

## 1. General description

Planar passivated sensitive gate four quadrant triac in a SOT223 surface-mountable plastic package. This sensitive gate "series E" triac is intended for interfacing with low power drivers including microcontrollers.

## 2. Features and benefits

- Direct interfacing to logic level ICs
- Direct interfacing to low power gate drivers and microcontrollers
- High blocking voltage capability
- Planar passivated for voltage ruggedness and reliability
- Sensitive gate
- Surface-mountable package
- Triggering in all four quadrants

## 3. Applications

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

## 4. Quick reference data

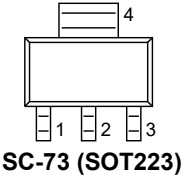
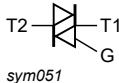
Table 1. Quick reference data

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; $T_{sp} \leq 108\text{ °C}$ ; <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; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	-	-	10	A
		full sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 16.7\text{ ms}$	-	-	11	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>	-	2.5	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	4	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	5	10	mA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	11	25	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 11</a>	-	2.2	15	mA
$V_T$	on-state voltage	$I_T = 2\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 12</a>	-	1.2	1.5	V
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ °C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit	-	30	-	V/ $\mu\text{s}$

## 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	T2	main terminal 2		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BT134W-600E	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

## 7. Marking

Table 4. Marking codes

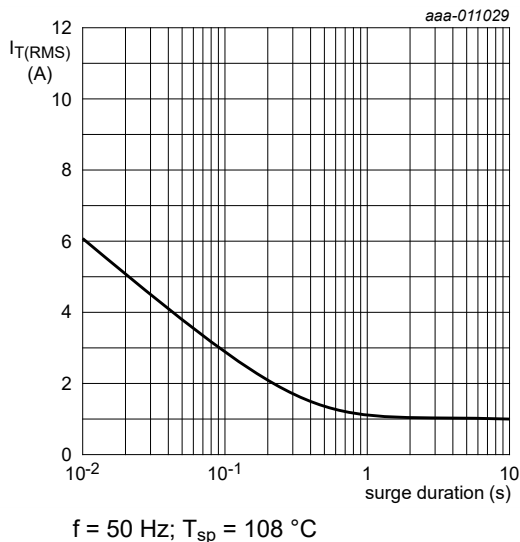
Type number	Marking code
BT134W-600E	BT134W-6E

## 8. Limiting values

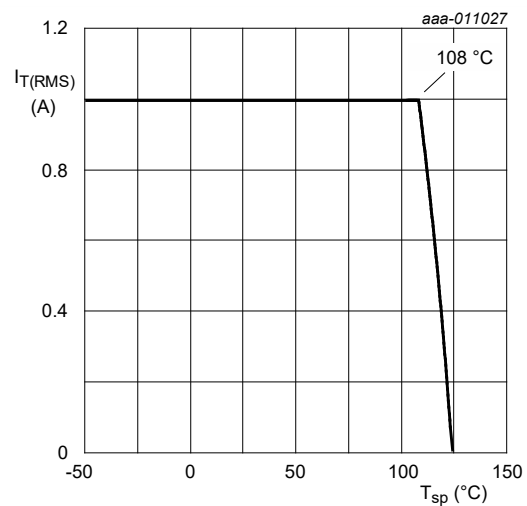
**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage		-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 108\text{ °C}$ ; <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>	-	10	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 16.7\text{ ms}$	-	11	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN	-	0.5	A <sup>2</sup> s
$di_T/dt$	rate of rise of on-state current	$I_G = 20\text{ mA}$	-	50	A/ $\mu$ s
		$I_G = 50\text{ mA}$	-	10	A/ $\mu$ s
		$I_G = 20\text{ mA}$	-	50	A/ $\mu$ s
		$I_G = 20\text{ mA}$	-	50	A/ $\mu$ s
$I_{GM}$	peak gate current		-	2	A
$P_{GM}$	peak gate power		-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	0.5	W
$T_{stg}$	storage temperature		-40	150	°C
$T_j$	junction temperature		-	125	°C



