

Solution Guide for Infineon Technologies AG EconoDUAL™



Supported by Infineon Technologies AG



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2) Introduction of One Tamura

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1) Solution Guide for EconoDUAL™

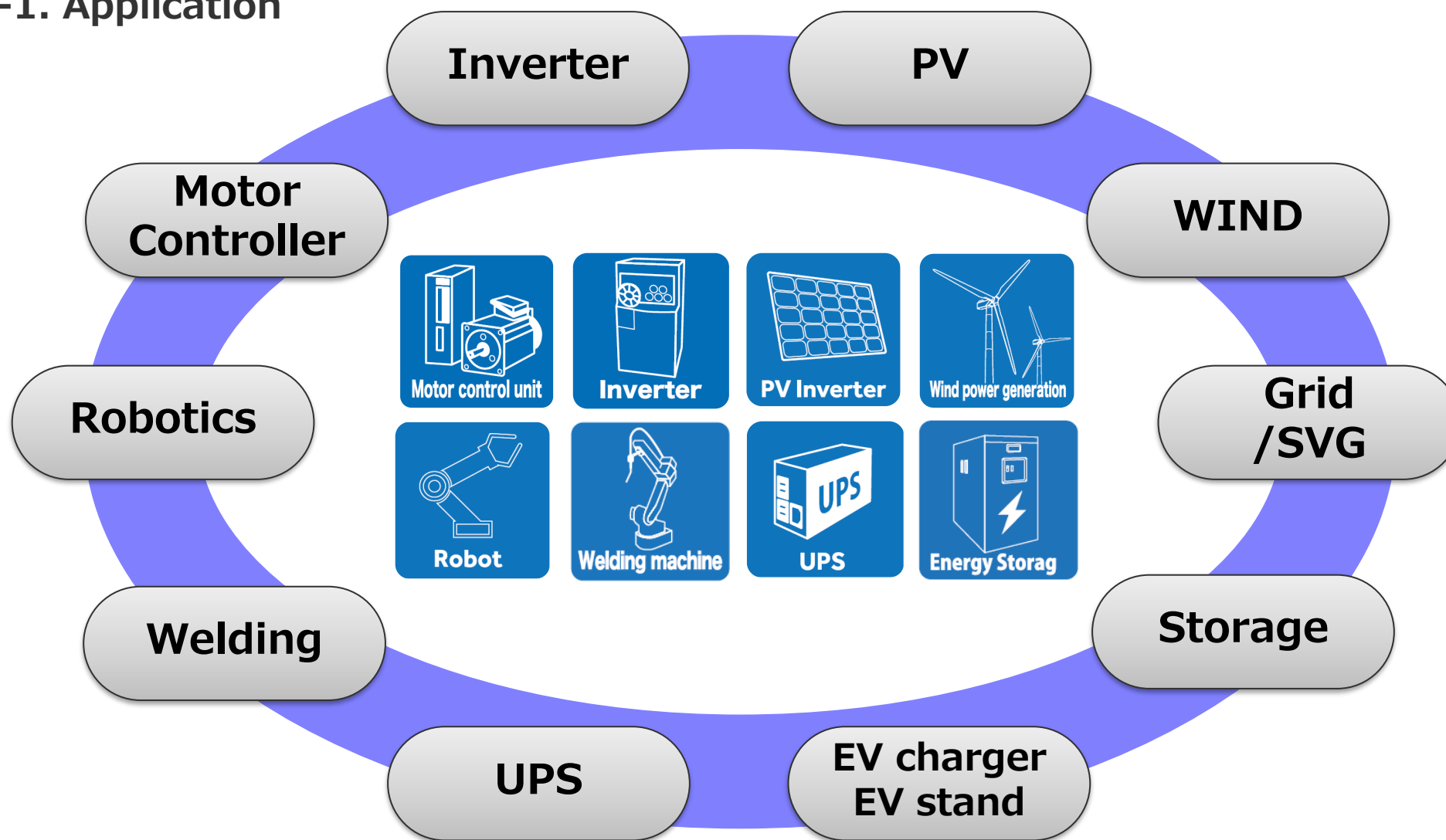
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1-1. Application



1. Solution Guide for EconoDUAL™

1-2. Tamura Gate Driver 7 key points

Low stray capacity

Soft turn off + Active Clamp

High-speed response

High-accuracy

High Power DC-DC converter

Multi parallel solution

Wider input voltage



1. Solution Guide for EconoDUAL™

1-3 Product features

Reference only



Infineon Technologies
/ EconoDUAL™

Reference only



Fuji Electric
/ DualXT

Reference only



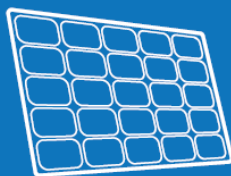
Mitsubishi Electric
/ NX type

4W per channel

Frequency
100kHz (Max)

Peak Current
43A

Suitable for various applications !



