DS502ST

Rectifier Diode

Replaces October 2001 version, DS4794-4.0

DS4794-5.1 June 2002

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

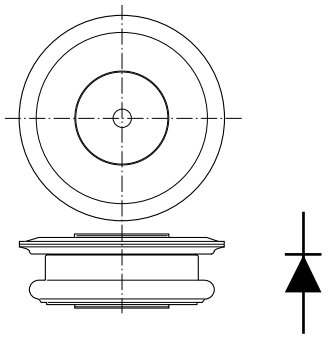
- Rectification
- Freewheel Diode
- DC Motor Control
- Power Supplies
- Welding
- Battery Chargers

KEY PARAMETERS

V_{RRM} **1400V**

$I_{F(AV)}$ **866A**

I_{FSM} **8000A**



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

Fig. 1 Package outline

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
DS502ST14	1400	$V_{RSM} = V_{RRM} + 100V$
DS502ST13	1300	
DS502ST12	1200	
DS502ST11	1100	
DS502ST10	1000	
DS502ST09	900	

Lower voltage grades available.

CURRENT RATINGS

ORDERING INFORMATION

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

DS502ST14

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	866	A
$I_{F(RMS)}$	RMS value	-	1360	A
I_F	Continuous (direct) forward current	-	1236	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	556	A
$I_{F(RMS)}$	RMS value	-	873	A
I_F	Continuous (direct) forward current	-	721	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	710	A
$I_{F(RMS)}$	RMS value	-	1115	A
I_F	Continuous (direct) forward current	-	994	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	449	A
$I_{F(RMS)}$	RMS value	-	705	A
I_F	Continuous (direct) forward current	-	569	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; T_{case} = 175°C	6.5	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - 1/4 sine	211 x 10^3	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; T_{case} = 175°C	8.0	kA
I^2t	I^2t for fusing	V_R = 0	320 x 10^3	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	-	0.07	°C/W
		Single side cooled	Anode dc	-	0.14	°C/W
			Cathode dc	-	0.14	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 4.5kN with mounting compound	Double side	-	0.02	°C/W
			Single side	-	0.04	°C/W
T_{vj}	Virtual junction temperature	Forward (conducting)		-	185	°C
		Reverse (blocking)		-	175	°C
T_{stg}	Storage temperature range			–55	200	°C
-	Clamping force			3.5	5.0	kN

CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Max.	Units
I_{RM}	Peak reverse current	At V_{RRM}, T_{case} = 175°C	-	30	mA
V_{TO}	Threshold voltage	At T_{vj} = 175°C	-	0.76	V
r_T	Slope resistance	At T_{vj} = 175°C	-	0.32	mΩ

