

## 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 $T_J = 175$ °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	$I_{F(AV)}$	180° conduction, half sine wave		12	A
				144	°C
Maximum RMS forward current	$I_{F(RMS)}$			19	A
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> √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	mΩ
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, $t_p = 400$ 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

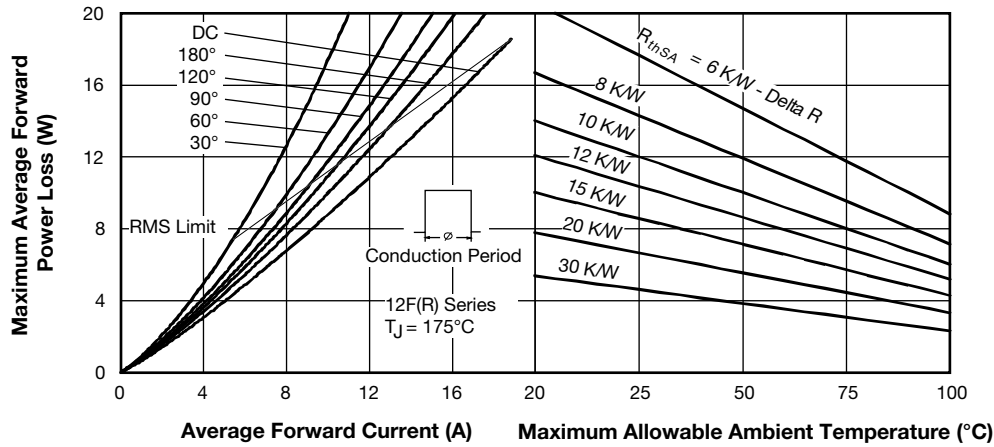


Fig. 4 - Forward Power Loss Characteristics

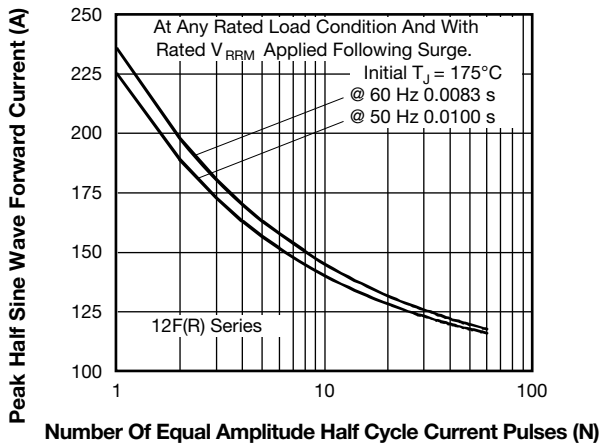


Fig. 5 - Maximum Non-Repetitive Surge Current

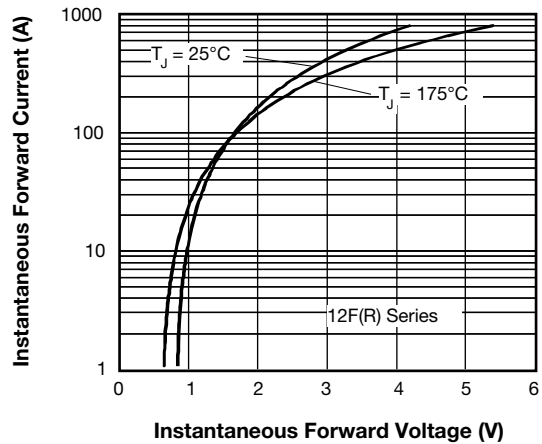


Fig. 7 - Forward Voltage Drop Characteristics

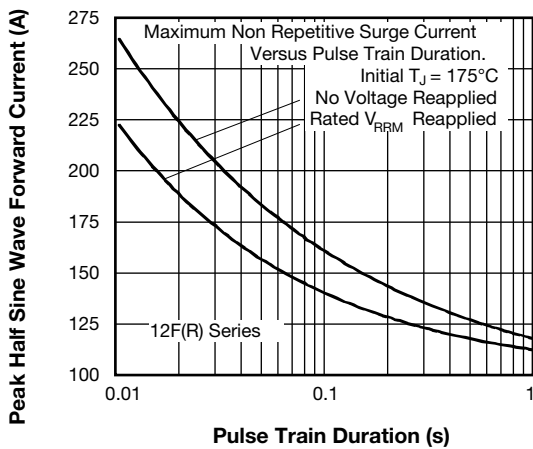


Fig. 6 - Maximum Non-Repetitive Surge Current

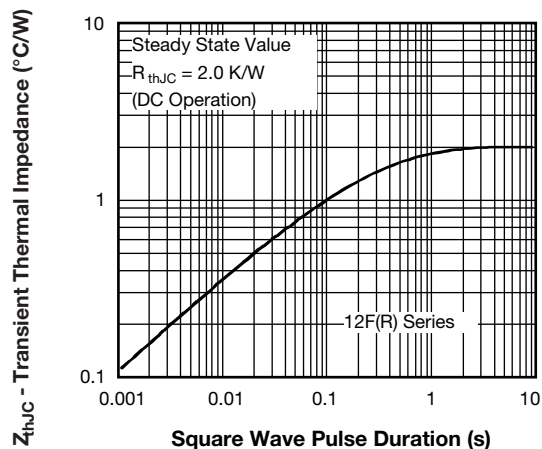


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>12</b>	<b>F</b>	<b>R</b>	<b>120</b>	<b>M</b>
	①	②	③	④	⑤	⑥
	<b>1</b>	-	Vishay Semiconductors product			
	<b>2</b>	-	Current rating: code = $I_{F(AV)}$			
	<b>3</b>	-	F = standard device			
	<b>4</b>	-	None = stud normal polarity (cathode to stud) R = stud reverse polarity (anode to stud)			
	<b>5</b>	-	Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)			
	<b>6</b>	-	None = stud base DO-4 (DO-203AA) 10-32UNF-2A M = stud base DO-4 (DO-203AA) M5 x 0.8			

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

## DO-203AA (DO-4)

**DIMENSIONS** in millimeters (inches)





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