

# BTA/BTB16 and T16 Series

SNUBBERLESS™, LOGIC LEVEL & STANDARD

## 16A TRIACs

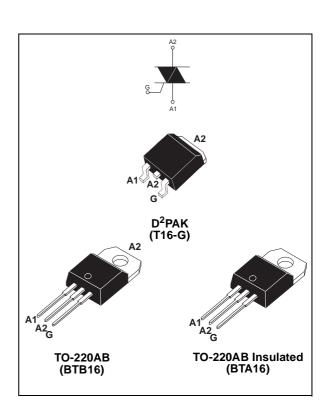
#### **MAIN FEATURES:**

Symbol	Value	Unit
I <sub>T(RMS)</sub>	16	А
V <sub>DRM</sub> /V <sub>RRM</sub>	600, 700 and 800	V
I <sub>GT (Q1)</sub>	10 to 50	mA

#### **DESCRIPTION**

Available either in through-hole or surface-mount packages, the BTA/BTB16 and T16 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 versions (BTA/BTB...W and T16 series) 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).



#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parame	eter		Value	Unit
I <sub>T(RMS)</sub>	RMS on-state current (full sine wave)	$\begin{array}{c} D2^2 PAK \\ \hline TO-220 AB \end{array} \qquad Tc = 100^{\circ} C$		16	А
		TO-220AB Ins.	Tc = 85°C		
ITSM	Non repetitive surge peak on-state			168	Α
	current (full cycle, Tj initial = 25°C) F = 50 Hz t = 20 ms		160		
l <sup>2</sup> t	I <sup>2</sup> t Value for fusing	tp = 10 r	144	A <sup>2</sup> s	
dl/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , tr $\leq 100 \text{ ns}$	F = 120 Hz	Tj = 125°C	50	A/µs
V <sub>DSM</sub> /V <sub>RSM</sub>	Non repetitive surge peak off-state voltage	tp = 10 ms Tj = 25°C		V <sub>DRM</sub> /V <sub>RRM</sub> + 100	V
I <sub>GM</sub>	Peak gate current	tp = 20 μs	Tj = 125°C	4	Α
P <sub>G(AV)</sub>	Average gate power dissipation		Tj = 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		

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#### BTA/BTB16 and T16 Series

### **ELECTRICAL CHARACTERISTICS** (Tj = 25°C, unless otherwise specified)

## ■ SNUBBERLESS™ and LOGIC LEVEL (3 Quadrants)

Symbol	Test Conditions	Quadrant		T16	BTA/BTB16		6	Unit
				T1635	sw	CW	BW	0
I <sub>GT</sub> (1)	$V_D = 12 \text{ V}$ $R_L = 33 \Omega$	1 - 11 - 111	MAX.	35	10	35	50	mA
V <sub>GT</sub>	NC = 55 32	1 - 11 - 111	MAX.		1.	.3		V
V <sub>GD</sub>	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $Tj = 125^{\circ}\text{C}$ $I - II - III$			0.2				V
I <sub>H</sub> (2)	I <sub>T</sub> = 500 mA			35	15	35	50	mA
ΙL	I <sub>G</sub> = 1.2 I <sub>GT</sub>	I - III	MAX.	50	25	50	70	mA
		II		60	30	60	80	
dV/dt (2)	V <sub>D</sub> = 67 % V <sub>DRM</sub> gate open Tj = 125°C		MIN.	500	40	500	1000	V/µs
(dl/dt)c (2)	(dV/dt)c = 0.1 V/μs Tj = 125°C			-	8.5	-	-	A/ms
	$(dV/dt)c = 10 V/\mu s$ Tj = 125°C		MIN.	-	3.0	-	-	
	Without snubber Tj = 12	5°C		8.5	-	8.5	14	

■ STANDARD (4 Quadrants)

Symbol	Test Conditions	Quadrant		BTA/BTB16		Unit
				С	В	<b>5</b>
I <sub>GT</sub> (1)	$V_D = 12 \text{ V}$ $R_L = 33 \Omega$	I - II - III IV	MAX.	25 50	50 100	mA
V <sub>GT</sub>		ALL	MAX.	1.	V	
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $Tj = 125^{\circ}\text{C}$	ALL	MIN.	0.2		V
I <sub>H</sub> (2)	I <sub>T</sub> = 500 mA		MAX.	25	50	mA
ΙL	I <sub>G</sub> = 1.2 I <sub>GT</sub>	I - III - IV	MAX.	40	60	mA
		II		80	120	
dV/dt (2)	$V_D = 67 \% V_{DRM}$ gate open $Tj = 125$ °C		MIN.	200	400	V/µs
(dV/dt)c(2)	(dI/dt)c = 7 A/ms $Tj = 125$ °C		MIN.	5	10	V/µs

