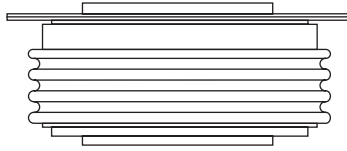


## Fast Recovery Diodes (Hockey PUK Version), 990 A



DO-200AC (K-PUK)

**FEATURES**

- High power FAST recovery diode series
- 5.0  $\mu$ s recovery time
- High voltage ratings up to 4500 V
- 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-200AC (K-PUK)
- Maximum junction temperature 125 °C
- Lead (Pb)-free
- Designed and qualified for industrial level


**RoHS**  
COMPLIANT

**PRODUCT SUMMARY**

$I_{F(AV)}$	990 A
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**TYPICAL APPLICATIONS**

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

**MAJOR RATINGS AND CHARACTERISTICS**

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{F(AV)}$		990	A
	$T_{hs}$	55	°C
$I_{F(RMS)}$		1800	A
	$T_{hs}$	25	°C
$I_{FSM}$	50 Hz	19 000	A
	60 Hz	19 900	
$I^2t$	50 Hz	1810	kA <sup>2</sup> s
	60 Hz	1652	
$V_{RRM}$	Range	3000 to 4500	V
$t_{rr}$		5.0	$\mu$ s
	$T_J$	25	°C
$T_J$		- 40 to 125	

# SD853C..S50K Series



Vishay High Power Products Fast Recovery Diodes  
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## ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	V <sub>RRM</sub> , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V <sub>RSM</sub> , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I <sub>RRM</sub> MAXIMUM AT T <sub>J</sub> = 125 °C mA
SD853C..S50K	30	3000	3100	100
	36	3600	3700	
	40	4000	4100	
	45	4500	4600	

FORWARD CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current at heatsink temperature	I <sub>F(AV)</sub>	180° conduction, half sine wave Double side (single side) cooled		990 (420)	A
				55 (85)	°C
Maximum RMS forward current	I <sub>F(RMS)</sub>	25 °C heatsink temperature double side cooled		1800	
Maximum peak, one-cycle forward, non-repetitive surge current	I <sub>FSM</sub>	t = 10 ms	No voltage reappplied	19 000	A
		t = 8.3 ms		19 900	
		t = 10 ms	50 % V <sub>RRM</sub> reappplied	16 000	
		t = 8.3 ms		16 750	
Maximum I <sup>2</sup> t for fusing	I <sup>2</sup> t	t = 10 ms	No voltage reappplied	1805	kA <sup>2</sup> s
		t = 8.3 ms		1645	
		t = 10 ms	50 % V <sub>RRM</sub> reappplied	1280	
		t = 8.3 ms		1165	
Maximum I <sup>2</sup> √t for fusing	I <sup>2</sup> √t	t = 0.1 to 10 ms, no voltage reappplied		18 050	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		1.50	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		1.67	
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		0.70	mΩ
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		0.65	
Maximum forward voltage drop	V <sub>FM</sub>	I <sub>pk</sub> = 2000 A, T <sub>J</sub> = 125 °C; t <sub>p</sub> = 10 ms sinusoidal wave		2.90	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)	
S50	5.0	1000	100	- 50	6.5	1000	270	



THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	$T_J$		- 40 to 125	°C
Maximum storage temperature range	$T_{Stg}$		- 40 to 150	
Maximum thermal resistance, junction to heatsink	$R_{thJ-hs}$	DC operation single side cooled	0.04	K/W
		DC operation double side cooled	0.02	
Mounting force, $\pm 10\%$			22 250 (2250)	N (kg)
Approximate weight			425	g
Case style		See dimensions - link at the end of datasheet	DO-200AC (K-PUK)	

$\Delta R_{thJ-hs}$ CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.0017	0.0019	0.0012	0.0012	$T_J = T_J$ maximum	K/W
120°	0.0021	0.0021	0.0021	0.0021		
90°	0.0026	0.0027	0.0029	0.0029		
60°	0.039	0.0039	0.0041	0.0041		
30°	0.0067	0.0067	0.0068	0.0068		

**Note**

- The table above shows the increment of thermal resistance  $R_{thJ-hs}$  when devices operate at different conduction angles than DC

