DCR1375SBA

Phase Control Thyristor

Supersedes September 1997 version, DS4654 - 2.2

DS4654 - 2.3 March 1998

APPLICATIONS

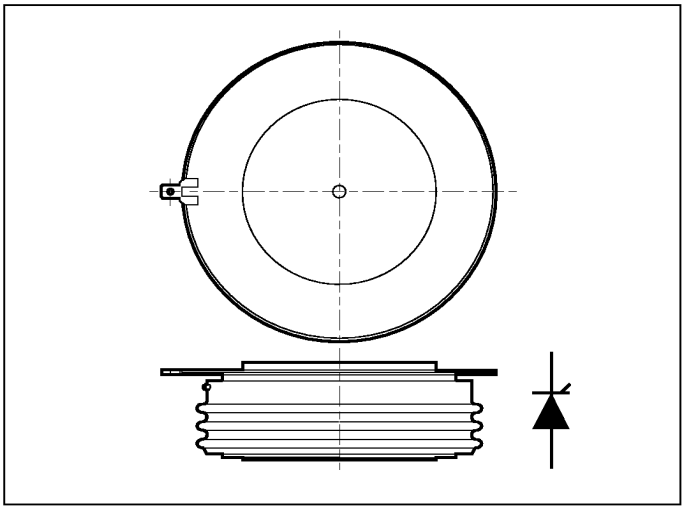
- High Voltage Power Converters.
- High Voltage Power Supplies.
- Motor Control.

KEY PARAMETERS

V_{DRM}	2800V
$I_{T(AV)}$	1575A
I_{TSM}	28000A
dVdt	1000V/μs
dI/dt	500A/μs

FEATURES

- Double Side Cooling.
- High Surge Capability.
- Low Turn-on Losses.



Outline type code: MU140. See package outline for further information.

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
DCR1375SBA28 DCR1375SBA27 DCR1375SBA26 DCR1375SBA25 DCR1375SBA24	2800 2700 2600 2500 2400	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

Lower voltage grades available.

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	1575	A
$I_{T(RMS)}$	RMS value	T_{case} = 80°C	2475	A
I_T	Continuous (direct) on-state current	T_{case} = 80°C	2200	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, T_{case} = 80°C	1150	A
$I_{T(RMS)}$	RMS value	T_{case} = 80°C	1805	A
I_T	Continuous (direct) on-state current	T_{case} = 80°C	1520	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	22.5	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - 1/4 sine	2.5 x 10^6	A^2s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; T_{case} = 125°C	28	kA
I^2t	I^2t for fusing	V_R = 0	3.92 x 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	-	0.013	°C/W
		Single side cooled	Anode dc	-	0.021	°C/W
			Cathode dc	-	0.034	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 40kN with mounting compound	Double side	-	0.003	°C/W
			Single side	-	0.006	°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			36.0	44.0	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.		-	1000	V/µs
dI/dt	Rate of rise of on-state current	From 80% V_{DRM} Gate source 20V, 20Ω $t_r \leq 1.0\mu s$. T_j = 125°C.	Repetitive 50Hz	-	250	A/µs
			Non-repetitive	-	500	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125°C		-	1.02	V
r_T	On-state slope resistance	At T_{vj} = 125°C		-	0.259	mΩ
t_{gd}	Delay time	V_D = 67% V_{DRM}, Gate source 30V, 15Ω Rise time 0.5µs, T_j = 25°C		-	2	µs
t_q	Turn-off time	I_T = 800A, 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		400	-	µs
I_L	Latching current	T_j = 25°C, V_D = 5V		-	500	mA
I_H	Holding current	T_j = 25°C, V_{G-K} = ∞		-	260	mA

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 5V, T_{case} = 25°C	3.0	V
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25°C	350	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		10	W

