

1. General description

Planar passivated SCR with sensitive gate in a SOT223 surface mountable plastic package. This SCR is designed 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

- Ground Fault Circuit Interrupters (GFCI)
- General purpose switching and phase control
- Ignition circuits, CDI for 2- and 3-wheelers
- Motor control - e.g. small kitchen appliances

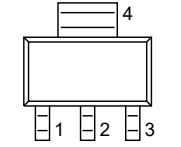


4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	1000	V
V_{RRM}	repetitive peak reverse voltage		-	-	1000	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 100\text{ }^{\circ}\text{C}$	-	-	0.8	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 100\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	1.1	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	-	-	11	A
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 10\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7	1	-	100	μA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>SC-73 (SOT223)</p>	 <p>A  K G sym037</p>
2	A	anode		
3	G	gate		
4	A	mb; connected to anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NCR100W-12M	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
NCR100W-12M	10012M

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		-	1000	V
V_{RRM}	repetitive peak reverse voltage		-	1000	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 100\text{ }^{\circ}\text{C}$	-	0.8	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 100\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	1.1	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	-	11	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$	-	12.1	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	0.605	A ² s
di_T/dt	rate of rise of on-state current	$I_G = 0.1\text{ mA}$	-	50	A/ μs
I_{GM}	peak gate current		-	1	A
V_{RGM}	peak reverse gate voltage		-	5	V
P_{GM}	peak gate power		-	2	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	0.1	W
T_{stg}	storage temperature		-40	150	$^{\circ}\text{C}$
T_j	junction temperature		-	125	$^{\circ}\text{C}$

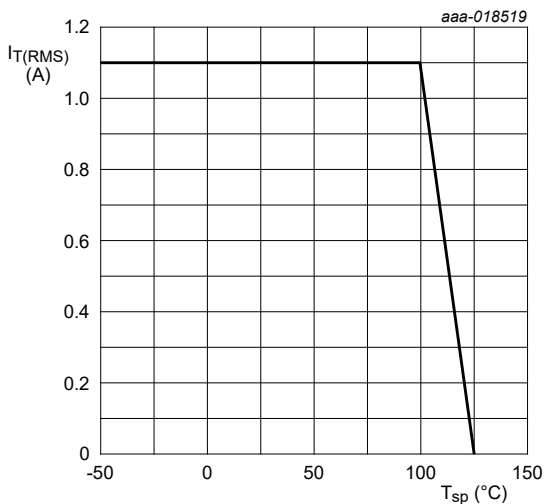


Fig. 1. RMS on-state current as a function of solder point temperature; maximum values

