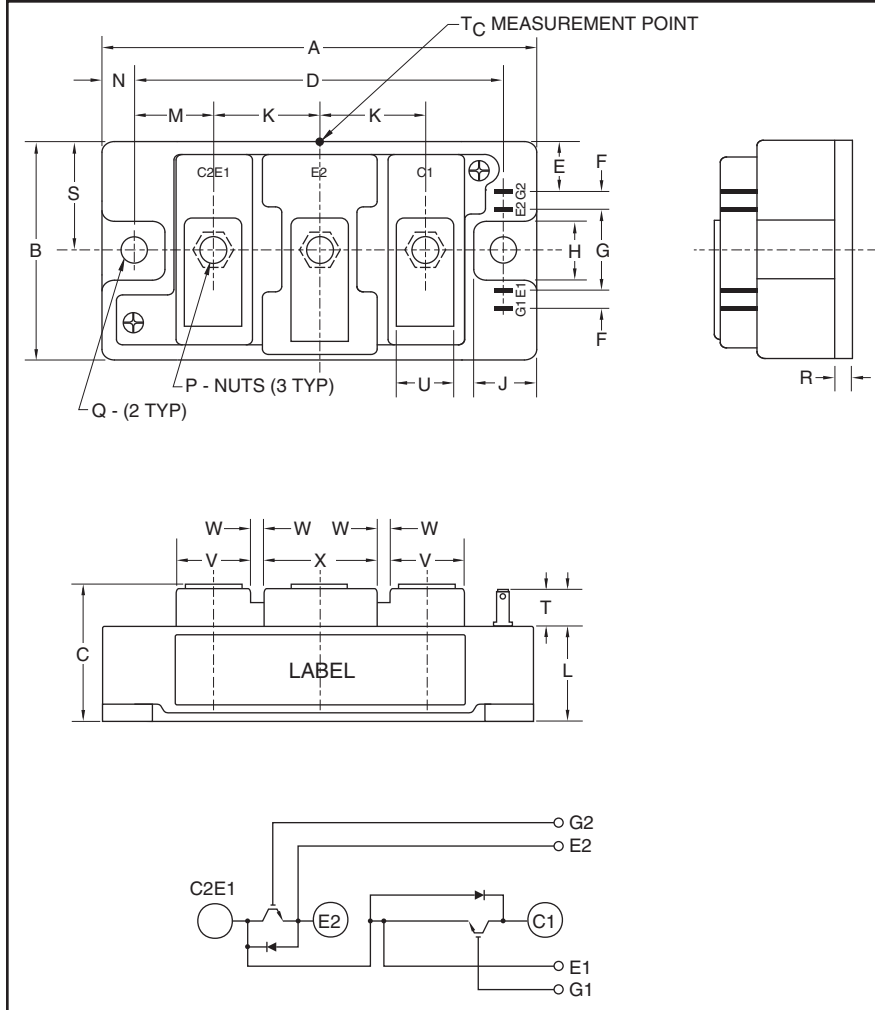


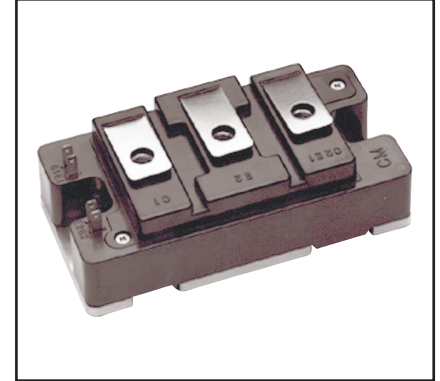
Dual IGBT NFH-Series Module 150 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches | Millimeters |
|------------|-----------------|---------------|
| A | 3.70 | 94.0 |
| B | 1.89 | 48.0 |
| C | 1.18+0.04/-0.01 | 30.0+1.0/-0.5 |
| D | 3.15±0.01 | 80.0±0.25 |
| E | 0.43 | 11.0 |
| F | 0.16 | 4.0 |
| G | 0.71 | 18.0 |
| H | 0.51 | 13.0 |
| J | 0.53 | 13.5 |
| K | 0.91 | 23.0 |
| L | 0.83 | 21.2 |

| Dimensions | Inches | Millimeters |
|------------|-----------|-------------|
| M | 0.67 | 17.0 |
| N | 0.28 | 7.0 |
| P | M5 Metric | M5 |
| Q | 0.26 Dia. | Dia. 6.5 |
| R | 0.02 | 4.0 |
| S | 0.94 | 24.0 |
| T | 0.3 | 7.5 |
| U | 0.47 | 12.0 |
| V | 0.63 | 16.0 |
| W | 0.1 | 2.5 |
| X | 0.98 | 25.0 |



Description:

