

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


**K-PUK (DO-200AC)**

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	990 A
Package	K-PUK (DO-200AC)
Circuit configuration	Single

**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® K-PUK (DO-200AC)
- Maximum junction temperature 125 °C
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**
**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	

**ELECTRICAL SPECIFICATIONS**

VOLTAGE RATINGS				
TYPE NUMBER	VOLTAGE CODE	$V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ MAXIMUM AT $T_J = 125$ °C mA
VS-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	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled		990 (420)	A
				55 (85)	°C
Maximum RMS forward current	$I_{F(RMS)}$	25 °C heatsink temperature double side cooled		1800	
Maximum peak, one-cycle forward, non-repetitive surge current	$I_{FSM}$	t = 10 ms t = 8.3 ms	No voltage reappplied	19 000	A
			50 % $V_{RRM}$ reappplied	19 900	
		Sinusoidal half wave, initial $T_J = T_J$ maximum		t = 10 ms t = 8.3 ms	
			16 750		
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms t = 8.3 ms	No voltage reappplied	1805	kA <sup>2</sup> s
			50 % $V_{RRM}$ reappplied	1645	
		Sinusoidal half wave, initial $T_J = T_J$ maximum		t = 10 ms t = 8.3 ms	
			1165		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reappplied		18 050	kA <sup>2</sup> √s
Low level value of threshold voltage	$V_{F(TO)1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		1.50	V
High level value of threshold voltage	$V_{F(TO)2}$	(I $> \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		1.67	
Low level value of forward slope resistance	$r_{f1}$	(16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		0.70	mW
High level value of forward slope resistance	$r_{f2}$	(I $> \pi \times I_{F(AV)}$ , $T_J = T_J$ maximum)		0.65	
Maximum forward voltage drop	$V_{FM}$	$I_{pk} = 2000$ A, $T_J = 125$ °C; $t_p = 10$ ms sinusoidal wave		2.90	V

RECOVERY CHARACTERISTICS								
CODE	MAXIMUM VALUE AT $T_J = 25$ °C	TEST CONDITIONS			TYPICAL VALUES AT $T_J = 125$ °C			
	$t_{rr}$ at 25 % $I_{RRM}$ (μs)	$I_{pk}$ SQUARE PULSE (A)	di/dt (A/μs)	$V_r$ (V)	$t_{rr}$ at 25 % $I_{RRM}$ (μs)	$Q_{rr}$ (μC)	$I_{rr}$ (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, ± 10 %			22 250 (2250)	N (kg)
Approximate weight			425	g
Case style		See dimensions - link at the end of datasheet	K-PUK (DO-200AC)	

