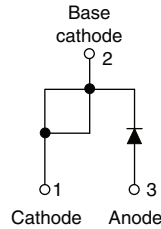


Fast Soft Recovery Rectifier Diode, 20 A



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/ μs	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	$A^2\sqrt{s}$

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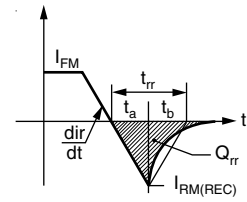


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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	20 A, $T_J = 25\text{ }^\circ\text{C}$		1.30	V
		60 A, $T_J = 25\text{ }^\circ\text{C}$		1.67	
Forward slope resistance	r_t			12.5	m Ω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



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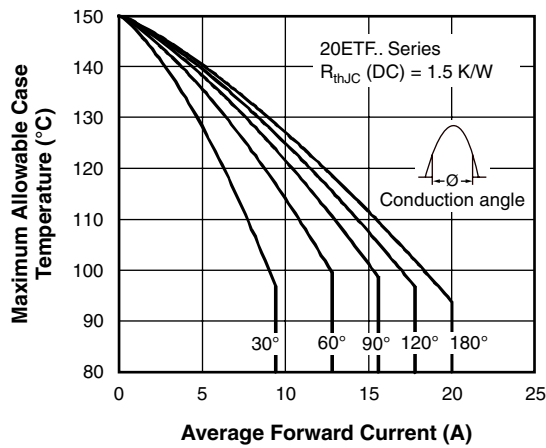


