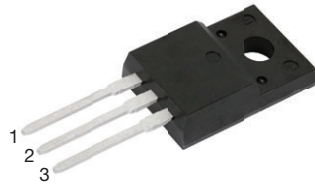
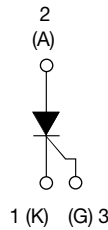


Thyristor High Voltage, Phase Control SCR, 25 A



TO-220 FullPAK 3L



FEATURES

- Designed and qualified for industrial level
- Fully isolated package ($V_{INS} = 2500 V_{RMS}$)
- 125 °C max. operating junction temperature
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Typical usage is in input rectification crowbar (soft start) and AC switch in motor control, UPS, welding, and battery charge

DESCRIPTION

The VS-25TTS...FP... 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.

PRIMARY CHARACTERISTICS

| | |
|-----------------------|-------------------|
| $I_{T(AV)}$ | 16 A |
| V_{DRM}/V_{RRM} | 800 V, 1200 V |
| V_{TM} | 1.25 V |
| I_{GT} | 45 mA |
| T_J | -40 °C to 125 °C |
| Package | 3L TO-220 FullPAK |
| Circuit configuration | Single SCR |

OUTPUT CURRENT IN TYPICAL APPLICATIONS

| APPLICATIONS | SINGLE-PHASE BRIDGE | THREE-PHASE BRIDGE | UNITS |
|--|---------------------|--------------------|-------|
| Capacitive input filter $T_A = 55$ °C, $T_J = 125$ °C, common heatsink of 1 °C/W | 18 | 22 | A |

MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER | TEST CONDITIONS | VALUES | UNITS |
|-------------------|---------------------|-------------|-------|
| $I_{T(AV)}$ | Sinusoidal waveform | 16 | A |
| I_{RMS} | | 25 | |
| V_{RRM}/V_{DRM} | | 800, 1200 | V |
| I_{TSM} | | 350 | A |
| V_T | 16 A, $T_J = 25$ °C | 1.25 | V |
| dV/dt | | 500 | V/μs |
| dI/dt | | 150 | A/μs |
| T_J | | -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-25TTS08FP-M3 | 800 | 800 | 10 |
| VS-25TTS12FP-M3 | 1200 | 1200 | |



| ABSOLUTE MAXIMUM RATINGS | | | | | | |
|---|-----------------|---|-----------------------------------|------|---------------|----|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | | UNITS | |
| | | | TYP. | MAX. | | |
| Maximum average on-state current | $I_{T(AV)}$ | $T_C = 51\text{ }^\circ\text{C}$, 180° conduction half sine wave | 16 | | A | |
| Maximum RMS on-state current | I_{RMS} | | 25 | | | |
| Maximum peak, one-cycle, non-repetitive surge current | I_{TSM} | 10 ms sine pulse, rated V_{RRM} applied | 300 | | | |
| | | 10 ms sine pulse, no voltage reapplied | 350 | | | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied | 450 | | A^2s | |
| | | 10 ms sine pulse, no voltage reapplied | 630 | | | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1\text{ms}$ to 10 ms, no voltage reapplied | 6300 | | $A^2\sqrt{s}$ | |
| Maximum on-state voltage drop | V_{TM} | 16 A, $T_J = 25\text{ }^\circ\text{C}$ | 1.25 | | V | |
| On-state slope resistance | r_t | $T_J = 125\text{ }^\circ\text{C}$ | 12.0 | | $m\Omega$ | |
| Threshold voltage | $V_{T(TO)}$ | | 1.0 | | V | |
| Maximum reverse and direct leakage current | I_{RM}/I_{DM} | $V_R = \text{Rated } V_{RRM}/V_{DRM}$ | $T_J = 25\text{ }^\circ\text{C}$ | 0.5 | | mA |
| | | | $T_J = 125\text{ }^\circ\text{C}$ | 10 | | |
| Holding current | I_H | Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$ | - | 150 | | |
| Maximum latching current | I_L | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$ | 200 | | | |
| Maximum rate of rise of off-state voltage | dV/dt | $T_J = T_J \text{ max.}$, linear to 80 %, $V_{DRM} = R_g - k = \text{Open}$ | 500 | | $V/\mu s$ | |
| Maximum rate of rise of turned-on current | dI/dt | | 150 | | $A/\mu s$ | |

