

Gate driver module that brings out the performance of All-SiC power modules



SUSTAINABLE
DEVELOPMENT
 GOALS

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- Functions to bring out the features and performance of All-SiC power modules
- Introducing the line-up of gate drivers for All-SiC power modules

Appendix) Contact person

Role of gate driver

Power Module
SiC MOSFET
IGBT



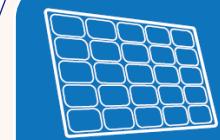
● What is required of a gate driver ?

1. Bring out the performance of power modules
2. Increase reliability of both power modules and applications.
3. Providing efficient development

Applications



Wind power generation



PV Inverter



UPS



Energy Storage



Welding machine

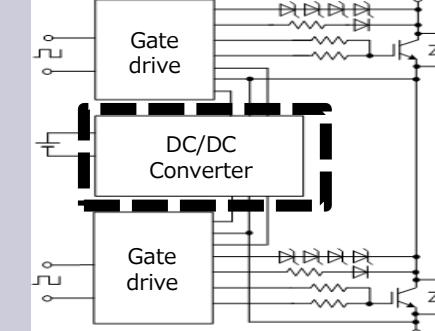
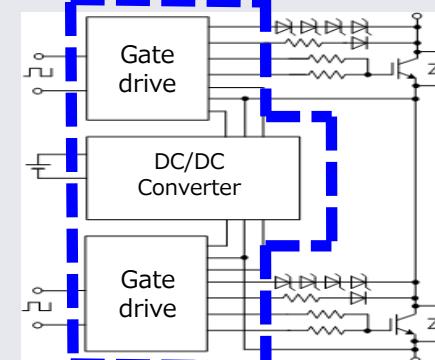
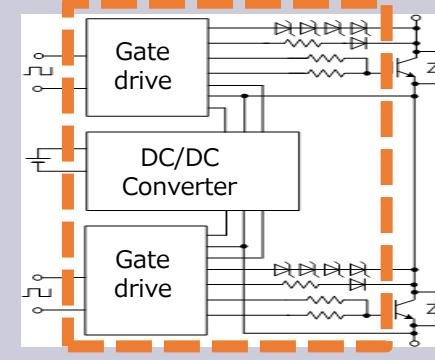


Motor control unit



Automotive

Tamura Corporation Gate Driver Product Overview

Product	Function	Block diagram	Appearance
DC/DC Converter	2 in1 PM designated DC/DC Converter		2DD series 
Gate Driver Module	DC/DC Converter + Gate drive		2CG series 
Gate Driver Unit	Gate Driver Module + Gate resistors Protective function		

Tamura Corporation Gate Driver Product Overview

Outline of specifications

Gate Driver Module 2CG-B series



Gate Driver Unit 2EG-B series



		MODEL				
		2CG010BBC11N	2CG010BBC12N	2CG010BBC13N	2CG010BBC14N	2CG010BBC15N *
Output	Output voltage(+)	+15V	+15V	+18V	+18V	+15V
	Output voltage(-)	-10V	-15V	-4V	-2V	-4V
	Output power/1ch	3.8W	3.3W	3.5W	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

Features of All-SiC Power Module

Feature① Short circuit tolerance is lower than Si

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

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

Feature④ dV/dt can be set high

Feature⑤ High frequency operation is possible

Functions to bring out the features and performance of All-SiC power modules

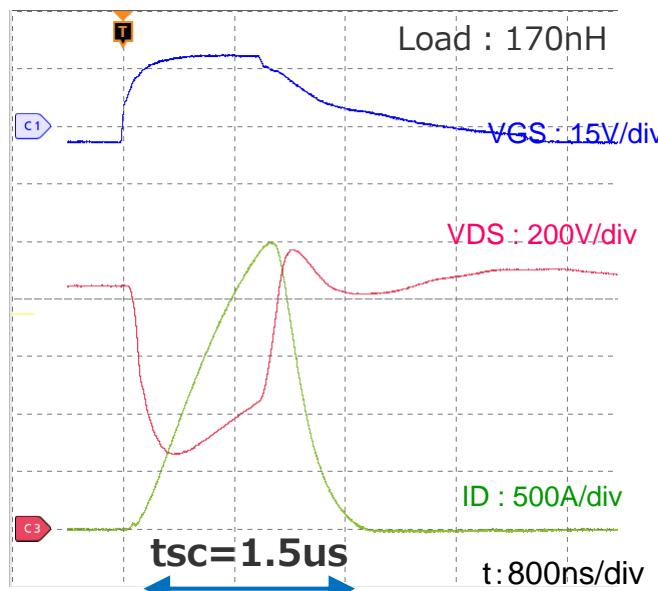
Feature ① Short circuit tolerance
is lower than Si

