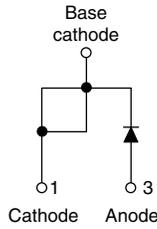




## High Voltage, Input Rectifier Diode, 10 A



TO-220 FULL-PAK



### FEATURES

- Very low forward voltage drop
- 150 °C max. operating junction temperature
- Designed and qualified according to JEDEC-JESD47
- Fully isolated package ( $V_{INS} = 2500 V_{RMS}$ )
- UL E78996 approved
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

| PRODUCT SUMMARY |                 |
|-----------------|-----------------|
| Package         | TO-220FP        |
| $I_{F(AV)}$     | 10 A            |
| $V_R$           | 800 V to 1200 V |
| $V_F$ at $I_F$  | 1.1 V           |
| $I_{FSM}$       | 160 A           |
| $T_J$ max.      | 150 °C          |
| Diode variation | Single die      |

### APPLICATIONS

- Input rectification
- Vishay Semiconductors switches and output rectifiers which are available in identical package outlines

### DESCRIPTION

High voltage rectifiers optimized for very low forward voltage drop with moderate leakage.

These devices are intended for use in main rectification (single or three phase bridge).

| OUTPUT CURRENT IN TYPICAL APPLICATIONS  |                     |                    |       |
|---|---------------------|--------------------|-------|
| APPLICATIONS  | SINGLE-PHASE BRIDGE | THREE-PHASE BRIDGE | UNITS |
| Capacitive input filter $T_A = 55 °C$ , $T_J = 125 °C$<br>common heatsink of 1 °C/W | 12.0                | 16.0               | A     |

| MAJOR RATINGS AND CHARACTERISTICS |                     |             |       |
|-----------------------------------|---------------------|-------------|-------|
| SYMBOL                            | CHARACTERISTICS     | VALUES      | UNITS |
| $I_{F(AV)}$                       | Sinusoidal waveform | 10          | A     |
| $V_{RRM}$                         | Range               | 800/1200    | V     |
| $I_{FSM}$                         |                     | 160         | A     |
| $V_F$                             | 10 A, $T_J = 25 °C$ | 1.1         | V     |
| $T_J$                             |                     | - 40 to 150 | °C    |

| VOLTAGE RATINGS                  |   |  |                           |
|----------------------------------|---|--|---------------------------|
| PART NUMBER                      | $V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ AT 150 °C<br>mA |
| VS-10ETS08FPPbF, VS-10ETS08FP-M3 | 800   | 900  | 0.5                       |
| VS-10ETS12FPPbF, VS-10ETS12FP-M3 | 1200  | 1300   |                           |



| <b>ABSOLUTE MAXIMUM RATINGS</b>                     |               |  |        |               |
|---|---------------|--|--------|---------------|
| PARAMETER   | SYMBOL        | TEST CONDITIONS  | VALUES | UNITS         |
| Maximum average forward current                     | $I_{F(AV)}$   | $T_C = 105\text{ }^\circ\text{C}$ , 180° conduction half sine wave | 10     | A             |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$     | 10 ms sine pulse, rated $V_{RRM}$ applied                          | 135    |               |
|   |               | 10 ms sine pulse, no voltage reapplied                             | 160    |               |
| Maximum $I^2t$ for fusing                           | $I^2t$        | 10 ms sine pulse, rated $V_{RRM}$ applied                          | 91     | $A^2s$        |
|   |               | 10 ms sine pulse, no voltage reapplied                             | 130    |               |
| Maximum $I^2\sqrt{t}$ for fusing                    | $I^2\sqrt{t}$ | $t = 0.1\text{ ms to }10\text{ ms}$ , no voltage reapplied         | 1300   | $A^2\sqrt{s}$ |

| <b>ELECTRICAL SPECIFICATIONS</b> |             |  |        |           |
|----------------------------------|-------------|--|--------|-----------|
| PARAMETER                        | SYMBOL      | TEST CONDITIONS                        | VALUES | UNITS     |
| Maximum forward voltage drop     | $V_{FM}$    | 10 A, $T_J = 25\text{ }^\circ\text{C}$ | 1.1    | V         |
| Forward slope resistance         | $r_t$       | $T_J = 150\text{ }^\circ\text{C}$      | 20     | $m\Omega$ |
| Threshold voltage                | $V_{F(TO)}$ |  | 0.82   | V         |
| Maximum reverse leakage current  | $I_{RM}$    | $T_J = 25\text{ }^\circ\text{C}$       | 0.05   | mA        |
|                                  |             | $T_J = 150\text{ }^\circ\text{C}$      |        |           |