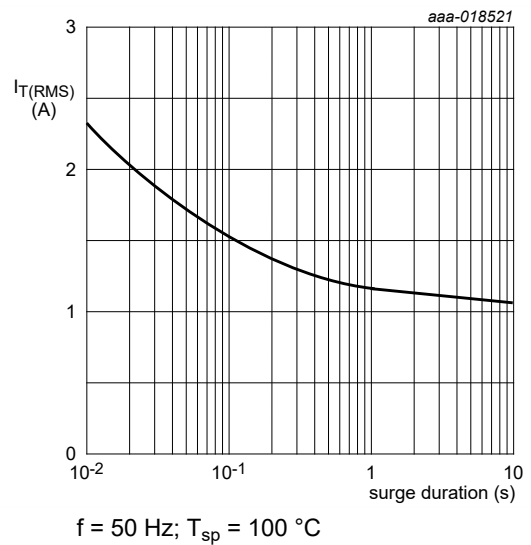


Fig. 2. RMS on-state current as a function of surge duration; maximum values

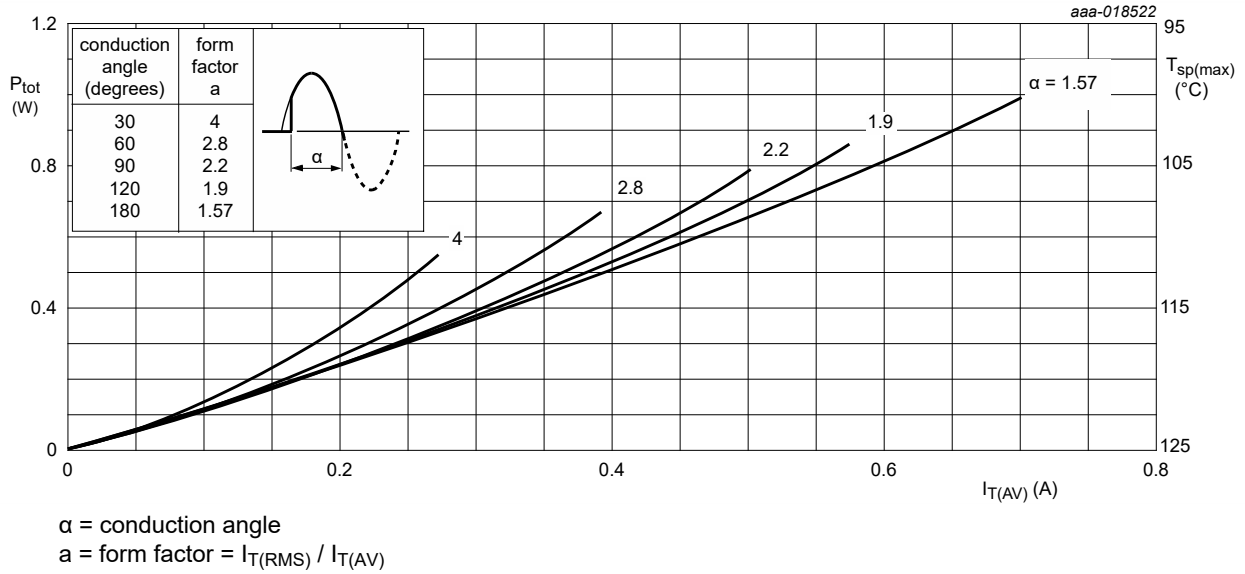


Fig. 3. Total power dissipation as a function of average on-state current; maximum values

