

Features

- Double Side Cooling.
- High Surge Capability.

Applications

- High Power Drives.
- High Voltage Power Supplies.
- DC Motor Control.
- Welding.
- Battery Chargers.

Key Parameters

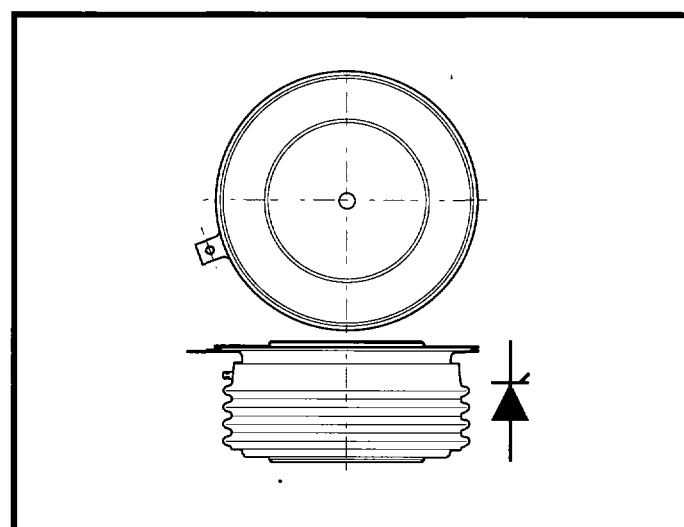
V_{DRM}	6500V
$I_{T(AV)}$	310A
I_{TSM}	6000A
dV/dt^*	1000V/ μ s
di/dt	100A/ μ s

*Higher dV/dt selections available

Voltage Ratings

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM}	Conditions
DCR820SG65	6500	$T_{vj} = 0^\circ \text{ to } 125^\circ\text{C}$, $I_{DRM} = I_{RRM} = 50\text{mA}$, V_{DRM} V_{RRM} $t_p =$ 10ms, V_{DSM} & $V_{RSM} =$ V_{DRM} & $V_{RRM} + 100\text{V}$ Respectively
DCR820SG64	6400	
DCR820SG63	6300	
DCR820SG62	6200	
DCR820SG61	6100	
DCR820SG60	6000	

Lower voltage grades available.



Outline type code: G.

See package details for further information.

Current Ratings

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^\circ\text{C}$	310	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^\circ\text{C}$	485	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^\circ\text{C}$	447	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^\circ\text{C}$	204	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^\circ\text{C}$	321	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^\circ\text{C}$	279	A

DCR820SG

Surge Ratings

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$ $V_R = 50\% V_{RRM} - 1/4$ sine	4.8	kA
I^2t	I^2t for fusing		115×10^3	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$ $V_R = 0$	6.0	kA
I^2t	I^2t for fusing		180×10^3	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	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.064	$^{\circ}C/W$
			Cathode dc	-	0.064	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 12.0kN with mounting compound	Double side	-	0.008	$^{\circ}C/W$
			Single side	-	0.016	$^{\circ}C/W$
T_{vj}	Virtual junction temperature	On-state (conducting)		-	135	$^{\circ}C$
		Reverse (blocking)		-	125	$^{\circ}C$
T_{stg}	Storage temperature range			-55	150	$^{\circ}C$
-	Clamping force			10.8	13.2	kN

Dynamic Characteristics

Symbol	Parameter	Conditions	Min.	Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$	-	50	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 125^{\circ}C$.	-	1000	V/ μs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A, Gate source 10V, 5 Ω $t_r \leq 0.5\mu s$, $T_j = 125^{\circ}C$.	Repetitive 50Hz	50	A/ μs
			Non-repetitive	100	A/ μs
$V_{T(TO)}$	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-	1.6	V
r_T	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	3.5	m Ω
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, Gate source 20V, 10 Ω Rise time 0.5 μs , $T_j = 25^{\circ}C$	-	3.3	μs
I_L	Latching current	$T_j = 25^{\circ}C$, $V_D = 20V$.	-	1	A
I_H	Holding current	$T_j = 25^{\circ}C$, $V_D = 5V$, $I_T = 5A$, $I_{TM} = 500A$	30	120	mA
t_q	Turn-off time	$I_T = 500A$, $t_p = 1ms$, $T_j = 125^{\circ}C$, $V_{RM} = 100V$, $dI_{RR}/dt = 10A/\mu s$, $dV_{DR}/dt = 25V/\mu s$ to 3000V	500	1200	μs
Q_S	Stored charge - triangular approximation through I_{RR} and 25% I_{RR}	$I_T = 320A$, $-dI_T/dt = 6A/\mu s$	600	1500	μC

