WeEn
WeEn Semiconductors

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.

In this document where the previous NXP references remain, please use the new links as shown below.

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founded by
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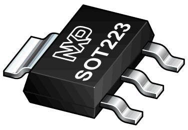


Z0107NN0

4Q Triac

4 April 2014 **Product data sheet**

1. General description

Planar passivated very sensitive gate four quadrant triac in a SOT223 (SC-73) surface-mountable plastic package intended for applications requiring enhanced immunity to noise and direct interfacing to logic level ICs and low power gate drivers.

2. Features and benefits

- Direct interfacing to logic level ICs
- Enhanced current surge capability
- Enhanced noise immunity
- High blocking voltage capability
- Planar passivated for voltage ruggedness and reliability
- Surface-mountable package
- Triggering in all four quadrants
- Very sensitive gate

3. Applications

- General purpose low power motor control
- Home appliances
- Industrial process control
- Low power AC Fan controllers

4. Quick reference data

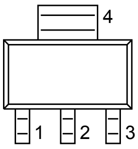
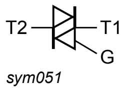
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	800	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25$ °C; $t_p = 20$ ms; Fig. 4; Fig. 5		-	-	12.5	A
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 105$ °C; Fig. 1; Fig. 2; Fig. 3		-	-	1	A
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12$ V; $I_T = 0.1$ A; T2+ G+; $T_j = 25$ °C; Fig. 9		0.3	-	5	mA

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		V_D = 12 V; I_T = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 9		0.3	-	5	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; T_j = 25 °C; Fig. 9		0.3	-	5	mA
		V_D = 12 V; I_T = 0.1 A; T2- G+; T_j = 25 °C; Fig. 9		0.3	-	7	mA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 **SC-73 (SOT223)**	
2	T2	main terminal 2		
3	G	gate		
4	T2	main terminal 2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
Z0107NN0	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223

7. Marking

Table 4. Marking codes

Type number	Marking code
Z0107NN0	107NN0

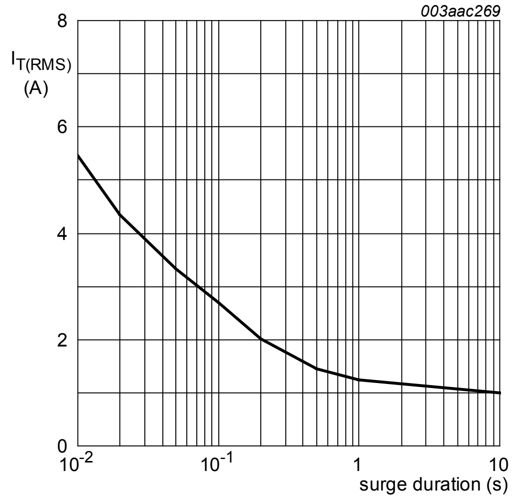
8. Limiting values

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			-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; T_{sp} ≤ 105 °C; Fig. 1; Fig. 2; Fig. 3		-	1	A

Symbol	Parameter	Conditions		Min	Max	Unit
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5		-	12.5	A
		full sine wave; $T_{j(init)}$ = 25 °C; t_p = 16.7 ms		-	13.8	A
I^2t	I^2t for fusing	t_p = 10 ms; SIN		-	0.78	A^2s
dI_T/dt	rate of rise of on-state current	I_T = 1 A; I_G = 20 mA; dI_G/dt = 100 mA/µs; T2+ G+		-	50	A/µs
		I_T = 1 A; I_G = 20 mA; dI_G/dt = 100 mA/µs; T2+ G-		-	50	A/µs
		I_T = 1 A; I_G = 20 mA; dI_G/dt = 100 mA/µs; T2- G-		-	50	A/µs
		I_T = 1 A; I_G = 20 mA; dI_G/dt = 100 mA/µs; T2- G+		-	20	A/µs
I_{GM}	peak gate current			-	1	A
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



