Bulletin I2065 rev. B 10/06

International
IOR Rectifier

SD253N/R SERIES

FAST RECOVERY DIODES **Stud Version**

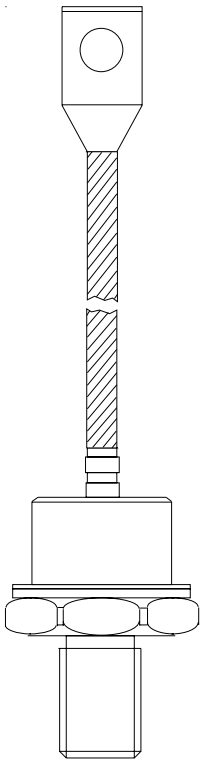
250A

Features

- High power FAST recovery diode series
- 1.5 to 2.0 µs recovery time
- High voltage ratings up to 1600V
- 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
- RoHS Compliant

Typical Applications

- Snubber diode for GTO
- High voltage free-wheeling diode
- Fast recovery rectifier applications



case style
DO-205AB (DO-9)

Major Ratings and Characteristics

Parameters		SD253N/R	Units
$I_{F(AV)}$		250	A
	@ T_C	85	°C
$I_{F(RMS)}$		392	A
I_{FSM}	@ 50Hz	5350	A
	@ 60Hz	5600	A
I^2t	@ 50Hz	143	KA^2s
	@ 60Hz	130	KA^2s
V_{RRM} range		400 to 1600	V
t_{rr} range		1.5 to 2.0	µs
	@ T_J	25	°C
T_J		- 40 to 125	°C

Downloaded from Elcodis.com electronic components distributor

ELECTRICAL SPECIFICATIONS

Voltage Ratings

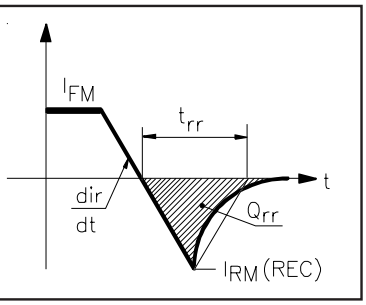
Type number	Voltage Code	V_{RRM} max. repetitive peak and off-state voltage V	V_{RSM}, maximum non-repetitive peak voltage V	I_{RRM} max. T_J = 125°C mA
SD253N/R..S15	04	400	500	35
	08	800	900	
	10	1000	1100	
SD253N/R..S20	12	1200	1300	
	14	1400	1500	
	16	1600	1700	

Forward Conduction

	Parameter	SD253N/R	Units	Conditions		
$I_{F(AV)}$	Max. average forward current	250	A	180° conduction, half sine wave.		
	@ Case temperature	85	°C			
$I_{F(RMS)}$	Max. RMS current	392	A	DC @ 74°C case temperature		
I_{FSM}	Max. peak, one-cycle non-repetitive forward current	5350	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		5600		t = 8.3ms		
		4500		t = 10ms	100% V_{RRM} reapplied	
		4710		t = 8.3ms		
I^2t	Maximum I^2t for fusing	143	KA^2s	t = 10ms	No voltage reapplied	
		130		t = 8.3ms		
		101		t = 10ms	100% V_{RRM} reapplied	
		92		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	1430	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level of threshold voltage	0.87	V	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
$V_{F(TO)2}$	High level of threshold voltage	1.17		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{f1}	Low level of forward slope resistance	0.62	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{f2}	High level of forward slope resistance	0.29		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
V_{FM}	Max. forward voltage	1.38	V	I_{pk}= 785A, T_J = 25°C, t_p = 400 µs square pulse		

Recovery Characteristics

Code	T_J = 25°C typical t_{rr} @ 25% I_{RRM} (µs)	Test conditions I_{pk} Square Pulse (A)	di/dt (A/µs)	V_r (V)	Max. values @ T_J=125°C t_{rr} @ 25% I_{RRM} (µs)	Q_{rr} (µC)	I_{rr} (A)
S15	1.5	750	25	- 30	2.9	90	44
S20	2.0				3.2	107	46



Downloaded from Elcodis.com electronic components distributor

Thermal and Mechanical Specification

	Parameter	SD253N/R	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	°C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJC}	Max. thermal resistance, junction to case	0.115	K/W	DC operation
R_{thCS}	Max. thermal resistance, case to heatsink	0.08		Mounting surface, smooth, flat and greased
T	Mounting torque ± 10%	31	N m	Not lubricated threads
		24.5		Lubricated threads
wt	Approximate weight	250	g	
	Case style	DO-205AB (DO-9)		See Outline Table

