

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

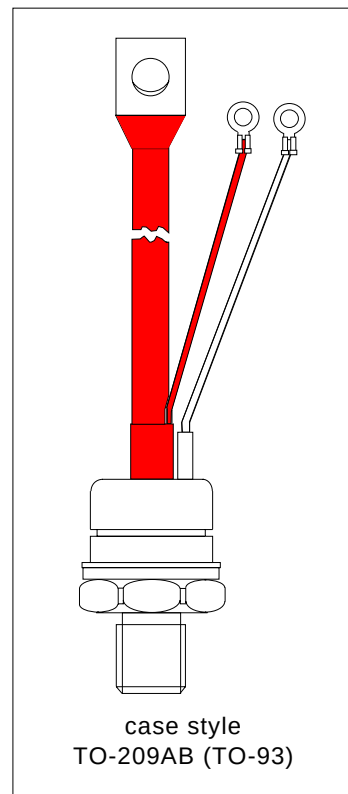
200A

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} @ 50Hz	5000	A
@ 60Hz	5230	A
I^2t @ 50Hz	125	KA ² s
@ 60Hz	114	KA ² s
V_{DRM}/V_{RRM}	400 to 2000	V
t_q typical	100	μs
T_J	- 40 to 125	°C



ST180S Series

Bulletin I25165 rev. C 03/03

International
IRF 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. @ $T_J = T_J \text{ max}$ 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
$I_{T(AV)}$ Max. average on-state current @ Case temperature	200	A	180° conduction, half sine wave
	85	°C	
$I_{T(RMS)}$ Max. RMS on-state current	314	A	DC @ 76°C case temperature
I_{TSM} Max. peak, one-cycle non-repetitive surge current	5000	A	t = 10ms No voltage
	5230		t = 8.3ms reapplied
	4200		t = 10ms 100% V_{RRM}
	4400		t = 8.3ms reapplied
I^2t Maximum I^2t for fusing	125	KA ² s	t = 10ms No voltage
	114		t = 8.3ms reapplied
	88		t = 10ms 100% V_{RRM}
	81		t = 8.3ms reapplied
I^2/t Maximum I^2/t for fusing	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	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
$V_{T(TO)2}$ High level value of threshold voltage	1.14		$(I > \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
r_{t1} Low level value of on-state slope resistance	1.18	mΩ	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
r_{t2} High level value of on-state slope resistance	1.14		$(I > \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$
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	$T_J = T_J \text{ max, anode supply 12V resistive load}$
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, $t_r \leq 1\mu s$ $T_J = T_J \text{ max, anode voltage} \leq 80\% V_{DRM}$
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		$I_{TM} = 300A, T_J = T_J \text{ max, } di/dt = 20A/\mu s, V_R = 50V$ $dv/dt = 20V/\mu s, \text{ Gate } 0V \text{ } 100\Omega, t_p = 500\mu s$

Blocking

Parameter	ST180S	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/ μ s	$T_J = T_J$ 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

Triggering

Parameter	ST180S	Units	Conditions
P_{GM} Maximum peak gate power	10	W	$T_J = T_J$ max, $t_p \leq 5$ ms
$P_{G(AV)}$ Maximum average gate power	2.0		$T_J = T_J$ max, $f = 50$ Hz, $d\% = 50$
I_{GM} Max. peak positive gate current	3.0	A	$T_J = T_J$ max, $t_p \leq 5$ ms
$+V_{GM}$ Maximum peak positive gate voltage	20	V	$T_J = T_J$ max, $t_p \leq 5$ ms
$-V_{GM}$ Maximum peak negative gate voltage	5.0		
I_{GT} DC gate current required to trigger	TYP.	MAX.	$T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied
	180	-	
	90	150	
	40	-	
V_{GT} DC gate voltage required to trigger	2.9	-	$T_J = -40^\circ\text{C}$
	1.8	3.0	$T_J = 25^\circ\text{C}$
	1.2	-	$T_J = 125^\circ\text{C}$
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	

Thermal and Mechanical Specification

Parameter	ST180S	Units	Conditions
T_J Max. operating temperature range	-40 to 125	$^\circ\text{C}$	
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	Nm (lbf-in)	Non lubricated threads
	(275)		
	24.5 (210)		Lubricated threads
wt Approximate weight	280	g	
Case style	TO - 209AB (TO-93)		See Outline Table

