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}
- 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

PRODUCT SUMMARY	
$I_{F(AV)}$	40 A
Package	DO-203AB (DO-5)
Circuit configuration	Single diode

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	

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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-203AB (DO-5)		

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

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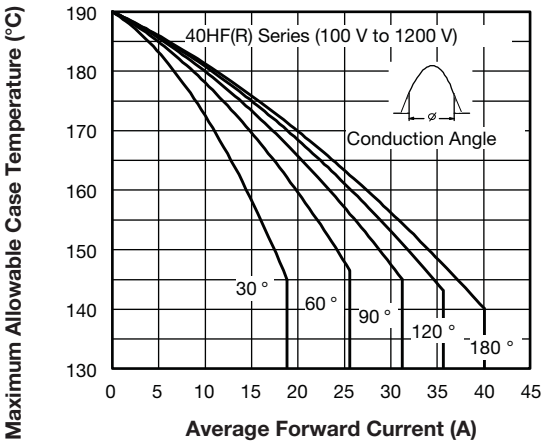

Fig. 1 - Current Ratings Characteristics

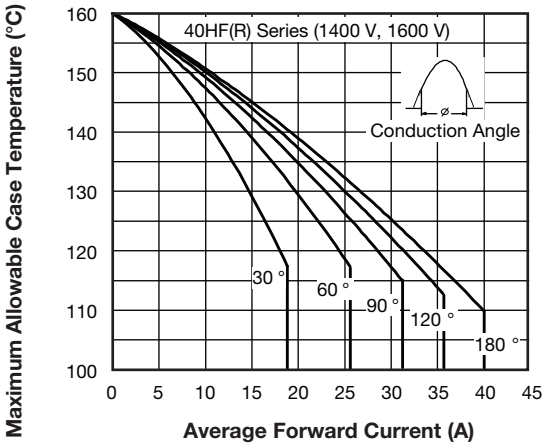

Fig. 3 - Current Ratings Characteristics

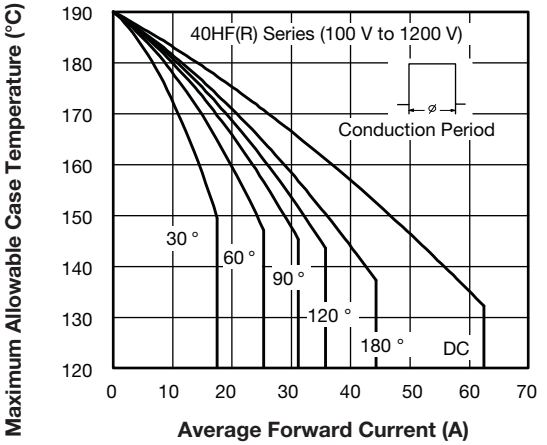

Fig. 2 - Current Ratings Characteristics

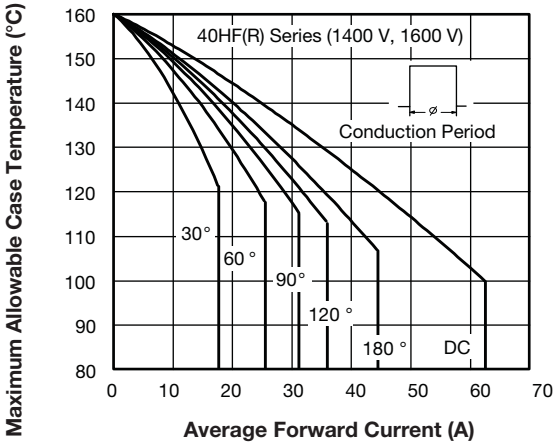

Fig. 4 - Current Ratings Characteristics

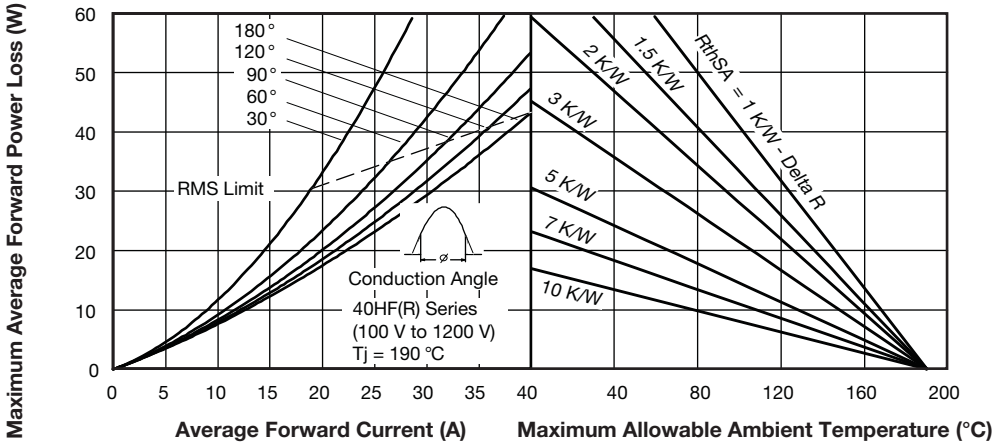

Fig. 5 - Forward Power Loss Characteristics

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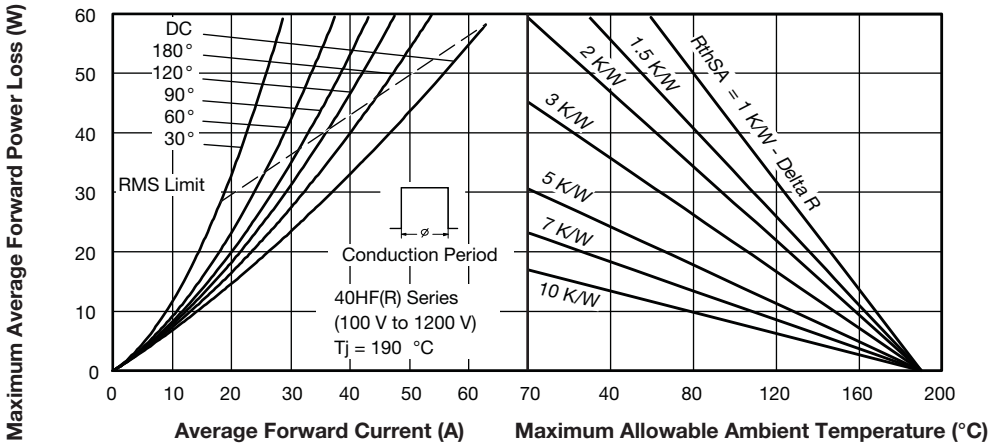

