

1. General description

Planar passivated four quadrant triac in a TO252 (DPAK) surface-mountable plastic package intended for use in bidirectional switching and phase control applications.

2. Features and benefits

- High blocking voltage capability
- Less sensitive gate for improved noise immunity
- Planar passivated for voltage ruggedness and reliability
- Surface-mountable package
- Triggering in all four quadrants

3. Applications

- General purpose motor control
- General purpose switching

4. Quick reference data

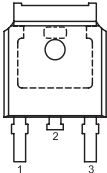
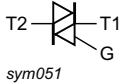
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Absolute maximum rating						
V_{DRM}	repetitive peak off-state voltage		-	-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	-	65	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$	-	-	71	A
T_j	junction temperature		-	-	125	°C
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	-	5	35	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ °C}$; Fig. 7	-	8	35	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ °C}$; Fig. 7	-	11	35	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G+; $T_j = 25\text{ °C}$; Fig. 7	-	30	70	mA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; Fig. 9	-	2.5	20	mA
V_T	on-state voltage	$I_T = 10\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10	-	1.3	1.65	V
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 125\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	100	250	-	V/ μs
dV_{com}/dt	rate of change of commutating voltage	$V_D = 400\text{ V}$; $T_j = 95\text{ °C}$; $dI_{com}/dt = 3.6\text{ A/ms}$; $I_T = 8\text{ A}$; gate open circuit	-	20	-	V/ μs

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
BT137S-600	TO252	BT137S-600,118	Reel	2500	TO252N	14-Nov-2016

7. Marking

Table 4. Marking codes

Type number	Marking codes
BT137S-600	137S6

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		-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102\text{ }^{\circ}\text{C}$; Fig 1 ; Fig 2 ; Fig 3	-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig 4 ; Fig 5	-	65	A
		full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 16.7\text{ ms}$	-	71	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	$I_G = 140\text{ mA}$	-	50	$\text{A}/\mu\text{s}$
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	150	$^{\circ}\text{C}$
T_j	junction temperature		-	125	$^{\circ}\text{C}$

