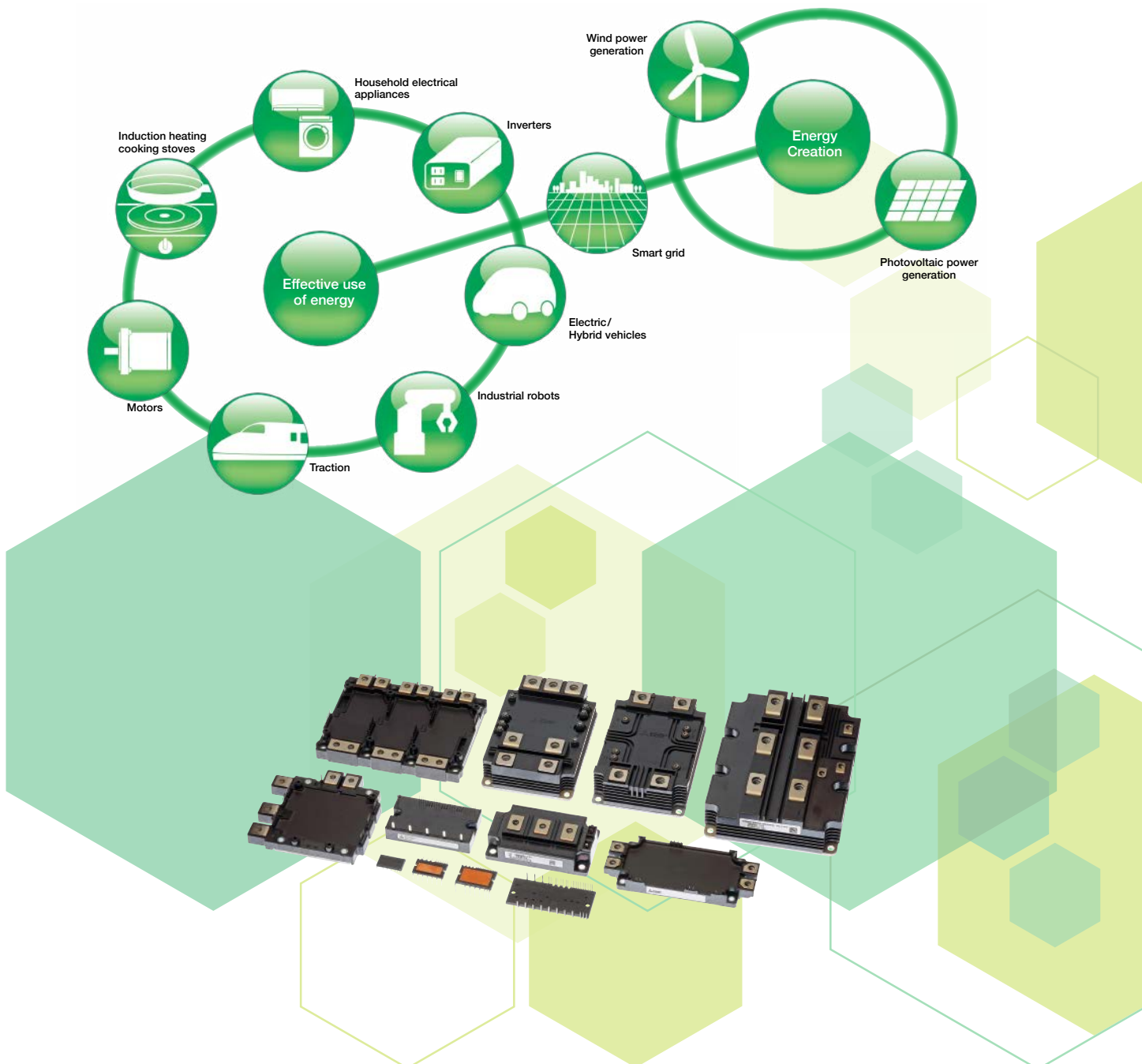


POWER MODULES

Power
Modules

Innovative Power Devices for a Sustainable Future

Mitsubishi Electric power modules are at the forefront of the latest energy innovations that seek to solve global environmental issues while creating a more affluent and comfortable society for all. Some of these innovations are photovoltaic (PV) and wind power generation from renewable energy sources, smart grids realizing efficient supply of power, hybrid/electric vehicles (HVs/EVs) that take the next step in reducing carbon emissions and fuel consumption, and home appliances that achieve ground-breaking energy savings. Whether in appliances, railcars, EVs or industrial systems, our power modules are key elements in changing the way energy is used.



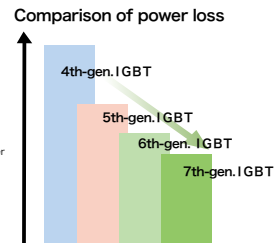
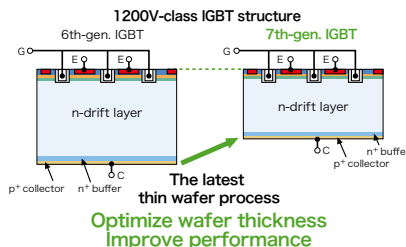


Focus Technology

7th-Generation 1,200V-Class IGBT Chip Technology Cutting-edge technology realizes energy-saving inverter devices

- Latest thin-wafer processing (n-drift layer) achieves thinner wafer than 6th-generation devices
- Performance improved by combining CSTBT™* and light punch-through (LPT) structures
- Inverter system power dissipation minimized by its superior performance (lower V_{CEsat} and E_{off})

*CSTBT™: Mitsubishi Electric's unique IGBT that makes use of carrier cumulative effect



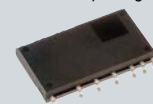
A small surface mount package IPM has been newly developed for fan and low-power motor drive applications

Key Features

- Optimal pin layout realizes easier PCB wiring design and enables smaller PCB size
- Newly integrated interlock function in addition to conventional protection features for robust operation
- Bootstrap diode is integrated for the P-side drive power supply like conventional DIPIM™ series, reducing the number of peripheral external parts

MISOP™

Surface mount package IPM

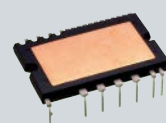


Modules realizing single-control power supply and photocoupler-less systems for household appliances and low-capacity inverters

Key Features

- Transfer-molded structure incorporating a high thermal conductivity insulation sheet provides heat
- High-voltage IC equipped with drive, protection and level-shift circuits for direct control via input signals from a CPU or microcomputer
- Compact board and highly reliable equipment realized through single power-supply and photocoupler-less systems
- Includes built-in bootstrap diode (BSD)

DIPIM™



Modules with built-in control and protection circuits for AC servo robots and PV power generation

Key Features

- Built-in protection circuits for short-circuiting, power supply undervoltage and overheating
- Highly compatible package with simplified printed circuit board (PCB) design
- Special intelligent power modules (IPMs) for power conditioners in PV power generation systems

IPM Intelligent Power Modules



IGBT modules for general-purpose inverters used in various applications

Key Features

- Various low-inductance packages and power chips available
- Compatible with high-frequency, high-voltage (1,700V) applications
- Large-capacity modules available for renewable energy systems

IGBT Modules Insulated Gate Bipolar Transistor Modules



High voltage, large capacity and high reliability are realized for traction and power transmission application

Key Features

- Two types of package are realized: "std type" with large output power and "dual type" for various inverter capacity by easy parallel connection
- The abundant field experience more than 20 years especially in the application of bullet train
- High reliability due to a long lifetime design and a robust design against severe environment

HVIGBT Modules High-Voltage Insulated Gate Bipolar Transistor Modules



Modules realizing high performance and reliability for propulsion inverters in HVs/EVs

Key Features

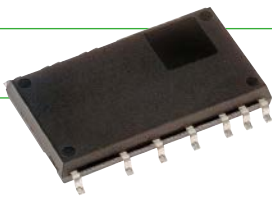
- Built-in temperature analog output function realizing highly reliable drive train
- High-power/temperature cycle life ensures high reliability
- Compliant with the End-of-life Vehicles Directive, regulations relating to substances of environmental concern
- High traceability in managing materials/components throughout the entire production process for each product

Power Modules for Vehicles Power Modules for EV/PHEV





New Products



Data sheet here



Surface mount package IPM MISOP™ SP2SK, SP3SK

A small Surface mount package IPM has been newly developed for fan and low-power motor drive applications

- <Main Features>
- Optimal pin layout realizes easier PCB wiring design and enables smaller PCB size
 - Insulation distance between pins ensured, realizing easier board mounting without coating process
 - Newly integrated interlock function in addition to conventional protection features for robust operation
 - Installing RC-IGBT¹ simultaneously realizes compact package and low loss performance can go together
 - Bootstrap diode is integrated for the P-side drive power supply like conventional DIPIM™ series, reducing the number of peripheral external parts
- ¹*1 Reverse-conducting IGBT

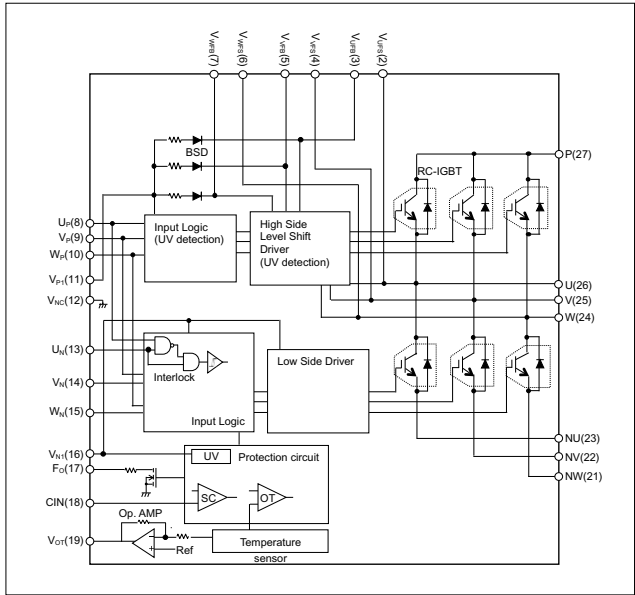
MISOP™

Type name	Rated current	Rated voltage	Chips	Protection	Shape
SP2SK★★	2A	600V	RC-IGBT, HVIC, LVIC, BSD	UV, SC, OT, VoT, IL	Surface mount package
SP3SK★★	3A				

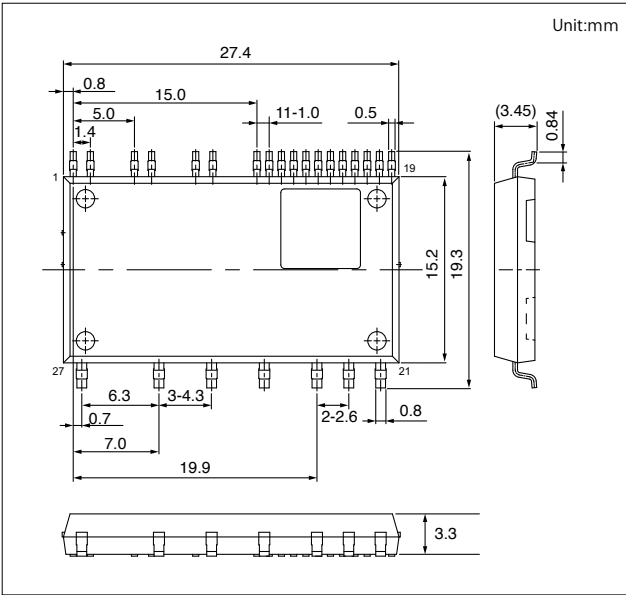
[Term] UV : Power supply Under Voltage protection
SC : Short Circuit protection
OT : Over Temperature protection
VoT : Analog Temperature Output
IL : Inter Lock

★★:Under development

Schematic drawing



Outline Drawing





Featured Products

Smaller package size realized by integrating newly designed RC-IGBT
Recommended for low-cost inverter and fan controller applications

SLIMDIP™

SLIMDIP-S, SLIMDIP-L

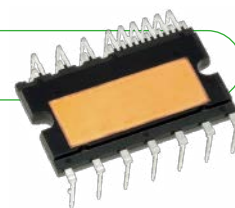
<Main Features>

- RC-IGBT^{*1} incorporated, reducing package size 30% compared to Super-mini DIIPM
- Maximum case temperature increased from 100°C to 115°C, increasing the operating temperature range and leading to easier system design
- Additional terminals for floating supply and built-in bootstrap diodes simplify PCB wiring pattern
- Both VOT^{*2} and OT^{*3} functions integrated for temperature protection

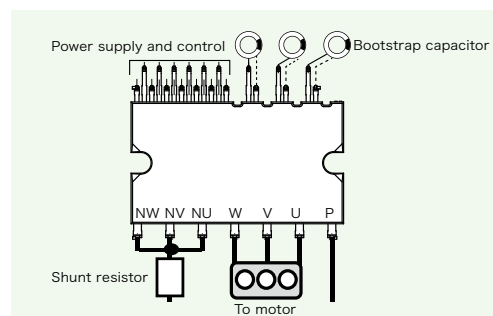
*1 Reverse conducting IGBT

*2 Analog Temperature Output

*3 Over Temperature protection



Data sheet
here



Featured Products

All-in-one intelligent power modules equipped with 3-phase converter and brake circuit in addition to inverter circuit

DIIPM+™

PSS05MC1FT, PSS10MC1FT, PSS15MC1FT,
PSS25MC1FT, PSS35MC1FT, PSS50MC1F6

<Main Features>

- Encapsulated with transfer molded resin, integrates three-phase converter, inverter, brake and control IC
- Built-in converter and brake enable system size to be reduced and save design cost, contributing to total cost reduction
- Lower PCB inductance pattern reduces noise, thereby reducing design time and countermeasure parts required for noise reduction
- Built-in BSD^{*1} with 1,200V withstand voltage reduces number of external parts and improves reliability

*1 Bootstrap diode

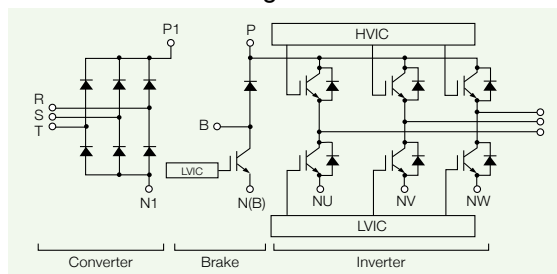
*2 Without brake circuit types are also line-up



Data sheet
here



Internal circuit diagram



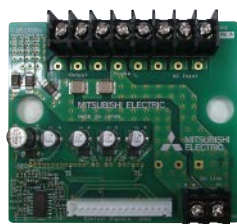
Customer Support

EVA series, evaluation boards for each DIIPM™

Various evaluation boards to easy support system design



Super mini DIIPM™
evaluation board
EVA11-SDIP



DIIPM+™ evaluation board
EVA14-DIP+



SLIMDIP™ evaluation board
EVA01-SLIM



SLIMDIP™ evaluation board
EVA15-SLIM



DIIPM+™ evaluation
board
EVA03-DIP+

* For further information, please contact sales office.

