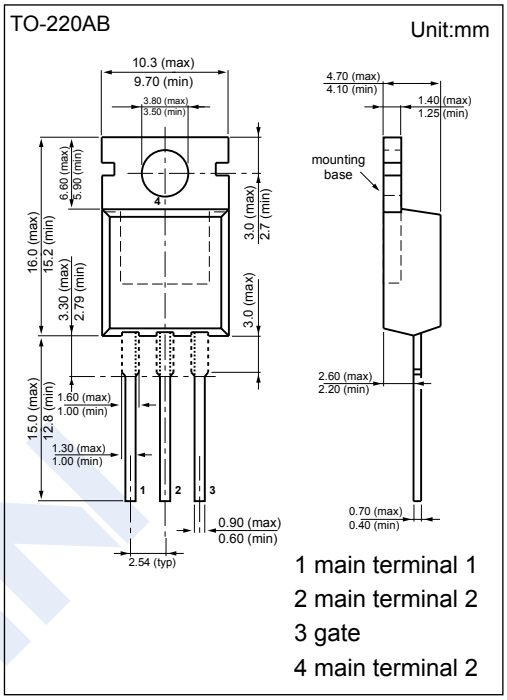
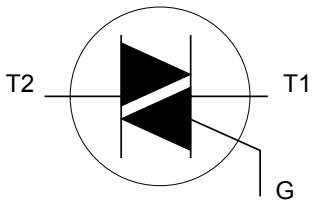
TRIACS Thyristor
BT138 series (KT138 series)



■ Features

- Repetitive peak off-state voltages :500V/600V/800V
- RMS on-state current :12A
- Non-repetitive peak on-state current :95A



■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	BT138 -500/F/G	BT138 -600/F/G	BT138 -800/F/G	Unit
Repetitive Peak Off-state Voltages		V_{DRM}	500	600	800	V
RMS on-state Current $T_{amb} \leqslant 99$ °C		$I_{T(RMS)}$	12			A
Non-Repetitive Peak on-state Current	t=20ms	I_{TSM}	95			A
	t=16.7ms		105			A
Circuit Fusing Considerations t = 10ms		I^2t	45			A^2s
Peak Gate Current		I_{GM}	2			A
Peak Gate Voltage		V_{GM}	5			V
Peak Gate Power		P_{GM}	5			W
Average Gate Power @ over any 20 ms period		$P_{G(AV)}$	0.5			W
Thermal Resistance Junction to Ambient		R_{thJA}	60			K/W
Thermal Resistance Junction to Mounting Base	full cycle	R_{thJMB}	1.5			K/W
	half cycle		2			K/W
junction Temperature		T_J	125			℃
Storage Temperature range		T_{stg}	-40 to 150			℃

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■ Electrical Characteristics (Ta = 25℃, unless otherwise noted.)

Parameter	Symbol	Test Conditions			Min	Typ.	Max	Unit
Repetitive Peak off-state Voltages	V_{DRM}	I_D=I_R=50uA	BT138-500,BT138-500F,BT138-500G		500			V
			BT138-600,BT138-600F,BT138-600G		600			
			BT138-800,BT138-800F,BT138-800G		800			
Off-state Leakage Current	I_D	V_D = $V_{DRM(max)}$, T_J=125℃				0.1	0.5	mA
On-state Voltage	V_{TM}	I_T=15A				1.4	1.65	V
Gate Trigger Voltage	V_{GT}	V_D=12V, I_T=0.1A				0.7	1.5	
		V_D=400V, I_T=0.1A, T_J = 125℃			0.25	0.4		
Gate Trigger Current	I_{GT}	V_D=12V, I_T=0.1A	BT138-500/600/800	T_2+ G+		5	35	mA
			BT138-500F/600F/800F				25	
			BT138-500G/600G/800G				50	
			BT138-500/600/800	T_2+ G-		8	35	
			BT138-500F/600F/800F				25	
			BT138-500G/600G/800G				50	
			BT138-500/600/800	T_2- G-		10	35	
			BT138-500F/600F/800F				25	
			BT138-500G/600G/800G				50	
			BT138-500/600/800	T_2- G+		22	70	
			BT138-500F/600F/800F				70	
			BT138-500G/600G/800G				100	
Latching Current	I_L	V_D=12V, I_{GT}=0.1A	BT138-500/600/800	T_2+ G+		7	40	mA
			BT138-500F/600F/800F				40	
			BT138-500G/600G/800G				60	
			BT138-500/600/800	T_2+ G-		20	60	
			BT138-500F/600F/800F				60	
			BT138-500G/600G/800G				90	
			BT138-500/600/800	T_2- G-		8	40	
			BT138-500F/600F/800F				40	
			BT138-500G/600G/800G				60	
			BT138-500/600/800	T_2- G+		10	60	
			BT138-500F/600F/800F				60	
			BT138-500G/600G/800G				90	
Holding Current	I_H	V_D=12V ,I_{GT}=0.1A	BT138-500/600/800			6	30	
			BT138-500F/600F/800F				30	
			BT138-500G/600G/800G				60	
Repetitive rate of rise of on-state current after triggering	dI_T/dt	I_{TM} = 20 A , I_G = 0.2 A, dI_G/dt = 0.2 A/us		T2+ G+			50	A/us
				T2+ G-			50	
				T2- G-			50	
				T2- G+			10	

