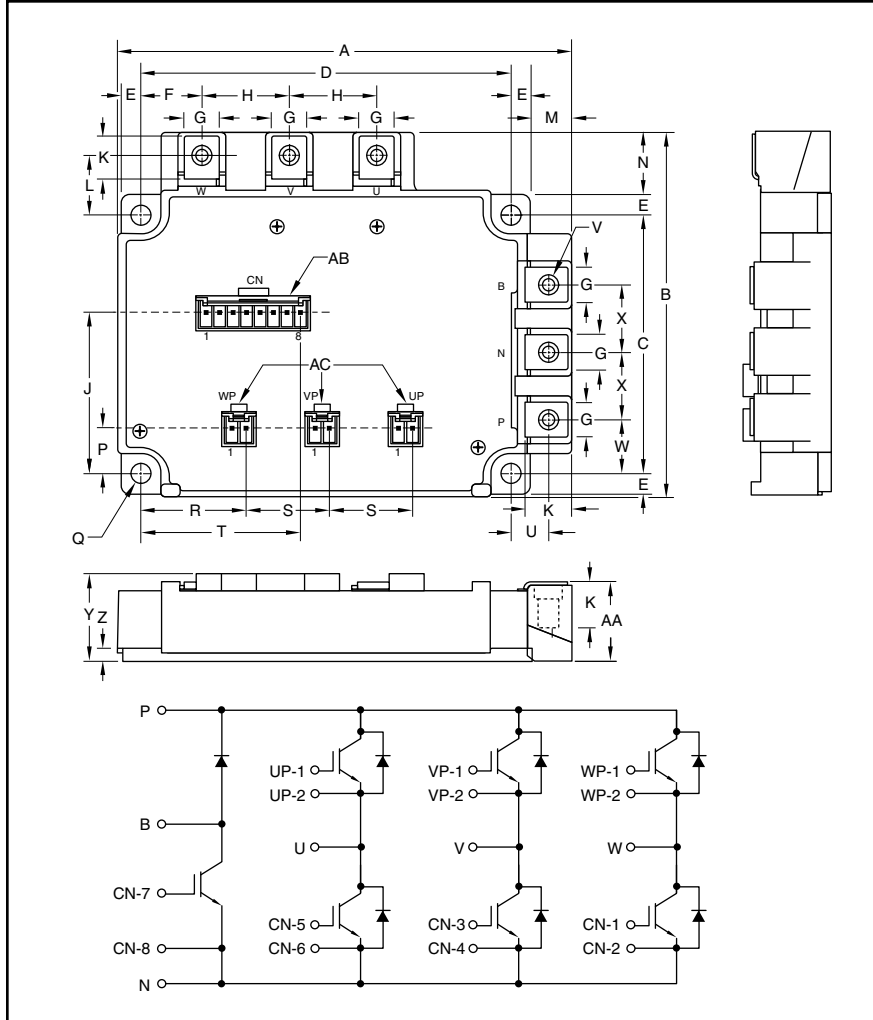


Six IGBTMOD™ + Brake NF-Series Module 200 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.32	135.0
B	4.33±0.02	110.0±0.5
C	3.07±0.02	78.0±0.5
D	4.33±0.02	110.0±0.5
E	0.24	6.05
F	0.69	17.5
G	0.41	10.5
H	1.02	26.0
J	1.92	48.75
K	0.51	13.0
L	0.71	18.0
M	0.46	11.7

Dimensions	Inches	Millimeters
N	0.74	18.7
P	0.54	13.75
Q	0.22	5.5 Dia.
R	1.20	30.5
S	0.98	25.0
T	1.82	46.3
U	0.43	11.0
V	M5	M5
W	0.65	16.5
X	0.78	20.0
Y	1.04	26.5
Z	0.16	4.0
AA	0.95+0.04/-0.02	24.1+1.0/-0.5

Housing Types (J.S.T. Mfg. Co. Ltd.)

