

### FAST RECOVERY DIODES

### Hockey Puk Version

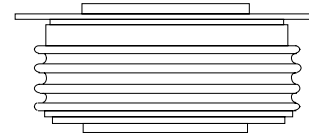
#### Features

- High power FAST recovery diode series
- 2.0 to 3.0  $\mu$ s recovery time
- High voltage ratings up to 3000V
- 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

#### Typical Applications

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

920A  
1050A



case style DO-200AB (B-PUK)

#### Major Ratings and Characteristics

Parameters	SD1053C..L		Units
	S20	S30	
$I_{F(AV)}$	1050	920	A
@ $T_{hs}$	55	55	°C
$I_{F(RMS)}$	1940	1700	A
$I_{FSM}$ @ 50Hz	15000	13000	A
@ 60Hz	15700	13610	A
$V_{RRM}$ range	1800 to 2500	1800 to 3000	V
$t_{rr}$	2.0	3.0	$\mu$ s
@ $T_J$	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
SD1053C..S20L	18	1800	1900	50
	22	2200	2300	
	25	2500	2600	
SD1053C..S30L	18	1800	1900	
	22	2200	2300	
	25	2500	2600	
	28	2800	2900	
	30	3000	3100	

Forward Conduction

Parameter	SD1053C..L		Units	Conditions
	S20	S30		
$I_{F(AV)}$ Max. average forward current @ heatsink temperature	1050(450)	920(390)	A	180° conduction, half sine wave Double side (single side) cooled
	55 (85)	55 (85)	°C	
$I_{F(RMS)}$ Max. RMS forward current	1940	1700	A	@ 25°C heatsink temperature double side cooled
$I_{FSM}$ Max. peak, one-cycle forward, non-repetitive surge current	15000	13000	A	t = 10ms No voltage
	15700	13610		t = 8.3ms reapplied
	12620	10930		t = 10ms 100% $V_{RRM}$
	13210	11450		t = 8.3ms reapplied
$I^2t$ Maximum $I^2t$ for fusing	1125	845	KA <sup>2</sup> s	t = 10ms No voltage
	1027	772		t = 8.3ms reapplied
	796	598		t = 10ms 100% $V_{RRM}$
	727	546		t = 8.3ms reapplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	11250	8450	KA <sup>2</sup> √s	t = 0.1 to 10ms, no voltage reapplied
$V_{F(TO)1}$ Low level value of threshold voltage	1.34	1.51	V	(16.7% x $\pi$ x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.
$V_{F(TO)2}$ High level value of threshold voltage	1.48	1.67	V	( $I > \pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.
$r_{f1}$ Low level value of forward slope resistance	0.37	0.50	mΩ	(16.7% x $\pi$ x $I_{F(AV)} < I < \pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.
$r_{f2}$ High level value of forward slope resistance	0.33	0.45	mΩ	( $I > \pi$ x $I_{F(AV)}$ ), $T_J = T_J$ max.
$V_{FM}$ Max. forward voltage drop	1.90	2.26	V	$I_{pk} = 1500A$ , $T_J = T_J$ max, $t_p = 10ms$ sinusoidal wave

**Recovery Characteristics**

Code	$T_J = 25^\circ\text{C}$ Typical $t_{rr}$ @ 25% $I_{RRM}$ ( $\mu\text{s}$ )	Test conditions			Max. values @ $T_J = 150^\circ\text{C}$		
		$I_{pk}$ Square Pulse (A)	$di/dt$ (A/ $\mu\text{s}$ )	$V_r$ (V)	$t_{rr}$ @ 25% $I_{RRM}$ ( $\mu\text{s}$ )	$Q_{rr}$ ( $\mu\text{C}$ )	$I_{rr}$ (A)
S20	2.0	1000	100	- 50	4.0	400	180
S30	3.0	1000	100	- 50	4.5	550	230

**Thermal and Mechanical Specifications**

Parameter	SD1053C..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	0.073 0.031		K/W	DCoperation single side cooled DCoperation double side cooled
F Mounting force, $\pm 10\%$	14700 (1500)		N (Kg)	
wt Approximate weight	255		g	
Case style	DO-200AB(B-PUK)			See Outline Table

**$\Delta R_{thJ-hs}$  Conduction**

(The following table shows the increment of thermal resistance  $R_{thJ-hs}$  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°	0.009	0.008	0.006	0.006	K/W	$T_J = T_J \text{ max.}$
120°	0.011	0.011	0.011	0.011		
90°	0.014	0.014	0.015	0.015		
60°	0.020	0.021	0.021	0.022		
30°	0.036	0.036	0.036	0.036		

**Ordering Information Table**

Device Code						
SD	105	3	C	30	S30	L
①	②	③	④	⑤	⑥	⑦
<b>1</b>	- Diode					
<b>2</b>	- Essential part number					
<b>3</b>	- 3 = Fast recovery					
<b>4</b>	- C = Ceramic Puk					
<b>5</b>	- Voltage code: Code x 100 = $V_{RRM}$ (See Voltage Ratings table)					
<b>6</b>	- $t_{rr}$ code					
<b>7</b>	- L = Puk Case DO-200AB(B-PUK)					

