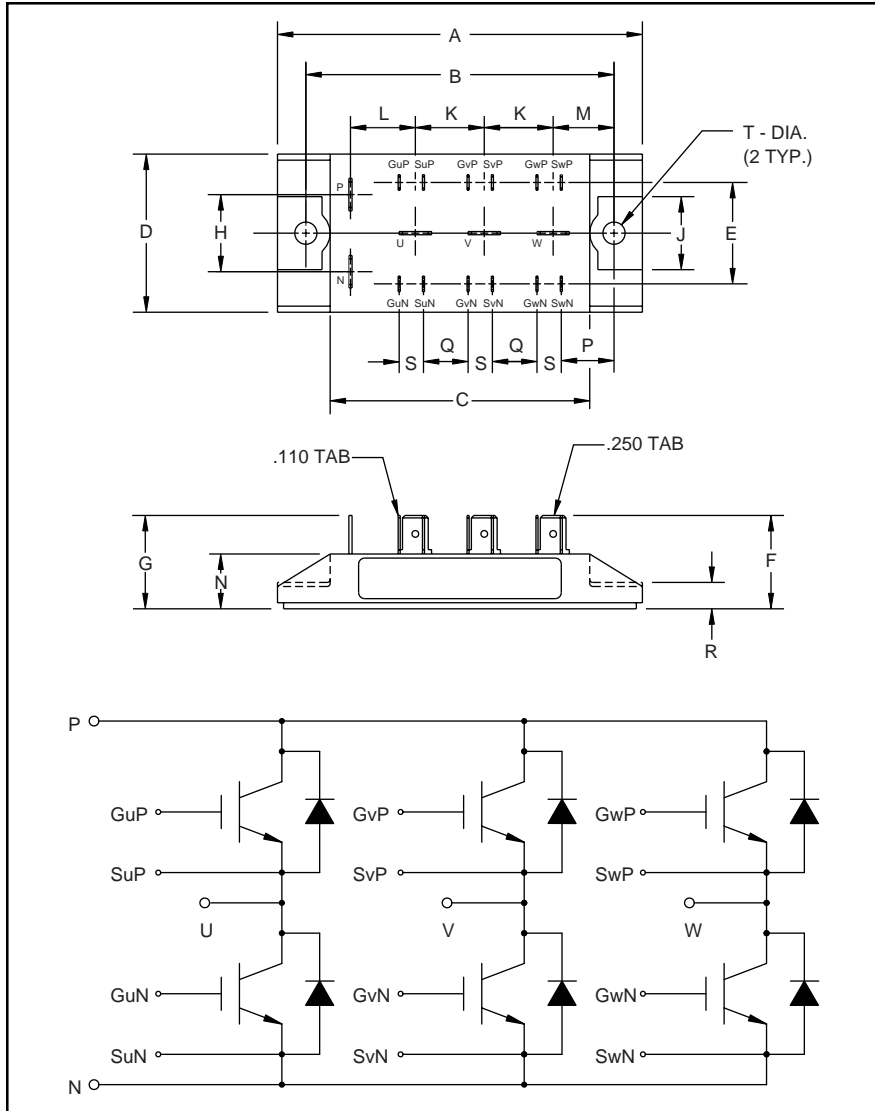


Six-IGBT IGBTMOD™ H-Series Module 20 Amperes/600 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| A | 3.54 | 90.0 |
| B | 2.99±0.01 | 76.0±0.2 |
| C | 2.52 | 64.0 |
| D | 1.54 | 39.0 |
| E | 0.98 | 25.0 |
| F | 0.90 | 23.0 |
| G | 0.87 | 22.0 |
| H | 0.75 | 19.0 |
| J | 0.71 | 18.0 |

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| K | 0.67 | 17.0 |
| L | 0.63 | 16.0 |
| M | 0.59 | 15.0 |
| N | 0.56 | 14.1 |
| P | 0.51 | 13.0 |
| Q | 0.43 | 11.0 |
| R | 0.26 | 6.5 |
| S | 0.24 | 6.0 |
| T | 0.22 Dia. | Dia. 5.5 |



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. CM20TF-12H is a 600V (V_{CES}), 20 Ampere Six-IGBT IGBTMOD™ Power Module.

