



IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

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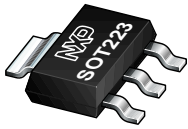
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Thank you for your cooperation and understanding,

WeEn Semiconductors





EC103D1W

SCR

23 July 2014

Product data sheet

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

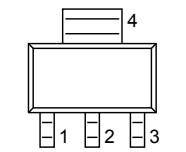

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	400	V
V_{RRM}	repetitive peak reverse voltage		-	-	400	V
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	-	8	A
T_j	junction temperature		-	-	125	°C
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 114\text{ °C}$; Fig. 2 ; Fig. 3	-	-	0.8	A
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



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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	-	V/ μs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>SC-73 (SOT223)</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	Description	Version
EC103D1W	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. Marking

Table 4. Marking codes

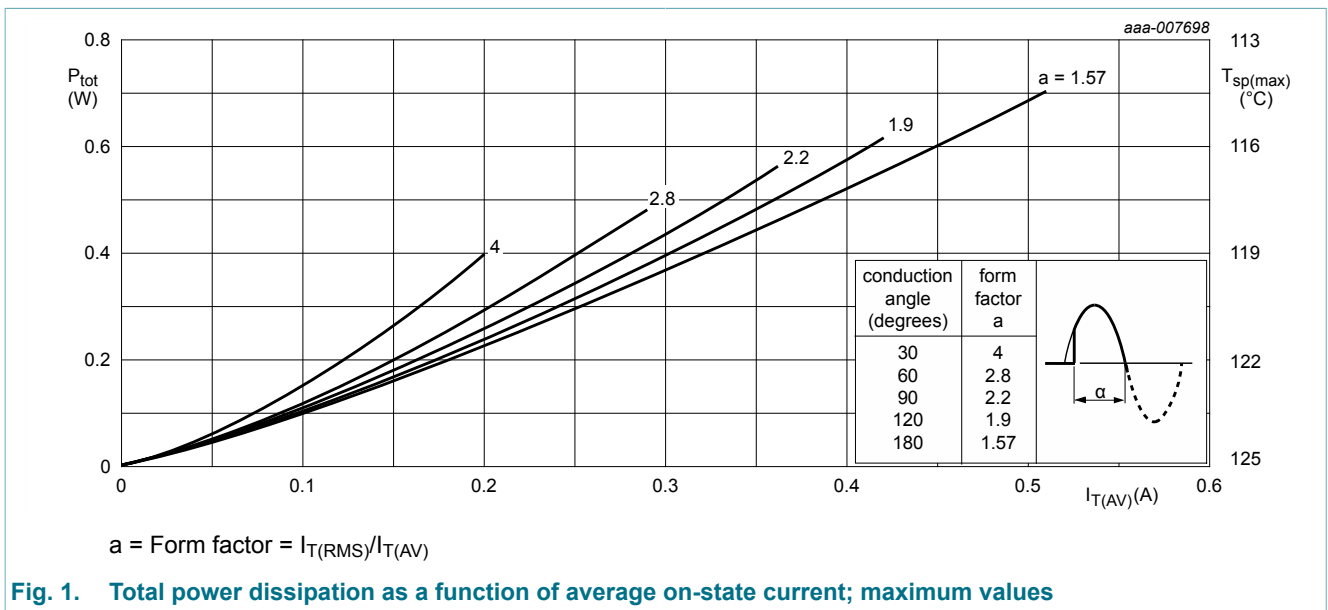
Type number	Marking code
EC103D1W	WYM-103D1W

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		-	400	V
V_{RRM}	repetitive peak reverse voltage		-	400	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 114\text{ °C}$; 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; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	8	A
		half sine wave; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$	-	9	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse	-	0.32	A ² s
di_T/dt	rate of rise of on-state current	$I_T = 2\text{ A}$; $I_G = 0.01\text{ A}$; $di_G/dt = 0.1\text{ A}/\mu\text{s}$	-	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	°C
T_j	junction temperature		-	125	°C



