DS2101SY / DS2101SV

Rectifier Diode

Replaces October 2002 version, DS4170-6.0

DS4170-6.1 February 2003

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

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

KEY PARAMETERS

V_{RRM} 1500V

$I_{F(AV)}$ 7810A

I_{FSM} 79000A

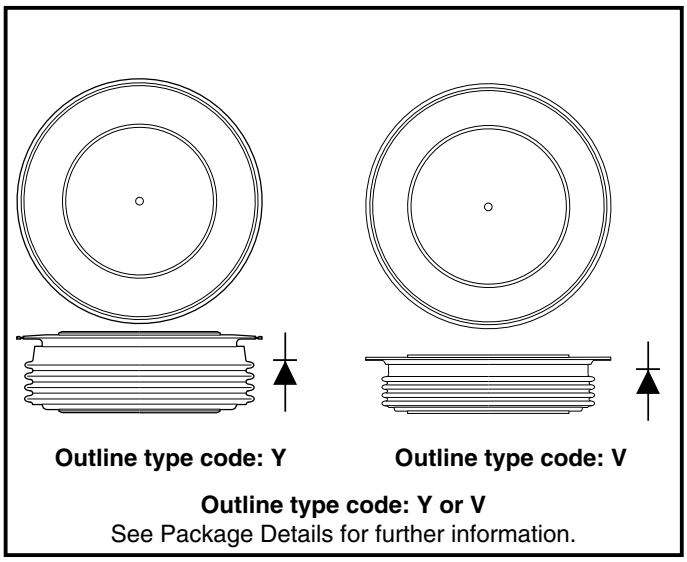


Fig. 1 Package outline

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
DS2101SY15	1500	$V_{RSM} = V_{RRM} + 100V$

Lower voltage grades available.

ORDERING INFORMATION

When ordering, use part number shown in the Voltage Ratings selection table. If a lower voltage grade is required, then use two a digit abbreviation for the grade required (V_{RRM}/100) e.g.:

DS2101SY14 for a 1400V deivce.

If the device is required in the slim 'V' package then substitute the 'Y' shown in the part number in the Voltage Ratings table for 'V', i.e.:

DS2101SV15

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

CURRENT RATINGS

T_{case} = 75°C unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	7810	A
$I_{F(RMS)}$	RMS value	-	12268	A
I_F	Continuous (direct) forward current	-	11091	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	5035	A
$I_{F(RMS)}$	RMS value	-	7909	A
I_F	Continuous (direct) forward current	-	6579	A

T_{case} = 100°C unless otherwise stated

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	6630	A
$I_{F(RMS)}$	RMS value	-	10400	A
I_F	Continuous (direct) forward current	-	8600	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	4220	A
$I_{F(RMS)}$	RMS value	-	6630	A
I_F	Continuous (direct) forward current	-	5190	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; T_{case} = 190°C	72.0	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - 1/4 sine	25.9 x 10^6	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; T_{case} = 190°C	79.0	kA
I^2t	I^2t for fusing	V_R = 0	31.2 x 10^6	A^2s

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	°C/W
		Single side cooled	Anode dc	-	0.019	°C/W
			Cathode dc	-	0.019	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 43kN with mounting compound	Double side	-	0.002	°C/W
			Single side	-	0.004	°C/W
T_{vj}	Virtual junction temperature	Forward (conducting)		-	200	°C
		Reverse (blocking)		-	190	°C
T_{stg}	Storage temperature range			–55	190	°C
-	Clamping force			38	47	kN

CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Max.	Units
V_{FM}	Forward voltage	At 3000A peak, T_{case} = 25°C	-	0.95	V
I_{RRM}	Peak reverse current	At V_{RRM}, T_{case} = 190°C	-	100	mA
Q_S	Total stored charge	I_F = 2000A, dI_{RR}/dt = 3A/µs	-	1600	µC
I_{RM}	Peak recovery current	T_{case} = 175˚C, V_R = 100V	-	90	A
V_{TO}	Threshold voltage	At T_{vj} = 190˚C	-	0.67	V
r_T	Slope resistance	At T_{vj} = 190˚C	-	0.038	mΩ

