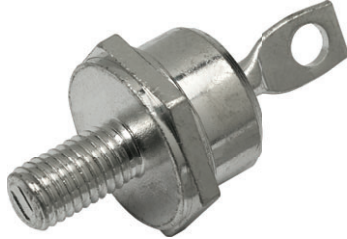




**THE DATASHEET OF  
VS-70HFR80M**



## Standard Recovery Diodes, (Stud Version), 70 A



DO-5 (DO-203AB)

### FEATURES

- High surge current capability
- Designed for a wide range of applications
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600 V  $V_{RRM}$
- Designed and qualified for industrial level
- 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

$I_{F(AV)}$	70 A
Package	DO-5 (DO-203AB)
Circuit configuration	Single

### MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	70HF(R)		UNITS
		10 TO 120	140/160	
$I_{F(AV)}$		70	70	A
	$T_C$	140	110	°C
$I_{F(RMS)}$		110	110	A
$I_{FSM}$	50 Hz	1200	1200	A
	60 Hz	1250	1250	
$I^2t$	50 Hz	7100	7100	A <sup>2</sup> s
	60 Hz	6450	6450	
$V_{RRM}$	Range	100 to 1200	1400 to 1600	V
$T_J$		-65 to +180	-65 to +150	°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	$V_{R(BR)}$ , MINIMUM AVALANCHE VOLTAGE V	$I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM mA
VS-70HF(R)	10	100	200	200	15
	20	200	300	300	
	30	300	400	400	
	40	400	500	500	
	60	600	720	725	9
	80	800	960	950	
	100	1000	1200	1150	
	120	1200	1440	1350	
	140	1400	1650	1550	
160	1600	1900	1750	4.5	



FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS		70HF(R)		UNITS	
				10 to 120	140/160		
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		70		A	
				140	110	°C	
Maximum RMS forward current	$I_{F(RMS)}$			110		A	
Maximum peak, one cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial $T_J = T_J$ maximum		1200	A
		t = 8.3 ms				1250	
		t = 10 ms	100 % $V_{RRM}$ reappplied			1000	
		t = 8.3 ms				1050	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reappplied			7100	A <sup>2</sup> s
		t = 8.3 ms				6450	
		t = 10 ms	100 % $V_{RRM}$ reappplied			5000	
		t = 8.3 ms				4550	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		71 000		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)		0.79		V	
High level value of threshold voltage	$V_{F(TO)2}$	(I > $\pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		1.00			
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)		2.33		mΩ	
High level value of forward slope resistance	$r_{f2}$	(I > $\pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		1.53			
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 220$ A, $T_J = 25$ °C, $t_p = 400$ μs rectangular wave		1.35	1.46	V	

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		70HF(R)		UNITS
				10 to 120	140/160	
Maximum junction and storage temperature range	$T_J, T_{Stg}$			-65 to +180	-65 to +150	°C
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation		0.45		K/W
Thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth, flat and greased		0.25		
Maximum allowable mounting torque (+0 %, -10 %)		Not lubricated thread, tightening on nut <sup>(1)</sup>		3.4 (30)		N · m (lbf · in)
		Lubricated thread, tightening on nut <sup>(1)</sup>		2.3 (20)		
		Not lubricated thread, tightening on hexagon <sup>(2)</sup>		4.2 (37)		
		Lubricated thread, tightening on hexagon <sup>(2)</sup>		3.2 (28)		
Approximate weight				17		g
				0.6		oz.
Case style		See dimensions - link at the end of datasheet		DO-5 (DO-203AB)		

**Notes**

- (1) Recommended for pass-through holes
- (2) Recommended for holed threaded heatsinks

$\Delta R_{thJC}$ CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.08	0.06	$T_J = T_J$ maximum	K/W
120°	0.10	0.11		
90°	0.13	0.14		
60°	0.19	0.20		
30°	0.30	0.30		