Small chip
area

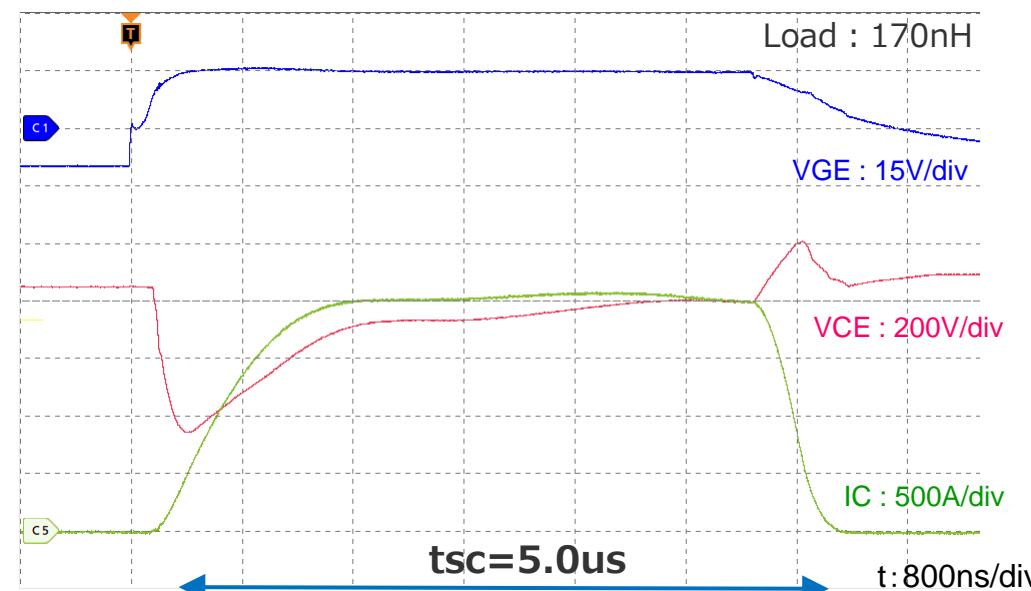
- Wide band gap
- High breakdown voltage
- High temperature operation

