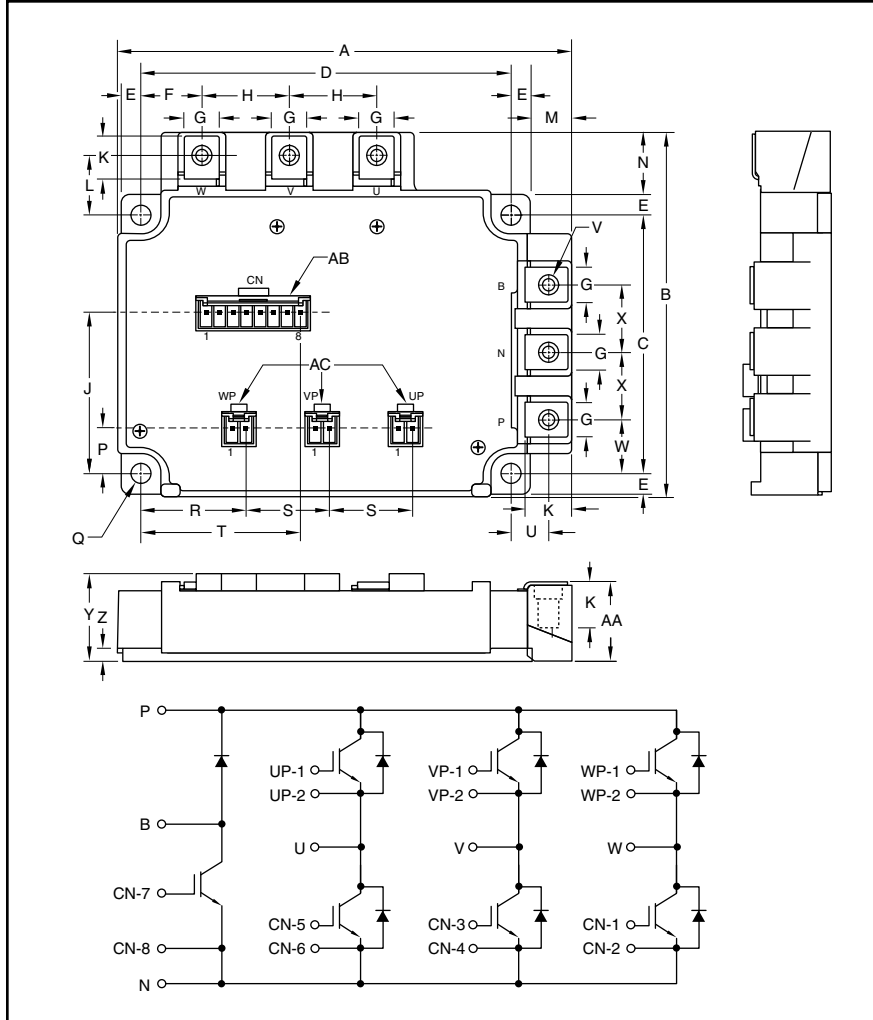


### Six IGBTMOD™ + Brake NF-Series Module 150 Amperes/1200 Volts



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	78.0
D	4.33±0.02	110±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/-0.0	24.1+1.0/-0.0

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. CM150RL-24NF is a 1200V ( $V_{CES}$ ), 150 Ampere Six-IGBTMOD™ + Brake Power Module.

Type	Current Rating Amperes	$V_{CES}$ Volts (x 50)
CM	150	24

**CM150RL-24NF**

**Six IGBTMOD™ + Brake NF-Series Module**

150 Amperes/1200 Volts

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

Characteristics	Symbol	CM150RL-24NF	Units
Power Device Junction Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$	-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)	—	750	Grams
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	$V_{\text{ISO}}$	2500	Volts

**Inverter Sector**

Collector-Emitter Voltage (G-E Short)	$V_{\text{CES}}$	1200	Volts
Gate-Emitter Voltage (C-E Short)	$V_{\text{GES}}$	$\pm 20$	Volts
Collector Current ( $T_C = 76^\circ\text{C}$ )*	$I_C$	150	Amperes
Peak Collector Current ( $T_j \leq 150^\circ\text{C}$ )	$I_{\text{CM}}$	300**	Amperes
Emitter Current***	$I_E$	150	Amperes
Peak Emitter Current***	$I_{\text{EM}}$	300**	Amperes
Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j < 150^\circ\text{C}$ )	$P_C$	890	Watts

**Brake Sector**

Collector-Emitter Voltage (G-E Short)	$V_{\text{CES}}$	1200	Volts
Gate-Emitter Voltage (C-E Short)	$V_{\text{GES}}$	$\pm 20$	Volts
Collector Current ( $T_C = 86^\circ\text{C}$ )*	$I_C$	75	Amperes
Peak Collector Current ( $T_j \leq 150^\circ\text{C}$ )	$I_{\text{CM}}$	150**	Amperes
Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j < 150^\circ\text{C}$ )	$P_C$	520	Watts
Repetitive Peak Reverse Voltage (Clamp Diode Part)	$V_{\text{RRM}}$	1200	Volts
Forward Current (Clamp Diode Part)	$I_{\text{FM}}$	75	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).