CURVES

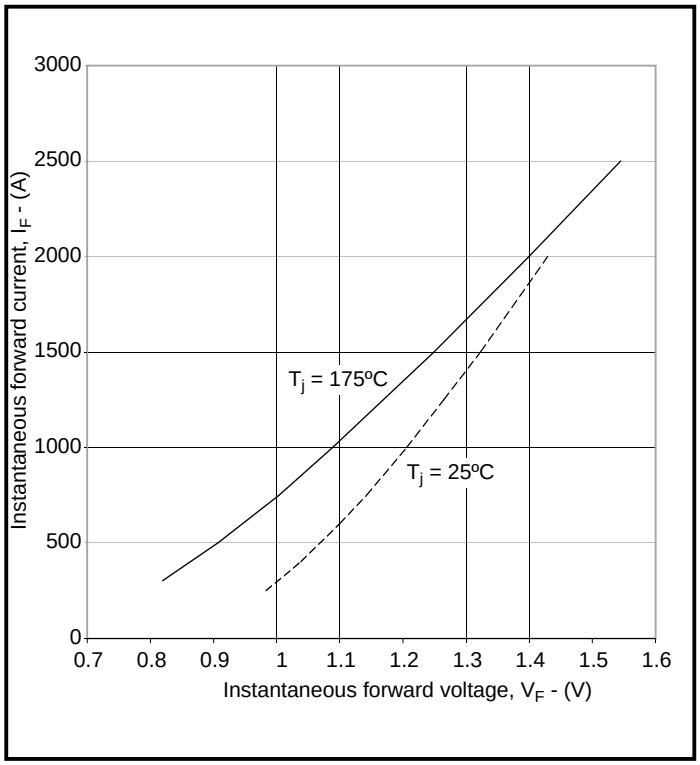


Fig.2 Maximum (limit) forward characteristics

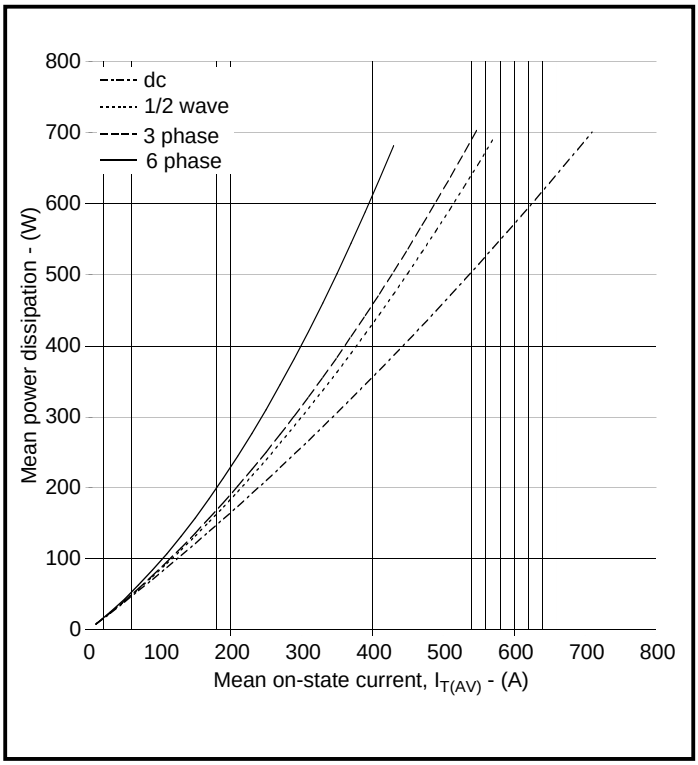


Fig.3 Dissipation curves

V_{FM} Equation:-

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

Where A = 0.137416004
B = 0.109992
C = 0.000247686
D = –0.001728407

these values are valid for T_j = 175˚C for I_F 500A to 2500A

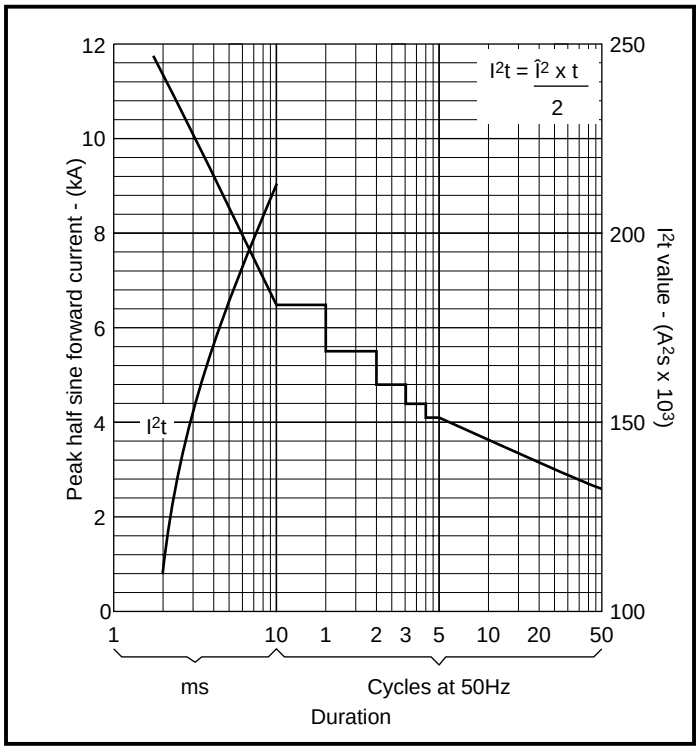
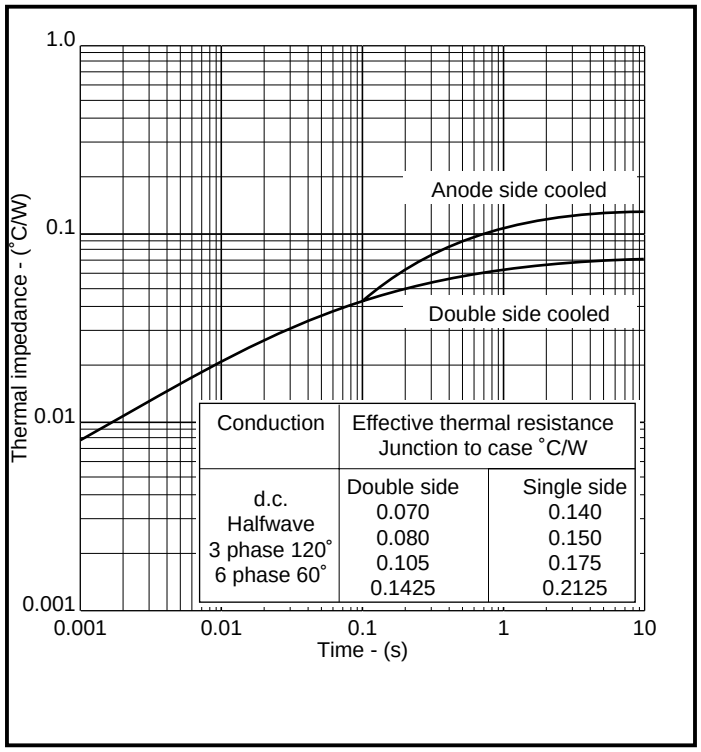


