

DCR1576SY

PHASE CONTROL THYRISTOR

APPLICATIONS

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

KEY PARAMETERS

V_{DRM}	5000V
$I_{T(AV)}$	1770A
I_{TSM}	40000A
dV/dt^*	1000V/ μ s
dI/dt	300A/ μ s

*Higher dV/dt selections available

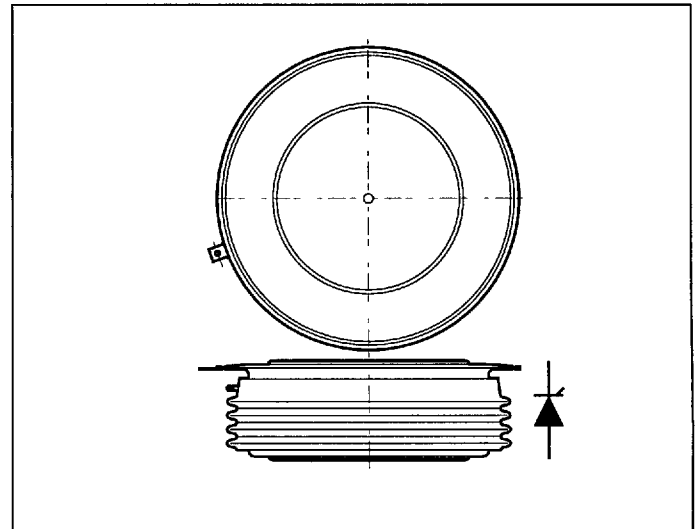
FEATURES

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

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM}	Conditions
DCR1576SY5050	5000	$T_{vj} = 0^\circ$ to 125°C , $I_{DRM} = I_{RRM} = 500\text{mA}$, $V_{DRM}^* V_{RRM} t_p = 10\text{ms}$, V_{DSM} & $V_{RSM} =$ V_{DRM} & $V_{RRM} + 100\text{V}$ Respectively
DCR1576SY4848	4800	
DCR1576SY4646	4600	
DCR1576SY4444	4400	
DCR1576SY4242	4200	
DCR1576SY4040	4000	

Lower voltage grades available.



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CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^\circ\text{C}$	1770	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^\circ\text{C}$	2700	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^\circ\text{C}$	2500	A
Single Side Cooled (Anode side)				
$I_{T(AV)}$	Mean on-state current	Half wave resistive load, $T_{case} = 80^\circ\text{C}$	1120	A
$I_{T(RMS)}$	RMS value	$T_{case} = 80^\circ\text{C}$	1760	A
I_T	Continuous (direct) on-state current	$T_{case} = 80^\circ\text{C}$	1510	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	32.0	kA
I^2t	I^2t for fusing	$V_R = 50\% V_{RRM} - 1/4$ sine	5.12×10^6	A ² s
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; $T_{case} = 125^{\circ}C$	40.0	kA
I^2t	I^2t for fusing	$V_R = 0$	8.0×10^6	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 50.0kN 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	150	$^{\circ}C$	
-	Clamping force		45.0	55.0	kN	

DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Max.	Units	
V_{TM}	Maximum on-state voltage	At 6500A peak, $T_{case} = 25^{\circ}C$	-	2.9	V	
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$	-	300	mA	
dV/dt	Maximum linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 125^{\circ}C$.	-	1000	V/ μ s	
dl/dt	Rate of rise of on-state current	From 67% V_{DRM} to $2 \times I_{T(AV)}$ Gate source 20V, 20 Ω $t_r < 1\mu$ s.	Repetitive 50Hz	-	150	A/ μ s
			Non-repetitive	-	300	A/ μ s
$V_{T(TO)}$	Threshold voltage	At $T_{vj} = 125^{\circ}C$	-	1.05	V	
r_T	On-state slope resistance	At $T_{vj} = 125^{\circ}C$	-	0.34	m Ω	
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, Gate source 30V, 15 Ω Rise time 0.5 μ s, $T_j = 25^{\circ}C$	-	2.5	μ s	
I_L	Latching current	$T_j = 25^{\circ}C$, $V_D = 5V$	-	550	mA	
I_H	Holding current	$T_j = 25^{\circ}C$, $R_{g-k} = \infty$	-	150	mA	
t_q	Turn-off time	$I_T = 800A$, $t_p = 1ms$, $T_j = 125^{\circ}C$, $V_{RM} = 50V$, $dI_{RR}/dt = 20A/\mu$ s, $V_{DR} = 67\% V_{DRM}$, $dV_{DR}/dt = 20V/\mu$ s linear	1.0	-	ms	

