ST180S

Phase Control Thyristors

STUD VERSION

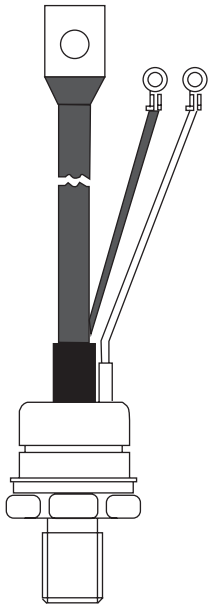
Liujing rectifier co., Ltd.

FEATURES

1). Center amplifying gate
2). Hermetic metal case with ceramic insulator
(Also available with glass-metal seal up to 1200V)
3). International standard case TO-209AB (TO-93)
4). Threaded studs UNF 3/4 - 16UNF2A or ISO M16x1.5
5). Compression Bonded Encapsulation for heavy duty operations such as severe thermal cycling

TYPICAL APPLICATIONS

1). DC motor controls
2). Controlled DC power supplies
3). AC controllers



MAJOR RATINGS AND CHARACTERISTICS

Parameters		ST180S	Unit
$I_{F(AV)}$		180	A
	@ T_C	85	℃
$I_{F(RMS)}$		360	A
I_{FSM}	@ 50Hz	5700	A
	@ 60Hz	5970	A
I^2t	@ 50Hz	163	KA^2s
	@ 60Hz	149	KA^2s
V_{DRM}/V_{RRM}		400 to 1600	V
T_q	typical	100	μ s
T_J		40 to 125	℃

ELECTRICAL SPECIFICATIONS

1). Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM}, maximum repetitive peak reverse voltage	V_{RSM}, maximum non-repetitive peak reverse voltage	I_{DRM}/I_{RRM} max. @ $T_J = T_J$ max
		V	V	mA
ST180S	04	400	500	30
	08	800	900	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

2). Forward Conduction

Parameters		ST180S	Unit	Conditions		
$I_{T(AV)}$	Max. average forward current	180	A	180° conduction, half sine wave		
	@ Case temperature	85	℃			
$I_{T(RMS)}$	Max. RMS forward current	360	A	DC @ 78℃ case temperature		
I_{TSM}	Max. peak, one-cycle forward, non-repetitive surge current	5700	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		5970		t = 8.3ms		
		4800		t = 10ms	100% V_{RRM} reapplied	
		5000		t = 8.3ms		
I^2t	Maximum I^2t for fusing	163	KA^2s	t = 10ms	No voltage reapplied	
		148		t = 8.3ms		
		115		t = 10ms	100% V_{RRM} reapplied	
		105		t = 8.3ms		
$I^2\surd t$	Maximum $I^2\surd t$ for fusing	1630	$KA^2\surd s$	t = 0.1 to 10ms, no voltage reapplied		
$V_{T(TO)1}$	Low level value of threshold voltage	0.92	V	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
$V_{T(TO)2}$	High level value of threshold voltage	0.98		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{t1}	Low level value of forward slope resistance	0.88	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{t2}	High level value of forward slope resistance	0.81		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
V_{TM}	Max. forward voltage drop	1.55	V	I_{pk}= 620A, $T_J = T_J$ max, t_p = 10ms sine pulse		
I_H	Maximum holding current	600	mA	T_J = 25℃, anode supply 12V resistive load		
I_L	Typical latching current	1000 (300)				
di/dt	Max. non-repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, tr ≤ 1 μs $T_J = T_J$ max, anode voltage ≤ 80% V_{DRM}		
t_d	Typical delay time	1.0	μs	Gate current 1A, di_g/d_t = 1A/μs V_d = 0.67% V , T = 25℃ V_{DRM}, T_J =25℃		
t_q	Typical turn-off time	100		I_{TM} = 300A, $T_J = T_J$ max, di/dt = 20A/μs, V_R = 50V dv/dt = 20V/μs, Gate 0V 100Ω, t_p = 500 μs		
dv/dt	Maximum critical rate of rise of off-state voltage	500	V/μs	$T_J = T_J$ max. linear to 80% rated V_{DRM}		
I_{DRM} I_{RRM}	Max. peak reverse and off-state leakage current	30	mA	$T_J = T_J$ max. rated V_{DRM}/V_{RRM} applied		

