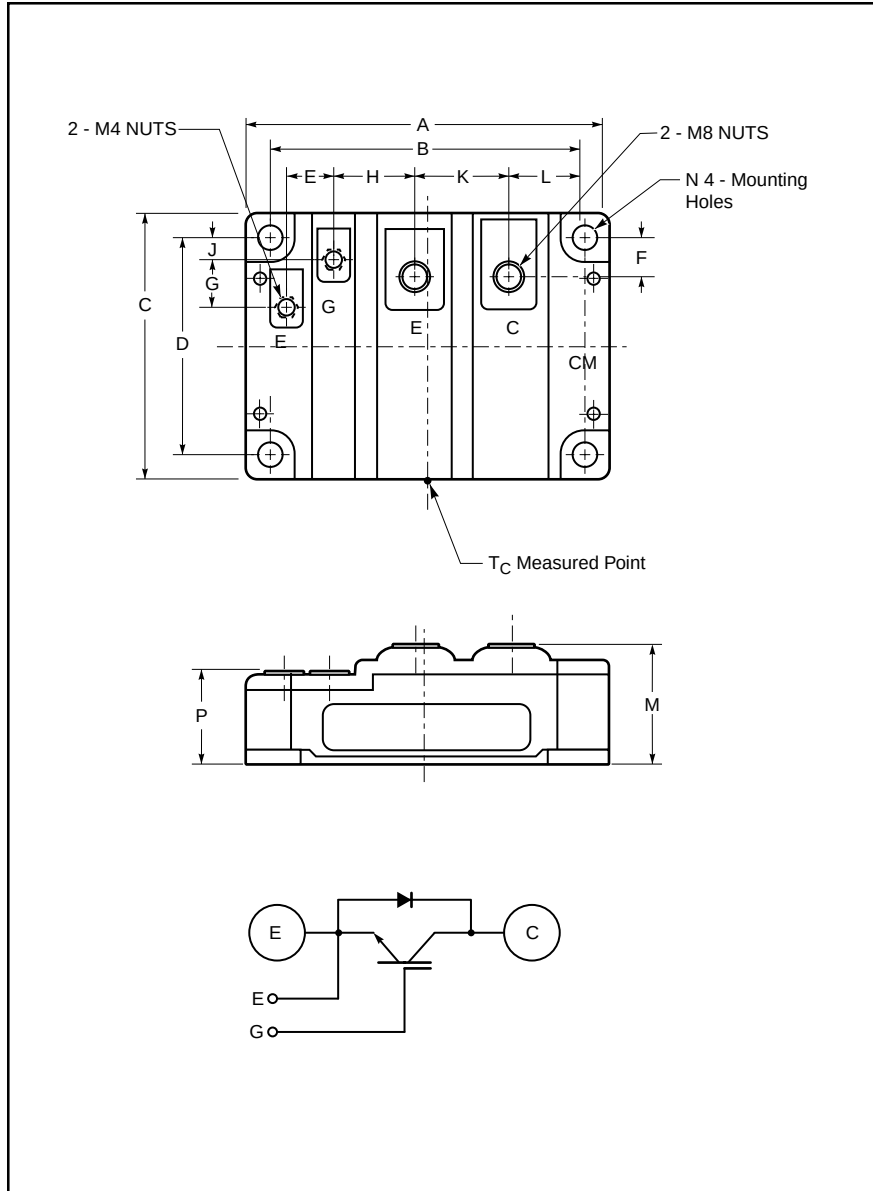


### Single IGBTMOD™ U-Series Module 600 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| A          | 4.33      | 110.0       |
| B          | 3.66±0.01 | 93.0±0.25   |
| C          | 3.15      | 80.0        |
| D          | 2.44±0.01 | 62.0±0.25   |
| E          | 0.53      | 13.5        |
| F          | 0.37      | 9.5         |
| G          | 0.57      | 14.5        |

| Dimensions | Inches           | Millimeters  |
|------------|------------------|--------------|
| H          | 0.96             | 24.5         |
| J          | 0.22             | 5.5          |
| K          | 1.14             | 29.0         |
| L          | 0.85             | 21.5         |
| M          | 1.34 +0.04/-0.02 | 34 +1.0/-0.5 |
| N          | 0.26 Dia.        | 6.5 Dia.     |
| 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 (135ns) 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-24H is a 1200V ( $V_{CES}$ ), 600 Ampere Single IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 600                       | 24                        |

