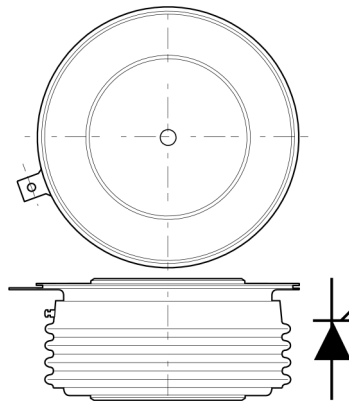


# Phase Control Thyristor

**multicomp** PRO

RoHS  
Compliant



## Features

- Double Side Cooling
- High Surge Capability

## Applications

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

Outline type code: G

## Key Parameters

Part Number	Repetitive Peak Voltages $V_{DRM}$ and $V_{RRM}$ V	$I_{T(AV)}$	$I_{TSM}$	$dV/dt^*$	$dI/dt$	Conditions
MPPCT780G300	3000	780 A	10500 A	1000 V/ $\mu$ s	200 A/ $\mu$ s	$T_{vj} = -40^{\circ}\text{C}$ to $125^{\circ}\text{C}$ , $I_{DRM} = I_{RRM} = 60\text{mA}$ , $V_{DRM}, V_{RRM} t_p = 10\text{ms}$ , $V_{DSM} \& V_{RSM} =$ $V_{DRM} \& V_{RRM} + 100\text{V}$ respectively

\* Higher  $dV/dt$  selections available

## Current Ratings

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

Symbol	Parameter	Test Conditions	Max.	Units
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	780	A
$I_{T(RMS)}$	RMS value	-	1220	
$I_T$	Continuous (direct) on-state current	-	1100	

## Surge Ratings

Symbol	Parameter	Test Conditions	Max.	Units
$I_{TSM}$	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 125^{\circ}\text{C}$ $V_R = 0$	10.5	kA
$I^2t$	$I^2t$ for fusing		0.551	$\text{MA}^2\text{s}$

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## Thermal and Mechanical Ratings

Symbol	Parameter	Test Conditions	Min.	Max.	Units
R <sub>th(j-c)</sub>	Thermal resistance – junction to case	Double side cooled DC	-	0.35	°C/W
R <sub>th(c-h)</sub>	Thermal resistance – case to heatsink			0.008	
T <sub>vj</sub>	Virtual junction temperature	Blocking V <sub>DRM</sub> / V <sub>RRM</sub>		125	°C
T <sub>stg</sub>	Storage temperature range		-40	140	
F <sub>m</sub>	Clamping force		4	18	kN

## Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min.	Max.	Units
I <sub>RRM</sub> /I <sub>DRM</sub>	Peak reverse and off-state current	At V <sub>RRM</sub> /V <sub>DRM</sub> , T <sub>case</sub> = 125°C	-	60	mA
dV/dt	Max. linear rate of rise of off-state voltage	To 67% V <sub>DRM</sub> , T <sub>j</sub> = 125°C, gate open	1000	-	V/μs
dI/dt	Rate of rise of on-state current	From 67% V <sub>DRM</sub> to 1000A Gate source 30V, 10Ω, t <sub>r</sub> < 0.5μs, T <sub>j</sub> = 125°C	Repetitive 50Hz	200	A/μs
			Non-repetitive	1000	
V <sub>T</sub>	On-state voltage	I <sub>T</sub> = 1500A, T <sub>case</sub> = 125°C		1.9	V
V <sub>T(TO)</sub>	Threshold voltage – Low level	T <sub>case</sub> = 125°C		1	
r <sub>T</sub>	On-state slope resistance – Low level	T <sub>case</sub> = 125°C		0.6	mΩ
t <sub>gd</sub>	Delay time	V <sub>D</sub> = 67% V <sub>DRM</sub> , gate source 30V, 10Ω t <sub>r</sub> = 0.5μs, T <sub>j</sub> = 25°C		3	μs
t <sub>q</sub>	Turn-off time	T <sub>j</sub> = 125°C, V <sub>R</sub> = 100V, dI/dt = 10A/μs, dV <sub>DR</sub> /dt = 20V/μs linear to 67% V <sub>DRM</sub>		400	
Q <sub>s</sub>	Stored charge	I <sub>T</sub> = 1000A, t <sub>p</sub> = 1000us, T <sub>j</sub> = 125°C, dI/dt = 10A/μs,		2400	μC
I <sub>RR</sub>	Reverse recovery current			125	A
I <sub>L</sub>	Latching current	T <sub>j</sub> = 25°C,		1	
I <sub>H</sub>	Holding current	T <sub>j</sub> = 25°C,		200	mA

