Four quadrant Triacs BTA20 800B

1、Description & Applications

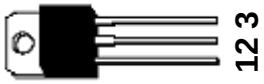
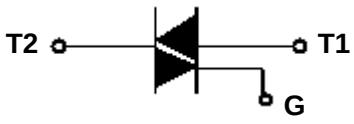
Suitable for general purpose AC power switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, water heaters, induction motor starting circuits...or for phase control operation in high power motor speed controllers, soft start circuits...

- Motor control
- **Heating regulation**
- water heaters

2、Features

- Blocking voltage to 800V
- On-state RMS current to 20A
- Ultra low gate trigger current
- TO-220 package.

3、Pinning information

PIN	Description	Simplified outline	Symbol
1	main terminal 1 (T1)	 TO-220	
2	main terminal 2 (T2)		
3	gate (G)		
tab	main terminal		

4、Quick reference data

SYMBOL	PARAMETER	MAX	UNIT
$V_{DRM}V_{RRM}$	Repetitive peak off-state voltages	800	V
$I_{T(RMS)}$	RMS on-state current	20	A
I_{TSM}	Non-repetitive peak on-state current	180	A

5、Limiting value

Limiting values in accordance with the Maximum System(IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
V_{DRM} V_{RRM}	Repetitive peak off-state voltages		-	-	800	V
$I_{T(RMS)}$	RMS on-state current	Full Cycle Sine Wave 50 to 60 Hz (TC = +90 C)	-	-	20	A
I_{TSM}	Peak Non–repetitive Surge Current	One Full Cycle Sine Wave, 60 Hz, t=16.7ms	-	-	180	A
I^2t	I^2t for fusing	tp = 10 ms	-	-	240	A^2s
dI/dt	Critical rate of rise of on-state current	I_G = 2 x I_{GT} , tr 100 ns F = 120 Hz T_j = 125°C	-	-	50	A/µs
I_{GM}	Peak gate current	tp = 20µs, T_j = 125°C	-	-	2	A
V_{DSM} V_{RSM}	Non repetitive surge peak off-state voltage	tp = 10 ms Tj = 25°C	-	-	700	V
$P_{G(AV)}$	Average gate power	T_j = 125°C	-		0.5	W
T_{stg}	Storage temperature		-40	-	150	°C
T_j	Operating junction temperature		-40	-	125	°C

6、Characteristics

T_J = 25℃ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Static characteristics						
I_{GT}	Gate trigger current	V_D = 12 V; R_L = 33Ω				
		T2+ G+	-	-	50	mA
		T2+ G-	-	-	50	mA
		T2- G-	-	-	50	mA
		T2- G+	-	-	75	mA
V_{GT}	Gate Trigger Voltage (Continuous dc)	V_D = 12 V; R_L = 33Ω				
		T2+ G+	-	0.9	2.0	V
		T2+ G-	-	0.9	2.0	V
		T2- G-	-	1.1	2.0	V
		T2- G+ “A” SUFFIX ONLY	-	1.4	2.5	V
I_H	Holding current	I_T = ±500 mA		25	60	mA
I_L	Latching current	I_G = 1.2 I_{GT}				
		T2 G(++,--,-+)			60	mA
		T2 G(+-)			100	
V_{TM}	On-state voltage	I_{TM} = 25 A tp = 380 µs	-	1.3	2.0	V
V_{to}	Threshold voltage	T_j = 125°C	-	-	0.85	V
R_d	Dynamic resistance	T_j = 125°C	-	-	16	mΩ
V_{GD}	Gate Non–Trigger Voltage	V_D = V_{DRM} R_L = 3.3 k Tj = 125°C	0.2	-	-	mA
Dynamic Characteristics						
dV/dt	Critical Rate of Rise of Voltage	VD = 67 % VDRM gate open Tj = 125°C	500	-	-	V/µs
(dV/dt)c	Critical Rate of Rise of Commutation Voltage	(dI/dt)c = 13.3 A/ms Tj = 125°C	10	-	-	V/µs

