



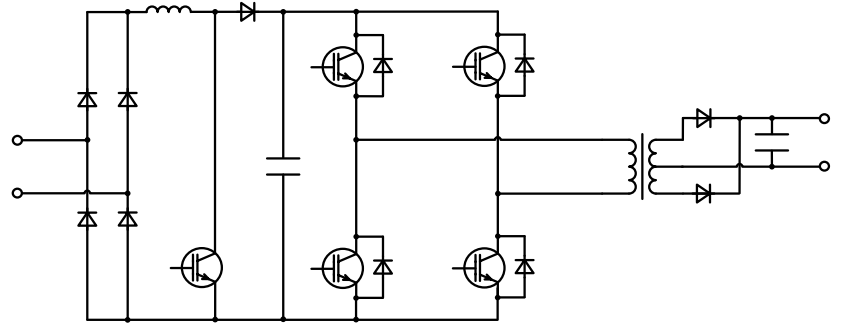
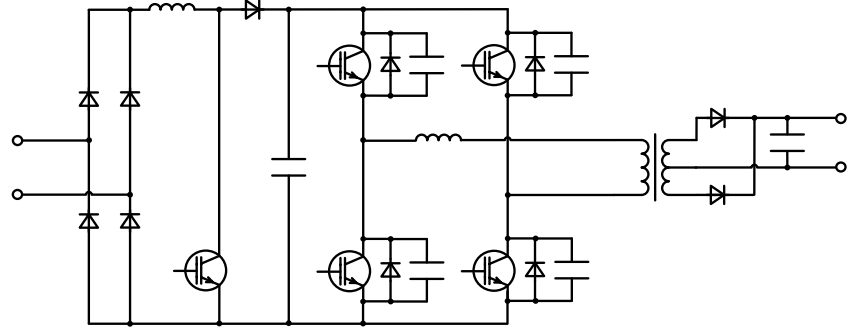
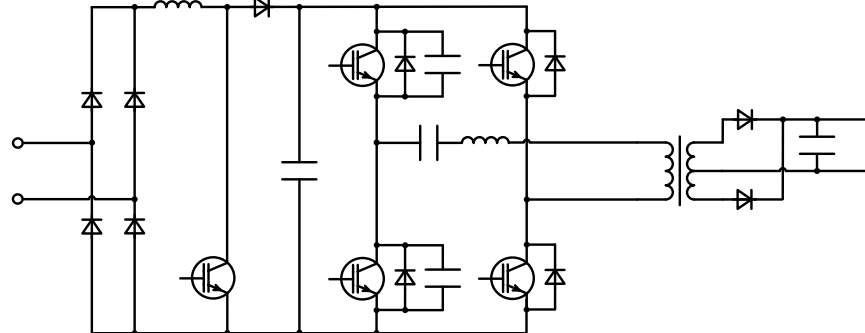
Fuji IGBT Modules for Welding machine

2022.10

Device Application Technology Dept.
Sales Division
Semiconductors Business Group

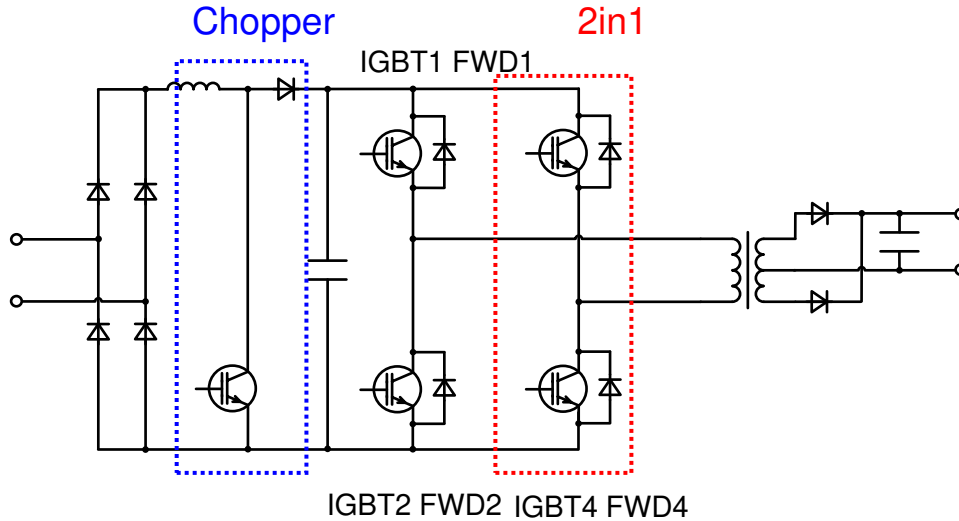
- **Topology in Welding machine**
- Fuji's solutions for Welding machine
- Introduction of Gate Driver Unit (GDU)

