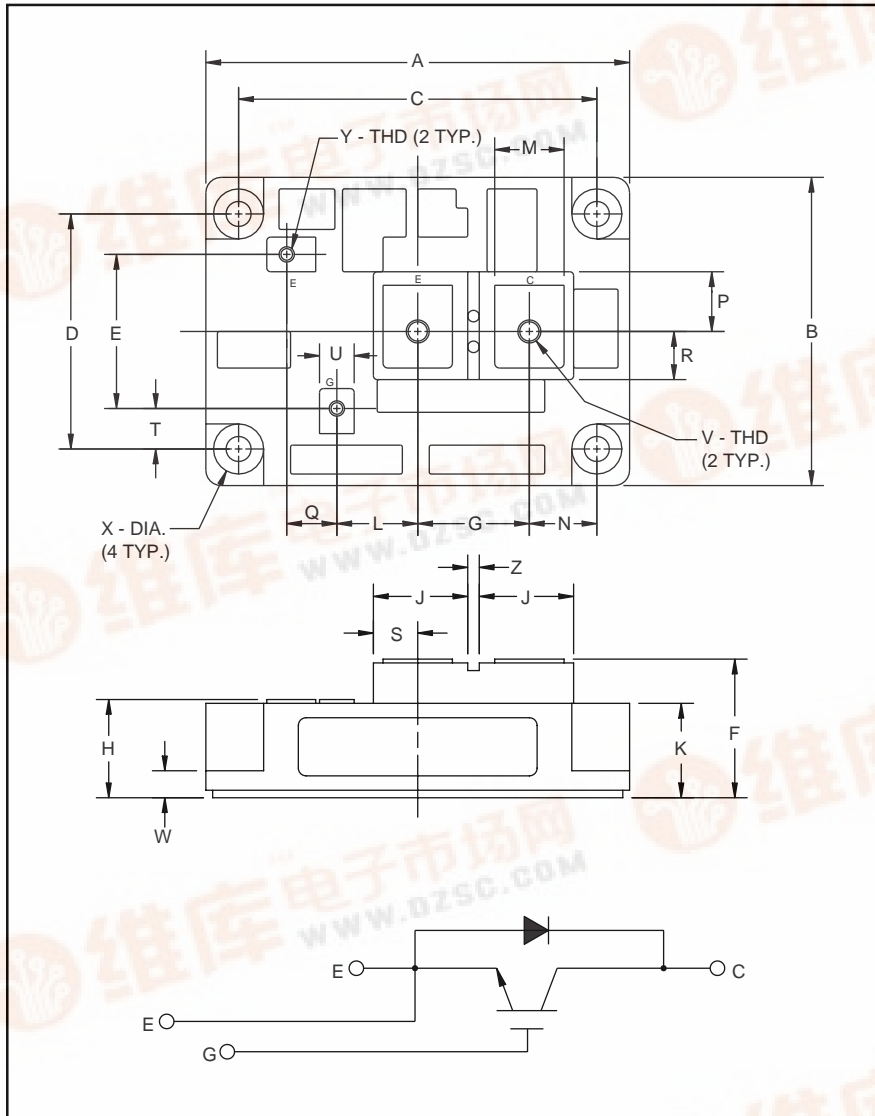




Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

## CM600HA-24H

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



Outline Drawing and Circuit Diagram

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| A          | 4.33       | 110.0       |
| B          | 3.15       | 80.0        |
| C          | 3.66±0.008 | 93.0±0.25   |
| D          | 2.44±0.008 | 62.0±0.25   |
| E          | 1.57       | 40.0        |
| F          | 1.42 Max.  | 36.0 Max.   |
| G          | 1.14       | 29.0        |
| H          | 1.00 Max.  | 25.5 Max.   |
| J          | 0.96       | 25.0        |
| K          | 0.94       | 24.5        |
| L          | 0.83       | 21.0        |

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| N          | 0.69       | 17.5        |
| P          | 0.61       | 15.5        |
| Q          | 0.51       | 13.0        |
| R          | 0.49       | 12.5        |
| S          | 0.45       | 11.5        |
| T          | 0.43       | 11.0        |
| U          | 0.35       | 9.0         |
| V          | M8 Metric  | M8          |
| W          | 0.28       | 7.0         |
| X          | 0.256 Dia. | Dia. 6.50   |
| Y          | 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. CM600HA-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                        |





