BTA16-800B

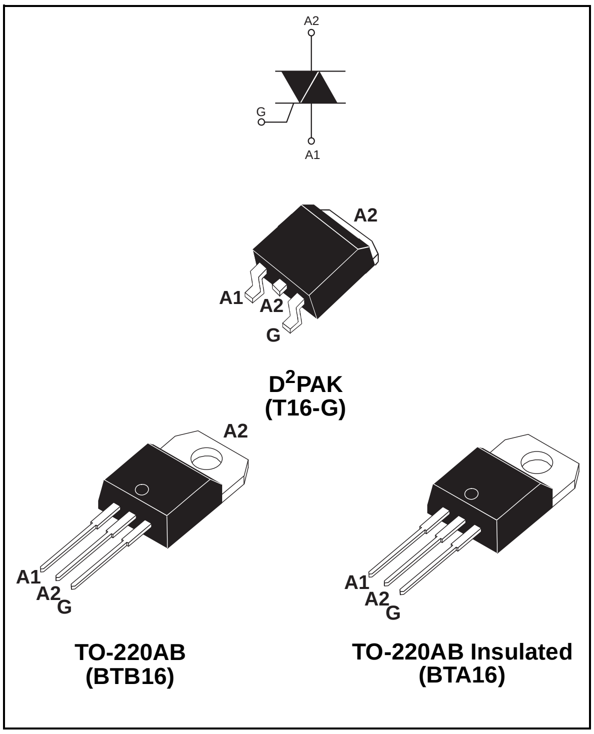
BTA/BTB16 and T16 Series

SNUBBERLESS™ , LOGIC LEVEL & STANDARD

16A TRIACs

MAIN FEATURES:

Symbol	Value	Unit
$I_{T(RMS)}$	16	A
V_{DRM}/V_{RRM}	600, 700 and 800	V
I_{GT} (Q_1)	10 to 50	mA



D²PAK (T16-G)

TO-220AB (BTB16)

TO-220AB Insulated (BTA16)

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	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	D2²PAK	Tc = 100°C	16	A
		TO-220AB			
		TO-220AB Ins.	Tc = 85°C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, Tj initial = 25°C)	F = 60 Hz	t = 16.7 ms	168	A
		F = 50 Hz	t = 20 ms	160	
I^2t	I^2t Value for fusing	tp = 10 ms		144	A^2s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $tr \leq 100$ ns	F = 120 Hz	Tj = 125°C	50	A/µs
V_{DSM}/V_{RSM}	Non repetitive surge peak off-state voltage	tp = 10 ms	Tj = 25°C	V_{DRM}/V_{RRM} + 100	V
I_{GM}	Peak gate current	tp = 20 µs	Tj = 125°C	4	A
$P_{G(AV)}$	Average gate power dissipation		Tj = 125°C	1	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C

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

■ SNUBBERLESS™ and LOGIC LEVEL (3 Quadrants)

Symbol	Test Conditions	Quadrant		T16	BTA/BTB16			Unit
				T1635	SW	CW	BW	
I_{GT} (1)	V_D = 12 V R_L = 33 Ω	I - II - III	MAX.	35	10	35	50	mA
V_{GT}		I - II - III	MAX.	1.3				V
V_{GD}	V_D = V_{DRM} R_L = 3.3 kΩ Tj = 125°C	I - II - III	MIN.	0.2				V
I_H (2)	I_T = 500 mA		MAX.	35	15	35	50	mA
I_L	I_G = 1.2 I_{GT}	I - III	MAX.	50	25	50	70	mA
		II		60	30	60	80	
dV/dt (2)	V_D = 67 % V_{DRM} gate open Tj = 125°C		MIN.	500	40	500	1000	V/µs
(dI/dt)c (2)	(dV/dt)c = 0.1 V/µs Tj = 125°C		MIN.	-	8.5	-	-	A/ms
	(dV/dt)c = 10 V/µs Tj = 125°C			-	3.0	-	-	
	Without snubber Tj = 125°C			8.5	-	8.5	14	

■ STANDARD (4 Quadrants)