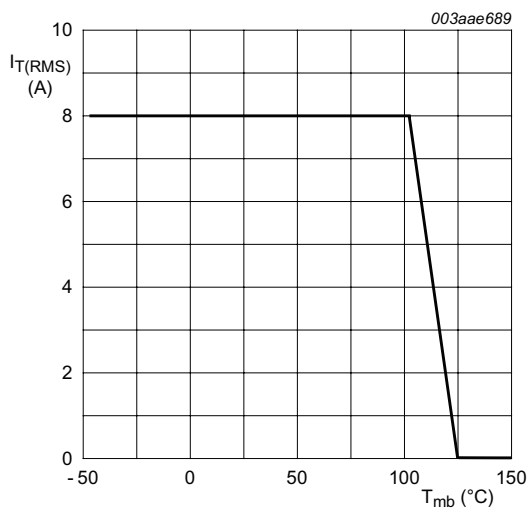


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

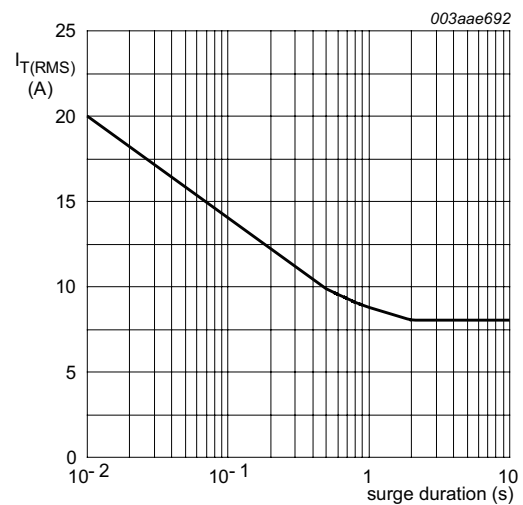
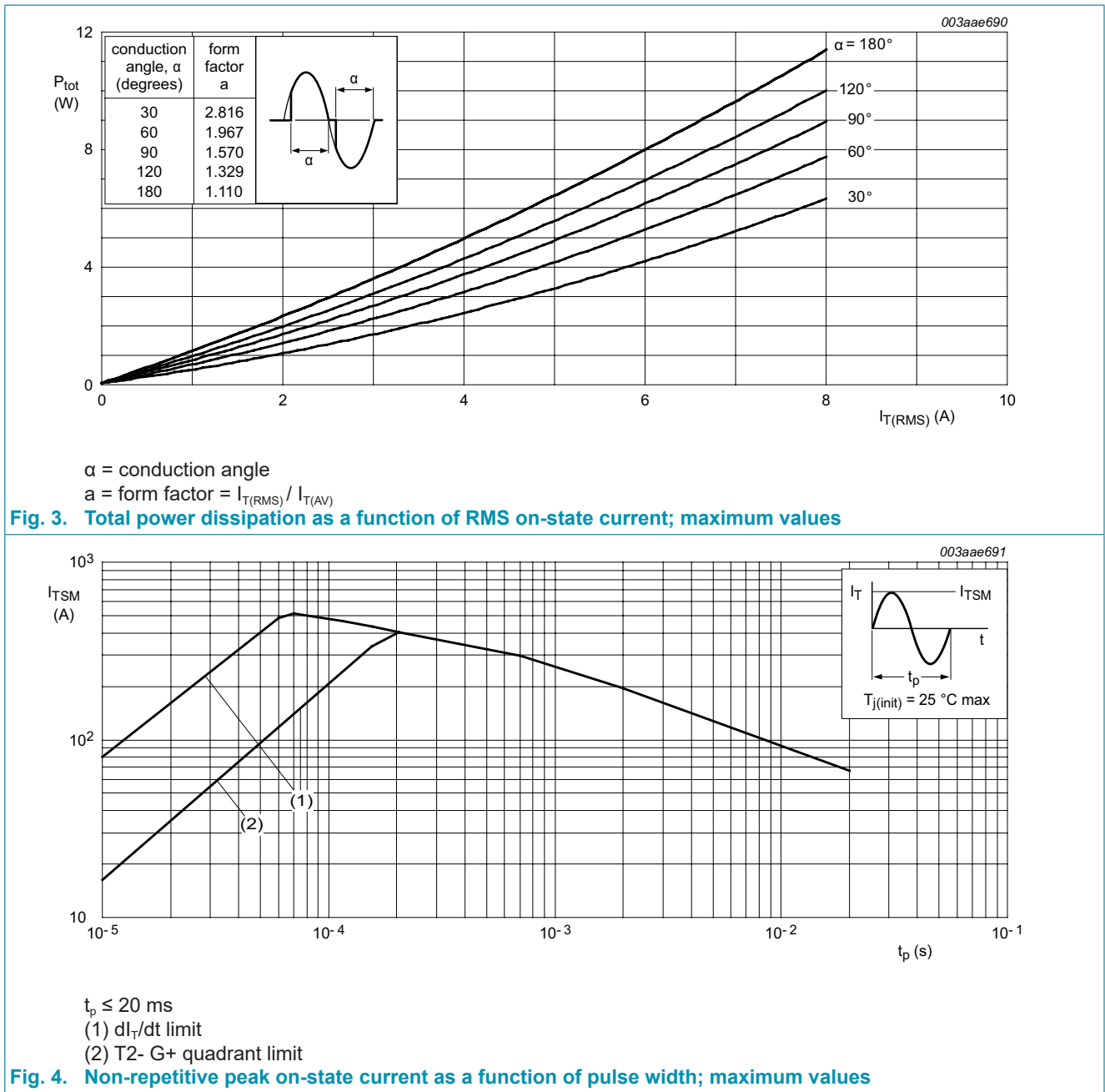
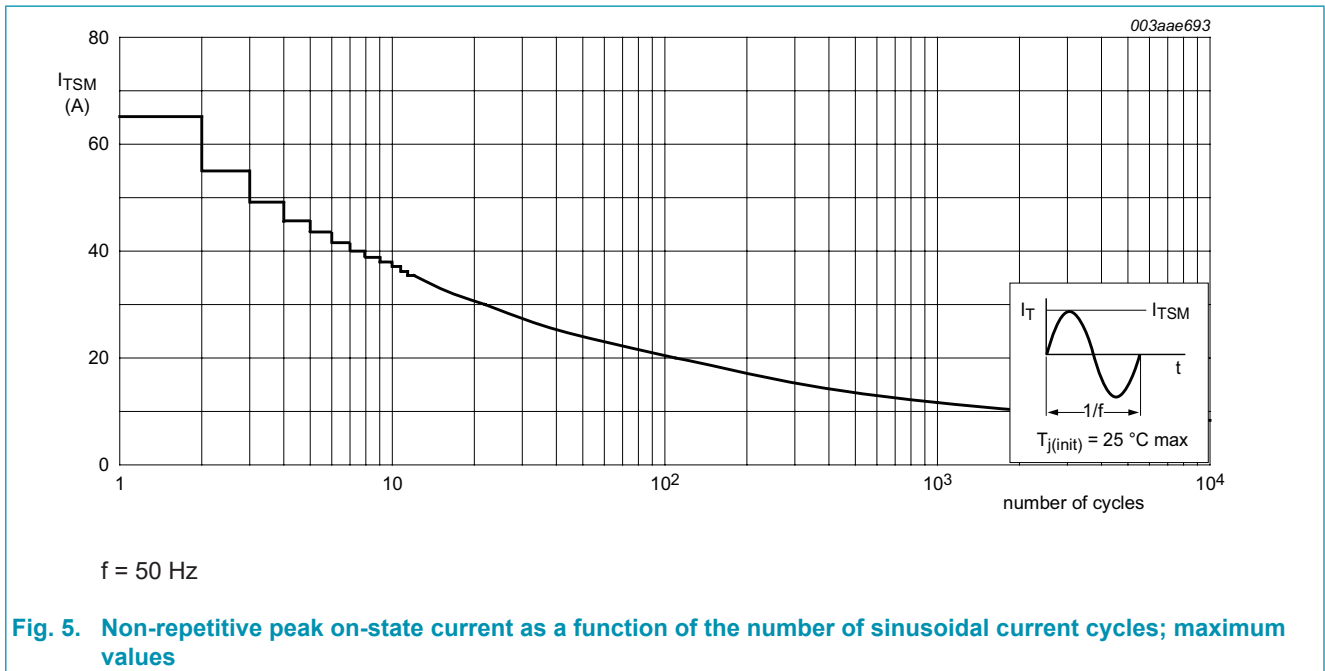