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

| Ratings                                 | Symbol    | CM600HA-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                    | $V_{GES}$ | $\pm 20$    | Volts            |
| Collector Current                       | $I_C$     | 600         | Amperes          |
| Peak Collector Current                  | $I_{CM}$  | 1200*       | Amperes          |
| Diode Forward Current                   | $I_F$     | 600         | Amperes          |
| Diode Forward Surge Current             | $I_{FM}$  | 1200*       | 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            |
| Module Weight (Typical)                 | -         | 560         | 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             | $I_{CES}$     | $V_{CE} = V_{CES}, V_{GE} = 0V$                            | -    | -    | 2.0   | mA            |
| Gate Leakage Current                 | $I_{GES}$     | $V_{GE} = V_{GES}, V_{CE} = 0V$                            | -    | -    | 0.5   | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 60\text{mA}, V_{CE} = 10V$                          | 4.5  | 6.0  | 7.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 600\text{A}, V_{GE} = 15V$                          | -    | 2.5  | 3.4** | Volts         |
|                                      |               | $I_C = 600\text{A}, V_{GE} = 15V, T_j = 150^\circ\text{C}$ | -    | 2.25 | -     | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 600V, I_C = 600\text{A}, V_{GS} = 15V$           | -    | 3000 | -     | nC            |
| Diode Forward Voltage                | $V_{FM}$      | $I_E = 600\text{A}, V_{GS} = 0V$                           | -    | -    | 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             | $C_{ies}$           |  | -  | -    | 120  | nF            |    |
| Output Capacitance            | $C_{oes}$           | $V_{GE} = 0V, V_{CE} = 10V, f = 1\text{MHz}$             | -  | -    | 42   | nF            |    |
| Reverse Transfer Capacitance  | $C_{res}$           |  | -  | -    | 24   | nF            |    |
| Resistive                     | Turn-on Delay Time  | $t_{d(on)}$  | -  | -    | 300  | ns            |    |
| Load                          | Rise Time           | $t_r$  | -  | -    | 700  | ns            |    |
| Switching                     | Turn-off Delay Time | $t_{d(off)}$   | $V_{GE1} = V_{GE2} = 15V, R_G = 2.1\Omega$ | -    | -    | 450           | ns |
|                               |                     |  |  |      |      |               |    |
| Diode Reverse Recovery Time   | $t_{rr}$            | $I_E = 600\text{A}, di_E/dt = -1200\text{A}/\mu\text{s}$ | -  | -    | 250  | ns            |    |
| Diode Reverse Recovery Charge | $Q_{rr}$            | $I_E = 600\text{A}, di_E/dt = -1200\text{A}/\mu\text{s}$ | -  | 4.46 | -    | $\mu\text{C}$ |    |

