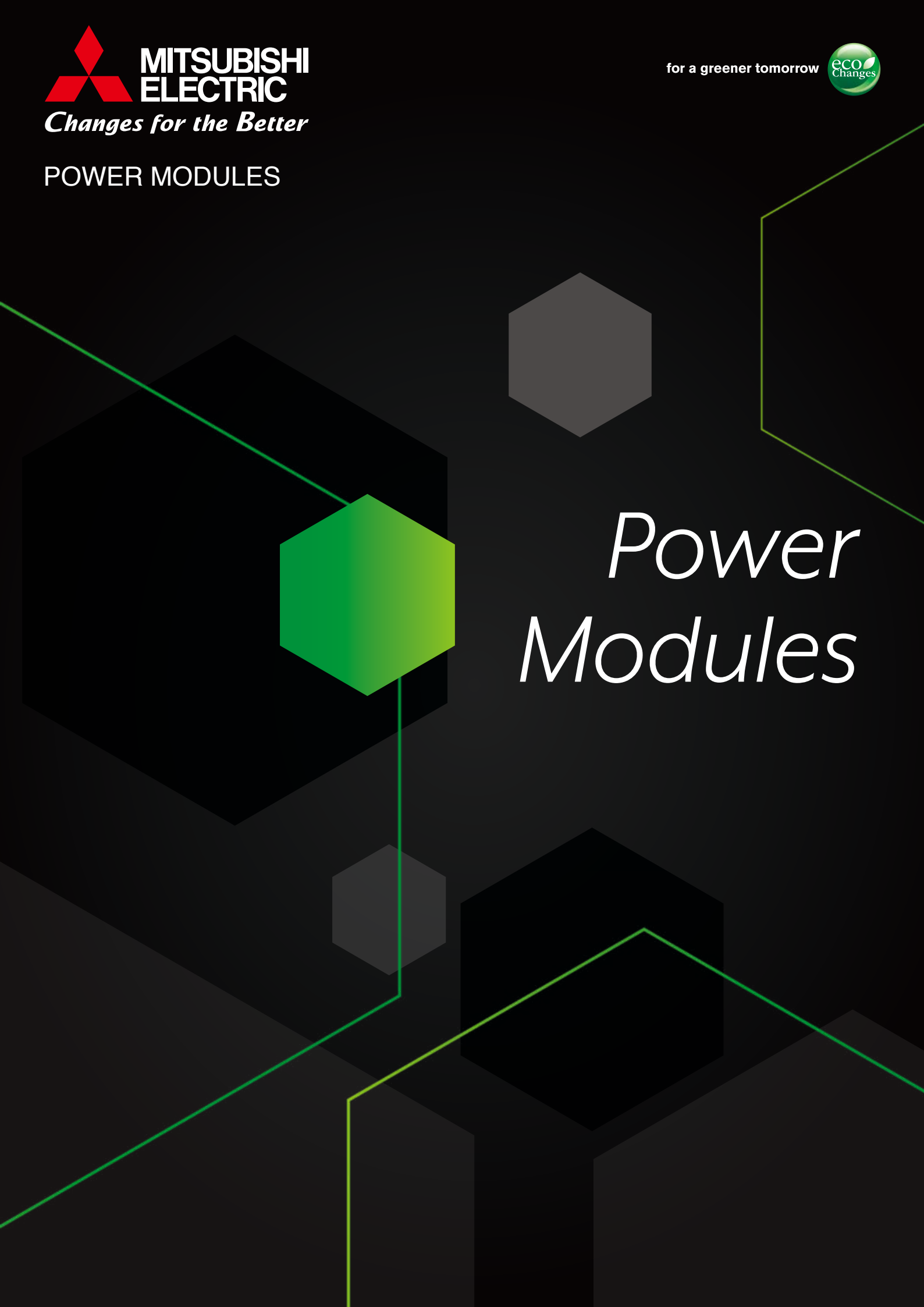


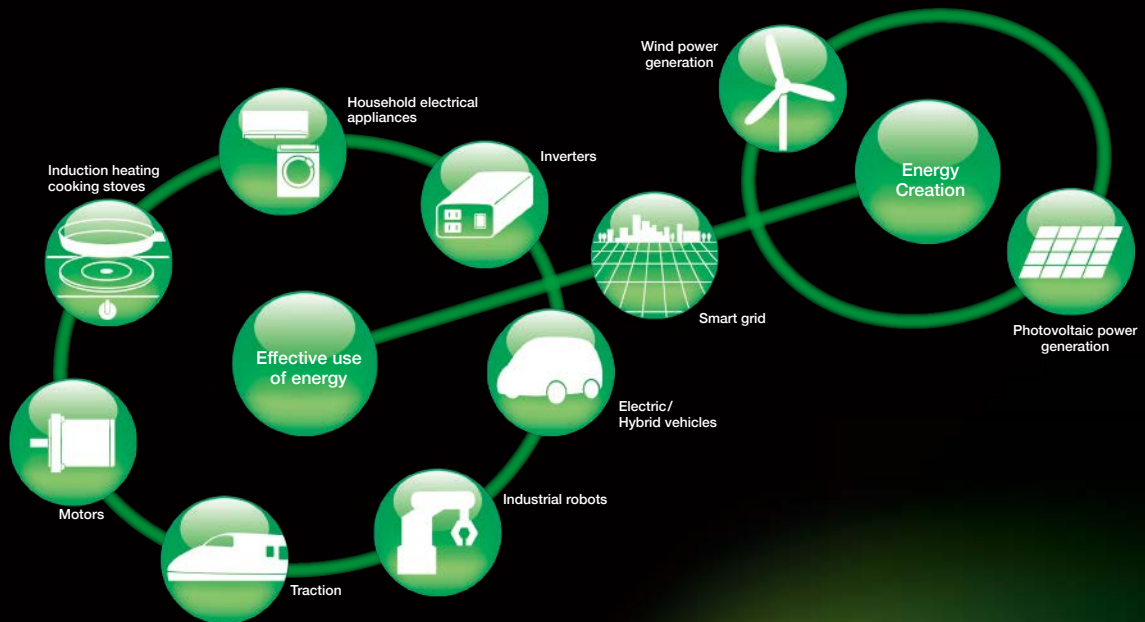
POWER MODULES



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.



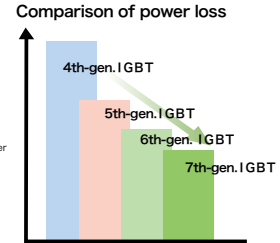
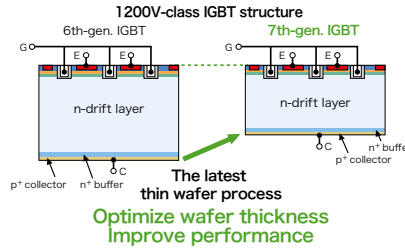


Focus Technology

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

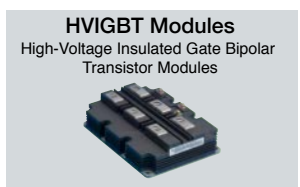
- Various low-inductance packages and power chips available
- Compatible with high-frequency, high-voltage (1,700V) applications
- Large-capacity modules available for renewable energy systems



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 "LV100/HV100 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

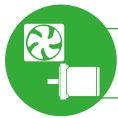


Modules realizing high performance and reliability for propulsion inverters in HVs/EVs

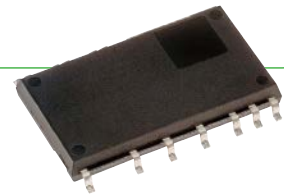
Key Features

- 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



Surface mount package IPM MISOP™

SP1SK, SP1SL, SP3SK and SP3SL

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 Reverse-conducting IGBT

Type name	Rated current	Rated voltage	Chips	BSC	Protection	Shape
SP1SK**	1A	600V	RC-IGBT	-	UV	Surface mount package
SP1SL**			HVIC	Embedded	SC	
SP3SK**	3A		LVIC	-	OT	
SP3SL**			BSD	Embedded	VOT IL	

