

16 A Three-quadrant triacs high commutation Rev. 01 — 11 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

Very high commutation performance High immunity to dV/dt maximized at each gate sensitivity

1.3 Applications

- High power motor control e.g. washing Refrigeration and air conditioning machines and vacuum cleaners
- Non-linear rectifier-fed motor loads

1.4 Quick reference data

- V_{DRM} \leq 600 V (BTA316-600B/C)
- V_{DRM} ≤ 800 V (BTA316-800B/C)
- I_{TSM} \leq 140 A (t = 20 ms)

- compressors
- Electronic thermostats
- I_{GT} \leq 50 mA (BTA316 series B)
- I_{GT} \leq 35 mA (BTA316 series C)
- I_{T(RMS)} \leq 16 A

SOT78 (TO-220AB)

2. **Pinning information**

Pin	Description	Simplified outline	Symbol
1	main terminal 1 (T1)		
2	main terminal 2 (T2)	mb	T2-T1
3	gate (G)	۲ 🔾 ۲	sym051
mb	mounting base; main terminal 2 (T2)		



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3. Ordering information

Type number	Package							
	Name	Description	Version					
BTA316-600B	SC-46	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead	SOT78					
BTA316-600C		TO-220AB						
BTA316-800B								
BTA316-800C								

4. Limiting values

Table 3.Limiting values

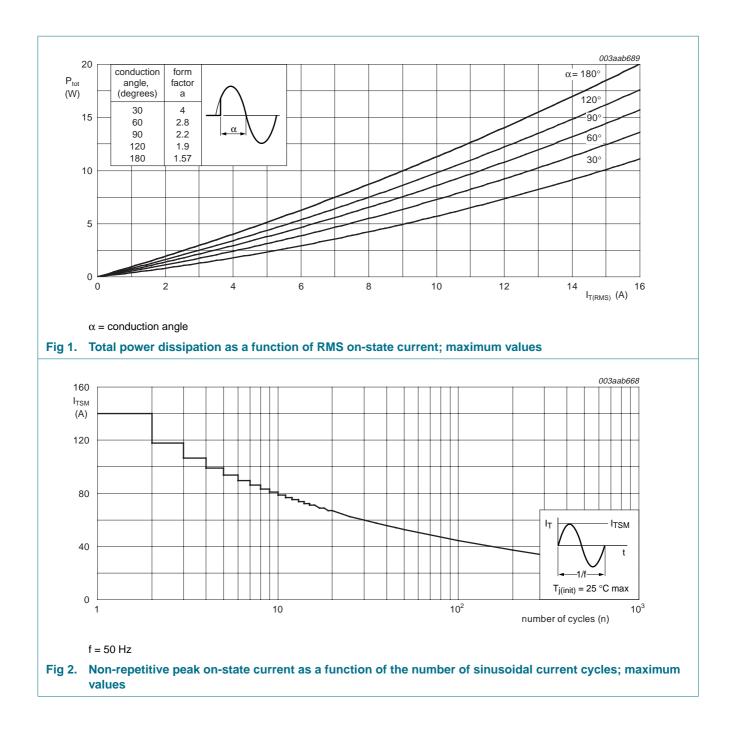
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DRM}	repetitive peak off-state voltage	BTA316-600B; BTA316-600C	<u>[1]</u> _	600	V
		BTA316-800B; BTA316-800C	-	800	V
I _{T(RMS)}	RMS on-state current	full sine wave; $T_{mb} \le 101 \text{ °C}$; see Figure 4 and 5	-	16	А
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	-	140	А
		t = 16.7 ms	-	150	А
l ² t	l ² t for fusing	t = 10 ms	-	98	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

[1] 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.

