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Collective Semiconductor Technology Zhongshan Co., Ltd.
SEMICONDUCTOR TECHNICAL DATA (C02J160403)

Three quadrant Triacs   **BTA20 800CW**

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）		
2	main terminal 2（T2）	TO-220	T2 —◦ ◦— T1 G
3	gate（G）		
tab	main terminal		
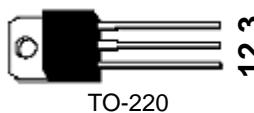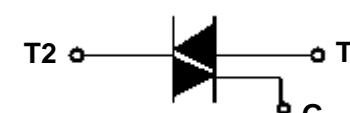
4、Quick reference data

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	$I_G = 2 \times I_{GT}$, 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

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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; $R_L = 33\Omega$				
		T2+ G+	-	-	35	mA
		T2+ G-	-	-	35	mA
		T2- G-	-	-	35	mA
		T2- G+	-	-		
V_{GT}	Gate Trigger Voltage (Continuous dc)	$V_D = 12$ V; $R_L = 33\Omega$				
		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	-			
I_H	Holding current	$I_T = \pm500$ mA		20	50	mA
I_L	Latching current	$I_G = 1.2\ I_{GT}$ T2 G(++,--,-+) T2 G(+-)			50	mA
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 $T_j = 125°C$	0.2	-	-	mA
Dynamic Characteristics						
dV/dt	Critical Rate of Rise of Voltage	VD = 67 % VDRM gate open $T_j = 125°C$	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

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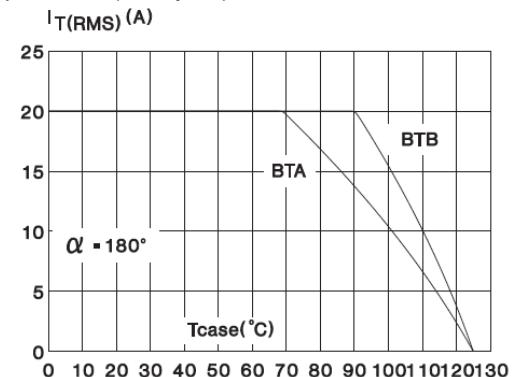
Fig. 3: Relative variation of thermal impedance versus pulse duration.

Fig. 4: On-state characteristics (maximum values).
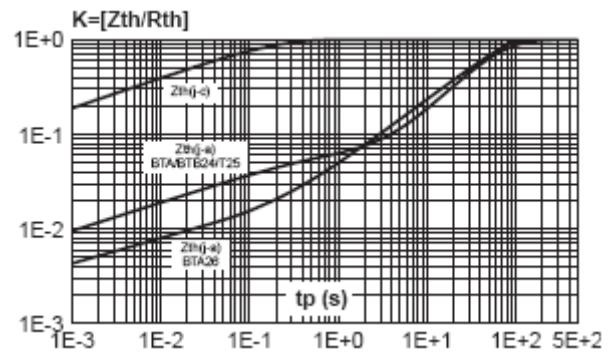
**Fig. 5:** Surge peak on-state current versus number of cycles.

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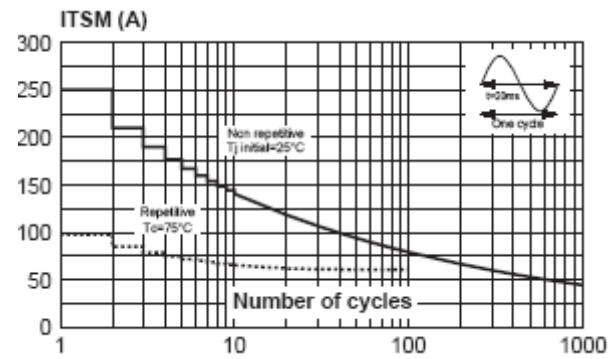
Fig. 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10ms, and corresponding value of I²t.
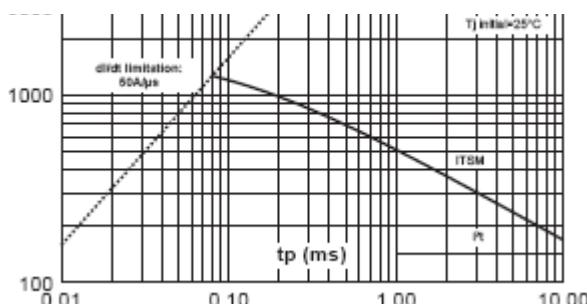

