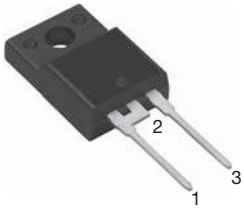
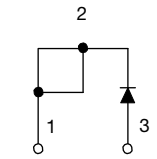
Fast Soft Recovery Rectifier Diode, 10 A



TO-220 FULL-PAK



Cathode Anode

FEATURES

- Glass passivated pellet chip junction
- 150 °C max. operation junction temperature
- Designed and qualified according to JEDEC®-JESD 47
- Fully isolated package (V_{INS} = 2500 V_{RMS})
- UL E78996 approved
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb e3 RoHS COMPLIANT HALOGEN FREE Available

APPLICATIONS

These devices are intended for use in output rectification and freewheeling in inverters, choppers and converters as well as in input rectification where severe restrictions on conducted EMI should be met.

DESCRIPTION

The VS-10ETF1..FP... 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	
Package	TO-220FP
$I_{F(AV)}$	10 A
V_R	1000 V, 1200 V
V_F at I_F	1.33 V
I_{FSM}	140 A
t_{rr}	80 ns
T_J max.	150 °C
Diode variation	Single die
Snap factor	0.6

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		1000 to 1200	V
$I_{F(AV)}$	Sinusoidal waveform	10	A
I_{FSM}		140	
t_{rr}	1 A, 100 A/µs	80	ns
V_F	10 A, T_J = 25 °C	1.33	V
T_J		-40 to +150	°C

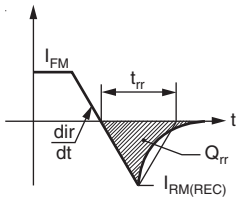
VOLTAGE RATINGS			
PART NUMBER	V_{RRM}, MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 150 °C mA
VS-10ETF10FPPbF, VS-10ETF10FP-M3	1000	1100	4
VS-10ETF12FPPbF, VS-10ETF12FP-M3	1200	1300	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 95 °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	115	
		10 ms sine pulse, no voltage reapplied	140	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	66	A^2s
		10 ms sine pulse, no voltage reapplied	94	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied	940	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	10 A, T_J = 25 °C		1.33	V
Forward slope resistance	r_t	T_J = 150 °C		22.9	mΩ
Threshold voltage	$V_{F(TO)}$			0.96	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °C		4	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 10 A_{pk} 25 A/µs 25 °C	310	ns	
Reverse recovery current	I_{rr}		4.7	A	
Reverse recovery charge	Q_{rr}		1.05	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	2.5	°C/W
Maximum thermal resistance junction to ambient		R_{thJA}		62	
Typical thermal resistance, case to heatsink		R_{thCS}	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-220 FULL-PAK	10ETF10FP 10ETF12FP	