7、Thermal characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	*Thermal resistance junction to case*		-	-	1.1	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		-	-	50	°C/W

8、Electrical Characteristics Curve

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

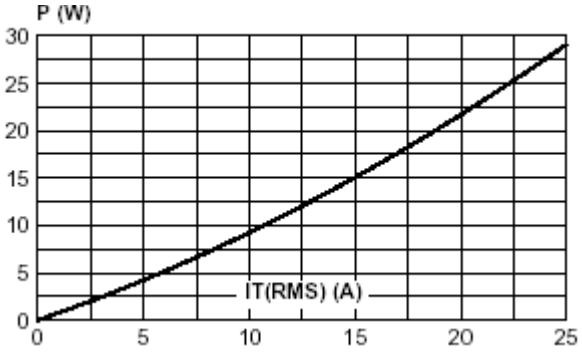


Fig. 2-1: RMS on-state current versus case temperature (full cycle).

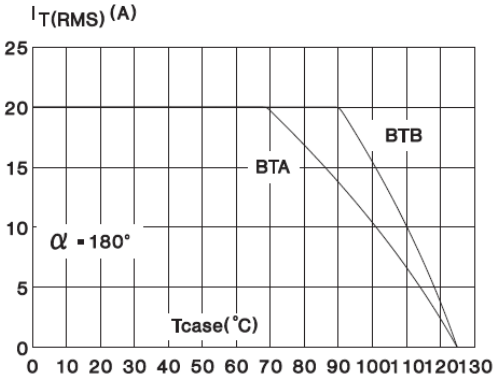


Fig. 2-2: D²PAK RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 μm), full cycle.

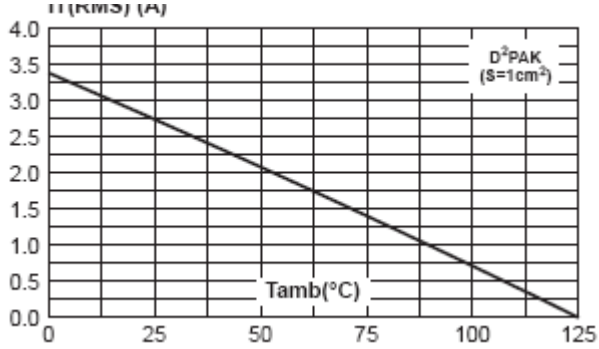


Fig. 3: Relative variation of thermal impedance versus pulse duration.

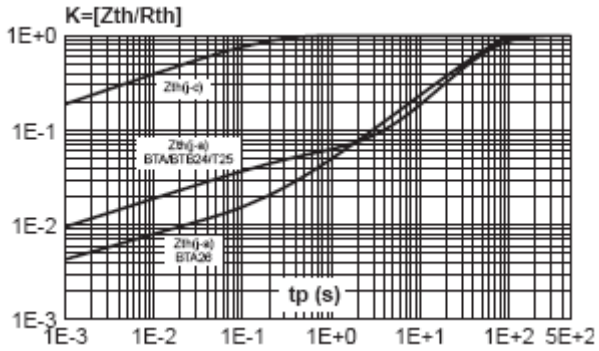


Fig. 4: On-state characteristics (maximum values).

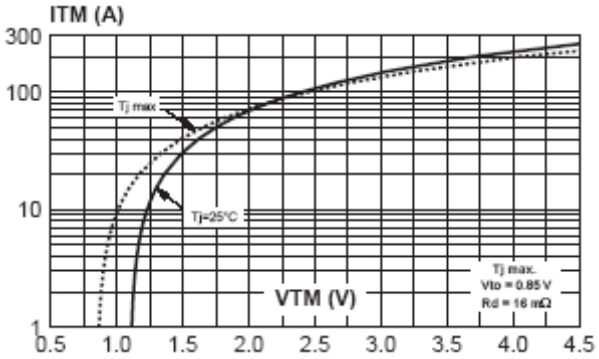


Fig. 5: Surge peak on-state current versus number of cycles.

