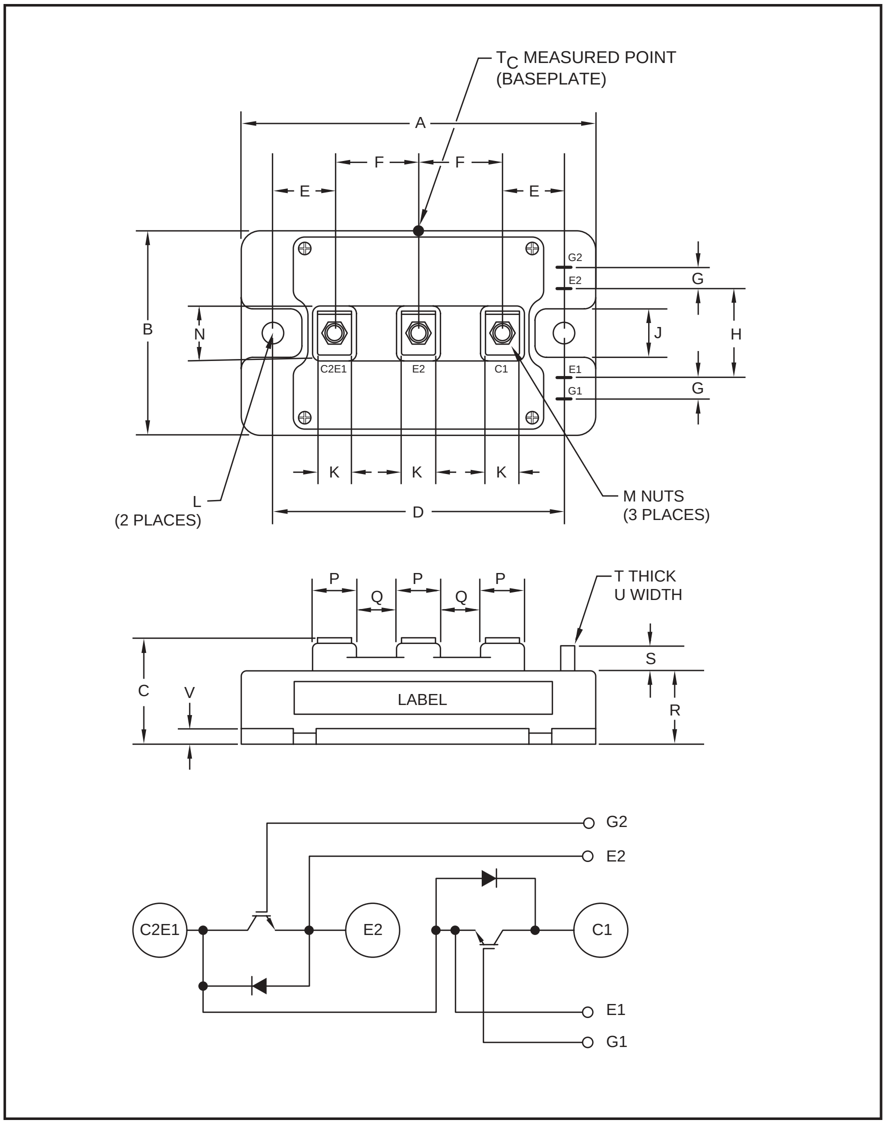
CM200DY-12NF

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

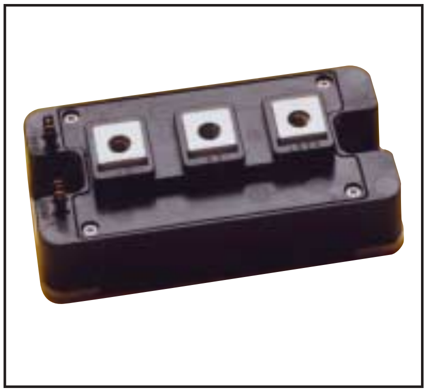
Dual IGBTMOD™
NF-Series Module
200 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.70	94.0
B	1.89	48.0
C	1.14+0.04/-0.02	29.0+1.0/-0.5
D	3.15±0.01	80.0±0.25
E	0.67	17.0
F	0.91	23.0
G	0.16	4.0
H	0.71	18.0
J	0.51	13.0
K	0.47	12.0

Dimensions	Inches	Millimeters
L	0.26 Dia.	Dia. 6.5
M	M5 Metric	M5
N	0.79	20.0
P	0.63	16.0
Q	0.28	7.0
R	0.83	21.2
S	0.30	7.5
T	0.02	0.5
U	0.110	2.8
V	0.16	4.0



