



*Changes for the Better*

for a greener tomorrow

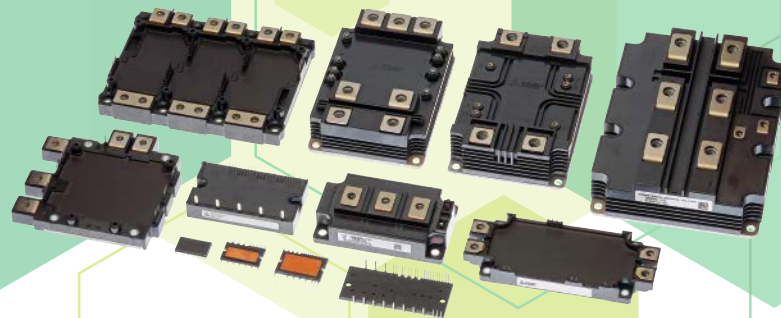
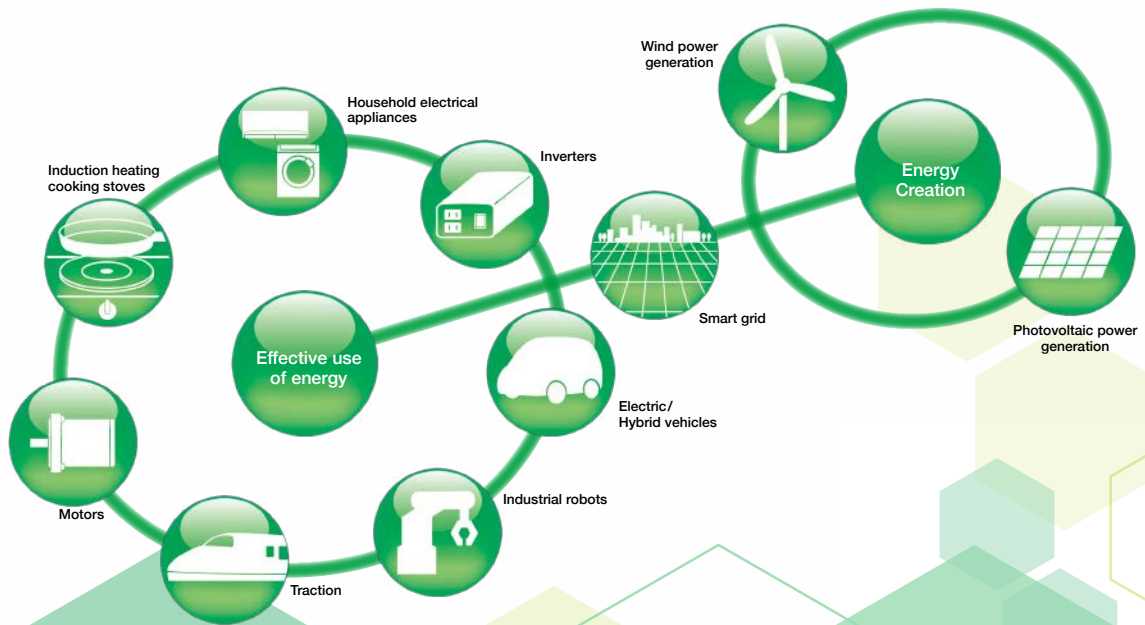


POWER MODULES

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.



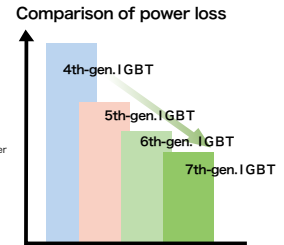
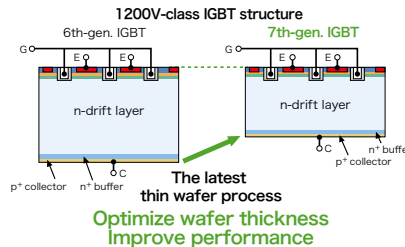


## Focus Technology

### 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 DIIPM™ series, reducing the number of peripheral external parts



### 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)



### 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



### IGBT modules for general-purpose inverters used in various applications

#### Key Features

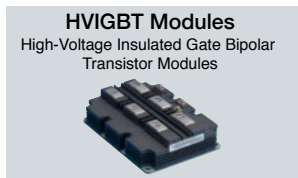
- Various low-inductance packages and power chips available
- Compatible with high-frequency, high-voltage (1,700V) applications
- Large-capacity modules available for renewable energy systems



### 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

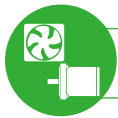


### Modules realizing high performance and reliability for propulsion inverters in HVs/EVs

#### 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





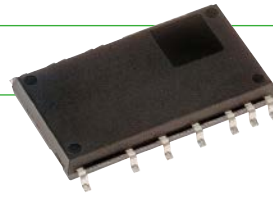
## New Products

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-IGBT<sup>1</sup> 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 Reverse-conducting IGBT

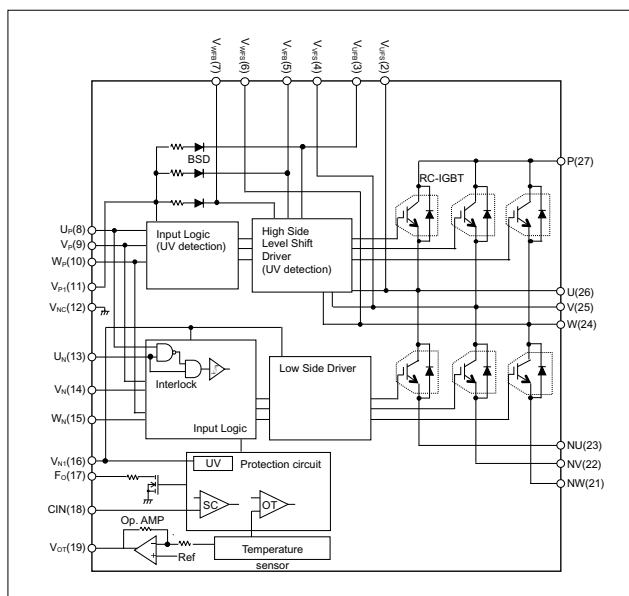
### MISOP™

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				

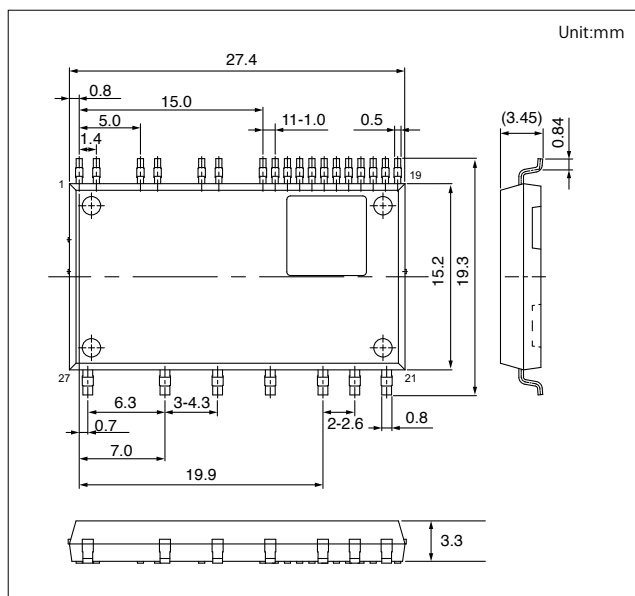
[Term] UV : Power supply Under Voltage protection  
 SC : Short Circuit protection  
 OT : Over Temperature protection  
 VoT : Analog Temperature Output  
 IL : Inter Lock

\*\* : Under development

### Schematic drawing



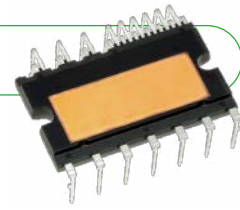
### Outline Drawing





## Featured Products

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



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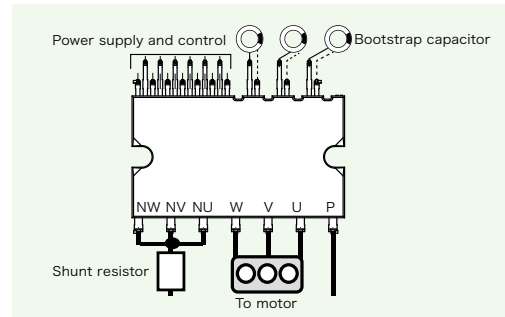
### SLIMDIP™

SLIMDIP-S, SLIMDIP-L

#### <Main Features>

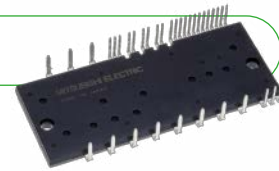
- RC-IGBT<sup>\*1</sup> incorporated, reducing package size 30% compared to Super-mini DIIPM
- Maximum case temperature increased from 100°C to 115°C, increasing the operating temperature range and leading to easier system design
- Additional terminals for floating supply and built-in bootstrap diodes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

- \*1 Reverse conducting IGBT
- \*2 Analog Temperature Output
- \*3 Over Temperature protection



## Featured Products

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



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### DIIPM+™

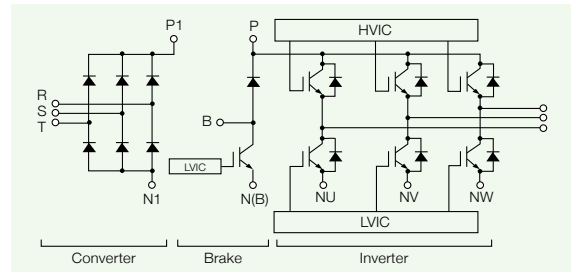
PSS05MC1FT, PSS10MC1FT, PSS15MC1FT,  
PSS25MC1FT, PSS35MC1FT, PSS50MC1F6

#### <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<sup>\*1</sup> 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

#### Internal circuit diagram

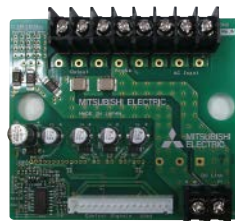


## Customer Support

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™

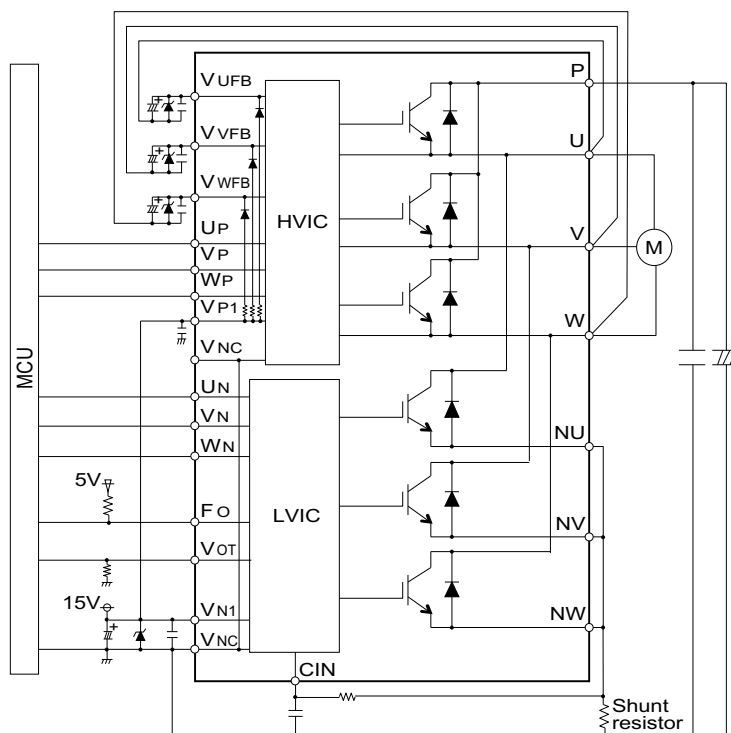
## Series Matrix of 600V / 500V DIIPM™

V <sub>CEs</sub> (V)		600V					500V
I <sub>c</sub> (A)	Series	SLIMDIP	Super mini	Mini	Large	DIIPM+	Super mini
			Ver.6		Ver.4	CIB/CI	MOSFET
3	SLIMDIP-S						PSM03S93E5-A
5			PSS05S92F6-AG PSS05S92E6-AG	PSS05S51F6			PSM05S93E5-A
10	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
Protective Function	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 <sub>OT</sub>	N-side	N-side*1	N-side	N-side	N-side	—
Specifications	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
	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<sub>OT</sub> 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<sub>OT</sub>: 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™

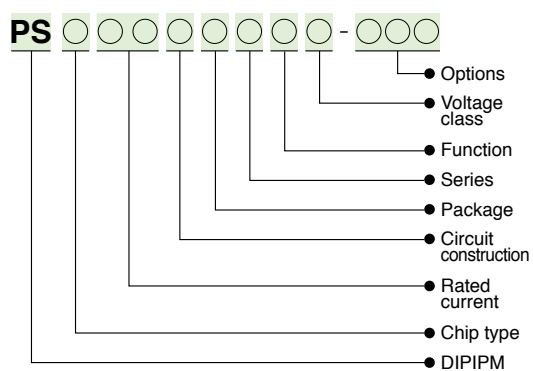
V <sub>ces</sub> (V)		1200V			
I <sub>c</sub> (A)	Series	Mini	Large		DIIPM+
			Ver.6	Ver.4	CIB/CI
5	PSS05S72FT	PSS05SA2FT	PS22A72		PSS05MC1FT PSS05NC1FT*1
10	PSS10S72FT	PSS10SA2FT	PS22A73		PSS10MC1FT PSS10NC1FT*1
15		PSS15SA2FT	PS22A74		PSS15MC1FT PSS15NC1FT*1
25		PSS25SA2FT	PS22A76		PSS25MC1FT PSS25NC1FT*1
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 <sub>OT</sub>	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<sub>OT</sub>: 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™

