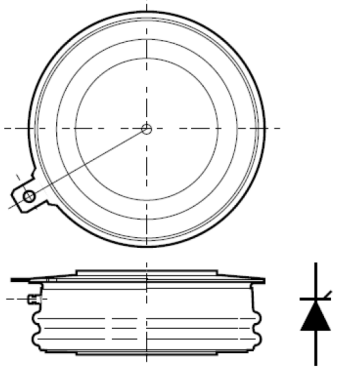
Phase Control Thyristor

multicomp PRO

RoHS Compliant



Outline type code: D

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
MPPCT950D140	1400	950 A	12800 A	1000 V/µs	200 A/µs	Tvj = -40°C to 125°C, I_{DRM} = I_{RRM} = 50mA, V_{DRM}, V_{RRM} t_p = 10ms, V_{DSM} & V_{RSM} = V_{DRM} & V_{RRM} +100V respectively

*** Higher dV/dt selections available**

Current Ratings

T_{case} = 60°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
$I_{T(AV)}$	Mean on-state current	Half wave resistive load	950	A
$I_{T(RMS)}$	RMS value	-	1490	
I_T	Continuous (direct) on-state current	-	1340	

Surge Ratings

Symbol	Parameter	Test Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine, T_{case} = 125°C V_R = 0	12.8	kA
I^2t	I^2t for fusing		0.819	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	-	0.35	°C/W
$R_{th(c-h)}$	Thermal resistance – case to heatsink				0.01	
T_{vj}	Virtual junction temperature	Blocking V_{DRM} / V_{RRM}			125	°C
T_{stg}	Storage temperature range			-40	140	
F_m	Clamping force			8	12	kN

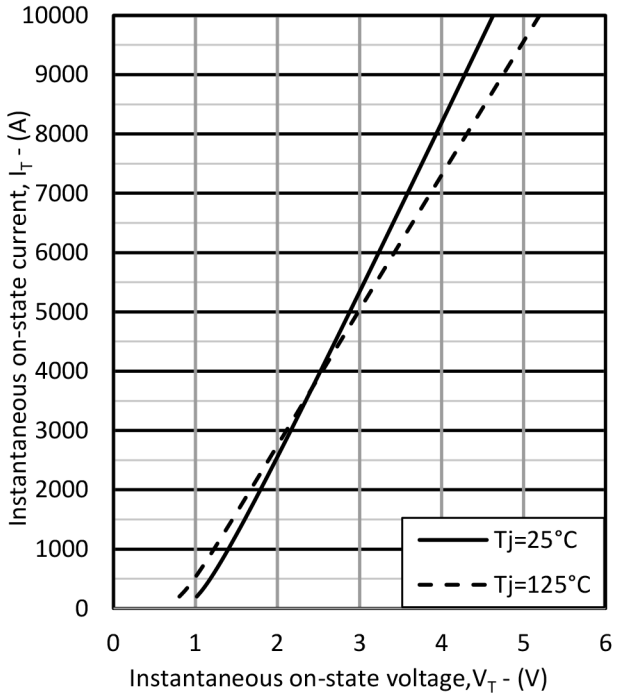
Dynamic Characteristics

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°C		-	50	mA
dV/dt	Max. linear rate of rise of off-state voltage	To 67% V_{DRM}, T_j = 125°C, gate open		1000	-	V/µs
dI/dt	Rate of rise of on-state current	From 67% V_{DRM} to 1000A Gate source 30V, 10Ω, t_r < 0.5µs, T_j = 125°C	Repetitive 50Hz	-	200	A/µs
			Non-repetitive		1000	
V_T	On-state voltage	I_T = 1500A, T_{case} = 125°C			1.45	V
$V_{T(TO)}$	Threshold voltage	T_{case} = 125°C			0.87	
r_T	On-state slope resistance	T_{case} = 125°C			0.382	mΩ
t_{gd}	Delay time	V_D = 67% V_{DRM}, gate source 30V, 10Ω t_r = 0.5µs, T_j = 25°C			3	µs
t_q	Turn-off time	T_j = 125°C, V_R = 100V, dI/dt = 10A/µs, dV_{DR}/dt = 20V/µs linear to 67% V_{DRM}			150	
Q_S	Stored charge	I_T = 1000A, tp = 1000us, T_j = 125°C, dI/dt =10A/µs,			1500	µC
I_{RR}	Reverse recovery current				100	A
I_L	Latching current	T_j = 25°C,			1	
I_H	Holding current	T_j = 25°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°C	3	V
V_{GD}	Gate non-trigger voltage	At 40% V_{DRM}, T_{case} = 125°C	0.3	
I_{GT}	Gate trigger current	V_{DRM} = 5V, T_{case} = 25°C	300	mA
I_{GD}	Gate non-trigger current	At 40% V_{DRM}, T_{case} = 125°C	20	