Fig. 6 - Forward Power Loss Characteristics

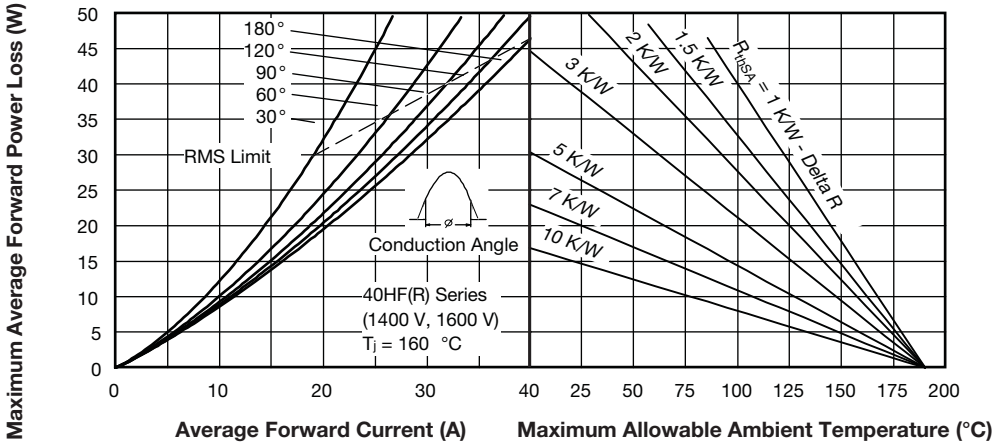

Fig. 7 - Forward Power Loss Characteristics

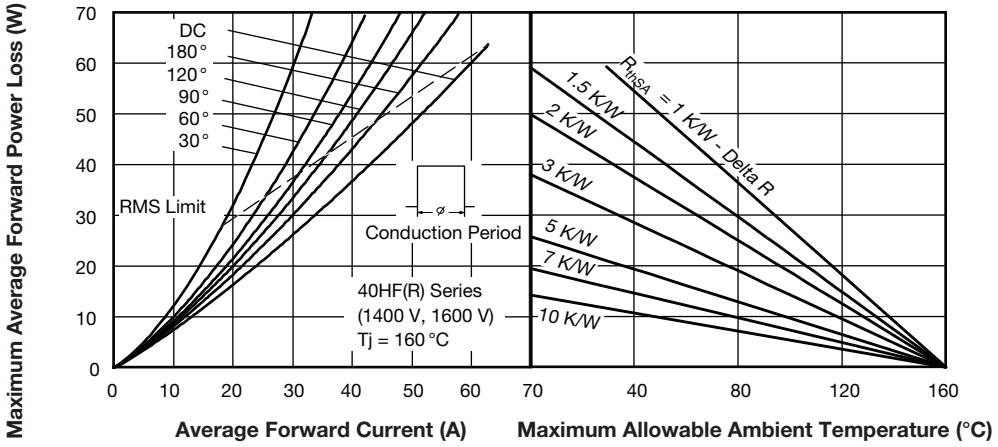

Fig. 8 - Forward Power Loss Characteristics

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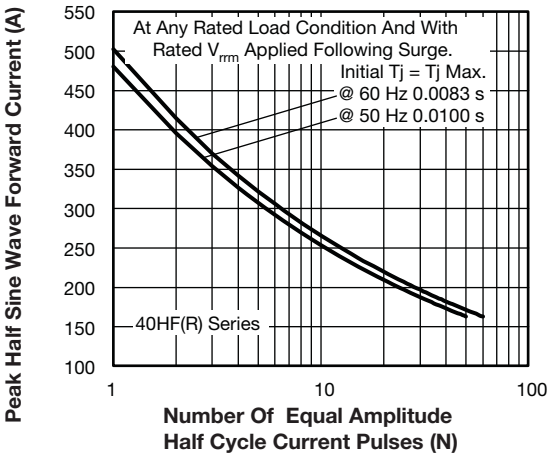

Fig. 9 - Maximum Non-Repetitive Surge Current

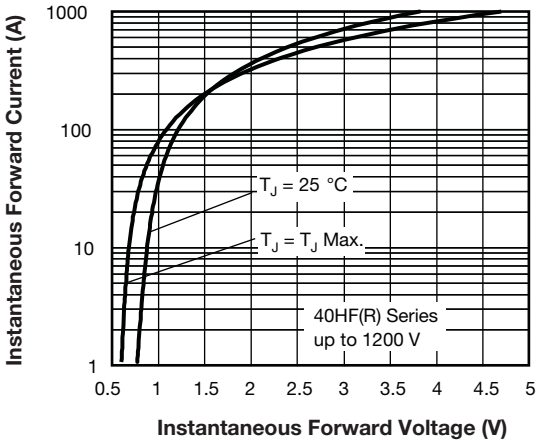

Fig. 11 - Forward Voltage Drop Characteristics
(Up To 1200 V)

