KERSEMI ELECTRONIC CO.,LTD.

BTA16, BTB16
T1610, T1635

16 A Snubberless™, logic level and standard Triacs

Features

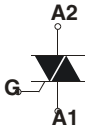
- Medium current Triac
- Low thermal resistance with clip bonding
- Low thermal resistance insulation ceramic for insulated BTA
- High commutation (4Q) or very high commutation (3Q) capability
- BTA series UL1557 certified (File ref: 81734)
- RoHS (2002/95/EC) compliant
- Insulated tab (BTA series, rated at 2500 V_{RMS})

TO-220AB insulated BTA16

TO-220AB BTB16

Applications

- Snubberless versions (BTA/BTB...W and T1635) especially recommended for use on inductive loads, because of their high commutation performances
- On/off or phase angle function in applications such as static relays, light dimmers and appliance motor speed controllers



D^2PAK T1610G T1635G

Description

Available either in through-hole or surface-mount packages, the BTA16, BTB16, T1610 and T1635 Triacs series are suitable for general purpose mains power AC switching.

Table 1. Device summary

Symbol	Parameter	BTA16 (1)	BTB16	T1610	T1635
$I_{T(RMS)}$	On-state rms current	16	16	16	16
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage	600/800	600/800	600/800	600/800
I_{GT} (Snubberless)	Triggering gate current	35/50	35/50	-	35
I_{GT} (logic level)	Triggering gate current	10	10	10	-
I_{GT} (standard)	Triggering gate current	25/50	25/50	-	-

1. Insulated

TM: Snubberless is a trademark of STMicroelectronics

Table 2. Absolute maximum ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)	D^2PAK / TO-220AB	T_c = 100 °C	16	A
		TO-220AB insulated	T_c = 86 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	160	A
		F = 60 Hz	t = 16.7 ms	168	
I^2t	I^2t value for fusing	t_p = 10 ms		144	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_{DRM}/V_{RRM} + 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}	Storage temperature range			-40 to + 150	
T_j	Maximum operating junction temperature			-40 to + 125	

Table 3. Electrical characteristics (T_j = 25 °C, unless otherwise specified) Snubberless and logic level (3 quadrants)

Symbol	Test conditions	Quadrant		T1610	T1635	BTA16 / BTB16			Unit
						SW	CW	BW	
I_{GT} (1)	V_D = 12 V R_L = 33 Ω	I - II - III	Max.	10	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 T_j = 125 °C	I - II - III	Min.	0.2					V
I_H (2)	I_T = 500 mA		Max.	15	35	15	35	50	mA
I_L	$I_G = 1.2\ I_{GT}$	I - III	Max.	25	50	25	50	70	mA
		II		30	60	30	60	80	
dV/dt (2)	V_D = 67 %V_{DRM} gate open	T_j = 125 °C	Min.	40	500	40	500	1000	V/µs
(dI/dt)c (2)	(dV/dt)c = 0.1 V/µs	T_j = 125 °C	Min.	8.5	-	8.5	-	-	A/ms
	(dV/dt)c = 10 V/µs	T_j = 125 °C		3.0	-	3.0	-	-	
	Without snubber	T_j = 125 °C		-	8.5	-	8.5	14	

1. Minimum IGT is guaranted at 5% of I_{GT} max
2. For both polarities of A2 referenced to A1

Table 4. Electrical characteristics (T_j = 25 °C, unless otherwise specified) standard (4 quadrants)

Symbol	Test conditions	Quadrant		BTA16 / 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 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	60	mA
		II		80	120	
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 = 7 A/ms	T_j = 125 °C	Min.	5	10	V/µs

1. Minimum IGT is guaranted at 5% of I_{GT} max
2. For both polarities of A2 referenced to A1

Table 5. Static characteristics

Symbol	Test conditions			Value	Unit
V_T (2)	I_{TM} = 22.5 A t_p = 380 µs	T_j = 25 °C	Max.	1.55	V
V_{to} (2)	Threshold voltage	T_j = 125 °C	Max.	0.85	V
R_d (2)	Dynamic resistance	T_j = 125 °C	Max.	25	mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$	T_j = 25 °C	Max.	5	µA
		T_j = 125 °C		2	mA

Table 6. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)		D^2PAK / TO-220AB	1.2	°C/W
			TO-220AB insulated	2.1	
$R_{th(j-a)}$	Junction to ambient	S(1) = 1 cm²	D^2PAK	45	°C/W
			TO-220AB / TO-220AB insulated	60	

1. S = Copper surface under tab

Figure 1. Maximum power dissipation versus on-state rms current (full cycle)