Performance Curves



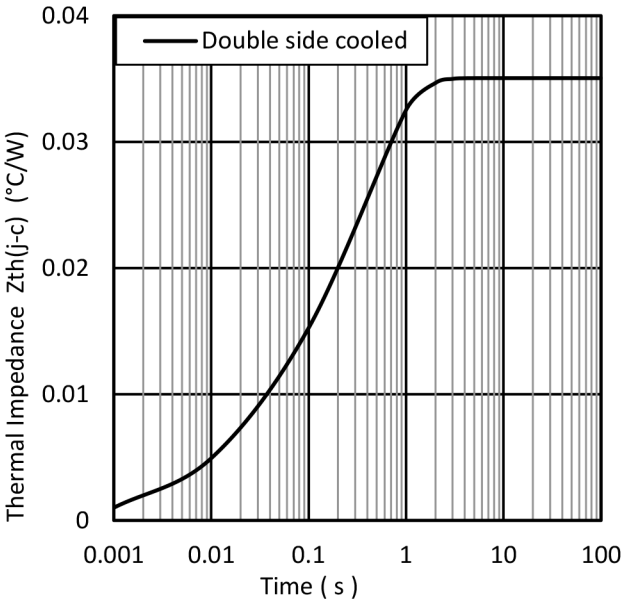
V_{TM} EQUATION

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

Where A = 0.205061
B = 0.117768
C = 0.000476
D = -0.00852

These values are valid for T_j = 125°C

Fig.2 Maximum &minimum on-state characteristics



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

i	τ_i (s)	R_{thi} (°C/kW)
1	0.5391689	15.7
2	0.1940576	11.19235
3	0.0219527	6.412673
4	0.0021962	1.759765

