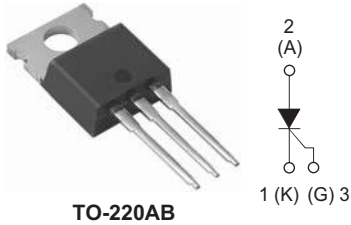


Phase Control SCR, 12.5 A



DESCRIPTION/FEATURES

The 12TTS08PbF 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.



RoHS*
COMPLIANT

Typical applications are in input rectification and crowbar (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 and lead (Pb)-free.

| PRODUCT SUMMARY | |
|-----------------|-------|
| V_T at 8 A | 1.2 V |
| I_{TSM} | 140 A |
| V_{RRM} | 800 V |

| OUTPUT CURRENT IN TYPICAL APPLICATIONS | | | |
|---|---------------------|--------------------|-------|
| APPLICATIONS | SINGLE-PHASE BRIDGE | THREE-PHASE BRIDGE | UNITS |
| Capacitive input filter $T_A = 55\text{ °C}$, $T_J = 125\text{ °C}$, common heatsink of 1 °C/W | 13.5 | 17 | A |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|---------------------------|-------------|------------|
| PARAMETER | TEST CONDITIONS | VALUES | UNITS |
| $I_{T(AV)}$ | Sinusoidal waveform | 8 | A |
| $I_{T(RMS)}$ | | 12.5 | |
| V_{DRM}/V_{RRM} | | 800 | V |
| I_{TSM} | | 140 | A |
| V_T | 8 A, $T_J = 25\text{ °C}$ | 1.2 | V |
| dV/dt | | 150 | V/ μ s |
| dI/dt | | 100 | A/ μ s |
| T_J | Range | - 40 to 125 | °C |

| VOLTAGE RATINGS | | | |
|-----------------|---------------------------------------|--|-----------------------------------|
| PART NUMBER | V_{RRM} , MAXIMUM PEAK VOLTAGE V | V_{DRM} , MAXIMUM PEAK DIRECT VOLTAGE V | I_{RRM}/I_{DRM} AT 125 °C mA |
| 12TTS08PbF | 800 | 800 | 1.0 |

* Pb containing terminations are not RoHS compliant, exemptions may apply

12TTS08PbF High Voltage Series



Vishay High Power Products Phase Control SCR, 12.5 A

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|-----------------|--|---------------------------------------|--------|-------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average on-state current | $I_{T(AV)}$ | $T_C = 108\text{ }^\circ\text{C}$, 180° conduction, half sine wave | | 8 | A |
| Maximum RMS on-state current | $I_{T(RMS)}$ | | | 12.5 | |
| 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 ² s |
| | | 10 ms sine pulse, no voltage reapplied, $T_J = 125\text{ }^\circ\text{C}$ | | 100 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1$ to 10 ms, no voltage reapplied, $T_J = 125\text{ }^\circ\text{C}$ | | 1000 | A ² √s |
| Maximum on-state voltage drop | V_{TM} | 8 A, $T_J = 25\text{ }^\circ\text{C}$ | | 1.2 | V |
| On-state slope resistance | r_t | $T_J = 125\text{ }^\circ\text{C}$ | | 16.2 | mΩ |
| Threshold voltage | $V_{T(TO)}$ | | | 0.87 | V |
| Maximum reverse and direct leakage current | I_{RM}/I_{DM} | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_{RRM}/V_{DRM}$ | 0.05 | mA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 1.0 | |
| Typical holding current | I_H | Anode supply = 6 V, resistive load, initial $I_T = 1$ 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/μs |
| Maximum rate of rise of turned-on current | dI/dt | | | 100 | A/μs |

| 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 | |



12TTS08PbF High Voltage Series

Phase Control SCR, 12.5 A Vishay High Power Products

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | |
|---|----------------|--------------------------------------|-------------|------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum junction and storage temperature range | T_J, T_{Stg} | | - 40 to 125 | °C |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation | 1.5 | °C/W |
| Maximum thermal resistance, junction to ambient | R_{thJA} | | 62 | |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth and greased | 0.5 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style TO-220AB | 12TTS08 | |

