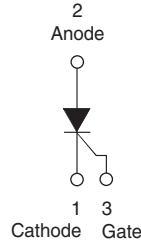


Surface Mountable Phase Control SCR, 10 A



D²PAK



FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Input rectification (soft start)
- Vishay input diodes, switches and output rectifiers which are available in identical package outlines

DESCRIPTION

The VS-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.

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 μm) 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 mm²

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/μs |
| dI/dt | | 100 | A/μs |
| T_J | Range | - 40 to 125 | °C |

VOLTAGE RATINGS

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

VS-10TTS08SPbF High Voltage Series



Vishay Semiconductors

Surface Mountable
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| 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 | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied, $T_J = 125\text{ }^\circ\text{C}$ | 72 | A^2s |
| | | 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} | $V_R = \text{Rated } V_{RRM}/V_{DRM}$ | $T_J = 25\text{ }^\circ\text{C}$ | 0.05 |
| | | | $T_J = 125\text{ }^\circ\text{C}$ | 1.0 |
| Typical holding current | I_H | Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$ | 30 | mA |
| 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 | μs |
| Typical reverse recovery time | t_{rr} | $T_J = 125\text{ }^\circ\text{C}$ | 3 | |
| Typical turn-off time | t_q | | 100 | |



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| 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 ² PAK (SMD-220) | 10TTS08S | |

Note

(1) When mounted on 1" square (650 mm²) 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

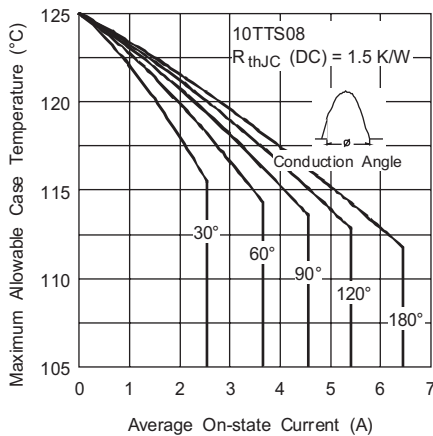


Fig. 1 - Current Rating Characteristics

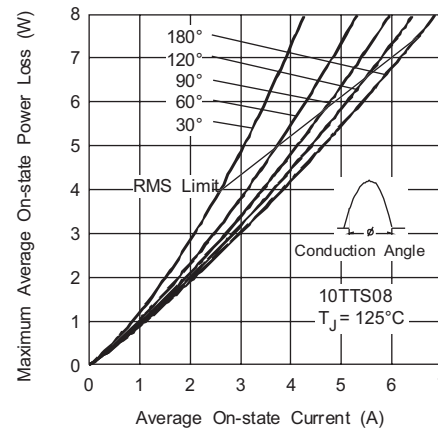


Fig. 3 - On-State Power Loss Characteristics

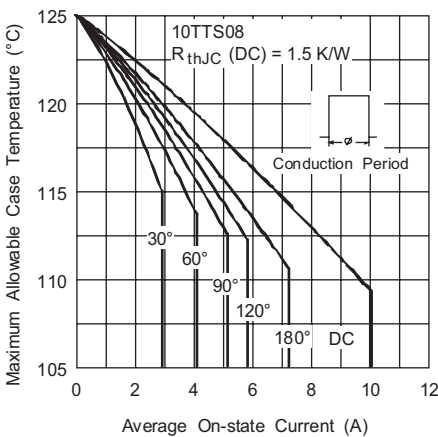


Fig. 2 - Current Rating Characteristics

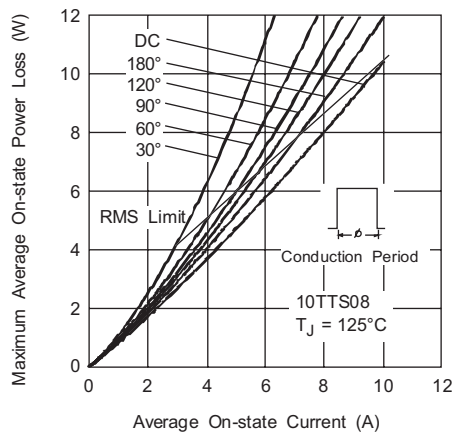


Fig. 4 - On-State Power Loss Characteristics

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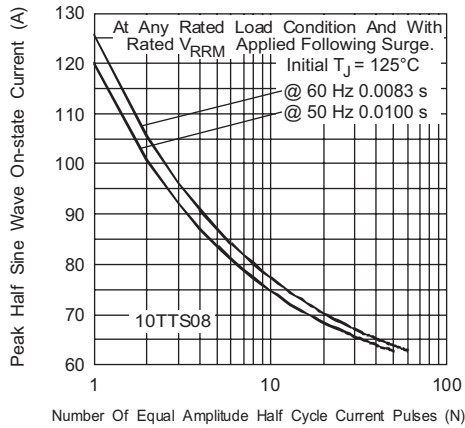


