

## Fast Recovery Diodes (Stud Version) 200 A



DO-205AB (DO-9)


**RoHS  
COMPLIANT**
**FEATURES**

- High power fast recovery diode series
- 1.0  $\mu$ s to 2.0  $\mu$ 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-205AB (DO-9)
- Maximum junction temperature 125 °C
- Designed and qualified for industrial level
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

**TYPICAL APPLICATIONS**

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

**PRODUCT SUMMARY**

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

**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 <sup>2</sup> s
	60 Hz	114	
$V_{RRM}$	Range	400 to 2500	V
$t_{rr}$	Range	1.0 to 2.0	$\mu$ s
	$T_J$	25	°C
$T_J$		-40 to +125	



**ELECTRICAL SPECIFICATIONS**

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	V <sub>RRM</sub> , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	I <sub>RRM</sub> MAXIMUM T <sub>J</sub> = 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 <sub>F(AV)</sub>	180° conduction, half sine wave		200	A
				85	°C
Maximum RMS current	I <sub>F(RMS)</sub>	DC at 76 °C case temperature		314	
Maximum peak, one-cycle non-repetitive forward current	I <sub>FSM</sub>	t = 10 ms	No voltage reappplied	4990	A
		t = 8.3 ms			
		t = 10 ms	100 % V <sub>RRM</sub> reappplied	4200	
		t = 8.3 ms			
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reappplied	125	kA <sup>2</sup> s
		t = 8.3 ms			
		t = 10 ms	100 % V <sub>RRM</sub> reappplied	88	
		t = 8.3 ms			
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 to 10 ms, no voltage reappplied		1250	kA <sup>2</sup> √s
Low level value of threshold voltage	V <sub>F(TO)1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum		1.00	V
High level value of threshold voltage	V <sub>F(TO)2</sub>	(I > π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum		1.47	
Low level value of forward slope resistance	r <sub>f1</sub>	(16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum		1.10	mW
High level value of forward slope resistance	r <sub>f2</sub>	(I > π × I <sub>F(AV)</sub> , T <sub>J</sub> = T <sub>J</sub> maximum		0.46	
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 628 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 400 μs square pulse		1.65	V

RECOVERY CHARACTERISTICS								
CODE	MAXIMUM VALUE AT T <sub>J</sub> = 25 °C	TEST CONDITIONS			TYPICAL VALUES AT T <sub>J</sub> = 125 °C			
	t <sub>rr</sub> AT 25 % I <sub>RRM</sub> (μs)	I <sub>pk</sub> SQUARE PULSE (A)	di/dt (A/μs)	V <sub>r</sub> (V)	t <sub>rr</sub> AT 25 % I <sub>RRM</sub> (μs)	Q <sub>rr</sub> (μC)	I <sub>rr</sub> (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 $\pm 10\%$		Not-lubricated threads	31	Nm
		Lubricated threads	24.5	
Approximate weight			250	g
Case style		See dimensions (link at the end of datasheet)	DO-205AB (DO-9)	

$\Delta R_{thJC}$ CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.010	0.008	$T_J = T_J$ 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

