



ST180S SERIES

PHASE CONTROL THYRISTORS

Stud Version

Features

- Center amplifying gate
- Hermetic metal case with ceramic insulator
(Also available with glass-metal seal up to 1200V)
- International standard case TO-209AB (TO-93)
- Compression Bonded Encapsulation for heavy duty operations such as severe thermal cycling

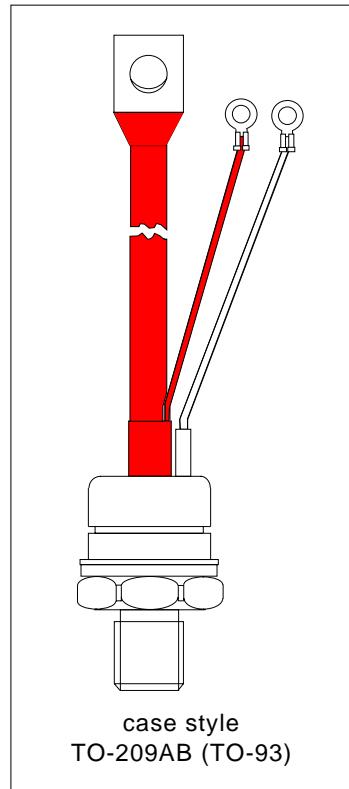
200A

Typical Applications

- DC motor controls
- Controlled DC power supplies
- AC controllers

Major Ratings and Characteristics

Parameters	ST180S	Units
$I_{T(AV)}$	200	A
@ T_c	85	°C
$I_{T(RMS)}$	314	A
I_{TSM}	5000	A
@ 50Hz	5230	A
I^2t	125	KA ² s
@ 50Hz	114	KA ² s
V_{DRM}/V_{RRM}	400 to 2000	V
t_q typical	100	μs
T_j	- 40 to 125	°C



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Bulletin I25165 rev. C 03/03

International
IR Rectifier

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM} , max. repetitive peak and off-state voltage V	V_{RSM} , maximum non-repetitive peak voltage V	I_{DRM}/I_{RRM} max. @ $T_J = T_{J\max}$ mA
ST180S	04	400	500	30
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	

On-state Conduction

Parameter	ST180S	Units	Conditions
$I_{T(AV)}$ @ Case temperature	200	A	180° conduction, half sine wave
	85	°C	
$I_{T(RMS)}$	314	A	DC @ 76°C case temperature
I_{TSM} Max. peak, one-cycle non-repetitive surge current	5000	A	Sinusoidal half wave, Initial $T_J = T_{J\max}$
	5230		
	4200		
	4400		
I^2t Maximum I^2t for fusing	125	KA ² s	No voltage reapplied
	114		
	88		
	81		
$I^2\sqrt{t}$	1250	KA ² √s	t = 0.1 to 10ms, no voltage reapplied
$V_{T(TO)1}$ Low level value of threshold voltage	1.08	V	(16.7% × π × $I_{T(AV)} < I < \pi \times I_{T(AV)}$), $T_J = T_{J\max}$
$V_{T(TO)2}$ High level value of threshold voltage	1.14		($I > \pi \times I_{T(AV)}$), $T_J = T_{J\max}$
r_{t1} Low level value of on-state slope resistance	1.18	mΩ	(16.7% × π × $I_{T(AV)} < I < \pi \times I_{T(AV)}$), $T_J = T_{J\max}$
r_{t2} High level value of on-state slope resistance	1.14		($I > \pi \times I_{T(AV)}$), $T_J = T_{J\max}$
V_{TM} Max. on-state voltage	1.75	V	$I_{pk} = 570A$, $T_J = 125^\circ C$, $t_p = 10ms$ sine pulse
I_H Maximum holding current	600	mA	$T_J = T_{J\max}$, anode supply 12V resistive load
I_L Max. (typical) latching current	1000 (300)		

