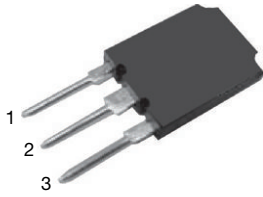
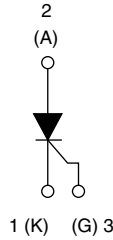




Thyristor High Voltage, Phase Control SCR, 70 A



Super TO-247



FEATURES

- High surge capability
- High voltage input rectification
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS COMPLIANT

| PRIMARY CHARACTERISTICS | |
|-------------------------|-------------------|
| $I_{T(AV)}$ | 70 A |
| V_{DRM}/V_{RRM} | 1200 V, 1600 V |
| V_{TM} | 1.25 V |
| I_{GT} | 100 mA |
| T_J | -40 °C to +125 °C |
| Package | Super TO-247 |
| Circuit configuration | Single SCR |

APPLICATIONS

- AC switches
- High voltage input rectification (soft start)
- High current crow-bar
- Other phase-control circuits
- Designed to be used with Vishay input diodes, switches, and output rectifiers which are available in identical package outlines

DESCRIPTION

The VS-70TPS.. PbF high voltage series of silicon controlled rectifiers are specifically designed for high and medium power switching, and phase control applications.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|-----------------------------|--------------|------------|
| PARAMETER | TEST CONDITIONS | VALUES | UNITS |
| $I_{T(AV)}$ | Sinusoidal waveform | 70 | A |
| I_{RMS} | Lead current limitation | 75 | |
| V_{RRM}/V_{DRM} | Range | 1200 to 1600 | V |
| I_{TSM} | | 1100 | A |
| V_T | 100 A, $T_J = 25\text{ °C}$ | 1.4 | V |
| dV/dt | | 500 | V/ μ s |
| dI/dt | | 150 | A/ μ s |
| T_J | | -40 to +125 | °C |

| VOLTAGE RATINGS | | | |
|-----------------|--|--|-----------------------------------|
| PART NUMBER | V_{RRM}/V_{DRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{RRM}/I_{DRM} AT 125 °C mA |
| VS-70TPS12PbF | 1200 | 1300 | 15 |
| VS-70TPS16PbF | 1600 | 1700 | |



VS-70TPS12PbF, VS-70TPS16PbF High Voltage Series

www.vishay.com

Vishay Semiconductors

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|--|-------------------|---|--|--------|-------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average on-state current | $I_{T(AV)}$ | $T_C = 82\text{ }^\circ\text{C}$, 180° conduction half sine wave | | 70 | A |
| Maximum continuous RMS on-state current as AC switch | $I_{T(RMS)}$ | Lead current limitation | | 75 | |
| Maximum peak, one-cycle non-repetitive surge current | I_{TSM} | 10 ms sine pulse, rated V_{RRM} applied | | 930 | A ² s |
| | | 10 ms sine pulse, no voltage reapplied | | 1100 | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied | | 4325 | |
| | | 10 ms sine pulse, no voltage reapplied | | 6115 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1\text{ ms to } 10\text{ ms}$, no voltage reapplied | | 61 150 | A ² √s |
| Low level value of threshold voltage | $V_{T(TO)1}$ | $T_J = 125\text{ }^\circ\text{C}$ | | 0.916 | V |
| High level value of threshold voltage | $V_{T(TO)2}$ | | | 1.21 | |
| Low level value of on-state slope resistance | r_{t1} | | | 4.138 | mΩ |
| High level value of on-state slope resistance | r_{t2} | | | 3.43 | |
| Maximum peak on-state voltage | V_{TM} | 100 A, $T_J = 25\text{ }^\circ\text{C}$ | | 1.4 | V |
| Maximum rate of rise of turned-on current | di/dt | $T_J = 25\text{ }^\circ\text{C}$ | | 150 | A/μs |
| Maximum holding current | I_H | Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$ | | 200 | mA |
| Maximum latching current | I_L | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$ | | 400 | |
| Maximum reverse and direct leakage current | I_{RRM}/I_{DRM} | $T_J = 25\text{ }^\circ\text{C}$ | | 1.0 | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 15 | |
| Maximum rate of rise of off-state voltage | dV/dt | $T_J = 125\text{ }^\circ\text{C}$ | | 500 | V/μs |