Line-up of DIIPM™

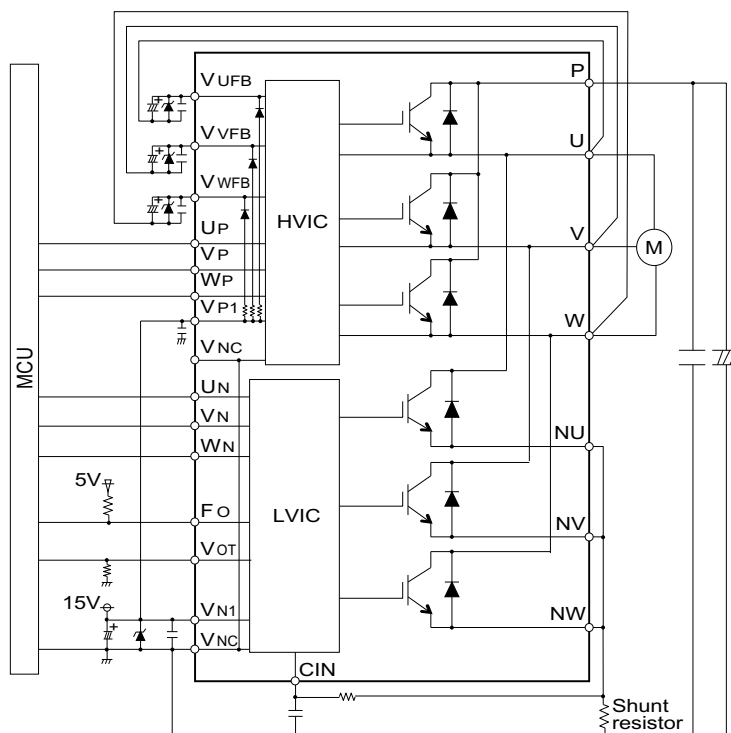
Series Matrix of 600V / 500V DIIPM™

V _{CE} (V)		600V					500V
I _C (A)	Series	SLIMDIP	Super mini	Mini	Large	DIIPM+	Super mini
			Ver.6		Ver.4	CIB/CI	MOSFET
3	5	SLIMDIP-S					PSM03S93E5-A
5			PSS05S92F6-AG PSS05S92E6-AG	PSS05S51F6			PSM05S93E5-A
10	15	SLIMDIP-L	PSS10S92F6-AG PSS10S92E6-AG	PSS10S51F6			
15			PSS15S92F6-AG PSS15S92E6-AG	PSS15S51F6			
20			PSS20S92F6-AG PSS20S92E6-AG	PSS20S51F6 PSS20S71F6			
30			PSS30S92F6-AG PSS30S92E6-AG	PSS30S71F6			
35			PSS35S92F6-AG PSS35S92E6-AG				
50				PSS50S71F6	PS21A79	PSS50MC1F6 PSS50NC1F6 *5	
75					PS21A7A		
Chip	IGBT/MOSFET	RC-IGBT	CSTBT	CSTBT	CSTBT	CSTBT	MOSFET
	UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side/Brake part	P-side/N-side
	SC	N-side	N-side	N-side	N-side with sense	N-side	N-side
	OT	N-side	N-side*1	—	—	—	N-side
	V _{OT}	N-side	N-side*1	N-side	N-side	N-side	—
	Active input	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(5V)	High(3/5V)
	Emitter pin of N-side	Open	Open	Open	Open	Open	Open
	Fault output	N-side(UV,SC,OT)	N-side (UV,SC,OT)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC,OT)
	Insulation voltage	2000Vrms*2	1500Vrms*2	2500Vrms	2500Vrms	2500Vrms	1500Vrms*2
	Insulation structure	Insulation sheet	Insulation sheet	Molding resin*4/Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
Specifications	RoHS directive	Compliant	Compliant	Compliant *3	Compliant	Compliant	Compliant
	Pin type	Control side of Zigzag (Normal, Short)	Long	Control side of Zigzag,Short	—	—	Long

- [Notes] *1 : PSSxxS92E6 has OT function, PSSxxS92F6 has V_{OT} function
*2 : AC60Hz, 1minute. Corresponds to isolation voltage 2500Vrms in the case the convex-shaped heat sink
*3 : High melting point solder (Lead Over 85%) is used for chip soldering of PSSxxS51F6 only.
*4 : Molding resin insulation for PSSxxS51F6/-C
*5 : PSS50NC1F6 is not included brake.

- [Term] CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect
RC-IGBT: Reverse conducting IGBT
HVIC: High Voltage IC
LVIC: Low Voltage IC
BSD: Bootstrap Diode
UV: Power supply Under Voltage protection
OT: Over Temperature protection
SC: Short Circuit protection
V_{OT}: Analog Temperature Output
RoHS: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
CIB: Converter Inverter Brake,
CI: Converter Inverter

Application circuit of super mini DIIPM™



Series Matrix of 1200V DIIPM™

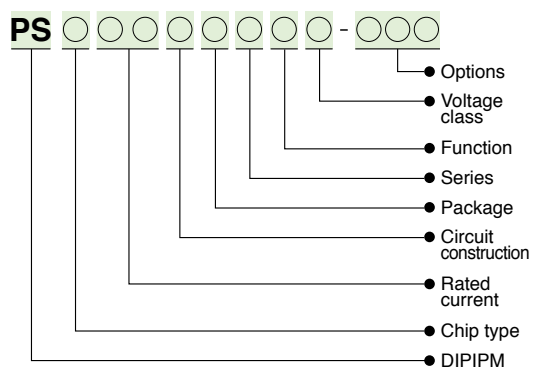
V _{ces} (V)		1200V			
I _c (A)	Series	Mini	Large		DIIPM+
			Ver.6	Ver.4	
5		PSS05S72FT	PSS05SA2FT	PS22A72	PSS05MC1FT PSS05NC1FT*1
10		PSS10S72FT	PSS10SA2FT	PS22A73	PSS10MC1FT PSS10NC1FT*1
15			PSS15SA2FT	PS22A74	PSS15MC1FT PSS15NC1FT*1
25			PSS25SA2FT	PS22A76	PSS25MC1FT PSS25NC1FT*1
35			PSS35SA2FT	PS22A78-E	PSS35MC1FT PSS35NC1FT*1
50			PSS50SA2FT	PS22A79	
75			PSS75SA2FT		
Chip	IGBT/MOSFET	CSTBT	CSTBT	CSTBT	CSTBT
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side/Brake
	SC	N-side	N-side	N-side	N-side
	OT	—	—	—	—
	V _{OT}	N-side	N-side	N-side	N-side
Specifications	Active input	High(5V)	High(5V)	High(5V)	High(5V)
	Emitter pin of N-side	Open	Open	Open	Open
	Fault output	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)
	Insulation voltage	2500Vrms	2500Vrms	2500Vrms	2500Vrms
	Insulation structure	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive	Compliant	Compliant	Compliant	Compliant
	Pin type	—	—	—	—

Not recommended : Please contact to the sales offices.

[Notes] *1: PSS**NC1FT is not included brake

[Term] BSD: Bootstrap Diode
CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect
HVIC: High Voltage IC
LVIC: Low Voltage IC
UV: Power supply Under Voltage protection
OT: Over Temperature protection
SC: Short Circuit protection
V_{OT}: Analog Temperature Output
RoHS: Restriction of hazardous substances in electrical and electronic equipment
CIB: Converter Inverter Brake
CI: Converter Inverter

Type Name Definition of DIIPM™

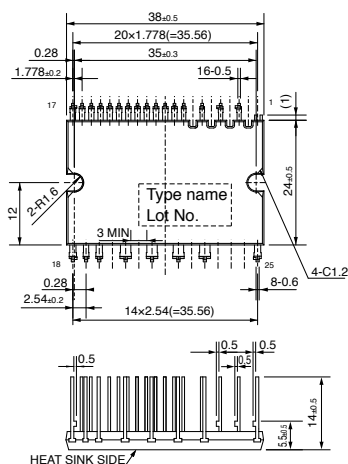


Line-up of DIIPM™

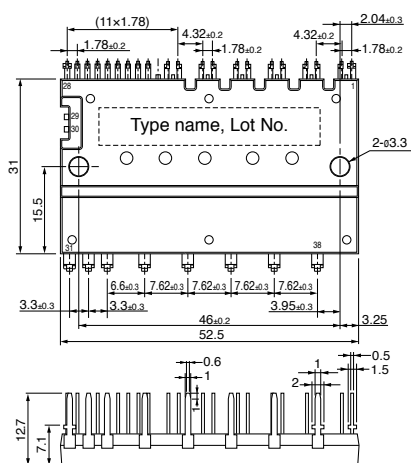
■ Outline Drawing of DIIPM™

Unit:mm

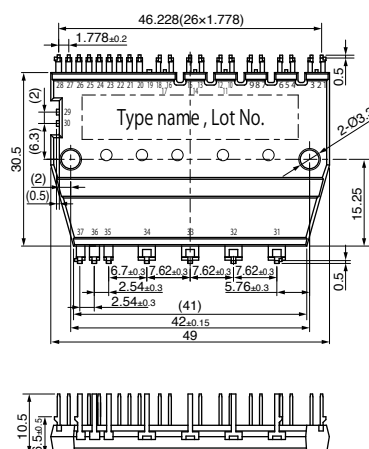
Super mini DIIPM Ver.6
MOSFET Super mini DIIPM
Long



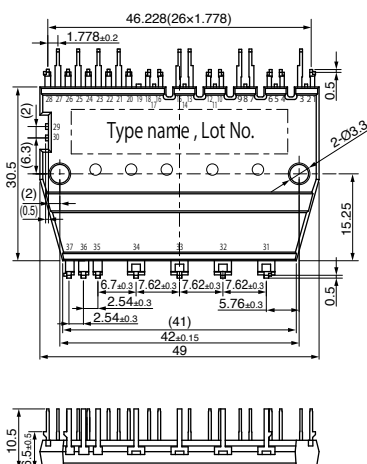
Mini DIIPM (PSSxxS71F6)
1200V Mini DIIPM



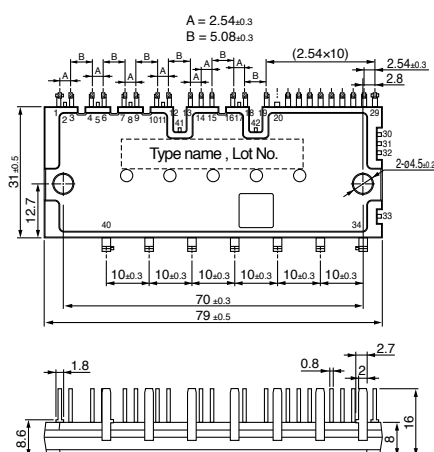
Mini DIIPM (PSSxxS51F6)



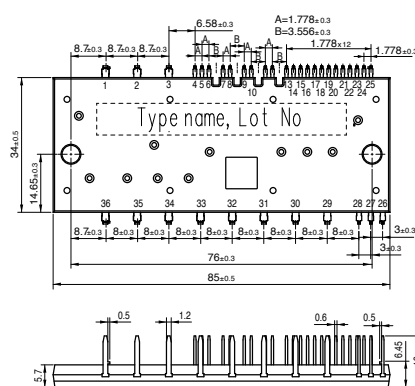
Mini DIIPM(PSSxxS51F6)
Zigzag



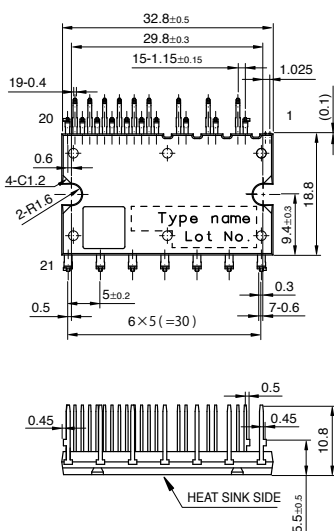
Large DIIPM



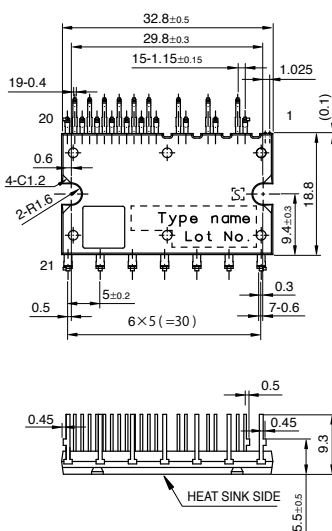
DIIPM+



SLIMDIP
Normal



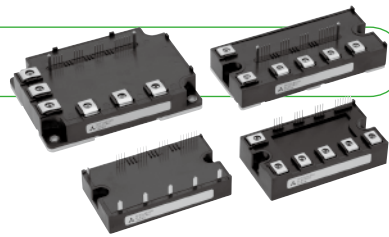
SLIMDIP
Short





Featured Products

Loaded with built-in functions, contributing to inverters with enhanced energy savings



Data sheet
here



G1 Series IPM with 7th-generation IGBT

<Main Features>

- Power loss has been reduced with the introduction of the 7th-generation IGBT produced using CSTBT™^{*1} and a diode incorporating a RFC[®]^{*2} structure that contributes to reducing the power consumed in inverters
- The new resin-insulated metal baseplate, originally introduced in 7th-generation IGBT modules, eliminates the solder-attached section, increasing the thermal cycle lifetime and improving inverter reliability
- In addition to the built-in functions of the previous product,^{*3} automatic switching speed control, and error detection function contribute to lowering inverter loss and shortening design time

*1 CSTBT™: Mitsubishi Electric's unique IGBT that utilizes the carrier cumulative effect

*2 RFC: Relaxed field cathode

*3 Conventional product: IPM L1-Series

Built-in functions: Supply Undervoltage lock protection (UV), Short-circuit protection (SC), Over-temperature protection (OT)

■ "A" package main pin shape and layout

For the "A" package 6-in-1 (CG1A) main pin shape, select either solder pin or screw type

For the pin layout, select either straight or L-shaped

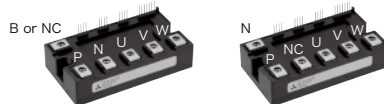
Main pin shape



Main pin: Solder pin

Main pin: Screw

Main pin layout



Straight

L-shaped

■ Lineup

V _{CES} (V)	Package	Main pin shape	Main pin layout	I _c (A)								
				25	35	50	75	100	150	200	300	450
650V	A package	Screw	Straight			PM50CG1A065 PM50RG1A065	PM75CG1A065 PM75RG1A065	PM100CG1A065				
			L-shaped			PM50CG1AL065	PM75CG1AL065	PM100CG1AL065				
		Solder pin	Straight			PM50CG1AP065 PM50RG1AP065	PM75CG1AP065 PM75RG1AP065	PM100CG1AP065				
			L-shaped			PM50CG1APL065	PM75CG1APL065	PM100CG1APL065				
	B package	Screw	L-shaped			PM50CG1B065 PM50RG1B065	PM75CG1B065 PM75RG1B065	PM100CG1B065 PM100RG1B065	PM150CG1B065 PM150RG1B065	PM200CG1B065 PM200RG1B065		
	C package	Screw	L-shaped							PM200CG1C065 PM200RG1C065	PM300CG1C065 PM300RG1C065	PM450CG1C065 PM450RG1C065
1200V	A package	Screw	Straight	PM25CG1A120 PM25RG1A120	PM35CG1A120 PM35RG1A120	PM50CG1A120						
			L-shaped	PM25CG1AL120	PM35CG1AL120	PM50CG1AL120						
		Solder pin	Straight	PM25CG1AP120 PM25RG1AP120	PM35CG1AP120 PM35RG1AP120	PM50CG1AP120						
			L-shaped	PM25CG1APL120	PM35CG1APL120	PM50CG1APL120						
	B package	Screw	L-shaped	PM25CG1B120 PM25RG1B120	PM35CG1B120 PM35RG1B120	PM50CG1B120 PM50RG1B120	PM75CG1B120 PM75RG1B120	PM100CG1B120 PM100RG1B120				
	C package	Screw	L-shaped					PM100CG1C120 PM100RG1C120	PM150CG1C120 PM150RG1C120	PM200CG1C120 PM200RG1C120		

Representative reference is "A" package with screw terminal and straight layout (CG1A).