Outline Table

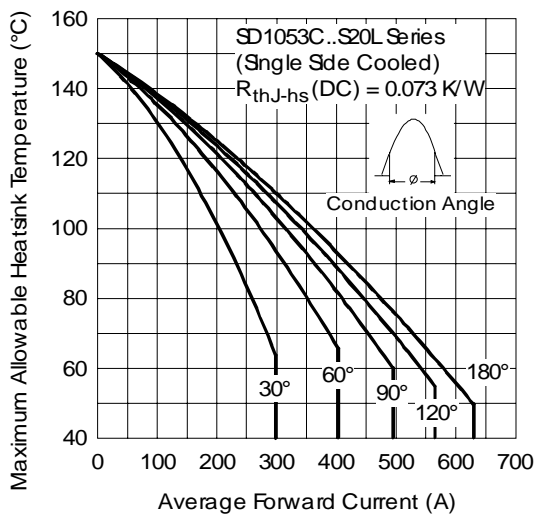
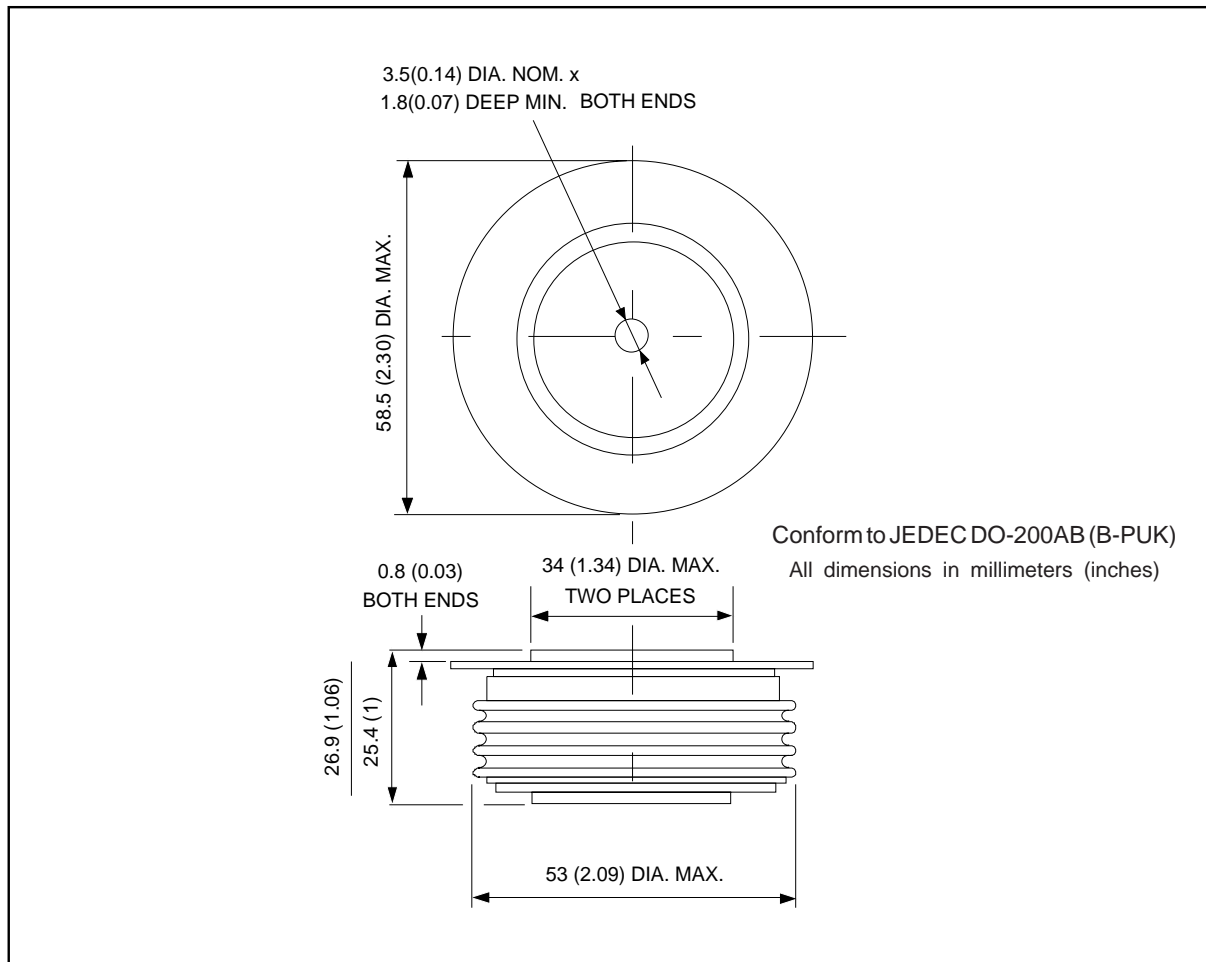


