



BT148W-600R

SCR

2 December 2014

Product data sheet

1. General description

Planar passivated SCR with sensitive gate in a SOT223 (SC-73) surface mountable plastic package. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

2. Features and benefits

- Sensitive gate
- Planar passivated for voltage ruggedness and reliability
- Direct triggering from low power drivers and logic ICs
- Surface mountable package

3. Applications

- Adapters
- Battery powered applications
- Industrial automation

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		[1]	-	-	600	V
V_{RRM}	repetitive peak reverse voltage			-	-	600	V
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 10\text{ ms}$; Fig. 4; Fig. 5		-	-	10	A
$I_{\text{T(AV)}}$	average on-state current	half sine wave; $T_{\text{sp}} \leq 112\text{ }^{\circ}\text{C}$; Fig. 1		-	-	0.6	A
$I_{\text{T(RMS)}}$	RMS on-state current	half sine wave; $T_{\text{sp}} \leq 112\text{ }^{\circ}\text{C}$; Fig. 2; Fig. 3		-	-	1	A
Static characteristics							
I_{GT}	gate trigger current	$V_{\text{D}} = 12\text{ V}$; $I_{\text{T}} = 0.1\text{ A}$; $T_{\text{j}} = 25\text{ }^{\circ}\text{C}$; Fig. 9		-	50	200	μA

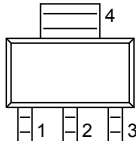

[1] Although not recommended, off-state voltages up to 800 V may be applied without damage, but the thyristor may switch to the on-state.



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5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-73 (SOT223)	
2	A	anode		
3	G	gate		
4	mb	mb; connected to anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BT148W-600R	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
BT148W-600R	BT148W 60

8. Limiting values

Table 5. 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		[1]	-	600	V
V_{RRM}	repetitive peak reverse voltage			-	600	V
$I_{\text{T(AV)}}$	average on-state current	half sine wave; $T_{\text{sp}} \leq 112\text{ }^{\circ}\text{C}$; Fig. 1		-	0.6	A
$I_{\text{T(RMS)}}$	RMS on-state current	half sine wave; $T_{\text{sp}} \leq 112\text{ }^{\circ}\text{C}$; Fig. 2 ; Fig. 3		-	1	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{\text{J(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 10\text{ ms}$; Fig. 4 ; Fig. 5		-	10	A
		half sine wave; $T_{\text{J(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 8.3\text{ ms}$		-	11	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$; SIN		-	0.5	A^2s
di_{T}/dt	rate of rise of on-state current	$I_{\text{G}} = 400\text{ }\mu\text{A}$		-	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			-	1	A
V_{RGM}	peak reverse gate voltage			-	5	V
P_{GM}	peak gate power			-	1.2	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period		-	0.12	W
T_{stg}	storage temperature			-40	150	$^{\circ}\text{C}$
T_{j}	junction temperature		[2]	-	125	$^{\circ}\text{C}$

[1] Although not recommended, off-state voltages up to 800 V may be applied without damage, but the thyristor may switch to the on-state.

[2] Operation above 110 $^{\circ}\text{C}$ may require the use of a gate to cathode resistor of 1k Ω or less.

