

## 1. General description

Planar passivated sensitive gate four quadrant triac in a SOT223-2L surface-mountable plastic package intended for applications requiring direct interfacing to logic level ICs and low power gate drivers.

## 2. Features and benefits

- Direct interfacing to logic level ICs
- Direct interfacing to low power gate drive circuits
- 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

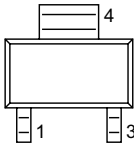
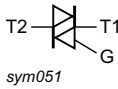
Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
<b>Absolute maximum rating</b>							
$V_{DRM}$	repetitive peak off-state voltage			800			V
$V_{RRM}$	repetitive peak reverse voltage			800			V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 55\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		2			A
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		16			A
		full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 16.7\text{ ms}$		18			A
$T_j$	operating junction temperature			-40 to 125			$^{\circ}\text{C}$
Symbol	Parameter	Conditions	Notes	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. 7</a>		-	-	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 7</a>		-	-	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 7</a>		-	-	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 7</a>		-	-	10	mA

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>		-	-	10	mA
$V_T$	on-state voltage	$I_T = 2\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>		-	1.3	1.6	V
<b>Dynamic characteristics</b>							
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ °C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit; <a href="#">Fig. 12</a>		20	-	-	V/ $\mu$ s
$dV_{com}/dt$	rate of change of commutating voltage	$V_D = 400\text{ V}$ ; $T_j = 110\text{ °C}$ ; $dI_{com}/dt = 0.44\text{ A/ms}$ ; gate open circuit		1	-	-	V/ $\mu$ s

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		 sym051
3	G	gate		
4	T2	main terminal 2		

## 6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BT232V-800D	SOT223-2L	BT232V-800DF	Reel	4000	SOT223d-2L	02-Apr-2025

## 7. Marking

Table 4. Marking codes

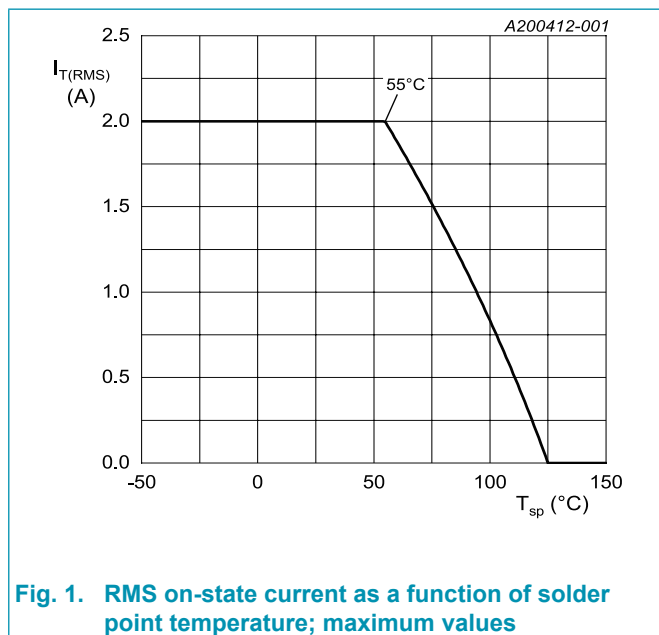
Type number	Marking codes
BT232V-800D	232V8D