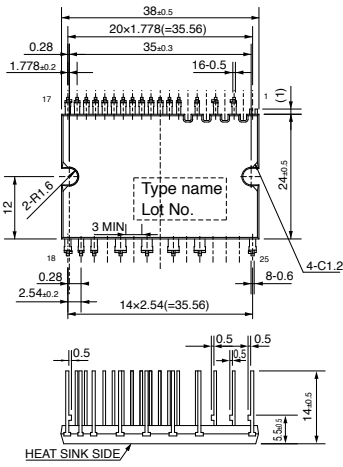


# Line-up of DIIPM™

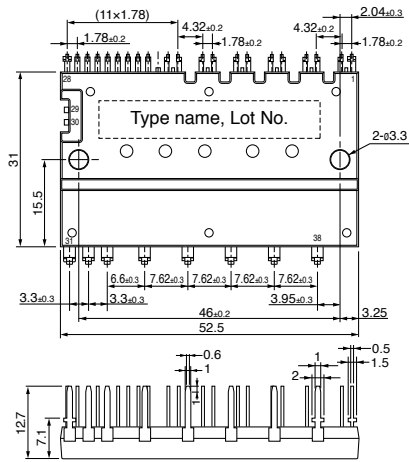
## Outline Drawing of DIIPM™

Unit:mm

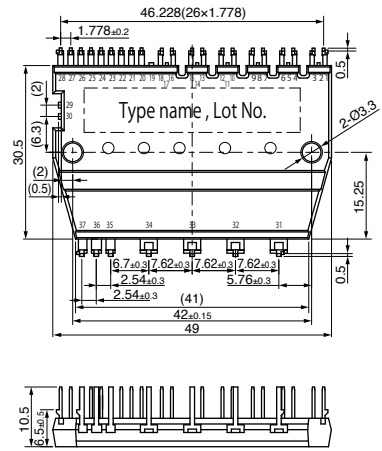
### Super mini DIIPM Ver.6 MOSFET Super mini DIIPM Long



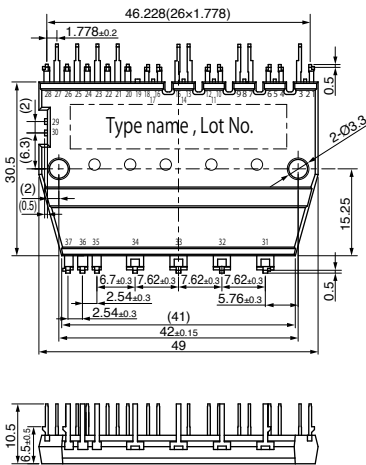
### Mini DIIPM (PSSxxS71F6) 1200V Mini DIIPM



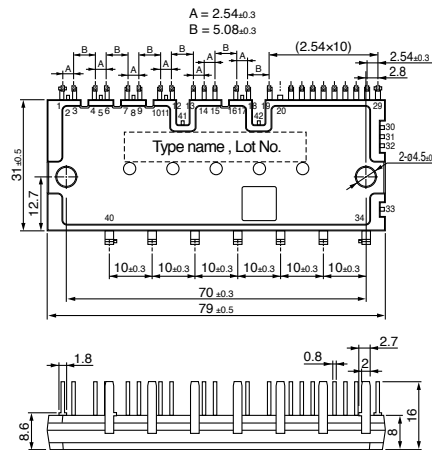
### Mini DIIPM (PSSxxS51F6)



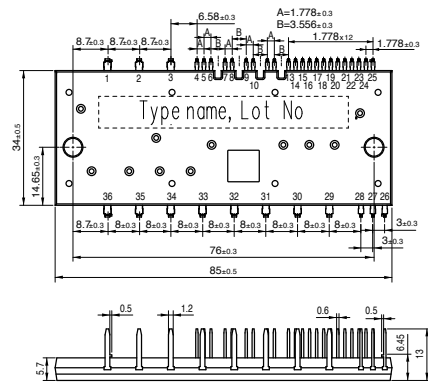
### Mini DIIPM(PSSxxS51F6) Zigzag



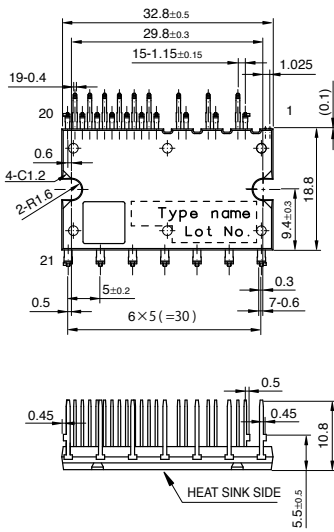
### Large DIIPM



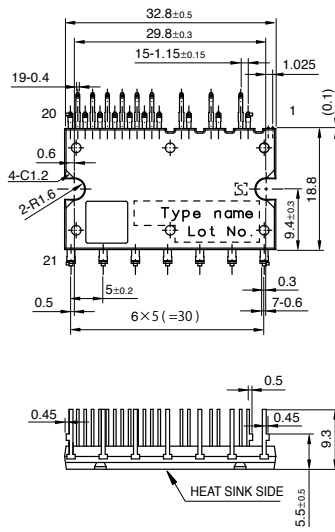
### DIIPM+



### SLIMDIP Normal



### SLIMDIP Short

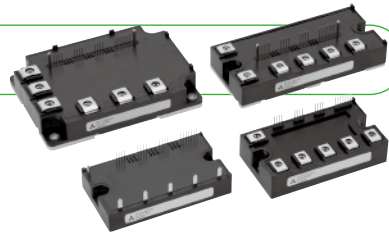






## Featured Products

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™<sup>1</sup> and a diode incorporating a RFC<sup>2</sup> 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,<sup>3</sup> 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

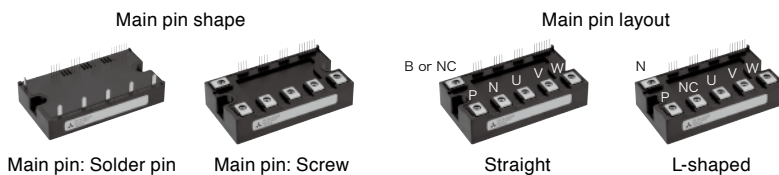
\*2 RFC: Relaxed field cathode

\*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



#### Lineup

V <sub>CE</sub> (V)	Package	Main pin shape	Main pin layout	I <sub>c</sub> (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)

V <sub>CE</sub> (V)	650V						600V									
	Series	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	C	01	PM50CS1D060	C	05	PM50B4LA060	B4	01	PM50CLA060	C		
	PM50RG1A065	R	12							PM50B5LA060	B5	01				
	PM50CG1B065	C	10							PM50B6LA060	B6	01			PM50CLB060	C
	PM50RG1B065	R	10							PM50B4LB060	B4	02			PM50RLA060	R
	PM50CG1AL065	C	12							PM50B5LB060	B5	02			PM50RLB060	R
	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	C	01	PM75CS1D060	C	05	PM75B4LA060	B4	01	PM75CLA060	C		
	PM75RG1A065	R	12							PM75B5LA060	B5	01				
	PM75CG1B065	C	10							PM75B6LA060	B6	01			PM75CLB060	C
	PM75RG1B065	R	10							PM75B4LB060	B4	02			PM75RLA060	R
	PM75CG1AL065	C	12							PM75B5LB060	B5	02			PM75RLB060	R
	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	C	01	PM100CS1D060	C	05				PM100CLA060	C		
	PM100CG1B065	C	10							PM100CL1B060	C	02				
	PM100RG1B065	R	10							PM100RL1A060	R	01			PM100RLA060	R
	PM100CG1AL065	C	12							PM100RL1B060	R	02				
	PM100CG1AP065	C	09													
PM100CG1APL065	C	09														
150	PM150CG1B065	C	10	PM150CL1A060	C	01	PM150CS1D060	C	05				PM150CLA060	C		
	PM150RG1B065	R	10	PM150CL1B060	C	02				PM150RLA060	R					
				PM150RL1A060	R	01										
			PM150RL1B060	R	02											
200	PM200CG1B065	C	10	PM200CL1A060	C	04	PM200CS1D060	C	05				PM200CLA060	C		
	PM200RG1B065	R	10							PM200RL1A060	R	04			PM200RLA060	R
	PM200CG1C065	C	11													
	PM200RG1C065	R	11													
300	PM300CG1C065	C	11	PM300CL1A060	C	04							PM300CLA060	C		
	PM300RG1C065	R	11	PM300RL1A060	R	04							PM300RLA060	R		
400/450	PM450CG1C065	C	11							PM400DV1A060	D	06		PM450CLA060	C	08
	PM450RG1C065	R	11													
600										PM600DV1A060	D	06		PM600CLA060	C	08
800										PM800DV1B060	D	07				
IGBT chip	CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*2			
	Emitter sensor installed Temperature sensor installed		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor			
Fault output	UV	P-side/N-side		P-side/N-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				
	SC	P-side/N-side		P-side/N-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 <sub>CE</sub> (V)		1200V														
Series	G1 Series			L1 Series			S1 Series			V1 Series			L Series			
	I <sub>C</sub> (A)	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.			
25	PM25CG1A120	C	12													
	PM25CG1B120	C	10													
	PM25RG1A120	R	12	PM25CL1A120	C	01						PM25CLA120	C			
	PM25RG1B120	R	10	PM25CL1B120	C	02						PM25CLB120	C			
	PM25CG1AL120	C	12	PM25RL1A120	R	01	PM25CS1D120	C	05			PM25RLA120	R			
	PM25CG1AP120	C	09	PM25RL1B120	R	02						PM25RLB120	R			
	PM25CG1APL120	C	09	PM25RL1C120	R	03										
	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													
	PM50CG1B120	C	10	PM50CL1A120	C	01						PM50CLA120	C			
	PM50RG1B120	R	10	PM50CL1B120	C	02						PM50CLB120	C			
	PM50CG1AL120	C	12	PM50RL1A120	R	01	PM50CS1D120	C	05			PM50RLA120	R			
	PM50CG1AP120	C	09	PM50RL1B120	R	02						PM50RLB120	R			
	PM50CG1APL120	C	09													
75	PM75CG1B120	C	10	PM75CL1A120	C	01						PM75CLA120	C			
	PM75RG1B120	R	10	PM75CL1B120	C	02						PM75CLB120	C			
				PM75RL1A120	R	01	PM75CS1D120	C	05			PM75RLA120	R			
				PM75RL1B120	R	02						PM75RLB120	R			
100	PM100CG1B120	C	10													
	PM100CG1C120	C	11	PM100CL1A120	C	04						PM100CLA120	C			
	PM100RG1B120	R	10	PM100RL1A120	R	04	PM100CS1D120	C	05			PM100RLA120	R			
	PM100RG1C120	R	11													
150	PM150CG1C120	C	11	PM150CL1A120	C	04						PM150CLA120	C			
	PM150RG1C120	R	11	PM150RL1A120	R	04						PM150RLA120	R			
200	PM200CG1C120	C	11							PM200DV1A120	D	06	PM200CLA120	C	08	
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			
Fault output	UV	P-side/N-side			P-side/N-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		
	SC	P-side/N-side			P-side/N-side			N-side			P-side/N-side			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																

Not recommended : Please contact to the sales offices.

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

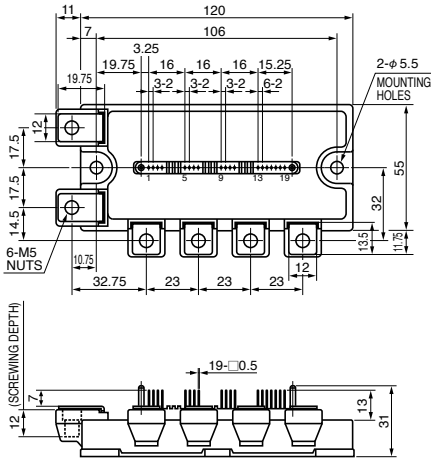
[Term] UV: Power supply Under Voltage protection  
 SC: Short Circuit protection  
 OT: Over Temperature protection  
 OC: Over current protection  
 RoHS : the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

# Line-up of IPM

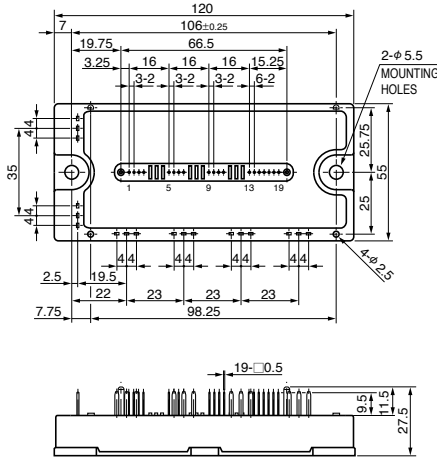
## Outline Drawing of IPM

Unit:mm

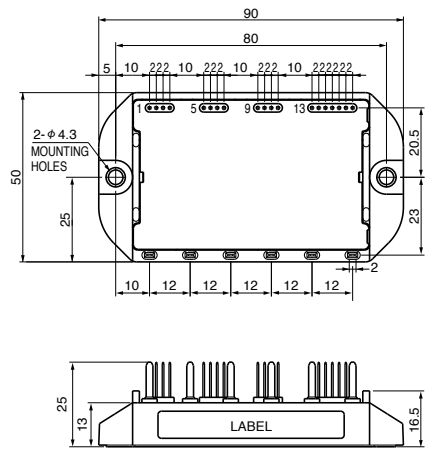
**01** PM50,75,100,150CL1A/RL1A060  
PM25,50,75CL1A/RL1A120  
PM50,75B4/B5/B6LA060