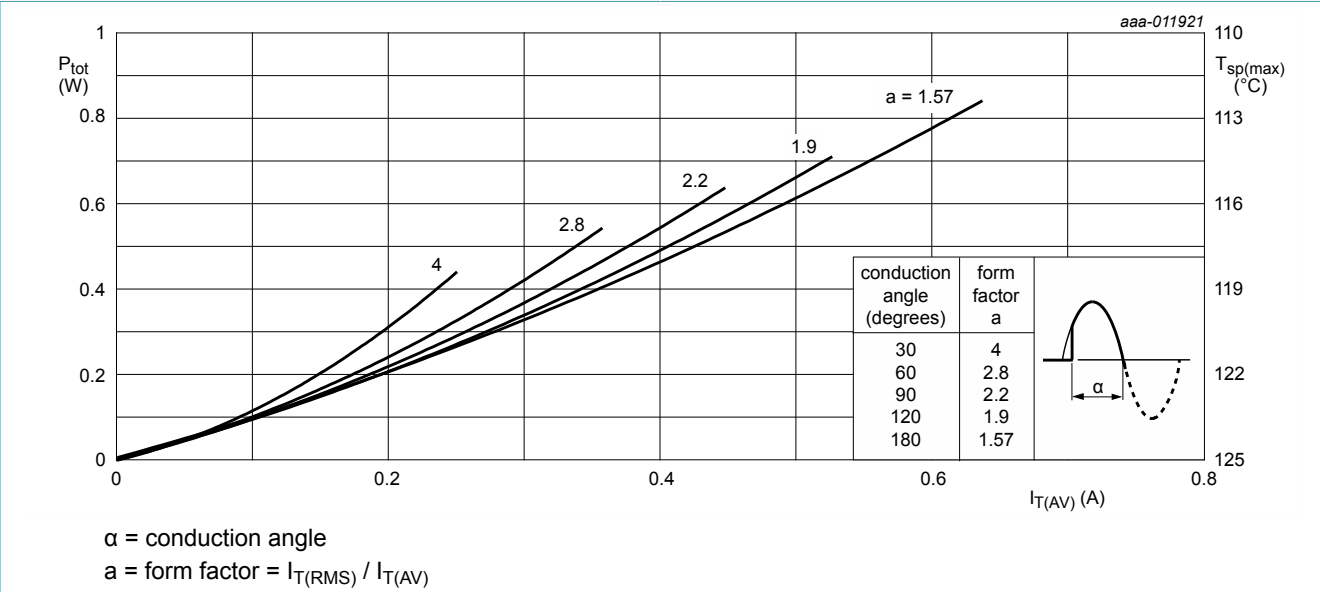


Fig. 1. Total power dissipation as a function of average on-state current; maximum values

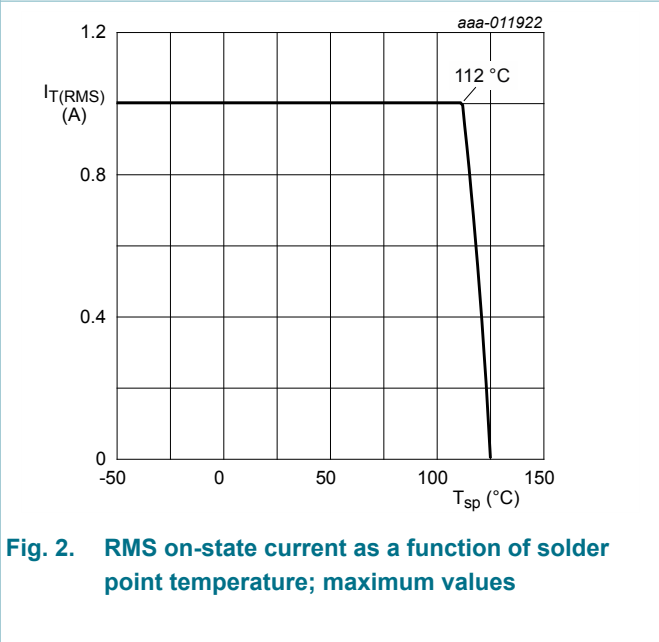


Fig. 2. RMS on-state current as a function of solder point temperature; maximum values

