

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

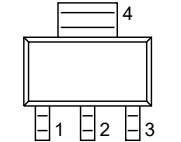
4. Quick reference data

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; $T_{sp} \leq 114\text{ °C}$; Fig. 1	-	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 114\text{ °C}$; Fig. 2 ; Fig. 3	-	-	0.8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	-	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
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ °C}$; Fig. 9	-	3	12	μA
Dynamic characteristics						
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	 SC-73 (SOT223)	
2	A	anode		
3	G	gate		
4	mb	mounting base; connected to anode		

6. Ordering information

Table 3. Ordering information

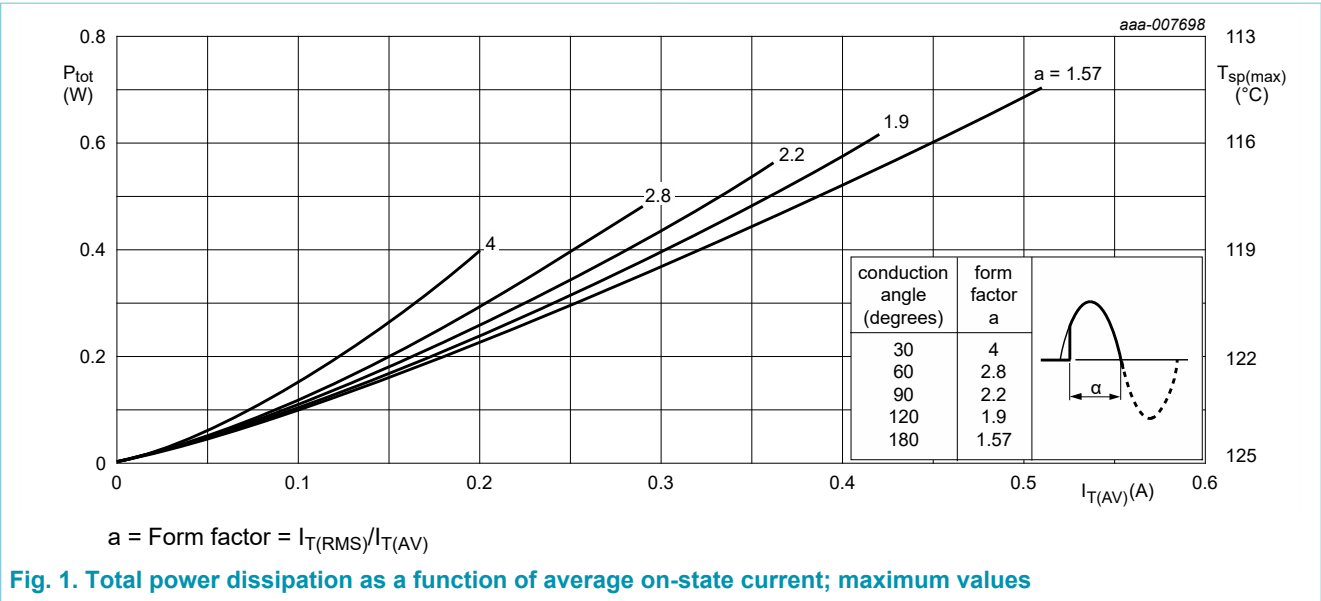
Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
EC103D1W	SOT223	EC103D1WX	Reel	1000	SOT223	16-Mar-2006
		EC103D1WF	Reel	4000		

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
$I_{\text{T(AV)}}$	average on-state current	half sine wave; $T_{\text{sp}} \leq 114\text{ }^{\circ}\text{C}$; Fig. 1	-	0.5	A
$I_{\text{T(RMS)}}$	RMS on-state current	half sine wave; $T_{\text{sp}} \leq 114\text{ }^{\circ}\text{C}$; Fig. 2; Fig. 3	-	0.8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 10\text{ ms}$; Fig. 4; Fig. 5	-	8	A
		half sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 8.3\text{ ms}$	-	9	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$; sine-wave pulse	-	0.32	A^2s
dl_{T}/dt	rate of rise of on-state current	$I_{\text{T}} = 2\text{ A}$; $I_{\text{G}} = 0.01\text{ A}$; $dl_{\text{G}}/dt = 0.1\text{ A}/\mu\text{s}$	-	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
$P_{\text{G(AV)}}$	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	$^{\circ}\text{C}$