## 8. Limiting values

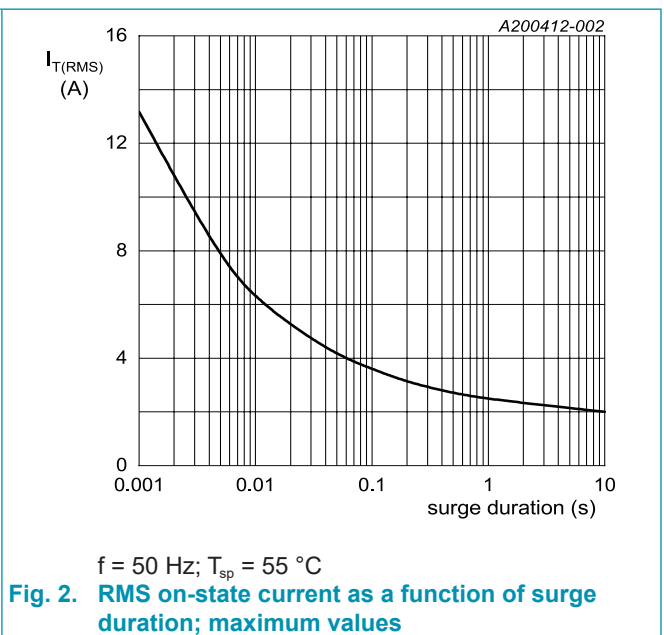
**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Notes	Values	Unit
$V_{DRM}$	repetitive peak off-state voltage			800	V
$V_{RRM}$	repetitive peak reverse voltage			800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 55\text{ }^{\circ}\text{C}$ ; <a href="#">Fig 1</a> ; <a href="#">Fig 2</a> ; <a href="#">Fig 3</a>		2	A
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig 4</a> ; <a href="#">Fig 5</a>		16	A
		full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 16.7\text{ ms}$		18	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN		1.28	$\text{A}^2\text{s}$
$di_T/dt$	rate of rise of on-state current	$I_G = 20\text{ mA}$ ; T2+ G+		50	$\text{A}/\mu\text{s}$
		$I_G = 20\text{ mA}$ ; T2+ G-		50	$\text{A}/\mu\text{s}$
		$I_G = 20\text{ mA}$ ; T2- G-		50	$\text{A}/\mu\text{s}$
		$I_G = 20\text{ mA}$ ; T2- G+		20	$\text{A}/\mu\text{s}$
$I_{GM}$	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 to 150	$^{\circ}\text{C}$
$T_j$	operating junction temperature			-40 to 125	$^{\circ}\text{C}$



