Mitsubishi Electric has developed a new SLIM package Intelligent Power Module (SLIMDIP™) for Consumer Goods Applications. Power chips, drive and protection circuits are all integrated into the module, which makes it a simple choice for AC100-200V class motor inverter control. SLIMDIP™ utilizes reverse conducting RC-IGBT technology, which applies MITSUBISHiS latest 7th generation IGBT chip design, enabling the use of a smaller package by reducing number of internal component when compared to MITSUBISHi's Super Mini DIPIPM series. By virtue of these features SLIMDIP™ is especially suitable for low cost inverterized home appliances and can contribute to system cost reduction.

**Product Advantages**
- Smaller package (30% smaller than Super Mini DIPIPM)
- Integrated bootstrap diode eliminates the need for external diode, simplifying design & PCB layout
- Dedicated protection functions: short circuit, over temperature, under voltage lockout
- Robust package for high temperature operation, TC,max of 115°C for switching operation
- UL recognized, isolation voltage Viso = 2000V AC RMS

### Table: Comparison between Super Mini DIPIPM and SLIMDIP

<table>
<thead>
<tr>
<th></th>
<th>Super Mini DIPIPM</th>
<th>SLIMDIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power chip</td>
<td>7th Gen. IGBT</td>
<td>RC-IGBT</td>
</tr>
<tr>
<td>Tj max</td>
<td>150deg C</td>
<td>150deg C</td>
</tr>
<tr>
<td>Tc max</td>
<td>100deg C</td>
<td>+15deg C</td>
</tr>
<tr>
<td>Package</td>
<td>Super Mini</td>
<td>-30%</td>
</tr>
<tr>
<td></td>
<td>24x38</td>
<td>SLIM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18.8x32.8</td>
</tr>
<tr>
<td>Viso</td>
<td>1500Vrms</td>
<td>2000Vrms</td>
</tr>
</tbody>
</table>

### Circuit Diagram

#### Circuit

```
6in1

P

+15deg C

-30%

+500V

Easy pattern
```

#### Application

- **Air Conditioners**
- **Washing Machine**
- **Refrigerators**
- **Pumps**
- **Fans**
- **Small AC Drives**

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*for a greener tomorrow*
SLIMDIP™ Package

- The SLIMDIP™ package has roughly a 30% smaller footprint area than the conventional Super Mini DIPIPM. The package and power semiconductors are optimized to provide the smallest 3-phase IPM for motor drive applications up to 1.5kW.
- The conventional DIPIPM package contains 6 IGBTs and 6 FWDs, but the new RC-IGBTs used in the SLIMDIP™ allows a 50% reduction in the number of power chips, thus shrinking the internal space requirement.

Ease of Use

The SLIMDIP™ shows an improvement in the following areas compared to the Super Mini DIPIPM, making it easier to use.
- An increased maximum case temperature specification, Tc max 100 → 115 deg C
- Both temperature protection tripping OT and analog temperature information are IC functions.

Simplified PCB Pattern

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

- 30% reduction in package size
- Simple wiring of bootstrap circuit