Bulletin I2075 rev. E 09/06

International
IOR Rectifier

SD703C..L SERIES

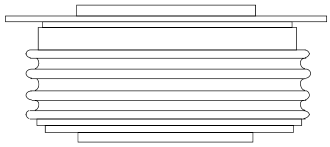
FAST RECOVERY DIODES

Hockey Puk Version

700A
790A

Features

- High power FAST recovery diode series
- 2.0 to 3.0 µs recovery time
- High voltage ratings up to 2500V
- 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 DO-200AB (B-PUK)
- Maximum junction temperature 150°C
- RoHS Compliant



case style DO-200AB (B-PUK)

Typical Applications

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

Major Ratings and Characteristics

Parameters	SD703C..L		Units
	S20	S30	
$I_{F(AV)}$	700	790	A
@ T_{hs}	55	55	°C
$I_{F(RMS)}$	1320	1470	A
I_{FSM} @ 50Hz	9300	9600	A
@ 60Hz	9730	10050	A
V_{RRM} range	1200 to 2500	1200 to 2500	V
t_{rr}	2.0	3.0	µs
@ T_J	25	25	°C
T_J	- 40 to 150		°C

ELECTRICAL SPECIFICATIONS

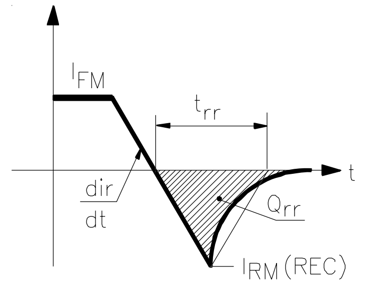
Voltage Ratings

Type number	Voltage Code	V_{RRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ $T_J = T_J$ max. mA
SD703C..L	12	1200	1300	50
	16	1600	1700	
	20	2000	2100	
	25	2500	2600	

Forward Conduction

	Parameter	SD703C..L		Units	Conditions		
		S20	S30				
$I_{F(AV)}$	Max. average forward current	700 (365)	790 (400)	A	180° conduction, half sine wave		
	@ case temperature	55 (85)	55 (85)	°C	Double side (single side) cooled		
$I_{F(RMS)}$	Max. RMS forward current	1320	1470	A	@ 25°C heatsink temperature double side cooled		
I_{FSM}	Max. peak, one-cycle forward, non-repetitive surge current	9300	9600	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		9730	10050		t = 8.3ms		
		7820	8070		t = 10ms	100% V_{RRM} reapplied	
		8190	8450		t = 8.3ms		
I^2t	Maximum I^2t for fusing	432	460	KA^2s	t = 10ms	No voltage reapplied	
		395	420		t = 8.3ms		
		306	326		t = 10ms	100% V_{RRM} reapplied	
		279	297		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	4320	4600	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level value of threshold voltage	1.00	0.95	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
$V_{F(TO)2}$	High level value of threshold voltage	1.11	1.05		$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
r_{f1}	Low level value of forward slope resistance	0.80	0.60	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
r_{f2}	High level value of forward slope resistance	0.76	0.56		$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
V_{FM}	Max. forward voltage drop	2.20	1.85	V	I_{pk}= 1500A, $T_J = T_J$ max, t_p = 10ms sinusoidal wave		

Recovery Characteristics

Code	$T_J = 25^oC$ typical t_{rr} @ 25% I_{RRM} (µs)	Test conditions			Max. values @ $T_J = 150°C$			
		I_{pk} Square Pulse (A)	di/dt (A/µs)	V_r (V)	t_{rr} @ 25% I_{RRM} (µs)	Q_{rr} (µC)	I_{rr} (A)	
S20	2.0	1000	50	- 50	3.5	240	110	
S30	3.0	1000	50	- 50	5.0	380	130	

Thermal and Mechanical Specifications

Parameter		SD703C..L		Units	Conditions
		S20	S30		
T_J	Max. junction operating temperature range	-40 to 150		°C	
T_{stg}	Max. storage temperature range	-40 to 150			
R_{thJ-hs}	Max. thermal resistance, case junction to heatsink	0.092 0.046		K/W	DC operation single side cooled DC operation double side cooled
F	Mounting force, ± 10%	9800 (1000)		N (Kg)	
wt	Approximate weight	250		g	
	Case style	DO-200AB (B-PUK)			See Outline Table

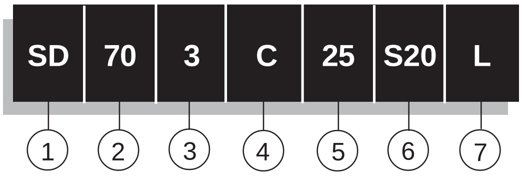
ΔR_{thJ-hs} Conduction

(The following table shows the increment of thermal resistence R_{thJ-hs} 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°	0.011	0.011	0.008	0.008	K/W	$T_J = T_J$ max.
120°	0.013	0.014	0.013	0.013		
90°	0.017	0.017	0.018	0.018		
60°	0.024	0.025	0.026	0.026		
30°	0.043	0.043	0.043	0.044		

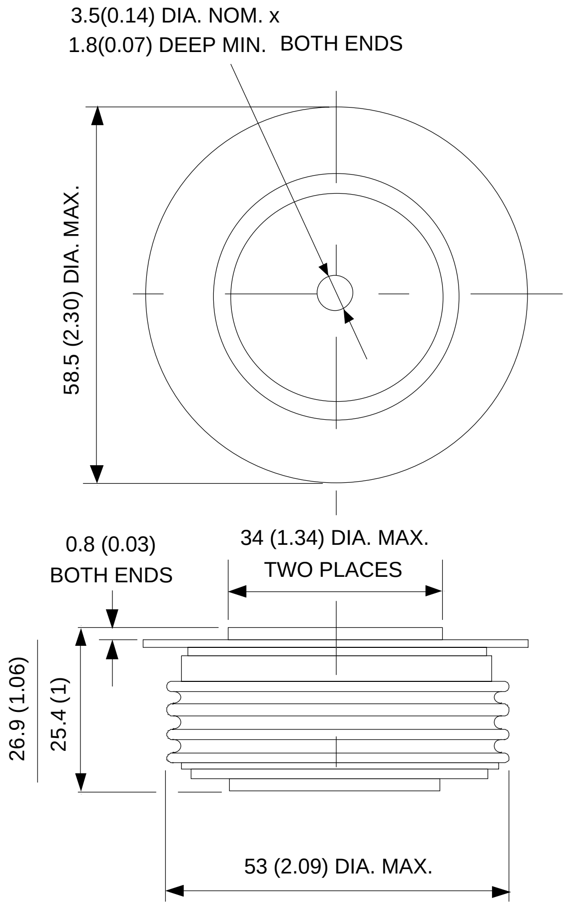
Ordering Information Table

Device Code



- **1** - Diode
- **2** - Essential part number
- **3** - 3 = Fast recovery
- **4** - C = Ceramic Puk
- **5** - Voltage code: Code x 100 = V_{RRM} (See Voltage Ratings table)
- **6** - t_{rr} code
- **7** - L = Puk Case DO-200AB (B-PUK)

