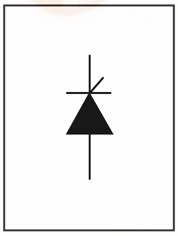
Bulletin I2164 rev. A 10/04

International
IOR Rectifier

SAFEIR Series
70TPS..

PHASE CONTROL SCR



V_T	< 1.4V @ 100A
I_{TSM}	= 1400A
V_{RRM}	= 1200, 1600V

Description/ Features

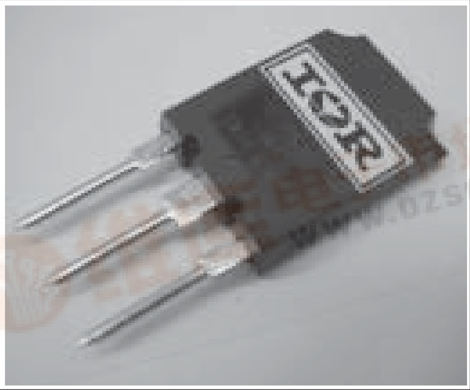
The 70TPS... *SAFE**IR*** series of silicon controlled rectifiers are specifically designed for high and medium power switching and phase control applications.
Typical applications are in input rectification (soft start) or AC-Switches or high current crow-bar as well as others phase-control circuits.
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°C	1.4	V
dv/dt		500	V/µs
di/dt		150	A/µs
T_J		- 40 to 125	°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^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°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}/ I_{DRM}	Max. Reverse and Direct Leakage Current	1.0	mA	T_J = 25°C	V_R = rated V_{RRM}/ V_{DRM}
		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	
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		
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	
		Max.	12 (10)	(lbf-in)	
	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	°C/W