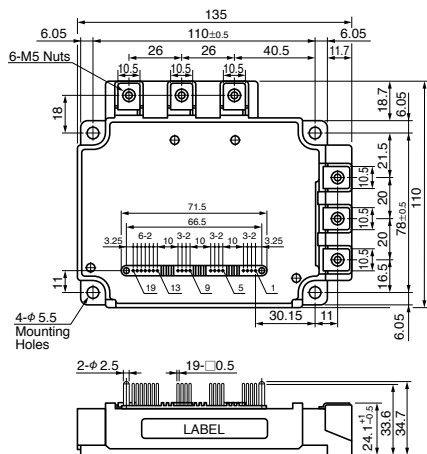
**02** PM50,75,100,150CL1B/RL1B060  
PM25,50,75CL1B/RL1B120  
PM50,75B4/B5/B6LB060



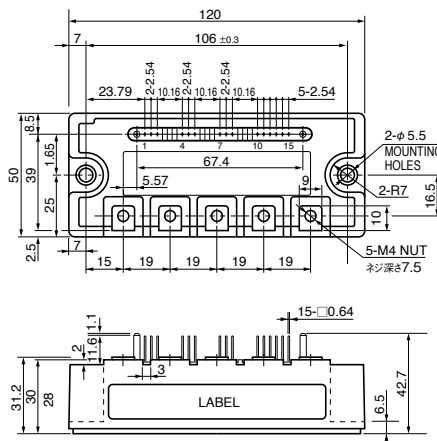
**03** PM50RL1C060  
PM25RL1C120  
PM50,75,B4/B5/B6L1C060



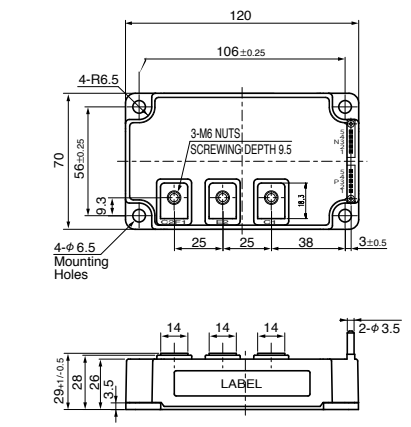
**04** PM200,300CL1A/RL1A060  
PM100,150CL1A/RL1A120



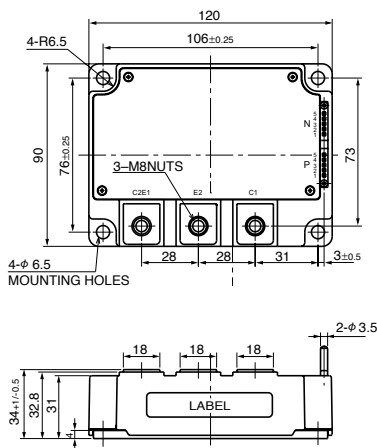
**05** PM50,75,100,150,200CS1D060  
PM25,50,75,100CS1D120



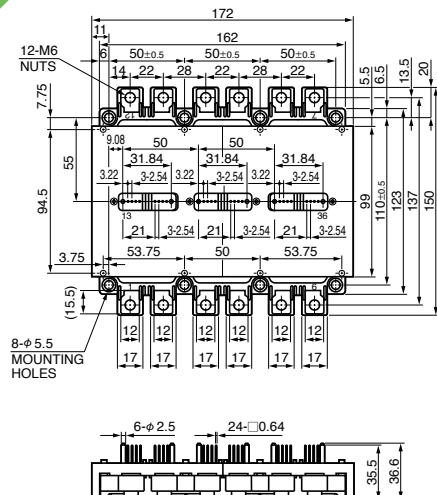
**06** PM400,600DV1A060  
PM200,300,450DV1A120



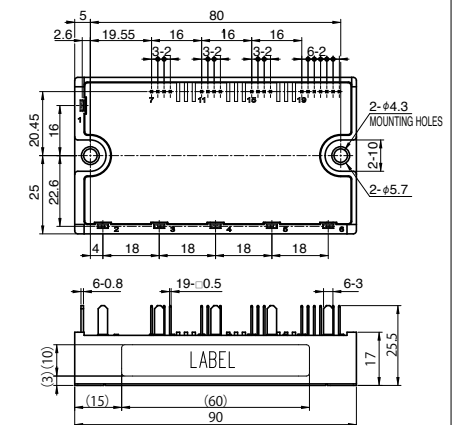
**07** PM800DV1B060



**08** PM450,600CLA060  
PM200,300,450CLA120



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

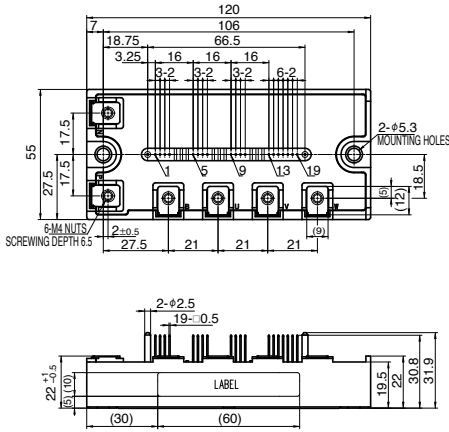


■ Outline Drawing of IPM

Unit:mm

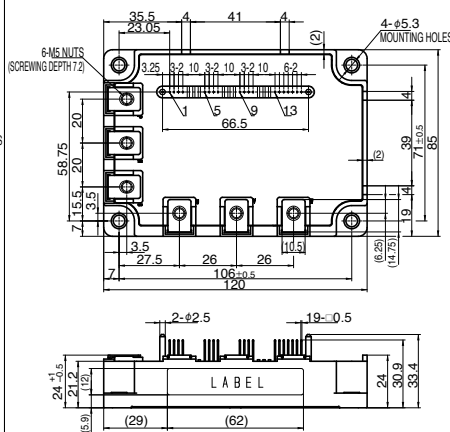
10

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



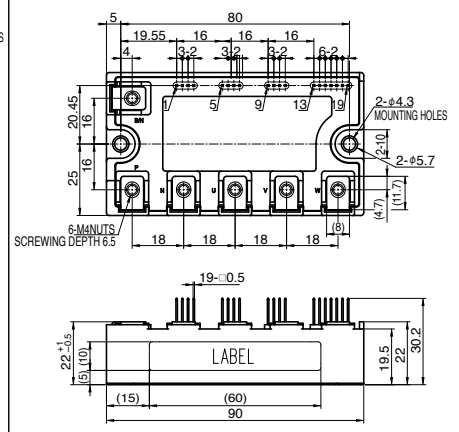
11

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



12

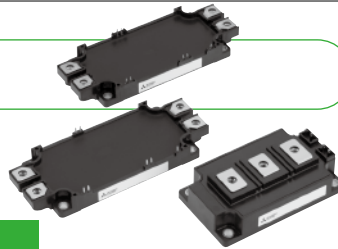
PM50,75,100CG1A/CG1AL065  
PM50,75RG1AP065  
PM25,35,50CG1A/CG1AL120  
PM25,35RG1A120





## Featured Products

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



Data sheet here



NX type



std type

### IGBT Module T/T1-Series

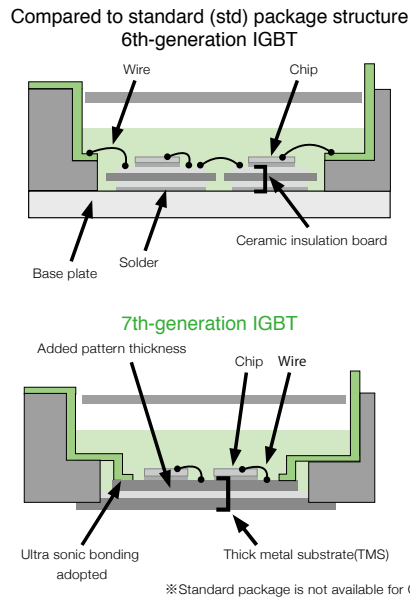
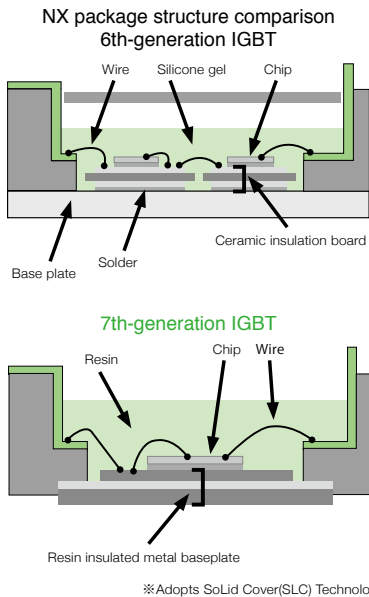
<Main Features>

- 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™<sup>2</sup> 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-TIM<sup>1</sup> 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

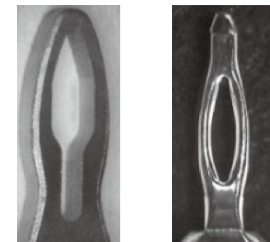
### New structure realizes improved reliability (improved thermal cycle lifetime)



### Press-fit terminal support (NX)

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

#### Press-fit pin



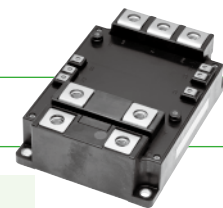
① Main pin

② Signal 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)

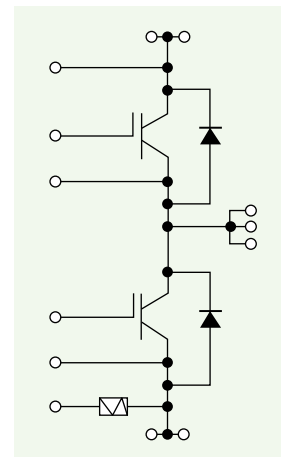
IGBT module 2in1 type

■ 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



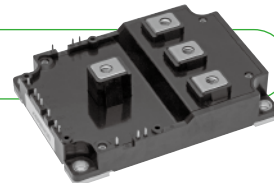


# Featured Products

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%<sup>\*1</sup>
- New package developed<sup>\*2</sup> contributing to lower inductance and simplified inverter circuit structure
- IGBT specifications optimized<sup>\*3</sup> with development of new compact, low-inductance package
- 4-in-1<sup>\*4</sup> and 1-in-1/2-in-1<sup>\*5</sup> 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.

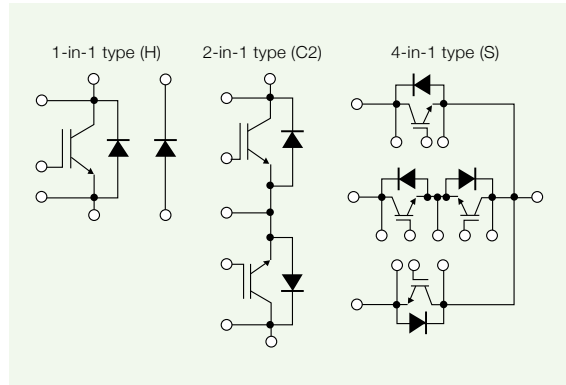
\*2 1-in-1/2-in-1 type external dimensions of 130x67mm, 4-in-1 type external dimensions of 115x82mm, new package developed with innovative terminal positioning.

\*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.

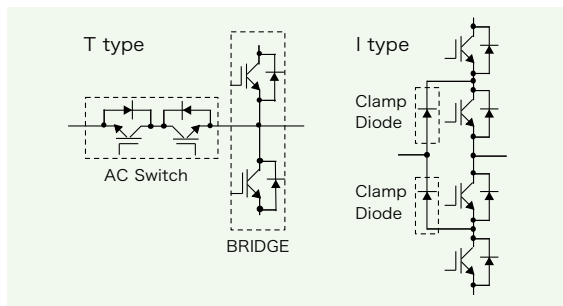
### Internal circuit diagram



### 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	115x82	
		BRIDGE	CM450DY-24T			450A	2in1		
		AC Switch	CM450C1Y-24T			600A			
		BRIDGE	CM600DY-24T						
	250kW~	AC Switch	CM500C2Y-24S		1200V	500A	2in1	130x67	
		BRIDGE	CM600HA-34S		1700V	600A	1in1		
		BRIDGE	CM800HA-34S			800A			
		BRIDGE	CM1000HA-34S			1000A			
		BRIDGE	CM400DY-34T			400A			
		AC Switch	CM450C1Y-24T		1700V	400A	2in1		108x62
		BRIDGE	CM300DY-34T		1200V	450A			
		AC Switch	CM600C1Y-24T		1700V	300A			
					1200V	600A			
		I type	500kW~		-	CM1400HA-24S	Diode		1200V
Clamp Diode	RM1400HA-24S			600A	2in1	108x62			
Clamp Diode	RM600DY-34S			1700V				800A	
Clamp Diode	RM800DY-34S								

### Typical circuit of 3level inverter



### 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

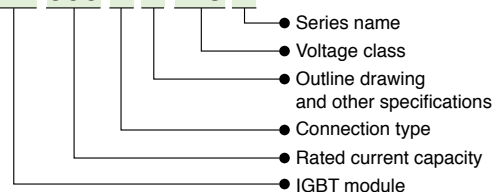
#### NFH Series

- 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.

