

FEATURES

- Double Side Cooling
- High Surge Capability

KEY PARAMETERS

V_{DRM}	8500V
$I_{T(AV)}$	1300A
I_{TSM}	17600A
dV/dt^*	1500V/ μ s
dI/dt	400A/ μ s

APPLICATIONS

- High Power Drives
- High Voltage Power Supplies
- Static Switches

* Higher dV/dt selections available

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{RRM} V	Conditions
DCR1300L85* DCR1300L80 DCR1300L75 DCR1300L70	8500 8000 7500 7000	$T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 300\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively

Lower voltage grades available.
*8200V @ -40°C , 8500V @ 0°C

ORDERING INFORMATION

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

For example:

DCR1300L85

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

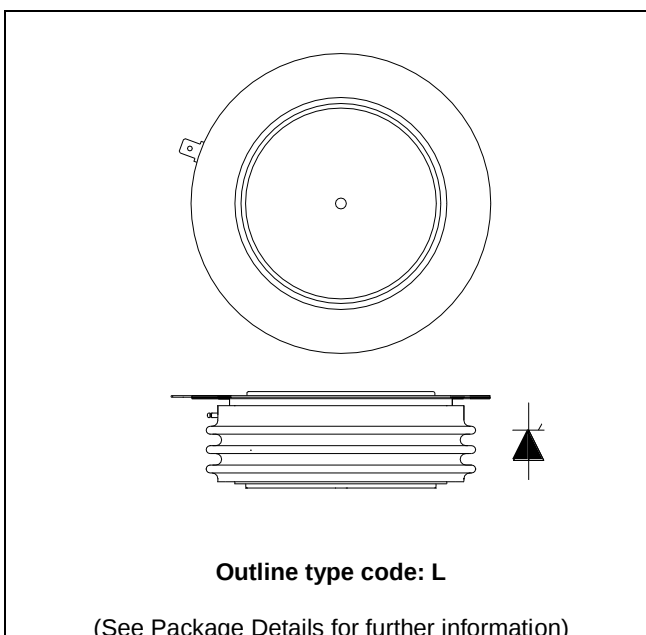


Fig. 1 Package outline

CURRENT RATINGS

$T_{case} = 60^{\circ}\text{C}$ unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	1300	A
$I_{T(RMS)}$	RMS value	-	2037	A
I_T	Continuous (direct) on-state current	-	1963	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$	17.6	kA
I^2t	I^2t for fusing	$V_R = 0$	1.55	MA^2s

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance – junction to case	Double side cooled	DC	-	0.0117	$^{\circ}\text{C/W}$
		Single side cooled	Anode DC	-	0.0187	$^{\circ}\text{C/W}$
			Cathode DC	-	0.0329	$^{\circ}\text{C/W}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 37kN (with mounting compound)	Double side	-	0.0025	$^{\circ}\text{C/W}$
			Single side	-	0.005	$^{\circ}\text{C/W}$
T_{vj}	Virtual junction temperature	Blocking V_{DRM} / V_{RRM}		-	125	$^{\circ}\text{C}$
T_{stg}	Storage temperature range			-55	125	$^{\circ}\text{C}$
F_m	Clamping force			33	41	kN

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Max.	Units
I _{RRM} /I _{DRM}	Peak reverse and off-state current	At V _{RRM} /V _{DRM} , T _{case} = 125°C		-	300	mA
dV/dt	Max. linear rate of rise of off-state voltage	To 67% V _{DRM} , T _j = 125°C, gate open		-	1500	V/μs
dI/dt	Rate of rise of on-state current	From 67% V _{DRM} to 2x I _{T(AV)}	Repetitive 50Hz	-	200	A/μs
		Gate source 30V, 10Ω, t _r < 0.5μs, T _j = 125°C	Non-repetitive	-	400	A/μs
V _{T(TO)}	Threshold voltage – Low level	100A to 2000A at T _{case} = 125°C		-	1.2	V
	Threshold voltage – High level	2000A to 7000A at T _{case} = 125°C		-	1.35	V
r _T	On-state slope resistance – Low level	100A to 2000A at T _{case} = 125°C		-	0.8615	mΩ
	On-state slope resistance – High level	2000A to 7000A at T _{case} = 125°C		-	0.767	mΩ
t _{gd}	Delay time	V _D = 67% V _{DRM} , gate source 30V, 10Ω t _r = 0.5μs, T _j = 25°C		-	3	μs
t _q	Turn-off time	T _j = 125°C, V _R = 200V, dI/dt = 1A/μs, dV _{DR} /dt = 20V/μs linear		-	1200	μs
Q _S	Stored charge	I _T = 2000A, T _j = 125°C, dI/dt – 1A/μs,		4000	6500	μC
I _L	Latching current	T _j = 25°C, V _D = 5V		-	3	A
I _H	Holding current	T _j = 25°C, R _{G-K} = ∞, I _{TM} = 500A, I _T = 5A		-	300	mA

