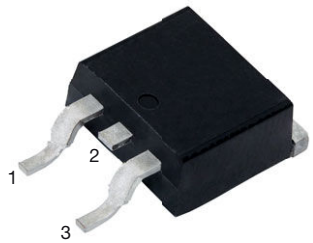
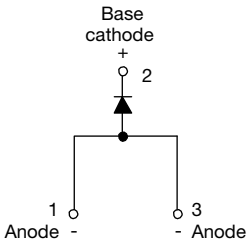
VS-20ETF08S-M3, VS-20ETF10S-M3, VS-20ETF12S-M3

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

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..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	D²PAK (TO-263AB)
Circuit configuration	Single

ADDITIONAL RESOURCES

3D Models

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/µs	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	

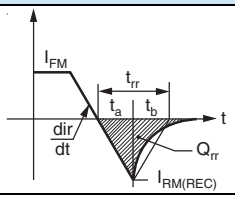
ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 97 °C, 180° conduction half sine wave	20	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	300	
		10 ms sine pulse, no voltage reapplied	355	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	450	A^2s
		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	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	20 A, T_J = 25 °C		1.31	V
Forward slope resistance	r_t	T_J = 150 °C		11.88	mΩ
Threshold voltage	$V_{F(TO)}$			0.93	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = rated V_{RRM}	0.1	mA
		T_J = 150 °C		6	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	t_{rr}	I_F at 20 A_{pk} 25 A/µs 25 °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	°C
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.9	°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^2PAK (TO-263AB)	20ETF08S	
			20ETF10S	
			20ETF12S	

Note

(1) When mounted on 1" square (650 mm^2) PCB of FR-4 or G-10 material 4 oz. (140 µm) copper 40 °C/W.
For recommended footprint and soldering techniques refer to application note #AN-994

