

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



DO-203AB (DO-5)

### FEATURES

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600 V  $V_{RRM}$
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for multiple level


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### PRODUCT SUMMARY

$I_{F(AV)}$	40 A
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### 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		A
$I_{FSM}$	50 Hz	570		A
	60 Hz	595		
$I^2t$	50 Hz	1600		A <sup>2</sup> s
	60 Hz	1450		
$V_{RRM}$	Range	100 to 1200	1400/1600	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
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		

# 40HF(R) Series



Vishay High Power Products Standard Recovery Diodes,  
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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
				140	110	°C
Maximum RMS forward current	$I_{F(RMS)}$			62		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		570
		t = 8.3 ms				595
		t = 10 ms	100 % $V_{RRM}$ reappplied			480
		t = 8.3 ms				500
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reappplied	1600		
		t = 8.3 ms		1450		
		t = 10 ms	100 % $V_{RRM}$ reappplied	1150		
		t = 8.3 ms		1050		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reappplied		16 000	$A^2\sqrt{s}$	
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	140/160	
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-203AB (DO-5)		

## Notes

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



# 40HF(R) Series

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$\Delta R_{thJC}$ CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.14	0.10	T <sub>J</sub> = T <sub>J</sub> 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<sub>thJC</sub> when devices operate at different conduction angles than DC