CURVES

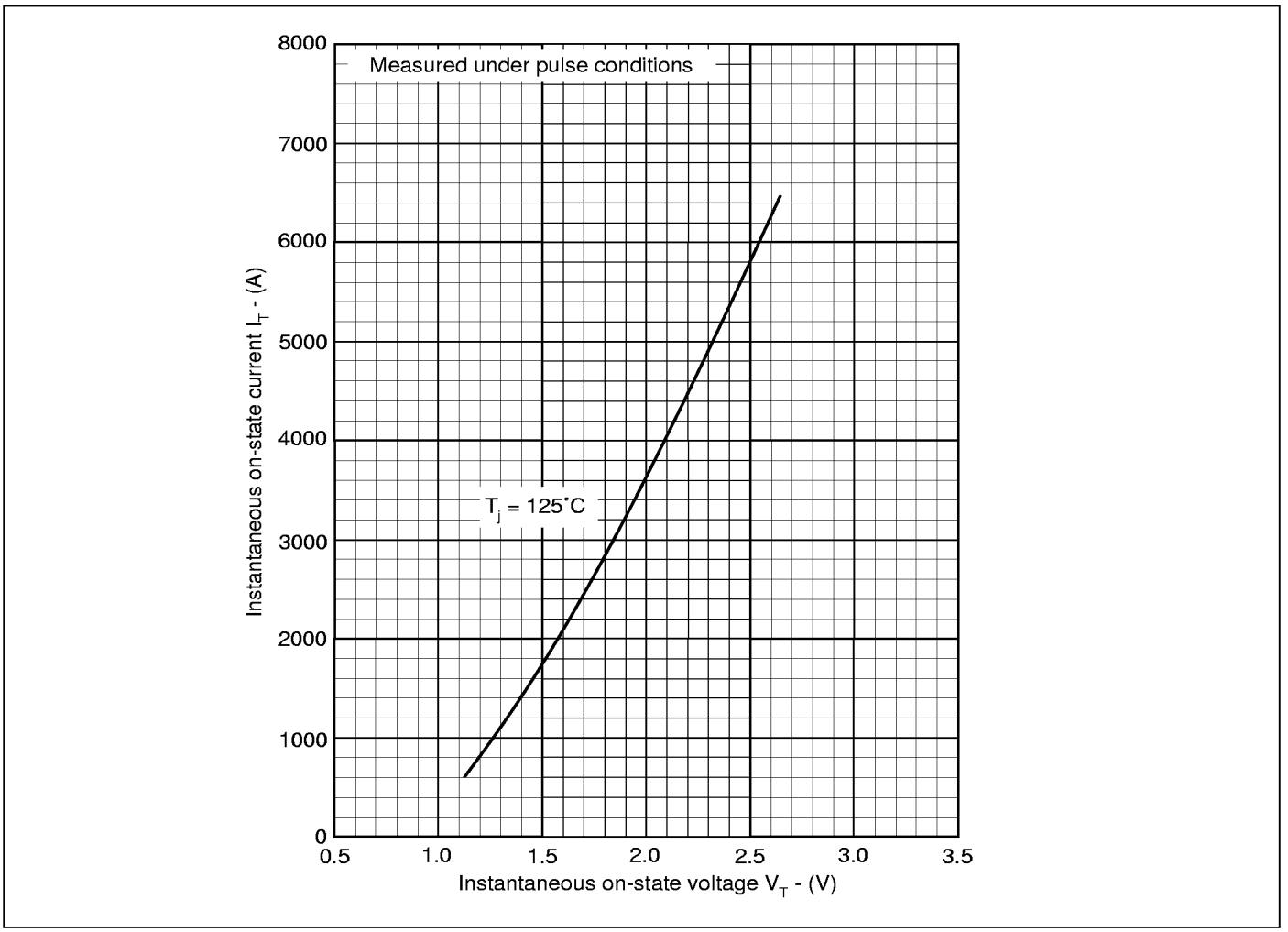


Fig.1 Maximum (limit) on-state characteristics

