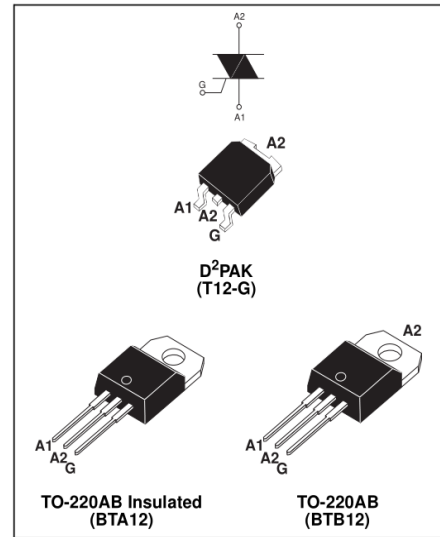


BTB/BTB12(12A TRIACS)

MAIN FEATURES:

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
V_{DRM}/V_{RRM}	600 and 800	V
$I_{GT(Q1)}$	5 to 50	mA



ABSOLUTE RATING

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	D ² PAK/TO-220AB $T_c = 105^\circ\text{C}$	12	A
		TO-220AB Ins. $T_c = 90^\circ\text{C}$		
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 = 16.7 ms	126	
$I^2 t$	$I^2 t$ Value for fusing	tp = 10 ms		$\text{A}^2 \text{s}$
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, tr ≤ 100 ns	F = 120 Hz $T_j = 125^\circ\text{C}$	50	A/μs
V_{DSM}/V_{RSM}	Non repetitive surge peak off-state voltage	tp = 10 ms $T_j = 25^\circ\text{C}$	$V_{DRM}/V_{RRM} + 100$	V
I_{GM}	Peak gate current	tp = 20 μs $T_j = 125^\circ\text{C}$	4	A
$P_{G(AV)}$	Average gate power dissipation	$T_j = 125^\circ\text{C}$	1	W
T_{stj}	Storage junction temperature range		- 40 to + 150	°C
T_j	Operating junction temperature range		- 40 to + 125	

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

SNUBBERLESS™ and LOGIC LEVEL (3 Quadrants)

Symbol	Test Conditions	Quadrant		T12		BTA/BTB12			Unit
				T1235	TW	SW	CW	BW	
I _{GT} (1)	V _D = 12 V R _L = 30 Ω	I - II - III	MAX.	35	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		MAX.	35	10	15	35	50	mA
I _L	I _G = 1.2 I _{GT}	I - III	MAX.	50	10	25	50	70	mA
		II		60	15	30	60	80	
dV/dt (2)	V _D = 67 %V _{DRM} gate open T _j = 125°C		MIN.	500	20	40	500	1000	V/μs
(dl/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			-	1	2.9	-	-	
	Without snubber T _j = 125°C			6.5	-	-	6.5	12	

STANDARD (4 Quadrants)

Symbol	Test Conditions	Quadrant		BTA/BTB12		Unit
				C	B	
I _{GT} (1)	V _D = 12 V R _L = 30 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	50	mA
		II		80	100	
dV/dt (2)	V _D = 67 %V _{DRM} gate open T _j = 125°C		MIN.	200	400	V/μs
(dl/dt) _c (2)	(dl/dt) _c = 5.3 A/ms T _j = 125°C		MIN.	5	10	V/μs

STATIC CHARACTERISTICS

Symbol	Test Conditions		Value	Unit	
V _T (2)	I _{TM} = 17 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.	35	m Ω
I _{DRM} I _{RRM}	V _{DRM} = V _{RRM}	T _j = 25°C	MAX.	5	μA
		T _j = 125°C		1	mA

Typical Characteristics

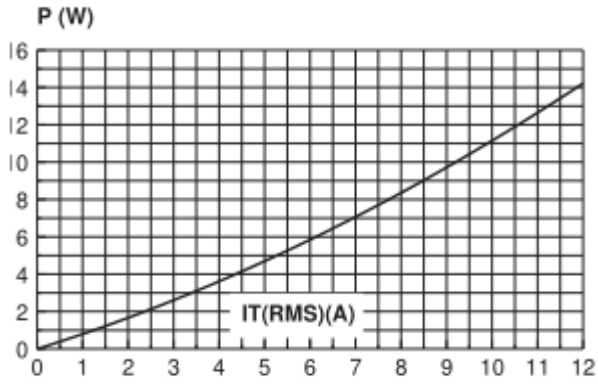


Fig. 2-2: RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 μ m), full cycle.