| 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, $T_J = -10\text{ }^\circ\text{C}$ | 60 | | mA |
| | | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$ | 45 | | |
| | | Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$ | 20 | | |
| Maximum required DC gate voltage to trigger | V_{GT} | Anode supply = 6 V, resistive load, $T_J = -10\text{ }^\circ\text{C}$ | 2.5 | | V |
| | | Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$ | 2.0 | | |
| | | Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$ | 1.0 | | |
| Maximum DC gate voltage not to trigger | V_{GD} | $T_J = 125\text{ }^\circ\text{C}$, $V_{DRM} = \text{Rated value}$ | 0.25 | | |
| Maximum DC gate current not to trigger | I_{GD} | | 2.0 | | mA |

| SWITCHING | | | | |
|-------------------------------|----------|-----------------------------------|--------|---------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Typical turn-on time | t_{gt} | $T_J = 25\text{ }^\circ\text{C}$ | 0.9 | μs |
| Typical reverse recovery time | t_{rr} | $T_J = 125\text{ }^\circ\text{C}$ | 4 | |
| Typical turn-off time | t_q | | 110 | |



| 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 | 2.5 | °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 3L TO-220 FullPAK | 25TTS08FP | |
| | | | 25TTS12FP | |

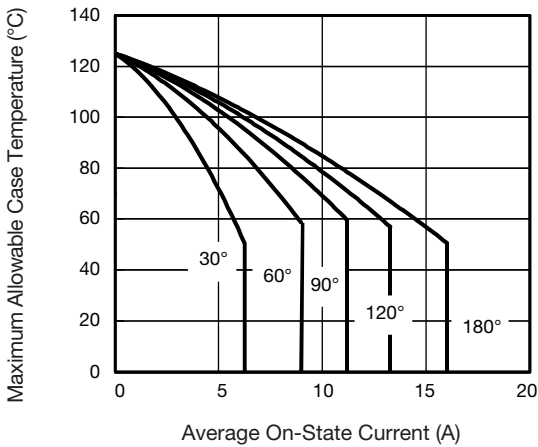


Fig. 1 - Current Rating Characteristics

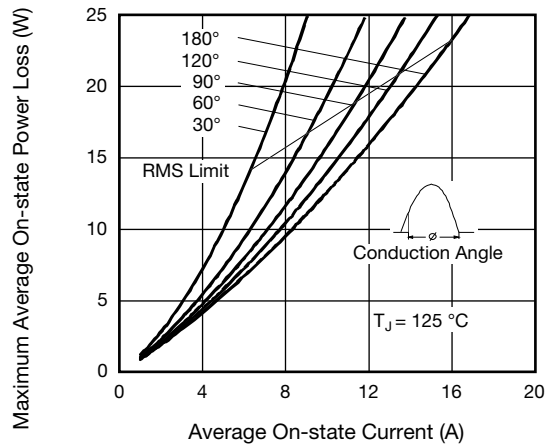


Fig. 3 - On-State Power Loss Characteristics

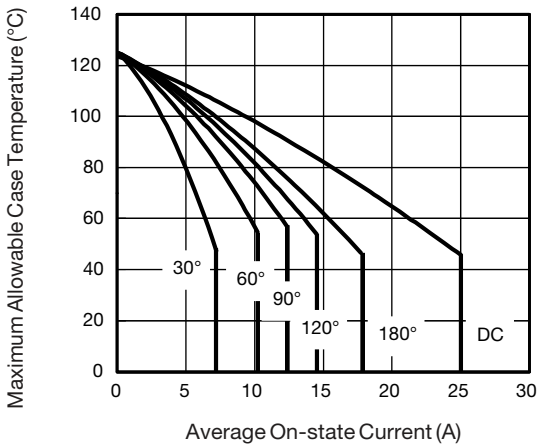


Fig. 2 - Current Rating Characteristics

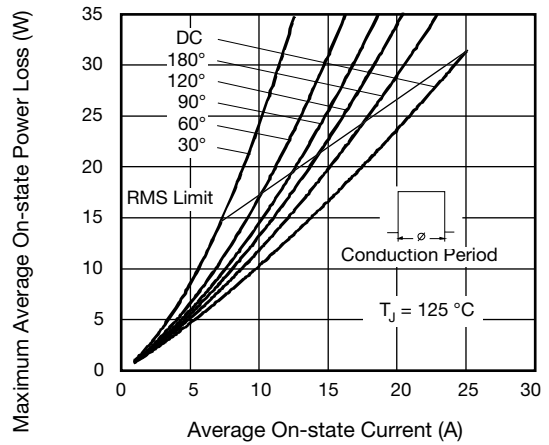


Fig. 4 - On-State Power Loss Characteristics

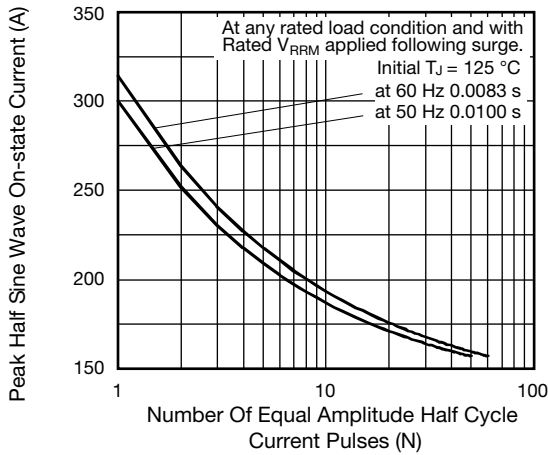


Fig. 5 - Maximum Non-Repetitive Surge Current

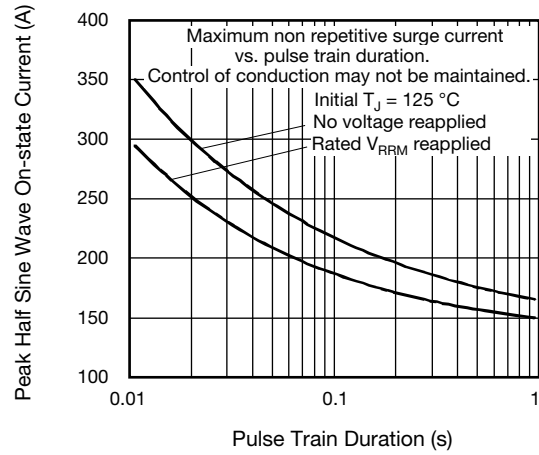


Fig. 6 - Maximum Non-Repetitive Surge Current

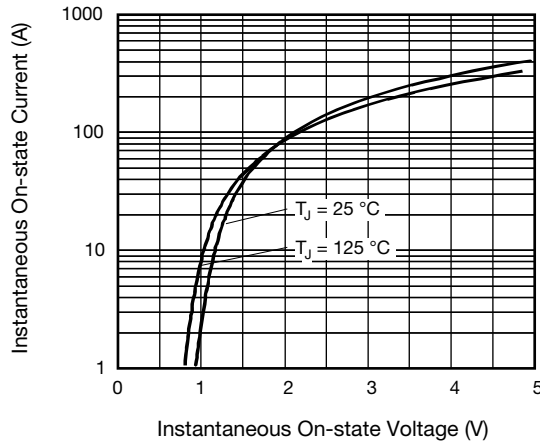


Fig. 7 - On-State Voltage Drop Characteristics