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



$f = 50\text{ Hz}$ ;  $T_{sp} = 55\text{ }^{\circ}\text{C}$

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

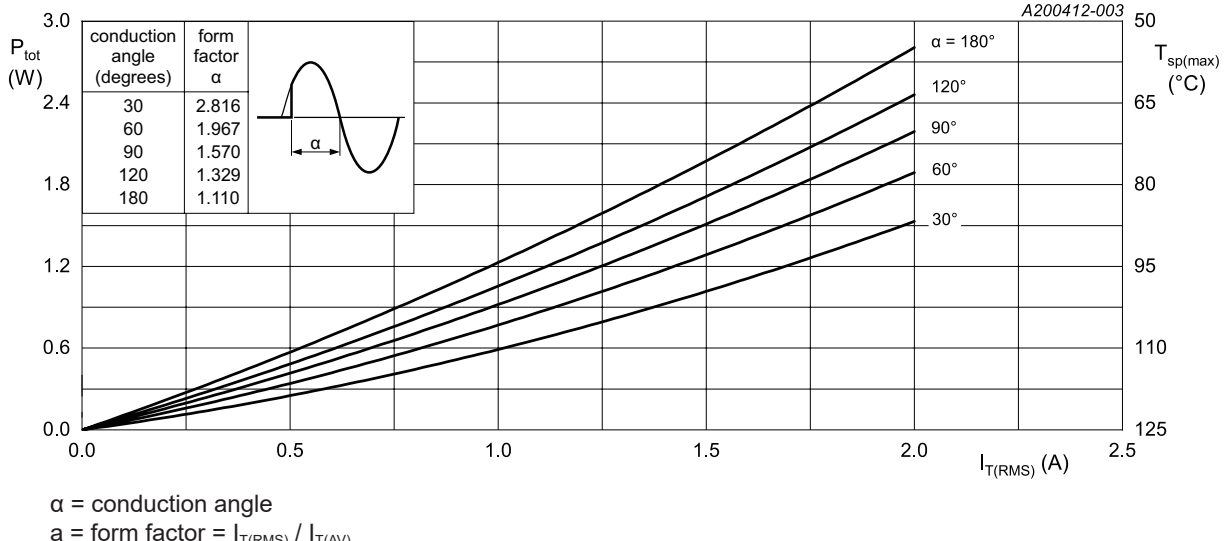


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

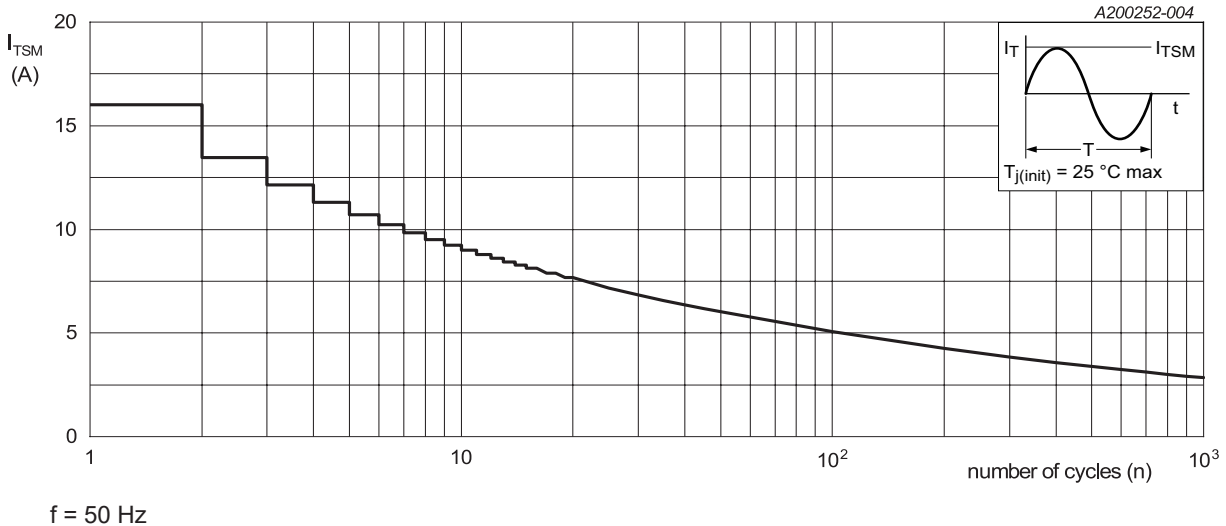


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

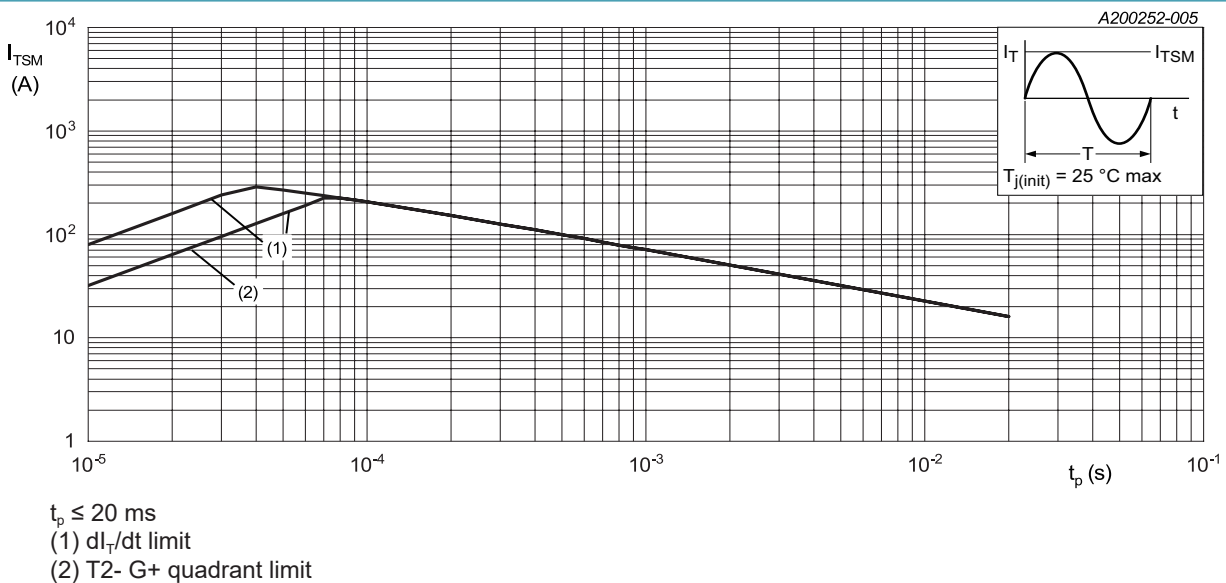


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	full cycle; <a href="#">Fig 6</a>		-	-	25	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; printed-circuit board mounted; pad area		-	65	-	K/W

