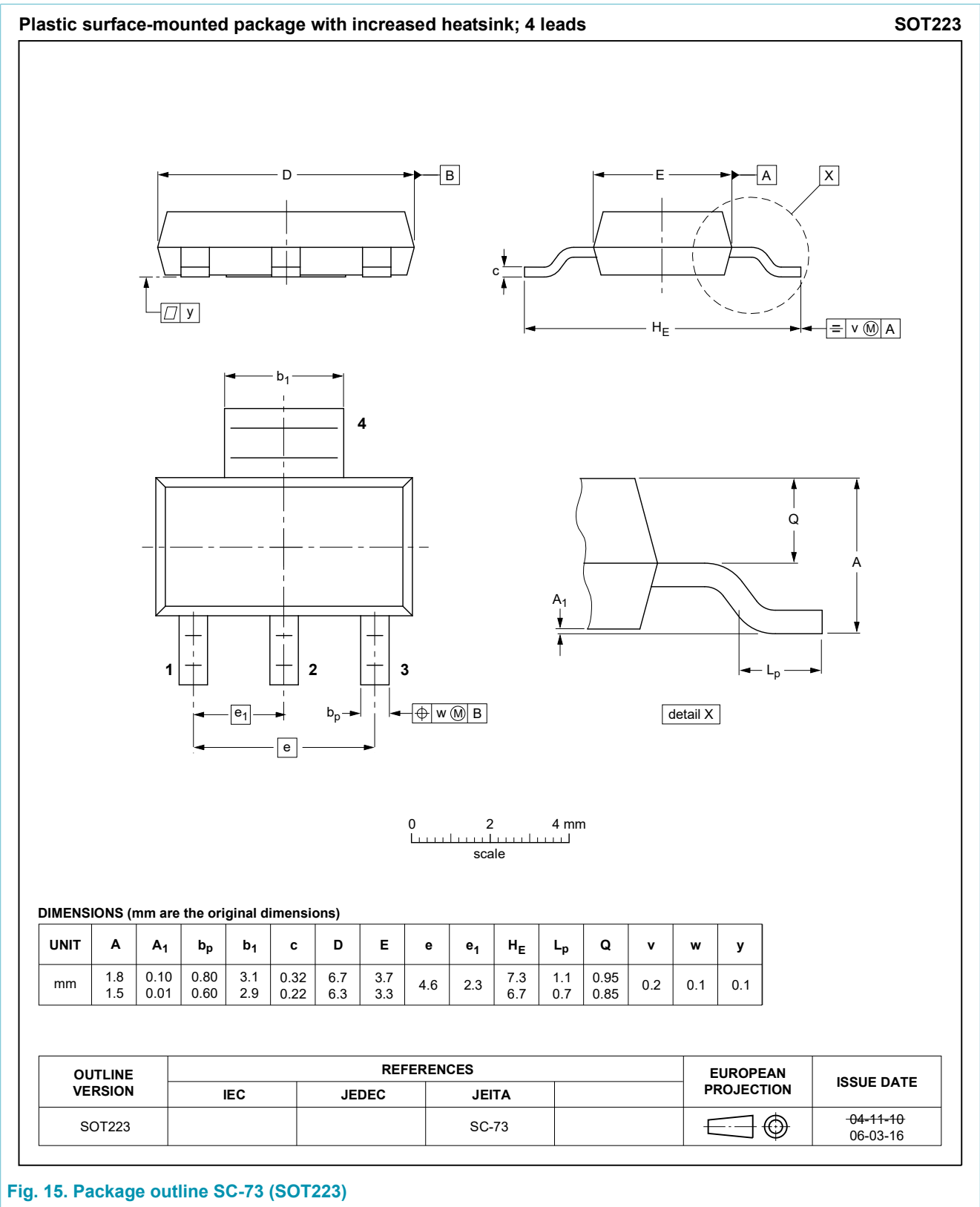
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>	-	0.4	3	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>	-	1.3	3	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>	-	1.4	3	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>	-	3.8	7	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>	-	1.2	5	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>	-	4	8	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>	-	1	5	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>	-	2.5	8	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 11</a>	-	1.3	5	mA
$V_T$	on-state voltage	$I_T = 1.4\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 12</a>	-	1.2	1.5	V
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <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>	0.2	0.3	-	V
$I_D$	off-state current	$V_D = 600\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$	-	0.1	0.5	mA
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; $R_{GT1(ext)} = 1\text{ k}\Omega$ ; <a href="#">Fig. 14</a>	10	20	-	V/ $\mu\text{s}$
$dV_{com}/dt$	rate of change of commutating voltage	$V_D = 400\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; $dI_{com}/dt = 0.5\text{ A/ms}$ ; $I_T = 1\text{ A}$ ; gate open circuit	2	-	-	V/ $\mu\text{s}$
$t_{gt}$	gate-controlled turn-on time	$I_{TM} = 1.5\text{ A}$ ; $V_D = 600\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	$\mu\text{s}$