[Term] VOT: Analog temperature output

UV : Power supply under-voltage protection

SC : Short-circuit protection

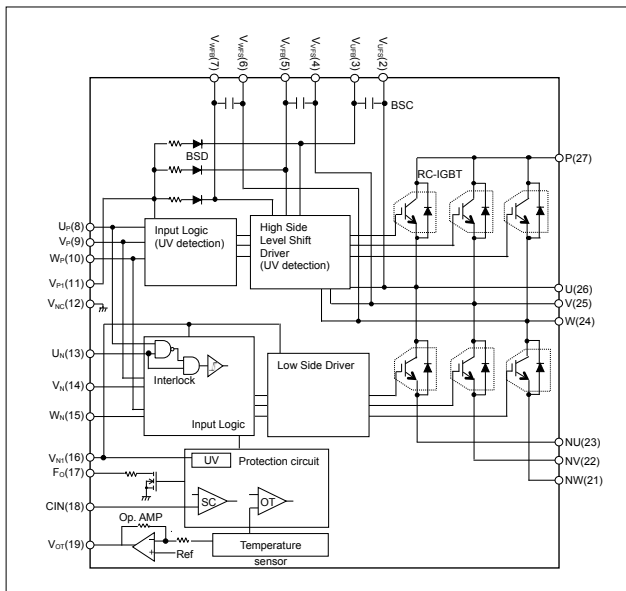
OT : Over Temperature protection

IL : Inter Lock

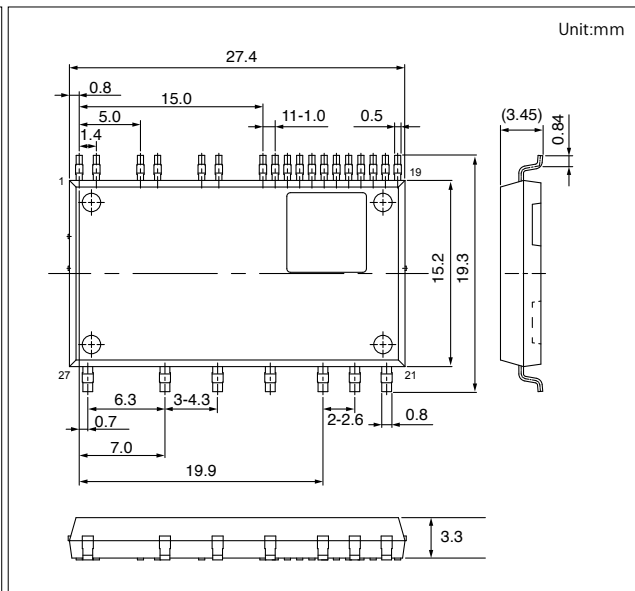
BSC : Bootstrap capacitor

★★:Under development

Schematic drawing



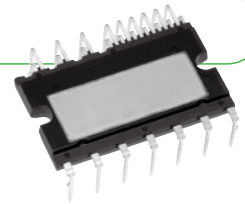
Outline Drawing





Feature 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

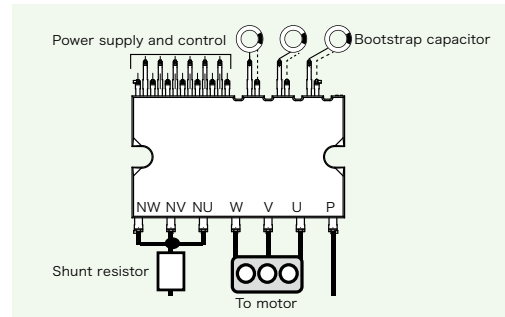
<Main Features>

- 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 RC-IGBT: Reverse conducting IGBT

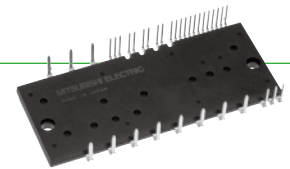
*2 VOT: Temperature information output function

*3 OT: Over-temperature protection function



Feature 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

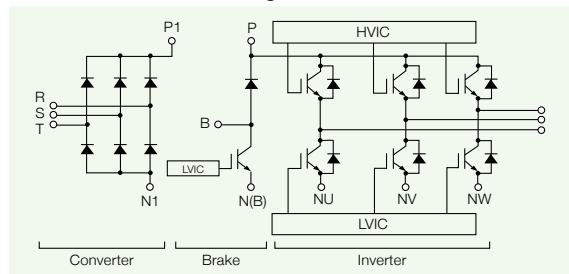
<Main Features>

- 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 BSD: Bootstrap diode

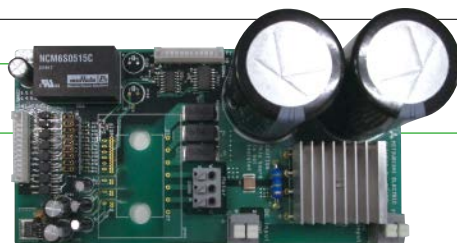
*2: Available without brake circuit

■ Internal circuit diagram



Customer Support

EVA series, evaluation boards for each DIIPM™
Various evaluation boards to easy support system design



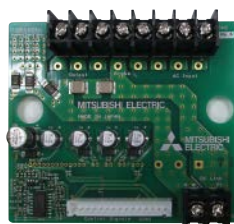
SLIMDIP™ evaluation board
 EVA01-SLIM



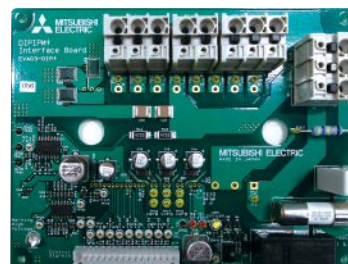
SLIMDIP™ evaluation board
 EVA15-SLIM



Super mini DIIPM™
 evaluation board
 EVA11-SDIP



DIIPM+™ evaluation board
 EVA14-DIP+



DIIPM+™
 evaluation
 board
 EVA03-DIP+

* For further information, please contact sales office.

Line-up of DIIPM™

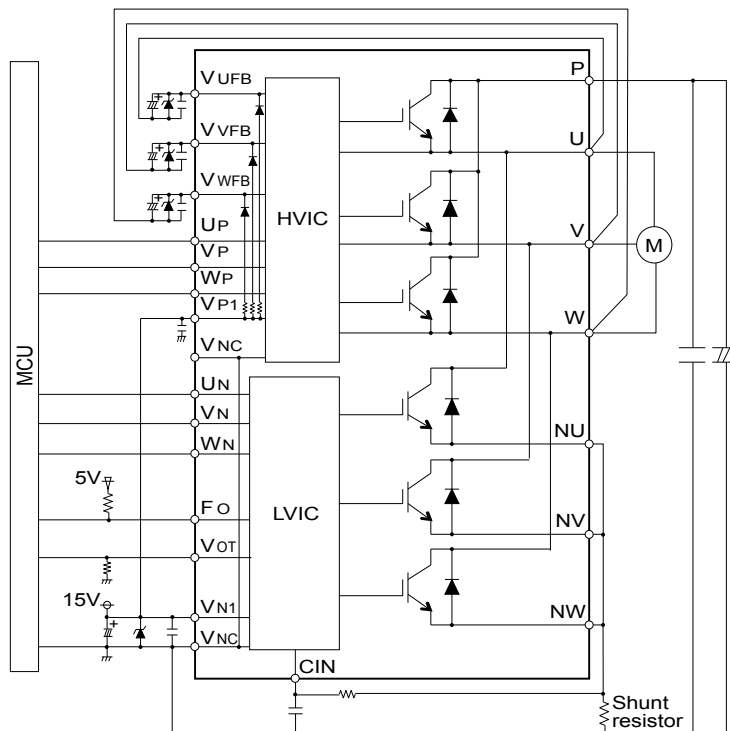
Series Matrix of 600V / 500V DIIPM™

Ic (A)	Series	600V					500V	
		SLIMDIP	Super mini	Mini	Large	CIB/CI	Super mini	
			Ver.6		Ver.4	DIIPM+	MOSFET	
3	SLIMDIP-S SLIMDIP-L							PSM03S93E5-A
5		PSS05S92F6-AG PSS05S92E6-AG	PSS05S51F6 PSS05S51F6-C					PSM05S93E5-A
10		PSS10S92F6-AG PSS10S92E6-AG	PSS10S51F6 PSS10S51F6-C					
15		PSS15S92F6-AG PSS15S92E6-AG	PSS15S51F6 PSS15S51F6-C				PSM15S94H6-A	
20		PSS20S92F6-AG PSS20S92E6-AG	PSS20S51F6 PSS20S51F6-C PSS20S71F6				PSM20S94H6-A	
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	SJ-MOSFET	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	P-side/N-side
	SC	N-side	N-side	N-side	N-side with sense	N-side	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	N-side	—
Specifications	Active input	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(5V)	High(3/5V)	High(3/5V)
	Emitter pin of N-side	Open	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)	N-side (UV,SC,OT)
	Insulation voltage	2000Vrms*2	1500Vrms*2	2500Vrms	2500Vrms	2500Vrms	1500Vrms*2	1500Vrms*2
	Insulation structure	Insulation sheet	Insulation sheet	Molding resin*4/Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive	Compliant	Compliant	Compliant *3	Compliant	Compliant	Compliant	Compliant
	Pin type	Control side of zigzag (Long, Short)	Long	C: Control side of zigzag None: Short	—	—	Long	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: 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™

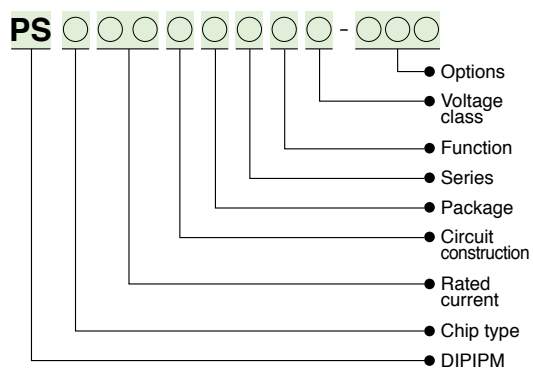
V _{ces} (V)		1200V			
I _c (A)	Series	Mini	Large		DIIPM+
			Ver.6	Ver.4	CIB/CI
5	PSS05S72FT	PSS05SA2FT	PS22A72		PSS05MC1FT PSS05NC1FT*1
10	PSS10S72FT	PSS10SA2FT	PS22A73		PSS10MC1FT PSS10NC1FT*1
15		PSS15SA2FT	PS22A74		PSS15MC1FT PSS15NC1FT*1
25		PSS25SA2FT	PS22A76		PSS25MC1FT PSS25NC1FT*1
35		PSS35SA2FT	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 _{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	—	—	—	—

★: New Product Non-recommended : Please contact to the sales offices.

