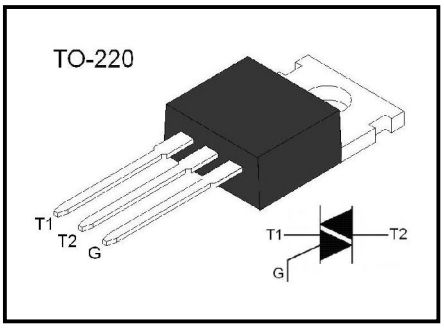
Triacs

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.



Absolute Maximum Rating (Ta=25°C)

Limiting values in accordance with the Absolute Maximum System

Parameter	Symbol	Conditions		Min	Max			Unit
Repetitive peak off-state voltages	V_{RRM} V_{DRM}			-	-500 500	-600 600	-800 800	V
On-State RMS Current	$I_{T(RMS)}$	full sine wave; Tmb ≤ 51 °C		-	4			A
Non-repetitive peak on-state current	I_{TSM}	full sine wave; Tj = 25 °C prior to surge	t = 20 ms	-	25			A
			t = 16.7 ms	-	27			
I^2t for fusing	I^2t	t = 20ms		-	3.1			A^2s
Repetitive rate of rise of on-state current after triggering	dIT/dt	I_{TM} = 6 A; I_G = 0.2 A; dI_G/dt = 0.2 A/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			-	+125			°C
Storage Temperature	T_{stg}			-40	+150			°C

Thermal Resistances

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Thermal resistance junction to solder point	Rth j-sp	full cycle half cycle	-		3.0 3.7	K/W
Thermal resistance junction to ambient	Rth j-a	in free air	-	75		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_{GT} = 0.1 A	T2+ G+			15	mA
			T2+ G-			20	
			T2- G-			15	
			T2- G+			20	
Holding current	I_H	V_D = 12 V, I_{GT} = 0.1 A				15	mA
On-state voltage	V_T	I_T = 5A			1.4	1.7	V
Gate trigger voltage	V_{GT}	V_D = 12 V; I_T = 0.1 A			0.7	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				0.5	mA

Dynamic Characteristics Tj = 25 ˚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 °C Vexponential waveform; gate open circuit		50	-	V/μs
Gate controlled turn-on time	tgt	I_{TM} = 6 A; I_G = 0.1 A; V_D = $V_{DRM(max)}$; dI_G/dt = 5 A/μs;				μs

Typical Characteristics

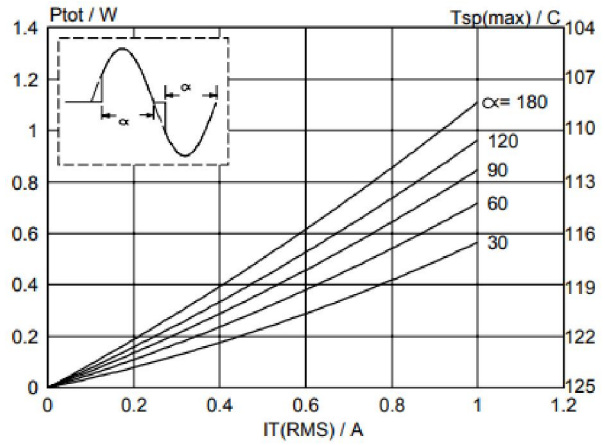


Fig.1. Maximum on-state dissipation, Ptot, versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

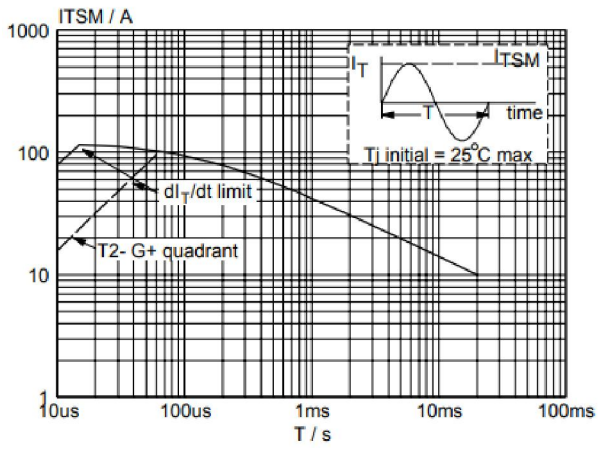


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width tp, for sinusoidal currents, tp ≤ 20ms.