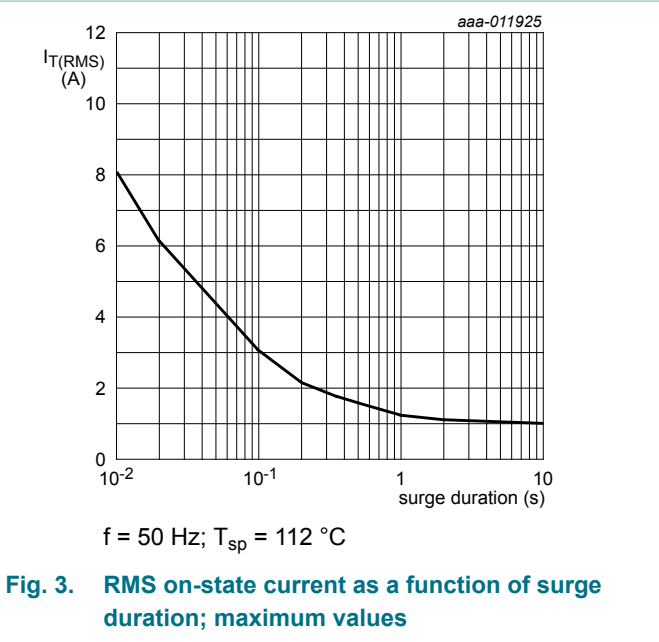


Fig. 3. RMS on-state current as a function of surge duration; maximum values

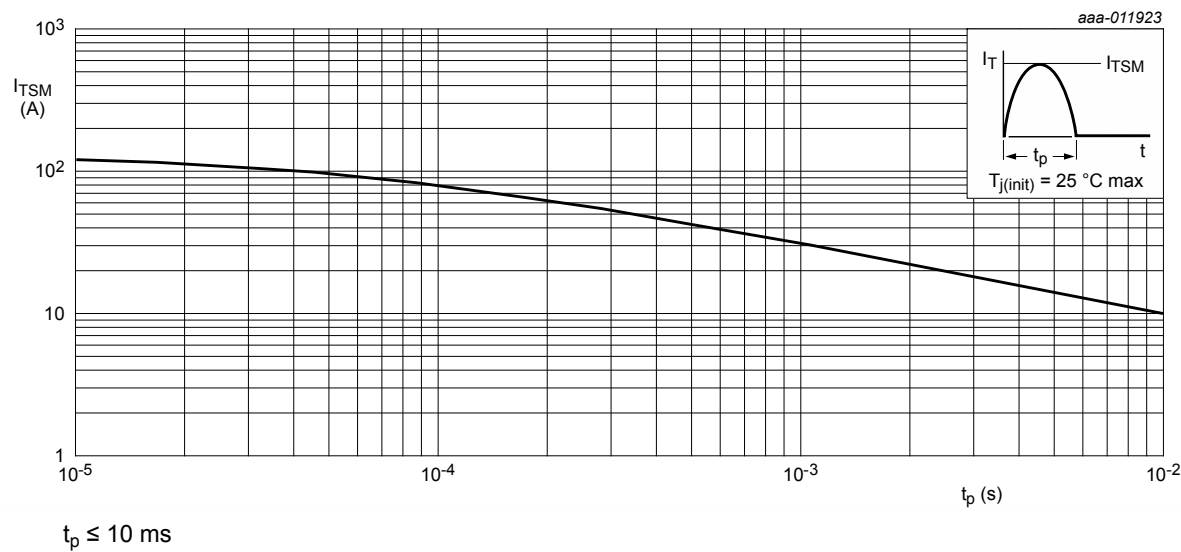


Fig. 4. Non-repetitive peak on-state current as a function of pulse width for sinusoidal currents; maximum values

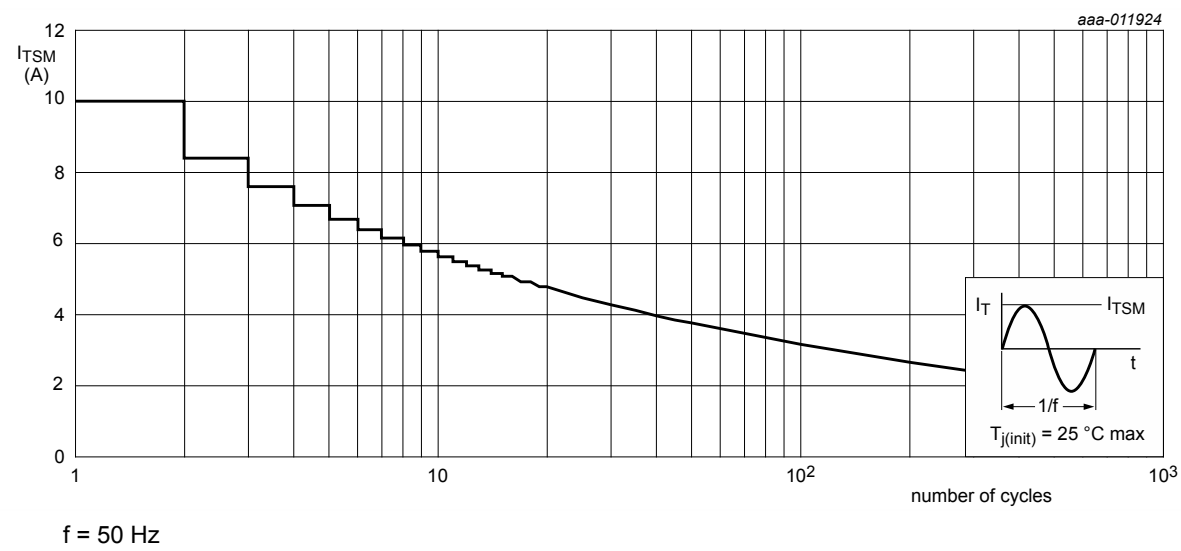
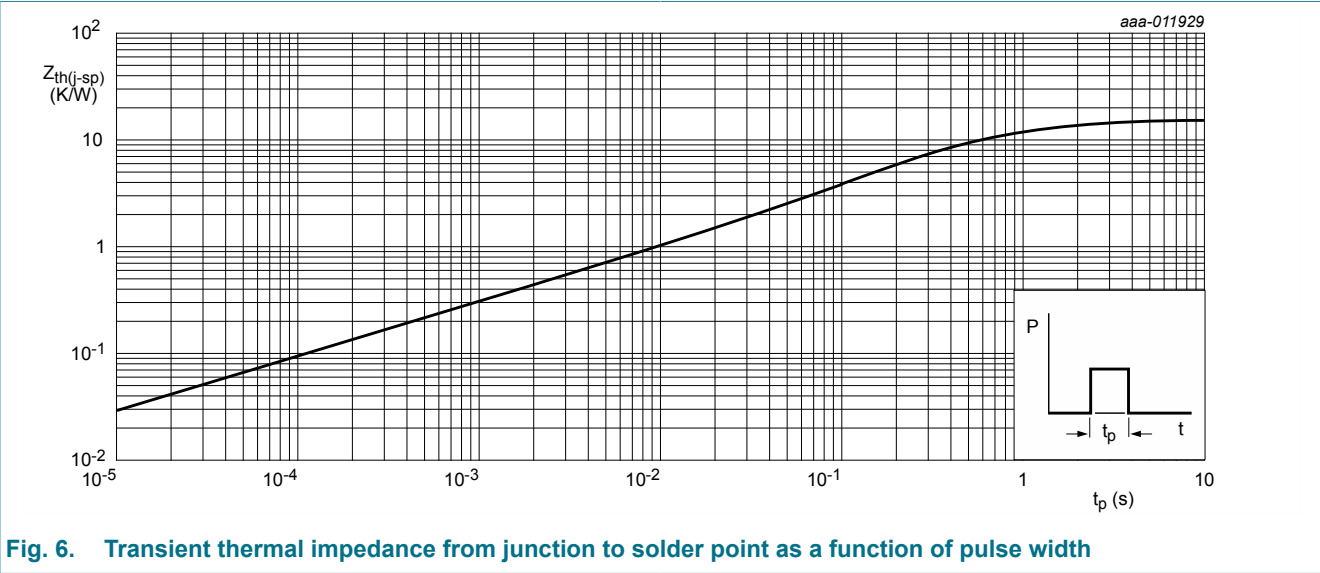


