

## 6<sup>th</sup> Generation IGBT Modules (NX-Series)

In 2007, Mitsubishi Electric already introduced the novel flexible NX package concept for a new IGBT line-up. Based on a unified package footprint (122 x 62mm) several terminal and circuit configurations can be produced. By using the same NX-package concept Mitsubishi Electric are now launching a completely new IGBT family using the latest 6<sup>th</sup> generation IGBT chips with advanced CSTBT<sup>TM</sup> (Carrier Stored Trench Gate Bipolar Transistor) technology and newly developed diode chips for an optimized loss performance.

For 1200V modules a  $V_{CE(sat)}$  value of 1.7V (typ.) at  $T_j = 125^\circ\text{C}$  and a wide SOA at  $V_{cc} = 900\text{V}$  are achieved. For 1700V modules:  $V_{CE(sat)} = 2.2\text{V}$  (typ.) at  $T_j = 125^\circ\text{C}$ , SOA at  $V_{cc} = 1200\text{V}$ . The newly developed fast recovery Free-Wheel Diode (FWDi) improves the trade-off between forward voltage ( $V_F$ ) and recovery switching loss  $E_{rec}$ .

With the new IGBT chip generation, more than 10 $\mu\text{s}$  short circuit capability and excellent paralleling characteristics can be obtained. A maximum junction temperature  $T_{j(max)} = 175^\circ\text{C}$  is achieved. The total power loss in sine-wave PWM inverter application is reduced by approx. 20% compared to 5<sup>th</sup> generation. Thus – compared to conventional products – the new 6<sup>th</sup> Generation NX-Series follows the demand for a higher efficiency in power conversion to save resources and energy.

Mitsubishi NX-Series IGBT modules feature a high power cycling capability (wire bond fatigue) and more than a tenfold better thermal cycling capability (solder fatigue) in comparison with the previous module technology. For thermal protection an isolated NTC thermistor is included in all standard NX-modules.

Multiple configuration options such as duals, six- and seven-packs and CIB (converter-inverter-brake) circuit configurations, ranging from 35A to 1000A at 1200V and 50A to 600A at 1700V are realized with two package footprints only: 122 x 62mm and 122 x 122mm. The new 6<sup>th</sup> Generation NX-Series IGBTs are ideally suited for general purpose inverters, servo control as well as photo-voltaic and fuel cell inverters with improved manufacturability, reduced development time, and lower cost.

All modules are entirely RoHS compliant and UL certified.

First samples of 1200V modules will be available in summer 2009. A 600V line-up is under preparation.

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