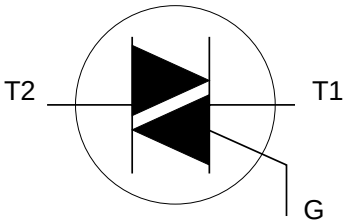
GENERAL DESCRIPTION

Glass passivated, sensitive gate triacs in a plastic envelope suitable for surface mounting, intended for use in general purpose bidirectional switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

SYMBOL



SOT223

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
	BT131W-	**500**	**600**	
V_{DRM}	Repetitive peak off-state voltages	500	600	V
$I_{T(RMS)}$	RMS on-state current	1	1	A
I_{TSM}	Non-repetitive peak on-state current	10	10	A

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{DRM}	Repetitive peak off-state voltages		-	**-500** 500[1]	**-600** 600[1]	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{sp} \leq 108$ ˚C	-	1		A
I_{TSM}	Non-repetitive peak on-state current	full sine wave; $T_j = 25$ ˚C prior to surge				
		t = 20 ms	-	10		A
		t = 16.7 ms	-	11		A
I^2t	I^2t for fusing	t = 10 ms	-	0.5		A^2s
dI_T/dt	Repetitive rate of rise of on-state current after triggering	I_{TM} = 1.5 A; I_G = 0.2 A; dI_G/dt = 0.2 A/µs				
		T2+ G+	-	50		A/µs
		T2+ G-	-	50		A/µs
		T2- G-	-	50		A/µs
		T2- G+	-	10		A/µs
I_{GM}	Peak gate current		-	2		A
V_{GM}	Peak gate voltage		-	5		V
P_{GM}	Peak gate power		-	5		W
$P_{G(AV)}$	Average gate power	over any 20 ms period	-	0.5		W
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	125		˚C

1 Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 3 A/µs.

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}sp}$	Thermal resistance junction to solder point	full or half cycle	-	-	15	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted; minimum footprint	-	156	-	K/W
		pcb mounted; pad area as in fig:14	-	70	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current	V_D = 12 V; I_T = 0.1 A					
			T2+ G+	-	0.4	3	mA
			T2+ G-	-	1.3	3	mA
			T2- G-	-	1.4	3	mA
			T2- G+	-	3.8	7	mA
I_L	Latching current	V_D = 12 V; I_{GT} = 0.1 A					
			T2+ G+	-	1.2	5	mA
			T2+ G-	-	4.0	8	mA
			T2- G-	-	1.0	5	mA
			T2- G+	-	2.5	8	mA
I_H	Holding current	V_D = 12 V; I_{GT} = 0.1 A		-	1.3	5	mA
V_T	On-state voltage	I_T = 2 A		-	1.2	1.5	V
V_{GT}	Gate trigger voltage	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		0.2	0.3	-	V
I_D	Off-state leakage current	V_D = $V_{DRM(max)}$; T_j = 125 ˚C		-	0.1	0.5	mA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
dV_D/dt	Critical rate of change of off-state voltage	V_{DM} = 67% $V_{DRM(max)}$; T_j = 125 ˚C; exponential waveform; R_{GK} = 1 kΩ	5	15	-	V/µs
t_{gt}	Gate controlled turn-on time	I_{TM} = 1.5 A; V_D = $V_{DRM(max)}$; I_G = 0.1 A; dI_G/dt = 5 A/µs	-	2	-	µs

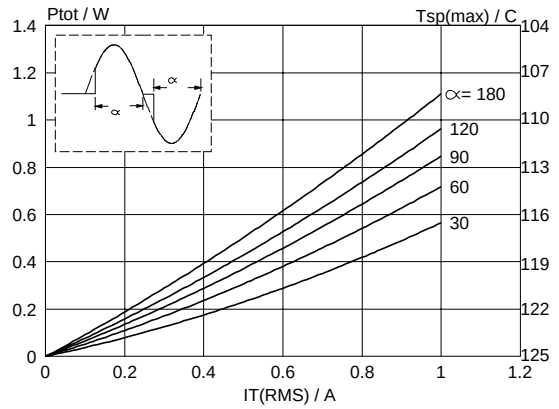


Fig.1. Maximum on-state dissipation, P_{tot}, versus rms on-state current, $I_{T(RMS)}$, where α = conduction angle.