Gate Trigger Characteristics and Ratings

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	-	3.0	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	-	300	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} , $T_{case} = 125^{\circ}C$	-	0.25	V
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	-	10	A
P_{GM}	Peak gate power	See Fig.7/8 Gate characteristics curves and table	-	100	W
$P_{G(AV)}$	Mean gate power		-	5	W

Curves

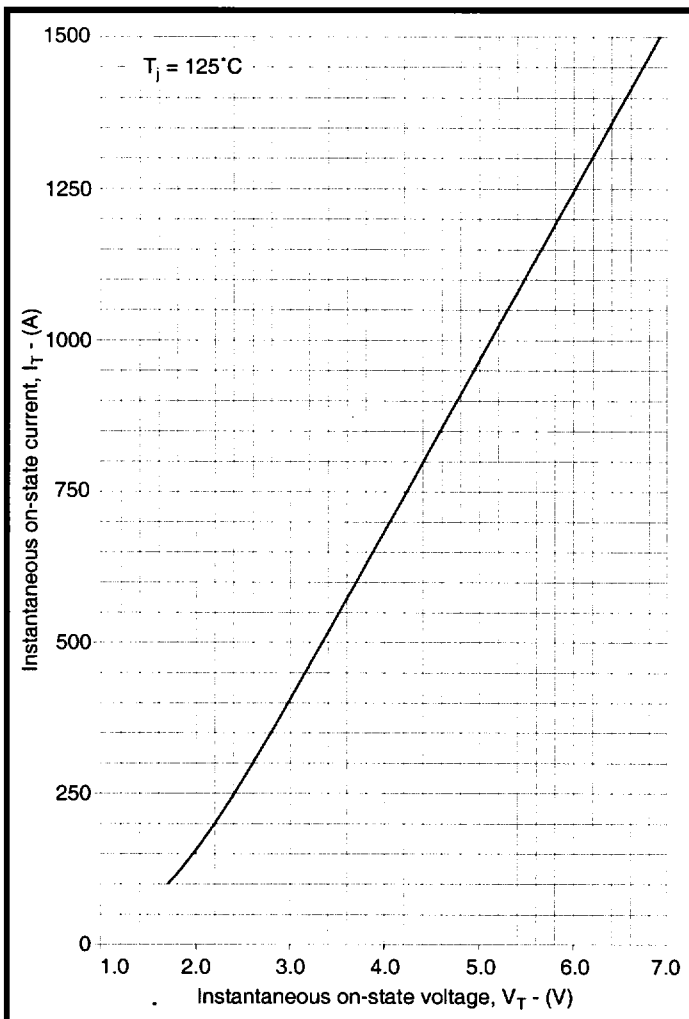


Fig.1 Maximum (limit) on-state characteristics