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistence R_{thJC} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.010	0.008	K/W	$T_J = T_J$ max.
120°	0.013	0.014		
90°	0.017	0.019		
60°	0.025	0.027		
30°	0.044	0.044		

Ordering Information Table

Device Code

SD	25	3	R	16	S20	P	B	V
1	2	3	4	5	6	7	8	9

1 - Diode

2 - Essential part number

3 - 3 = Fast recovery

4 - N = Stud Normal Polarity (Cathode to Stud)
R = Stud Reverse Polarity (Anode to Stud)

5 - Voltage code: Code x 100 = V_{RRM} (see Voltage Ratings table)

6 - t_{rr} code (see Recovery Characteristics table)

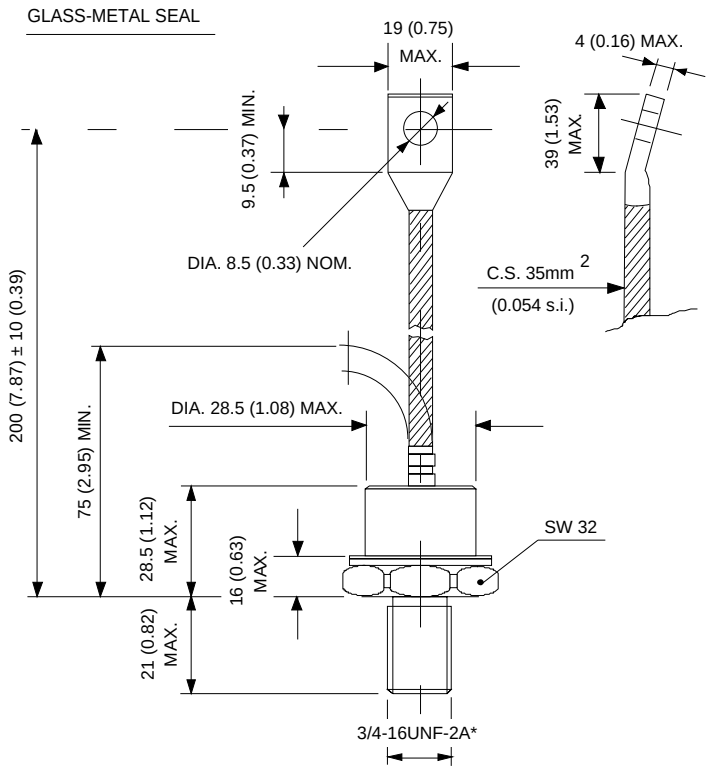
7 - P = Stud base DO-205AB (DO-9) 3/4" 16UNF-2A
M = Stud base DO-205AB (DO-9) M16 X 1.5

8 - B = Flag top terminals (for Cathode/ Anode Leads)
S = Isolated lead with silicone sleeve
(Red = Reverse Polarity; Blue = Normal Polarity)
None = Not isolated lead

9 - V = Glass-metal seal

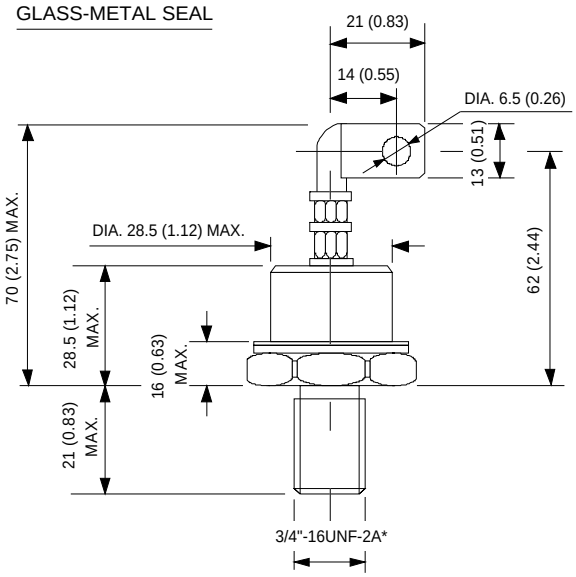
Downloaded from Elcodis.com electronic components distributor

Outline Table



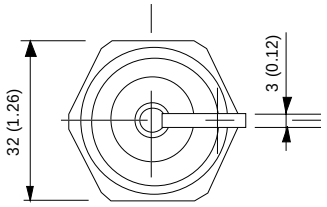
* FOR METRIC DEVICE: M16 X 1.5

Conform to JEDEC DO-205AB (DO-9)
All dimensions in millimeters (inches)



