DS2101SY

Rectifier Diode

Replaces September 2001 version, DS4170-5.0

DS4170-5.1 December 2001

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

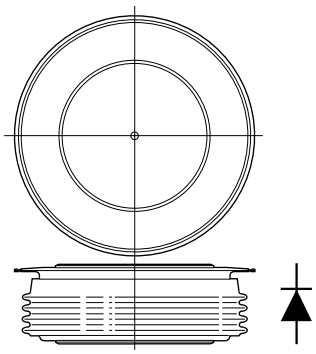
- Rectification
- Freewheel Diode
- DC Motor Control
- Power Supplies
- Welding
- Battery Chargers

KEY PARAMETERS

V_{RRM} **1500V**

$I_{F(AV)}$ **7810A**

I_{FSM} **79000A**



Outline type code: F
See Package Details for further information.

Fig. 1 Package outline

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
DS2101SY15	1500	$V_{RSM} = V_{RRM} + 100V$
DS2101SY14	1400	
DS2101SY13	1300	
DS2101SY12	1200	
DS2101SY11	1100	
DS2101SY10	1000	

Lower voltage grades available.

ORDERING INFORMATION

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

DS2101SY13

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, T_{case} = 100°C	6630	A
$I_{F(RMS)}$	RMS value	T_{case} = 100°C	10400	A
I_F	Continuous (direct) forward current	T_{case} = 100°C	8600	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 100°C	4220	A
$I_{F(RMS)}$	RMS value	T_{case} = 100°C	6630	A
I_F	Continuous (direct) forward current	T_{case} = 100°C	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 43.0kN with mounting compound	Double side	-	0.002	°C/W
			Single side	-	0.004	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	200	°C
		Reverse (blocking)		-	190	°C
T_{stg}	Storage temperature range			–55	190	°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°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

