

## 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.

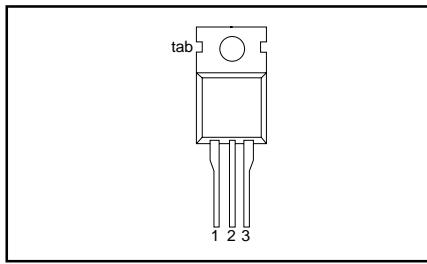
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
$V_{DRM}$	BTA140- Repetitive peak off-state voltages	500 500	600 600	800 800	V
$I_{T(RMS)}$ $I_{TSM}$	RMS on-state current Non-repetitive peak on-state current	25 190	25 190	25 190	A A

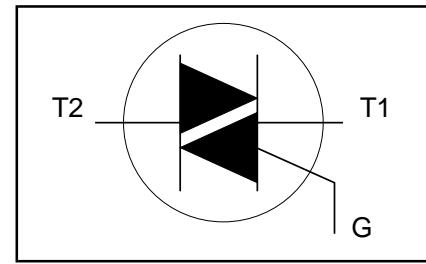
## PINNING - TO220

PIN	DESCRIPTION
1	main terminal 1
2	main terminal 2
3	gate
tab	main terminal 2

## PIN CONFIGURATION



## SYMBOL



## 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 <sup>1</sup>	-600 600 <sup>1</sup>	-800 800	V
$I_{T(RMS)}$ $I_{TSM}$	RMS on-state current Non-repetitive peak on-state current	full sine wave; $T_{mb} \leq 91^\circ\text{C}$ full sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 20\text{ ms}$ $t = 16.7\text{ ms}$ $t = 10\text{ ms}$ $I_{TM} = 30\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-	25			A
$I^2t$ $dl/dt$	$I^2t$ for fusing Repetitive rate of rise of on-state current after triggering		-	190	209	180	$\text{A}^2\text{s}$
$I_{GM}$ $V_{GM}$ $P_{GM}$ $P_{G(AV)}$ $T_{stg}$ $T_j$	Peak gate current Peak gate voltage Peak gate power Average gate power Storage temperature Operating junction temperature	over any 20 ms period	T2+ G+ T2+ G- T2- G- T2- G+	-	50 50 50 10	2 5 5 0.5	$\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$ A V W W °C °C
			-40	150	125		

<sup>1</sup> 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 15 A/ $\mu\text{s}$ .

## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	full cycle	-	-	1.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	half cycle in free air	-	60	1.4	K/W

## STATIC CHARACTERISTICS

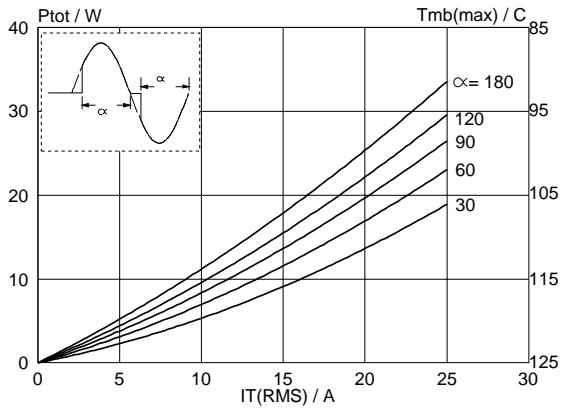
$T_j = 25^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT		
$I_{GT}$	Gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	6	35	mA		
			T2+ G+	-	35	mA		
			T2+ G-	-	35	mA		
			T2- G-	-	35	mA		
$I_L$	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	T2- G+	-	70	mA		
			T2+ G+	-	23	mA		
			T2+ G-	-	8	40		
			T2+ G-	-	30	mA		
$I_H$	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	T2- G-	-	40	mA		
			T2- G-	-	18	mA		
			T2- G+	-	60	mA		
			T2+	-	15	mA		
$V_T$ $V_{GT}$	On-state voltage Gate trigger voltage	$I_T = 30\text{ A}$ $V_D = 12\text{ V}; I_T = 0.1\text{ A}$ $V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 125^\circ\text{C}$	T2-	-	30	mA		
			-	12	30	mA		
$I_D$	Off-state leakage current	$V_D = V_{DRM(\text{max})}; T_j = 125^\circ\text{C}$	-	1.3	1.55	V		
			-	0.7	1.5	V		
			0.25	0.4	-	V		
			-	0.1	0.5	mA		

