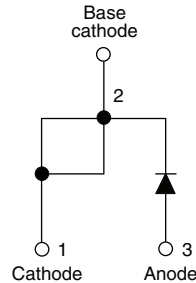


Fast Soft Recovery Rectifier Diode, 20 A



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



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/ 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
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



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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	160	ns	
Reverse recovery current	I_{rr}		100 A/ μs	10	
Reverse recovery charge	Q_{rr}	$25\text{ }^\circ\text{C}$	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	20ETF02FP	
			20ETF04FP	
			20ETF06FP	

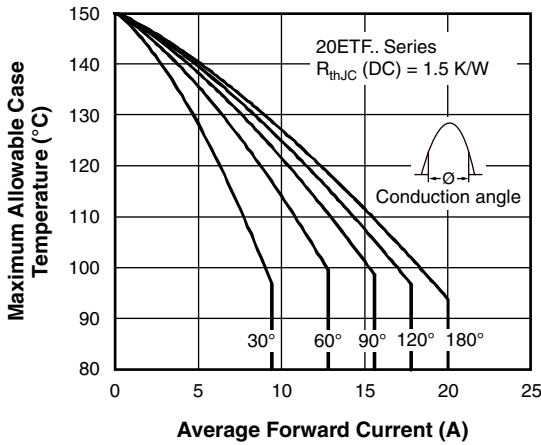


Fig. 1 - Current Rating Characteristics

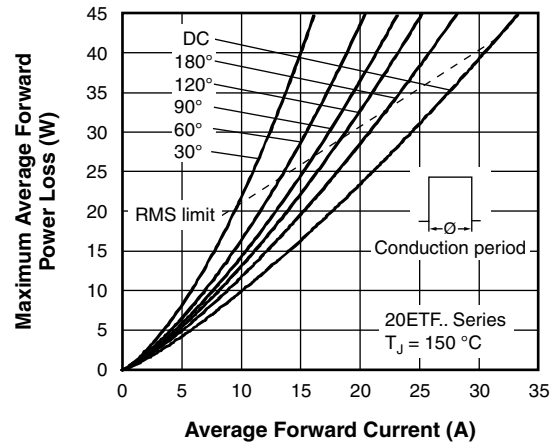


Fig. 4 - Forward Power Loss Characteristics

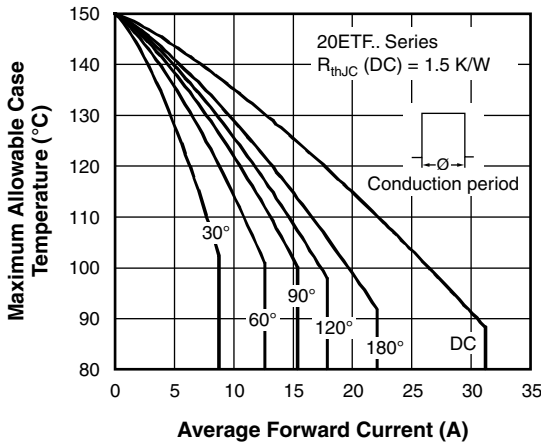


Fig. 2 - Current Rating Characteristics

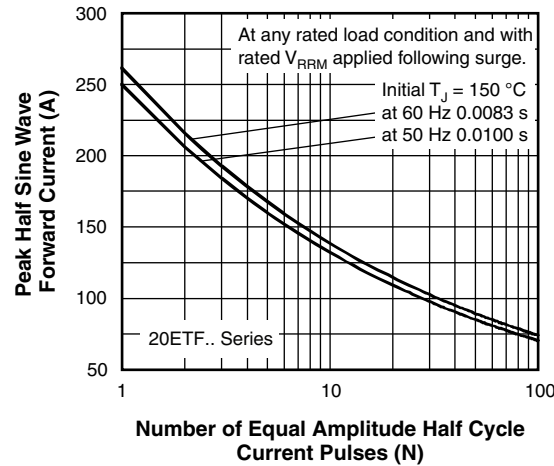


Fig. 5 - Maximum Non-Repetitive Surge Current

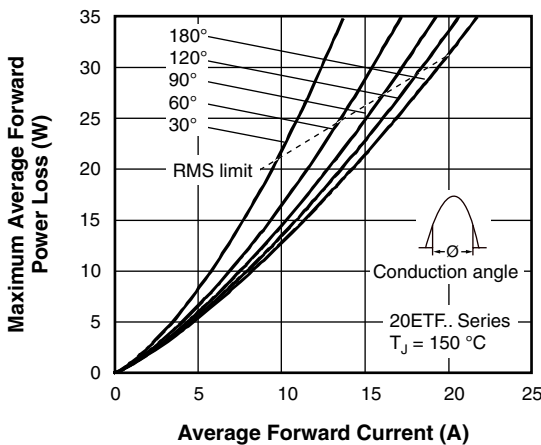


Fig. 3 - Forward Power Loss Characteristics

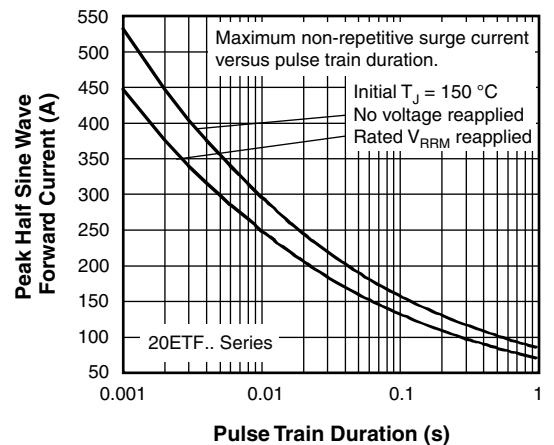


Fig. 6 - Maximum Non-Repetitive Surge Current

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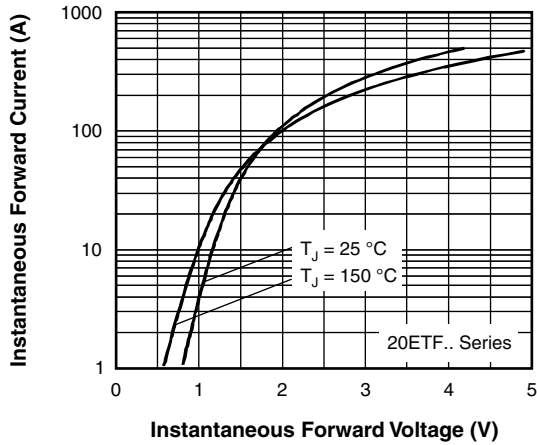