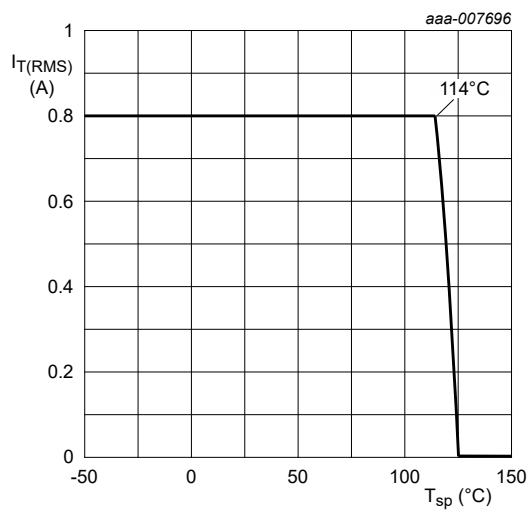


Fig. 2. RMS on-state current as a function of solder point temperature; maximum values

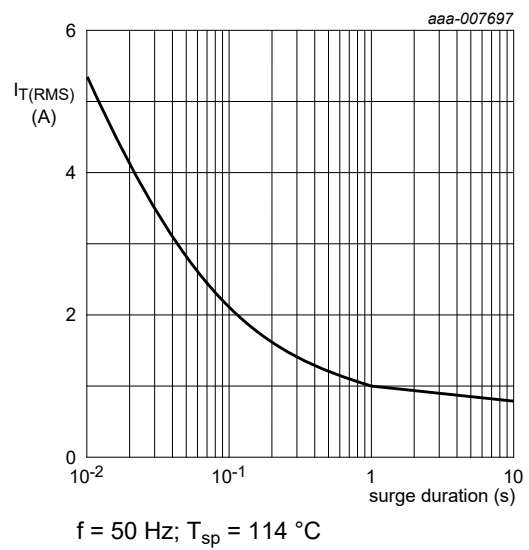


Fig. 3. RMS on-state current as a function