Bulletin I2074/B

International
IOR Rectifier

SD823C..C SERIES

FAST RECOVERY DIODES

Hockey Puk Version

810A
910A

case style B-43

Features

- High power FAST recovery diode series
- 2.0 to 3.0 µs recovery time
- High voltage ratings up to 2500V
- High current capability
- Optimized turn on and turn off characteristics
- Low forward recovery
- Fast and soft reverse recovery
- Press-puk encapsulation
- Hockey Puk version case style B-43
- Maximum junction temperature 150°C

Typical Applications

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

Major Ratings and Characteristics

Parameters		SD823C..C		Units
		S20	S30	
$I_{F(AV)}$		810	910	A
	@ T_{hs}	55	55	°C
$I_{F(RMS)}$		1500	1690	A
I_{FSM}	@ 50Hz	9300	9600	A
	@ 60Hz	9730	10050	A
V_{RRM} range		1200 to 2500	1200 to 2500	V
t_{rr}		2.0	3.0	µs
	@ T_J	25	25	°C
T_J		- 40 to 150		°C

ELECTRICAL SPECIFICATIONS

Voltage Ratings

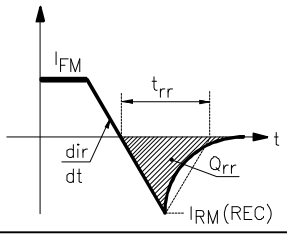
Type number	Voltage Code	V_{RRM}, maximum repetitive peak reverse voltage V	V_{RSM}, maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ $T_J = T_J$ max. mA
SD823C..C	12	1200	1300	50
	16	1600	1700	
	20	2000	2100	
	25	2500	2600	

Forward Conduction

	Parameter	SD823C..C S20	SD823C..C S30	Units	Conditions		
$I_{F(AV)}$	Max. average forward current	810 (425)	910 (470)	A	180° conduction, half sine wave		
	@ heatsink temperature	55 (85)	55 (85)	°C	Double side (single side) cooled		
$I_{F(RMS)}$	Max. RMS forward current	1500	1690	A	@ 25°C heatsink temperature double side cooled		
I_{FSM}	Max. peak, one-cycle forward, non-repetitive surge current	9300	9600	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		9730	10050		t = 8.3ms		
		7820	8070		t = 10ms	100% V_{RRM} reapplied	
		8190	8450		t = 8.3ms		
I^2t	Maximum I^2t for fusing	432	460	KA^2s	t = 10ms	No voltage reapplied	
		395	420		t = 8.3ms		
		306	326		t = 10ms	100% V_{RRM} reapplied	
		279	297		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	4320	4600	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
$V_{F(TO)1}$	Low level value of threshold voltage	1.00	0.95	V	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
$V_{F(TO)2}$	High level value of threshold voltage	1.11	1.06		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{f1}	Low level value of forward slope resistance	0.80	0.60	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{f2}	High level value of forward slope resistance	0.76	0.57		(I > π x $I_{F(AV)}$), $T_J = T_J$ max.		
V_{FM}	Max. forward voltage drop	2.20	1.85	V	I_{pk} = 1500A, $T_J = T_J$ max, t_p = 10ms sinusoidal wave		

Recovery Characteristics

Code	T_J = 25°C Typical t_{rr} @ 25% I_{RRM} (µs)	Test conditions I_{pk} Square Pulse (A)	di/dt (A/µs)	V_r (V)	Max. values @ T_J = 150°C t_{rr} @ 25% I_{RRM} (µs)	Q_{rr} (µC)	I_{rr} (A)
S20	2.0	1000	50	-50	3.5	240	110
S30	3.0	1000	50	-50	5.0	380	130



