

DCR1478SY

PHASE CONTROL THYRISTOR

APPLICATIONS

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

KEY PARAMETERS

V_{DRM}	4800V
$I_{T(AV)}$	1625A
I_{TSM}	27500A
dV/dt^*	500V/ μ s
dI/dt	300A/ μ s

*Higher dV/dt selections available

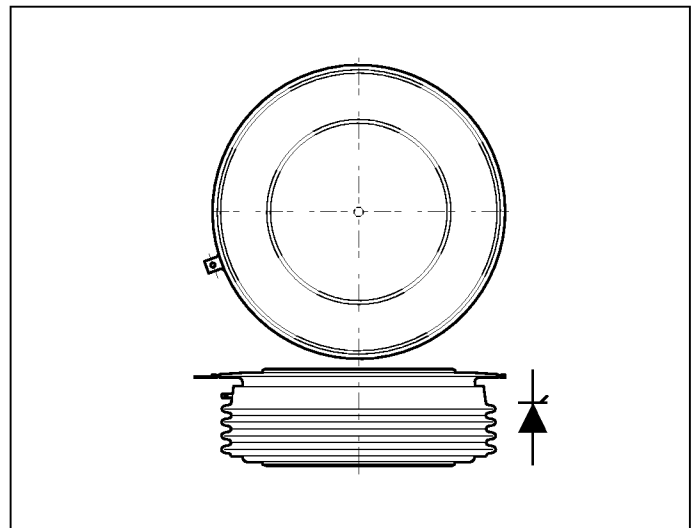
FEATURES

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

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM} V	Conditions
DCR1478SY48	4800	$T_{vj} = 0^\circ$ to 125° C, $I_{DRM} = I_{RRM} = 250$ mA, $V_{DRM}, V_{RRM} t_p = 10$ ms, V_{DSM} & $V_{RSM} =$ V_{DRM} & $V_{RRM} + 100$ V Respectively
DCR1478SY47	4700	
DCR1478SY46	4600	
DCR1478SY45	4500	
DCR1478SY44	4400	

Lower voltage grades available.



Outline type code: Y. 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, $T_{case} = 80^\circ$ C	1625	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^\circ$ C	2550	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^\circ$ C	2270	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^\circ$ C	1050	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^\circ$ C	1650	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^\circ$ C	1450	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	22.0	kA
I^2t	I^2t for fusing	$V_R = 50\% V_{RRM}$ - 1/4 sine	2.42×10^6	A ² s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	27.5	kA
I^2t	I^2t for fusing	$V_R = 0$	3.78×10^6	A ² s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.0095	$^{\circ}C/W$
		Single side cooled	Anode dc	-	0.019	$^{\circ}C/W$
			Cathode dc	-	0.019	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 43.0kN with mounting compound	Double side	-	0.002	$^{\circ}C/W$
			Single side	-	0.004	$^{\circ}C/W$
T_{vj}	Virtual junction temperature	On-state (conducting)		-	135	$^{\circ}C$
		Reverse (blocking)		-	125	$^{\circ}C$
T_{stg}	Storage temperature range			-55	125	$^{\circ}C$
-	Clamping force			38.0	47.0	kN

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions	Typ.	Max.	Units	
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$	-	250	mA	
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 125^{\circ}C$.	-	500	V/ μ s	
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A Gate source 20V, 10 Ω $t_r \leq 0.5\mu$ s to 1A, $T_j = 125^{\circ}C$	Repetitive 50Hz	-	100	A/ μ s
			Non-repetitive	-	300	A/ μ s
$V_{T(TO)}$	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-	1.4	V	
r_T	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	0.31	m Ω	
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, Gate source 30V, 15 Ω $t_r \leq 0.5\mu$ s, $T_j = 25^{\circ}C$	-	2.5	μ s	
I_L	Latching current	$T_j = 25^{\circ}C$, $V_D = 5V$	300	1000	mA	
I_H	Holding current	$T_j = 25^{\circ}C$, $R_{g-k} = \infty$	-	500	mA	
t_q	Holding current	$I = 1000A$, $t = 1ms$, $T_j = 125^{\circ}C$, $V = 50V$, $dI/dt = 20A/\mu$ s, $V_{DR} = 67\%$ V_{DRM} , $dV_{DR}/dt = 8V/\mu$ s linear	500	-	μ s	

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	4.0	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	400	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	30	A
P_{GM}	Peak gate power	See table, fig.4	150	W
$P_{G(AV)}$	Mean gate power		10	W