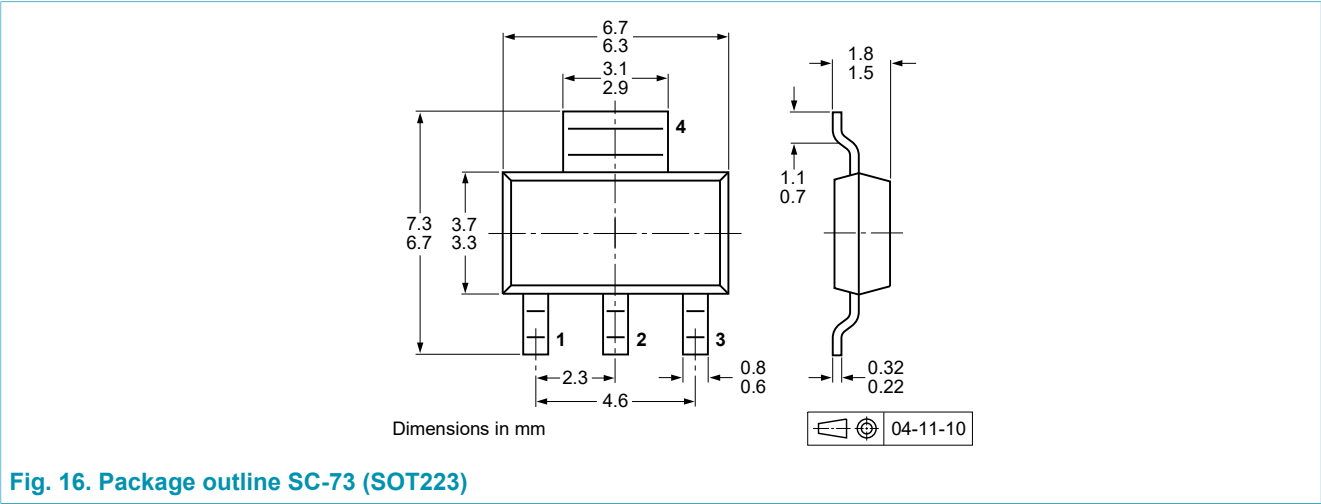




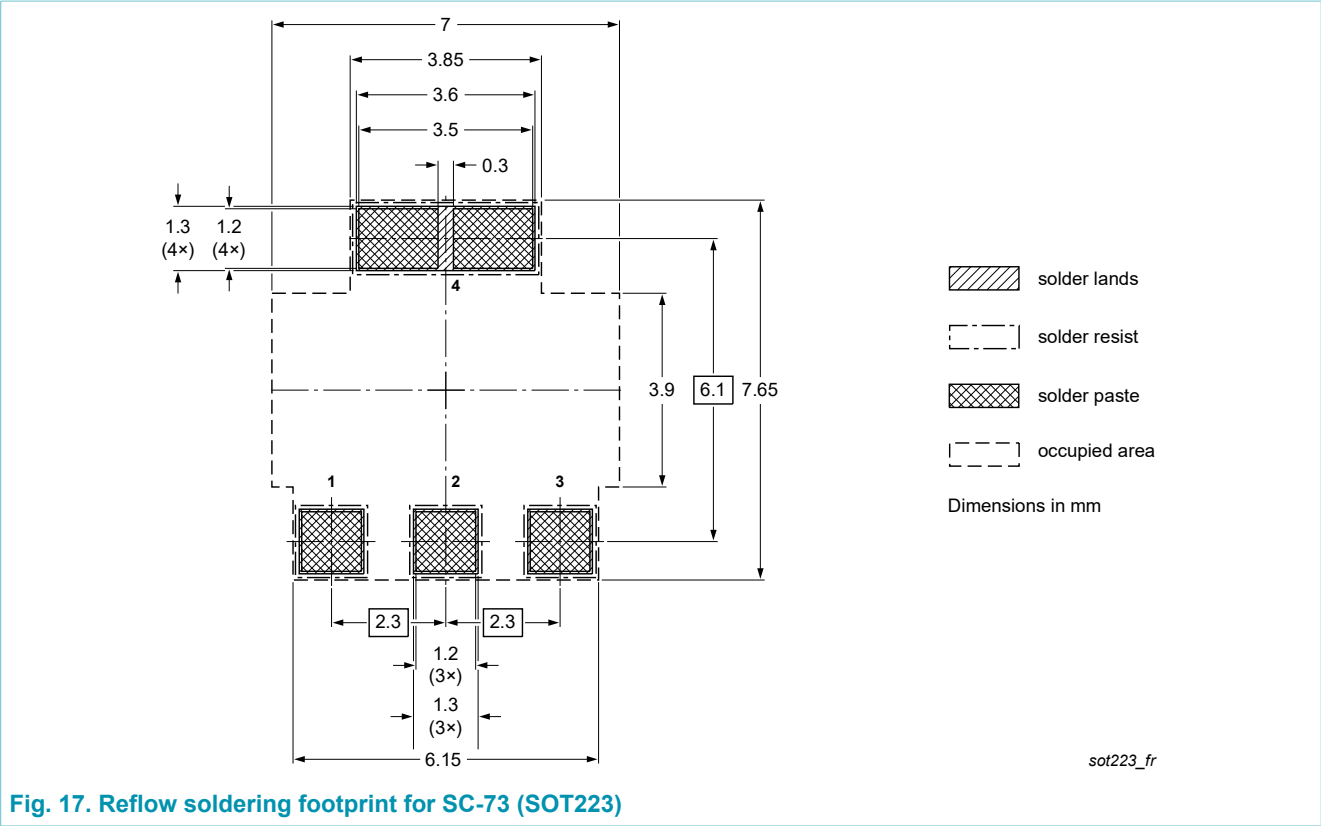
10. Package outline



11. Package outline (minimized)



12. Soldering



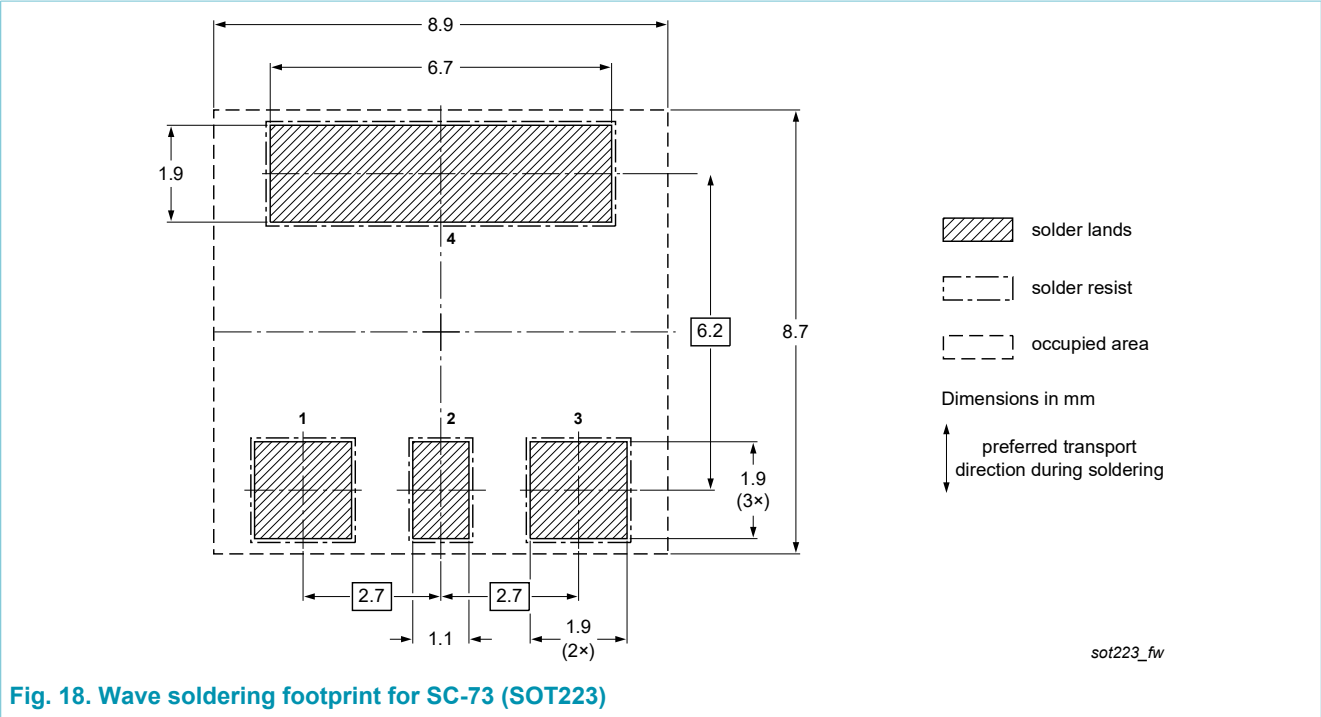


Fig. 18. Wave soldering footprint for SC-73 (SOT223)

## 13. Legal information

### 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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