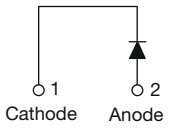
Fast Soft Recovery Rectifier Diode, 20 A

TO-220 FullPAK 2L



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})
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
V_R	1000 V, 1200 V
V_F at I_F	1.31 V
I_{FSM}	320 A
t_{rr}	95 ns
T_J max.	150 °C
Snap factor	0.6
Package	TO-220 FullPAK 2L
Circuit configuration	Single

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-20ETF...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.

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		1000, 1200	V
$I_{F(AV)}$	Sinusoidal waveform	20	A
I_{FSM}		320	
t_{rr}	1 A, 100 A/µs	95	ns
V_F	20 A, T_J = 25 °C	1.31	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-20ETF10FP-M3	1000	1100	6
VS-20ETF12FP-M3	1200	1300	

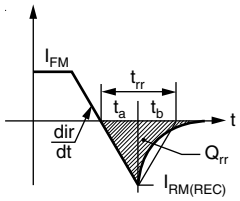
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 50 °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	270	A
		10 ms sine pulse, no voltage reapplied	320	A
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	365	A^2s
		10 ms sine pulse, no voltage reapplied	515	A^2s
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied	5150	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	20 A, T_J = 25 °C		1.31	V
Forward slope resistance	r_t	T_J = 150 °C		11.88	mΩ
Threshold voltage	$V_{F(TO)}$			0.93	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °C		6	mA

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 20 A_{pk} 25 A/µs 25 °C	400	ns	
Reverse recovery current	I_{rr}		6.1	A	
Reverse recovery charge	Q_{rr}		1.7	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	°C
Maximum thermal resistance, junction to case		R_{thJC}	DC operation	2.5	°C/W
Maximum thermal resistance, junction to ambient		R_{thJA}		62	°C/W
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth, and greased	0.5	°C/W
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	kgf · cm (lbf · in)
Marking device			Case style TO-220 FullPAK 2L	20ETF10FP 20ETF12FP	