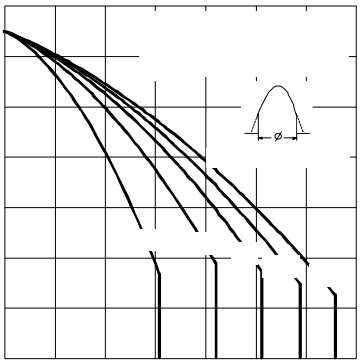


Fig. 3 - Current Ratings Characteristics

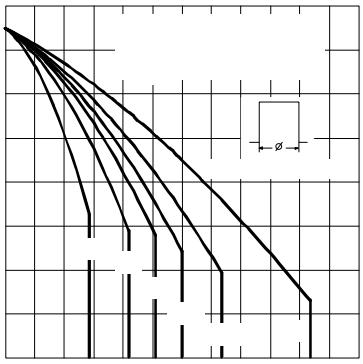


Fig. 4 - Current Ratings Characteristics

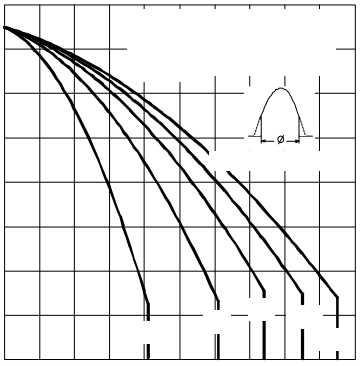


Fig. 5 - Current Ratings Characteristics

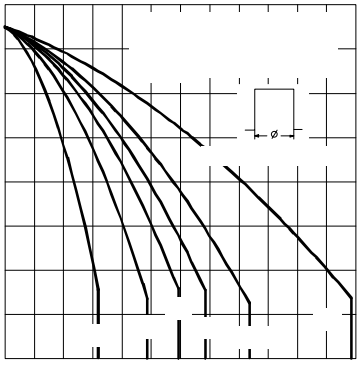


Fig. 6 - Current Ratings Characteristics

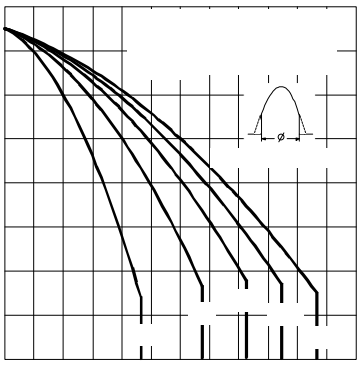


Fig. 7 - Current Ratings Characteristics

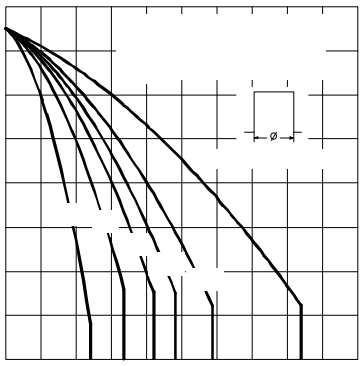


Fig. 8 - Current Ratings Characteristics

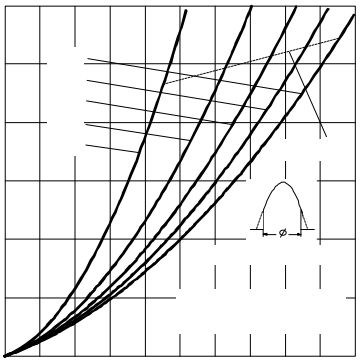


Fig. 9 - Forward Power Loss Characteristics

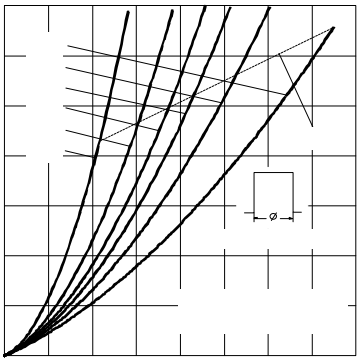


Fig. 10 - Forward Power Loss Characteristics

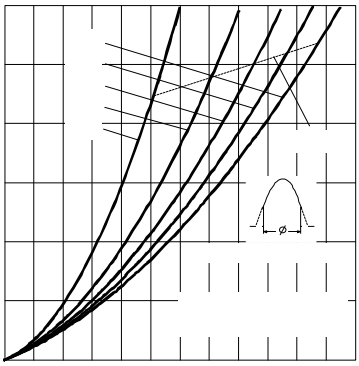


Fig. 11 - Forward Power Loss Characteristics

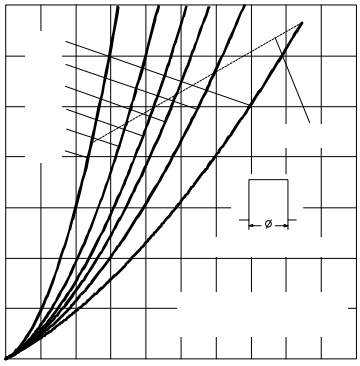