**Note**

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

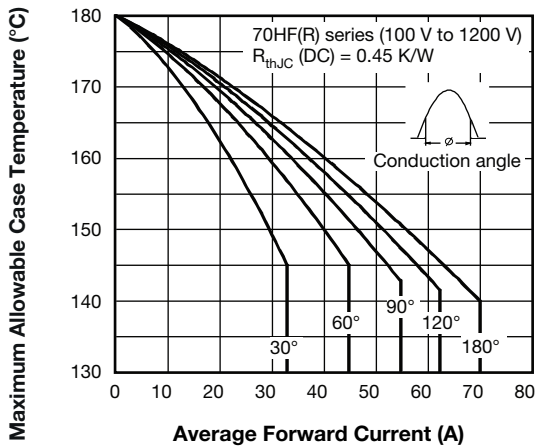


Fig. 1 - Current Ratings Characteristics

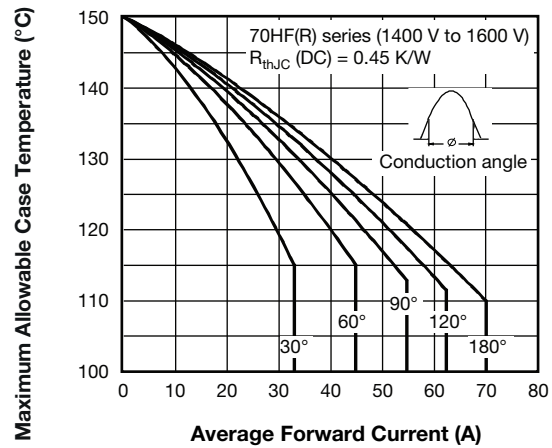


Fig. 3 - Current Ratings Characteristics

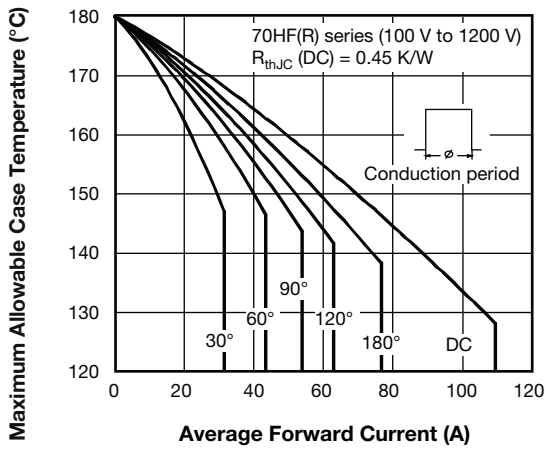


Fig. 2 - Current Ratings Characteristics

