



# NCR100-8L

SCR

8 April 2015

Product data sheet

## 1. General description

Planar passivated sensitive gate Silicon Controlled Rectifier in a SOT23 (TO-236AB) plastic package.

## 2. Features and benefits

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

## 3. Applications

- Earth leakage circuit breakers or Ground Fault Circuit Interrupters (GFCI)
- Ignition circuits
- Low power latching circuits
- Protection circuit / shut-down circuits: lighting ballasts
- Protection circuit / shut-down circuits: Switched Mode Power Supplies

## 4. Quick reference data

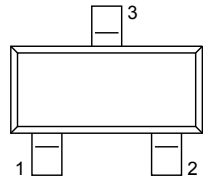

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage		-	-	600	V
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{TSM}$	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
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 75\text{ °C}$	-	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 75\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	0.8	A
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 10\text{ mA}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	15	-	50	$\mu\text{A}$



## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 <p>TO-236AB (SOT23)</p>	 <p>sym037</p>
2	K	cathode		
3	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NCR100-8L	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

## 7. Marking

Table 4. Marking codes

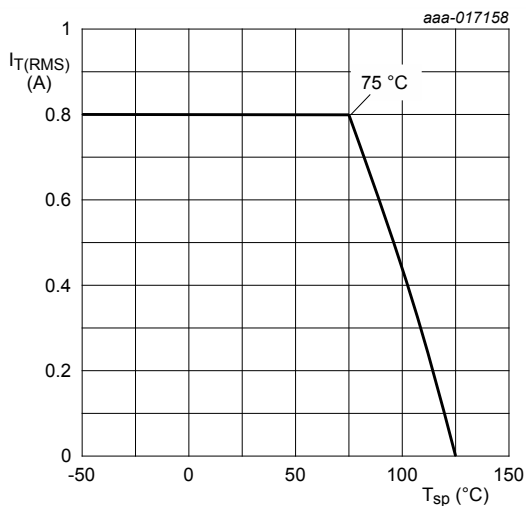
Type number	Marking code
NCR100-8L	W8L

## 8. Limiting values

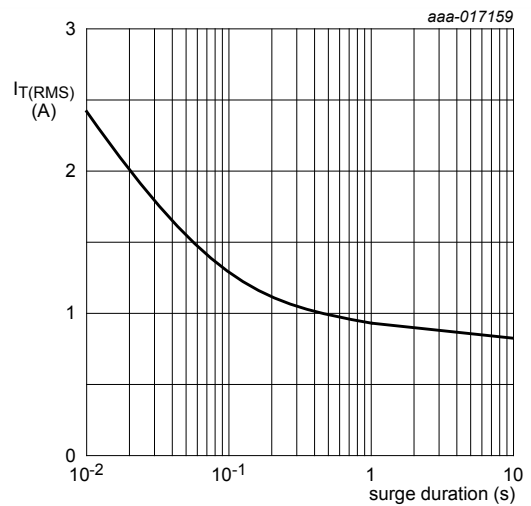
**Table 5. Limiting values**

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
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{sp} \leq 75\text{ °C}$	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{sp} \leq 75\text{ °C}$ ; <a href="#">Fig. 1</a> ; <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
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN	-	0.36	A <sup>2</sup> s
$dl_T/dt$	rate of rise of on-state current	$I_G = 0.1\text{ mA}$	-	50	A/ $\mu$ 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	°C
$T_j$	junction temperature		-	125	°C



