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

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^2s
	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) 10 TO 120	40HF(R) 140/160	UNITS
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 reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	570		A
		t = 8.3 ms			595		
		t = 10 ms	100 % V_{RRM} reapplied		480		
		t = 8.3 ms			500		
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		1600		A^2s
		t = 8.3 ms			1450		
		t = 10 ms	100 % V_{RRM} reapplied		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 reapplied			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) 10 to 120	40HF(R) 140 to 160	UNITS
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, tighting on nut (1)	3.4 (30)		N · m (lbf · in)
		Lubricated thread, tighting on nut (1)	2.3 (20)		
		Not lubricated thread, tighting on hexagon (2)	4.2 (37)		
		Lubricated thread, tighting on hexagon (2)	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

ΔR_{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

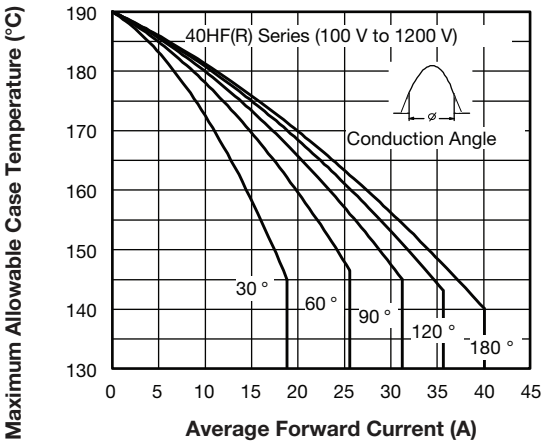


Fig. 1 - Current Ratings Characteristics

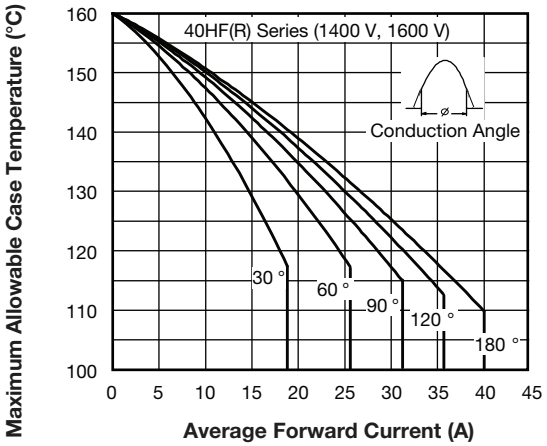


Fig. 3 - Current Ratings Characteristics

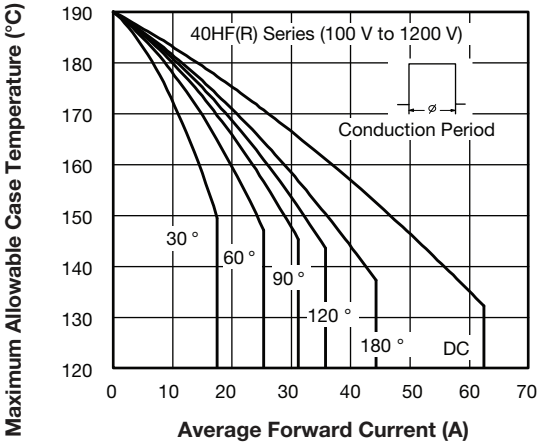


Fig. 2 - Current Ratings Characteristics

