

Standard Recovery Diodes (Hockey PUK Version), 650A/540A

FEATURES

- Wide current range
- High voltage ratings up to 3200 V
- High surge current capabilities
- Diffused junction
- Hockey PUK version
- Case style DO-200AA(A-PUK), Nell's A-type Capsule
- Lead (Pb)-free

TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications



DO-200AA(A-PUK)
(Nell's A-type Capsule)

PRODUCT SUMMARY

$I_{F(AV)}$	650A/540A
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MAJOR RATINGS AND CHARACTERISTICS

PARAMETER	TEST CONDITIONS	D650A		UNIT
		04 TO 20	25 TO 32	
$I_{F(AV)}$		650	540	A
	T_{hs}	55	55	°C
$I_{F(RMS)}$		1150	995	A
	T_{hs}	25	25	°C
I_{FSM}	50 HZ	6050	6050	A
	60 HZ	6334	6334	
I^2t	50 HZ	183	183	kA ² s
	60 HZ	166	166	
V_{RRM}		400 to 2000	2500 to 3200	V
T_J	Typical	-40 to 180	-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 REVERSE VOLTAGE V	I_{RRM} , MAXIMUM AT $T_J = T_J$ MAXIMUM mA
D650A	04	400	500	15
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	
	25	2500	2600	
	28	2800	2900	
	30	3000	3100	
	32	3200	3300	

FORWARD CONDUCTION								
PARAMETER	SYMBOL	TEST CONDITIONS			D650A		UNIT	
					04 to 20	25 to 32		
Maximum average forward current at heatsink temperature	$I_{F(AV)}$	180° conduction, half sine wave Double side (single side) cooled			650 (380)	540 (250)	A	
					55 (85)	55 (85)	°C	
Maximum RMS forward current	$I_{F(RMS)}$	25°C heatsink temperature double side cooled			1150	995	A	
Maximum peak, one cycle non-repetitive surge current	I_{FSM}	t = 10ms	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	6050		A	
		t = 8.3ms			6334			
		t = 10ms	100% V_{RRM} reapplied		5082			
		t = 8.3ms			5320			
Maximum I^2t for fusing	I^2t	t = 10ms	No voltage reapplied			183		kA ² s
		t = 8.3ms				166		
		t = 10ms	100% V_{RRM} reapplied			129		
		t = 8.3ms				117		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied				1830		kA ² √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				0.95		V
High level value of threshold voltage	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum				1.00		
Low level value of forward slope resistance	r_{t1}	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$ $T_J = T_J$ maximum				0.75		mΩ
High level value of forward slope resistance	r_{t2}	$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum			0.72			
Maximum forward voltage drop	V_{FM}	$I_{pk} = 1500A$, $T_J = T_J$ maximum, $t_p = 10$ ms sinusoidal wave			2.10		V	

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		D650A	UNIT
Maximum junction operating temperature range	T_J	400V to 2000V		-40 to 180	°C
		2500V to 3200V		-40 to 150	
Maximum storage temperature range	T_{stg}			-55 to 200	
Maximum thermal resistance, junction to heatsink	R_{thJ-hs}	DC operation single side cooled		0.160	K/W
		DC operation double side cooled		0.080	
Mounting force, ±10%				4900 (500)	N (kg)
Approximate weight				70	g
Case style		DO-200AA (A-PUK), Nell's A-type Capsule			

△ R_{thJC} CONDUCTION						
CONDUCTION ANGEL	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDUCTIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.017	0.017	0.011	0.012	$T_J = T_J$ maximum	K/W
120°	0.020	0.020	0.020	0.020		
90°	0.025	0.025	0.027	0.027		
60°	0.036	0.036	0.038	0.038		
30°	0.064	0.062	0.065	0.062		