$\Delta R_{thJ-hs}$ 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

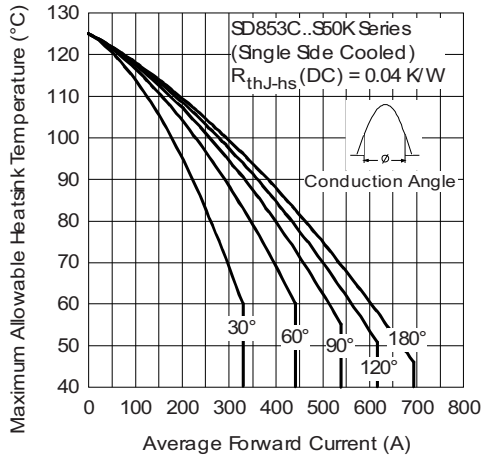


Fig. 1 - Current Ratings Characteristics

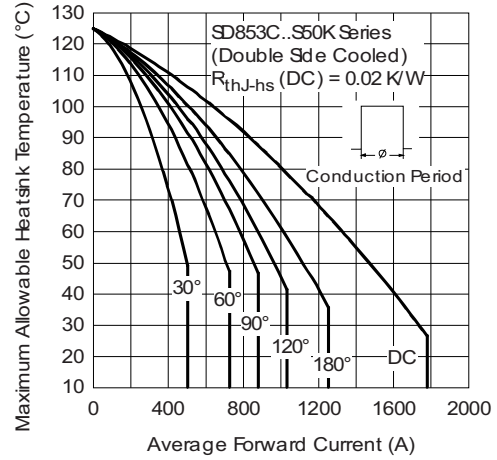


Fig. 4 - Current Ratings Characteristics

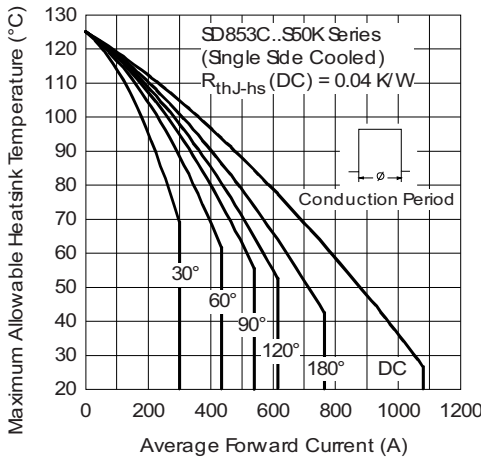


Fig. 2 - Current Ratings Characteristics

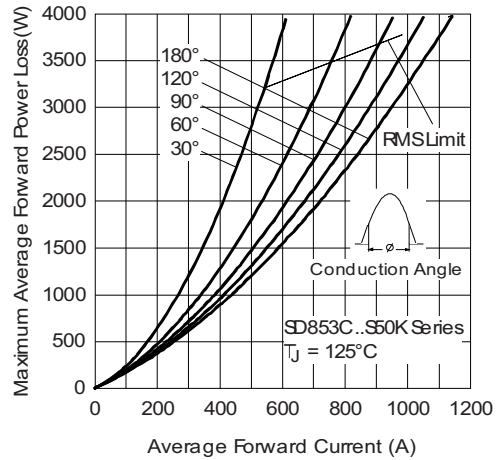


Fig. 5 - Forward Power Loss Characteristics

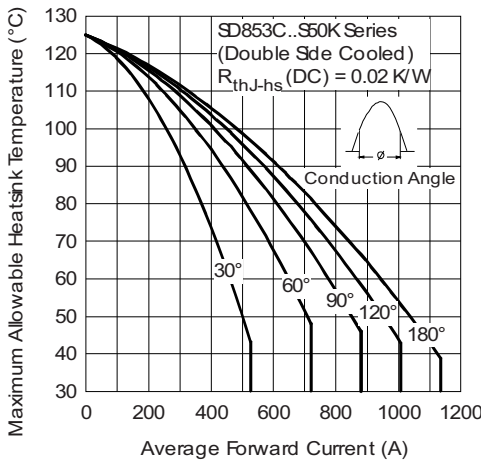


Fig. 3 - Current Ratings Characteristics

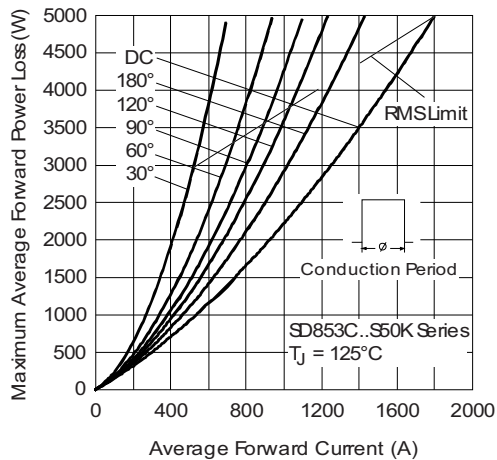


Fig. 6 - Forward Power Loss Characteristics

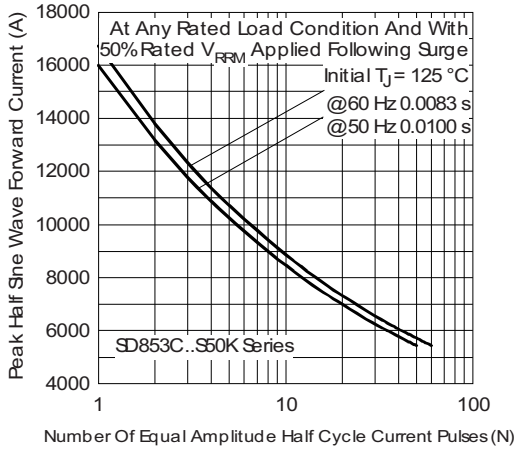


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

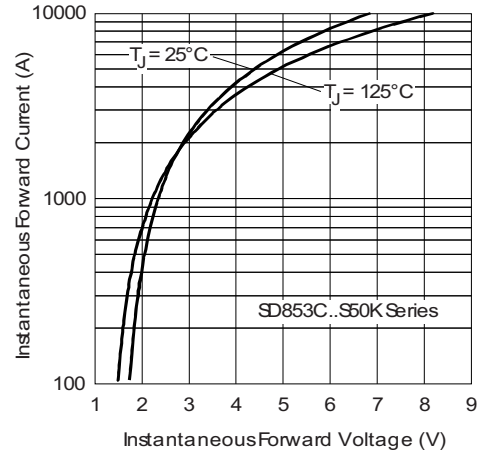


