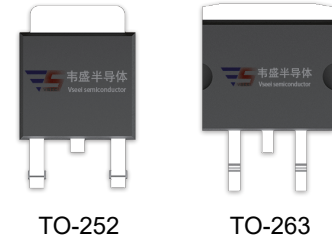


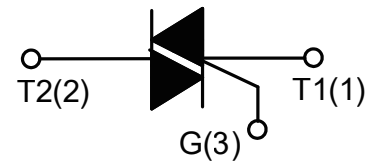
## DESCRIPTION:

The BT138B-600E SCR series with the parallel resistor between Gate and Cathode are especially recommended for use on straight hair, igniter, anion generator, etc.



## MAIN FEATURES

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
$V_{DRM}/V_{RRM}$	600/800	V



## ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Storage junction temperature range		$T_{stg}$	-40-150	°C
Operating junction temperature range		$T_j$	-40-125	°C
Repetitive peak off-state voltage( $T_j=25^{\circ}C$ )		$V_{DRM}$	600/800	V
Repetitive peak reverse voltage( $T_j=25^{\circ}C$ )		$V_{RRM}$	600/800	V
RMS on-state current	TO-252 ( $T_c=95^{\circ}C$ )	$I_{T(RMS)}$	12	A
	TO-263( $T_c=105^{\circ}C$ )			
Non repetitive surge peak on-state current (full cycle, $F=50Hz$ )		$I_{TSM}$	95	A
$I^2t$ value for fusing ( $t_p=10ms$ )		$I^2t$	45	$A^2s$
Critical rate of rise of on-state current( $I_G=2 \times I_{GT}$ )	I - II -III	$dI/dt$	50	$A/\mu s$
	IV		10	
Peak gate current		$I_{GM}$	2	A
Average gate power dissipation		$P_{G(AV)}$	0.5	W
Peak gate power		$P_{GM}$	5	W

**ELECTRICAL CHARACTERISTICS** ( $T_j=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Test Condition	Quadrant		Value			Unit
				D	E	F	
$I_{GT}$	$V_D=12\text{V } R_L=33\Omega$	I - II -III	MAX	5	10	25	mA
		IV		10	25	70	
$V_{GT}$		ALL	MAX	1.5			V
$V_{GD}$	$V_D=V_{DRM} T_j=125^{\circ}\text{C}$ $R_L=3.3\text{K}\Omega$	ALL	MIN	0.2			V
$I_L$	$I_G=1.2I_{GT}$	I - III	MAX	15	30	40	mA
		II - IV		20	40	80	
$I_H$	$I_T=100\text{mA}$		MAX	10	25	30	mA
$dV/dt$	$V_D=2/3V_{DRM}$ Gate Open $T_j=125^{\circ}\text{C}$		MIN	20	50	50	V/ $\mu\text{s}$

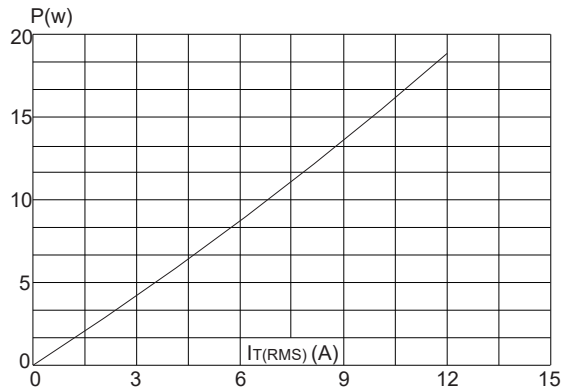
**STATIC CHARACTERISTICS**

Symbol	Parameter		Value(MAX)	Unit
$V_{TM}$	$I_{TM}=15\text{A } t_p=380\mu\text{s}$	$T_j=25^{\circ}\text{C}$	1.6	V
$I_{DRM}$	$V_D=V_{DRM} V_R=V_{RRM}$	$T_j=25^{\circ}\text{C}$	5	$\mu\text{A}$
$I_{RRM}$		$T_j=125^{\circ}\text{C}$	1	mA

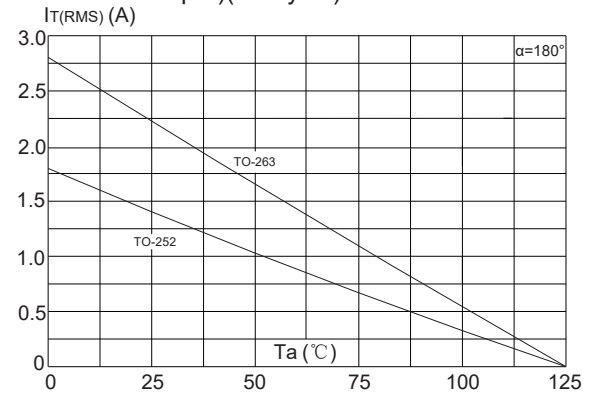
**THERMAL RESISTANCES**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	junction to case(AC)	TO-252 1.7		$^{\circ}\text{C/W}$
		TO-263	0.9	
$R_{th(j-a)}$	junction to ambient	TO-252 70		$^{\circ}\text{C/W}$
		TO-263	45	

