

FEATURES

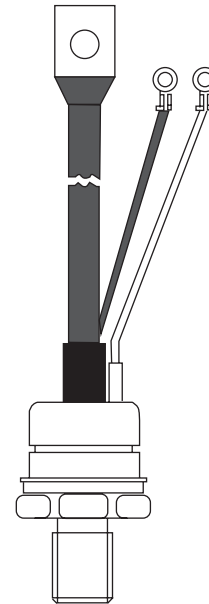
- 1). Center amplifying gate
- 2). Hermetic metal case with ceramic insulator
(Also available with glass-metal seal up to 1200V)
- 3). International standard case TO-209AB (TO-93)
- 4). Threaded studs UNF 3/4 - 16UNF2A or ISO M16x1.5
- 5). Compression Bonded Encapsulation for heavy duty operations such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

TYPICAL APPLICATIONS

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

MAJOR RATINGS AND CHARACTERISTICS

Parameters		ST230S	Unit
$I_{F(AV)}$		230	A
	@ T_C	85	°C
$I_{F(RMS)}$		360	A
I_{FSM}	@ 50Hz	5700	A
	@ 60Hz	5970	A
I^2t	@ 50Hz	163	KA ² s
	@ 60Hz	149	KA ² s
V_{DRM}/V_{RRM}		400 to 1600	V
T_q	typical	100	μs
T_J		40 to 125	°C



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
ST230S	04	400	500	30
	08	800	900	
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

2). Forward Conduction

Parameters		ST230S	Unit	Conditions		
I _{T(AV)}	Max. average forward current	230	A	180° conduction, half sine wave		
	@ Case temperature	85	°C			
I _{T(RMS)}	Max. RMS forward current	360	A	DC @ 78°C case temperature		
I _{TSM}	Max. peak, one-cycle forward, non-repetitive surge current	5700	A	t = 10ms	No voltage	Sinusoidal half wave, Initial T _J = T _J max.
		5970		t = 8.3ms	reapplied	
		4800		t = 10ms	100% V _{RRM}	
		5000		t = 8.3ms	reapplied	
I ² t	Maximum I ² t for fusing	163	KA ² s	t = 10ms	No voltage	Initial T _J = T _J max.
		148		t = 8.3ms	reapplied	
		115		t = 10ms	100% V _{RRM}	
		105		t = 8.3ms	reapplied	
I ² √t	Maximum I ² √t for fusing	1630	KA ² √s	t = 0.1 to 10ms, no voltage reapplied		
V _{T(TO)1}	Low level value of threshold voltage	0.92	V	(16.7% × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J max.		
V _{T(TO)2}	High level value of threshold voltage	0.98		(I > π × I _{F(AV)}), T _J = T _J max.		
r _{t1}	Low level value of forward slope resistance	0.88	mΩ	(16.7% × π × I _{F(AV)} < I < π × I _{F(AV)}), T _J = T _J max.		
r _{t2}	High level value of forward slope resistance	0.81		(I > π × I _{F(AV)}), T _J = T _J max.		
V _{TM}	Max. forward voltage drop	1.55	V	I _{pk} = 720A, T _J = T _J max, t _p = 10ms sine pulse		
I _H	Maximum holding current	600	mA	T _J = 25°C, 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 /dt = 1A/μs V _d = 0.67% V, T = 25°C V _{DRM} , T _J = 25°C		
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}	Max. peak reverse and off-state	30	mA	T _J = T _J max. rated V _{DRM} /V _{RRM} applied		
I _{RDM}	leakage current					

3). Triggering

Parameters		ST230S		Unit	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			
I_{GM}	Max. peak positive gate current	3.0		A	$T_J = T_J \text{ max, } f = 50\text{Hz, } d\% = 50$
$+V_{GM}$	Max. peak positive gate current	20		V	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$-V_{GM}$	Maximum peak positive gate voltage	5.0			
I_{GT}	DC gate current required to trigger	TYP.	MAX.	mA	$T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
		180	-		
		90	150		
V_{GT}	DC gate voltage required to trigger	2.9	-	V	$T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
		1.8	3.0		
		1.2	-		
I_{GD}	DC gate current not to trigger	10		mA	$T_J = T_J \text{ max.}$ 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
V_{GD}	DC gate voltage not to trigger	0.25			
T_J	Max. operating temperature range	-40 to 125		$^\circ\text{C}$	
T_{stg}	Max. storage temperature range	-40 to 150		$^\circ\text{C}$	
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 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	$T_J = T_J \text{ max.}$
120°	0.019	0.020		
90°	0.025	0.027		
60°	0.036	0.037		
30°	0.060	0.060		