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

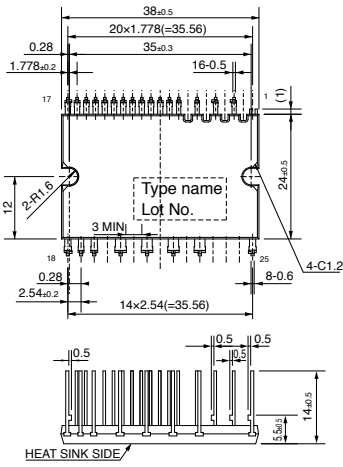
[Term] BSD: Bootstrap Diode
 CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect.
 HVIC: High Voltage IC, LVIC: Low Voltage IC
 UV: Supply Under Voltage protection, OT: Over Temperature protection, SC: Short Circuit protection
 VOT: Analog temperature output
 RoHS: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

Type Name Definition of DIIPM™

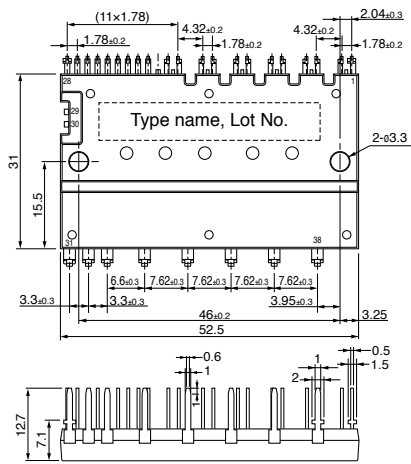


■ Outline Drawing of DIIPM™

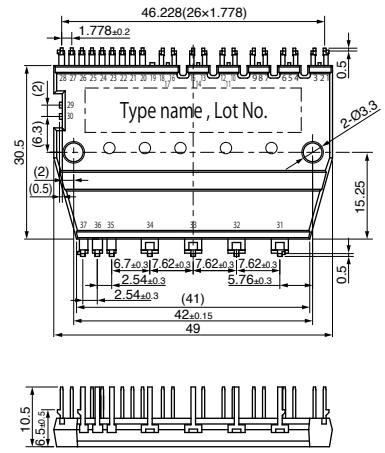
**Super mini DIIPM Ver.6
MOSFET Super mini DIIPM
Long (A)**



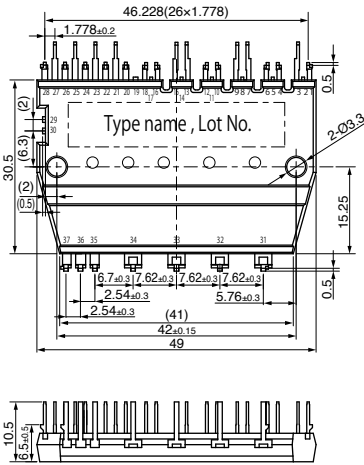
**Mini DIIPM (PSSxxS71F6)
1200V Mini DIIPM**



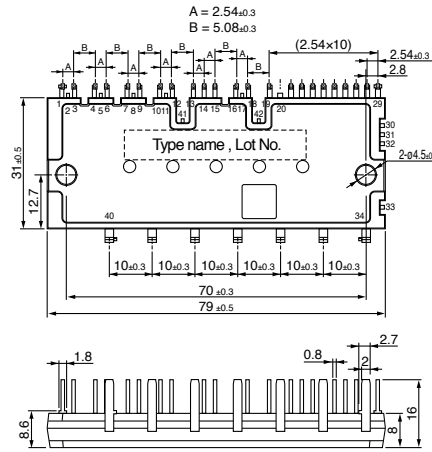
Mini DIIPM (PSSxxS51F6)



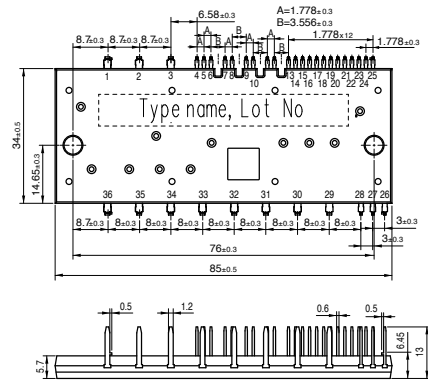
**Mini DIIPM(PSSxxS51F6-C)
Zigzag(C)**



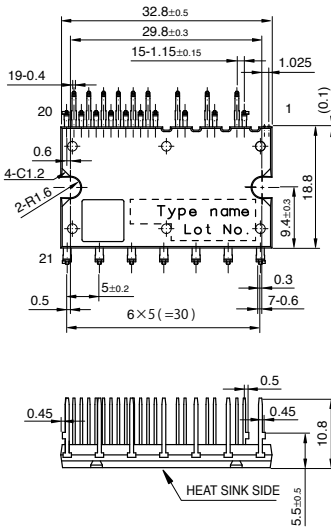
Large DIIPM



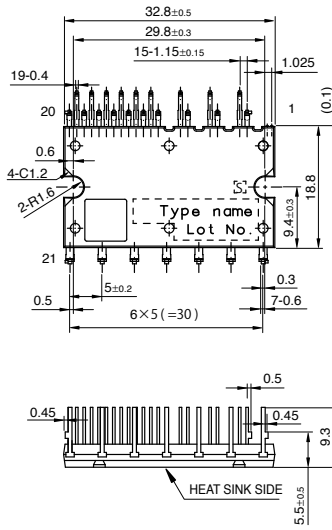
DIIPM+



**SLIMDIP
Long**



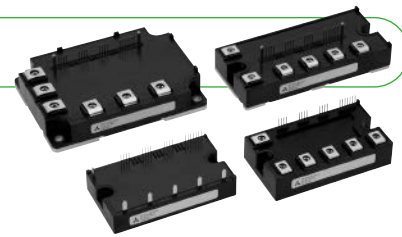
**SLIMDIP
Short**





New Products

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



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 RFC² 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, error detection function and Bootstrap diode (BSD)⁴ contribute to lowering inverter loss and shortening design time
- The introduction of PC-TIM⁵ contribute to simplifying the inverter assembly process (optional)

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

*2 RFC: Relaxed field cathode

*3 Conventional product: IPM L1-Series

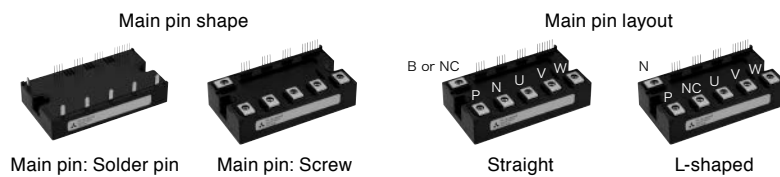
Built-in functions: Supply Undervoltage lock protection (UV), Short-circuit protection (SC), Over-temperature protection (OT)

*4 Bootstrap diode (BSD): Optional products include 50A, 75A, 100A/650V, 25A,35A,50A /1200V

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

■ "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 _{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*			

★: New Product

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 _{CE} (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		C	02		PM50B5LA060	B5	01	PM50CLB060	C					
	PM50CG1B065*	C	10		PM50RL1A060	R		01	PM50B6LA060	B6		01		PM50RLA060		R	
	PM50RG1B065*	R	10		PM50RL1B060	R		02	PM50B4LB060	B4		02				PM50RLB060	R
	PM50CG1AL065*	C	12		PM50RL1C060	R		03	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	C	01	PM75CS1D060	C	05	PM75B4LA060	B4	01	PM75CLA060		C		
	PM75RG1A065*	R	12		C	02		PM75B5LA060	B5	01	PM75CLB060	C					
	PM75CG1B065*	C	10		PM75RL1A060	R		01	PM75B6LA060	B6		01		PM75RLA060	R		
	PM75RG1B065*	R	10		PM75RL1B060	R		02	PM75B4LB060	B4		02			PM75RLB060	R	
	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	C	01	PM100CS1D060	C	05				PM100CLA060			C	
	PM100RG1B065*	R	10		PM100CL1B060	C		02	PM100RLA060	R							
	PM100RG1B065*	R	10		PM100RL1A060	R		01									
	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		PM200CL1B060	C		04	PM200RLA060	R							
	PM200CG1C065*	C	11		PM200RL1A060	R		04									
	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		
600	PM450RG1C065*	R	11							PM600DV1A060	D	06		PM600CLA060	C	08	
800							PM800DV1B060	D	07								
IGBT chip	CSTBT*1 Emitter sensor installed Temperature sensor installed		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*1 Built-in emitter sensor Built-in temperature sensor		CSTBT*2 Built-in emitter sensor Built-in temperature sensor				
	UV	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	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side				
Fault output	OT	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	P-side/N-side	P-side/N-side	P-side/N-side					
	SC	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	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				

★: New Product Non-recommended : Please contact to the sales offices.