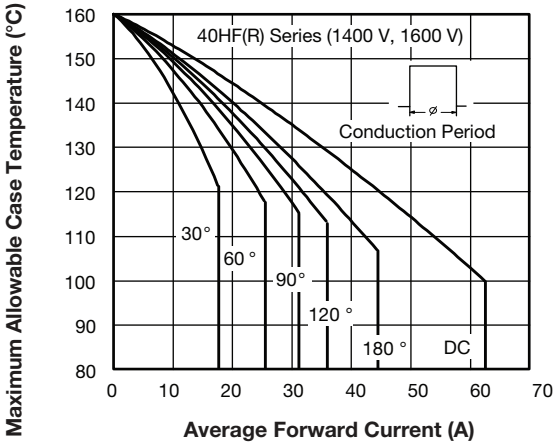


Fig. 4 - Current Ratings Characteristics

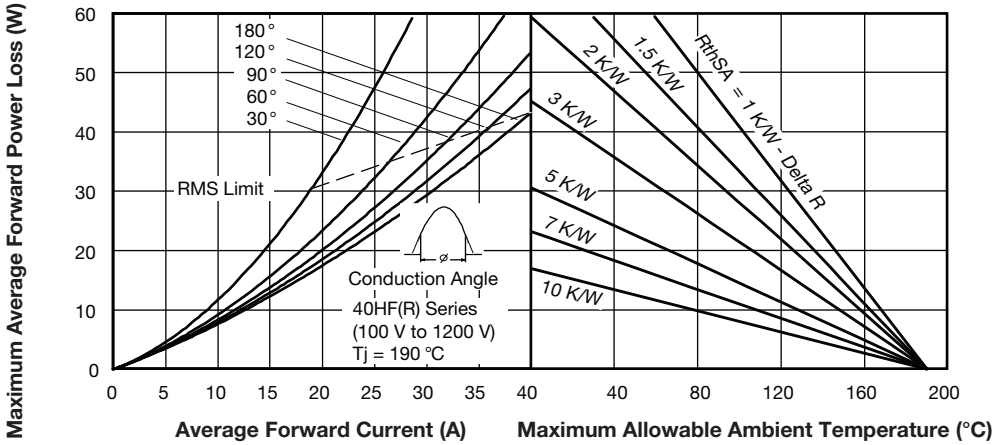


Fig. 5 - Forward Power Loss Characteristics

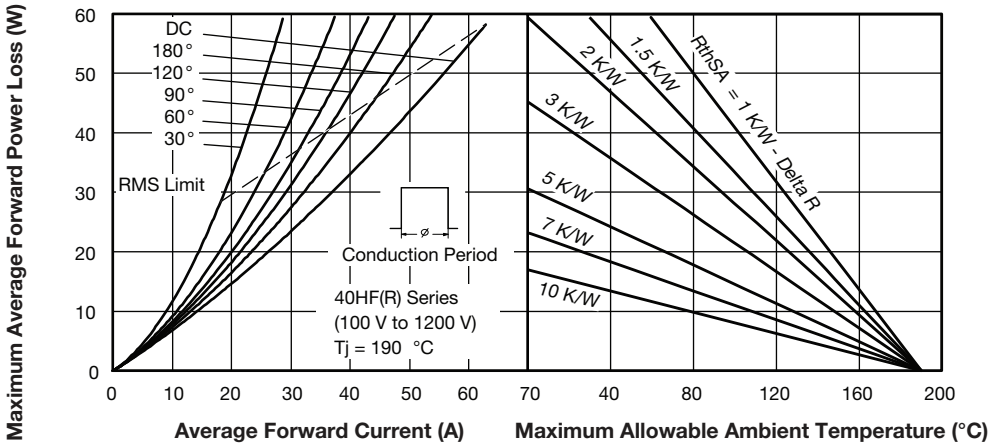


Fig. 6 - Forward Power Loss Characteristics

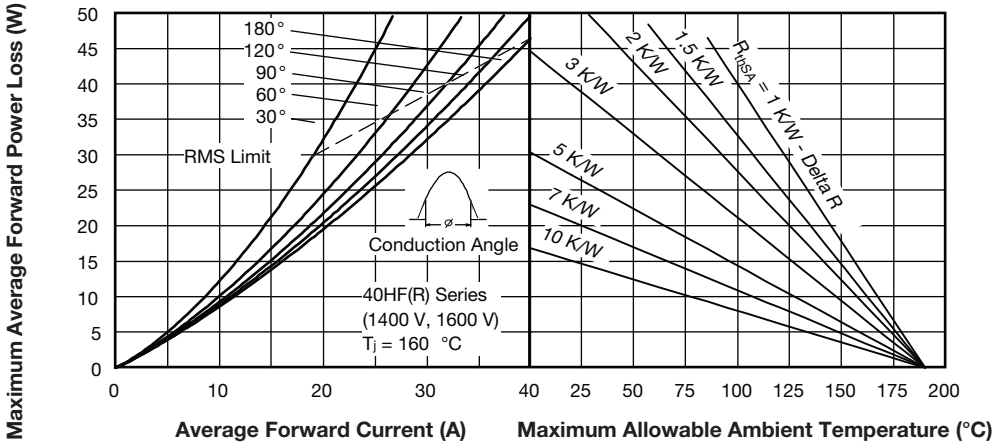


Fig. 7 - Forward Power Loss Characteristics

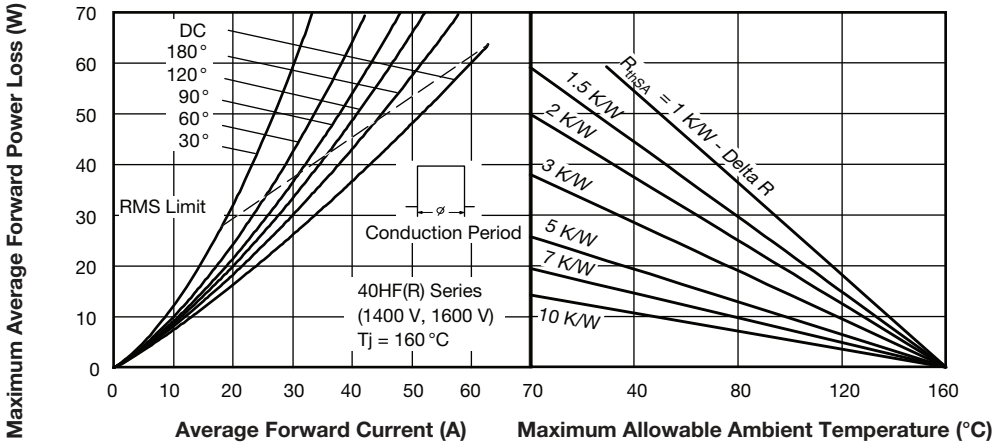


Fig. 8 - Forward Power Loss Characteristics

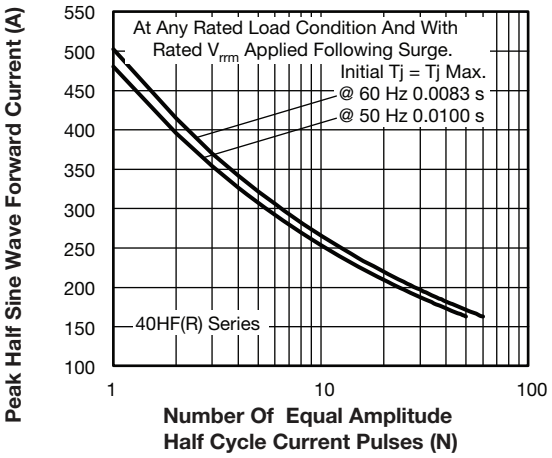


Fig. 9 - Maximum Non-Repetitive Surge Current

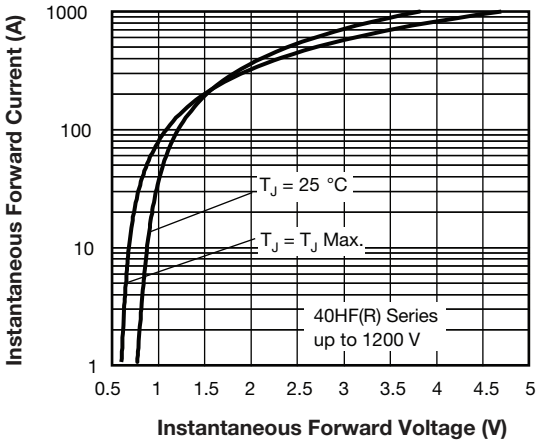


Fig. 11 - Forward Voltage Drop Characteristics
(Up To 1200 V)

