

Gate driver module that bring out the performance of Mitsubishi Electric SiC Power Module



SUSTAINABLE
DEVELOPMENT
GOALS



TAMURA

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Rev 0

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1) Solution Guide for SiC Power Module

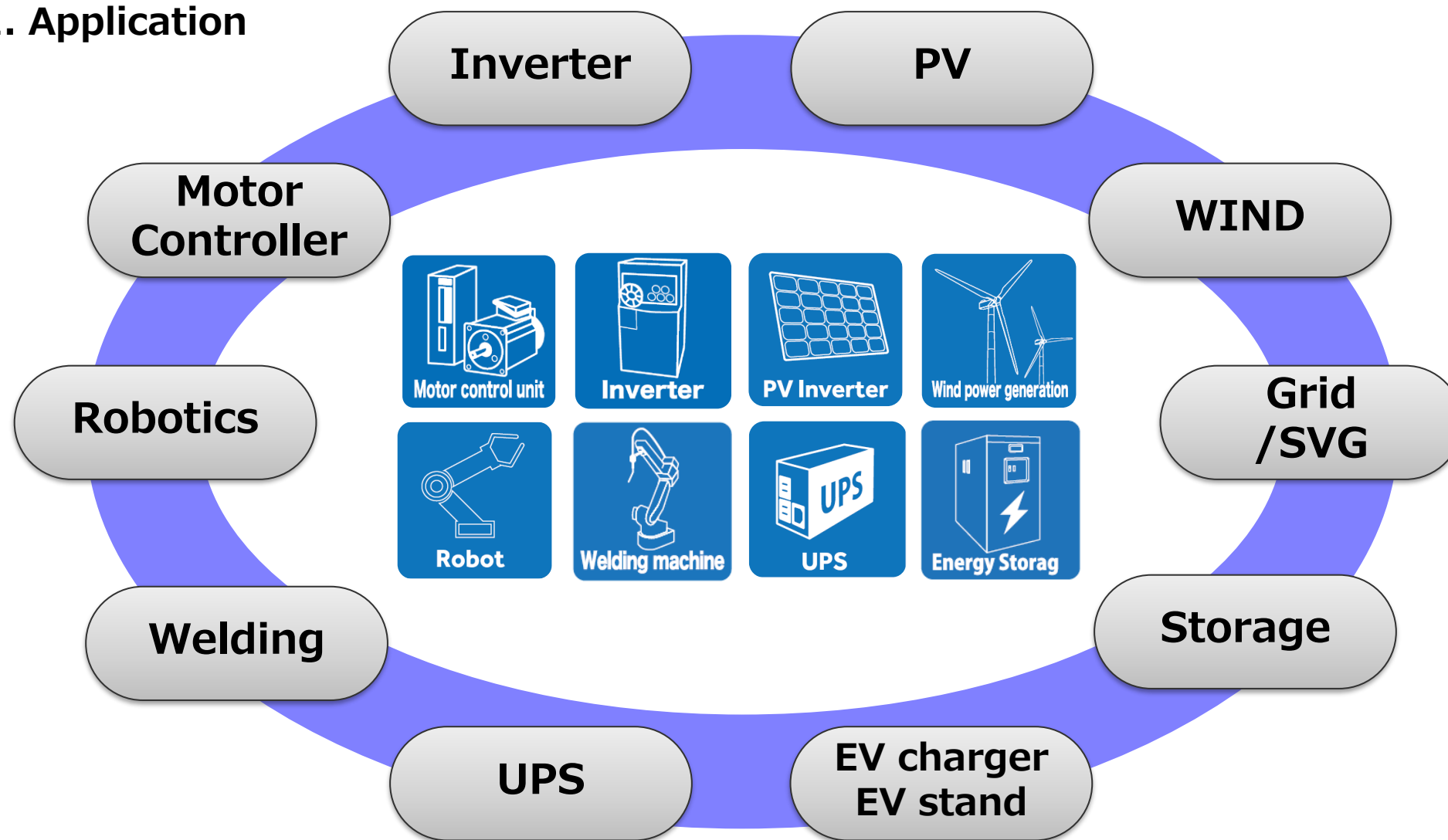
- 1-1 Application
- 1-2 Features of Gate driver module.
- 1-3 Product line-up
- 1-4 Evaluation board

2) Introduction of One Tamura

Appendix) Contact person

1. Solution Guide for SiC Power Module

1-1. Application



1. Solution Guide for SiC Power Module

1-2. Features of Gate driver module.