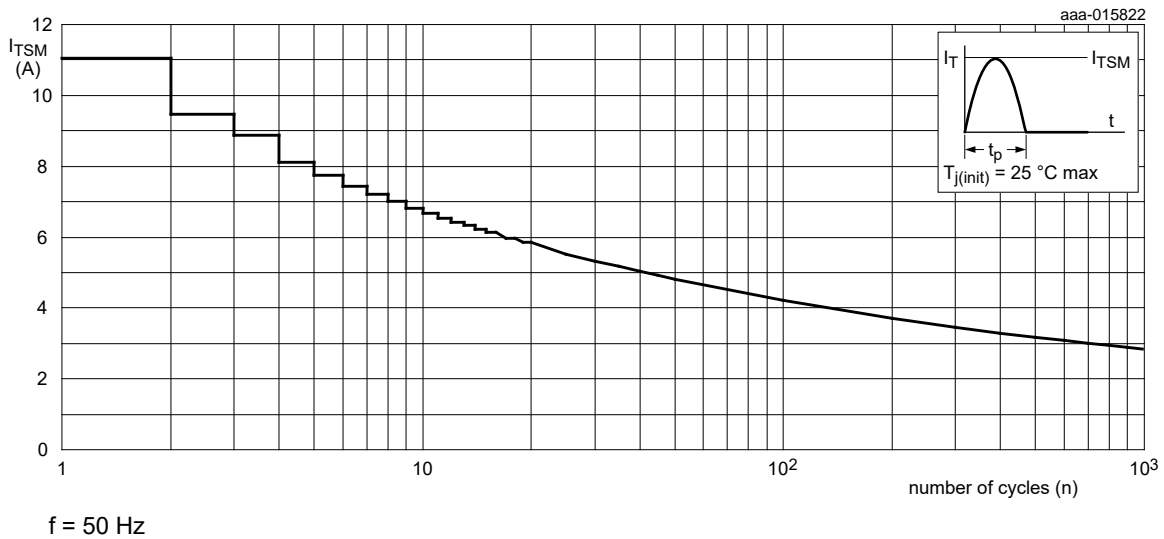


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

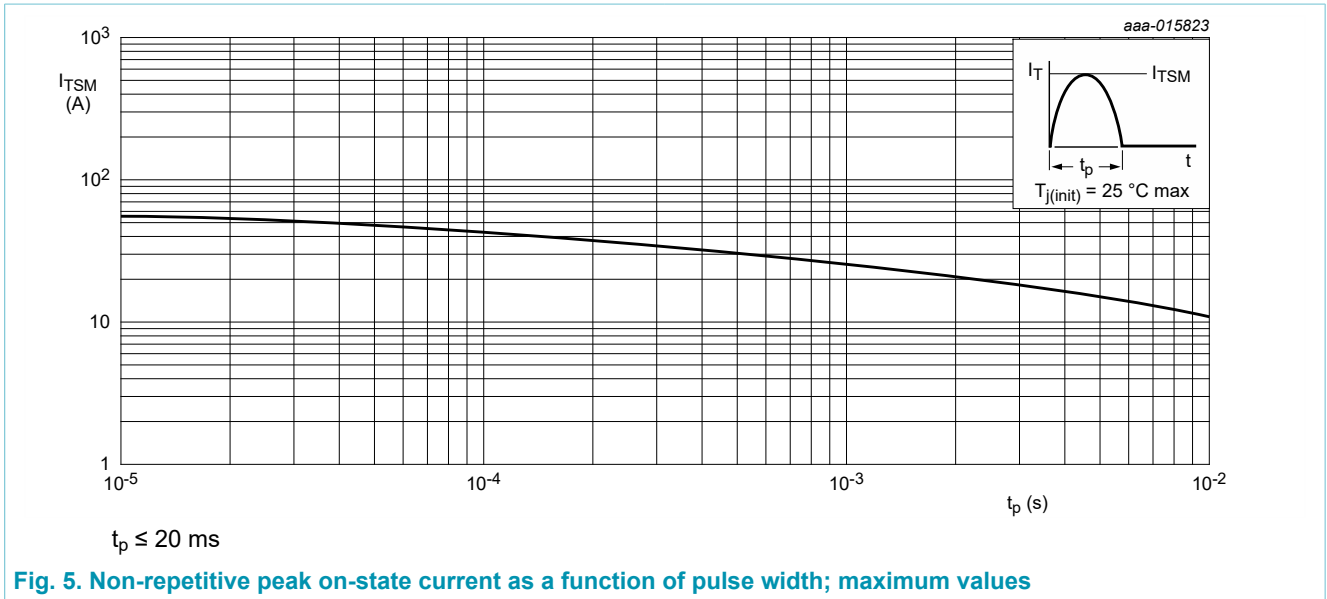


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

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	half cycle; Fig. 6	-	-	25	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board mounted; minimum footprint; in free air	-	130	-	K/W

