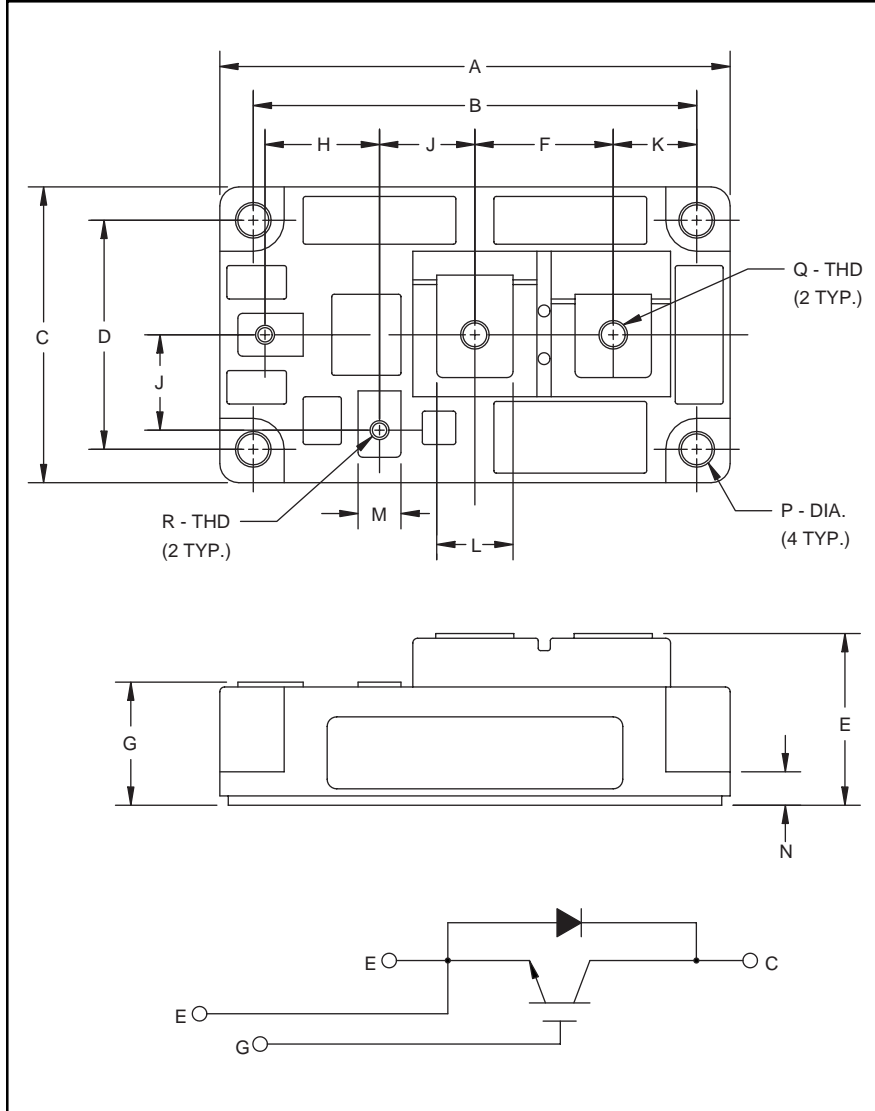


Single IGBTMOD™ H-Series Module 400 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches | Millimeters |
|------------|-----------------|---------------|
| A | 4.21 | 107.0 |
| B | 3.661±0.01 | 93.0±0.25 |
| C | 2.44 | 62.0 |
| D | 1.89±0.01 | 48.0±0.25 |
| E | 1.42+0.04/-0.02 | 36.0+1.0/-0.5 |
| F | 1.14 | 29.0 |
| G | 1.02+0.04/-0.2 | 25.8+1.0/-0.5 |
| H | 0.94 | 24.0 |

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| J | 0.79 | 20.0 |
| K | 0.69 | 17.5 |
| L | 0.63 | 16.0 |
| M | 0.35 | 9.0 |
| N | 0.28 | 7.0 |
| P | 0.26 Dia. | Dia. 6.5 |
| Q | M6 Metric | M6 |
| 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 (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. CM400HA-24H is a 1200V (V_{CES}), 400 Ampere Single IGBTMOD™ Power Module.

