

1. General description

Planar passivated three quadrant high commutation triac in a SOT223 surface mountable plastic package for use in motor control circuits or with other highly inductive loads. This triac balances the requirements of commutation performance and gate sensitivity.

2. Applications

- General purpose motor controls
- Small loads in washing machines
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

3. Quick reference data

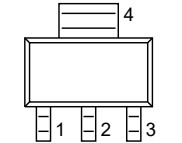
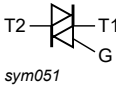
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	600	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{sp}} \leq 108\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	1	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{j(init)}} = 25\text{ °C}$; $t_{\text{p}} = 16.7\text{ ms}$	-	-	11	A
		full sine wave; $T_{\text{j(init)}} = 25\text{ °C}$; $t_{\text{p}} = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	-	10	A
T_{j}	junction temperature		-	-	125	°C
Static characteristics						
I_{GT}	gate trigger current	$V_{\text{D}} = 12\text{ V}$; $I_{\text{T}} = 0.1\text{ A}$; T2+ G+; $T_{\text{j}} = 25\text{ °C}$; Fig. 9	-	-	25	mA
		$V_{\text{D}} = 12\text{ V}$; $I_{\text{T}} = 0.1\text{ A}$; T2+ G-; $T_{\text{j}} = 25\text{ °C}$; Fig. 9	-	-	25	mA
		$V_{\text{D}} = 12\text{ V}$; $I_{\text{T}} = 0.1\text{ A}$; T2- G-; $T_{\text{j}} = 25\text{ °C}$; Fig. 9	-	-	25	mA
I_{H}	holding current	$V_{\text{D}} = 12\text{ V}$; $T_{\text{j}} = 25\text{ °C}$; Fig. 11	-	-	30	mA
V_{T}	on-state voltage	$I_{\text{T}} = 2\text{ A}$; $T_{\text{j}} = 25\text{ °C}$; Fig. 12	-	1.2	1.5	V
Dynamic characteristics						
dV_{D}/dt	rate of rise of off-state voltage	$V_{\text{DM}} = 402\text{ V}$; $T_{\text{j}} = 125\text{ °C}$; (67% of V_{DRM}); exponential waveform; gate open circuit	50	-	-	V/ μs

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
di_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$; $I_{T(RMS)} = 1\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; (snubberless condition); gate open circuit		2.5	-	-	A/ms

4. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 SC-73 (SOT223)	 sym051
2	T2	main terminal 2		
3	G	gate		
4	mb	mounting base; connected to main terminal 2		