Outline Table



Conform to JEDEC DO-200AB (B-PUK)

All dimensions in millimeters (inches)

Quote between upper and lower pole pieces has to be considered after application of Mounting Force (see Thermal and Mechanical Specification)

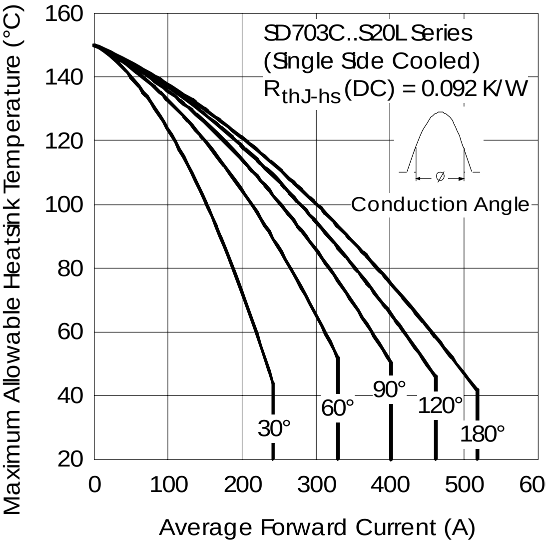


Fig. 1 - Current Ratings Characteristics

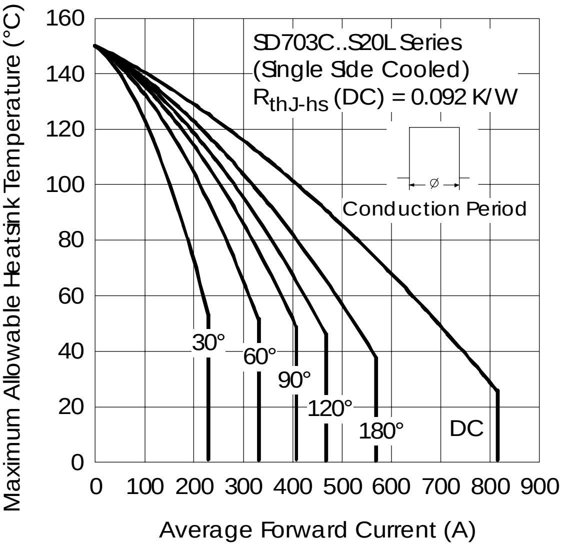


Fig. 2 - Current Ratings Characteristics

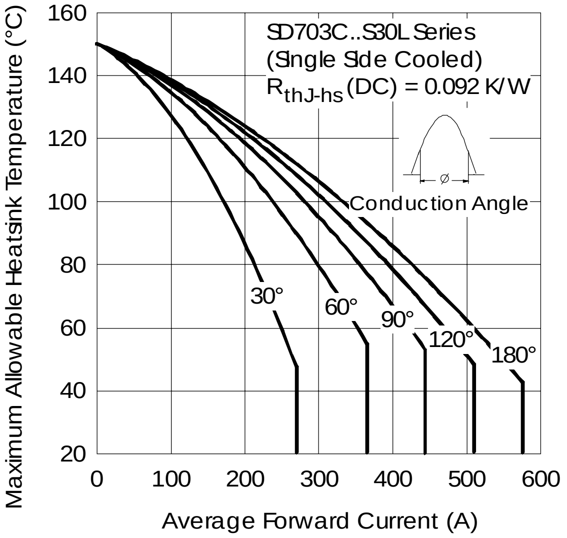


Fig. 3 - Current Ratings Characteristics

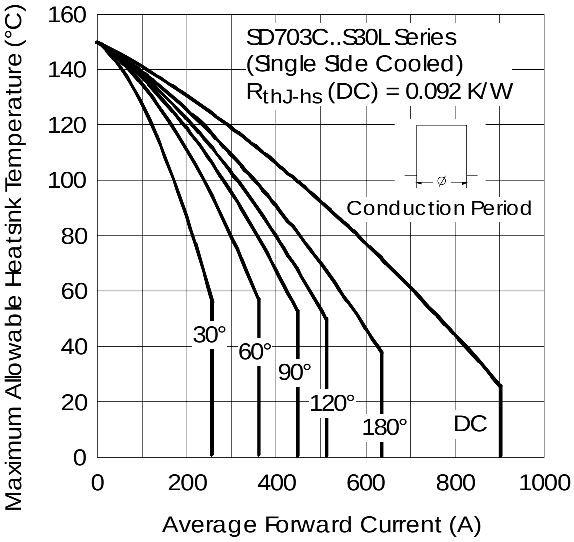