Powerex IGBT Modules are designed for use in high frequency applications; 30 kHz for hard switching applications and 60 to 70 kHz for soft switching applications. Each module consists of two IGBT Transistors in a half-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 ESW(off)
- Discrete Super-Fast Recovery Free-Wheel Diode
- Isolated Baseplate for Easy Heat Sinking

Applications:

- Power Supplies
- Induction Heating
- Welders

Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM150DU-24NFH is a 1200V (V_{CE(S)}), 150 Ampere Dual IGBT Power Module.

| Type | Current Rating Amperes | V _{CE(S)} Volts (x 50) |
|------|---------------------------|------------------------------------|
| CM | 150 | 24 |



Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272 www.pwr.com

CM150DU-24NFH
Dual IGBT NFH-Series Module
 150 Amperes/1200 Volts

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

| Ratings | Symbol | CM150DU-24NF | Units |
|--|---------------|--------------|------------------|
| Collector-Emitter Voltage (G-E Short) | V_{CES} | 1200 | Volts |
| Gate-Emitter Voltage (C-E Short) | V_{GES} | ± 20 | Volts |
| Collector Current (Operation) ^{*2} | I_C | 150 | Amperes |
| Peak Collector Current (Pulse) ^{*2} | I_{CM} | 300 | Amperes |
| Emitter Current (Operation) ^{*2} | I_E^{*1} | 150 | Amperes |
| Peak Emitter Current (Pulse) ^{*2} | I_{EM}^{*1} | 300 | Amperes |
| Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$) | P_C^{*3} | 650 | Watts |
| Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$) ^{*7} | P_C^{*3} | 960 | Watts |
| Junction Temperature | T_j | -40 ~ +150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -40 ~ +125 | $^\circ\text{C}$ |
| Isolation Voltage (Terminals to Baseplate, f = 60Hz, AC 1 Minute) | V_{ISO} | 2500 | Volts |
| Mounting Torque, M5 Main Terminal | — | 30 | in-lb |
| Mounting Torque, M6 Mounting | — | 40 | in-lb |
| Weight | — | 310 | Grams |

Electrical Characteristics, $T_j = 25^\circ\text{C}$ 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-Emitter Threshold Voltage | $V_{GE(th)}$ | $I_C = 15mA, V_{CE} = 10V$ | 4.5 | 6.0 | 7.5 | Volts |
| Gate Leakage Current | I_{GES} | $\pm V_{GE} = V_{GES}, V_{CE} = 0V$ | — | — | 0.5 | μA |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 150A, V_{GE} = 15V, T_j = 25^\circ\text{C}$ | — | 5.0 | 6.5 | Volts |
| | | $I_C = 150A, V_{GE} = 15V, T_j = 125^\circ\text{C}$ | — | 5.0 | — | Volts |
| Input Capacitance | C_{ies} | | — | — | 24 | nf |
| Output Capacitance | C_{oes} | $V_{CE} = 10V, V_{GE} = 0V$ | — | — | 2.0 | nf |
| Reverse Transfer Capacitance | C_{res} | | — | — | 0.45 | nf |
| Total Gate Charge | Q_G | $V_{CC} = 600V, I_C = 150A, V_{GE} = 15V$ | — | 680 | — | nC |
| Turn-on Delay Time | $t_{d(on)}$ | | — | — | 150 | ns |
| Turn-on Rise Time | t_r | $V_{CC} = 600V, I_C = 150A,$ | — | — | 80 | ns |
| Turn-off Delay Time | $t_{d(off)}$ | $V_{GE} = \pm 15V, R_G = 2.1\Omega,$ | — | — | 400 | ns |
| Turn-off Fall Time | t_f | Inductive Load, | — | — | 150 | ns |
| Diode Reverse Recovery Time | t_{rr}^{*1} | $I_E = 150A$ | — | — | 150 | ns |
| Diode Reverse Recovery Charge | Q_{rr}^{*1} | | — | 7.5 | — | μC |
| Emitter-Collector Voltage | V_{EC}^{*1} | $I_E = 150A, V_{GE} = 0V$ | — | — | 3.5 | Volts |

*1 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDI).

*2 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.

*3 Junction temperature (T_j) should not increase beyond maximum junction temperature ($T_{j(max)}$) rating.