5. Ordering information

Table 3. Ordering information

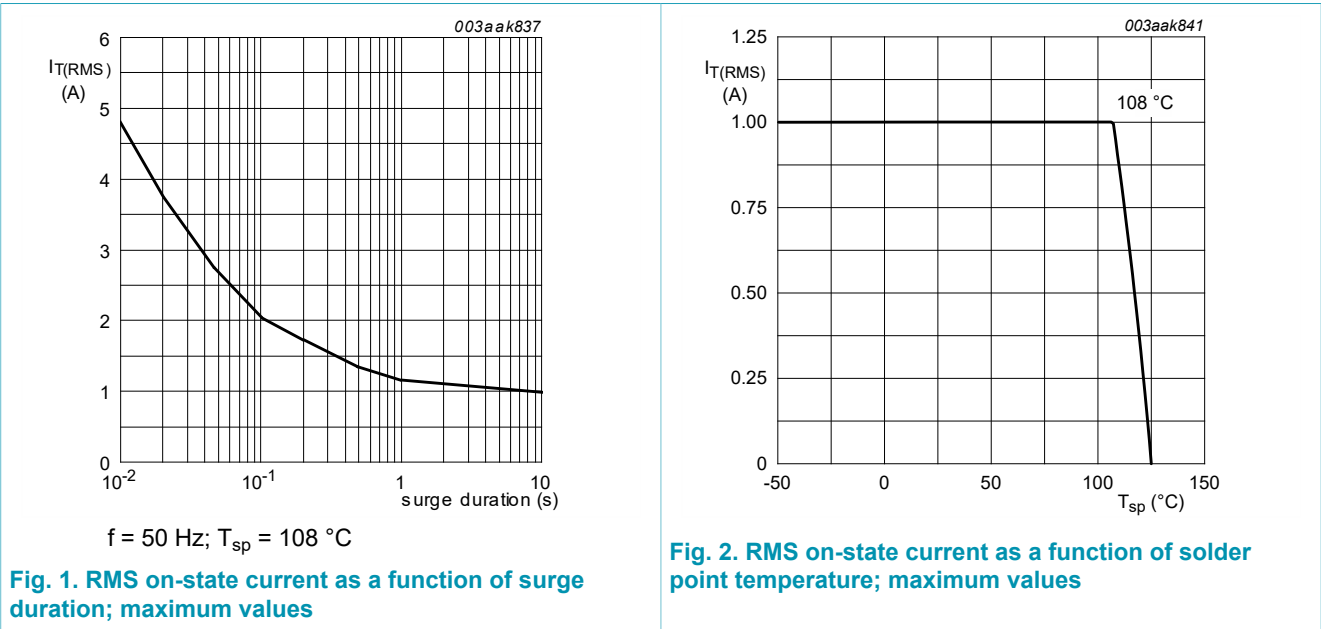
Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BTA204W-600F	SOT223	BTA204W-600F, 135	Reel	4000	SOT223	16-Mar-2006

