

# **POWEREX**<sup>®</sup>

*Power Semiconductor Solutions*



**EXPERTISE ■ INNOVATION ■ RELIABILITY**

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# **POWEREX<sup>®</sup>**

## **POWER SEMICONDUCTOR SOLUTIONS**



### **Quality Products**

Powerex offers a broad line of quality products to meet your power application need.

- IGBTs
- SiC Modules
- Discrete Thyristors
- Discrete Rectifiers
- Thyristor & Diode Modules
- Fast Recovery Diode Modules
- Assemblies
- IGBT Assemblies
- Custom Modules

### **Powerex Also Offers:**

- High reliability testing for both Powerex and non-Powerex devices.
  - Group A, B and C testing capabilities
- Unmatched packaging expertise

### **Impeccable Customer Service**

At Powerex, your success is our success.

You can count on impeccable service and support before, during and after your purchase.

Our mission is to help engineers choose the absolute right product for their application. A dedicated group of experienced Powerex applications engineers are available to serve as an extension of your design team. They will help you to reduce your design cycle by:

- Identifying key project requirements
- Assisting in selection of the optimal device or devices
- Validating device performance
- Supporting rapid prototyping

In addition, manufacturing support continues through our logistics and stocking programs.

Please refer to the Powerex Quick Reference Guide (starting on page 2) for detailed information on our products.

## Markets Served

Powerex is a leading supplier of discrete devices, modules and integrated high power semiconductor solutions, supporting many markets, including:

- AC, DC and Servo Drives  
(Low and Medium Voltage)
- Aircraft
  - Electro-Hydrostatic Actuators
  - Power Generators
- Alternative Energy and Distributed Power
  - Wind
  - Photovoltaic
  - Flywheel
  - Fuel Cell
  - Microturbine
- Electric Vehicles
- Induction Heating
- Industrial Pump Controls
- Medical Power Supplies
  - CT
  - MRI
  - X-Ray
- Power Generation and Distribution
- Pulsed Power
- Transportation
  - Propulsion and Auxiliary Power for Rail and Shipboard
- Uninterruptible Power Supplies (UPS)
- Welding

## Knowledge and Experience - A Solid Foundation

Established on January 1, 1986, Powerex is the result of a combination of three pioneers in the power semiconductor industry – the Power Semiconductor Divisions of General Electric Company, Westinghouse Electric Corporation, and Mitsubishi Electric Corporation. In 1994, Westinghouse sold its shares to General Electric and Mitsubishi Electric. General Electric and Mitsubishi Electric currently share equal ownership of Powerex.

Powerex offers not only the highest quality product but also innovative solutions. An already broad product line is enhanced by business units devoted to:

- Custom Modules
- Customer Specific Assemblies

## Reliable, cost-effective chip fabrication and device assembly

Powerex manufactures a wide range of rectifier and thyristor products at its 90,000 square-foot Youngwood, Pennsylvania USA facility where Powerex:

- Has over 40 years of experience in the manufacture of power semiconductor solutions.
- Uses tools such as Six Sigma, Statistical Quality Control and Lean Manufacturing to continuously improve quality, productivity and performance.
- Has been registered to the ISO 9001 standard since 1998 and to AS9100, the aerospace quality management system, since 2004.

## Reliable supply chain with strategically located manufacturing facilities

In addition to the Powerex manufacturing facility / corporate headquarters in Youngwood, PA, USA, Powerex also serves the global market via its manufacturing facility in Tangiers, Morocco.

## Advanced Research and Development

Powerex and its strategic partners maintain a commitment to research and new product development to meet customer power semiconductor requirements, including:

- Decreased Component Size
- Reduced Costs
- Increased Energy Efficiency
- Switches that
  - Operate at higher frequencies,
  - Are more reliable, and
  - Offer integrated functions.



