

Fast Recovery Diodes (Stud Version) 200 A



DO-9 (DO-205AB)


**RoHS
COMPLIANT**
FEATURES

- High power fast recovery diode series
- 1.0 μ s to 2.0 μ s recovery time
- High voltage ratings up to 2500 V
- High current capability
- Optimized turn-on and turn-off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Compression bonded encapsulation
- Stud version JEDEC® DO-9 (DO-205AB)
- Maximum junction temperature 125 °C
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	200 A
Package	DO-9 (DO-205AB)
Circuit configuration	Single

TYPICAL APPLICATIONS

- Snubber diode for GTO
- High voltage freewheeling diode
- Fast recovery rectifier applications

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		200	A
	T_C	85	°C
$I_{F(RMS)}$		314	A
I_{FSM}	50 Hz	4990	
	60 Hz	5230	
I^2t	50 Hz	125	kA ² s
	60 Hz	114	
V_{RRM}	Range	400 to 2500	V
t_{rr}	Range	1.0 to 2.0	μ s
	T_J	25	°C
T_J		-40 to +125	

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	V_{RRM} , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	I_{RRM} MAXIMUM $T_J = 125$ °C mA
VS-SD203N/R..S10	04	400	500	35
	08	800	900	
	10	1000	1100	
VS-SD203N/R..S15	12	1200	1300	
	14	1400	1500	
	16	1600	1700	
VS-SD203N/R..S20	20	2000	2100	
	25	2500	2600	



FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave		200	A
				85	°C
Maximum RMS current	$I_{F(RMS)}$	DC at 76 °C case temperature		314	A
Maximum peak, one-cycle non-repetitive forward current	I_{FSM}	t = 10 ms	No voltage reapplied	4990	
		t = 8.3 ms		5230	
		t = 10 ms	100 % V_{RRM} reapplied	4200	
		t = 8.3 ms		4400	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied	125	kA ² s
		t = 8.3 ms		114	
		t = 10 ms	100 % V_{RRM} reapplied	88	
		t = 8.3 ms		81	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		1250	kA ² √s
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$, $T_J = T_J$ maximum)		1.00	V
High level value of threshold voltage	$V_{F(TO)2}$	(I > $\pi \times I_{F(AV)}$, $T_J = T_J$ maximum)		1.47	
Low level value of forward slope resistance	r_{f1}	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$, $T_J = T_J$ maximum)		1.10	mW
High level value of forward slope resistance	r_{f2}	(I > $\pi \times I_{F(AV)}$, $T_J = T_J$ maximum)		0.46	
Maximum forward voltage drop	V_{FM}	$I_{pk} = 628$ A, $T_J = 25$ °C, $t_p = 400$ μs square pulse		1.65	V

RECOVERY CHARACTERISTICS								
CODE	MAXIMUM VALUE AT $T_J = 25$ °C	TEST CONDITIONS			TYPICAL VALUES AT $T_J = 125$ °C			
	t_{rr} at 25 % I_{RRM} (μs)	I_{pk} SQUARE PULSE (A)	dI/dt (A/μs)	V_r (V)	t_{rr} at 25 % I_{RRM} (μs)	Q_{rr} (μC)	I_{rr} (A)	
S10	1.0	750	25	-30	2.4	52	33	
S15	1.5				2.9	90	44	
S20	2.0				3.2	107	46	

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum operating temperature range	T_J		-40 to 125	°C
Maximum storage temperature range	T_{Stg}		-40 to 150	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.115	K/W
Maximum thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, flat and greased	0.08	
Mounting torque ± 10 %		Not-lubricated threads	31	Nm
		Lubricated threads	24.5	
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°	0.010	0.008	$T_J = T_{J \text{ maximum}}$	K/W
120°	0.013	0.014		
90°	0.017	0.019		
60°	0.025	0.027		
30°	0.044	0.044		

