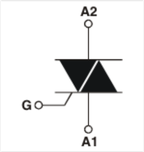
BTA10 and BTB10 Series

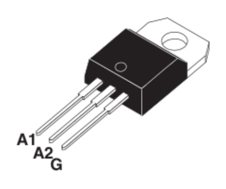
SNUBBERLESS™ & STANDARD

10A TRIACs

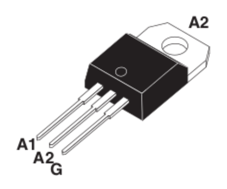
Table 1: Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	10	A
V_{DRM}/V_{RRM}	600 and 800	V
$I_{GT\ (Q_1)}$	25 to 50	mA





TO-220AB Insulated (BTA10)



TO-220AB (BTB10)

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).

Table 2: Order Codes

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

Table 3: Absolute Maximum Ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	TO-220AB	T_c = 105°C	10	A
		TO-220AB Ins.	T_c = 95°C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25°C)	F = 50 Hz	t = 20 ms	100	A
		F = 60 Hz	t = 16.7 ms	105	
I^2t	I^2t Value for fusing	t_p = 10 ms		55	A^2s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100$ 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 µs	T_j = 125°C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125°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 (3 quadrants)**

Symbol	Test Conditions	Quadrant		BTA10 / BTB10		Unit
				CW	BW	
I_{GT} (1)	V_D = 12 V R_L = 33 Ω	I - II - III	MAX.	35	50	mA
V_{GT}		I - II - III	MAX.	1.3		V
V_{GD}	$V_D = V_{DRM}$ R_L = 3.3 kΩ T_j = 125°C	I - II - III	MIN.	0.2		V
I_H (2)	I_T = 500 mA		MAX.	35	50	mA
I_L	$I_G = 1.2\ I_{GT}$	I - III	MAX.	50	70	mA
		II		60	80	
dV/dt (2)	V_D = 67 %V_{DRM} gate open T_j = 125°C		MIN.	500	1000	V/µs
(dI/dt)c (2)	Without snubber T_j = 125°C		MIN.	5.5	9.0	A/ms

- **Standard (4 quadrants)**

Symbol	Test Conditions	Quadrant		BTA10 / BTB10		Unit
				C	B	
I_{GT} (1)	V_D = 12 V R_L = 33 Ω	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 kΩ T_j = 125°C	ALL	MIN.	0.2		V
I_H (2)	I_T = 500 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°C		MIN.	200	400	V/µs
(dV/dt)c (2)	(dI/dt)c = 4.4 A/ms T_j = 125°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°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} I_{RRM}	$V_{DRM} = V_{RRM}$	T_j = 25°C	MAX.	5	µA
		T_j = 125°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	1.5	°C/W
		TO-220AB Insulated	2.4	
$R_{th(j-a)}$	Junction to ambient	TO-220AB	60	°C/W
		TO-220AB Insulated		

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

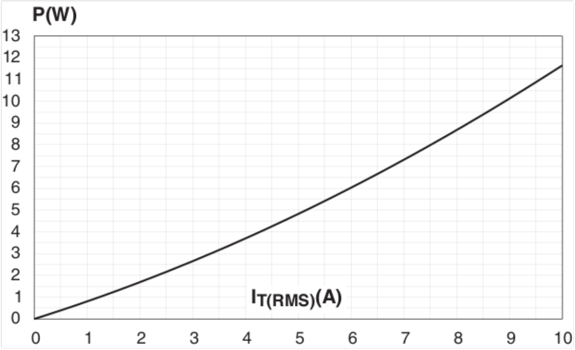


Figure 2: RMS on-state current versus case temperature (full cycle)

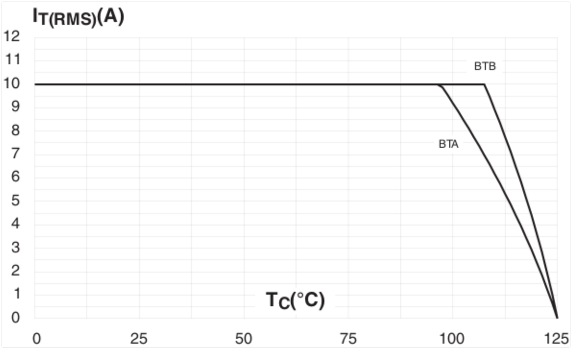


Figure 3: Relative variation of thermal impedance versus pulse duration

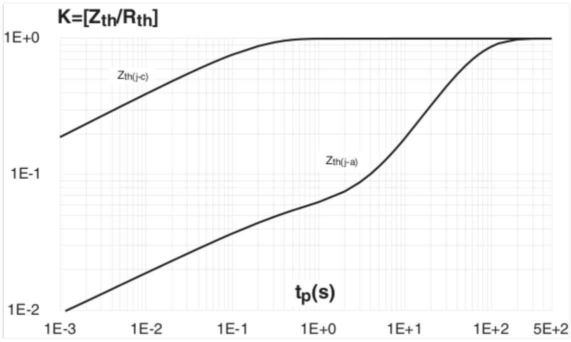


Figure 4: On-state characteristics (maximum values)

