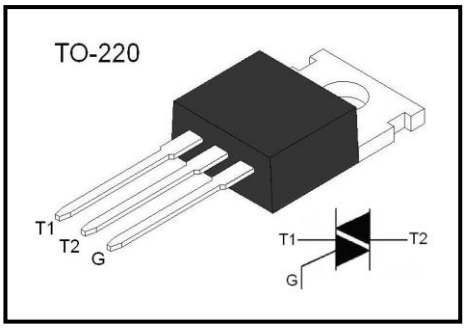
BT139 TO-220 Plastic-Encapsulate Triacs

General Description

Glass passivated triacs in a plastic envelope, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.



Maximum Values

Limiting values in accordance with the Absolute Maximum System

Parameter	Symbol	Conditions		Min	Max.	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			16	A
Non-repetitive peak on-state current	I_{TSM}	full sine wave; Tj = 25 °C prior to surge	t = 20 ms		140	A
			t=16.7ms		150	
I^2t for fusing	I^2t	t = 10 ms			98	A^2s
Repetitive rate of rise of on-state current after triggering	dI_T/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
Storage Temperature	T_{stg}			-40	150	°C
Operating junction temperature	T_J				125	°C

Thermal resistances

Parameter	Symbol	Conditions	Min	Typ.	Max.	Unit
Thermal resistance junction to mounting base	$R_{th\ j\text{-}mb}$	full cycle half cycle			1.2 1.7	K/W
Thermal resistance junction to ambient	$R_{th\ j\text{-}a}$	in free air		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+			35	mA
			T2+ G-			35	
			T2- G-			35	
			T2- G+			50	
Latching current	I_L	V_D = 12 V, $_T$ = 0.1 A	T2+ G+			50	mA
			T2+ G-			50	
			T2- G-			50	
			T2- G+			60	
Holding current	I_H	V_D = 12 V, I_{GT} = 0.1 A				50	mA
On-state voltage	V_T	I_T = 20A				1.6	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	0.4		
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	50			V/μs
Critical rate of change ofcommutating voltage	dV_{com}/dt	V_{DM} = 400 V; T_j = 95˚C; $I_{T(RMS)}$ = 12 A; dIcom/dt = 5.4 A/ms; gate open circuit		20		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

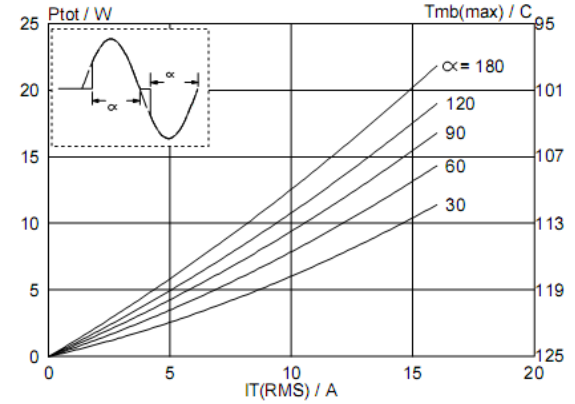


Fig.1. Maximum on-state dissipation, P_{tot}, versus rms on-state current, $I_{T(RMS)}$, where α=conduction angle.

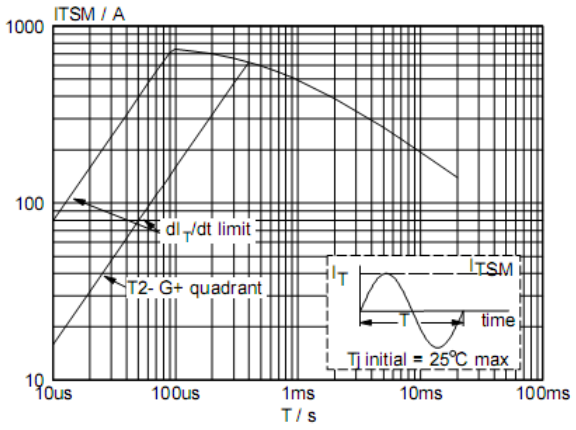


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width tp, for sinusoidal currents, tp ≤ 20ms.

