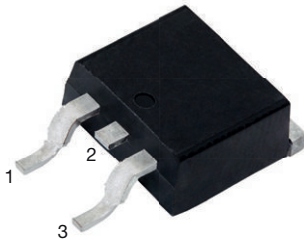
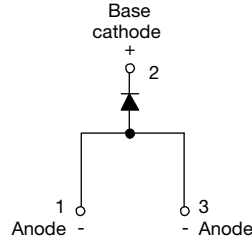




Surface Mount Fast Soft Recovery Rectifier Diode, 20 A



D²PAK (TO-263AB)



FEATURES

- Glass passivated pellet chip junction
- Designed and qualified according to JEDEC®-JESD 47
- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

DESCRIPTION

The VS-20ETF..S-M3 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.

| PRIMARY CHARACTERISTICS | |
|-------------------------|-------------------------------|
| $I_{F(AV)}$ | 20 A |
| V_R | 800 V, 1000 V, 1200 V |
| V_F at I_F | 1.31 V |
| I_{FSM} | 355 A |
| t_{rr} | 95 ns |
| T_J max. | 150 °C |
| Snap factor | 0.6 |
| Package | D ² PAK (TO-263AB) |
| Circuit configuration | Single |

LINKS TO ADDITIONAL RESOURCES



| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|---------------------|-------------|-------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Sinusoidal waveform | 20 | A |
| V_{RRM} | | 800 to 1200 | V |
| I_{FSM} | | 355 | A |
| V_F | 20 A, $T_J = 25$ °C | 1.31 | V |
| t_{rr} | 1 A, 100 A/ μ s | 95 | ns |
| T_J | Range | -40 to +150 | °C |

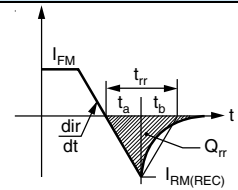
| VOLTAGE RATINGS | | | |
|-----------------|---|--|---------------------------|
| PART NUMBER | V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{RRM} AT 150 °C mA |
| 20ETF08S-M3 | 800 | 900 | 6 |
| 20ETF10S-M3 | 1000 | 1100 | |
| 20ETF12S-M3 | 1200 | 1300 | |

| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|---------------|---|--------|-------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | $T_C = 97$ °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 | 300 | |
| | | 10 ms sine pulse, no voltage reapplied | 355 | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied | 450 | A ² s |
| | | 10 ms sine pulse, no voltage reapplied | 635 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1$ ms to 10 ms, no voltage reapplied | 6350 | A ² /s |



| ELECTRICAL SPECIFICATIONS | | | | | |
|---------------------------------|-------------|--|-------------------------------|--------|------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop | V_{FM} | 20 A, $T_J = 25\text{ }^\circ\text{C}$ | | 1.31 | V |
| Forward slope resistance | r_t | $T_J = 150\text{ }^\circ\text{C}$ | | 11.88 | m Ω |
| Threshold voltage | $V_{F(TO)}$ | | | | |
| Maximum reverse leakage current | I_{RM} | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{rated } V_{RRM}$ | 0.1 | mA |
| | | $T_J = 150\text{ }^\circ\text{C}$ | | 6 | |

| RECOVERY CHARACTERISTICS | | | | |
|--------------------------|----------|---|--------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Reverse recovery time | t_{rr} | I_F at 20 A _{pk} 25 A/ μ s 25 $^\circ\text{C}$ | 400 | ns |
| Reverse recovery current | I_{rr} | | 6.1 | A |
| Reverse recovery charge | Q_{rr} | | 1.7 | 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 | 0.9 | $^\circ\text{C/W}$ |
| Maximum thermal resistance, junction to ambient (PCB mount) | $R_{thJA}^{(1)}$ | | 62 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Marking device | | Case style D ² PAK (TO-263AB) | 20ETF08S | |
| | | | 20ETF10S | |
| | | | 20ETF12S | |

