# DSF21545SV

## Fast Recovery Diode

Replaces January 2000 version, DS4153-4.0

DS4153-5.0 June 2004

## APPLICATIONS

■ The DSF21545SV is a purpose designed freewheel diode to complement the DG858BW GTO in inverter circuits, using energy recovery snubbers.

## KEY PARAMETERS

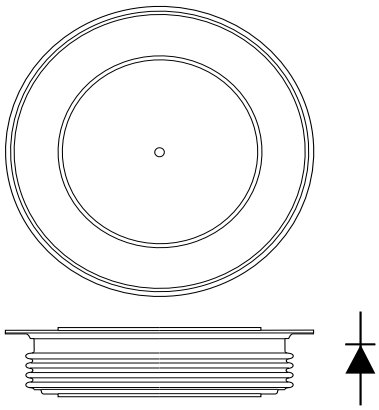
| | |
|---|---|
| $V_{RRM}$ | 4500V |
| $I_{F(AV)}$ | 3230A |
| $I_{FSM}$ | 20000A |
| $Q_r$ | 1800μC |
| $t_{rr}$ | 7.0μs |

## FEATURES

■ The DSF21545SV is designed for fast turn-on thus minimising reverse current through the GTO.

■ Low recovered charge for low losses.

■ DSF21545SV is housed in a similar outline to that of the DG858BW therefore offering complete mechanical compatibility for parallel and series clamping.



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

**Fig. 1 Package outline**

## VOLTAGE RATINGS

| Type Number | Repetitive Peak Reverse Voltage $V_{RRM}$ V | Conditions |
|---|---|---|
| DSF21545SV45 | 4500 | $V_{RSM} = V_{RRM} + 100V$ |

Lower voltage grades available.

## ORDERING INFORMATION

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

**DSF21545SV45**

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

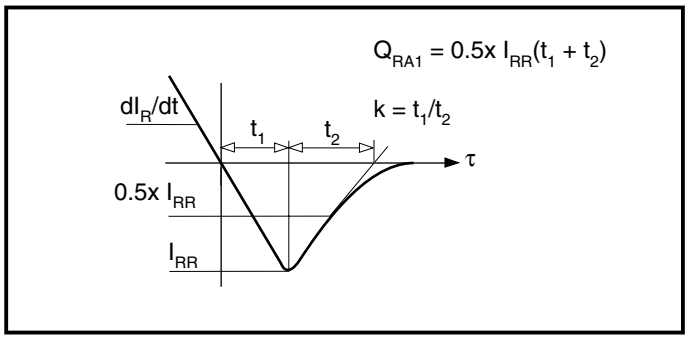
## CURRENT RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|---|---|---|---|---|
| **Double Side Cooled** | | | | |
| $I_{F(AV)}$ | Mean forward current | Half wave resistive load, $T_{case}$ = 65°C | 3230 | A |
| $I_{F(RMS)}$ | RMS value | $T_{case}$ = 65°C | 5080 | A |
| $I_F$ | Continuous (direct) forward current | $T_{case}$ = 65°C | 4680 | A |
| **Single Side Cooled (Anode side)** | | | | |
| $I_{F(AV)}$ | Mean forward current | Half wave resistive load, $T_{case}$ = 65°C | 2070 | A |
| $I_{F(RMS)}$ | RMS value | $T_{case}$ = 65°C | 3255 | A |
| $I_F$ | Continuous (direct) forward current | $T_{case}$ = 65°C | 2875 | A |

