


**SURFACE MOUNTABLE  
PHASE CONTROL SCR**

**Description/Features**

The 10TTS08S **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 (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.

	$V_T < 1.15V @ 6.5A$
	$I_{TSM} = 140A$
	$V_{RRM} = 800V$

**Output Current in Typical Applications**

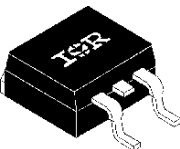
Applications	Single-phase Bridge	Three-phase Bridge	Units
NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz (140µm) copper	2.5	3.5	A
Aluminum IMS, $R_{thCA} = 15^\circ C/W$	6.3	9.5	
Aluminum IMS with heatsink, $R_{thCA} = 5^\circ C/W$	14.0	18.5	

$T_A = 55^\circ C, T_J = 125^\circ C, \text{footprint } 300\text{mm}^2$

**Major Ratings and Characteristics**

Characteristics	10TTS08S	Units
$I_{T(AV)}$ Sinusoidal waveform	6.5	A
$I_{RMS}$	10	A
$V_{RRM}/V_{DRM}$	800	V
$I_{TSM}$	140	A
$V_T @ 6.5A, T_J = 25^\circ C$	1.15	V
dv/dt	150	V/µs
di/dt	100	A/µs
$T_J$ range	-40 to 125	°C

**Package Outline**



**D² PAK (SMD-220)**

# 10TTS08S *SAFEIR* Series

Preliminary Data Sheet I2145 12/97

International  
**ISOR** Rectifier

## 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
10TTS08S	800	800	1.0

## Absolute Maximum Ratings

Parameters	10TTS08S	Units	Conditions
$I_{T(AV)}$ Max. Average On-state Current	6.5	A	@ $T_C = 112^\circ\text{C}$ , 180° conduction half sine wave
$I_{T(RMS)}$ Max. RMS On-state Current	10		
$I_{TSM}$ 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	$\text{A}^2\text{s}$	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	$\text{A}^2\sqrt{\text{s}}$	$t = 0.1$ to 10ms, no voltage reapplied, $T_J = 125^\circ\text{C}$
$V_{TM}$ Max. On-state Voltage Drop	1.15	V	@ 6.5A, $T_J = 25^\circ\text{C}$
$r_t$ On-state slope resistance	17.3	$\text{m}\Omega$	$T_J = 125^\circ\text{C}$
$V_{T(TO)}$ Threshold Voltage	0.85	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 $I_T = 1\text{A}$
$I_L$ Max. Latching Current	50	mA	Anode Supply = 6V, Resistive load
$dv/dt$ Max. rate of rise of off-state Voltage	150	$\text{V}/\mu\text{s}$	$T_J = 25^\circ\text{C}$
$di/dt$ Max. rate of rise of turned-on Current	100	$\text{A}/\mu\text{s}$	

### Triggering

Parameters	10TTS08S	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	10TTS08S	Units	Conditions
$t_{gt}$ Typical turn-on time	0.8	$\mu\text{s}$	$T_J = 25^\circ\text{C}$
$t_{tr}$ Typical reverse recovery time	3		$T_J = 125^\circ\text{C}$
$t_q$ Typical turn-off time	100		

### Thermal-Mechanical Specifications

Parameters	10TTS08S	Units	Conditions
$T_J$ Max. Junction Temperature Range	-40 to 125	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-40 to 125	$^\circ\text{C}$	
	Soldering Temperature	240	$^\circ\text{C}$ for 10 seconds (1.6mm from case)
$R_{thJC}$ Max. Thermal Resistance Junction to Case	1.5	$^\circ\text{C/W}$	DC operation
$R_{thJA}$ Typ. Thermal Resistance Junction to Ambient (PCB Mount)**	40	$^\circ\text{C/W}$	
wt Approximate Weight	2 (0.07)	g (oz.)	
T Case Style	D <sup>2</sup> Pak (SMD-220)		

\*\*When mounted on 1" square (650mm<sup>2</sup>) PCB of FR-4 or G-10 material 4oz (140 $\mu\text{m}$ ) copper 40 $^\circ\text{C/W}$   
 For recommended footprint and soldering techniques refer to application note #AN-994

# 10TTS08S SAFEIR Series

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International  
**ISOR** Rectifier

