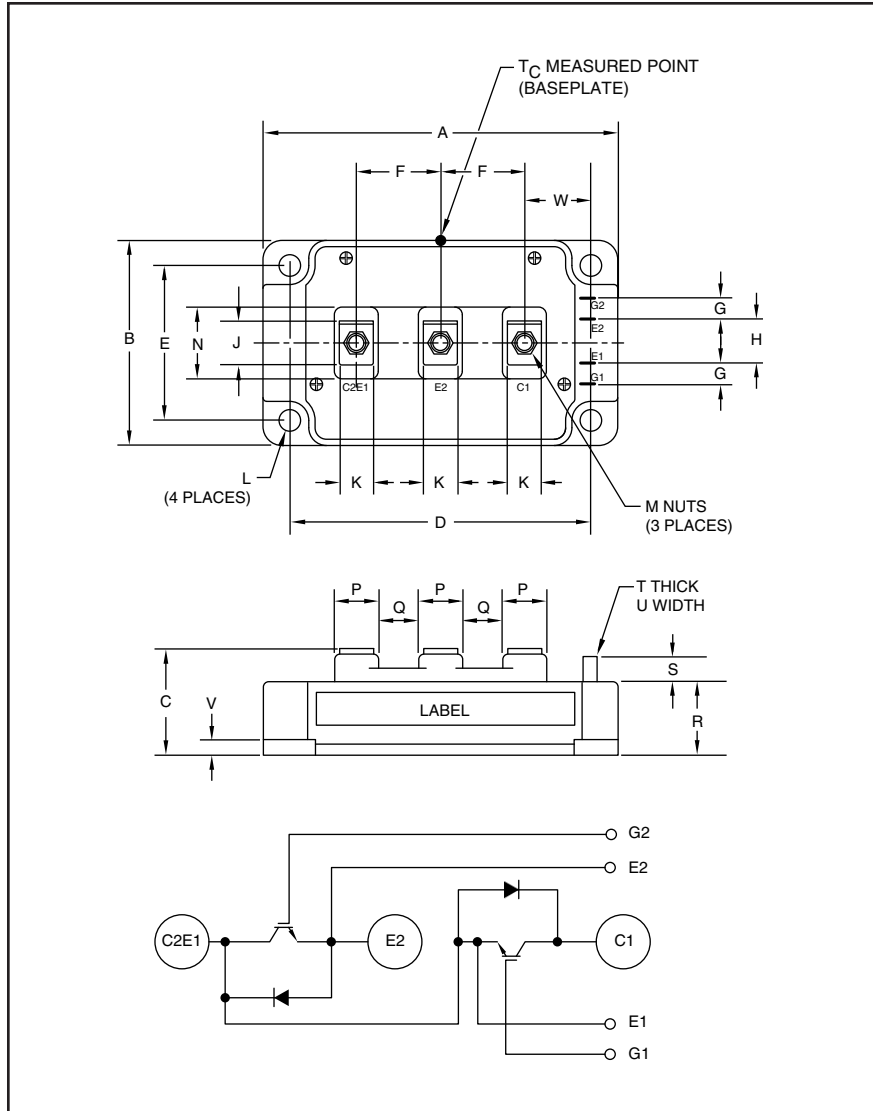


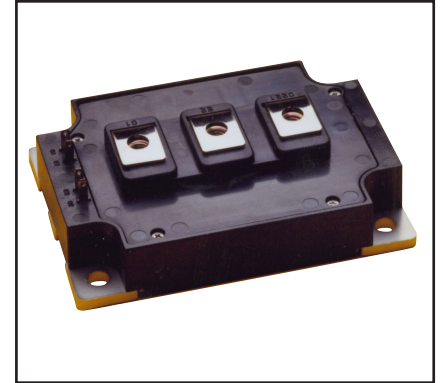
### Dual IGBTMOD™ NF-Series Module 600 Amperes/600 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches           | Millimeters   |
|------------|------------------|---------------|
| A          | 4.33             | 110.0         |
| B          | 3.15             | 80.0          |
| C          | 1.14+0.04/-0.002 | 29.0+1.0/-0.5 |
| D          | 3.66±0.01        | 93.0±0.25     |
| E          | 2.44±0.01        | 62.0±0.25     |
| F          | 0.98             | 25.0          |
| G          | 0.24             | 6.0           |
| H          | 0.59             | 15.0          |
| J          | 0.81             | 20.5          |
| K          | 0.55             | 14.0          |
| L          | 0.26 Dia.        | Dia. 6.5      |

| Dimensions | Inches    | Millimeters |
|------------|-----------|-------------|
| M          | M6 Metric | M6          |
| N          | 1.18      | 30.0        |
| P          | 0.71      | 18.0        |
| Q          | 0.28      | 7.0         |
| R          | 0.83      | 21.2        |
| S          | 0.33      | 8.5         |
| T          | 0.02      | 0.5         |
| U          | 0.110     | 2.8         |
| V          | 0.16      | 4.0         |
| W          | 0.85      | 21.5        |



#### Description:

Powerex IGBTMOD™ Modules are designed for use in 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 heatsinking baseplate, offering simplified system assembly and thermal management.

