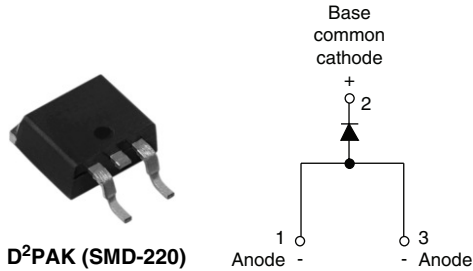


## Fast Soft Recovery Rectifier Diode, 20 A



### FEATURES/DESCRIPTION

The 20ETF..SPbF fast soft recovery rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.



RoHS\*  
COMPLIANT

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

This product series has been designed and qualified for industrial level and lead (Pb)-free.

### APPLICATIONS

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

### PRODUCT SUMMARY

$V_F$ at 20 A	< 1.31 V
$I_{FSM}$	355 A
$V_{RRM}$	800 to 1200 V

### 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, $T_J = 25^\circ\text{C}$	1.31	V
$t_{rr}$	1 A, 100 A/ $\mu\text{s}$	95	ns
$T_J$	Range	- 40 to 150	$^\circ\text{C}$

### VOLTAGE RATINGS

PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 $^\circ\text{C}$ mA
20ETF08SPbF	800	900	6
20ETF10SPbF	1000	1100	
20ETF12SPbF	1200	1300	

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 97^\circ\text{C}$ , 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	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	$\text{A}^2\text{s}$
		10 ms sine pulse, no voltage reapplied	635	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied	6350	$\text{A}^2\sqrt{\text{s}}$

\* Pb containing terminations are not RoHS compliant, exemptions may apply

# 20ETF..SPbF Soft Recovery Series

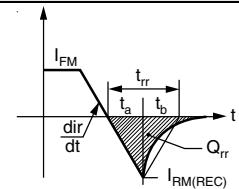


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Fast Soft Recovery  
Rectifier Diode, 20 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	20 A, $T_J = 25\text{ }^\circ\text{C}$		1.31	V
Forward slope resistance	$r_t$	$T_J = 150\text{ }^\circ\text{C}$		11.88	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.93	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		6	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	$t_{rr}$	$I_F$ at 20 Apk 25 A/ $\mu\text{s}$ $25\text{ }^\circ\text{C}$	400	ns
Reverse recovery current	$I_{rr}$		6.1	A
Reverse recovery charge	$Q_{rr}$		1.7	$\mu\text{C}$
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)	$R_{thJA}^{(1)}$		62	
Soldering temperature	$T_S$		240	$^\circ\text{C}$
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D <sup>2</sup> PAK (SMD-220)	20ETF08S	
			20ETF10S	
			20ETF12S	

**Note**

<sup>(1)</sup> When mounted on 1" square (650 mm<sup>2</sup>) PCB of FR-4 or G-10 material 4 oz. (140  $\mu\text{m}$ ) copper 40  $^\circ\text{C/W}$   
For recommended footprint and soldering techniques refer to application note #AN-994



