

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

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

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{RRM} V	Conditions
DCR1970X18	1800	$T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 150\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$, $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively
DCR1970X16	1600	
DCR1970X14	1400	
DCR1970X12	1200	

Lower voltage grades available.

ORDERING INFORMATION

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

For example:

DCR1970X18

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

KEY PARAMETERS

V_{DRM}	1800 V
$I_{T(AV)}$	1970 A
I_{TSM}	28000 A
dV/dt^*	1000 V/μs
dI/dt	200 A/μs

* Higher dV/dt selections available

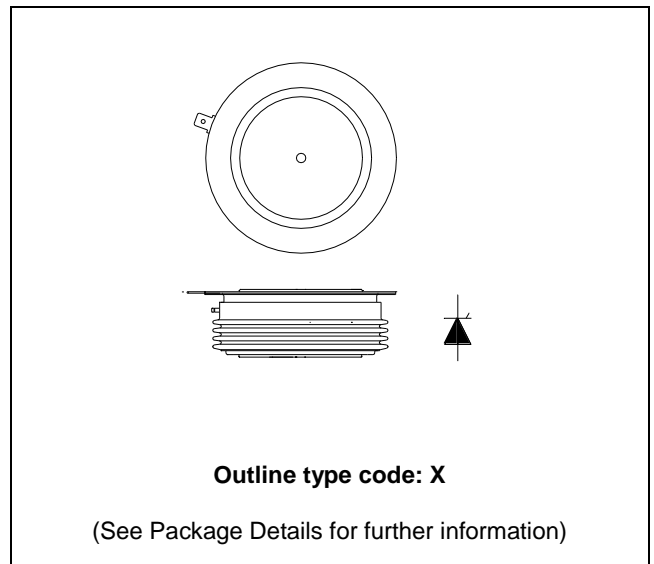


Fig. 1 Package outline

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	1970	A
$I_{T(RMS)}$	RMS value	-	3090	A
I_T	Continuous (direct) on-state current	-	2790	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$	28.0	kA
I^2t	I^2t for fusing	$V_R = 0$	3.92	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	-	0.018	$^{\circ}\text{C/W}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Double side cooled DC	-	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		-40	140	$^{\circ}\text{C}$
F_m	Clamping force		26	34	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} , $T_{case} = 125^{\circ}C$	-	150	mA	
dV/dt	Max. linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 125^{\circ}C$, gate open	1000	-	V/ μ s	
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 2000A	Repetitive 50Hz	-	200	A/ μ s
		Gate source 30V, 10 Ω , $t_r < 0.5\mu$ s, $T_j = 125^{\circ}C$	Non-repetitive	-	1000	A/ μ s
V_T	On-state voltage	$I_T = 3000A$, $T_{case} = 125^{\circ}C$		1.36	V	
$V_{T(TO)}$	Threshold voltage	$T_{case} = 125^{\circ}C$	-	0.88	V	
r_T	On-state slope resistance	$T_{case} = 125^{\circ}C$	-	0.16	m Ω	
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, gate source 30V, 10 Ω $t_r = 0.5\mu$ s, $T_j = 25^{\circ}C$	-	3.0	μ s	
t_q	Turn-off time	$T_j = 125^{\circ}C$, $V_R = 100V$, $dI/dt = 10A/\mu$ s, $dV_{DR}/dt = 20V/\mu$ s linear to 67% V_{DRM}	-	300	μ s	
Q_S	Stored charge	$I_T = 2000A$, $t_p = 1000\mu$ s, $T_j = 125^{\circ}C$, $dI/dt = 10A/\mu$ s,	-	3000	μ C	
I_{RR}	Reverse recovery current		-	165	A	
I_L	Latching current	$T_j = 25^{\circ}C$,	-	1	A	
I_H	Holding current	$T_j = 25^{\circ}C$,	-	200	mA	

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	3	V
V_{GD}	Gate non-trigger voltage	At 40% V_{DRM} , $T_{case} = 125^{\circ}C$	0.3	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V$, $T_{case} = 25^{\circ}C$	300	mA
I_{GD}	Gate non-trigger current	At 40% V_{DRM} , $T_{case} = 125^{\circ}C$	20	mA

