Standard Recovery Diodes, (Stud Version), 400 A

DO-9 (DO-205AB)

FEATURES

- Wide current range
- High voltage ratings up to 2400 V
- High surge current capabilities
- Stud cathode and stud anode version
- Standard JEDEC® types
- Compression bonded encapsulations
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT

TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	400 A
Package	DO-9 (DO-205AB)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		480	A
	T_C	120	°C
$I_{F(RMS)}$		630	A
I_{FSM}	50 Hz	8250	
	60 Hz	8640	
I^2t	50 Hz	340	kA^2s
	60 Hz	311	
V_{RRM}	Range	1600 to 2400	V
T_J		-40 to +190	°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-SD400N/R	16	1600	1700	15
	20	2000	2100	
	24	2400	2500	

FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave			400	A
					120	°C
					480	A
					100	°C
Maximum RMS forward current	$I_{F(RMS)}$	DC at 110 °C case temperature			630	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	8250	
		t = 8.3 ms			8640	
		t = 10 ms	100 % V_{RRM} reapplied		6940	
		t = 8.3 ms			7270	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		340	kA^2s
		t = 8.3 ms			311	
		t = 10 ms	100 % V_{RRM} reapplied		241	
		t = 8.3 ms			220	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied			3400	$kA^2\sqrt{s}$
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.80	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.85	
Low level value of forward slope resistance	r_{f1}	(16.7 % x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.55	mW
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.51	
Maximum forward voltage drop	V_{FM}	I_{pk} = 1500 A, $T_J = T_J$ maximum, t_p = 10 ms sinusoidal wave			1.62	V

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	T_J		-40 to +190	°C
Maximum storage temperature range	T_{Stg}		-55 to +200	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.11	K/W
Maximum thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, flat and greased	0.04	
Maximum allowed mounting torque ± 10 %		Not-lubricated threads	27	Nm
Approximate weight			250	g
Case style		See dimensions (link at the end of datasheet	DO-9 (DO-205AB)	

ΔR_{thJC} CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.020	0.013	$T_J = T_J$ maximum	K/W
120°	0.023	0.023		
90°	0.029	0.031		
60°	0.042	0.044		
30°	0.073	0.074		