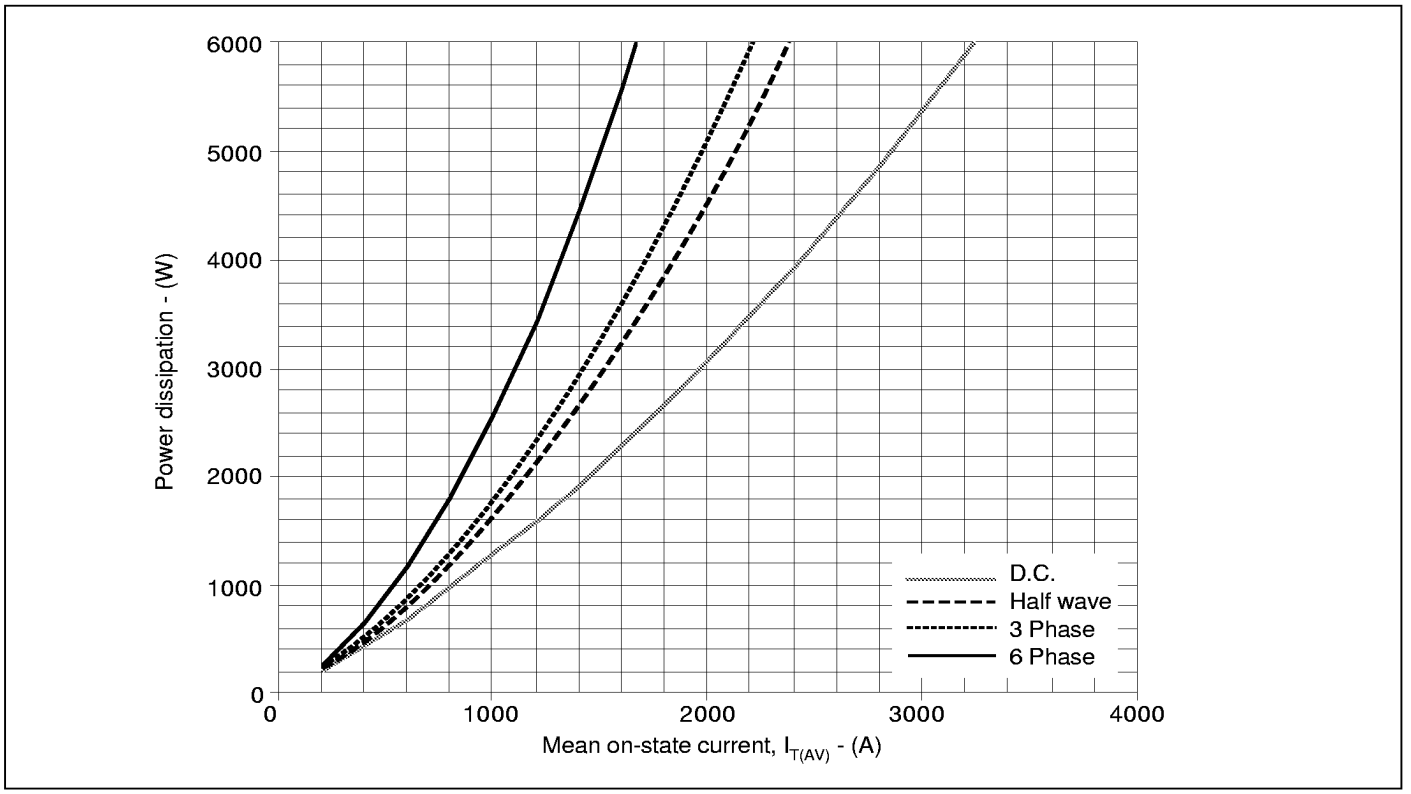


Fig.2 Dissipation curves

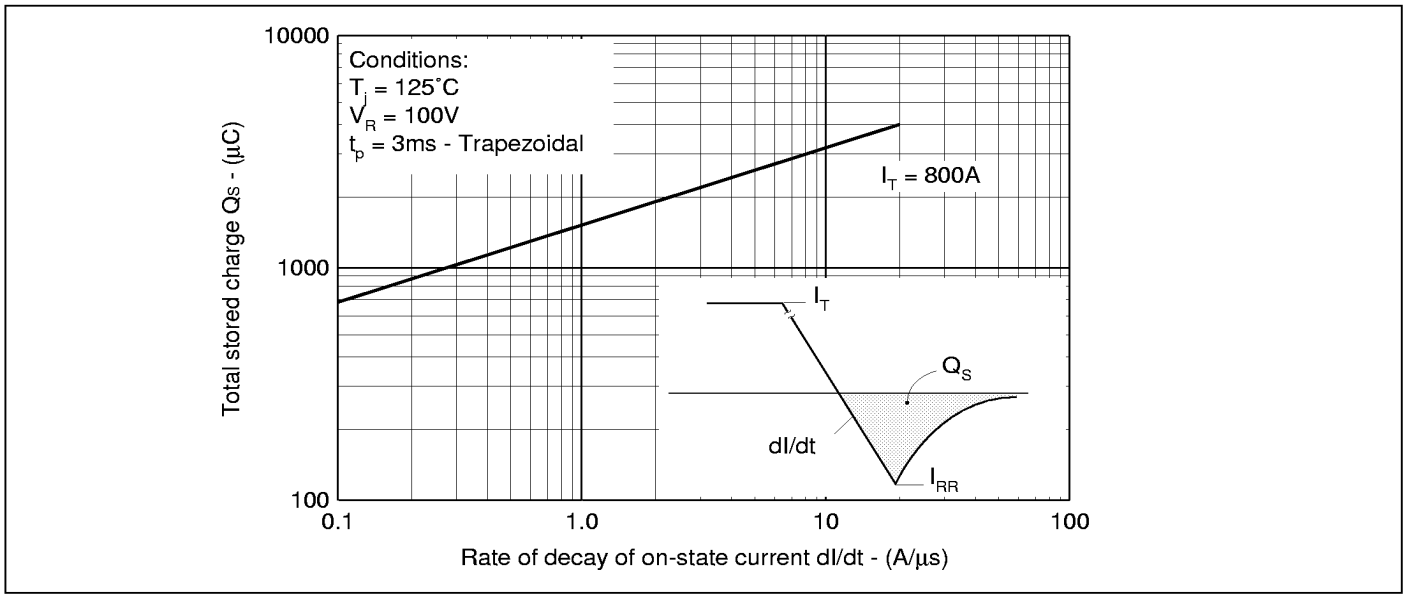


