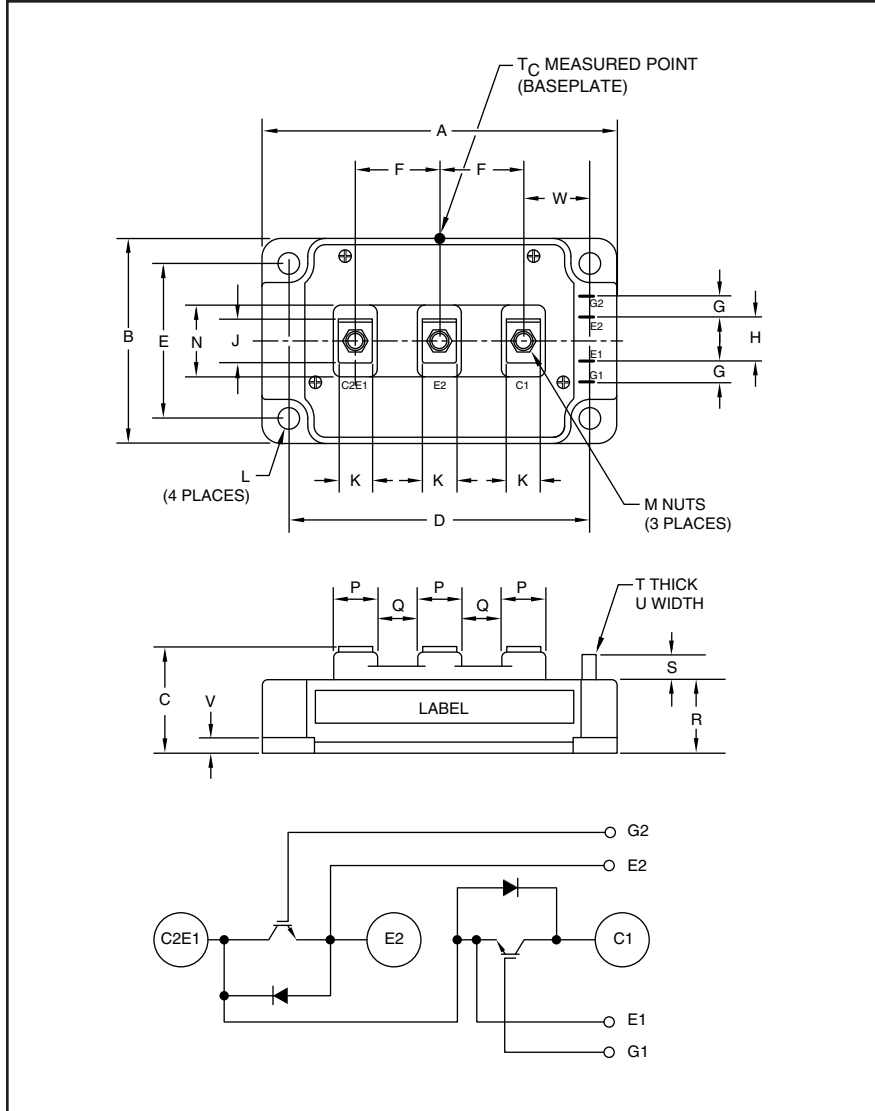


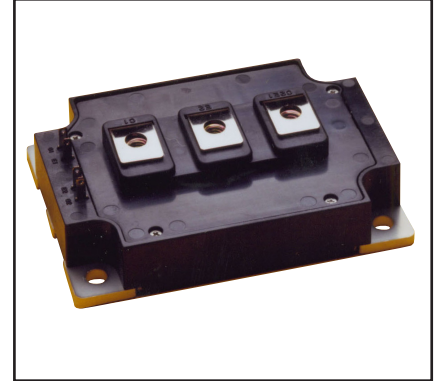
### Dual IGBTMOD™ NF-Series Module 600 Amperes/600 Volts



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 Amperes	$V_{CES}$ Volts (x 50)
CM	600	12