## Gate Trigger Characteristics and Ratings

Symbol	Parameter	Test Conditions	Max.	Units
V <sub>GT</sub>	Gate trigger voltage	V <sub>DRM</sub> = 5V, T <sub>case</sub> = 25°C	3	V
V <sub>GD</sub>	Gate non-trigger voltage	At 40% V <sub>DRM</sub> , T <sub>case</sub> = 125°C	0.3	
I <sub>GT</sub>	Gate trigger current	V <sub>DRM</sub> = 5V, T <sub>case</sub> = 25°C	300	mA
I <sub>GD</sub>	Gate non-trigger current	At 40% V <sub>DRM</sub> , T <sub>case</sub> = 125°C	20	

## Performance Curves

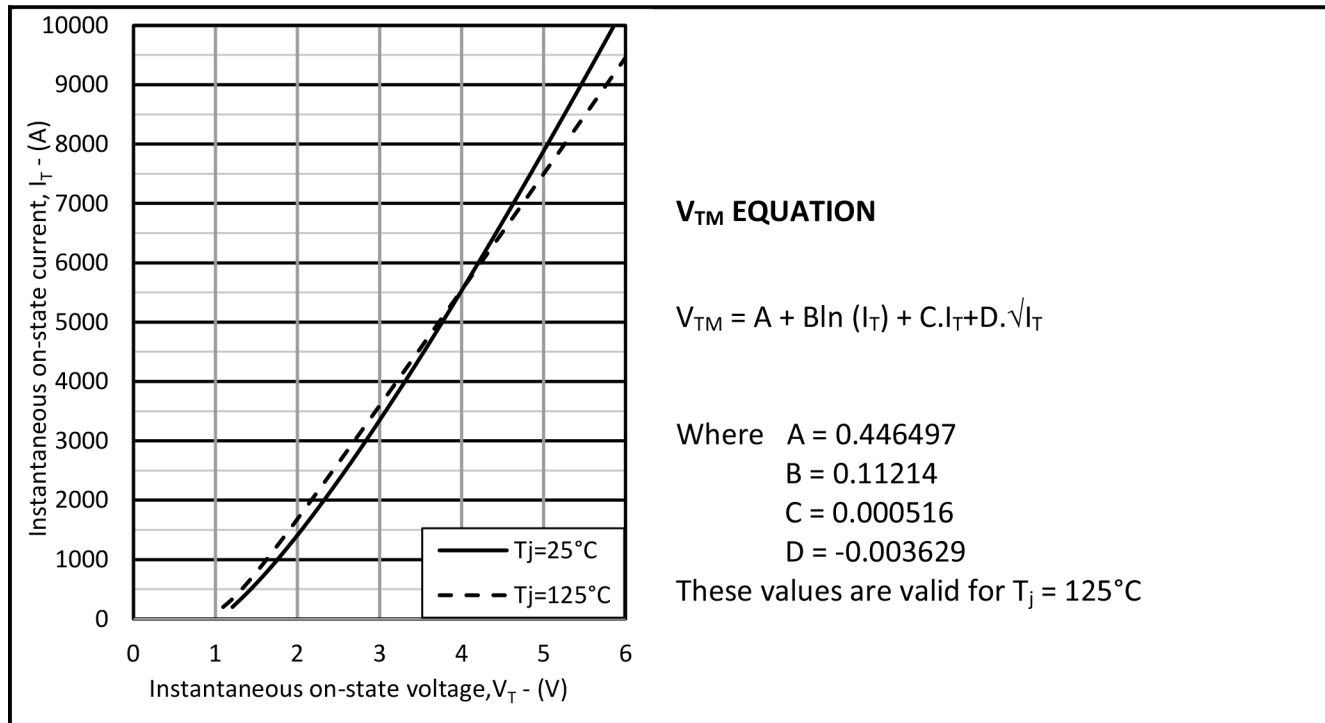


Fig.2 Maximum & minimum on-state characteristics

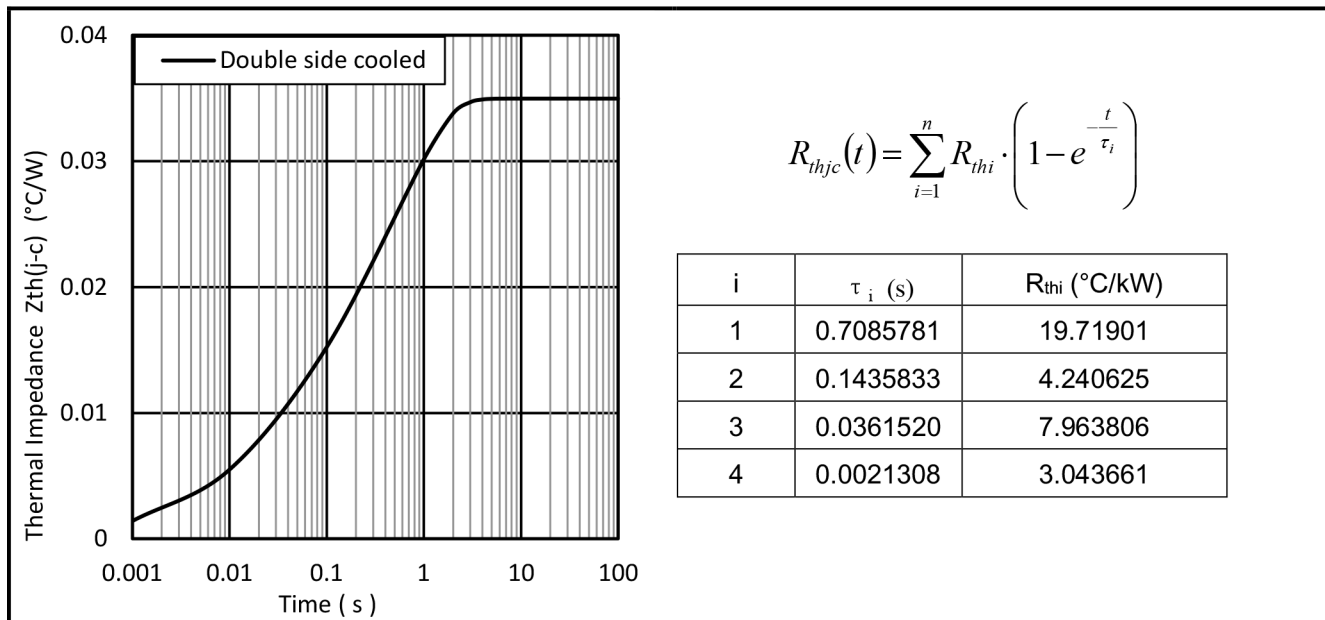
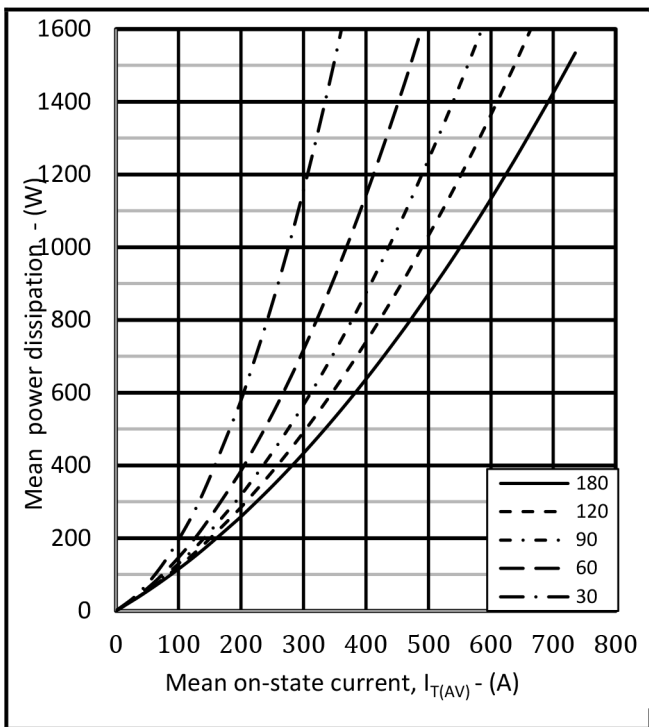
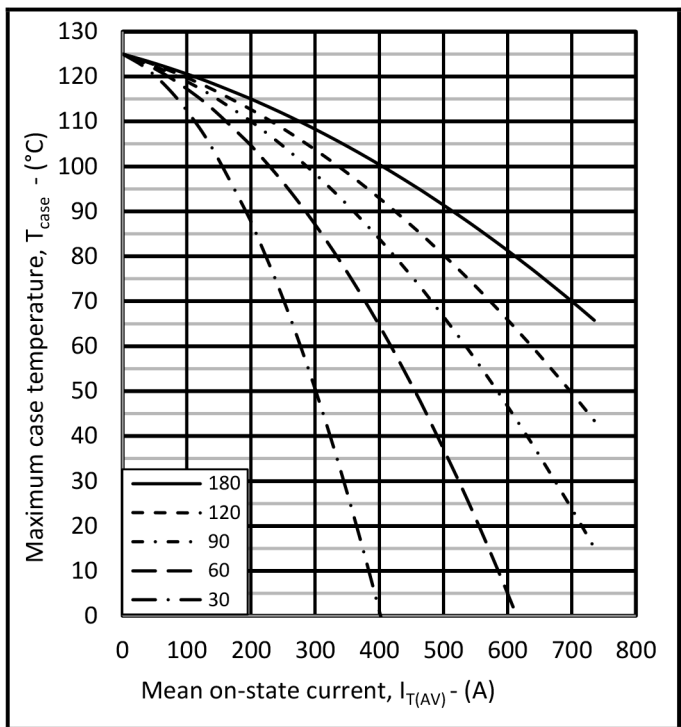


