

## 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	4.5
	160	1600	1900	1750	



FORWARD CONDUCTION							
PARAMETER	SYMBOL	TEST CONDITIONS			70HF(R)		UNITS
					10 to 120	140/160	
Maximum average forward current at case temperature	I <sub>F(AV)</sub>	180° conduction, half sine wave			70		A
					140	110	°C
Maximum RMS forward current	I <sub>F(RMS)</sub>				110		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	1200		A
		t = 8.3 ms			1250		
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		1000		
		t = 8.3 ms			1050		
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reapplied		7100		A <sup>2</sup> s
		t = 8.3 ms			6450		
		t = 10 ms	100 % V <sub>RRM</sub> reapplied		5000		
		t = 8.3 ms			4550		
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 ms to 10 ms, no voltage reapplied			71 000		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			0.79		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			1.00		
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			2.33		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			1.53		
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 220 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs rectangular wave			1.35	1.46	

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS	70HF(R)		UNITS
			10 to 120	140/160	
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-65 to +180	-65 to +150	°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation	0.45		K/W
Thermal resistance, case to heatsink	R <sub>thCS</sub>	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

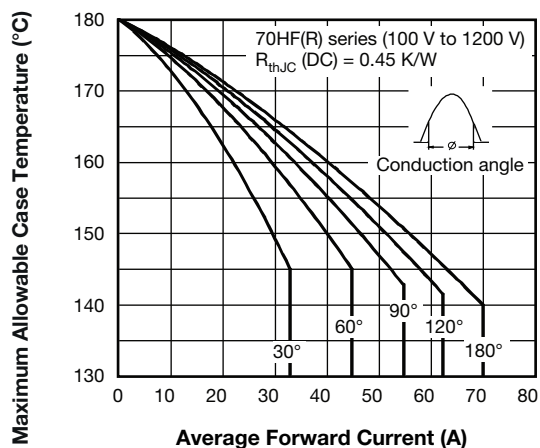


Fig. 1 - Current Ratings Characteristics

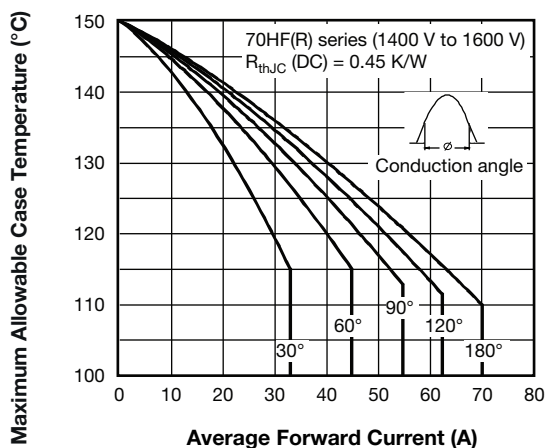


Fig. 3 - Current Ratings Characteristics

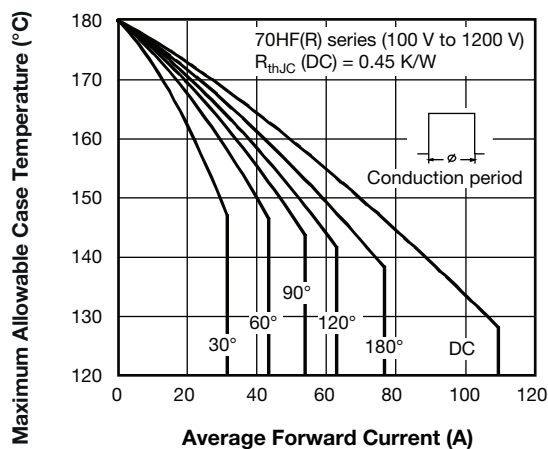


Fig. 2 - Current Ratings Characteristics

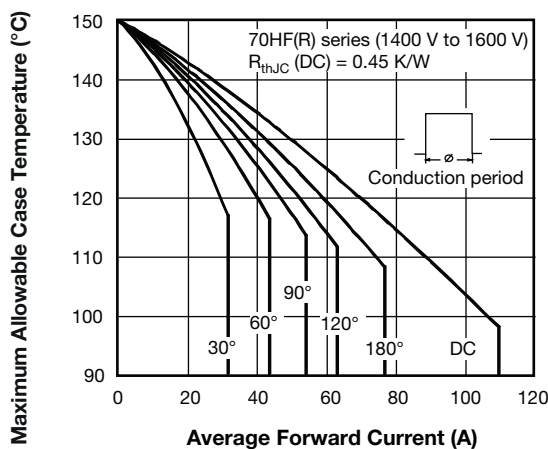


Fig. 4 - Current Ratings Characteristics

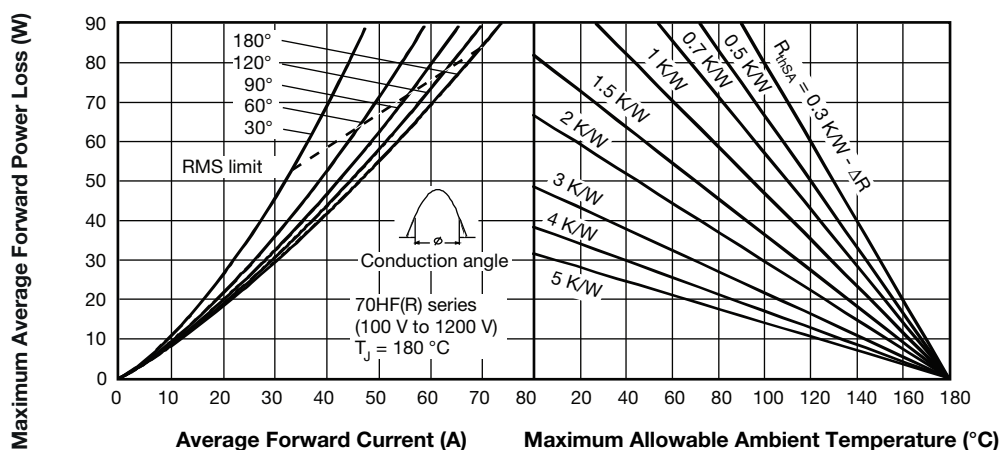


