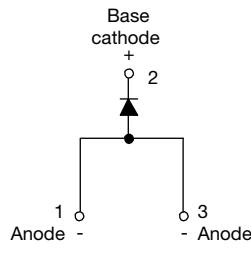


Surface Mount Fast Soft Recovery Rectifier Diode, 20 A


D²PAK (TO-263AB)

RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 245 °C
- Glass passivated pellet chip junction
- AEC-Q101 qualified
- Meets JESD 201 class 1A whisker test
- Flexible solution for reliable AC power rectification
- High surge, low V_F rugged blocking diode for DC charging stations
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Input rectification
- On-board and off-board EV / HEV battery chargers

DESCRIPTION

The VS-20ETF12SLHM3 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.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	20 A
V_R	1200 V
V_F at I_F	1.31 V
I_{FSM}	355 A
t_{rr}	95 ns
T_J max.	150 °C
Package	D ² PAK (TO-263AB)
Circuit configuration	Single
Snap factor	0.6

ADDITIONAL RESOURCES



3D Models

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	20	A
V_{RRM}		1200	V
I_{FSM}		355	A
V_F	20 A, $T_J = 25$ °C	1.31	V
t_{rr}	1 A, 100 A/μs	95	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-20ETF12SLHM3	1200	1300	6

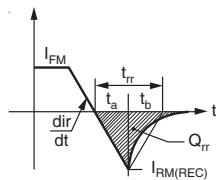
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 97$ °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	300	
		10 ms sine pulse, no voltage reapplied	355	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	450	A^2s
		10 ms sine pulse, no voltage reapplied	635	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied	6350	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

