

## 1. General description

Planar passivated sensitive gate four quadrant triac in a SOT223 surface-mountable plastic package. This sensitive gate "series D" 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
- 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

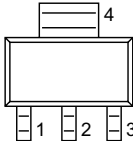
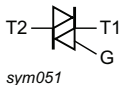
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Absolute maximum rating</b>						
$V_{DRM}$	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
$T_j$	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	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	2.5	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	2.5	5	mA

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>		-	5	10	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 11</a>		-	1.2	10	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
Dynamic characteristics							
$dV_D/dt$	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; $R_{GT1(ext)} = 1\text{ k}\Omega$		-	5	-	V/ $\mu\text{s}$

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		
2	T2	main terminal 2		
3	G	gate		
4	T2	main terminal 2		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BT134W-600D	SOT223	BT134W-600D,115	Reel	1000	SOT223	16-Mar-2006

7. Marking

Table 4. Marking codes

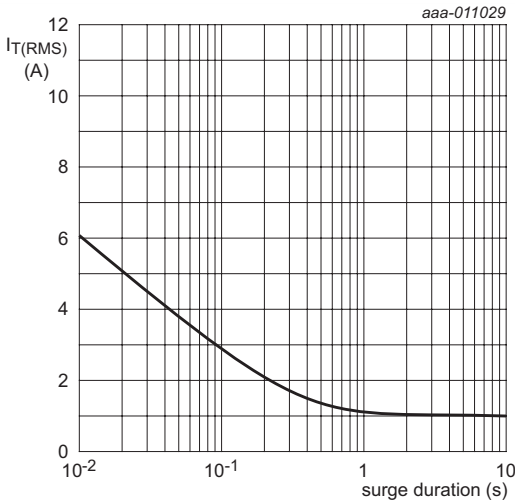
Type number	Marking codes	
	Assembly factory: L	Assembly factory: d
BT134W-600D	JLxxx 6D BT134W	Jdxxx 6D BT134W

## 8. Limiting values

**Table 5. Limiting values**

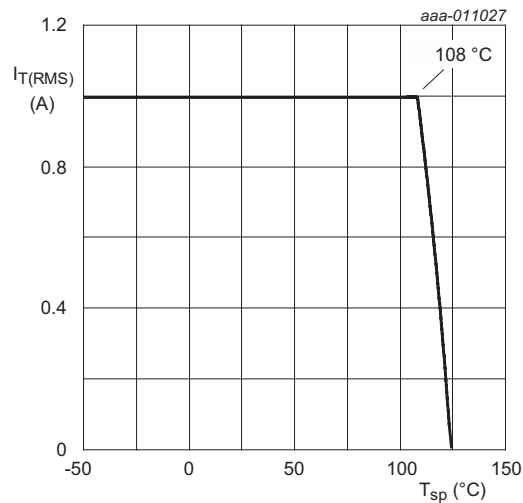
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
$V_{\text{DRM}}$	repetitive peak off-state voltage			-	600	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 108\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	1	A
$I_{\text{TSM}}$	non-repetitive peak on-state current	full sine wave; $T_{\text{j(init)}} = 25\text{ °C}$ ; $t_{\text{p}} = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		-	10	A
		full sine wave; $T_{\text{j(init)}} = 25\text{ °C}$ ; $t_{\text{p}} = 16.7\text{ ms}$		-	11	A
$I^2t$	$I^2t$ for fusing	$t_{\text{p}} = 10\text{ ms}$ ; SIN		-	0.5	$\text{A}^2\text{s}$
$di_{\text{T}}/dt$	rate of rise of on-state current	$I_{\text{G}} = 10\text{ mA}$		-	50	$\text{A}/\mu\text{s}$
				-	50	$\text{A}/\mu\text{s}$
		$I_{\text{G}} = 20\text{ mA}$		-	10	$\text{A}/\mu\text{s}$
		$I_{\text{G}} = 10\text{ mA}$		-	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	$^{\circ}\text{C}$



