

International
IR Rectifier

SAFEIR Series
70TPS..

PHASE CONTROL SCR



$$V_T < 1.4V @ 100A$$

$$I_{TSM} = 1400A$$

$$V_{RRM} = 1200, 1600V$$

Description/ Features

The 70TPS... **SAFEIR** series of silicon controlled rectifiers are specifically designed for high and medium power switching and phase control applications.

Typical applications are in input rectification (soft start) or AC-Switches or high current crow-bar as well as others phase-control circuits.

These products are designed to be used with International Rectifier input diodes, switches and output rectifiers which are available in identical package outlines.

Major Ratings and Characteristics

Characteristics	70TPS..	Units
$I_{T(AV)}$ Sinusoidal waveform	70	A
I_{RMS} (*)	75	A
V_{RRM}/V_{DRM} Range	1200, 1600	V
I_{TSM}	1400	A
V_T @ 100 A, $T_J = 25^\circ C$	1.4	V
dv/dt	500	V/ μs
di/dt	150	A/ μs
T_J	-40 to 125	$^\circ C$

(*) Lead current limitation

Package Outline



Super-247

Voltage Ratings

Part Number	V_{RRM}/V_{DRM} , max. repetitive peak and off-state voltage V	V_{RSM} , maximum non repetitive peak reverse voltage V	I_{RRM}/I_{DRM} 125°C mA
70TPS12	1200	1300	15
70TPS16	1600	1700	

Absolute Maximum Ratings

Parameters		70TPS..	Units	Conditions	
I _{T(AV)}	Max. Average On-state Current	70	A	@ T _C = 82° C, 180° conduction half sine wave	
I _{T(RMS)}	Max. Continuous RMS On-state Current As AC switch	75		Lead current limitation	
I _{TSM}	Max. Peak One Cycle Non-Repetitive Surge Current	1200	A	10ms Sine pulse, rated V _{RRM} applied	Initial T _J = T _J max.
		1400		10ms Sine pulse, no voltage reapplied	
I ² t	Max. I ² t for Fusing	7200	A ² s	10ms Sine pulse, rated V _{RRM} applied	
		10200		10ms Sine pulse, no voltage reapplied	
I ² √t	Max. I ² √t for Fusing	102000	A ² √s	t = 0.1 to 10ms, no voltage reapplied	
V _{T(TO)1}	Low Level Value of Threshold Voltage	0.916	V	T _J = 125°C	
V _{T(TO)2}	High Level Value of Threshold Voltage	1.21			
r _{t1}	Low Level Value of On-state Slope Resistance	4.138	mΩ		
r _{t2}	High Level Value of On-state Slope Resistance	3.43			
V _{TM}	Max. Peak On-state Voltage	1.4	V	@ 100A, T _J = 25°C	
di/dt	Max. Rate of Rise of Turned-on Current	150	A/μs	T _J = 25°C	
I _H	Max. Holding Current	200	mA	T _J = 25°C	
I _L	Max. Latching Current	400			
I _{RRM} /	Max. Reverse and Direct	1.0	mA	T _J = 25°C	V _R = rated V _{RRM} /V _{DRM}
I _{DRM}	Leakage Current	15		T _J = 125°C	
dv/dt	Max. Rate of Rise	500	V/μs	T _J = 125°C	

Triggering

Parameters		70TPS..	Units	Conditions	
P _{GM}	Max. peak Gate Power	10	W	t = 30μs	
P _{G(AV)}	Max. average Gate Power	2.5			
I _{GM}	Max. peak Gate Current	2.5	A		
- V _{GM}	Max. peak negative Gate Voltage	10	V		
V _{GT}	Max. required DC Gate Voltage to trigger	4.0		T _J = - 40°C	Anode supply = 6V resistive load
		1.5		T _J = 25°C	
		1.1		T _J = 125°C	
I _{GT}	Max. required DC Gate Current to trigger	270	mA	T _J = - 40°C	
		100		T _J = 25°C	
		80		T _J = 125°C	
V _{GD}	Max. DC Gate Voltage not to trigger	0.25	V	T _J = 125°C, V _{DRM} = rated value	
I _{GD}	Max. DC Gate Current not to trigger	6	mA		

