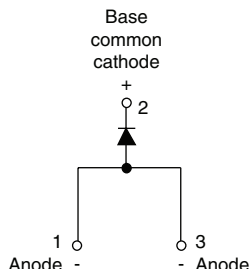


Surface Mountable Fast Soft Recovery Rectifier Diode, 20 A



D²PAK (SMD-220)



FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level



RoHS
COMPLIANT
HALOGEN
FREE

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..SPbF 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.

PRODUCT SUMMARY

V_F at 10 A	< 1.2 V
I_{FSM}	300 A
V_{RRM}	200 V to 600 V

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	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
VS-20ETF02SPbF	200	300	5
VS-20ETF04SPbF	400	500	
VS-20ETF06SPbF	600	700	

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 97\text{ °C}$, 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 ² s
		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 /s

VS-20ETF..SPbF Soft Recovery Series

Vishay High Power Products Surface Mountable Fast Soft Recovery Rectifier Diode, 20 A



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			12.5	m Ω
Threshold voltage	$V_{F(TO)}$	$T_J = 150\text{ }^{\circ}\text{C}$		0.9	V
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^{\circ}\text{C}$		5.0	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 20 Apk 100 A/ μ s 25 $^{\circ}\text{C}$	160	ns	
Reverse recovery current	I_{rr}		10	A	
Reverse recovery charge	Q_{rr}		1.25	μ C	
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)	$R_{thJA}^{(1)}$		40	
Soldering temperature	T_S		240	$^{\circ}\text{C}$
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D ² PAK (SMD-220)	20ETF02S	
			20ETF04S	
			20ETF06S	

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.

