


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/ $\mu s$
di/dt	150	A/ $\mu s$
$T_J$	-40 to 125	$^\circ C$

(\*) Lead current limitation

### Package Outline



Super-247

70TPS.. **SAFEIR** Series

Bulletin I2164 Rev. A 10/04

International  
**IR** Rectifier

## 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	@ $T_C = 82^\circ\text{C}$ , 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 $T_J = T_{J\text{max}}$ .
	1400		10ms Sine pulse, no voltage reapplied	
$I^2t$ Max. $I^2t$ for Fusing	7200	$A^2s$	10ms Sine pulse, rated $V_{RRM}$ applied	
	10200		10ms Sine pulse, no voltage reapplied	
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for Fusing	102000	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied	
$V_{T(TO)1}$ Low Level Value of Threshold Voltage	0.916	V	$T_J = 125^\circ\text{C}$	
$V_{T(TO)2}$ High Level Value of Threshold Voltage	1.21			
$r_{t1}$ Low Level Value of On-state Slope Resistance	4.138			
$r_{t2}$ High Level Value of On-state Slope Resistance	3.43			
$V_{TM}$ Max. Peak On-state Voltage	1.4	V	@ 100A, $T_J = 25^\circ\text{C}$	
$di/dt$ Max. Rate of Rise of Turned-on Current	150	A/ $\mu s$	$T_J = 25^\circ\text{C}$	
$I_H$ Max. Holding Current	200	mA	$T_J = 25^\circ\text{C}$	
$I_L$ Max. Latching Current	400			
$I_{RRM}/I_{DRM}$ Max. Reverse and Direct Leakage Current	1.0/15	mA	$T_J = 25^\circ\text{C}$	$V_R = \text{rated } V_{RRM}/V_{DRM}$
			$T_J = 125^\circ\text{C}$	
$dv/dt$ Max. Rate of Rise	500		V/ $\mu s$	

## Triggering

Parameters	70TPS..	Units	Conditions		
$P_{GM}$ Max. peak Gate Power	10	W	$t = 30\mu s$		
$P_{G(AV)}$ Max. average Gate Power	2.5				
$I_{GM}$ Max. peak Gate Current	2.5	A			
$-V_{GM}$ Max. peak negative Gate Voltage	10	V	Anode supply = 6V resistive load		
$V_{GT}$ Max. required DC Gate Voltage to trigger	4.0				$T_J = -40^\circ C$
	1.5				$T_J = 25^\circ C$
	1.1				$T_J = 125^\circ C$
$I_{GT}$ Max. required DC Gate Current to trigger	270	mA	$T_J = -40^\circ C$		
	100		$T_J = 25^\circ C$		
	80		$T_J = 125^\circ C$		
$V_{GD}$ Max. DC Gate Voltage not to trigger	0.25	V	$T_J = 125^\circ C, V_{DRM} = \text{rated value}$		
$I_{GD}$ 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			
$T_{stg}$ Max. Storage Temperature Range	-40 to 150				
$R_{thJC}$ Max. Thermal Resistance Junction to Case	0.27	°C/W	DC operation		
$R_{thJA}$ Max. Thermal Resistance Junction to Ambient	40		Mounting surface, smooth and greased		
$R_{thCS}$ Max. Thermal Resistance Case to Heatsink	0.2				
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				

