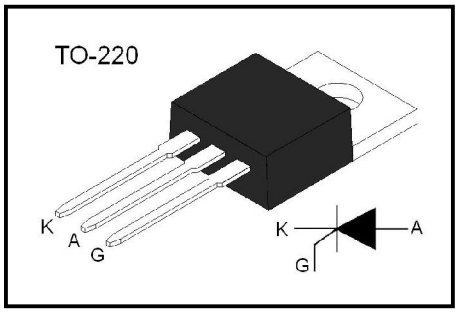
BT152 TO-220 Plastic-Encapsulate Thyristors

Applications

Glasspassivated thyristors ina 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.



Absolute Maximum Rating (T_C=25°C unless otherwise specified)

Parameter	Symbol	Conditions		Ratings	Unit
Repetitive peak off-state voltage	V_{DRM}			600/800	V
Repetitive peak reverse voltage	V_{RRM}			600/800	
Average on-state current	$I_{T(AV)}$			12	A
RMS on-state current	$I_{T(RMS)}$	full sine wave; Tmb ≤ 95°C		20	A
Non-repetitive peak on-state current	I_{TSM}	full sine wave; T_j = 25 °C prior to surge	t = 10 ms t = 8.3 ms	200 220	A
I^2t value	I^2t	t = 10 ms		200	A^2/s
Repetitive rate of rise of on-state current after triggering	dI_T/dt	I_{TM}=20A, I_G=50mA, dI_G/dt=50mA/μs		50	A/μs
Peak gate current	I_{GM}			5	A
Peak gate voltage	V_{GM}			5	V
Peak reverse gate voltage	V_{RGM}			5	V
Peak gate power	P_{GM}			20	W
Average gate power	$P_{G(AV)}$	over any 20 ms period		0.5	W
Operating junction temperature	T_j			110	°C
Storage temperature	T_{stg}			–40 ~ +150	°C

Note:

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 15A/μs.
2. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings onlyand functional device operation is not implied.

Thermal Characteristics

Parameter	Symbol	Ratings	Unit
Junction to Mounting Base	$R_{\theta JMb}$	1.3	°C / W
Junction to Ambient	$R_{\theta JA}$	60	°C / W

Static Characteristics (T_j = 25 °C unless otherwise stated)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Gate trigger current	I_{GT}	V_D = 12 V; I_T = 0.1 A		5	30	mA
Latching current	I_L	V_D = 12 V; I_{GT} = 0.1 A		25	80	mA
Holding current	I_H	V_D = 12 V; I_{GT} = 0.1 A	-	15	60	mA
On-state voltage	V_T	I_T = 23A	-	1.4	1.75	V
Gate Trigger Voltage	V_{GT}	V_D = 12 V; I_T = 0.1 A V_D = V_{DRM}; I_T = 0.1 A	- 0.25	0.6 0.4	1.5 -	V
Off-state leakage current	I_D	V_D = $V_{DRM(max)}$; T_j = 125 °C	-		0.5	mA
Reverse current	I_R	V_D = $V_{DRM(max)}$; T_j = 125 °C	-		0.5	mA

Dynamic Characteristics (T_j = 25 °C unless otherwise stated)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Critical rate of rise of off-state voltage	dV_D/dt	V_{DM}=67%$V_{DRM(max)}$;T_j=125˚C; exponentialwaveform;	Gate open	50	130		V/μs
			R_{GK} = 100Ω	200	1000		
Gate controlled turn-on time	t_{gt}	I_{TM} = 40A; V_D =$V_{DRM(max)}$; I_G = 0.1 A; dI_G/dt = 5 A/μs			2		μs
Circuit commutated turn-off time	t_q	V_D = 67% $V_{DRM(max)}$; T_j = 125 ˚C; I_{TM} = 20 A; V_R = 25V; dI_{TM}/dt = 30 A/μs; dV_D/dt = 50 V/μs; R_{GK} = 100 Ω		-	70		μs

Typical Characteristics

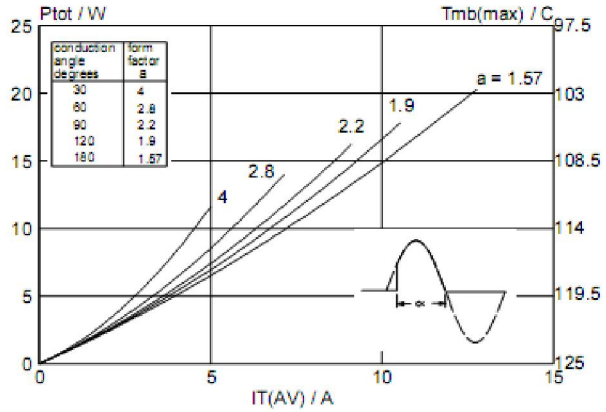


Fig.1. Maximum on-state dissipation, Ptot, vs $I_{T(AV)}$, where a = form factor = $I_{T(RMS)}$/ $I_{T(AV)}$

