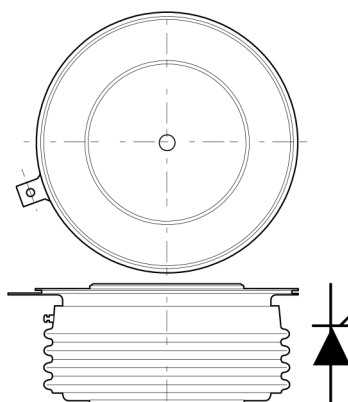


Phase Control Thyristor

multicompPRO

**RoHS
Compliant**



Outline type code: G

Features

- Double Side Cooling
- High Surge Capability

Applications

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

Key Parameters

Part Number	Repetitive Peak Voltages V_{DRM} and V_{RRM} V	$I_{T(AV)}$	I_{TSM}	dV/dt^*	dI/dt	Conditions
MPPCT1010G140	1400	1010 A	15000 A	1000 V/ μ s	200 A/ μ s	$T_{vj} = -40^{\circ}\text{C}$ to 125°C , $I_{DRM} = I_{RRM} = 60\text{mA}$, V_{DRM} , V_{RRM} $t_p = 10\text{ms}$, V_{DSM} & $V_{RSM} =$ V_{DRM} & $V_{RRM} + 100\text{V}$ respectively

Current Ratings

$T_{case} = 60^{\circ}\text{C}$ unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
$I_{T(AV)}$	Surge (non-repetitive) on-state current	Half wave resistive load	1010	A
$I_{T(RMS)}$	RMS value	-	1590	
I_T	Continuous (direct) on-state current	-	1430	

Surge Ratings

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Mean on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$ $V_R = 0$	15	kA
I^2t	I^2t for fusing		1.13	MA^2s

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Thermal and Mechanical Ratings

Symbol	Parameter	Test Conditions		Min.	Max.	Units
R _{th(j-c)}	Thermal resistance – junction to case	Double side cooled	DC	-	0.035	°C/W
R _{th(c-h)}	Thermal resistance – case to heatsink			-	0.008	
T _{vj}	Virtual junction temperature	Blocking V _{DRM} / V _{RRM}		-	125	°C
T _{stg}	Storage temperature range			-40	140	
F _m	Clamping force			12	18	kN

