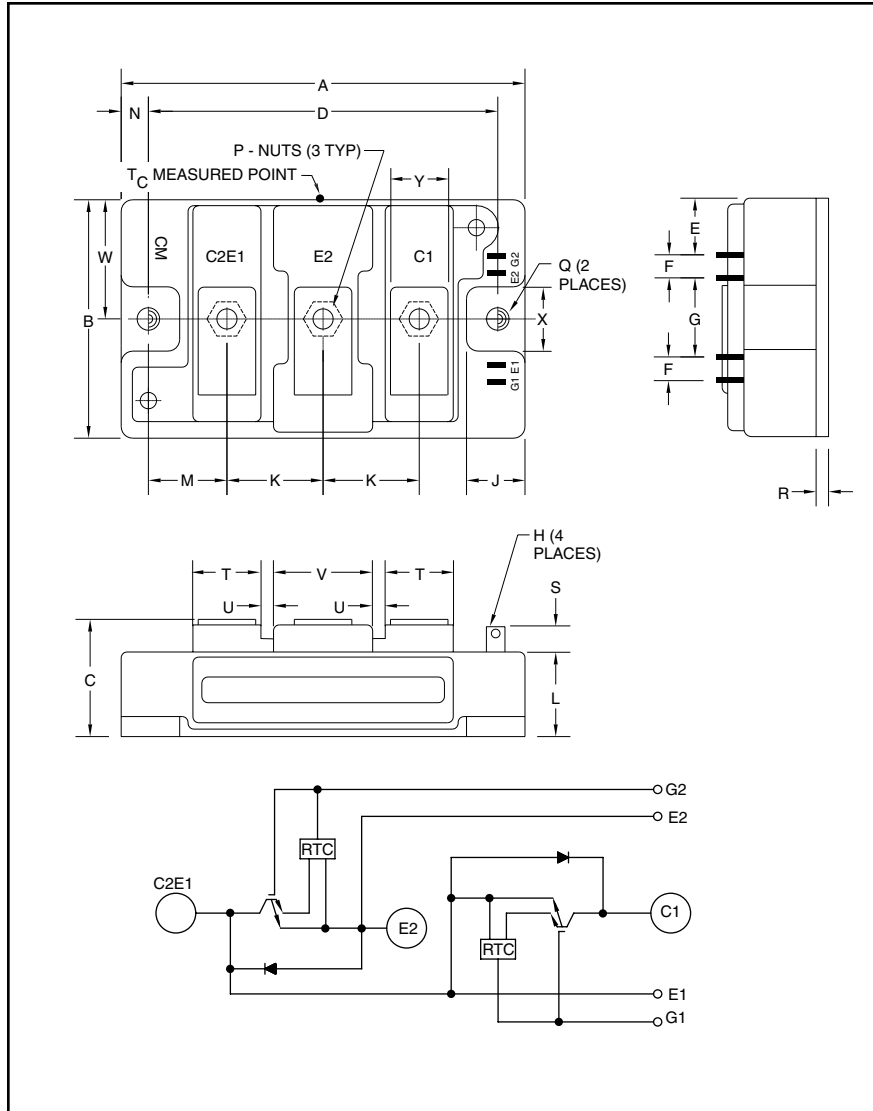


### Trench Gate Design Dual IGBTMOD™ 200 Amperes/600 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches           | Millimeters    |
|------------|------------------|----------------|
| A          | 3.70             | 94.0           |
| B          | 1.89             | 48.0           |
| C          | 1.18 +0.04/-0.02 | 30.0 +1.0/-0.5 |
| D          | 3.15±0.01        | 80.0±0.25      |
| E          | 0.43             | 11.0           |
| F          | 0.16             | 4.0            |
| G          | 0.71             | 18.0           |
| H          | 0.02             | 0.5            |
| J          | 0.53             | 13.5           |
| K          | 0.91             | 23.0           |
| L          | 0.83             | 21.2           |
| M          | 0.67             | 17.0           |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| N          | 0.28      | 7.0         |
| P          | M5        | M5          |
| Q          | Dia. 0.26 | 6.5 Dia.    |
| R          | 0.02      | 4.0         |
| S          | 0.30      | 7.5         |
| T          | 0.63      | 16.0        |
| U          | 0.10      | 2.5         |
| V          | 1.0       | 25.0        |
| W          | 0.94      | 24.0        |
| X          | 0.51      | 13.0        |
| Y          | 0.47      | 12.0        |
| Z          | 0.47      | 12.0        |



#### Description:

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 module number you desire from the table - i.e. CM200DU-12F is a 600V ( $V_{CES}$ ), 200 Ampere Dual IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 200                       | 12                        |