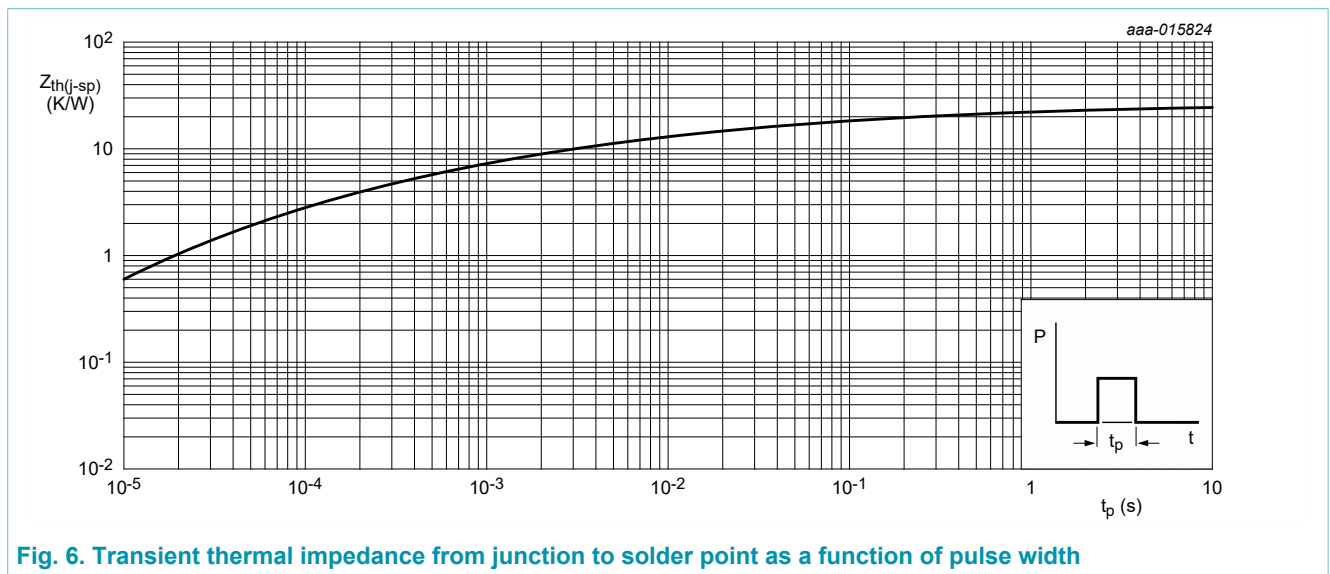


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 10\text{ mA}$; $T_j = 25\text{ °C}$; Fig. 7	1	-	100	μA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.5\text{ mA}$; $T_j = 25\text{ °C}$; $R_{GK(\text{ext})} = 1\text{ k}\Omega$; Fig. 8	-	-	6	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; $R_{GK(\text{ext})} = 1\text{ k}\Omega$; Fig. 9	-	-	3	mA
V_T	on-state voltage	$I_T = 1.2\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10	-	1.25	1.7	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 10\text{ mA}$; $T_j = 25\text{ °C}$; Fig. 11	-	0.5	0.8	V
		$V_D = 1000\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$; Fig. 11	0.3	0.5	-	V
I_D	off-state current	$V_D = 1000\text{ V}$; $R_{GK(\text{ext})} = 1\text{ k}\Omega$; $T_j = 125\text{ °C}$	-	0.05	1	mA
I_R	reverse current	$V_R = 1000\text{ V}$; $T_j = 125\text{ °C}$; $R_{GK(\text{ext})} = 1\text{ k}\Omega$	-	0.05	1	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 670\text{ V}$; $T_j = 125\text{ °C}$; $R_{GK} = 1\text{ k}\Omega$; exponential waveform; ($V_{DM} = 67\%$ of V_{DRM})	100	-	-	$\text{V}/\mu\text{s}$
t_{gt}	gate-controlled turn-on time	$I_{TM} = 2\text{ A}$; $V_D = 1000\text{ V}$; $I_G = 10\text{ mA}$; $dI_G/dt = 0.1\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$	-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 670\text{ V}$; $T_j = 125\text{ °C}$; $I_{TM} = 1.6\text{ A}$; $V_R = 35\text{ V}$; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 2\text{ V}/\mu\text{s}$; $R_{GK(\text{ext})} = 1\text{ k}\Omega$; ($V_{DM} = 67\%$ of V_{DRM})	-	100	-	μs

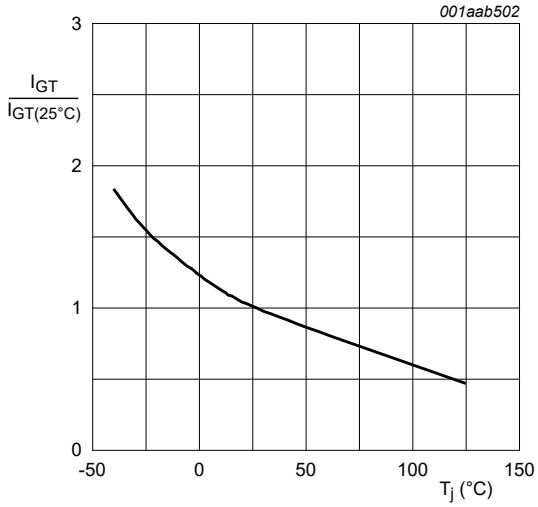


Fig. 7. Normalized gate trigger current as a function of junction temperature

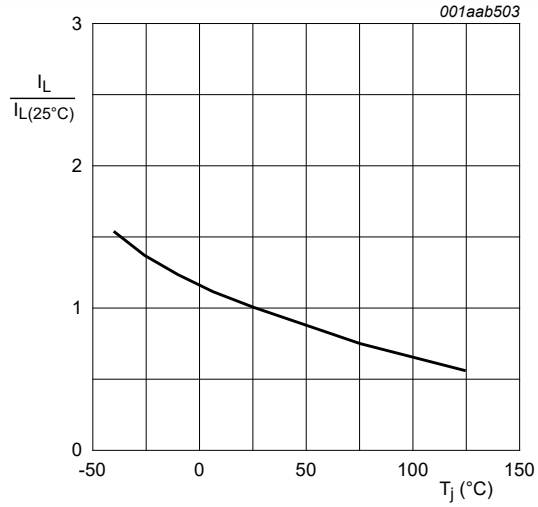


Fig. 8. Normalized latching current as a function of junction temperature
 $R_{GK} = 1 \text{ k}\Omega$