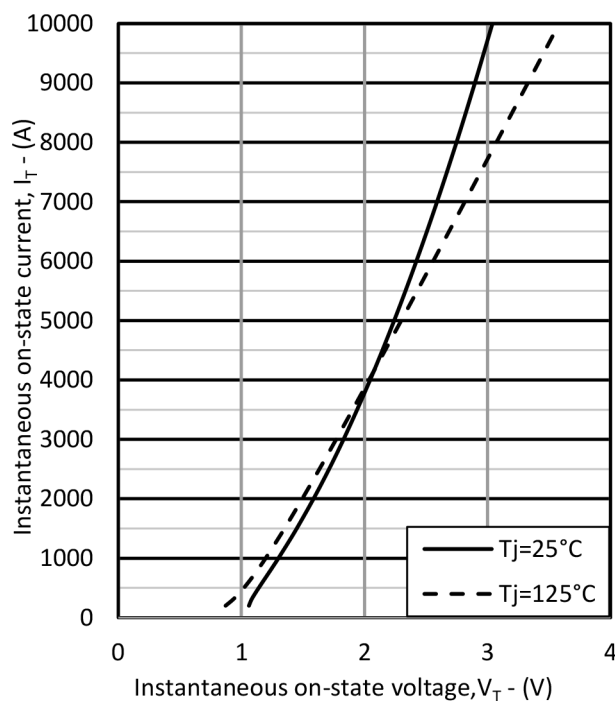
Dynamic Characteristics

Symbol	Parameter	Test Conditions		Min.	Max.	Units
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM} , $T_{case} = 125^{\circ}C$		-	60	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/ μs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A Gate source 30V, 10 Ω , $t_r < 0.5\mu s$, $T_j = 125^{\circ}C$	Repetitive 50Hz	-	200	A/ μs
			Non-repetitive		1000	
V_T	On-state voltage	$I_T = 1500A$, $T_{case} = 125^{\circ}C$			1.35	V
$V_{T(TO)}$	Threshold voltage – Low level	$T_{case} = 125^{\circ}C$			0.85	
r_T	On-state slope resistance – Low level	$T_{case} = 125^{\circ}C$			0.33	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	μs
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}			200	
Q_S	Stored charge	$I_T = 1000A$, $t_p = 1000\mu s$, $T_j = 125^{\circ}C$, $dI/dt = 10A/\mu s$,			1500	μC
I_{RR}	Reverse recovery current				120	A
I_L	Latching current	$T_j = 25^{\circ}C$,			1	
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	
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	

Performance Curves



V_{TM} EQUATION

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

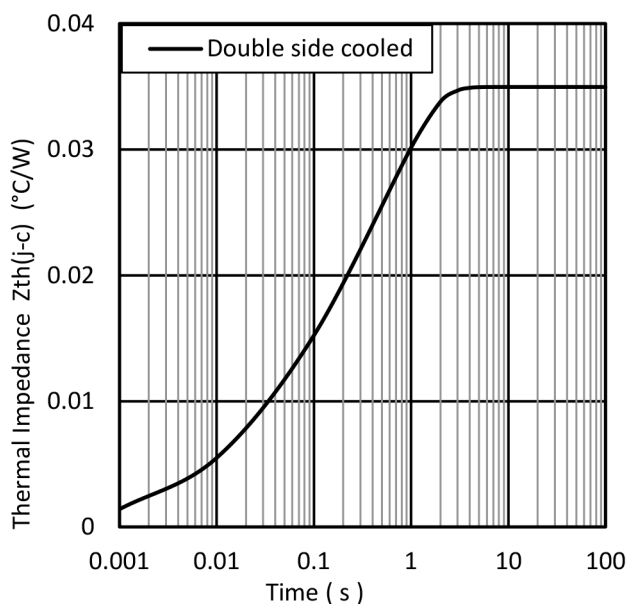
Where $A = 0.347941$

$B = 0.0934097$

$C = 0.000252939$

$D = -0.00154403$

These values are valid for $T_j = 125^\circ\text{C}$



$$R_{thjc}(t) = \sum_{i=1}^n R_{thi} \cdot \left(1 - e^{-\frac{t}{\tau_i}} \right)$$

i	τ_i (s)	R_{thi} ($^\circ\text{C/kW}$)
1	0.7085781	19.71901
2	0.1435833	4.240625
3	0.0361520	7.963806
4	0.0021308	3.043661

