DCR803SG

Phase Control Thyristor

Supersedes January 2000 version, DS4451-4.0

DS4451-5.0 July 2001

FEATURES

- Double Side Cooling
- High Surge Capability
- High Mean Current
- Fatigue Free

APPLICATIONS

- High Power Drives
- High Voltage Power Supplies
- DC Motor Control

KEY PARAMETERS

V_{DRM} 1800V

$I_{T(AV)}$ 1045A

I_{TSM} 14000A

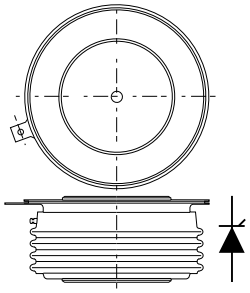
dVdt 1000V/μs

dI/dt 1000A/μs

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
DCR803SG18	1800	T_{vj} = 0˚ to 125˚C, I_{DRM} = I_{RRM} = 50mA, V_{DRM}, V_{RRM} t_p = 10ms, V_{DSM} & V_{RSM} = V_{DRM} & V_{RRM} + 100V respectively
DCR803SG17	1700	
DCR803SG16	1600	
DCR803SG15	1500	
DCR803SG14	1400	

Lower voltage grades available.



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

Fig. 1 Package outline

ORDERING INFORMATION

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

For example:

DCR806SG26

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

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CURRENT RATINGS

T_{case} = 60°C unless stated otherwise

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	1045	A
$I_{T(RMS)}$	RMS value	-	1641	A
I_T	Continuous (direct) on-state current	-	1450	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	675	A
$I_{T(RMS)}$	RMS value	-	1060	A
I_T	Continuous (direct) on-state current	-	862	A

CURRENT RATINGS

T_{case} = 80°C unless stated otherwise

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	820	A
$I_{T(RMS)}$	RMS value	-	1285	A
I_T	Continuous (direct) on-state current	-	1085	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	505	A
$I_{T(RMS)}$	RMS value	-	793	A
I_T	Continuous (direct) on-state current	-	620	A

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SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	11.2	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - 1/4 sine	625 x 10^3	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	14.0	kA
I^2t	I^2t for fusing	V_R = 0	975 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	-	0.032	°C/W
		Single side cooled	Anode dc	-	0.064	°C/W
			Cathode dc	-	0.064	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 12.5kN with mounting compound	Double side	-	0.008	°C/W
			Single side	-	0.016	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	135	°C
		Reverse (blocking)		-	125	°C
T_{stg}	Storage temperature range			-55	125	°C
-	Clamping force			11.0	13.0	kN

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DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions		Typ.	Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM}, T_{case} = 125°C		-	50	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% V_{DRM} T_j = 125°C. Gate open circuit.		-	1000	V/µs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1500A Gate source 1.5A t_r = 0.5µs, T_j = 125°C	Repetitive 50Hz	-	500	A/µs
			Non-repetitive	-	1000	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125°C		-	0.85	V
r_T	On-state slope resistance	At T_{vj} = 125°C		-	0.38	mΩ
t_{gd}	Delay time	V_D = 67% V_{DRM}, Gate source 30V, 15Ω t_r = 0.5µs, T_j = 25°C		-	1.5	µs
t_q	Turn-off time	I_T = 1000A, t_p = 1ms, T_j = 125°C, V_R = 50V, dI_{RR}/dt = 20A/µs, V_{DR} = 67% V_{DRM}, dV_{DR}/dt = 20V/µs linear		200	300	µs
I_L	Latching current	T_j = 25°C, V_D = 5V		350	1000	mA
I_H	Holding current	T_j = 25°C, V_D = 5V		40	100	mA

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 5V, T_{case} = 25°C	1.0	3.5	V
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25°C	-	200	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125°C	-	0.25	V
I_{GD}	Gate non-trigger current	At V_{DRM} T_{case} = 125°C	-	-	A
V_{FGM}	Peak forward gate voltage	Anode positive with respect to cathode	-	30	V
V_{FGN}	Peak forward gate voltage	Anode negative with respect to cathode	-	0.25	V
V_{RGM}	Peak reverse gate voltage		-	5	V
I_{FGM}	Peak forward gate current	Anode positive with respect to cathode	-	30	A
P_{GM}	Peak gate power	See table, gate characteristics curve	-	150	W
$P_{G(AV)}$	Mean gate power		-	10	W

