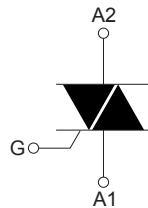


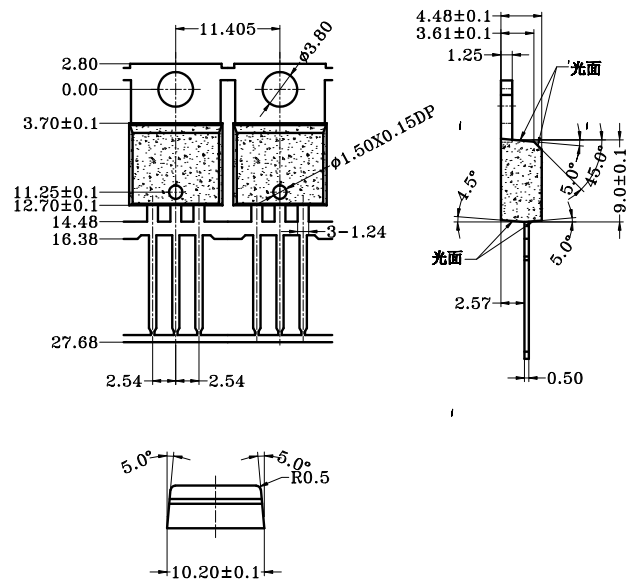
Features

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, Snubberless™) capability

BTA series UL1557 certified (file ref: 81734)
 Packages are RoHS (2002/95/EC) compliant
 Insulated tab (BTA series, rated at 2500 V_{RMS})



TO-220



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameters	Value	Unit	
I _{T(RMS)}	RMS on-state current (full sine wave)	TO-220AB, D ² PAK T _c = 100 °C	16	A
		TO-220AB Ins. T _c = 86 °C		
I _{TSM}	Non repetitive surge peak on-state current (full cycle, T _j initial = 25 °C)	F = 50 Hz t _p = 20 ms	160	A
		F = 60 Hz t _p = 16.7 ms		
I ² t	I ² t value for fusing	t _p = 10 ms	144	A ² s
di/dt	Critical rate of rise of on-state current I _G = 2 × I _{GT} , t _r ≤ 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 junction temperature range		-40 to +150	°C
T _j	Operating junction temperature range		-40 to +125	°C

T1610, T1635, T1650

BTA16, BTB16

Electrical characteristics ($T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified) - standard (4 quadrants)

Symbol	Parameters	Quadrant		BTA16 BTB16		Unit
				C	B	
$I_{GT}^{(1)}$	$V_D = 12\text{ V}, R_L = 33\ \Omega$	I - II - III	Max.	25	50	mA
V_{GT}		IV		50	100	
V_{GD}	$V_D = V_{DRM}, R_L = 3.3\text{ k}\Omega, T_j = 125\text{ }^\circ\text{C}$	All	Max.	1.3		V
$I_H^{(2)}$		All	Min.	0.2		V
I_L	$I_G = 1.2\ I_{GT}$	I - III - IV	Max.	25	50	mA
$(dV/dt)^{(2)}$		II	Max.	40	60	
$(dI/dt)^{(2)}$	$D = 67\% V_{DRM}$ gate open, $T_j = 125\text{ }^\circ\text{C}$		Min.	80	120	V/ μs
$(dV/dt)^{(2)}$			Min.	200	400	V/ μs
$(dI/dt)^{(2)}$	$(dI/dt)^{(2)} = 7\text{ A/ms}, T_j = 125\text{ }^\circ\text{C}$		Min.	5	10	V/ μs
$(dI/dt)^{(2)}$			Min.	5	10	V/ μs

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

Electrical characteristics ($T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified) - Snubberless and logic level (3 quadrants)

Symbol	Parameters	Quadrant		T1610 / BTA16- SW / BTB16- SW	T1635 / BTA16-CW / BTB16-CW	T1650 / BTA16-BW / BTB16-BW	Unit	
$I_{GT}^{(1)}$	$V_D = 12\text{ V}, R_L = 30\ \Omega$	I - II - III	Max.	10	35	50	mA	
V_{GT}			Max.	1.3				V
V_{GD}			Min.	0.2				V
$I_H^{(2)}$	$I_T = 500\text{ mA}$	I - III	Max.	15	35	50	mA	
I_L			II	Max.	25	50		70
$(dV/dt)^{(2)}$	$V_D = 67\% V_{DRM}$ gate open, $T_j = 125\text{ }^\circ\text{C}$		Min.	30	60	80	mA	
$(dV/dt)^{(2)}$			Min.	40	500	1000		V/ μs
$(dI/dt)^{(2)}$			Min.	8.5				A/ms
$(dI/dt)^{(2)}$	Min.	3.0						
$(dI/dt)^{(2)}$	Without snubber, $T_j = 125\text{ }^\circ\text{C}$		8.5	14				