Fig. 1 - Current Ratings Characteristics

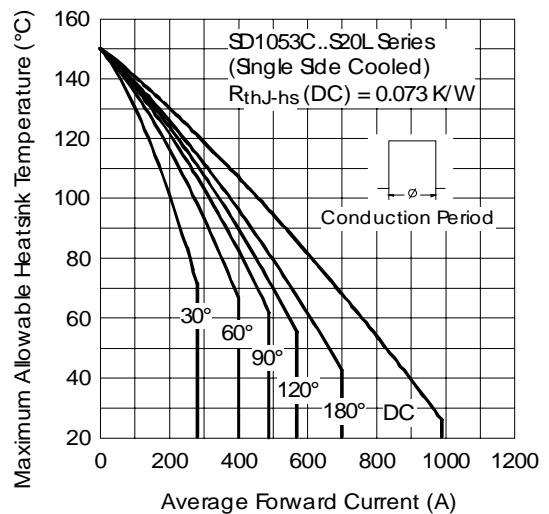


Fig. 2 - Current Ratings Characteristics

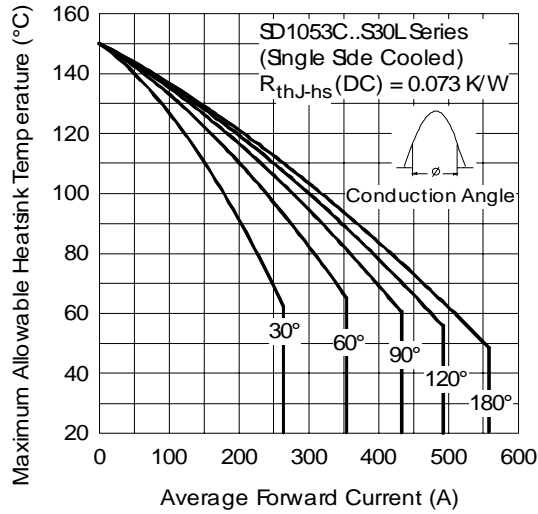


Fig. 3 - Current Ratings Characteristics

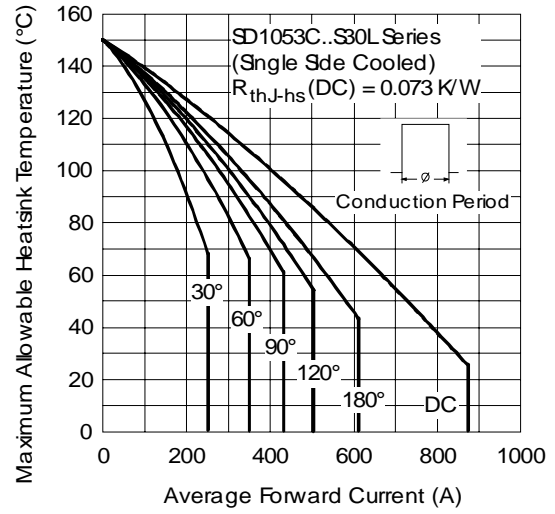


Fig. 4 - Current Ratings Characteristics

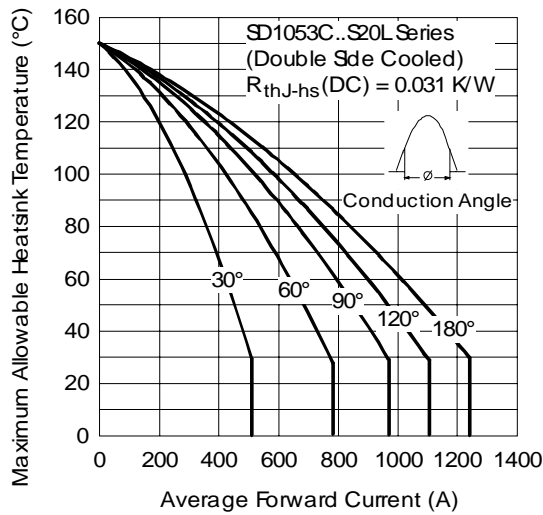


Fig. 5 - Current Ratings Characteristics

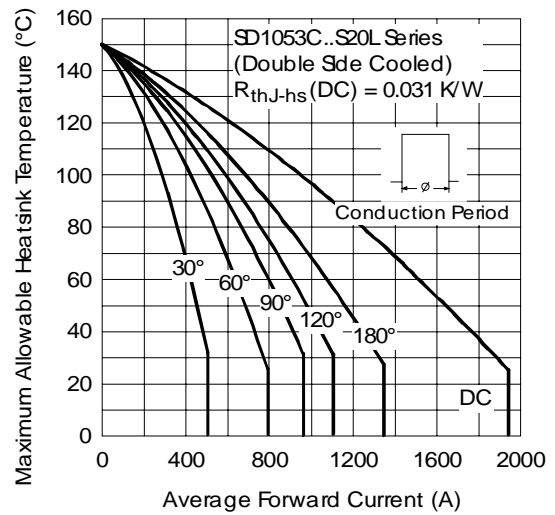


Fig. 6 - Current Ratings Characteristics

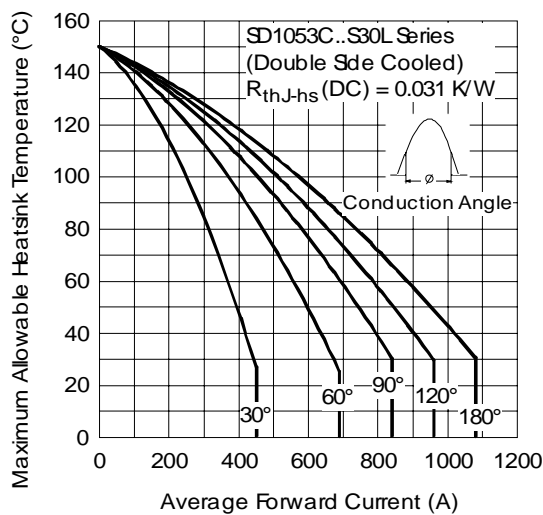


Fig. 7 - Current Ratings Characteristics

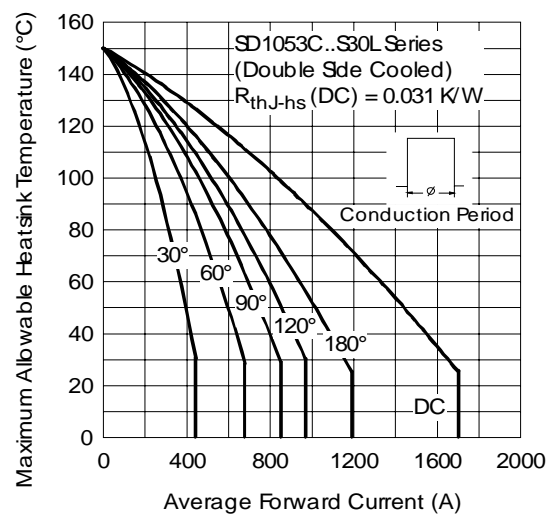