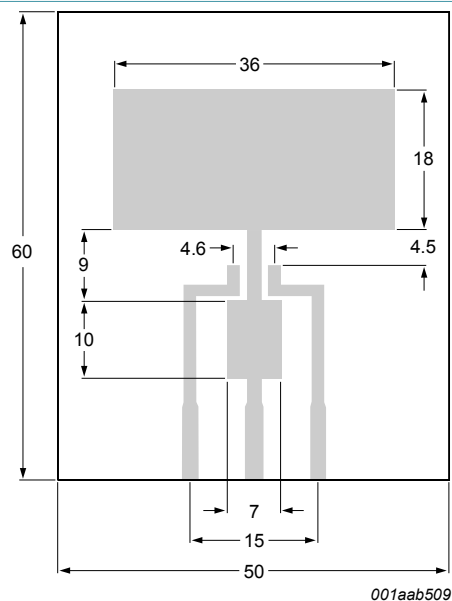
Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

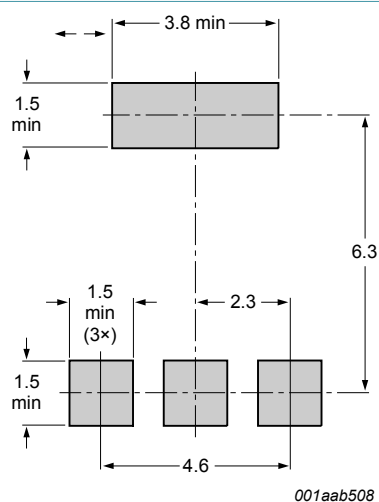
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	printed circuit board mounted; pad area; Fig. 7	-	70	-	K/W
		printed circuit board mounted; minimum footprint; Fig.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





