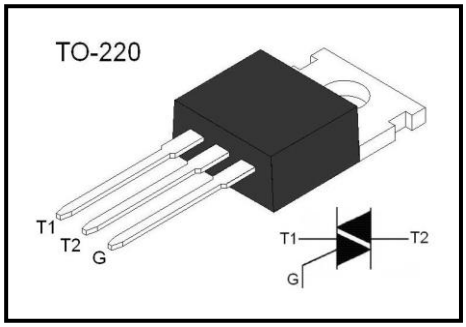
BT138 TO-220 Plastic-Encapsulate Triacs

Applications

- General purpose switching and phase control
- 230V lamp dimmers



Features

- Very sensitive gate
- Gate triggering in four quadrants
- Direct interfacing to logic level Ics
- Directinterfacingtolowpowergatedrive circuits

Absolute Maximum Ratings

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

Parameter	Symbol	Conditions		Ratings	Unit
Repetitive peak off-state voltages	V_{DRM},V_{RRM}			600 800	V
On-State RMS Current	$I_{T(RMS)}$	full sine wave; Tmb ≤ 99 °C		12	A
Non-repetitive peak on-state current	I_{TSM}	full sine wave; T_j = 25 ℃ prior to surge	t = 20 ms	95	A
			t=16.7ms	105	
I^2t for fusing	I^2t	t = 10 ms		45	A^2s
Repetitive rate of rise of on-state current after triggering	dI/dt	I_{TM} = 20A; I_G = 0.2A; dI_G/dt = 0.2A/μs	T2+ G+	50	A/μs
			T2+ G-	50	
			T2- G-	50	
			T2- G+	10	
Peak gate current	I_{GM}			2	A
Peak Gate Voltage	V_{GM}			5	V
Peak gate power	P_{GM}			5	W
Average gate power	$P_{G(AV)}$	over any 20 ms period		0.5	W
Operating junction temperature	T_j			-40 ~ 125	℃
Storage Temperature	T_{stg}			-40 ~ 150	℃

Thermal Resistances

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Thermal resistance junction to mounting base	Rth j-mb	full cycle half cycle	-		1.5 2.0	K/W
Thermal resistance junction to ambient	Rth j-a	pcb mounted; minimum footprint pcb mounted;	-	60		K/W

Static Characteristics T_j = 25 °C unless otherwise stated

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Gate trigger current	I_{GT}	V_D = 12 V,I_T = 0.1 A	T2+ G+	-		10	mA
			T2+ G-	-		10	
			T2- G-	-		10	
			T2- G+	-		25	
Latching current	I_L	V_D = 12 V,I_T = 0.1 A	T2+ G+	-		30	mA
			T2+ G-	-		40	
			T2- G-	-		30	
			T2- G+	-		40	
Holding current	I_H	V_D = 12 V, I_{GT} = 0.1 A				30	mA
On-state voltage	V_T	I_T = 15A				1.65	V
Gate trigger voltage	V_{GT}	V_D = 12 V; I_T = 0.1 A				1.5	V
		V_D = 400 V; I_T = 0.1 A;T_j = 125 °C		0.25			
Off-state leakage current	I_D	V_D = $V_{DRM(max)}$; T_j = 125 °C			0.1	0.5	mA

Dynamic Characteristics T_j = 25 °C unless otherwise stated

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Critical rate of rise ofoff-state voltage	dV_D/dt	V_{DM} = 67% V_{DRM}(max); Tj = 125 ˚C; exponential waveform; gate open circuit		150		V/μs
Gate controlled turn-on time	t_{gt}	I_{TM} = 16 A; V_D = $V_{DRM(max)}$; I_G = 0.1 A; dI_G/dt = 5 A/μs		2		μs

Typical Characteristics

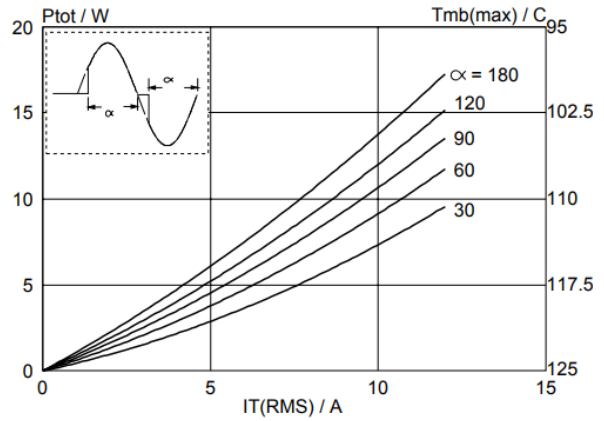


Fig.1. Maximum on-state dissipation,P_{tot},versus rms on-state current,$I_{T(RMS)}$,where α=conduction angle.

