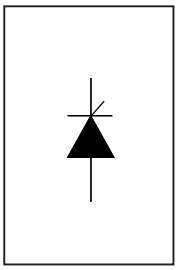
Bulletin I2198 rev. A 09/05

International
IOR Rectifier

SAFEIR Series
12TTS08PbF

PHASE CONTROL SCR
Lead-Free ("PbF" suffix)



V_T < 1.2V @ 8A
I_{TSM} = 140A
V_{RRM} = 800V

Description/ Features

The 12TTS08... *SAFEIR* series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125° C junction temperature.

Typical applications are in input rectification and crow-bar (soft start) and these products are designed to be used with International Rectifier input diodes, switches and output rectifiers which are available in identical package outlines.

Output Current in Typical Applications

Applications	Single-phase Bridge	Three-phase Bridge	Units
Capacitive input filter T_A = 55°C, T_J = 125°C, common heatsink of 1°C/W	13.5	17	A

Major Ratings and Characteristics

Characteristics		Values	Units
$I_{T(AV)}$	Sinusoidal waveform	8	A
$I_{T(RMS)}$		12.5	A
V_{RRM}/V_{DRM}		800	V
I_{TSM}		140	A
V_T	@ 8 A, T_J = 25°C	1.2	V
dv/dt		150	V/µs
di/dt		100	A/µs
T_J	range	-40 to 125	°C

Package Outline

TO-220

Voltage Ratings

Part Number	V_{RRM}, maximum peak reverse voltage V	V_{DRM}, maximum peak direct voltage V	I_{RRM}/I_{DRM} 125°C mA
12TTS08PbF	800	800	1.0

Absolute Maximum Ratings

	Parameters	Values	Units	Conditions
$I_{T(AV)}$	Max. Average On-state Current	8	A	@ T_C = 108° C, 180° conduction half sine wave
$I_{T(RMS)}$	Max. RMS On-state Current	12.5		
I_{TSM}	Max. Peak One Cycle Non-Repetitive	120	A	10ms Sine pulse, rated V_{RRM} applied, T_J = 125°C
	Surge Current	140		10ms Sine pulse, no voltage reapplied, T_J = 125°C
I^2t	Max. I^2t for fusing	72	A^2s	10ms Sine pulse, rated V_{RRM} applied, T_J = 125°C
		100		10ms Sine pulse, no voltage reapplied, T_J = 125°C
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for fusing	1000	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied, T_J = 125°C
V_{TM}	Max. On-state Voltage Drop	1.2	V	@ 8A, T_J = 25°C
r_t	On-state slope resistance	16.2	mΩ	T_J = 125°C
$V_{T(TO)}$	Threshold Voltage	0.87	V	
I_{RM}/I_{DM}	Max. Reverse and Direct	0.05	mA	T_J = 25 °C; V_R = rated V_{RRM}/ V_{DRM}
	Leakage Current	1.0		T_J = 125 °C; V_R = rated V_{RRM}/ V_{DRM}
I_H	Typ. Holding Current	30	mA	Anode Supply = 6V, Resistive load, Initial I_T=1A
I_L	Max. Latching Current	50	mA	Anode Supply = 6V, Resistive load
dv/dt	Max. rate of rise of off-state Voltage	150	V/µs	T_J = 25°C
di/dt	Max. rate of rise of turned-on Current	100	A/µs	

