

1. General description

Planar passivated high commutation three quadrant triac in a SOT428 (DPAK) surface mountable plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This "series B" triac will commute the full rated RMS current at the maximum rated junction temperature without the aid of a snubber

2. Features and benefits

- 3Q technology for improved noise immunity
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- High blocking voltage capability
- Less sensitive gate for very high noise immunity
- Planar passivated for voltage ruggedness and reliability
- Surface mountable package
- Triggering in three quadrants only

3. Applications

- Electronic thermostats
- General purpose motor controls
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

4. Quick reference data

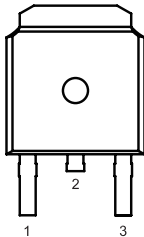
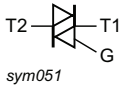
Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{DRM}	repetitive peak off-state voltage			600			V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 124\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		8			A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{J(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5		65			A
		full sine wave; $T_{J(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 16.7\text{ ms}$		72			A
T_J	junction temperature			150			$^{\circ}\text{C}$
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_J = 25\text{ }^{\circ}\text{C}$; Fig. 7		2	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_J = 25\text{ }^{\circ}\text{C}$; Fig. 7		2	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_J = 25\text{ }^{\circ}\text{C}$; Fig. 7		2	-	50	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_J = 25\text{ }^{\circ}\text{C}$; Fig. 9		-	-	60	mA
V_T	on-state voltage	$I_T = 10\text{ A}$; $T_J = 25\text{ }^{\circ}\text{C}$; Fig. 10		-	1.33	1.60	V

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 402 V; T _j = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		500	-	-	V/μs
		V _{DM} = 402 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		1000	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 8 A; dV _{com} /dt = 20 V/μs; gate open circuit		5	-	-	A/ms
		V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 8 A; dV _{com} /dt = 20 V/μs; gate open circuit		14		-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		 sym051
2	T2	main terminal 2		
3	G	gate		
mb	T2	mounting base; 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
BTA208S-600BT	TO252	BTA208S-600BT,118	Reel	2500	TO252N	07-Mar-2025
					TO252Q	05-Mar-2025

7. Marking

Table 4. Marking codes

Type number	Marking codes	
	Assembly factory: N	Assembly factory: Q
BTA208S-600BT	BTA208S 600BT PJNxxxx xx	BTA208S 600BT PJQxxxx xx

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			600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 124\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig 4 ; Fig 5		65	A
		full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 16.7\text{ ms}$		72	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN		21	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 100\text{ mA}$		100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			2	A
P_{GM}	peak gate power			5	W
$P_{G(AV)}$	average gate power	over any 20 ms period		0.5	W
T_{stg}	storage temperature			-40 to 150	$^{\circ}\text{C}$
T_j	junction temperature			150	$^{\circ}\text{C}$

