

## 1. General description

Planar passivated ultra sensitive gate Silicon Controlled Rectifier in a SOT223 surface mountable plastic package.

## 2. Features and benefits

- Planar passivated for voltage ruggedness and reliability
- Ultra sensitive gate
- Surface mountable package

## 3. Applications

- Electronic ballasts
- Safety shut down and protection circuits
- Sensing circuits
- Smoke detectors
- Switched Mode Power Supplies

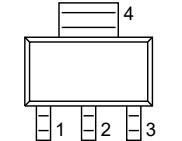

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	400	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 114\text{ °C}$ ; <a href="#">Fig. 1</a>	-	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 114\text{ °C}$ ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	0.8	A
$I_{TSM}$	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 10\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	-	-	8	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 8.3\text{ ms}$	-	-	9	A
$T_j$	junction temperature		-	-	125	°C
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	3	12	μA
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 268\text{ V}$ ; $T_j = 125\text{ °C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit	-	150	-	V/μs

# 5. Pinning information

Table 2. Pinning information

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

# 6. Ordering information

Table 3. Ordering information

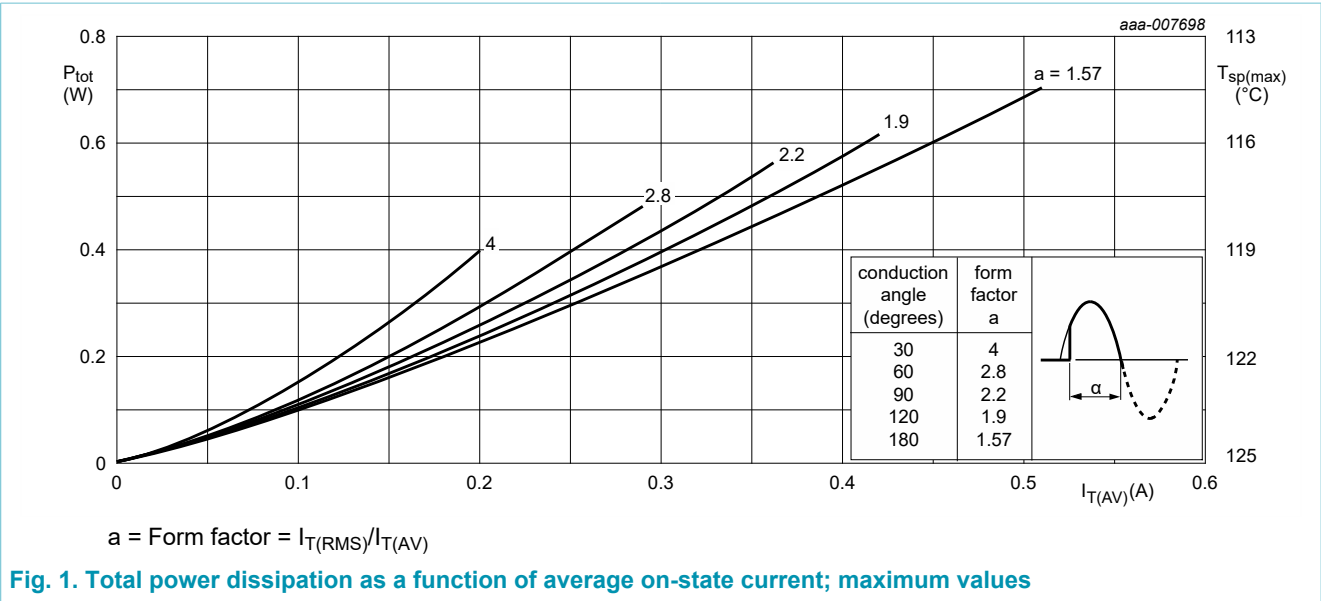
Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
EC103D1W	SOT223	EC103D1WX	Reel	1000	SOT223	16-Mar-2006
		EC103D1WF	Reel	4000		

Orderable part number	Marking codes	
	Assembly factory: d	Assembly factory: L
EC103D1WX	Jdxxx 103D1W	JLxxx 103D1W
EC103D1WF	Jdxxx 103D1W	-

