

### FAST RECOVERY DIODES

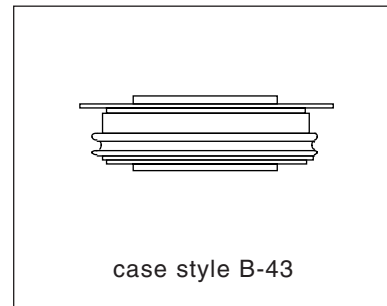
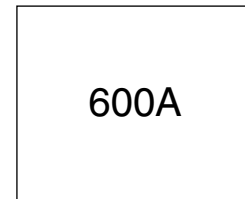
### Hockey Puk Version

#### Features

- High power FAST recovery diode series
- 1.0 to 2.0  $\mu$ s recovery time
- High voltage ratings up to 2200V
- High current capability
- Optimized turn on and turn off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press-puk encapsulation
- Case style conform to JEDEC B-43
- Maximum junction temperature 125°C

#### Typical Applications

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



#### Major Ratings and Characteristics

Parameters	SD603C..C	Units	
$I_{F(AV)}$	600	A	
@ $T_{hs}$	55	°C	
$I_{F(RMS)}$	942	A	
@ $T_{hs}$	25	°C	
$I_{FSM}$	@ 50Hz	8320	A
	@ 60Hz	8715	A
$I^2t$	@ 50Hz	346	KA <sup>2</sup> s
	@ 60Hz	316	KA <sup>2</sup> s
$V_{RRM}$ range	400 to 2200	V	
$t_{tr}$ range	1.0 to 2.0	$\mu$ s	
@ $T_J$	25	°C	
$T_J$	- 40 to 125	°C	

## SD603C..C Series

Bulletin I2068 rev.C 04/00

International  
**IOR** Rectifier

### ELECTRICAL SPECIFICATIONS

#### Voltage Ratings

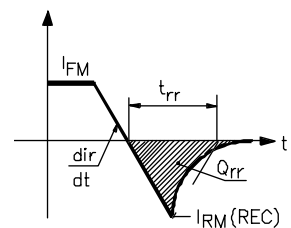
Type number	Voltage Code	$V_{RRM}$ max. repetitive peak and off-state voltage V	$V_{RSM}$ , maximum non-repetitive peak voltage V	$I_{RRM}$ max. $T_J = 125^\circ\text{C}$ mA
SD603C..S10C	04	400	500	45
	08	800	900	
	10	1000	1100	
SD603C..S15C	12	1200	1300	
	14	1400	1500	
	16	1600	1700	
SD603C..S20C	20	2000	2100	
	22	2200	2300	

#### Forward Conduction

Parameter	SD603C..C	Units	Conditions
$I_{F(AV)}$ Max. average forward current @ Heatsink temperature	600(300)	A	180° conduction, half sine wave.
	55(75)	°C	Double side (single side) cooled
$I_{F(RMS)}$ Max. RMS current	942	A	@ 25°C heatsink temperature double side cooled
$I_{FSM}$ Max. peak, one-cycle non-repetitive forward current	8320	A	t = 10ms No voltage
	8715		t = 8.3ms reapplied
	7000		t = 10ms 100% $V_{RRM}$
	7330		t = 8.3ms reapplied
$I^2t$ Maximum $I^2t$ for fusing	346	KA <sup>2</sup> s	t = 10ms No voltage
	316		t = 8.3ms reapplied
	245		t = 10ms 100% $V_{RRM}$
	224		t = 8.3ms reapplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	3460	KA <sup>2</sup> √s	t = 0.1 to 10ms, no voltage reapplied
$V_{F(TO)1}$ Low level of threshold voltage	1.36	V	(16.7% × π × $I_{F(AV)}$ ) < I < π × $I_{F(AV)}$ , $T_J = T_J$ max.
$V_{F(TO)2}$ High level of threshold voltage	1.81		(I > π × $I_{F(AV)}$ ), $T_J = T_J$ max.
$r_{f1}$ Low level of forward slope resistance	0.87	mΩ	(16.7% × π × $I_{F(AV)}$ ) < I < π × $I_{F(AV)}$ , $T_J = T_J$ max.
$r_{f2}$ High level of forward slope resistance	0.67		(I > π × $I_{F(AV)}$ ), $T_J = T_J$ max.
$V_{FM}$ Max. forward voltage	2.97	V	$I_{pk} = 1885\text{A}$ , $T_J = 25^\circ\text{C}$ , $t_p = 10\text{ms}$ sinusoidal wave