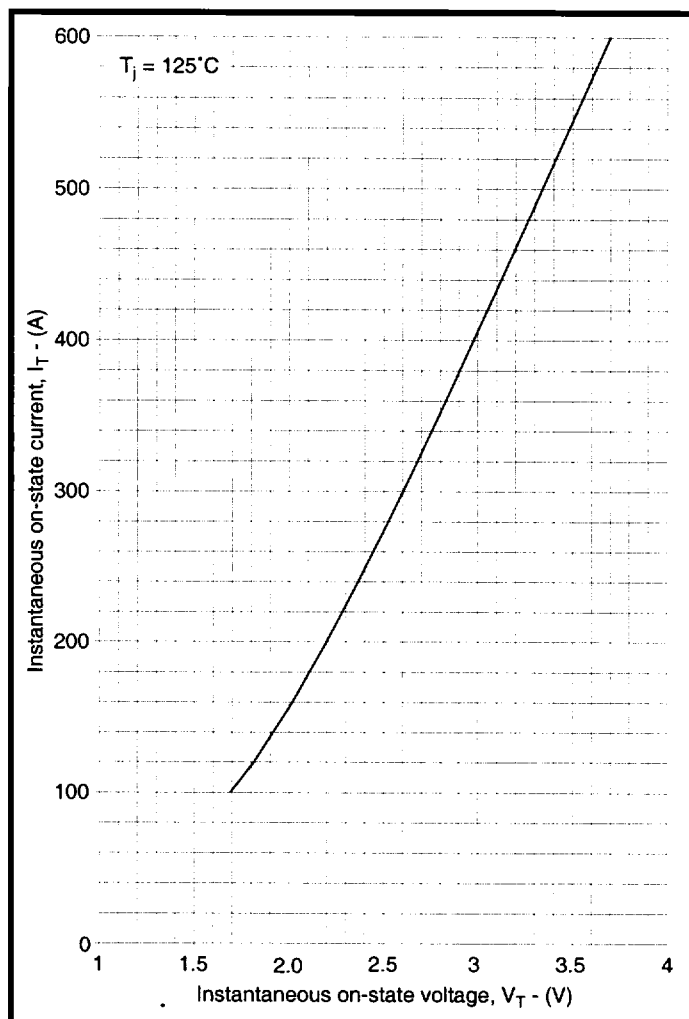


Fig.2 Maximum (limit) on-state characteristics

V_{TM} Equation:-

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

Where

$$A = -0.759775$$

$$B = 0.639225$$

$$C = 0.004376$$