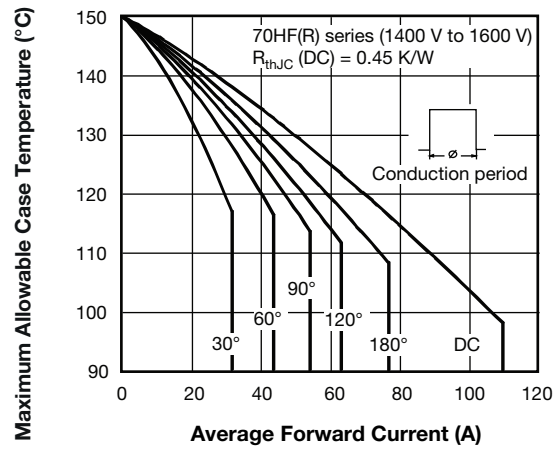


Fig. 4 - Current Ratings Characteristics

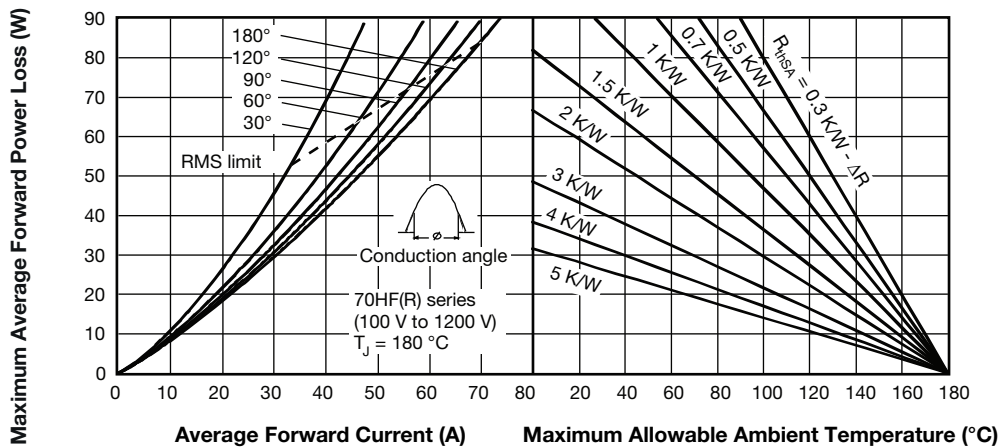


Fig. 5 - Forward Power Loss Characteristics

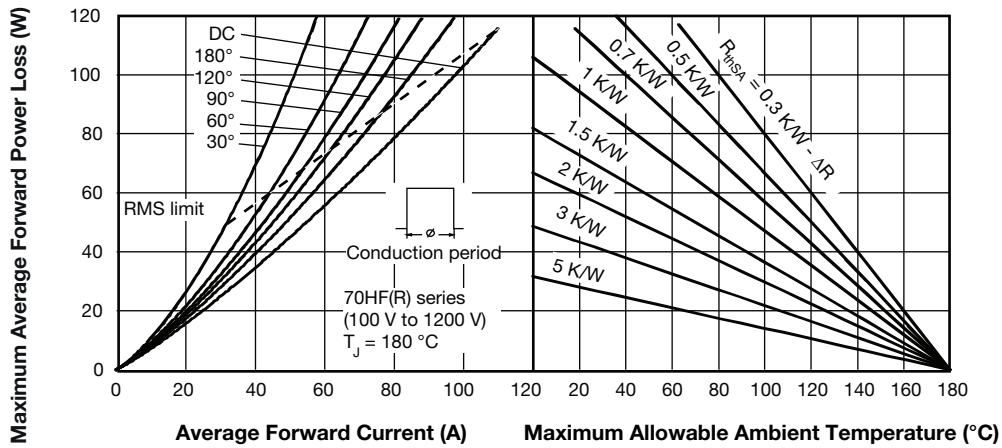


Fig. 6 - Forward Power Loss Characteristics

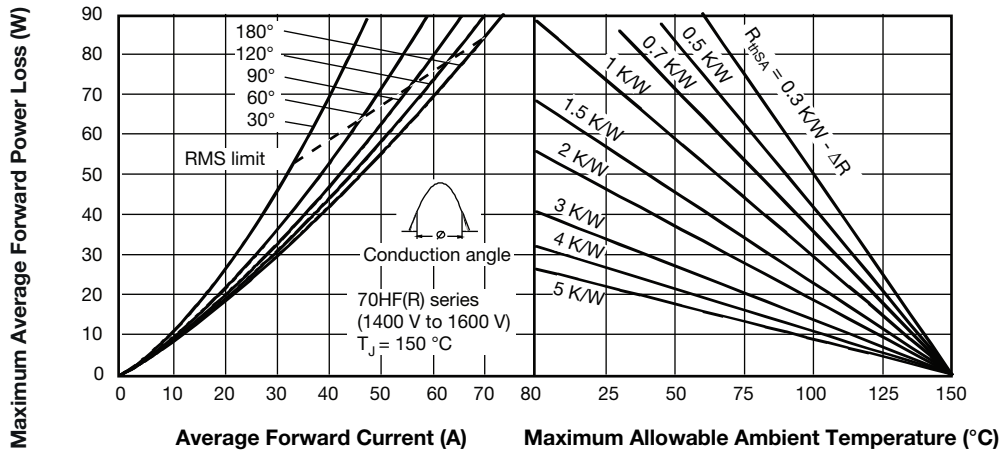