Fig. 4 - Current Ratings Characteristics

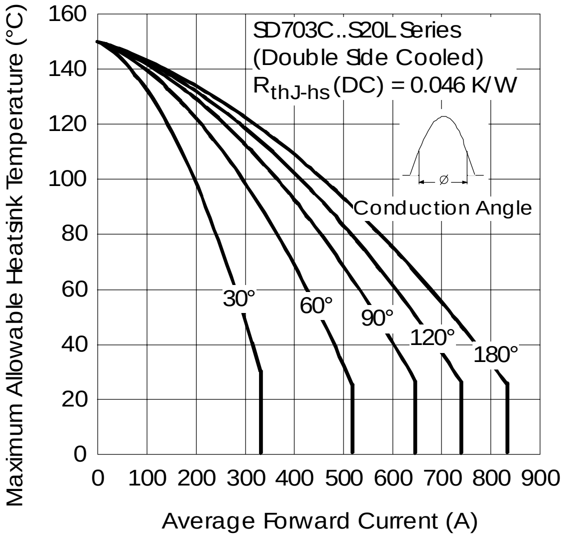


Fig. 5 - Current Ratings Characteristics

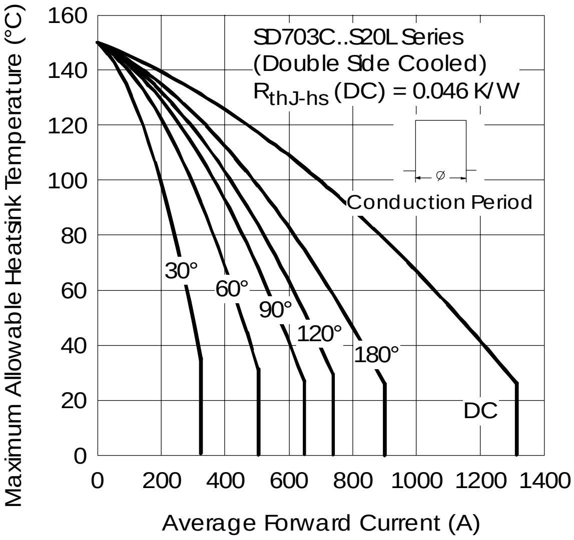


Fig. 6 - Current Ratings Characteristics

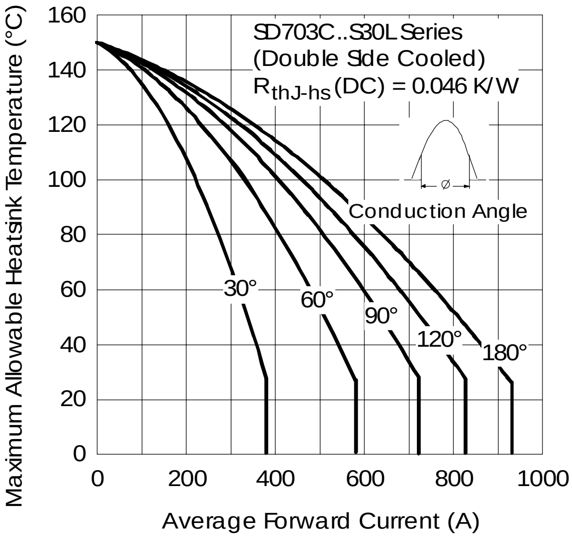


Fig. 7 - Current Ratings Characteristics

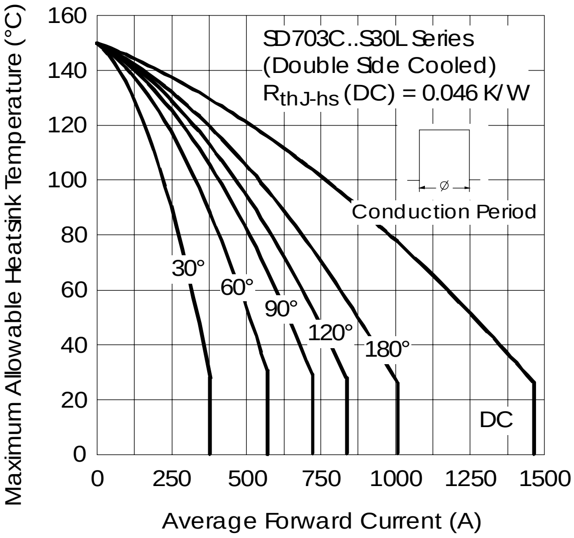


Fig. 8 - Current Ratings Characteristics

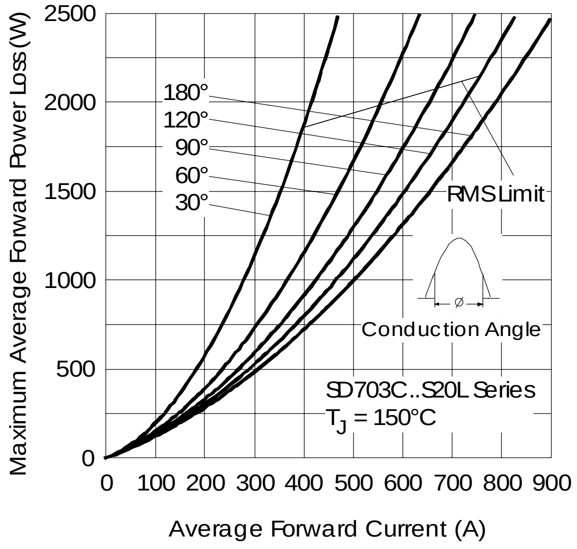


Fig. 9 - Forward Power Loss Characteristics

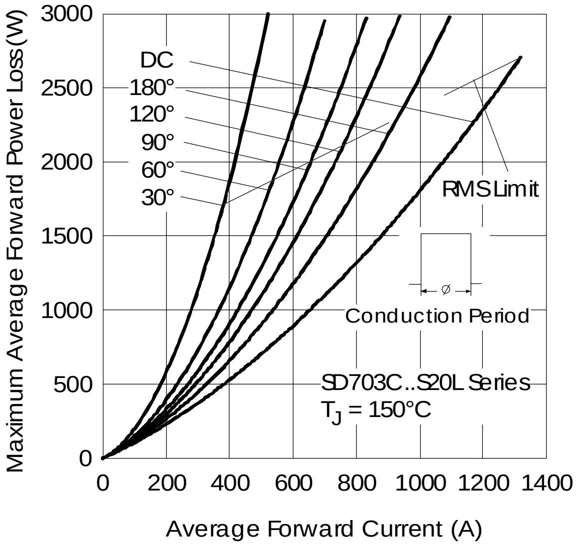


Fig. 10 - Forward Power Loss Characteristics

