



# THE DATASHEET OF VS-40HFR80





# Standard Recovery Diodes, (Stud Version), 40 A



DO-5 (DO-203AB)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600 V  $V_{RRM}$
- Designed and qualified for multiple level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



RoHS  
COMPLIANT

### TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	40 A
Package	DO-5 (DO-203AB)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS				
PARAMETER	TEST CONDITIONS	40HF(R)		UNITS
		10 TO 120	140/160	
$I_{F(AV)}$		40	40	A
	$T_C$	140	110	°C
$I_{F(RMS)}$		62	62	A
$I_{FSM}$	50 Hz	570	570	A
	60 Hz	595	595	
$I^2t$	50 Hz	1600	1600	A <sup>2</sup> s
	60 Hz	1450	1450	
$V_{RRM}$	Range	100 to 1200	1400 to 1600	V
$T_J$		-65 to 190	-65 to 160	°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 $T_J = T_J$ MAXIMUM mA
VS-40HF(R)	10	100	200	9
	20	200	300	
	40	400	500	
	60	600	700	
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	4.5
160	1600	1700		



FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS		40HF(R)		UNITS
				10 TO 120	140/160	
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		40	40	A
Maximum RMS forward current	$I_{F(RMS)}$			140	110	°C
Maximum peak, one-cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms t = 8.3 ms	No voltage reapplied	62		A
		t = 10 ms t = 8.3 ms	100 % $V_{RRM}$ reapplied	570		A
				595		
				480		
				500		
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms t = 8.3 ms	No voltage reapplied	1600		A <sup>2</sup> s
		t = 10 ms t = 8.3 ms	100 % $V_{RRM}$ reapplied	1450		
				1150		
				1050		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied		16 000		A <sup>2</sup> √s
Value of threshold voltage (up to 1200 V)	$V_{F(TO)}$	$T_J = T_J$ maximum		0.65		V
Value of threshold voltage (for 1400 V/1600 V)	$V_{F(TO)}$			0.76		
Value of forward slope resistance (up to 1200 V)	$r_f$	$T_J = T_J$ maximum		4.29		mΩ
Value of forward slope resistance (for 1400 V/1600 V)	$r_f$			3.8		
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 125$ A, $T_J = 25$ °C, $t_p = 400$ μs rectangular wave		1.30	1.50	V

THERMAL AND MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		40HF(R)		UNITS
				10 to 120	140 to 160	
Maximum junction operating and storage temperature range	$T_J, T_{Stg}$			-65 to 190	-65 to 160	°C
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation		0.95		K/W
Maximum 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°	0.14	0.10	$T_J = T_J$ maximum	K/W
120°	0.16	0.17		
90°	0.21	0.22		
60°	0.30	0.31		
30°	0.50	0.50		