AB – B8P-VH-FB-B
AC – B2P-VH-FB-B



Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of six IGBT Transistors in a three phase bridge configuration and a seventh IGBT with free-wheel diode for dynamic braking. 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
- Motion/Servo Control
- Photovoltaic/Fuel Cell

Ordering Information:

Example: Select the complete module number you desire from the table below -i.e. CM200RL-24NF is a 1200V (V_{CES}), 200 Ampere Six-IGBTMOD™ + Brake Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	2 00	24

CM200RL-24NF

Six IGBTMOD™ + Brake NF-Series Module

200 Amperes/1200 Volts

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

Characteristics	Symbol	CM200RL-24NF	Units
Power Device Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M5 Main Terminal Screws	—	31	in-lb
Module Weight (Typical)	—	350	Grams
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

Inverter Sector

Collector-Emitter Voltage (G-E Short)	V_{CES}	1200	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current ($T_C = 72^\circ\text{C}$)*	I_C	200	Amperes
Peak Collector Current ($T_j \leq 150^\circ\text{C}$)	I_{CM}	400**	Amperes
Emitter Current***	I_E	200	Amperes
Peak Emitter Current***	I_{EM}	400**	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j < 150^\circ\text{C}$)	P_C	1160	Watts

Brake Sector

Collector-Emitter Voltage (G-E Short)	V_{CES}	1200	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current ($T_C = 80^\circ\text{C}$)*	I_C	100	Amperes
Peak Collector Current ($T_j \leq 150^\circ\text{C}$)	I_{CM}	200**	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j < 150^\circ\text{C}$)	P_C	620	Watts
Repetitive Peak Reverse Voltage (Clamp Diode Part)	V_{RRM}	1200	Volts
Forward Current (Clamp Diode Part)	I_{FM}	100	Amperes

* T_C , T_f measured point is just under the chips.

**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).

CM200RL-24NF
Six IGBTMOD™ + Brake NF-Series Module
 200 Amperes/1200 Volts

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

Inverter Sector

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		$V_{GE(th)}$	$I_C = 20\text{mA}, V_{CE} = 10V$	6	7	8	Volts
Gate Leakage Current		I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	μA
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 200\text{A}, V_{GE} = 15V, T_j = 25^\circ\text{C}$	—	2.1	3.1	Volts
			$I_C = 200\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	2.4	—	Volts
Input Capacitance		C_{ies}	$V_{CE} = 10V, V_{GE} = 0V$	—	—	35.0	nf
Output Capacitance		C_{oes}		—	—	3.0	nf
Reverse Transfer Capacitance		C_{res}		—	—	0.68	nf
Total Gate Charge		Q_G		$V_{CC} = 600V, I_C = 200\text{A}, V_{GE} = 15V$	—	1000	—
Inductive	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 200\text{A},$ $V_{GE1} = V_{GE2} = 15V,$ $R_G = 1.6\Omega, I_E = 200\text{A},$	—	—	130	ns
Load	Turn-on Rise Time	t_r		—	—	70	ns
Switch	Turn-off Delay Time	$t_{d(off)}$		—	—	400	ns
Time	Turn-off Fall Time	t_f		—	—	350	ns
Reverse Recovery Time*		t_{rr}	Inductive Load Switching Operation	—	—	150	ns
Reverse Recovery Charge*		Q_{rr}		—	9.0	—	μC
Emitter-Collector Voltage*		V_{EC}	$I_E = 200\text{A}, V_{GE} = 0V$	—	—	3.8	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 1/6 Module	—	—	0.11	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case**		$R_{th(j-c)D}$	Per FWDi 1/6 Module	—	—	0.17	$^\circ\text{C/W}$
Contact Thermal Resistance		$R_{th(c-f)}$	Per 1/6 Module, Thermal Grease Applied	—	0.051	—	$^\circ\text{C/W}$
External Gate Resistance		R_G		1.6	—	21	Ω

