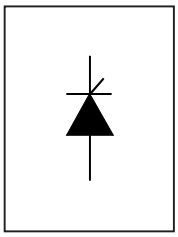
Bulletin I2164 rev. A 10/04

International
IOR Rectifier

# SAFEIR Series
# 70TPS..

## PHASE CONTROL SCR



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

### Description/ Features

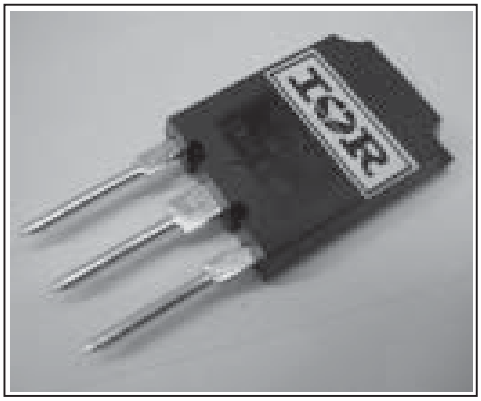
The 70TPS... *SAFEIR* series of silicon controlled rectifiers are specifically designed for high and medium power switching and phase control applications.
Typical applications are in input rectification (soft start) or AC-Switches or high current crow-bar as well as others phase-control circuits.
These 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°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 | | | |
| $I_{RRM}$/ | 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 | 4.0 | | $T_J$ = - 40°C | Anode supply = 6V |
| | to trigger | 1.5 | | $T_J$ = 25°C | resistive load |
| | | 1.1 | | $T_J$ = 125°C | |
| $I_{GT}$ | Max. required DC Gate Current | 270 | mA | $T_J$ = - 40°C | |
| | to trigger | 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 | | 0.27 | °C/W | DC operation |
| | to Case | | | | |
| $R_{thJA}$ | Max. Thermal Resistance Junction | | 40 | | |
| | to Ambient | | | | |
| $R_{thCS}$ | Max. Thermal Resistance Case | | 0.2 | | Mounting surface, smooth and greased |
| | to Heatsink | | | | |
| 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 |