of surge duration; maximum values

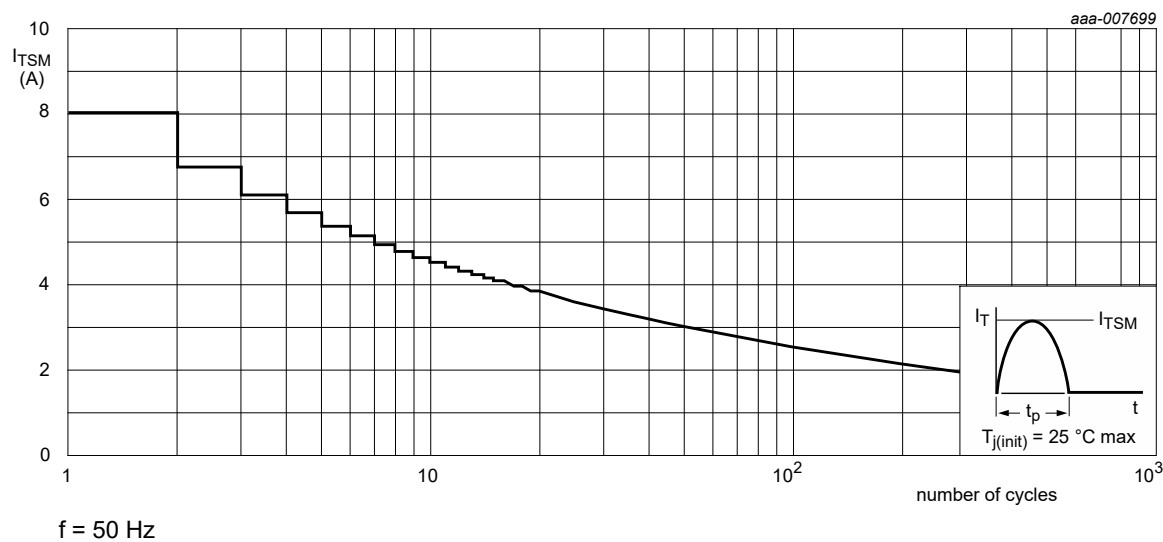
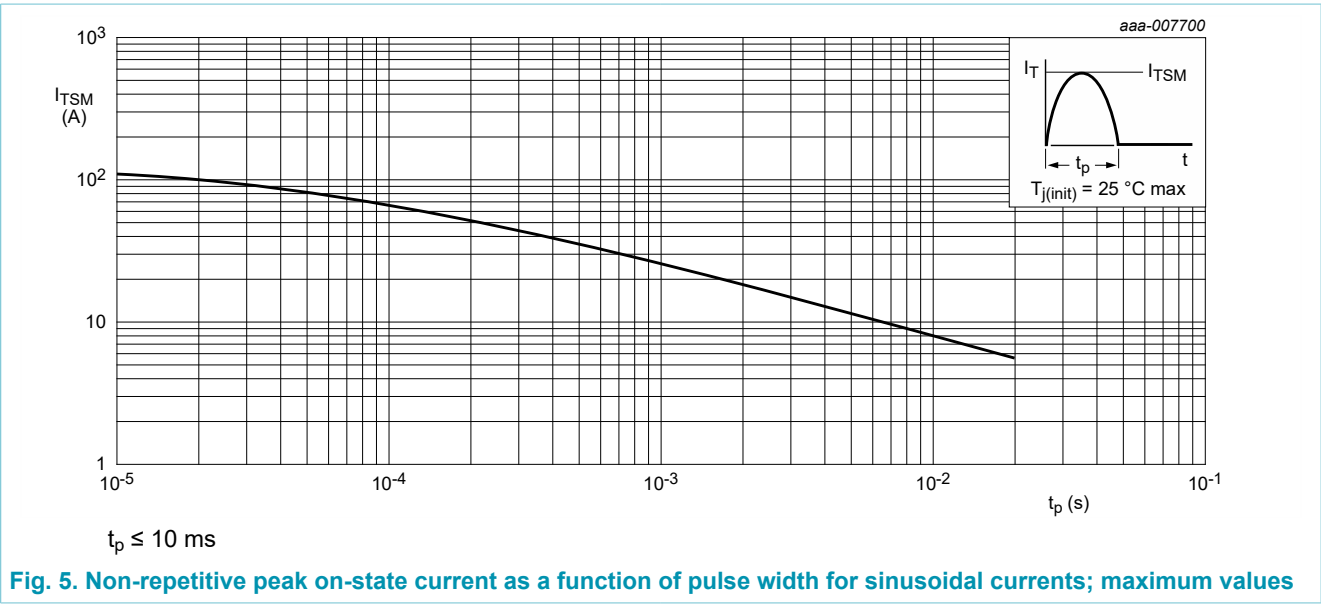


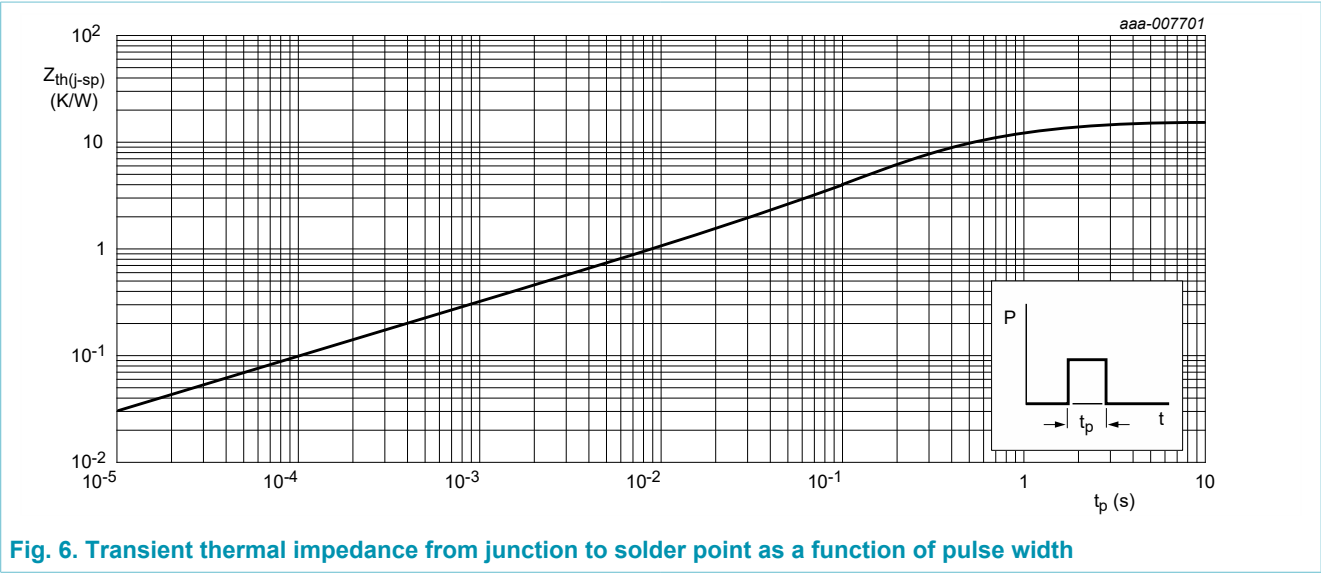
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