ST180S Series

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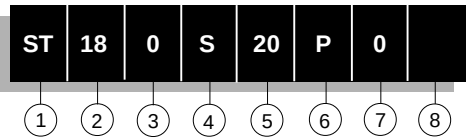
ΔR_{thJC} Conduction

(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	$T_J = T_J \text{ max.}$
120°	0.019	0.020		
90°	0.025	0.027		
60°	0.036	0.037		
30°	0.060	0.060		

Ordering Information Table

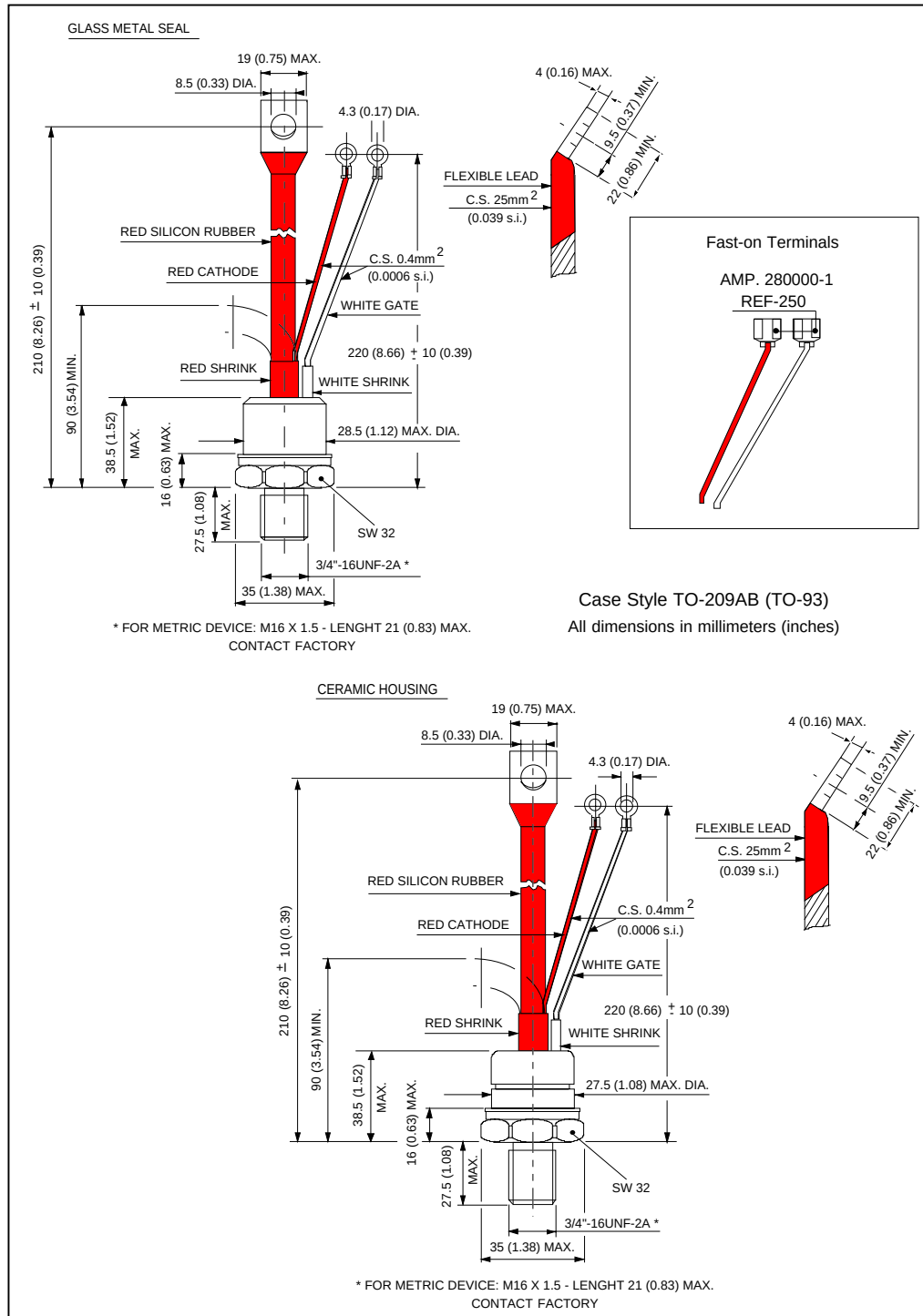
Device Code



- 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



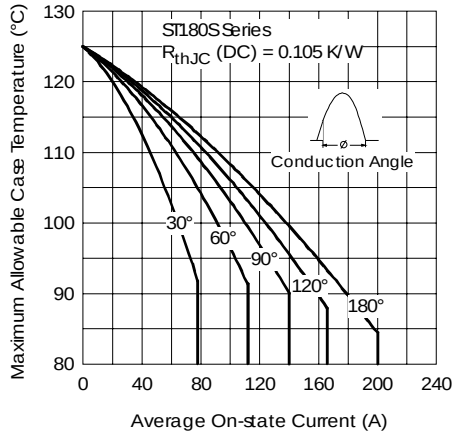


