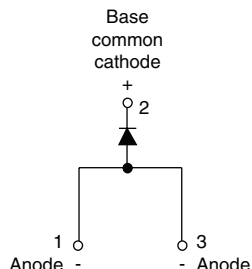


Surface Mountable Fast Soft Recovery Rectifier Diode, 20 A



D²PAK (SMD-220)



FEATURES/DESCRIPTION

The 20ETF..S 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.

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, $T_J = 25^\circ\text{C}$	1.2	V
t_{rr}	1 A, 100 A/ μs	60	ns
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
20ETF02S	200	300	5
20ETF04S	400	500	
20ETF06S	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	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	$\text{A}^2\sqrt{\text{s}}$

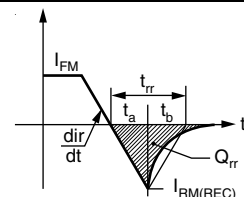
20ETF..S Soft Recovery Series

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ELECTRICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES
Maximum forward voltage drop	V_{FM}	20 A, $T_J = 25\text{ }^{\circ}\text{C}$		1.30
		60 A, $T_J = 25\text{ }^{\circ}\text{C}$		1.67
Forward slope resistance	r_t			12.5
Threshold voltage	$V_{F(TO)}$	$T_J = 150\text{ }^{\circ}\text{C}$		0.9
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1
		$T_J = 150\text{ }^{\circ}\text{C}$		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	A
Reverse recovery charge	Q_{rr}	25 $^{\circ}\text{C}$	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	0.9	$^{\circ}\text{C/W}$
Maximum thermal resistance junction to ambient (PCB mount)	$R_{thJA}^{(1)}$		40	
Soldering temperature	T_S		240	$^{\circ}\text{C}$
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D ² PAK (SMD-220)	20ETF02S	
			20ETF04S	
			20ETF06S	

Note

⁽¹⁾ When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μm) copper 40 $^{\circ}\text{C/W}$
For recommended footprint and soldering techniques refer to application note #AN-994



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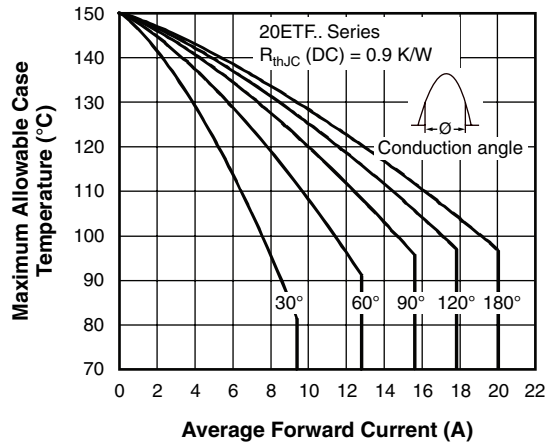


