



# BTA06 and BTB06 Series

SNUBBERLESS™, LOGIC LEVEL & STANDARD

6A TRIACs

**Table 1: Main Features**

Symbol	Value	Unit
$I_{T(RMS)}$	6	A
$V_{DRM}/V_{RRM}$	600 and 800	V
$I_{GT} (Q_1)$	5 to 50	mA

## DESCRIPTION

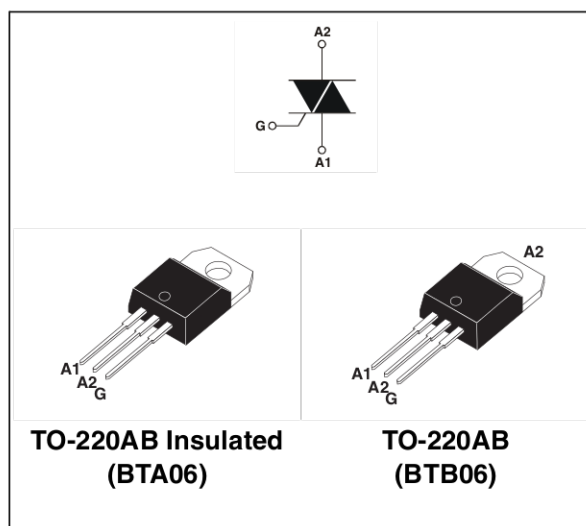
Available either in through-hole or surface-mount packages, the **BTA06** and **BTB06** triac series is suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, induction motor starting circuits... or for phase control 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<sub>RMS</sub>) complying with UL standards (File ref.: E81734).

**Table 3: Absolute Maximum Ratings**

Symbol	Parameter			Value	Unit
I <sub>T(RMS)</sub>	RMS on-state current (full sine wave)	TO-220AB	T <sub>c</sub> = 110°C	6	A
		TO-220AB Ins.	T <sub>c</sub> = 105°C		
I <sub>TSM</sub>	Non repetitive surge peak on-state current (full cycle, T <sub>j</sub> initial = 25°C)	F = 50 Hz	t = 20 ms	60	A
		F = 60 Hz	t = 16.7 ms	63	
I <sup>2</sup> t	I <sup>2</sup> t Value for fusing	t <sub>p</sub> = 10 ms		21	A <sup>2</sup> s
di/dt	Critical rate of rise of on-state current I <sub>G</sub> = 2 x I <sub>GT</sub> , t <sub>r</sub> ≤ 100 ns	F = 120 Hz	T <sub>j</sub> = 125°C	50	A/μs
I <sub>GM</sub>	Peak gate current	t <sub>p</sub> = 20 μs	T <sub>j</sub> = 125°C	4	A
P <sub>G(AV)</sub>	Average gate power dissipation		T <sub>j</sub> = 125°C	1	W
T <sub>stg</sub> T <sub>j</sub>	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C



**Table 2: Order Codes**

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

## BTA06 and BTB06 Series

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

### ■ SNUBBERLESS and Logic Level (3 quadrants)

Symbol	Test Conditions	Quadrant		BTA06 / BTB06				Unit
				TW	SW	CW	BW	
I <sub>GT</sub> (1)	V <sub>D</sub> = 12 V   R <sub>L</sub> = 30 Ω	I - II - III	MAX.	5	10	35	50	mA
V <sub>GT</sub>		I - II - III	MAX.	1.3				V
V <sub>GD</sub>	V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3 kΩ T <sub>j</sub> = 125°C	I - II - III	MIN.	0.2				V
I <sub>H</sub> (2)	I <sub>T</sub> = 100 mA		MAX.	10	15	35	50	mA
I <sub>L</sub>	I <sub>G</sub> = 1.2 I <sub>GT</sub>	I - III	MAX.	10	25	50	70	mA
		II		15	30	60	80	
dV/dt (2)	V <sub>D</sub> = 67 %V <sub>DRM</sub> gate open   T <sub>j</sub> = 125°C		MIN.	20	40	400	1000	V/μs
(dI/dt)c (2)	(dV/dt)c = 0.1 V/μs   T <sub>j</sub> = 125°C		MIN.	2.7	3.5	-	-	A/ms
	(dV/dt)c = 10 V/μs   T <sub>j</sub> = 125°C			1.2	2.4	-	-	
	Without snubber   T <sub>j</sub> = 125°C			-	-	3.5	5.3	