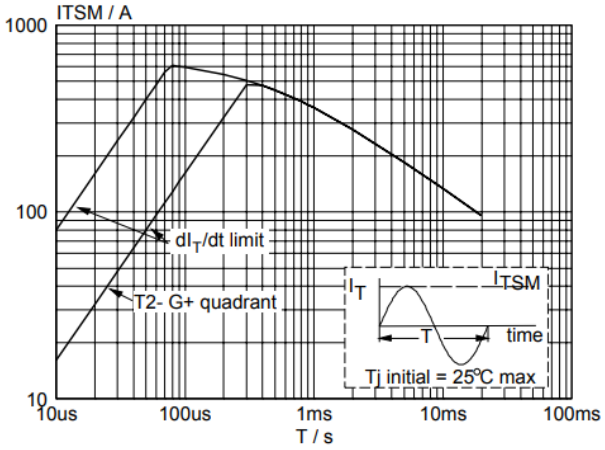


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width tp, for sinusoidal currents, tp ≤ 20ms.

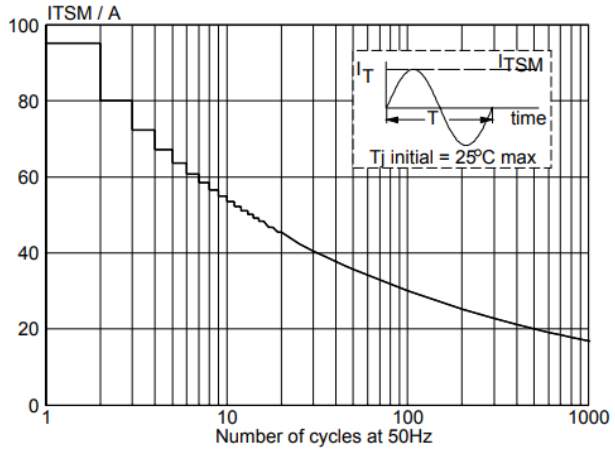


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

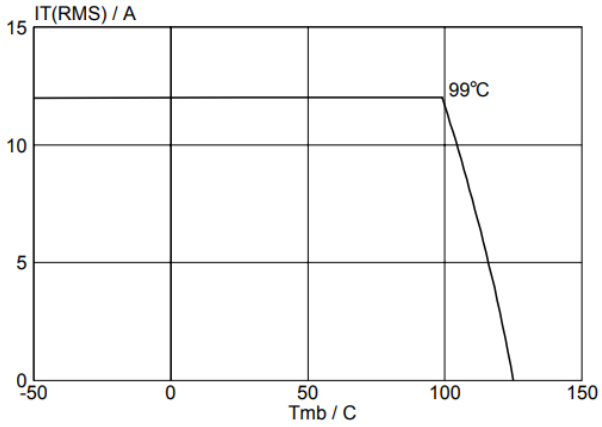


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus lead temperature Tlead.

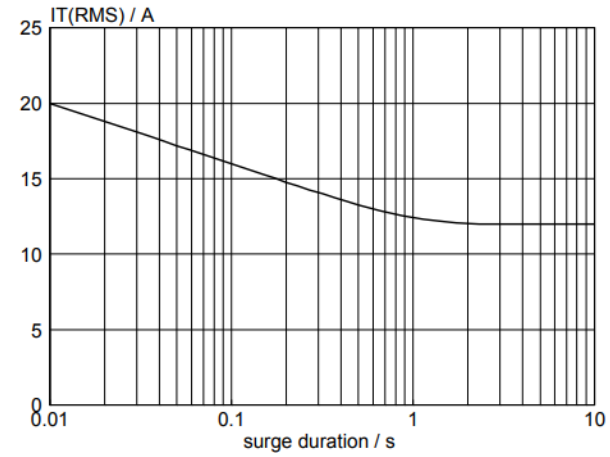


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; Tmb ≤ 99˚C.