7. Limiting values

Table 4. 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		-	400	V
$V_{RRM}$	repetitive peak reverse voltage		-	400	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 114\text{ }^{\circ}\text{C}$ ; Fig. 1	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 114\text{ }^{\circ}\text{C}$ ; Fig. 2; Fig. 3	-	0.8	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	-	8	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 8.3\text{ ms}$	-	9	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; sine-wave pulse	-	0.32	$\text{A}^2\text{s}$
$dl_T/dt$	rate of rise of on-state current	$I_T = 2\text{ A}$ ; $I_G = 0.01\text{ A}$ ; $dl_G/dt = 0.1\text{ A}/\mu\text{s}$	-	50	$\text{A}/\mu\text{s}$
$I_{GM}$	peak gate current		-	1	A
$V_{RGM}$	peak reverse gate voltage		-	5	V
$P_{GM}$	peak gate power		-	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	$^{\circ}\text{C}$



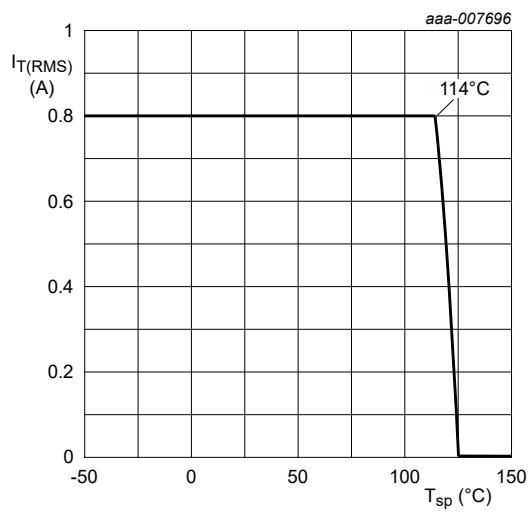


Fig. 2. RMS on-state current as a function of solder point temperature; maximum values