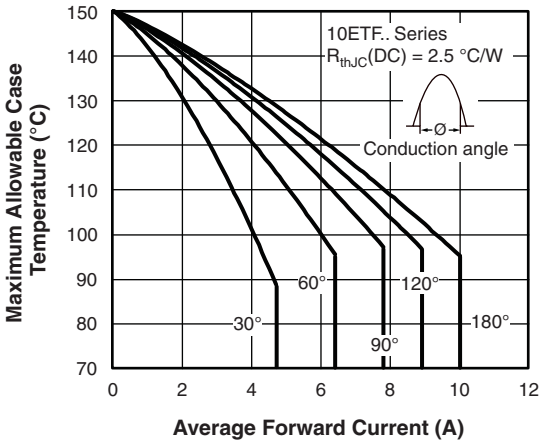


Fig. 1 - Current Rating Characteristics

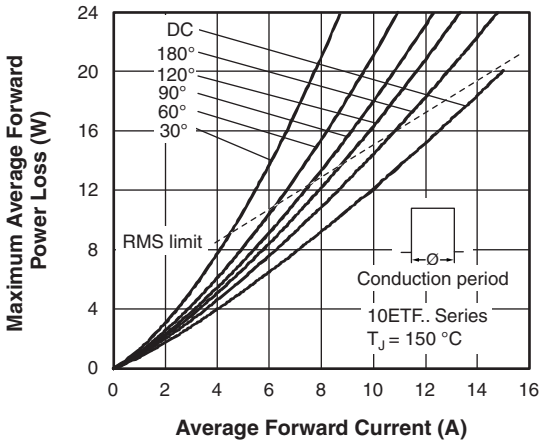


Fig. 4 - Forward Power Loss Characteristics

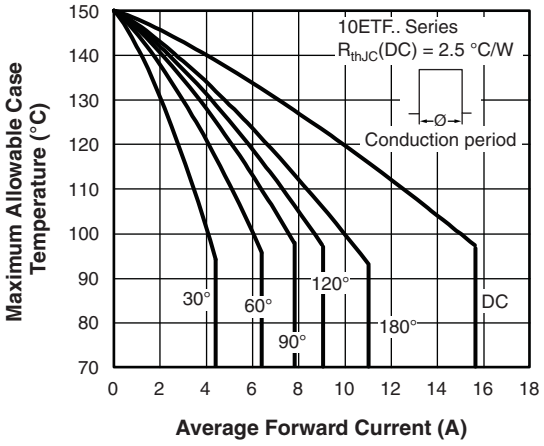


Fig. 2 - Current Rating Characteristics

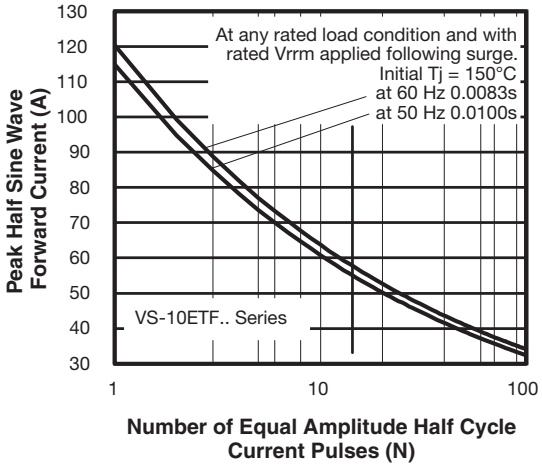


Fig. 5 - Maximum Non-Repetitive Surge Current

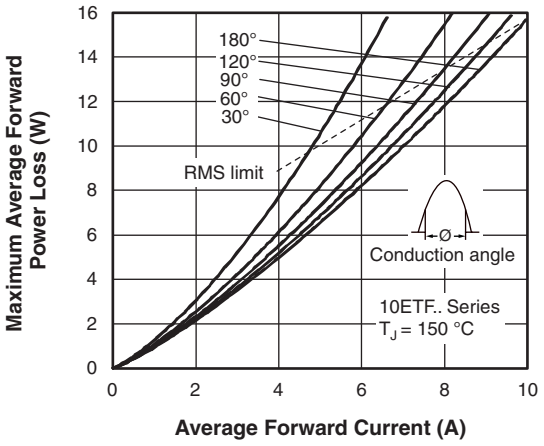


Fig. 3 - Forward Power Loss Characteristics