Fig. 5 - Forward Power Loss Characteristics

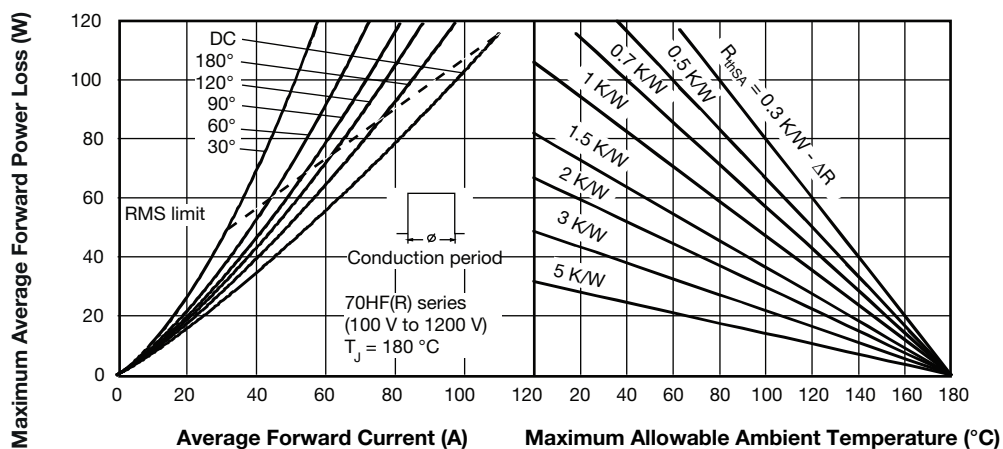


Fig. 6 - Forward Power Loss Characteristics

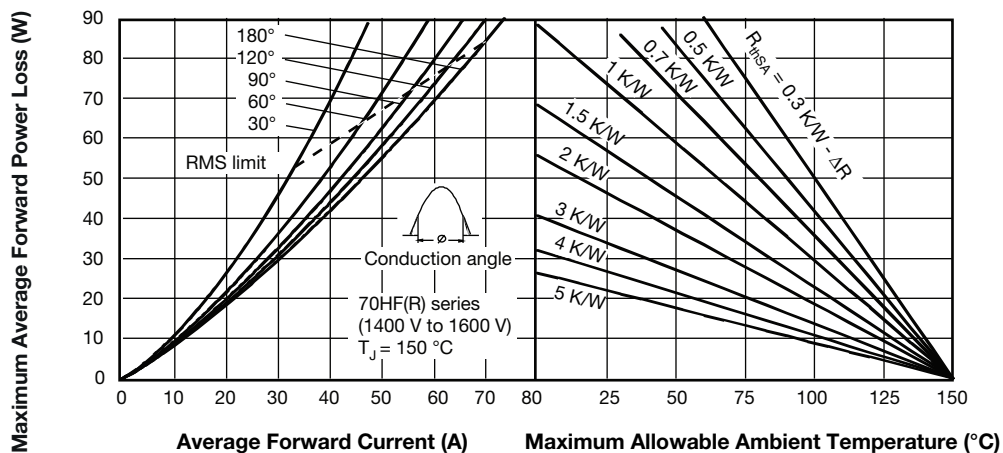


Fig. 7 - Forward Power Loss Characteristics

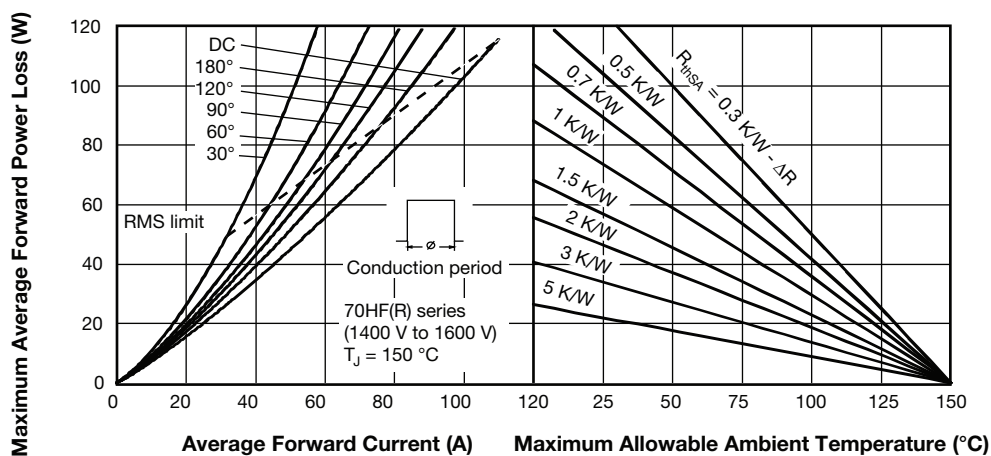


Fig. 8 - Forward Power Loss Characteristics

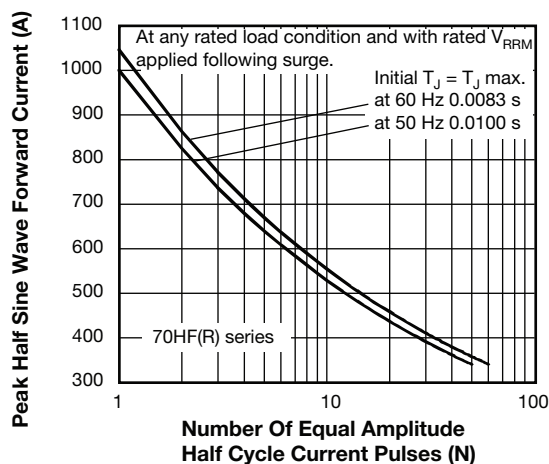


Fig. 9 - Maximum Non-Repetitive Surge Current

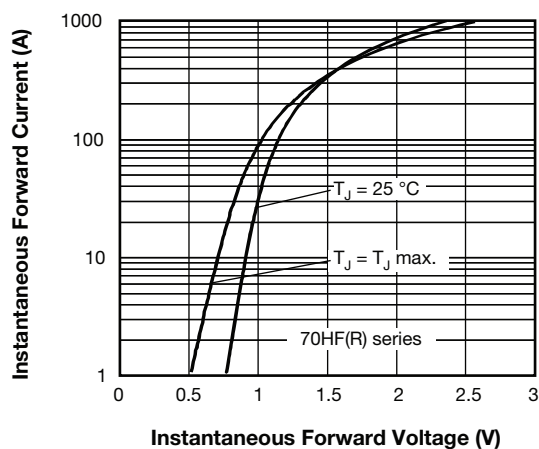


Fig. 11 - Forward Voltage Drop Characteristics

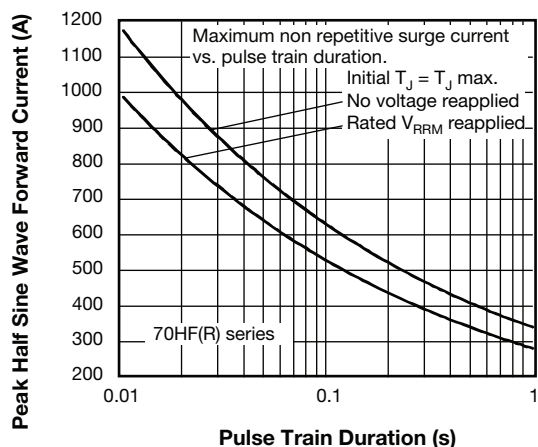


Fig. 10 - Maximum Non-Repetitive Surge Current

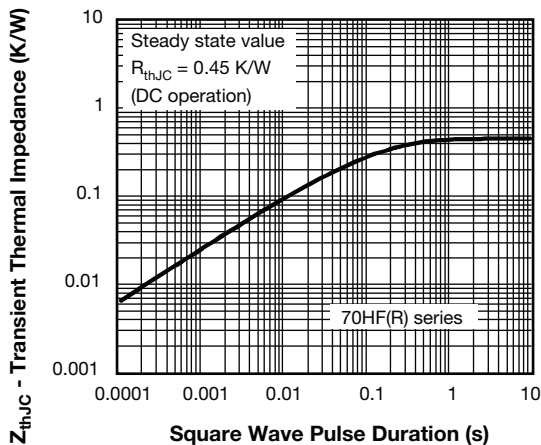
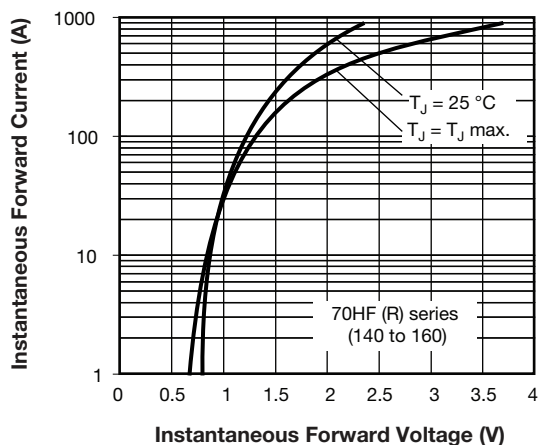