### ■ Standard (4 quadrants)

Symbol	Test Conditions	Quadrant		BTA06 / BTB06		Unit
				C	B	
$I_{GT} (1)$	$V_D = 12\text{ V}$ $R_L = 30\ \Omega$	I - II - III IV	MAX.	25 50	50 100	mA
$V_{GT}$		ALL	MAX.	1.3		V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ $T_j = 125^\circ\text{C}$	ALL	MIN.	0.2		V
$I_H (2)$	$I_T = 500\text{ mA}$		MAX.	25	50	mA
$I_L$	$I_G = 1.2\ I_{GT}$	I - III - IV	MAX.	40	50	mA
		II		80	100	
$dV/dt (2)$	$V_D = 67\ \%V_{DRM}$ gate open $T_j = 125^\circ\text{C}$		MIN.	200	400	V/ $\mu\text{s}$
$(dV/dt)c (2)$	$(dI/dt)c = 2.7\text{ A/ms}$ $T_j = 125^\circ\text{C}$		MIN.	5	10	V/ $\mu\text{s}$

**Table 5: Static Characteristics**

Symbol	Test Conditions			Value	Unit
$V_{TM} (2)$	$I_{TM} = 8.5\text{ A}$ $t_p = 380\ \mu\text{s}$	$T_j = 25^\circ\text{C}$	MAX.	1.55	V
$V_{t0} (2)$	Threshold voltage	$T_j = 125^\circ\text{C}$	MAX.	0.85	V
$R_d (2)$	Dynamic resistance	$T_j = 125^\circ\text{C}$	MAX.	60	m $\Omega$
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25^\circ\text{C}$	MAX.	5	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$		1	mA

**Note 1:** minimum  $I_{GT}$  is guaranteed at 5% of  $I_{GT}$  max.

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

Table 6: Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	TO-220AB	1.8	$^{\circ}\text{C/W}$
		TO-220AB Insulated	2.7	
$R_{th(j-a)}$	Junction to ambient	TO-220AB	60	$^{\circ}\text{C/W}$
		TO-220AB Insulated		

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

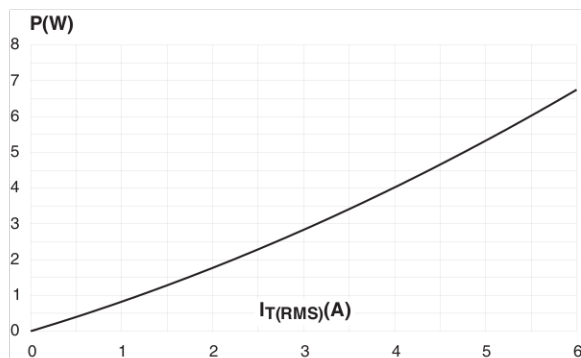


Figure 2: RMS on-state current versus case temperature (full cycle)