Fig.3 Stored charge

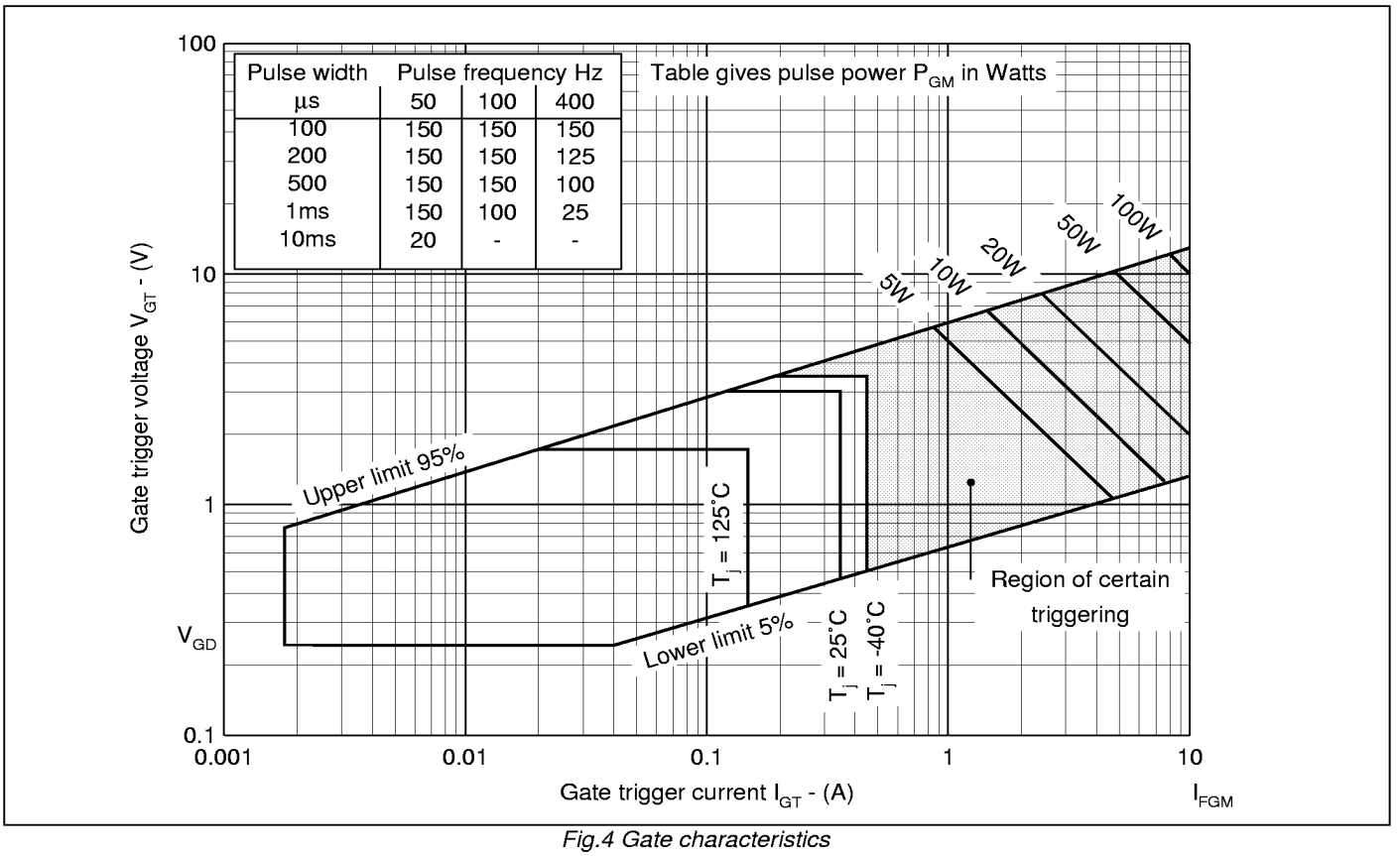


Fig.4 Gate characteristics