CURVES

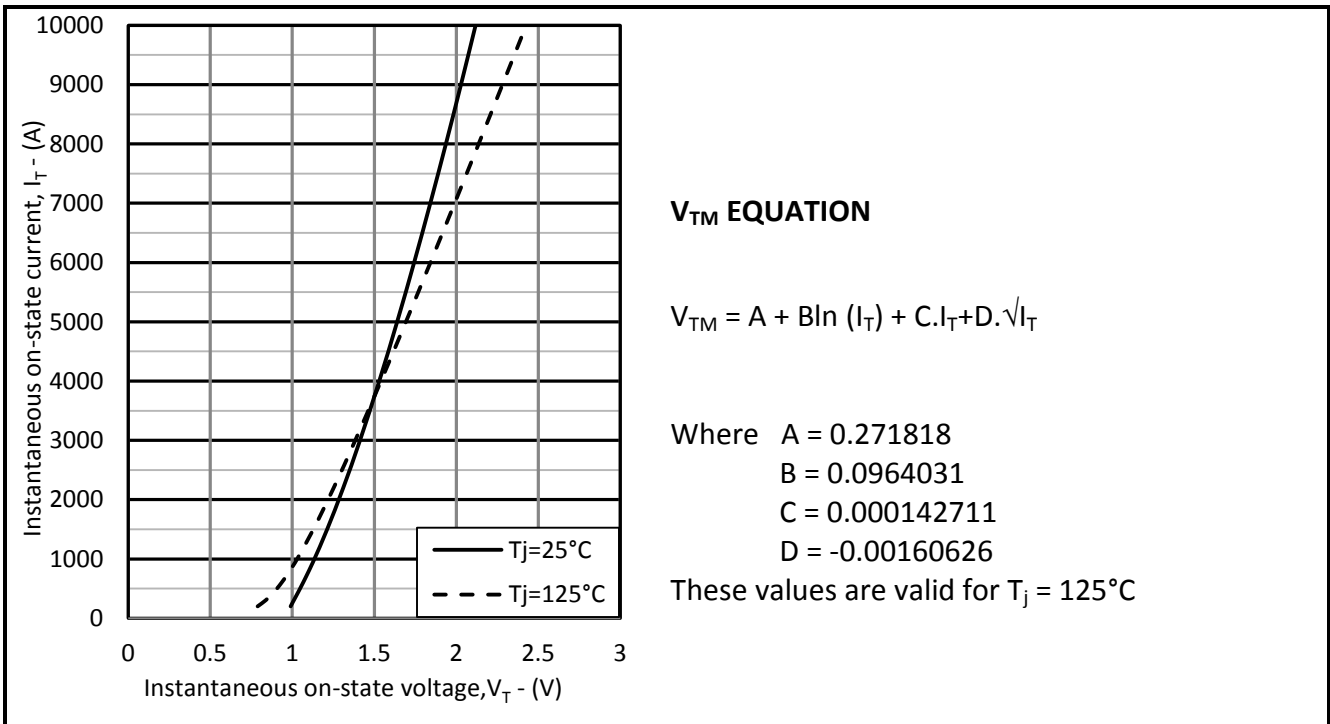


Fig.2 Maximum & minimum on-state characteristics

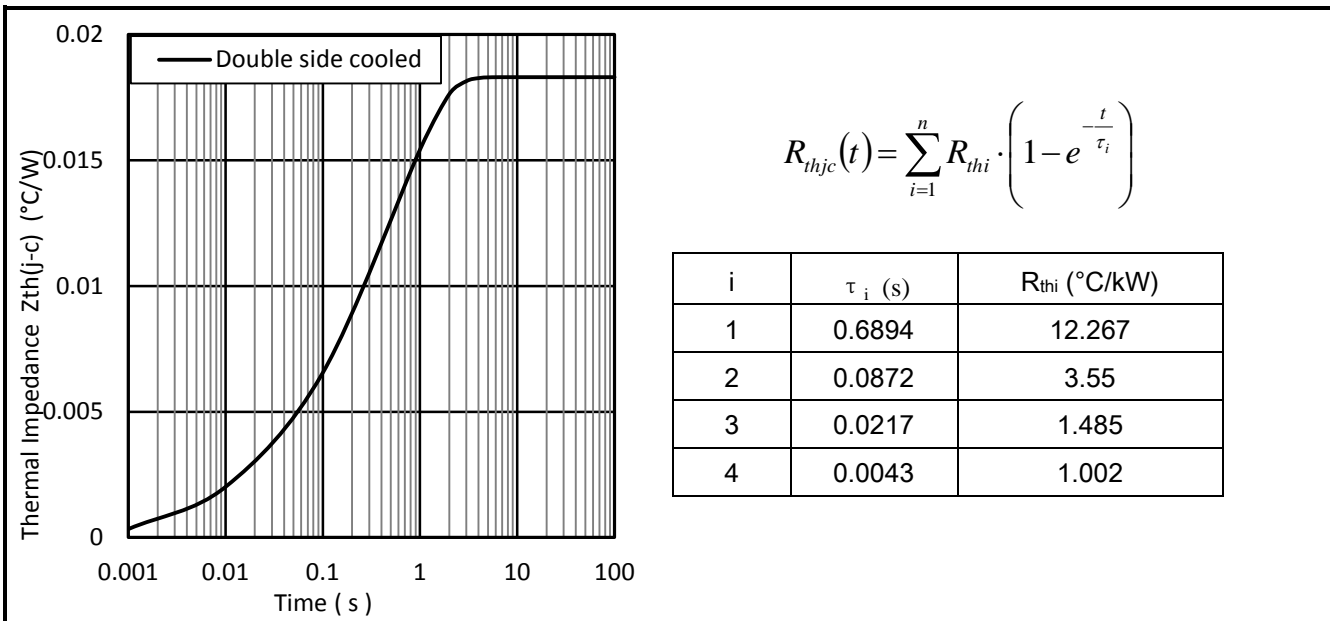


Fig.3 Maximum (limit) transient thermal impedance – junction to case (°C/W)