Topology in Welding machine

	Topology (example)	Feature
<p>Hard switching type</p>		<ul style="list-style-type: none"> • Duty control method • IGBT: small turn on and large turn off loss • FWD: small reverse recovery loss
<p>Soft switching type (ZVS)</p>		<ul style="list-style-type: none"> • IGBT: zero voltage switching at turn on, and hard switching at turn off. • FWD: small reverse recovery loss
<p>Soft switching Type (ZVZCS)</p>		<ul style="list-style-type: none"> • IGBT: zero voltage zero current switching at turn on, and hard switching at turn off. • FWD: small reverse recovery loss

Topology in Welding machine

■ Topology (Hard switching type)



-Chopper Module:

1MBI200HH-120L-50
1MBI300HH-120L-50
1MBI400HH-120L-50

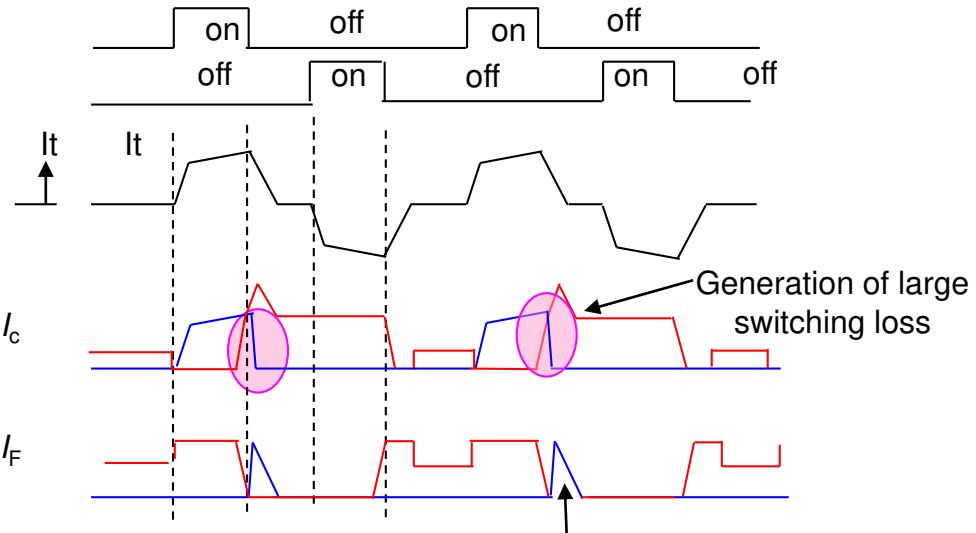
-H bridge (2in1)

2MBI100HB-120-50
2MBI200HH-120-50
2MBI300HH-120-50

■ Feature :

- Duty control method
- IGBT: small turn on and large turn off loss (high speed IGBT is necessary.)
- FWD: small reverse recovery loss (high speed diode in 2in1 module is not necessary.)