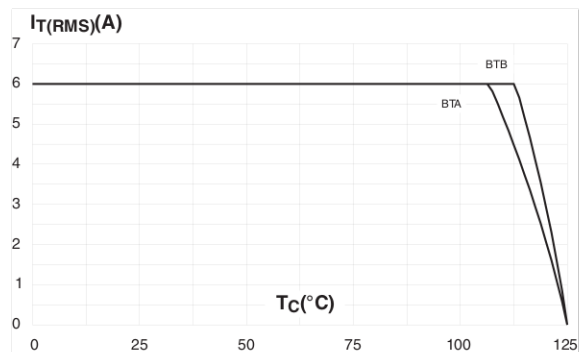


Figure 3: Relative variation of thermal impedance versus pulse duration

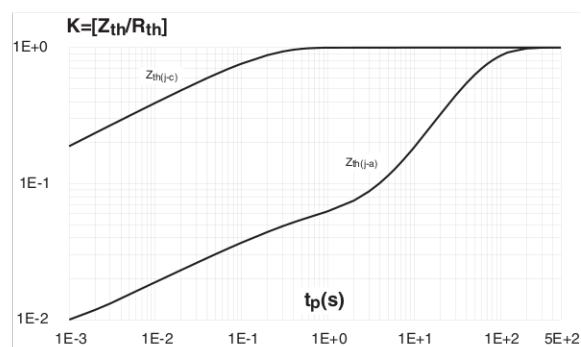
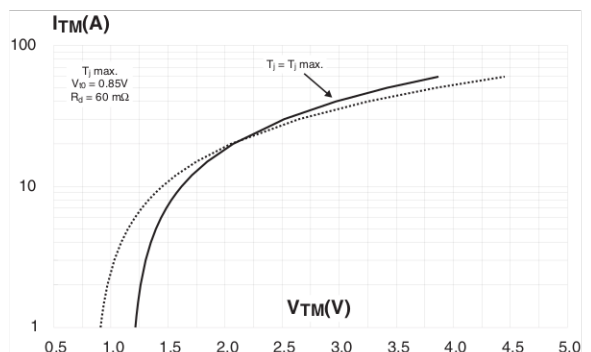
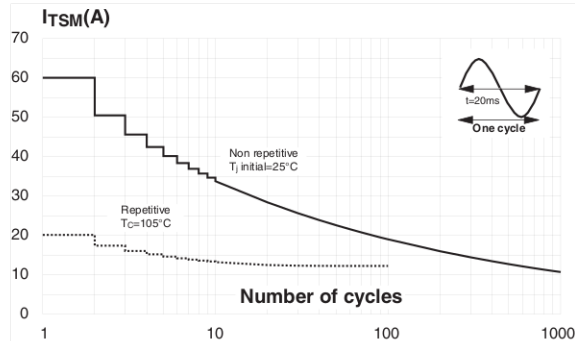


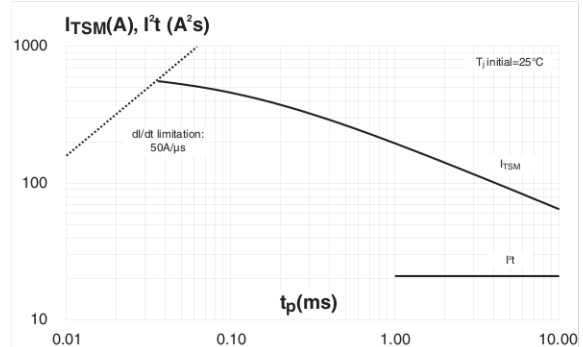
Figure 4: On-state characteristics (maximum values)



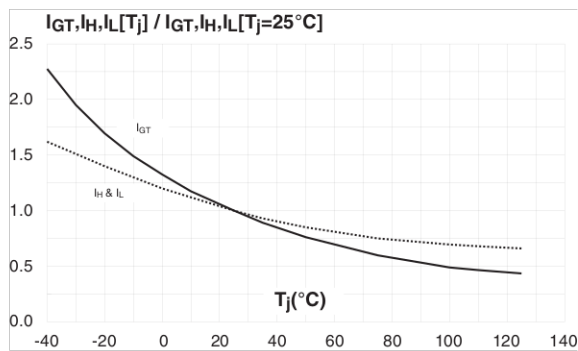
**Figure 5: Surge peak on-state current versus number of cycles**



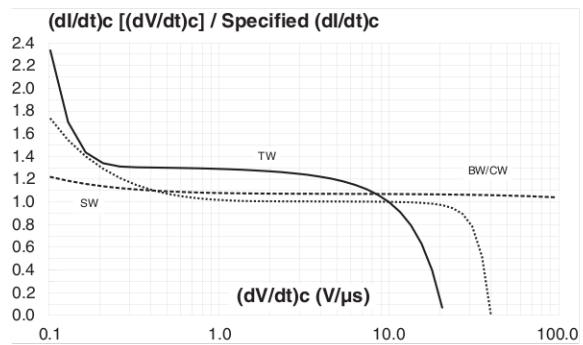
**Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms and corresponding value of  $I^2t$**



