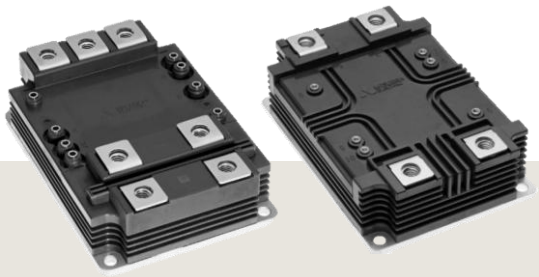
MITSUBISHI ELECTRIC
Changes for the Better



LV100 and HV100: High-Voltage Power Modules
One Standard. Endless Possibilities.

For high-reliability and demanding applications such as traction and heavy industry, the dual power modules in LV100 and HV100 packages enable robust, high-power-density inverter designs with outstanding reliability and performance. The portfolio covers the key voltage classes ranging from 1700 V up to 4500 V, supporting a wide range of systems. Parallel connection of modules is simplified through optimized terminal positioning and a symmetrical internal package structure, providing maximum design flexibility. For highest efficiency requirements and cutting-edge converter systems, both Full-SiC and Hybrid-SiC technologies are available within the same standardized package enabling a seamless transition toward higher efficiency and increased power density.

Product Advantages

- Availability of Si and SiC technology in same package
- Power loss reduction by latest generation chipsets
- Optimized packaging technology with low parasitic inductance and thermal resistance contribute to high energy efficiency and high power density
- LV100 and HV100 modules have a common package footprint
- Highest Reliability and Robustness for critical applications
- Simple, standardized connections allow an optimal system design and easy scalability

Package Type	Circuit Diagram	1700V	3300V	4500V
LV100 V_{iso} = 6kV	Half-Bridge		FMF800DC-66BEW$^{\Delta}$ Unifull™+ 800A FMF400DC-66BEW Unifull™+ 400A FMF200DC-66BE Unifull™+ 200A	
	Half-Bridge	Full SiC	FMF750DC-66A/-66A-1$^{\Delta}$ 750A FMF375DC-66A 375A FMF185DC-66A 185A	
	Chopper		FMF800E1C-66BEW Unifull™+ 800A	
	Chopper		FMF800E3C-66BEW Unifull™+ 800A	Hybrid SiC
	Half-Bridge		CMH600DC-66X$^{\Delta}$ 600A	
	Half-Bridge	CM1200DA-34X$^{\Delta}$ 1200A	CM600DA-66X$^{\Delta}$ 600A CM450DA-66X$^{\Delta}$ 450A	
	Chopper	Si	CM600E1A-66X 600A	
HV100 V_{iso} = 10.2kV	Half-Bridge		CM600DE-66X 600A CM450DE-66X 450A	CM450DE-90X 450A

$^{\Delta}$ Thermistor mounted type

AlSiC Baseplate

MCB Baseplate

Note: Unifull is trademark of Mitsubishi Electric Corporation

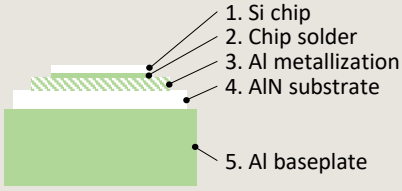
X-Series Si Modules

The LV100 and HV100 HVIGBT modules use the latest X-Series 7th-generation IGBTs with CSTBT technology and RFC diodes delivering enhanced efficiency and robustness. The optimized LNFLR (Linearly-Narrowed Field Limiting Ring) edge termination structure allows an increased active chip area of up to 28 % compared to previous generations, directly contributing to higher current capability an improved power density. The Surface Charge Control (SCC) technology of the chip further enhances the robustness against high humidity.

The standardized LV100 and HV100 package with a footprint of 100 mm x 140 mm allow a simplified design and improved scalability. The terminal layout enables easy parallel connection and a balanced current sharing between the modules, supporting reliable system scaling.

Compared to previous product (CM750HG-130R), the optimized edge termination increases the active chip area by 28 %

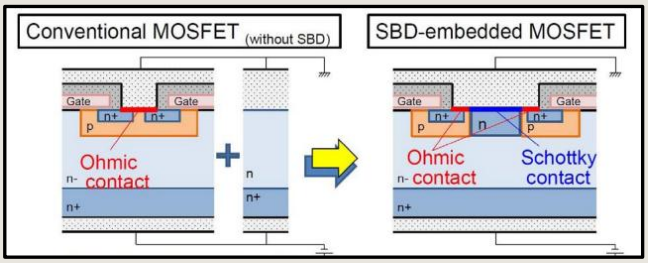
Furthermore, Mitsubishi Electric's high voltage LV100 and HV100 packages use the MCB (Metal Casting Direct Bonding) technology. Compared to conventional packaging structures, these aluminum-based baseplates bond the ceramic substrate directly onto the baseplate, eliminating the need for an additional solder layer resulting in higher thermal conductivity and reduced weight. This enables converter designs with increased output power and higher power density.



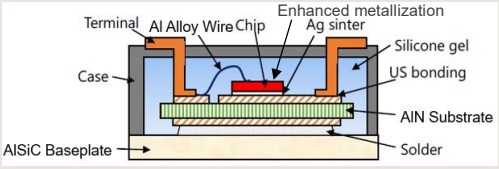
MCB-Baseplate Structure

Unifull™ Plus SiC Modules

The new Unifull™Plus SiC MOSFET modules deliver a superior switching performance through optimized chip design, increased switching speed and reduced switching delay time. A key feature is the integration of an antiparallel Schottky Barrier Diode (SBD) into the MOSFET structure, which suppresses intrinsic body diode conduction. This eliminates the risk of bipolar degradation, a known degradation mechanism that impacts long-term reliability, thereby enhancing overall device robustness. Optimization of the packaging structure, including the use of sintering technology, Al alloy wire with optimized chip metallization for enhanced power cycling capability, and an AlSiC baseplate for enhanced thermal cycling capability result in a superior overall system performance while achieving a good cycling lifetime. Beyond device-level robustness, extensive reliability testing including gate oxide robustness evaluations as well as HV-H3TRB demonstrate high robustness and long-term stability of the Unifull™Plus family.



Unifull™Plus Concept



Unifull™Plus Package Structure

Mitsubishi Electric Europe B.V. (European Headquaters)
- Semiconductor European Business Group -
Mitsubishi-Electric-Platz 1 / D-40882 Ratingen
Phone +49 (0) 2102 486 0
Fax +49 (0) 2102 486 7220

www.MitsubishiElectric.com

May 2026