DESCRIPTION:

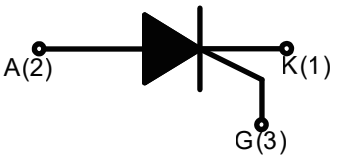
With high ability to withstand the shock loading of large current, BT151S-500R series of silicon controlled rectifiers provide high dv/dt rate with strong resistance to electromagnetic interference. They are especially recommended for use on solid state relay, motorcycle, power charger, T-tools etc.

TO-252

TO-263

MAIN FEATURES

Symbol	Value	Symbol
V_{DRM}/ V_{RRM}	650/800	V
$I_{T(RMS)}$	12	A
I_{GT}	≤15	mA



ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Storage junction temperature range		T_{stg}	-40 - 150	℃
Operating junction temperature range		T_j	-40 - 150	℃
Repetitive peak off-state voltage (T_j=25℃)		V_{DRM}	650/800	V
Repetitive peak reverse voltage (T_j=25℃)		V_{RRM}	650/800	V
RMS on-state current	TO-252 (T_C=115℃)	$I_{T(RMS)}$	12	A
	TO-263 (T_C=100℃)			
Non repetitive surge peak on-state current (F=50Hz tp=10ms)		I_{TSM}	120	A
Non repetitive surge peak on-state current (F=60Hz tp=8.3ms)		I_{TSM}	132	A
I^2t value for fusing (tp=10ms)		I^2t	72	A^2s
Repetitive rate of rise of on-state current (I_G=2×I_{GT})		dI_T/dt	50	A/μs
Peak gate current		I_{GM}	2	A

Peak gate power	P_{GM}	5	W
Average gate power dissipation	$P_{G(AV)}$	0.5	W

ELECTRICAL CHARACTERISTICS (T_j=25℃ unless otherwise specified)

Symbol	Test Condition	Value			Unit
		MIN.	TYP.	MAX.	
I_{GT}	V_D=12V R_L=33Ω	-	4	15	mA
V_{GT}		-	0.75	1.5	V
V_{GD}	V_D=V_{DRM} T_j=150℃ R_L=3.3KΩ	0.2	-	-	V
I_L	I_G=1.2I_{GT}	-	12	40	mA
I_H	I_T=500mA	-	12	30	mA
dV/dt	V_D=540V Gate Open T_j=150℃	50	-	-	V/μs
dV/dt	V_D=436V Gate Open T_j=150℃	80	-	-	V/μs
t_{on}	I_{GT}=20mA I_A=100mA I_R=10mA T_j=25℃	-	2	-	μs
t_{off}		-	30	-	μs
R_d	Dynamic resistance T_j=125℃	-	-	35	mΩ

STATIC CHARACTERISTICS

Symbol	Parameter		Value(MAX)	Unit
V_{TM}	I_{TM}=23A tp=380μs	T_j=25℃	1.6	V
I_{DRM}	V_D=V_{DRM} V_R=V_{RRM}	T_j=25℃	10	μA
I_{RRM}		T_j=150℃	1	mA

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-252 1.3		℃/W
		TO-263	2.0	
$R_{th(j-a)}$	Junction to ambient	TO-252 70		
		TO-263	45	

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

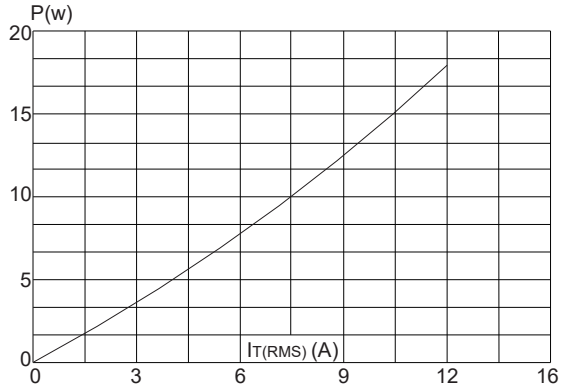


FIG.2: RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35μm) (full cycle)