**Note**

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

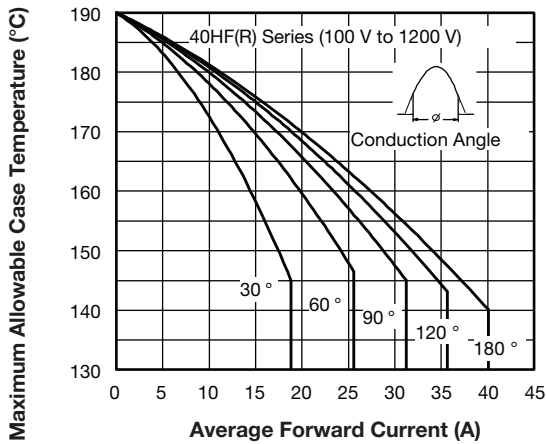


Fig. 1 - Current Ratings Characteristics

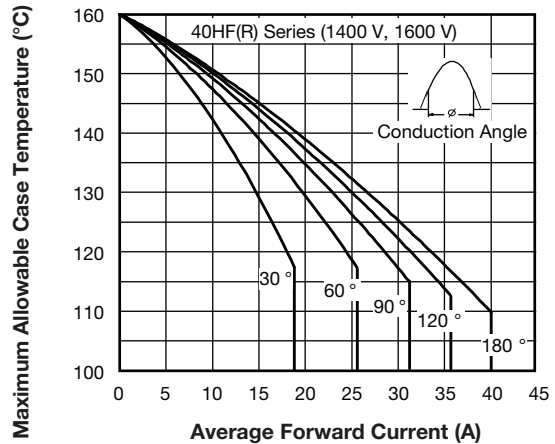


Fig. 3 - Current Ratings Characteristics

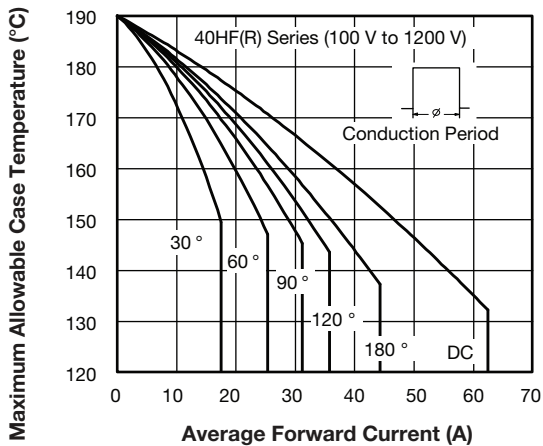


Fig. 2 - Current Ratings Characteristics

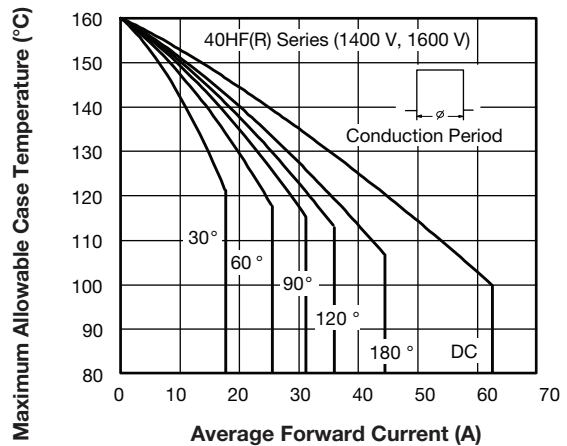


Fig. 4 - Current Ratings Characteristics

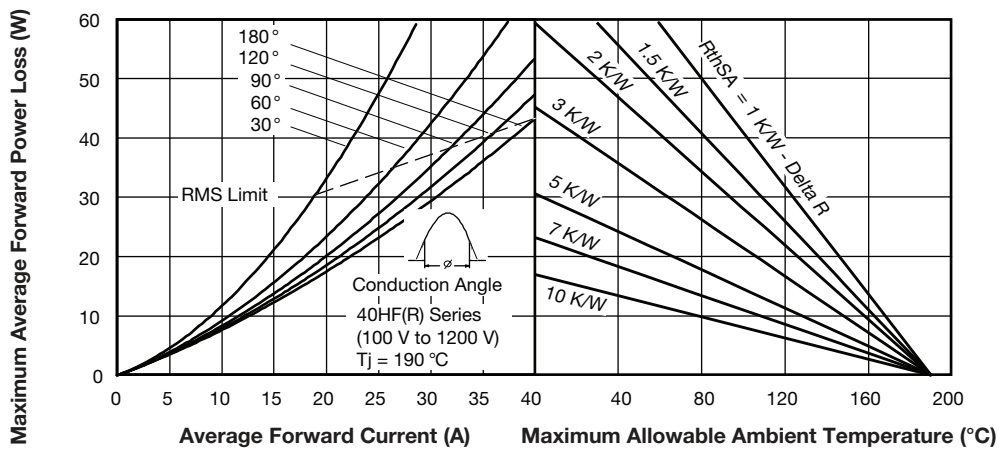


Fig. 5 - Forward Power Loss Characteristics