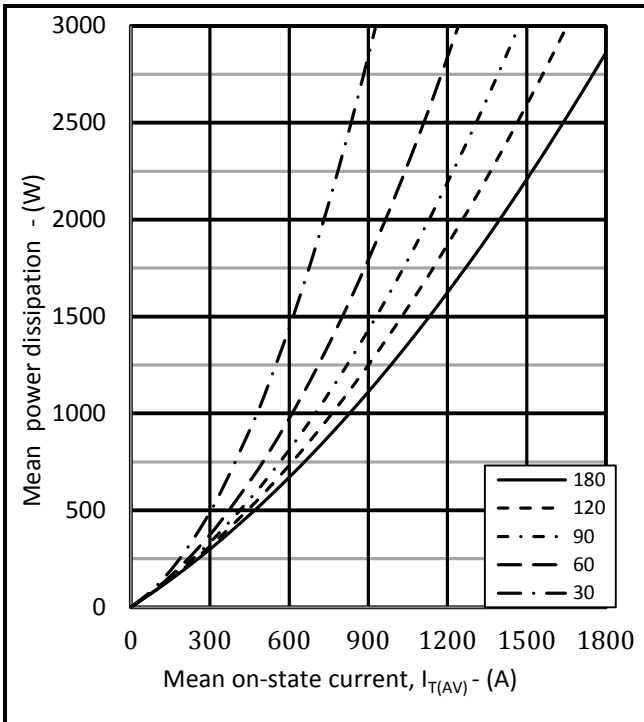


Fig.4 On-state power dissipation – sine wave

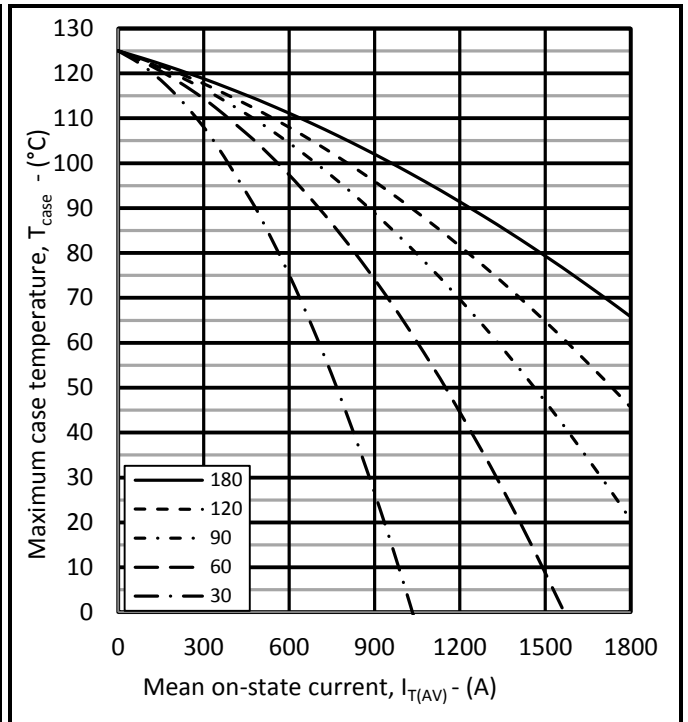


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