 $\Delta R$  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	°C/W

# 70TPS.. *SAFEIR* Series

Bulletin I2164 Rev. A 10/04

International  
**IR** Rectifier

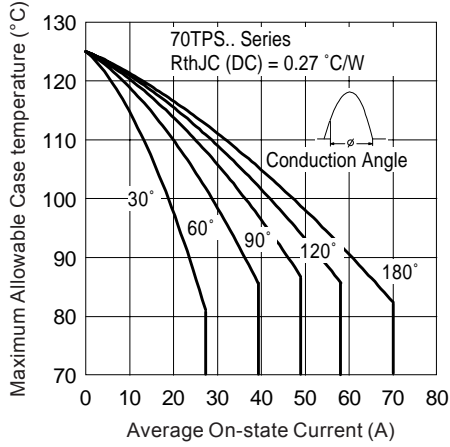


Fig. 1 - Current Rating Characteristics

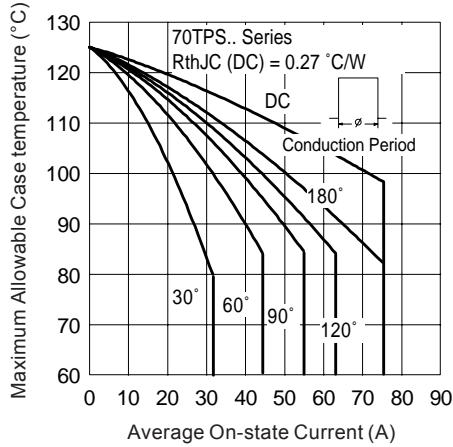


Fig. 2 - Current Rating Characteristics

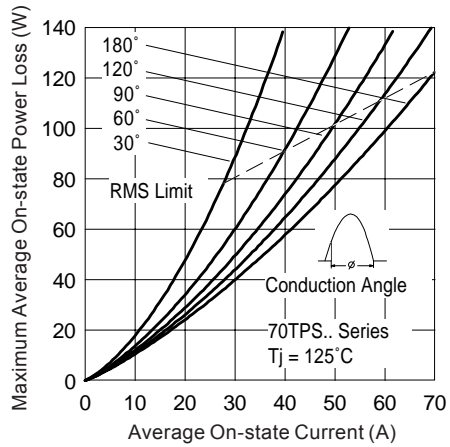


Fig. 3 - On-state Power Loss Characteristics

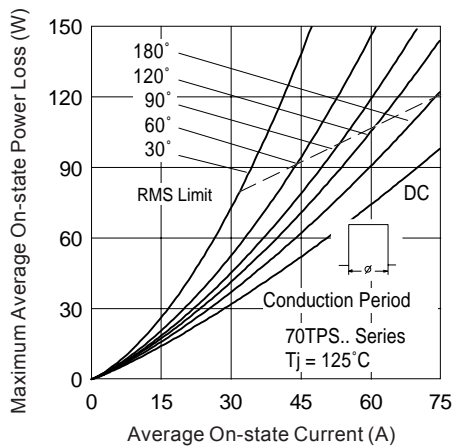