Symbol	Test Conditions	Quadrant		BTA/BTB16		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 Tj = 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	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 Conditions			Value	Unit
V_{TM} (2)	I_{TM} = 22.5 A tp = 380 µs	Tj = 25°C	MAX.	1.55	V
V_{to} (2)	Threshold voltage	Tj = 125°C	MAX.	0.85	V
R_d (2)	Dynamic resistance	Tj = 125°C	MAX.	25	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}	Tj = 25°C	MAX.	5	µA
		Tj = 125°C		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	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)		D^{2}PAK TO-220AB	1.2	°C/W
			TO-220AB Insulated	2.1	
$R_{th(j-a)}$	Junction to ambient	S = 1 cm^2	D^{2}PAK	45	°C/W
			TO-220AB	60	
			TO-220AB Insulated		

S: Copper surface under tab

PRODUCT SELECTOR

Part Number	Voltage(xxx)			Sensitivity	Type	Package
	600 V	700 V	800 V			
BTA/BTB16-xxxB	X	X	X	50 mA	Standard	TO-220AB
BTA/BTB16-xxxBW	X	X	X	50 mA	Snubberless	TO-220AB
BTA/BTB16-xxxC	X	X	X	25 mA	Standard	TO-220AB
BTA/BTB16-xxxCW	X	X	X	35 mA	Snubberless	TO-220AB
BTA/BTB16-xxxSW	X	X	X	10 mA	Logic level	TO-220AB
T1635-xxxG	X		X	35 mA	Snubberless	D^{2}PAK

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

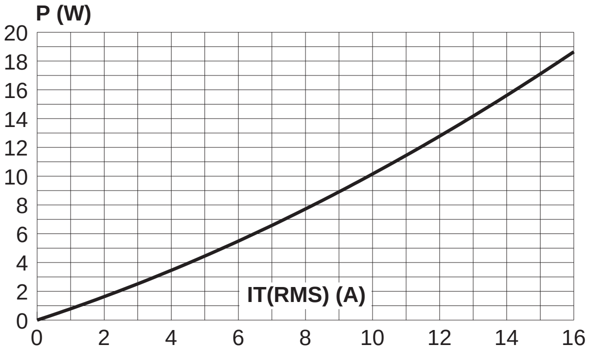


Fig. 2-1: RMS on-state current versus case temperature (full cycle).

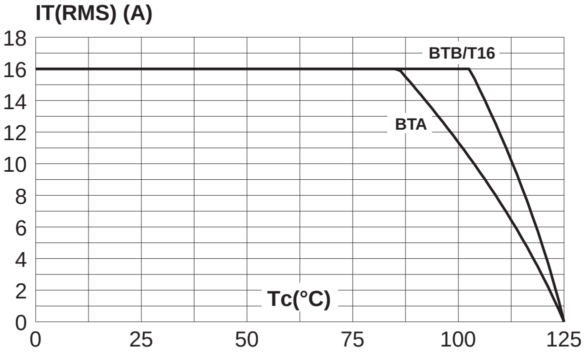


Fig. 2-2: D²PAK RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 µm), full cycle.

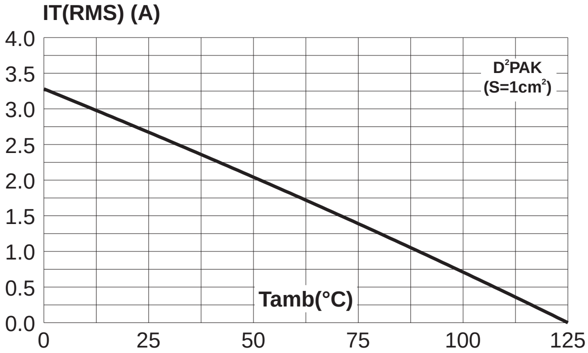


Fig. 3: Relative variation of thermal impedance versus pulse duration.