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

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

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

Ratings	Symbol	CM600DY-12NF	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 (C-E Short)	$V_{GES}$	$\pm 20$	Volts
Collector Current*** (DC, $T_C = 89^\circ\text{C}$ )	$I_C$	600	Amperes
Peak Collector Current	$I_{CM}$	1200*	Amperes
Emitter Current** ( $T_C = 25^\circ\text{C}$ )	$I_E$	600	Amperes
Emitter Surge Current**	$I_{EM}$	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.)	$V_{ISO}$	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	$I_{GES}$	$V_{GE} = V_{GES}$ , $V_{CE} = 0V$	—	—	0.5	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 60\text{mA}$ , $V_{CE} = 10V$	5.0	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 600\text{A}$ , $V_{GE} = 15V$ , $T_j = 25^\circ\text{C}$	—	1.7	2.2	Volts
		$I_C = 600\text{A}$ , $V_{GE} = 15V$ , $T_j = 125^\circ\text{C}$	—	1.7	—	Volts
Total Gate Charge	$Q_G$	$V_{CC} = 300V$ , $I_C = 600\text{A}$ , $V_{GE} = 15V$	—	2400	—	nC
Emitter-Collector Voltage**	$V_{EC}$	$I_E = 600\text{A}$ , $V_{GE} = 0V$	—	—	2.6	Volts

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

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

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

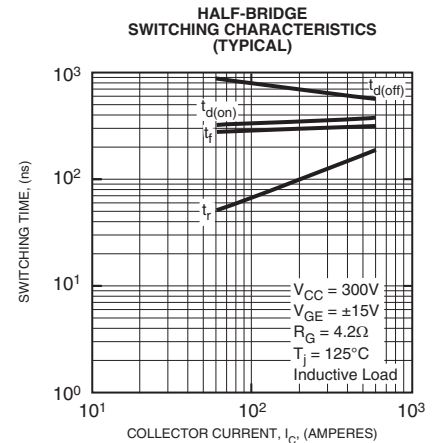
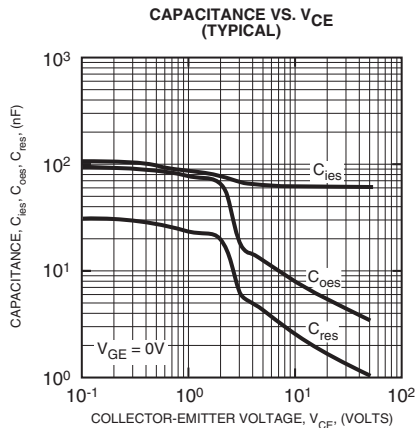
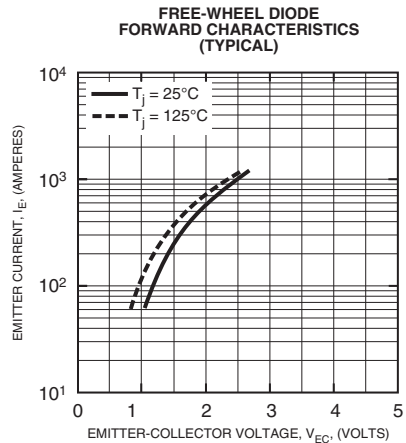
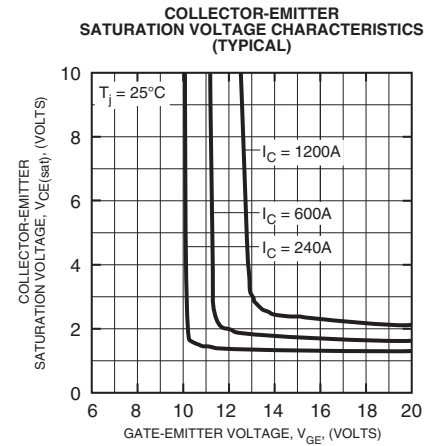
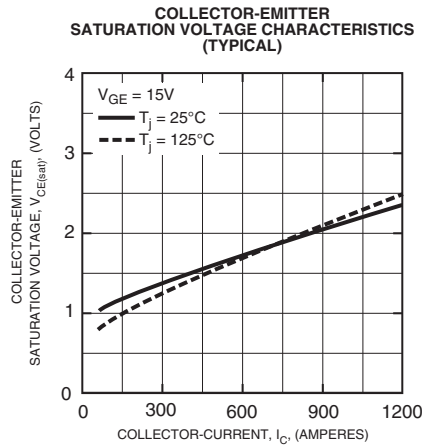
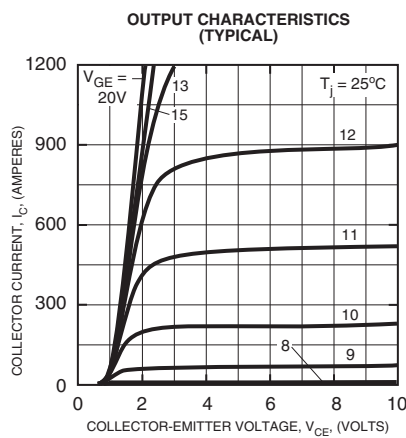
\*\*Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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