Fig. 8 - Current Ratings Characteristics

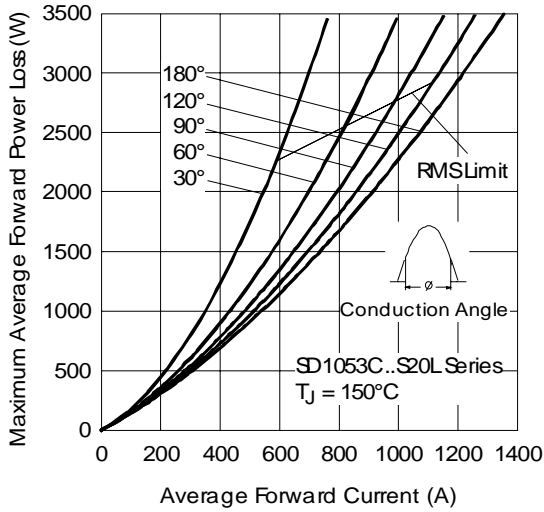


Fig. 9 - Forward Power Loss Characteristics

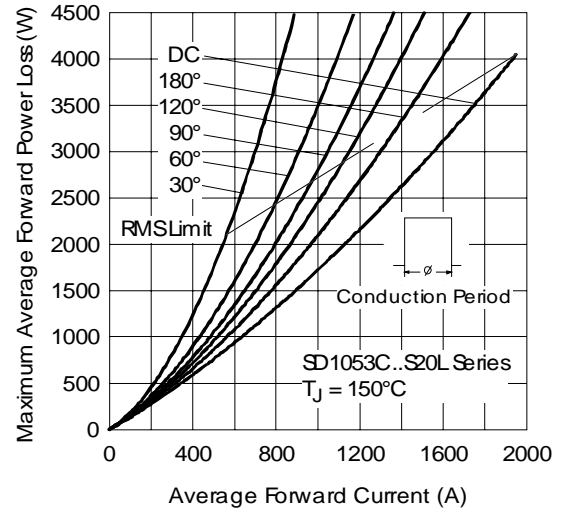


Fig. 10 - Forward Power Loss Characteristics

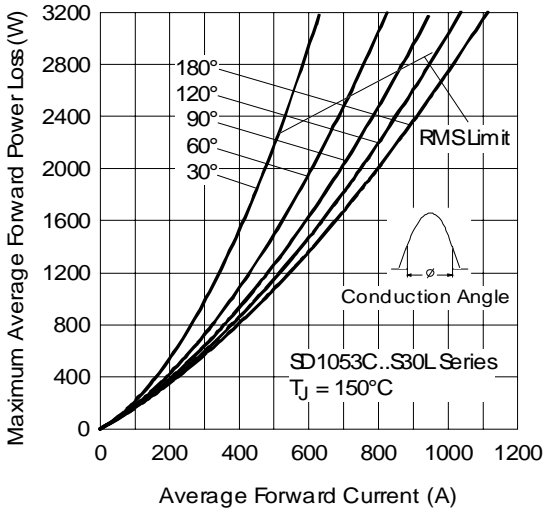


Fig. 11 - Forward Power Loss Characteristics

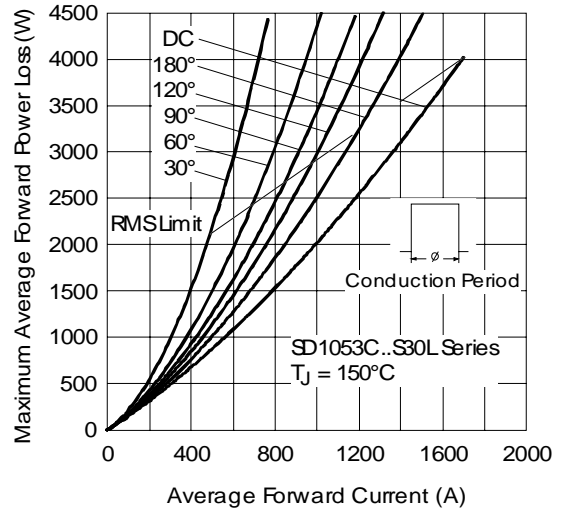


Fig. 12 - Forward Power Loss Characteristics

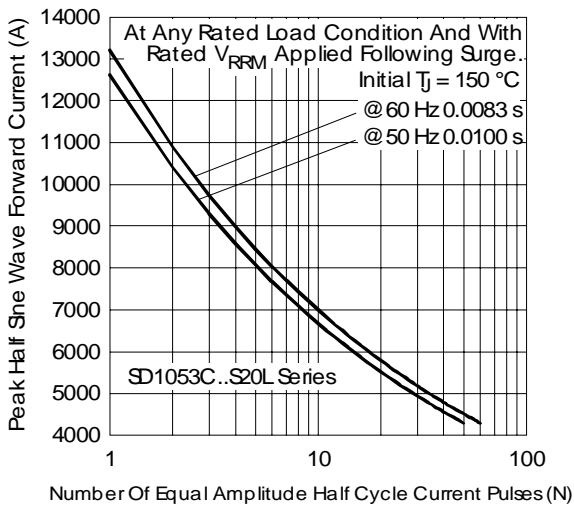


Fig. 13 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

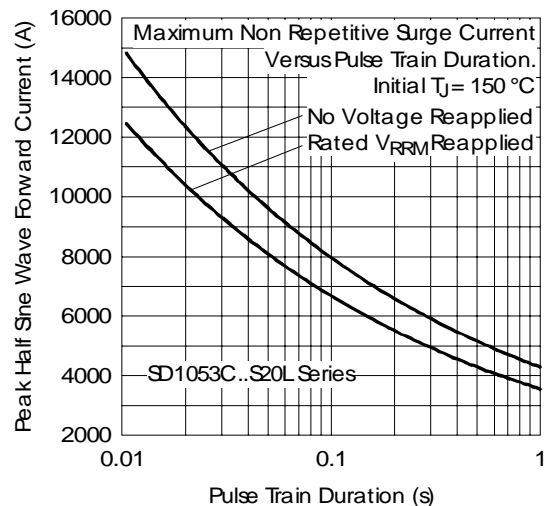


Fig. 14 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