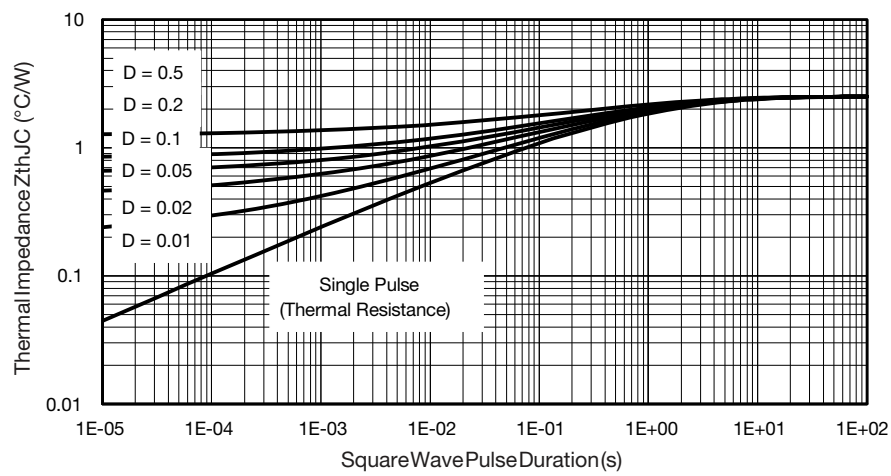


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

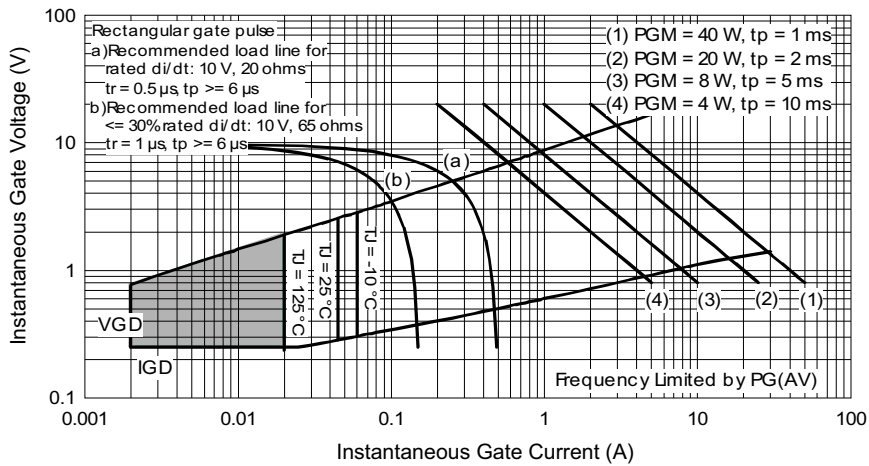


Fig. 9 - Gate Characteristics

ORDERING INFORMATION TABLE

| | | | | | | | | |
|-------------|------------|-----------|---|----------|----------|---------------------------|-----------|------------|
| Device code | VS- | 25 | T | T | S | 12 | FP | -M3 |
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| | 1 | - | Vishay Semiconductors product | | | | | |
| | 2 | - | Current rating (25 = 25 A) | | | | | |
| | 3 | - | Circuit configuration: T = single thyristor | | | | | |
| | 4 | - | Package: T = TO-220AB | | | | | |
| | 5 | - | Type of silicon: Standard recovery rectifier | | | | | |
| | 6 | - | Voltage code x 100 = V_{RRM} | | | 08 = 800 V 12 = 1200 V | | |
| | 7 | - | FullPAK | | | | | |
| | 8 | - | Environmental digit: -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free | | | | | |

