Fuji Electric

X series 7G

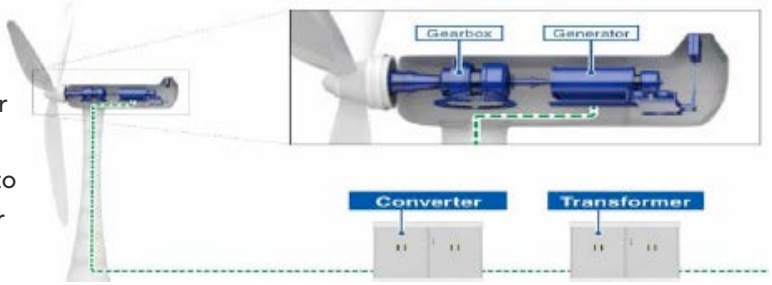
Reach the PINNACLE of **Performance** and **Reliability**

Wind Power Generation

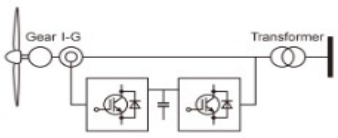
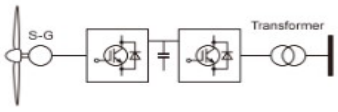
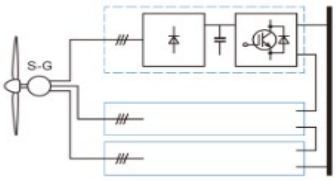
Wind Turbines convert mechanical energy generated by wind into electrical energy creating an alternative power source for cities. Wind Turbines are expanding globally as a clean, sustainable, and environmentally-friendly method of power generation contributing to a more renewable energy future. Fuji Electric's semiconductors play a crucial role in the energy conversion process transforming wind energy to easily usable electrical energy to generate renewable & sustainable power globally.

As wind turbines with increased blade lengths raise the amount of power generated, wind turbines are now becoming a mainstream source of power generation; now more than ever efficient energy conversion is critical to optimize the AC power generated by wind turbines. In most cases the AC is first converted into DC and subsequently converted back into AC to ensure the frequency and phase are coincident with the power grid.

Fuji Electric IGBT modules are used in large capacity converter and inverter systems to support wind turbine efficiency. Our state-of-the-art, high-quality IGBT technology is a key component in the optimization and performance of (DC-AC) converters as well as (AC-AC) inverters by their high-efficiency and high-reliability operation. Additionally, Fuji Electric's 7th generation IGBT semiconductors support 175 ◦ C maximum continuous operating junction temperatures (Tjop) further ensuring a higher level of performance and years of service



Wind Power Generation Configuration

Topology	Double	Direct	Direct + Multi-Level
Configuration			
Efficiency	89%	90%	93%
Cost	100%	98-100%	90-95%
Quality	Low	High	High
Gear Box	Need	Do Not Need	Do Not Need
Step Up Transformer	Need	Need	Do Not Need
Generator	Induction	Synchronous	Synchronous + Multi-winding
Converter Capacity	15 - 30%	100%	100%
IGBT	1700V / 450A-1000A	1700V / 1000A-3600A	3300V / 150A-400A

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Wind Power Generation IGBT Modules

IGBT modules proposal for Double fed system.

Wind Power Converter	Package	Rotor Side			Grid Side		
		IGBT Module		Number of Parallels	IGBT Module		Number of Parallels
		V Series	X Series		V Series	X Series	
1.5MW	Dual XT	2MBI450VN-170-50	2MBI450XNA170-50	6	2MBI450VN-170-50	2MBI450XNA170-50	3
		-	2MBI600XNG170-50	4	-	2MBI600XNG170-50	2
	PrimePACK™	2MBI1000VXB-170E-50	2MBI1000XXB170-50	3	2MBI1000VXB-170E-50	2MBI1000XXB170-50	1
		2MBI1400VXB-170P-50	2NBI400XXB170-50	2	2MBI1400VXB-170P-50	2NBI1400XXB170-50	1
		-	2MBI1800XXF170-50	1	-	2MBI1800XXF170-50	1
		-	2MBI1800XXG170-50	1	-	2MBI1800XXG170-50	1
	HPM	1MBI1600VC-170E	-	2	1MBI1600VC-170E	-	1
2.0MW	Dual XT	2MBI450VN-170-50	2MBI450XNA170-50	8	2MBI450VN-170-50	2MBI450XNA170-50	1
		-	2MBI600XNG170-50	6	-	2MBI600XNG170-50	4
	PrimePACK™	2MBI1000VXB-170E-50	2MBI1000XXB170-50	4	2MBI1000VXB-170E-50	2MBI1000XXB170-50	3
		2MBI1400VXB-170P-50	2NBI1400XXB170-50	3	2MBI1400VXB-170P-50	2NBI1400XXB170-50	2
		-	2MBI1800XXF170-50	1	-	2MBI1800XXF170-50	2
		-	2MBI1800XXG170-50	1	-	2MBI1800XXG170-50	1
	HPM	1MBI2400VC-170E	-	2	1MBI2400VC-170E	-	1
		1MBI2400VD-170E	-	2			1

Direct Drive System

IGBT modules proposal for Direct drive system.

Wind Power Converter	Package	Rotor Side			Grid Side		
		IGBT Module		Number of Parallels	IGBT Module		Number of Parallels
		V Series	X Series		V Series	X Series	
1.5MW	PrimePACK™	2MBI100VXB-170E-50	2MBI1000XXB170-50	3	2MBI1000VXB-170E-50	2MBI1000XXB170-50	2
		2MBI140VXB-170E-50	2MBI400XXB170-50	2	2MBI1400VXB-170E-50	2NBI1400XXB170-50	2
		-	2MBI1800XXB170-50	1	-	2MBI1800XXF170-50	-
		-	2MBI1800XXF170-50	1	-	2MBI1000XXG170-50	-
	HPM	1MBI1200VC-170E	-	2	1MBI1600VC-170E-50	-	1
		1MBI2400VC-170E	-	1	1MBI2400VC-170E-50	-	1
		1MBI2400VD-170E	-	1	1MBI2400VD-170E-50	-	1
2.0MW	PrimePACK™	2MBI1000VXB-170E-50	2MBI1000XXB170-50	3	2MBI1000VXB-170E-50	2MBI1000XXB170-50	3
		2MBI1400VXB-170E-50	2NBI1400XXB170-50	3	2MBI1400VXB-170E-50	2NBI1400XXB170-50	2
		-	2MBI1800XXF170-50	2	-	2MBI1800XXF170-50	1
		-	2MBI1800XXG170-50	1	-	2MBI1800XXG170-50	1
	HPM	1MBI2400VC-170E	-	1	1MBI1600VC-170E	-	1
		1MBI2400VD-170E	-	1			1

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