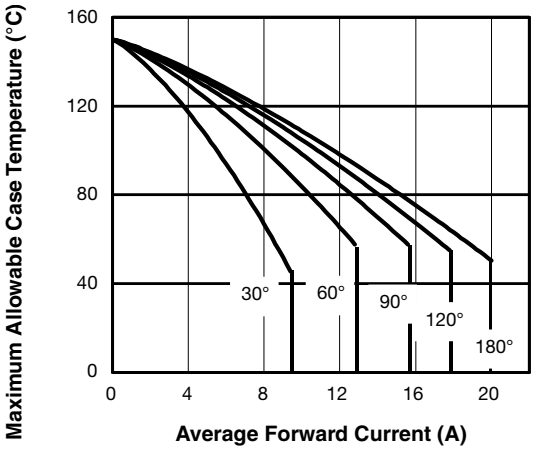


Fig. 1 - Current Rating Characteristics

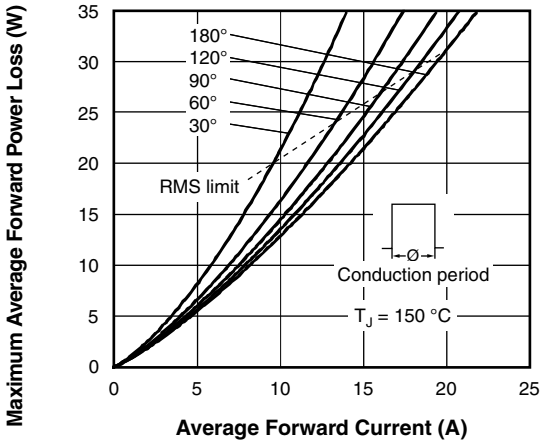


Fig. 4 - Forward Power Loss Characteristics

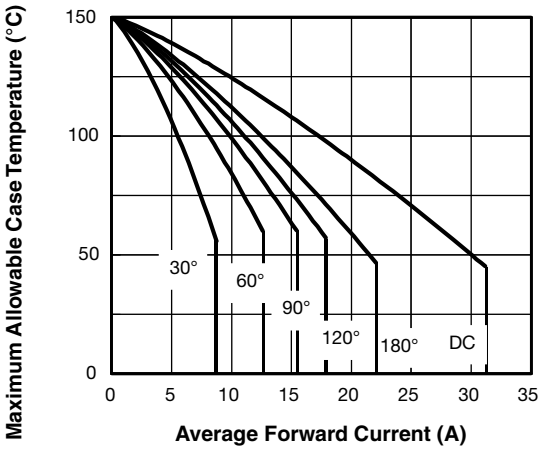


Fig. 2 - Current Rating Characteristics

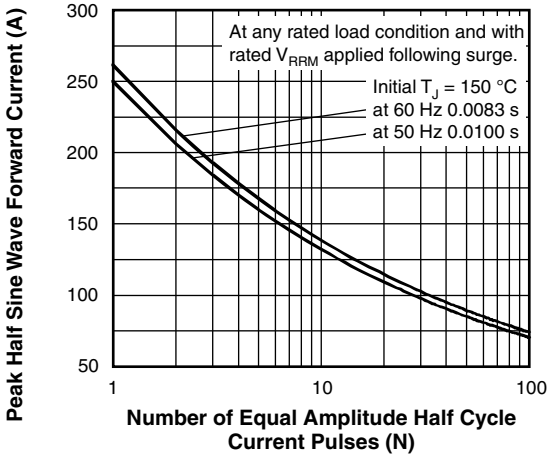


Fig. 5 - Maximum Non-Repetitive Surge Current

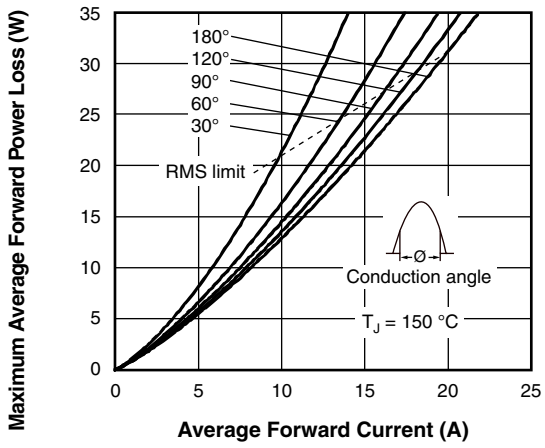


Fig. 3 - Forward Power Loss Characteristics

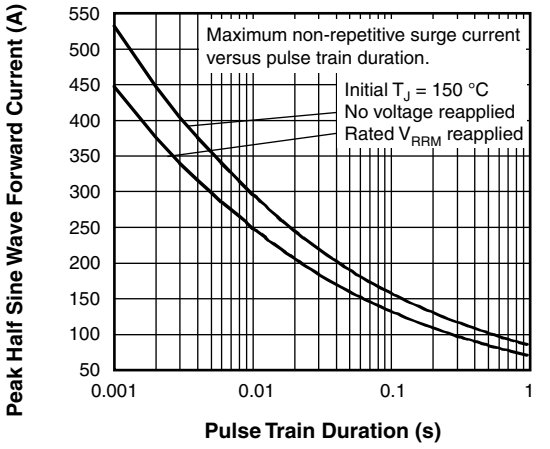


Fig. 6 - Maximum Non-Repetitive Surge Current

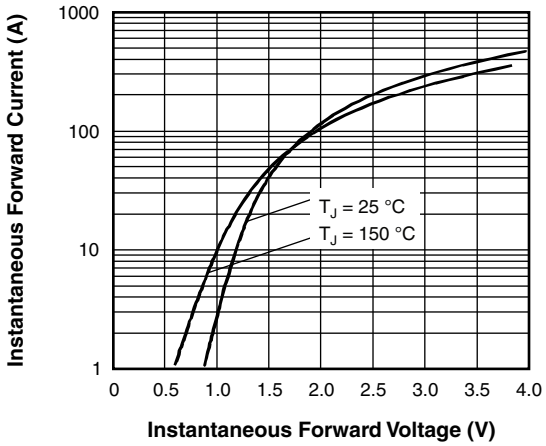


Fig. 7 - Forward Voltage Drop Characteristics