**Fig. 1. RMS on-state current as a function of surge duration; maximum values**



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

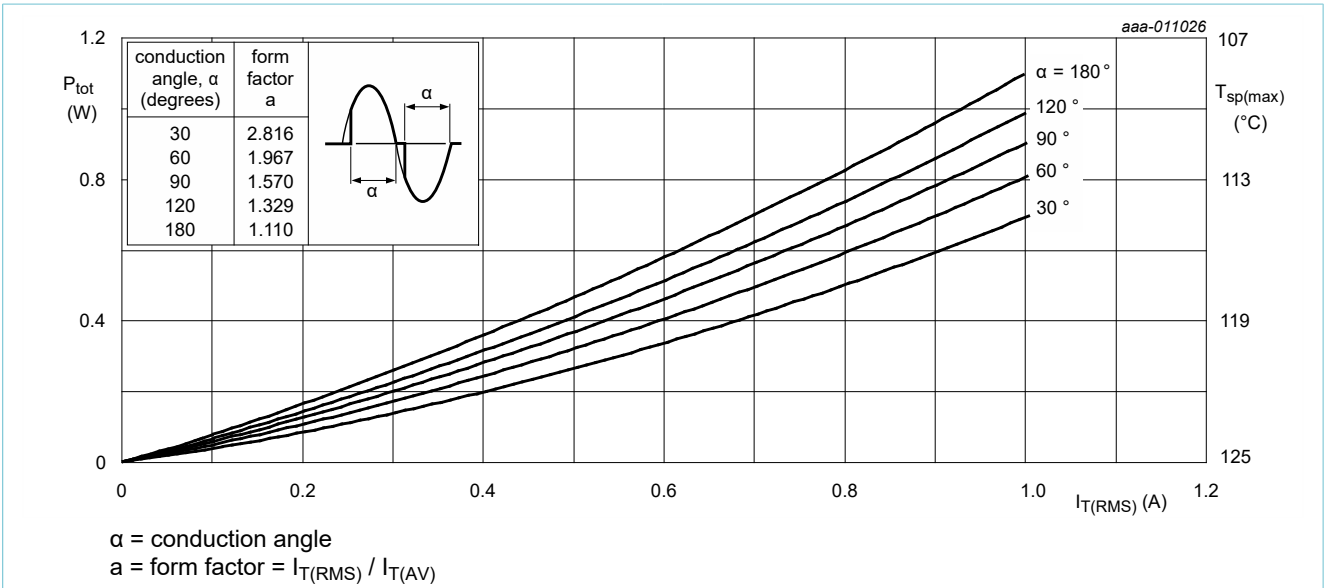


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

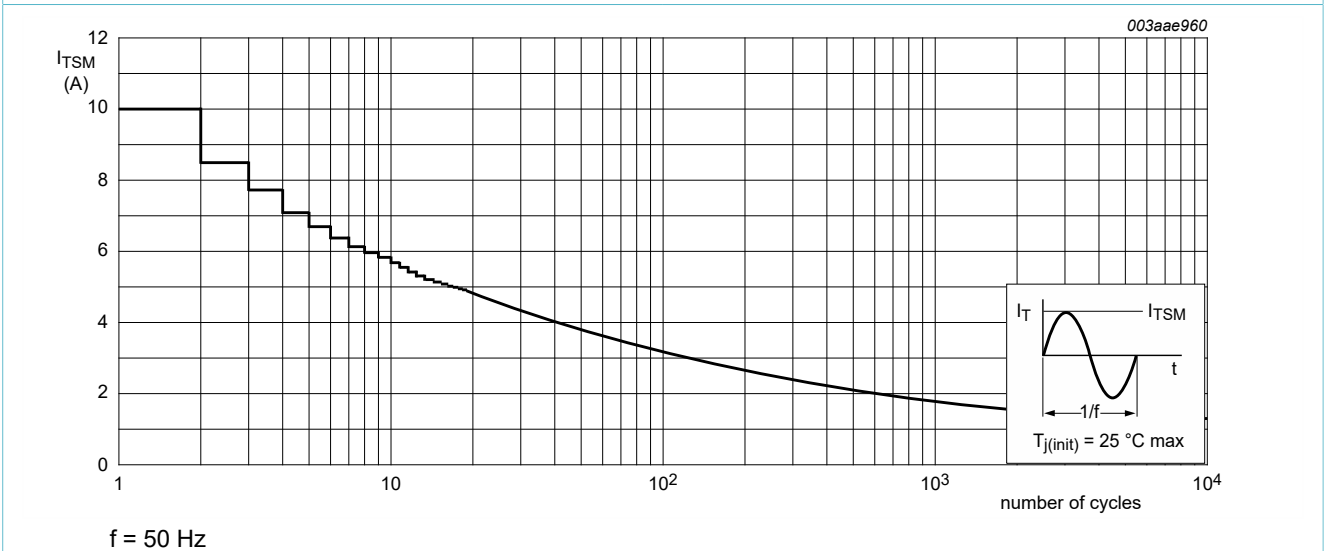
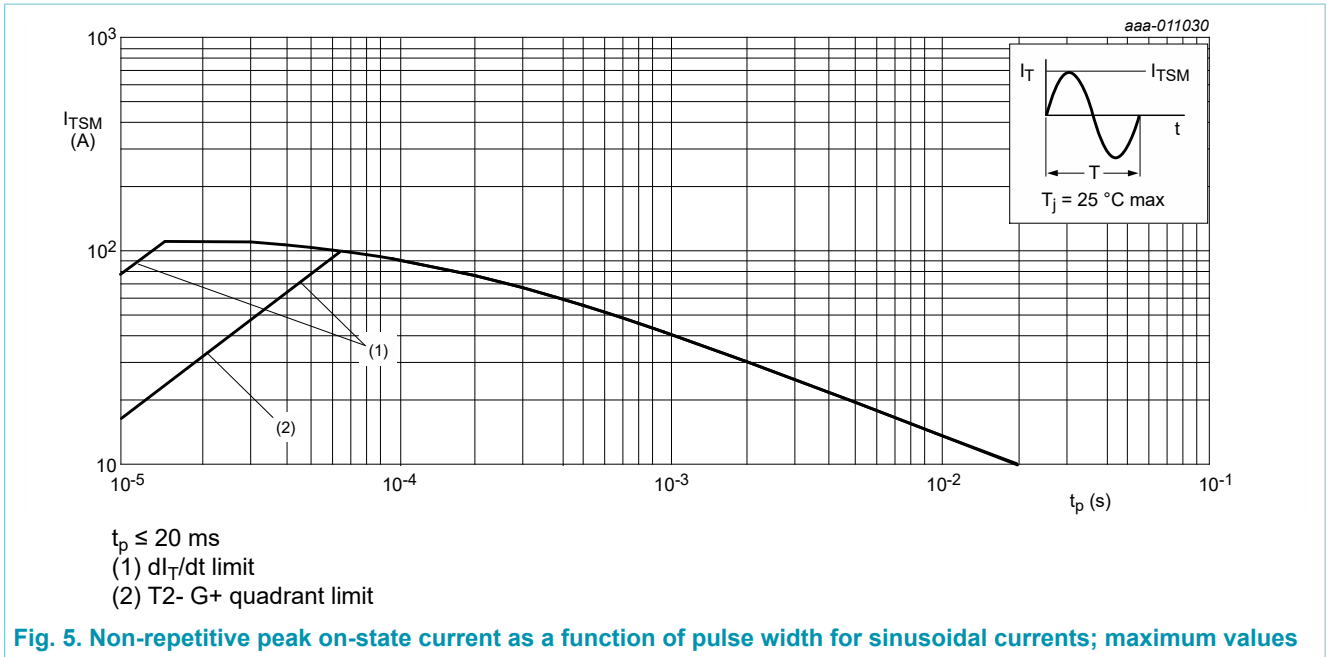


