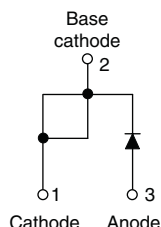


## Fast Soft Recovery Rectifier Diode, 20 A



TO-220AC



### FEATURES/DESCRIPTION

The 20ETF..PbF 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.

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



RoHS\*  
COMPLIANT

### PRODUCT SUMMARY

$V_F$ at 10 A	< 1.2 V
$I_{FSM}$	300 A
$V_{RRM}$	200 to 600 V

### APPLICATIONS

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

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$V_{RRM}$	Range	200 to 600	V
$I_{F(AV)}$	Sinusoidal waveform	20	A
$I_{FSM}$		300	
$t_{rr}$	1 A, 100 A/ $\mu$ s	60	ns
$V_F$	10 A, $T_J = 25^\circ\text{C}$	1.2	V
$T_J$	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
20ETF02PbF	200	300	5
20ETF04PbF	400	500	
20ETF06PbF	600	700	

### 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	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	$\text{A}^2\text{s}$
		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	$\text{A}^2\sqrt{\text{s}}$

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

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## ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	20 A, $T_J = 25\text{ }^{\circ}\text{C}$		1.3	V
Forward slope resistance	$r_t$	$T_J = 150\text{ }^{\circ}\text{C}$		12.5	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.9	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^{\circ}\text{C}$		5.0	

## RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	$t_{rr}$	$I_F$ at 20 Apk 100 A/ $\mu\text{s}$ 25 $^{\circ}\text{C}$	160	ns	
Reverse recovery current	$I_{rr}$		10	A	
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 <sub>J</sub> , T <sub>Stg</sub>		- 40 to 150	°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation	0.9	°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	0.5	
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	20ETF06	



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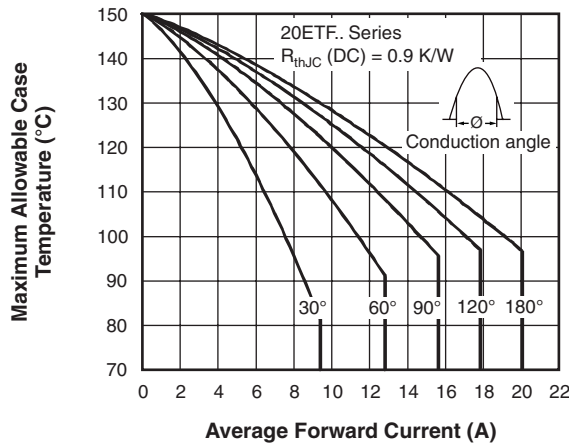