## SURGE RATINGS

| Symbol | Parameter | Conditions | Max. | Units |
|---|---|---|---|---|
| $I_{FSM}$ | Surge (non-repetitive) forward current | 10ms half sine; with 0% $V_{RRM}$, $T_j$ = 150°C | 20 | kA |
| $I^2t$ | $I^2t$ for fusing | | $2.0 \times 10^6$ | $A^2s$ |
| $I_{FSM}$ | Surge (non-repetitive) forward current | 10ms half sine; with 50% $V_{RRM}$, $T_j$ = 150°C | 16 | kA |
| $I^2t$ | $I^2t$ for fusing | | $1.28 \times 10^6$ | $A^2s$ |
| $I_{FSM}$ | Surge (non-repetitive) forward current | 10ms half sine; with 100% $V_{RRM}$, $T_j$ = 150°C | - | kA |
| $I^2t$ | $I^2t$ for fusing | | - | $A^2s$ |

## DEFINITION OF K FACTOR AND $Q_{RA1}$



## THERMAL AND MECHANICAL DATA

| Symbol | Parameter | Conditions | | Min. | Max. | Units |
|---|---|---|---|---|---|---|
| $R_{th(j-c)}$ | Thermal resistance - junction to case | Double side cooled | dc | - | 0.0075 | °C/W |
| | | Single side cooled | Anode dc | - | 0.015 | °C/W |
| | | | Cathode dc | - | 0.015 | °C/W |
| $R_{th(c-h)}$ | Thermal resistance - case to heatsink | Clamping force 35.0kN with mounting compound | Double side | - | 0.002 | °C/W |
| | | | Single side | - | 0.004 | °C/W |
| $T_{vj}$ | Virtual junction temperature | On-state (conducting) | | - | 150 | °C |
| $T_{stg}$ | Storage temperature range | | | -55 | 150 | °C |
| - | Clamping force | | | 34 | 48 | kN |

## CHARACTERISTICS

| Symbol | Parameter | Conditions | Typ. | Max. | Units |
|---|---|---|---|---|---|
| $V_{FM}$ | Forward voltage | At 3000A peak, $T_{case}$ = 25°C | - | 2.0 | V |
| $I_{RRM}$ | Peak reverse current | At $V_{RRM}$, $T_{case}$ = 150°C | - | 150 | mA |
| $t_{rr}$ | Reverse recovery time | $I_F$ = 1000A, $di_{RR}/dt$ = 100A/µs<br>$T_{case}$ = 150°C, $V_R$ = 100V | 7.0 | - | µs |
| $Q_{RA1}$ | Recovered charge (50% chord) | | - | 1800 | µC |
| $I_{RM}$ | Reverse recovery current | | - | 500 | A |
| K | Soft factor | | 2 | - | - |
| $V_{TO}$ | Threshold voltage | At $T_{vj}$ = 150°C | - | 1.25 | V |
| $r_T$ | Slope resistance | At $T_{vj}$ = 150°C | - | 0.25 | mΩ |
| $V_{FRM}$ | Forward recovery voltage | di/dt = 1000A/µs, $T_j$ = 125°C | - | 75 | V |