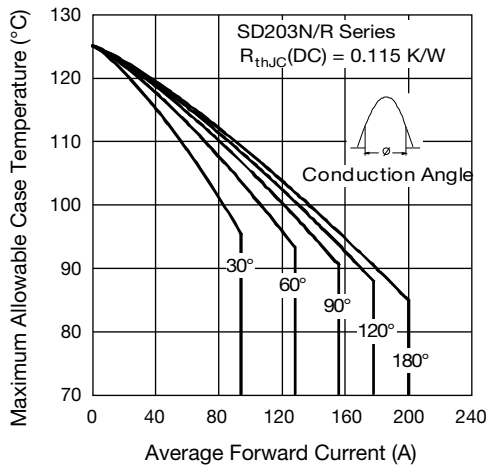


Fig. 1 - Current Ratings Characteristics

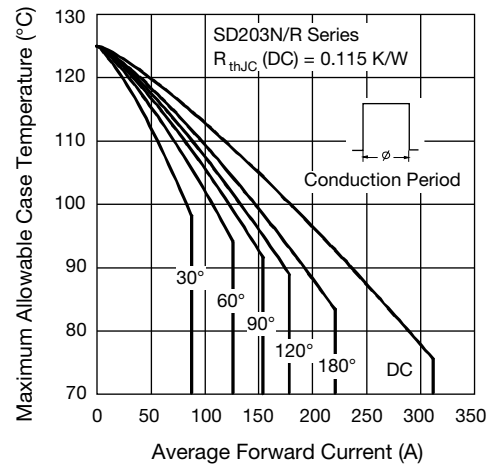


Fig. 2 - Current Ratings Characteristics

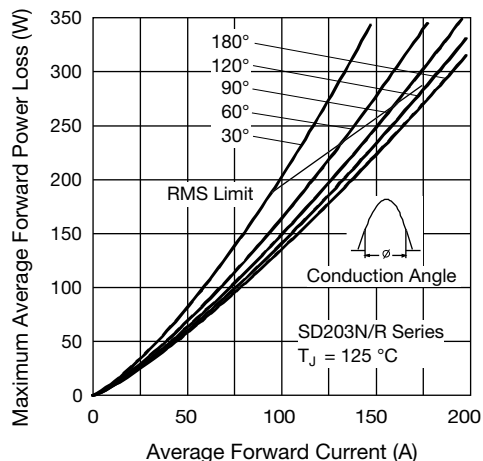


Fig. 3 - Forward Power Loss Characteristics

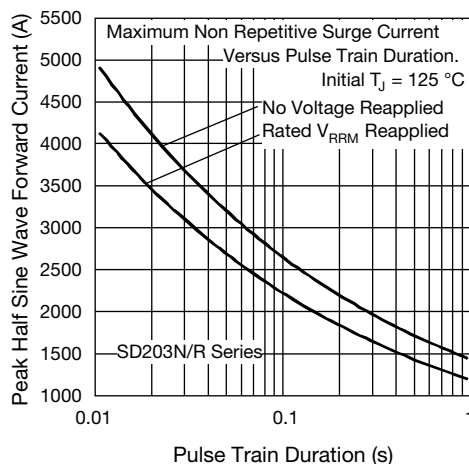


Fig. 6 - Maximum Non-Repetitive Surge Current

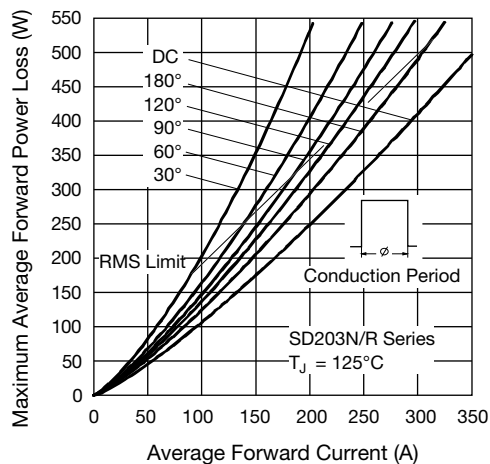


Fig. 4 - Forward Power Loss Characteristics