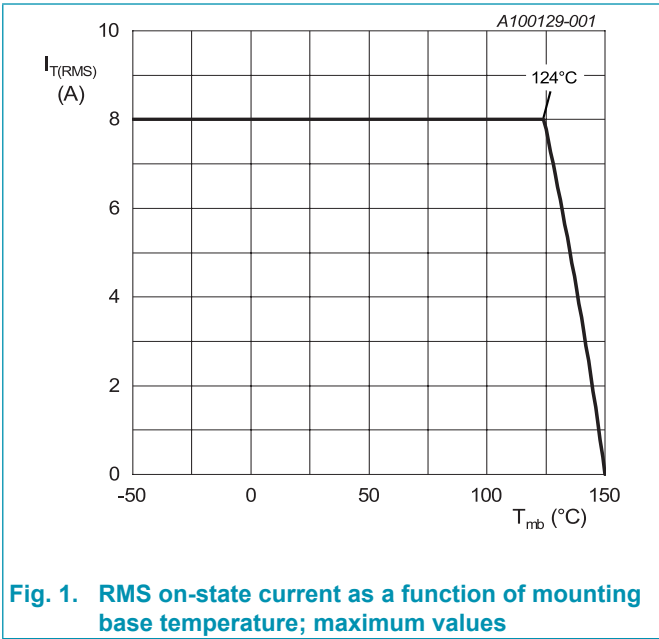


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

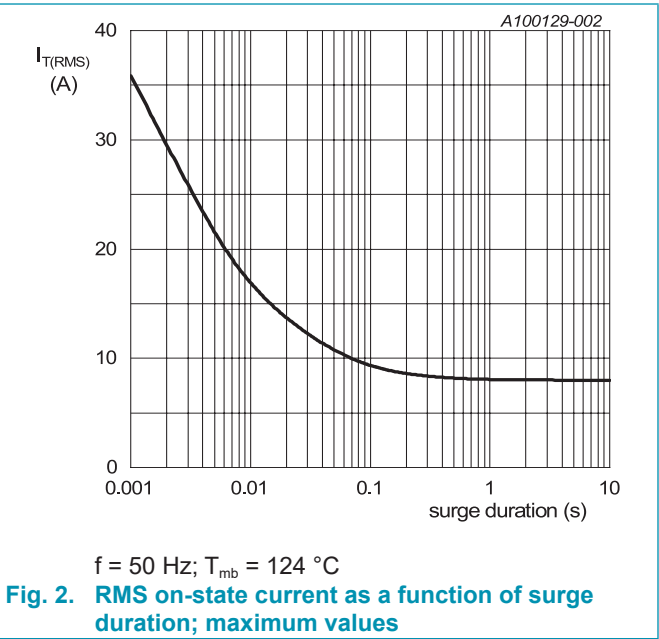


Fig. 2. RMS on-state current as a function of surge duration; maximum values

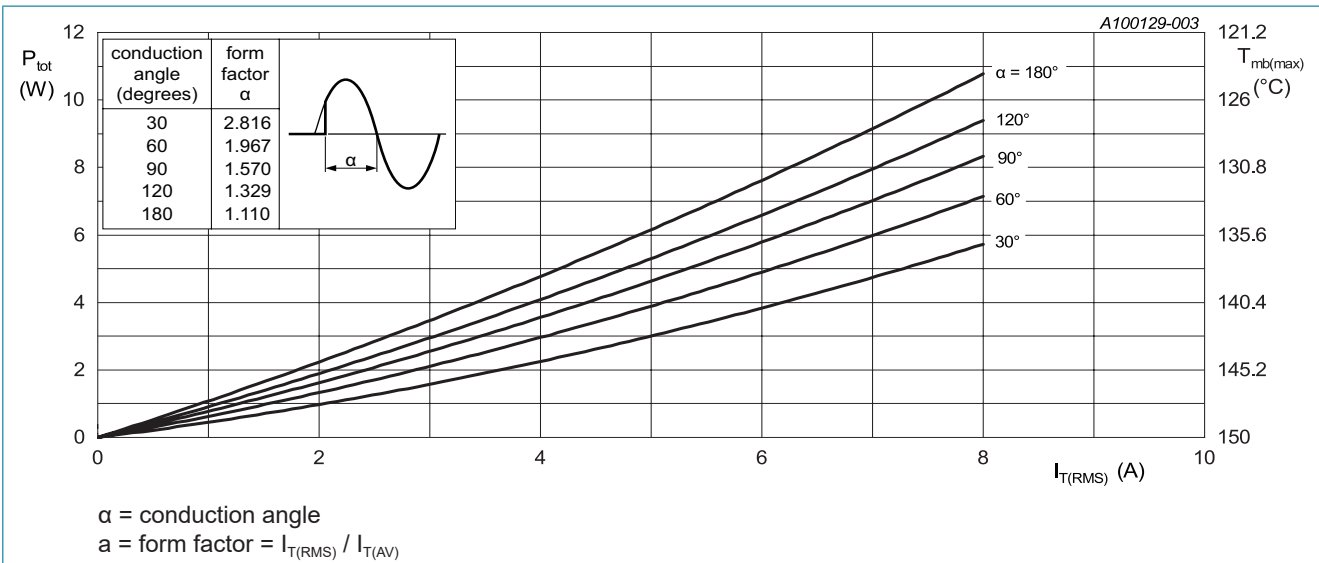


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

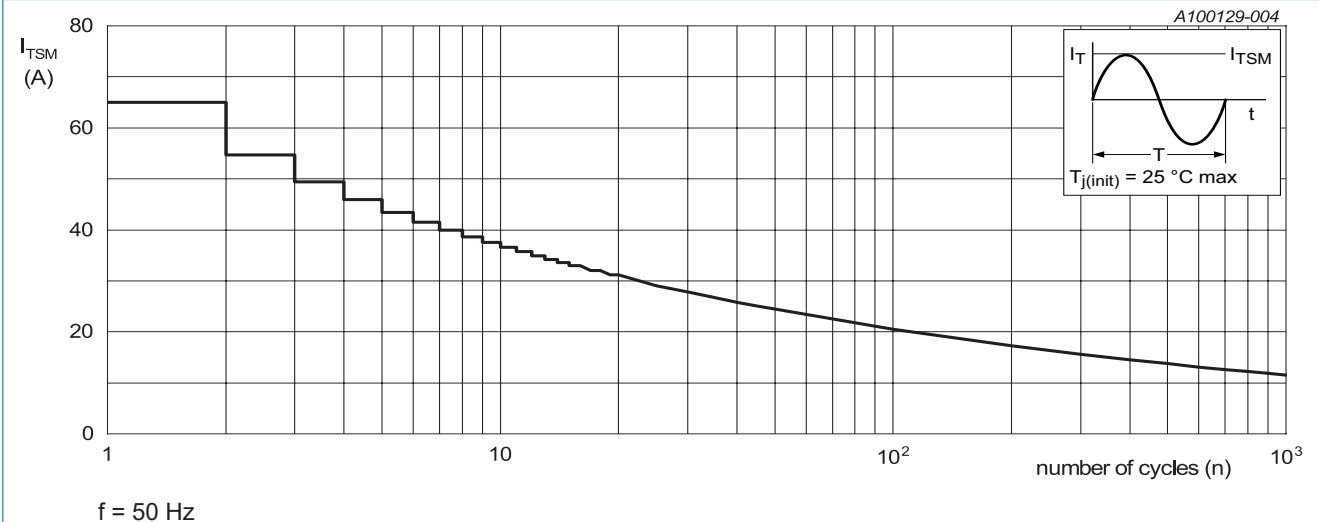


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

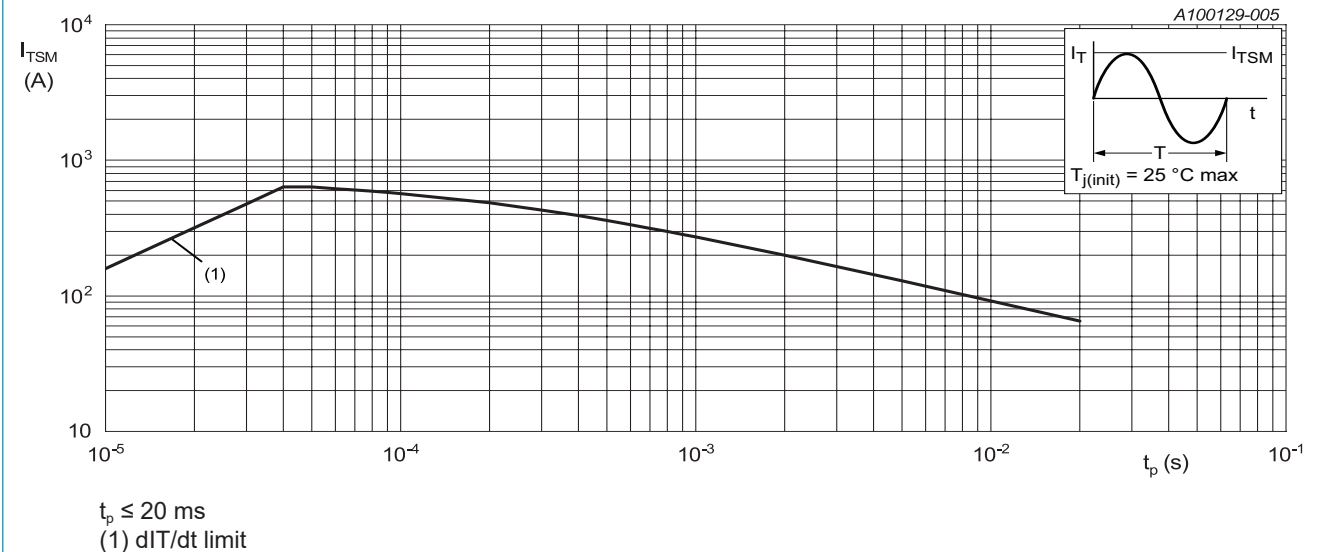
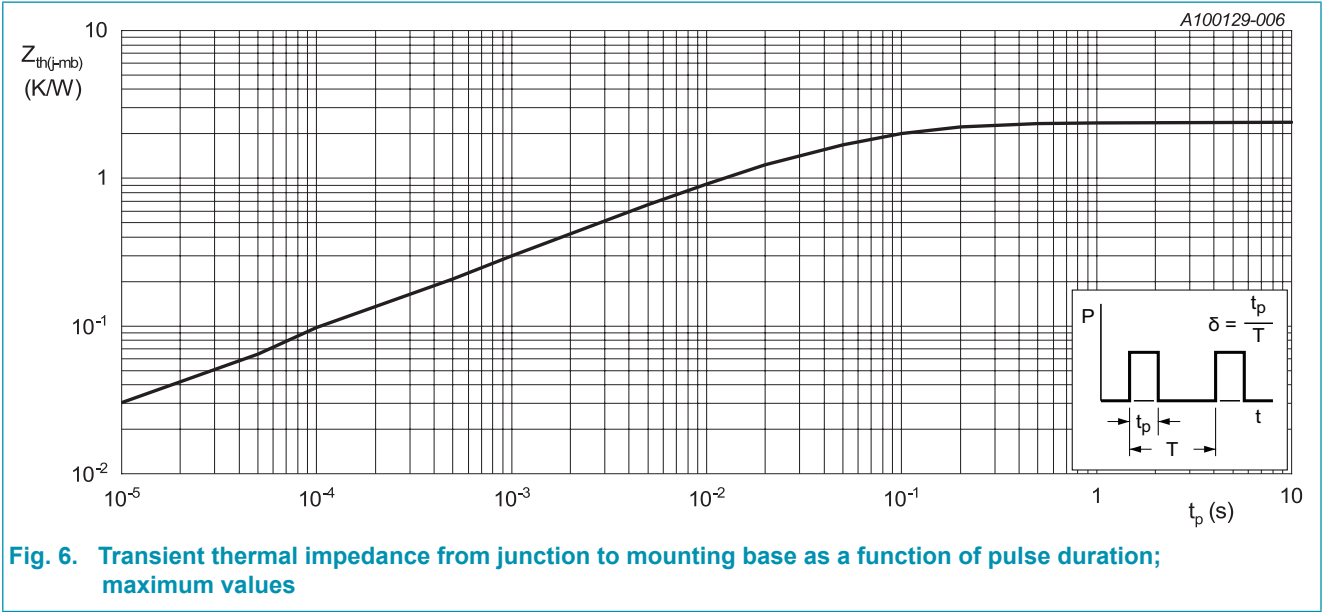


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

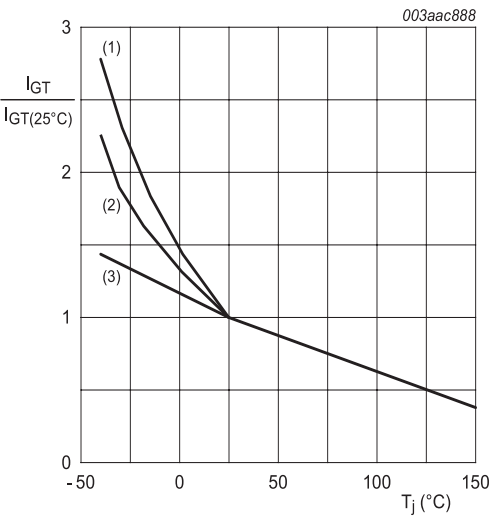
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 6		-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	50	-	K/W