Fig. 7 - Forward Power Loss Characteristics

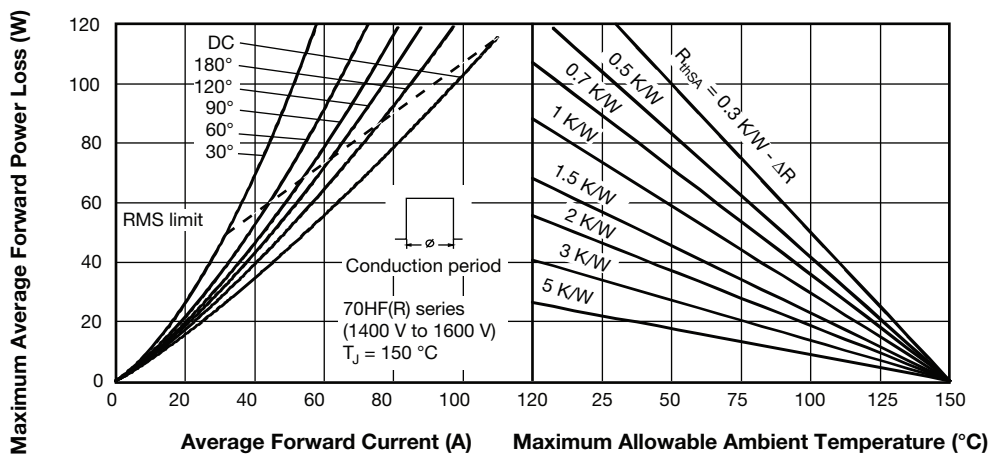


Fig. 8 - Forward Power Loss Characteristics

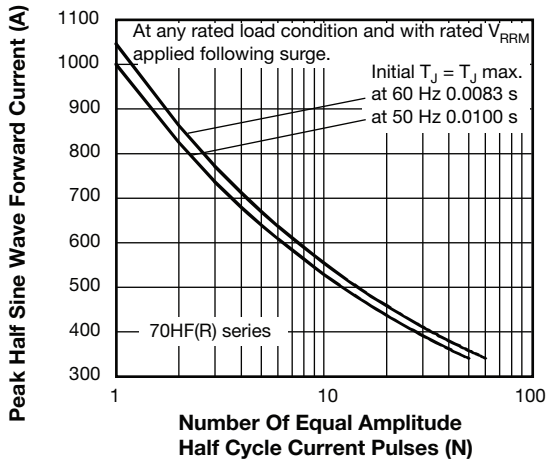


Fig. 9 - Maximum Non-Repetitive Surge Current

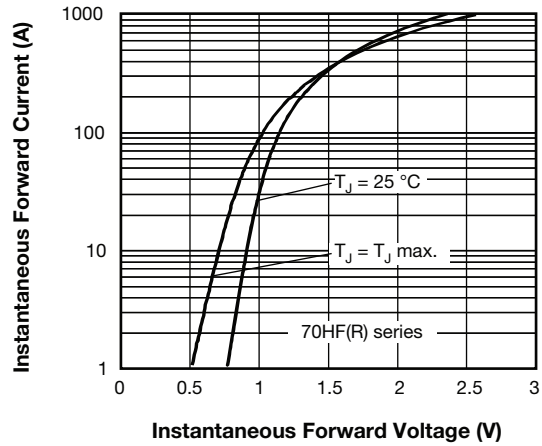


