SEPTEMBER 1997

DS4552-3.1

DCR1277SD

PHASE CONTROL THYRISTOR

APPLICATIONS

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

KEY PARAMETERS

V_{DRM}	3600V
$I_{T(AV)}$	995A
I_{TSM}	23750A
dVdt*	300V/µs
dI/dt	150A/µs

***Higher dV/dt selections available**

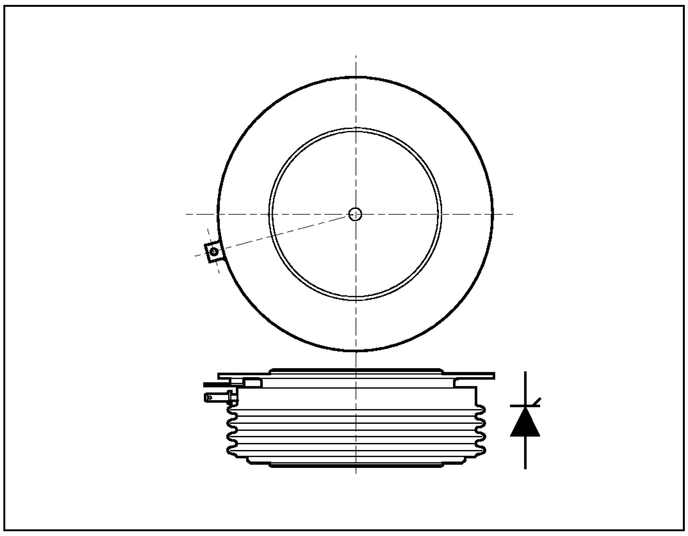
FEATURES

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

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
DCR1277SD36	3600	T_{vj} = 0˚ to 125˚C, I_{DRM} = I_{RRM} = 150mA, V_{DRM}, V_{RRM} t_p = 10ms, V_{DSM} & V_{RSM} = V_{DRM} & V_{RRM} + 100V Respectively
DCR1277SD35	3500	
DCR1277SD34	3400	
DCR1277SD33	3300	
DCR1277SD32	3200	

Lower voltage grades available.



Outline type code: D.See package outline 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°C	995	A
$I_{T(RMS)}$	RMS value	T_{case} = 80°C	1565	A
I_T	Continuous (direct) on-state current	T_{case} = 80°C	1420	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, T_{case} = 80°C	690	A
$I_{T(RMS)}$	RMS value	T_{case} = 80°C	1085	A
I_T	Continuous (direct) on-state current	T_{case} = 80°C	920	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C V_R = 50% V_{RRM} - 1/4 sine	19.0	kA
I^2t	I^2t for fusing		1.8×10^6	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C V_R = 0	23.75	kA
I^2t	I^2t for fusing		2.82×10^6	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	-	0.020	°C/W
		Single side cooled	Anode dc	-	0.036	°C/W
			Cathode dc	-	0.044	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 22.0kN with mounting compound	Double side	-	0.004	°C/W
			Single side	-	0.008	°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			20.0	24.0	kN

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		-	150	mA
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% V_{DRM} T_j = 125°C.		-	300	V/µs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A Gate source 10V, 5Ω $t_r \leq$ 0.5µs, T_j = 125°C	Repetitive 50Hz	-	100	A/µs
			Non-repetitive	-	150	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125°C		-	0.95	V
r_T	On-state slope resistance	At T_{vj} = 125°C		-	0.45	mΩ
t_{gd}	Delay time	V_D = 67% V_{DRM}, Gate source 30V, 15Ω t_r = 0.5µs, T_j = 25°C		-	2.5	µs
t_q	Turn-off time	I_T = 2000A, t_p = 1ms, T_j = 125˚C, V_R = 50V, dI_{RR}/dt = 5A/µs, V_{DR} = 67% V_{DRM}, dV_{DR}/dt = 20V/µs linear		500	650	µs
I_L	Latching current	T_j = 25°C, V_D = 5V		700	1000	mA
I_H	Holding current	T_j = 25°C, R_{g-k} = ∞		200	500	mA