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

** T_C, T_f measured point is just under the chips.

CM200RL-24NF

Six IGBTMOD™ + Brake NF-Series Module

200 Amperes/1200 Volts

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

Brake Sector

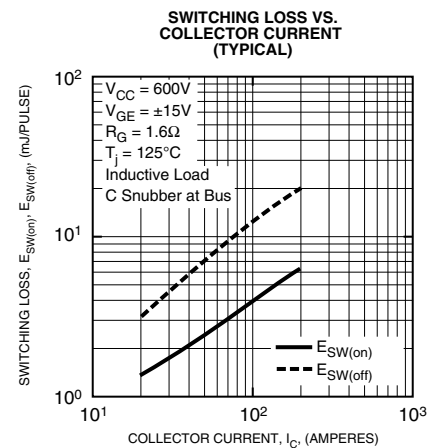
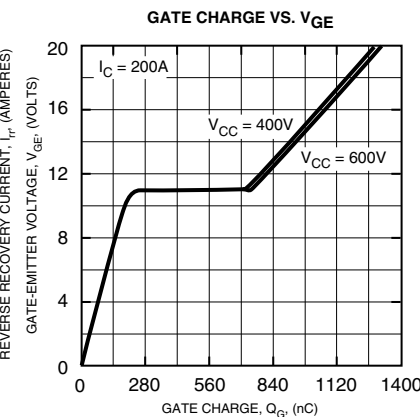
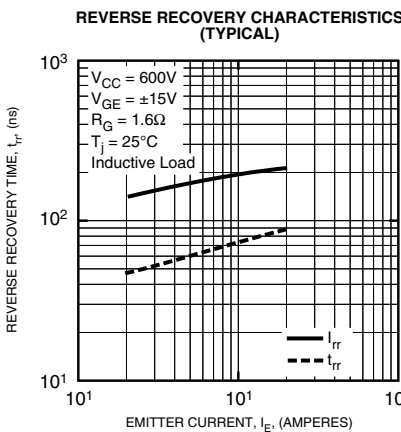
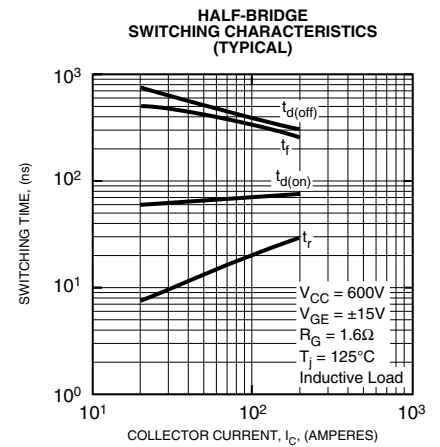
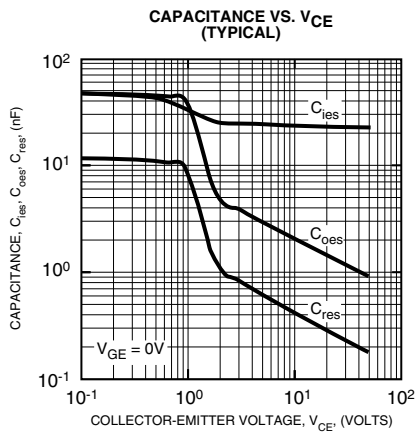
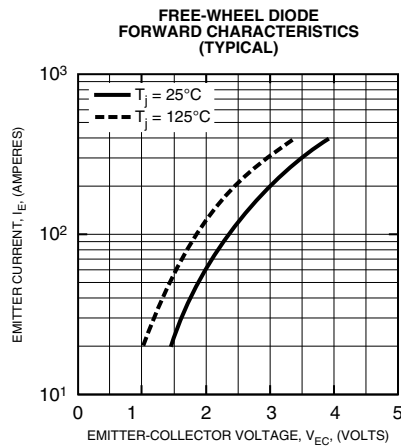
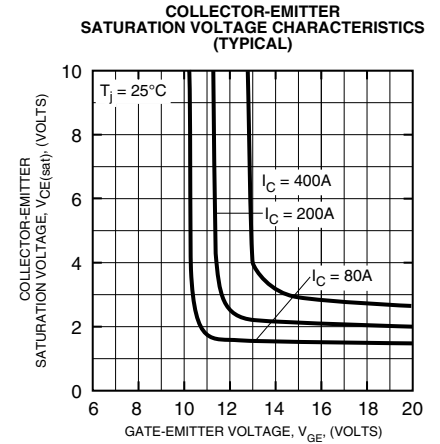
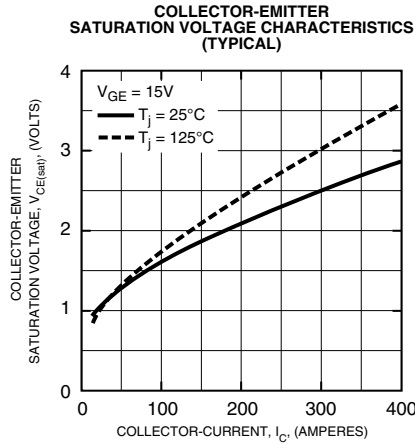
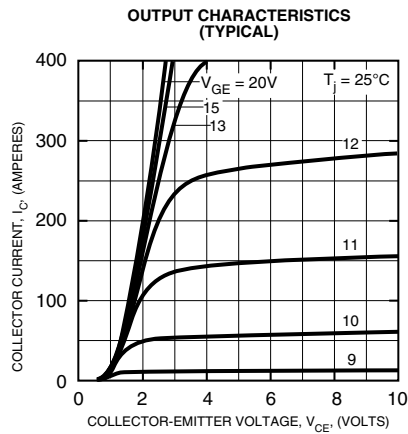
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1.0	mA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 10mA$	6	7	8	Volts
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 100A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	—	2.1	3.0	Volts
		$I_C = 100A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	2.4	—	Volts
Input Capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V$	—	—	17.5	nf
Output Capacitance	C_{oes}		—	—	1.5	nf
Reverse Transfer Capacitance	C_{res}		—	—	0.34	nf
Total Gate Charge	Q_G		$V_{CC} = 600V, I_C = 100A, V_{GE} = 15V$	—	500	—
Forward Voltage Drop	V_{FM}	$I_F = 100A$	—	—	3.8	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 1/6 Module	—	—	0.20	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case*	$R_{th(j-c)D}$	Per FWDi 1/6 Module	—	—	0.28	$^\circ\text{C/W}$