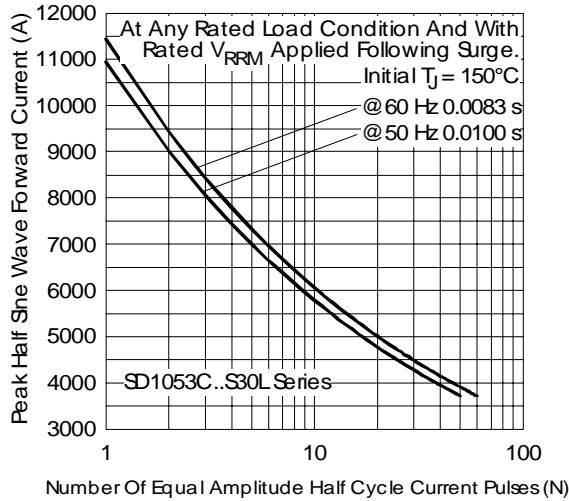


Fig. 15 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

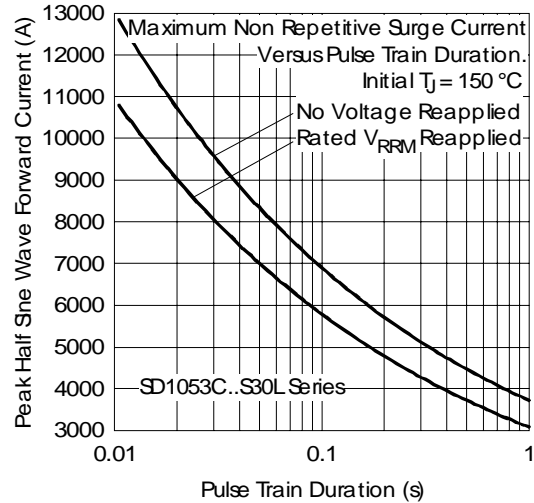


Fig. 16 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

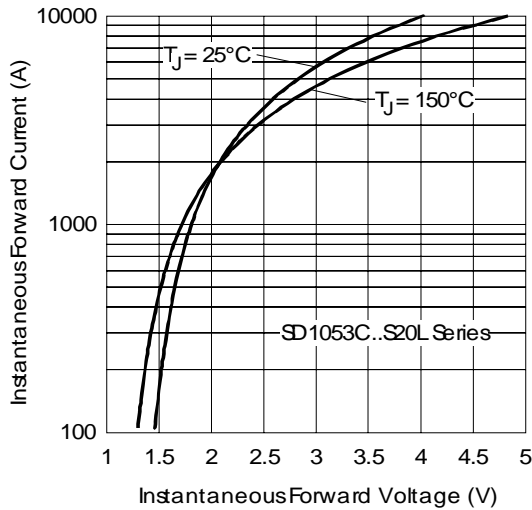


Fig. 17 - Forward Voltage Drop Characteristics

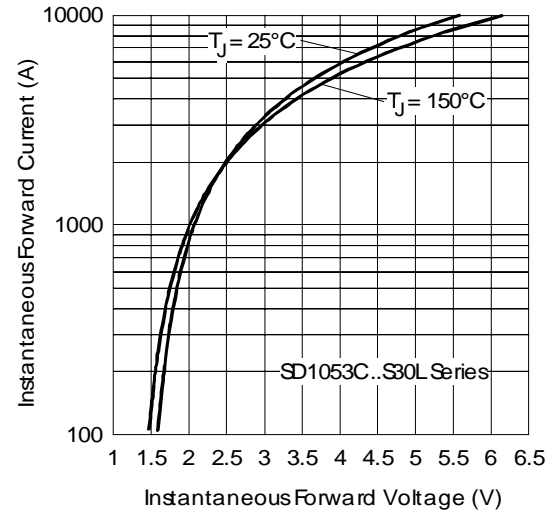


Fig. 18 - Forward Voltage Drop Characteristics

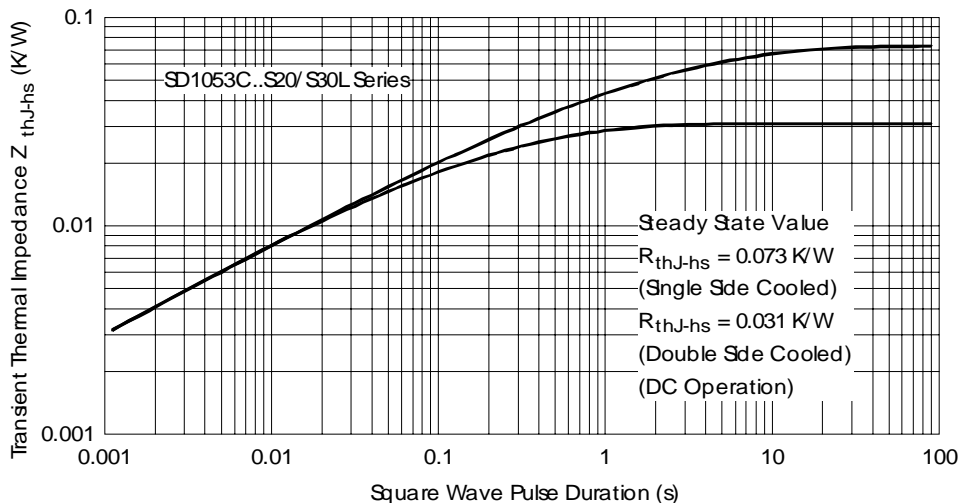


Fig. 19 - Thermal Impedance  $Z_{thJ-hs}$  Characteristic

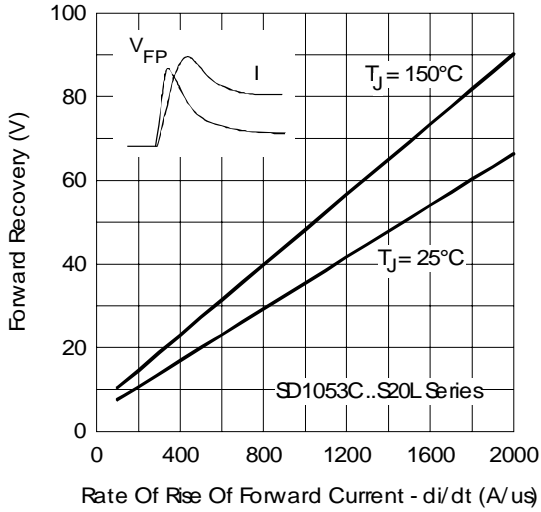


Fig. 20 - Typical Forward Recovery Characteristics

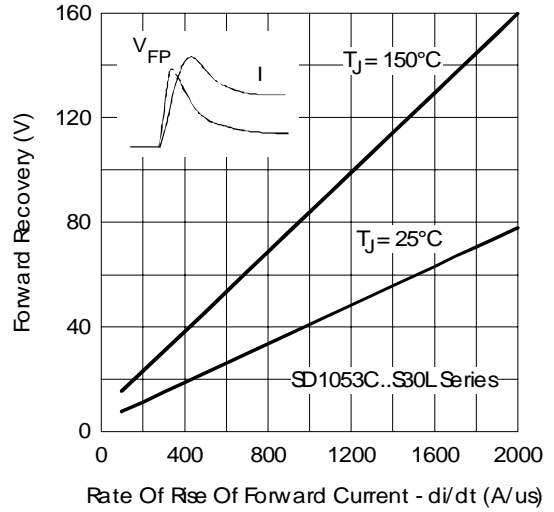