Fig. 1 - Current Rating Characteristics

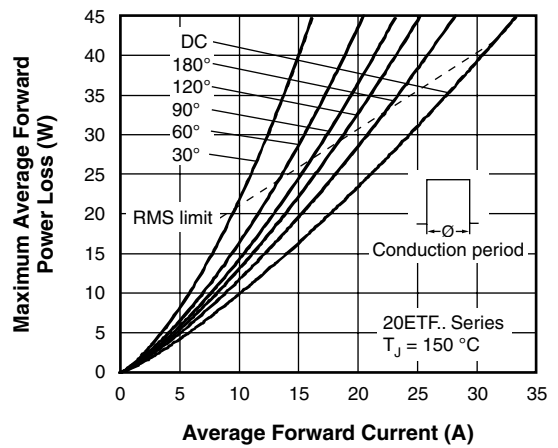


Fig. 4 - Forward Power Loss Characteristics

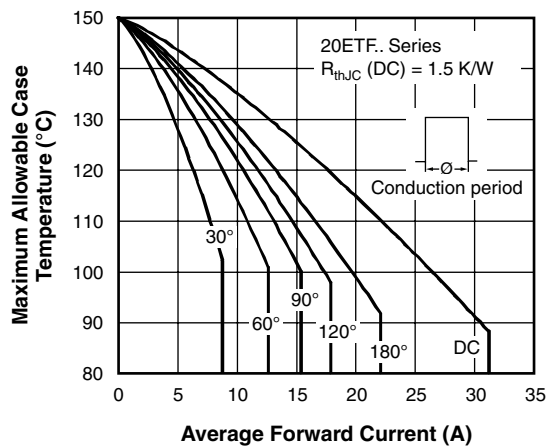


Fig. 2 - Current Rating Characteristics

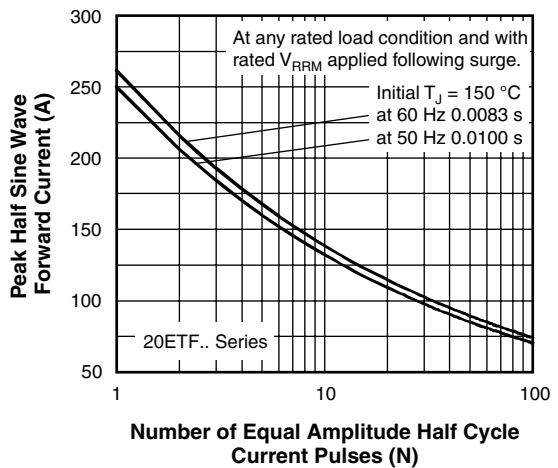


Fig. 5 - Maximum Non-Repetitive Surge Current

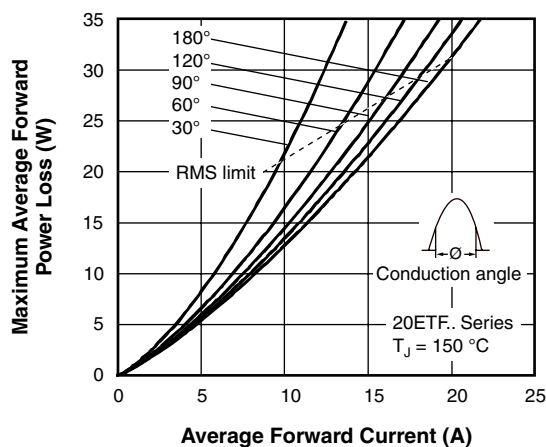


Fig. 3 - Forward Power Loss Characteristics

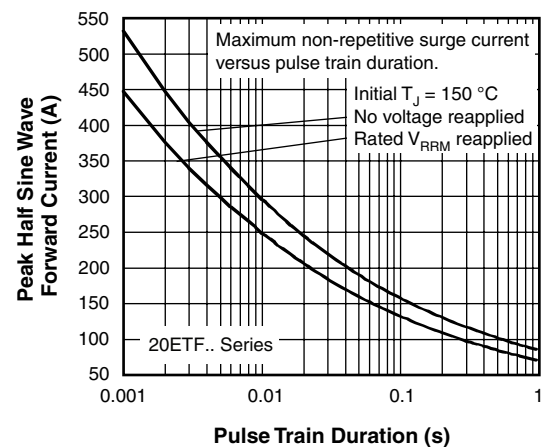


Fig. 6 - Maximum Non-Repetitive Surge Current

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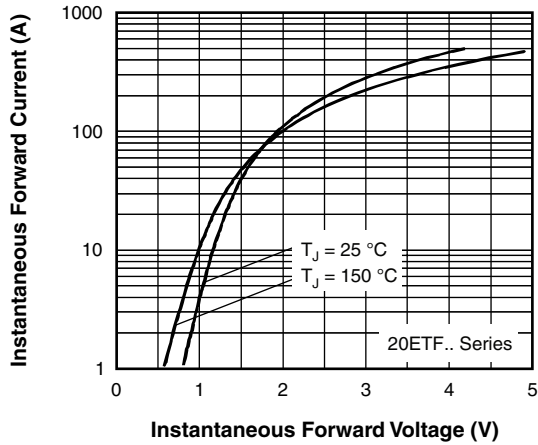