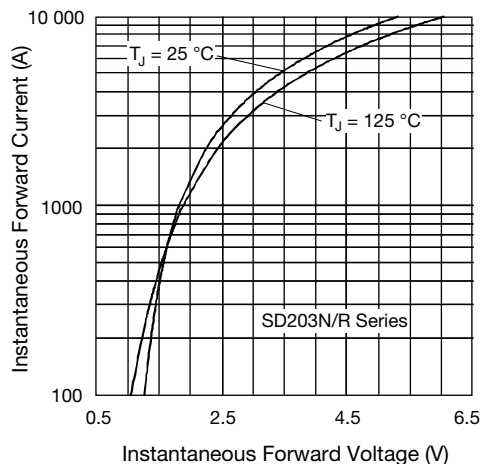


Fig. 7 - Forward Voltage Drop Characteristics

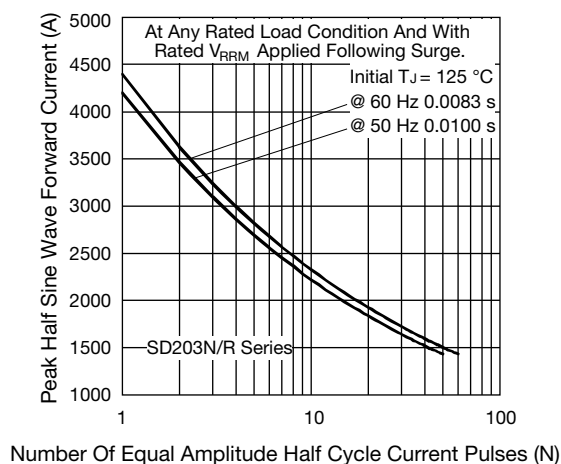


Fig. 5 - Maximum Non-Repetitive Surge Current

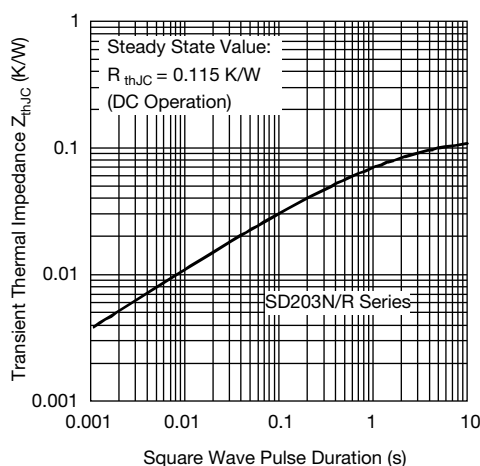


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristic

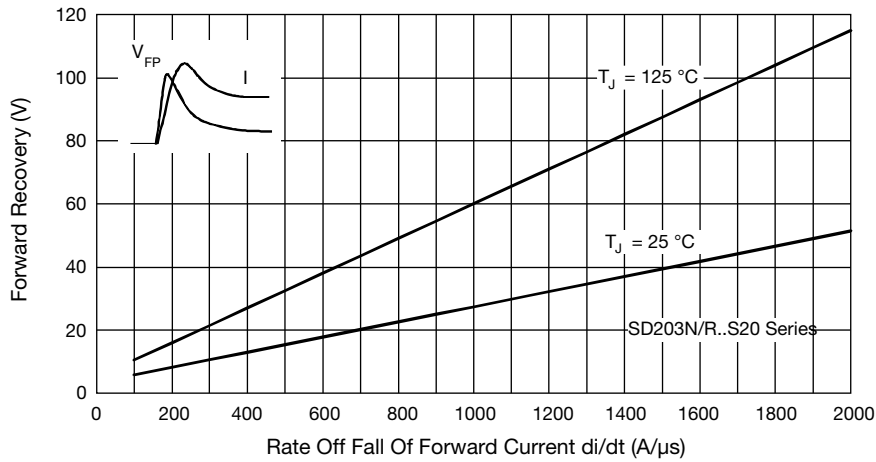


Fig. 9 - Typical Forward Recovery Characteristics