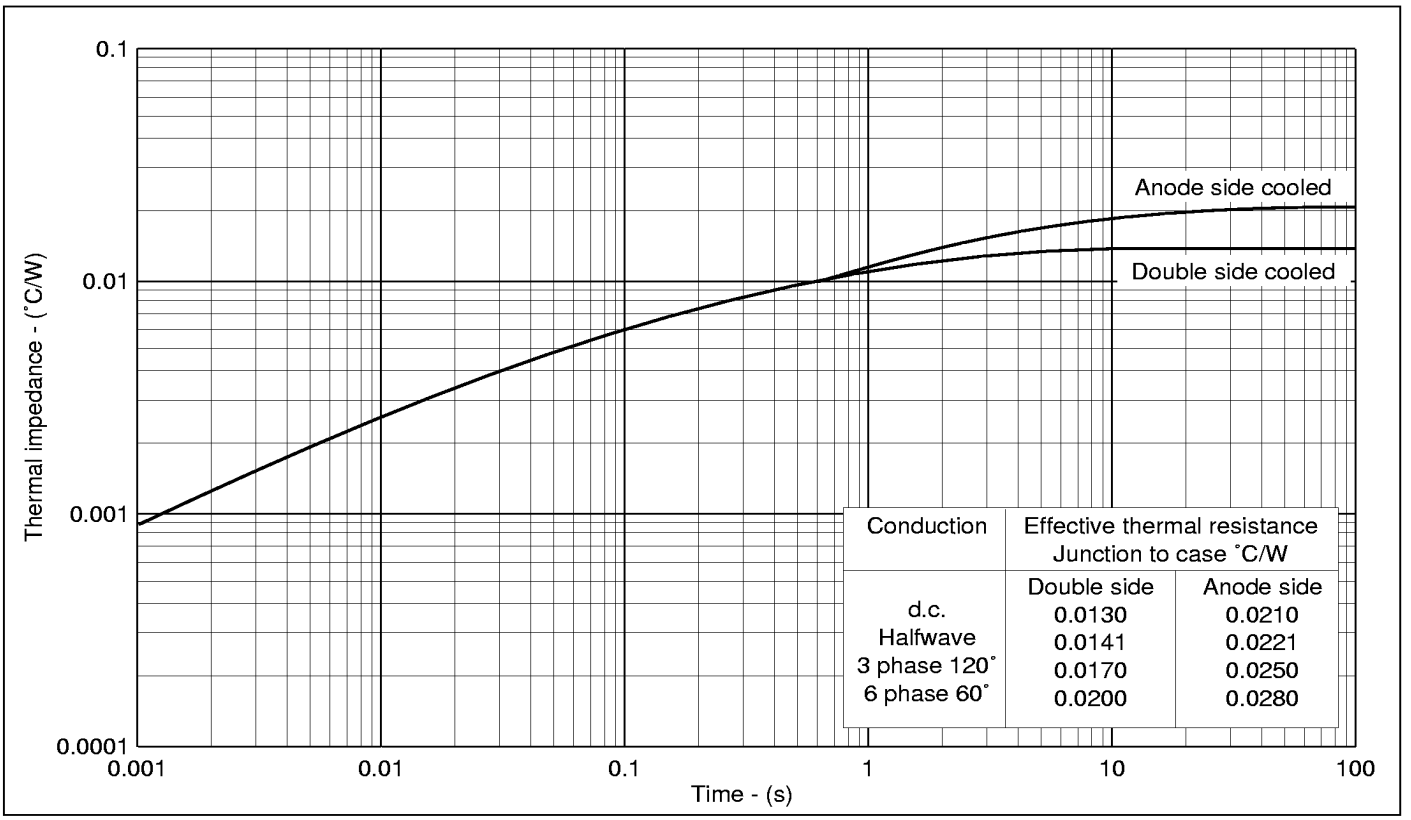


Fig.5 Maximum (limit) transient thermal impedance - junction to case (˚C/W)