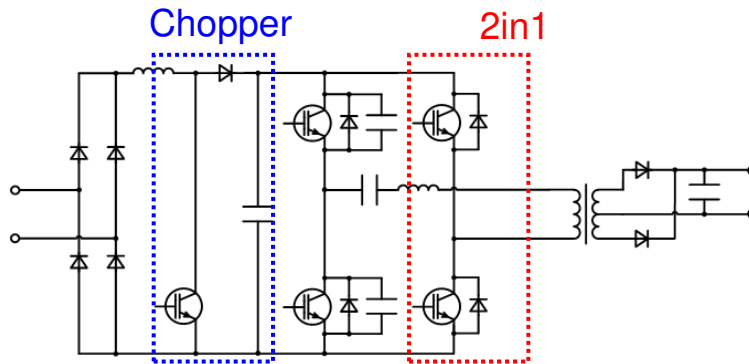
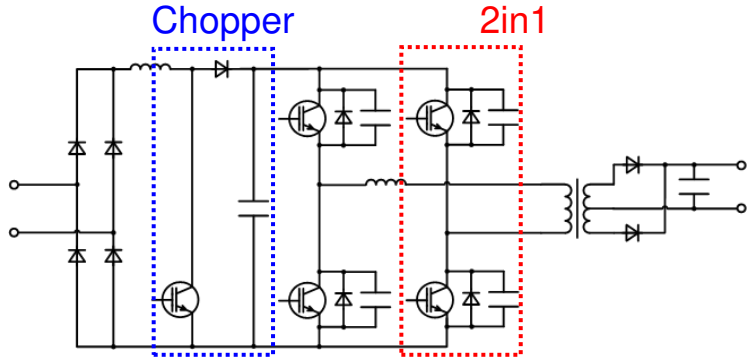
IGBT1 gate
IGBT4 gate



FWD current is small and it is only leakage inductance energy.

Topology in Welding machine

■ Topology (Soft switching type)



■ Feature :

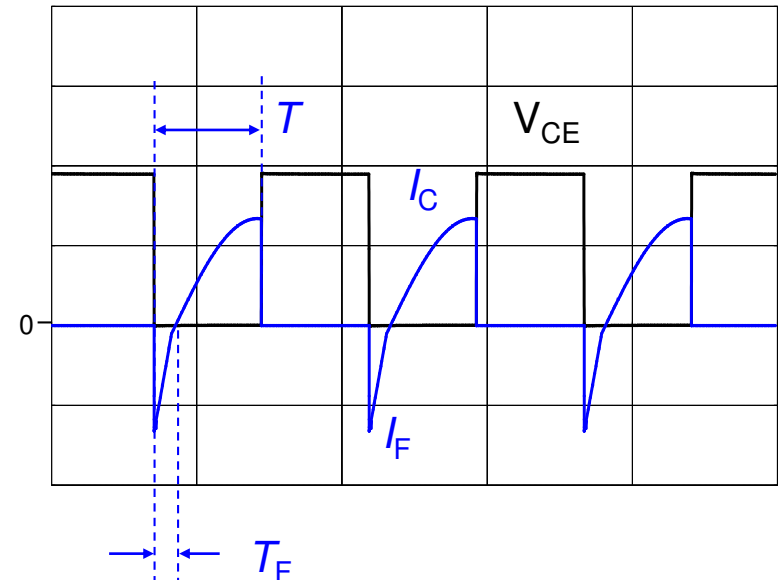
- IGBT: zero voltage switching at turn on, and hard switching at turn off. (high speed IGBT is necessary.)
- FWD: small reverse recovery loss (high speed diode in 2in1 module is not necessary.)

• Chopper Module:

- 1MBI200HH-120L-50
- 1MBI300HH-120L-50
- 1MBI400HH-120L-50





• H bridge (2in1)

- 2MBI100HB-120-50
- 2MBI200HH-120-50
- 2MBI300HH-120-50




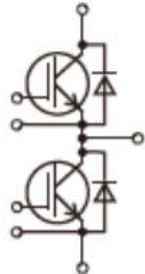

- Topology in Welding machine
- **Fuji's solutions for Welding machine**
- Introduction of Gate Driver Unit (GDU)

Fuji Discrete IGBTs for Welding machine – XS series


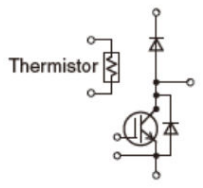
	Device type※1	Current	Voltage	Package	Equivalent circuit
XS series	FGW**XS65C	30A 40A 50A 75A	650V	TO-247 	
	FGW**XS65D	50A 75A	650V		
	FGW**XS120C	40A 75A	1200V		
	FGZ75XS65C	75A	650V	TO-247-4 	

※1 “**” is rated current.

Fuji IGBT modules for Welding machine – 2in1, Chopper

	Device type ^{※1}	Current	Voltage	Package	Equivalent circuit
2in1	2MBI100HB-120-50	100A	1200V	M233:92 x 45 x 30 	
	2MBI**HH-120-50	150A 200A	1200V	M249:108 x 62 x 30 	

※1 “**” is rated current.