Fig. 12 - Forward Power Loss Characteristics

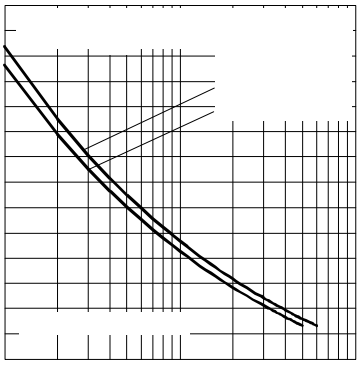


Fig. 13 - Maximum Non-repetitive Surge Current

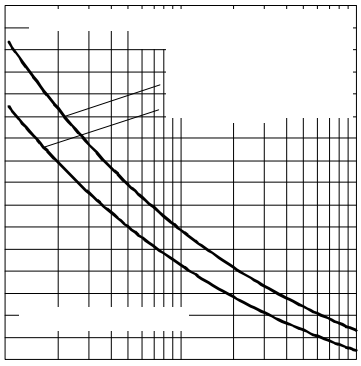


Fig. 14 - Maximum Non-repetitive Surge Current

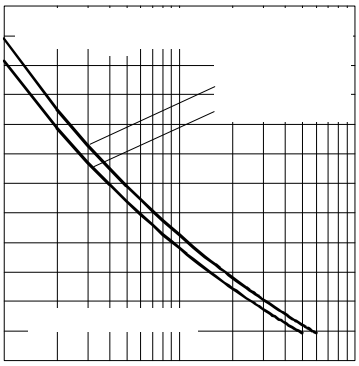


Fig. 15 - Maximum Non-repetitive Surge Current

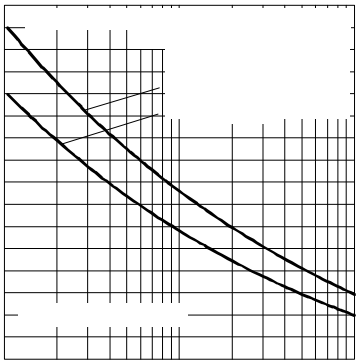


Fig. 16 - Maximum Non-repetitive Surge Current

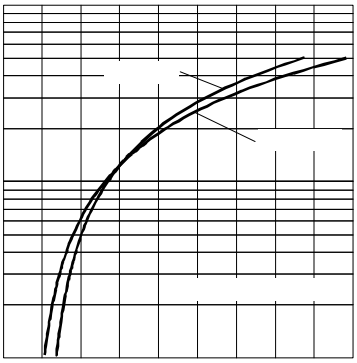


Fig. 17 - Forward Voltage Drop Characteristics

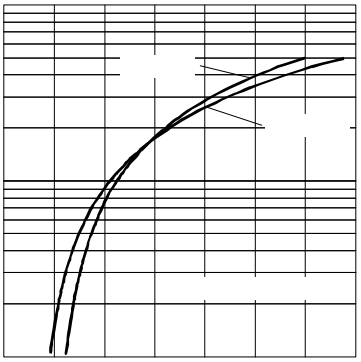


Fig. 18 - Forward Voltage Drop Characteristics

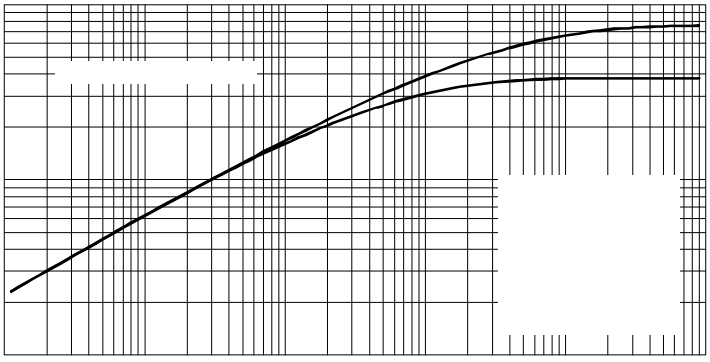


Fig. 19 - Thermal Impedance $Z_{thJ\text{-}hs}$ Characteristic

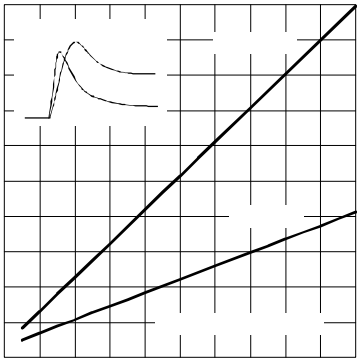


Fig. 20 - Typical Forward Recovery Characteristics