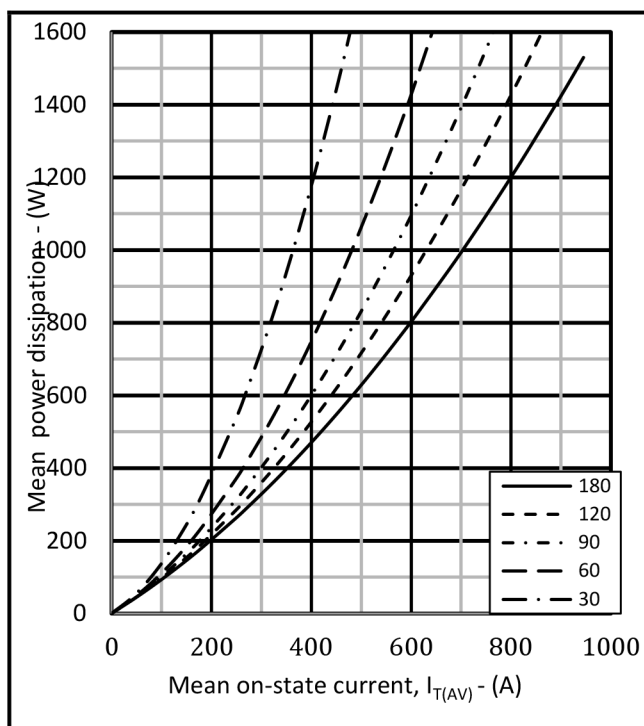


Fig.4 On-state power dissipation – sine wave

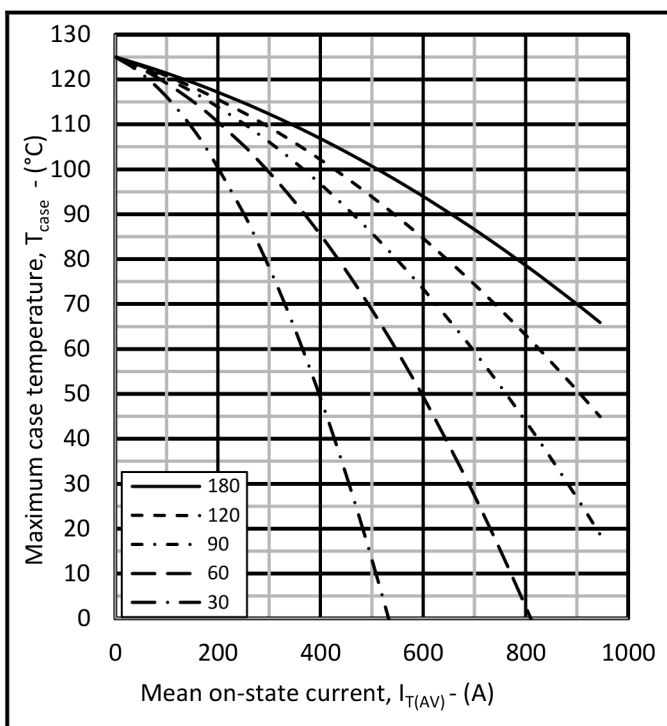


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

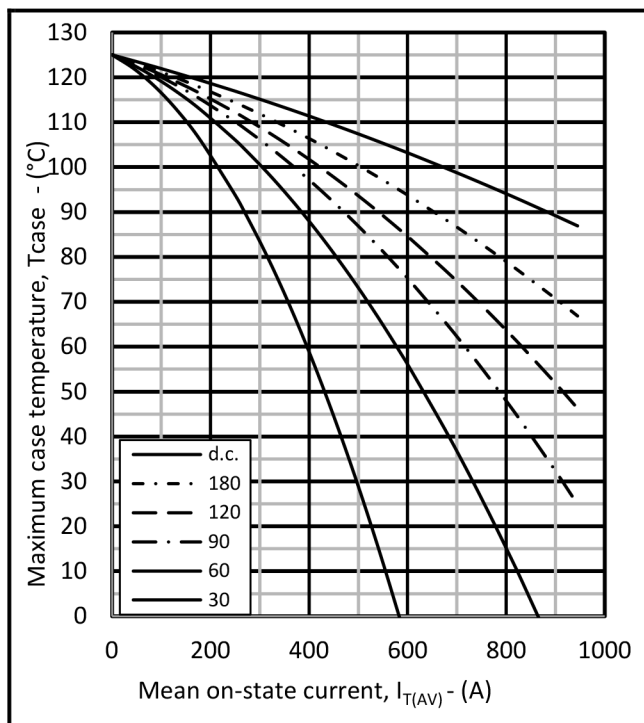


