Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a TO252 (DPAK) surface mountable plastic package. This triac balances the requirements of commutation performance and gate sensitivity and is intended for interfacing with low power drivers and logic ICs including microcontrollers. This "series ET" triac will commutate the full rated RMS current at the maximum rated junction temperature ($T_{i(max)} = 150$ °C) without the aid of a snubber.

2. Features and benefits

- High voltage capability
- · High commutation capability with maximum false trigger immunity
- Direct interfacing with low level power drivers and logic ICs
- High junction operating temperature capability (T_{i(max)} = 150 °C)
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only
- · Sensitive gate for easy logic level triggering
- Surface mountable package

3. Applications

- · Compressor starting control circuits
- General purpose motor controls
- · Reversing induction motor controls e.g. vertical axis washing machines
- Applications subject to high temperature (T_{i(max)} = 150 °C)

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{DRM}	repetitive peak off- state voltage		-	-	800	V
I _{T(RMS)}	RMS on-state current	full sine wave; $T_{mb} \le 131 ^{\circ}\text{C}$; Fig. 2; Fig. 3	-	-	8	Α
I _{TSM}	non-repetitive peak on- state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5	-	-	60	Α
		full sine wave; $T_{j(init)} = 25 \text{ °C}$; $t_p = 16.7 \text{ ms}$	-	-	65	Α
Tj	junction temperature		-	-	150	°C
Static chara	acteristics					
I _{GT}	gate trigger current	$V_D = 12 \text{ V; } I_T = 0.1 \text{ A; } T2 + G+;$ $T_j = 25 \text{ °C; } Fig. 7$	-	-	10	mA

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
		$V_D = 12 \text{ V; } I_T = 0.1 \text{ A; } T2 + \text{ G-;} $ $T_j = 25 \text{ °C; } \frac{\text{Fig. 7}}{}$	-	-	10	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; <u>Fig. 7</u>	-	-	10	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; <u>Fig. 9</u>	-	-	30	mA
V _T	on-state voltage	I _T = 10 A; T _j = 25 °C; <u>Fig. 10</u>	-	1.3	1.65	V
Dynamic ch	naracteristics					
dV _D /dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 125 °C; $(V_{DM}$ = 67% of V_{DRM}); exponential waveform; gate open circuit	400	-	-	V/µs
		V_{DM} = 536 V; T_j = 150 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit	200	-	-	V/µs
dl _{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/ μ s; snubberless condition; gate open circuit; Fig. 12	3	-	-	A/ms
		V_D = 400 V; T_j = 150 °C; $I_{T(RMS)}$ = 8 A; dV_{com}/dt = 10 V/µs; gate open circuit	4	-	-	A/ms
		V_D = 400 V; T_j = 150 °C; $I_{T(RMS)}$ = 8 A; dV_{com}/dt = 1 V/µs; gate open circuit	6	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	mb	T2—T1
2	T2	main terminal 2		G sym051
3	G	gate		Symost
mb	T2	mounting base; main terminal 2	1 3 DPAK (TO252N)	

6. Ordering information

Table 3. Ordering information

Type number	Package					
	Name	Description	Version			
BTA308S-800ET	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	TO252N			

7. 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		-	800	V
I _{T(RMS)}	RMS on-state current	full sine wave; $T_{mb} \le 131 ^{\circ}\text{C}$; Fig. 1; Fig. 2; Fig. 3	-	8	Α
I _{TSM}	non-repetitive peak on- state current	full sine wave; $T_{j(init)}$ = 25 °C; t_p = 20 ms; Fig. 4; Fig. 5	-	60	Α
		full sine wave; T _{j(init)} = 25 °C; t _p = 16.7 ms	-	65	Α
l ² t	I ² t for fusing	t _p = 10 ms; SIN	-	18	A²s
dl _T /dt	rate of rise of on-state current	I _G = 20 mA	-	100	A/µs
I _{GM}	peak gate current		-	2	Α
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	°C
T _j	junction temperature		-	150	°C