Fig. 1 - Current Ratings Characteristics

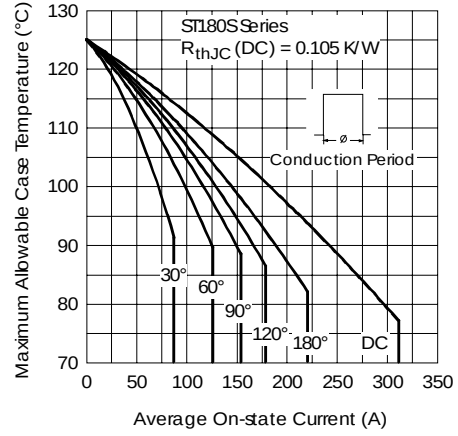


Fig. 2 - Current Ratings Characteristics

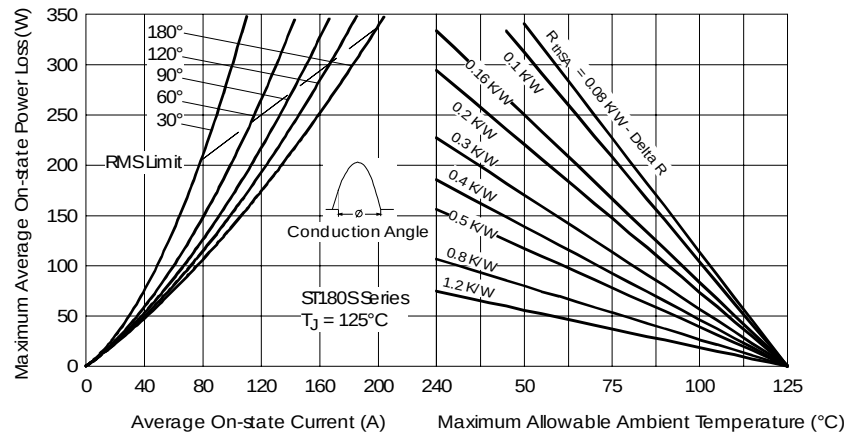


Fig. 3 - On-state Power Loss Characteristics

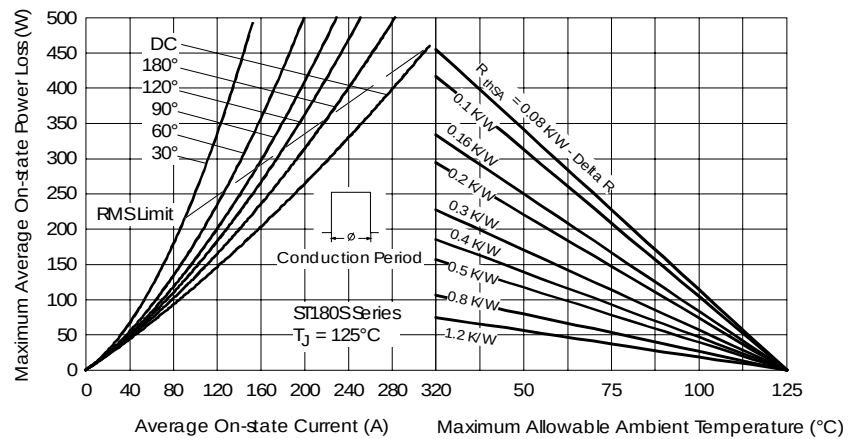


Fig. 4 - On-state Power Loss Characteristics

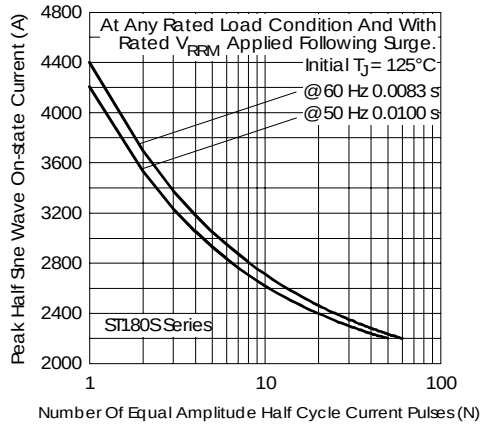


Fig. 5 - Maximum Non-Repetitive Surge Current

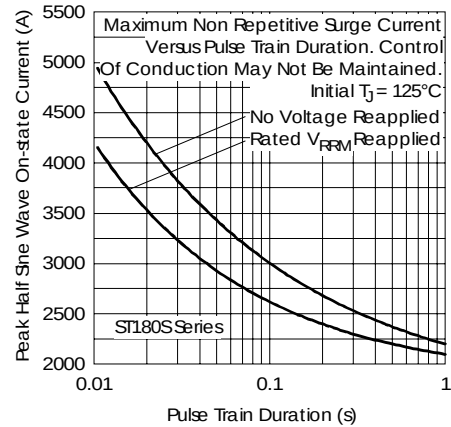


Fig. 6 - Maximum Non-Repetitive Surge Current