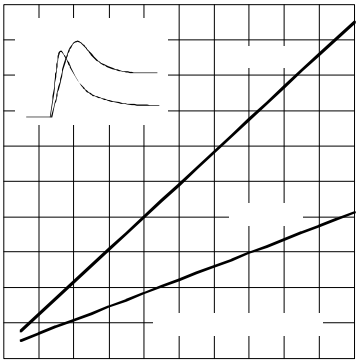


Fig. 21 - Typical Forward Recovery Characteristics

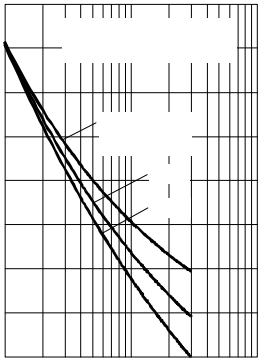


Fig. 22 - Recovery Time Characteristics

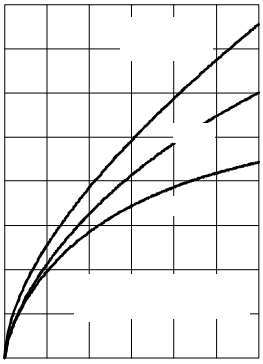


Fig. 23 - Recovery Charge Characteristics

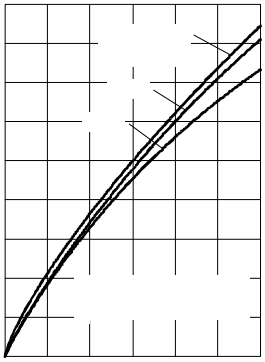


Fig. 24 - Recovery Current Characteristics

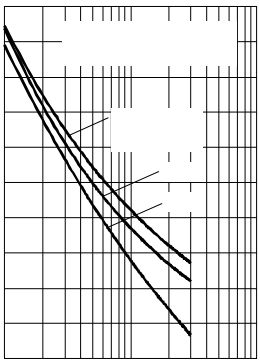


Fig. 25 - Recovery Time Characteristics

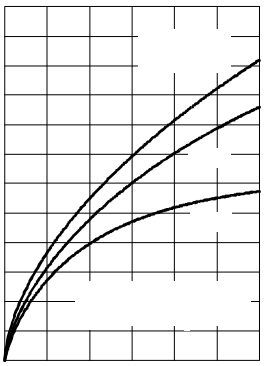


Fig. 26 - Recovery Charge Characteristics

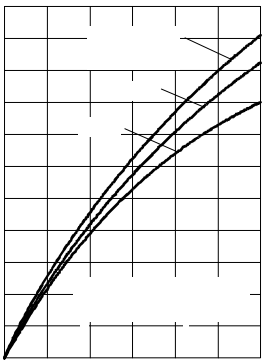


Fig. 27 - Recovery Current Characteristics

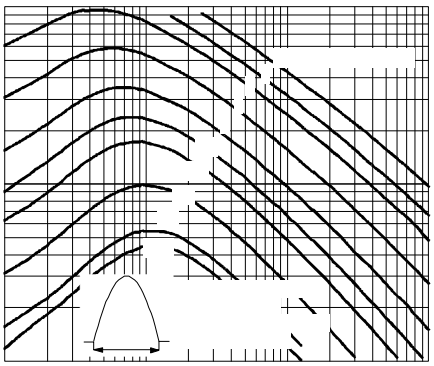


Fig. 28 - Maximum Total Energy Loss Per Pulse Characteristics

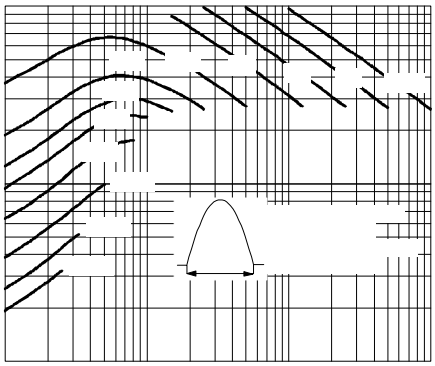


Fig. 29 - Frequency Characteristics

