Standard Recovery Diodes, (Stud Version), 400 A

DO-9 (DO-205AB)

FEATURES

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

RoHS COMPLIANT

TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives

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

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		400	A
	T_C	120	°C
$I_{F(RMS)}$		630	A
I_{FSM}	50 Hz	8250	A
	60 Hz	8640	
I^2t	50 Hz	340	kA^2s
	60 Hz	311	
V_{RRM}	Range	800 to 1600	V
T_J		-40 to +200	°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-400U(R)	80	800	900	15
	120	1200	1300	
	160	1600	1700	

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
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	A
		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			0.77	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			0.49	mΩ
High level value of forward slope resistance	r_{f2}	(I > π x $I_{F(AV)}$), $T_J = T_J$ maximum			0.49	
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 and storage temperature range	T_J, T_{Stg}		-40 to 200	°C
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.15	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	N · m
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

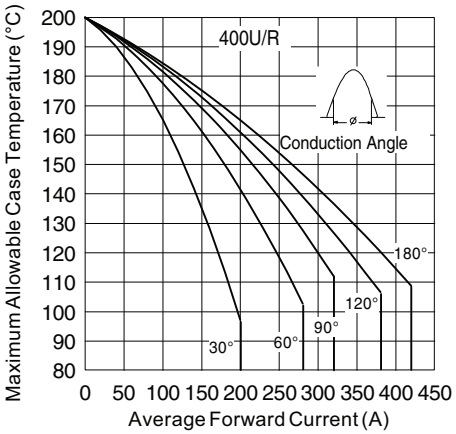


Fig. 1 - Current Ratings Characteristics

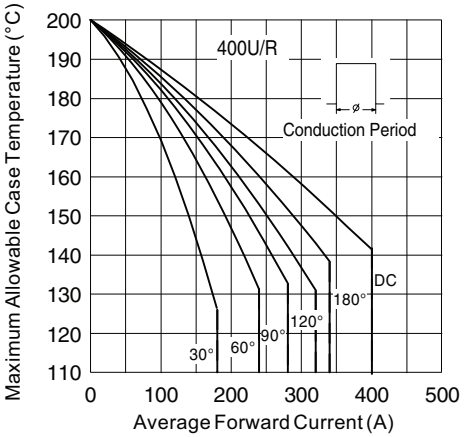


Fig. 2 - Current Ratings Characteristics

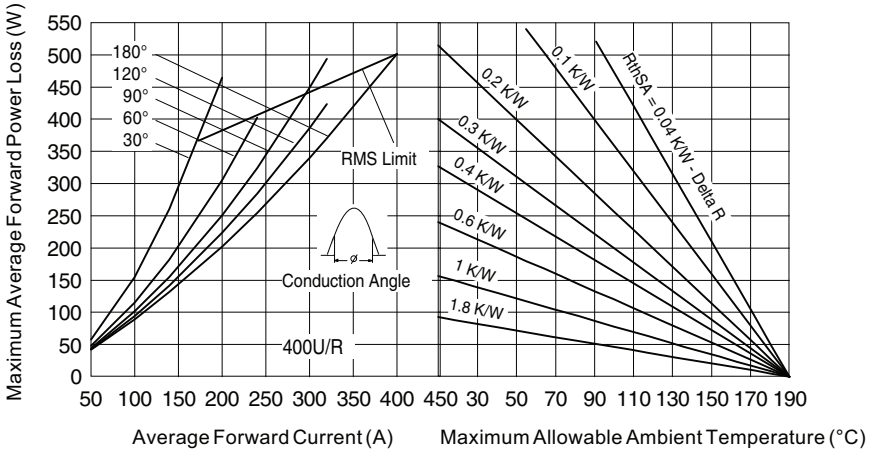


Fig. 3 - Forward Power Loss Characteristics

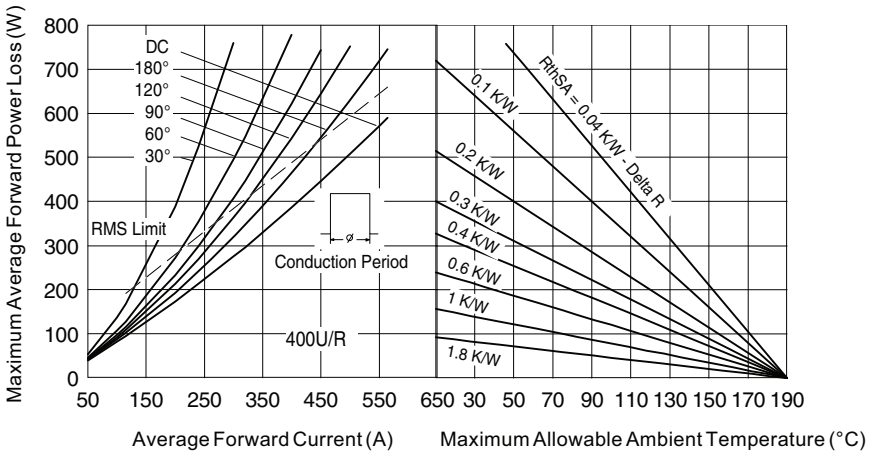


Fig. 4 - Forward Power Loss Characteristics

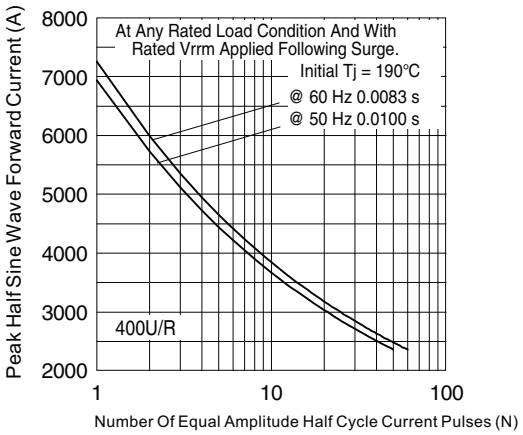


Fig. 5 - Maximum Non-Repetitive Surge Current

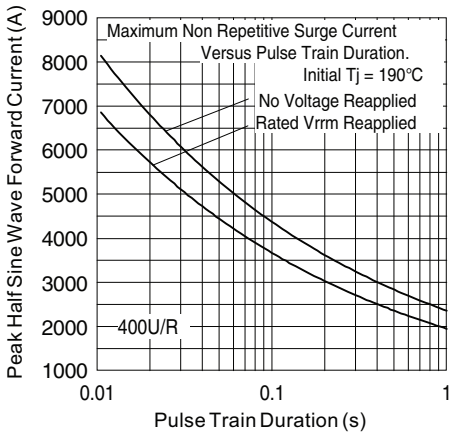


Fig. 6 - Maximum Non-Repetitive Surge Current

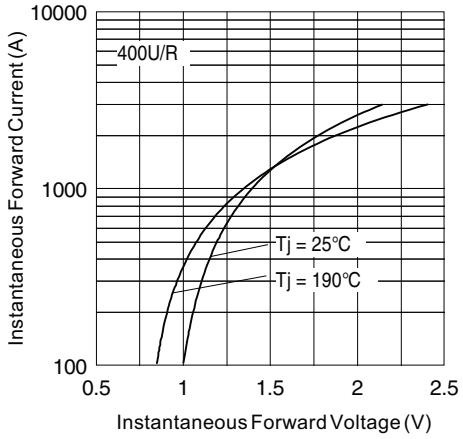


Fig. 7 - Forward Voltage Drop Characteristics

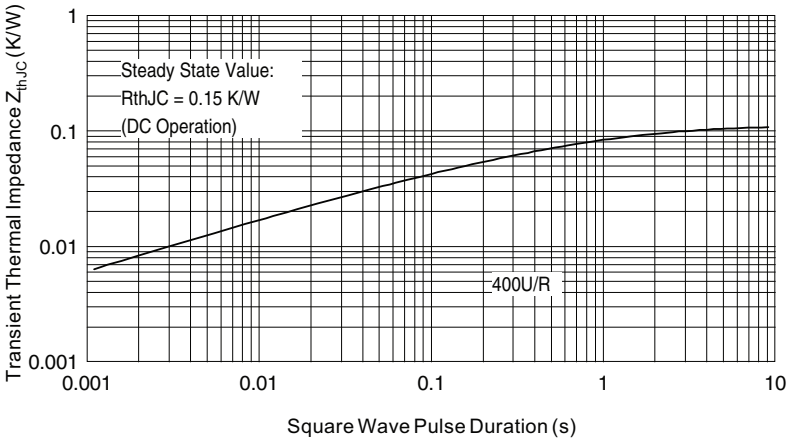


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

ORDERING INFORMATION TABLE

Device code

VS-	40	0	U	R	160	D
1	2	3	4	5	6	7

1 - Vishay Semiconductors product

2 - 40 = essential part number

3 - 0 = standard recovery device

4 - U = stud normal polarity (cathode to stud)