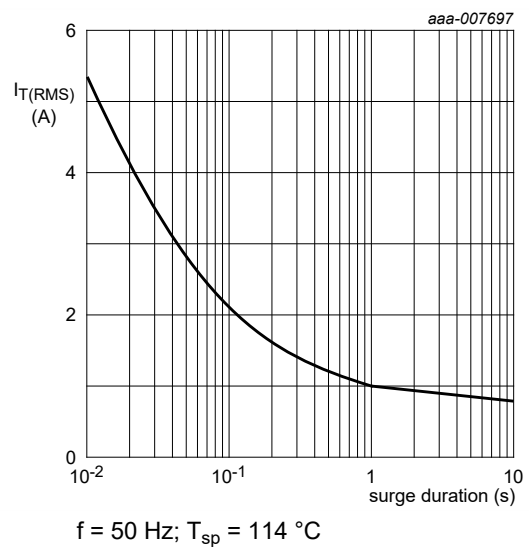


Fig. 3. RMS on-state current as a function of surge duration; maximum values

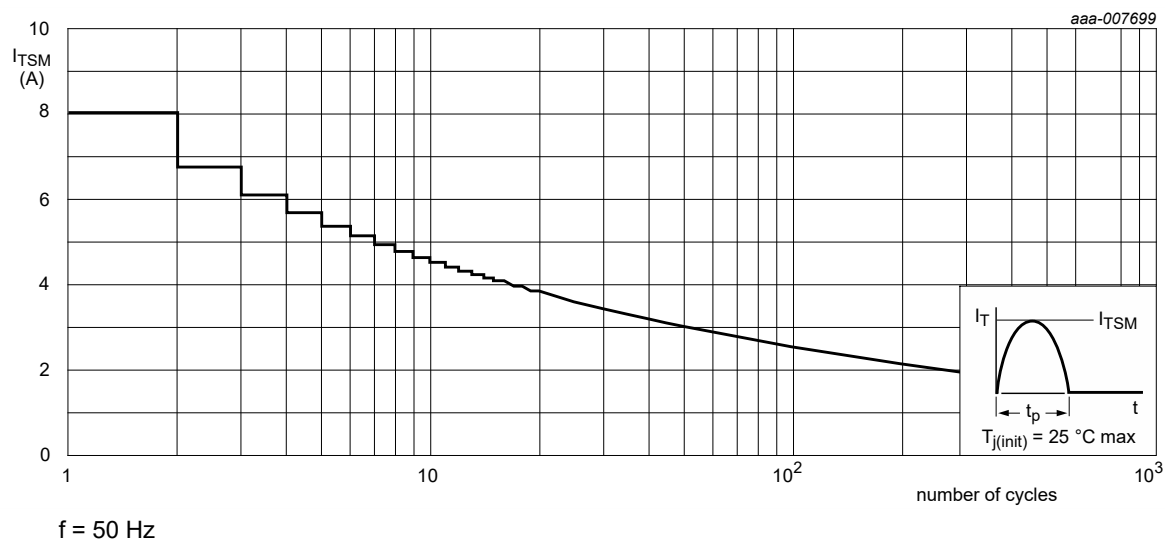
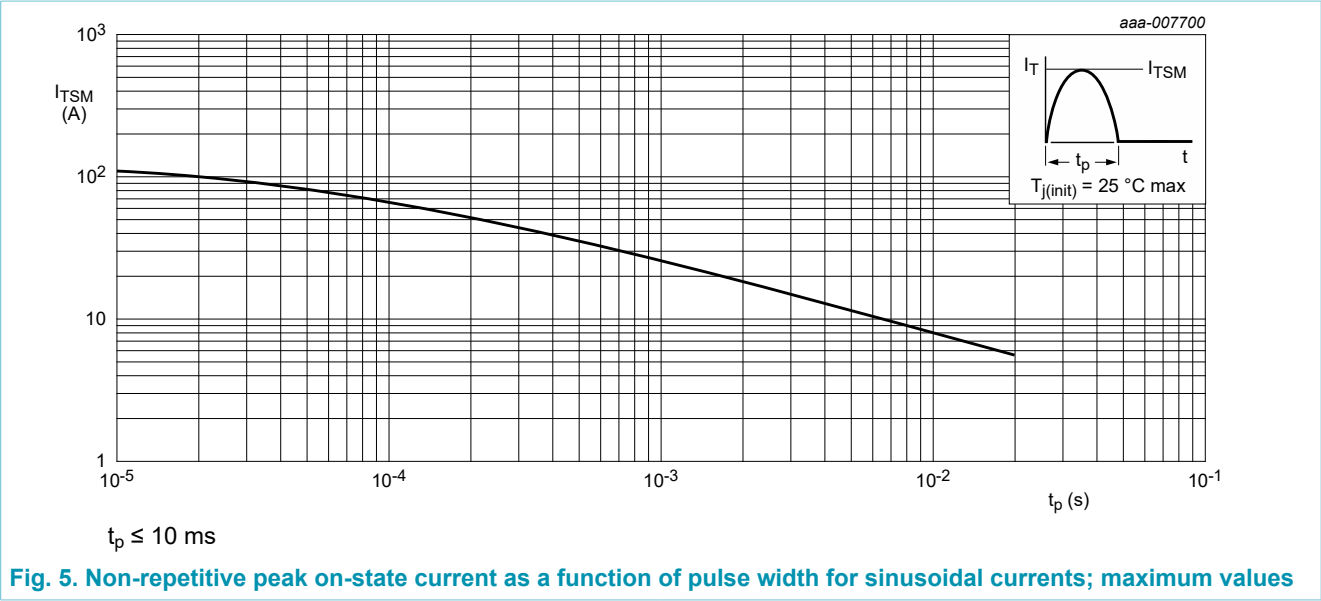


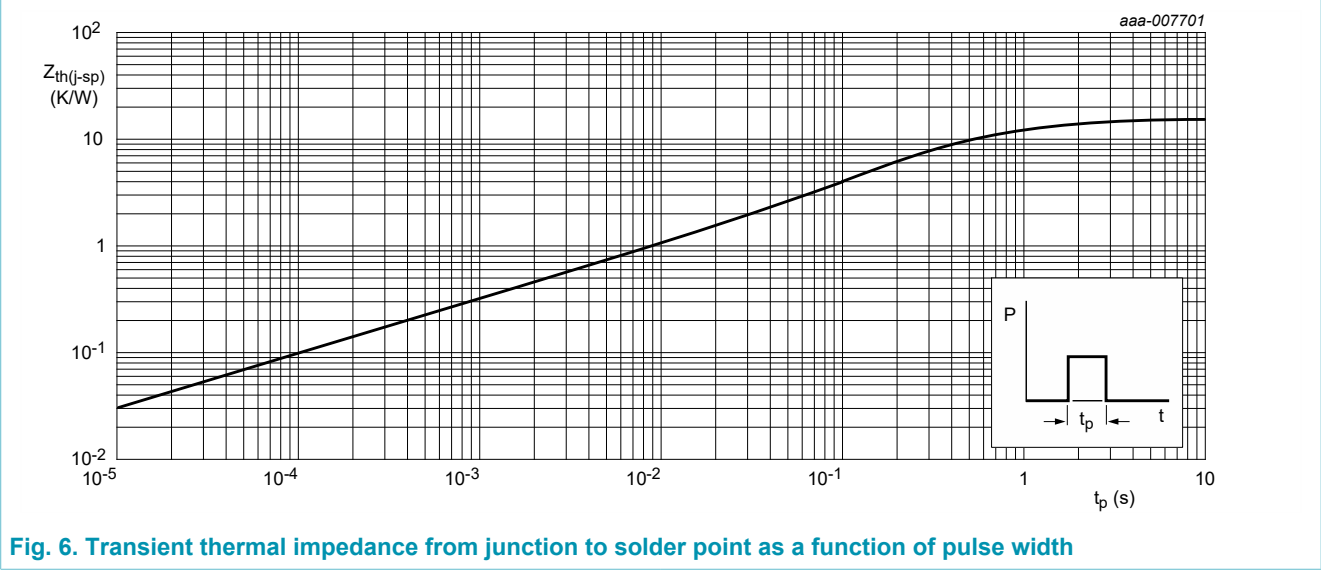
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