Fig. 1 - Current Rating Characteristics

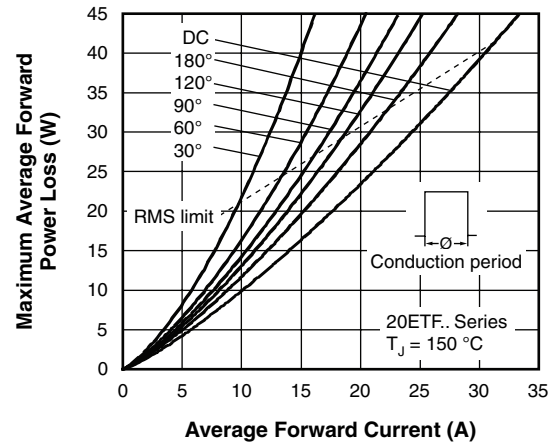


Fig. 4 - Forward Power Loss Characteristics

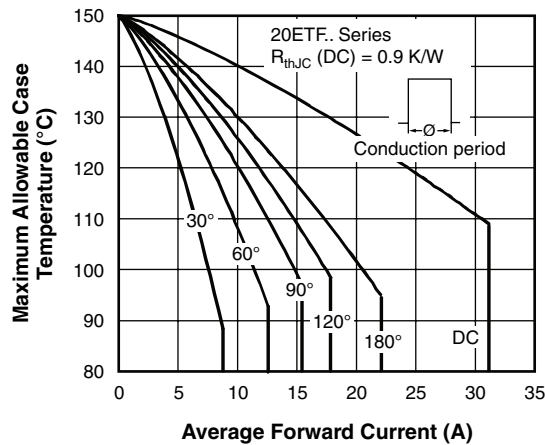


Fig. 2 - Current Rating Characteristics

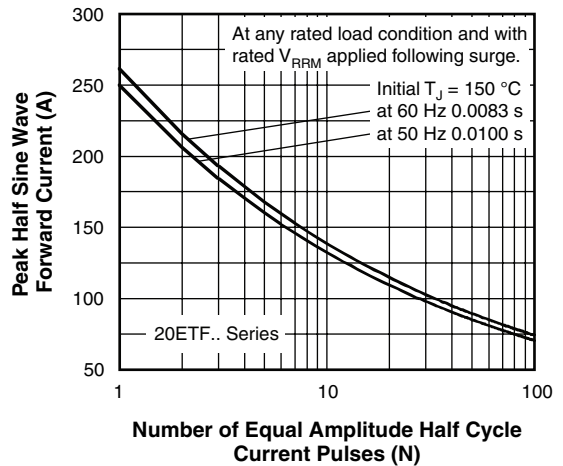


Fig. 5 - Maximum Non-Repetitive Surge Current

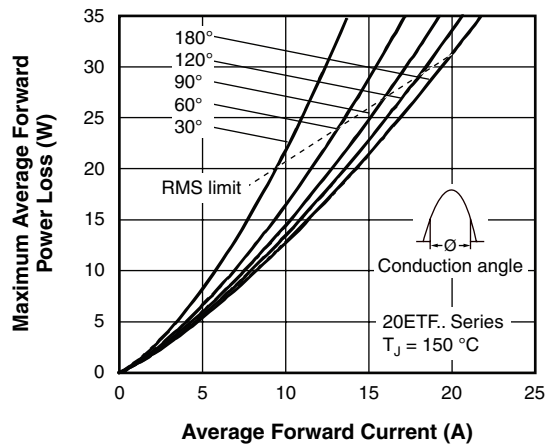


Fig. 3 - Forward Power Loss Characteristics

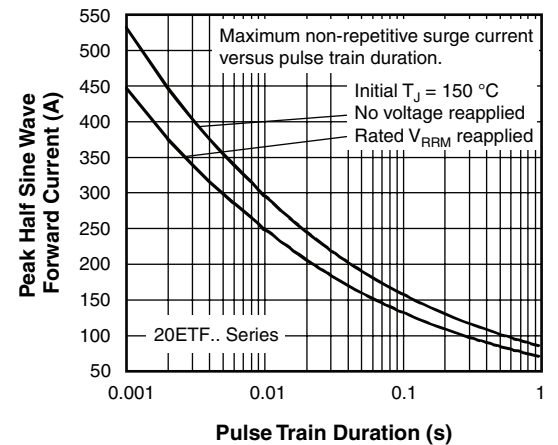


Fig. 6 - Maximum Non-Repetitive Surge Current

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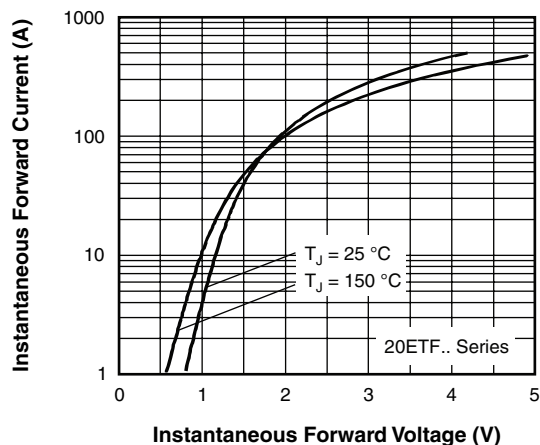


