Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of two IGBT Transistors in a half-bridge configuration with each transistor having a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

Features:
- Low Drive Power
- Low V_{CE(sat)}
- Discrete Super-Fast Recovery Free-Wheel Diode
- Isolated Baseplate for Easy Heat Sinking

Applications:
- AC Motor Control
- UPS
- Battery Powered Supplies

Ordering Information:
Example: Select the complete part module number you desire from the table below - i.e. CM100DY-34A is a 1700V (V_CES), 100 Ampere Dual IGBTMOD™ Power Module.
### Absolute Maximum Ratings, \( T_j = 25^\circ\text{C} \) unless otherwise specified

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Symbol</th>
<th>CM100DY-34A</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction Temperature</td>
<td>( T_j )</td>
<td>–40 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>( T_{stg} )</td>
<td>–40 to 125</td>
<td>°C</td>
</tr>
<tr>
<td>Collector-Emitter Voltage (G-E Short)</td>
<td>( V_{CES} )</td>
<td>1700</td>
<td>Volts</td>
</tr>
<tr>
<td>Gate-Emitter Voltage (C-E Short)</td>
<td>( V_{GES} )</td>
<td>±20</td>
<td>Volts</td>
</tr>
<tr>
<td>Collector Current (DC, ( T_C = 108^\circ\text{C} ))</td>
<td>( I_C )</td>
<td>100</td>
<td>Amperes</td>
</tr>
<tr>
<td>Peak Collector Current (Pulse Repetition)</td>
<td>( I_{CM} )</td>
<td>200</td>
<td>Amperes</td>
</tr>
<tr>
<td>Maximum Collector Dissipation (( T_C = 25^\circ\text{C}, T_j \leq 150^\circ\text{C} ))</td>
<td>( P_{C} )</td>
<td>960</td>
<td>Watts</td>
</tr>
<tr>
<td>Emitter Current (( T_C = 25^\circ\text{C} ))</td>
<td>( I_{E}^{*1} )</td>
<td>100</td>
<td>Amperes</td>
</tr>
<tr>
<td>Peak Emitter Current (Pulse Repetition)</td>
<td>( I_{EM}^{*1} )</td>
<td>200</td>
<td>Amperes</td>
</tr>
<tr>
<td>Mounting Torque, M5 Main Terminal</td>
<td>—</td>
<td>30</td>
<td>in-lb</td>
</tr>
<tr>
<td>Mounting Torque, M6 Mounting</td>
<td>—</td>
<td>40</td>
<td>in-lb</td>
</tr>
<tr>
<td>Weight</td>
<td>—</td>
<td>310</td>
<td>Grams</td>
</tr>
<tr>
<td>Isolation Voltage (Main Terminal to Baseplate, ( f = 60Hz, \text{AC 1 min.} ))</td>
<td>( V_{ISO} )</td>
<td>3500</td>
<td>Volts</td>
</tr>
</tbody>
</table>

### Static Electrical Characteristics, \( T_j = 25^\circ\text{C} \) unless otherwise specified

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Cutoff Current</td>
<td>( I_{CES} )</td>
<td>( V_{CE} = V_{CES}, V_{GE} = 0 \text{V} )</td>
<td>—</td>
<td>—</td>
<td>1.0</td>
<td>mA</td>
</tr>
<tr>
<td>Gate Leakage Current</td>
<td>( I_{GES} )</td>
<td>( V_{GE} = V_{GES}, V_{CE} = 0 \text{V} )</td>
<td>—</td>
<td>—</td>
<td>2.0</td>
<td>µA</td>
</tr>
<tr>
<td>Gate-Emitter Threshold Voltage</td>
<td>( V_{GE(th)} )</td>
<td>( I_{C} = 10\text{mA}, V_{CE} = 10 \text{V} )</td>
<td>5.5</td>
<td>7.0</td>
<td>8.5</td>
<td>Volts</td>
</tr>
<tr>
<td>Collector-Emitter Saturation Voltage</td>
<td>( V_{CE(sat)} )</td>
<td>( I_{C} = 100\text{A}, V_{GE} = 15\text{V}, T_j = 25^\circ\text{C} )</td>
<td>—</td>
<td>2.2</td>
<td>2.8</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( I_{C} = 100\text{A}, V_{GE} = 15\text{V}, T_j = 125^\circ\text{C} )</td>
<td>—</td>
<td>2.45</td>
<td>—</td>
<td>Volts</td>
</tr>
<tr>
<td>Total Gate Charge</td>
<td>( Q_{G} )</td>
<td>( V_{CC} = 1000\text{V}, I_{C} = 100\text{A}, V_{GE} = 15\text{V} )</td>
<td>—</td>
<td>670</td>
<td>—</td>
<td>nC</td>
</tr>
<tr>
<td>Emitter-Collector Voltage</td>
<td>( V_{EC}^{*1} )</td>
<td>( I_{E} = 100\text{A}, V_{GE} = 0\text{V} )</td>
<td>—</td>
<td>—</td>
<td>3.0</td>
<td>Volts</td>
</tr>
</tbody>
</table>