Fig. 1 - Current Rating Characteristics

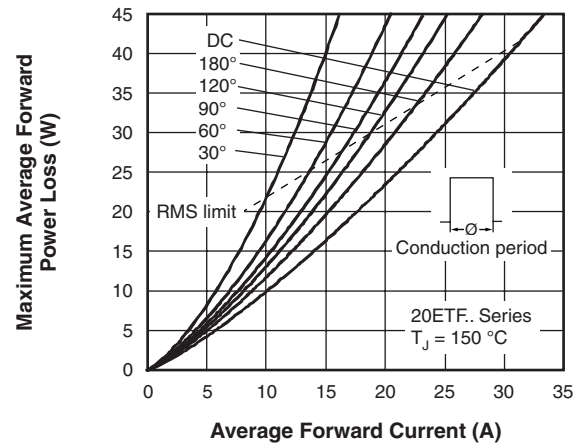


Fig. 4 - Forward Power Loss Characteristics

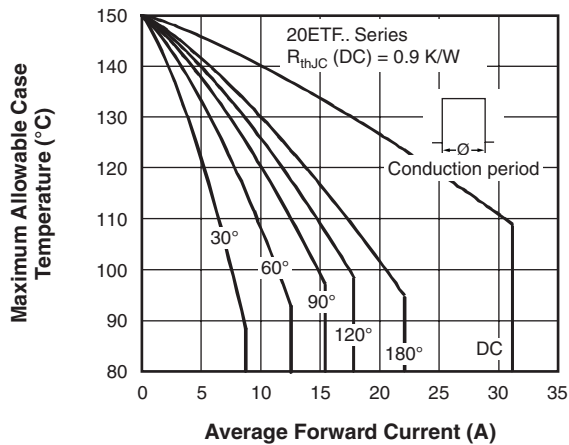


Fig. 2 - Current Rating Characteristics

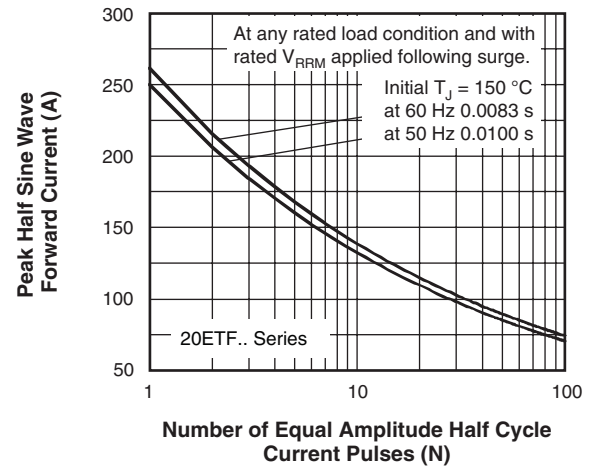


Fig. 5 - Maximum Non-Repetitive Surge Current

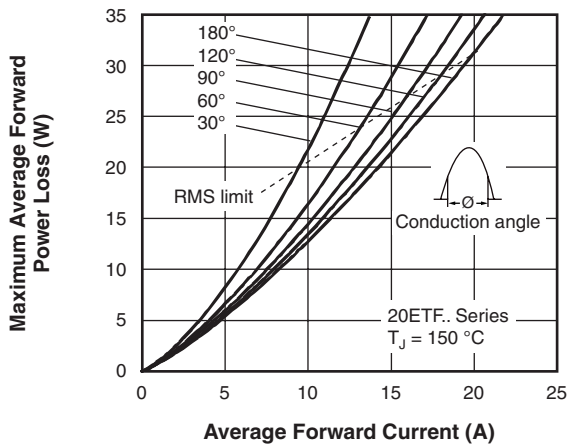


Fig. 3 - Forward Power Loss Characteristics

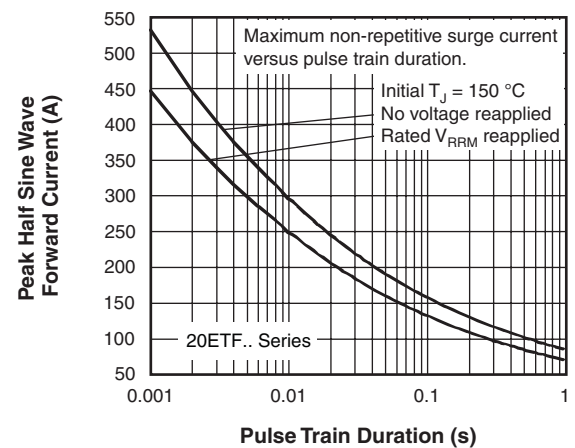


Fig. 6 - Maximum Non-Repetitive Surge Current

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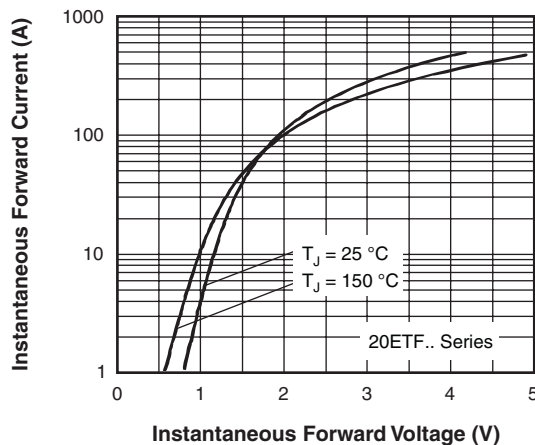


