

Solution Guide for Mitsubishi Electric NX type series.



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1) Solution Guide for Mitsubishi Electric NX type

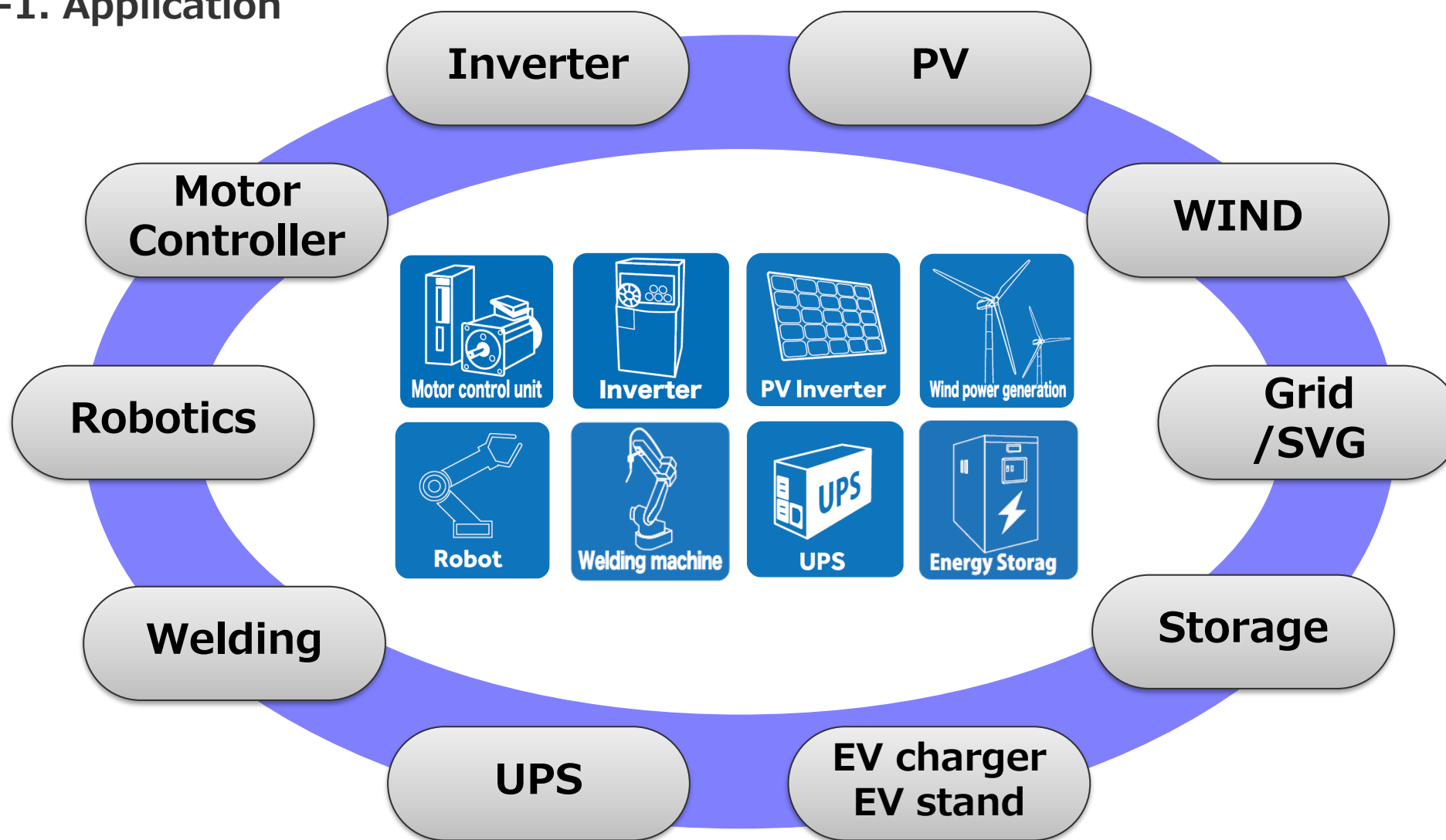
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1. Solution Guide for Mitsubishi Electric NX type

1-1. Application



1. Solution Guide for Mitsubishi Electric NX type

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 Mitsubishi Electric NX type

1-3 Product features

Reference only



Mitsubishi Electric
/ NX type

Reference only



Fuji Electric
/ DualXT

Reference only



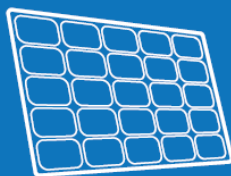
Infineon Technologies
/ EconoDUAL™

4W per channel

**Frequency
200kHz (Max)**

**Peak Current
43A**

Suitable for various applications !



