BT138

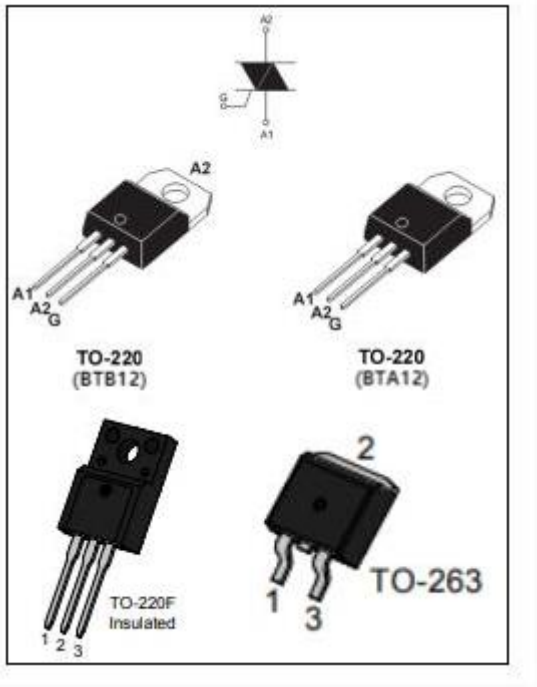
Bidirectional Thyristor

●Product features and main applications:

NPNPN five-layer structure of silicon bidirectional devices; with independent intellectual property rights of single-sided digging technology, table glass passivation process; multi-layer metallized electrodes on the back; with high blocking voltage and high temperature stability.

Mainly used in:

vacuum cleaners, power tools and other motor speed controllers; solid state relays; heating controllers (temperature regulation); other phase control circuits.



●Characteristics

Table 1. Absolute maximum ratings (Tj = 25 ° C unless otherwise stated)

Symbol	Parameter name			value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	BTA BTB	Tc=80℃ Tc=90℃	12	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, Tj initial = 25 ° C)	F=50HZ tp=20ms		120	A
I^2t	I2t value for fusing	tp=10ms		72	A^2S
di/dt	Critical rate of rise of on-state current IG = 2 x IGT, tr ≤ 100 ns	Tj=125℃		50	A/us

V_{DRM}/V_{RRM}	Off state repetitive peak voltage Reverse repetitive peak voltage	Tj=25℃		600/800/1000	V
I_{GM}	Peak gate current	tp=20us	Tj=150℃	4	A
$P_{G(AV)}$	Average gate power dissipation		Tj=150℃	1	W
Tstg Tj	Storage junction temperature range Operating junction temperature range			−40to+150 −40to+125	℃

●Table 2. Electrical characteristics (Tj = 25 ° C, unless otherwise specified) -- 3 quadrants

Symbol	Name and test conditions	Quadrant	Range	value	Unit
I_{GT}	V_D=12V R_L=100Ω	I II III	MAX	≦50	mA
V_{GT}			MAX	1.5	V
V_{GD}	VD = VDRM, RL = 3.3 kΩ, Tj = 125 ° C		MIN	0.2	V
I_H	IT = 100 mA		MAX	60	mA
I_L	IG = 1.2 x IGT		MAX	60	mA
				100	
dv/dt	VD = 67% VDRM, gate open, Tj = 125 ° C		MIN	500	V/us
(dv/dt)c	Critical rise rate of commutation voltage TJ = 150 ℃		MIN	8	V/us

●Table 3. Electrical characteristics (Tj = 25 ° C, unless otherwise specified) - Standard Triac (4 quadrants)

Symbol	Name and test conditions	Quadrant	Range	value		Unit
I_{GT}	V_D=12V R_L=100Ω	I II III IV	MAX	I II III	IV	mA
				≦50	≦120	
V_{GT}			MAX	1.5		V
V_{GD}	VD = VDRM, RL = 3.3 kΩ, Tj = 125 ° C		MIN	0.2		V
I_H	I_T=500mA		MAX	60		mA
I_L	IG = 1.2 x IGT		MAX	60		mA
				100		
dv/dt	VD = 67% VDRM, gate open, Tj = 125 ° C		MIN	500		V/us
(dv/dt)c	Critical rise rate of commutation voltage TJ = 150 ℃		MIN	10		V/us

●Static parameters

Symbol	Parameter name			value	Unit
V_{TM}	I_{TM}= 24A	Tj=25℃	MAX	1.50	V
V_{T0}	threshold on-state voltage	Tj=150℃	MAX	0.86	V
Rd	Dynamic resistance	Tj=150℃	MAX	36.6	mΩ
I_{DRM} I_{RRM}	VDRM = VRRM	Tj=25℃ Tj=150℃	MAX	5	uA
				1	mA
$R_{th(j-c)}$	Junction to ambient	BTA		2.05	℃/W
		BTB		1.25	

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●BT138-800 characteristic curve