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

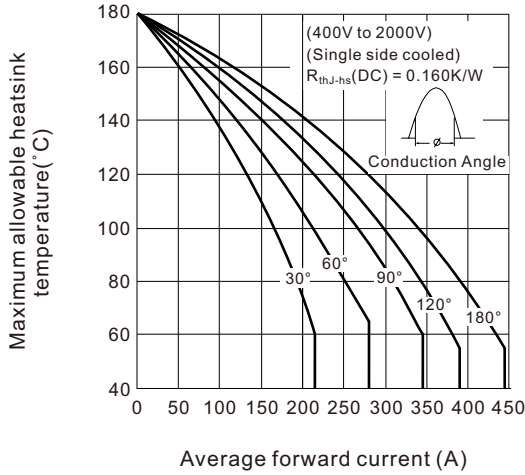


Fig.2 Current ratings characteristics

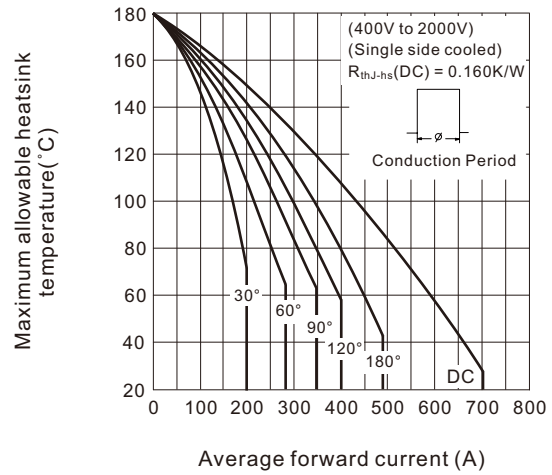


Fig.3 Current ratings characteristics

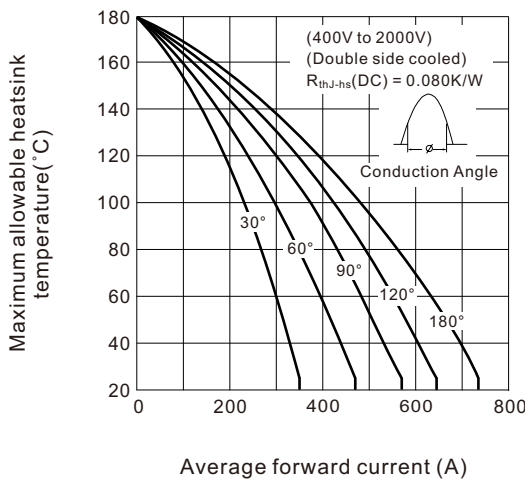


Fig.4 Current ratings characteristics

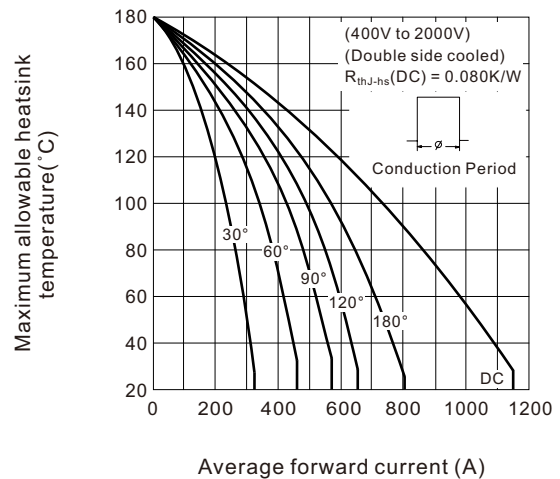


Fig.5 Current ratings characteristics

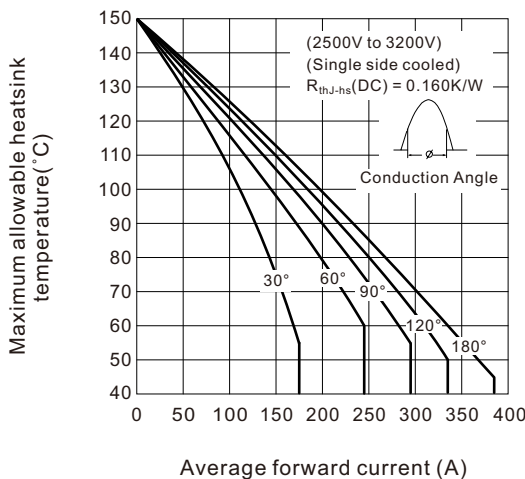