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_J = 25\text{ °C}$; Fig. 7		2	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_J = 25\text{ °C}$; Fig. 7		2	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_J = 25\text{ °C}$; Fig. 7		2	-	50	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G+; $T_J = 25\text{ °C}$; Fig. 8		-	-	60	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G-; $T_J = 25\text{ °C}$; Fig. 8		-	-	90	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G-; $T_J = 25\text{ °C}$; Fig. 8		-	-	60	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_J = 25\text{ °C}$; Fig. 9		-	-	60	mA
V_T	on-state voltage	$I_T = 10\text{ A}$; $T_J = 25\text{ °C}$; Fig. 10		-	1.33	1.60	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_J = 25\text{ °C}$; Fig. 11		-	0.7	1	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_J = 150\text{ °C}$		0.25	0.4	-	V
I_D	off-state current	$V_D = 600\text{ V}$; $T_J = 125\text{ °C}$		-	-	0.5	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_J = 150\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		500	-	-	V/ μ s
		$V_{DM} = 402\text{ V}$; $T_J = 125\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		1000	-	-	V/ μ s
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_J = 150\text{ °C}$; $I_{T(RMS)} = 8\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; gate open circuit		5	-	-	A/ms
		$V_D = 400\text{ V}$; $T_J = 125\text{ °C}$; $I_{T(RMS)} = 8\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; gate open circuit		14	-	-	A/ms



