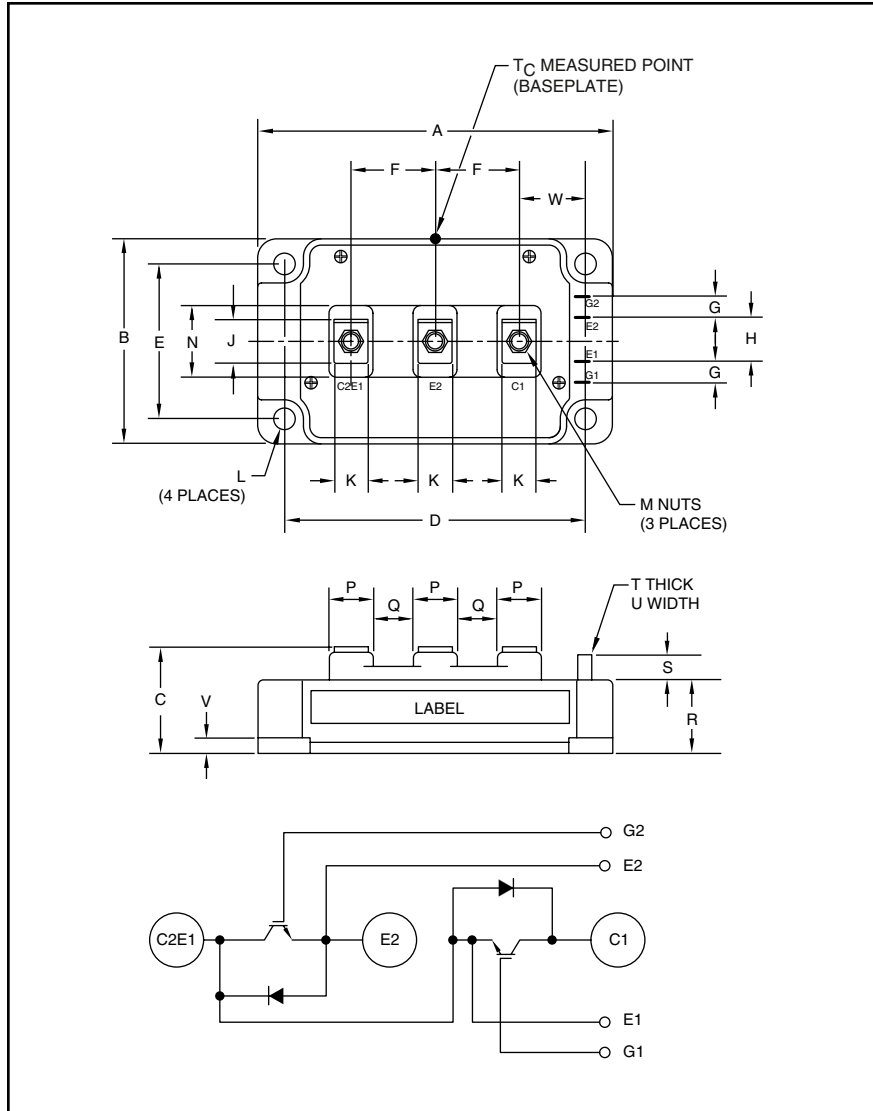


### Dual IGBTMOD™ NF-Series Module 300 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches          | Millimeters   |
|------------|-----------------|---------------|
| A          | 4.33            | 110.0         |
| B          | 3.15            | 80.0          |
| C          | 1.14+0.04/-0.02 | 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 heat sinking 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. CM300DY-24NF is a 1200V ( $V_{CES}$ ), 300 Ampere Dual IGBT-MOD™ Power Module.

| Type | Current Rating<br>Amperes | $V_{CES}$<br>Volts (x 50) |
|------|---------------------------|---------------------------|
| CM   | 300                       | 24                        |

