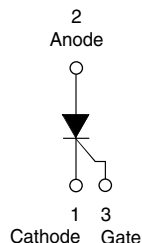


## Surface Mountable Phase Control SCR, 10 A



D<sup>2</sup>PAK



### DESCRIPTION/FEATURES

The 10TTS08SPbF High Voltage Series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125 °C junction temperature.

Typical applications are in input rectification (soft start) and these products are designed to be used with Vishay HPP input diodes, switches and output rectifiers which are available in identical package outlines.

This product has been designed and qualified for industrial level.

Compliant to RoHS directive 2002/95/EC.

Halogen-free according to IEC 61249-2-21 definition.



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### PRODUCT SUMMARY

|                |          |
|----------------|----------|
| $V_T$ at 6.5 A | < 1.15 V |
| $I_{TSM}$      | 140 A    |
| $V_{RRM}$      | 800 V    |

### OUTPUT CURRENT IN TYPICAL APPLICATIONS

| APPLICATIONS                                                               | SINGLE-PHASE BRIDGE | THREE-PHASE BRIDGE | UNITS |
|----------------------------------------------------------------------------|---------------------|--------------------|-------|
| NEMA FR-4 or G-10 glass fabric-based epoxy with 4 oz. (140 $\mu$ m) copper | 2.5                 | 3.5                | A     |
| Aluminum IMS, $R_{thCA} = 15$ °C/W                                         | 6.3                 | 9.5                |       |
| Aluminum IMS with heatsink, $R_{thCA} = 5$ °C/W                            | 14.0                | 18.5               |       |

#### Note

- $T_A = 55$  °C,  $T_J = 125$  °C, footprint 300 mm<sup>2</sup>

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER         | TEST CONDITIONS      | VALUES      | UNITS      |
|-------------------|----------------------|-------------|------------|
| $I_{T(AV)}$       | Sinusoidal waveform  | 6.5         | A          |
| $I_{RMS}$         |                      | 10          |            |
| $V_{RRM}/V_{DRM}$ |                      | 800         | V          |
| $I_{TSM}$         |                      | 140         | A          |
| $V_T$             | 6.5 A, $T_J = 25$ °C | 1.15        | V          |
| $dV/dt$           |                      | 150         | V/ $\mu$ s |
| $dI/dt$           |                      | 100         | A/ $\mu$ s |
| $T_J$             | Range                | - 40 to 125 | °C         |

### VOLTAGE RATINGS

| PART NUMBER | $V_{RRM}$ , MAXIMUM<br>PEAK REVERSE VOLTAGE<br>V | $V_{DRM}$ , MAXIMUM PEAK<br>DIRECT VOLTAGE<br>V | $I_{RRM}/I_{DRM}$<br>AT 125 °C<br>mA |
|-------------|--------------------------------------------------|-------------------------------------------------|--------------------------------------|
| 10TTS08SPbF | 800                                              | 800                                             | 1.0                                  |