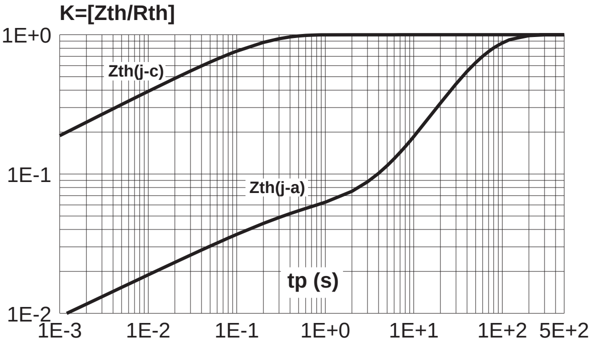


Fig. 4: On-state characteristics (maximum values)

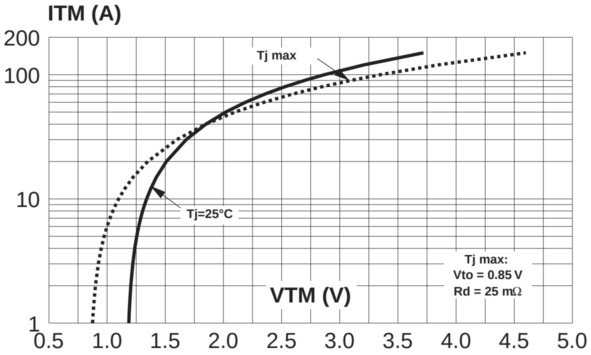


Fig. 5: Surge peak on-state current versus number of cycles.

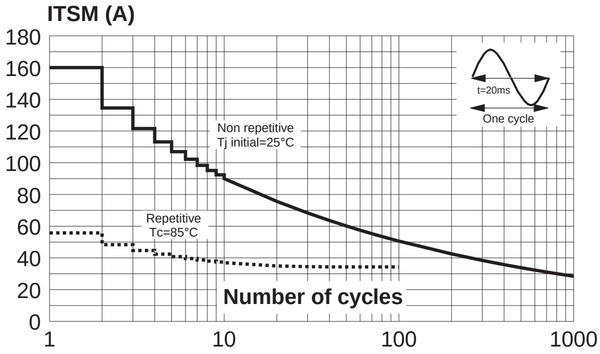


Fig. 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10ms, and corresponding value of I²t.

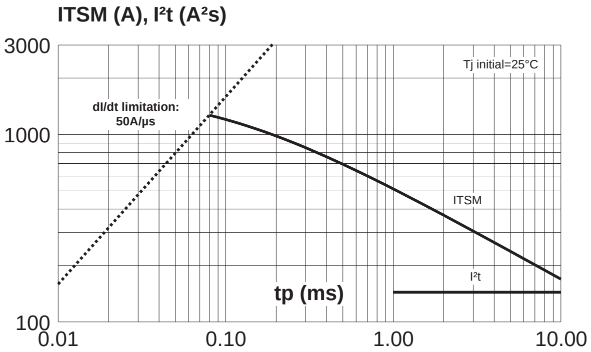


Fig. 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

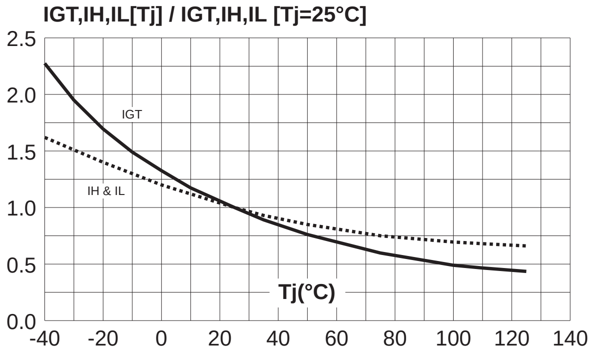


Fig. 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values).

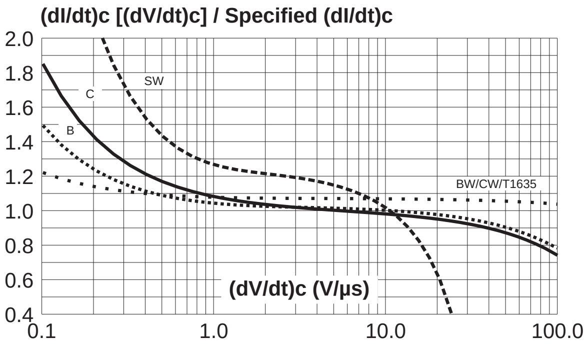


Fig. 9: Relative variation of critical rate of decrease of main current versus junction temperature.