Features of All-SiC Power Module

Feature① Short circuit tolerance is lower than Si

Feature② Low threshold voltage $V_{GS(th)}$ (1V~3V)

Feature③ $V_{GS}(+)$:On resistance does not decrease at 15V
 $V_{GS}(-)$:Low tolerance (Less than -5V)

Feature④ dV/dt can be set high

Feature⑤ High frequency operation is possible

1. Solution Guide for SiC Power Module

1-2. Features of Gate driver module.

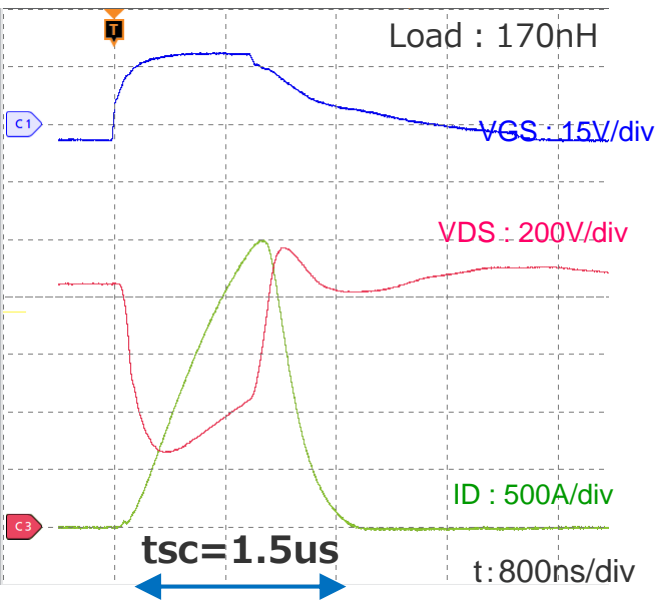
Feature ① Short circuit tolerance is lower than Si

----- Small chip area -----

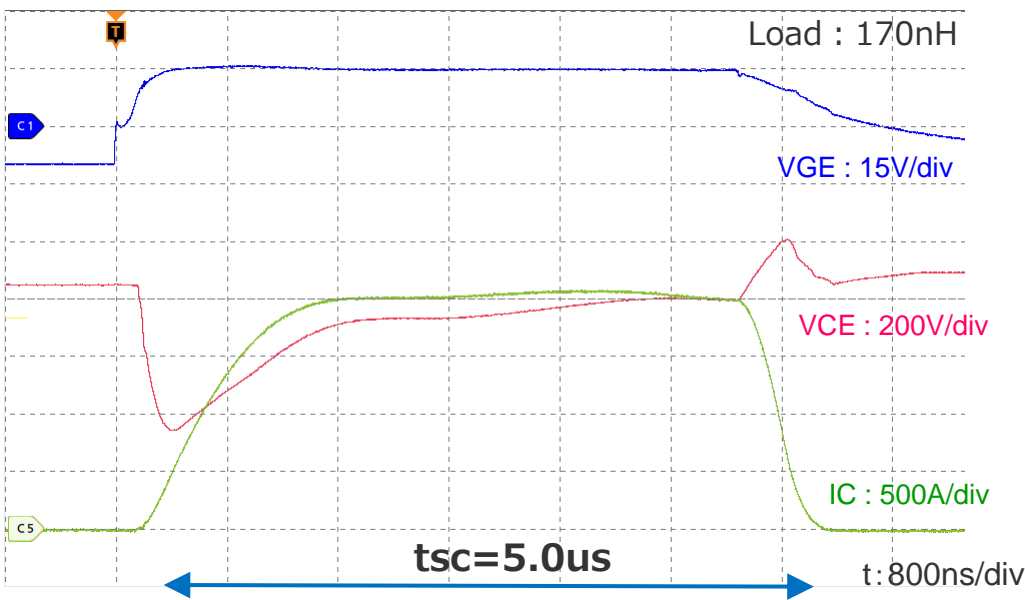
- Wide band gap
- High breakdown voltage
- High temperature operation

