



# DNB65

## Recifier Diode

Replaces January 2000 version, DS4175-2.0

DS4175-3.0 August 2001

### FEATURES

- Double Side Cooling
- High Surge Capability

### APPLICATIONS

- Rectification
- Freewheel Diode
- DC Motor Control
- Power Supplies
- Welding
- Battery Chargers

### VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Conditions
DNB65 45	4500	$V_{RSM} = V_{RRM} + 100V$
DNB65 44	4400	
DNB65 42	4200	
DNB65 40	4000	
DNB65 38	3800	
DNB65 36	3600	

Lower voltage grades available.

### ORDERING INFORMATION

When ordering, select the required part number shown in the Voltage Ratings selection table, e.g.:

#### DNB65 40

Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.

### KEY PARAMETERS

$V_{RRM}$	4500V
$I_{F(AV)}$	2590A
$I_{FSM}$	31000A

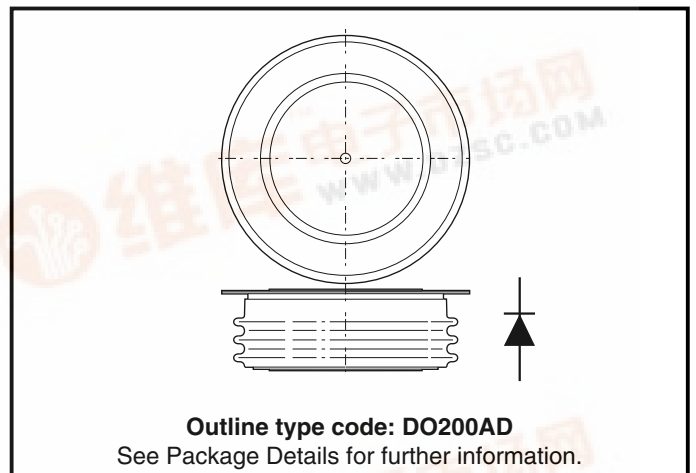


Fig. 1 Package outline

## CURRENT RATINGS

$T_{case} = 75^{\circ}\text{C}$  unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	2590	A
$I_{F(RMS)}$	RMS value	-	4068	A
$I_F$	Continuous (direct) forward current	-	3727	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	1940	A
$I_{F(RMS)}$	RMS value	-	3047	A
$I_F$	Continuous (direct) forward current	-	2656	A

$T_{case} = 100^{\circ}\text{C}$  unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, $T_{case} = 100^{\circ}\text{C}$	2000	A
$I_{F(RMS)}$	RMS value	$T_{case} = 100^{\circ}\text{C}$	3140	A
$I_F$	Continuous (direct) forward current	$T_{case} = 100^{\circ}\text{C}$	2800	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, $T_{case} = 100^{\circ}\text{C}$	1284	A
$I_{F(RMS)}$	RMS value	$T_{case} = 100^{\circ}\text{C}$	2017	A
$I_F$	Continuous (direct) forward current	$T_{case} = 100^{\circ}\text{C}$	1715	A

## SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
$I_{FSM}$	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 150^{\circ}C$ $V_R = 50\% V_{RRM} - 1/4$ sine	24.8	kA
$I^2t$	$I^2t$ for fusing		$3.075 \times 10^6$	A <sup>2</sup> s
$I_{FSM}$	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 150^{\circ}C$ $V_R = 0$	31.0	kA
$I^2t$	$I^2t$ for fusing		$4.8 \times 10^6$	A <sup>2</sup> s

## THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.013	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.025	$^{\circ}C/W$
			Cathode dc	-	0.027	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 45.0kN with mounting compound	Double side	-	0.003	$^{\circ}C/W$
			Single side	-	0.006	$^{\circ}C/W$
$T_{vj}$	Virtual junction temperature	Forward (conducting)		-	150	$^{\circ}C$
		Reverse (blocking)		-	150	$^{\circ}C$
$T_{stg}$	Storage temperature range			-55	175	$^{\circ}C$
-	Clamping force			40.0	48.0	kN