### Type Name Definition of IGBT Modules

#### CM 600 D Y -13 T



# 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 <sub>CEs</sub> (V)	650V						600V													
	T/T1-Series NX Type		Connection	No.	T-Series std Type		Connection	No.	A-Series NX Type		Connection	No.	NF-Series		Connection	No.	NF-Series NFH Type		Connection	No.
50	CM50MXUB-13T*	M			42															
	CM50MXUB-13T1*	M	42																	
	CM50MXUBP-13T*	M	46																	
	CM50MXUBP-13T1*	M	46																	
75	CM75MXUB-13T*	M	42					CM75MX-12A	M	01			CM75TL-12NF	T	07					
	CM75MXUB-13T1*	M	42										CM75RL-12NF	R	07					
	CM75MXUBP-13T*	M	46																	
	CM75MXUBP-13T1*	M	46																	
100	CM100TX-13T	T	33																	
	CM100TXP-13T	T	37																	
	CM100MXUB-13T*	M	42																	
	CM100MXUB-13T1*	M	42																	
	CM100MXUBP-13T*	M	46																	
	CM100MXUBP-13T1*	M	46																	
	CM100MXUD-13T*	M	44																	
	CM100MXUD-13T1*	M	44																	
	CM100MXUDP-13T*	M	48																	
	CM100MXUDP-13T1*	M	48																	
150	CM150TX-13T	T	33																	
	CM150TXP-13T	T	37																	
	CM150RX-13T	R	34																	
	CM150RXP-13T	R	38																	
	CM150MXUD-13T*	M	44																	
	CM150MXUD-13T1*	M	44																	
	CM150MXUDP-13T*	M	48																	
	CM150MXUDP-13T1*	M	48																	
200	CM200TX-13T	T	33																	
	CM200TXP-13T	T	37																	
	CM200RX-13T	R	34																	
	CM200RXP-13T	R	38																	
225																				
300	CM300DX-13T	D	28																	
	CM300DXP-13T	D	39																	
400																				
450	CM450DX-13T	D	28																	
	CM450DXP-13T	D	39																	
600	CM600DX-13T	D	28																	
	CM600DXP-13T	D	39																	
1000																				
Connection																				

★: 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 <sub>CEs</sub> /V <sub>VRM</sub>	1200 V IGBT Module			1700 V IGBT Module			1200 V Diode Module			1700 V Diode Module					
	T/S/S1-Series std Type		Connection	No.	S/S1-Series std Type		Connection	No.	S/S1-Series std Type		Connection	No.	S/S1-Series std Type		Connection
400	CM400ST-24S1	S			35										
	CM400C1Y-24S	C1	11												
450	CM450C1Y-24T*	C1	32												
500	CM500C2Y-24S	C2	36												
600	CM600C1Y-24T	C1	32										RM600DY-34S	D	32
800													RM800DY-34S	D	32
1000															
1400	CM1400HA-24S	H	36										RM1400HA-24S*	H	36
Connection															

\*Connection of diode module and IGBT module are different.

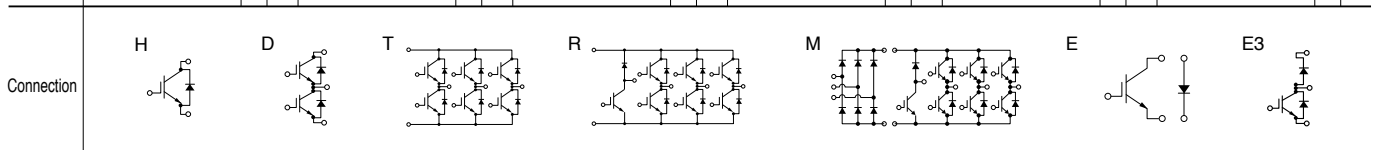
★: New Product



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 <sub>CEs</sub> (V)		1200V																									
Series	T/T1-Series NX Type	Connection			T-Series std Type	Connection			S/S1-Series NX Type	Connection			S/S1-Series std Type	Connection			S/S1-Series MPD Type	Connection			A-Series* <sup>1</sup> NF-Series* <sup>1</sup>	Connection					
		No.	No.	No.		No.	No.	No.		No.	No.	No.		No.	No.	No.		No.	No.	No.		No.	No.	No.			
35	CM35MXUA-24T*	M		41					CM35MXA-24S	M	04																
	CM35MXUA-24T1*	M		41																							
	CM35MXUAP-24T*	M		45																							
	CM35MXUAP-24T1*	M		45																							
50	CM50MXUA-24T*	M		41					CM50MXA-24S	M	04												CM50RL-24NF	R	07		
	CM50MXUA-24T1*	M		41																							
	CM50MXUAP-24T*	M		45																							
	CM50MXUAP-24T1*	M		45																							
75	CM75MXUB-24T*	M		42					CM75MXA-24S	M	04												CM75RL-24NF	R	07		
	CM75MXUB-24T1*	M		42																							
	CM75MXUBP-24T*	M		46																							
	CM75MXUBP-24T1*	M		46																							
	CM75MXUC-24T*	M		43																							
	CM75MXUC-24T1*	M		43																							
	CM75MXUCP-24T*	M		47																							
	CM75MXUCP-24T1*	M		47																							
100	CM100TX-24T	T		33	CM100DY-24T	D	30		CM100MXA-24S	M	04												CM100DY-24A	D	08		
	CM100TX-24T1*	T		37																							
	CM100RX-24T	R		34																							
	CM100RX-24T1*	R		38																							
	CM100MXUC-24T*	M		43																							
	CM100MXUC-24T1*	M		43																							
	CM100MXUCP-24T*	M		47																							
	CM100MXUCP-24T1*	M		47																							
	CM100TX-24S1	T		25																							
	CM100RX-24S1	R		26																							
150	CM150TX-24T	T		33	CM150DY-24T	D	30		CM150DX-24S	D	03												CM150DY-24A	D	08		
	CM150TX-24T1*	T		37																							
	CM150RX-24T	R		34																							
	CM150RX-24T1*	R		38																							
	CM150MXUD-24T*	M		44																							
	CM150MXUD-24T1*	M		44																							
	CM150MXUDP-24T*	M		48																							
	CM150MXUDP-24T1*	M		48																							
	CM150DX-24S1	D		27																							
	CM150EXS-24S	E		24																							
CM150TX-24S1	T		25																								
CM150RX-24S1	R		26																								
200	CM200TX-24T	T		33	CM200DY-24T	D	31		CM200EXS-24S	E	24											CM200DY-24A	D	08			
	CM200TX-24T1*	T		37																							
225	CM225DX-24T	D		28					CM225DX-24S1	D	27																
	CM225DXP-24T	D		39																							
300	CM300DX-24T	D		28	CM300DY-24T	D	31		CM300DX-24S1	D	27	CM300DY-24S	D	10									CM300DY-24A	D	10		
	CM300DX-24T1*	D		39																							
	CM300DXP-24T	D		39																							
400																						CM400DY-24A	D	11			
450	CM450DX-24T	D		28	CM450DY-24T	D	32		CM450DX-24S1	D	27	CM450DY-24S	D	11													
	CM450DXP-24T	D		39																							
600	CM600DX-24T	D		28	CM600DY-24T	D	32		CM600DX-24S1	D	27	CM600DY-24S	D	11									CM600DY-24A	D	11		
	CM600DX-24T1*	D		39																							
	CM600DXP-24T	D		39																							
	CM600DXL-24S	D		6																							
800	CM800DX-24T1*	D		28								CM800DY-24S	D	12													
	CM800DXP-24T1*	D		39																							
900																									CM900DUC-24S	D	17
1000	CM1000DX-24T	D		29					CM1000DXL-24S	D	06																
	CM1000DXP-24T	D		40																							
1400												CM1400HA-24S	H	36	CM1400DUC-24S	D	17										



\*1: A-Series have model name ending with A, NF-Series have model name ending with NF/NFH

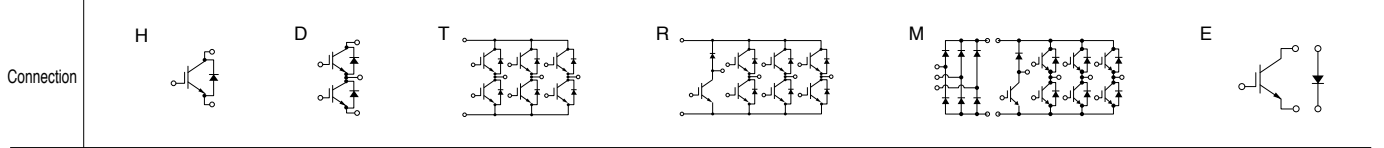
★: New Product

# Line-up of IGBT Modules

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

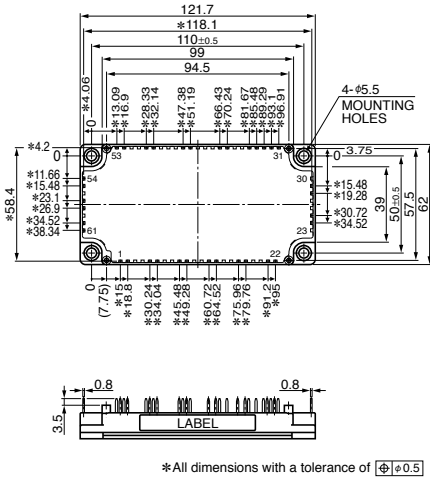
RoHS directive (2011/65/EU, (EU)2015/863) compliant

V <sub>CE</sub> (V)		1700V																				
Series	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			
	I <sub>c</sub>	Connection	No.	Connection	No.	Connection	No.	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* CM100XP-34T*	T T	33 37		CM100DY-34T*	D	30										CM100DY-34A	D	08
150				CM150TX-34T* CM150XP-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 CM200XS-34SA	D E	20 24							CM200DY-34A	D	10
225				CM225DX-34T* CM225XP-34T*	D D	28 39																
300				CM300DX-34T* CM300XP-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* CM450XP-34T*	D D	28 39					CM450DXL-34SA	D	22									
500																				CM500HA-34A	H	16
600				CM600DX-34T* CM600XP-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	-																			

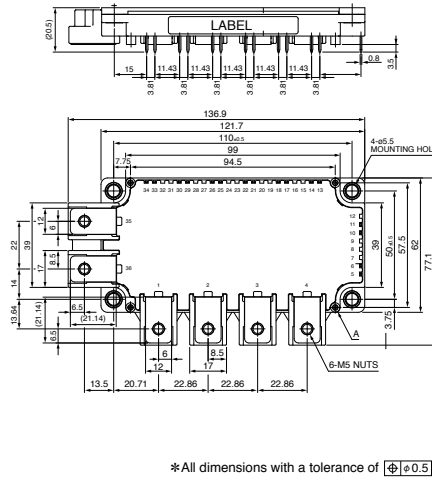


★★: Under Development ★: New Product

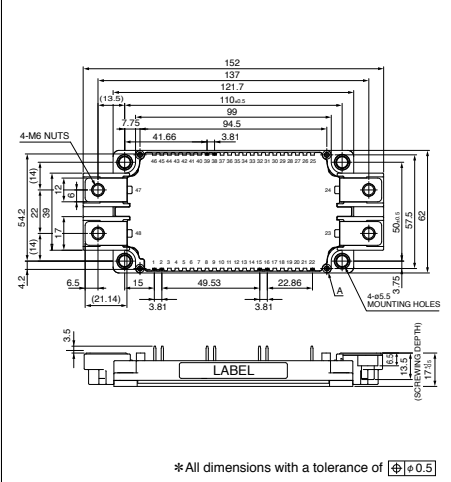
**01** CM75,100MX-12A



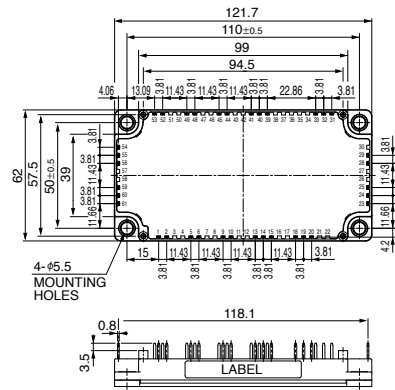
**02** CM100,150,200RX-12A  
CM75RX-24S



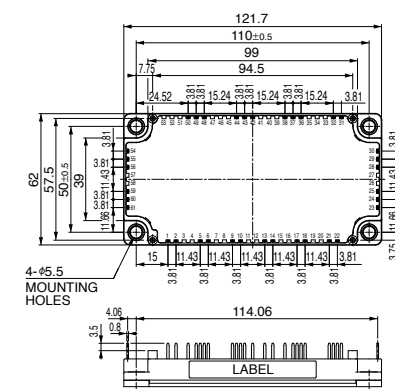
**03** CM300,400DX-12A  
CM150,200DX-24S



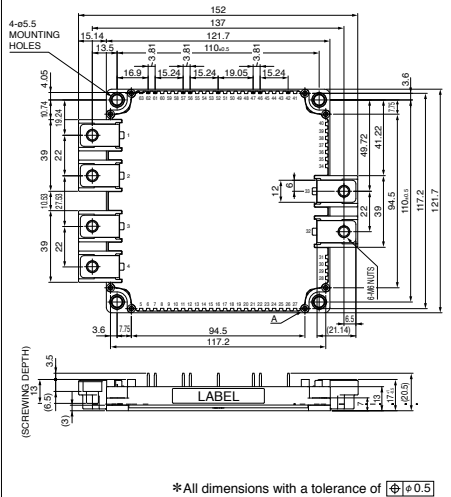
**04** CM35,50,75,100MXA-24S



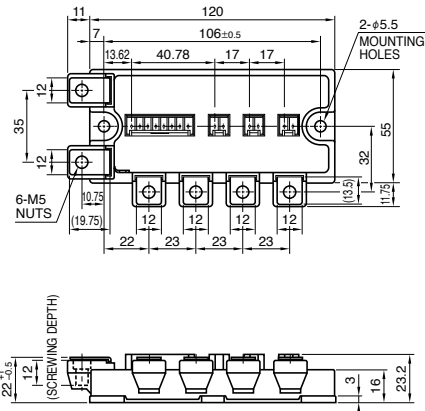
**05** CM75TX-24S



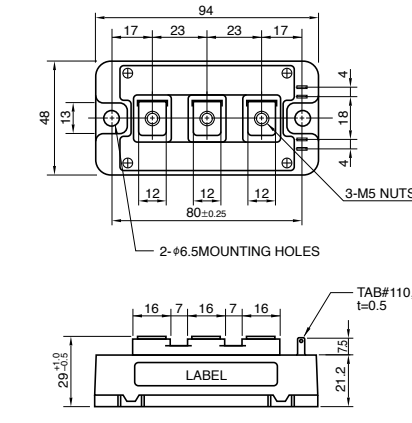
**06** CM600,1000DXL-24S



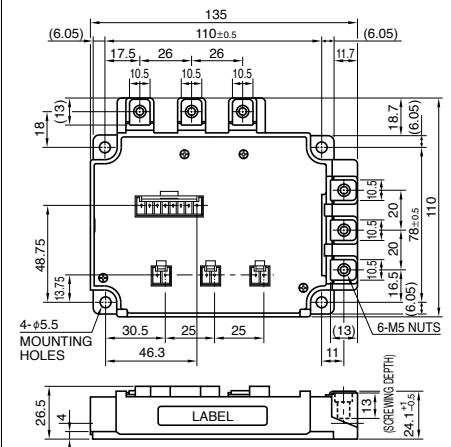
**07** CM75,100,150TL/RL-12NF  
CM50,75,100TL/RL-24NF