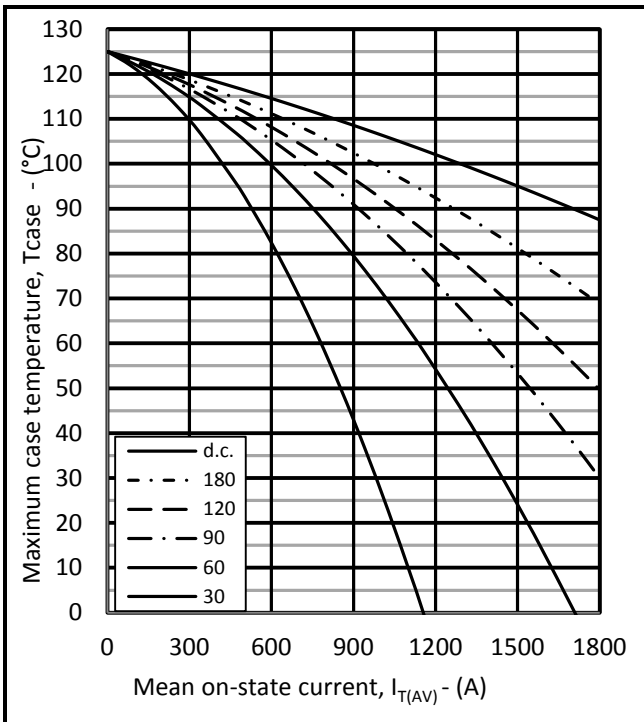


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

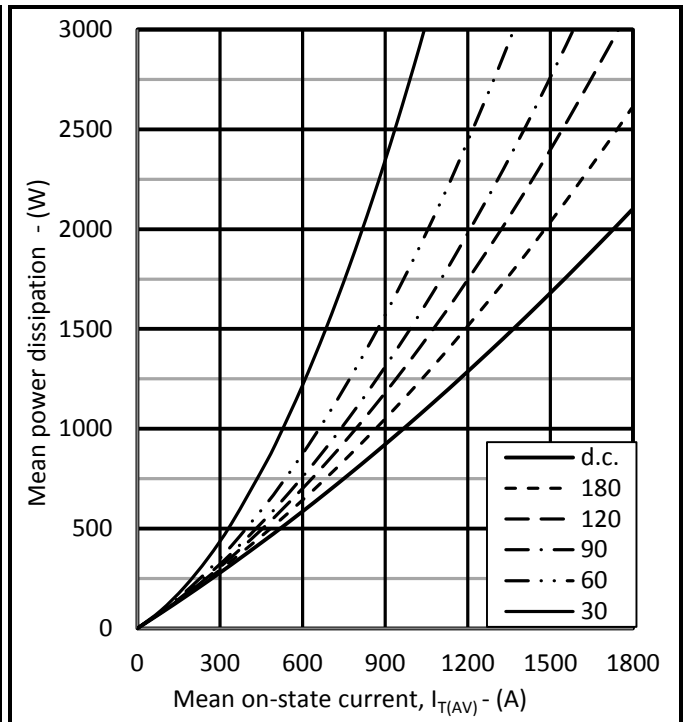


