



BT151 series Thyristors



GENERAL DESCRIPTION

Glass passivated thyristors in a plastic envelope, intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

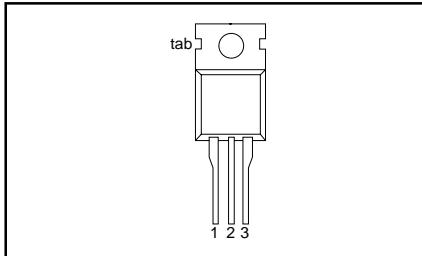
QUICK REFERENCE DATA

SYMBOL	PARAMETER	BT151-			UNIT
		500R	650R	800R	
V_{DRM} , V_{RRM}	Repetitive peak off-state voltages	500	650	800	V
$I_{T(AV)}$	Average on-state current	7.5	7.5	7.5	A
$I_{T(RMS)}$	RMS on-state current	12	12	12	A
I_{TSM}	Non-repetitive peak on-state current	100	100	100	A

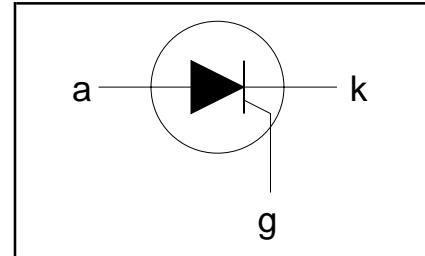
PINNING - TO220AB

PIN	DESCRIPTION
1	cathode
2	anode
3	gate
tab	anode

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-500R 500 ¹	-650R 650 ¹	-800R 800	
V_{DRM} , V_{RRM}	Repetitive peak off-state voltages		-				V
$I_{T(AV)}$ $I_{T(RMS)}$ I_{TSM}	Average on-state current RMS on-state current Non-repetitive peak on-state current	half sine wave, $T_{mb} \leq 109^\circ\text{C}$ all conduction angles half sine wave; $T_j = 25^\circ\text{C}$ prior to surge $t = 10\text{ ms}$ $t = 8.3\text{ ms}$ $t = 10\text{ ms}$ $I_{TM} = 20\text{ A}; I_G = 50\text{ mA};$ $dI_G/dt = 50\text{ mA}/\mu\text{s}$	- - - - - - - - over any 20 ms period		7.5 12 100 110 50 50 2 5		A A A A A ² A/ μs
I^2t dI_t/dt	I^2t for fusing Repetitive rate of rise of on-state current after triggering						
I_{GM} V_{GM} V_{RGM} P_{GM} $P_{G(AV)}$ T_{stg} T_j	Peak gate current Peak gate voltage Peak reverse gate voltage Peak gate power Average gate power Storage temperature Operating junction temperature						A V V W W °C °C

¹ Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed 15 A/ μs .



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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base		-	-	1.3	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	60	-	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	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	2	15	mA
I_L	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	10	40	mA
I_H	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	7	20	mA
V_T	On-state voltage	$I_T = 23\text{ A}$	-	1.4	1.75	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	0.6	1.5	V
I_D, I_R	Off-state leakage current	$V_D = V_{DRM(max)}; I_T = 0.1\text{ A}; T_j = 125^\circ\text{C}$ $V_D = V_{DRM(max)}; V_R = V_{RRM(max)}; T_j = 125^\circ\text{C}$	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	$V_{DM} = 67\% V_{DRM(max)}; T_j = 125^\circ\text{C}$; exponential waveform;				
t_{gt}	Gate controlled turn-on time	Gate open circuit $R_{GK} = 100\ \Omega$	50 200	130 1000	- -	V/ μ s V/ μ s
t_q	Circuit commutated turn-off time	$I_{TM} = 40\text{ A}; V_D = V_{DRM(max)}; I_G = 0.1\text{ A};$ $dI_G/dt = 5\text{ A}/\mu\text{s}$ $V_D = 67\% V_{DRM(max)}; T_j = 125^\circ\text{C}$; $I_{TM} = 20\text{ A}; V_R = 25\text{ V}; dI_{TM}/dt = 30\text{ A}/\mu\text{s};$ $dV_D/dt = 50\text{ V}/\mu\text{s}; R_{GK} = 100\ \Omega$	-	2 70	- -	μ s μ s

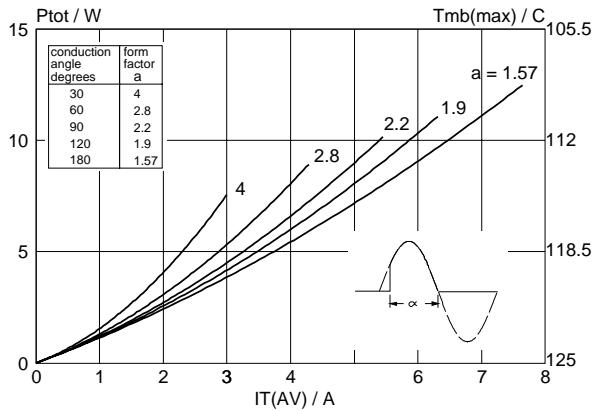


Fig.1. Maximum on-state dissipation, P_{tot} , versus average on-state current, $I_{T(AV)}$, where $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$.