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	1.5	V
V_{GD}	Gate non-trigger voltage	At 50% $V_{DRM}, T_{case} = 125^{\circ}C$	0.4	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	350	mA
I_{GD}	Gate non-trigger current	At 50% $V_{DRM}, T_{case} = 125^{\circ}C$	15	mA

CURVES

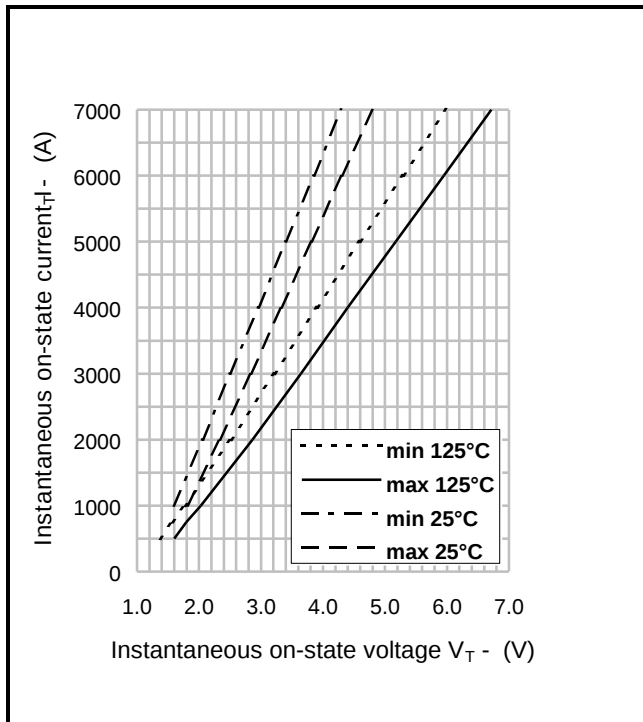


Fig.2 Maximum & minimum on-state characteristics

V_{TM} EQUATION

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

Where $A = 1.565095$
 $B = -0.121495$
 $C = 0.000638$
 $D = 0.021051$

these values are valid for $T_j = 125^{\circ}C$ for I_T 100A to 10000A

