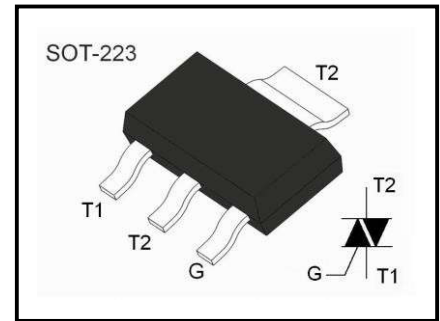


SOT-223 Plastic-Encapsulate Triacs

General Description

Glass passivated triacs in a plastic envelope suitable for surface mounting, 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	$V_{RRM}$		-	-500	-600	-800	V	
	$V_{DRM}$			500	600	800		
On-State RMS Current	$I_{T(RMS)}$	full sine wave; $T_{mb} \leq 108^\circ C$	-	2			A	
Non-repetitive peak on-state current	$I_{TSM}$	full sine wave; $T_j = 25^\circ C$ prior to surge		t = 20 ms	-	15		A
				t = 16.7 ms	-	18		
$I^2t$ for fusing	$I^2t$	t = 10 ms	-	0.5			$A^2s$	
Repetitive rate of rise of on-state current after triggering	$d_{IT}/dt$	$I_{TM} = 3A$ ; $I_G = 0.2A$ ; $d_{IG}/dt = 0.2A/\mu s$		T2+ G+	-	50		A/ $\mu s$
				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	
Storage Temperature	$T_{stg}$		-40	150			$^\circ C$	
Operating junction temperature	$T_j$		-	125			$^\circ C$	

Thermal Resistances

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Thermal resistance junction to solder point	$R_{th\ j-sp}$	full or half cycle	-		15	K/W
Thermal resistance junction to ambient	$R_{th\ j-a}$	pcb mounted; minimum footprint pcb mounted;	-	156 70		K/W

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

Parameter	Symbol	Conditions	Min	Typ	Max			Unit	
					...	...F	...G		
Gate trigger current	$I_{GT}$	$V_D = 12\text{V}$ $I_T = 0.1\text{A}$	T2+ G+	-		35	25	50	mA
			T2+ G-	-		35	25	50	
			T2- G-	-		35	25	50	
			T2- G+	-		70	70	100	
Latching current	$I_L$	$V_D = 12\text{V}$ $I_{GT} = 0.1\text{A}$	T2+ G+	-		20	20	30	mA
			T2+ G-	-		30	30	45	
			T2- G-	-		20	20	30	
			T2- G+	-		30	30	45	
Holding current	$I_H$	$V_D = 12\text{V}, I_{GT} = 0.1\text{A}$			15	15	30	mA	
On-state voltage	$V_T$	$I_T = 3\text{A}$		1.2	1.5			V	
Gate trigger voltage	$V_{GT}$	$V_D = 12\text{V};$ $I_T = 0.1\text{A}$ $V_D = 400\text{V};$ $I_T = 0.1\text{A};$ $T_j = 125^\circ\text{C}$	0.25		1.5			V	
Off-state leakage current	$I_D$	$V_D = V_{DRM}(\text{max}); T_j = 125^\circ\text{C}$			0.5			mA	

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

Parameter	Symbol	Conditions	Min			Typ	Max	Unit
			...	...F	...G			
Critical rate of rise of Critical rate of rise of	$d_{VD}/dt$	$V_{DM} = 67\% V_{DRM}(\text{max});$ $V_{DM} = 67\% V_{DRM}(\text{max});$ $V_{DM} = 67\% V_{DRM}(\text{max});$ circuit	100	50	200	250	-	V/ $\mu\text{s}$
Critical rate of change of commutating voltage	$dV_{com}/dt$	$V_{DM} = 400\text{V}; T_j = 95^\circ\text{C};$ $I_{T(\text{RMS})} = 1\text{A};$ $dI_{com}/dt = 1.5\text{A/ms};$ gate open circuit	-	-	10	50	-	V/ $\mu\text{s}$
Gate controlled turn-on time	tgt	$I_{TM} = 1.5\text{A};$ $V_D = V_{DRM}(\text{max});$ $I_G = 0.1\text{A};$ $dI_G/dt = 5\text{A}/\mu\text{s};$						$\mu\text{s}$

Typical Characteristics

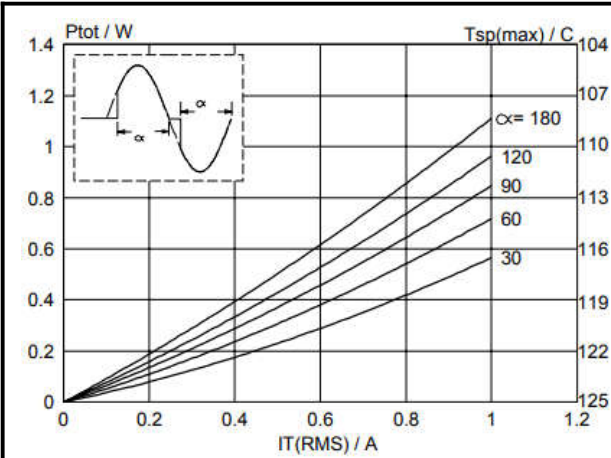


Fig.1. Maximum on-state dissipation, Ptot, versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha$  = conduction angle.