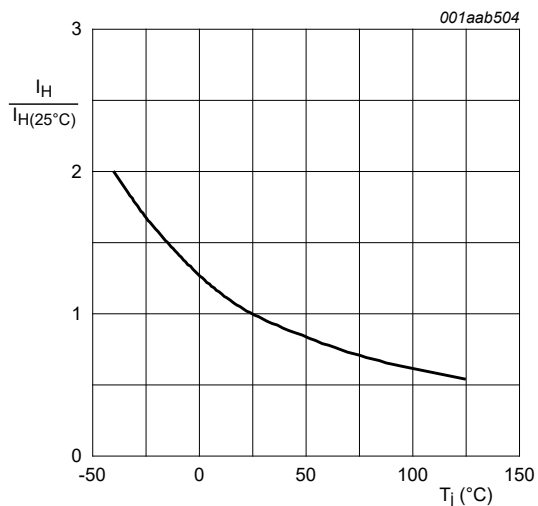


Fig. 9. Normalized holding current as a function of junction temperature
 $R_{GK} = 1 \text{ k}\Omega$

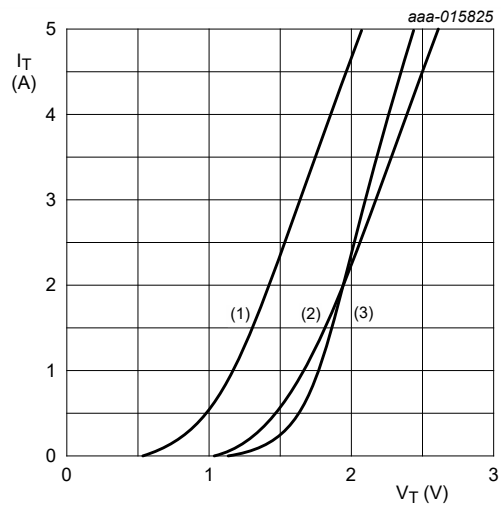


Fig. 10. On-state current as a function of on-state voltage
 $V_o = 1.289 \text{ V}; R_s = 0.292 \Omega$
 (1) $T_j = 125 \text{ }^\circ\text{C}$; typical values
 (2) $T_j = 125 \text{ }^\circ\text{C}$; maximum values
 (3) $T_j = 25 \text{ }^\circ\text{C}$; maximum values

