

## 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		



<b>FORWARD CONDUCTION</b>						
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

<b>THERMAL AND MECHANICAL SPECIFICATIONS</b>						
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

<b>Δ<math>R_{thJC}</math> CONDUCTION</b>				
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

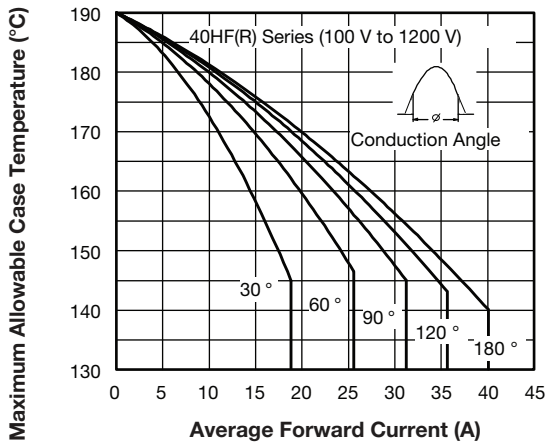


Fig. 1 - Current Ratings Characteristics

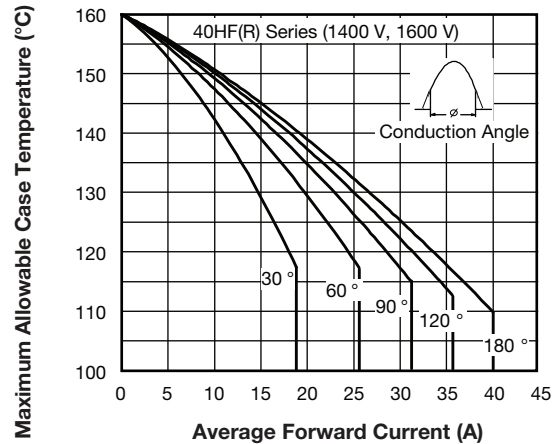


Fig. 3 - Current Ratings Characteristics

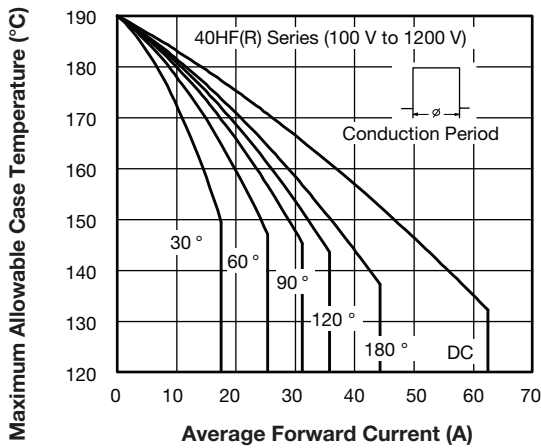