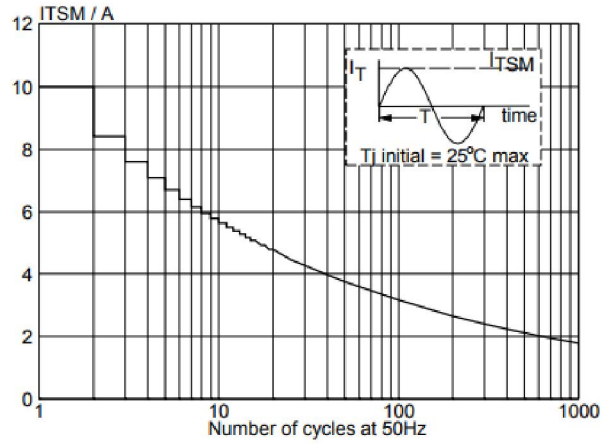


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

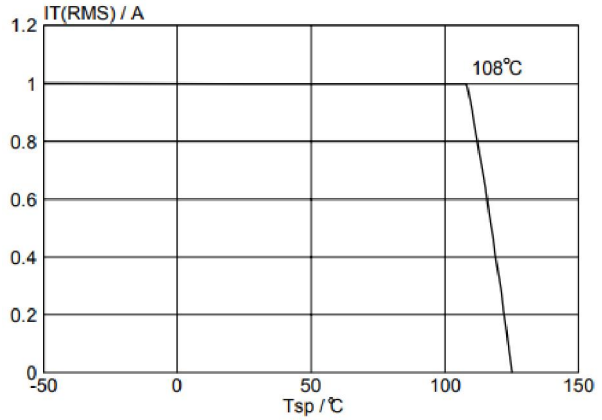


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus solder point temperature Tsp.

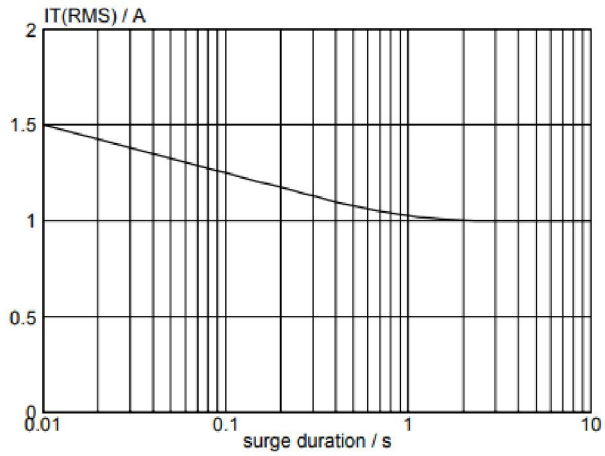


Fig.5. Maximum ermissible repetitive rms n-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50Hz; T_{sp} ≤ 108˚C.

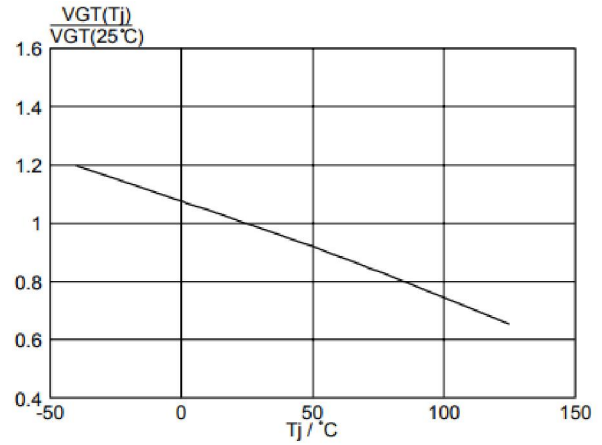


Fig.6.Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}$ (25˚C), versus junction temperature T_j .

