

Bulletin I2117 rev. D 12/98

International IOR Rectifier


SAFEIR Series 25TTS..S

SURFACE MOUNTABLE PHASE CONTROL SCR

Description/Features

The 25TTS..S **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	< 1.25V @ 16A
	I_{TSM}	= 300A
	V_{RRM}	800 to 1600V

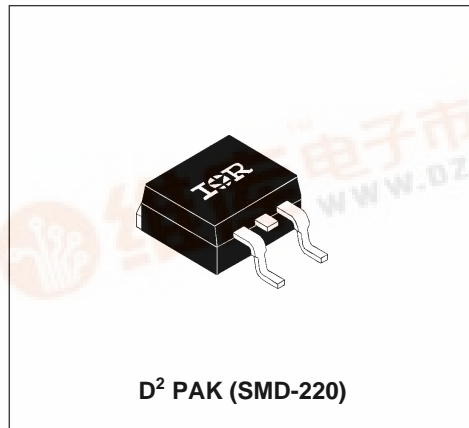
Output Current in Typical Applications

Applications	Single-phase Bridge	Three-phase Bridge	Units
NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz (140µm) copper	3.5	5.5	A
Aluminum IMS, $R_{thCA} = 15^\circ\text{C/W}$	8.5	13.5	
Aluminum IMS with heatsink, $R_{thCA} = 5^\circ\text{C/W}$	16.5	25.0	

$T_A = 55^\circ\text{C}$, $T_J = 125^\circ\text{C}$, footprint 300mm²

Major Ratings and Characteristics

Characteristics	25TTS..S	Units
$I_{T(AV)}$ Sinusoidal waveform	16	A
I_{RMS}	25	A
V_{RRM}/V_{DRM}	up to 1600	V
I_{TSM}	300	A
V_T @ 16 A, $T_J = 25^\circ\text{C}$	1.25	V
dv/dt	500	V/µs
di/dt	150	A/µs
T_J	-40 to 125	°C



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
25TTS08S	800	800	10
25TTS12S	1200	1200	
25TTS16S	1600	1600	

Absolute Maximum Ratings

Parameters	25TTS..S	Units	Conditions	
$I_{T(AV)}$ Max. Average On-state Current	16	A	@ $T_C = 93^\circ\text{C}$, 180° conduction half sine wave	
I_{RMS} Max. RMS On-state Current	25			
I_{TSM} Max. Peak One Cycle Non-Repetitive Surge Current	300		10ms Sine pulse, rated V_{RRM} applied	
	350	10ms Sine pulse, no voltage reapplied		
I^2t Max. I^2t for fusing	450	A^2s	10ms Sine pulse, rated V_{RRM} applied	
	630		10ms Sine pulse, no voltage reapplied	
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	6300	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied	
V_{TM} Max. On-state Voltage Drop	1.25	V	@ 16A, $T_J = 25^\circ\text{C}$	
r_t On-state slope resistance	12.0	mΩ	$T_J = 125^\circ\text{C}$	
$V_{T(TO)}$ Threshold Voltage	1.0	V		
I_{RM}/I_{DM} Max. Reverse and Direct Leakage Current	0.5	mA	$T_J = 25^\circ\text{C}$	$V_R = \text{rated } V_{RRM}/V_{DRM}$
	10		$T_J = 125^\circ\text{C}$	
I_H Holding Current	Typ. Max.	mA	Anode Supply = 6V, Resistive load, Initial $I_T = 1A$ 25TTS08S, 25TTS12S 25TTS16S	
	-- 100			
	100 150			
I_L Max. Latching Current	200	mA	Anode Supply = 6V, Resistive load	
dv/dt Max. Rate of Rise of off-state Voltage	500	V/μs		
di/dt Max. Rate of Rise of turned-on Current	150	A/μs		

Triggering

Parameters	25TTS..S	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	60	mA	Anode supply = 6V, resistive load, $T_J = -10^\circ\text{C}$
	45		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	20		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
V_{GT} Max. required DC Gate Voltage to trigger	2.5	V	Anode supply = 6V, resistive load, $T_J = -10^\circ\text{C}$
	2.0		Anode supply = 6V, resistive load, $T_J = 25^\circ\text{C}$
	1.0		Anode supply = 6V, resistive load, $T_J = 125^\circ\text{C}$
V_{GD} Max. DC Gate Voltage not to trigger	0.25		$T_J = 125^\circ\text{C}$, V_{DRM} = rated value
I_{GD} Max. DC Gate Current not to trigger	2.0	mA	$T_J = 125^\circ\text{C}$, V_{DRM} = rated value

