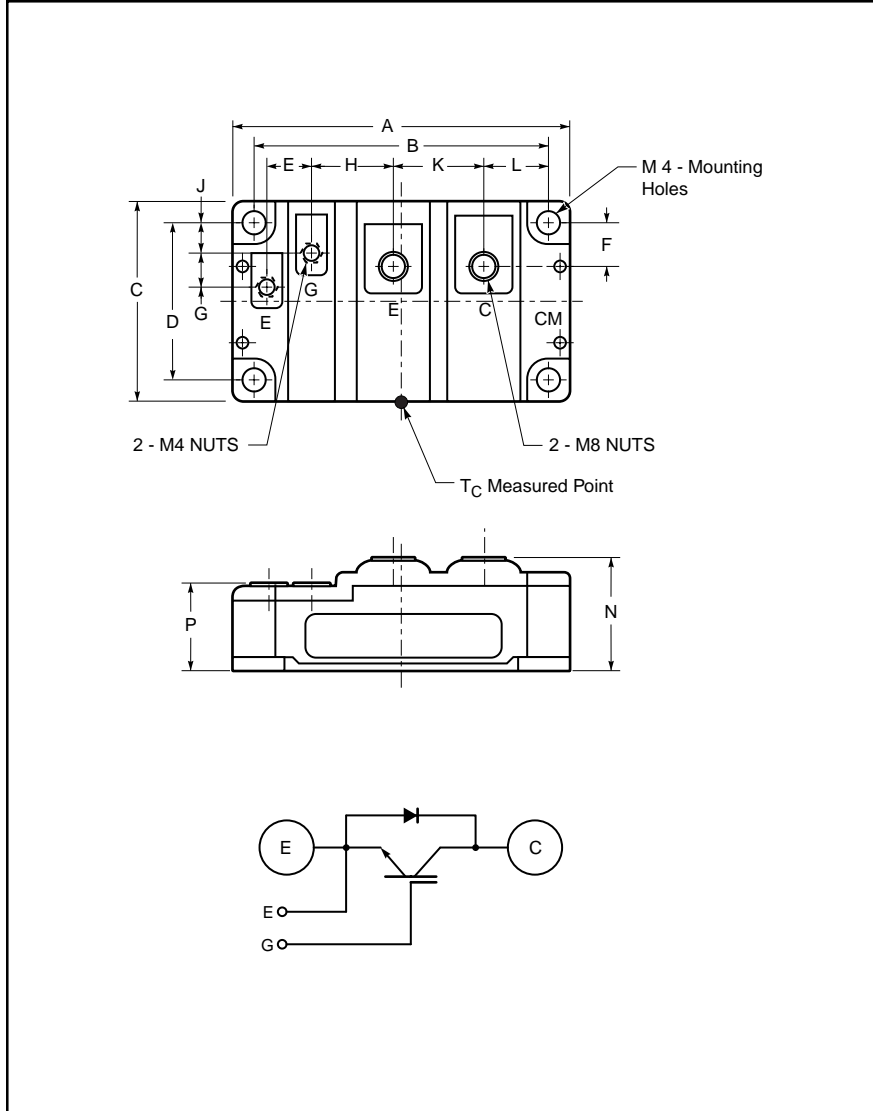


### Single IGBTMOD™ U-Series Module 600 Amperes/600 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| A          | 4.21      | 107.0       |
| B          | 3.66±0.01 | 93.0±0.25   |
| C          | 2.44      | 62.0        |
| D          | 1.89±0.01 | 48.0±0.25   |
| E          | 0.53      | 13.5        |
| F          | 0.49      | 12.55       |
| G          | 0.39      | 10.0        |

| Dimensions | Inches           | Millimeters  |
|------------|------------------|--------------|
| H          | 1.02             | 26.0         |
| J          | 0.37             | 9.5          |
| K          | 1.14             | 29.0         |
| L          | 0.81             | 20.5         |
| M          | 0.26 Dia.        | 6.5 Dia.     |
| N          | 1.34 +0.04/-0.02 | 34 +1.0/-0.5 |
| P          | 1.02 +0.04/-0.02 | 26 +1.0/-0.5 |



#### Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor in a single configuration with 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
- Motion/Servo Control
- UPS
- Welding Power Supplies
- Laser Power Supplies

#### Ordering Information:

Example: Select the complete module number you desire from the table - i.e. CM600HU-12H is a 600V ( $V_{CES}$ ), 600 Ampere Single IGBTMOD™ Power Module.

| Type | Current Rating Amperes | $V_{CES}$ Volts (x 50) |
|------|------------------------|------------------------|
| CM   | 600                    | 12                     |