# 10TTS08SPbF High Voltage Series

Vishay High Power Products Surface Mountable  
Phase Control SCR, 10 A



| ABSOLUTE MAXIMUM RATINGS                              |                 |                                                                                                 |        |               |
|-------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------|--------|---------------|
| PARAMETER                                             | SYMBOL          | TEST CONDITIONS                                                                                 | VALUES | UNITS         |
| Maximum average on-state current                      | $I_{T(AV)}$     | $T_C = 112\text{ }^{\circ}\text{C}$ , 180° conduction half sine wave                            | 6.5    | A             |
| Maximum RMS on-state current                          | $I_{T(RMS)}$    |                                                                                                 | 10     |               |
| Maximum peak, one-cycle, non-repetitive surge current | $I_{TSM}$       | 10 ms sine pulse, rated $V_{RRM}$ applied, $T_J = 125\text{ }^{\circ}\text{C}$                  | 120    |               |
|                                                       |                 | 10 ms sine pulse, no voltage reapplied, $T_J = 125\text{ }^{\circ}\text{C}$                     | 140    | $A^2s$        |
| Maximum $I^2t$ for fusing                             | $I^2t$          | 10 ms sine pulse, rated $V_{RRM}$ applied, $T_J = 125\text{ }^{\circ}\text{C}$                  | 72     |               |
|                                                       |                 | 10 ms sine pulse, no voltage reapplied, $T_J = 125\text{ }^{\circ}\text{C}$                     | 100    |               |
| Maximum $I^2\sqrt{t}$ for fusing                      | $I^2\sqrt{t}$   | $t = 0.1\text{ ms to }10\text{ ms}$ , no voltage reapplied, $T_J = 125\text{ }^{\circ}\text{C}$ | 1000   | $A^2\sqrt{s}$ |
| Maximum on-state voltage drop                         | $V_{TM}$        | 6.5 A, $T_J = 25\text{ }^{\circ}\text{C}$                                                       | 1.15   | V             |
| On-state slope resistance                             | $r_t$           | $T_J = 125\text{ }^{\circ}\text{C}$                                                             | 17.3   | $m\Omega$     |
| Threshold voltage                                     | $V_{T(TO)}$     |                                                                                                 | 0.85   | V             |
| Maximum reverse and direct leakage current            | $I_{RM}/I_{DM}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                              | 0.05   | mA            |
|                                                       |                 | $T_J = 125\text{ }^{\circ}\text{C}$                                                             | 1.0    |               |
| Typical holding current                               | $I_H$           | Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$                                  | 30     |               |
| Maximum latching current                              | $I_L$           | Anode supply = 6 V, resistive load                                                              | 50     |               |
| Maximum rate of rise of off-state voltage             | $dV/dt$         | $T_J = 25\text{ }^{\circ}\text{C}$                                                              | 150    | $V/\mu s$     |
| Maximum rate of rise of turned-on current             | $dI/dt$         |                                                                                                 | 100    | $A/\mu s$     |

| TRIGGERING                                  |             |                                                                         |        |       |
|---------------------------------------------|-------------|-------------------------------------------------------------------------|--------|-------|
| PARAMETER                                   | SYMBOL      | TEST CONDITIONS                                                         | VALUES | UNITS |
| Maximum peak gate power                     | $P_{GM}$    |                                                                         | 8.0    | W     |
| Maximum average gate power                  | $P_{G(AV)}$ |                                                                         | 2.0    |       |
| Maximum peak positive gate current          | $+I_{GM}$   |                                                                         | 1.5    | A     |
| Maximum peak negative gate voltage          | $-V_{GM}$   |                                                                         | 10     | V     |
| Maximum required DC gate current to trigger | $I_{GT}$    | Anode supply = 6 V, resistive load, $T_J = -65\text{ }^{\circ}\text{C}$ | 20     | mA    |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^{\circ}\text{C}$  | 15     |       |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 125\text{ }^{\circ}\text{C}$ | 10     |       |
| Maximum required DC gate voltage to trigger | $V_{GT}$    | Anode supply = 6 V, resistive load, $T_J = -65\text{ }^{\circ}\text{C}$ | 1.2    | V     |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^{\circ}\text{C}$  | 1      |       |
|                                             |             | Anode supply = 6 V, resistive load, $T_J = 125\text{ }^{\circ}\text{C}$ | 0.7    |       |
| Maximum DC gate voltage not to trigger      | $V_{GD}$    | $T_J = 125\text{ }^{\circ}\text{C}$ , $V_{DRM} = \text{Rated value}$    | 0.2    | mA    |
| Maximum DC gate current not to trigger      | $I_{GD}$    |                                                                         | 0.1    |       |

| SWITCHING                     |          |                                     |        |         |
|-------------------------------|----------|-------------------------------------|--------|---------|
| PARAMETER                     | SYMBOL   | TEST CONDITIONS                     | VALUES | UNITS   |
| Typical turn-on time          | $t_{gt}$ | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.8    | $\mu s$ |
| Typical reverse recovery time | $t_{rr}$ | $T_J = 125\text{ }^{\circ}\text{C}$ | 3      |         |
| Typical turn-off time         | $t_q$    |                                     | 100    |         |