Thermal-Mechanical Specifications

Parameters			70TPS..	Units	Conditions
T _J	Max. Junction Temperature Range		- 40 to 125	°C	DC operation
T _{stg}	Max. Storage Temperature Range		- 40 to 150		
R _{thJC}	Max. Thermal Resistance Junction to Case		0.27	°C/W	
R _{thJA}	Max. Thermal Resistance Junction to Ambient		40		
R _{thCS}	Max. Thermal Resistance Case to Heatsink		0.2		
			Mounting surface, smooth and greased		
wt	Approximate Weight		6 (0.21)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		
Case Style			Super-247		

ΔR Conduction (per Junction)

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

Device	Sine half wave conduction					Rect. wave conduction					Units
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
70TPS	0.078	0.092	0.117	0.172	0.302	0.053	0.092	0.125	0.180	0.306	$^\circ C/W$

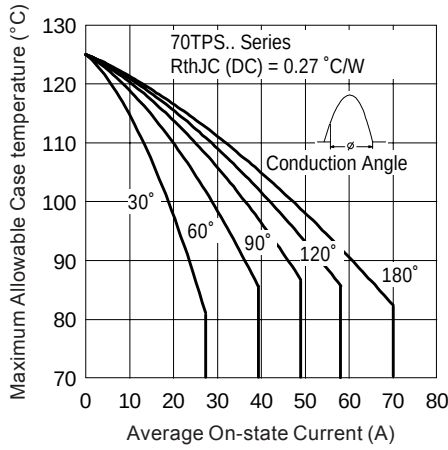


Fig. 1 - Current Rating Characteristics

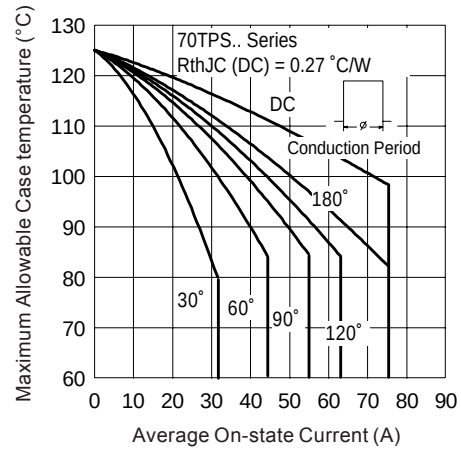


Fig. 2 - Current Rating Characteristics

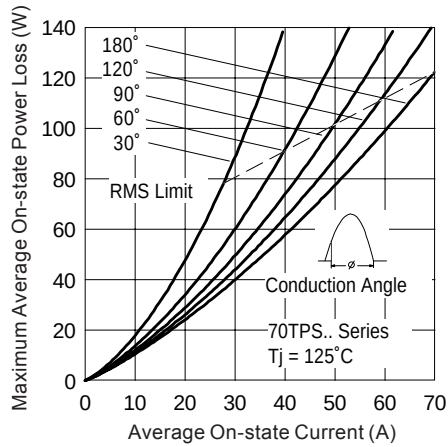


Fig. 3 - On-state Power Loss Characteristics

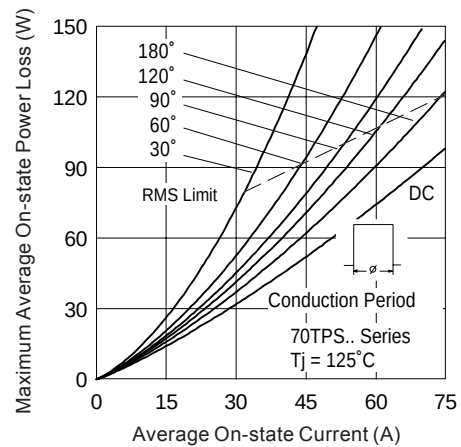


Fig. 4 - On-state Power Loss Characteristics

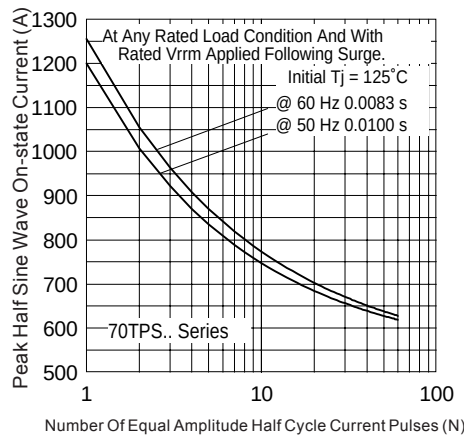


Fig. 5 - Maximum Non-Repetitive Surge Current