**CM600HU-24H**  
**Single IGBTMOD™ U-Series Module**  
 600 Amperes/1200 Volts

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

| Ratings                                                    | Symbol           | CM600HU-24H | Units            |
|------------------------------------------------------------|------------------|-------------|------------------|
| Junction Temperature                                       | $T_j$            | -40 to 150  | $^\circ\text{C}$ |
| Storage Temperature                                        | $T_{\text{stg}}$ | -40 to 125  | $^\circ\text{C}$ |
| Collector-Emitter Voltage (G-E SHORT)                      | $V_{\text{CES}}$ | 1200        | Volts            |
| Gate-Emitter Voltage (C-E SHORT)                           | $V_{\text{GES}}$ | $\pm 20$    | Volts            |
| Collector Current ( $T_c = 25^\circ\text{C}$ )             | $I_C$            | 600         | Amperes          |
| Peak Collector Current ( $T_j \leq 150^\circ\text{C}$ )    | $I_{\text{CM}}$  | 1200*       | Amperes          |
| Emitter Current** ( $T_c = 25^\circ\text{C}$ )             | $I_E$            | 600         | Amperes          |
| Peak Emitter Current**                                     | $I_{\text{EM}}$  | 1200*       | Amperes          |
| Maximum Collector Dissipation ( $T_c = 25^\circ\text{C}$ ) | $P_c$            | 3100        | Watts            |
| Mounting Torque, M8 Main Terminal                          | –                | 95          | in-lb            |
| Mounting Torque, M6 Mounting                               | –                | 40          | in-lb            |
| Mounting Torque, M4 Terminal                               | –                | 15          | in-lb            |
| Weight                                                     | –                | 600         | Grams            |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)  | $V_{\text{ISO}}$ | 2500        | Volts            |

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

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

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

| Characteristics                      | Symbol               | Test Conditions                                                              | Min. | Typ. | Max. | Units         |
|--------------------------------------|----------------------|------------------------------------------------------------------------------|------|------|------|---------------|
| Collector-Cutoff Current             | $I_{\text{CES}}$     | $V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$                  | –    | –    | 2    | mA            |
| Gate Leakage Voltage                 | $I_{\text{GES}}$     | $V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$                  | –    | –    | 0.5  | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{\text{GE(th)}}$  | $I_C = 60\text{mA}, V_{\text{CE}} = 10\text{V}$                              | 4.5  | 6    | 7.5  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 600\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 25^\circ\text{C}$      | –    | 2.9  | 3.7  | Volts         |
|                                      |                      | $I_C = 600\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 125^\circ\text{C}$     | –    | 2.85 | –    | Volts         |
| Total Gate Charge                    | $Q_G$                | $V_{\text{CC}} = 600\text{V}, I_C = 600\text{A}, V_{\text{GE}} = 15\text{V}$ | –    | 2250 | –    | nC            |
| Emitter-Collector Voltage*           | $V_{\text{EC}}$      | $I_E = 600\text{A}, V_{\text{GE}} = 0\text{V}$                               | –    | –    | 3.2  | Volts         |

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

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

| Characteristics               | Symbol              | Test Conditions                                                                                                                             | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| Input Capacitance             | $C_{\text{ies}}$    |                                                                                                                                             | –    | –    | 90   | nF            |
| Output Capacitance            | $C_{\text{oes}}$    | $V_{\text{CE}} = 10\text{V}, V_{\text{GE}} = 0\text{V}$                                                                                     | –    | –    | 31.5 | nF            |
| Reverse Transfer Capacitance  | $C_{\text{res}}$    |                                                                                                                                             | –    | –    | 18   | nF            |
| Resistive                     | Turn-on Delay Time  | $V_{\text{CC}} = 600\text{V}, I_C = 600\text{A},$<br>$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V},$<br>$R_G = 2.1\Omega, \text{Resistive}$ | –    | –    | 300  | ns            |
|                               | Rise Time           |                                                                                                                                             | –    | –    | 700  | ns            |
| Switch                        | Turn-off Delay Time | Load Switching Operation                                                                                                                    | –    | –    | 450  | ns            |
| Times                         | Fall Time           |                                                                                                                                             | –    | –    | 350  | ns            |
| Diode Reverse Recovery Time   | $t_{\text{rr}}$     | $I_E = 600\text{A}, di_E/dt = -1200\text{A}/\mu\text{s}$                                                                                    | –    | –    | 300  | ns            |
| Diode Reverse Recovery Charge | $Q_{\text{rr}}$     | $I_E = 600\text{A}, di_E/dt = -1200\text{A}/\mu\text{s}$                                                                                    | –    | 3.3  | –    | $\mu\text{C}$ |