	Device type ^{※1}	Current	Voltage	Package	Equivalent circuit
Chopper	1MBI**HH-120L-50	200A 300A 400A	1200V	M249:108 x 62 x 30 	

※1 “**” is rated current.

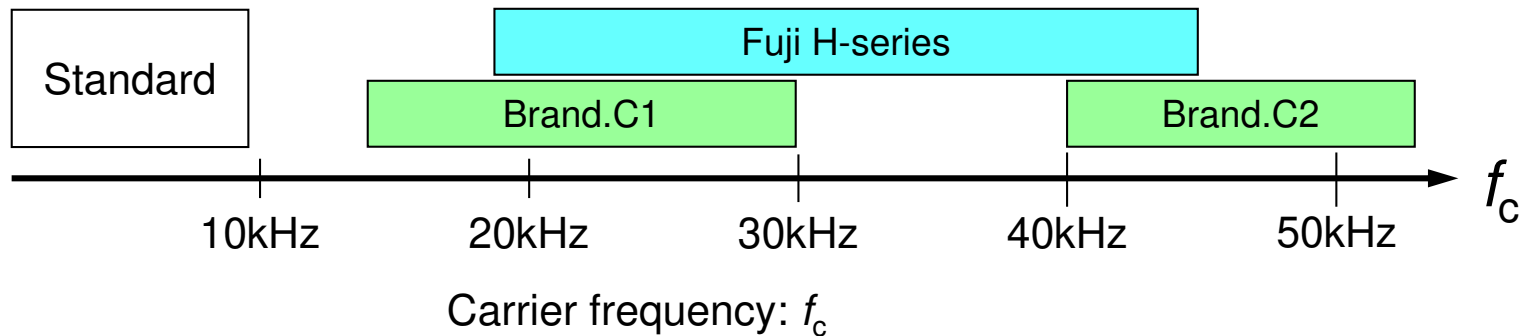
● High performance for high carrier frequency application

◆ Optimized design for $f_c = 20 \sim 50\text{kHz}$

Lower switching loss, lower surge voltage

◆ Low thermal impedance package

New Si_3N_4 -DCB substrate, RoHS package



● 2in1 module and Chopper module lineup

◆ 2in1 module: 1200V / 100A ~ 200A

◆ Chopper module: 1200V / 200A ~ 400A with NTC

Fuji IGBT modules for Welding machine

1/2 half-bridge - 2in1 module ※only for soft turn on
High-speed IGBT + Standard, small FWD

2MBI100HB-120-50 (1200V/100A Pkg: M233)

2MBI150HH-120-50 (1200V/150A Pkg: M249)

2MBI200HH-120-50 (1200V/200A Pkg: M249)

PFC – Chopper module + NTC

High-speed IGBT + High speed diode + NTC

1MBI200HH-120L-50 (1200V/200A Pkg: M249)

1MBI300HH-120L-50 (1200V/300A Pkg: M249)

1MBI400HH-120L-50 (1200V/400A Pkg: M249)

RoHS, SiN-DBC

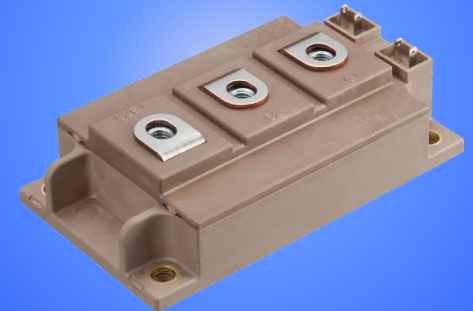
M233

Size:92 x 45 x 30 mm



M249

Size:108 x 62 x 30 mm



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I_C rating (A)	IGBT part No.	Driver part No.
100	2MBI100HB-120-50	2CG010BBC11N 2CG010DBC11N
150	2MBI150HH-120-50	
200	2MBI200HH-120-50	



I_C rating (A)	IGBT part No.	Driver part No.
100	2MBI100HB-120-50	VLA513, VLA502
150	2MBI150HH-120-50	
200	2MBI200HH-120-50	
200	1MBI200HH-120L-50	
300	1MBI300HH-120L-50	
400	1MBI400HH-120L-50	



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