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

Fig. 7. Printed circuit board pad area: SOT223



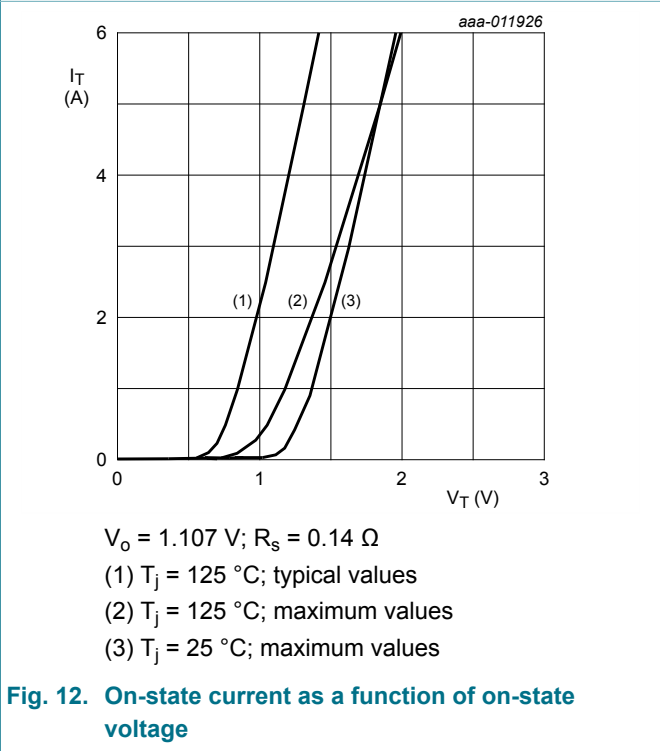
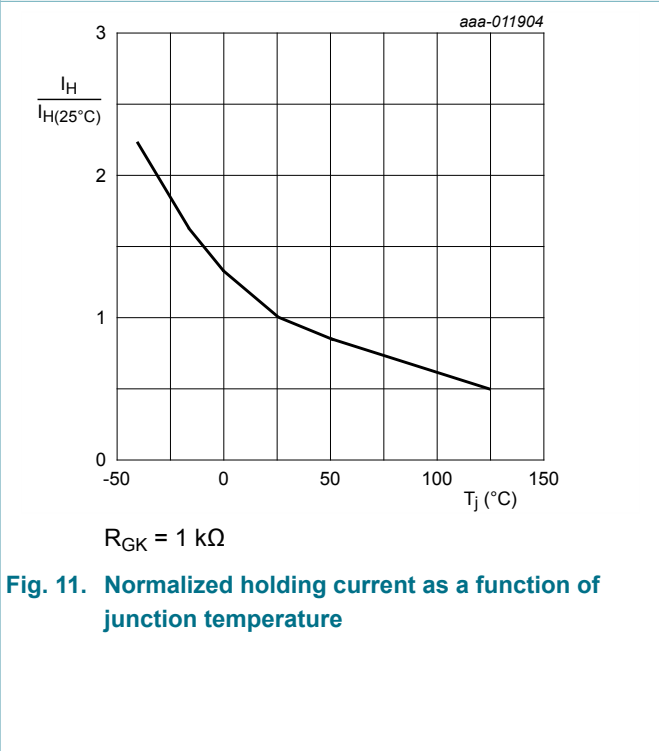
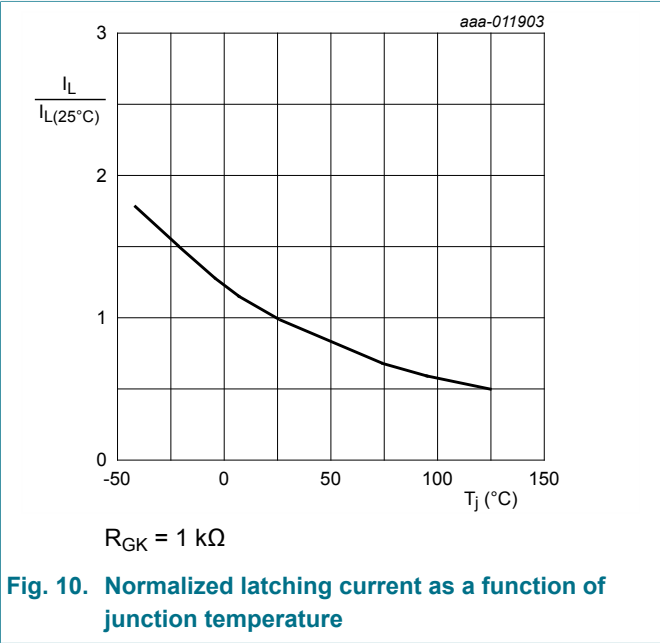
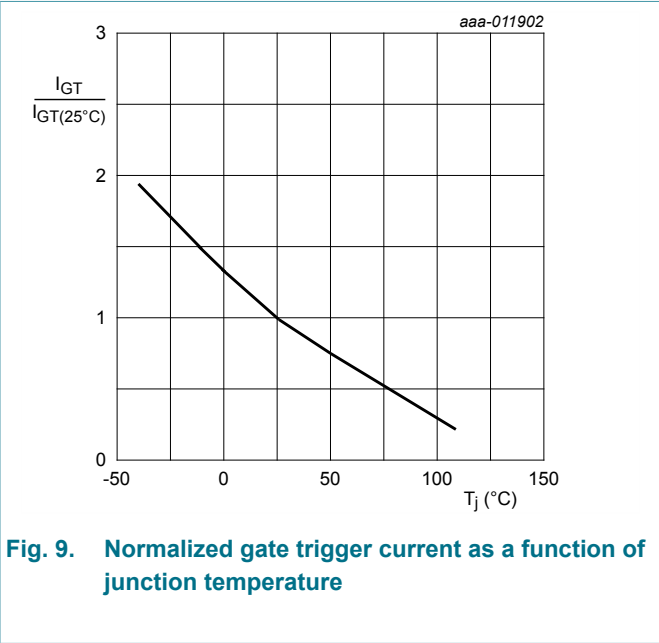
All dimensions are in mm

