



IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

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Thank you for your cooperation and understanding,

WeEn Semiconductors





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

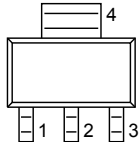
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		[1]	-	-	600	V
V_{RRM}	repetitive peak reverse voltage			-	-	600	V
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 10\text{ ms}$; Fig. 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.



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-73 (SOT223)	 sym037
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
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 112\text{ }^{\circ}\text{C}$; Fig. 1		-	0.6	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 112\text{ }^{\circ}\text{C}$; Fig. 2 ; Fig. 3		-	1	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5		-	10	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		-	11	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN		-	0.5	A^2s
dl_T/dt	rate of rise of on-state current	$I_G = 400\text{ }\mu\text{A}$		-	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
$P_{G(AV)}$	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.

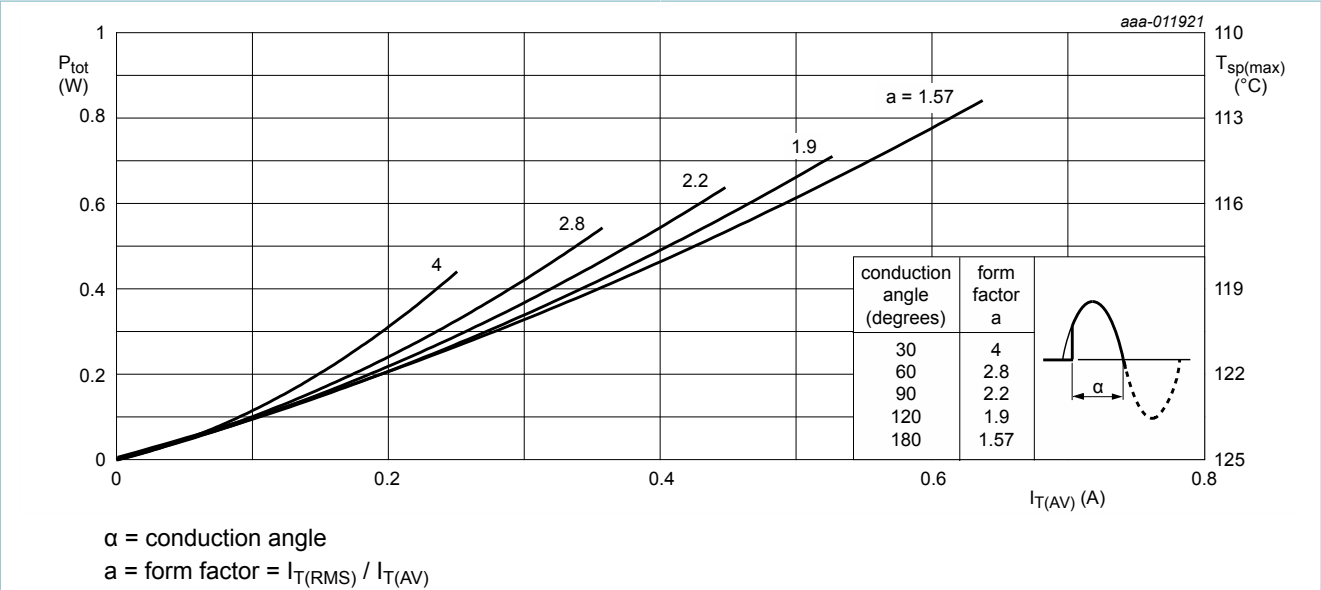


Fig. 1. Total power dissipation as a function of average on-state current; maximum values

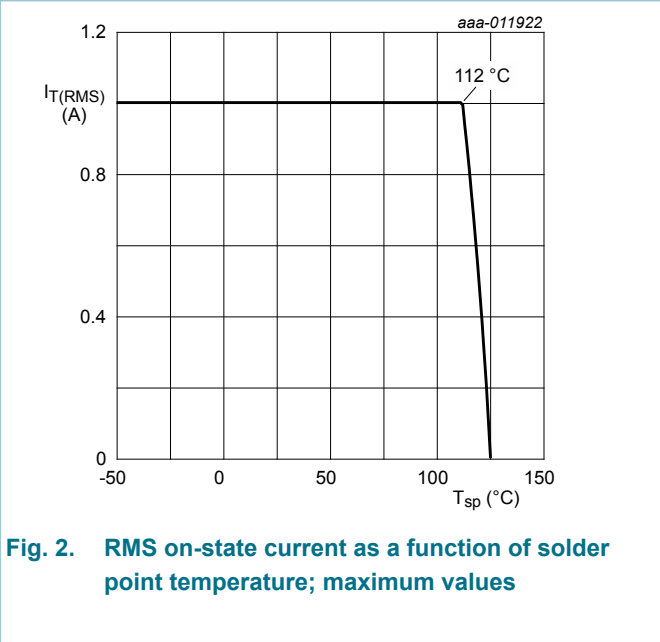


Fig. 2. RMS on-state current as a function of solder point temperature; maximum values