$f = 50\text{ Hz}$ ;  $T_{\text{sp}} \leq 108\text{ °C}$

**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**

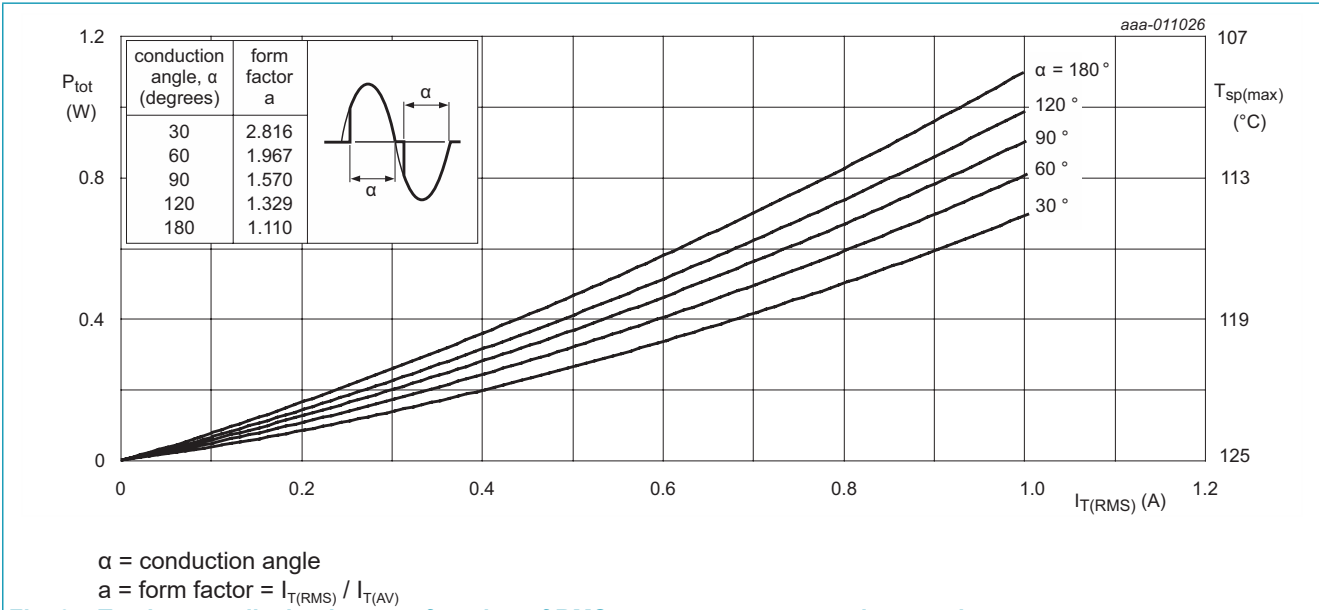
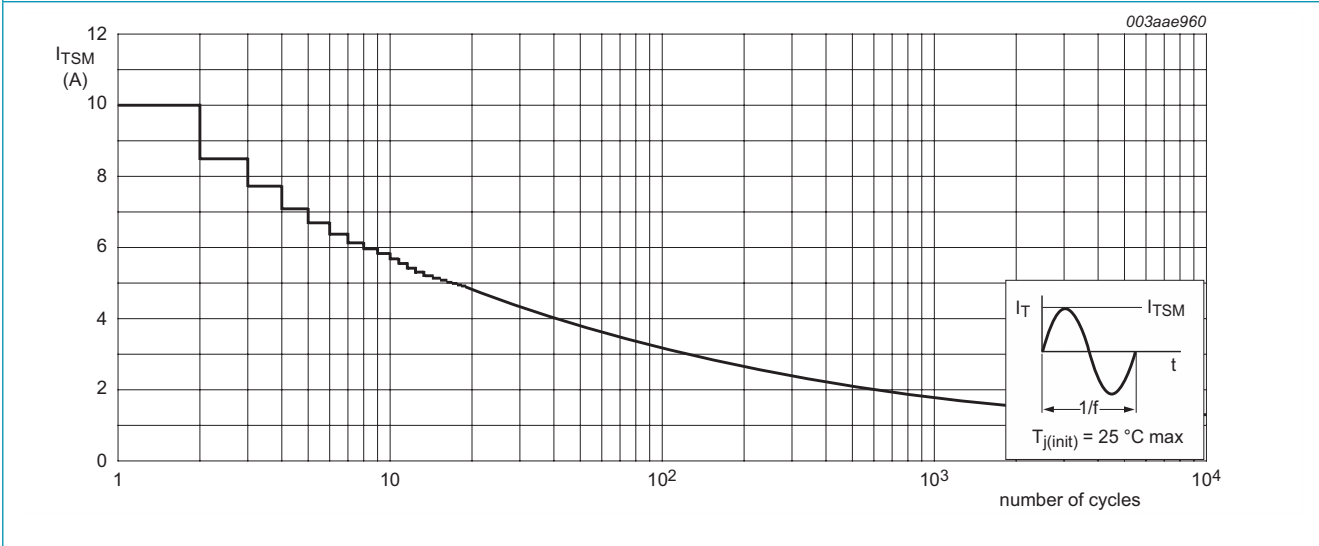
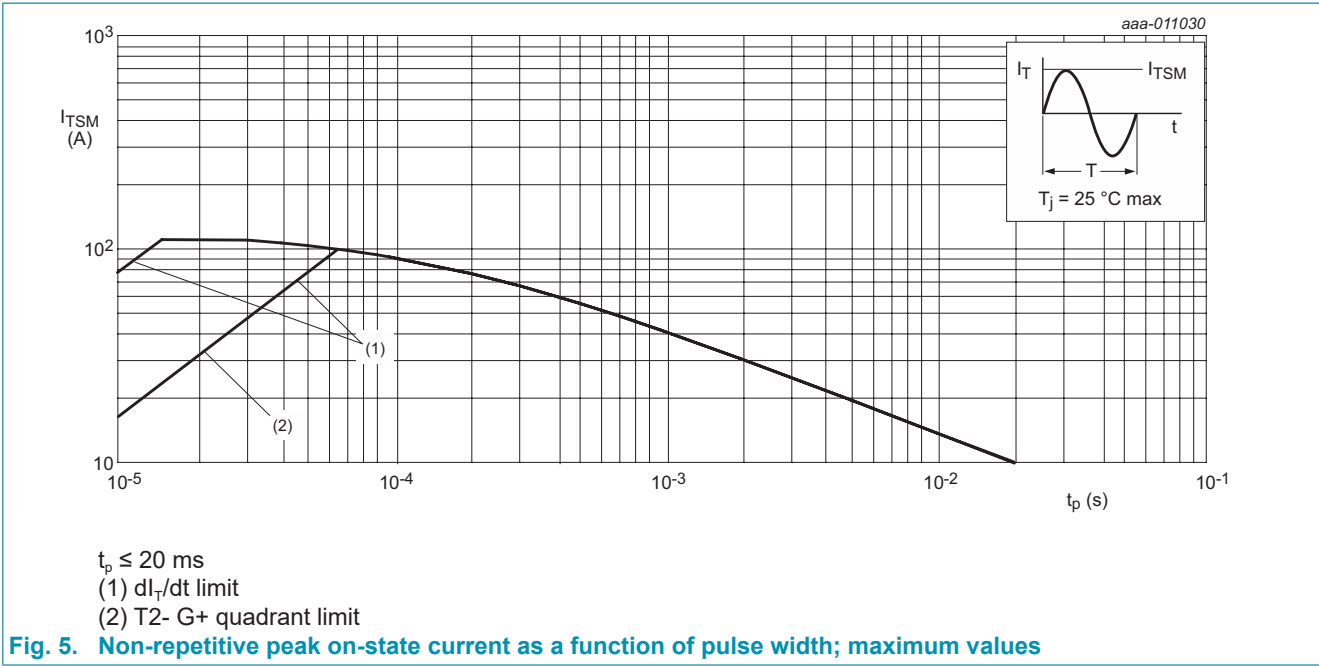


