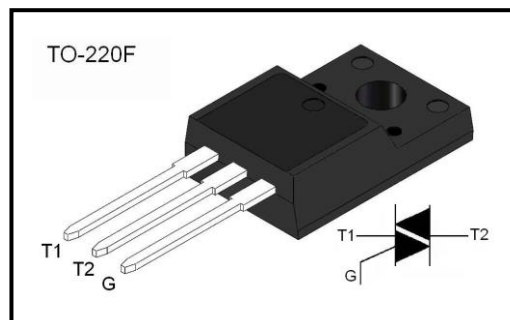




BT139-600E

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; $T_{mb} \leq 99^{\circ}\text{C}$		16	A
Non-repetitive peak on-state current	I_{TSM}	full sine wave; $T_j = 25^{\circ}\text{C}$ prior to surge	$t = 20\text{ ms}$	140	A
			$t = 16.7\text{ ms}$	150	
I^2t for fusing	I^2t	$t = 10\text{ ms}$		98	A^2s
Repetitive rate of rise of on-state current after triggering	di_T/dt	$I_{TM} = 20\text{A};$ $I_G = 0.2\text{A};$ $di_G/dt = 0.2\text{A}/\mu\text{s}$	T2+ G+	50	$\text{A}/\mu\text{s}$
			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			125	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40	150	$^{\circ}\text{C}$

Thermal resistances

Parameter	Symbol	Conditions	Min	Typ.	Max.	Unit
Thermal resistance junction to mounting base	$R_{th\ j-mb}$	full cycle half cycle			5.5 7.5	$^{\circ}\text{C}/\text{W}$
Thermal resistance junction to ambient	$R_{th\ j-a}$	in free air		60		$^{\circ}\text{C}/\text{W}$

Static Characteristics ($T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise stated)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Gate trigger current	I_{GT}	$V_D = 12\text{ V}, I_T = 0.1\text{ A}$	T2+ G+		35	mA
			T2+ G-		35	
			T2- G-		35	
			T2- G+		50	
Latching current	I_L	$V_D = 12\text{ V}, \tau = 0.1\text{ A}$	T2+ G+		50	mA
			T2+ G-		50	
			T2- G-		50	
			T2- G+		60	
Holding current	I_H	$V_D = 12\text{ V}, I_{GT} = 0.1\text{ A}$			50	mA
On-state voltage	V_T	$I_T = 20\text{ A}$			1.6	V
Gate trigger voltage	V_{GT}	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A};$ $T_j = 125\text{ }^{\circ}\text{C}$			1.5	V
			0.25	0.4		
Off-state leakage current	I_D	$V_D = V_{DRM(max)}; T_j = 125\text{ }^{\circ}\text{C}$		0.1	0.5	mA

Dynamic Characteristics ($T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise stated)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Critical rate of rise of off-state voltage	dV_D/dt	$V_{DM} = 67\% V_{DRM(max)};$ $T_j = 125\text{ }^{\circ}\text{C};$ exponential waveform; gate open circuit	50			V/ μs
Critical rate of change of commutating voltage	dV_{com}/dt	$V_{DM} = 400\text{ V}; T_j = 95\text{ }^{\circ}\text{C};$ $I_{T(RMS)} = 12\text{ A};$ $dI_{com}/dt = 5.4\text{ A/ms};$ gate open circuit		20		V/ μs
Gate controlled turn-on time	t_{gt}	$I_{TM} = 16\text{ A}; V_D = V_{DRM(max)};$ $I_G = 0.1\text{ A}; dI_G/dt = 5\text{ A}/\mu\text{s}$		2		μs

Typical Characteristics

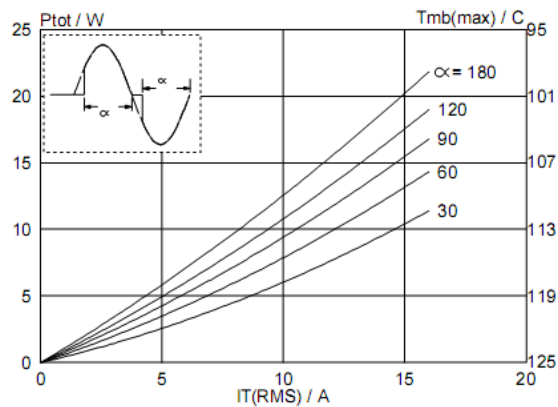


Fig.1. Maximum on-state dissipation, P_{tot} , versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

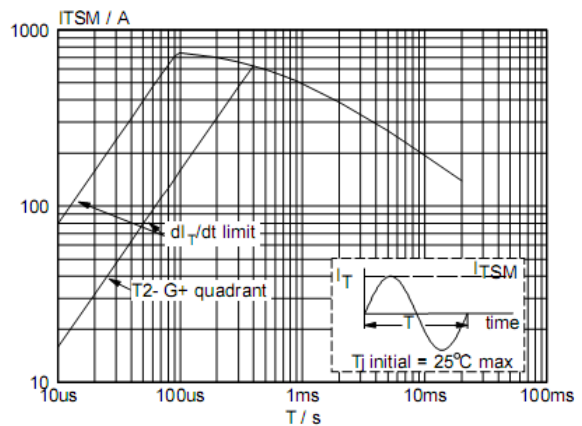


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 20\text{ms}$.