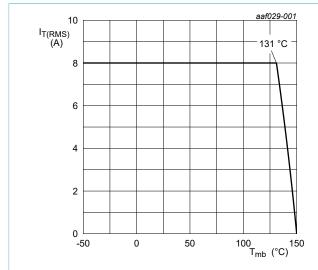


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

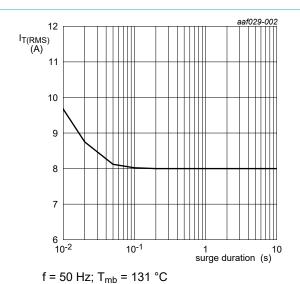


Fig. 2. RMS on-state current as a function of surge duration; maximum values

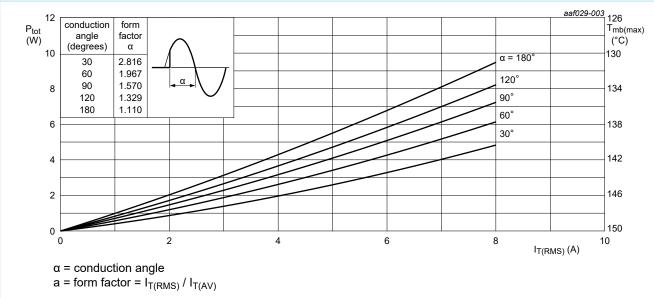


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

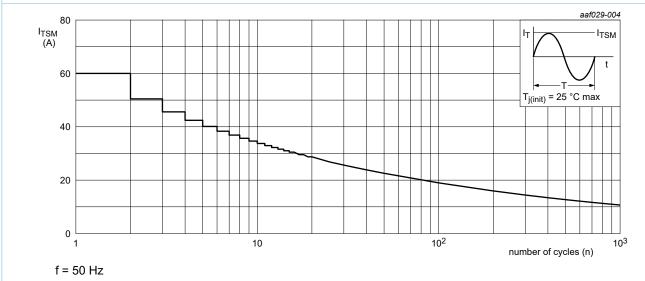
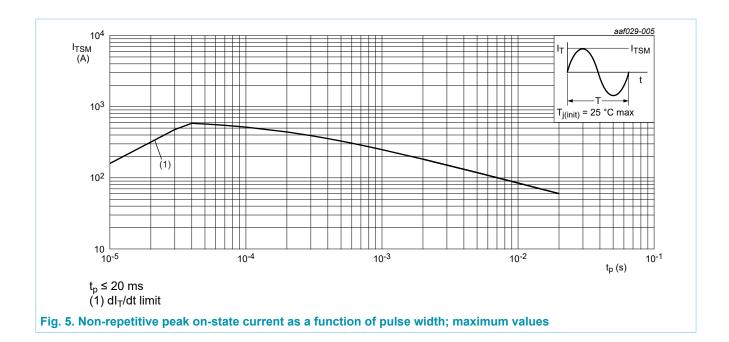


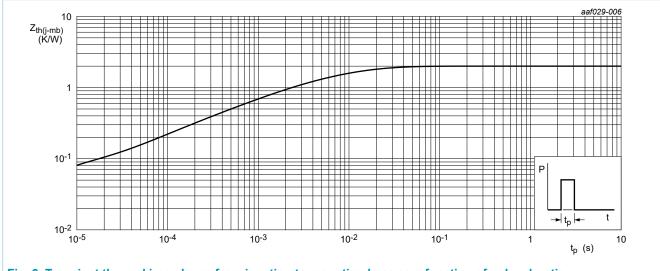
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-mb)}	thermal resistance from junction to mounting base	<u>Fig. 6</u>	-	-	2	K/W
R _{th(j-a)}	thermal resistance from junction to ambient free air	printed circuit board (FR4) mounted	-	75	-	K/W



9. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static char	acteristics			,		
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; <u>Fig. 7</u>	-	-	10	mA
		$V_D = 12 \text{ V}; I_T = 0.1 \text{ A}; T2+ G-;$ $T_j = 25 \text{ °C}; Fig. 7$	-	-	10	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; <u>Fig. 7</u>	-	-	10	mA
L	latching current	$V_D = 12 \text{ V}; I_G = 0.1 \text{ A}; T2+ G+;$ $T_j = 25 \text{ °C}; Fig. 8$	-	-	50	mA
		$V_D = 12 \text{ V}; I_G = 0.1 \text{ A}; T2+ G-;$ $T_j = 25 \text{ °C}; Fig. 8$	-	-	75	mA
		V _D = 12 V; I _G = 0.1 A; T2- G-; T _j = 25 °C; <u>Fig. 8</u>	-	-	50	mA
lн	holding current	V _D = 12 V; T _j = 25 °C; <u>Fig. 9</u>	-	-	30	mA
V _T	on-state voltage	I _T = 10 A; T _j = 25 °C; <u>Fig. 10</u>	-	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 V; I _T = 0.1 A; T _j = 150 °C; Fig. 11	0.2	0.45	-	V
l _D	off-state current	V _D = 800 V; T _j = 25 °C	-	-	10	μΑ
		V _D = 800 V; T _j = 150 °C	-	-	0.5	mA
Dynamic c	haracteristics					
dV _D /dt	rate of rise of off-state voltage	V_{DM} = 536 V; T_j = 125 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit	400	-	-	V/µs
		V_{DM} = 536 V; T_j = 150 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit	200	-	-	V/µs
dl _{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/ μ s; snubberless condition; gate open circuit; Fig. 12	3	-	-	A/ms
		V_D = 400 V; T_j = 150 °C; $I_{T(RMS)}$ = 8 A; dV_{com}/dt = 10 V/ μ s; gate open circuit	4	-	-	A/ms
		$V_D = 400 \text{ V}; T_j = 150 ^{\circ}\text{C}; I_{T(RMS)} = 8 \text{ A};$ $dV_{com}/dt = 1 \text{ V/}\mu\text{s}; gate open circuit}$	6	-	-	A/ms