PV Inverter



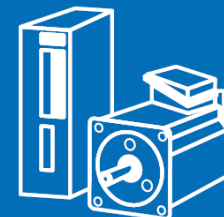
Wind power generation



Inverter



UPS



Motor control unit



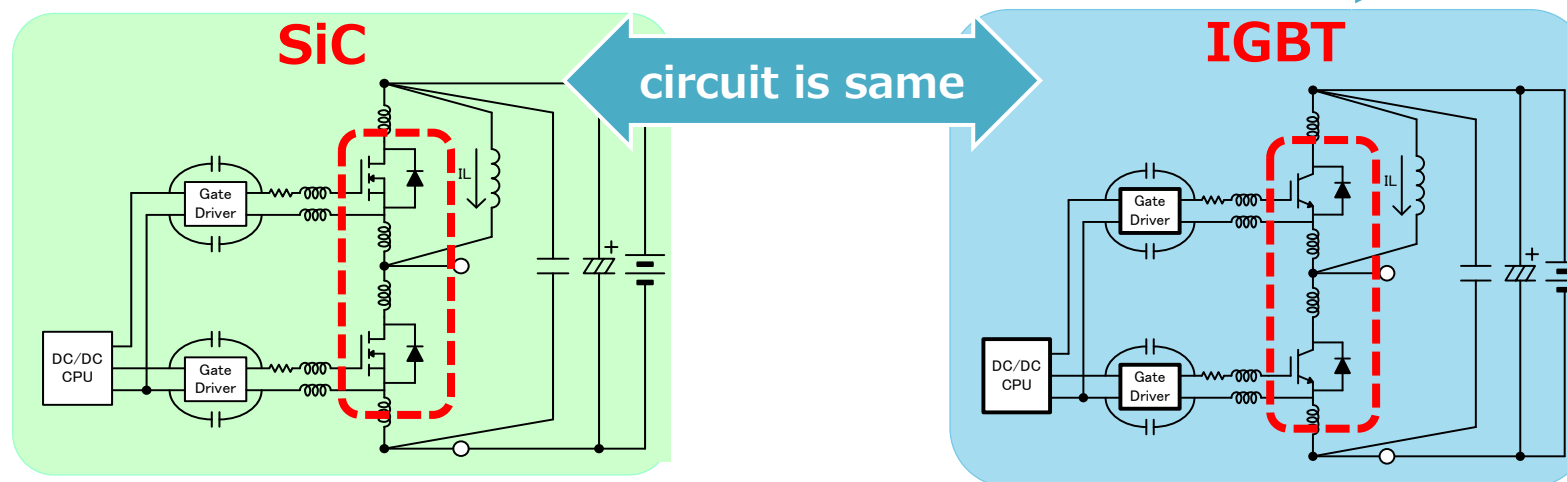
Robot

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1-4. Gate Driver differences (SiC and IGBT)

Item	Condition (SiC-MOSFET)	Condition (IGBT)
Gate drive circuit	2 (Half bridge)	2 (Half bridge)
Gate voltage (H)/(L)	18V/-5V	15V/-10V
Protection function	DESAT, Miller clamp	DESAT, STO,ACL
Operating frequency	100kHz (MAX)	20kHz (MAX)
Stray capacity	12pF	30-40pF
Response	85nsec (TYP)	350nsec (TYP)

Cover with all items!



If the SiC-MOSFET can be driven, the IGBT can be driven easily!

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1-5. Performance comparison of other companies



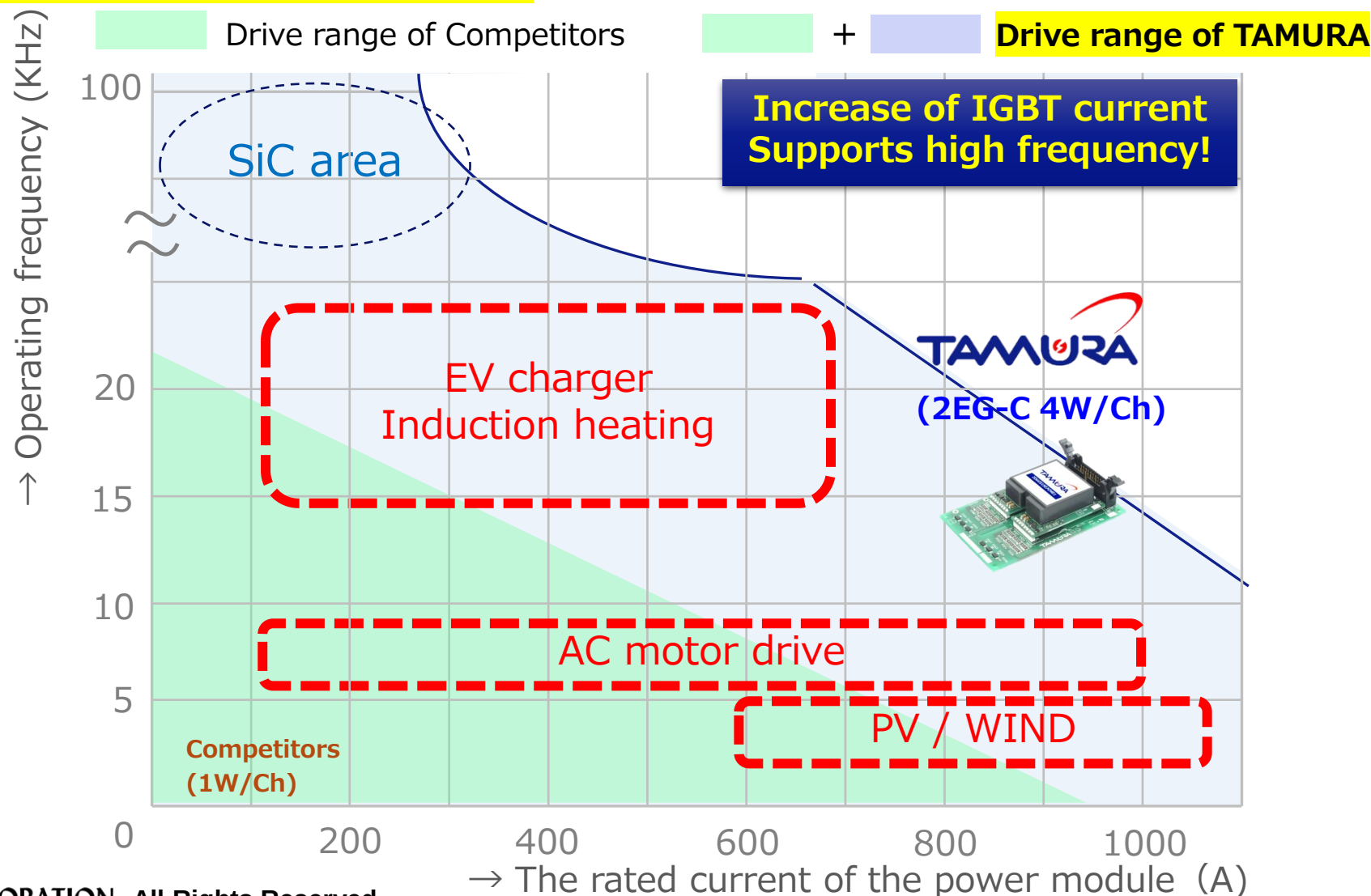
Item	TAMURA	Company A
Power module	SiC-MOSFET/IGBT	IGBT
Input Voltage	13-28V	15V
Output Voltage	15V/-10V	15V/-10V
Output power	○ 4W	1W
Frequency	○ 100kHz (Max)	20kHz (Max)
Output Peak current	○ 43A	15A

Large drive capacity makes it ideal for large capacity IGBTs!