Fig. 2. RMS on-state current as a function of surge duration; maximum values
 $f = 50\text{ Hz}$; $T_{mb} \leq 102\text{ }^{\circ}\text{C}$





9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	half cycle; Fig 6	-	-	2.4	K/W
		full cycle; Fig 6	-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	PCB (FR4) mounted; minimum pad sizes	-	75	-	K/W

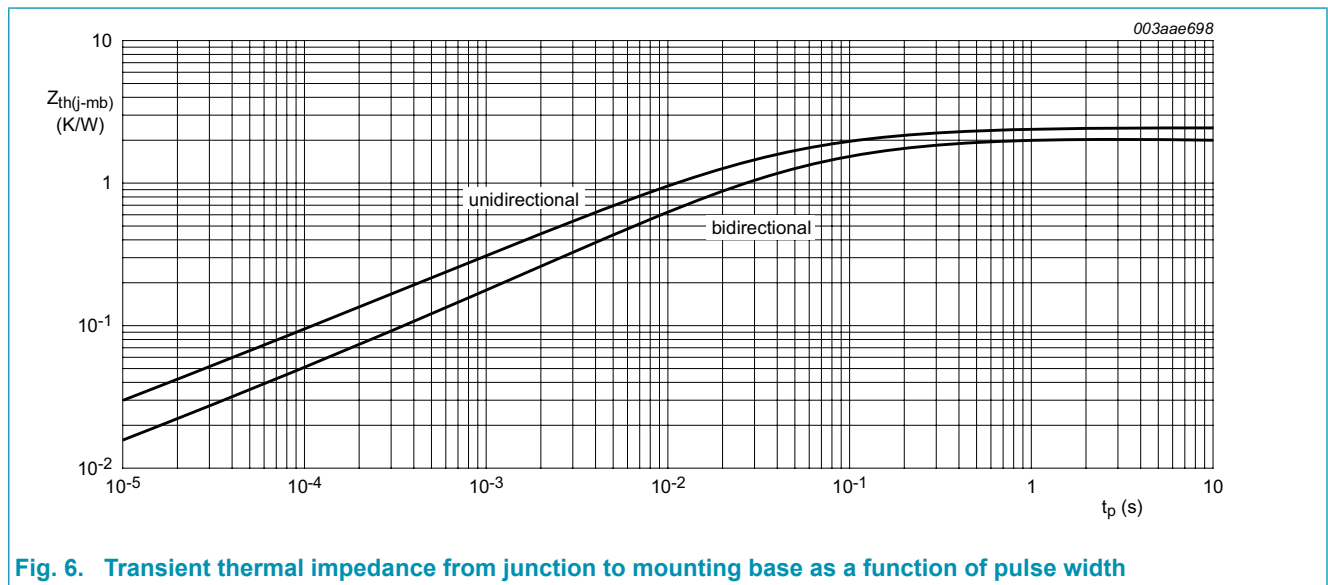
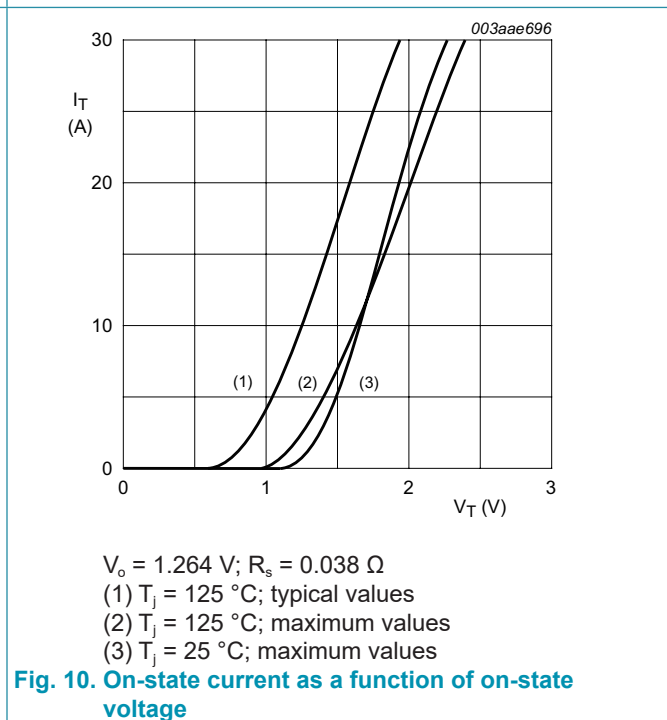
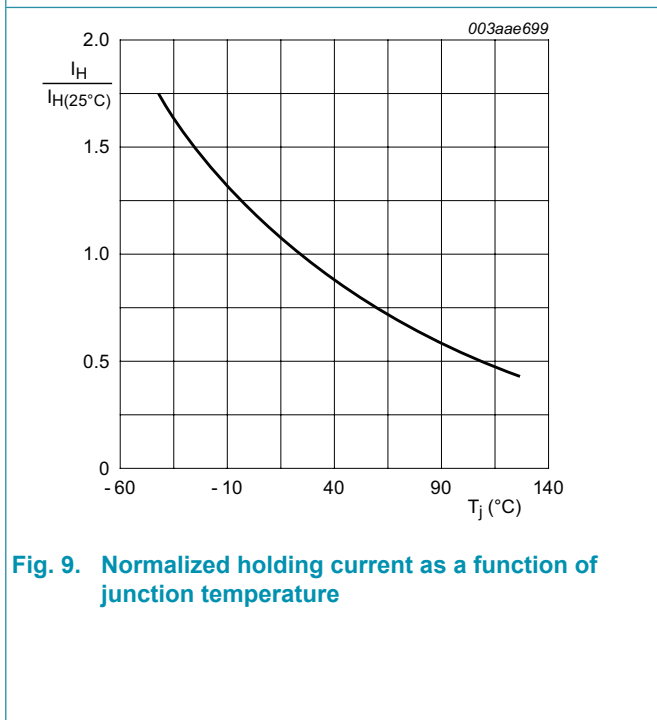
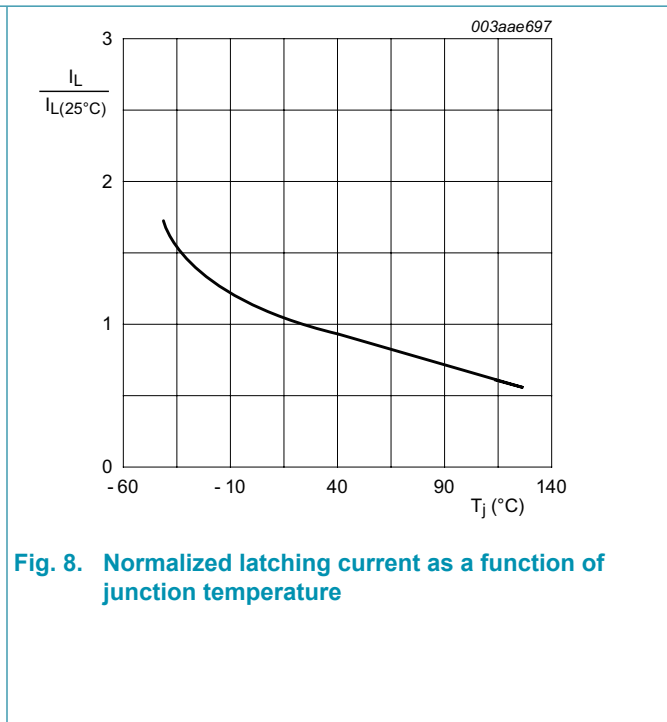
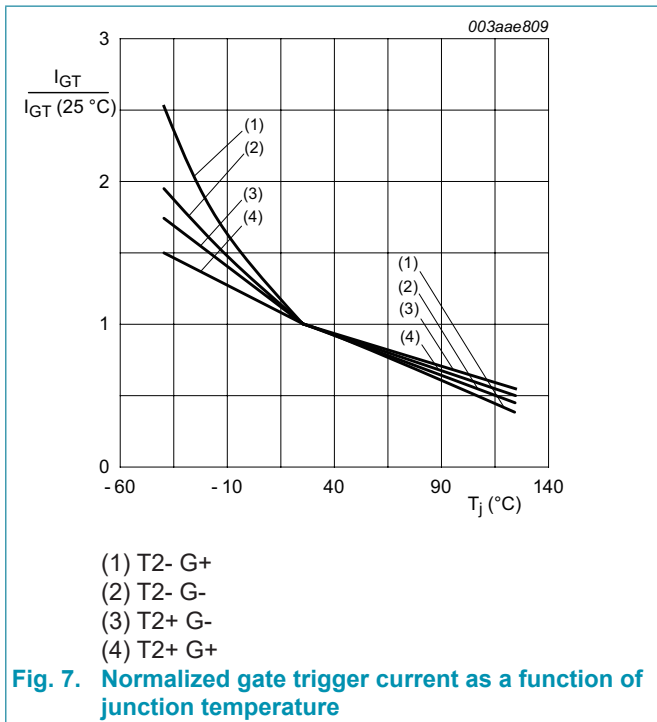