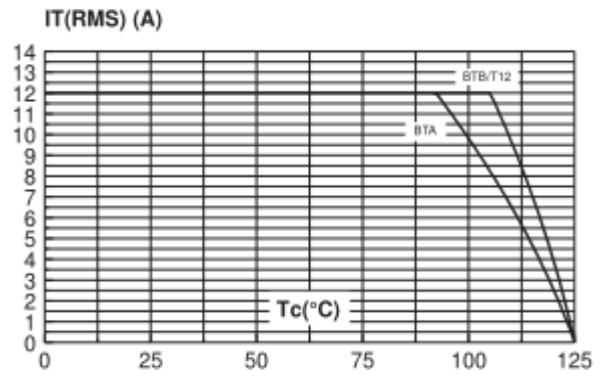


Fig. 3: Relative variation of thermal impedance versus pulse duration.

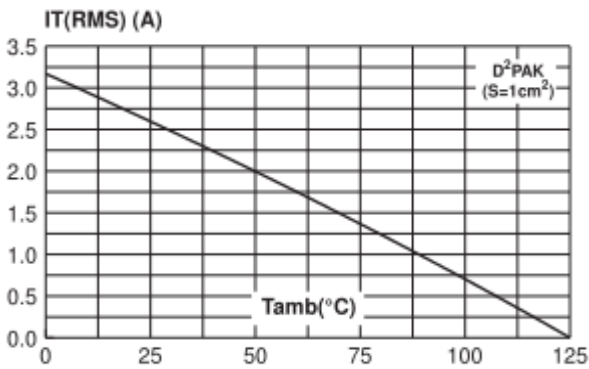


Fig. 4: On-state characteristics (maximum values).

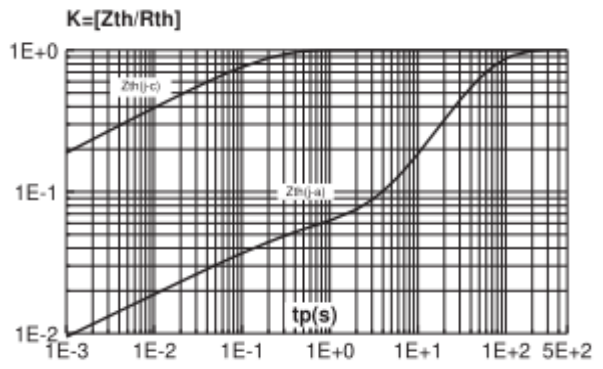
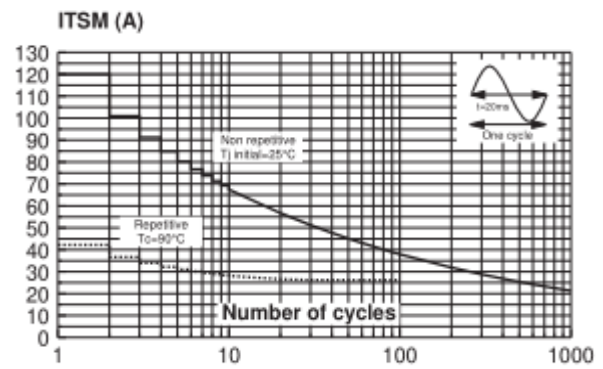
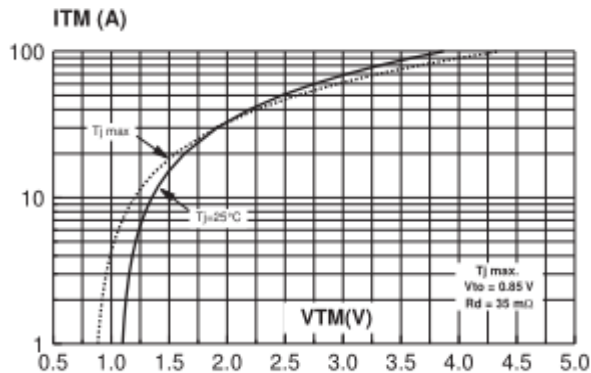


Fig. 5: Surge peak on-state current versus number of cycles.