PV Inverter



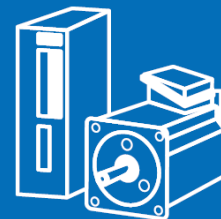
Wind power generation



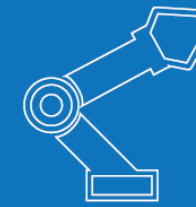
Inverter



UPS



Motor control unit



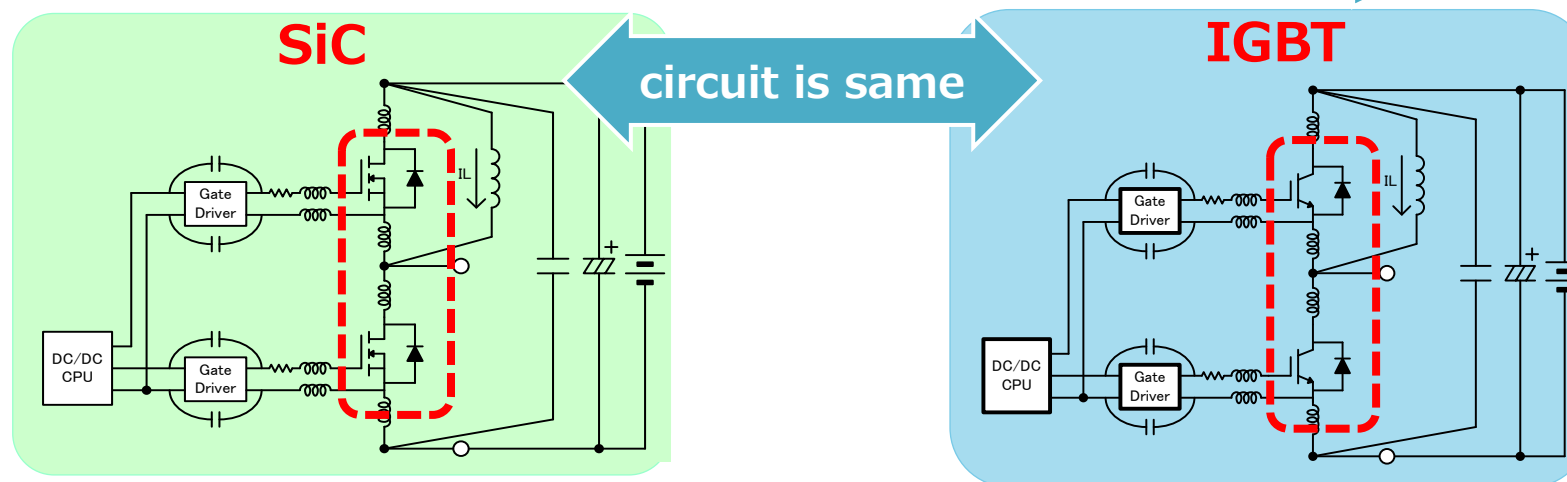
Robot

1. Solution Guide for Mitsubishi Electric NX type

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	200kHz (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



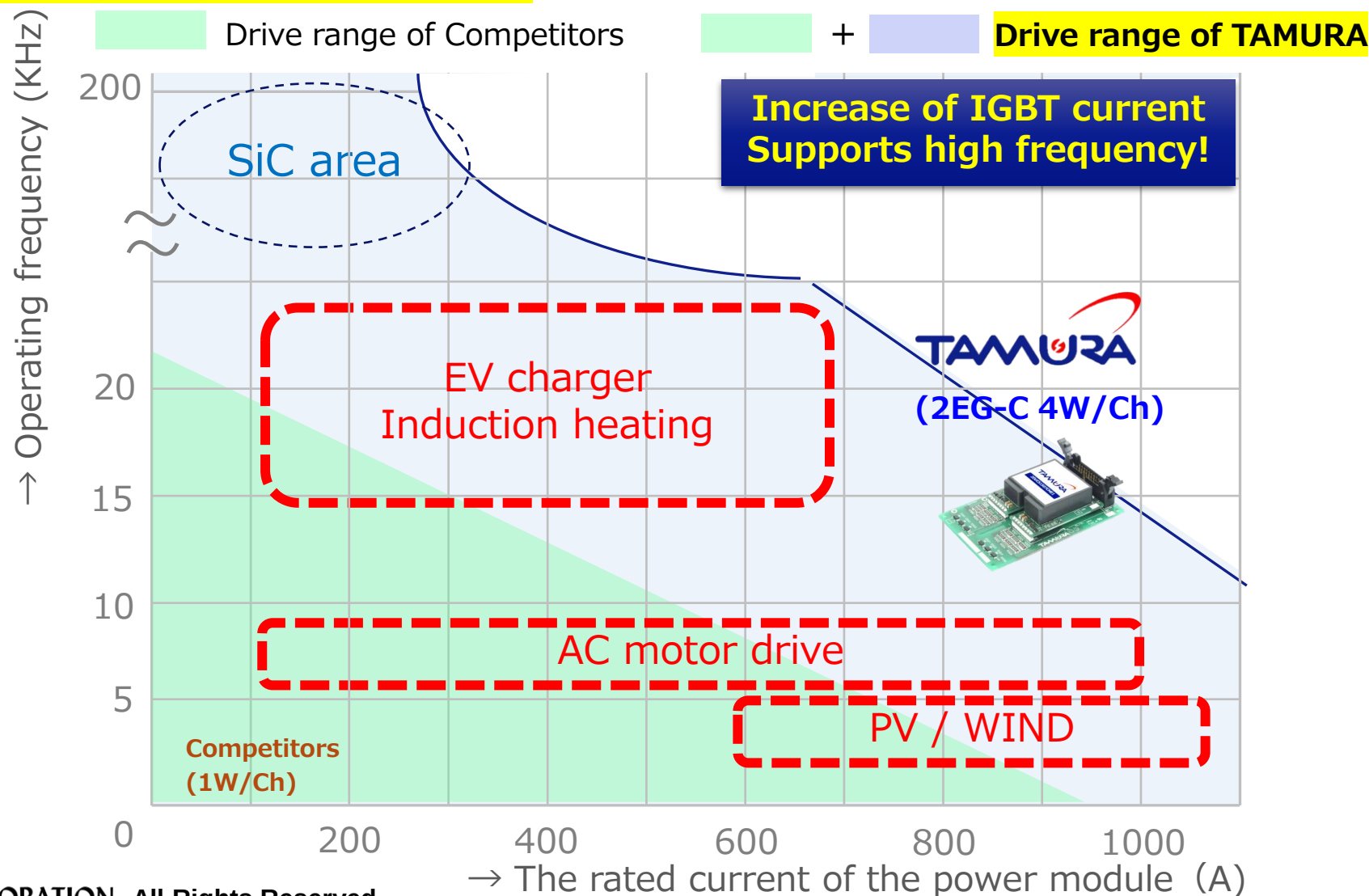
Item	TAMURA	Company A
Power module	SiC-MOSFET/IGBT	IGBT
Input Voltage	13-28V	15V
Output Voltage	15V/-10V	15V/-10V
Output power	○ 4W	1W
Frequency	○ 200kHz (Max)	20kHz (Max)
Output Peak current	○ 43A	15A

Large drive capacity makes it ideal for large capacity IGBTs!