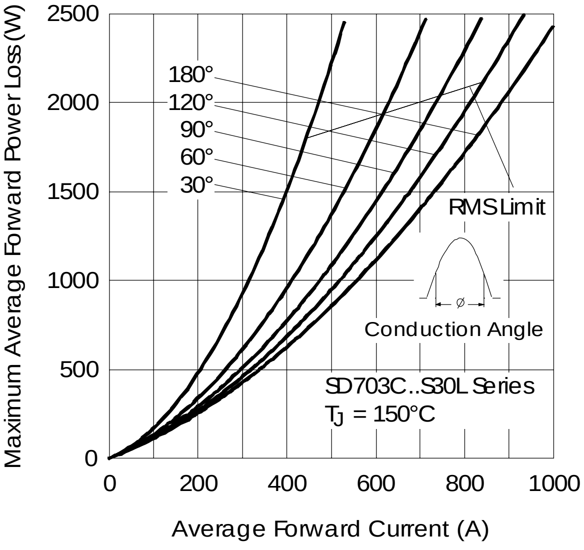


Fig. 11 - Forward Power Loss Characteristics

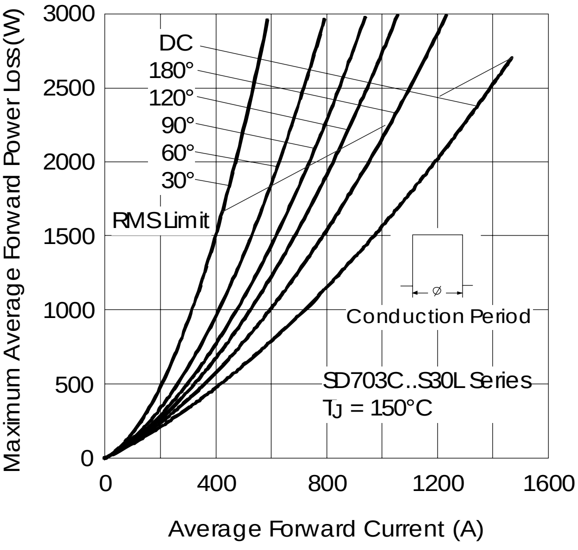


Fig. 12 - Forward Power Loss Characteristics

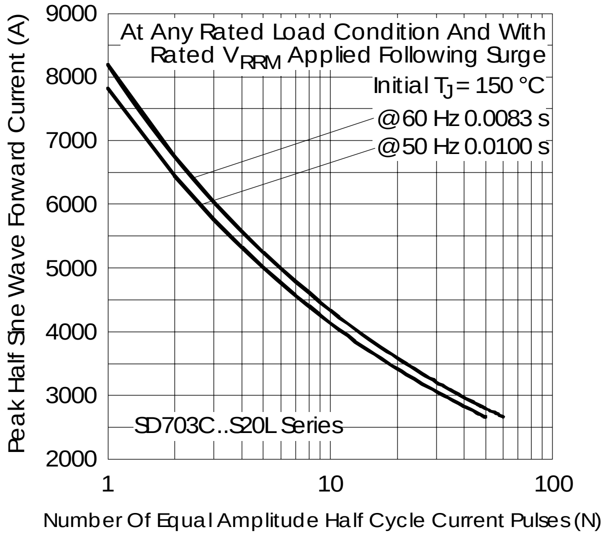


Fig. 13 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

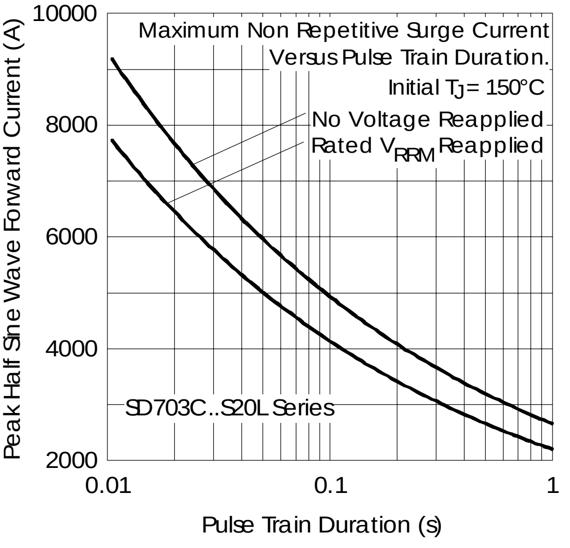


Fig. 14 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

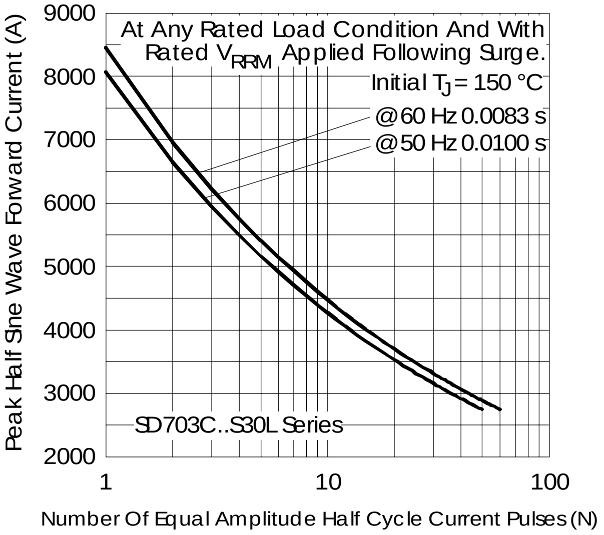


Fig. 15 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

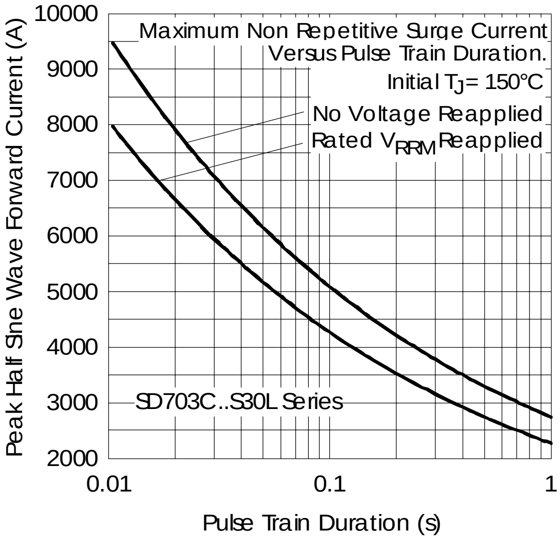


