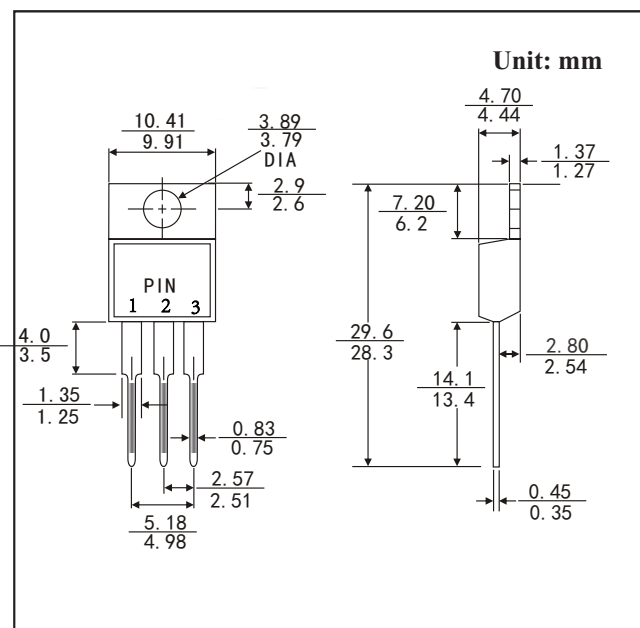
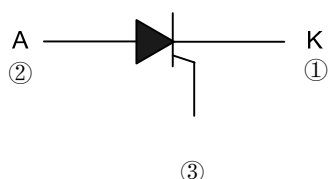


TO-220AB Silicon Controlled Rectifier

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 Voltage BT136-600D	V _{DRM}	600	V
RMS On-state Current (Full sine wave; T _{mb} ≤107°C)	I _{T(RMS)}	4	A
Non-Repetitive Peak. On-State Current (Full sine wave; T _j =25°C prior to surge) t = 20 ms t = 16.7ms	I _{TSM}	25 27	A
I ² t For Fusing t=10ms	I ² t	3.1	A ² s
Rate of Rise of On-state Current I _{TM} =6A; I _G =0.2A, dI _G /dt=0.2A/μs T2+G+ T2+G- T2-G- T2-G+	dI _T /dt	50 50 50 10	A/μs
Peak Gate Current	I _{GM}	2	A
Peak Gate Power	P _{GM}	5	W
Average Gate Power (Over any 20ms period)	P _{G(AV)}	0.5	W
Operating Junction Temperature	T _j	125	°C
Storage Temperature	T _{stg}	-40~150	°C

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Thermal Resistance Junction to Mounting Base	Rth j-mb			3	K/W
Full cycle				3.7	
Half cycle					
Thermal Resistance Junction to Ambient	Rth j-a		60		K/W
In free air					

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise stated)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC CHARACTERISTICS						
Gate Trigger Current	I _{GT}	V _D =12V, I _T =0.1A			5	mA
		T2+G+			5	
		T2+G-			5	
		T2-G-			10	
		T2-G+				
Latching Current	I _L	V _D =12V, I _T =0.1A			20	mA
		T2+G+			20	
		T2+G-			10	
		T2-G-			15	
		T2-G+				
Holding Current	I _H	V _D =12V, I _T =0.1A			10	mA
Gate Trigger Voltage	V _{GT}	V _D =12V, I _T =0.1A; T _J =25°C			1.0	V
		V _D =400V, I _T =0.1A; T _J =125°C	0.25			V
On-State Voltage	V _T	I _T =5A			1.7	V
Off-state Leakage Current	I _D	V _D =600V, T _J =125°C			0.5	mA
DYNAMIC CHARACTERISTICS						
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		5		V/μs
Gate Controlled Turn-on Time	t _{gt}	I _{TM} =6A, V _D =V _{DRM} , I _G =0.1A dI _G /dt=5A/μs		2		μs

