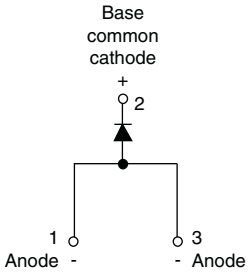
Surface Mountable Fast Soft Recovery Diode, 8 A

D-PAK



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

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

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

DESCRIPTION

The VS-8EWF..S-M3 fast soft recovery rectifier series has been optimized for combined short reverse recovery time, low forward voltage drop and low leakage current.

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

PRODUCT SUMMARY	
Package	D-PAK (TO-252AA)
$I_{F(AV)}$	8 A
V_R	200 V, 400 V, 600 V
V_F at I_F	1.2 V
I_{FSM}	120 A
t_{rr}	55 ns
Diode variation	Single die
Snap	0.5

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	8	A
V_{RRM}		200 to 600	V
I_{FSM}		120	A
V_F	8 A, T_J = 25 °C	1.2	V
t_{rr}	1 A, 100 A/µs	55	ns
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-8EWF02S-M3	200	300	3
VS-8EWF04S-M3	400	500	
VS-8EWF06S-M3	600	700	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 96 °C, 180° conduction half sine wave	8	A
Maximum peak one cycle non-repetitive surge current	I_{FSM} (1)	10 ms sine pulse, rated V_{RRM} applied	101	
		10 ms sine pulse, no voltage reapplied	120	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	51	A^2s
		10 ms sine pulse, no voltage reapplied	72	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied	510	$A^2\sqrt{s}$

Note

(1) Connecting one pin only.

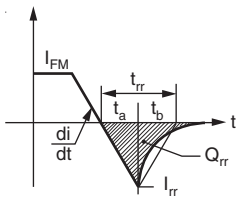
For technical questions within your region, please contact one of the following:
DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	8 A, T_J = 25 °C		1.2	V
Forward slope resistance	r_t	T_J = 150 °C		16	mΩ
Threshold voltage	$V_{F(TO)}$			1.13	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °C		3	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	t_{rr}	I_F at 1 Apk 100 A/µs T_J = 25 °C	55	ns
		I_F at 8 Apk 25 A/µs T_J = 25 °C	140	
Reverse recovery current	I_{rr}		2.6	A
Reverse recovery charge	Q_{rr}		0.25	µC
Snap factor	S		0.5	



THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		- 40 to 150	°C
Soldering temperature	T_S	For 10 seconds	240	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	2.5	°C/W
Typical thermal resistance, junction to ambient (PCB mount)	R_{thJA} (1)		50	
Approximate weight			1	g
			0.03	oz.
Marking device		Case style TO-252AA (D-PAK)	8EWF02S	
			8EWF04S	
			8EWF06S	

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

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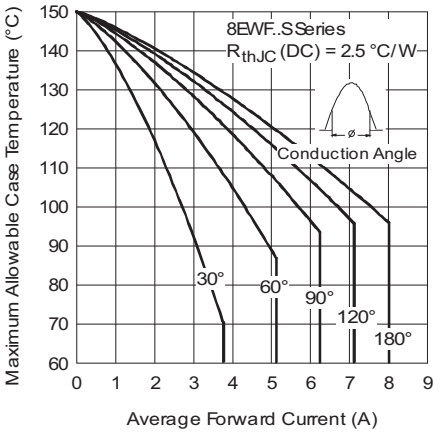