### **STATIC CHARACTERISTICS**

Symbol	Test Con		Value	Unit	
V <sub>TM</sub> (2)	I <sub>TM</sub> = 22.5 A tp = 380 μs	Tj = 25°C	MAX.	1.55	V
V <sub>to</sub> (2)	Threshold voltage	Threshold voltage Tj = 125°C MAX.		0.85	V
R <sub>d</sub> (2)	Dynamic resistance	Dynamic resistance Tj = 125°C MAX.		25	mΩ
I <sub>DRM</sub>	$V_{DRM} = V_{RRM}$	Tj = 25°C	MAX.	5	μΑ
I <sub>RRM</sub>		Tj = 125°C	IVIAA.	2	mA

Note 1: minimum IGT is guaranted at 5% of IGT max.

Note 2: for both polarities of A2 referenced to A1

#### THERMAL RESISTANCES

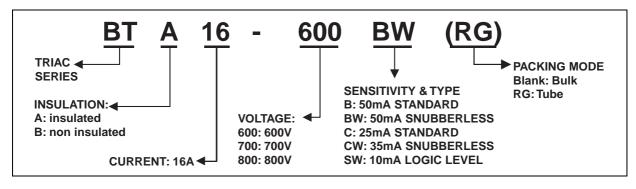
Symbol	Para	Parameter				
R <sub>th(j-c)</sub>	Junction to case (AC)	AC)		1.2	°C/W	
		TO-220AB Insulated	2.1			
R <sub>th(j-a)</sub>	Junction to ambient	$S = 1 \text{ cm}^2$	D <sup>2</sup> PAK	45	°C/W	
			TO-220AB 60			
			TO-220AB Insulated	00		

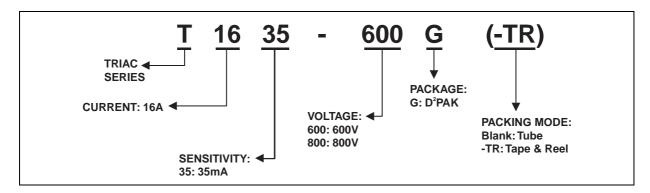
S: Copper surface under tab

#### **PRODUCT SELECTOR**

Part Number	Voltage(xxx)			Sensitivity	Type	Dookogo	
Part Number	600 V	700 V	800 V	Sensitivity	Туре	Package	
BTA/BTB16-xxxB	Х	Х	Х	50 mA	Standard	TO-220AB	
BTA/BTB16-xxxBW	Х	Х	Х	50 mA	Snubberless	TO-220AB	
BTA/BTB16-xxxC	Х	Х	Х	25 mA	Standard	TO-220AB	
BTA/BTB16-xxxCW	Х	Х	Х	35 mA	Snubberless	TO-220AB	
BTA/BTB16-xxxSW	Х	Х	Х	10 mA	Logic level	TO-220AB	
T1635-xxxG	Х		Х	35 mA	Snubberless	D <sup>2</sup> PAK	

#### **ORDERING INFORMATION**





#### **OTHER INFORMATION**

Part Number	Marking	Weight	Base quantity	Packing mode
BTA/BTB16-xxxyz	BTA/BTB16xxxyz	2.3 g	250	Bulk
BTA/BTB16-xxxyzRG	BTA/BTB16-xxxyz	2.3 g	50	Tube
T1635-xxxG	T1635xxxG	1.5 g	50	Tube
T1635-xxxG-TR	T1635xxxG	1.5 g	1000	Tape & reel

**Note:** xxx = voltage, y = sensitivity, z = type

**Fig. 1:** Maximum power dissipation versus RMS on-state current (full cycle).

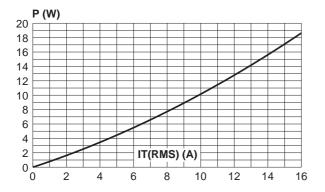
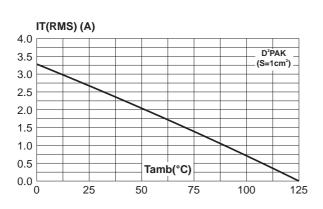
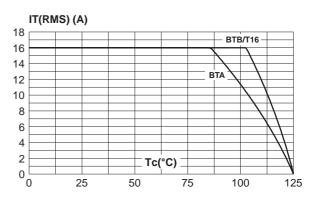


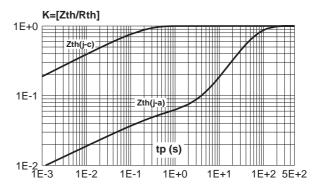
Fig. 2-2: D<sup>2</sup>PAK RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness:  $35 \mu m$ ), full cycle.