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



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

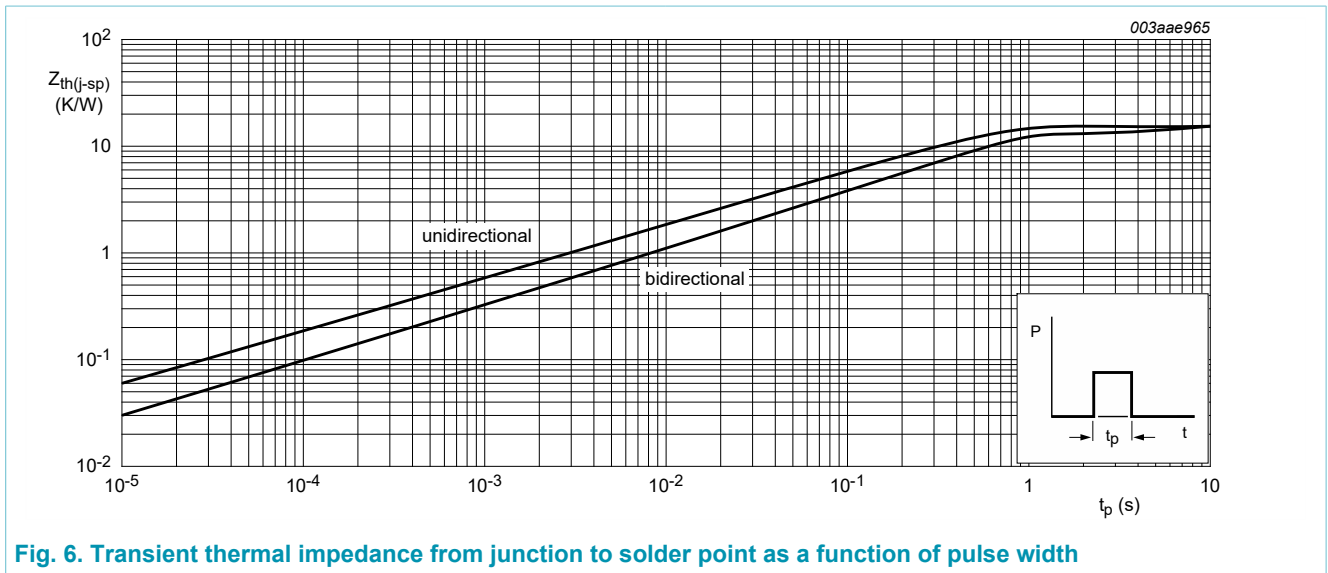
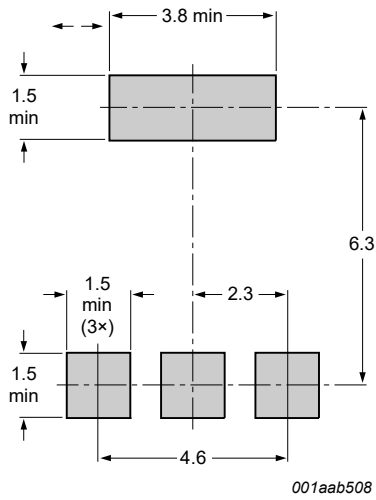
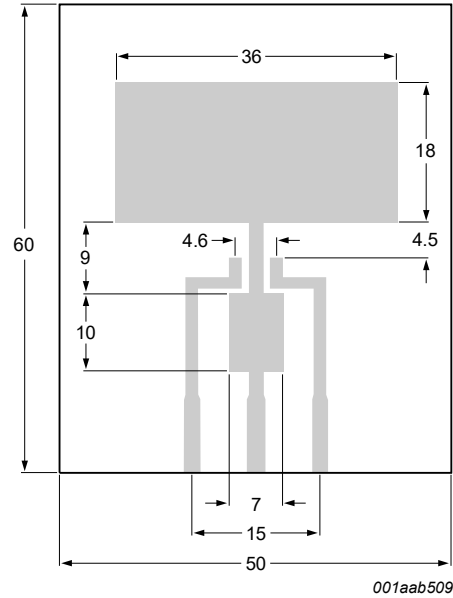


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width



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

## 10. Characteristics

Table 7. 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>	-	2.5	10	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>	-	4	10	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>	-	5	10	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>	-	11	25	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>	-	3	15	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>	-	10	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>	-	2.5	15	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	20	mA
$I_H$	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 11</a>	-	2.2	15	mA
$V_T$	on-state voltage	$I_T = 2\text{ A}; T_j = 25\text{ }^\circ\text{C};$ <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>	0.25	0.4	-	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; gate open circuit	-	30	-	V/ $\mu$ 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	-	$\mu$ s