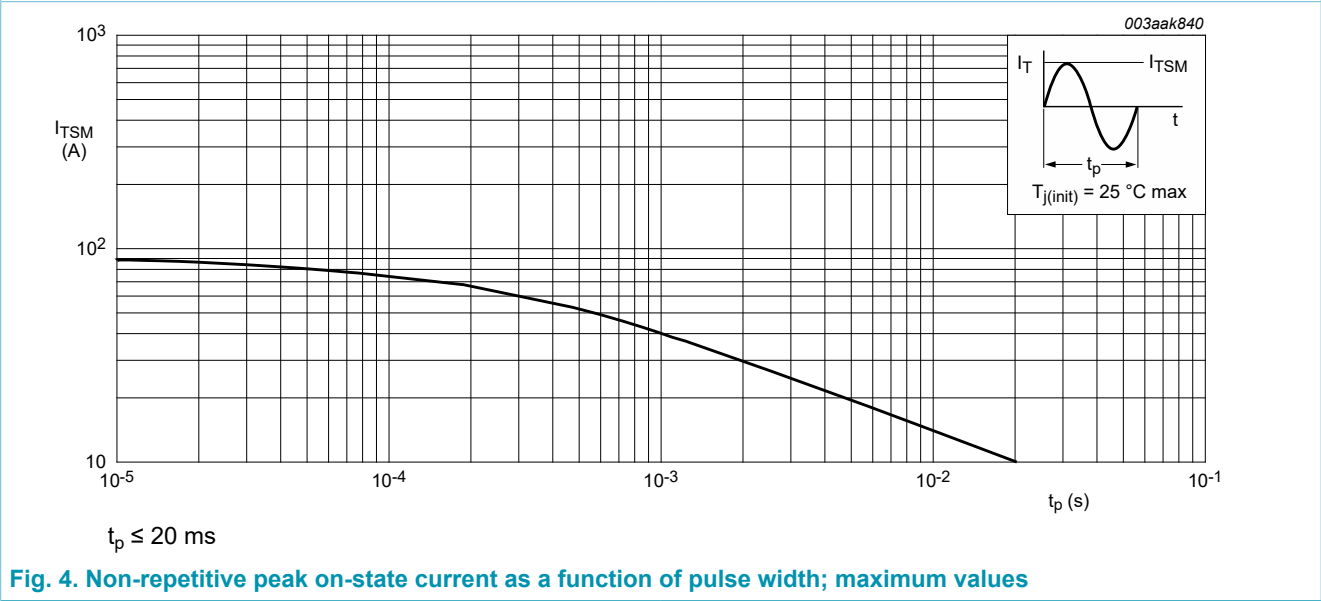
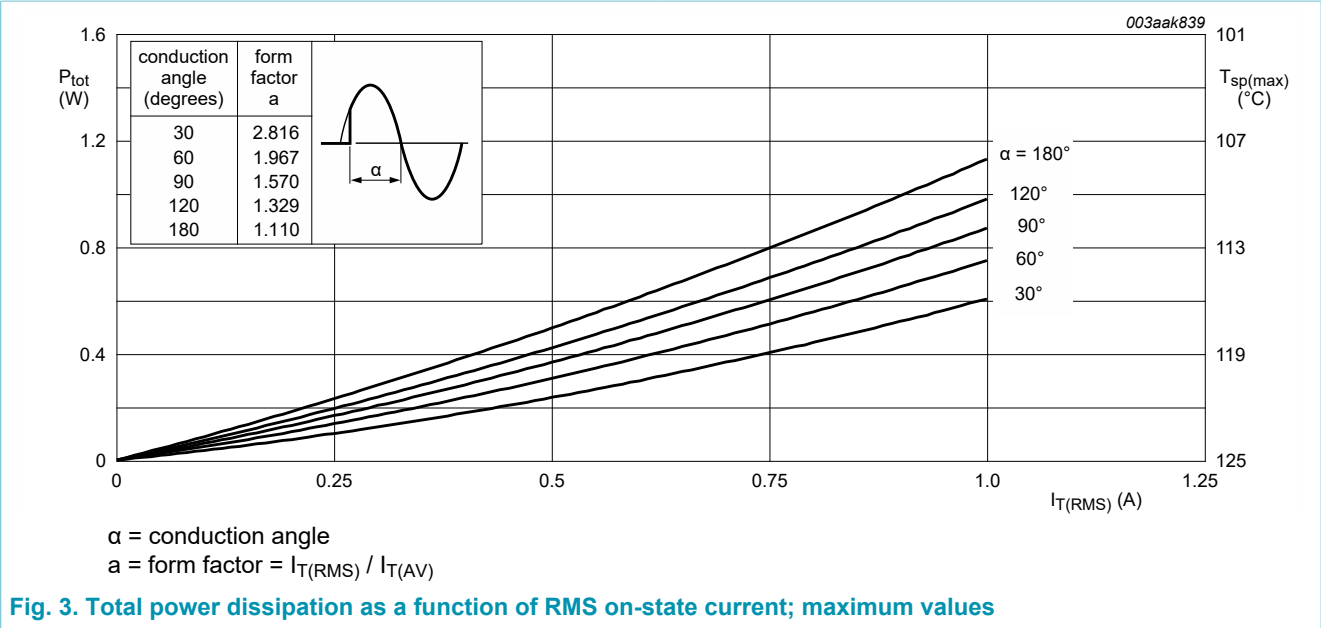
Type number	Marking codes	
	Assembly factory: d	Assembly factory: L
BTA204W-600F	Jdxxx 6F BTA204	JLxxx 6F BTA204