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

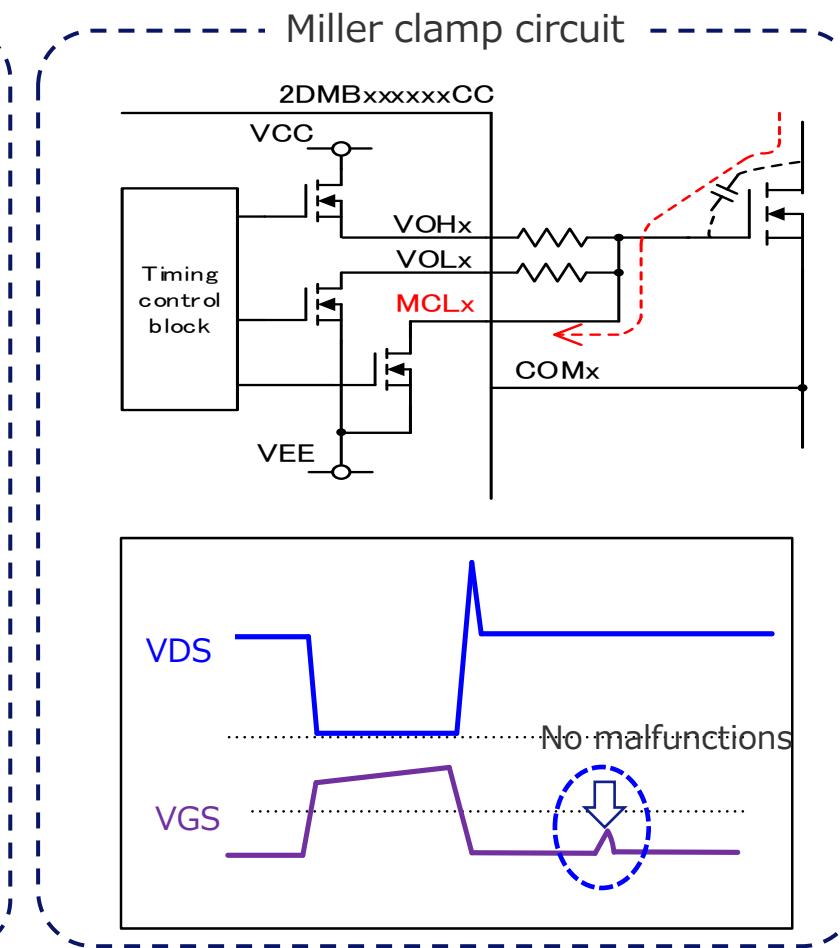
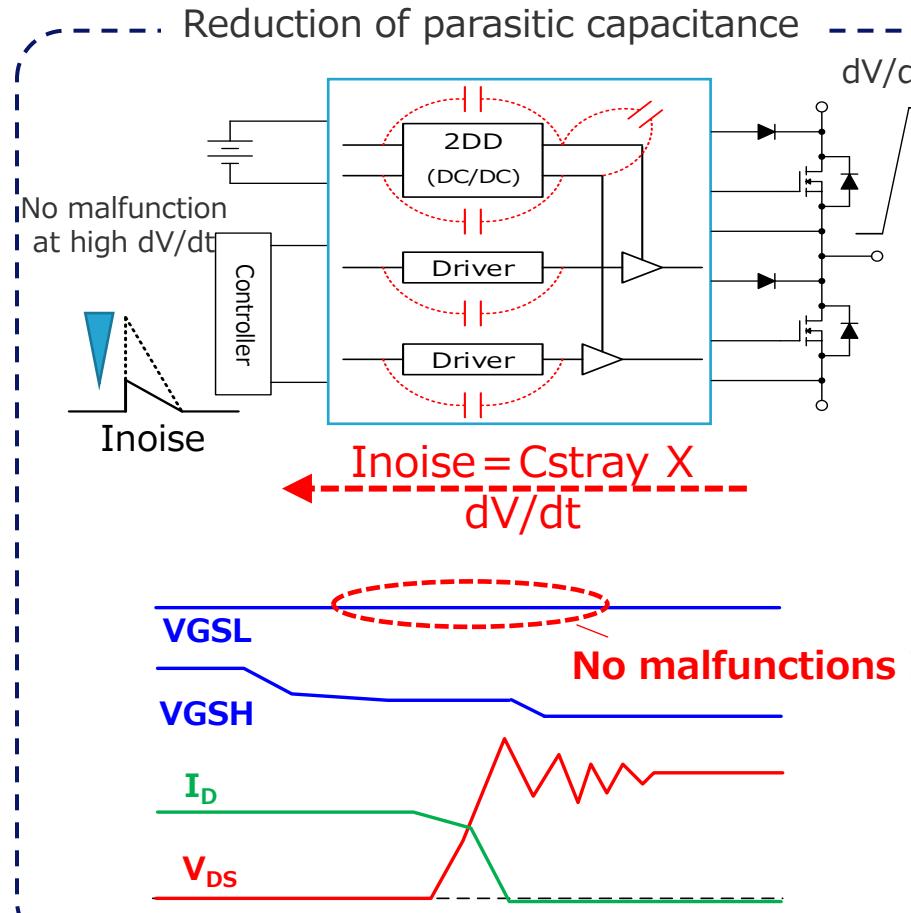
Optimal value of SiC : 1.0~3.0us