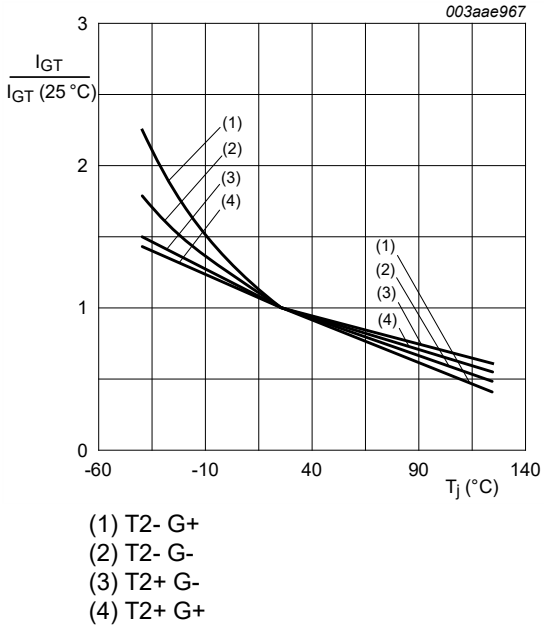


Fig. 9. Normalized gate trigger current as a function of junction temperature

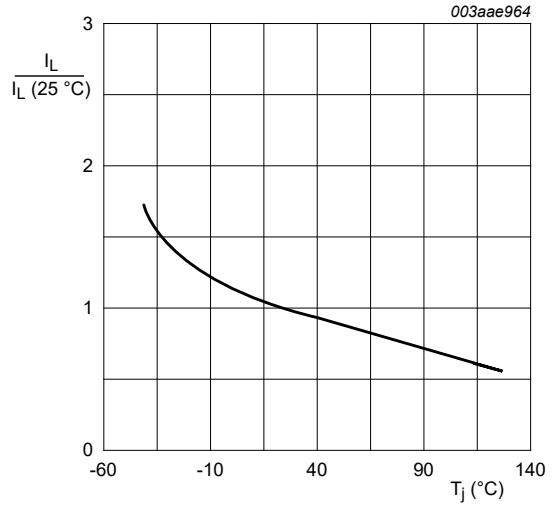


Fig. 10. Normalized latching current as a function of junction temperature

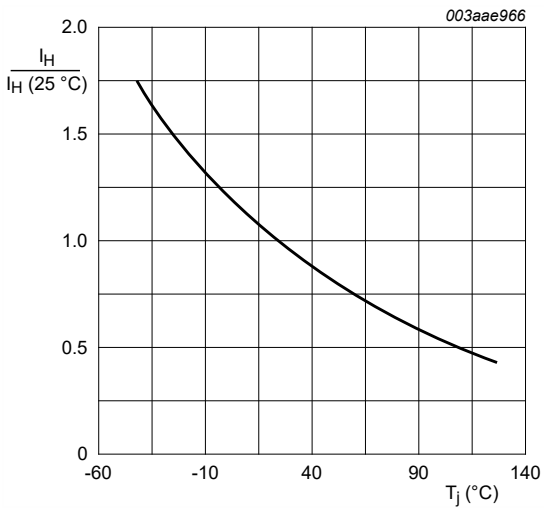
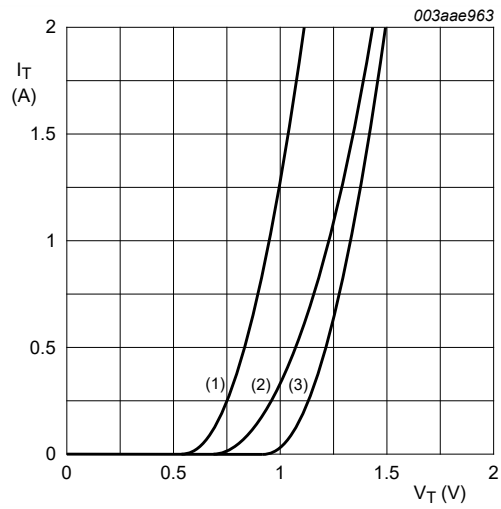


Fig. 11. Normalized holding current as a function of junction temperature



$V_o = 1.00\text{ V}$ ;  $R_s = 0.21\ \Omega$

- (1)  $T_j = 125^\circ\text{C}$ ; typical values
- (2)  $T_j = 125^\circ\text{C}$ ; maximum values
- (3)  $T_j = 25^\circ\text{C}$ ; maximum values