3). Triggering

Parameters		ST180S		Unit	Conditions	
P_{GM}	Maximum peak gate power	10.0		W	$T_J = T_J$ max, $t_p \leq 5$ms	
$P_{G(AV)}$	Maximum average gate power	2.0				
I_{GM}	Max. peak positive gate current	3.0		A	$T_J = T_J$ max, f = 50Hz, d% = 50	
$+V_{GM}$	Max. peak positive gate current	20		V	$T_J = T_J$ max, $t_p \leq 5$ms	
$-V_{GM}$	Maximum peak positive gate voltage	5.0				
I_{GT}	DC gate current required to trigger	TYP.	MAX.	mA		Max. required gate trigger current/voltage are the lowest value which will trigger all units 6V anode-to-cathode applied
		180	-		T_J = - 40℃	
		90	150		T_J = 25℃	
		40	-		T_J = 125℃	
V_{GT}	DC gate voltage required to trigger	2.9	-	V	T_J = - 40℃	
		1.8	3.0		T_J = 25℃	
		1.2	-		T_J = 125℃	
I_{GD}	DC gate current not to trigger	10		mA	$T_J = T_J$ max.	Max. gate current/ voltage not to trigger is the max. value which. will not trigger any unit with rated V_{DRM} anode-to-cathode applied
V_{GD}	DC gate voltage not to trigger	0.25		V		
T_J	Max. operating temperature range	-40 to 125		℃		
T_{stg}	Max. storage temperature range	-40 to 150		℃		
R_{thJC}	Max. thermal resistance, junction to case	0.105		K/W	DC operation	
R_{thCS}	Max. thermal resistance, case to heatsink	0.04		K/W	Mounting surface, smooth, flat and greased	
T	Mounting torque	31 (275)		Nm	Non lubricated threads	
		24.5 (210)		(lbf-in)	Lubricated threads	
wt	Approximate weight	280		g		
	Case style	TO-93			See Outline Table	

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistence R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.016	0.012	K/W	$T_J = T_J$ max.
120°	0.019	0.020		
90°	0.025	0.027		
60°	0.036	0.037		
30°	0.060	0.060		

