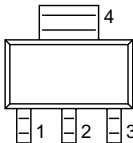
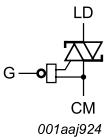


Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>	1	-	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>	1	-	10	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 12</a>	-	-	20	mA
$V_T$	on-state voltage	$I_T = 2\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 13</a>	-	-	1.3	V
$V_{CL}$	clamping voltage	$I_{CL} = 0.1\text{ mA}$ ; $t_p = 1\text{ ms}$ ; $T_j = 25\text{ }^\circ\text{C}$	850	-	-	V
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; (67% of $V_{DRM}$ ); exponential waveform; gate open circuit; <a href="#">Fig. 15</a>	30	-	-	V/ $\mu\text{s}$
$dI_{com}/dt$	rate of change of commutating current	$V_D = 400\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; $I_{T(RMS)} = 0.8\text{ A}$ ; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$ ; (snubberless condition); gate open circuit; <a href="#">Fig. 16</a> ; <a href="#">Fig. 17</a>	2	-	-	A/ms

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	LD	load		
2	CM	common		
3	G	gate		
4	CM	common		

## 6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
ACT108W-800E	SOT223	ACT108W-800EF	Reel	4000	SOT223	16-Mar-2006

## 7. Marking

Table 4. Marking codes

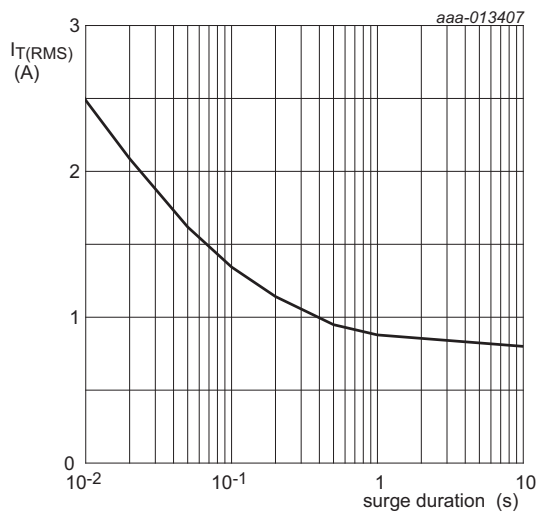
Type number	Marking codes
ACT108W-800E	108W8E

## 8. Limiting values

**Table 5. Limiting values**

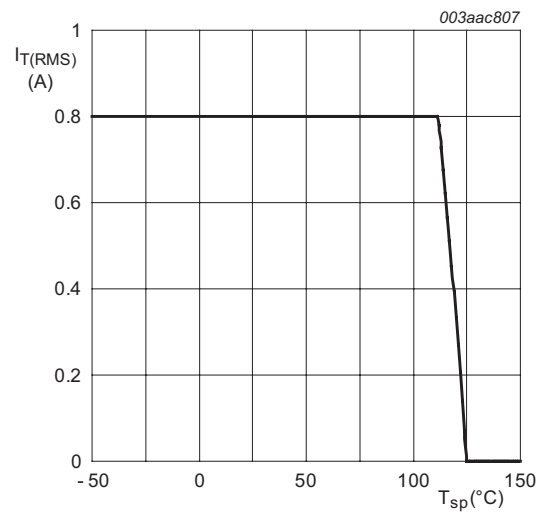
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{\text{DRM}}$	repetitive peak off-state voltage		-	800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 112\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	0.8	A
$I_{\text{TSM}}$	non-repetitive peak on-state current	full sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$ ; $t_{\text{p}} = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	-	13	A
		full sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$ ; $t_{\text{p}} = 16.7\text{ ms}$	-	14.3	A
$I^2t$	$I^2t$ for fusing	$t_{\text{p}} = 10\text{ ms}$ ; SIN	-	0.84	$\text{A}^2\text{s}$
$di_{\text{T}}/dt$	rate of rise of on-state current	$I_{\text{G}} = 20\text{ mA}$	-	100	$\text{A}/\mu\text{s}$
$I_{\text{GM}}$	peak gate current	$t = 20\text{ }\mu\text{s}$	-	1	A
$V_{\text{GM}}$	peak gate voltage	positive applied gate voltage	-	15	V
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period	-	0.1	W
$T_{\text{stg}}$	storage temperature		-40	150	$^{\circ}\text{C}$
$T_{\text{j}}$	junction temperature		-	125	$^{\circ}\text{C}$
$V_{\text{PP}}$	peak pulse voltage	$T_{\text{j}} = 25\text{ }^{\circ}\text{C}$ ; non-repetitive, off-state; ten pulses on each voltage polarity; 20s or more between successive pulses; <a href="#">Fig. 6</a>	-	2.5	kV