**CM150RL-24NF**  
**Six IGBTMOD™ + Brake NF-Series Module**  
 150 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		$V_{GE(th)}$	$I_C = 15mA, V_{CE} = 10V$	6	7	8	Volts
Gate Leakage Current		$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	$\mu\text{A}$
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 150A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	—	2.1	3.0	Volts
			$I_C = 150A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	2.4	—	Volts
Input Capacitance		$C_{ies}$		—	—	23.0	nf
Output Capacitance		$C_{oes}$	$V_{CE} = 10V, V_{GE} = 0V$	—	—	2.0	nf
Reverse Transfer Capacitance		$C_{res}$		—	—	0.45	nf
Total Gate Charge		$Q_G$	$V_{CC} = 600V, I_C = 150A, V_{GE} = 15V$	—	675	—	nC
Inductive	Turn-on Delay Time	$t_{d(on)}$		—	—	130	ns
Load	Turn-on Rise Time	$t_r$	$V_{CC} = 600V, I_C = 150A,$	—	—	70	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	$V_{GE1} = V_{GE2} = 15V,$	—	—	400	ns
Time	Turn-off Fall Time	$t_f$	$R_G = 2.1\Omega, I_E = 150A,$	—	—	350	ns
Reverse Recovery Time*		$t_{rr}$	Inductive Load Switching Operation	—	—	150	ns
Reverse Recovery Charge*		$Q_{rr}$		—	5.8	—	$\mu\text{C}$
Emitter-Collector Voltage*		$V_{EC}$	$I_E = 150A, V_{GE} = 0V$	—	—	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	—	—	0.14	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case**		$R_{th(j-c)D}$	Per FWDi 1/6 Module	—	—	0.23	$^\circ\text{C/W}$
Contact Thermal Resistance		$R_{th(c-f)}$	Per 1/6 Module, Thermal Grease Applied	—	0.051	—	$^\circ\text{C/W}$
External Gate Resistance		$R_G$		2.1	—	31	$\Omega$