**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



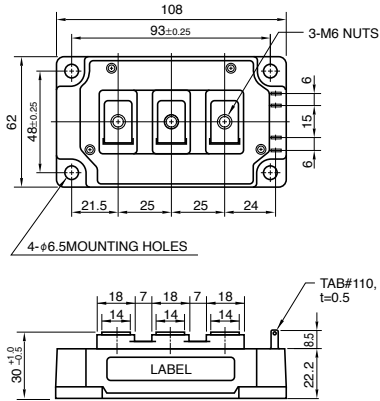
# Line-up of IGBT Modules

## Outline Drawing of IGBT Modules

Unit:mm

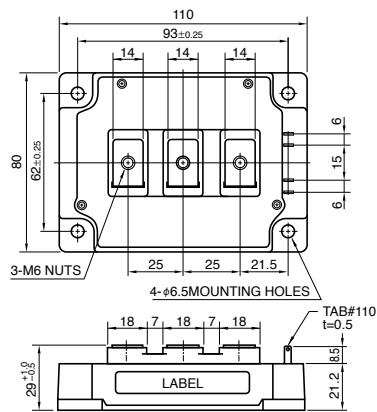
10

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



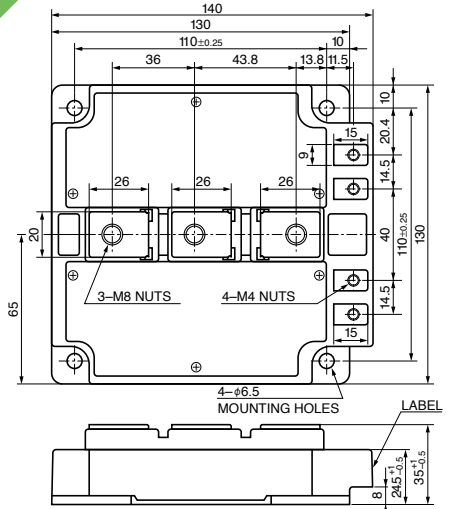
11

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



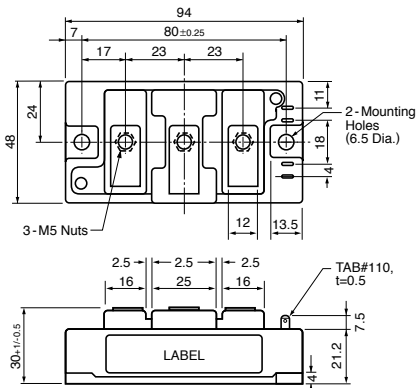
12

CM600DU-24NF  
CM800DY-24S



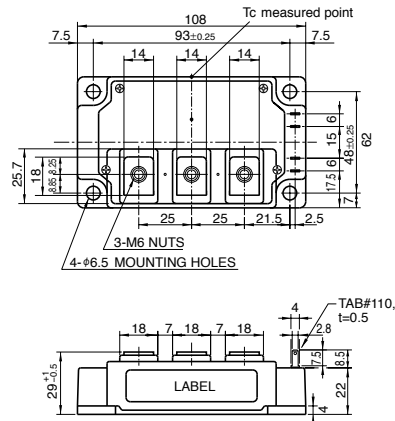
13

CM200DU-12NFH  
CM100,150DU-24NFH



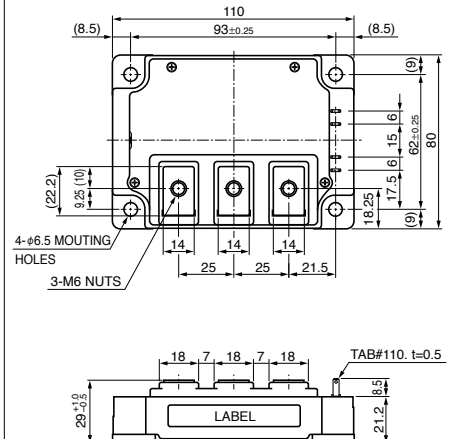
14

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



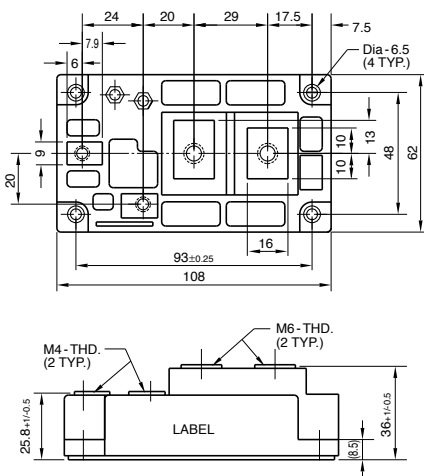
15

CM600DU-12NFH  
CM400,600DU-24NFH



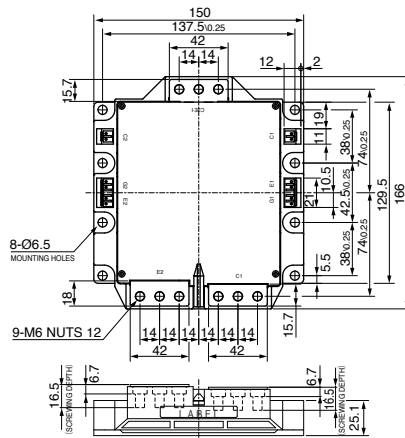
16

CM400,600HA-24A  
CM500HA-34A



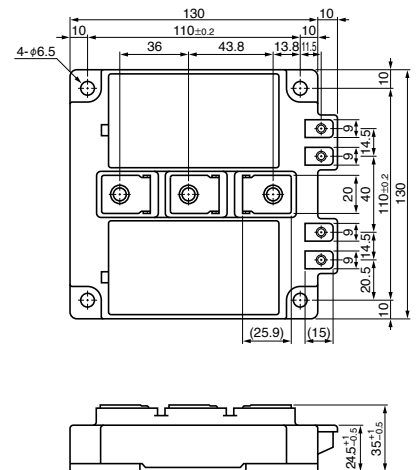
17

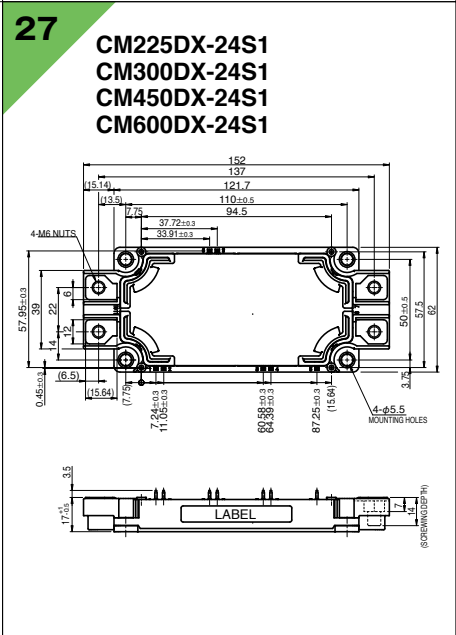
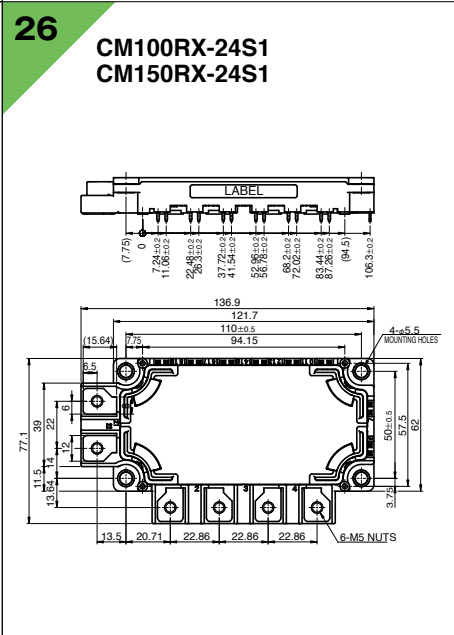
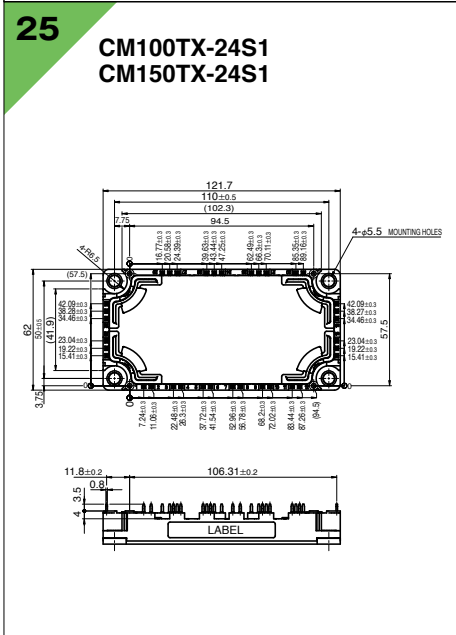
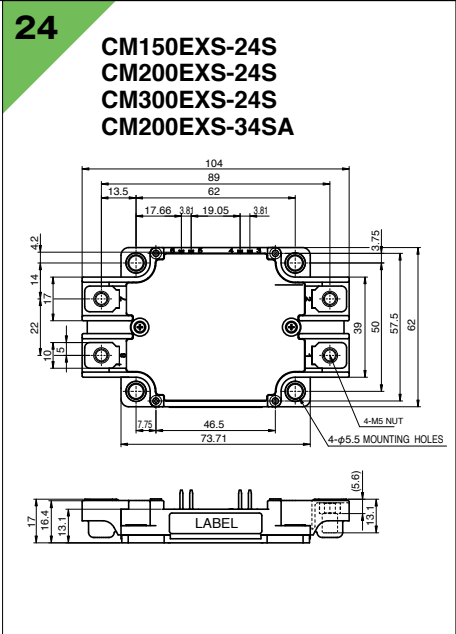
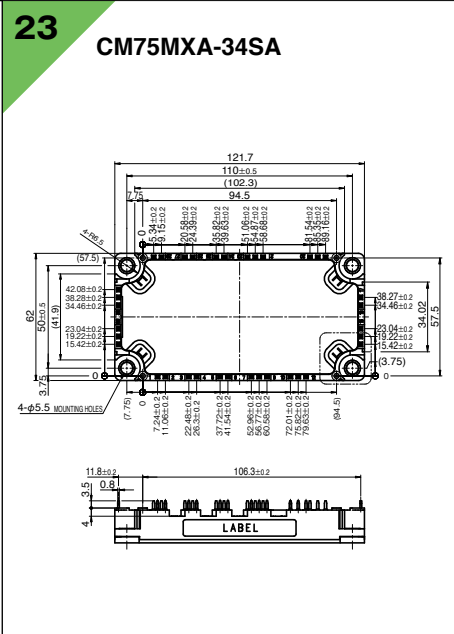
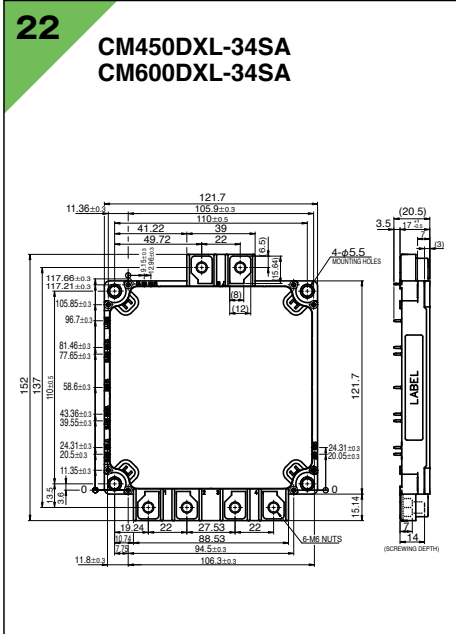
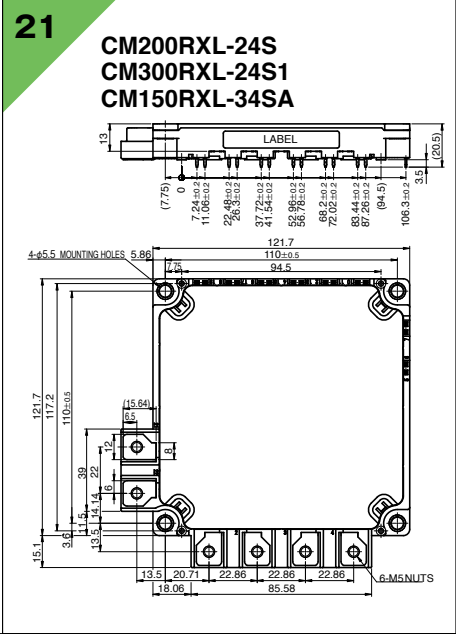
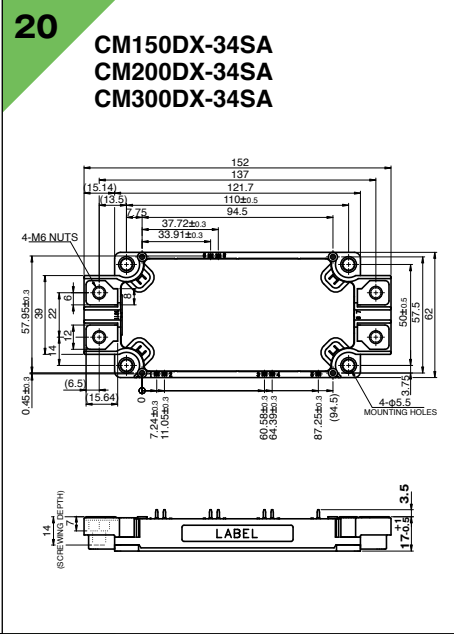
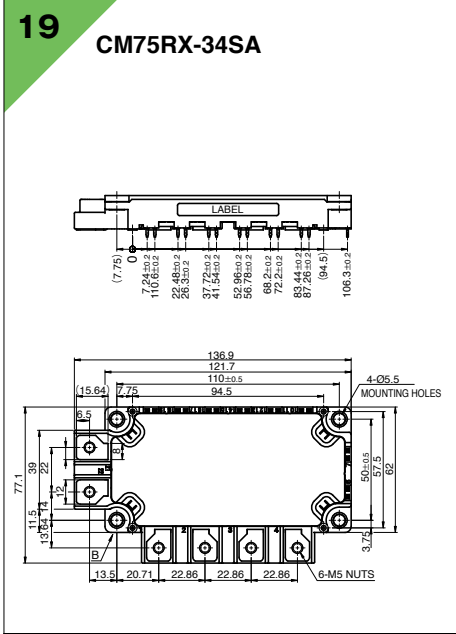
CM900,1400DUC-24S  
CM1000DUC-34SA