Fig. 16 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

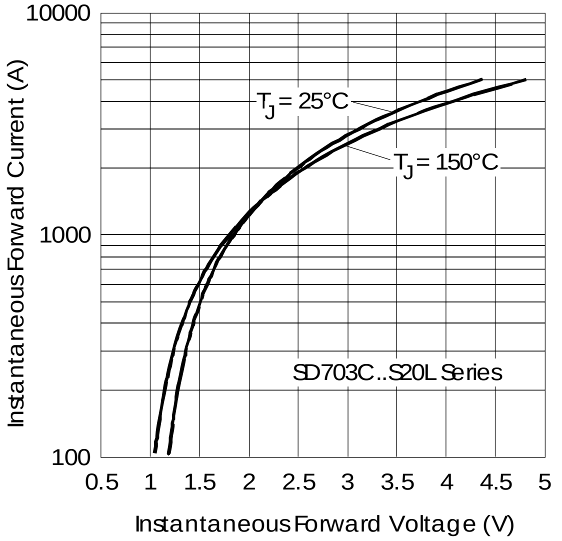


Fig. 17 - Forward Voltage Drop Characteristics

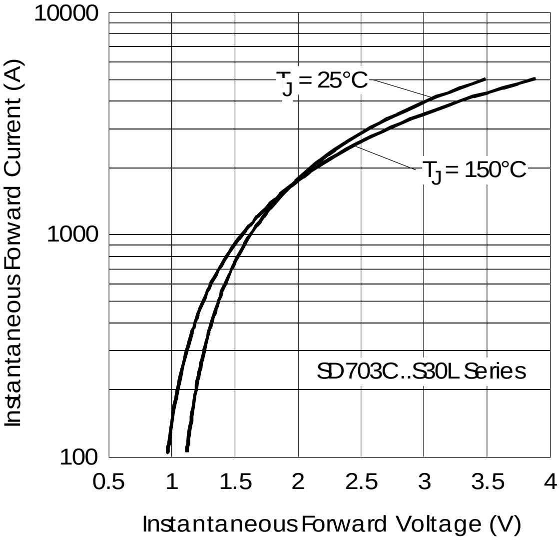


Fig. 18 - Forward Voltage Drop Characteristics

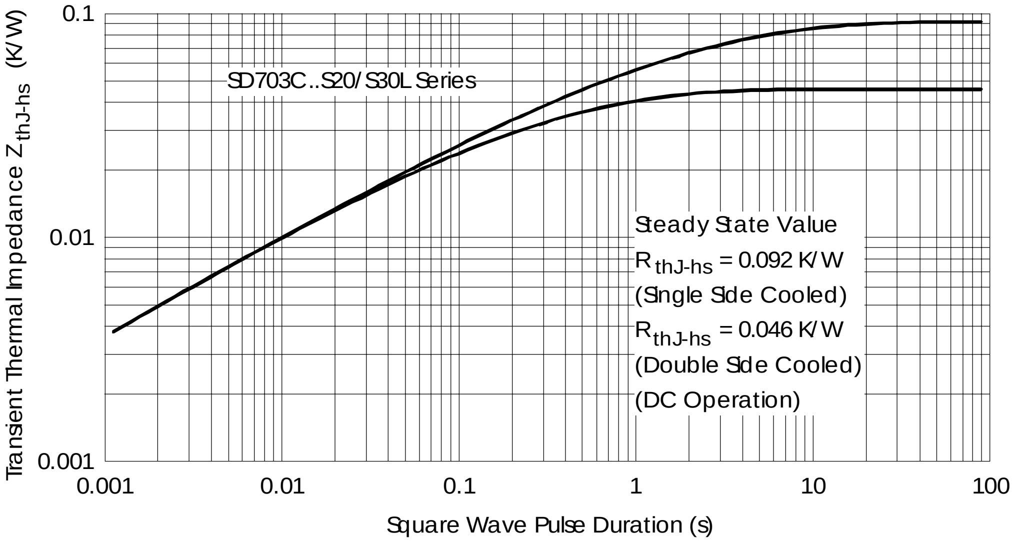


Fig. 19 - Thermal Impedance Z_{thJ-hs} Characteristic

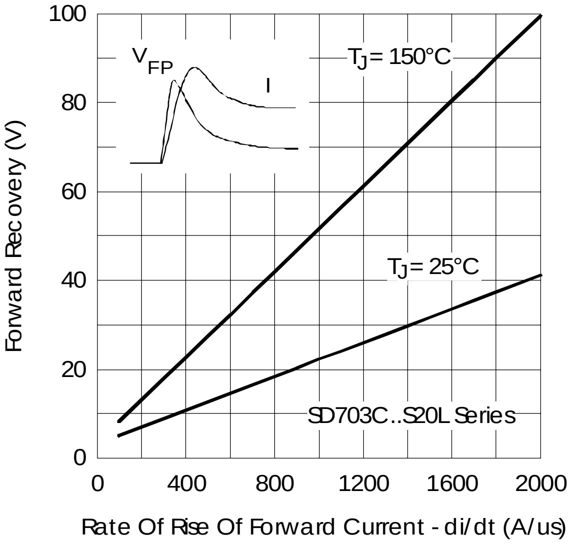


Fig. 20 - Typical Forward Recovery Characteristics

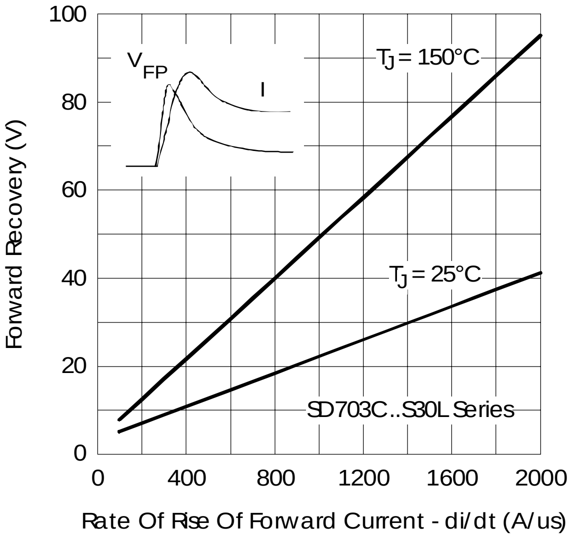


Fig. 21 - Typical Forward Recovery Characteristics

