

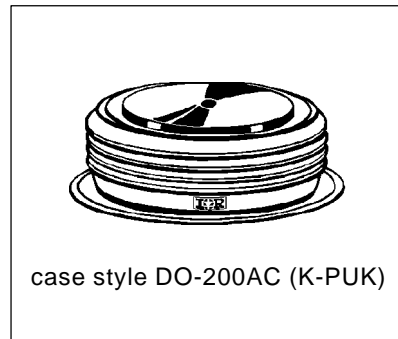


DISCRETE POWER DIODES and THYRISTORS
DATA BOOK

FAST RECOVERY DIODES
Hockey Puk Version
Features

- High power FAST recovery diode series
- 2.0 to 3.0 μ 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-200AC (K-PUK)
- Maximum junction temperature 150°C

1825A
1650A


Typical Applications

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

Major Ratings and Characteristics

Parameters	SD1553C..K		Units
	S20	S30	
$I_{F(AV)}$	1825	1650	A
@ T_{hs}	55	55	°C
$I_{F(RMS)}$	3100	2800	A
I_{FSM} @ 50Hz	25000	22000	A
@ 60Hz	26180	23000	A
V_{RRM} range	1800 to 2500	1800 to 3000	V
t_{rr}	2.0	3.0	μ s
@ T_J	25	25	°C
T_J	- 40 to 150		°C

SD1553C..K Series

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
SD1553C..S20K	18	1800	1900	75
	22	2200	2300	
	25	2500	2600	
SD1553C..S30K	18	1800	1900	
	22	2200	2300	
	25	2500	2600	
	28	2800	2900	
	30	3000	3100	

Forward Conduction

Parameter	SD1553C..K		Units	Conditions		
	S20	S30				
$I_{F(AV)}$ Max. average forward current @ heatsink temperature	1825(865)	1650(790)	A	180° conduction, half sine wave		
	55 (85)	55 (85)	°C	Double side (single side) cooled		
$I_{F(RMS)}$ Max. RMS forward current	3100	2800	A	@ 25°C heatsink temperature double side cooled		
I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current	25000	22000	A	t = 10ms	No voltage	Sinusoidal half wave, Initial $T_J = T_J$ max.
	26180	23000		t = 8.3ms	reapplied	
	21030	18500		t = 10ms	100% V_{RRM}	
	22010	19370		t = 8.3ms	reapplied	
I^2t Maximum I^2t for fusing	3126	2421	KA ² s	t = 10ms	No voltage	
	2854	2210		t = 8.3ms	reapplied	
	2210	1712		t = 10ms	100% V_{RRM}	
	2018	1563		t = 8.3ms	reapplied	
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	31260	24210	KA ² \sqrt{s}	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$ Low level value of threshold voltage	1.15	1.31	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	1.29	1.45		$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
r_{f1} Low level value of forward slope resistance	0.27	0.32	m Ω	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
r_{f2} High level value of forward slope resistance	0.25	0.30		$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ max.		
V_{FM} Max. forward voltage drop	2.23	2.60	V	$I_{pk} = 4000A$, $T_J = T_J$ max, $t_p = 10ms$ sinusoidal wave		