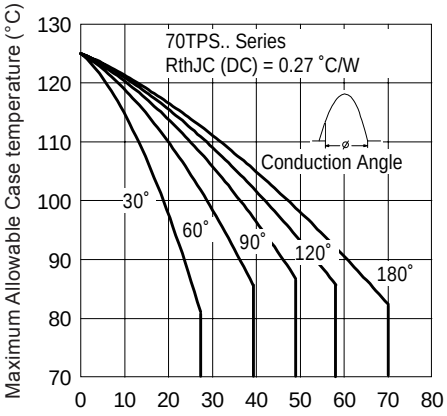



Fig. 1 - Current Rating Characteristics

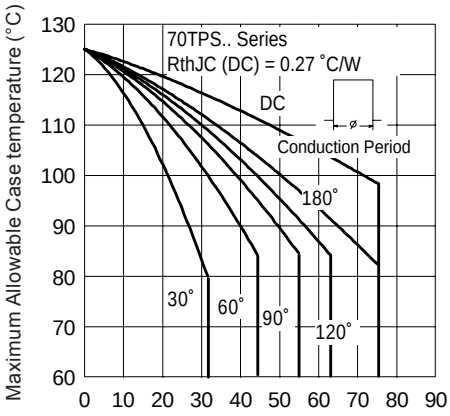



Fig. 2 - Current Rating Characteristics

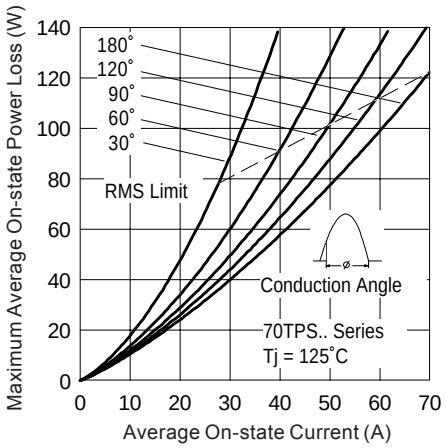



Fig. 3 - On-state Power Loss Characteristics

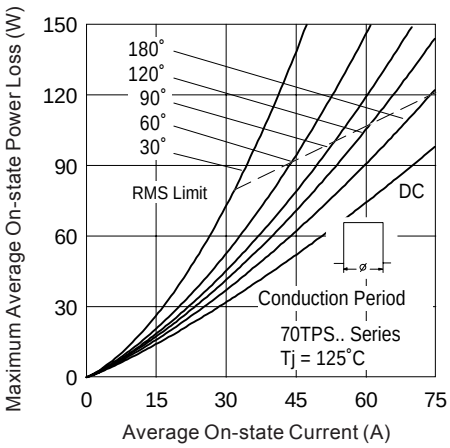



Fig. 4 - On-state Power Loss Characteristics

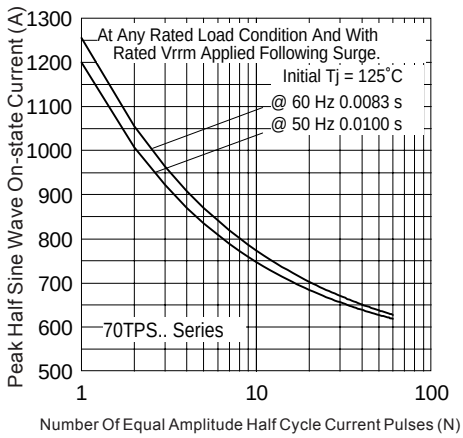



Fig. 5 - Maximum Non-Repetitive Surge Current

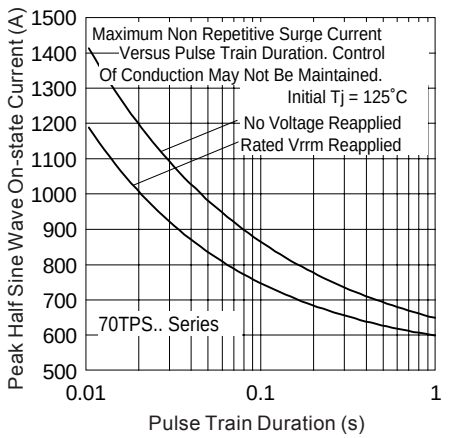



Fig. 6 - Maximum Non-Repetitive Surge Current

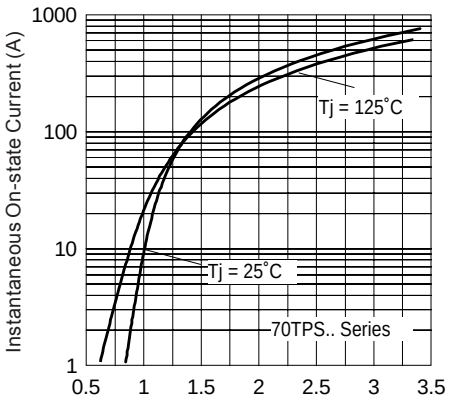