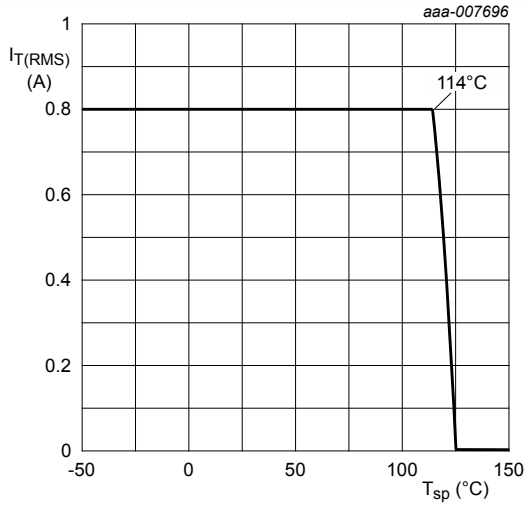
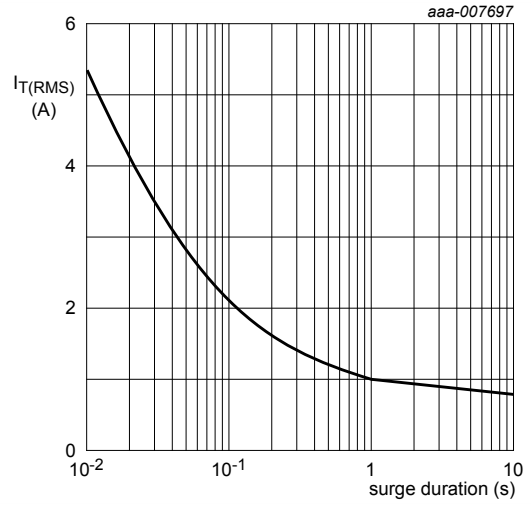
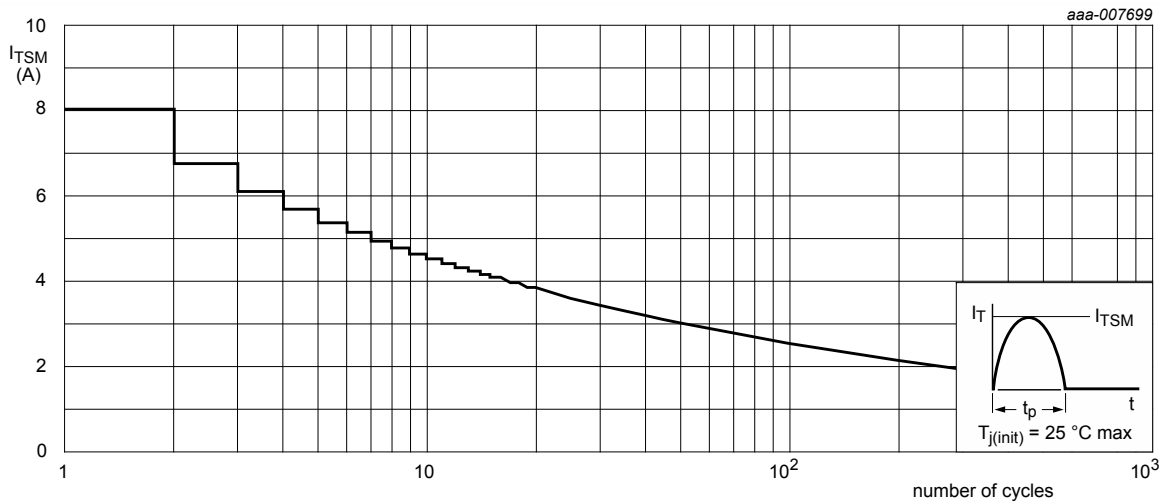