5 - • None = stud normal polarity (cathode to stud)
• R = stud reverse polarity (anode to stud)

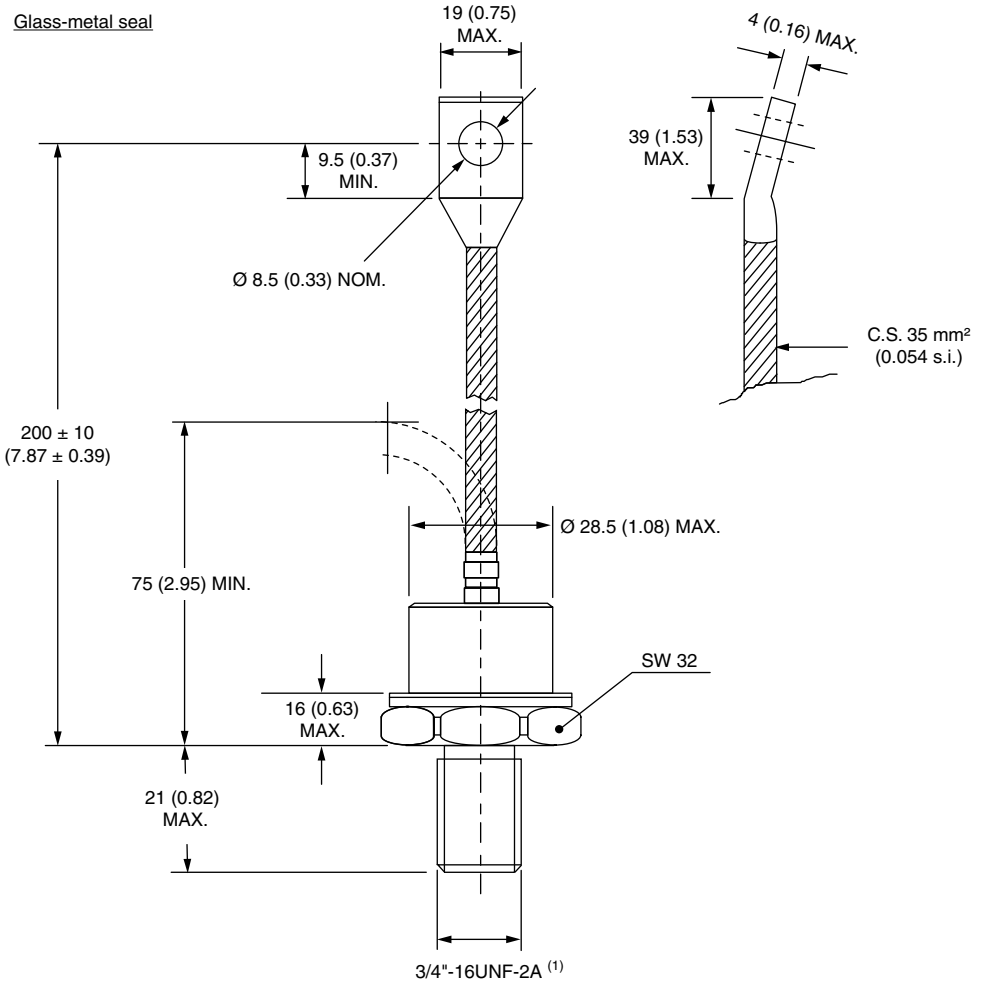
6 - Voltage code x 10 = V_{RRM} (see Voltage Ratings table)

7 - Diffused diode

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95339

DO-205AB (DO-9) for 400U(R) Series

DIMENSIONS in millimeters (inches)



Note

- For metric device: M16 x 1.5 contact factory

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