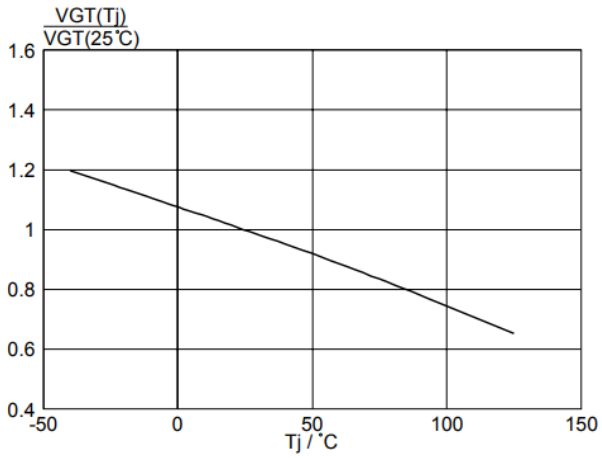


Fig.6. Normalised gate trigger voltage V_{GT}(Tj)/ V_{GT}(25°C), versus junction temperature Tj.

Typical Characteristics

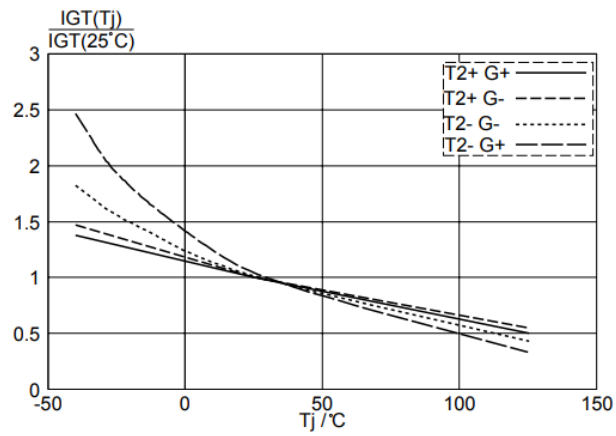


Fig.7. Normalised gate trigger current $I_{GT}(Tj)$ / $I_{GT}(25°C)$,Versus junction temperature Tj.

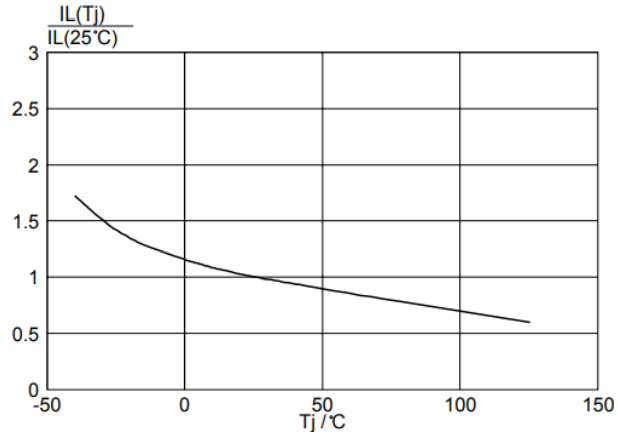


Fig.8. Normalised latching current $I_L(Tj)$ / $I_L(25°C)$, versus junction temperature Tj.

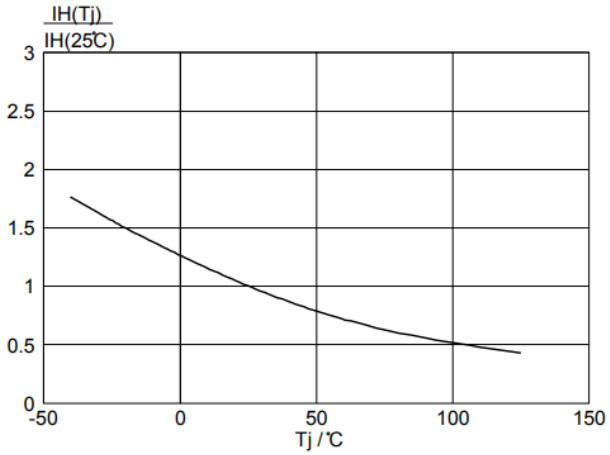


Fig.9. Normalised holding current $I_H(Tj)$ / $I_H(25°C)$, versus junction temperature Tj.