1. Solution Guide for Mitsubishi Electric NX type

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

Switching frequency range (image)



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1-7 Feature of Tamura gate driver

IGBT:CM800DX-24T1 (Mitsubishi Electric)

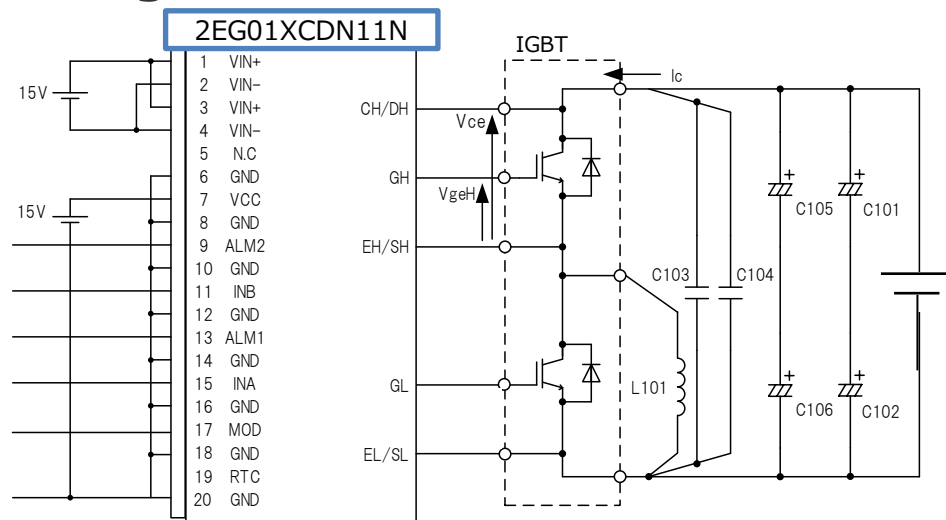
2EG01XCDN11N Switching Test Data



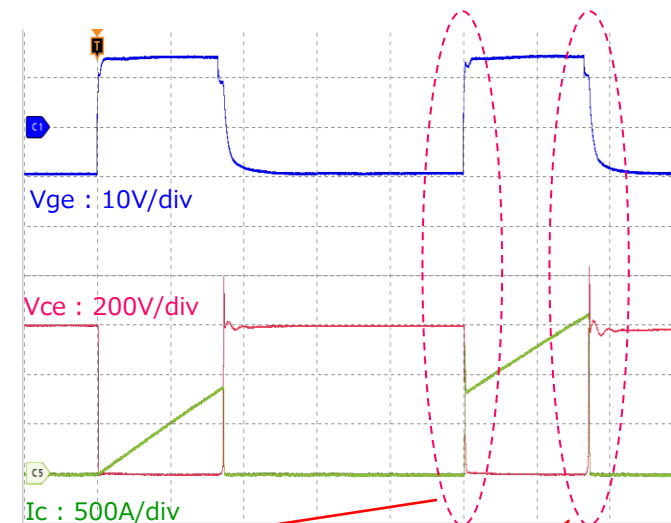
1. Solution Guide for Mitsubishi Electric NX type

1-7 Single drive solution /2 Pulse test

DC Link : 600V, Ron : 1Ω, Roff : 10Ω, Upper arm, Tj=150°C

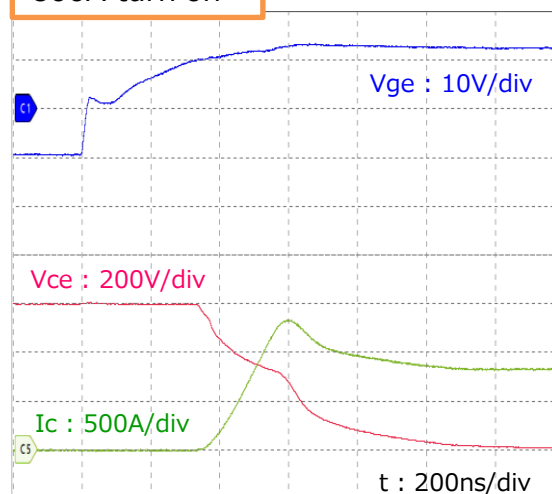


IGBT : CM800DX-24T1 (Mitsubishi)
C101,102,105,106 : 2700uF (Ls : 20nH)
C103,104: 4.7uF (Ls : 20nH)
L101: 22uH



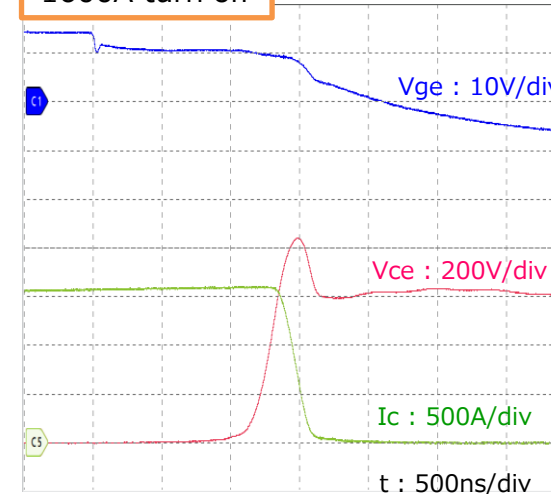
High temp test

800A turn on



Item	Measurement value	
DC Link	600	V
Ic	800	A
dV/dt	2.2	kV/us
di/dt	7.2	kA/us
td(on)	0.37	us
tr	0.14	us
Eon	99	mJ

1600A turn off

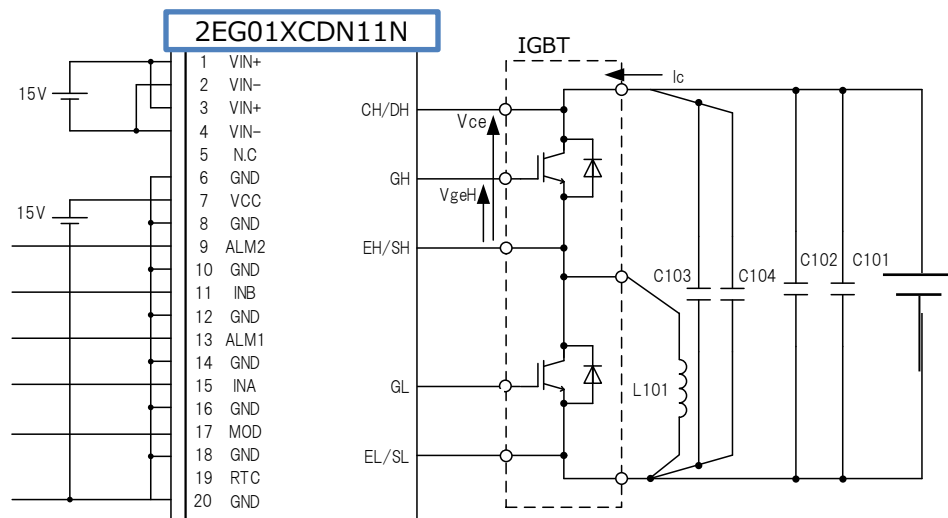


Item	Measurement value	
DC Link	600	V
Ic	1600	A
Vcep	838	V
dV/dt	3.4	kV/us
di/dt	8.4	kA/us
td(off)	1.38	us
tf	0.19	us
Eoff	261	mJ

