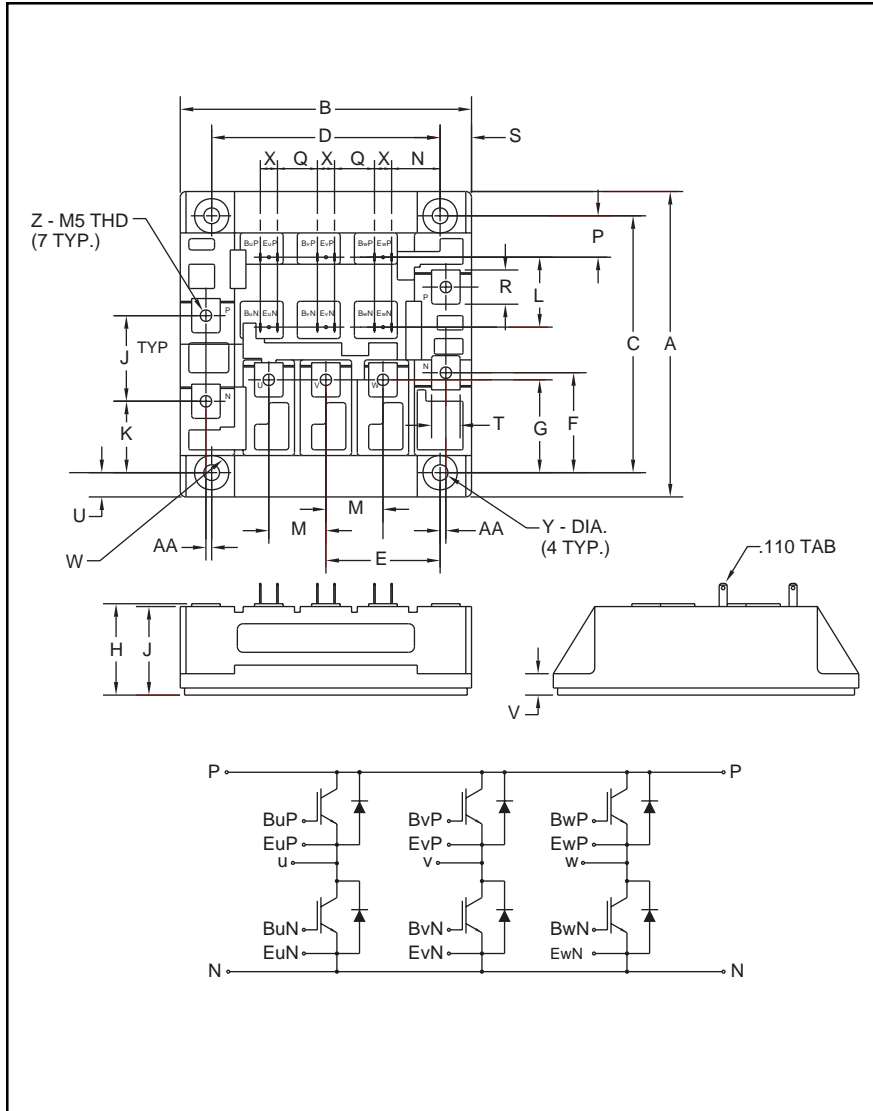


### Six-IGBT IGBTMOD™ H-Series Module 150 Amperes/600 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| A          | 4.21       | 107.0       |
| B          | 4.02       | 102.0       |
| C          | 3.543±0.01 | 90.0±0.25   |
| D          | 3.15±0.01  | 80.0±0.25   |
| E          | 1.57       | 40.0        |
| F          | 1.38       | 35.0        |
| G          | 1.28       | 32.5        |
| H          | 1.26 Max.  | 32.0 Max    |
| J          | 1.18       | 30.0        |
| K          | 0.98       | 25.0        |
| L          | 0.96       | 24.5        |
| M          | 0.79       | 20.0        |
| N          | 0.67       | 17.0        |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| P          | 0.57      | 14.5        |
| Q          | 0.55      | 14.0        |
| R          | 0.47      | 12.0        |
| S          | 0.43      | 11.0        |
| T          | 0.39      | 10.0        |
| U          | 0.33      | 8.5         |
| V          | 0.30      | 7.5         |
| W          | 0.24 Rad. | Rad. 6.0    |
| X          | 0.24      | 6.0         |
| Y          | 0.22      | 5.5         |
| Z          | M5 Metric | M5          |
| AA         | 0.08      | 2.0         |



#### Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of six IGBT Transistors in a three phase bridge configuration, with each transistor having 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 (70ns) 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. CM150TF-12H is a 600V ( $V_{CES}$ ), 150 Ampere Six-IGBT IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 150                       | 12                        |

