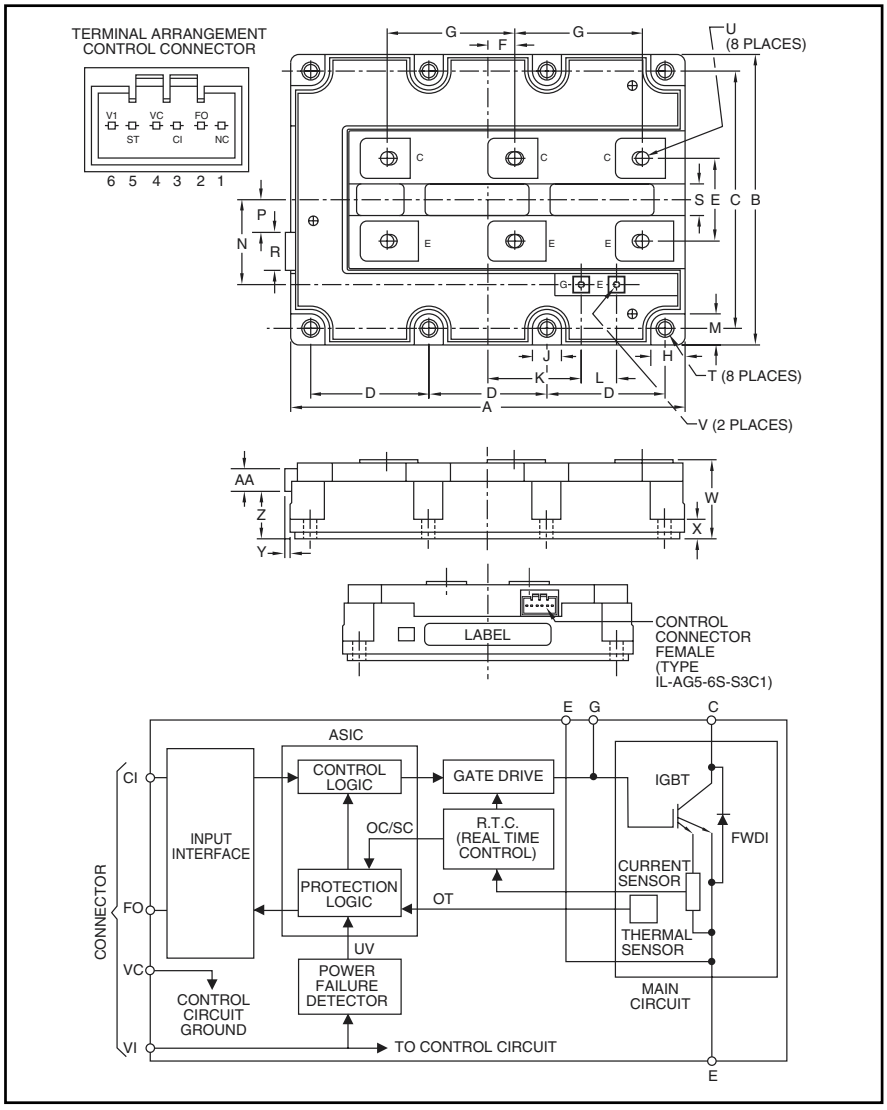
Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

High Voltage Intelligent Power Module

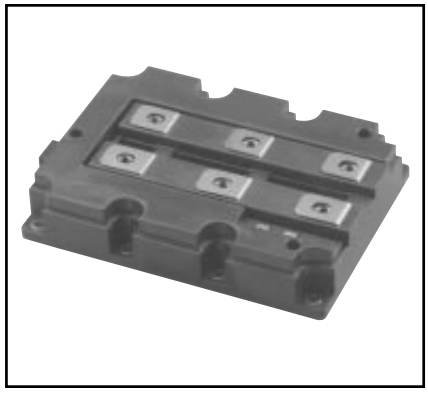
1200 Amperes/3300 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	7.48±0.012	190.0±0.3
B	5.51±0.012	140.0±0.3
C	4.88±0.012	124.0±0.3
D	2.24±0.012	57.0±0.3
E	1.57	40.0
F	0.51	13.0
G	2.42±0.012	61.5±0.3
H	0.65	16.5
J	0.55	14.0
K	1.77	45.0
L	0.67	17.0
M	0.59	15.0

Dimensions	Inches	Millimeters
N	1.61	41.0
P	0.62	15.85
R	0.72	18.3
S	0.59	15.0
T	0.26	6.5
U	M8	M8
V	M3	M3
W	1.50 +0.4/-0.0	38.0 +1.0/-0.0
X	0.37	9.3
Y	0.10	2.6
Z	0.91	23.0
AA	0.43	11.0



Description:

Powerex High Voltage Intelligent Power Module combines gate drive and protection circuitry in a fully isolated package. The new HVIPM reduces the saturation voltage by 7.5% while maintaining high short circuit withstanding capability. Gate drive noise is resolved through the use of the HVIPM by optimizing the control of the chip through close proximity of the gate drive control circuit.