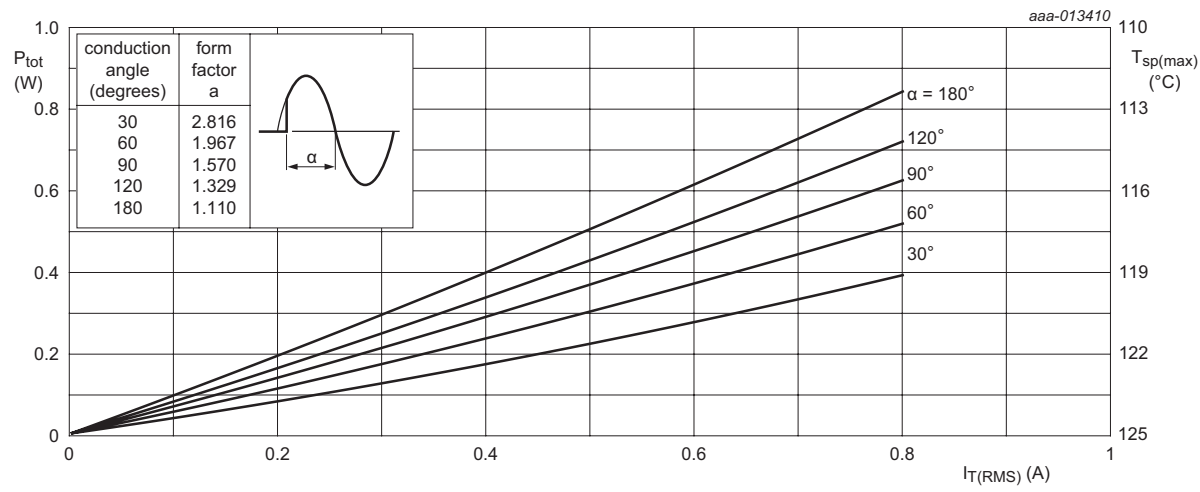


$f = 50\text{ Hz}$ ;  $T_{\text{sp}} = 112\text{ }^{\circ}\text{C}$

**Fig. 1. RMS on-state current as a function of surge duration; maximum values**

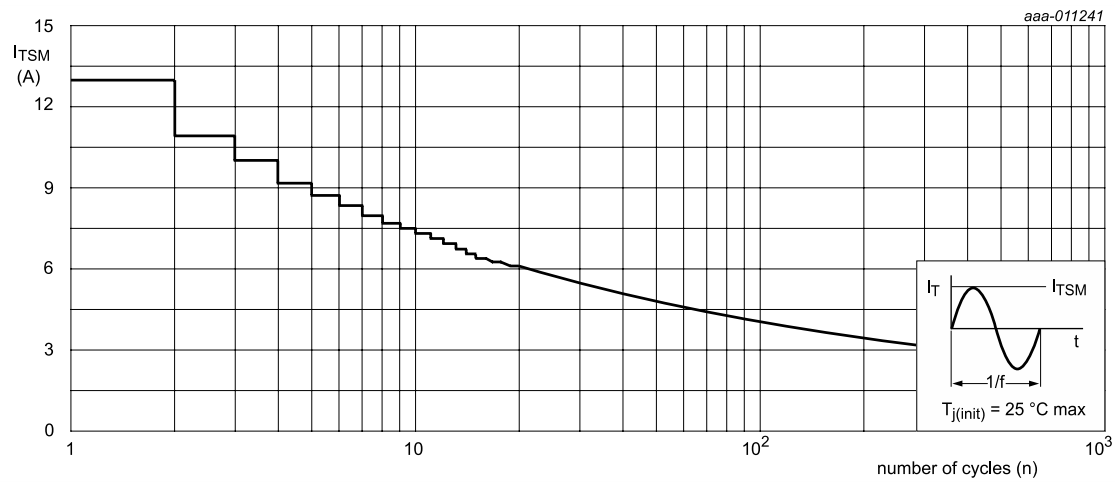


**Fig. 2. RMS on-state current as a function of solder point temperature; maximum values**



$\alpha$  = conduction angle  