**CM150TF-12H**  
**Six-IGBT IGBTMOD™ H-Series Module**  
 150 Amperes/600 Volts

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

| Ratings                                 | Symbol           | CM150TF-12H | 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)   | $V_{\text{CES}}$ | 600         | Volts            |
| Gate-Emitter Voltage                    | $V_{\text{GES}}$ | $\pm 20$    | Volts            |
| Collector Current                       | $I_C$            | 150         | Amperes          |
| Peak Collector Current                  | $I_{\text{CM}}$  | 300*        | Amperes          |
| Diode Forward Current                   | $I_F$            | 150         | Amperes          |
| Diode Forward Surge Current             | $I_{\text{FM}}$  | 200*        | Amperes          |
| Power Dissipation                       | $P_d$            | 600         | Watts            |
| Max. Mounting Torque M5 Terminal Screws | -                | 17          | in-lb            |
| Max. Mounting Torque M5 Mounting Screws | -                | 17          | in-lb            |
| Module Weight (Typical)                 | -                | 830         | 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             | $I_{\text{CES}}$     | $V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$                  | -    | -    | 1.0   | 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       | $V_{\text{GE(th)}}$  | $I_C = 15\text{mA}, V_{\text{CE}} = 10\text{V}$                              | 4.5  | 6.0  | 7.5   | Volts         |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 150\text{A}, V_{\text{GE}} = 15\text{V}$                              | -    | 2.1  | 2.8** | Volts         |
|                                      |                      | $I_C = 150\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 150^\circ\text{C}$     | -    | 2.15 | -     | Volts         |
| Total Gate Charge                    | $Q_G$                | $V_{\text{CC}} = 300\text{V}, I_C = 150\text{A}, V_{\text{GS}} = 15\text{V}$ | -    | 450  | -     | nC            |
| Diode Forward Voltage                | $V_{\text{FM}}$      | $I_E = 150\text{A}, V_{\text{GE}} = 0\text{V}$                               | -    | -    | 2.8   | Volts         |