CURVES

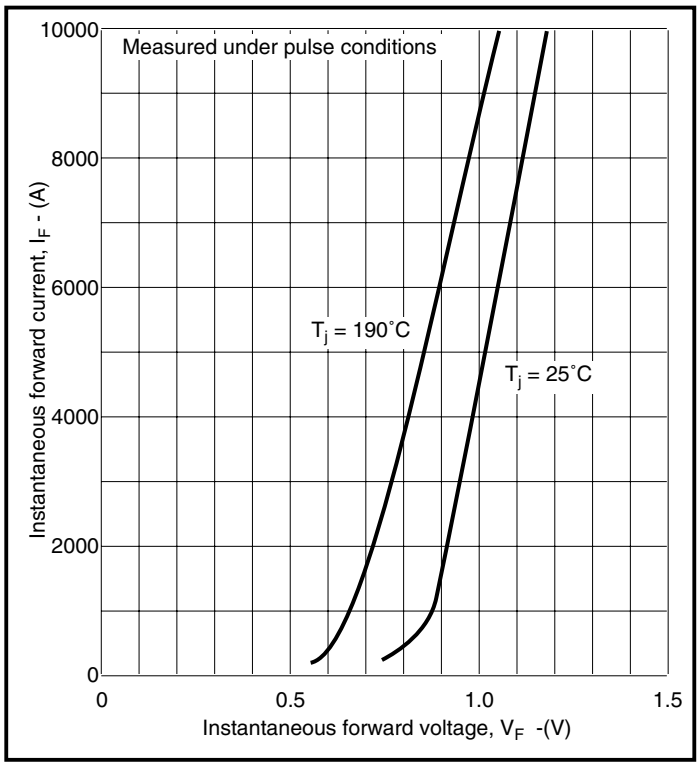


Fig.2 Maximum (limit) forward characteristics

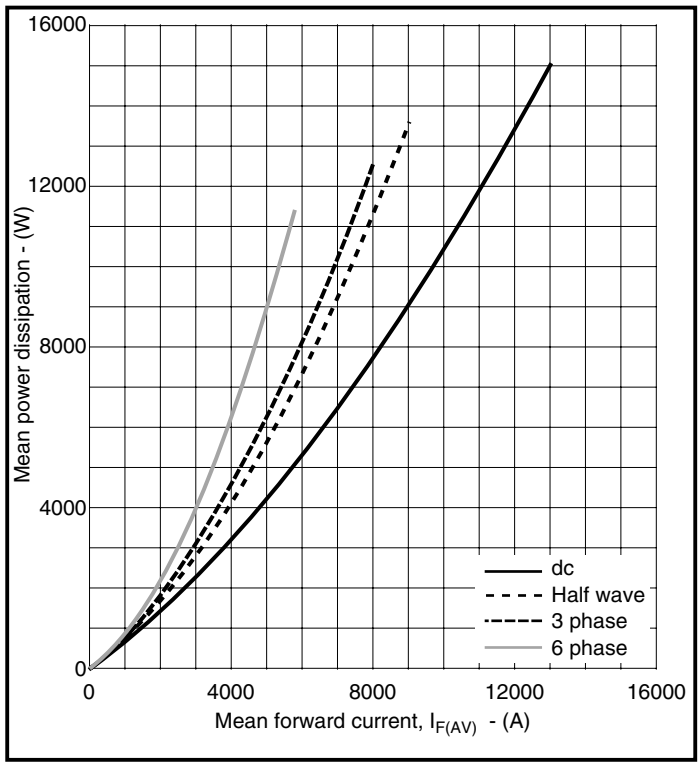


Fig.3 Dissipation curves

V_{FM} Equation:-

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

Where A = 0.081707