Support with a gate driver ... Short-circuit mask time (tsc) adjustment function

SiC power module (1200V 300A)
Waveform with shorted load



IGBT power module (1200V 300A)
Waveform with shorted load



Adjustable with external capacitor capacity

Optimal value of SiC : 1.0~3.0us

Optimal value of IGBT : 3.0~7.0us

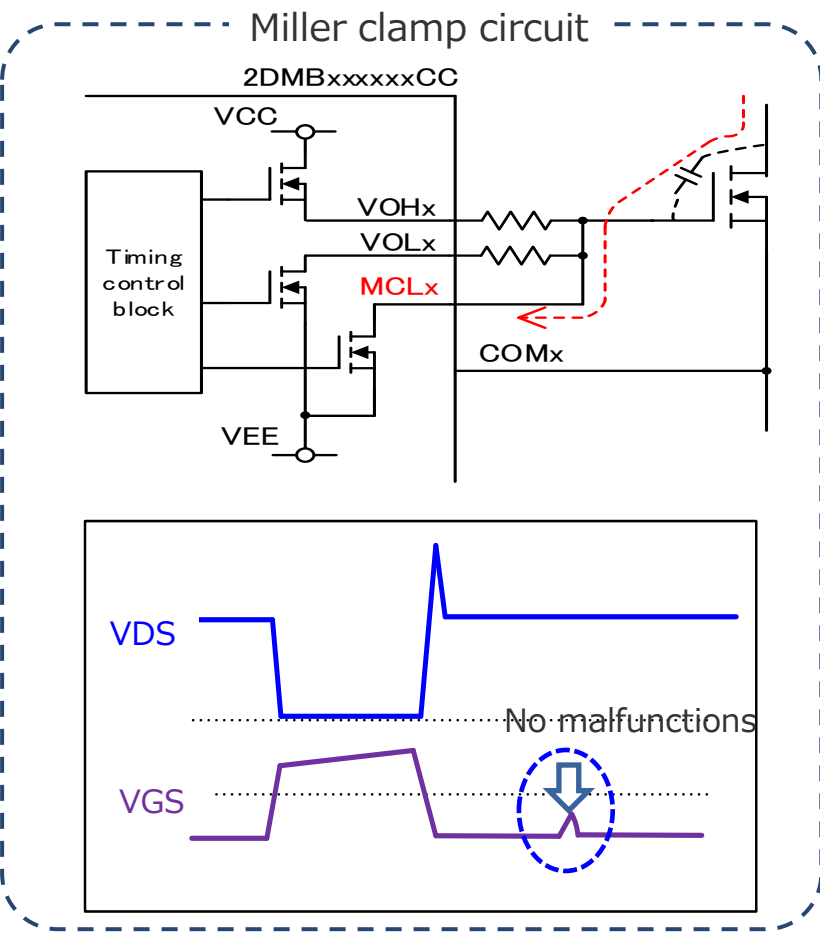
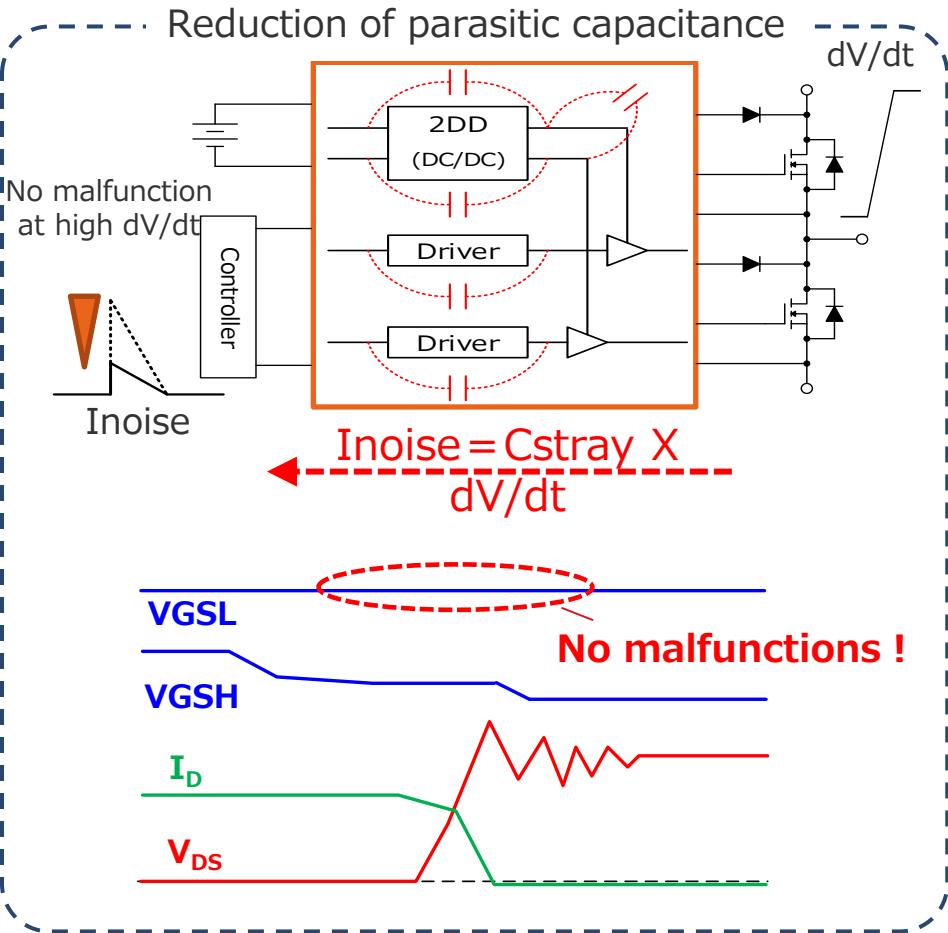
1. Solution Guide for SiC Power Module

