

### 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
DS2103SY26	2600	$V_{RSM} = V_{RRM} + 100V$
DS2103SY25	2500	
DS2103SY24	2400	
DS2103SY23	2300	
DS2103SY22	2200	
DS2103SY21	2100	

Lower voltage grades available.

### ORDERING INFORMATION

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

**DS2103SY22** for a 2200V device in a Y outline

or

**DS2103SV22** for a 2200V device in a V outline

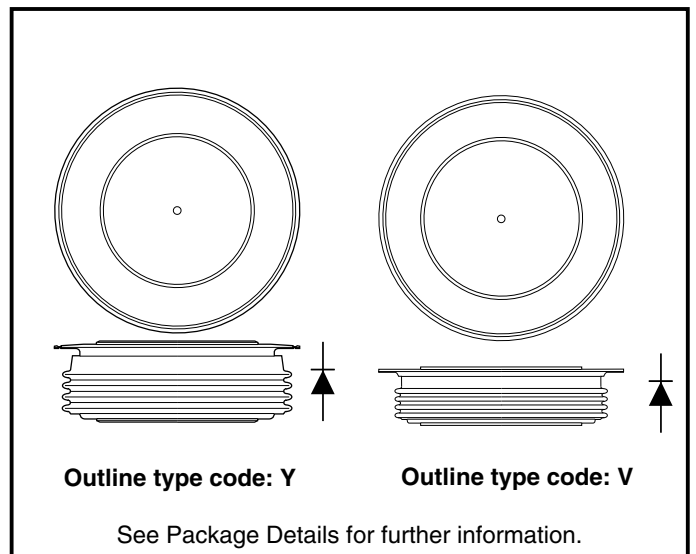
Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.

### KEY PARAMETERS

$V_{RRM}$  **2600V**

$I_{F(AV)}$  **5788A**

$I_{FSM}$  **81000A**



**Fig. 1 Package outlines**

## CURRENT RATINGS

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

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	5788	A
$I_{F(RMS)}$	RMS value	-	9076	A
$I_F$	Continuous (direct) forward current	-	8278	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	3751	A
$I_{F(RMS)}$	RMS value	-	5892	A
$I_F$	Continuous (direct) forward current	-	4955	A

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

Symbol	Parameter	Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	4785	A
$I_{F(RMS)}$	RMS value	-	7516	A
$I_F$	Continuous (direct) forward current	-	6725	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	3060	A
$I_{F(RMS)}$	RMS value	-	4807	A
$I_F$	Continuous (direct) forward current	-	3950	A

**SURGE RATINGS**

Symbol	Parameter	Conditions	Max.	Units
$I_{FSM}$	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 175^{\circ}C$	65.0	kA
$I^2t$	$I^2t$ for fusing	$V_R = 50\% V_{RRM}$ - 1/4 sine	$21.1 \times 10^6$	A <sup>2</sup> s
$I_{FSM}$	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 175^{\circ}C$	81.0	kA
$I^2t$	$I^2t$ for fusing	$V_R = 0$	$33 \times 10^6$	A <sup>2</sup> s

