Powerex Offers New Alternative for 460V Drive Manufacturers

Powerex recently introduced a 1200V DIP-IPM to its expansive line of Dual In-Line Package Intelligent Power Modules (DIP-IPMs) making it possible for customers designing a 460V drive the option of using an intelligent DIP device.

Integrating power devices, gate drive, level shifting and protection circuitry in an ultra compact dual-in-line transfer mold package, the Powerex 1200V DIP-IPM was developed for use in small 460V three-phase motor drives.

Up until now, manufacturers looking for this kind of smaller, compact solution could only use basic IGBT modules which are thicker and require more board space due to gate drive layout issues. The 1200V option allows designers to reduce inverter size as well as overall design time in the process of manufacturing blower motors/HVAC; industrial motor drives; pumps and compressors; servo motor control; and robotics.

The 1200V DIP-IPM line-up current ranges run from 5A through 25A and 2500V isolation rating is standard on all modules. Other features include 16mm pin length and open emitters for current sensing in each phase leg.

While the 1200V DIP-IPM may be a perfect fit for those designers looking for an intelligent solution, a standard solution is also now available for those customers who require more flexibility in their design.

(continued on page 2)
Powerex Offers New Alternative for 460V Drive Manufacturers
(continued from page 1)

The Powerex DIP-CIB is a standard module without the built-in gate drive and protection functions. Available in both 600V and 1200V options, these modules are ideal building blocks for both 220V and 460V drives. The DIP-CIB provides flexibility while also boasting an ultra low profile. In fact, the Powerex DIP-CIB uses the lowest profile package—only 5.7 mm thick—available on the market.

The DIP-CIB also features a transfer mold package; superior thermal dissipation; Carrier Stored Trench Gate Bipolar Transistor (CSTBT) chip technology for very low loss; an integrated NTC thermistor for over temperature protection; and it is fully Pb-free for RoHS compliance. The circuit is the standard Converter Inverter Brake (CIB) structure common to small motor drives. Open emitters are standard for implementation of low cost and high performance current sensing required in small motor drive applications.

Overall, the DIP-CIB is the ideal low profile, high performance and low cost solution for low current 120/220/460V motor drives.

For more information, call the Power Line at 1-800-451-1415.

<table>
<thead>
<tr>
<th>Type Name</th>
<th>Ratings (Ic/Vces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP20TD1-12A</td>
<td>20A/600V</td>
</tr>
<tr>
<td>CP30TD1-12A</td>
<td>30A/600V</td>
</tr>
<tr>
<td>CP10TD1-24A</td>
<td>10A/1200V</td>
</tr>
<tr>
<td>CP15TD1-24A</td>
<td>15A/1200V</td>
</tr>
<tr>
<td>CP25TD1-24A</td>
<td>25A/1200V</td>
</tr>
</tbody>
</table>

New 2006 Powerex Short Form Catalog

This new publication from Powerex, your Global Power-Semiconductor Solution Provider, includes technical specifications and outline drawings for all Powerex products recommended for new designs.

To obtain a copy of the new Powerex catalog, please contact Kelly Bandieramonte at kbandieramonte@pwrx.com.
Powerex Offers Surface Mount Discrete Solution to Pulse Power Market

Designed specifically for the pulse power market, the QIS4506002 is optimized to turn on in micro seconds and provide blocking voltages greater than 4 KV and peak current pulses upwards of 1000A.

First introduced in the fourth quarter of 2005, the QIS4506002 is the only single chip package of this kind on the market, offering designers the flexibility to parallel and series connect the device to meet the end need.

In a traditional application for high voltage modules, many chips are paralleled to produce high, long pulse conduction currents. Large packages with multiple chips and internal gate resistors are used. However, in the pulse power market, this approach does not work. The key here is to turn the device on quickly.

Other devices are typically optimized for the traction market and use a gate resistor which limits the turn-on speed of the device. By eliminating the gate resistor, the designer can optimize the turn-on characteristics.

In 2004, Powerex introduced the QIS4506001 to achieve that objective in a single, non-isolated discrete IGBT. By putting several of these discrete devices in a series, the designer was now given the ability to go to extremely high blocking voltages.

With the addition of QIS4506002 to the Powerex line, there is now a surface mount option available, making it possible to achieve this same objective while allowing for a lower profile assembly.

For more information on QIS4506002, please contact Duane Prusia, Director of Custom Modules and Value-Added Products, at 724-925-4402 or dprusia@pwrx.com.

The new mailing/shipping address is:
Powerex, Inc.
173 Pavilion Lane
Youngwood, PA 15697

The phone and fax numbers at Powerex have remained the same and mail already in transit will be forwarded.

Mailing/Shipping Address Change

The mailing/shipping address for Powerex recently changed. Powerex has NOT moved. Our corporate office and manufacturing facility remain in the same Youngwood, PA location. However, due to an issue with the local 911 Center, the street address for the facility changed.

