

BTA10 and BTB10 Series

SNUBBERLESS™ & STANDARD

10A TRIACs

Table 1: Main Features

Symbol	Value	Unit
I _{T(RMS)}	10	А
V _{DRM} /V _{RRM}	600 and 800	V
I _{GT (Q1})	25 to 50	mA

DESCRIPTION

Available either in through-hole or surface-mount packages, the **BTA10** and **BTB10** triac series is suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, induction motor starting circuits... or for phase control operation in light dimmers, motor speed controllers,...

The snubberless version (W suffix) is specially recommended for use on inductive loads, thanks to their high commutation performances.

By using an internal ceramic pad, the BTA series provides voltage insulated tab (rated at $2500V_{RMS}$) complying with UL standards (File ref.: E81734).

Go) 1
A1 A2 G	A2 A1 A2 G
TO-220AB Insulated (BTA10)	TO-220AB (BTB10)

Table 2: Order Codes

Part Number	Marking
BTA10-xxxxxRG	See page table 8 on
BTB10-xxxxRG	page 6

Symbol	Paramet	er		Value	Unit
	RMS on-state current (full sine	TO-220AB $T_c = 105^{\circ}$		10	А
I _{T(RMS)}	wave)	TO-220AB Ins.	$T_c = 95^{\circ}C$	10	A
Irou	Non repetitive surge peak on-state	F = 50 Hz	t = 20 ms	100	А
ITSM	current (full cycle, T_j initial = 25°C)	F = 60 Hz	t = 16.7 ms	105	~
l²t	I ² t Value for fusing	t _p = 10 ms		55	A²s
dl/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 120 Hz	T _j = 125°C	50	A/µs
V _{DSM} /V _{RSM}	Non repetitive surge peak off-state voltage	t _p = 10 ms	T _j = 25°C	V _{DSM} /V _{RSM} + 100	V
I _{GM}	Peak gate current $t_p = 20 \ \mu s$ $T_j = 125^{\circ}C$		4	А	
P _{G(AV)}	Average gate power dissipation $T_j = 125^{\circ}C$		1	W	
T _{stg} T _j	Storage junction temperature range Operating junction temperature range	- 40 to + 150 - 40 to + 125	°C		

Table 3: Absolute Maximum Ratings

BTA10 and BTB10 Series

Tables 4: Electrical Characteristics ($T_j = 25^{\circ}C$, unless otherwise specified)

SNUBBERLESS (3 quadrants)

Symbol	Symbol Test Conditions			BTA10	BTB10	Unit
Symbol	Test conditions	Quadrant		CW	BW	Onit
I _{GT} (1)	$V_{D} = 12 V R_{I} = 33 \Omega$	- -	MAX.	35	50	mA
V _{GT}	vD = 12 v 11 = 00 32	- -	MAX.	1	.3	V
V _{GD}	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^{\circ}\text{C}$ I - II -		MIN.	0.2		V
I _H (2)	I _T = 500 mA		MAX.	35	50	mA
l _l	I _G = 1.2 I _{GT}	-	MAX.	50	70	mA
'L		II		60	80	
dV/dt (2)	$V_D = 67 \% V_{DRM}$ gate open $T_j = 125^{\circ}C$		MIN.	500	1000	V/µs
(dl/dt)c (2)	Without snubber $T_j = 125^{\circ}C$		MIN.	5.5	9.0	A/ms

Standard (4 quadrants)

Symbol	Test Conditions	ons Quadrant		BTA10	/ BTB10	Unit
Symbol			С	В	Onn	
I _{GT} (1)	lor (1)		MAX.	25	50	mA
ur ()	$V_D = 12 V$ $R_L = 33 \Omega$	IV		50	100	
V _{GT}		ALL	MAX.	1	.3	V
V _{GD}	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^{\circ}C$ ALL		MIN.	0.2		V
I _H (2)	I _T = 500 mA		MAX.	25	50	mA
lı	$I_{G} = 1.2 I_{GT}$	I - III - IV	MAX.	40	50	mA
'L		II		80	100	
dV/dt (2)	$V_D = 67 \% V_{DRM}$ gate open $T_j = 125^{\circ}C$		MIN.	200	400	V/µs
(dV/dt)c (2)	$(dI/dt)c = 4.4 \text{ A/ms}$ $T_j = 125^{\circ}$	°C	MIN.	5	10	V/µs