f = 50 Hz; T_{sp} = 105 °C

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

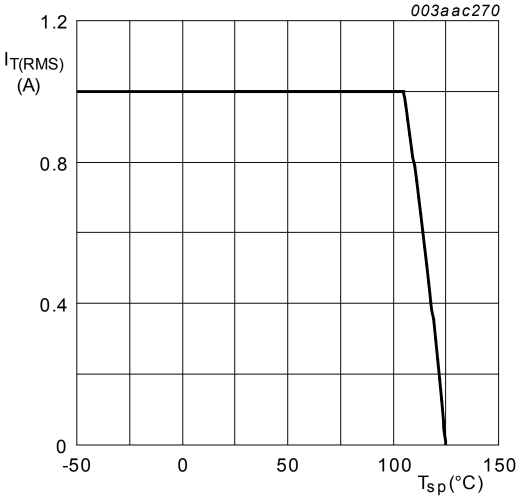
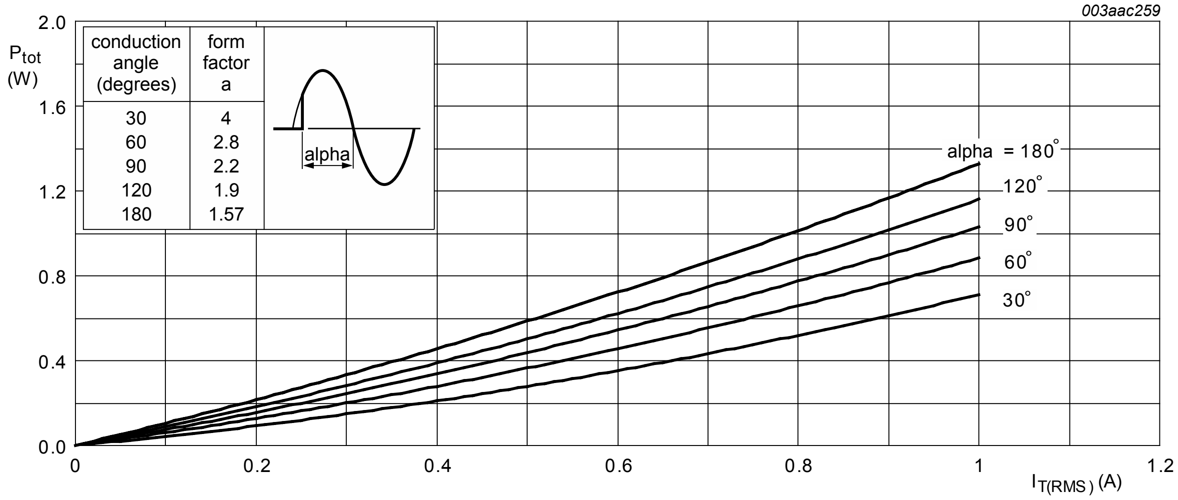


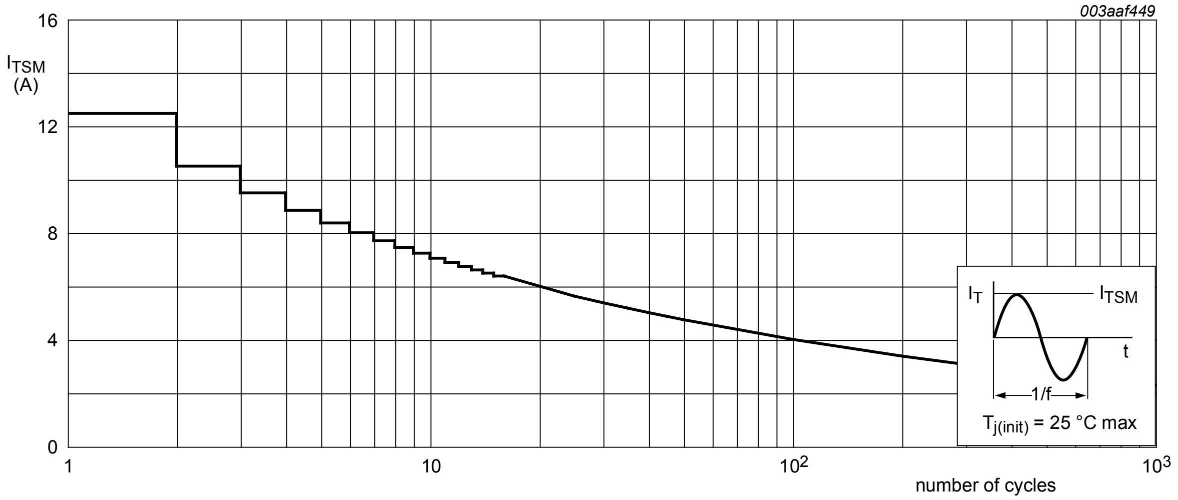
Fig. 2. **RMS on-state current as a function of solder point temperature; maximum values**