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

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

**CM150RL-24NF**

**Six IGBTMOD™ + Brake NF-Series Module**

150 Amperes/1200 Volts

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

**Brake Sector**

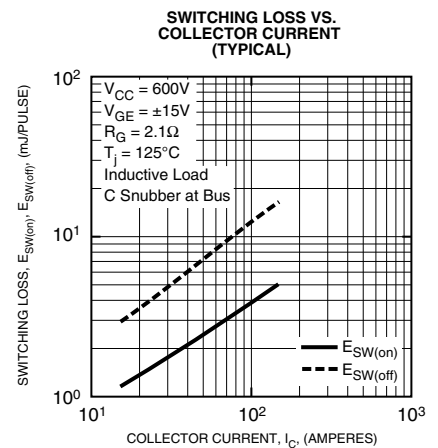
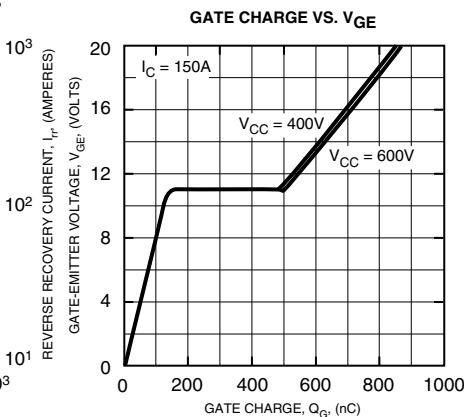
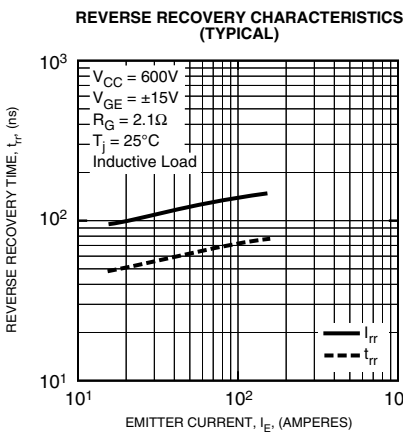
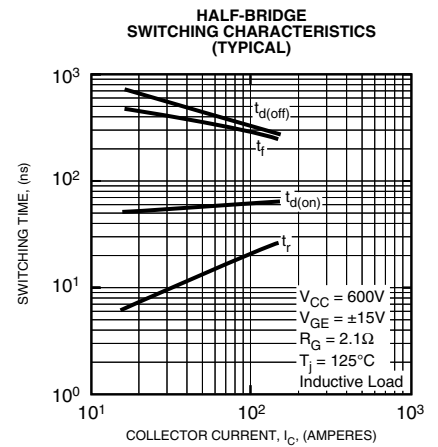
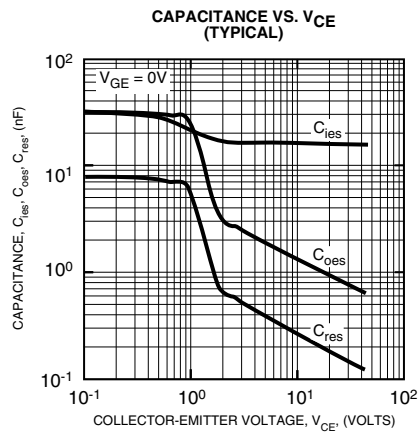
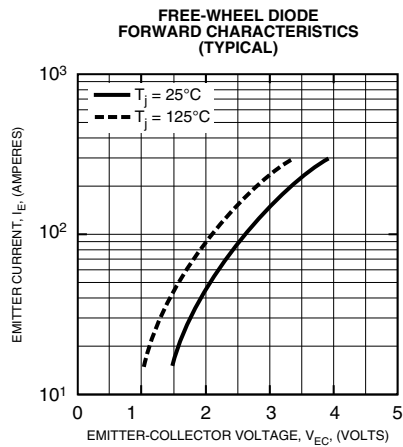
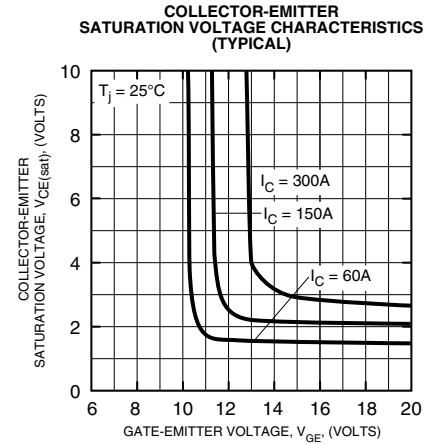
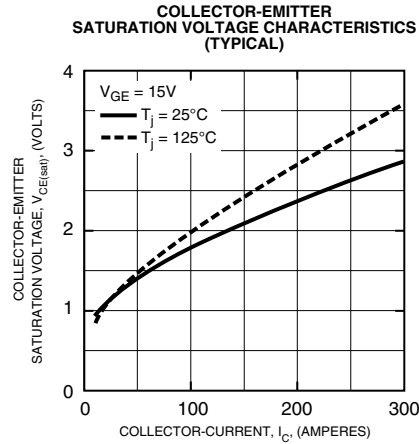
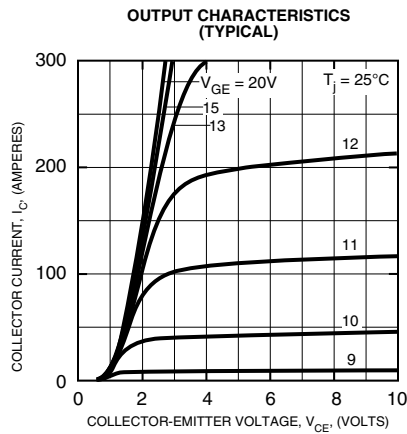
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current	$I_{CES}$	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1.0	mA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 7.5mA$	6	7	8	Volts
Gate Leakage Current	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	$\mu A$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 75A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	—	2.1	3.0	Volts
		$I_C = 75A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	2.4	—	Volts
Input Capacitance	$C_{ies}$	$V_{CE} = 10V, V_{GE} = 0V$	—	—	11.5	nf
Output Capacitance	$C_{oes}$		—	—	1.0	nf
Reverse Transfer Capacitance	$C_{res}$		—	—	0.23	nf
Total Gate Charge	$Q_G$		$V_{CC} = 600V, I_C = 75A, V_{GE} = 15V$	—	338	—
Forward Voltage Drop	$V_{FM}$	$I_F = 75A$	—	—	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	—	—	0.24	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case*	$R_{th(j-c)D}$	Per FWDi 1/6 Module	—	—	0.36	$^\circ\text{C/W}$

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

**CM150RL-24NF**  
**Six IGBTMOD™ + Brake NF-Series Module**  
 150 Amperes/1200 Volts



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