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. CM200DY-12NF is a 600V (V_{CES}), 200 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	200	12

CM200DY-12NF
Dual IGBTMOD™ NF-Series Module
200 Amperes/600 Volts

Absolute Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	CM200DY-12NF	Units
Junction Temperature	T_j	–40 to 150	°C
Storage Temperature	T_{stg}	–40 to 125	°C
Collector-Emitter Voltage (G-E Short)	V_{CES}	600	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	±20	Volts
Collector Current*** (DC, $T_C' = 93°C$)	I_C	200	Amperes
Peak Collector Current	I_{CM}	400*	Amperes
Emitter Current** ($T_C = 25°C$)	I_E	200	Amperes
Peak Emitter Current**	I_{EM}	400*	Amperes
Maximum Collector Dissipation ($T_C = 25°C$, $T_j \leq 150°C$)	P_C	650	Watts
Mounting Torque, M5 Main Terminal	—	30	in-lb
Mounting Torque, M6 Mounting	—	40	in-lb
Weight	—	310	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{ISO}	2500	Volts

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

Static Electrical Characteristics, T_j = 25 °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	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 20mA$, $V_{CE} = 10V$	5.0	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 200A$, $V_{GE} = 15V$, $T_j = 25°C$	—	1.7	2.2	Volts
		$I_C = 200A$, $V_{GE} = 15V$, $T_j = 125°C$	—	1.7	—	Volts
Total Gate Charge	Q_G	$V_{CC} = 300V$, $I_C = 200A$, $V_{GE} = 15V$	—	800	—	nC
Emitter-Collector Voltage**	V_{EC}	$I_E = 200A$, $V_{GE} = 0V$	—	—	2.6	Volts

Dynamic Electrical Characteristics, T_j = 25 °C unless otherwise specified

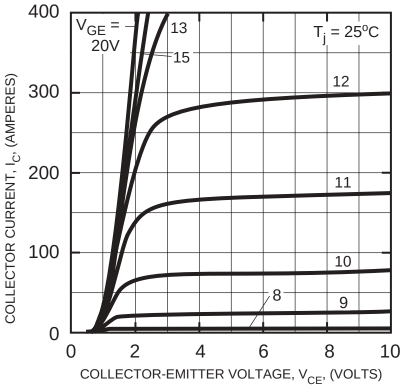
Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	$V_{CE} = 10V$, $V_{GE} = 0V$	—	—	30	nf
Output Capacitance		C_{oes}		—	—	3.7	nf
Reverse Transfer Capacitance		C_{res}		—	—	1.2	nf
Inductive Load Switch Time	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 300V$, $I_C = 200A$, $V_{GE1} = V_{GE2} = 15V$, $R_G = 3.1\Omega$, Inductive Load Switching Operation, $I_E = 200A$	—	—	120	ns
	Rise Time	t_r		—	—	120	ns
	Turn-off Delay Time	$t_{d(off)}$		—	—	300	ns
	Fall Time	t_f		—	—	300	ns
Diode Reverse Recovery Time**		t_{rr}		—	—	150	ns
Diode Reverse Recovery Charge**		Q_{rr}		—	3.5	—	µC

*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)
***Tc' measured point is just under chips. If this value is used, Rth(f-a) should be measured just under chips

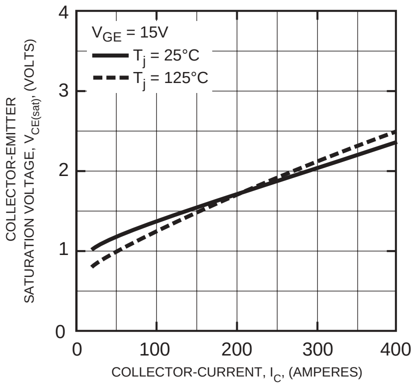
Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

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	—	—	0.19	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi 1/2 Module, T_C Reference Point per Outline Drawing	—	—	0.35	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c')}Q$	Per IGBT 1/2 Module, T_C Reference Point Under Chips	—	—	0.13	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/2 Module, Thermal Grease Applied	—	0.07	—	°C/W
External Gate Resistance	R_G		3.1	—	31	Ω

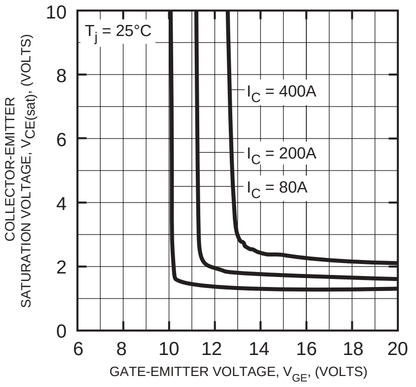
OUTPUT CHARACTERISTICS (TYPICAL)



