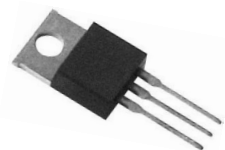


Features

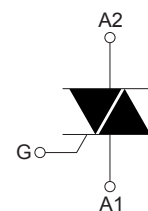
Medium current Triac
Low thermal resistance with clip bonding
Low thermal resistance insulation ceramic for insulated BTA
High commutation (4Q) or very high commutation (3Q, Snubberless™) capability

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 12.0 A



TO-220AB



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter			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 = 105 °C	12	A
		TO-220AB Ins.	T _c = 90 °C		
I _{TSM}	Non repetitive surge peak on-state current (full cycle, T _j initial = 25 °C)	f = 50 Hz	t = 20 ms	120	A
		f = 60 Hz	t _p = 16.7 ms	126	
I ² t	I ² t value for fusing		t _p = 10 ms	78	A ² s
di/dt	Critical rate of rise of on-state current I _G = 2 × I _{GT} , tr ≤ 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	Parameter	Quadrant		Value		Unit
				C	B	
I _{GT} ⁽¹⁾	V _D = 12 V, R _L = 30 Ω	I - II - III	Max.	25	50	mA
		IV		50	100	
V _{GT}		All	Max.	1.3		V
V _{GD}	V _D = V _{DRM} , R _L = 33 kΩ, T _j = 125 °C	All	Min.	0.2		V
I _H ⁽²⁾	I _T = 500 mA	I - II - III	Max.	25	50	mA
I _L	I _G = 1.2 I _{GT}	I - III - IV	Max.	40	50	mA
		II		80	100	
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 = 5.3 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	Parameter	Quadrant		T1205 BTB12-TW BTA12-TW	T1210 BTB12-SW BTA12-SW	T1235 BTB12-CW BTA12-CW	T1250 BTB12-BW BTA12-BW	Unit
I _{GT} ⁽¹⁾	V _D = 12 V, R _L = 30 Ω	I - II - III	Max.	5	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 = 100 mA	I - II - III	Max.	10	15	35	50	mA
I _L ⁽²⁾	I _G = 1.2 x I _{GT}	I - III	Max.	10	25	50	70	mA
		II	Max.	15	30	60	80	
dV/dt ⁽²⁾	V _D = 67% V _{DRM} , gate open, T _j = 125 °C		Max.	20	40	500	1000	V/μs
(dI/dt) _c ⁽²⁾	(dV/dt) _c = 0.1 V/μs, T _j = 125 °C		Min.	3.5	6.5			A/ms
	(dV/dt) _c = 10 V/μs, T _j = 125 °C		Min.	1.0	2.9			
	Without snubber, T _j = 125 °C		Min.			6.5	12	

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			Value	Unit
V _{TM} ⁽¹⁾	I _{TM} = 17 A, t _p = 380 μs	T _j = 25 °C	Max.	1.55	V
V _{TO} ⁽¹⁾	threshold on-state voltage	T _j = 125 °C	Max.	0.85	V
R _D ⁽¹⁾	Dynamic resistance	T _j = 125 °C	Max.	35	mΩ
I _{DRM} I _{RRM}	V _{DRM} = V _{RRM}	T _j = 25 °C	Max.	5	μA
		T _j = 125 °C	Max.	1	mA

1. For both polarities of A2 referenced to A1

Thermal resistance

Symbol	Parameter				Value	Unit
R _{th(j-c)}	Max. junction to case thermal resistance (AC)		D ² PAK / TO-220AB	Max.	1.4	°C/W
			TO-220AB insulated	Max.	2.3	
R _{th(j-a)}	Junction to ambient	S = 2 cm ² (1)	D ² PAK	Typ.	45	°C/W
	Junction to ambient		TO-220AB / TO-220AB insulated	Typ.	60	

1. S = Copper surface under tab.

RATING AND CHARACTERISTIC CURVES

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

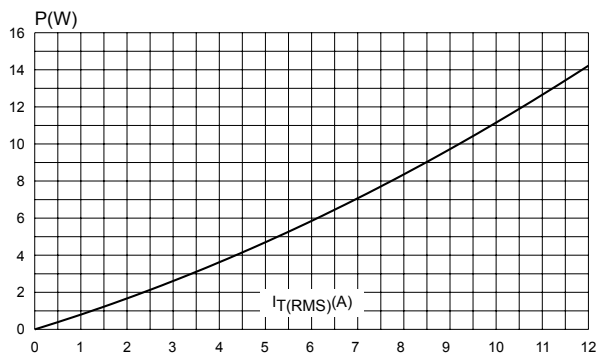


Figure 2. RMS on-state current versus case temperature (full cycle)