$$D = -0.092153$$

these values are valid for $T_j = 125^\circ\text{C}$ for I_T 100A to 1500A

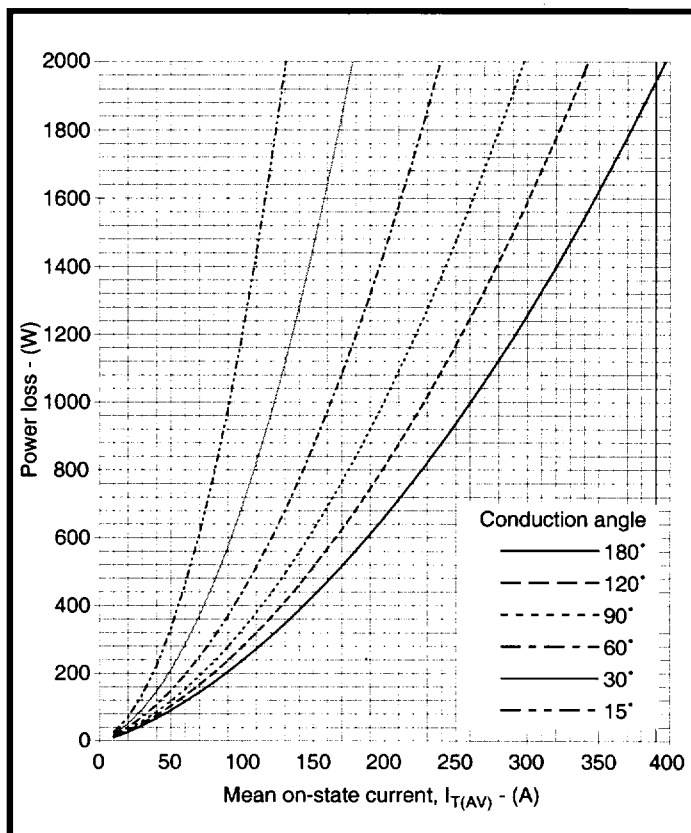


Fig.3 Sine wave power dissipation curves

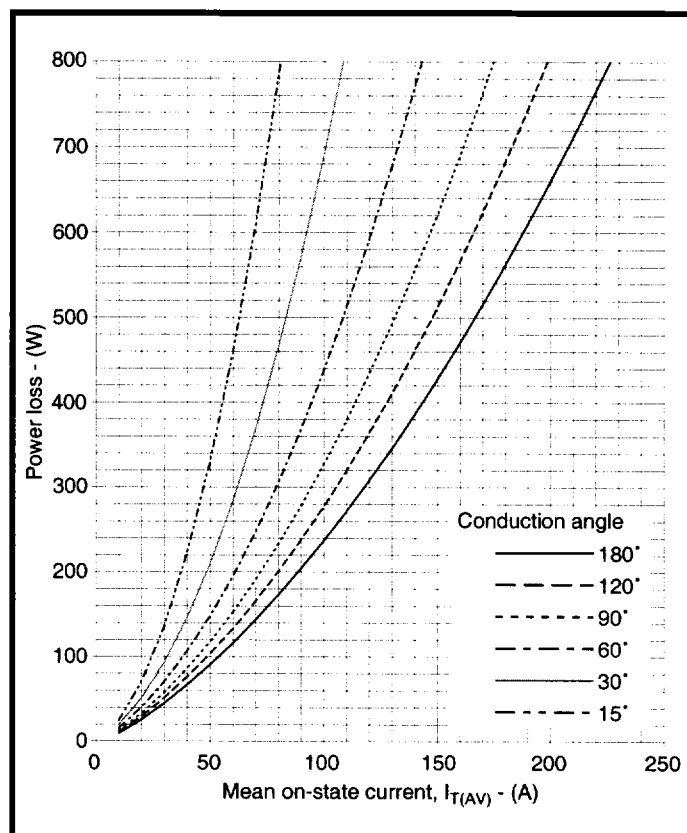


Fig.4 Sine wave power dissipation curves