## CHARACTERISTICS

Symbol	Parameter	Conditions	Typ.	Max.	Units
$V_{FM}$	Forward voltage	At 3000A peak, $T_{case} = 25^{\circ}C$	-	1.45	V
$I_{RRM}$	Peak reverse current	At $V_{RRM}$ , $T_{case} = 150^{\circ}C$	-	150	mA
$Q_S$	Total stored charge	$I_F = 1500A$ , $di_{RR}/dt = 25A/\mu s$ $T_{case} = 25^{\circ}C$ , $V_R = 100V$	6000	-	$\mu C$
$I_{RM}$	Peak recovery current		-	500	A
$t_{rr}$	Reverse recovery time		25	-	$\mu s$
$V_{TO}$	Threshold voltage	At $T_{vj} = 150^{\circ}C$	-	0.84	V
$r_T$	Slope resistance	At $T_{vj} = 150^{\circ}C$	-	0.19	m $\Omega$

## CURVES

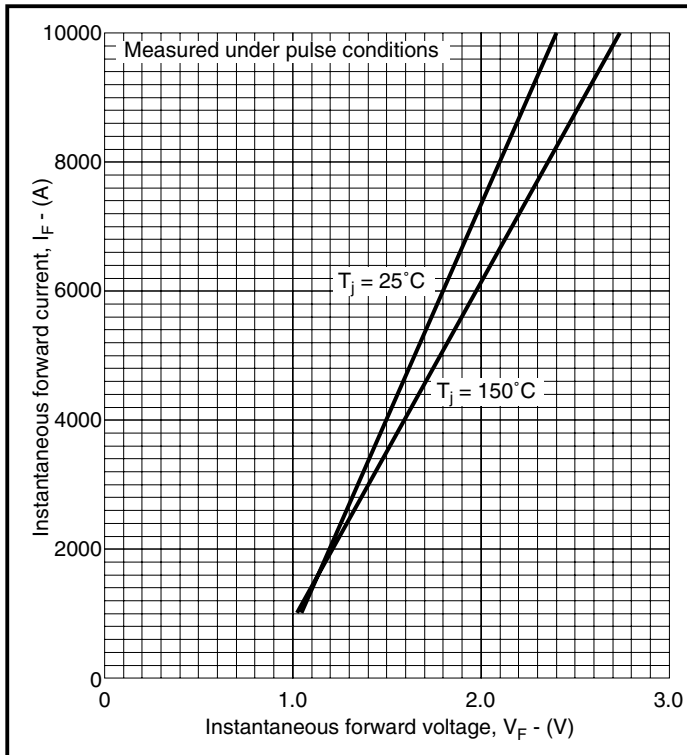


Fig.2 Maximum (limit) forward characteristics

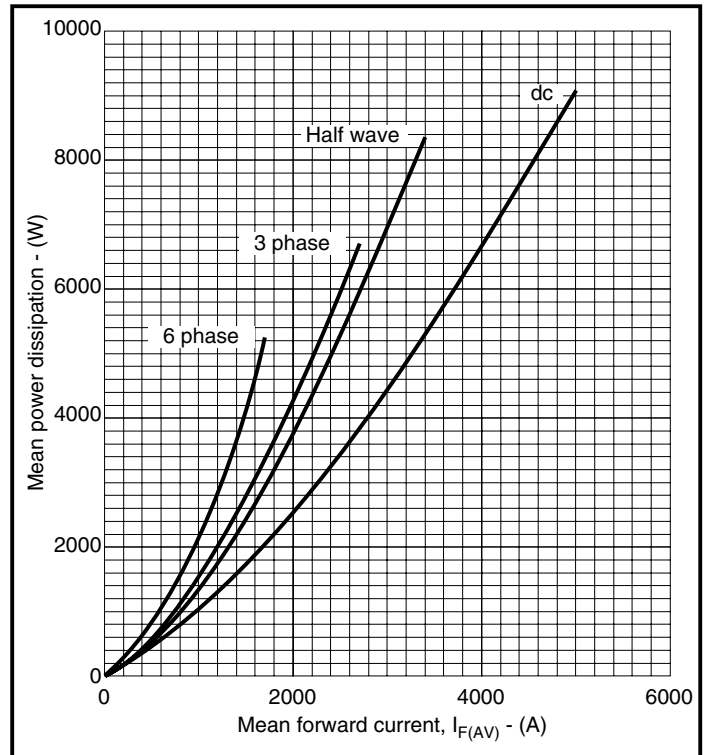


Fig.3 Dissipation curves

$V_{FM}$  Equation:-