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

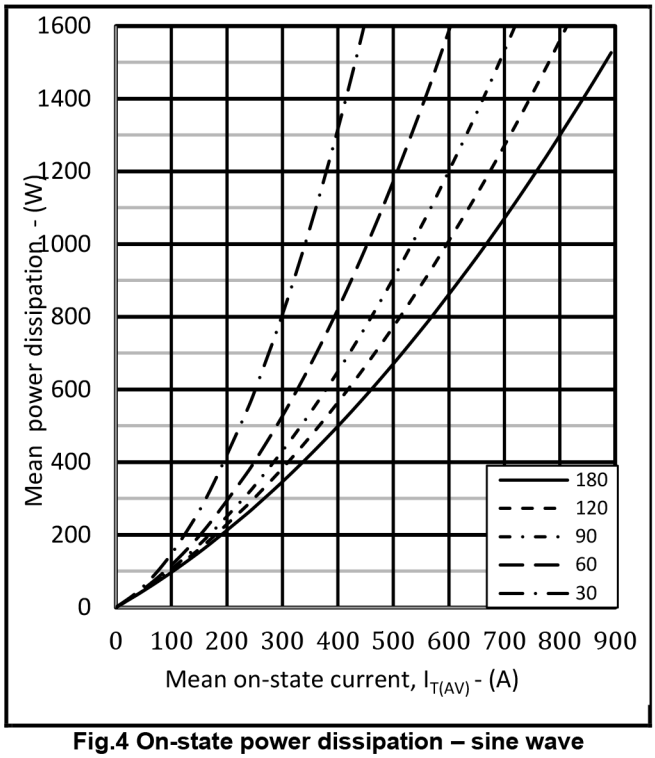


Fig.4 On-state power dissipation – sine wave

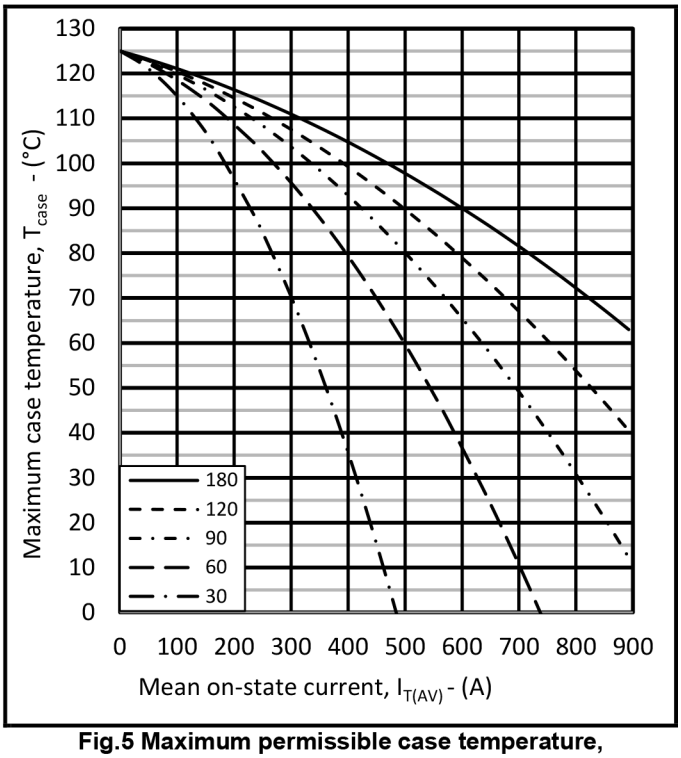


Fig.5 Maximum permissible case temperature, double side cooled – sine wave

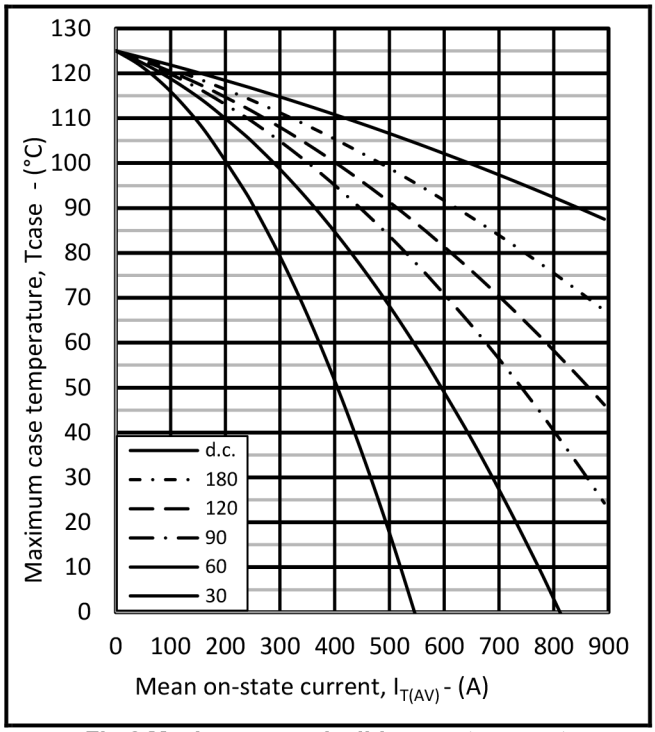


Fig.6 Maximum permissible case temperature, double side cooled – rectangular wave