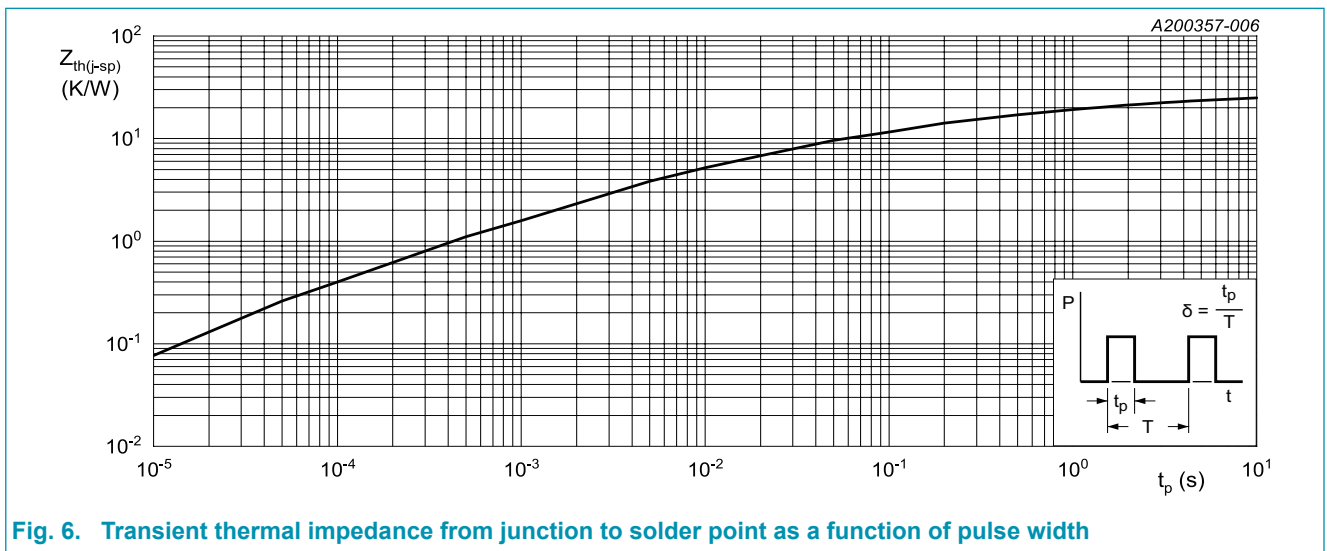
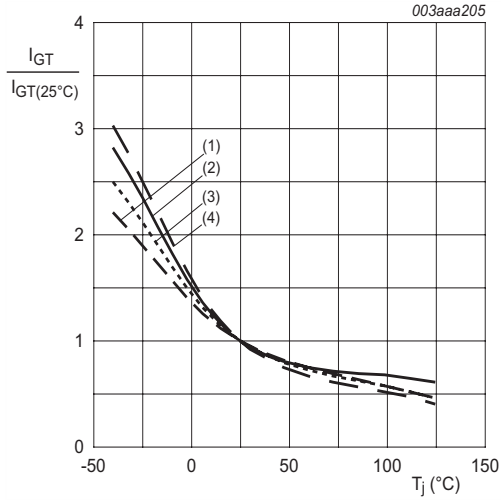