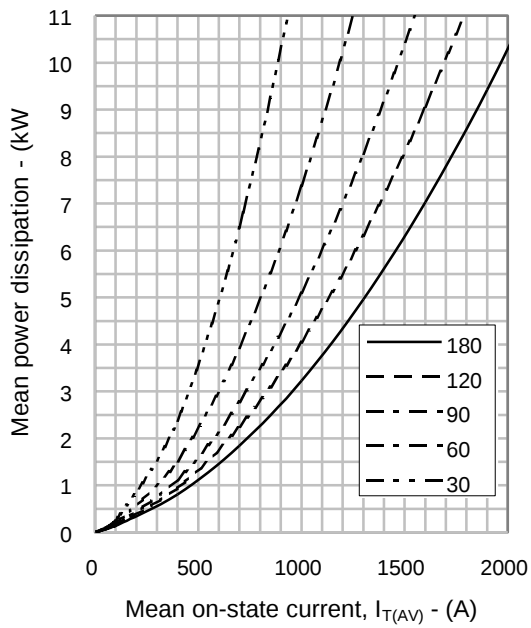


Fig.3 On-state power dissipation – sine wave

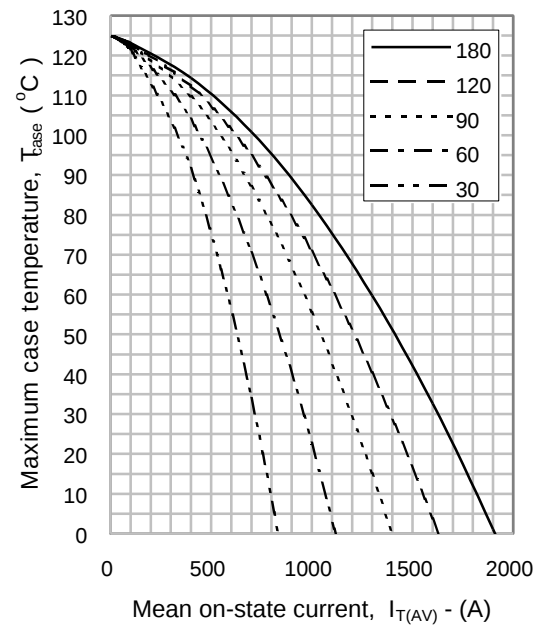


Fig.4 Maximum permissible case temperature, double side cooled – sine wave

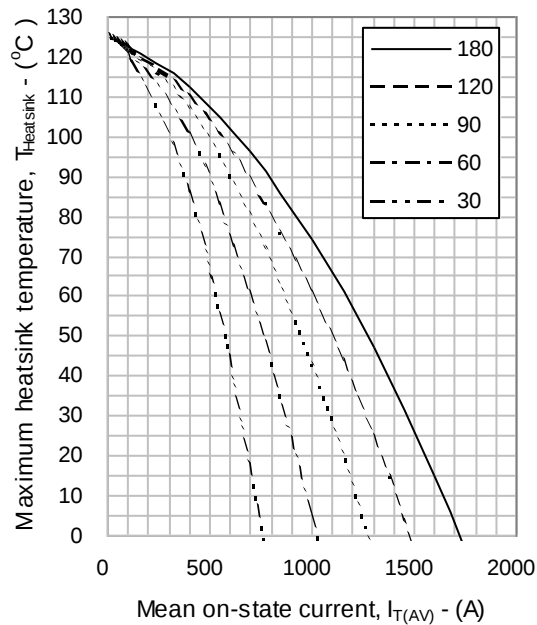


Fig.5 Maximum permissible heatsink temperature, double side cooled – sine wave

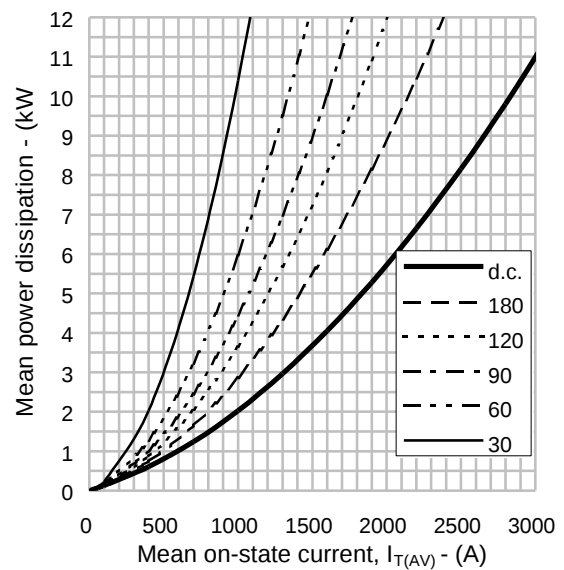


Fig.6 On-state power dissipation – rectangular wave

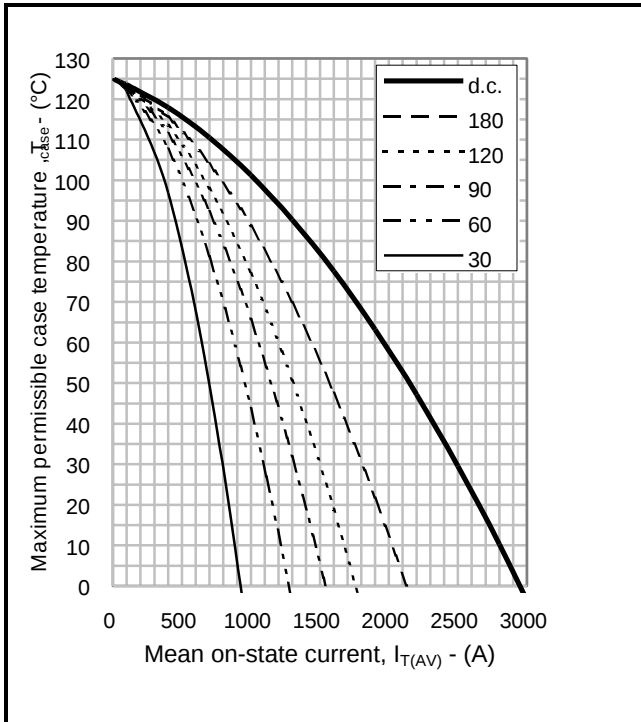


Fig.7 Maximum permissible case temperature, double side cooled – rectangular wave