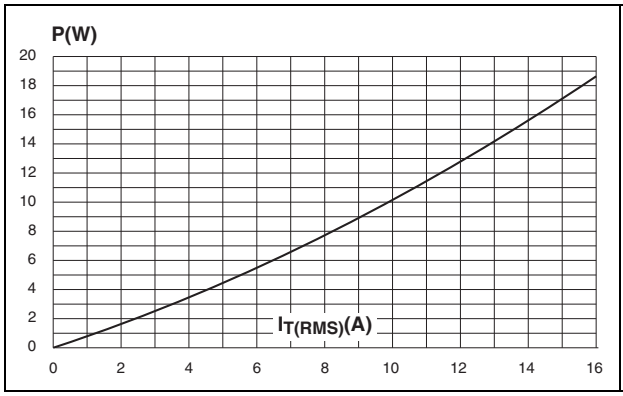


Figure 2. On-state rms current versus case temperature (full cycle)

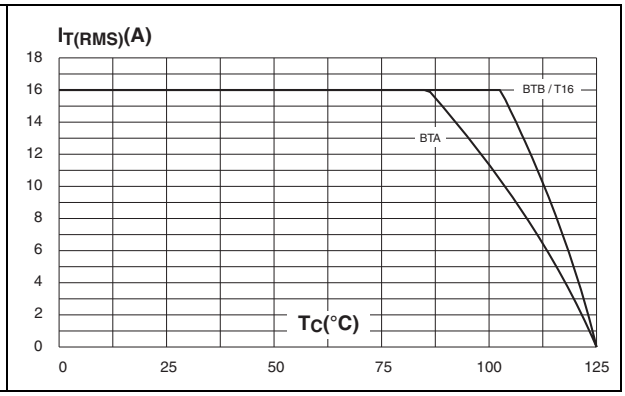


Figure 3. On-state rms current versus ambient temperature (full cycle)

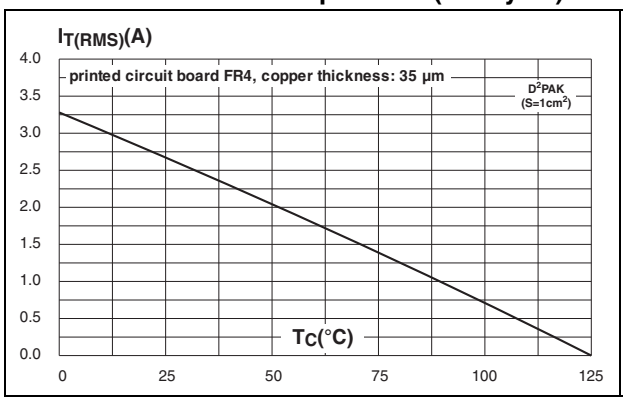


Figure 4. Relative variation of thermal impedance versus pulse duration

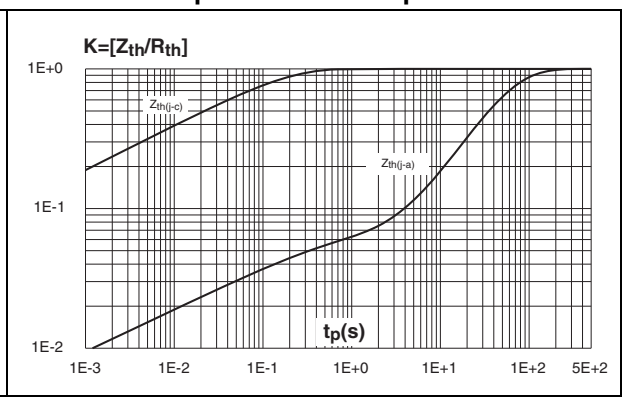


Figure 5. On-state characteristics (maximum values)

