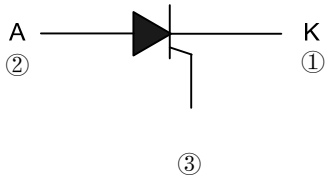
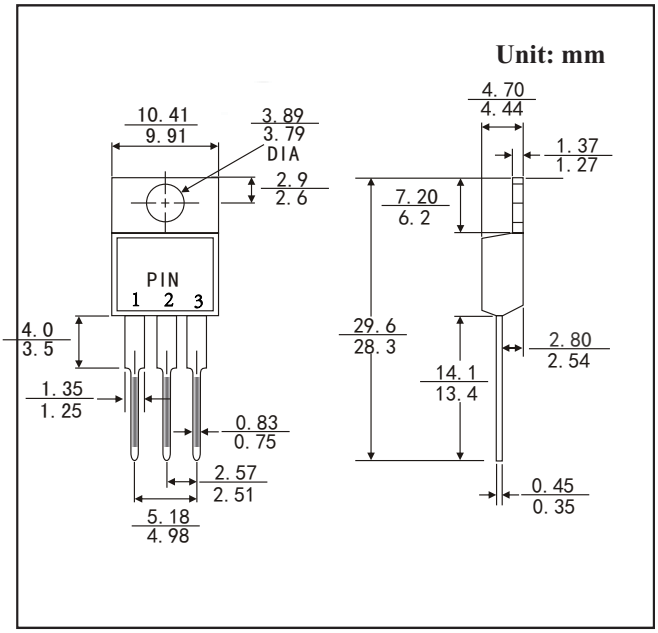
TO-220AB Silicon Controlled Rectifier

Description

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.

Symbol





MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Repetitive Peak Off-State Voltages	BT151(F)-500R	V_{DRM}, V_{RRM}	500 (Note 2)	V
	BT151(F)-650R		650 (Note 2)	
	BT151(F)-800R		800	
Average On-State Current (half sine wave; T_{mb} ≤109°C)		$I_{T(AV)}$	7.5	A
RMS on-State Current (all conduction angles)		$I_{T(RMS)}$	12	A
Non-Repetitive Peak On-State Current (half sine wave; T_J = 25 °C prior to surge)	t = 10 ms	I_{TSM}	100	A
	t = 8.3 ms		110	
I^2t for Fusing (t = 10 ms)		I^2t	50	A^2s
Repetitive Rate of Rise of On-State Current After Triggering (I_{TM} = 20 A; I_G = 50 mA; dI_G/dt = 50 mA/μs)		d_{IT}/dt	50	A/μs
Peak Gate Current		I_{GM}	2	A
Peak Gate Voltage		V_{GM}	5	V
Peak Reverse Gate Voltage		V_{RGM}	5	V
Peak Gate Power		P_{GM}	5	W
Average Gate Power (Over any 20 ms period)		$P_{G(AV)}$	0.5	W
Operating Junction Temperature		T_J	125	°C
Storage Temperature		T_{STG}	-40 ~150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. 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.

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Mounting Base	TO-220	θ_{JMb}	1.3	K/W
Junction to Ambient	TO-220	θ_{JA}	60	K/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			10	mA
Latching Current	I_L	V_D = 12 V, I_{GT} = 0.1 A			40	mA
Holding Current	I_H	V_D = 12 V, I_{GT} = 0.1 A			30	mA
On-State Voltage	V_T	I_T = 23 A			1.75	V
Gate Trigger Voltage	V_{GT}	V_D = 12 V, I_T = 0.1 A V_D = $V_{DRM(max)}$, I_T = 0.1 A, T_J = 125 °C	0.35		1.5	
Off-State Leakage Current	I_D , I_R	V_D = $V_{DRM(max)}$, V_R = $V_{RRM(max)}$, T_J = 125°C			0.5	mA

DYNAMIC CHARACTERISTICS (T_J = 25°C, unless otherwise stated)

PARAMETER	SYMBOL	CONDITIONS		MIN	MAX	UNIT	
Critical Rate of Rise of Off-State Voltage	dV_D/dt	V_{DM} = 67% $V_{DRM(max)}$, T_J = 125 °C, exponential waveform;	Gate open circuit	50	130		V/μs
			R_{GK} = 100Ω	200	1000		
Gate Controlled Turn-on Time	t_{GT}	I_{TM} = 40 A, 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 = 25 V, 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, p_{tot}, Versus Average On-State Current, $I_{T(AV)}$, Where a=form factor=$I_{T(RMS)}/I_{T(AV)}$

