

International
IR Rectifier

ST280S SERIES

PHASE CONTROL THYRISTORS

Stud Version

Features

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

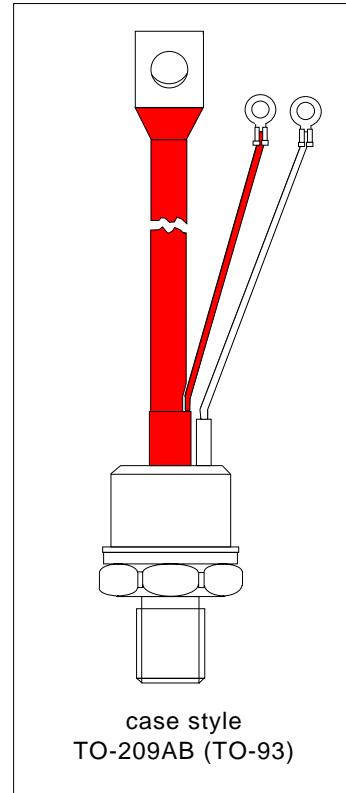
280A

Typical Applications

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

Major Ratings and Characteristics

Parameters	ST280S	Units
$I_{T(AV)}$	280	A
@ T_c	85	°C
$I_{T(RMS)}$	440	A
I_{TSM}	7850	A
@ 60Hz	8220	A
I^2t	308	KA ² s
@ 60Hz	281	KA ² s
V_{DRM}/V_{RRM}	400 to 600	V
t_q typical	100	μs
T_J	- 40 to 125	°C



ST280S Series

Bulletin I25161 rev. C 03/03

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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
ST280S	04	400	500	30
	06	600	700	

On-state Conduction

Parameter	ST280S	Units	Conditions
$I_{T(AV)}$ Max. average on-state current @ Case temperature	280	A	180° conduction, half sine wave
	85	°C	
$I_{T(RMS)}$ Max. RMS on-state current	440	A	DC @ 75°C case temperature
I_{TSM} Max. peak, one-cycle non-repetitive surge current	7850	A	Sinusoidal half wave, Initial $T_J = T_J$ max.
	8220		
	6600		
	6900		
I^2t Maximum I^2t for fusing	310	KA ² s	t = 10ms No voltage reapplied
	220		
	218		
	200		
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	3100	KA ² \sqrt{s}	t = 0.1 to 10ms, no voltage reapplied
$V_{T(TO)1}$ Low level value of threshold voltage	0.84	V	(16.7% $\times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}$, $T_J = T_J$ max.)
$V_{T(TO)2}$ High level value of threshold voltage	0.88		($I > \pi \times I_{T(AV)}$, $T_J = T_J$ max.)
r_{t1} Low level value of on-state slope resistance	0.50	mΩ	(16.7% $\times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}$, $T_J = T_J$ max.)
r_{t2} High level value of on-state slope resistance	0.47		($I > \pi \times I_{T(AV)}$, $T_J = T_J$ max.)
V_{TM} Max. on-state voltage	1.28	V	$I_{pk} = 880A$, $T_J = T_J$ max, $t_p = 10ms$ sine pulse
I_H Maximum holding current	600	mA	$T_J = 25^\circ C$, anode supply 12V resistive load
I_L Max. (typical) latching current	1000 (300)		

Switching

Parameter	ST280S	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, $t_f \leq 1\mu s$ $T_J = T_J$ 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		$I_{TM} = 300A$, $T_J = T_J$ max, $di/dt = 20A/\mu s$, $V_R = 50V$ $dv/dt = 20V/\mu s$, Gate 0V 100Ω, $t_p = 500\mu s$

Blocking

Parameter	ST280S	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	ST280S	Units	Conditions
P_{GM} Maximum peak gate power	10.0	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 $T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied
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	ST280S	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, ±10%	31 (275)	Nm (lbf-in)	Non lubricated threads
	24.5 (210)		Lubricated threads
wt Approximate weight	280	g	
Case style	TO-209AB(TO-93)		See Outline Table