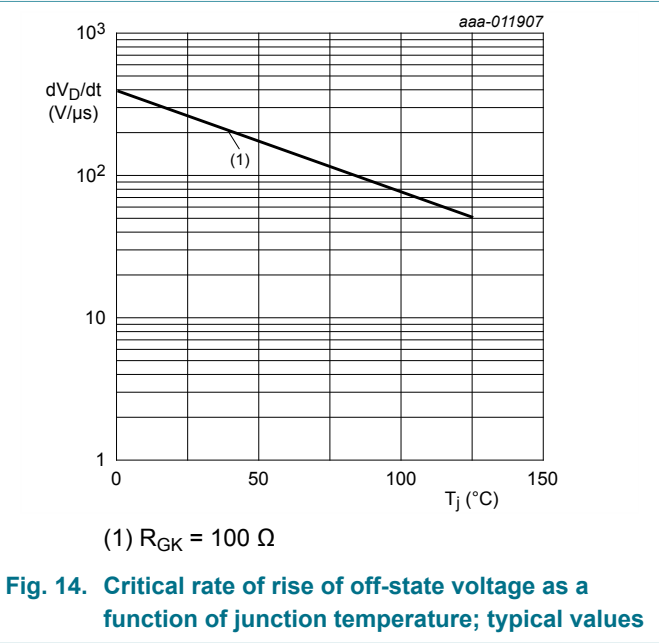
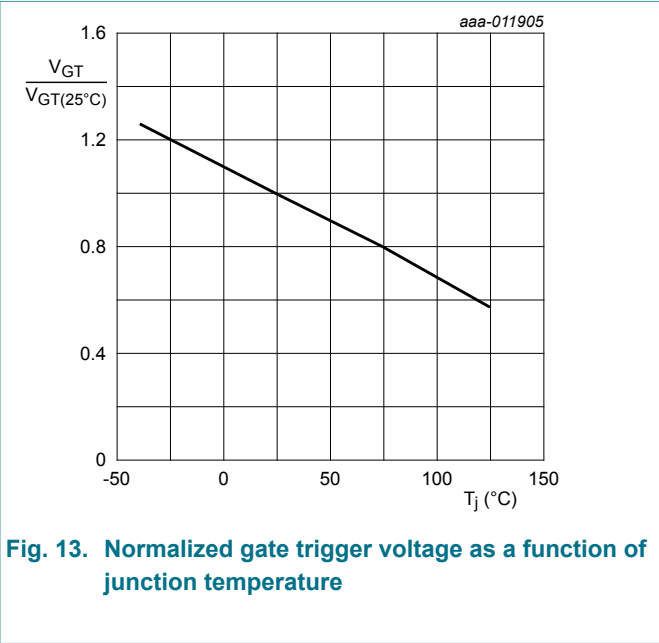
Fig. 8. Minimum footprint SOT223

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9		-	50	200	μA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10		-	0.17	10	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 11		-	0.1	6	mA
V_T	on-state voltage	$I_T = 2\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 12		-	1.3	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		-	0.4	1	V
		$V_D = 600\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 13		0.1	0.2	-	V
I_D	off-state current	$V_D = 600\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$		-	0.1	0.5	mA
I_R	reverse current	$V_R = 600\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$		-	0.1	0.5	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; Fig. 14		-	50	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 4\text{ A}$; $V_D = 600\text{ V}$; $I_G = 5\text{ mA}$; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 402\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{TM} = 4\text{ A}$; $V_R = 35\text{ V}$; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 2\text{ V}/\mu\text{s}$; $R_{GK} = 1\text{ k}\Omega$; ($V_{DM} = 67\%$ of V_{DRM})		-	100	-	μs