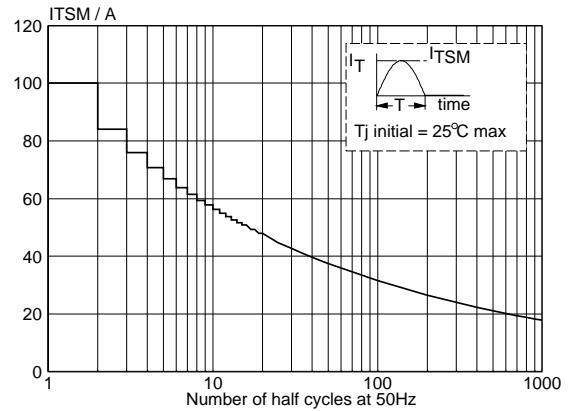


Fig.4. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50$ Hz.

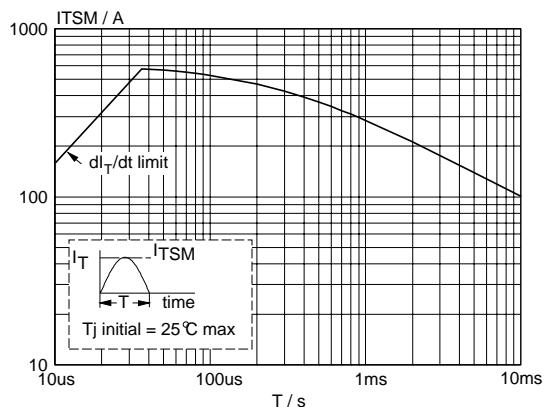


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 10\text{ms}$.

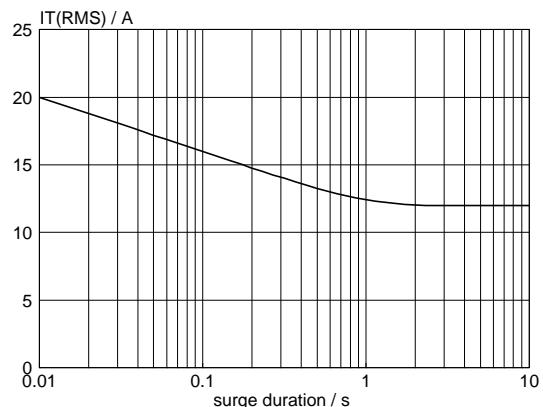


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50$ Hz; $T_{mb} \leq 109^\circ\text{C}$.