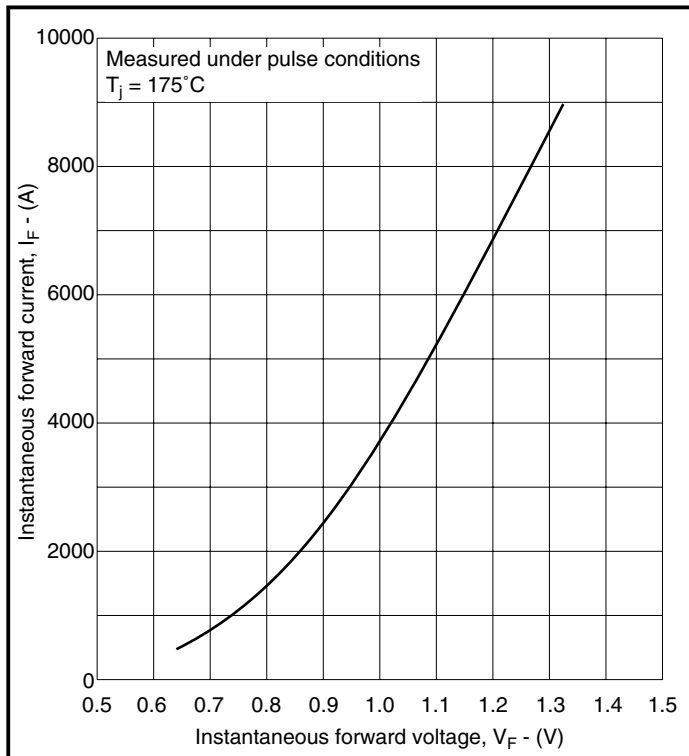
**THERMAL AND MECHANICAL DATA**

Symbol	Parameter	Conditions	Min.	Max.	Units	
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.0095	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.019	$^{\circ}C/W$
			Cathode dc	-	0.019	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 43.0kN with mounting compound	Double side	-	0.002	$^{\circ}C/W$
			Single side	-	0.004	$^{\circ}C/W$
$T_{vj}$	Virtual junction temperature	Forward (conducting)	-	200	$^{\circ}C$	
		Reverse (blocking)	-	175	$^{\circ}C$	
$T_{stg}$	Storage temperature range		-55	175	$^{\circ}C$	
-	Clamping force		38.0	47.0	kN	

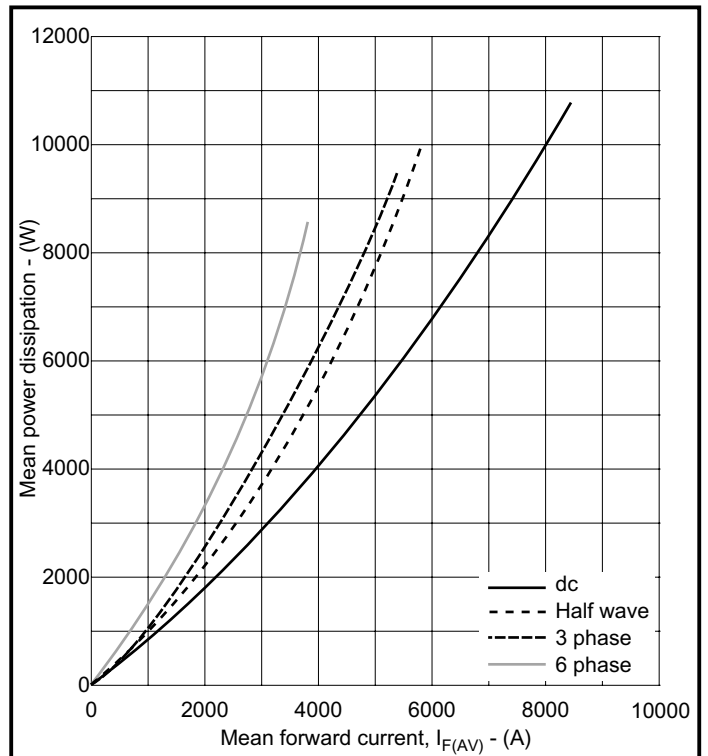
**CHARACTERISTICS**

Symbol	Parameter	Conditions	Min.	Max.	Units
$V_{FM}$	Forward voltage	At 3000A peak, $T_{case} = 25^{\circ}C$	-	1.05	V
$I_{RM}$	Peak reverse current	At $V_{RRM}$ , $T_{case} = 175^{\circ}C$	-	150	mA
$Q_s$	Total stored charge	$I_F = 2000A$ , $di_{RR}/dt = 3A/\mu s$ $T_{case} = 175^{\circ}C$ , $V_R = 100V$	-	3000	$\mu C$
$I_{rr}$	Peak reverse recovery current		-	125	A
$V_{TO}$	Threshold voltage	At $T_{vj} = 175^{\circ}C$	-	0.75	V
$r_T$	Slope resistance	At $T_{vj} = 175^{\circ}C$	-	0.063	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