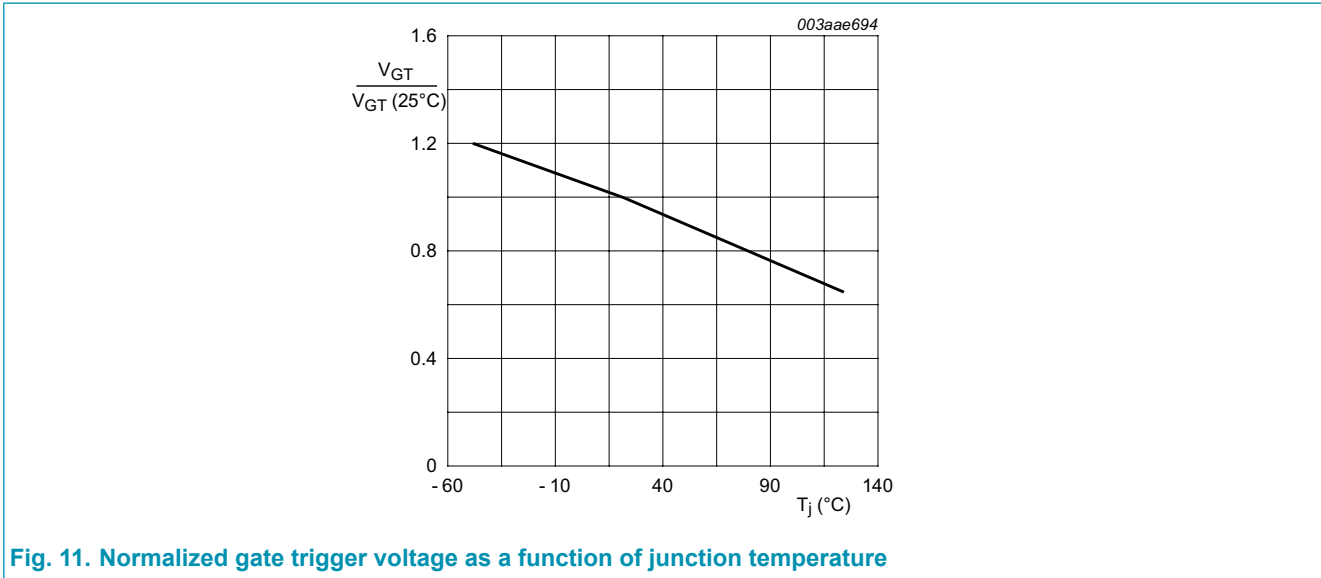
Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_2+ G+;$ $T_J = 25\text{ °C};$ Fig. 7	-	5	35	mA
		$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_2+ G-;$ $T_J = 25\text{ °C};$ Fig. 7	-	8	35	mA
		$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_2- G-;$ $T_J = 25\text{ °C};$ Fig. 7	-	11	35	mA
		$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_2- G+;$ $T_J = 25\text{ °C};$ Fig. 7	-	30	70	mA
I_L	latching current	$V_D = 12\text{ V}; I_G = 0.1\text{ A}; T_2+ G+;$ $T_J = 25\text{ °C};$ Fig. 8	-	7	30	mA
		$V_D = 12\text{ V}; I_G = 0.1\text{ A}; T_2+ G-;$ $T_J = 25\text{ °C};$ Fig. 8	-	16	45	mA
		$V_D = 12\text{ V}; I_G = 0.1\text{ A}; T_2- G-;$ $T_J = 25\text{ °C};$ Fig. 8	-	5	30	mA
		$V_D = 12\text{ V}; I_G = 0.1\text{ A}; T_2- G+;$ $T_J = 25\text{ °C};$ Fig. 8	-	7	45	mA
I_H	holding current	$V_D = 12\text{ V}; T_J = 25\text{ °C};$ Fig. 9	-	5	20	mA
V_T	on-state voltage	$I_T = 10\text{ A}; T_J = 25\text{ °C};$ Fig. 10	-	1.3	1.65	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
		$V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_J = 125\text{ °C}$	0.25	0.4	-	V
I_D	off-state current	$V_D = 600\text{ V}; T_J = 125\text{ °C}$	-	0.1	0.5	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}; T_J = 125\text{ °C}; (V_{DM} = 67\%$ of $V_{DRM});$ exponential waveform; gate open circuit	100	250	-	V/ μ s
dV_{com}/dt	rate of change of commutating voltage	$V_D = 400\text{ V}; T_J = 95\text{ °C}; dI_{com}/dt = 3.6\text{ A/}$ $\text{ms}; I_T = 8\text{ A};$ gate open circuit	-	20	-	V/ μ s
t_{gt}	gate-controlled turn-on time	$I_{TM} = 12\text{ A}; V_D = 600\text{ V}; I_G = 0.1\text{ A}; dI_G/$ $dt = 5\text{ A}/\mu\text{s}$	-	2	-	μ s