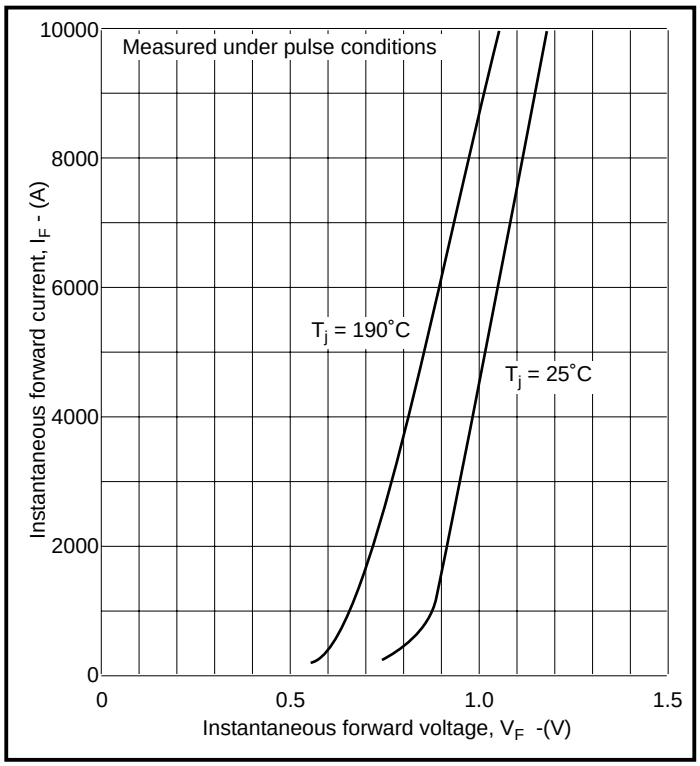


Fig.2 Maximum (limit) forward characteristics

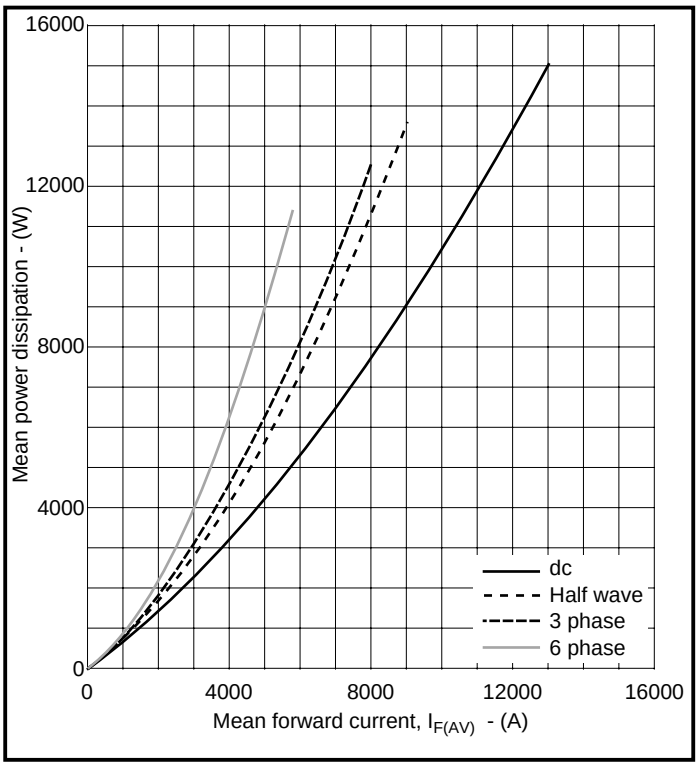


Fig.3 Dissipation curves

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 = 125˚C for I_F 500A to 16000A

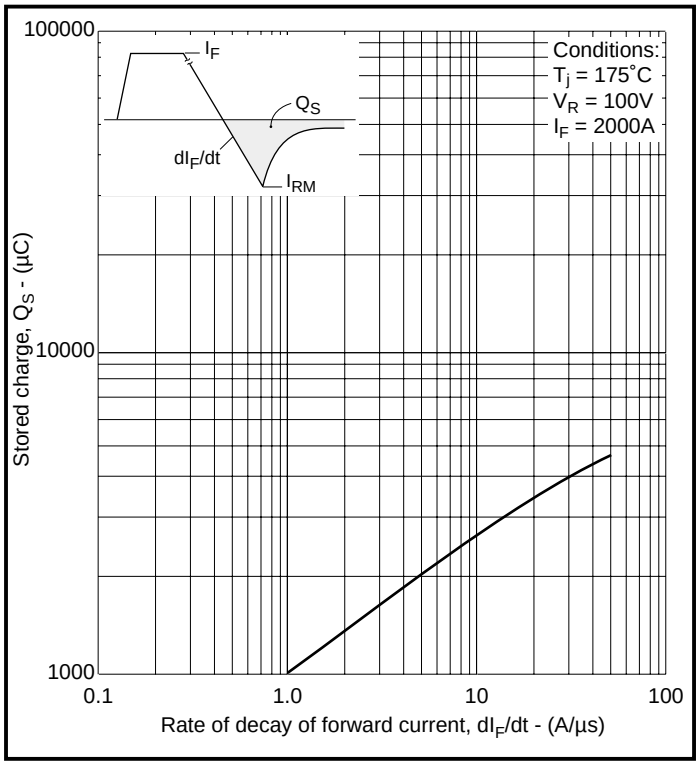


Fig.4 Total stored charge

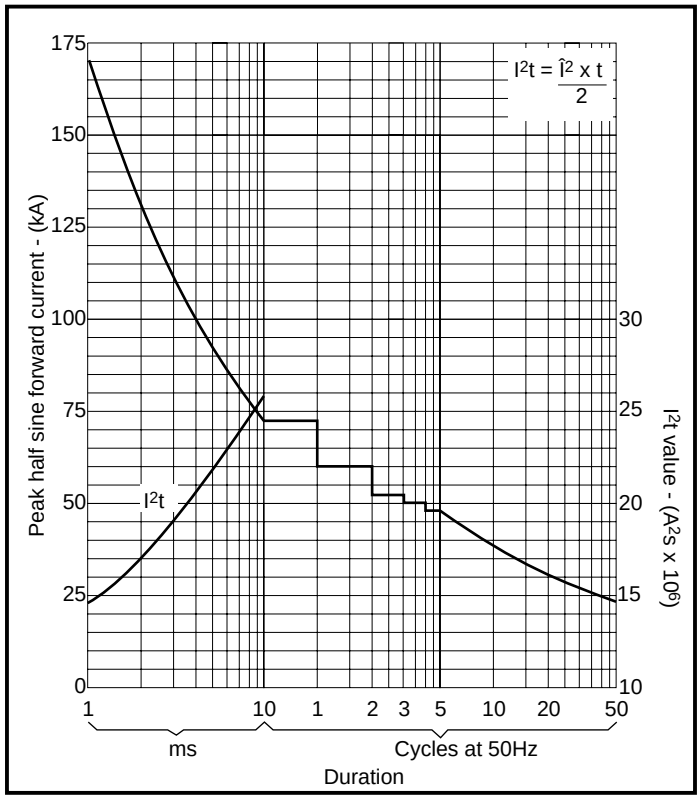
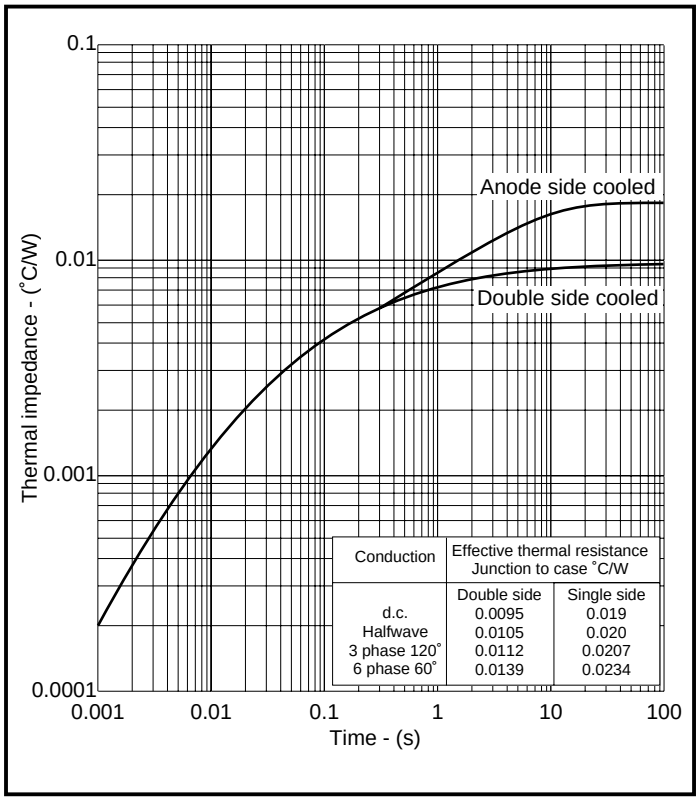