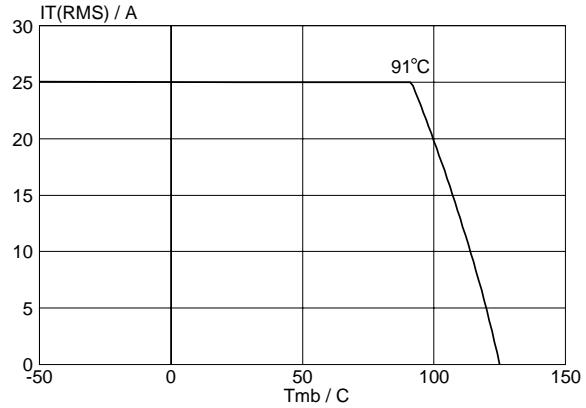
## DYNAMIC CHARACTERISTICS

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

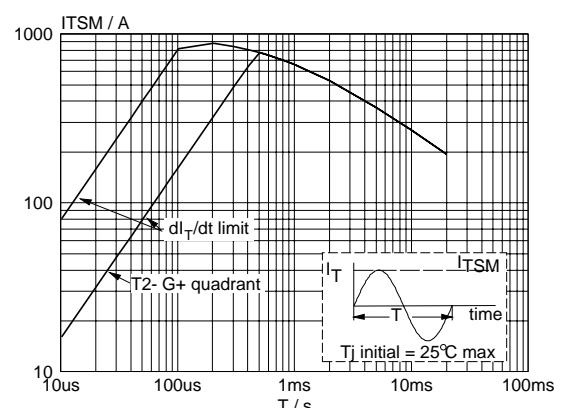
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(\text{max})}; T_j = 125^\circ\text{C};$ exponential waveform; gate open circuit	100	300	-	V/ $\mu\text{s}$
$dV_{com}/dt$	Critical rate of change of commutating voltage	$V_{DM} = 400\text{ V}; T_j = 95^\circ\text{C}; I_{T(\text{RMS})} = 25\text{ A};$ $dl_{com}/dt = 9\text{ A/ms}$ ; gate open circuit	-	10	-	V/ $\mu\text{s}$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 30\text{ A}; V_D = V_{DRM(\text{max})}; I_G = 0.1\text{ A};$ $dl_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	$\mu\text{s}$



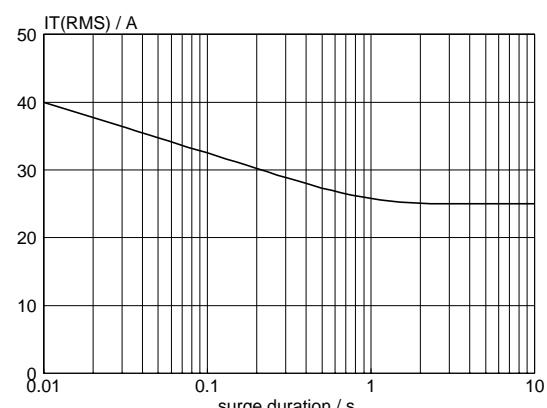
*Fig.1. Maximum on-state dissipation,  $P_{tot}$ , versus rms on-state current,  $I_{T(RMS)}$ , where  $\alpha$  = conduction angle.*



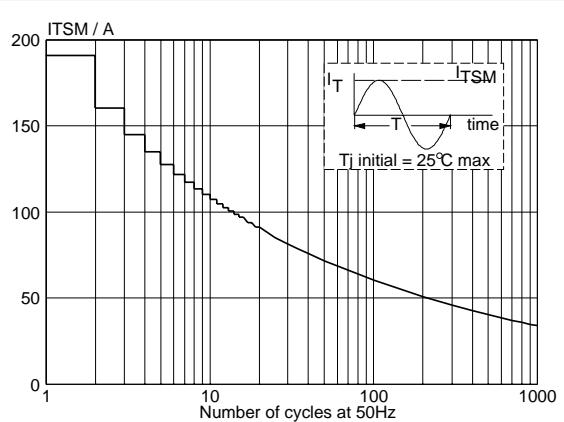
*Fig.4. Maximum permissible rms current  $I_{T(RMS)}$ , versus mounting base temperature  $T_{mb}$ .*



