

BTA06 and BTB06 Series

6A TRIACs

SNUBBERLESS™, LOGIC LEVEL & STANDARD

Table 1: Main Features

Symbol	Value	Unit
I _{T(RMS)}	6	Α
V _{DRM} /V _{RRM}	600 and 800	V
I _{GT (Q₁)}	5 to 50	mA

DESCRIPTION

Available either in through-hole or surface-mount packages, the **BTA06** and **BTB06** 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 and logic level versions (BTA/BTB...W) are 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).

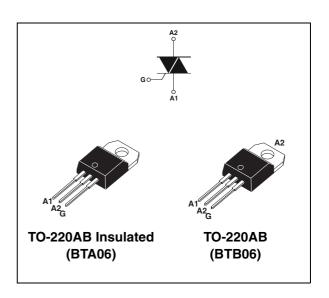


Table 2: Order Codes

Part Number	Marking
BTA06-xxxxxRG	See page table 8 on
BTB06-xxxxxRG	page 6

Table 3: Absolute Maximum Ratings

Symbol	Paramet	er		Value	Unit
I=(=, (a)	RMS on-state current (full sine wave)	TO-220AB $T_c = 110^{\circ}C$		6	Α
I _{T(RMS)}		TO-220AB Ins.	$T_c = 105^{\circ}C$	0	A
Ітом	Non repetitive surge peak on-state	F = 50 Hz	t = 20 ms	60	Α
TSM	current (full cycle, T _j initial = 25°C)		t = 16.7 ms	63	
l ² t	I ² t Value for fusing	t _p = 10 ms		21	A ² s
dl/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \le 100 \text{ ns}$	F = 120 Hz	T _j = 125°C	50	A/µs
I _{GM}	Peak gate current	t _p = 20 μs	T _j = 125°C	4	Α
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

Tables 4: Electrical Characteristics ($T_j = 25$ °C, unless otherwise specified)

■ SNUBBERLESS and Logic Level (3 quadrants)

Symbol	Test Conditions	Quadrant		BTA06 / BTB06				Unit	
Syllibol	rest conditions	Quaurani		TW	SW	CW	BW	Ollit	
I _{GT} (1)	$V_D = 12 \text{ V} R_1 = 30 \Omega$	1 - 11 - 111	MAX.	5	10	35	50	mA	
V _{GT}	VD = 12 V 11[= 50 52	1 - 11 - 111	MAX.		1	.3		V	
V _{GD}	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $I - II - III$		MIN.		0	.2		V	
I _H (2)	I _T = 100 mA		MAX.	10	15	35	50	mA	
I _I	I _G = 1.2 I _{GT}	I - III	MAX.	10	25	50	70	mA	
<u>'</u> L	IG = 1.2 IG			IVI/A/X.	15	30	60	80	ША
dV/dt (2)	$V_D = 67 \text{ %}V_{DRM}$ gate open $T_j = 125 \text{°}C$		MIN.	20	40	400	1000	V/µs	
	$(dV/dt)c = 0.1 V/\mu s$ $T_j = 125^{\circ}C$			2.7	3.5	-	-		
(dl/dt)c (2)	$(dV/dt)c = 10 V/\mu s$ $T_j = 125$ °C		MIN.	1.2	2.4	-	-	A/ms	
	Without snubber $T_j = 125^{\circ}C$;		-	-	3.5	5.3		

■ Standard (4 quadrants)

Symbol	mbol Test Conditions Quadrant			BTA06	BTB06	Unit
Syllibol				С	В	Oilit
I _{GT} (1)	$V_D = 12 \text{ V}$ $R_L = 30 \Omega$	I - II - III IV	MAX.	25 50	50 100	mA
V _{GT}	V _{GT}		MAX.	1.	.3	٧
V_{GD}	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^{\circ}\text{C}$ ALL		MIN.	0.2		٧
I _H (2)	I _T = 500 mA		MAX.	25	50	mA
I	I _G = 1.2 I _{GT}	I - III - IV	MAX.	40	50	mA
ic ig - ii- igi		II	IVIAA.	80	100	
dV/dt (2)	$V_D = 67 \text{ %}V_{DRM}$ gate open $T_j = 125 \text{°}C$		MIN.	200	400	V/µs
(dV/dt)c (2)	$(dI/dt)c = 2.7 \text{ A/ms}$ $T_j = 125^{\circ}$	С	MIN.	5	10	V/µs

Table 5: Static Characteristics

Symbol	Test C	Test Conditions			
V _{TM} (2)	$I_{TM} = 8.5 \text{ A}$ $t_p = 380 \mu\text{s}$	T _j = 25°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.	60	mΩ
I _{DRM}	$V_{DRM} = V_{RRM}$	T _j = 25°C	MAX. 5		μA
I _{RRM}	*DRM - *RRM	T _j = 125°C	IVIAA.	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.