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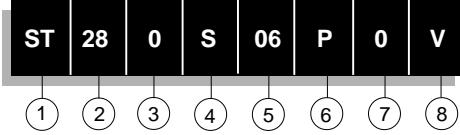
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ΔR_{thJC} Conduction

(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°	0.016	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		

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"-16UNF-2A threads							
7	-	0 = Eyelet terminals (Gate and Auxiliary Cathode Leads)							
		1 = Fast - on terminals (Gate and Auxiliary Cathode Leads)							
8	-	V = Glass-metal seal							
NOTE: For Metric Device M16 x 1.5 Contact Factory									

Outline Table

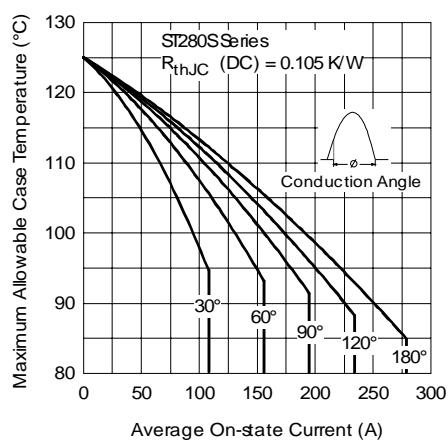
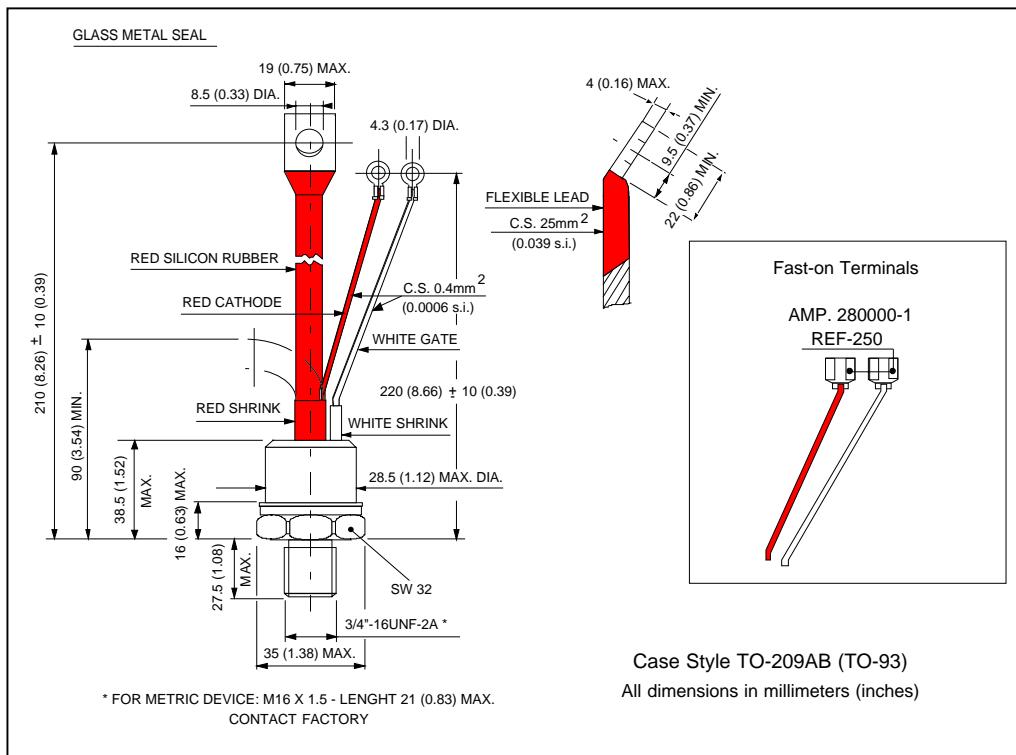