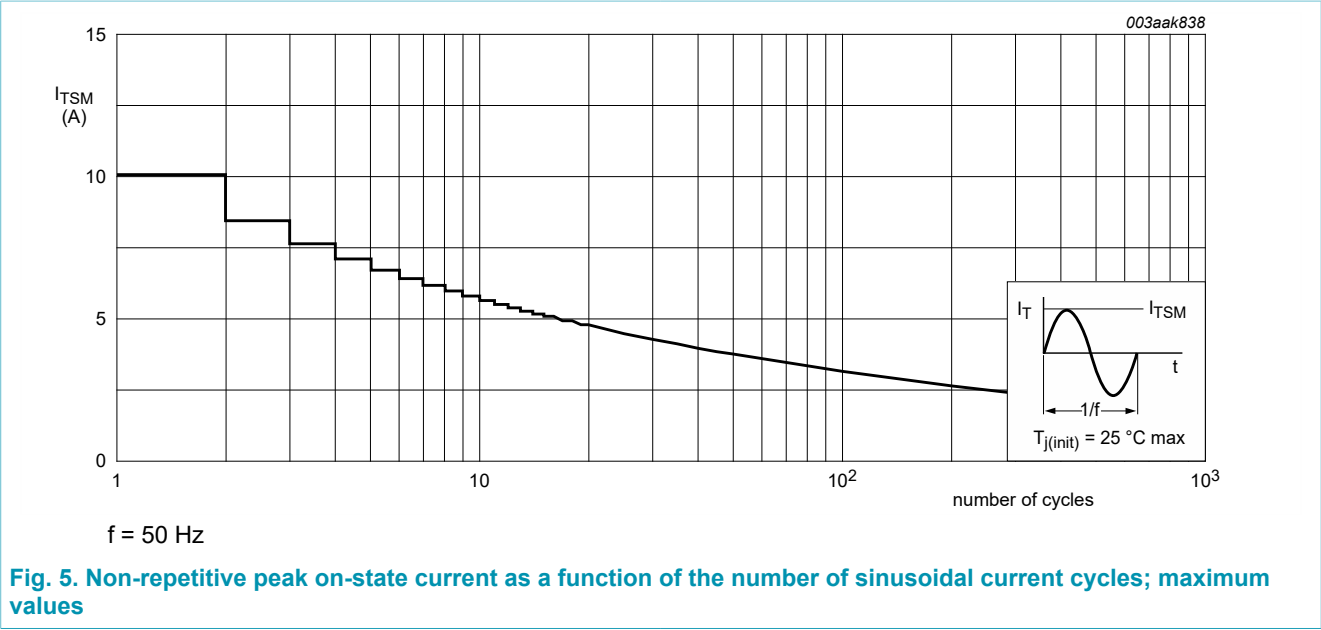
6. Limiting values

Table 4. 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
I _{T(RMS)}	RMS on-state current	full sine wave; T _{sp} ≤ 108 °C; Fig. 1 ; Fig. 2 ; Fig. 3		-	1	A
I _{TSM}	non-repetitive peak on-state current	full sine wave; T _{j(init)} = 25 °C; t _p = 16.7 ms		-	11	A
		full sine wave; T _{j(init)} = 25 °C; t _p = 20 ms; Fig. 4 ; Fig. 5		-	10	A
I ² t	I ² t for fusing	t _p = 10 ms; SIN		-	0.5	A ² s
di _T /dt	rate of rise of on-state current	I _G = 0.2 A		-	100	A/μs
I _{GM}	peak gate current			-	2	A
P _{GM}	peak gate power			-	5	W
P _{G(AV)}	average gate power	over any 20ms period		-	0.5	W
T _{stg}	storage temperature			-40	150	°C
T _j	junction temperature			-	125	°C



