


## 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

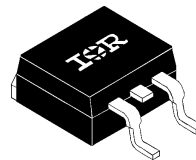
### Output Current in Typical Applications

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 300mm<sup>2</sup>

### 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
$V_T$ @ 16A, $T_J = 25^\circ\text{C}$	1.25	V
dv/dt	500	V/µs
di/dt	150	A/µs
$T_J$	-40 to 125	°C



**D<sup>2</sup> PAK (SMD-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
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	$m\Omega$	$T_J = 125^\circ\text{C}$
$V_{T(TO)}$ Threshold Voltage	1.0	V	
$I_{RM}/I_{DM}$ Max. Reverse and Direct Leakage Current	0.5	mA	$T_J = 25^\circ\text{C}$
	10		$T_J = 125^\circ\text{C}$
$I_H$ Holding Current	Typ.	mA	Anode Supply = 6V, Resistive load, Initial $I_T = 1A$ 25TTS08S, 25TTS12S 25TTS16S
	Max.		
	--		
$I_L$ Max. Latching Current	200	mA	Anode Supply = 6V, Resistive load
	100		
$dv/dt$ Max. Rate of Rise of off-state Voltage	500	$V/\mu s$	
$di/dt$ Max. Rate of Rise of turned-on Current	150	$A/\mu s$	

### 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	$\mu\text{s}$	$T_J = 25^\circ\text{C}$
$t_{rr}$ 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 <sup>2</sup> Pak (SMD-220)		

