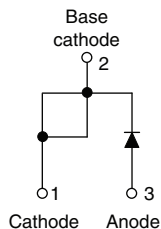



## Fast Soft Recovery Rectifier Diode, 20 A



TO-220AC FULL-PAK



### FEATURES

- The fully isolated package ( $V_{INS} = 2500 V_{RMS}$ ) is UL E78996 approved 
- Designed and qualified for industrial level



Available  
**RoHS\***  
COMPLIANT

### APPLICATIONS

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

### DESCRIPTION

The 20ETF..FPPbF 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.

### PRODUCT SUMMARY

$V_F$ at 20 A	< 1.31 V
$I_{FSM}$	355 A
$V_{RRM}$	1000 V to 1200 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_{RRM}$		1000 to 1200	V
$I_{F(AV)}$	Sinusoidal waveform	20	A
$I_{FSM}$		355	
$t_{rr}$	1 A, 100 A/ $\mu$ s	95	ns
$V_F$	20 A, $T_J = 25^\circ C$	1.31	V
$T_J$	Range	- 40 to 150	$^\circ C$

### VOLTAGE RATINGS

PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 $^\circ C$ mA
20ETF10FPPbF	1000	1100	6
20ETF12FPPbF	1200	1300	

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 97^\circ C$ , 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	$A^2\sqrt{s}$

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

# 20ETF10FPPbF, 20ETF12FPPbF Soft Recovery Series

Vishay Semiconductors

Fast Soft Recovery  
Rectifier Diode, 20 A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V <sub>FM</sub>	20 A, T <sub>J</sub> = 25 °C		1.31	V
Forward slope resistance	r <sub>t</sub>	T <sub>J</sub> = 150 °C		11.88	mΩ
Threshold voltage	V <sub>F(TO)</sub>			0.93	V
Maximum reverse leakage current	I <sub>RM</sub>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>RRM</sub>	0.1	mA
		T <sub>J</sub> = 150 °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 $^{\circ}\text{C}$	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 <sub>J</sub> , T <sub>Stg</sub>		- 40 to 150	°C
Maximum thermal resistance, junction to case		R <sub>thJC</sub>	DC operation	1.5	°C/W
Maximum thermal resistance, junction to ambient		R <sub>thJA</sub>		62	
Typical thermal resistance, case to heatsink		R <sub>thCS</sub>	Mounting surface, smooth and greased	1.5	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-220AC FULL-PAK	20ETF10FP	
				20ETF12FP	



# 20ETF10FPPbF, 20ETF12FPPbF Soft Recovery Series

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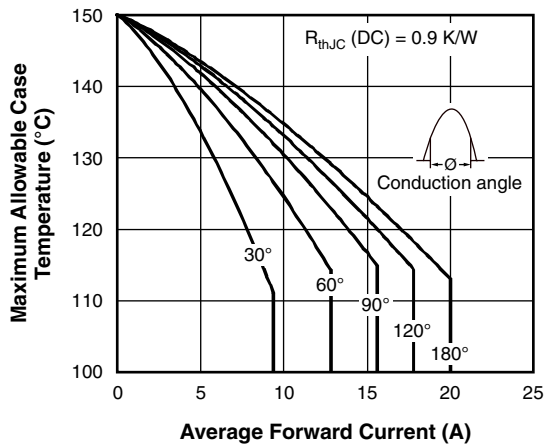


