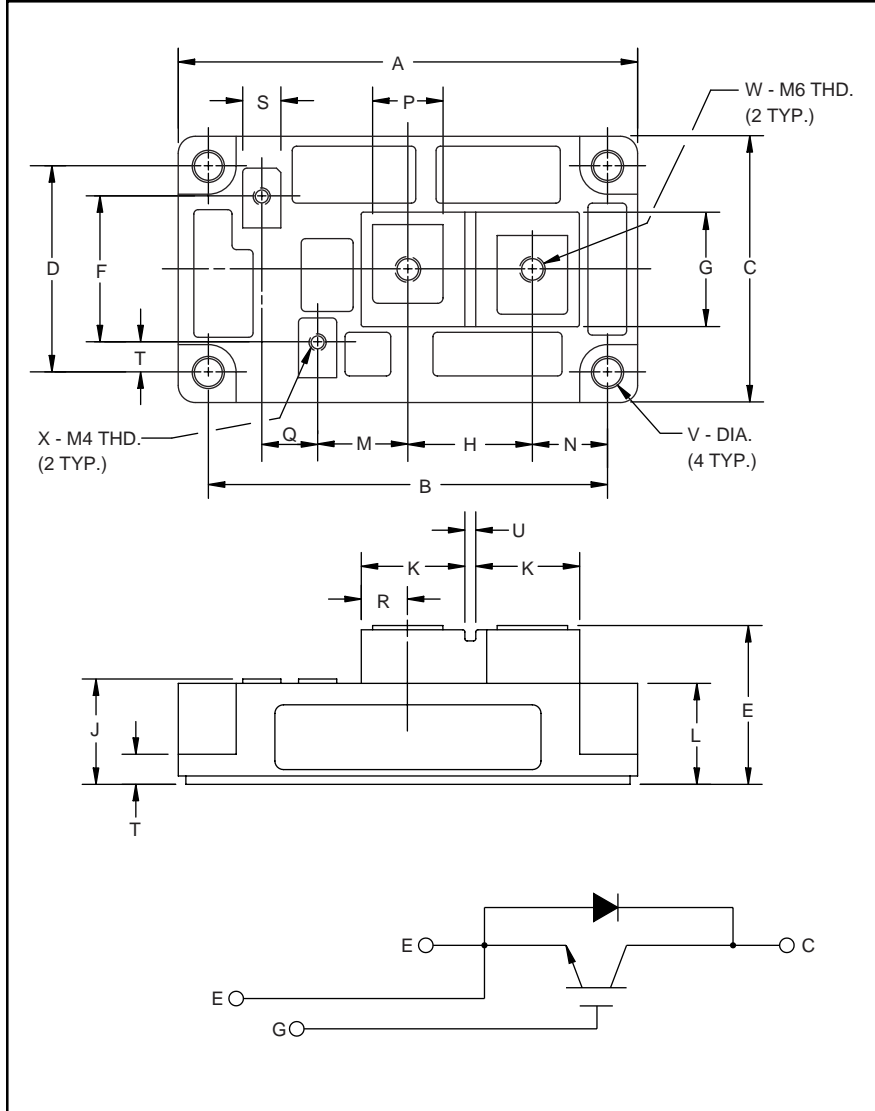


Single IGBTMOD™ H-Series Module 300 Amperes/1400 Volts



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 Max. | 36.0 Max. |
| F | 1.34 | 34.0 |
| G | 1.18 | 30.0 |
| H | 1.14 | 29.0 |
| J | 0.98 Max. | 25.0 Max. |
| K | 0.94 | 24.0 |
| L | 0.93 | 23.5 |

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| M | 0.83 | 21.0 |
| N | 0.69 | 17.5 |
| P | 0.63 | 16.0 |
| Q | 0.51 | 13.0 |
| R | 0.43 | 11.0 |
| S | 0.35 | 9.0 |
| T | 0.28 | 7.0 |
| U | 0.12 | 3.0 |
| V | 0.26 Dia. | Dia. 6.5 |
| W | M6 Metric | M6 |
| X | 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. CM300HA-28H is a 1400V (V_{CES}), 300 Ampere Single IGBTMOD™ Power Module.

| Type | Current Rating Amperes | V_{CES} Volts (x 50) |
|------|---------------------------|---------------------------|
| CM | 300 | 28 |