Fig. 4 - On-state Power Loss Characteristics

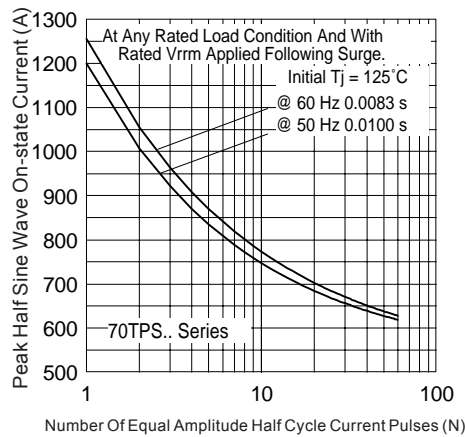


Fig. 5 - Maximum Non-Repetitive Surge Current

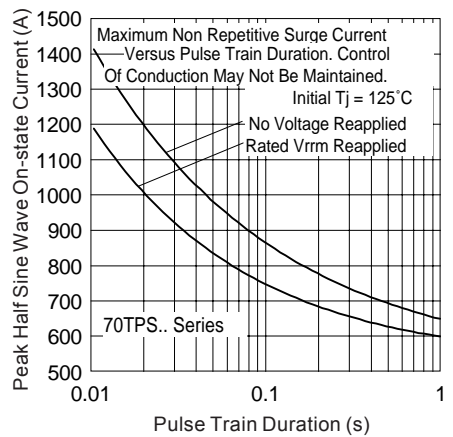


Fig. 6 - Maximum Non-Repetitive Surge Current

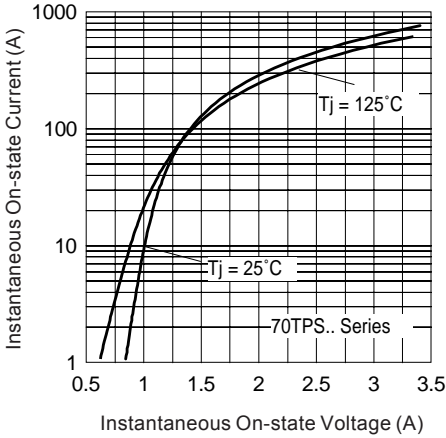


Fig. 7 - On-state Voltage Drop Characteristics

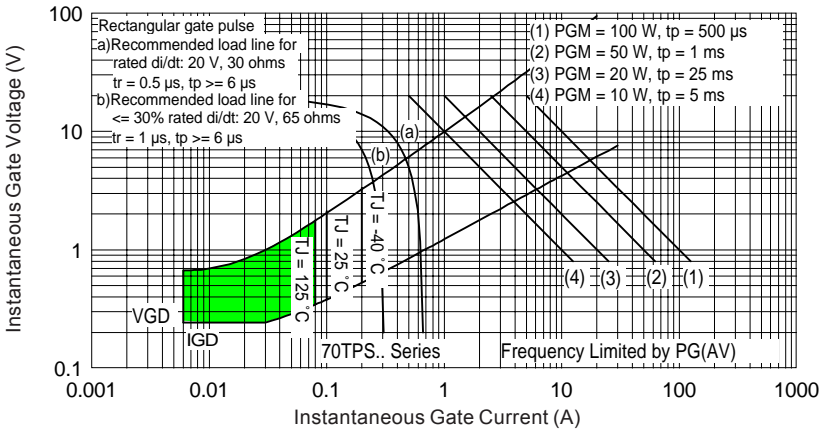


Fig. 8 - Gate Characteristics

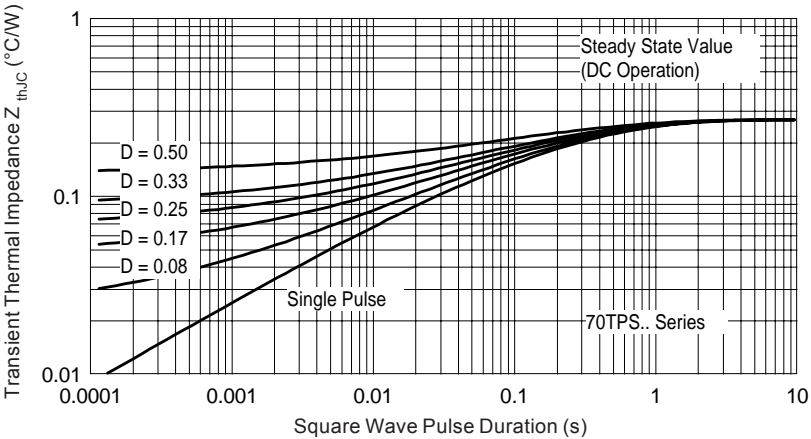


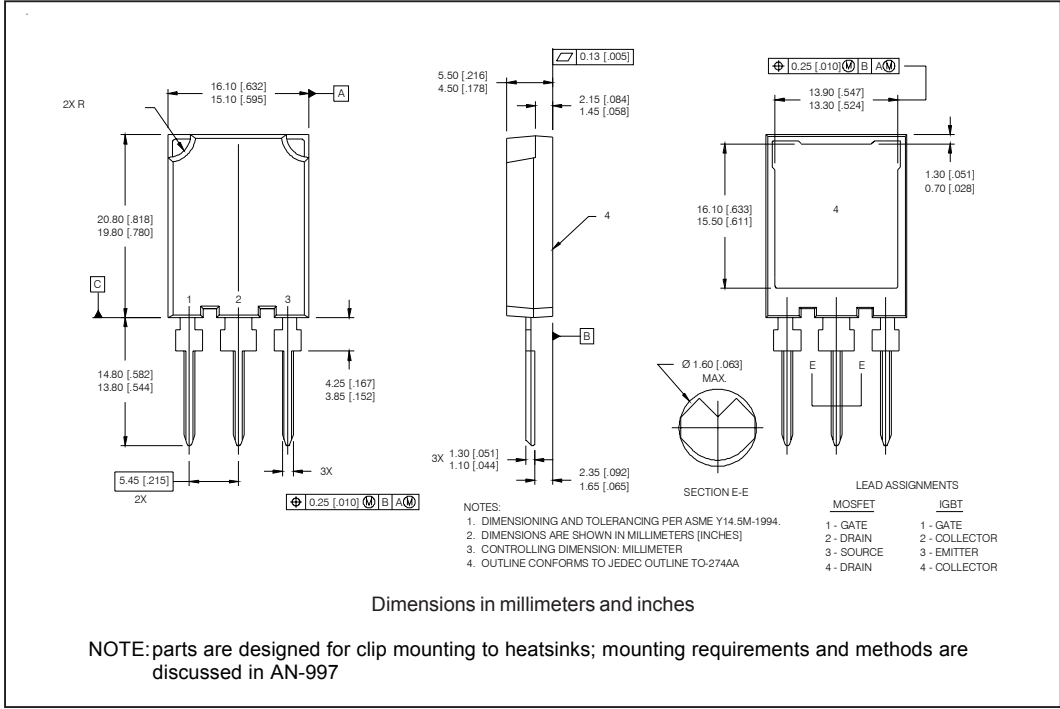