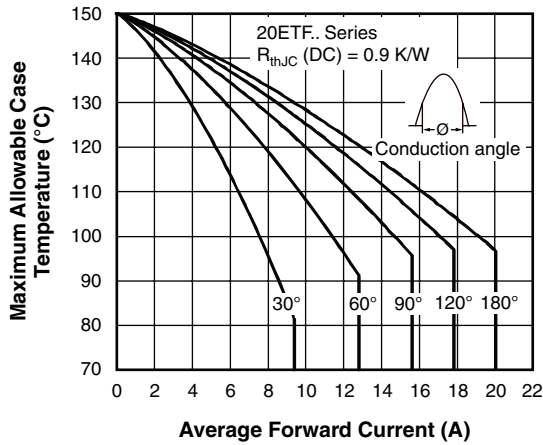


Fig. 1 - Current Rating Characteristics

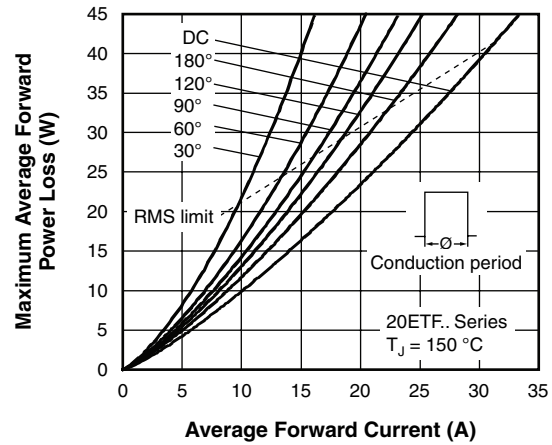


Fig. 4 - Forward Power Loss Characteristics

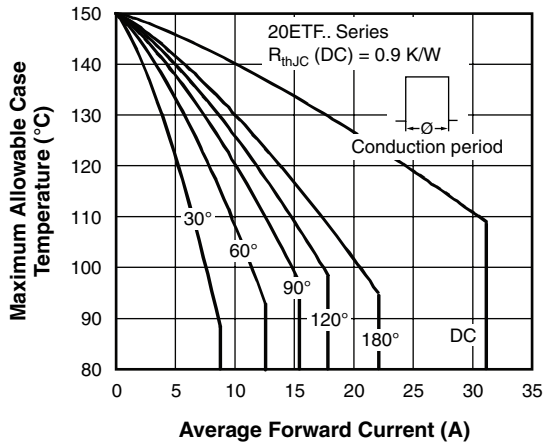


Fig. 2 - Current Rating Characteristics

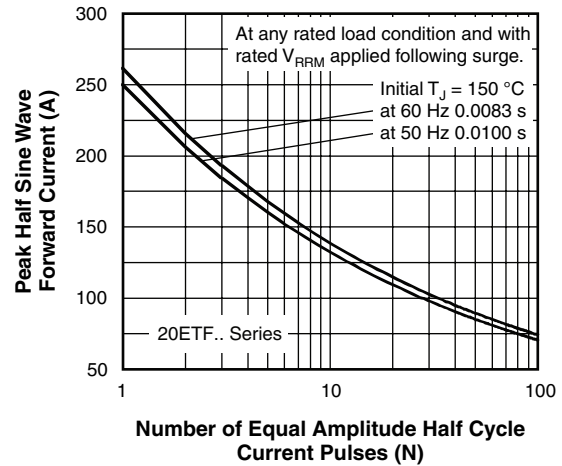


Fig. 5 - Maximum Non-Repetitive Surge Current

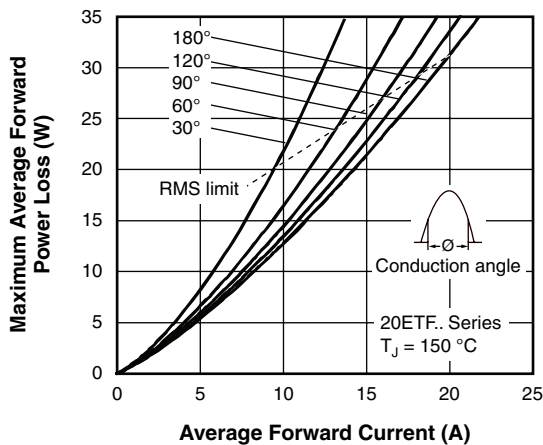


Fig. 3 - Forward Power Loss Characteristics

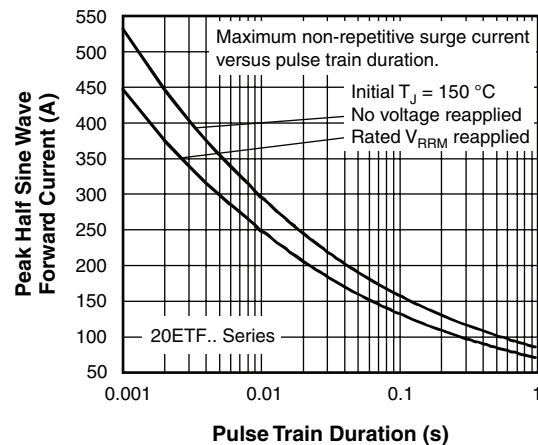


Fig. 6 - Maximum Non-Repetitive Surge Current

VS-20ETF..SPbF Soft Recovery Series



Vishay High Power Products Surface Mountable Fast Soft Recovery Rectifier Diode, 20 A