Triggering

Parameters		Values	Units	Conditions
P_{GM}	Max. peak Gate Power	8.0	W	
$P_{G(AV)}$	Max. average Gate Power	2.0		
$+ I_{GM}$	Max. paek positive Gate Current	1.5	A	
$- V_{GM}$	Max. paek negative Gate Voltage	10	V	
I_{GT}	Max. required DC Gate Current to trigger	20	mA	Anode supply = 6V, resistive load, T_J = - 65°C
		15		Anode supply = 6V, resistive load, T_J = 25°C
		10		Anode supply = 6V, resistive load, T_J = 125°C
V_{GT}	Max. required DC Gate Voltage to trigger	1.2	V	Anode supply = 6V, resistive load, T_J = - 65°C
		1		Anode supply = 6V, resistive load, T_J = 25°C
		0.7		Anode supply = 6V, resistive load, T_J = 125°C
V_{GD}	Max. DC Gate Voltage not to trigger	0.2		T_J = 125°C, V_{DRM} = rated value
I_{GD}	Max. DC Gate Current not to trigger	0.1	mA	T_J = 125°C, V_{DRM} = rated value

Switching

Parameters		Values	Units	Conditions
t_{gt}	Typical turn-on time	0.8	µs	T_J = 25°C
t_{rr}	Typical reverse recovery time	3		T_J = 125°C
t_q	Typical turn-off time	100		

Thermal-Mechanical Specifications

Parameters			Values	Units	Conditions
T_J	Max. Junction Temperature Range		-40 to 125	°C	
T_{stg}	Max. Storage Temperature Range		-40 to 125		
R_{thJC}	Max. Thermal Resistance Junction to Case		1.5	°C/W	DC operation
R_{thJA}	Max. Thermal Resistance Junction to Ambient		62		
R_{thCS}	Typ. Thermal Resistance Case to Heatsink		0.5		Mounting surface, smooth and greased
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		
	Case Style		TO-220		
	Marking Device		12TTS08		Case style TO-220