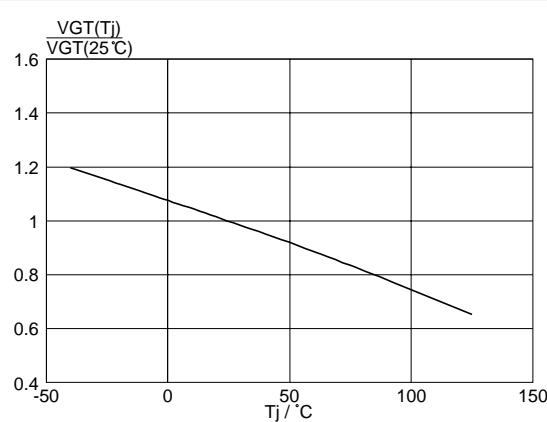
*Fig.2. Maximum permissible non-repetitive peak on-state current  $I_{TSM}$ , versus pulse width  $t_p$ , for sinusoidal currents,  $t_p \leq 20\text{ms}$ .*



*Fig.5. Maximum permissible repetitive rms on-state current  $I_{T(RMS)}$ , versus surge duration, for sinusoidal currents,  $f = 50\text{ Hz}$ ;  $T_{mb} \leq 91^\circ\text{C}$ .*



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



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

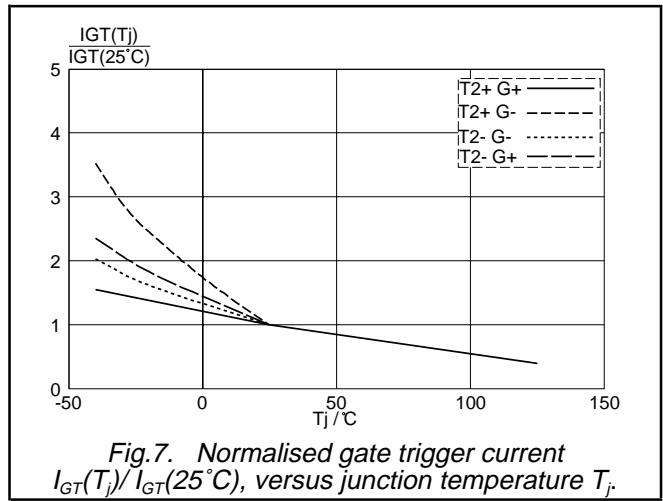


Fig.7. Normalised gate trigger current  $I_{GT}(T_j)/I_{GT}(25^\circ C)$ , versus junction temperature  $T_j$ .

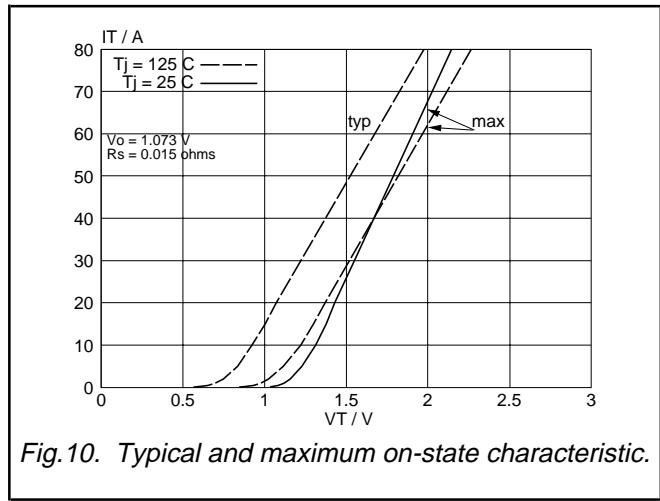


Fig.10. Typical and maximum on-state characteristic.