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values



$f = 50\text{ Hz}$   
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; Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	full cycle; printed circuit board mounted; minimum footprint; Fig. 7	-	156	-	K/W
		full cycle; printed circuit board mounted; pad area; Fig. 8	-	70	-	K/W

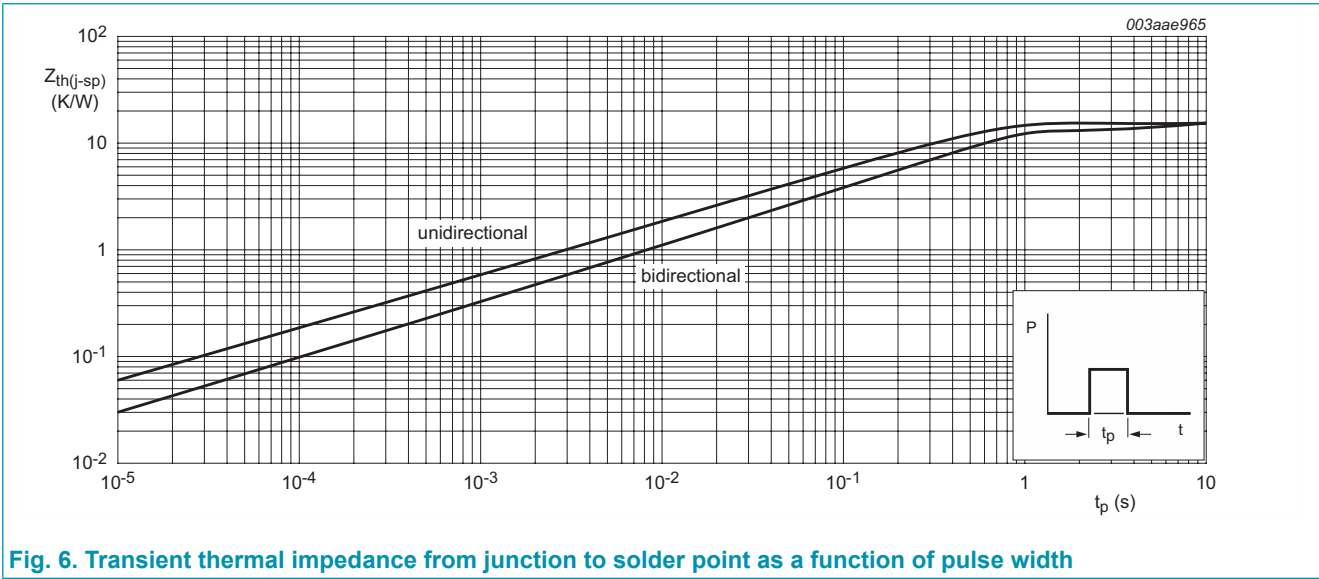
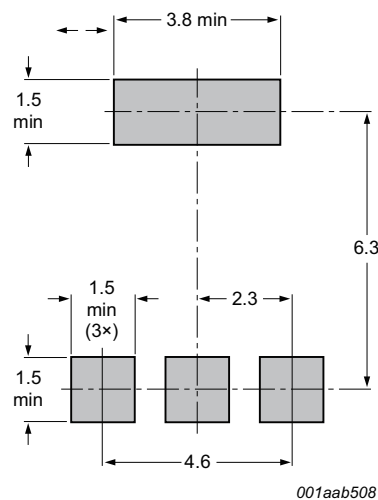
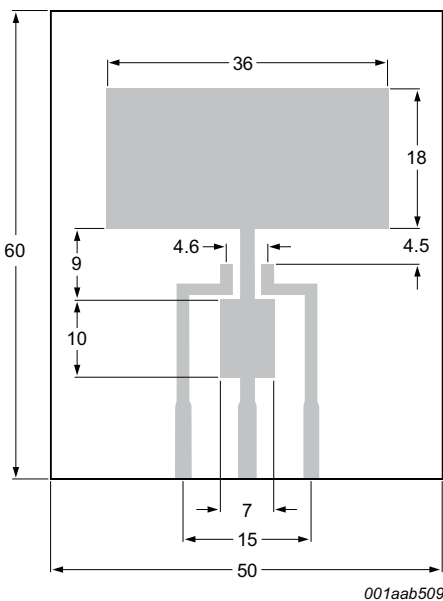


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width



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)