Fig. 7 - Forward Voltage Drop Characteristics

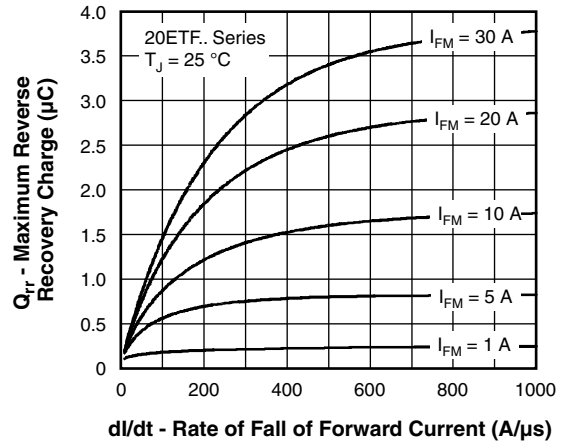


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ °C}$

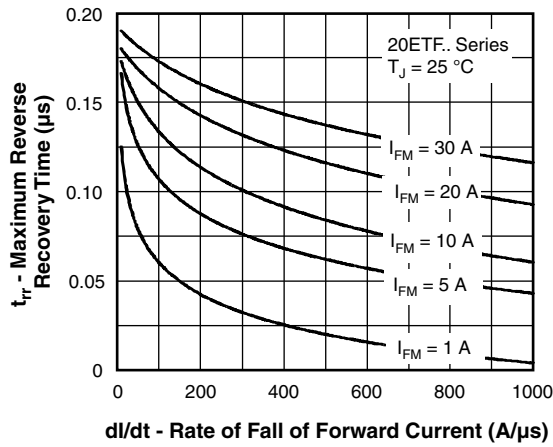


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ °C}$

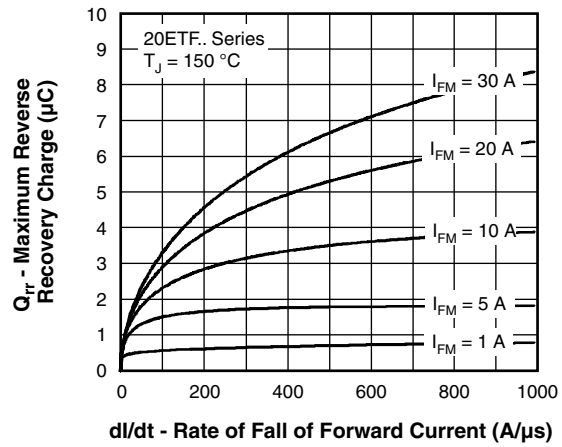


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ °C}$

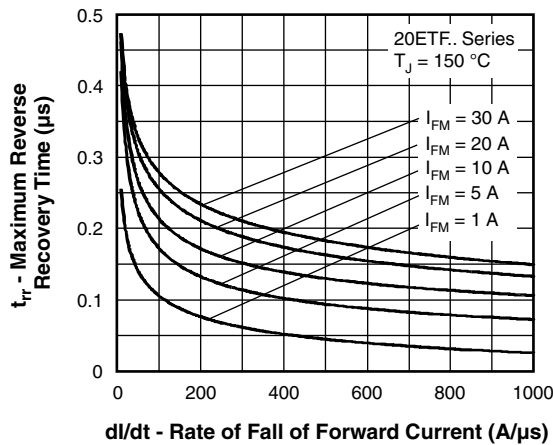


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ °C}$

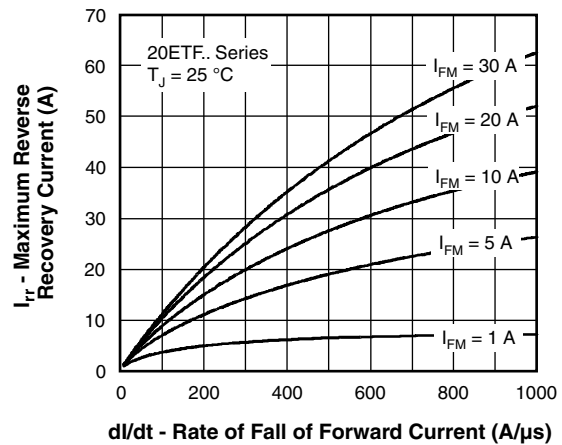


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ °C}$



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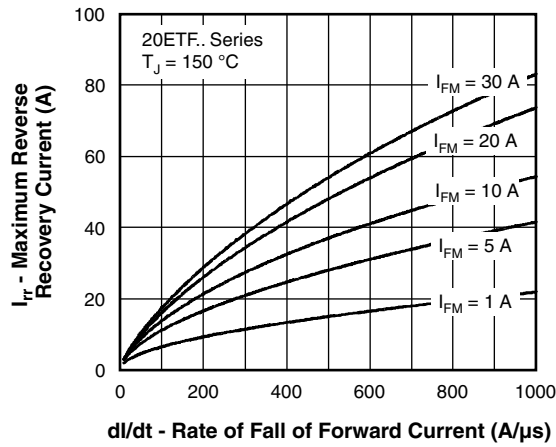