11. Package outline

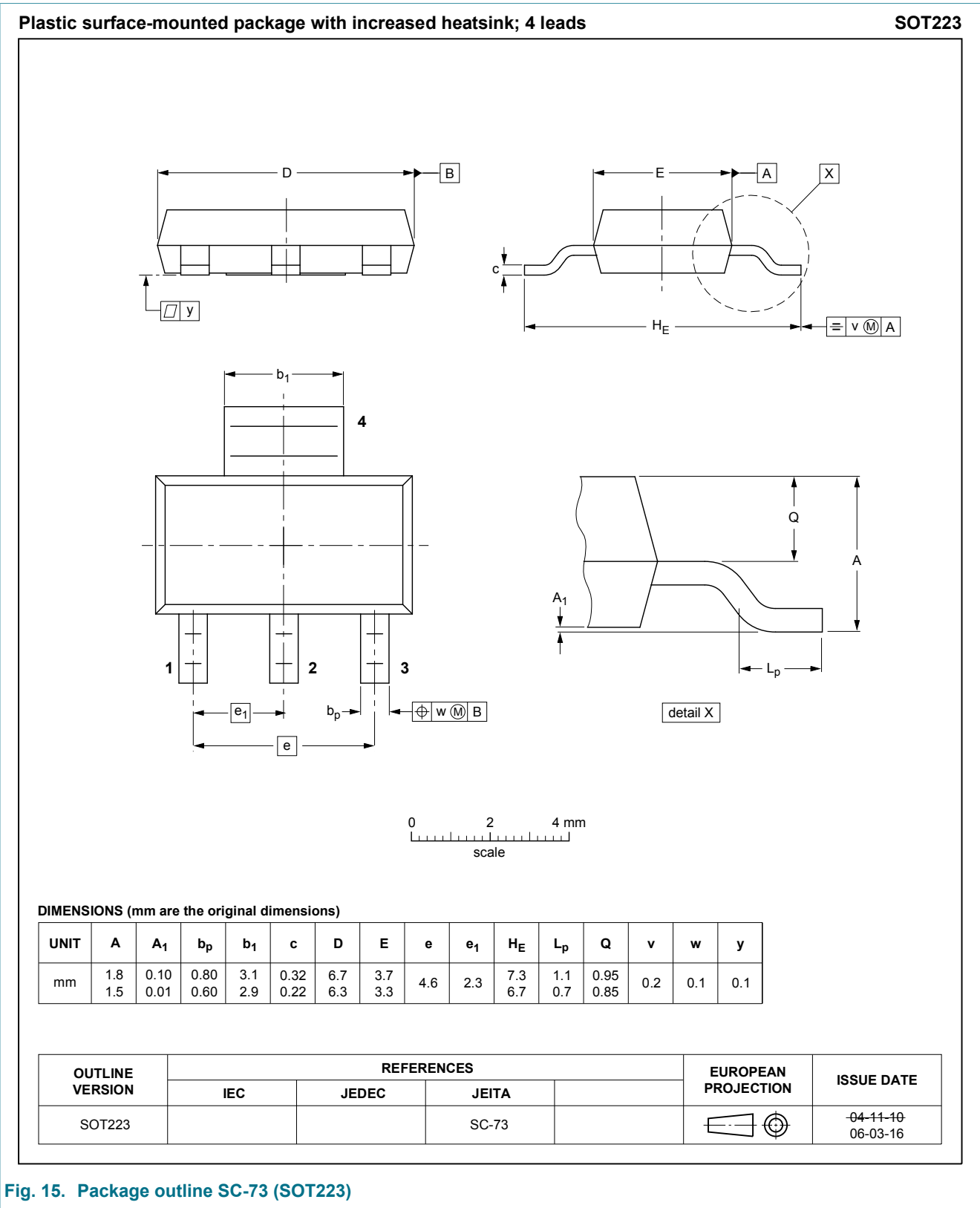


Fig. 15. Package outline SC-73 (SOT223)