Note

- The table above shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

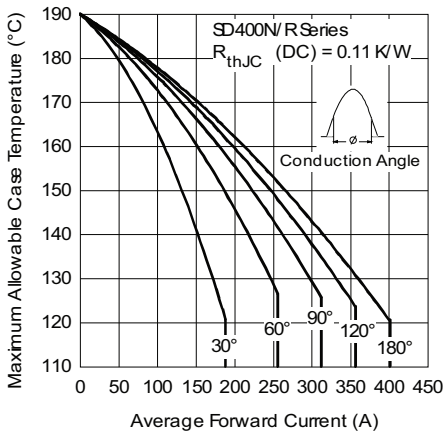


Fig. 1 - Current Ratings Characteristics

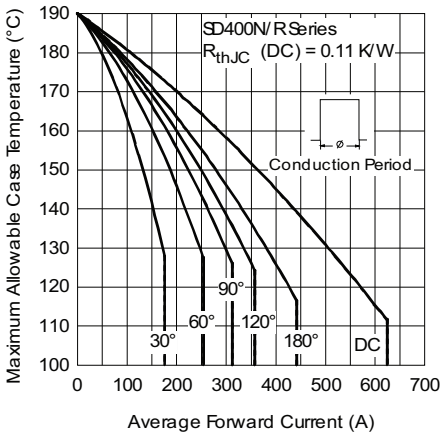


Fig. 2 - Current Ratings Characteristics

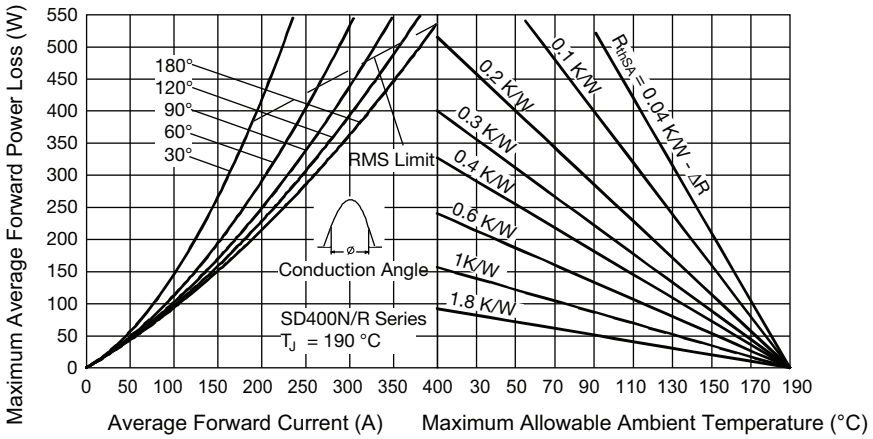


Fig. 3 - Forward Power Loss Characteristics

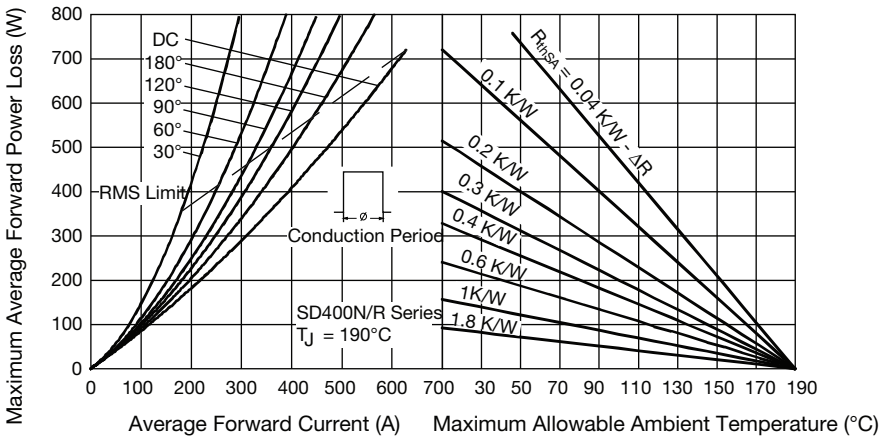


Fig. 4 - Forward Power Loss Characteristics

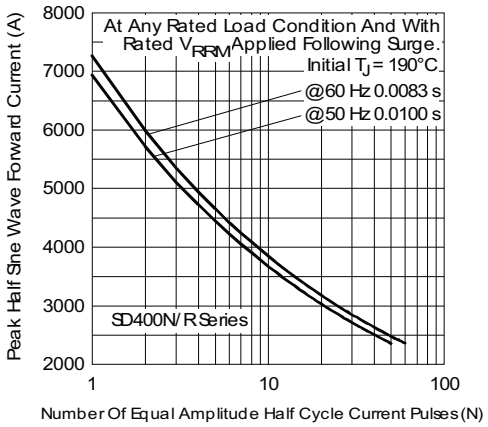


Fig. 5 - Maximum Non-Repetitive Surge Current

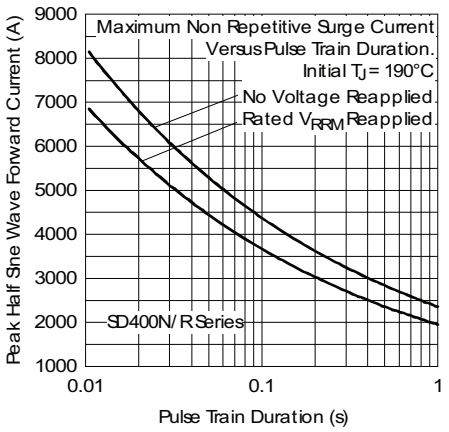


Fig. 6 - Maximum Non-Repetitive Surge Current

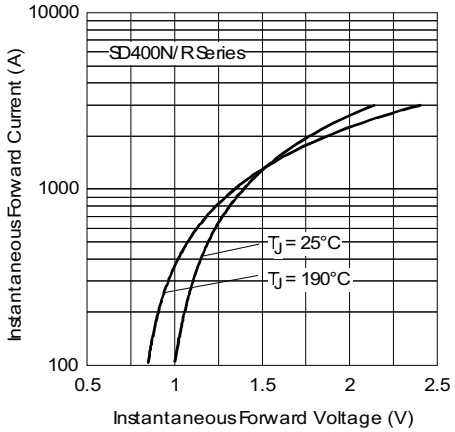


Fig. 7 - Forward Voltage Drop Characteristics