DO-205AB (DO-9) Flag
All dimensions in millimeters (inches)

*FOR METRIC DEVICE: M16 X 1.5



Downloaded from Elcodis.com electronic components distributor

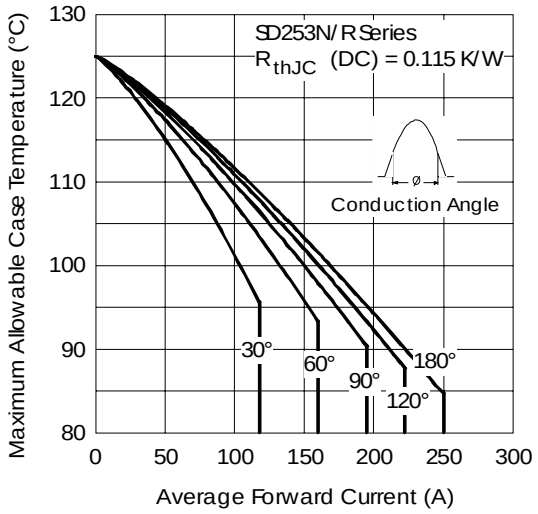


Fig. 1 - Current Ratings Characteristics

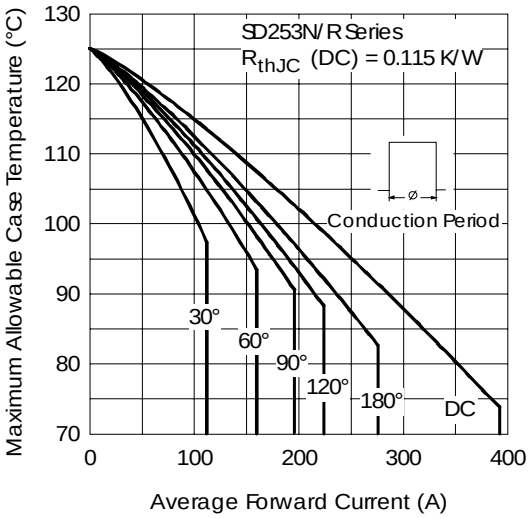


Fig. 2 - Current Ratings Characteristics

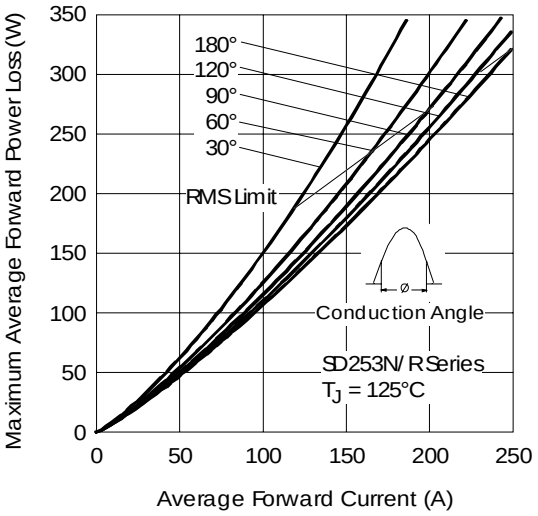


Fig. 3 - Forward Power Loss Characteristics

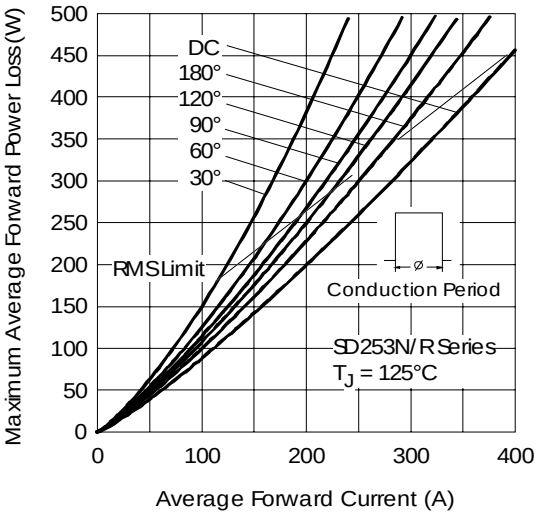


