


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

**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.

	$V_T < 1.2V @ 8A$ $I_{TSM} = 140A$ $V_{RRM} = 800V$
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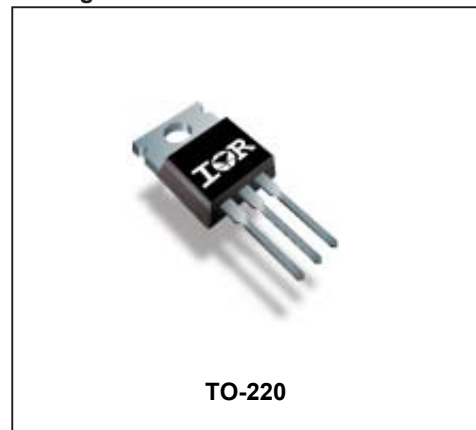
**Output Current in Typical Applications**

Applications	Single-phase Bridge	Three-phase Bridge	Units
Capacitive input filter $T_A = 55^\circ C, T_J = 125^\circ C,$ common heatsink of $1^\circ C/W$	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
$V_T @ 8A, T_J = 25^\circ C$	1.2	V
dv/dt	150	V/ $\mu s$
di/dt	100	A/ $\mu s$
$T_J$ range	-40 to 125	$^\circ C$

**Package Outline**



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	@ $T_C = 108^\circ\text{C}$ , 180° conduction half sine wave
$I_{T(RMS)}$ Max. RMS On-state Current	12.5		
$I_{TSM}$ Max. Peak One Cycle Non-Repetitive Surge Current	120	A	10ms Sine pulse, rated $V_{RRM}$ applied, $T_J = 125^\circ\text{C}$
	140		10ms Sine pulse, no voltage reapplied, $T_J = 125^\circ\text{C}$
$I^2t$ Max. $I^2t$ for fusing	72	$A^2s$	10ms Sine pulse, rated $V_{RRM}$ applied, $T_J = 125^\circ\text{C}$
	100		10ms Sine pulse, no voltage reapplied, $T_J = 125^\circ\text{C}$
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	1000	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied, $T_J = 125^\circ\text{C}$
$V_{TM}$ Max. On-state Voltage Drop	1.2	V	@ 8A, $T_J = 25^\circ\text{C}$
$r_t$ On-state slope resistance	16.2	$m\Omega$	$T_J = 125^\circ\text{C}$
$V_{T(TO)}$ Threshold Voltage	0.87	V	
$I_{RM}/I_{DM}$ Max. Reverse and Direct Leakage Current	0.05	mA	$T_J = 25^\circ\text{C}$
	1.0		$T_J = 125^\circ\text{C}$
$V_R = \text{rated } V_{RRM} / V_{DRM}$			
$I_H$ 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	$V/\mu s$	$T_J = 25^\circ\text{C}$
$di/dt$ Max. rate of rise of turned-on Current	100	$A/\mu s$	

### 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. peak positive Gate Current	1.5	A	
$-V_{GM}$ Max. peak negative Gate Voltage	10	V	
$I_{GT}$ Max. required DC Gate Current to trigger	20	mA	Anode supply = 6V, resistive load, $T_J = -65^\circ\text{C}$
	15		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	10		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
$V_{GT}$ Max. required DC Gate Voltage to trigger	1.2	V	Anode supply = 6V, resistive load, $T_J = -65^\circ\text{C}$
	1		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	0.7		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
$V_{GD}$ Max. DC Gate Voltage not to trigger	0.2		$T_J = 125^\circ\text{C}$ , $V_{DRM} = \text{rated value}$
$I_{GD}$ Max. DC Gate Current not to trigger	0.1	mA	$T_J = 125^\circ\text{C}$ , $V_{DRM} = \text{rated value}$

### Switching

Parameters	Values	Units	Conditions
$t_{gt}$ Typical turn-on time	0.8	$\mu\text{s}$	$T_J = 25^\circ\text{C}$
$t_{rr}$ Typical reverse recovery time	3		$T_J = 125^\circ\text{C}$
$t_q$ Typical turn-off time	100		

### Thermal-Mechanical Specifications

Parameters	Values	Units	Conditions
$T_J$ Max. Junction Temperature Range	-40 to 125	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-40 to 125		
$R_{thJC}$ Max. Thermal Resistance Junction to Case	1.5	$^\circ\text{C}/\text{W}$	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