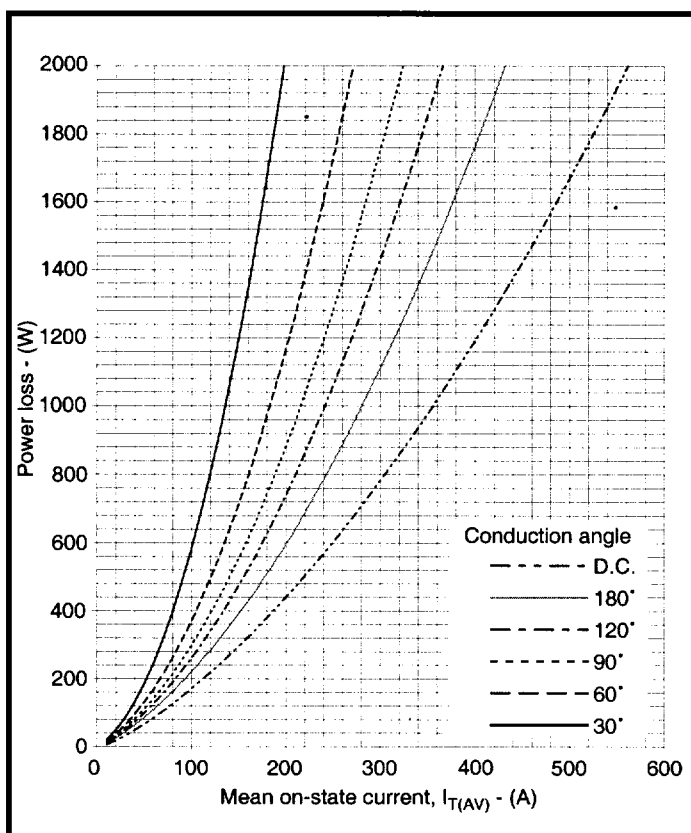


Fig.5 Square wave power dissipation curves

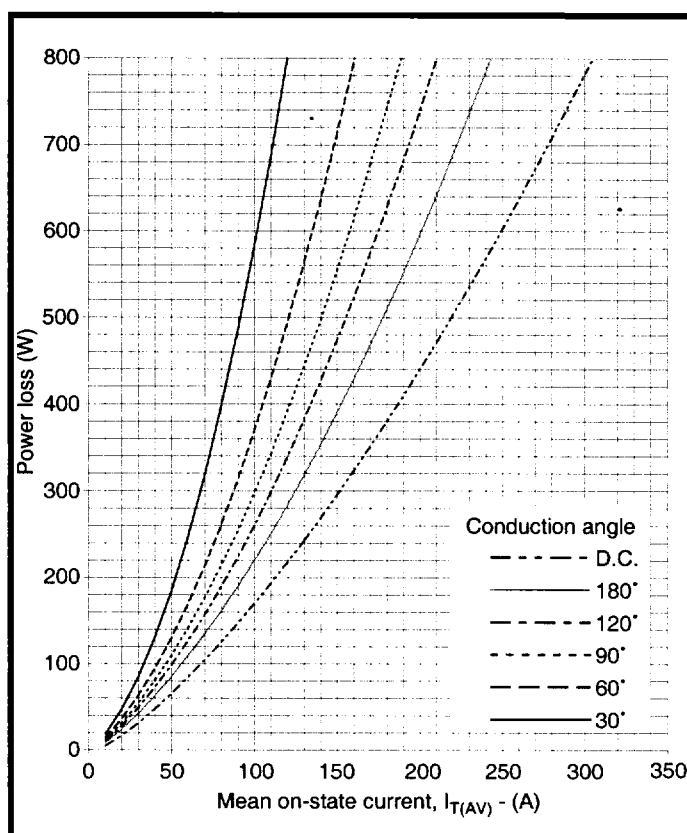


Fig.6 Square wave power dissipation curves

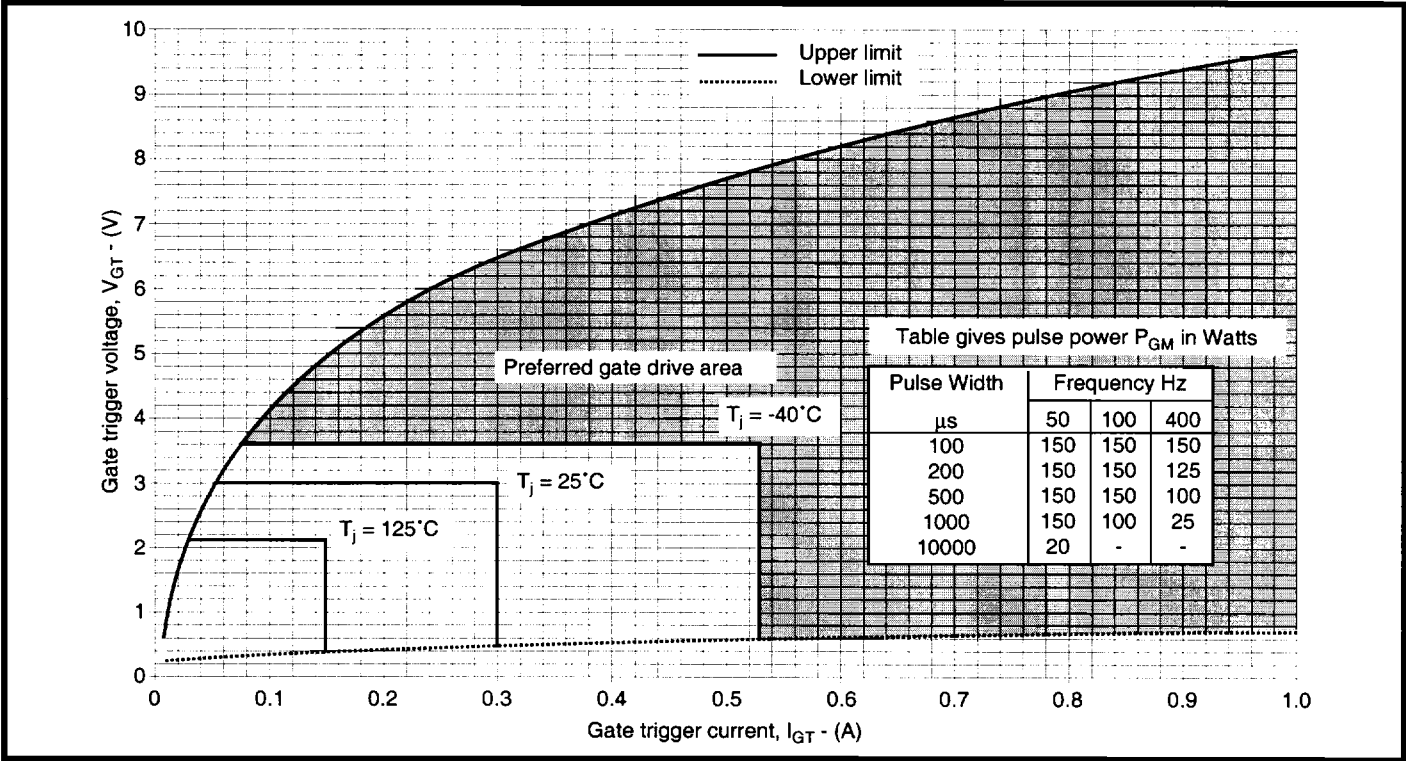


Fig.7 Gate characteristics