| <b>THERMAL - MECHANICAL SPECIFICATIONS</b>      |                |                                      |             |  |
|---|----------------|--------------------------------------|-------------|--|
| PARAMETER                                       | SYMBOL         | TEST CONDITIONS                      | VALUES      | UNITS  |
| Maximum junction and storage temperature range  | $T_J, T_{Stg}$ |                                      | - 40 to 150 | $^\circ\text{C}$   |
| Maximum thermal resistance, junction to case    | $R_{thJC}$     | DC operation                         | 2.5         | $^\circ\text{C/W}$   |
| 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)       | $\text{kgf} \cdot \text{cm}$<br>$(\text{lbf} \cdot \text{in})$ |
|   | maximum        |                                      | 12 (10)     |  |
| Marking device                                  |                | Case style TO-220 FULL-PAK (94/V0)   | 10ETS08FP   |  |
|   |                |                                      | 10ETS12FP   |  |

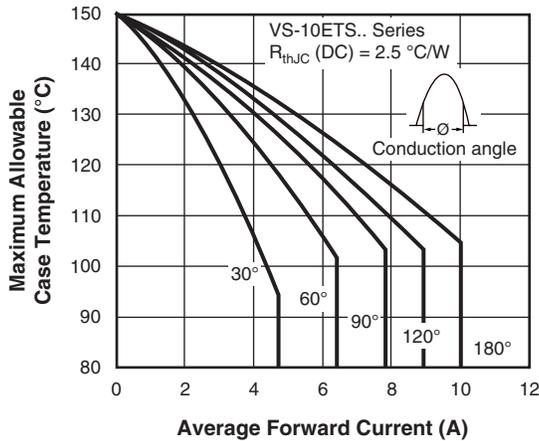


Fig. 1 - Current Rating Characteristics

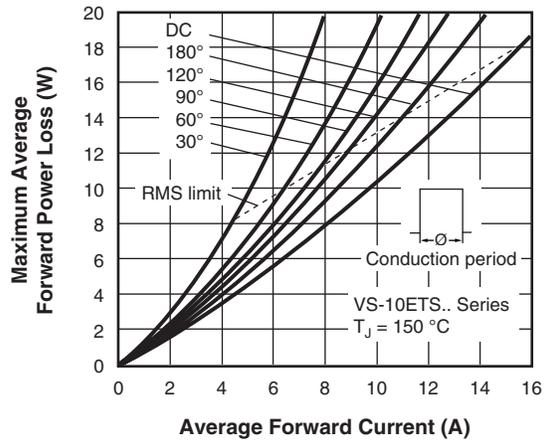


Fig. 4 - Forward Power Loss Characteristics

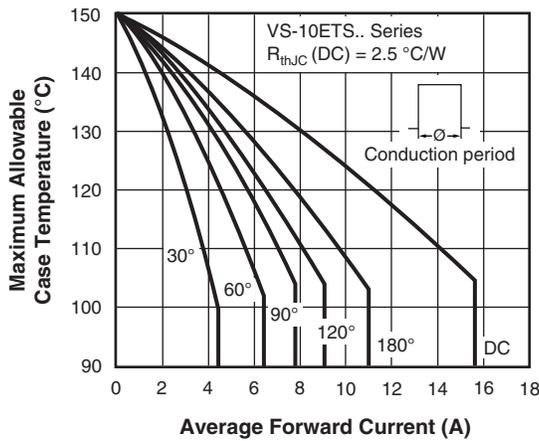


Fig. 2 - Current Rating Characteristics

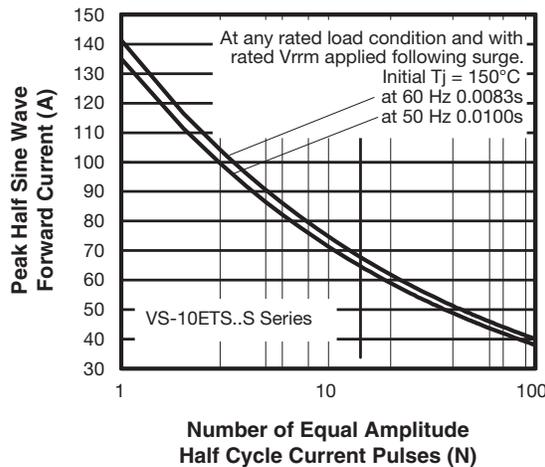


Fig. 5 - Maximum Non-Repetitive Surge Current

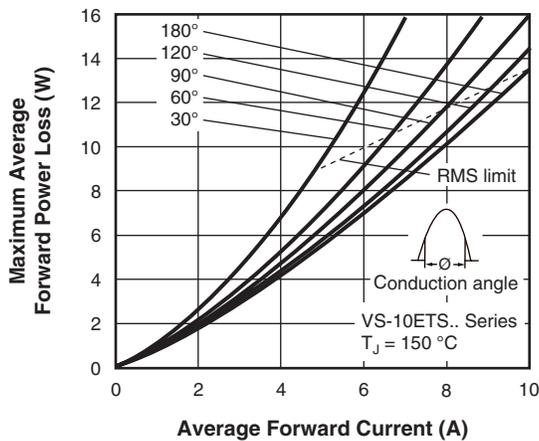


Fig. 3 - Forward Power Loss Characteristics

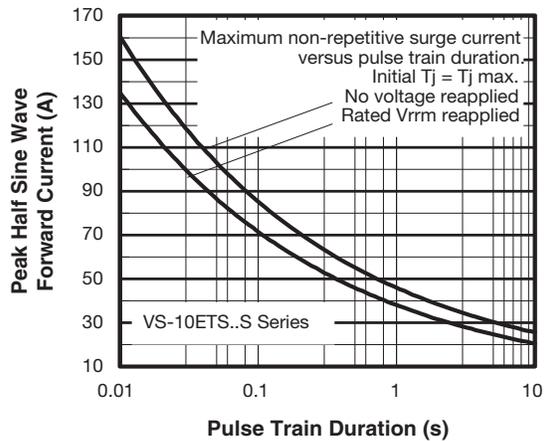


Fig. 6 - Maximum Non-Repetitive Surge Current

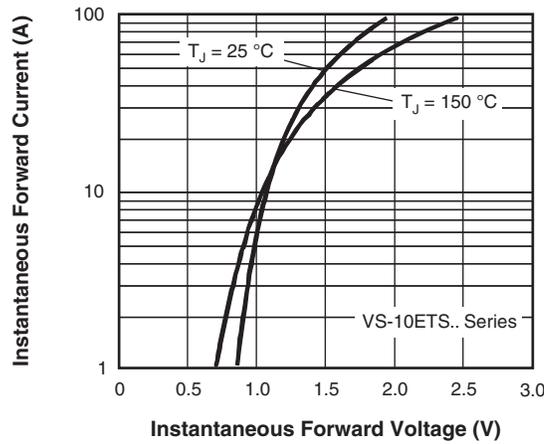


Fig. 7 - Forward Voltage Drop Characteristics

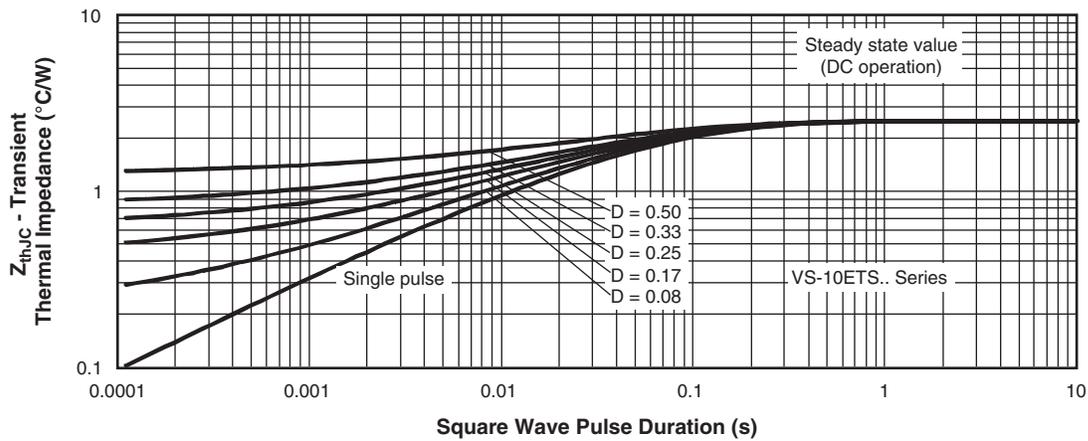
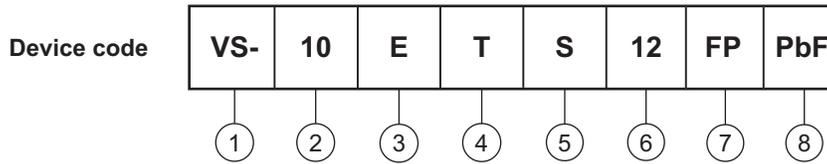


