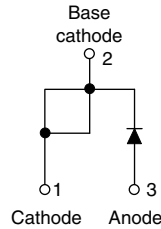


## Fast Soft Recovery Rectifier Diode, 20 A



TO-220 FULL-PAK



### FEATURES/DESCRIPTION

The 20ETF..FP 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.

The fully isolated package ( $V_{INS} = 2500 V_{RMS}$ ) is UL E78996 approved.

This product series has been designed and qualified for industrial level.

### 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 10 A	< 1.2 V
$I_{FSM}$	300 A
$V_{RRM}$	200 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
20ETF02FP	200	300	5
20ETF04FP	400	500	
20ETF06FP	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	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied	4420	$A^2\sqrt{s}$

# 20ETF..FP Soft Recovery Series

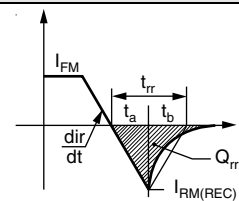


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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	20 A, $T_J = 25\text{ }^\circ\text{C}$		1.30	V
		60 A, $T_J = 25\text{ }^\circ\text{C}$		1.67	
Forward slope resistance	$r_t$			12.5	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 25 $^\circ\text{C}$	160	ns
Reverse recovery current	$I_{rr}$		100 A/ $\mu\text{s}$	10
Reverse recovery charge	$Q_{rr}$		1.25	$\mu\text{C}$
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	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	20ETF06FP	



# 20ETF..FP Soft Recovery Series

Fast Soft Recovery Rectifier Diode, 20 A

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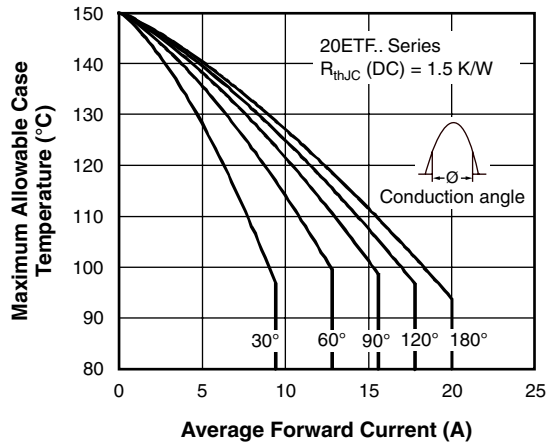


