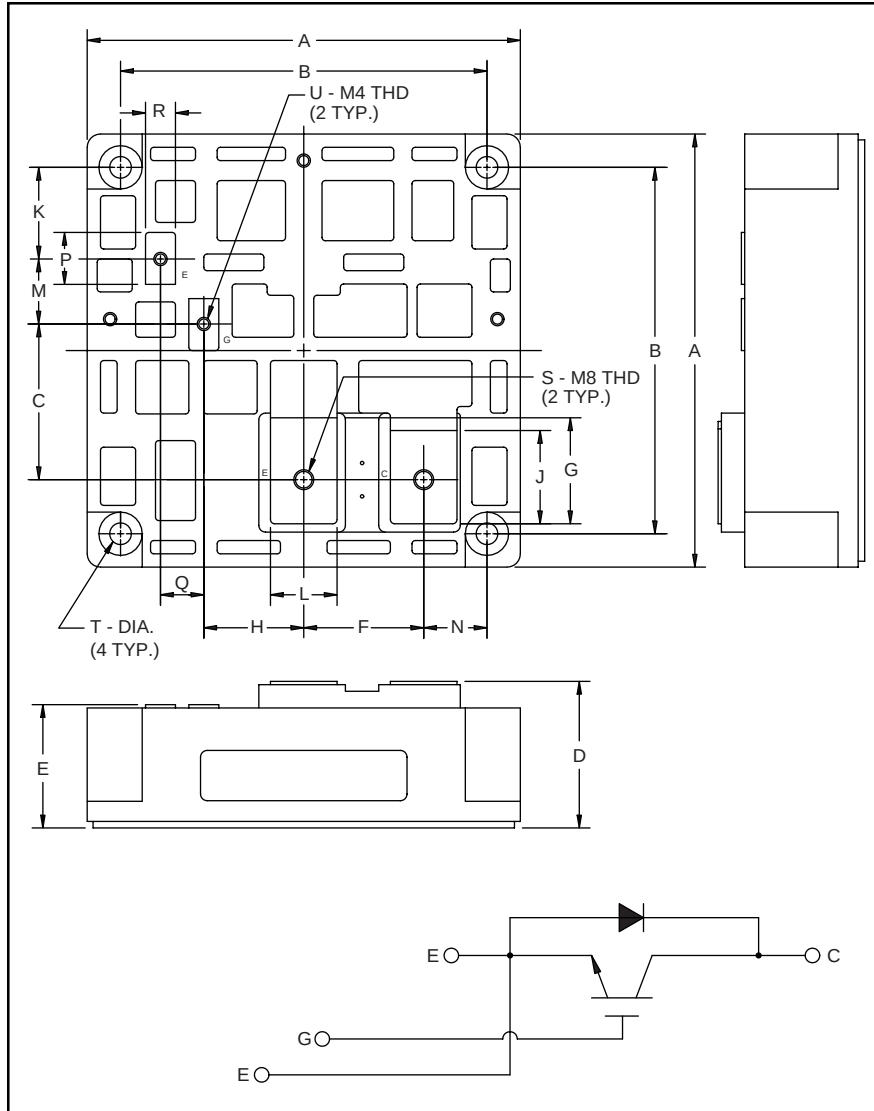


### Single IGBTMOD™ H-Series Module 1000 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches         | Millimeters  |
|------------|----------------|--------------|
| A          | 5.12           | 130.0        |
| B          | 4.33±0.01      | 110.0±0.25   |
| C          | 1.840          | 46.75        |
| D          | 1.73±0.04/0.02 | 44.0±1.0/0.5 |
| E          | 1.46±0.04/0.02 | 37.0±1.0/0.5 |
| F          | 1.42           | 36.0         |
| G          | 1.25           | 31.8         |
| H          | 1.18           | 30.0         |
| J          | 1.10           | 28.0         |
| K          | 1.08           | 27.5         |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| L          | 0.79      | 20.0        |
| M          | 0.77      | 19.5        |
| N          | 0.75      | 19.0        |
| P          | 0.61      | 15.6        |
| Q          | 0.51      | 13.0        |
| R          | 0.35      | 9.0         |
| S          | M8 Metric | M8          |
| T          | 0.26 Dia. | Dia. 6.5    |
| U          | M4 Metric | M4          |



#### 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
- ☐ High Frequency Operation (20-25kHz)
- ☐ 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 part module number you desire from the table below -i.e. CM1000HA-24H is a 1200V ( $V_{CES}$ ), 1000 Ampere Single IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 1000                      | 24                        |