Fig. 2. RMS on-state current as a function of solder point temperature; maximum values



f = 50 Hz; $T_{sp} = 114\text{ °C}$

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



f = 50 Hz

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

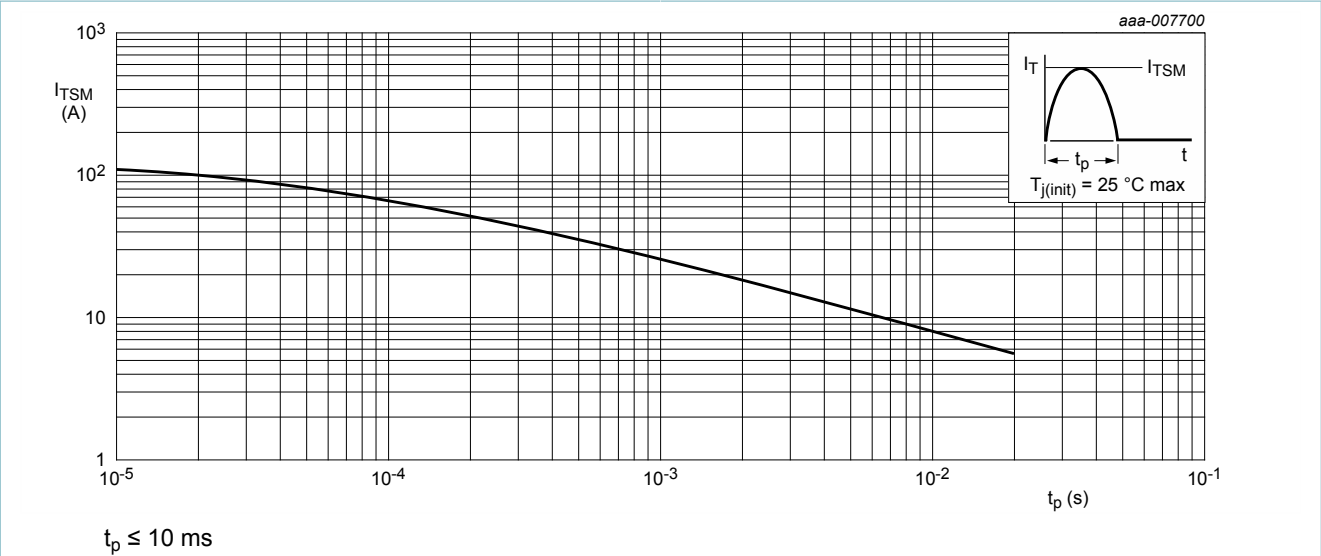


Fig. 5. Non-repetitive peak on-state current as a function of pulse width for sinusoidal currents; maximum values

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	Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	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