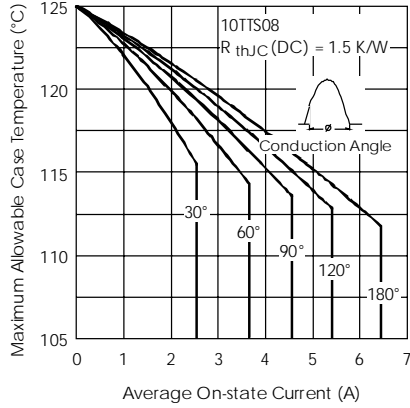


Fig. 1 - Current Rating Characteristics

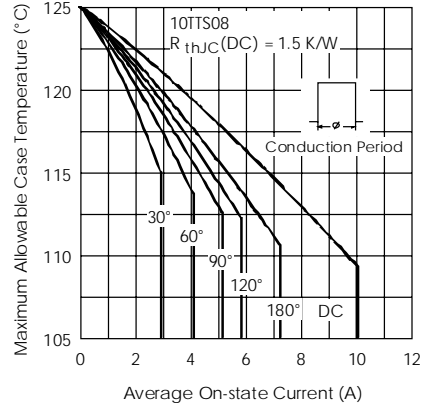


Fig. 2 - Current Rating Characteristics

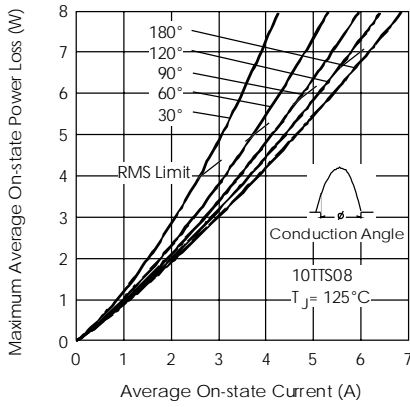


Fig. 3 - On-state Power Loss Characteristics

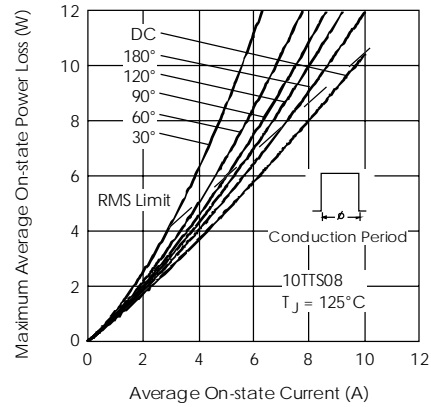


Fig. 4 - On-state Power Loss Characteristics

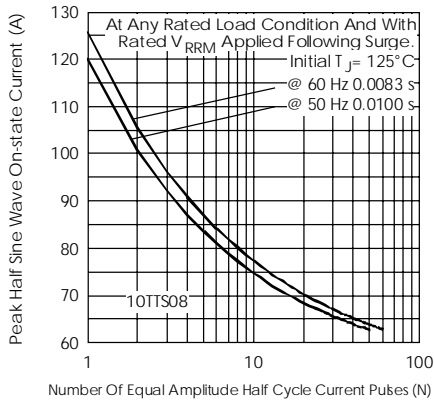