Fig.6 Current ratings characteristics

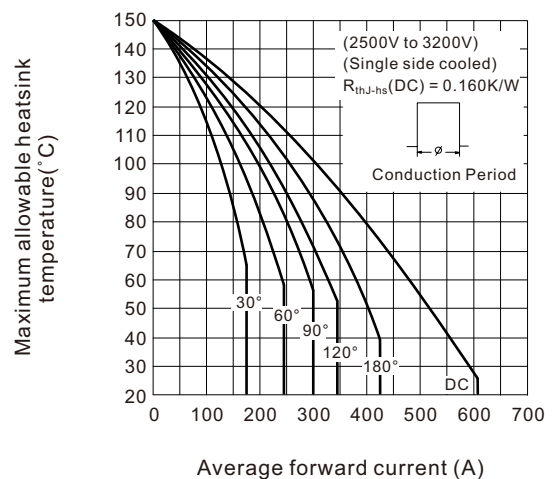


Fig.7 Current ratings characteristics

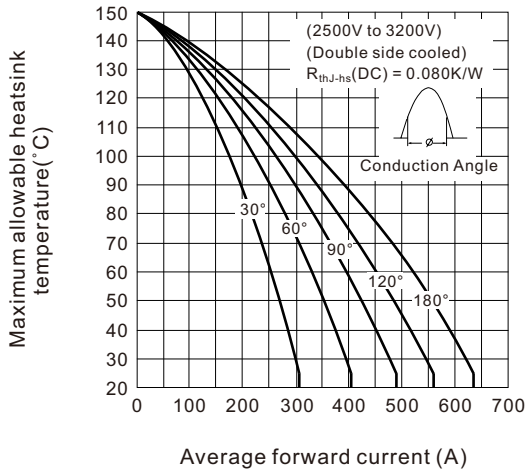


Fig.8 Current ratings characteristics

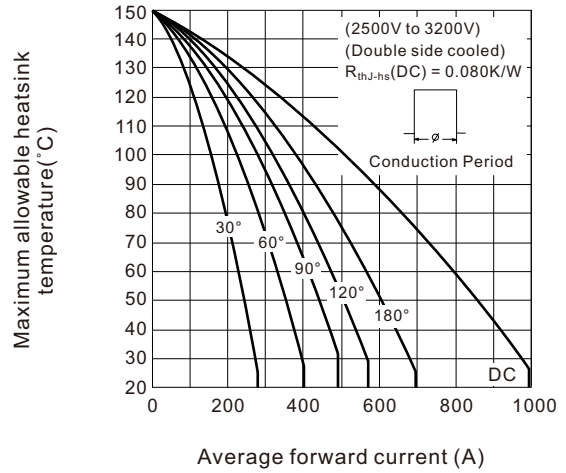


Fig.9 Forward power loss characteristics

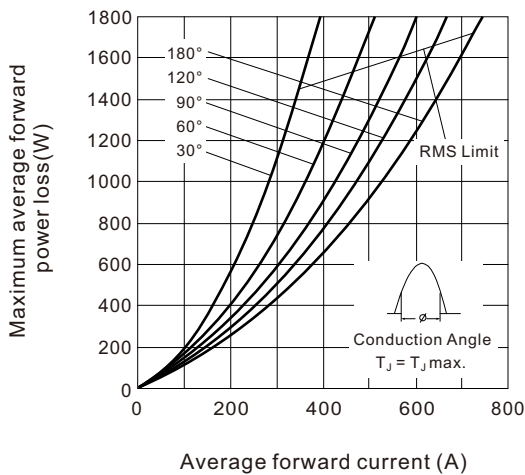


Fig.10 Forward power loss characteristics

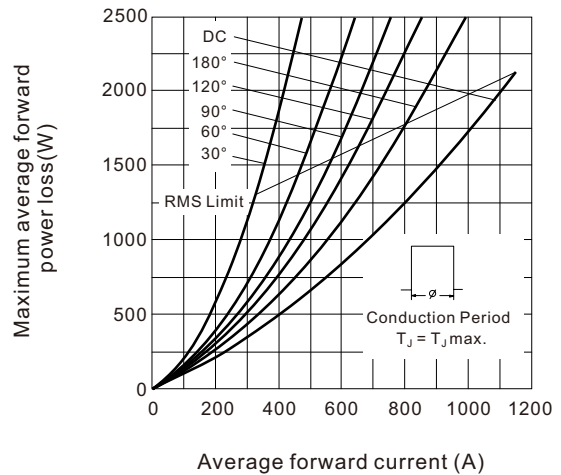