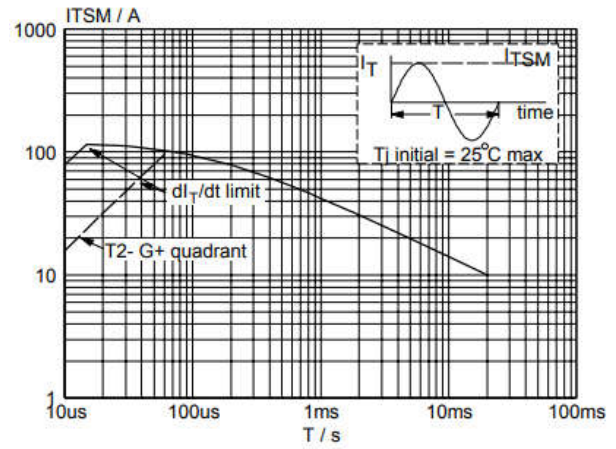


Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20\text{ms}$ .

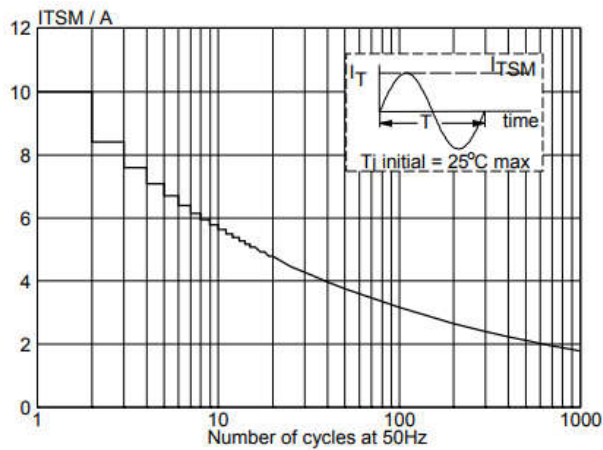


Fig.3. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus number of cycles, for sinusoidal currents,  $f = 50\text{Hz}$ .

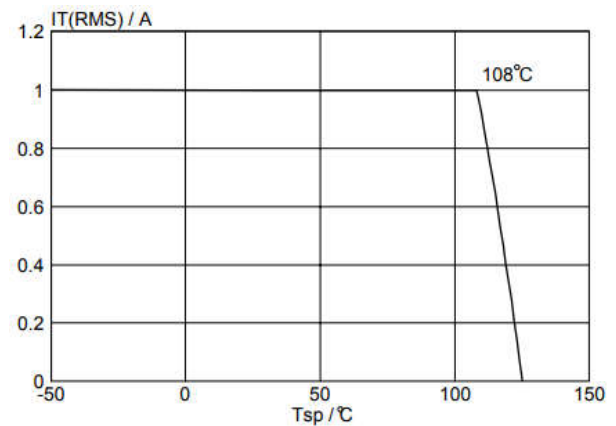


Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus solder point temperature  $T_{sp}$ .

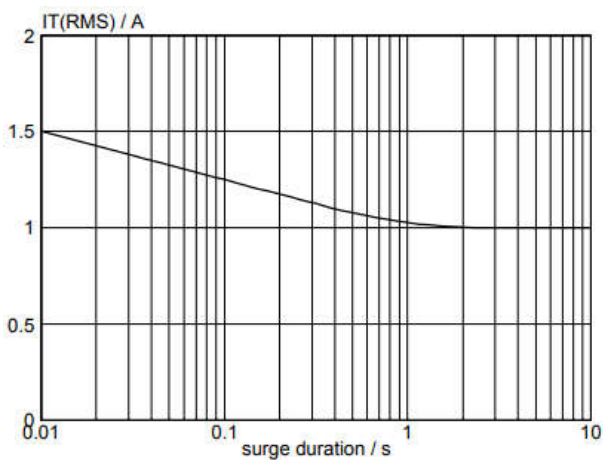


Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{Hz}$ ;  $T_{sp} \leq 108^\circ\text{C}$ .

