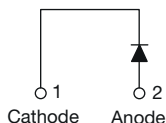


# High Voltage, Input Rectifier Diode, 10 A


**TO-220 FullPAK 2L**


## FEATURES

- Very low forward voltage drop
- 150 °C max. operating junction temperature
- Glass passivated pellet chip junction
- Designed and qualified according to JEDEC®-JESD 47
- Fully isolated package ( $V_{INS} = 2500 V_{RMS}$ )
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## 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).

## PRIMARY CHARACTERISTICS

|                       |                   |
|-----------------------|-------------------|
| $I_{F(AV)}$           | 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            |
| Package               | TO-220 FullPAK 2L |
| Circuit configuration | Single            |

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

**ABSOLUTE MAXIMUM RATINGS**

| 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     | $\text{A}^2\text{s}$        |
|   |               | 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   | $\text{A}^2\sqrt{\text{s}}$ |

**ELECTRICAL SPECIFICATIONS**

| 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     | $\text{m}\Omega$ |
| Threshold voltage               | $V_{F(TO)}$ |  | 0.82   | V                |
| Maximum reverse leakage current | $I_{RM}$    | $T_J = 25\text{ }^{\circ}\text{C}$       | 0.05   | mA               |
|                                 |             | $T_J = 150\text{ }^{\circ}\text{C}$      | 0.50   |                  |

**THERMAL - MECHANICAL SPECIFICATIONS**

| PARAMETER                                       | SYMBOL                            | TEST CONDITIONS                       | VALUES      | UNITS                  |
|---|-----------------------------------|---------------------------------------|-------------|------------------------|
| Maximum junction and storage temperature range  | T <sub>J</sub> , T <sub>Stg</sub> |                                       | -40 to +150 | °C                     |
| Maximum thermal resistance, junction to case    | R <sub>thJC</sub>                 | DC operation                          | 2.5         | °C/W                   |
| Maximum thermal resistance, junction to ambient | R <sub>thJA</sub>                 |                                       | 62          |                        |
| Typical thermal resistance, case to heatsink    | R <sub>thCS</sub>                 | Mounting surface, smooth, and greased | 0.5         |                        |
| Approximate weight                              |                                   |                                       | 2           | g                      |
|   |                                   |                                       | 0.07        | oz.                    |
| Mounting torque                                 | minimum                           |                                       | 6 (5)       | kgf · cm<br>(lbf · in) |
|   | maximum                           |                                       | 12 (10)     |                        |
| Marking device                                  |                                   | Case style TO-220 FullPAK 2L          | 10ETS08FP   |                        |
|   |                                   |                                       | 10ETS12FP   |                        |