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

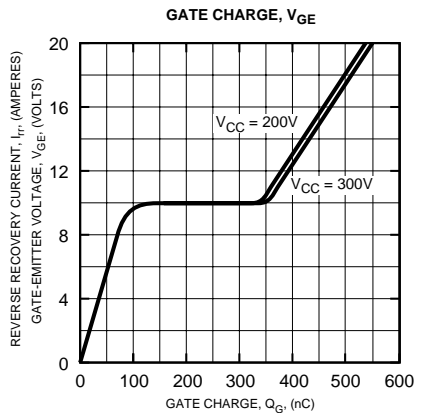
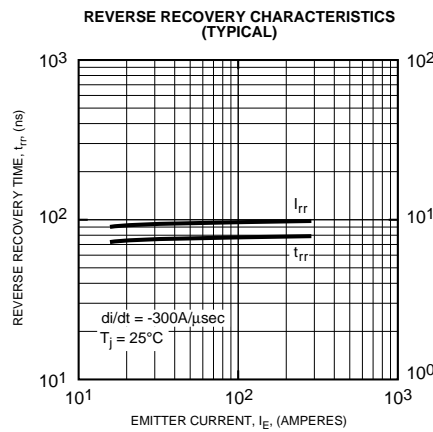
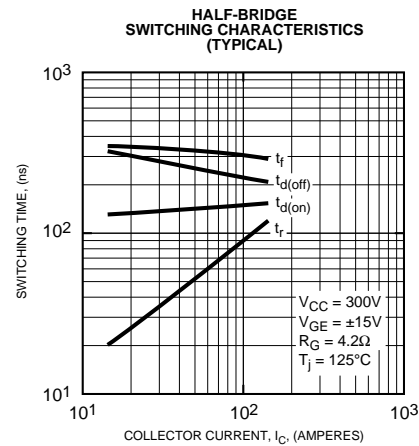
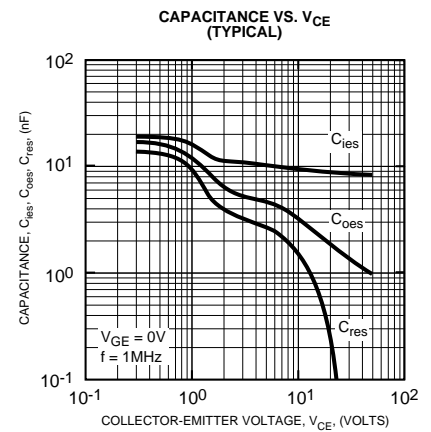
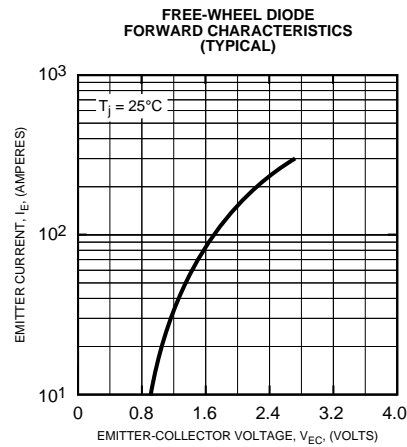
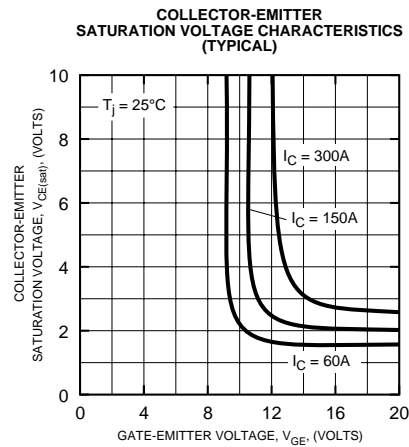
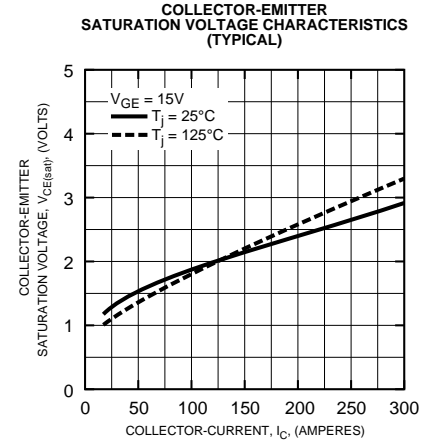
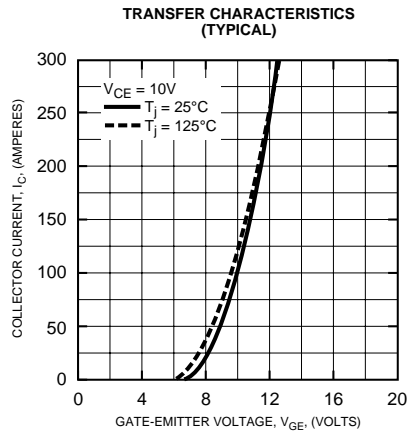
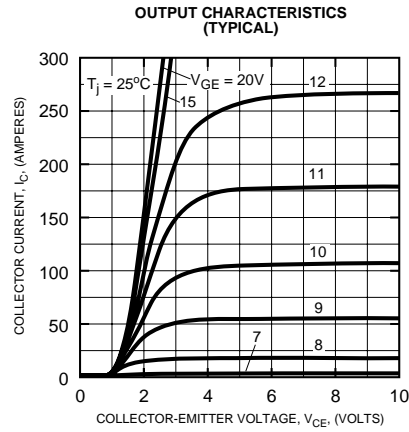
**Dynamic Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

| Characteristics               | Symbol              | Test Conditions  | Min. | Typ. | Max. | Units         |
|-------------------------------|---------------------|--|------|------|------|---------------|
| Input Capacitance             | $C_{\text{ies}}$    |  | -    | -    | 15   | nF            |
| Output Capacitance            | $C_{\text{oes}}$    | $V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}, 1\text{MHz}$ | -    | -    | 5.3  | nF            |
| Reverse Transfer Capacitance  | $C_{\text{res}}$    |  | -    | -    | 3    | nF            |
| Resistive                     | Turn-on Delay Time  | $t_{\text{d(on)}}$   | -    | -    | 200  | ns            |
|                               | Rise Time           | $t_r$  | -    | -    | 550  | ns            |
| Switching                     | Turn-off Delay Time | $t_{\text{d(off)}}$  | -    | -    | 300  | ns            |
|                               | Fall Time           | $t_f$  | -    | -    | 300  | ns            |
| Diode Reverse Recovery Time   | $t_{\text{rr}}$     | $I_E = 150\text{A}, di_E/dt = -300\text{A}/\mu\text{s}$              | -    | -    | 110  | ns            |
| Diode Reverse Recovery Charge | $Q_{\text{rr}}$     | $I_E = 150\text{A}, di_E/dt = -300\text{A}/\mu\text{s}$              | -    | 0.41 | -    | $\mu\text{C}$ |

**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                           | -    | -    | 0.21  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\text{th(j-c)}}$ | Per FWDi                           | -    | -    | 0.47  | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance           | $R_{\text{th(c-f)}}$ | Per Module, Thermal Grease Applied | -    | -    | 0.025 | $^\circ\text{C}/\text{W}$ |

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