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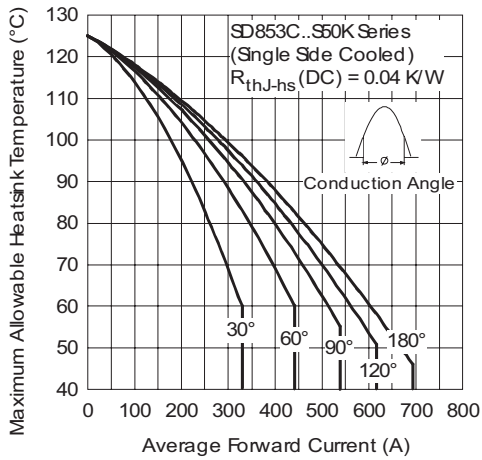


Fig. 1 - Current Ratings Characteristics

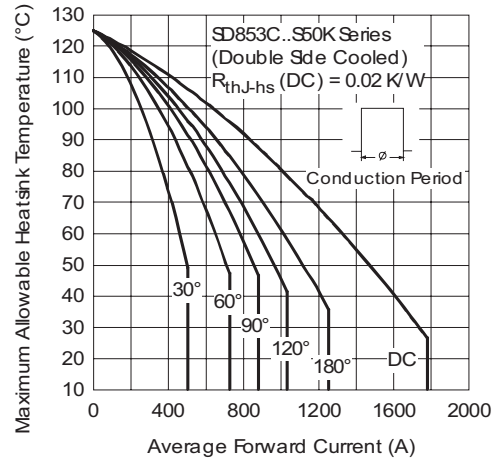


Fig. 4 - Current Ratings Characteristics

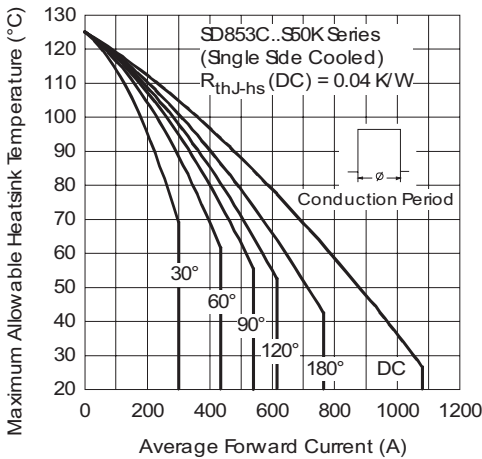


Fig. 2 - Current Ratings Characteristics

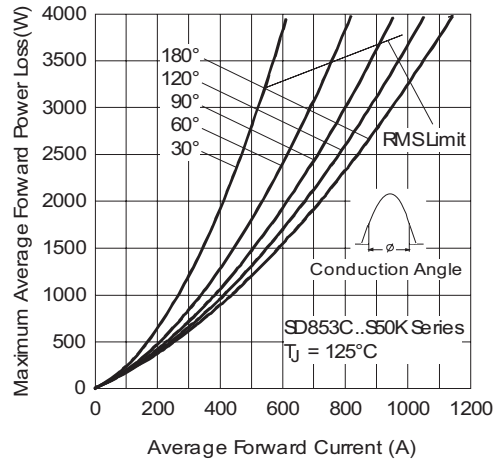


Fig. 5 - Forward Power Loss Characteristics

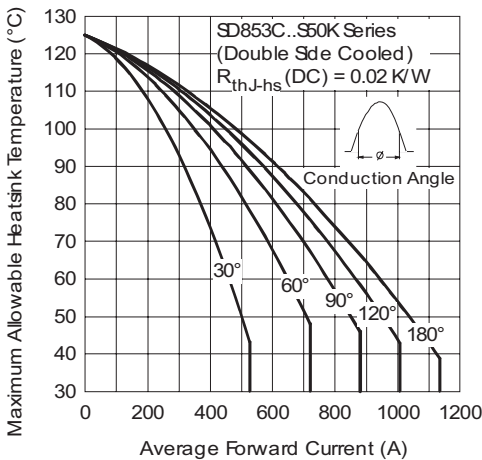


Fig. 3 - Current Ratings Characteristics

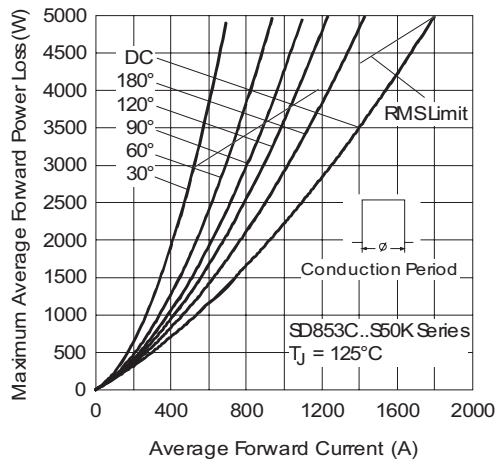


