

Fast Recovery Diodes (Hockey PUK Version), 990 A


K-PUK (DO-200AC)

**RoHS
COMPLIANT**
FEATURES

- High power fast recovery diode series
- 5.0 μ 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

TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS

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

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 ² s
	60 Hz	1652	
V_{RRM}	Range	3000 to 4500	V
t_{rr}		5.0	μ 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
				t = 10 ms t = 8.3 ms	
		t = 10 ms t = 8.3 ms	50 % V_{RRM} reappplied		
				t = 10 ms t = 8.3 ms	
Maximum I^2t for fusing	I^2t	t = 10 ms t = 8.3 ms	No voltage reappplied		1805
				t = 10 ms t = 8.3 ms	50 % V_{RRM} reappplied
		t = 10 ms t = 8.3 ms	50 % V_{RRM} reappplied		
				t = 10 ms t = 8.3 ms	50 % V_{RRM} reappplied
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reappplied			
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)	

ΔR_{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

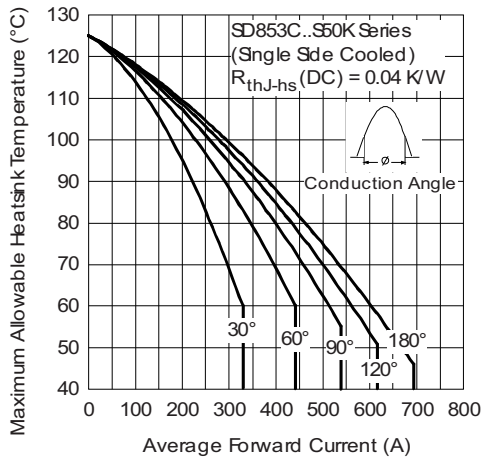


Fig. 1 - Current Ratings Characteristics

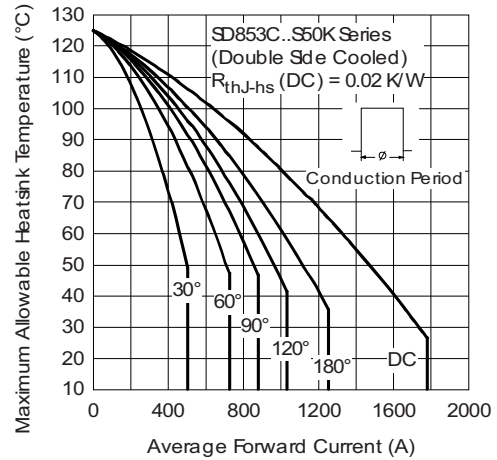


Fig. 4 - Current Ratings Characteristics

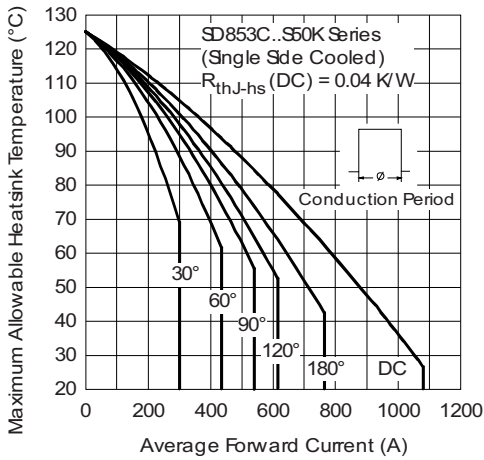


Fig. 2 - Current Ratings Characteristics