alpha = conduction angle

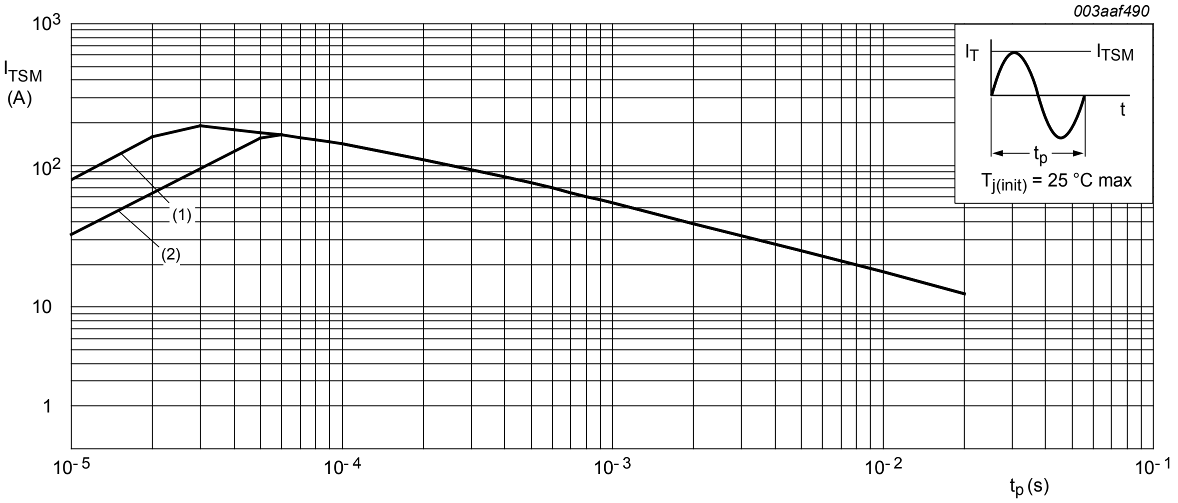
a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



f = 50 Hz

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



$t_p \leq 20$ ms

(1) dI_T/dt limit

(2) T2- G+ quadrant limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse width; 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	full cycle; Fig. 6		-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; printed-circuit board mounted: minimum footprint; full cycle; Fig. 7		-	156	-	K/W
		in free air; printed-circuit board mounted: pad area; full cycle; Fig. 8		-	70	-	K/W

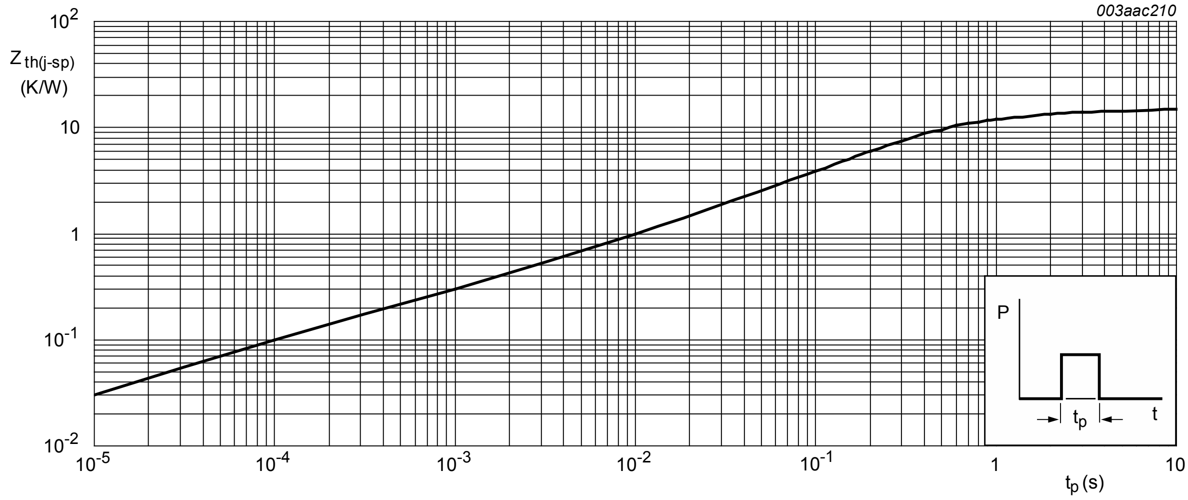
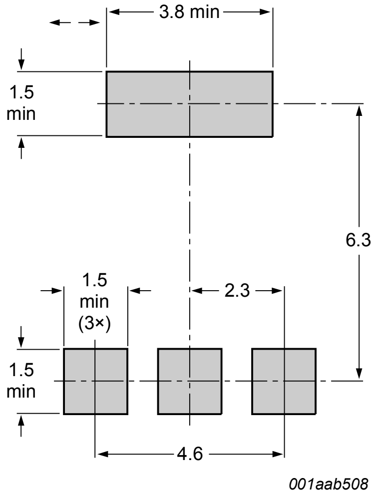
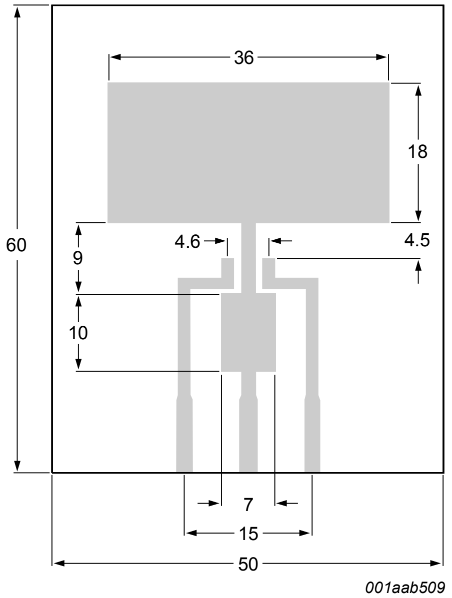


