

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



DO-203AA (DO-4)

### 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

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

### 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	$V_{R(BR)}$ , MINIMUM AVALANCHE VOLTAGE V <sup>(1)</sup>	$I_{RRM}$ MAXIMUM AT $T_J = 175^\circ\text{C}$ mA
VS-12F(R)	10	100	150	-	12
	20	200	275	-	
	40	400	500	500	
	60	600	725	750	
	80	800	950	950	
	100	1000	1200	1150	
	120	1200	1400	1350	

**Note**

<sup>(1)</sup> Avalanche version only available from  $V_{RRM}$  400 V to 1200 V



FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		12	A
				144	°C
Maximum RMS forward current	$I_{F(RMS)}$			19	A
Maximum on-repetitive peak reverse power	$P_R^{(1)}$	10 $\mu$ s square pulse, $T_J = T_J$ maximum		7	K/W
Maximum peak, one-cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reapplied	265	A
		t = 8.3 ms		280	
		t = 10 ms	100 % $V_{RRM}$ reapplied	225	
		t = 8.3 ms		235	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied	351	A <sup>2</sup> s
		t = 8.3 ms		320	
		t = 10 ms	100 % $V_{RRM}$ reapplied	250	
		t = 8.3 ms		226	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		3510	A <sup>2</sup> $\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		0.77	V
High level value of threshold voltage	$V_{F(TO)2}$	(I $> \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		0.97	
Low level value of forward slope resistance	$r_{f1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		10.70	m $\Omega$
High level value of forward slope resistance	$r_{f2}$	(I $> \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		6.20	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 38$ A, $T_J = 25$ °C, $t_p = 400$ $\mu$ s rectangular wave		1.26	V

**Note**

(1) Available only for avalanche version, all other parameters the same as 12F

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-203AA (DO-4)	

$\Delta R_{thJC}$ 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

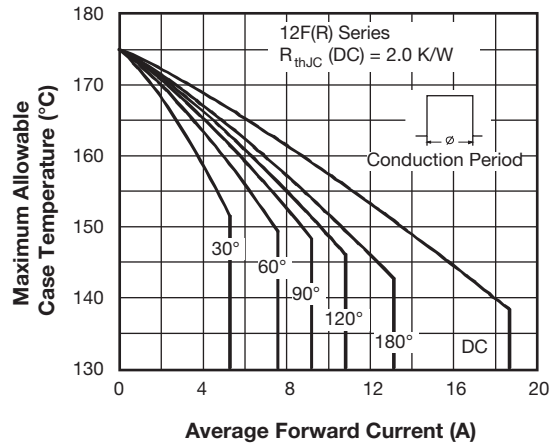


Fig. 2 - Current Ratings Characteristics



Fig. 3 - Forward Power Loss Characteristics



Fig. 4 - Forward Power Loss Characteristics

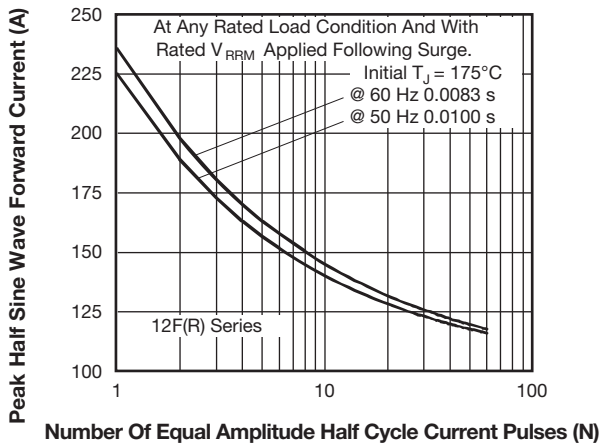


Fig. 5 - Maximum Non-Repetitive Surge Current



Fig. 7 - Forward Voltage Drop Characteristics

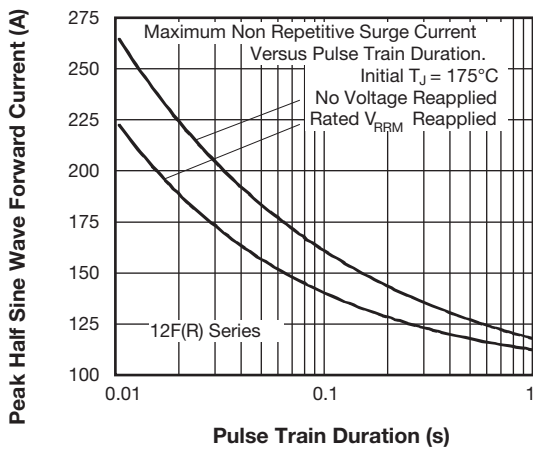


Fig. 6 - Maximum Non-Repetitive Surge Current

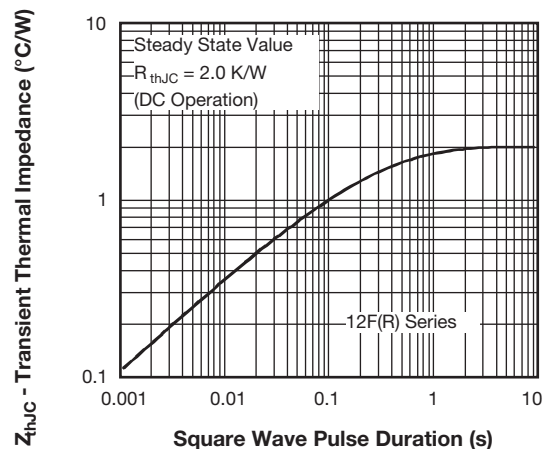


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>12</b>	<b>F</b>	<b>R</b>	<b>120</b>	<b>M</b>
	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 x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- ⑥ - None = Stud base DO-203AA (DO-4) 10-32UNF-2A  
M = Stud base DO-203AA (DO-4) M5 x 0.8  
(not available for avalanche diodes)

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95311">www.vishay.com/doc?95311</a>





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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.