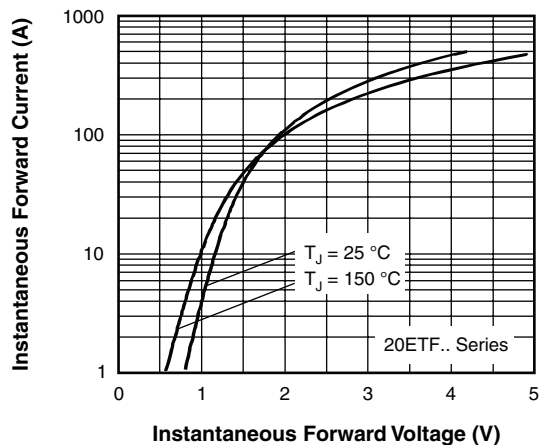


Fig. 7 - Forward Voltage Drop Characteristics

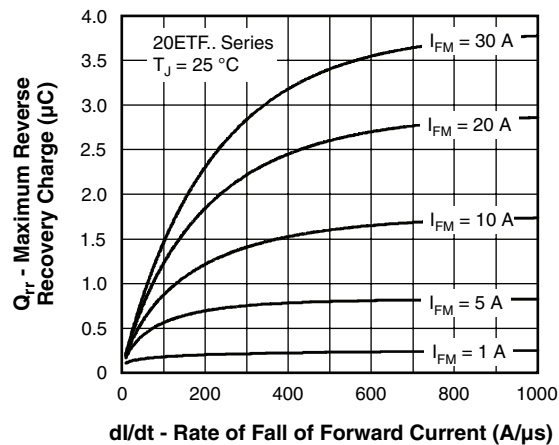


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ °C}$

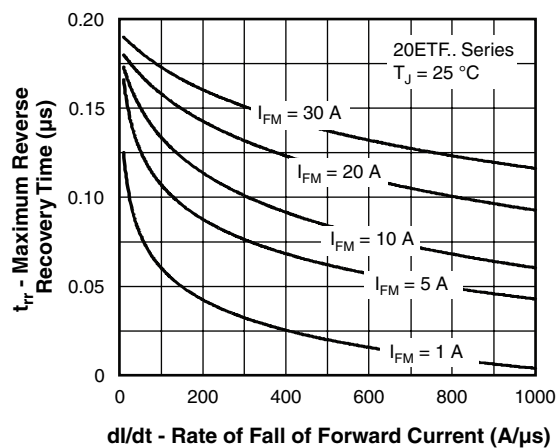


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ °C}$

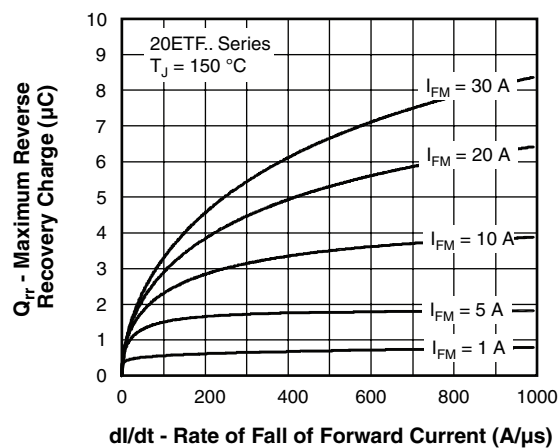


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ °C}$

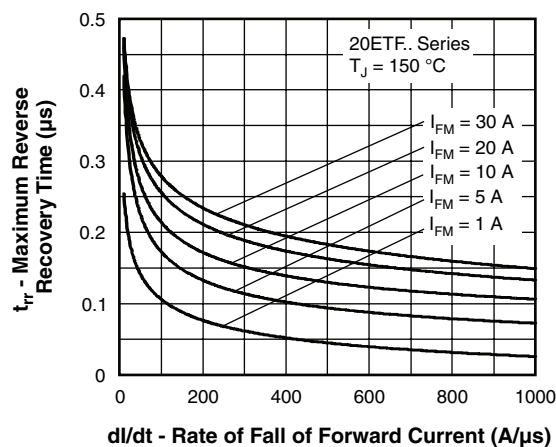


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ °C}$

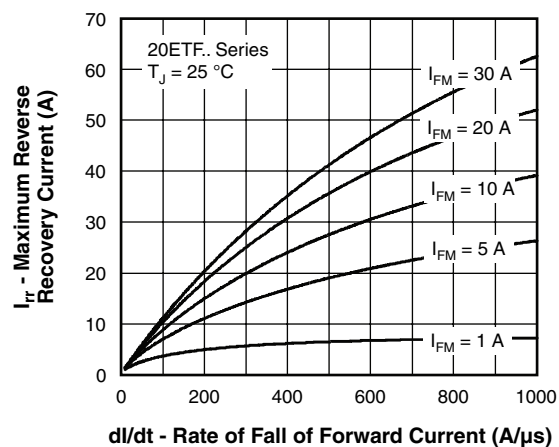


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ °C}$

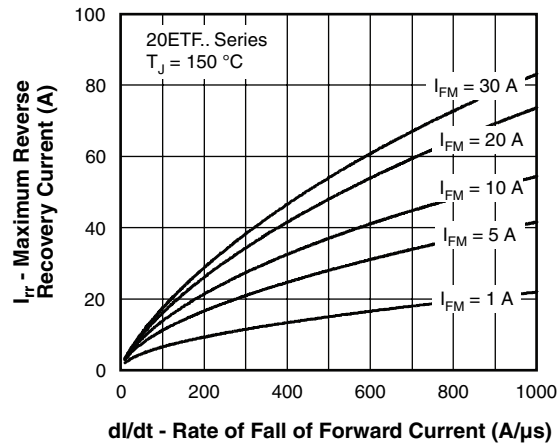


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^{\circ}\text{C}$

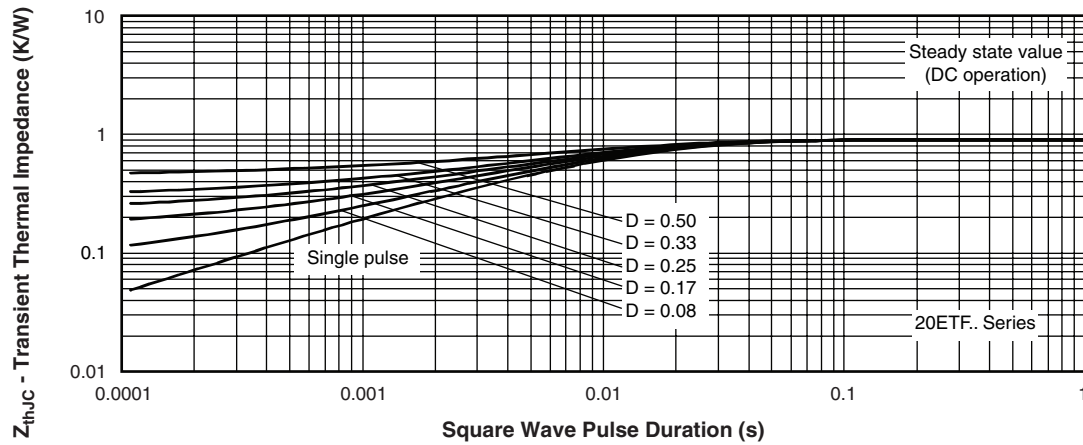


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

VS-20ETF..SPbF Soft Recovery Series

Vishay High Power Products Surface Mountable Fast Soft
Recovery Rectifier Diode, 20 A



ORDERING INFORMATION TABLE

Device code	VS-	20	E	T	F	06	S	TRL	PbF
	1	2	3	4	5	6	7	8	9

- | | | | |
|----------|---|--|--|
| 1 | - | HPP product suffix | |
| 2 | - | Current rating (20 = 20 A) | |
| 3 | - | Circuit configuration:
E = Single diode | |
| 4 | - | Package:
T = D ² PAK (TO-220AC) | |
| 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 | - | S = Surface mountable | |
| 8 | - | • None = Tube
• TRR = Tape and reel (right oriented)
• TRL = Tape and reel (left oriented) | |
| 9 | - | PbF = Lead (Pb)-free | |

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95046
Part marking information	www.vishay.com/doc?95054
Packaging information	www.vishay.com/doc?95032



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