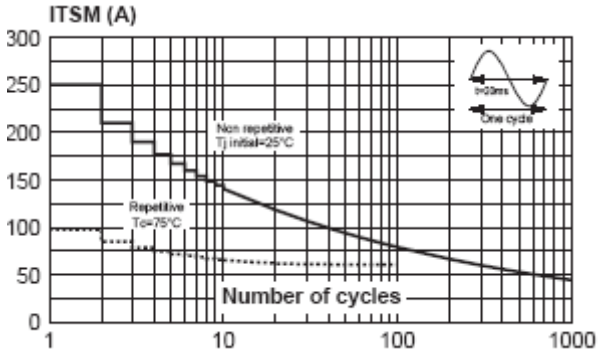


Fig. 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10ms, and corresponding value of I²t.

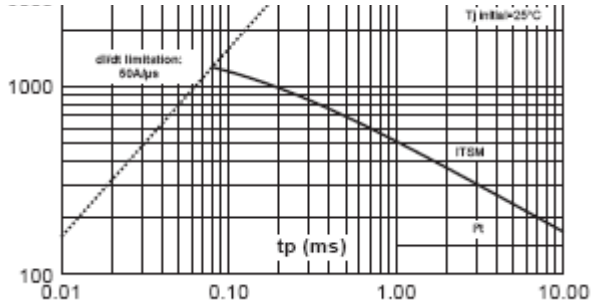


Fig. 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

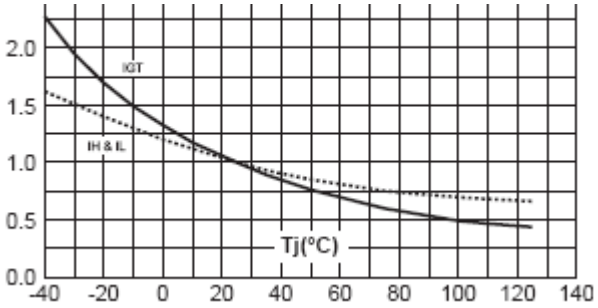


Fig. 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values).

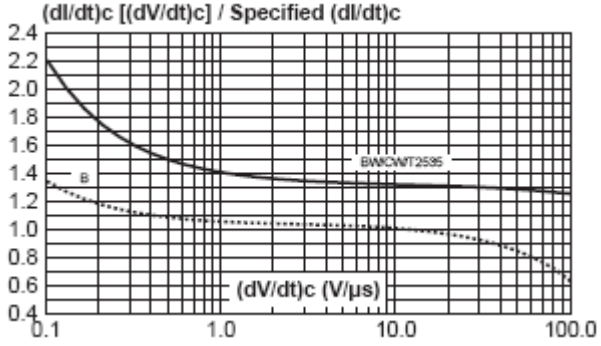


Fig. 9: Relative variation of critical rate of decrease of main current versus junction temperature.