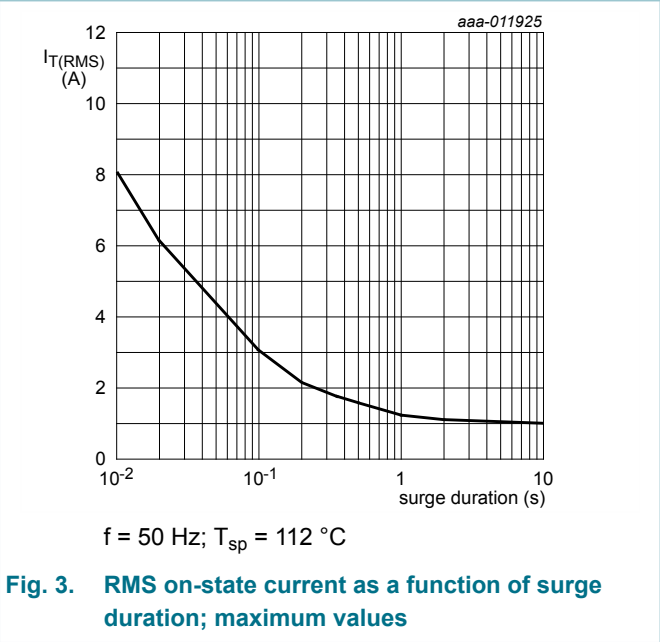


Fig. 3. RMS on-state current as a function of surge duration; maximum values

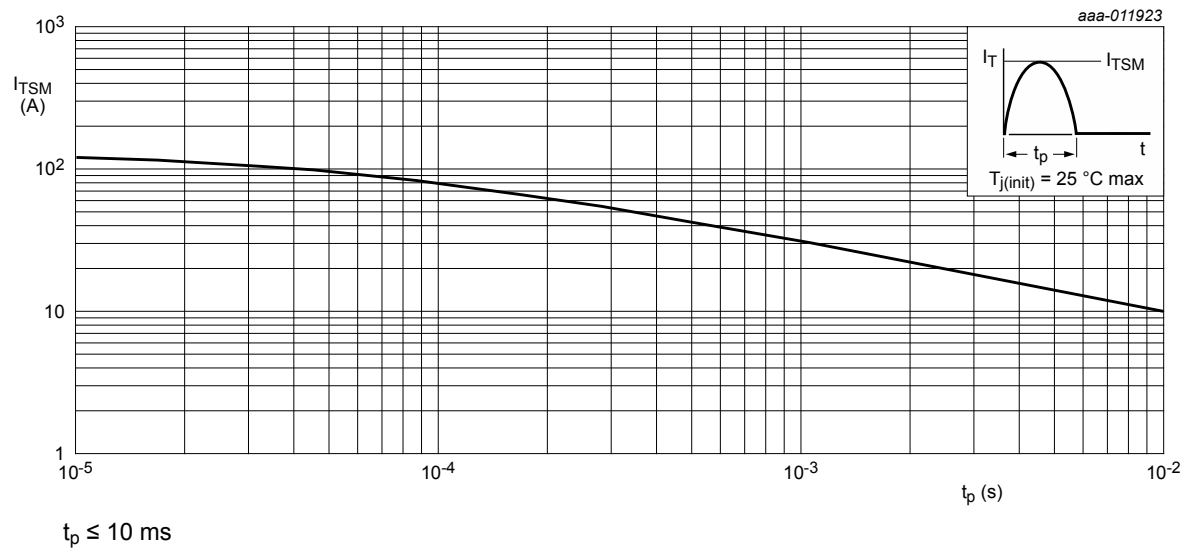


Fig. 4. Non-repetitive peak on-state current as a function of pulse width for sinusoidal currents; maximum values