Note

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

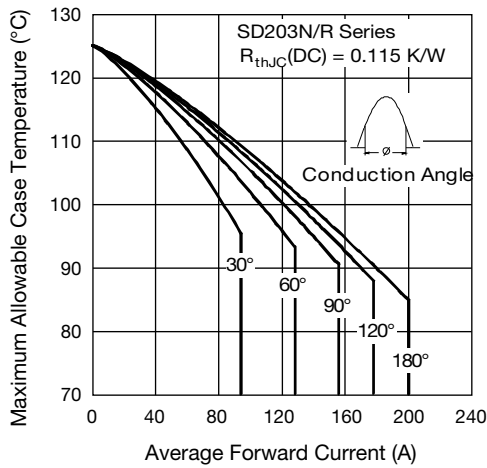


Fig. 1 - Current Ratings Characteristics

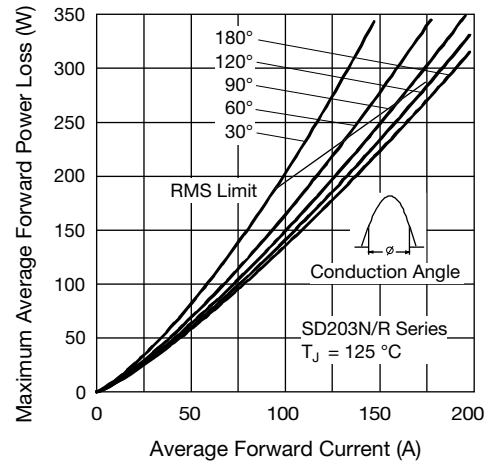


Fig. 3 - Forward Power Loss Characteristics

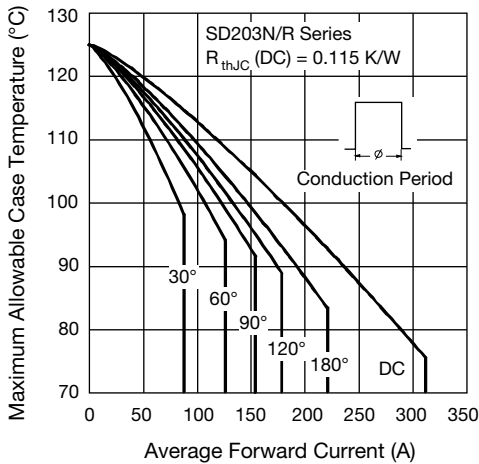


Fig. 2 - Current Ratings Characteristics

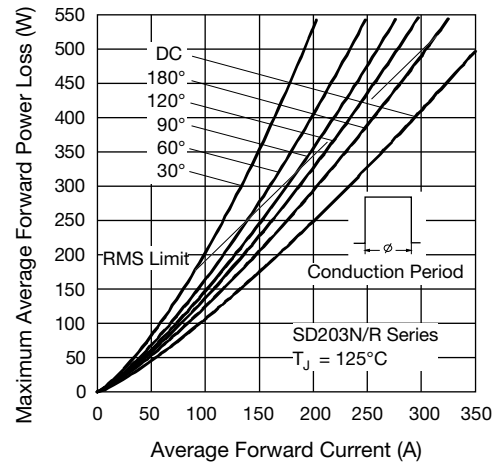


Fig. 4 - Forward Power Loss Characteristics

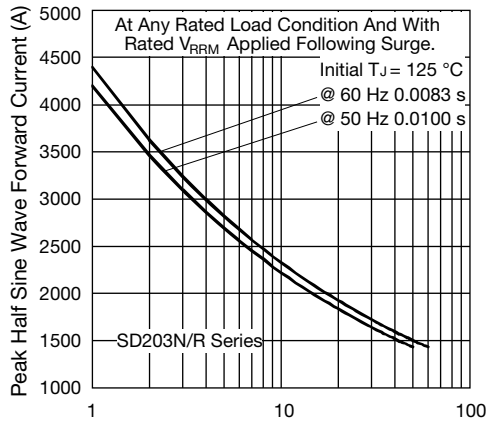