Fig. 12 - Thermal Impedance  $Z_{thJC}$  Characteristics


Fig. 13 - Forward Voltage Drop Characteristics



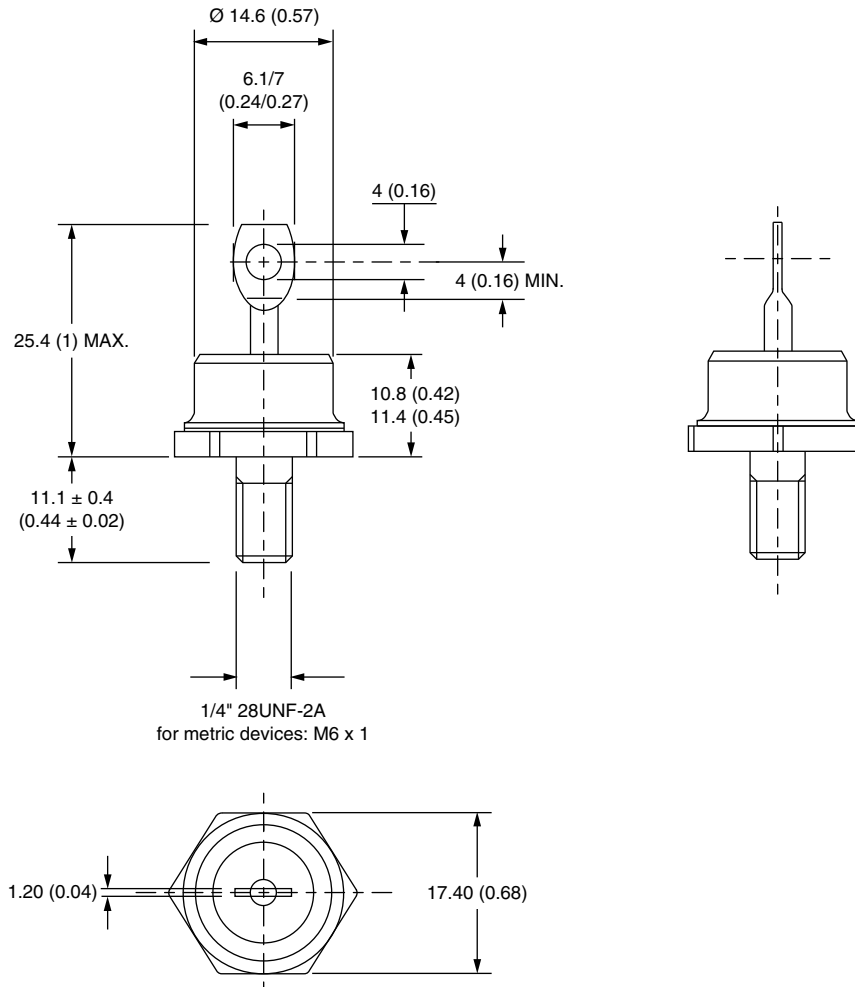
## ORDERING INFORMATION TABLE

Device code	VS-	70	HF	R	160	M
	1	2	3	4	5	6
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)



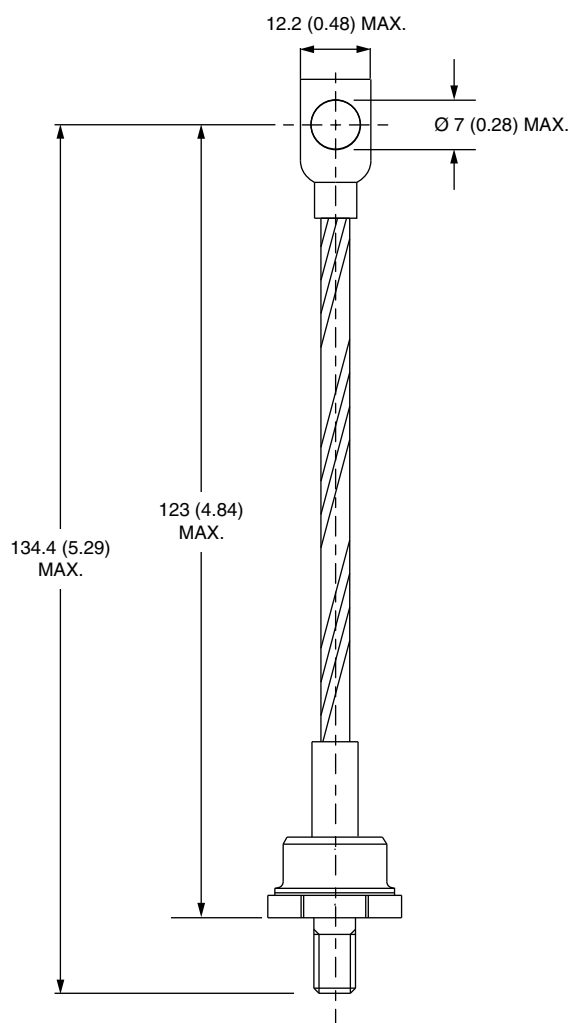
# Outline Dimensions

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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