Features:

- ☐ Control Circuit and Protection Circuitry for Overcurrent, Short Circuit and Over-temperature
- ☐ Low $V_{CE(sat)}$ 7.5% Reduction Versus HVIGBT
- ☐ Exterior Package Matches Standard HVIGBT
- ☐ Optimized Isolation Design to Satisfy 6KV AC.

Applications:

- ☐ High Power Converters and Inverters
- ☐ Medium Voltage Drives
- ☐ Traction Drives

Ordering Information:

Example: Select the complete module number you desire from the table - i.e. PM1200HCE330-1 is a 1200V (V_{CES}), 3300 Ampere High Voltage Power Module.

Type	Current Rating (A)	V_{CES} (V)
PM	3300	1200

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

Ratings	Symbol	PM1200HCE330-1	Units
Junction Temperature	T_j	-40 to 150	°C
Storage Temperature	T_{stg}	-40 to 115	°C
Mounting Torque, M6 Mounting Screws	–	30	in-lb
Mounting Torque, M8 Main Terminal Screw	–	95	in-lb
Mounting Torque, M3 Auxiliary Terminal Screw	–	5	in-lb
Weight (Typical)	–	1.5	kg
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	6000	Volts
Control Part			
Supply Voltage Applied between V_1 ~ V_C	V_D	26.4	Volts
Input Voltage Applied between C_1 ~ V_C	V_{CIN}	26.4	Volts
Fault Output Supply Voltage Applied between F_O-V_C	V_{FO}	26.4	Volts
Fault Output Current (Sink Current at F_O Terminals)	I_{FO}	20	mA
Inverter Part			
Collector-Emitter Voltage	V_{CES}	3300	Volts
Collector Current	I_C	1200	Amperes
Peak Collector Current	I_{CP}	2400	Amperes

ElectricalCharacteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Part						
Supply Voltage	V_D	Applied between V_1 ~ V_C	21.6	24.0	26.4	Volts
Circuit Current	I_D	V_D = 24V, T_j = 25°C	—	80	120	mA
Input ON Threshold Voltage	$V_{th(on)}$	Applied between C_1 ~ V_C	6.1	6.7	7.3	Volts
Input OFF Threshold Voltage	$V_{th(off)}$		10.5	11.1	11.7	Volts
Minimum Fault Output Pulse Width	t_{FO}	V_D = 24V	—	100	200	µs
Overcurrent Trip Level	OC	T_j = -25°C ~ 125°C	2200	—	—	Amperes
Overtemperature Protection	OT	Trip Level	103	113	123	°C
(Baseplate Temperature Detection)	OT_r	Reset Level	88	98	108	°C
Supply Circuit Undervoltage Protection	UV	Trip Level	19.2	20.0	20.8	Volts
(T_j = -25°C ~ 125°C)	UV_r	Reset Level	—	20.5	—	Volts
Inverter Part						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 1200A, T_j = 25°C	—	3.05	3.97	Volts
FWDi Forward Voltage	V_{EC}	-I_C = 1200A, T_j = 25°C	—	2.90	3.77	Volts
Collector Cutoff Current	I_{CES}	V_{CE} = V_{CES}, T_j = 25°C	—	—	15	mA
		V_{CE} = V_{CES}, T_j = 125°C	—	—	60	mA

PM1200HCE330-1
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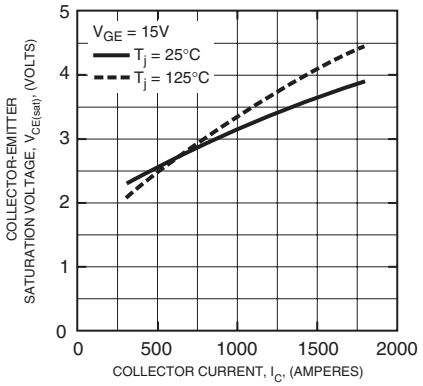
Thermal Characteristics

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}Q$	Per IGBT	—	0.0083	0.0100	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi	—	0.0167	0.0200	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	—	0.0075	—	°C/W

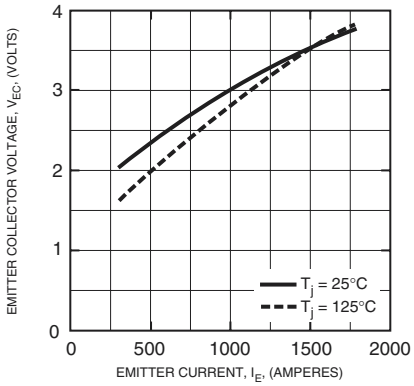
Recommended Conditions for Use

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Inverter Supply Voltage	V_{CC}	Applied between C-E	0	1500	2200	Volts
Control Supply Voltage	V_D	Applied between V_1-V_C	21.6	24.0	26.4	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between C_1-V_C	0	—	4.0	Volts
Input OFF Voltage	$V_{CIN(off)}$	—	16.0	—	V_D	Volts
PWM Input Frequency	f_{PWM}	3 Phase Sinsusoidal PWM Control	—	0.5	2.0	kHz
Arm Shoot-though Blocking Time	t_{DEAD}	Reference at IPM's Input Terminals	8.0	—	—	µs

COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



SWITCHING ENERGY CHARACTERISTICS (TYPICAL)