



# Full SiC & Hybrid SiC IGBTs <sup>RoHS</sup>

## Product Advantages

- Significant reduction in switching losses
- Increased system efficiency
- High temperature operation
- Higher operating frequency
- Reduced cooling requirements
- Zero reverse recovery current from diode
- Low parasitic inductance
- Reduced system size / high power density

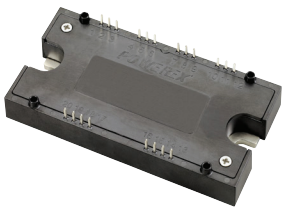
## Overview

Large bandgap energy and high field breakdown are two primary characteristics of silicon carbide (SiC) which have been leveraged to create a new generation of power semiconductors with zero reverse recovery charge, significantly lower switching losses and the opportunity for higher temperature operation.

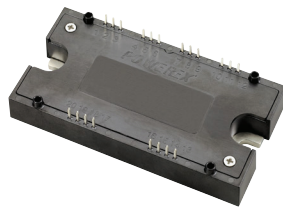
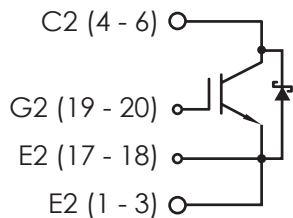
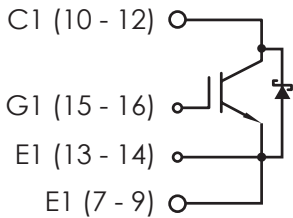
Powerex packages SiC MOSFETs and Schottky barrier diodes from leading suppliers into high performance full SiC modules or with high frequency silicon IGBTs into hybrid Si / SiC modules. The new low profile split dual package features low inductance and either a copper or AISiC baseplate for high thermal cycling applications.

Additionally Powerex remains a HV SiC packaging expert. Contact Powerex for 10kV+ SiC module capability.

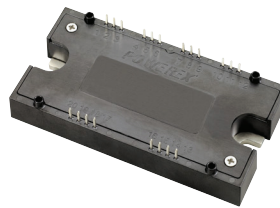
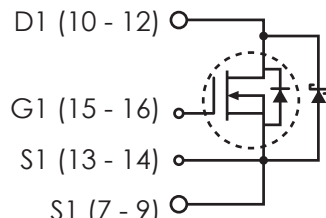
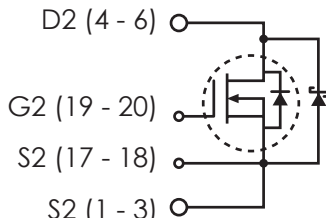
## Package Configuration



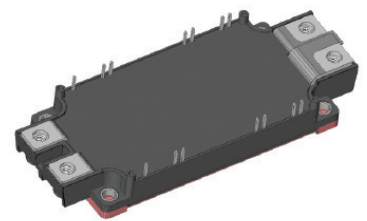
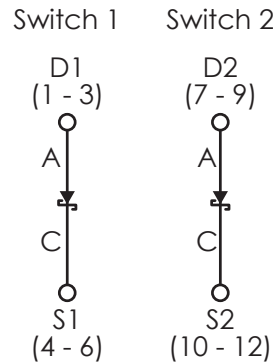
**QID1210005,  
QID1210006**