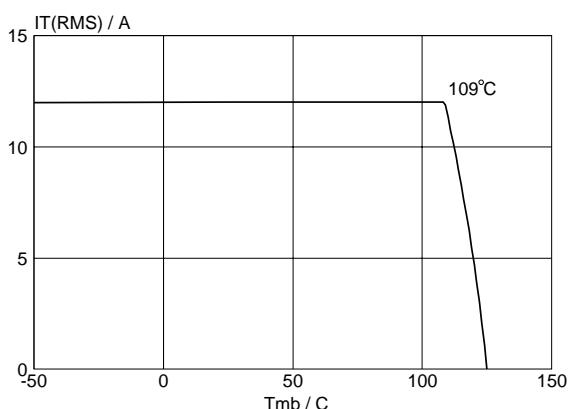


Fig.3. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

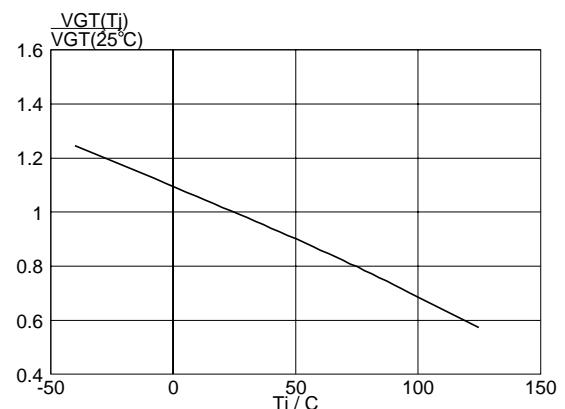


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

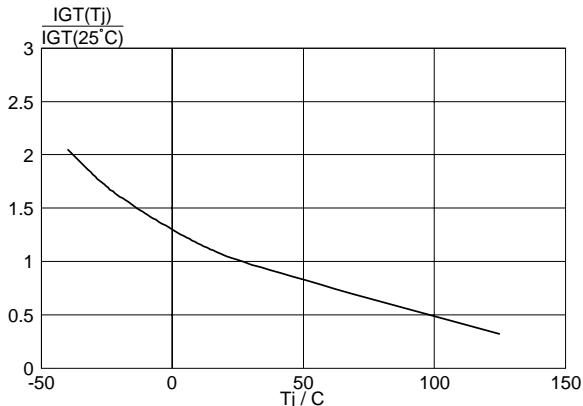


Fig.7. Normalised gate trigger current $I_{GT}(T_j)/I_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

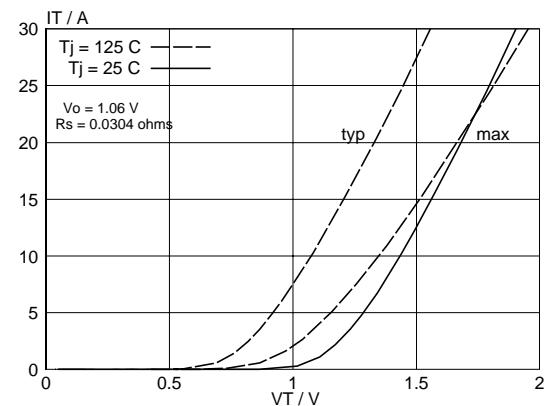


Fig.10. Typical and maximum on-state characteristic.

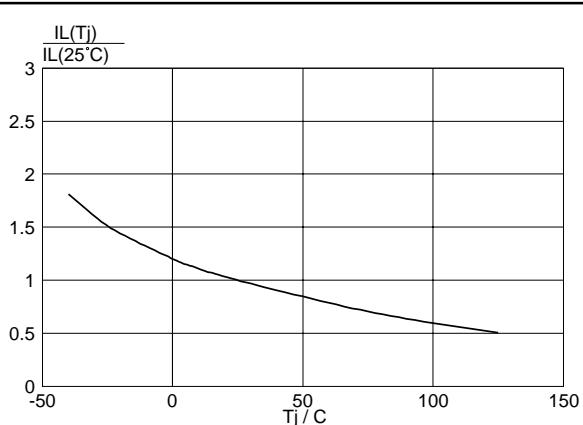


Fig.8. Normalised latching current $I_L(T_j)/I_L(25^\circ\text{C})$, versus junction temperature T_j .

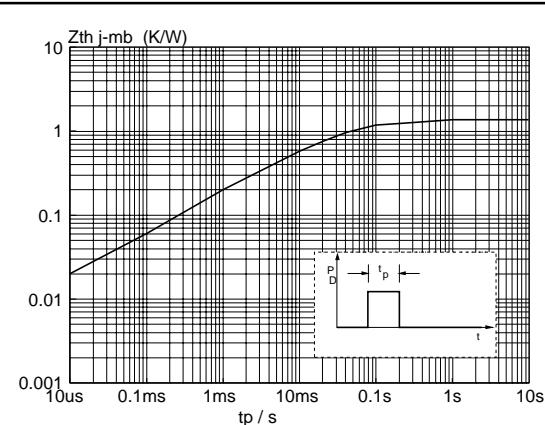


Fig.11. Transient thermal impedance $Z_{th,j-mb}$, versus pulse width t_p .

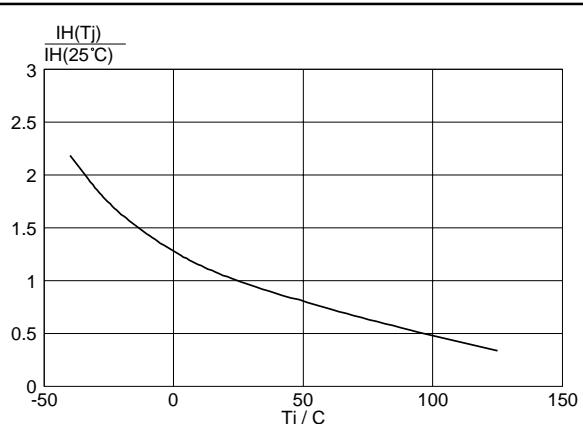


Fig.9. Normalised holding current $I_H(T_j)/I_H(25^\circ\text{C})$, versus junction temperature T_j .

