The IGBT module is a key device for achieving energy savings and stable power supply in industrial equipment such as motor drive inverters, uninterruptible power supplies (UPS), and power conditioners for wind and photovoltaic power generation equipment. In recent years, there has been a strong demand for energy savings, miniaturization, space savings, and increased reliability in industrial equipment and devices. To meet this demand, Fuji Electric developed the 7th Generation “X Series” IGBT Module.

- Contributes to energy savings by reducing power loss
  - Reduces inverter loss by 10% and lower chip temperature by 11°C (Comparison with the 6th Generation V Series (1200V 75A), at \( f_c = 8 \) kHz)
- Achieves equipment miniaturization
  - Footprint size can be reduced by 36% by replacing the previous 6th Generation (1200V 75A) with the new 7th Generation X Series (1200V 75A) (*1)
- Contributes to improved equipment reliability
  - Achieves guaranteed continuous operation at \( T_{j(\text{op})} = 175^\circ \text{C} \)
- Increased rated current with RC-IGBT technology.

*1 Mounting area ratio with 1200V PIM models

Packages (typical examples)

Application example: General motor drives, UPS, PCS, others
1. Low loss

The surface and vertical structures of the IGBT and diode chips are optimized. This reduces power losses during inverter operation compared with previous products (our 6th generation V series).

Reduces inverter loss by 10% and chip temperature by 11°C (Comparison with the 6th Generation V Series (1200V 75A), at \( f_c = 8 \text{ kHz} \))

2. Miniaturization

The newly developed insulating substrate is applied to improve the heat dissipation of the module. By suppressing heat generation as well as reducing power loss, some products can be mounted in a package of about 36% smaller.

Application example) **36% reduction**

![Image of 1200V 75A (6th Generation V Series) vs 1200V 75A (7th Generation X Series)]

3. High-temperature operation

Achieves continuous operation at 175°C through chip optimization, improved package reliability and heat resistance.

- Up to 35% more output than the previous generation
- \( \Delta T_{vj} \) power cycle lifetime is doubled compared to the conventional products, thus the same level of lifetime is secured even at 175°C continuous operation.

### Product series (tentative) 1700V /1200V /650V

<table>
<thead>
<tr>
<th>Package</th>
<th>Appearance</th>
<th>Size (mm)</th>
<th>10A</th>
<th>15A</th>
<th>20A</th>
<th>25A</th>
<th>30A</th>
<th>35A</th>
<th>50A</th>
<th>75A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small PIM</td>
<td></td>
<td>33.8 x 48.0</td>
<td>1200V</td>
<td>1200V</td>
<td>650V</td>
<td>RC-IGBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIM</td>
<td></td>
<td>45.0 x 107.5</td>
<td>1200V</td>
<td>1200V</td>
<td>650V</td>
<td>RC-IGBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-PACK</td>
<td></td>
<td>62.0 x 122.0</td>
<td>1200V</td>
<td>1200V</td>
<td>650V</td>
<td>RC-IGBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard 2-PACK</td>
<td></td>
<td>34.0 x 94.0</td>
<td>1200V</td>
<td>1200V</td>
<td>650V</td>
<td>RC-IGBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dual XT</td>
<td></td>
<td>62.0 x 150.0</td>
<td>1200V</td>
<td>1200V</td>
<td>650V</td>
<td>RC-IGBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PrimePACK™</td>
<td></td>
<td>89.0 x 172.0</td>
<td>1200V</td>
<td>1200V</td>
<td>650V</td>
<td>RC-IGBT</td>
<td></td>
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</tr>
</tbody>
</table>

Power Integrated Modules are products that integrate multiple circuits in one module. PrimePACK™ are registered trademarks of Infineon Technologies AG.

<table>
<thead>
<tr>
<th>IGBT Junction Temperature: ( T_{vj} ) [deg.C]</th>
<th>Inverter Power Losses [W]</th>
<th>Output Current: ( I_{out} ) [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°C</td>
<td>120.0</td>
<td>35</td>
</tr>
<tr>
<td>85°C</td>
<td>105.0</td>
<td>75</td>
</tr>
</tbody>
</table>

*ODSFBTF

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**Safety Precautions**

- Before using this product, read the "Instruction Manual" and "Specifications" carefully, and consult with the retailer from which you purchased this product as necessary to use this product correctly.
- The product must be handled by a technician with the appropriate skills.

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