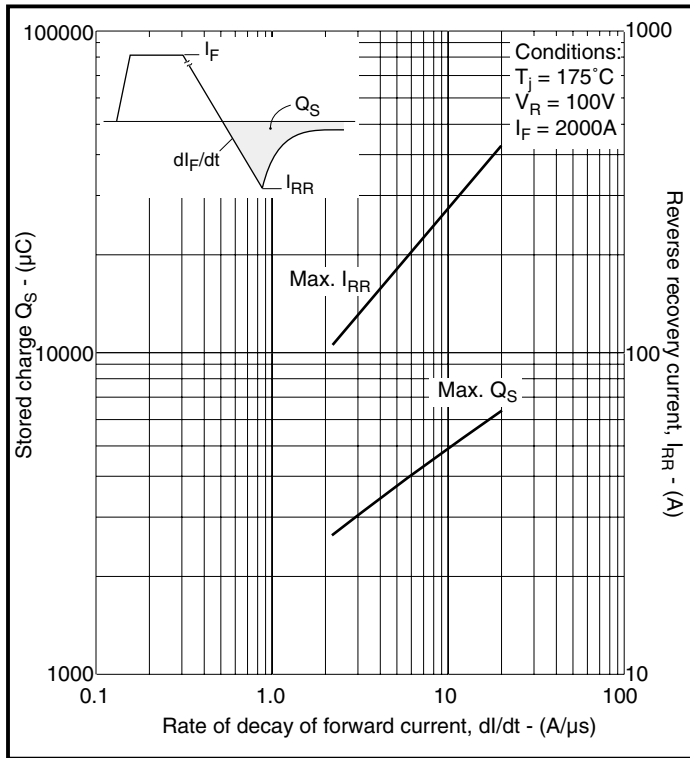
$A = -0.51826$

$B = 0.195881$

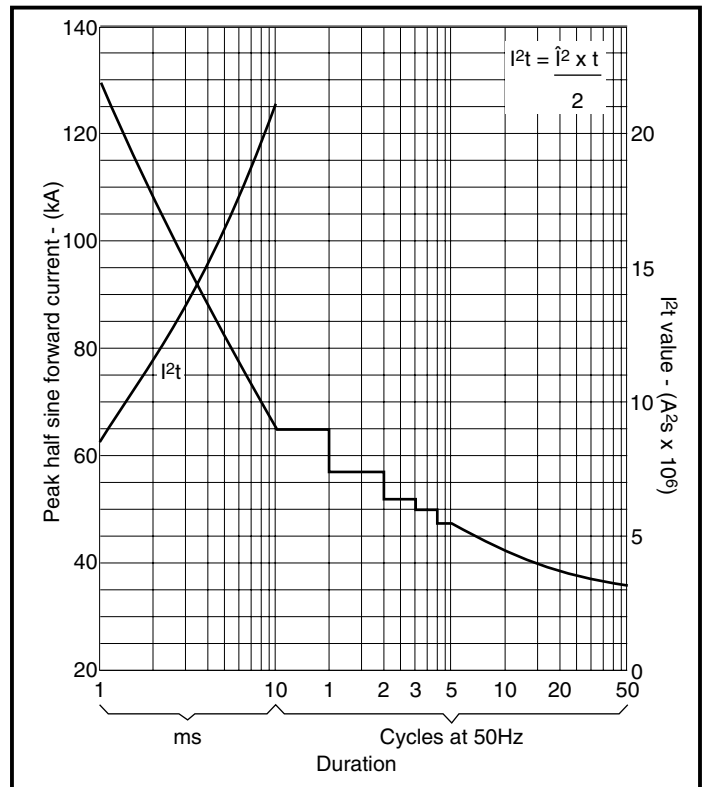
$C = 6.39 \times 10^{-5}$

$D = -0.00544$

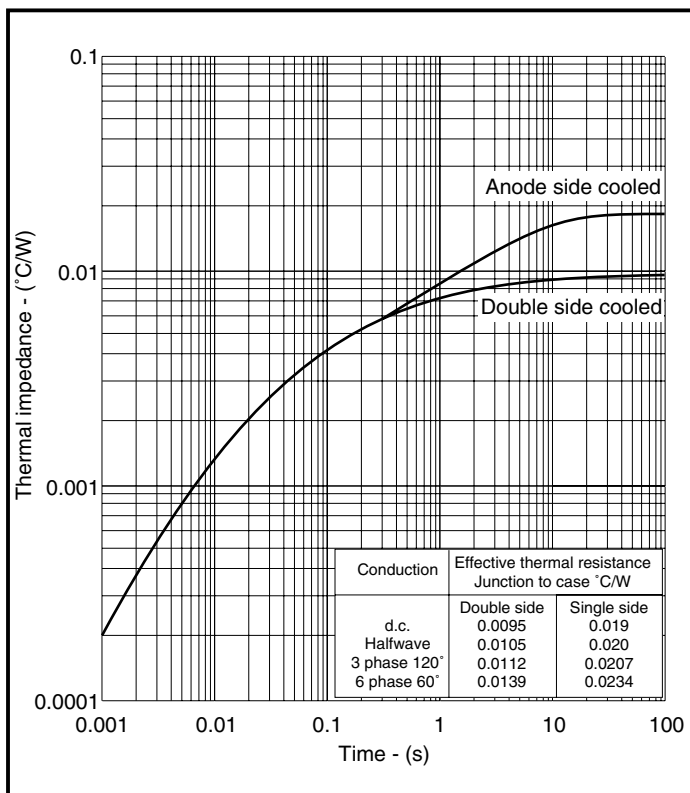
these values are valid for  $T_j = 175^{\circ}C$  for  $I_F$  500A to 9000A



