

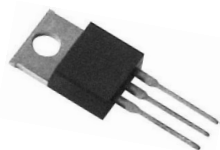
Features

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

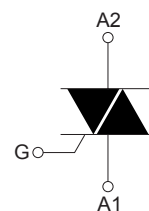
BTA series UL1557 certified (file ref: 81734)
Packages are RoHS (2002/95/EC) compliant
insulated tab (BTA series, rated at 2500 V_{RMS})

VOLTAGE 600/800 V

CURRENT 16.0 A



TO-220AB



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Parameters			Value	Unit
V _{DRM}	Repetitive peak off-state voltage			600 / 800	V
V _{RRM}	Repetitive peak reverse voltage			600 / 800	V
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	168	
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 x 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

Electrical Characteristics (T_j=25°C unless otherwise specified)

- standard (4 quadrants)

Symbol	Parameters	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	Max.	80	120	
dV/dt ⁽²⁾	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 I_{GT} is guaranteed at 5 % of I_{GT} max.
2. For both polarities of A2 referenced to A1

- 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 V, R _L = 30 Ω	I - II - III	Max.	10	35	50	mA
V _{GT}			Max.	1.3			V
V _{GD}	V _D = V _{DRM} , R _L = 3.3 kΩ, T _j = 125 °C		Min.	0.2			V
I _H ⁽²⁾	I _T = 500 mA		Max.	15	35	50	mA
I _L	I _G = 1.2 I _{GT}	I - III	Max.	25	50	70	mA
		II	Max.	30	60	80	
(dV/dt) ⁽²⁾	V _D = 67 % V _{DRM} gate open, T _j = 125 °C		Min.	40	500	1000	V/μs
(dI/dt) _c ⁽²⁾	(dV/dt) _c = 0.1 V/μs, T _j = 125 °C		Min.	8.5			A/ms
	(dV/dt) _c = 10 V/μs, T _j = 125 °C			3.0			
	Without snubber, T _j = 125 °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

Static electrical characteristics

Symbol	Test conditions	T _j		Value	Unit
V _T ⁽¹⁾	I _{TM} = 22.5 A, t _p = 380 μs	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	mΩ
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

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

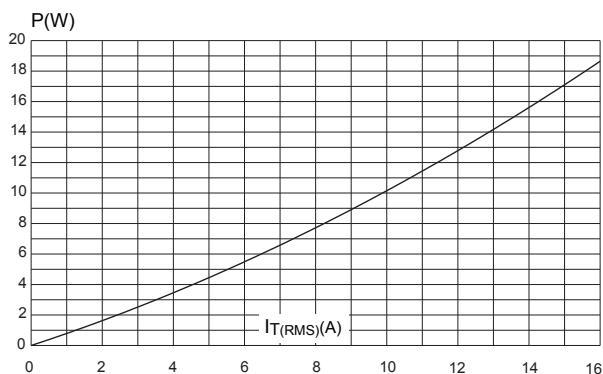


Figure 2. RMS on-state current versus case temperature (full cycle)

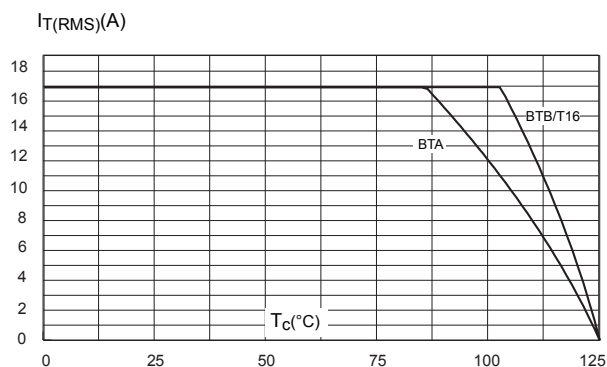


Figure 3. On-state rms current versus ambient temperature (full cycle)