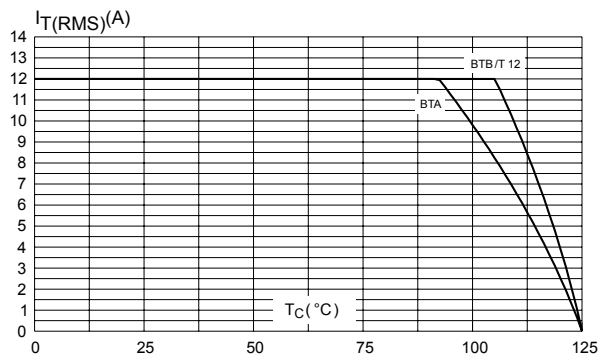


Figure 3. RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 μm) (full cycle)

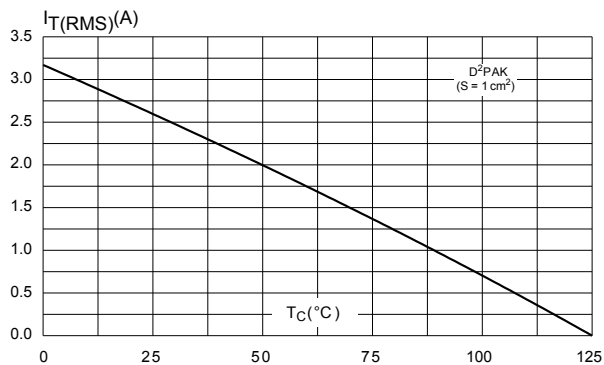


Figure 4. Relative variation of thermal impedance versus pulse duration

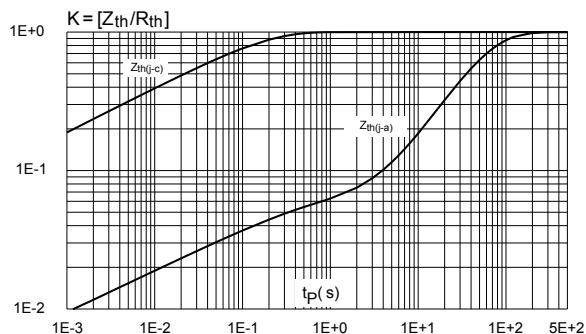


Figure 5. On-state characteristics (maximum values)

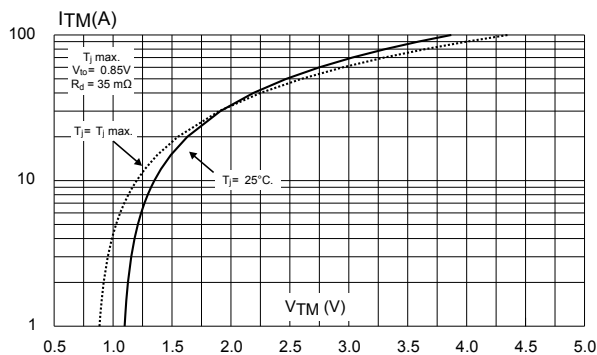
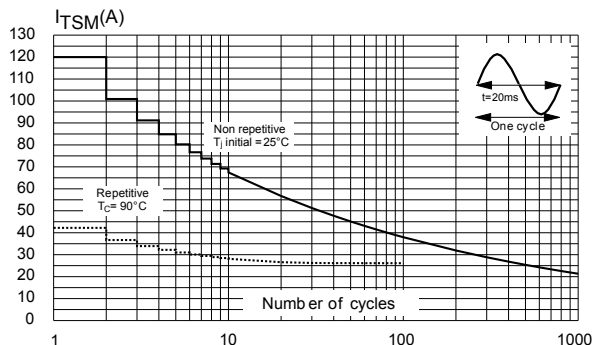


Figure 6. Surge peak on-state current versus number of cycles



RATING AND CHARACTERISTIC CURVES

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

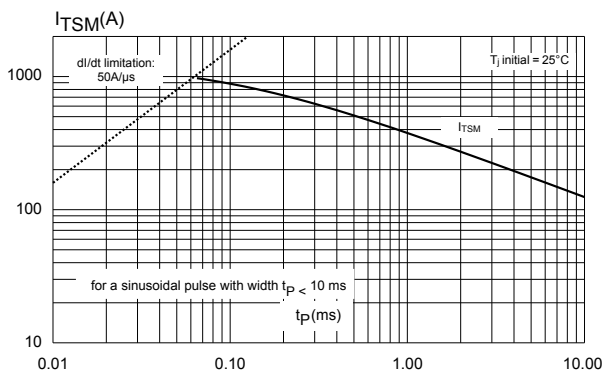


Figure 8. Relative variation of gate trigger current holding current and latching current versus junction temperature (typical values)