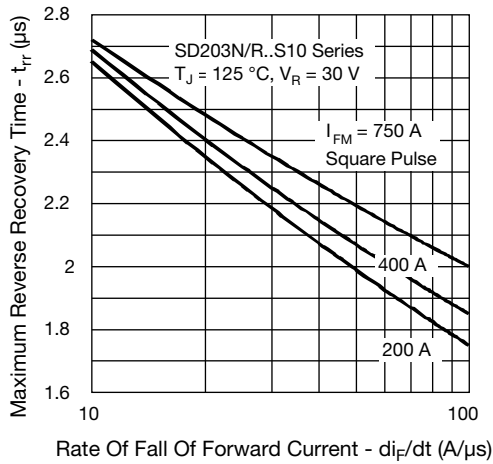


Fig. 10 - Recovery Time Characteristics

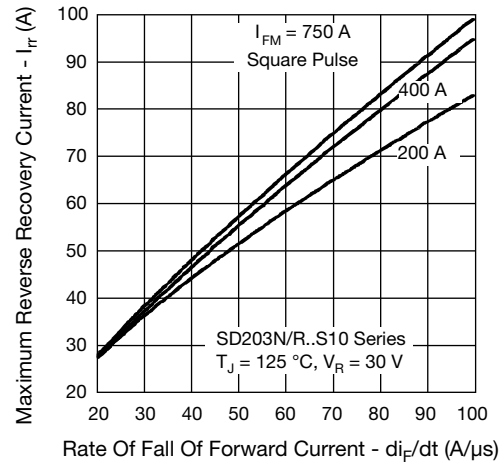


Fig. 12 - Recovery Current Characteristics

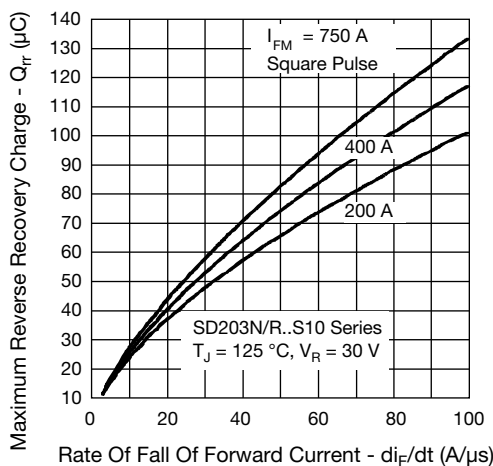


Fig. 11 - Recovery Charge Characteristics

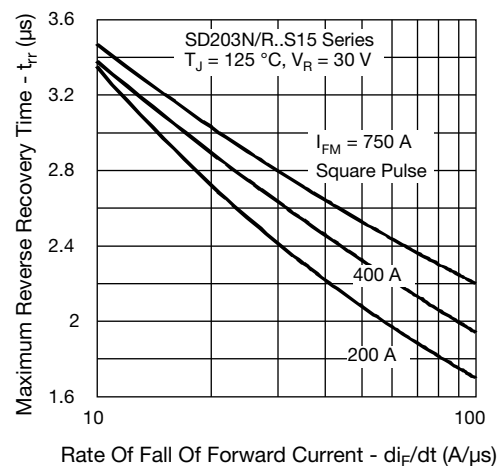


Fig. 13 - Recovery Time Characteristics

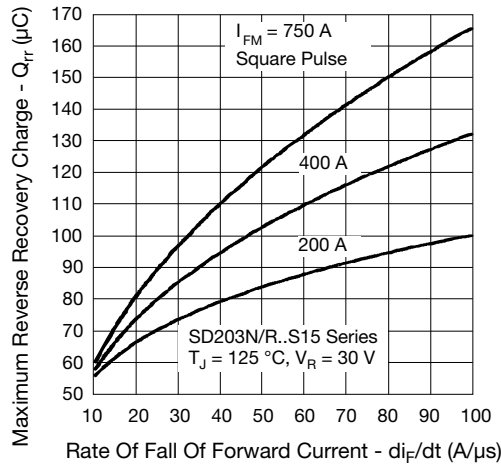


Fig. 14 - Recovery Charge Characteristics