#### Recovery Characteristics

Code	$T_J = 25^\circ\text{C}$ typical $t_{rr}$ @ 25% $I_{RRM}$ (μs)	Test conditions			Max. values @ $T_J = 125^\circ\text{C}$		
		$I_{pk}$ Square Pulse (A)	di/dt (A/μs)	$V_r$ (V)	$t_{rr}$ @ 25% $I_{RRM}$ (μs)	$Q_{rr}$ (μC)	$I_{rr}$ (A)
S10	1.0	1000	25	-30	2.0	45	34
S15	1.5				3.2	87	51
S20	2.0				3.5	97	55



**Thermal and Mechanical Specifications**

Parameter	SD603C..C	Units	Conditions
T <sub>J</sub> Max. operating temperature range	-40 to 125	°C	
T <sub>stg</sub> Max. storage temperature range	-40 to 150		
R <sub>thJ-hs</sub> Max. thermal resistance, junction to heatsink	0.076 0.038	K/W	DC operationsingle side cooled DC operationdouble side cooled
F Mounting force, ± 10%	9800 (1000)		N (Kg)
wt Approximate weight	83	g	
Case style	B-43		See Outline Table

**ΔR<sub>thJ-hs</sub> Conduction**

(The following table shows the increment of thermal resistance R<sub>thJ-hs</sub> when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction		Rectangular conduction		Units	Conditions
	Single Side	Double Side	Single Side	Double Side		
180°	0.006	0.007	0.005	0.005	K/W	T <sub>J</sub> = T <sub>J</sub> max.
120°	0.008	0.008	0.008	0.008		
90°	0.010	0.010	0.011	0.011		
60°	0.015	0.015	0.016	0.015		
30°	0.026	0.025	0.026	0.025		

**Ordering Information Table**

**Device Code**

<b>SD</b>	<b>60</b>	<b>3</b>	<b>C</b>	<b>22</b>	<b>S20</b>	<b>C</b>
①	②	③	④	⑤	⑥	⑦

- 1** - Diode
- 2** - Essential part number
- 3** - 3 = Fast recovery
- 4** - C = Ceramic Puk
- 5** - Voltage code: Code x 100 = V<sub>RRM</sub> (see Voltage Ratings table)
- 6** - t<sub>rr</sub> code (see Recovery Characteristics table)
- 7** - C = Puk Case B-43

