Applications for Standard & Custom Low Profile Power Modules

Minimum Size—Maximum Performance!

Microsemi
Typical Applications include Solar Inverters 1kW to 50kW, Wind Turbines and Fuel Cells

**The Microsemi Advantage**

Inverters for renewable energy demand the most efficient semiconductor and power modules to send power from solar panels and wind turbines to the grid.

**Microsemi offers:**

- Mix of silicon (Trench & CoolMos) for better performance
- SiC diodes for greater efficiency
- High performance base modules versus baseless modules
- New three level topology

**Our Value Proposition:**

- Same height power module to realize the full inverter system
- SP1, SP3, SP6P offering same 12mm height as SOT-227
- Low stray inductance module for improved efficiency
- Standard configuration with SiC diodes integrated
- Temperature sensor built in
- New Multi Level Converter topology available (Neutral Point Clamped)

**Why and When Choose Silicon Carbide?**

- Real advantage in hard switching conditions
- Ultra low Qrr leads to reduced switching losses
- Temperature independent switching behavior
- Reduced system size and cost
- Improved system efficiency
- Improved cooling system

**Applications:**

- PFC
- Output rectifier,
- Freewheeling diode

**Solutions for Solar Inverters 1kW to 50kW, Wind Turbines and Fuel Cells**

<table>
<thead>
<tr>
<th>Sample Part Numbers</th>
<th>Inverter</th>
<th>Output Rectifier</th>
<th>Resonant Converter</th>
<th>PFC</th>
<th>Input Rectifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>APTDR100YH12073G</td>
<td>APTDF100H1201G</td>
<td>APTGF50M120T1G</td>
<td>APTC6040201G</td>
<td>APT1505H40JC2U</td>
<td>APTDRKX1601G</td>
</tr>
<tr>
<td>APTDR150YH12073G</td>
<td>APTDF150H1201G</td>
<td>APTGF50M120T1G</td>
<td>APTC6040201G</td>
<td>APT1505H40JC2U</td>
<td>APTDRKX1601G</td>
</tr>
<tr>
<td>APTDR200YH12073G</td>
<td>APTDF200H1201G</td>
<td>APTGF50M120T1G</td>
<td>APTC6040201G</td>
<td>APT1505H40JC2U</td>
<td>APTDRKX1601G</td>
</tr>
</tbody>
</table>

Various topologies with same 12mm height packages
Hybrid and Electric Vehicles

Applications:
• Power Train up to 120kW
• DC-DC Converter
• Battery Charger

Microsemi offers:
• Greater flexibility in locating terminals
• Low stray inductance packages
• Baseplate models with optional incorporated fins
• Assembly material matched for thermal expansion
• High reliability (AEC Q101 qualification performed)
• Complete product line for low-cost solution
• Mass production manufacturing lines

Welding Equipment

Microsemi offers:
• Low RDSON MOSFET High Current Diode
• UltraFast IGBT
• Low Cost Products
• Standard and Custom Copper Baseplate for:
  - Improved Thermal Performance
  - High power Cycling Capabilities

Our Experience:
• 30% of Power Module Sales
• 10 year old Design still on market
• Up to 50K EAU per Reference
• Very high customer satisfaction
• Zero field return

Applications:
• MIG/MAG Welders
• Plasma Cutters
• TIG AC & DC Welders
• STUD Welding
**Induction Heating**

**Applications:**
- **Induction heating from 10kW to 500kW**

**Microsemi advantages:**
- Unique high voltage power MOSFET range: 1000V and 1200V
- Easy paralleling of power modules
- Low profile package design dedicated to high frequency
- 500kHz operating frequency capability with MOSFET
- Various topologies available with series and parallel fast diodes
- Dedicated topologies for ZVS and ZCS mode application
- Fast IGBT combinations for resonant mode up to 100kHz

---

**Aerospace / Military**

**Applications:**
- Modules are used in aircraft for flight actuators, air conditioning, fuel pumps and cooling & chilling systems. They are also used in naval vessels, ground vehicles and back-up power systems.

**Microsemi offers:**
- Thermal expansion material matching for increased power and temperature cycling performance.
- Flexibility in design to develop any kind of shape and size power module.
- Withstands temperatures from -60°C to +200°C
- Hermetic sealed modules capabilities
- Light material for aerospace application
- Short development cycle
- Qualification test and Screening to customer specification
- No quantity limitation

**Our Experience:**
- 15 year old design still on market
- Thousands in the field, no returns
- Numerous developments for demonstrator
- Strong technical expertise and support

---

Microsemi PPG Power Module Products, Chemin de Magret – 33700 Merignac, France
Tel.+33 557 921 515 – Fax +33 556 479 761
www.microsemi.com