Fig. 9 - Forward Voltage Drop Characteristics

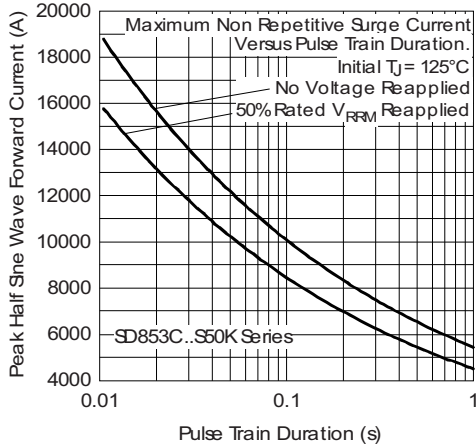


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

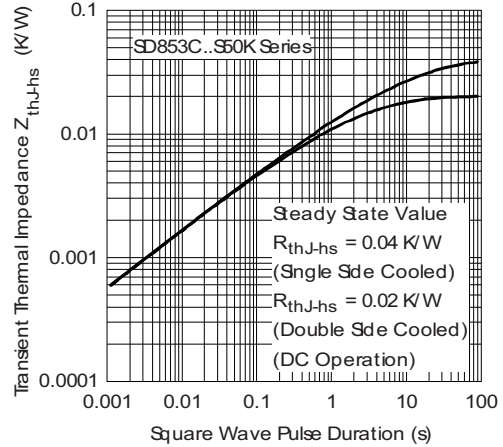


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics

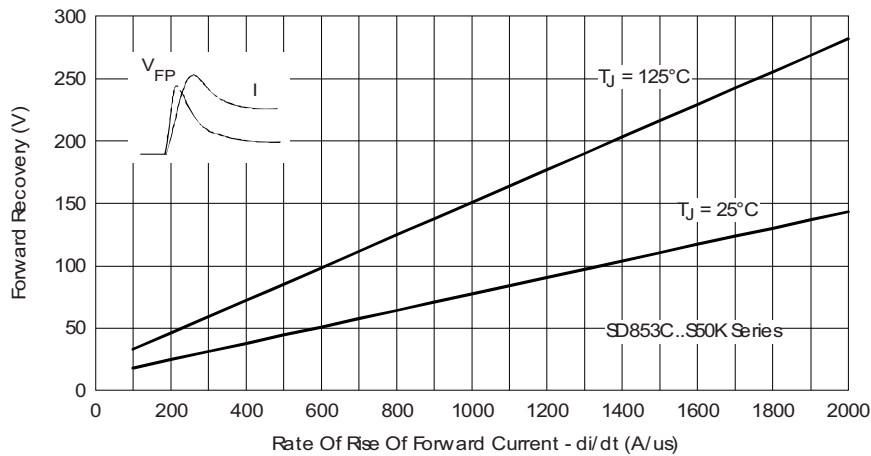


Fig. 11 - Typical Forward Recovery Characteristics

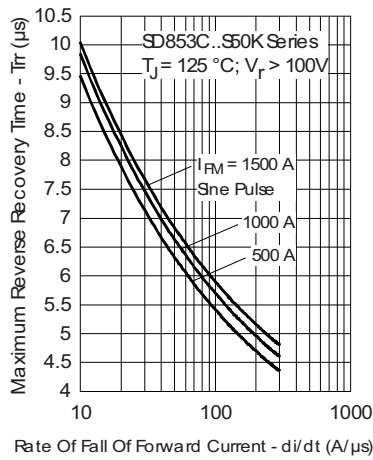


Fig. 12 - Recovery Time Characteristics

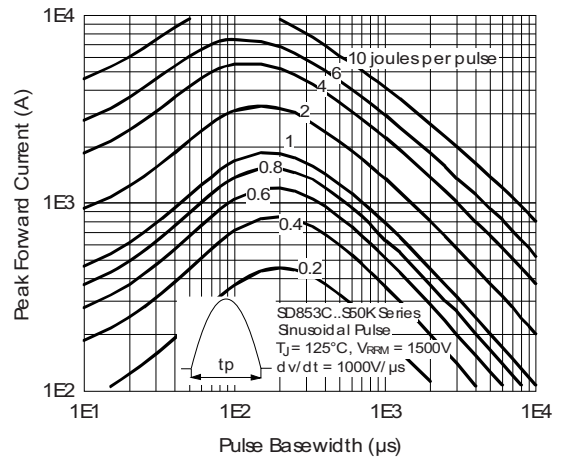


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

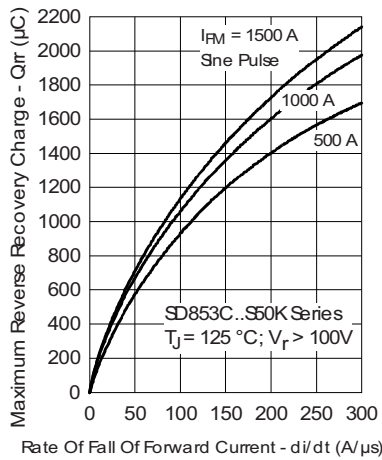


Fig. 13 - Recovery Charge Characteristics

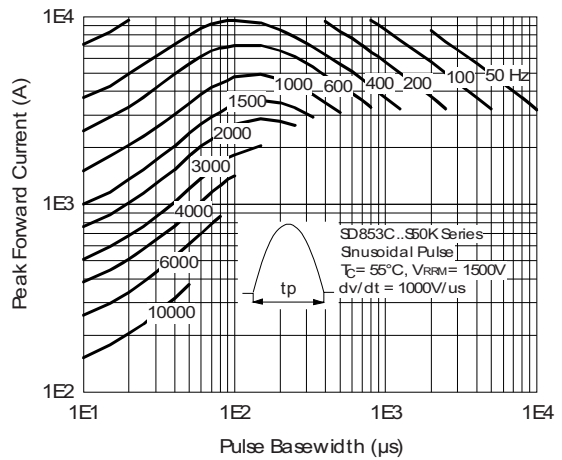


Fig. 16 - Frequency Characteristics