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 5V, T_{case} = 25°C	4.0	V
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25°C	400	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125°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 table, fig.4	150	W
$P_{G(AV)}$	Mean gate power		5	W

CURVES

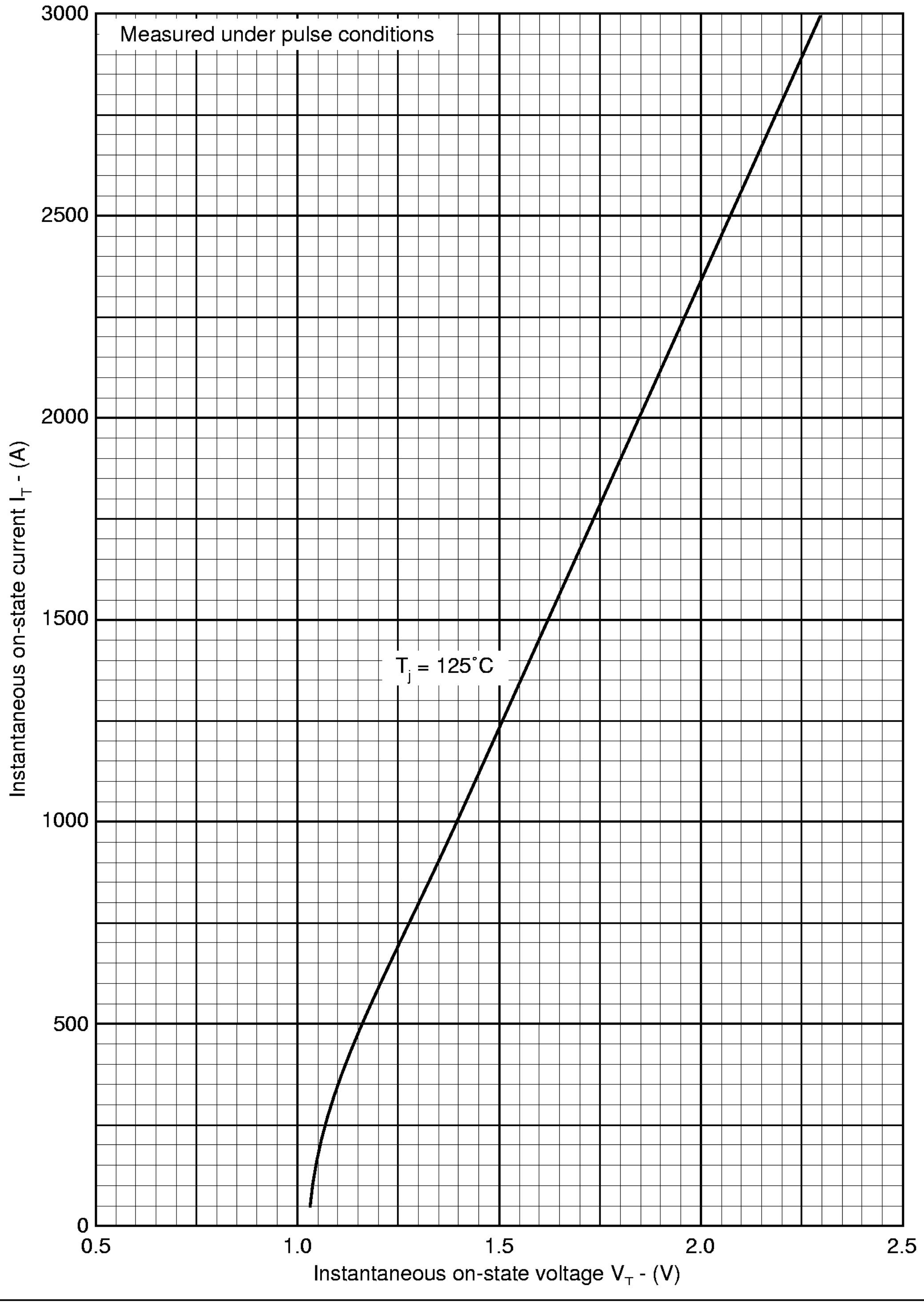


Fig.1 Maximum (limit) on-state characteristics

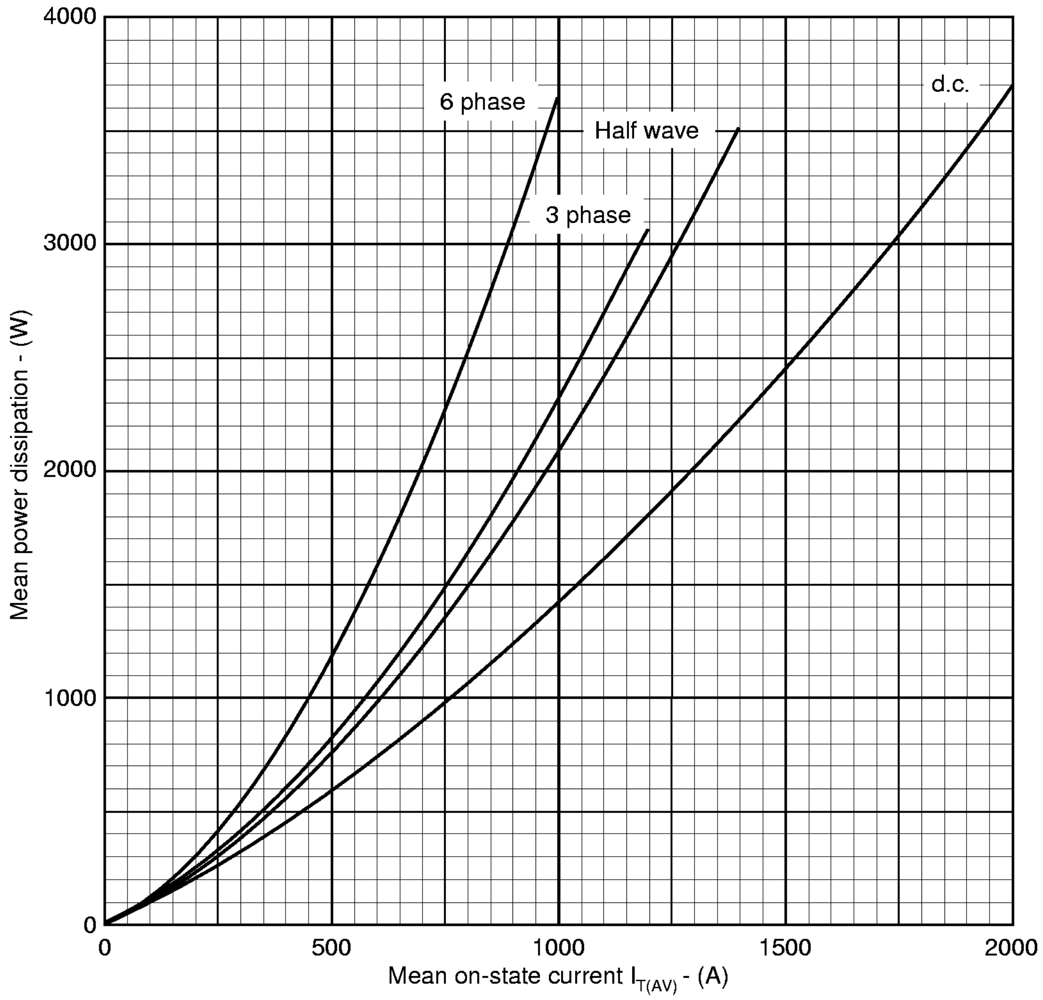


Fig.2 Dissipation curves