Line-up of IPM

■ Matrix of IPM Modules 650V/600V (No.: Number of outline drawing, see page 11 to 12)

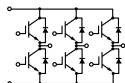
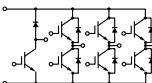
Vces(V) Series		650V			600V																	
Ic(A)	G1 Series		L1 Series			S1 Series			V1 Series			Photovoltaic			L Series							
	Connection	No.	Connection	No.		Connection	No.		Connection	No.		Connection	No.	Connection	No.							
50	PM50CG1A065	C	12	PM50CL1A060 PM50CL1B060 PM50RL1A060 PM50RL1B060 PM50RL1C060	C	01	PM50CS1D060	C	05			PM50B4LA060	B4	01	PM50CLA060 PM50CLB060 PM50RLA060 PM50RLB060	C C R R						
	PM50RG1A065	R	12									PM50B5LA060	B5	01								
	PM50CG1B065	C	10									PM50B6LA060	B6	01								
	PM50RG1B065	R	10									PM50B4LB060	B4	02								
	PM50CG1AL065	C	12									PM50B5LB060	B5	02								
	PM50CG1AP065	C	09									PM50B6LB060	B6	02								
	PM50CG1APL065	C	09									PM50B4L1C060	B4	03								
	PM50RG1AP065	R	09									PM50B5L1C060	B5	03								
												PM50B6L1C060	B6	03								
75	PM75CG1A065	C	12	PM75CL1A060 PM75CL1B060 PM75RL1A060 PM75RL1B060	C	01	PM75CS1D060	C	05			PM75B4LA060	B4	01	PM75CLA060 PM75CLB060 PM75RLA060 PM75RLB060	C C R R						
	PM75RG1A065	R	12									PM75B5LA060	B5	01								
	PM75CG1B065	C	10									PM75B6LA060	B6	01								
	PM75RG1B065	R	10									PM75B4LB060	B4	02								
	PM75CG1AL065	C	12									PM75B5LB060	B5	02								
	PM75CG1AP065	C	09									PM75B6LB060	B6	02								
	PM75CG1APL065	C	09									PM75B4L1C060	B4	03								
	PM75RG1AP065	R	09									PM75B5L1C060	B5	03								
												PM75B6L1C060	B6	03								
100	PM100CG1A065	C	12	PM100CL1A060 PM100CL1B060 PM100RL1A060 PM100RL1B060	C	01	PM100CS1D060	C	05						PM100CLA060 PM100RLA060	C R						
	PM100CG1B065	C	10																			
	PM100RG1B065	R	10																			
	PM100CG1AL065	C	12																			
	PM100CG1AP065	C	09																			
	PM100CG1APL065	C	09																			
150	PM150CG1B065	C	10	PM150CL1A060 PM150CL1B060 PM150RL1A060 PM150RL1B060	C	01	PM150CS1D060	C	05						PM150CLA060 PM150RLA060	C R						
	PM150RG1B065	R	10																			
200	PM200CG1B065	C	10	PM200CL1A060 PM200RL1A060	C	04	PM200CS1D060	C	05						PM200CLA060 PM200RLA060	C R						
	PM200RG1B065	R	10																			
	PM200CG1C065	C	11																			
	PM200RG1C065	R	11																			
300	PM300CG1C065	C	11	PM300CL1A060 PM300RL1A060	C	04									PM300CLA060 PM300RLA060	C R						
	PM300RG1C065	R	11																			
400/450	PM450CG1C065	C	11							PM400DV1A060	D	06				PM450CLA060	C	08				
600										PM600DV1A060	D	06				PM600CLA060	C	08				
800										PM800DV1B060	D	07										
IGBT chip	CSTBT*1			CSTBT*1			CSTBT*1			CSTBT*1			CSTBT*1			CSTBT*2						
	Emitter sensor installed			Built-in emitter sensor			Built-in emitter sensor			Built-in emitter sensor			Built-in emitter sensor			Built-in emitter sensor						
	Temperature sensor installed			Built-in temperature sensor			Built-in temperature sensor			Built-in temperature sensor			Built-in temperature sensor			Built-in temperature sensor						
	UV	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side						
	OT	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side						
Fault output	SC	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side						
	Identification	P-side/N-side		—		—		—		—		—		—		—						
RoHS directive	Compliant			Compliant			Compliant			Compliant			Compliant			Compliant						
Compatibility	—			L Series			S-DASH SERVO			V Series			—			—						
Connection																						
	D	B4	B5				B6				C				R							

Not recommended : Please contact to the sales offices.

[Notes] *1: Full-gate CSTBT™ *2: PCM (Plugged Cell Merged) CSTBT™

[Term] UV: Power supply Under Voltage protection
SC: Short Circuit protection
OT: Over Temperature protection
OC: Over current protection
RoHS: Restriction of hazardous substances in electrical and electronic equipment

■ Matrix of IPM Modules 1200V (No.: Number of outline drawing, see page 11 to 12)

V _{CE} (V)		1200V														
Series		G1 Series			L1 Series			S1 Series			V1 Series			L Series		
I _C (A)		Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.	
25	PM25CG1A120	C	12	PM25CL1A120 PM25CL1B120 PM25RL1A120 PM25RL1B120 PM25RL1C120	C	01	PM25CS1D120	C	05	PM25CLA120 PM25CLB120 PM25RLA120 PM25RLB120	C	08				
	PM25CG1B120	C	10		C	02					C	08				
	PM25RG1A120	R	12		R	01					R	08				
	PM25RG1B120	R	10		R	02					R	08				
	PM25CG1AL120	C	12		R	02										
	PM25CG1AP120	C	09		R	03										
	PM25CG1APL120	C	09													
	PM25RG1AP120	R	09													
35	PM35CG1A120	C	12													
	PM35CG1B120	C	10													
	PM35RG1A120	R	12													
	PM35RG1B120	R	10													
	PM35CG1AL120	C	12													
	PM35CG1AP120	C	09													
	PM35CG1APL120	C	09													
	PM35RG1AP120	R	09													
50	PM50CG1A120	C	12	PM50CL1A120 PM50CL1B120 PM50RL1A120 PM50RL1B120	C	01	PM50CS1D120	C	05	PM50CLA120 PM50CLB120 PM50RLA120 PM50RLB120	C	08				
	PM50CG1B120	C	10		C	02					C	08				
	PM50RG1B120	R	10		R	01					R	08				
	PM50CG1AL120	C	12		R	02										
	PM50CG1AP120	C	09													
	PM50CG1APL120	C	09													
75	PM75CG1B120	C	10	PM75CL1A120 PM75CL1B120 PM75RL1A120 PM75RL1B120	C	01	PM75CS1D120	C	05	PM75CLA120 PM75CLB120 PM75RLA120 PM75RLB120	C	08				
	PM75RG1B120	R	10		C	02					C	08				
			R		01				R		08					
			R		02											
100	PM100CG1B120	C	10	PM100CL1A120 PM100RL1A120	C	04	PM100CS1D120	C	05	PM100CLA120 PM100RLA120	C	08				
	PM100CG1C120	C	11		R	04					R	08				
	PM100RG1B120	R	10													
	PM100RG1C120	R	11													
150	PM150CG1C120	C	11	PM150CL1A120 PM150RL1A120	C	04				PM150CLA120 PM150RLA120	C	08				
	PM150RG1C120	R	11		R	04					R	08				
200	PM200CG1C120	C	11							PM200DV1A120	D	06	PM200CLA120	C	08	
	PM200RG1C120	R	11													
300										PM300DV1A120	D	06	PM300CLA120	C	08	
450										PM450DV1A120	D	06	PM450CLA120	C	08	
IGBT chip	CSTBT*1 Emitter sensor installed Temperature sensor installed			CSTBT*1 Built-in current sensor Built-in temperature sensor			CSTBT*1 Built-in current sensor Built-in temperature sensor			CSTBT*1 Built-in current sensor Built-in temperature sensor			CSTBT*2 Built-in current sensor Built-in temperature sensor			
	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side			
	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side			
	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side			
Fault output	UV	P-side/N-side			—			—			—			—		
	OT	P-side/N-side			—			—			—			—		
	SC	P-side/N-side			—			—			—			—		
Identification		P-side/N-side			—			—			—			—		
RoHS directive		Compliant			Compliant			Compliant			Compliant			Compliant		
Compatibility		—			L Series			S-DASH SERVO			V Series			—		
Connection		D C R														

Not recommended : Please contact to the sales offices.

[Notes] *1: Full-gate CSTBT™ *2: PCM (Plugged Cell Merged) CSTBT™

[Term] UV: Power supply Under Voltage protection
 SC: Short Circuit protection
 OT: Over Temperature protection
 OC: Over current protection
 RoHS : the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

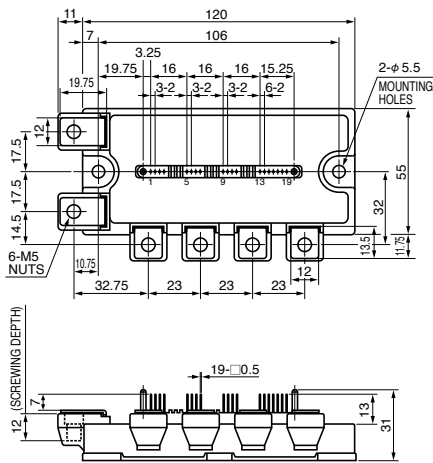
Line-up of IPM

Outline Drawing of IPM

Unit:mm

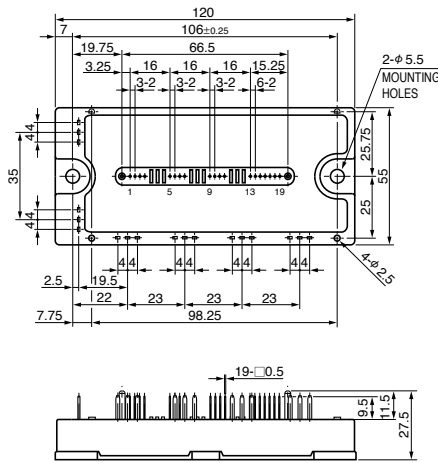
01

PM50,75,100,150CL1A/RL1A060
PM25,50,75CL1A/RL1A120
PM50,75B4/B5/B6LA060



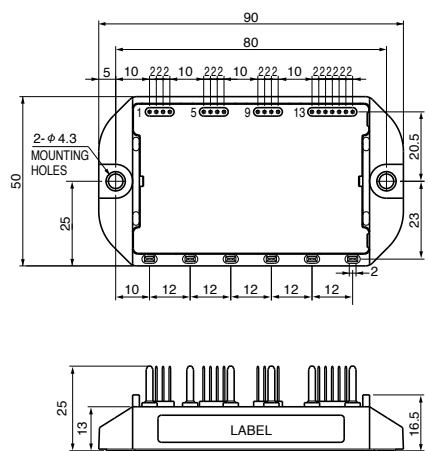
02

PM50,75,100,150CL1B/RL1B060
PM25,50,75CL1B/RL1B120
PM50,75B4/B5/B6LB060



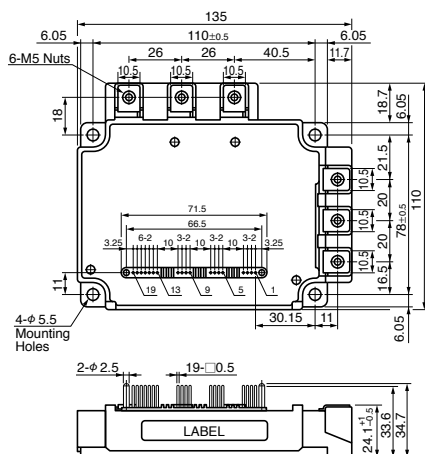
03

PM50RL1C060
PM25RL1C120
PM50,75,B4/B5/B6L1C060



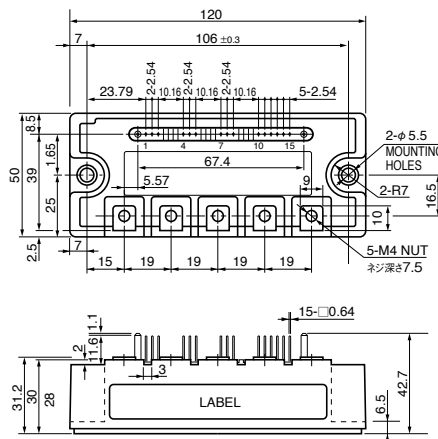
04

PM200,300CL1A/RL1A060
PM100,150CL1A/RL1A120



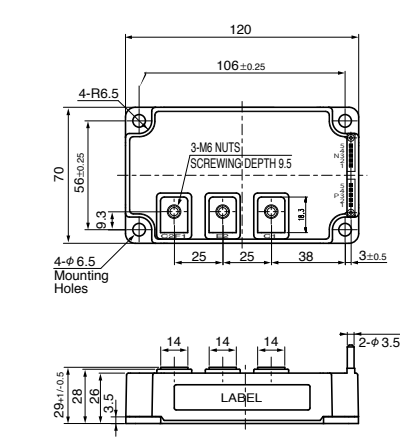
05

PM50,75,100,150,200CS1D060
PM25,50,75,100CS1D120



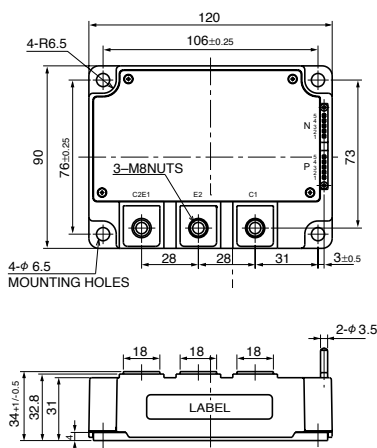
06

PM400,600DV1A060
PM200,300,450DV1A120



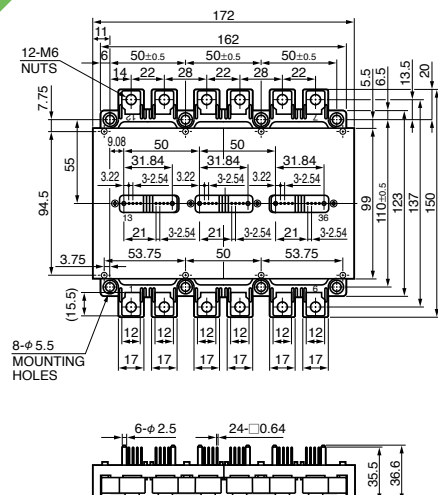
07

PM800DV1B060



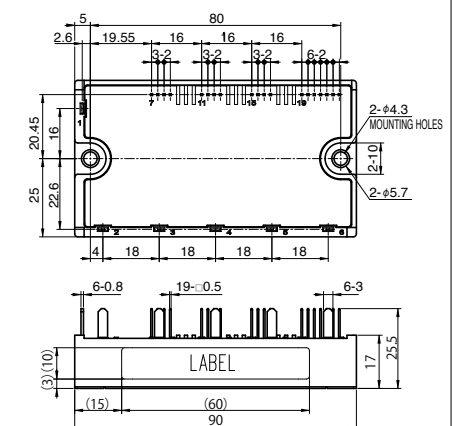
08

PM450,600CLA060
PM200,300,450CLA120



09

PM50,75,100CG1AP/CG1APL065
PM50,75RG1AP065
PM25,35,50CG1AP/CG1APL120
PM25,35RG1AP120

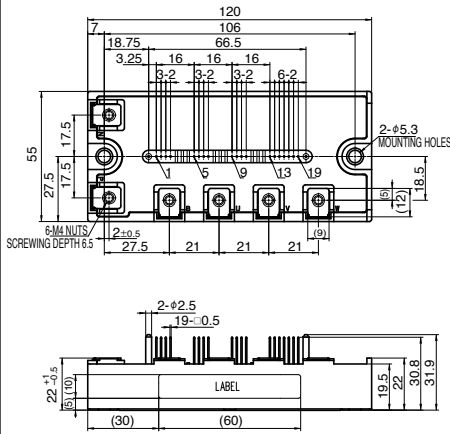


Outline Drawing of IPM

Unit:mm

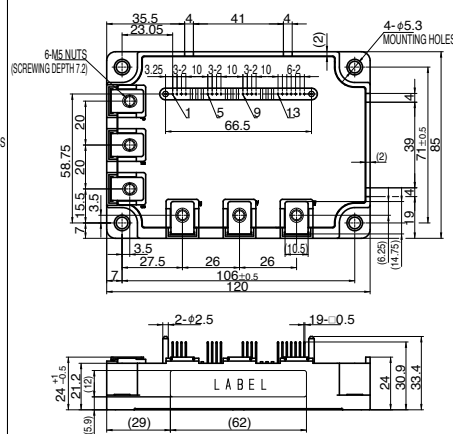
10

**PM50,75,100,150,200CG1B/
RG1B065
PM25,35,50,75,100CG1B/
RG1B120**



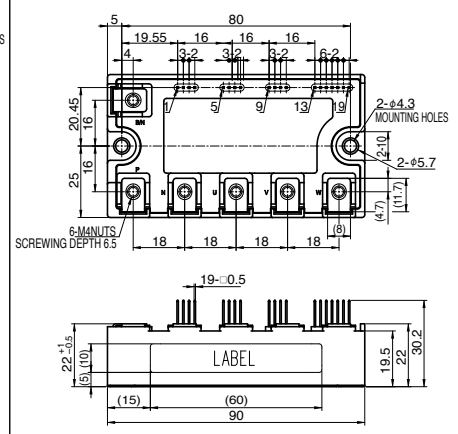
11

**PM200,300,450CG1C/
RG1C065
PM100,150,200CG1C/
RG1C120**



12

**PM50,75,100CG1A/CG1AL065
PM50,75RG1AP065
PM25,35,50CG1A/CG1AL120
PM25,35RG1A120**

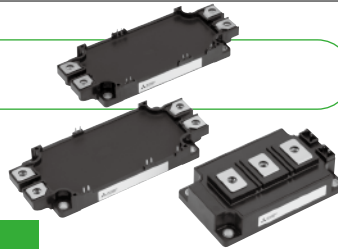




Featured Products

New lineup contributes to simple design downsizing, energy-savings of industrial inverters.