**Fig. 1. RMS on-state current as a function of solder point temperature; maximum values**



$f = 50\text{ Hz}$ ;  $T_{sp} = 75\text{ °C}$

**Fig. 2. RMS on-state current as a function of surge duration; maximum values**

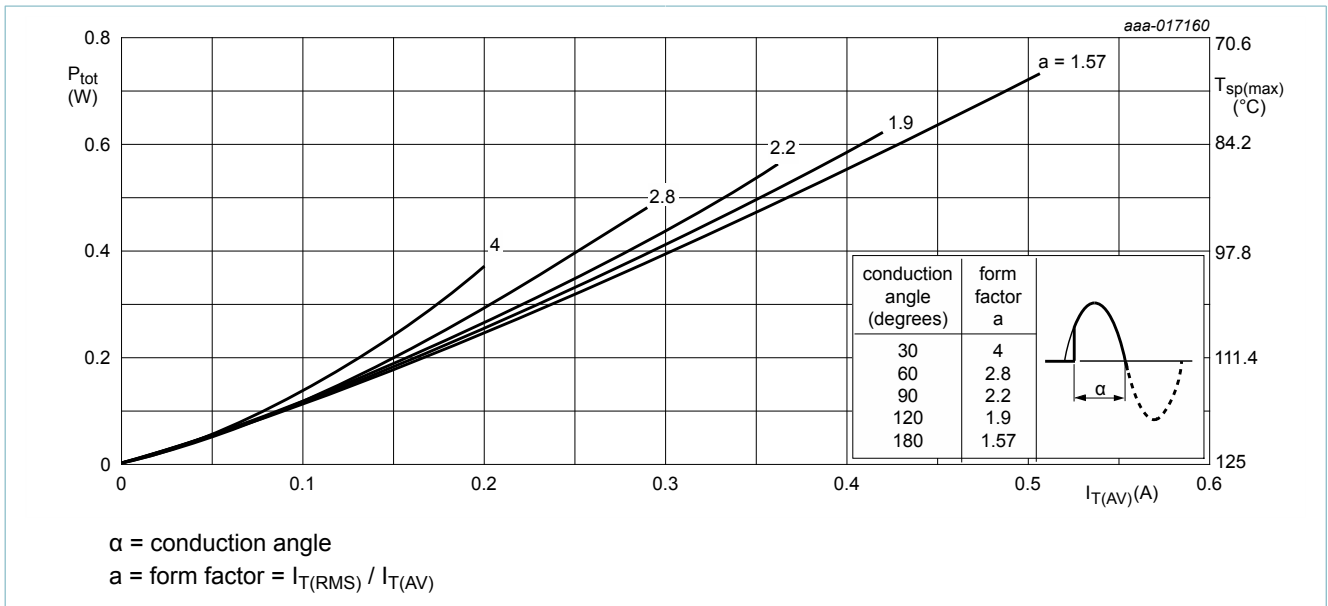


Fig. 3. Total power dissipation as a function of average on-state current; maximum values