| Type | Current Rating Amperes | V_{CES} Volts (x 50) |
|------|---------------------------|---------------------------|
| CM | 20 | 12 |

CM20TF-12H
Six-IGBT IGBTMOD™ H-Series Module
 20 Amperes/600 Volts

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

| Ratings | Symbol | CM20TF-12H | 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} | 600 | Volts |
| Gate-Emitter Voltage | V_{GES} | ± 20 | Volts |
| Collector Current | I_C | 20 | Amperes |
| Peak Collector Current | I_{CM} | 40* | Amperes |
| Diode Forward Current | I_F | 20 | Amperes |
| Diode Forward Surge Current | I_{FM} | 40* | Amperes |
| Power Dissipation | P_d | 125 | Watts |
| Max. Mounting Torque M5 Mounting Screws | - | 17 | in-lb |
| Module Weight (Typical) | - | 150 | 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} | $V_{CE} = V_{CES}, V_{GE} = 0V$ | - | - | 1.0 | mA |
| Gate Leakage Current | I_{GES} | $V_{GE} = V_{GES}, V_{CE} = 0V$ | - | - | 0.5 | μA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $I_C = 2\text{mA}, V_{CE} = 10V$ | 4.5 | 6.0 | 7.5 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 20\text{A}, V_{GE} = 15V$ | - | 2.1 | 2.8** | Volts |
| | | $I_C = 20\text{A}, V_{GE} = 15V, T_j = 150^\circ\text{C}$ | - | 2.15 | - | Volts |
| Total Gate Charge | Q_G | $V_{CC} = 300V, I_C = 20\text{A}, V_{GS} = 15V$ | - | 60 | - | nC |
| Diode Forward Voltage | V_{FM} | $I_E = 20\text{A}, V_{GS} = 0V$ | - | - | 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_{ies} | | - | - | 2.0 | nF |
| Output Capacitance | C_{oes} | $V_{GE} = 0V, V_{CE} = 10V, f = 1\text{MHz}$ | - | - | 0.7 | nF |
| Reverse Transfer Capacitance | C_{res} | | - | - | 0.4 | nF |
| Resistive | Turn-on Delay Time | $t_{d(on)}$ | - | - | 120 | ns |
| | Rise Time | t_r | - | - | 300 | ns |
| Switching | Turn-off Delay Time | $t_{d(off)}$ | - | - | 200 | ns |
| | Fall Time | t_f | - | - | 300 | ns |
| Diode Reverse Recovery Time | t_{rr} | $I_E = 20\text{A}, di_E/dt = -40\text{A}/\mu\text{s}$ | - | - | 110 | ns |
| Diode Reverse Recovery Charge | Q_{rr} | $I_E = 20\text{A}, di_E/dt = -40\text{A}/\mu\text{s}$ | - | 0.05 | - | μC |

