

## Standard Recovery Diodes, (Stud Version), 12 A



DO-4 (DO-203AA)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Wide current range
- Types up to 1200 V  $V_{RRM}$
- Designed and qualified for industrial and consumer level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	12 A
Package	DO-4 (DO-203AA)
Circuit configuration	Single

### TYPICAL APPLICATIONS

- Battery charges
- Converters
- Power supplies
- Machine tool controls

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		12	A
	$T_C$	144	°C
$I_{F(RMS)}$		19	A
$I_{FSM}$	50 Hz	265	A
	60 Hz	280	
$I^2t$	50 Hz	351	A <sup>2</sup> s
	60 Hz	320	
$V_{RRM}$	Range	100 to 1200	V
$T_J$		-65 to +175	°C

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	$V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	$I_{RRM}$ MAXIMUM AT $T_J = 175\text{ °C}$ mA
VS-12F(R)	10	100	150	12
	20	200	275	
	40	400	500	
	60	600	725	
	80	800	950	
	100	1000	1200	
	120	1200	1400	



FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at case temperature	I <sub>F(AV)</sub>	180° conduction, half sine wave			12	A
					144	°C
Maximum RMS forward current	I <sub>F(RMS)</sub>				19	A
Maximum peak, one-cycle forward, non-repetitive surge current	I <sub>FSM</sub>	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial T <sub>J</sub> = T <sub>J</sub> maximum	265	A
		t = 8.3 ms	No voltage reapplied		280	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		225	
		t = 8.3 ms	100 % V <sub>RRM</sub> reapplied		235	
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reapplied		351	A <sup>2</sup> s
		t = 8.3 ms	No voltage reapplied		320	
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		250	
		t = 8.3 ms	100 % V <sub>RRM</sub> reapplied		226	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 to 10 ms, no voltage reapplied			3510	A <sup>2</sup> √s
Low level value of threshold voltage	V <sub>F(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum			0.77	V
High level value of threshold voltage	V <sub>F(TO)2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum			0.97	
Low level value of forward slope resistance	r <sub>f1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum			10.70	mΩ
High level value of forward slope resistance	r <sub>f2</sub>	(I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum			6.20	
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 38 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs rectangular wave			1.26	V

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	$T_J$		-65 to +175	°C
Maximum storage temperature range	$T_{Stg}$		-65 to +200	
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	2	K/W
Maximum thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth, flat and greased	0.5	
Allowable mounting torque		Not lubricated threads	1.5 + 0 - 10 %	N · m
			13	lbf · in
		Lubricated threads	1.2 + 0 - 10 %	N · m
			10	lbf · in
Approximate weight			7	g
			0.25	oz.
Case style		See dimensions - link at the end of datasheet	DO-4 (DO-203AA)	

$\Delta R_{thJC}$ CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.33	0.26	$T_J = T_J$ maximum	K/W
120°	0.41	0.44		
90°	0.53	0.58		
60°	0.78	0.81		
30°	1.28	1.29		