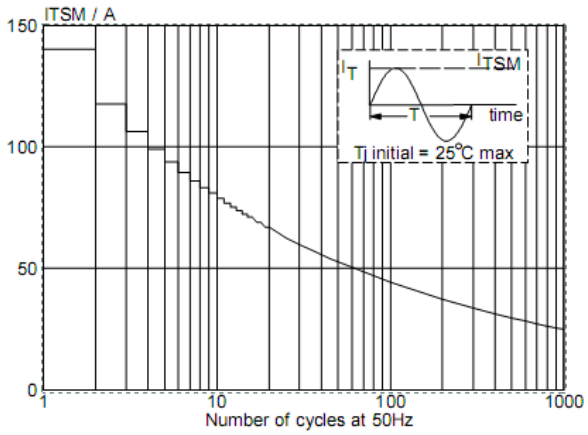


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

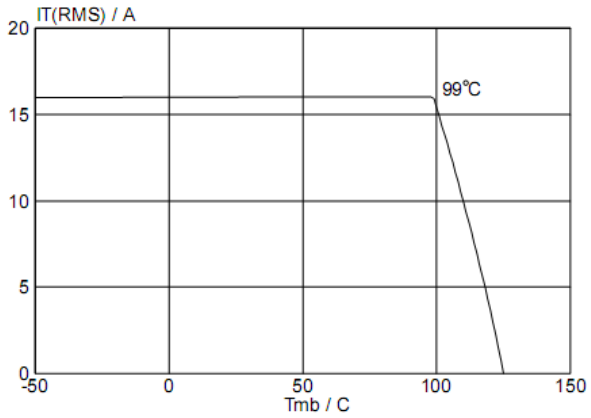


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus lead temperature Tlead.

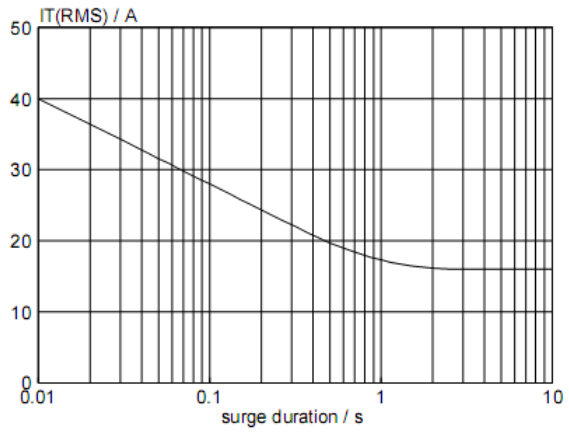


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; Tmb ≤ 99˚C.

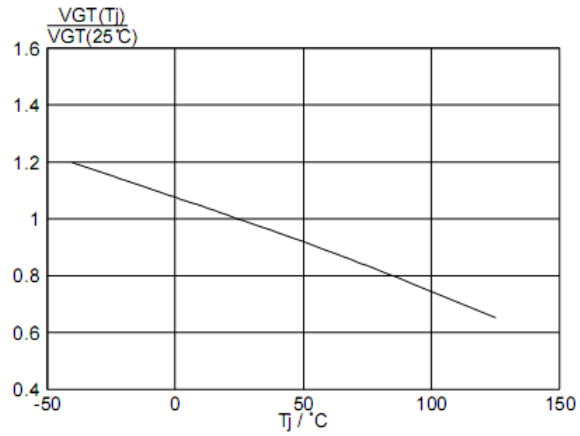


Fig.6. Normalised gate trigger voltage $V_{GT}(Tj)/ V_{GT}(25°C)$, versus junction temperature Tj.

Typical Characteristics

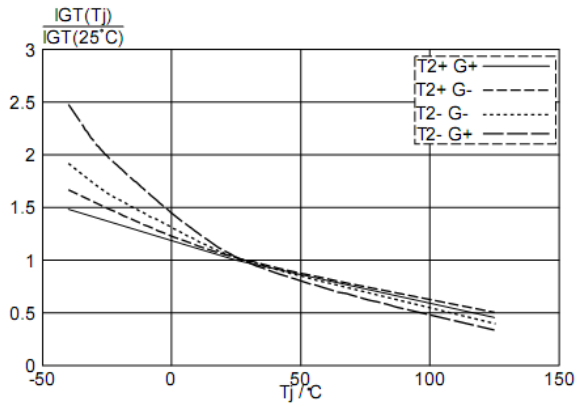


Fig.7. Normalised gate trigger current $I_{GT}(Tj)$ / $I_{GT}(25°C)$, Versus junction temperature Tj.

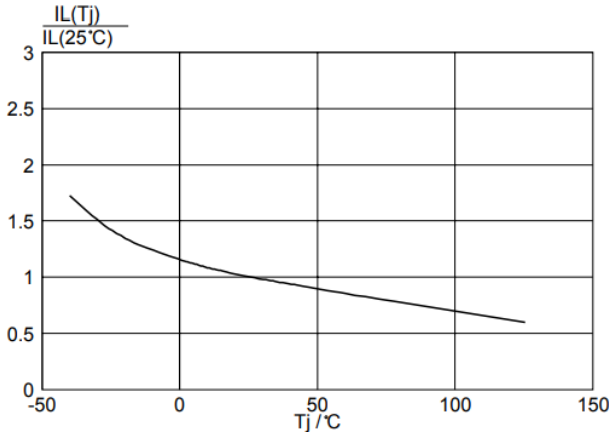


Fig.8. Normalised latching current $I_L(Tj)$ / $I_L(25°C)$, versus junction temperature Tj.