#### Features:

- ☐ Low Drive Power
- ☐ Low  $V_{CE(sat)}$
- ☐ Discrete Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

#### Applications:

- ☐ AC Motor Control
- ☐ UPS
- ☐ Battery Powered Supplies

#### Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM600DY-12NF is a 600V ( $V_{CES}$ ), 600 Ampere Dual IGBTMOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 600                       | 12                        |

**CM600DY-12NF**  
**Dual IGBTMOD™ NF-Series Module**  
 600 Amperes/600 Volts

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

| Ratings                                                                                   | Symbol           | CM600DY-12NF | 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 (C-E Short)                                                          | $V_{\text{GES}}$ | $\pm 20$     | Volts            |
| Collector Current*** (DC, $T_C = 89^\circ\text{C}$ )                                      | $I_C$            | 600          | Amperes          |
| Peak Collector Current                                                                    | $I_{\text{CM}}$  | 1200*        | Amperes          |
| Emitter Current** ( $T_C = 25^\circ\text{C}$ )                                            | $I_E$            | 600          | Amperes          |
| Emitter Surge Current**                                                                   | $I_{\text{EM}}$  | 1200*        | Amperes          |
| Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j \leq 150^\circ\text{C}$ ) | $P_C$            | 1130         | Watts            |
| Mounting Torque, M6 Main Terminal                                                         | —                | 40           | in-lb            |
| Mounting Torque, M6 Mounting                                                              | —                | 40           | in-lb            |
| Weight                                                                                    | —                | 580          | Grams            |
| Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)                                 | $V_{\text{ISO}}$ | 2500         | Volts            |

**Static Electrical Characteristics,  $T_j = 25^\circ\text{C}$  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       | $V_{\text{GE(th)}}$  | $I_C = 60\text{mA}$ , $V_{\text{CE}} = 10\text{V}$                                 | 5.0  | 6.0  | 7.5  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_C = 600\text{A}$ , $V_{\text{GE}} = 15\text{V}$ , $T_j = 25^\circ\text{C}$      | —    | 1.7  | 2.2  | Volts         |
|                                      |                      | $I_C = 600\text{A}$ , $V_{\text{GE}} = 15\text{V}$ , $T_j = 125^\circ\text{C}$     | —    | 1.7  | —    | Volts         |
| Total Gate Charge                    | $Q_G$                | $V_{\text{CC}} = 300\text{V}$ , $I_C = 600\text{A}$ , $V_{\text{GE}} = 15\text{V}$ | —    | 2400 | —    | nC            |
| Emitter-Collector Voltage**          | $V_{\text{EC}}$      | $I_E = 600\text{A}$ , $V_{\text{GE}} = 0\text{V}$                                  | —    | —    | 2.6  | Volts         |

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

| Characteristics                 | Symbol              | Test Conditions                                                                                                               | Min. | Typ. | Max. | Units         |
|---------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| Input Capacitance               | $C_{\text{ies}}$    | $V_{\text{CE}} = 10\text{V}$ , $V_{\text{GE}} = 0\text{V}$                                                                    | —    | —    | 90   | nf            |
| Output Capacitance              | $C_{\text{oes}}$    |                                                                                                                               | —    | —    | 11.0 | nf            |
| Reverse Transfer Capacitance    | $C_{\text{res}}$    |                                                                                                                               | —    | —    | 3.6  | nf            |
| Inductive                       | Turn-on Delay Time  | $V_{\text{CC}} = 300\text{V}$ , $I_C = 600\text{A}$ ,<br>$V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}$ , $R_G = 4.2\Omega$ , | —    | —    | 500  | ns            |
| Load                            | Rise Time           |                                                                                                                               | —    | —    | 300  | ns            |
| Switch                          | Turn-off Delay Time |                                                                                                                               | —    | —    | 750  | ns            |
| Time                            | Fall Time           |                                                                                                                               | —    | —    | 300  | ns            |
| Diode Reverse Recovery Time**   | $t_{\text{rr}}$     | Switching Operation,                                                                                                          | —    | —    | 250  | ns            |
| Diode Reverse Recovery Charge** | $Q_{\text{rr}}$     | $I_E = 600\text{A}$                                                                                                           | —    | 8.7  | —    | $\mu\text{C}$ |