## CM200DU-12F

### Trench Gate Design Dual IGBTMOD™

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#### Absolute Maximum Ratings, $T_j = 25^\circ\text{C}$ unless otherwise specified

| Ratings                                                                                   | Symbol    | CM200DU-12F | Units            |
|-------------------------------------------------------------------------------------------|-----------|-------------|------------------|
| Junction Temperature                                                                      | $T_j$     | -40 to 150  | $^\circ\text{C}$ |
| Storage Temperature                                                                       | $T_{stg}$ | -40 to 125  | $^\circ\text{C}$ |
| Collector-Emitter Voltage (G-E SHORT)                                                     | $V_{CES}$ | 600         | Volts            |
| Gate-Emitter Voltage (C-E SHORT)                                                          | $V_{GES}$ | $\pm 20$    | Volts            |
| Collector Current ( $T_c = 25^\circ\text{C}$ )                                            | $I_C$     | 200         | Amperes          |
| Peak Collector Current                                                                    | $I_{CM}$  | 400*        | Amperes          |
| Emitter Current** ( $T_c = 25^\circ\text{C}$ )                                            | $I_E$     | 200         | Amperes          |
| Peak Emitter Current**                                                                    | $I_{EM}$  | 400*        | Amperes          |
| Maximum Collector Dissipation ( $T_c = 25^\circ\text{C}$ , $T_j \leq 150^\circ\text{C}$ ) | $P_c$     | 590         | Watts            |
| Mounting Torque, M5 Main Terminal                                                         | –         | 31          | in-lb            |
| Mounting Torque, M6 Mounting                                                              | –         | 40          | in-lb            |
| Weight                                                                                    | –         | 310         | Grams            |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)                                 | $V_{iso}$ | 2500        | Volts            |

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

| Characteristics                      | Symbol        | Test Conditions                                           | Min. | Typ. | Max. | Units         |
|--------------------------------------|---------------|-----------------------------------------------------------|------|------|------|---------------|
| Collector-Cutoff Current             | $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$                        | –    | –    | 1    | mA            |
| Gate Leakage Current                 | $I_{GES}$     | $V_{GE} = V_{GES}$ , $V_{CE} = 0V$                        | –    | –    | 20   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 20\text{mA}$ , $V_{CE} = 10V$                      | 5    | 6    | 7    | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 200A$ , $V_{GE} = 15V$ , $T_j = 25^\circ\text{C}$  | –    | 1.6  | 2.2  | Volts         |
|                                      |               | $I_C = 200A$ , $V_{GE} = 15V$ , $T_j = 125^\circ\text{C}$ | –    | 1.6  | –    | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 300V$ , $I_C = 200A$ , $V_{GE} = 15V$           | –    | 1240 | –    | nC            |
| Emitter-Collector Voltage**          | $V_{EC}$      | $I_E = 200A$ , $V_{GE} = 0V$                              | –    | –    | 2.6  | Volts         |

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

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

**CM200DU-12F**  
**Trench Gate Design Dual IGBTMOD™**  
 200 Amperes/600 Volts

**Dynamic Electrical Characteristics,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

| Characteristics                 |                     | Symbol              | Test Conditions                                | Min. | Typ. | Max. | Units |
|---------------------------------|---------------------|---------------------|------------------------------------------------|------|------|------|-------|
| Input Capacitance               |                     | C <sub>ies</sub>    |                                                | —    | —    | 54   | nf    |
| Output Capacitance              |                     | C <sub>oes</sub>    | V <sub>CE</sub> = 10V, V <sub>GE</sub> = 0V    | —    | —    | 3.6  | nf    |
| Reverse Transfer Capacitance    |                     | C <sub>res</sub>    |                                                | —    | —    | 2    | nf    |
| Inductive                       | Turn-on Delay Time  | t <sub>d(on)</sub>  | V <sub>CC</sub> = 300V, I <sub>C</sub> = 200A, | —    | —    | 120  | ns    |
| Load                            | Rise Time           | t <sub>r</sub>      | V <sub>GE1</sub> = V <sub>GE2</sub> = 15V,     | —    | —    | 100  | ns    |
| Switch                          | Turn-off Delay Time | t <sub>d(off)</sub> | R <sub>G</sub> = 3.1Ω,                         | —    | —    | 350  | ns    |
| Times                           | Fall Time           | t <sub>f</sub>      | Inductive Load                                 | —    | —    | 250  | ns    |
| Diode Reverse Recovery Time**   |                     | t <sub>rr</sub>     | Switching Operation                            | —    | —    | 150  | ns    |
| Diode Reverse Recovery Charge** |                     | Q <sub>rr</sub>     | I <sub>E</sub> = 200A                          | —    | 3.8  | —    | μC    |

**Thermal and Mechanical Characteristics,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

| Characteristics                      | Symbol          | Test Conditions                                                | Min. | Typ.  | Max. | Units              |
|--------------------------------------|-----------------|----------------------------------------------------------------|------|-------|------|--------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)Q}$  | Per IGBT 1/2 Module, $T_c$ Reference Point per Outline Drawing | —    |       | 0.21 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)D}$  | Per FWDi 1/2 Module, $T_c$ Reference Point per Outline Drawing | —    | —     | 0.35 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)'Q}$ | Per IGBT 1/2 Module, $T_c$ Reference Point Under Chip          | —    | 0.13  |      | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$   | Per Module, Thermal Grease Applied                             | —    | 0.045 | —    | $^\circ\text{C/W}$ |

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

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