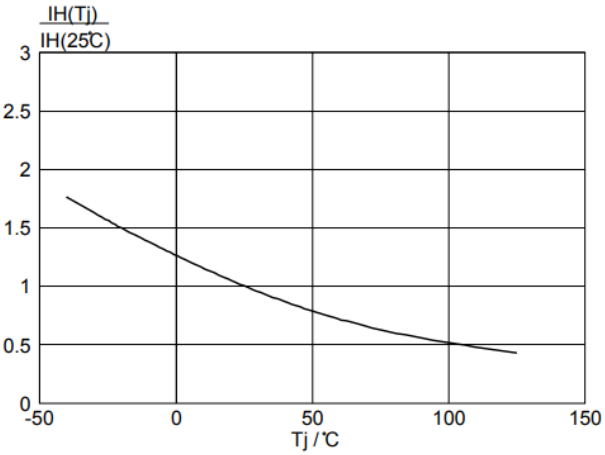


Fig.9. Normalised holding current $I_H(Tj)$ / $I_H(25°C)$, versus junction temperature Tj.

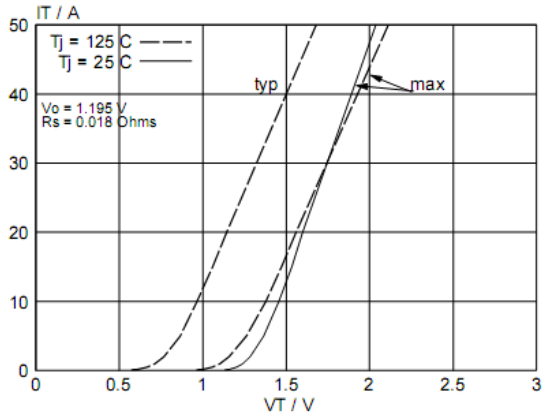


Fig.10. Typical and maximum on-state characteristic.

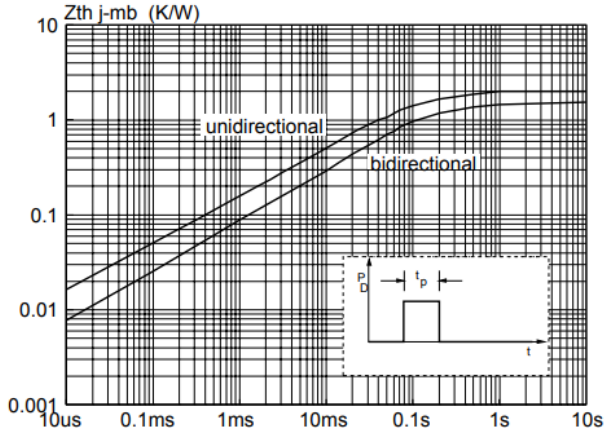


Fig.11. Transient thermal impedance Zth j-lead, versus pulse width tp.

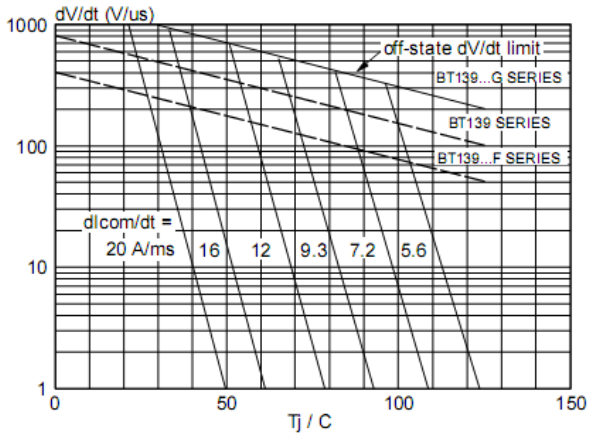
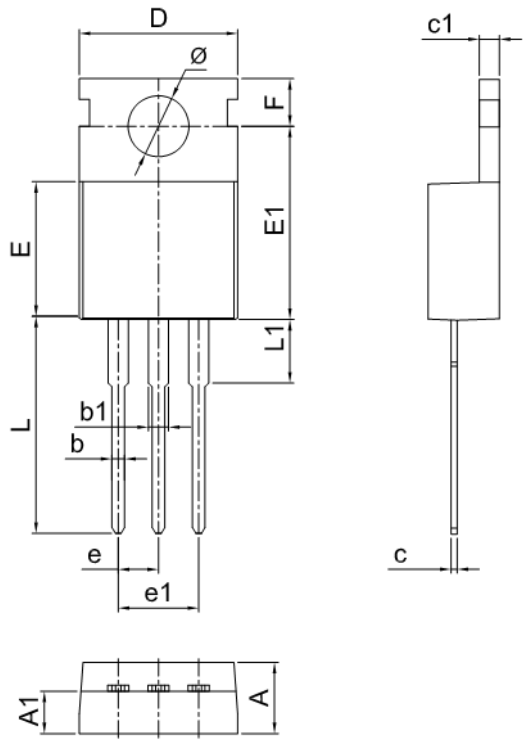


Fig.12. Typical, critical rate of rise of off-state voltage, dV/dt versus junction temperature Tj.

Package Dimensions



Diml	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