

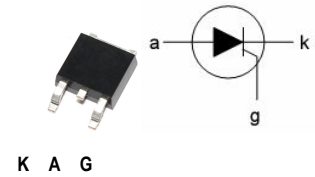
BT151

Thyristors

General Description

- ◆ Package: TO-252A
- ◆ 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.

DRAWING



Limiting Values

Limiting values in accordance with the absolute Maximum System(IEC134)

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
V_{DRM}, V_{RRM}	Repetitive peak off-state Voltages			600	V
$I_{T(AV)}$	Average on-state current	half sine wave; $T_{mb} \leq 109^{\circ}\text{C}$		7.5	A
$I_{T(RMS)}$	RMS on-state current	all conduction angles		12	A
I_{TSM}	Non-repetitive peak on-state current	half sine wave; $T_j = 25^{\circ}\text{C}$ prior to surge			
		$t = 10\text{ms}$		100	A
		$t = 8.3\text{ms}$		110	A
I^2T	I^2T for fusing	$t = 10\text{ms}$		50	A^2S
Dit/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 20\text{A}; I_G = 50\text{mA}; \text{Dig/dt} = 50\text{mA/us}$		50	A/us
I_{GM}	Peak gate current			2	A
V_{gm}	Peak gate voltage			5	V
V_{RGM}	Peak reverse 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	$^{\circ}\text{C}$
T_j	Operating junction temperature			125	$^{\circ}\text{C}$

Thermal Resistances

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
R_{thj-mb}	Thermal resistance junction to mounting base				1.8	K/W
R_{thj-a}	Thermal resistance junction to ambient			75		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 =12V; I _T =0.1A		2	15	mA
I _L	Latching current	V _D =12V; I _{GT} =0.1A		10	40	mA
I _H	Holding current	V _D =12V; I _{GT} =0.1A		7	20	mA
V _T	On-state voltage	I _T =23A		1.4	1.75	V
V _{GT}	Gate trigger voltage	V _D =12V; I _T =0.1A		0.6	1.5	V
		V _D =V _{DRM(MAX)} ; I _T =0.1A; T _J =125°C	0.25	0.4		V
I _D , I _R	Off-state leakage current	V _D =V _{DRM(MAX)} ; V _R =V _{RRM(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
DVD/dt	Critical rate of rise or off-state voltage	V _{DM} =67%V _{DRM(MAX)} ; T _J =125°C; exponential waveform;				
		Gate open circuit	50	130		V/us
		RGK=100Ω	200	1000		V/us
t _{gt}	Gate controlled turn-on time	ITM=40A; VD=V _{DRM(MAX)} ; IG=0.1A Dig/dt=5A/us		2		us
t _q	Circuit commutated turn-off time	VD=67%V _{DRM(MAX)} ; T _J =125°C		70		us
		ITM=20A; VR=25V; Ditm/dt=30A/us				
		dvd/dt=50V/us; Rgk=100Ω				

Typical Characteristics

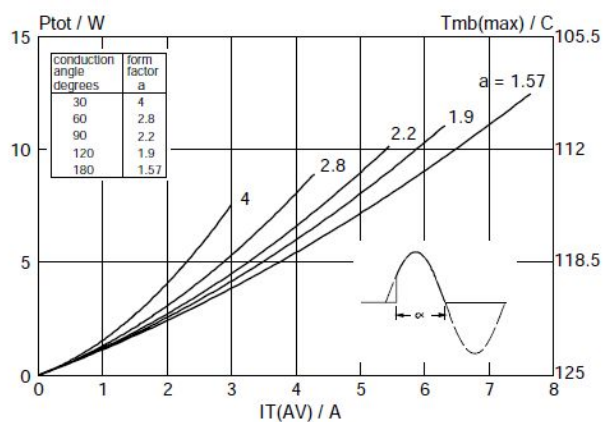


Fig.1. Maximum on-state dissipation, P_{tot} , versus average on-state current, $I_{T(AV)}$, where $a = \text{form factor} = I_{T(RMS)} / I_{T(AV)}$.