Fig. 11 - Forward Voltage Drop Characteristics

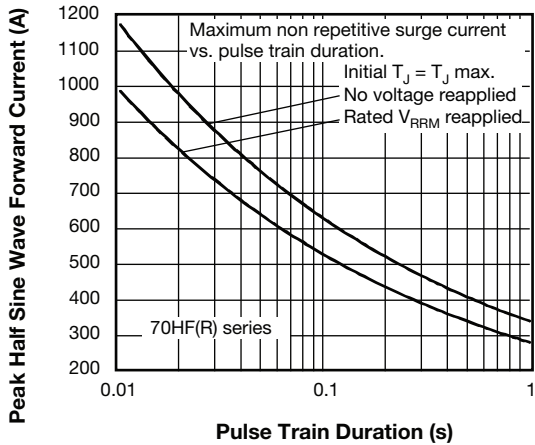


Fig. 10 - Maximum Non-Repetitive Surge Current

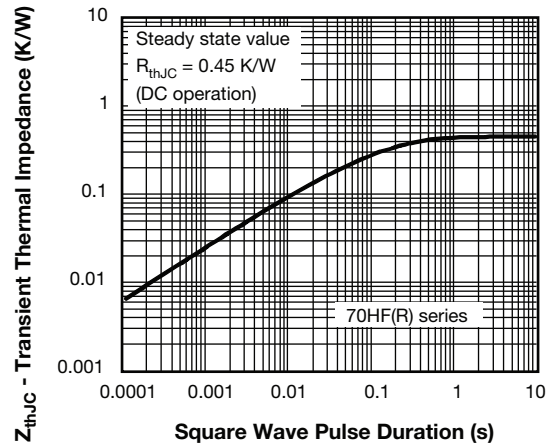


Fig. 12 - Thermal Impedance  $Z_{thJC}$  Characteristics

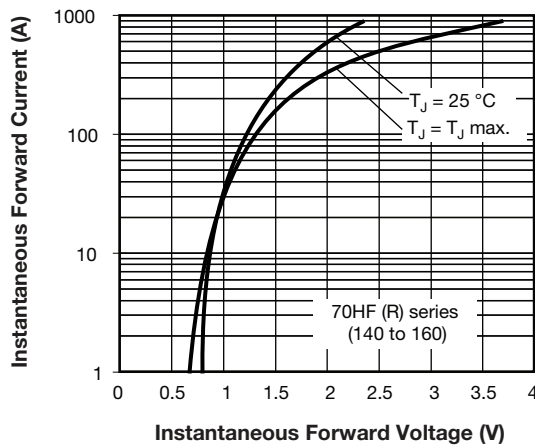
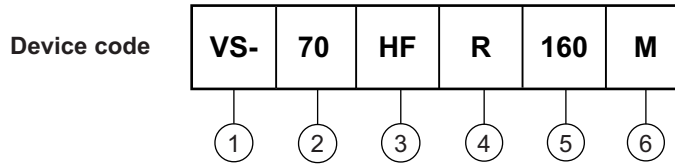