### Dynamic Electrical Characteristics, \( T_j = 25^\circ\text{C} \) unless otherwise specified

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Capacitance</td>
<td>( C_{ges} )</td>
<td>( V_{CE} = 10\text{V}, V_{GE} = 0\text{V} )</td>
<td>—</td>
<td>—</td>
<td>24.7</td>
<td>nf</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>( C_{ges} )</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2.8</td>
<td>nf</td>
</tr>
<tr>
<td>Reverse Transfer Capacitance</td>
<td>( C_{res} )</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.53</td>
<td>nf</td>
</tr>
<tr>
<td>Inductive Turn-on Delay Time</td>
<td>( t_{d(on)} )</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>200</td>
<td>ns</td>
</tr>
<tr>
<td>Load Rise Time</td>
<td>( t_r )</td>
<td>( V_{CC} = 1000\text{V}, I_{C} = 100\text{A} )</td>
<td>—</td>
<td>—</td>
<td>150</td>
<td>ns</td>
</tr>
<tr>
<td>Switch Turn-off Delay Time</td>
<td>( t_{d(off)} )</td>
<td>( V_{GE1} = V_{GE2} = 15\text{V}, R_{G} = 4.8\text{Ω} )</td>
<td>—</td>
<td>—</td>
<td>550</td>
<td>ns</td>
</tr>
<tr>
<td>Time Fall Time</td>
<td>( t_{f} )</td>
<td>Inductive Load</td>
<td>—</td>
<td>—</td>
<td>350</td>
<td>ns</td>
</tr>
<tr>
<td>Diode Reverse Recovery Time</td>
<td>( t_{rr}^{*1} )</td>
<td>Switching Operation,</td>
<td>—</td>
<td>—</td>
<td>300</td>
<td>ns</td>
</tr>
<tr>
<td>Diode Reverse Recovery Charge</td>
<td>( Q_{rr}^{*1} )</td>
<td>( I_{E} = 100\text{A} )</td>
<td>—</td>
<td>—</td>
<td>10</td>
<td>µC</td>
</tr>
</tbody>
</table>

*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

*2 Pulse width and repetition rate should be such that device junction temperature \( T_j \) does not exceed \( T_j(\text{max}) \) rating.

*3 Pulse width and repetition rate should be such as to cause negligible temperature rise.

*4 Case temperature \( (T_C) \), and heatsink temperature \( (T_f) \) measured point is just under the chips.
Thermal and Mechanical Characteristics, $T_J = 25^\circ C$ unless otherwise specified

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance, Junction to Case</td>
<td>$R_{th(j-c)}$</td>
<td>Per IGBT$^4$</td>
<td>—</td>
<td>—</td>
<td>0.13</td>
<td>°C/W</td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Case</td>
<td>$R_{th(j-c)}$</td>
<td>Per FWD$^4$</td>
<td>—</td>
<td>—</td>
<td>0.21</td>
<td>°C/W</td>
</tr>
<tr>
<td>Contact Thermal Resistance</td>
<td>$R_{th(c-f)}$</td>
<td>Thermal Grease Applied$^4$</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>°C/W</td>
</tr>
<tr>
<td>External Gate Resistance</td>
<td>$R_G$</td>
<td></td>
<td>4.8</td>
<td>—</td>
<td>48</td>
<td>Ω</td>
</tr>
</tbody>
</table>

$^4$ Case temperature ($T_C$), and heatsink temperature ($T_f$) measured point is just under the chips.

$^5$ Typical value is measured by using thermally conductive grease of $\lambda = 0.9$ [W/(m • K)].
CM100DY-34A
Dual IGBTMOD™ A-Series Module
100 Amperes/1700 Volts

TIME, (s)
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
(Zth = Rth • (NORMALIZED VALUE))

Single Pulse
TC = 25°C
Per Unit Base =
Rth(j-c) = 0.13°C/W  (IGBT)
Rth(j-c) = 0.21°C/W  (FWDi)

GATE CHARGE VS. VGE

Collector Current, Ic (AMPERES)

Collector Current, Ic (AMPERES)

EMITTER CURRENT, IE, (AMPERES)

SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)

SWITCHING TIME VS. GATE RESISTANCE (TYPICAL)

SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)

REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)

NORMALIZED TRANSIENT THERMAL IMPEDANCE, Z(t)

VCC = 1000V
VGE = 15V
Tj = 125°C
Inductive Load

VCC = 1000V
VGE = 15V
Rg = 4.7Ω
Tj = 25°C
Inductive Load

VCC = 800V
VGE = 15V
Rg = 4.7Ω
Tj = 25°C
Inductive Load

VCC = 1000V
VGE = 15V
IC = 100A
Tj = 125°C
Inductive Load

0 200 400 600 800 1000
GATE CHARGE, Qg (nC)

GATE CHARGE VS. VGE

VCC = 1000V
VGE = 15V
IC = 100A
Tj = 125°C
Inductive Load

VCC = 1000V
VGE = 15V
RG = 4.7Ω
Tj = 125°C
Inductive Load

VCC = 1000V
VGE = 15V
IC = 100A
Tj = 125°C
Inductive Load

GATE CHARGE VS. VGE

VCC = 1000V
VGE = 15V
IC = 100A
Tj = 125°C
Inductive Load

VCC = 1000V
VGE = 15V
RG = 4.7Ω
Tj = 125°C
Inductive Load

VCC = 1000V
VGE = 15V
IC = 100A
Tj = 125°C
Inductive Load