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CURVES

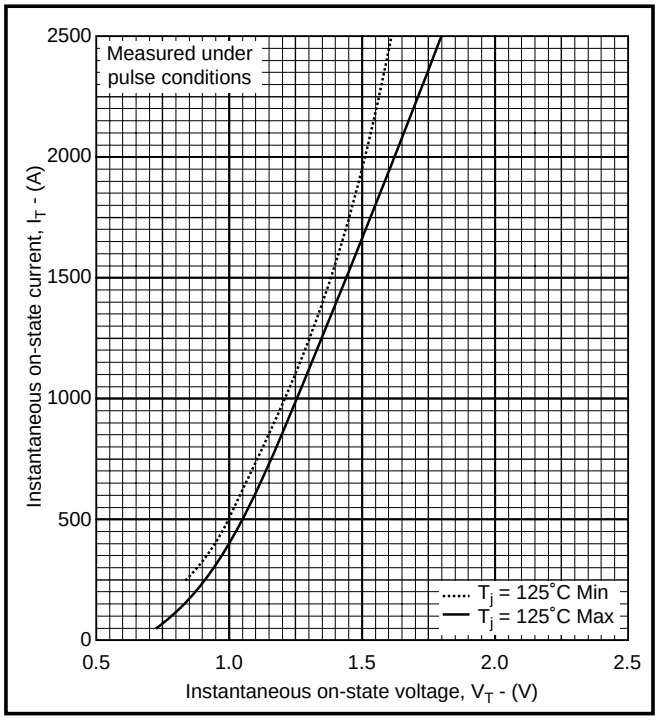

Fig.2 Maximum (limit) on-state characteristics

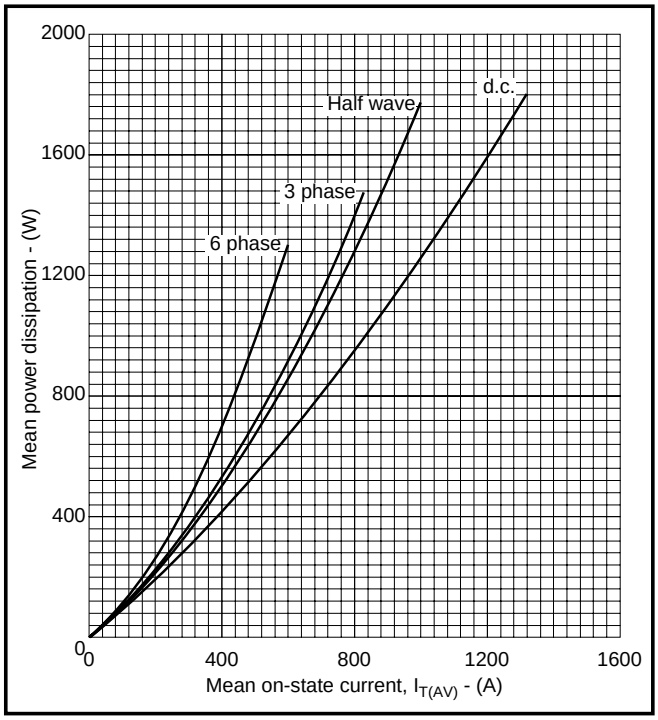

Fig.3 Dissipation curves

V_{TM} Equation:-

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

Where A = 0.464203
B = 0.51516
C = 0.000249
D = 0.005951

these values are valid for T_j = 125˚C for I_T 500A to 2500A

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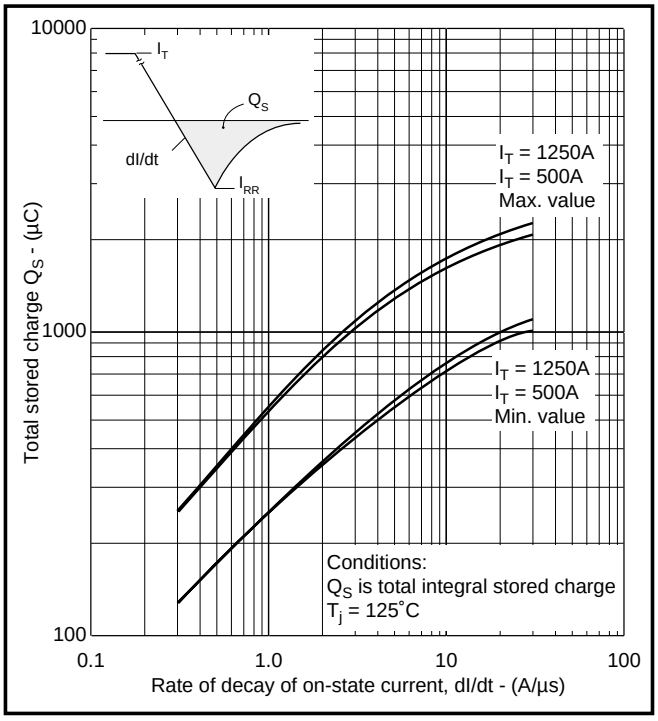