# SD603C..C Series

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## Outline Table

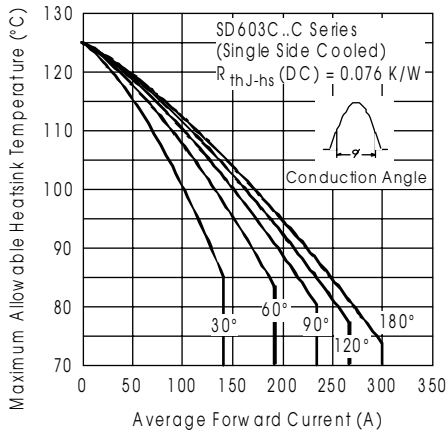
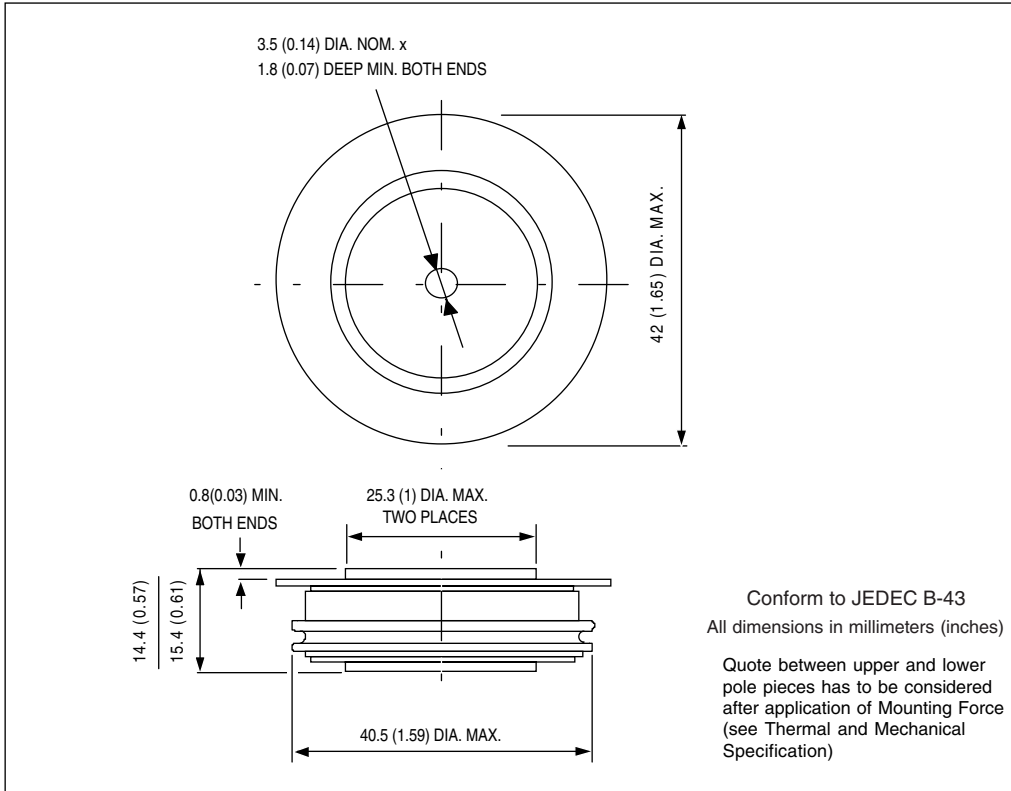


