

12 A Three-quadrant triacs high commutation Rev. 01 — 16 April 2007

Product data sheet

Product profile 1.

1.1 General description

Passivated, new generation, high commutation triacs in a SOT78 plastic package

1.2 Features

- Sensitive gate
- Very high commutation performance maximized at each gate sensitivity

1.3 Applications

- High power motor control e.g. washing Refrigeration and air conditioning machines, vacuum cleaners
- Electronic thermostats

1.4 Quick reference data

- V_{DRM} \leq 600 V (BTA312-600D)
- V_{DRM} ≤ 600 V (BTA312-600E)
- V_{DRM} ≤ 800 V (BTA312-800E)
- I_{TSM} \leq 95 A (t = 20 ms)

- High immunity to dV/dt
 - compressors
- I_{GT} \leq 5 mA (BTA312-600D)
- I_{GT} ≤ 10 mA (BTA312-600E)
- I_{GT} ≤ 10 mA (BTA312-800E)
- I $I_{T(RMS)} \le 12 \text{ A}$

SOT78 (TO-220AB)

Pinning information 2.

Table 1.	Pinning		
Pin	Description	Simplified outline	Symbol
1	main terminal 1 (T1)	mb	NI
2	main terminal 2 (T2)		T2-T1
3	gate (G)		`G <i>sym051</i>
mb	mounting base; main terminal 2 (T2)		



12 A Three-quadrant triacs high commutation

3. Ordering information

Table 2.OrdeType number	ring information Package							
	Name	Description	Version					
BTA312-600D	SC-46	plastic single-ended package; heatsink mounted; 1 mounting hole;	SOT78					
BTA312-600E		3-lead TO-220AB						
BTA312-800E								

4. Limiting values

Table 3.Limiting values

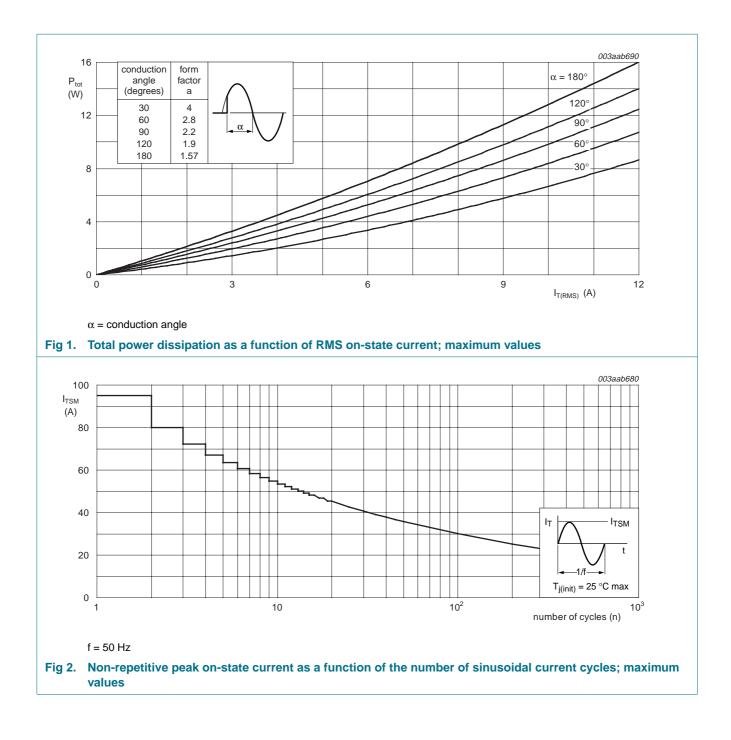
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DRM}	repetitive peak off-state voltage	BTA312-600D; BTA312-600E	<u>[1]</u> -	600	V
		BTA312-800E	-	800	V
I _{T(RMS)}	RMS on-state current	full sine wave; $T_{mb} \le 101 \text{ °C}$; see Figure 4 and 5	-	12	A
I _{TSM}	non-repetitive peak on-state current	full sine wave; $T_j = 25 \text{ °C prior to}$ surge; see <u>Figure 2</u> and <u>3</u>			
		t = 20 ms	-	95	А
		t = 16.7 ms	-	105	А
l ² t	I ² t for fusing	t = 10 ms	-	45	A ² s
dl _T /dt	rate of rise of on-state current	$I_{TM} = 20 \text{ A}; I_G = 0.2 \text{ A};$ $dI_G/dt = 0.2 \text{ A}/\mu \text{s}$	-	100	A/μs
I _{GM}	peak gate current		-	2	А
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 _i	junction temperature		-	125	°C

 Although not recommended, off-state voltages up to 800 V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/μs.