**CM600HU-12H**  
**Single IGBTMOD™ U-Series Module**  
 600 Amperes/600 Volts

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

| Ratings  | Symbol    | CM600HU-12H | 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 ( $T_c = 25^\circ\text{C}$ )             | $I_C$     | 600         | Amperes          |
| Peak Collector Current ( $T_j \leq 150^\circ\text{C}$ )    | $I_{CM}$  | 1200*       | Amperes          |
| Emitter Current** ( $T_c = 25^\circ\text{C}$ )             | $I_E$     | 600         | Amperes          |
| Peak Emitter Current**                                     | $I_{EM}$  | 1200*       | Amperes          |
| Maximum Collector Dissipation ( $T_c = 25^\circ\text{C}$ ) | $P_c$     | 1560        | Watts            |
| Mounting Torque, M8 Main Terminal                          | –         | 95          | in-lb            |
| Mounting Torque, M6 Mounting                               | –         | 40          | in-lb            |
| Mounting Torque, M4 Terminal                               | –         | 15          | in-lb            |
| Weight   | –         | 450         | Grams            |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)  | $V_{iso}$ | 2500        | 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).

**Static Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  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 Voltage                 | $I_{GES}$     | $V_{GE} = V_{GES}, V_{CE} = 0V$                            | –    | –    | 0.5  | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 60\text{mA}, V_{CE} = 10V$                          | 4.5  | 6    | 7.5  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 600\text{A}, V_{GE} = 15V, T_j = 25^\circ\text{C}$  | –    | 2.4  | 3.0  | Volts         |
|                                      |               | $I_C = 600\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}$ | –    | 2.6  | –    | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 300V, I_C = 600\text{A}, V_{GE} = 15V$           | –    | 1200 | –    | nC            |
| Emitter-Collector Voltage*           | $V_{EC}$      | $I_E = 600\text{A}, V_{GE} = 0V$                           | –    | –    | 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.

