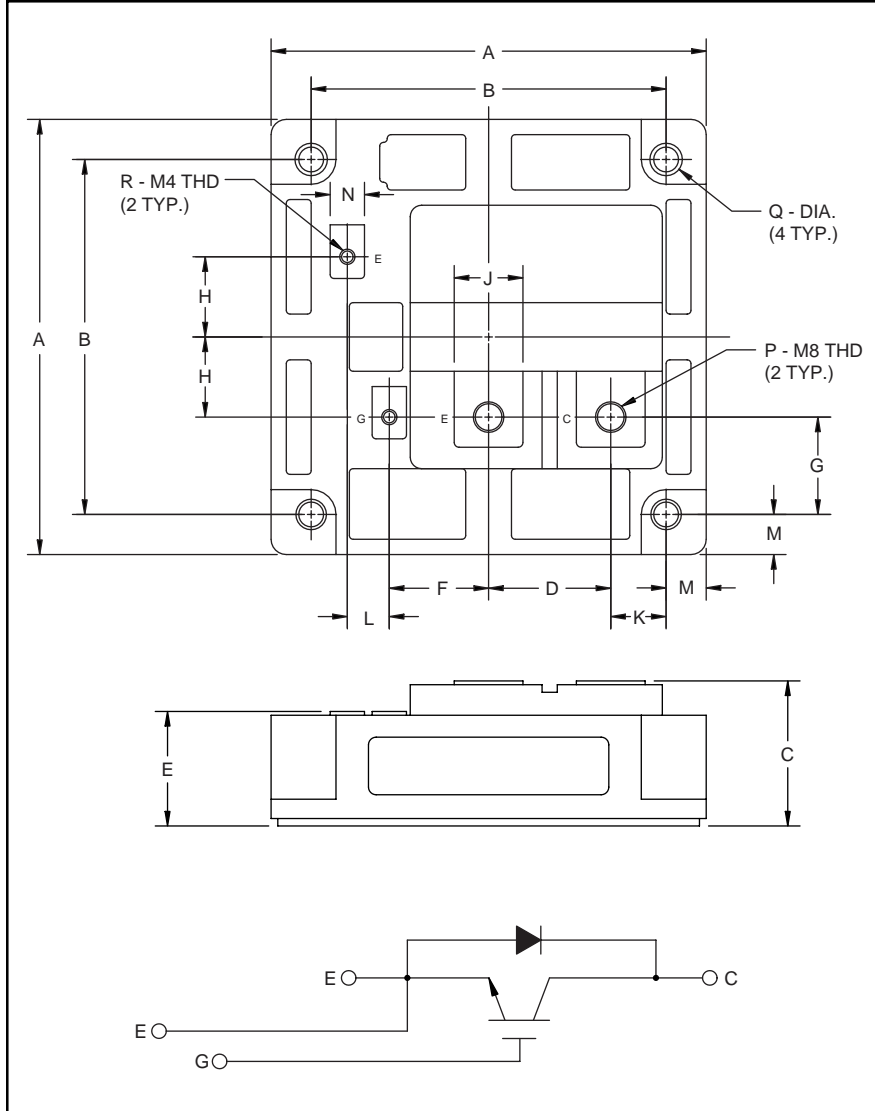


### Single IGBTMOD™ H-Series Module 400 Amperes/1700 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches          | Millimeters   |
|------------|-----------------|---------------|
| A          | 4.49            | 114.0         |
| B          | 3.66±0.01       | 93.0±0.25     |
| C          | 1.50+0.04/-0.02 | 38.0+1.0/-0.5 |
| D          | 1.26            | 32.0          |
| E          | 1.18+0.04/-0.02 | 30.0+1.0/-0.5 |
| F          | 1.02            | 26.0          |
| G          | 1.0             | 25.5          |
| H          | 0.83            | 21.0          |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| J          | 0.71      | 18.0        |
| K          | 0.57      | 14.5        |
| L          | 0.43      | 11.0        |
| M          | 0.41      | 10.5        |
| N          | 0.35      | 9.0         |
| P          | M8 Metric | M8          |
| Q          | 0.26 Dia. | Dia. 6.5    |
| R          | 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 Free-Wheel Diode
- High Frequency Operation (20-25kHz)
- Isolated Baseplate for Easy Heat Sinking

#### Applications:

- AC Motor Control
- Auxilliary Inverter for Traction
- UPS
- Welding Power Supplies
- Laser Power Supplies

#### Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM400HA-34H is a 1700V ( $V_{CES}$ ), 400 Ampere Single IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 400                       | 34                        |

