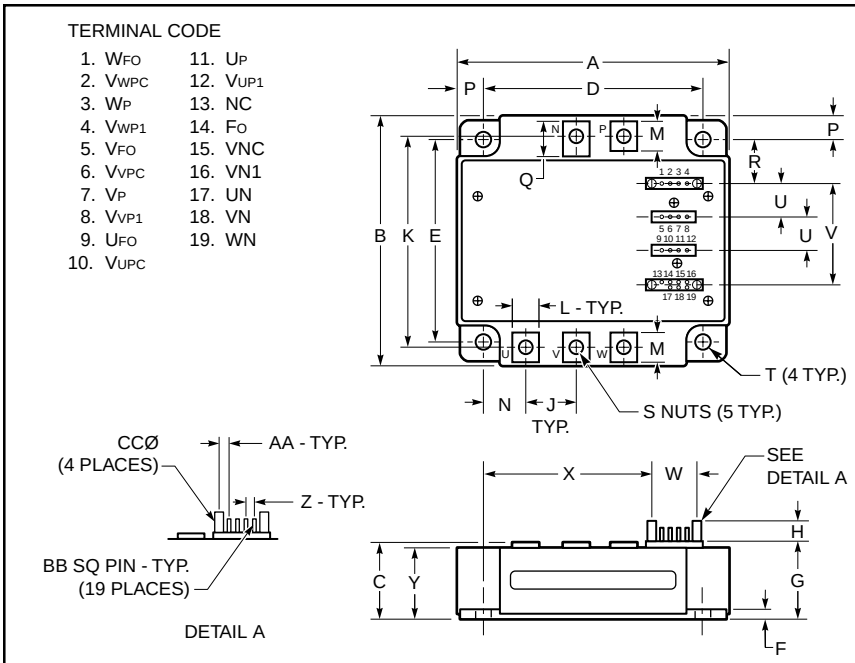
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

Intellimod™ Module

Three Phase
IGBT Inverter Output
75 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.72	120.0
B	4.02	102.0
C	0.95+0.04/-0.02	24.1 +1.0/-0.5
D	4.13±0.010	105.0±0.25
E	3.43±0.010	87.0±0.25
F	0.16	4.0
G	0.95	24.1
H	0.42	10.6
J	0.87	22.0
K	3.51±0.02	89.2±0.5
L	0.47	12.0
M	0.48	12.3
N	0.77	19.5
P	0.30	7.5

Dimensions	Inches	Millimeters
Q	0.59	15.1
R	0.72	18.25
S	M5 Metric	M5
T	0.22 Dia.	Dia. 5.5
U	0.56±0.010	14.1±0.25
V	1.72±0.012	43.57±0.3
W	0.57±0.012	14.6±0.3
X	3.35	85.2
Y	0.85	21.6
Z	0.10±0.010	2.54±0.25
AA	0.137±0.010	3.49±0.25
BB	0.02 SQ	0.64 SQ
CC	0.12+0.04/-0.02	3.0+1.0/-0.5

Description:
Powerex Intellimod™ Intelligent Power Modules are isolated base modules designed for power switching applications operating at frequencies to 20kHz. Built-in control circuits provide optimum gate drive and protection for the IGBT and free-wheel diode power devices.

Features:
- ☐ Complete Output Power Circuit
- ☐ Gate Drive Circuit
- ☐ Protection Logic
  - – Short Circuit
  - – Over Temperature
  - – Under Voltage

Applications:
- ☐ Inverters
- ☐ UPS
- ☐ Motion/Servo Control
- ☐ Power Supplies

Ordering Information:
Example: Select the complete part number from the table below -i.e. PM75CVA120 is a 1200V, 75 Ampere Intellimod™ Intelligent Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 10)
PM	75	120

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PM75CVA120
Intellimod™ Module
Three Phase IGBT Inverter Output
75 Amperes/1200 Volts

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

Characteristics	Symbol	PM75CVA120	Units
Power Device Junction Temperature	T_j	-20 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°C
Case Operating Temperature	T_C	-20 to 100	°C
Mounting Torque, M5 Mounting Screws (Typical)	—	17	in-lb
Mounting Torque, M5 Main Terminal Screws (Typical)	—	17	in-lb
Module Weight (Typical)	—	730	Grams
Supply Voltage (Applied between P - N)	$V_{CC(surge)}$	1000	Volts
Supply Voltage Protected by SC (V_D = 13.5 ~16.5V, Inverter Part, T_j = 125°C Start)	$V_{CC(prot.)}$	800	Volts
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{RMS}	2500	Volts