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

T1610, T1635, T1650 BTA16, BTB16

Static electrical characteristics

Symbol	Test conditions	T_j		Value	Unit
$V_T^{(1)}$	$I_{TM} = 22.5 \text{ A}$, $t_p = 380 \mu\text{s}$	25 °C	Max.	1.55	V
$V_{TO}^{(1)}$	threshold on-state voltage	125 °C	Max.	0.85	V
$R_D^{(1)}$	Dynamic resistance	125 °C	Max.	25	m Ω
I_{DRM}/I_{RRM}	$V_{DRM} = V_{RRM}$	25 °C	Max.	5	μA
		125 °C		2	mA

1. For both polarities of A2 referenced to A1

Thermal resistance

Symbol	Parameters		Value	Unit
$R_{th(j-c)}$	Max. junction to case (AC)	TO-220AB / D ² PAK	1.2	°C/W
		TO-220AB insulated	2.1	
$R_{th(j-a)}$	Junction to ambient (S = 2 cm ²)	D ² PAK	45	
	Junction to ambient	TO-220AB / TO-220AB ins	60	

1. Copper surface under tab.

RATING AND CHARACTERISTIC CURVES (T1610,T1635,T1650,BTA16,BTB16)

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

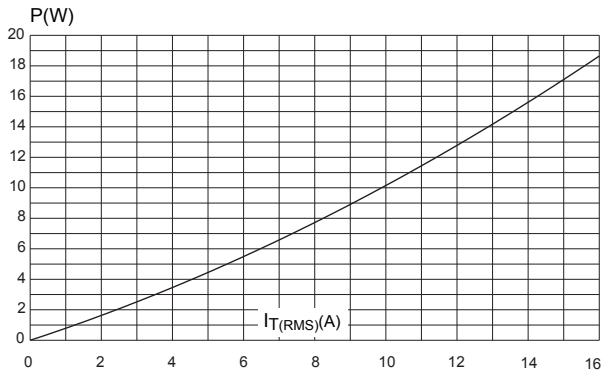


Figure 2. RMS on-state current versus case temperature (full cycle)

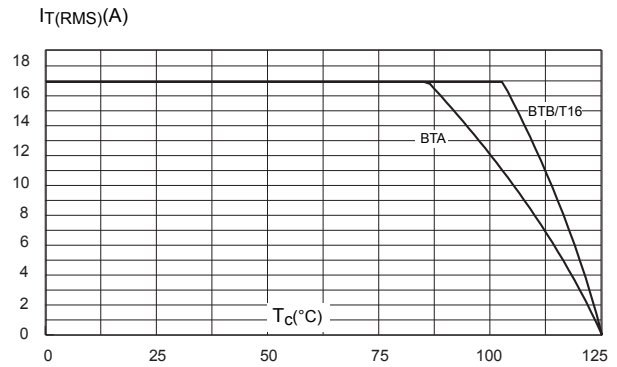


Figure 3. On-state rms current versus ambient temperature (full cycle)

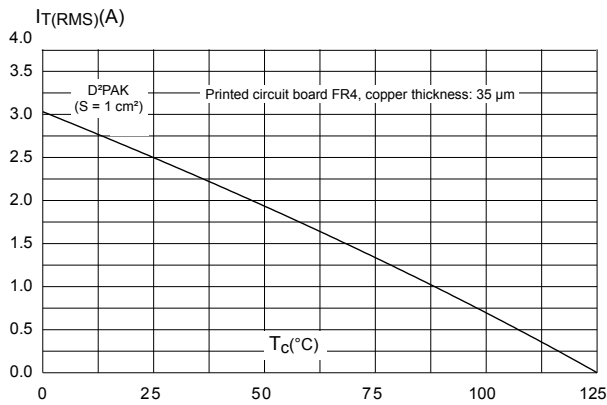


Figure 4. Relative variation of thermal impedance versus pulse duration

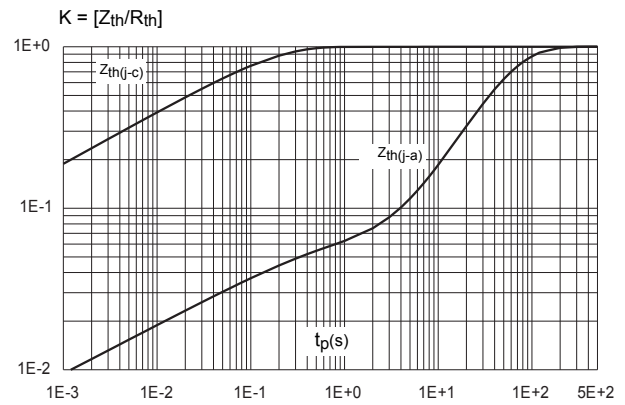


Figure 5. On-state characteristics (maximum values)