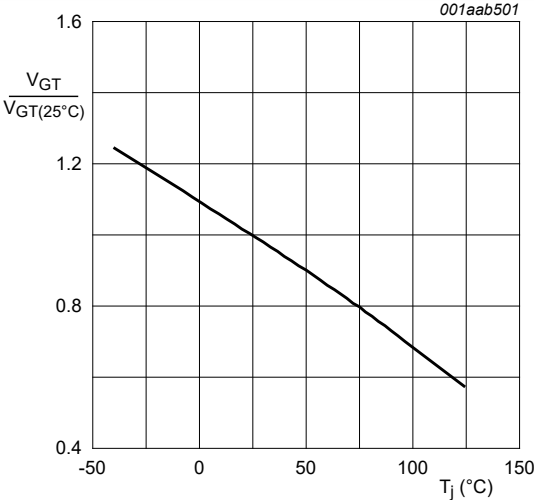


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

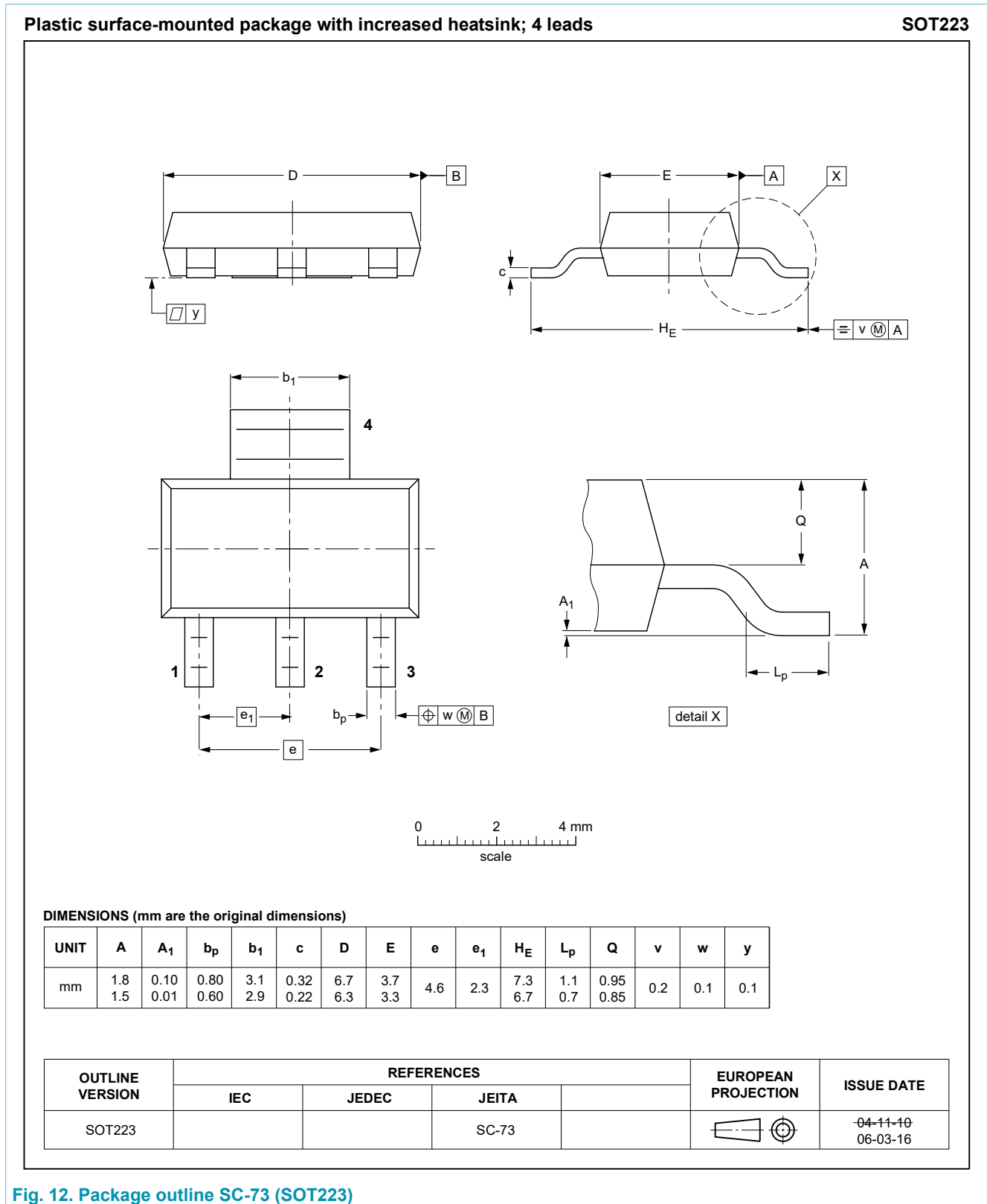


Fig. 12. Package outline SC-73 (SOT223)