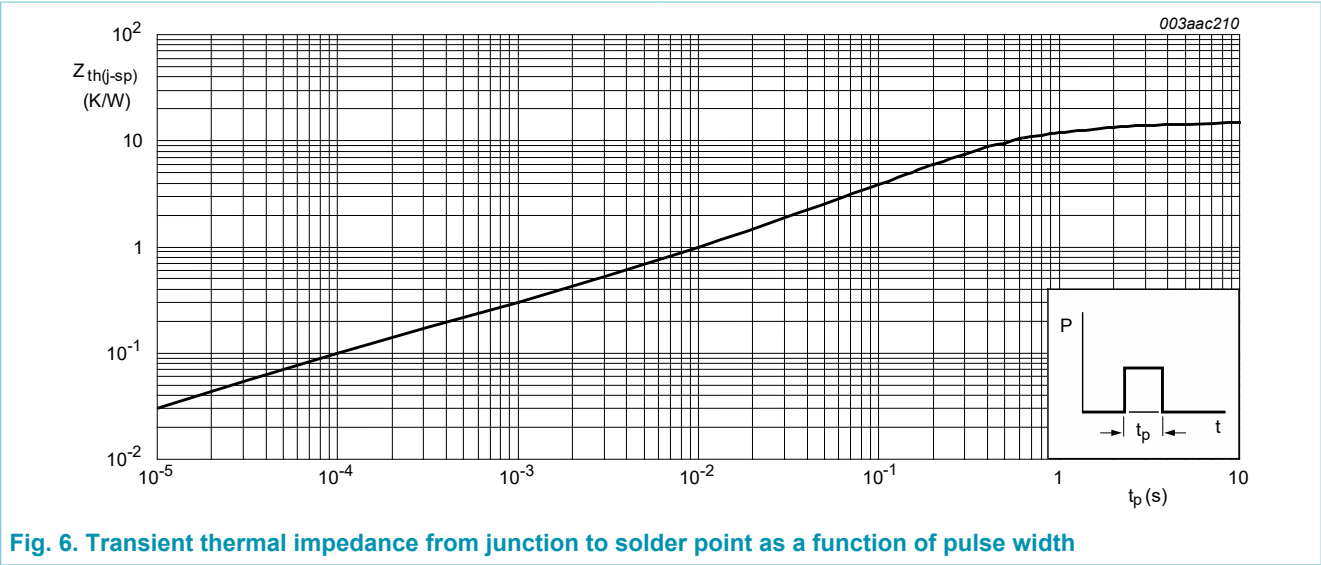


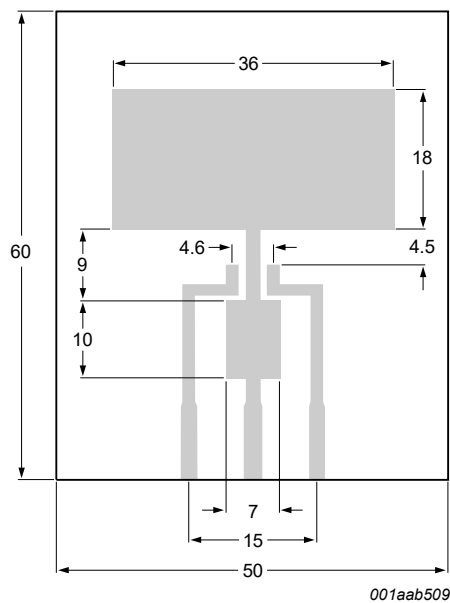


7. Thermal characteristics

Table 5. Thermal characteristics

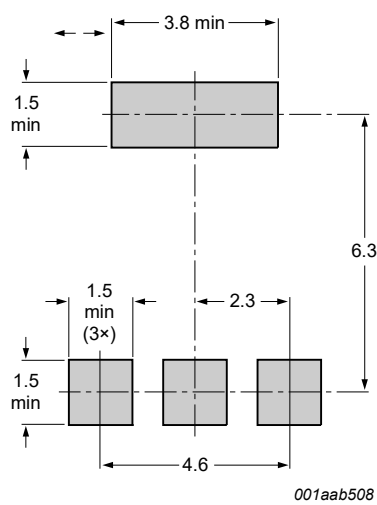
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	full cycle or half cycle; Fig. 6	-	-	15	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air; printed circuit board mounted: minimum pad area; Fig. 7	-	70	-	K/W
		in free air; printed circuit board mounted: minimum footprint; Fig. 8	-	156	-	K/W