**CM300DY-24NF**  
**Dual IGBTMOD™ NF-Series Module**  
 300 Amperes/1200 Volts

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

| Ratings                                                                                   | Symbol    | CM300DY-24NF | 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)                                                     | $V_{CES}$ | 1200         | Volts            |
| Gate-Emitter Voltage (C-E Short)                                                          | $V_{GES}$ | $\pm 20$     | Volts            |
| Collector Current*** (DC, $T_C = 111^\circ\text{C}$ )                                     | $I_C$     | 300          | Amperes          |
| Peak Collector Current                                                                    | $I_{CM}$  | 600*         | Amperes          |
| Emitter Current** ( $T_C = 25^\circ\text{C}$ )                                            | $I_E$     | 300          | Amperes          |
| Peak Emitter Current**                                                                    | $I_{EM}$  | 600*         | 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.)                                 | $V_{ISO}$ | 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             | $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0\text{V}$                               | —    | —    | 1.0  | mA            |
| Gate Leakage Current                 | $I_{GES}$     | $V_{GE} = V_{GES}$ , $V_{CE} = 0\text{V}$                               | —    | —    | 0.5  | $\mu\text{A}$ |
| Gate-Emitter Threshold Voltage       | $V_{GE(th)}$  | $I_C = 30\text{mA}$ , $V_{CE} = 10\text{V}$                             | 6.0  | 7.0  | 8.0  | Volts         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$ , $T_j = 25^\circ\text{C}$  | —    | 1.8  | 2.5  | Volts         |
|                                      |               | $I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$ , $T_j = 125^\circ\text{C}$ | —    | 2.0  | —    | Volts         |
| Total Gate Charge                    | $Q_G$         | $V_{CC} = 600\text{V}$ , $I_C = 300\text{A}$ , $V_{GE} = 15\text{V}$    | —    | 2000 | —    | nC            |
| Emitter-Collector Voltage**          | $V_{EC}$      | $I_E = 300\text{A}$ , $V_{GE} = 0\text{V}$                              | —    | —    | 3.2  | Volts         |

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

| Characteristics                 | Symbol              | Test Conditions                                                                                          | Min. | Typ. | Max. | Units         |
|---------------------------------|---------------------|----------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| Input Capacitance               | $C_{ies}$           | $V_{CE} = 10\text{V}$ , $V_{GE} = 0\text{V}$                                                             | —    | —    | 70   | nF            |
| Output Capacitance              | $C_{oes}$           |                                                                                                          | —    | —    | 6.0  | nF            |
| Reverse Transfer Capacitance    | $C_{res}$           |                                                                                                          | —    | —    | 1.4  | nF            |
| Inductive                       | Turn-on Delay Time  | $V_{CC} = 600\text{V}$ , $I_C = 300\text{A}$ ,<br>$V_{GE1} = V_{GE2} = 15\text{V}$ , $R_G = 1.0\Omega$ , | —    | —    | 500  | ns            |
| Load                            | Rise Time           |                                                                                                          | —    | —    | 120  | ns            |
| Switch                          | Turn-off Delay Time |                                                                                                          | —    | —    | 600  | ns            |
| Time                            | Fall Time           |                                                                                                          | —    | —    | 350  | ns            |
| Diode Reverse Recovery Time**   | $t_{rr}$            | Switching Operation,                                                                                     | —    | —    | 250  | ns            |
| Diode Reverse Recovery Charge** | $Q_{rr}$            | $I_E = 300\text{A}$                                                                                      | —    | 13   | —    | $\mu\text{C}$ |

\*Pulse width and repetition rate should be such that device junction temperature ( $T_j$ ) does not exceed  $T_{j(max)}$  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,  $R_{th(f-a)}$  should be measured just under the chips.

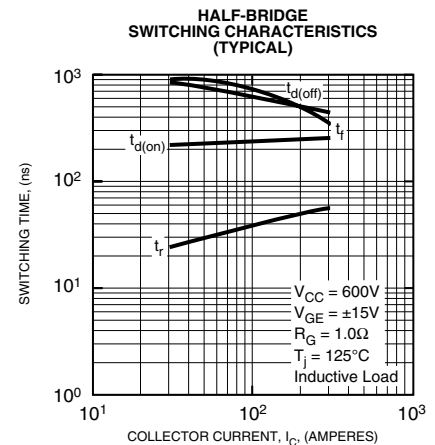
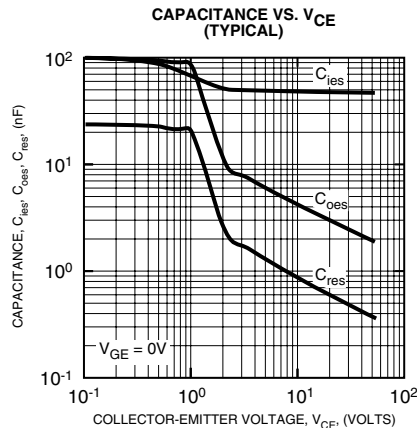
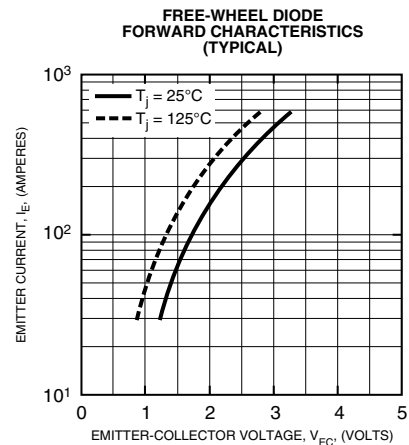
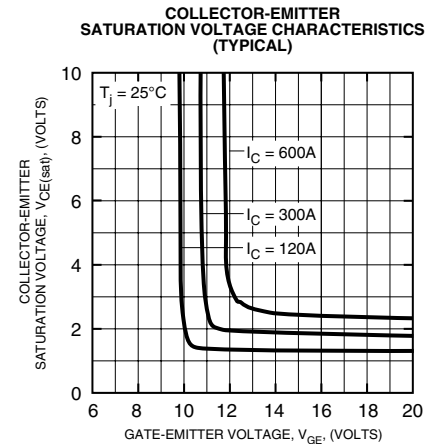
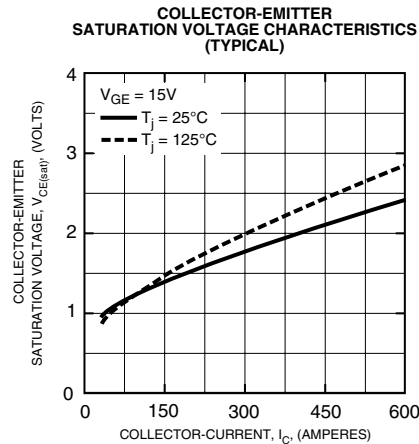
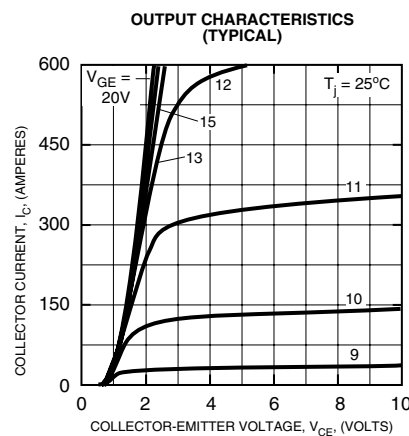
## CM300DY-24NF