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

[Term] UV: Supply Under Voltage-lock protection, SC: Short-Circuit protection, OT: Over-temperature protection,
 OC: Over-current protection, CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect
 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															
I _C (A)	Series	G1 Series			L1 Series			S1 Series			V1 Series			L Series			
		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
	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				
	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	D				C				R								

★: New Product Non-recommended : Please contact to the sales offices.

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

[Term] UV : Supply Under Voltage-lock 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

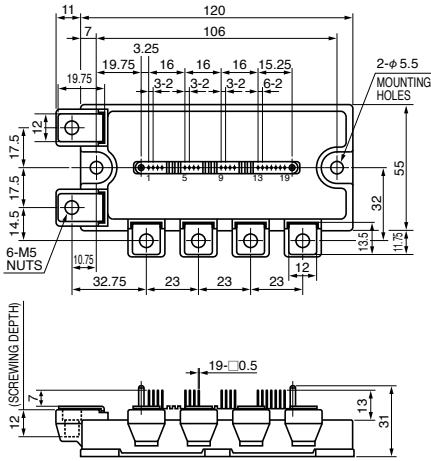
Line-up of IPM

Outline Drawing of IPM

Unit:mm

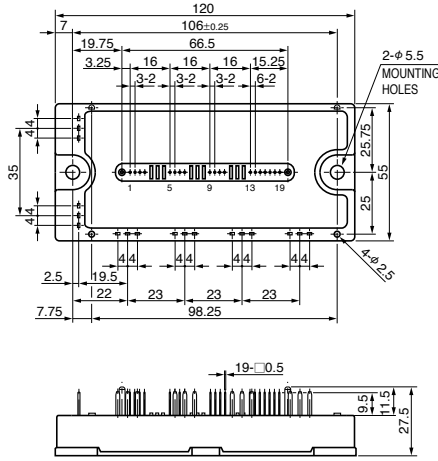
01

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



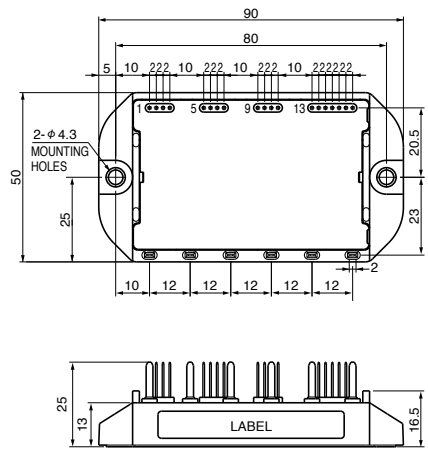
02

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



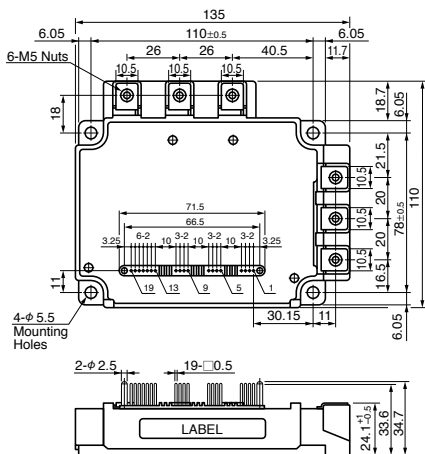
03

PM50RL1C060
PM25RL1C120
PM50,75,B4/B5/B6L1C060



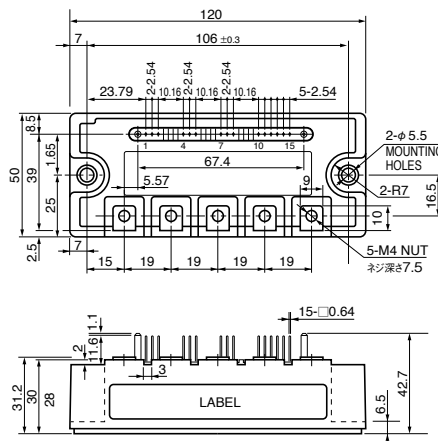
04

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



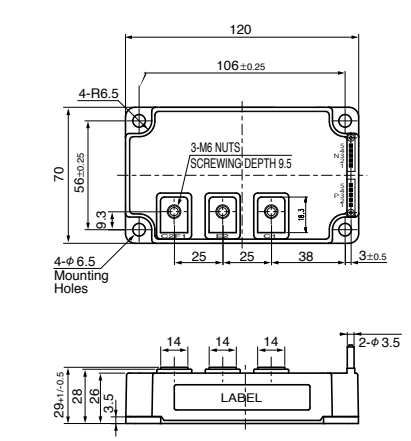
05

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



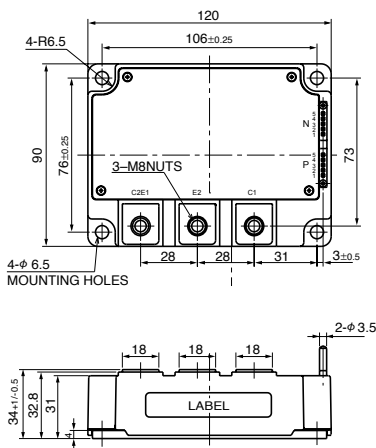
06

PM400,600DV1A060
PM200,300,450DV1A120



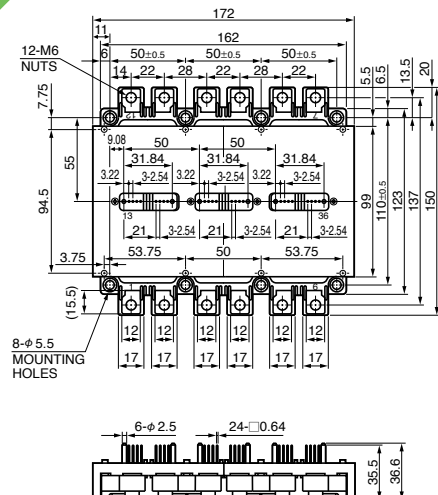
07

PM800DV1B060



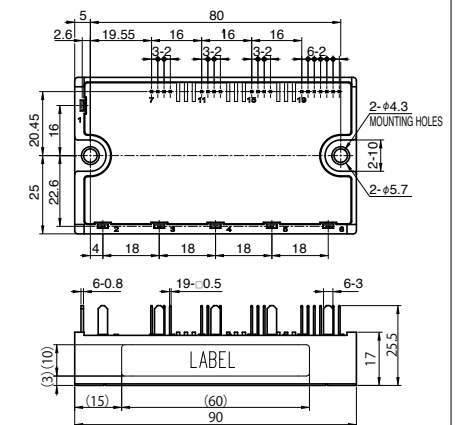
08

PM450,600CLA060
PM200,300,450CLA120



09

PM50,75,100CG1AP/
CG1APL/RG1AP065
PM25/35/50CG1AP/
CG1APL/RG1AP120

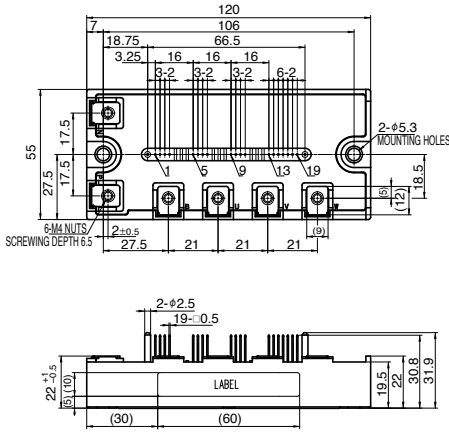


■ Outline Drawing of IPM

Unit:mm

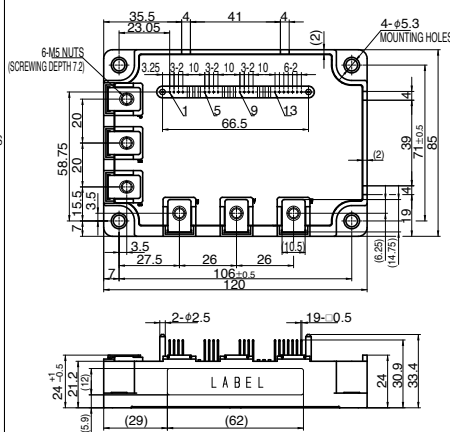
10

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



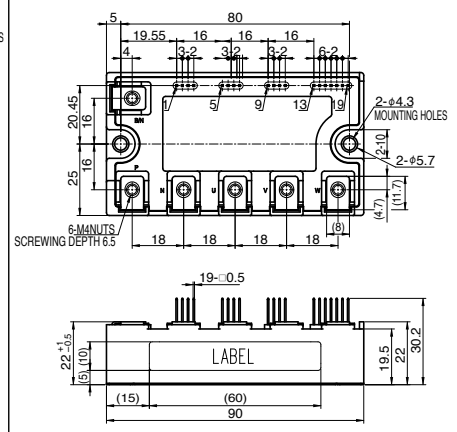
11

PM200,300,400,450CG1C/
RG1C065
PM100,150,200CG1C/
RG1C120



12

PM50,75,100CG1A/CG1AL/
RG1A065
PM25/35/50CG1A/CG1AL/
RG1A120