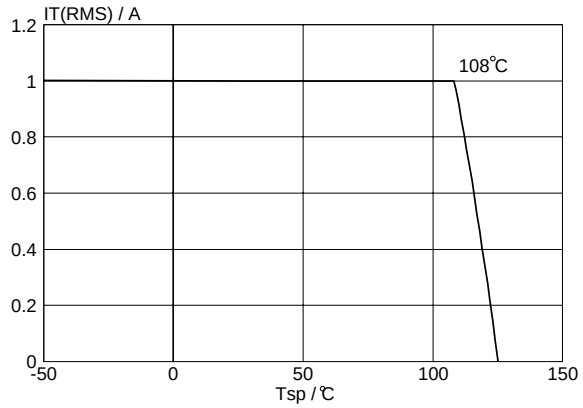


Fig.4. Maximum permissible rms current $I_{T(RMS)}$, versus lead temperature T_{lead}.

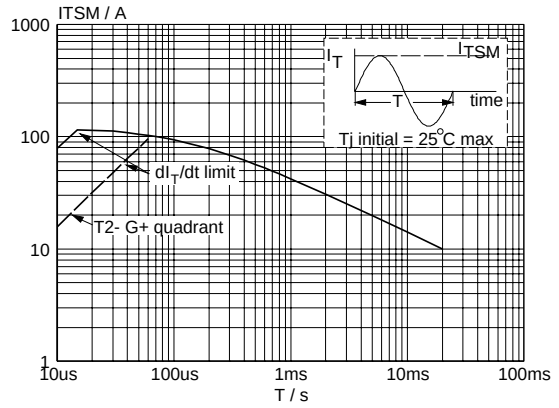


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus pulse width t_p, for sinusoidal currents, $t_p \leq 20ms$.

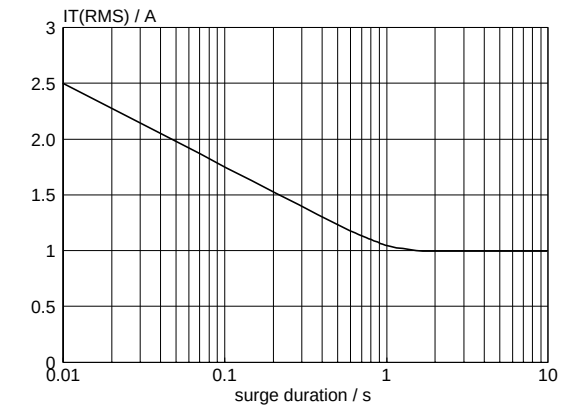


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, f = 50 Hz; $T_{lead} \leq 108℃$.

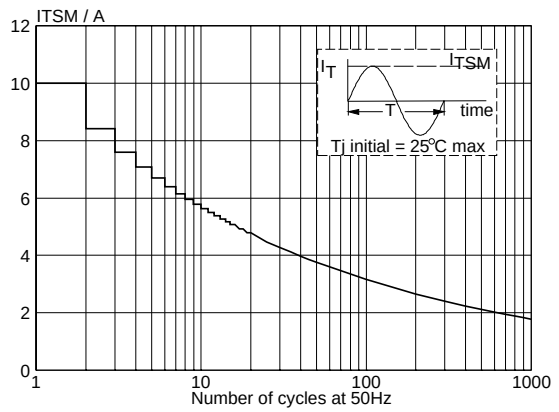


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, versus number of cycles, for sinusoidal currents, f = 50 Hz.

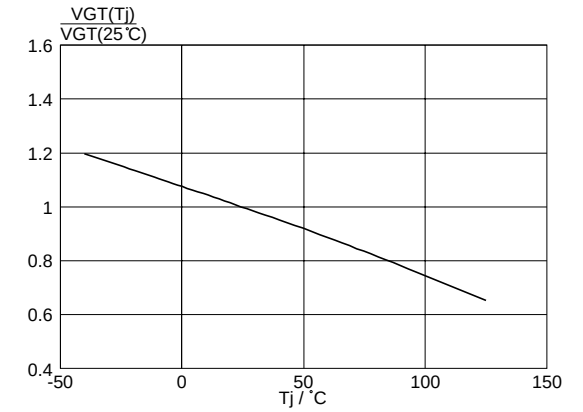


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)/ V_{GT}(25℃)$, versus junction temperature T_j.