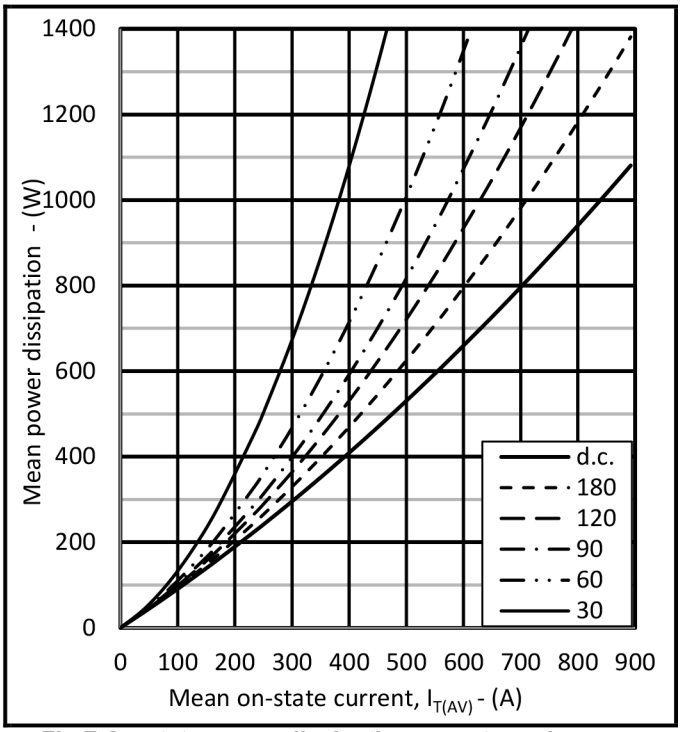


Fig.7 On-state power dissipation – rectangular wave

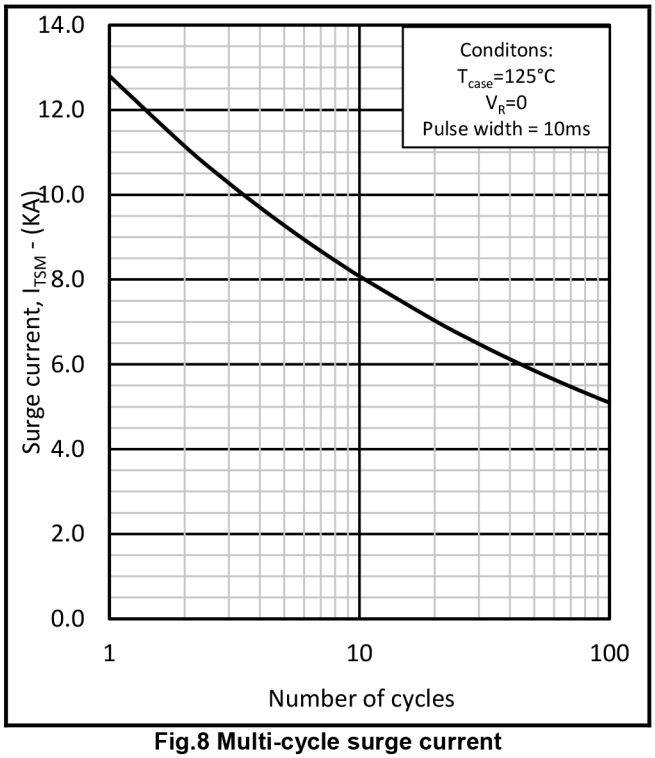


Fig.8 Multi-cycle surge current