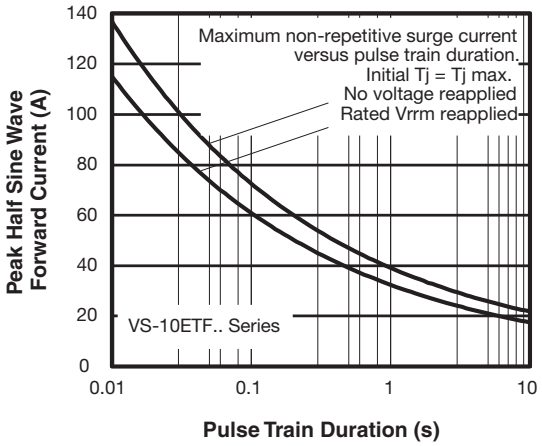


Fig. 6 - Maximum Non-Repetitive Surge Current

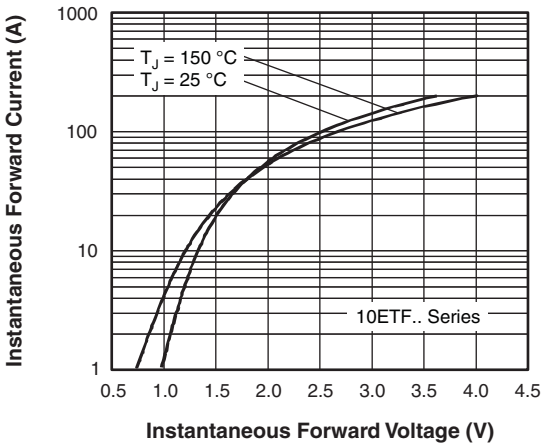


Fig. 7 - Forward Voltage Drop Characteristics

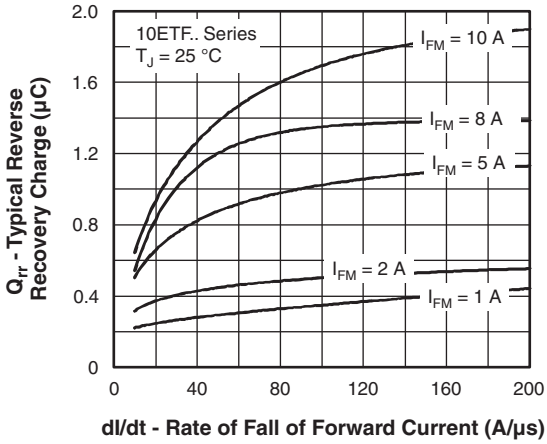


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

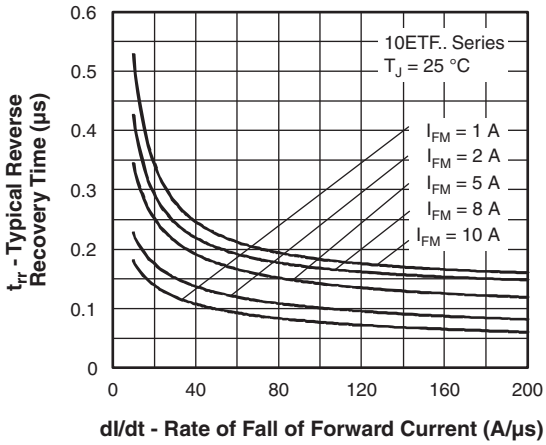


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

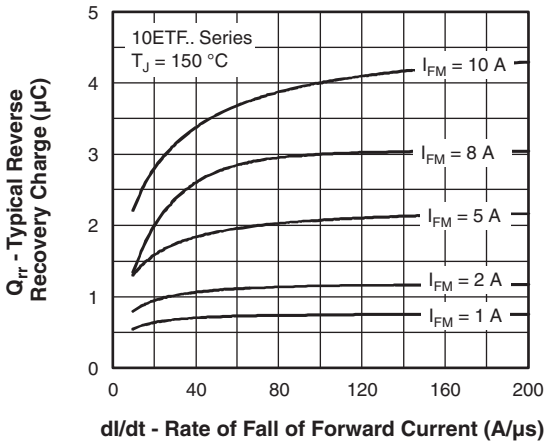