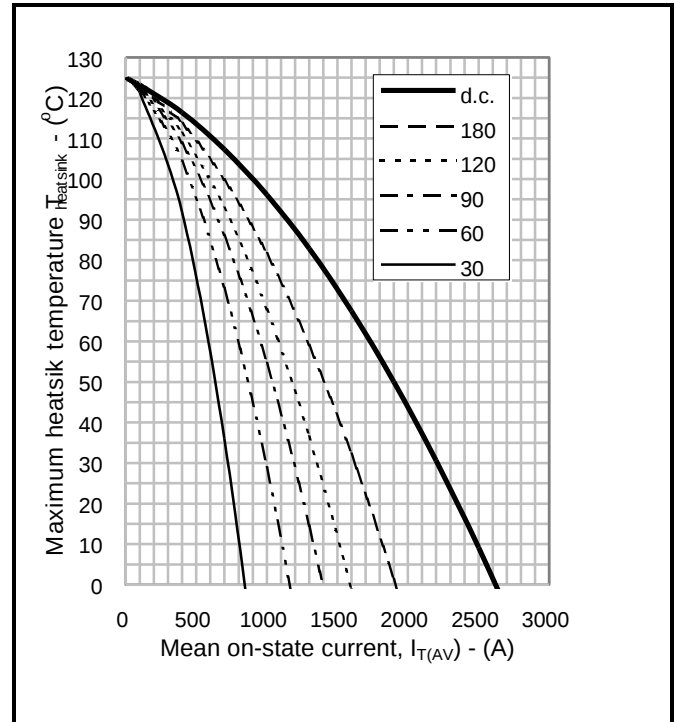


Fig.8 Maximum permissible heatsink temperature, double side cooled – rectangular wave

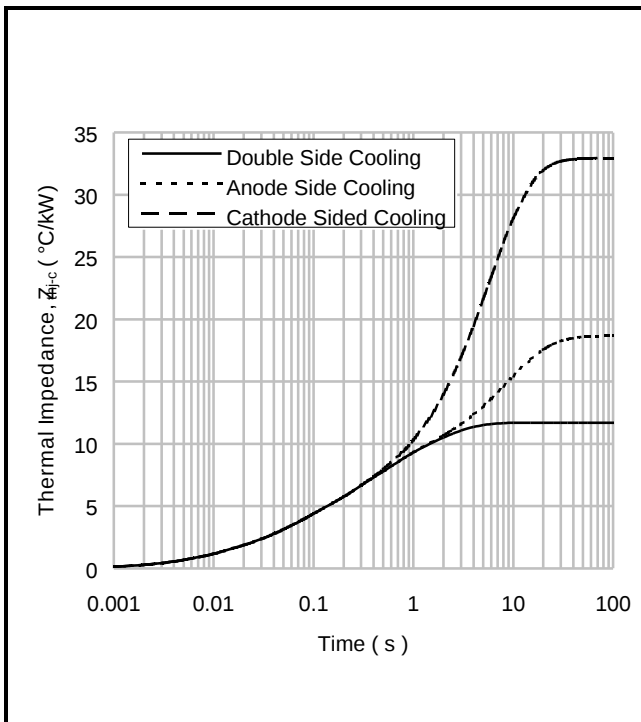


Fig.9 Maximum (limit) transient thermal impedance – junction to case (°C/kW)

		1	2	3	4
Double side cooled	$R_{\theta j-c}$ (°C/kW)	0.8342	2.6074	4.2073	4.041
	T_1 (s)	0.008639	0.0533503	0.3309504	1.612
Anode side cooled	$R_{\theta j-c}$ (°C/kW)	0.9647	2.8312	4.9433	9.909
	T_1 (s)	0.0096096	0.0627037	0.4198958	8.908
Cathode side cooled	$R_{\theta j-c}$ (°C/kW)	0.9285	2.9366	2.3581	26.683
	T_1 (s)	0.0093033	0.0621535	0.3092235	5.835

$$Z_{th} = \sum [R_i \times (1 - \exp. (-t/t_i))] \quad [1]$$

$\Delta R_{th(j-c)}$ Conduction

Tables show the increments of thermal resistance $R_{th(j-c)}$ when the device operates at conduction angles other than d.c.