Fig.11 Maximum non-repetitive surge current single and double side cooled

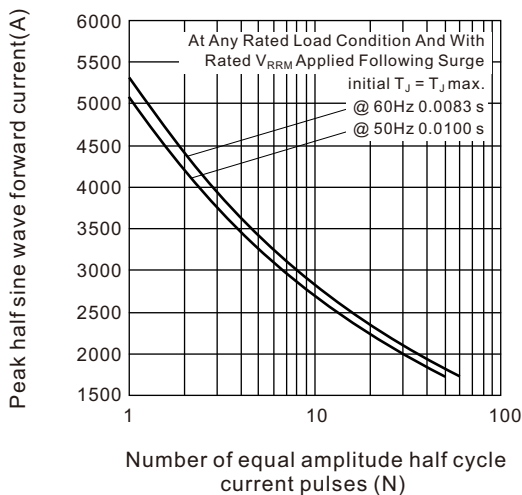


Fig.12 Maximum non-repetitive surge current single and double side cooled

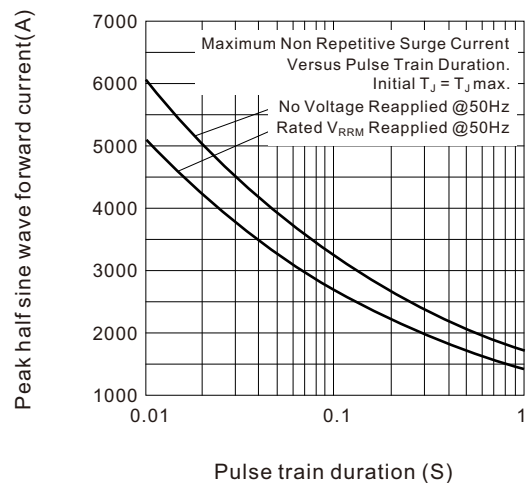


Fig.13 Forward voltage drop characteristics

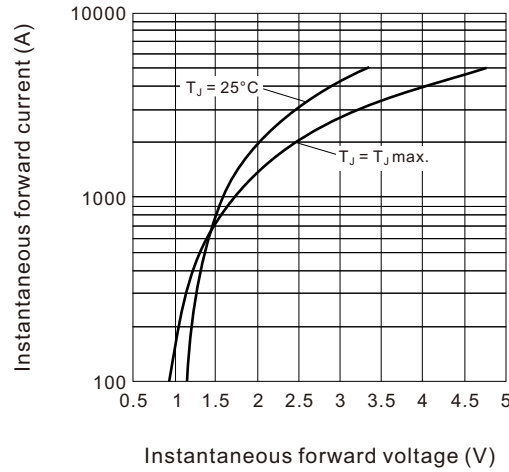
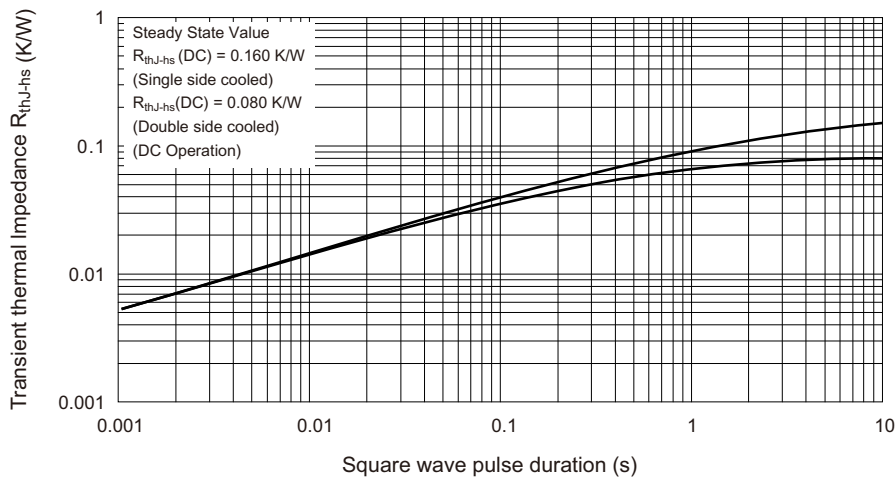


Fig.14 Thermal Impedance R_{thJ-hs} characteristics