Fig. 5 - Maximum Non-Repetitive Surge Current

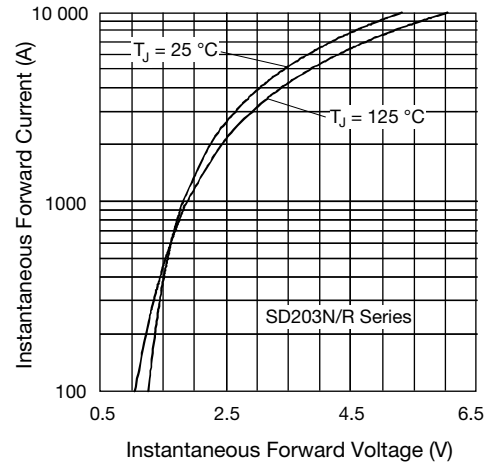


Fig. 7 - Forward Voltage Drop Characteristics

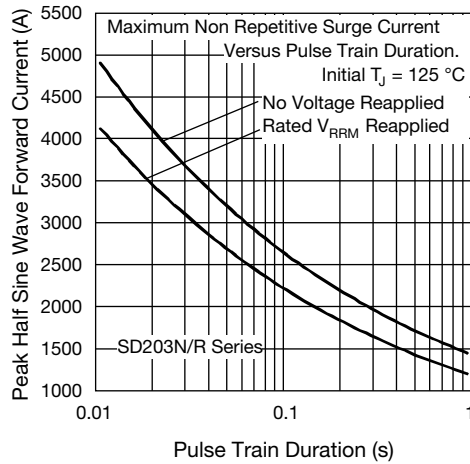


Fig. 6 - Maximum Non-Repetitive Surge Current

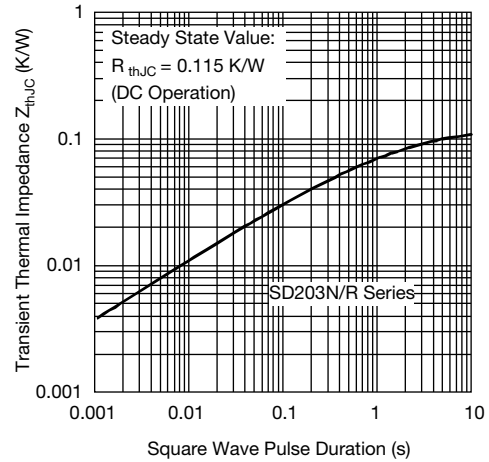


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

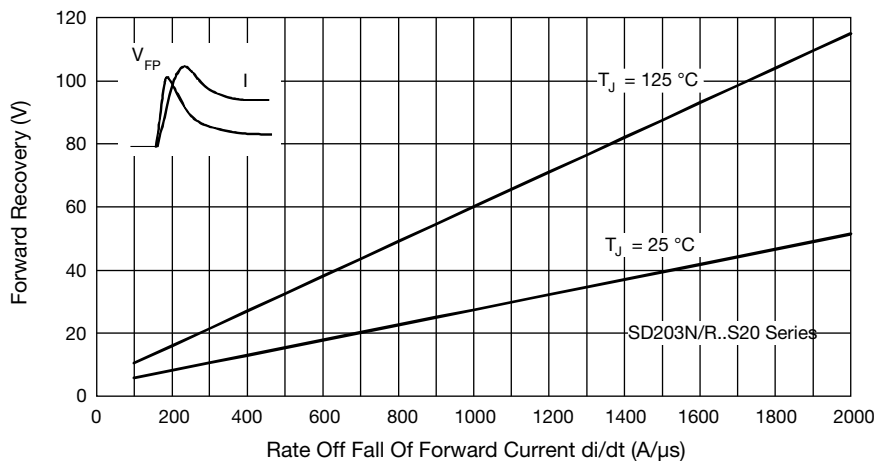


Fig. 9 - Typical Forward Recovery Characteristics