*Typical value.

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	-	30	A
P_{GM}	Peak gate power	$t_p = 100\mu$ s	-	150	W
$P_{G(AV)}$	Mean gate power		-	10	W

CURVES

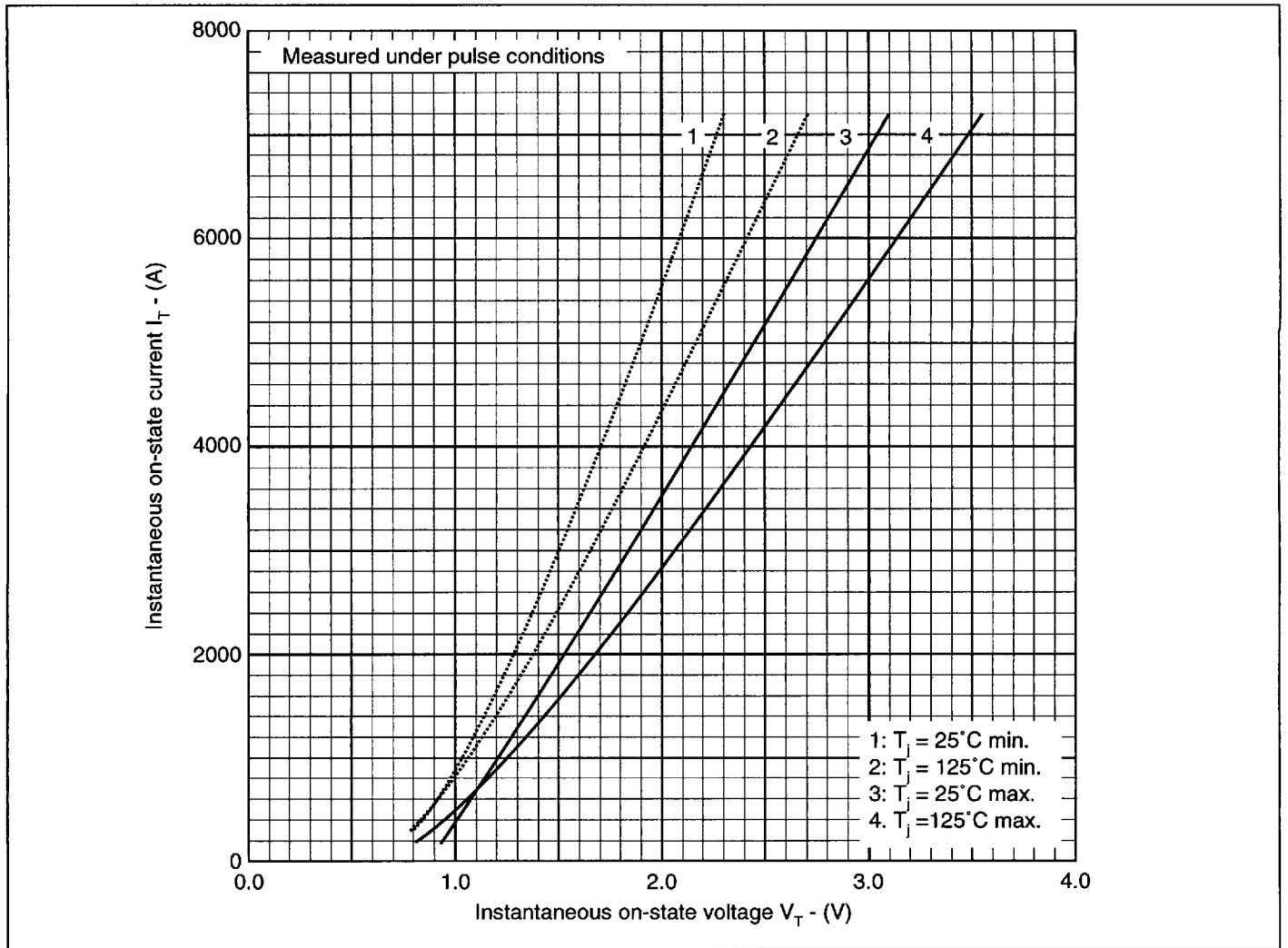


Fig.1 Maximum (limit) on-state characteristics

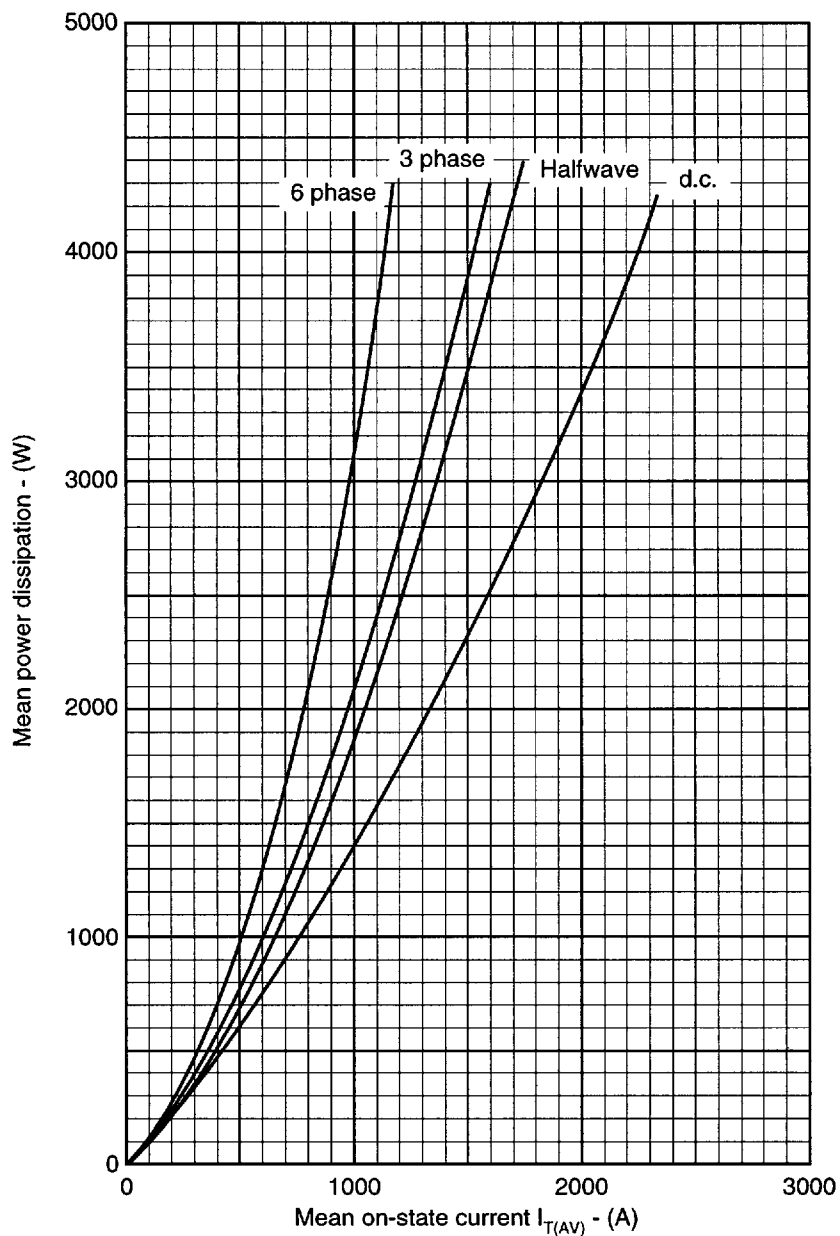


Fig.2 Dissipation curves

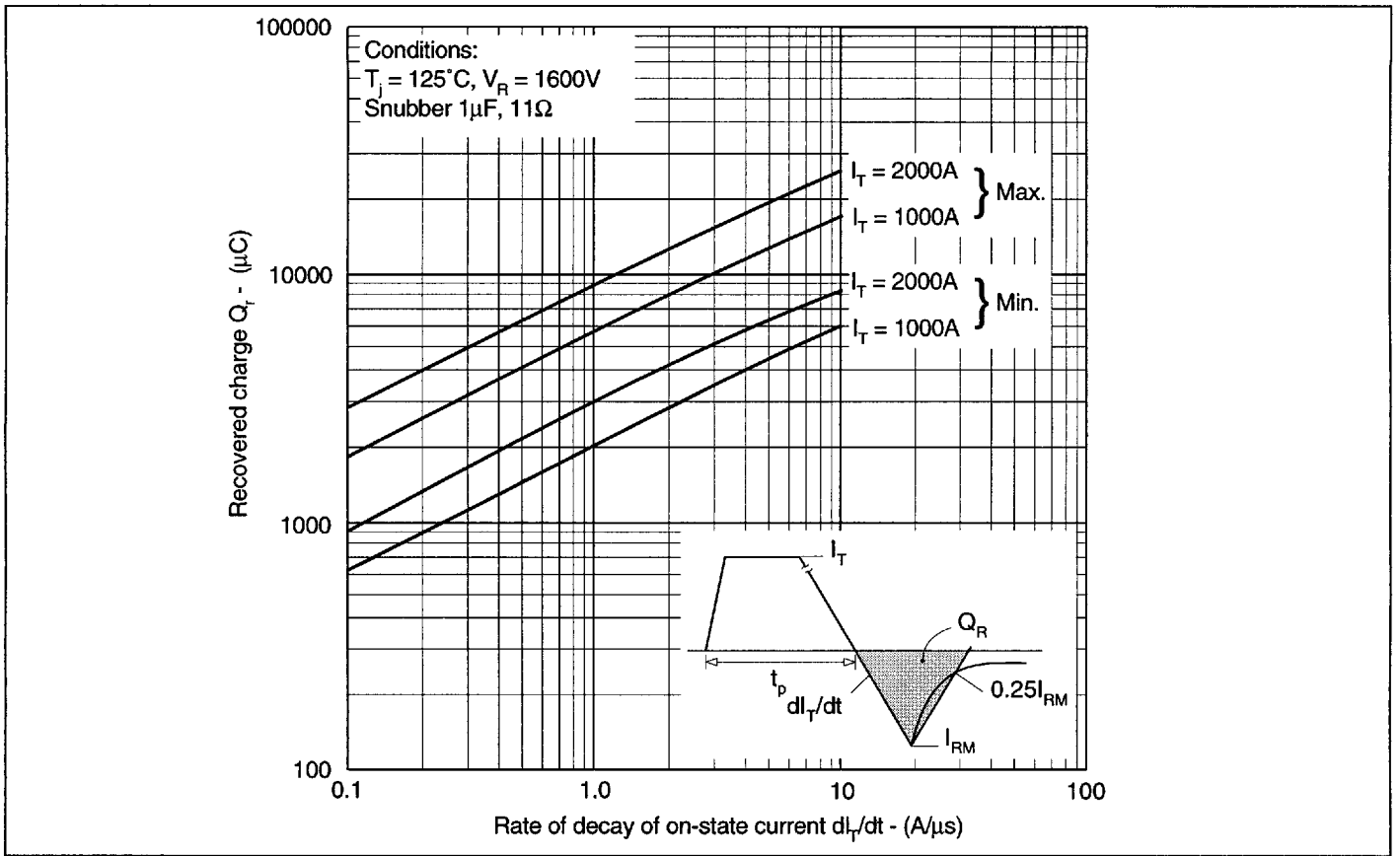