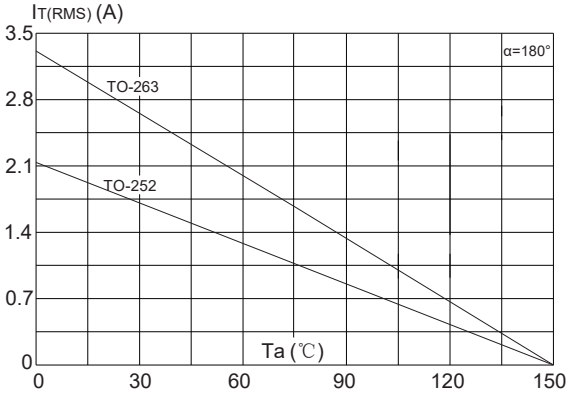


FIG.3: Surge peak on-state current versus number of cycles

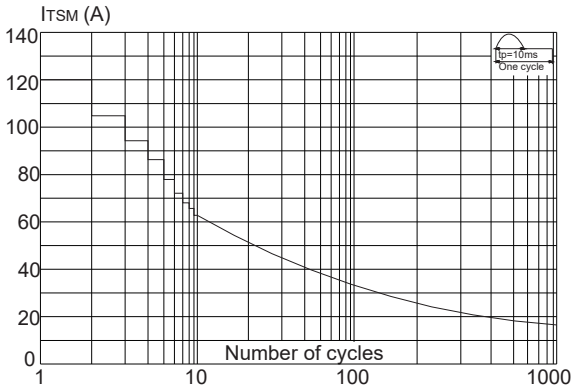


FIG.4: On-state characteristics (maximum values)

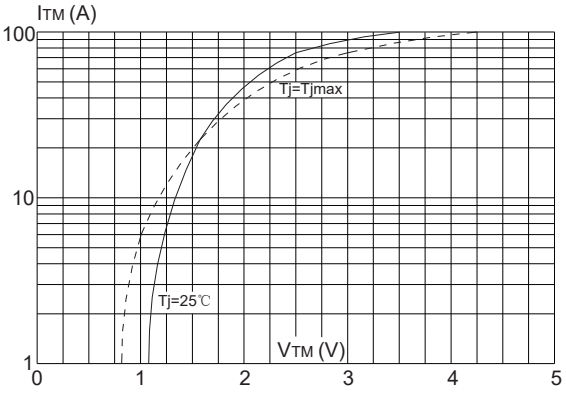


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp<10ms, and corresponging value of I^2t (dI/dt < 50A/μs)

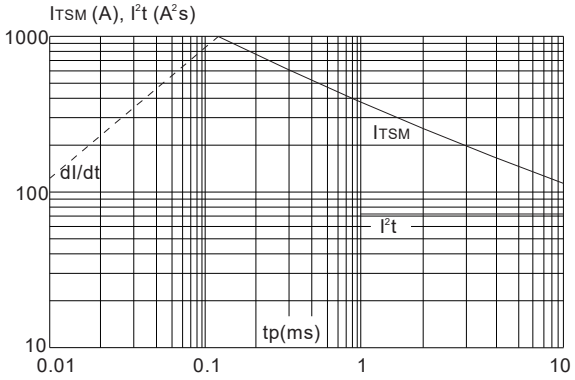
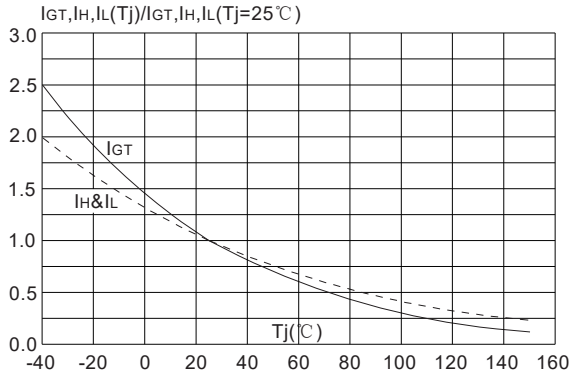


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature



SOLDERING PARAMETERS

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