Fig. 1 - Current Rating Characteristics

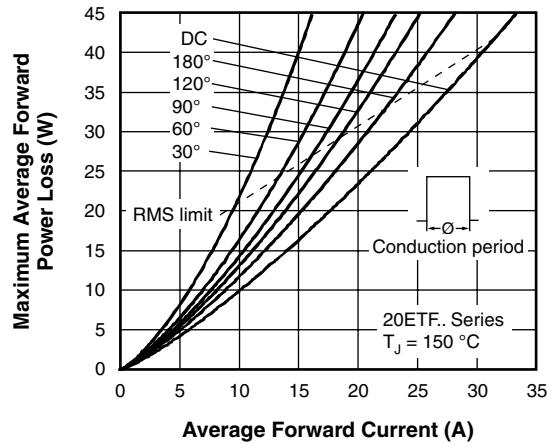


Fig. 4 - Forward Power Loss Characteristics

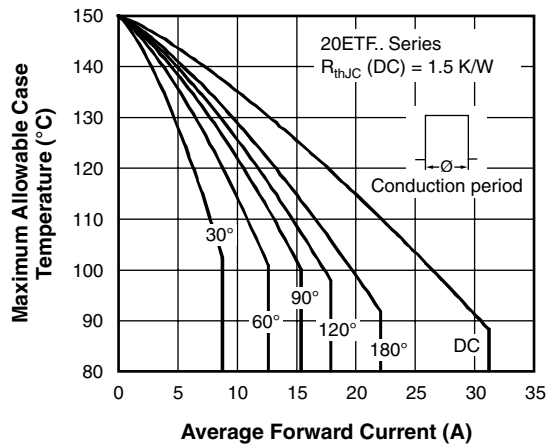


Fig. 2 - Current Rating Characteristics

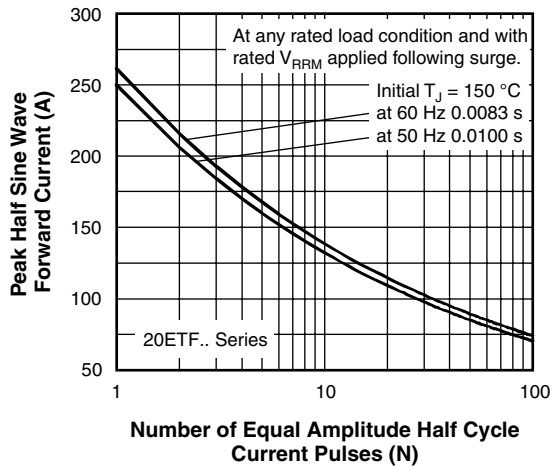


Fig. 5 - Maximum Non-Repetitive Surge Current

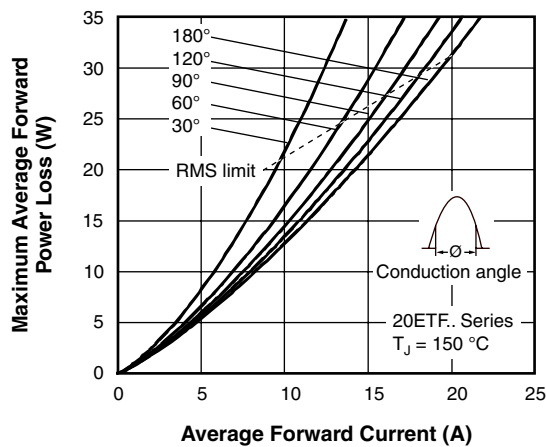


Fig. 3 - Forward Power Loss Characteristics

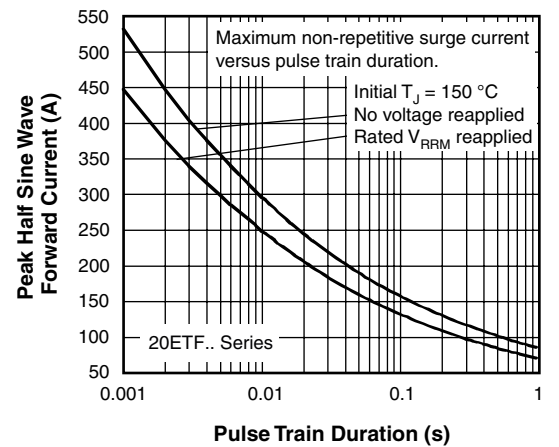


Fig. 6 - Maximum Non-Repetitive Surge Current

# 20ETF..FP Soft Recovery Series



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Fast Soft Recovery Rectifier Diode, 20 A