IGBT Module T/T1-Series



Data sheet here



NX type



std type

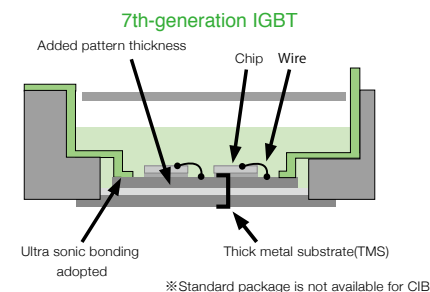
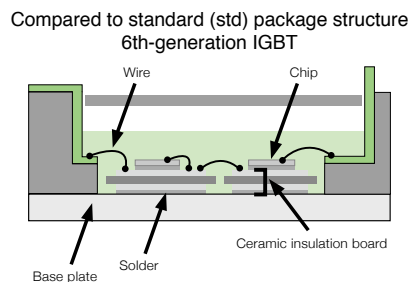
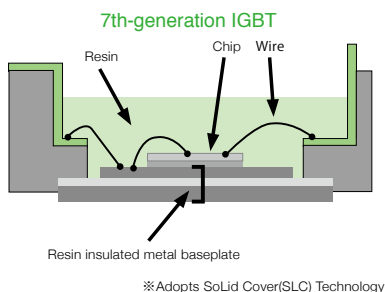
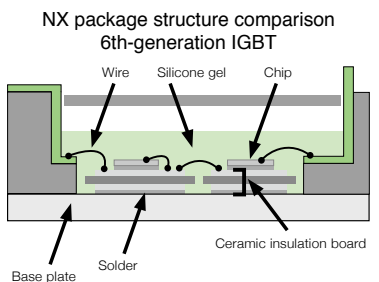
<Main Features>

- New modules equipped with three-phase converter, inverter, and brake circuit(CIB), contributes to simplifying design for inverter systems
- CIB modules contribute to compact inverter systems by reducing package size by 36% compared to the Mitsubishi Electric's existing module.(CIB)
- Power loss has been reduced with the introduction of the 7th-generation IGBT produced using CSTBT™² and a diode incorporating a relaxed field of cathode (RFC) structure
- The new structure introduced eliminates the solder-attached section, increasing the thermal cycle lifetime, which contributes to improving the reliability of inverters
- The introduction of press-fit pins and PC-TIM¹ contribute to simplifying the assembly process for inverters

*1 PC-TIM: Phase change - thermal interface material

*2 CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect

■ New structure realizes improved reliability (improved thermal cycle lifetime)



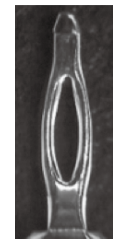
◆ Press-fit terminal support (NX)

- Possible to select the control pin shape (soldered terminals/press-fit terminals)
- Solder attachment process eliminated

■ Press-fit pin



①Main pin



②Signal pin



New Products

Under Development

Industrial IGBT module with new standard package "LV100" for high power density inverter, have been developed for the application that high-density inverter is required.

IGBT module T-series (LV100 for industrial)

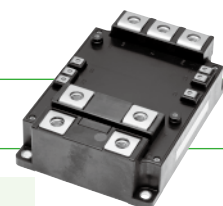
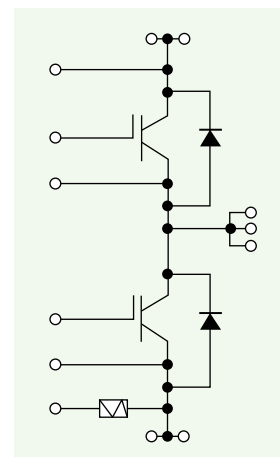
IGBT module 2in1 type

■ Lineup

800A/1700V, 800A/1700V(with enhanced FWD), 1200A/1700V

<Main Features>

- Next generation high capacity standard package for industrial use
- Improved ease of use by applying low impedance package
- Reducing the switching loss and optimal for the applications that are used in 1 to 5KHz
- Isolation voltage 4kV



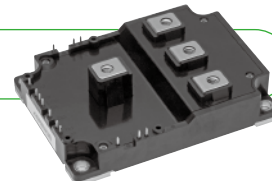


Featured Products

Contributes to realizing smaller, energy-saving large-capacity inverters



1-in-1 / 2-in-1 type



4-in-1 type

Data sheet here



Power Modules for 3-level Inverters

<Main Features>

- Compatible with 3-level inverters, reducing power consumption approx. 30%^{*1}
- New package developed^{*2} contributing to lower inductance and simplified inverter circuit structure
- IGBT specifications optimized^{*3} with development of new compact, low-inductance package
- 4-in-1^{*4} and 1-in-1/2-in-1^{*5} lineup contributes to improved compactness and freedom in inverter design

^{*1} Comparison between 3-level inverter incorporated in this device and 2-level inverter in conventional device.

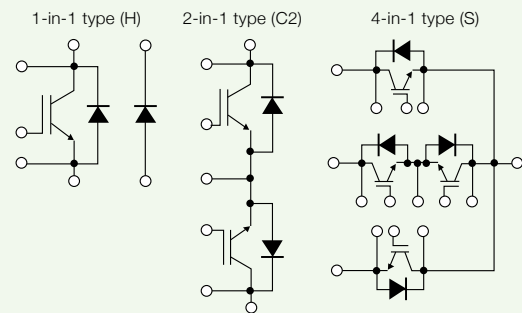
^{*2} 1-in-1/2-in-1 type external dimensions of 130x67mm, 4-in-1 type external dimensions of 115x82mm, new package developed with innovative terminal positioning.

^{*3} IGBT specifications optimized for 3-level inverters, adopting CSTBT[™] (Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect).

^{*4} 4-in-1 module with one 3-level inverter arm in one package.

^{*5} Bidirectional switch model as emitter common connection.

Internal circuit diagram



Lineup

General use for 3Level inverter			Model	Module type	Rated voltage	Rated current	Circuit structure	External dimensions WxD(mm)	
Circuit topology	Inverter range	Function							
T type	125kW~ 630kW	-	CM400ST-24S1	IGBT	1200V	400A	4in1	115×82	
		BRIDGE	CM450DY-24T			450A	2in1	108×62	
		AC Switch	CM450C1Y-24T			600A			
		BRIDGE	CM600DY-24T						
	AC Switch	CM600C1Y-24T	1200V		500A	2in1	130×67		
	250kW~	AC Switch			CM500C2Y-24S	1700V		600A	1in1
		BRIDGE			CM600HA-34S			800A	
		BRIDGE			CM800HA-34S			1000A	
		BRIDGE			CM1000HA-34S	1700V	400A	2in1	108×62
		BRIDGE			CM400DY-34T		450A		
		AC Switch			CM450C1Y-24T		300A		
	BRIDGE	CM300DY-34T			600A				
	AC Switch	CM600C1Y-24T			1200V	600A			
	I type	500kW~			-	CM1400HA-24S	Diode	1200V	1400A
Clamp Diode			RM1400HA-24S	1700V	600A	2in1		108×62	
Clamp Diode			RM600DY-34S		800A				
Clamp Diode			RM800DY-34S						

Features of IGBT Module Series

S Series

- Lineup includes various package types
- 6th-generation CSTBT[™] delivers low-loss performance
- Thinner package (Height: 17mm) (NX type)
- Suited to large-capacity applications (MPD type)

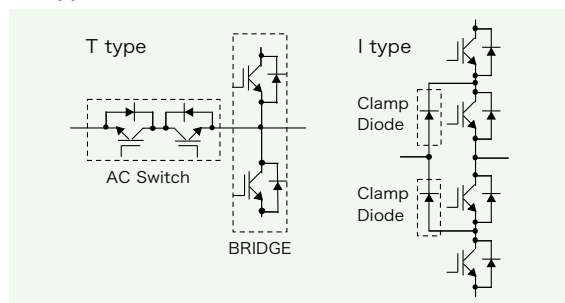
MPD: Mega power dual

NFH Series

- High-speed CSTBT[™] delivers low-loss performance
- Soft switching (resonant) turn-off function (ZVS)
- Enhanced inner wiring (skin effect)

CSTBT[™]: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect.

Typical circuit of 3level inverter



Type Name Definition of IGBT Modules

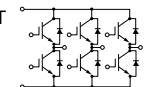
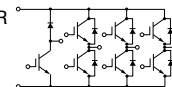
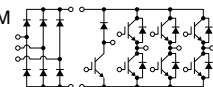
CM 600 D Y -13 T

- Series name
- Voltage class
- Outline drawing and other specifications
- Connection type
- Rated current capacity
- IGBT module

Line-up of IGBT Modules

■ Matrix of IGBT Modules 650V/600V (No.: Number of outline drawing, see page 18 to 23)

RoHS directive (2011/65/EU, (EU)2015/863) compliant

V _{CE} (V)	650V						600V								
	T/T1-Series NX Type			T-Series std Type			A-Series NX Type			NF-Series			NF-Series NFH Type		
I _C (A)		Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.
50	CM50MXUB-13T★ CM50MXUB-13T1★ CM50MXUBP-13T★ CM50MXUBP-13T1★	M	42 42 46 46												
75	CM75MXUB-13T★ CM75MXUB-13T1★ CM75MXUBP-13T★ CM75MXUBP-13T1★	M	42 42 46 46				CM75MX-12A	M	01	CM75TL-12NF CM75RL-12NF	T R	07 07			
100	CM100TX-13T CM100TXP-13T CM100MXUB-13T★ CM100MXUB-13T1★ CM100MXUBP-13T★ CM100MXUBP-13T1★ CM100MXUD-13T★ CM100MXUD-13T1★ CM100MXUDP-13T★ CM100MXUDP-13T1★	T T M M M M M M M M	33 37 42 42 46 46 44 44 48 48	CM100DY-13T	D	30	CM100MX-12A CM100RX-12A	M R	01 02	CM100TL-12NF CM100RL-12NF	T R	07 07			
150	CM150TX-13T CM150TXP-13T CM150RX-13T CM150RXP-13T CM150MXUD-13T★ CM150MXUD-13T1★ CM150MXUDP-13T★ CM150MXUDP-13T1★	T T R R M M M M	33 37 34 38 44 44 48 48	CM150DY-13T	D	30	CM150RX-12A	R	02	CM150DY-12NF CM150TL-12NF CM150RL-12NF	D T R	08 07 07			
200	CM200TX-13T CM200TXP-13T CM200RX-13T CM200RXP-13T	T T R R	33 37 34 38	CM200DY-13T	D	30	CM200RX-12A	R	02	CM200DY-12NF CM200TL-12NF CM200RL-12NF	D T R	08 09 09	CM200DU-12NFH	D	13
225															
300	CM300DX-13T CM300DXP-13T	D D	28 39	CM300DY-13T	D	31	CM300DX-12A	D	03	CM300DY-12NF	D	08	CM300DU-12NFH	D	14
400				CM400DY-13T	D	31	CM400DX-12A	D	03	CM400DY-12NF	D	10	CM400DU-12NFH	D	14
450	CM450DX-13T CM450DXP-13T	D D	28 39												
600	CM600DX-13T CM600DXP-13T	D D	28 39	CM600DY-13T	D	32				CM600DY-12NF	D	11	CM600DU-12NFH	D	15
1000															
Connection	D T R M														

★: New Product

■ Matrix of Power Modules for 3-level Inverter (No.: Number of outline drawing, see page 19 to 21)

RoHS directive (2011/65/EU, (EU)2015/863) compliant

V _{CE} /V _{RM}	1200 V IGBT Module			1700 V IGBT Module			1200 V Diode Module			1700 V Diode Module		
	T/S/S1-Series std Type			S/S1-Series std Type			S/S1-Series std Type			S/S1-Series std Type		
I _C /I _F		Connection	No.		Connection	No.		Connection	No.		Connection	No.
400	CM400ST-24S1 CM400C1Y-24S	S C1	35 11									
450	CM450C1Y-24T★	C1	32									
500	CM500C2Y-24S	C2	36									
600	CM600C1Y-24T	C1	32	CM600HA-34S	H	36				RM600DY-34S	D	32
800				CM800HA-34S	H	36				RM800DY-34S	D	32
1000				CM1000HA-34S	H	36						
1400	CM1400HA-24S	H	36				RM1400HA-24S★	H	36			
Connection												

*Connection of diode module and IGBT module are different.

★: New Product

Matrix of IGBT Modules 1200V (No.: Number of Outline Drawing, see page 18 to 23)

RoHS directive (2011/65/EU, (EU)2015/863) compliant

V _{CE} (V)		1200V																			
I _C	Series	T/T1-Series			T-Series			S/S1-Series			S/S1-Series			S/S1-Series			A-Series ^{*1}				
		NX Type	Connection	No.	std Type	Connection	No.	NX Type	Connection	No.	std Type	Connection	No.	MPD Type	Connection	No.	NF-Series ^{*1}	Connection	No.		
35		CM35MXUA-24T* CM35MXUA-24T1* CM35MXUAP-24T* CM35MXUAP-24T1*	M M M M	41 41 45 45				CM35MXA-24S	M	04											
50		CM50MXUA-24T* CM50MXUA-24T1* CM50MXUAP-24T* CM50MXUAP-24T1*	M M M M	41 41 45 45				CM50MXA-24S	M	04							CM50RL-24NF CM50TL-24NF	R T	07 07		
75		CM75MXUB-24T* CM75MXUB-24T1* CM75MXUBP-24T* CM75MXUBP-24T1* CM75MXUC-24T* CM75MXUC-24T1* CM75MXUCP-24T* CM75MXUCP-24T1*	M M M M M M M M	42 42 46 46 43 43 47 47				CM75MXA-24S CM75TX-24S CM75RX-24S	M T R	04 05 02							CM75RL-24NF CM75TL24NF	R T	07 07		
100		CM100TX-24T CM100TXP-24T CM100RX-24T CM100RXP-24T CM100MXUC-24T* CM100MXUC-24T1* CM100MXUCP-24T* CM100MXUCP-24T1*	T T R R M M M M	33 37 34 38 43 43 47 47	CM100DY-24T	D	30	CM100MXA-24S CM100TX-24S1 CM100RX-24S1	M T R	04 25 26							CM100DY-24A CM100DY-24NF CM100E3Y-24NF CM100RL-24NF CM100TL-24NF CM100DU-24NFH	D D E3 R T D	08 08 08 07 07 13		
150		CM150TX-24T CM150TXP-24T CM150RX-24T CM150RXP-24T CM150MXUD-24T* CM150MXUD-24T1* CM150MXUDP-24T* CM150MXUDP-24T1*	T T R R M M M M	33 37 34 38 44 44 48 48	CM150DY-24T	D	30	CM150DX-24S CM150EXS-24S CM150TX-24S1 CM150RX-24S1	D E T R	03 24 25 26							CM150DY-24A CM150DY-24NF CM150E3Y-24NF CM150RL-24NF CM150TL-24NF CM150DU-24NFH	D D E3 R T D	08 08 08 09 09 13		
200		CM200TX-24T CM200TXP-24T	T T	33 37	CM200DY-24T	D	31	CM200EXS-24S CM200RXL-24S	E R	24 21							CM200DY-24A CM200DY-24NF CM200RL-24NF CM200TL-24NF CM200DU-24NFH	D D R T D	08 10 09 09 14		
225		CM225DX-24T CM225DXP-24T	D D	28 39				CM225DX-24S1	D	27											
300		CM300DX-24T CM300DXP-24T	D D	28 39	CM300DY-24T	D	31	CM300DX-24S1 CM300EXS-24S CM300RXL-24S1	D E R	27 24 21	CM300DY-24S	D	10				CM300DY-24A CM300DY-24NF CM300DU-24NFH	D D D	10 11 14		
400																	CM400DY-24A CM400HA-24A CM400DY-24NF CM400DU-24NFH	D H D D	11 16 11 15		
450		CM450DX-24T CM450DXP-24T	D D	28 39	CM450DY-24T	D	32	CM450DX-24S1	D	27	CM450DY-24S	D	11								
600		CM600DX-24T CM600DXP-24T	D D	28 39	CM600DY-24T	D	32	CM600DX-24S1 CM600DXL-24S	D D	27 6	CM600DY-24S	D	11				CM600DY-24A CM600HA-24A CM600DU-24NF CM600DU-24NFH	D H D D	11 16 12 15		
800		CM800DX-24T1* CM800DXP-24T1*	D D	28 39							CM800DY-24S	D	12								
900														CM900DUC-24S	D	17					
1000		CM1000DX-24T CM1000DXP-24T	D D	29 40				CM1000DXL-24S	D	06											
1400											CM1400HA-24S	H	36	CM1400DUC-24S	D	17					
Connection		H	D	T	R	M	E	E3													