Fig. 1 - Current Rating Characteristics

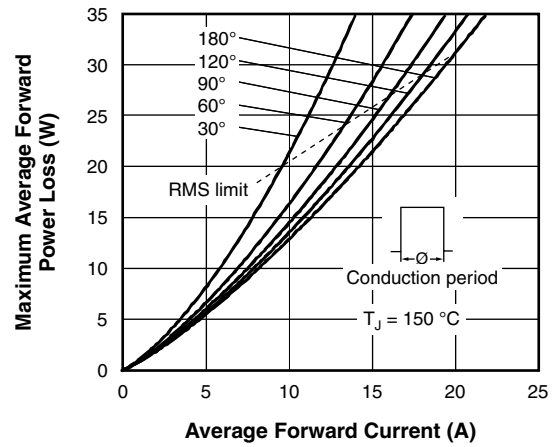


Fig. 4 - Forward Power Loss Characteristics

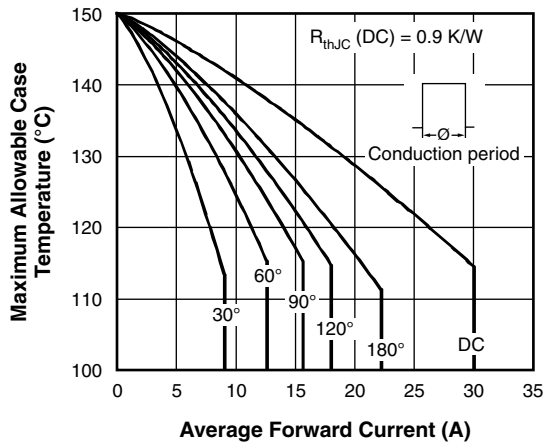


Fig. 2 - Current Rating Characteristics

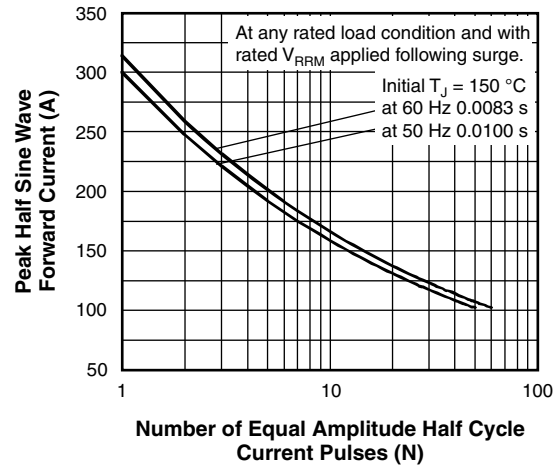


Fig. 5 - Maximum Non-Repetitive Surge Current

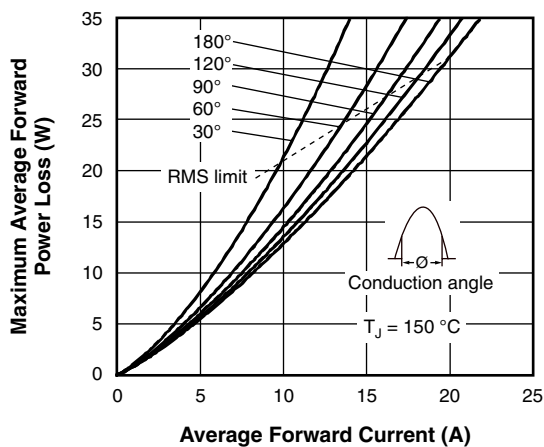


Fig. 3 - Forward Power Loss Characteristics

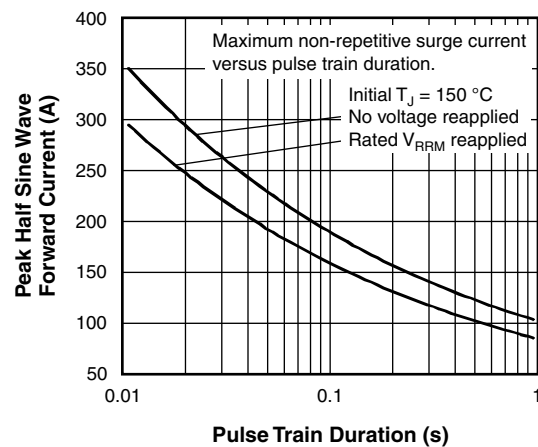


Fig. 6 - Maximum Non-Repetitive Surge Current

# 20ETF10FPPbF, 20ETF12FPPbF Soft Recovery Series

Vishay Semiconductors

Fast Soft Recovery  
Rectifier Diode, 20 A

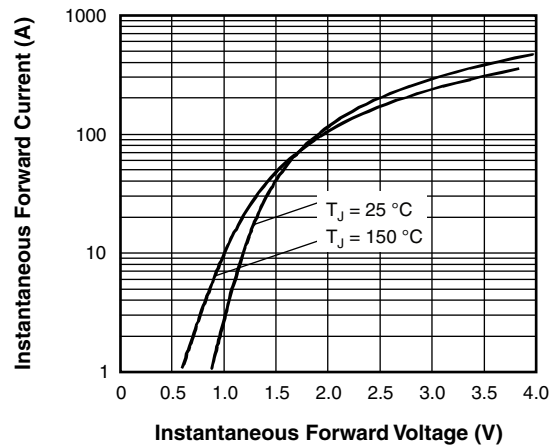