BTA312 series D and E

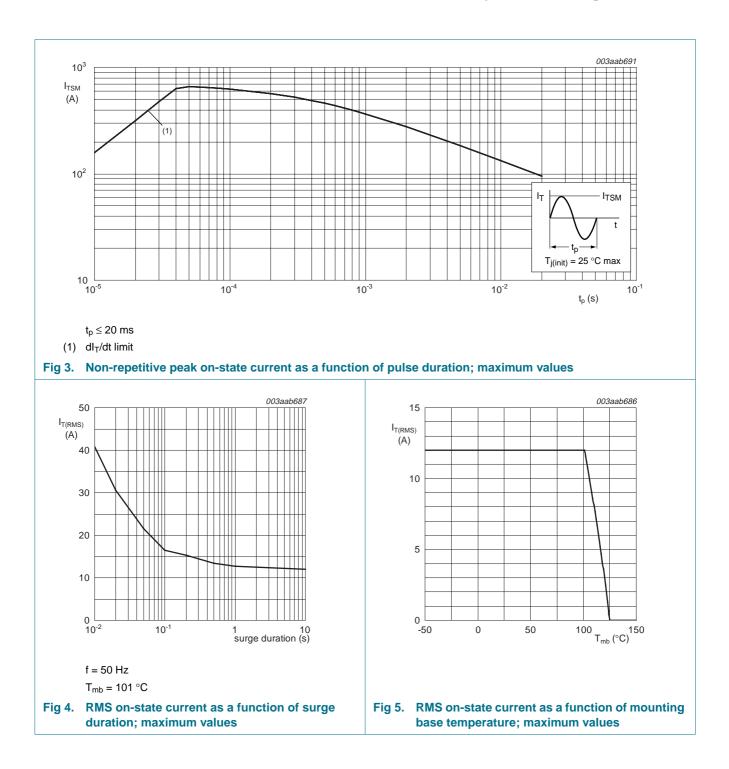
12 A Three-quadrant triacs high commutation



BTA312_SER_D_E_1

BTA312 series D and E

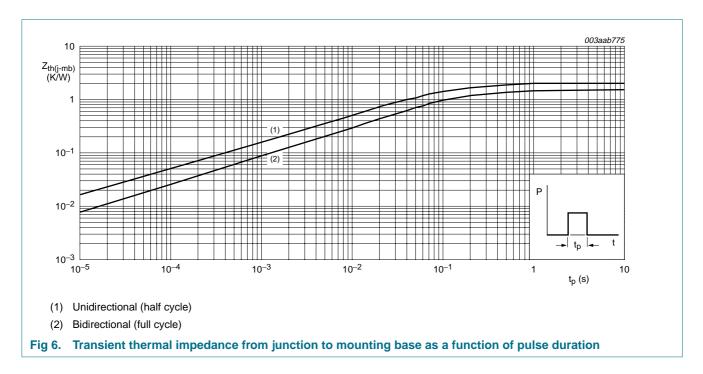
12 A Three-quadrant triacs high commutation



12 A Three-quadrant triacs high commutation

Thermal characteristics 5.

Table 4.	Thermal characteristics					
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-mb)}	,	half cycle; see Figure 6	-	-	2.0	K/W
	mounting base	full cycle; see Figure 6	-	-	1.5	K/W
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	-	60	-	K/W



Thermal characteristics Table 4

12 A Three-quadrant triacs high commutation

6. Static characteristics

Table 5. Static characteristics

 $T_i = 25 \circ C$ unless otherwise specified.

