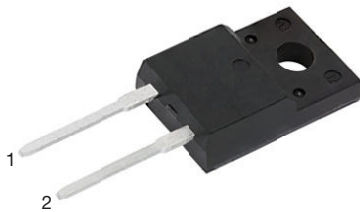
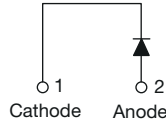




Fast Soft Recovery Rectifier Diode, 20 A



2L TO-220 FullPAK



FEATURES

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



RoHS
COMPLIANT
HALOGEN
FREE

| PRIMARY CHARACTERISTICS | |
|-------------------------|---------------------|
| $I_{F(AV)}$ | 20 A |
| V_R | 200 V, 400 V, 600 V |
| V_F at I_F | 1.3 V |
| I_{FSM} | 300 A |
| t_{rr} | 60 ns |
| T_J max. | 150 °C |
| Snap factor | 0.6 |
| Package | 2L TO-220 FullPAK |
| Circuit configuration | Single |

APPLICATIONS

These devices are intended for use in output rectification and freewheeling in inverters, choppers and converters as well as in input rectification where severe restrictions on conducted EMI should be met.

DESCRIPTION

The VS-20ETF0..FP... fast soft recovery rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|----------------------------|-------------|-------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Sinusoidal waveform | 20 | A |
| V_{RRM} | | 200 to 600 | V |
| I_{FSM} | | 300 | A |
| V_F | 10 A, $T_J = 25\text{ °C}$ | 1.2 | V |
| t_{rr} | 1 A, 100 A/ μ s | 60 | ns |
| T_J | | -40 to +150 | °C |

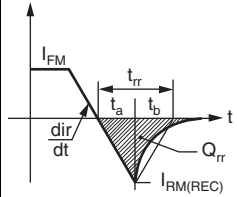
| VOLTAGE RATINGS | | | |
|-----------------|---|--|---------------------------|
| PART NUMBER | V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{RRM} AT 150 °C mA |
| VS-20ETF02FP-M3 | 200 | 300 | 5 |
| VS-20ETF04FP-M3 | 400 | 500 | |
| VS-20ETF06FP-M3 | 600 | 700 | |



| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|---------------|---|--------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | $T_C = 51\text{ }^\circ\text{C}$, 180° conduction half sine wave | 20 | A |
| Maximum peak one cycle non-repetitive surge current | I_{FSM} | 10 ms sine pulse, rated V_{RRM} applied | 250 | |
| | | 10 ms sine pulse, no voltage reapplied | 300 | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied | 316 | A^2s |
| | | 10 ms sine pulse, no voltage reapplied | 442 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1\text{ ms to }10\text{ ms}$, no voltage reapplied | 4420 | $A^2\sqrt{s}$ |

| ELECTRICAL SPECIFICATIONS | | | | |
|---------------------------------|-------------|--|--------|-----------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum forward voltage drop | V_{FM} | 20 A, $T_J = 25\text{ }^\circ\text{C}$ | 1.30 | V |
| | | 60 A, $T_J = 25\text{ }^\circ\text{C}$ | 1.67 | |
| Forward slope resistance | r_t | $T_J = 150\text{ }^\circ\text{C}$ | 12.5 | $m\Omega$ |
| Threshold voltage | $V_{F(TO)}$ | $T_J = 150\text{ }^\circ\text{C}$ | 0.9 | V |
| Maximum reverse leakage current | I_{RM} | $T_J = 25\text{ }^\circ\text{C}$ | 0.1 | mA |
| | | $T_J = 150\text{ }^\circ\text{C}$ | | |

| RECOVERY CHARACTERISTICS | | | | |
|--------------------------|----------|--|--------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Reverse recovery time | t_{rr} | I_F at 20 A_{pk} 100 $A/\mu s$ 25 $^\circ\text{C}$ | 160 | ns |
| Reverse recovery current | I_{rr} | | 10 | A |
| Reverse recovery charge | Q_{rr} | | 1.25 | μC |
| Snap factor | S | Typical | 0.6 | |



| THERMAL - MECHANICAL SPECIFICATIONS | | | | |
|---|----------------|---------------------------------------|-------------------------------------|--|
| 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) | $\text{kgf} \cdot \text{cm}$ ($\text{lbf} \cdot \text{in}$) |
| | maximum | | 12 (10) | |
| Marking device | | Case style 2L TO-220 FullPAK | 20ETF02FP 20ETF04FP 20ETF06FP | |