Line-up of MOSFET Modules

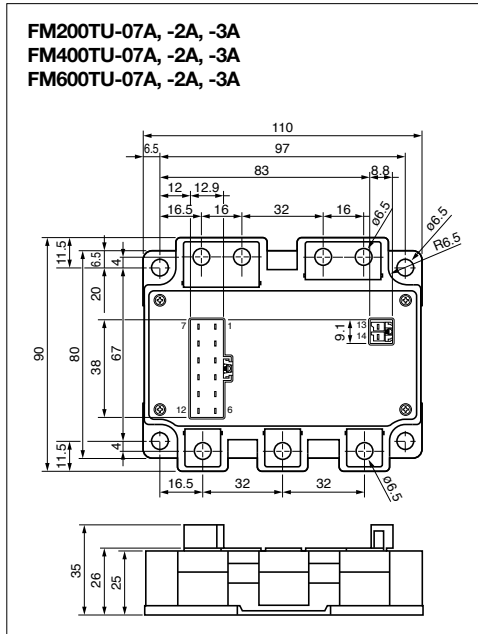
Series Matrix of MOSFET Modules

RoHS directive compliant

V_{DS} I_D (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

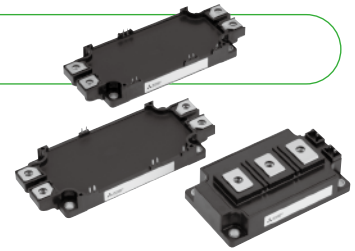
Unit: mm





New Products

New lineup contributes to simplifying design, downsizing, energy-saving of industrial inverters.



IGBT Module T/T1-Series

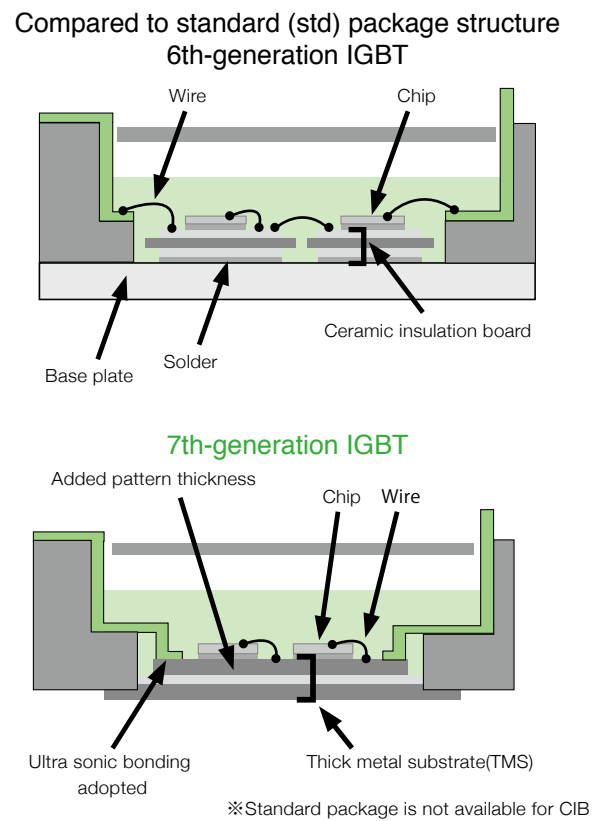
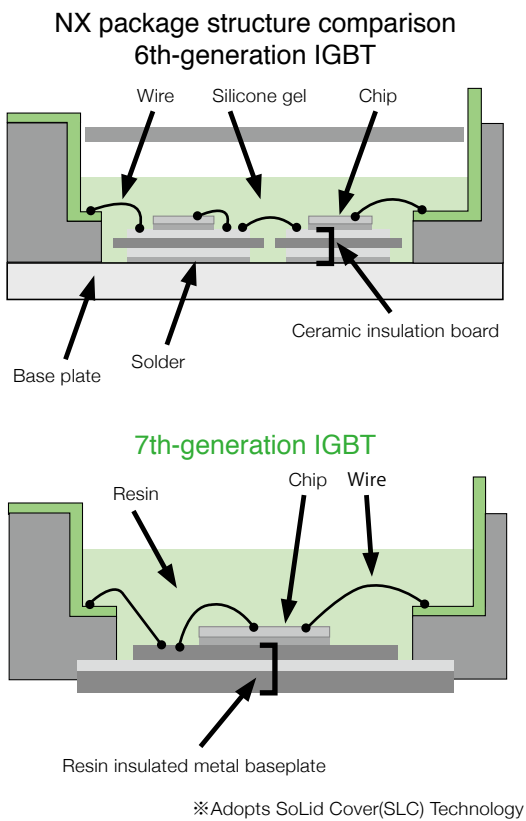
<Main Features>

- 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™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)



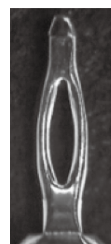
◆ Press-fit terminal support (NX)

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

■ Press-fit pin



① Main pin



② Signal pin



Feature Products

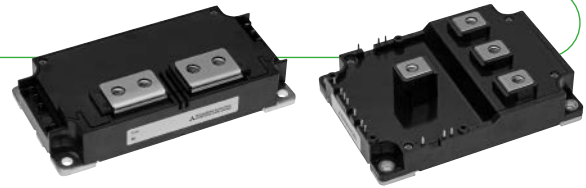
Contributes to realizing smaller, energy-saving large-capacity inverters

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

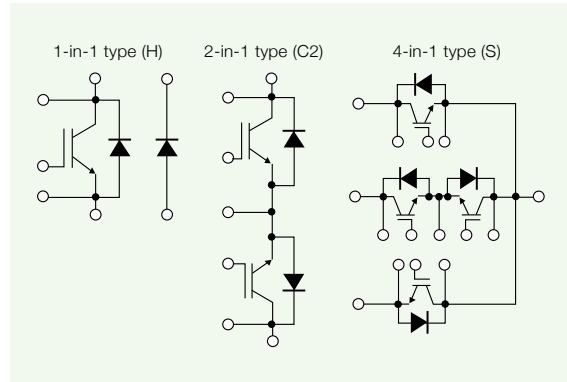
- *1 Comparison between 3-level inverter incorporated in this device and 2-level inverter in conventional device.
- *2 1-in-1/2-in-1 type external dimensions of 130x67mm, 4-in-1 type external dimensions of 115x82mm, new package developed with innovative terminal positioning.
- *3 IGBT specifications 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.



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

4-in-1 type

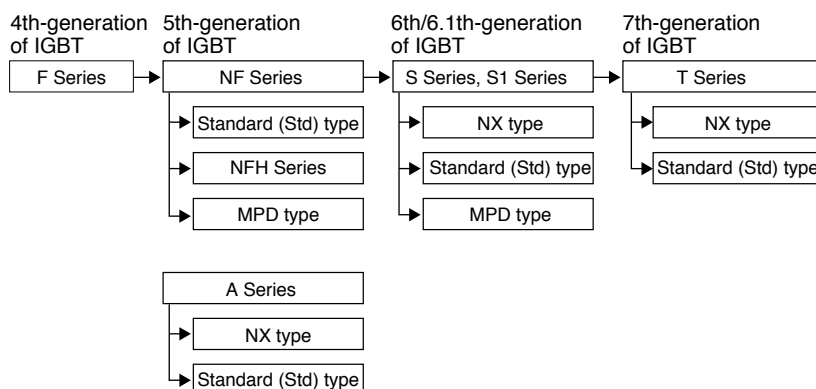
Internal circuit diagram



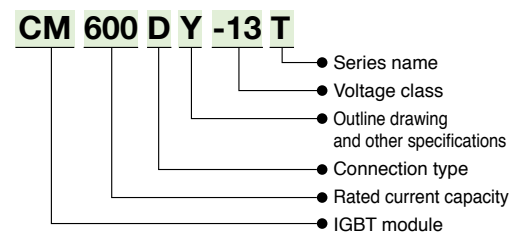
Lineup

Main application	Model	Module type	Rated voltage	Rated current	Circuit structure	External dimensions WxD (mm)
125-500kW inverter	CM400ST-24S1	IGBT	1200V	400A	4-in-1	115x82
500kW - inverter	CM1400HA-24S	IGBT	1200V	1400A	1-in-1	130x67
	RM1400HA-24S	Diode	1200V	1400A	1-in-1	130x67
	CM1000HA-34S	IGBT	1700V	1000A	1-in-1	130x67
	CM500C2Y-24S	IGBT	1200V	500A	2-in-1	130x67

Evolution of IGBT Module Series



Type Name Definition of IGBT Modules



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.