Fig. 6 - Forward Power Loss Characteristics

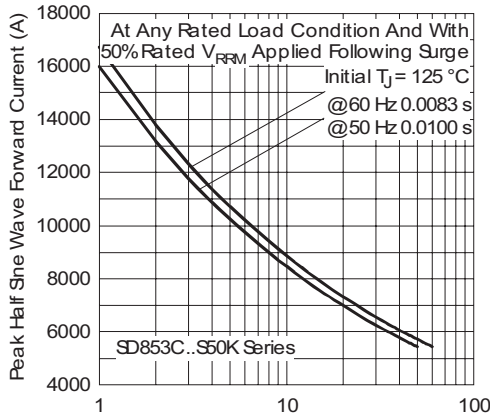


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

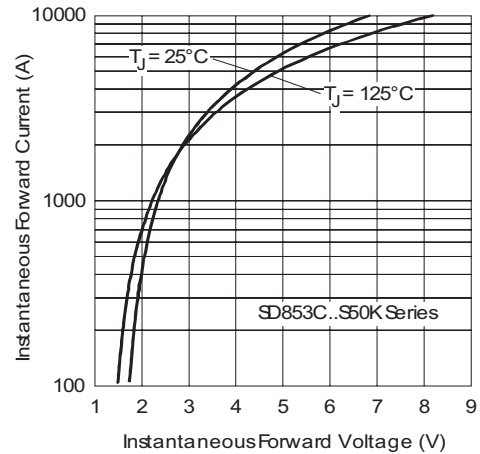


Fig. 9 - Forward Voltage Drop Characteristics

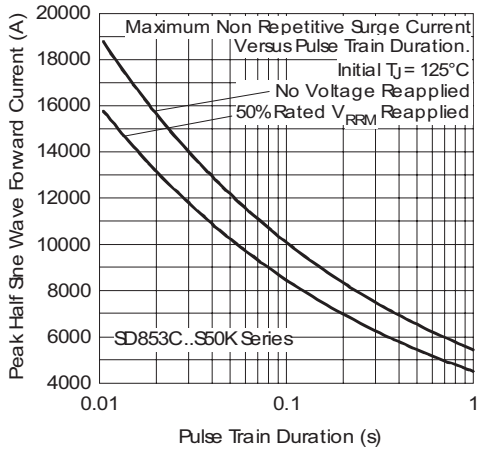


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

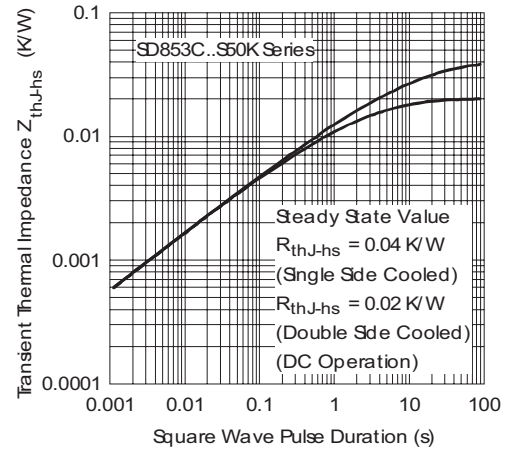


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics

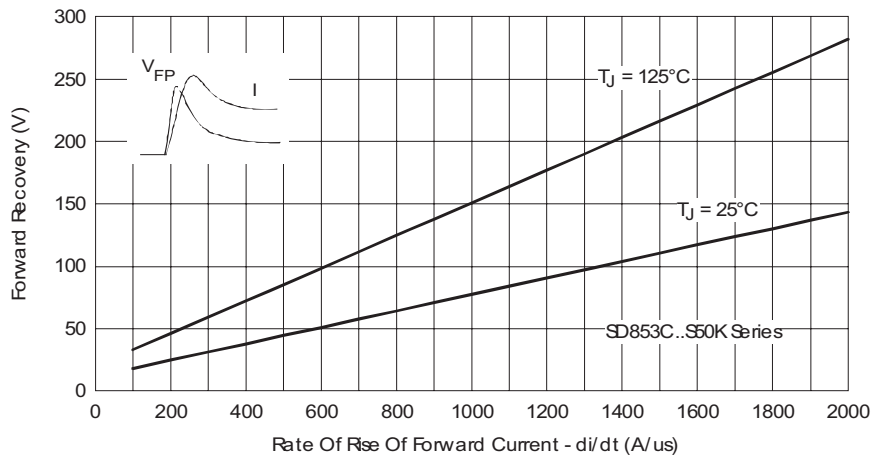
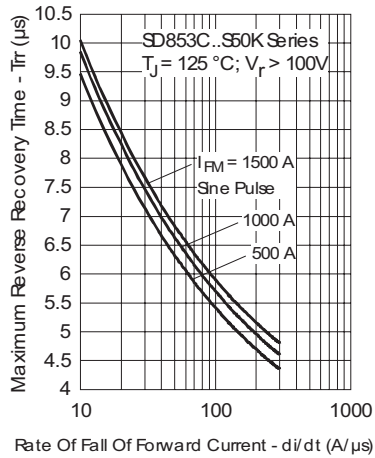