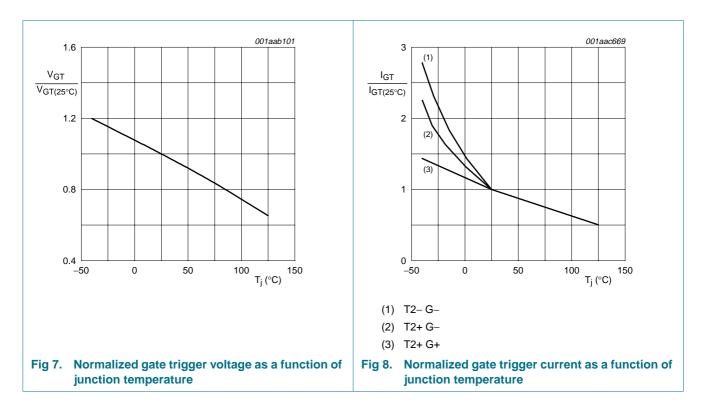
Symbol	Parameter	Conditions	B	TA312-6	600D	B' B'	Unit		
			Min	Тур	Max	Min	Тур	Max	
I _{GT}	gate trigger	$V_D = 12 \text{ V}; \text{ I}_T = 0.1 \text{ A}; \text{ see } \frac{\text{Figure 8}}{100000000000000000000000000000000000$	·	·					
	current	T2+ G+	-	-	5	-	-	10	mA
		T2+ G-	-	-	5	-	-	10	mA
		T2– G–	-	-	5	-	-	10	mA
IL	latching current	$V_D = 12 \text{ V}; \text{ I}_{GT} = 0.1 \text{ A}; \text{ see } \frac{\text{Figure } 10}{\text{Figure } 10}$							
		T2+ G+	-	-	10	-	-	25	mA
		T2+ G-	-	-	15	-	-	30	mA
		T2– G–	-	-	15	-	-	25	mA
I _H	holding current	$V_D = 12 \text{ V}; \text{ I}_{GT} = 0.1 \text{ A}; \text{ see } \frac{\text{Figure } 11}{\text{Figure } 11}$	-	-	10	-	-	15	mA
V _T	on-state voltage	$I_T = 15 \text{ A}; \text{ see } \frac{\text{Figure 9}}{100000000000000000000000000000000000$	-	1.3	1.6	-	1.3	1.6	V
V _{GT}	gate trigger	V_D = 12 V; I_T = 0.1 A; see <u>Figure 7</u>	-	0.7	1.5	-	0.7	1.5	V
	voltage	$V_D = 400 \text{ V}; \text{ I}_T = 0.1 \text{ A}; \text{ T}_j = 125 \ ^\circ\text{C}$	0.25	0.4	-	0.25	0.4	-	V
I _D	off-state current	$V_D = V_{DRM(max)}; T_j = 125 \ ^{\circ}C$	-	0.1	0.5	-	0.1	0.5	mA