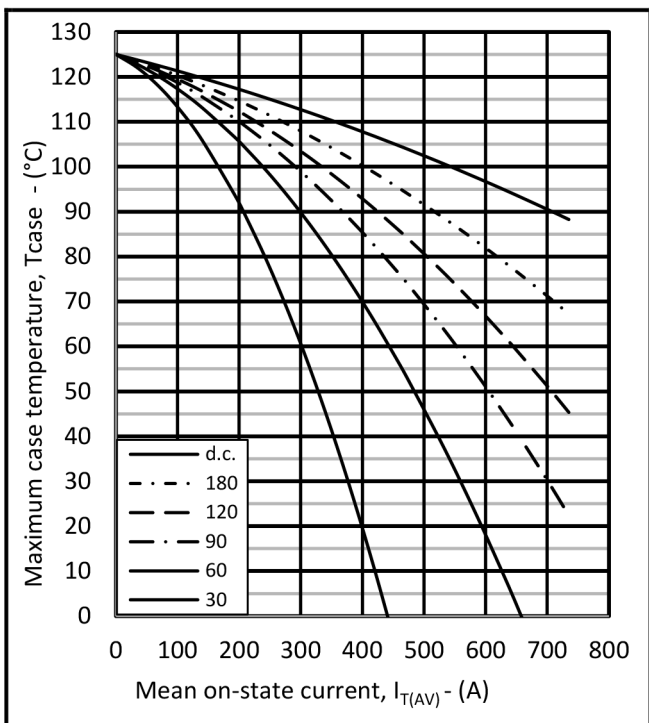
Fig.3 Maximum (limit) transient thermal impedance – junction to case (°C/W)