Fig. 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).
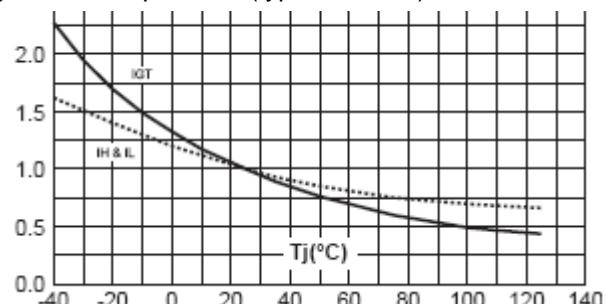

Fig. 8: Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values).
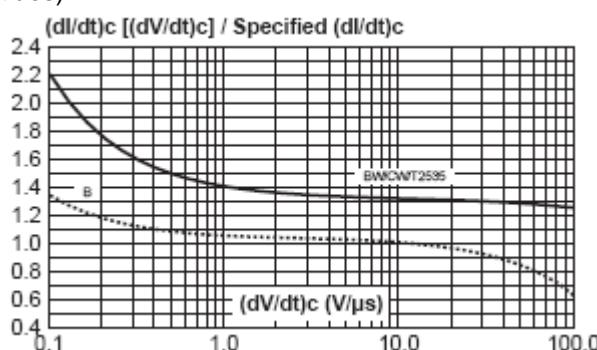

Fig. 9: Relative variation of critical rate of decrease of main current versus junction temperature.
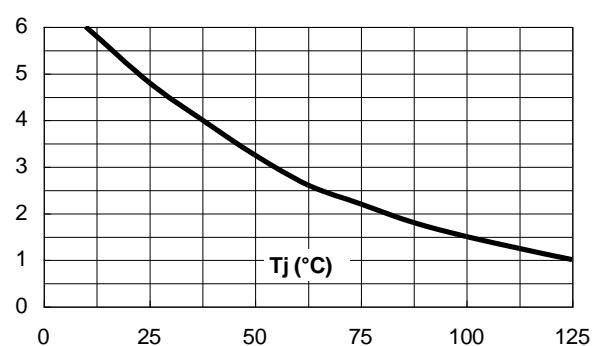
Fig. 10: D²PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35µm).
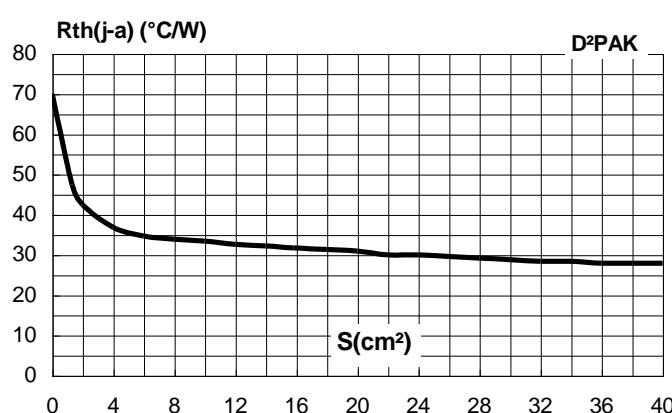
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9、Package outline (TO-220I)

Marking:

CsT
BTA20
800CW
XX ⬤ XX
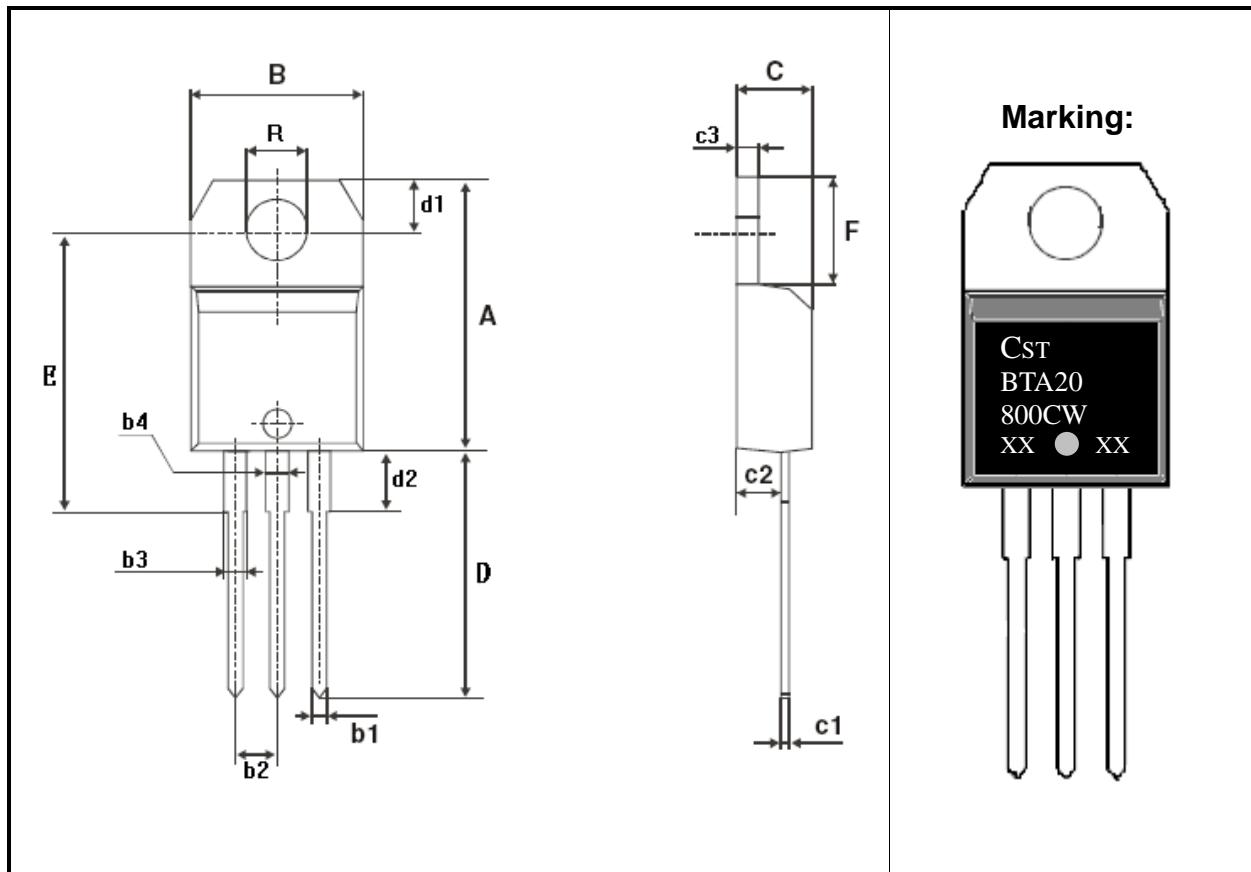
DIM	Inches			Milimeters		
	Min	Type	Max	Min	Type	Max
A	0.591	-	0.646	15.00	-	16.40
B	0.386	-	0.409	9.80	-	10.40
C	0.160	-	0.190	4.07	-	4.82
D	0.500	-	0.562	12.70	-	14.27
E	-	0.640	-	-	16.25	-
F	0.248	-	0.271	6.29	-	6.89
R	0.140	-	0.156	3.56	-	3.96
b1	0.030	-	0.037	0.75	-	0.95
b2	0.095	-	0.105	2.42	-	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

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