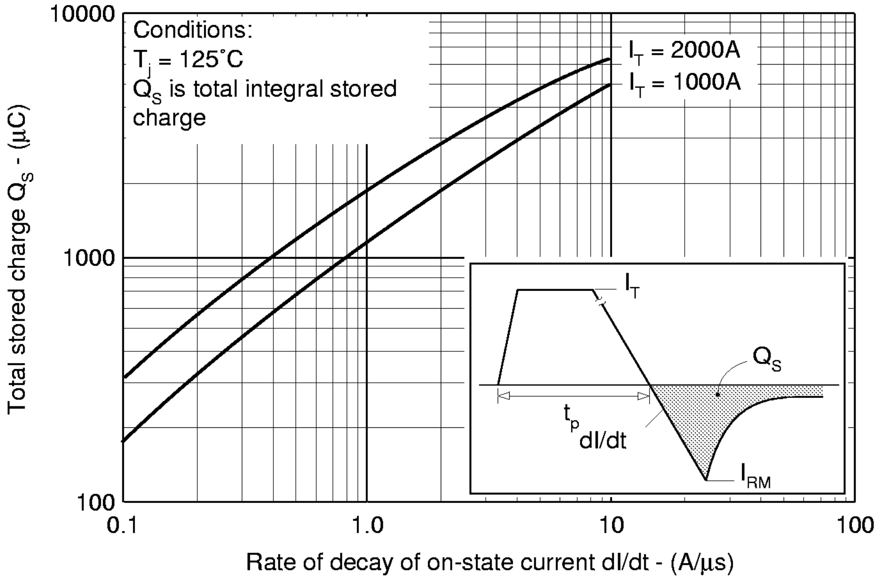


Fig.3 Stored charge

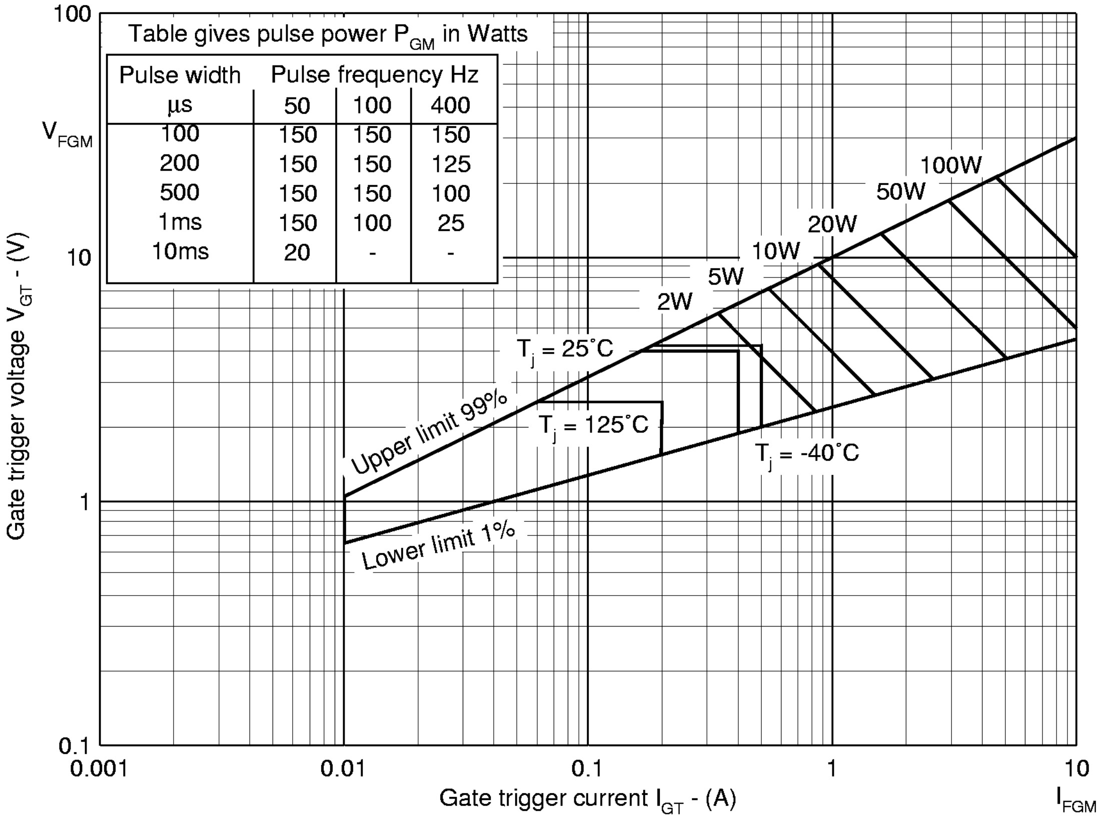
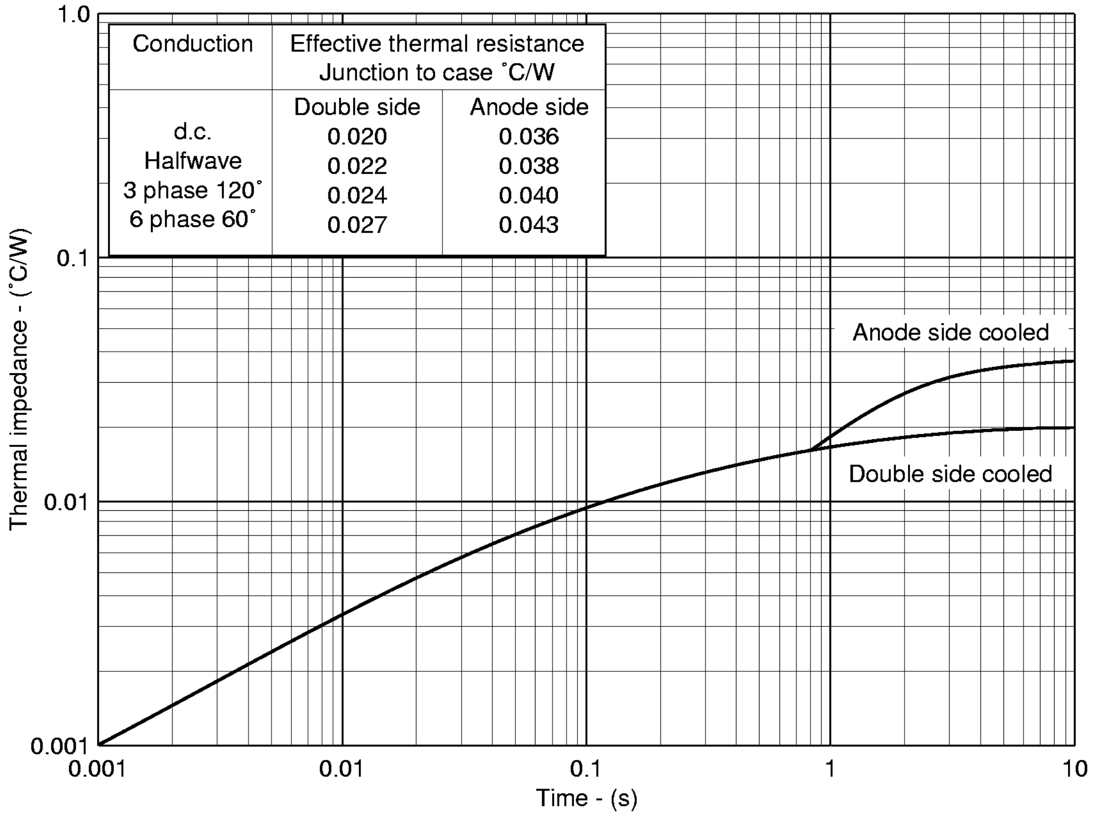


Table gives pulse power P_{GM} in Watts

Pulse width	Pulse frequency Hz		
µs	50	100	400
100	150	150	150
200	150	150	125
500	150	150	100
1ms	150	100	25
10ms	20	-	-

Fig.4 Gate characteristics



Conduction	Effective thermal resistance Junction to case ˚C/W	
	Double side	Anode side
d.c.	0.020	0.036
Halfwave	0.022	0.038
3 phase 120˚	0.024	0.040
6 phase 60˚	0.027	0.043