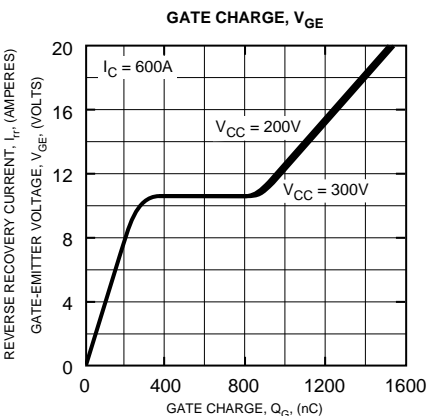
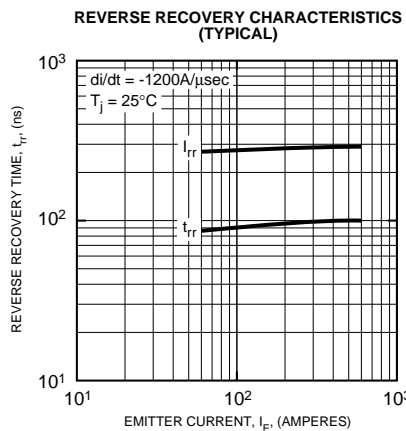
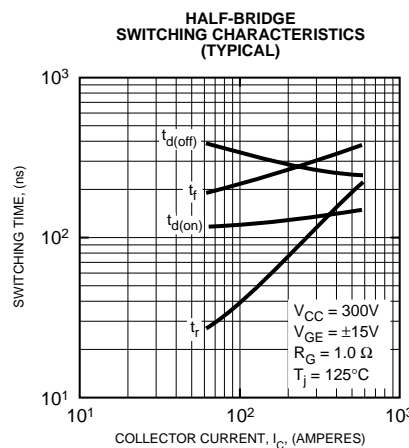
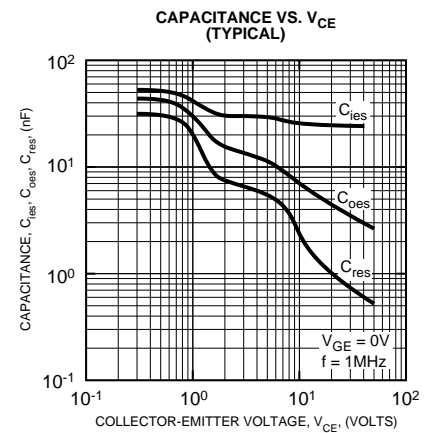
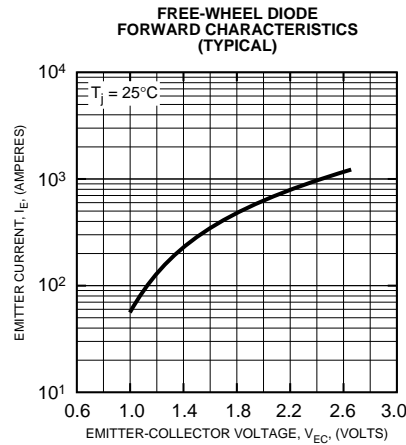
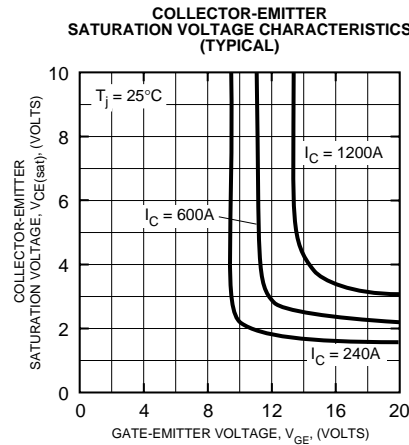
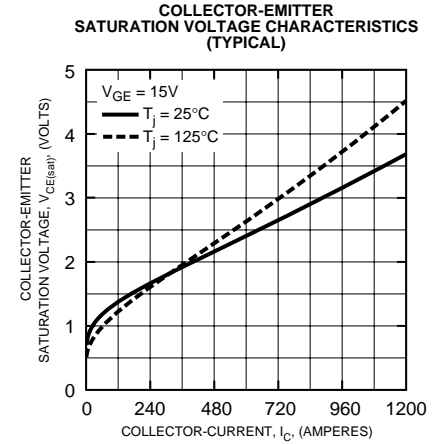
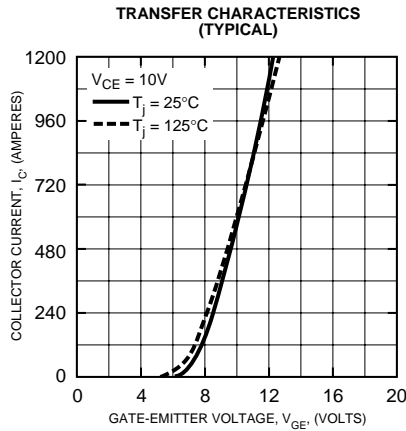
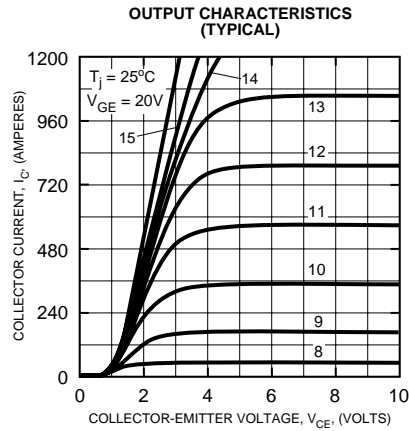
**Dynamic Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

| Characteristics               | Symbol              | Test Conditions   | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|---|------|------|------|---------------|
| Input Capacitance             | $C_{ies}$           |   | –    | –    | 52.8 | nf            |
| Output Capacitance            | $C_{oes}$           | $V_{CE} = 10V, V_{GE} = 0V$                                       | –    | –    | 28.8 | nf            |
| Reverse Transfer Capacitance  | $C_{res}$           |   | –    | –    | 7.8  | nf            |
| Resistive                     | Turn-on Delay Time  | $V_{CC} = 300V, I_C = 600\text{A},$<br>$V_{GE1} = V_{GE2} = 15V,$ | –    | –    | 300  | ns            |
|                               | Load                |   |      |      |      |               |
| Switch                        | Turn-off Delay Time | $R_G = 1.0\Omega, \text{Resistive}$<br>Load Switching Operation   | –    | –    | 350  | ns            |
|                               | Times               |   |      |      |      |               |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 600\text{A}, di_E/dt = -1200\text{A}/\mu\text{s}$          | –    | –    | 160  | ns            |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 600\text{A}, di_E/dt = -1200\text{A}/\mu\text{s}$          | –    | 1.44 | –    | $\mu\text{C}$ |

**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 Module                    | –    | –    | 0.08 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)D}$ | Per FWDi Module                    | –    | –    | 0.12 | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$  | Per Module, Thermal Grease Applied | –    | 0.02 | –    | $^\circ\text{C}/\text{W}$ |

**CM600HU-12H**  
**Single IGBTMOD™ U-Series Module**  
 600 Amperes/600 Volts



**CM600HU-12H**  
**Single IGBTMOD™ U-Series Module**  
 600 Amperes/600 Volts

