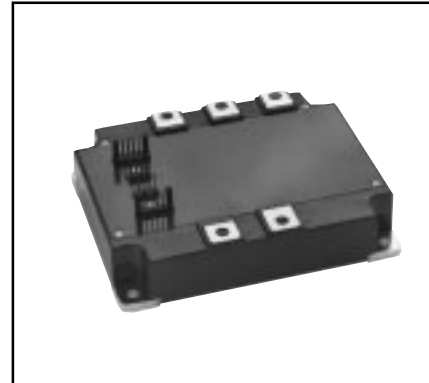
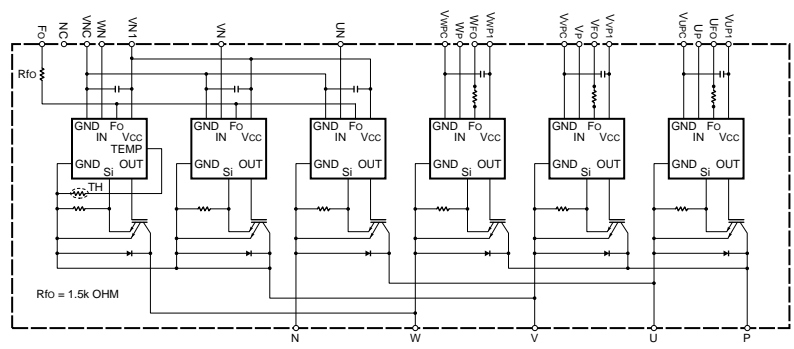
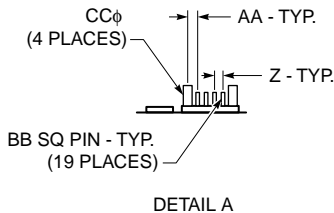
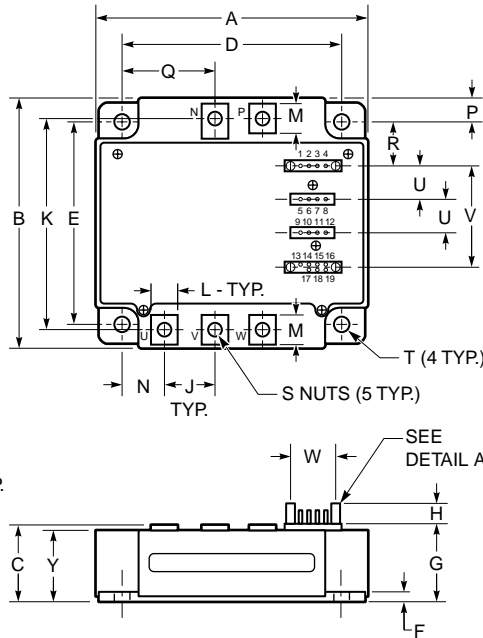


PM150CVA120

FLAT-BASE TYPE
INSULATED PACKAGE

TERMINAL CODE

- | | |
|----------|----------|
| 1. WFO | 11. UP |
| 2. VWPC | 12. VUP1 |
| 3. WP | 13. NC |
| 4. VWP1 | 14. Fo |
| 5. VFO | 15. VNC |
| 6. VVPC | 16. VN1 |
| 7. VP | 17. UN |
| 8. VVP1 | 18. VN |
| 9. UFO | 19. WN |
| 10. VUVC | |



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. PM150CVA120 is a 1200V, 150 Ampere Intelligent Power Module.