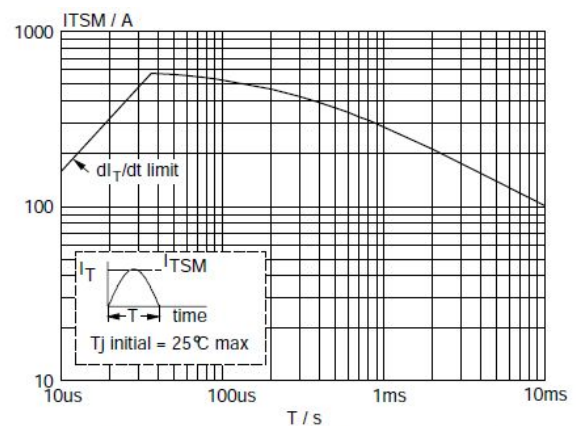


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM} versus pulse width t_p for sinusoidal currents, $t_p \leq 10\text{ms}$.

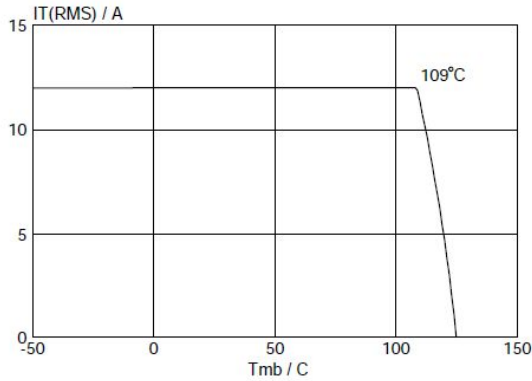


Fig.3. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{mb} .

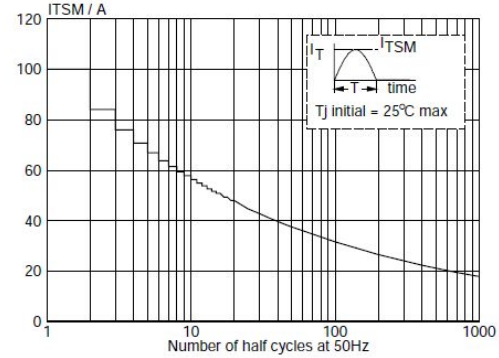


Fig.4. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50 \text{ Hz}$.

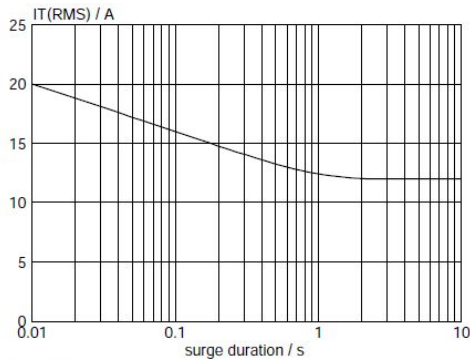


Fig.5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50 \text{ Hz}$; $T_{mb} \leq 109^\circ\text{C}$.

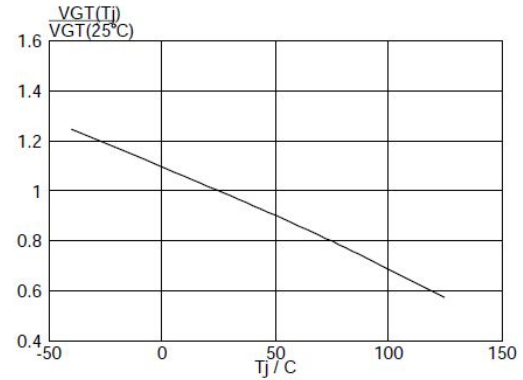


Fig.6. Normalised gate trigger voltage $V_{GT}(T_J) / V_{GT}(25^\circ\text{C})$, versus junction temperature T_J .

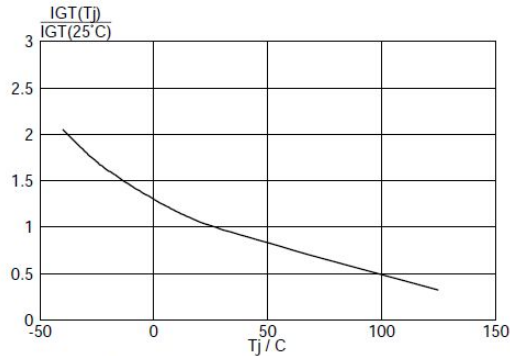


Fig.7. Normalised gate trigger current $I_{GT}(T_J) / I_{GT}(25^\circ\text{C})$, versus junction temperature T_J .