FIG.1 Maximum power dissipation versus RMS on-state current

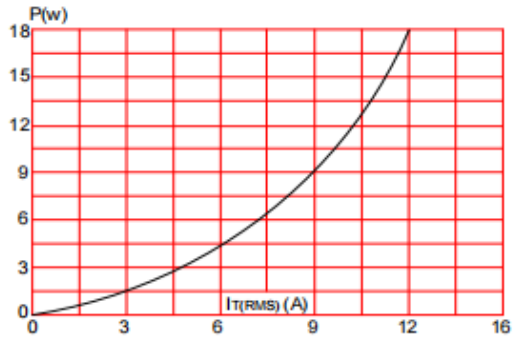


FIG.2: RMS on-state current versus case temperature

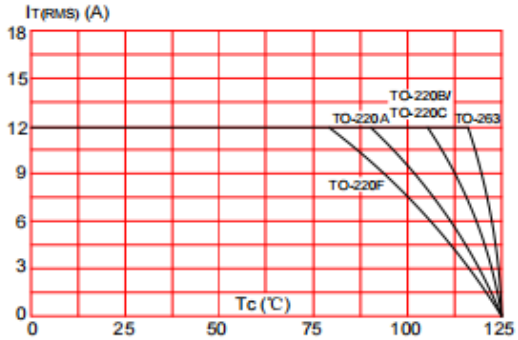


FIG.3: Surge peak on-state current versus number of cycles

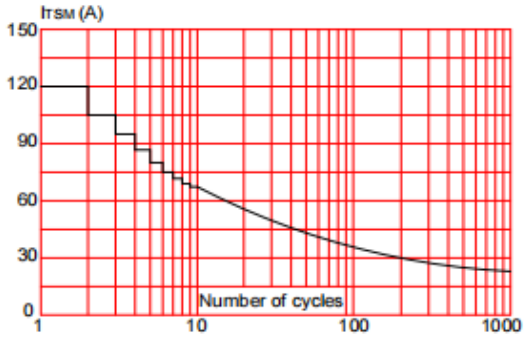


FIG.4: On-state characteristics (maximum values)

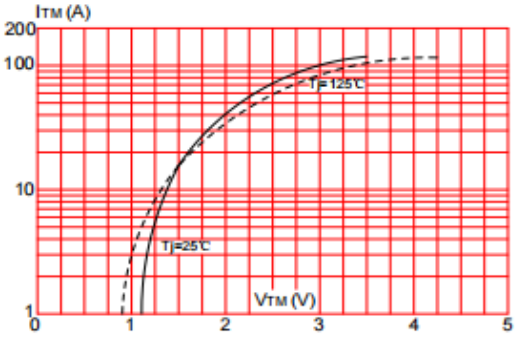


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<10ms, and corresponging value of I^2t (dI/dt < 50A/μs)

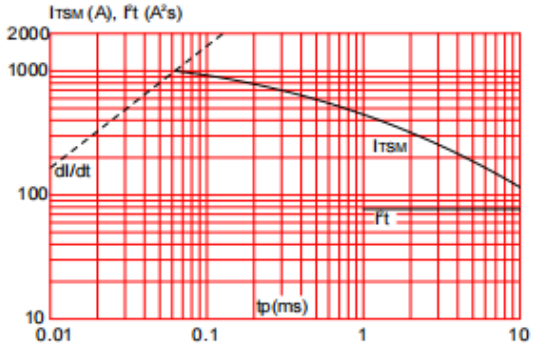
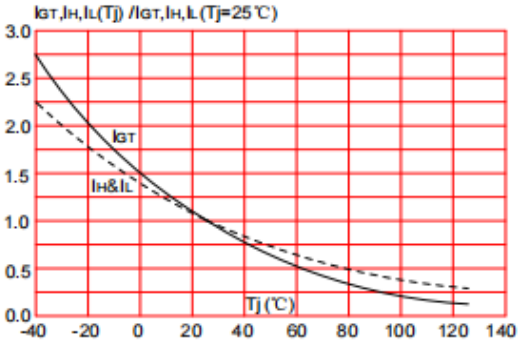