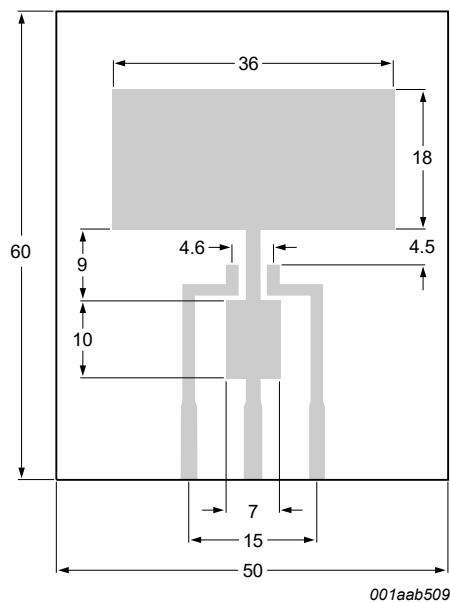


8. Thermal characteristics

Table 5. Thermal characteristics

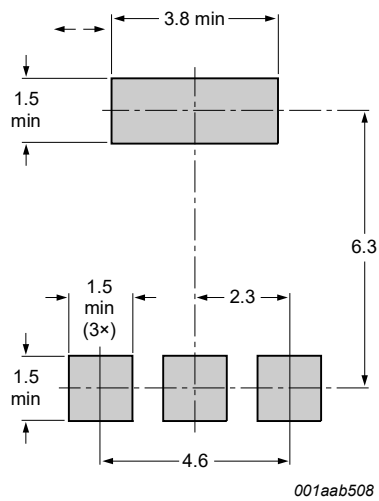
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board mounted; minimum pad area; in free air; Fig. 7	-	70	-	K/W
		printed circuit board mounted;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



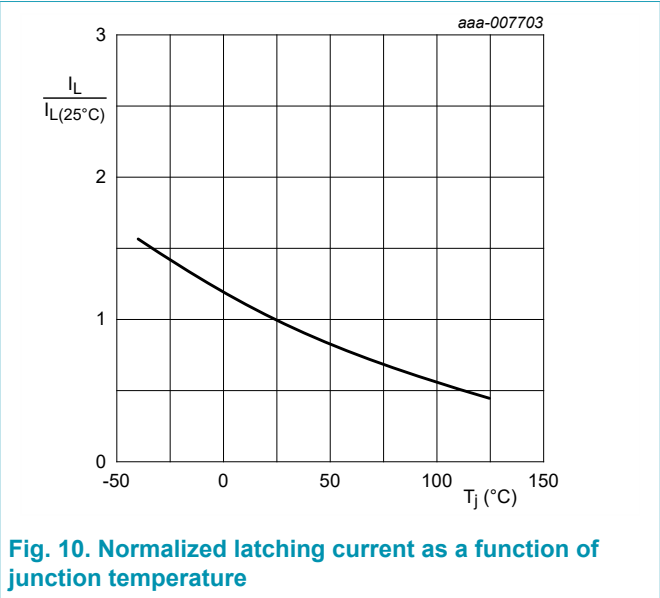
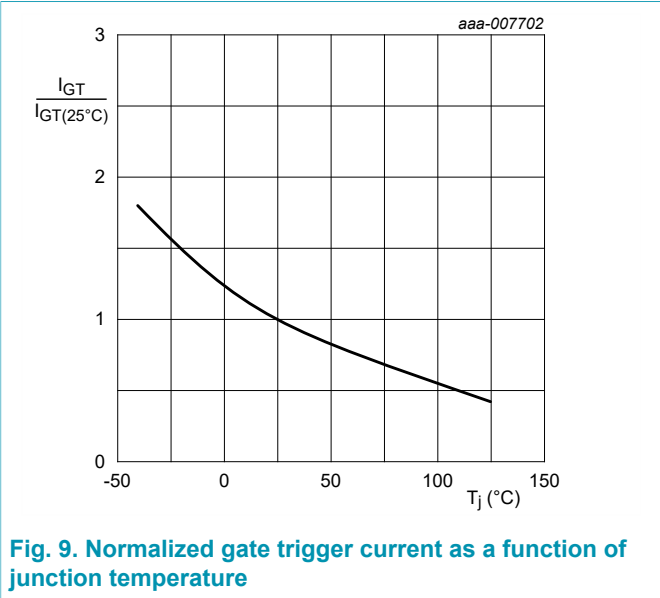
All dimensions are in mm