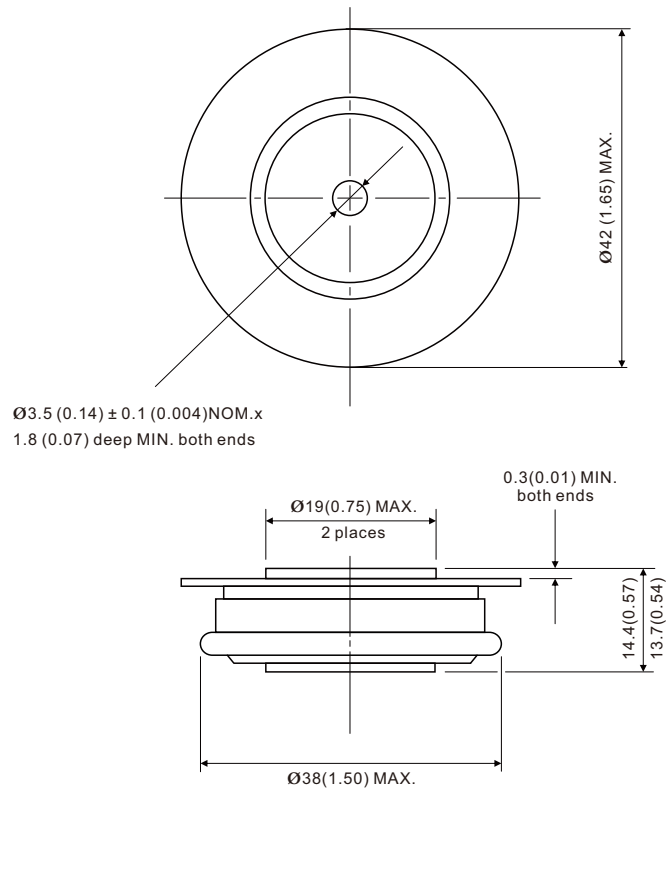


ORDERING INFORMATION TABLE

Device code	D	650	A	20
	①	②	③	④

- ① - "D" for standard recovery diode
- ② - Maximum average forward current, "650" for 650A and 540A
- ③ - Case style : "A" for Nell's A-type Capsule, DO-200AA (A-PUK)
- ④ - Voltage code, code x 100 = V_{RRM}

DO-200AA (A-PUK), Nell's A-type Capsule



All dimensions in millimeters (inches)