

FEATURES

- Double Side Cooling
- High Surge Capability
- Very Low Cosmic Ray FIT Rating
- High dv/dt Rating

APPLICATIONS

- Multi-level VSC By-pass thyristor for HVDC

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{RRM} V	Conditions
ACR3200VR33	1000 / 3300	$T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 400\text{mA}$, $V_{DRM}, V_{RRM} t_p = 10\text{ms}$,

ORDERING INFORMATION

For example:

ACR3200VR33

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}	1000V
V_{RRM}	3300V
$I_{T(AV)}$	3200A
I_{TSM}	43000A
dV/dt	10kV/ μs
dI/dt	400A/ μs

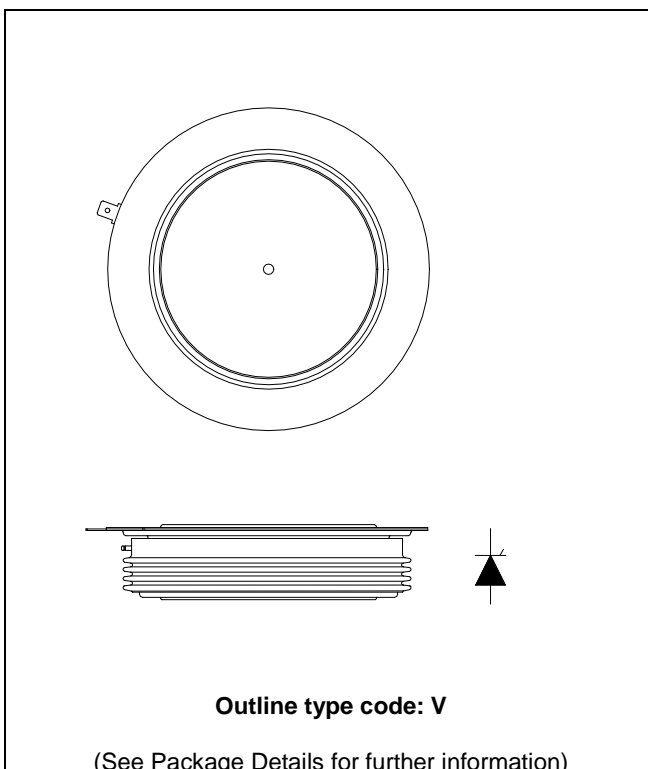


Fig. 1 Package outline

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	3200	A
$I_{T(RMS)}$	RMS value	-	5026	A
I_T	Continuous (direct) on-state current	-	4900	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$	43	kA
I^2t	I^2t for fusing	$V_R = 0$	9.24	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	-	0.00746	$^{\circ}\text{C/W}$
		Single side cooled	Anode DC	-	0.0130	$^{\circ}\text{C/W}$
			Cathode DC	-	0.0178	$^{\circ}\text{C/W}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 54kN (with mounting compound)	Double side	-	0.002	$^{\circ}\text{C/W}$
			Single side	-	0.004	$^{\circ}\text{C/W}$
T_{vj}	Virtual junction temperature	Blocking V_{DRM} / V_{RRM}		-	125	$^{\circ}\text{C}$
T_{stg}	Storage temperature range			-55	125	$^{\circ}\text{C}$
F_m	Clamping force			48.0	59.0	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} , $T_{case} = 125^{\circ}C$		-	400	mA
dV/dt	Max. linear rate of rise of off-state voltage	To 67% V_{DRM} , $T_j = 60^{\circ}C$, gate open circuit		-	10000	V/ μs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to $2 \times I_{T(AV)}$ Gate source 30V, 10 Ω , $t_r < 0.5\mu s$, $T_j = 125^{\circ}C$	Non-repetitive	-	400	A/ μs
$V_{T(TO)}$	Threshold voltage – Low level	300A to 2400A at $T_{case} = 125^{\circ}C$		-	0.8383	V
	Threshold voltage – High level	2400A to 9000A at $T_{case} = 125^{\circ}C$		-	1.0419	V
r_T	On-state slope resistance – Low level	300A to 2400A at $T_{case} = 125^{\circ}C$		-	0.2374	m Ω
	On-state slope resistance – High level	2400A to 9000A at $T_{case} = 125^{\circ}C$		-	0.1490	m Ω
t_{gd}	Delay time	$V_D = 67\% V_{DRM}$, $I_g = 3A$, $t_r = 0.5\mu s$, $T_j = 25^{\circ}C$, $t_p = 40\mu s$		3	3	μs
DC FITs	DC Cosmic Ray FIT Rating	$T_j = 25^{\circ}C$, $V_R = 50\% V_{RRM}$, sea level			24	Per 10^9
		$T_j = 25^{\circ}C$, $V_R = 67\% V_{RRM}$, sea level			743	hours
V_{pu}	Pick-up Voltage	$I_g = 3A$, $t_r = 0.5\mu s$, $T_j = 25^{\circ}C$, $t_p = 40\mu s$			2	V
I_L	Latching current	$T_j = 25^{\circ}C$, $V_D = 5V$		-	3	A
I_H	Holding current	$T_j = 25^{\circ}C$, $R_{G-K} = \infty$, $I_{TM} = 500A$, $I_T = 5A$		-	300	mA

