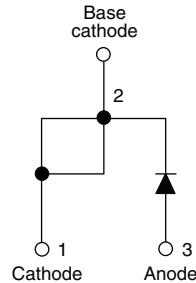


## Fast Soft Recovery Rectifier Diode, 20 A



TO-220AC FULL-PAK



### FEATURES

- The fully isolated package ( $V_{INS} = 2500 V_{RMS}$ ) is UL E78996 approved
- Compliant to RoHS directive 2002/95/EC
- 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 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, $T_J = 25^\circ C$	1.2	V
$t_{rr}$	1 A, 100 A/ $\mu s$	60	ns
$T_J$		- 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
20ETF02FPPbF	200	300	5
20ETF04FPPbF	400	500	
20ETF06FPPbF	600	700	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 94^\circ C$ , 180 $^\circ$ 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	$A^2s$
		10 ms sine pulse, no voltage reapplied	442	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied	4420	$A^2\sqrt{s}$

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

# 20ETF..FPPbF Soft Recovery Series



Vishay Semiconductors

Fast Soft Recovery  
Rectifier Diode, 20 A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	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 $\Omega$
Threshold voltage	$V_{F(TO)}$	$T_J = 150\text{ }^\circ\text{C}$		0.9	V
Maximum reverse leakage current	$I_{RM}$	$V_R = \text{Rated } V_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	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	160	ns	
Reverse recovery current	$I_{rr}$		100 A/ $\mu$ s	10	
Reverse recovery charge	$Q_{rr}$	$25\text{ }^\circ\text{C}$	1.25	$\mu$ 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	1.5	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$		62	
Typical thermal resistance, case to heatsink	$R_{thCS}$	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-220 FULL-PAK	20ETF02FP	
			20ETF04FP	
			20ETF06FP	