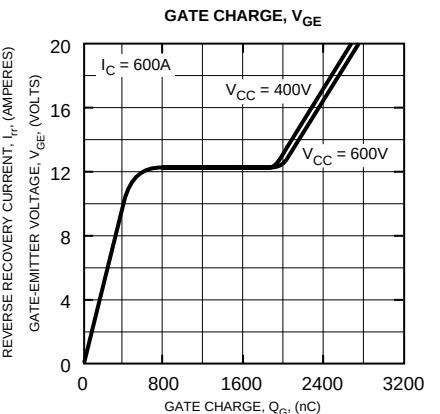
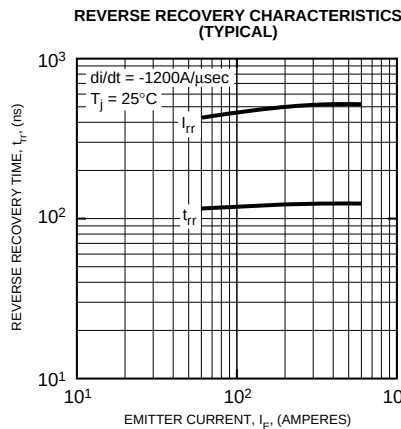
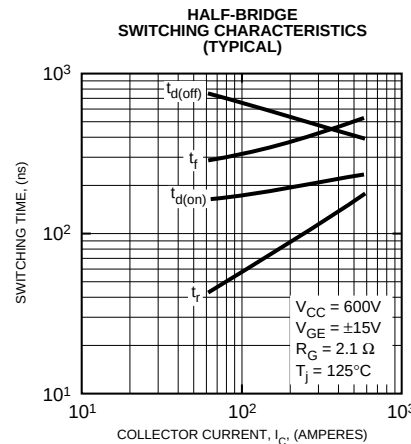
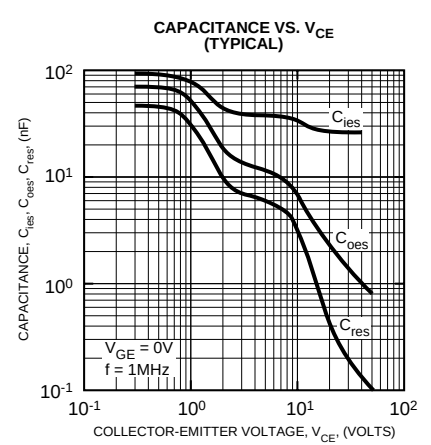
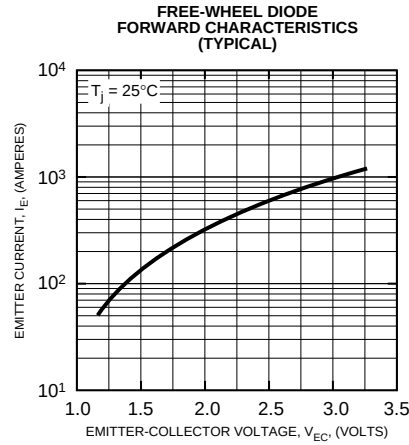
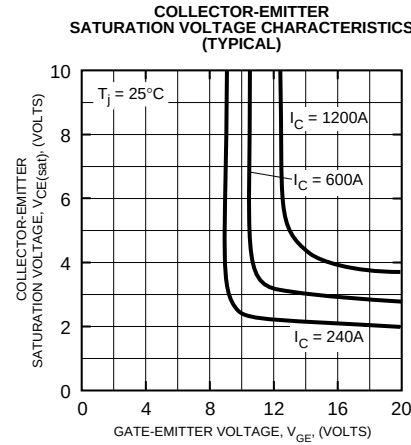
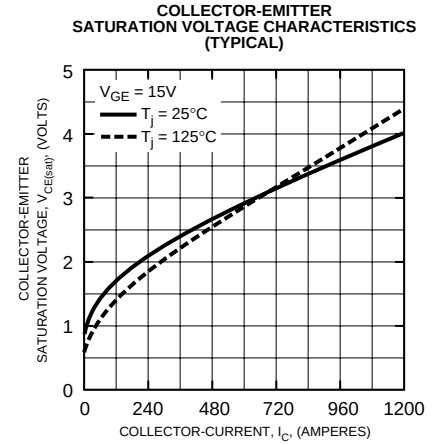
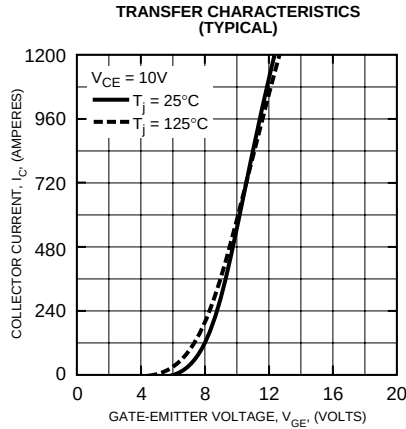
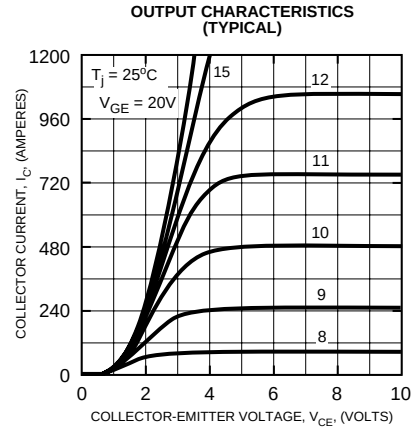
**Thermal and Mechanical Characteristics,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

| Characteristics                      | Symbol                | Test Conditions                    | Min. | Typ.  | Max. | Units                     |
|--------------------------------------|-----------------------|------------------------------------|------|-------|------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)Q}}$ | Per IGBT Module                    | –    | –     | 0.04 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)D}}$ | Per FWDi Module                    | –    | –     | 0.06 | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{\text{th(c-f)}}$  | Per Module, Thermal Grease Applied | –    | 0.015 | –    | $^\circ\text{C}/\text{W}$ |

## CM600HU-24H

### Single IGBTMOD™ U-Series Module

600 Amperes/1200 Volts



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