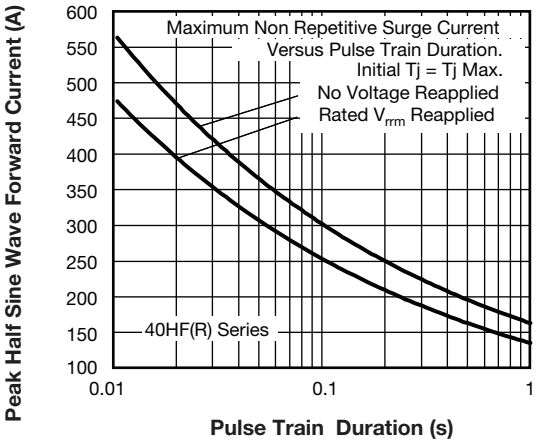

Fig. 10 - Maximum Non-Repetitive Surge Current

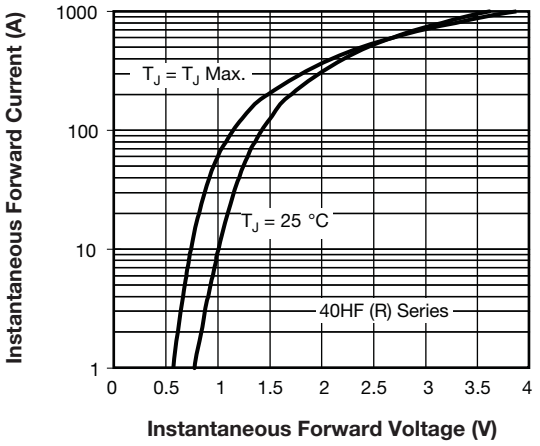

Fig. 12 - Forward Voltage Drop Characteristics
(For 1400 V/1600 V)

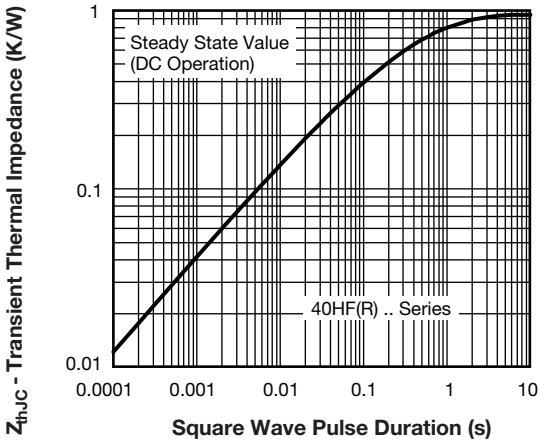

Fig. 13 - Thermal Impedance Z_{thJC} Characteristics

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ORDERING INFORMATION TABLE

Device code

VS-	40	HF	R	160	M
1	2	3	4	5	6

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-203AB (DO-5) 1/4" 28UNF-2A
• M = Stud base DO-203AB (DO-5) M6 x 1