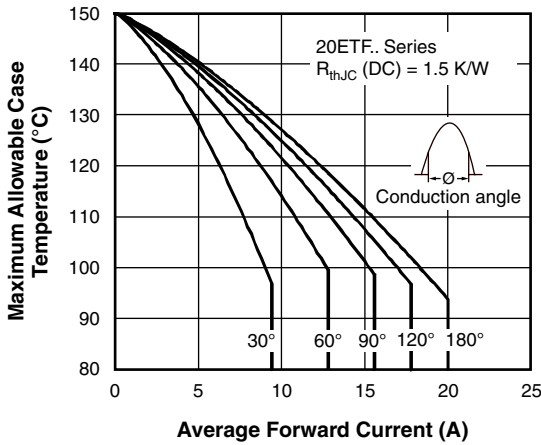


Fig. 1 - Current Rating Characteristics

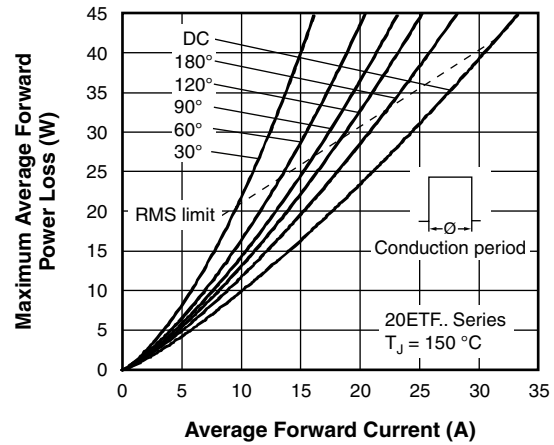


Fig. 4 - Forward Power Loss Characteristics

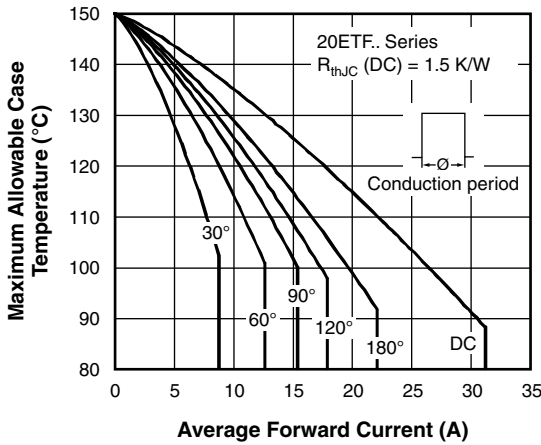


Fig. 2 - Current Rating Characteristics

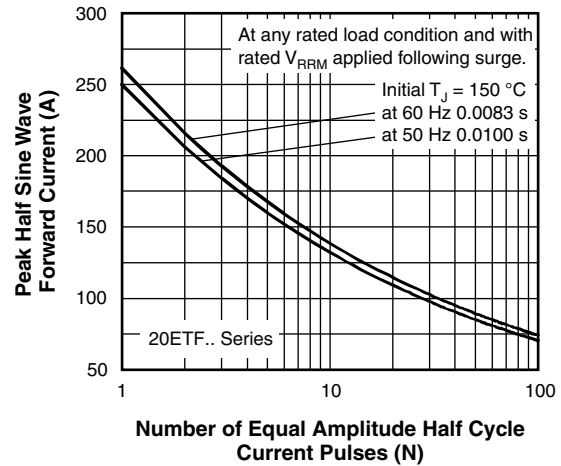


Fig. 5 - Maximum Non-Repetitive Surge Current

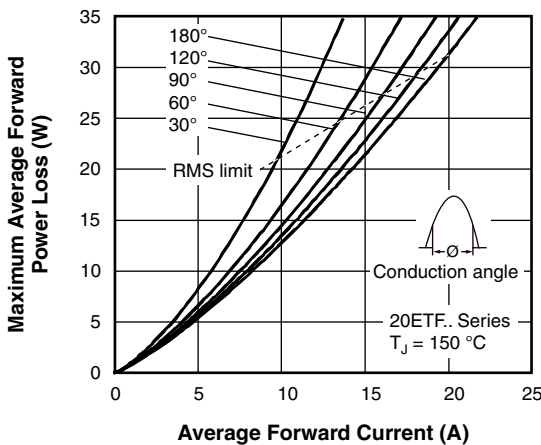


Fig. 3 - Forward Power Loss Characteristics

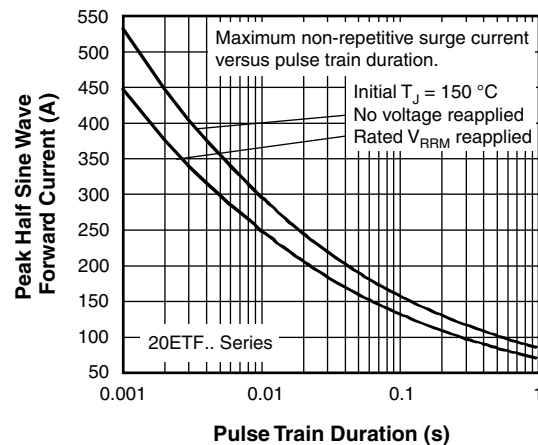


Fig. 6 - Maximum Non-Repetitive Surge Current

# 20ETF..FPPbF Soft Recovery Series



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Fast Soft Recovery Rectifier Diode, 20 A