Fig. 6. Transient thermal impedance from junction to solder point as a junction of pulse width



All dimensions are in mm

Fig. 7. Minimum footprint SOT223



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

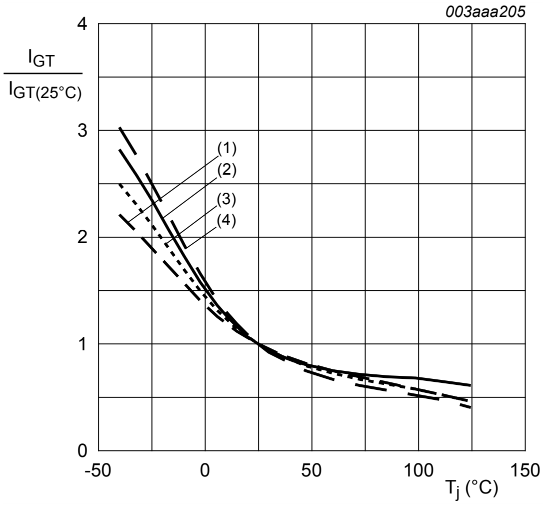
Fig. 8. Printed circuit board pad area: SOT223

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; T2+ G+; T_j = 25 °C; Fig. 9		0.3	-	5	mA

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		V_D = 12 V; I_T = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 9		0.3	-	5	mA
		V_D = 12 V; I_T = 0.1 A; T2- G-; T_j = 25 °C; Fig. 9		0.3	-	5	mA
		V_D = 12 V; I_T = 0.1 A; T2- G+; T_j = 25 °C; Fig. 9		0.3	-	7	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T2+ G+; T_j = 25 °C; Fig. 10		-	-	10	mA
		V_D = 12 V; I_G = 0.1 A; T2+ G-; T_j = 25 °C; Fig. 10		-	-	25	mA
		V_D = 12 V; I_G = 0.1 A; T2- G-; T_j = 25 °C; Fig. 10		-	-	10	mA
		V_D = 12 V; I_G = 0.1 A; T2- G+; T_j = 25 °C; Fig. 10		-	-	10	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 11		-	-	10	mA
V_T	on-state voltage	I_T = 1.4 A; T_j = 25 °C; Fig. 12		-	1.3	1.6	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 13		-	-	1	V
		V_D = 800 V; I_T = 0.1 A; T_j = 125 °C; Fig. 13		0.2	-	-	V
I_D	off-state current	V_D = 800 V; T_j = 125 °C		-	-	0.5	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 110 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit; Fig. 14		100	-	-	V/µs
dV_{com}/dt	rate of change of commutating voltage	V_D = 400 V; T_j = 110 °C; dI_{com}/dt = 0.44 A/ms; gate open circuit		1	-	-	V/µs