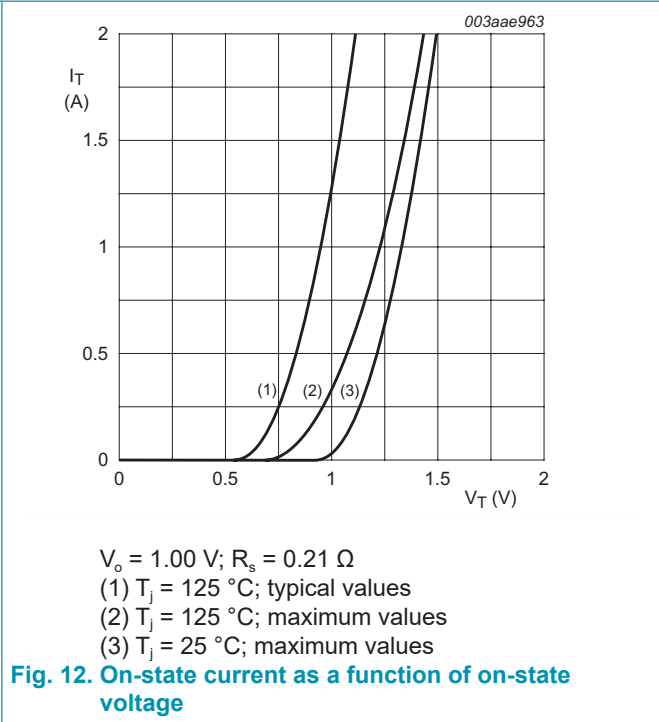
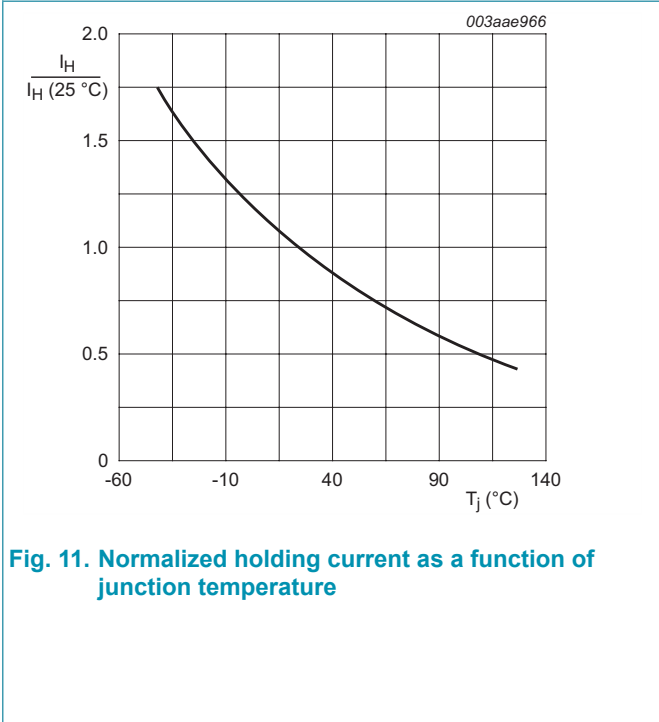
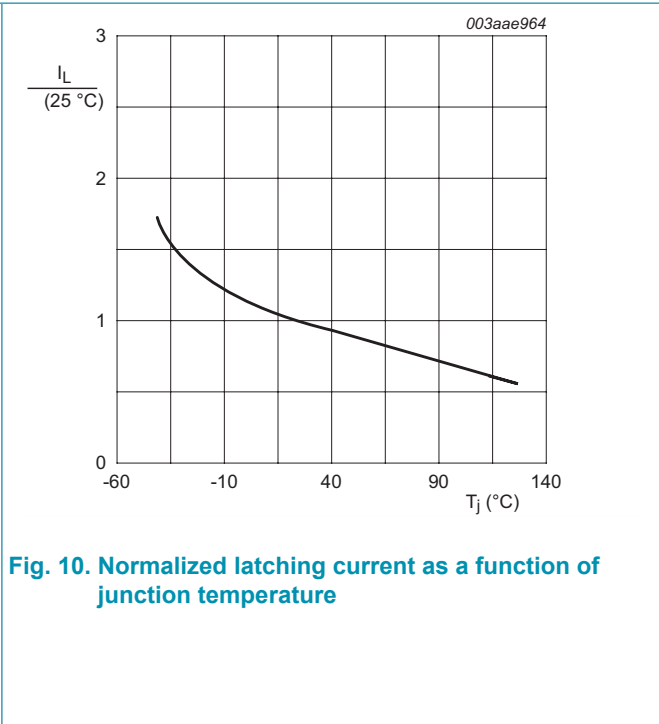
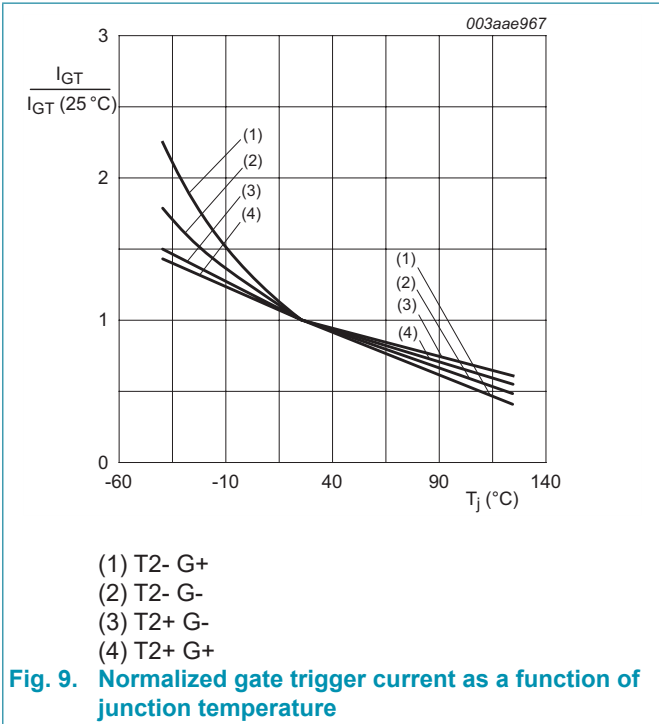
Fig. 8. Printed circuit board pad area: SOT223