Fig. 5 - Maximum Non-Repetitive Surge Current

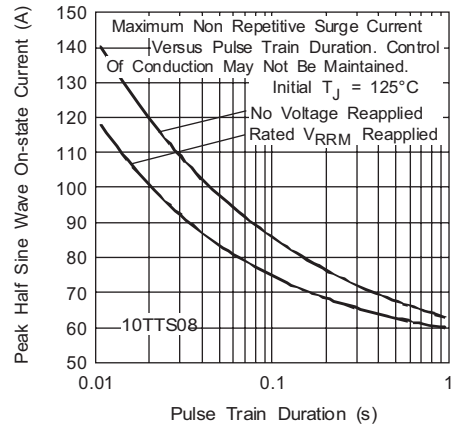


Fig. 6 - Maximum Non-Repetitive Surge Current

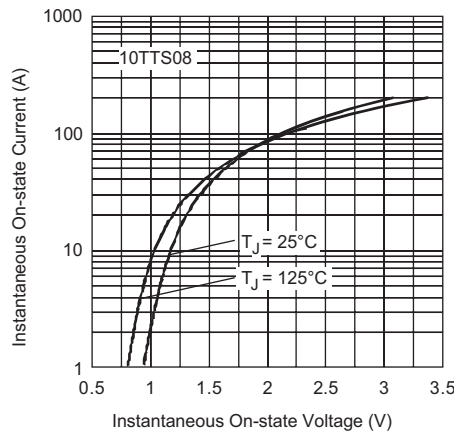


Fig. 7 - On-State Voltage Drop Characteristics

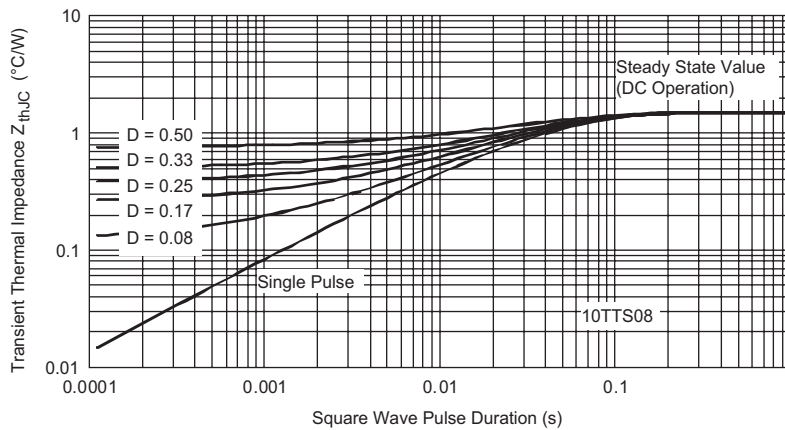


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics



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ORDERING INFORMATION TABLE

| | | | | | | | | | |
|-------------|------------|-----------|----------|----------|----------|-----------|----------|------------|------------|
| Device code | VS- | 10 | T | T | S | 08 | S | TRL | PbF |
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ |

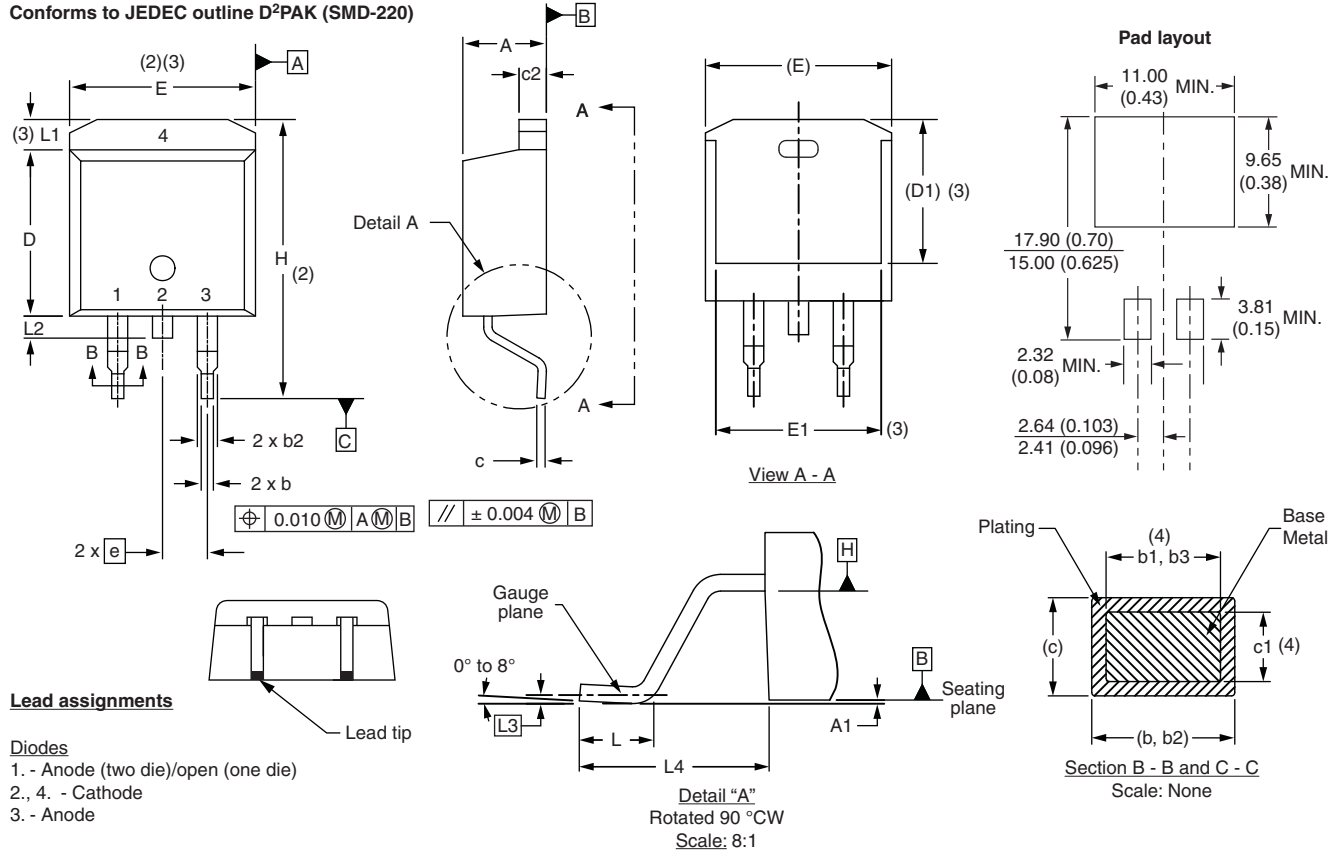
- 1** - HPP product suffix
- 2** - Current rating, RMS value
- 3** - Circuit configuration:
T = Single thyristor
- 4** - Package:
T = TO-220AC
- 5** - Type of silicon:
S = Converter grade
- 6** - Voltage code x 100 = V_{RRM}
- 7** - S = TO-220 D²PAK (SMD-220) version
- 8** - Tape and reel option:
 - TRL = Tape and reel (left oriented)
 - TRR = Tape and reel (right oriented)
- 9** - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95046 |
| Part marking information | www.vishay.com/doc?95054 |
| Packaging information | www.vishay.com/doc?95032 |

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC outline D²PAK (SMD-220)



| SYMBOL | MILLIMETERS | | INCHES | | NOTES | SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|--------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | | | MIN. | MAX. | MIN. | MAX. | |
| A | 4.06 | 4.83 | 0.160 | 0.190 | | D1 | 6.86 | 8.00 | 0.270 | 0.315 | 3 |
| A1 | 0.00 | 0.254 | 0.000 | 0.010 | | E | 9.65 | 10.67 | 0.380 | 0.420 | 2, 3 |
| b | 0.51 | 0.99 | 0.020 | 0.039 | | E1 | 7.90 | 8.80 | 0.311 | 0.346 | 3 |
| b1 | 0.51 | 0.89 | 0.020 | 0.035 | 4 | e | 2.54 BSC | | 0.100 BSC | | |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 | | H | 14.61 | 15.88 | 0.575 | 0.625 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 | L | 1.78 | 2.79 | 0.070 | 0.110 | |
| c | 0.38 | 0.74 | 0.015 | 0.029 | | L1 | - | 1.65 | - | 0.066 | 3 |
| c1 | 0.38 | 0.58 | 0.015 | 0.023 | 4 | L2 | 1.27 | 1.78 | 0.050 | 0.070 | |
| c2 | 1.14 | 1.65 | 0.045 | 0.065 | | L3 | 0.25 BSC | | 0.010 BSC | | |
| D | 8.51 | 9.65 | 0.335 | 0.380 | 2 | L4 | 4.78 | 5.28 | 0.188 | 0.208 | |

Notes

- Dimensioning and tolerancing per ASME Y14.5 M-1994
- Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- Thermal pad contour optional within dimension E, L1, D1 and E1
- Dimension b1 and c1 apply to base metal only
- Datum A and B to be determined at datum plane H
- Controlling dimension: inch
- Outline conforms to JEDEC outline TO-263AB



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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

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