



**THE DATASHEET OF  
VS-6FR60**



## Standard Recovery Diodes, (Stud Version), 6 A



DO-4 (DO-203AA)

### FEATURES

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


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### PRIMARY CHARACTERISTICS

$I_{F(AV)}$	6 A
Package	DO-4 (DO-203AA)
Circuit configuration	Single

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		6	A
	$T_C$	160	°C
$I_{F(RMS)}$		9.5	A
$I_{FSM}$	50 Hz	159	A
	60 Hz	167	
$I^2t$	50 Hz	134	A <sup>2</sup> s
	60 Hz	141	
$V_{RRM}$	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 REVERSE VOLTAGE V	$I_{RRM}$ MAXIMUM AT $T_J = 175$ °C mA
VS-6F(R)	10	100	150	12
	20	200	275	
	40	400	500	
	60	600	725	
	80	800	950	
	100	1000	1200	
	120	1200	1400	



<b>FORWARD CONDUCTION</b>					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		6	A
				160	°C
Maximum RMS forward current	$I_{F(RMS)}$			9.5	A
Maximum peak, one cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reappplied	159	A
		t = 8.3 ms		100 % $V_{RRM}$ reappplied	
		t = 10 ms	Sinusoidal half wave, initial $T_J = T_J$ maximum		
		t = 8.3 ms		141	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reappplied	127	A <sup>2</sup> s
		t = 8.3 ms		100 % $V_{RRM}$ reappplied	
		t = 10 ms			
		t = 8.3 ms		82	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		1270	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		0.63	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		0.86	
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		15.7	mΩ
High level value of forward slope resistance	$r_{f2}$	(I > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum		5.6	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 19$ A, $T_J = 25$ °C, $t_p = 400$ μs rectangular wave		1.10	V

<b>THERMAL AND MECHANICAL SPECIFICATIONS</b>				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction 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	2.5	K/W
Maximum thermal resistance, case to heat sink	$R_{thCS}$	Mounting surface, smooth, flat and greased	0.5	
Mounting torque, ± 10 %		Lubricated threads (Not lubricated threads)	1.2 (1.5)	N · m (lbf · in)
Approximate weight			7	g
			0.25	oz.
Case style		See dimensions - link at the end of datasheet	DO-4 (DO-203AA)	

<b><math>\Delta R_{thJC}</math> CONDUCTION</b>				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.34	0.29	$T_J = T_J$ maximum	K/W
120°	0.44	0.48		
90°	0.57	0.63		
60°	0.85	0.88		
30°	1.37	1.39		