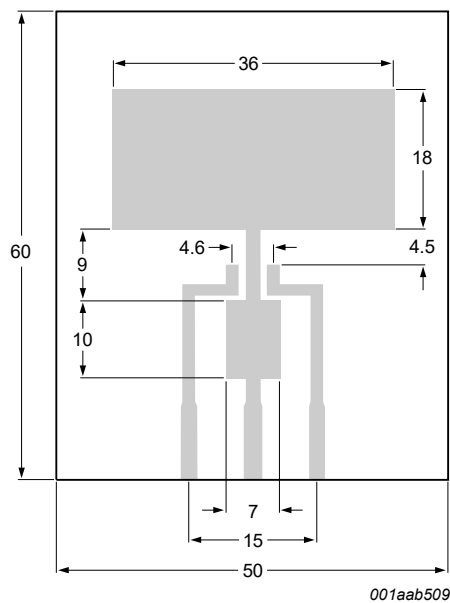


8. Thermal characteristics

Table 5. Thermal characteristics

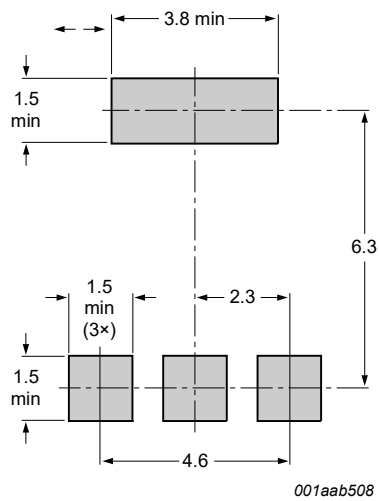
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	<a href="#">Fig. 6</a>		-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board mounted; minimum pad area; in free air; <a href="#">Fig. 7</a>		-	70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





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

Fig. 7. Printed circuit board pad area: SOT223



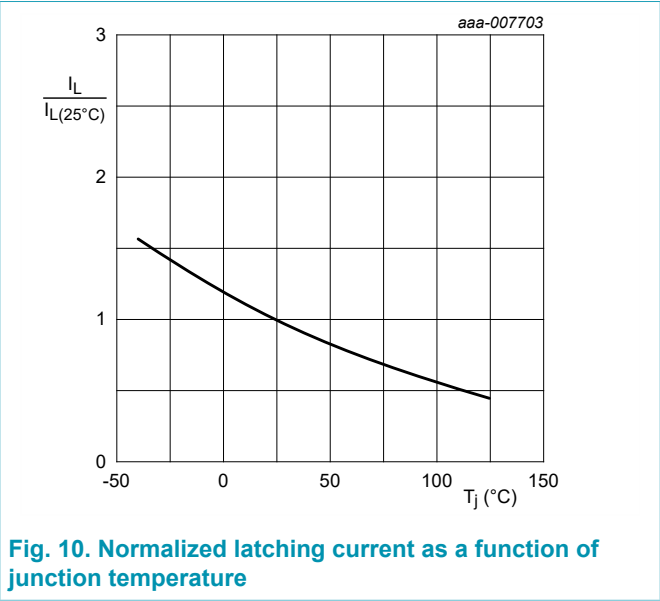
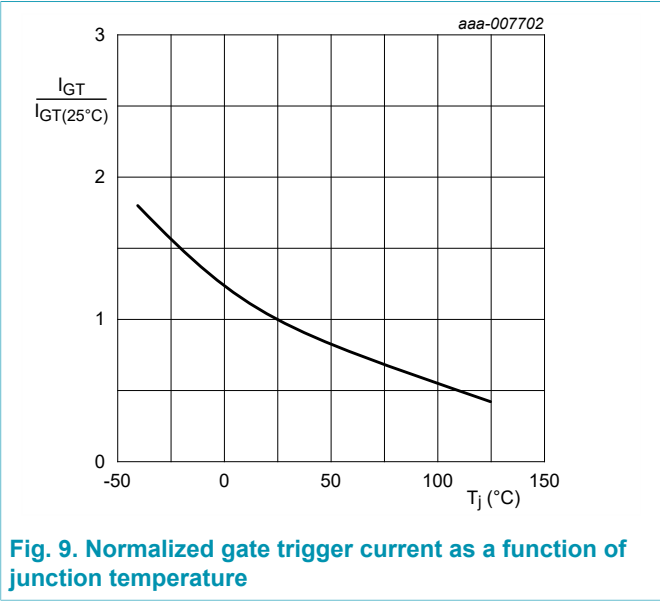
All dimensions are in mm