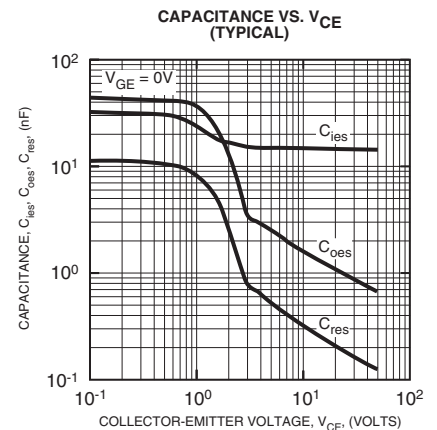
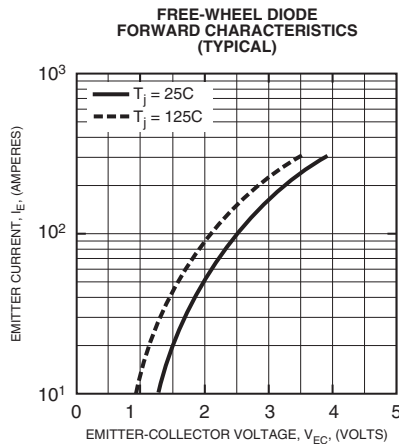
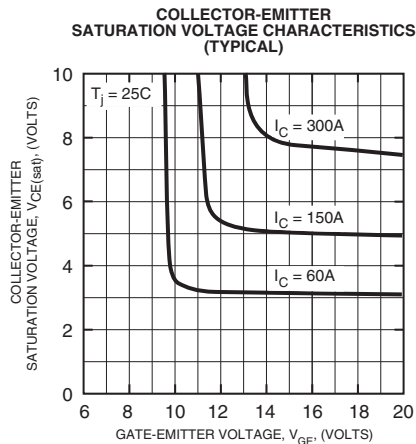
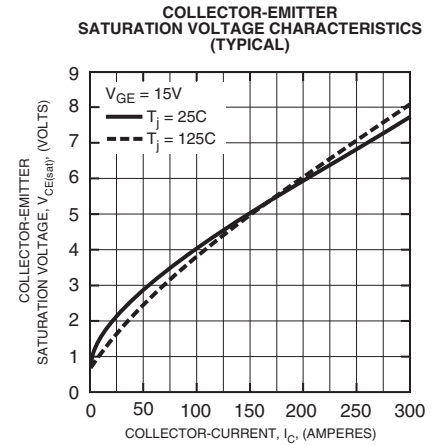
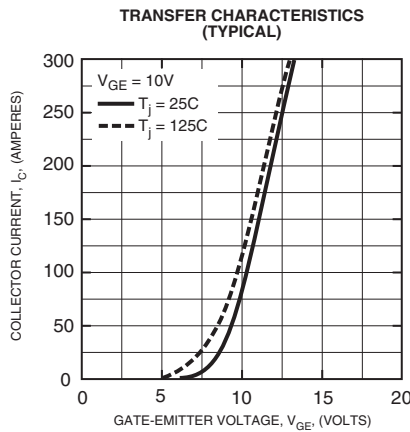
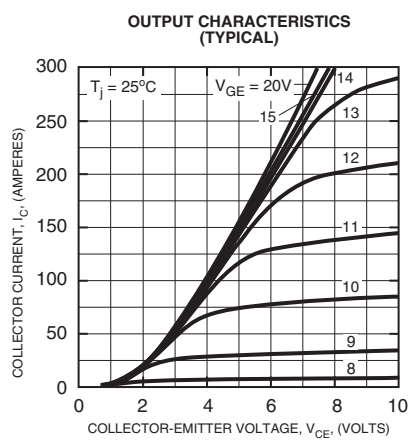
*7 Case temperature (T_C) measured point is just under the chips.

CM150DU-24NFH
Dual IGBT NFH-Series Module
 150 Amperes/1200 Volts

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

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--|-----------------|---|------|------|--------------------|----------|
| Thermal Resistance ^{*4} Junction to Case | $R_{th(j-c)Q}$ | Per IGBT 1/2 Module | — | — | 0.19 | K/W |
| Thermal Resistance ^{*4} Junction to Case | $R_{th(j-c)D}$ | Per FWDi 1/2 Module | — | — | 0.35 | K/W |
| Contact Thermal Resistance ^{*5} Case to Heatsink | $R_{th(c-f)}$ | Per 1/2 Module, Thermal Grease Applied | — | 0.07 | — | K/W |
| Thermal Resistance ^{*7} Junction to Case | $R_{th(j-c)'Q}$ | Per IGBT 1/2 Module | — | — | 0.13 ^{*6} | K/W |
| Thermal Resistance ^{*7} Junction to Case | $R_{th(j-c)'D}$ | Per FWDi 1/2 Module | — | — | 0.21 ^{*6} | K/W |
| External Gate Resistance | R_G | | 2.1 | — | 21 | Ω |

*4 Case temperature (T_C) measured point is shown on page 1 of the outline drawing.
 *5 Typical value is measured by using thermally conductive grease of $\lambda = 0.9\text{ [W/(m}\cdot\text{K)]}$.
 *6 If you use this value, $R_{th(f-a)}$ should be measured just under the chips.
 *7 Case temperature (T_C) measured point is just under the chips.



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