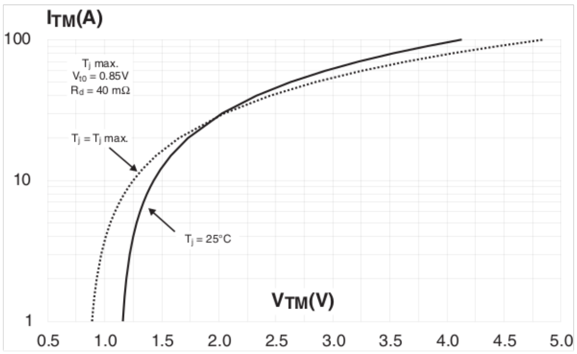


Figure 5: Surge peak on-state current versus number of cycles

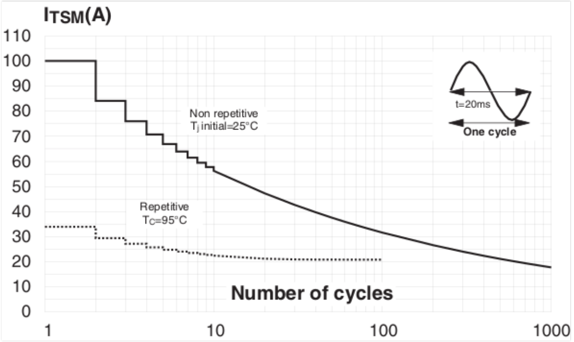


Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width t_p < 10 ms and corresponding value of I^2t

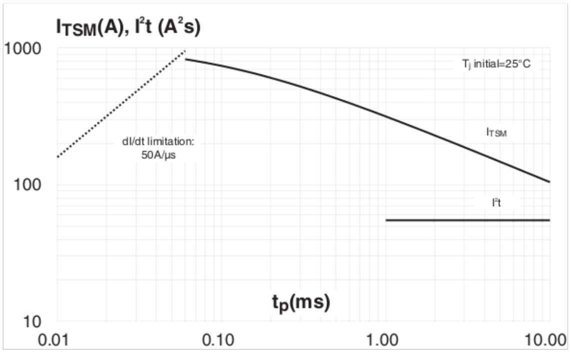


Figure 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

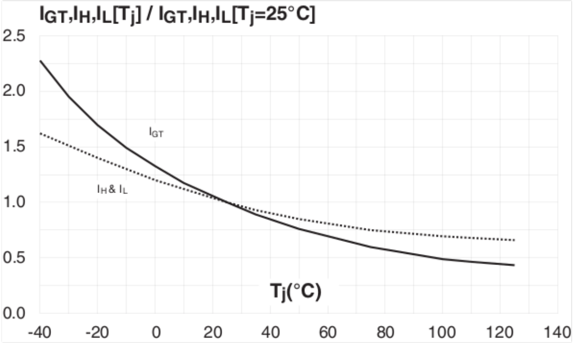


Figure 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

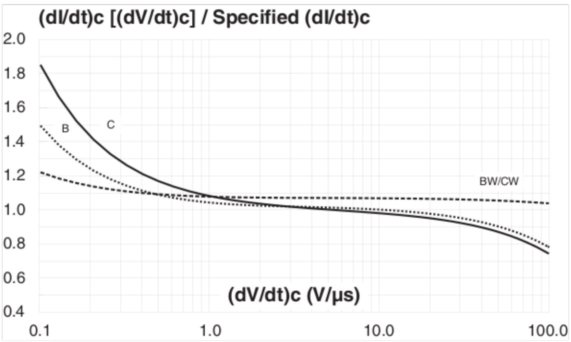


Figure 9: Relative variation of critical rate of decrease of main current versus junction temperature

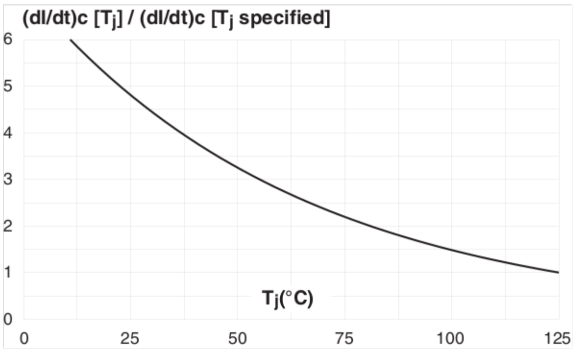


Figure 10: Ordering Information Scheme

BT A 10 - 600 BW RG

Triac series

Insulation
A = insulated
B = non insulated

Current
10 = 10A

Voltage
600 = 600V
800 = 800V

Sensitivity and type
B = 50mA Standard
C = 25mA Standard
BW = 50mA Snubberless
CW = 35mA Snubberless

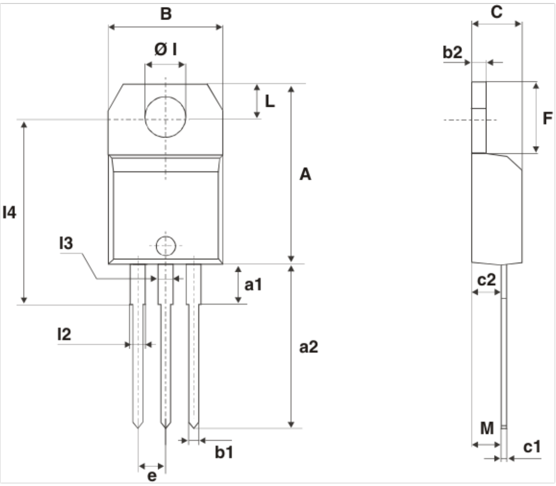
Packing mode
RG = Tube

Table 7: Product Selector

Part Number	Voltage (xxx)		Sensitivity	Type	Package
	600 V	800 V			
BTA/BTB10-xxxB	X	X	50 mA	Standard	TO-220AB
BTA/BTB10-xxxBW	X	X	50 mA	Snubberless	TO-220AB
BTA/BTB10-xxxC	X	X	25 mA	Standard	TO-220AB
BTA/BTB10-xxxCW	X	X	35 mA	Snubberless	TO-220AB

BTB: non insulated TO-220AB package

Figure 11: 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.

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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