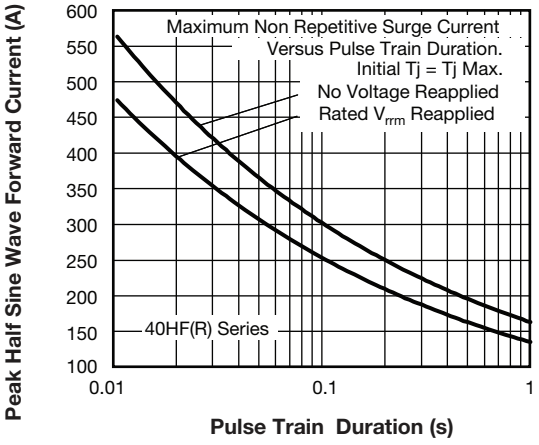


Fig. 10 - Maximum Non-Repetitive Surge Current

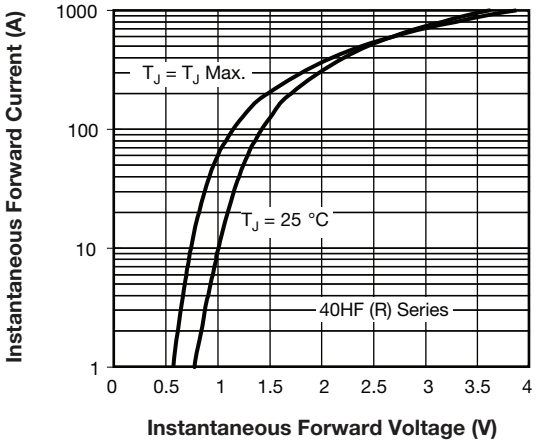


Fig. 12 - Forward Voltage Drop Characteristics
(For 1400 V/1600 V)

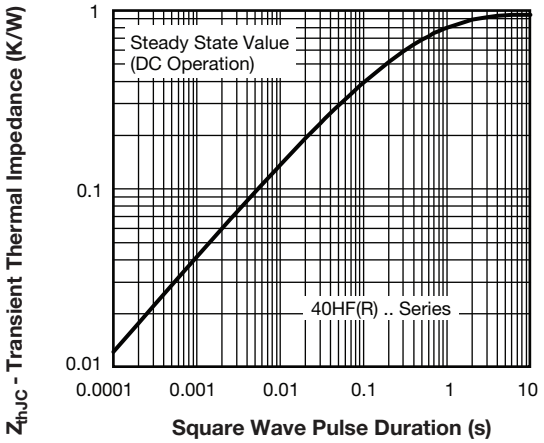
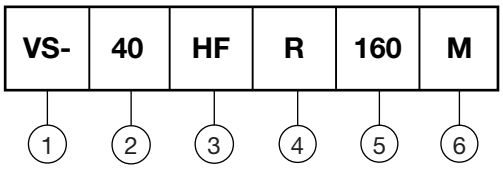


Fig. 13 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code



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)