 $a$  = form factor =  $I_{T(RMS)} / I_{T(AV)}$

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

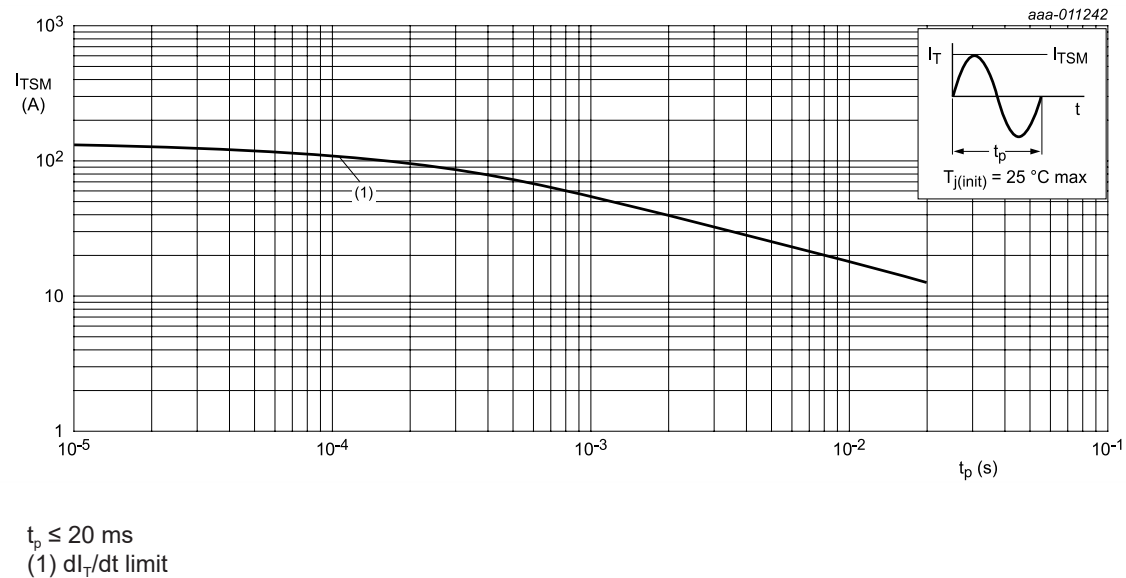


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

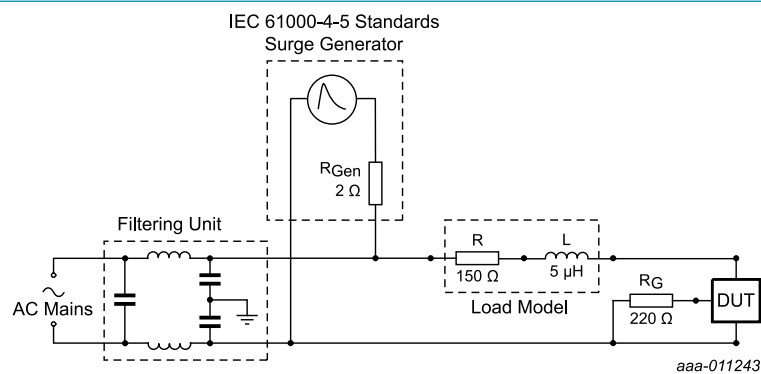


Fig. 6. Test circuit for inductive and resistive loads with conditions equivalent to IEC 61000-4-5