Switching

Parameters	25TTS..S	Units	Conditions
t_{gt} Typical turn-on time	0.9	μs	$T_J = 25^\circ\text{C}$
t_{tr} Typical reverse recovery time	4		$T_J = 125^\circ\text{C}$
t_{q} Typical turn-off time	110		

Thermal-Mechanical Specifications

Parameters	25TTS..S	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	1.1	$^\circ\text{C}/\text{W}$	DC operation
R_{thJA} Typ. Thermal Resistance Junction to Ambient (PCB Mount)**	40	$^\circ\text{C}/\text{W}$	
wt Approximate Weight	2 (0.07)	g (oz.)	
T Case Style	D ² Pak (SMD-220)		

**When mounted on 1" square (650mm²) PCB of FR-4 or G-10 material 4 oz (140 μm) copper 40 $^\circ\text{C}/\text{W}$
 For recommended footprint and soldering techniques refer to application note #AN-994

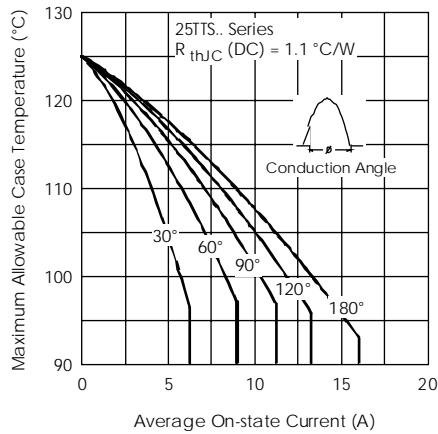


Fig. 1 - Current Rating Characteristics

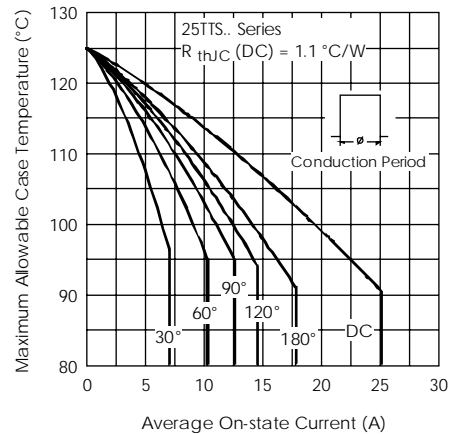


Fig. 2 - Current Rating Characteristics

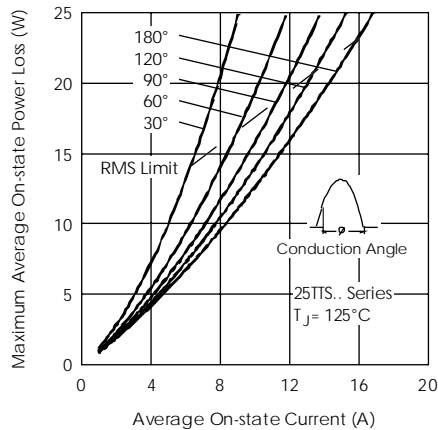


Fig. 3 - On-state Power Loss Characteristics

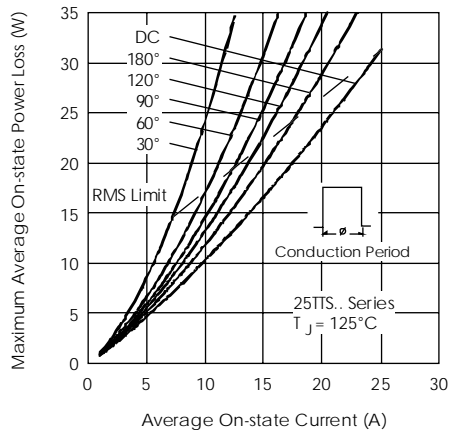


Fig. 4 - On-state Power Loss Characteristics

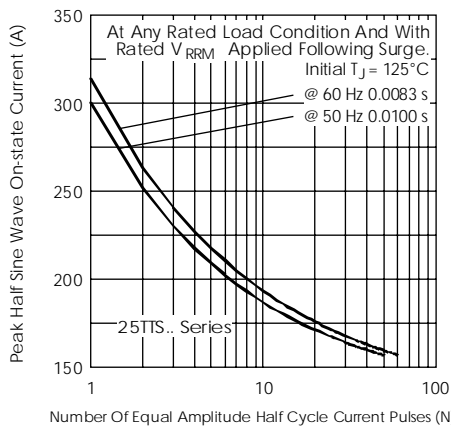


Fig. 5 - Maximum Non-Repetitive Surge Current