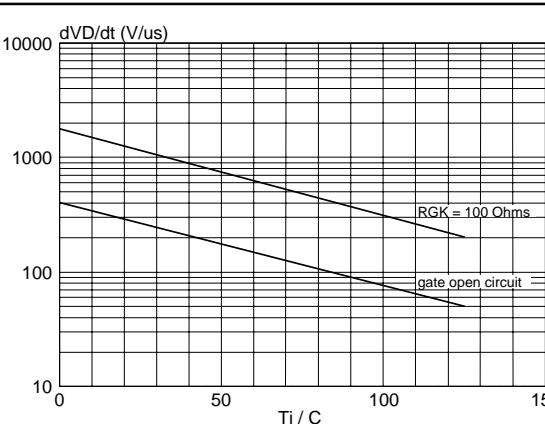


Fig.12. Typical, critical rate of rise of off-state voltage, dV_D/dt versus junction temperature T_j .

MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

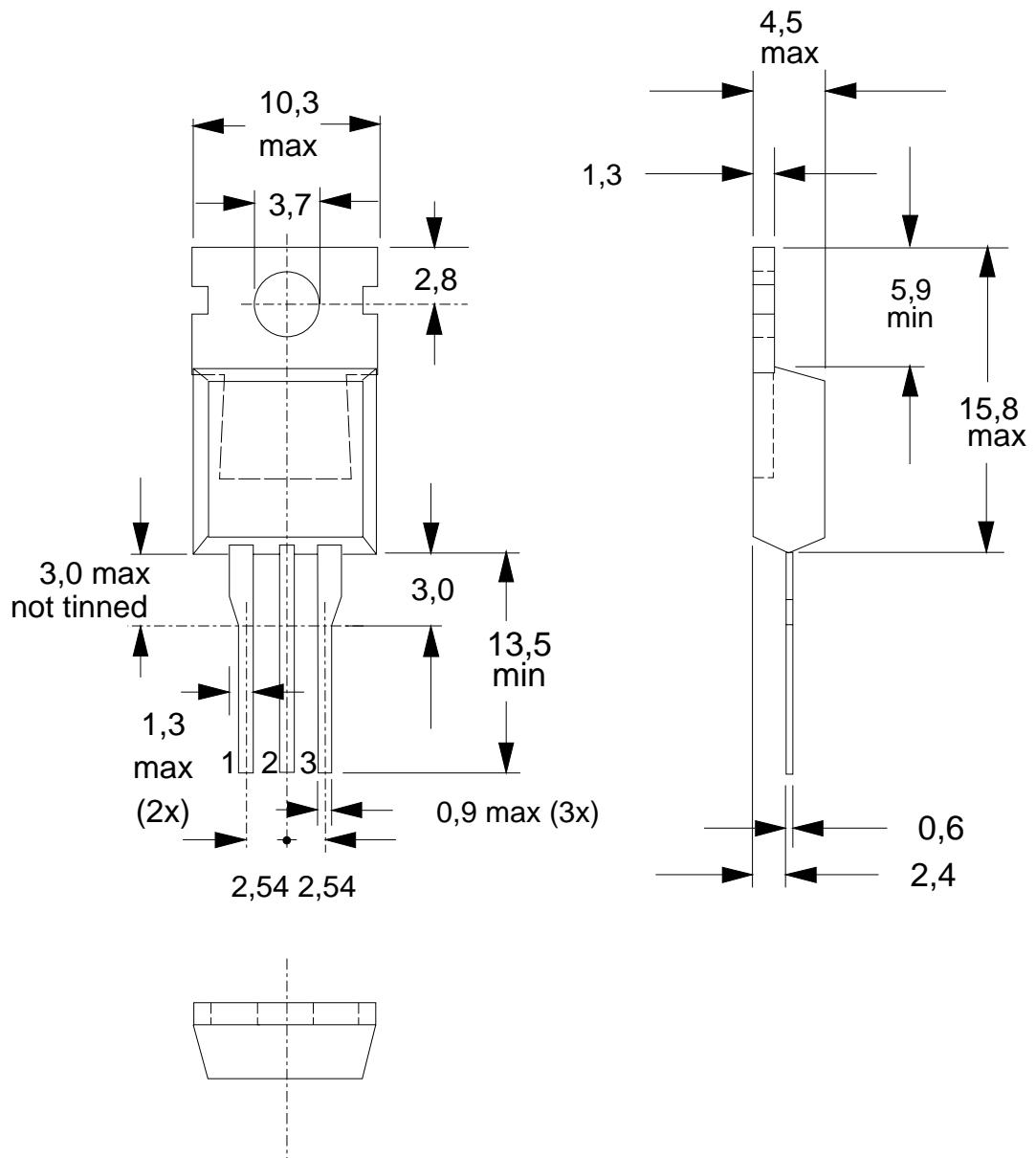


Fig.13. TO220AB; pin 2 connected to mounting base.

Notes

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

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