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width

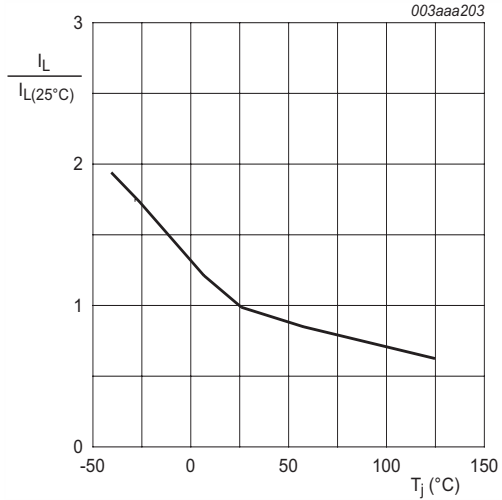
## 10. Characteristics

Table 7. Characteristics

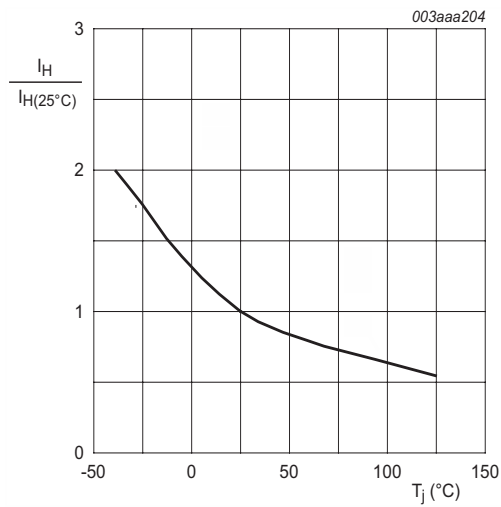
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
<b>Static characteristics</b>							
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		-	-	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		-	-	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		-	-	5	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		-	-	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. 8</a>		-	-	10	mA
		$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 8</a>		-	-	20	mA
		$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 8</a>		-	-	10	mA
		$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G+; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 8</a>		-	-	20	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>		-	-	10	mA
$V_T$	on-state voltage	$I_T = 2\text{ A}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>		-	1.3	1.6	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. 11</a>		-	-	1	V
		$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ }^\circ\text{C}$		0.2	-	-	V
$I_D$	off-state current	$V_D = 800\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$		-	-	10	$\mu\text{A}$
		$V_D = 800\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$		-	-	0.5	mA
$I_R$	reverse current	$V_R = 800\text{ V}$ ; $T_j = 25\text{ }^\circ\text{C}$		-	-	10	$\mu\text{A}$
		$V_R = 800\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$		-	-	0.5	mA
<b>Dynamic characteristics</b>							
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit; <a href="#">Fig. 12</a>		20	-	-	V/ $\mu\text{s}$



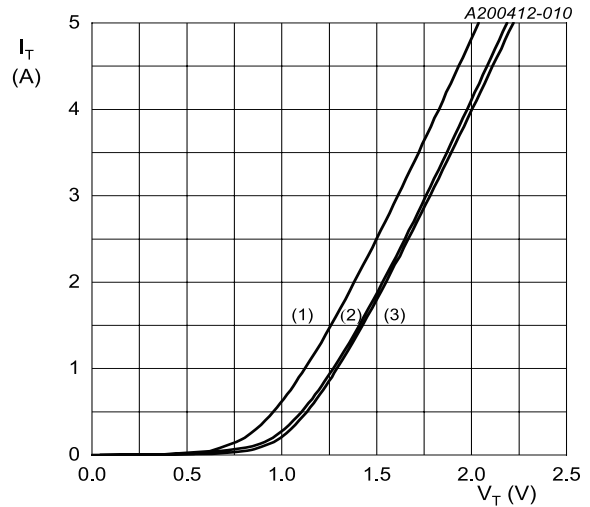
**Fig. 7. Normalized gate trigger current as a function of junction temperature**



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



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



$V_o = 1.169\text{ V}; R_s = 0.1750\ \Omega$   
 (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. 10. On-state current as a function of on-state voltage**

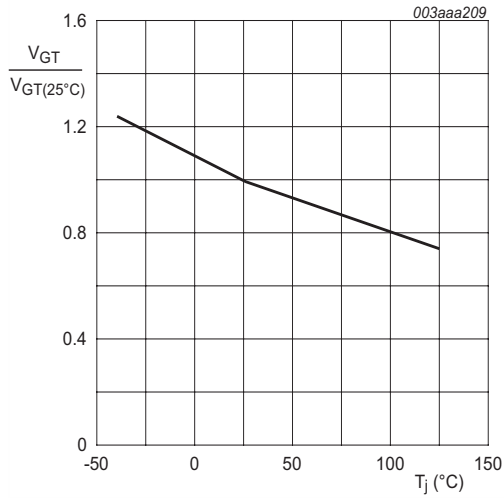
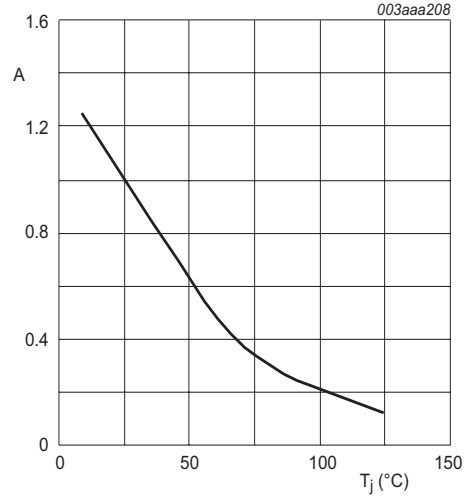