Line-up of IGBT Modules

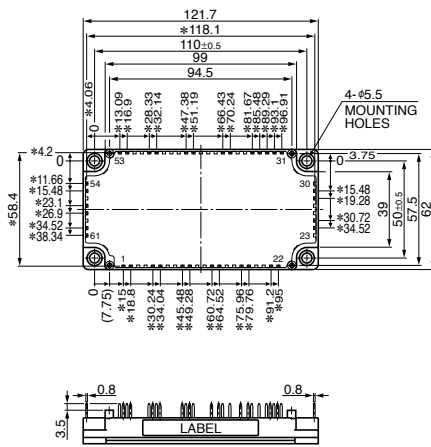
Matrix of IGBT Modules 1700V(No.: Number of Outline Drawing, see page 18 to 23)

RoHS directive (2011/65/EU, (EU)2015/863) compliant

V _{CE} (V)		1700V																			
Series I _C	T-Series LV100 Type			T-Series NX Type			T-Series std Type			S/S1-Series NX Type			S/S1-Series std Type			S/S1-Series MPD Type			A-Series std Type		
	Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.	
75							CM75DY-34T*	D	30	CM75MXA-34SA CM75RX-34SA	M R	23 19							CM75DY-34A	D	08
100				CM100TX-34T* CM100TXP-34T*	T T	33 37	CM100DY-34T*	D	30										CM100DY-34A	D	08
150				CM150TX-34T* CM150TXP-34T*	T T	33 37	CM150DY-34T*	D	31	CM150DX-34SA CM150RXL-34SA	D R	20 21							CM150DY-34A	D	10
200							CM200DY-34T*	D	31	CM200DX-34SA CM200EXS-34SA	D E	20 24							CM200DY-34A	D	10
225				CM225DX-34T* CM225DXP-34T*	D D	28 39															
300				CM300DX-34T* CM300DXP-34T*	D D	28 39	CM300DY-34T*	D	32	CM300DX-34SA	D	20							CM300DY-34A	D	11
400							CM400DY-34T*	D	32										CM400DY-34A	D	18
450				CM450DX-34T* CM450DXP-34T*	D D	28 39				CM450DXL-34SA	D	22									
500																			CM500HA-34A	H	16
600				CM600DX-34T* CM600DXP-34T*	D D	28 39				CM600DXL-34SA	D	22	CM600HA-34S	H	36						
800	CM800DW-34T** CM800DW-34TA**	D D	- -										CM800HA-34S	H	36						
1000													CM1000HA-34S	H	36	CM1000DUC-34SA	D	17			
1200	CM1200DW-34T**	D	-																		
Connection	H D T R M E																				

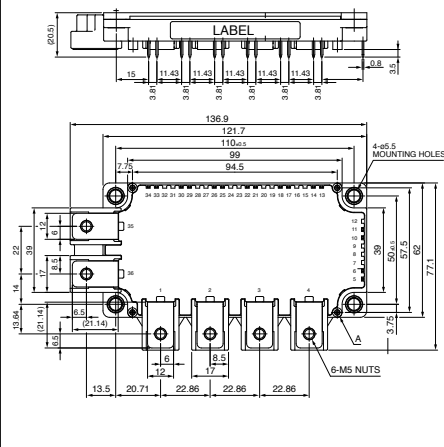
★★: Under Development ★: New Product

01 CM75,100MX-12A



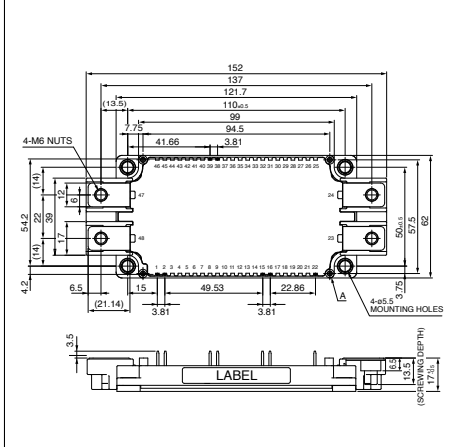
*All dimensions with a tolerance of $\boxed{\Phi} \pm 0.5$

02 CM100,150,200RX-12A
CM75RX-24S



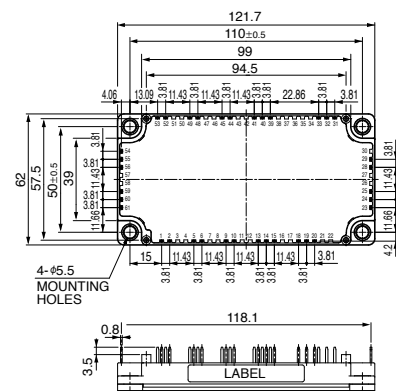
*All dimensions with a tolerance of $\boxed{\Phi} \pm 0.5$

03 CM300,400DX-12A
CM150,200DX-24S

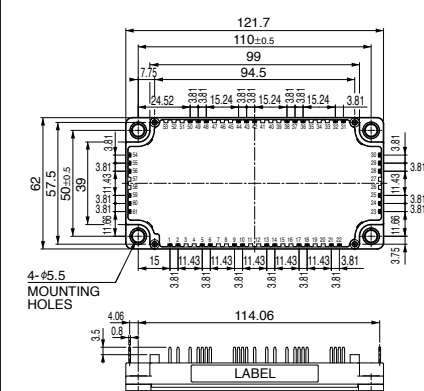


*All dimensions with a tolerance of $\boxed{\Phi} \pm 0.5$

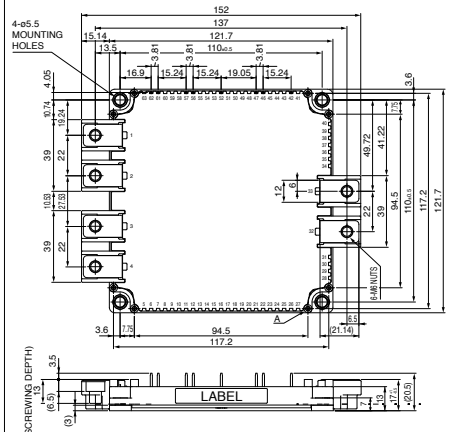
04 CM35,50,75,100MXA-24S



05 CM75TX-24S

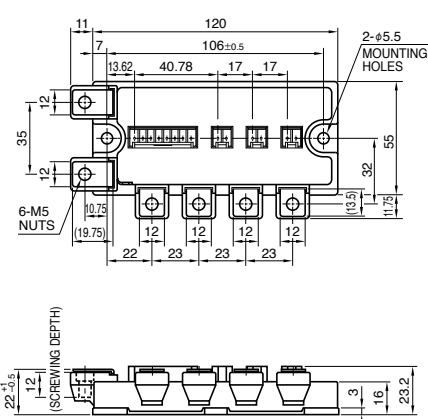


06 CM600,1000DXL-24S

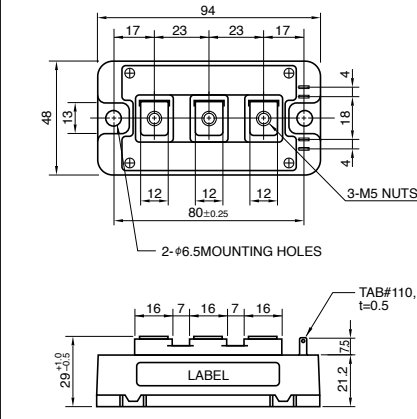


*All dimensions with a tolerance of $\boxed{\Phi} \pm 0.5$

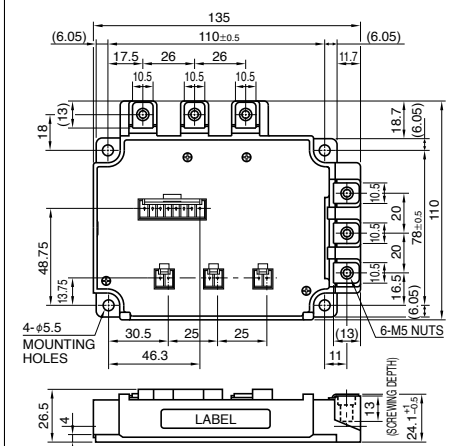
07 CM75,100,150TL/RL-12NF
CM50,75,100TL/RL-24NF