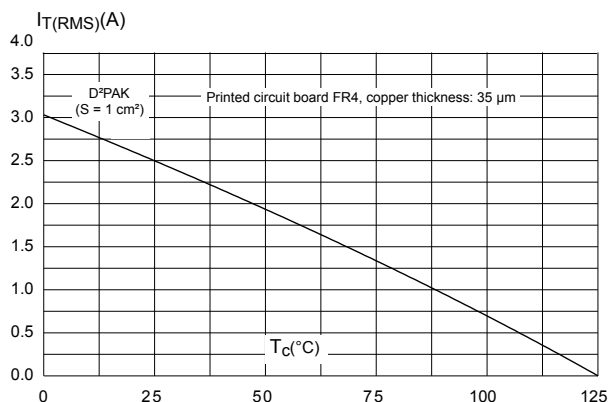


Figure 4. Relative variation of thermal impedance versus pulse duration

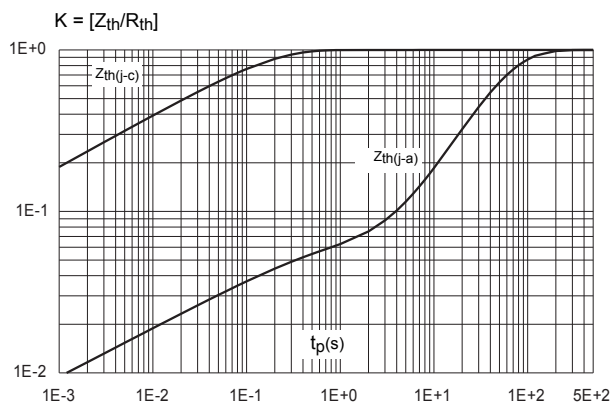


Figure 5. On-state characteristics (maximum values)

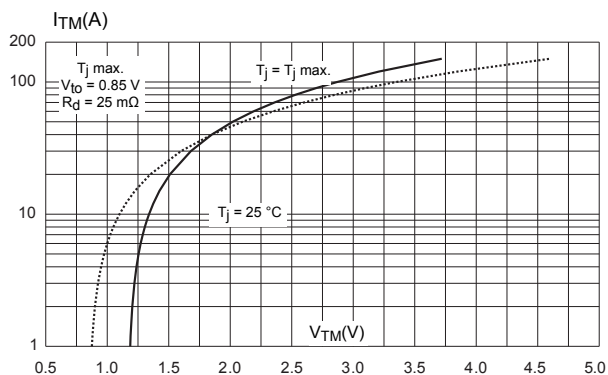
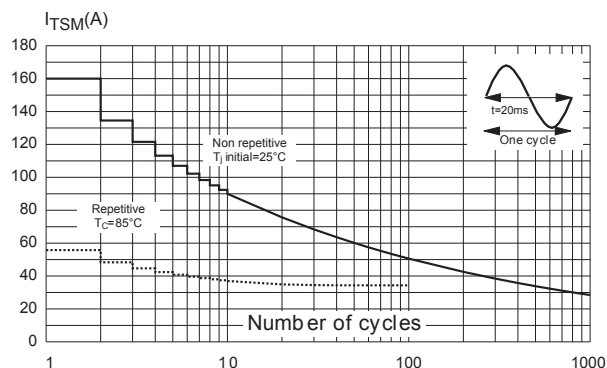


Figure 6. Surge peak on-state current versus number of cycles



RATING AND CHARACTERISTIC CURVES

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

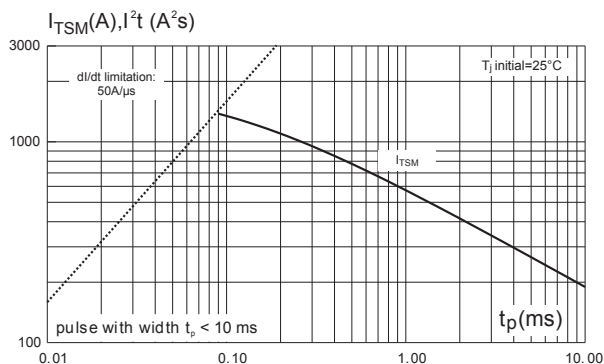


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)_c (typical values)