TYPICAL CHARACTERISTICS

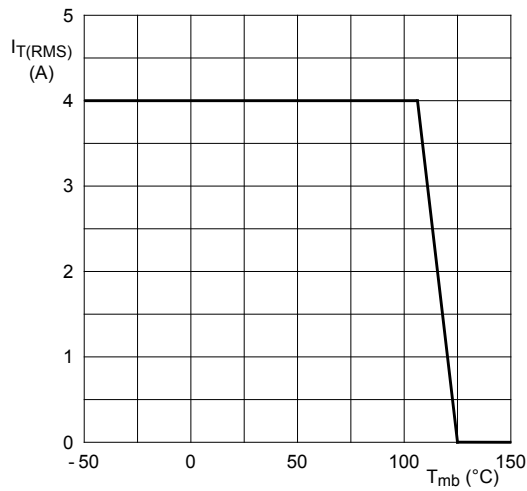


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

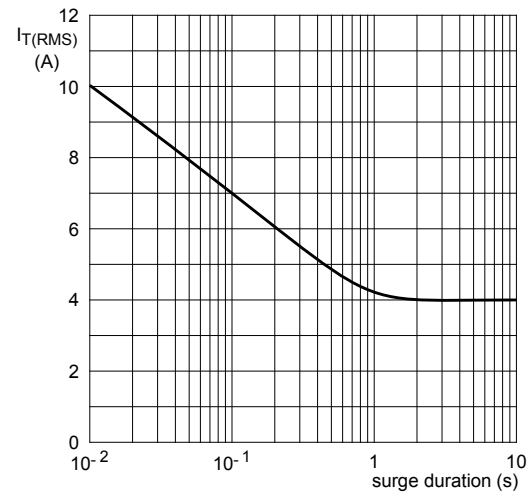
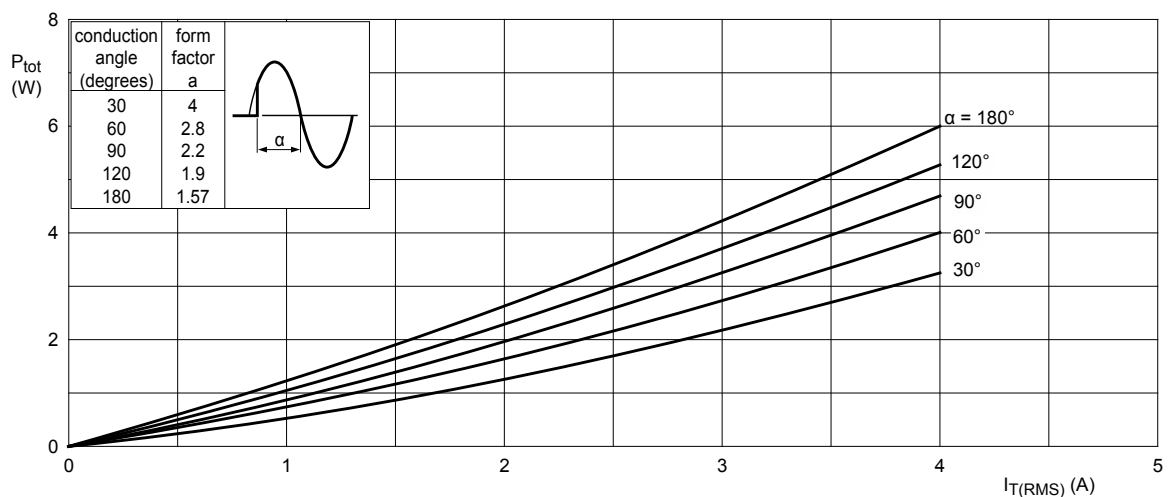