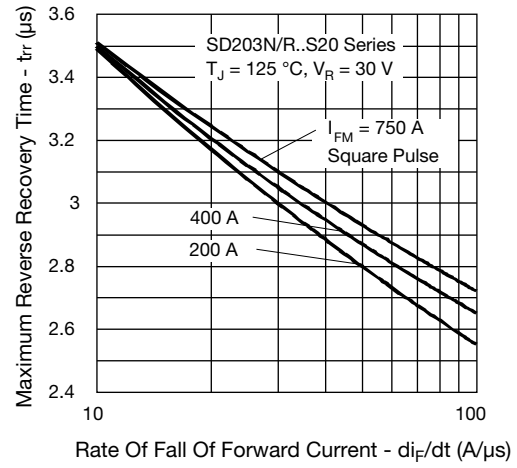


Fig. 16 - Recovery Time Characteristics

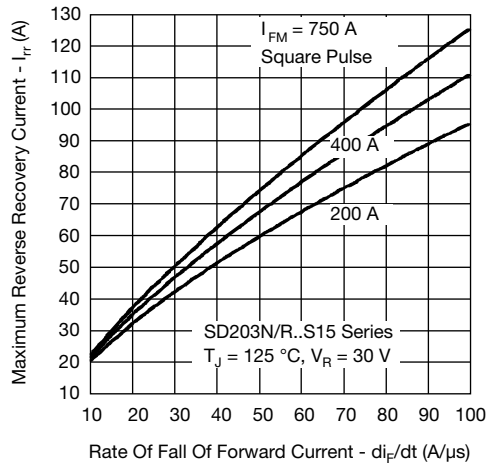


Fig. 15 - Recovery Current Characteristics

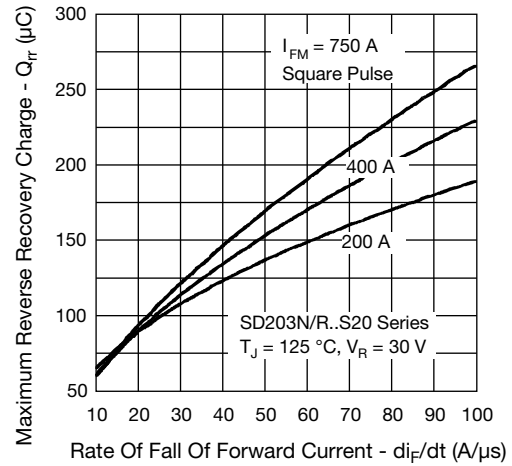


Fig. 17 - Recovery Charge Characteristics

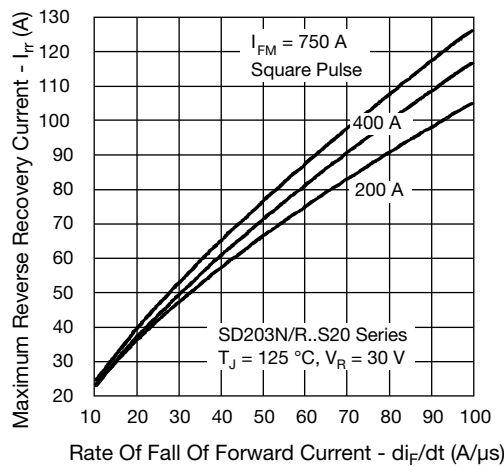


Fig. 18 - Recovery Current Characteristics

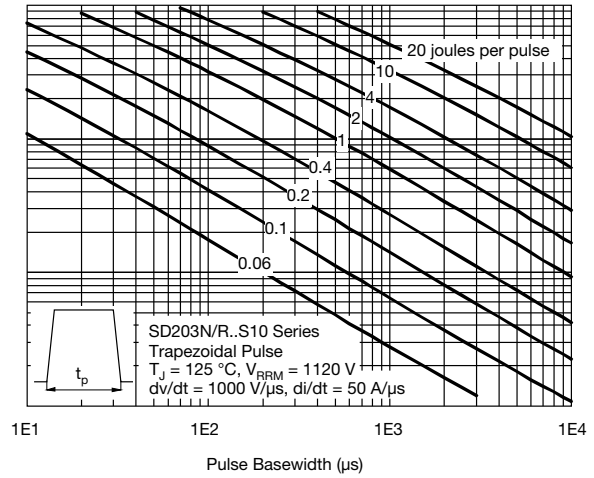
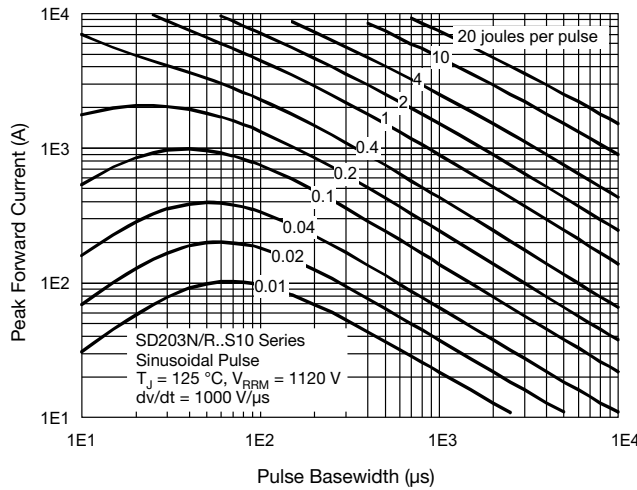