Fig.7 On-state power dissipation – rectangular wave

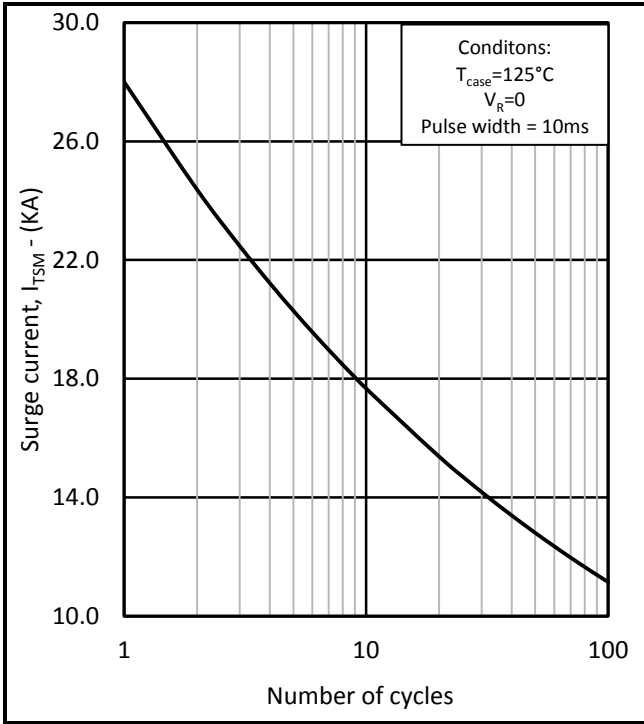


Fig.8 Multi-cycle surge current

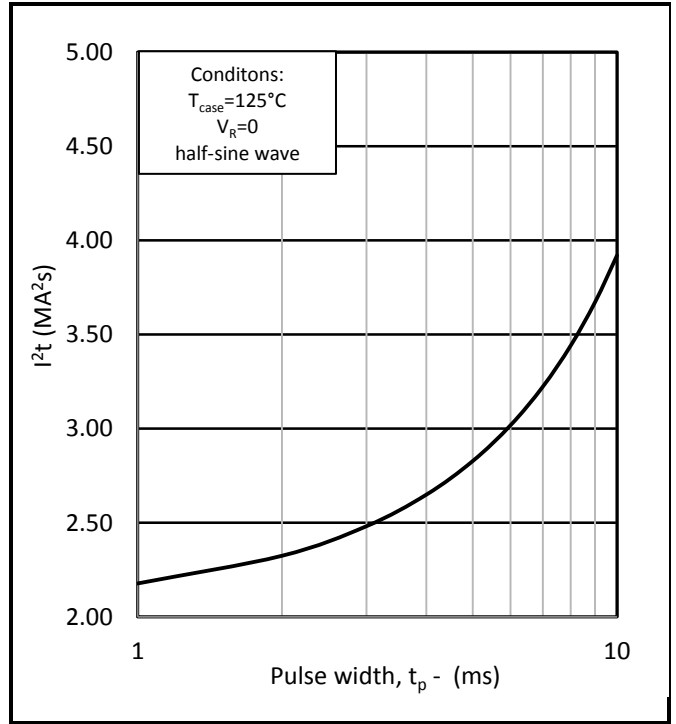