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

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

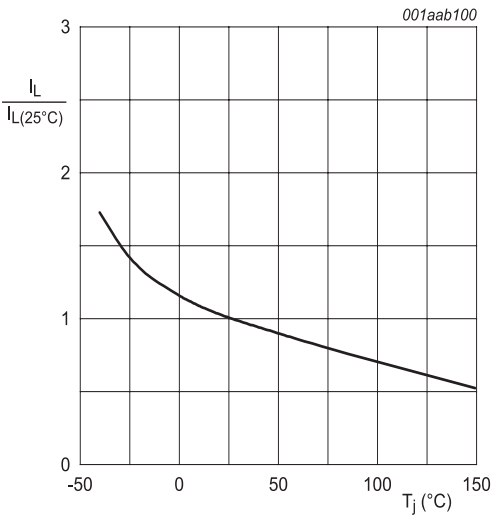


Fig. 8. Normalized latching current as a function of junction temperature

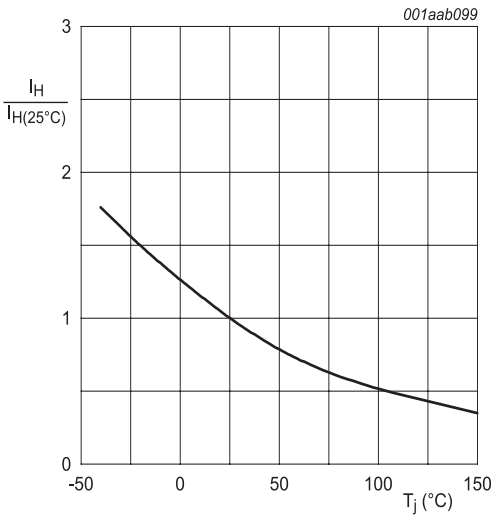
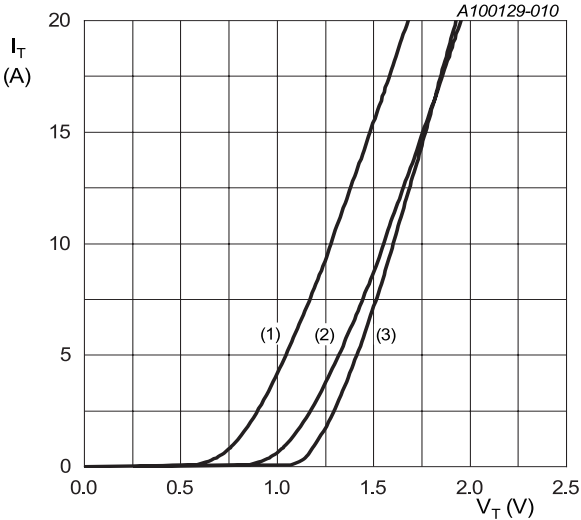


Fig. 9. Normalized holding current as a function of junction temperature



- $V_o = 1.156\text{ V}; R_s = 0.0380\text{ }\Omega$
- (1) $T_j = 150\text{ }^{\circ}C$; typical values
 - (2) $T_j = 150\text{ }^{\circ}C$; maximum values
 - (3) $T_j = 25\text{ }^{\circ}C$; maximum values