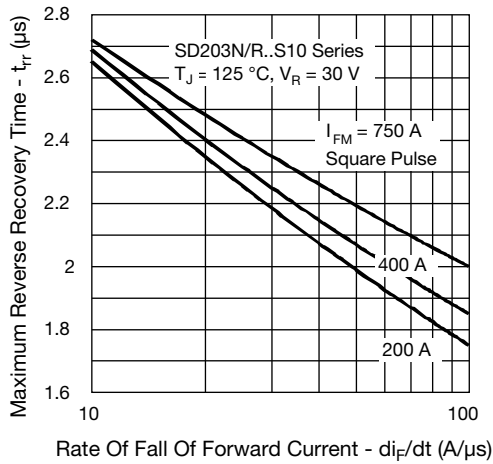


Fig. 10 - Recovery Time Characteristics

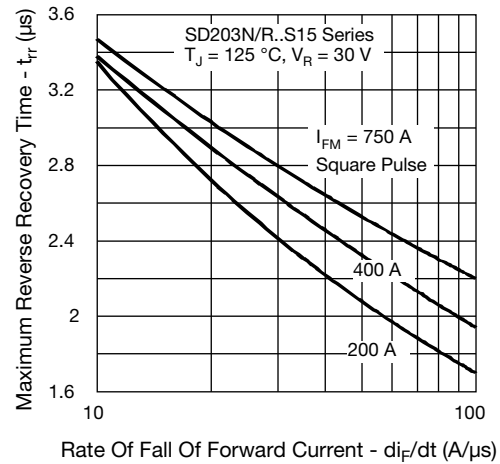


Fig. 13 - Recovery Time Characteristics

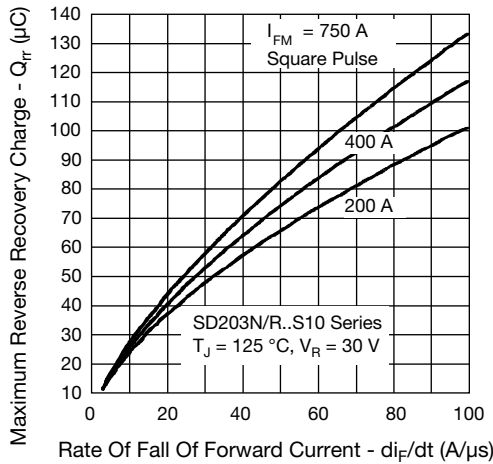


Fig. 11 - Recovery Charge Characteristics

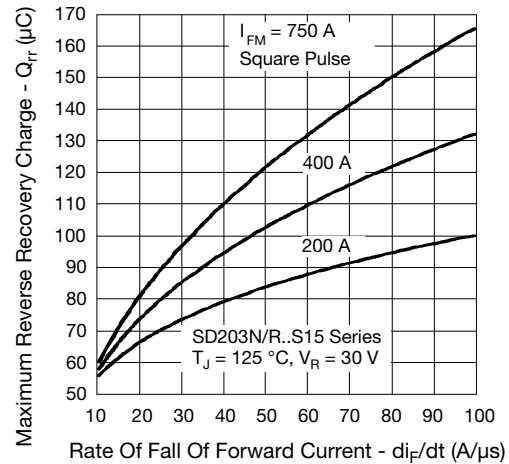


Fig. 14 - Recovery Charge Characteristics

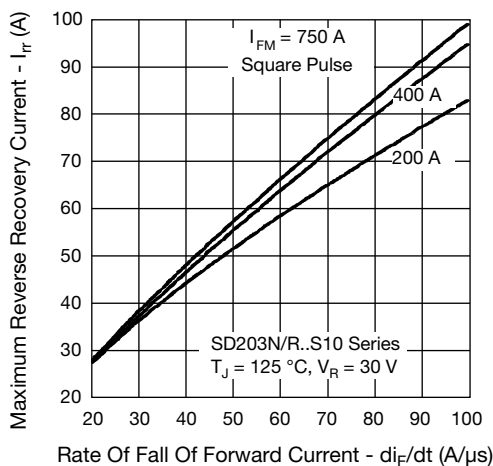


Fig. 12 - Recovery Current Characteristics