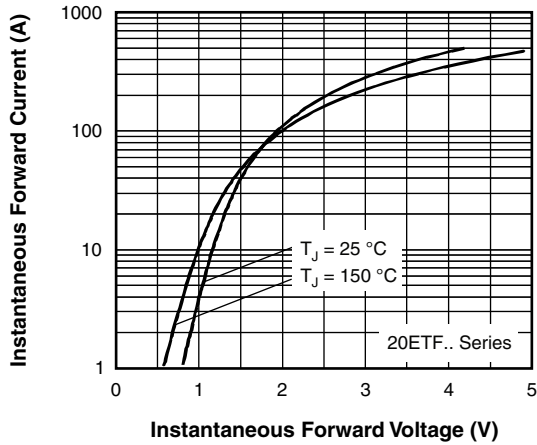


Fig. 7 - Forward Voltage Drop Characteristics

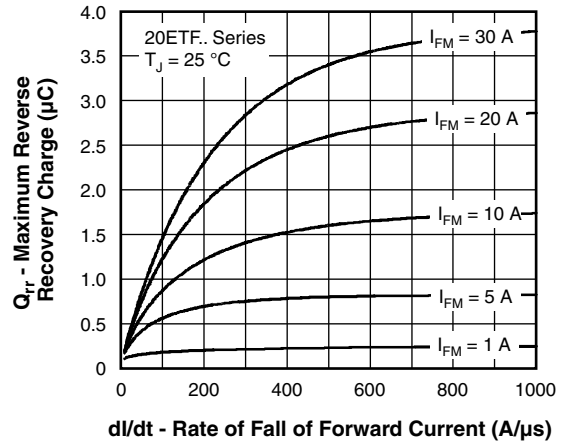


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ °C}$

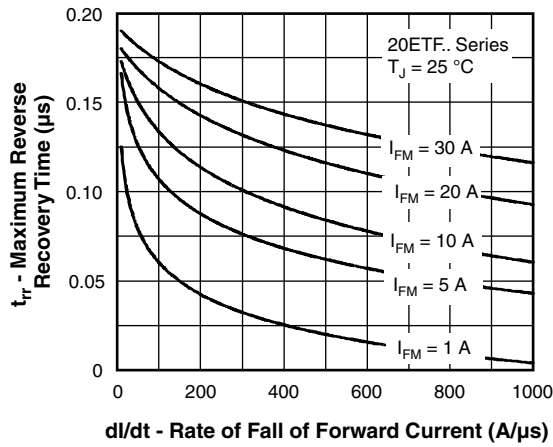


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ °C}$

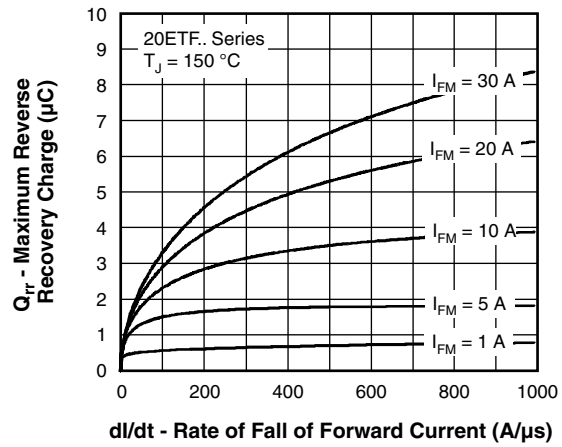


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ °C}$

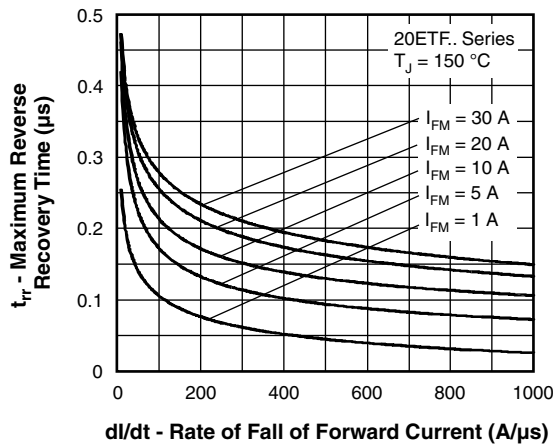


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ °C}$

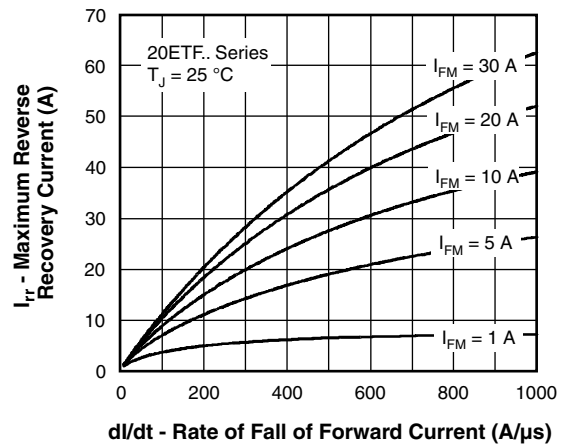


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ °C}$



# 20ETF..FPPbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 20 A

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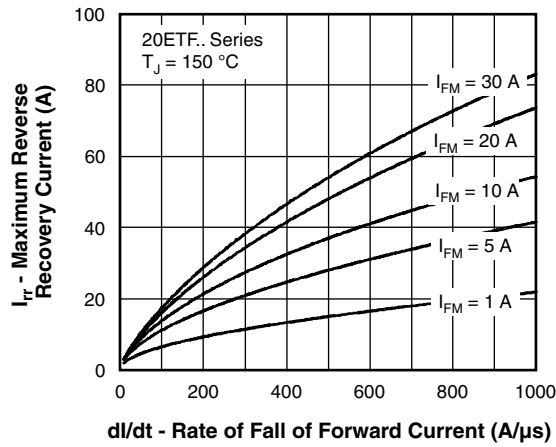