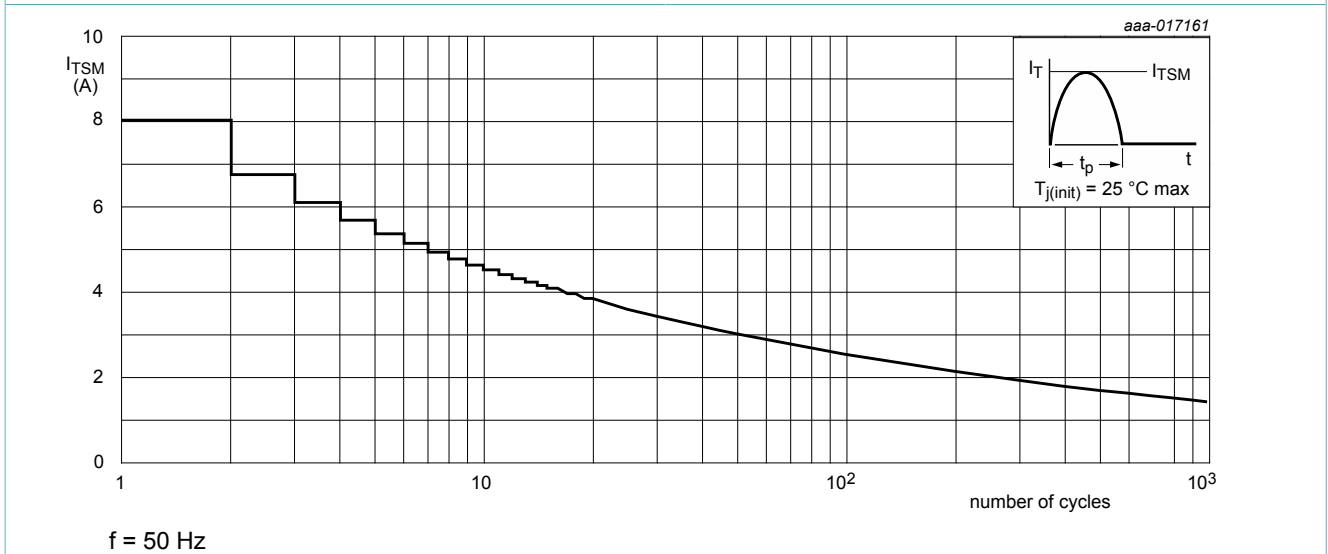
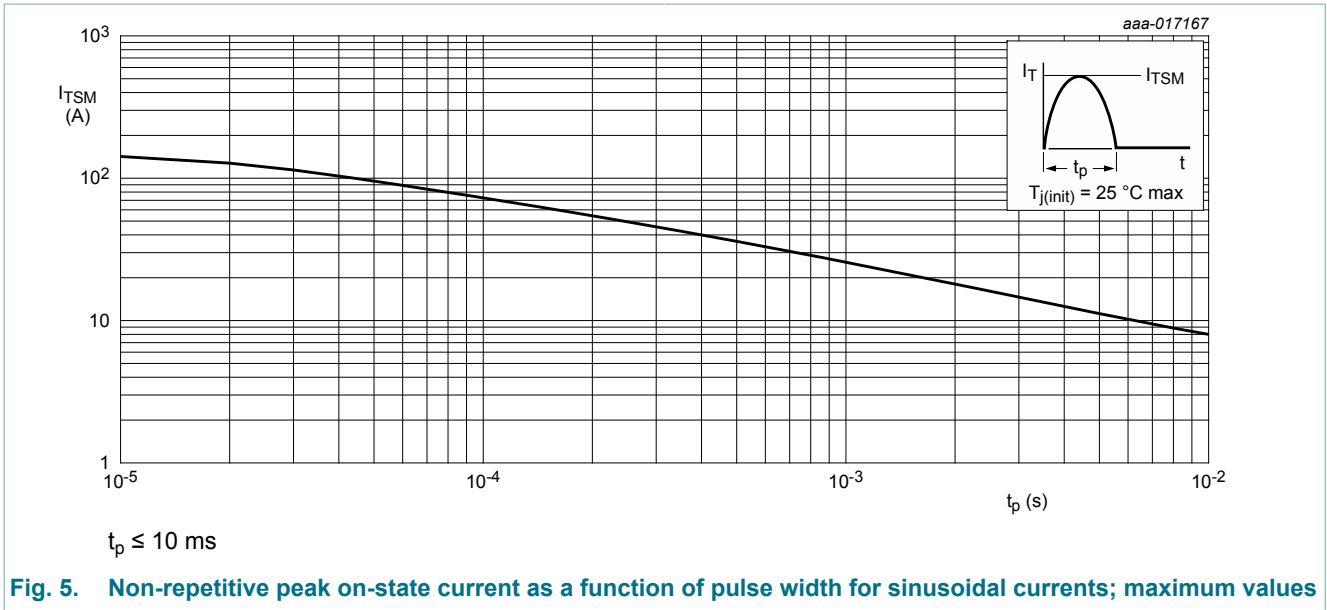