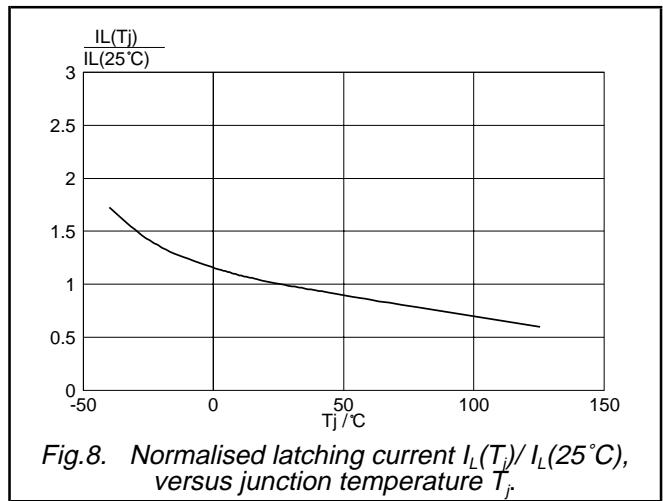


Fig.8. Normalised latching current  $I_L(T_j)/I_L(25^\circ C)$ , versus junction temperature  $T_j$ .

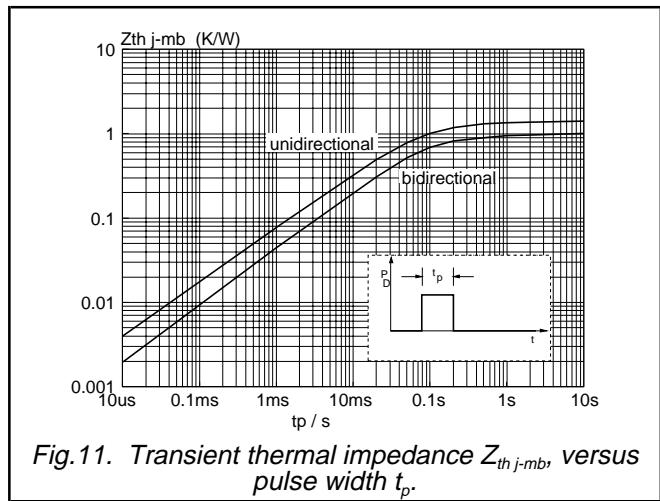


Fig.11. Transient thermal impedance  $Z_{th,j-mb}$ , versus pulse width  $t_p$ .

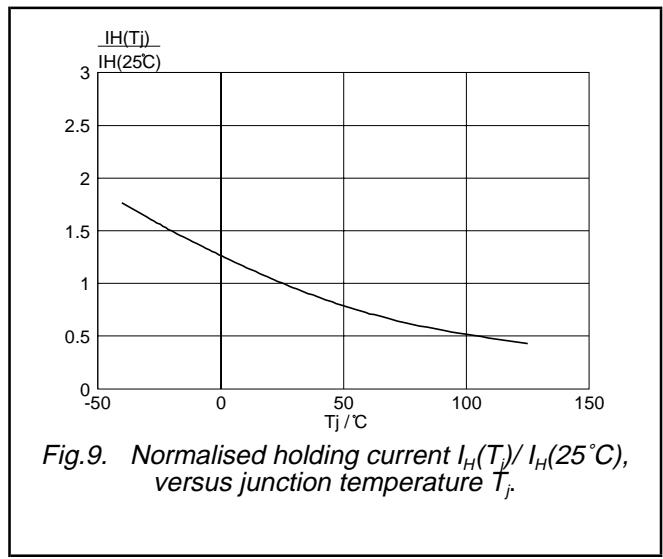


Fig.9. Normalised holding current  $I_H(T_j)/I_H(25^\circ C)$ , versus junction temperature  $T_j$ .