**CM400HA-34H**  
**Single IGBTMOD™ H-Series Module**  
 400 Amperes/1700 Volts

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

| Ratings                                    | Symbol    | CM400HA-34H | 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)      | $V_{CES}$ | 1700        | Volts            |
| Gate-Emitter Voltage                       | $V_{GES}$ | $\pm 20$    | Volts            |
| Collector Current                          | $I_C$     | 400         | Amperes          |
| Peak Collector Current                     | $I_{CM}$  | 800*        | Amperes          |
| Diode Forward Current                      | $I_F$     | 400         | Amperes          |
| Diode Forward Surge Current                | $I_{FM}$  | 800*        | Amperes          |
| Power Dissipation                          | $P_d$     | 4100        | Watts            |
| Max. Mounting Torque M8 Terminal Screws    | -         | 95          | in-lb            |
| Max. Mounting Torque M6 Mounting Screws    | -         | 26          | in-lb            |
| Max. Mounting Torque M4 G-E Terminal Screw | -         | 13          | in-lb            |
| Module Weight (Typical)                    | -         | 980         | Grams            |
| V Isolation                                | $V_{RMS}$ | 4000        | 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             | $I_{CES}$     | $V_{CE} = V_{CES}, V_{GE} = 0V$                     | -    | -    | 4     | mA            |
| Gate Leakage Current                 | $I_{GES}$     | $V_{GE} = V_{GES}, V_{CE} = 0V$                     | -    | -    | 0.5   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 40\text{mA}, V_{CE} = 10V$                   | 4.5  | 6.0  | 7.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 400A, V_{GE} = 15V$                          | -    | 2.7  | 3.7** | Volts         |
|                                      |               | $I_C = 400A, V_{GE} = 15V, T_j = 150^\circ\text{C}$ | -    | -    | -*    | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 750V, I_C = 400A, V_{GS} = 15V$           | -    | 2900 | -     | nC            |
| Diode Forward Voltage                | $V_{FM}$      | $I_E = 400A, V_{GS} = 0V$                           | -    | -    | 3.4   | Volts         |