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

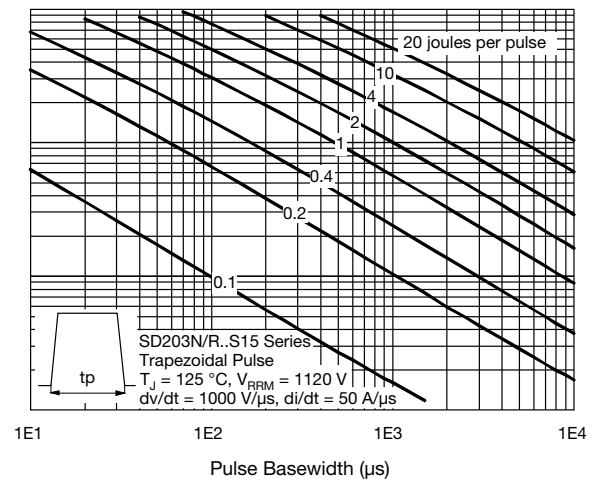
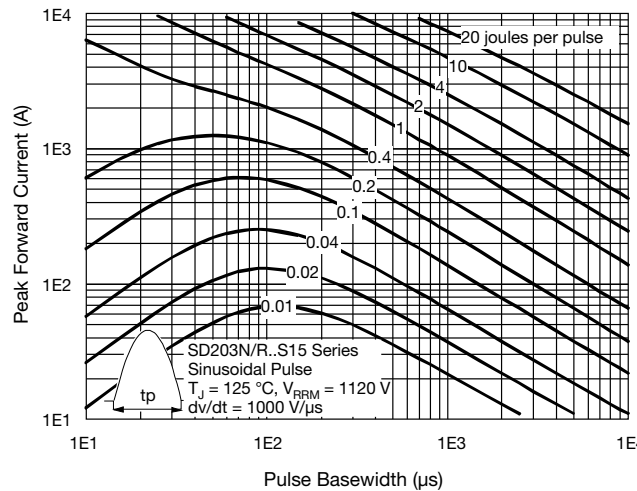


Fig. 20 - Maximum Total Energy Loss Per Pulse Characteristics

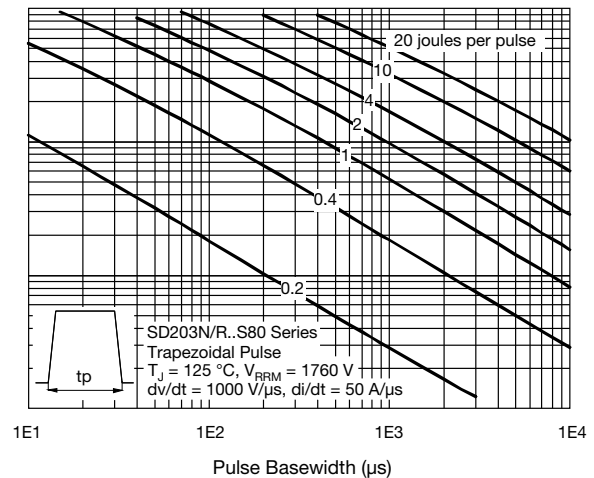
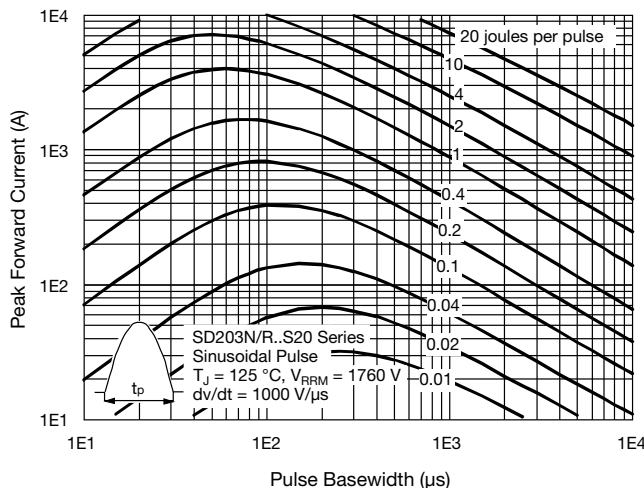