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Critical Rate of rise of off-state Voltage	dV_D/dt	V_{DM}=67% V_{DRM}(max); T_j=125℃ exponential waveform;	BT138-500/600/800	100	250	V/us
			BT138-500F/600F/800F	50		
			BT138-500G/600G/800G	200		
Critical rate of change of commutating voltage	dV_{com}/dt	V_{DM} = 400V , T_J= 95 °C $I_{T(RMS)}$ = 12 A , dI_{com}/dt = 5.4 A/us; gate open circuit			20	V/us
Gate Controlled turn-on time	tgt	I_{TM}=16A; V_D=V_{DRM}(max),I_G=0.1A; dI_G/dt=5A/us			2	us

■ Typical Characterisitics

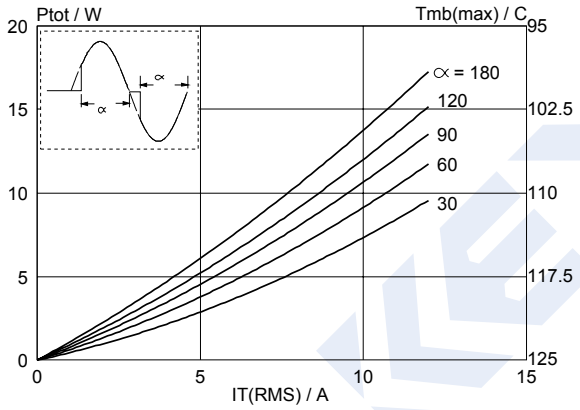

Fig.1. Maximum on-state dissipation, P_{tot}, versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

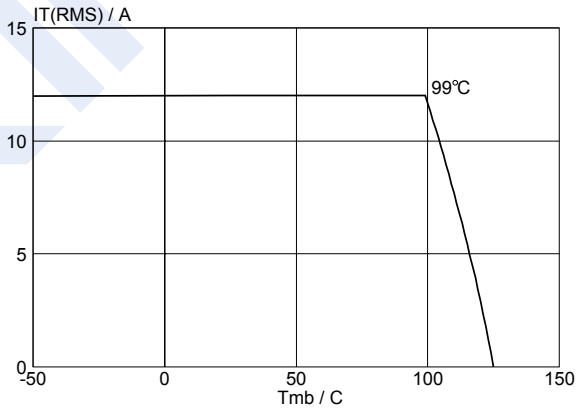

Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb}.

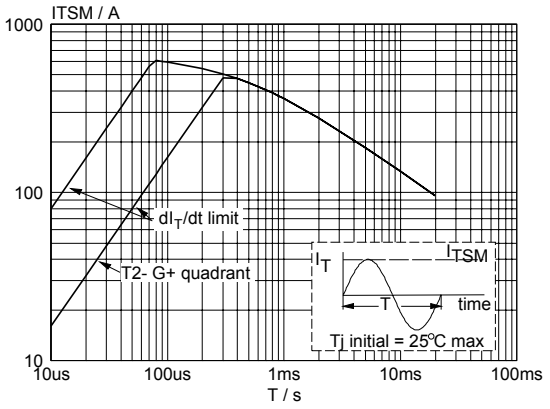

Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width t_p, for sinusoidal currents, $t_p \leq 20ms$.

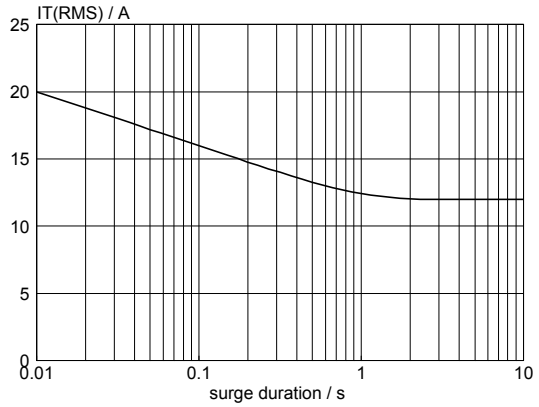

Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{mb} \leq 99℃$.

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■ Typical Characterisitics

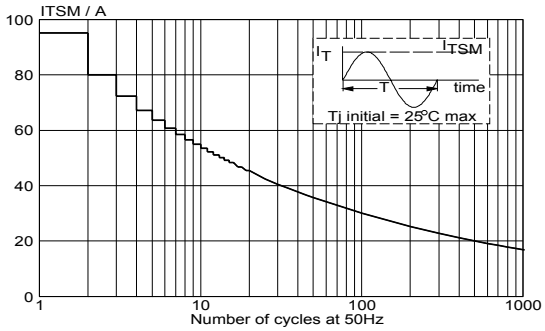

Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

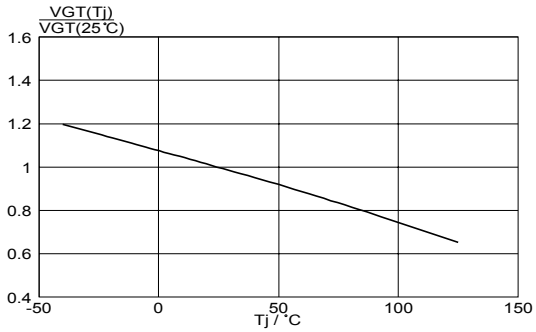

Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/ V_{GT}(25°C)$, versus junction temperature T_j.