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 with heatsink compound; <a href="#">Fig. 7</a>	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air; printed circuit board mounted: minimum pad area; <a href="#">Fig. 8</a>	-	70	-	K/W
		in free air; printed circuit board mounted: minimum footprint; <a href="#">Fig. 9</a>	-	156	-	K/W

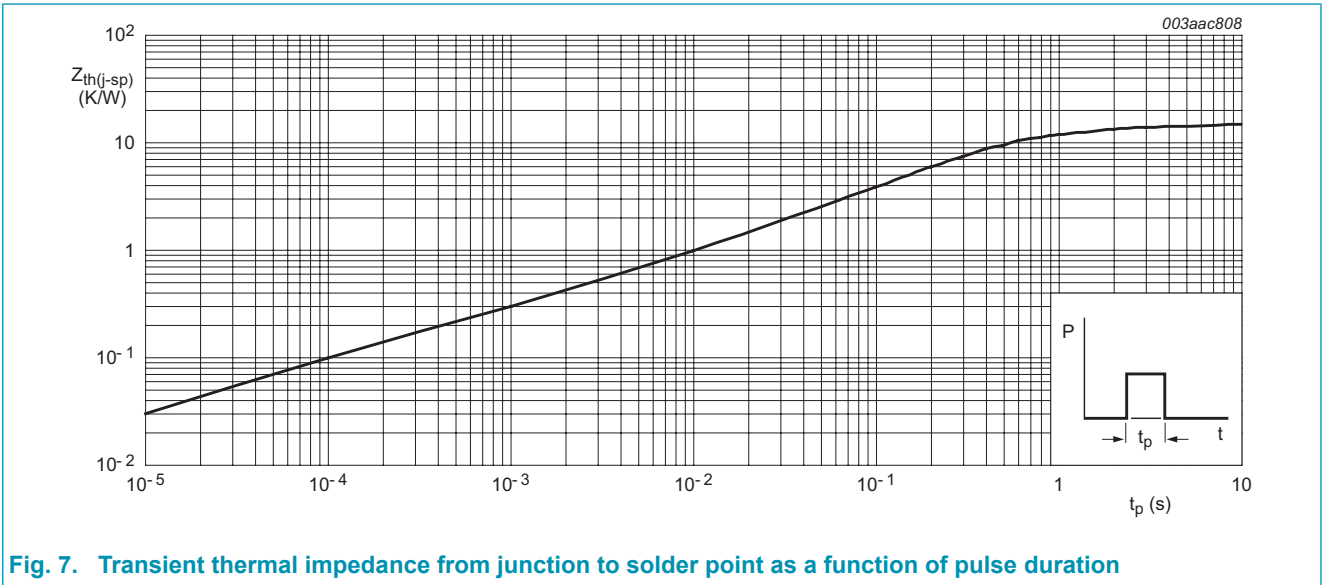
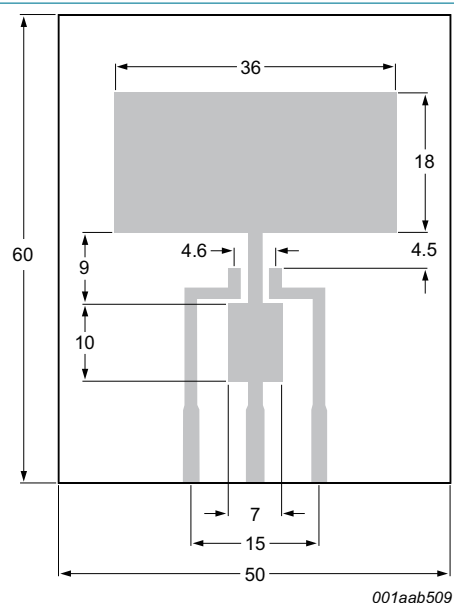
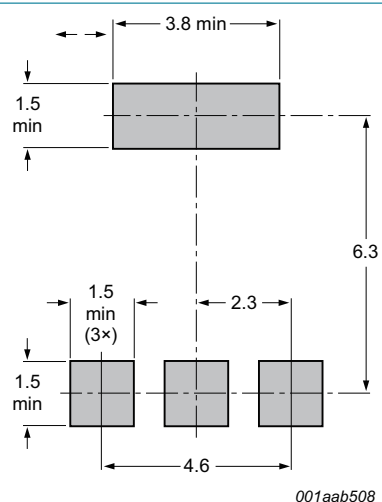