Type	Current Rating Amperes	V _{CES} Volts (x 10)
PM	150	120

Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.31	135.0
B	4.33	110.0
C	1.14 +0.04/-0.02	29.0 +1.0/-0.5
D	4.74±0.010	120.5±0.25
E	3.76±0.010	95.5±0.25
F	0.16	4.0
G	1.14	29.0
H	0.41	10.4
J	1.10	28.0
K	3.82	97.0
L	0.55	14.0
M	0.59	15.0
N	0.88	22.25

Dimensions	Inches	Millimeters
P	0.29	7.25
Q	1.98	50.25
R	1.03	26.25
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
Y	1.04	26.5
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

PM150CVA120

FLAT-BASE TYPE
INSULATED PACKAGE

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

Ratings	Symbol	PM150CVA120	Units
Power Device Junction Temperature	T_j	-20 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Case Operating Temperature	T_C	-20 to 100	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	2.5 ~ 3.5	$\text{N} \cdot \text{m}$
Mounting Torque, M5 Main Terminal Screws	—	2.5 ~ 3.5	$\text{N} \cdot \text{m}$
Module Weight (Typical)	—	1000	Grams
Supply Voltage (Applied between P - N)	$V_{\text{CC(surge)}}$	1000	Volts
Supply Voltage Protected by SC ($V_D = 13.5 \sim 16.5\text{V}$, Inverter Part, $T_j = 125^\circ\text{C}$ Start)	$V_{\text{CC(prot.)}}$	800	Volts
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	2500	V_{rms}

Control Sector

Supply Voltage (Applied between $V_{\text{UP1}}-V_{\text{UPC}}$, $V_{\text{VP1}}-V_{\text{VPC}}$, $V_{\text{WP1}}-V_{\text{WPC}}$, $V_{\text{N1}}-V_{\text{NC}}$)	V_D	20	Volts
Input Voltage (Applied between U_P-V_{UPC} , V_P-V_{VPC} , W_P-V_{WPC} , $U_N \cdot V_N \cdot W_N-V_{\text{NC}}$)	V_{CIN}	20	Volts
Fault Output Supply Voltage (Applied between $U_{\text{FO}}-V_{\text{UPC}}$, $V_{\text{FO}}-V_{\text{VPC}}$, $W_{\text{FO}}-V_{\text{WPC}}$, F_O-V_{NC})	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 ($V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$)	V_{CES}	1200	Volts
Collector Current, ($T_C = 25^\circ\text{C}$)	I_C	150	Amperes
Peak Collector Current, ($T_C = 25^\circ\text{C}$)	I_{CP}	300	Amperes
Collector Dissipation ($T_C = 25^\circ\text{C}$)	P_C	780	Watts

PM150CVA120

FLAT-BASE TYPE
INSULATED PACKAGE

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Short Circuit Trip Level	SC	$-20^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$, $V_D = 15\text{V}$	200	—	—	Amperes
Short Circuit Current Delay Time	$t_{\text{off(SC)}}$	$V_D = 15\text{V}$	—	10	—	μs
Over Temperature Protection	OT	Trip Level	100	110	120	$^\circ\text{C}$
($V_D = 15\text{V}$, Lower Arm)	OT_r	Reset Level	85	95	105	$^\circ\text{C}$
Supply Circuit Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
($-20^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$)	UV_r	Reset Level	—	12.5	—	Volts
Circuit Current	I_D	$V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$, $V_{\text{N1}}-V_{\text{NC}}$	—	72	100	mA
		$V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$, $V_{\text{XP1}}-V_{\text{XPC}}$	—	24	34	mA
Input ON Threshold Voltage	$V_{\text{th(on)}}$	Applied between U_P-V_{UPC} , V_P-V_{VPC} ,	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	$V_{\text{th(off)}}$	W_P-V_{WPC} , $U_N \cdot V_N \cdot W_N-V_{\text{NC}}$	1.7	2.0	2.3	Volts
Fault Output Current	$I_{\text{FO(H)}}$	$V_D = 15\text{V}$, $V_{\text{FO}} = 15\text{V}$	—	—	0.01	mA
	$I_{\text{FO(L)}}$	$V_D = 15\text{V}$, $V_{\text{FO}} = 15\text{V}$	—	10	15	mA
Minimum Fault Output Pulse Width	t_{FO}	$V_D = 15\text{V}$	1.0	1.8	—	ms