Fig.9 Single-cycle I^2t

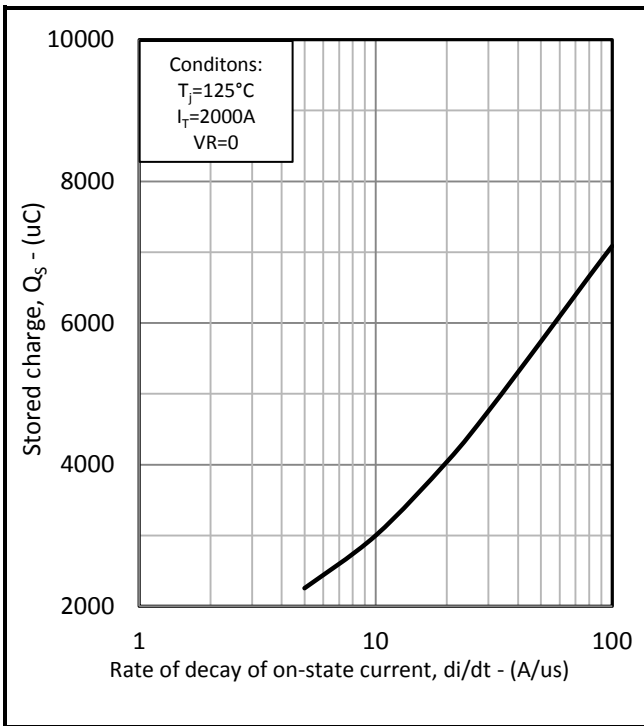


Fig.10 Stored charge vs di/dt

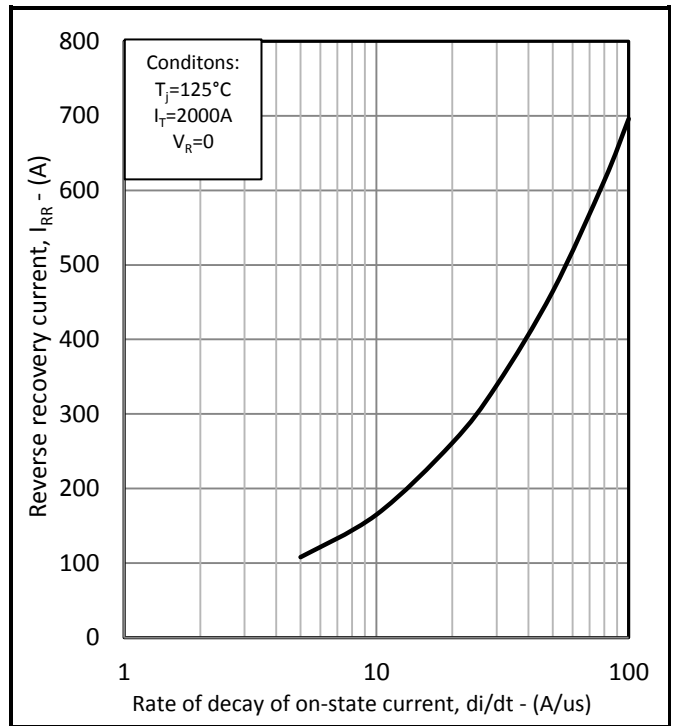


Fig.11 Reverse recovery current vs di/dt