Note

(1) When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μ m) copper 40 $^\circ\text{C/W}$. For recommended footprint and soldering techniques refer to application note #AN-994

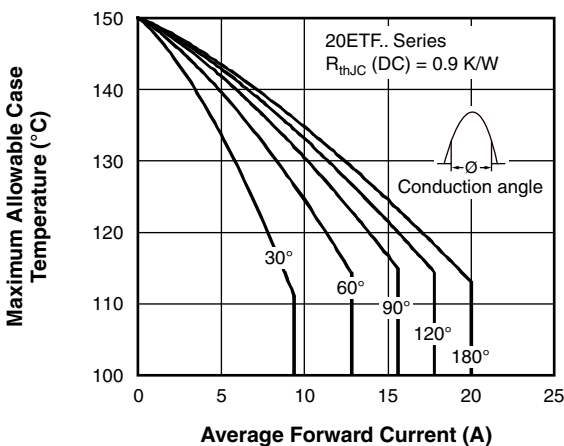


Fig. 1 - Current Rating Characteristics

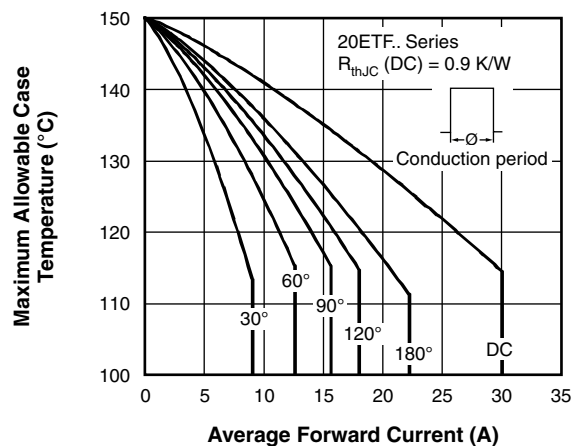


Fig. 2 - Current Rating Characteristics

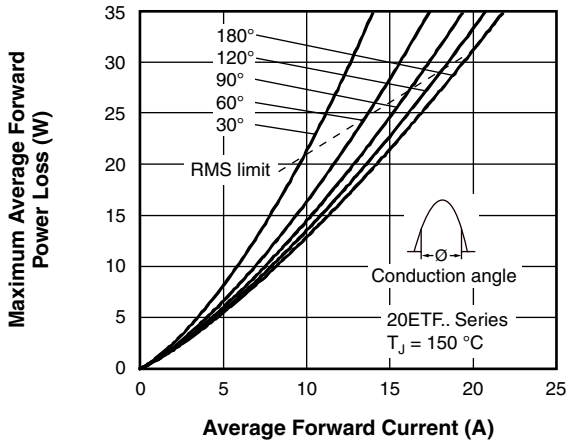


Fig. 3 - Forward Power Loss Characteristics

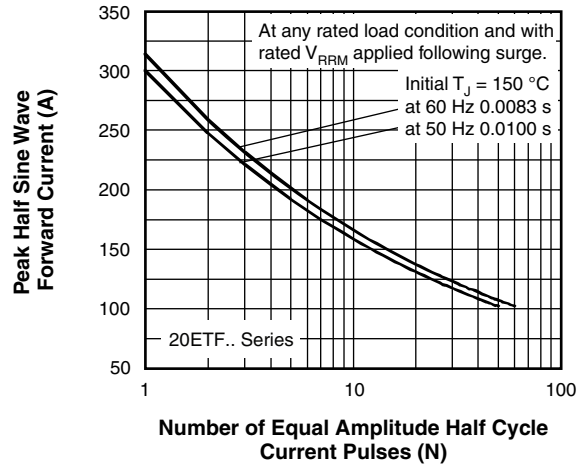


Fig. 5 - Maximum Non-Repetitive Surge Current

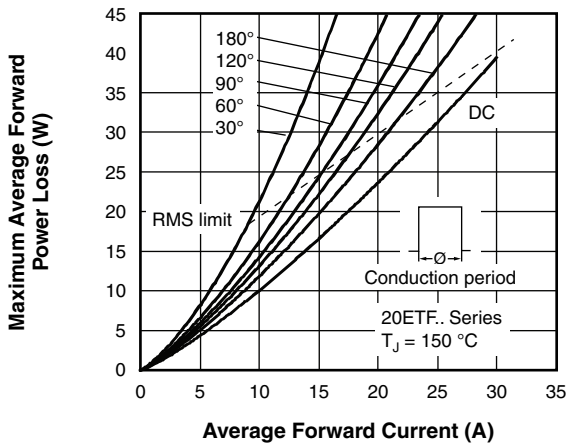


Fig. 4 - Forward Power Loss Characteristics

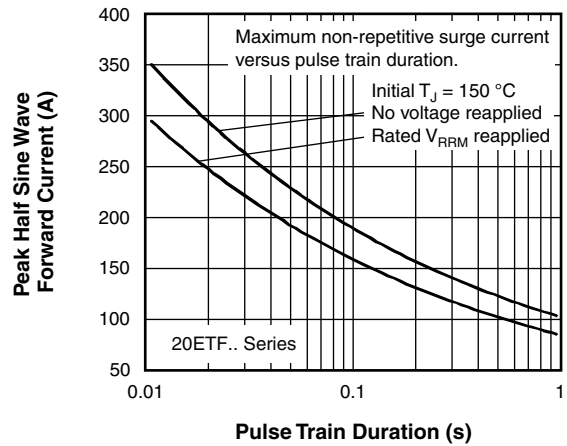


Fig. 6 - Maximum Non-Repetitive Surge Current

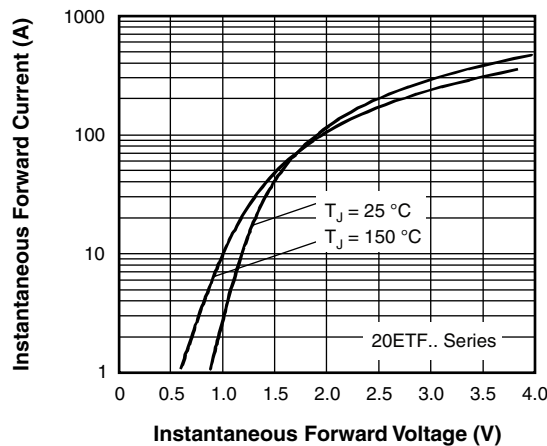


Fig. 7 - Forward Voltage Drop Characteristics

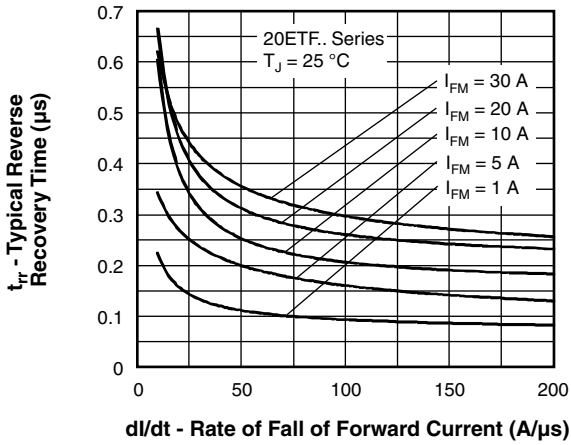