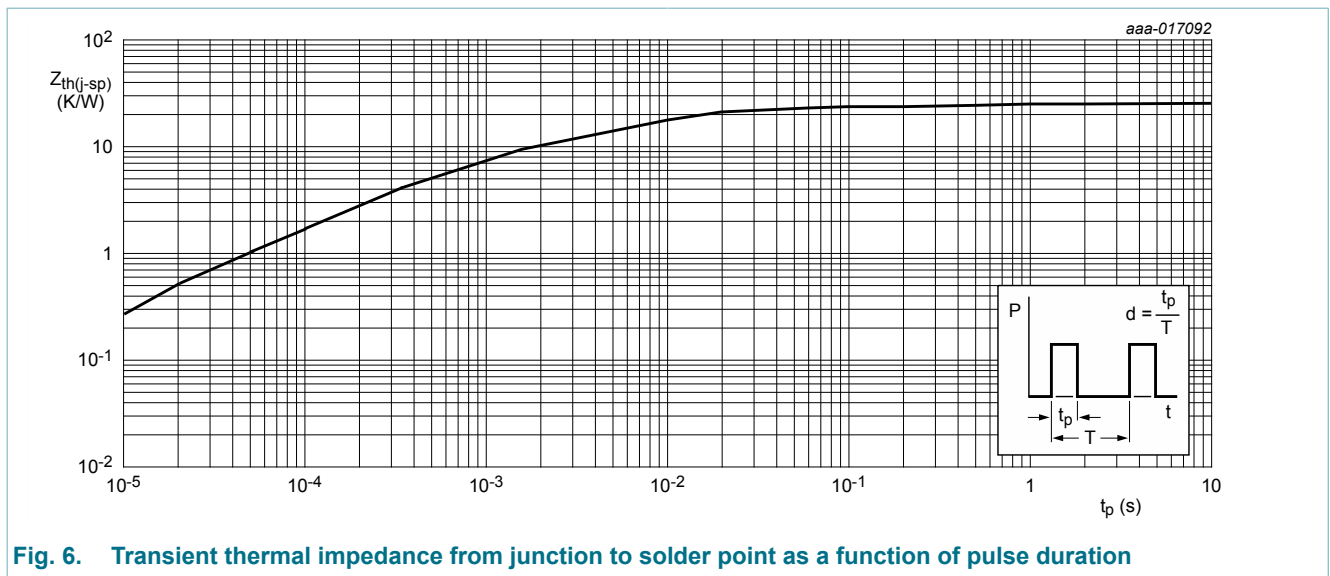
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



## 9. Thermal characteristics

Table 6. Thermal characteristics

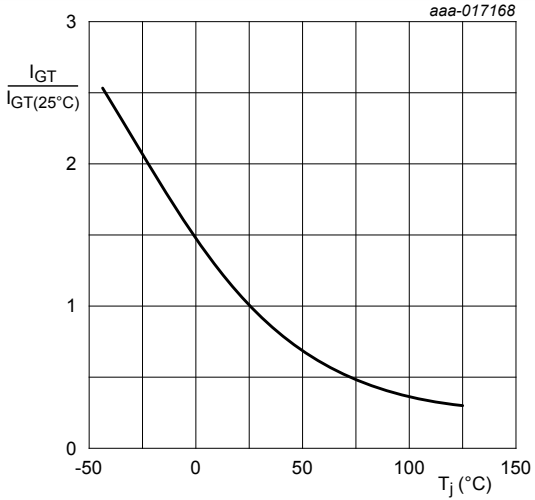
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	<a href="#">Fig. 6</a>	-	-	23	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode 6 sq cm.	-	105	-	K/W