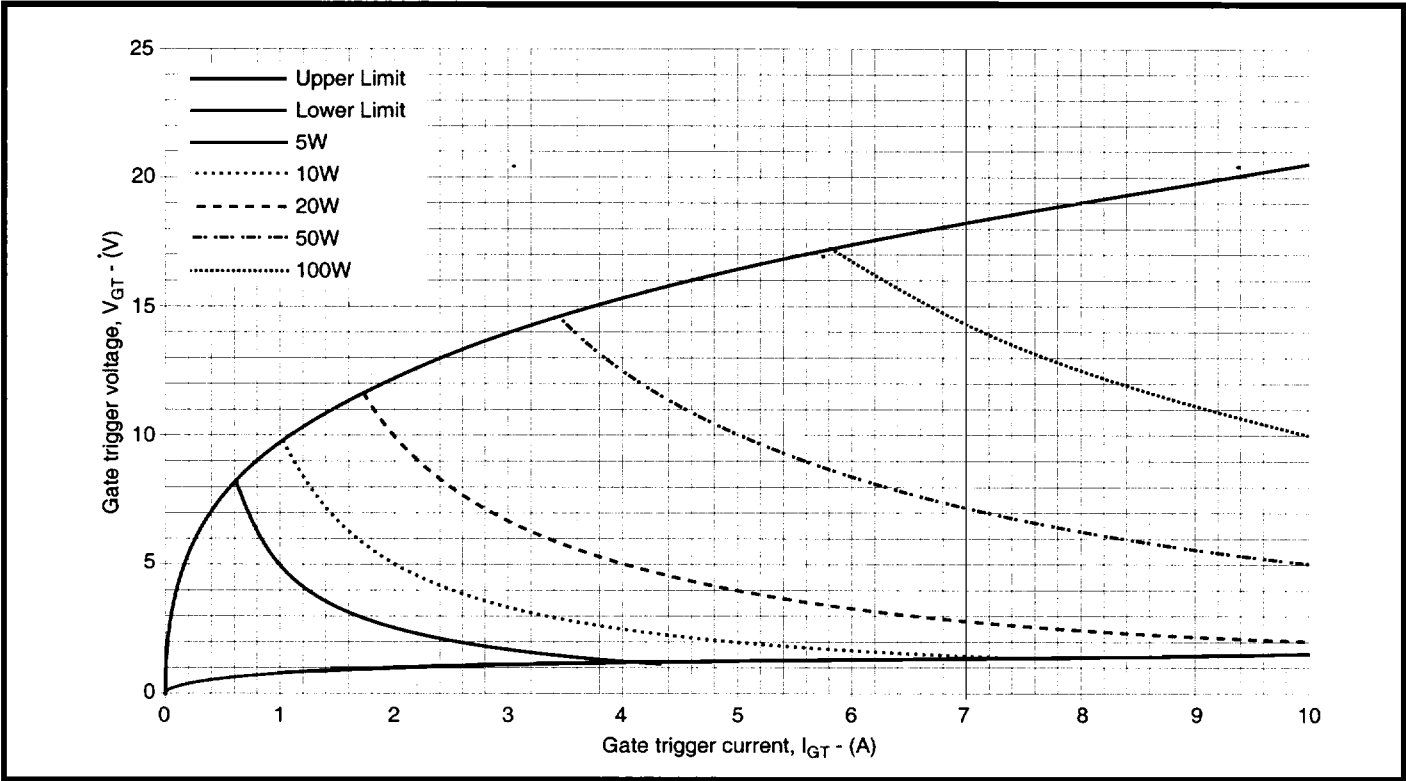


Fig.8 Gate characteristics

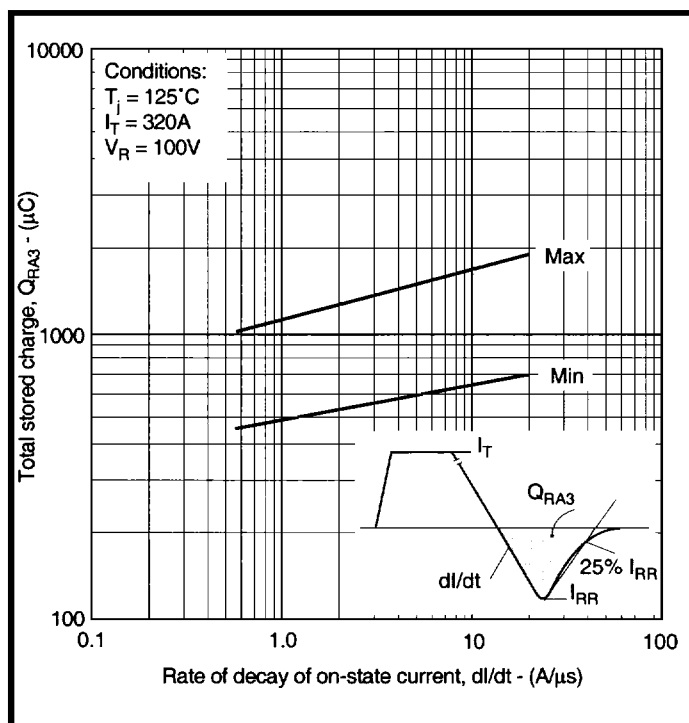


Fig.9 Stored charge

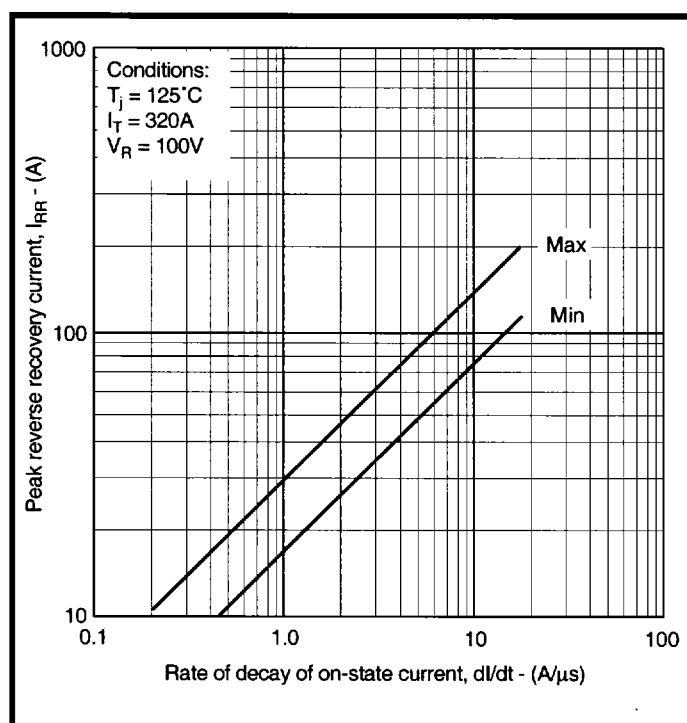
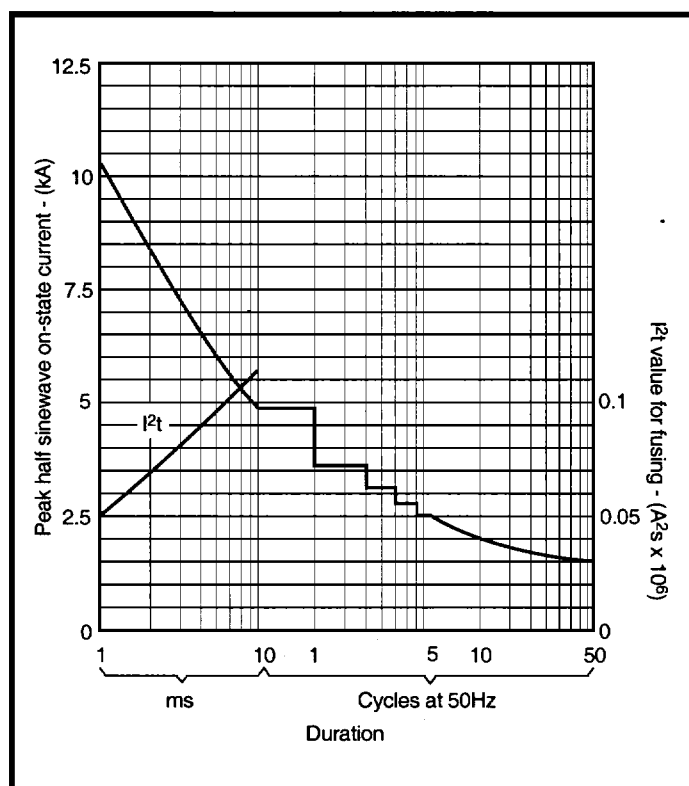
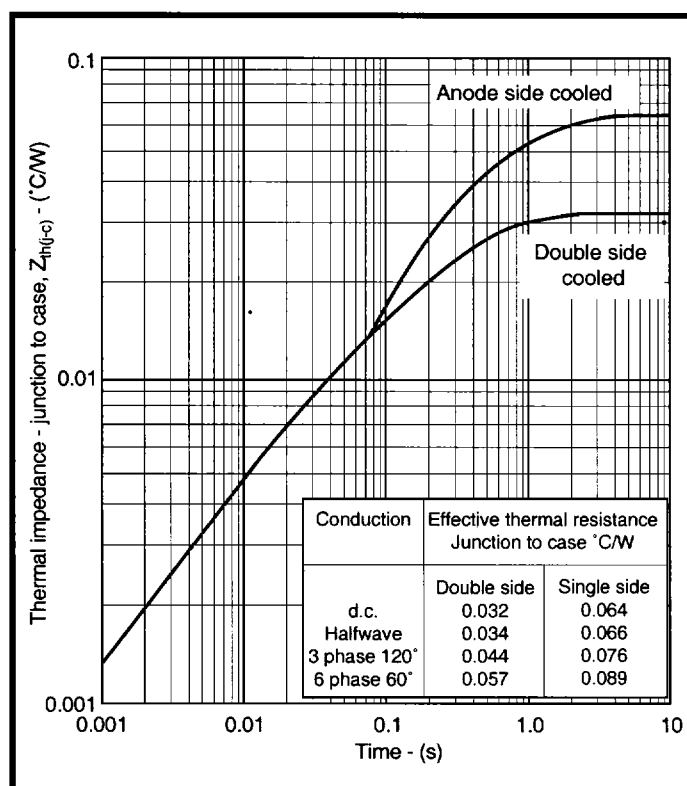