Optimal value of IGBT : 3.0~7.0us

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



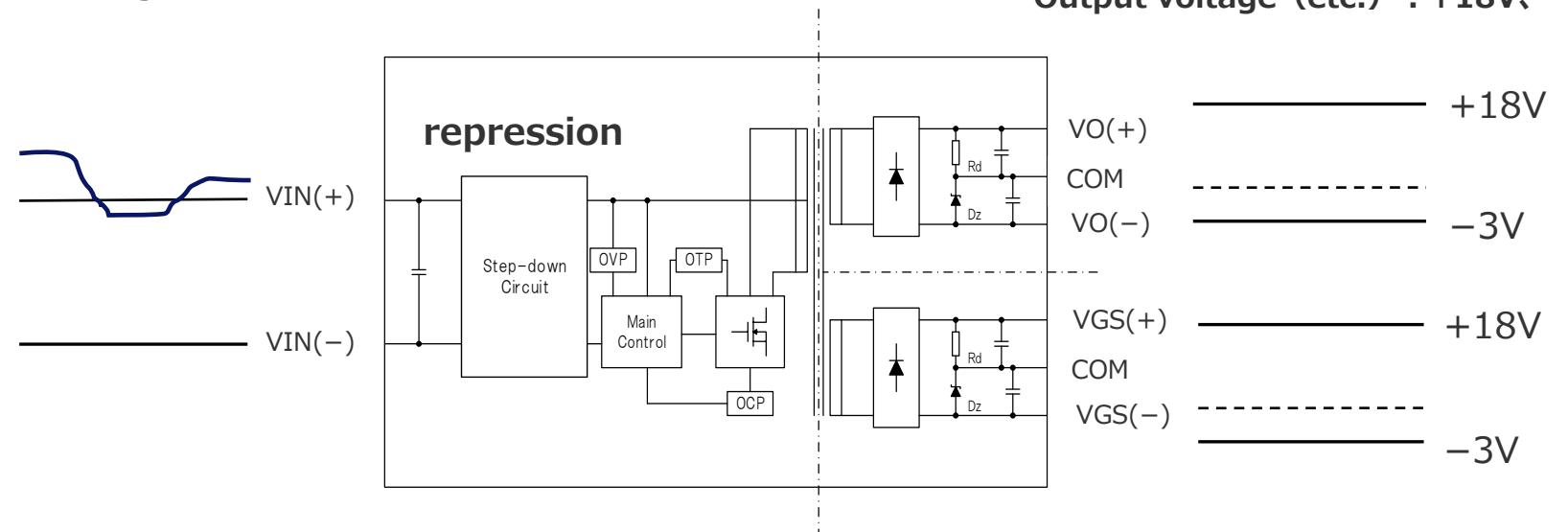
Feature③ VGS(+) :On resistance does not decrease at 15V
VGS(-) :Low tolerance (Less than -5V)

--- 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

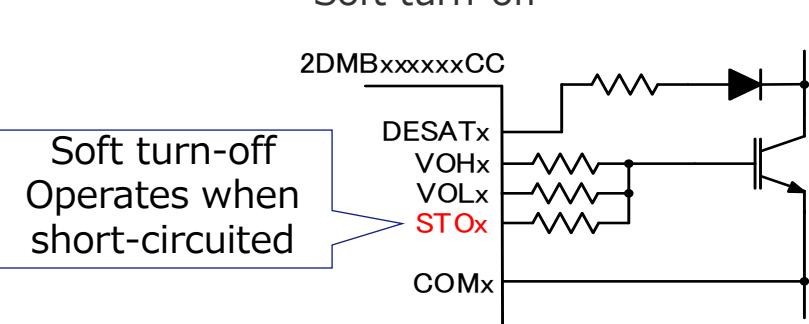
Feature④ dV/dt can be set high

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)

Soft turn-off



Soft turn-off
Operates when
short-circuited

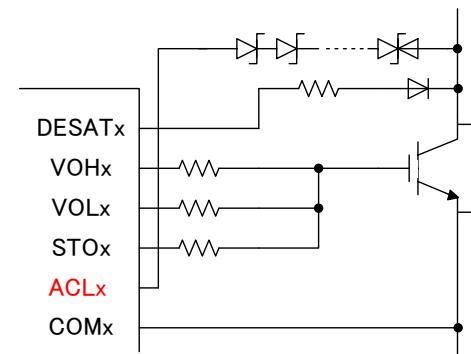
Surge voltage
suppression

VCE

VGE

IC

Active clamp (Option)