PERFORMANCE CURVES FIGURE

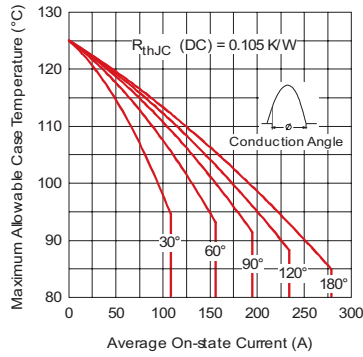


Fig. 1 - Current Ratings Characteristics

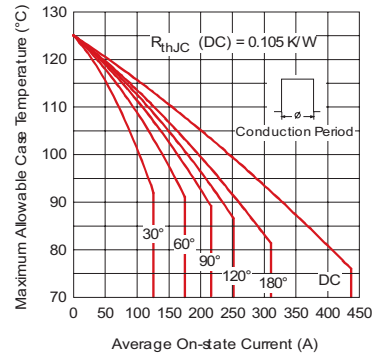


Fig. 2 - Current Ratings Characteristics

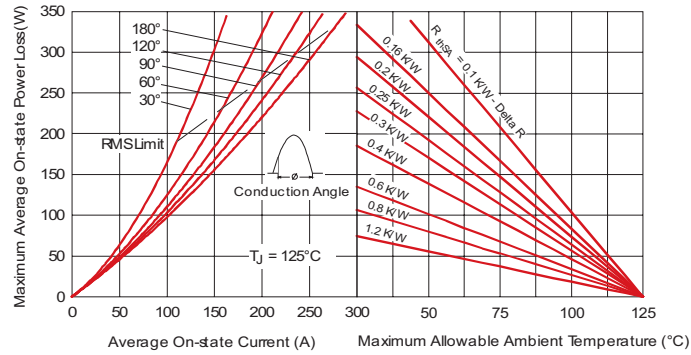


Fig. 3 - On-state Power Loss Characteristics

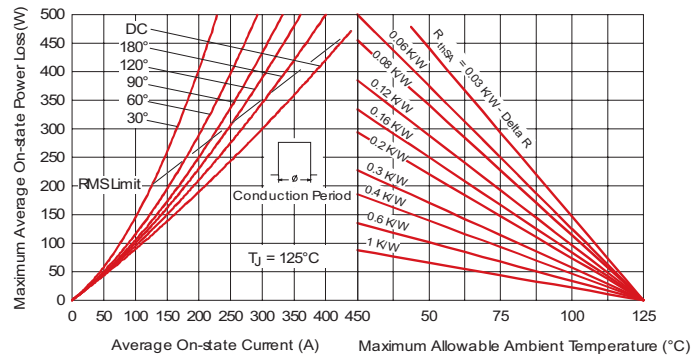


Fig. 4 - On-state Power Loss Characteristics

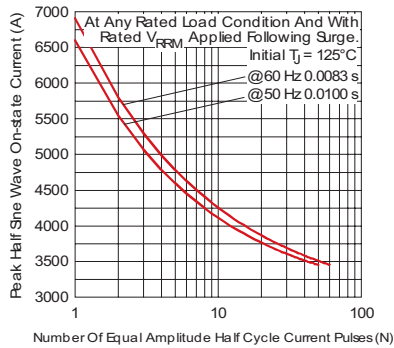


Fig. 5 - Maximum Non-Repetitive Surge Current