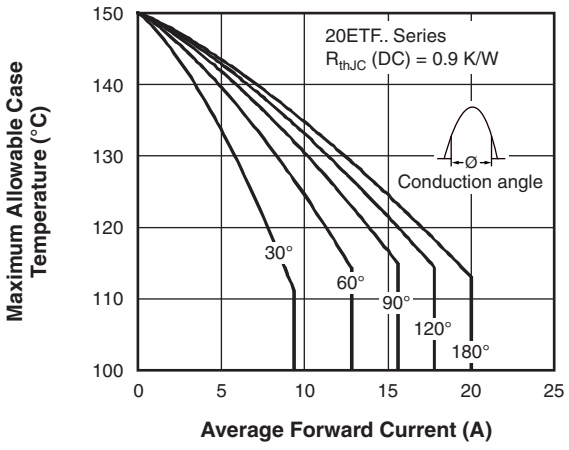


Fig. 1 - Current Rating Characteristics

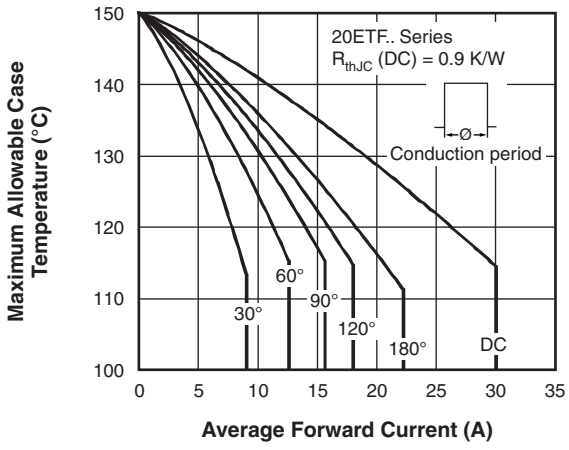


Fig. 2 - Current Rating Characteristics

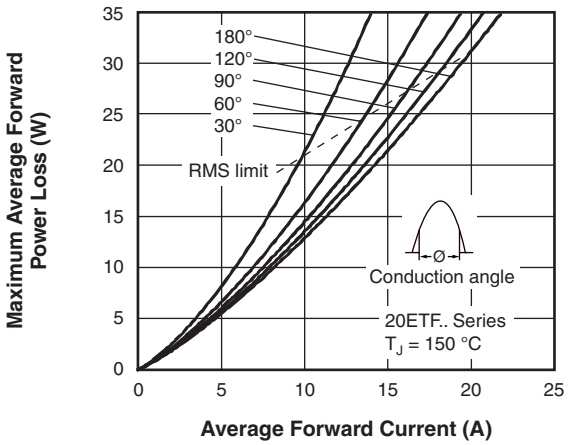


Fig. 3 - Forward Power Loss Characteristics

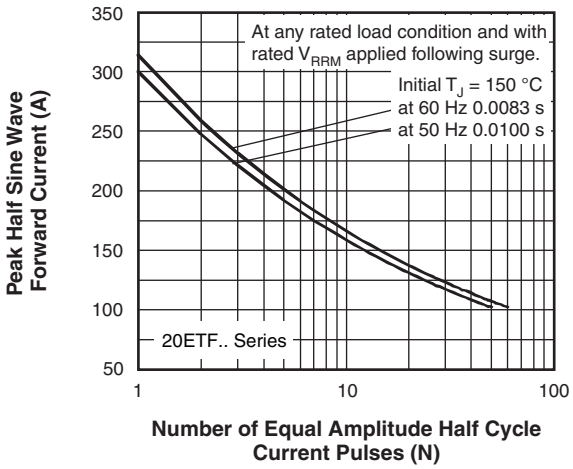


Fig. 5 - Maximum Non-Repetitive Surge Current

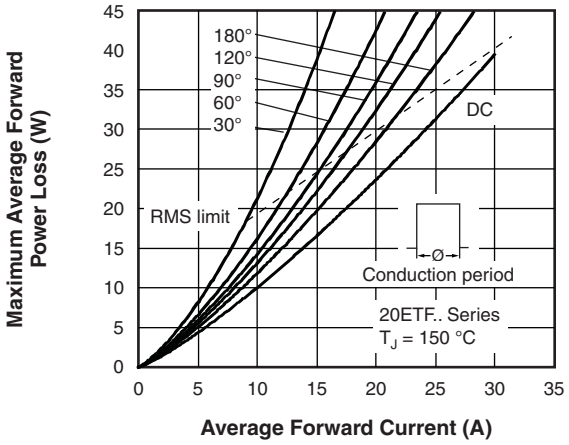


Fig. 4 - Forward Power Loss Characteristics

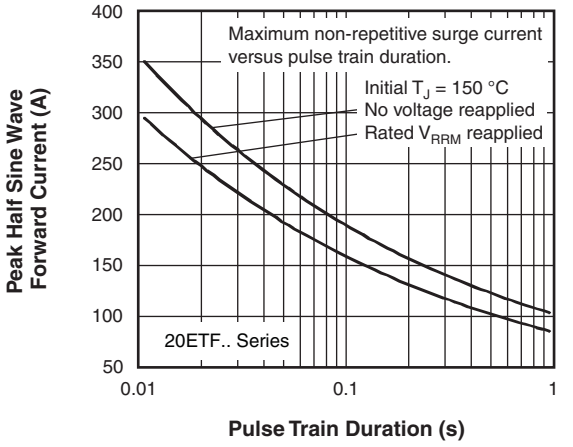


Fig. 6 - Maximum Non-Repetitive Surge Current

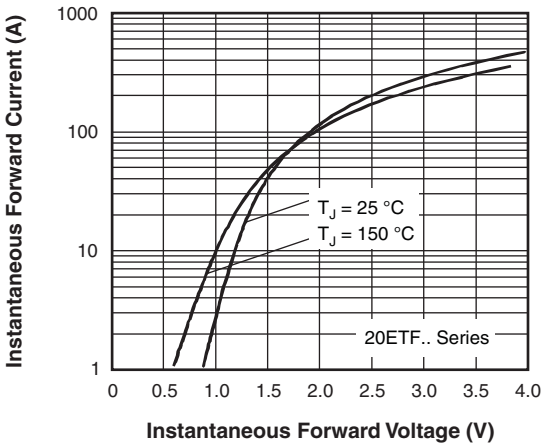


Fig. 7 - Forward Voltage Drop Characteristics

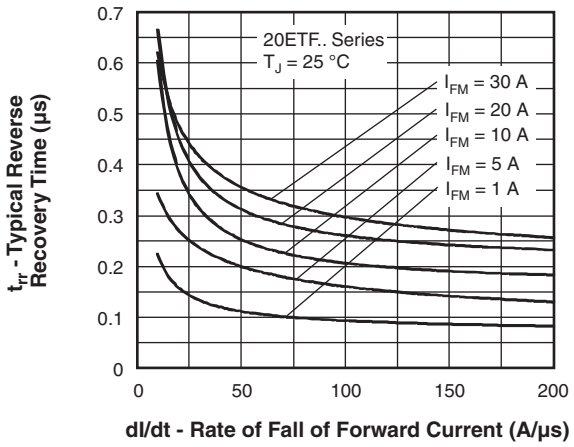


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