# 20ETF..SPbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 20 A

Vishay High Power Products

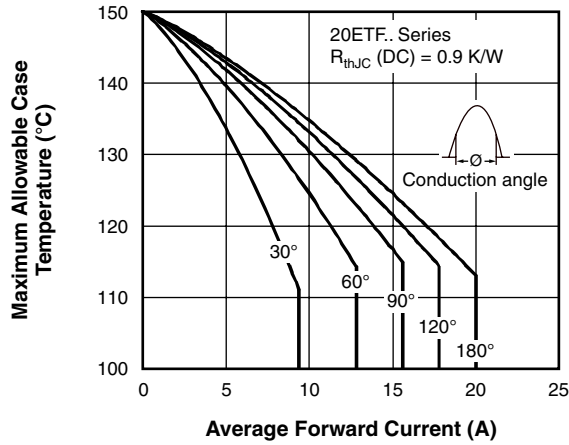


Fig. 1 - Current Rating Characteristics

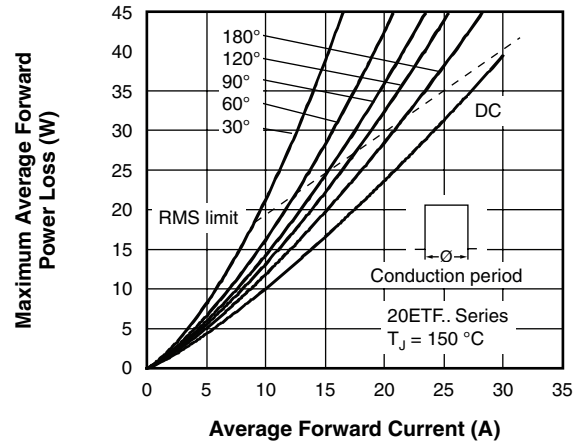


Fig. 4 - Forward Power Loss Characteristics

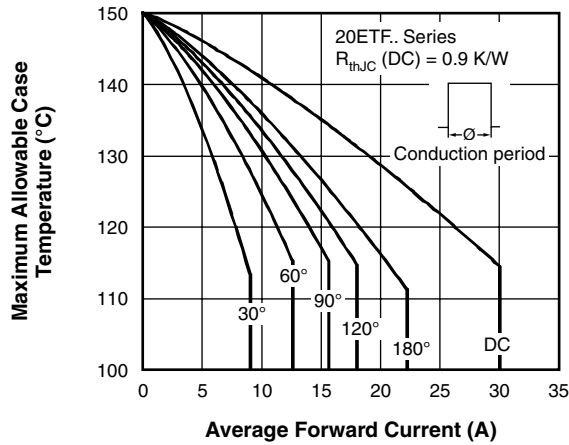


Fig. 2 - Current Rating Characteristics

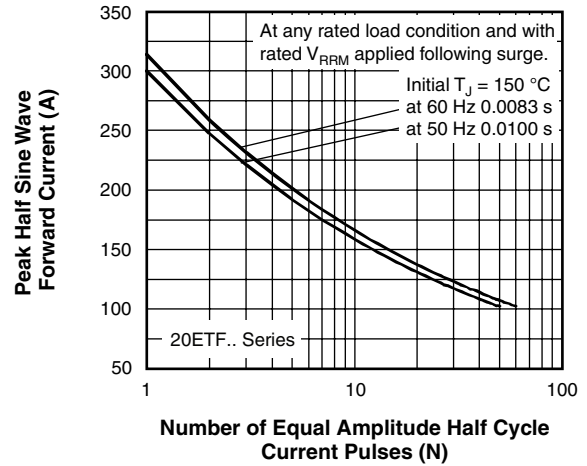


Fig. 5 - Maximum Non-Repetitive Surge Current

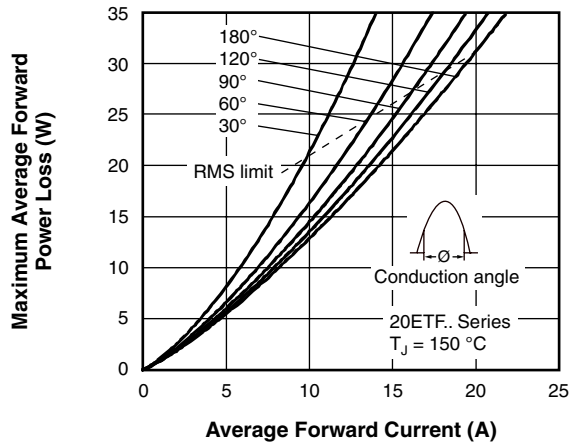


Fig. 3 - Forward Power Loss Characteristics

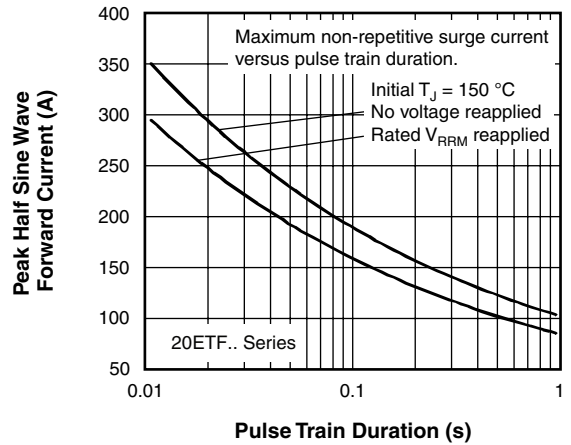


Fig. 6 - Maximum Non-Repetitive Surge Current

# 20ETF..SPbF Soft Recovery Series



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Fast Soft Recovery Rectifier Diode, 20 A