## 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	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>		-	2.5	5	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>		-	2.5	5	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
$I_L$	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>		-	1.6	10	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>		-	4.5	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>		-	1.2	10	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>		-	2.2	10	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 11</a>		-	1.2	10	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; $R_{GT1(ext)} = 1\text{ k}\Omega$		-	5	-	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	-	$\mu\text{s}$





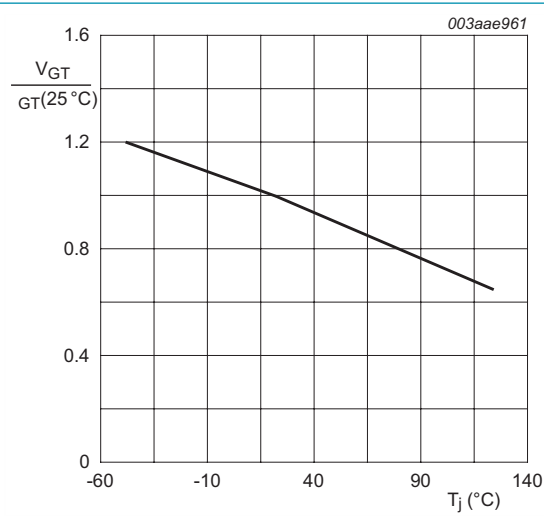


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

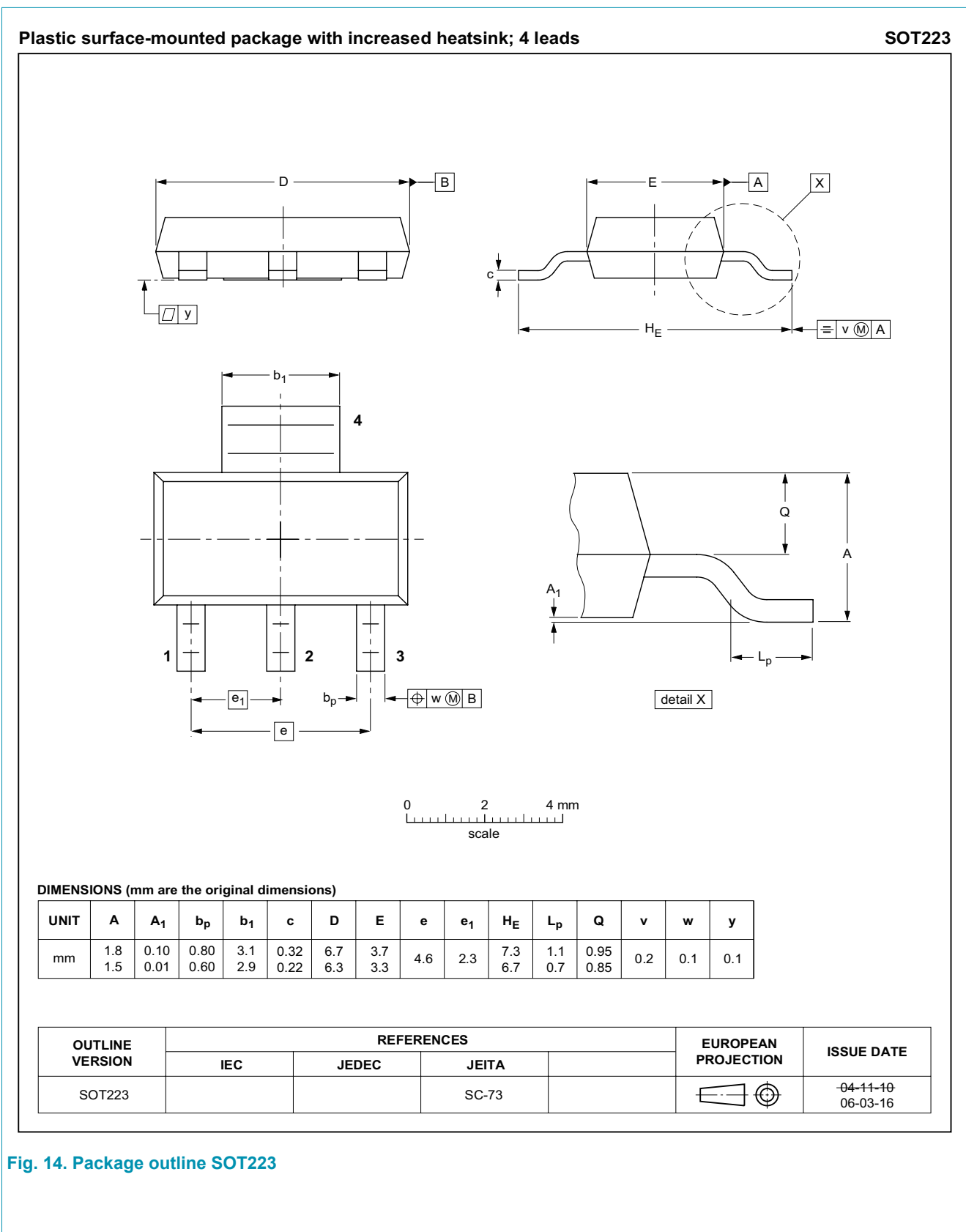
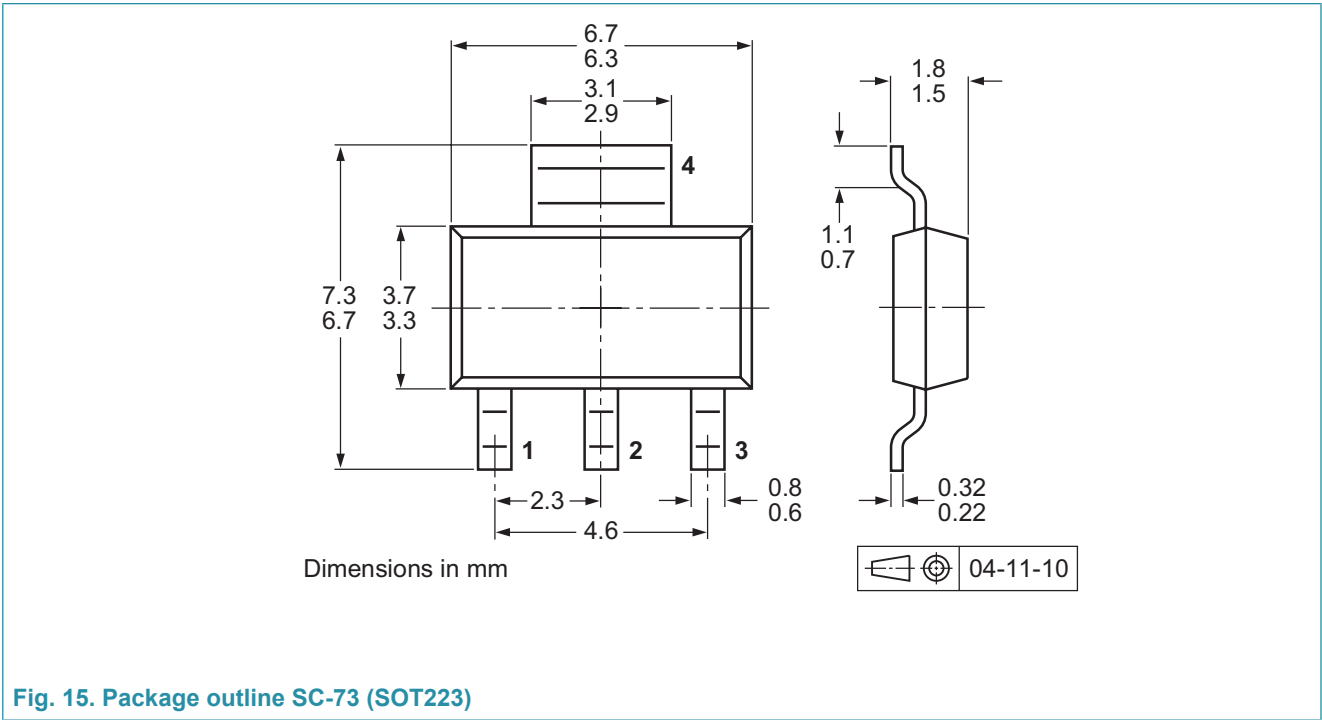