$$V_{FM} = A + B \ln(I_F) + C \cdot I_F + D \cdot \sqrt{I_F}$$

Where

$$A = -0.36984$$

$$B = 0.292197$$

$$C = 0.000354$$

$$D = -0.03111$$

these values are valid for  $T_j = 125^{\circ}C$  for  $I_F$  500A to 10000A

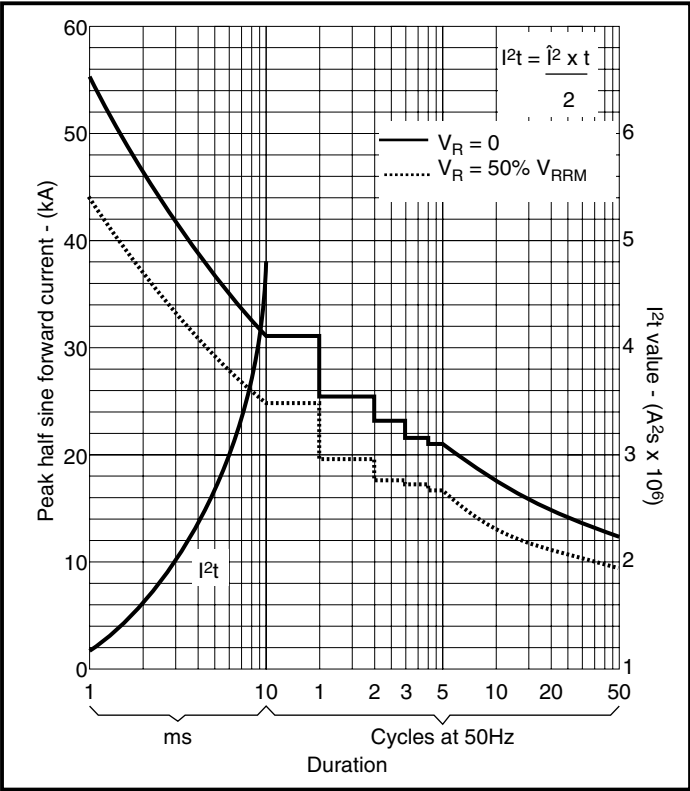


Fig.4 Surge (non-repetitive) forward current vs time at  $T_{case} 150^{\circ}C$

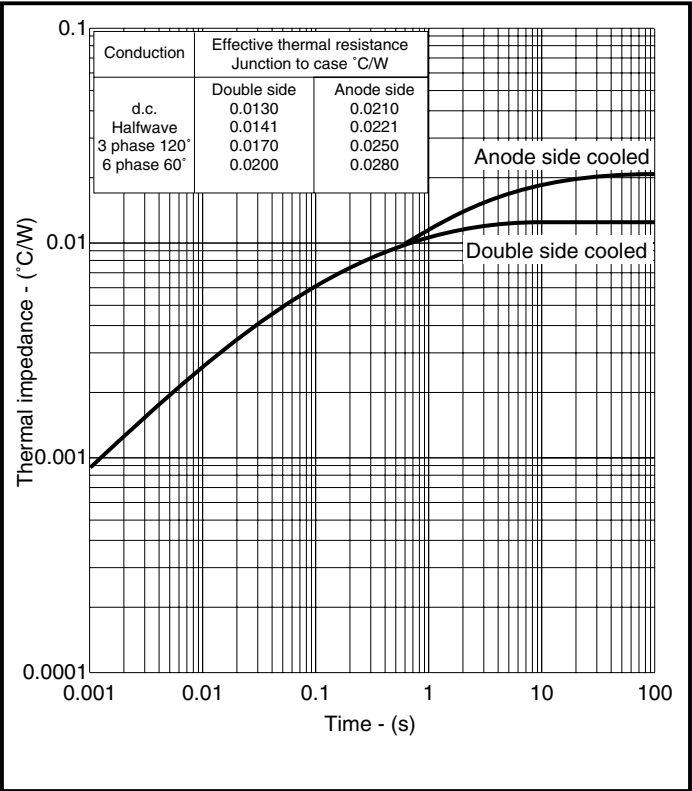
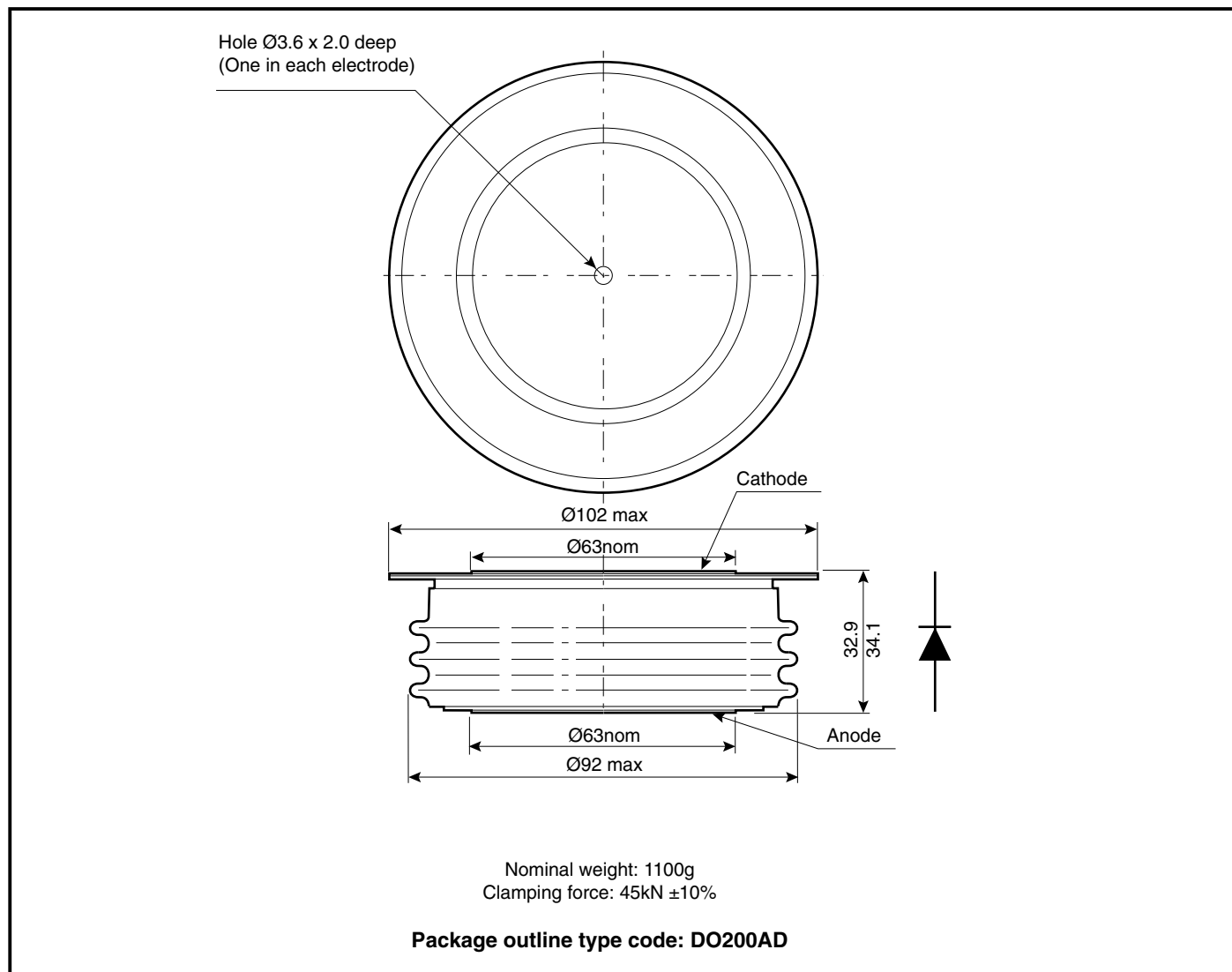


Fig.5 Maximum (limit) transient thermal impedance - junction to case

## PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise.  
DO NOT SCALE.



### Note:

1. Package maybe supplied with pins and/or tags.

## POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink and clamping systems in line with advances in device voltages and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group offers high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the latest CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete Solution (PACs).

## HEATSINKS

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks which have been designed to optimise the performance of Dynex semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest sales representative or Customer Services.

Stresses above those listed in this data sheet may cause permanent damage to the device. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture of the package. Appropriate safety precautions should always be followed.



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