Fig. 2. RMS on-state current as a function of surge duration; maximum values



α = conduction angle
 a = form factor = $I_{T(RMS)} / I_{T(AV)}$

Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

TYPICAL CHARACTERISTICS

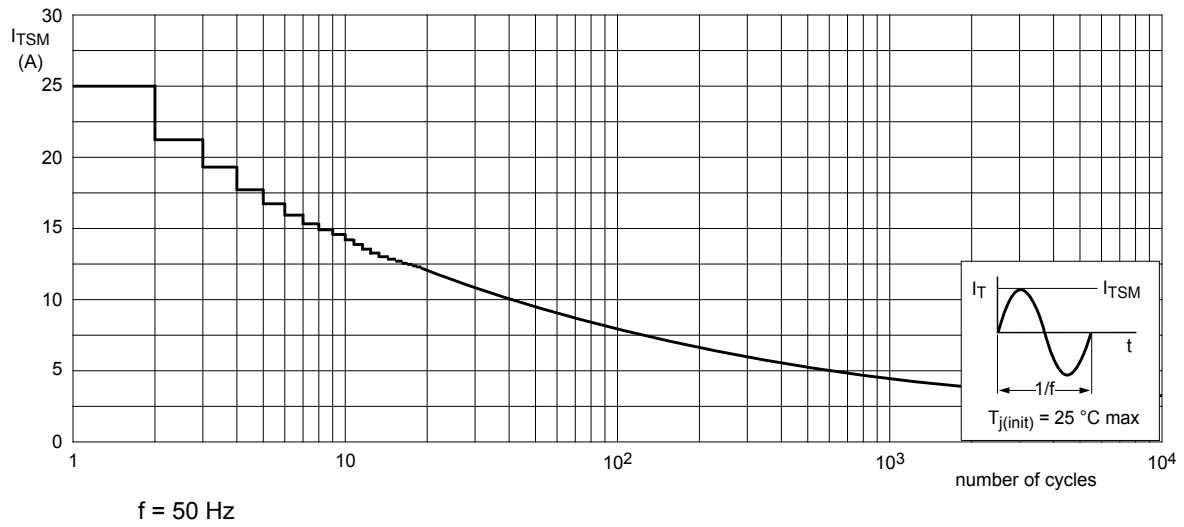
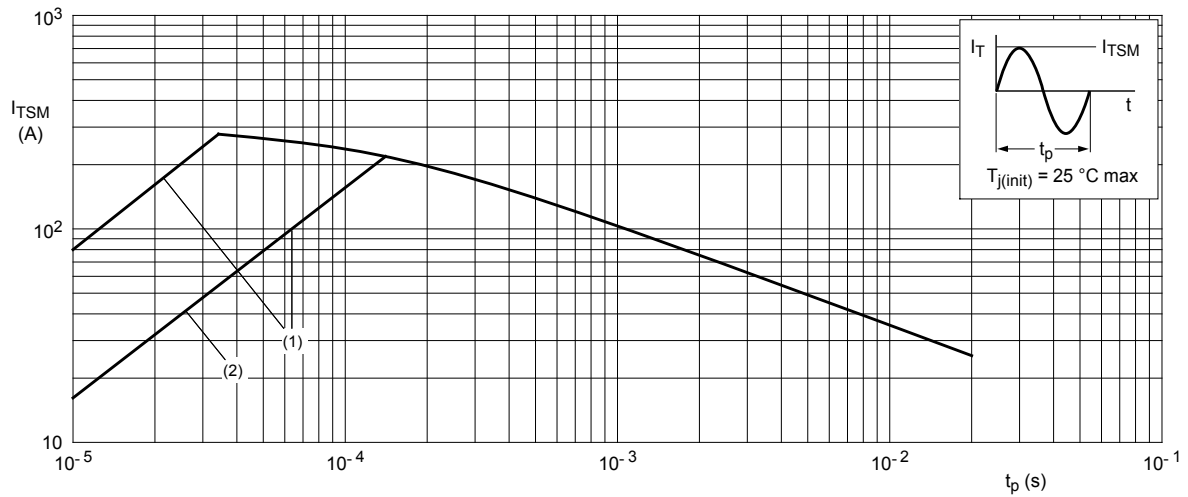


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



- $t_p \leq 20$ ms
- (1) dI_T/dt limit
- (2) T2- G+ quadrant limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

TYPICAL CHARACTERISTICS

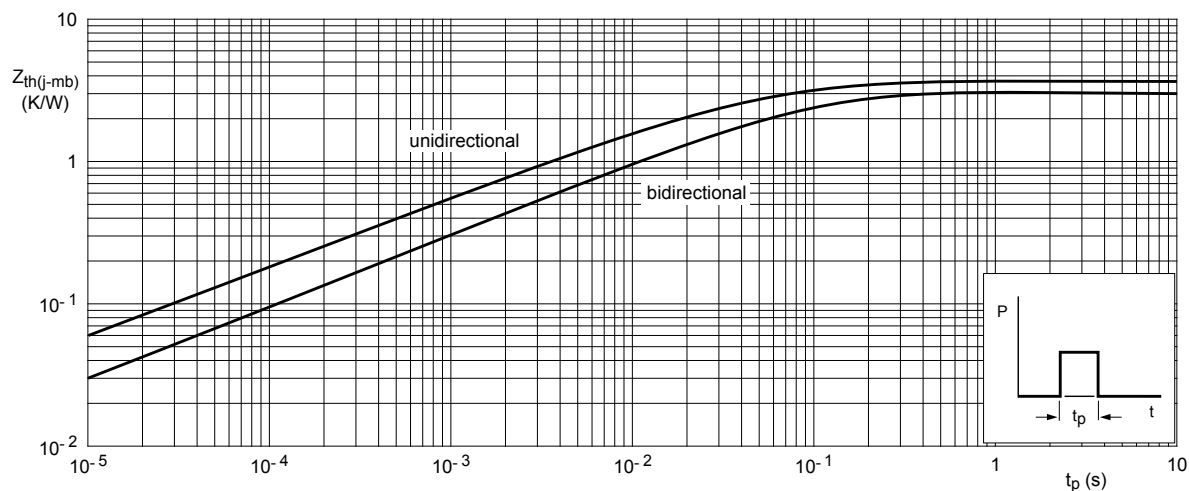
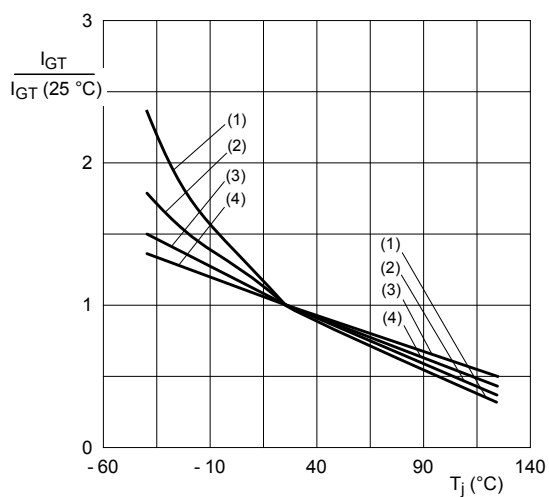