The remittance address for payments to Powerex has NOT changed. It is still:
Powerex, Inc.
Lockbox #51195
PO Box 8500
Philadelphia, PA 19178-1195
NEW PRODUCTS

Control of Gate Driver Retained with Powerex Compact IGBT Series

Powerex Compact IGBT Series offers a solution to customers who require more than an IGBT in their design but are not willing to give up control of their gate driver. The Compact IGBT Series includes packages with an integrated thermistor for case temperature monitoring or an over-temperature and over-current protection feature is included.

The large line-up for this series includes 600V duals at 400, 600 and 800 Amperes; 1200V duals at 200, 300, 400 and 600 Amperes; and 1700V duals at 400 Amperes. In addition, a six-pack is offered at 200 Amperes and a 600V seven-pack is offered at 150 Amperes. Another feature of this series is low Vce (sat) for a reduction of steady state power loss. The Powerex Compact IGBT Series is designed for motor drives, UPS, welders, servo drives and fuel cell inverters.

Powerex Targets Emerging Photovoltaic Inverter Application

Powerex recently introduced a new series of Intelligent Power Modules (IPMs), designated as the PV IPM. Targeted specifically for the emerging photovoltaic inverter application, this new series is optimized for operation at 30 kHz hard switching. At this operating frequency, the series has the lowest power loss of any IGBT-based module, thereby producing the highest inverter efficiency which is critical in the solar or PV inverter application. The series also contains a newly developed control IC which further supports reduction of the controller’s power consumption and reduces any radiated noise.

The Powerex PV IPM series has three different circuit topologies available with 50 or 75 Ampere/600V ratings. Topologies include a single-phase inverter circuit; single-phase inverter circuit plus one boost chopper; and a single-phase inverter circuit plus two boost chopper circuits. As with the standard series of Powerex IPMs, short circuit, under voltage lockout for the gate drive and over temperature protection are provided with a fault status indicator.

New DC-DC Converters, VLA106 Series

Powerex recently introduced a new series of DC-DC converters, VLA106 series, targeted specifically to power gate drives for IGBT modules and other on-board power supplies for industrial and control equipment. The series includes VLA106-24242 and VLA106-15242.

VLA106-24242 has an output power rating of 2.4 watts and an input isolated from the output at 2500Vrms. The input range is 12V – 18V DC with an output of 24V and 100ma. VLA106-15242 also has output power rating of 2.4 watts and an input isolated from the output at 2500Vrms. The input range is 12V – 18V DC with an output of 24V and 100ma.

Both devices have a thin profile and over current protection.

For more information on these devices or other Powerex products, call 1-800-451-1415
The CSTBT (Carrier Stored Trench Gate Bipolar Transistor) chip, an industry-leading technology responsible for lowering losses and saturation voltage, is now available in a high voltage device, the Powerex N-Series HVIGBT.

Due to its ability to lower losses and saturation voltage, the CSTBT chip has been successfully used in Powerex IGBTs such as the Mega Power Dual, the NF-Series and the NFH-Series, allowing designers to save money by using smaller heatsinks in their designs.

While the trench gate technology is available elsewhere, Powerex is an industry leader by applying not only the trench gate technology but also incorporating a carrier stored feature to that technology in CSTBT. This unique feature results in a superior trade-off between switching and conduction losses.

In this latest expansion to the Powerex line, the CSTBT chip will now provide the same advantages in a higher voltage device with the introduction of the N-Series HVIGBT.

Four devices are available as part of this product line extension in single, dual and chopper configurations.

CM1800HC-34N and CM2400HC-34N utilize single connections while CM1200DC-34N and CM1200E4C-34N utilize dual and chopper configurations respectively.

CM2400HC-34N at 2400 Amperes is the largest rated device in the Powerex product line.

The N-Series is suitable for all standard applications, including inverters, converters, induction heating, power supplies, medium voltage drives, and DC choppers.

Powerex now has a complete line-up of high voltage IGBTs, ranging from 1700 to 6500 volts in single, dual and chopper configurations. Typically, the HVIGBT incorporates an H-Series chip. However, with the new N-Series devices, the CSTBT chip will replace the H-chip. (See product line-up.)

For more information on the N-Series HVIGBT or other Powerex high voltage devices, please call 1-800-451-1415

### HVIGBT Module Series Product Line Up

<table>
<thead>
<tr>
<th>Type Name*</th>
<th>Connection</th>
<th>Vces(Volts)</th>
<th>Ic (Amperes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM2400HC-34N</td>
<td>Single</td>
<td>2400</td>
<td>600</td>
</tr>
<tr>
<td>CM600E2C-66H</td>
<td>Chopper</td>
<td>3300</td>
<td>800</td>
</tr>
<tr>
<td>CM400HB-90H</td>
<td>Single</td>
<td>4500</td>
<td>400</td>
</tr>
<tr>
<td>CM600HG-130H</td>
<td>Single</td>
<td>6500</td>
<td>200</td>
</tr>
</tbody>
</table>

**Detailed Technical data available at our web site:** [www.pwrx.com](http://www.pwrx.com)
A 10.2 KV isolation voltage is now available with several Powerex high voltage devices. While the standard isolation voltage—measured from the terminals to the baseplate—has been 6000 KV, there has been a growing trend whereby newer applications are requiring a 10.2 KV isolation voltage. Such new applications include medium voltage drives, high power power supplies, and wind power inverters.