Fig. 7 - Forward Voltage Drop Characteristics

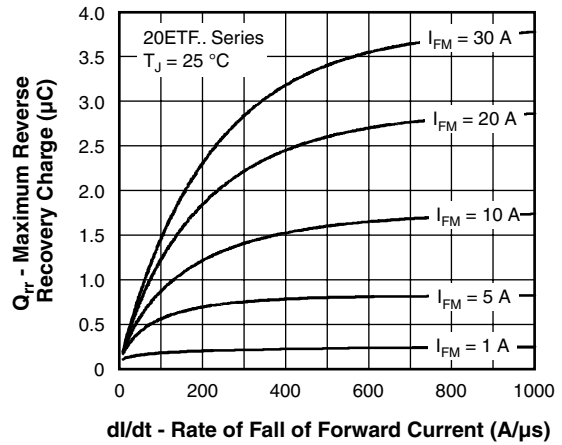


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^\circ\text{C}$

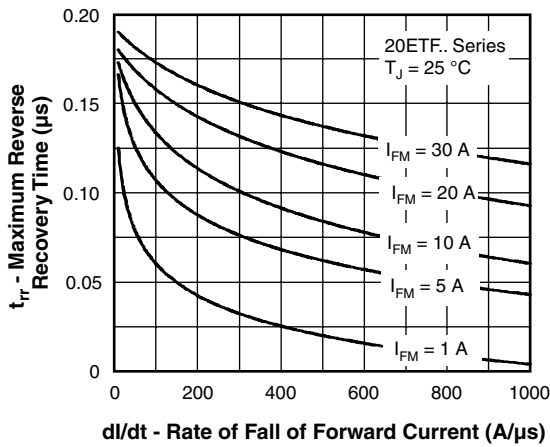


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^\circ\text{C}$

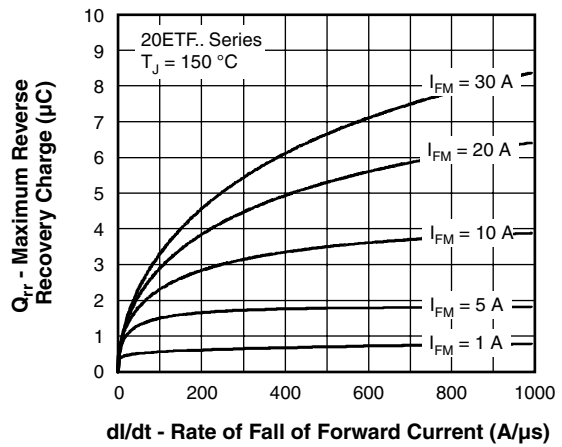


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^\circ\text{C}$

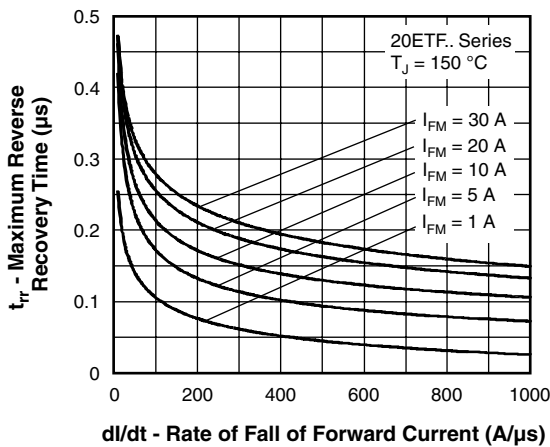


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^\circ\text{C}$

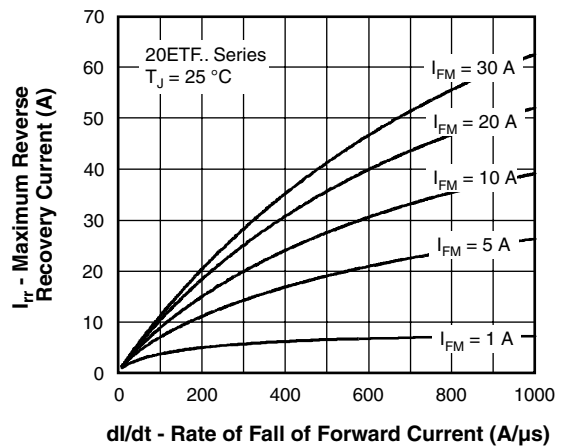


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^\circ\text{C}$



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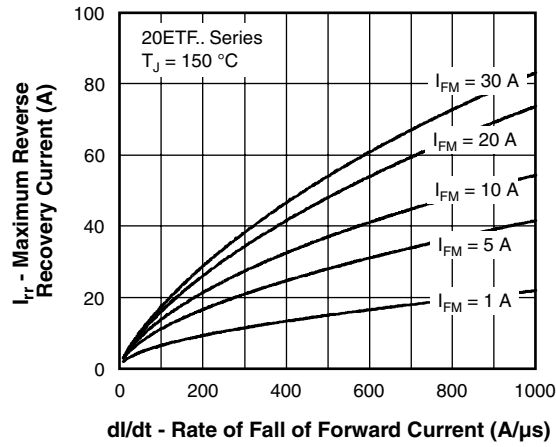


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^\circ\text{C}$

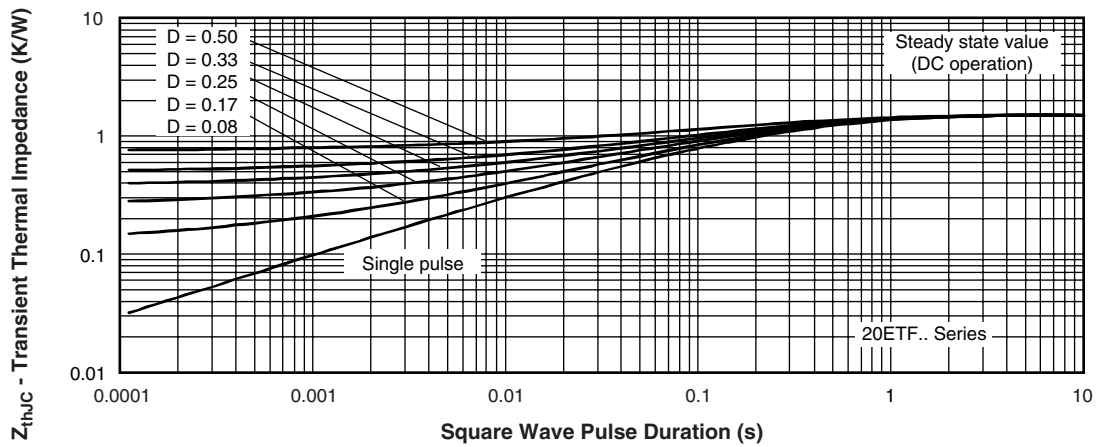


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

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ORDERING INFORMATION TABLE

Device code	20	E	T	F	06	FP	-
	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}			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	http://www.vishay.com/doc?95005
Part marking information	http://www.vishay.com/doc?95009



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