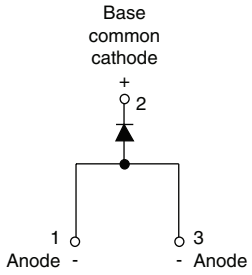
Fast Soft Recovery Rectifier Diode, 10 A

D²PAK (SMD-220)



FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

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

DESCRIPTION

The VS-10ETF..SPbF 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.

PRODUCT SUMMARY	
V_{RRM}	200 V to 600 V
V_F at 10 A	< 1.2 V
t_{rr}	50 ns

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		200 to 600	V
$I_{F(AV)}$	Sinusoidal waveform	10	A
I_{FSM}		150	
t_{rr}	1 A, 100 A/µs	50	ns
V_F	10 A, T_J = 25 °C	1.2	V
T_J	Range	- 40 to 150	°C

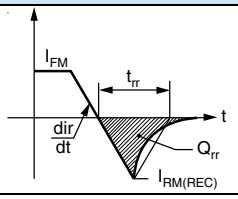
VOLTAGE RATINGS			
PART NUMBER	V_{RRM}, MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 150 °C mA
VS-10ETF02SPbF	200	300	2
VS-10ETF04SPbF	400	500	
VS-10ETF06SPbF	600	700	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 128 °C, 180° conduction half sine wave	10	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	150	
		10 ms sine pulse, no voltage reapplied	160	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	112.5	A^2s
		10 ms sine pulse, no voltage reapplied	160	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied	1125	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	10 A, T_J = 25 °C		1.2	V
Forward slope resistance	r_t	T_J = 150 °C		12.7	mΩ
Threshold voltage	$V_{F(TO)}$			1.25	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °C		2.0	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 10 Apk 25 A/µs 25 °C	145	ns	
Reverse recovery current	I_{rr}		2.75	A	
Reverse recovery charge	Q_{rr}		0.32	µC	
Snap factor	S		0.6		

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		- 40 to 150	°C
Maximum thermal resistance junction to case	R_{thJC}	DC operation	1.5	°C/W
Maximum thermal resistance junction to ambient (PCB mount)	R_{thJA} (1)		40	
Soldering temperature	T_S		240	°C
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D^2PAK (SMD-220)	10ETF02S	
			10ETF04S	
			10ETF06S	

Note

(1) When mounted on 1" square (650 mm^2) PCB of FR-4 or G-10 material 4 oz. (140 µm) copper 40 °C/W.
For recommended footprint and soldering techniques refer to application note #AN-994.