Fig. 6 - Maximum Non-Repetitive Surge Current

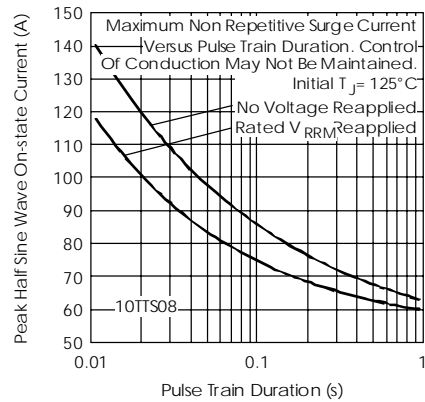


Fig. 7 - Maximum Non-Repetitive Surge Current

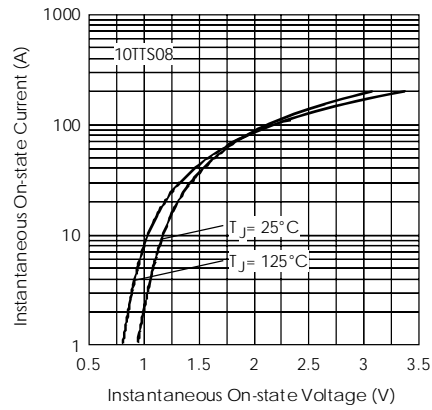


Fig. 7 - On-state Voltage Drop Characteristics

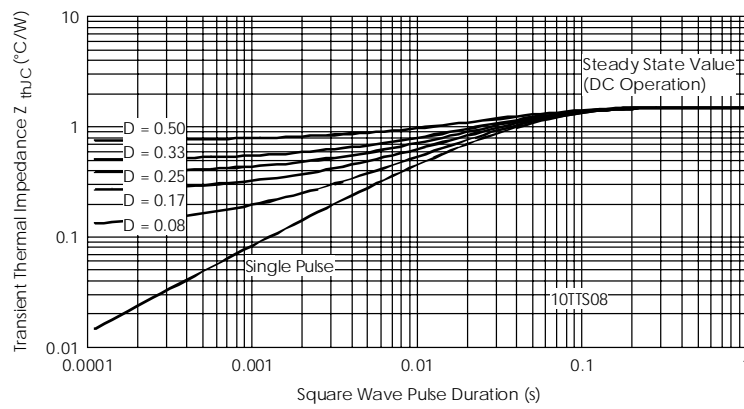
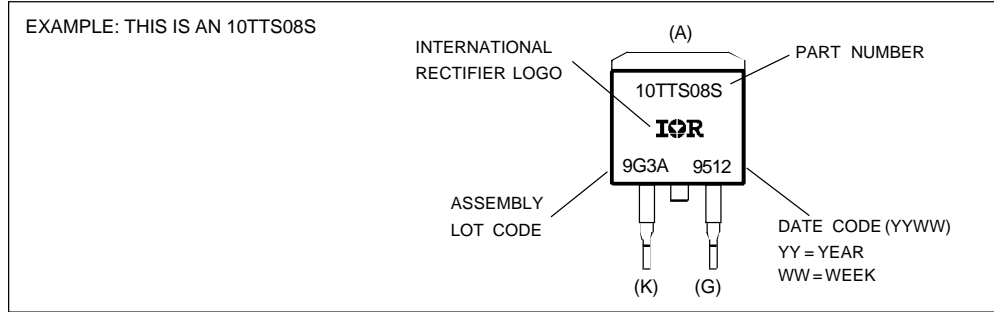
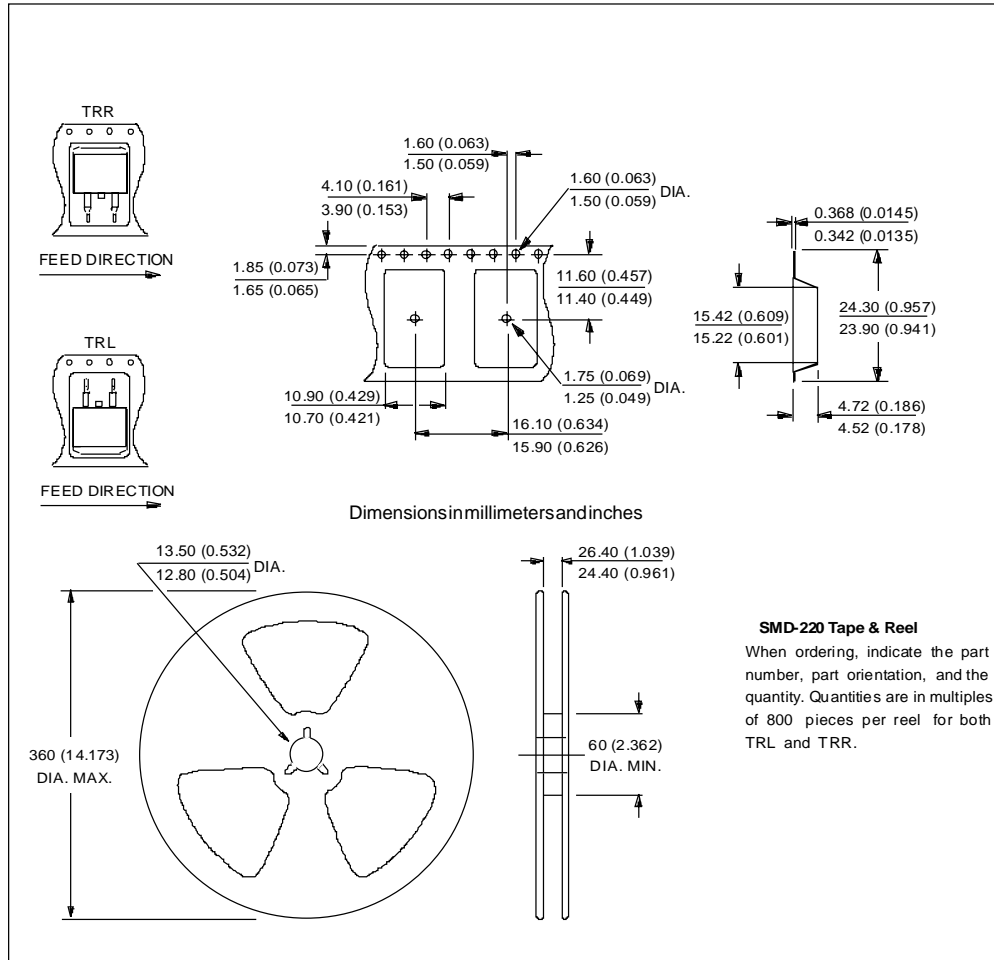