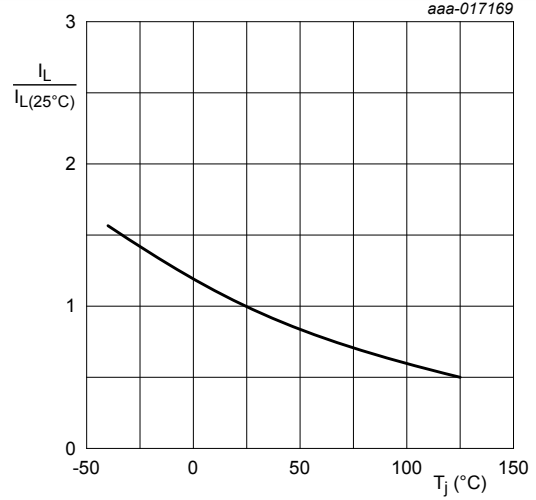
## 10. Characteristics

Table 7. Characteristics

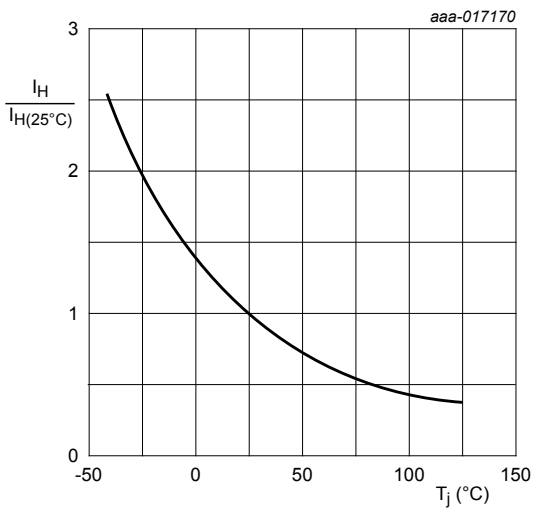
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 10\text{ mA}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	15	-	50	$\mu\text{A}$
$I_L$	latching current	$V_D = 12\text{ V}$ ; $I_G = 0.5\text{ mA}$ ; $R_{GK} = 1\text{ k}\Omega$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 8</a>	-	-	6	$\text{mA}$
$I_H$	holding current	$V_D = 12\text{ V}$ ; $R_{GK} = 1\text{ k}\Omega$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>	-	-	3	$\text{mA}$
$V_T$	on-state voltage	$I_T = 1.2\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>	-	1.25	1.7	$\text{V}$
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 10\text{ mA}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 11</a>	-	0.5	0.8	$\text{V}$
		$V_D = 400\text{ V}$ ; $I_T = 10\text{ mA}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 11</a>	0.3	0.5	-	$\text{V}$
$I_D$	off-state current	$V_D = 600\text{ V}$ ; $T_j = 125\text{ °C}$ ; $R_{GK} = 1\text{ k}\Omega$	-	0.05	0.1	$\text{mA}$
$I_R$	reverse current	$V_R = 600\text{ V}$ ; $T_j = 125\text{ °C}$ ; $R_{GK} = 1\text{ k}\Omega$	-	0.05	0.1	$\text{mA}$
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ °C}$ ; $R_{GK} = 1\text{ k}\Omega$ ; exponential waveform; ( $V_{DM} = 67\%$ of $V_{DRM}$ )	100	-	-	$\text{V}/\mu\text{s}$
$t_{gt}$	gate-controlled turn-on time	$I_{TM} = 0.8\text{ A}$ ; $V_D = 600\text{ V}$ ; $I_G = 10\text{ mA}$ ; $dI_G/dt = 0.1\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$	-	2	-	$\mu\text{s}$
$t_q$	commutated turn-off time	$V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ °C}$ ; $I_{TM} = 0.8\text{ A}$ ; $V_R = 35\text{ V}$ ; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$ ; $dV_D/dt = 2\text{ V}/\mu\text{s}$ ; $R_{GK} = 1\text{ k}\Omega$	-	100	-	$\mu\text{s}$



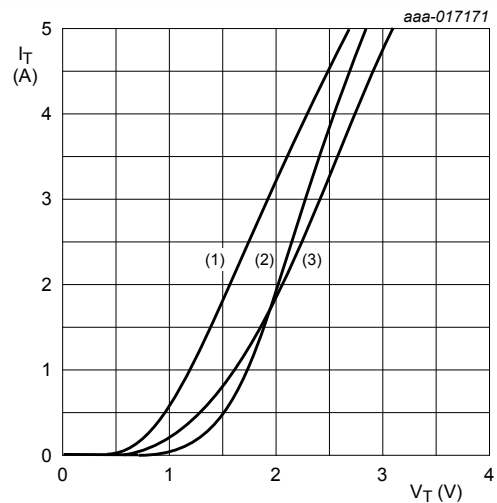
**Fig. 7. Normalized gate trigger current as a function of junction temperature**



**Fig. 8. Normalized latching current as a function of junction temperature**



**Fig. 9. Normalized holding current as a function of junction temperature**



$V_o = 1.173 \text{ V}; R_s = 0.216 \Omega$   
 (1)  $T_j = 125^\circ\text{C}$ ; typical values  
 (2)  $T_j = 25^\circ\text{C}$ ; maximum values  
 (3)  $T_j = 125^\circ\text{C}$ ; maximum values