Fig. 4 - Forward Power Loss Characteristics

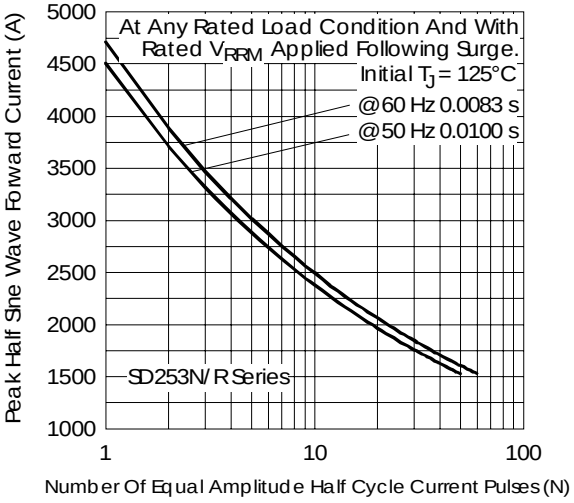


Fig. 5 - Maximum Non-repetitive Surge Current

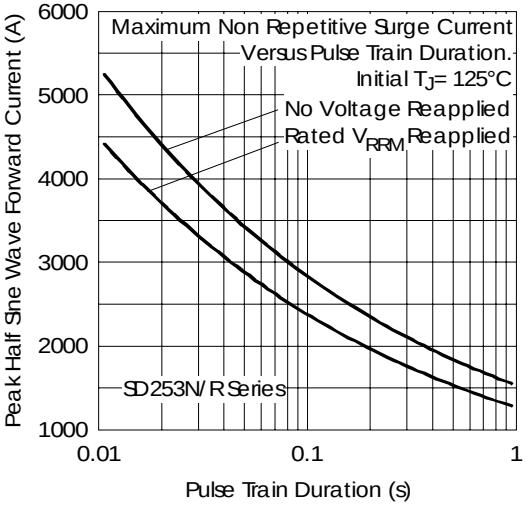


Fig. 6 - Maximum Non-repetitive Surge Current

Downloaded from Elcodis.com electronic components distributor

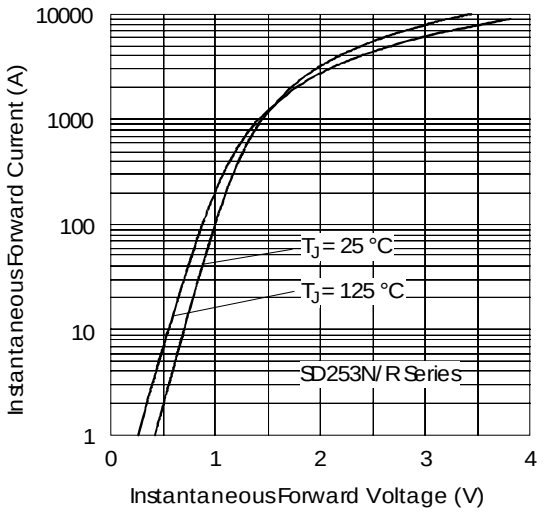


Fig. 7 - Forward Voltage Drop Characteristics

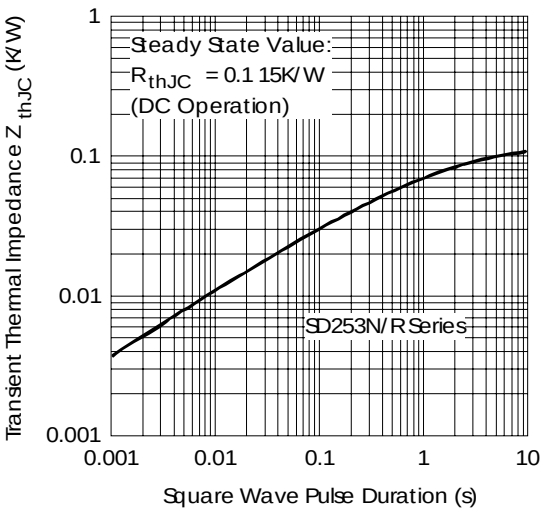


Fig. 8 - Thermal Impedance Z_{thJC} Characteristic