Fig. 7 - Forward Voltage Drop Characteristics

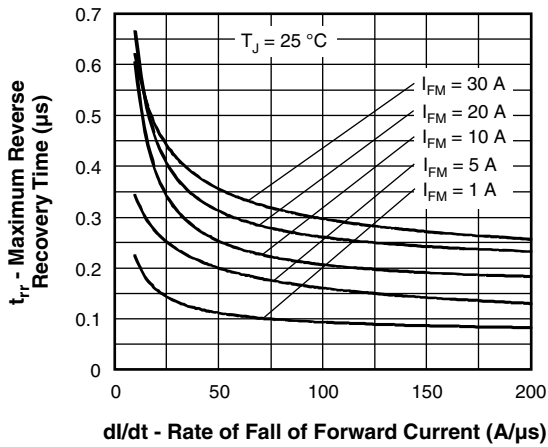


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

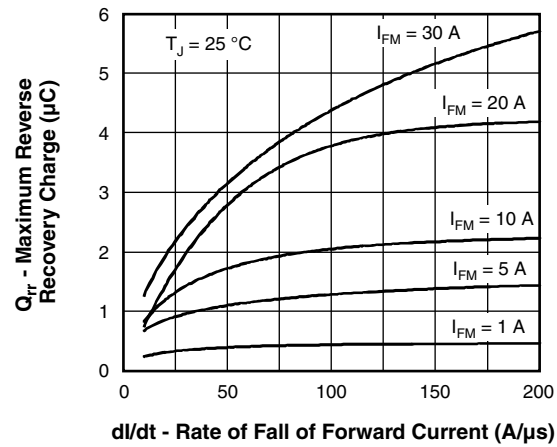


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

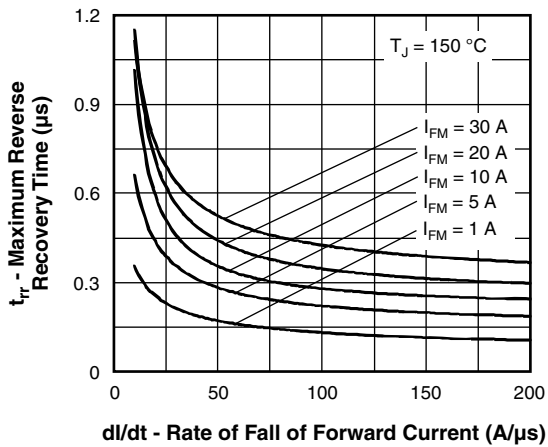


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$

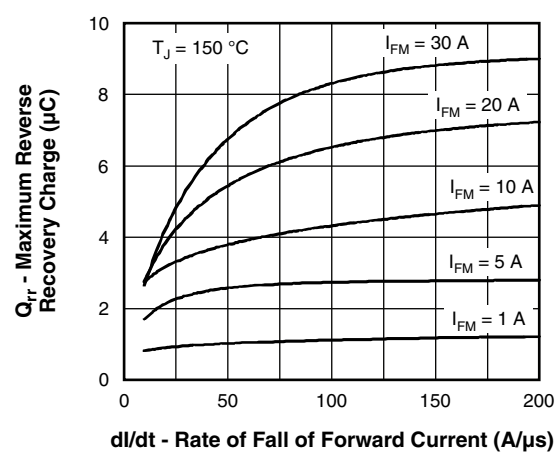


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$



## 20ETF10FPPbF, 20ETF12FPPbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 20 A

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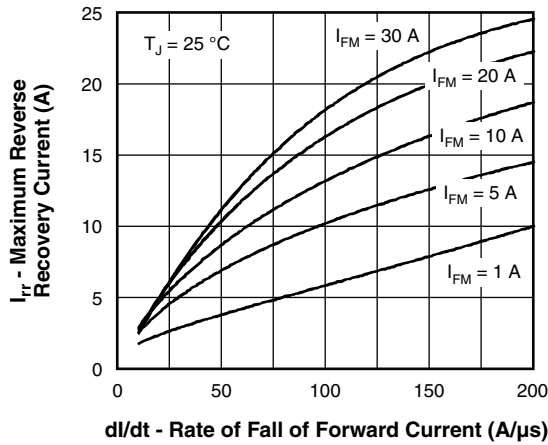