B = 0.100349
C = 5.72×10^{-5}
D = –0.00529

These values are valid for T_j = 190˚C for I_F 500A to 10000A

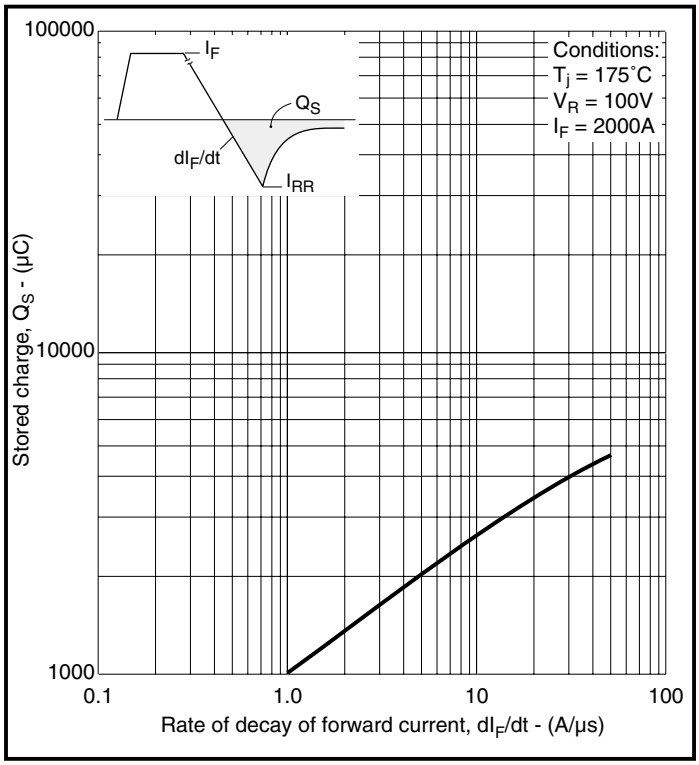


Fig.4 Total stored charge

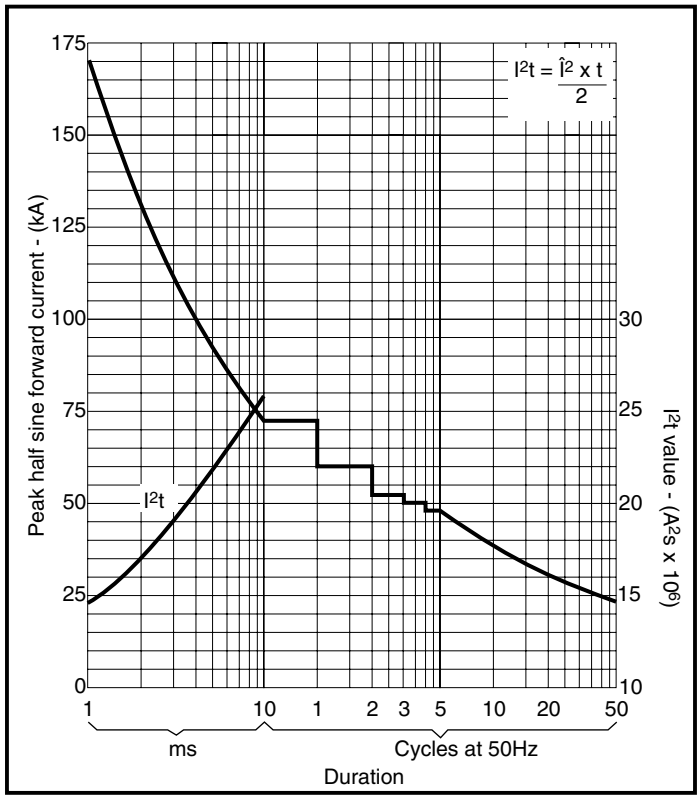
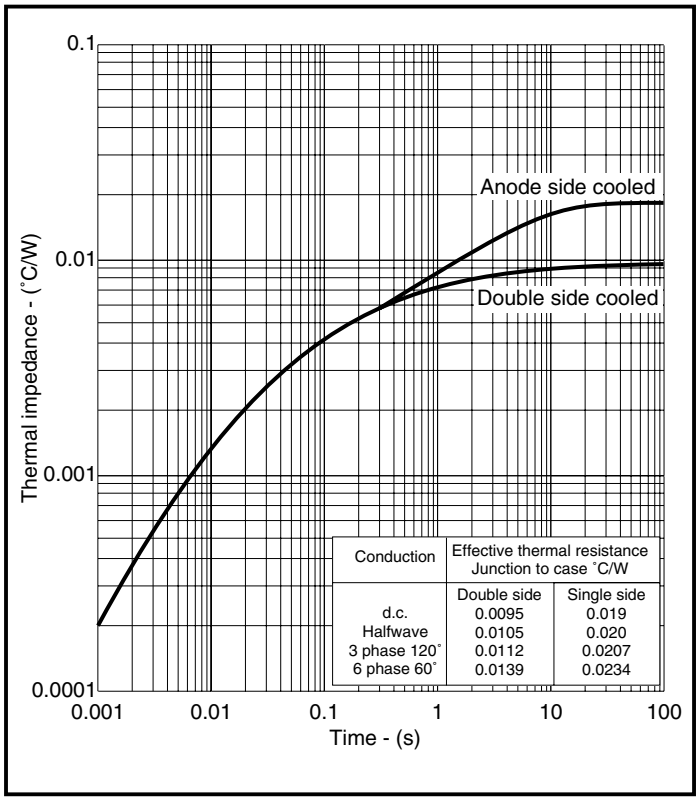