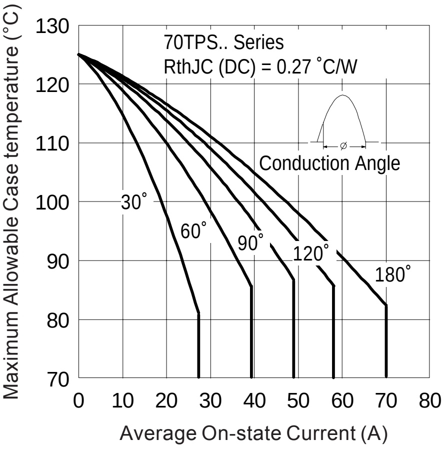


Fig. 1 - Current Rating Characteristics

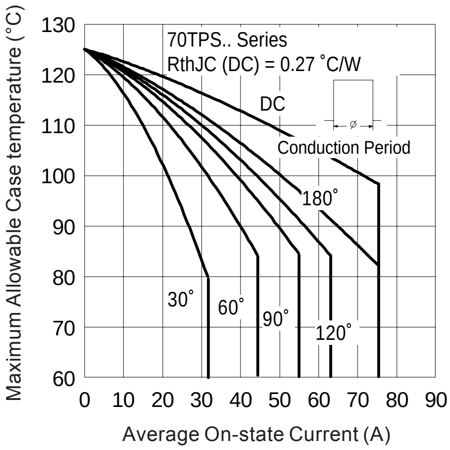


Fig. 2 - Current Rating Characteristics

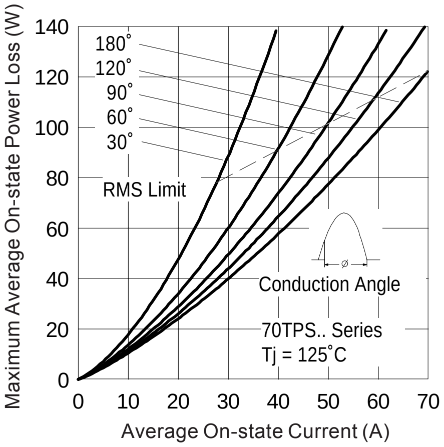


Fig. 3 - On-state Power Loss Characteristics

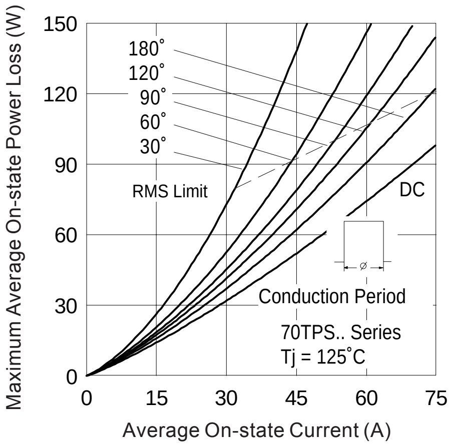


Fig. 4 - On-state Power Loss Characteristics

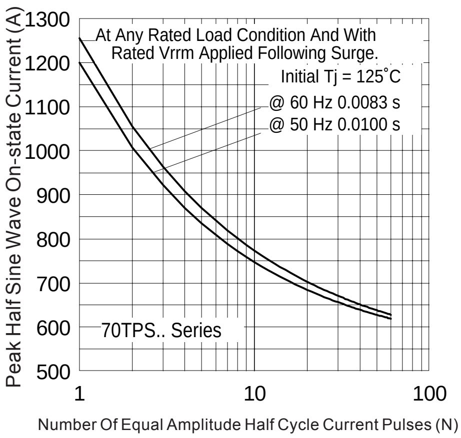


Fig. 5 - Maximum Non-Repetitive Surge Current

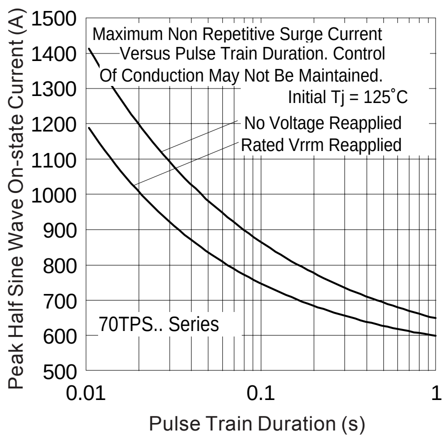


Fig. 6 - Maximum Non-Repetitive Surge Current

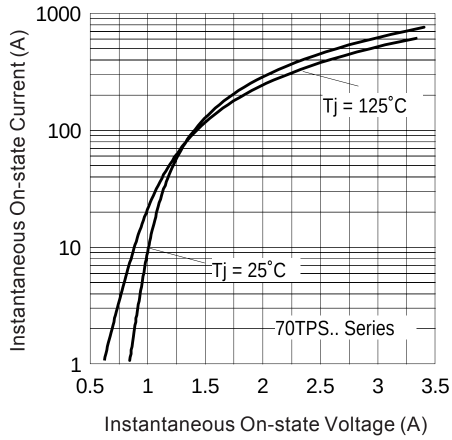


Fig. 7 - On-state Voltage Drop Characteristics

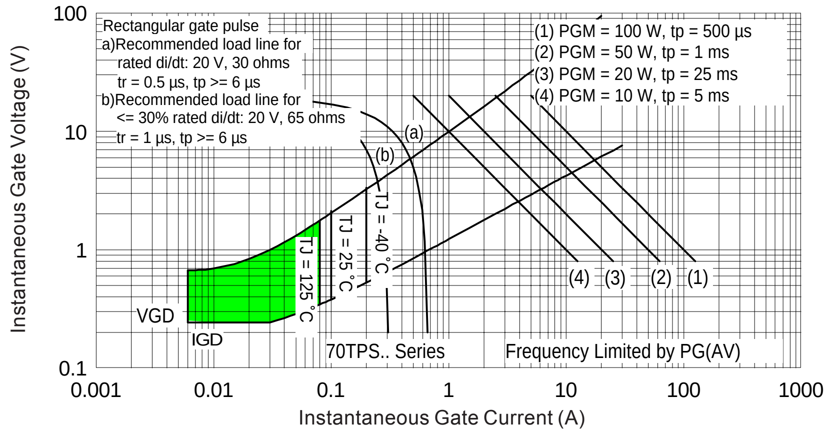


Fig. 8 - GateCharacteristics