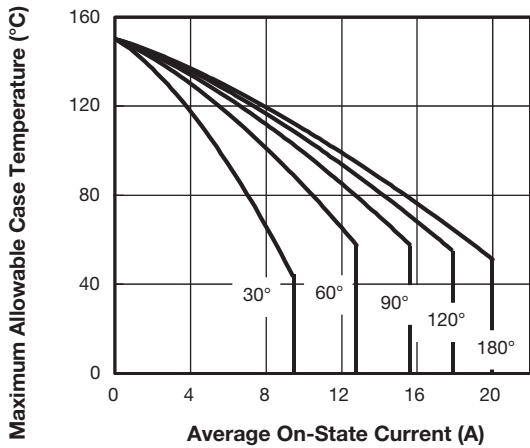


Fig. 1 - Current Rating Characteristics

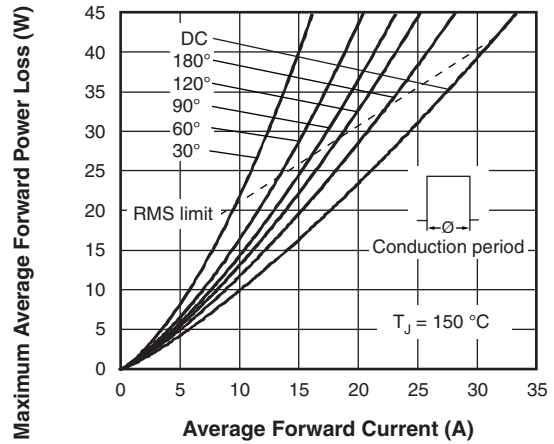


Fig. 4 - Forward Power Loss Characteristics

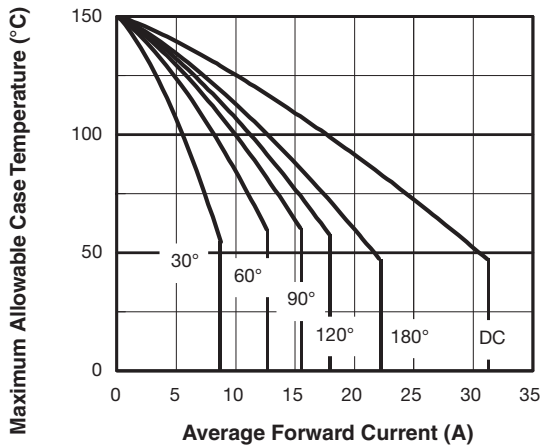


Fig. 2 - Current Rating Characteristics

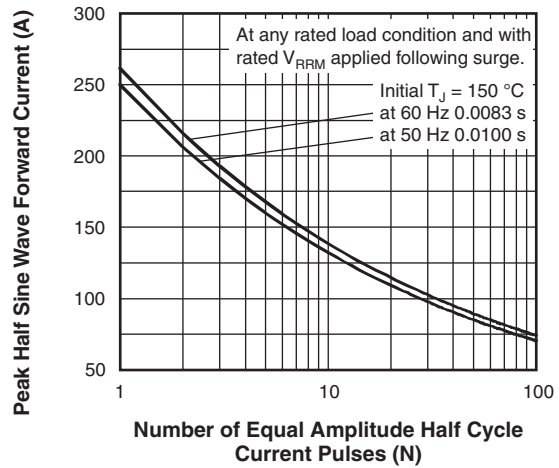


Fig. 5 - Maximum Non-Repetitive Surge Current

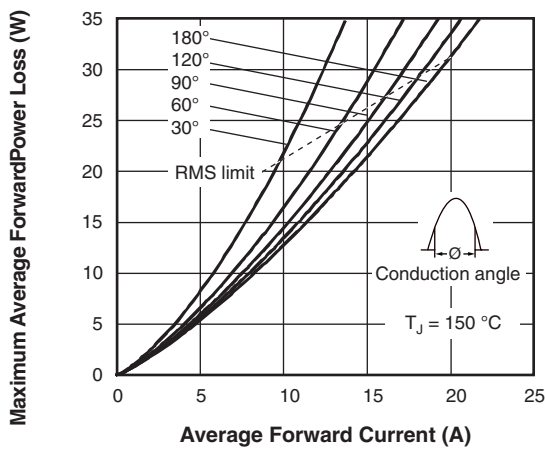


Fig. 3 - Forward Power Loss Characteristics

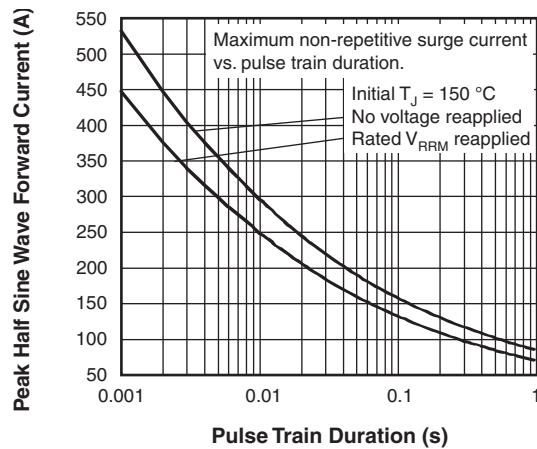


Fig. 6 - Maximum Non-Repetitive Surge Current

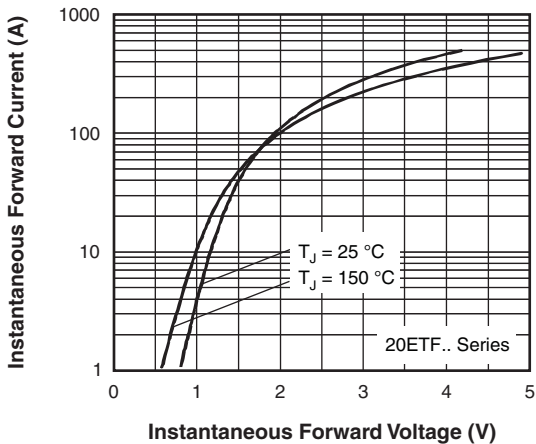


Fig. 7 - Forward Voltage Drop Characteristics

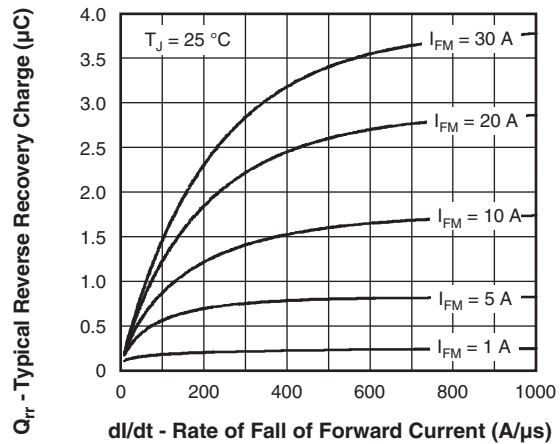


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