Fig.5 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at T_{case} 190˚C)

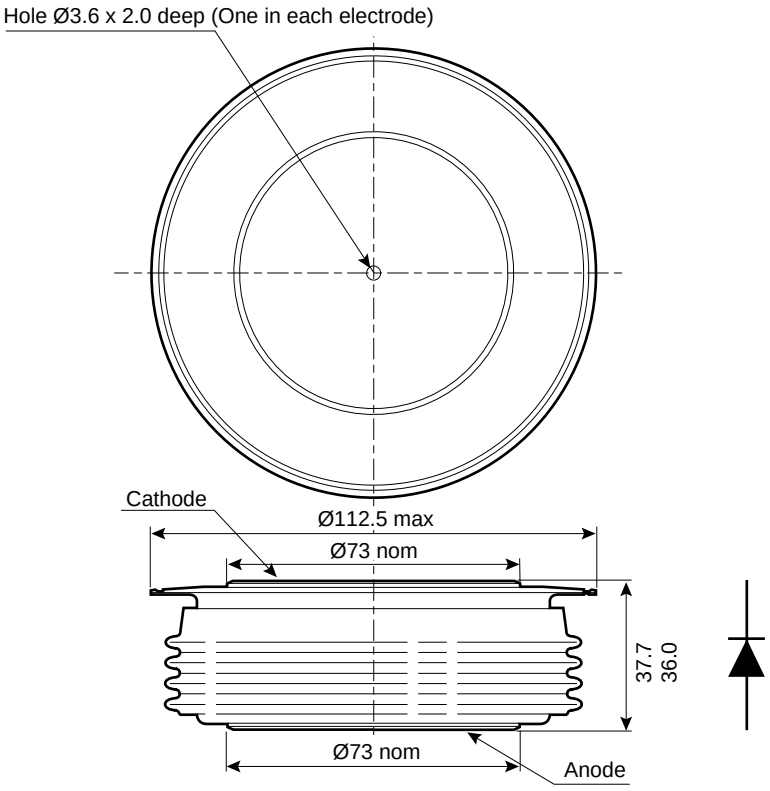


Conduction	Effective thermal resistance Junction to case ˚C/W	
	Double side	Single side
d.c.	0.0095	0.019
Halfwave	0.0105	0.020
3 phase 120˚	0.0112	0.0207
6 phase 60˚	0.0139	0.0234

Fig.7 Maximum (limit) transient thermal impedance - junction to case

PACKAGE DETAILS

For further package information, please contact your nearest Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Nominal weight: 1600g
Clamping force: 50kN ±10%

Package outine type code: Y

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 / clamping systems in line with advances in device types and the voltage 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 continues to offer high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

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

DEVICE CLAMPS

Disc devices require the correct clamping force to ensure their safe operation. The PACs range offers a varied selection of pre-loaded clamps to suit all of our manufactured devices. This include cube clamps for single side cooling of 'T' 22mm

Clamps are available for single or double side cooling, with high insulation versions for high voltage assemblies.

Please refer to our application note on device clamping, AN4839

HEATSINKS

Power Assembly has its own proprietary range of extruded aluminium heatsinks. They have been designed to optimise the performance or our 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.

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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.

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