# 10TTS08SPbF High Voltage Series

Surface Mountable      Vishay High Power Products  
Phase Control SCR, 10 A

| THERMAL - MECHANICAL SPECIFICATIONS                         |                  |                                         |             |       |
|-------------------------------------------------------------|------------------|-----------------------------------------|-------------|-------|
| PARAMETER                                                   | SYMBOL           | TEST CONDITIONS                         | VALUES      | UNITS |
| Maximum junction and storage temperature range              | $T_J, T_{Stg}$   |                                         | - 40 to 125 | °C    |
| Soldering temperature                                       | $T_S$            | For 10 s (1.6 mm from case)             | 240         |       |
| Maximum thermal resistance, junction to case                | $R_{thJC}$       | DC operation                            | 1.5         | °C/W  |
| Typical thermal resistance, junction to ambient (PCB mount) | $R_{thJA}^{(1)}$ |                                         | 40          |       |
| Approximate weight                                          |                  |                                         | 2           | g     |
|                                                             |                  |                                         | 0.07        | oz.   |
| Marking device                                              |                  | Case style D <sup>2</sup> PAK (SMD-220) | 10TTS08S    |       |

**Note**

<sup>(1)</sup> When mounted on 1" square (650 mm<sup>2</sup>) PCB of FR-4 or G-10 material 4 oz. (140 µm) copper 40 °C/W  
For recommended footprint and soldering techniques refer to application note #AN-994

# 10TTS08SPbF High Voltage Series

Vishay High Power Products

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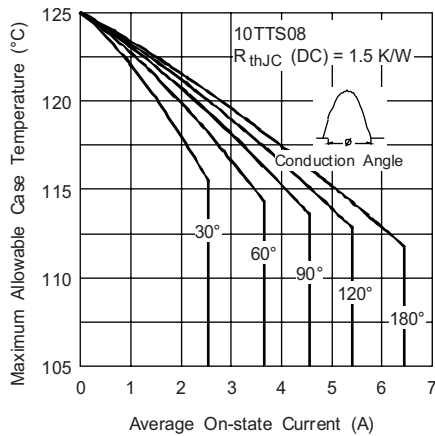