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature



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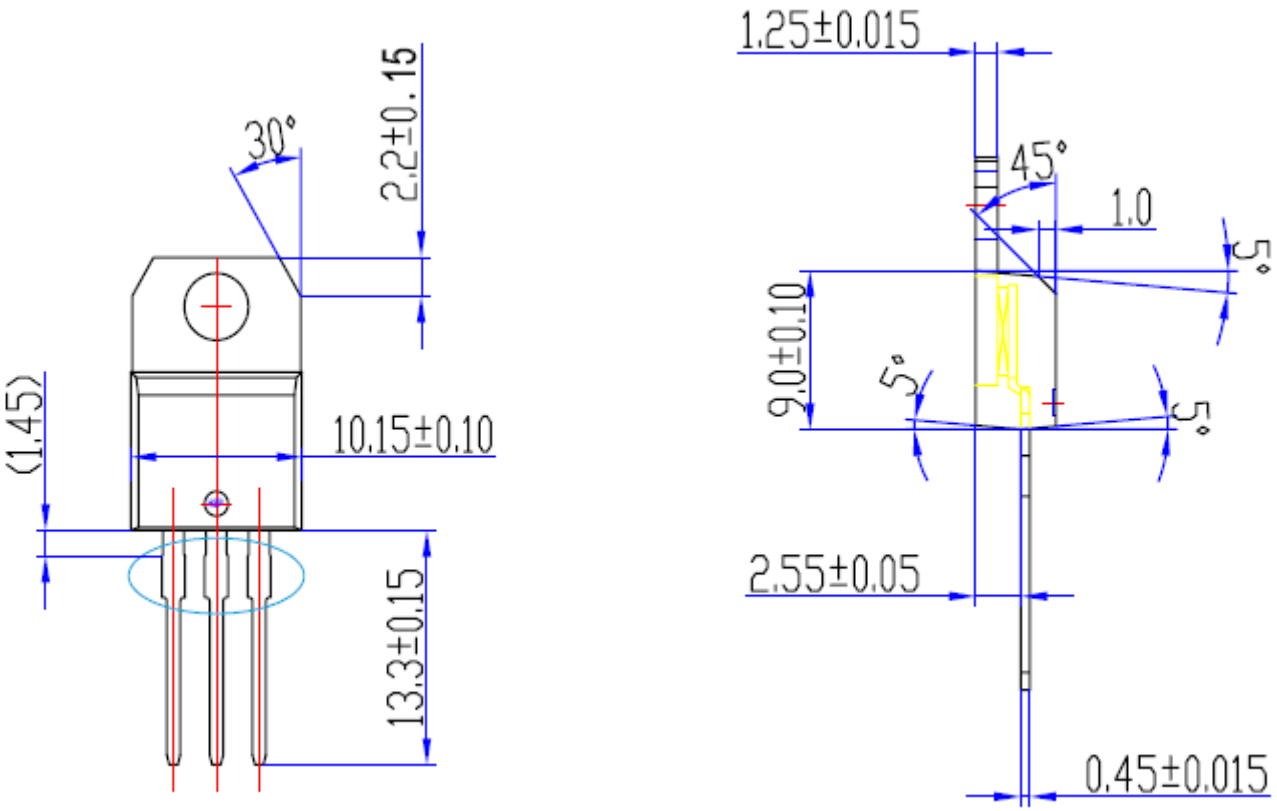
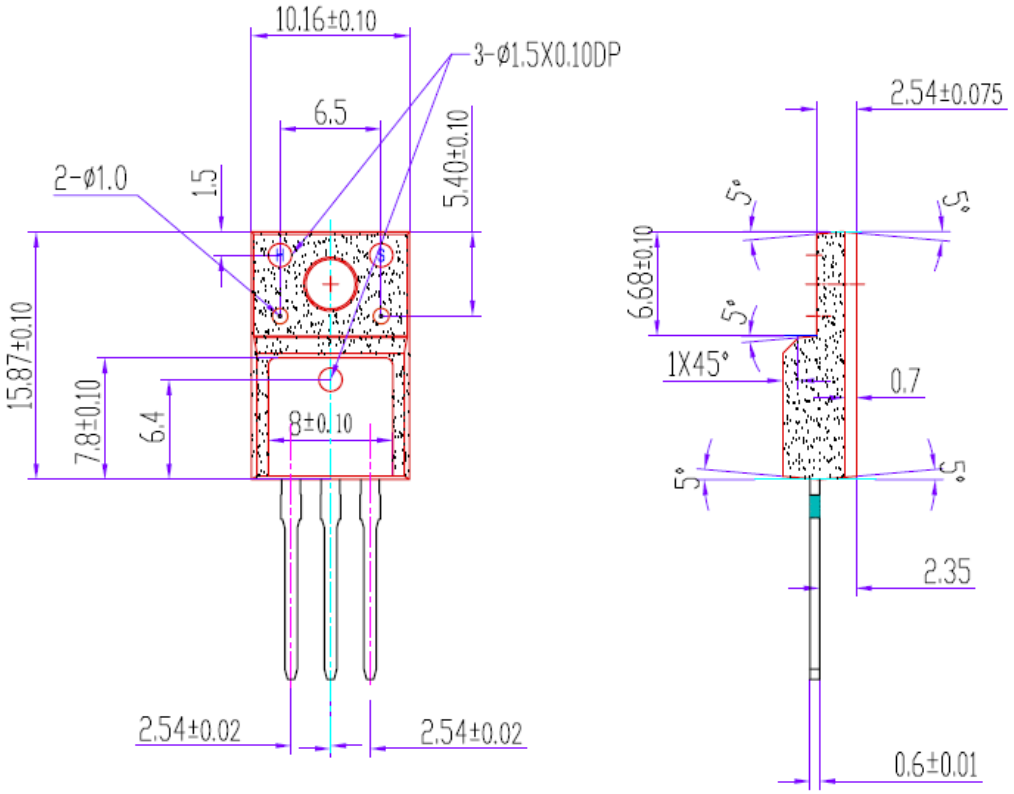
● TO-220 Dimensional drawing:

Unit：mm（±0.1）



●TO-220F Dimensional drawing：

Unit：mm（±0.1）



●TO-263 Dimensional drawing:

Unit：mm（±0.1）