Fig.3 Recovered charge

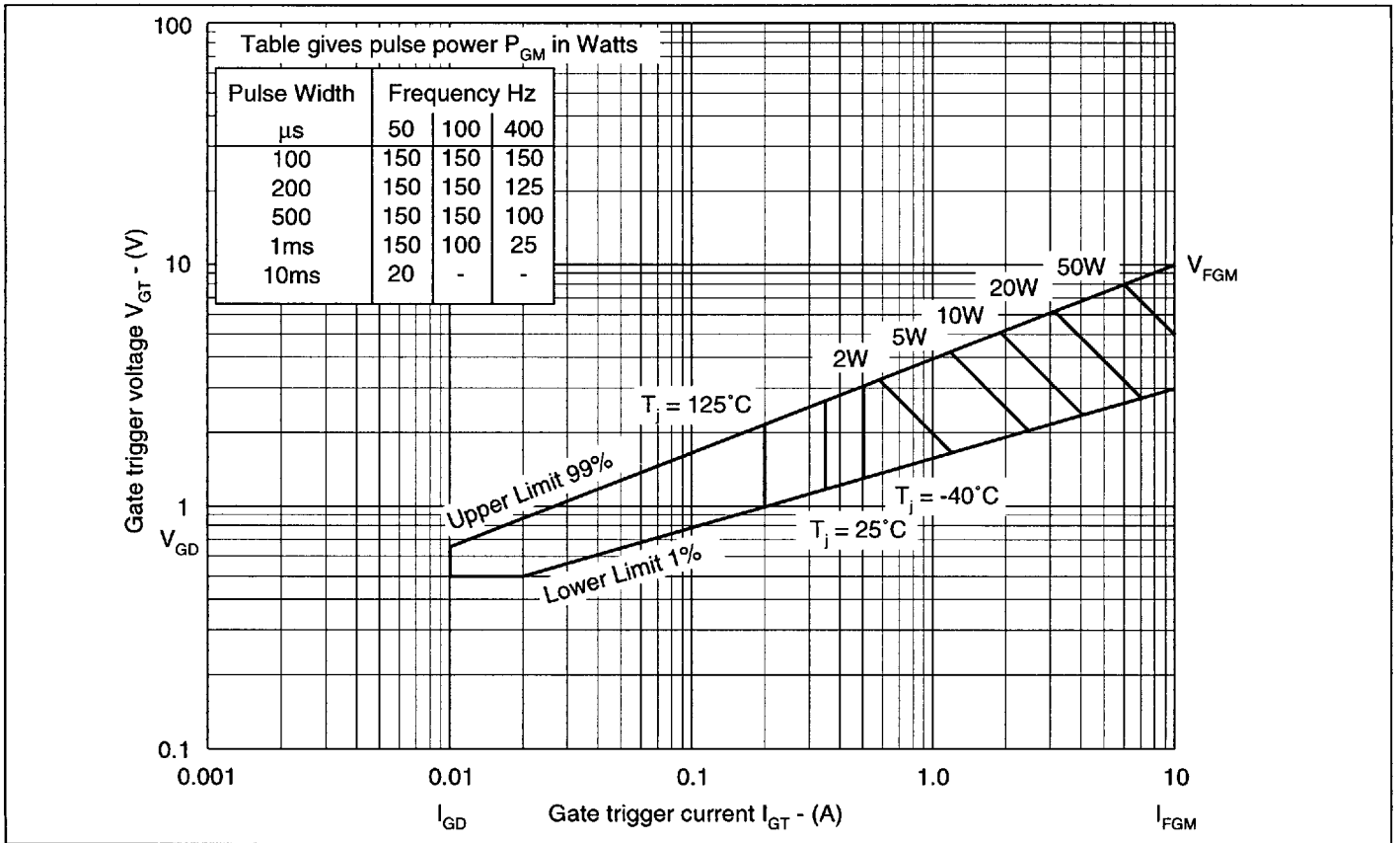


Fig.4 Gate characteristics