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1-6 High power of DC-DC converter (Performance comparison)

Switching frequency range (image)



1. Solution Guide for EconoDUAL™

1-7 Feature of Tamura gate driver

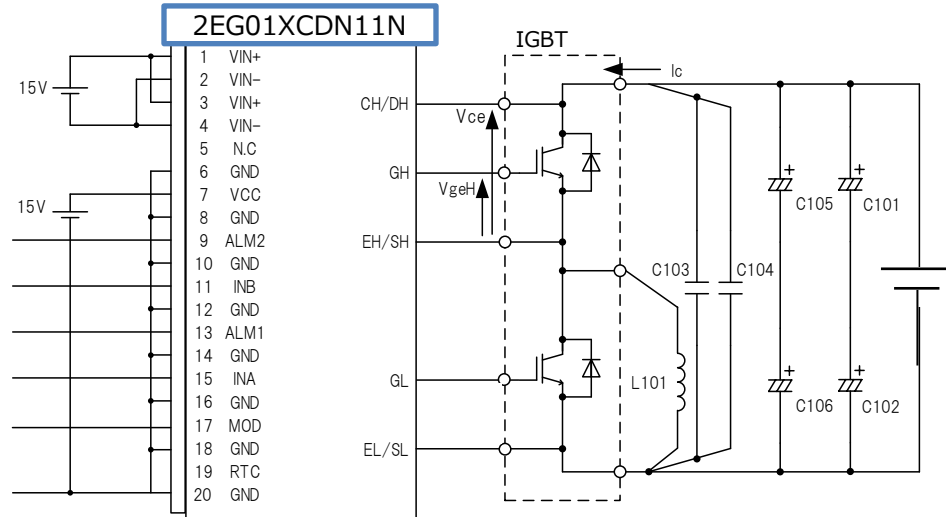
IGBT:FF900R12ME7_B11 (Infineon Technologies)

2EG01XCDN11N Switching Test Data



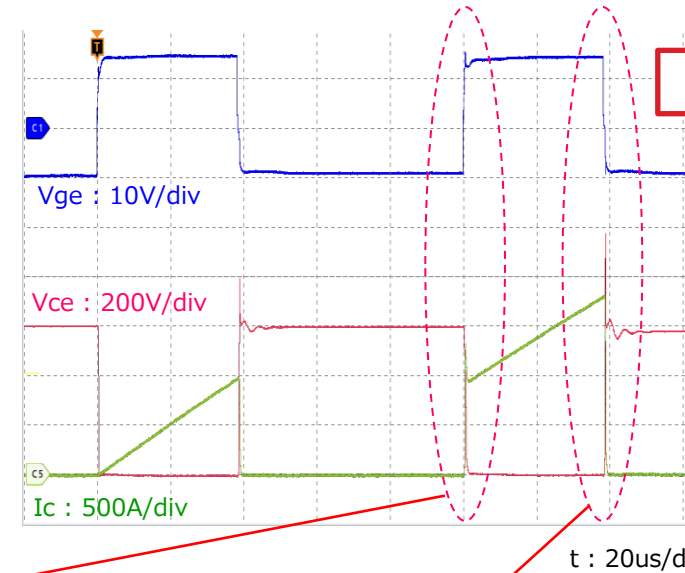
1. Solution Guide for EconoDUAL™

1-7 Single drive solution /2 Pulse test

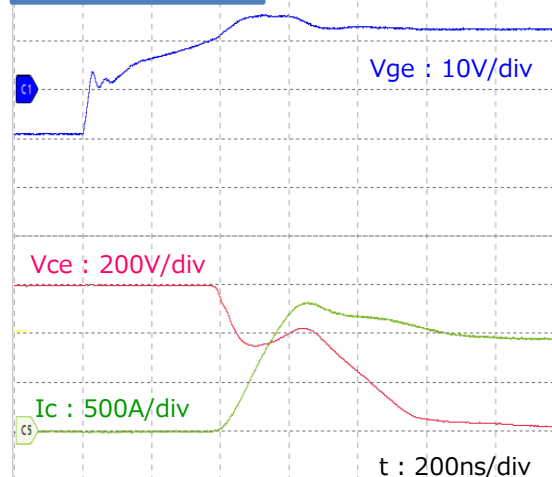


IGBT : FF900R12ME7_B11 (Infineon)
C101,102,105,106 : 2700uF (Ls : 20nH)
C103,104: 4.7uF (Ls : 20nH)
L101: 22uH

DC Link : 600V, Ron=Roff : 0.51Ω, Upper arm, Tj=150°C

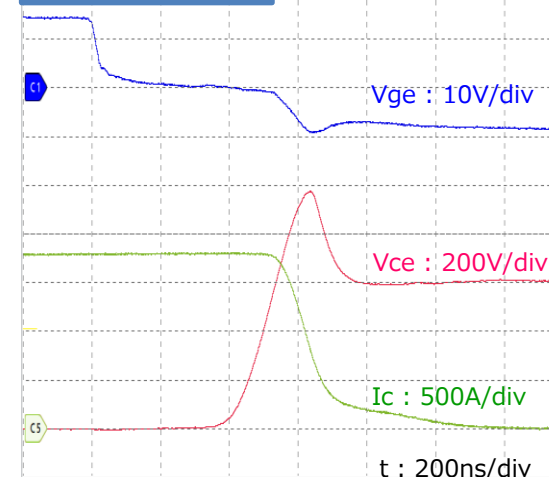


900A turn on



Item	Measurement value	
DC Link	600	V
Ic	900	A
dV/dt	2.7	kV/us
di/dt	7.5	kA/us
td(on)	0.40	us
tr	0.12	us
Eon	172	mJ

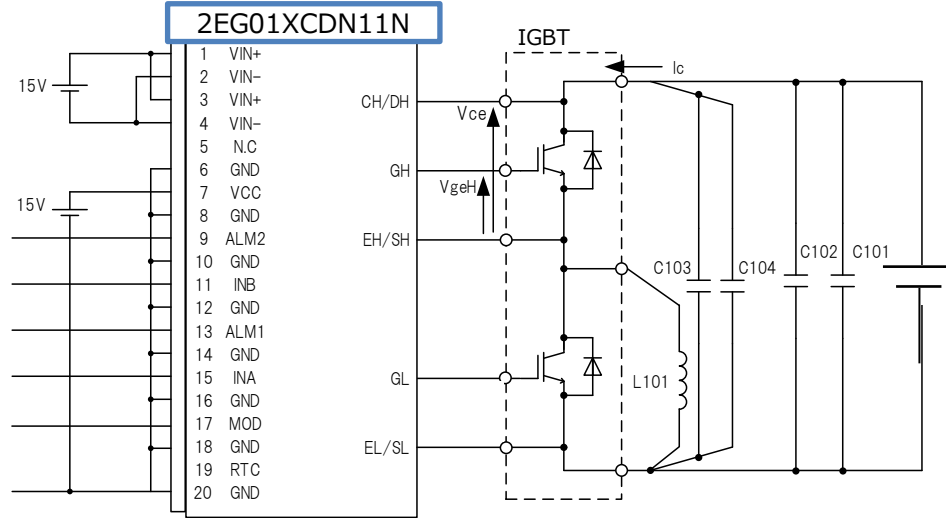
1800A turn off



Item	Measurement value	
DC Link	600	V
Ic	1800	A
Vcep	973	V
dV/dt	5.2	kV/us
di/dt	12.4	kA/us
td(off)	0.56	us
tf	0.28	us
Eoff	240	mJ