CURVES

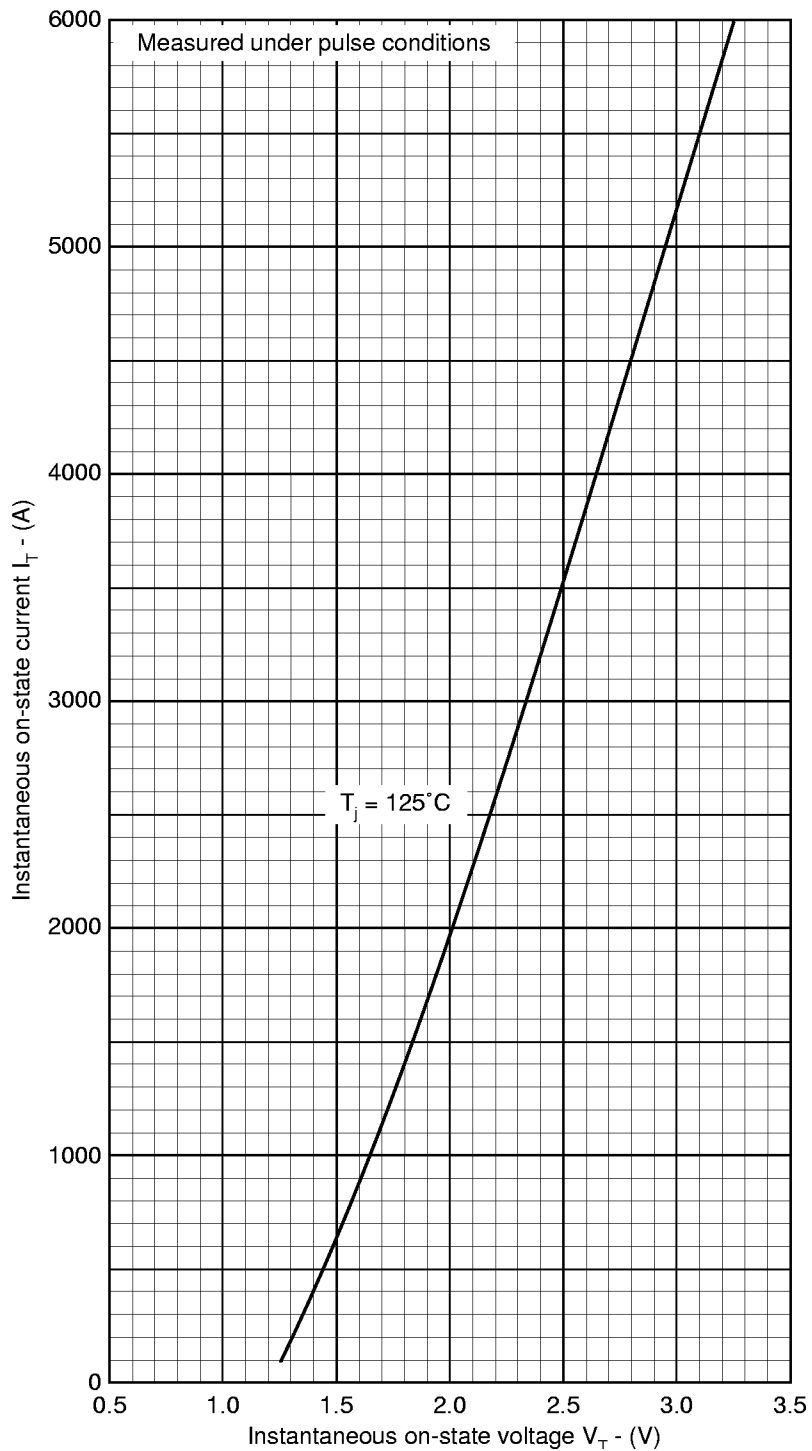


Fig.1 Maximum (limit) on-state characteristics

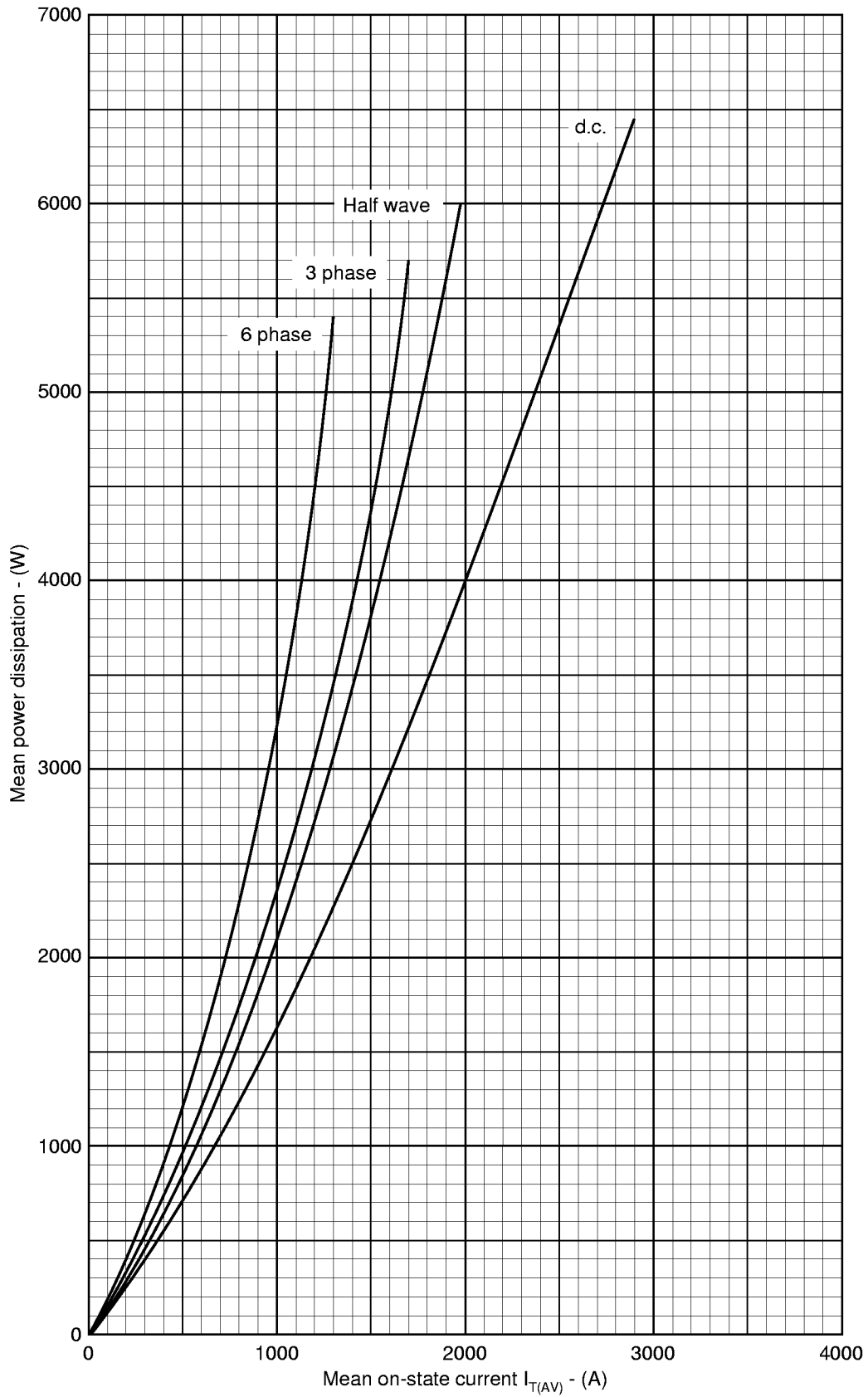