12. Soldering

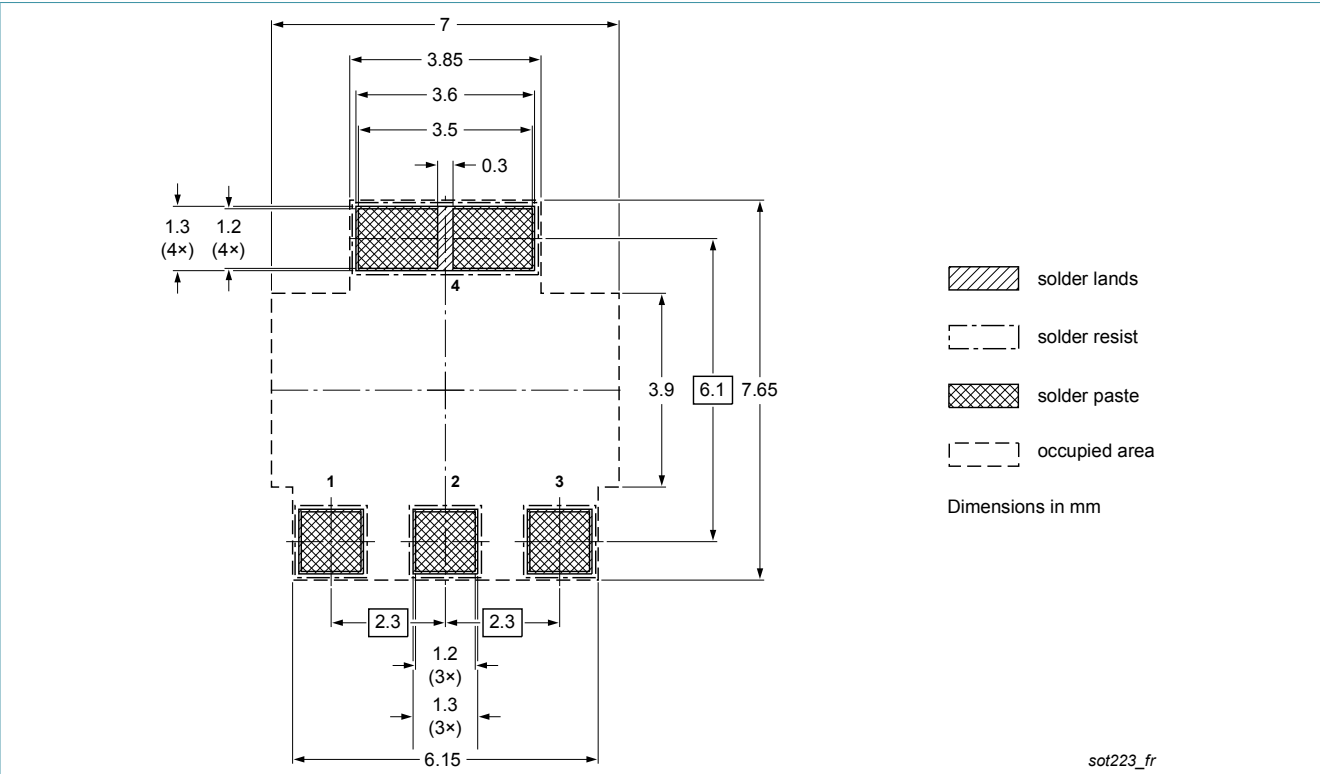


Fig. 16. Reflow soldering footprint for SC-73 (SOT223)

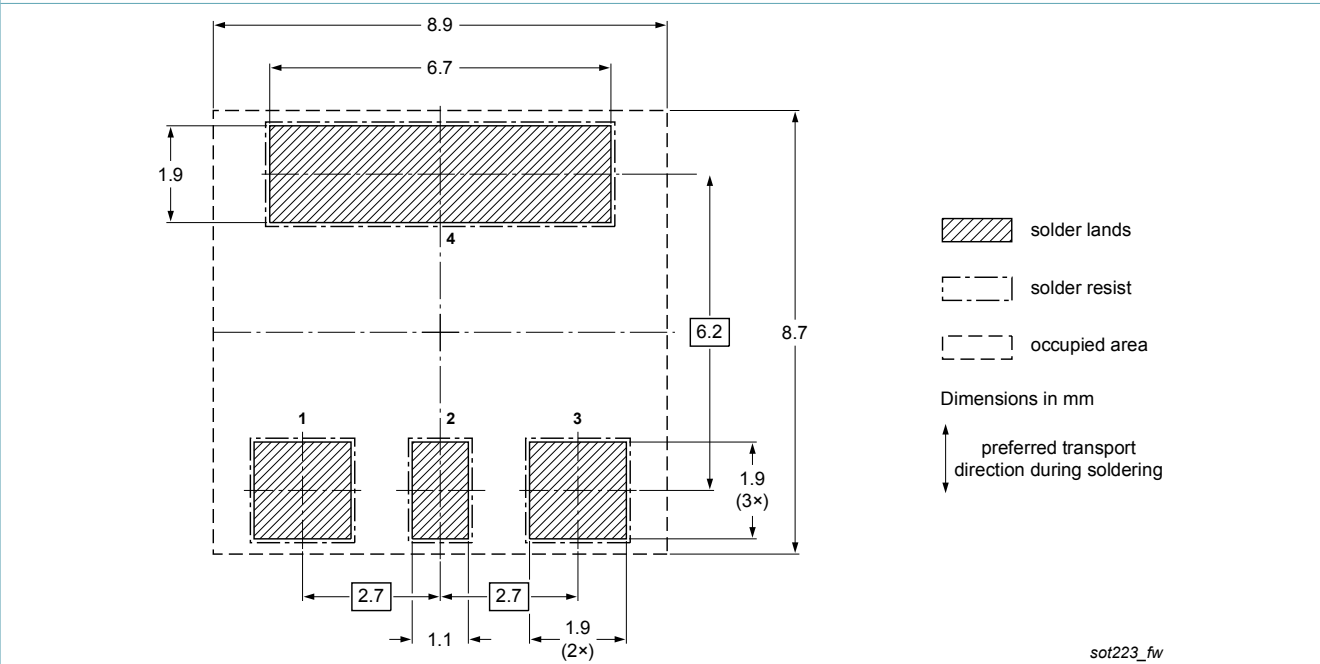


Fig. 17. Wave soldering footprint for SC-73 (SOT223)

13. Legal information

13.1 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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14. Contents

1 General description 1

2 Features and benefits 1

3 Applications 1

4 Quick reference data 1

5 Pinning information 2

6 Ordering information 2

7 Marking 2

8 Limiting values 3

9 Thermal characteristics 6

10 Characteristics 8

11 Package outline 11

12 Soldering 12

13 Legal information 13

13.1 Data sheet status 13

13.2 Definitions 13

13.3 Disclaimers 13

13.4 Trademarks 14

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