1. Solution Guide for EconoDUAL™

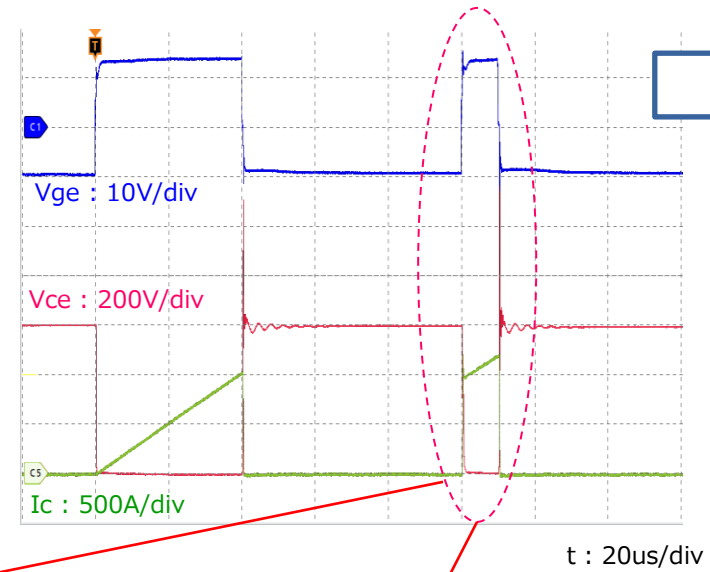
1-7 Single drive solution /2 Pulse test



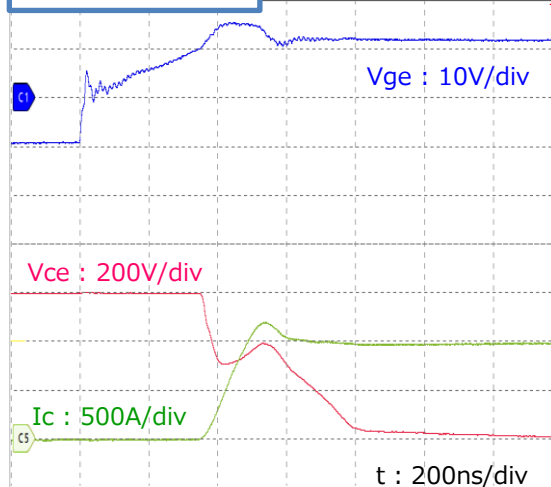
IGBT : FF900R12ME7_B11 (Infineon)
 C101,102 : 1500uF (Ls : 50nH)
 C103,104 : 4.7uF (Ls : 20nH)
 L101: 22uH

DC Link : 600V, Ron=Roff : 0.51Ω, Upper arm, Tj=-40℃

Low temp test

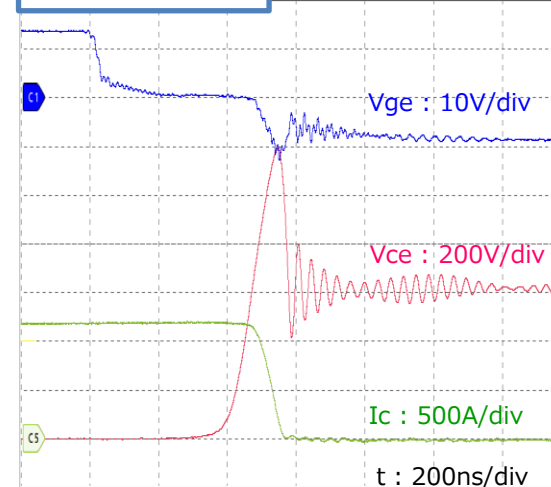


900A turn on



Item	Measurement value	
DC Link	600	V
Ic	900	A
dV/dt	4.2	kV/us
di/dt	9.2	kA/us
td(on)	0.36	us
tr	0.10	us
Eon	108	mJ

1200A turn off



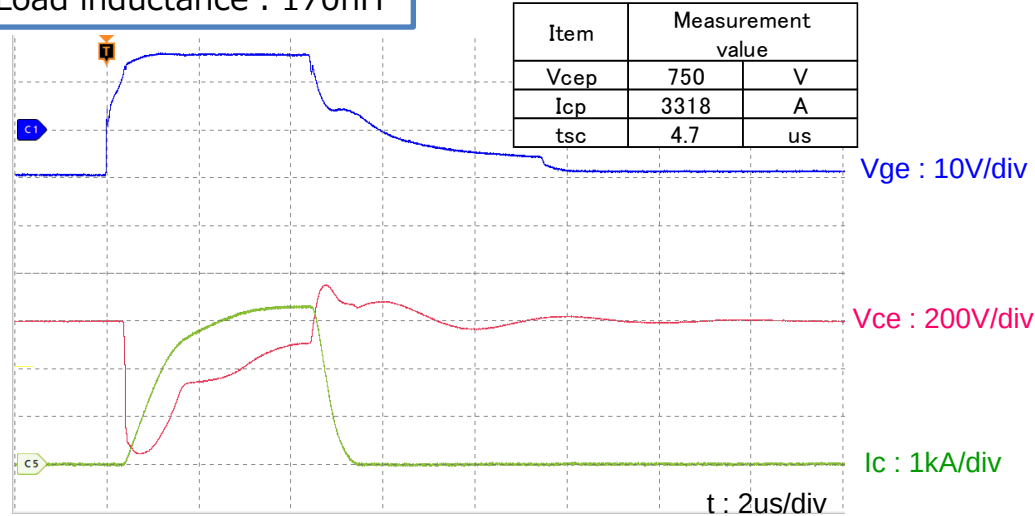
Item	Measurement value	
DC Link	600	V
Ic	1200	A
Vcep	1197	V
dV/dt	8.0	kV/us
di/dt	16.3	kA/us
td(off)	0.47	us
tf	0.07	us
Eoff	82	mJ