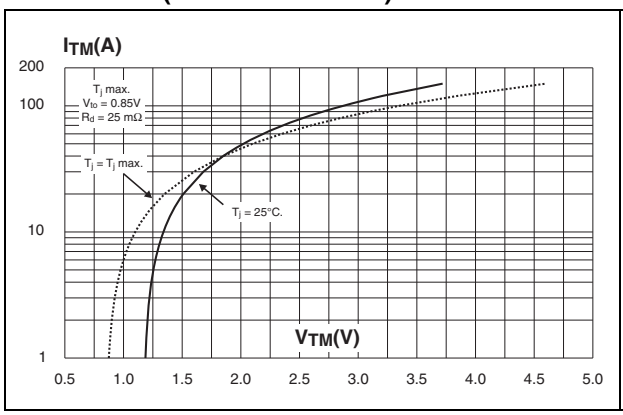


Figure 6. Surge peak on-state current versus number of cycles

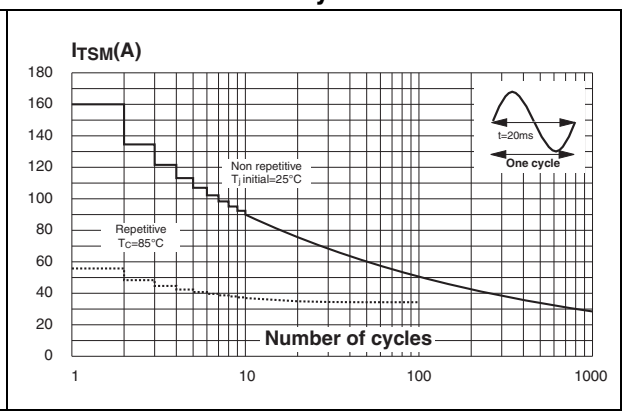


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal

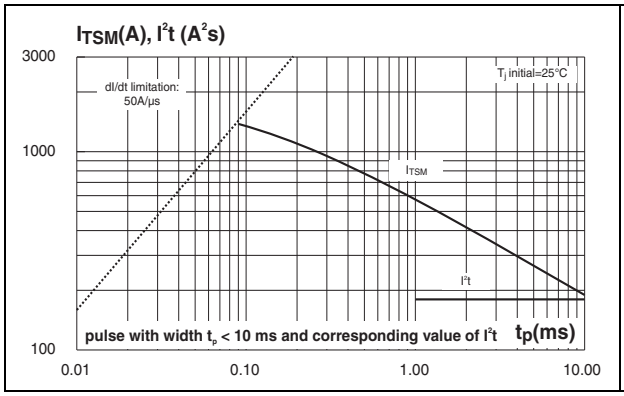


Figure 8. Relative variation of gate trigger current

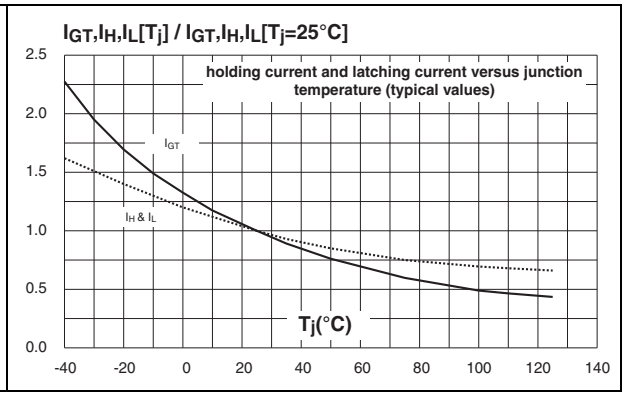


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

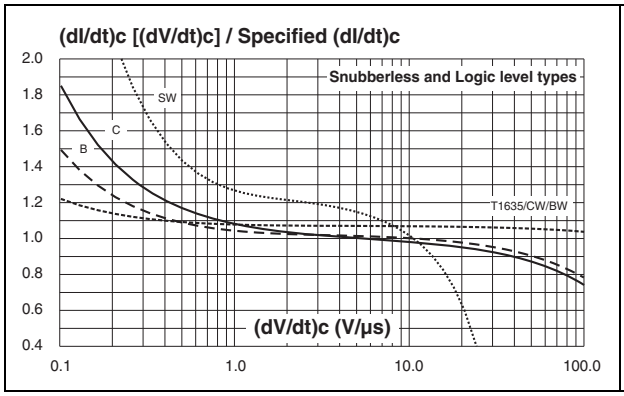


Figure 10. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

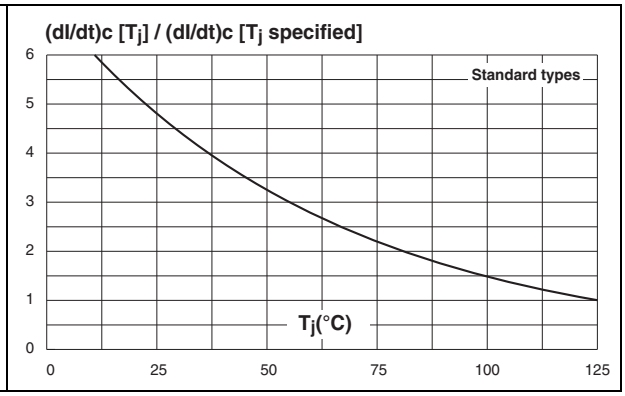


Figure 11. D²PAK thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 µm)