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

Fig. 7. Printed circuit board pad area: SOT223



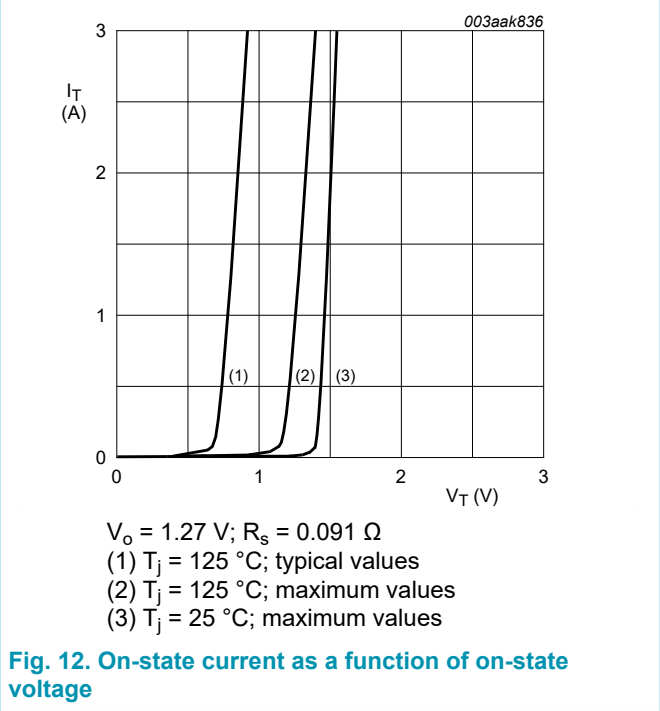
