



7th Generation X series RC-IGBT

Modules for Industrial Applications



Power Conversion system has been continuously required to provide compact form factor, better efficiency, lower power dissipation, high reliability.

Fuji Electric introduced the 7th generation “X series” IGBT module “DualXT” which has reduced loss of 10% by improving the semiconductor chips – both IGBT and FWD – characteristics, has enhanced the package capability to carry higher current by a new structure, upgraded the ability to remove the heat in excess by using lower R_{th} materials, get better isolation performances by the use of new silicon gel, while guaranteeing a high reliability / ΔT_{vj} power cycling capability over the whole T_{vjop} continuous operation range up to 175 °C.

This permitted Fuji Electric to be the industry’s first “DualXT” module having 1200V/800A rating by using traditional IGBT+FWD solution and 1200V/1000A by using RC-IGBT chip.

FEATURES

- ▶ Chip structure is based on Fuji Electric’s actual X series
- ▶ Improved power cycle lifetime by reduced temperature ripple
- ▶ Solder and press-fit pin type available
- ▶ Significantly reduced power dissipation and T_{vj} during DC lock operation
- ▶ The i^2t capability of the DualXT X series RC-IGBT module is 3times higher compared to the conventional V series.
- ▶ IGBT region becomes buffer layer of heat during the FWD operation, which is the reason of high i^2t capability.

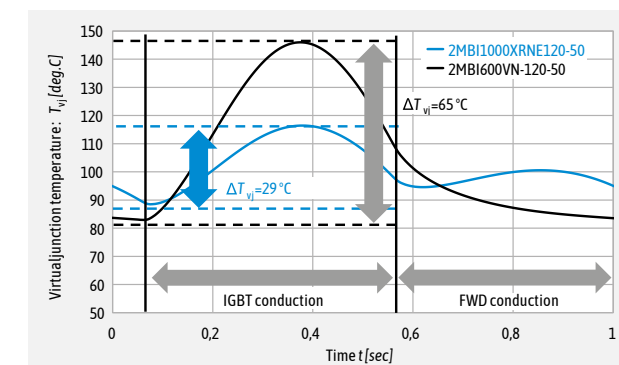
Advantages of RC-IGBT

- ▶ Total chip size reduction
 - Expansion of inverter output current with the same inverter size
- ▶ Chip temperature reduction
 - Lower $R_{th(j-c)}$ and reduction of temperature ripple



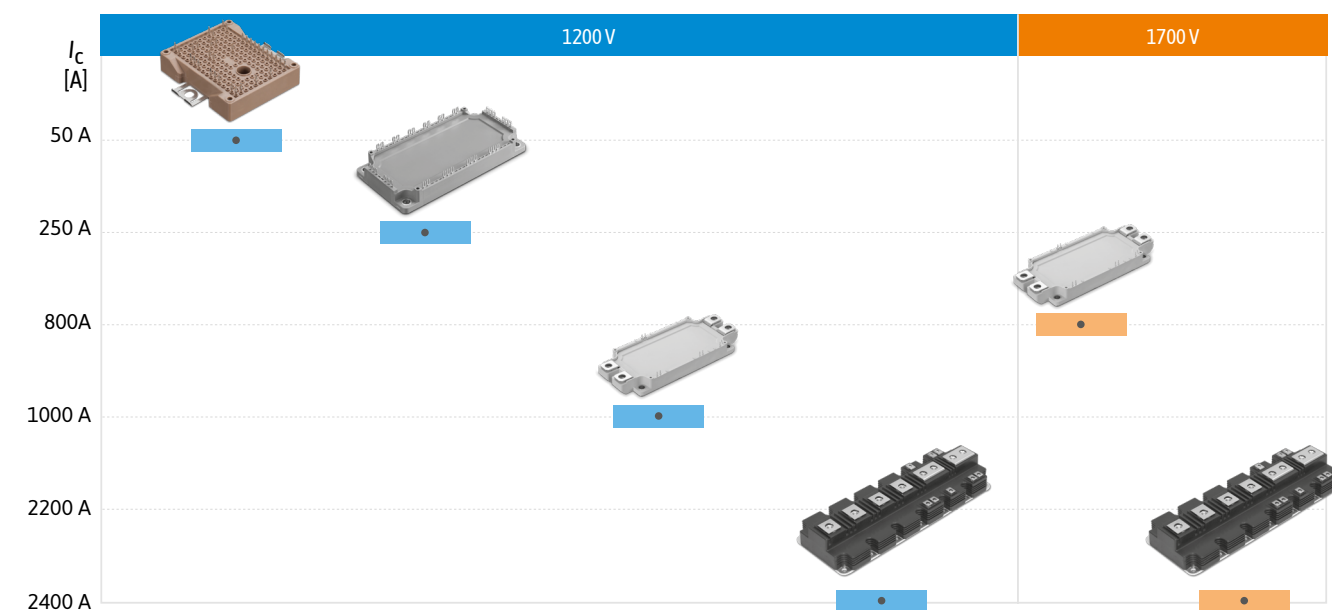
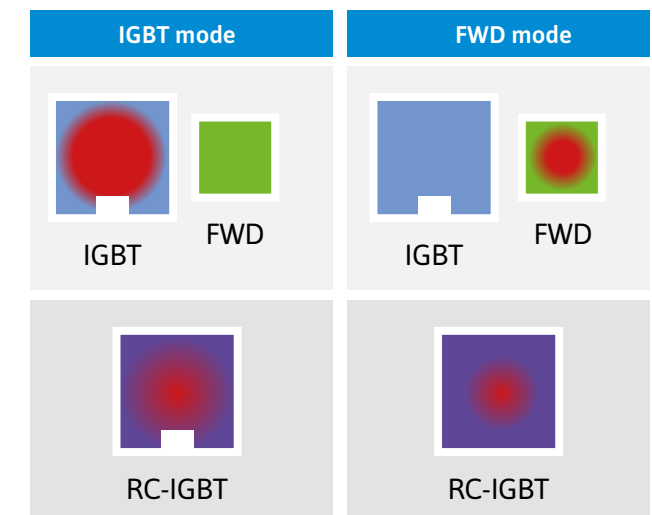
Basic structure of RC-IGBT based on the 7G IGBT/FWD technology (X series)

The implementation of the IGBT and the FWD on the same chip offers great benefits in thermal behavior of the chip and module.



- ▶ The output characteristics of X series RC-IGBT module DualXT has been significantly improved compared with V series IGBT module DualXT with maximum rated current 600A

RC-IGBT Chip and Circuit Diagram



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