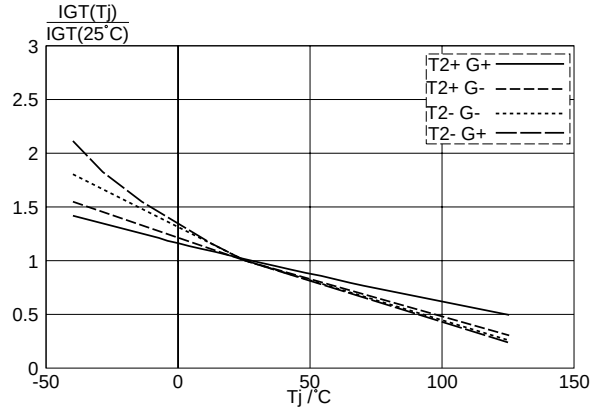


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/ I_{GT}(25^{\circ}C)$, versus junction temperature T_j.

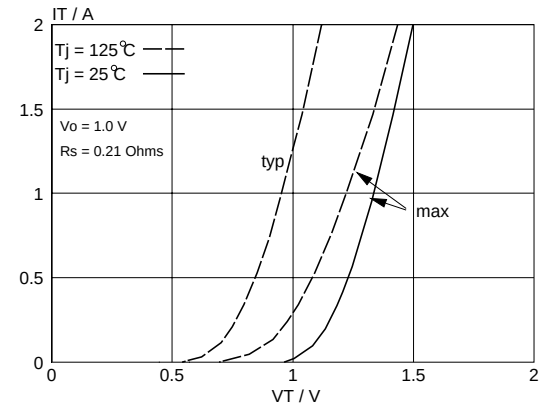


Fig.10. Typical and maximum on-state characteristic.

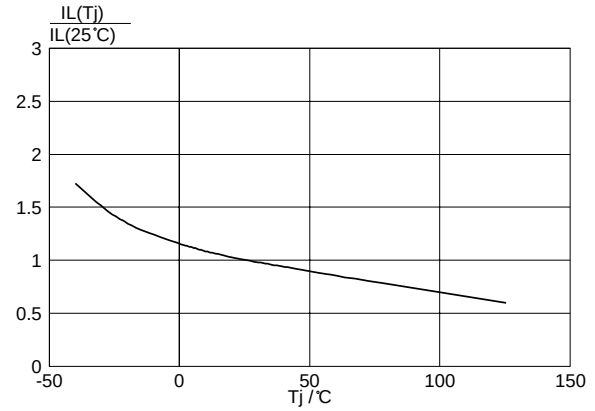


Fig.8. Normalised latching current $I_L(T_j)/ I_L(25^{\circ}C)$, versus junction temperature T_j.

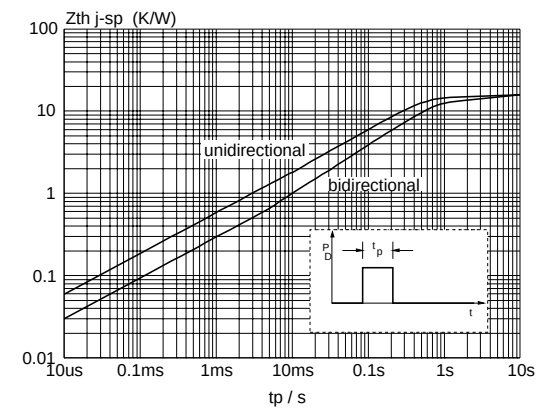


Fig.11. Transient thermal impedance $Z_{th\ j\text{-}sp}$, versus pulse width t_p.

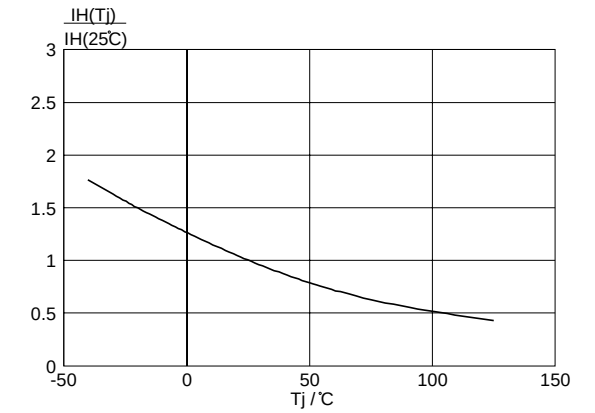


Fig.9. Normalised holding current $I_H(T_j)/ I_H(25^{\circ}C)$, versus junction temperature T_j.