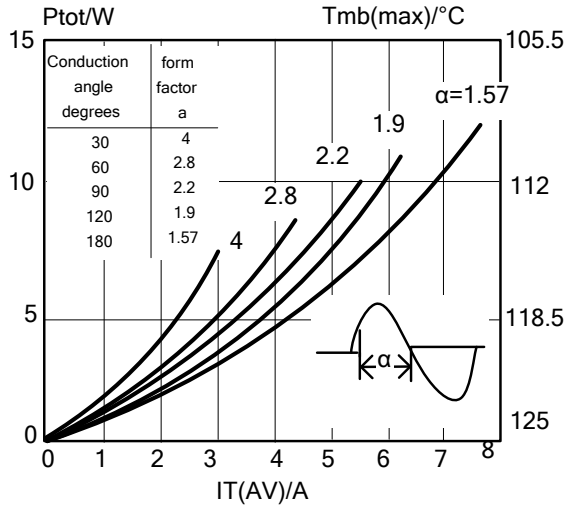


Fig 2. Maximum Permissible Non-Repetitive Peak On-State Current ITSM,Versus Pulse Width tp, for Sinusoidal Currents, tp ≤ 10ms ITSM/A

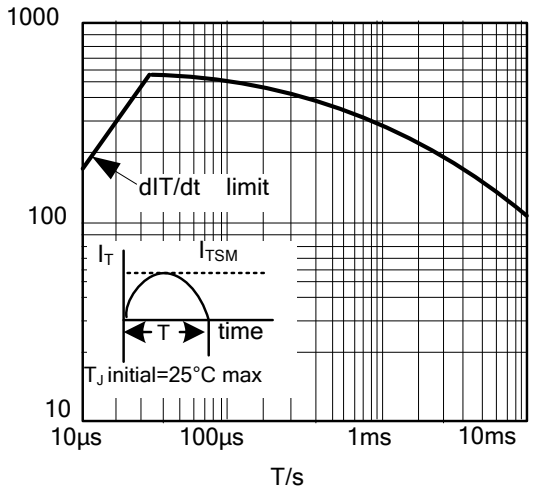


Fig 3. Maximum Permissible Rms Current IT(RMS), Versus Mounting Base Temperature Tmb

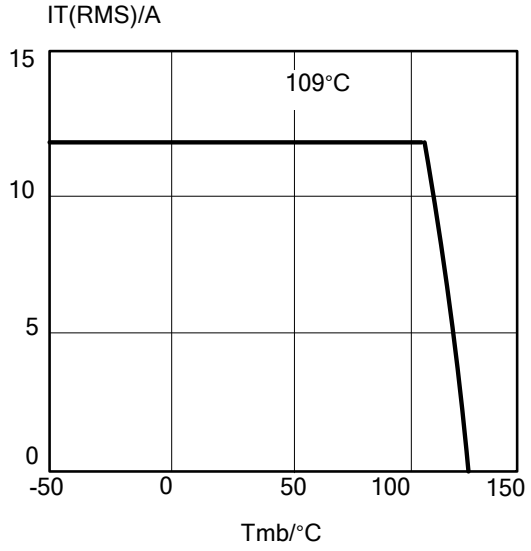


Fig 4. Maximum Permissible Non-Repetitive Peak On-State Current I_{TSM},Versus Number Of Cycles,For Sinusoidal Currents, f=50HZ

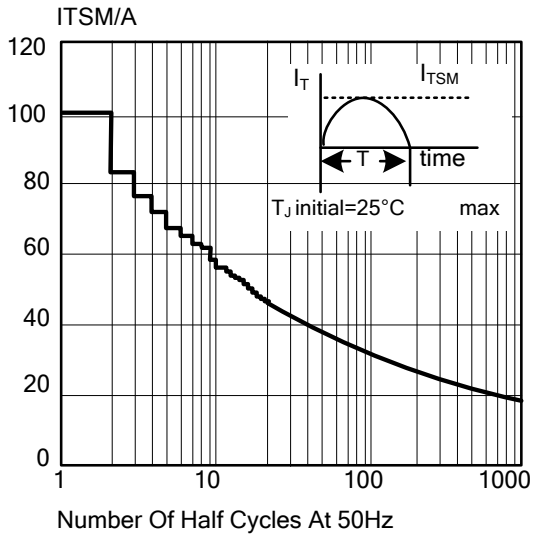


Fig 5. Maximum Permissible Repetitive Rms On-State Current IT(RMS),Versus Surge Duration,For Sinusoidal Currents, f=50HZ; Tmb ≤109°C