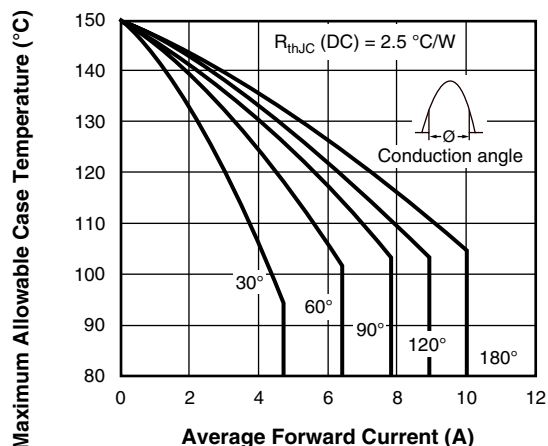


Fig. 1 - Current Rating Characteristics

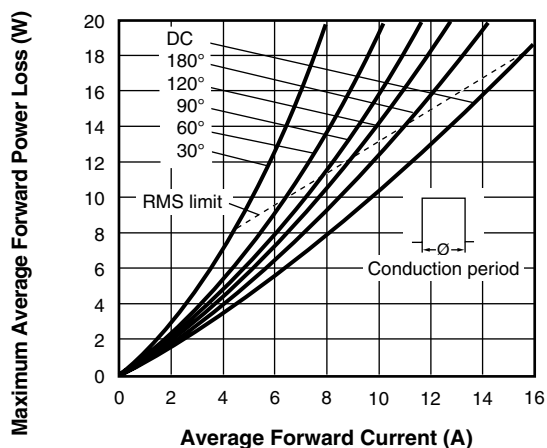


Fig. 4 - Forward Power Loss Characteristics

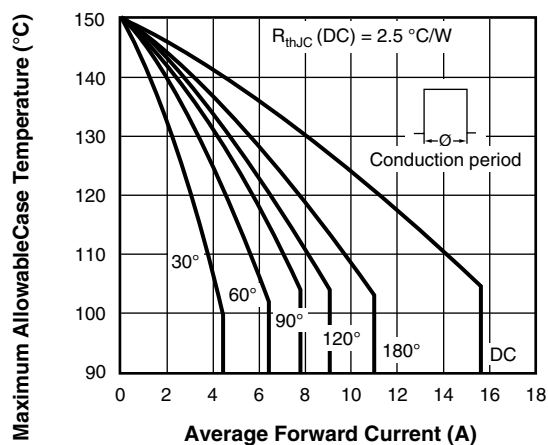


Fig. 2 - Current Rating Characteristics

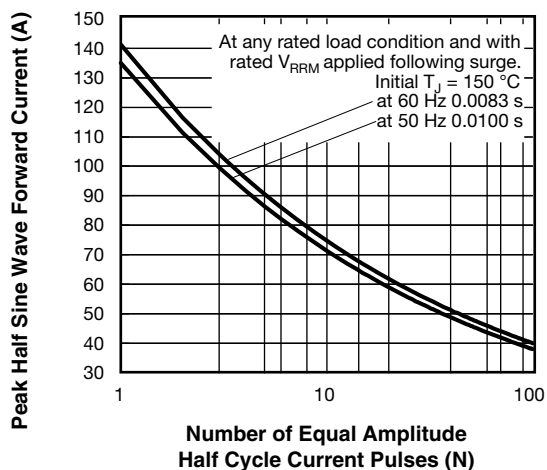


Fig. 5 - Maximum Non-Repetitive Surge Current

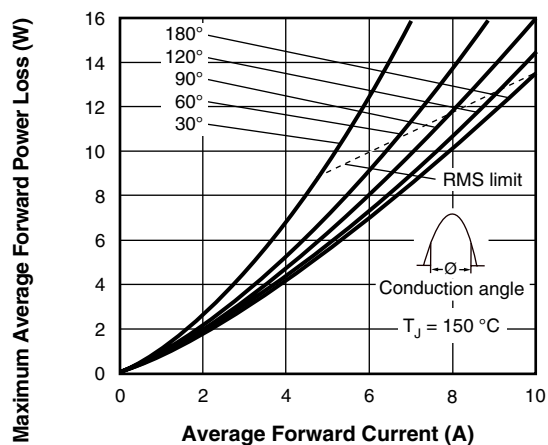


Fig. 3 - Forward Power Loss Characteristics

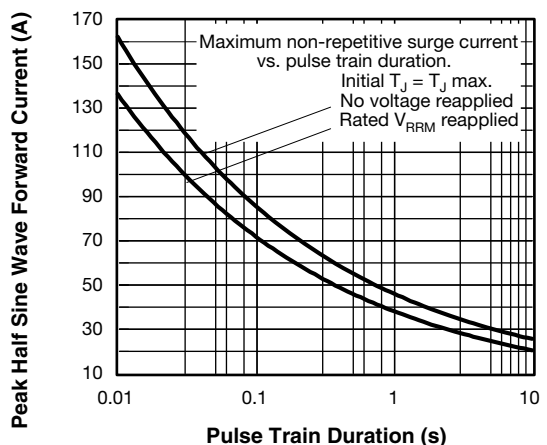


Fig. 6 - Maximum Non-Repetitive Surge Current

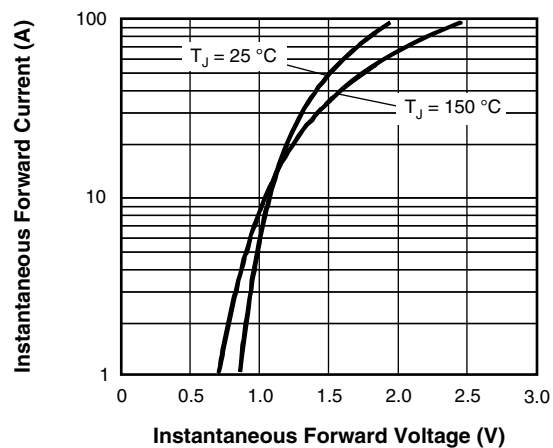
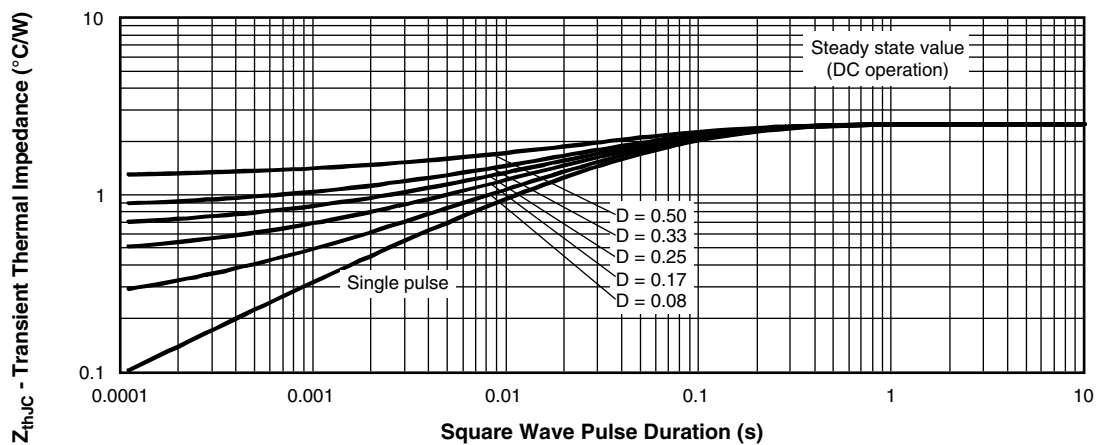


Fig. 7 - Forward Voltage Drop Characteristics


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

**ORDERING INFORMATION TABLE**

|             |            |           |          |          |          |           |           |            |
|-------------|------------|-----------|----------|----------|----------|-----------|-----------|------------|
| Device code | <b>VS-</b> | <b>10</b> | <b>E</b> | <b>T</b> | <b>S</b> | <b>12</b> | <b>FP</b> | <b>-M3</b> |
|             | 1          | 2         | 3        | 4        | 5        | 6         | 7         | 8          |

- 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** - FullPAK
- 8** - Environmental digit:  
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

| <b>ORDERING INFORMATION</b> (Example) |                  |                        |                          |
|---------------------------------------|------------------|------------------------|--------------------------|
| PREFERRED P/N                         | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION    |
| VS-10ETS08FP-M3                       | 50               | 1000                   | Antistatic plastic tubes |
| VS-10ETS12FP-M3                       | 50               | 1000                   | Antistatic plastic tubes |

| <b>LINKS TO RELATED DOCUMENTS</b> |  |
|-----------------------------------|--|
| Dimensions                        | <a href="http://www.vishay.com/doc?96157">www.vishay.com/doc?96157</a> |
| Part marking information          | <a href="http://www.vishay.com/doc?95392">www.vishay.com/doc?95392</a> |



## 2L TO-220 FullPAK

**DIMENSIONS** in millimeters





## Disclaimer

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