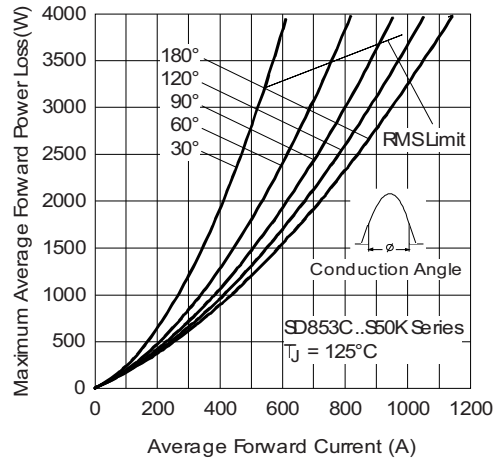


Fig. 5 - Forward Power Loss Characteristics

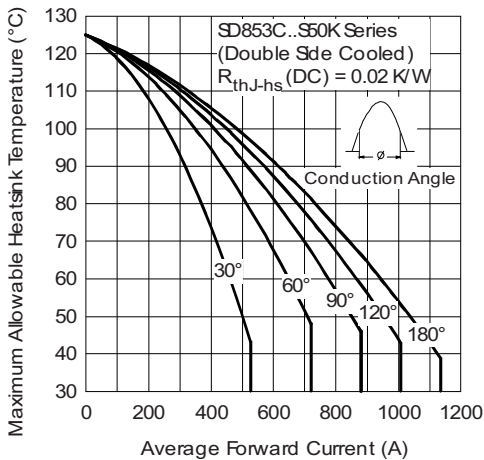


Fig. 3 - Current Ratings Characteristics

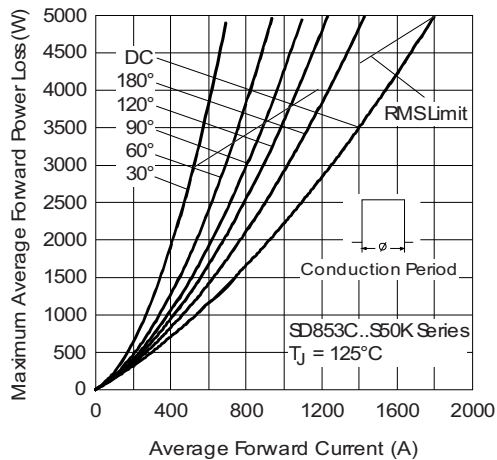


Fig. 6 - Forward Power Loss Characteristics

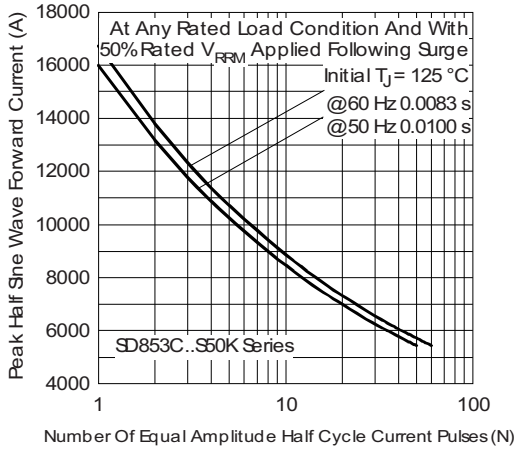


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

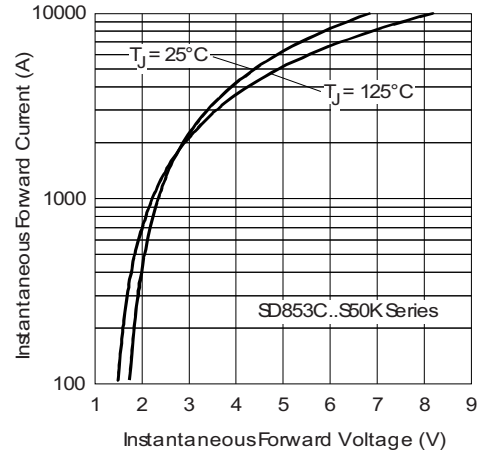


Fig. 9 - Forward Voltage Drop Characteristics

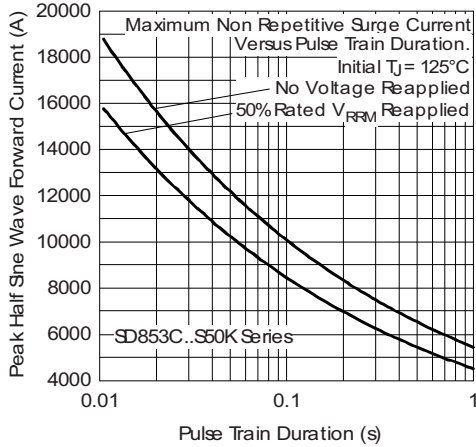


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

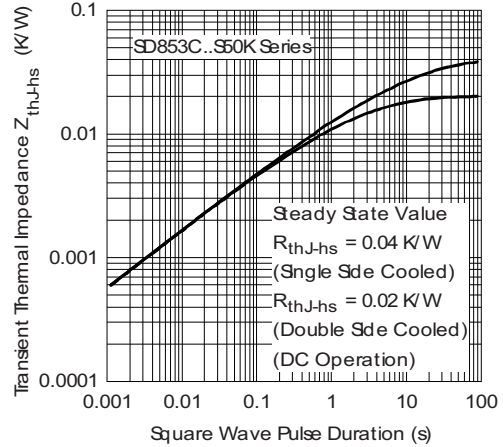


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