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^\circ\text{C}$

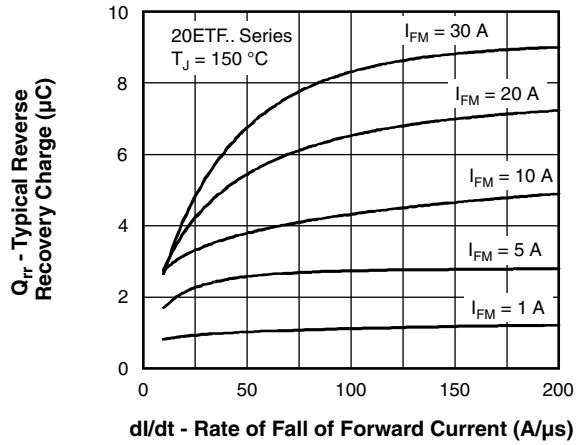


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^\circ\text{C}$

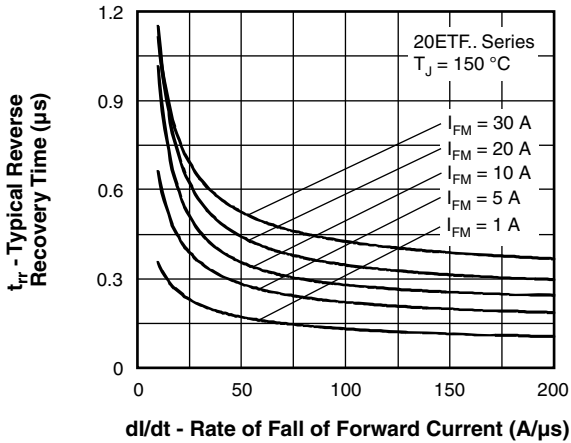


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^\circ\text{C}$

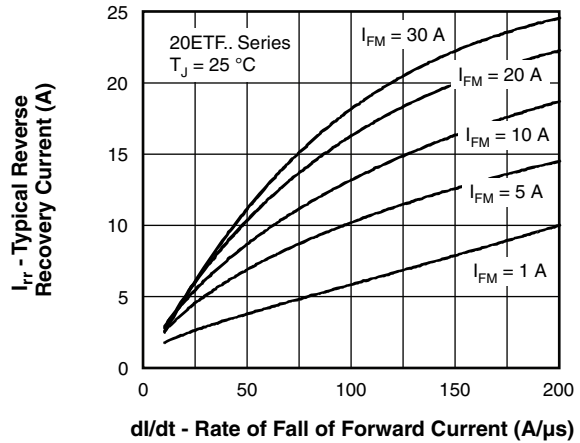


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^\circ\text{C}$

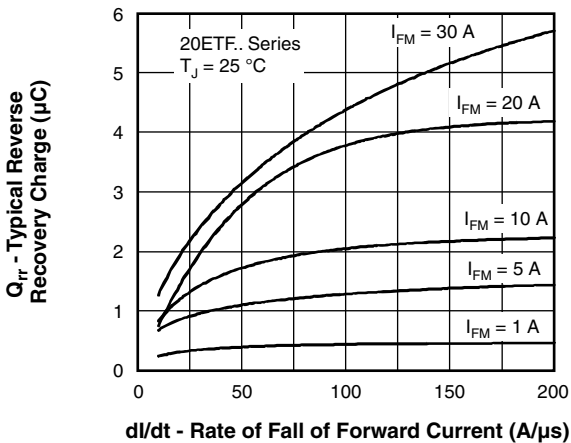


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^\circ\text{C}$

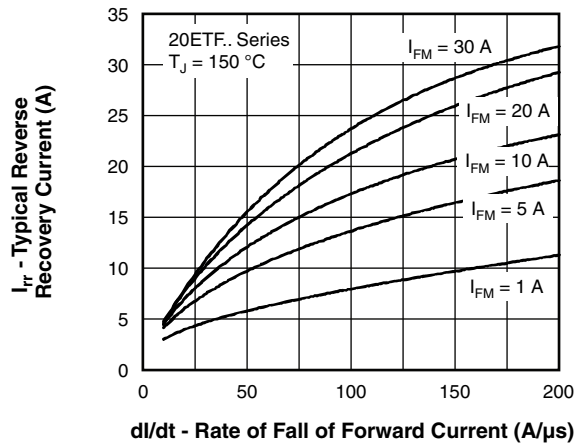


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^\circ\text{C}$

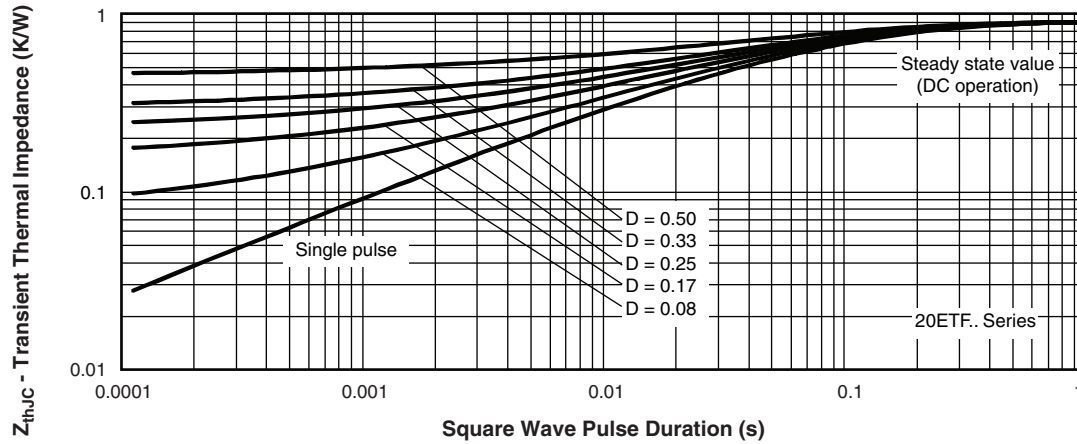


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

| | | | | | | | | | |
|-------------|------------|-----------|----------|----------|----------|-----------|----------|------------|------------|
| Device code | VS- | 20 | E | T | F | 12 | S | TRL | -M3 |