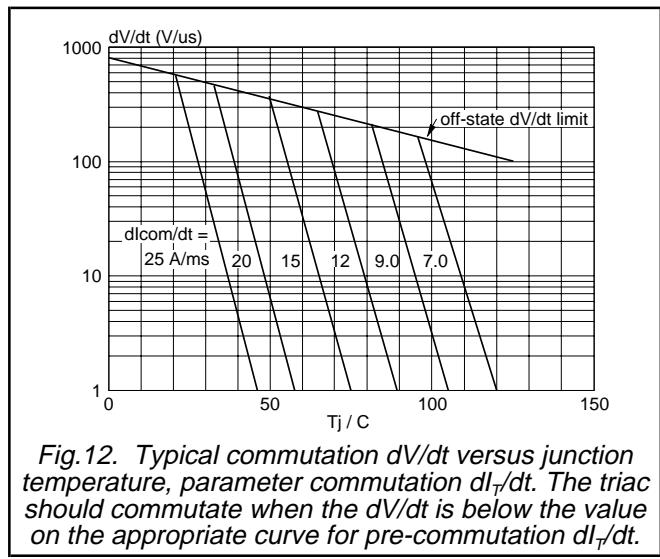


Fig.12. Typical commutation  $dV/dt$  versus junction temperature, parameter commutation  $dl/dt$ . The triac should commute when the  $dV/dt$  is below the value on the appropriate curve for pre-commutation  $dl/dt$ .

## MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

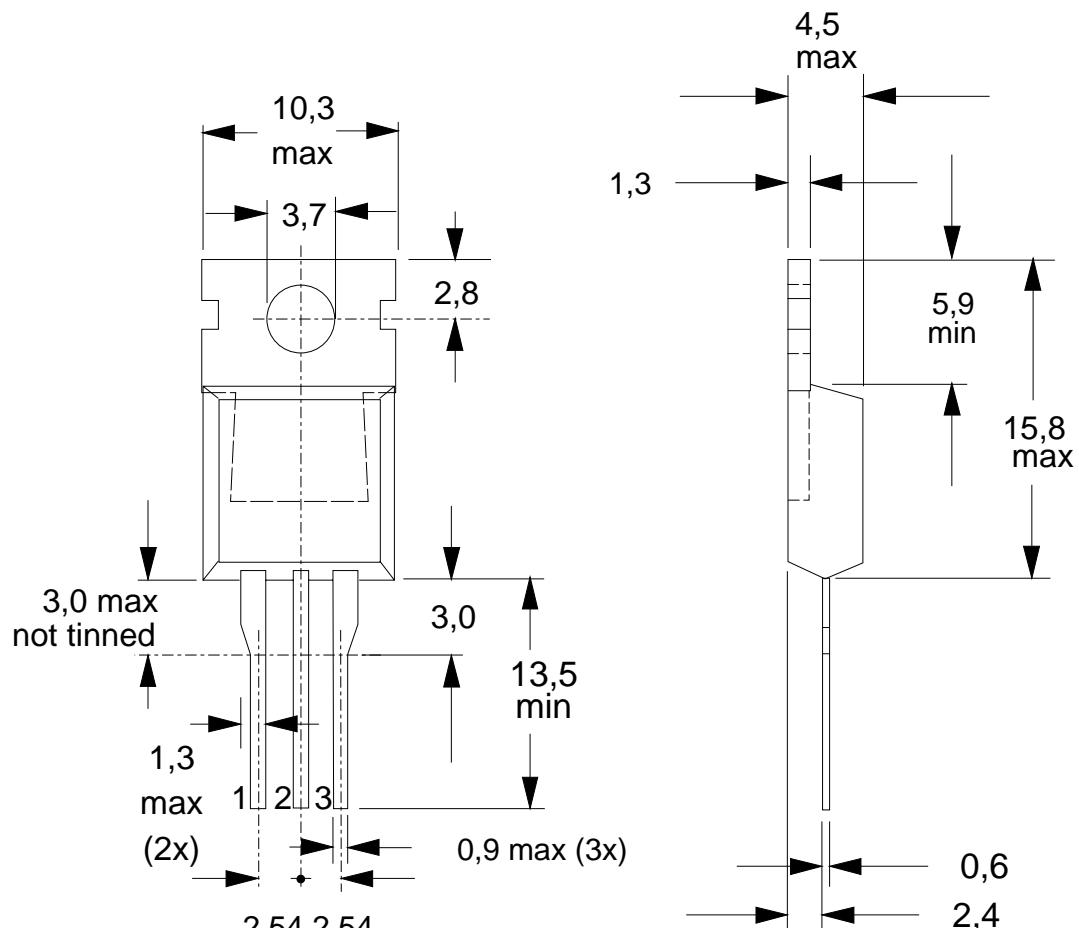


Fig.13. TO220; pin 2 connected to mounting base.

### Notes

1. Refer to mounting instructions for TO220 envelopes.
2. Epoxy meets UL94 V0 at 1/8".