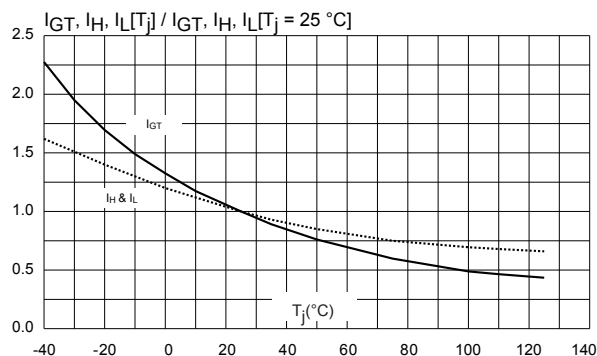


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

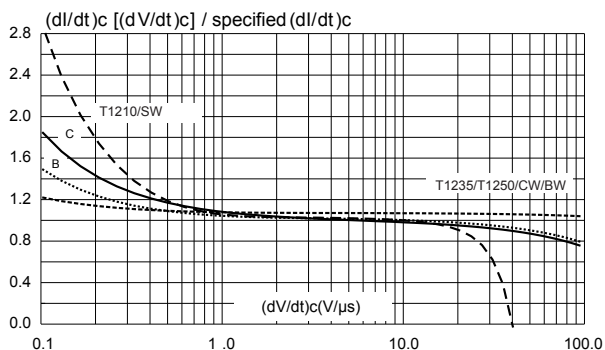


Figure 10. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)(TW)

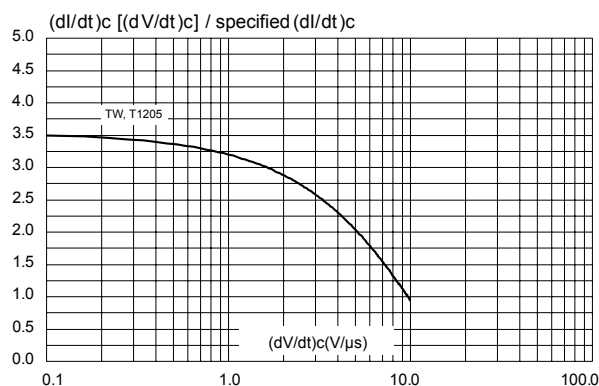


Figure 11. Relative variation of critical rate of decrease of main current versus junction temperature

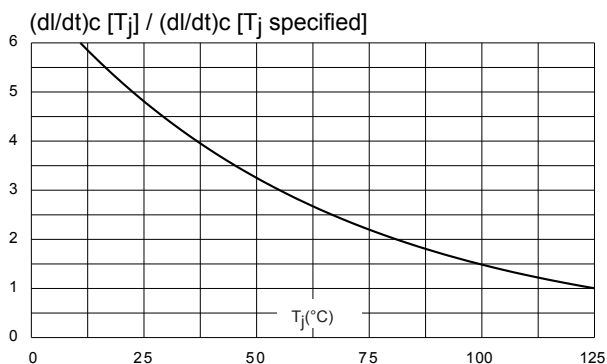
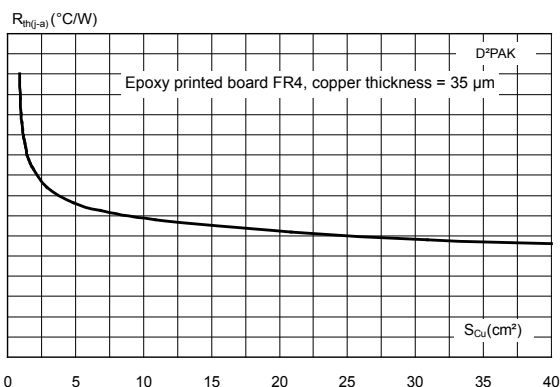
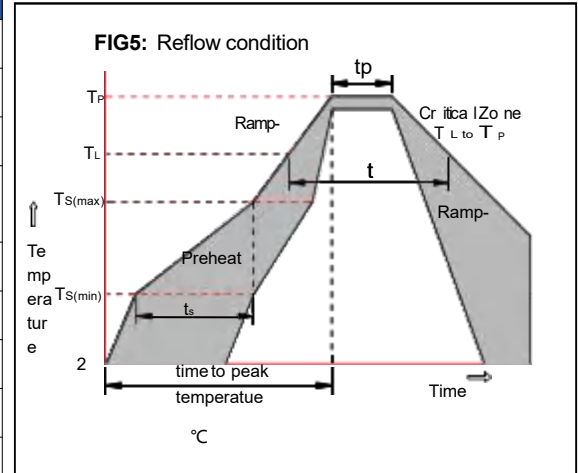


Figure 12. D²PAK thermal resistance junction to ambient versus copper surface under tab



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