## IGBTs

### Applications Include:

- Hybrid Electric Vehicles (HEV/EV)
- Inverters
- Medical Power Supplies
- Medium Voltage Drives
- Motor Drives
- Servo Drives
- Traction Inverters
- UPS
- Welding

### Circuit Configurations:

- Single
- Dual



Voltage: 1200V to 4500V  
Current: 150A to 600A

## SiC Modules

### Hybrid Si / SiC IGBT Modules

### Applications Include:

- Energy Saving Power Systems
- High Frequency Type Power Systems
- High Temperature Power Systems

### SiC MOSFET Modules

### Applications Include:

- High Efficiency Inverters
- High Frequency Power Supplies
- High Temperature Environment

### Circuit Configurations:

- Single
- Dual
- In-Parallel
- Common Collector (Drain)
- Common Emitter (Source)



Voltage: 1200V  
Current: 100A

## Discrete Thyristors

### Phase Control SCR / Inverter Grade SCR

### Applications Include:

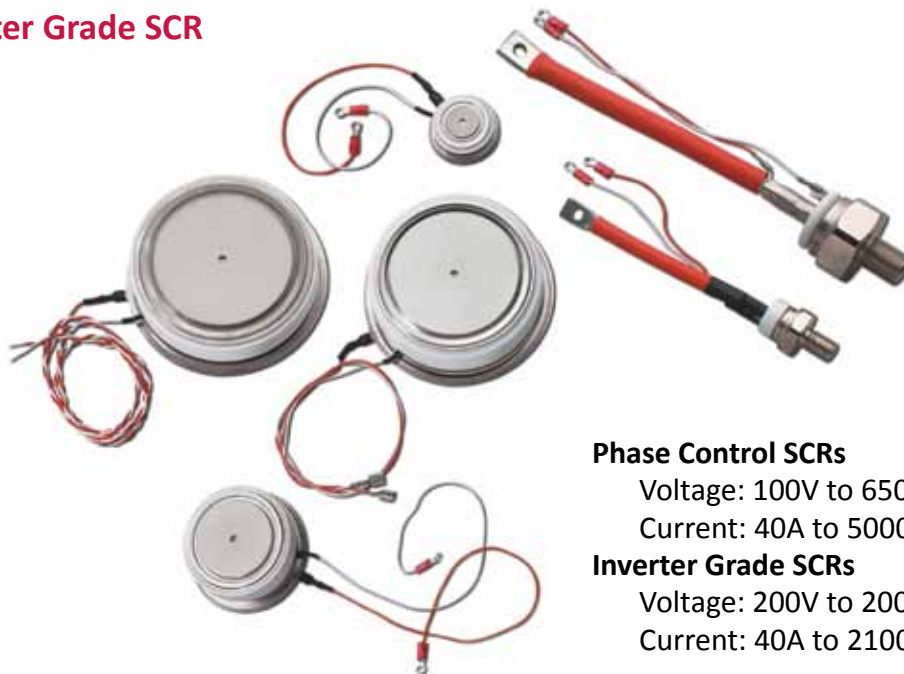
- Battery Chargers
- Flexible AC Transmissions
- HVDC
- Induction Heating
- Medical Equipment
- Medium Voltage Inverters
- Motor Controls
- Power Supplies
- Soft Starters
- Traction Inverters
- Transportation
- UPS
- VAR Generators
- Welding

### Packages:

- Discrete Discs
- Discrete Studs

### Features:

- Nickel Plating finish
- Hermetic Encapsulation for Long-Term Reliability to  $1 \times 10^{-6}$  cc/He/sec



### Phase Control SCRs

Voltage: 100V to 6500V  
Current: 40A to 5000A

### Inverter Grade SCRs

Voltage: 200V to 2000V  
Current: 40A to 2100A



## Discrete Rectifiers

### General Purpose Rectifiers

#### Applications Include:

- Battery Chargers
- Induction Heating/Melting
- Motor Controls
- Power Supplies
- Transportation
- Welding

### Fast Recovery Rectifiers

#### Applications Include:

- Induction Heating
- Medical Equipment
- Motor Controls
- Transportation
- Welding

#### Packages:

- Discrete Discs
- Discrete Studs

#### Features:

- Nickel Plating finish
- Hermetic Encapsulation for Long-Term Reliability to  $1 \times 10^{-6}$  cc/He/sec



#### General Purpose

Voltage: 100V to 6500V  
Current: 100A to 12,000A

#### Fast Recovery

Voltage: 200V to 3600V  
Current: 125A to 1500A

## Thyristor & Diode Modules

### POW-R-BLOK™

#### Applications Include:

- Battery Chargers
- Induction Heating/Melting
- Medical Equipment
- Motor Controls
- Power Supplies
- UPS
- Welding