Fig. 1 - Current Rating Characteristics

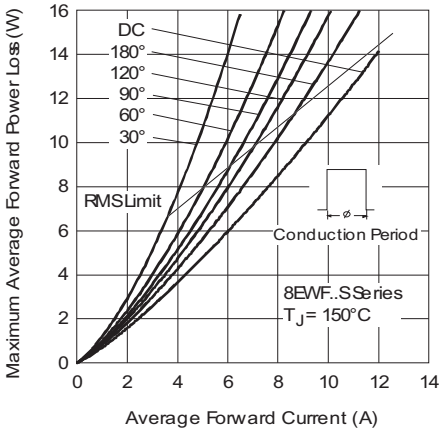


Fig. 4 - Forward Power Loss Characteristics

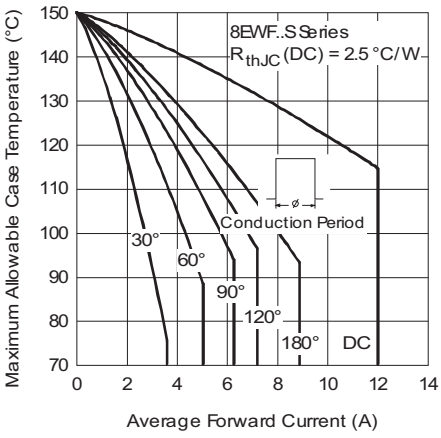


Fig. 2 - Current Rating Characteristics

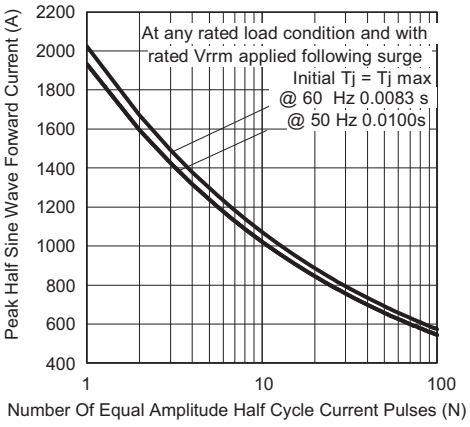


Fig. 5 - Maximum Non-Repetitive Surge Current

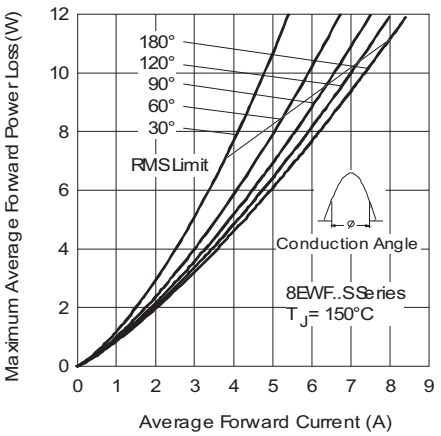


Fig. 3 - Forward Power Loss Characteristics

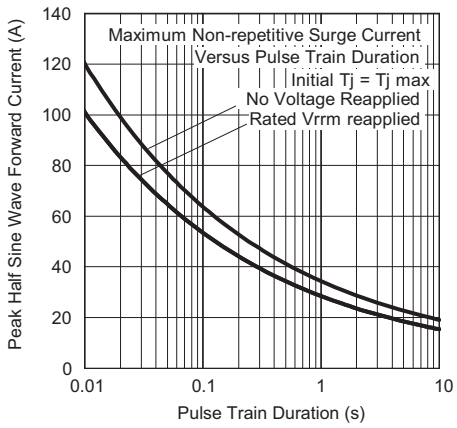


Fig. 6 - Maximum Non-Repetitive Surge Current

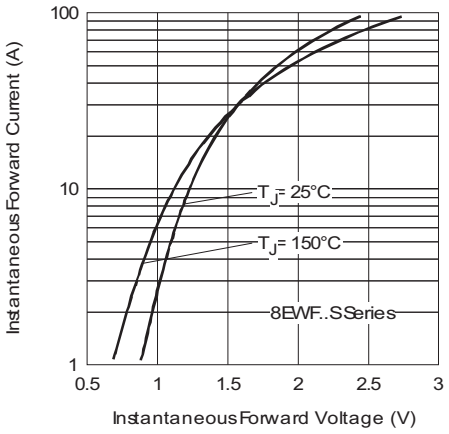


Fig. 7 - Forward Voltage Drop Characteristics

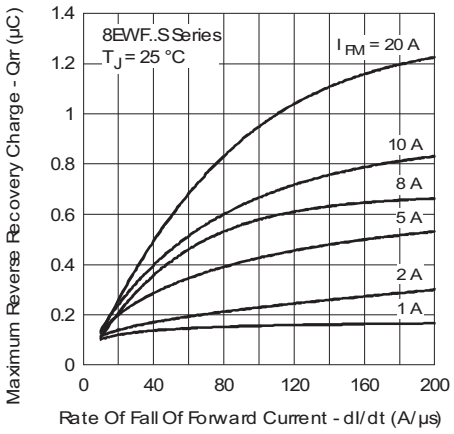


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

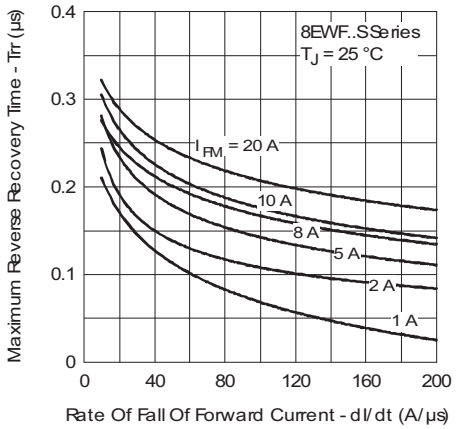


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

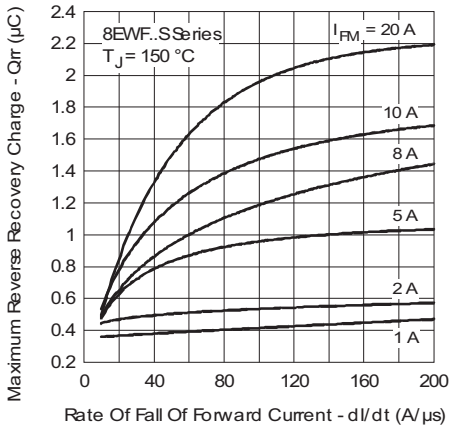