08 CM150,200,300DY-12NF
CM100,150DY-24NF
CM100,150,200DY-24A
CM75,100DY-34A
CM100,150E3Y-24NF



09 CM200TL/RL-12NF
CM150,200TL/RL-24NF



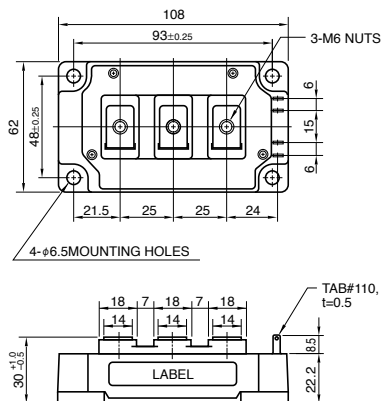
Line-up of IGBT Modules

■ Outline Drawing of IGBT Modules

Unit:mm

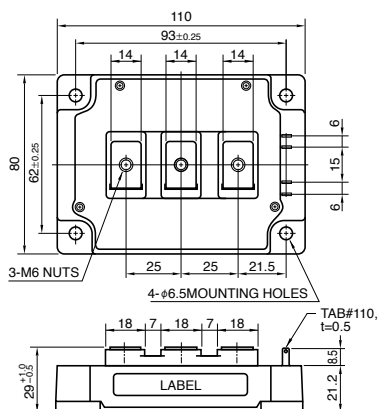
10

CM400DY-12NF
CM200DY-24NF
CM300DY-24A
CM300DY-24S
CM150,200DY-34A



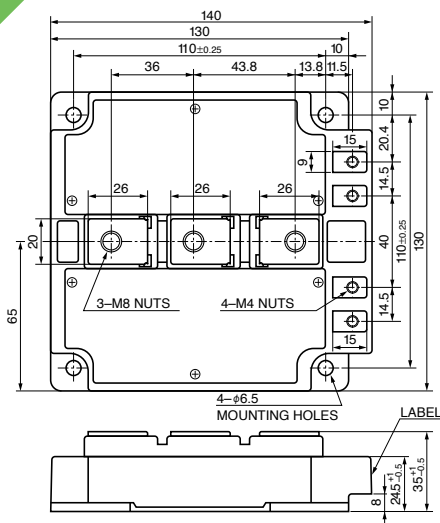
11

CM600DY-12NF	CM400C1Y-24S
CM400DY-24NF	CM450DY-24S
CM400,600DY-24A	CM600DY-24S
CM300DY-34A	CM300DY-24NF



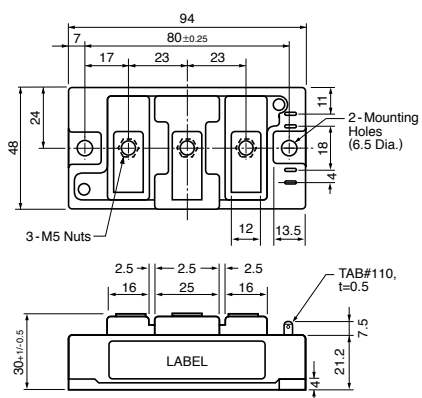
12

CM600DU-24NF
CM800DY-24S



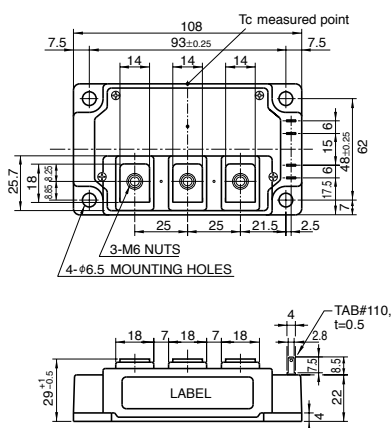
13

CM200DU-12NFH
CM100,150DU-24NFH



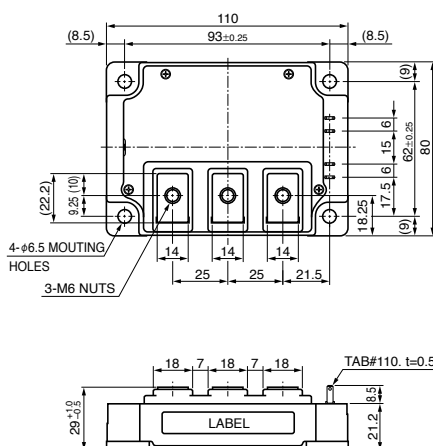
14

CM300,400DU-12NFH
CM200,300DU-24NFH



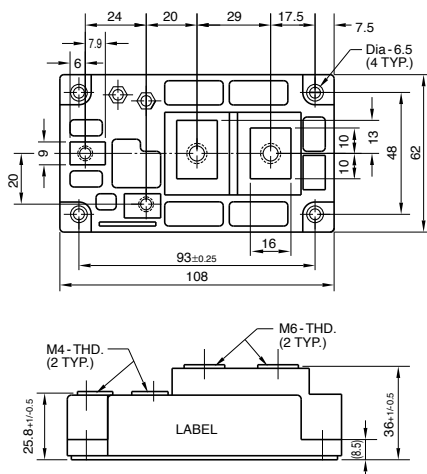
15

CM600DU-12NFH
CM400,600DU-24NFH



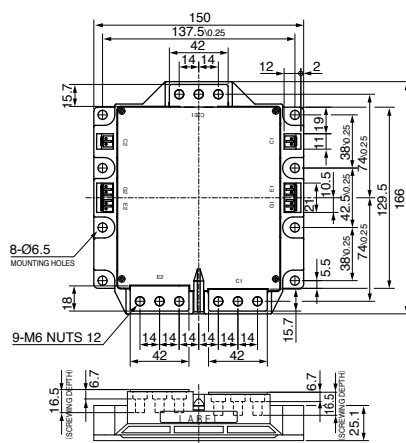
16

CM400,600HA-24A
CM500HA-34A

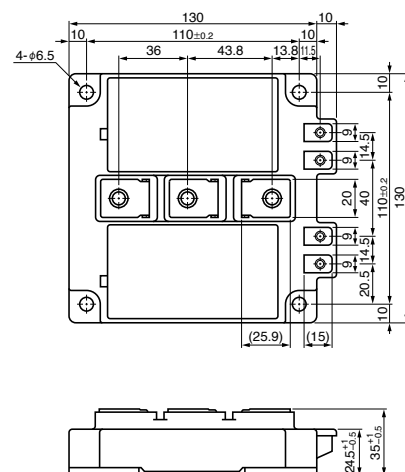


17

CM900,1400DUC-24S
CM1000DUC-34SA



18

CM400DY-34A

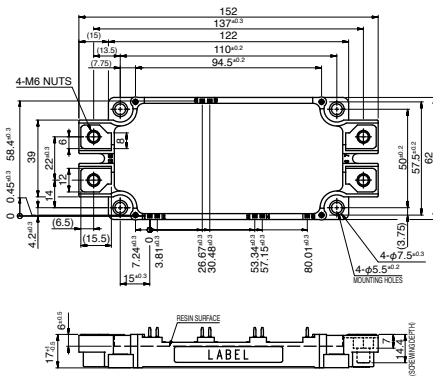
Line-up of IGBT Modules

Outline Drawing of IGBT Modules

Unit:mm

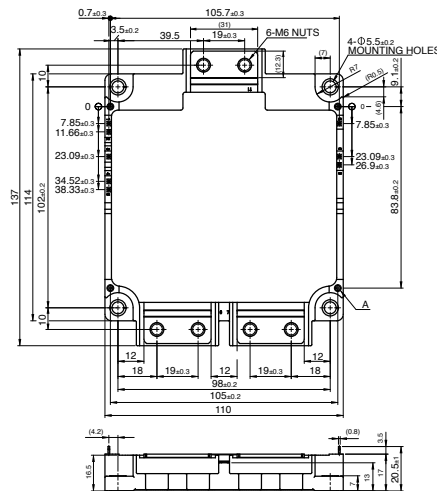
28

CM300,450,600DX-13T
CM225,300,450,600DX-24T
CM800DX-24T1



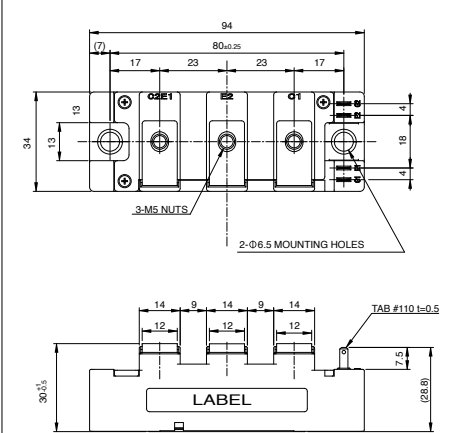
29

CM1000DX-24T



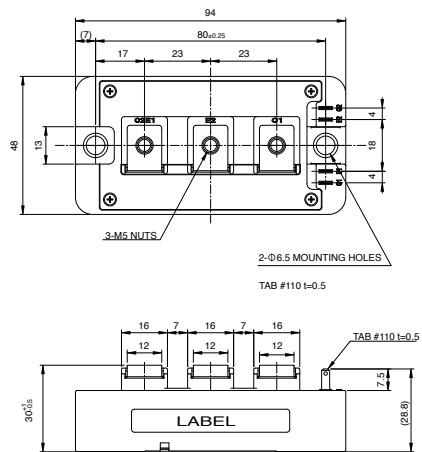
30

CM100,150,200DY-13T
CM100,150DY-24T



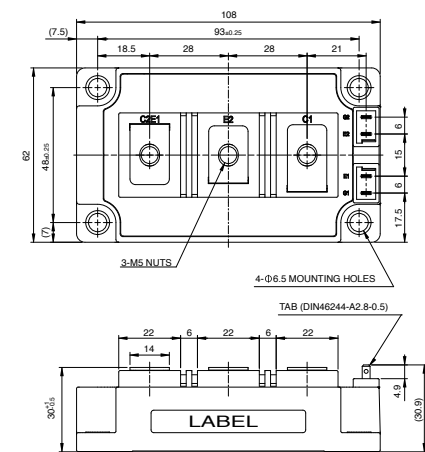
31

CM300,400DY-13T
CM200,300DY-24T



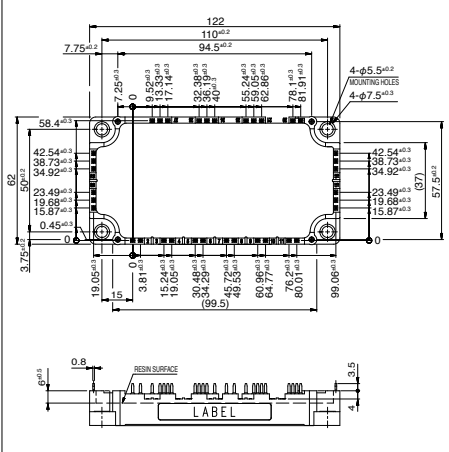
32

CM600DY-13T
CM450,600DY-24T
CM450,600C1Y-24T



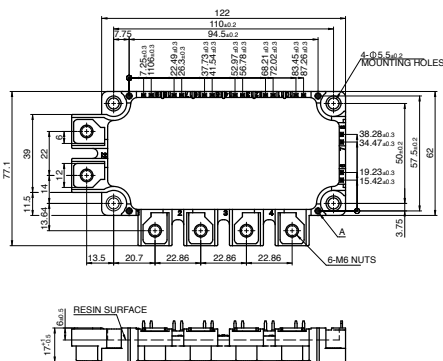
33

CM100,150,200TX-13T
CM100,150,200TX-24T
CM100,150TX-34T



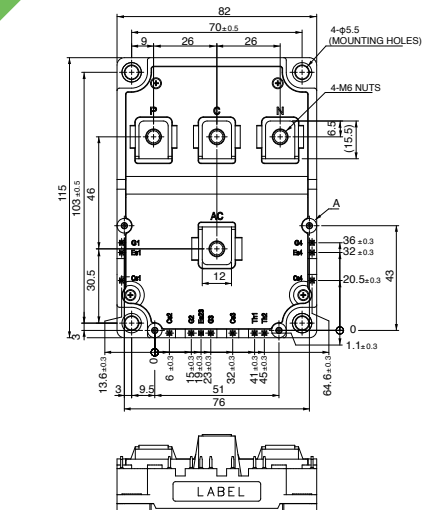
34

CM150,200RX-13T
CM100,150RX-24T



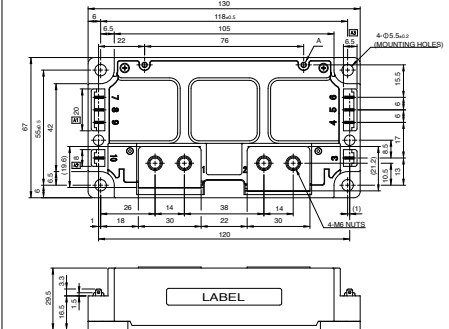
35

CM400ST-24S1



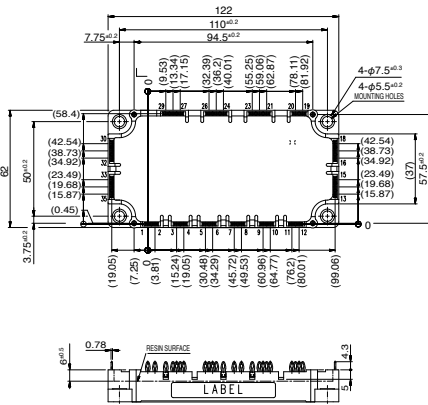
36

CM500C2Y-24S
CM1400HA-24S
CM1000HA-34S
RM1400HA-24S



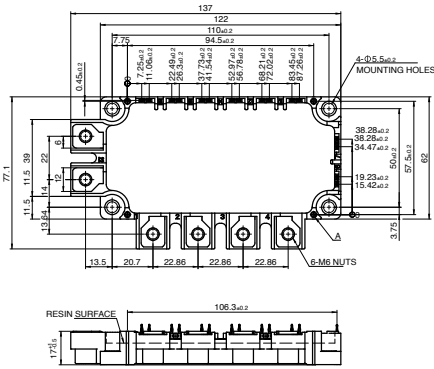
37

CM100,150,200TXP-13T
CM100,150,200TXP-24T
CM100,150TXP-34T



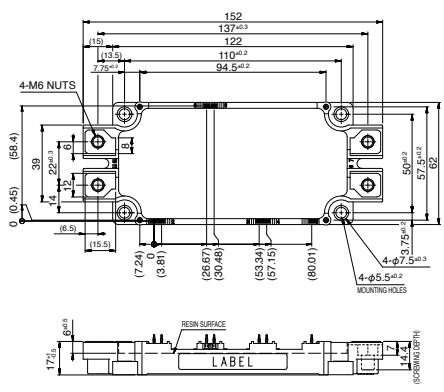
38

CM150,200RXP-13T
CM100,150RXP-24T



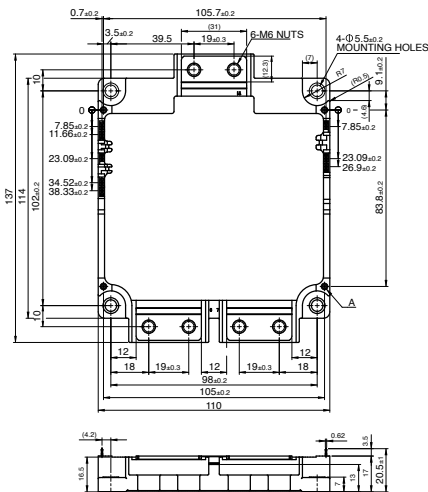
39

CM300,450,600DXP-13T
CM225,300,450,600DXP-24T
CM800DXP-24T1



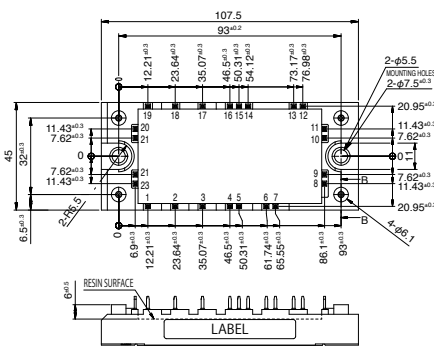
40

CM1000DXP-24T



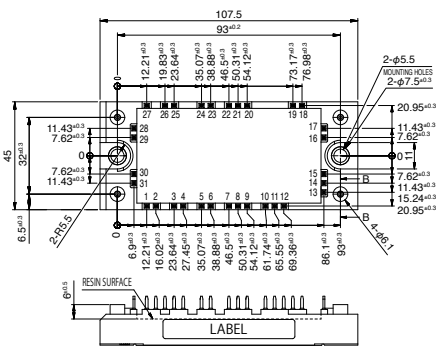
41

CM35,50MXUA-24T/24T1



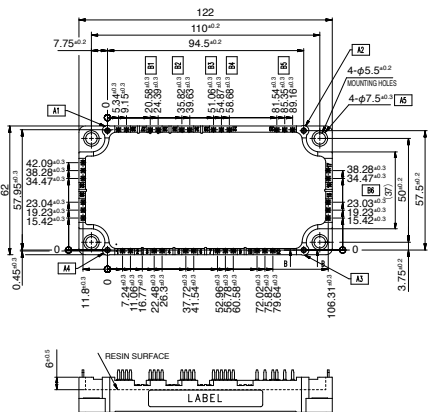
42

CM50,75,100MXUB-13T/13T1
CM75MXUB-24T/24T1



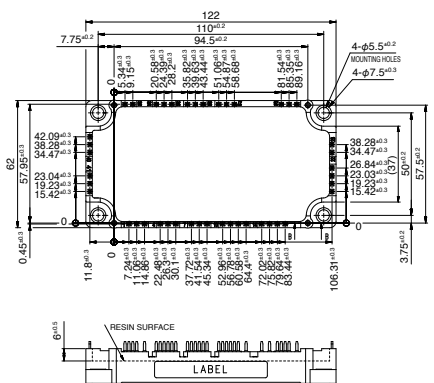
43

CM75,100MXUC-24T/24T1



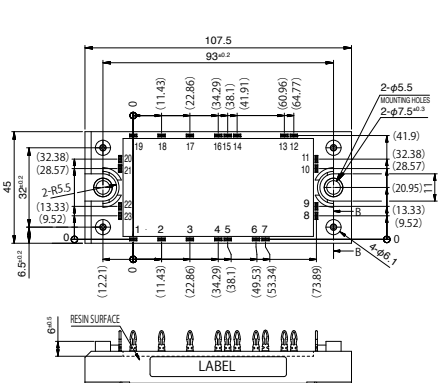
44

CM100/150MXUD-13T/T1
CM150MXUD-24T/T1



45

CM35/50MXUAP-24T/T1



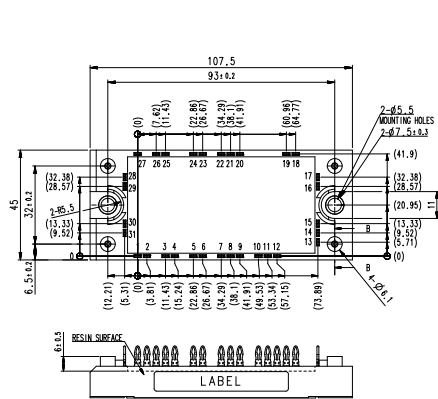
Line-up of IGBT Modules

Outline Drawing of IGBT Modules

Unit:mm

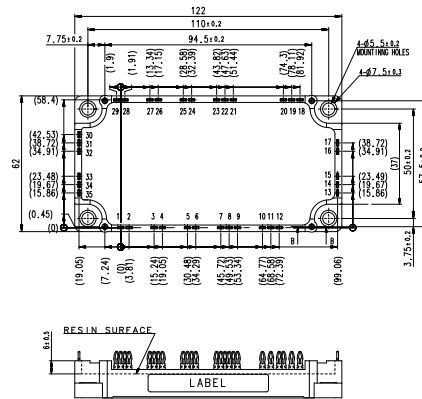
46

CM50/75/100MXUBP-13T/T1
CM75MXUBP-24T/T1



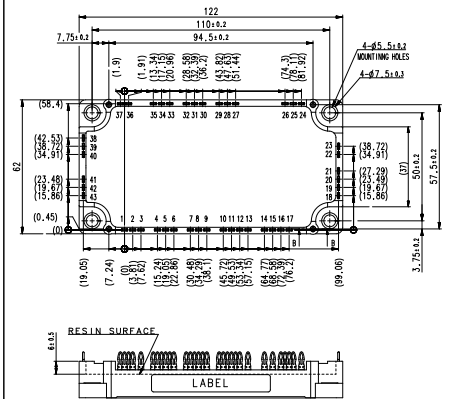
47

CM75/100MXUCP-24T/T1



48

CM100/150MXUDP-13T/T1
CM150MXUDP-24T/T1





New Products

X Series HVIGBT Modules std type

Existing compatible package: Standard type Contributes to smaller, higher-capacity inverter systems by expanding lineup



std type

<Main Features>

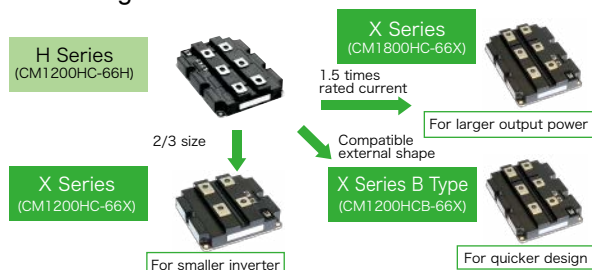
- Power loss reduced by incorporating 7th-generation IGBT and RFC^{*1} diode
- Industry-leading power^{*2} for increased inverter capacity
- External size reduced 33% while maintaining the same voltage resistance and rated current as conventional products,^{*3} contributing to inverter downsizing
- Optimal package internal structure realizes improved heat dissipation, humidity resistance and flame retardance, increasing product life

^{*1} RFC : Relaxed field of cathode

^{*2} 3.3kV - 6.6kV (as of Apr. 5, 2018 based on Mitsubishi Electric research)