Fig. 12. On-state current as a function of on-state voltage

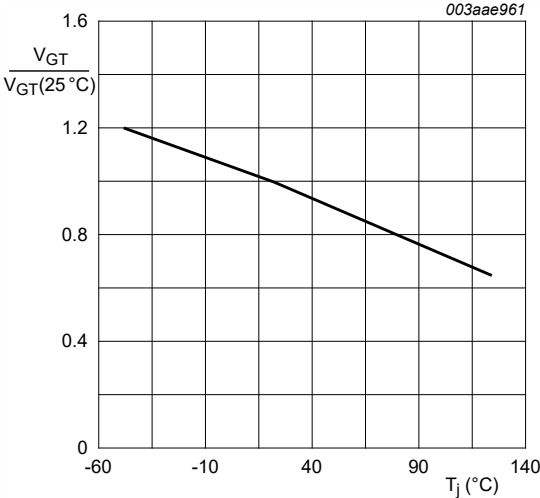


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

### 11. Package outline

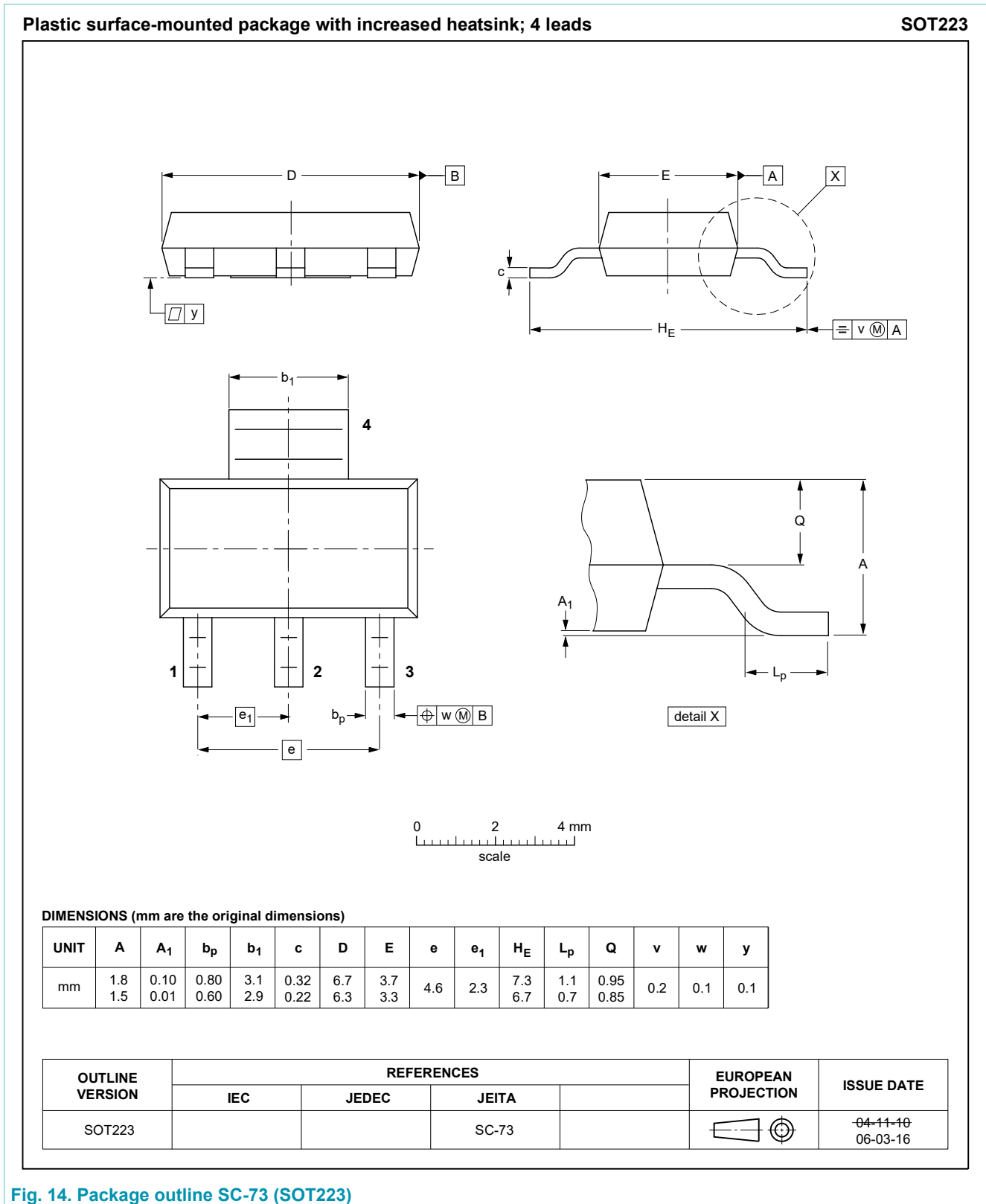


Fig. 14. Package outline SC-73 (SOT223)

