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}
- RoHS compliant
- 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

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^2s
	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	

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 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) 140/160	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		
Allowable mounting torque		Not lubricated threads	$3.4^{+0-10\%}$ (30)		N · m (lbf · in)
		Lubricated threads	$2.3^{+0-10\%}$ (20)		
Approximate weight			17		g
			0.6		oz.
Case style		See dimensions - link at the end of datasheet	DO-203AB (DO-5)		

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

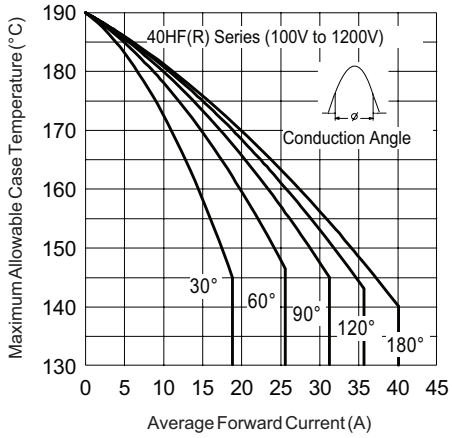

Fig. 1 - Current Ratings Characteristics

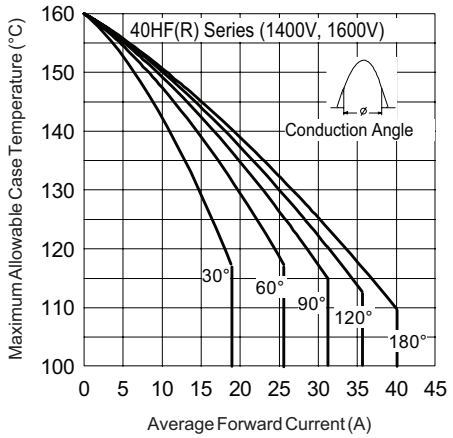

Fig. 3 - Current Ratings Characteristics

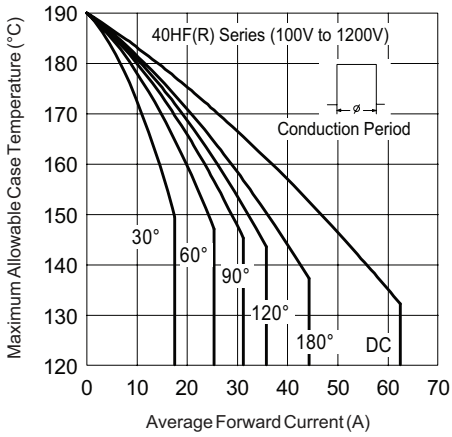

Fig. 2 - Current Ratings Characteristics

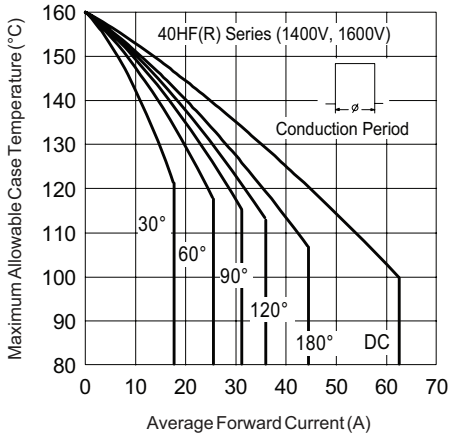

Fig. 4 - Current Ratings Characteristics

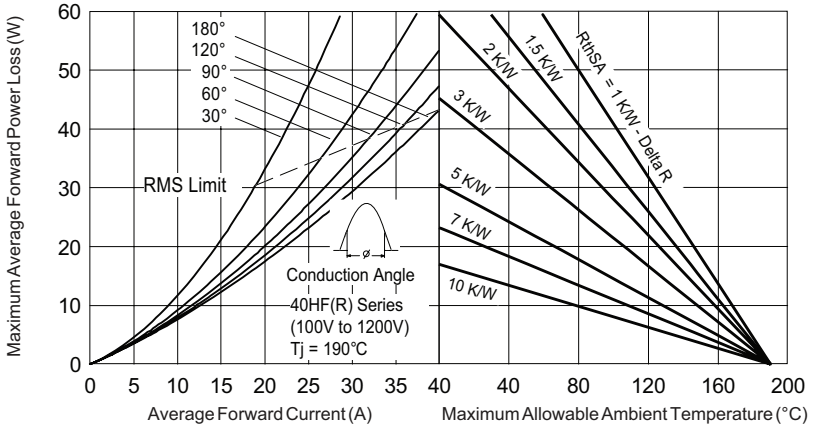

Fig. 5 - Forward Power Loss Characteristics

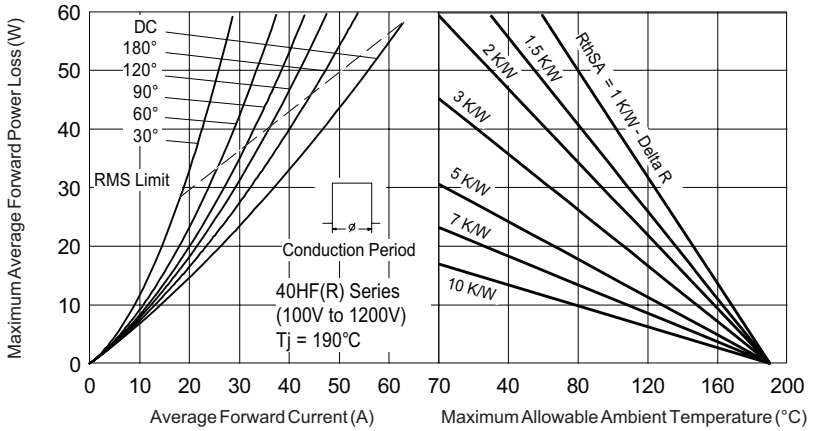

Fig. 6 - Forward Power Loss Characteristics

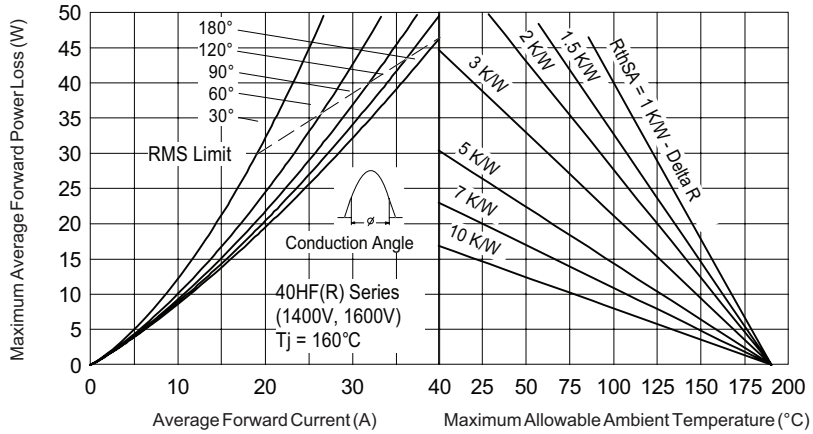

Fig. 7 - Forward Power Loss Characteristics

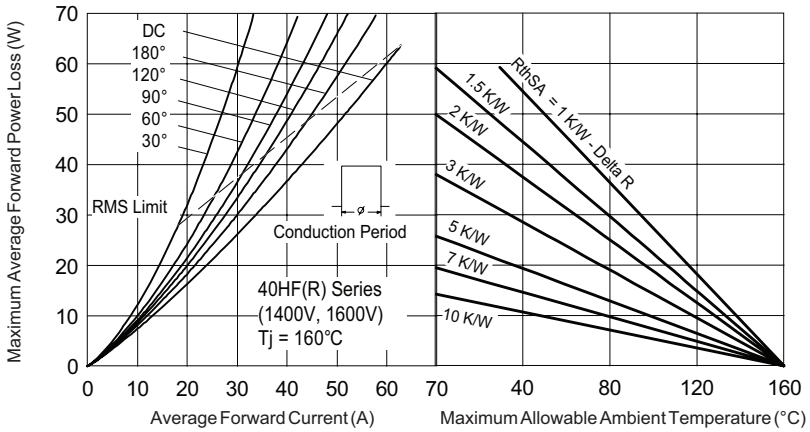