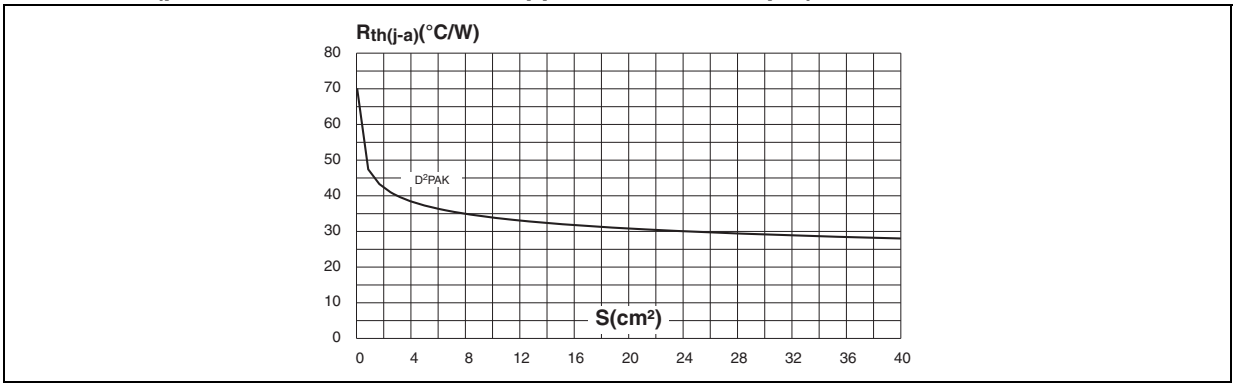


Figure 12. Ordering information scheme (BTA16 and BTB16 series)

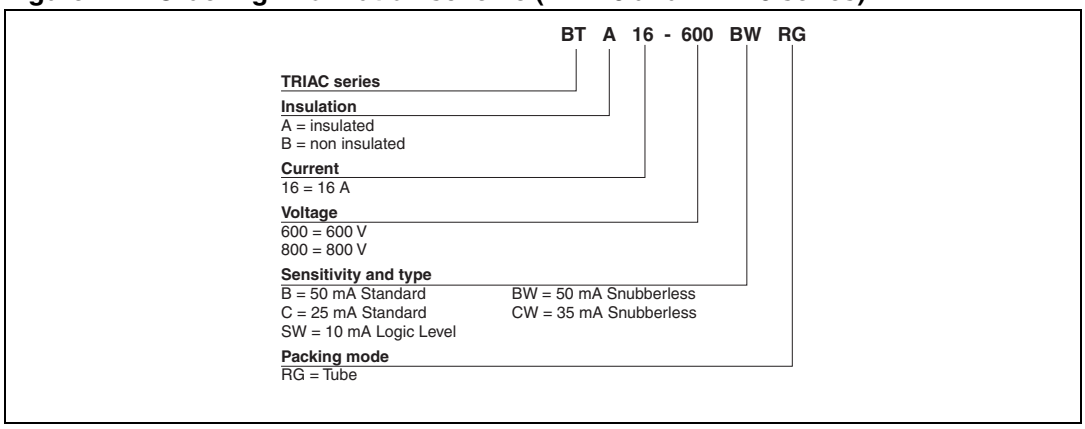


Figure 13. Ordering information scheme (T16 series)

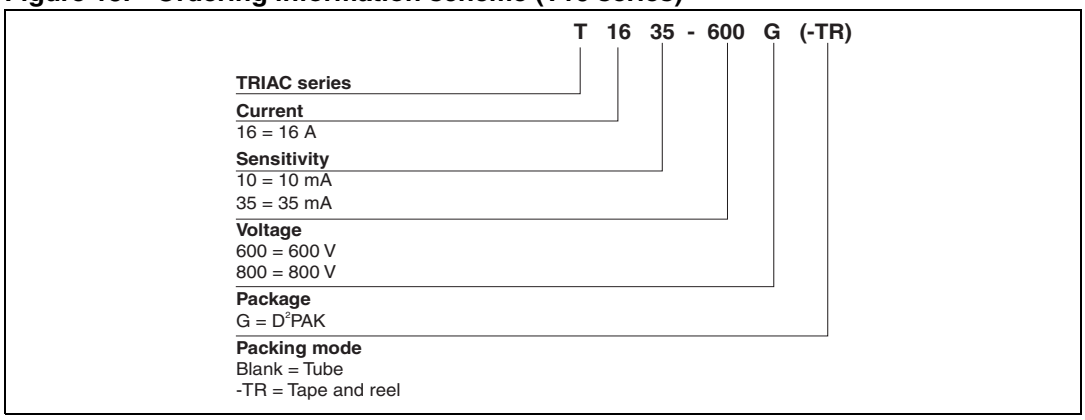


Table 7. Product selector

Device[1]	Voltage (xxx)		Sensitivity	Type	Package
	600 V	800 V			
BTA/BTB16-xxxB	X	X	50 mA	Standard	TO-220AB
BTA/BTB16-xxxBW	X	X	50 mA	Snubberless	TO-220AB
BTA/BTB16-xxxC	X		25 mA	Standard	TO-220AB
BTA/BTB16-xxxCW	X	X	35 mA	Snubberless	TO-220AB
BTA/BTB16-xxxSW	X	X	10 mA	Logic level	TO-220AB
T1610-xxxG	X	X	10 mA	Logic level	D^2PAK
T1635-xxxG	X	X	35 mA	Snubberless	D^2PAK

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