1-2. Features of Gate driver module.

Feature② Low threshold voltage VGS (th)
(1V~3V)

--- IGBT is 6V~7V --- Beware of malfunctions from IGBT

Support with a gate driver ... Reduction of parasitic capacitance and Miller clamp circuit



1. Solution Guide for SiC Power Module

1-2. Features of Gate driver module.

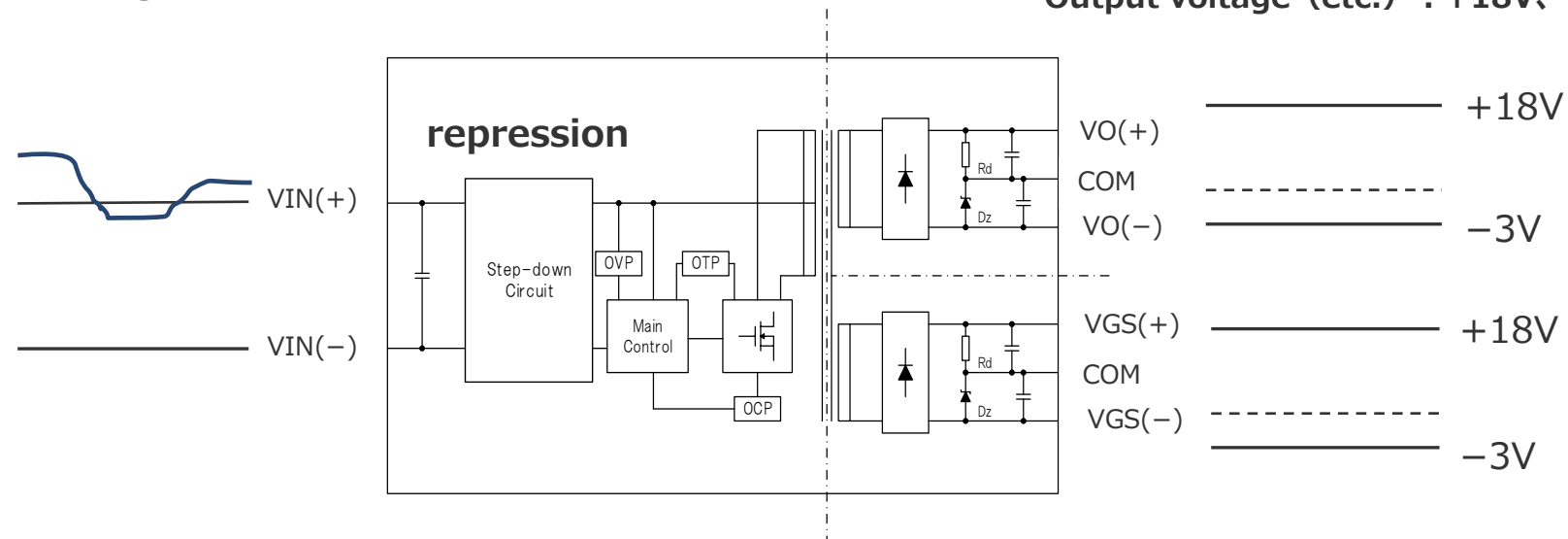
Feature③ VGS(+) :On resistance does not decrease at 15V
VGS(-) :Low tolerance (Less than -5V)