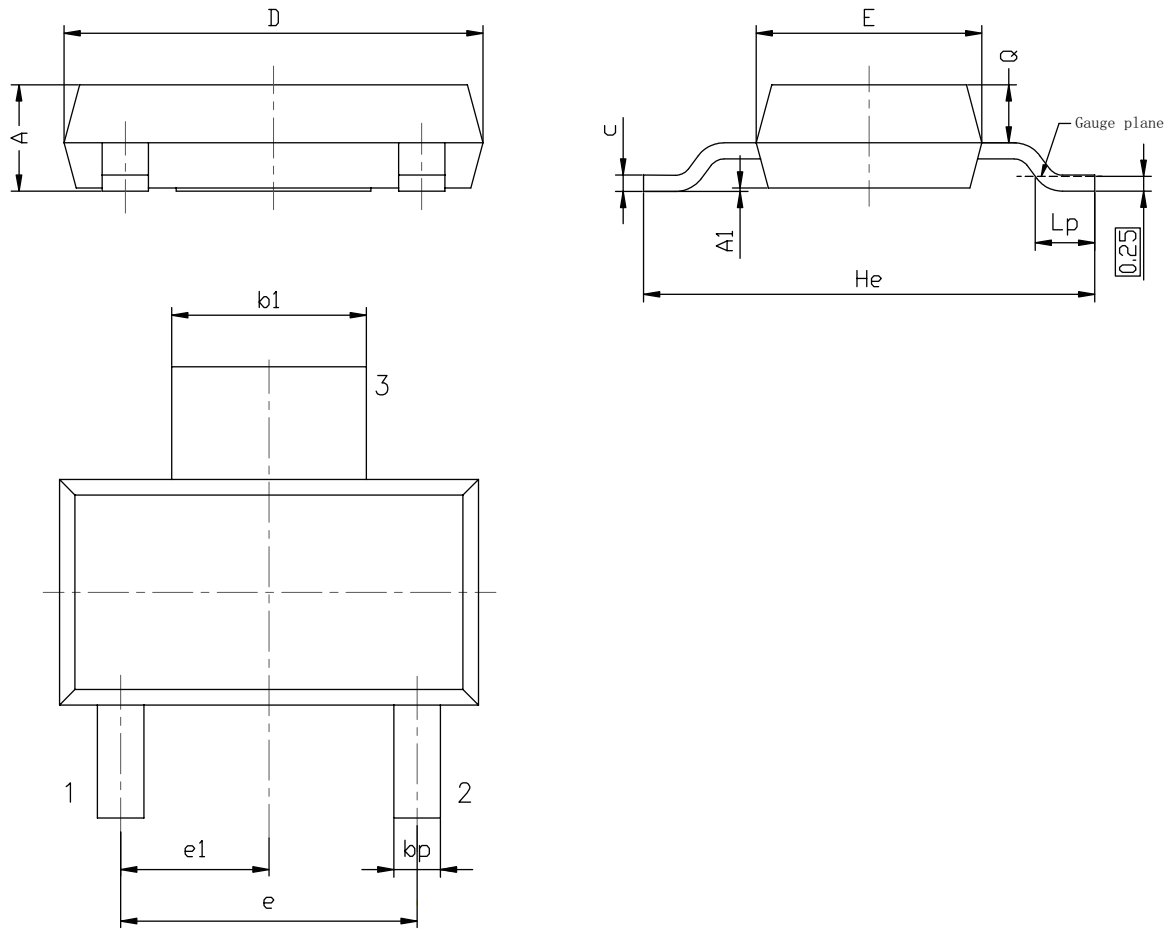
Fig. 11. Normalized gate trigger voltage as a function of junction temperature



$$A = \frac{dV_{D(T_j)} / dt}{dV_{D(25^\circ C)} / dt}$$

Fig. 12. Normalized critical rate of rise of off-state voltage as a function of junction temperature; typical values

### 11. Package outline



Unit	A	A1	bp	b1	c	D	E	e	e1	He	Lp	Q	
mm	Min	1.50	0.01	0.66	2.90	0.23	6.30	3.30	4.50	2.20	6.70	0.75	0.82
	Max	1.81	0.12	0.85	3.13	0.35	6.70	3.70	4.70	2.40	7.30	1.20	0.93

## 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.
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Product [short] data sheet	Production	This document contains the product specification.

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