Typical Characteristics

Fig. 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10\text{ms}$, and corresponding value of I^2t .

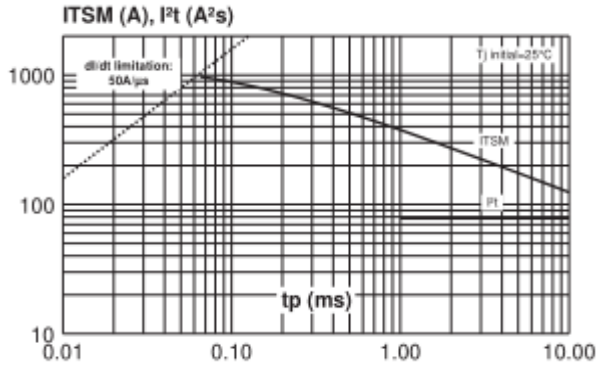


Fig. 8-1: Relative variation of critical rate of decrease of main current versus $(dV/dt)_c$ (typical values) (BW/CW/T1235).

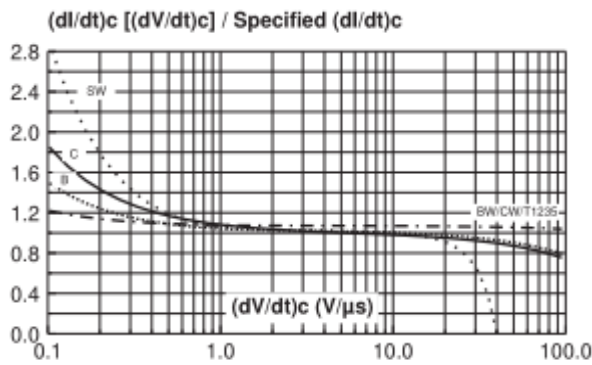


Fig. 9: Relative variation of critical rate of decrease of main current versus junction temperature.

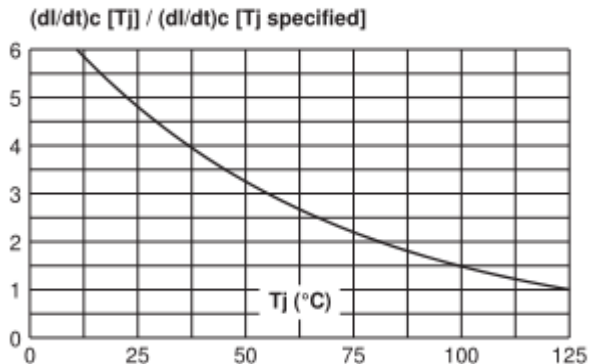


Fig. 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

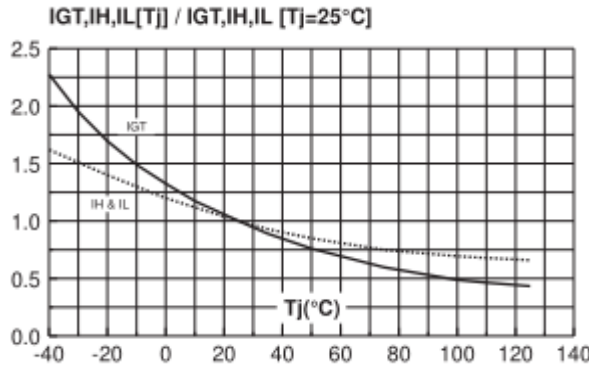


Fig. 8-2: Relative variation of critical rate of decrease of main current versus $(dV/dt)_c$ (typical values) (TW).

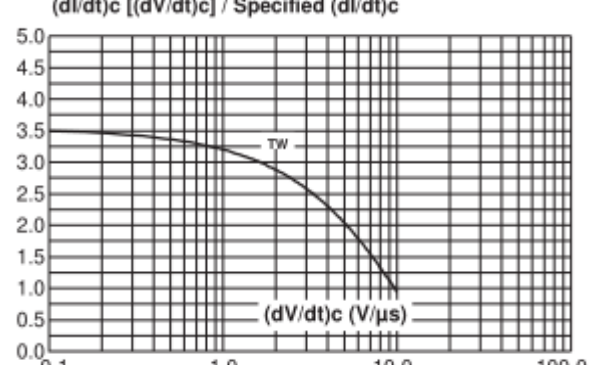


Fig. 10: D²PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 μ m).