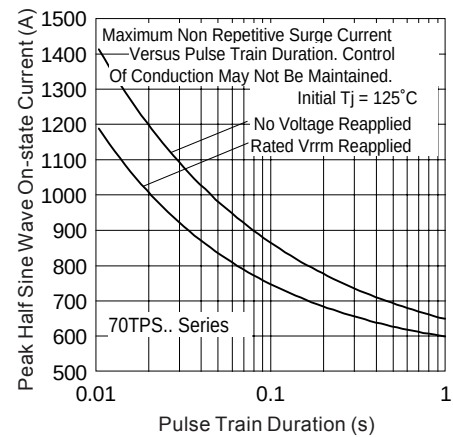


Fig. 6 - Maximum Non-Repetitive Surge Current

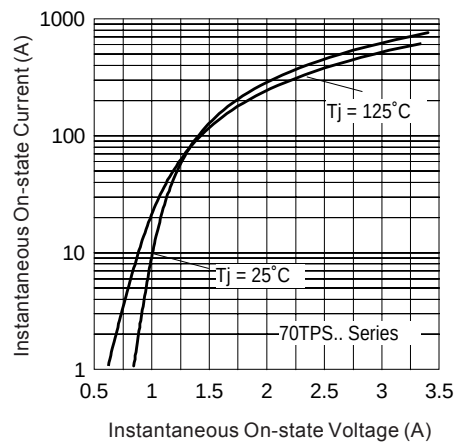


Fig. 7 - On-state Voltage Drop Characteristics

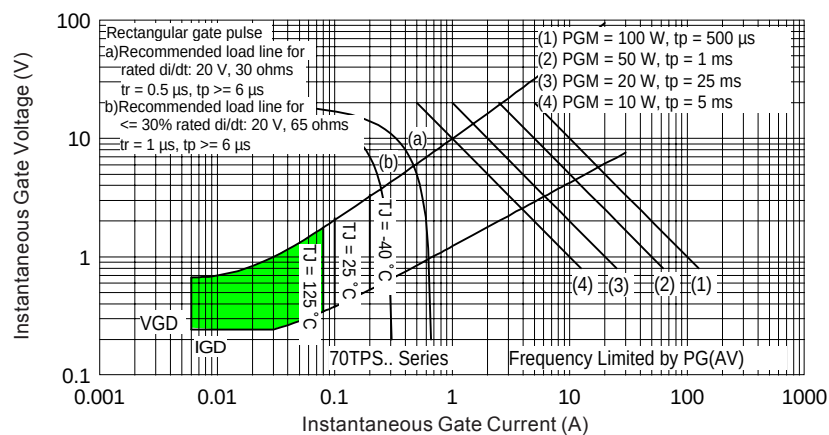


Fig. 8 - Gate Characteristics

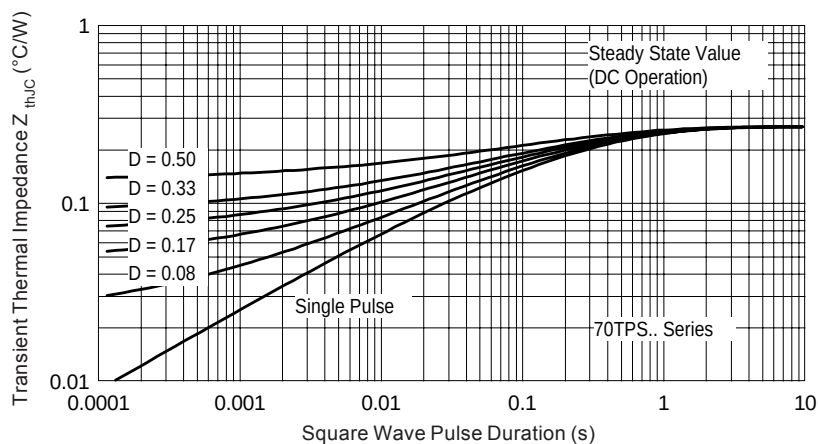
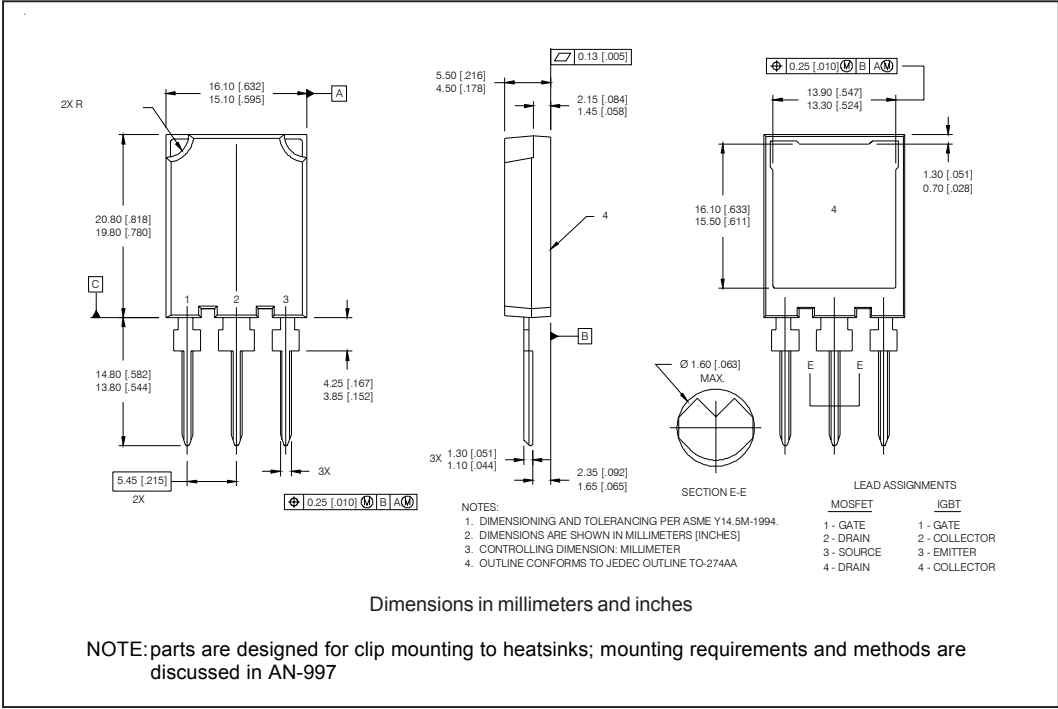
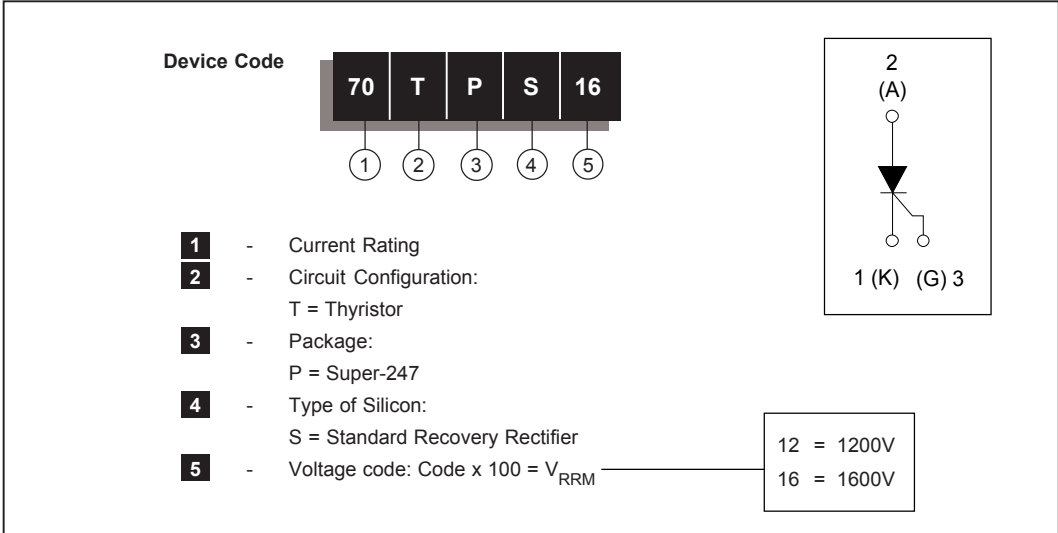


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

Outline Table



Ordering Information Table



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

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309

Visit us at www.irf.com for sales contact information. 10/04