**Note**

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

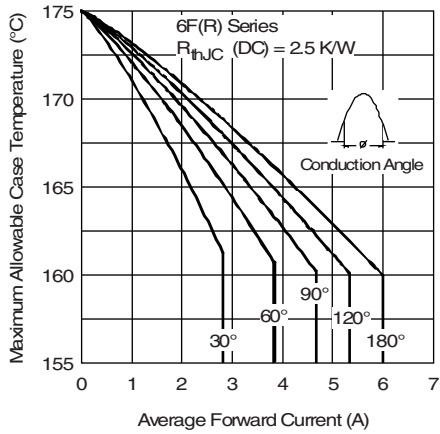


Fig. 1 - Current Ratings Characteristics

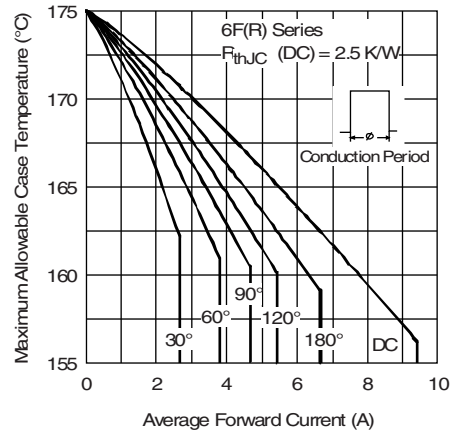


Fig. 2 - Current Ratings Characteristics

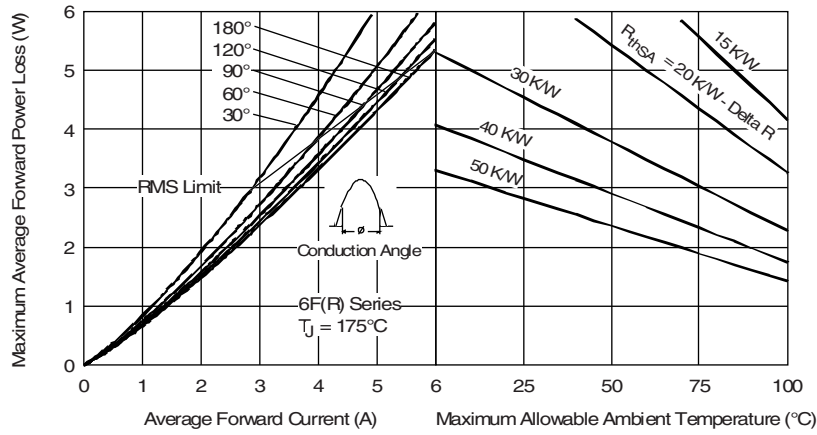


Fig. 3 - Forward Power Loss Characteristics

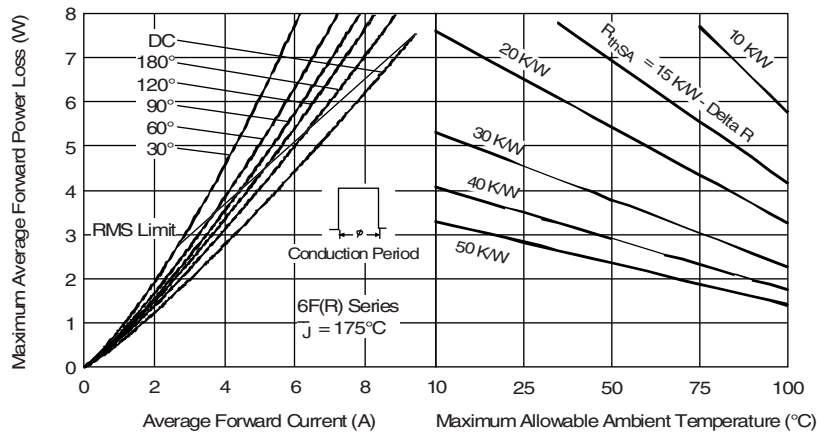


Fig. 4 - Forward Power Loss Characteristics

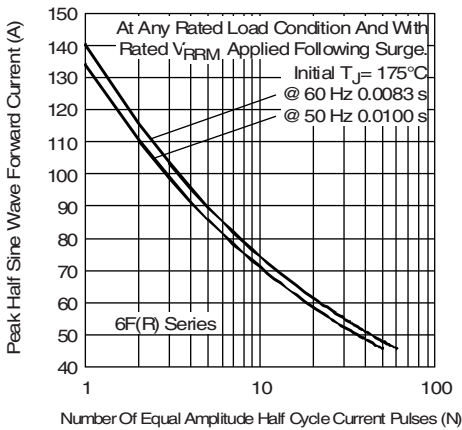


Fig. 5 - Maximum Non-Repetitive Surge Current

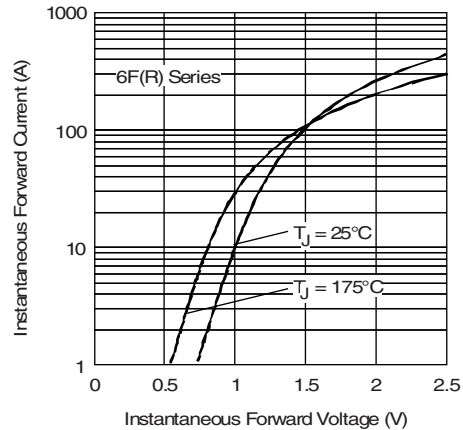


Fig. 7 - Forward Voltage Drop Characteristics

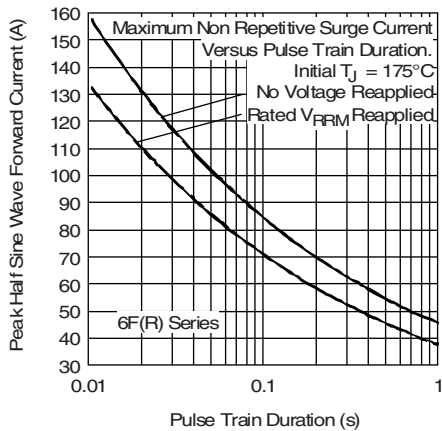


Fig. 6 - Maximum Non-Repetitive Surge Current

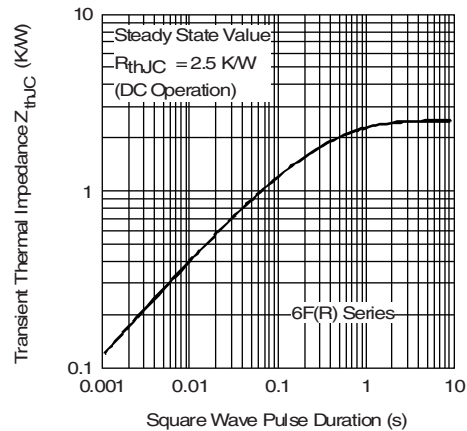


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>6</b>	<b>F</b>	<b>R</b>	<b>120</b>	<b>M</b>
	①	②	③	④	⑤	⑥