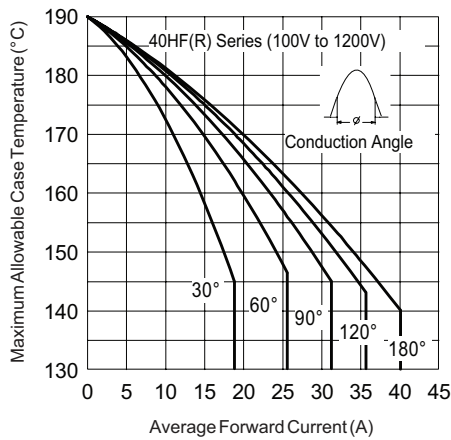


Fig. 1 - Current Ratings Characteristics

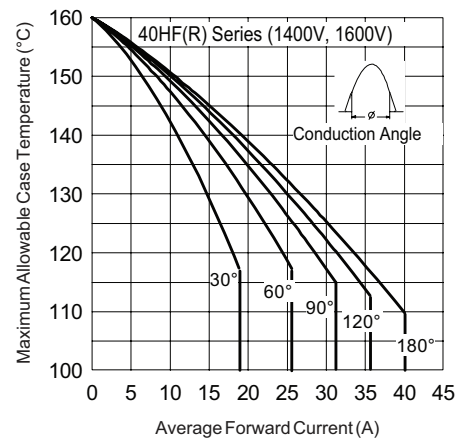


Fig. 3 - Current Ratings Characteristics

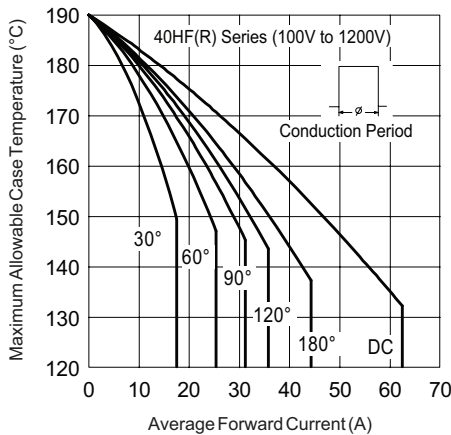


Fig. 2 - Current Ratings Characteristics

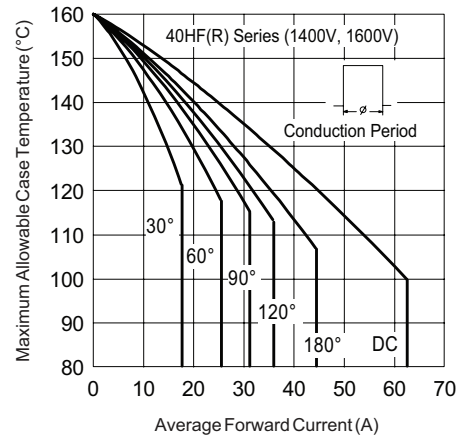


Fig. 4 - Current Ratings Characteristics

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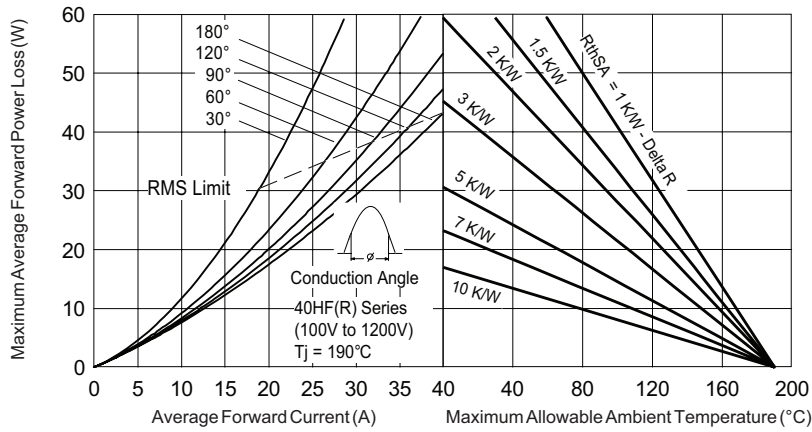