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ |

- 1** - Vishay Semiconductors product
- 2** - Current rating (20 = 20 A)
- 3** - Circuit configuration:
E = single
- 4** - Package:
T = D²PAK (TO-263AB)
- 5** - Type of silicon:
F = fast soft recovery rectifier
- 6** - Voltage code x 100 = V_{RRM}

| |
|-------------|
| 08 = 800 V |
| 10 = 1000 V |
| 12 = 1200 V |
- 7** - S = surface mountable
- 8** -
 - None = tube
 - TRR = tape and reel (right oriented)
 - TRL = tape and reel (left oriented)
- 9** - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free



VS-20ETF08S-M3, VS-20ETF10S-M3, VS-20ETF12S-M3

www.vishay.com

Vishay Semiconductors

| ORDERING INFORMATION (Example) | | |
|---------------------------------------|-----------------------|------------------------------------|
| PREFERRED P/N | BASSE QUANTITY | PACKAGING DESCRIPTION |
| VS-20ETF08S-M3 | 50 | Antistatic plastic tubes |
| VS-20ETF08STRR-M3 | 800 | 13" diameter plastic tape and reel |
| VS-20ETF08STRL-M3 | 800 | 13" diameter plastic tape and reel |
| VS-20ETF10S-M3 | 50 | Antistatic plastic tubes |
| VS-20ETF10STRR-M3 | 800 | 13" diameter plastic tape and reel |
| VS-20ETF10STRL-M3 | 800 | 13" diameter plastic tape and reel |
| VS-20ETF12S-M3 | 50 | Antistatic plastic tubes |
| VS-20ETF12STRR-M3 | 800 | 13" diameter plastic tape and reel |
| VS-20ETF12STRL-M3 | 800 | 13" diameter plastic tape and reel |

| LINKS TO RELATED DOCUMENTS | |
|-----------------------------------|--|
| Dimensions | www.vishay.com/doc?96164 |
| Part marking information | www.vishay.com/doc?95444 |
| Packaging information | www.vishay.com/doc?96424 |
| SPICE model | www.vishay.com/doc?96669 |



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