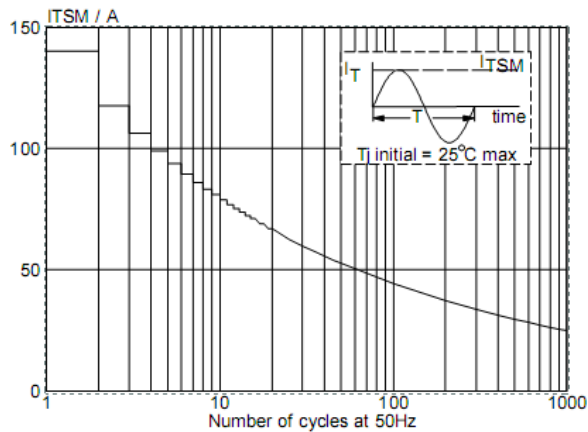


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50\text{ Hz}$.

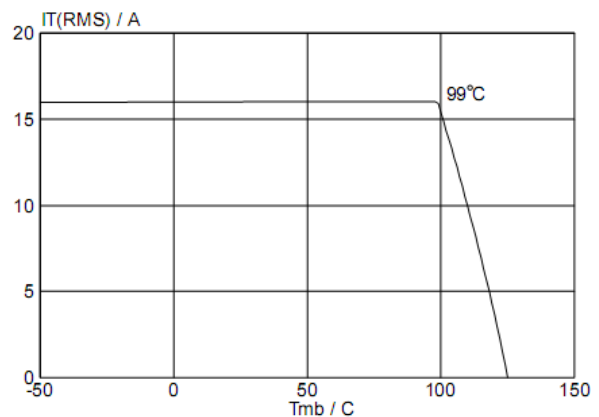


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus lead temperature T_{lead} .

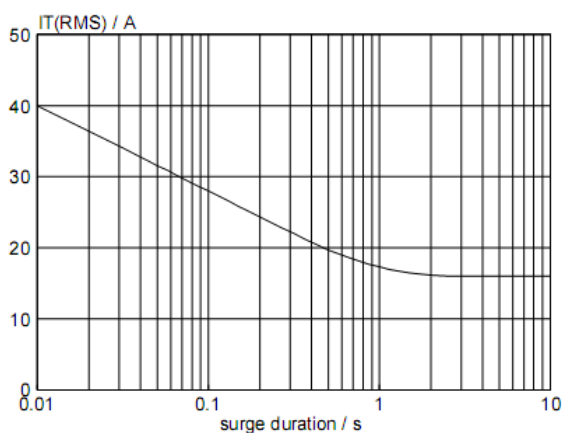


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50\text{ Hz}$; $T_{mb} \leq 99^\circ\text{C}$.

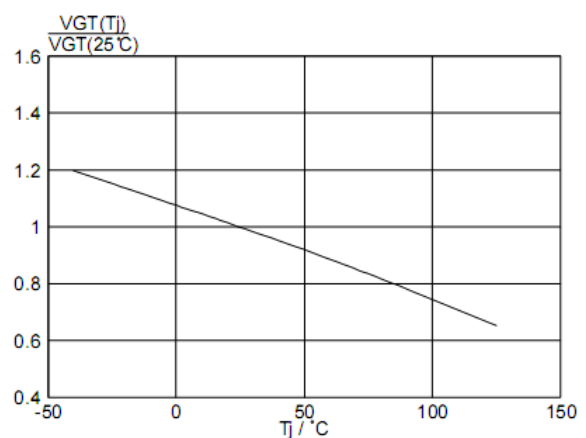


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

Typical Characteristics

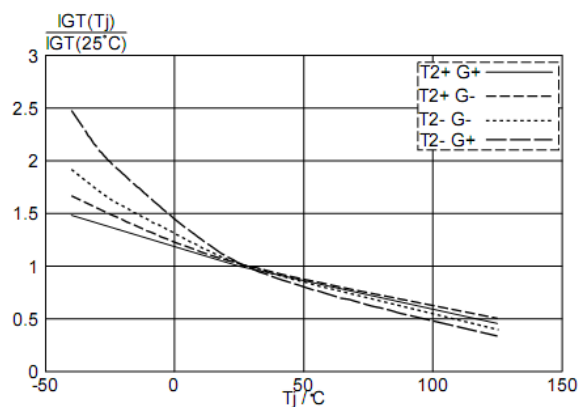


Fig.7. Normalised gate trigger current $I_{GT}(T_j) / I_{GT}(25^\circ\text{C})$, Versus junction temperature T_j .