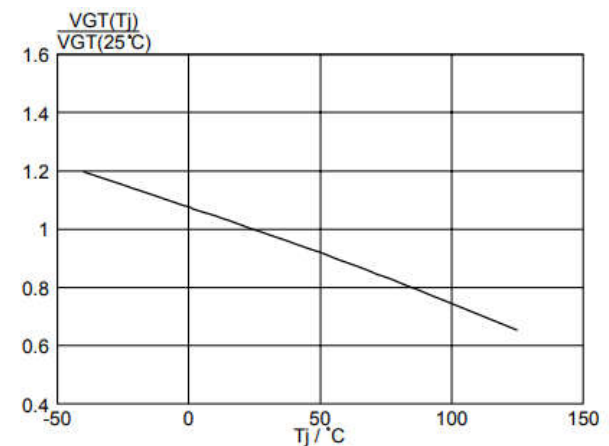


Fig.6. Normalised gate trigger voltage  $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

Typical Characteristics

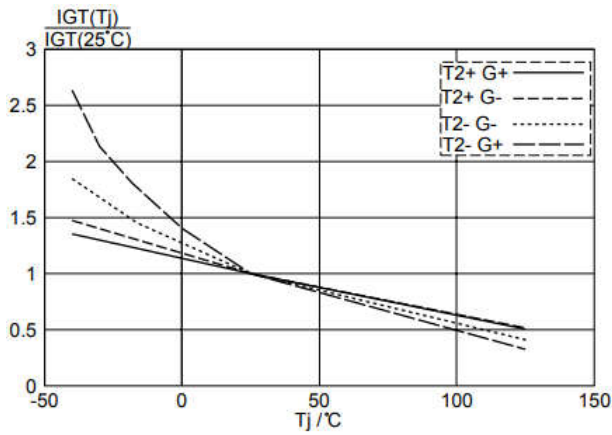


Fig.7. Normalised gate trigger current  $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

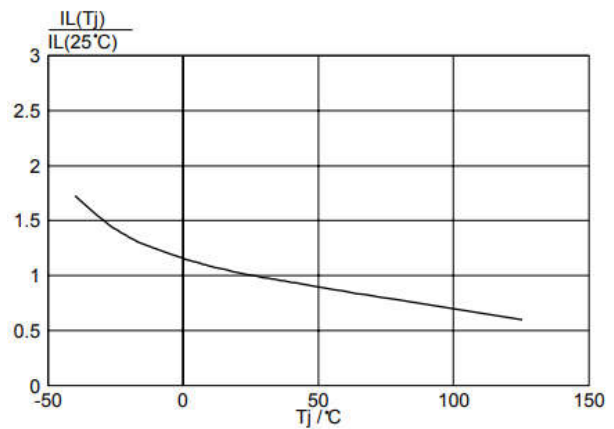


Fig.8. Normalised latching current  $I_L(T_j)/I_L(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

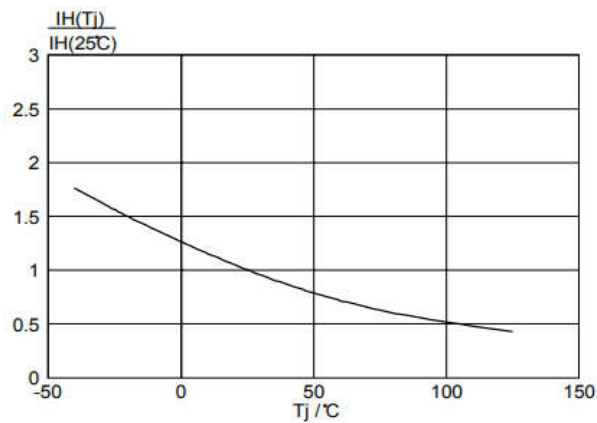


Fig.9. Normalised holding current  $I_H(T_j)/I_H(25^\circ\text{C})$ , versus junction temperature  $T_j$ .

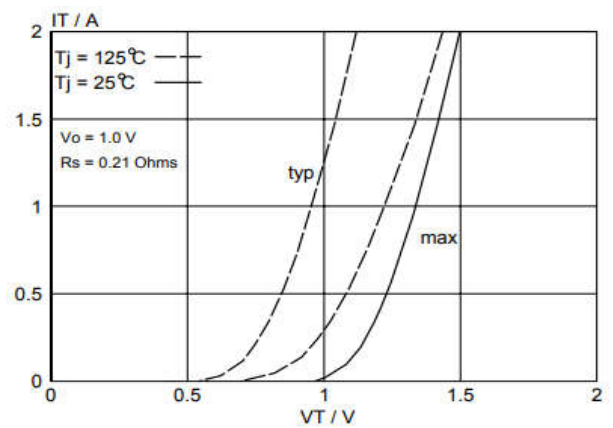


Fig.10. Typical and maximum on-state characteristic.