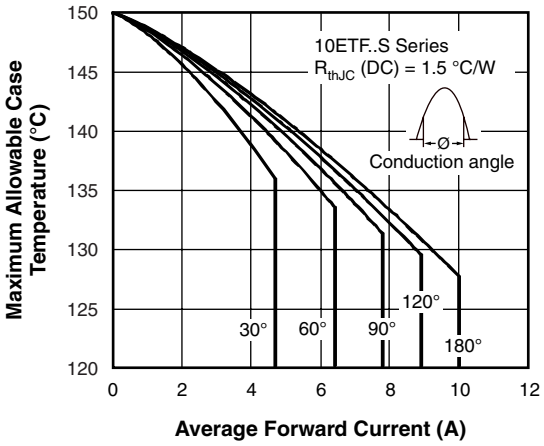


Fig. 1 - Current Rating Characteristics

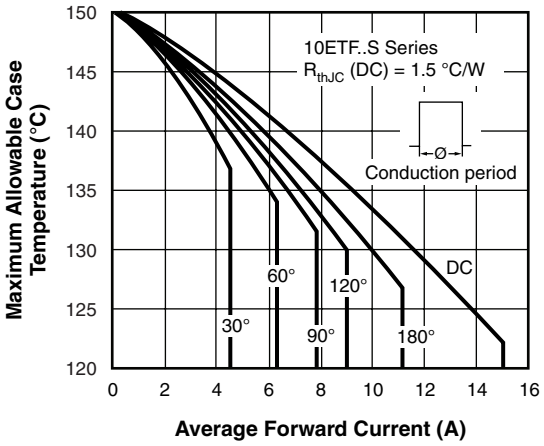


Fig. 2 - Current Rating Characteristics

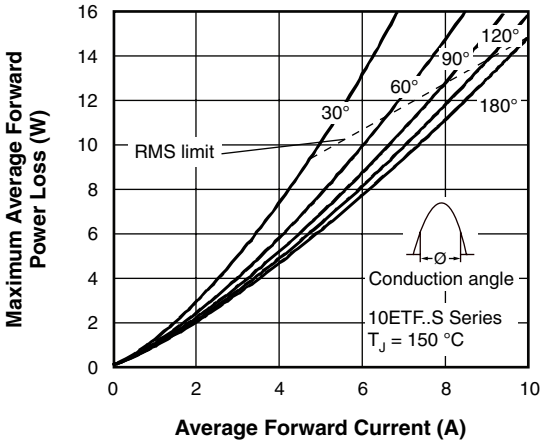


Fig. 3 - Forward Power Loss Characteristics

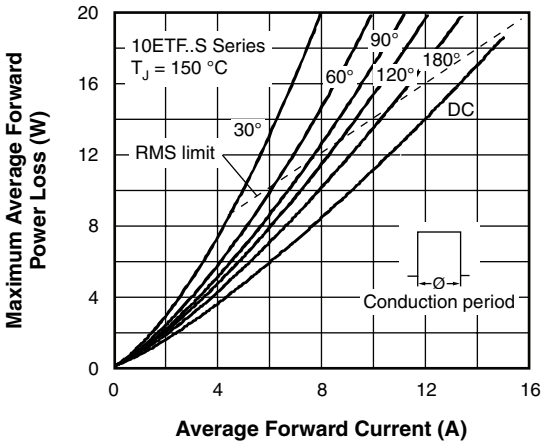


Fig. 4 - Forward Power Loss Characteristics

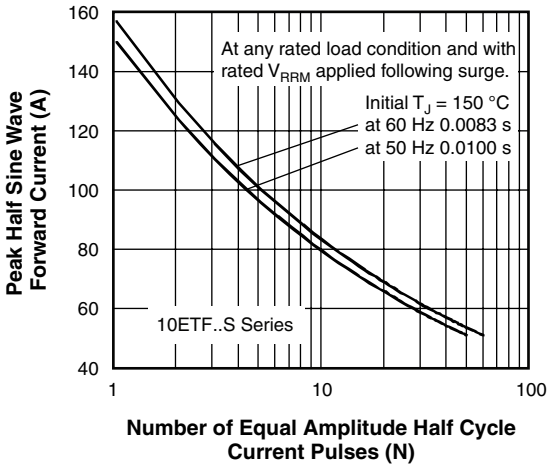


Fig. 5 - Maximum Non-Repetitive Surge Current

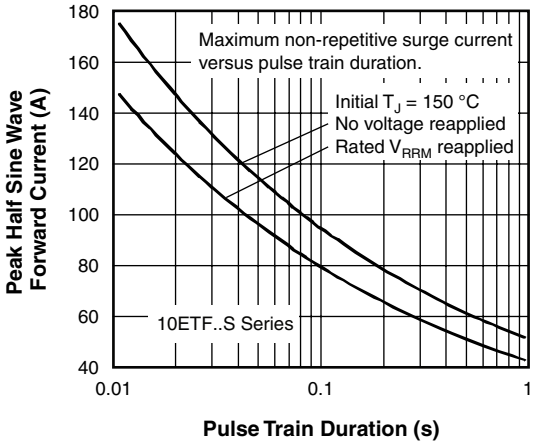


Fig. 6 - Maximum Non-Repetitive Surge Current

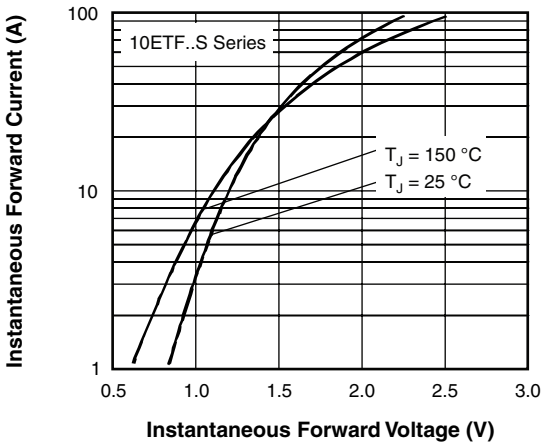


Fig. 7 - Forward Voltage Drop Characteristics