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

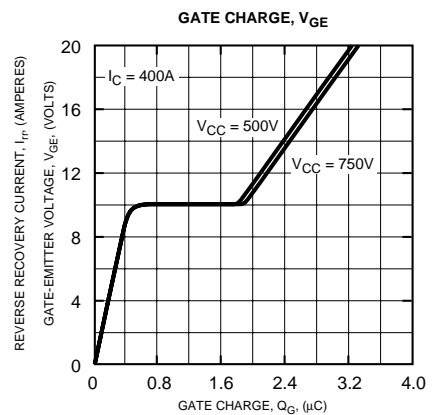
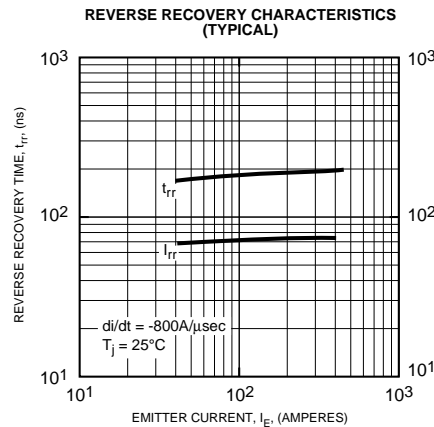
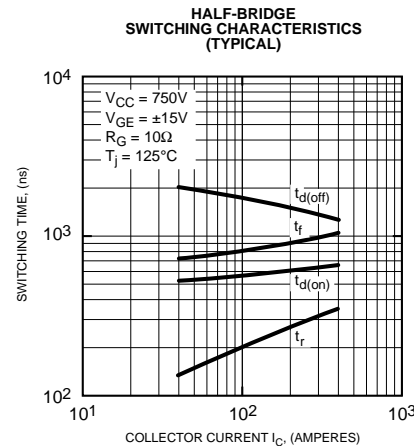
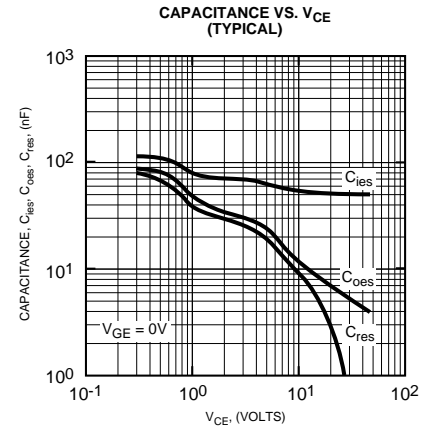
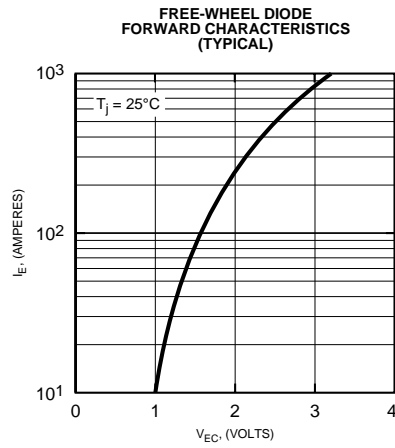
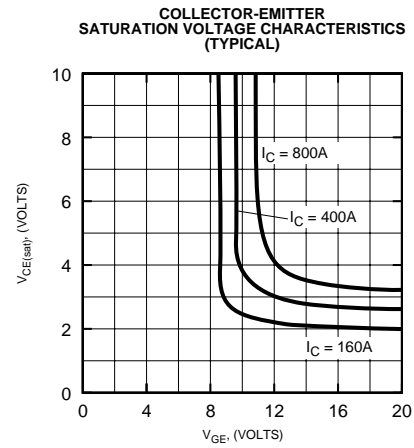
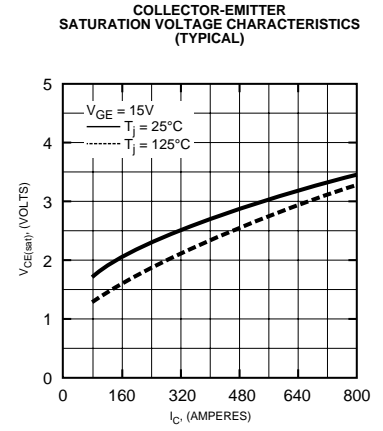
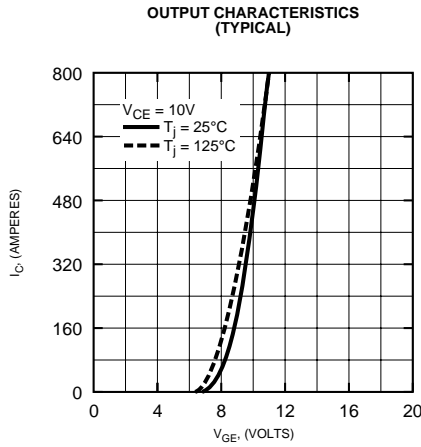
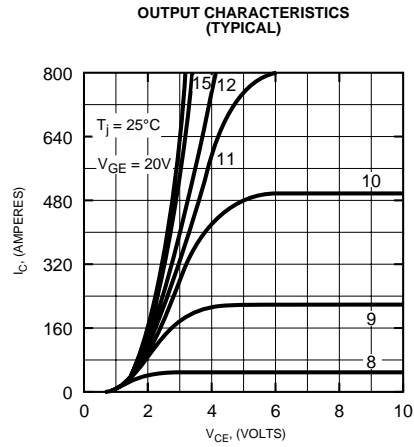
**Dynamic Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

| Characteristics               | Symbol              | Test Conditions                           | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|-------------------------------------------|------|------|------|---------------|
| Input Capacitance             | $C_{ies}$           |                                           | -    | -    | 85   | nF            |
| Output Capacitance            | $C_{oes}$           | $V_{GE} = 0V, V_{CE} = 10V$               | -    | -    | 20   | nF            |
| Reverse Transfer Capacitance  | $C_{res}$           |                                           | -    | -    | 15   | nF            |
| Resistive                     | Turn-on Delay Time  | $t_{d(on)}$                               | -    | -    | 900  | ns            |
|                               | Rise Time           | $t_r$                                     | -    | -    | 1500 | ns            |
| Switching                     | Turn-off Delay Time | $t_{d(off)}$                              | -    | -    | 1500 | ns            |
|                               | Fall Time           | $t_f$                                     | -    | -    | 800  | ns            |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 600A, di_E/dt = -800A/\mu\text{s}$ | -    | -    | 400  | ns            |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 600A, di_E/dt = -800A/\mu\text{s}$ | -    | 7.0  | -    | $\mu\text{C}$ |

**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 | $R_{th(j-c)}$ | Per IGBT                           | -    | -    | 0.030 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi                           | -    | -    | 0.060 | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | -    | -    | 0.023 | $^\circ\text{C/W}$ |

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