Fig. 7 - On-state Voltage Drop Characteristics

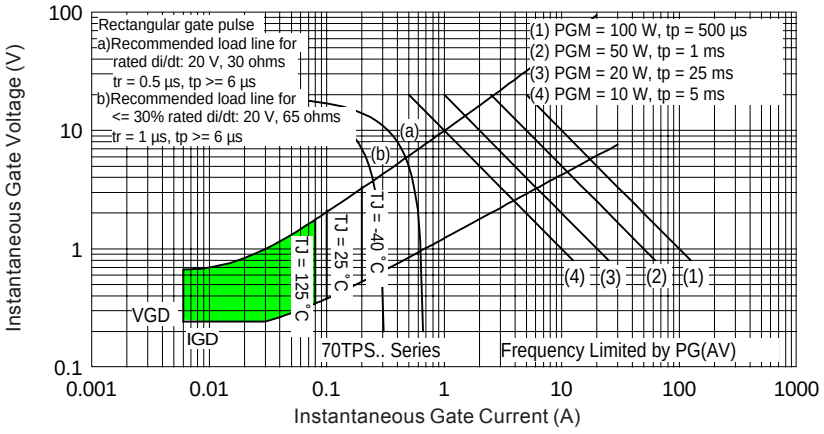



Fig. 8 - GateCharacteristics

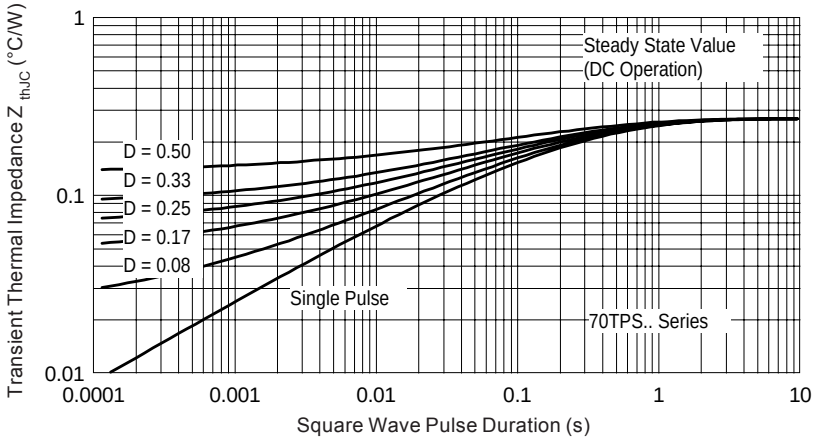
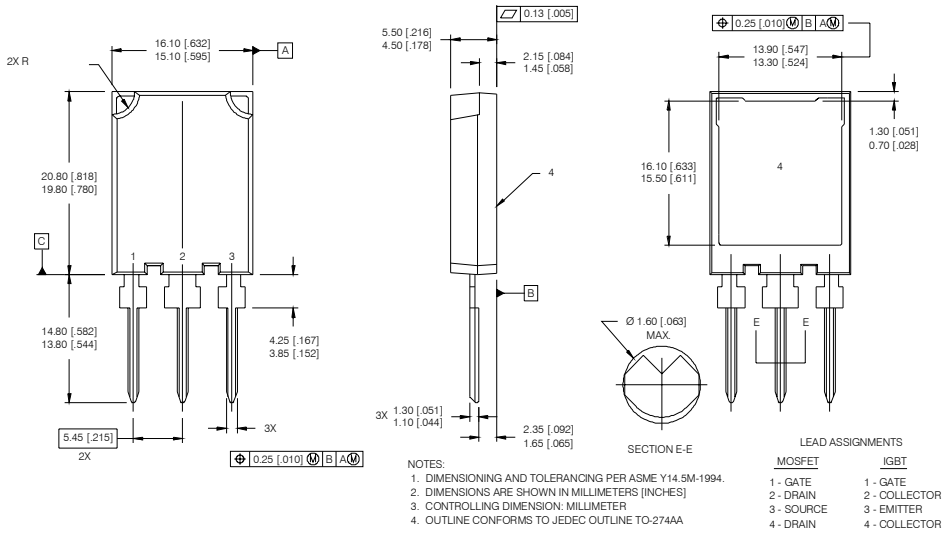



Fig. 9 - Thermal Impedance $Z_{thJC}$ Characteristics

## Outline Table

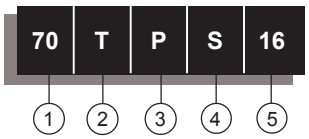


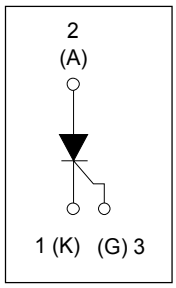

Dimensions in millimeters and inches

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

## Ordering Information Table

**Device Code**




**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
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