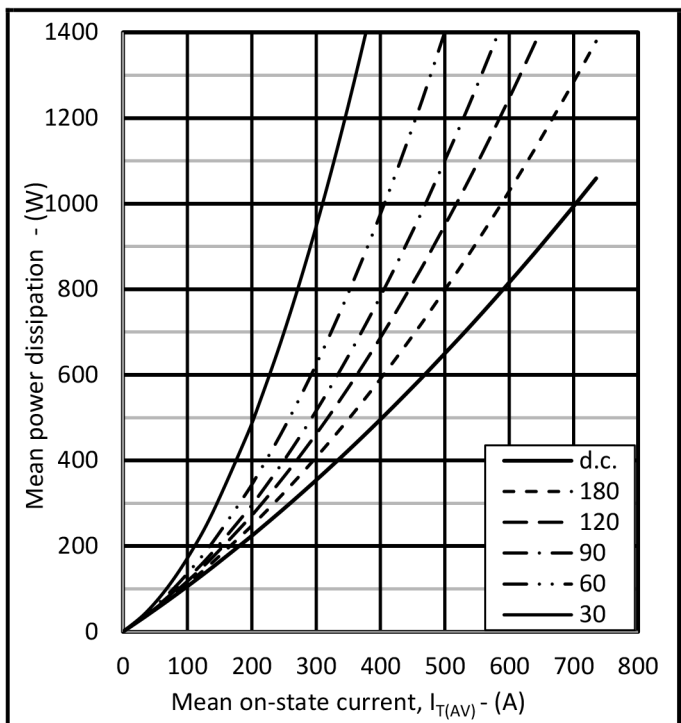
**Fig.4 On-state power dissipation – sine wave**