* T_C, T_f measured point is just under the chips.

CM200RL-24NF
Six IGBTMOD™ + Brake NF-Series Module
 200 Amperes/1200 Volts

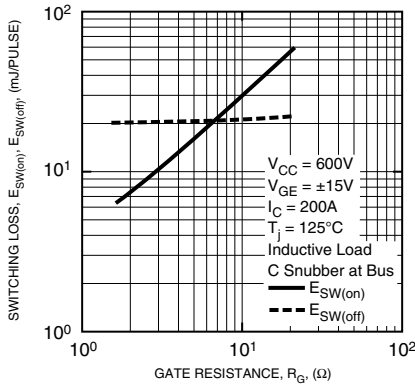


CM200RL-24NF

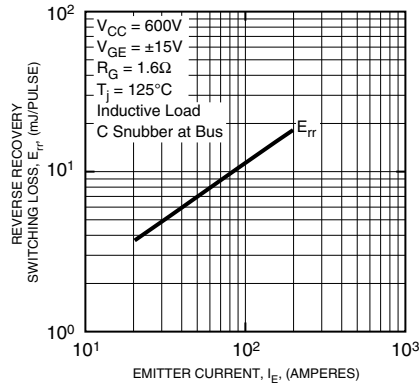
Six IGBTMOD™ + Brake NF-Series Module

200 Amperes/1200 Volts

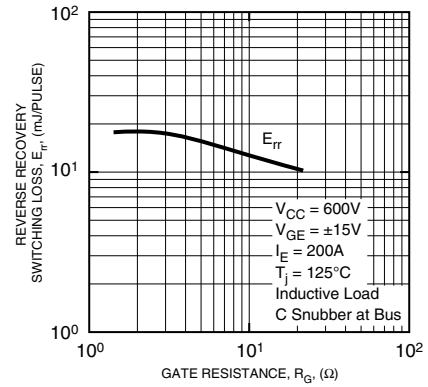
SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. EMITTER CURRENT (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDI)