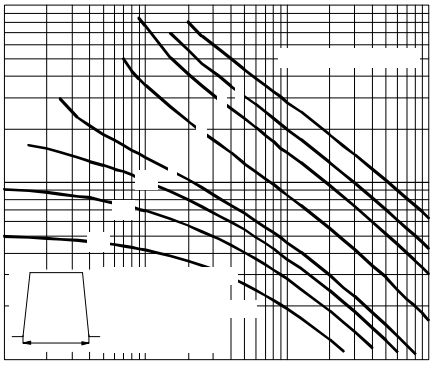


Fig. 30 - Maximum Total Energy Loss Per Pulse Characteristics

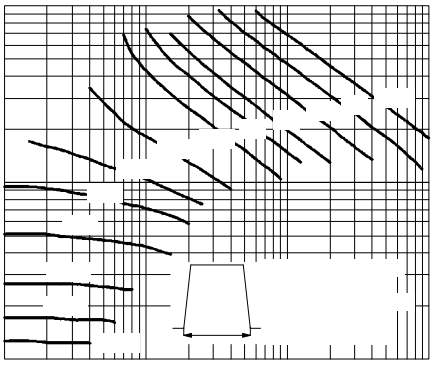


Fig. 31 - Frequency Characteristics

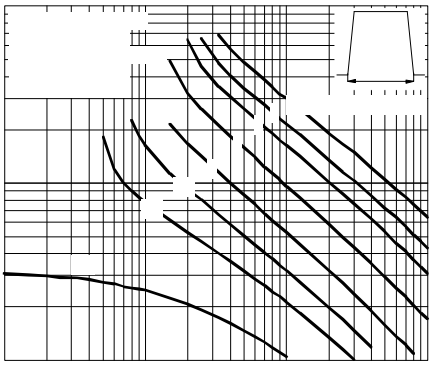


Fig. 32 - Maximum Total Energy Loss Per Pulse Characteristics

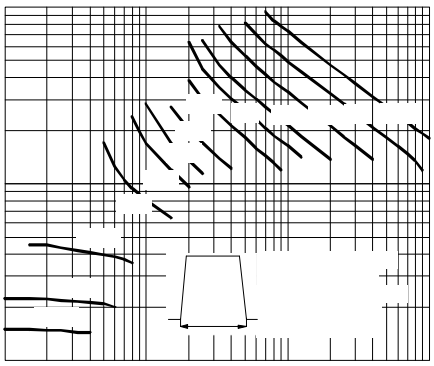


Fig. 33 - Frequency Characteristics

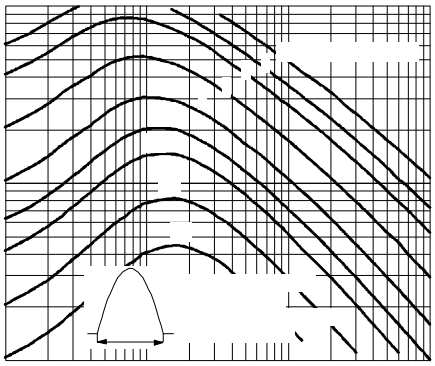


Fig. 34 - Maximum Total Energy Loss Per Pulse Characteristics

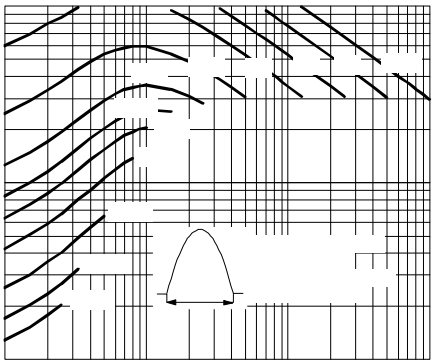


Fig. 35 - Frequency Characteristics

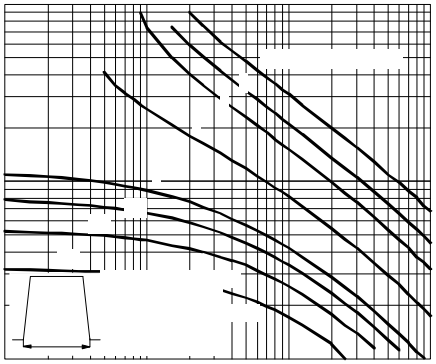


Fig. 36 - Maximum Total Energy Loss Per Pulse Characteristics

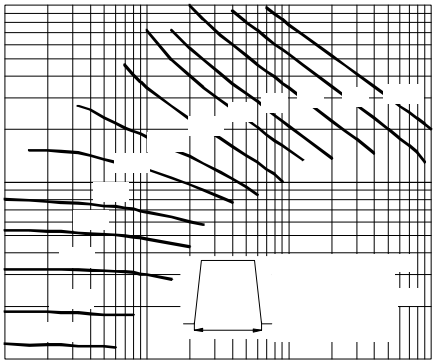


Fig. 37 - Frequency Characteristics

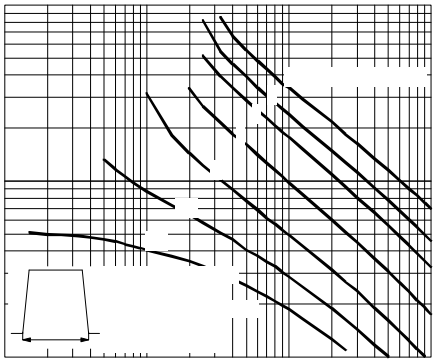