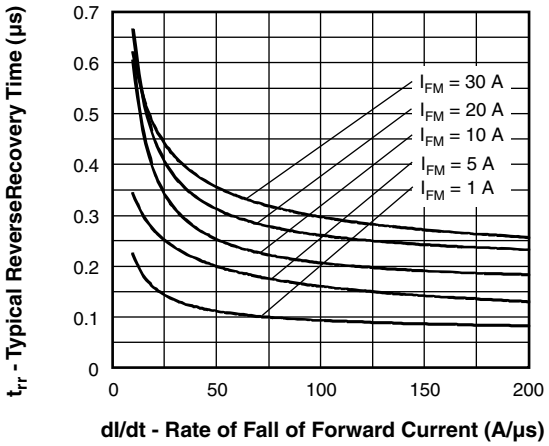


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

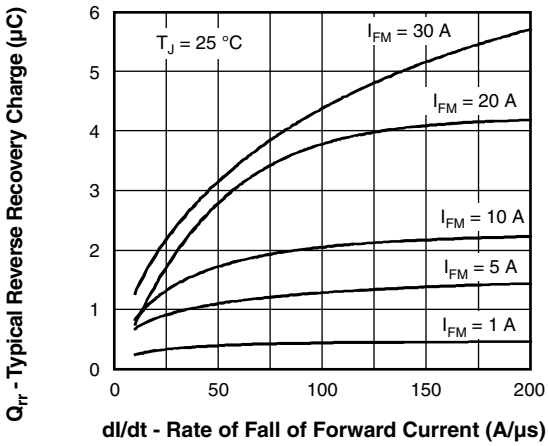


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

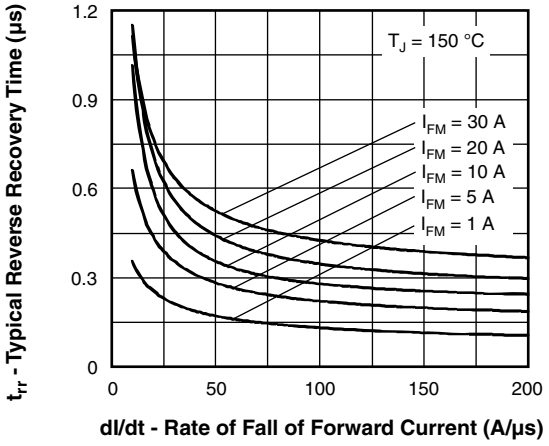


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

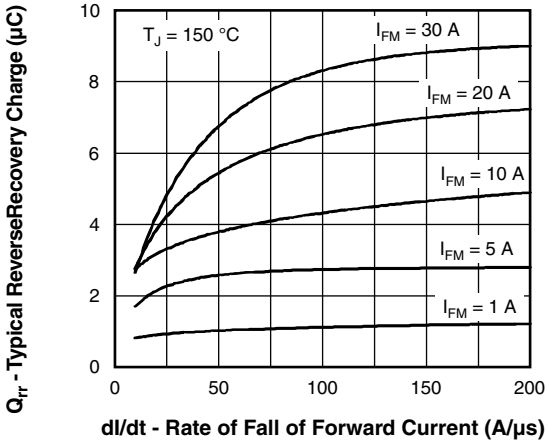


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

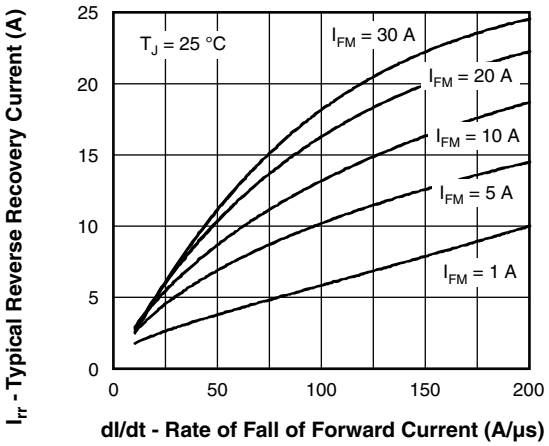


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

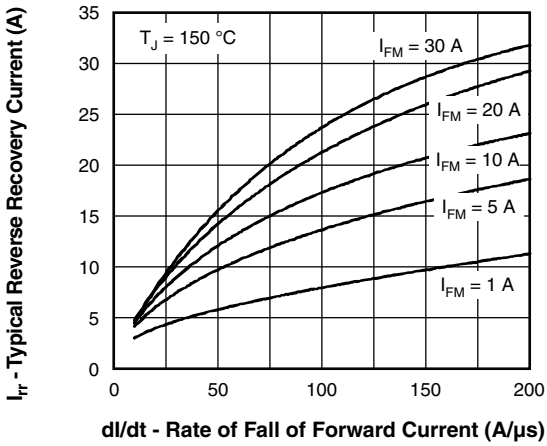


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

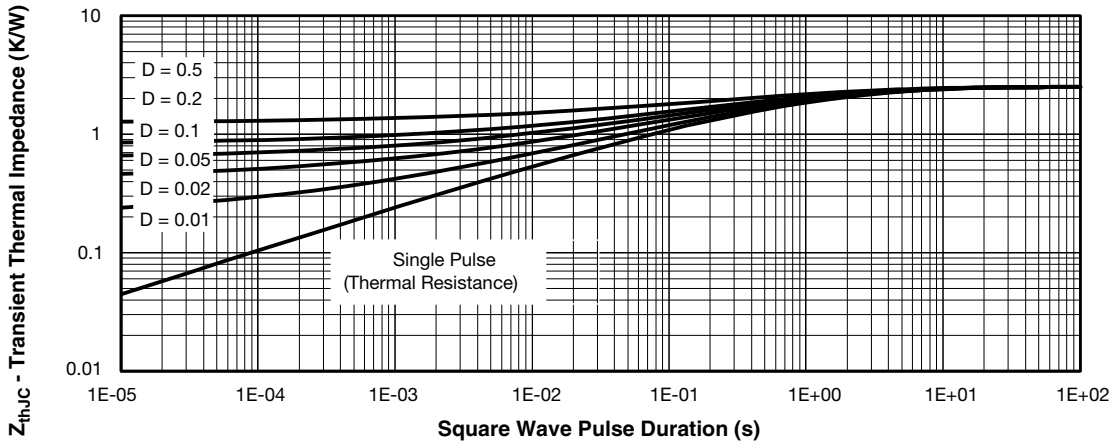