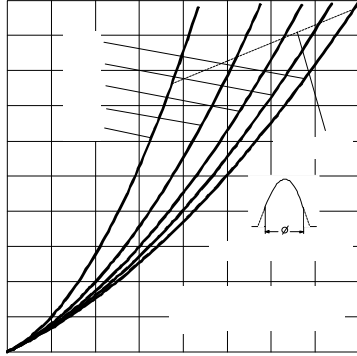


Fig. 9 - Forward Power Loss Characteristics

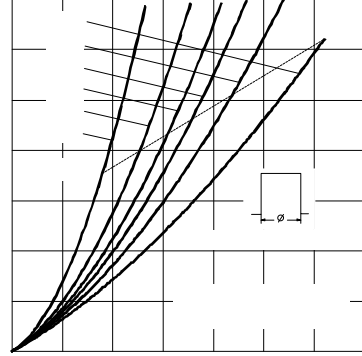


Fig. 10 - Forward Power Loss Characteristics

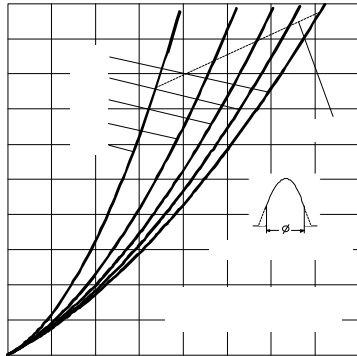


Fig. 11 - Forward Power Loss Characteristics

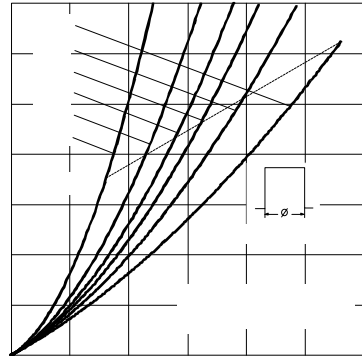


Fig. 12 - Forward Power Loss Characteristics

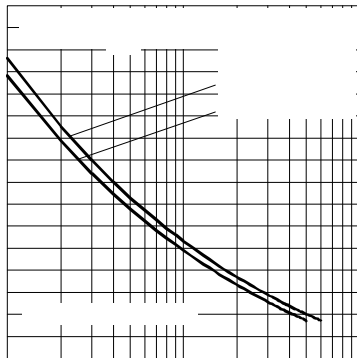


Fig. 13 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

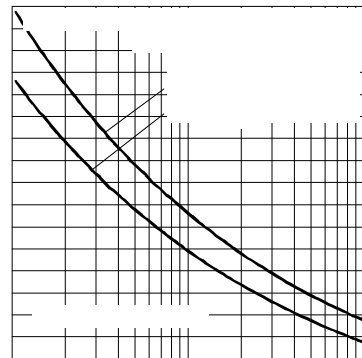


Fig. 14 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

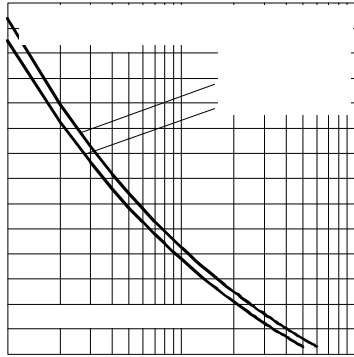


Fig. 15 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

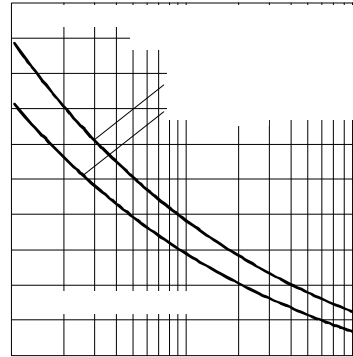


Fig. 16 - Maximum Non-repetitive Surge Current Single and Double Side Cooled

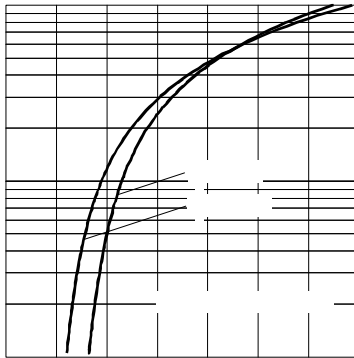


Fig. 17 - Forward Voltage Drop Characteristics

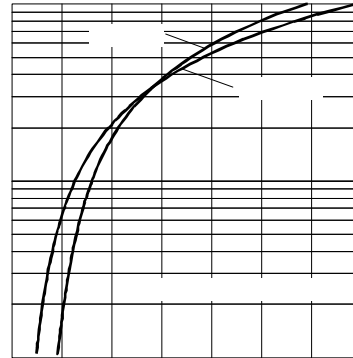