Fig. 38 - Maximum Total Energy Loss Per Pulse Characteristics

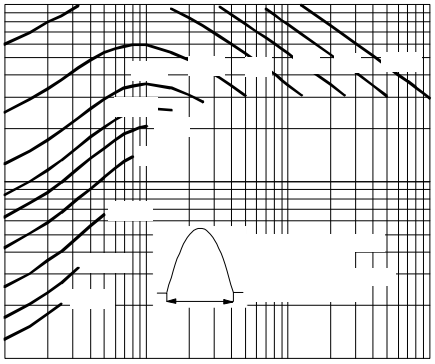


Fig. 39 - Frequency Characteristics

Thermal and Mechanical Specifications

Parameter		SD823C..C		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	0.076 to heatsink		K/W 0.038	DCoperation single side cooled DCoperation double side cooled
F	Mounting force, ± 10%	9800 (1000)		N (Kg)	
wt	Approximate weight	83		g	
	Case style	B-43			See Outline Table

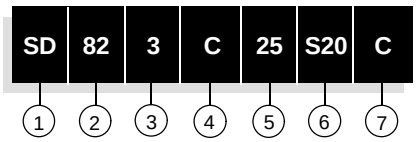
ΔR_{thJ-hs} Conduction

(The following table shows the increment of thermal resistence 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°	0.007	0.007	0.005	0.005	K/W	$T_J = T_J$ max.
120°	0.008	0.008	0.008	0.008		
90°	0.010	0.010	0.011	0.011		
60°	0.015	0.015	0.016	0.016		
30°	0.026	0.026	0.026	0.026		