Fig. 8 - Thermal Impedance  $Z_{thjC}$  Characteristics

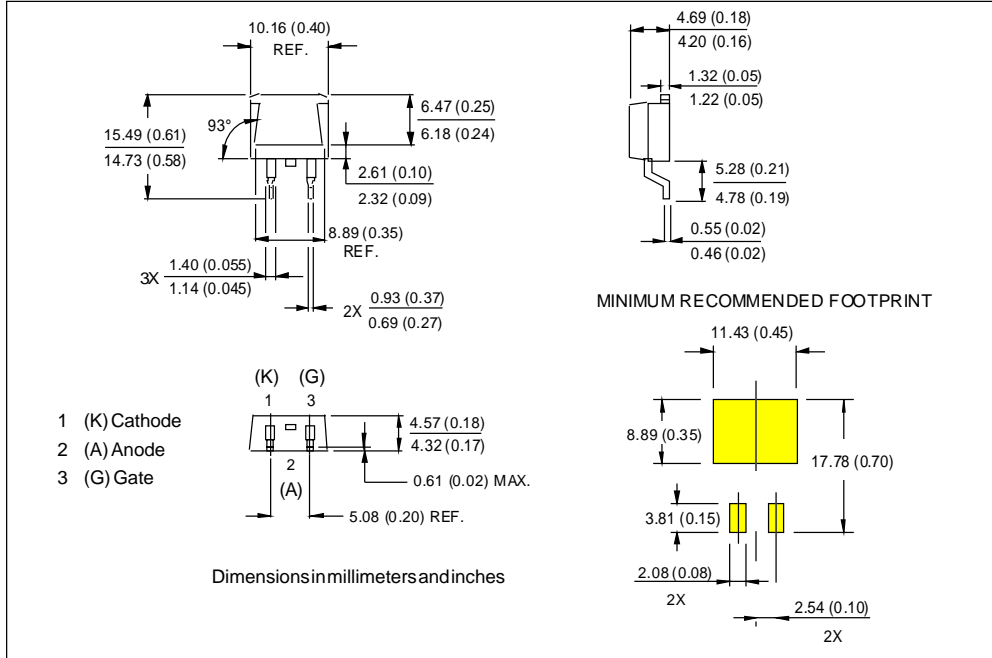
Marking Information



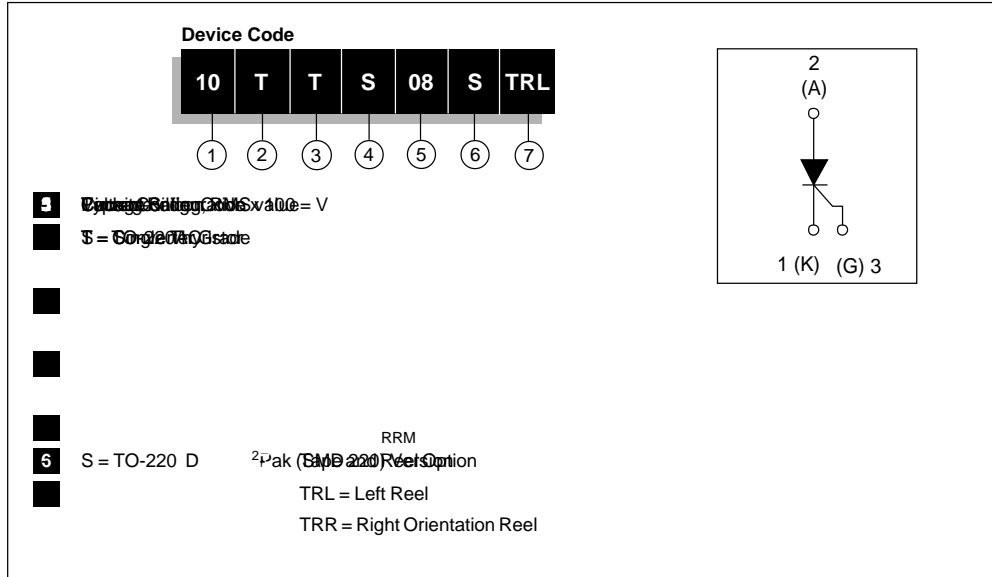
Tape & Reel Information



Outline Table



Ordering Information Table



# 10TTS08S *SAFEIR* Series

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International  
**IOR** Rectifier

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