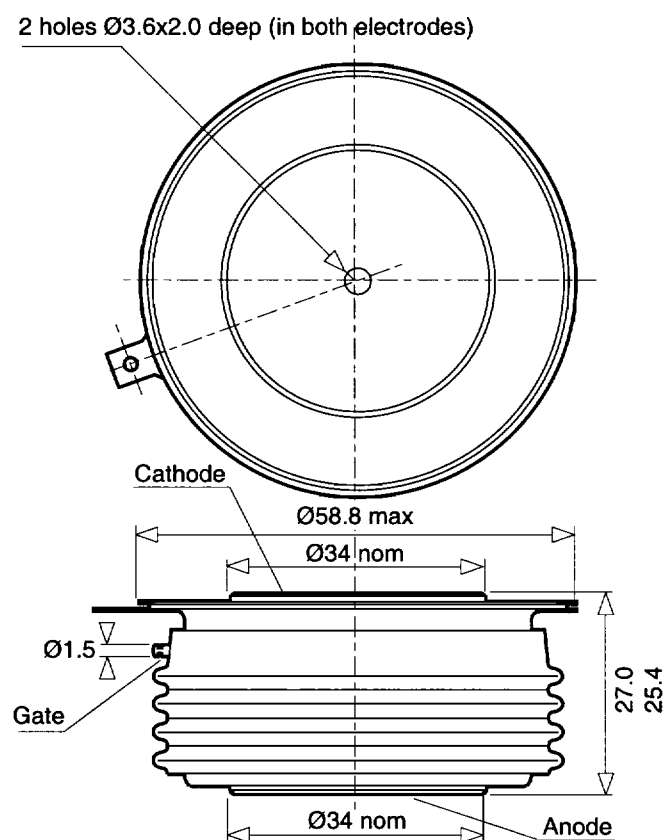
Fig.10 Reverse recovery current

Fig.11 Surge (non-repetitive) on-state current vs time
(with 50% V_{RRM} @ $T_{case} = 125^\circ\text{C}$)Fig.12 Maximum (limit) transient thermal impedance
- junction to case

DCR820SG

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: 310g

Package outline type code - G



<http://www.mitelsemi.com>

e-mail: power_solutions@mitel.com

Power Headquarters - United Kingdom

Tel: +44 (0)1522 500500

Fax: +44 (0)1522 500550

North America

Tel: 011-800-5554-5554

Fax: 011-800-5444-5444

UK, Germany, Rest Of World

Tel: +44 (0)1522 500500

Fax: +44 (0)1522 500020

France, Benelux and Spain

Tel: +33 (0)1 69 18 90 00

Fax: +33 (0)1 64 46 54 50

Information relating to products and circuits ("Product") furnished herein by Mitel Corporation or its subsidiaries ("Mitel") is believed to be reliable. However, Mitel assumes no liability for errors that may appear in this document, or for liability otherwise arising from the application or use of any such information or Product or for any infringement of patents or other intellectual property rights owned by third parties which may result from such application or use. Neither the supply of such information or the purchase of Product conveys any license, either expressed or implied, under patents or other intellectual property rights owned by Mitel or licensed from third parties by Mitel, whatsoever. Purchasers of Products are also hereby notified that the use of Product in certain ways or in combination with Mitel or non-Mitel furnished goods or services may infringe patents or intellectual property rights owned by Mitel. The Products, their specifications and the information appearing in the document are subject to change by Mitel without notice.

M Mitel (design) is a registered trademark of MITEL Corporation

Mitel Semiconductor is an ISO 9001 Registered Company

Copyright 1999 MITEL Corporation

All Rights Reserved

Printed in 1999

Publication No. DS4224-4 Issue No 4.0 March 1999 TECHNICAL DOCUMENTATION – NOT FOR RESALE.