BTA312 series D and E

12 A Three-quadrant triacs high commutation

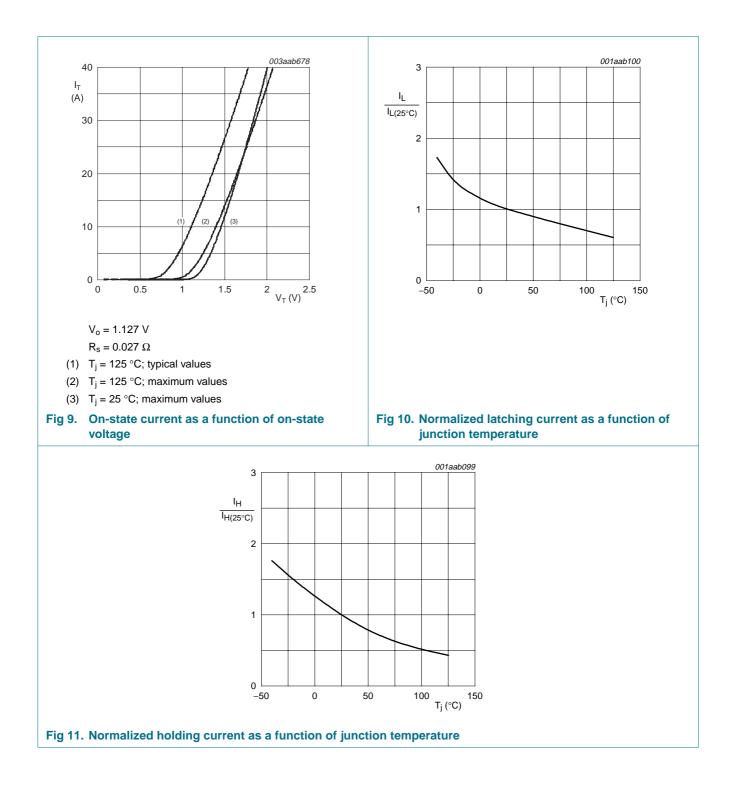
7. Dynamic characteristics

Table 6.	Dynamic cha	racteristics							
Symbol	Parameter	Conditions		A312-60	00D		00E 00E	Unit	
			Min	Тур	Max	Min	Тур	Max	
dV _D /dt	rate of rise of off-state voltage	$V_{DM} = 0.67 \times V_{DRM(max)}$; $T_j = 125 \ ^{\circ}C$; exponential waveform; gate open circuit	20	-	-	50	-	-	V/μs
dl _{com} /dt	rate of change of commutating current	V_{DM} = 400 V; T _j = 125 °C; I _{T(RMS)} = 12 A; without snubber; gate open circuit	1	-	-	3	-	-	A/ms
		V_{DM} = 400 V; T _j = 125 °C; I _{T(RMS)} = 12 A; dV/dt = 10 V/µs; gate open circuit	1.5	-	-	6	-	-	A/ms
		V_{DM} = 400 V; T _j = 125 °C; I _{T(RMS)} = 12 A; dV/dt = 1 V/µs; gate open circuit	4.5	-	-	10	-	-	A/ms
t _{gt}	gate-controlled turn-on time	$\begin{split} I_{TM} &= 20 \text{ A}; V_D = V_{DRM(max)}; I_G = 0.1 \text{ A}; \\ dI_G/dt &= 5 A/\mu s \end{split}$	-	2	-	-	2	-	μs



BTA312 series D and E

12 A Three-quadrant triacs high commutation



12 A Three-quadrant triacs high commutation

8. Package outline

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				nal dime	nsions)		0	SC	lale							٦
UNIT	Α	A ₁	b	b ₁	C	D	D ₁	E	е	L	L1	L ₂ max.	р	q	Q	_
	4.7 4.1	1.40 1.25	0.9 0.6	1.45 1.00	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2	
mm							CEEDE	NOFE								
										EUROPEAN						
ou	TLINE RSION		IE	с		JEDEC			ITA				PROJ	ECTION	1	ISSUE DATE

Fig 12. Package outline SOT78 (3-lead TO-220AB)

12 A Three-quadrant triacs high commutation

9. Revision history

Table 7.Revision his	Revision history							
Document ID	Release date	Data sheet status	Change notice	Supersedes				
BTA312_SER_D_E_1	20070416	Product data sheet	-	-				

12 A Three-quadrant triacs high commutation

10. Legal information

10.1 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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BTA312 series D and E

12 A Three-quadrant triacs high commutation

12. Contents

1	Product profile 1
1.1	General description
1.2	Features
1.3	Applications 1
1.4	Quick reference data 1
2	Pinning information 1
3	Ordering information 2
4	Limiting values 2
5	Thermal characteristics 5
6	Static characteristics 6
7	Dynamic characteristics7
8	Package outline 9
9	Revision history 10
10	Legal information 11
10.1	Data sheet status 11
10.2	Definitions 11
10.3	Disclaimers
10.4	Trademarks 11
11	Contact information 11
12	Contents 12

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Date of release: 16 April 2007 Document identifier: BTA312_SER_D_E_1