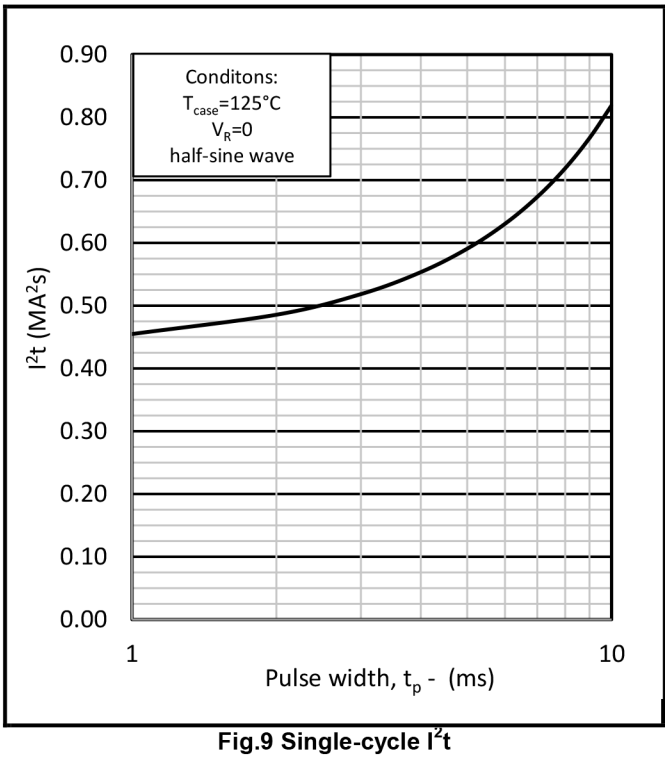


Fig.9 Single-cycle I^2t

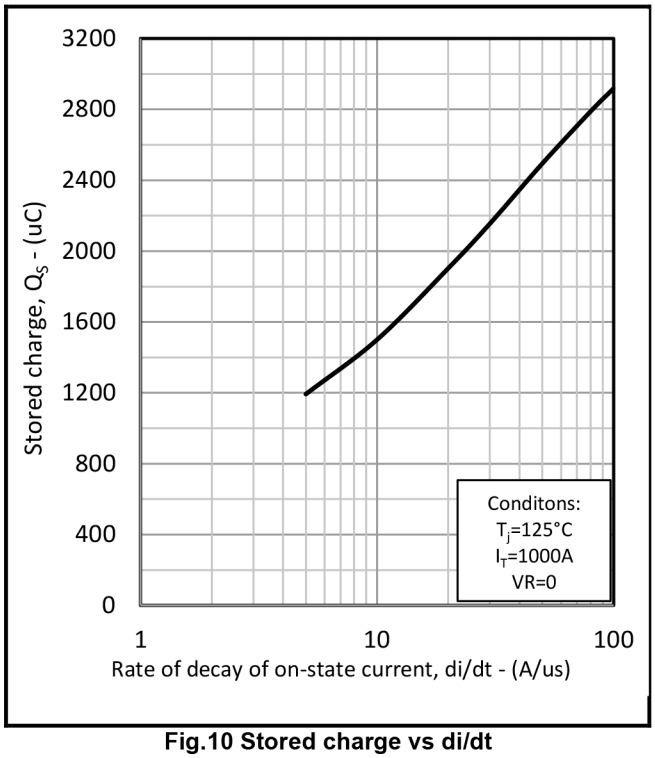


Fig.10 Stored charge vs di/dt

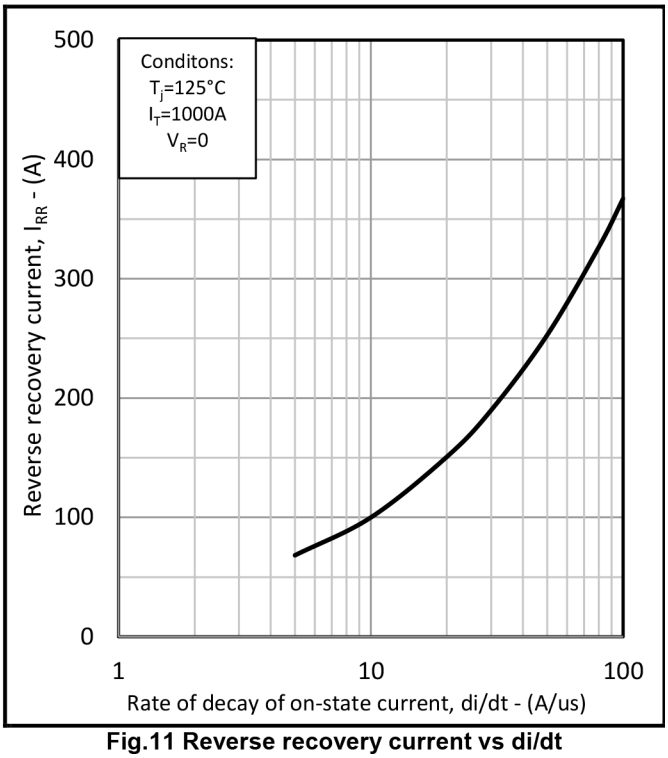