| TRIGGERING | | | | | |
|---|-------------|--|--|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum peak gate power | P_{GM} | $T = 30\text{ }\mu\text{s}$ | | 10 | W |
| Maximum average gate power | $P_{G(AV)}$ | | | 2.5 | |
| Maximum peak gate current | I_{GM} | | | 2.5 | A |
| Maximum peak negative gate voltage | $-V_{GM}$ | | | 10 | V |
| Maximum required DC gate voltage to trigger | V_{GT} | $T_J = -40\text{ }^\circ\text{C}$ | | 1.8 | |
| | | $T_J = 25\text{ }^\circ\text{C}$ | | 1.5 | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 1.1 | |
| Maximum required DC gate current to trigger | I_{GT} | $T_J = -40\text{ }^\circ\text{C}$ | | 150 | mA |
| | | $T_J = 25\text{ }^\circ\text{C}$ | | 100 | |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 80 | |
| Maximum DC gate voltage not to trigger | V_{GD} | $T_J = 125\text{ }^\circ\text{C}$, $V_{DRM} = \text{rated value}$ | | 0.25 | V |
| Maximum DC gate current not to trigger | I_{GD} | | | 6 | mA |



| THERMAL AND MECHANICAL SPECIFICATIONS | | | | |
|---|------------|--------------------------------------|-------------|------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum junction temperature range | T_J | | -40 to +125 | °C |
| Maximum storage temperature range | T_{Stg} | | -40 to +150 | |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation | 0.27 | °C/W |
| Maximum thermal resistance, junction to ambient | R_{thJA} | | 40 | |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth and greased | 0.2 | |
| Approximate weight | | | 6 | g |
| | | | 0.21 | oz. |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style Super TO-247 | 70TPS12 | |
| | | | 70TPS16 | |

| ΔR_{thJ-hs} CONDUCTION PER JUNCTION | | | | | | | | | | | |
|---|---------------------------|-------|-------|-------|-------|-----------------------------|-------|-------|-------|-------|-------|
| DEVICE | SINE HALF WAVE CONDUCTION | | | | | RECTANGULAR WAVE CONDUCTION | | | | | UNITS |
| | 180° | 120° | 90° | 60° | 30° | 180° | 120° | 90° | 60° | 30° | |
| VS-70TPS..PbF | 0.078 | 0.092 | 0.117 | 0.172 | 0.302 | 0.053 | 0.092 | 0.125 | 0.180 | 0.306 | °C/W |

Note

- The table above shows the increment of thermal resistance R_{thJ-hs} when devices operate at different conduction angles than DC