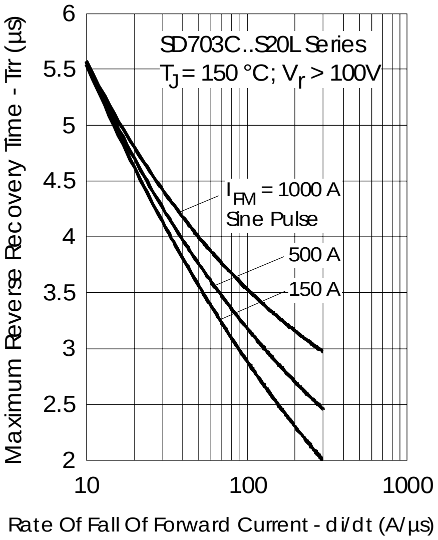


Fig. 22 - Recovery Time Characteristics

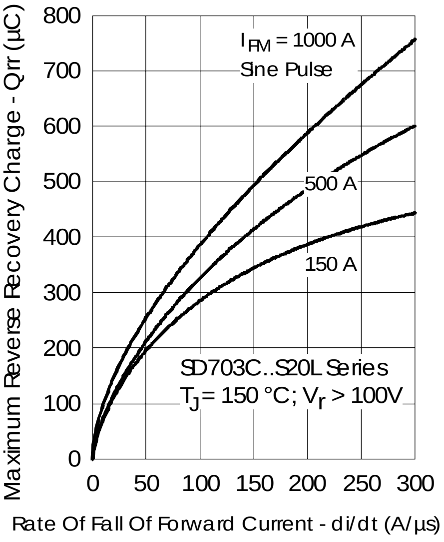


Fig. 23 - Recovery Charge Characteristics

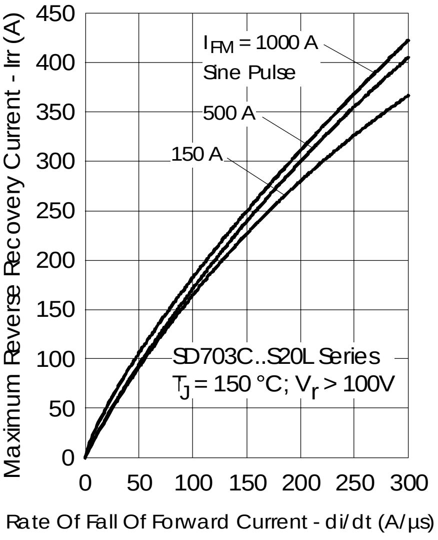


Fig. 24 - Recovery Current Characteristics

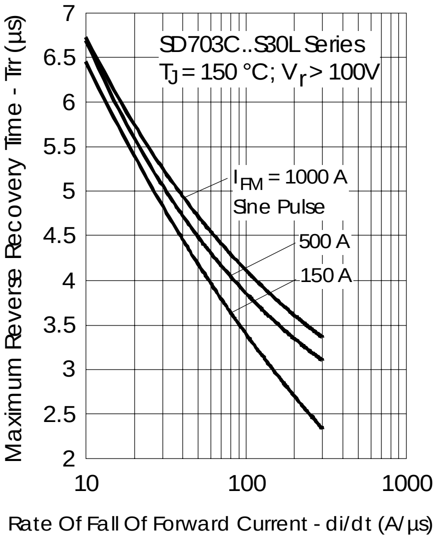


Fig. 25 - Recovery Time Characteristics

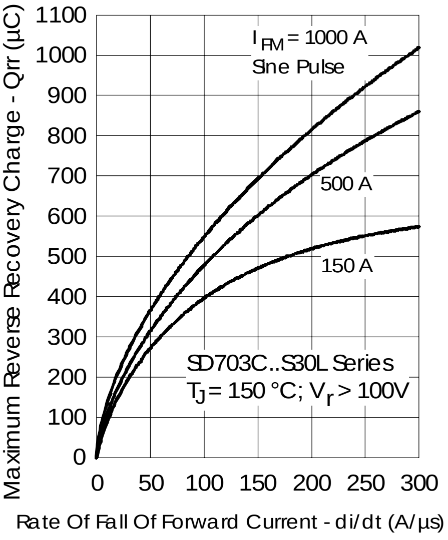


Fig. 26 - Recovery Charge Characteristics

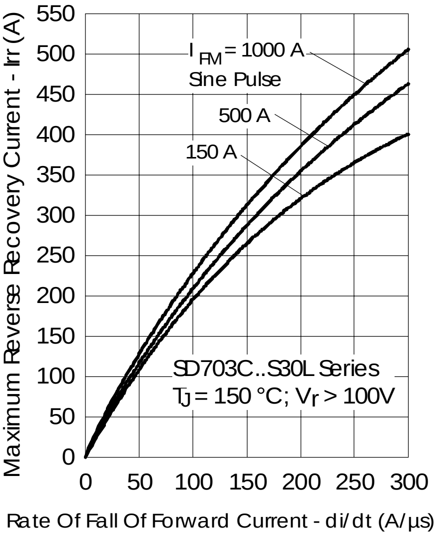


Fig. 27 - Recovery Current Characteristics

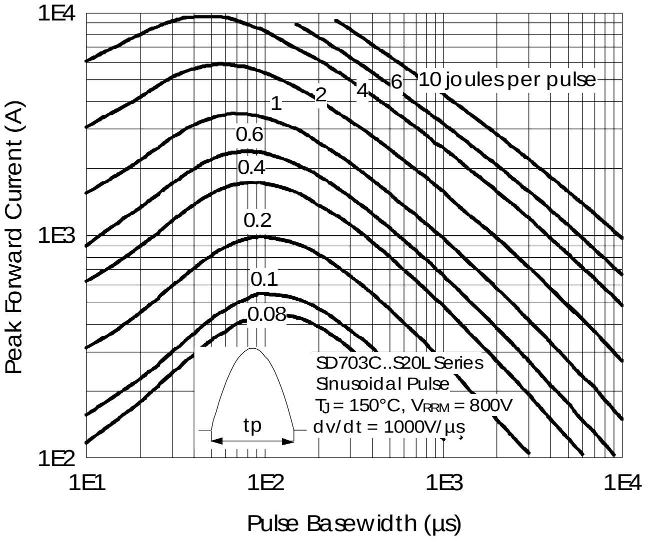