Fig. 9 - Thermal Impedance  $Z_{thJC}$  Characteristics

70TPS.. **SAFEIR** Series

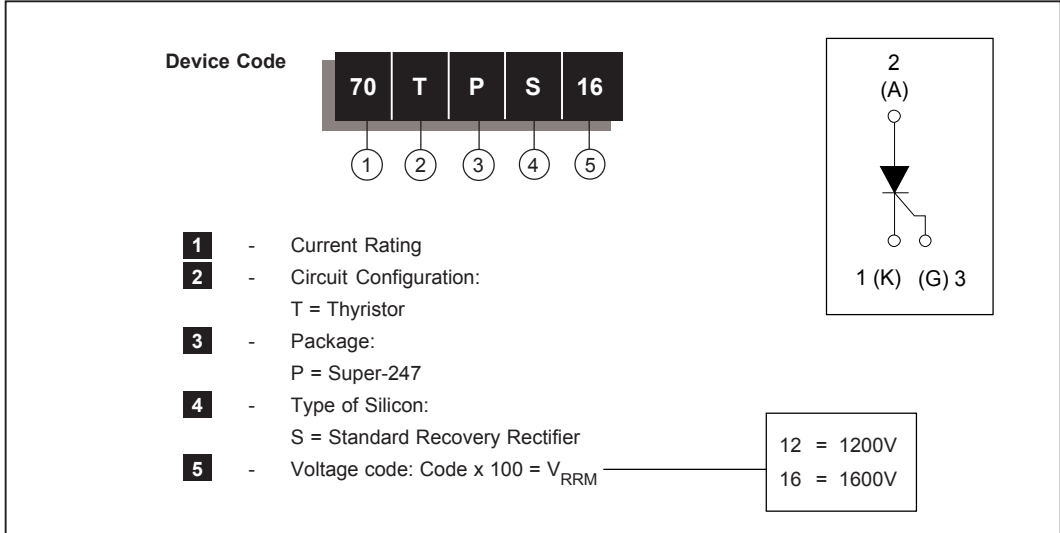
Bulletin I2164 Rev. A 10/04

International  
**IR** Rectifier

Outline Table



Ordering Information Table



International  
**IOR** Rectifier

70TPS.. **SAFEIR** Series

Bulletin I2164 Rev. A 10/04

---

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](http://www.irf.com) for sales contact information. 10/04