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
V_{GT}	Gate trigger voltage	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	1.5	V
V_{GD}	Gate non-trigger voltage	At $V_{DRM}, T_{case} = 125^{\circ}C$	TBD	V
I_{GT}	Gate trigger current	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	350	mA
I_{GD}	Gate non-trigger current	$V_{DRM} = 5V, T_{case} = 25^{\circ}C$	TBD	mA

CURVES

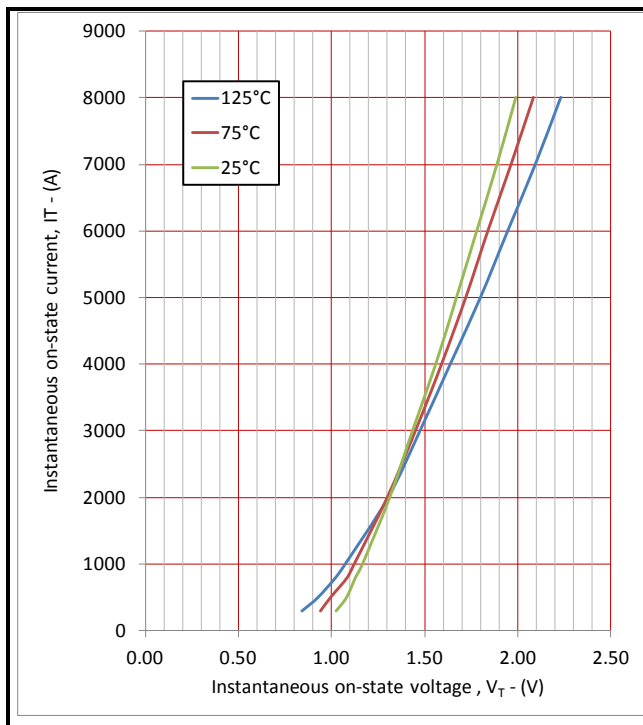


Fig.2 Maximum & minimum on-state characteristics

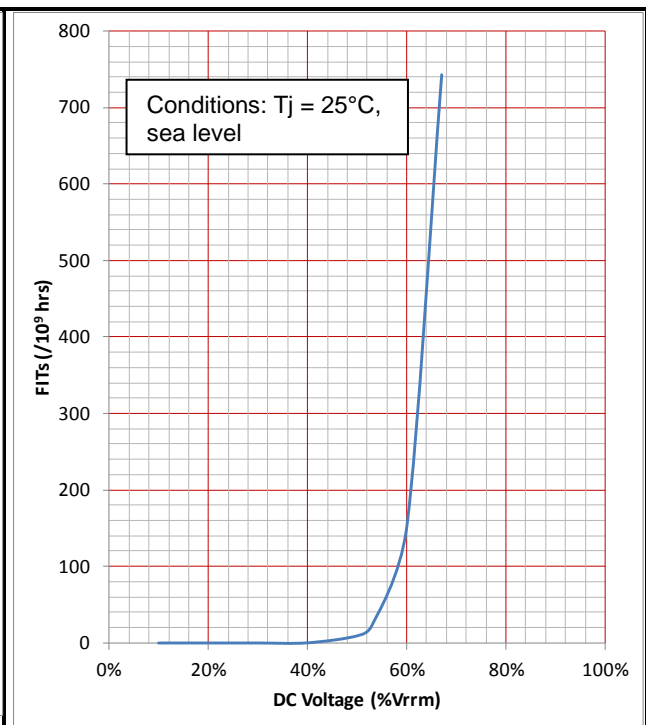


Fig.3 Cosmic Ray DC FIT Rating

V_{TM} EQUATION

$$V_{TM} = A + B \cdot \ln(I_T) + C \cdot I_T + D \cdot \sqrt{I_T}$$

Where

$$\begin{aligned} A &= -0.303672 \\ B &= 0.216168 \\ C &= 0.000164 \\ D &= -0.007999 \end{aligned}$$