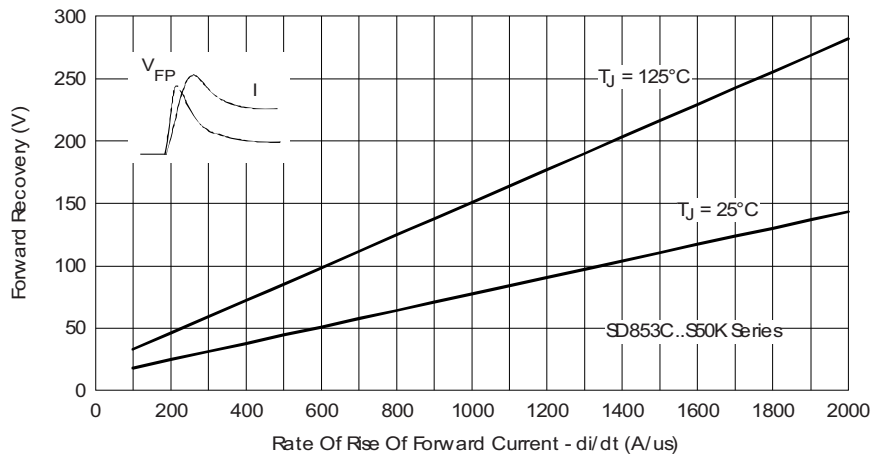


Fig. 11 - Typical Forward Recovery Characteristics

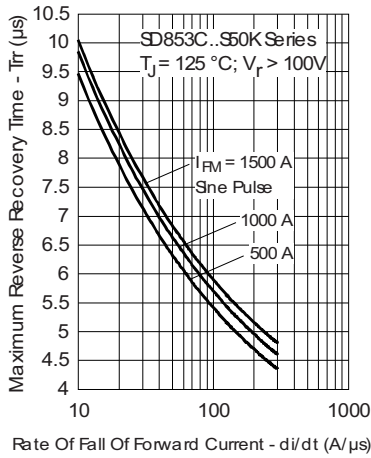


Fig. 12 - Recovery Time Characteristics

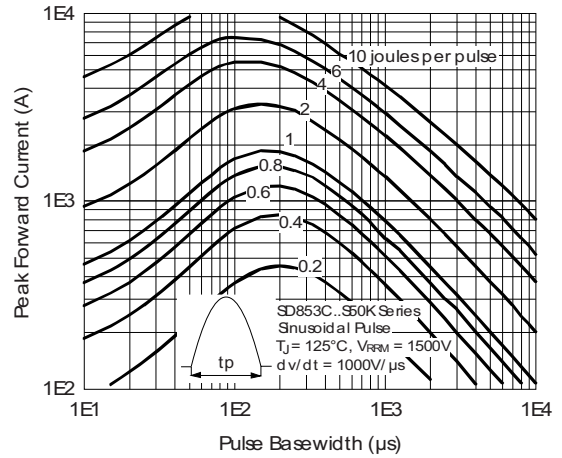


Fig. 15 - Maximum Total Energy Loss Per Pulse Characteristics

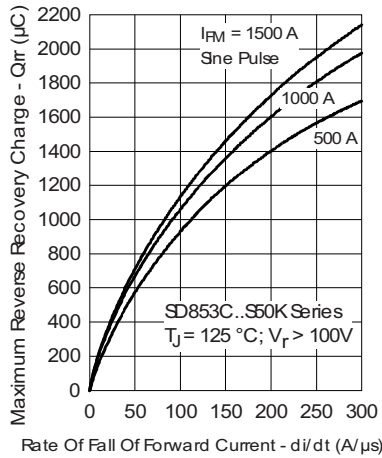


Fig. 13 - Recovery Charge Characteristics

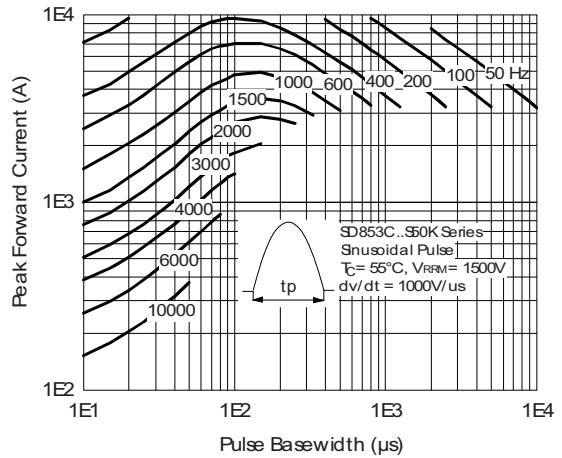


Fig. 16 - Frequency Characteristics

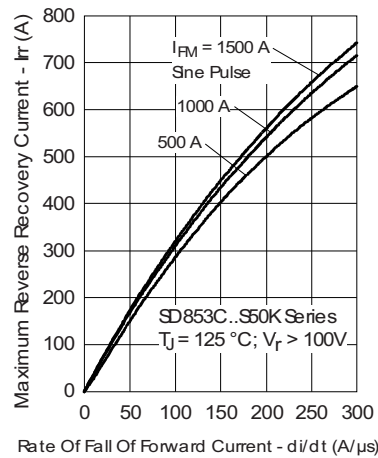


Fig. 14 - Recovery Current Characteristics

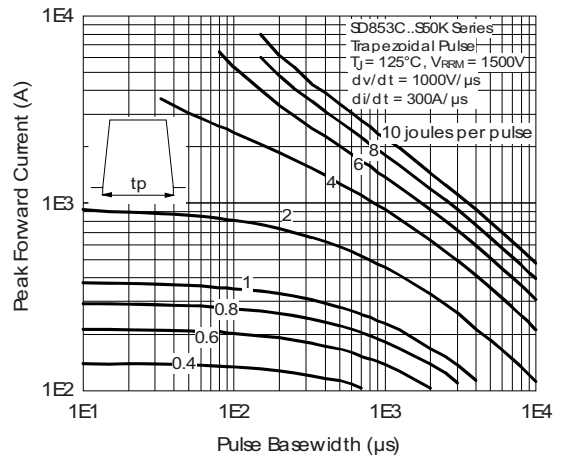


Fig. 17 - Maximum Total Energy Loss Per Pulse Characteristics