Fig.4 Stored charge

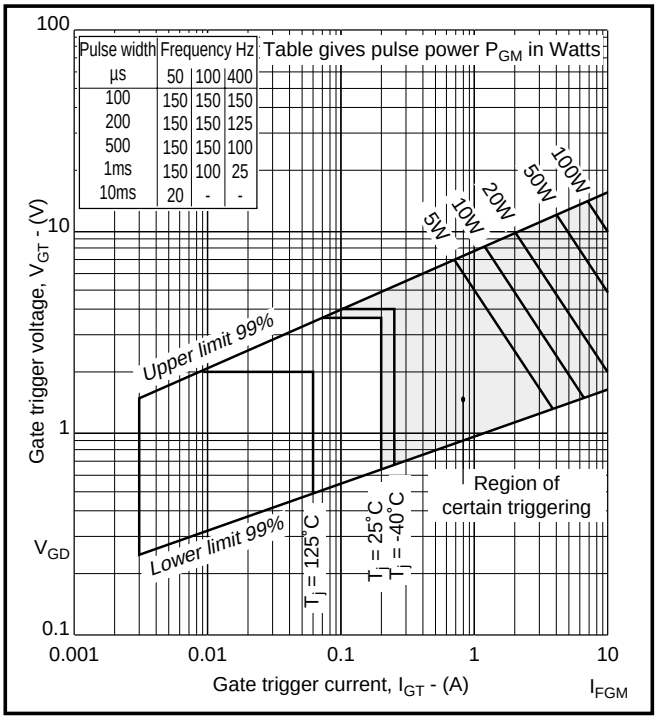

Fig.5 Gate characteristics

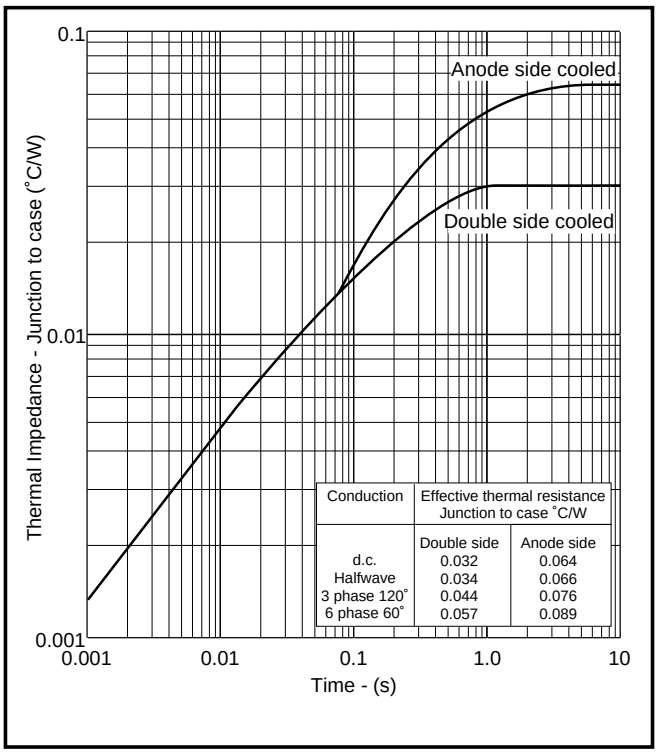

Fig.6 Maximum (limit) transient thermal impedance - junction to case

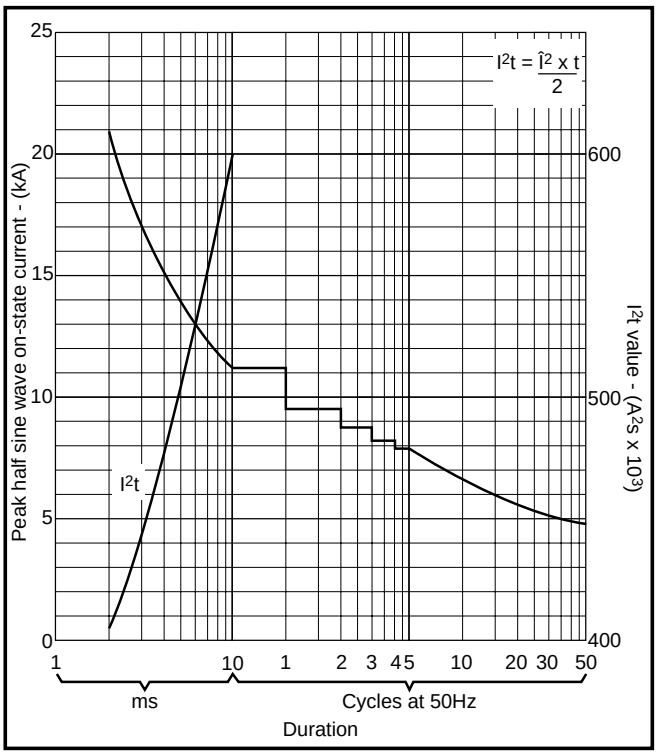

Fig.7 Surge (non-repetitive) on-state current vs time (with 50% V_{RRM} at T_{case} 125˚C)

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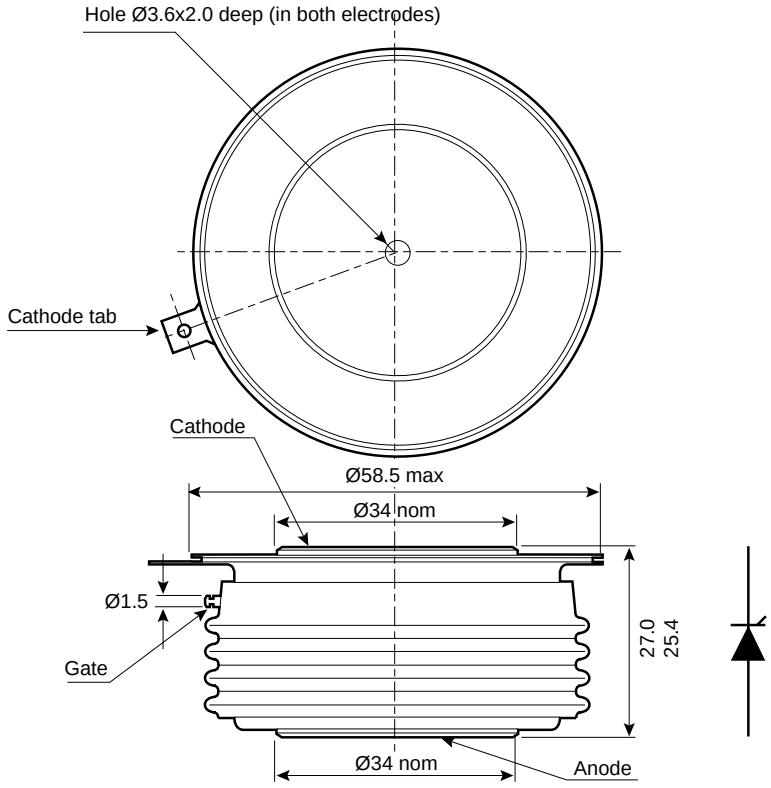
PACKAGE DETAILS

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



Nominal weight: 250g
Clamping force: 12.5kN ±10%
Lead length: 420mm
Lead terminal connector: M4 ring

Package outline type code: G

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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.

http://www.dynexsemi.com

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

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

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