Switching

Parameter	ST180S	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, $t_r \leq 1\mu s$ $T_J = T_{J\max}$, anode voltage ≤ 80% V_{DRM}
t_d Typical delay time	1.0	μs	Gate current 1A, $di_g/dt = 1A/\mu s$ $V_d = 0.67\% V_{DRM}$, $T_J = 25^\circ C$
t_q Typical turn-off time	100		$I_{TM} = 300A$, $T_J = T_{J\max}$, $di/dt = 20A/\mu s$, $V_R = 50V$ $dv/dt = 20V/\mu s$, Gate 0V 100Ω, $t_p = 500\mu s$

Blocking

Parameter	ST180S	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/μs	$T_J = T_J \text{ max linear to } 80\% \text{ rated } V_{DRM}$
I_{DRM} Max. peak reverse and off-state leakage current	30	mA	$T_J = T_J \text{ max, rated } V_{DRM}/V_{RRM} \text{ applied}$

Triggering

Parameter	ST180S	Units	Conditions
P_{GM} Maximum peak gate power	10	W	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$P_{G(AV)}$ Maximum average gate power	2.0		$T_J = T_J \text{ max, } f = 50\text{Hz, d\% = 50}$
I_{GM} Max. peak positive gate current	3.0	A	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$+V_{GM}$ Maximum peak positive gate voltage	20	V	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$-V_{GM}$ Maximum peak negative gate voltage	5.0		
I_{GT} DC gate current required to trigger	TYP. 180 90 40	MAX. - 150 -	mA $T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
V_{GT} DC gate voltage required to trigger	2.9 1.8 1.2	- 3.0 -	V $T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
I_{GD} DC gate current not to trigger	10	mA	
V_{GD} DC gate voltage not to trigger	0.25	V	$T_J = T_J \text{ max}$ 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

Thermal and Mechanical Specification

Parameter	ST180S	Units	Conditions
T_J Max. operating temperature range	-40 to 125	°C	
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		Mounting surface, smooth, flat and greased
T Mounting torque, $\pm 10\%$	31 (275) 24.5 (210)	Nm (lbf-in)	Non lubricated threads Lubricated threads
wt Approximate weight	280	g	
Case style	TO-209AB (TO-93)		See Outline Table

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ΔR_{thJC} Conduction

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

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.015	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		