^{*3} Comparison of X Series CM1200HC-66X and H Series CM1200HC-66H

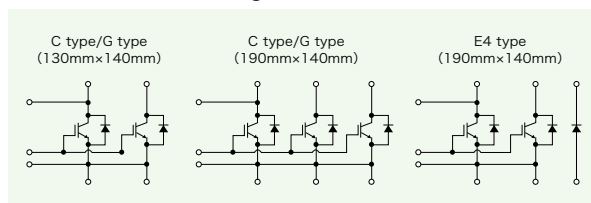
Positioning from conventional series



Product lineup

std Type	1.7kV	3.3kV	4.5kV	6.6kV
	1200A 1600A 2400A	1200A	900A 1000A	600A
	2400A 3600A	1200A 1800A	900A 1350A 1500A	600A 900A 1000A

Internal circuit diagram



X Series HVIGBT Modules dual type

New common frame package: dual type Class-leading current density contributes to increased power output in inverter systems



dual type

<Main Features>

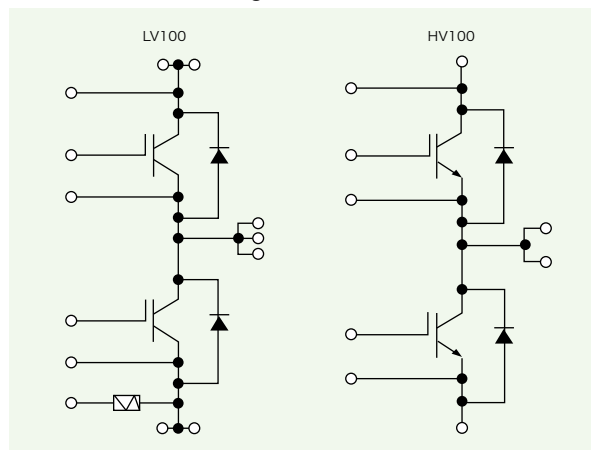
- Power loss reduced by incorporating 7th-generation IGBT and RFC^{*1} diode
- Industry's highest 3.3kV/600A Si module power density of 8.57A/cm²^{*4} contributes to increased power output and efficiency
- Terminal layout optimized for easy paralleling and flexible inverter configurations and capacities
- New package structure offers extra reliability

^{*4} As of Apr. 5, 2018, based on Mitsubishi Electric research

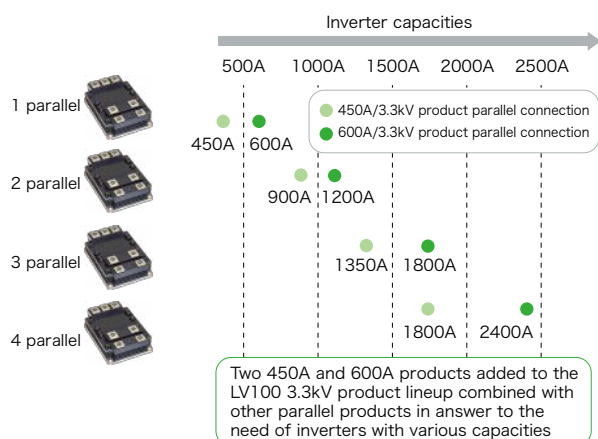
Product lineup

LV100	1.7kV	3.3kV	HV100	3.3kV	4.5kV	6.6kV
	1000A	450A		450A	350A	225A
	1200A	600A		600A	450A	300A

Internal circuit diagram

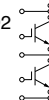


Various current ratings for optimal system design



Line-up of HVIGBT Modules

Series Matrix of HVIGBT/HVIPM(No.: Number of Outline Drawing, see page 29 to 31)

V _{CE} (V) I _C (A)	1700V												2500V						3300V																
	X-Series				S-Series N-Series				H-Series				H-Series				X-Series				R-Series				H-Series										
	Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.				
400A													CM400DY-50H	D1	B	15														CM400HG-66H	H	G	07		
450A																	CM450DC-66X**	D2	C	G	20														
600A									CM600DY-34H	D1	B	01	CM600E2Y-34H	E2	B	01				CM600DC-66X**	D2	C	G	20											
800A					CM800DZB-34N	D1	C	01	CM800DZ-34H	D1	H	01	CM800HA-34H	C	B	—	CM800HB-50H	H	B	03											CM800HC-66H	H	C	03	
1000A	CM1000DC-34X**	D2	C	20																			CM1000HC-66R	H	C	08									
1200A	CM1200DC-34X**	D2	C	20	CM1200HCB-34N	H	C	03	CM1200DC-34N	D1	C	04	CM1200E4C-34N	E4	C	05	CM1200HC-34H	H	C	02	CM1200HC-50H	H	C	06	CM1200HC-66X**	H	C	16			CM1200HG-66H	H	C	09	
	CM1200E4C-34X**	E4	C	16	CM1200DC-34N	D1	C	05	CM1200E4C-34N	E4	C	05	CM1200DC-34S	D1	C	04				CM1200HCB-66X**	H	C	17	CM1200E4C-66X**	E4	C	17			CM1200HC-66H	H	C	06		
1500A																							CM1500HC-66R	H	C	17									
																							CM1500HG-66R	H	G	19									
1600A	CM1600HC-34X**	H	C	16					CM1600HC-34H	H	C	02																							
1800A					CM1800HC-34N	H	C	05	CM1800HCB-34N	H	C	06	CM1800HC-34H	H	C	06				CM1800HC-66X*	H	C	17	CM1800HG-66X**	H	G	18								
2400A	CM2400HC-34X**	H	C	16	CM2400HC-34N	H	C	05	CM2400HCB-34N	H	C	06	CM2400HC-34H	H	C	06																			
	CM2400HCB-34X**	H	C	17																															
3600A	CM3600HC-34X**	H	C	17																															
Connection	H		E2/E6		E4		D1		D2																										

[Type]

B: Cu base plate 6kV Isolation
C: AlSiC base plate 6kV Isolation
G: AlSiC base plate 10kV Isolation

★★: Under Development ★: New Product

Series Matrix of HVIGBT/HVIPM(No.: Number of Outline Drawing, see page 29 to 31)

V _{CE} (V) I _C (A)	4500V												6500V											
	X-Series				R-Series				H-Series				X-Series				R-Series				H-Series			
	Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.	
200A																					CM200HG-130H	H	G	7
225A													CM225DG-130X**	D2	G	21								
300A													CM300DG-130X**	D2	G	21								
350A	CM350DG-90X**	D2	G	21																				
400A																					CM400HG-130H CM400E2G-130H CM400E4G-130H	H E2 E4	G G G	12 09 09
450A	CM450DG-90X**	D2	G	21																				
600A								CM600HG-90H	H	G	12	CM600HG-130X** CM600HGB-130X** CM600E4G-130X	H H E4	G H G	18 19 19					CM600HG-130H	H	G	11	
750A																	CM750HG-130R	H	G	11				
800A					CM800HC-90R CM800HG-90R	H H	C G	08 13																
900A	CM900HC-90X** CM900HG-90X** CM900HGB-90X** CM900E4G-90X**	H H H E4	C G G C	16 18 19 19				CM900HG-90H CM900HC-90H	H H	G C	13 09	CM900HG-130X**	H	G	19									
1000A	CM1000HG-90X**	H	G	18								CM1000HG-130XA*	H	G	19									
1200A					CM1200HC-90R CM1200HC-90RA CM1200HG-90R	H H H	C C G	10 10 11																
1350A	CM1350HC-90X** CM1350HG-90X**	H H	C G	17 19																				
1500A	CM1500HC-90XA* CM1500HG-90X**	H H	C G	17 19																				
Connection	H E2/E6 E4 D2																							

[Type]

B: Cu base plate 6kV Isolation
C: AlSiC base plate 6kV Isolation
G: AlSiC base plate 10kV Isolation

★★: Under Development ★: New Product

Line-up of HVDIODE Modules

■ Series Matrix of HVDIODE Modules (No.: Number of outline drawing, see page 31)

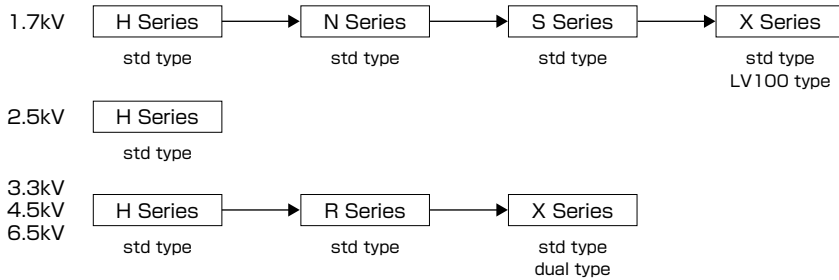
V _{PRM} I _F (A)	1700V				3300V				4500V				6500V			
	Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.	
200													RM200DG-130S	D	G	24
250													RM250DG-130F	D	G	24
300									RM300DG-90S	D	G	24	RM300DG-130X**	D	G	24
400					RM400DG-66S	D	G	24	RM400DG-90F	D	G	24				
					RM400DY-66S	D	B	25								
450									RM450DG-90X**	D	G	24	RM450DG-130X**	D	G	24
600					RM600DY-66S	D	B	25	RM600HE-90S	H	C	23	RM600DG-130S	D	G	24
					RM600DC-66X**	D	C	26					RM600DG-130X**	D	G	24
					RM600DG-66X**	D	G	24								
800	RM800DC-34X**	D	C	22					RM800DG-90F	D	G	24				
900					RM900DG-66X**	D	G	24	RM900HC-90S	H	C	27				
									RM900DB-90S	D	B	27				
									RM900DG-90X**	D	G	24				
1000					RM1000DC-66F	D	C	26					RM1000DG-130XA**	D	G	24
1200	RM1200DB-34S	D	B	22	RM1200DG-66S	D	G	24	RM1200DG-90F	D	D	24				
	RM1200DC-34X**	D	C	22	RM1200HE-66S	H	C	23								
					RM1200DB-66S	D	B	27								
					RM1200DC-66X**	D	C	26								
					RM1200DG-66X**	D	G	24								
1500					RM1500HE-66F	H	C	23	RM1500DC-90X**	D	C	26				
					RM1500DC-66F	D	C	26	RM1500DG-90X**	D	G	24				
1800	RM1800HE-34S	H	C	23												
Connection																

[Type]

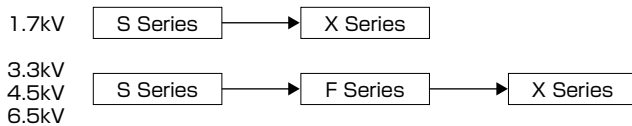
B: Cu base plate 6kV Isolation
C: AlSiC base plate 6kV Isolation
G: AlSiC base plate 10kV Isolation