Fig. 8 - Forward Power Loss Characteristics

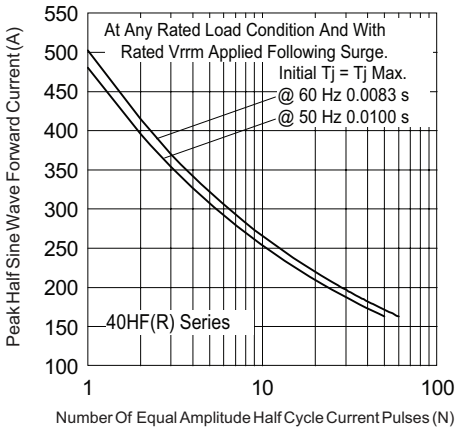

Fig. 9 - Maximum Non-Repetitive Surge Current

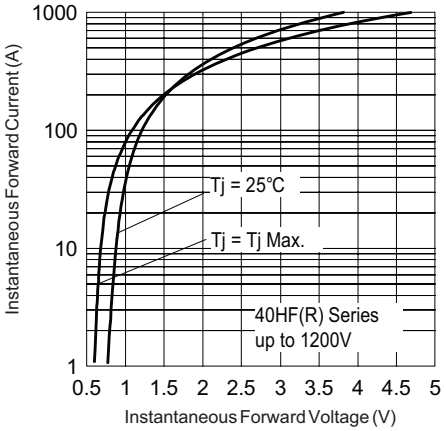

Fig. 11 - Forward Voltage Drop Characteristics
(Up To 1200 V)

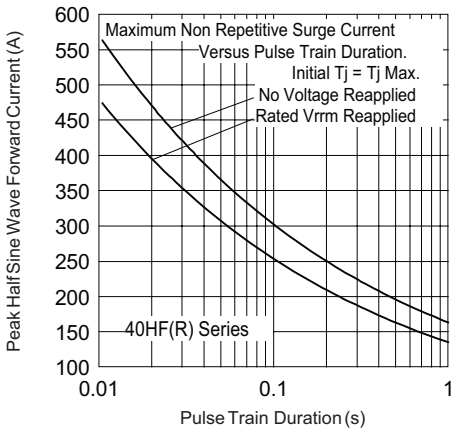

Fig. 10 - Maximum Non-Repetitive Surge Current

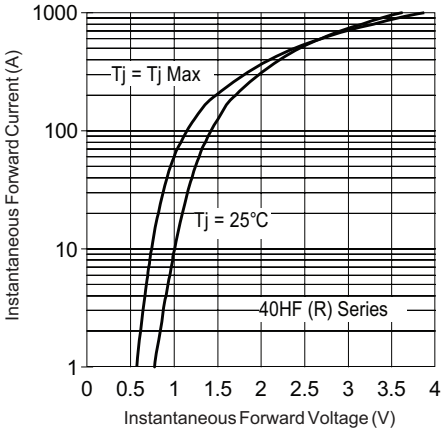

Fig. 12 - Forward Voltage Drop Characteristics
(For 1400 V/1600 V)

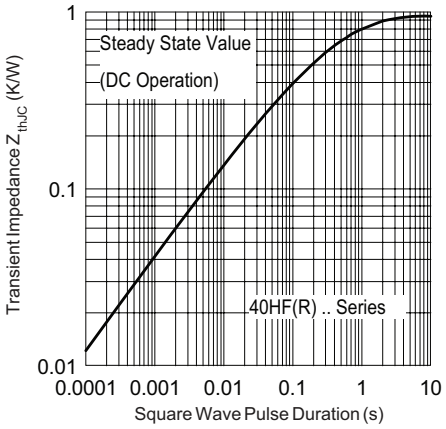

Fig. 13 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

40	HF	R	160	M
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	http://www.vishay.com/doc?95344

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