Fig. 5 - Forward Power Loss Characteristics

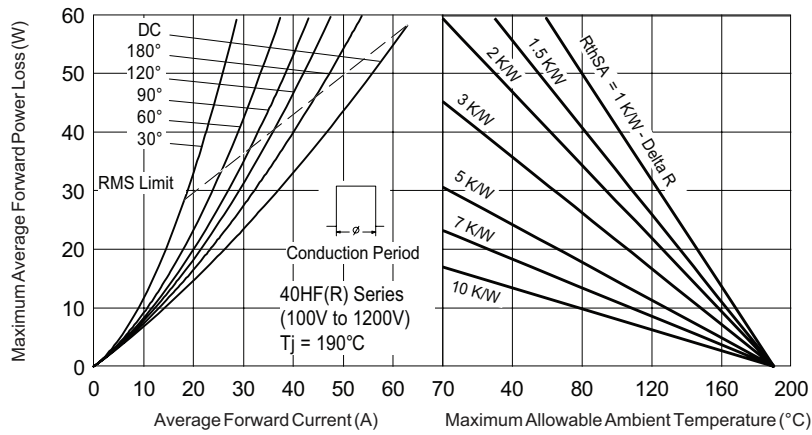


Fig. 6 - Forward Power Loss Characteristics

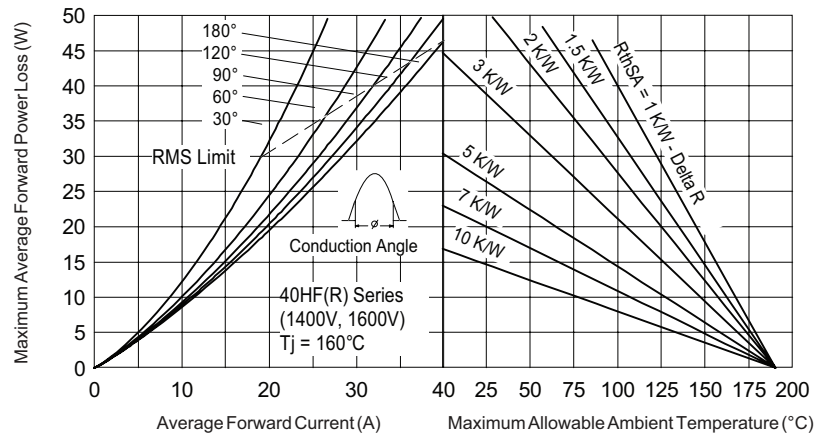


Fig. 7 - Forward Power Loss Characteristics

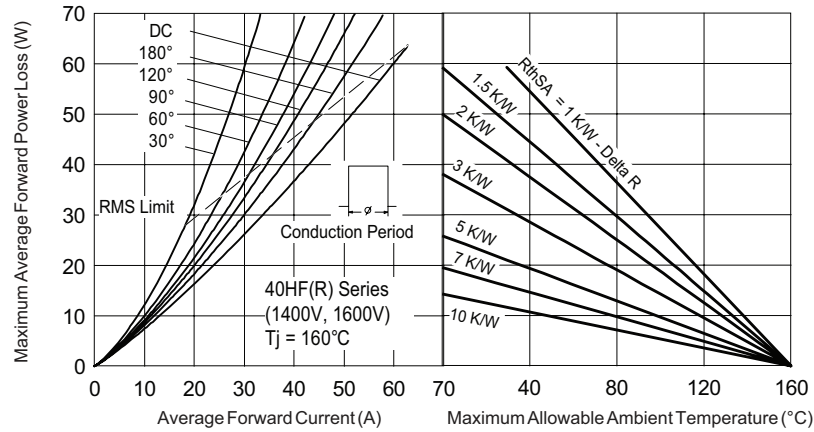


Fig. 8 - Forward Power Loss Characteristics

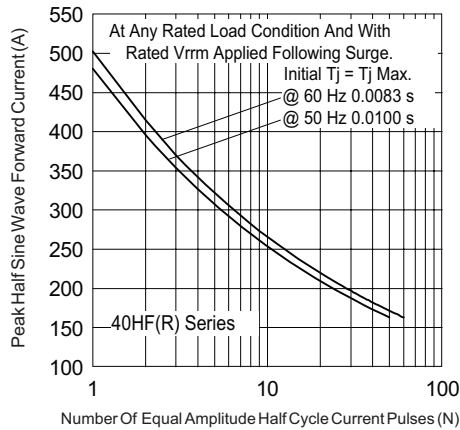


Fig. 9 - Maximum Non-Repetitive Surge Current

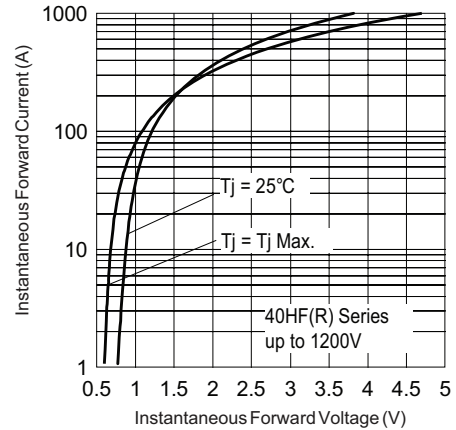


Fig. 11 - Forward Voltage Drop Characteristics (Up To 1200 V)

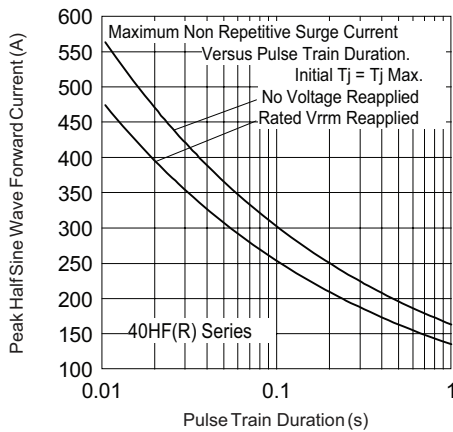


Fig. 10 - Maximum Non-Repetitive Surge Current

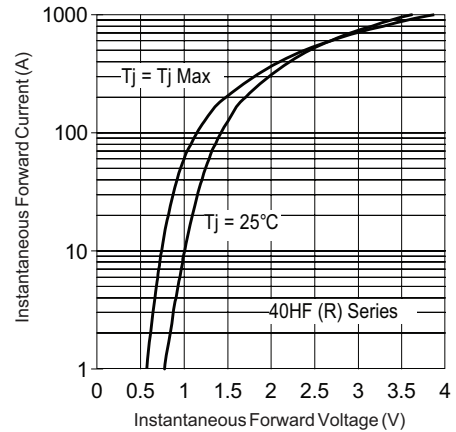


Fig. 12 - Forward Voltage Drop Characteristics (For 1400 V/1600 V)

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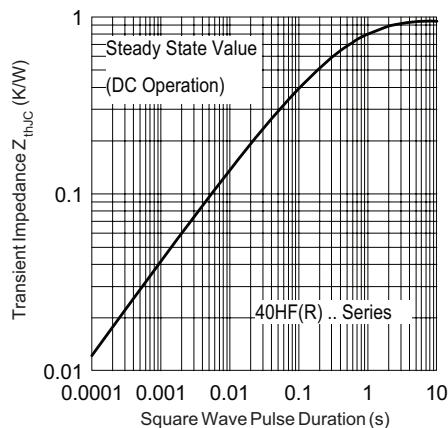


Fig. 13 - Thermal Impedance  $Z_{thJC}$  Characteristics

## ORDERING INFORMATION TABLE

Device code	<b>40</b>	<b>HF</b>	<b>R</b>	<b>160</b>	<b>M</b>
	①	②	③	④	⑤

- 1** -
  - 40 = Standard device
  - 41 = Not isolated lead
  - 42 = Isolated lead with silicone sleeve  
(red = Reverse polarity)  
(blue = Normal polarity)
- 2** - HF = Standard diode
- 3** -
  - None = Stud normal polarity (cathode to stud)
  - R = Stud reverse polarity (anode to stud)
- 4** - Voltage code x 10 =  $V_{RRM}$  (see Voltage Ratings table)
- 5** -
  - None = Stud base DO-203AB (DO-5) 1/4" 28UNF-2A
  - M = Stud base DO-203AB (DO-5) M6 x 1

### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95344">www.vishay.com/doc?95344</a>
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