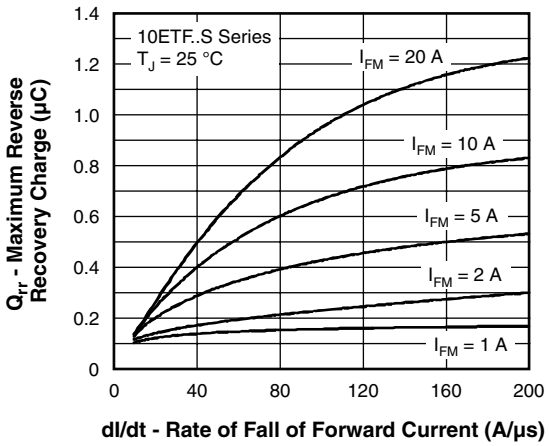


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

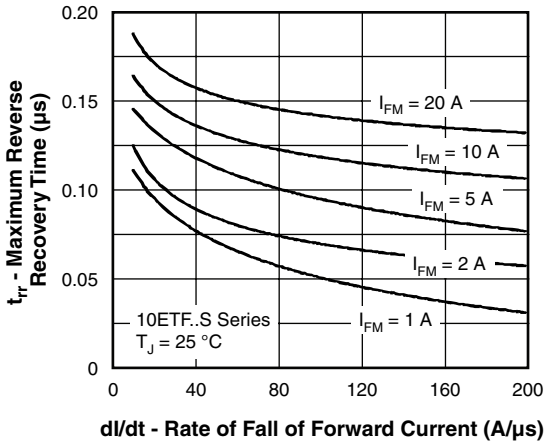


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

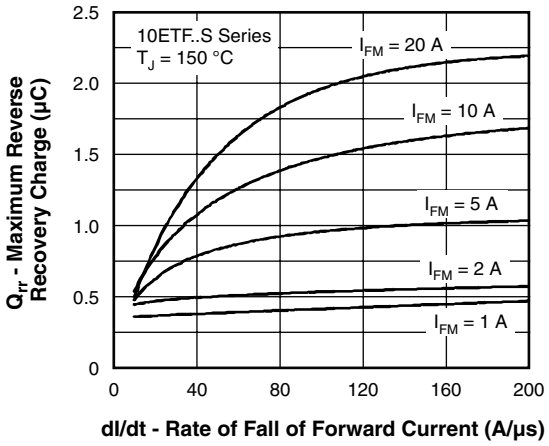


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

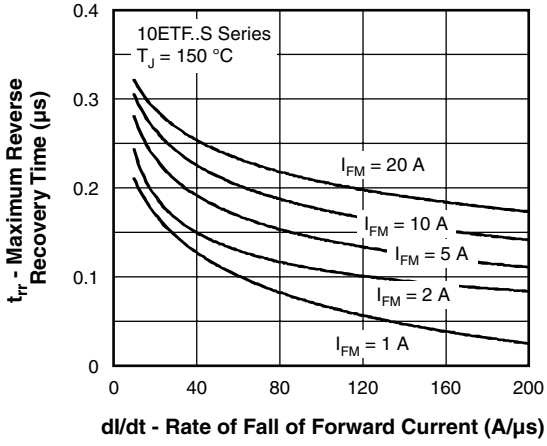


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

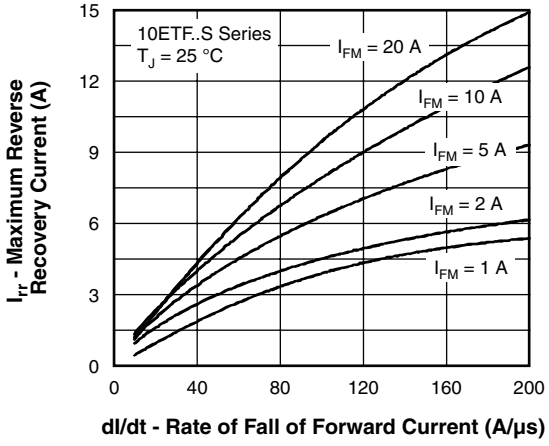


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

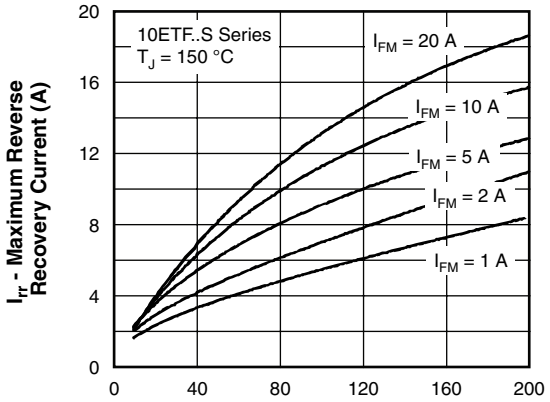


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

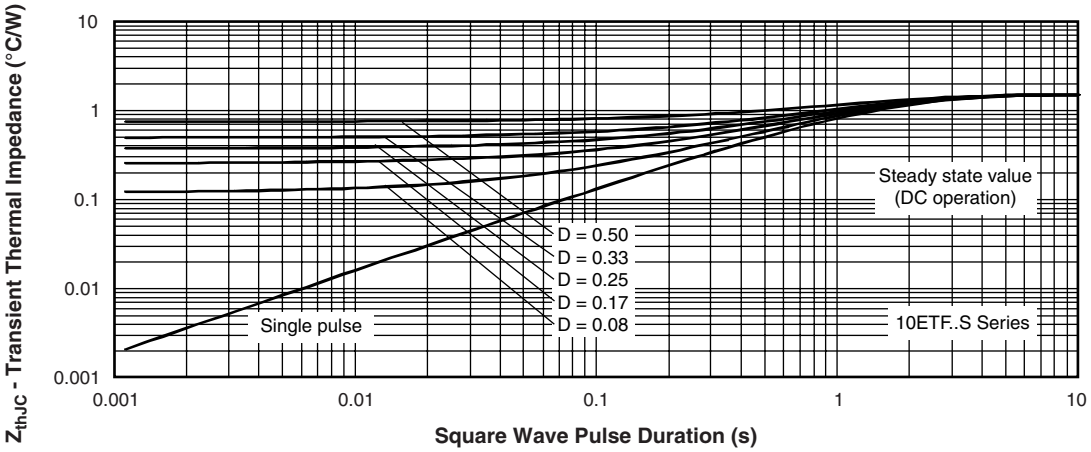


Fig. 14 - - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	10	E	T	F	06	S	TRL	PbF
1	2	3	4	5	6	7	8	9

1 - HPP product suffix

2 - Current rating (10 = 10 A)

3 - Circuit configuration:
E = Single diode

4 - Package:
T = D^2PAK (TO-220AC)

5 - Type of silicon:
F = Fast soft recovery rectifier

6 - Voltage code x 100 = V_{RRM}
02 = 200 V
04 = 400 V
06 = 600 V

7 - S = Surface mountable

8 - • None = Tube
• TRR = Tape and reel (right oriented)
• TRL = Tape and reel (left oriented)

9 - PbF = Lead (Pb)-free

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

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