Fig. 2 - Current Ratings Characteristics

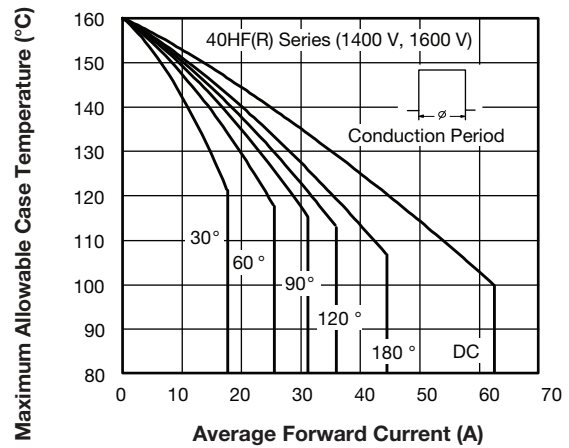


Fig. 4 - Current Ratings Characteristics

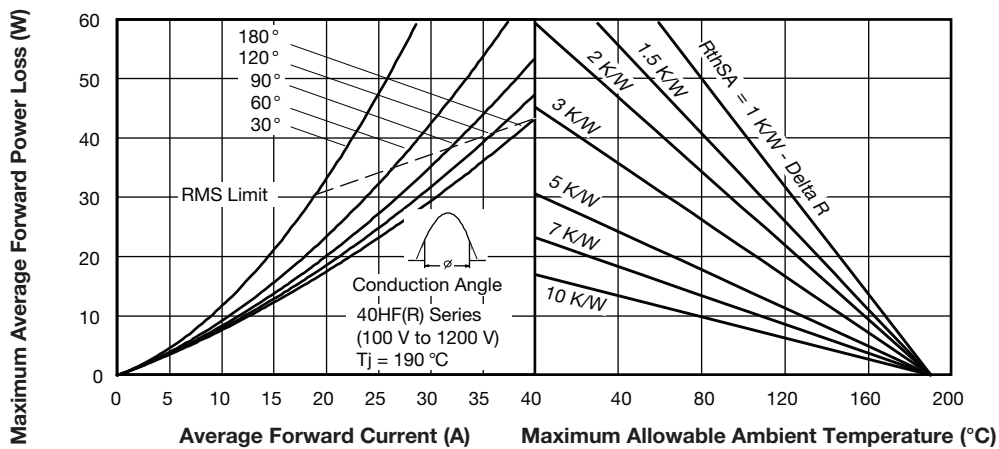


Fig. 5 - Forward Power Loss Characteristics



Fig. 6 - Forward Power Loss Characteristics

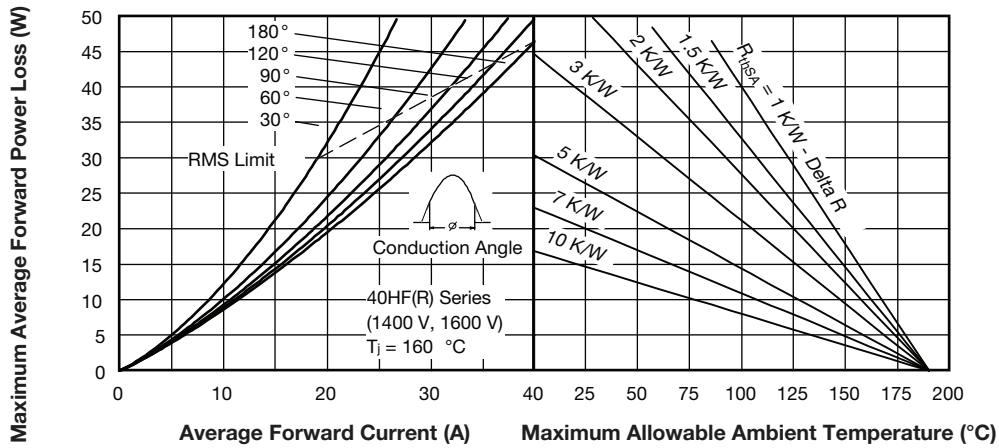


Fig. 7 - Forward Power Loss Characteristics

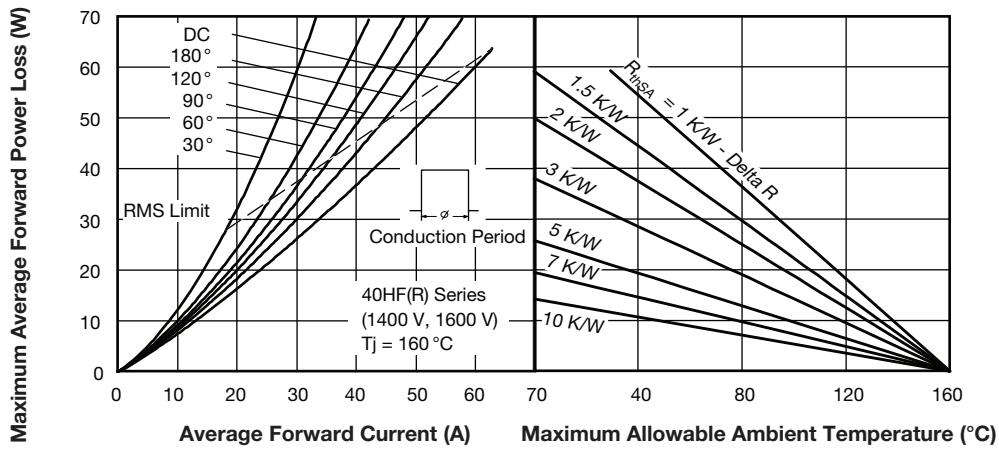


Fig. 8 - Forward Power Loss Characteristics

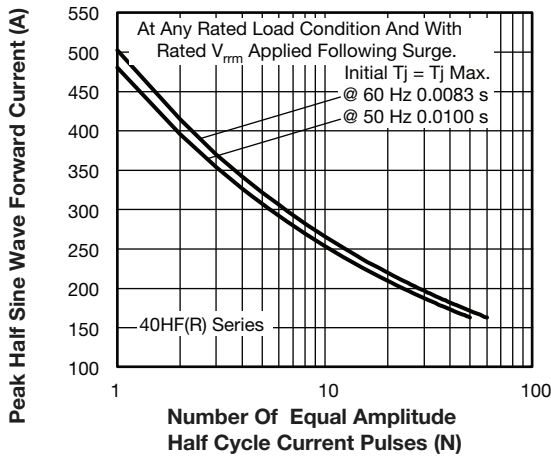


Fig. 9 - Maximum Non-Repetitive Surge Current