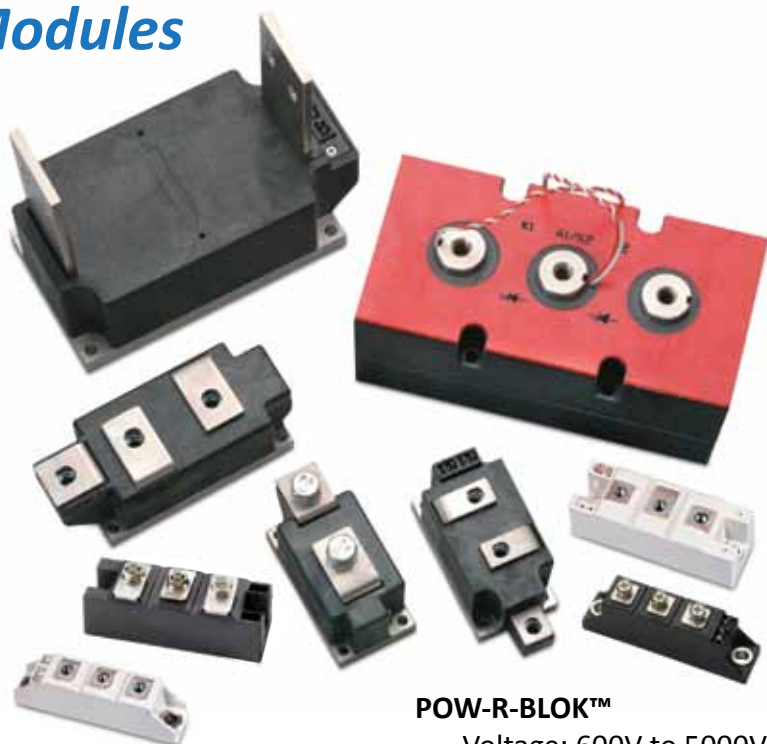
### POW-R-BRIK™

#### Applications Include:

- AC Motor Starters
- DC Motor Controls
- Mining Power Centers
- Resistance Welding Controls
- Transportation

#### Circuit Configurations:

- Single
- Dual
- Split Dual
- Common Anode
- Common Cathode
- AC Switch



#### POW-R-BLOK™

Voltage: 600V to 5000V  
Current: 40A to 2500A

#### POW-R-BRIK™

Voltage: 600V to 5000V  
Current: 300A to 1585A

## Fast Recovery Diode Modules

### Applications Include:

- Motor Controls
- Power Supplies
- Switching Power Supplies
- Transportation
- Welding

### Circuit Configuration:

- Single
- Dual
- Common Anode
- Common Cathode



Voltage: 600V to 3300V  
Current: 48A to 420A

## Assemblies

### Air Cooled / Liquid Cooled / Integrated Power Structures

### Applications Include:

- Battery Chargers
- Induction Heating/Melting
- Motor Controls
- Motor Starters
- Power Supplies
- Transportation
- UPS
- Welding

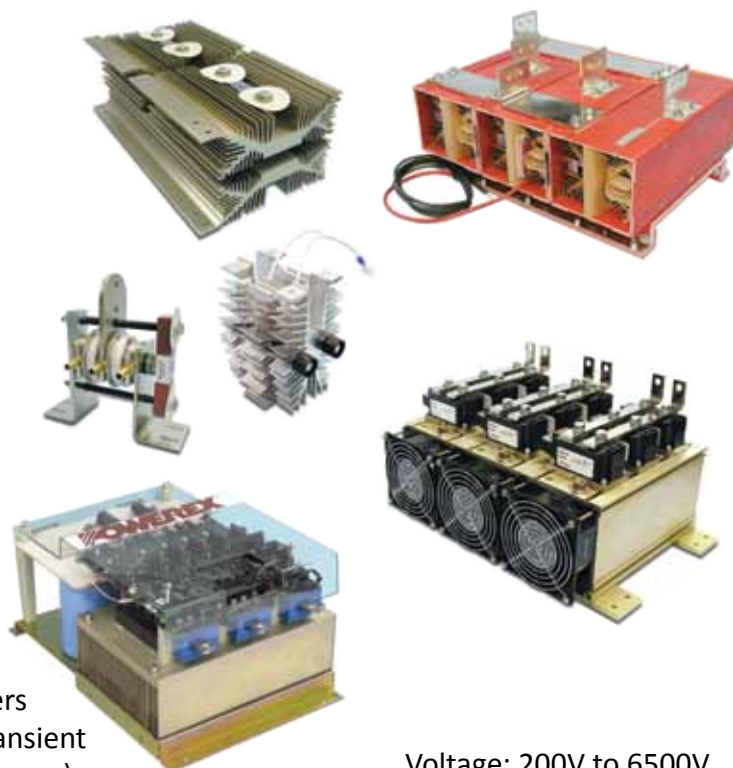
### Circuit Configurations:

- Single
- Half-Bridge
- AC Switch
- Common Cathode/Common Anode
- Single-Phase Bridge
- Three-Phase Bridge

### Options Available in Engineered Assemblies:

- |            |                   |                |
|------------|-------------------|----------------|
| ■ Bus Bars | ■ Insulators      | ■ Snubbers     |
| ■ Fans     | ■ Terminal Blocks | (R-C Transient |
| ■ Fuses    | ■ Thermal Sensors | Suppressors)   |

Note: Custom Assemblies Also Available



Voltage: 200V to 6500V  
Current: 30A to 30,000A

# IGBT Assemblies

## POW-R-PAK-GenII™

### Applications Include:

- Distributed Power Generation
- Energy Storage
- Industrial Power Supplies
- Motor Drives
- Power Quality

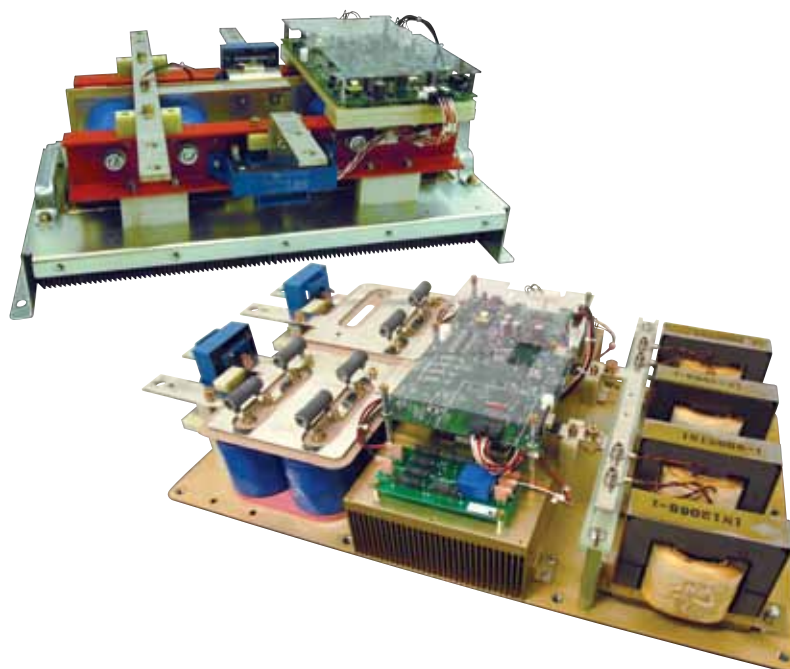
### Circuit Configurations:

- Single, Brake
- Half-Bridge
- H-Bridge
- Three-Phase Bridge
- Three-Phase Bridge + Brake
- Chopper

### Additional Available Options:

- Blower/Fan
- Application Specific

Note: Custom IGBT Assemblies Also Available



Voltage: 250V to 3300V  
Current: 50A to 2800A

# Custom Modules

## Commercial / Moisture Resistant / Hermetic

### Applications Include:

- Customer Specific

### Substrates:

- Alumina
- Aluminum Nitride
- BeO
- IMS

### Die technology:

- Diode
- FR Diode
- GTO
- HVIGBT
- IGBT
- MOSFET
- SCR
- SiC Diode
- SiC MOSFET

### Packages:

- Custom Development for Both Plastic and Hermetic Packages
- Picture Frame
- Standard IGBT Cases



Voltage: 30V to 4500V  
Current: 50A to 1500A



## Multiple Sales Channels

- Powerex has an extensive network of experienced and knowledgeable manufacturer sales representatives and authorized distributors spanning the globe.
- To locate Powerex sales support in your country / region, go to [www.pwrx.com/SalesSupport.aspx](http://www.pwrx.com/SalesSupport.aspx)



Powerex also offers various online purchasing options, including ordering inventory in stock by credit card.

## Multiple Strategically Located Manufacturing Facilities

- Youngwood, PA, USA
- Tangiers, Morocco



# POWEREX®

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