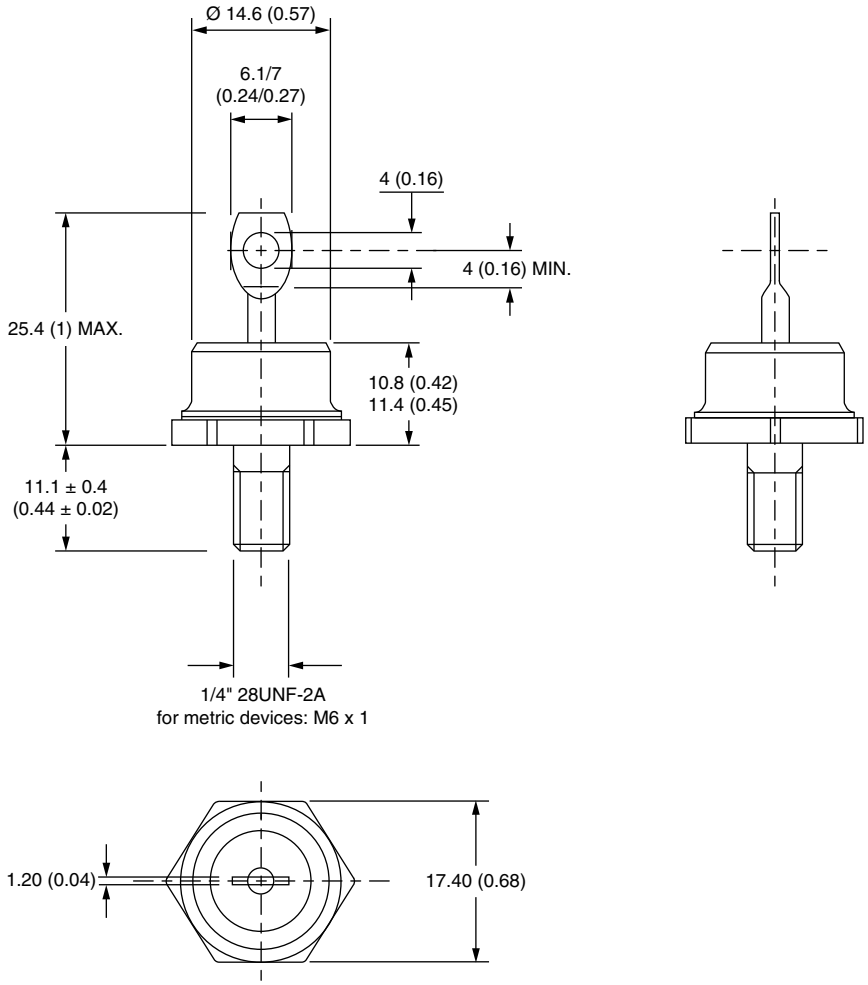
5 - Voltage code x 10 = V_{RRM} (see Voltage Ratings table)

6 - • None = stud base DO-5 (DO-203AB) 1/4" 28UNF-2A
• M = stud base DO-5 (DO-203AB) M6 x 1

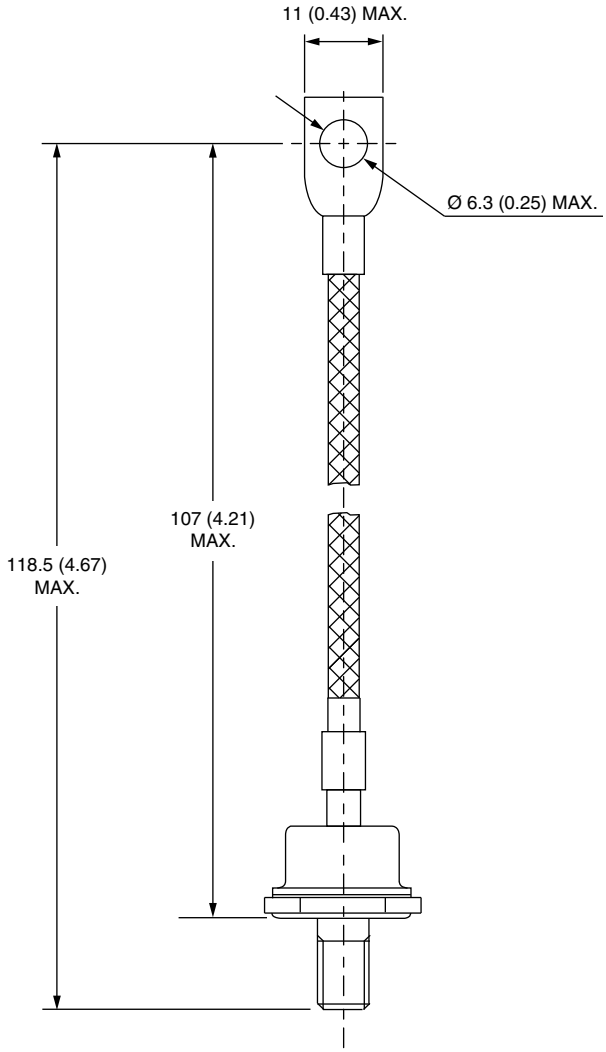
LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95344

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

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



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



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