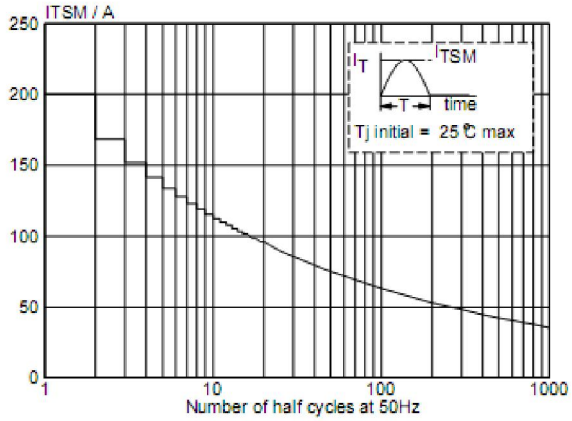


Fig.2. Maximum permissible non-repetitive peak on-state current I_{TSM}, vs number of cycles, for sinusoidal currents, f = 50 Hz.

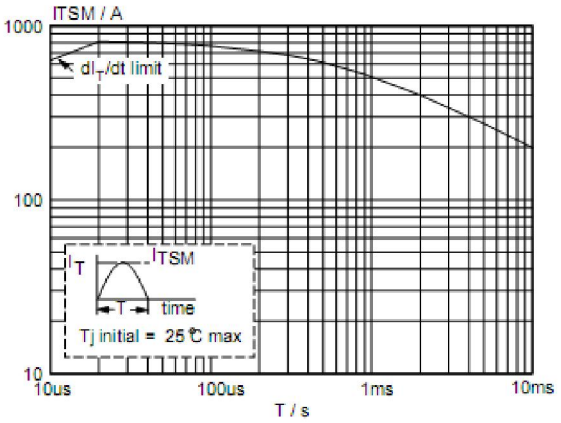


Fig.3. Maximum permissible non-repetitive peak on-state current I_{TSM}, vs pulse width tp, for sinusoidal currents, tp ≤ 10ms

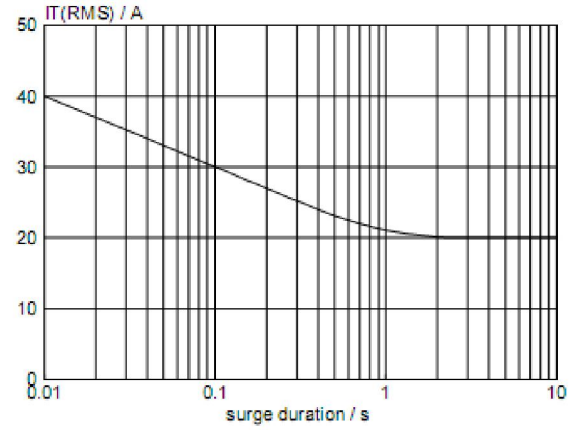


Fig.4. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, vs surge duration, for sinusoidal currents, f = 50 Hz; Tmb ≤ 95˚C.

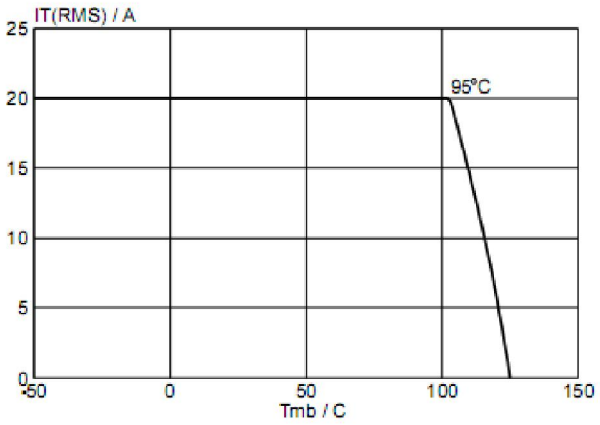


Fig.5. Maximum permissible rms current $I_{T(RMS)}$, vs mounting base temperature T_{mb}.