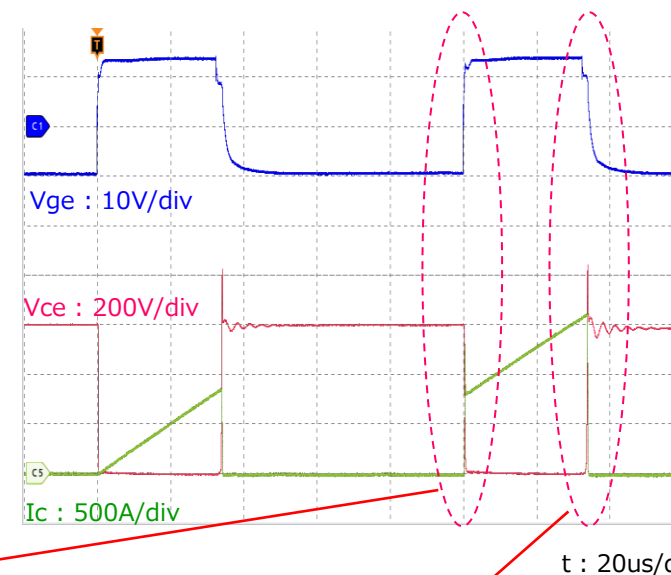
1. Solution Guide for Mitsubishi Electric NX type

1-7 Single drive solution /2 Pulse test

DC Link : 600V, Ron : 1Ω, Roff : 10Ω, Upper arm, Tj = -40°C

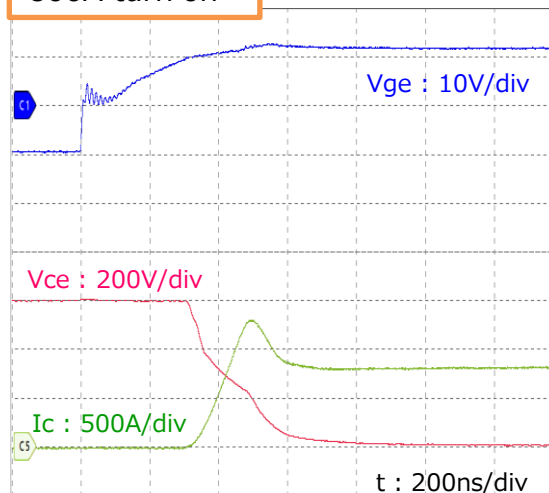


IGBT : CM800DX-24T1 (Mitsubishi)
C101,102 : 1500uF (Ls : 50nH)
C103,104 : 4.7uF (Ls : 20nH)
L101: 22uH



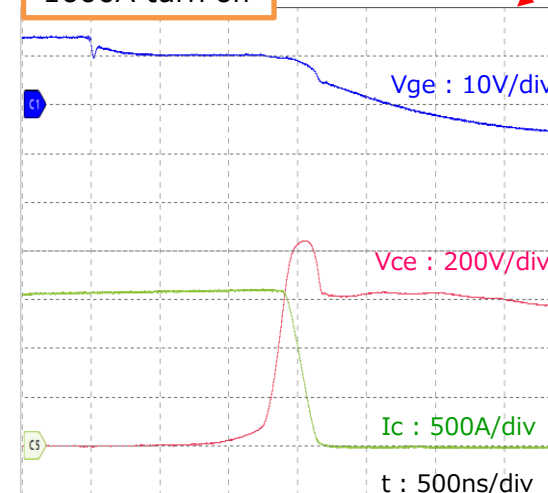
Low temp test

800A turn on



Item	Measurement value	
DC Link	600	V
Ic	800	A
dV/dt	3.2	kV/us
di/dt	8.9	kA/us
td(on)	0.33	us
tr	0.08	us
Eon	46	mJ

1600A turn off



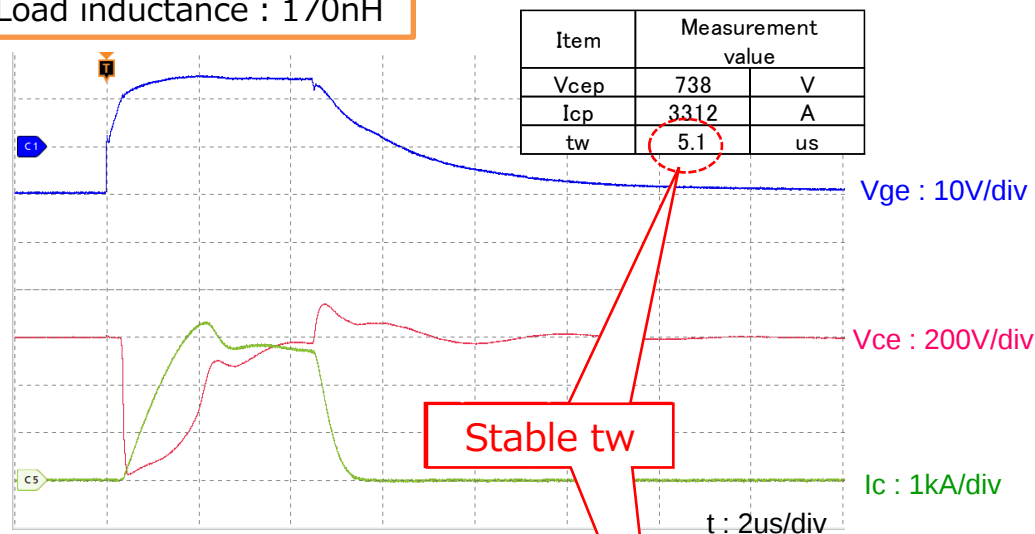
Item	Measurement value	
DC Link	600	V
Ic	1600	A
Vcep	840	V
dV/dt	4.3	kV/us
di/dt	8.0	kA/us
td(off)	1.45	us
tf	0.18	us
Eoff	236	mJ