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

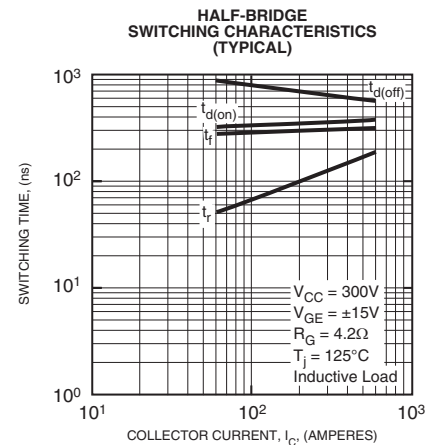
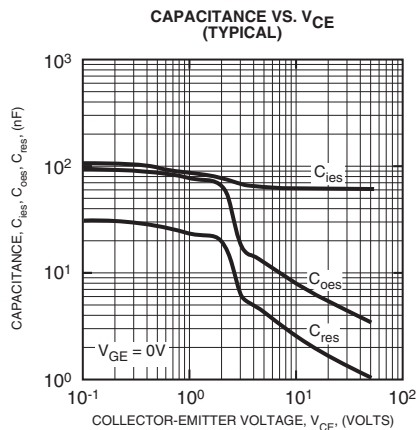
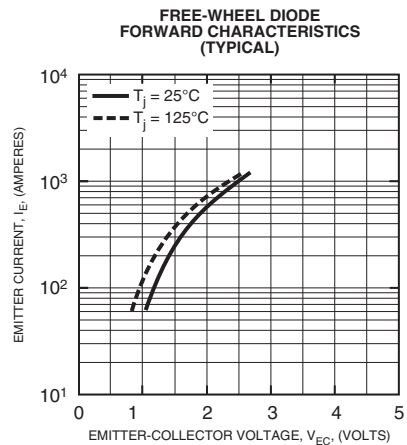
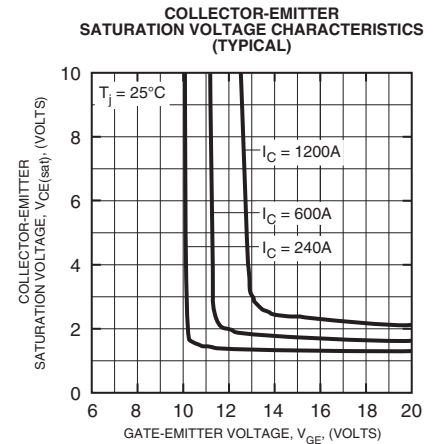
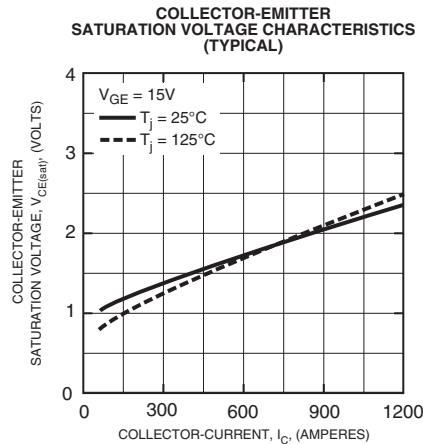
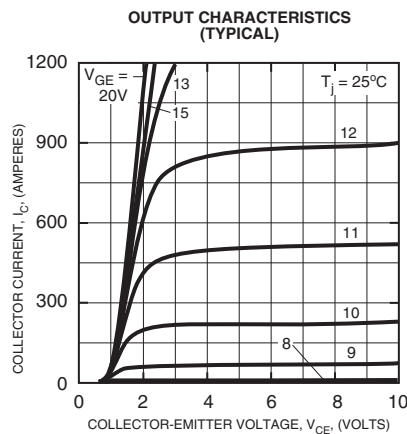
\*\*Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDI).

\*\*\* $T_C$  measured point is just under the chips. If this value is used,  $R_{\text{th}(f-a)}$  should be measured just under the chips.

**CM600DY-12NF**  
**Dual IGBTMOD™ NF-Series Module**  
 600 Amperes/600 Volts

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

| Characteristics                      | Symbol          | Test Conditions                                                | Min. | Typ. | Max.  | Units              |
|--------------------------------------|-----------------|----------------------------------------------------------------|------|------|-------|--------------------|
| Thermal Resistance, Junction to Case | $R_{th(j-c)Q}$  | Per IGBT 1/2 Module, $T_C$ Reference Point per Outline Drawing | —    | —    | 0.11  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)D}$  | Per FWDi 1/2 Module, $T_C$ Reference Point per Outline Drawing | —    | —    | 0.18  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{th(j-c)'Q}$ | Per IGBT 1/2 Module, $T_C$ Reference Point Under Chips         | —    | —    | 0.046 | $^\circ\text{C/W}$ |
| Contact Thermal Resistance           | $R_{th(c-f)}$   | Per 1/2 Module, Thermal Grease Applied                         | —    | 0.02 | —     | $^\circ\text{C/W}$ |
| External Gate Resistance             | $R_G$           |                                                                | 1.0  | —    | 10    | $\Omega$           |



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