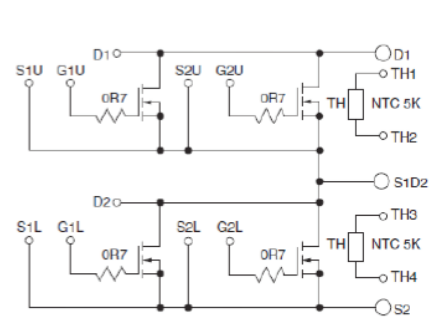
**QJD1210010,  
QJD1210011**



**QRD1210004,  
QRD1210005**



**QJD1740002,  
QJD1240002**

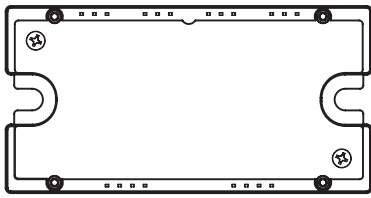
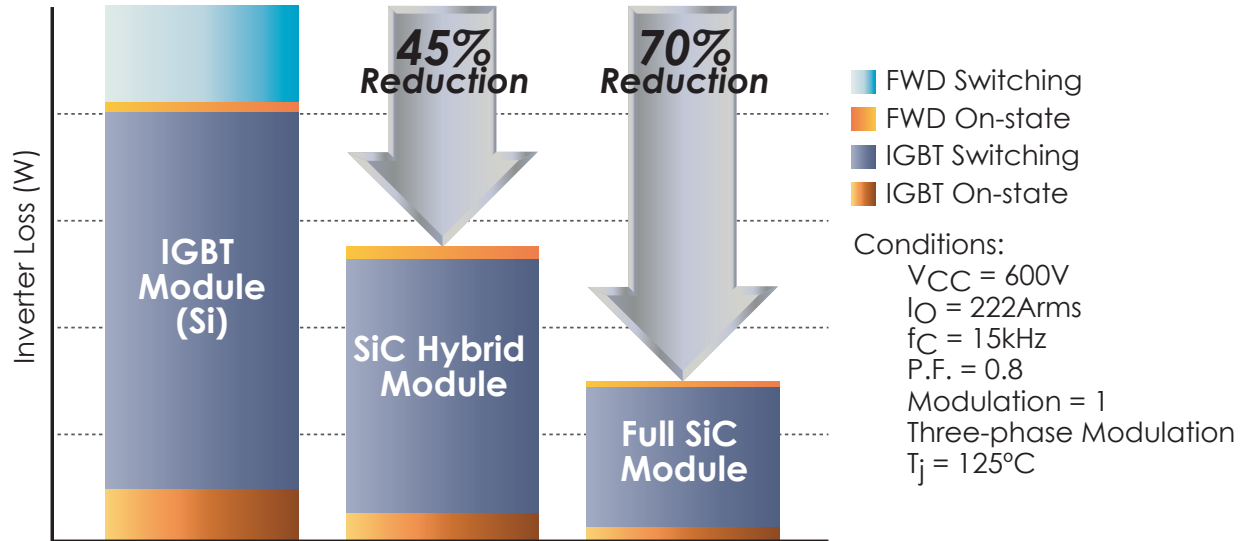


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## Flow Through Layout

**SiC hybrid modules offer ~45% reduction** in power loss vs. silicon counterparts due to lower turn-on losses, lower  $V_f$ , and effective reduction of diode reverse recovery losses to zero.

**Full SiC modules offer ~70% reduction** in power loss vs. silicon counterparts due to switching efficiency of MOSFET technology as well as reduced diode losses. Further, use of full SiC modules results in ~60% module size reduction vs. traditional silicon.



109.9mm x 56.1mm



121.7mm x 56.1mm

## Line-up Table

Part Number	Package Configuration	VCES (V)	IC (A)
<b>Split Dual Hybrid Si / SiC</b>			
QID1210005 - Cu Baseplate	Split Dual	1200	100
QID1210006 - AISiC Baseplate	Split Dual	1200	100
<b>All SiC</b>			
QJD1210010 - Cu Baseplate	Split Dual MOSFET	1200	100
QJD1210011 - AISiC Baseplate	Split Dual MOSFET	1200	100
QRD1210004 - Cu Baseplate	Split Dual SiC Diode	1200	100
QRD1210005 - AISiC Baseplate	Split Dual SiC Diode	1200	100
QJD1240002	Dual SiC MOSFET	1200	400
QJD1740002	Dual SiC MOSFET	1700	400

## Features

**QID1210005, QID1210006**

- Low ESW(off)
- Aluminum Nitride Isolation
- Discrete Super-Fast Recovery Free-Wheel Silicon Carbide Schottky Diode
- Low Internal Inductance
- 2 Individual Switches per Module
- Isolated Baseplate for Easy Heat Sinking
- Automated Assembly Assures High Reliability
- NFH Silicon IGBTs

**QJD1210010, QJD1210011**

- Junction Temperature: 175°C
- Silicon Carbide Chips
- Low Internal Inductance
- Discrete Super-Fast Recovery Free-Wheel Silicon Carbide Schottky Diode
- High Speed Switching
- Low Switching Losses
- Low Capacitance
- High Power Density
- Isolated Baseplate
- Aluminum Nitride Isolation
- 2 Individual Switches per Module

**QRD1210004, QRD1210005**

- Low  $E_{SW(off)}$
- Aluminum Nitride Isolation
- Discrete Super-Fast Recovery Free-Wheel Silicon Carbide Schottky Diode
- Low Internal Inductance
- 2 Individual Switches per Module
- Isolated Baseplate for Easy Heat Sinking
- Automated Assembly Assures High Reliability



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For more information:

email: [globalsales@pwr.com](mailto:globalsales@pwr.com)

phone: 724-925-7272, Option 3 (Applications Engineering Assistance)