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

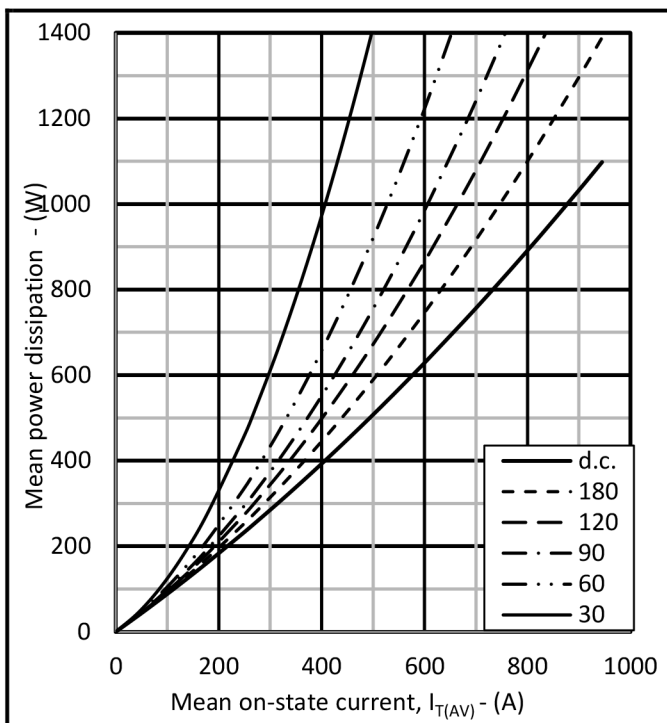


Fig.7 On-state power dissipation – rectangular wave

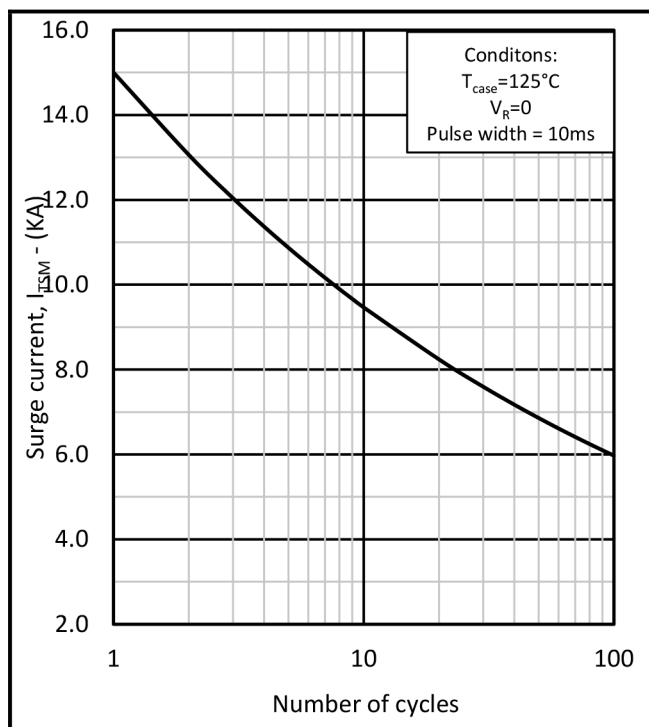


Fig.8 Multi-cycle surge current