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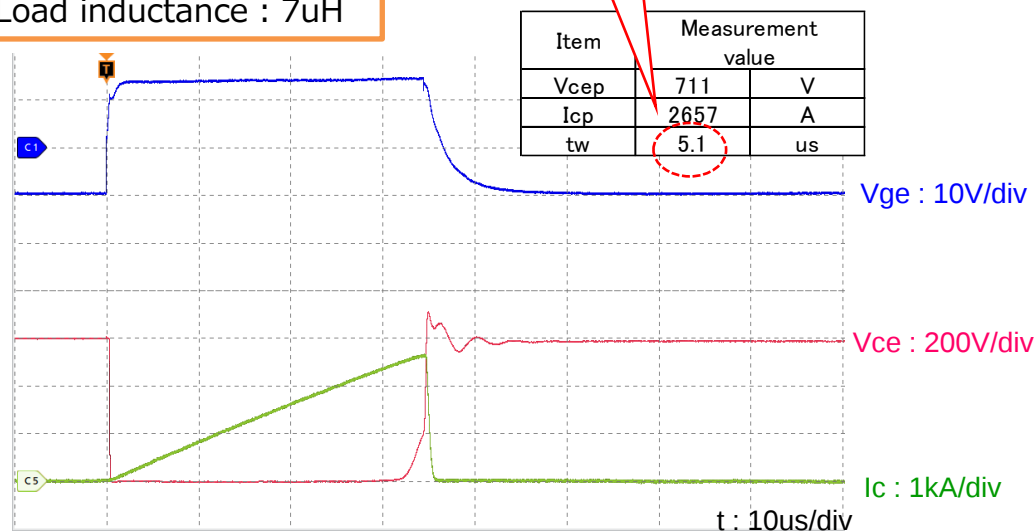
1-7 Single drive solution/Arm short circuit