these values are valid for $T_j = 125^{\circ}C$ for I_T 300A to 9000

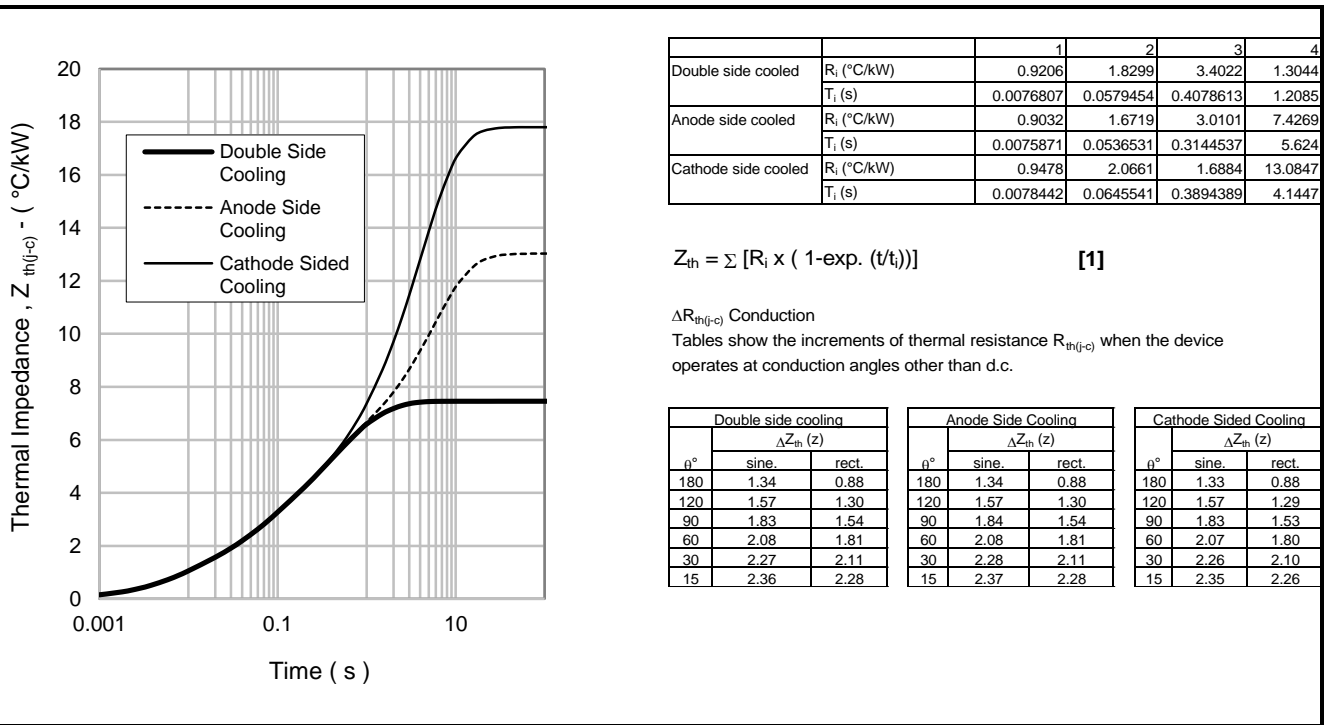


Fig.4
Maximum (limit) transient thermal impedance – junction to case (°C/kW)