VGS

VDS

ID

Active Clamp gate

Surge voltage
suppression

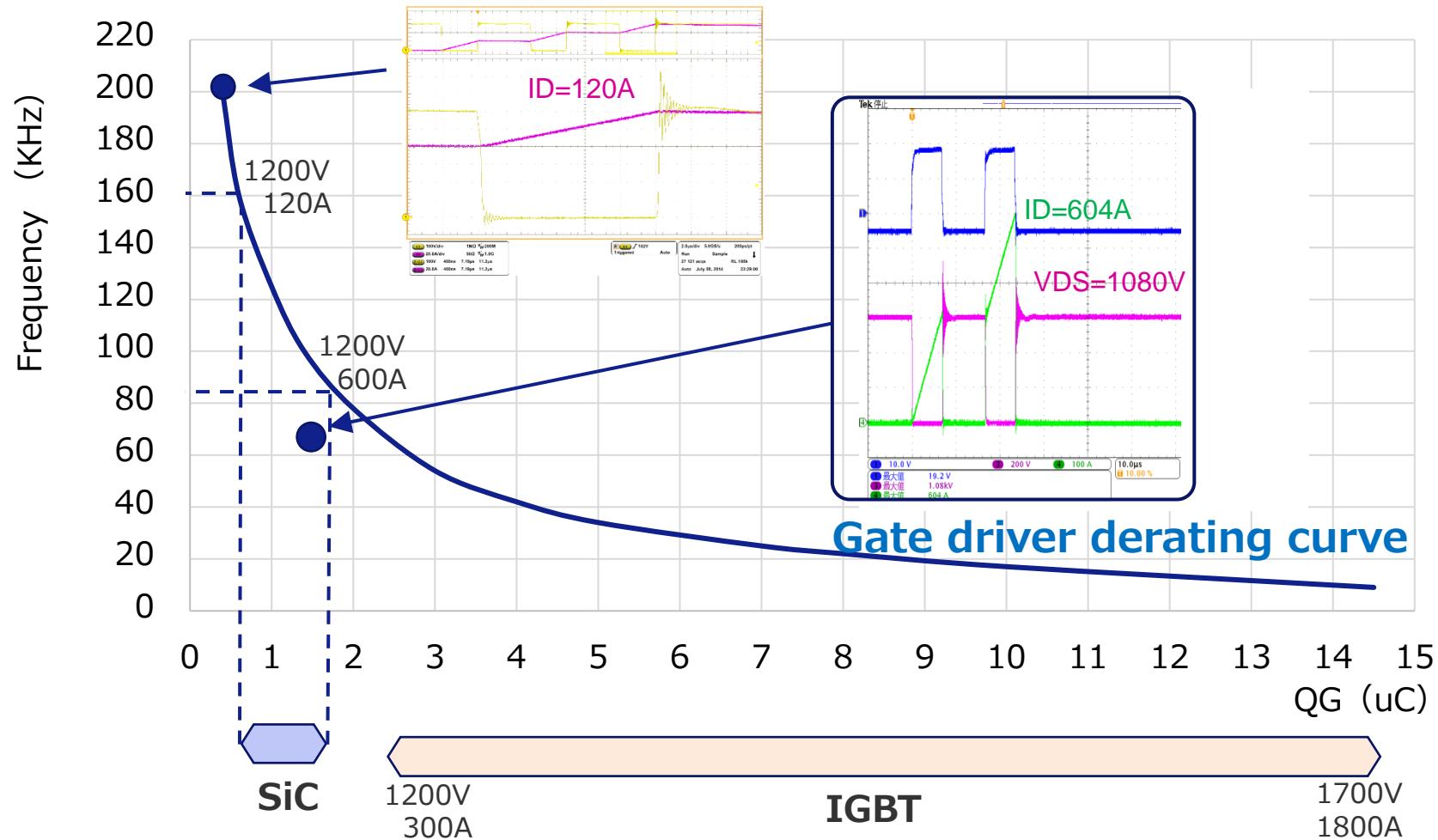
Surge clamp

Functions to bring out the features and performance of All-SiC power modules

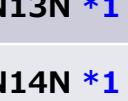
Feature⑤ High frequency operation is possible