### 12. Package outline (minimized)

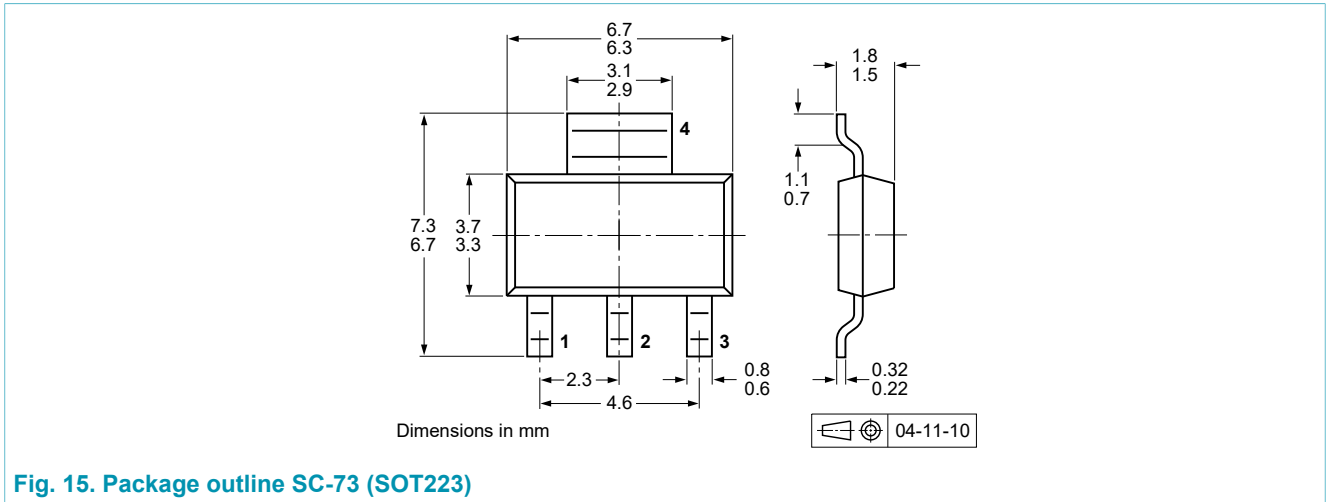


Fig. 15. Package outline SC-73 (SOT223)