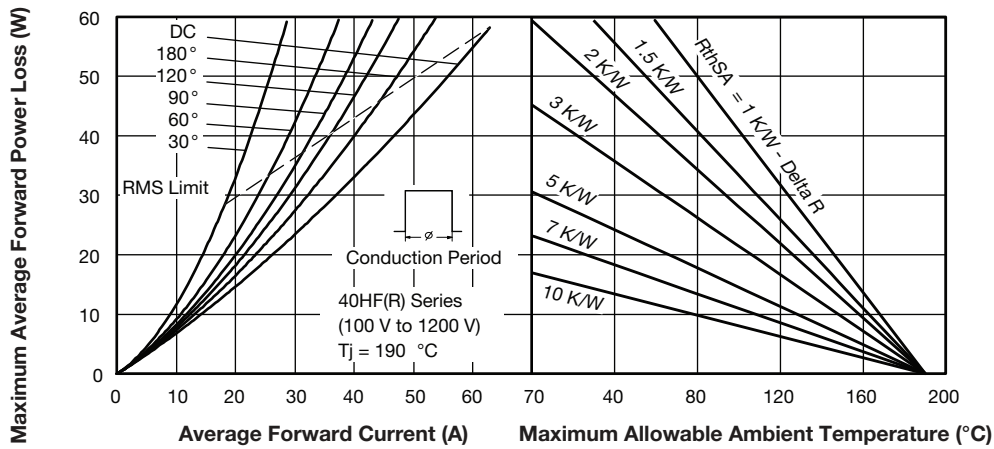


Fig. 6 - Forward Power Loss Characteristics

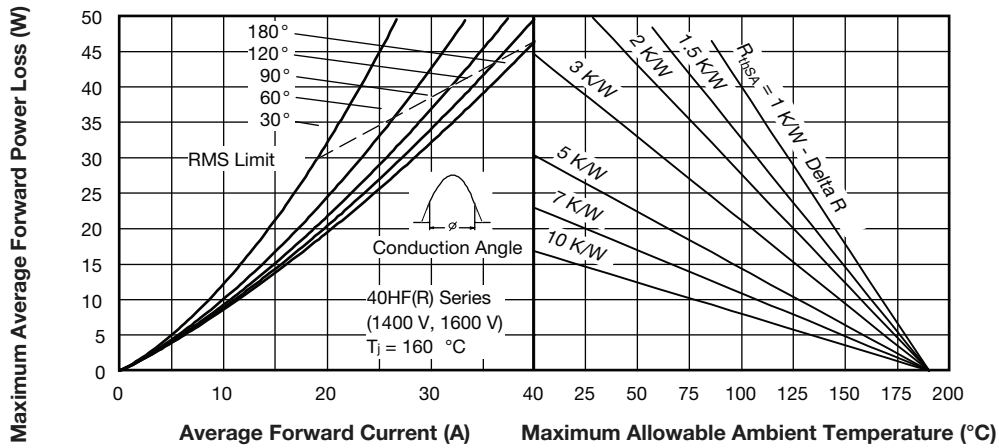


Fig. 7 - Forward Power Loss Characteristics

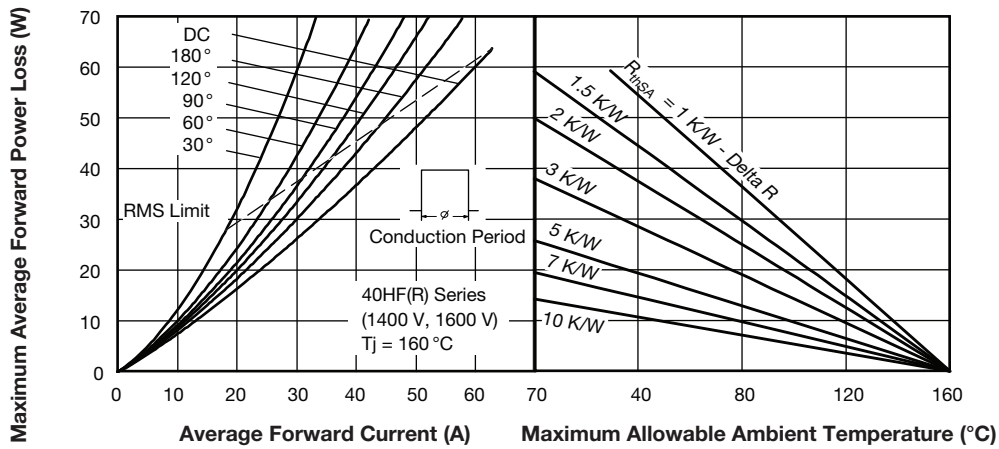


Fig. 8 - Forward Power Loss Characteristics

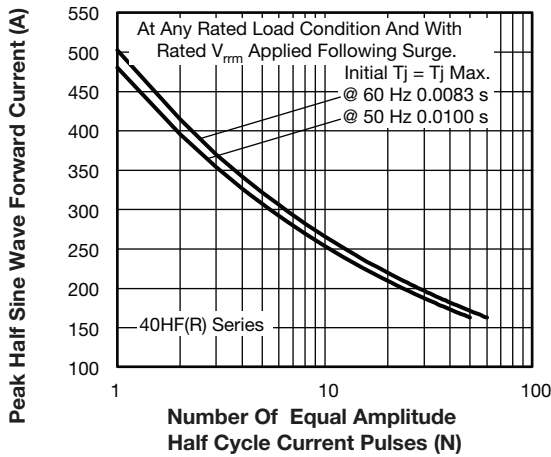


Fig. 9 - Maximum Non-Repetitive Surge Current

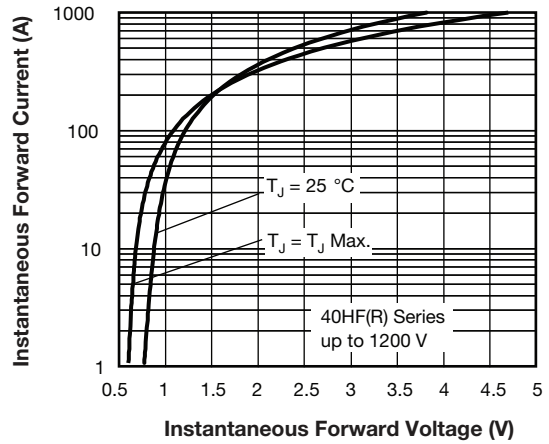


Fig. 11 - Forward Voltage Drop Characteristics (Up To 1200 V)

