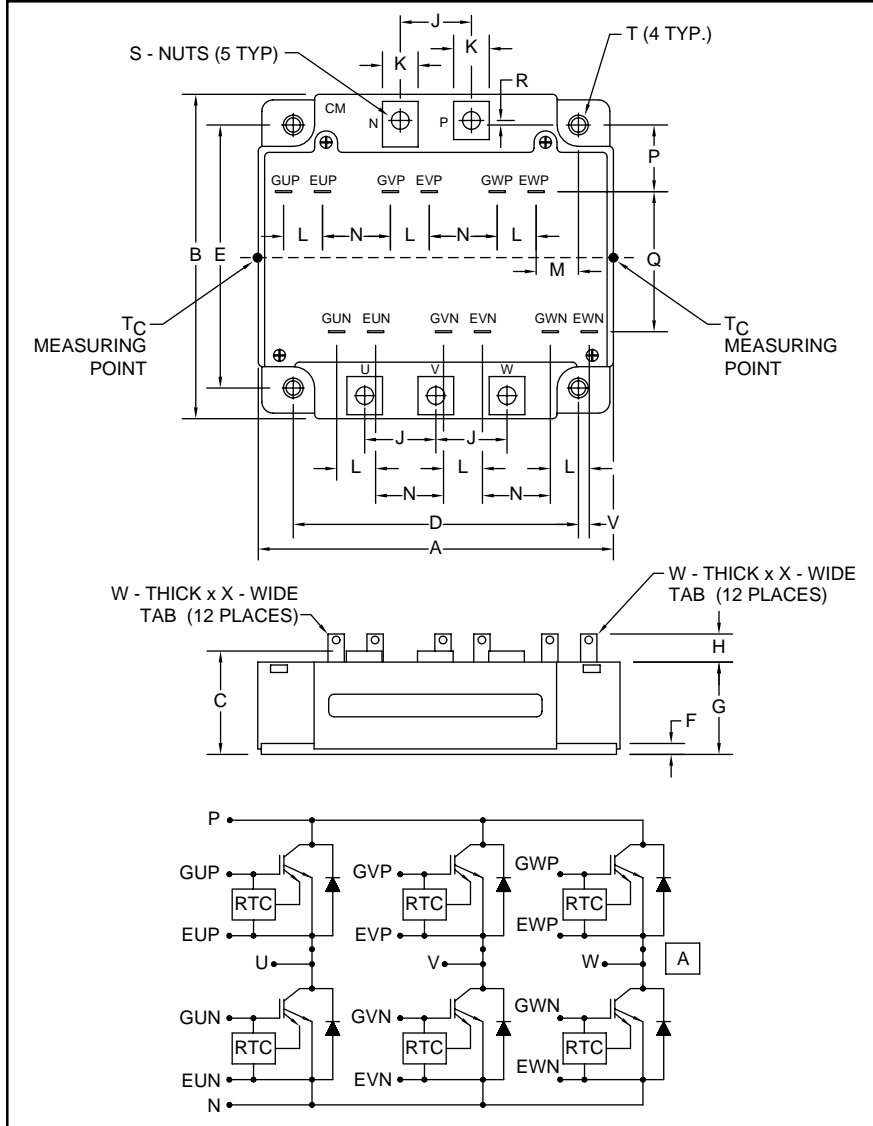


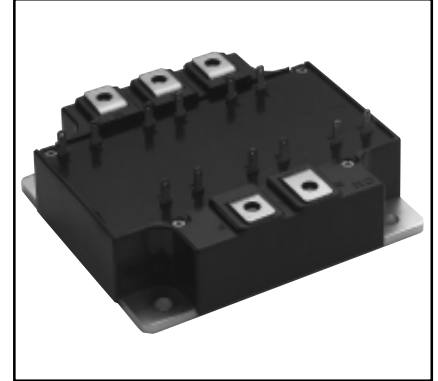
### Trench Gate Design Six IGBTMOD™ 100 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches           | Millimeters    |
|------------|------------------|----------------|
| A          | 4.21             | 107.0          |
| B          | 4.02             | 102.0          |
| C          | 1.14 +0.04/-0.02 | 29.0 +1.0/-0.5 |
| D          | 3.54±0.01        | 90.0±0.25      |
| E          | 3.15±0.01        | 80.0±0.25      |
| F          | 0.16             | 4.0            |
| G          | 1.02             | 26.0           |
| H          | 0.31             | 8.1            |
| J          | 0.91             | 23.0           |
| K          | 0.47             | 12.0           |
| L          | 0.43             | 11.0           |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| M          | 0.57      | 14.4        |
| N          | 0.85      | 21.7        |
| P          | 0.67      | 17.0        |
| Q          | 1.91      | 48.5        |
| R          | 0.15      | 3.75        |
| S          | M5        | M5          |
| T          | 0.22 Dia. | 5.5 Dia.    |
| V          | 0.03      | 0.8         |
| W          | 0.02      | 0.5         |
| X          | 0.110     | 2.79        |



#### Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of six IGBT Transistors in a three phase 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. CM100TU-24F is a 1200V ( $V_{CES}$ ), 100 Ampere Six-IGBT IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 100                       | 24                        |



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

**CM100TU-24F**  
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**Absolute Maximum Ratings,  $T_j = 25\text{ °C}$  unless otherwise specified**

| Ratings   | Symbol    | CM100TU-24F | Units   |
|---|-----------|-------------|---------|
| Junction Temperature                                      | $T_j$     | -40 to 150  | °C      |
| Storage Temperature                                       | $T_{stg}$ | -40 to 125  | °C      |
| Collector-Emitter Voltage (G-E SHORT)                     | $V_{CES}$ | 1200        | Volts   |
| Gate-Emitter Voltage (C-E SHORT)                          | $V_{GES}$ | ±20         | Volts   |
| Collector Current ( $T_c = 25\text{ °C}$ )                | $I_C$     | 100         | Amperes |
| Peak Collector Current ( $T_j \leq 150\text{ °C}$ )       | $I_{CM}$  | 200*        | Amperes |
| Emitter Current**   | $I_E$     | 100         | Amperes |
| Peak Emitter Current**                                    | $I_{EM}$  | 200*        | Amperes |
| Maximum Collector Dissipation ( $T_j < 150\text{ °C}$ )   | $P_c$     | 500         | Watts   |
| Mounting Torque, M5 Main Terminal                         | –         | 31          | in-lb   |
| Mounting Torque, M5 Mounting                              | –         | 31          | in-lb   |
| Weight  | –         | 680         | Grams   |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.) | $V_{iso}$ | 2500        | Volts   |

**Static Electrical Characteristics,  $T_j = 25\text{ °C}$  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   | μA    |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 10mA, V_{CE} = 10V$                      | 5    | 6    | 7    | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100A, V_{GE} = 15V, T_j = 25\text{ °C}$  | –    | 1.8  | 2.4  | Volts |
|                                      |               | $I_C = 100A, V_{GE} = 15V, T_j = 125\text{ °C}$ | –    | 1.9  | –    | Volts |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 600V, I_C = 100A, V_{GE} = 15V$       | –    | 1100 | –    | nC    |
| Emitter-Collector Voltage**          | $V_{EC}$      | $I_E = 100A, V_{GE} = 0V$                       | –    | –    | 3.2  | 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,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

| Characteristics                 | Symbol              | Test Conditions  | Min. | Typ. | Max. | Units   |
|---------------------------------|---------------------|--|------|------|------|---------|
| Input Capacitance               | $C_{ies}$           |  | –    | –    | 39   | nf      |
| Output Capacitance              | $C_{oes}$           | $V_{CE} = 10V, V_{GE} = 0V$  | –    | –    | 1.7  | nf      |
| Reverse Transfer Capacitance    | $C_{res}$           |  | –    | –    | 1    | nf      |
| Inductive                       | Turn-on Delay Time  | $V_{CC} = 600V, I_C = 100A,$<br>$V_{GE1} = V_{GE2} = 15V,$<br>$R_G = 3.1\Omega,$ | –    | –    | 100  | ns      |
| Load                            | Rise Time           |  |      |      |      |         |
| Switch                          | Turn-off Delay Time | Inductive Load   | –    | –    | 400  | ns      |
| Times                           | Fall Time           |  |      |      |      |         |
| Diode Reverse Recovery Time**   | $t_{rr}$            | Switching Operation  | –    | –    | 150  | ns      |
| Diode Reverse Recovery Charge** | $Q_{rr}$            | $I_E = 100A$   | –    | 4.1  | –    | $\mu C$ |

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

| Characteristics                      | Symbol         | Test Conditions  | Min. | Typ.  | Max. | Units              |
|--------------------------------------|----------------|--|------|-------|------|--------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)Q}$ | Per IGBT 1/6 Module, $T_C$ Reference Point per Outline Drawing | –    |       | 0.25 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)D}$ | Per FWDi 1/6 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 1/6 Module, $T_C$ Reference Point Under Chip          | –    | 0.15  |      | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$  | Per Module, Thermal Grease Applied                             | –    | 0.015 | –    | $^\circ\text{C/W}$ |

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