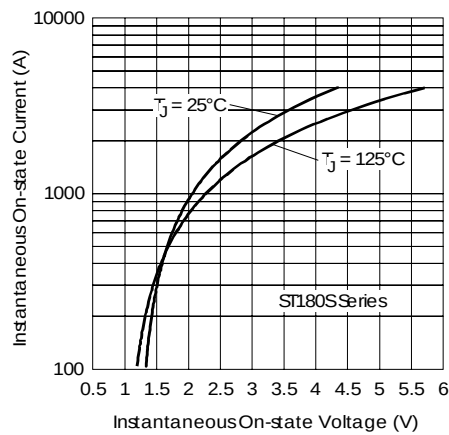


Fig. 7 - On-state Voltage Drop Characteristics

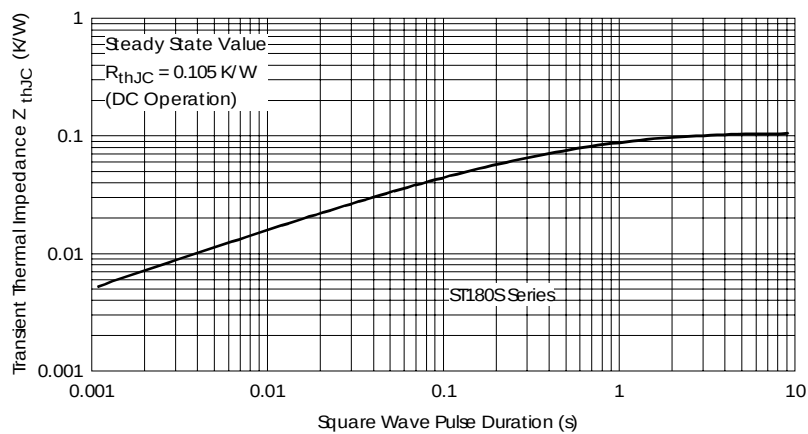


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

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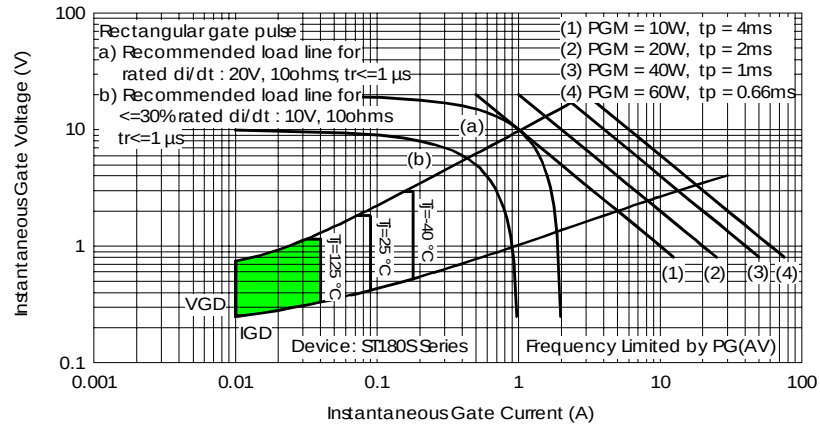


Fig. 9 - Gate Characteristics

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.

International
IR Rectifier

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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