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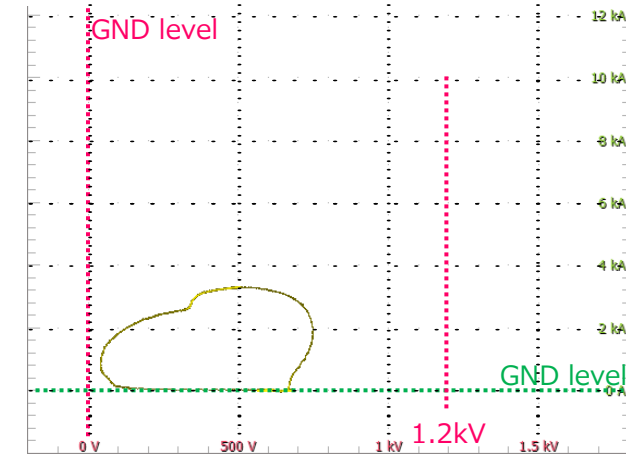
1-7 Single drive solution/Arm short circuit

DC Link : 600V, Ron=Roff : 0.51Ω, Upper arm, Tj=150℃

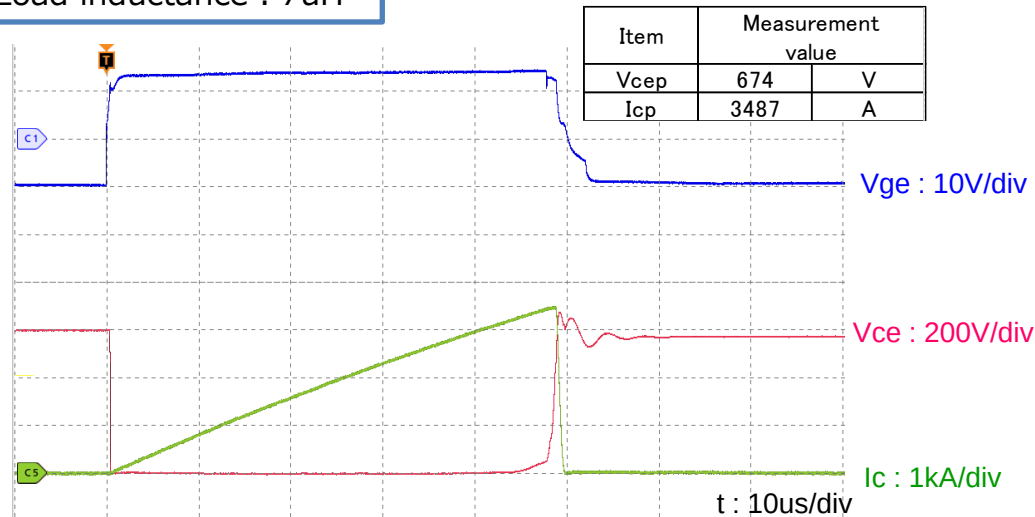
Load inductance : 170nH



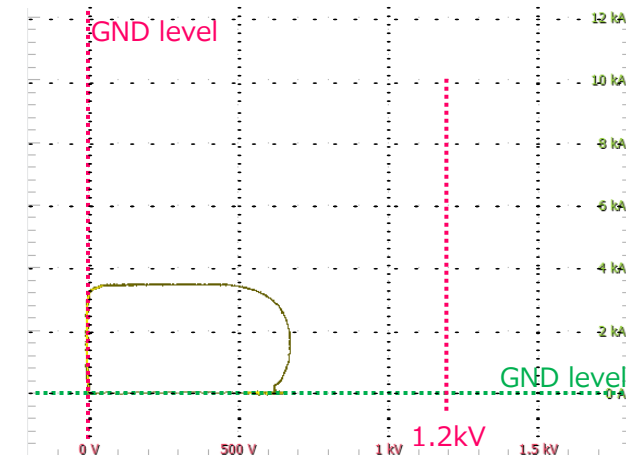
SOA



Load inductance : 7uH



SOA

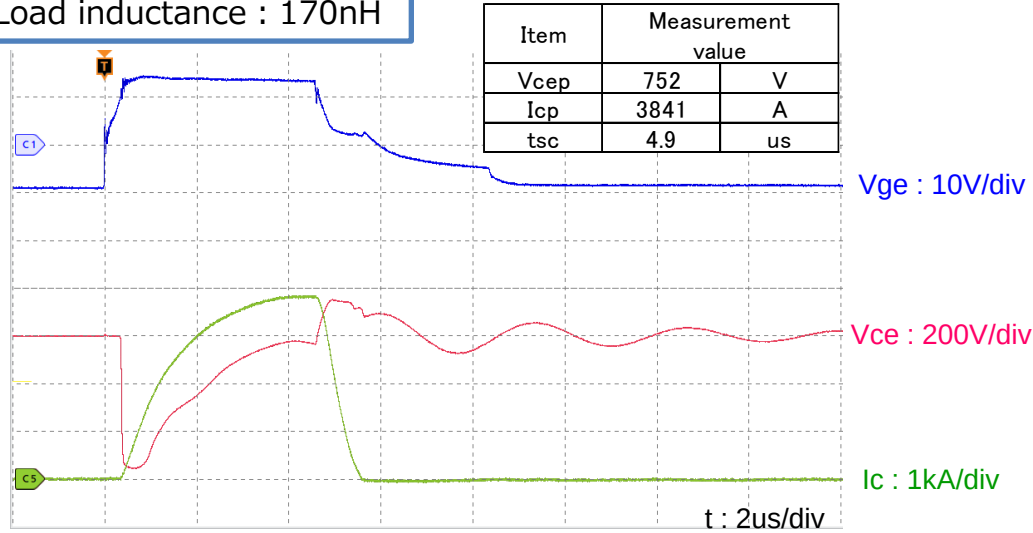


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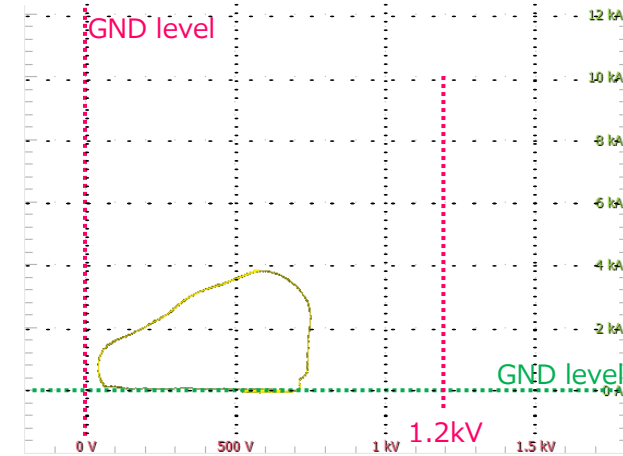
1-7 Single drive solution/Arm short circuit