--- IGBT's Gate driver cannot be used

Support with a gate driver ... Constant voltage control of VGS

Input voltage : 13V~28V

Output voltage (etc.) : +18V、-3V



Controls the gate voltage to be constant even for input fluctuations
The gate voltage is constant even for output fluctuations
(SW frequency, QG of power module)

**Improved SiC reliability
Low loss operation**

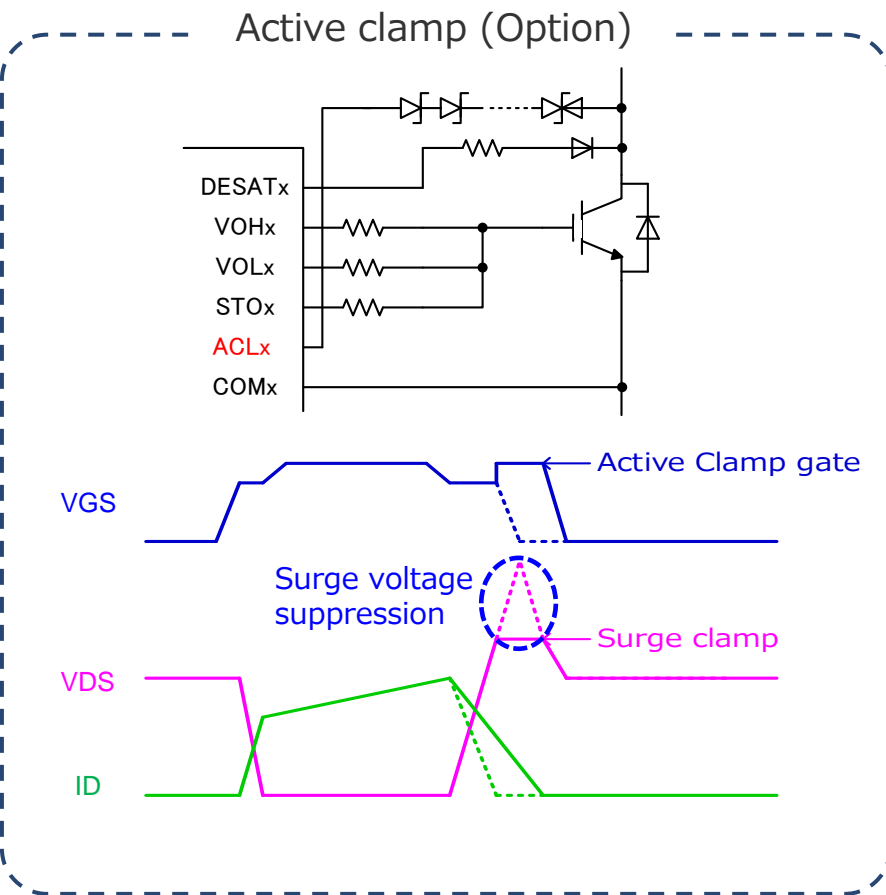
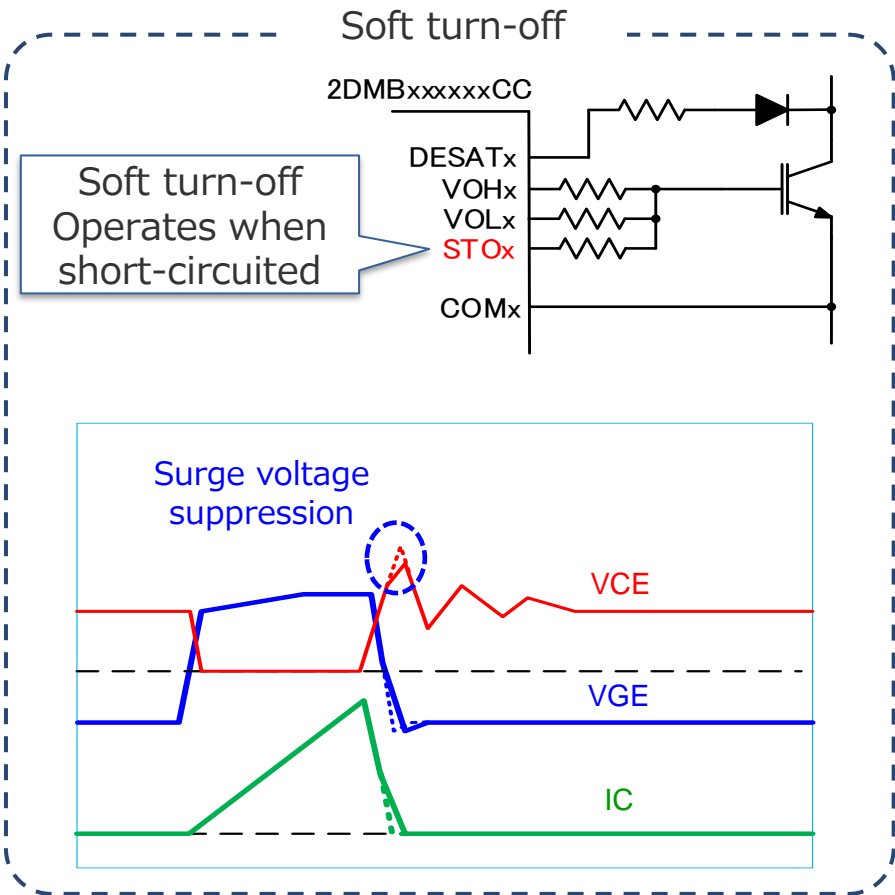
1. Solution Guide for SiC Power Module