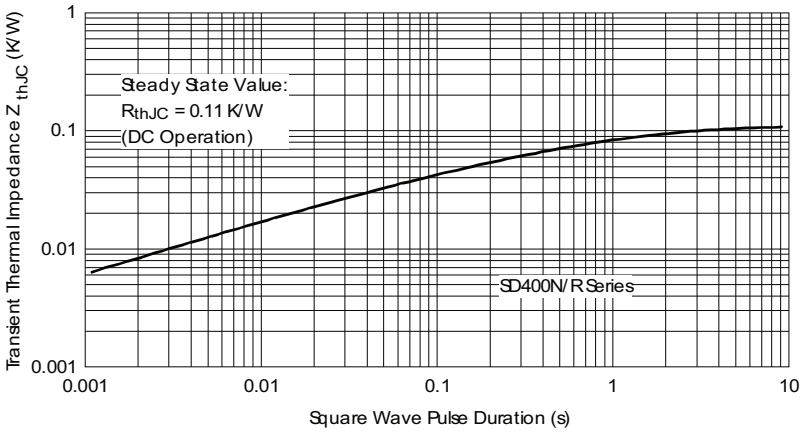


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

ORDERING INFORMATION TABLE

Device code

VS-	SD	40	0	N	24	P	C
1	2	3	4	5	6	7	8

1 - Vishay Semiconductors product

2 - Diode

3 - Essential part number

4 - 0 = standard recovery

5 - • N = stud normal polarity (cathode to stud)
• R = stud reverse polarity (anode to stud)

6 - Voltage code x 100 = V_{RRM} (see Voltage Ratings table)

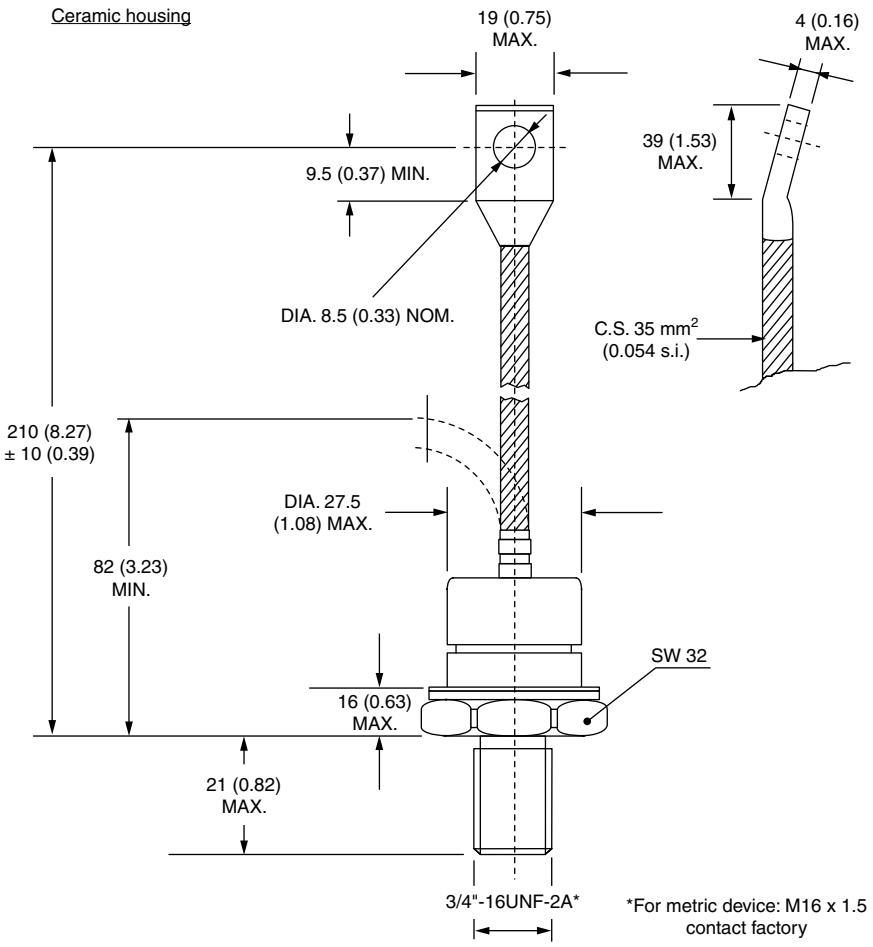
7 - P = stud base DO-9 (DO-205AB) 3/4" 16UNF-2A

8 - C = ceramic housing

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95301

DO-205AB (DO-9)

DIMENSIONS in millimeters (inches)



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