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

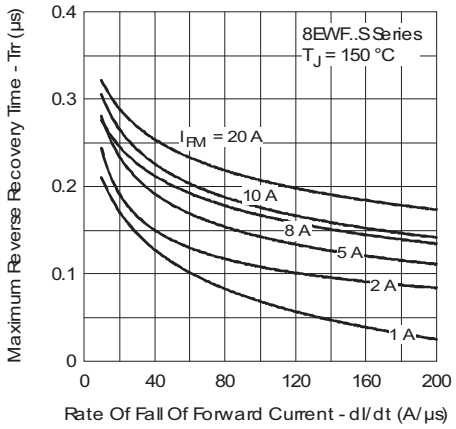


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

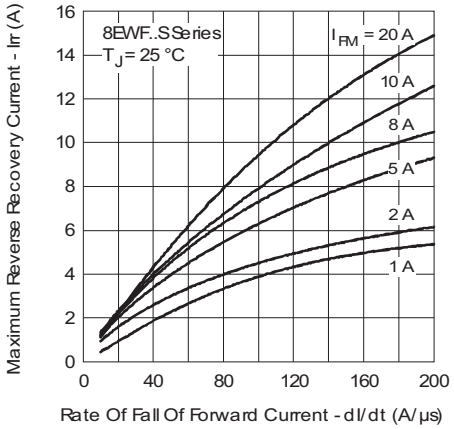


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

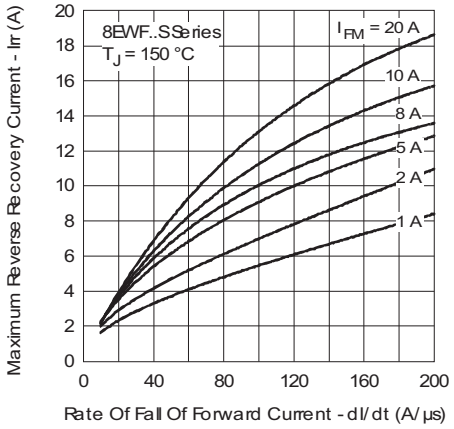


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

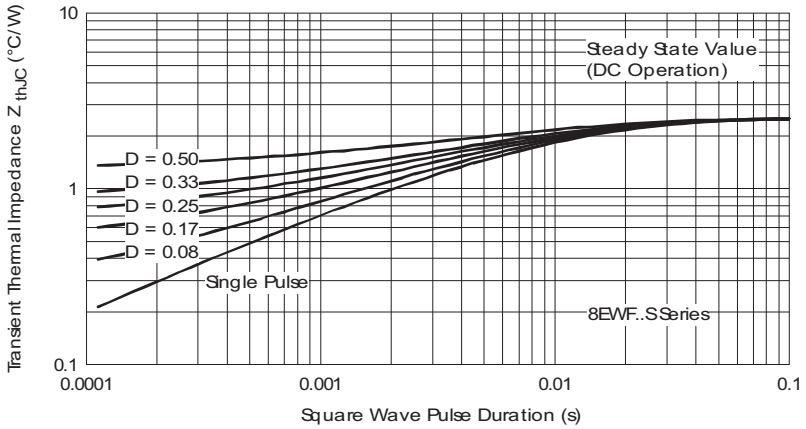


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	8	E	W	F	06	S	TR	-M3
1	2	3	4	5	6	7	8	9

1 - Vishay Semiconductors product

2 - Current rating (8 = 8 A)

3 - Circuit configuration:

E = Single diode

4 - Package:

W = D-PAK

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 - • TR = Tape and reel

• TRR = Tape and reel (right oriented)

• TRL = Tape and reel (left oriented)

9 - Environmental digit:

-M3 = Halogen-free, RoHS compliant and terminations lead (Pb)-free

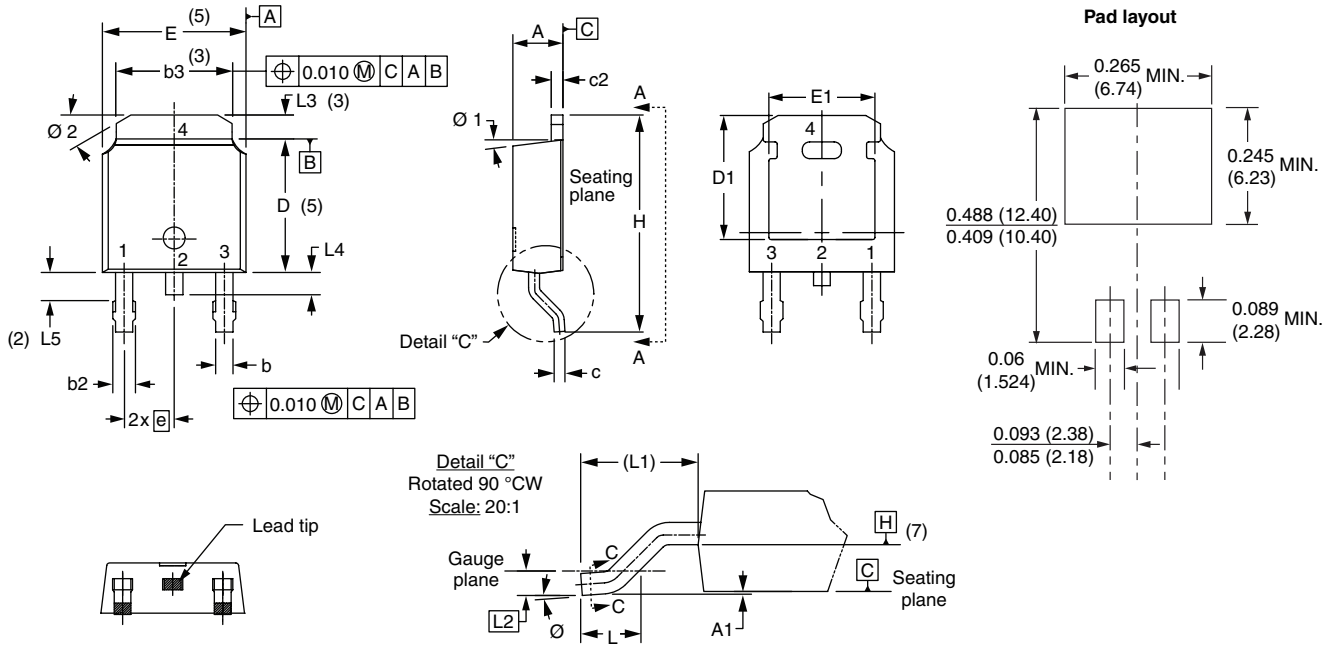
ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-8EWF02S-M3	75	3000	Antistatic plastic tubes
VS-8EWF02STR-M3	2000	2000	13" diameter reel
VS-8EWF02STRL-M3	3000	3000	13" diameter reel
VS-8EWF02STRR-M3	3000	3000	13" diameter reel
VS-8EWF04S-M3	75	3000	Antistatic plastic tubes
VS-8EWF04STR-M3	2000	2000	13" diameter reel
VS-8EWF04STRL-M3	3000	3000	13" diameter reel
VS-8EWF04STRR-M3	3000	3000	13" diameter reel
VS-8EWF06S-M3	75	3000	Antistatic plastic tubes
VS-8EWF06STR-M3	2000	2000	13" diameter reel
VS-8EWF06STRL-M3	3000	3000	13" diameter reel
VS-8EWF06STRR-M3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95016
Part marking information	www.vishay.com/doc?95176
Packaging information	www.vishay.com/doc?95033

D-PAK (TO-252AA)

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094	
A1	-	0.13	-	0.005	
b	0.64	0.89	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	3
c	0.46	0.61	0.018	0.024	
c2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	5
D1	5.21	-	0.205	-	3
E	6.35	6.73	0.250	0.265	5
E1	4.32	-	0.170	-	3

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
e	2.29 BSC		0.090 BSC		
H	9.40	10.41	0.370	0.410	
L	1.40	1.78	0.055	0.070	
L1	2.74 BSC		0.108 REF.		
L2	0.51 BSC		0.020 BSC		
L3	0.89	1.27	0.035	0.050	3
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	2
Ø	0°	10°	0°	10°	
Ø1	0°	15°	0°	15°	
Ø2	25°	35°	25°	35°	

Notes

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994

(2) Lead dimension uncontrolled in L5

(3) Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad

(4) Section C - C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.10") from the lead tip

(5) Dimension D, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body

(6) Dimension b1 and c1 applied to base metal only

(7) Datum A and B to be determined at datum plane H

(8) Outline conforms to JEDEC outline TO-252AA

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