CM300HA-28H
Single IGBTMOD™ H-Series Module
 300 Amperes/1400 Volts

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

| Ratings | Symbol | CM300HA-28H | 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} | 1400 | Volts |
| Gate-Emitter Voltage (C-E SHORT) | V_{GES} | ± 20 | Volts |
| Collector Current ($T_c = 25^\circ\text{C}$) | I_C | 300 | Amperes |
| Peak Collector Current ($T_j \leq 150^\circ\text{C}$) | I_{CM} | 600 | Amperes |
| Emitter Current* ($T_c = 25^\circ\text{C}$) | I_E | 300 | Amperes |
| Peak Emitter Current* ($T_j \leq 150^\circ\text{C}$) | I_{EM} | 600 | Amperes |
| Maximum Collector Dissipation ($T_c = 25^\circ\text{C}$) | P_c | 2100 | Watts |
| Max. Mounting Torque M6 Main Terminal Screws | - | 26 | in-lb |
| Max. Mounting Torque M6 Mounting Screws | - | 26 | in-lb |
| Max. Mounting Torque M4 Terminal Screws | - | 13 | in-lb |
| Module Weight (Typical) | - | 400 | Grams |
| V Isolation (Main Terminal to Baseplate, AC 1 min.) | V_{RMS} | 2500 | Volts |

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} | $V_{GE} = V_{CES}, V_{CE} = 0V$ | - | - | 0.5 | μA |
| Gate-Emitter Threshold Voltage | $V_{GE(th)}$ | $I_C = 30\text{mA}, V_{CE} = 10V$ | 5.0 | 6.5 | 8.0 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 300\text{A}, V_{GE} = 15V, T_j = 25^\circ\text{C}$ | - | 3.1 | 4.2 | Volts |
| | | $I_C = 300\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}$ | - | 2.95 | - | Volts |
| Total Gate Charge | Q_G | $V_{CC} = 800V, I_C = 300\text{A}, V_{GE} = 15V$ | - | 1530 | - | nC |
| Emitter-Collector Voltage* | V_{EC} | $I_E = 300\text{A}, V_{GE} = 0V$ | - | - | 3.8 | Volts |

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} | | - | - | 60 | nF |
| Output Capacitance | C_{oes} | $V_{GE} = 0V, V_{CE} = 10V, f = 1\text{MHz}$ | - | - | 21 | nF |
| Reverse Transfer Capacitance | C_{res} | | - | - | 12 | nF |
| Resistive | Turn-on Delay Time | $t_{d(on)}$ | - | - | 250 | ns |
| Load | Rise Time | t_r | - | - | 500 | ns |
| Switching | Turn-off Delay Time | $t_{d(off)}$ | - | - | 350 | ns |
| | | | | | | |
| Times | Fall Time | t_f | - | - | 500 | ns |
| Diode Reverse Recovery Time* | t_{rr} | $I_E = 300\text{A}, di_E/dt = -600\text{A}/\mu\text{s}$ | - | - | 300 | ns |
| Diode Reverse Recovery Charge* | Q_{rr} | $I_E = 300\text{A}, di_E/dt = -600\text{A}/\mu\text{s}$ | - | 3.0 | - | 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 | - | - | 0.06 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)}$ | Per FWDi | - | - | 0.12 | $^\circ\text{C}/\text{W}$ |
| Contact Thermal Resistance | $R_{th(c-f)}$ | Per Module, Thermal Grease Applied | - | - | 0.04 | $^\circ\text{C}/\text{W}$ |

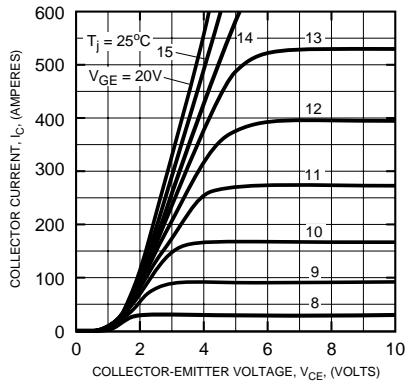
* Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode.