12. Package outline (minimized)

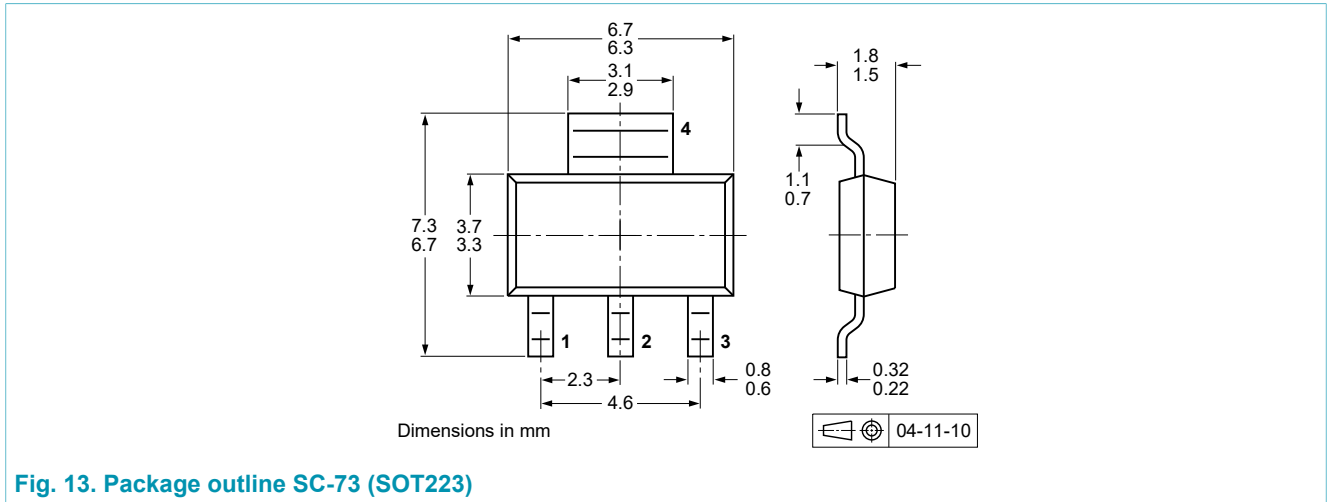


Fig. 13. Package outline SC-73 (SOT223)