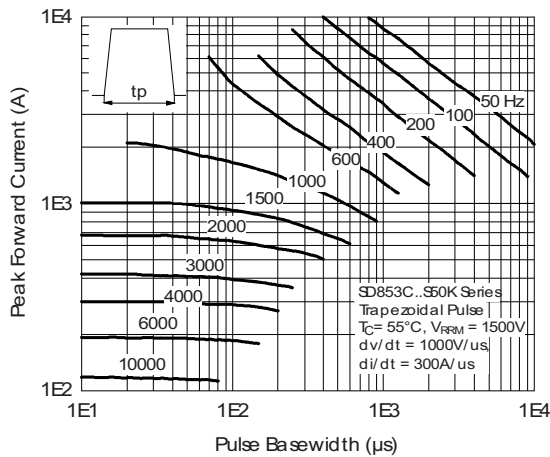


Fig. 18 - Frequency Characteristics

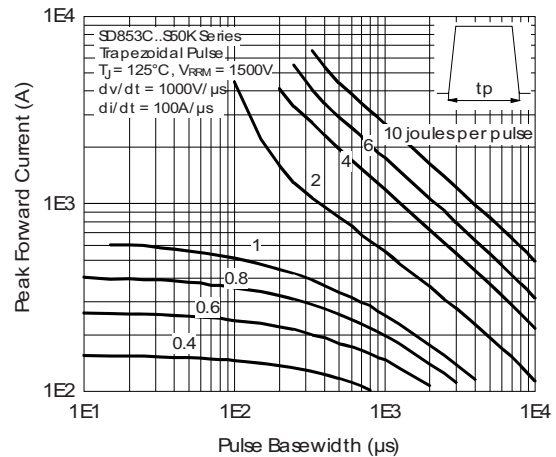


Fig. 19 - Maximum Total Energy Loss Per Pulse Characteristics

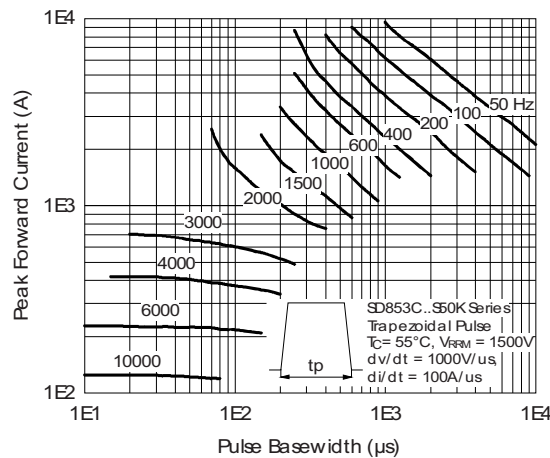


Fig. 20 - Frequency Characteristics

ORDERING INFORMATION TABLE

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

LINKS TO RELATED DOCUMENTS

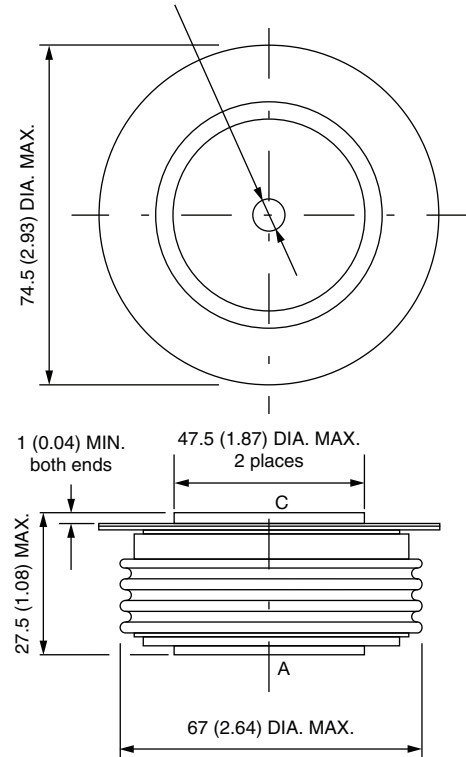
Dimensions	www.vishay.com/doc?95247
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K-PUK (DO-200AC)

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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