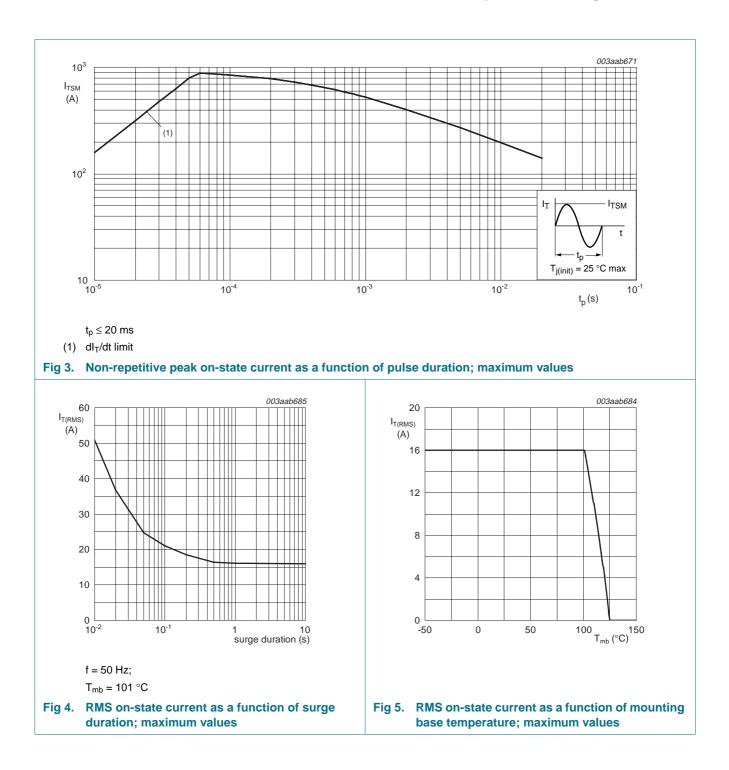
BTA316 series B and C

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BTA316 series B and C

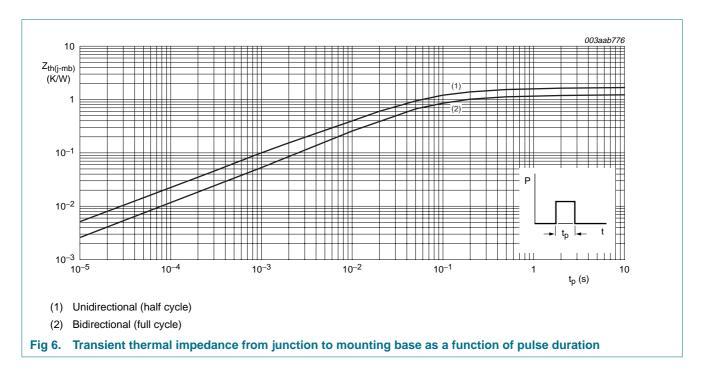
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Thermal characteristics 5.

Table 4.	Thermal characteristics					
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R _{th(j-mb)}	thermal resistance from junction to	half cycle; see Figure 6	-	-	1.7	K/W
	mounting base	full cycle; see Figure 6	-	-	1.2	K/W
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	-	60	-	K/W



Thermal characteristics Table 4

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6. Static characteristics

Table 5. Static characteristics

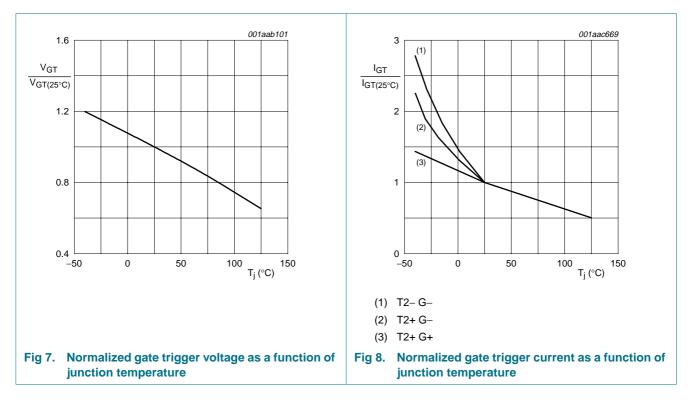
 $T_i = 25 \circ C$ unless otherwise specified.