Fig.5 Maximum (limit) transient thermal impedance - junction to case

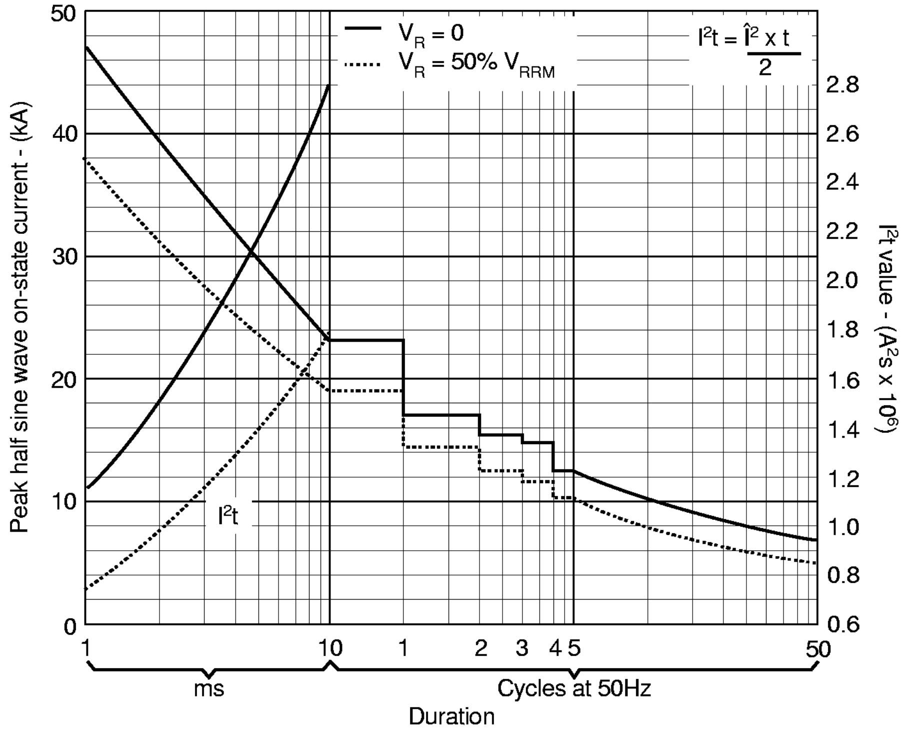
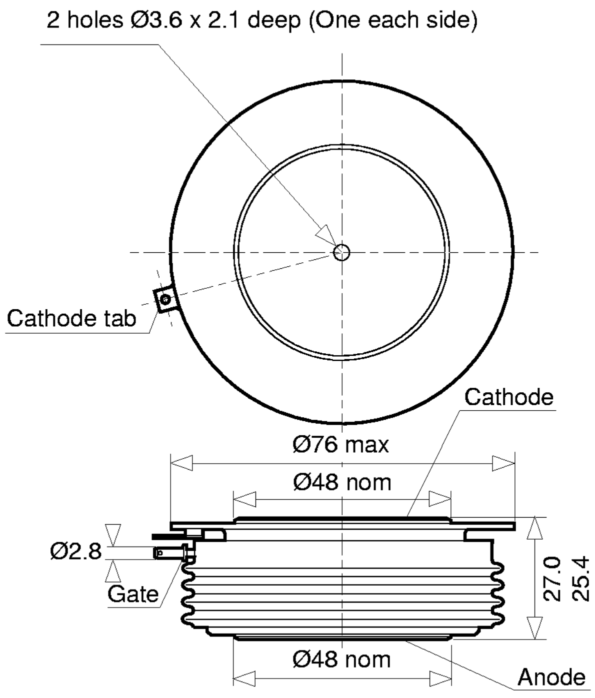


Fig.6 Surge (non-repetitive) on-state current vs time at T_{case} 125˚C

PACKAGE OUTLINE - D

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



Weight: 500g

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