Fig. 21 - Maximum Total Energy Loss Per Pulse Characteristics



## ORDERING INFORMATION TABLE

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

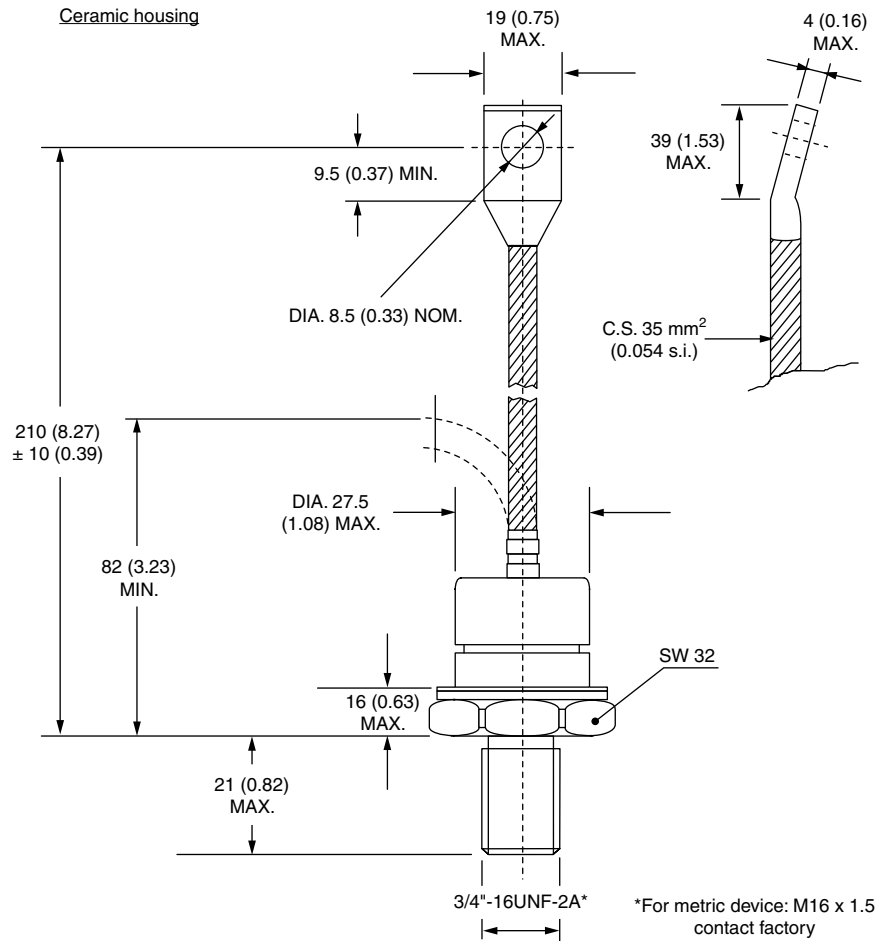
- 1** - Vishay Semiconductors product
- 2** - Diode
- 3** - Essential part number
- 4** - 3 = Fast recovery
- 5** -
  - N = Stud normal polarity (cathode to stud)
  - R = Stud reverse polarity (anode to stud)
- 6** - Voltage code x 100 =  $V_{RRM}$  (see Voltage Ratings table)
- 7** -  $t_{rr}$  code (see Recovery Characteristics table)
- 8** -
  - P = Stud base DO-205AB (DO-9) 3/4" 16UNF-2A
  - M = Stud base DO-205AB (DO-9) 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	<a href="http://www.vishay.com/doc?95301">www.vishay.com/doc?95301</a>



## DO-205AB (DO-9)

**DIMENSIONS** in millimeters (inches)





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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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