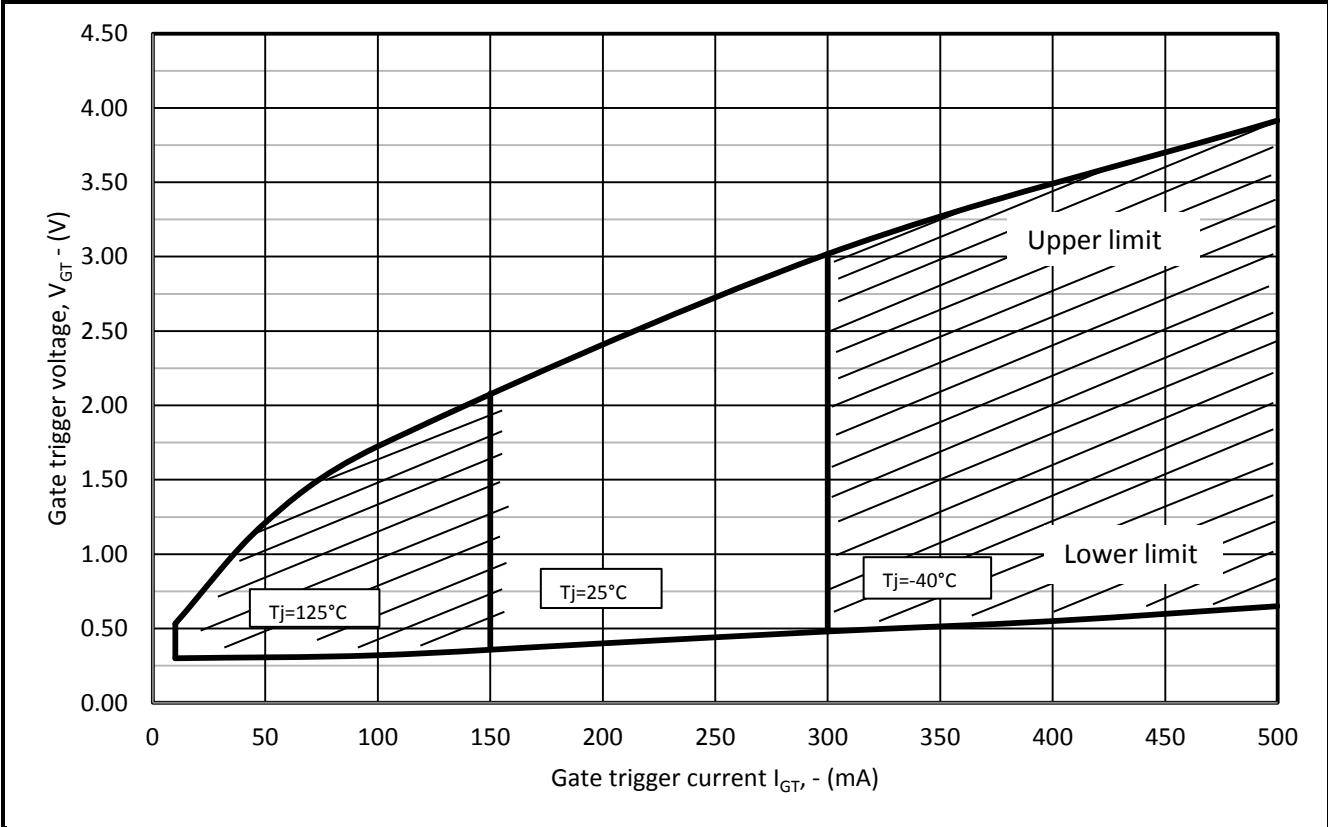


Fig.12 Gate characteristics

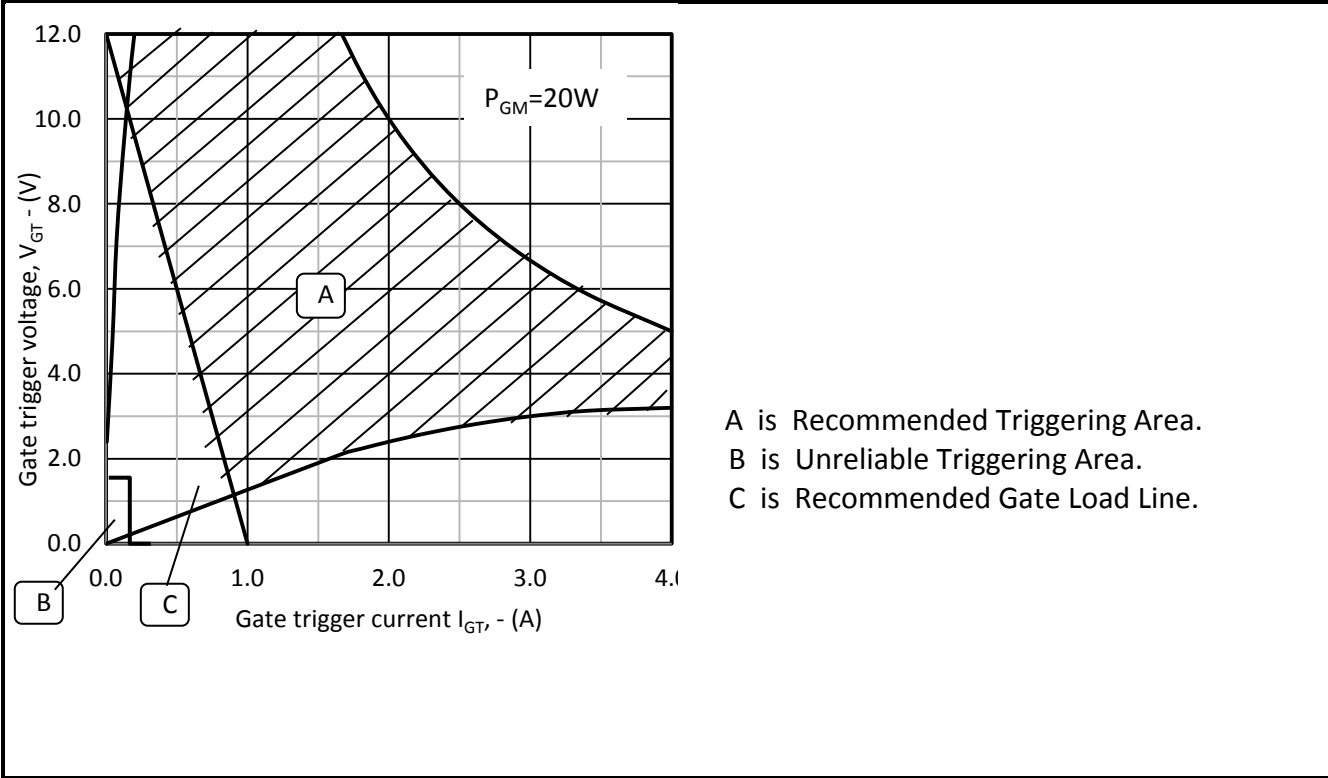


Fig.13 Gate characteristics

PACKAGE DETAILS