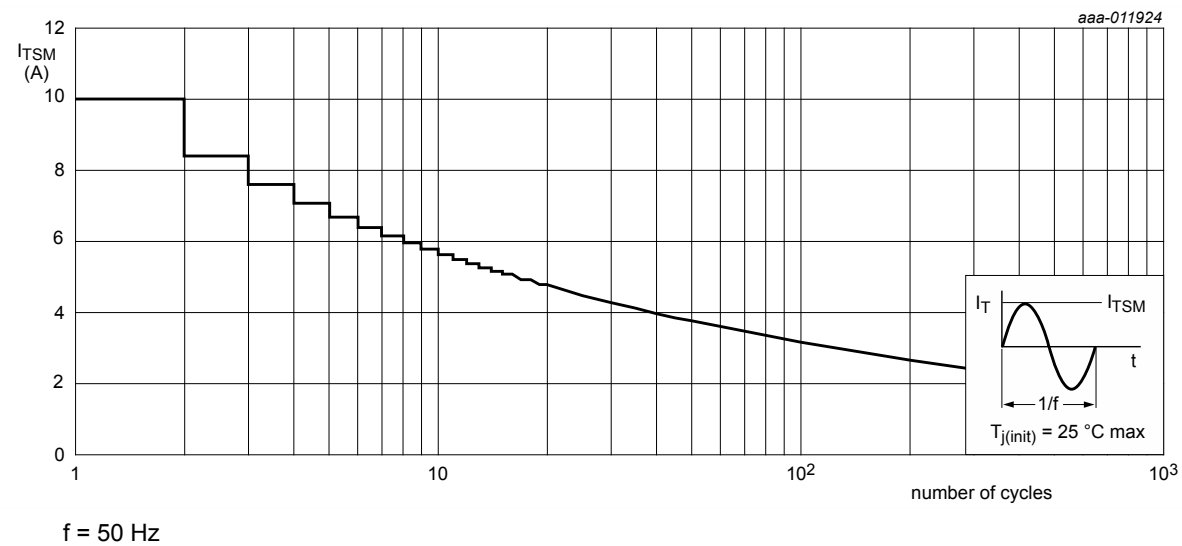
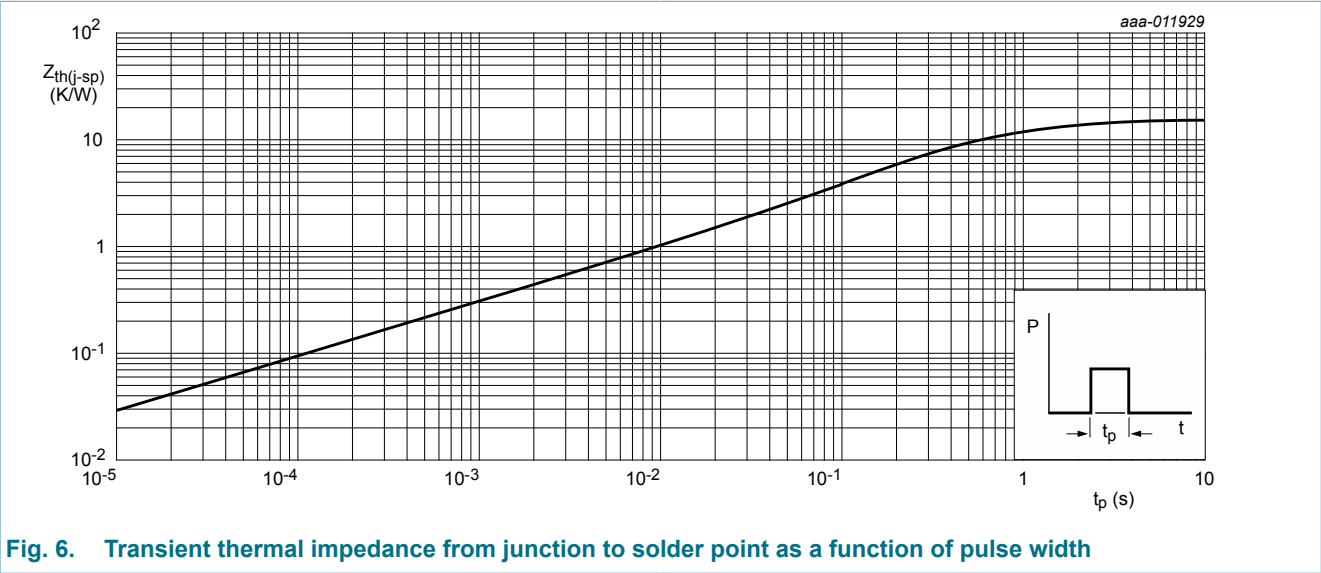