**Note**

- The table above shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC

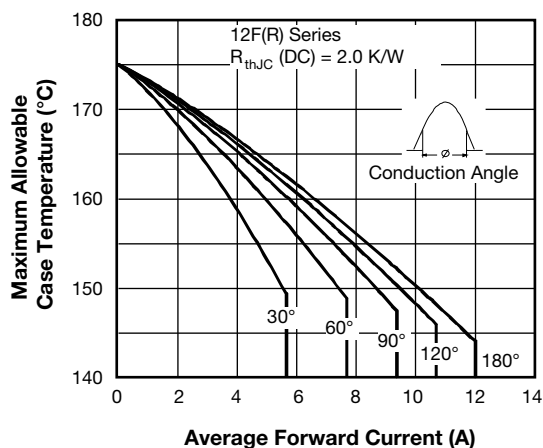


Fig. 1 - Current Ratings Characteristics

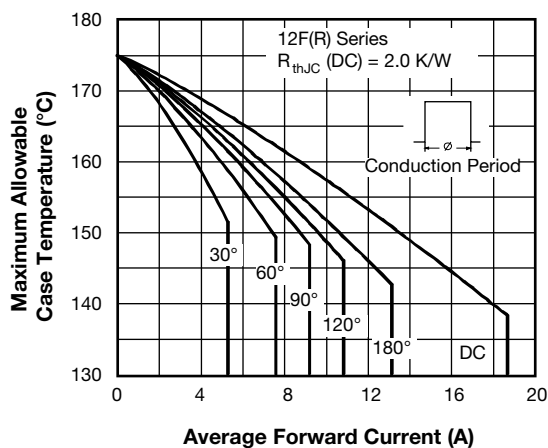


Fig. 2 - Current Ratings Characteristics

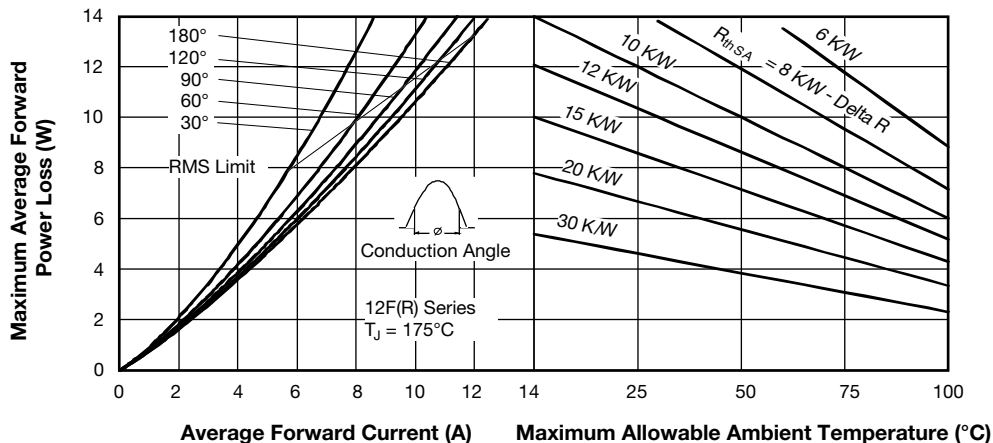


Fig. 3 - Forward Power Loss Characteristics

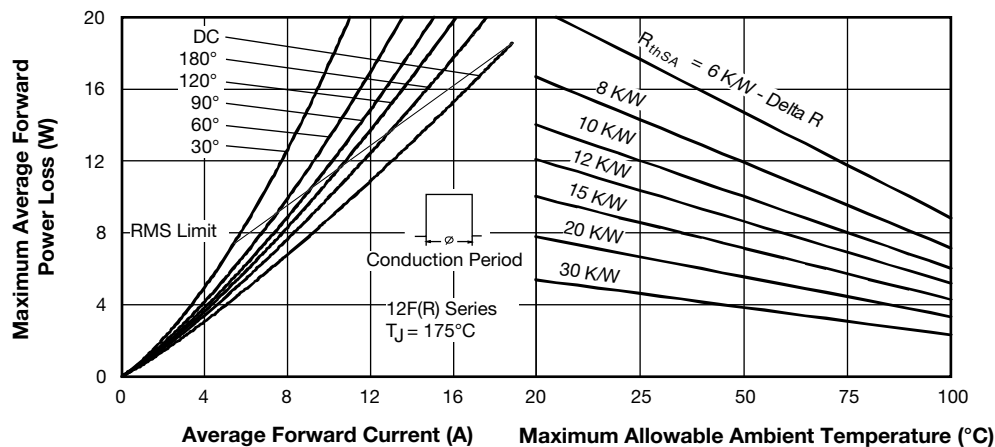


Fig. 4 - Forward Power Loss Characteristics

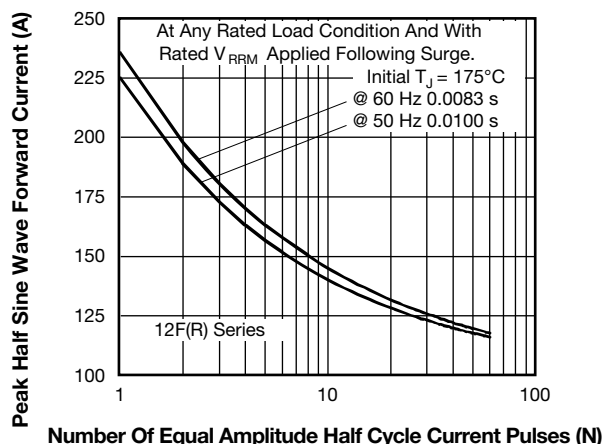


Fig. 5 - Maximum Non-Repetitive Surge Current

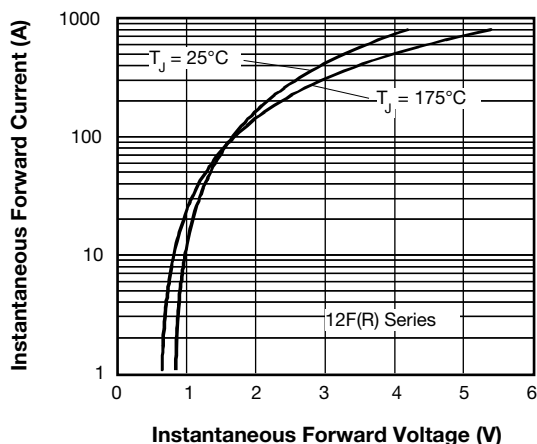


Fig. 7 - Forward Voltage Drop Characteristics

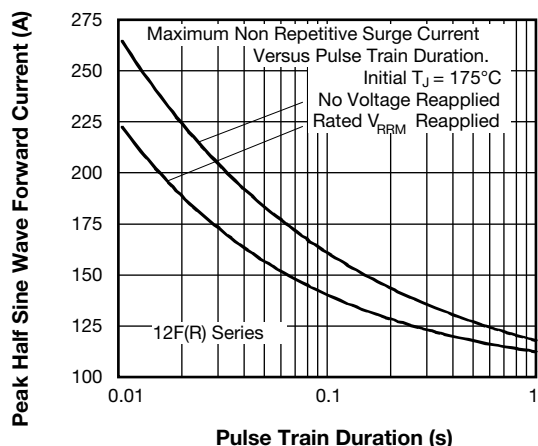


Fig. 6 - Maximum Non-Repetitive Surge Current

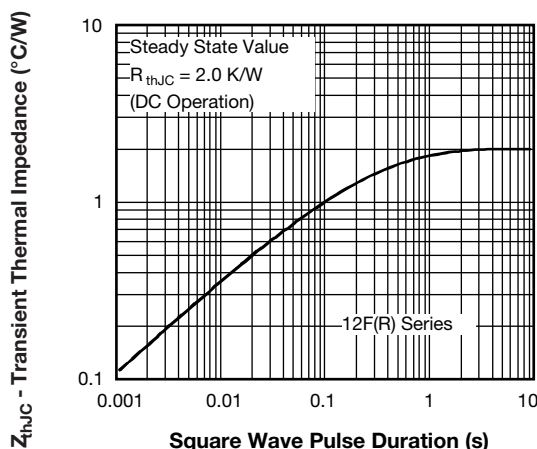


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code

VS-	12	F	R	120	M
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① ② ③ ④ ⑤ ⑥

- 1** - Vishay Semiconductors product
- 2** - Current rating: code =  $I_{F(AV)}$
- 3** - F = standard device
- 4** - None = stud normal polarity (cathode to stud)  
R = stud reverse polarity (anode to stud)
- 5** - Voltage code  $\times 10 = V_{RRM}$  (see Voltage Ratings table)
- 6** - None = stud base DO-4 (DO-203AA) 10-32UNF-2A  
M = stud base DO-4 (DO-203AA) M5  $\times$  0.8

## LINKS TO RELATED DOCUMENTS

Dimensions

[www.vishay.com/doc?95311](http://www.vishay.com/doc?95311)

**DIMENSIONS** in millimeters (inches)





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