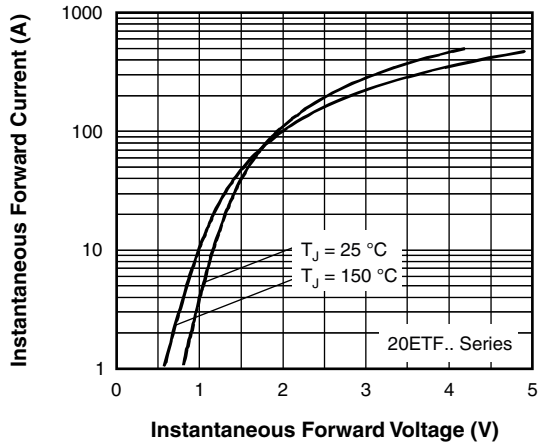


Fig. 7 - Forward Voltage Drop Characteristics

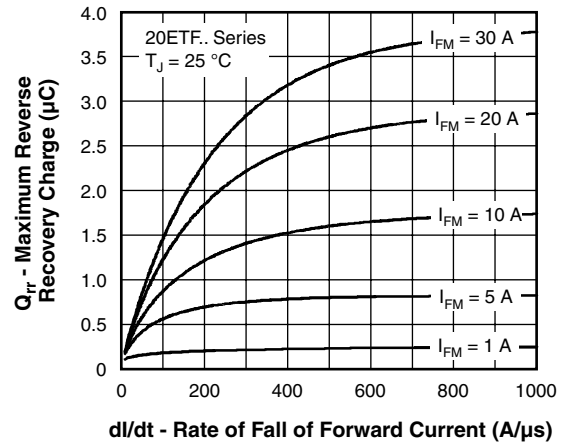


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

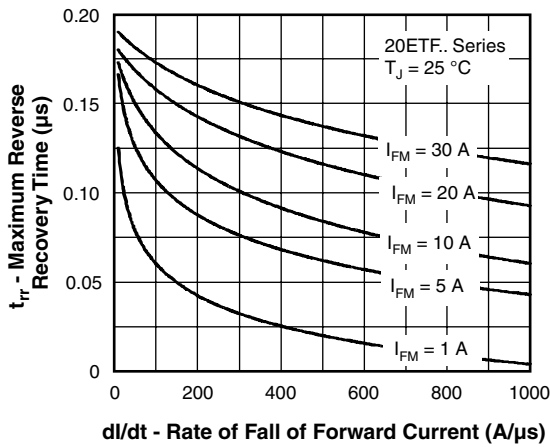


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

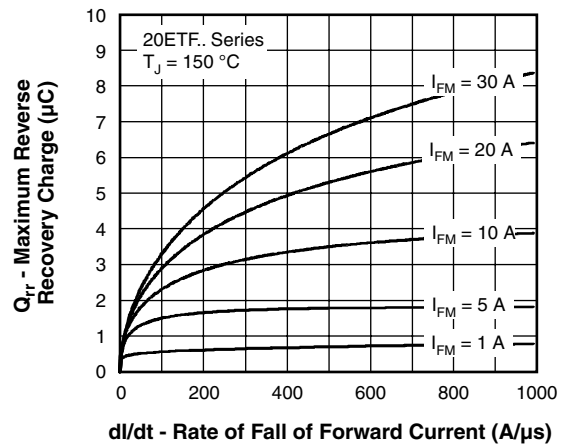


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

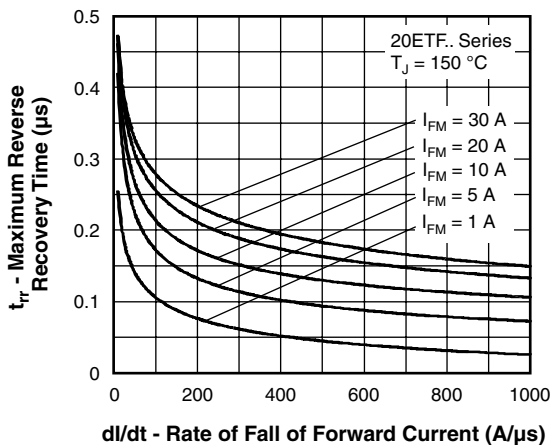


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

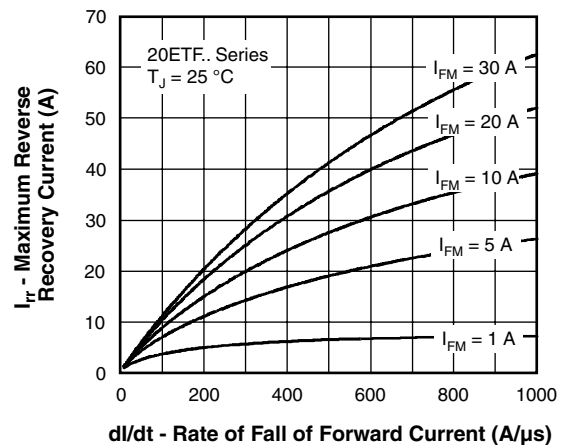


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$



# 20ETF..FP Soft Recovery Series

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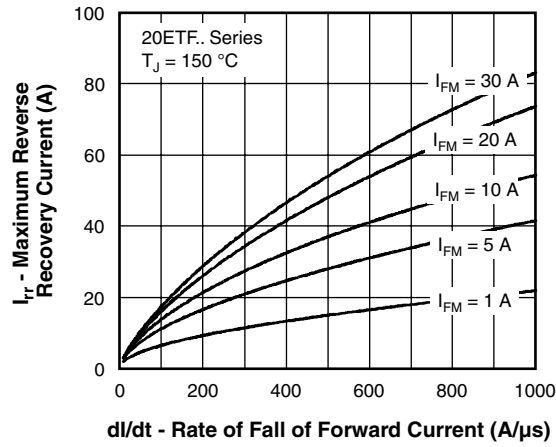


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

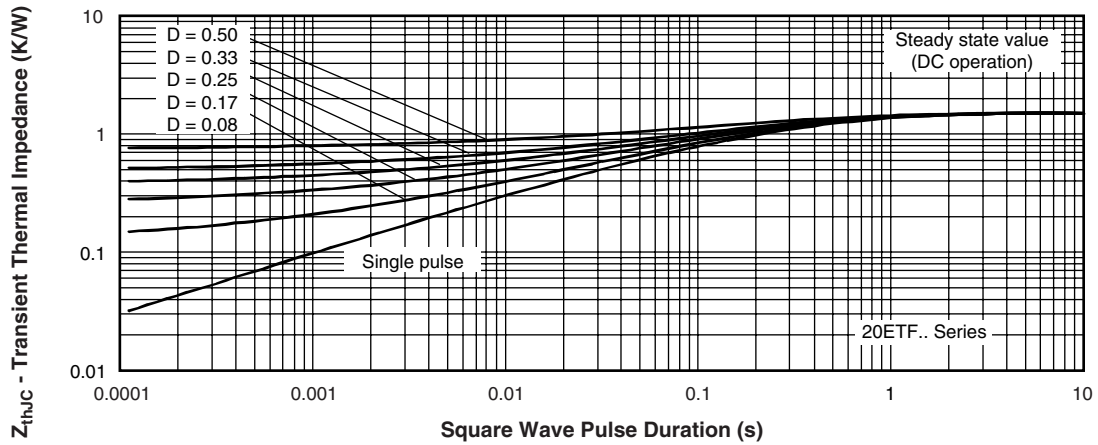


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

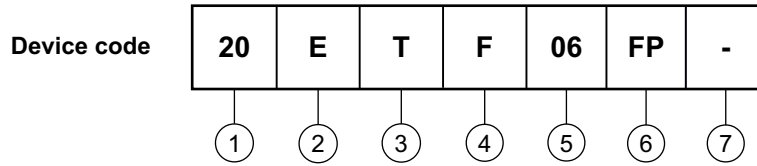
# 20ETF..FP Soft Recovery Series

Vishay High Power Products

Fast Soft Recovery  
Rectifier Diode, 20 A



## ORDERING INFORMATION TABLE



- 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 =  $V_{RRM}$ 

02 = 200 V
04 = 400 V
06 = 600 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">http://www.vishay.com/doc?95005</a>
Part marking information	<a href="http://www.vishay.com/doc?95009">http://www.vishay.com/doc?95009</a>



### Notice

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