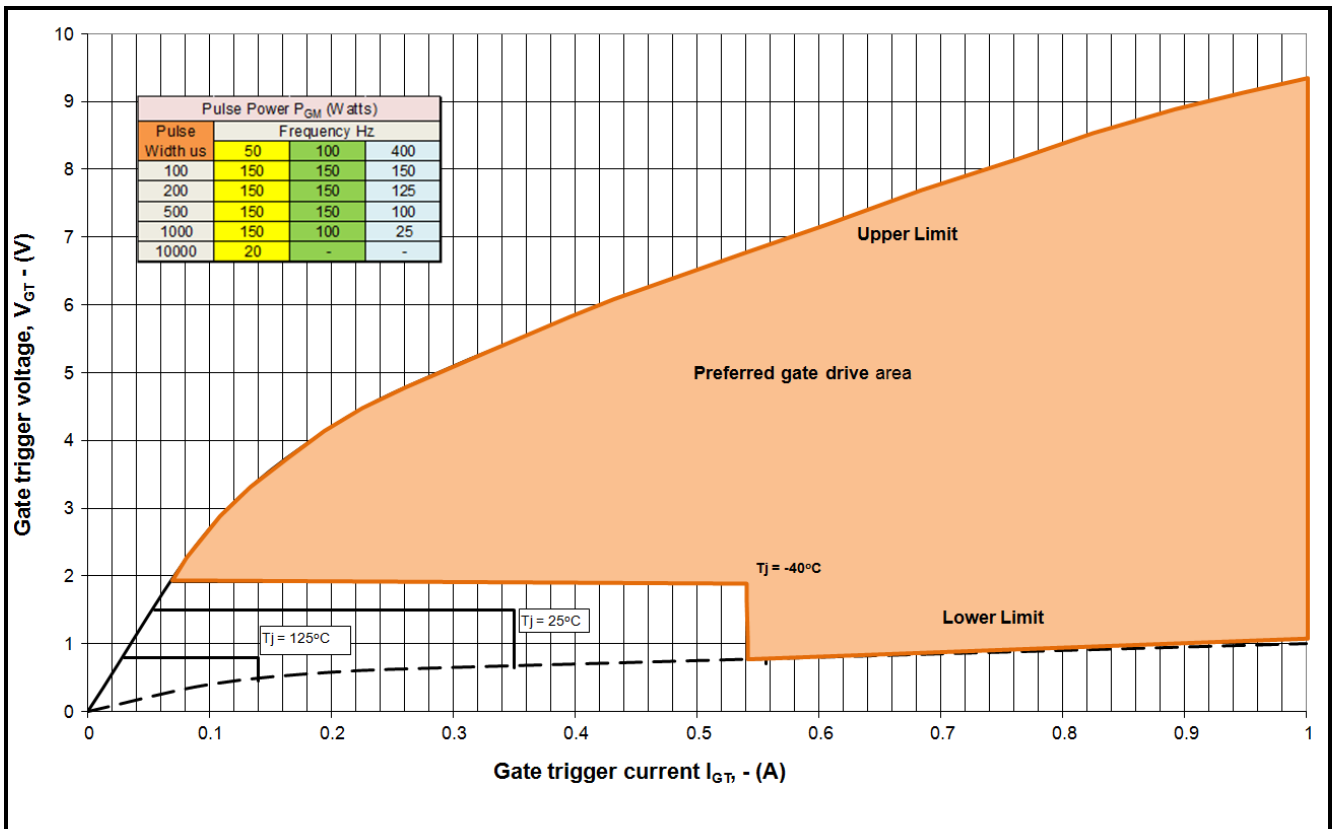


Fig5 Gate Characteristics

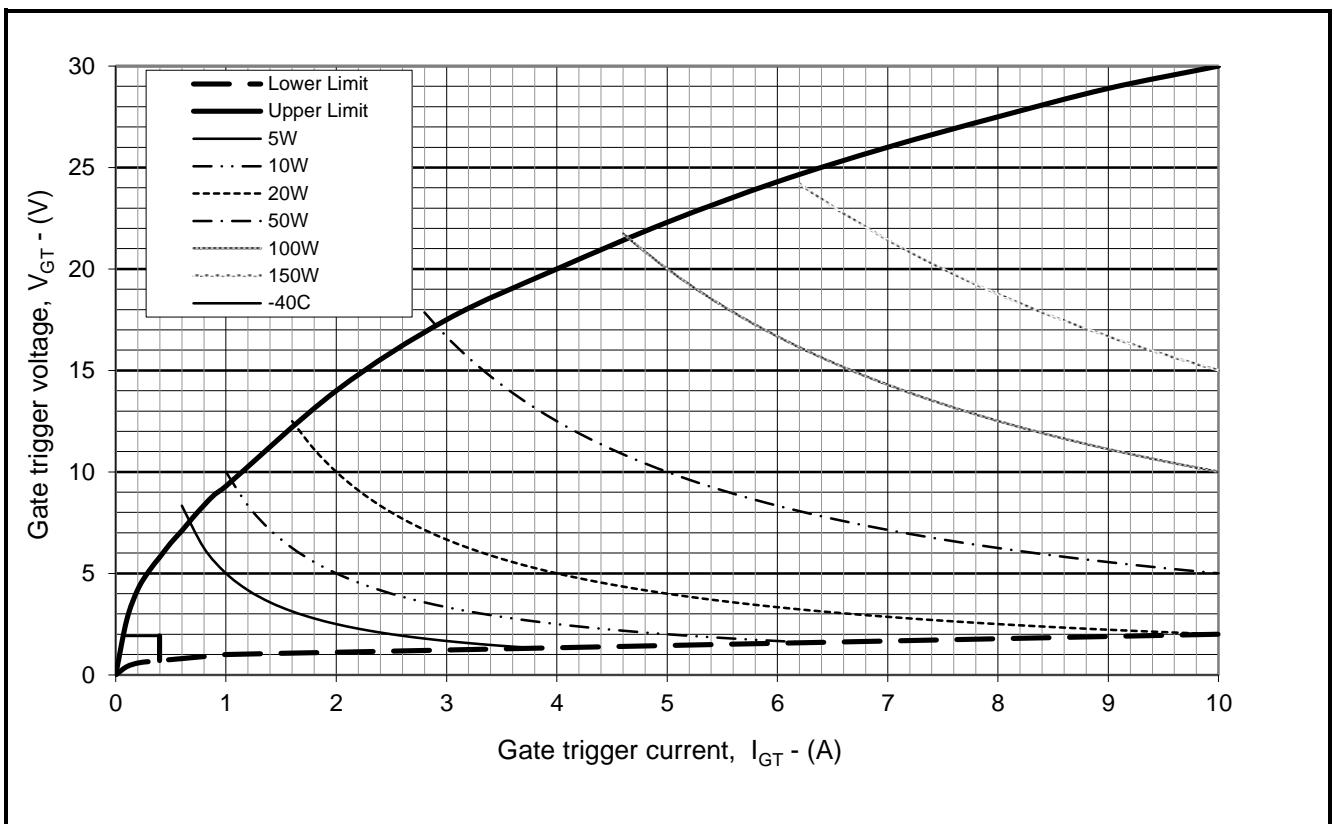