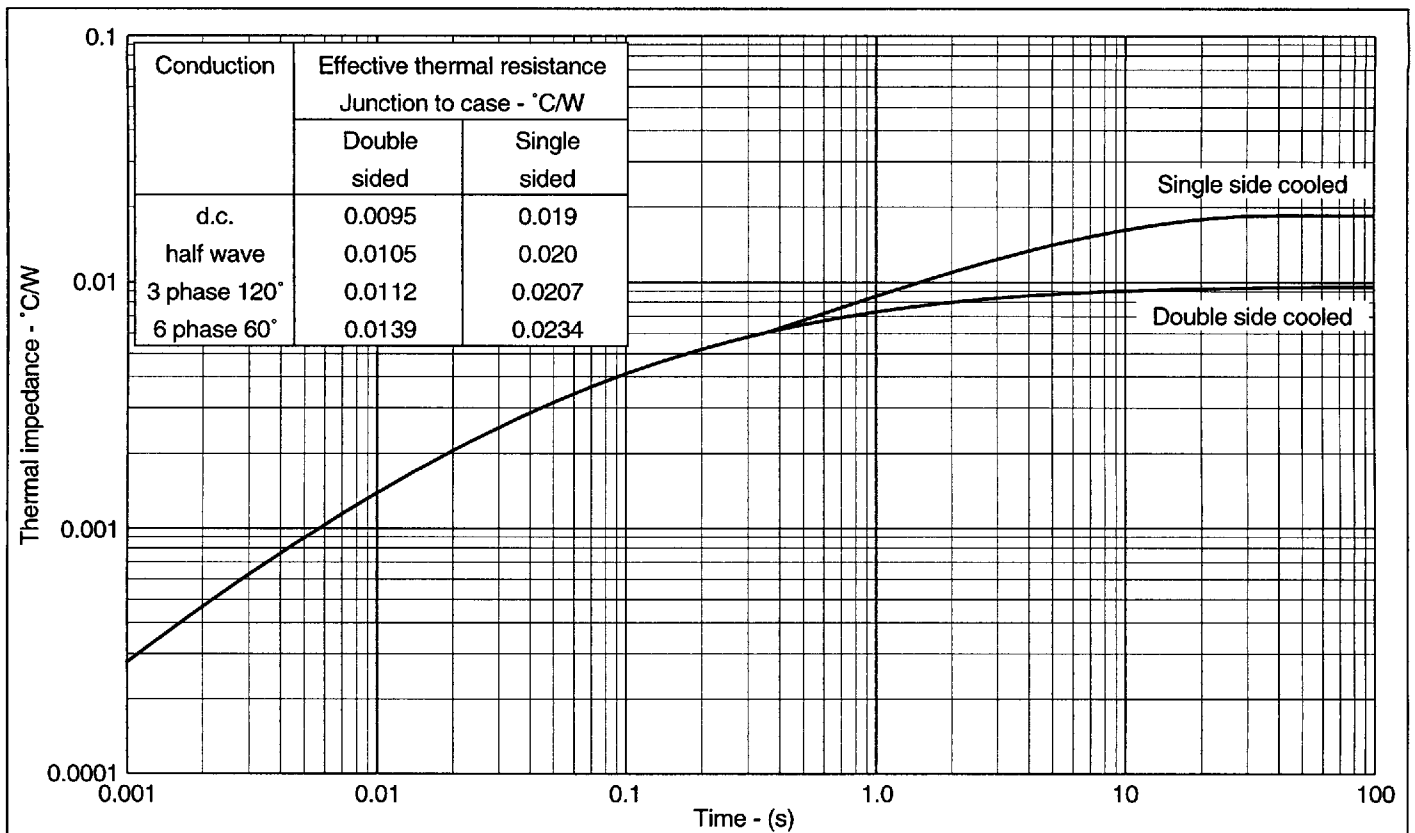


Fig.5 Maximum (limit) transient thermal impedance - junction to case - (°C/W)

