Mitsubishi Electric has added a new transfer molded SMD type Intelligent Power Module to its line-up – the SOPIPM™ surface-mount package IPM (intelligent power module). Applications with small power inverters like pump, fan or low servos are requesting compactness, easy assembling, reliability and high performance. The new SOPIPM™ SMD type IPM combines all the attractive features of Mitsubishi Electric DIPIPM family with the high efficiency RC-IGBT technology (based on Mitsubishi Electric 7th Chip technology). The integration of driver ICs (HVIC and LVIC), bootstrap diodes & limiting-resistors, and protection functions conveniently reduces the inverter design & development time.

Product Advantages
- SMD type IPM with RC-IGBT chip technology
- Integrated bootstrap diode (BSD) & limiting-resistors
- Short circuit protection through external shunt resistor
- Power supply under-voltage protection : Fo output on N-side
- Over Temperature protection
- Analog temperature voltage signal output
- Optimal pin layout for easier & smaller PCB design
- Ensured insulation distance for coating-less mounting
- Interlock function

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Circuit Diagram</th>
<th>Package Size</th>
<th>Product Name</th>
<th>Application</th>
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<tr>
<td>6in1</td>
<td><img src="image" alt="Circuit Diagram" /></td>
<td>15.2 mm X 27.4 mm X 3.3 mm</td>
<td>SP2SK (2A / 600V)</td>
<td>Pumps Fans Small AC Drives</td>
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**SOPIPMTM Package**

The SOPIPMTM Reverse Conduction (RC) IGBT is based on the Mitsubishi Electric 7th generation chip technology. The 7th generation chip technology is a low loss thin wafer IGBT technology which allows an optimization of the balance between performance and IGBT chip size. In addition to the inherent benefits of the 7th generation chip technology, the RC technology enables a significant level of optimization of the power module’s surface area requirement since the IGBT and the diode are effectively integrated into one single die.

**Protection via Mitsubishi**

The device offers the possibility to implement a short circuit protection via external shunt resistances which can be connected to each of the open emitter pins. To avoid the risk of overheating during operation, there is a built-in over-temperature protection (OT), and the functionality to monitor the module temperature with an accurate linear analog voltage output signals (VOT), which helps to define the derating points to use the module with high power density. The availability of the “interlock-protection” is an important implementation, this protection function prevents the simultaneous turn-on of both high side and low side switches (such a turn-on would lead to an arm-shoot through short circuit). In addition, the ability to detect and indicate a failure in the control supply voltage is also included in the SOPIPMTM.

**Simplified PCB Pattern**

Bootstrap circuits, which require external capacitors, are generally used to provide the high-side power supply in conventional DIPIPIM circuits. In a conventional DIPIPIM circuit, the pins used for bootstrap capacitor connection are located on opposite sides of the module. In the SOPIPMTM, the ground pins are placed next to the high voltage supply pins, simplifying the PCB wiring design and thus utilizing more efficient available space.