Fig.2 Dissipation curves

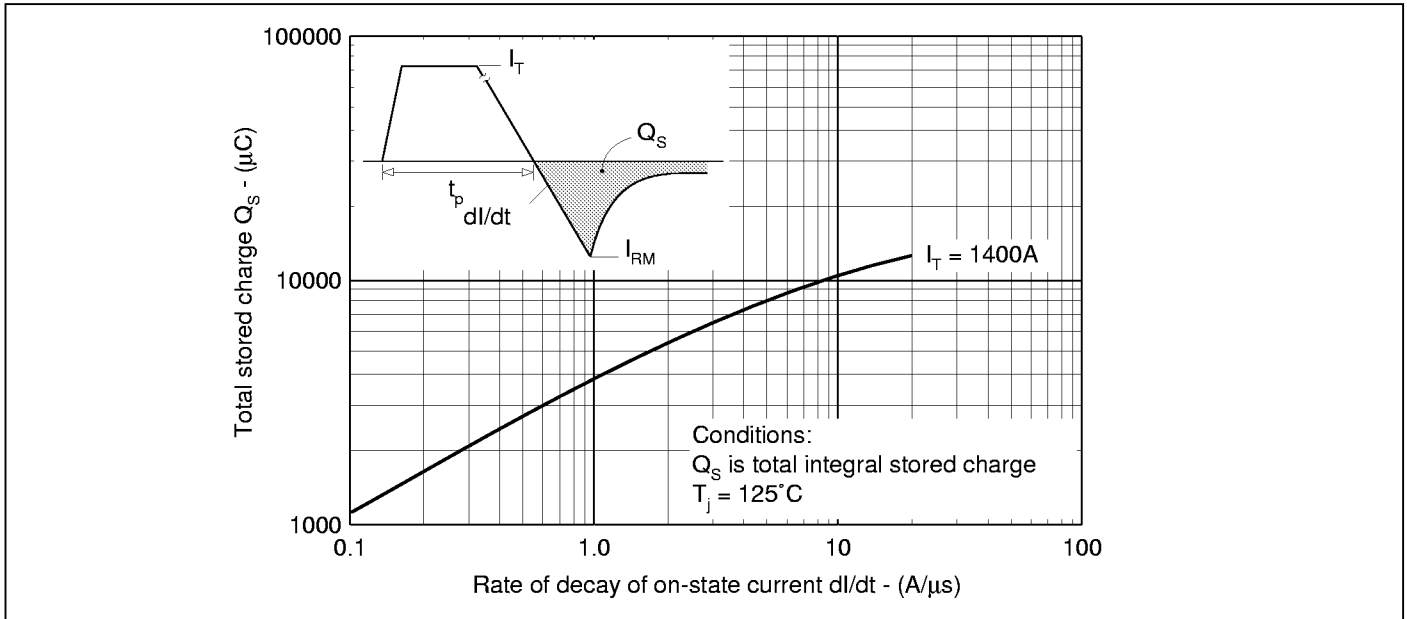


Fig.3 Stored charge