DC Link : 600V, Ron : 1Ω, Roff : 10Ω, Upper arm, Tj=150℃

Load inductance : 170nH

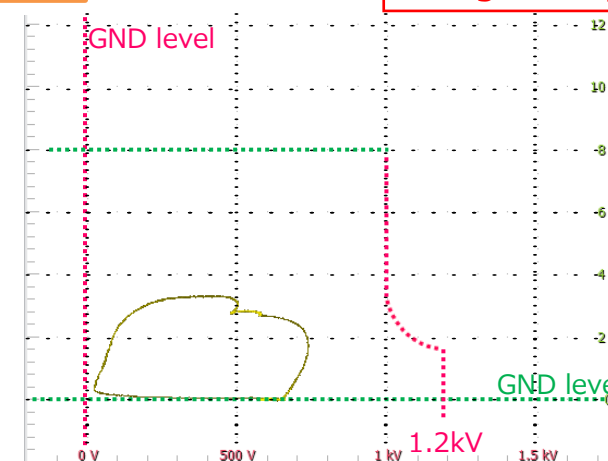


Load inductance : 7uH

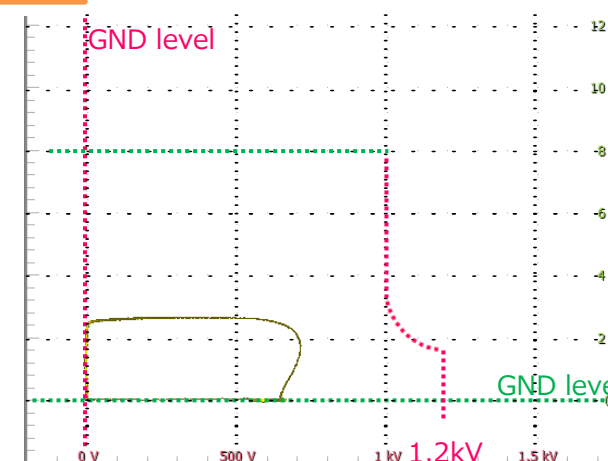


SOA

High temp test



SOA

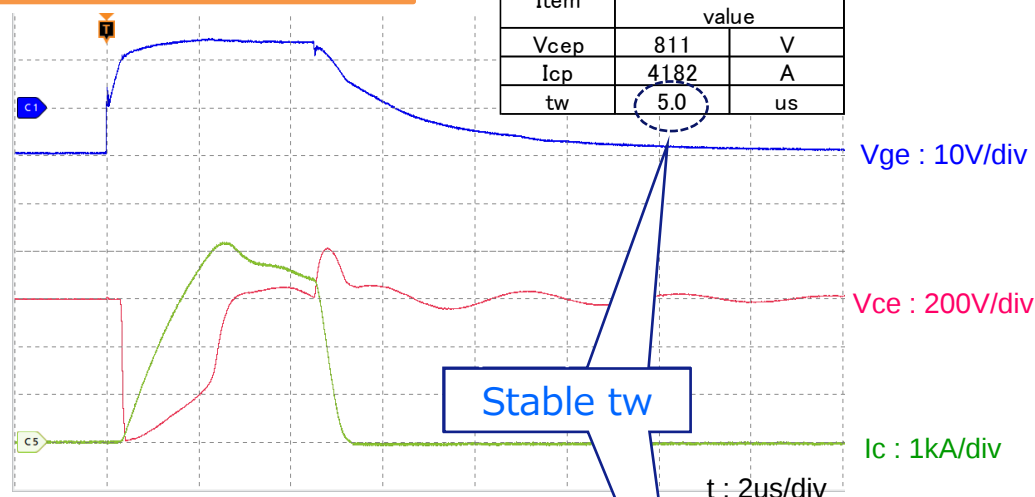


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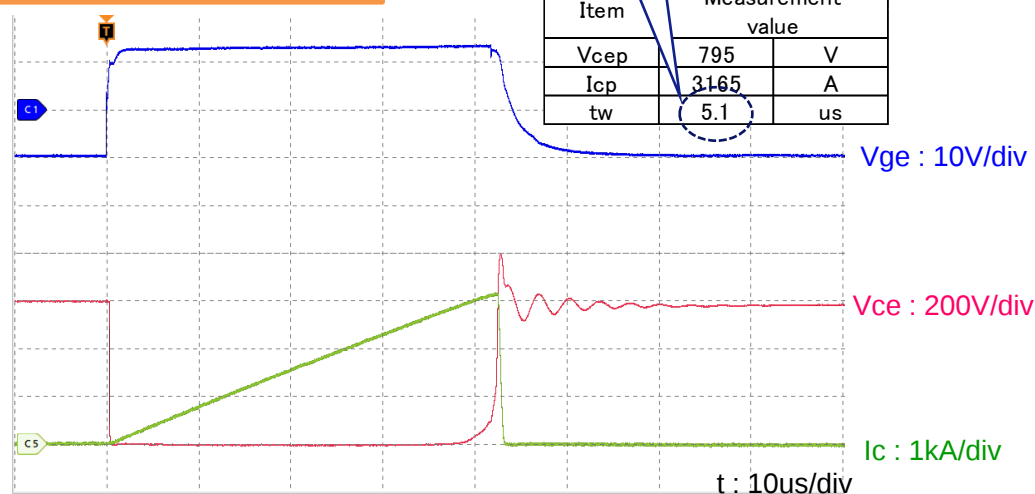
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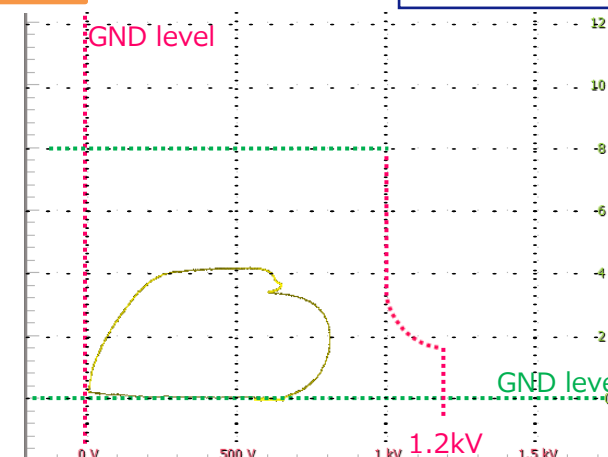
Load inductance : 170nH