Fig. 8. Minimum footprint SOT223

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 9		-	3	12	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		-	2	6	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 11		-	2	5	mA
V_T	on-state voltage	$I_T = 1\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 12		-	1.2	1.35	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		-	0.5	0.8	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^{\circ}\text{C}$; Fig. 13		0.2	0.3	-	V
I_D	off-state current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$		-	0.05	0.1	mA
I_R	reverse current	$V_R = 400\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$		-	0.05	0.1	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	-	$\text{V}/\mu\text{s}$



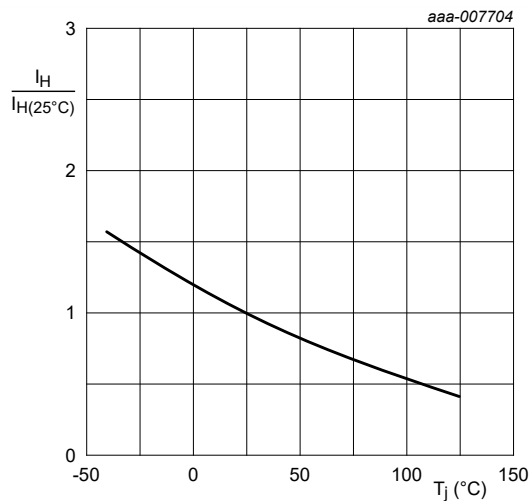
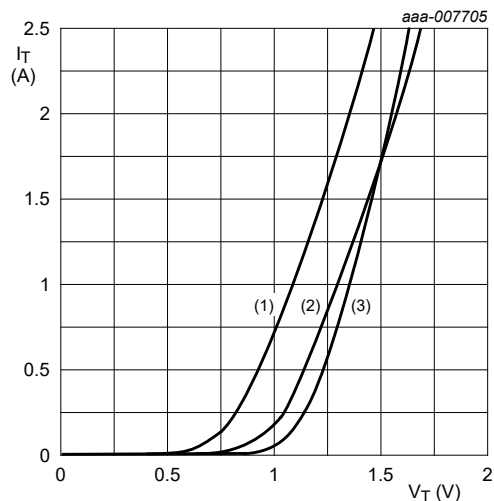