**CM1000HA-24H**  
**Single IGBTMOD™ H-Series Module**  
 1000 Amperes/1200 Volts

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

| Ratings                                 | Symbol           | CM1000HA-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                    | $V_{\text{GES}}$ | $\pm 20$     | Volts              |
| Collector Current                       | $I_C$            | 1000         | Amperes            |
| Peak Collector Current                  | $I_{\text{CM}}$  | 2000*        | Amperes            |
| Diode Forward Current                   | $I_F$            | 1000         | Amperes            |
| Diode Forward Surge Current             | $I_{\text{FM}}$  | 2000*        | Amperes            |
| Power Dissipation                       | $P_d$            | 5800         | Watts              |
| Max. Mounting Torque M8 Terminal Screws | –                | 95           | in-lb              |
| Max. Mounting Torque M6 Mounting Screws | –                | 26           | in-lb              |
| Module Weight (Typical)                 | –                | 1600         | Grams              |
| V Isolation                             | $V_{\text{RMS}}$ | 2500         | Volts              |

\* Pulse width and repetition rate should be such that device junction temperature does not exceed the device rating.

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

| Characteristics                      | Symbol               | Test Conditions                                                               | Min. | Typ. | Max.  | Units         |
|--------------------------------------|----------------------|-------------------------------------------------------------------------------|------|------|-------|---------------|
| Collector-Cutoff Current             | $I_{\text{CES}}$     | $V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$                   | –    | –    | 6     | mA            |
| Gate Leakage Current                 | $I_{\text{GES}}$     | $V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$                   | –    | –    | 0.5   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{\text{GE(th)}}$  | $I_C = 100\text{mA}, V_{\text{CE}} = 10\text{V}$                              | 4.5  | 6.0  | 7.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 1000\text{A}, V_{\text{GE}} = 15\text{V}$                              | –    | 2.7  | 3.6** | Volts         |
|                                      |                      | $I_C = 1000\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 150^{\circ}\text{C}$   | –    | 2.4  | –     | Volts         |
| Total Gate Charge                    | $Q_G$                | $V_{\text{CC}} = 600\text{V}, I_C = 1000\text{A}, V_{\text{GS}} = 15\text{V}$ | –    | 5000 | –     | nC            |
| Diode Forward Voltage                | $V_{\text{FM}}$      | $I_E = 1000\text{A}, V_{\text{GS}} = 0\text{V}$                               | –    | –    | 3.5   | Volts         |

\*\* Pulse width and repetition rate should be such that device junction temperature rise is negligible.