(1) T2- G+
(2) T2- G-
(3) T2+ G-
(4) T2+ G+

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

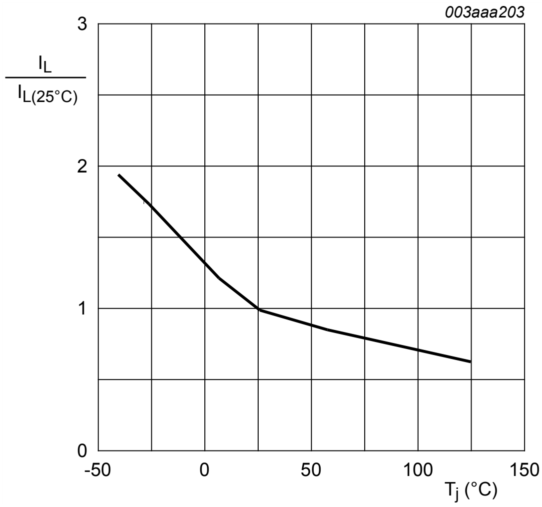


Fig. 10. Normalized latching current as a function of junction temperature

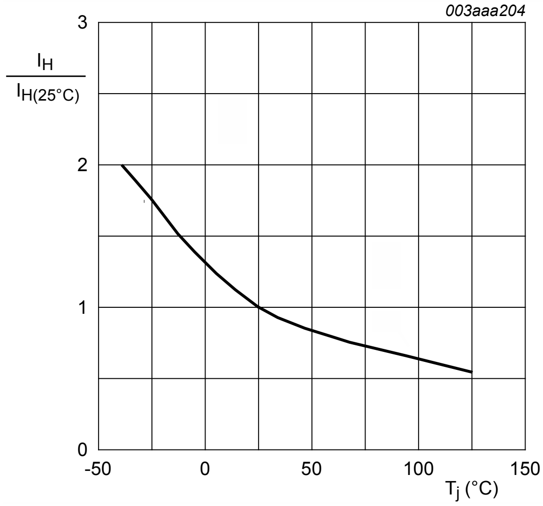
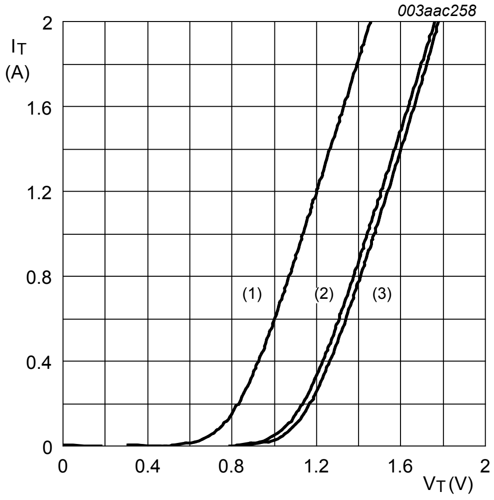


Fig. 11. Normalized holding current as a function of junction temperature



V_o = 1.13 V
R_s = 0.31 Ω
(1) T_j = 125 °C; typical values
(2) T_j = 125 °C; maximum values
(3) T_j = 25 °C; maximum values