Fig. 13 - Forward Voltage Drop Characteristics



## ORDERING INFORMATION TABLE

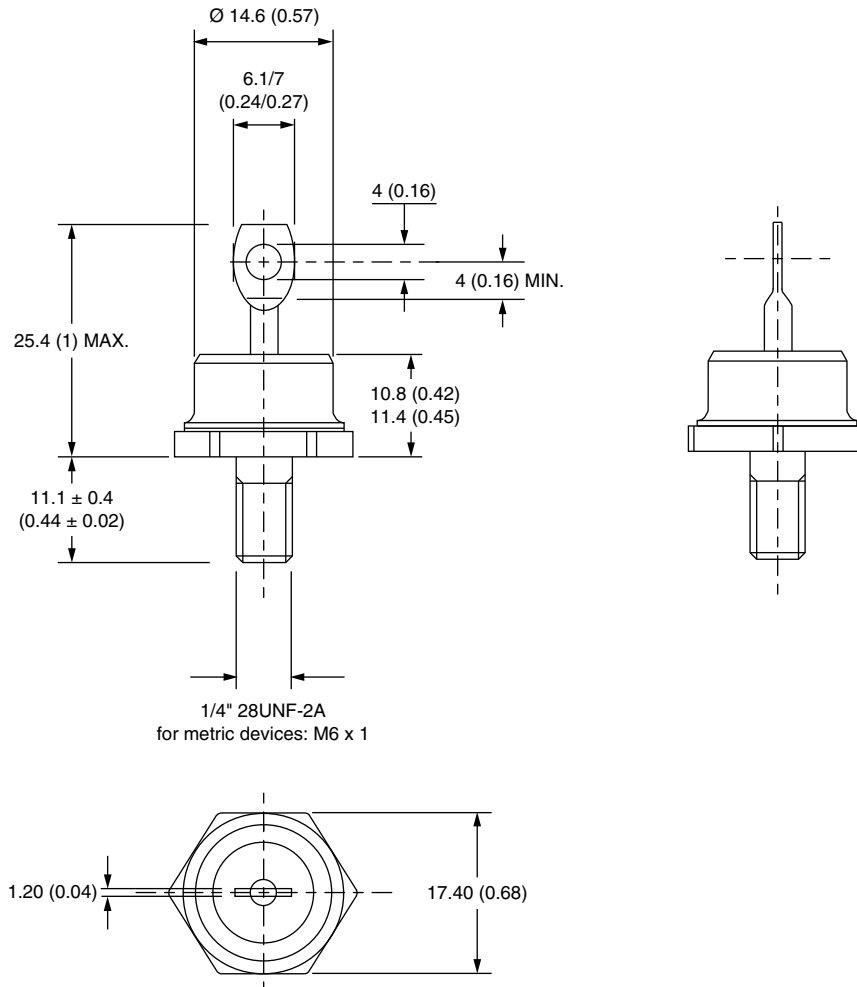


- 1** - Vishay Semiconductors product
- 2** - 70 = standard device  
71 = not isolated lead  
72 = isolated lead with silicone sleeve  
(red = reverse polarity)  
(blue = normal polarity)
- 3** - HF = standard diode
- 4** -
  - None = stud normal polarity (cathode to stud)
  - R = stud reverse polarity (anode to stud)
- 5** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 6** -
  - None = stud base DO-5 (DO-203AB) 1/4" 28UNF-2A
  - M = stud base DO-5 (DO-203AB) M6 x 1

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95343">www.vishay.com/doc?95343</a>

## DO-203AB (DO-5) for 70HF(R) and 71HF(R) Series

### DIMENSIONS FOR 70HF(R) SERIES in millimeters (inches)



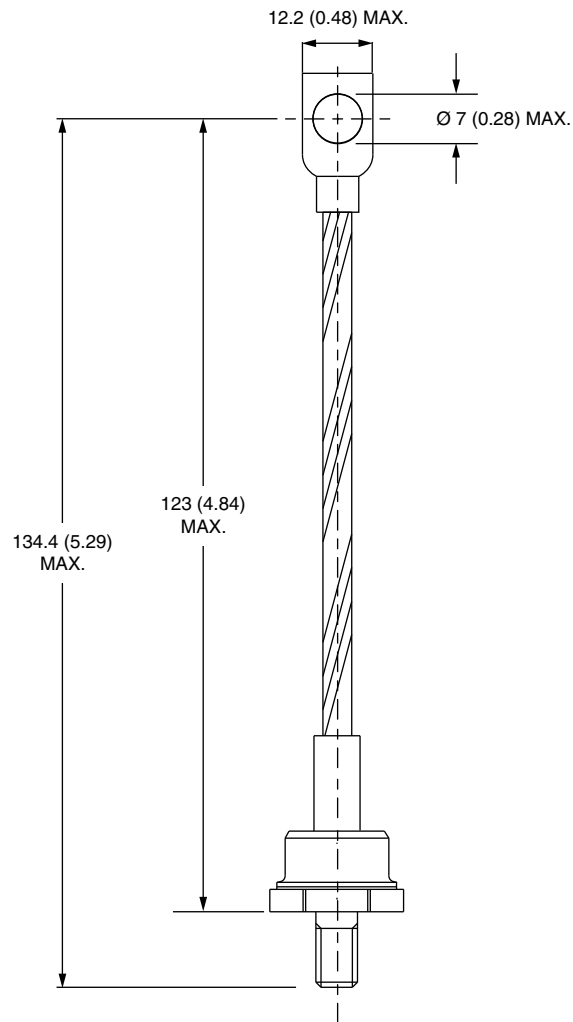
# Outline Dimensions

Vishay Semiconductors

DO-203AB (DO-5) for 70HF(R)  
and 71HF(R) Series



## **DIMENSIONS FOR 71HF(R) SERIES** in millimeters (inches)





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