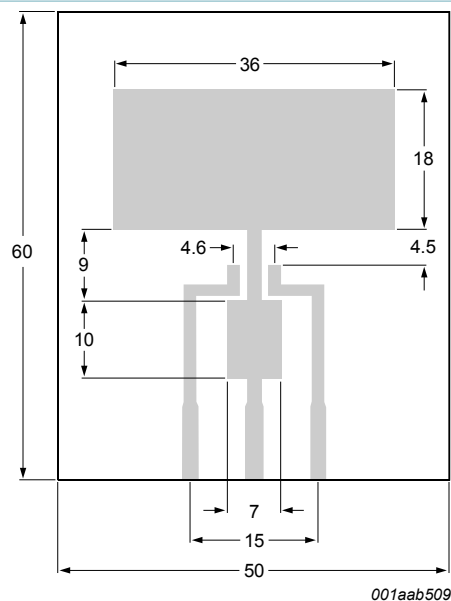
Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

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



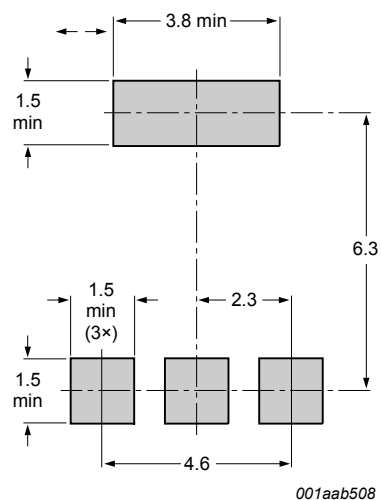


All dimensions are in mm

Printed circuit board:

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

Fig. 7. Printed circuit board pad area: SOT223



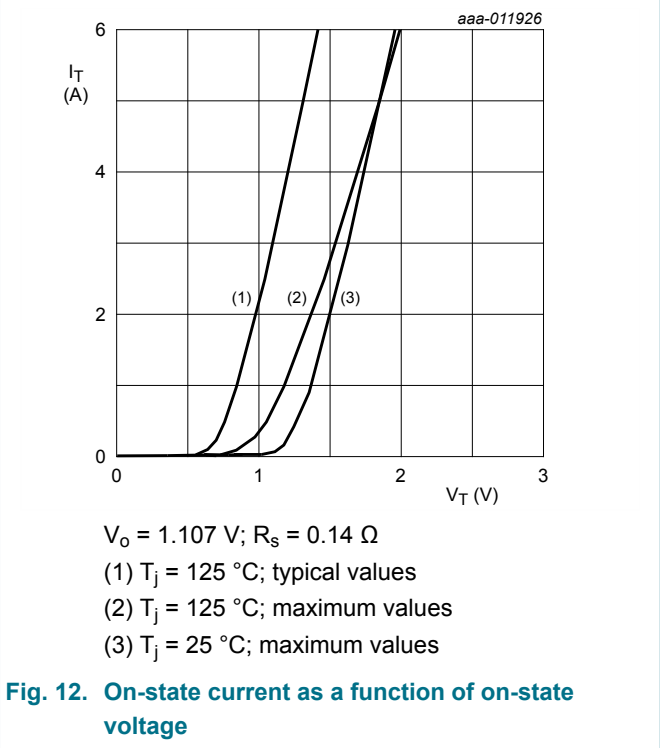
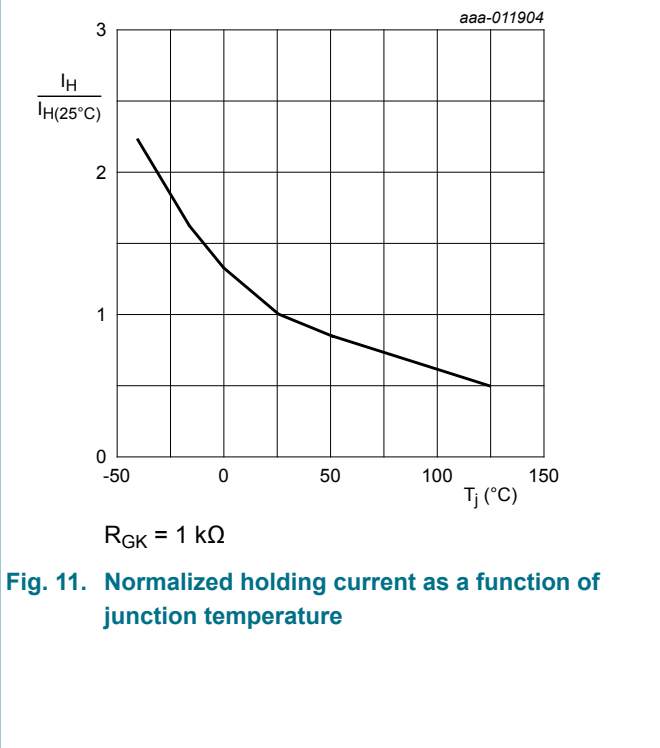
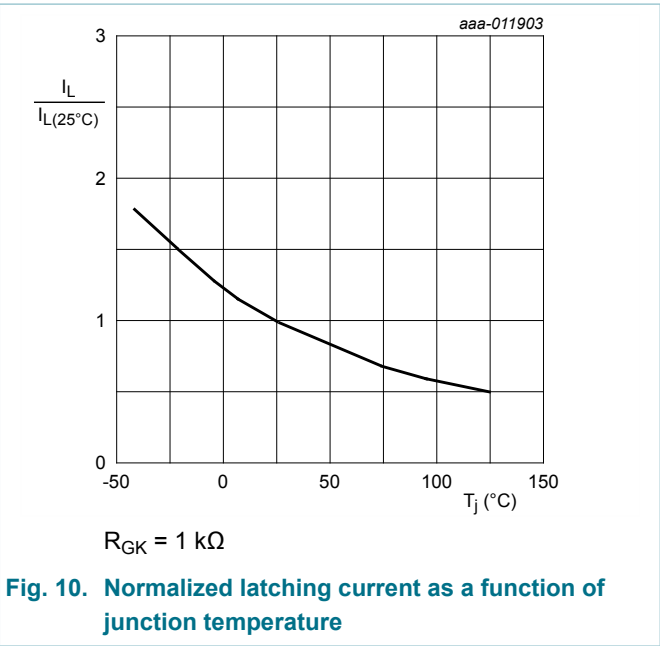
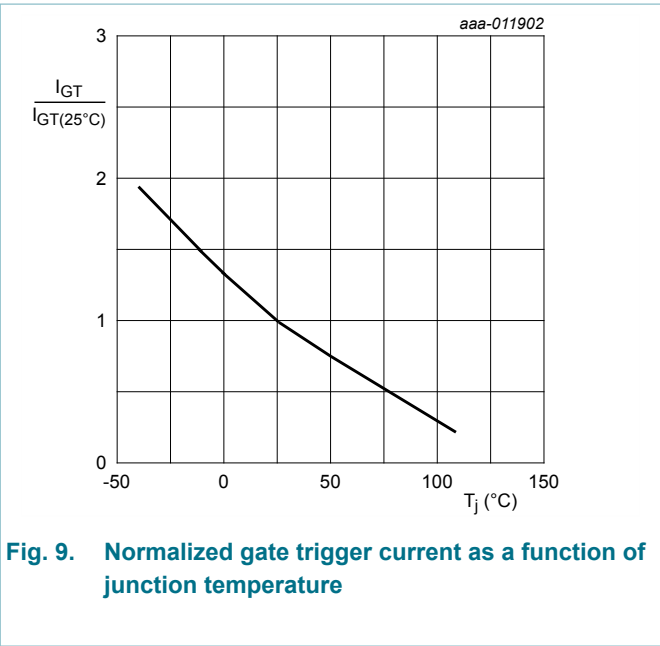
All dimensions are in mm