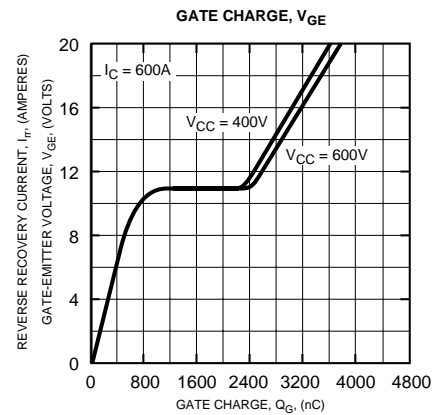
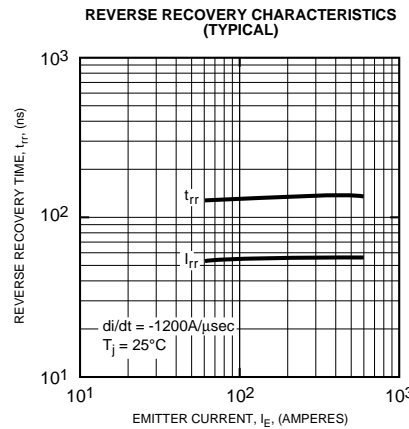
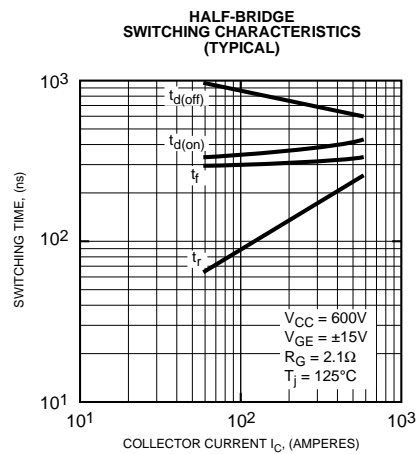
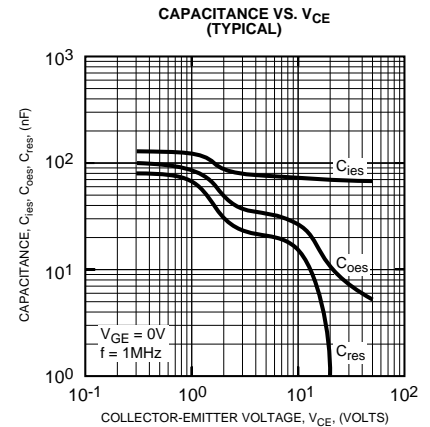
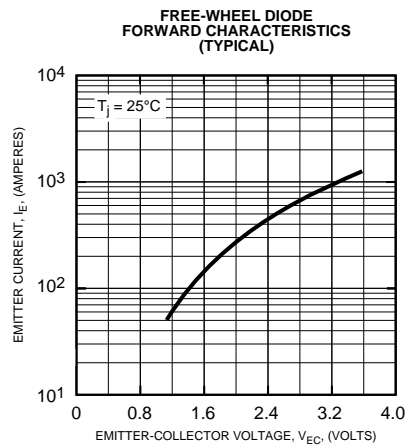
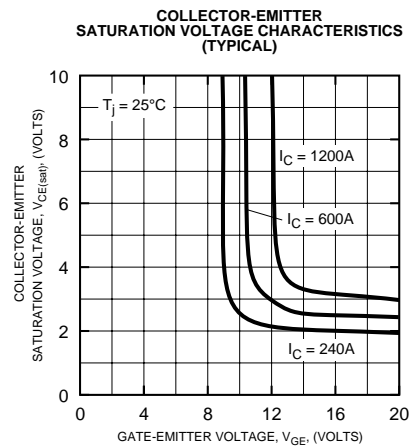
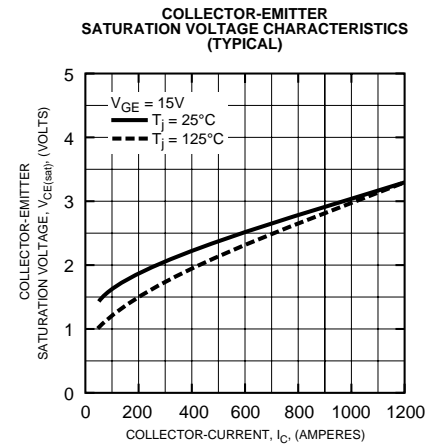
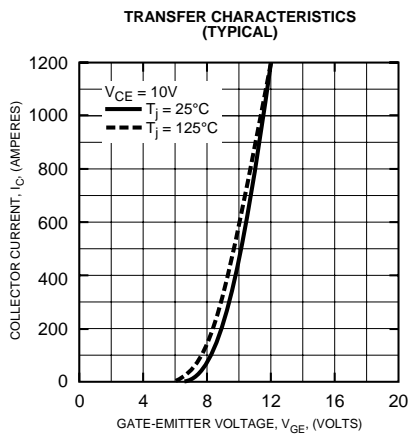
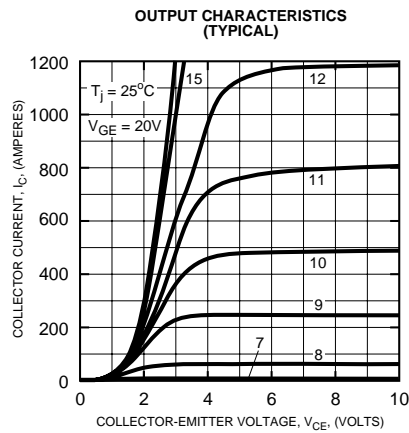
### Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics                      | Symbol        | Test Conditions                    | Min. | Typ. | Max.  | Units                     |
|--------------------------------------|---------------|------------------------------------|------|------|-------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per IGBT                           | -    | -    | 0.035 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi                           | -    | -    | 0.06  | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | -    | -    | 0.035 | $^\circ\text{C}/\text{W}$ |



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