12TTS08PbF High Voltage Series

Vishay High Power Products Phase Control SCR, 12.5 A

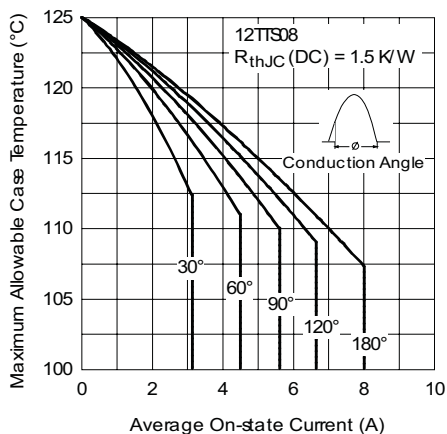


Fig. 1 - Current Ratings Characteristics

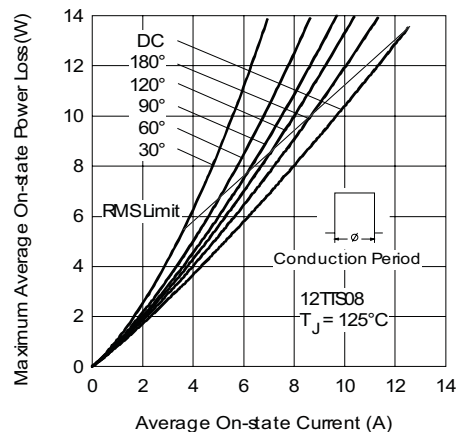


Fig. 4 - On-State Power Loss Characteristics

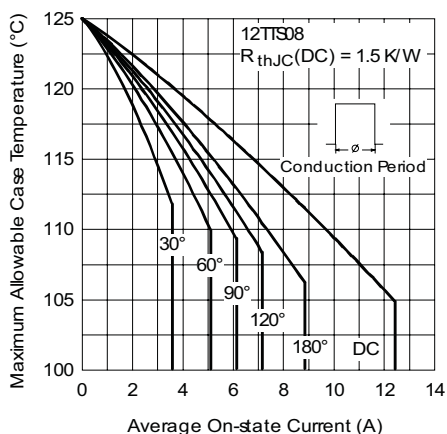


Fig. 2 - Current Ratings Characteristics

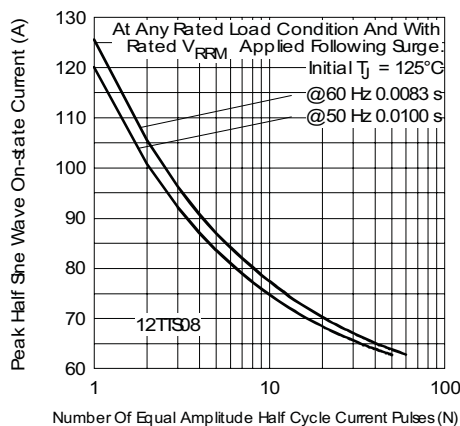


Fig. 5 - Maximum Non-Repetitive Surge Current

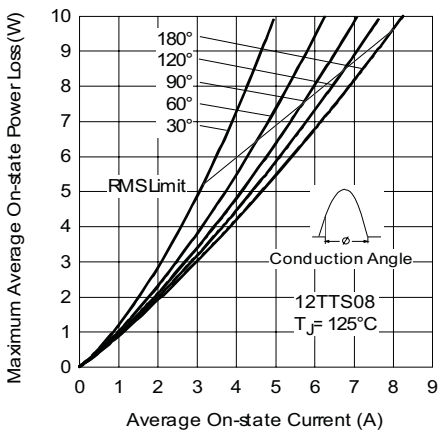


Fig. 3 - On-State Power Loss Characteristics

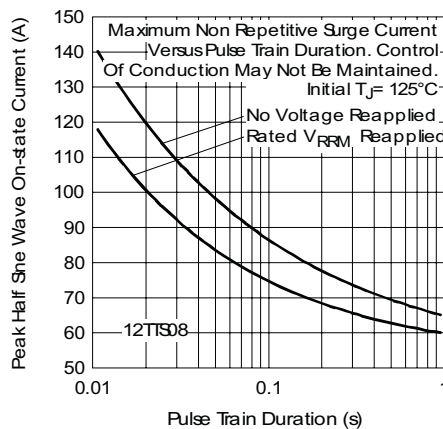


Fig. 6 - Maximum Non-Repetitive Surge Current



12TTS08PbF High Voltage Series

Phase Control SCR, 12.5 A Vishay High Power Products

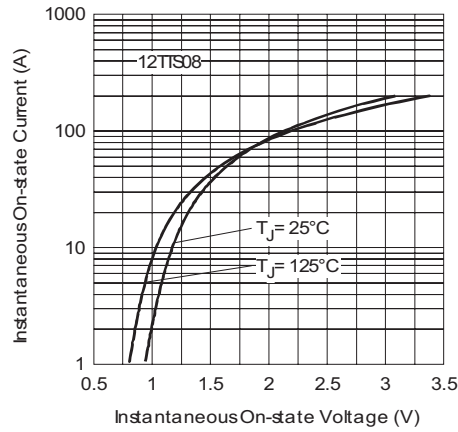


Fig. 7 - On-State Voltage Drop Characteristics

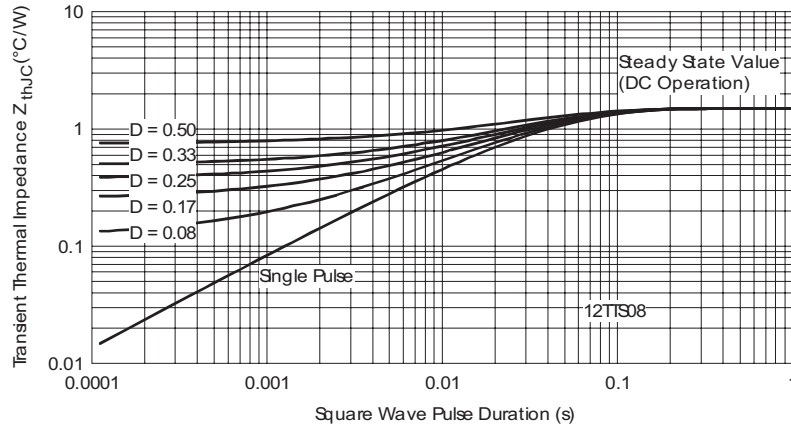


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

12TTS08PbF High Voltage Series

Vishay High Power Products Phase Control SCR, 12.5 A



ORDERING INFORMATION TABLE

| | | | | | | |
|-------------|----|--|---|---|----|-----|
| Device code | 12 | T | T | S | 08 | PbF |
| | ① | ② | ③ | ④ | ⑤ | ⑥ |
| 1 | - | Current ratings (12 = 12.5 A) | | | | |
| 2 | - | Circuit configuration: T = Single thyristor | | | | |
| 3 | - | Package: T = TO-220 | | | | |
| 4 | - | Type of silicon S = Standard recovery rectifier | | | | |
| 5 | - | Voltage rating (08 = 800 V) | | | | |
| 6 | - | • None = Standard production • PbF = Lead (Pb)-free | | | | |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|---|
| Dimensions | http://www.vishay.com/doc?95222 |
| Part marking information | http://www.vishay.com/doc?95225 |