1-2. Features of Gate driver module.

Feature④ dV/dt can be set high

Turn-on: Recovery current is small
Turn-off: No tail current

Support with a gate driver ... Ability to suppress surge voltage with high dV/dt
(Soft turn-off, Active clamp)



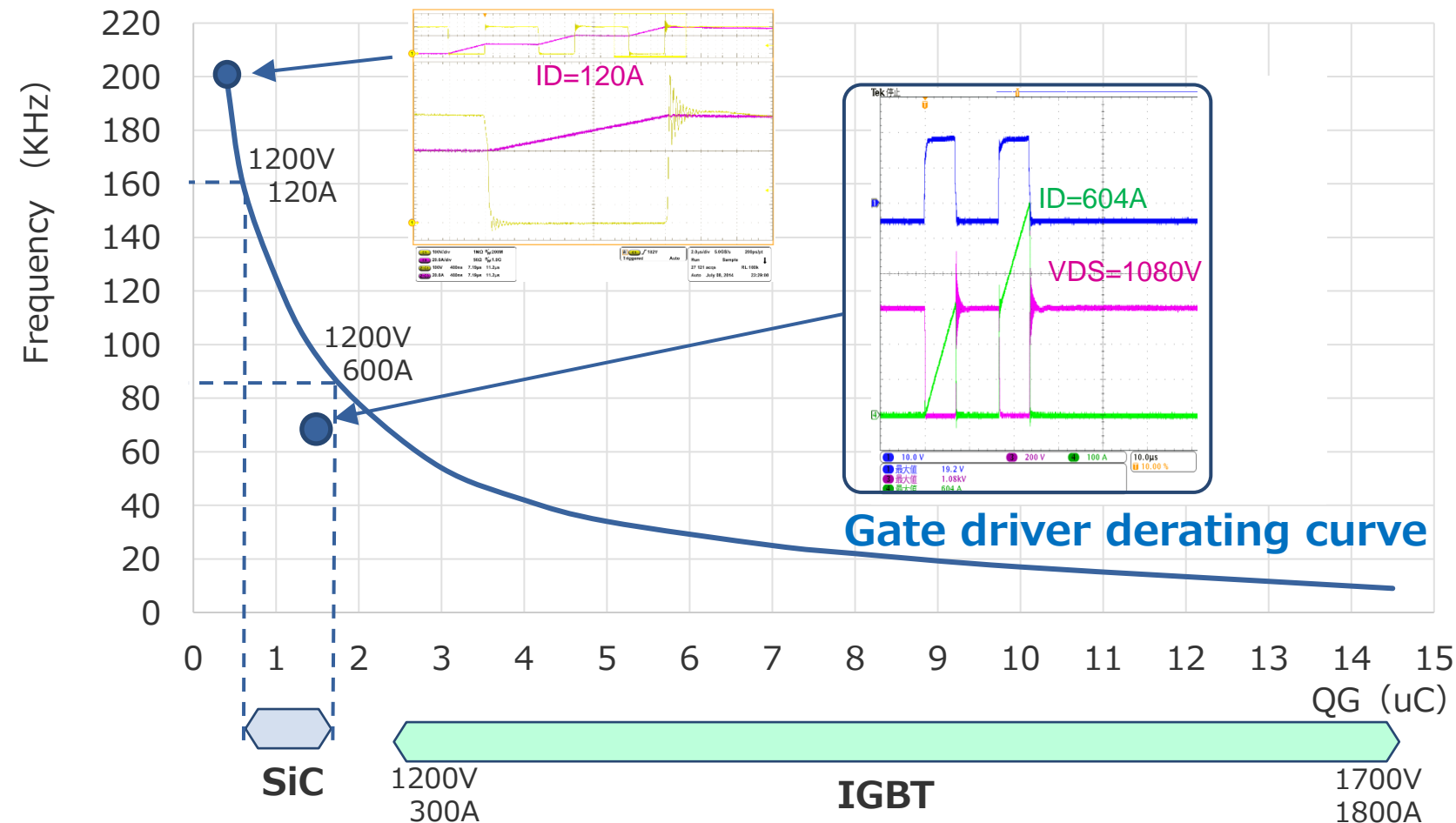
1. Solution Guide for SiC Power Module

1-2. Features of Gate driver module.

Feature⑤ High frequency operation is possible

----- Drive power needs to be increased

Support with a gate driver ... Output capacity considering SiC power module



1. Solution Guide for SiC Power Module

1-3. Product Line-up



Gate Driver Module 2CG-B series

		MODEL					
		2CG010BBC11N	2CG010BBC12N	2CG010BBC13N	2CG010BBC14N	2CG010BBC1xN *	2CG010BBC1xN *
Output	Output voltage(+)	+15V	+15V	+18V	+18V	+15V	+15V
	Output voltage(-)	-10V	-15V	-4V	-2V	-5V	-4V
	Output power/1ch	3.8W	3.3W	3.5W	3.2W	3.2W	3.0W
	Number of output	2					
	Peak output current	±43A					
Input	Input voltage	DC13~28V					
	Logic input voltage	DC3.3~5V					