Fig. 1 - Current Ratings Characteristics

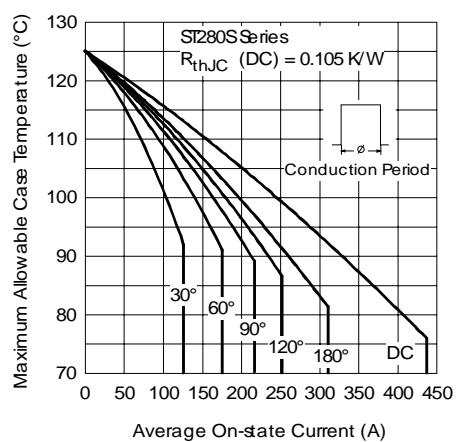


Fig. 2 - Current Ratings Characteristics

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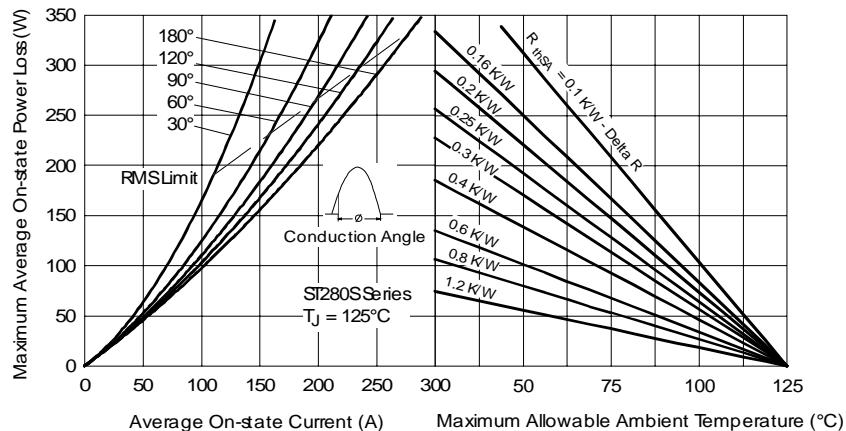