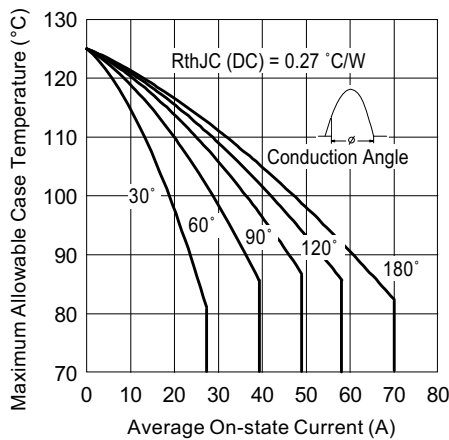


Fig. 1 - Current Rating Characteristics

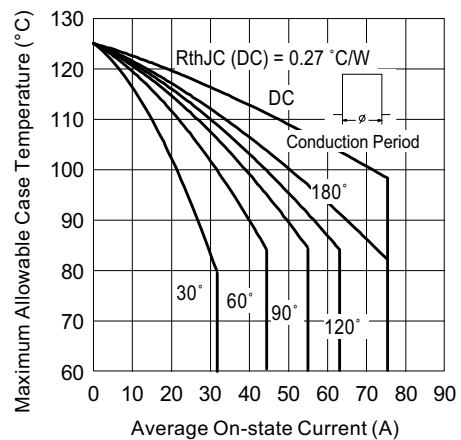


Fig. 2 - Current Rating Characteristics

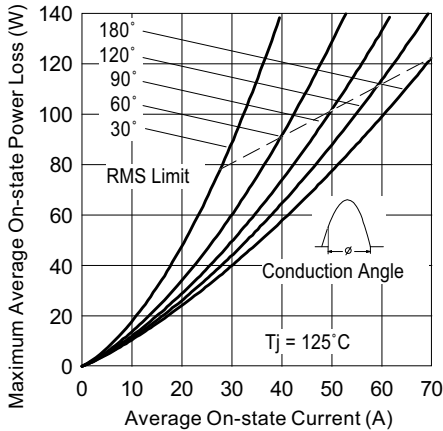


Fig. 3 - On-State Power Loss Characteristics

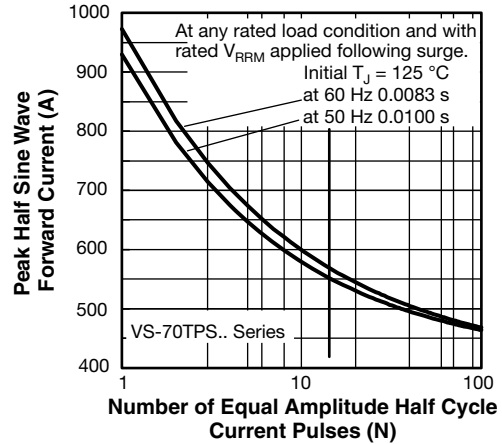


Fig. 5 - Maximum Non-Repetitive Surge Current

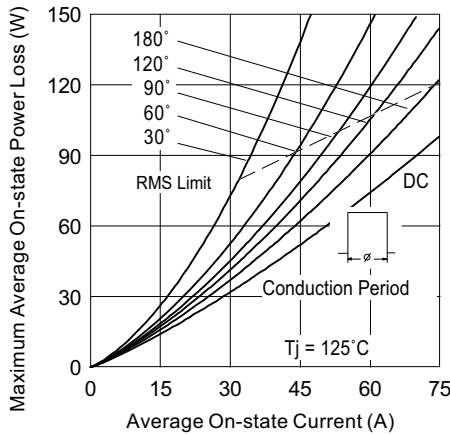


Fig. 4 - On-State Power Loss Characteristics

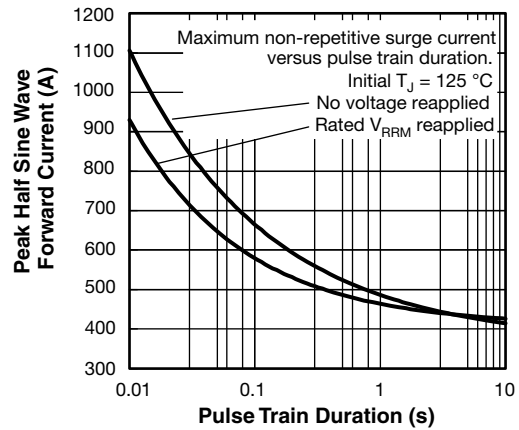


Fig. 6 - Maximum Non-Repetitive Surge Current