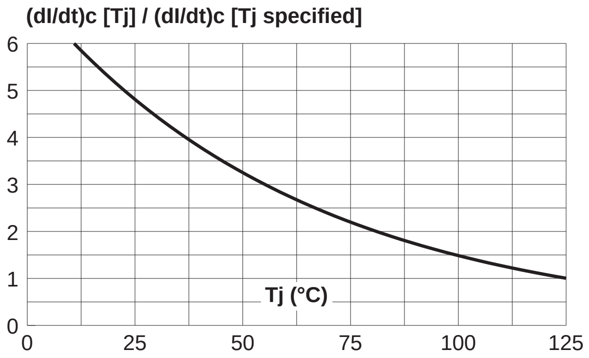
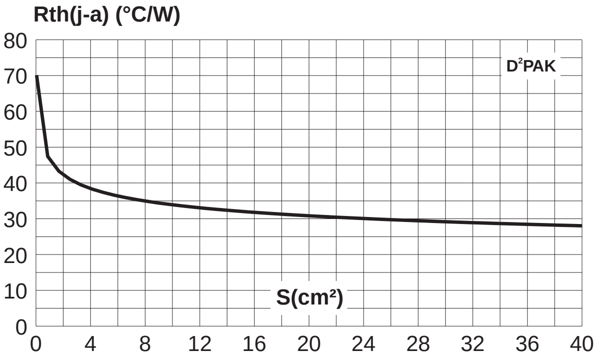
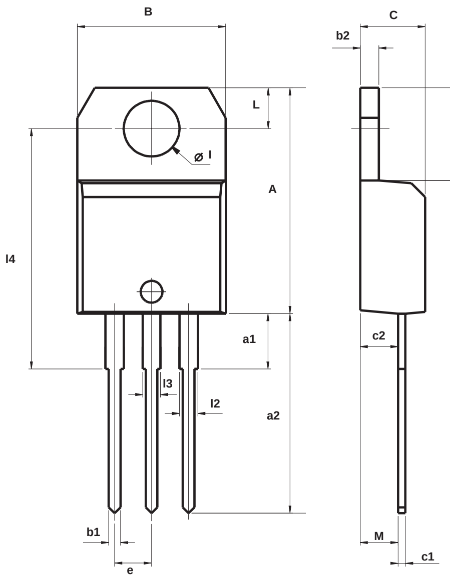


Fig. 10: D²PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 µm).



PACKAGE MECHANICAL DATA

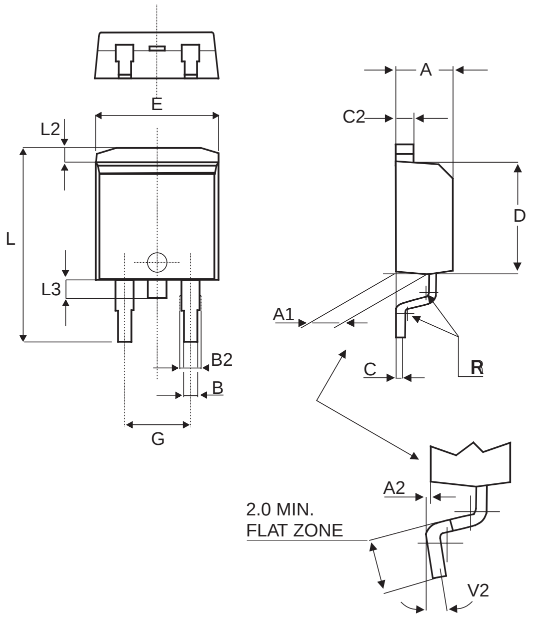
TO-220AB (Plastic)



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
I	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	

PACKAGE MECHANICAL DATA

D²PAK (Plastic)



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	**Typ.**	**Max.**	**Min.**	**Typ.**	**Max.**
A	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
B	0.70		0.93	0.027		0.037
B2	1.25	1.40		0.048	0.055	
C	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
E	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)