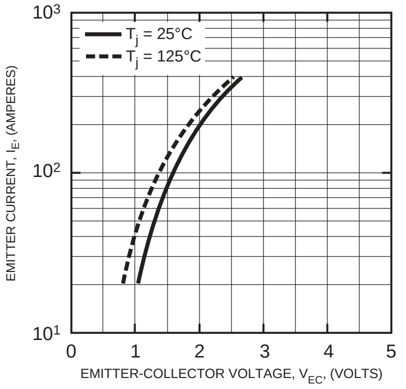
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



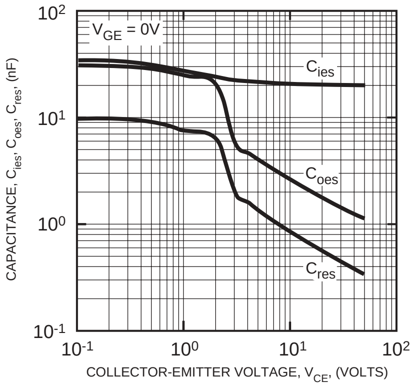
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



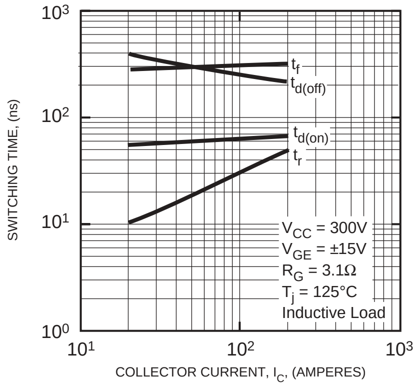
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)

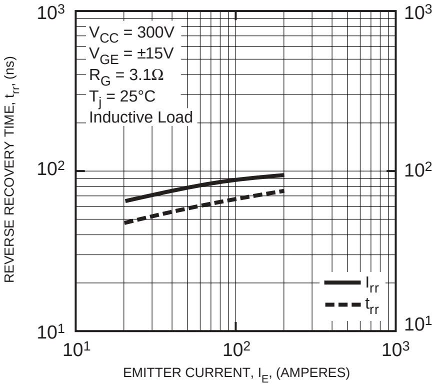


CAPACITANCE VS. V_{CE} (TYPICAL)

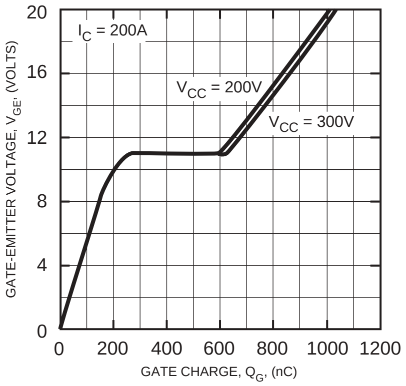


HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)

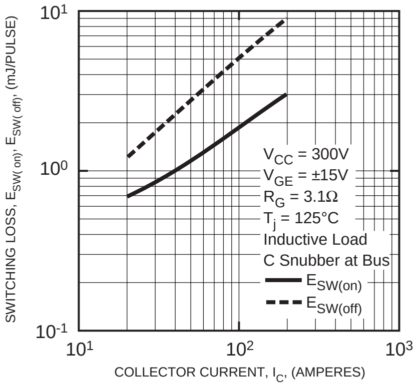




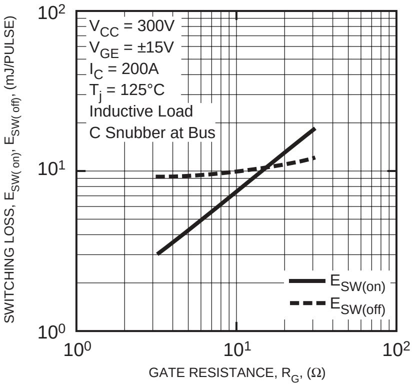
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



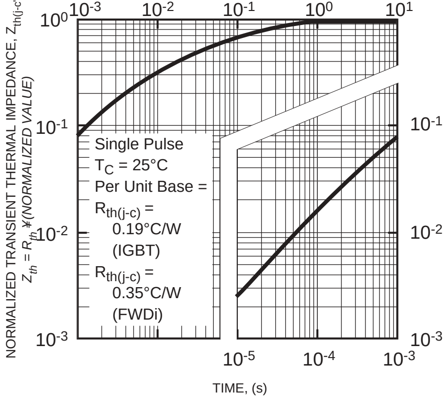
GATE CHARGE VS. V_{GE}



SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)