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

RECOVERY CHARACTERISTICS

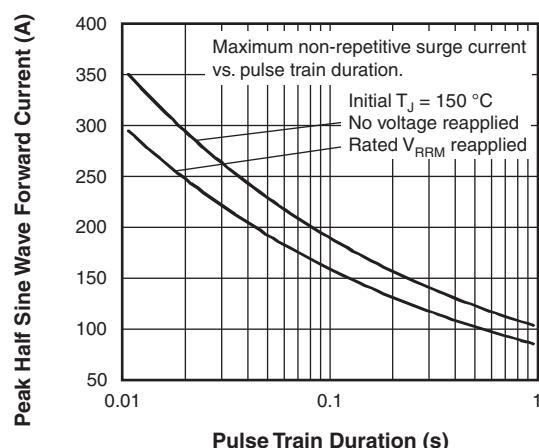
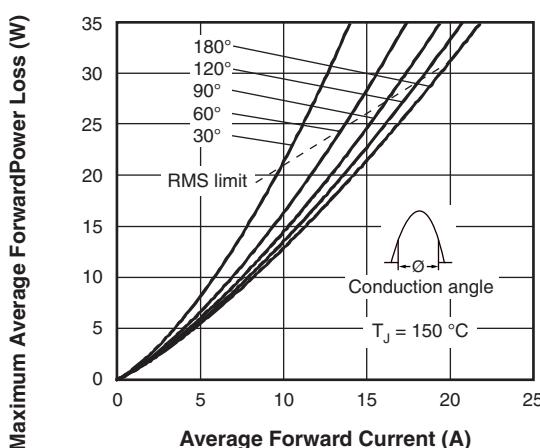
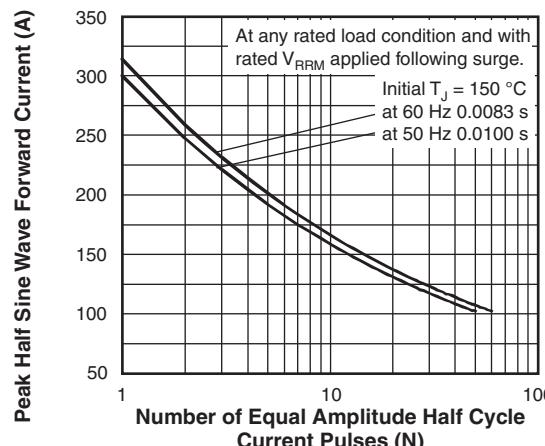
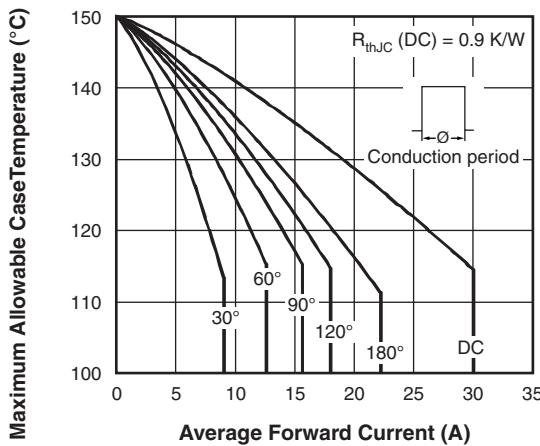
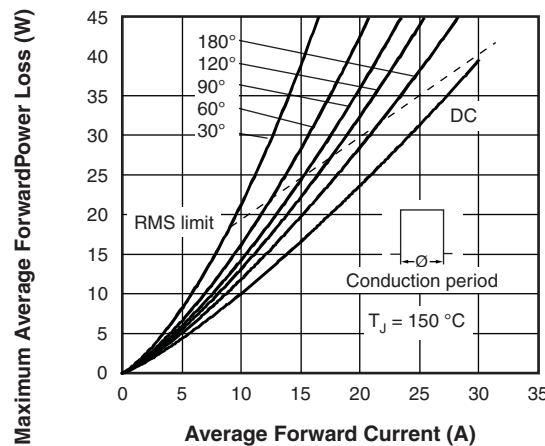
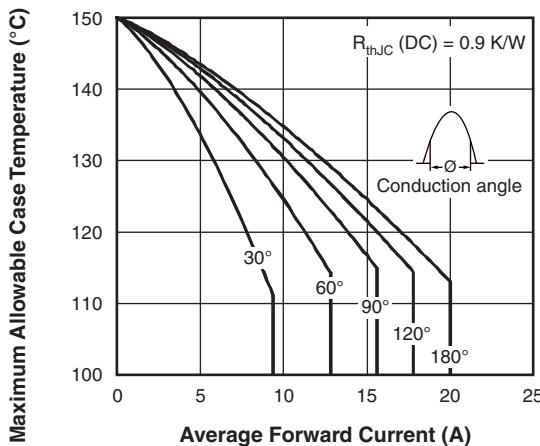
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 20 A _{pk} 25 A/ μs 25°C	400	ns	
Reverse recovery current	I_{rr}		6.1	A	
Reverse recovery charge	Q_{rr}		1.7	μC	
Snap factor	S	Typical		0.6	

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-40 to +150	$^\circ\text{C}$
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⁾		62	
Approximate weight			2	g
			0.07	
Marking device		Case style D ² PAK (TO-263AB)	20ETF12SLH	

Note

⁽¹⁾ When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μm) copper 40 $^\circ\text{C/W}$.