Control Sector

Supply Voltage Applied between (V_{UP1}-V_{UPC}, V_{VP1}-V_{VPC}, V_{WP1}-V_{WPC}, V_{N1}-V_{NC})	V_D	20	Volts
Input Voltage Applied between (U_P, V_P, W_P, U_N, V_N, W_N)	V_{CIN}	20	Volts
Fault Output Supply Voltage (Applied between F_O-GND)	V_{FO}	20	Volts
Fault Output Current (Sink Current at F_O Terminals)	I_{FO}	20	mA

IGBT Inverter Sector

Collector-Emitter Voltage (V_D = 15V, V_{CIN} = 15V)	V_{CES}	1200	Volts
Collector Current, ± (T_C = 25°C)	I_C	75	Amperes
Peak Collector Current, ± (T_C = 25°C)	I_{CP}	150	Amperes
Collector Dissipation (T_C = 25°C)	P_C	500	Watts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Short Circuit Trip Level	SC	-20°C ≤ T_j ≤ 125°C, V_D = 15V	105	—	—	Amperes
Short Circuit Current Delay Time	$t_{off(SC)}$	V_D = 15V	—	10	—	µS
Over Temperature Protection	OT	Trip Level	100	110	120	°C
(V_D = 15V, Lower Arm)	OT_r	Reset Level	85	95	105	°C
Supply Circuit Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
(-20°C ≤ T_j ≤ 125°C)	UV_r	Reset Level	—	12.5	—	Volts
Circuit Current	I_D	V_D = 15V, V_{CIN} = 15V, V_{N1}-V_{NC}	—	40	55	mA
		V_D = 15V, V_{CIN} = 15V, V_{XP1}-V_{XPC}	—	13	18	mA
Input ON Threshold Voltage	$V_{CIN(on)}$	Applied between U_P-V_{UPC}, V_P-V_{VPC},	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	$V_{CIN(off)}$	W_P-V_{WPC}, U_N, V_N, W_N-V_{NC}	1.7	2.0	2.3	Volts
Fault Output Current	$I_{FO(H)}$	V_D = 15V, V_{FO} = 15V*	—	—	0.01	mA
	$I_{FO(L)}$	V_D = 15V, V_{FO} = 15V*	—	10	15	mA
Minimum Fault Output Pulse Width	t_{FO}	V_D = 15V*	1.0	1.8	—	mS

* Fault output is given only when the internal SC, OT, and UV protections circuits of either an upper-arm or a lower-arm device operate to protect it.

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
IGBT Inverter Sector						
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, V_D = 15V, T_j = 25°C	—	—	1.0	mA
		$V_{CE} = V_{CES}$, V_D = 15V, T_j = 125°C	—	—	10.0	mA
FWDi Forward Voltage	V_{EC}	$-I_C$ = 75A, V_D = 15V, V_{CIN} = 15V	—	2.50	3.50	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, V_{CIN} = 0V, I_C = 75A, Pulsed, T_j = 25°C	—	2.65	3.30	Volts
		V_D = 15V, V_{CIN} = 0V, I_C = 75A, Pulsed, T_j = 125°C	—	2.75	3.35	Volts
Inductive Load Switching Times	t_{on}	V_D = 15V, V_{CIN} = 0V ~ 15V, V_{CC} = 600V, I_C = 75A, T_j = 125°C	0.4	0.9	2.3	µS
	t_{rr}		—	0.2	0.3	µS
	$t_{C(on)}$		—	0.4	1.0	µS
	t_{off}		—	2.4	3.4	µS
	$t_{C(off)}$		—	0.7	1.2	µS

Thermal Characteristics

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	Each Inverter IGBT	—	—	0.25	°C/Watt
	$R_{th(j-c)F}$	Each Inverter FWDi	—	—	0.51	°C/Watt
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied	—	—	0.025	°C/Watt

Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	≤ 800	Volts
	$V_{CE(surge)}$	Applied across P-N Terminals	≤ 1000	Volts
	V_D	Applied between V_{UP1}-V_{UPC}, V_{N1}-V_{NC}, V_{VP1}-V_{VPC}, V_{WP1}-V_{WPC} *	15 ± 1.5	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between U_P, V_P, W_P, U_N, V_N, W_N	≤ 0.8	Volts
Input OFF Voltage	$V_{CIN(off)}$		≥ 4.0	Volts
Arm Shoot-Through Blocking Time	t_{DEAD}	For IPM's each Input Signal	≥ 3.0	µS

* With ripple satisfying the following conditions, dv/dt swing ≤ 5V/µs, Variation ≤ 2V peak to peak.