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

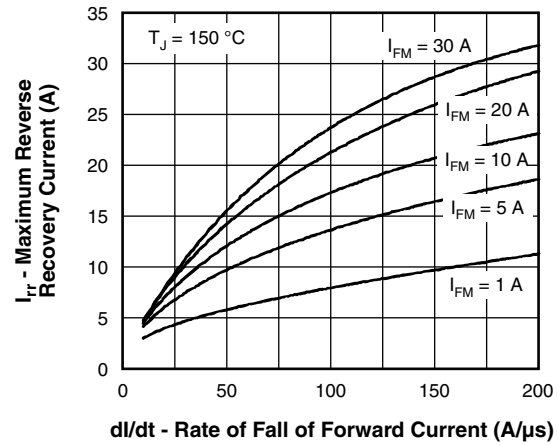


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$

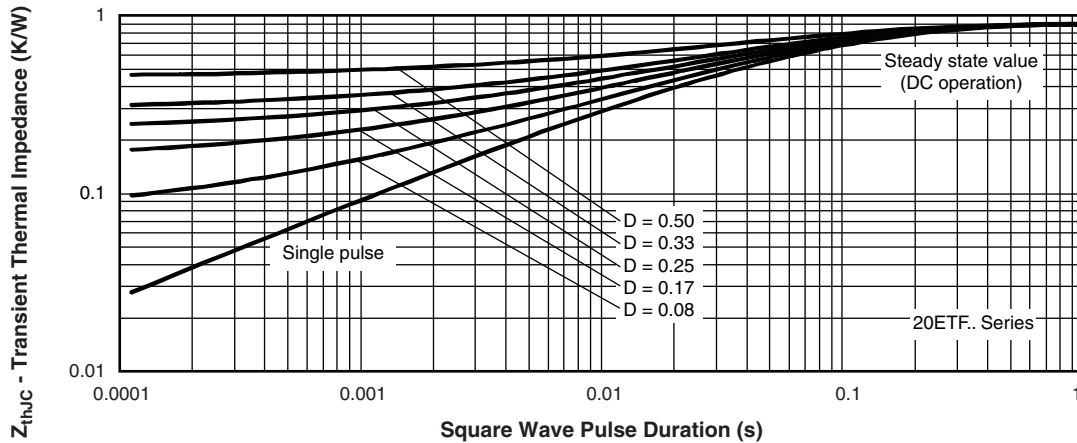


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 20ETF10FPPbF, 20ETF12FPPbF Soft Recovery Series

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Fast Soft Recovery  
Rectifier Diode, 20 A



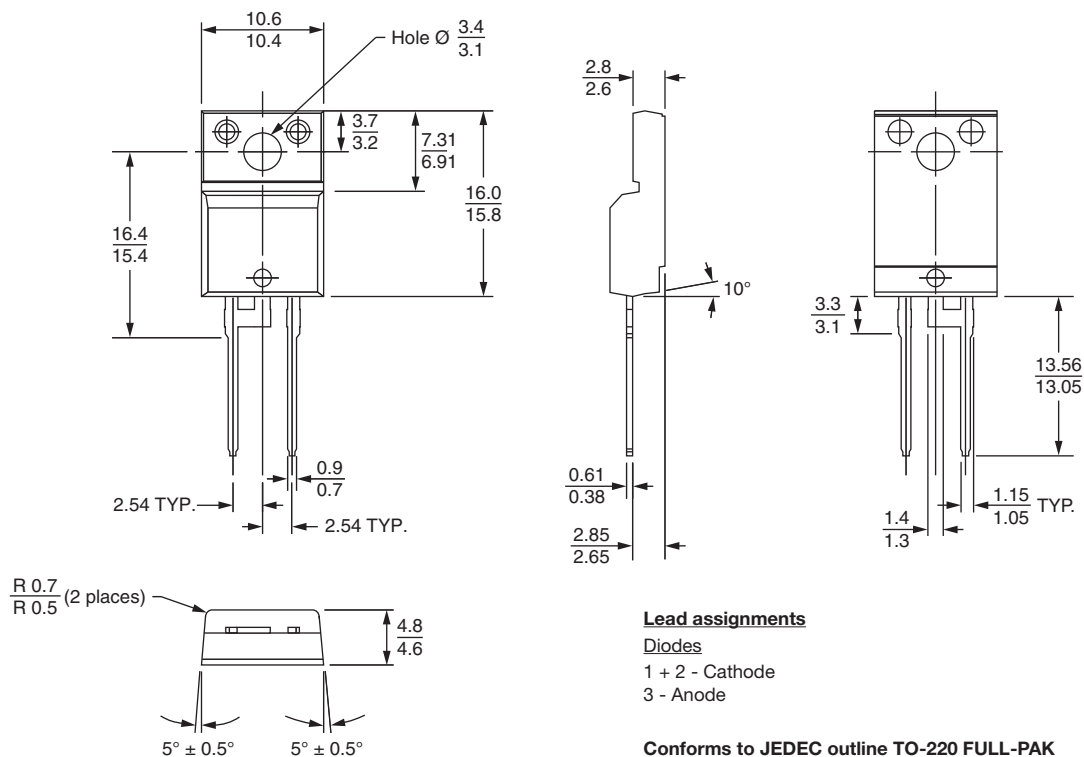
## ORDERING INFORMATION TABLE

Device code	20	E	T	F	12	FP	PbF
	①	②	③	④	⑤	⑥	⑦
	1	-	Current rating (20 = 20 A)				
	2	-	Circuit configuration:				
			E = Single diode				
	3	-	Package:				
			T = TO-220AC				
	4	-	Type of silicon:				
			F = Fast soft recovery rectifier				
	5	-	Voltage ratings			10 = 1000 V 12 = 1200 V	
	6	-	FULL-PAK				
	7	-	• None = Standard production • PbF = Lead (Pb)-free				

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95005">www.vishay.com/doc?95005</a>
Part marking information	<a href="http://www.vishay.com/doc?95009">www.vishay.com/doc?95009</a>



**DIMENSIONS** in millimeters





## Disclaimer

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