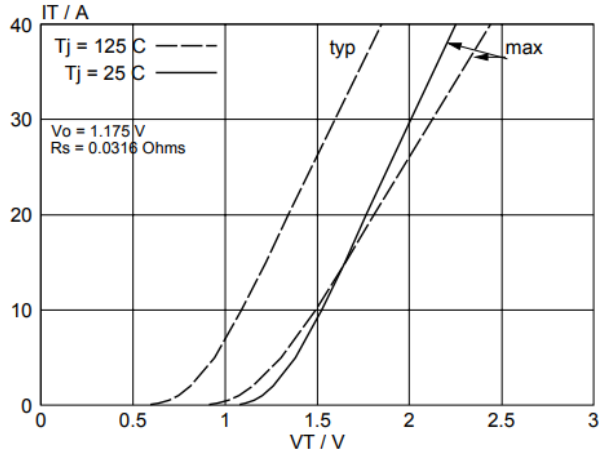


Fig.10. Typical and maximum on-state characteristic.

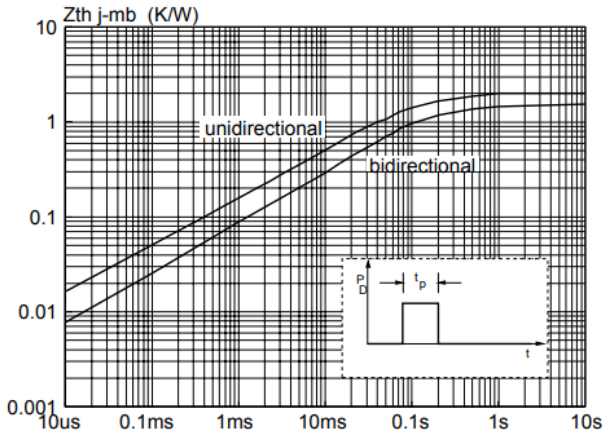


Fig.11. Transient thermal impedance Zth j-lead, versus pulse width tp.

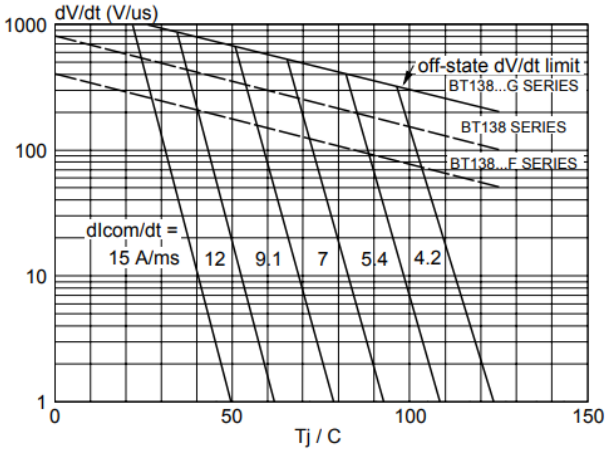
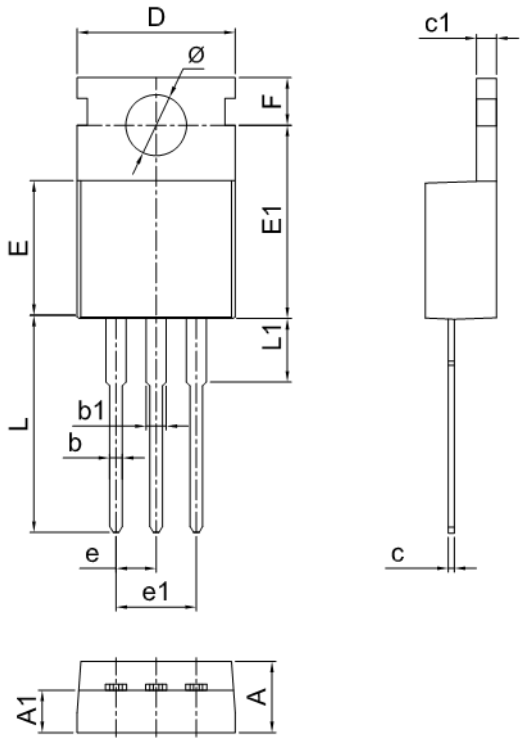


Fig.12. Typical, critical rate of rise of off-state voltage, dV/dt versus junction temperature Tj.

Package Dimensions



Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.34	4.67	0.171	0.184
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.30	0.50	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
E1	12.00	12.50	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	13.20	13.80	0.520	0.543
L1	3.80	4.20	0.150	0.165
Φ	3.60	3.96	0.142	0.156