18

CM400DY-34A

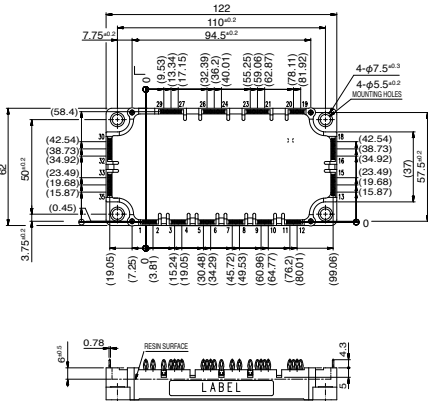






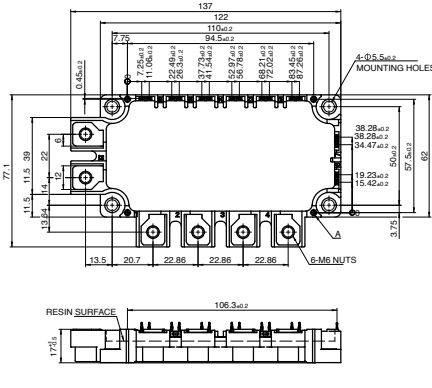
37

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



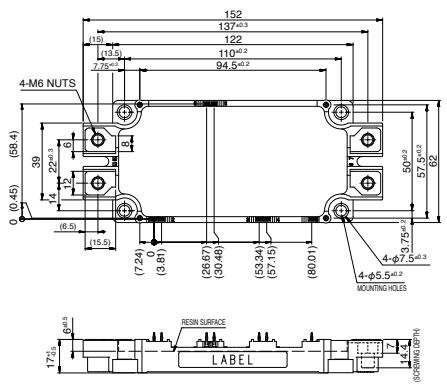
38

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



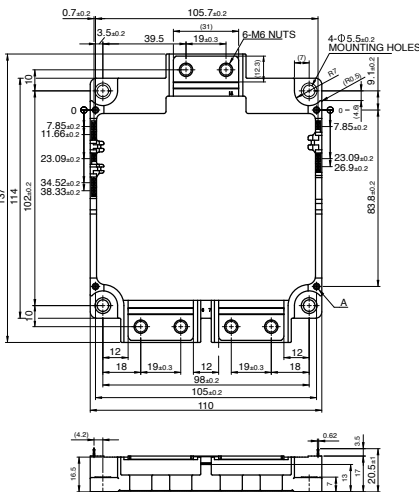
39

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



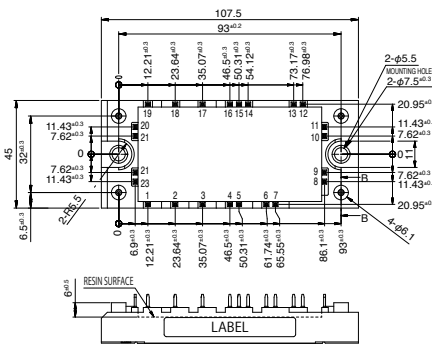
40

**CM1000DXP-24T**



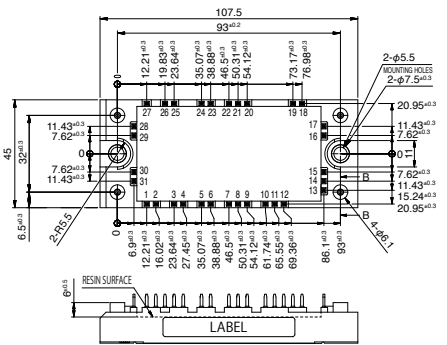
41

**CM35,50MXUA-24T/24T1**



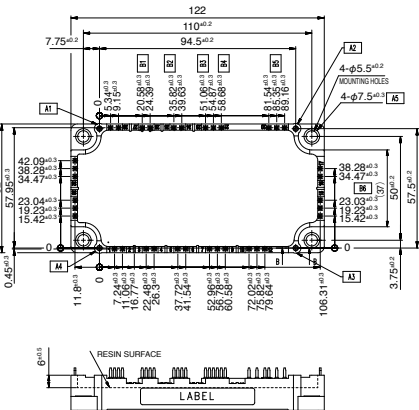
42

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



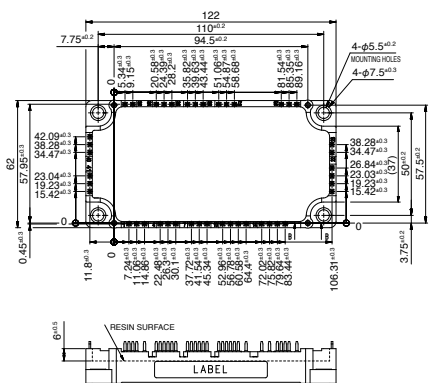
43

**CM75,100MXUC-24T/24T1**



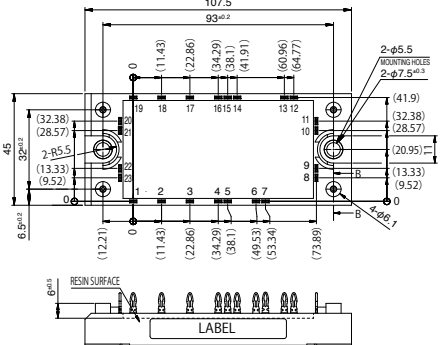
44

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



45

**CM35/50MXUAP-24T/T1**



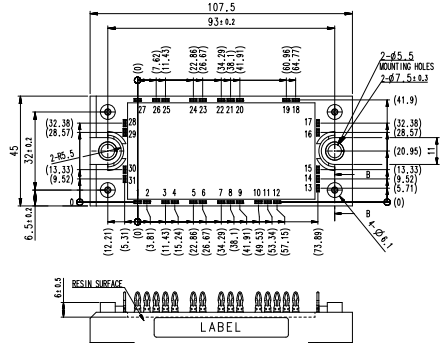
# Line-up of IGBT Modules

## Outline Drawing of IGBT Modules

Unit:mm

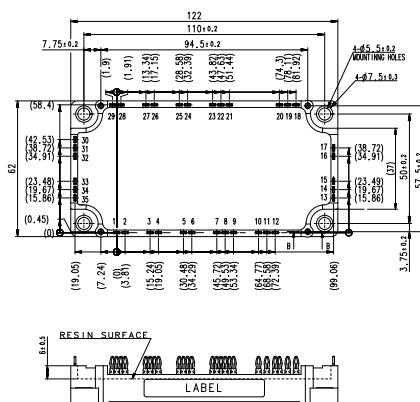
46

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



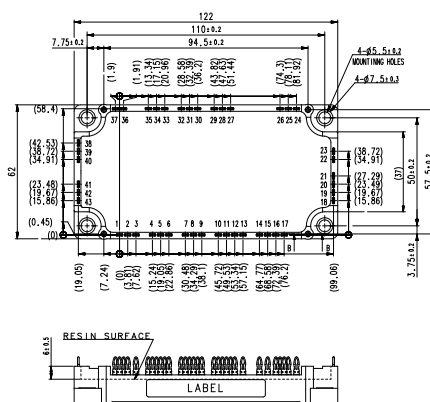
47

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>

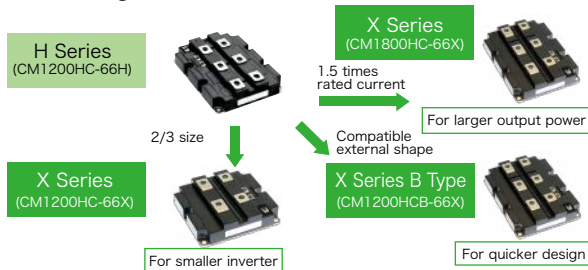
- Power loss reduced by incorporating 7th-generation IGBT and RFC<sup>\*1</sup> diode
- Industry-leading power<sup>\*2</sup> for increased inverter capacity
- External size reduced 33% while maintaining the same voltage resistance and rated current as conventional products,<sup>\*3</sup> contributing 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 - 6.5kV (as of Apr. 5, 2018 based on Mitsubishi Electric research)

\*3 Comparison of X Series CM1200HC-66X and H Series CM1200HC-66H

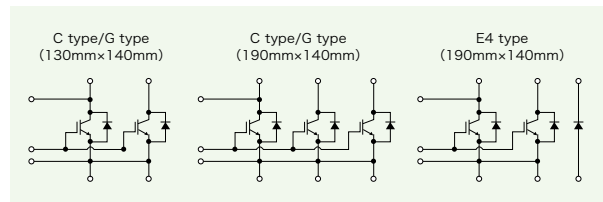
### Positioning from conventional series



### 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>

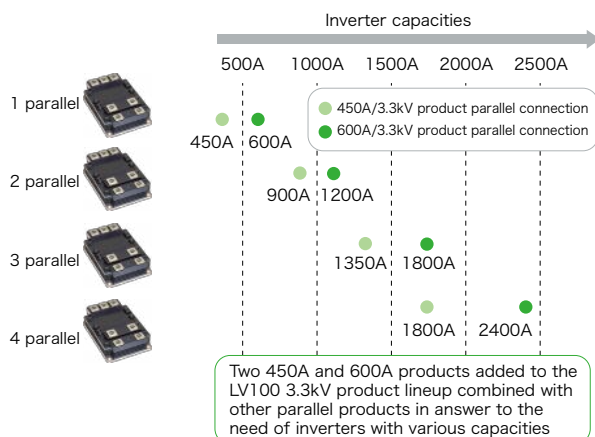
- Power loss reduced by incorporating 7th-generation IGBT and RFC<sup>\*1</sup> diode
- Industry's highest 3.3kV/600A Si module power density of 8.57A/cm<sup>2</sup><sup>\*4</sup> contributes to increased power output and efficiency
- Terminal layout optimized for easy paralleling and flexible inverter configurations and capacities
- New package structure offers extra reliability

\*4 As of Apr. 5, 2018, based on Mitsubishi Electric research

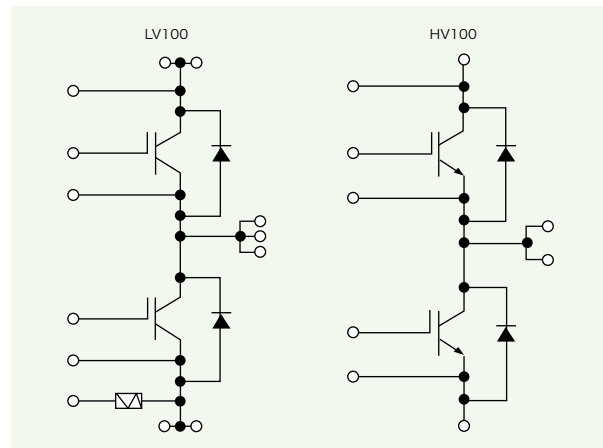
### Product lineup

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

### Various current ratings for optimal system design



### Internal circuit diagram



# Line-up of HVIGBT Modules

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

V <sub>CEs</sub> (V) I <sub>c</sub> (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.						
400A												CM400DY-50H	D1	B	15							CM400HG-66H	H	G	07		
																						CM400DY-66H	D1	B	15		
450A																	CM450DC-66X**	D2	C	G	20						
																	CM450DG-66X**	D2	G		21						
600A							CM600DY-34H	D1	B	01	CM600E2Y-34H	E2	B	01				CM600DC-66X**	D2	C	G	20					
																		CM600DG-66X**	D2	G		21					
800A				CM800DZB-34N	D1	C	01	CM800DZ-34H	D1	B	01	CM800HA-34H	H	B	-	CM800HB-50H	H	B	03				CM800HC-66H	H	C	03	
																						CM800E4C-66H	E4	C	06		
																						CM800E6C-66H	E2	C	06		
1000A	CM1000DC-34X**	D2	C	20																		CM1000HC-66R	H	C	08		
																						CM1000E4C-66R	E4	C	10		
1200A	CM1200DC-34X**	D2	C	20	CM1200HCB-34N	H	C	03														CM1200HC-66H	H	C	09		
	CM1200E4C-34X**	E4	C	16	CM1200DC-34N	D1	C	04	CM1200HC-34H	H	C	02	CM1200HC-50H	H	C	06							CM1200HG-66H	H	C	06	
					CM1200E4C-34N	E4	C	05															CM1200HC-66H	H	C	06	
					CM1200DC-34S	D1	C	04															PM1200HCE330-1	H	B	14	
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	CM1800HC-34H	H	C	06											CM1800HC-66X*	H	C	17	
					CM1800HCB-34N	H	C	06															CM1800HG-66X**	H	G	18	
2400A	CM2400HC-34X**	H	C	16	CM2400HC-34N	H	C	05	CM2400HC-34H	H	C	06															
	CM2400HCB-34X**	H	C	17	CM2400HCB-34N	H	C	06																			
3600A	CM3600HC-34X**	H	C	17																							