Fig.11 Reverse recovery current vs di/dt

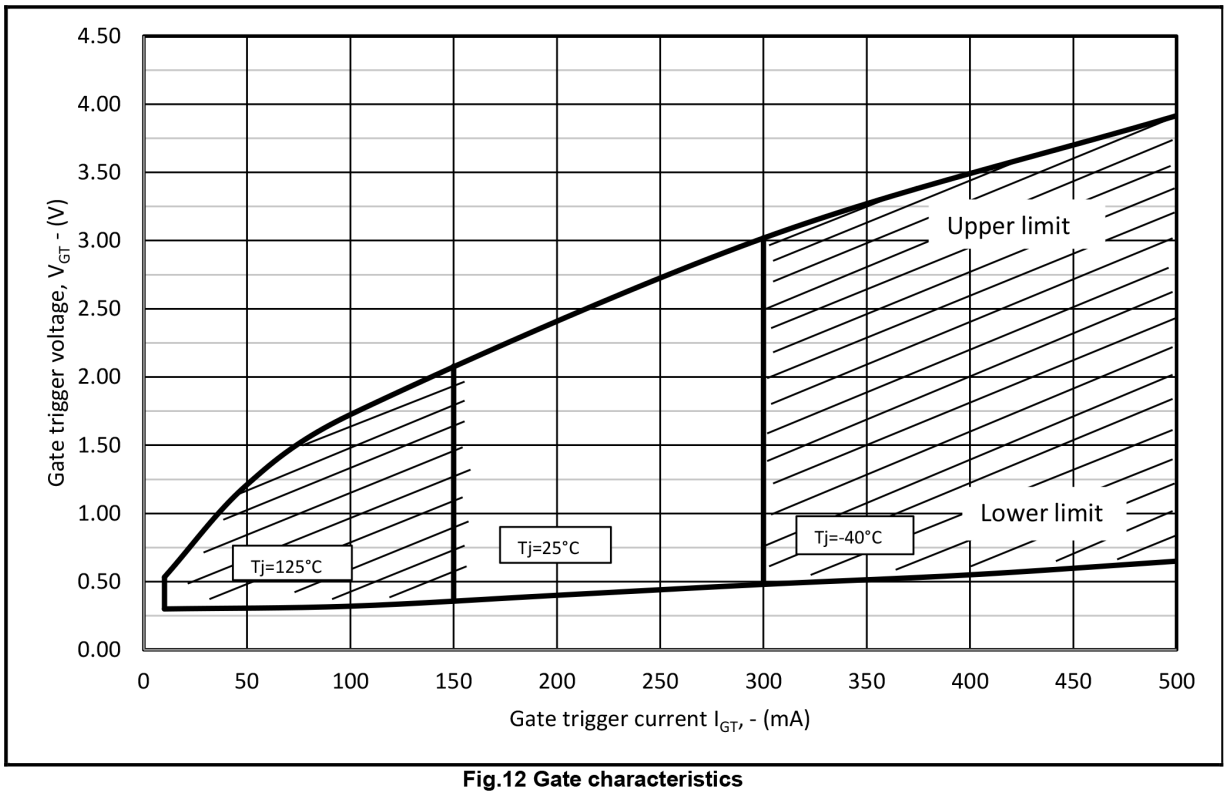


Fig.12 Gate characteristics

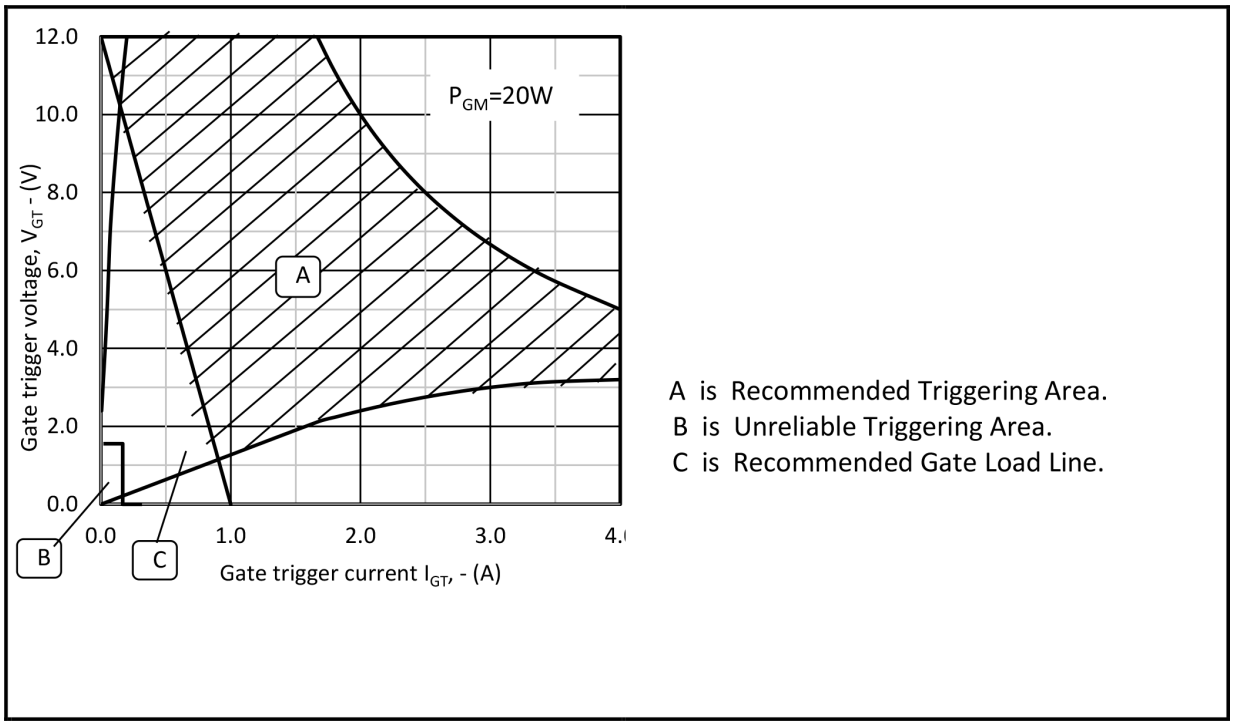
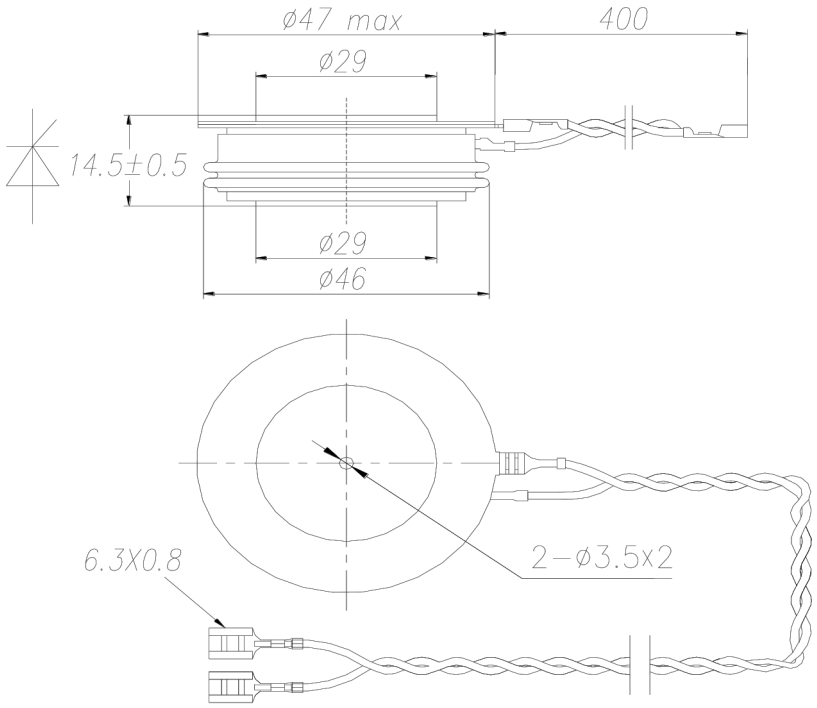


Fig.13 Gate characteristics



Package outline type code: D

Part Number Table

Description	Part Number
Phase Control Thyristor Module, 1400V, 950A, D Case Code	MPPCT950D140