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Table 6: Thermal resistance

Symbol	Paramete	Value	Unit	
D	lunction to cope (AC)	TO-220AB	1.8	°C/W
R _{th(j-c)} Junction to case (AC)	TO-220AB Insulated	2.7	- C/VV	
R _{th(j-a)}	Junction to ambient	TO-220AB TO-220AB Insulated	60	°C/W

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

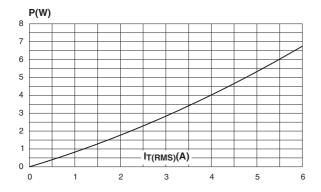


Figure 3: Relative variation of thermal impedance versus pulse duration

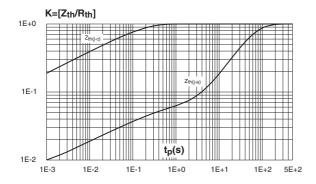


Figure 2: RMS on-state current versus case temperature (full cycle)

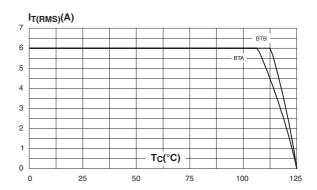
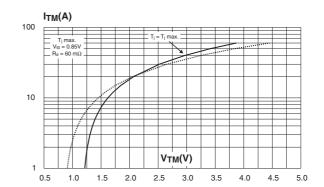


Figure 4: On-state characteristics (maximum values)



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

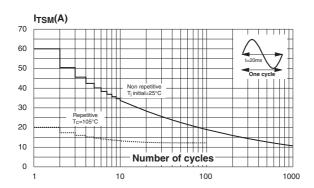


Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

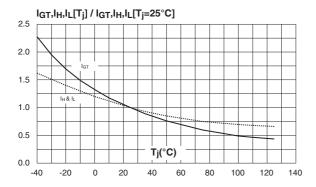


Figure 9: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values) (Standard types)

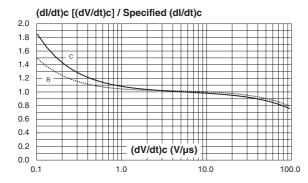


Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10 \text{ ms}$ and corresponding value of l^2t

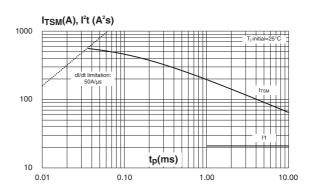


Figure 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values) (Snubberless & logic level types)

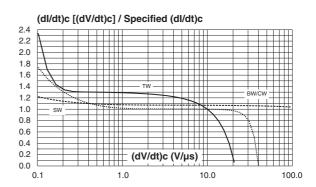
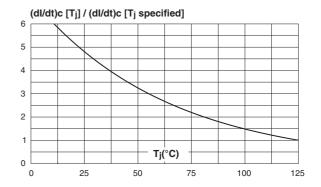


Figure 10: Relative variation of critical rate of decrease of main current versus junction temperature



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Figure 11: Ordering Information Scheme

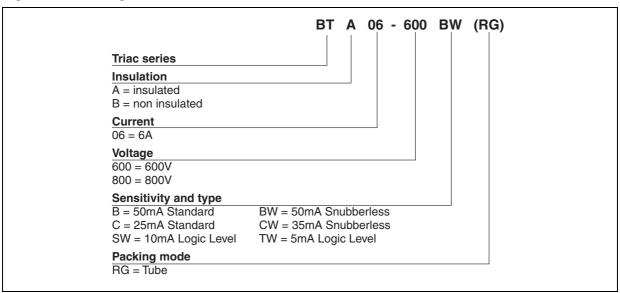


Table 7: Product Selector

Part Number	Port Number Voltage (xxx)		Sensitivity	Туре		
rait Nullibei	600 V	800 V	- Sensitivity	туре	Package	
BTA/BTB06-xxxB	Х	Х	50 mA	Standard	TO-220AB	
BTA/BTB06-xxxBW	Х	Х	50 mA	Snubberless	TO-220AB	
BTA/BTB06-xxxC	Х	Х	25 mA	Standard	TO-220AB	
BTA/BTB06-xxxCW	Х	Х	35 mA	Snubberless	TO-220AB	
BTA/BTB06-xxxSW	Х	Х	10 mA	Logic level	TO-220AB	
BTA/BTB06-xxxTW	Х	Х	5 mA	Logic Level	TO-220AB	

BTB: non insulated TO-220AB package

DIMENSIONS REF. Millimeters Inches Min. Тур. Max. Min. Typ. 15.20 15.90 0.598 Α В a1 3.75 0.147 Ø١ a2 13.00 14.00 0.511 Ĺ В 10.00 10.40 0.393 0.61 0.88 0.024 b1 b2 1.23 1.32 0.048 14 С 4.40 4.60 0.173 13 c1 0.49 0.70 0.019 c2 a1 2.72 0.094 c2 2.40 2.40 2.70 0.094 е a2 6.20 6.60 0.244 F ØI 3.75 3.85 0.147 14 15.80 16.40 16.80 0.622 0.646 L 2.65 2.95 0.104 12 1.14 1.70 0.044 0.044 13 1.14 1.70

Max.

0.625

0.551

0.409

0.034

0.051

0.181

0.027

0.107

0.106

0.259

0.151

0.661

0.116

0.066

0.066

0.102

Figure 12: 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: www.st.com.

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Table 8: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
BTA/BTB06-xxxyzRG	BTA/BTB06-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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