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

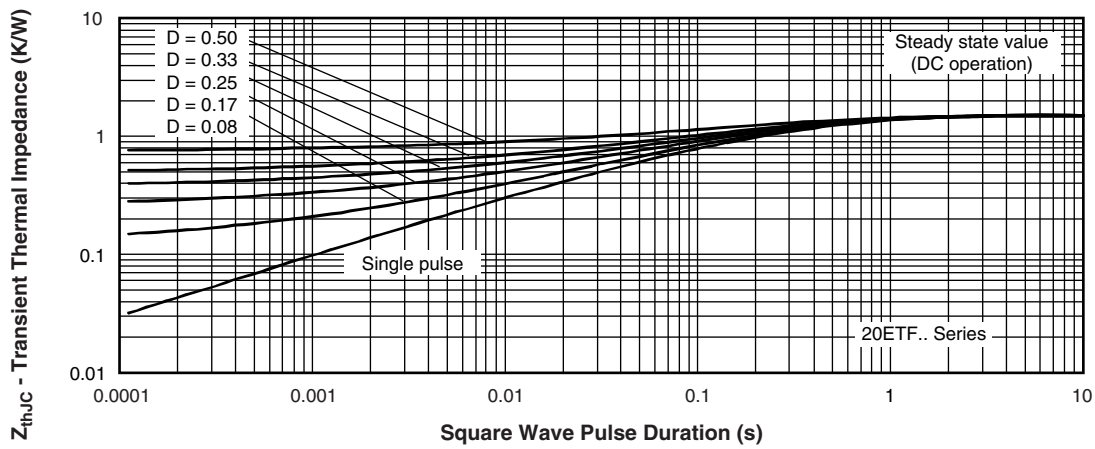


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 20ETF..FPPbF Soft Recovery Series

Vishay Semiconductors

Fast Soft Recovery  
Rectifier Diode, 20 A



## ORDERING INFORMATION TABLE

Device code	20	E	T	F	06	FP	PbF
	①	②	③	④	⑤	⑥	⑦
	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 code x 100 =  $V_{RRM}$

**6** - FULL-PAK

**7** -  
• None = Standard production  
• PbF = Lead (Pb)-free

02 = 200 V
04 = 400 V
06 = 600 V

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>
SPIICE model	<a href="http://www.vishay.com/doc?95410">www.vishay.com/doc?95410</a>



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