**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	$\Omega$

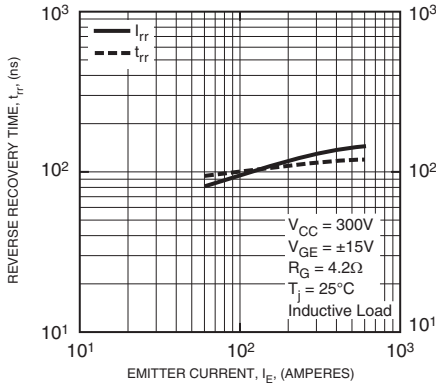




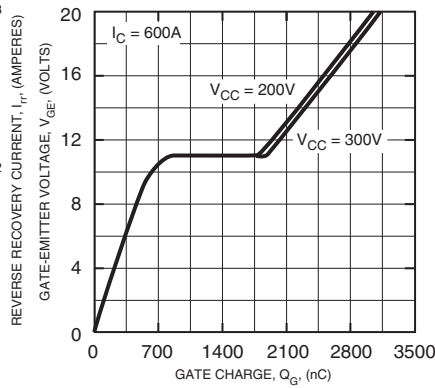
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**CM600DY-12NF**  
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 600 Amperes/600 Volts

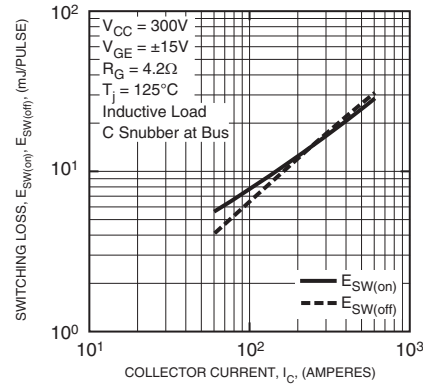
**REVERSE RECOVERY CHARACTERISTICS (TYPICAL)**



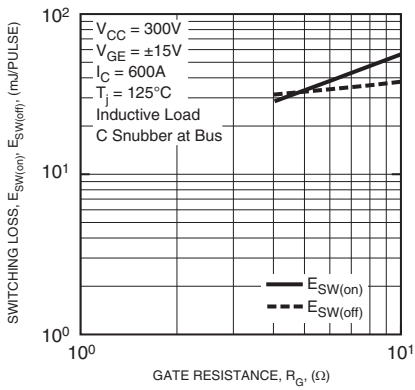
**GATE CHARGE VS.  $V_{GE}$**



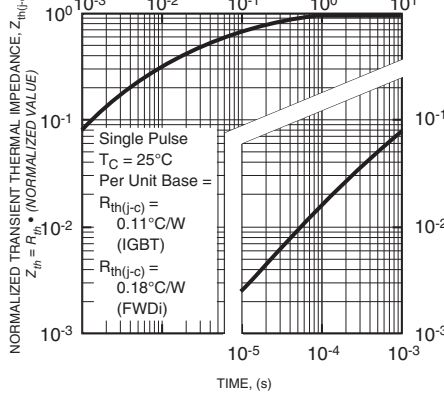
**SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)**



**SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDI)**



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