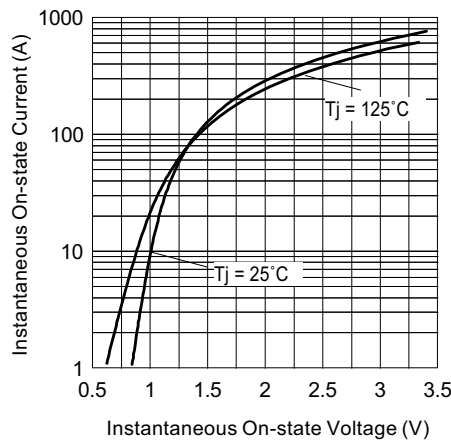


Fig. 7 - On-State Voltage Drop Characteristics

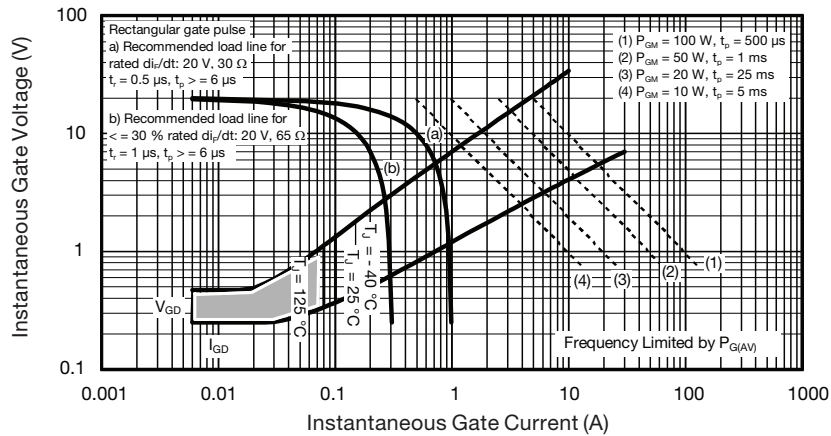


Fig. 8 - Gate Characteristics

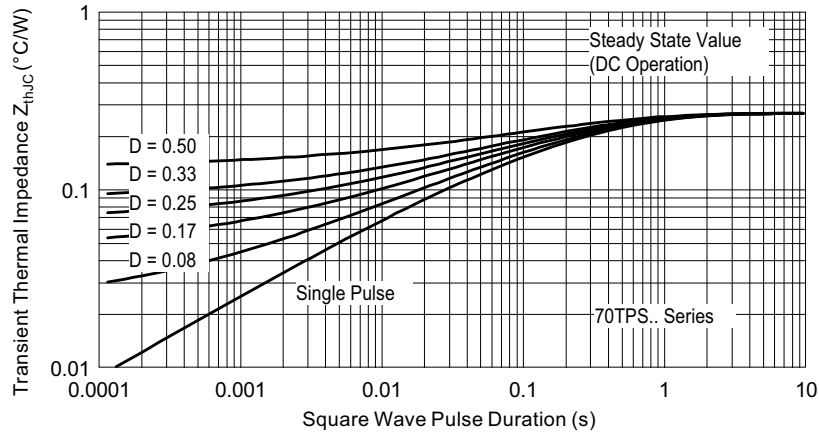
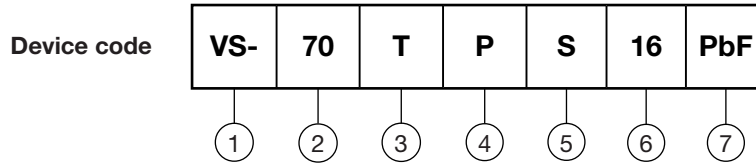


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (70 = 70 A)
- 3** - Circuit configuration:
T = thyristor
- 4** - Package:
P = super TO-247
- 5** - Type of silicon:
S = standard recovery rectifier
- 6** - Voltage code x 100 = V_{RRM}