PERFORMANCE CURVES FIGURE

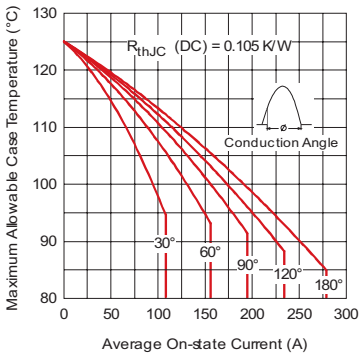


Fig. 1 - Current Ratings Characteristics

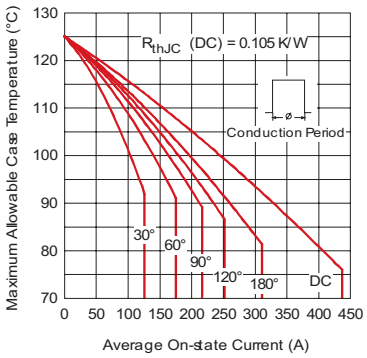


Fig. 2 - Current Ratings Characteristics

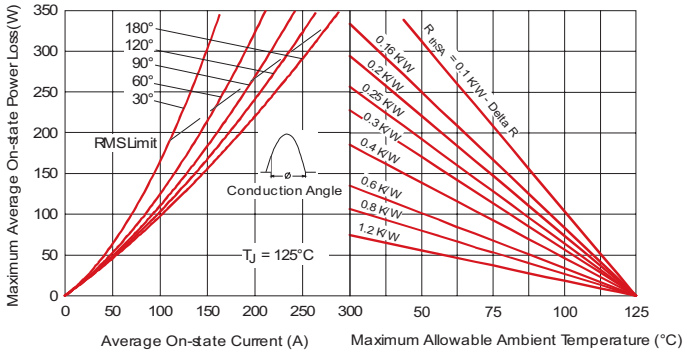


Fig. 3 - On-state Power Loss Characteristics

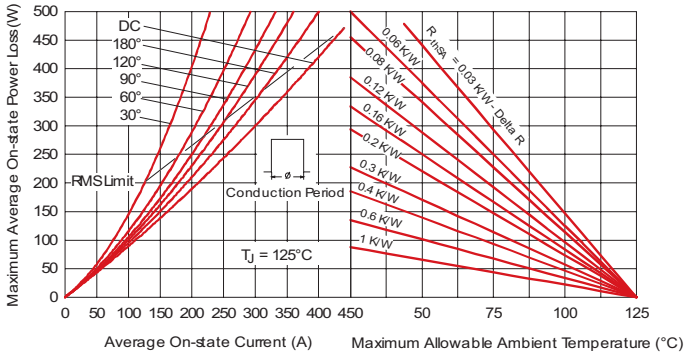


Fig. 4 - On-state Power Loss Characteristics

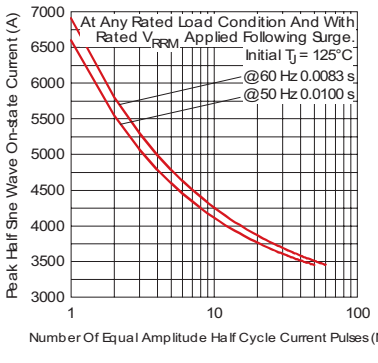


Fig. 5 - Maximum Non-Repetitive Surge Current

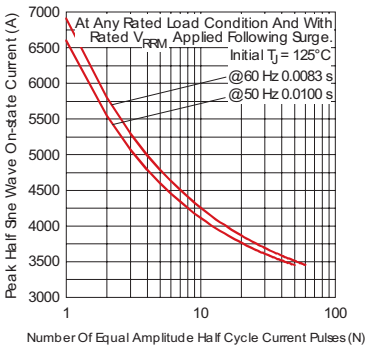


Fig. 6 - Maximum Non-Repetitive Surge Current

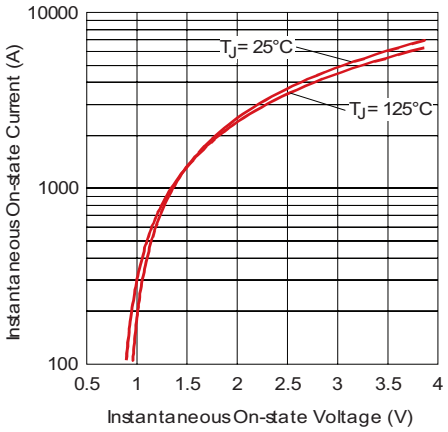


Fig. 7 - On-state Voltage Drop Characteristics

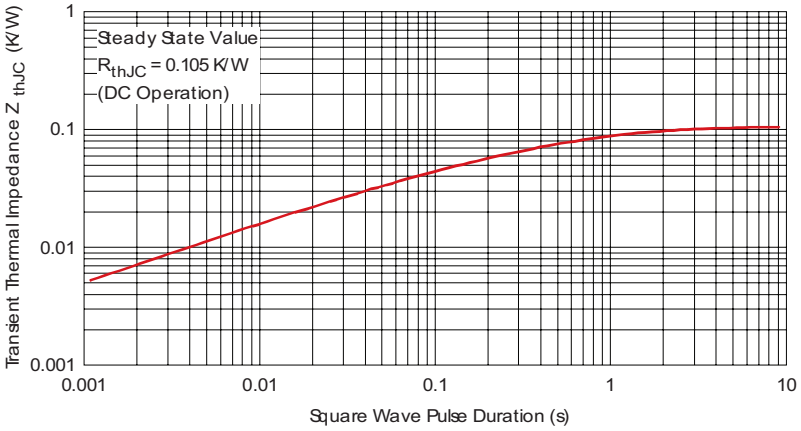


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

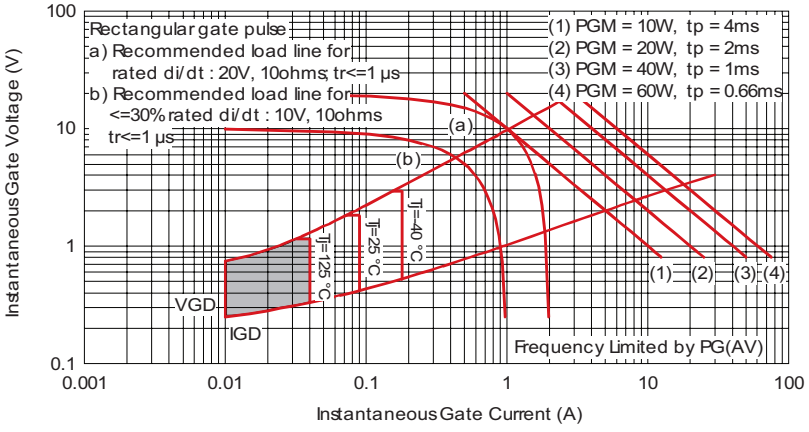
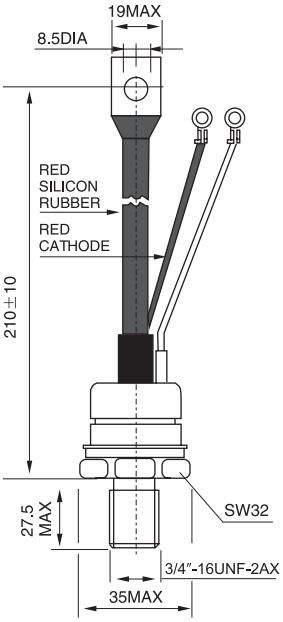


Fig. 9 - Gate Characteristics

OUTLINE



*FOR METRIC DEVICES:
M20×1.5/M16×1.5-LENGHT21 MAX

Case Style TO-93(ceramic)

LiUJiNG Liujing Electronics

E-mail: rectifier@163.com thyristors@yahoo.cn

YUEQING LIUJING RECTIFIER CO., LTD
Sale Departmant: Liujing Building, Yueqing City, Zhejiang Province
Add: Wanao Industrial Zone, Yueqing city, Zhejiang Province
Tel: 0086-577-62519692 0089-577-62519693
Fax: 0086-577-62518692
International Export: 0086-577-62571902
Technical Support: 0086-15868768965
After Service: 400-6606-086
http://www.china-liujing.com
http://www.liujingdianqi.cn
http://www.cnrectifier.com
http://www.cnthyristor.com.cn
MSN: thristors@hotmail.com

打造最具竞争力的电力半导体产品

To be the most competitive Power Semiconductor Devices manufactory.