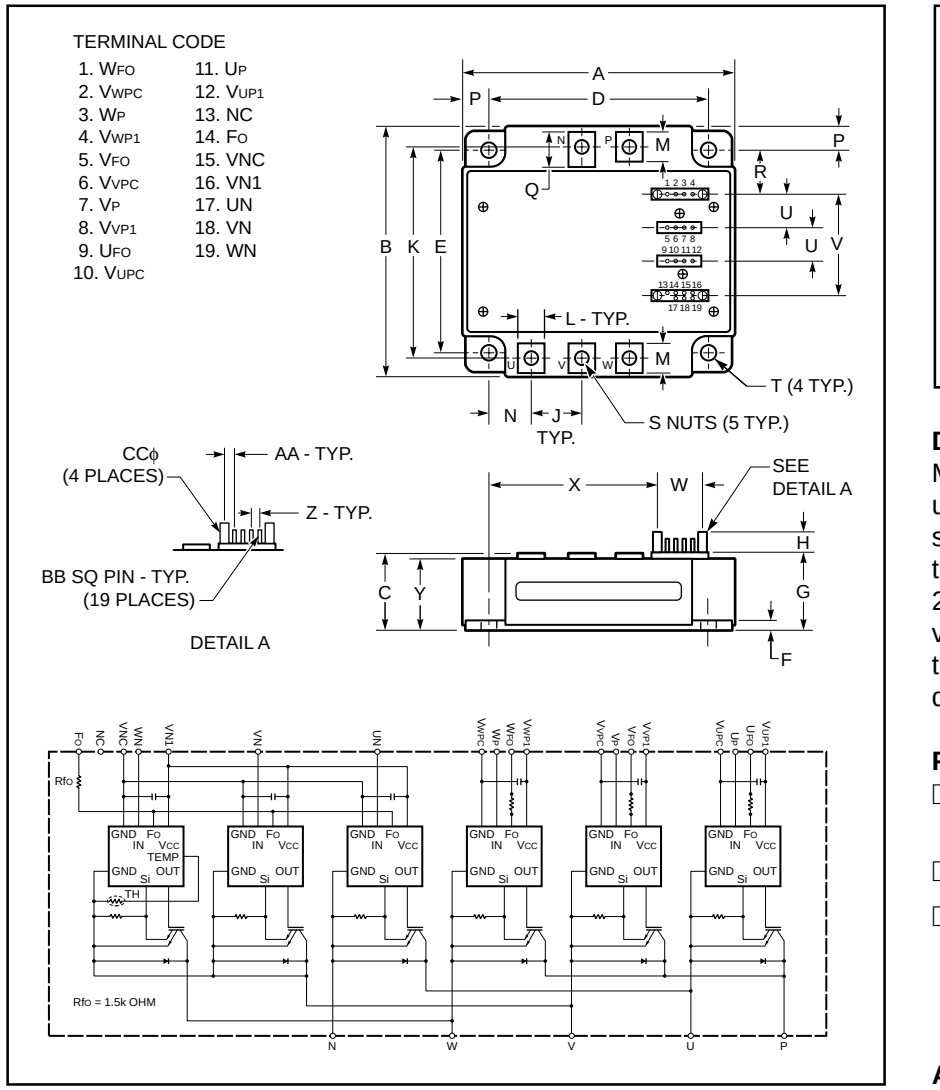
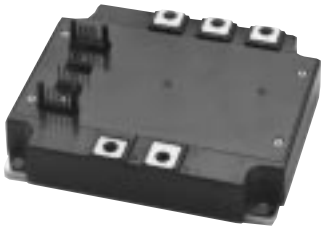
MITSUBISHI INTELLIGENT POWER MODULES

PM200CVA060

FLAT-BASE TYPE
INSULATED PACKAGE





Description:

Mitsubishi 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. PM200CVA060 is a 600V, 200 Ampere Intelligent Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 10)
PM	200	60

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	1.37±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

MITSUBISHI ELECTRIC

PM200CVA060

FLAT-BASE TYPE
INSULATED PACKAGE

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

Ratings	Symbol	PM200CVA060	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	—	2.5~3.5	N · m
Mounting Torque, M5 Main Terminal Screws	—	2.5~3.5	N · m
Module Weight (Typical)	—	730	Grams
Supply Voltage (Applied between P - N, Surge Value)	$V_{CC(surge)}$	500	Volts
Supply Voltage Protected by SC (V_D = 13.5 ~16.5V, Inverter Part, T_j = 125°C Start)	$V_{CC(prot.)}$	400	Volts
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	2500	Vrms

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_{UPC}, V_P-V_{VPC}, W_P-V_{WPC}, U_N · V_N · W_N-V_{NC})	V_{CIN}	20	Volts
Fault Output Supply Voltage (Applied between F_O-V_{NC}, $*_{FO}$-V_{*PC})	V_{FO}	20	Volts
Fault Output Current (Sink Current at U_{FO}, V_{FO}, W_{FO} and F_O Terminal)	I_{FO}	20	mA

IGBT Inverter Sector

Collector-Emitter Voltage (V_D = 15V, V_{CIN} = 15V)	V_{CES}	600	Volts
Collector Current, (T_C = 25°C)	I_C	200	Amperes
Peak Collector Current, (T_C = 25°C)	I_{CP}	400	Amperes
Collector Dissipation (T_C = 25°C)	P_C	595	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	310	—	—	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)	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	$V_{th(on)}$	Applied between U_P-V_{UPC}, V_P-V_{VPC},	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	$V_{th(off)}$	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

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}	$-I_C$ = 200A, V_D = 15V, V_{CIN} = 15V	—	2.20	3.30	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, V_{CIN} = 0V, I_C = 200A, Pulsed, T_j = 25°C	—	2.35	2.80	Volts
		V_D = 15V, V_{CIN} = 0V, I_C = 200A, Pulsed, T_j = 125°C	—	2.55	3.05	Volts
Inductive Load Switching Times	t_{on}	V_D = 15V, V_{CIN} = 0V ↔ 15V, V_{CC} = 300V, I_C = 200A, T_j = 125°C	0.4	0.8	2.1	µs
(Upper-Lower Arm)	t_{rr}		—	0.2	0.3	µs
	$t_{C(on)}$		—	0.3	1.1	µs
	t_{off}		—	1.8	2.9	µs
	$t_{C(off)}$		—	0.6	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	—	—	0.21	°C/Watt
	$R_{th(j-c)F}$	Each Inverter FWDi	—	—	0.35	°C/Watt
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied	—	—	0.022	°C/Watt

Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	≤ 400	Volts
	$V_{CE(surge)}$	Applied across Terminals P-U, P-V, P-W, U-N, V-N, W-N	≤ 500	Volts
	V_D	Applied between V_{UP1}-V_{UPC}, V_{VP1}-V_{VPC}, V_{WP1}-V_{WPC}, V_{N1}-V_{NC}	15 ± 1.5	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between U_P-V_{UPC}, V_P-V_{VPC}, W_P-V_{WPC}, U_N · V_N · W_N-V_{NC}	≤ 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	≥ 2.5	µs