**Fig.4 Total stored charge and maximum reverse recovery current**



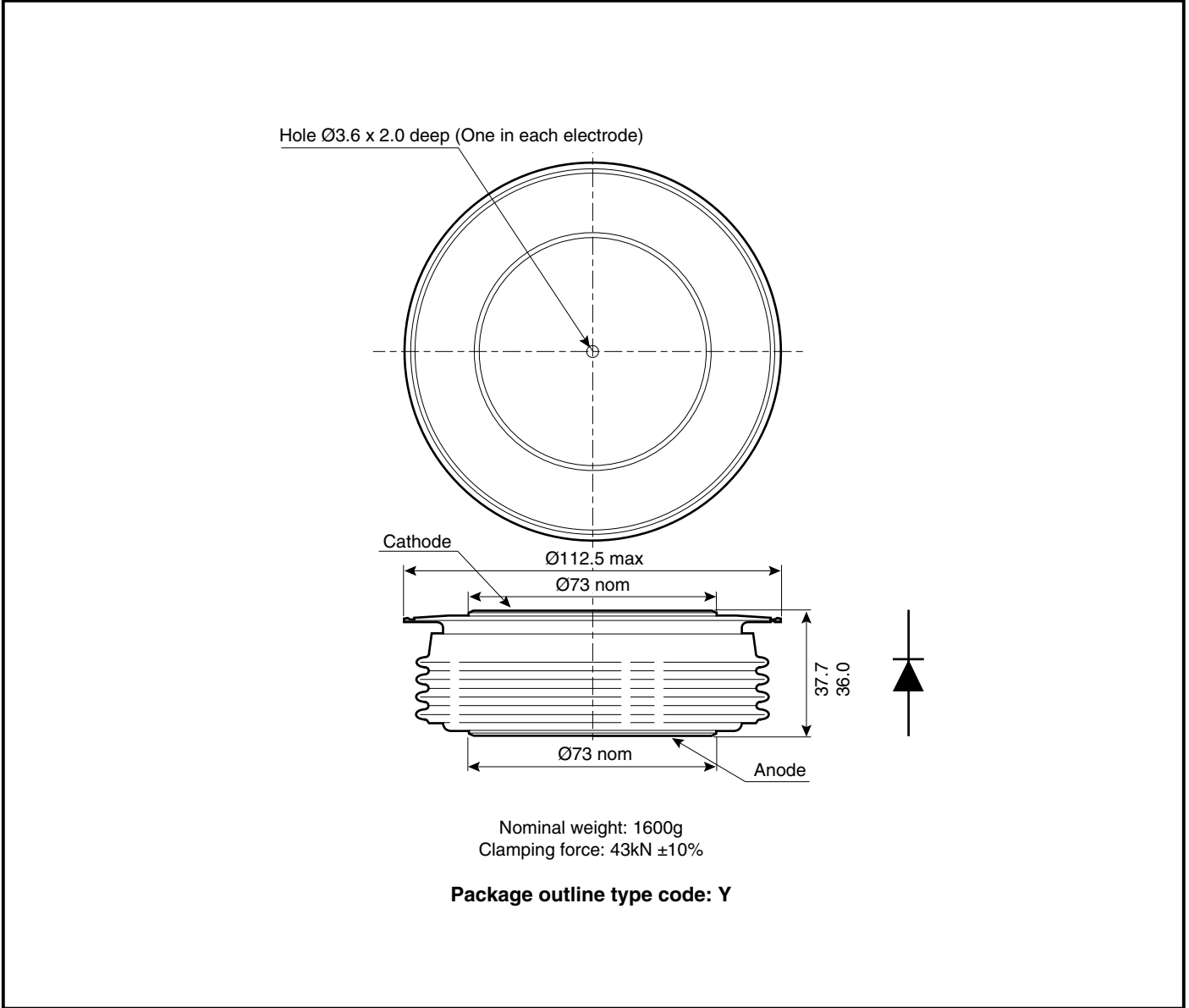
**Fig.5 Surge (non-repetitive) forward current vs time (with 50%  $V_{RRM}$  at  $T_{case} 175^\circ\text{C}$ )**