Fig. 18 - Forward Voltage Drop Characteristics

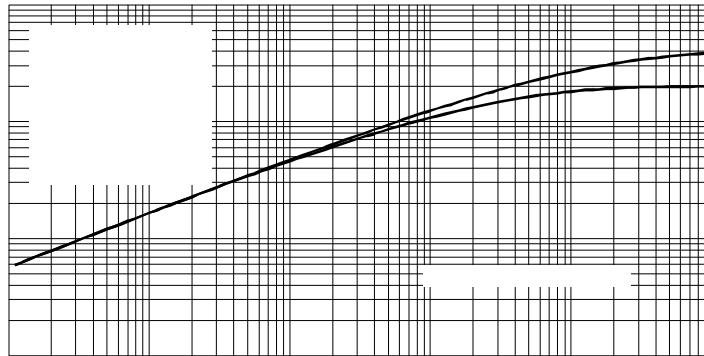


Fig. 19 - Thermal Impedance Z_{th-jhs} Characteristic

SD1553C..K Series

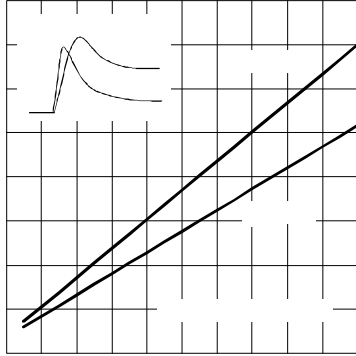


Fig. 20 - Typical Forward Recovery Characteristics

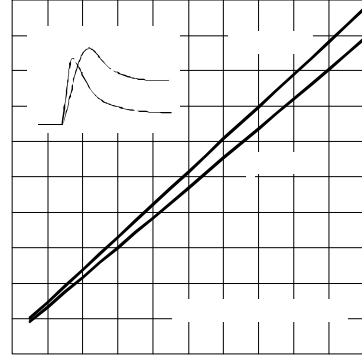


Fig. 21 - Typical Forward Recovery Characteristics

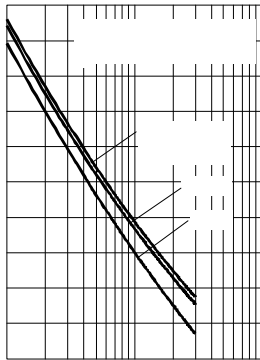


Fig. 22 - Recovery Time Characteristics

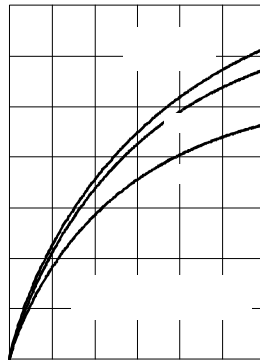


Fig. 23 - Recovery Charge Characteristics

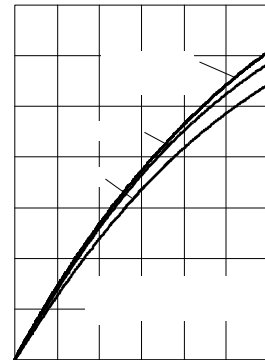


Fig. 24 - Recovery Current Characteristics

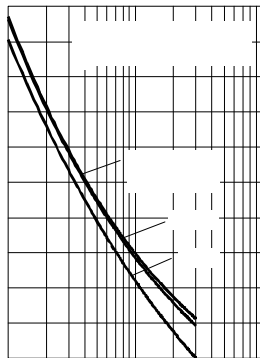


Fig. 25 - Recovery Time Characteristics

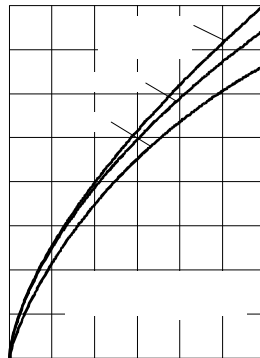


Fig. 26 - Recovery Charge Characteristics

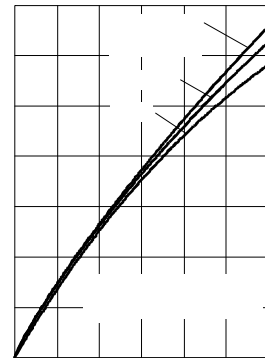


Fig. 27 - Recovery Current Characteristics

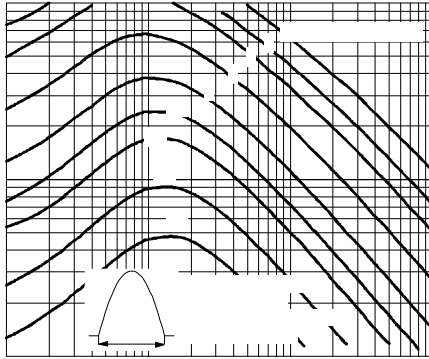