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

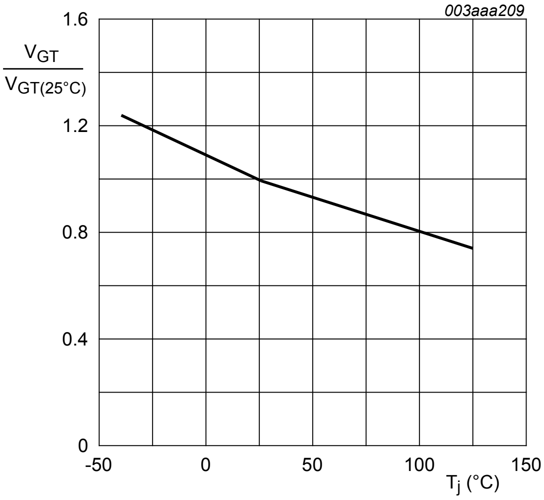


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

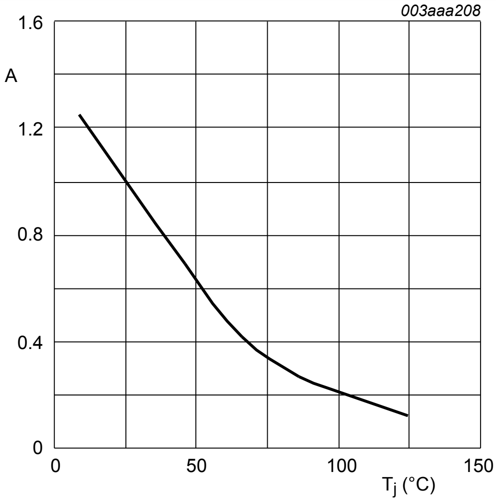
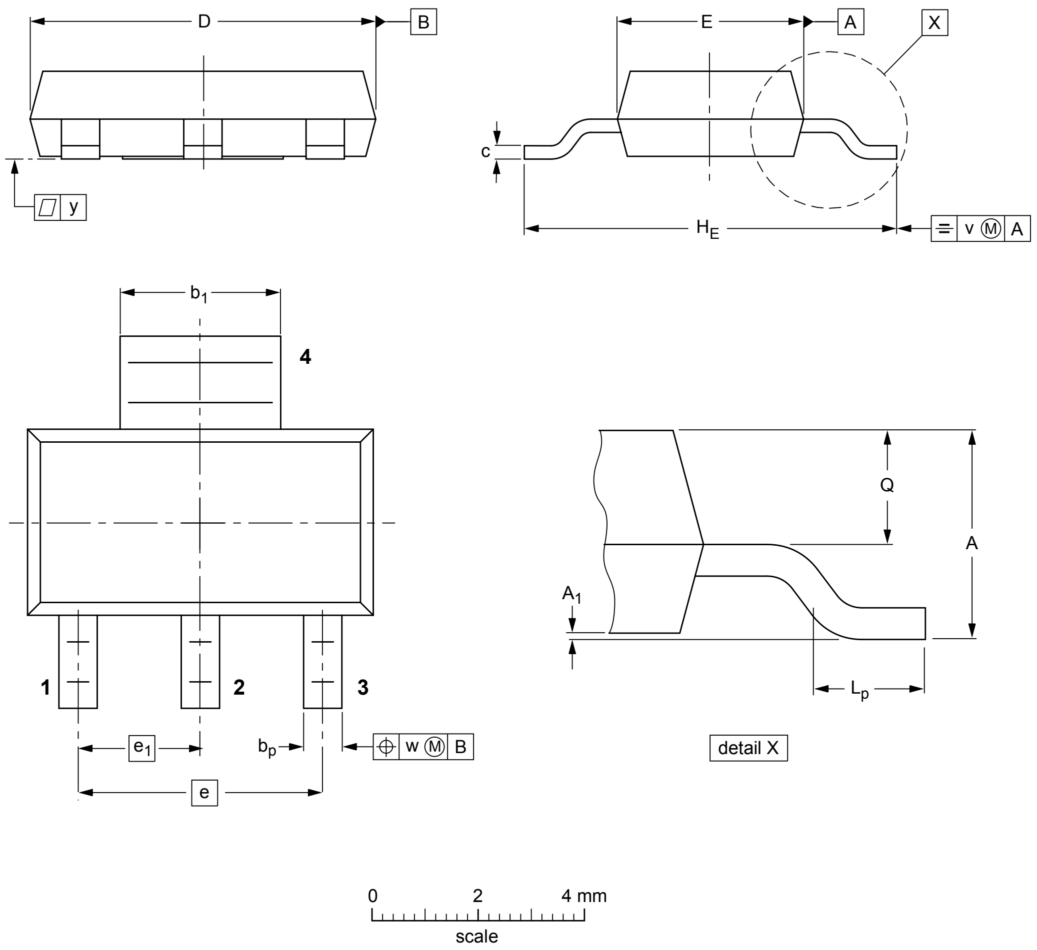


Fig. 14. Normalized critical rate of rise of off-state voltage as a function of junction temperature; typical values

$$A = \frac{dV_{D(Tj\,°C)} / dt}{dV_{D(25\,°C)} / dt}$$

11. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads **SOT223**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	b_1	c	D	E	e	e_1	H_E	L_p	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

Fig. 15. 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.

[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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