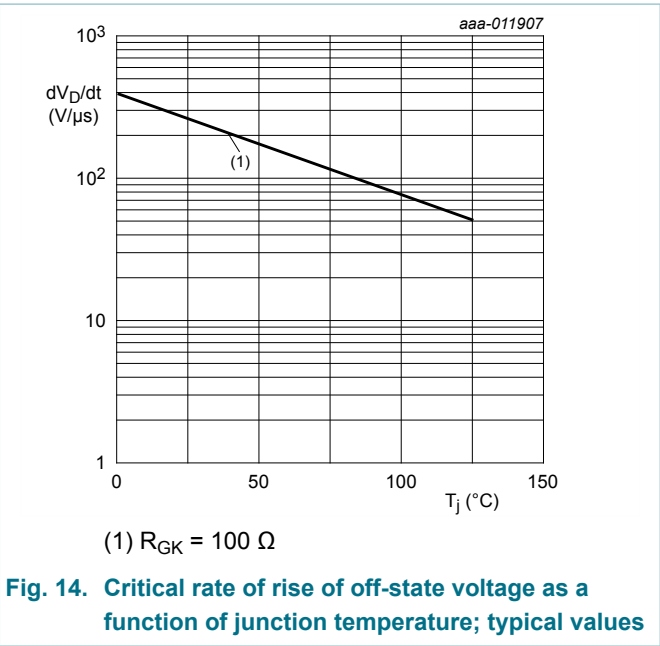
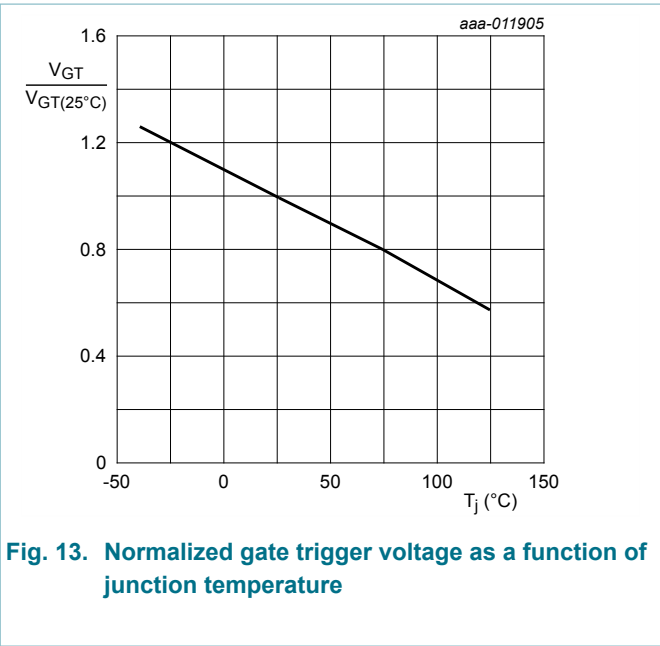
Fig. 8. Minimum footprint SOT223