13. Soldering

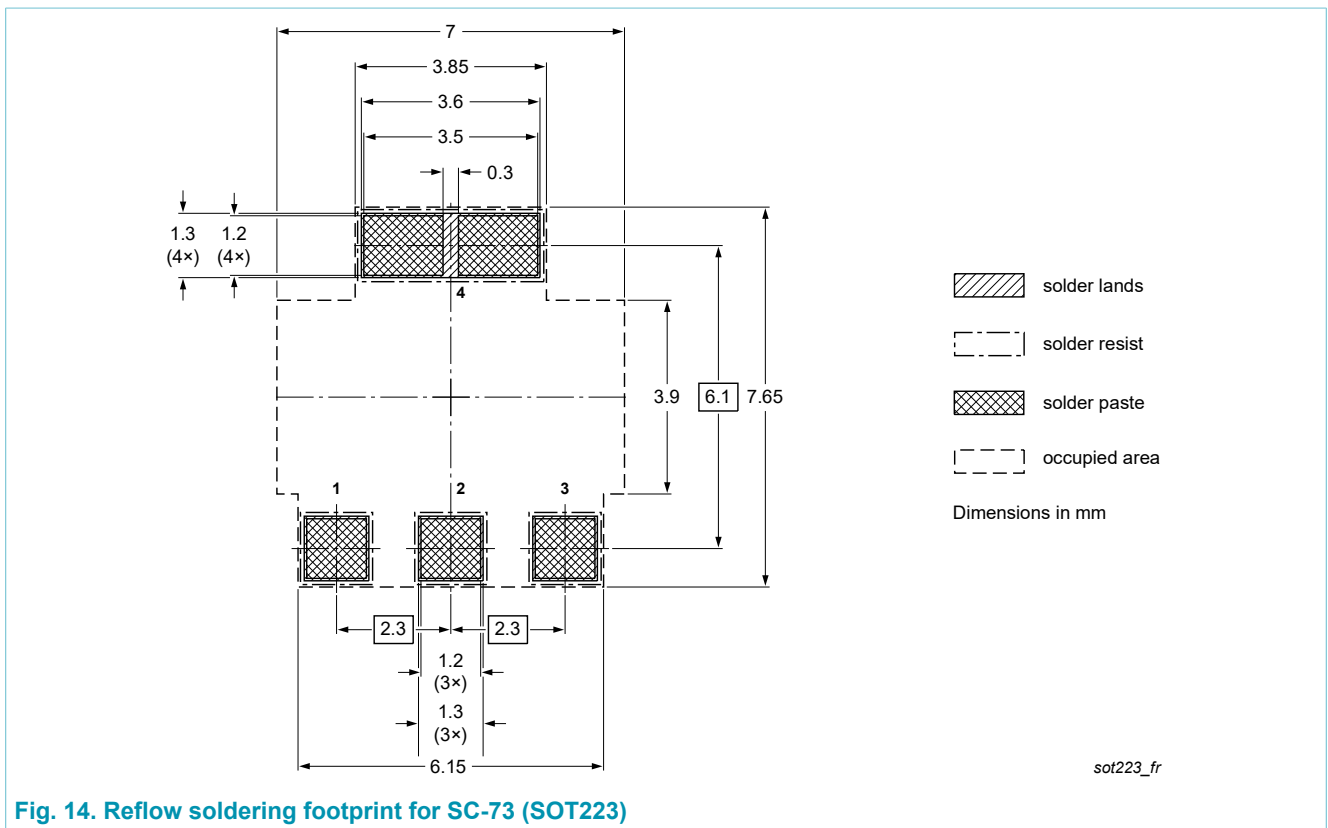


Fig. 14. Reflow soldering footprint for SC-73 (SOT223)

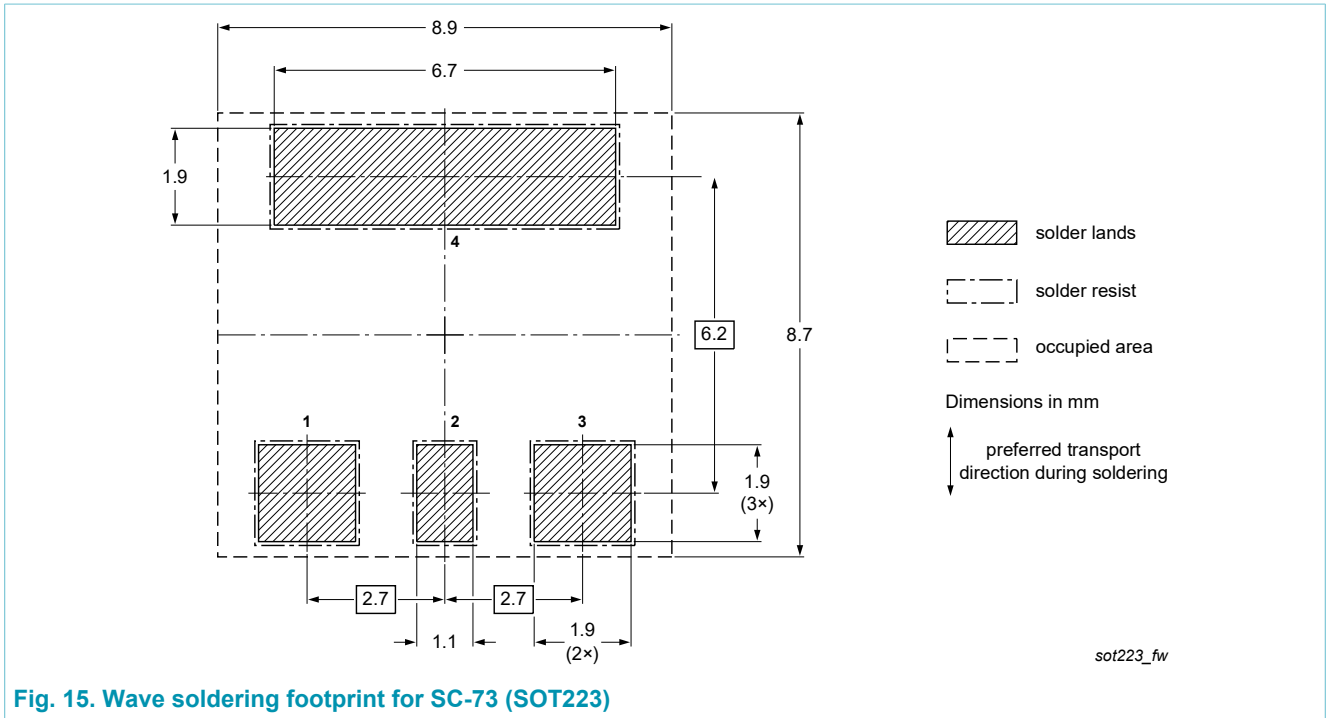


Fig. 15. Wave soldering footprint for SC-73 (SOT223)

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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.
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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- [2] The term 'short data sheet' is explained in section "Definitions".
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