Fig. 1 - Current Ratings Characteristics

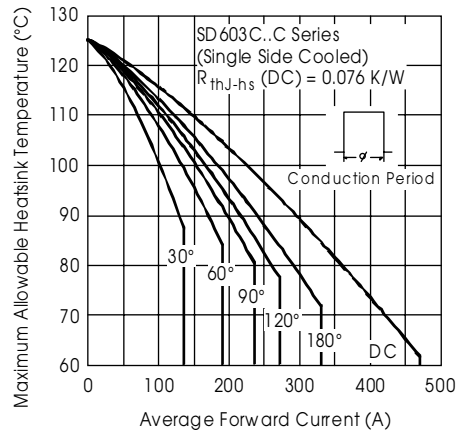


Fig. 2 - Current Ratings Characteristics

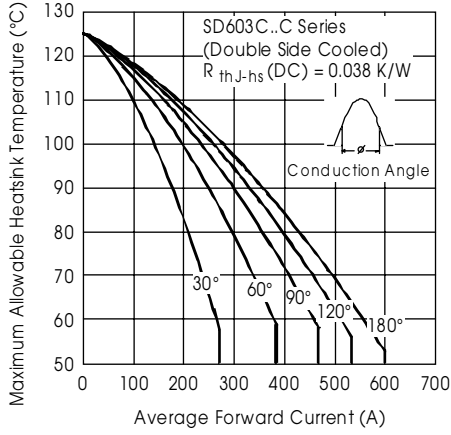


Fig. 3 - Current Ratings Characteristics

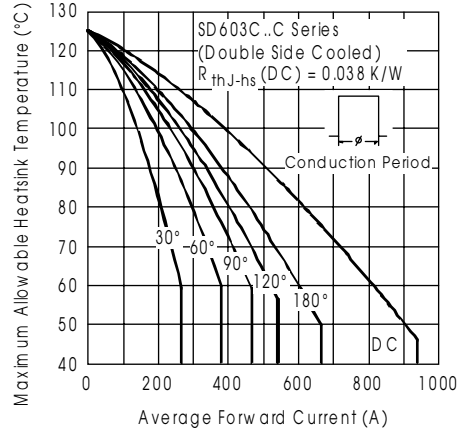


Fig. 4 - Current Ratings Characteristics

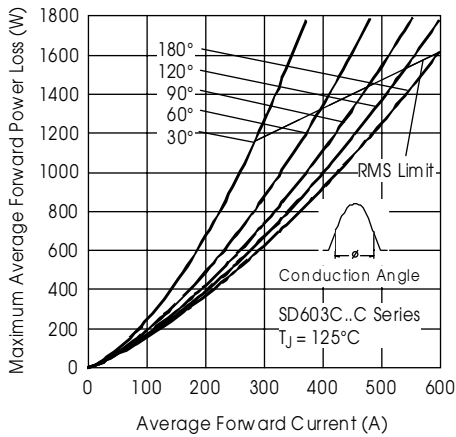


Fig. 5 - Forward Power Loss Characteristics

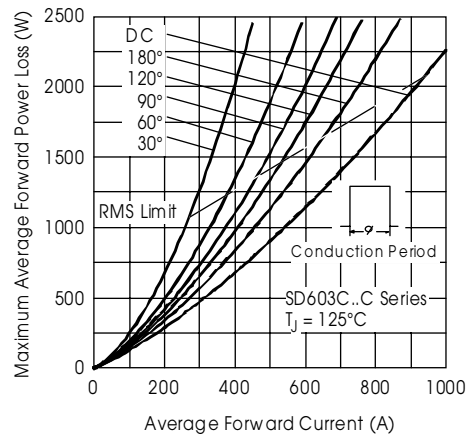


Fig. 6 - Forward Power Loss Characteristics

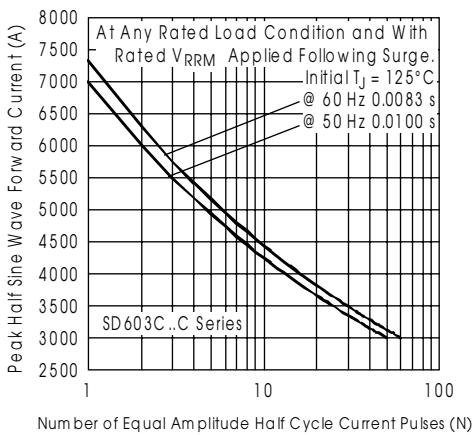


Fig. 7 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

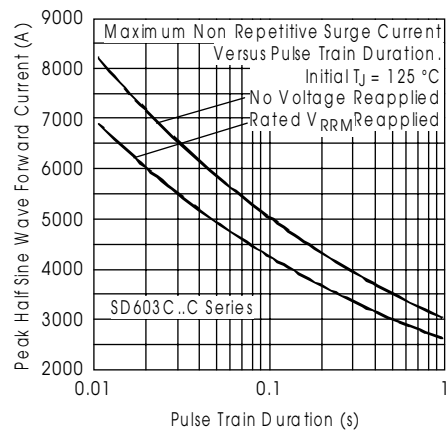


Fig. 8 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

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International  
**IR** Rectifier