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

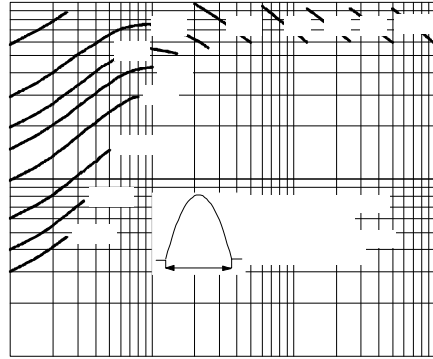


Fig. 29 - Frequency Characteristics

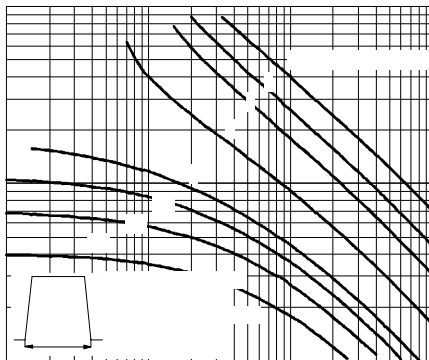


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

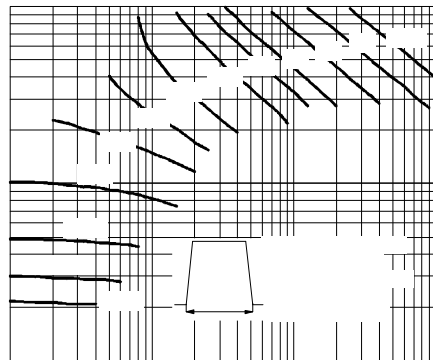


Fig. 31 - Frequency Characteristics

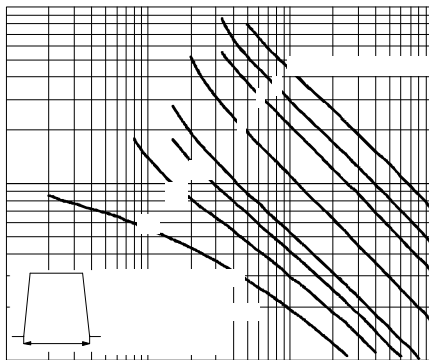


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

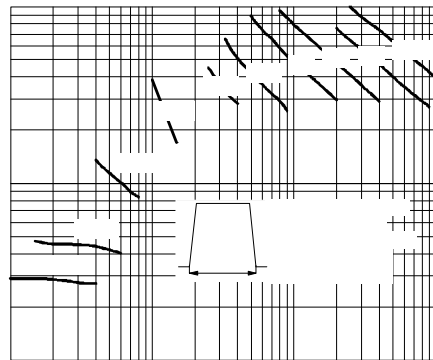


Fig. 33 - Frequency Characteristics

SD1553C..K Series

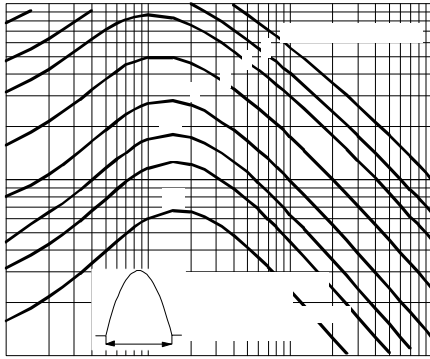


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

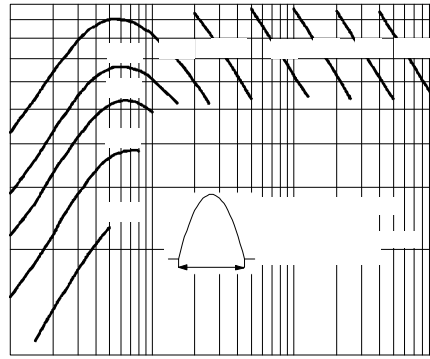


Fig. 35 - Frequency Characteristics

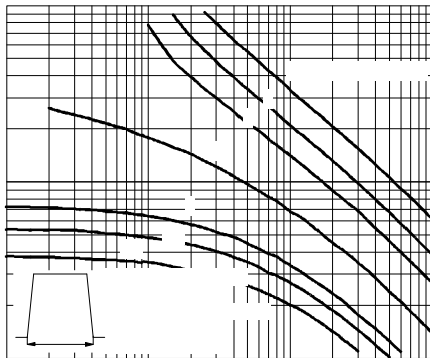


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

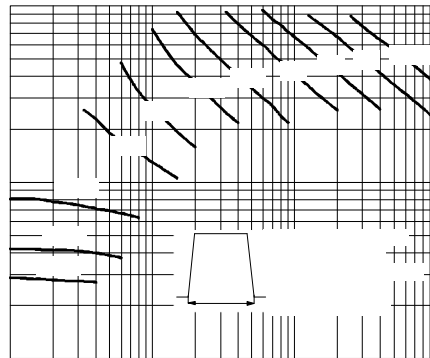


Fig. 37 - Frequency Characteristics

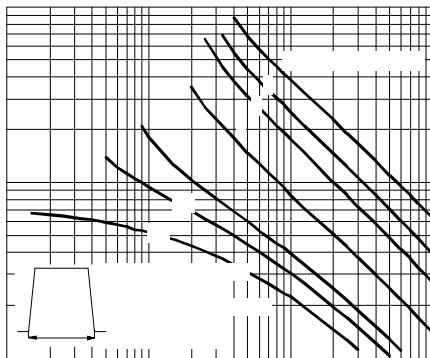


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