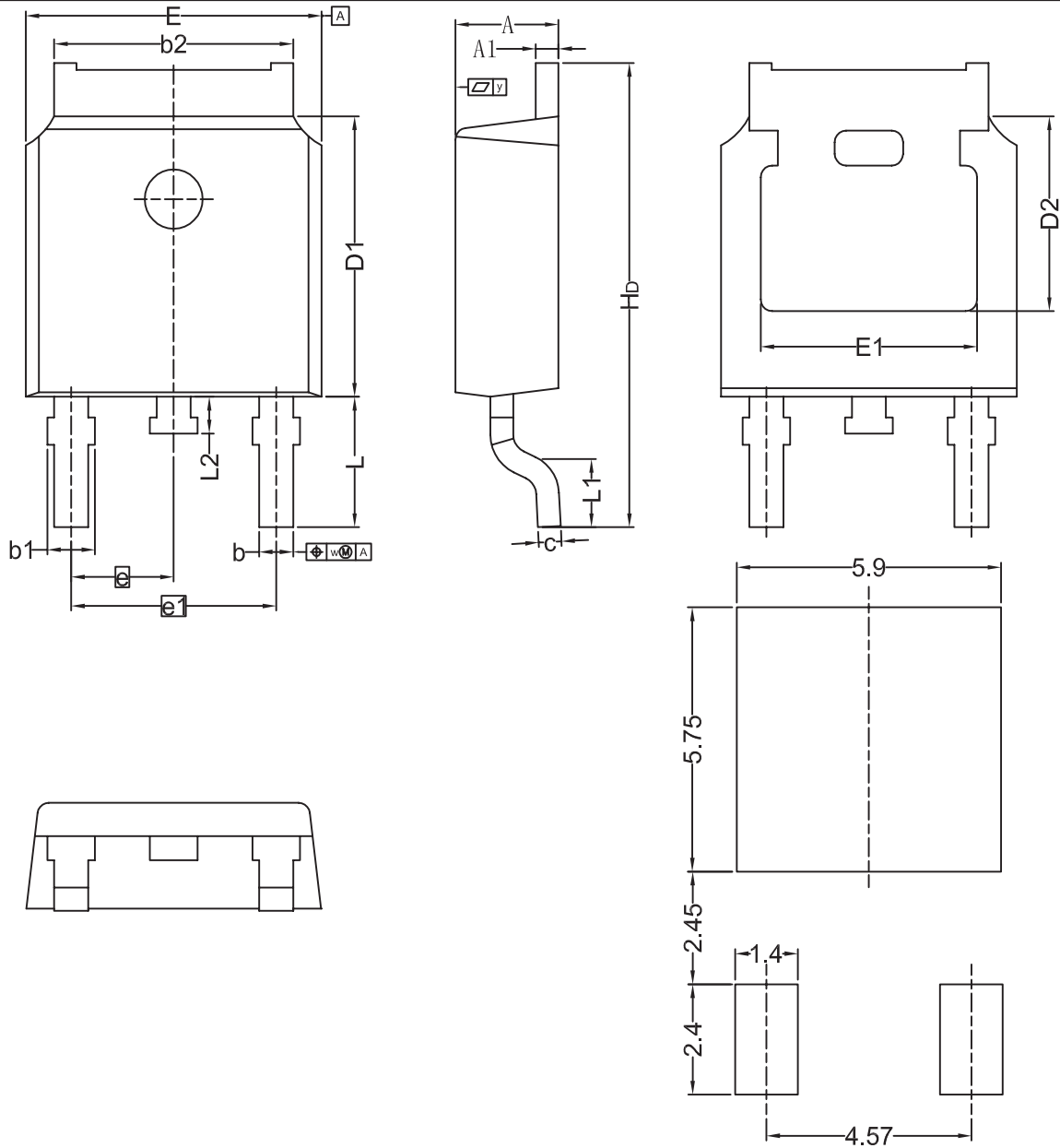




11. Package outline

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

TO252



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	2.285	4.57	9.60	2.90 (Ref.)	0.50	0.50	0.20	
nom																		
max	2.38	0.93	0.89	1.10	5.46	0.56	6.22	---	6.73	---			10.40	---	---	0.90		0.20

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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