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

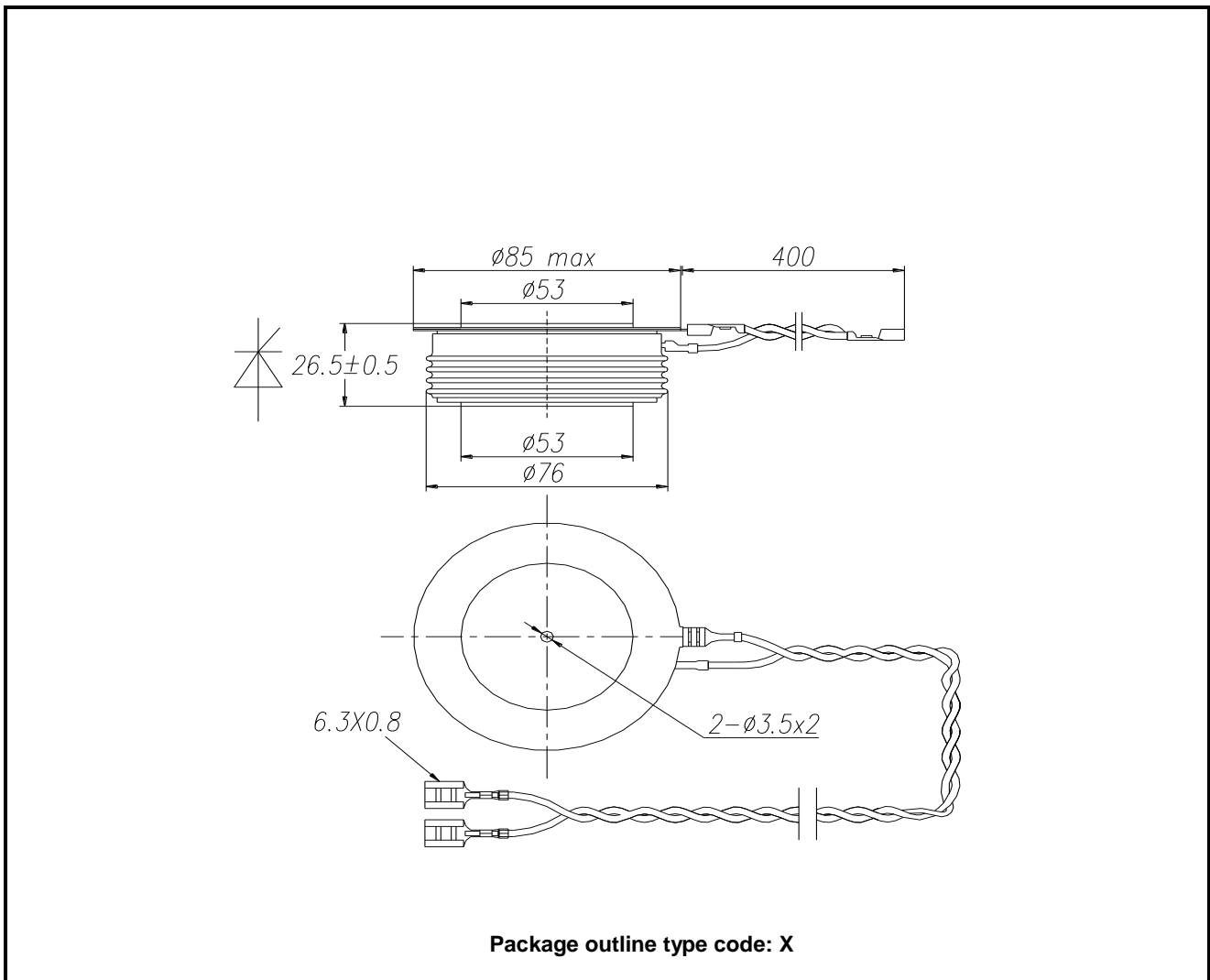


Fig.14 Package outline

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