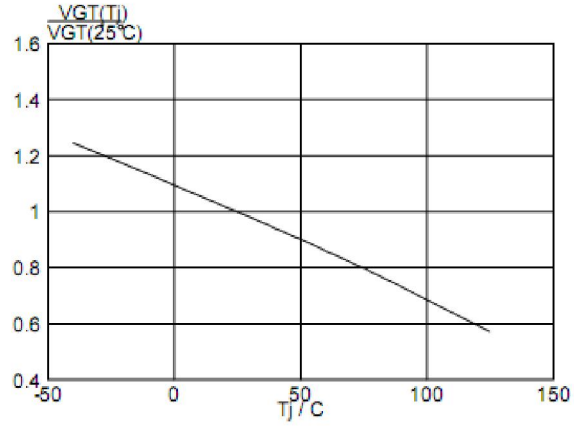


Fig.6. Normalised gate trigger voltage $V_{GT}(T_j)$/ $V_{GT}(25^{\circ}C)$, vs T_j .

Typical Characteristics

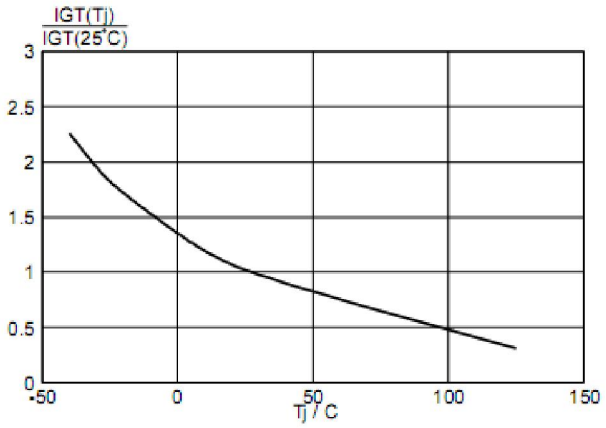


Fig.7. Normalised gate trigger current $I_{GT}(T_j)$/ $I_{GT}(25^{\circ}C)$, vs T_j .

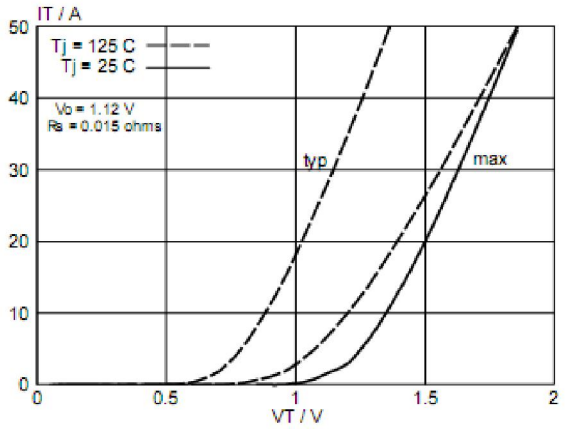


Fig.8. Typical and maximum on-state characteristic.

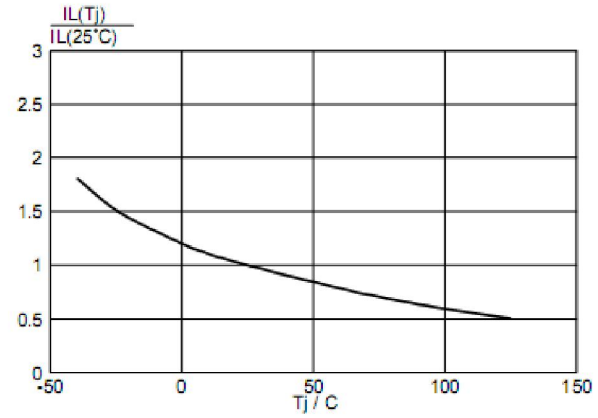


Fig.9. Normalised latching current $I_L(T_j)$/ $I_L(25^{\circ}C)$, vs T_j .

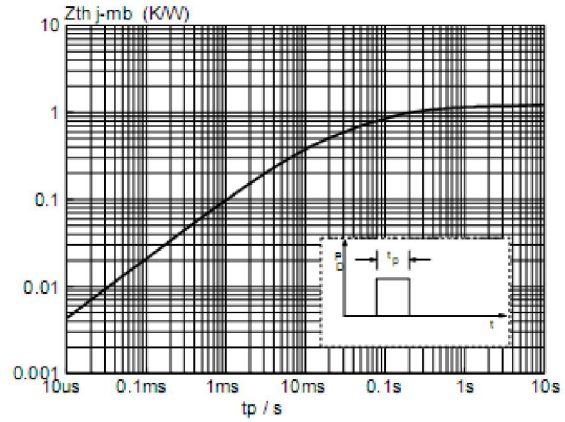


Fig.10. Transient thermal impedance $Z_{th\ j\text{-}mb}$, vs pulse width tp.