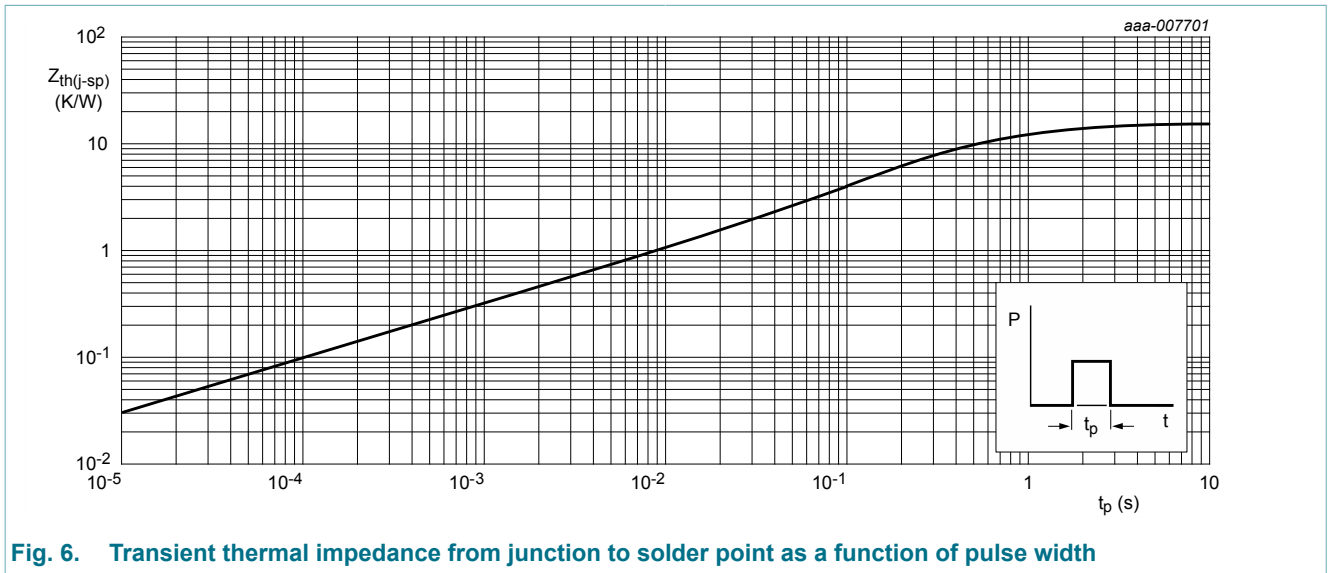
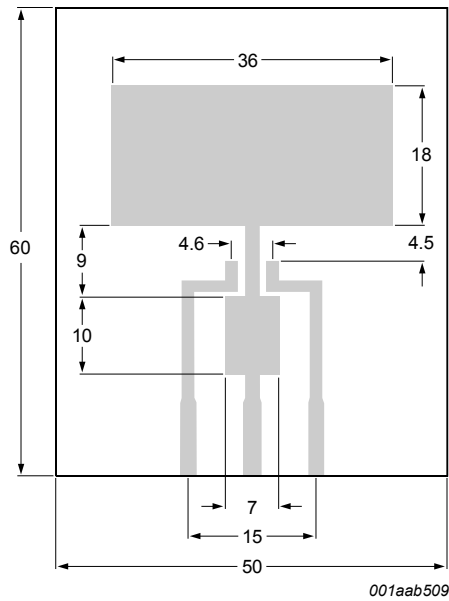
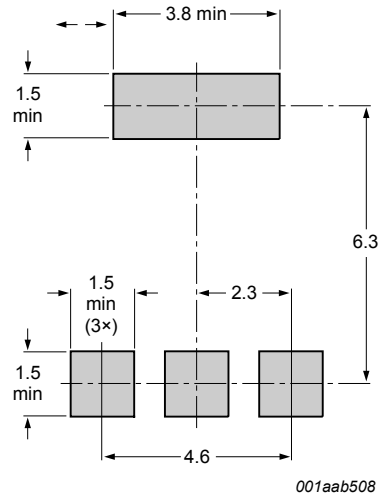