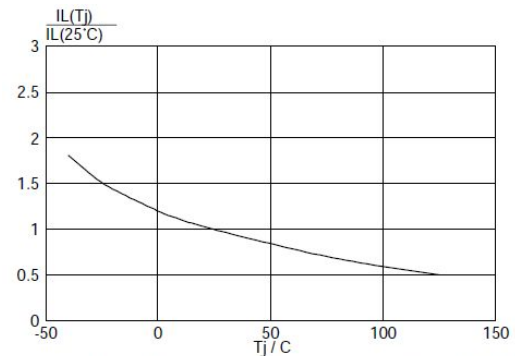


Fig.8. Normalised latching current $I_L(T_J) / I_L(25^\circ\text{C})$, versus junction temperature T_J .

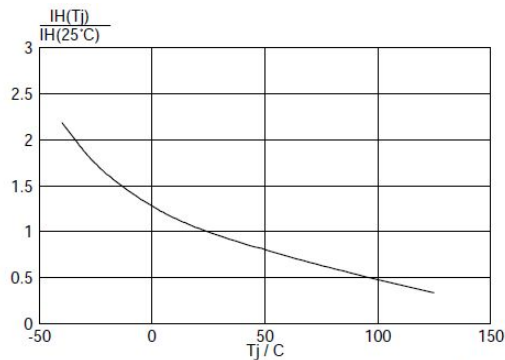


Fig.9. Normalised holding current $I_H(T_J) / I_H(25^\circ\text{C})$, versus junction temperature T_J .

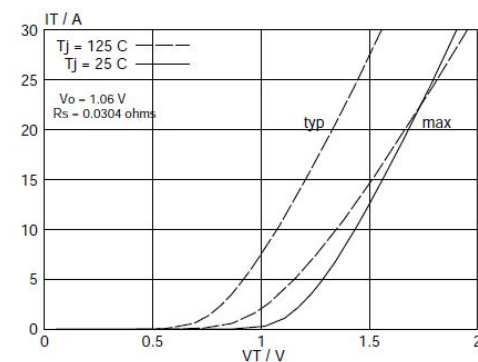


Fig.10. Typical and maximum on-state characteristic.

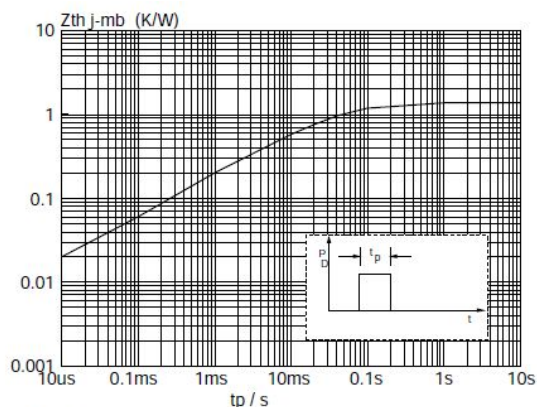


Fig.11. Transient thermal impedance $Z_{th\ j-mb}$ versus pulse width t_p .

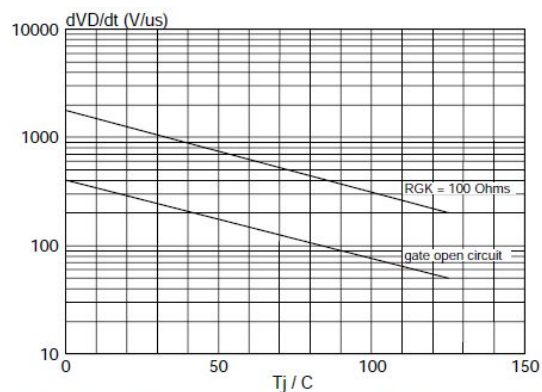


Fig.12. Typical, critical rate of rise of off-state voltage, dV_d/dt versus junction temperature T_j .

Mechanical Dimensions