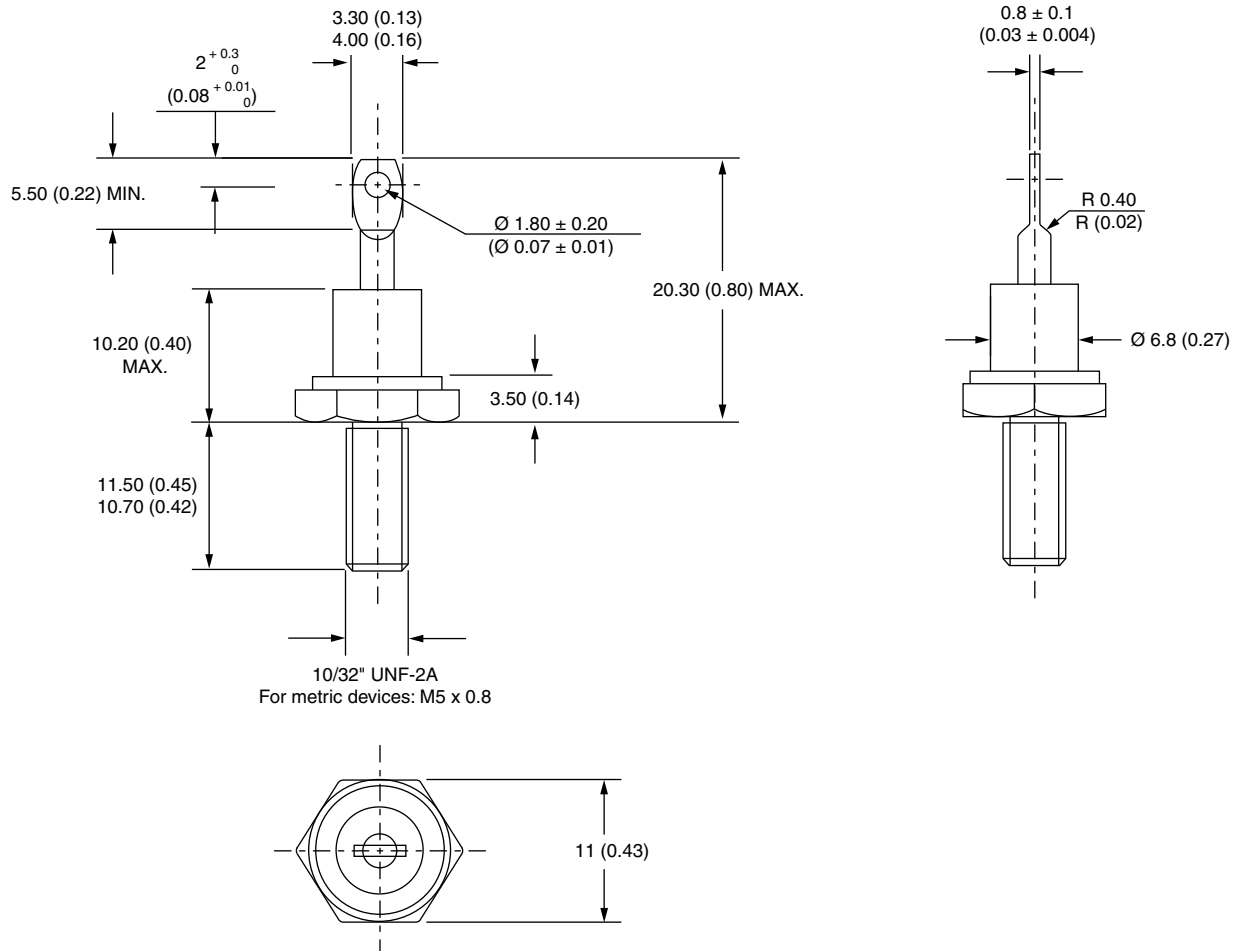
- 1** - Vishay Semiconductors product
- 2** - Current rating: code =  $I_{F(AV)}$
- 3** - F = standard device
- 4** -
  - None = stud normal polarity (cathode to stud)
  - R = stud reverse polarity (anode to stud)
- 5** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 6** -
  - None =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

**DIMENSIONS** in millimeters (inches)





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