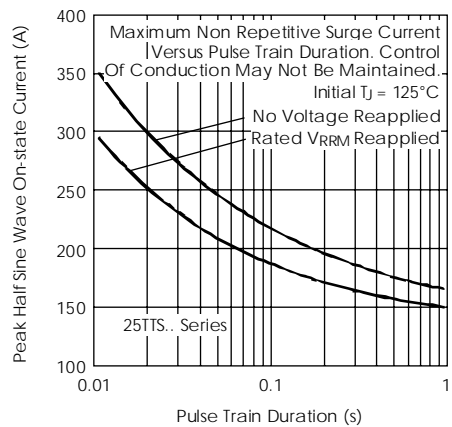


Fig. 6 - Maximum Non-Repetitive Surge Current

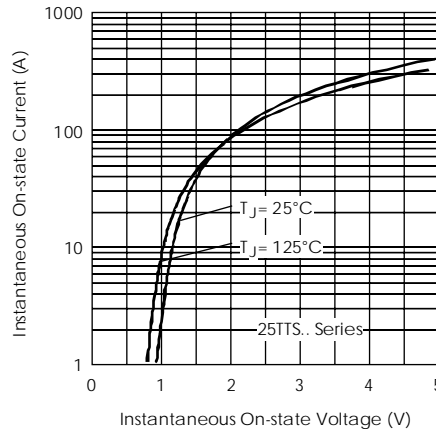


Fig. 7 - On-state Voltage Drop Characteristics

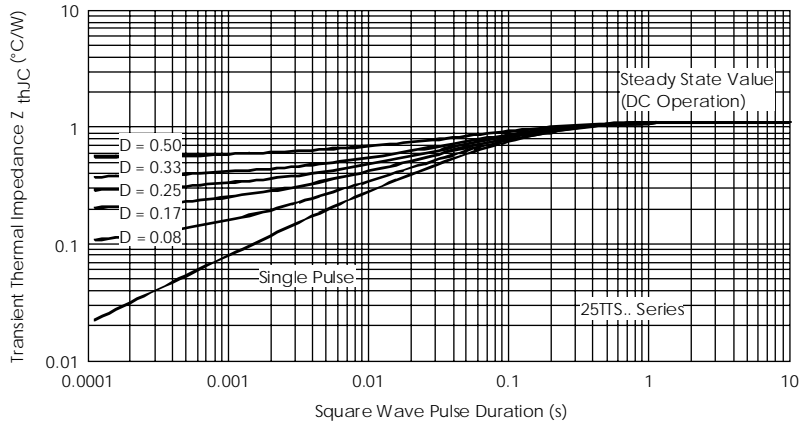


Fig. 8 - Gate Characteristics

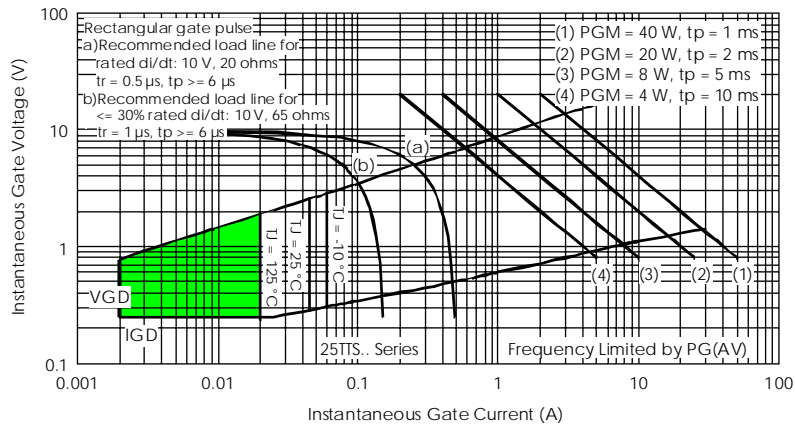


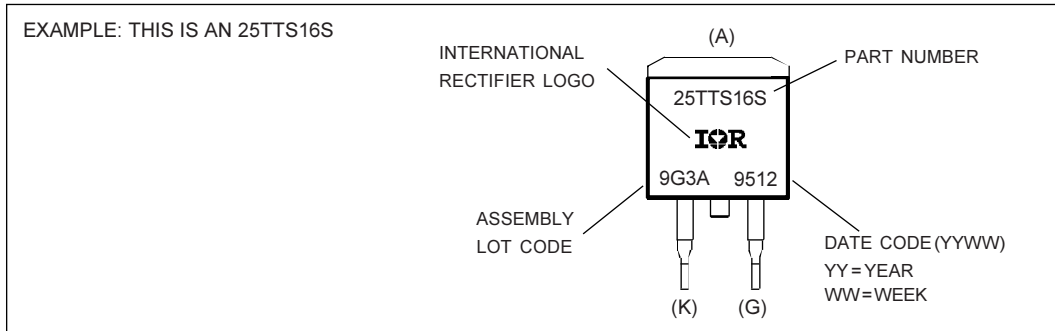
Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

25TTS..S SAFEIR Series

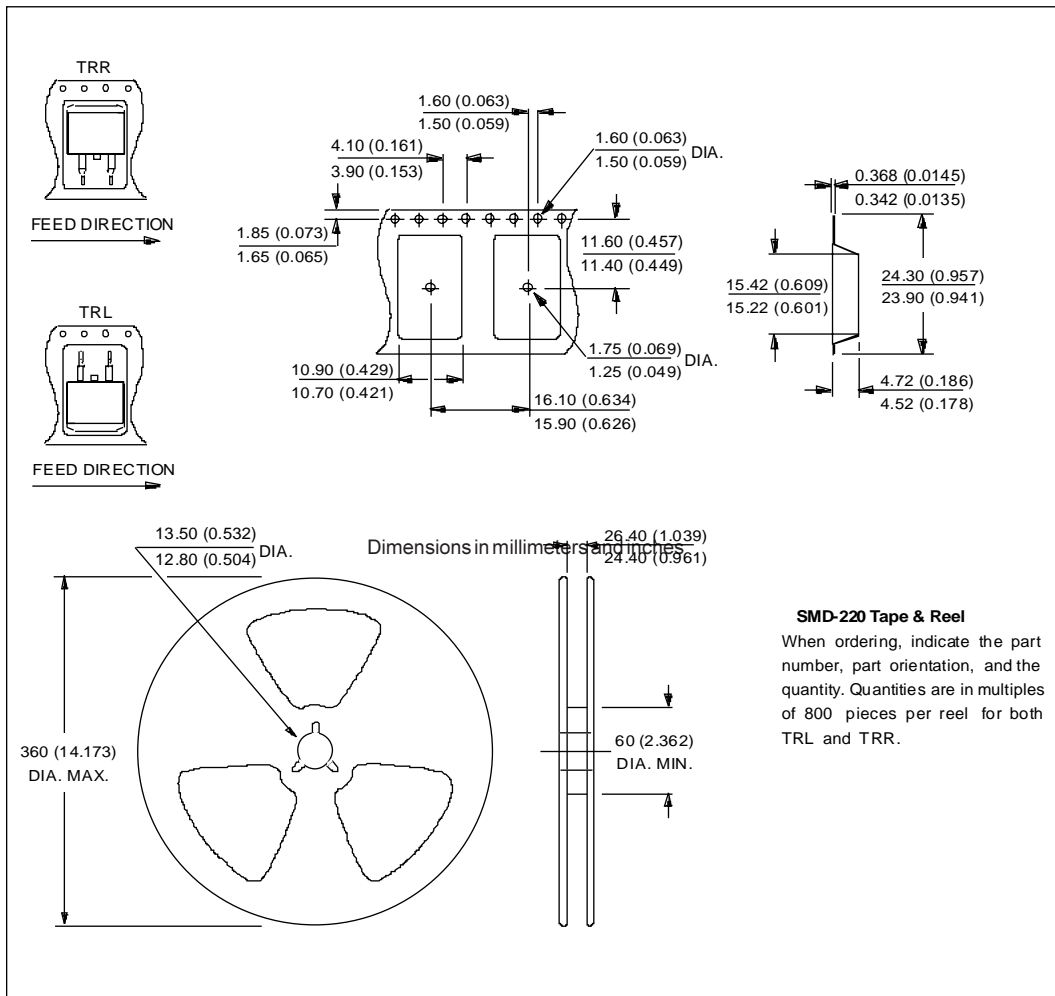
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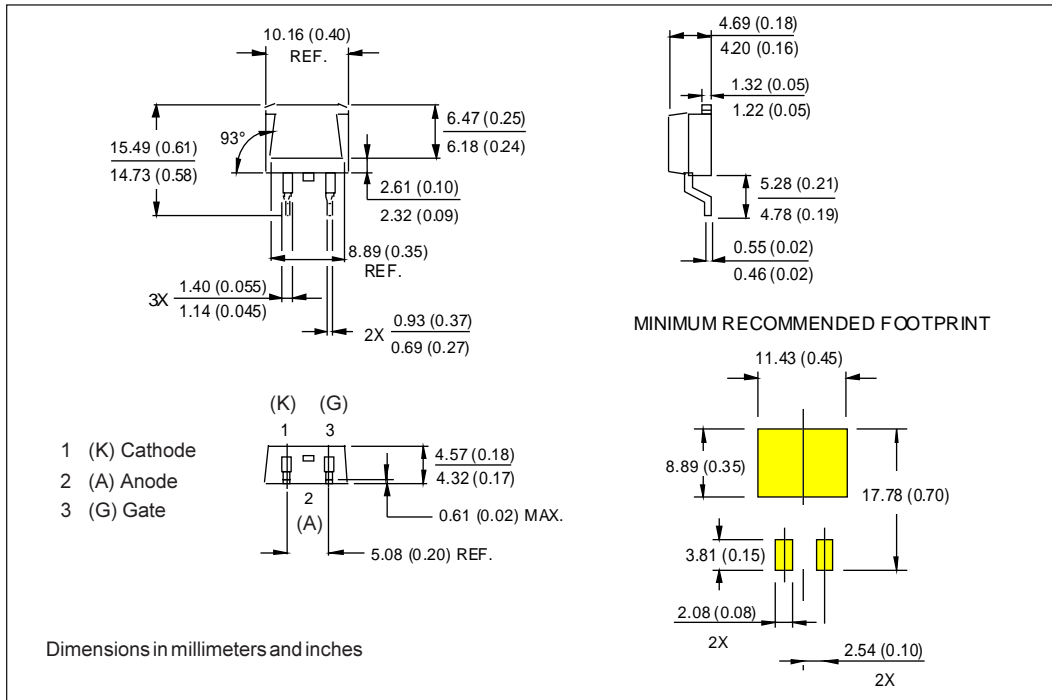
Marking Information