Fig. 7. Transient thermal impedance from junction to solder point as a function of pulse duration



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

**Fig. 8. Printed circuit board pad area: SOT223**



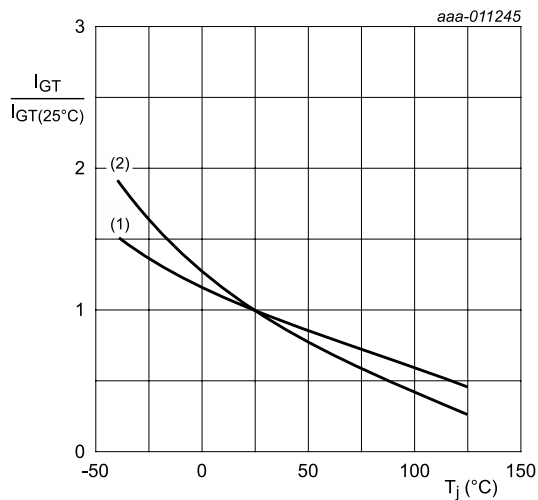
All dimensions are in mm

**Fig. 9. Minimum footprint 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. 10</a>		1	-	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>		1	-	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. 11</a>		-	-	25	mA
		$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G-; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 11</a>		-	-	20	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 12</a>		-	-	20	mA
$V_T$	on-state voltage	$I_T = 1.1\text{ A}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 13</a>		-	-	1.3	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. 14</a>		-	-	1	V
		$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_J = 125\text{ }^\circ\text{C}$		0.15	-	-	V
$I_D$	off-state current	$V_D = 800\text{ V}$ ; $T_J = 25\text{ }^\circ\text{C}$		-	-	2	mA
		$V_D = 800\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$		-	-	0.2	mA
$V_{CL}$	clamping voltage	$I_{CL} = 0.1\text{ mA}$ ; $t_p = 1\text{ ms}$ ; $T_J = 25\text{ }^\circ\text{C}$		850	-	-	V
<b>Dynamic characteristics</b>							
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$ ; (67% of $V_{DRM}$ ); exponential waveform; gate open circuit; <a href="#">Fig. 15</a>		500	-	-	V/ $\mu\text{s}$
$dI_{com}/dt$	rate of change of commutating current	$V_D = 400\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$ ; $I_{T(RMS)} = 0.8\text{ A}$ ; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$ ; (snubberless condition); gate open circuit; <a href="#">Fig. 16</a> ; <a href="#">Fig. 17</a>		0.5	-	-	A/ms