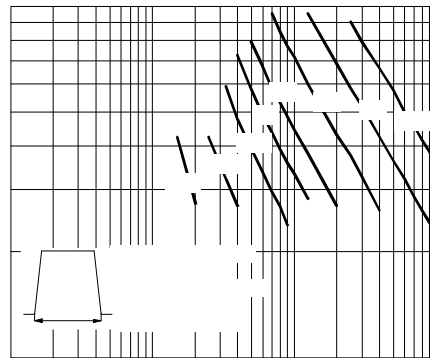


Fig. 39 - Frequency Characteristics

Recovery Characteristics

Code	$T_J = 25^\circ\text{C}$ typical t_{rr} @ 25% I_{RRM} (μs)	Test conditions			Max. values @ $T_J = 150^\circ\text{C}$			
		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	100	-50	4.5	650	240	
S30	3.0	1000	100	-50	5.0	780	260	

Thermal and Mechanical Specifications

Parameter	SD1553C..K		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	0.04 0.02		K/W	DC operation single side cooled DC operation double side cooled
F Mounting force, $\pm 10\%$	22250 (2250)		N (Kg)	
wt Approximate weight	425		g	
Case style	DO-200AC (K-PUK)			See Outline Table

 ΔR_{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°	0.0018	0.0019	0.0012	0.0012	K/W	$T_J = T_J \text{ max.}$
120°	0.0021	0.0021	0.0021	0.0021		
90°	0.0027	0.0027	0.0029	0.0029		
60°	0.0039	0.0039	0.0041	0.0041		
30°	0.0067	0.0067	0.0068	0.0068		