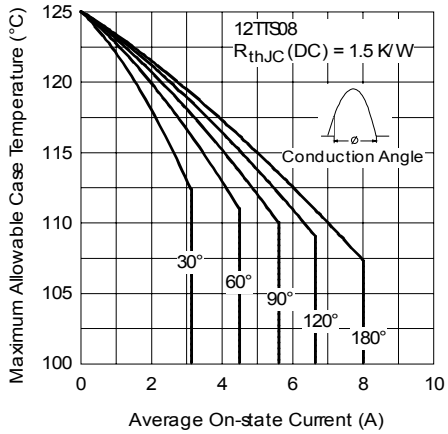


Fig. 1 - Current Rating Characteristics

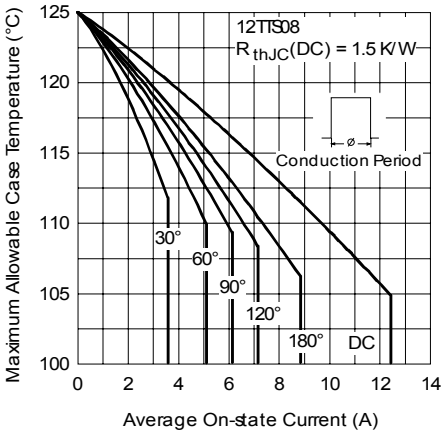


Fig. 2 - Current Rating Characteristics

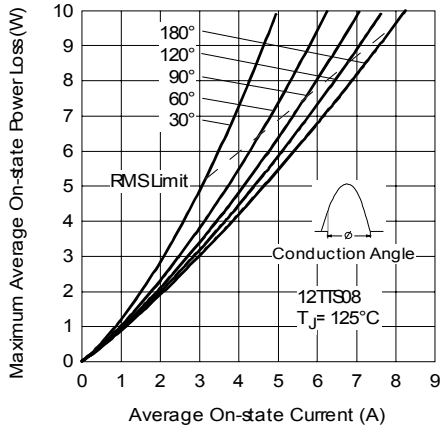


Fig. 3 - On-state Power Loss Characteristics

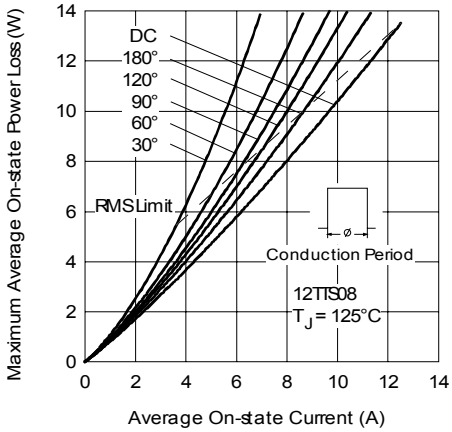


Fig. 4 - On-state Power Loss Characteristics

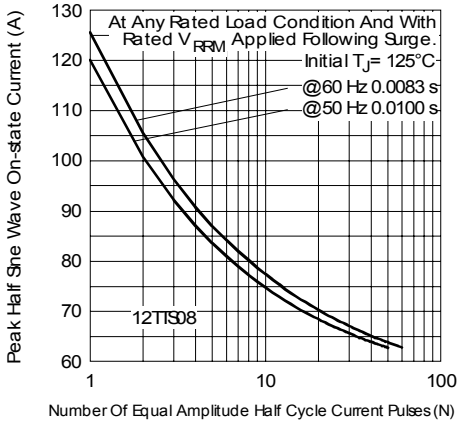


Fig. 6 - Maximum Non-Repetitive Surge Current

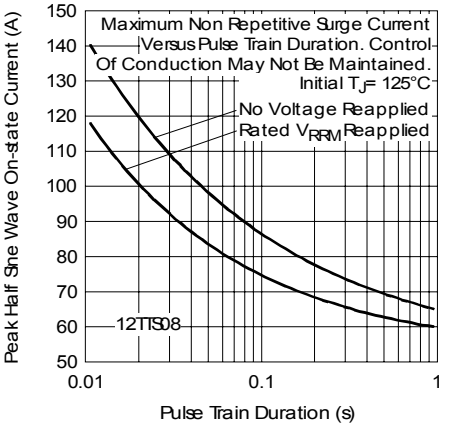


Fig. 7 - Maximum Non-Repetitive Surge Current

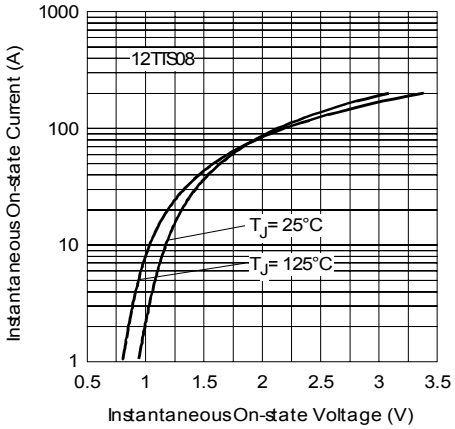


Fig. 7 - On-state Voltage Drop Characteristics

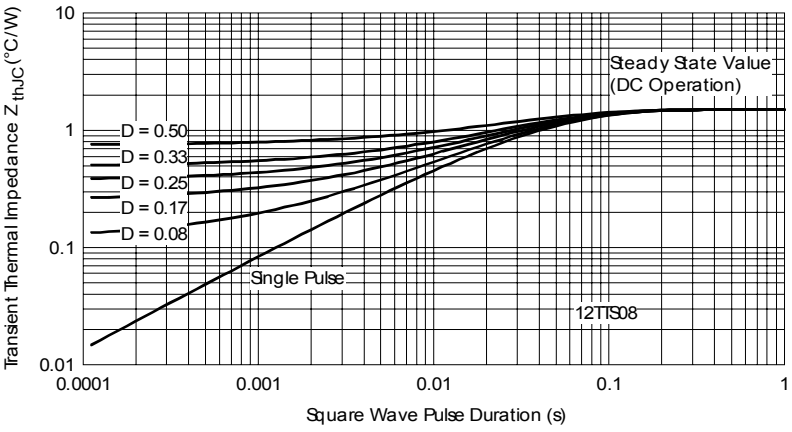
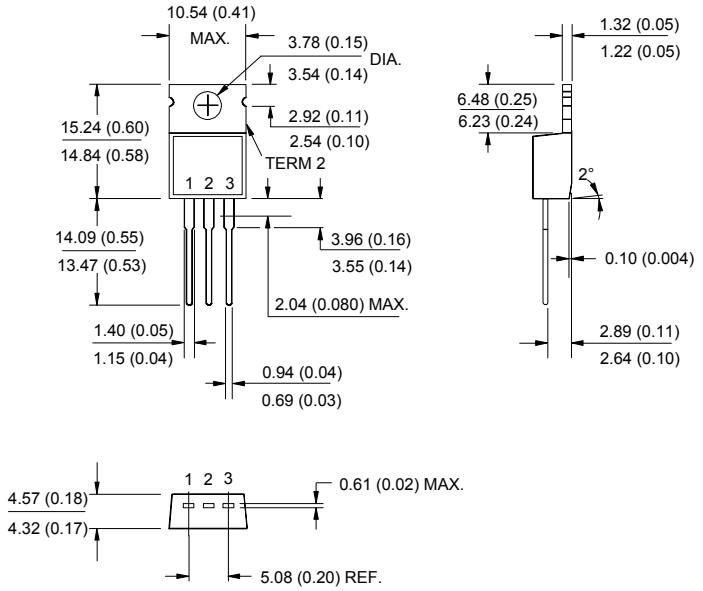