(1) LD+ G-  
(2) LD- G-

Fig. 10. Normalized gate trigger current as a function of junction temperature

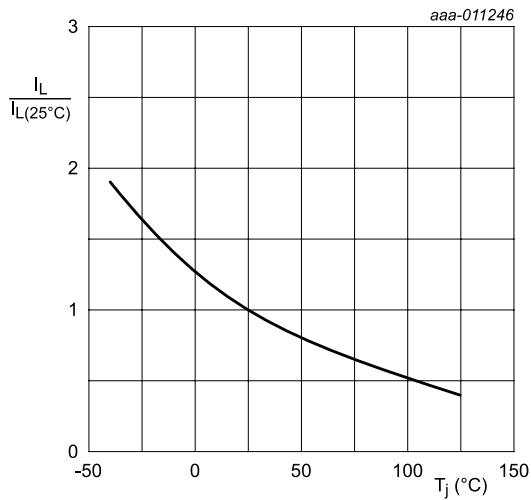


Fig. 11. Normalized latching current as a function of junction temperature

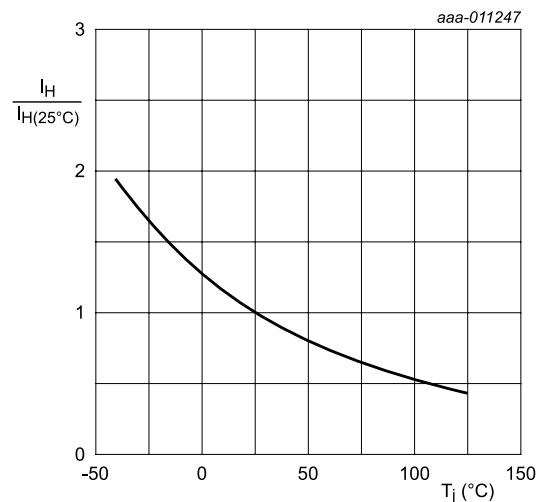
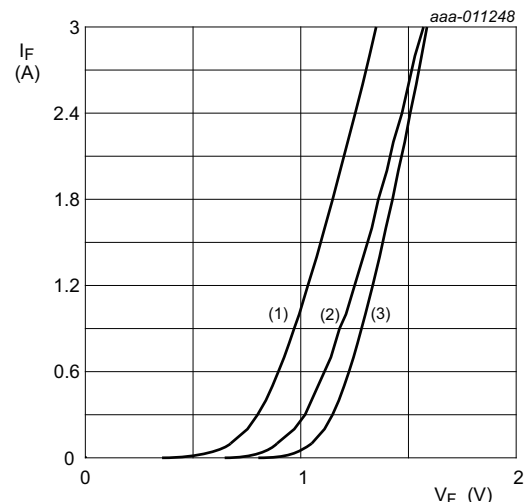