**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**

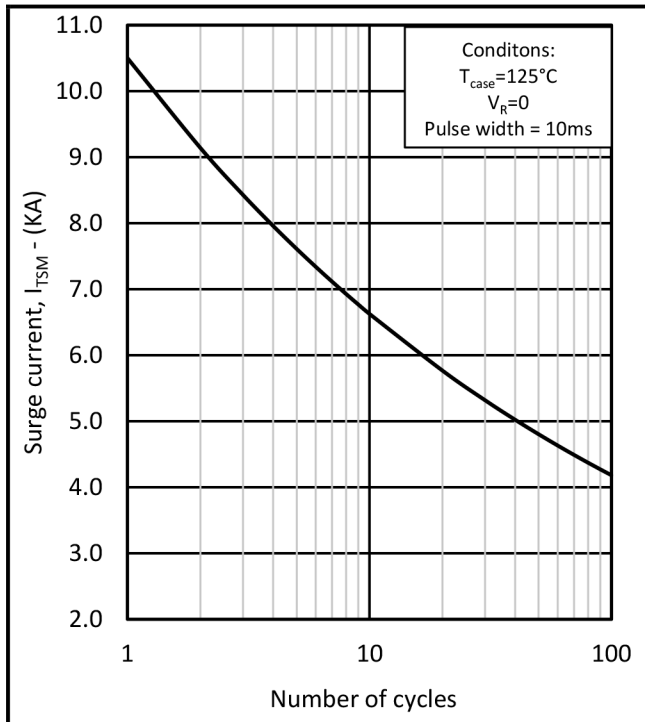


Fig.8 Multi-cycle surge current

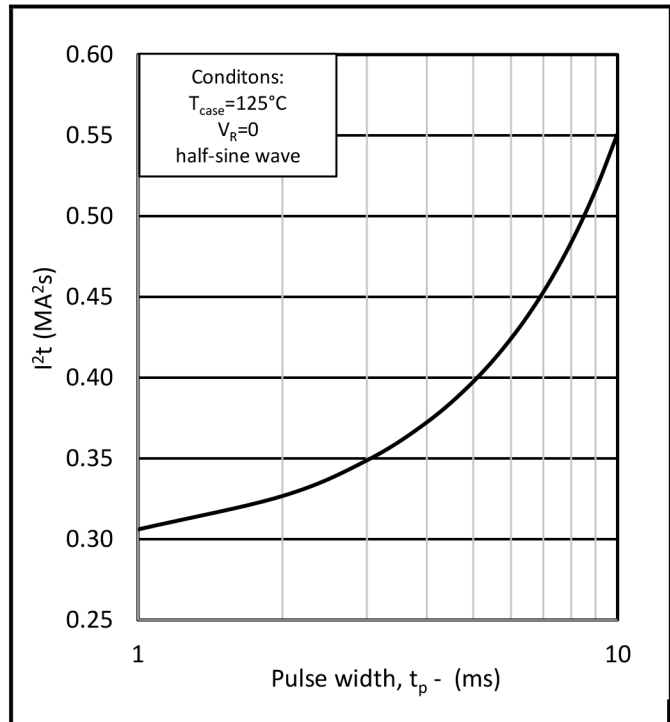


Fig.9 Single-cycle  $I^2t$