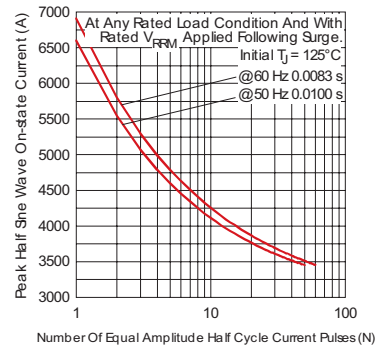


Fig. 6 - Maximum Non-Repetitive Surge Current

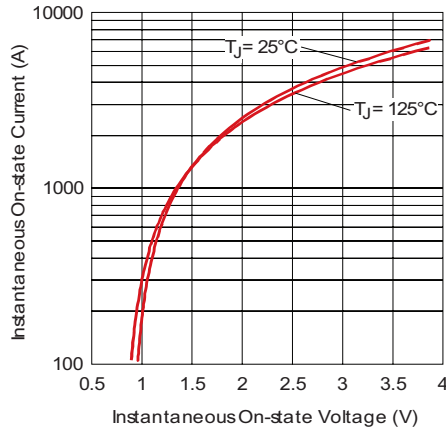


Fig. 7 - On-state Voltage Drop Characteristics

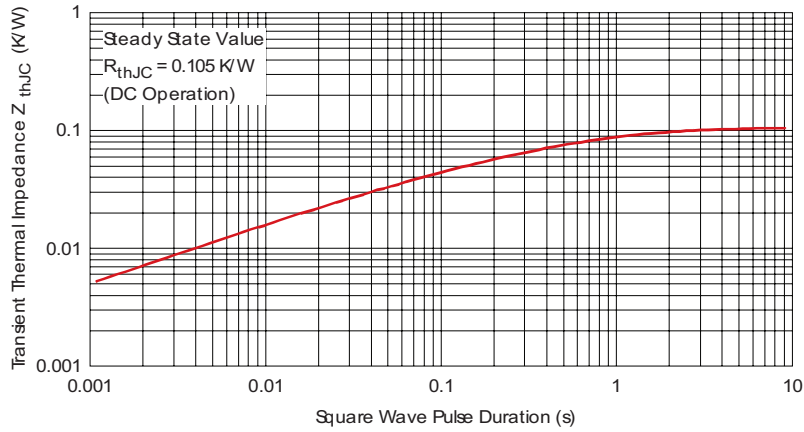


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

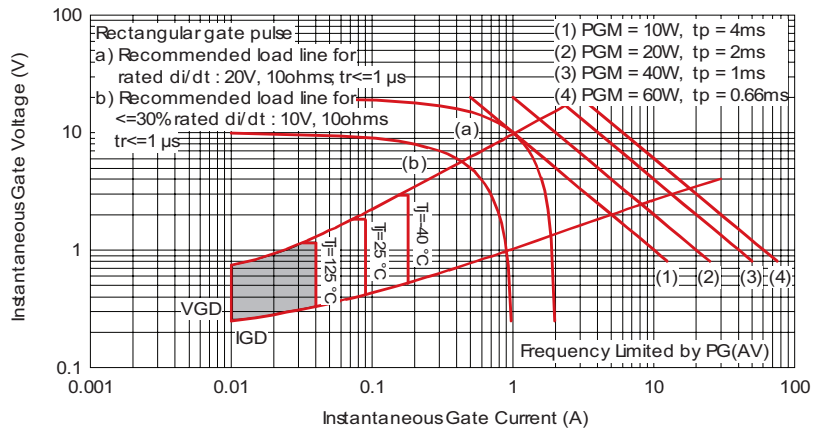
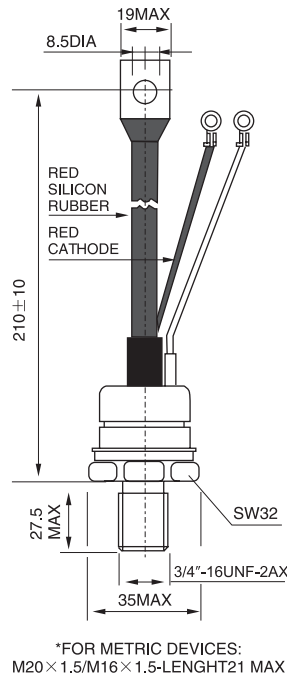


Fig. 9 - Gate Characteristics

OUTLINE



Case Style TO-93(ceramic)

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