Line-up of IGBT Modules

Matrix of IGBT Modules 650V/600V (No.: Number of outline drawing, see page 19 to 20)

RoHS directive (2011/65/EU) compliant

V _{CEs} (V)	650V						600V									
	T/T1-Series NX Type		Connection	No.	T-Series std Type		Connection	No.	A-Series NX Type		NF-Series		NF-Series NFH Type		Connection	No.
I _c (A)																
50	CM50MXUB-13T** CM50MXUB-13T1** CM50MXUBP-13T** CM50MXUBP-13T1**	M M M M	42 42 - -													
75	CM75MXUB-13T** CM75MXUB-13T1** CM75MXUBP-13T** CM75MXUBP-13T1**	M M M M	42 42 - -					CM75MX-12A	M	01	CM75TL-12NF CM75RL-12NF	T R	07 07			
100	CM100TX-13T* CM100XP-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 - - 44 44 - -		CM100DY-13T*	D	30	CM100MX-12A CM100RX-12A	M R	01 02	CM100TL-12NF CM100RL-12NF	T R	07 07	CM100DUS-12F	D	13
150	CM150TX-13T* CM150XP-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 - -		CM150DY-13T*	D	30	CM150RX-12A	R	02	CM150DY-12NF CM150TL-12NF CM150RL-12NF	D T R	08 07 07	CM150DUS-12F	D	13
200	CM200TX-13T* CM200XP-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																

★★: Under Development ★: New Product Non-recommended : Please contact to the sales offices.

Matrix of Power Modules for 3-level Inverter (No.: Number of outline drawing, see page 22 to 23)

RoHS directive (2011/65/EU) compliant

V _{CEs} /V _{RRM}	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.	
I _c /I _F													
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.

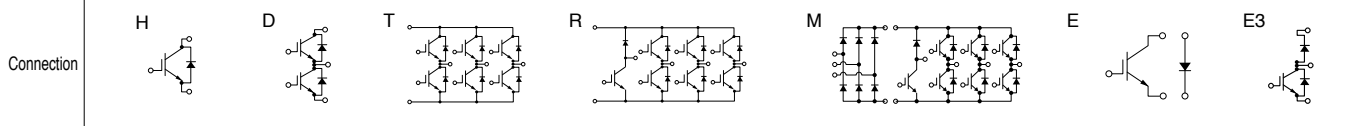
★★: Under Development ★: New Product

Line-up of IGBT Modules

Matrix of IGBT Modules 1200V (No.: Number of Outline Drawing, see page 19 to 23)

RoHS directive (2011/65/EU) compliant

V _{CE} (V)	1200V																		
	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**	M	41																
	CM35MXUA-24T1**	M	41				CM35MXA-24S	M	04										
	CM35MXUAP-24T**	M	-																
	CM35MXUAP-24T1**	M	-																
50	CM50MXUA-24T**	M	41																
	CM50MXUA-24T1**	M	41				CM50MXA-24S	M	04							CM50RL-24NF	R	07	
	CM50MXUAP-24T**	M	-													CM50TL-24NF	T	07	
	CM50MXUAP-24T1**	M	-																
75	CM75MXUB-24T**	M	42																
	CM75MXUB-24T1**	M	42																
	CM75MXUBP-24T**	M	-				CM75MXA-24S	M	04										
	CM75MXUBP-24T1**	M	-				CM75TX-24S	T	05							CM75RL-24NF	R	07	
	CM75MXUC-24T**	M	43				CM75RX-24S	R	02							CM75TL-24NF	T	07	
	CM75MXUC-24T1**	M	43																
	CM75MXUCP-24T**	M	-																
	CM75MXUCP-24T1**	M	-																
100	CM100TX-24T*	T	33																
	CM100TXP-24T*	T	37													CM100DY-24A	D	08	
	CM100RX-24T*	R	34				CM100MXA-24S	M	04							CM100DY-24NF	D	08	
	CM100RXP-24T*	R	38	CM100DY-24T*	D	30	CM100TX-24S1	T	25							CM100E3Y-24NF	E3	08	
	CM100MXUC-24T**	M	43				CM100RX-24S1	R	26							CM100RL-24NF	R	07	
	CM100MXUC-24T1**	M	43													CM100TL-24NF	T	07	
	CM100MXUCP-24T**	M	-													CM100DU-24NFH	D	13	
	CM100MXUCP-24T1**	M	-																
150	CM150TX-24T*	T	33																
	CM150TXP-24T*	T	37													CM150DY-24A	D	08	
	CM150RX-24T*	R	34				CM150DX-24S	D	03							CM150DY-24NF	D	08	
	CM150RXP-24T*	R	38	CM150DY-24T*	D	30	CM150EXS-24S	E	24							CM150E3Y-24NF	E3	08	
	CM150MXUD-24T**	M	44				CM150TX-24S1	T	25							CM150RL-24NF	R	09	
	CM150MXUD-24T1**	M	44				CM150RX-24S1	R	26							CM150TL-24NF	T	09	
	CM150MXUDP-24T**	M	-													CM150DU-24NFH	D	13	
	CM150MXUDP-24T1**	M	-																
200	CM200TX-24T*	T	33	CM200DY-24T*	D	31	CM200EXS-24S	E	24							CM200DY-24A	D	08	
	CM200TXP-24T*	T	37				CM200RXL-24S	R	21							CM200DY-24NF	D	10	
225	CM225DX-24T*	D	28																
	CM225DXP-24T*	D	39				CM225DX-24S1	D	27										
300	CM300DX-24T*	D	28	CM300DY-24T*	D	31	CM300DX-24S1	D	27			CM300DY-24S	D	10		CM300DY-24A	D	10	
	CM300DXP-24T*	D	39				CM300EXS-24S	E	24							CM300DY-24NF	D	11	
400							CM300RXL-24S1*	R	21							CM300DU-24NFH	D	14	
																CM400DY-24A	D	11	
																CM400HA-24A	H	16	
																CM400DY-24NF	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	
	CM600DXP-24T*	D	39				CM600DXL-24S	D	6							CM600HA-24A	H	16	
800																CM600DU-24NF	D	12	
																CM600DU-24NFH	D	15	
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			



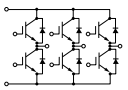
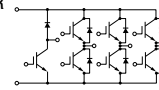
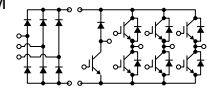



*1: A-Series have model name ending with A, NF-Series have model name ending with NF/NFH

★★: Under Development ★: New Product

Matrix of IGBT Modules 1700V

RoHS directive (2011/65/EU) compliant

V _{CEs} (V)	1700V																	
	Series	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 _c		Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.
35																		
50																		
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											CM800HA-34S*	H	36					
900																		
1000											CM1000HA-34S*	H	36	CM1000DUC-34SA	D	17		
1400																		
Connection	H		D		T		R		M		E							

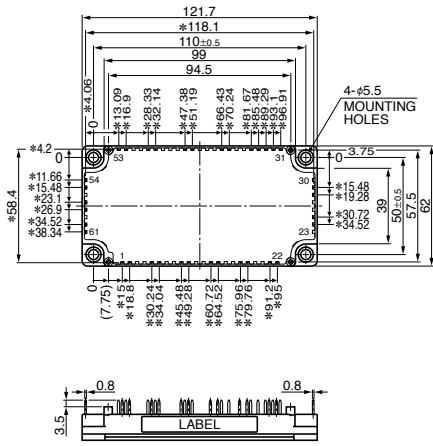
★★: Under Development ★: New Product

Line-up of IGBT Modules

Outline Drawing of IGBT Modules

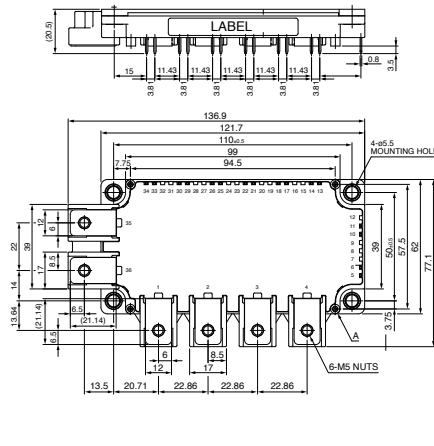
Unit:mm

01 CM75,100MX-12A



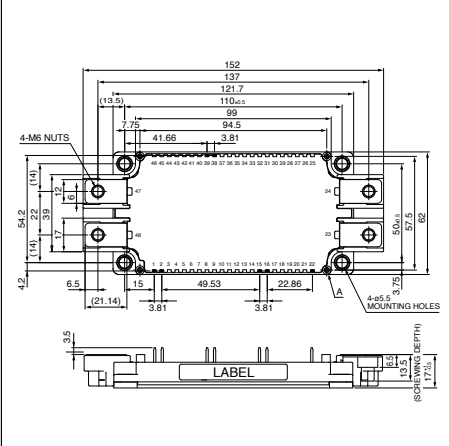
*All dimensions with a tolerance of ± 0.5

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



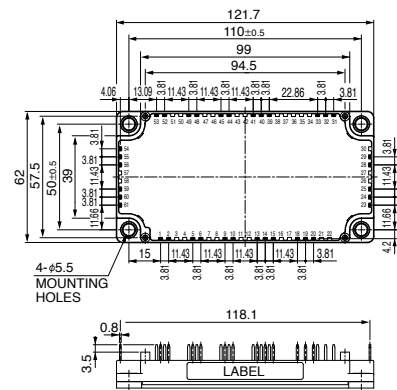
*All dimensions with a tolerance of ± 0.5