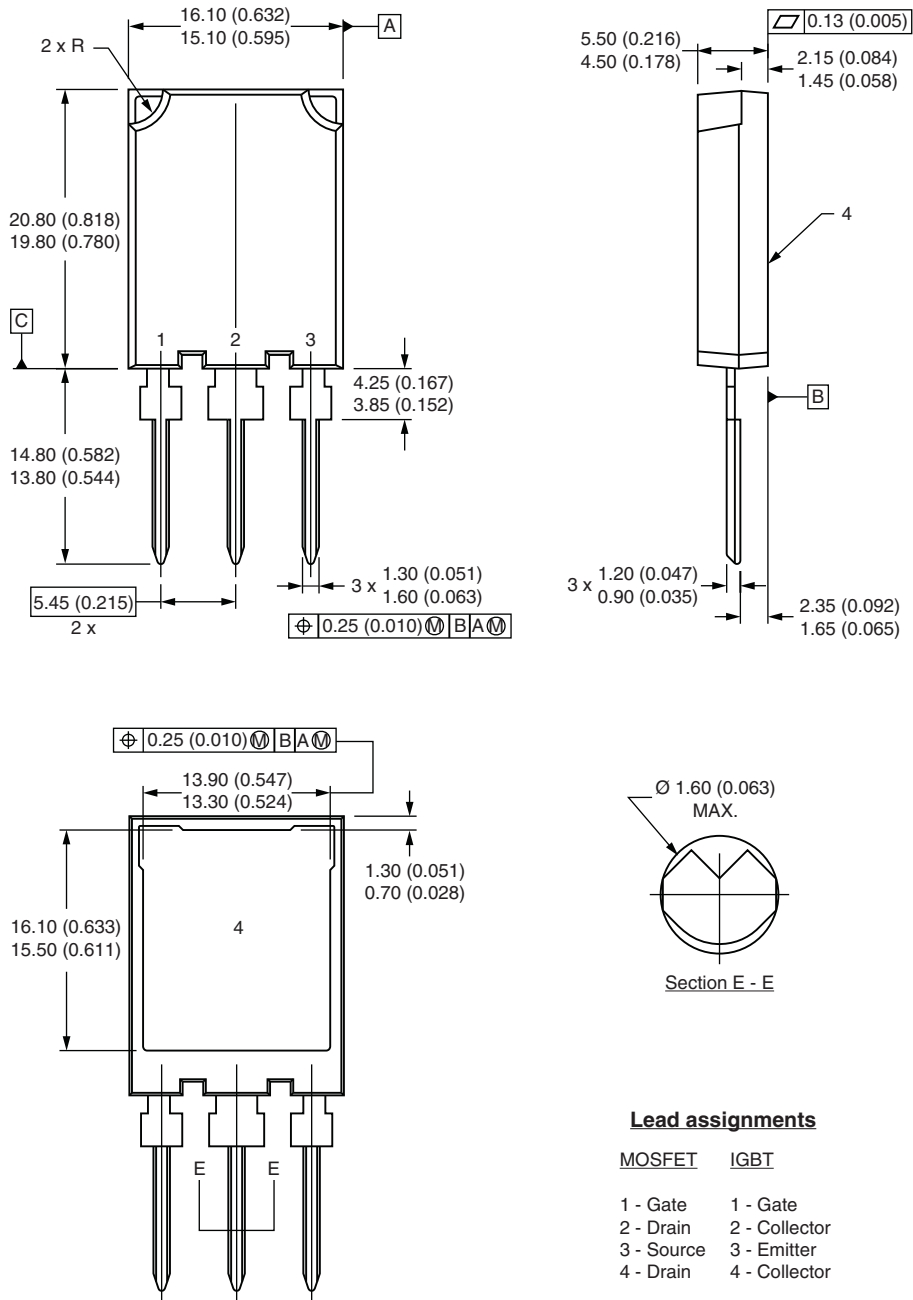
| |
|-------------|
| 12 = 1200 V |
| 16 = 1600 V |
- 7** - PbF = lead (Pb)-free

| ORDERING INFORMATION (example) | | | |
|--------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-70TPS12PbF | 25 | 500 | Antistatic plastic tube |
| VS-70TPS16PbF | 25 | 500 | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95073 |
| Part marking information | www.vishay.com/doc?95070 |
| SPICE model VS-70TPS12 | www.vishay.com/doc?96760 |
| SPICE model VS-70TPS16 | www.vishay.com/doc?96761 |

Super TO-247

DIMENSIONS in millimeters (inches)



Notes

- (1) Dimension and tolerancing per ASME Y14.5M-1994
- (2) Controlling dimension: millimeter
- (3) Outline conforms to JEDEC® outline TO-274AA



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