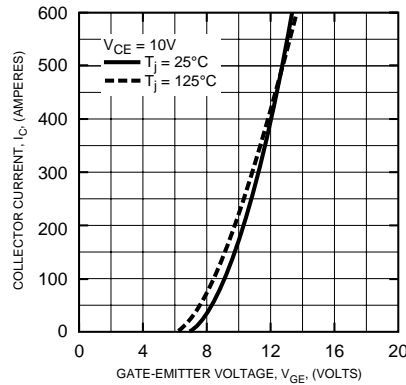
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

CM300HA-28H
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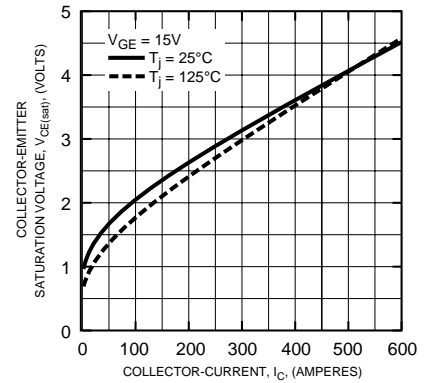
OUTPUT CHARACTERISTICS (TYPICAL)



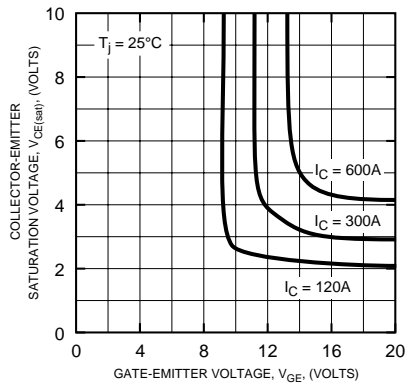
TRANSFER CHARACTERISTICS (TYPICAL)



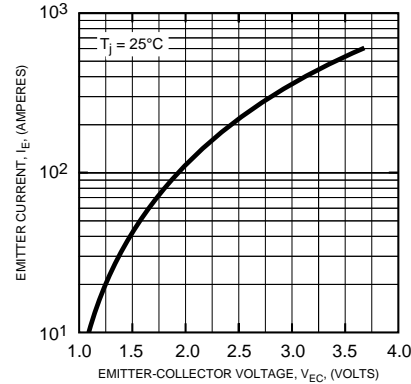
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



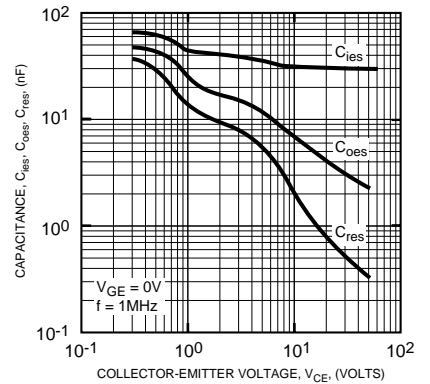
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



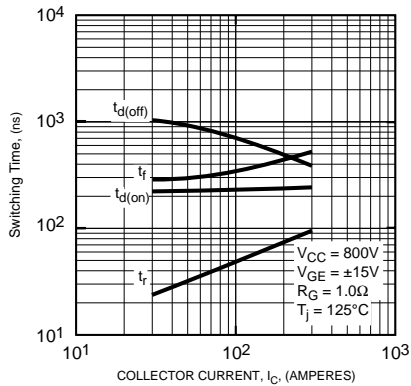
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



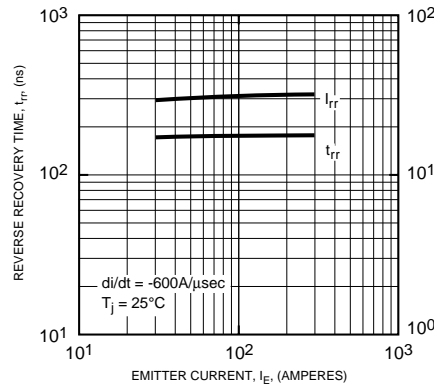
CAPACITANCE VS. V_{CE} (TYPICAL)



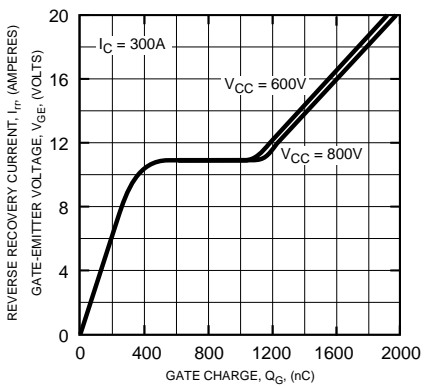
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, V_{GE}



CM300HA-28H
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