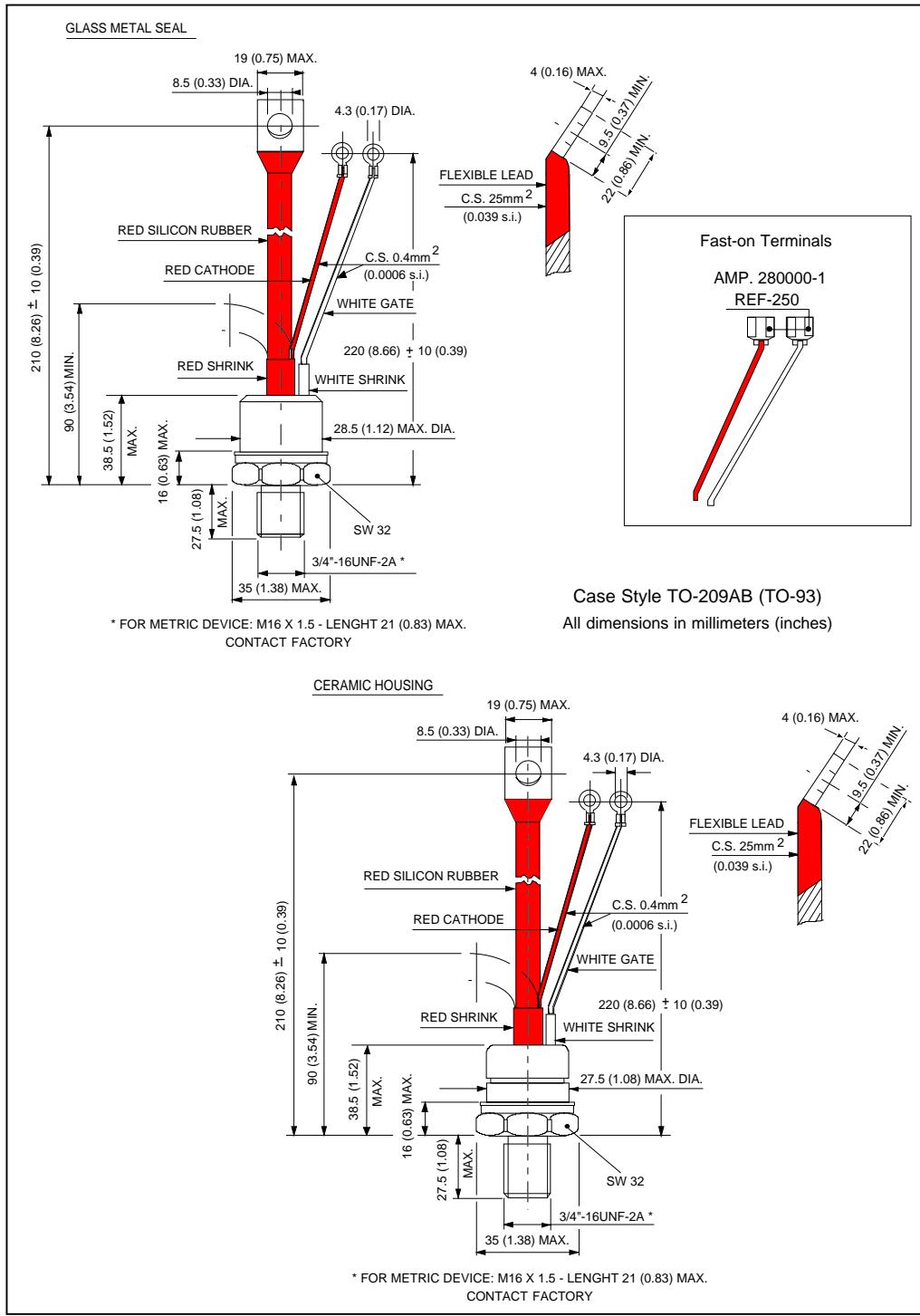
Ordering Information Table

Device Code	
ST	18 0 S 20 P 0
1	2
3	4
5	6
7	8

1 - Thyristor
2 - Essential part number
3 - 0 = Converter grade
4 - S = Compression bonding Stud
5 - Voltage code: Code x 100 = V_{RRM} (See Voltage Rating Table)
6 - P = Stud base 3/4"-16UNF2A threads
7 - 0 = Eyelet terminals (Gate and Auxiliary Cathode Leads)
 1 = Fast - on terminals (Gate and Auxiliary Cathode Leads)
8 - V = Glass-metal seal (only up to 1200V)
 None = Ceramic housing (over 1200V)

NOTE: For Metric device M16 x 1.5 Contact factory

Outline Table



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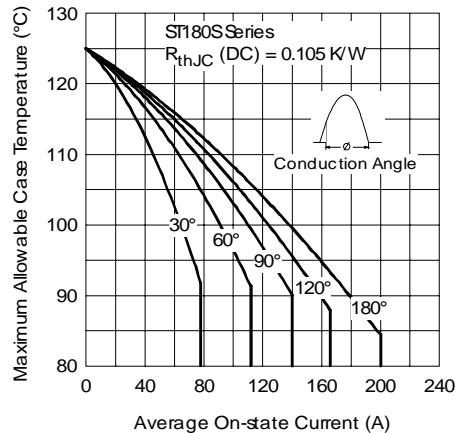