Fig. 7 - Forward Voltage Drop Characteristics

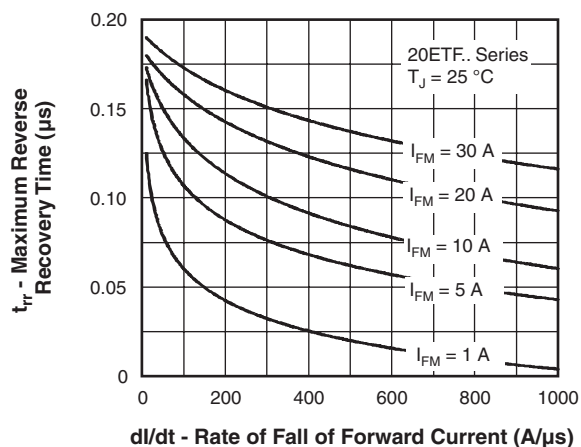


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ °C}$

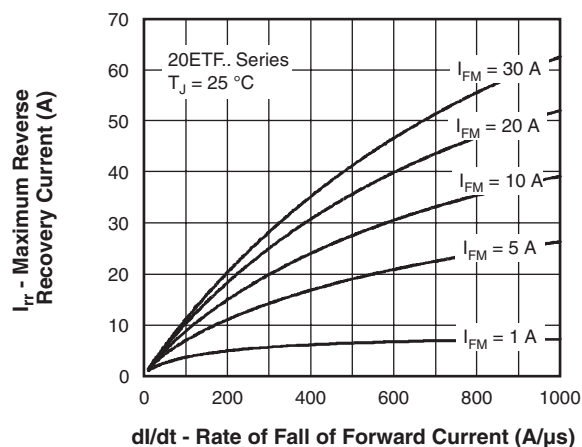


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ °C}$

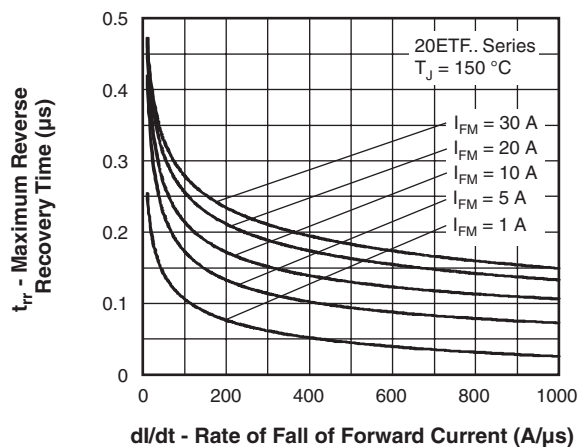


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ °C}$

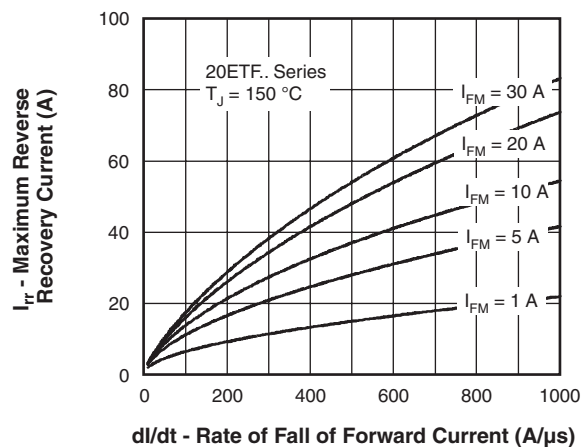


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ °C}$



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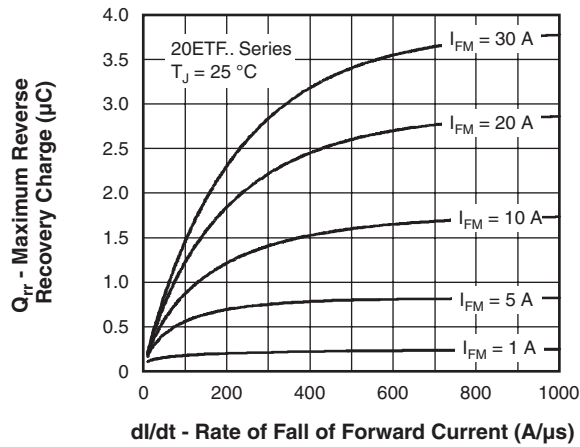


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

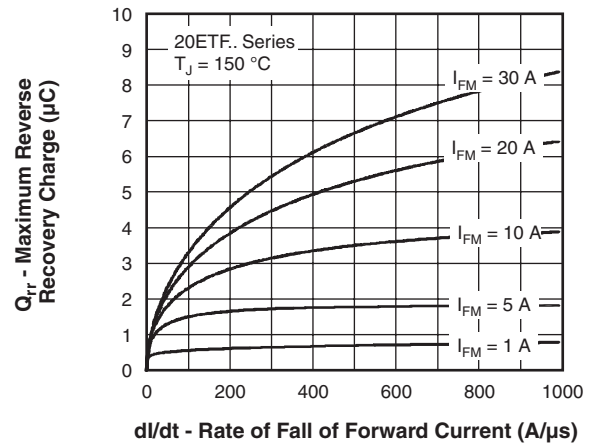


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$