Fig. 1 - Current Rating Characteristics

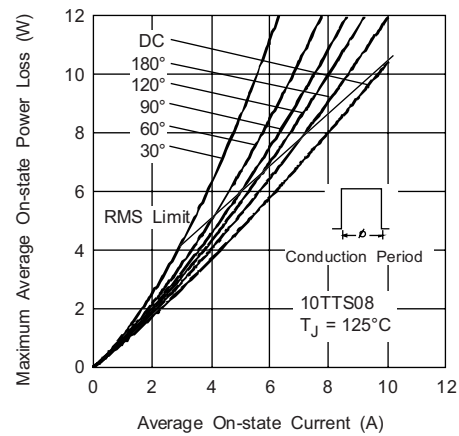


Fig. 4 - On-State Power Loss Characteristics

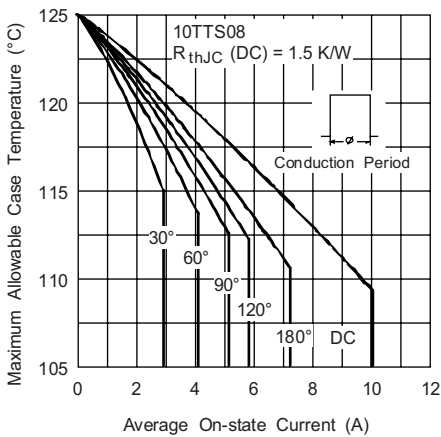


Fig. 2 - Current Rating Characteristics

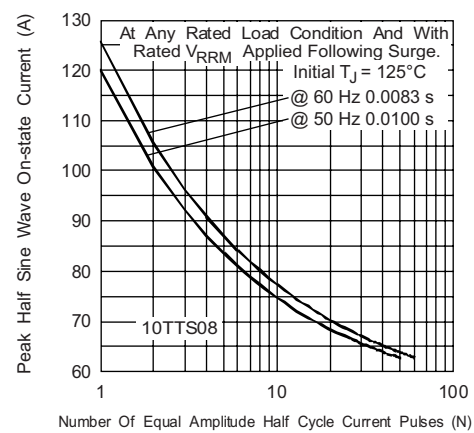


Fig. 5 - Maximum Non-Repetitive Surge Current

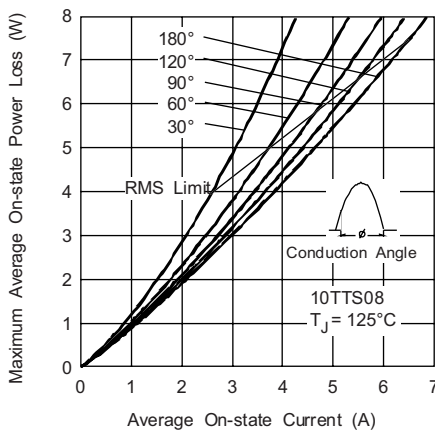


Fig. 3 - On-State Power Loss Characteristics

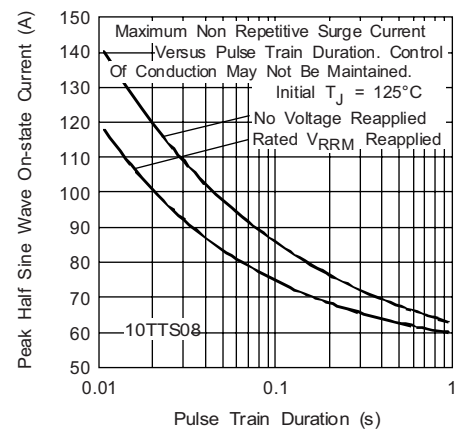


Fig. 6 - Maximum Non-Repetitive Surge Current



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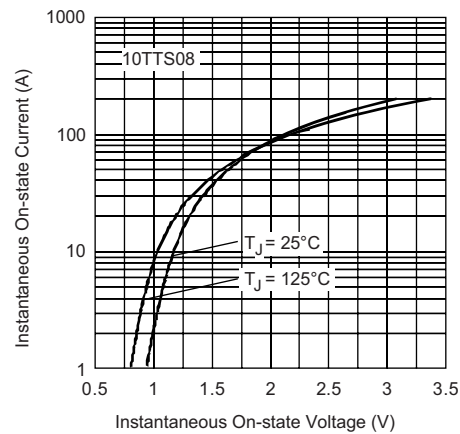


Fig. 7 - On-State Voltage Drop Characteristics

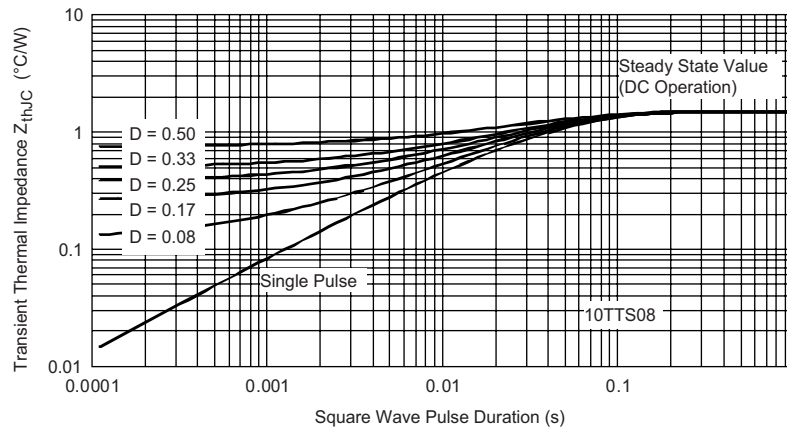


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 10TTS08SPbF High Voltage Series

Vishay High Power Products      Surface Mountable  
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## ORDERING INFORMATION TABLE

|             |    |   |   |   |    |   |     |     |
|-------------|----|---|---|---|----|---|-----|-----|
| Device code | 10 | T | T | S | 08 | S | TRL | PbF |
|             | 1  | 2 | 3 | 4 | 5  | 6 | 7   | 8   |

- 1** - Current rating, RMS value
- 2** - Circuit configuration:  
T = Single thyristor
- 3** - Package:  
T = TO-220AC
- 4** - Type of silicon:  
S = Converter grade
- 5** - Voltage code x 100 =  $V_{RRM}$
- 6** - S = TO-220 D<sup>2</sup>PAK (SMD-220) version
- 7** - Tape and reel option:
  - TRL = Left reel
  - TRR = Right orientation reel
- 8** -
  - None = Standard production
  - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95046">www.vishay.com/doc?95046</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95054">www.vishay.com/doc?95054</a> |
| Packaging information      | <a href="http://www.vishay.com/doc?95032">www.vishay.com/doc?95032</a> |



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