


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 |
| $V_T @ 100A, T_J = 25^\circ C$ | 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 | @ $T_C = 82^\circ\text{C}$, 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/ μs | $T_J = 25^\circ\text{C}$ | |
| I_H Max. Holding Current | 200 | mA | $T_J = 25^\circ\text{C}$ | |
| I_L Max. Latching Current | 400 | | | |
| I_{RRM} / Max. Reverse and Direct | 1.0 | mA | $T_J = 25^\circ\text{C}$ | $V_R = \text{rated } V_{RRM}/V_{DRM}$ |
| I_{DRM} Leakage Current | 15 | | $T_J = 125^\circ\text{C}$ | |
| dv/dt Max. Rate of Rise | 500 | | V/ μs | |

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 | | | |
| V_{GT} Max. required DC Gate Voltage to trigger | 4.0 | | $T_J = -40^\circ C$ | Anode supply = 6V resistive load | |
| | 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 | | | |
| 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 | °C/W |

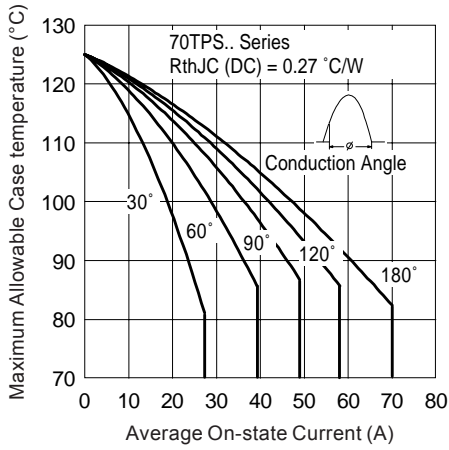


Fig. 1 - Current Rating Characteristics

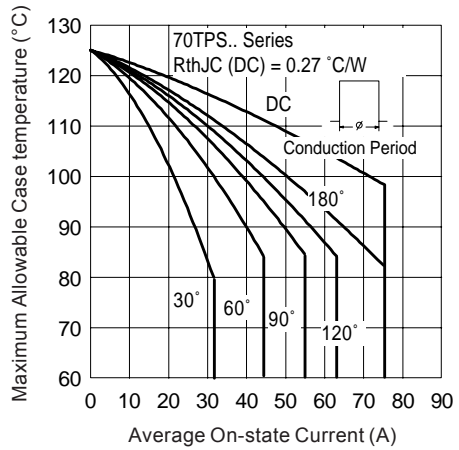


Fig. 2 - Current Rating Characteristics

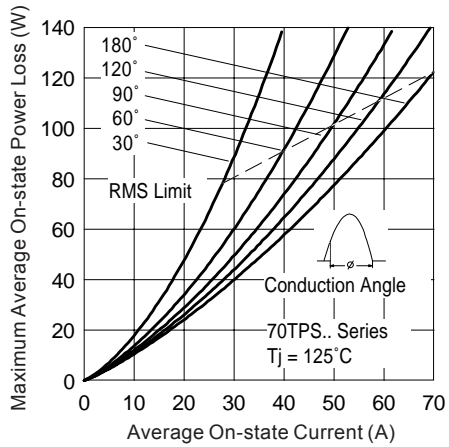


Fig. 3 - On-state Power Loss Characteristics

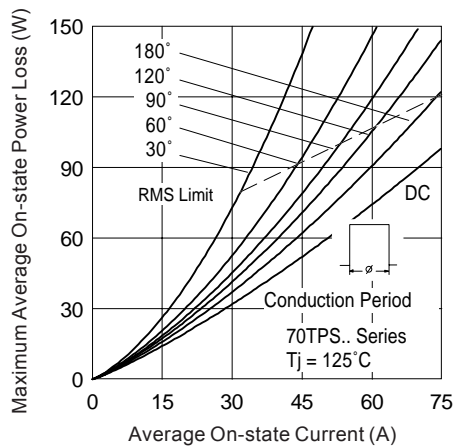