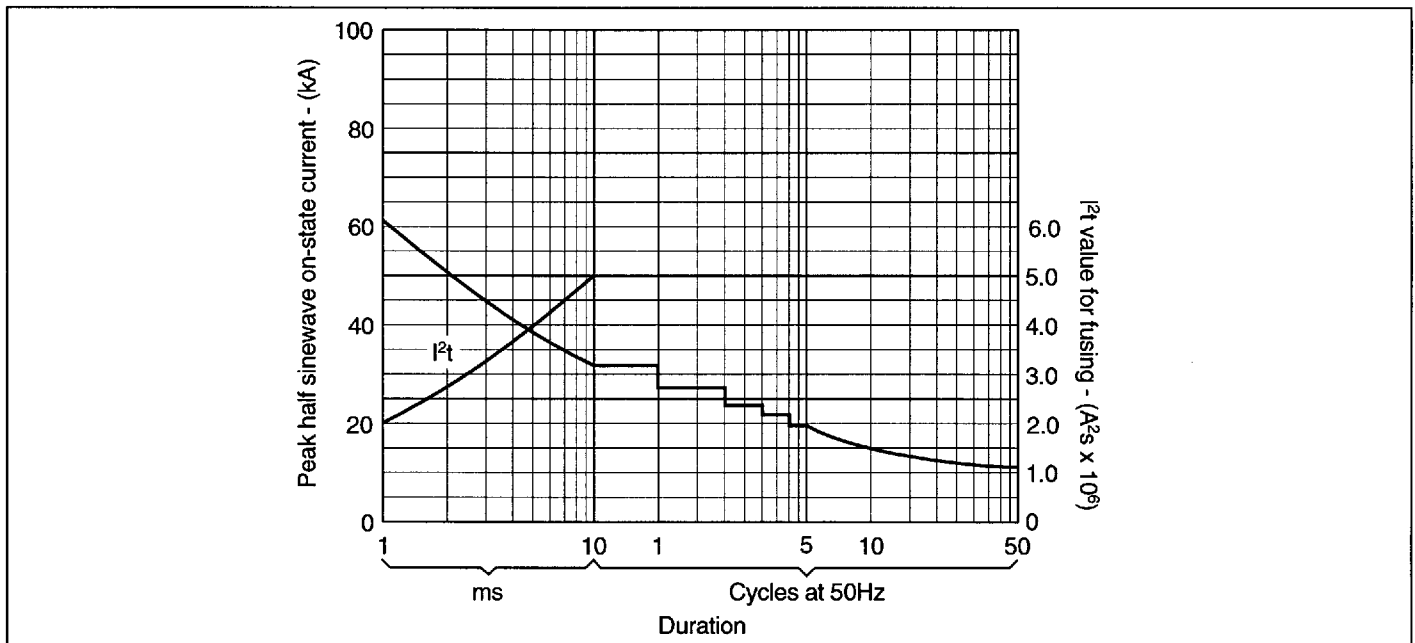
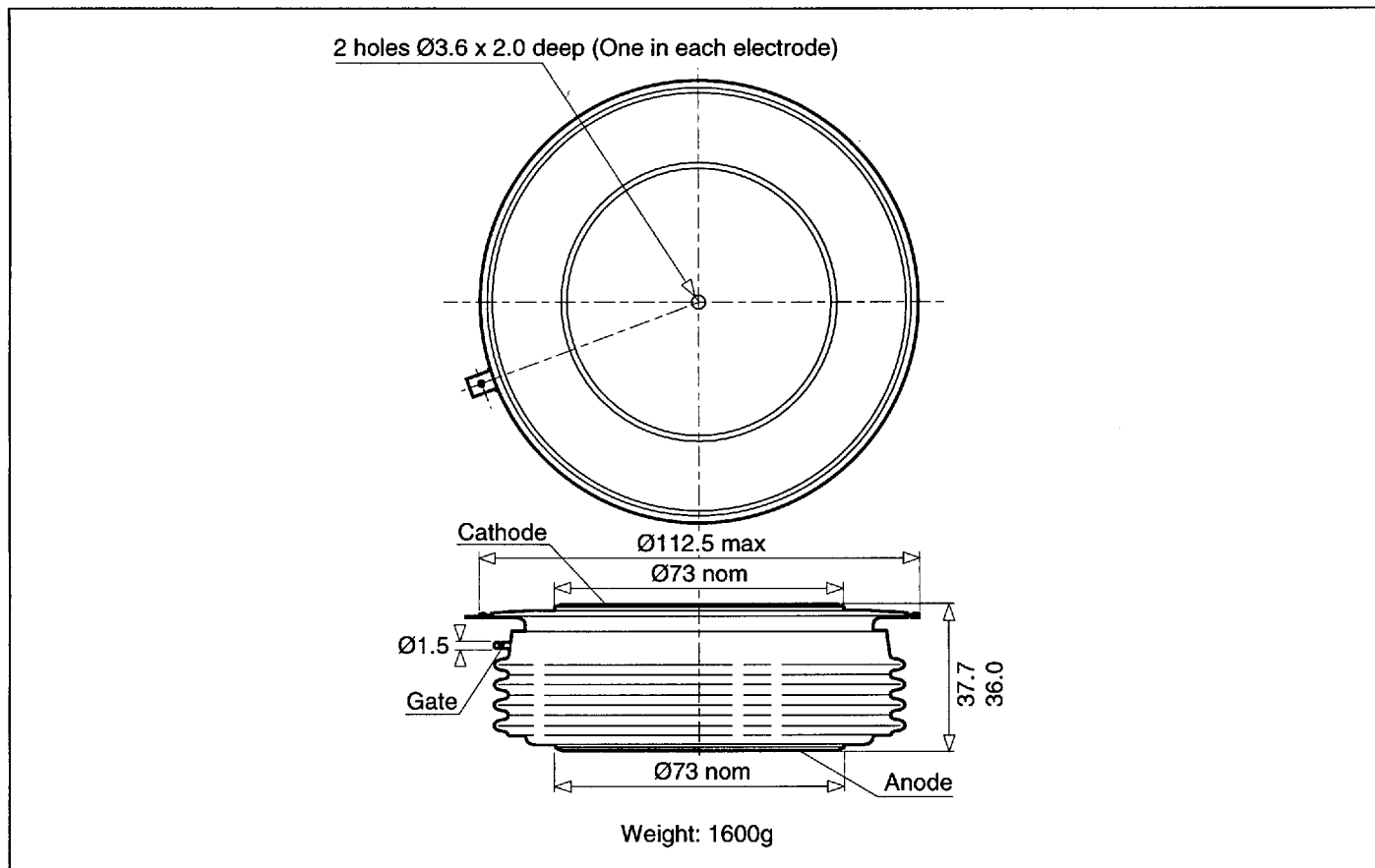


Fig.6 Surge(non-repetitive) on-state current vs time

PACKAGE DETAILS - 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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