★★: Under Development

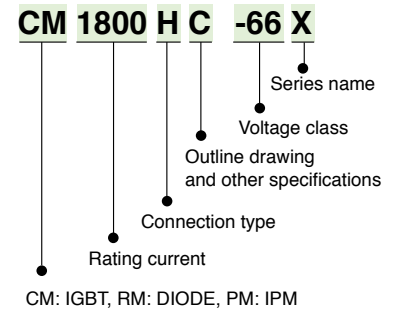
■ Evolution of HVIGBT Module Series



■ Evolution of HVDIODE Module Series



■ Type Name Definition of IGBT Modules



CM600DY-34H
CM600E2Y-34H
CM800DZ-34H
CM800DZB-34N

**CM1200,1600HC-34H**

CM1200HCB-34N
CM800HB-50H,-66H
CM800HC-66H



CM1200DB/DC-34N
CM1200DC-34S



CM1200E4C-34N
CM1800,2400HC-34N



CM1800,2400HCB-34N
CM1800,2400HC-34H
CM1200HB/HC-50H,-66H
CM800E4C/E6C-66H
CM900HC-90H



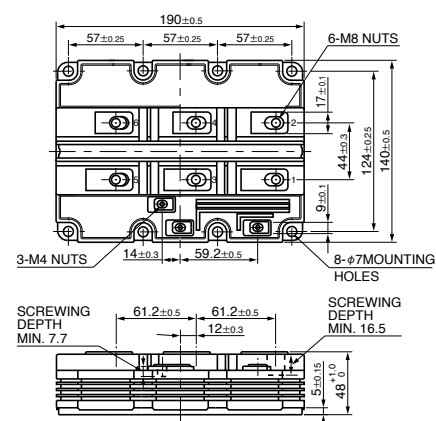
CM400HG-66H
CM200HG-130H



CM1000HC-66R
CM800HC-90R



CM1200HG-66H
CM900HG-90H
CM400E2G/E4G-130H
CM600HG-130H



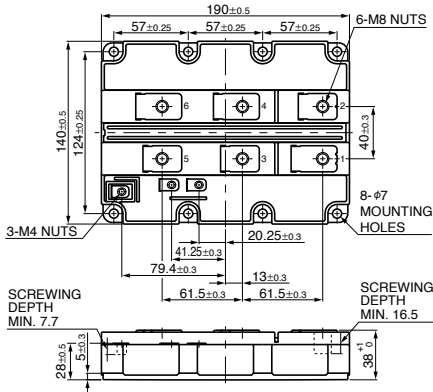
Line-up of HVIGBT Modules

Outline Drawing of HVIGBT Modules

Unit:mm

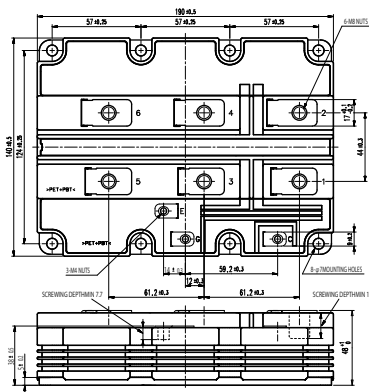
10

CM1000E4C-66R
CM1500HC-66R
CM1200HC-90R
CM1200HC-90RA



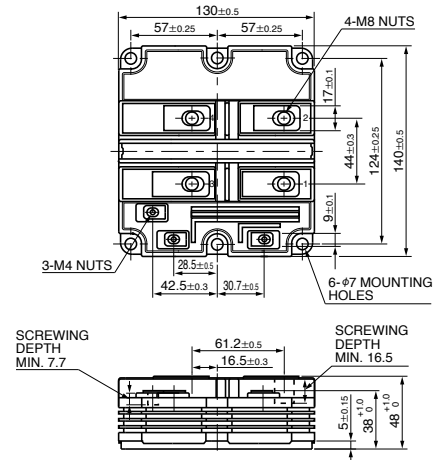
11

CM1500HG-66R
CM1200HG-90R
CM750HG-130R



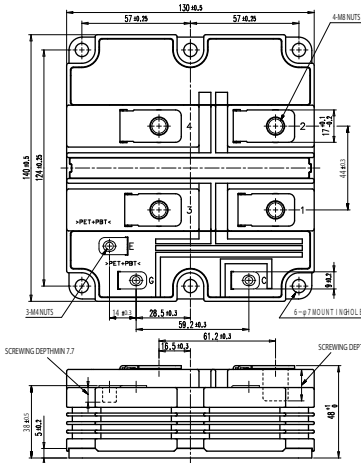
12

CM600HG-90H
CM400HG-130H



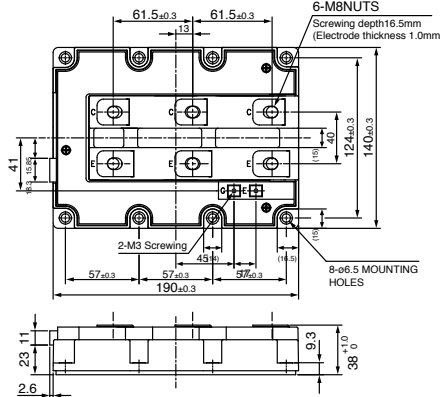
13

CM800HG-90R



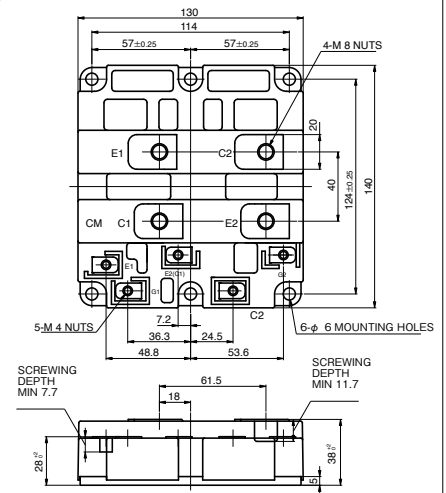
14

PM1200HCE330-1



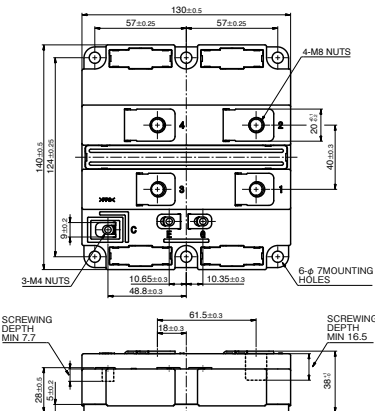
15

CM400DY-50H/66H



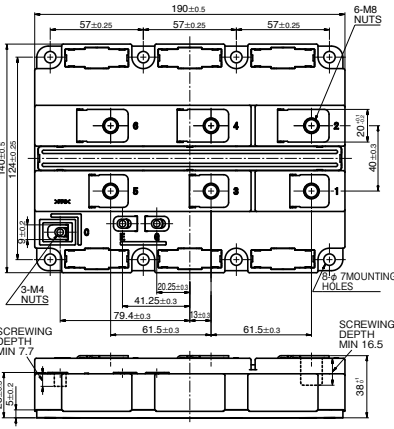
16

CM1200E4C-34X
CM1600HC-34X
CM2400HC-34X
CM1200HC-66X
CM900HC-90X



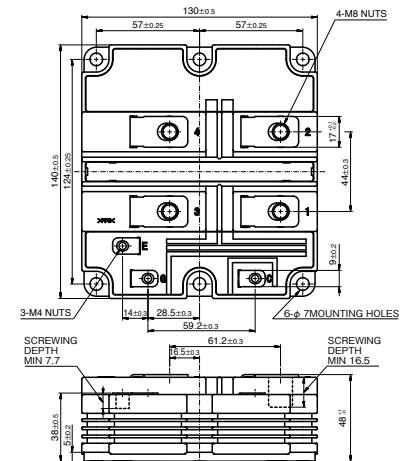
17

CM2400HCB-34X, CM3600HC-34X
CM1200E4C-66X, CM1200HCB-66X
CM1800HC-66X
CM1350HC-90X
CM1500HC-90XA



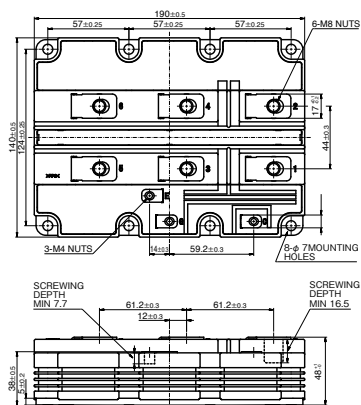
18

CM900HG-90X
CM1000HG-90X
CM600HG-130X



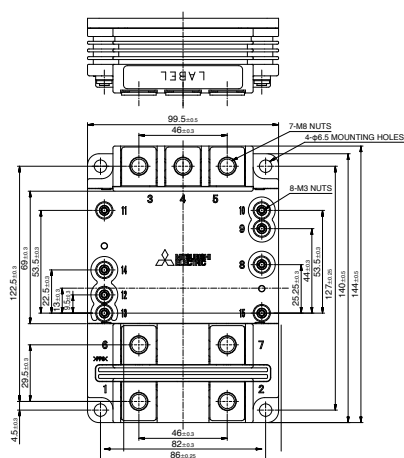
19

CM1800HG-66X
 CM900HGB-90X, CM900E4G-90X
 CM1350HG-90X, CM1500HG-90X
 CM600HGB-130X, CM600E4G-130X
 CM900HG-130X, CM1000HG-130XA



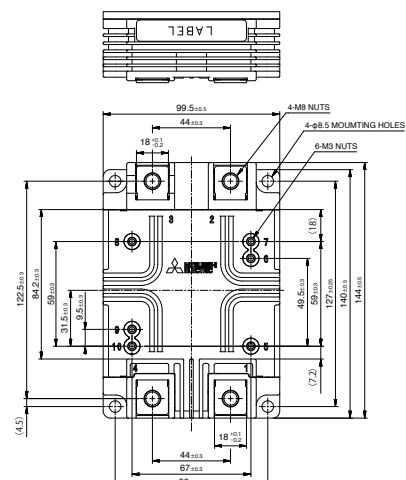
20

CM1000DC-34X
 CM1200DC-34X
 CM450DC-66X
 CM600DC-66X



21

CM450DG-66X, CM600DG-66X
 CM350DG-90X, CM450DG-90X
 CM225DG-130X, CM300DG-130X

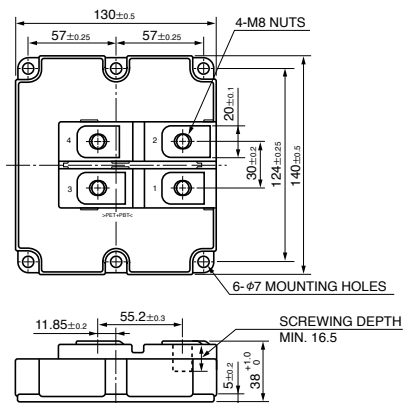


Line-up of HVDIODE Modules

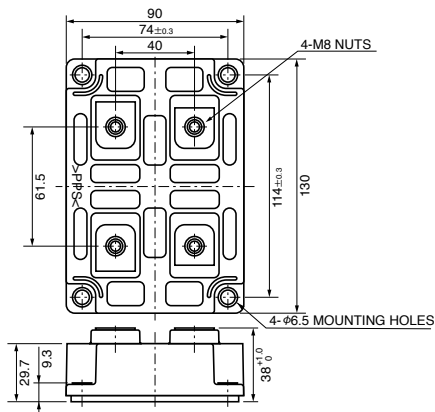
Outline Drawing of HVDIODE Modules

Unit:mm

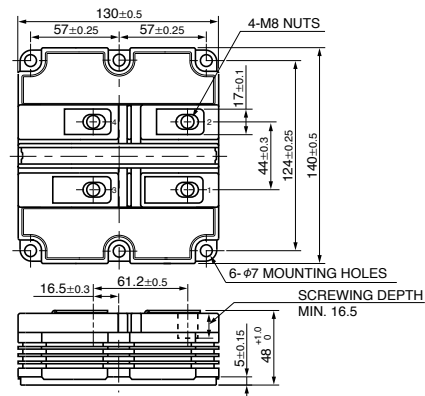
22 RM1200DB-34S RM800DC-34X RM1200DC-34X



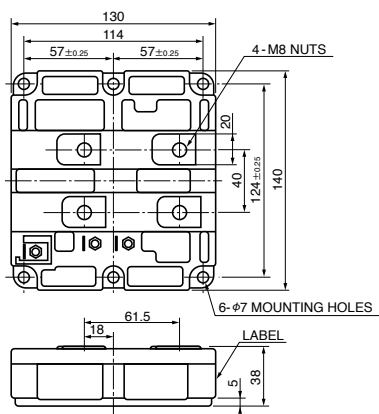
23 RM1800HE-34S RM1200HE-66S RM600HE-90S RM1500HE-66F



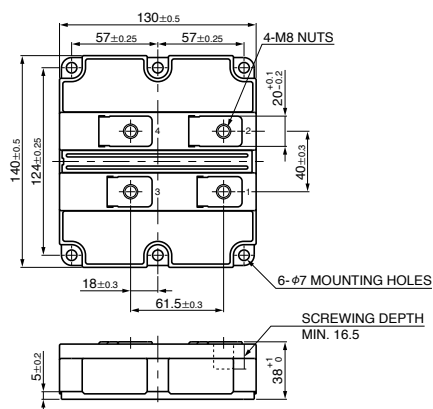
24 RM400/1200DG-66S RM300DG-90S RM200/600DG-130S RM400/800/1200DG-90F RM250DG-130F RM600/900/1200DG-66X RM450/900/1500DG-90X RM300/450/600DG-130X RM1000DG-130XA



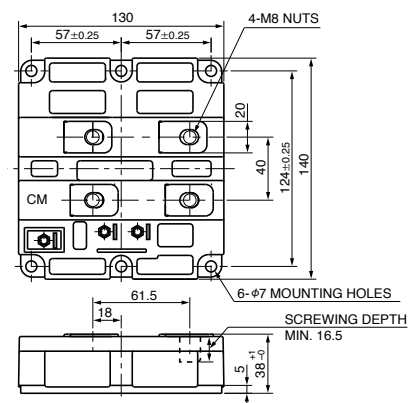
25 RM400,600DY-66S



26 RM1000,1500DC-66F RM600DC-66X RM1200DC-66X RM1500DC-90X



27 RM1200DB-66S RM900DB/HC-90S



Line-up of MOSFET Modules

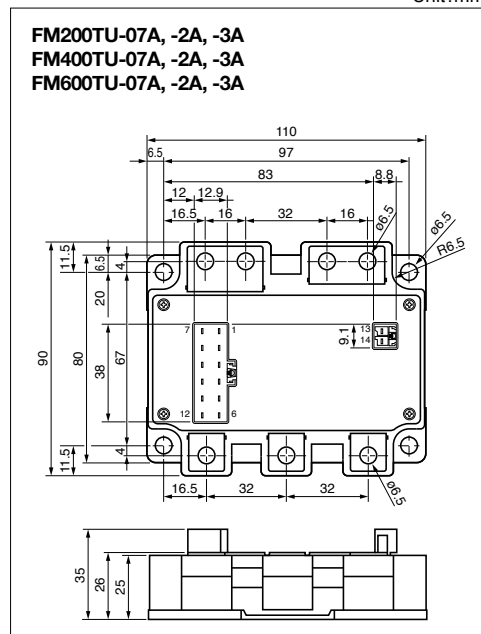
Series Matrix of MOSFET Modules

RoHS directive (2011/65/EU, (EU)2015/863) compliant

V _{SS} Id (A)	75V		100V		150V	
		Connection		Connection		Connection
100	FM200TU-07A	T	FM200TU-2A	T	FM200TU-3A	T
200	FM400TU-07A	T	FM400TU-2A	T	FM400TU-3A	T
300	FM600TU-07A	T	FM600TU-2A	T	FM600TU-3A	T
Connection						

■ Outline Drawing of MOSFET Modules

Unit: mm



Power Modules for Electric and Hybrid Vehicles



New Products

Package with 6-in-1 connection and integrated water-cooled fin contributes to more compact, high-power inverters for EVs/HEVs

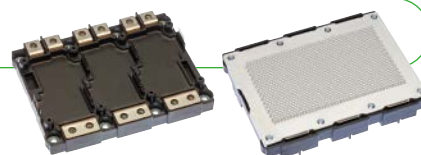
High Power J1 Series Power Modules for EVs/HEVs

CT1000CJ1B060,
CT600CJ1B120

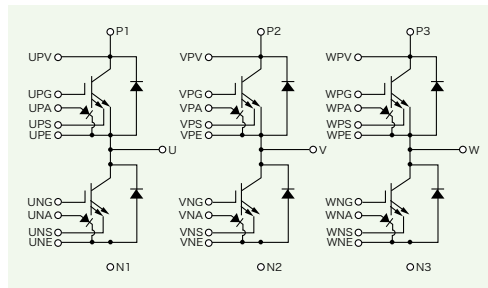
<Main Features>

- Integrated direct water-cooling structure with cooling fins and 6-in-1 connection contribute to more compact inverters for EVs/HEVs
- Direct lead bonding (DLB) structure ensures high reliability
- Loss further reduced by incorporating 7th-generation IGBT built with a CSTBT™* structure
- Completely lead-free, conforms to RoHS directives (2011/65/EU)
- Suitable for a variety of electric and hybrid vehicle inverters

* CSTBT™: Mitsubishi Electric's unique IGBT that utilizes the carrier cumulative effect.



Block Diagram



Features

Common

- Long power/temperature cycle life
- High-precision on-chip temperature sensor
- High traceability in managing materials/components for each product throughout the entire production process

- Package structure compliant with the End-of-Life-Vehicles Directive, regulations relating to substances of environmental concern

J Series T-PM (Transfer-molded Power Module)

- Structure incorporates transfer molding and original direct lead bonding(DLB) technique
- DLB structure reduces internal wiring resistance and inductance
- Completely Pb-free (including the pins)

J1 Series (6-in-1)

- Cooling fin integrated direct water-cooled structure and 6-in-1 configuration contribute to minimize the automobile inverter
- DLB structure realizes high reliability
- Installation of the 7th generation IGBT adapting the CSTBT™* structure realizes a further reduction in loss
- On-chip current sensor that enables high-speed current-cutoff protection is installed

Matrix of 650V Power Modules (No. : Number of outline drawing, please refer to page 30)

V _{CE} (V)	650V					
	J1 Series			J Series		
	Power Module with pin fin	Connection	No.	T-PM	Connection	No.
300	-	-	-	CT300DJG060**	D	02
600	CT600CJ1A060	C	01	-	-	-
700	CT700CJ1A060	C	01	-	-	-
1000	CT1000CJ1B060	C	03	-	-	-
Connection	C D 					

★★: Under Development

Matrix of 1200V Power Modules

(No. : Number of Outline Drawing, please refer to page 30)

V _{CE} (V)	1200V			
	J1 Series			
	Power Module with pin fin	Connection	No.	
300	CT300CJ1A120**	C	01	
600	CT600CJ1B120	C	03	
Connection	C 			

★★: Under Development

Type Name Definition of Power Modules for Electric and Hybrid Vehicles

CT 600 C J1B 120

- Voltage class
- Series name and structure
- Connection type
- Rating current class
- CT: IGBT

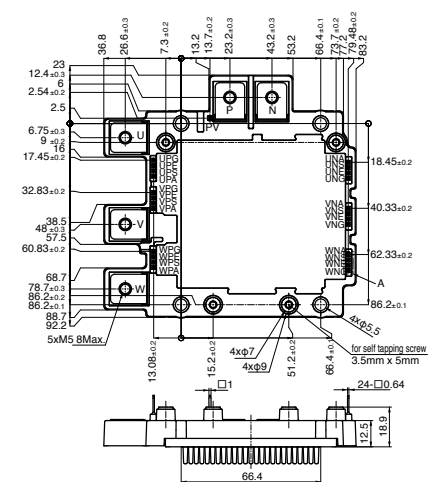
NOTE: In case of CT1000CJ1B060 and CT600CJ1B120, each pair of arms is not connected internally.

■ Outline Drawing of Power Modules for Electric and Hybrid Vehicles

Unit:mm

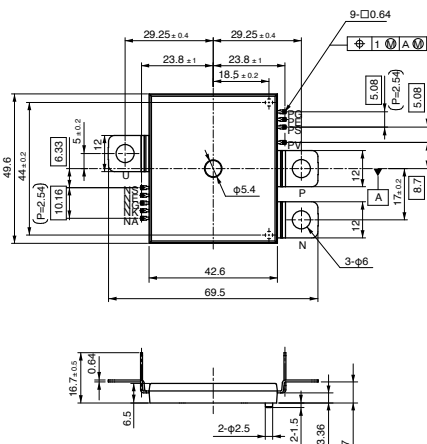
01

CT600CJ1A060
CT700CJ1A060
CT300CJ1A120



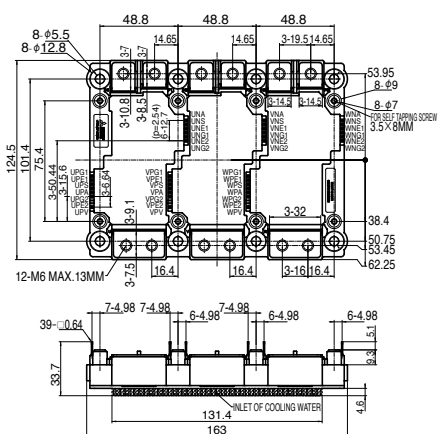
02

CT300DJG060



03

CT1000CJ1B060
CT600CJ1B120



Mitsubishi Electric Semiconductors & Devices Website

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- Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

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for a greener tomorrow

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