Fig. 8. Minimum footprint SOT223

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 9</a>		-	3	12	$\mu\text{A}$
$I_L$	latching current	$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 10</a>		-	2	6	$\text{mA}$
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 11</a>		-	2	5	$\text{mA}$
$V_T$	on-state voltage	$I_T = 1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 12</a>		-	1.2	1.35	$\text{V}$
$V_{GT}$	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>		-	0.5	0.8	$\text{V}$
		$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 13</a>		0.2	0.3	-	$\text{V}$
$I_D$	off-state current	$V_D = 400\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$		-	0.05	0.1	$\text{mA}$
$I_R$	reverse current	$V_R = 400\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$		-	0.05	0.1	$\text{mA}$
Dynamic characteristics							
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 268\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit		-	150	-	$\text{V}/\mu\text{s}$





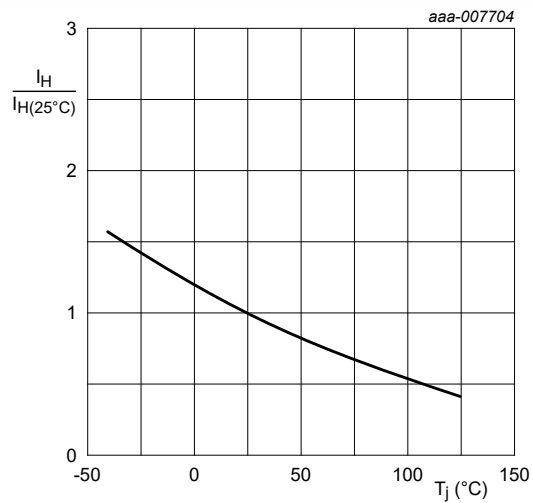
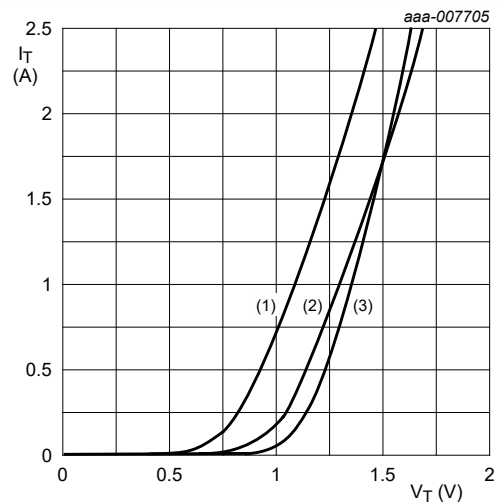


Fig. 11. Normalized holding current as a function of junction temperature



$V_o = 0.987\text{ V}; R_s = 0.3125\ \Omega$   
(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