Fig. 3 - On-state Power Loss Characteristics

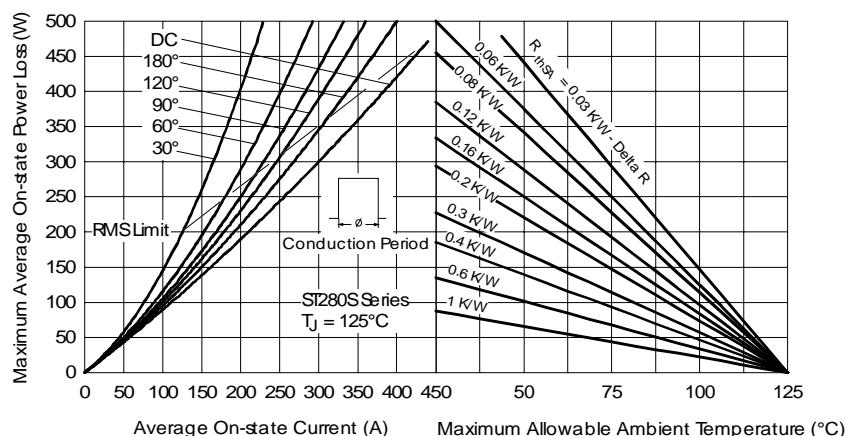


Fig. 4 - On-state Power Loss Characteristics

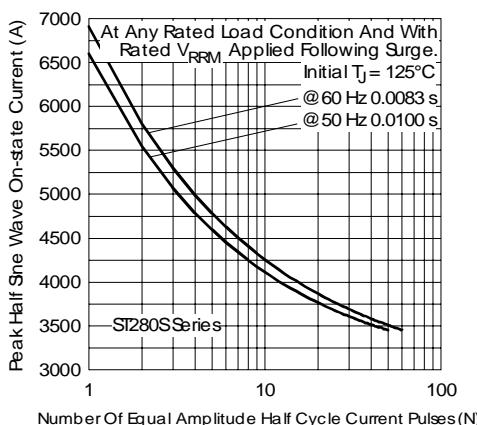


Fig. 5 - Maximum Non-Repetitive Surge Current

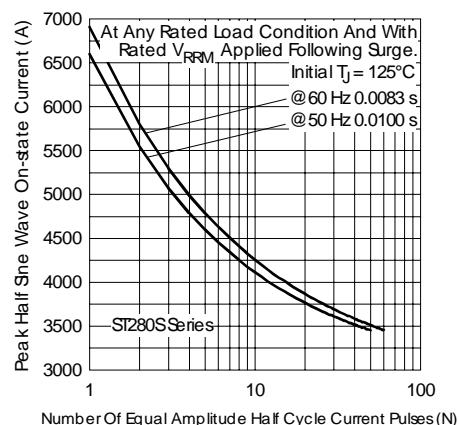


Fig. 6 - Maximum Non-Repetitive Surge Current

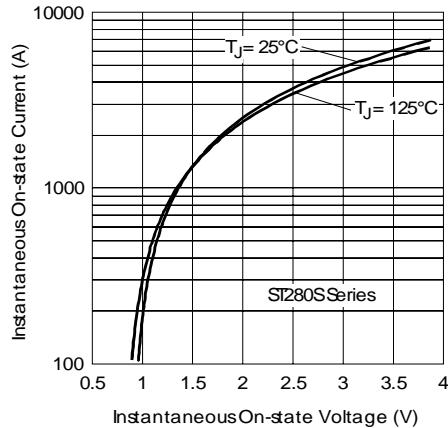


Fig. 7 - On-state Voltage Drop Characteristics

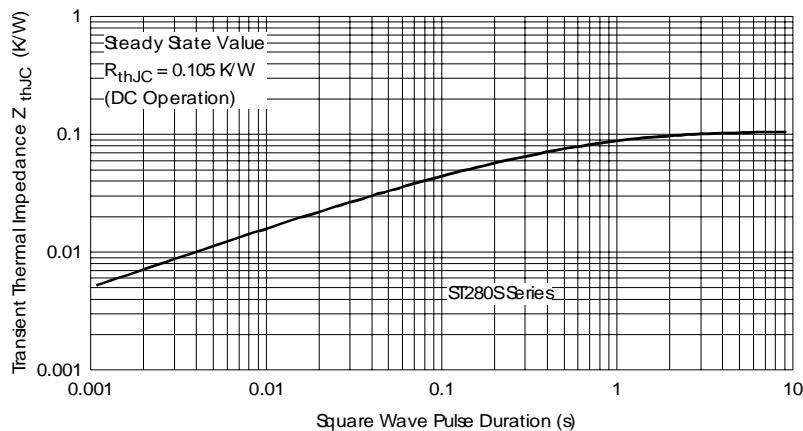


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

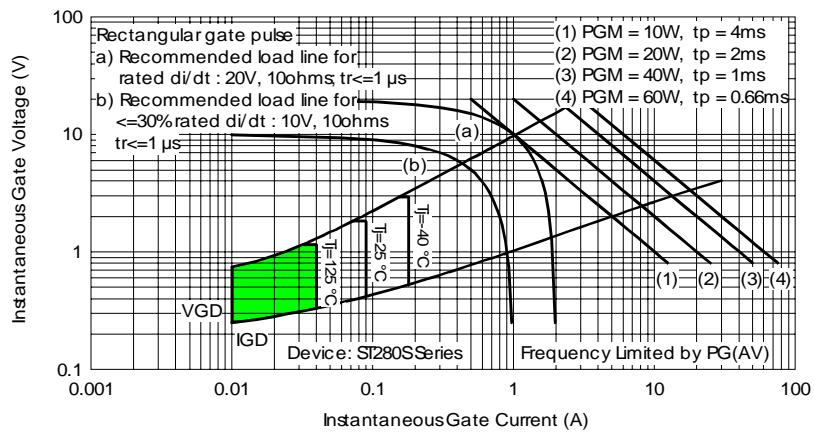


Fig. 9 - Gate Characteristics

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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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ООО "ЛайфЭлектроникс"

"LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибуторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибуторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помочь разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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