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width



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

Fig. 7. Printed circuit board pad area: SOT223



All dimensions are in mm

Fig. 8. Minimum footprint SOT223

10. Characteristics

Table 7. Characteristics

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

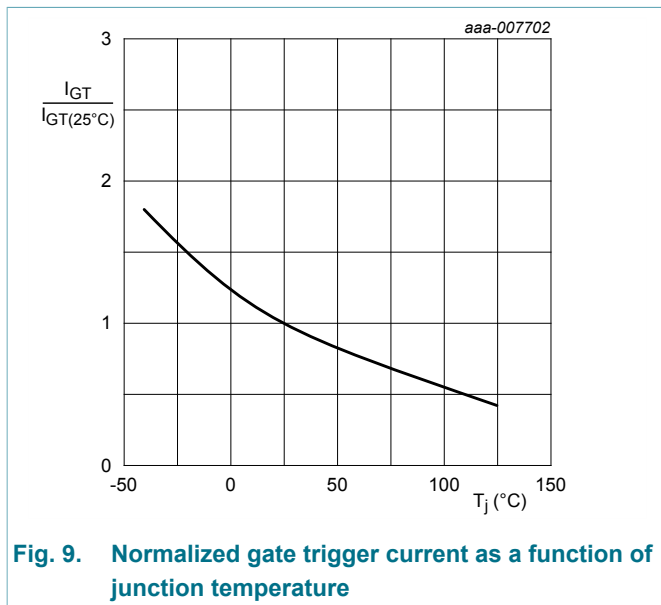


Fig. 9. Normalized gate trigger current as a function of junction temperature

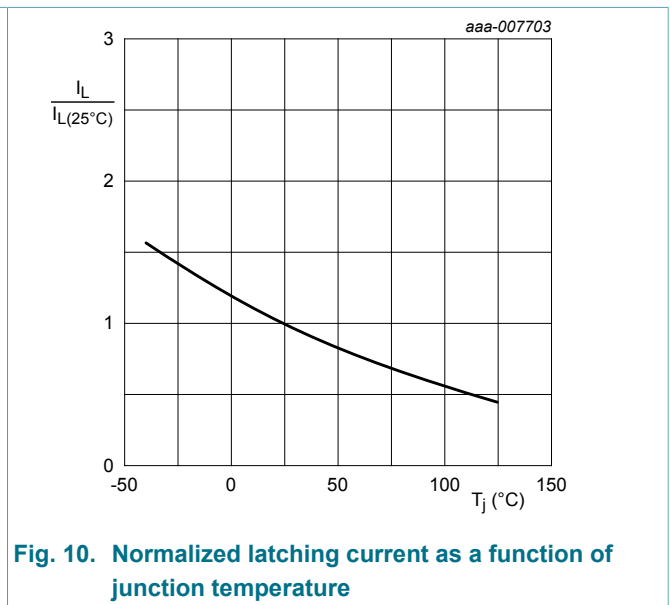


Fig. 10. Normalized latching current as a function of junction temperature

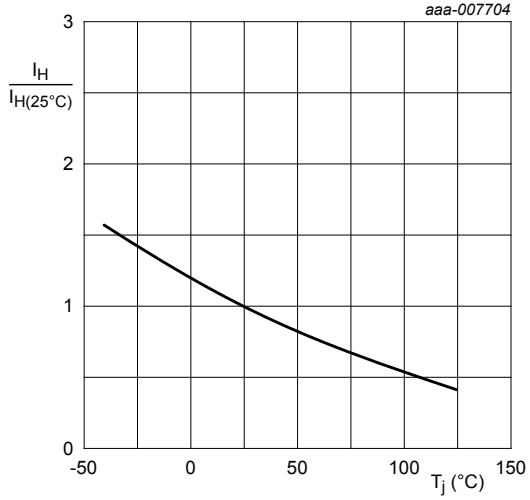
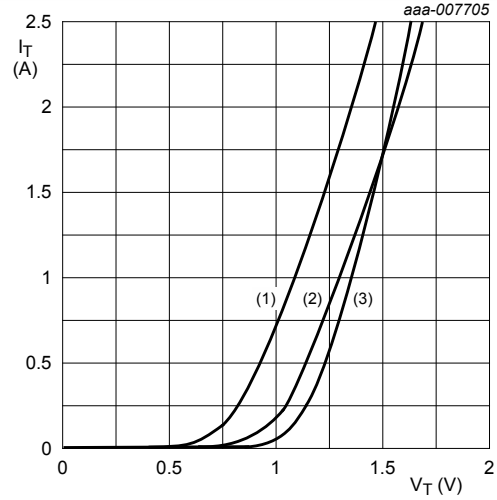