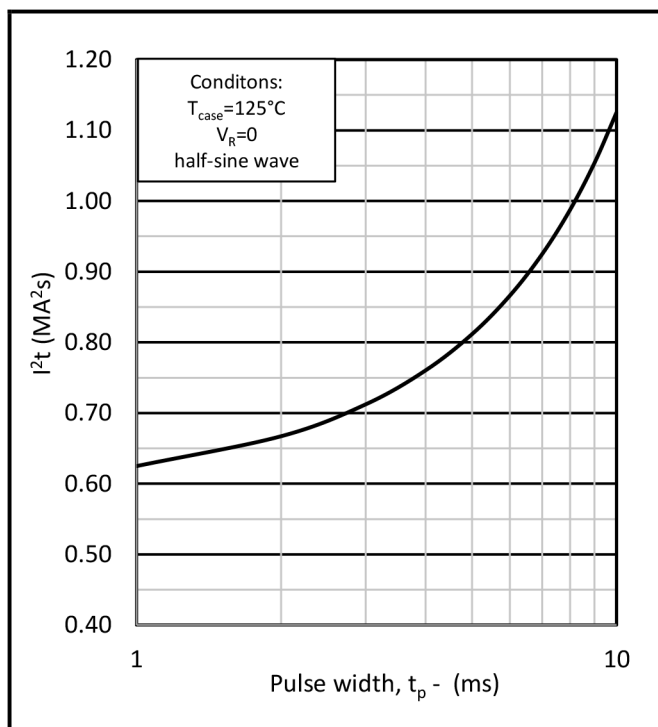


Fig.9 Single-cycle I^2t

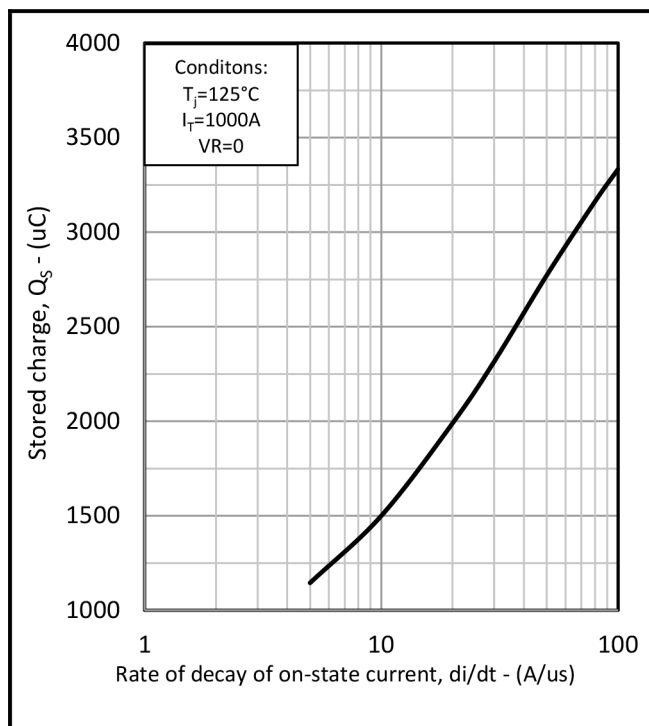


Fig.10 Stored charge vs di/dt

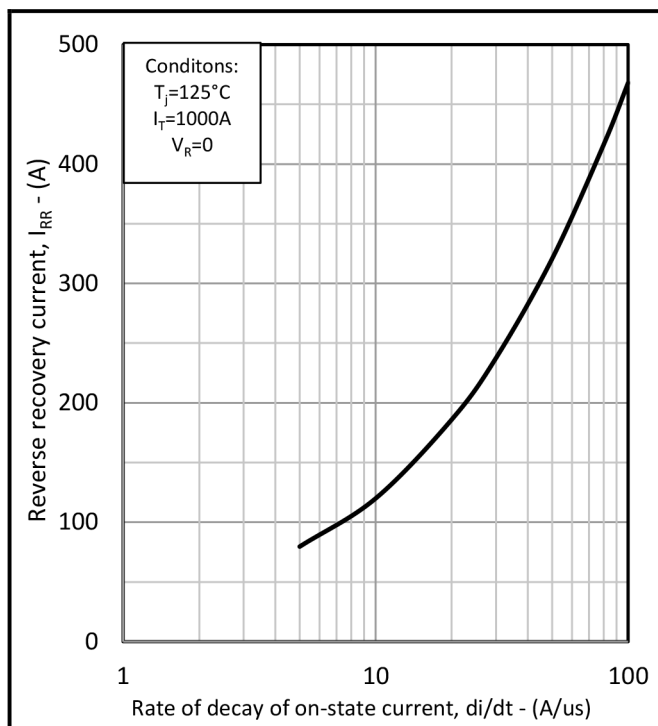


Fig.11 Reverse recovery current vs di/dt