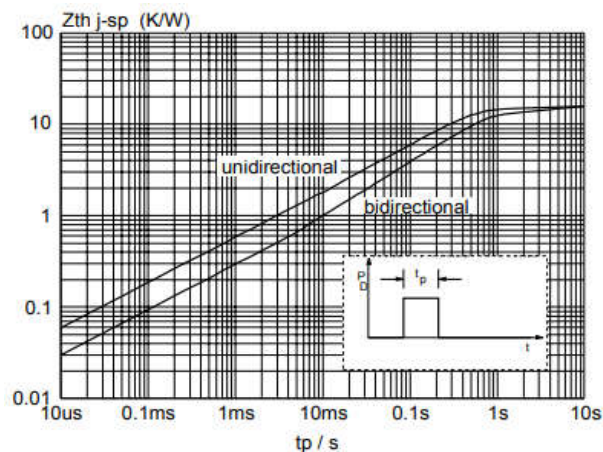


Fig.11. Transient thermal impedance  $Z_{th\ j-sp}$ , versus pulse width  $t_p$ .

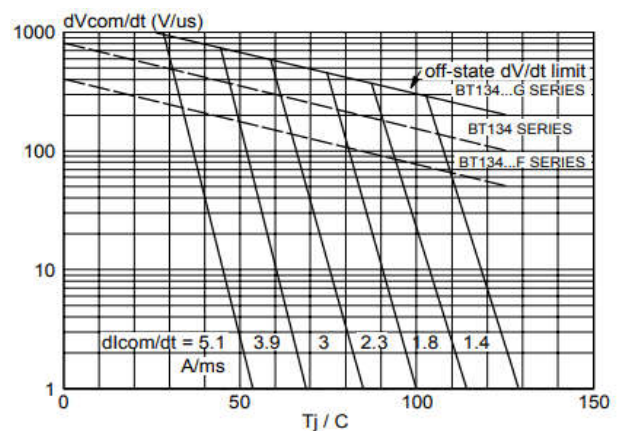
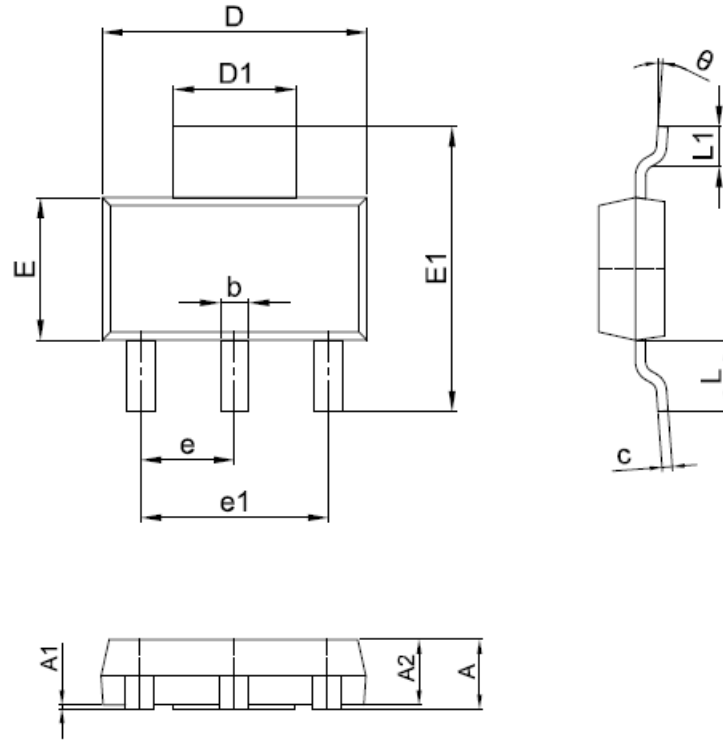


Fig.12. Typical commutation  $dV/dt$  versus junction temperature, parameter commutation  $dI_T/dt$ . The triac should commute when the  $dV/dt$  is below the value on the appropriate curve for pre-commutation  $dI_T/dt$ .

Package Dimensions (Unit:mm)



Symbol	SOT-223		
	Min.	Typ	Max.
A	1.50	1.65	1.80
A1	0.00	0.05	0.10
A2	1.50	1.60	1.70
b	0.65	0.70	0.75
c	0.20	0.25	0.30
D	6.40	6.50	6.60
D1	2.90	3.00	3.10
E	3.30	3.50	3.70
E1	6.85	7.00	7.15
e	2.20	2.30	2.40
e1	4.40	4.60	4.80
L	1.65	1.75	1.85
L1	0.90	1.00	1.15
θ	0°	5°	10°



**NOTE:**

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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