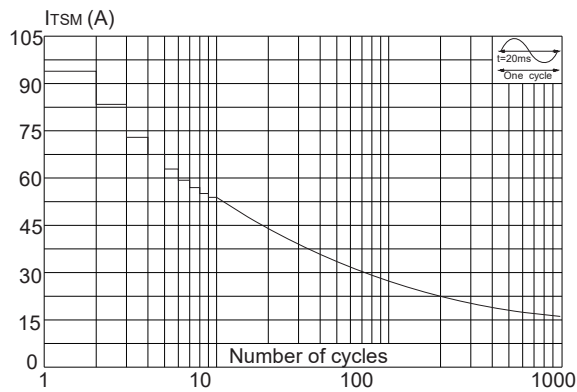
**FIG.1:** Maximum power dissipation versus RMS on-state current



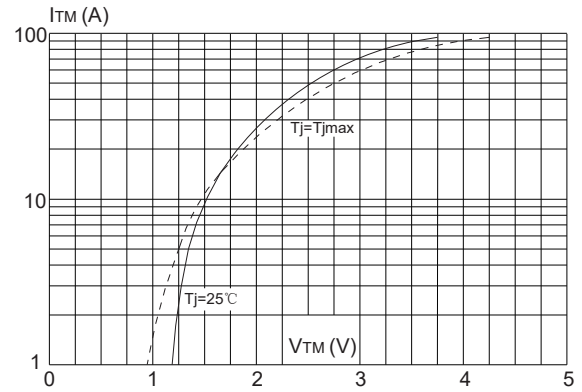
**FIG.2:** RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness:35 $\mu m$ )(full cycle)



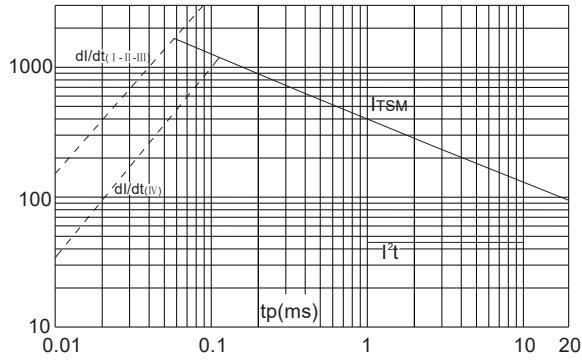
**FIG.3:** Surge peak on-state current versus number of cycles



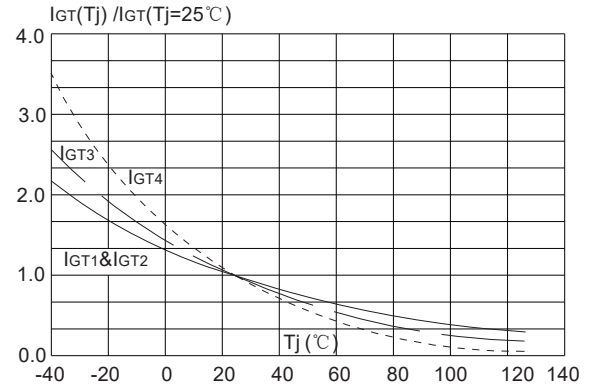
**FIG.4:** On-state characteristics (maximum values)



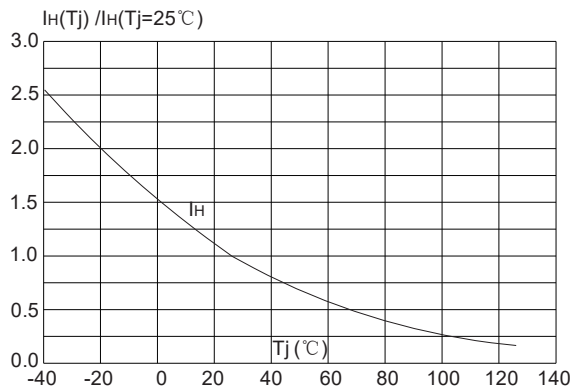
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2t$  ( I -II -III:  $di/dt < 50\text{A}/\mu\text{s}$ ; IV:  $di/dt < 10\text{A}/\mu\text{s}$ )  
 $I_{TSM}$  (A),  $I^2t$  ( $\text{A}^2\text{s}$ )



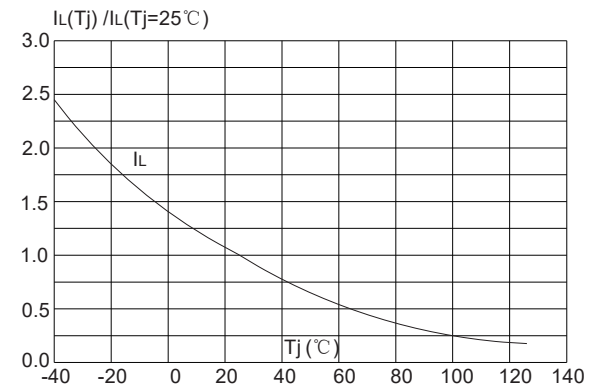
**FIG.6:** Relative variations of gate trigger current versus junction temperature



**FIG.7:** Relative variations of holding current versus junction temperature



**FIG.8:** Relative variations of latching current versus junction temperature



## SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ ) (Liquidus)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_P$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		20-40secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_P$ )		8 min. Max
Do not exceed		+260°C