Fig. 11. Normalized holding current as a function of junction temperature



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

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

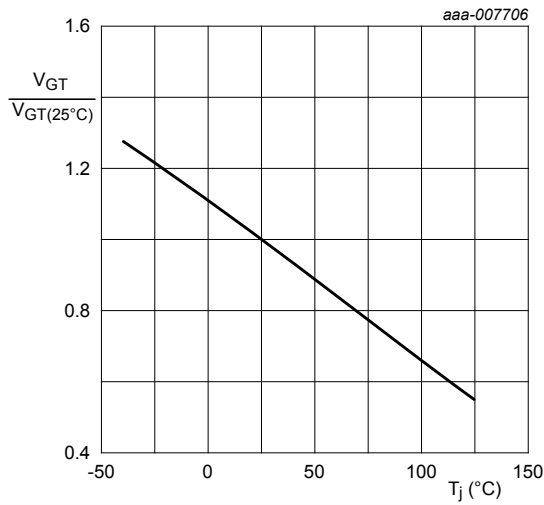


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

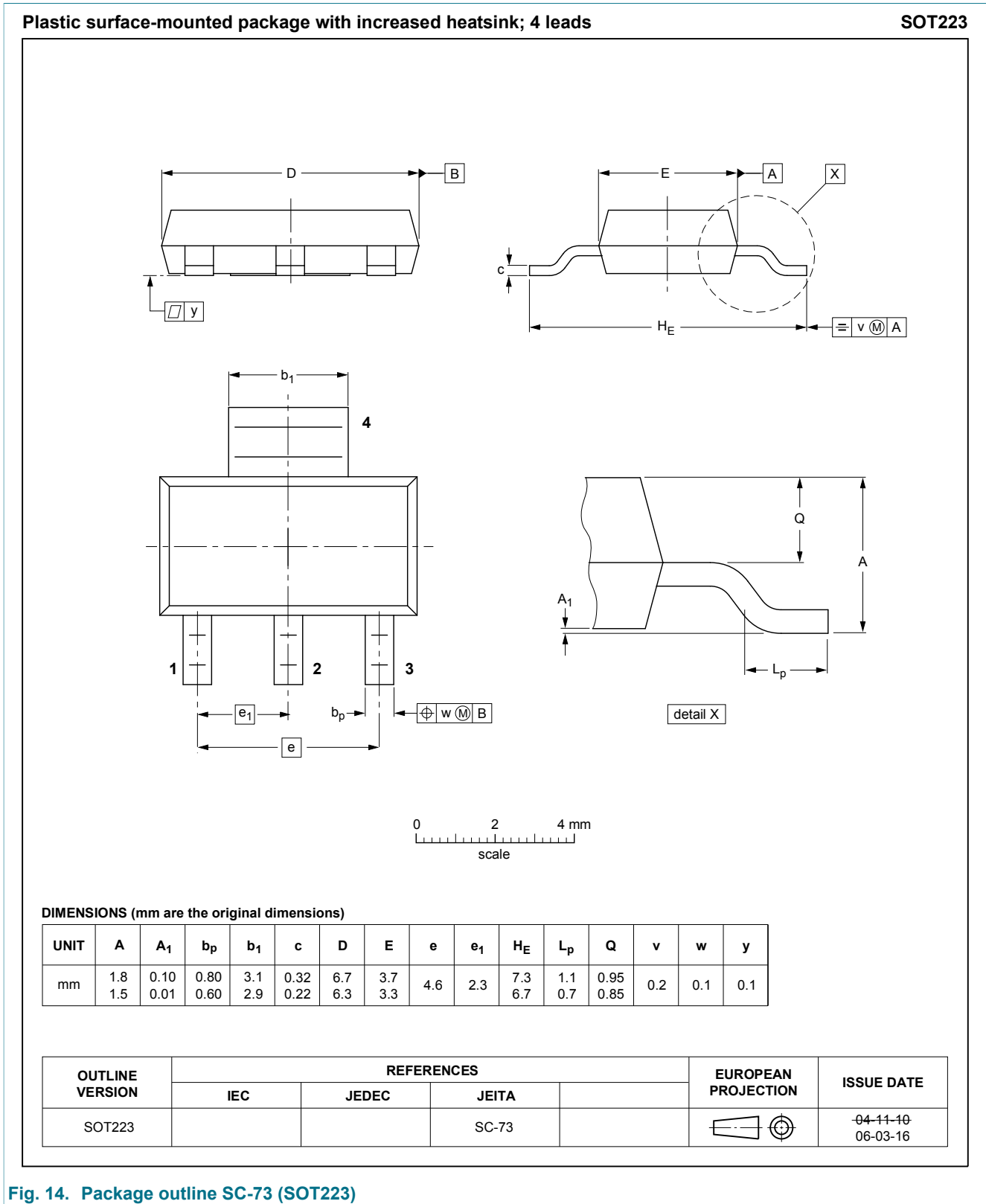


Fig. 14. Package outline SC-73 (SOT223)

12. Legal information

12.1 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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