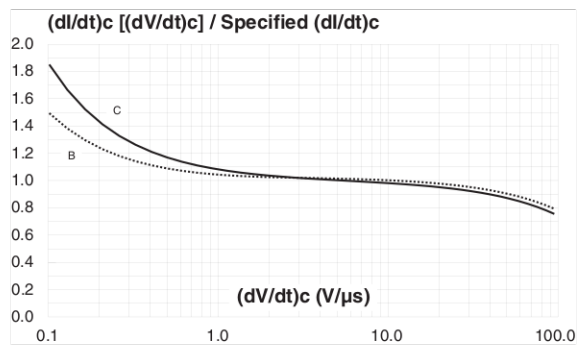
**Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)**



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



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



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

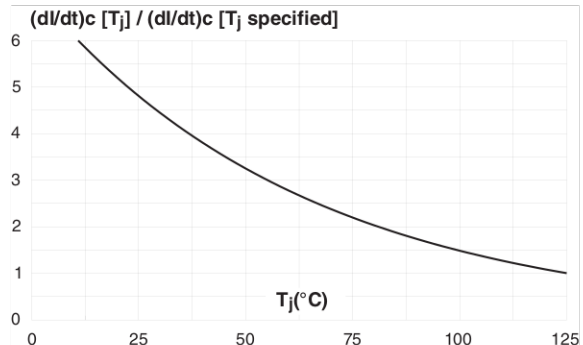


Figure 11: Ordering Information Scheme

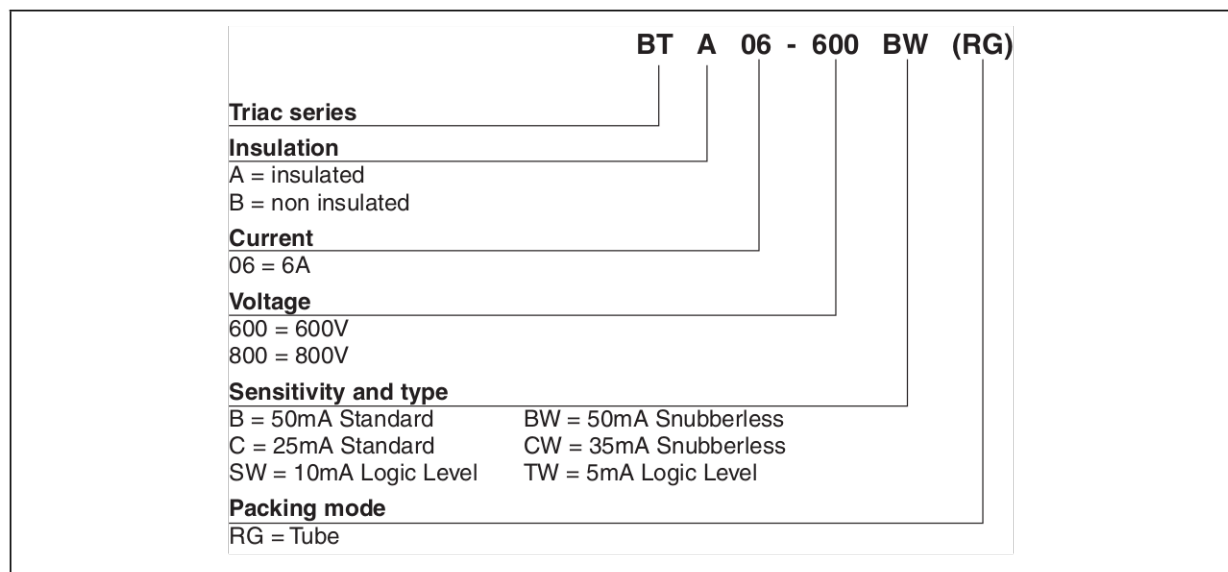


Table 7: Product Selector

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

**BTB:** non insulated TO-220AB package

Figure 12: TO-220AB (insulated and non insulated) Package Mechanical Data

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
l4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
l3	1.14		1.70	0.044		0.066
M		2.60			0.102	

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](http://www.st.com).

Table 8: Ordering Information

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