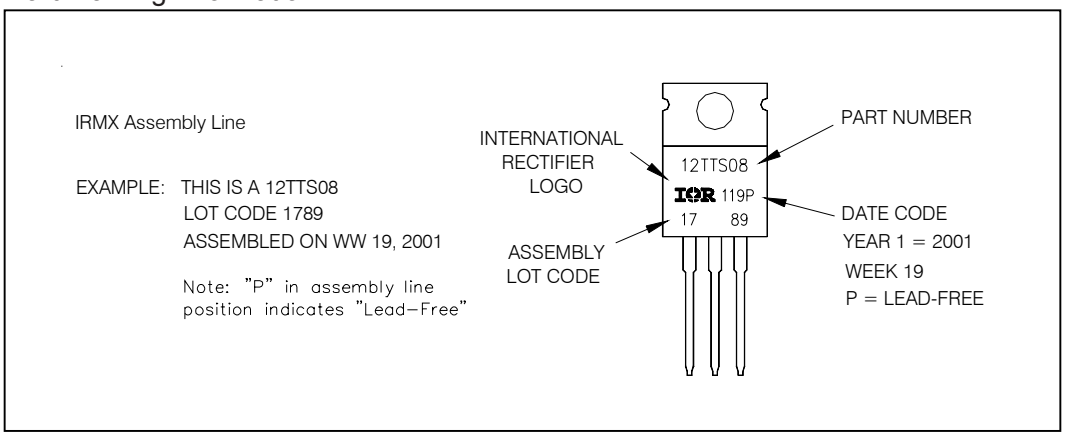
Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

Outline Table



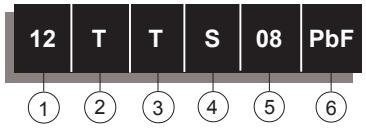
Conform to JEDEC outline TO-220AB
Dimensions in millimeters and (inches)

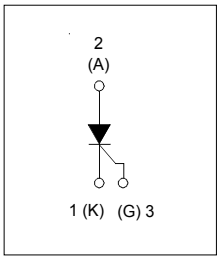
Part Marking Information



Ordering Information Table

Device Code





1	-	Current Rating (12 = 12.5A)
2	-	Circuit Configuration T = Single Thyristor
3	-	Package T = TO-220
4	-	Type of Silicon S = Standard Recovery Rectifier
5	-	Voltage Rating (08 = 800V)
6	-	• none = Standard Production • PbF = Lead-Free

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

International
IOR Rectifier

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