## CURVES

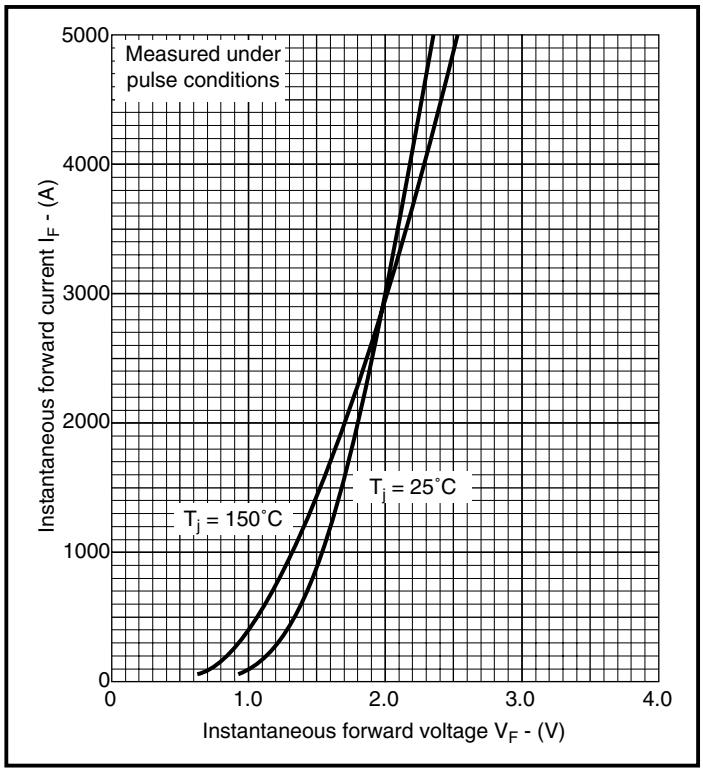



**Fig.2 Maximum (limit) forward characteristics**

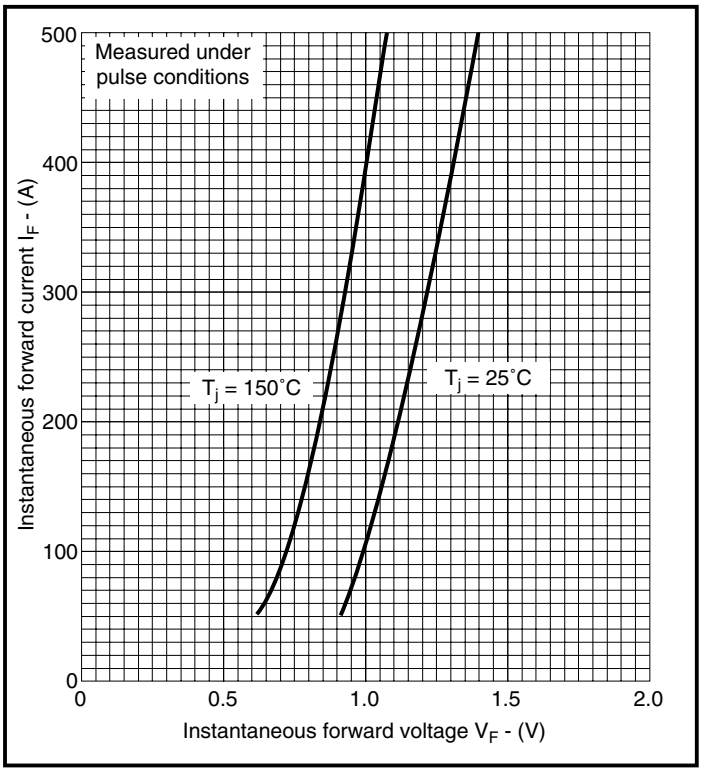



**Fig.3 Maximum (limit) forward characteristics**

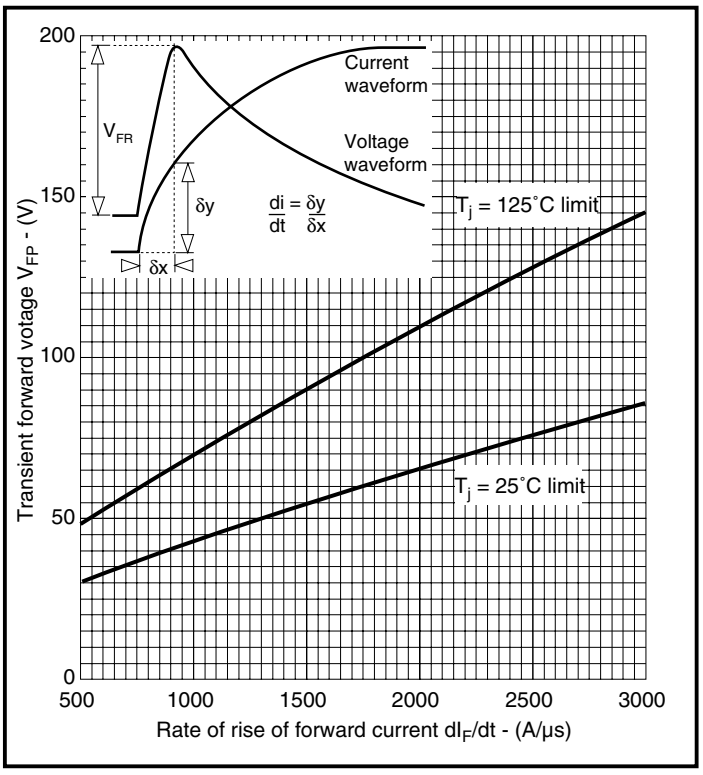



**Fig.4 Transient forward voltage vs rate of rise of forward current**

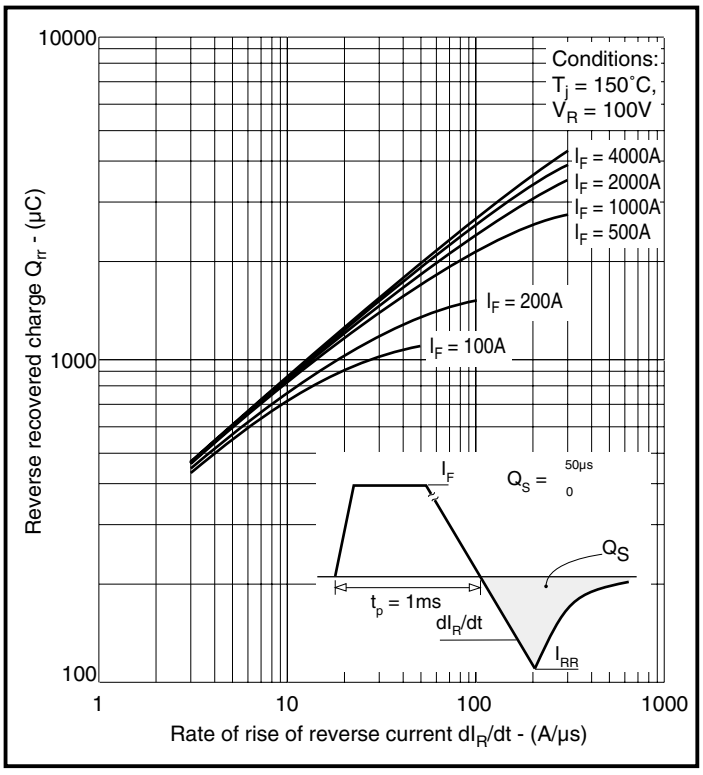