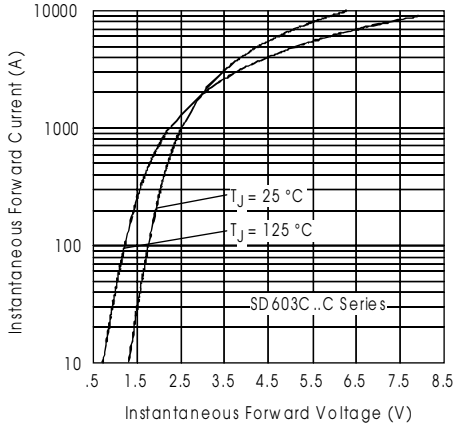


Fig. 9 - Forward Voltage Drop Characteristics

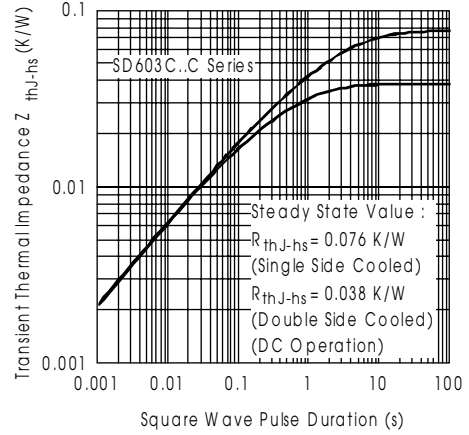


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristic

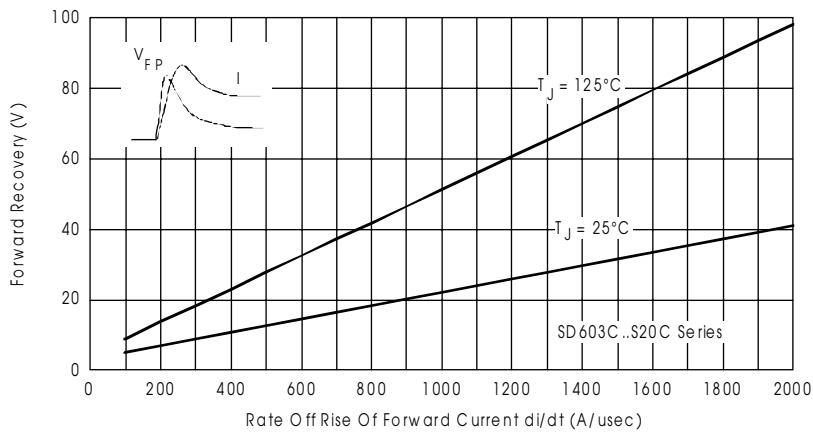


Fig. 11 - Typical Forward Recovery Characteristics

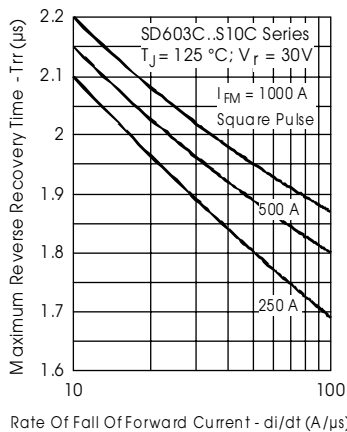


Fig. 12 - Recovery Time Characteristics

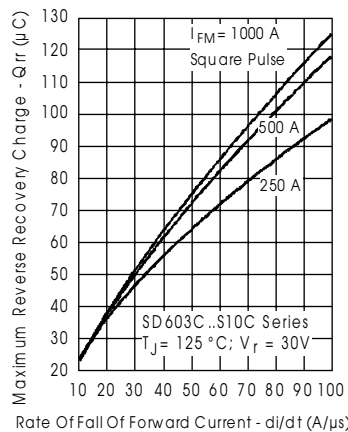


Fig. 13 - Recovery Charge Characteristics

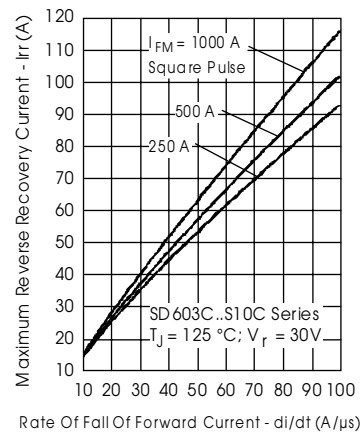


Fig. 14 - Recovery Current Characteristics

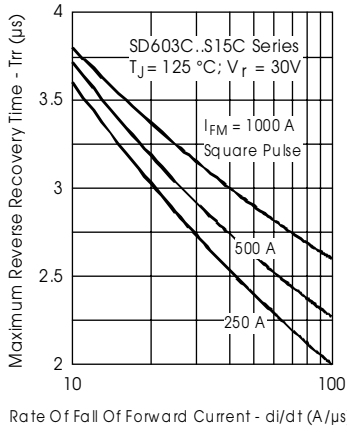