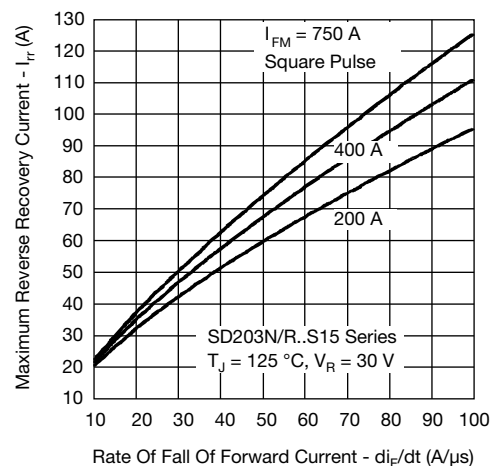


Fig. 15 - Recovery Current Characteristics

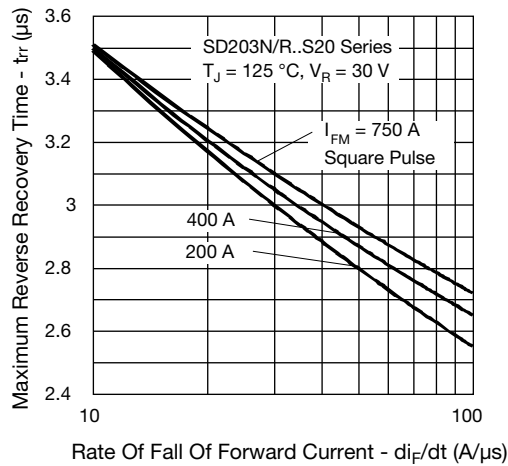


Fig. 16 - Recovery Time Characteristics

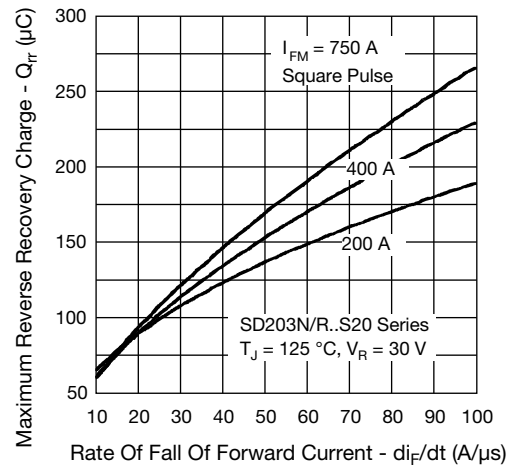


Fig. 17 - Recovery Charge Characteristics

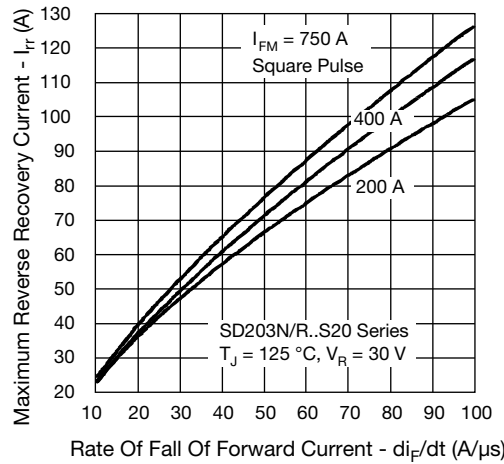


Fig. 18 - Recovery Current Characteristics

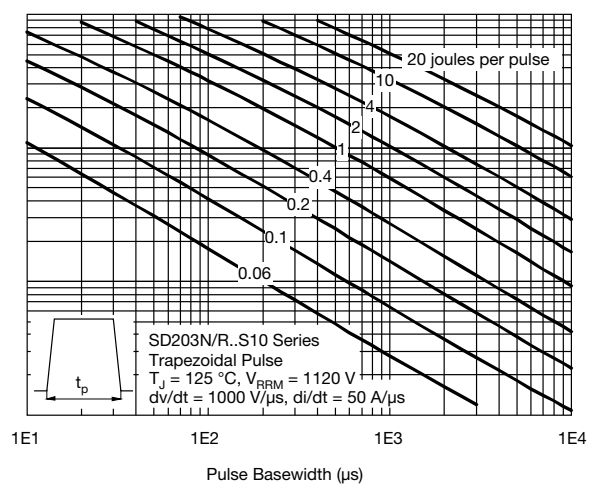
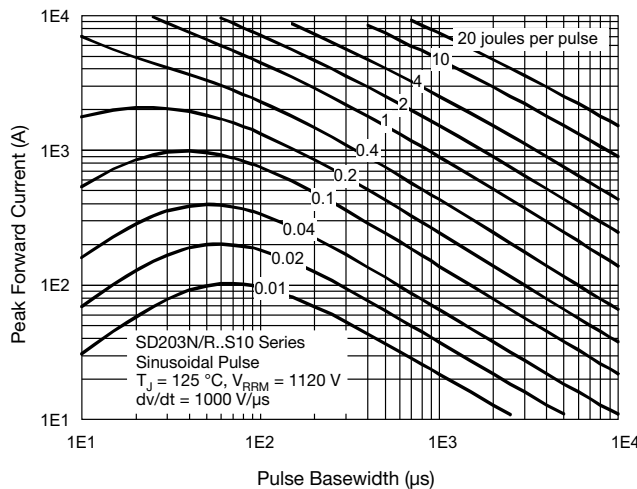