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



## ORDERING INFORMATION TABLE



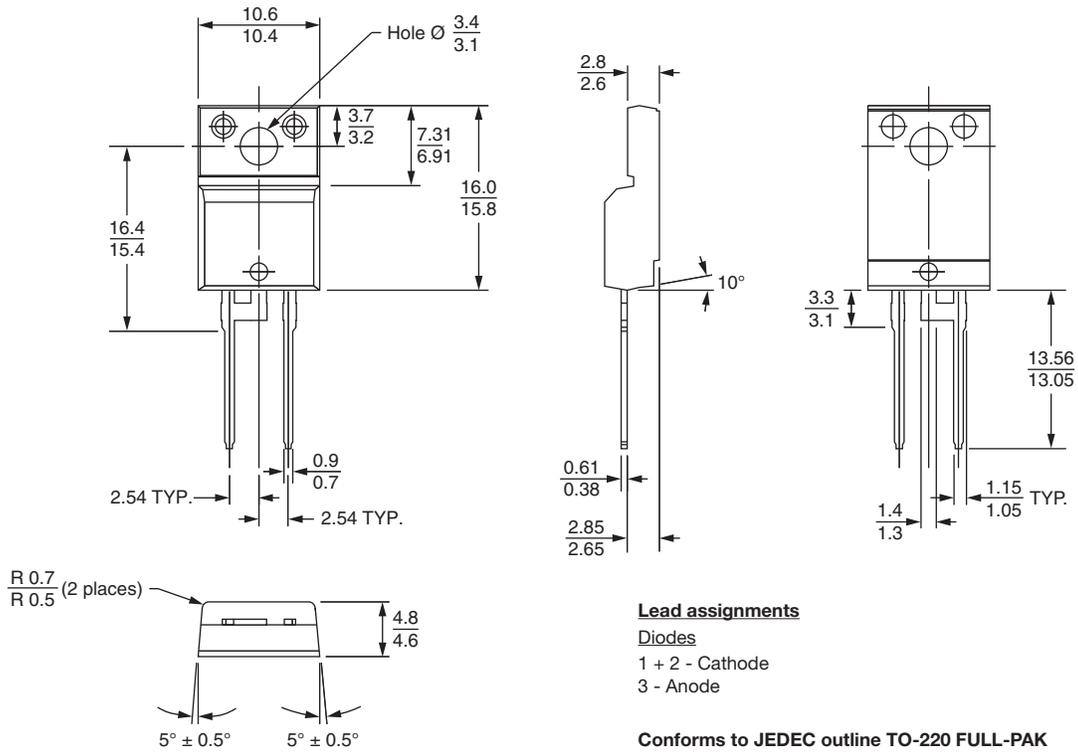
- 1** - Vishay Semiconductors product
- 2** - Current rating (10 = 10 A)
- 3** - Circuit configuration:  
E = Single diode
- 4** - Package:  
T = TO-220
- 5** - Type of silicon:  
S = Standard recovery rectifier
- 6** - Voltage rating 08 = 800 V  
12 = 1200 V
- 7** - FULL-PAK
- 8** - Environmental digit:  
PbF = Lead (Pb)-free and RoHS compliant  
-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-10ETS08FPPbF                | 50               | 1000                   | Antistatic plastic tubes |
| VS-10ETS08FP-M3                | 50               | 1000                   | Antistatic plastic tubes |
| VS-10ETS12FPPbF                | 50               | 1000                   | Antistatic plastic tubes |
| VS-10ETS12FP-M3                | 50               | 1000                   | Antistatic plastic tubes |

| LINKS TO RELATED DOCUMENTS |   |
|----------------------------|---|
| Dimensions                 | <a href="http://www.vishay.com/doc?95005">www.vishay.com/doc?95005</a>              |
| Part marking information   | TO-220FP PbF <a href="http://www.vishay.com/doc?95009">www.vishay.com/doc?95009</a> |
|                            | TO-220FP -M3 <a href="http://www.vishay.com/doc?95440">www.vishay.com/doc?95440</a> |



**DIMENSIONS** in millimeters





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