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

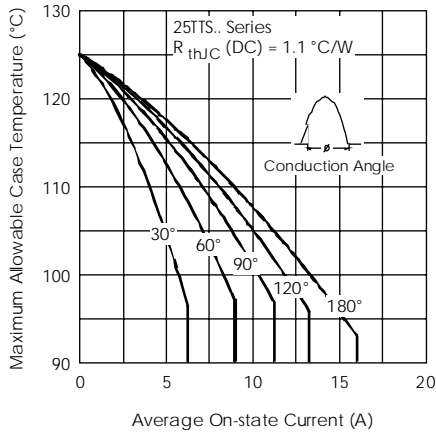


Fig. 1 - Current Rating Characteristics

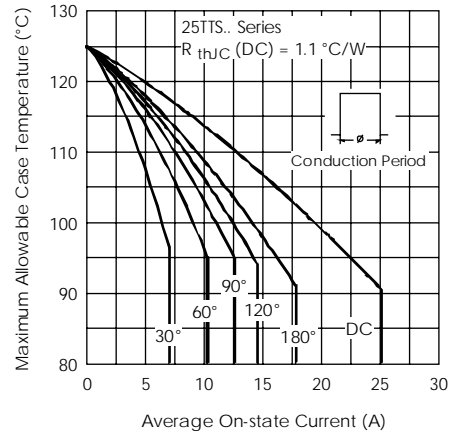


Fig. 2 - Current Rating Characteristics

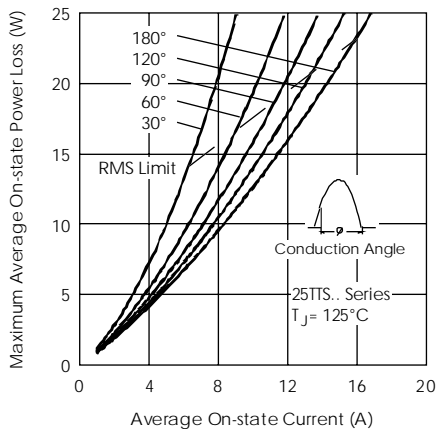


Fig. 3 - On-state Power Loss Characteristics

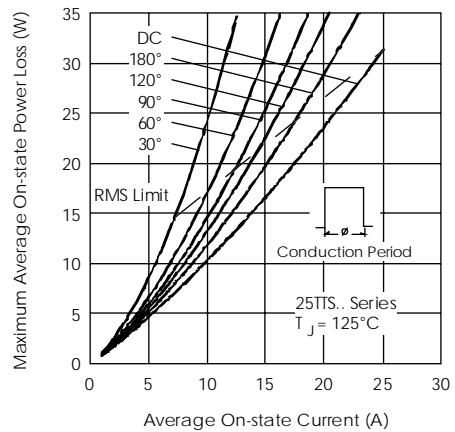


Fig. 4 - On-state Power Loss Characteristics

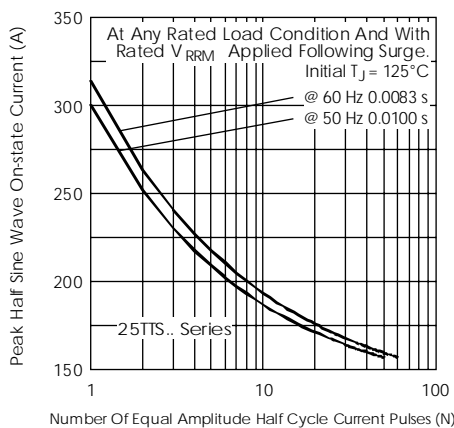