Fig.5 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at T_{case} 190˚C)

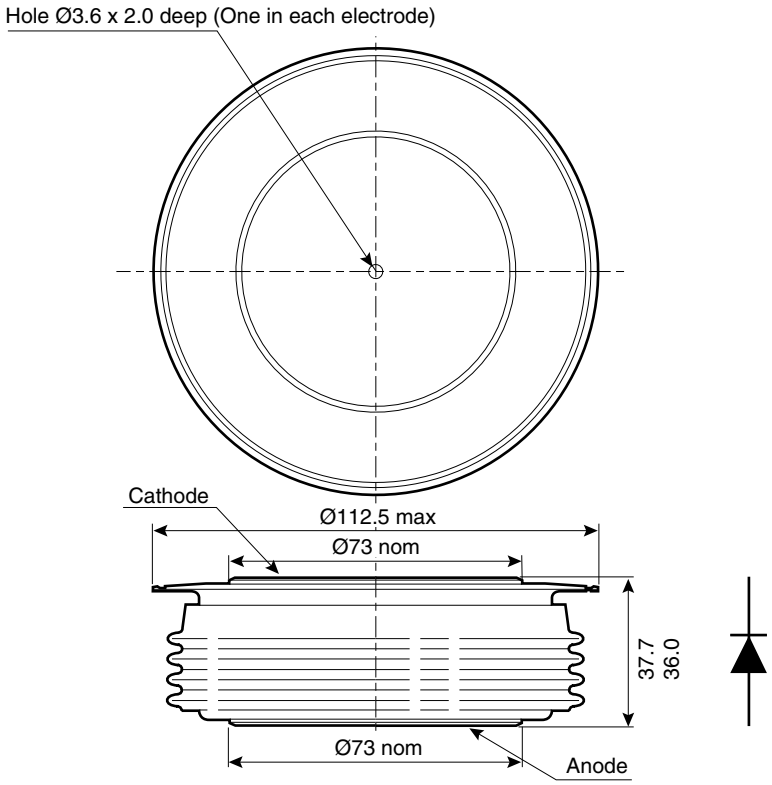


Conduction	Effective thermal resistance Junction to case ˚C/W	
	Double side	Single side
d.c.	0.0095	0.019
Halfwave	0.0105	0.020
3 phase 120˚	0.0112	0.0207
6 phase 60˚	0.0139	0.0234

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.



Nominal weight: 1600g
Clamping force: 43kN ±10%

Package outline type code: Y

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

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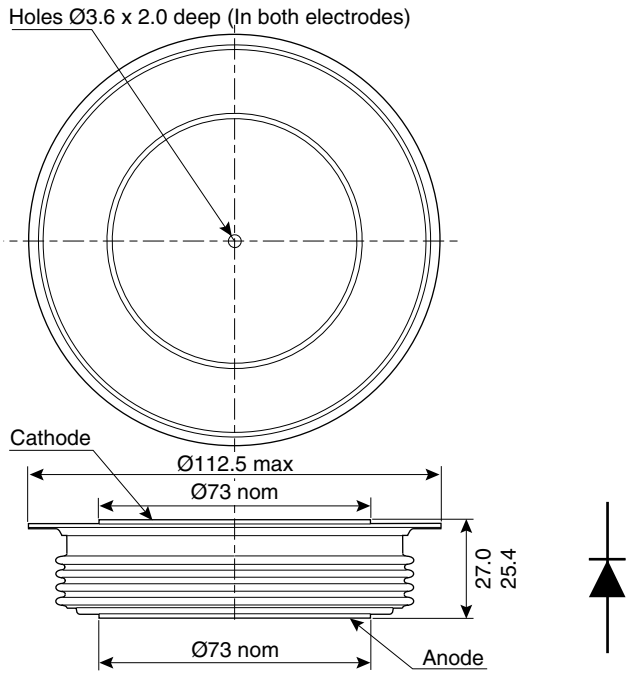

Nominal weight: 1100g
Clamping force: 43kN ±10%

Package outline type code: V

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.

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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