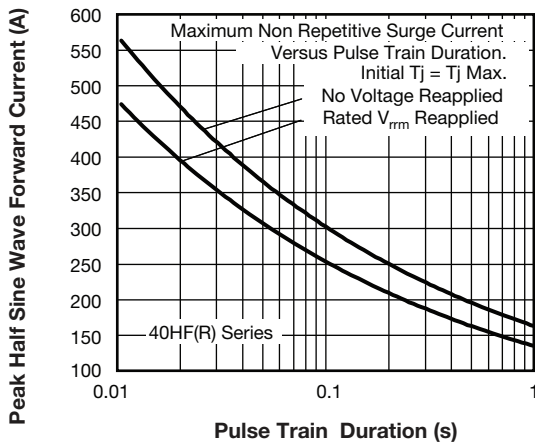


Fig. 10 - Maximum Non-Repetitive Surge Current

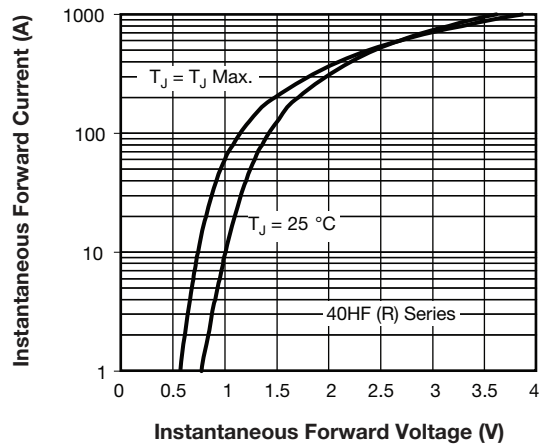


Fig. 12 - Forward Voltage Drop Characteristics (For 1400 V/1600 V)

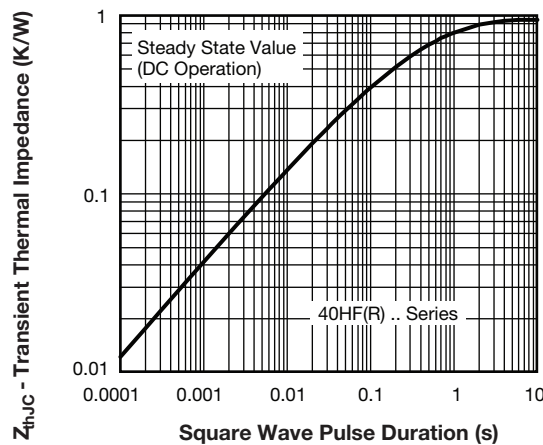
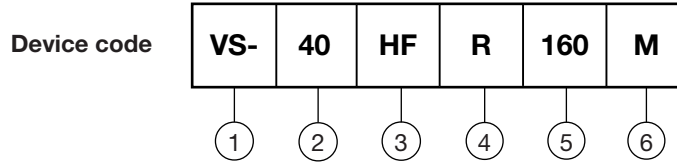