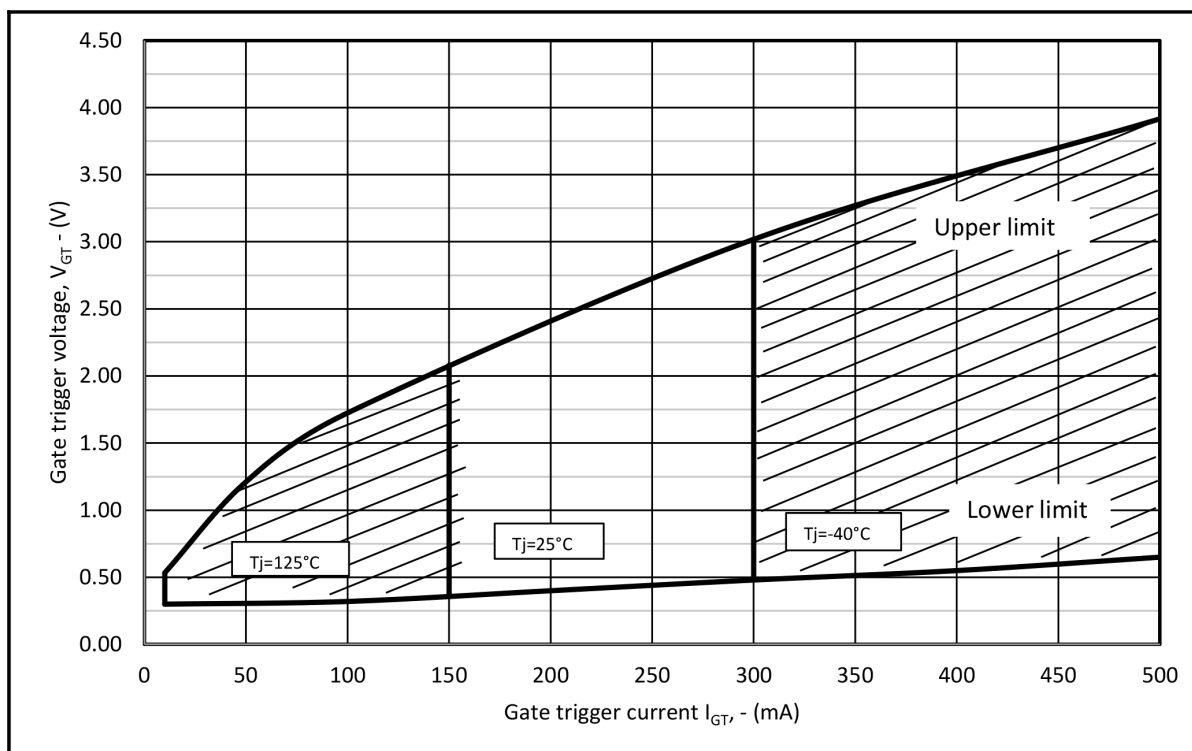


Fig.12 Gate characteristics

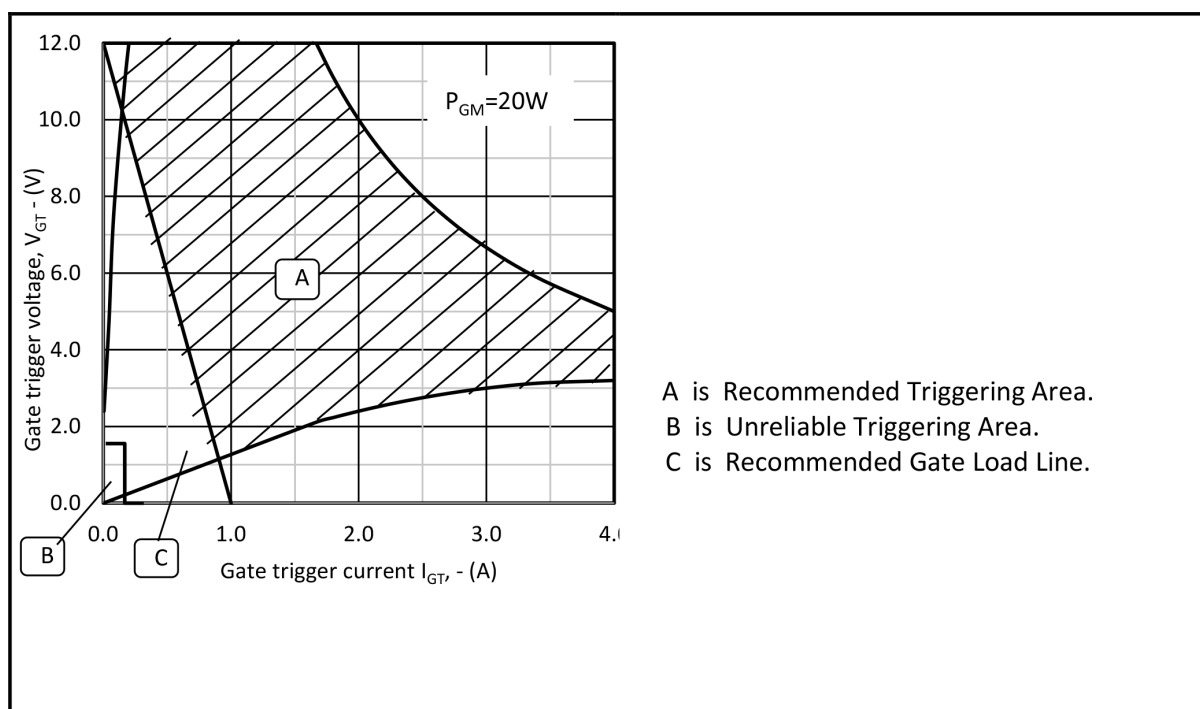
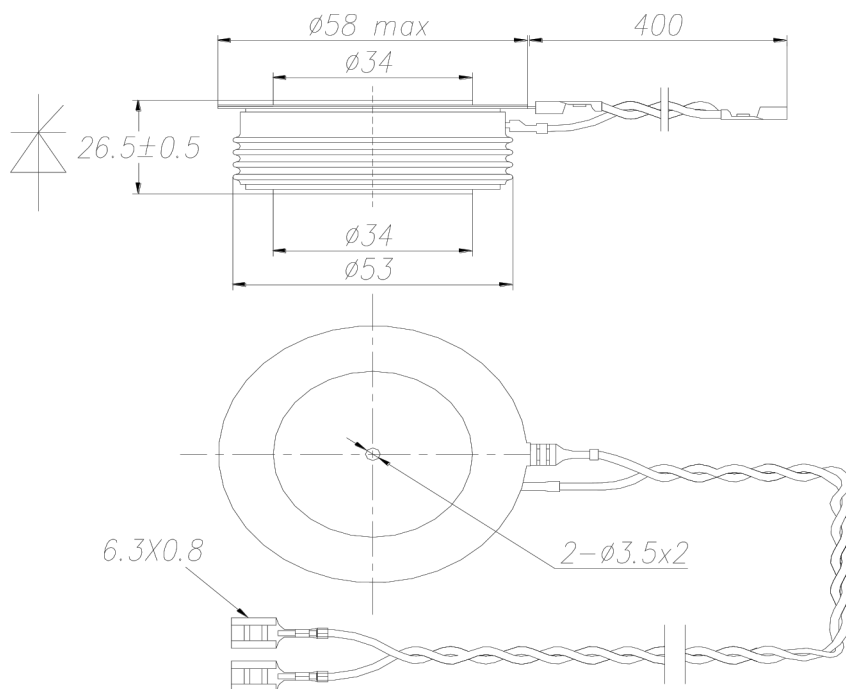


Fig.13 Gate characteristics

Phase Control Thyristor

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Package outline type code: G

Part Number Table

Description	Part Number
Phase Control Thyristor Module, 1400V, 1010A, G Case Code	MPPCT1010G140

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