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

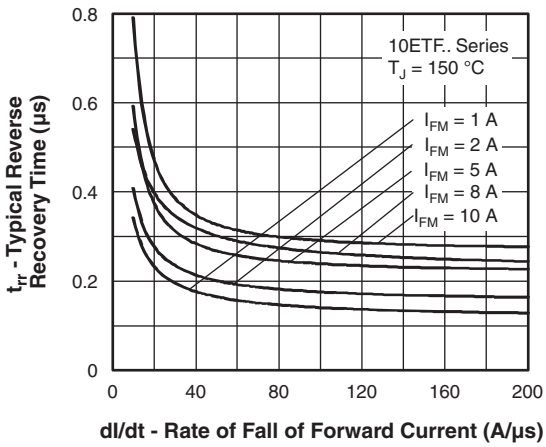


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

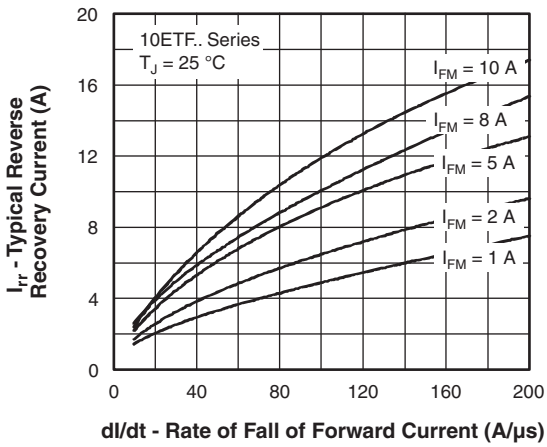


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

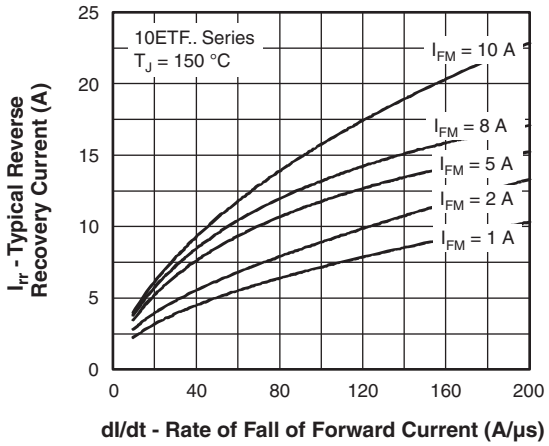


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

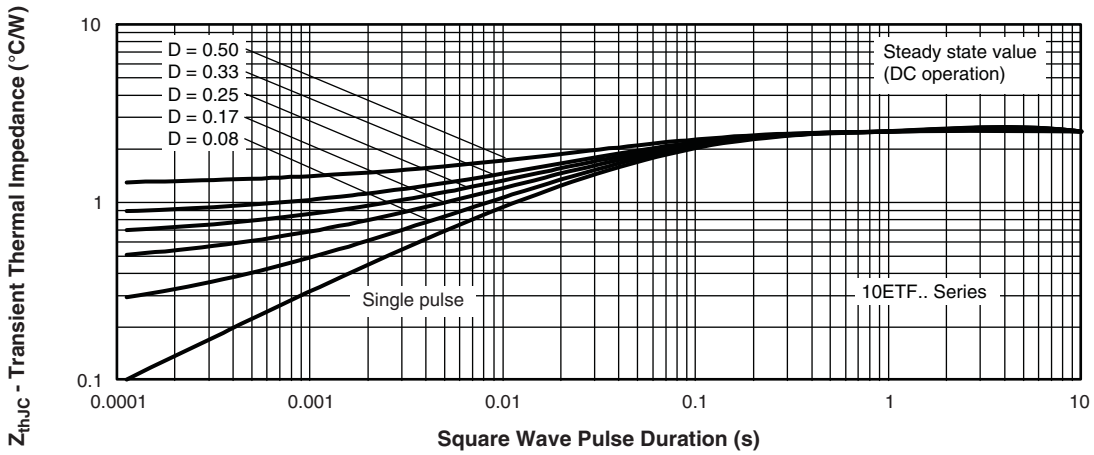
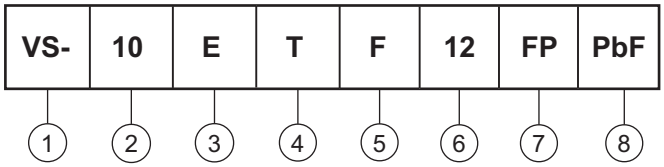


