

New Family of Mega Power Dual IGBT Modules

To tie up with the success of the first line-up of Mega Power Dual (MPD) IGBT Modules, Mitsubishi Electric started the development of a new MPD family (1200V and 1700V) for industrial use with higher rated currents to meet the market request for higher power industrial equipments. Especially the fast growing renewable energy market like wind power generation needs larger system power. The new modules will be available for up to 2500A/1200V and 1800A/1700V avoiding paralleling and thus reducing the complexity of converter design as well as overall system cost.

The new MPD modules will use Mitsubishi Electric's latest 6th generation IGBT chips with CSTBT™ (Carrier Stored Trench Gate Bipolar Transistor) technology and newly developed diode chips for 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 $V_{cc} = 1200\text{V}$. A 25% total loss reduction in the inverter operation compared to 5th generation IGBT modules was achieved under the same dv/dt conditions. A maximum junction temperature of $T_{j(max)} = 175^\circ\text{C}$ is obtained with the new module generation.

In such high power applications usually liquid cooling is required. The chip layout of the new Mitsubishi MPD IGBT modules is especially designed for liquid cooling. A new solderless Al baseplate with direct-bonded insulation substrates was developed to improve the thermal impedance and to increase the temperature cycling capability. To achieve a better thermal contact between the large baseplate area and the cooling fin, the baseplate is divided into several sections.

Mitsubishi Electric was able to reduce the internal package inductance (Lint) to about 5nH from P to N for the package (size B) by using an internal four layer main terminal bus.

AC and DC main terminals are well separated for an easy DC-bus design. The signal terminals are located centrally on the package allowing easy mounting of the gate driver board directly on top of the module. Auxiliary C-terminals for SC-protection are available both for P- and N-side IGBTs. For thermal protection an isolated NTC is integrated.

All modules are entirely RoHS compliant.

The new Mega Power Dual IGBT family will be officially introduced by Mitsubishi Electric at PCIM 2009 (12 - 14 May 2009) in Nuremberg. First samples of the 1800A/1700V and the 2500A/1200V modules will be available in the fourth quarter of 2009. At a later stage Mitsubishi Electric also will offer versions rated 1100A/1700V and 1500A/1200V.

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