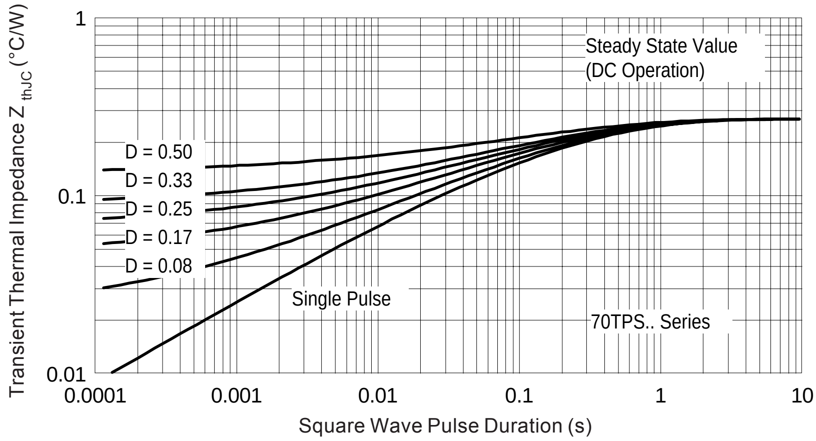
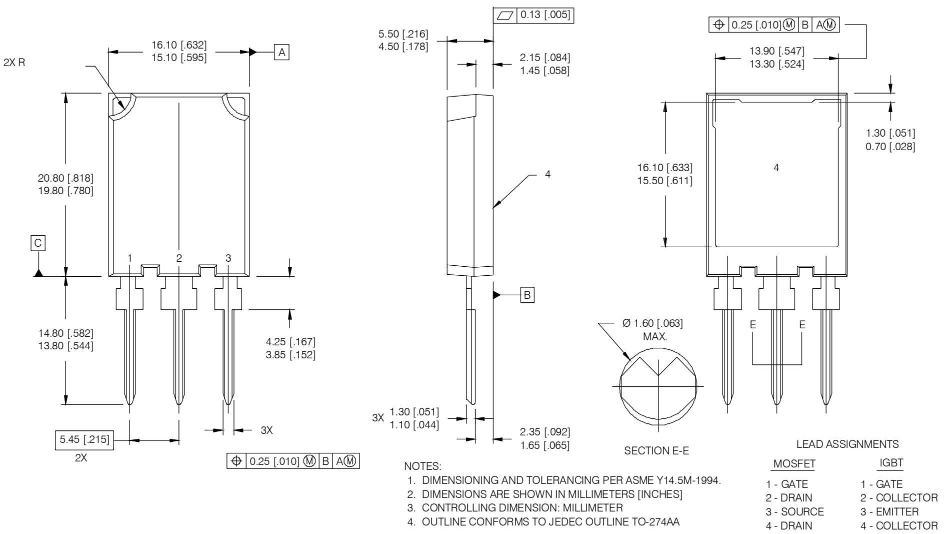


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

Outline Table



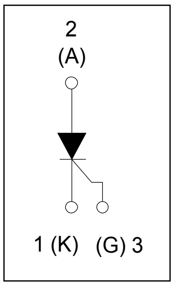
Dimensions in millimeters and inches

NOTE: parts are designed for clip mounting to heatsinks; mounting requirements and methods are discussed in AN-997

Ordering Information Table

Device Code

70	T	P	S	16
1	2	3	4	5



1 - Current Rating
2 - Circuit Configuration:
T = Thyristor
3 - Package:
P = Super-247
4 - Type of Silicon:
S = Standard Recovery Rectifier
5 - Voltage code: Code x 100 = V_{RRM}

12 = 1200V
16 = 1600V

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

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