DC Link : 600V, Ron=Roff : 0.51Ω, Upper arm, Tj=-40℃

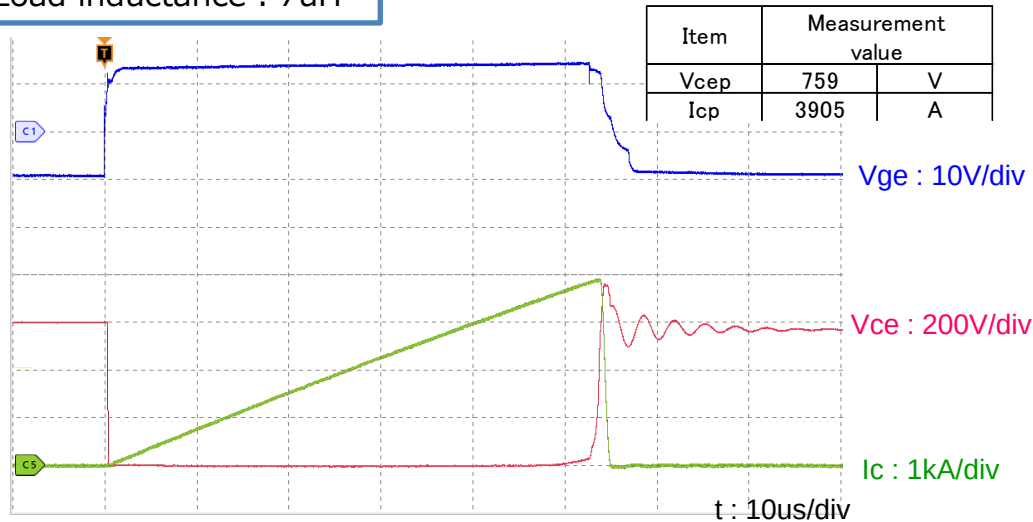
Load inductance : 170nH



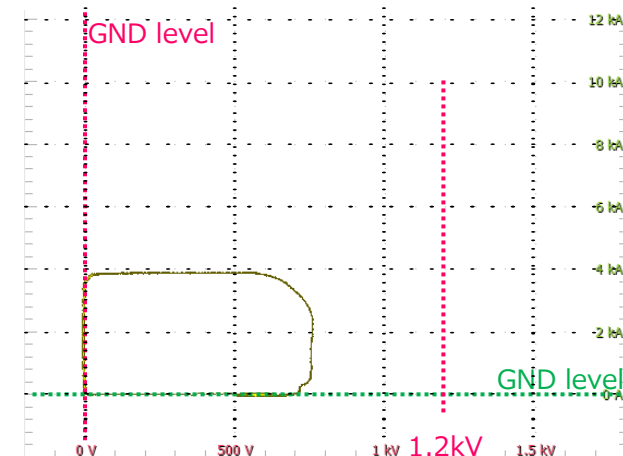
SOA



Load inductance : 7uH



SOA

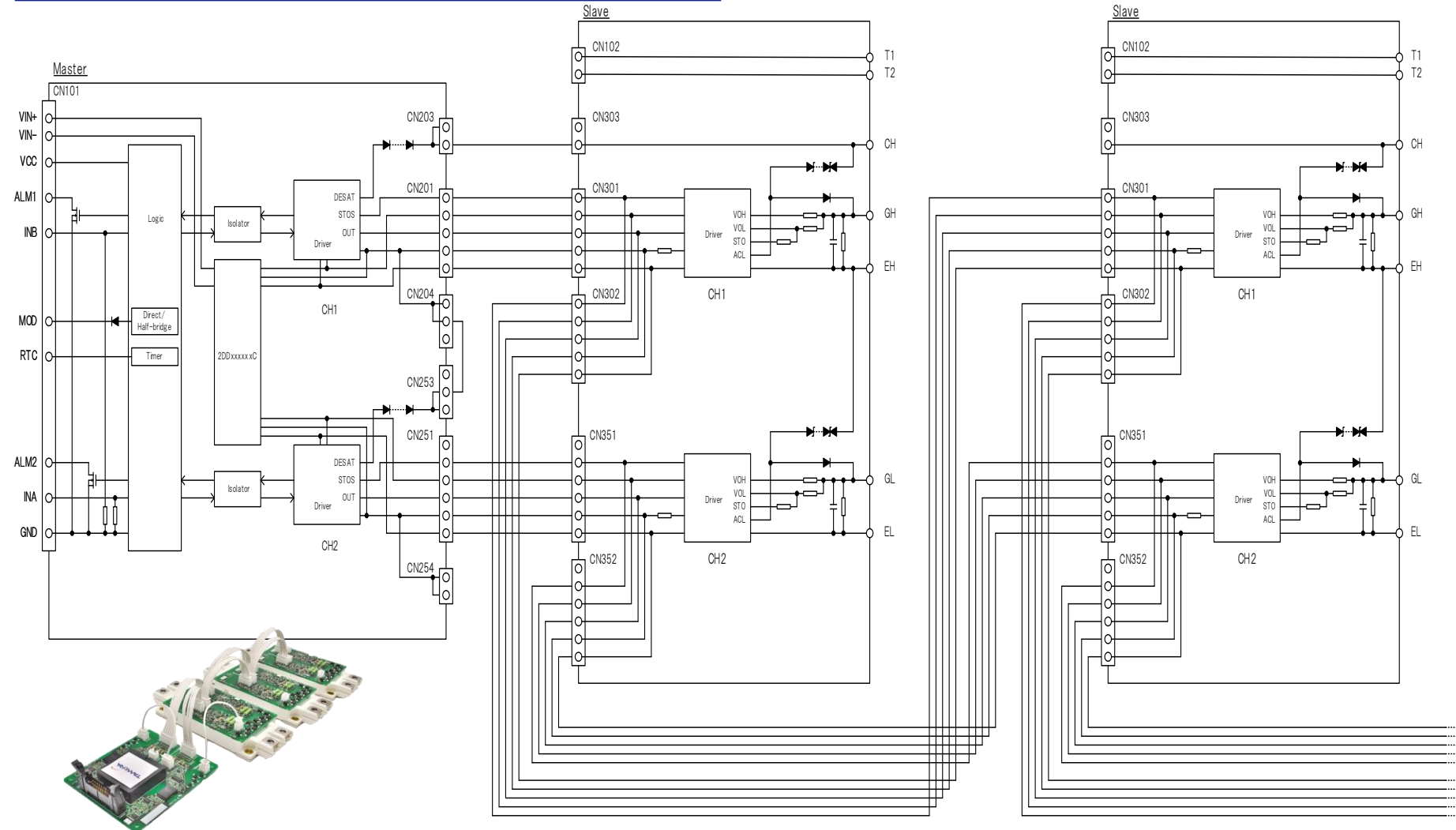


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1-8 Application example (parallel drive configuration)