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

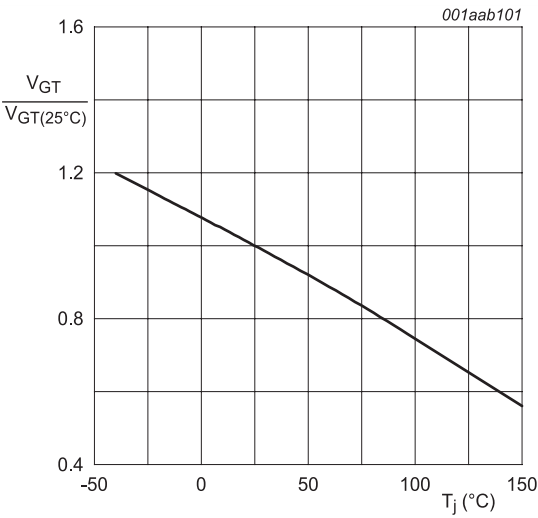
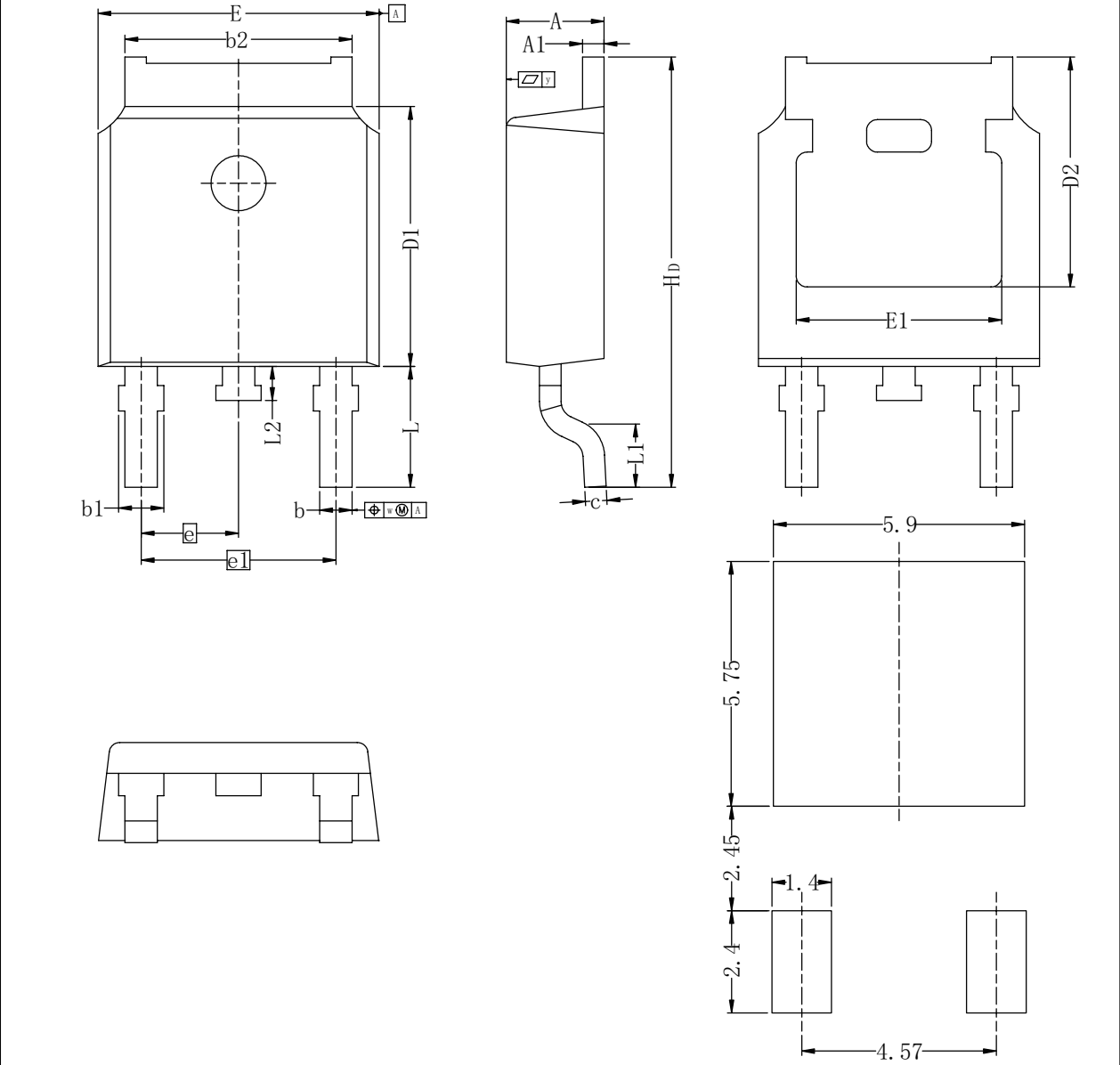


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Assembly factory: N

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)