Insulation	Withstand voltage	Primary to secondary AC5KV / Secondary to secondary AC4KV					
	Partial discharge extinction voltage	1768V peak					
Function	Mode select	Direct mode / Half bridge mode					
	DESAT protection	Yes					
	Soft turn off	Yes					
	Active clamp	No					
	Miller clamp	Yes					

* Under development

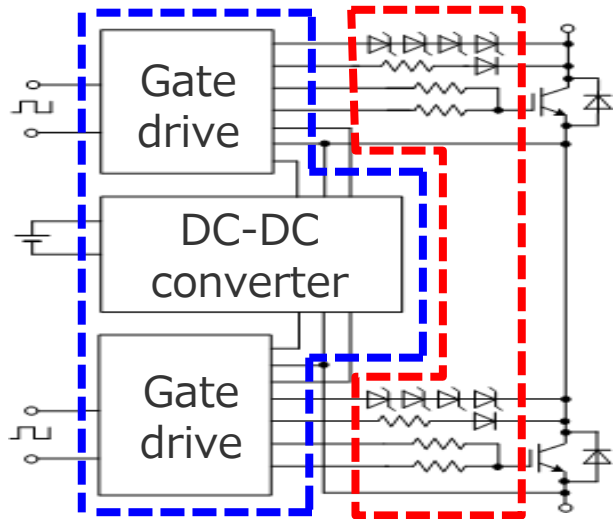
1. Solution Guide for SiC Power Module

1-4. Evaluation board

Help your evaluation !



Gate Driver Module
2CG-B series



Evaluation board
for 2CG-B series



I _D	Part No	2CG-B series	Evaluation board
	V_{DS}=1200V		
300	FMF300BXZ-24B	2CG010BBC11N 2CG010BBC12N 2CG010BBC13N 2CG010BBC14N 2CG010BBC1xN 	*1
400	FMF400BX-24B		*2
	FMF400BXZ-24B		*1
600	FMF600DXZ-24B		*3
800	FMF800DX-24B		*2
	FMF800DXZ-24B		
1200	FMF1200DXZ-24B		*3
	V_{DS}=1700V		
300	FMF300DXZ-34B		

- *1: It is necessary to branch the lead wire of the gate signal from the evaluation board.
- *2: A connection board with the SiC power module is required.
- *3: A lead wire with a connector is required.