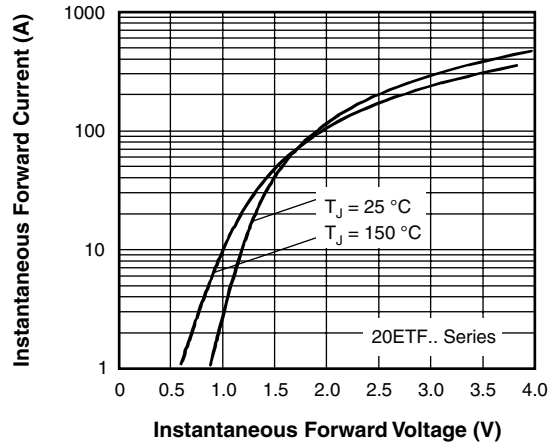


Fig. 7 - Forward Voltage Drop Characteristics

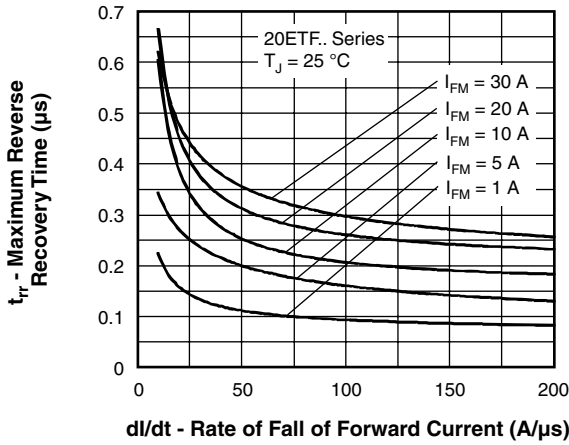


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

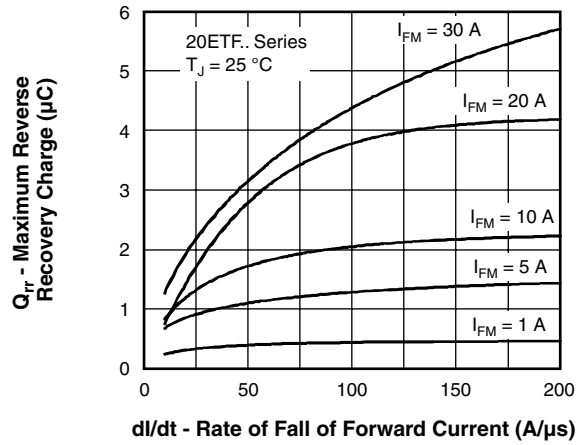


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

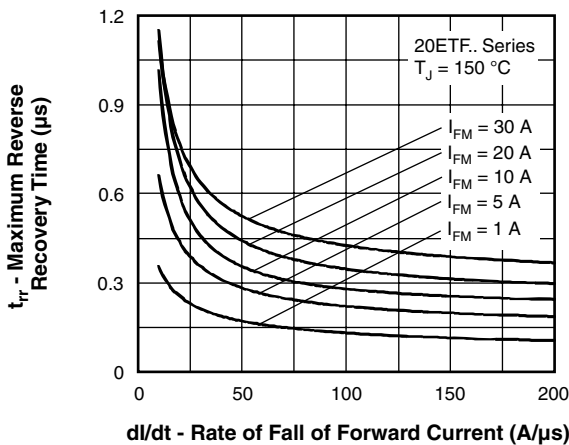


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

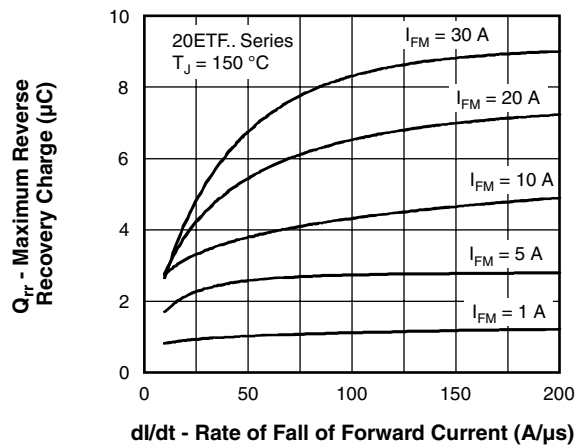


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$



# 20ETF..SPbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 20 A

Vishay High Power Products

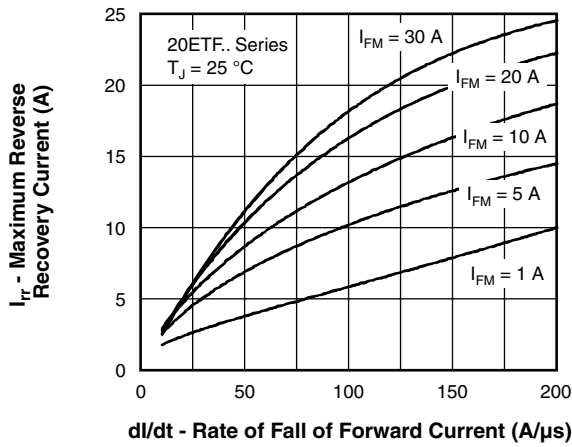


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

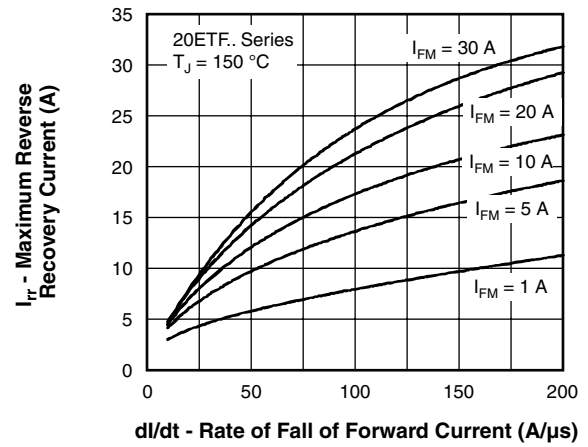


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

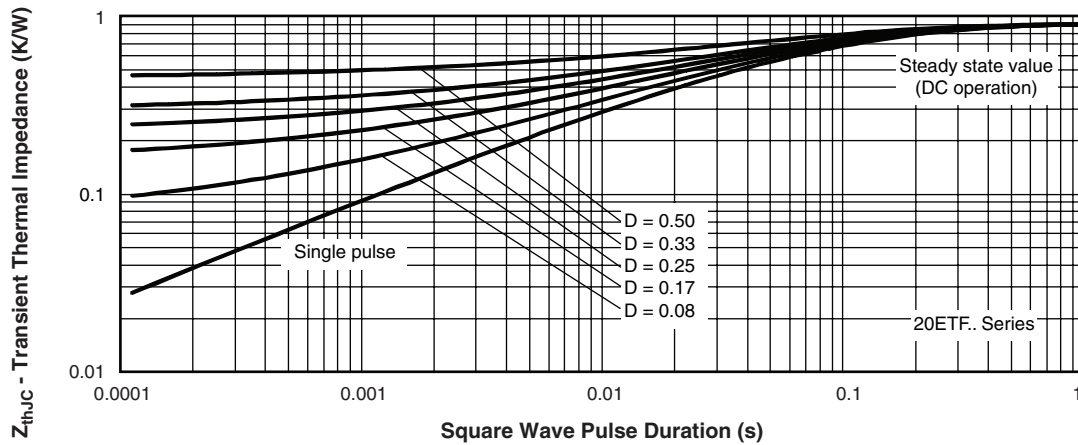


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 20ETF..SPbF Soft Recovery Series



Vishay High Power Products

Fast Soft Recovery  
Rectifier Diode, 20 A

## ORDERING INFORMATION TABLE

Device code	<b>20</b>	<b>E</b>	<b>T</b>	<b>F</b>	<b>12</b>	<b>S</b>	<b>TRL</b>	<b>PbF</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- 1** - Current rating (20 = 20 A)
- 2** - Circuit configuration:  
E = Single diode
- 3** - Package:  
T = D<sup>2</sup>PAK (TO-220AC)
- 4** - Type of silicon:  
F = Fast soft recovery rectifier
- 5** - Voltage code x 100 = V<sub>RRM</sub>
- 6** - S = Surface mountable
- 7** -
  - None = Tape
  - TRR = Tape and reel (right oriented)
  - TRL = Tape and reel (left oriented)
- 8** -
  - None = Standard production
  - PbF = Lead (Pb)-free

08 = 800 V
10 = 1000 V
12 = 1200 V

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95046">http://www.vishay.com/doc?95046</a>
Part marking information	<a href="http://www.vishay.com/doc?95054">http://www.vishay.com/doc?95054</a>
Packaging information	<a href="http://www.vishay.com/doc?95032">http://www.vishay.com/doc?95032</a>



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