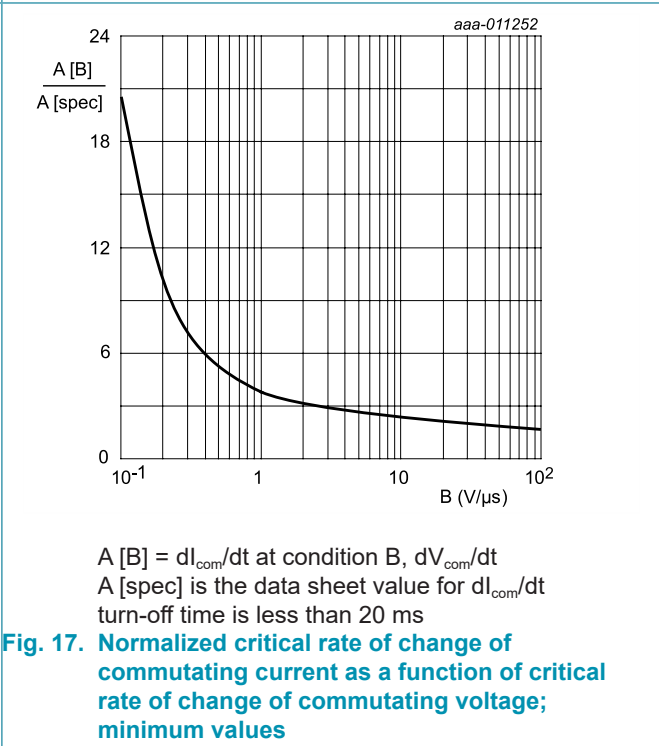
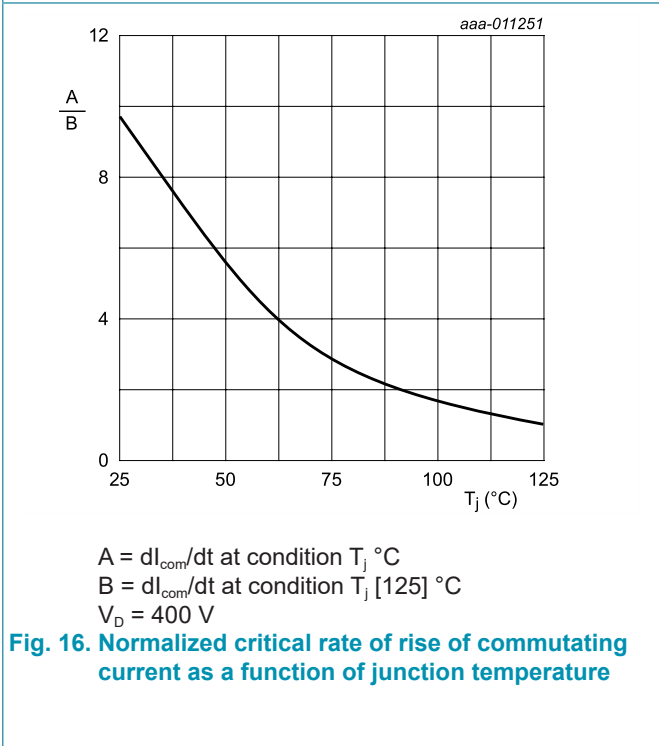
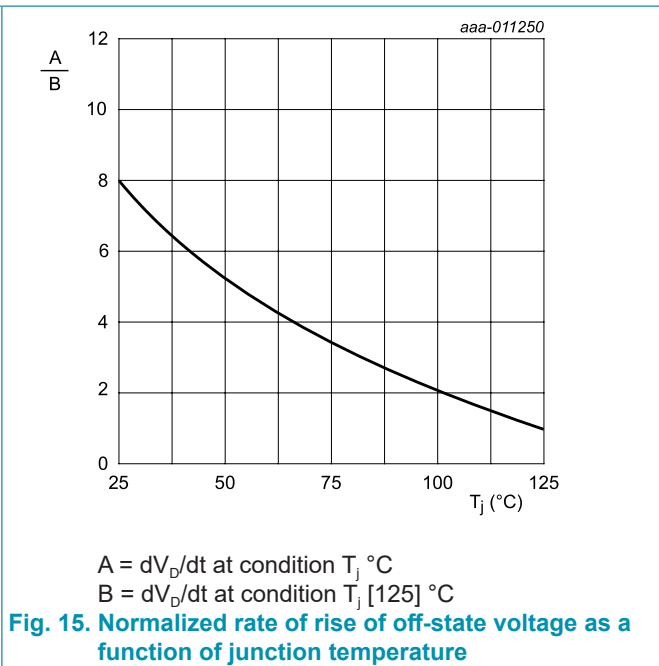
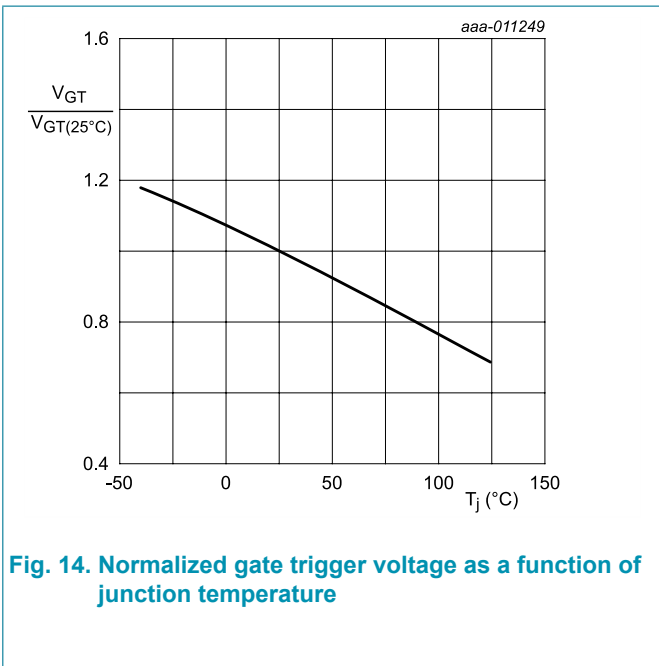
Fig. 12. Normalized holding current as a function of junction temperature