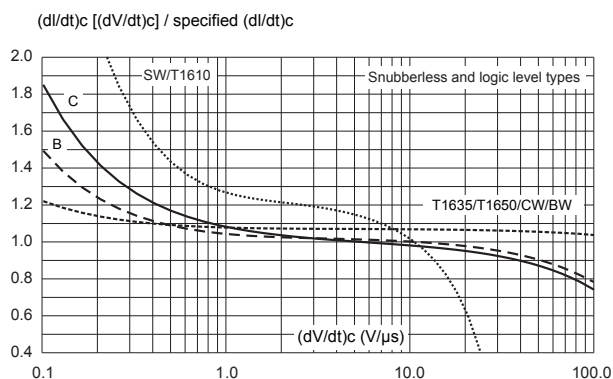


Figure 8. Relative variation of gate trigger current

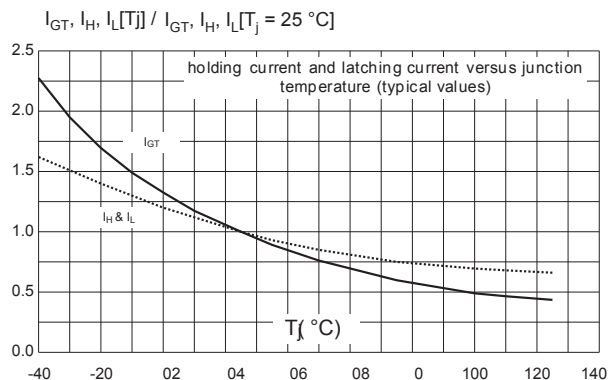


Figure 10. Relative variation of critical rate of decrease of main current versus (junction temperature (typical values)

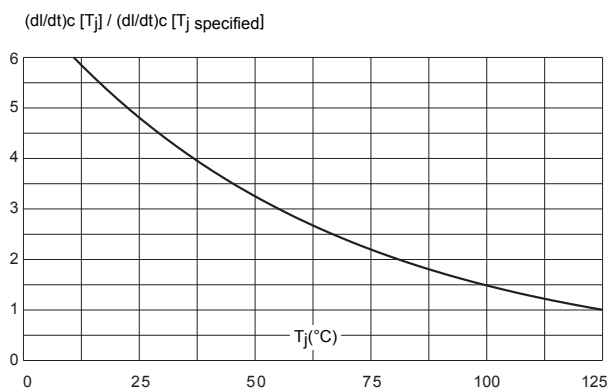
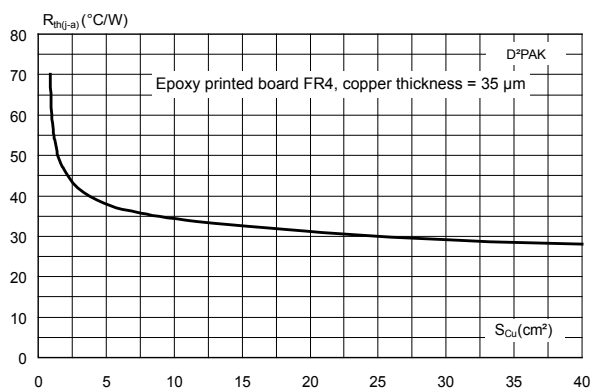
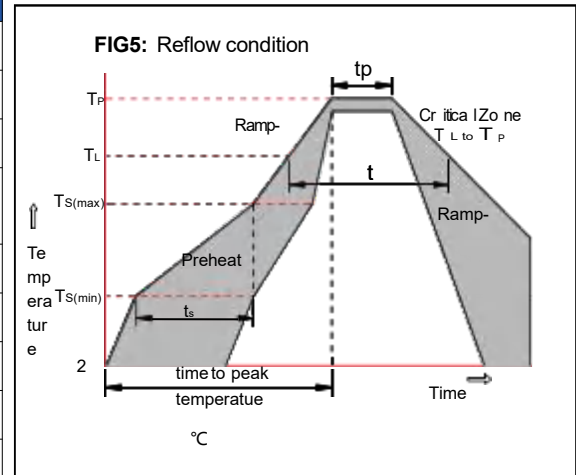


Figure 11. D²PAK thermal resistance junction to ambient versus copper surface under tab



Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150 °C
	-Temperature Max ($T_{s(max)}$)	+200 °C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3 °C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3 °C/sec. Max
Reflow	-Temperature (T_L) (Liquid us)	+217 °C
	-Temperature (t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5) °C
Time within 5 °C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6 °C/sec. Max
Time 25 °C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260 °C



Package Dimensions & Suggested Pad Layout

TO-220AB