Fig. 11. Normalized holding current as a function of junction temperature



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

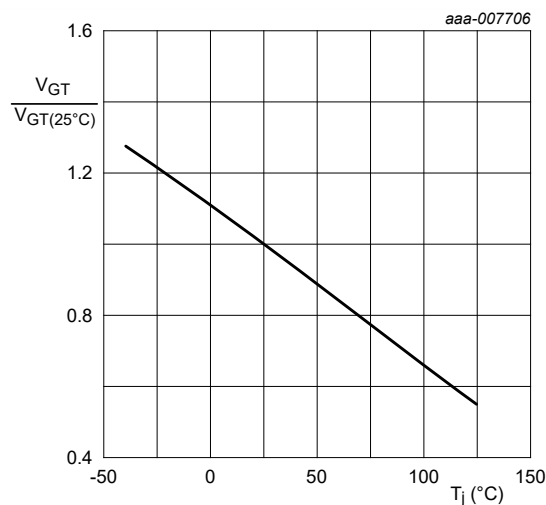
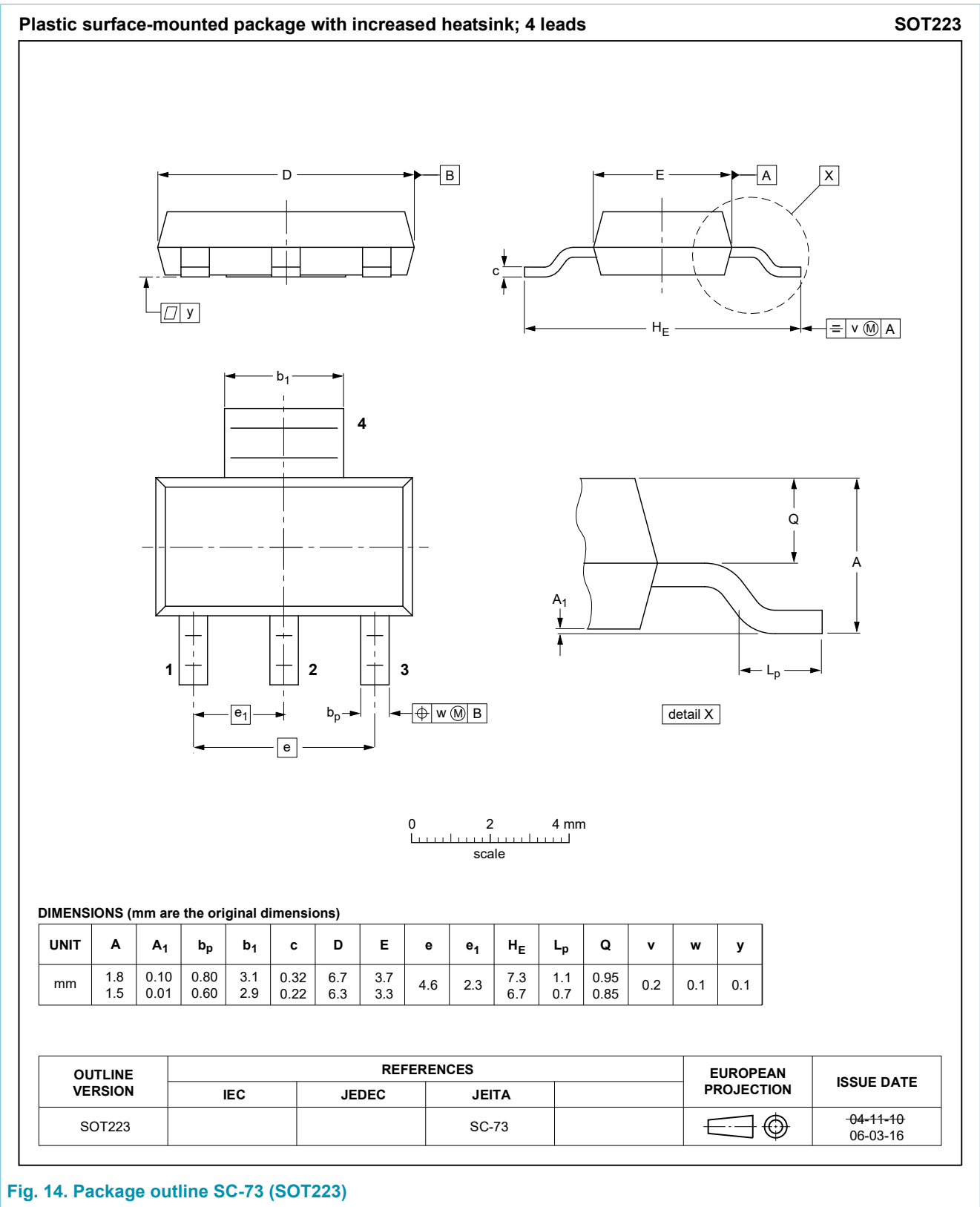


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

10. Package outline



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.
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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