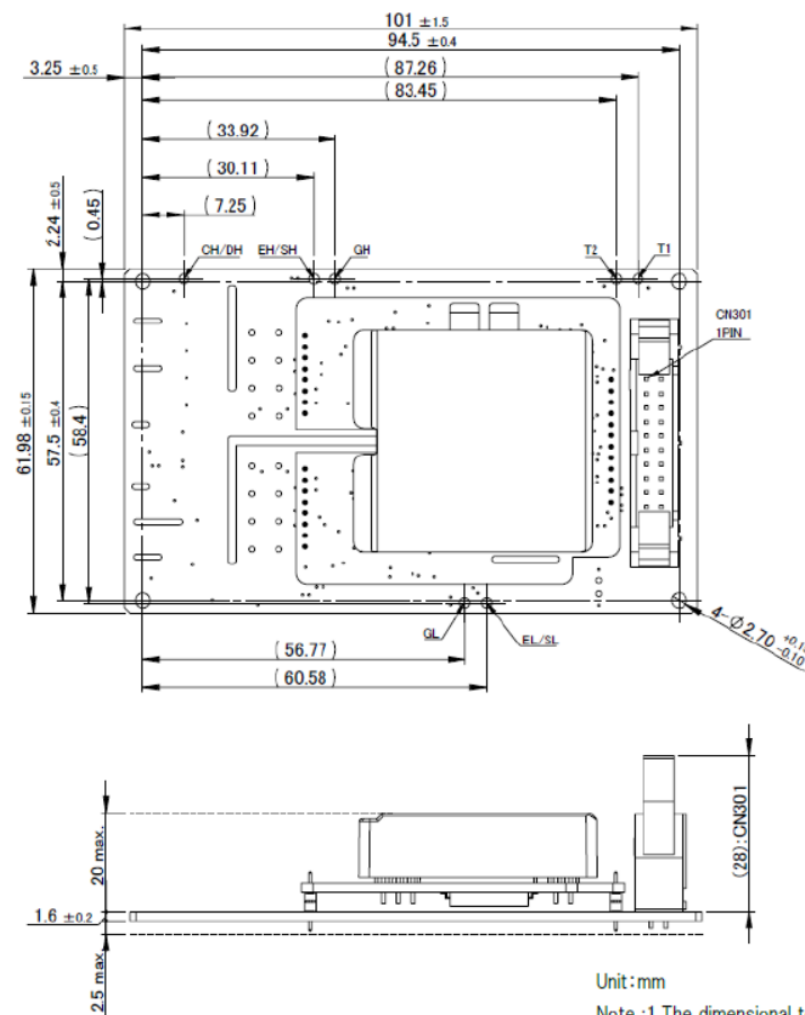
Connection diagram in parallel drive

Please contact us if you are interested !



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1-9 Products appearance and line-up



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1-9. Product line-up for Infineon Technologies EconoDUAL™ 2in1 Type

Package	Output power (Ref.)	Ic	Part No	TAMURA Driver			
				2EG-C / D	2CG-B/2CG-D	2DD	
				Vce = 1200V			
	20kW	150	FF150R12MS4G		2EG01XCCN11N *1 2EG01XCDN11N *1 2EG??zyxN11N - ?? *2	2CG010BBC11N (+15/-10V) Soft turn off ----- 2CG010DBC11N (+15/-10V) Soft turn off +Active clamp 	2DD151008C (+15V/-10V) 
	30kW	225	FF225R12ME4 FF225R12MS4				
	50kW	300	FF300R12ME4 FF300R12MS4				
	100kW	450	FF450R12ME4				
	125kW	600	FF600R12ME4				
	150kW	900	FF900R12ME7				
				Vce = 1700V			
	TBC	225	FF225R17ME4		2EG01XCCN11N *1 2EG01XCDN11N *1 2EG??zyxN11N - ?? *2	2CG010BBC11N (+15/-10V) Soft turn off ----- 2CG010DBC11N (+15/-10V) Soft turn off +Active clamp 	2DD151008C (+15V/-10V) 
		300	FF300R17ME4				
		450	FF450R17ME4				
		600	FF600R17ME4				
		750	T.B.D				
		900	T.B.D				

*1 Catalog products. Please confirm stock.

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

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

~~y~~: Protection circuits: "~~C~~" => Soft turn off / "~~D~~" => Soft turn off + Active clamp

~~z~~: Gate resistors: "~~X~~" => Not mounted / "~~0~~" mounted

??: Semi-optimized code

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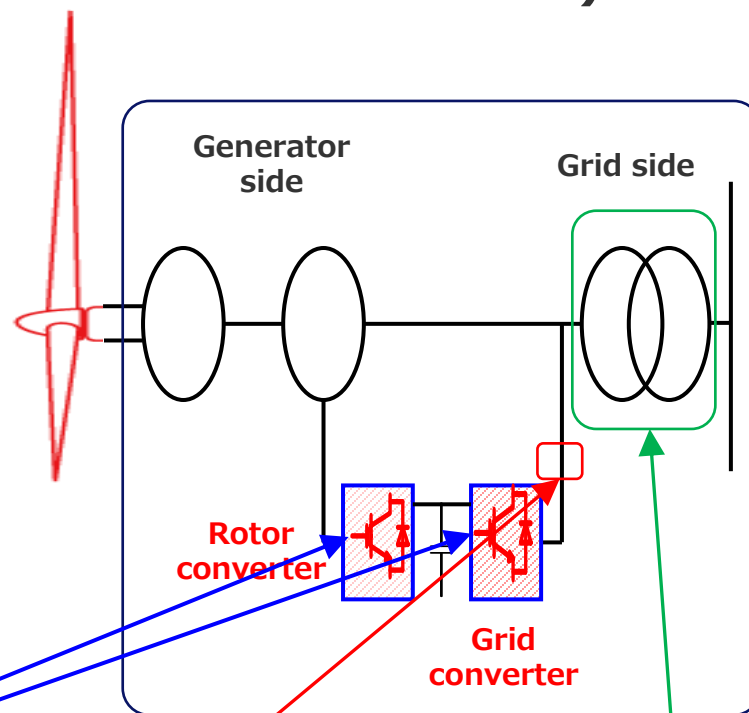
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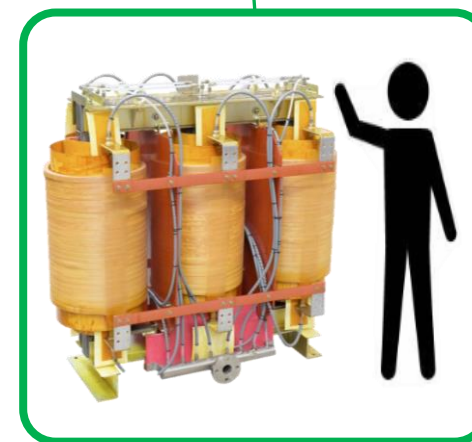
2) Introduction of One Tamura (Wind Power converters)