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

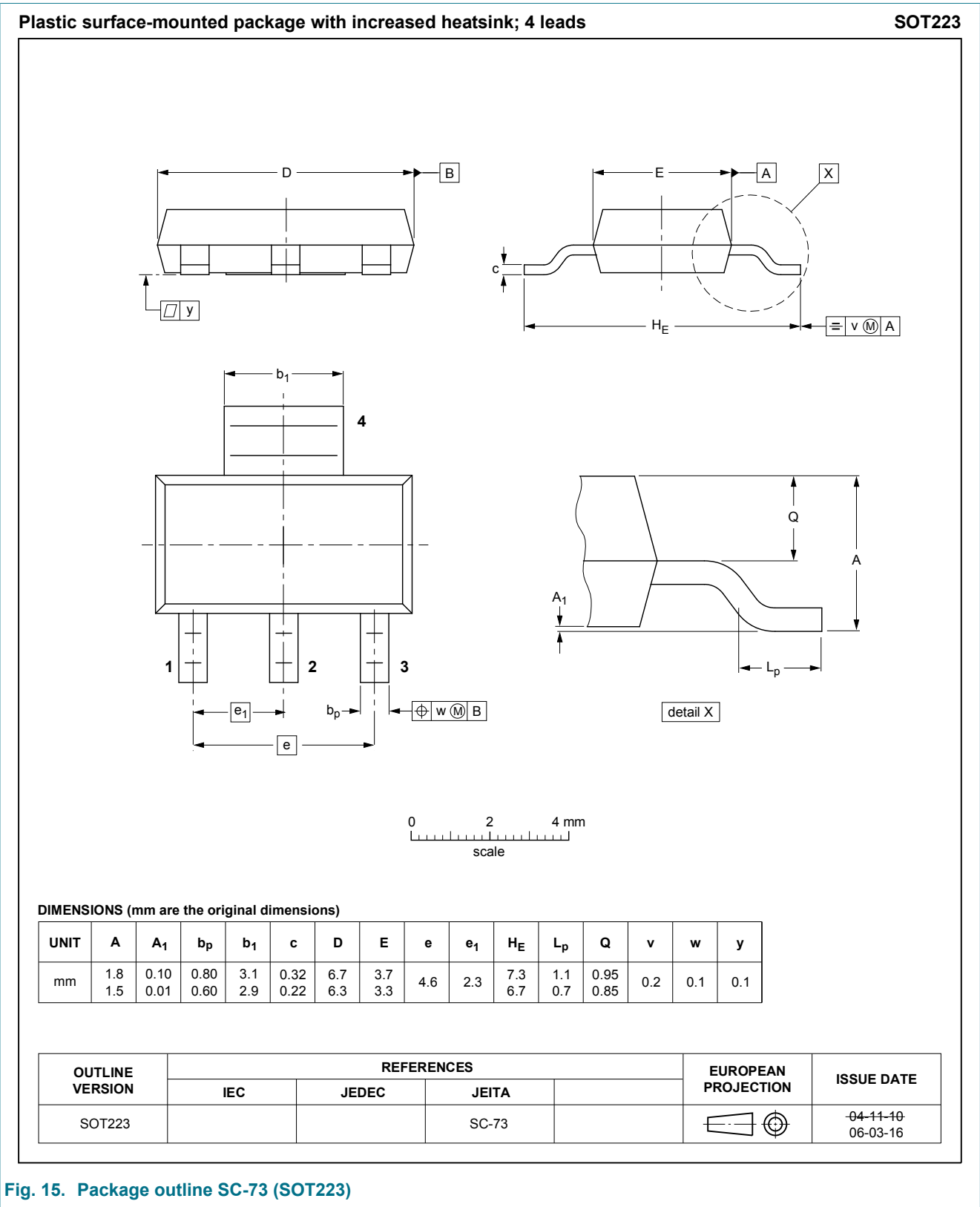


Fig. 15. Package outline SC-73 (SOT223)