----- Drive power needs to be increased

Support with a gate driver



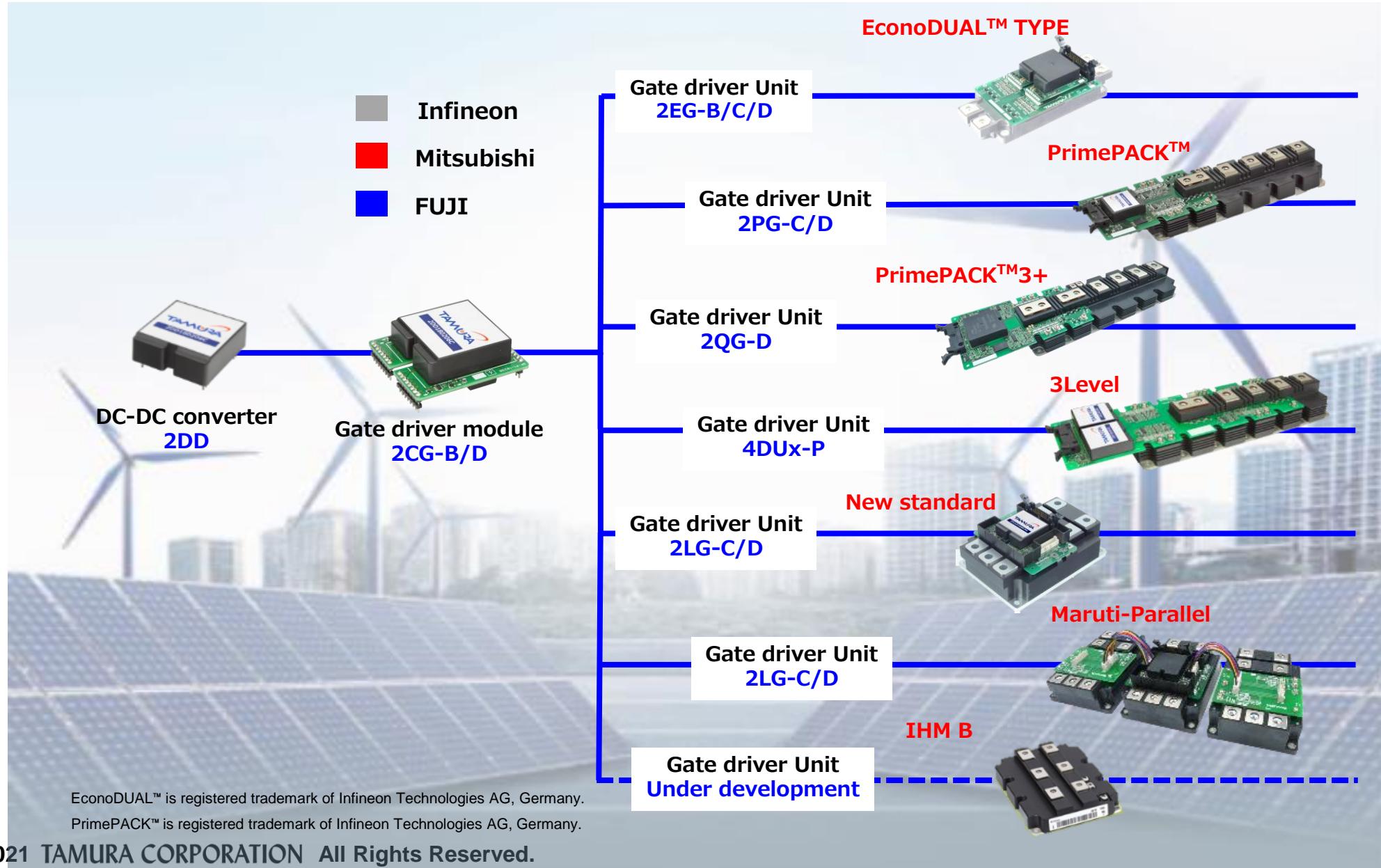
Gate Driver Line-up for SiC power module

Package	Ic	Part No	TAMURA Driver		
			2EG-B	2CG-B	2DD
Vce = 1200V					
 C type	80	BSM080D12P2C008	-	 2CG010BBC13N	 2DD180407C
	120	BSM120D12P2C005	-		
	180	BSM180D12P3C007	-	2CG010BBC14N	2DD180206C
 E type	180	BSM180D12P2E002	2EG01XBxN13N *1	 2CG010BBC13N	 2DD180407C
	300	BSM300D12P2E001	2EG01XBxN13N *1		
	300	BSM300D12P3E005	2EG01XBxN14N *1	2CG010BBC14N	2DD180206C
 G type	400	BSM400D12P2G003	2EG01XBxN13N *1	 2CG010BBC13N	 2DD180407C
	400	BSM400D12P3G002	2EG01XBxN14N *1		
	600	BSM600D12P3G001	2EG01XBxN14N *1	2CG010BBC14N	2DD180206C
Vce = 1700V					
 E type	250	BSM250D17P2E004	2EG01XBxN13N *1	2CG010BBC13N	2DD180407C

*1 Not in stock due to optimization required. Please contact us.

x: Signal input voltage selectable "C" => 3.3~15V "D" => 15V

Extensive line-up of SiC and IGBT gate drivers



Appendix) Information & Contact

Please visit our website!



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

Feel free to inquire! ↓

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