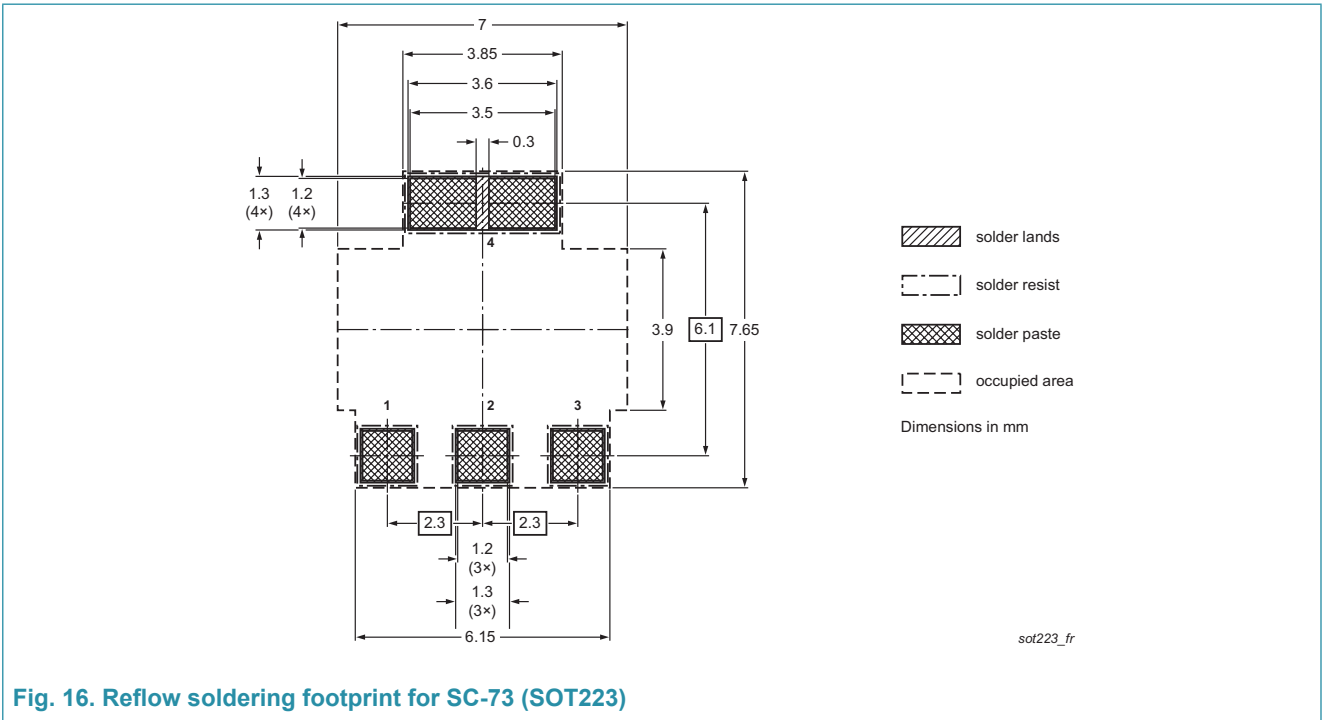


Fig. 14. Package outline SOT223

12. Package outline (minimized)



13. Soldering



**Fig. 17. Wave 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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15. 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. Package outline (minimized) ..... 12

13. Soldering ..... 12

14. Legal information ..... 14

15. Contents ..... 16

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