Typical Characteristics

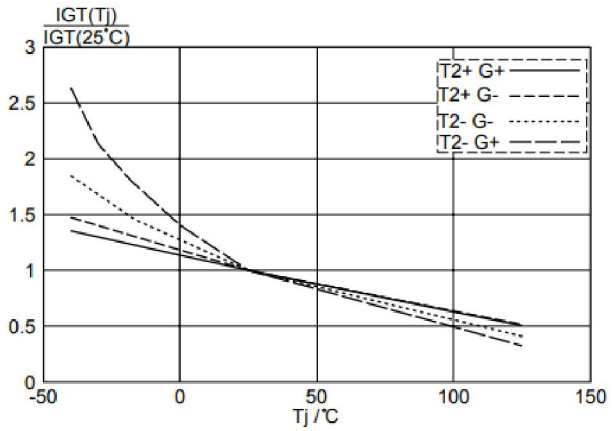


Fig.7. Normalised gate trigger current $I_{GT}(T_j)$/ $I_{GT}(25^{\circ}C)$, versus junction temperature T_j.

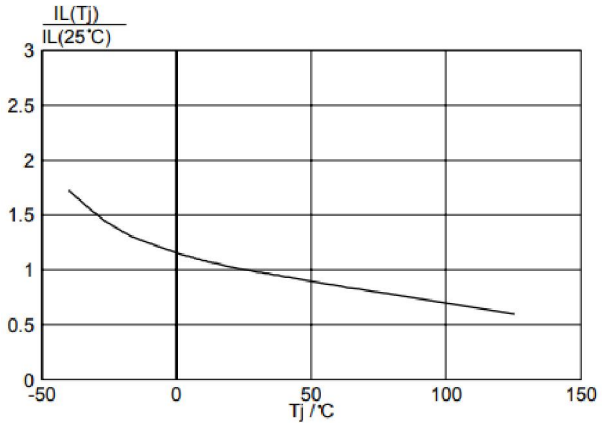


Fig.8. Normalised latching current $I_L(T_j)$/ $I_L(25^{\circ}C)$, versus junction temperature T_j.

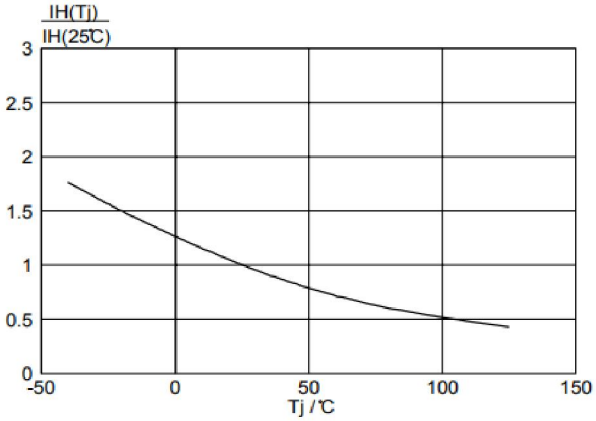


Fig.9. Normalised holding current $I_H(T_j)$/ I_H (25°C), versus junction temperature T_j.

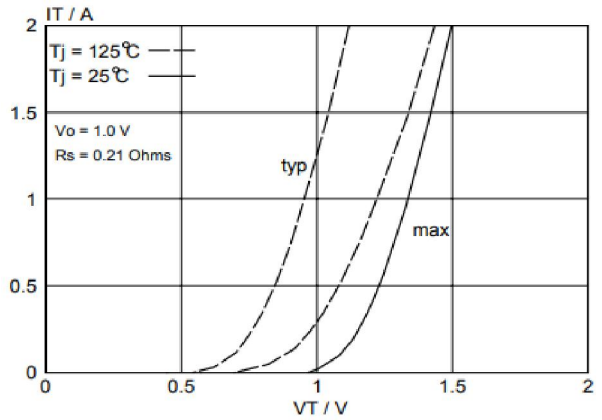


Fig.10. Typical and maximum on-state characteristic.