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

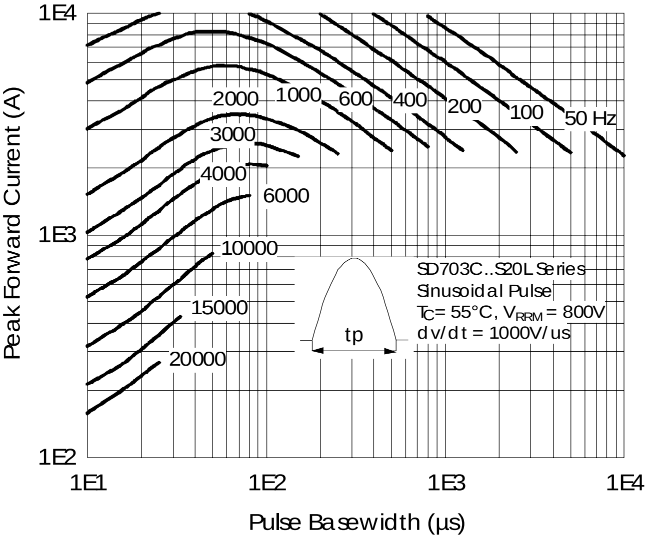


Fig. 29 - Frequency Characteristics

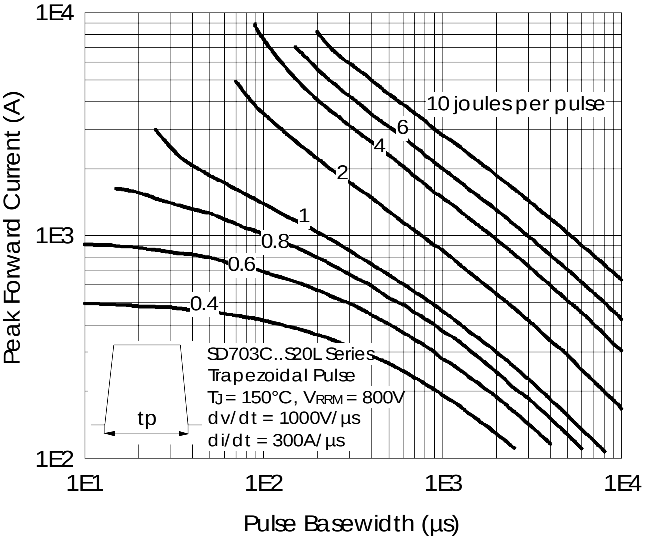


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

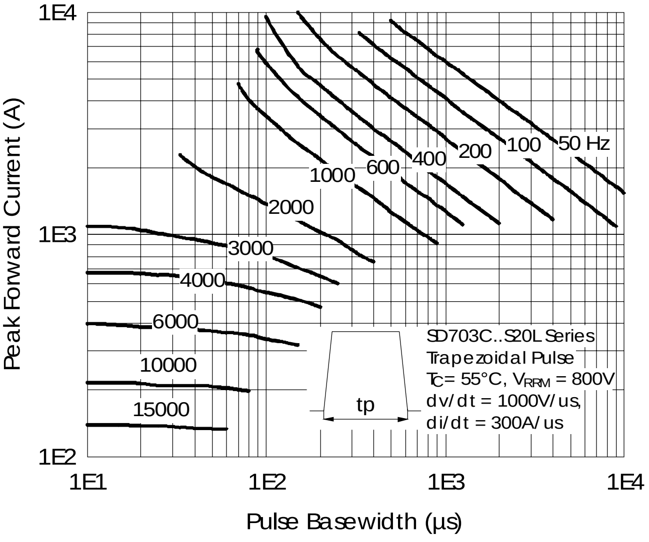


Fig. 31 - Frequency Characteristics

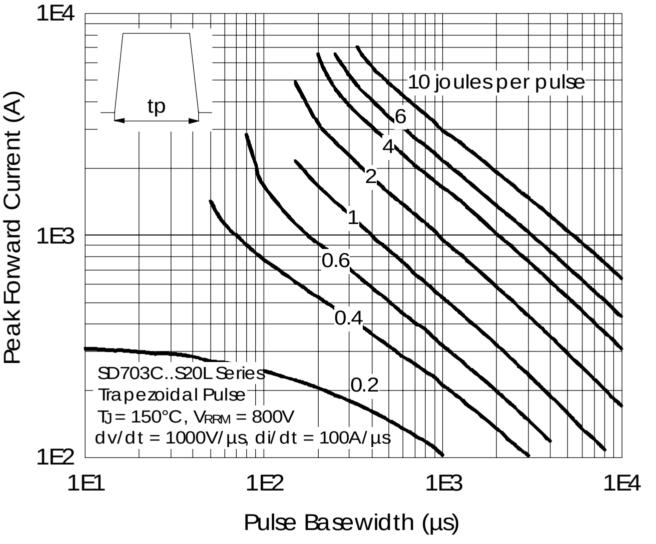


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

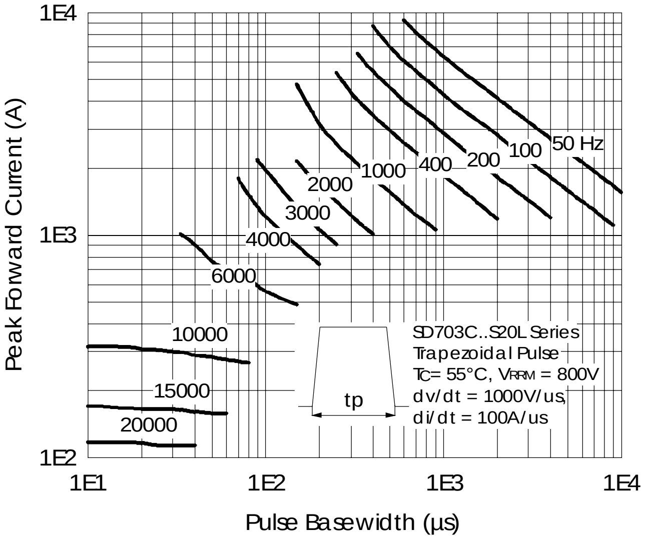


Fig. 33 - Frequency Characteristics

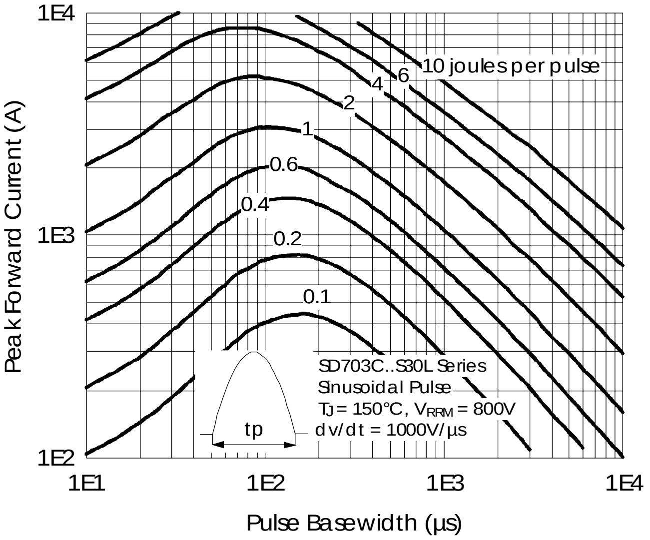