| Type | Current Rating Amperes | V_{CES} Volts (x 50) |
|------|---------------------------|---------------------------|
| CM | 400 | 24 |

CM400HA-24H
Single IGBTMOD™ H-Series Module
 400 Amperes/1200 Volts

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

| Ratings | Symbol | CM400HA-24H | 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} | 1200 | Volts |
| Gate-Emitter Voltage | V_{GES} | ± 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 | 2800 | Watts |
| Max. Mounting Torque M6 Terminal Screws | - | 26 | in-lb |
| Max. Mounting Torque M6 Mounting Screws | - | 26 | in-lb |
| Module Weight (Typical) | - | 400 | Grams |
| V Isolation | V_{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_{CES} | $V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$ | - | - | 1.0 | mA |
| Gate Leakage Current | I_{GES} | $V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$ | - | - | 0.5 | μA |
| Gate-Emitter Threshold Voltage | $V_{\text{GE(th)}}$ | $I_C = 40\text{mA}, V_{\text{CE}} = 10\text{V}$ | 4.5 | 6.0 | 7.5 | Volts |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 400\text{A}, V_{\text{GE}} = 15\text{V}$ | - | 2.5 | 3.4** | Volts |
| | | $I_C = 400\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 150\text{ }^\circ\text{C}$ | - | 2.25 | - | Volts |
| Total Gate Charge | Q_G | $V_{\text{CC}} = 600\text{V}, I_C = 400\text{A}, V_{\text{GS}} = 15\text{V}$ | - | 2000 | - | nC |
| Diode Forward Voltage | V_{FM} | $I_E = 400\text{A}, V_{\text{GS}} = 0\text{V}$ | - | - | 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} | | - | - | 80 | nF |
| Output Capacitance | C_{Oes} | $V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}, f = 1\text{MHz}$ | - | - | 28 | nF |
| Reverse Transfer Capacitance | C_{res} | | - | - | 16 | nF |
| Resistive | Turn-on Delay Time | $V_{\text{CC}} = 600\text{V}, I_C = 400\text{A}$ | - | - | 300 | ns |
| Load | Rise Time | | | | | |
| Switching | Turn-off Delay Time | $V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}, R_G = 0.78\Omega$ | - | - | 350 | ns |
| | Times | | | | | |
| Diode Reverse Recovery Time | t_{rr} | $I_E = 400\text{A}, di_E/dt = -800\text{A}/\mu\text{s}$ | - | - | 250 | ns |
| Diode Reverse Recovery Charge | Q_{rr} | $I_E = 400\text{A}, di_E/dt = -800\text{A}/\mu\text{s}$ | - | 2.97 | - | μC |