PM150CVA120

FLAT-BASE TYPE
INSULATED PACKAGEElectrical and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
IGBT Inverter Sector						
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 25^\circ\text{C}$	—	—	1.0	mA
		$V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 125^\circ\text{C}$	—	—	10.0	mA
FWDi Forward Voltage	V_{EC}	$-I_C = 150\text{A}, V_D = 15\text{V}, V_{CIN} = 15\text{V}$	—	2.50	3.50	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 150\text{A},$ Pulsed, $T_j = 25^\circ\text{C}$	—	2.65	3.30	Volts
		$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 150\text{A},$ Pulsed, $T_j = 125^\circ\text{C}$	—	2.60	3.25	Volts
Inductive Load Switching Times	t_{on}		0.4	0.9	2.3	μs
	t_{rr}	$V_D = 15\text{V}, V_{CIN} = 0 \leftrightarrow 15\text{V}$	—	0.2	0.3	μs
	$t_{C(on)}$	$V_{CC} = 600\text{V}, I_C = 150\text{A},$ $T_j = 125^\circ\text{C}$	—	0.4	1.0	μs
	t_{off}		—	2.4	3.4	μs
	$t_{C(off)}$		—	0.7	1.2	μs

Thermal Characteristics

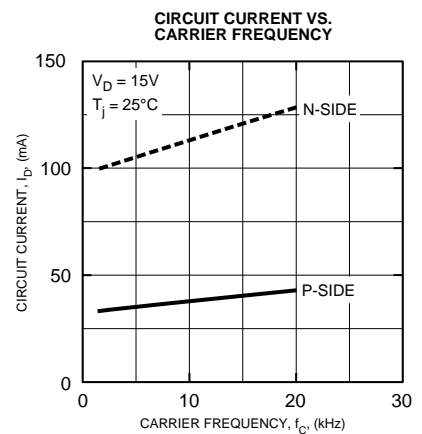
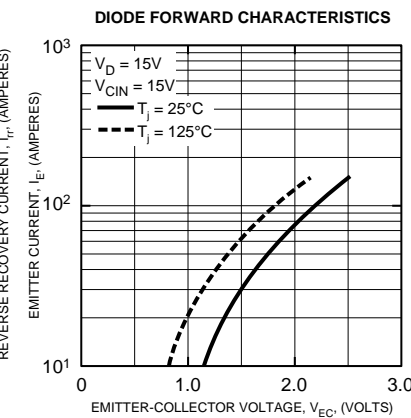