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^\circ\text{C}$

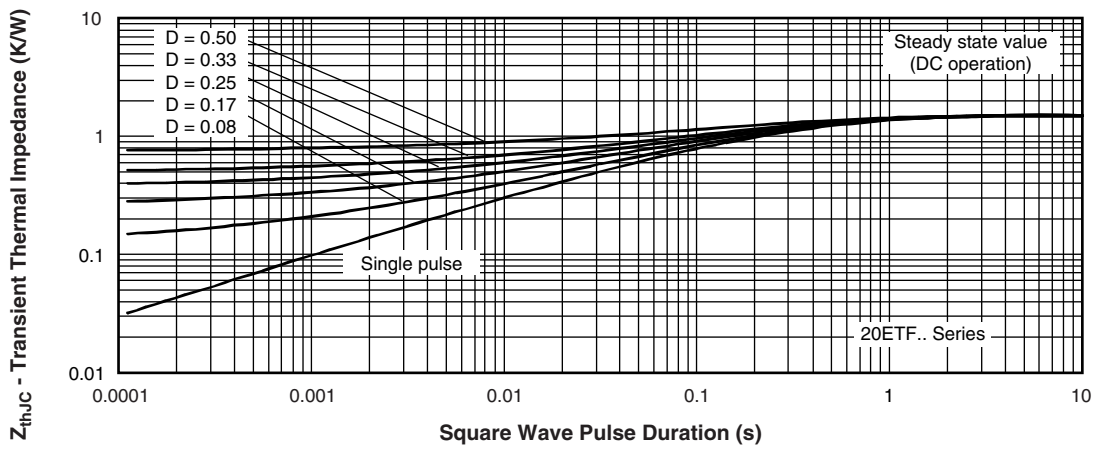


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

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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

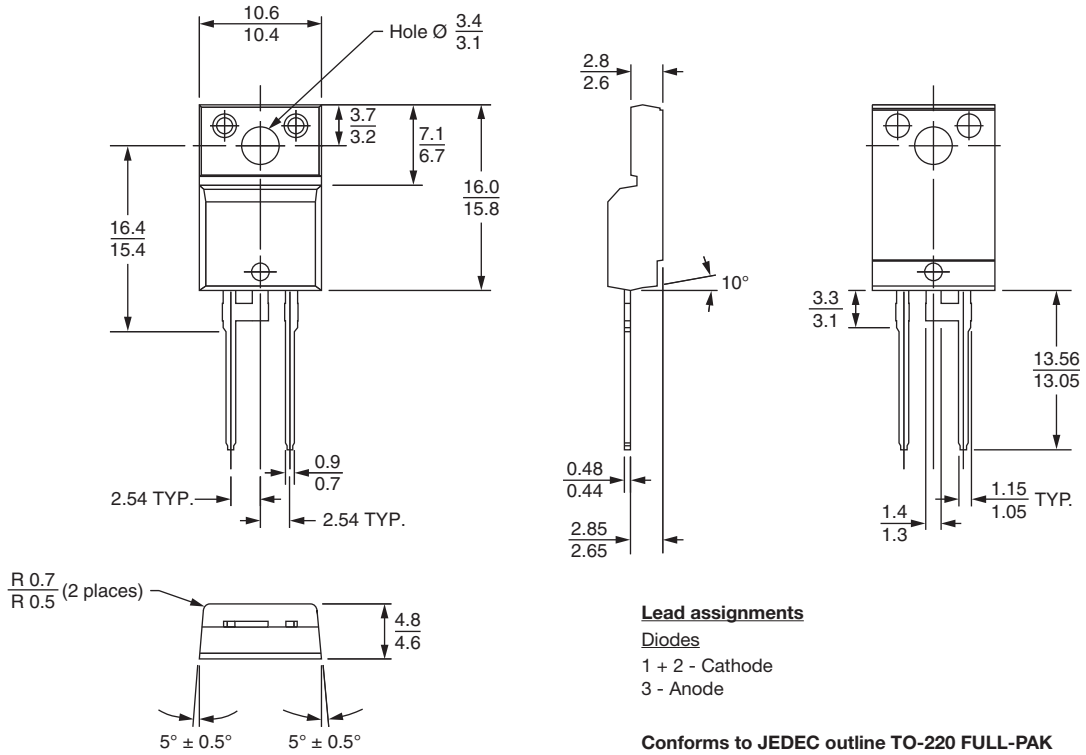
02 = 200 V
04 = 400 V
06 = 600 V

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95005
Part marking information	www.vishay.com/doc?95009
SPIICE model	www.vishay.com/doc?95410

TO-220AC FULL-PAK

DIMENSIONS in millimeters



Lead assignments

Diodes

- 1 + 2 - Cathode
- 3 - Anode

Conforms to JEDEC outline TO-220 FULL-PAK



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