**Fig.6 Maximum (limit) transient thermal impedance - junction to case**

**PACKAGE DETAILS**

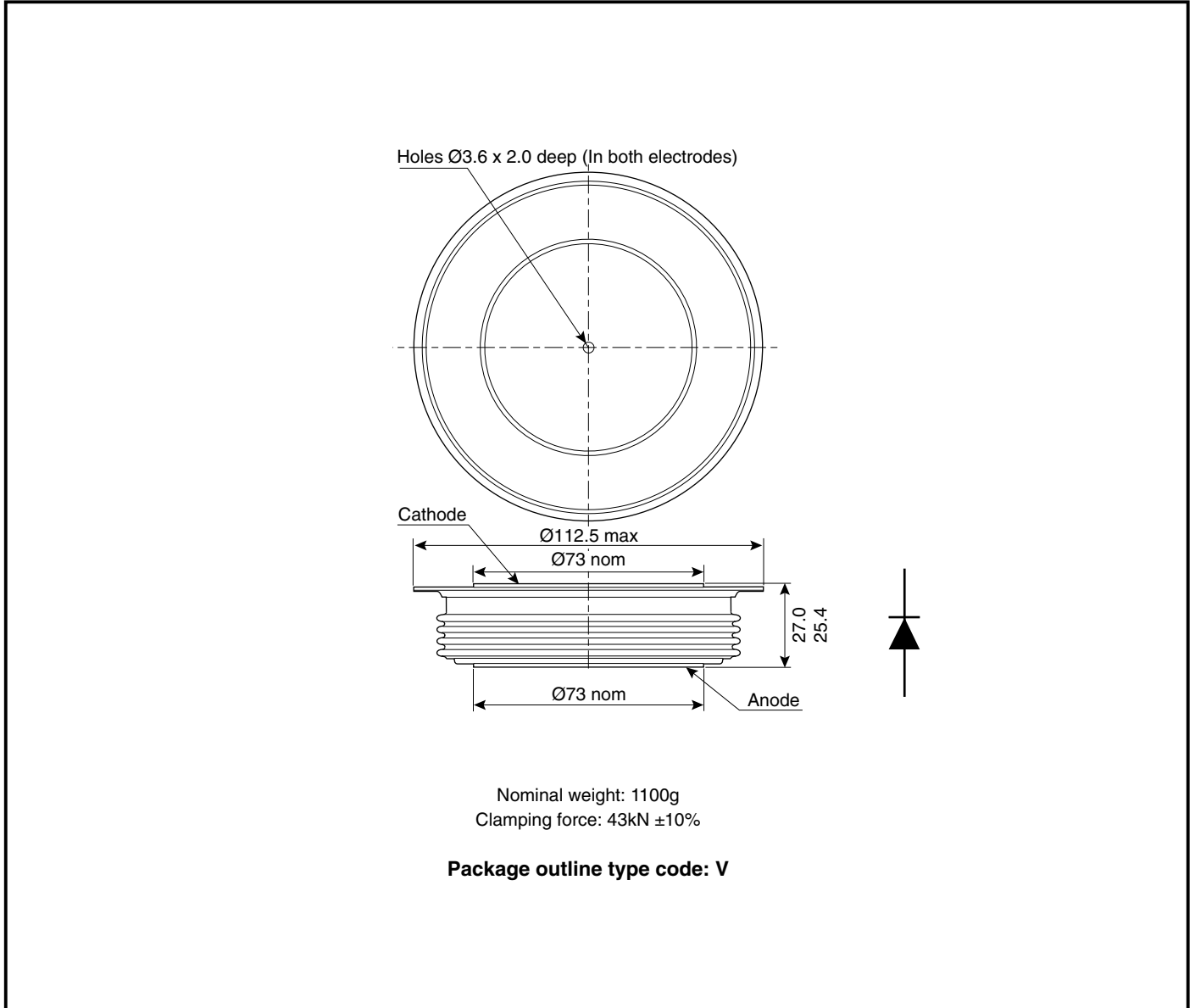
For further package information, please visit our website or contact Customer Services. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



**Note:**  
Some packages may be supplied with gate pins and/or tags.

**PACKAGE DETAILS**

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



**Note:**  
Some packages may be supplied with gate 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.



<http://www.dynexsemi.com>

**e-mail: [power\\_solutions@dynexsemi.com](mailto:power_solutions@dynexsemi.com)**

HEADQUARTERS OPERATIONS  
**DYNEX SEMICONDUCTOR LTD**  
Doddington Road, Lincoln.  
Lincolnshire. LN6 3LF. United Kingdom.  
Tel: +44-(0)1522-500500  
Fax: +44-(0)1522-500550

CUSTOMER SERVICE  
Tel: +44 (0)1522 502753 / 502901. Fax: +44 (0)1522 500020

SALES OFFICES  
**Benelux, Italy & Switzerland:** Tel: +33 (0)1 64 66 42 17. Fax: +33 (0)1 64 66 42 19.  
**France:** Tel: +33 (0)2 47 55 75 52. Fax: +33 (0)2 47 55 75 59.  
**Germany, Northern Europe, Spain & Rest Of World:** Tel: +44 (0)1522 502753 / 502901.  
Fax: +44 (0)1522 500020  
**North America:** Tel: (440) 259-2060. Fax: (440) 259-2059. Tel: (949) 733-3005. Fax: (949) 733-2986.

These offices are supported by Representatives and Distributors in many countries world-wide.  
© Dynex Semiconductor 2003 TECHNICAL DOCUMENTATION – NOT FOR RESALE. PRODUCED IN UNITED KINGDOM

### Datasheet Annotations:

Dynex Semiconductor annotate datasheets in the top right hand corner of the front page, to indicate product status. The annotations are as follows:-

**Target Information:** This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

**Preliminary Information:** The product is in design and development. The datasheet represents the product as it is understood but details may change.

**Advance Information:** The product design is complete and final characterisation for volume production is well in hand.

**No Annotation:** The product parameters are fixed and the product is available to datasheet specification.

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior notice the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.

All brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.