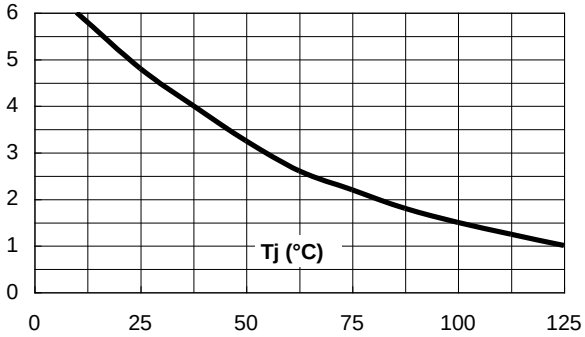
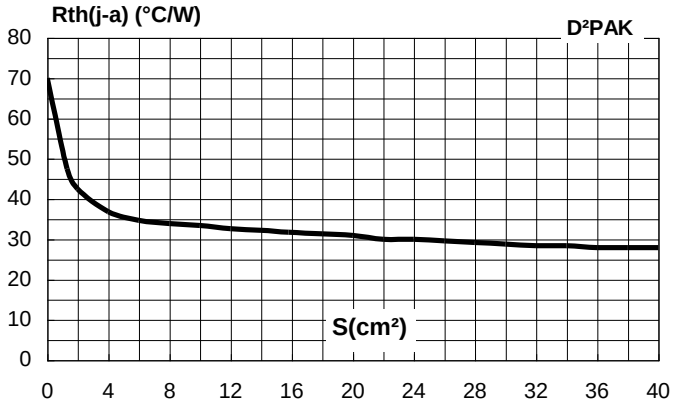
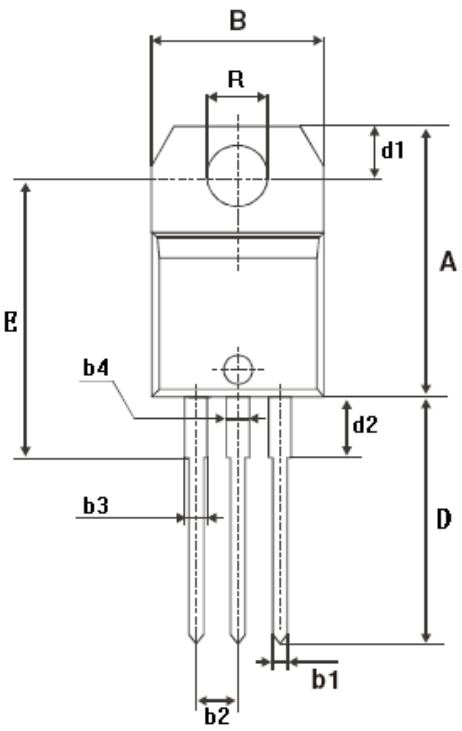
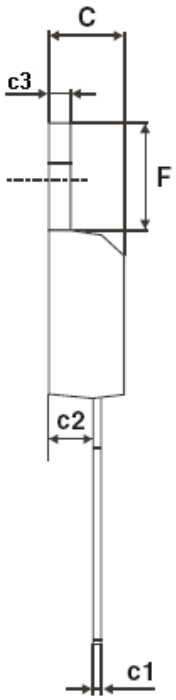


Fig. 10: D²PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35µm).

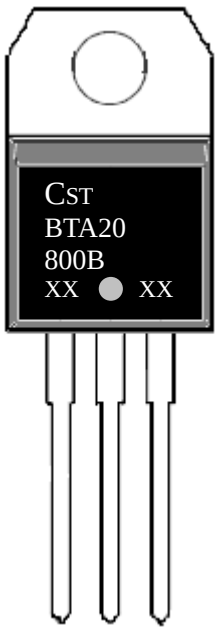


9、Package outline (TO-220I)





Marking:



DIM	Inches			Milimeters		
	Min	Type	Max	Min	Type	Max
A	0.591	-	0.646	15.00	-	16.40
B	0.386	-	0.409	9.80	-	10.40
C	0.160	-	0.190	4.07	-	4.82
D	0.500	-	0.562	12.70	-	14.27
E	-	0.640	-	-	16.25	-
F	0.248	-	0.271	6.29	-	6.89
R	0.140	-	0.156	3.56	-	3.96
b1	0.030	-	0.037	0.75	-	0.95
b2	0.095	-	0.105	2.42	-	2.66
b3	0.046	-	0.054	1.17	-	1.37
b4	0.046	-	0.054	1.17	-	1.37
c1	0.017	-	0.023	0.42	-	0.58
c2	0.091	-	0.115	2.32	-	2.92
c3	0.045	-	0.055	1.15	-	1.39
d1	0.100	-	0.120	2.54	-	3.04
d2	0.125	-	0.155	3.18	-	3.93