Fig.4 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at T_{case} 175˚C)

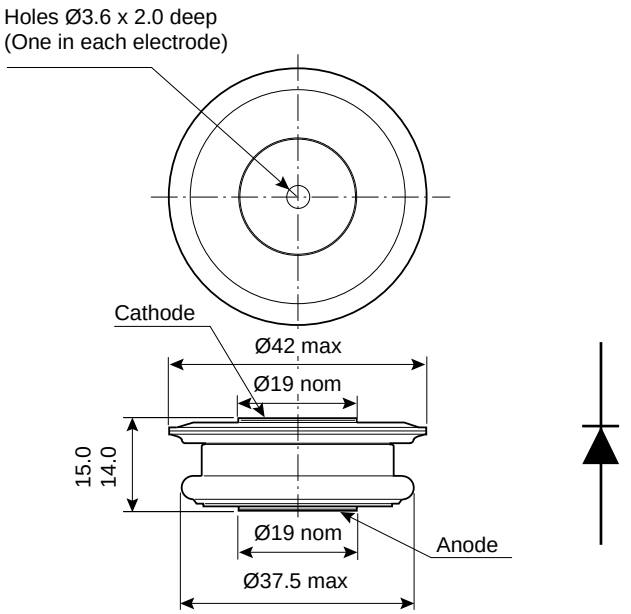


Conduction	Effective thermal resistance Junction to case ˚C/W	
	Double side	Single side
d.c.	0.070	0.140
Halfwave	0.080	0.150
3 phase 120˚	0.105	0.175
6 phase 60˚	0.1425	0.2125

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.



Nominal weight: 55g
Clamping force: 4.5kN ±10%

Package outine type code: T

Note:
1. Package may be 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 continues to offer 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).

DEVICE CLAMPS

Disc devices require the correct clamping force to ensure their safe operation. The PACS range includes a varied selection of pre-loaded clamps to suit all of our manufactured devices. Types available include cube clamps for single side cooling of 'T' 23mm and 'E' 30mm discs, and bar clamps right up to 83kN for our 'Z' 100mm thyristors and diodes.

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

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks. They 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 service office.

DYNEX SEMICONDUCTOR

http://www.dynexsemi.com

e-mail: power_solutions@dynexsemi.com

HEADQUARTERS OPERATIONS
DYNEX SEMICONDUCTOR LTD
Doddington Road, Lincoln.
Lincolnshire. LN6 3LF. United Kingdom.
Tel: 00-44-(0)1522-500500
Fax: 00-44-(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 & Spain: Tel: +33 (0)2 47 55 75 52. Fax: +33 (0)2 47 55 75 59.
Germany, Northern Europe & Rest Of World: Tel: +44 (0)1522 502753 / 502901. Fax: +44 (0)1522 500020
North America: Tel: (613) 723-7035. Fax: (613) 723-1518. Toll Free: 1.888.33.DYNEX (39639) /
Tel: (949) 733-3005. Fax: (949) 733-2986.

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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.