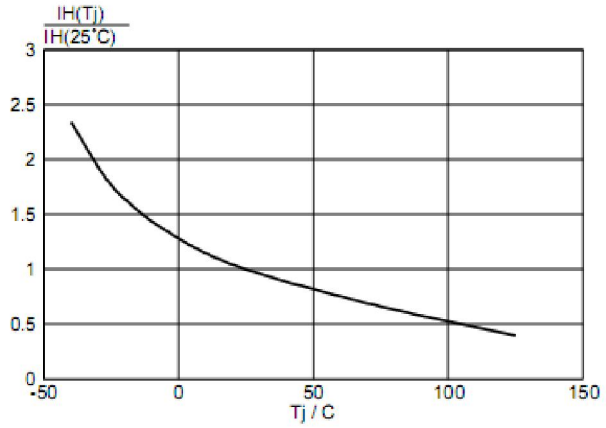


Fig.11. Normalised holding current $I_H(T_j)$/ $I_H(25^{\circ}C)$, vs T_j .

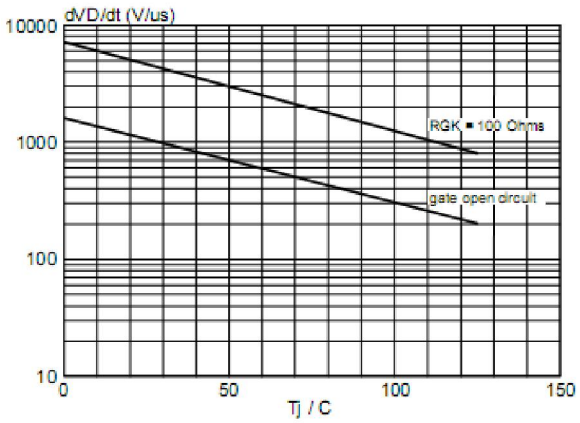
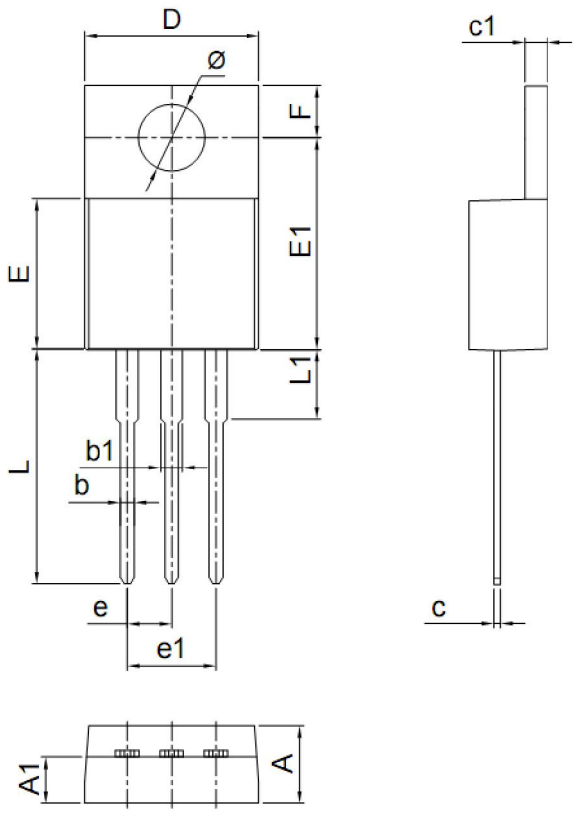


Fig.12. Typical, critical rate of rise of off-state voltage, dV_D/dt vs T_j .

Package Dimensions



Dim	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.34	4.67	0.171	0.184
A1	2.52	2.82	0.099	0.111
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
c	0.30	0.50	0.012	0.020
c1	1.17	1.37	0.046	0.054
D	9.90	10.20	0.390	0.402
E	8.50	8.90	0.335	0.350
E1	12.00	12.50	0.472	0.492
e	2.44	2.64	0.096	0.104
e1	4.88	5.28	0.192	0.208
F	2.60	2.80	0.102	0.110
L	13.20	13.80	0.520	0.543
L1	3.80	4.20	0.150	0.165
Φ	3.60	3.96	0.142	0.156