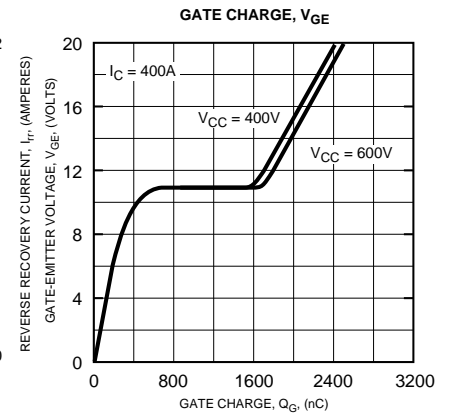
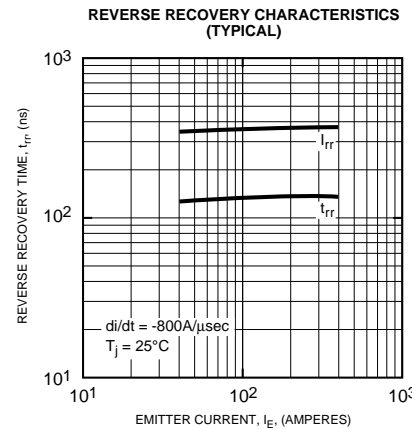
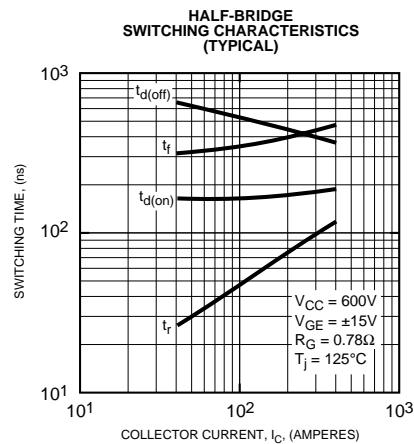
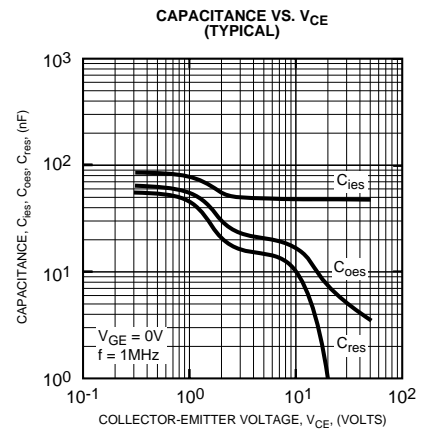
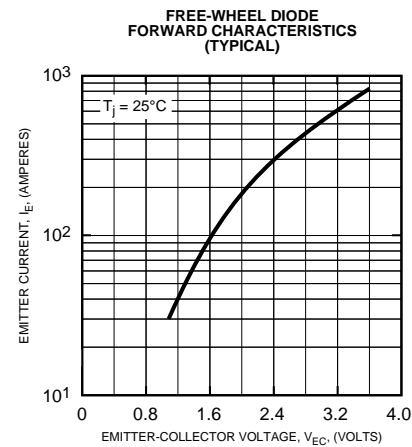
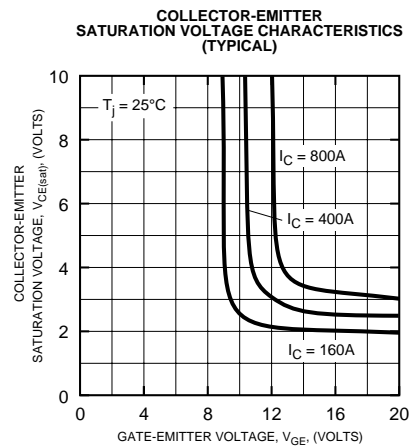
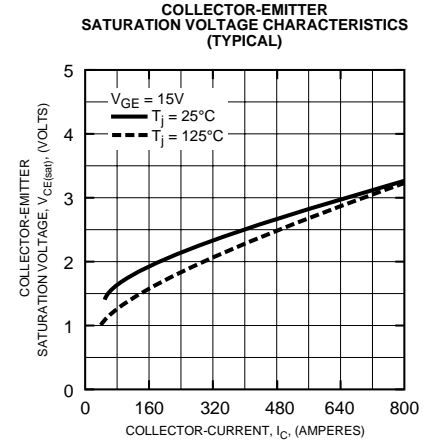
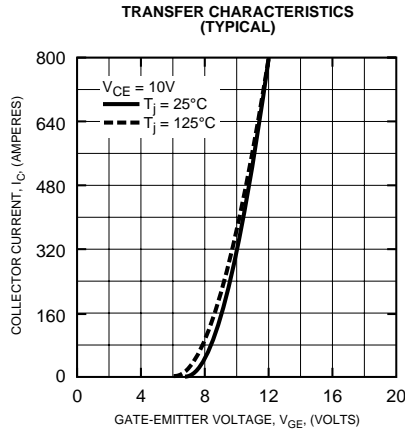
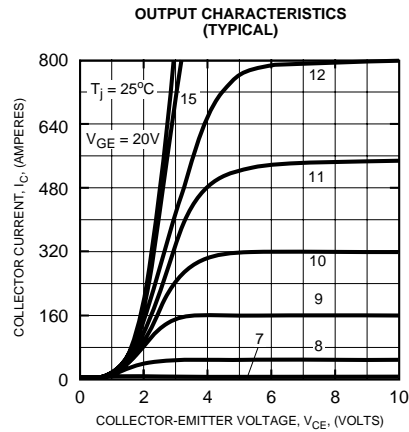
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|----------------------|------------------------------------|------|------|-------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per IGBT | - | - | 0.045 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per FWDi | - | - | 0.09 | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance | $R_{\text{th(c-f)}}$ | Per Module, Thermal Grease Applied | - | - | 0.040 | $^\circ\text{C}/\text{W}$ |



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