Fig. 15 - Recovery Time Characteristics

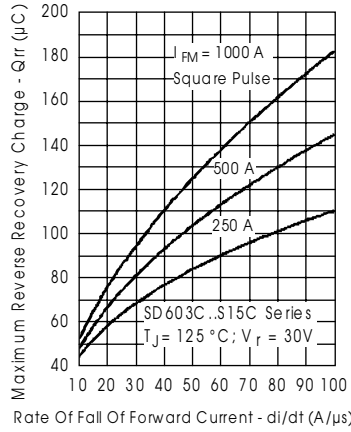


Fig. 16 - Recovery Charge Characteristics

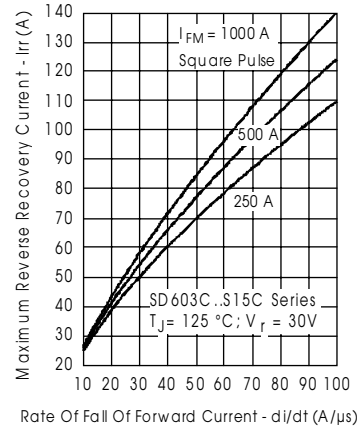


Fig. 17 - Recovery Current Characteristics

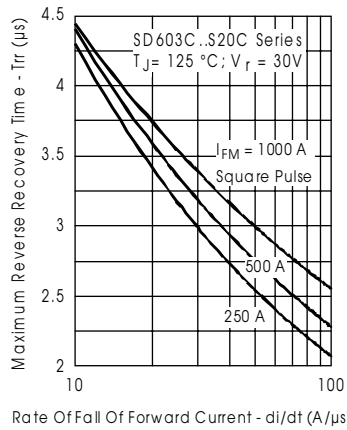


Fig. 18 - Recovery Time Characteristics

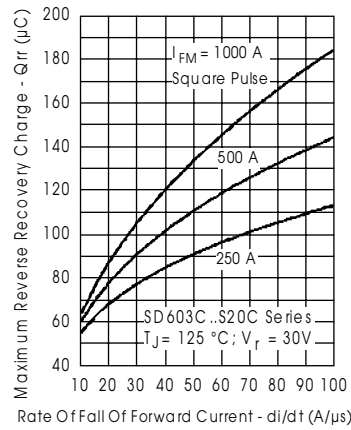


Fig. 19 - Recovery Charge Characteristics

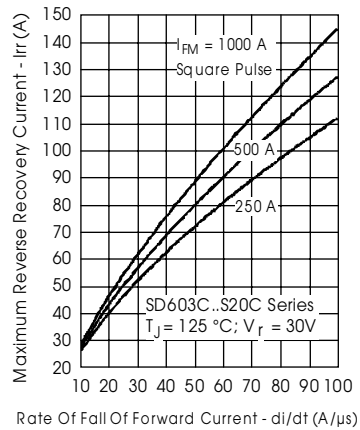


Fig. 20 - Recovery Current Characteristics

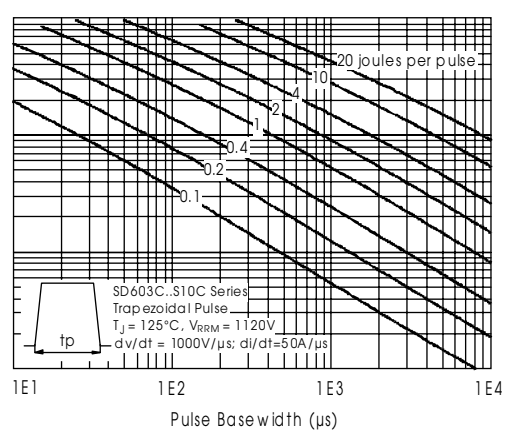
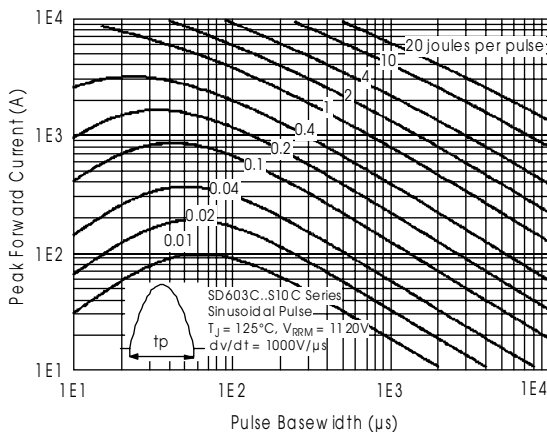