Fig. 1 - Current Ratings Characteristics

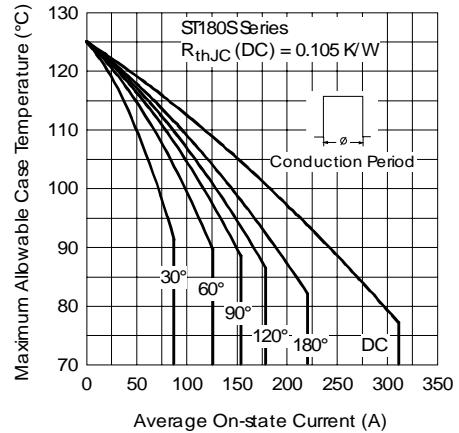


Fig. 2 - Current Ratings Characteristics

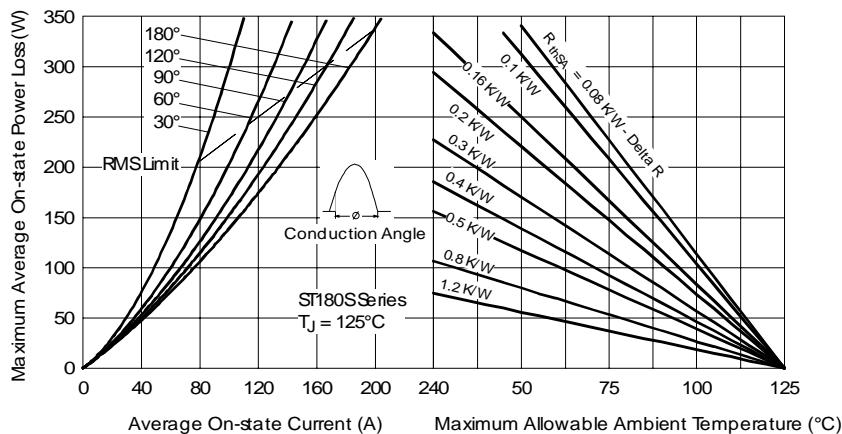


Fig. 3 - On-state Power Loss Characteristics

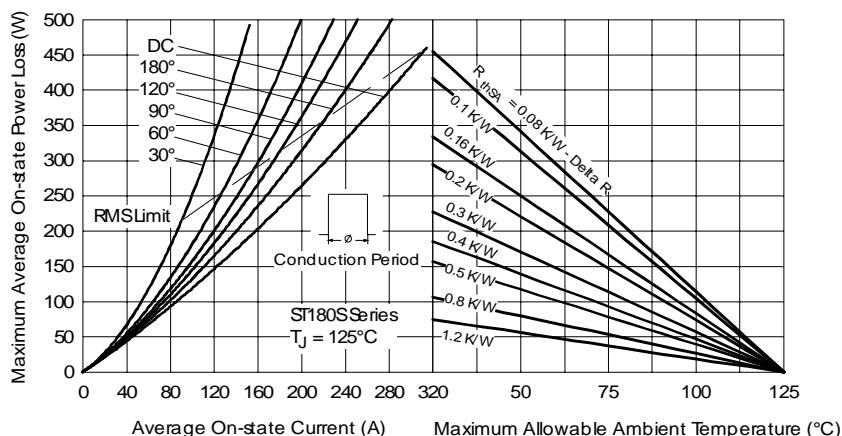


Fig. 4 - On-state Power Loss Characteristics

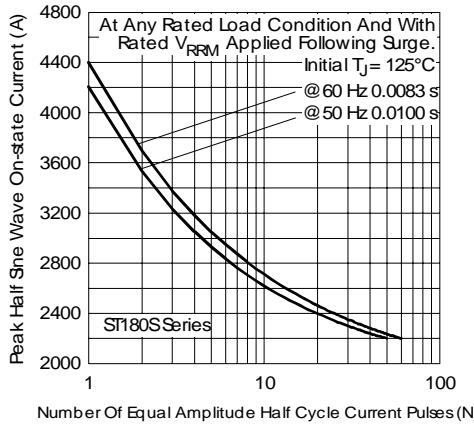


Fig. 5 - Maximum Non-Repetitive Surge Current

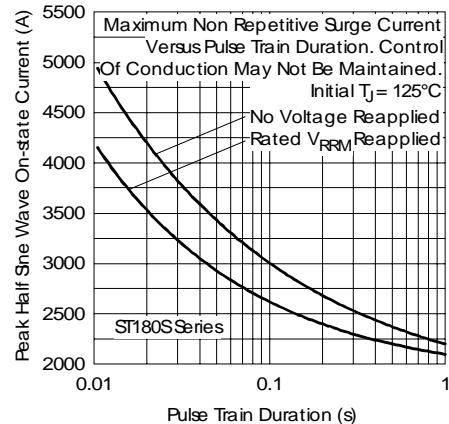


Fig. 6 - Maximum Non-Repetitive Surge Current