Fig. 11 - Typical Forward Recovery Characteristics

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Rate Of Fall Of Forward Current -  $di/dt$  (A/ $\mu$ s)  
Fig. 12 - Recovery Time Characteristics

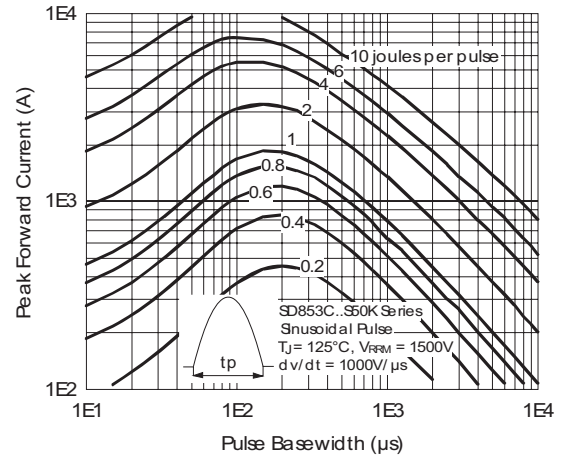
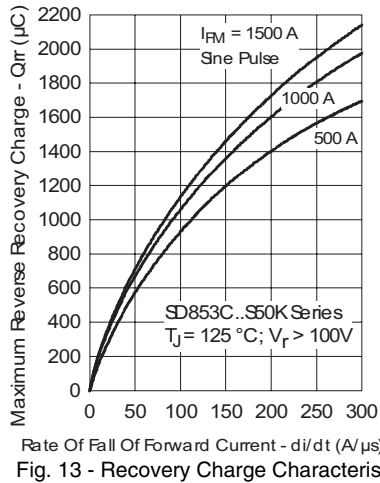


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics



Rate Of Fall Of Forward Current -  $di/dt$  (A/ $\mu$ s)  
Fig. 13 - Recovery Charge Characteristics

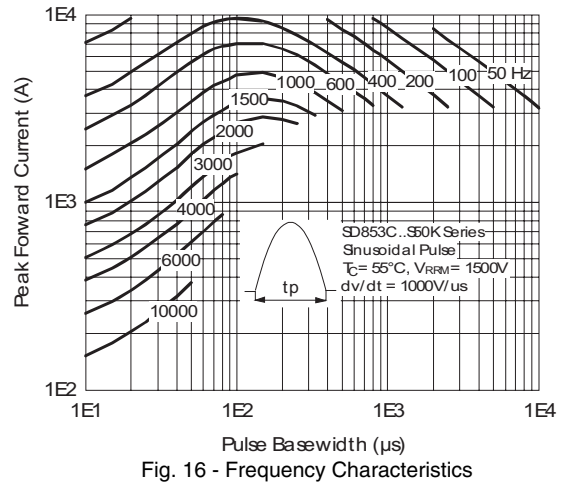
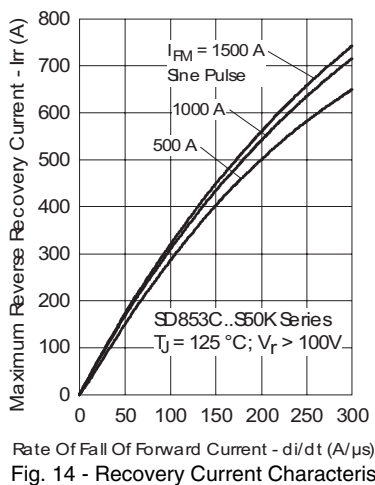


Fig. 16 - Frequency Characteristics



Rate Of Fall Of Forward Current -  $di/dt$  (A/ $\mu$ s)  
Fig. 14 - Recovery Current Characteristics