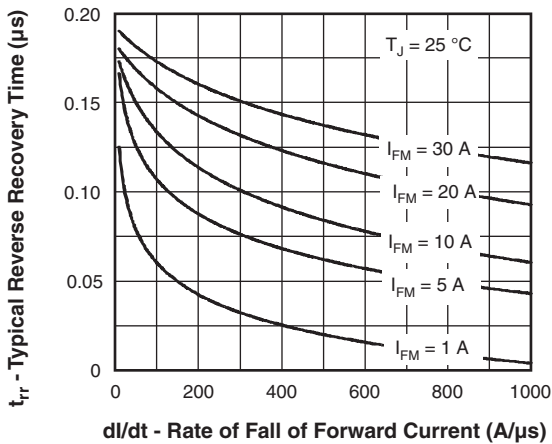


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

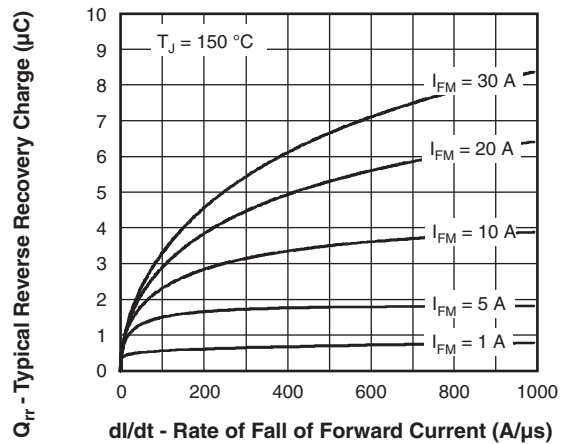


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

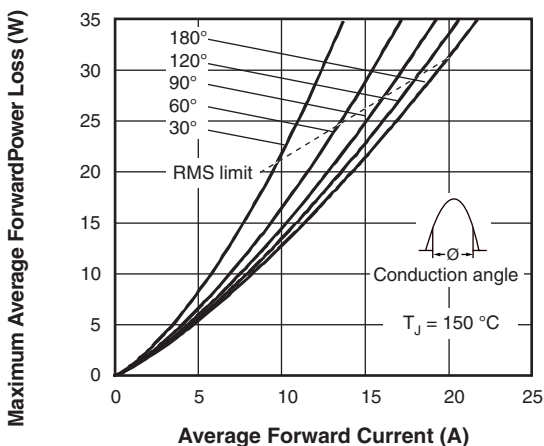


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

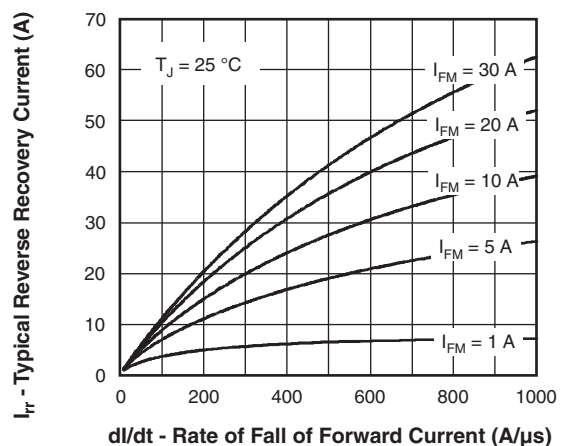


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

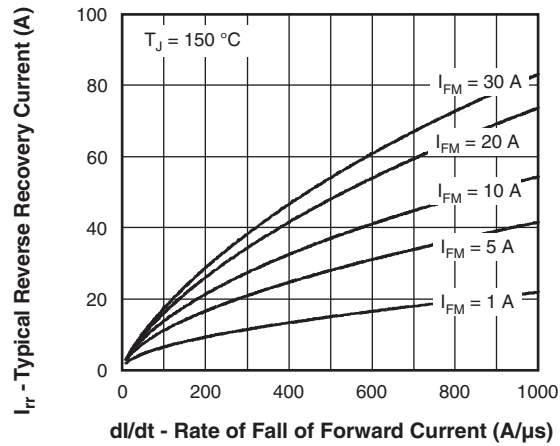


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^\circ\text{C}$

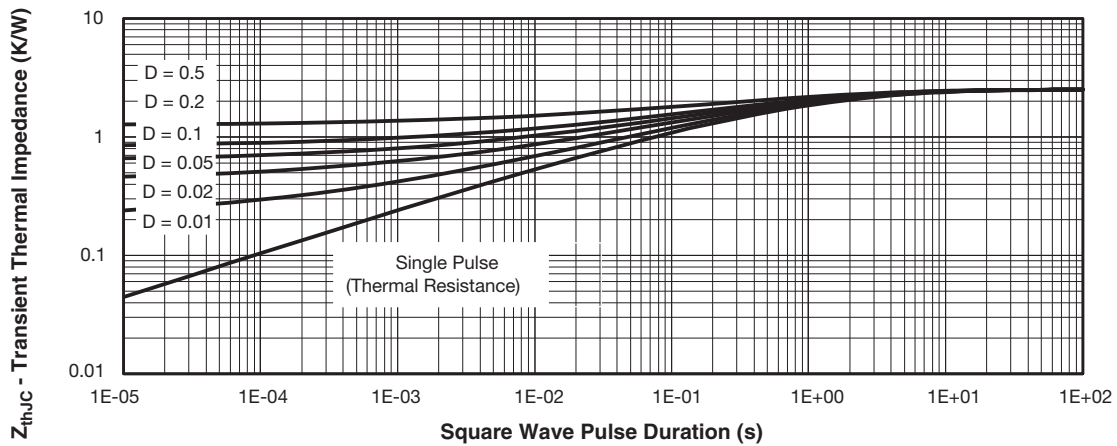
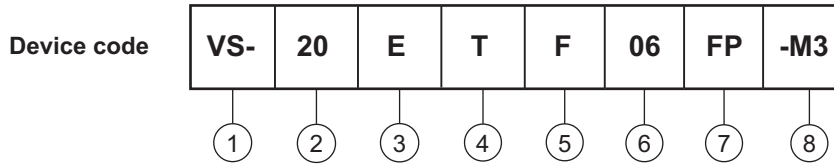


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (20 = 20 A)
- 3** - Circuit configuration:
E = single diode
- 4** - Package:
T = TO-220
- 5** - Type of silicon:
F = fast soft recovery rectifier
- 6** - Voltage code x 100 = V_{RRM}

| |
|------------|
| 02 = 200 V |
| 04 = 400 V |
| 06 = 600 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-20ETF02FP-M3 | 50 | 1000 | Antistatic plastic tubes |
| VS-20ETF04FP-M3 | 50 | 1000 | Antistatic plastic tubes |
| VS-20ETF06FP-M3 | 50 | 1000 | Antistatic plastic tubes |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?96157 |
| Part marking information | www.vishay.com/doc?95392 |
| SPIICE model | www.vishay.com/doc?95410 |



2L TO-220 FullPAK

DIMENSIONS in millimeters



Bottom view





Disclaimer

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