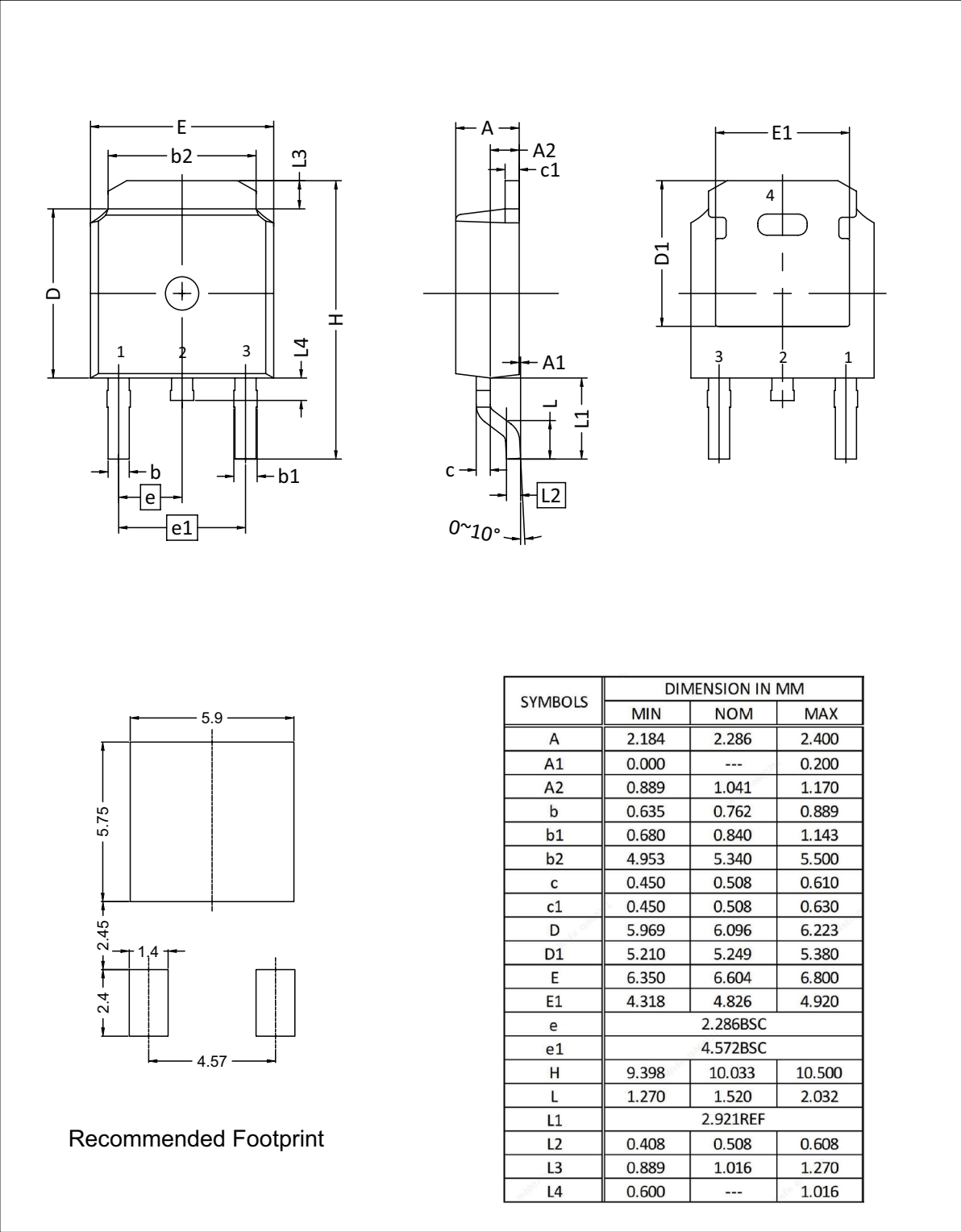
Recommended Footprint

Unit	A	A1	b	b1	b2	c	D1	D2	E	E1	e	e1	H _D	L	L1	L2	w	y
min	2.22	0.46	0.71	0.72	5.00	0.20	5.98	4.00	6.47	4.45			9.60	2.90	0.50	0.50		
nom														(Ref.)	---	---	0.20	
max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---	2.285	4.57	10.40			0.90		0.20

Assembly factory: Q

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)

TO252



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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