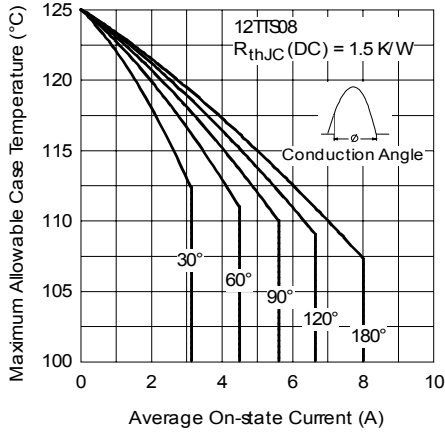


Fig. 1 - Current Rating Characteristics

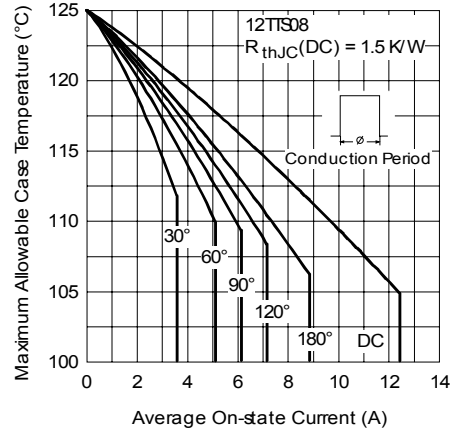


Fig. 2 - Current Rating Characteristics

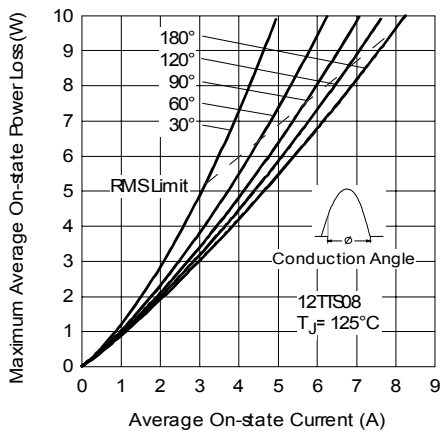


Fig. 3 - On-state Power Loss Characteristics

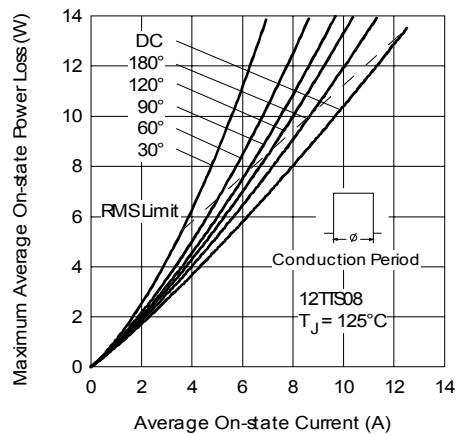


Fig. 4 - On-state Power Loss Characteristics

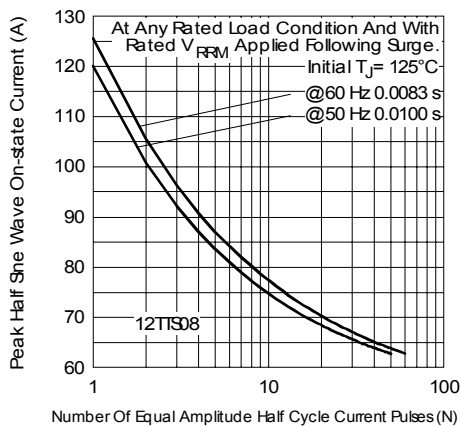


Fig. 6 - Maximum Non-Repetitive Surge Current

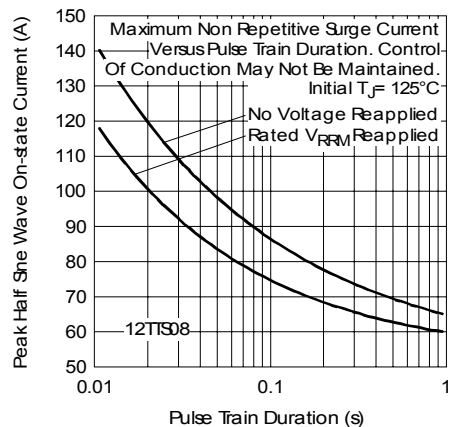