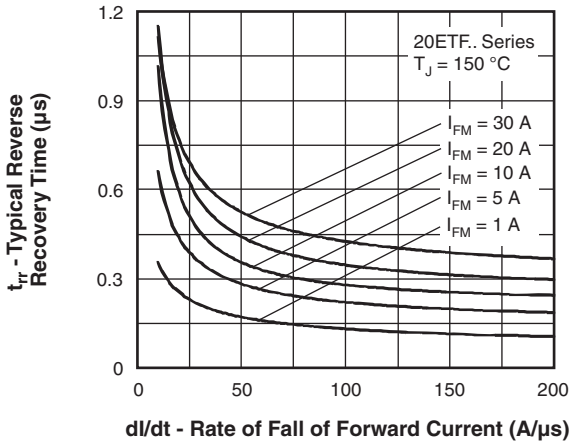


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

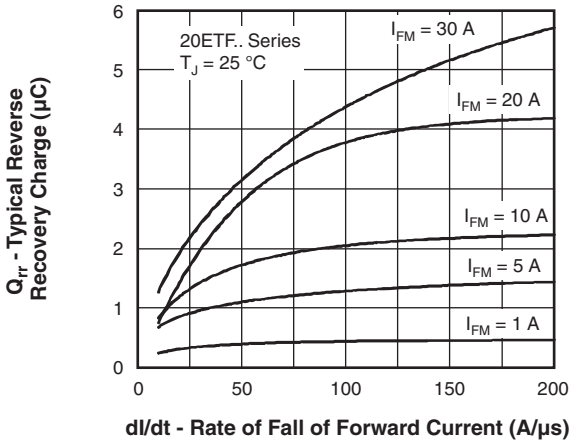


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

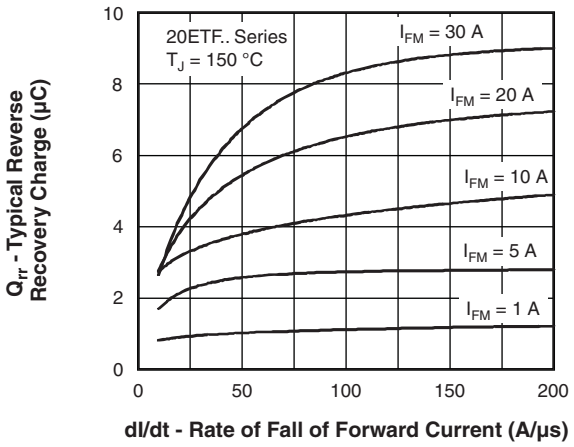


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

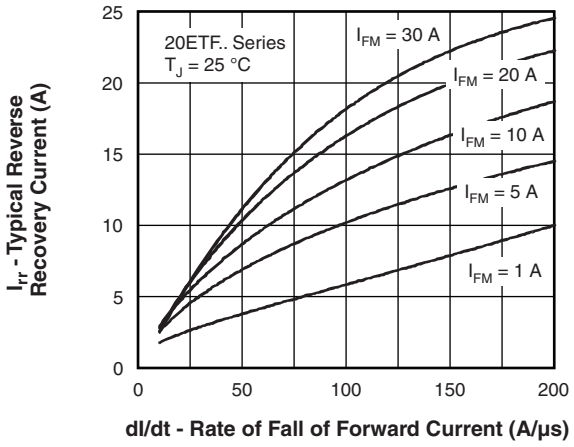


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

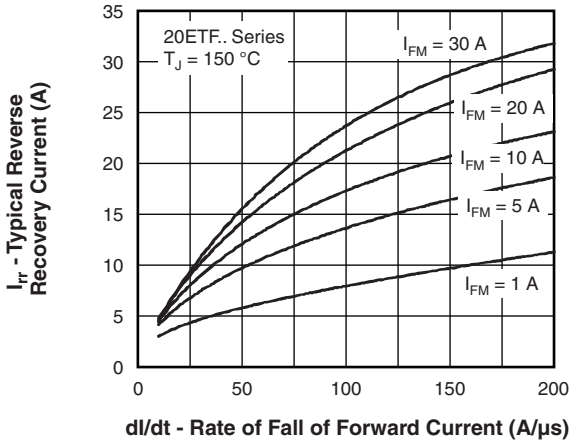


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

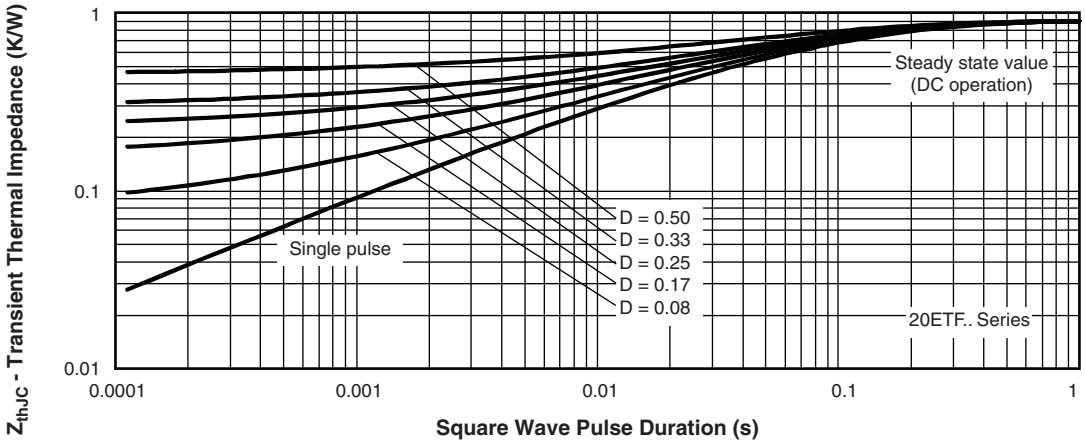


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

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 = D^2PAK (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 = tape
• TRR = tape and reel (right oriented)
• TRL = tape and reel (left oriented)

9 - -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-20ETF08S-M3	50	1000	Antistatic plastic tubes
VS-20ETF08STRR-M3	800	800	13" diameter reel
VS-20ETF08STRL-M3	800	800	13" diameter reel
VS-20ETF10S-M3	50	1000	Antistatic plastic tubes
VS-20ETF10STRR-M3	800	800	13" diameter reel
VS-20ETF10STRL-M3	800	800	13" diameter reel
VS-20ETF12S-M3	50	1000	Antistatic plastic tubes
VS-20ETF12STRR-M3	800	800	13" diameter reel
VS-20ETF12STRL-M3	800	800	13" diameter 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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