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - Current rating (10 = 10 A)

3 - Circuit configuration:
E = single diode

4 - Package:
T = TO-220

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

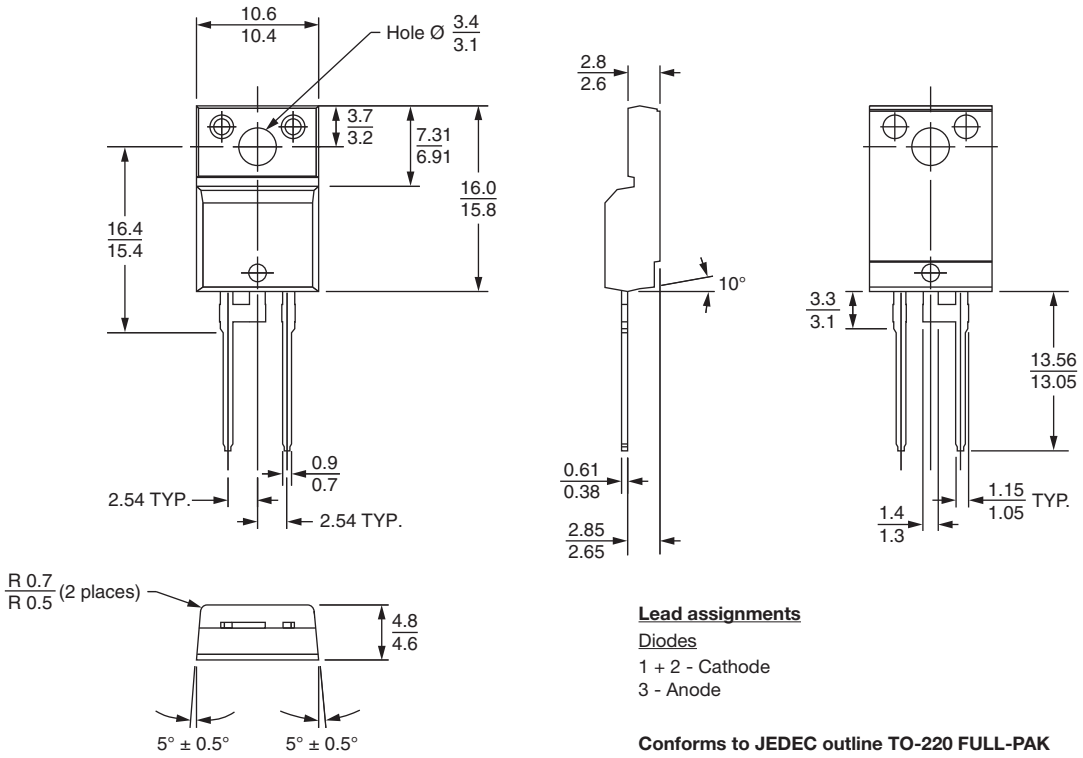
7 - FULL-PAK

8 - Environmental digit:
- PbF = lead (Pb)-free and RoHS-compliant
- -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-10ETF10FPPbF	50	1000	Antistatic plastic tubes
VS-10ETF10FP-M3	50	1000	Antistatic plastic tubes
VS-10ETF12FPPbF	50	1000	Antistatic plastic tubes
VS-10ETF12FP-M3	50	1000	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions		www.vishay.com/doc?95005
Part marking information	TO-220 FP PbF	www.vishay.com/doc?95009
	TO-220 FP -M3	www.vishay.com/doc?95440

DIMENSIONS in millimeters



Lead assignments

Diodes

1 + 2 - Cathode

3 - Anode

Conforms to JEDEC outline TO-220 FULL-PAK

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