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

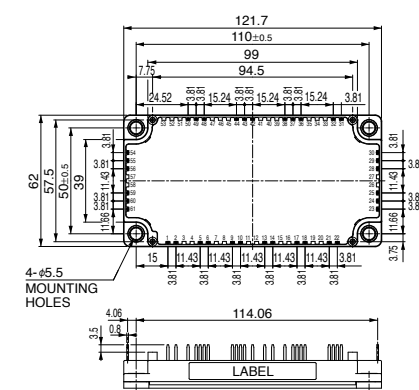


*All dimensions with a tolerance of ± 0.5

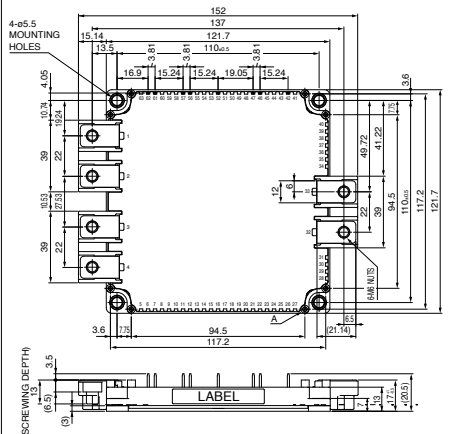
04 CM35,50,75,100MXA-24S



05 CM75TX-24S

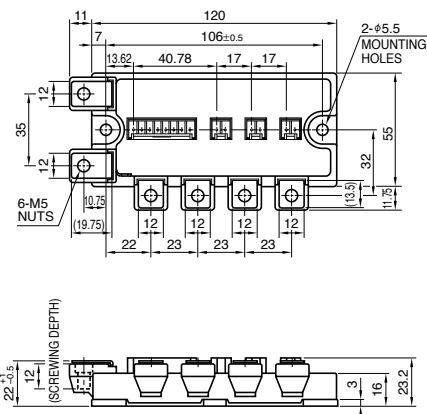


06 CM600,1000DXL-24S

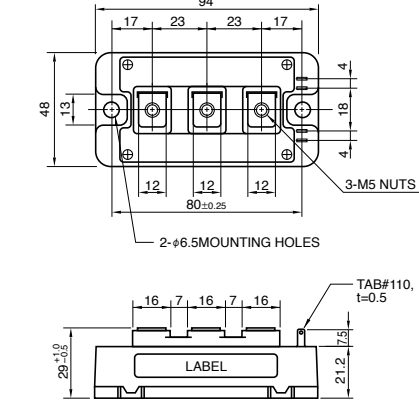


*All dimensions with a tolerance of ± 0.5

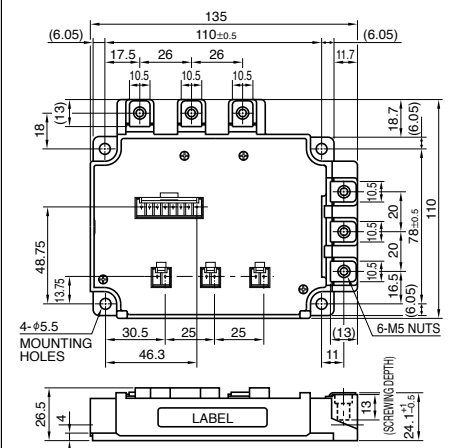
07 CM75,100,150TL/RL-12NF
CM50,75,100TL/RL-24NF



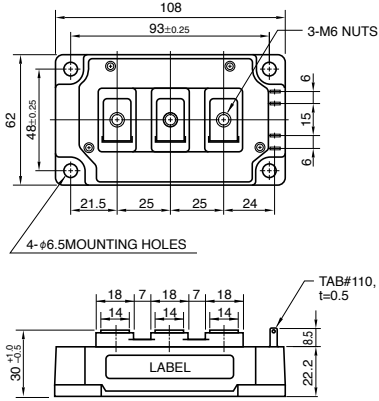
08 CM150,200,300DY-12NF
CM100,150DY-24NF
CM100,150,200DY-24A
CM75,100DY-34A
CM100,150E3Y-24NF



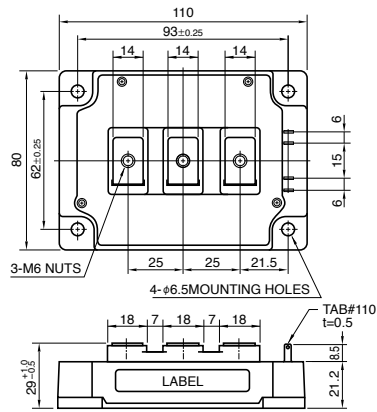
09 CM200TL/RL-12NF
CM150,200TL/RL-24NF



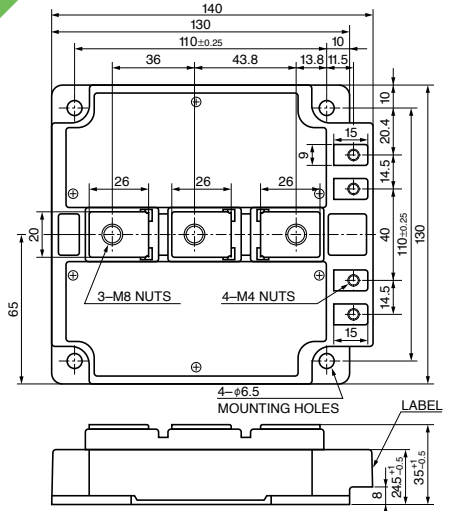
10 CM400DY-12NF
CM200DY-24NF
CM300DY-24A
CM300DY-24S
CM150,200DY-34A



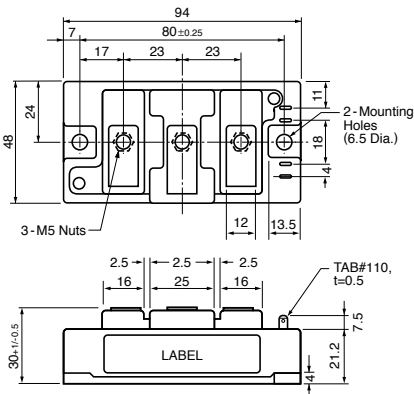
11 CM600DY-12NF CM400C1Y-24S
CM400DY-24NF CM450DY-24S
CM400,600DY-24A CM600DY-24S
CM300DY-34A CM300DY-24NF



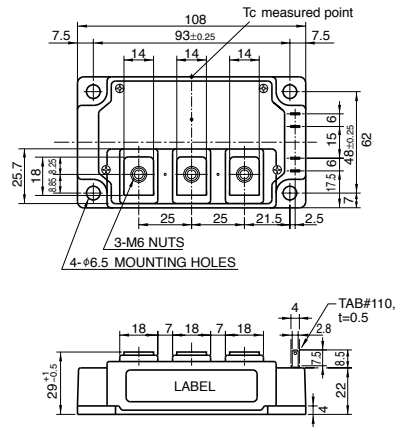
12 CM600DU-24NF
CM800DY-24S



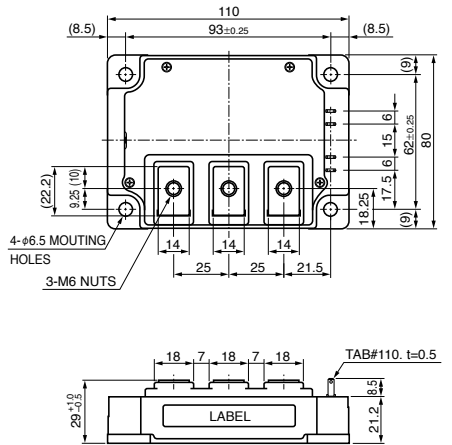
13 CM100,150DUS-12F
CM200DU-12NFH
CM100,150DU-24NFH