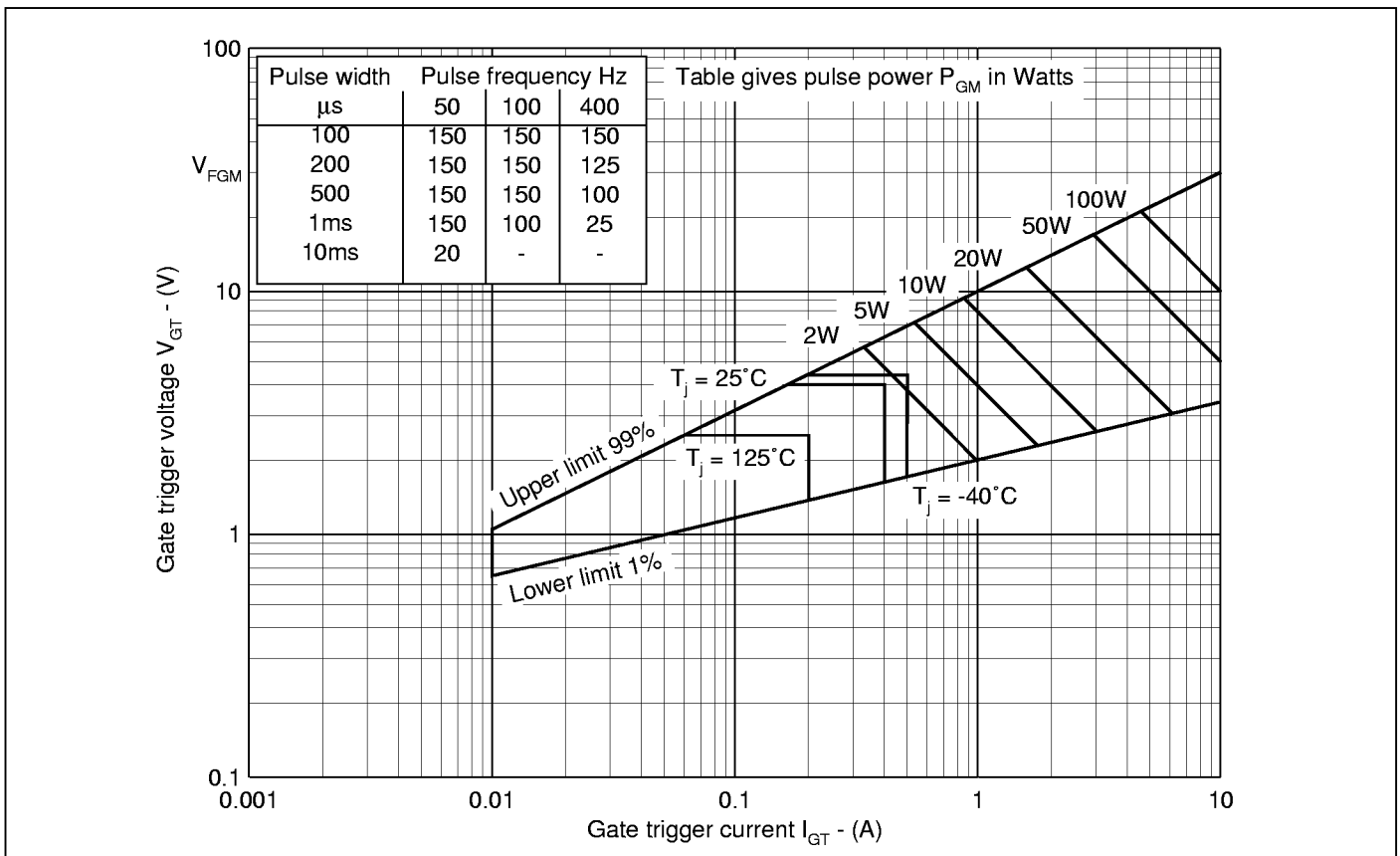


Fig.4 Gate characteristics

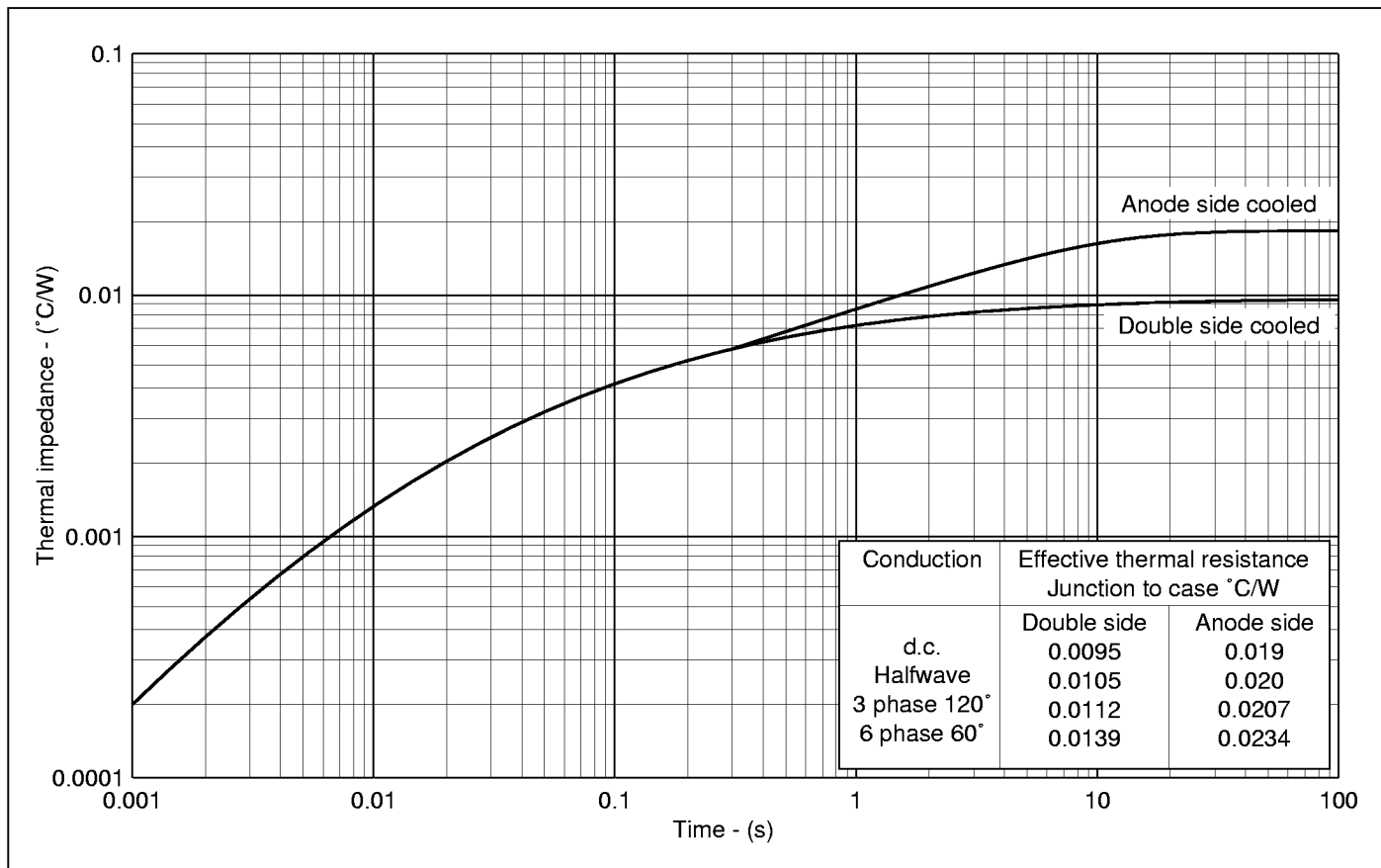