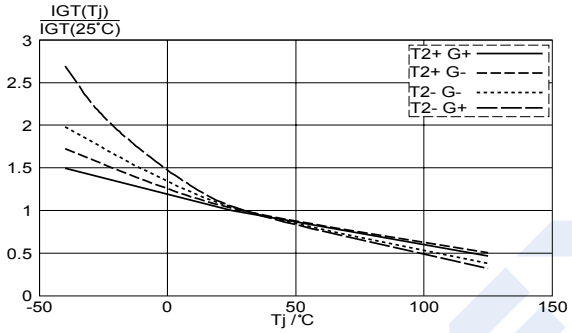

Fig.7. Normalised gate trigger current $I_{GT}(T_j)/ I_{GT}(25°C)$, versus junction temperature T_j.

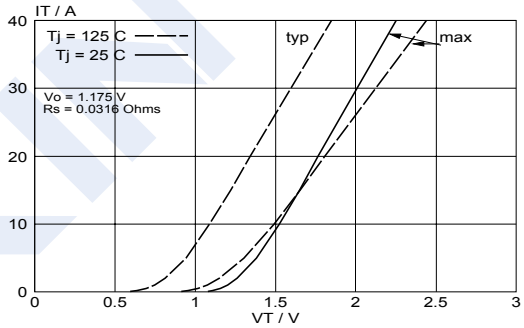

Fig.10. Typical and maximum on-state characteristic.

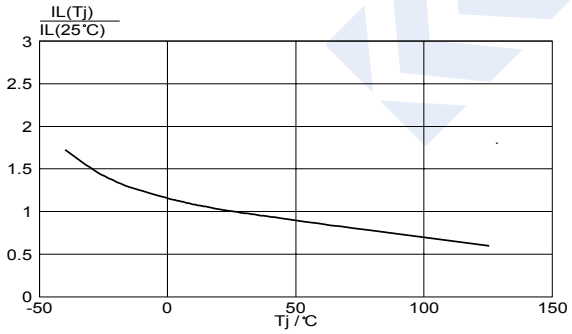

Fig.8. Normalised latching current $I_L(T_j)/ I_L(25°C)$, versus junction temperature T_j.

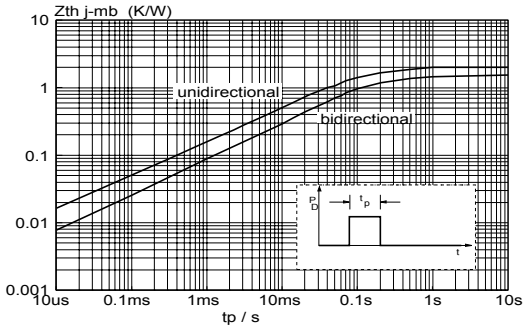

Fig.11. Transient thermal impedance $Z_{th\ j\text{-}mb}$, versus pulse width t_p.

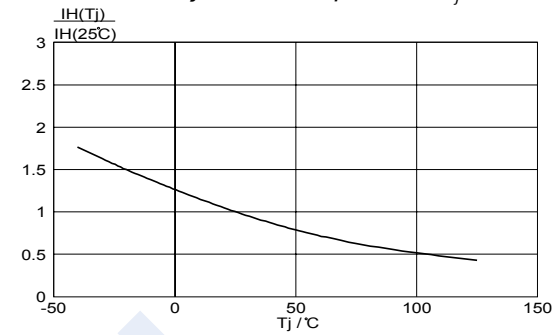

Fig.9. Normalised holding current $I_H(T_j)/ I_H(25°C)$, versus junction temperature T_j.

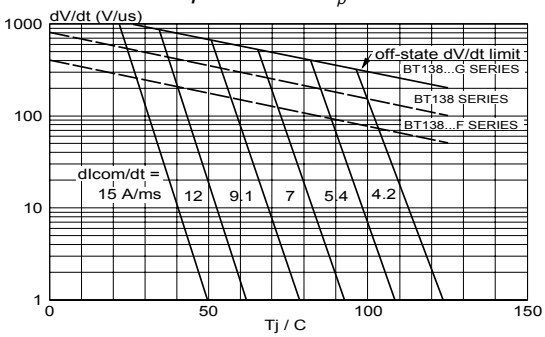

Fig.12. Typical commutation dV/dt versus junction temperature, parameter commutation dI_T/dt. The triac should commutate when the dV/dt is below the value on the appropriate curve for pre-commutation dI_T/dt.