Fig. 7 - Maximum Non-Repetitive Surge Current

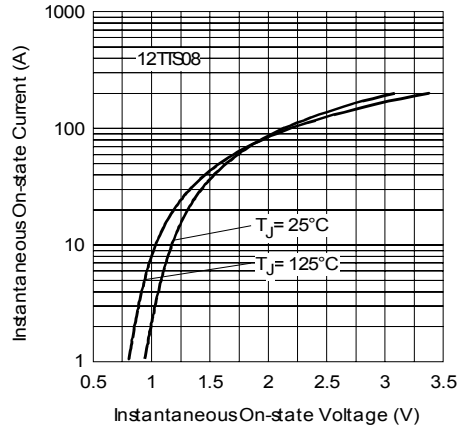


Fig. 7 - On-state Voltage Drop Characteristics

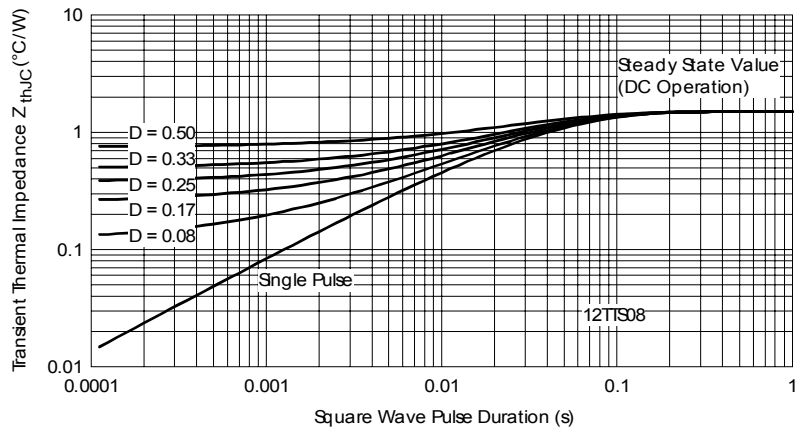
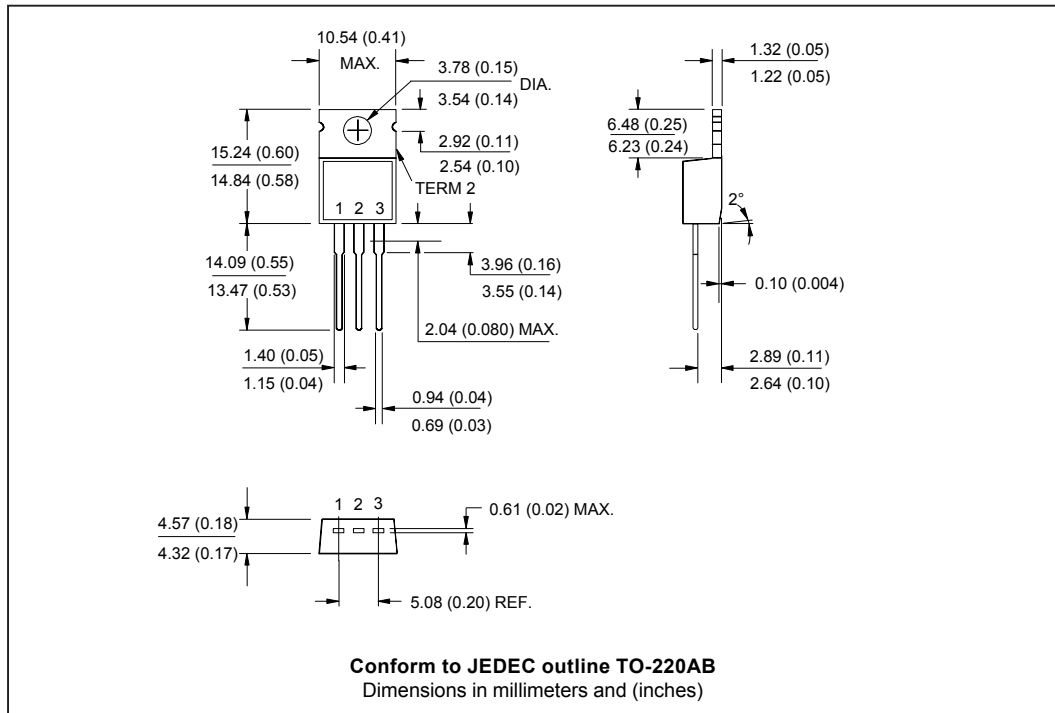
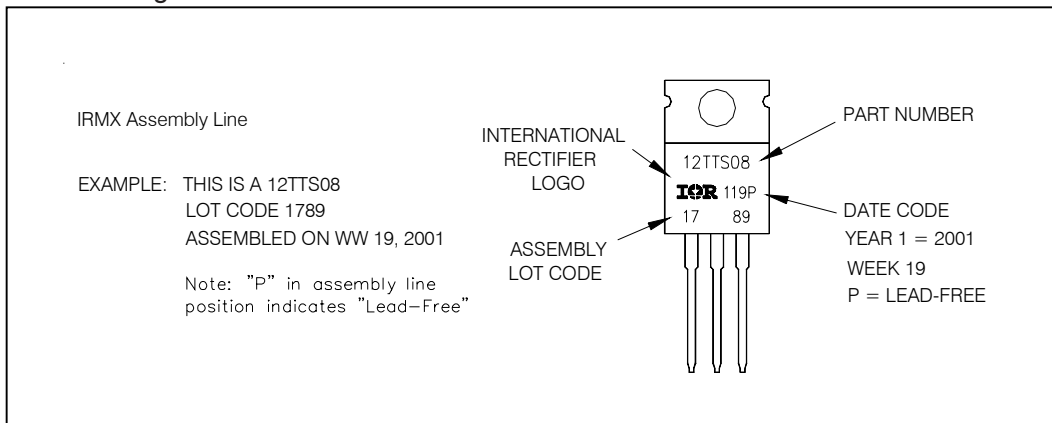


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

Outline Table



Part Marking Information



Ordering Information Table

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

2  
(A)

1 (K) (G) 3

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.