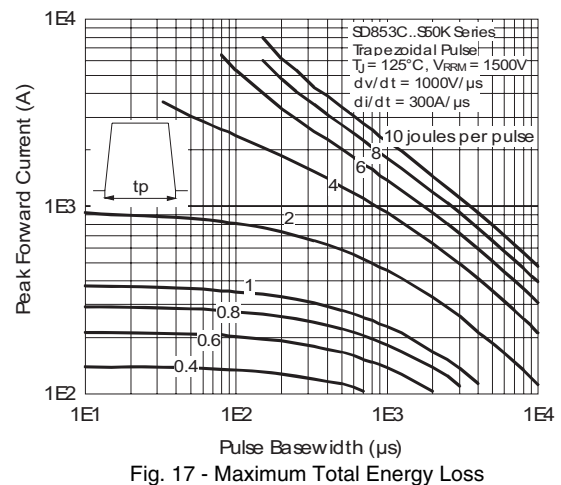


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics



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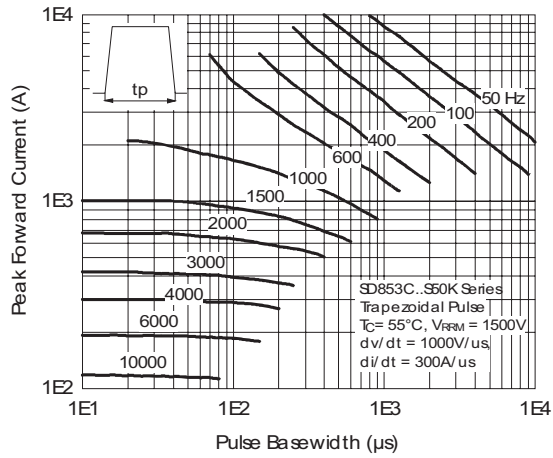


Fig. 18 - Frequency Characteristics

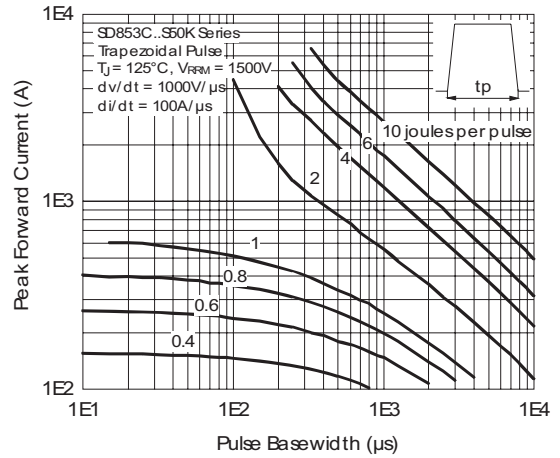


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

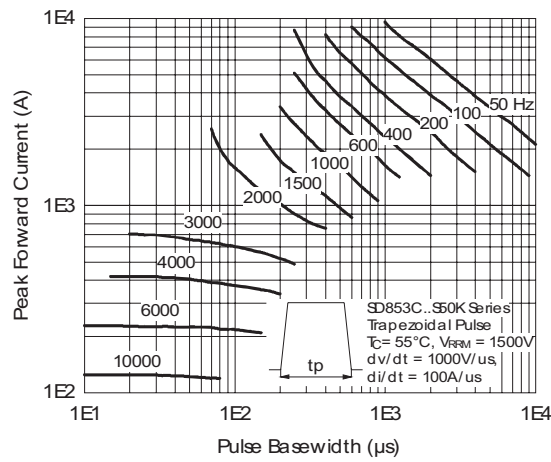


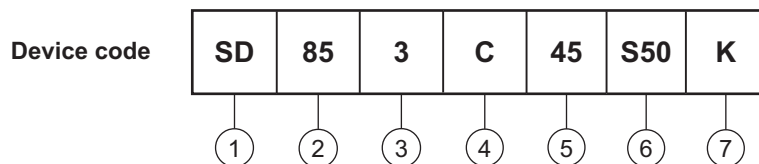
Fig. 20 - Frequency Characteristics

# SD853C..S50K Series



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## ORDERING INFORMATION TABLE



- 1** - Diode
- 2** - Essential part number
- 3** - 3 = Fast recovery
- 4** - C = Ceramic PUK
- 5** - Voltage code x 100 =  $V_{RRM}$  (see Voltage Ratings table)
- 6** -  $t_{rr}$  code
- 7** - K = PUK case DO-200AC (K-PUK)

### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95247">http://www.vishay.com/doc?95247</a>
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