Fig.5 Maximum (limit) transient thermal impedance - junction to case

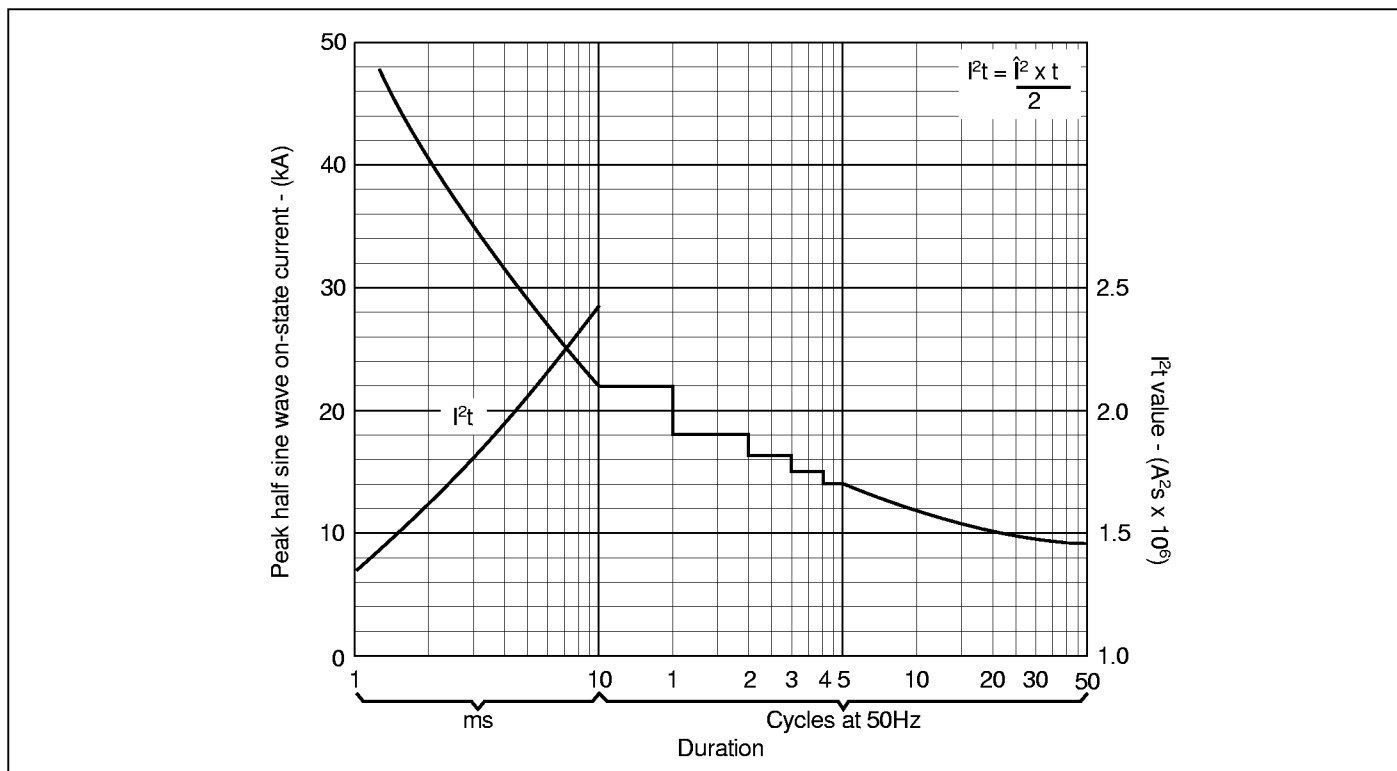
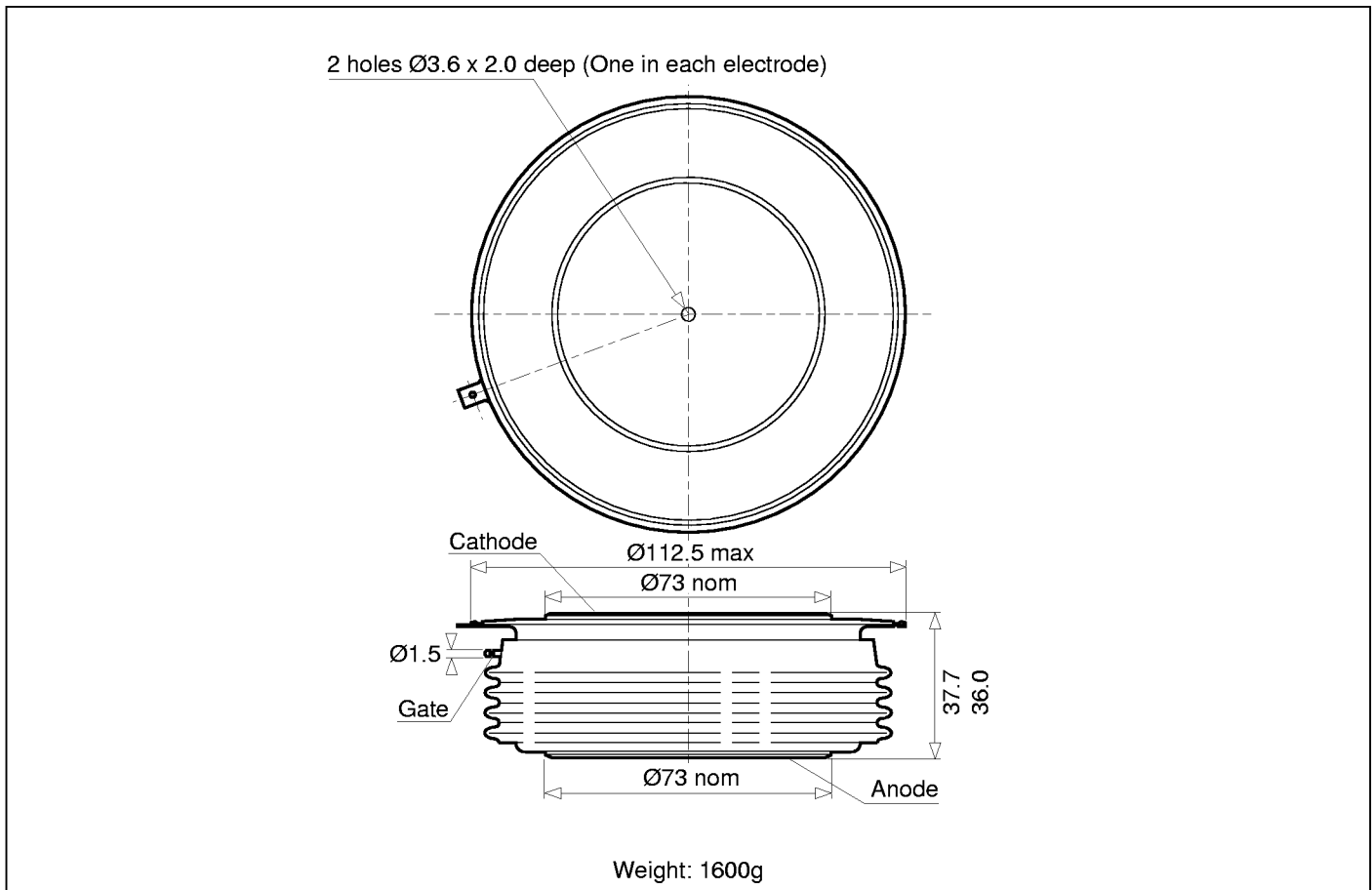


Fig.6 Surge (non-repetitive) on-state current vs time (with 50% V_{RRM} at T_{case} 125°C)

PACKAGE OUTLINE - Y

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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