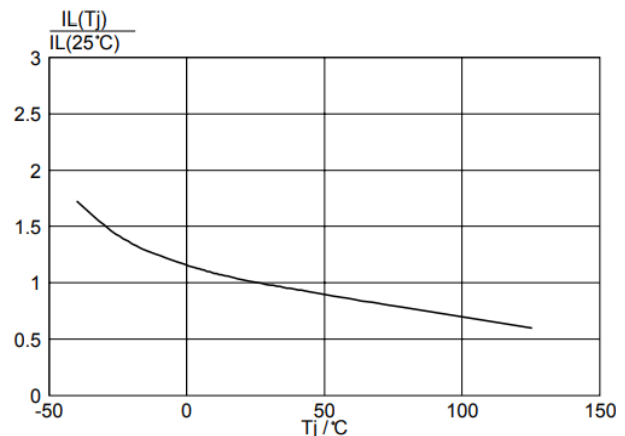


Fig.8. Normalised latching current $I_L(T_j) / I_L(25^\circ\text{C})$, versus junction temperature T_j .

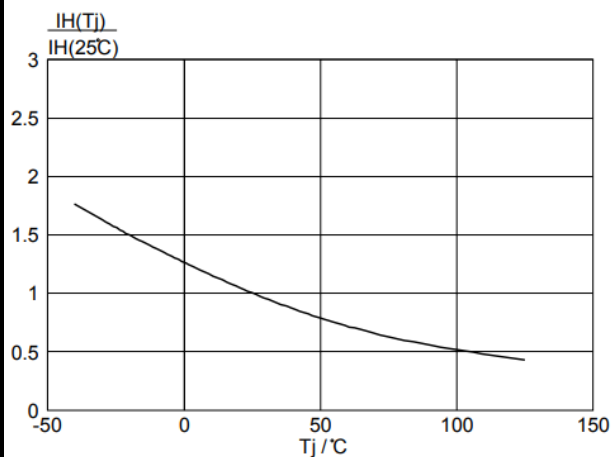


Fig.9. Normalised holding current $I_H(T_j) / I_H(25^\circ\text{C})$, versus junction temperature T_j .

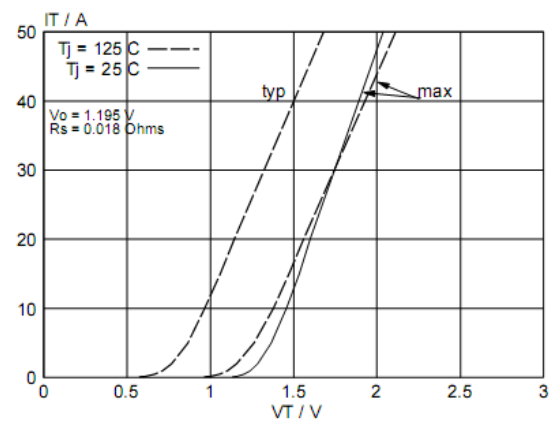


Fig.10. Typical and maximum on-state characteristic.

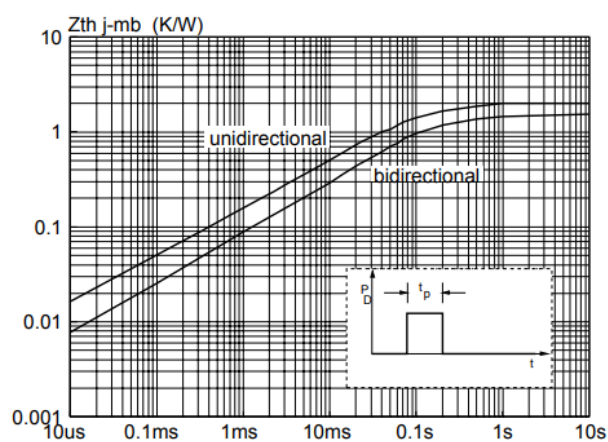


Fig.11. Transient thermal impedance $Z_{th} j\text{-lead}$, versus pulse width t_p .

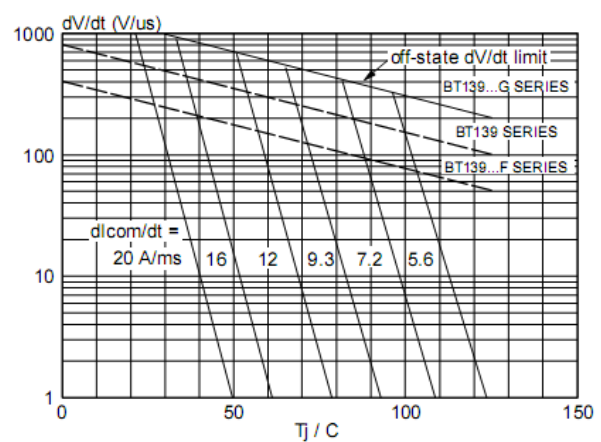


Fig.12. Typical, critical rate of rise of off-state voltage, dV/dt versus junction temperature T_j .

Package Dimensions

Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.66	2.86	0.105	0.113
b	0.75	0.85	0.030	0.033
b1	1.24	1.44	0.049	0.057
c	0.40	0.60	0.016	0.024
D	10.00	10.32	0.394	0.406
E	15.75	16.05	0.620	0.632
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	3.10	3.5	0.122	0.138
L	12.90	13.50	0.508	0.531
L1	2.90	3.30	0.114	0.130
Φ	3.10	3.30	0.122	0.130