**Fig.5 Recovered charge**

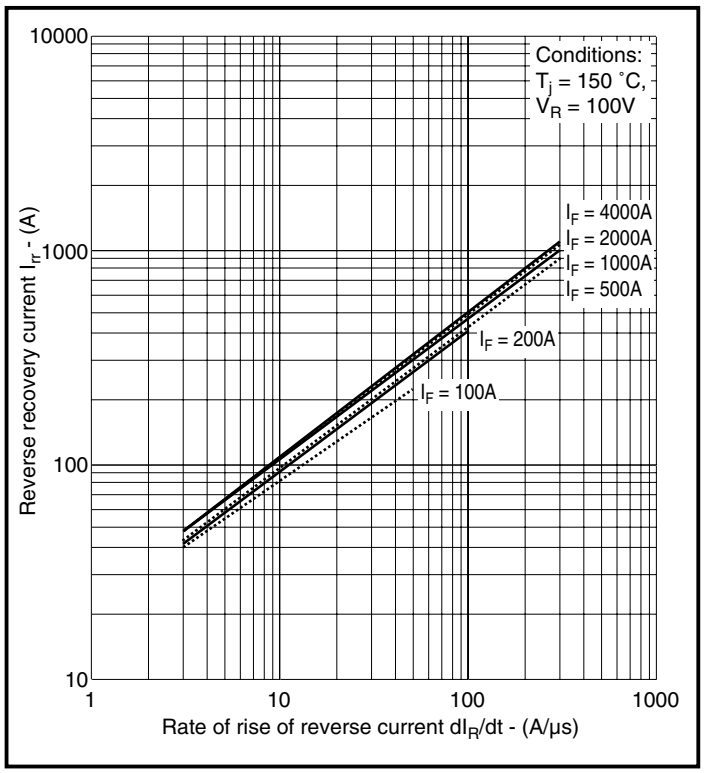



**Fig.6 Typical reverse recovery current vs rate of rise of forward current**

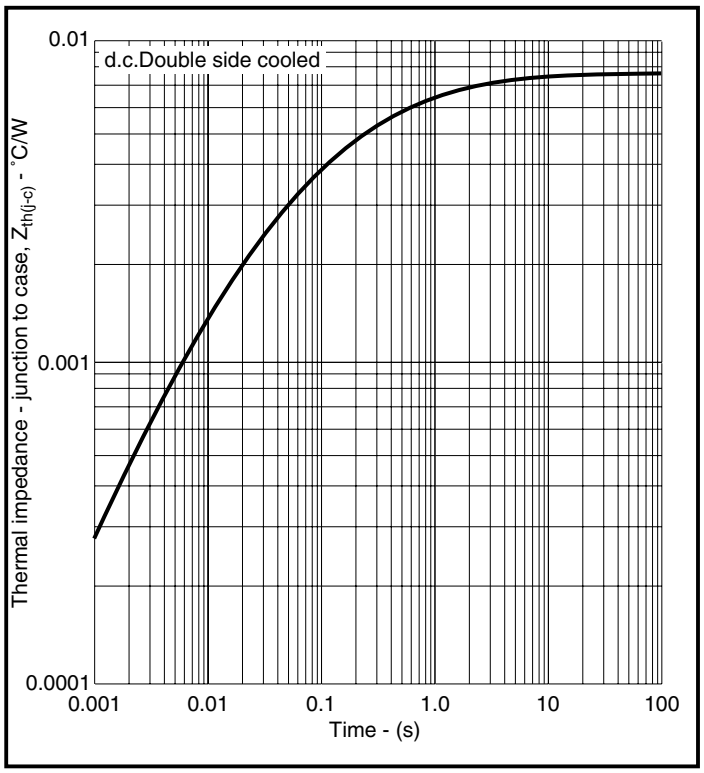
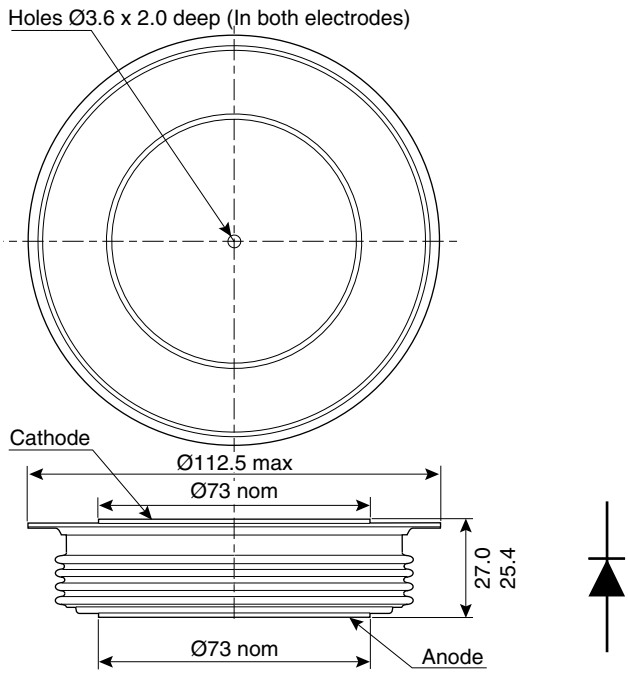



**Fig.7 Maximum (limit) transient thermal impedance - junction to case - (˚C/W)**

## PACKAGE DETAILS

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




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

**Package outline type code: V**

## 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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