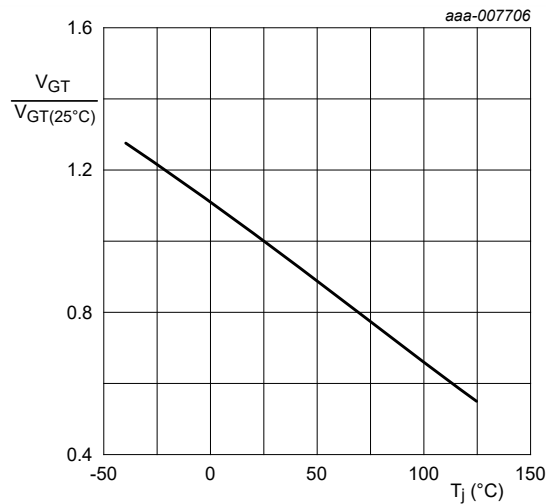


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

10. Package outline

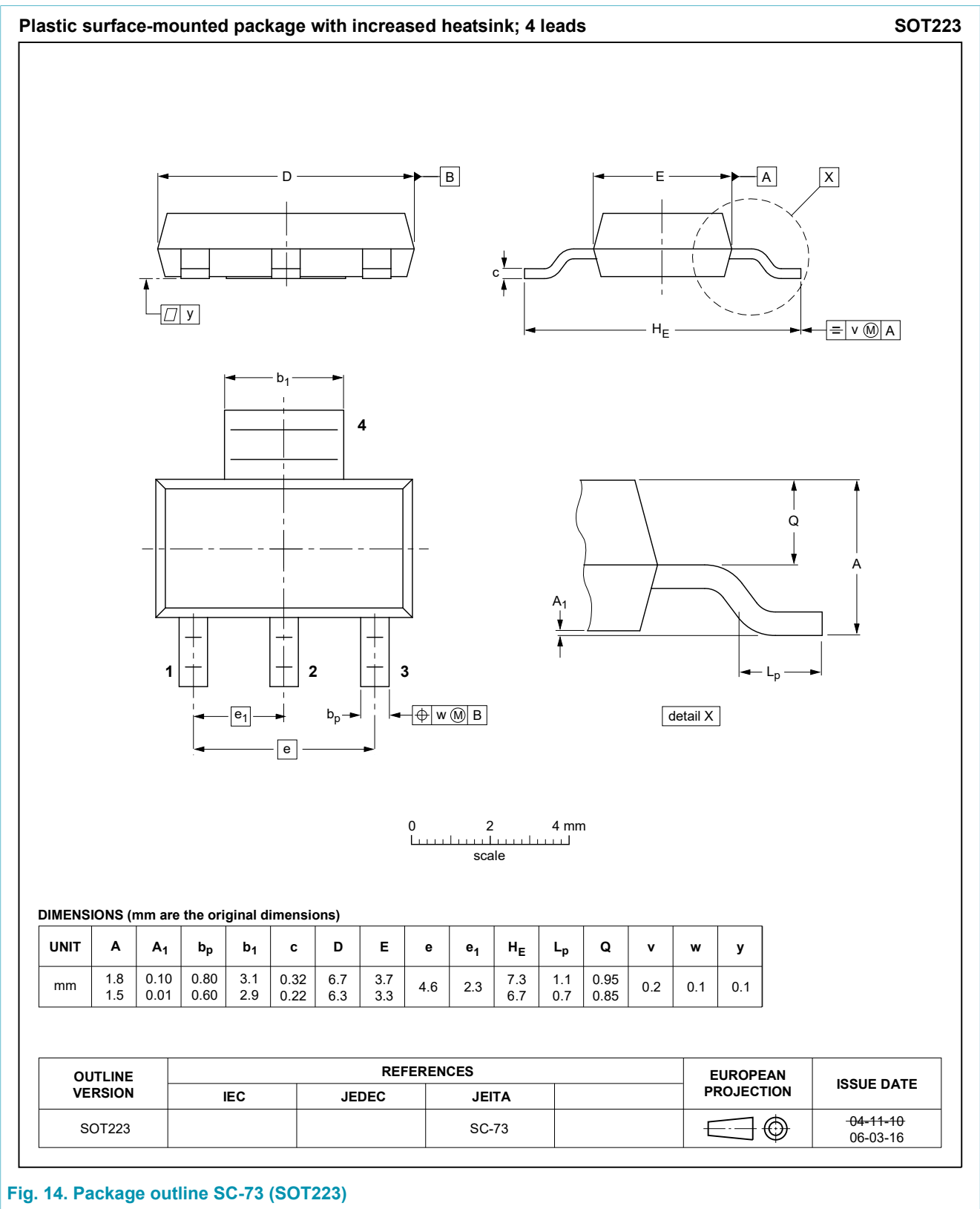


Fig. 14. Package outline SC-73 (SOT223)

## 11. Legal information

### 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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