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

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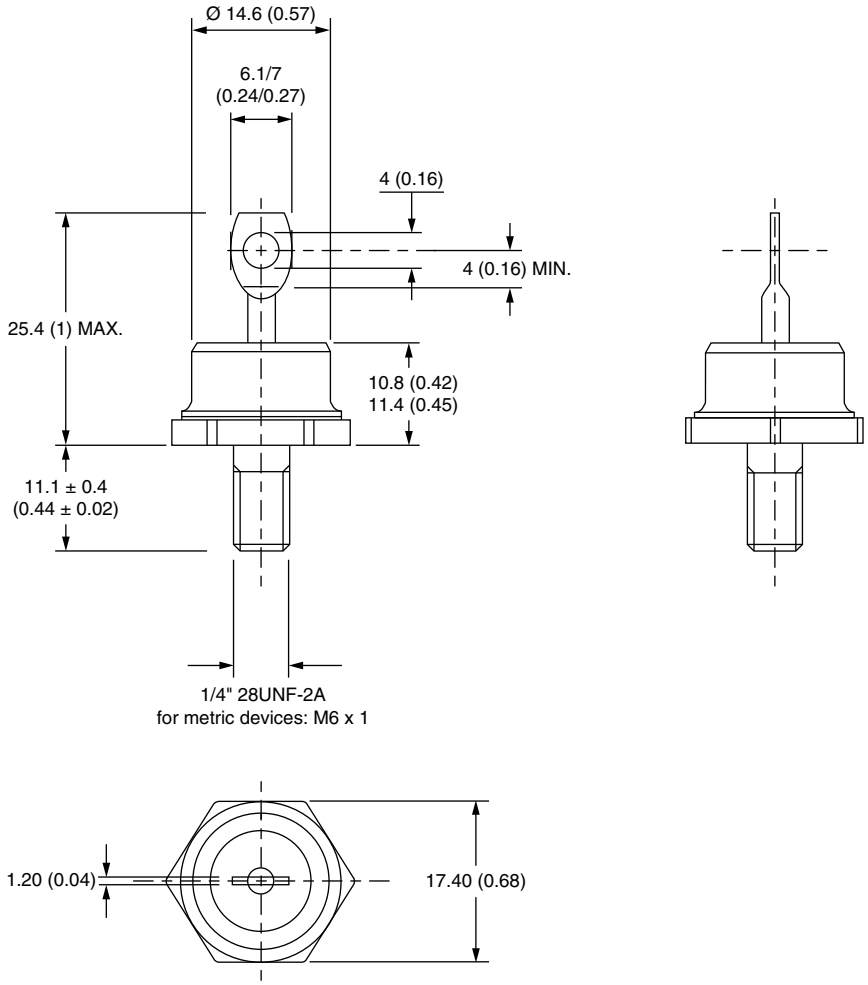
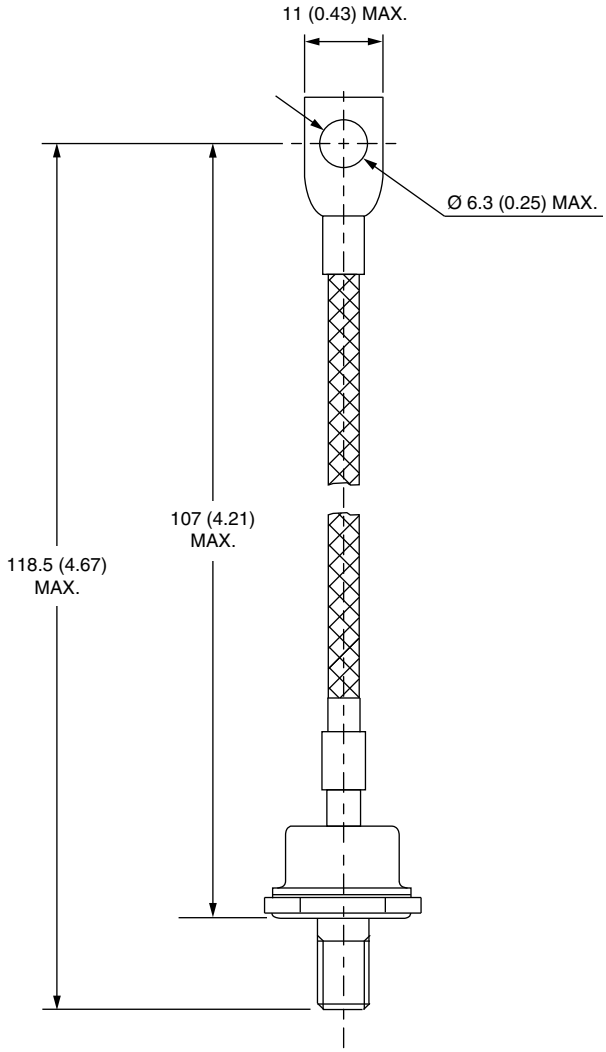
DO-203AB (DO-5) for 40HF(R) and 41HF(R) Series

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



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



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