$V_o = 1.031\text{ V}$ ;  $R_s = 0.1488\text{ }\Omega$   
(1)  $T_j = 125^{\circ}C$ ; typical values  
(2)  $T_j = 125^{\circ}C$ ; maximum values  
(3)  $T_j = 25^{\circ}C$ ; maximum values

Fig. 13. On-state current as a function of on-state voltage

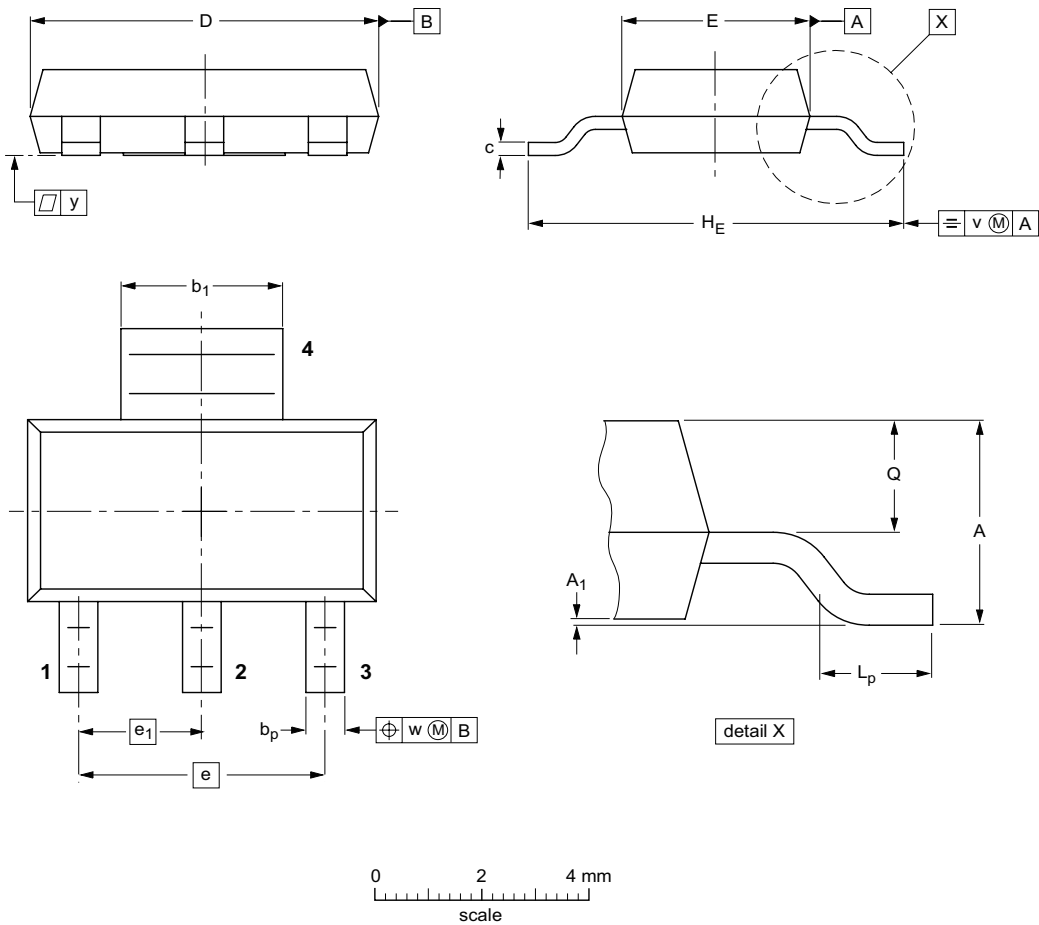




11. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	b <sub>1</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.8 1.5	0.10 0.01	0.80 0.60	3.1 2.9	0.32 0.22	6.7 6.3	3.7 3.3	4.6	2.3	7.3 6.7	1.1 0.7	0.95 0.85	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT223			SC-73			04-11-10 06-03-16

· PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.

## 12. 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.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 06 April 2021