Fig. 21 - Typical Forward Recovery Characteristics

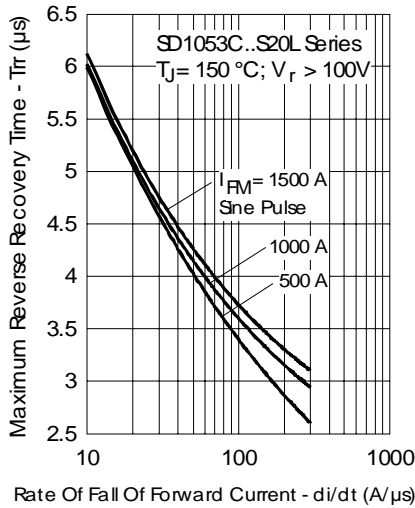


Fig. 22 - Recovery Time Characteristics

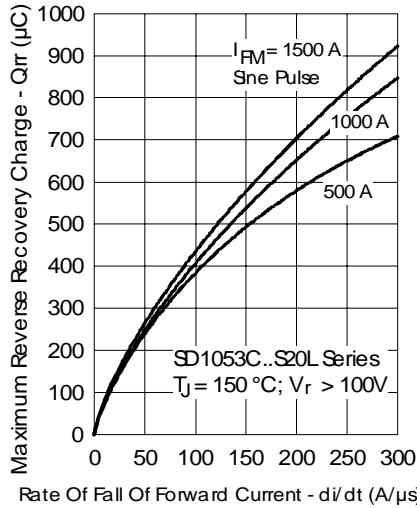


Fig. 23 - Recovery Charge Characteristics

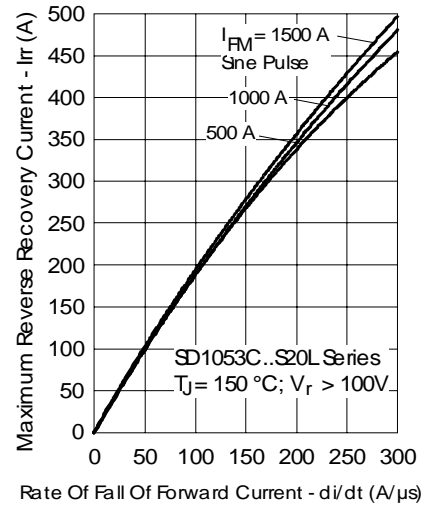


Fig. 24 - Recovery Current Characteristics

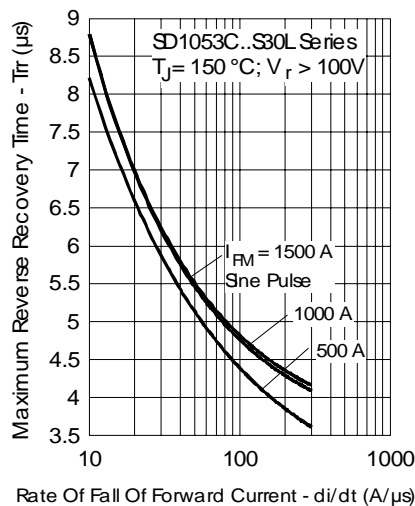


Fig. 25 - Recovery Time Characteristics

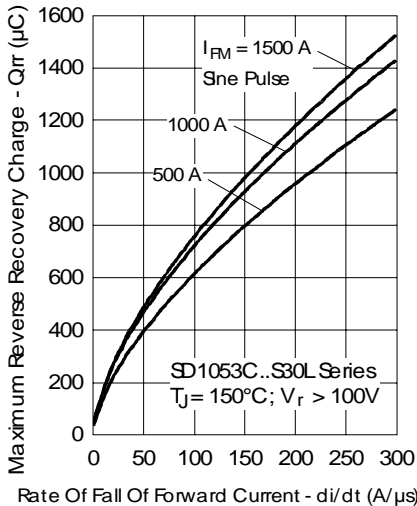


Fig. 26 - Recovery Charge Characteristics

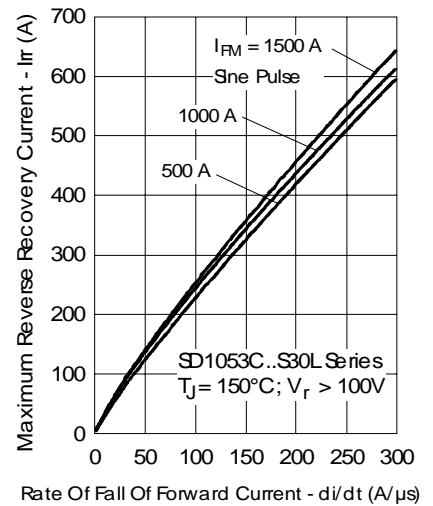


Fig. 27 - Recovery Current Characteristics



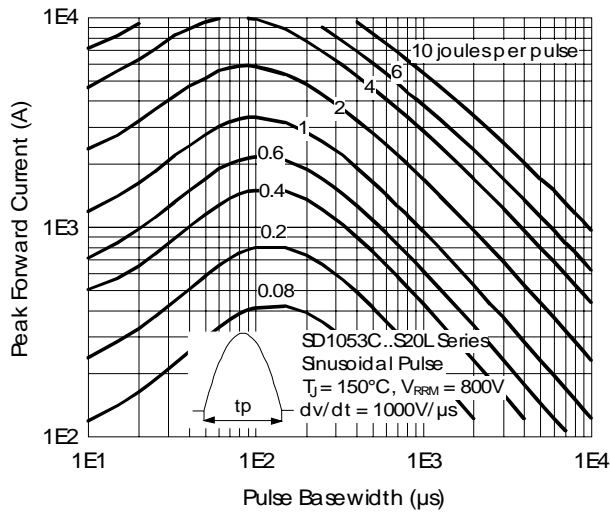