**Fig. 10. On-state current as a function of on-state voltage**



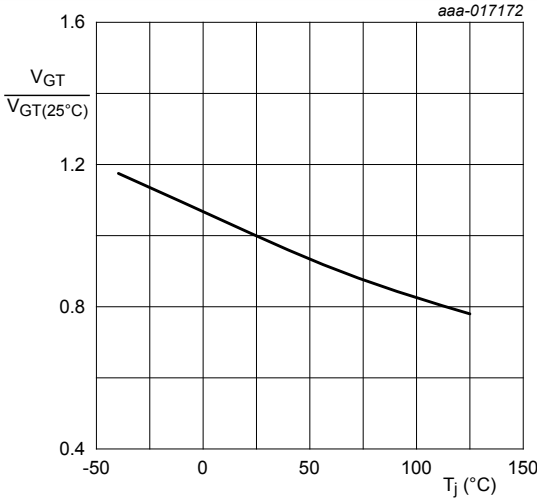


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

### 11. Package outline

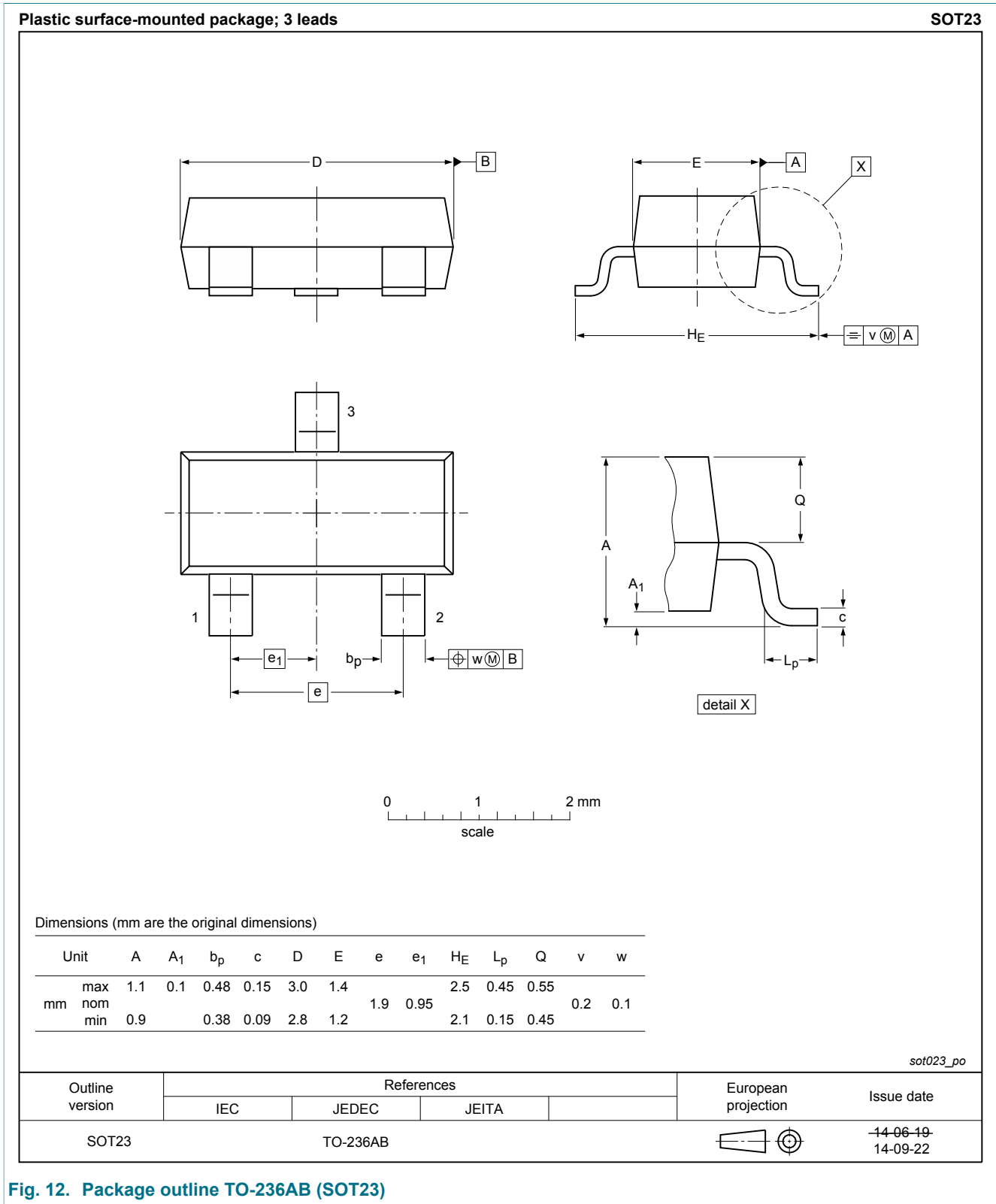


Fig. 12. Package outline TO-236AB (SOT23)

## 12. 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.
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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