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	20	E	T	F	12	FP	-M3
1	2	3	4	5	6	7	8

1 - Vishay Semiconductors product

2 - Current rating (20 = 20 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} (10 = 1000 V, 12 = 1200 V)

7 - FullPAK

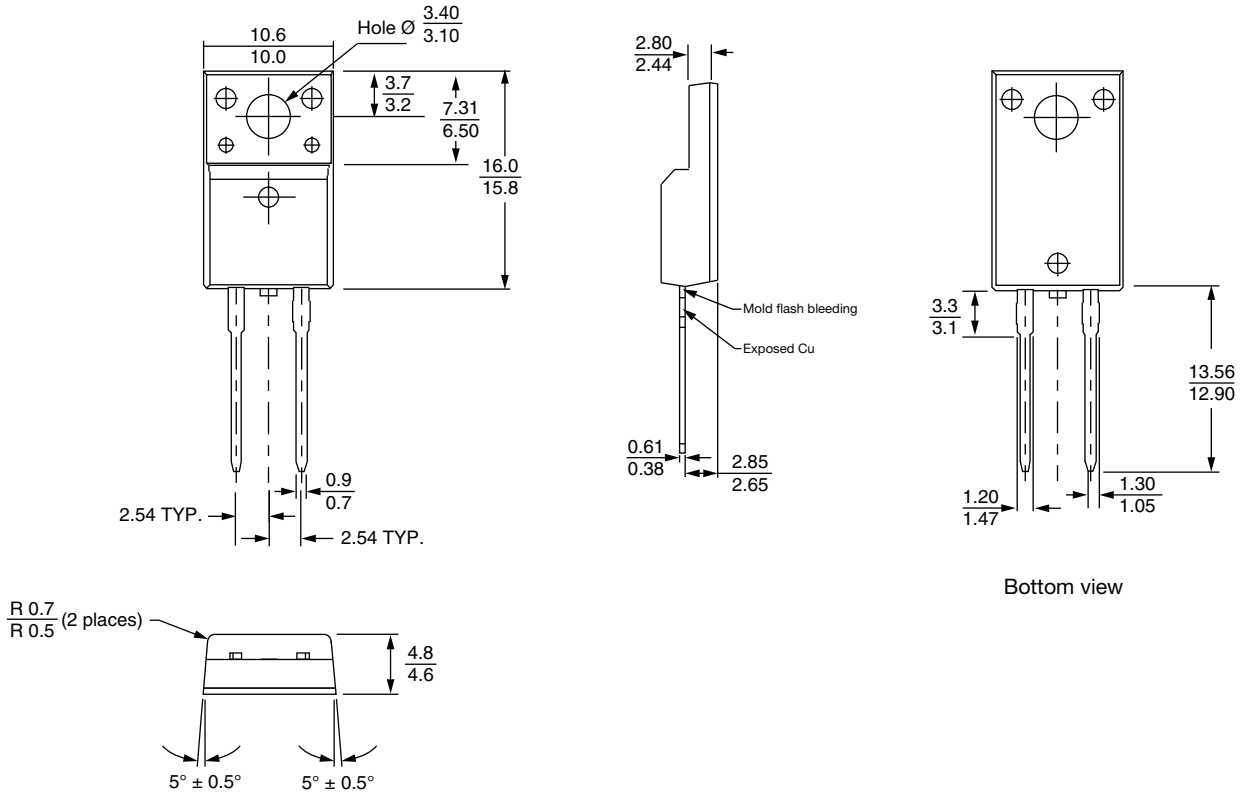
8 - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-20ETF10FP-M3	50	1000	Antistatic plastic tubes
VS-20ETF12FP-M3	50	1000	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96157
Part marking information	www.vishay.com/doc?95392

2L TO-220 FullPAK

DIMENSIONS in millimeters



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