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

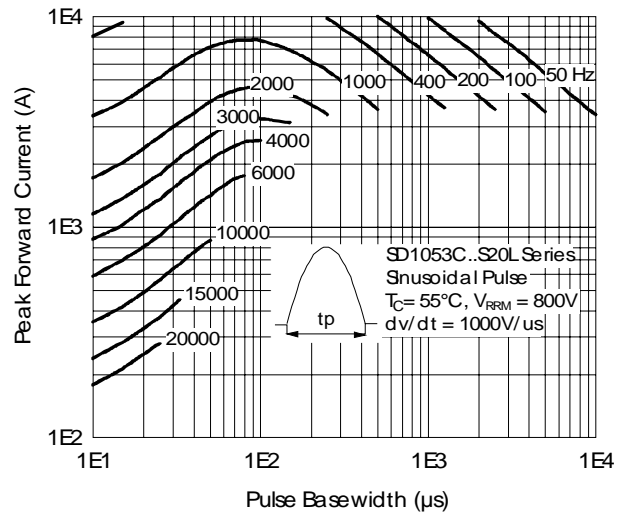


Fig. 29 - Frequency Characteristics

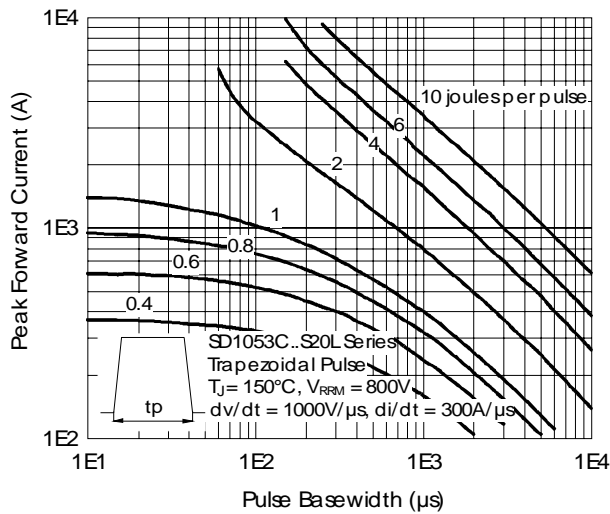


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

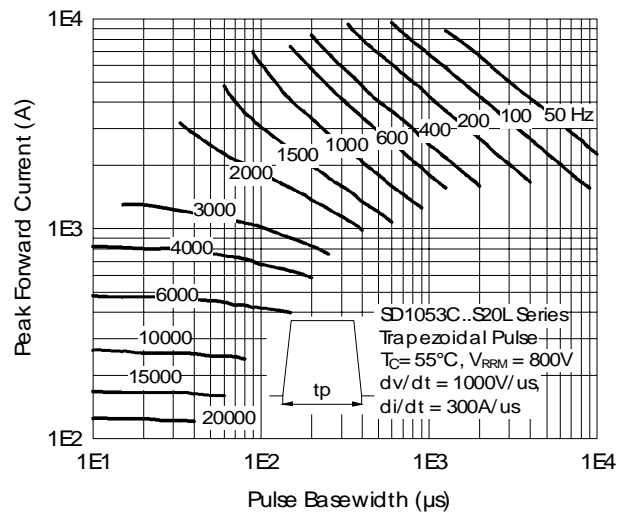


Fig. 31 - Frequency Characteristics

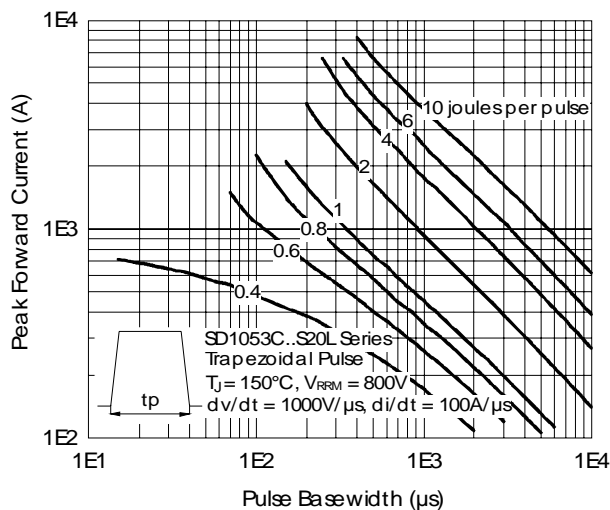


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

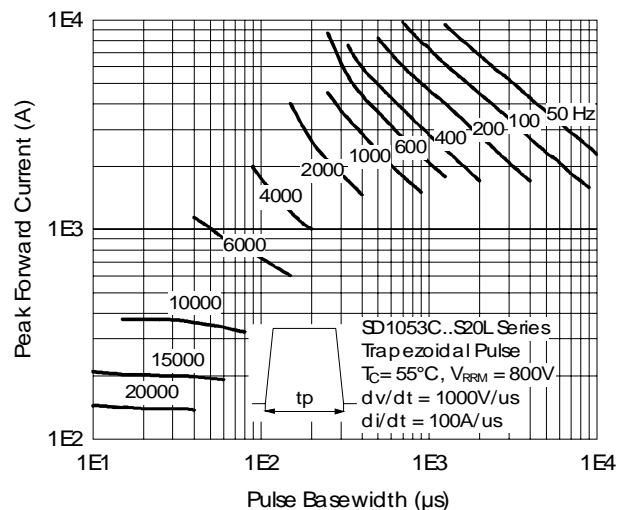


Fig. 33 - Frequency Characteristics

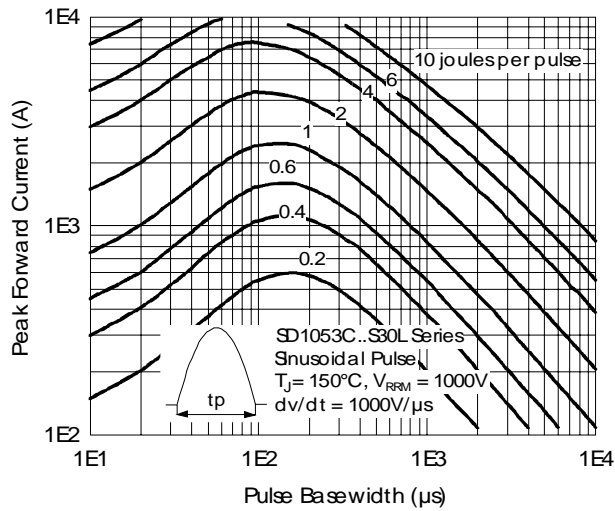


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