[Type] ★★: Under Development ★: New Product  
 B: Cu base plate 6kV Isolation  
 C: AlSiC base plate 6kV Isolation  
 G: AlSiC base plate 10kV Isolation

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

Ic(A)	V <sub>CE(S)</sub> (V)		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	H	G	12					
																		CM400E2G-130H	E2	G	09					
																		CM400E4G-130H	E4	G	09					
450A	CM450DG-90X**	D2	G	21																						
600A									CM600HG-90H	H	G	12	CM600HG-130X**	H	G	18										
													CM600HGB-130X**	H	G	19										
													CM600E4G-130X	E4	G	19										
																	CM750HG-130R	H	G	11						
800A								CM800HC-90R	H	C	08															
								CM800HG-90R	H	G	13															
900A	CM900HC-90X**	H	C	16								CM900HG-90H	H	G	13											
	CM900HG-90X**	H	G	18								CM900HC-90H	H	C	09											
	CM900HGB-90X**	H	G	19									CM900HG-130X**	H	G	19										
	CM900E4G-90X**	E4	C	19																						
1000A	CM1000HG-90X**	H	G	18									CM1000HG-130XA*	H	G	19										
1200A								CM1200HC-90R	H	C	10															
								CM1200HC-90RA	H	C	10															
								CM1200HG-90R	H	G	11															
1350A	CM1350HC-90X**	H	C	17																						
	CM1350HG-90X**	H	G	19																						
1500A	CM1500HC-90XA*	H	C	17																						
	CM1500HG-90X**	H	G	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 <sub>PRM</sub> I <sub>F</sub> (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
400												RM400DG-66S RM400DY-66S	D D	G B	24 25
450												RM450DG-90X**	D	G	24
600												RM600DY-66S RM600DC-66X** RM600DG-66X**	D D D	B C G	25 26 24
800	RM800DC-34X**	D	C	22								RM800DG-90F	D	G	24
900												RM900HC-90S RM900DB-90S RM900DG-90X**	H D D	C B G	27 27 24
1000												RM1000DC-66F	D	C	26
1200	RM1200DB-34S RM1200DC-34X**	D D	B C	22 22								RM1200DG-66S RM1200HE-66S RM1200DB-66S RM1200DC-66X** RM1200DG-66X**	D H D D D	G C B C G	24 23 27 26 24
1500												RM1500HE-66F RM1500DC-66F	H D	C C	23 26
1800	RM1800HE-34S	H	C	23								RM1500DC-90X** RM1500DG-90X**	D D	C G	26 24

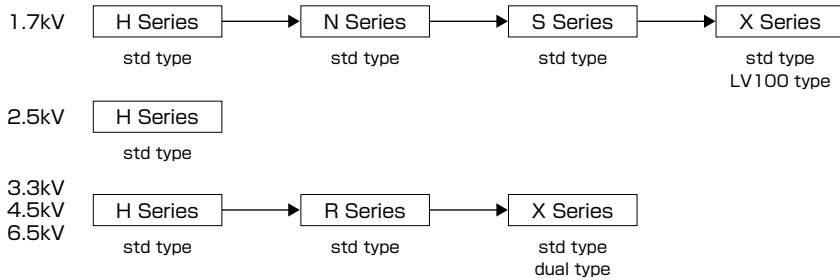
Connection

[Type]

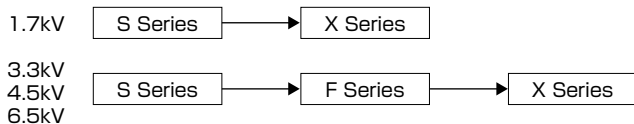
★★: Under Development

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

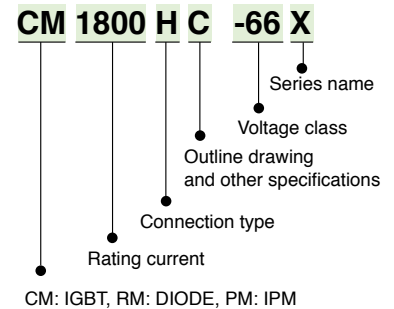
## Evolution of HVIGBT Module Series



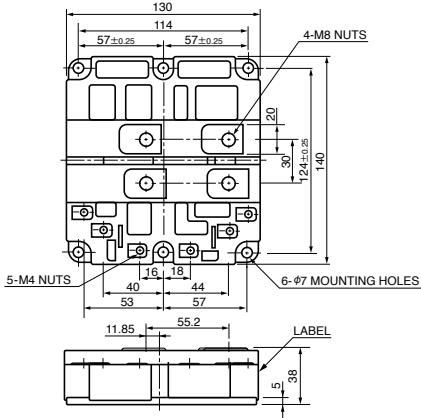
## Evolution of HVDIODE Module Series



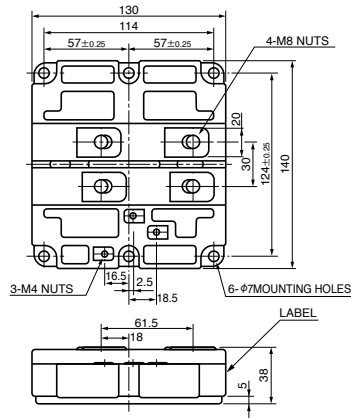
## Type Name Definition of IGBT Modules



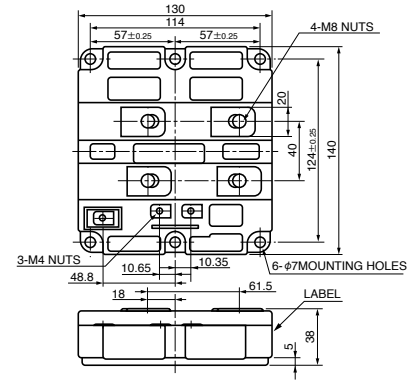
**01** CM600DY-34H  
CM600E2Y-34H  
CM800DZ-34H  
CM800DZB-34H



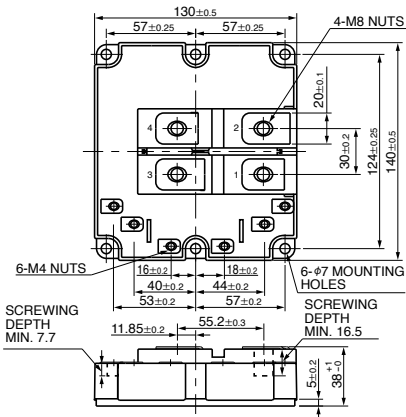
**02** CM1200,1600HC-34H



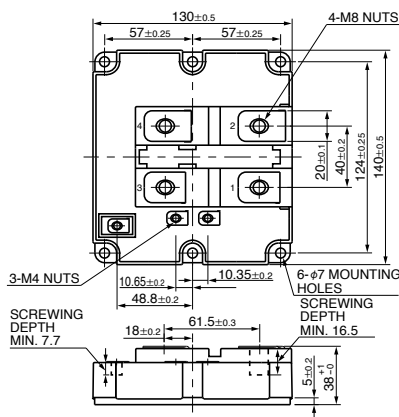
**03** CM1200HCB-34N  
CM800HB-50H,-66H  
CM800HC-66H



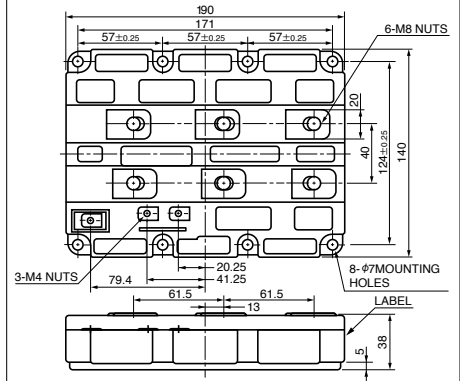
**04** CM1200DB/DC-34N  
CM1200DC-34S



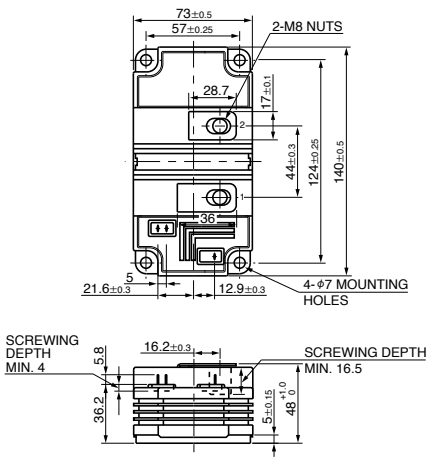
**05** CM1200E4C-34N  
CM1800,2400HC-34N



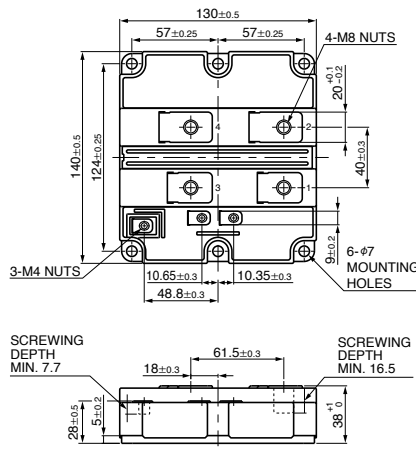
**06** CM1800,2400HCB-34N  
CM1800,2400HC-34H  
CM1200HB/HC-50H,-66H  
CM800E4C/E6C-66H  
CM900HC-90H