Fig. 21 - Maximum Total Energy Loss Per Pulse Characteristics

**SD603C..C Series**

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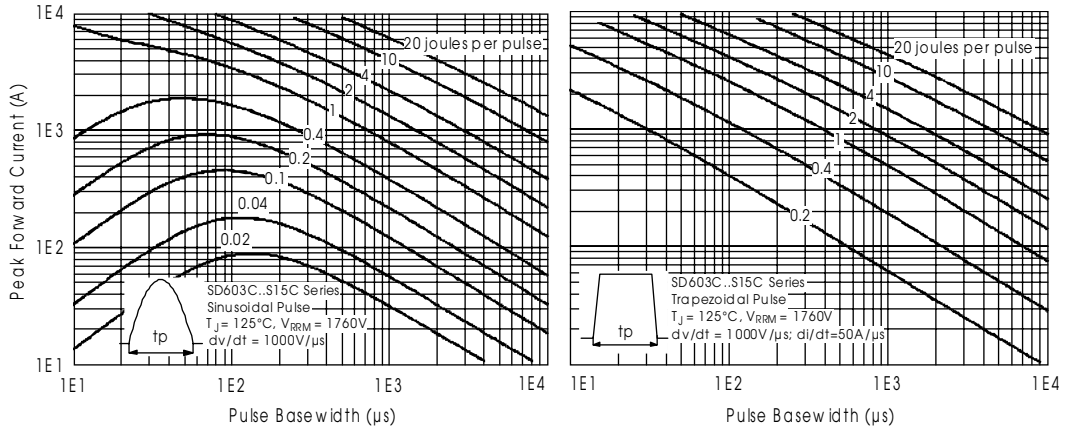


Fig. 22 - Maximum Total Energy Loss Per Pulse Characteristics

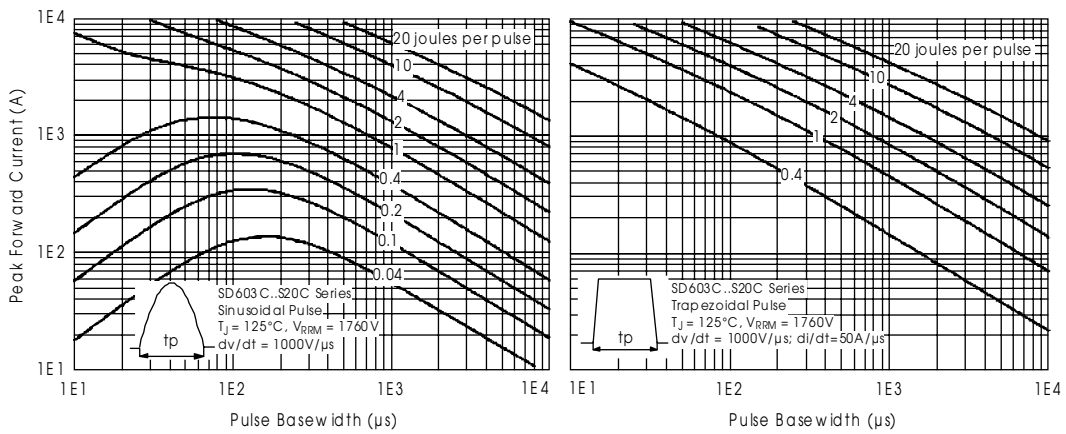


Fig. 23 - Maximum Total Energy Loss Per Pulse Characteristics