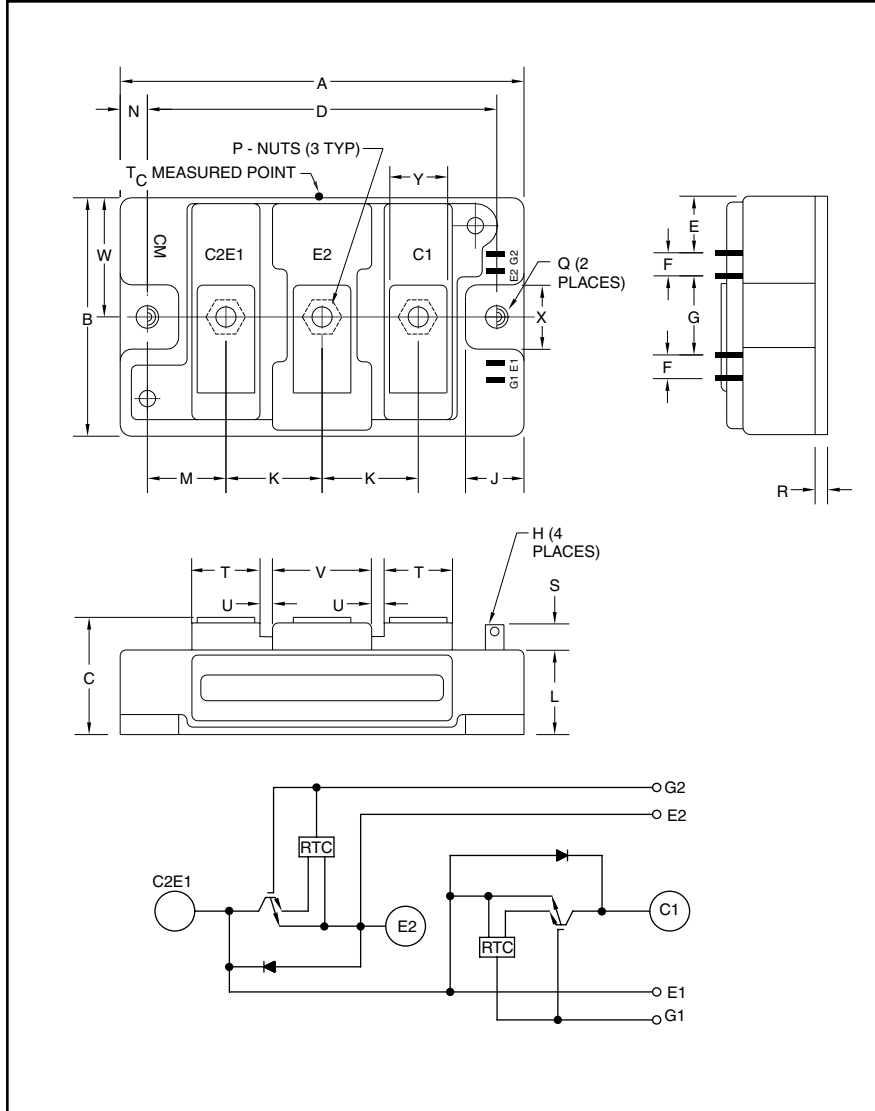


### Trench Gate Design Dual IGBTMOD™ 100 Amperes/600 Volts



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. CM100DU-12F is a 600V ( $V_{CES}$ ), 100 Ampere Dual IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 100                       | 12                        |



Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

**CM100DU-12F**  
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**Absolute Maximum Ratings,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

| Ratings   | Symbol    | CM100DU-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 ( $T_C = 25^\circ\text{C}$ )  | $I_C$     | 100         | Amperes          |
| Peak Collector Current  | $I_{CM}$  | 200*        | Amperes          |
| Emitter Current** ( $T_C = 25^\circ\text{C}$ )  | $I_E$     | 100         | Amperes          |
| Peak Emitter Current**  | $I_{EM}$  | 200*        | Amperes          |
| Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j \leq 150^\circ\text{C}$ ) | $P_C$     | 350         | 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       | $V_{GE(th)}$  | $I_C = 10\text{mA}$ , $V_{CE} = 10V$                      | 5    | 6    | 7    | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100A$ , $V_{GE} = 15V$ , $T_j = 25^\circ\text{C}$  | –    | 1.6  | 2.2  | Volts         |
|                                      |               | $I_C = 100A$ , $V_{GE} = 15V$ , $T_j = 125^\circ\text{C}$ | –    | 1.6  | –    | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 300V$ , $I_C = 100A$ , $V_{GE} = 15V$           | –    | 620  | –    | nC            |
| Emitter-Collector Voltage**          | $V_{EC}$      | $I_E = 100A$ , $V_{GE} = 0V$                              | –    | –    | 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).



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

| Characteristics                 | Symbol              | Test Conditions   | Min. | Typ. | Max. | Units         |
|---------------------------------|---------------------|---|------|------|------|---------------|
| Input Capacitance               | $C_{ies}$           |   | –    | –    | 27   | nf            |
| Output Capacitance              | $C_{oes}$           | $V_{CE} = 10\text{V}, V_{GE} = 0\text{V}$   | –    | –    | 1.8  | nf            |
| Reverse Transfer Capacitance    | $C_{res}$           |   | –    | –    | 1    | nf            |
| Inductive                       | Turn-on Delay Time  | $V_{CC} = 300\text{V}, I_C = 100\text{A},$<br>$V_{GE1} = V_{GE2} = 15\text{V},$<br>$R_G = 6.3\Omega,$ | –    | –    | 100  | ns            |
| Load                            | Rise Time           |   |      |      |      |               |
| Switch                          | Turn-off Delay Time | Inductive Load  | –    | –    | 300  | ns            |
| Times                           | Fall Time           |   |      |      |      |               |
| Diode Reverse Recovery Time**   | $t_{rr}$            | Switching Operation   | –    | –    | 150  | ns            |
| Diode Reverse Recovery Charge** | $Q_{rr}$            | $I_E = 100\text{A}$   | –    | 1.9  | –    | $\mu\text{C}$ |

**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 | –    |       | 0.35 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)D}$ | Per FWDi 1/2 Module, $T_C$ Reference Point per Outline Drawing | –    | –     | 0.70 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)Q}$ | Per IGBT 1/2 Module, $T_C$ Reference Point Under Chip          | –    | 0.23  |      | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$  | Per Module, Thermal Grease Applied                             | –    | 0.055 | –    | $^\circ\text{C/W}$ |

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