Fig. 7 - Forward Voltage Drop Characteristics

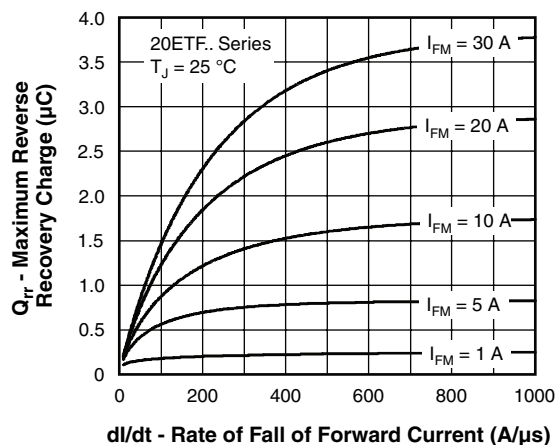


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^{\circ}\text{C}$

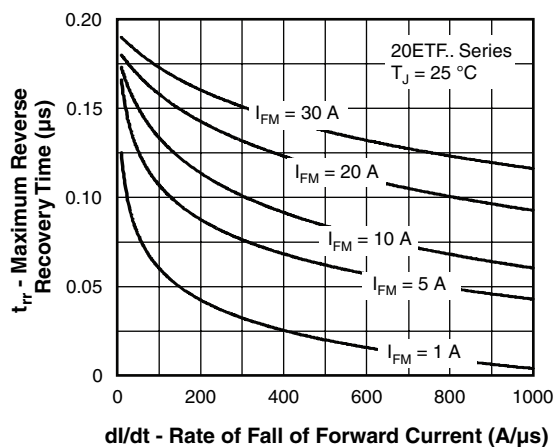


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^{\circ}\text{C}$

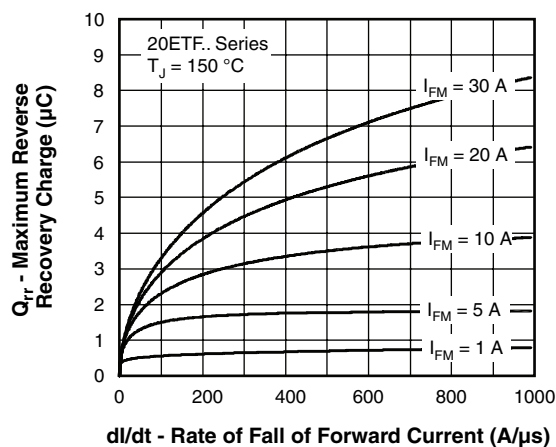


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^{\circ}\text{C}$

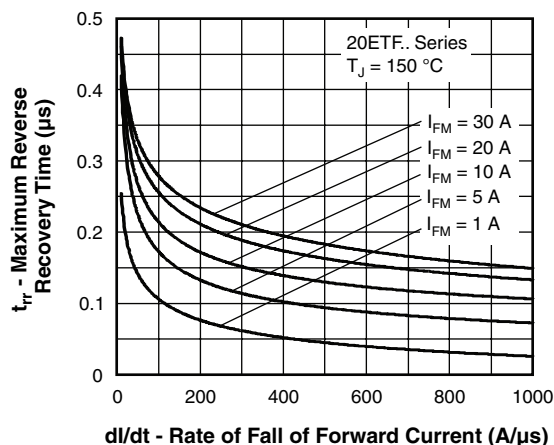


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^{\circ}\text{C}$

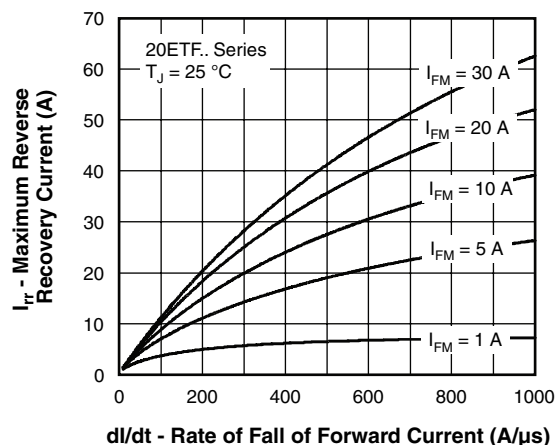


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^{\circ}\text{C}$



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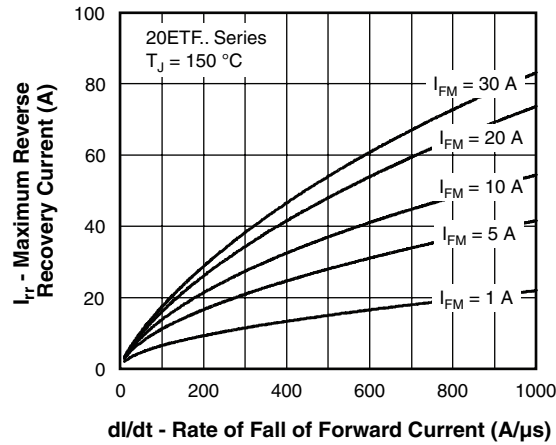


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ C$

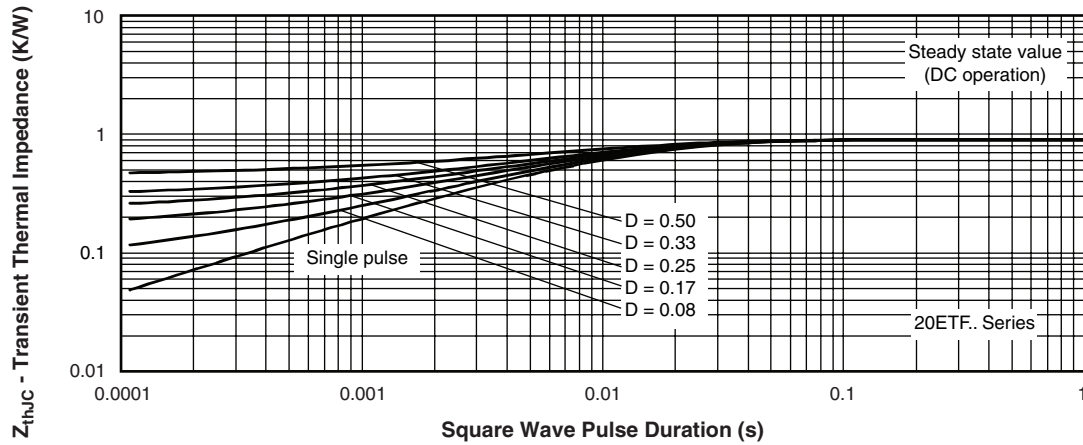


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

20ETF..S Soft Recovery Series

Vishay High Power Products Surface Mountable Fast
Soft Recovery Rectifier Diode, 20 A



ORDERING INFORMATION TABLE

Device code	20	E	T	F	06	S	TRL	-
	1	2	3	4	5	6	7	8

- | | | | |
|----------|---|--|------------|
| 1 | - | Current rating (20 = 20 A) | |
| 2 | - | Circuit configuration: | |
| | | E = Single diode | |
| 3 | - | Package: | |
| | | T = D ² PAK (TO-220AC) | |
| 4 | - | Type of silicon: | |
| | | F = Fast soft recovery rectifier | |
| 5 | - | Voltage code x 100 = V _{RRM} | 02 = 200 V |
| 6 | - | S = Surface mountable | 04 = 400 V |
| | | | 06 = 600 V |
| 7 | - | • None = Tube | |
| | | • TRR = Tape and reel (right oriented) | |
| | | • TRL = Tape and reel (left oriented) | |
| 8 | - | • None = Standard production | |
| | | • PbF = Lead (Pb)-free | |

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95046
Part marking information	http://www.vishay.com/doc?95054
Packaging information	http://www.vishay.com/doc?95032



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