Load inductance : 7uH

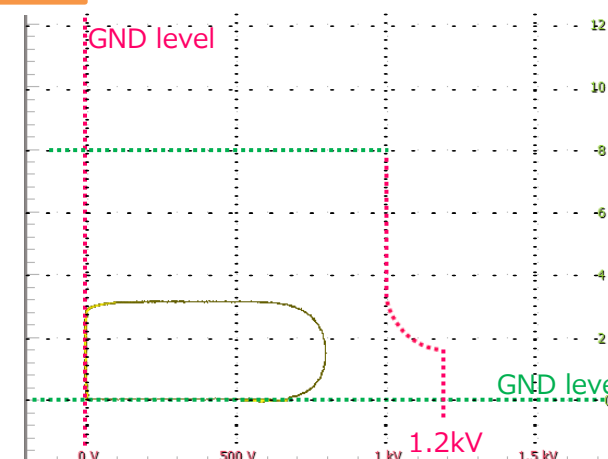


SOA



Low temp test

SOA

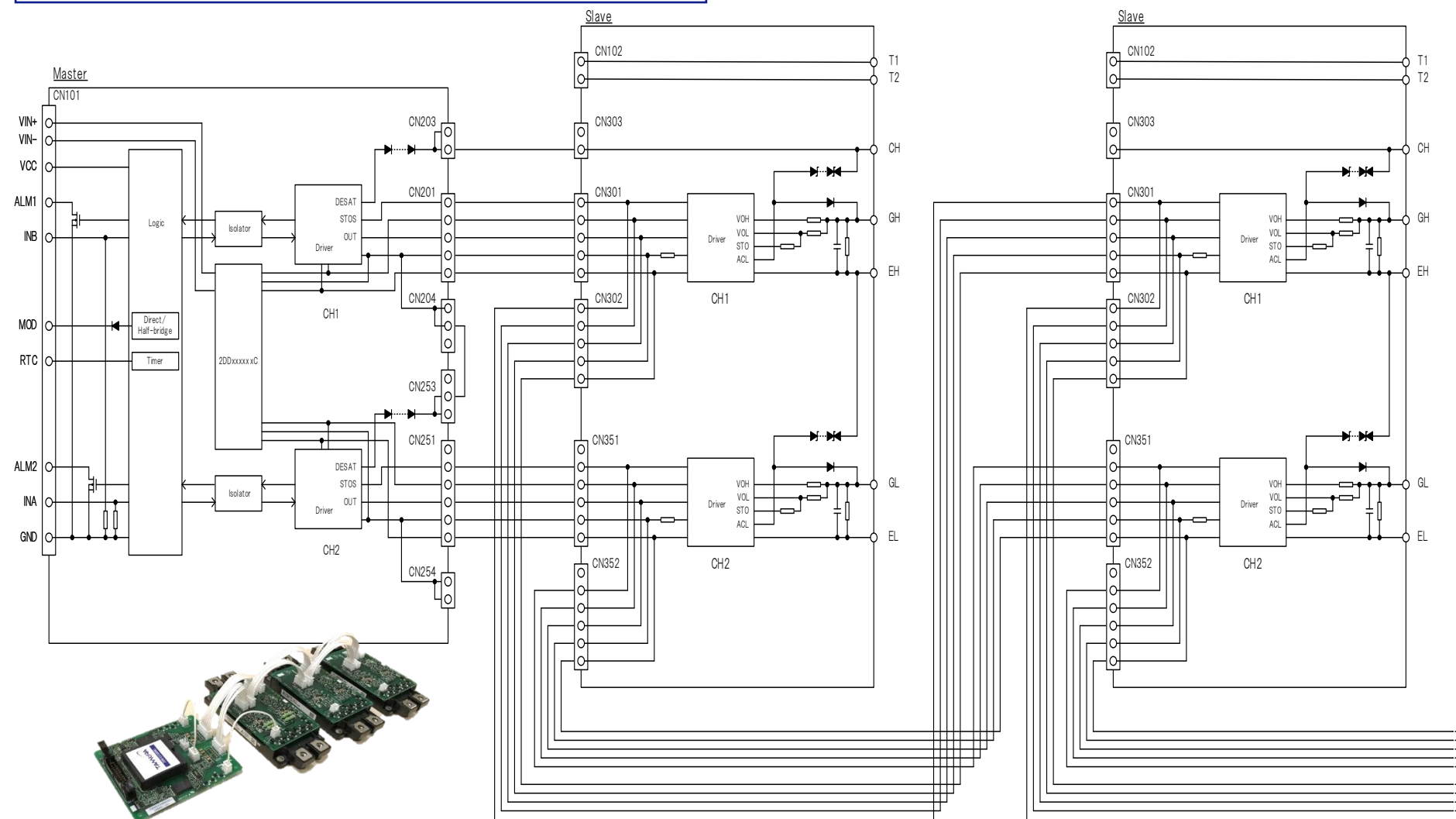


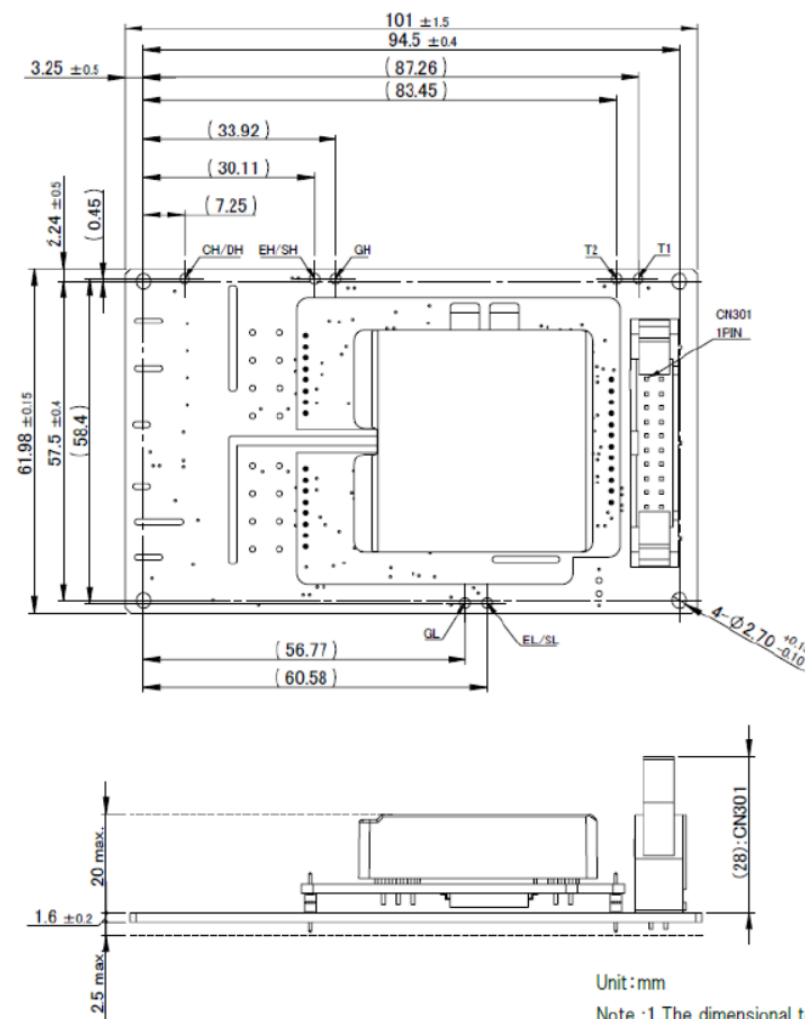
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1-8 Application example (parallel drive configuration)

Connection diagram in parallel drive

Please contact us if you are interested !





1. Solution Guide for Mitsubishi Electric NX type

1-9 Products appearance and line-up

*1 Catalog products. Please confirm stock.

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

Package	Output power (Ref.)	Ic	Part No	TAMURA Driver			
				2EG-C / D	2CG-B/2CG-D	2DD	
				Vce = 1200V			
	30kW	225	CM225DX-24T1		2EG01XCCN11N *1 2EG01XCDN11N *1 2EG??zyxN11N - ?? *2	2CG010BBC11N (+15/-10V) Soft turn off ----- 2CG010DBC11N (+15/-10V) Soft turn off +Active clamp 	2DD151008C (+15V/-10V) 
			CM225DX-24T				
	50kW	300	CM300DX-24T1				
			CM300DX-24T				
	100kW	450	CM450DX-24T1				
			CM450DX-24T				
	125kW	600	CM600DX-24T1				
			CM600DX-24T				
	150kW	900	CM800DX-24T1				
	TBC	225	CM225DX-34T		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	CM300DX-34T				
		450	CM450DX-34T				
		600	CM600DX-34T				

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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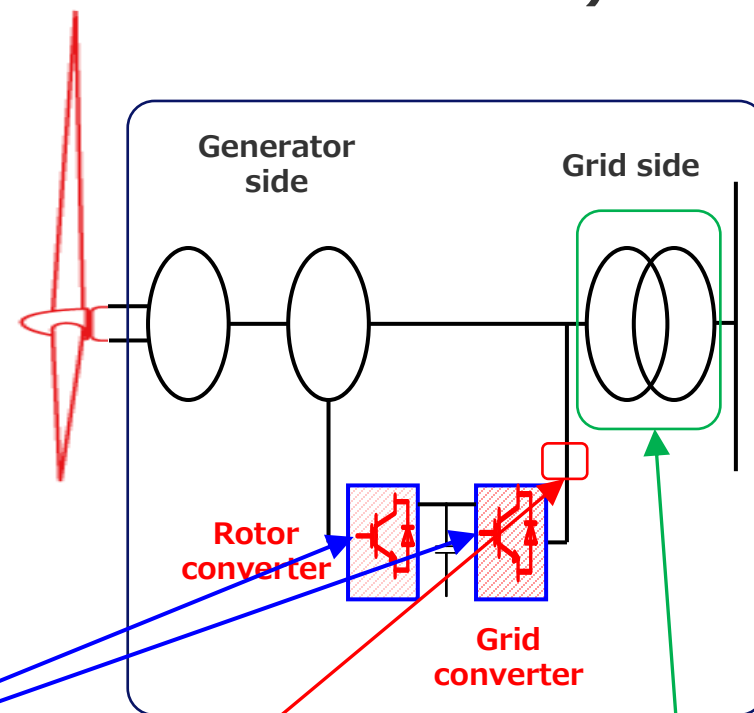
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2) Introduction of One Tamura

Appendix) Contact person

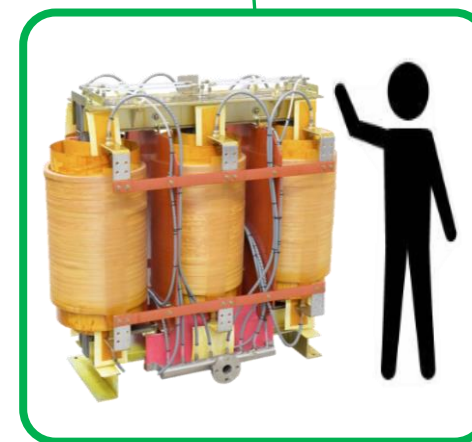
2) Introduction of One Tamura (Wind Power converters)