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width



- (1) T2- G+
- (2) T2- G-
- (3) T2+ G-
- (4) T2+ G+

Fig. 7. Normalized gate trigger current as a function of junction temperature

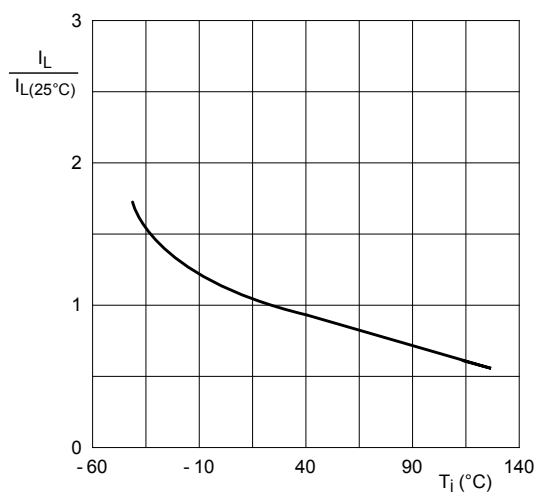


Fig. 8. Normalized latching current as a function of junction temperature

TYPICAL CHARACTERISTICS

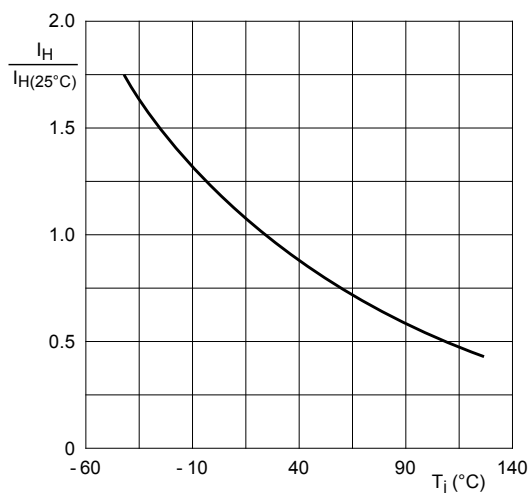
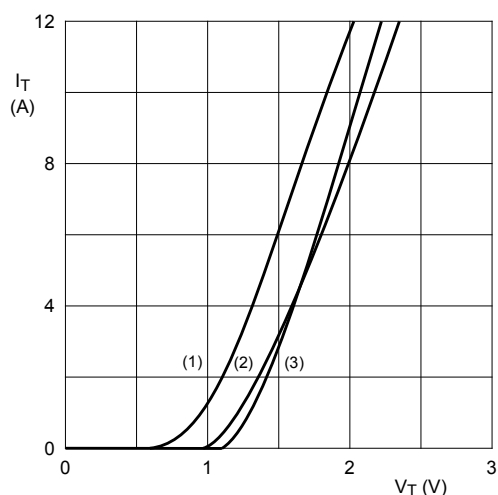


Fig. 9. Normalized holding current as a function of junction temperature



$$V_o = 1.27 \text{ V}$$

$$R_s = 0.091 \text{ } \Omega$$

(1) $T_j = 125 \text{ } ^\circ\text{C}$; typical values (2)

$T_j = 125 \text{ } ^\circ\text{C}$; maximum values (3)

$T_j = 25 \text{ } ^\circ\text{C}$; maximum values

Fig. 10. On-state current as a function of on-state voltage

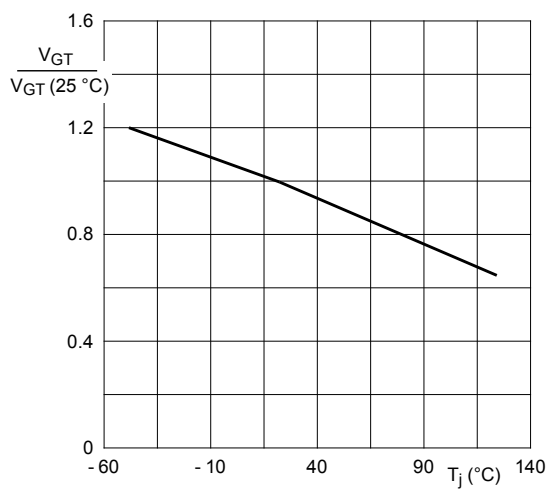


Fig. 11. Normalized gate trigger voltage as a function of junction temperature