Fig. 5 - Maximum Non-Repetitive Surge Current

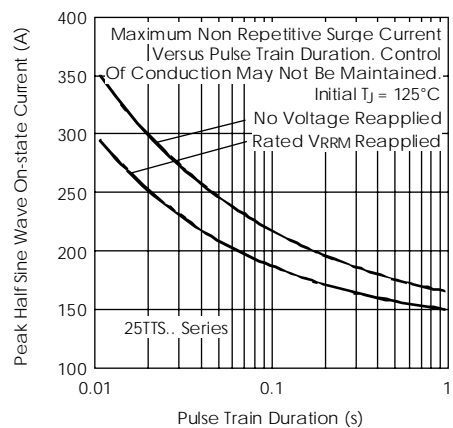


Fig. 6 - Maximum Non-Repetitive Surge Current

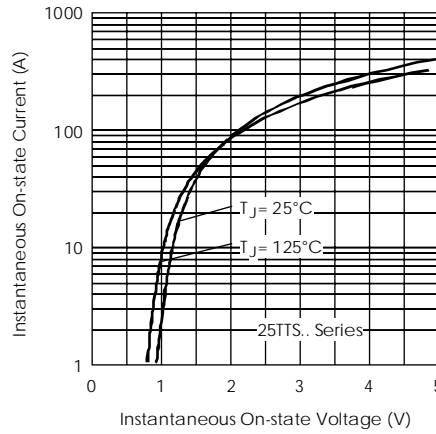


Fig. 7 - On-state Voltage Drop Characteristics

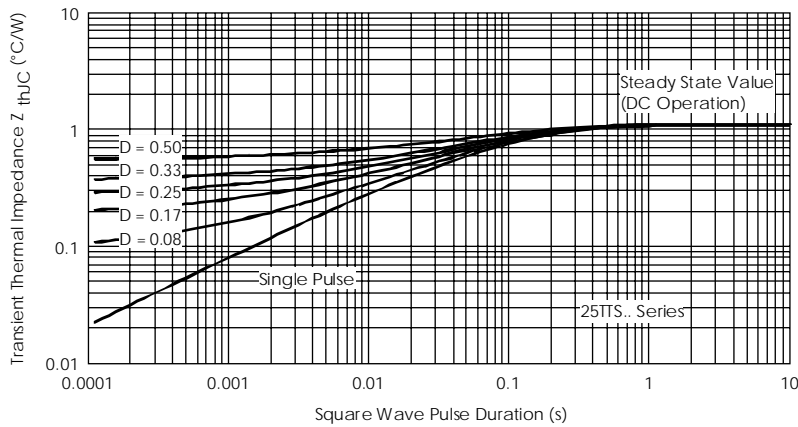


Fig. 8 - Gate Characteristics

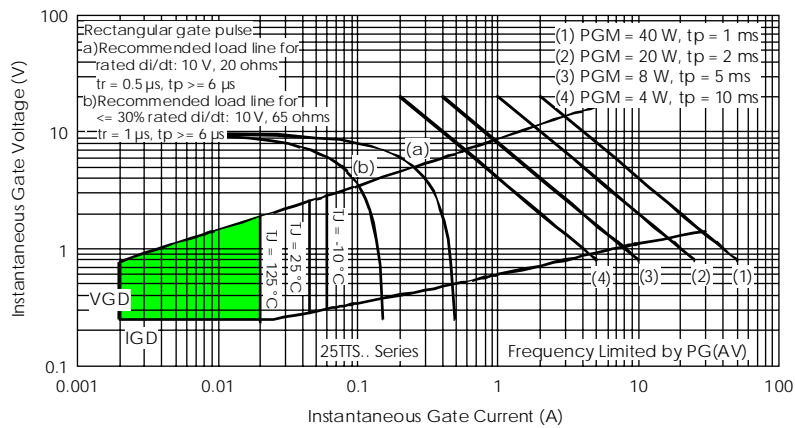
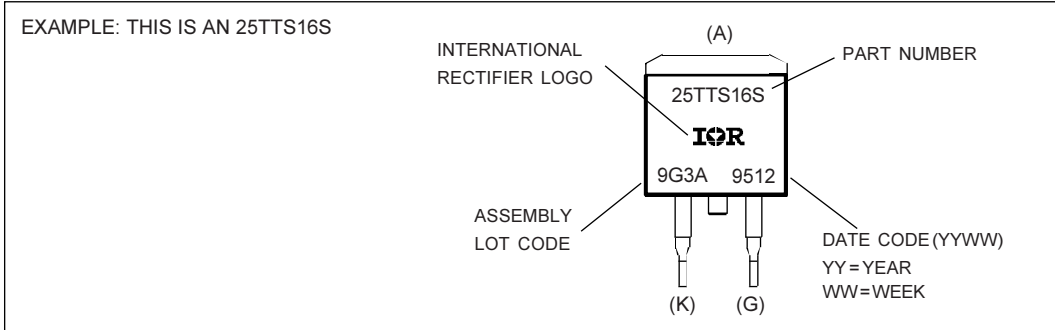
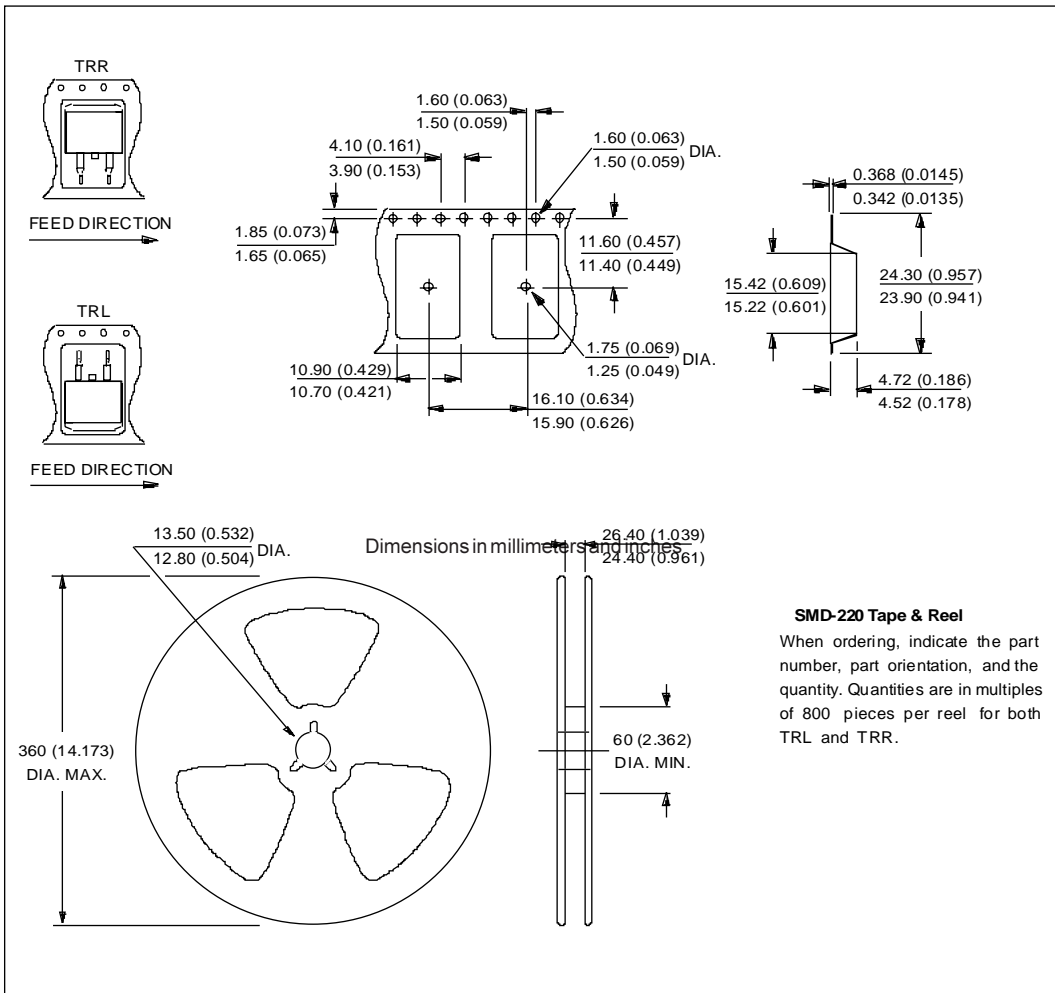