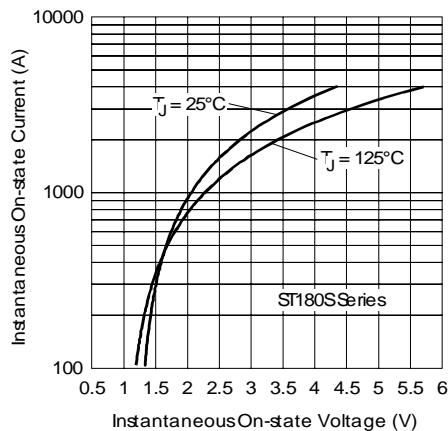


Fig. 7 - On-state Voltage Drop Characteristics

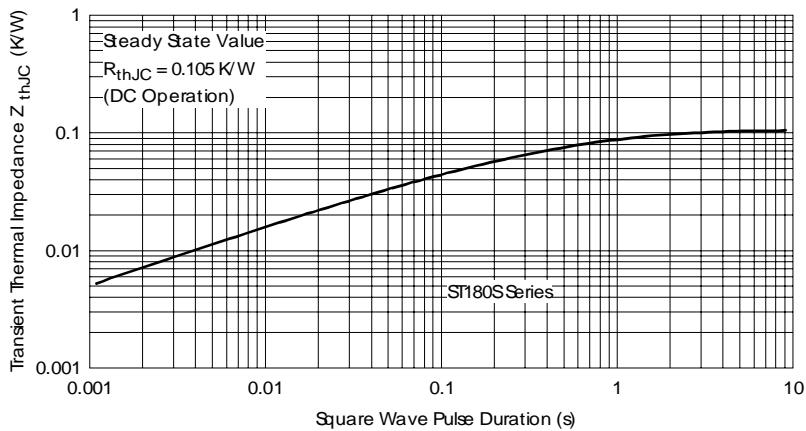


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

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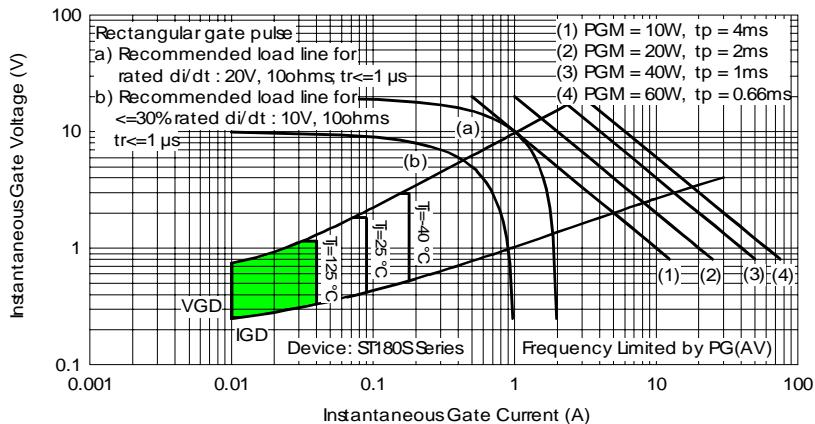


Fig. 9 - Gate Characteristics

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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Электрон
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