### Dual IGBTMOD™ NF-Series Module

300 Amperes/1200 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    | $\Omega$           |

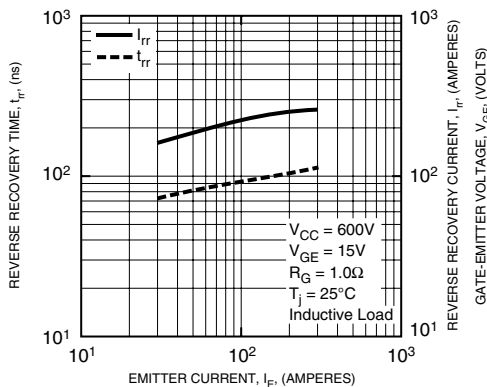


## CM300DY-24NF

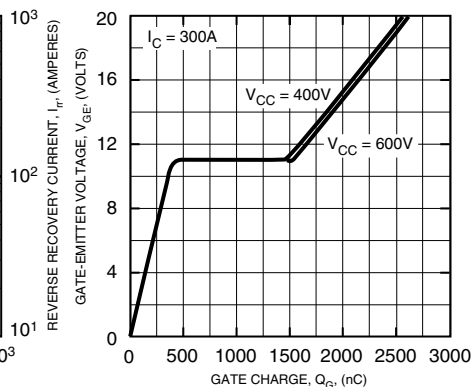
### Dual IGBTMOD™ NF-Series Module

300 Amperes/1200 Volts

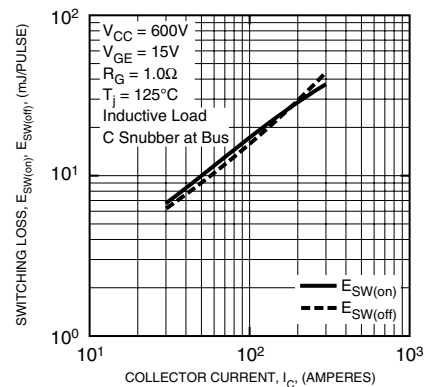
REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)



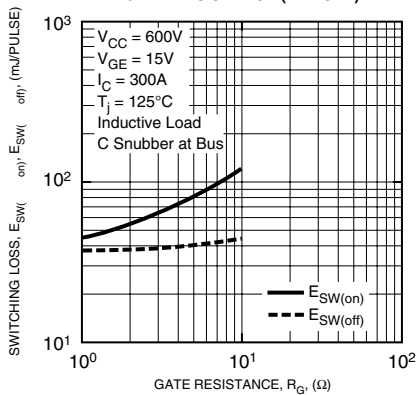
GATE CHARGE VS.  $V_{GE}$



SWITCHING LOSS VS.  
COLLECTOR CURRENT (TYPICAL)



SWITCHING LOSS VS.  
GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL  
IMPEDANCE CHARACTERISTICS  
(IGBT & FWDI)