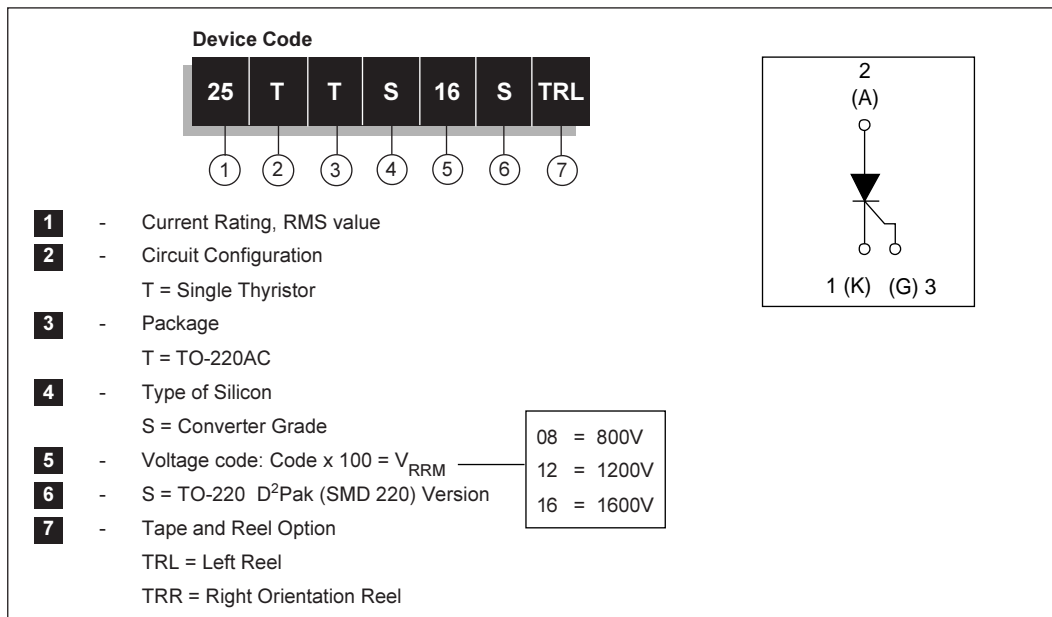
Tape & Reel Information



Outline Table



Ordering Information Table



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Data and specifications subject to change without notice.