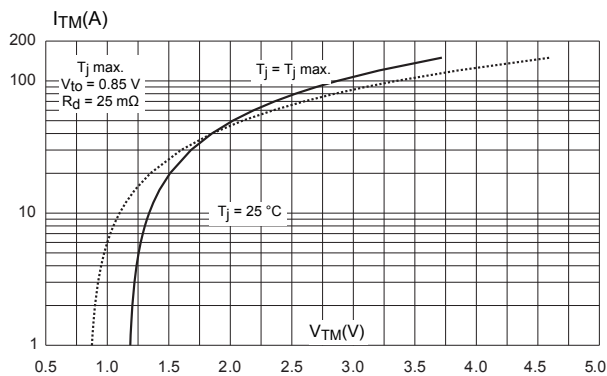
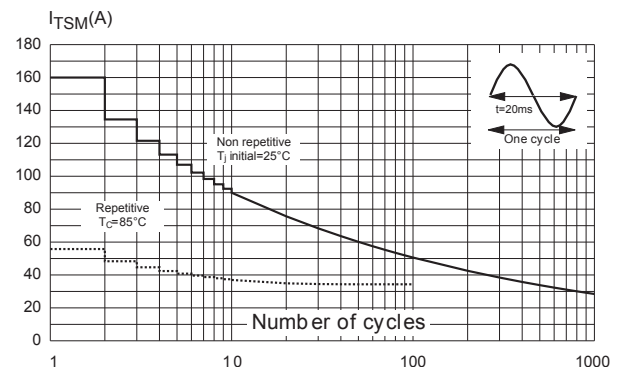


Figure 6. Surge peak on-state current versus number of cycles



RATING AND CHARACTERISTIC CURVES (T1610,T1635,T1650,BTA16,BTB16)

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

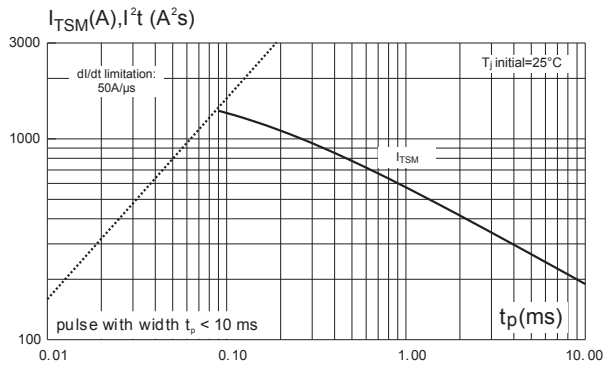


Figure 8. Relative variation of gate trigger current

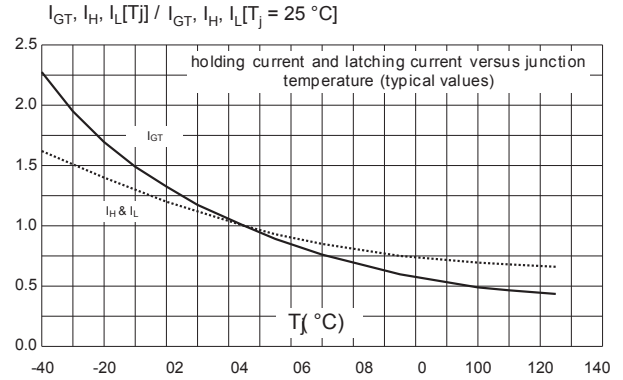


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)_c (typical values)

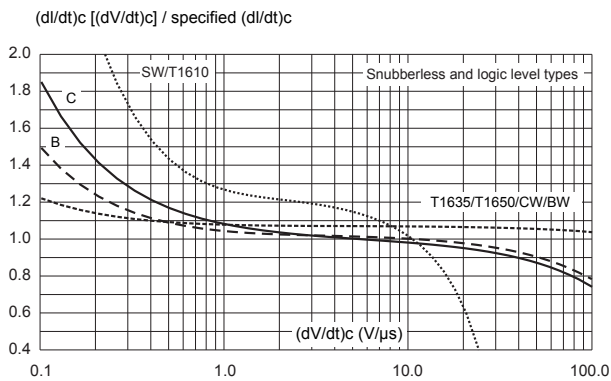


Figure 10. Relative variation of critical rate of decrease of main current versus (junction temperature (typical values)

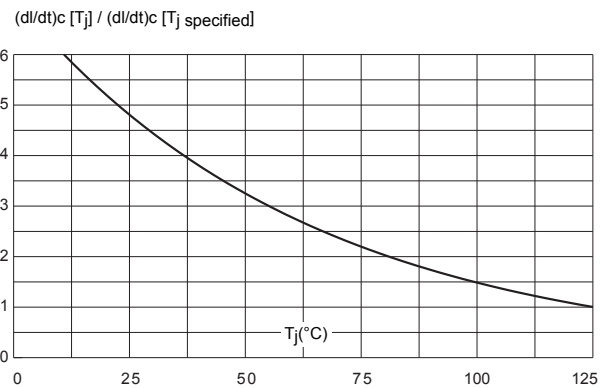


Figure 11. D²PAK thermal resistance junction to ambient versus copper surface under tab