### 13. Soldering

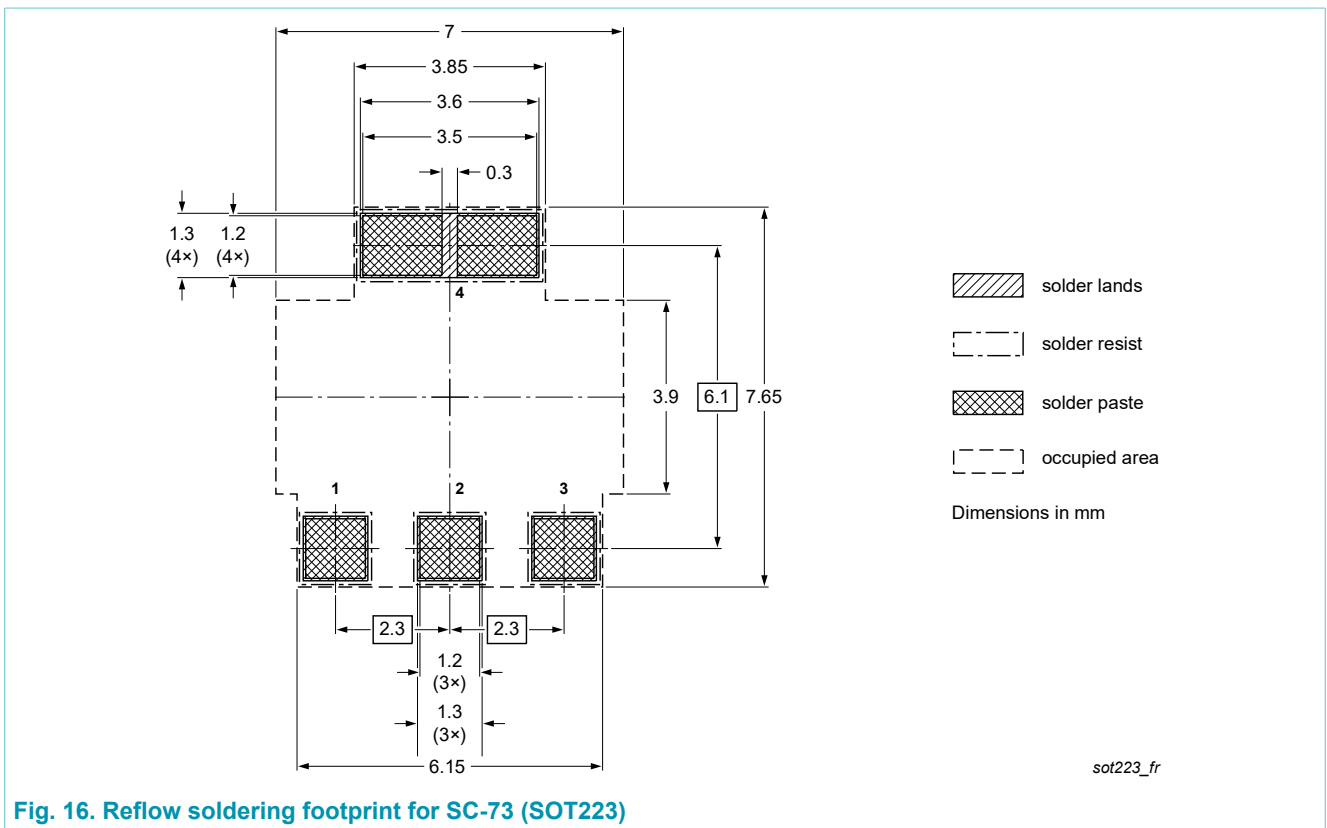
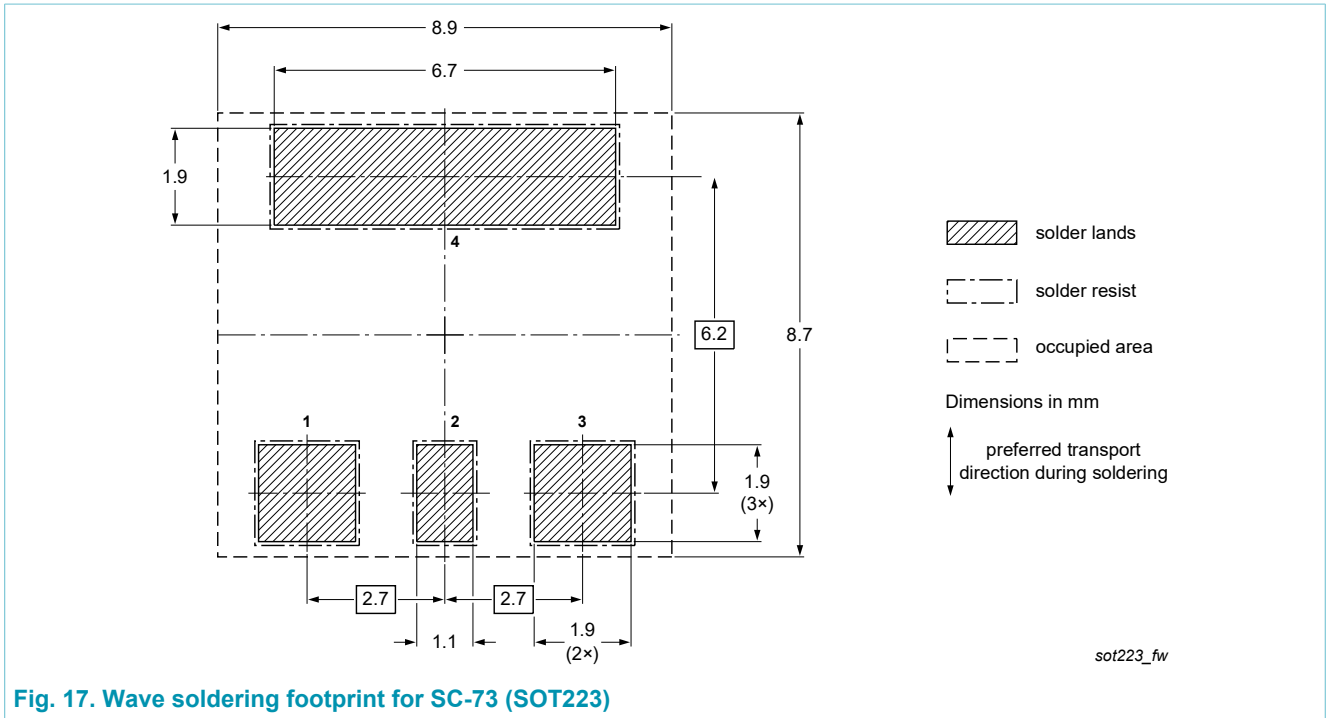


Fig. 16. Reflow soldering footprint for SC-73 (SOT223)



## 14. Legal information

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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.
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