Fig. 9 - Thermal Impedance  $Z_{thJC}$  Characteristics

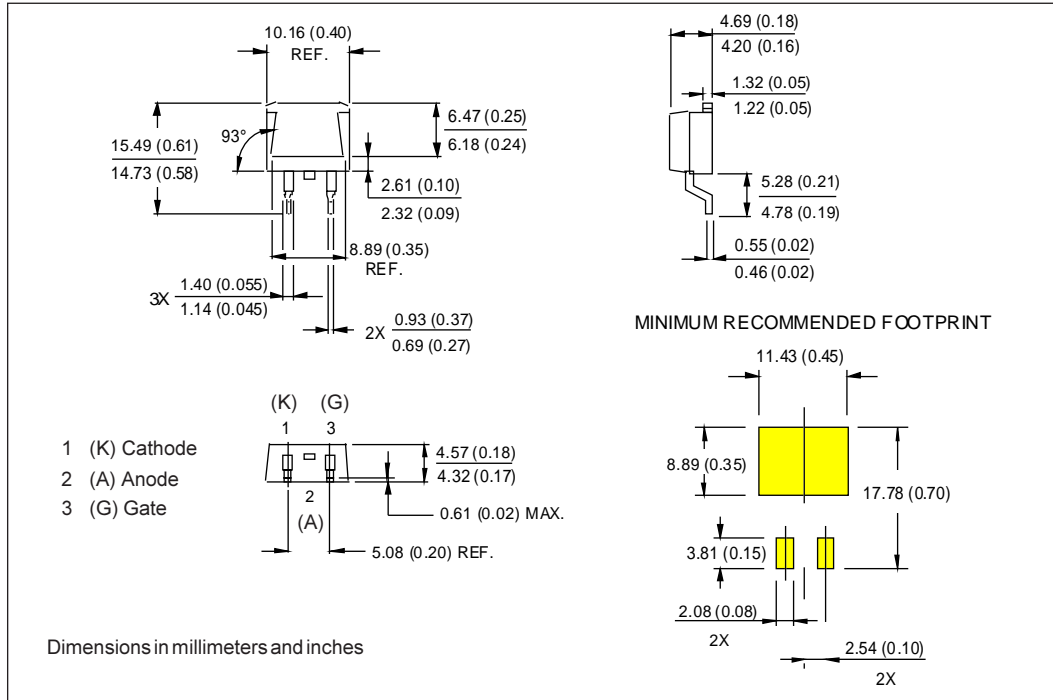
Marking Information



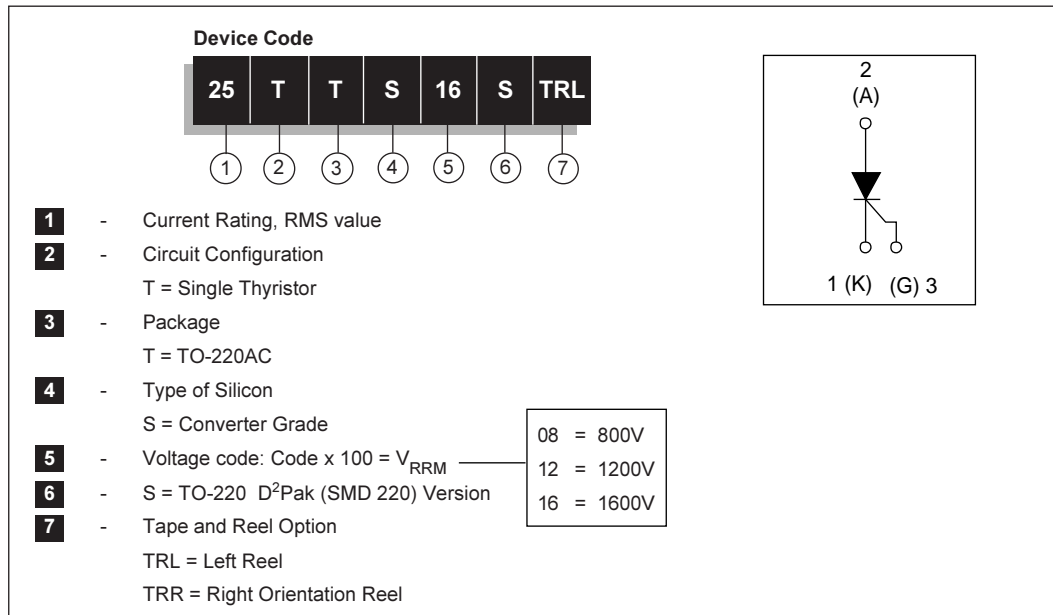
Tape & Reel Information



Outline Table



Ordering Information Table



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