Powerex has responded to this new requirement with the introduction of a variety of new HVIGBTs and HVDiodes featuring a 10.2 KV isolation.

See the line-up on this page for specific part numbers.

### HVIGBT

<table>
<thead>
<tr>
<th>Vce (V)</th>
<th>ic (A)</th>
<th>Baseplate Size</th>
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<tbody>
<tr>
<td>3300</td>
<td>200</td>
<td>CM400HG-66H CM1200HG-66H</td>
</tr>
<tr>
<td>6500</td>
<td>400</td>
<td>CM200HG-130H CM400HG-130H CM600HG-130H</td>
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<tr>
<td>6500</td>
<td>600</td>
<td>CM400E4G-130H</td>
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<tr>
<td></td>
<td>800</td>
<td>UNDER DEVELOPMENT</td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>190mm x 140mm</td>
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</table>

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<td>CM400E4G-130H</td>
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<tr>
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<td>800</td>
<td>UNDER DEVELOPMENT</td>
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<td>190mm x 140mm</td>
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### HVDIODE

<table>
<thead>
<tr>
<th>Vce (V)</th>
<th>ic (A)</th>
<th>Baseplate Size</th>
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</thead>
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<tr>
<td>3300</td>
<td>200</td>
<td>CM400HG-66H CM1200HG-66H</td>
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<td>6500</td>
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</tr>
<tr>
<td></td>
<td>1200</td>
<td>190mm x 140mm</td>
</tr>
</tbody>
</table>

Package code: HG=10.2 KV Isolation Type with AISiC Baseplate
Suffix: H/S= Standard Type

### Optimized IGBT Power Package

**MEGA POWER DUAL™**

1. **NEW CSTBT** (Carrier Stored Trench Gate Bipolar Transistor Chip) for improved (Vce(sat) vs Eoff) for optimizing total power loss
2. **PCM** (Plug Cell Merged) design improves short circuit safe operating area
   - Controls saturation current level
   - Reduces gate capacitance
3. **LPT** (Light Punch Through) process for decreasing current leakage and mitigation of thermal run-away
   - Lowers cross point for positive temperature co-efficient
   - Can be paralleled without matching

Mega Dual’s compact power package is 60% the size of two Powerex single 1000A devices.
Powerex Assemblies Provide Convenience, Cost Savings

With access to top of the line power semiconductor components and a staff of experienced engineers, Powerex has all of the resources necessary to assist customers in the development of power semiconductor assemblies.

The Powerex line of assemblies ranges from standard to definite purpose to customer’s design, offering as little or as much customized design assistance as needed.

Powerex has developed a wide line-up of standard air or liquid cooled rectifier/thyristor assemblies in all common circuit configurations utilizing either discrete disk or isolated baseplate power semiconductors. A range of standard extrusions or chill blocks and clamps are used to produce a comprehensive range of assemblies from 100 to 6000A DC output in air cooled and 400 to 15,000A output when liquid cooled.

In addition, when standard assemblies are not adequate, the Powerex engineering team will design and manufacture power semiconductor assemblies to specific application requirements. These engineered solutions provide the optimum solution to electrical, thermal or mechanical challenges. Options available in engineered assemblies include: optimized heatsink/chill block; thermal sensors; bus bars; high voltage clamps; specific mechanical configurations; insulators; terminal blocks; snubbers; firing boards; current sensors; mounting plates; and fans/blowers.

Another facet of the Powerex assemblies product line are IGBT assemblies, known by the Powerex trade name POW-R-PAK. The POW-R-PAK is a family of configurable IGBT based power assemblies that may be used in a wide variety of power conversion applications, such as energy storage, motor drives, distributed power generation, industrial power supplies, and power quality.

POW-R-PAK IGBT assemblies consist of a high performance IGBT bridge mounted on a heatsink with an interface and driver circuit that includes integrated fault detection and feedback circuits. Package/circuit configurations for POW-R-PAK include half-bridge; full or H-bridge; Buck/Boost chopper; three-phase bridge; three-phase bridge & brake; converter/inverter; dual inverter; and chopper. Standard designs are available from 400 to 1200A at 600V and 300 to 1400A at 1200V. The POW-R-PAK is flexible in design and can readily be modified to accommodate the requirements of specific applications.

For more information on Powerex assemblies, please contact Gregg Ehler, gehert@pwrx.com.
If you would like to add or delete yourself or someone else from our mailing list, please contact Kelly Bandieramonte (kbandieramonte@pwrx.com).

For a complete listing of Powerex manufacturers representatives and distributors, visit the Powerex web site at www.pwrx.com.