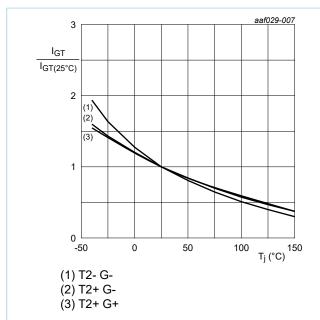


Fig. 7. Normalized gate trigger current as a function of junction temperature

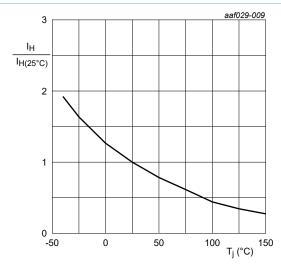


Fig. 9. Normalized holding current as a function of junction temperature

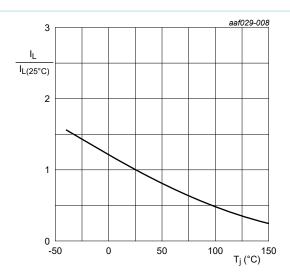
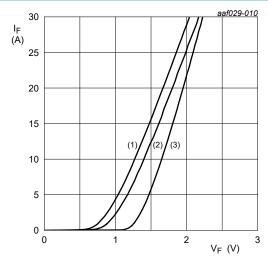


Fig. 8. Normalized latching current as a function of junction temperature



 V_o = 1.067 V; R_s = 0.0281 Ω (1) T_j = 150 °C; typical values (2) T_j = 150 °C; maximum values (3) T_j = 25 °C; maximum values

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

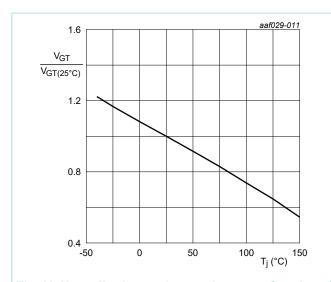


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

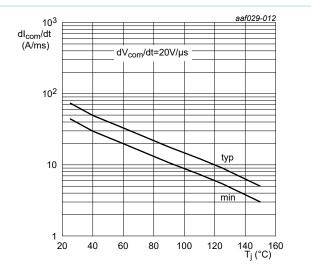
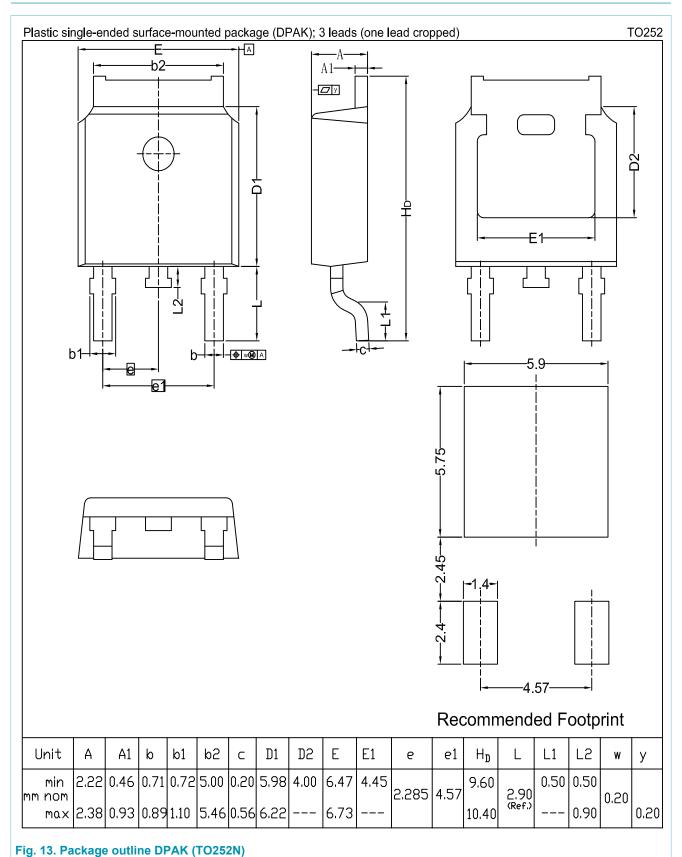


Fig. 12. Rate of change of commutating current as a function of junction temperature; typical and minimum values

10. Package outline



BTA308S-800ET

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: http://oceanchips.ru/

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А