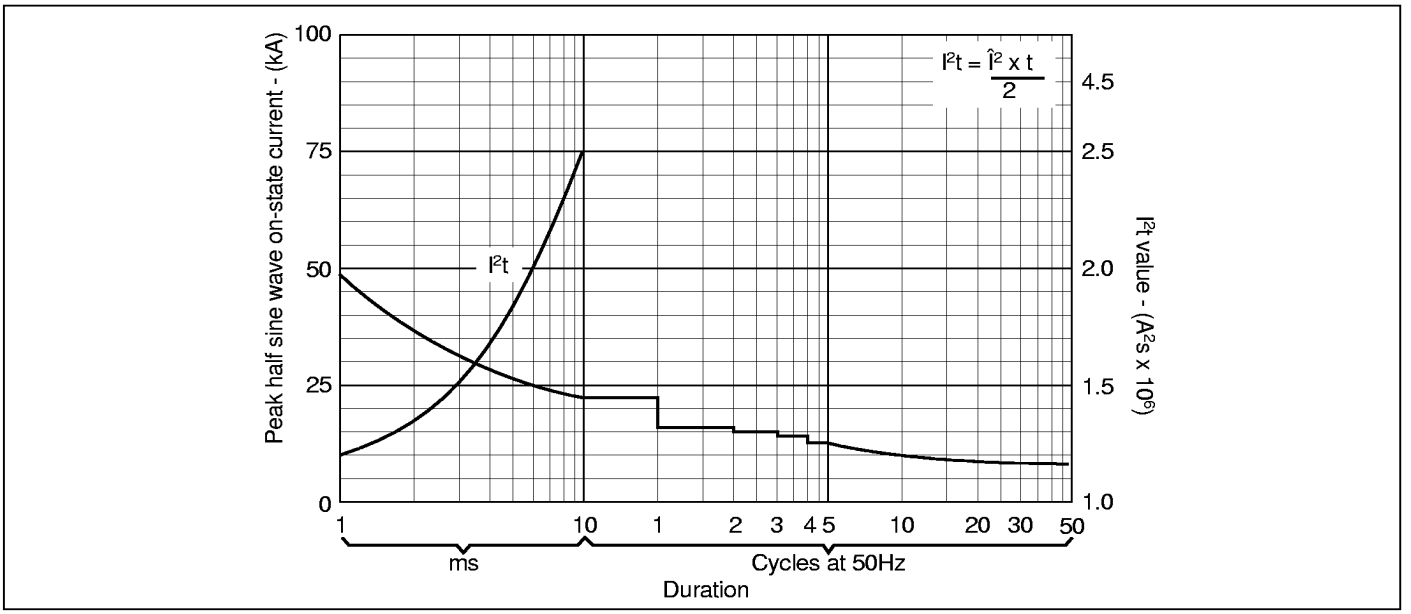
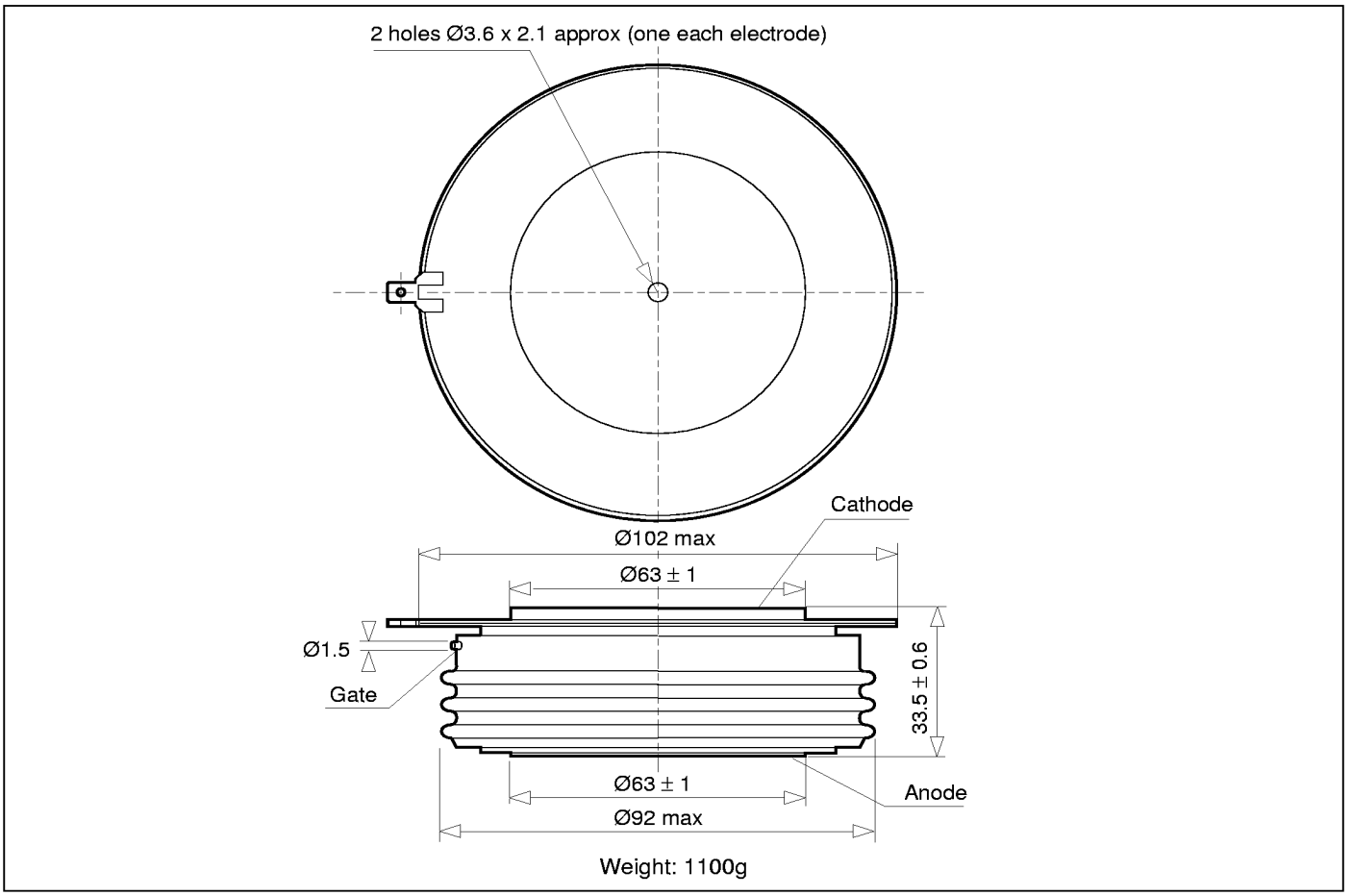


Fig.6 Surge (non-repetitive) on-state current vs time (with 50% V_{RRM} at T_{case} 125˚C)

PACKAGE OUTLINE- MU140

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



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