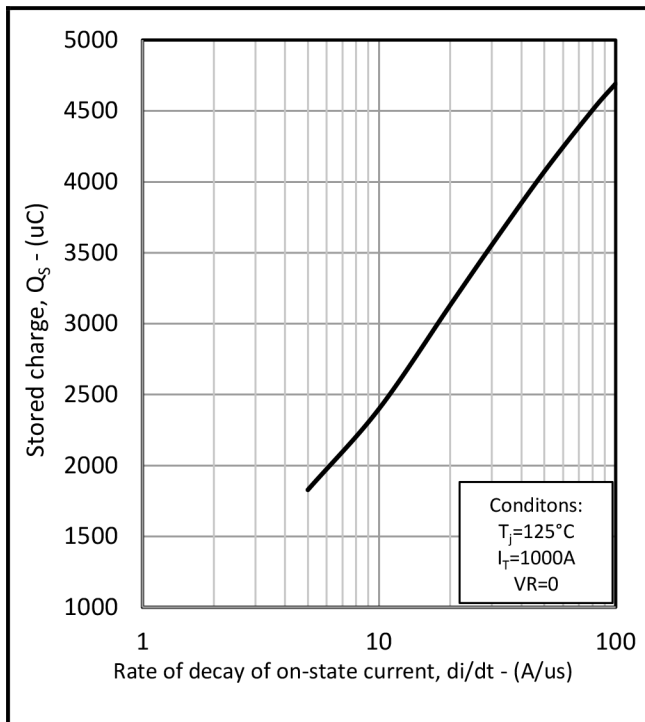


Fig.10 Stored charge vs  $di/dt$

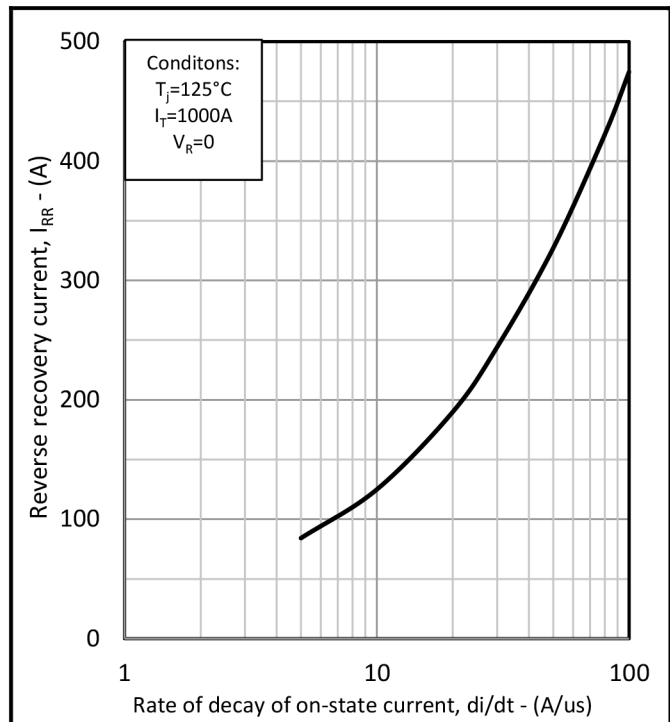


Fig.11 Reverse recovery current vs  $di/dt$

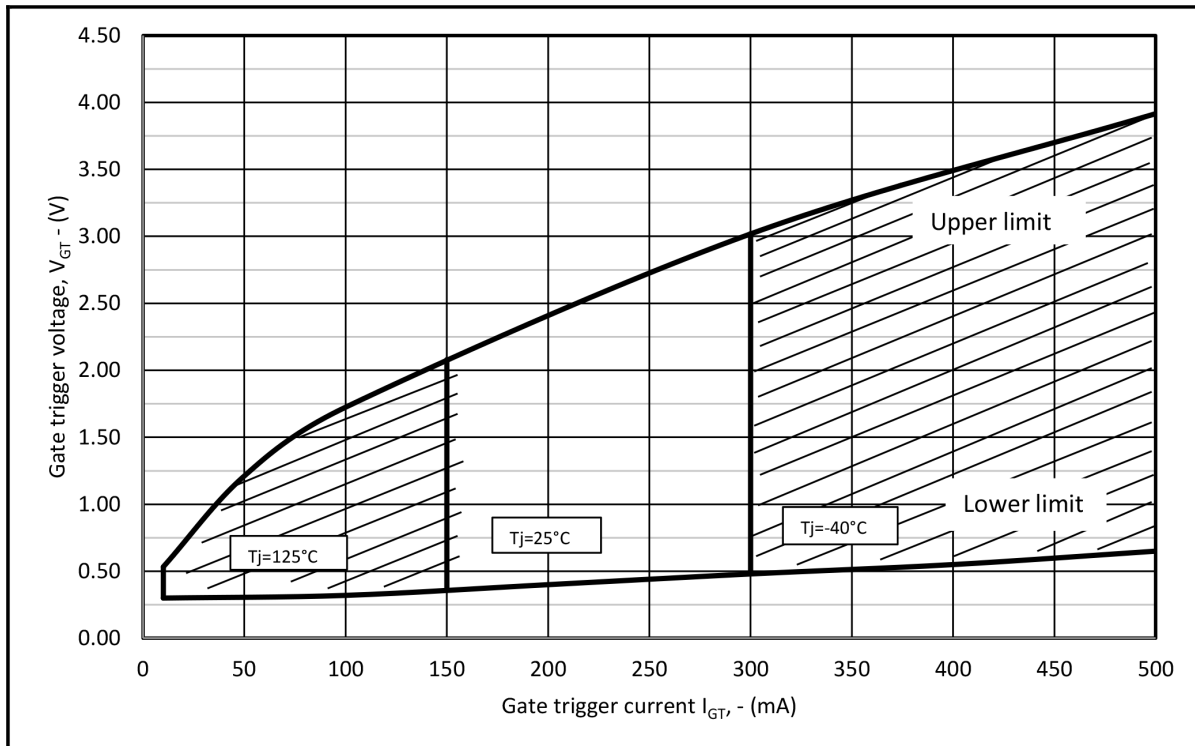
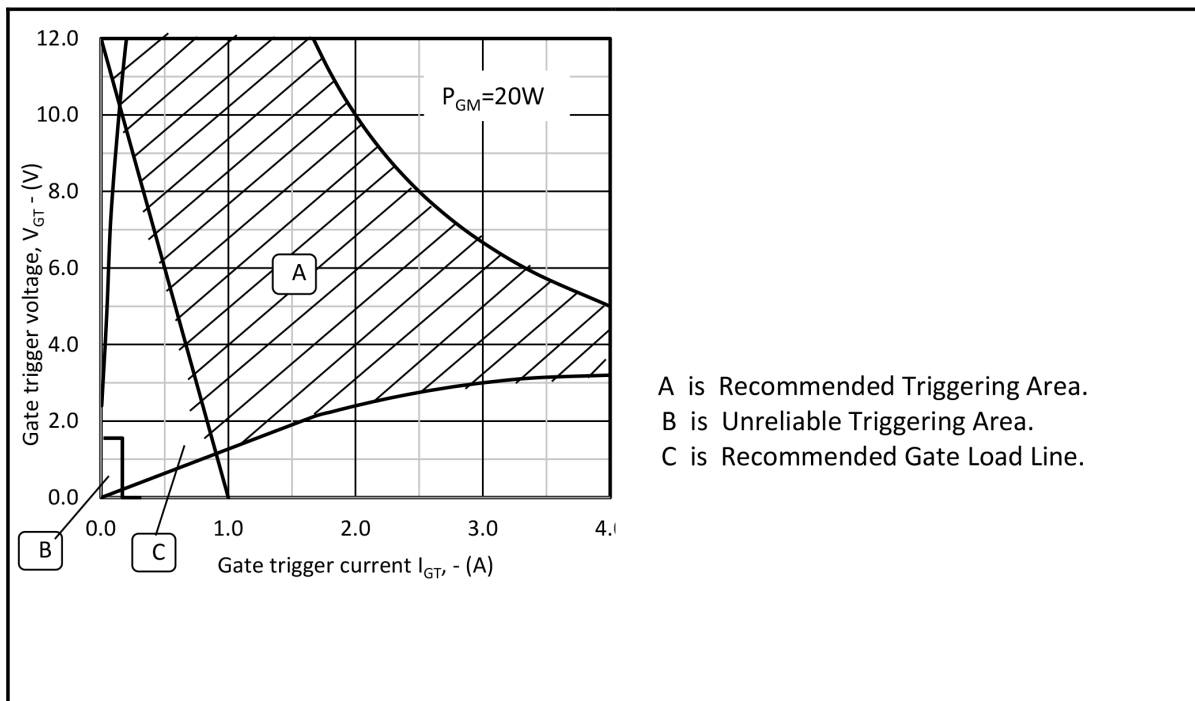