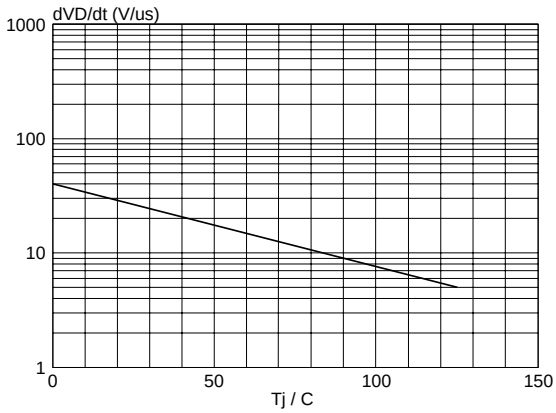


Fig.12. Minimum, critical rate of rise of off-state voltage, dV_D/dt versus junction temperature T_j.

MOUNTING INSTRUCTIONS

Dimensions in mm.

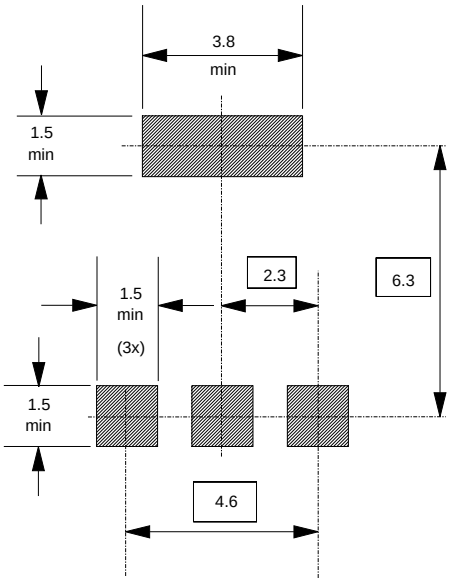


Fig.13. soldering pattern for surface mounting SOT223.

MECHANICAL DATA

Dimensions in mm

Net Mass: 0.11 g

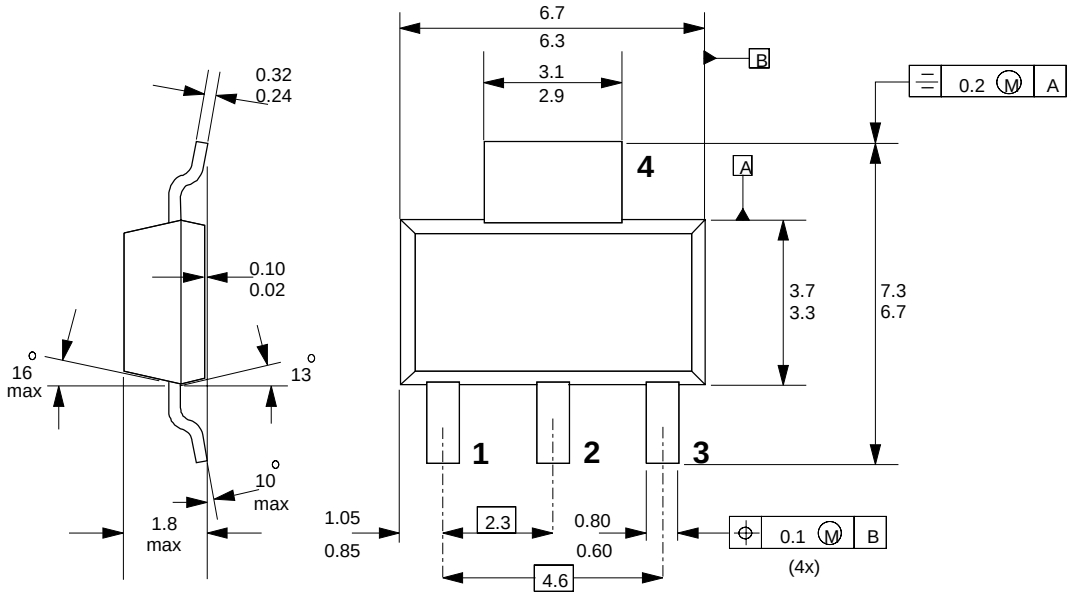


Fig.14. SOT223 surface mounting package.

Notes

1. For further information, refer to Philips publication SC18 " SMD Footprint Design and Soldering Guidelines". Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".