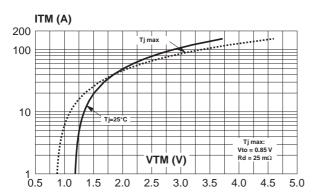
**Fig. 2-1:** RMS on-state current versus case temperature (full cycle).



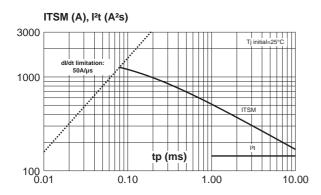
**Fig. 3:** Relative variation of thermal impedance versus pulse duration.



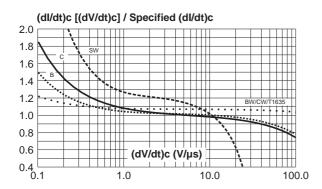
**Fig. 4:** On-state characteristics (maximum values)



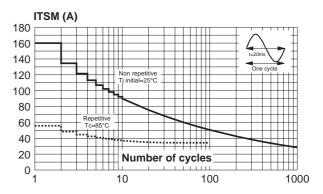
**Fig. 6:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10ms, and corresponding value of  $l^2t$ .



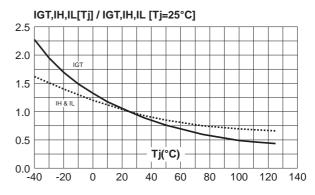
**Fig. 8:** Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values).



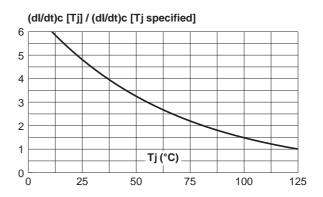
**Fig. 5:** Surge peak on-state current versus number of cycles.



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

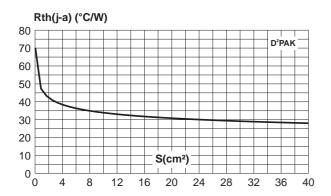


**Fig. 9:** Relative variation of critical rate of decrease of main current versus junction temperature.



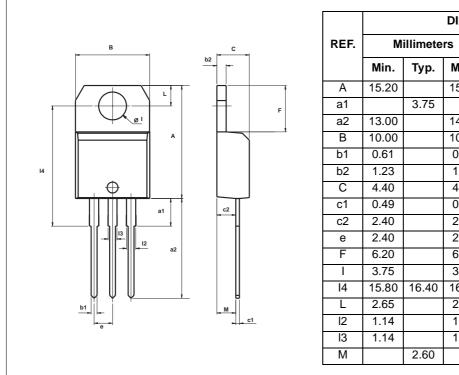
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**Fig. 10:**D<sup>2</sup>PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness:  $35 \mu m$ ).



### PACKAGE MECHANICAL DATA

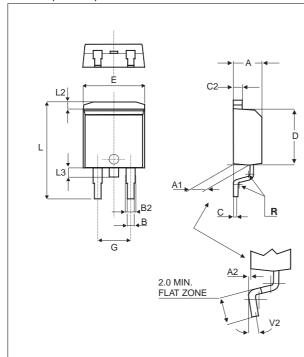
TO-220AB (Plastic)



			DIMEN	SIONS		
REF.	Millimeters			Inches		
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
В	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
С	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
е	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
I	3.75		3.85	0.147		0.151
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	

#### PACKAGE MECHANICAL DATA

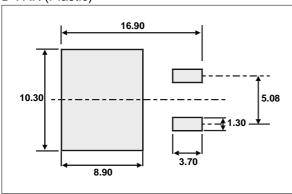
#### D2PAK (Plastic)



	DIMENSIONS						
REF.	Millimeters			Inches			
	Min.	Тур.	Max.	Min.	Тур.	Max.	
Α	4.30		4.60	0.169		0.181	
A1	2.49		2.69	0.098		0.106	
A2	0.03		0.23	0.001		0.009	
В	0.70		0.93	0.027		0.037	
B2	1.25	1.40		0.048	0.055		
С	0.45		0.60	0.017		0.024	
C2	1.21		1.36	0.047		0.054	
D	8.95		9.35	0.352		0.368	
Е	10.00		10.28	0.393		0.405	
G	4.88		5.28	0.192		0.208	
L	15.00		15.85	0.590		0.624	
L2	1.27		1.40	0.050		0.055	
L3	1.40		1.75	0.055		0.069	
R		0.40			0.016		
V2	0°		8°	0°		8°	

#### **FOOTPRINT DIMENSIONS** (in millimeters)

#### D2PAK (Plastic)



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