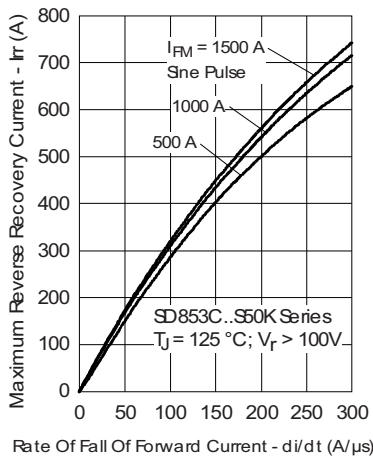


Fig. 14 - Recovery Current Characteristics

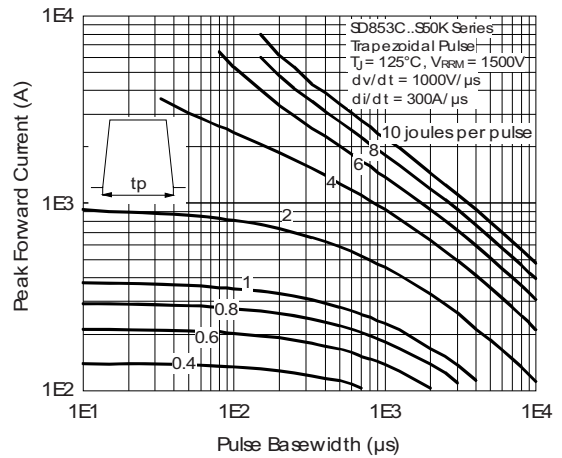


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

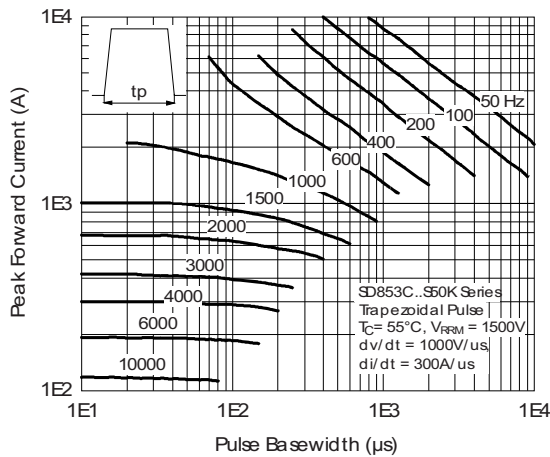


Fig. 18 - Frequency Characteristics

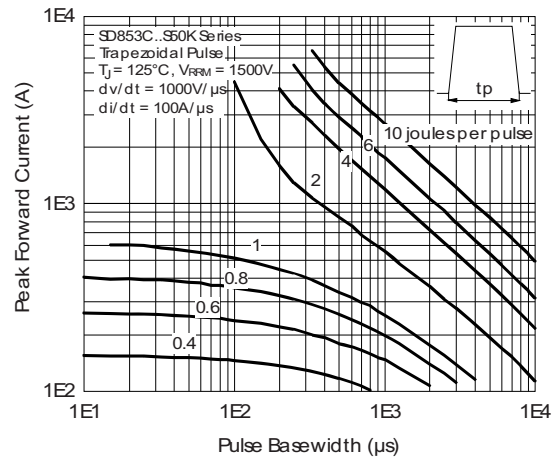


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

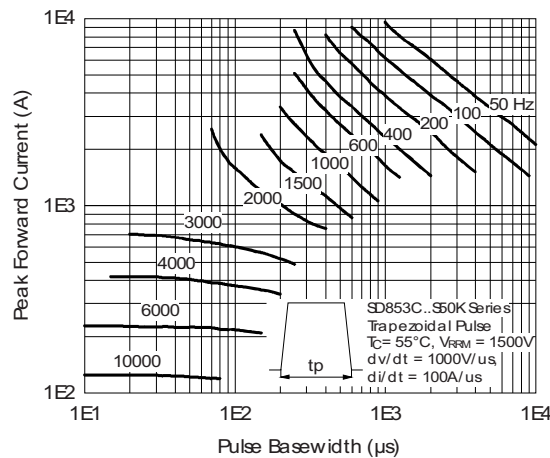


Fig. 20 - Frequency Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>SD</b>	<b>85</b>	<b>3</b>	<b>C</b>	<b>45</b>	<b>S50</b>	<b>K</b>
	①	②	③	④	⑤	⑥	⑦	⑧
	<b>1</b>	-	Vishay Semiconductors product	<b>2</b>	-	Diode	<b>3</b>	-
	<b>3</b>	-	Essential part number	<b>4</b>	-	3 = fast recovery	<b>5</b>	-