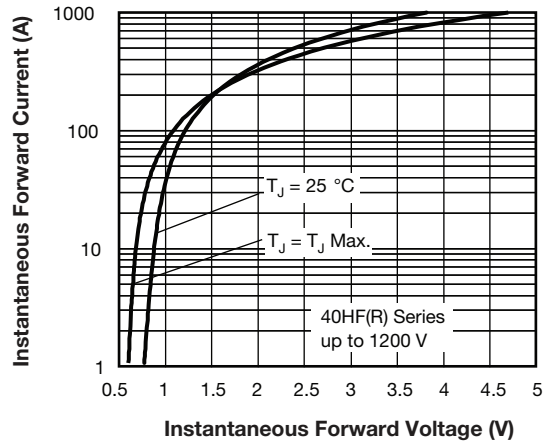


Fig. 11 - Forward Voltage Drop Characteristics (Up To 1200 V)

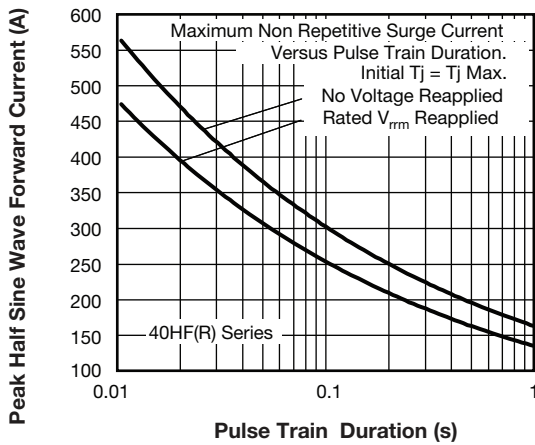


Fig. 10 - Maximum Non-Repetitive Surge Current

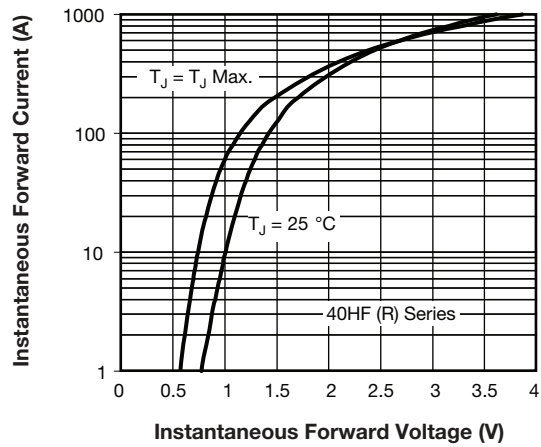


Fig. 12 - Forward Voltage Drop Characteristics (For 1400 V/1600 V)

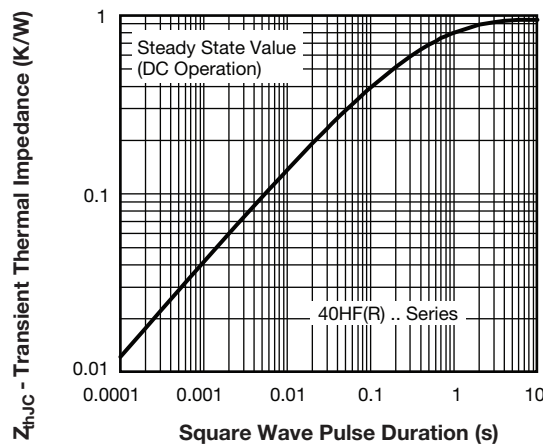
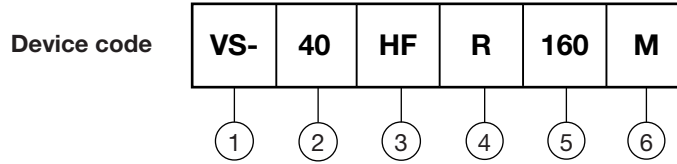


Fig. 13 - Thermal Impedance  $Z_{thJC}$  Characteristics



**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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