Notice

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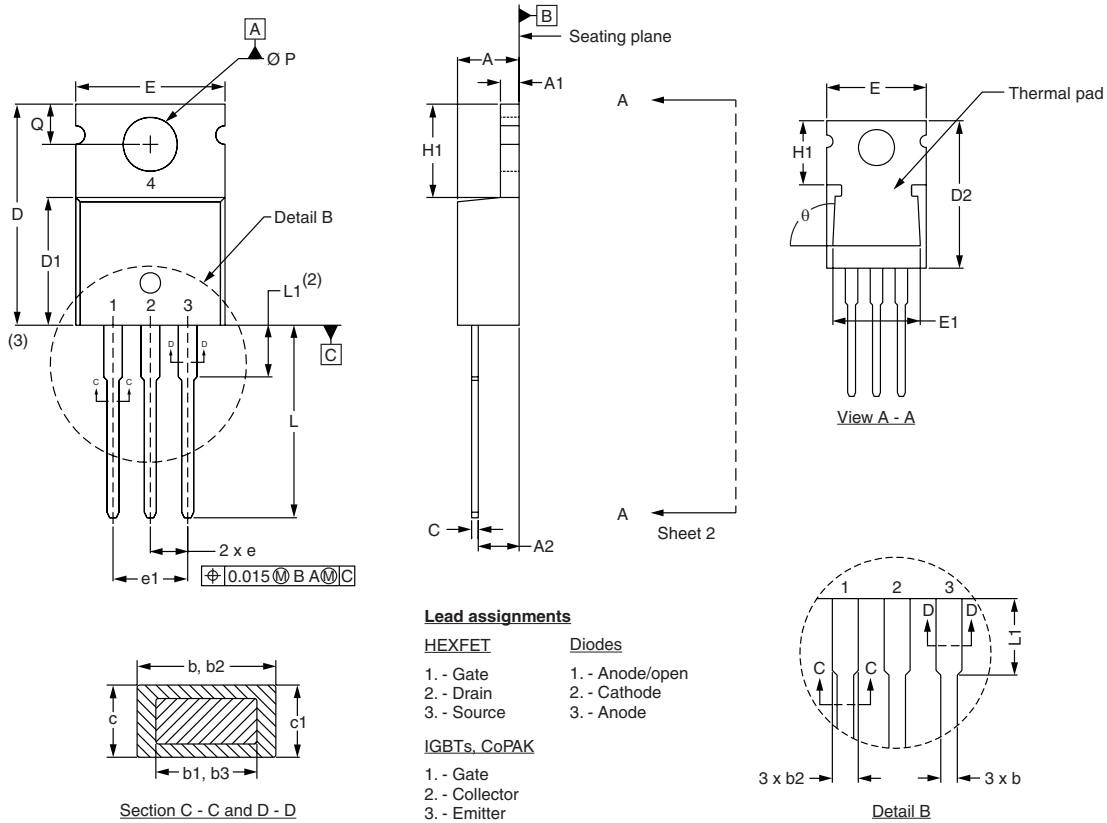
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TO-220AB

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 3.56 | 4.82 | 0.140 | 0.190 | |
| A1 | 0.51 | 1.40 | 0.020 | 0.055 | |
| A2 | 2.04 | 2.92 | 0.080 | 0.115 | |
| b | 0.38 | 1.01 | 0.015 | 0.040 | |
| b1 | 0.38 | 0.96 | 0.015 | 0.038 | 4 |
| b2 | 1.15 | 1.77 | 0.045 | 0.070 | |
| b3 | 1.15 | 1.73 | 0.045 | 0.068 | |
| c | 0.36 | 0.61 | 0.014 | 0.024 | |
| c1 | 0.36 | 0.56 | 0.014 | 0.022 | 4 |
| c2 | 0.31 | 1.14 | 0.012 | 0.045 | |
| D | 14.22 | 15.87 | 0.560 | 0.625 | 3 |

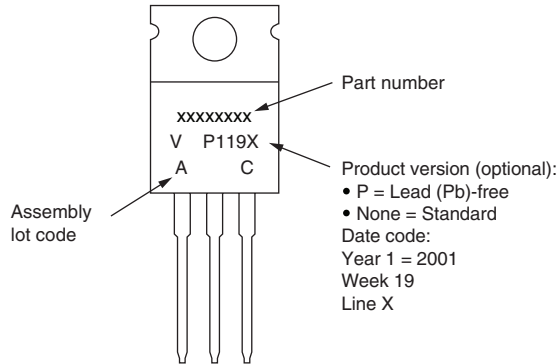
| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|------------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| D1 | 8.38 | 9.02 | 0.330 | 0.355 | |
| D2 | 12.19 | 12.88 | 0.480 | 0.507 | |
| E | 9.66 | 10.66 | 0.380 | 0.420 | 3 |
| E1 | 8.38 | 8.89 | 0.330 | 0.350 | |
| e | 2.54 BSC | | 0.100 BSC | | |
| H1 | 5.85 | 6.86 | 0.230 | 0.270 | |
| L | 12.70 | 14.73 | 0.500 | 0.580 | |
| L1 | - | 6.35 | - | 0.250 | 2 |
| Ø P | 3.54 | 3.73 | 0.139 | 0.147 | |
| Q | 2.54 | 3.05 | 0.100 | 0.120 | |
| θ | 90° to 93° | | 90° to 93° | | |

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) 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 outermost extremes of the plastic body
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimensions: inches



TO-220AB



Example: This is a xxxxxxxx with assembly lot code AC, assembled on WW 19, 2001 in the assembly line "X"