	<b>5</b>	-	C = ceramic PUK	<b>6</b>	-	Voltage code x 100 = V <sub>RRM</sub> (see Voltage Ratings table)	<b>7</b>	-
	<b>7</b>	-	t <sub>r</sub> code	<b>8</b>	-	K = PUK case K-PUK (DO-200AC)		

**LINKS TO RELATED DOCUMENTS**

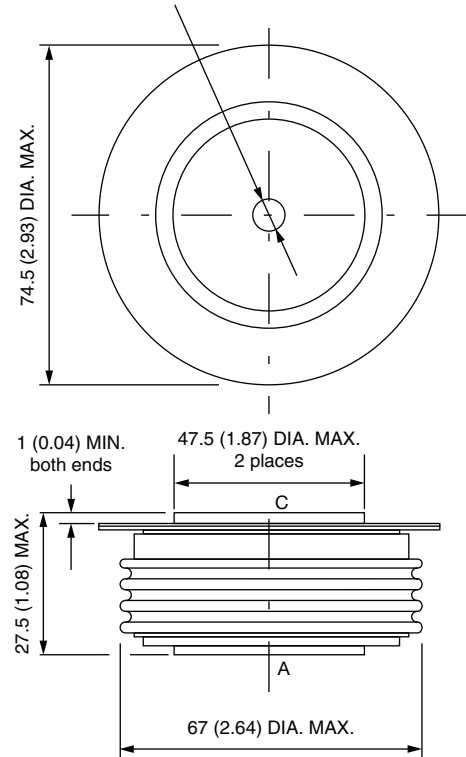
Dimensions	<a href="http://www.vishay.com/doc?95247">www.vishay.com/doc?95247</a>
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## K-PUK (DO-200AC)

**DIMENSIONS** in millimeters (inches)

3.5 (0.14) DIA. NOM. x  
1.8 (0.07) deep MIN. both ends



**Note:**  
A = Anode  
C = Cathode

Quote between upper and lower pole pieces has to be considered after application of mounting force (see Thermal and Mechanical Specifications)



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