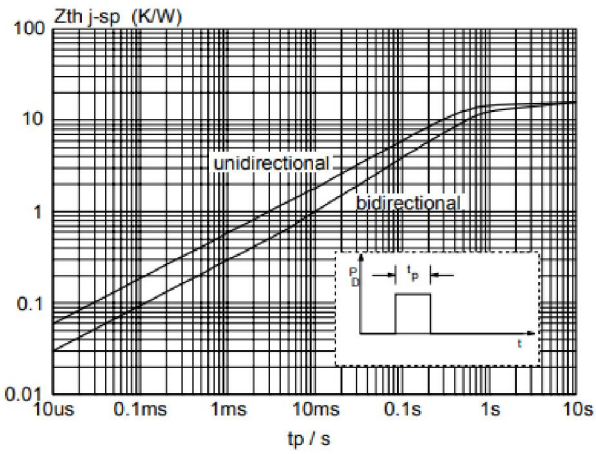


Fig.11. Transient thermal impedance $Z_{th\ j\text{-}sp}$, versus pulse width tp.

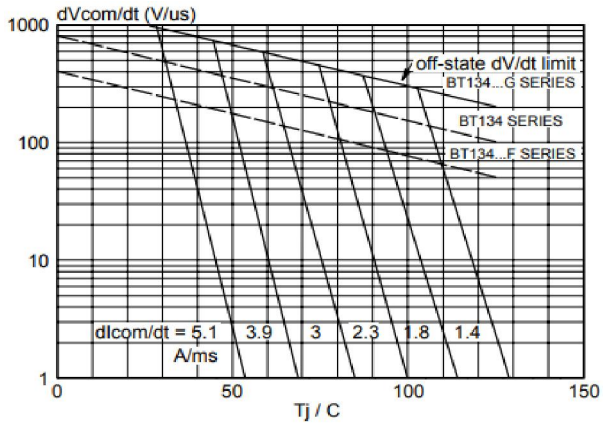
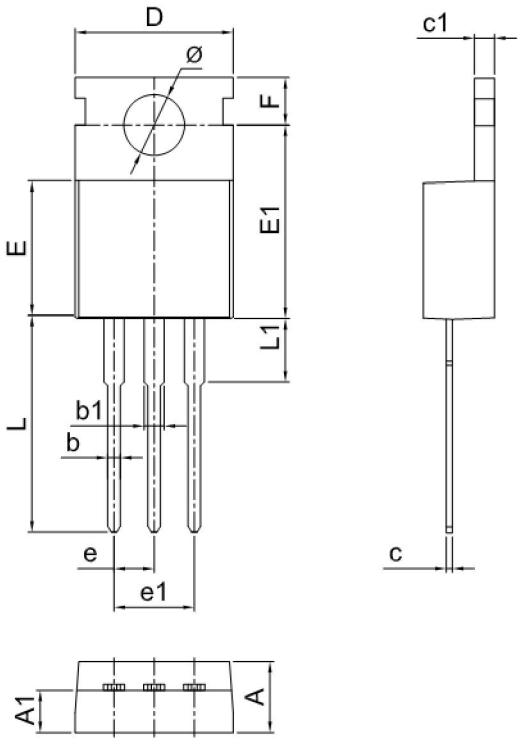


Fig.12. Typical commutation dV/dt versus junction temperature, parameter commutation dI_T/dt. The triac should commutate when the dV/dt is below the value on the appropriate curve for pre-commutation dI_T/dt.

Package Dimensions



Symbol	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