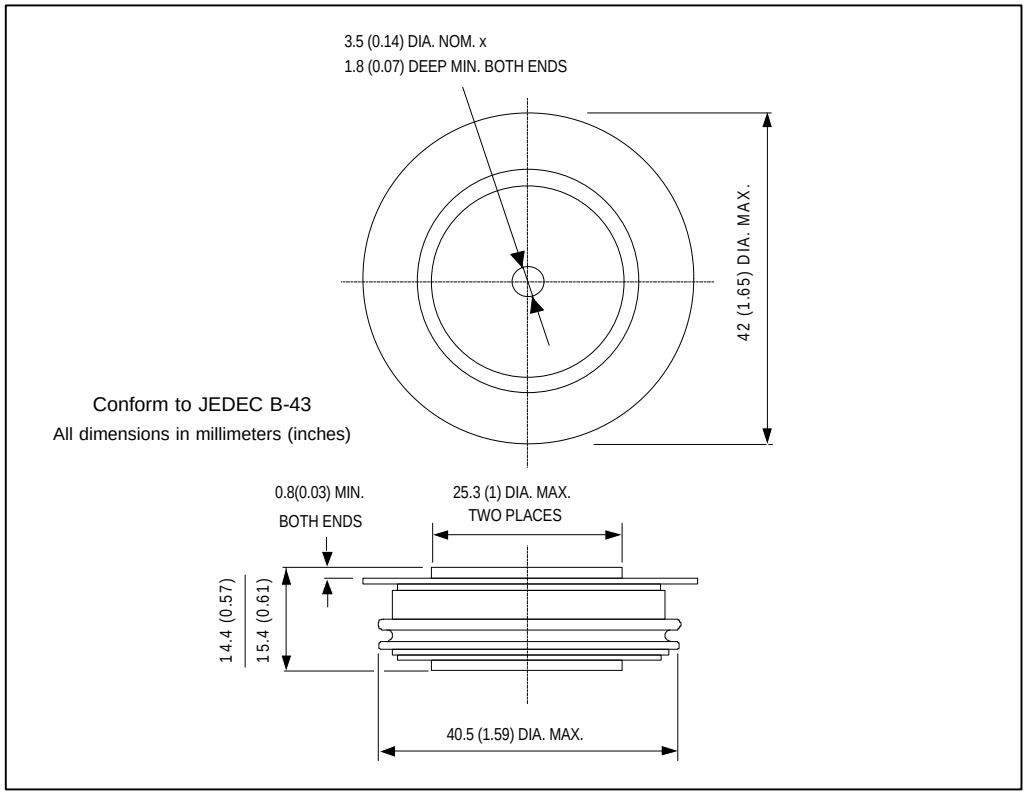
Ordering Information Table

Device Code



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 - C = Puk Case B-43

Outline Table



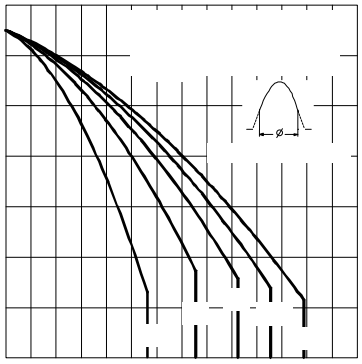


Fig. 1 - Current Ratings Characteristics

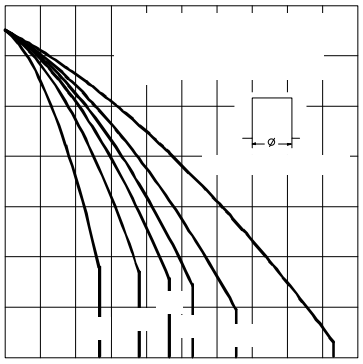


Fig. 2 - Current Ratings Characteristics