Fig. 4 - On-state Power Loss Characteristics

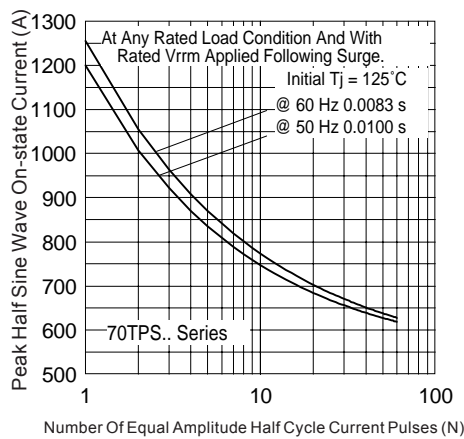


Fig. 5 - Maximum Non-Repetitive Surge Current

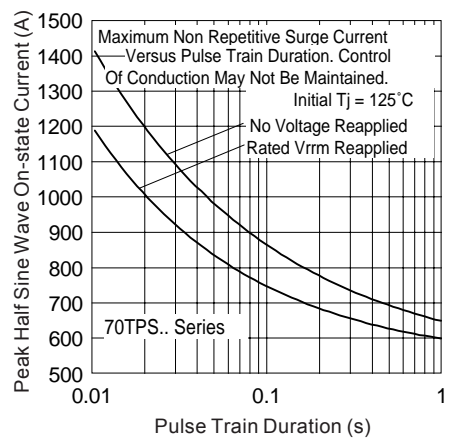


Fig. 6 - Maximum Non-Repetitive Surge Current

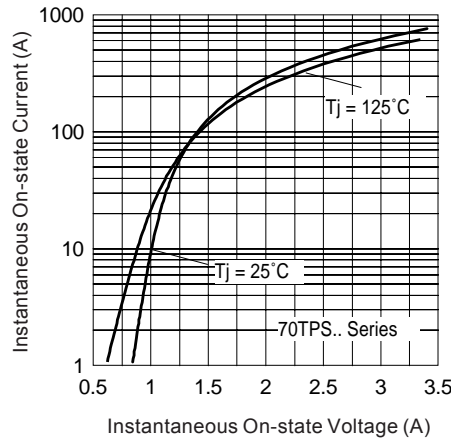


Fig. 7 - On-state Voltage Drop Characteristics

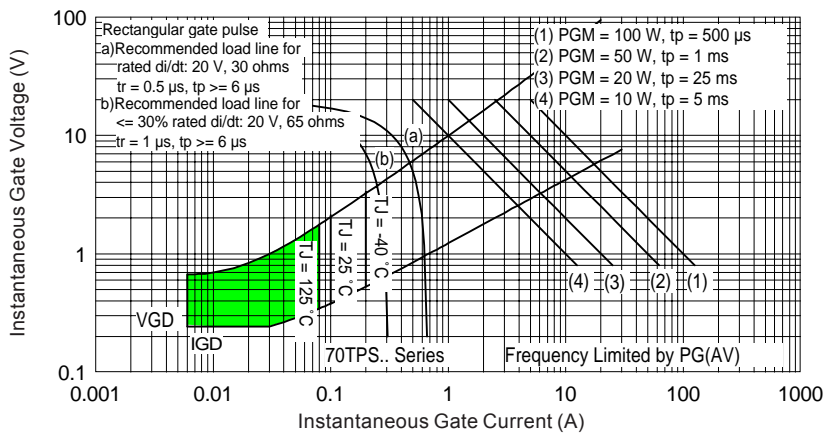


Fig. 8 - Gate Characteristics

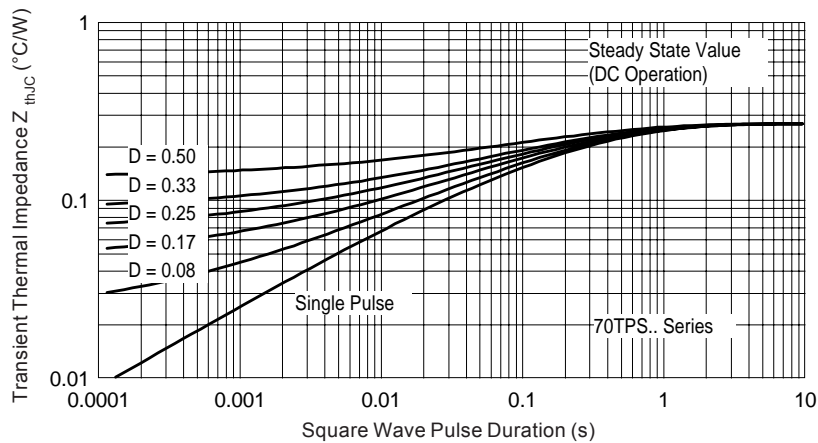
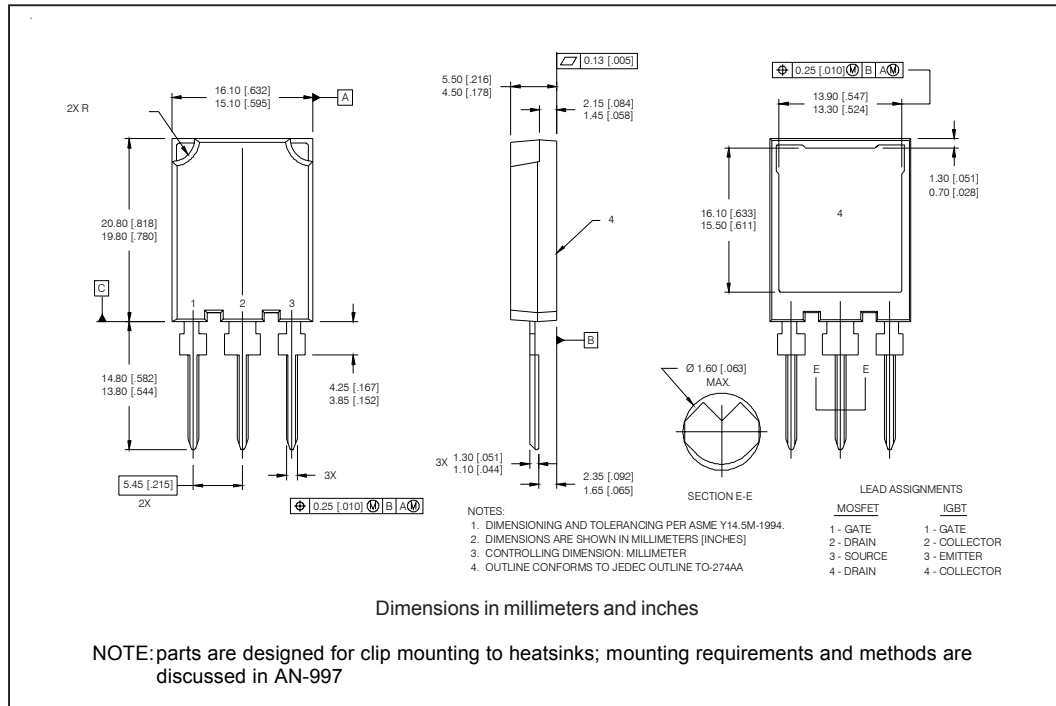
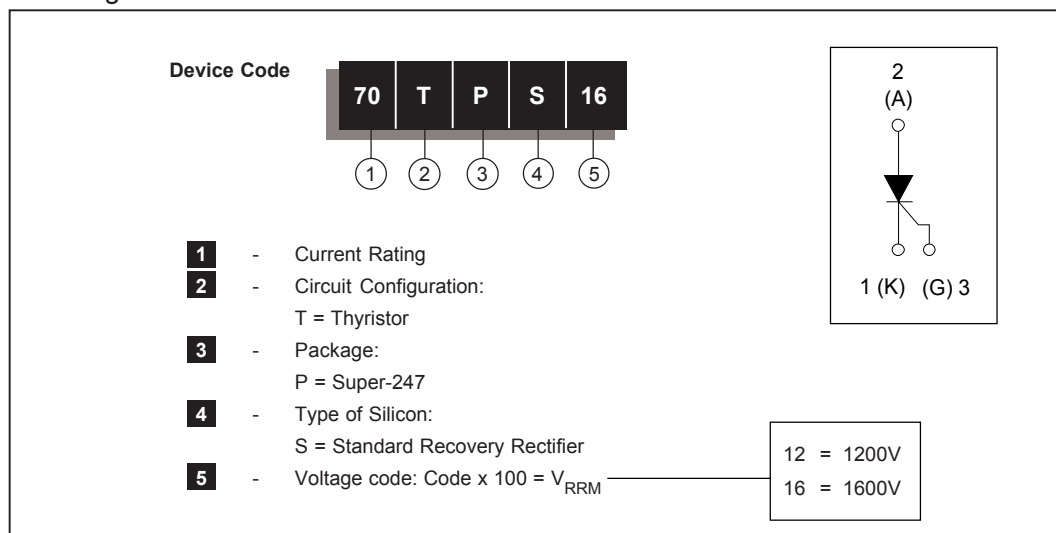


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

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