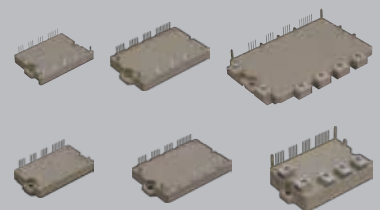


High-Performance Power Module for the New Era

Since 1988, Fuji Electric has continuously innovated technologies to achieve miniaturization, low loss and high reliability in its IGBT modules for power semiconductors. For example, we have been commercializing IPMs that incorporate drive and protection functions on a single IGBT module and were the first in the industry to also integrate IGBT chip overhear protection and alarm factor identification functions. This has enabled our products to meet the market demand for higher performance and reliability. It is against this backdrop that we have recently released our 7th-generation X Series IGBT-IPM as a product that satisfies the need for smaller, more efficient and more reliable power conversion equipment.

- **Low loss:** Contributes to energy savings
Reduces power loss by at least 10% compared to V Series IPMs (1200 V, 75 A rating comparison)
- **Package miniaturization:** Helps reduce the size of equipment
Three new packages, P639, P644, and P638, are now available
Expands the current rating using the same package as V Series IPMs
- **High operating temperature:** $T_{vj} = 175^{\circ}\text{C}$
The chip junction temperature has been increased by 25°C . T_{vj} is now 175°C for instantaneous operation and T_{vjop} is 150°C for continuous operation.
- **Advanced functionality:** Comes with the industry's first temperature warning output function



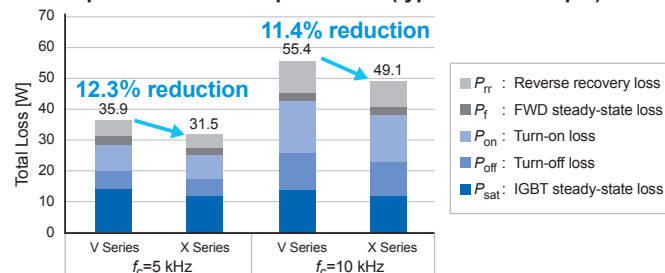
Application examples: General motion control, PCSs, elevators, air conditioners, etc.



1. Low loss

Our 7th-generation IGBT technology (miniaturized surface structure and optimized vertical structure) and gate control circuit technology (turn-on drive control function) have reduced generated loss by about 11% compared to conventional V Series IPMs. (1200 V, 75 A rating and $f_c = 10$ kHz comparison)

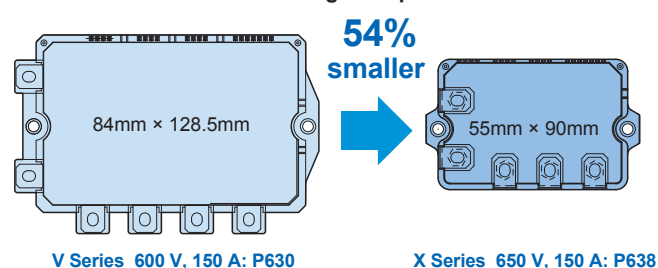
Comparison of inverter power loss (typical use example)



2. Miniaturization

We have added three new packages, P639, P644, and P638, to our lineup, expanding the lineup to eight packages of varying current ratings. The footprint of the P638 is 54% smaller than the P630, a conventional package with the same current capacity.

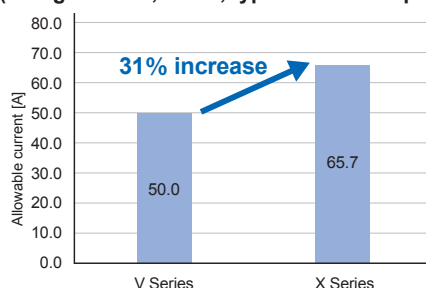
Package comparison



3. High-temperature operation

Compared to the V Series, the IGBT continuous-operation chip junction temperature T_{vjop} has been increased from 125°C to 150°C. Furthermore, the reduction in loss enables an increase in output current by about 31% compared to V Series IPMs.

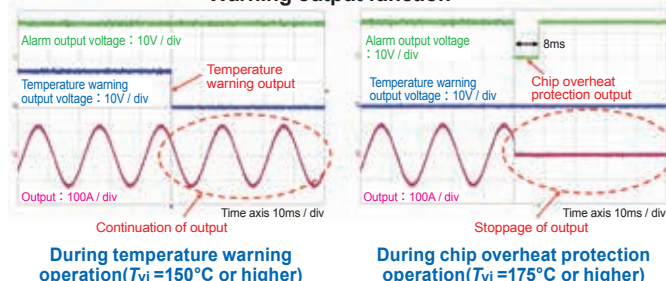
Inverter at continuous operation (rating of 650 V, 150 A, typical use example)



4. Enhanced functionality

In addition to the conventional chip overheat protection function, the X Series also comes with a temperature warning output function. This makes it possible to notify equipment of temperature abnormalities before shutdown occurs due to chip overheating. By monitoring the equipment's temperature warning signal, countermeasures can be taken against sudden equipment shutdown.

Warning output function



Product series (planned) 650 V/1200 V

Package	Size (mm)	10A	20A 25A	30A 35A	50A	75A	100A	150A	200A 225A	250A 300A	400A 450A
P639	26.0 x 43.0	1200V									
P629	49.5 x 70.0		650V								
P626	50.2 x 87.0		1200V		650V						
P644*	50.2 x 87.0		1200V		650V						
P636*	55.0 x 90.0				1200V		650V				
P638*	55.0 x 90.0				1200V	650V					
P630*	84.0 x 128.5					1200V	650V				
P631*	110.0 x 142.0							1200V	650V		

* Under development

⚠ Safety Precautions

- * Before using this product, read the "Instruction Manual" and "Specifications" carefully, and consult with the retailer from which you purchased this product as necessary to use this product correctly.
- * The product must be handled by a technician with the appropriate skills.

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