Table 5: Static Characteristics

Symbol	Test Conditions			Value	Unit
V _T (2)	I _{TM} = 14 A t _p = 380 μs	$T_j = 25^{\circ}C$	MAX.	1.55	V
V _{t0} (2)	Threshold voltage	T _j = 125°C	MAX.	0.85	V
R _d (2)	Dynamic resistance	T _j = 125°C	MAX.	40	mΩ
I _{DRM}	V _{DRM} = V _{RRM}	$T_j = 25^{\circ}C$	MAX. 5		μA
I _{RRM}		$T_j = 125^{\circ}C$		1	mA

Note 1: minimum I_{GT} is guaranted at 5% of I_{GT} max.

Note 2: for both polarities of A2 referenced to A1.

Symbol	Paramete	Parameter		
B	Junction to case (AC)	TO-220AB	1.5	°C/W
R _{th(j-c)} Junction to case (AC)	TO-220AB Insulated	2.4	0/11	
Burn	lunction to ambient	TO-220AB	60	°C/W
R _{th(j-a)}	Junction to ambient	TO-220AB Insulated	00	0/11

 Table 6: Thermal resistance

Figure 1: Maximum power dissipation versus RMS on-state current (full cycle)



Figure 3: Relative variation of thermal impedance versus pulse duration



Figure 2: RMS on-state current versus case temperature (full cycle)







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Figure 5: Surge peak on-state current versus number of cycles



Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)



Figure 9: Relative variation of critical rate of decrease of main current versus junction temperature



Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10$ ms and corresponding value of l^2t



Figure 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)



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Figure 10: Ordering Information Scheme



Table 7: Product Selector

Part Number	Voltag	Voltage (xxx)		Туре	
r art Number	600 V	800 V	 Sensitivity 	туре	Package
BTA/BTB10-xxxB	Х	Х	50 mA	Standard	TO-220AB
BTA/BTB10-xxxBW	Х	Х	50 mA	Snubberless	TO-220AB
BTA/BTB10-xxxC	Х	Х	25 mA	Standard	TO-220AB
BTA/BTB10-xxxCW	Х	Х	35 mA	Snubberless	TO-220AB

BTB: non insulated TO-220AB package

					DIMEN	SIONS		
		REF.	Mi	llimete	rs		Inches	
			Min.	Тур.	Max.	Min.	Тур.	Max.
В	с	Α	15.20		15.90	0.598		0.625
	b2	a1		3.75			0.147	
		a2	13.00		14.00	0.511		0.551
	F	В	10.00		10.40	0.393		0.409
		b1	0.61		0.88	0.024		0.034
A		b2	1.23		1.32	0.048		0.051
14		С	4.40		4.60	0.173		0.181
	c2	c1	0.49		0.70	0.019		0.027
	←→ _	c2	2.40		2.72	0.094		0.107
l2a2		е	2.40		2.70	0.094		0.106
		F	6.20		6.60	0.244		0.259
	M	ØI	3.75		3.85	0.147		0.151
 ← b1	• <u>→</u> <u>c1</u>	14	15.80	16.40	16.80	0.622	0.646	0.661
		L	2.65		2.95	0.104		0.116
		12	1.14		1.70	0.044		0.066
		13	1.14		1.70	0.044		0.066
		М		2.60			0.102	

Figure 11: TO-220AB (insulated and non insulated) Package Mechanical Data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: <u>www.st.com</u>.

Table 8: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
BTA/BTB10-xxxyzRG	BTA/BTB10-xxxyz	TO-220AB	2.3 g	50	Tube

Note: xxx = voltage, yy = sensitivity, z = type

Table 9: Revision History

Date	Revision	Description of Changes
Apr-2002	5A	Last update.
13-Feb-2006	6	TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added.

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