12. Soldering

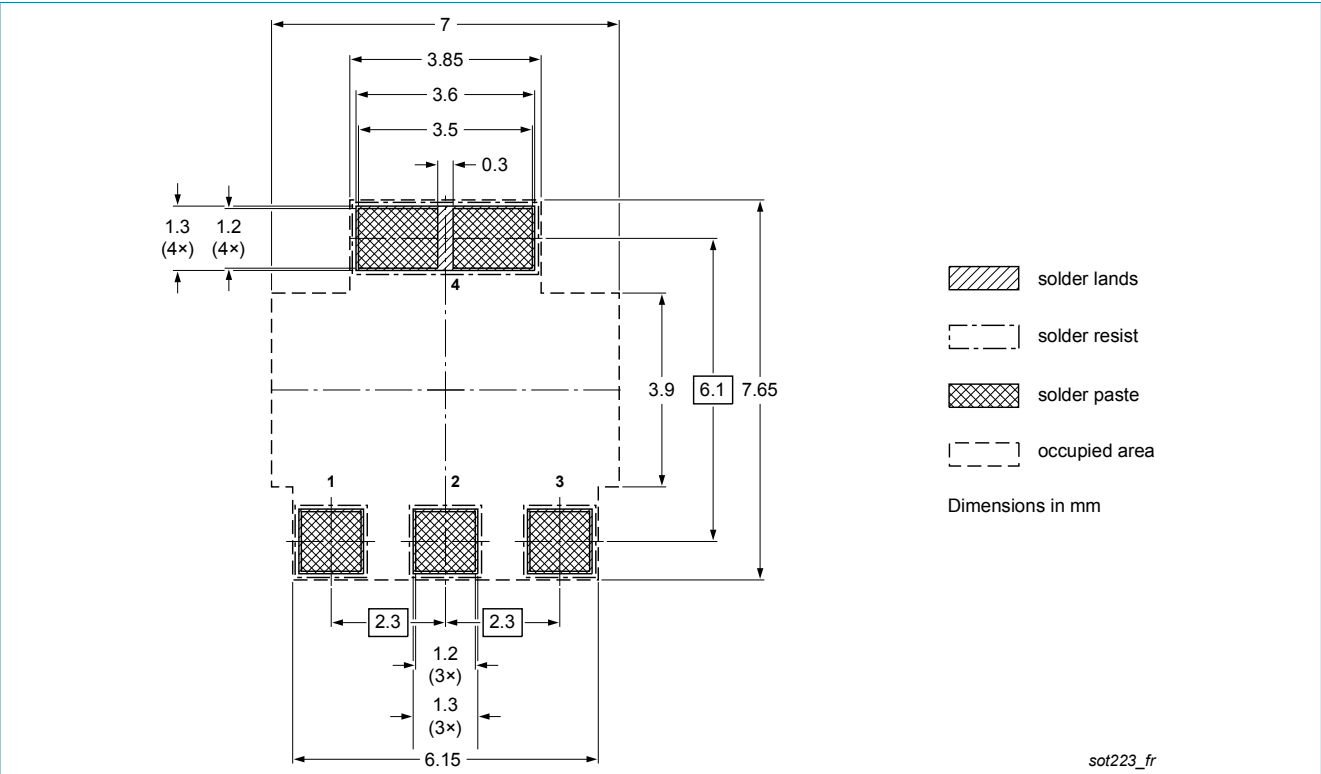


Fig. 16. Reflow soldering footprint for SC-73 (SOT223)

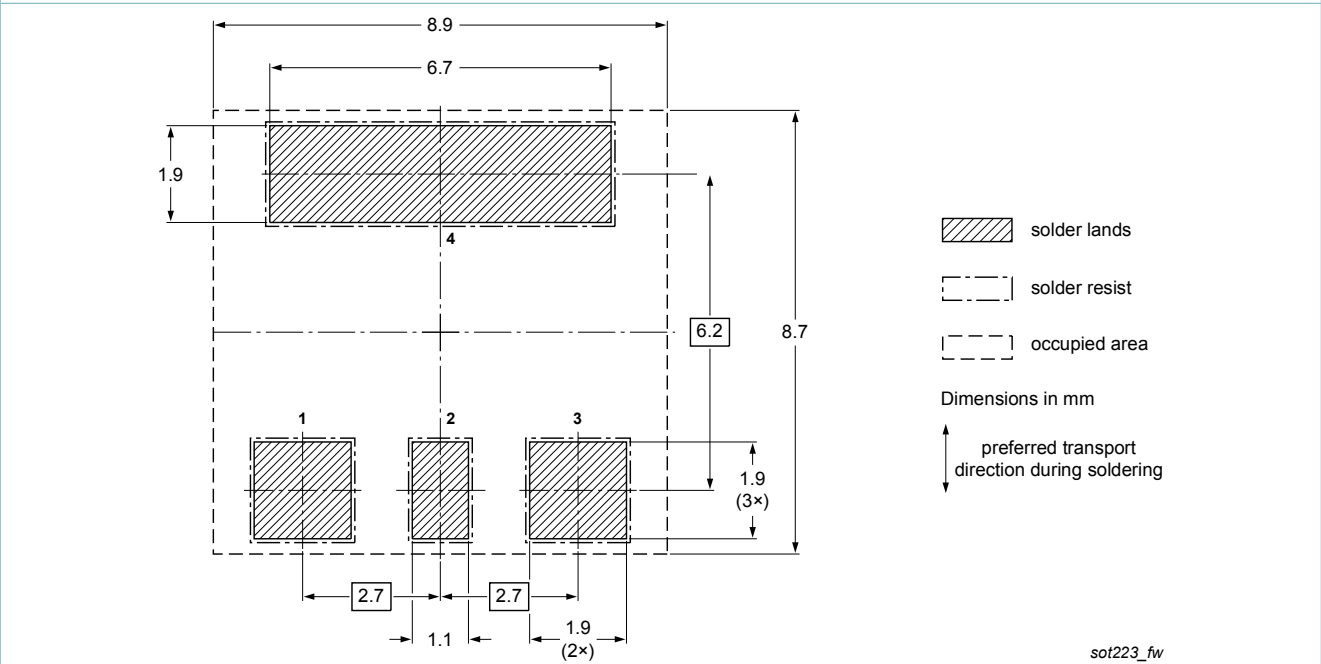


Fig. 17. Wave soldering footprint for SC-73 (SOT223)

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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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