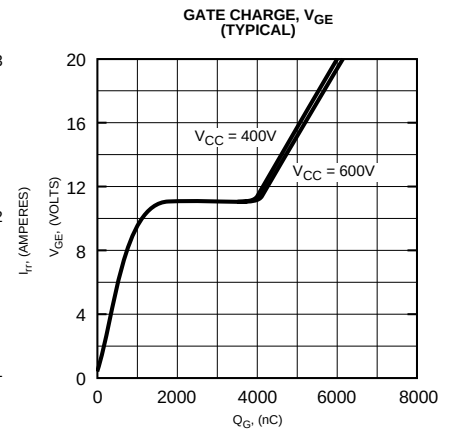
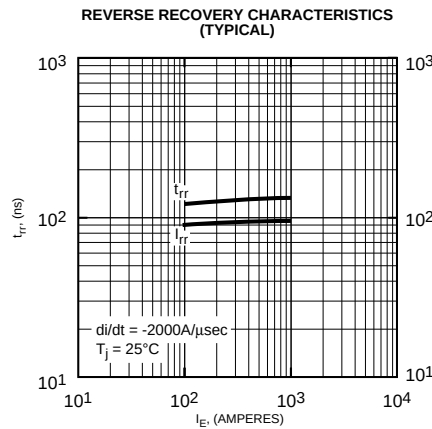
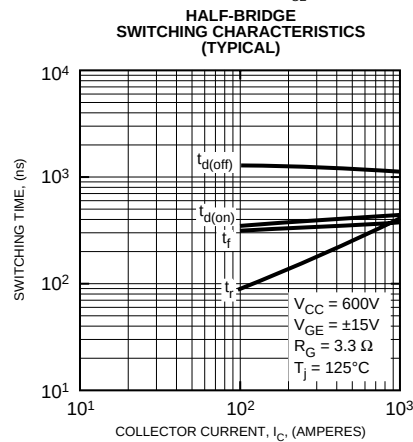
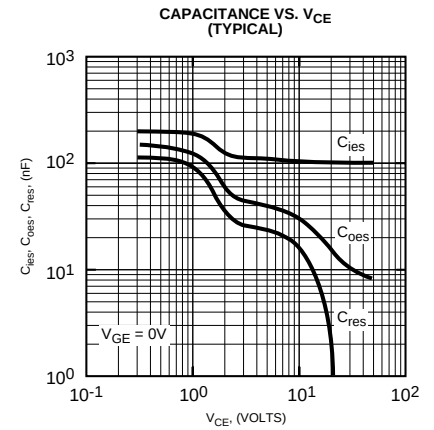
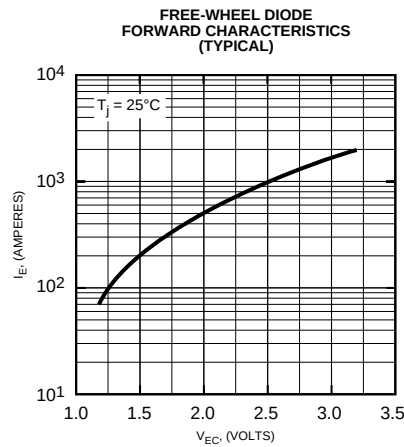
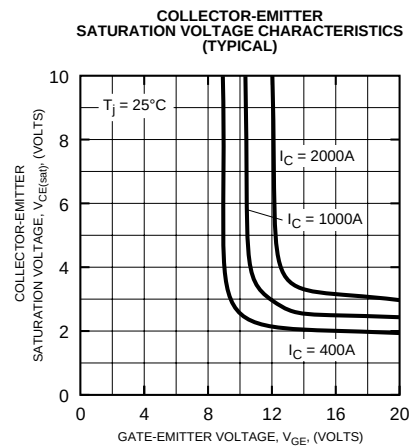
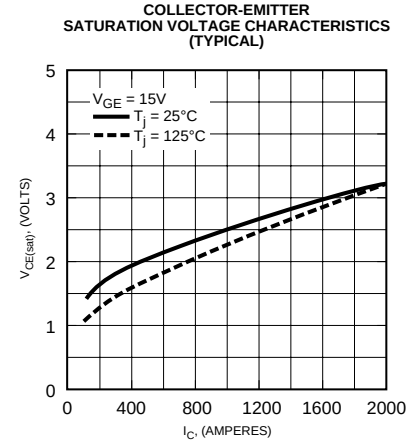
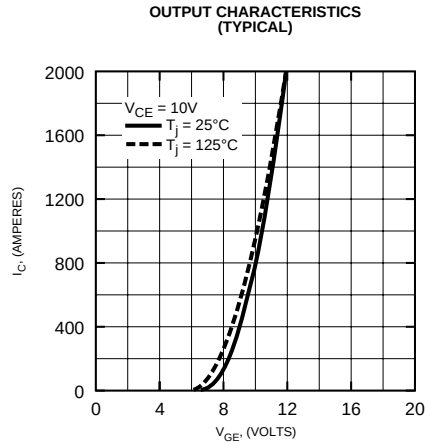
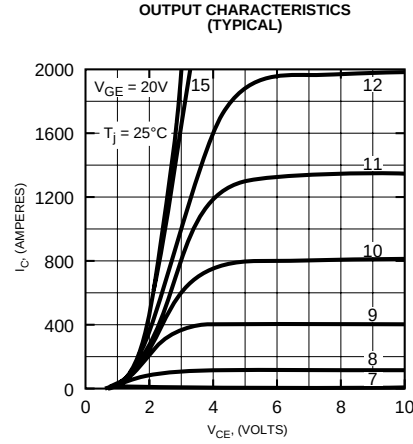
**Dynamic Electrical Characteristics,  $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified**

| Characteristics               | Symbol              | Test Conditions                                                                                                       | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| Input Capacitance             | $C_{\text{ies}}$    |                                                                                                                       | –    | –    | 200  | nF            |
| Output Capacitance            | $C_{\text{oes}}$    | $V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}, f = 1\text{MHz}$                                              | –    | –    | 70   | nF            |
| Reverse Transfer Capacitance  | $C_{\text{res}}$    |                                                                                                                       | –    | –    | 40   | nF            |
| Resistive                     | Turn-on Delay Time  | $V_{\text{CC}} = 600\text{V}, I_C = 1000\text{A},$<br>$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}, R_G = 3.3\Omega$ | –    | –    | 600  | ns            |
| Load                          | Rise Time           |                                                                                                                       | –    | –    | 1500 | ns            |
| Switching                     | Turn-off Delay Time |                                                                                                                       | –    | –    | 1200 | ns            |
| Time                          | Fall Time           |                                                                                                                       | –    | –    | 350  | ns            |
| Diode Reverse Recovery Time   | $t_{\text{rr}}$     | $I_E = 1000\text{A}, di_E/dt = -2000\text{A}/\mu\text{s}$                                                             | –    | –    | 250  | ns            |
| Diode Reverse Recovery Charge | $Q_{\text{rr}}$     | $I_E = 1000\text{A}, di_E/dt = -2000\text{A}/\mu\text{s}$                                                             | –    | 7.4  | –    | $\mu\text{C}$ |

**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 | $R_{\text{th(j-c)}}$ | Per IGBT                           | –    | –    | 0.022 | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per FWDi                           | –    | –    | 0.050 | $^{\circ}\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{\text{th(c-f)}}$ | Per Module, Thermal Grease Applied | –    | –    | 0.018 | $^{\circ}\text{C}/\text{W}$ |

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