Fig. 6 Gate characteristics

PACKAGE DETAILS

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

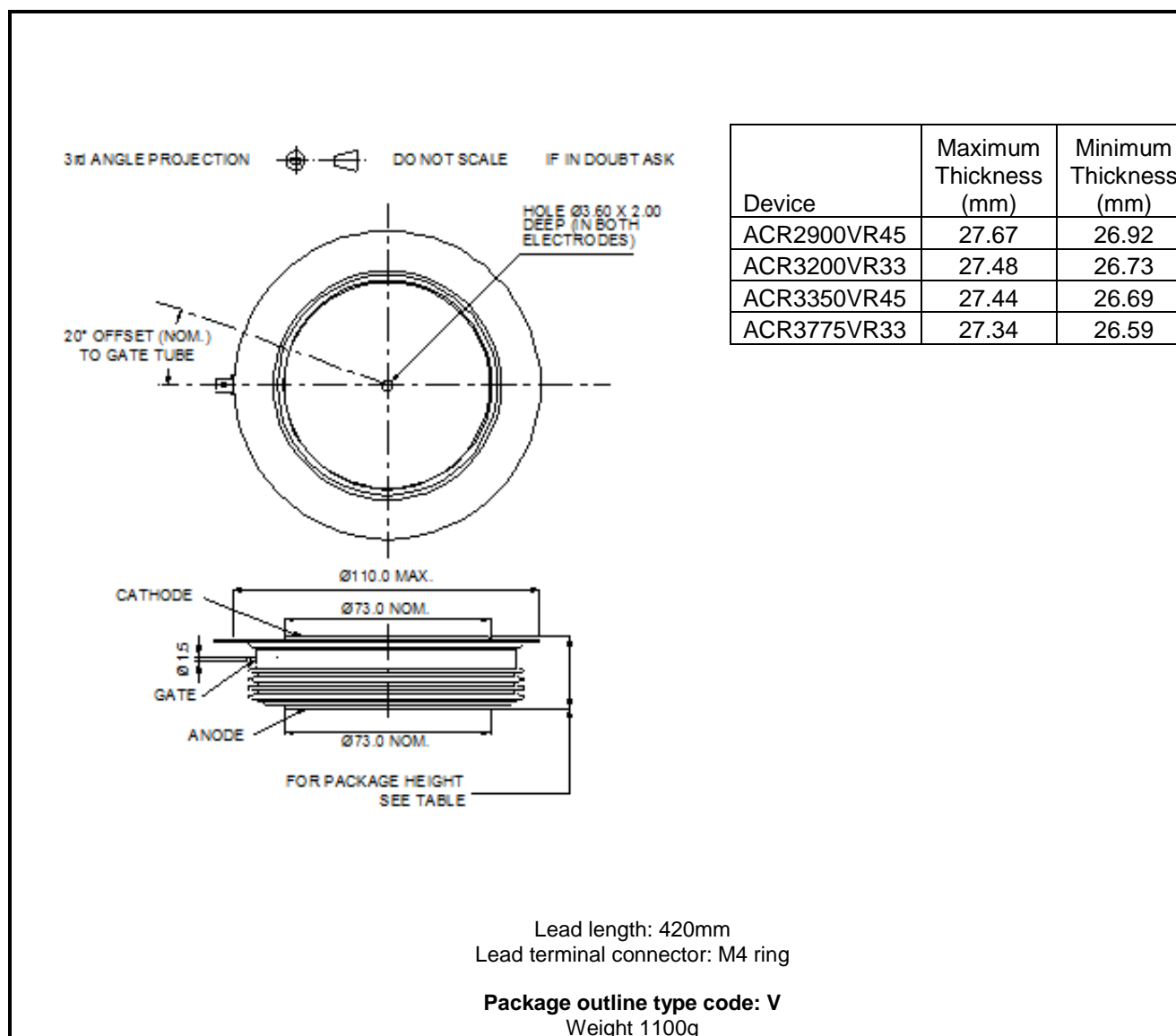


Fig.7 Package outline

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