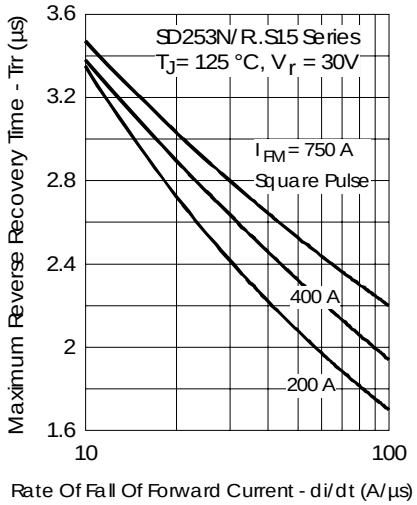


Fig. 9 - Recovery Time Characteristics

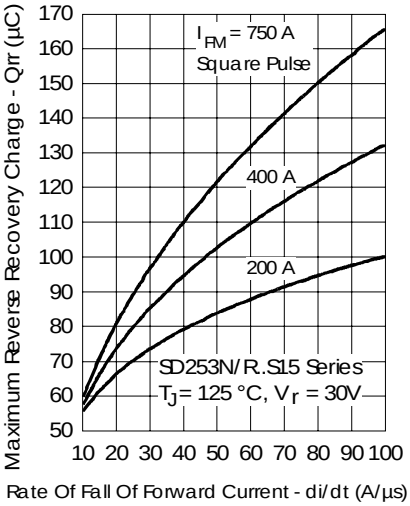


Fig. 10 - Recovery Charge Characteristics

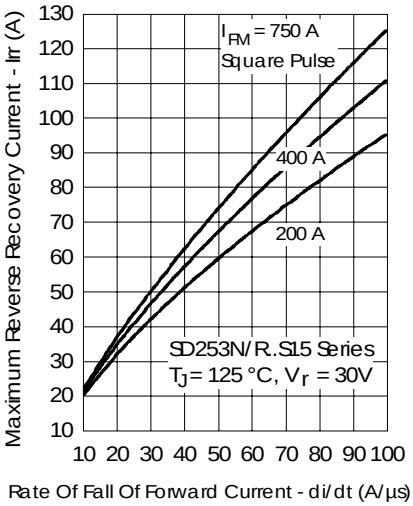


Fig. 11 - Recovery Current Characteristics

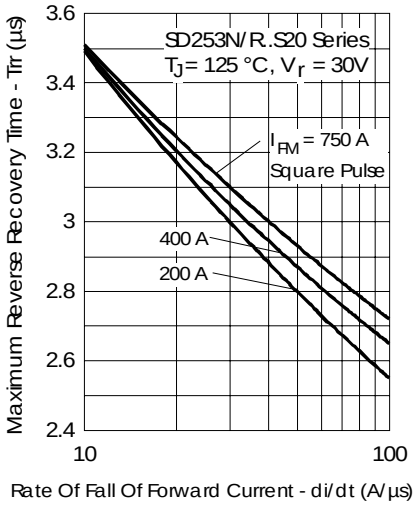


Fig. 12 - Recovery Time Characteristics

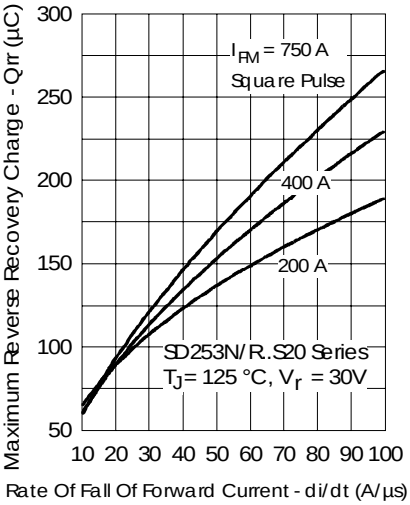


Fig. 13 - Recovery Charge Characteristics