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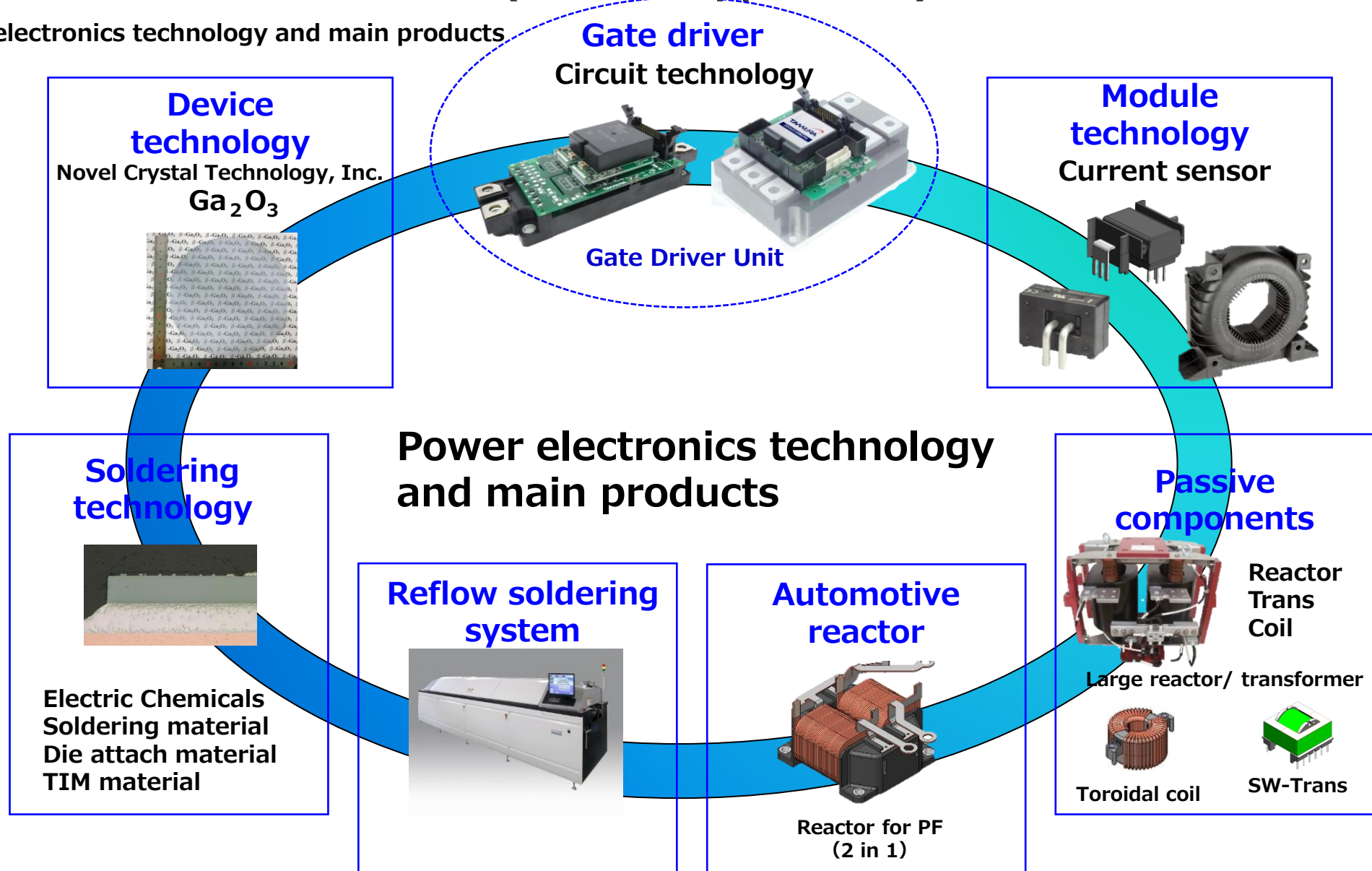
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2) Introduction of One Tamura

Appendix) Contact person

2. Introduction of One Tamura (General application)

Power electronics technology and main products



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Tamura Gate Driver



- Let's know more TAMURA products
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Presentation of conference
- Easy Get the essential
Matching data with power module
3D data to design!
- One-click to purchase
from the check stock!

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