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

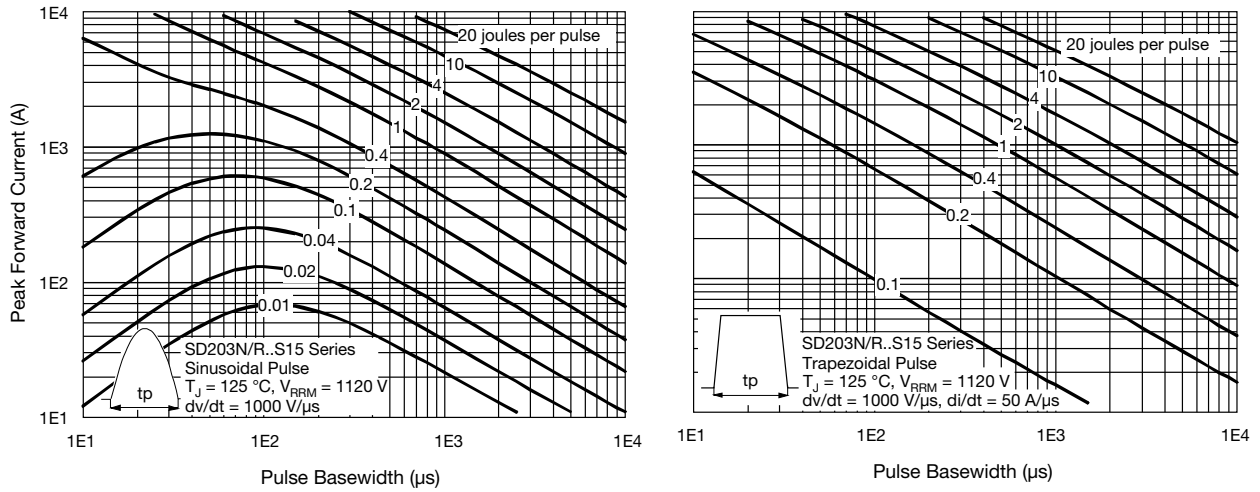


Fig. 20 - Maximum Total Energy Loss Per Pulse Characteristics

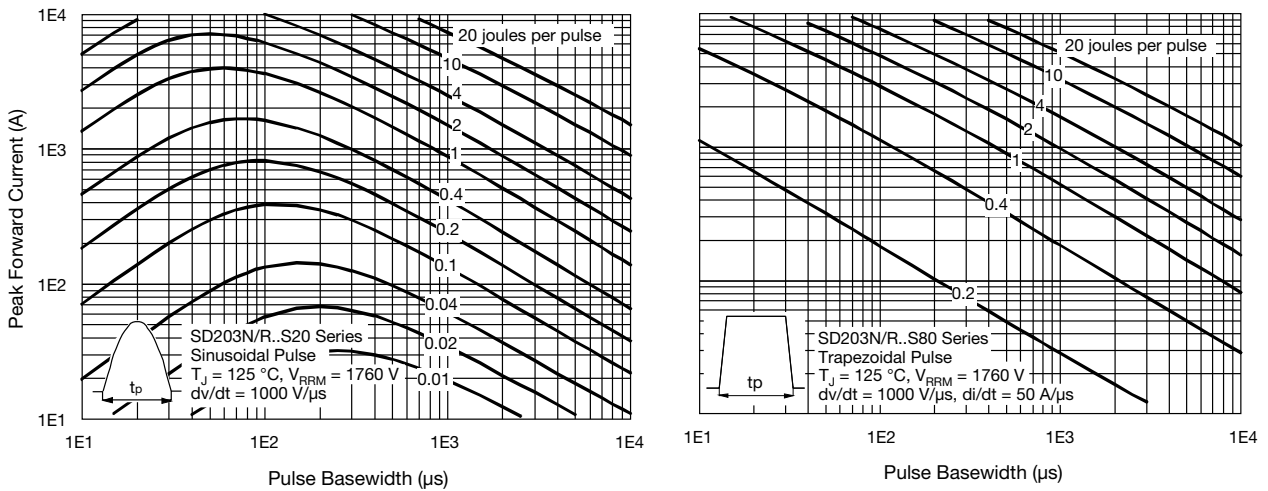


Fig. 21 - Maximum Total Energy Loss Per Pulse Characteristics



ORDERING INFORMATION TABLE

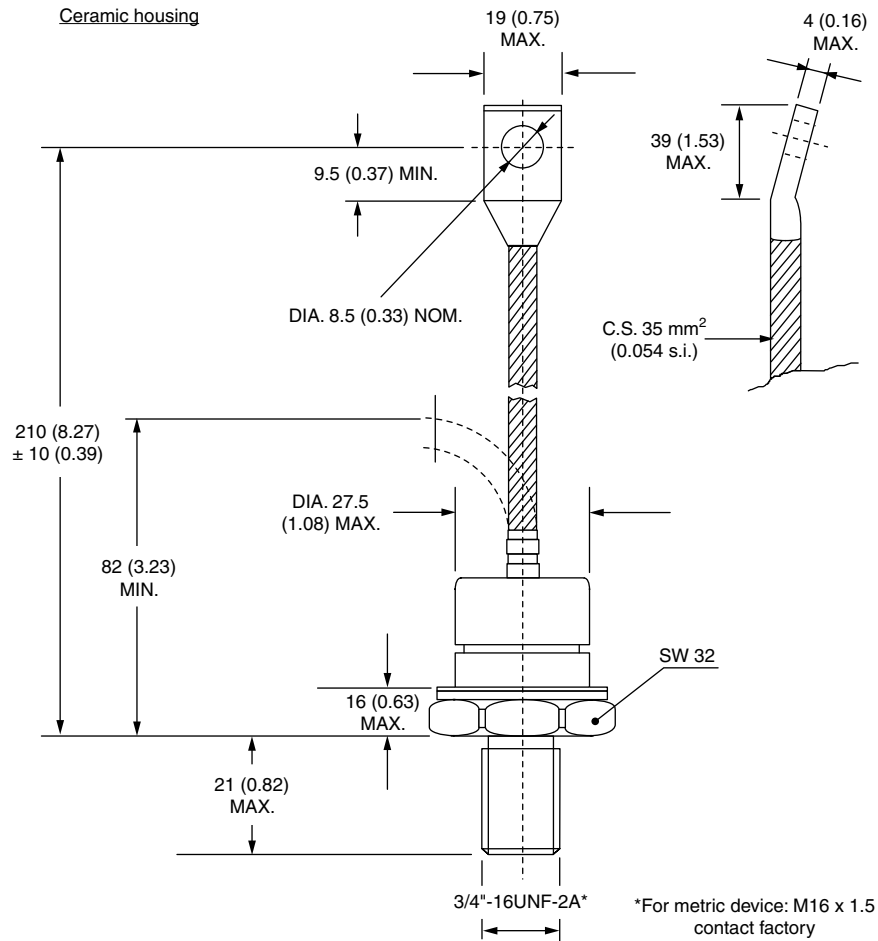
Device code	VS-	SD	20	3	R	25	S20	P	B	C
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

- 1** - Vishay Semiconductors product
- 2** - Diode
- 3** - Essential part number
- 4** - 3 = fast 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** - t_{rr} code (see Recovery Characteristics table)
- 8** -
 - P = stud base DO-9 (DO-205AB) 3/4" 16UNF-2A
 - M = stud base DO-9 (DO-205AB) M16 x 1.5
- 9** -
 - B = flag top terminals (for cathode / anode leads)
 - S = isolated lead with silicon sleeve (red = reverse polarity; blue = normal polarity)
 - None = not isolated lead
- 10** -
 - C = ceramic housing (over 1600 V)
 - V = glass-metal seal (only up to 1600 V)

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

DO-205AB (DO-9)

DIMENSIONS in millimeters (inches)





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