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

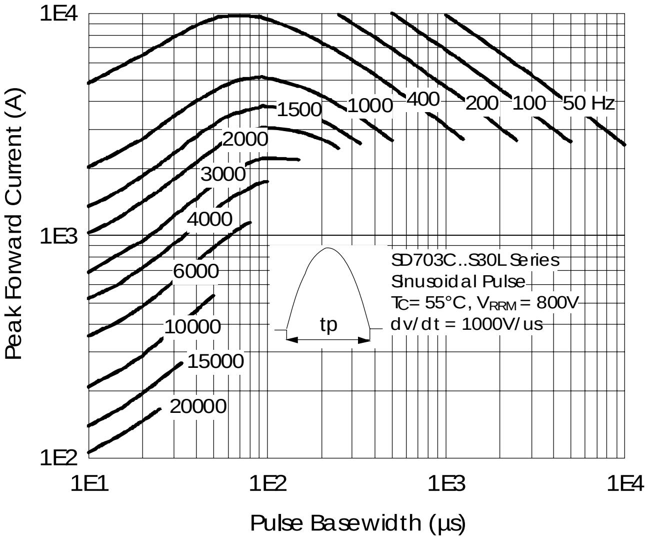


Fig. 35 - Frequency Characteristics

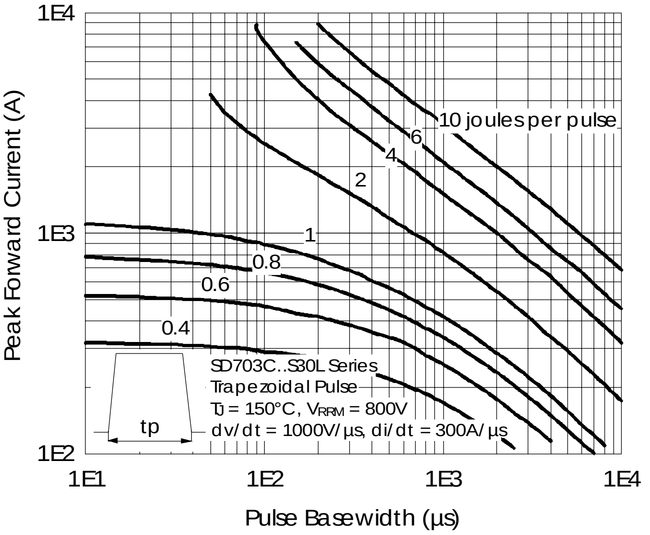


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

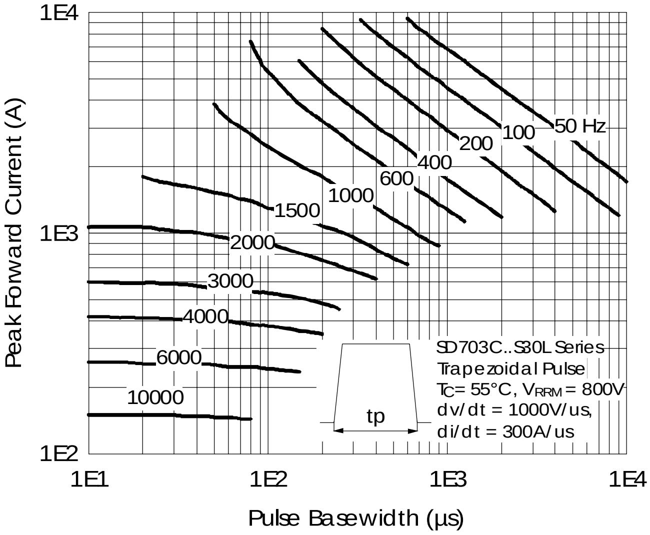


Fig. 37 - Frequency Characteristics

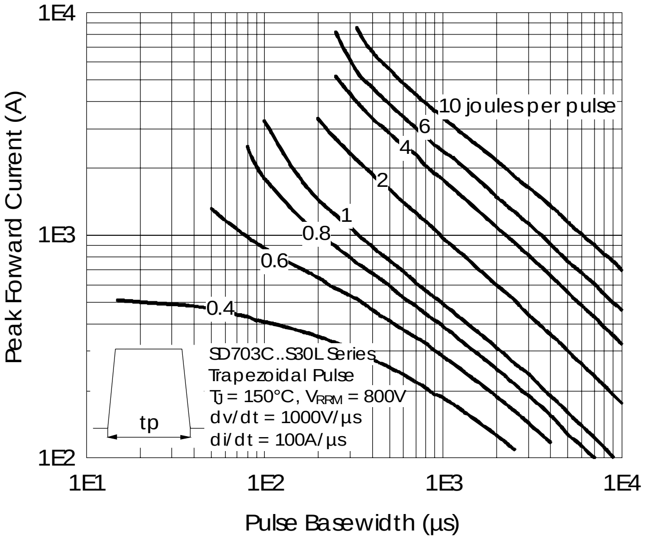


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

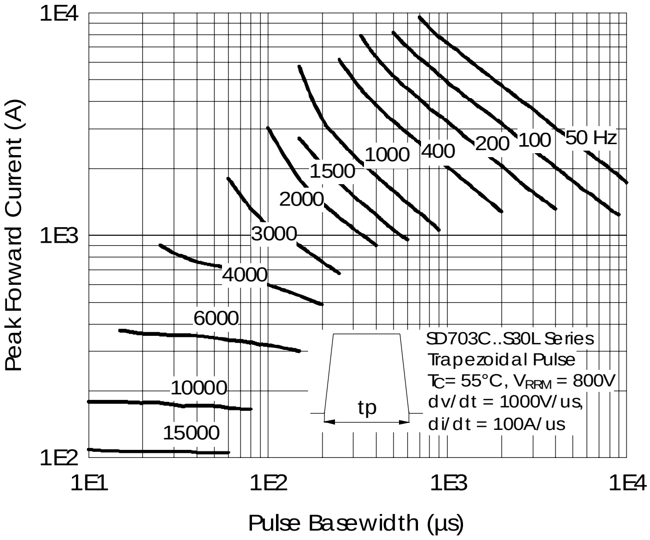


Fig. 39 - Frequency Characteristics

International
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