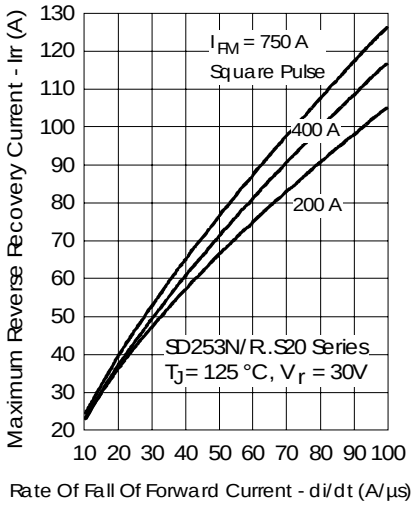


Fig. 14 - Recovery Current Characteristics

Downloaded from Elcodis.com electronic components distributor

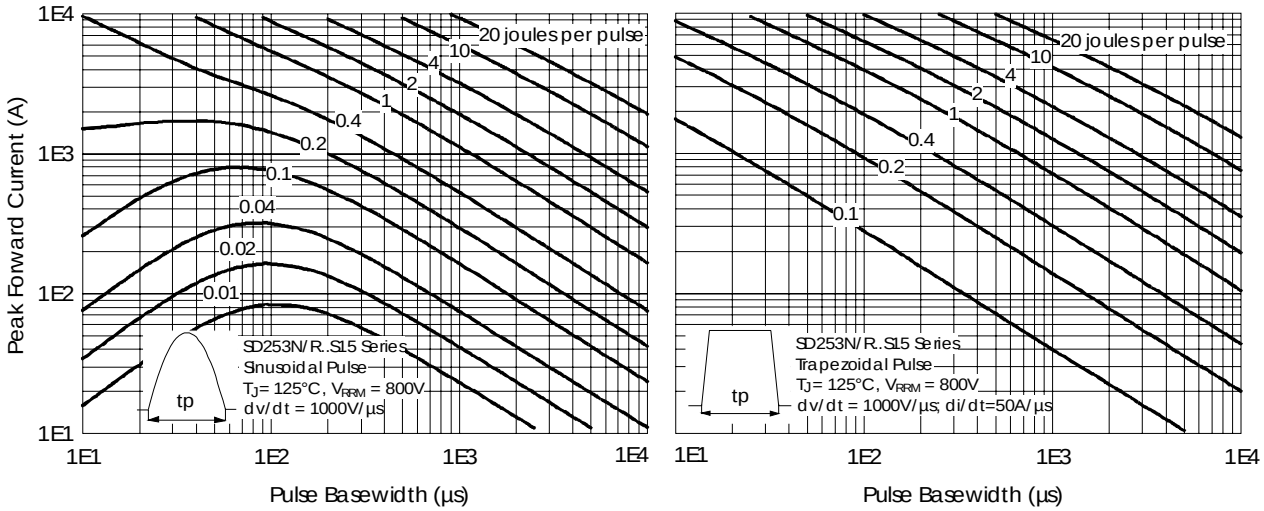


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

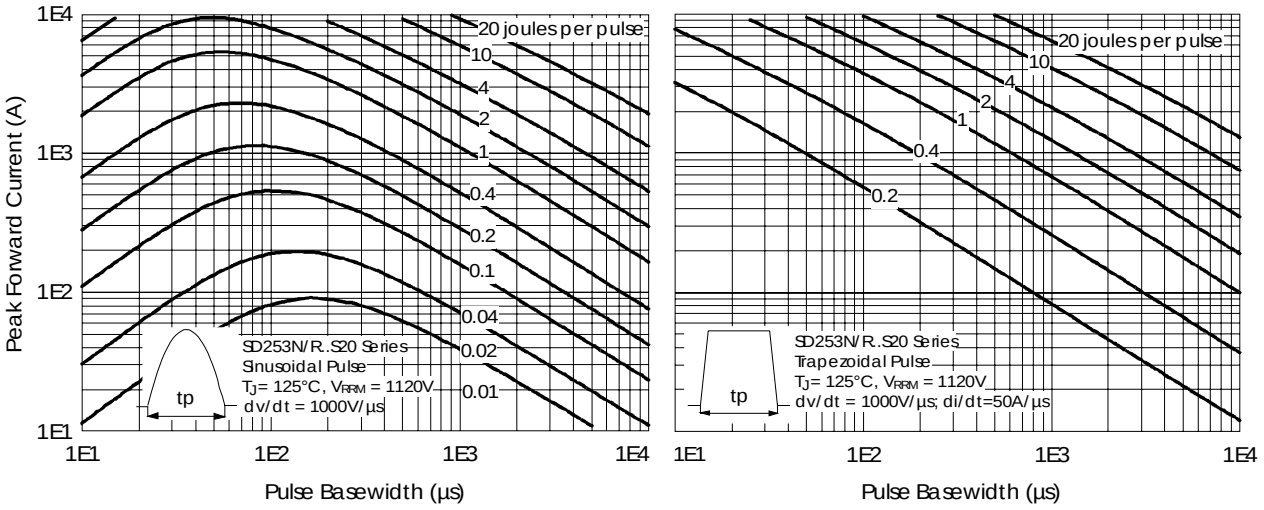


Fig. 16 - Maximum Total Energy Loss Per Pulse Characteristics

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 10/06

Downloaded from Elcodis.com electronic components distributor