Ordering Information Table

Device Code							
SD	155	3	C	30	S30	K	
①	②	③	④	⑤	⑥	⑦	
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	- K = Puk Case DO-200AC (K-PUK)		

SD1553C..K Series

Outline Table

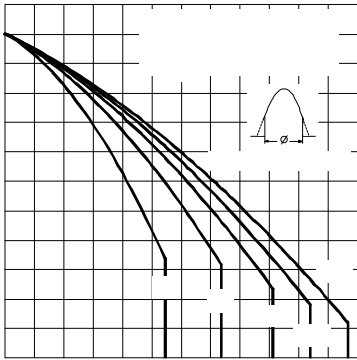
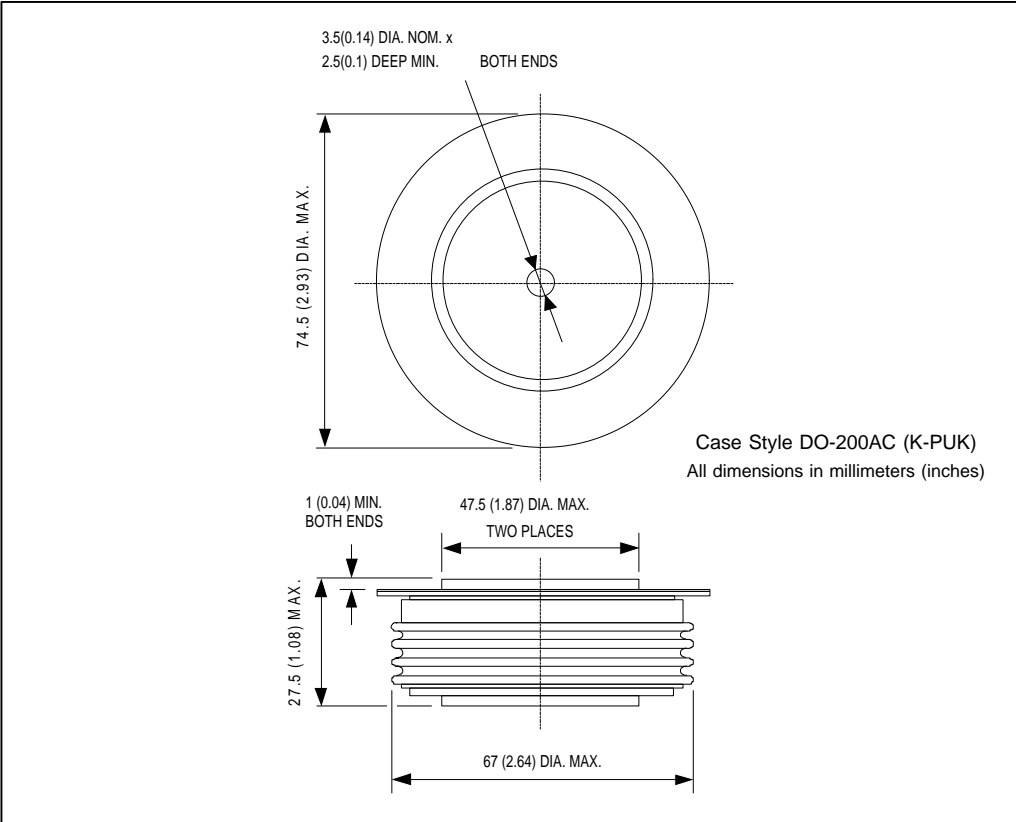


Fig. 1 - Current Ratings Characteristics

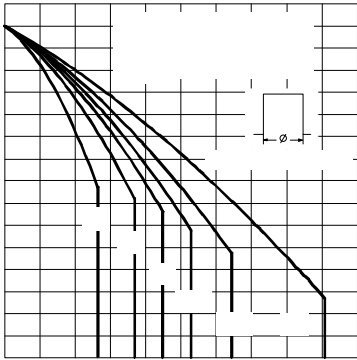


Fig. 2 - Current Ratings Characteristics