Fig.12 Gate characteristics

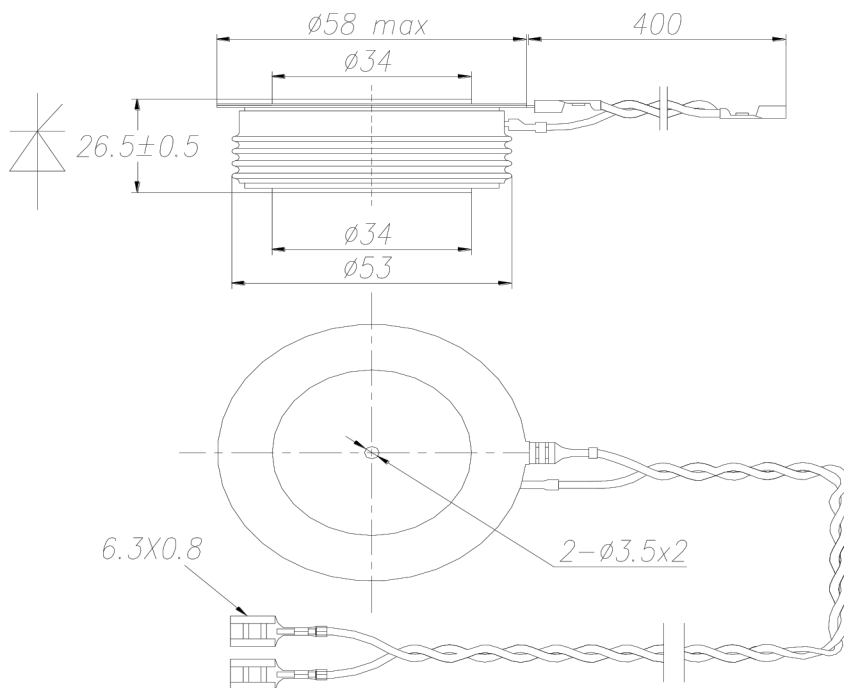


A is Recommended Triggering Area.  
 B is Unreliable Triggering Area.  
 C is Recommended Gate Load Line.

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, 3000V, 780A, G Case Code	MPPCT780G300

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