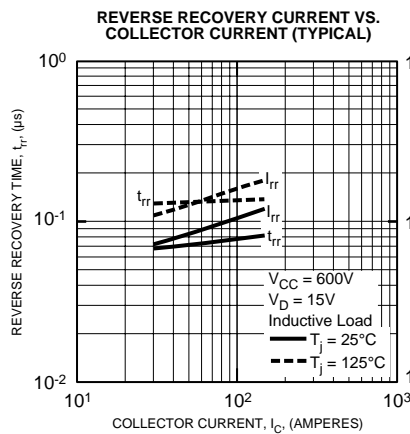
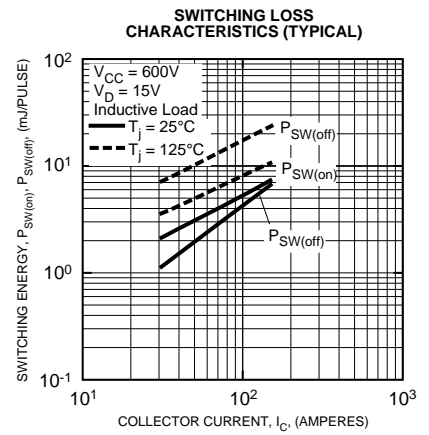
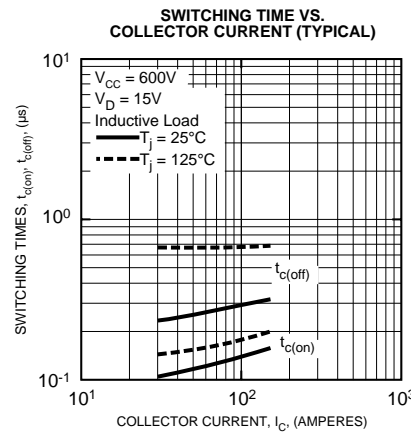
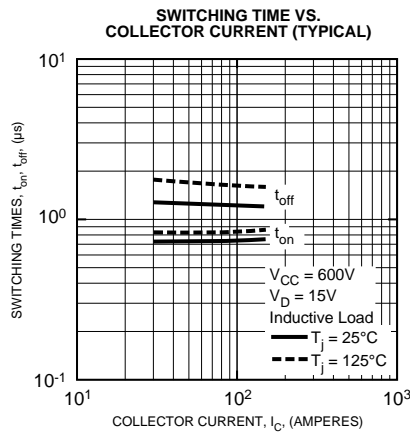
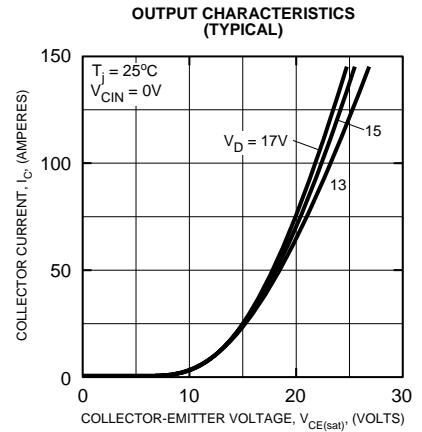
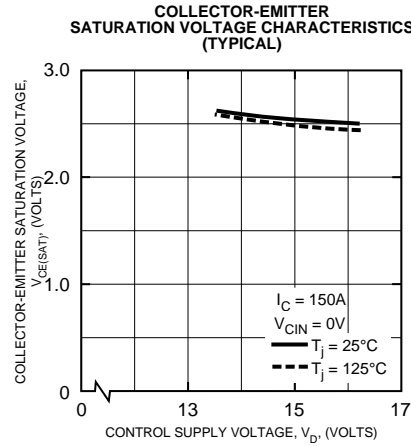
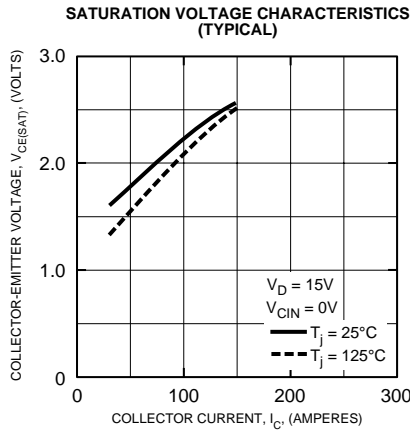
Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	Each Inverter IGBT	—	—	0.16	$^\circ\text{C}/\text{Watt}$
	$R_{th(j-c)F}$	Each Inverter FWDi	—	—	0.26	$^\circ\text{C}/\text{Watt}$
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied	—	—	0.018	$^\circ\text{C}/\text{Watt}$

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 $V_{UP1}-V_{UPC},$ $V_{VP1}-V_{VPC}, V_{WP1}-V_{WPC}, V_{N1}-V_{NC}$	15 ± 1.5	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between	≤ 0.8	Volts
Input OFF Voltage	$V_{CIN(off)}$	$U_P-V_{UPC}, V_P-V_{VPC}, W_P-V_{WPC},$ $U_N \cdot V_N \cdot W_N-V_{NC}$	≥ 4.0	Volts
Arm Shoot-Through Blocking Time	t_{dead}	For IPM's each Input Signal	≥ 3.0	μs

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