Fig. 13 - Thermal Impedance  $Z_{thJC}$  Characteristics



**ORDERING INFORMATION TABLE**

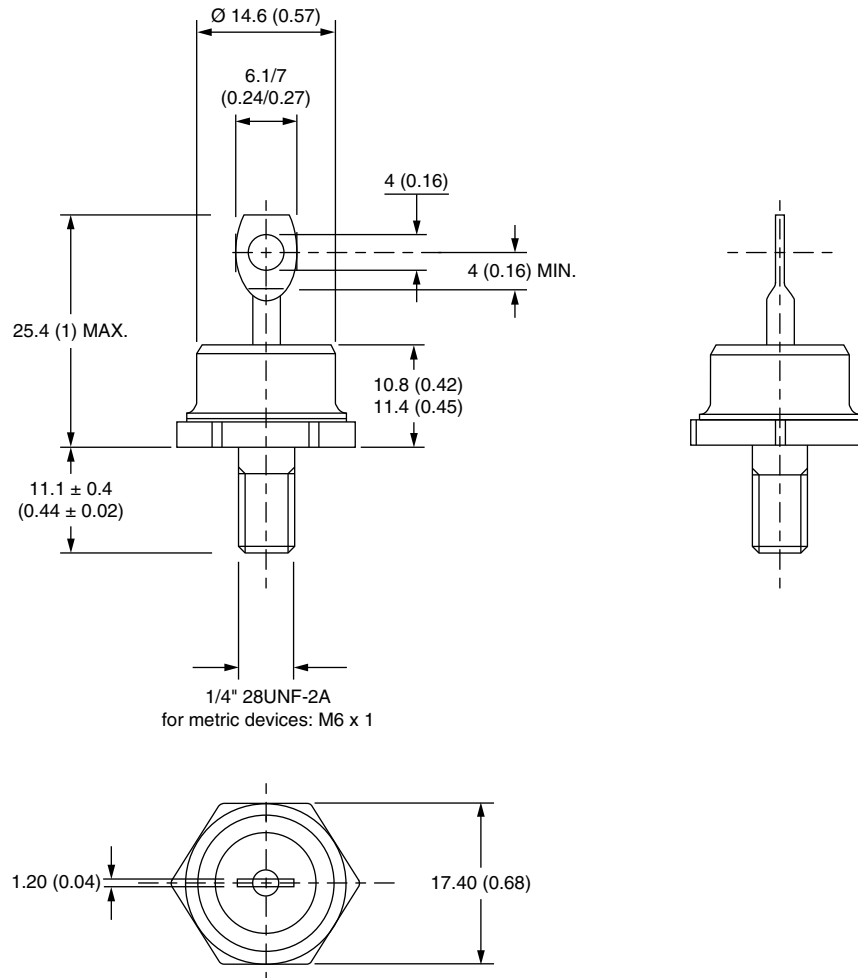


- 1** - Vishay Semiconductors product
- 2** -
  - 40 = standard device
  - 41 = not isolated lead
  - 42 = isolated lead with silicone sleeve  
(red = reverse polarity)  
(blue = normal polarity)
- 3** - HF = standard diode
- 4** -
  - None = stud normal polarity (cathode to stud)
  - R = stud reverse 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?95344">www.vishay.com/doc?95344</a>

## DO-203AB (DO-5) for 40HF(R) and 41HF(R) Series

**DIMENSIONS FOR 40HF(R) SERIES** in millimeters (inches)



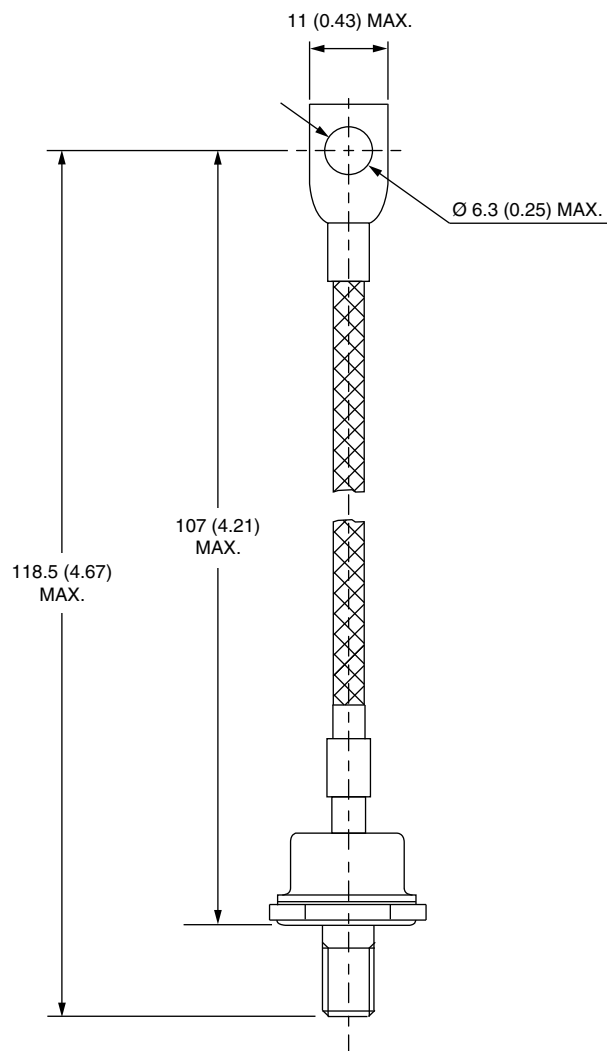
# Outline Dimensions

Vishay Semiconductors

DO-203AB (DO-5) for 40HF(R)  
and 41HF(R) Series



## DIMENSIONS FOR 41HF(R) SERIES in millimeters (inches)





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