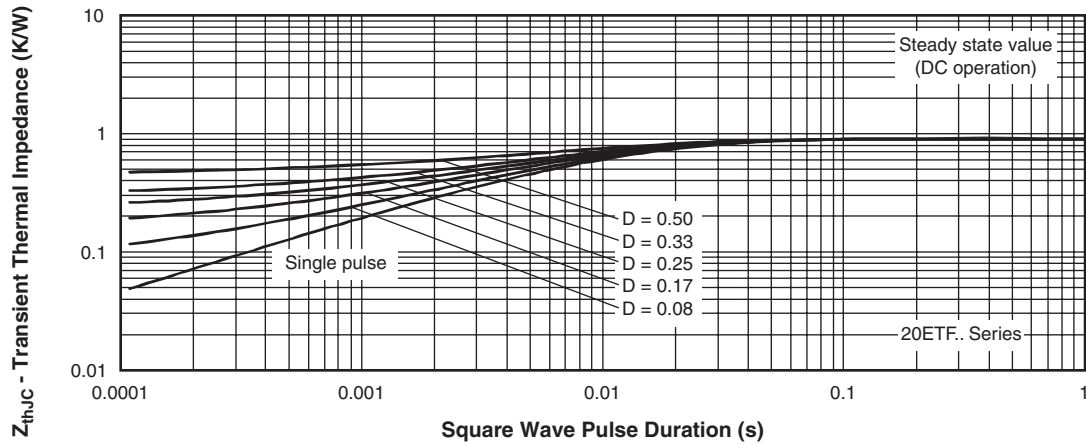


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

# 20ETF..PbF Soft Recovery Series



Vishay High Power Products

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## ORDERING INFORMATION TABLE

Device code	20	E	T	F	06	PbF
	1	2	3	4	5	6
	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	-	• None = Standard production			
			• PbF = Lead (Pb)-free			

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95221">http://www.vishay.com/doc?95221</a>
Part marking information	<a href="http://www.vishay.com/doc?95224">http://www.vishay.com/doc?95224</a>



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