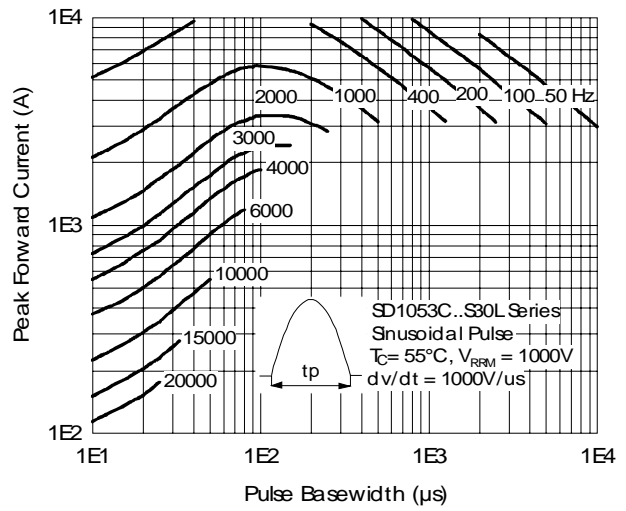


Fig. 35 - Frequency Characteristics

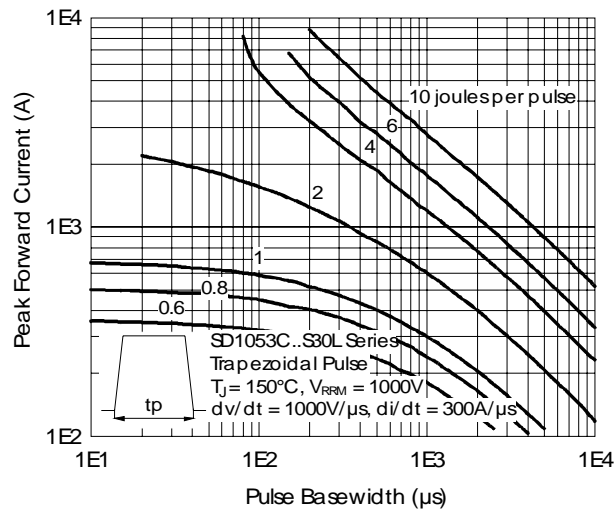


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

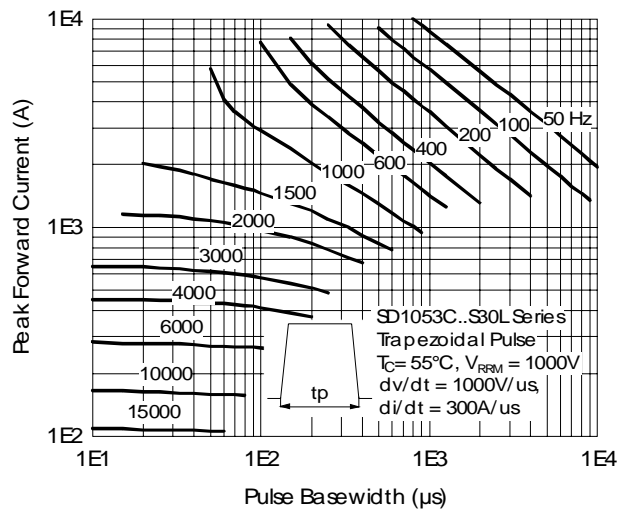


Fig. 37 - Frequency Characteristics

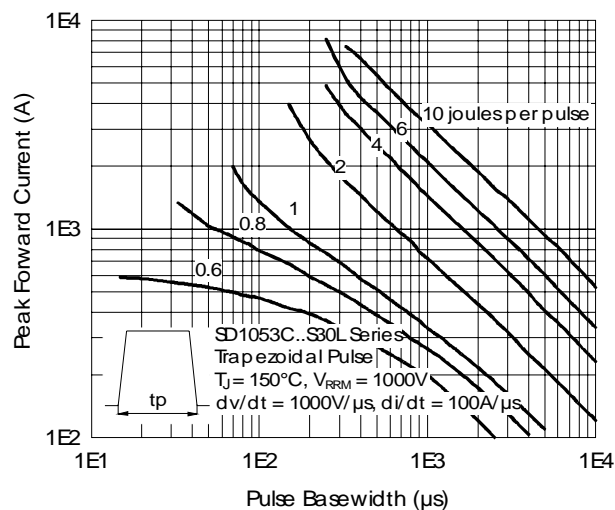


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

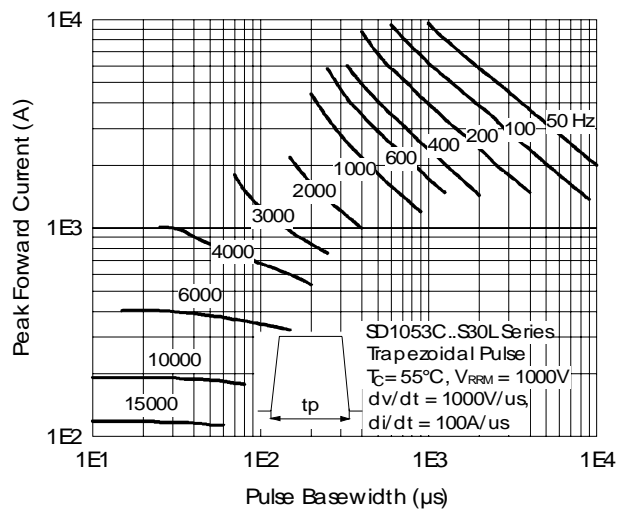


Fig. 39 - Frequency Characteristics

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

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10/06



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