Gate Driver Unit



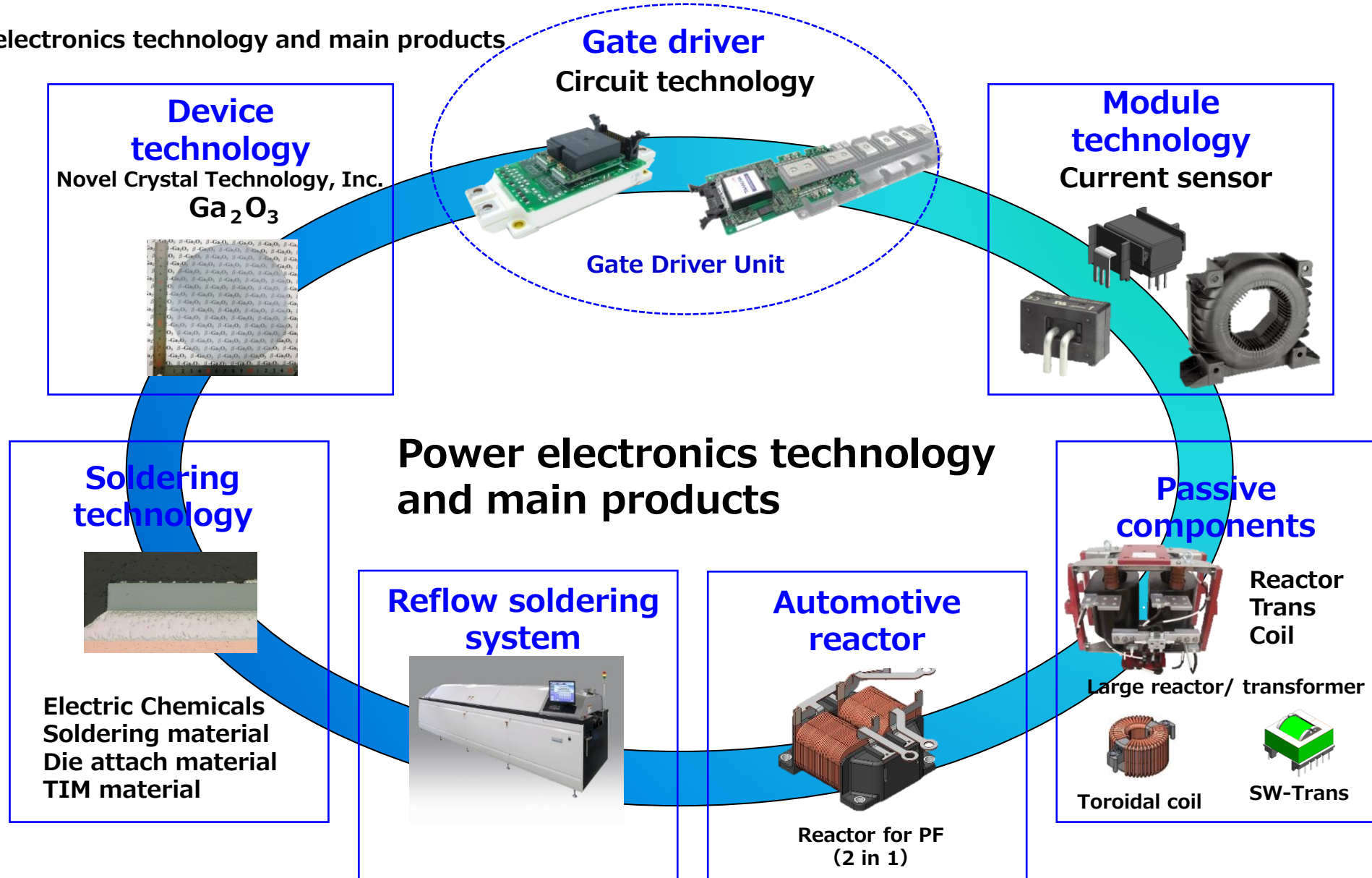
Current sensor



Reactor

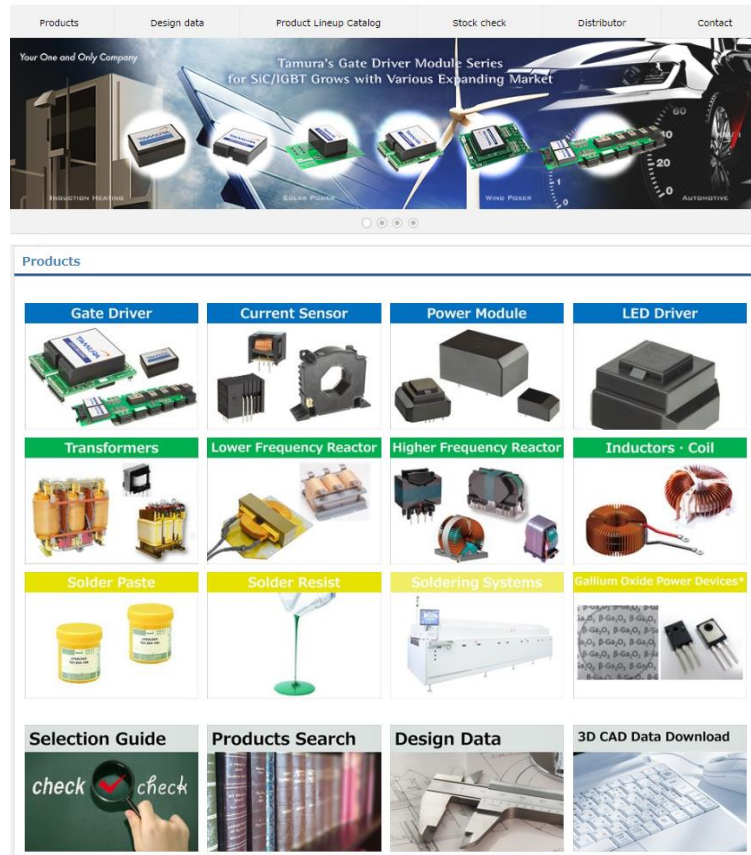
2) Introduction of One Tamura (General application)

Power electronics technology and main products



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! ↓

<https://www.tamuracorp.com/electronics/en/contact/>