Gate Driver Unit



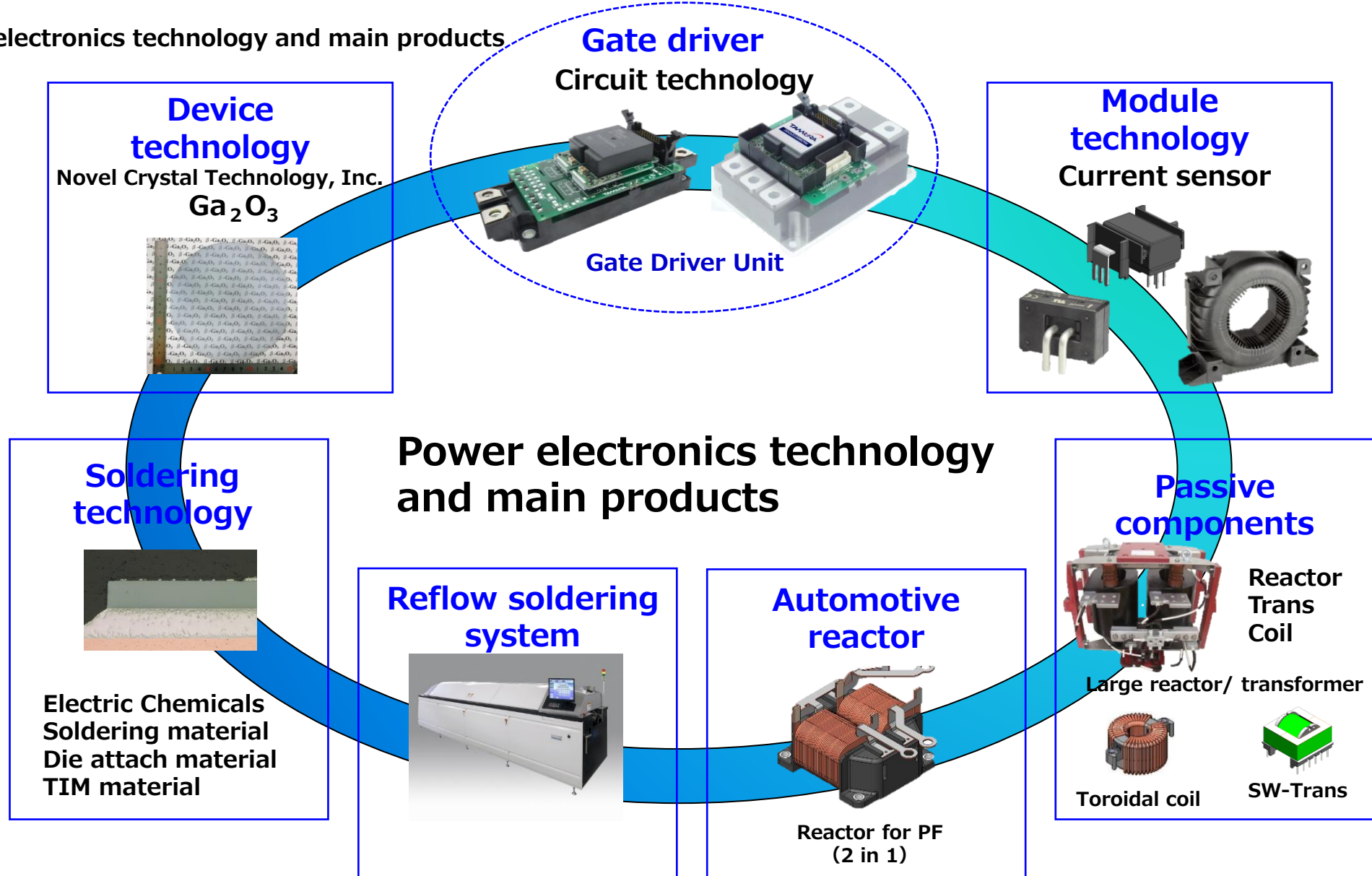
Current sensor



Reactor

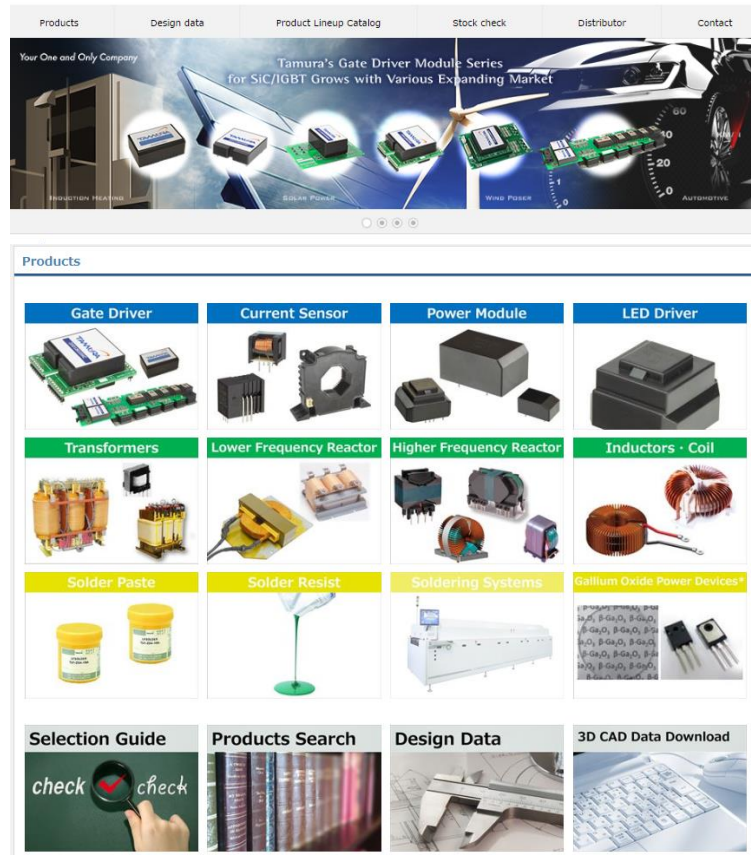
2) Introduction of One Tamura (General application)

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/>