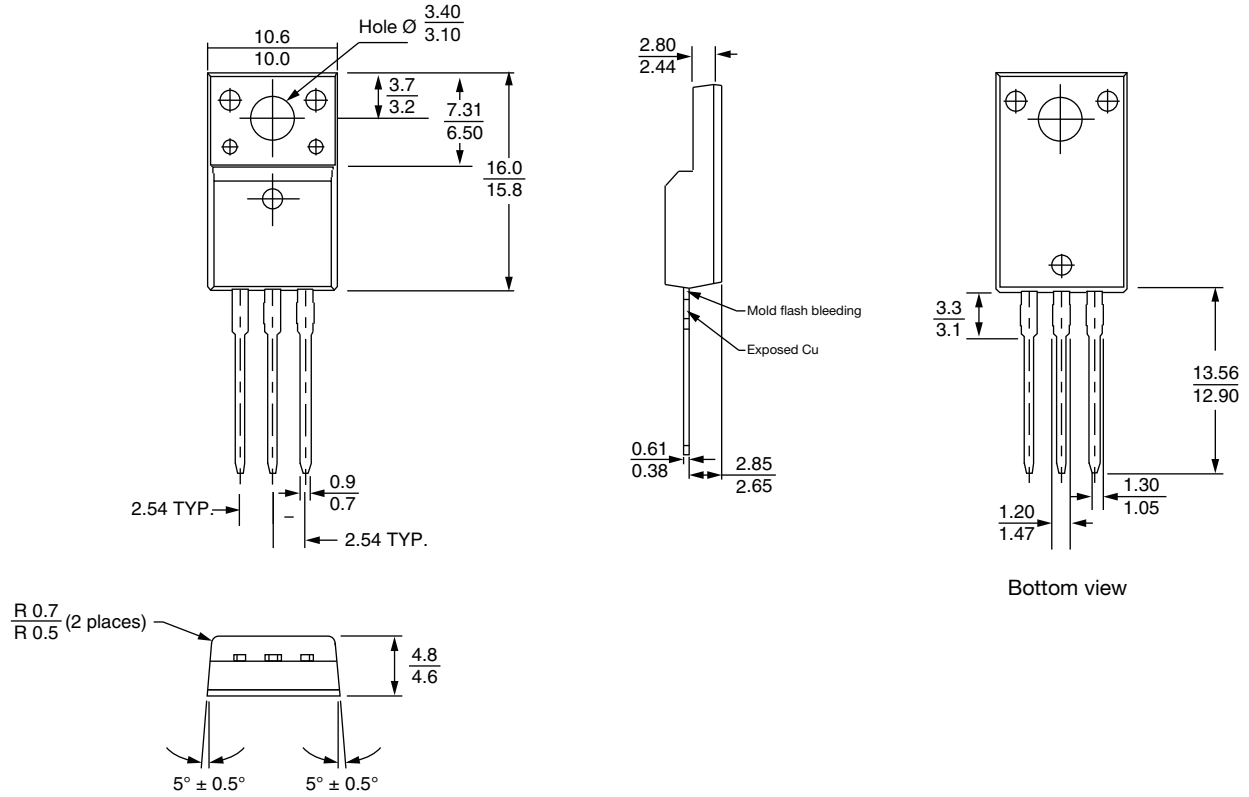
| ORDERING INFORMATION (Example) | | | |
|---------------------------------------|------------------|------------------------|--------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-25TTS08FP-M3 | 50 | 1000 | Antistatic plastic tubes |
| VS-25TTS12FP-M3 | 50 | 1000 | Antistatic plastic tubes |

| LINKS TO RELATED DOCUMENTS | |
|-----------------------------------|--|
| Dimensions | www.vishay.com/doc?96155 |
| Part marking information | www.vishay.com/doc?95456 |



3L TO-220 FullPAK

DIMENSIONS in millimeters



Notes

- (1) All dimensions are in mm
- (2) Package body size exclude mold flash and burrs. Moldflash should be less than 6 mils



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