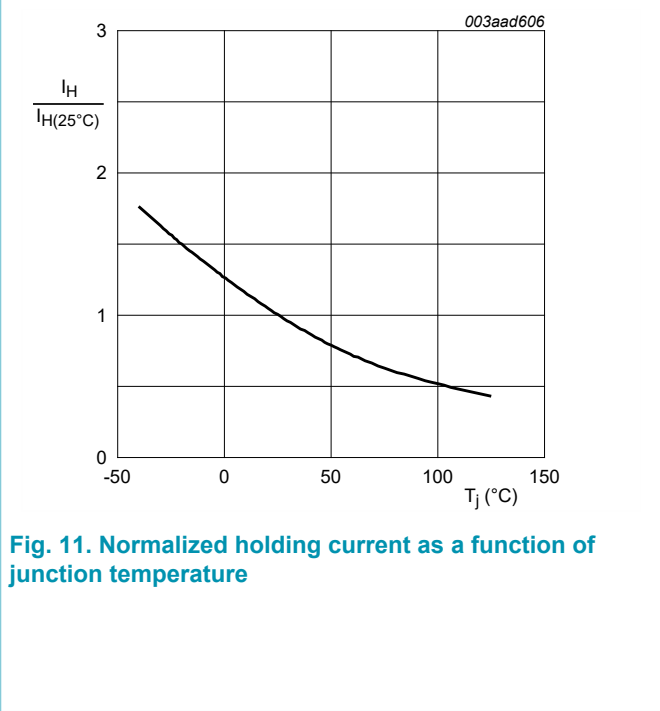
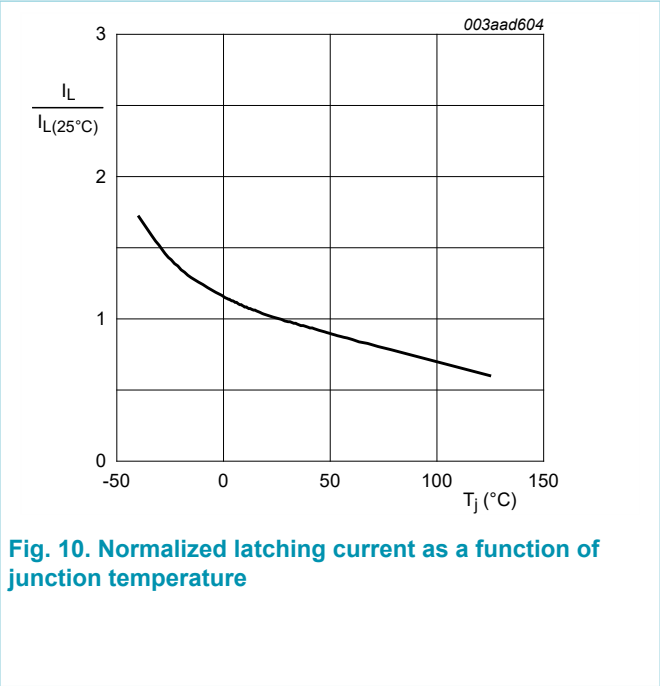
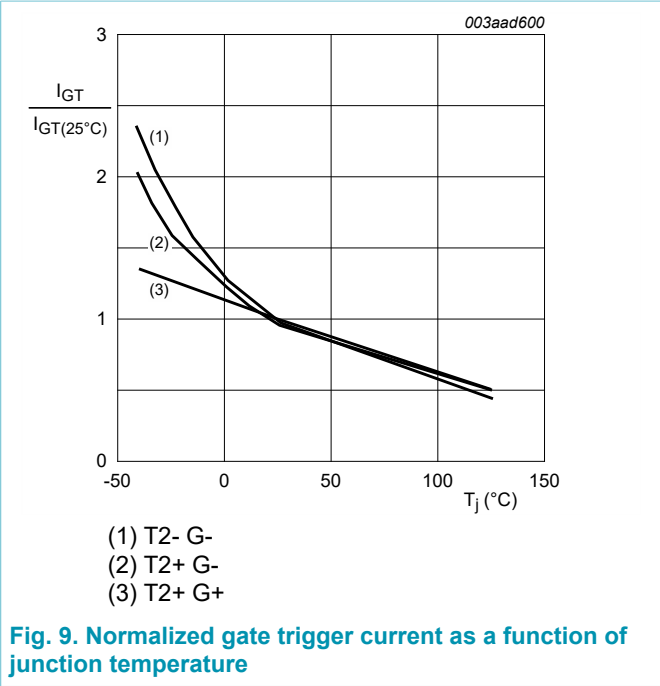
All dimensions are in mm