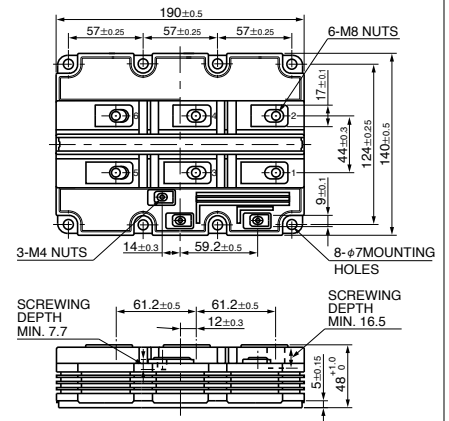
**07** CM400HG-66H  
CM200HG-130H



**08** CM1000HC-66R  
CM800HC-90R



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



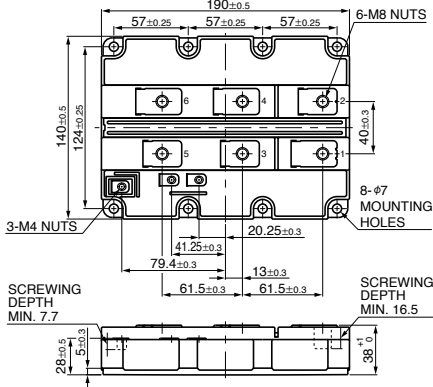
# Line-up of HVIGBT Modules

## Outline Drawing of HVIGBT Modules

Unit:mm

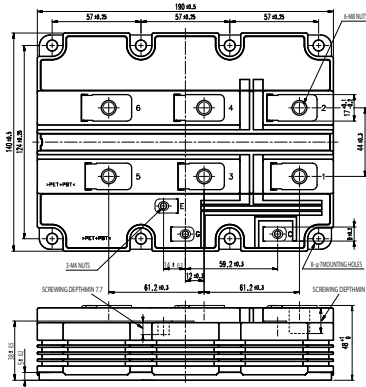
10

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



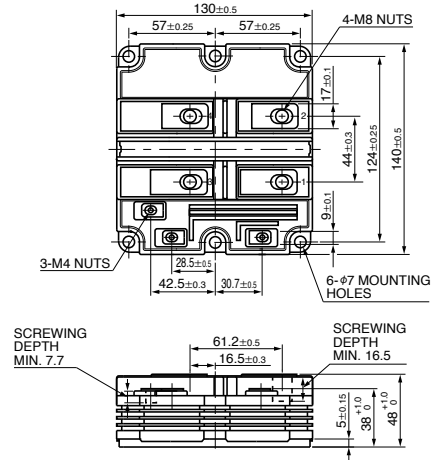
11

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



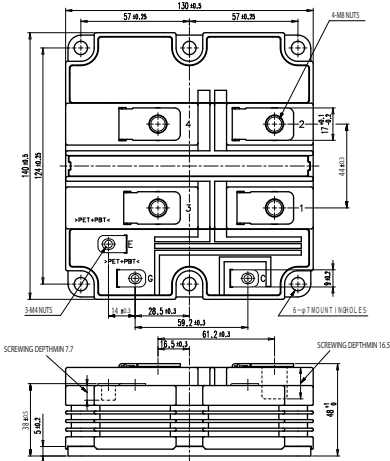
12

CM600HG-90H  
CM400HG-130H



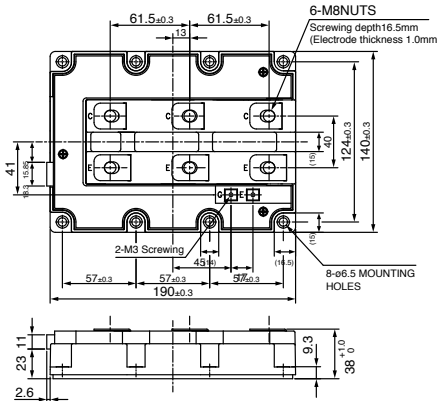
13

CM800HG-90R



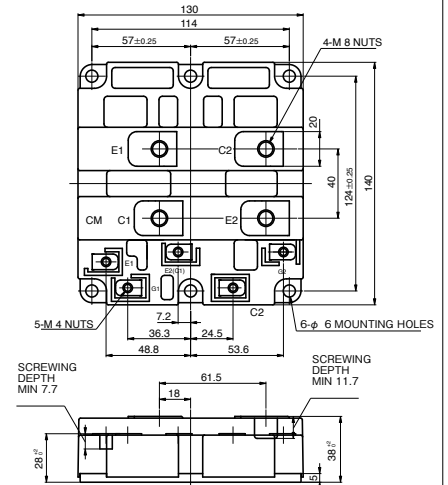
14

PM1200HCE330-1



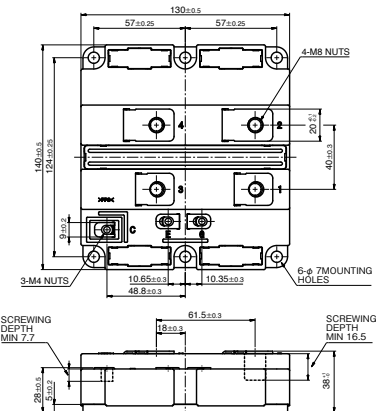
15

CM400DY-50H/66H



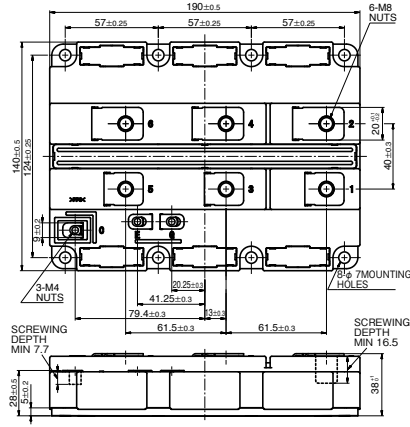
16

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



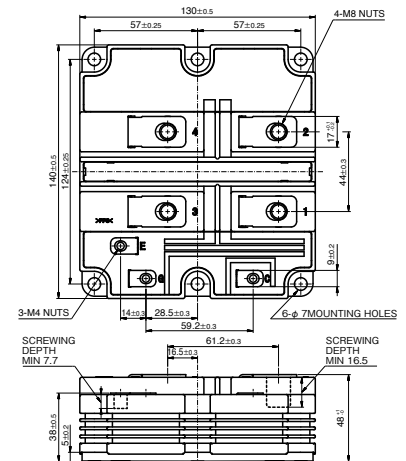
17

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



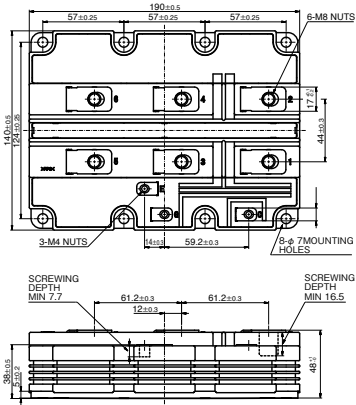
18

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



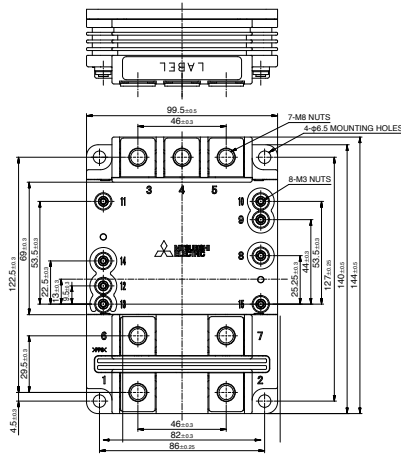
19

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



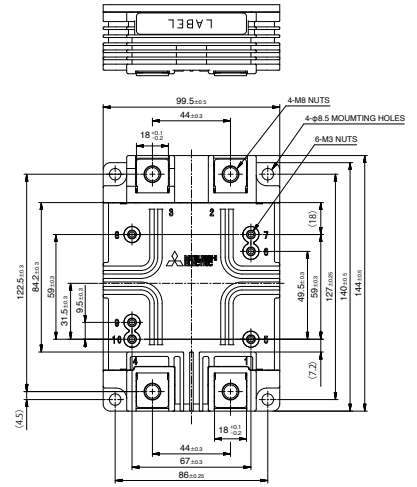
20

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



21

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

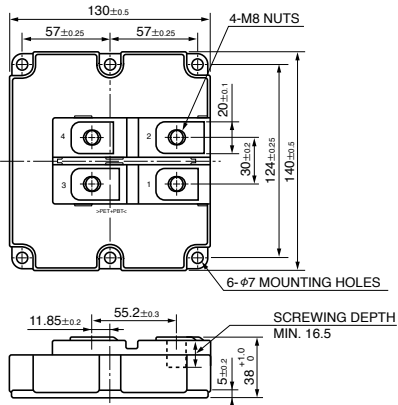


# Line-up of HVDIODE Modules

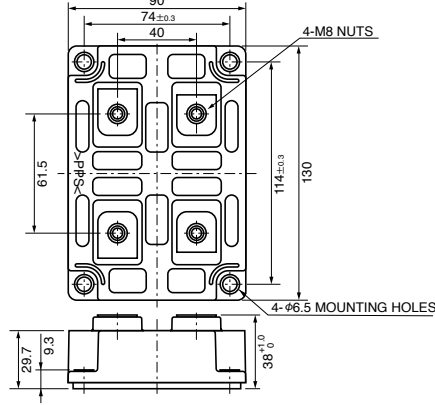
## Outline Drawing of HVDIODE Modules

Unit:mm

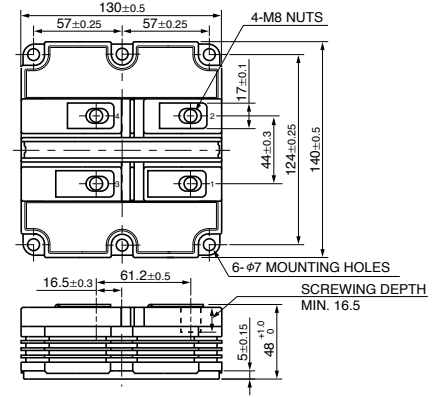
**22** RM1200DB-34S  
RM800DC-34X  
RM1200DC-34X



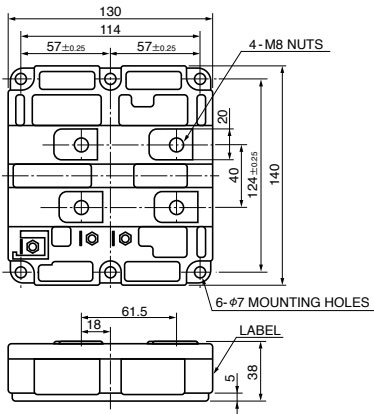
**23** RM1800HE-34S  
RM1200HE-66S  
RM600HE-90S  
RM1500HE-66F



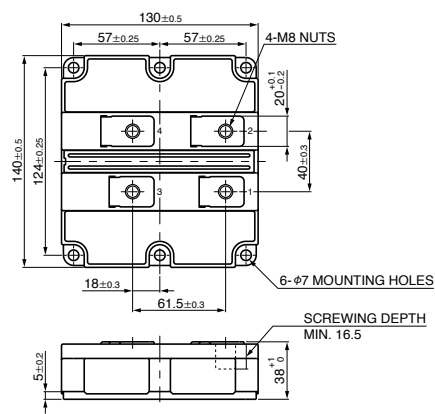
**24** RM400/1200DG-66S  
RM300DG-90S  
RM200/600DG-130S  
RM400/800/1200DG-90F  
RM250DG-130F  
RM600/900/1200DG-66X  
RM450/900/1500DG-90X  
RM300/450/600DG-130X  
RM1000DG-130XA



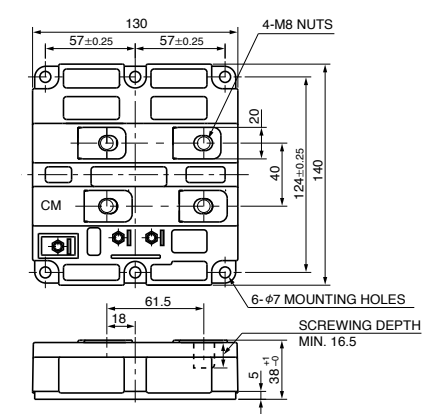
**25** RM400,600DY-66S



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



**27** RM1200DB-66S  
RM900DB/HC-90S





# Line-up of MOSFET Modules

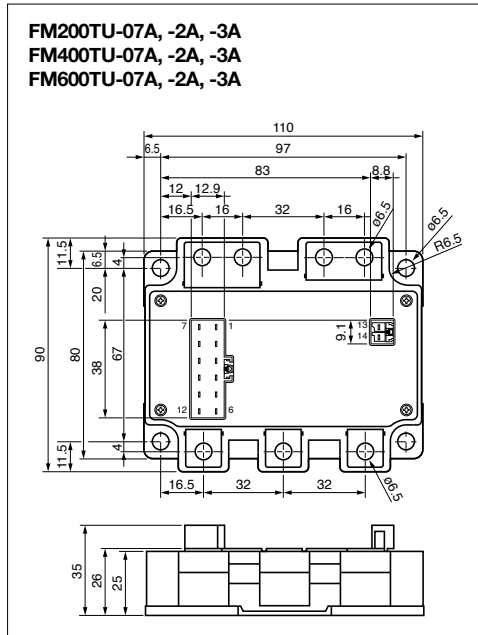
## Series Matrix of MOSFET Modules

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

V <sub>DS</sub> I <sub>D</sub> (A)	75V	Connection	100V	Connection	150V	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

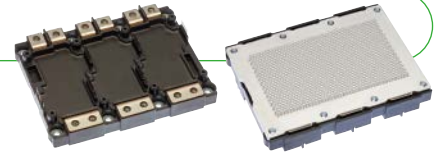


# Power Modules for Electric and Hybrid Vehicles



## 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

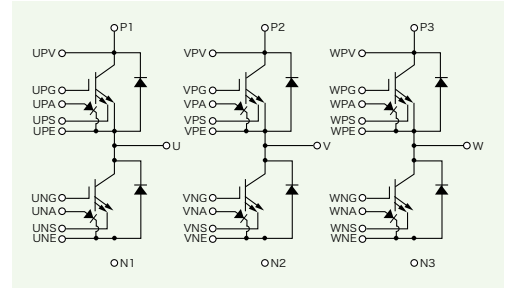
CT1000CJ1B060,  
CT600CJ1B120

### <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 <sub>CEs</sub> (V)	650V						
	Series	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	
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★★: Under Development

## Matrix of 1200V Power Modules

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

V <sub>CEs</sub> (V)	1200V			
	Series	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

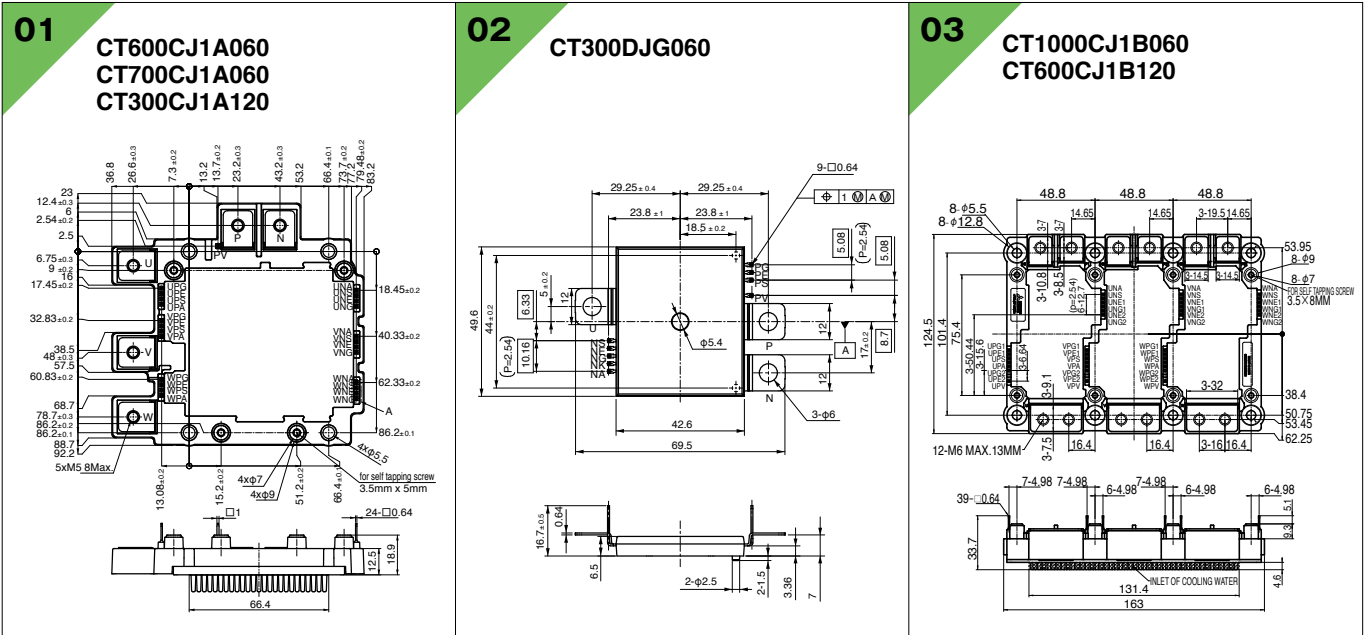
**CT 600 C J1B 120**

- 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



## Mitsubishi Electric Semiconductors & Devices Website

[www.MitsubishiElectric.com/semiconductors/](http://www.MitsubishiElectric.com/semiconductors/)



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for a greener tomorrow

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