Symbol	Parameter	Conditions		ГАЗ16-6 ГАЗ16-8			A316-6 A316-8		Unit
				Тур	Max	Min	Тур	Мах	
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+	2	-	50	2	-	35	mA
		T2+ G–	2	-	50	2	-	35	mA
		T2-G-	2	-	50	2	-	35	mA
IL	latching current	$V_D = 12 \text{ V}; \text{ I}_{GT} = 0.1 \text{ A}; \text{ see } \frac{\text{Figure } 10}{100000000000000000000000000000000$							
		T2+ G+	-	-	60	-	-	50	mA
		T2+ G–	-	-	90	-	-	60	mA
		T2- G-	-	-	60	-	-	50	mA
I _H	holding current	$V_D = 12 \text{ V}; \text{ I}_{GT} = 0.1 \text{ A}; \text{ see } \frac{\text{Figure } 11}{100000000000000000000000000000000$	-	-	60	-	-	35	mA
V _T	on-state voltage	I _T = 18 A; see <u>Figure 9</u>	-	1.3	1.5	-	1.3	1.5	V
V _{GT}	gate trigger	$V_D = 12 \text{ V}; \text{ I}_T = 0.1 \text{ A}; \text{ see } \frac{\text{Figure 7}}{100000000000000000000000000000000000$	-	0.8	1.5	-	0.8	1.5	V
	voltage	V_D = 400 V; I _T = 0.1 A; T _j = 125 °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

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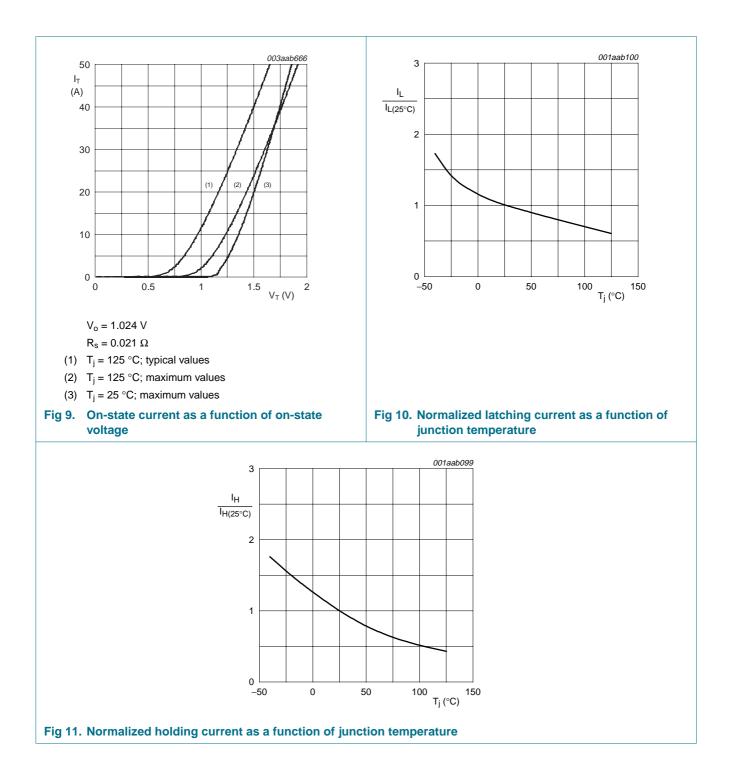
7. Dynamic characteristics

Table 6.	Dynamic cha	racteristics							
Symbol	Parameter	Conditions		A316-60 A316-80	-	BT/ BT/	Unit		
			Min	Тур	Max	Min	Тур	Max	
dV _D /dt	rate of rise of off-state voltage	$V_{DM} = 0.67 \times V_{DRM(max)}$; $T_j = 125 \text{ °C}$; exponential waveform; gate open circuit	1000	-	-	500	-	-	V/µs
dl _{com} /dt	rate of change of commutating current	V_{DM} = 400 V; T_{j} = 125 °C; $I_{T(RMS)}$ = 16 A; without snubber; gate open circuit	20	-	-	15	-	-	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



BTA316 series B and C

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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								
									EUROPEA							
ou	TLINE RSION		IE	с		JEDEC			ITA				PROJ	ECTION	1	ISSUE DATE

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

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9. Revision history

Table 7. Revision history	у			
Document ID	Release date	Data sheet status	Change notice	Supersedes
BTA316_SER_B_C_1	20070411	Product data sheet	-	-

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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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