Fig. 8. Minimum footprint SOT223

8. Characteristics

Table 6. 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		-	-	25	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 9		-	-	25	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 9		-	-	25	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 10		-	-	20	mA
		V _D = 12 V; I _G = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 10		-	-	30	mA
		V _D = 12 V; I _G = 0.1 A; T2- G-; T _j = 25 °C; Fig. 10		-	-	20	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 11		-	-	30	mA
V _T	on-state voltage	I _T = 2 A; T _j = 25 °C; Fig. 12		-	1.2	1.5	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _j = 25 °C; Fig. 13		-	0.7	1	V
		V _D = 400 V; I _T = 0.1 A; T _j = 125 °C; Fig. 13		0.25	0.4	-	V
I _D	off-state current	V _D = 600 V; T _j = 125 °C		-	0.1	0.5	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 402 V; T _j = 125 °C; (67% of V _{DRM}); exponential waveform; gate open circuit		50	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 1 A; dV _{com} /dt = 20 V/μs; (snubberless condition); gate open circuit		2.5	-	-	A/ms



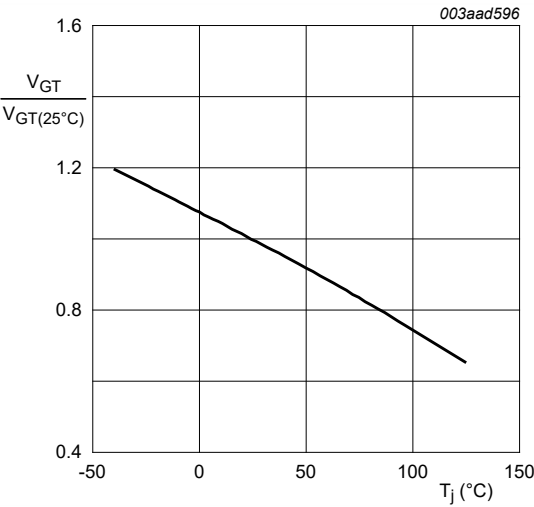
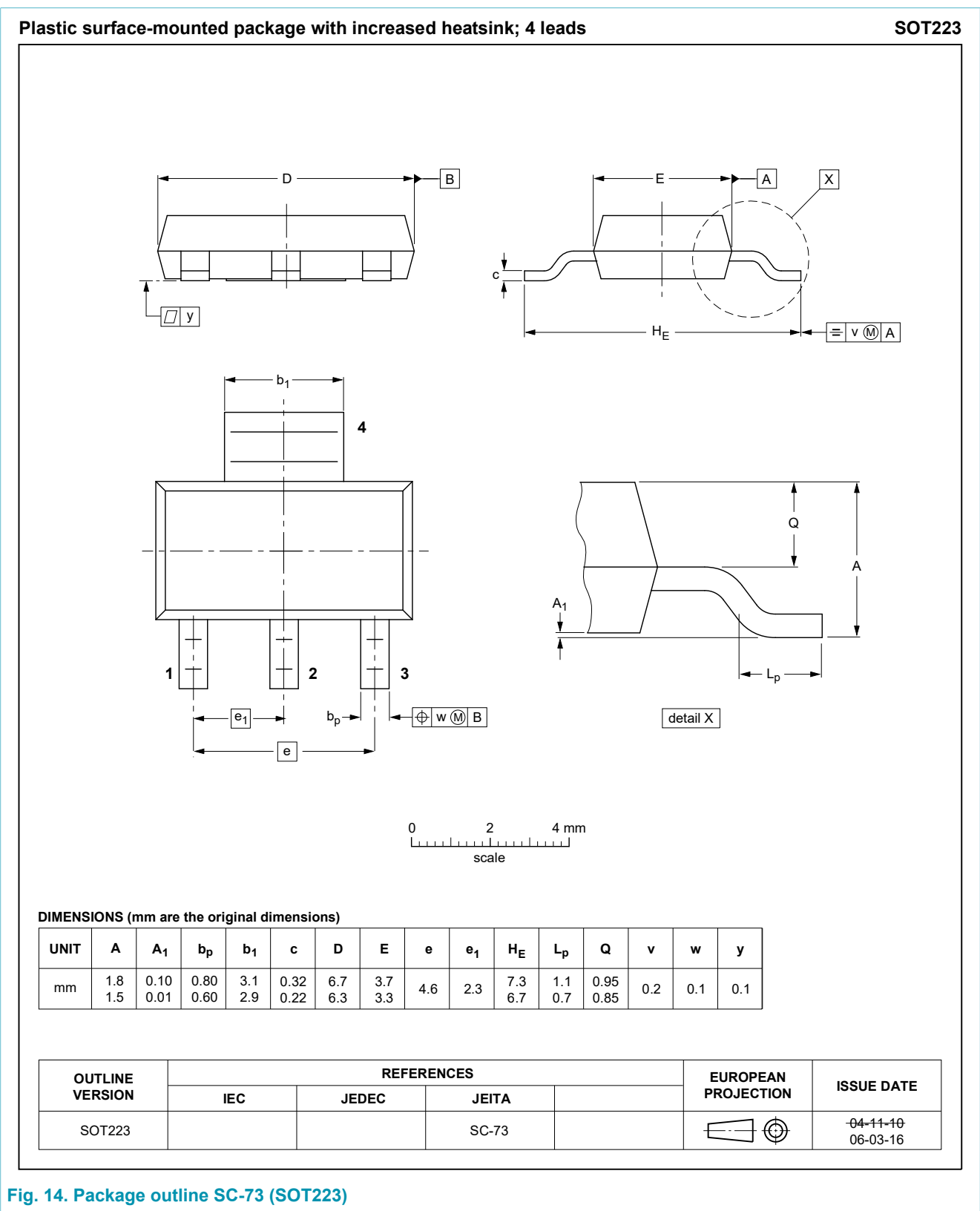


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

9. Package outline



10. 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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