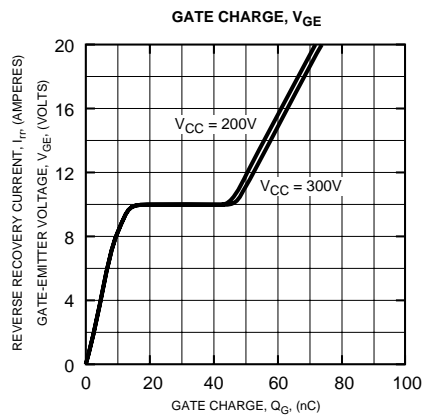
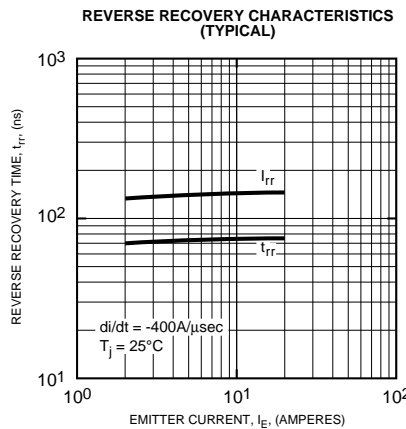
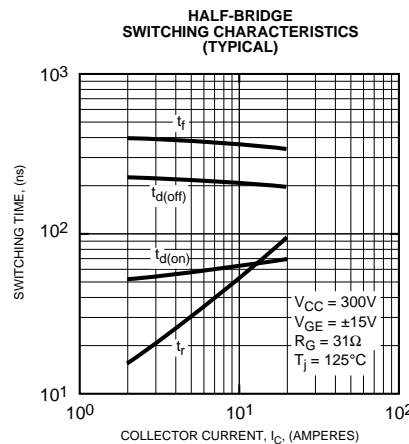
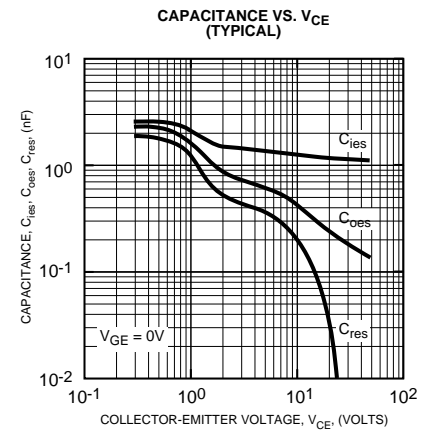
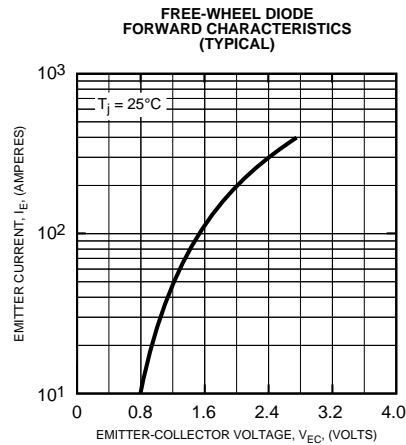
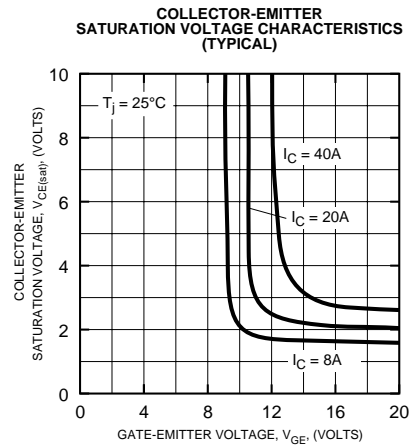
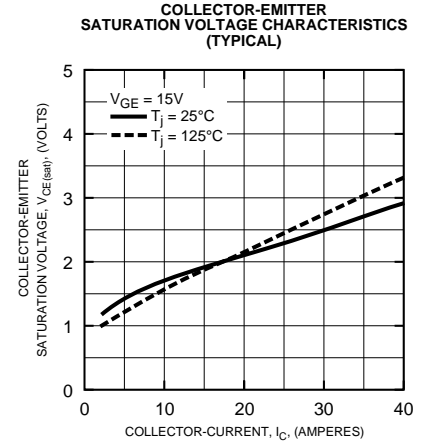
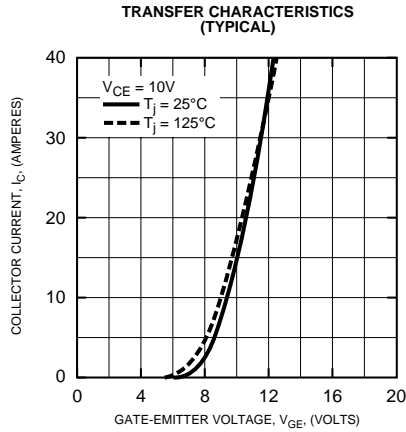
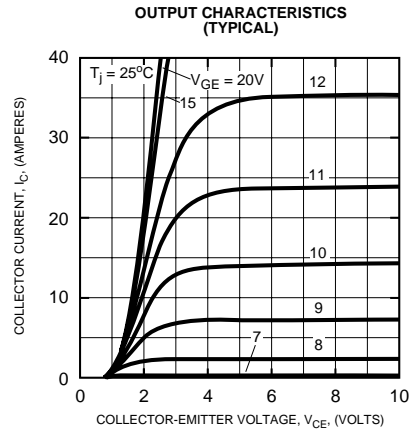
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---------------|------------------------------------|------|------|-------|---------------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per IGBT | - | - | 1.00 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi | - | - | 3.50 | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | - | - | 0.092 | $^\circ\text{C}/\text{W}$ |



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