Double side cooling			Anode Side Cooling			Cathode Sided Cooling		
θ°	$\Delta Z_{th} (z)$		θ°	$\Delta Z_{th} (z)$		θ°	$\Delta Z_{th} (z)$	
	sine.	rect.		sine.	rect.		sine.	rect.
180	1.45	0.98	180	1.43	0.97	180	1.44	0.97
120	1.68	1.40	120	1.66	1.39	120	1.66	1.39
90	1.93	1.64	90	1.90	1.62	90	1.91	1.63
60	2.16	1.90	60	2.12	1.88	60	2.14	1.89
30	2.34	2.19	30	2.30	2.15	30	2.31	2.17
15	2.42	2.34	15	2.37	2.30	15	2.39	2.31

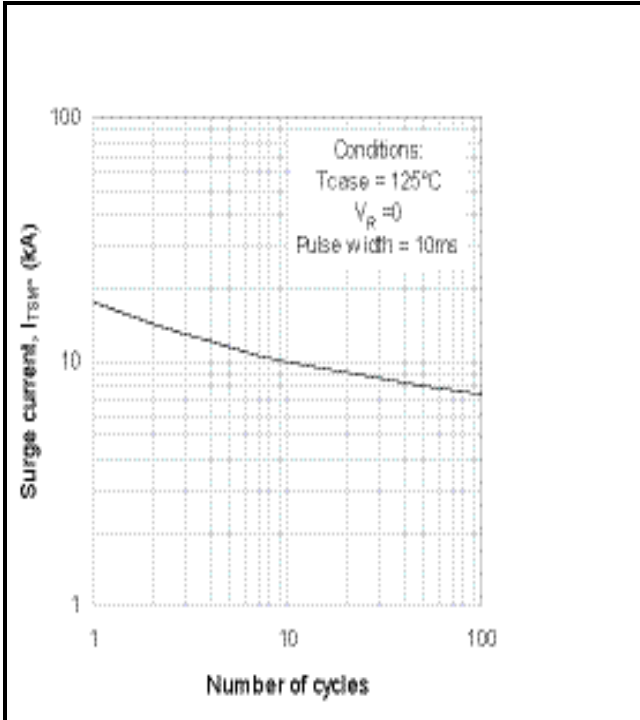


Fig.10 Multi-cycle surge current

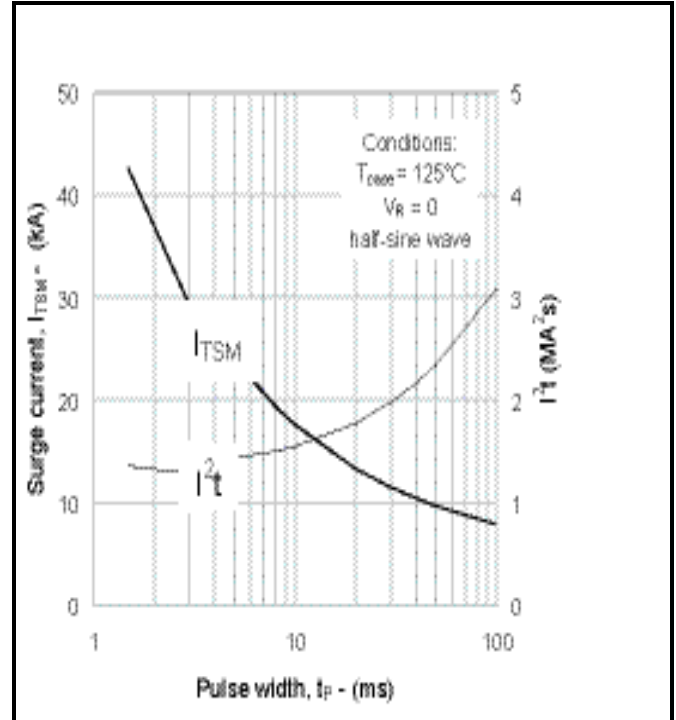