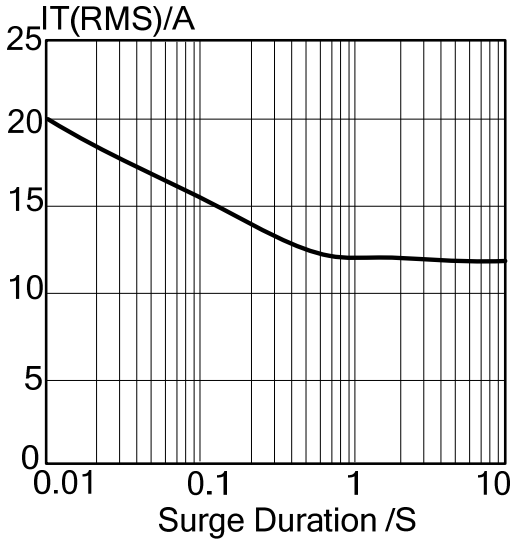
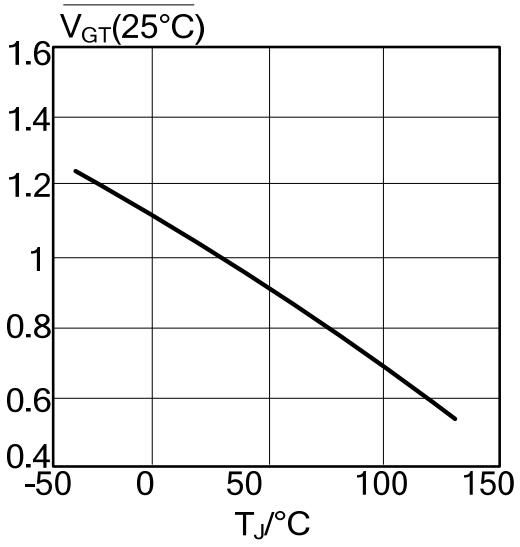


Fig 6. Normalised Gate Trigger Voltage $V_{GT}(T_J)/V_{GT}(25°C)$,Versus Junction Temperature T_J



TYPICAL CHARACTERISTICS(Cont.)

Fig 7. Normalised Gate Trigger Current $I_{GT}(T_J)$/ $I_{GT}(25°C)$, Versus Junction Temperature T_J

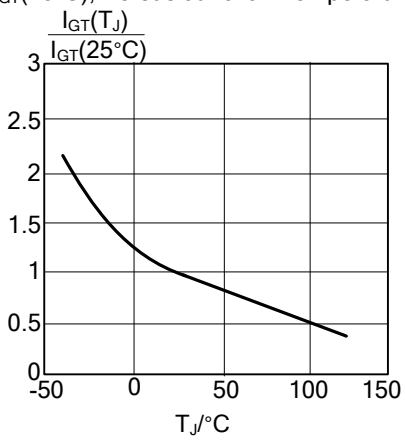


Fig 8. Normalised Latching Current $I_L(T_J)/I_L(25°C)$, Versus Junction Temperature T_J

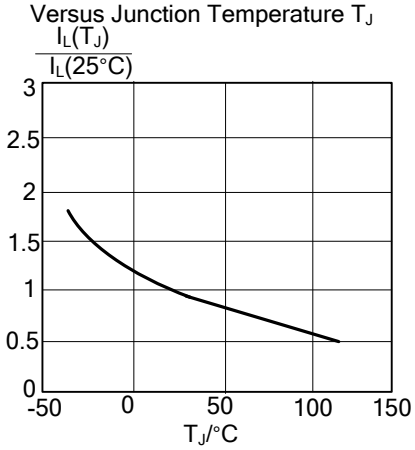


Fig 9. Normalised Holding Current $I_H(T_J)/I_H(25℃)$, Versus Junction Temperature T_J

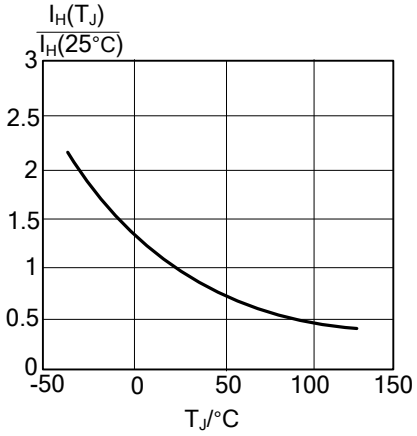


Fig 10. Typical and Maximum On-State Characteristic

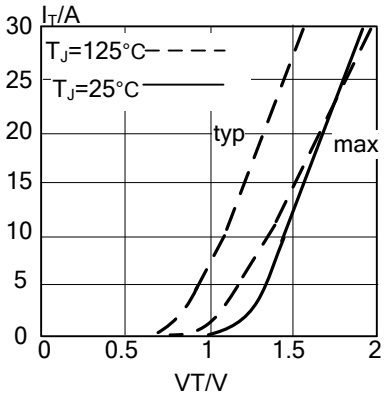


Fig 11.Transient Thermal Impedance Zthj-mb, Versus Pulse Width tp

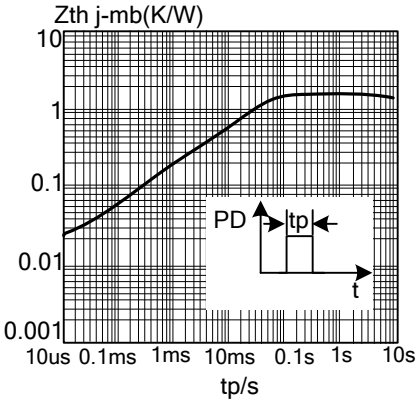


Fig 12. Typical, Critical Rate Of Rise Of Off-State Voltage, dV_D/dt Versus Junction Temperature T_J