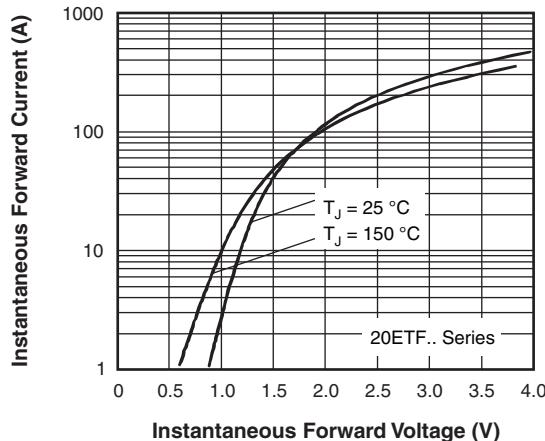


Fig. 7 - Forward Voltage Drop Characteristics

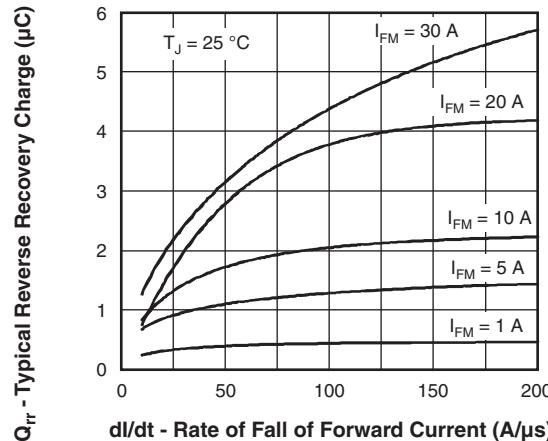


Fig. 10 - Recovery Charge Characteristics, $T_J = 25 \text{ } ^\circ\text{C}$

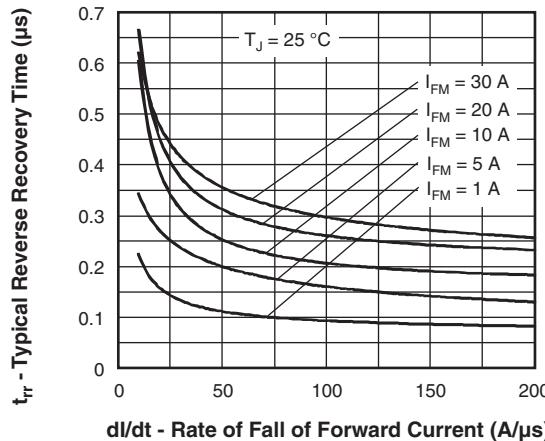


Fig. 8 - Recovery Time Characteristics, $T_J = 25 \text{ } ^\circ\text{C}$

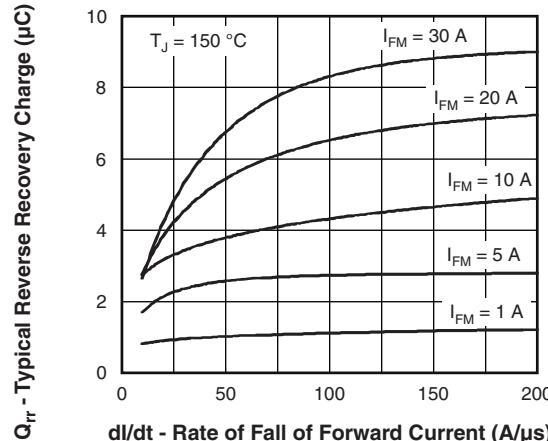


Fig. 11 - Recovery Charge Characteristics, $T_J = 150 \text{ } ^\circ\text{C}$

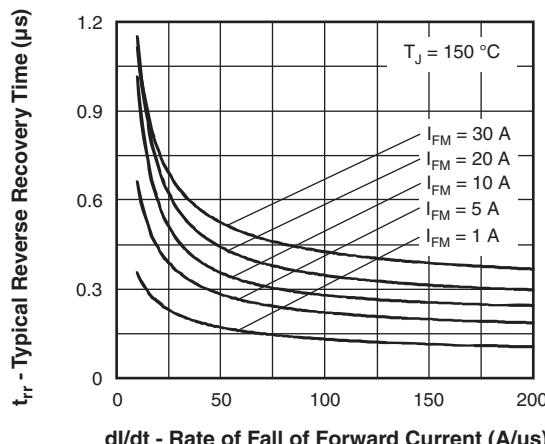


Fig. 9 - Recovery Time Characteristics, $T_J = 150 \text{ } ^\circ\text{C}$

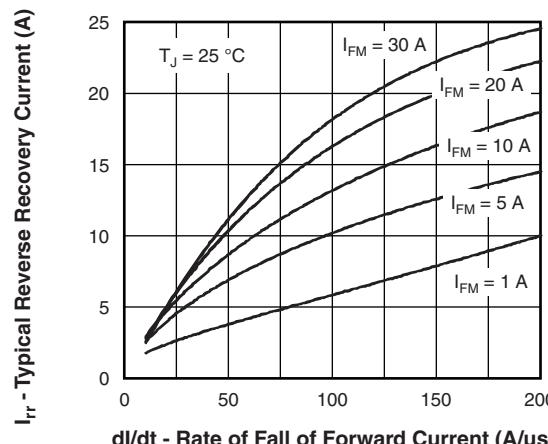


Fig. 12 - Recovery Current Characteristics, $T_J = 25 \text{ } ^\circ\text{C}$

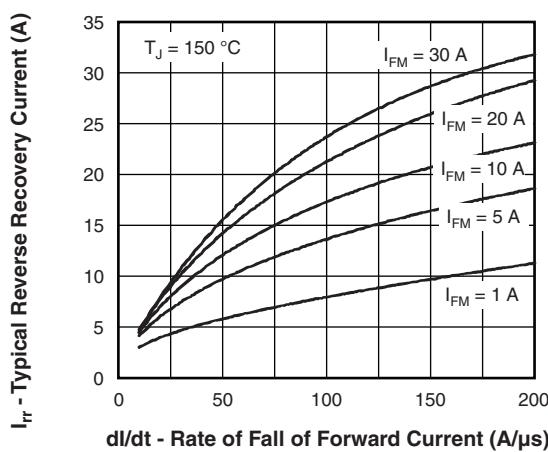


Fig. 13 - Recovery Current Characteristics, $T_J = 150 \text{ }^{\circ}\text{C}$

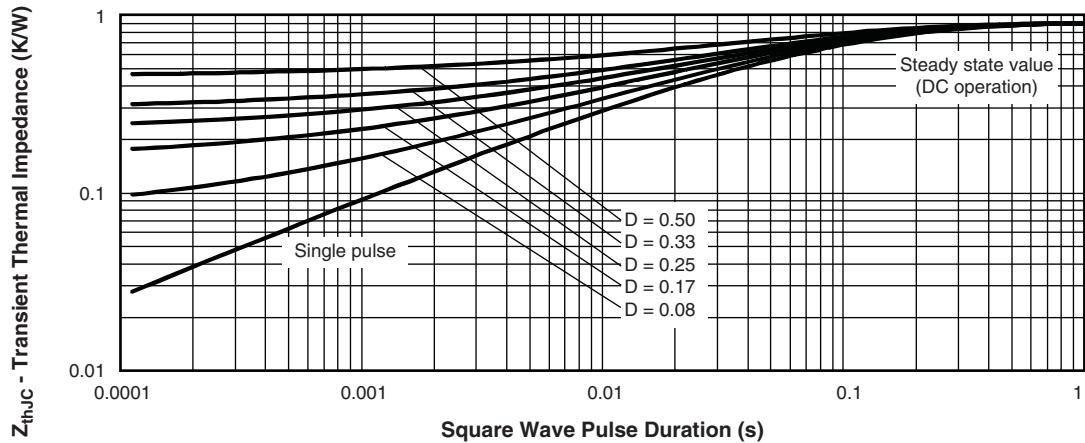


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-	20	E	T	F	12	S	L	H	M3
	1	2	3	4	5	6	7	8	9	10

- 1** - Vishay Semiconductors product
- 2** - Current rating (20 = 20 A)
- 3** - Circuit configuration:
E = single
- 4** - Package:
T = D²PAK (TO-263AB)
- 5** - Type of silicon:
F = fast soft recovery rectifier
- 6** - Voltage code x 100 = V_{RRM} → **12** = 1200 V
- 7** - S = surface mountable
- 8** - L = tape and reel (left oriented), for different orientation, contact factory
- 9** - H = AEC-Q101 qualified
- 10** - 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-20ETF12SLHM3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95046
Part marking information	www.vishay.com/doc?95444
Packaging information	www.vishay.com/doc?96317
SPICE model	www.vishay.com/doc?96669

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