Fig.11 Single-cycle surge current

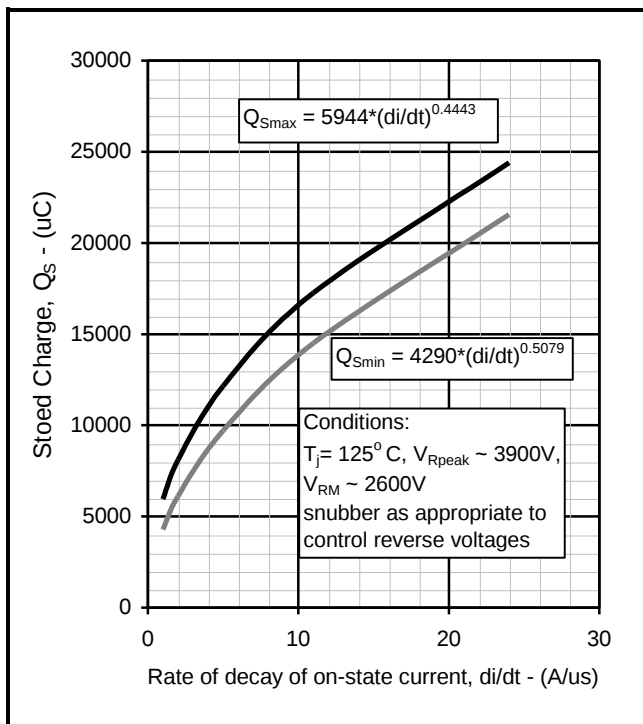


Fig.12 Reverse recovery charge

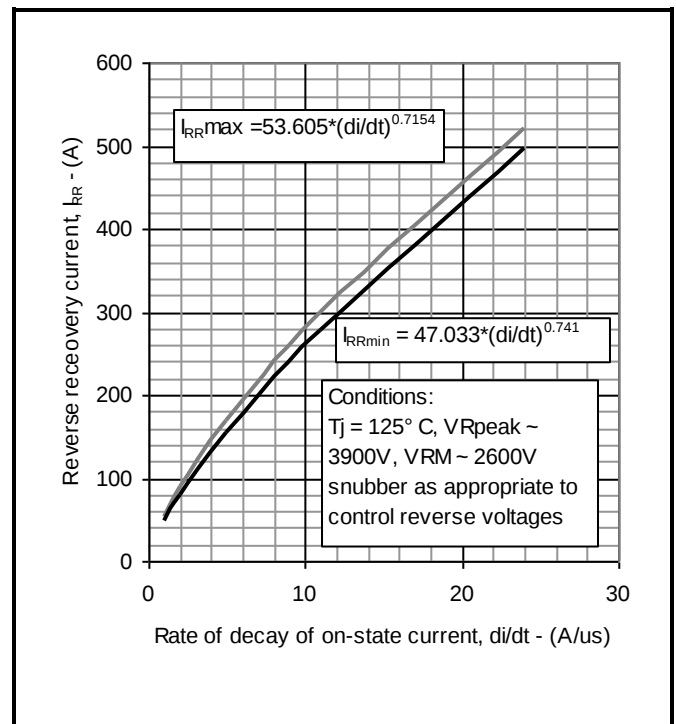


Fig. 13 Reverse recovery current

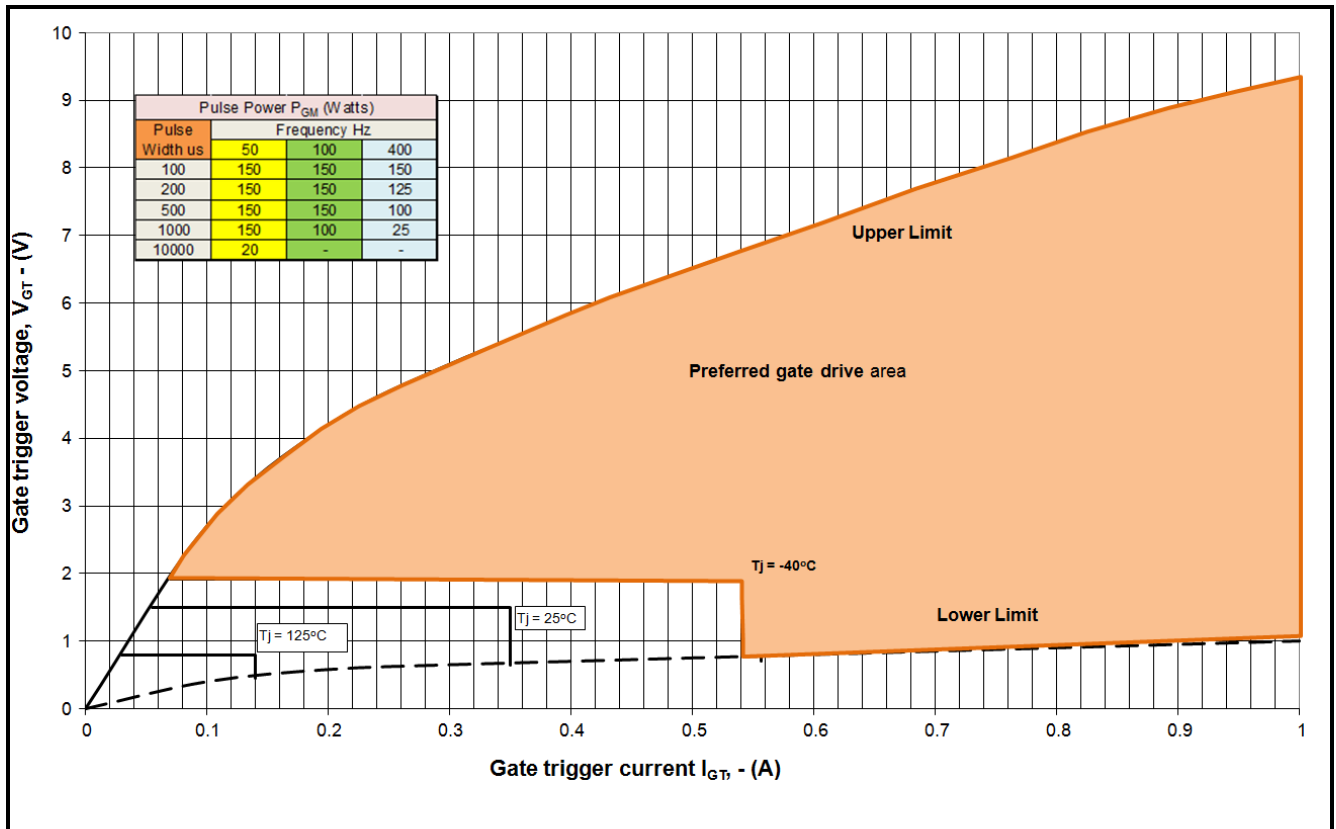


Fig14 Gate Characteristics

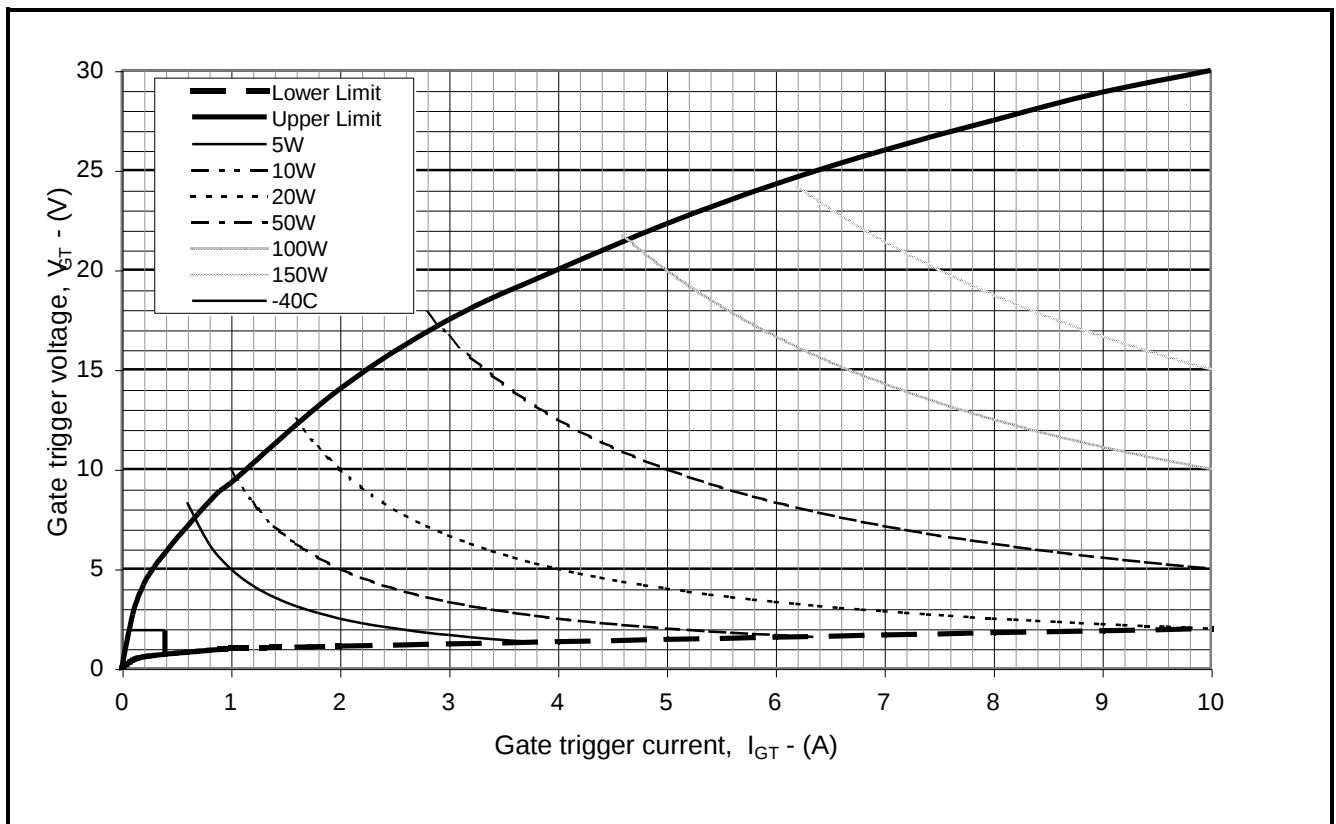
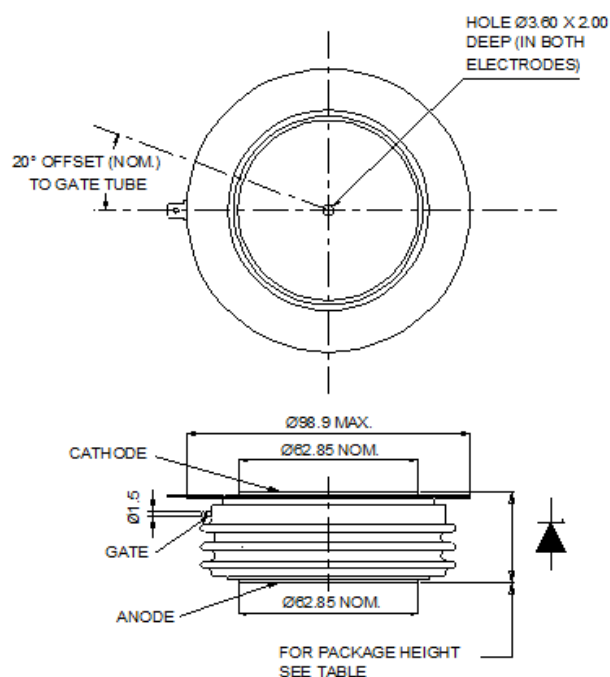


Fig. 15 Gate characteristics

PACKAGE DETAILS

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

3rd ANGLE PROJECTION  DO NOT SCALE IF IN DOUBT ASK



Device	Maximum Thickness (mm)	Minimum Thickness (mm)
DCR1374SBA18	34.515	33.965
DCR1375SBA28	34.59	34.04
DCR1376SBA36	34.82	34.27
DCR2690L22	34.515	33.965
DCR2480L28	34.59	34.04
DCR2040L42	34.82	34.27
DCR1850L52	34.94	34.39
DCR1570L65	35.2	34.65
DCR1300L85	35.56	35.01

Nominal weight: 1500g
Clamping force: 37kN $\pm 10\%$
Lead length: 420mm
Lead terminal connector: M4 ring

Package outline type code: L

Fig.16 Package outline

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Provisional Information:	Some initial development work has been performed. The datasheet represents a view of the end product based on very limited information. Certain details will change.
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HEADQUARTERS OPERATIONS

DYNEX SEMICONDUCTOR LIMITED
Doddington Road, Lincoln, Lincolnshire, LN6 3LF
United Kingdom.
Phone: +44 (0) 1522 500500
Fax: +44 (0) 1522 500550
Web: <http://www.dynexsemi.com>

CUSTOMER SERVICE

Phone: +44 (0) 1522 502753 / 502901
Fax: +44 (0) 1522 500020
e-mail: power_solutions@dynexsemi.com