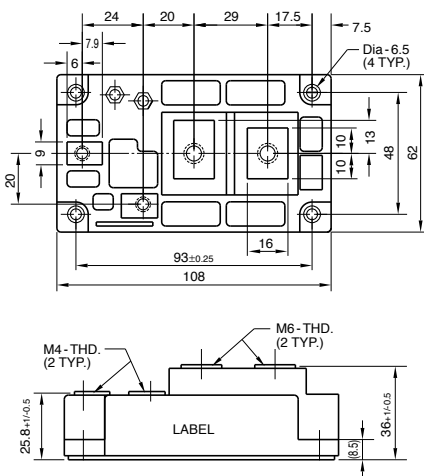
14 CM300,400DU-12NFH
CM200,300DU-24NFH



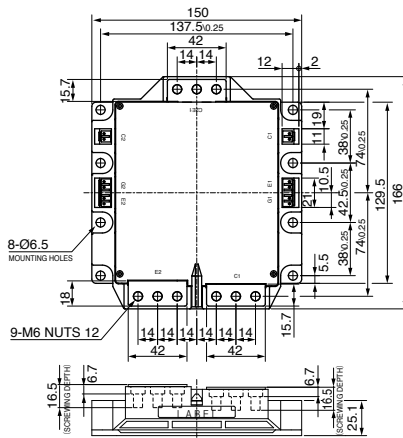
15 CM600DU-12NFH
CM400,600DU-24NFH



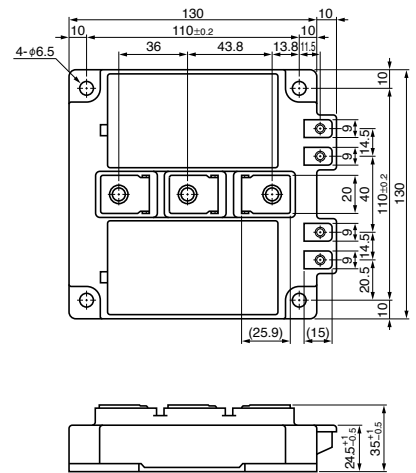
16 CM400,600HA-24A
CM500HA-34A



17 CM900,1400DUC-24S
CM1000DUC-34SA



18 CM400DY-34A

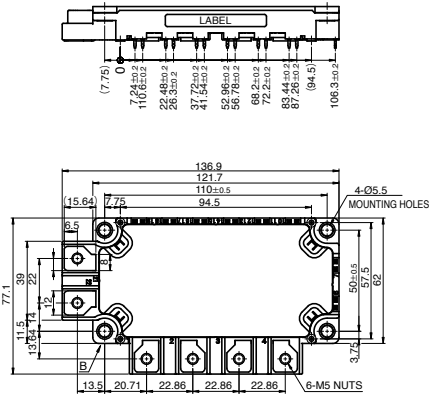


Line-up of IGBT Modules

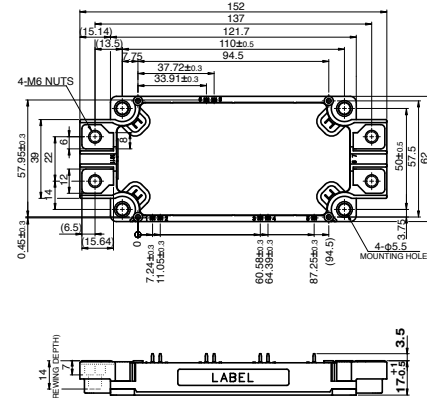
Outline Drawing of IGBT Modules

Unit:mm

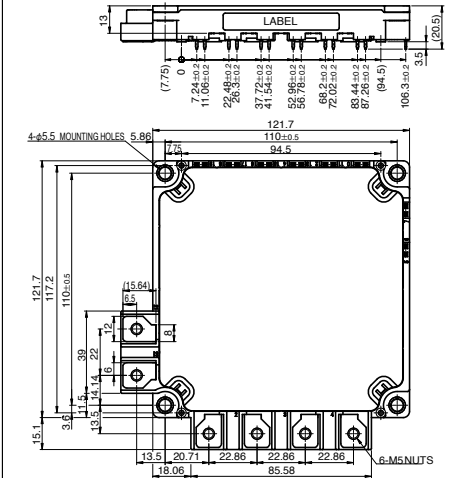
19 CM75RX-34SA



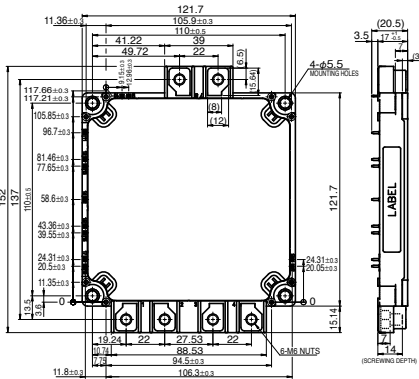
20 CM150DX-34SA
CM200DX-34SA
CM300DX-34SA



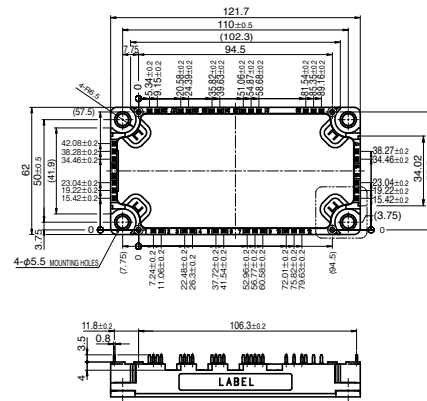
21 CM200RXL-24S
CM300RXL-24S1
CM150RXL-34SA



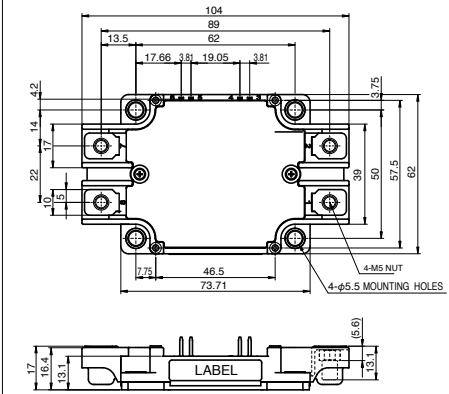
22 CM450DXL-34SA
CM600DXL-34SA



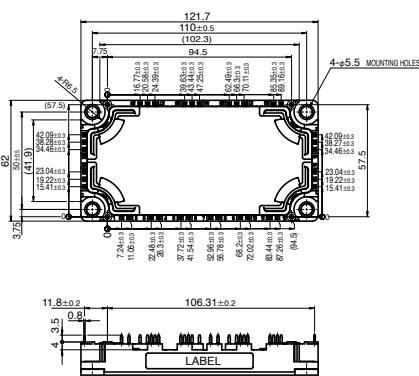
23 CM75MXA-34SA



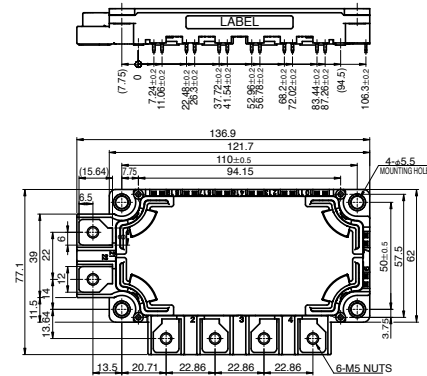
24 CM150EXS-24S
CM200EXS-24S
CM300EXS-24S
CM200EXS-34SA



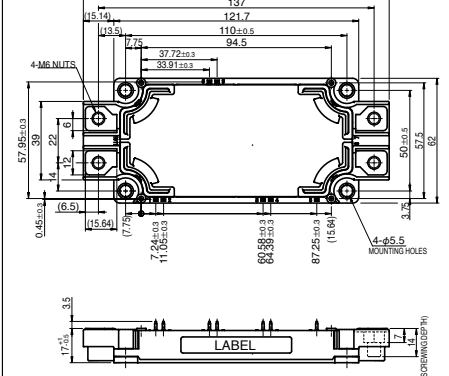
25 CM100TX-24S1
CM150TX-24S1



26 CM100RX-24S1
CM150RX-24S1



27 CM225DX-24S1
CM300DX-24S1
CM450DX-24S1
CM600DX-24S1

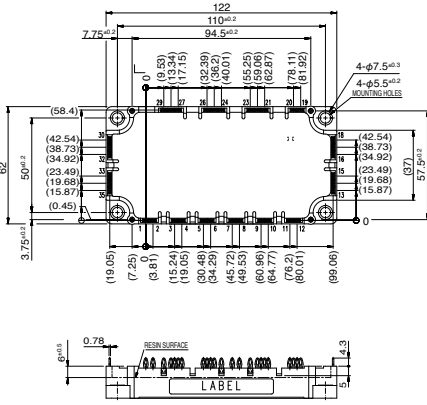


Line-up of IGBT Modules

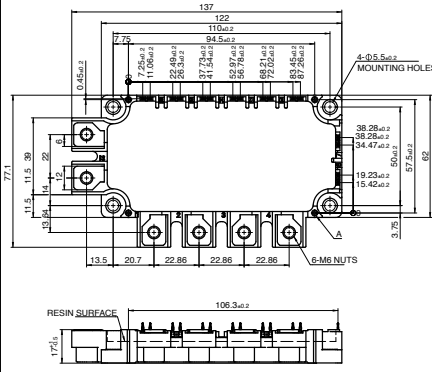
Outline Drawing of IGBT Modules

Unit:mm

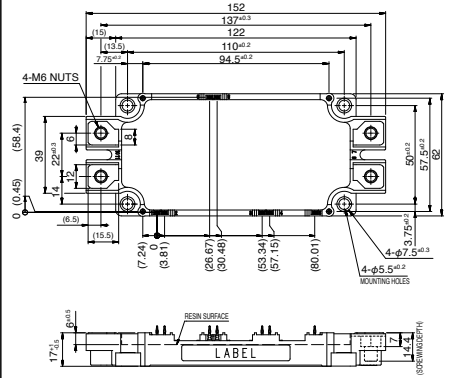
37
CM100,150,200TXP-13T
CM100,150,200TXP-24T
CM100,150TXP-34T



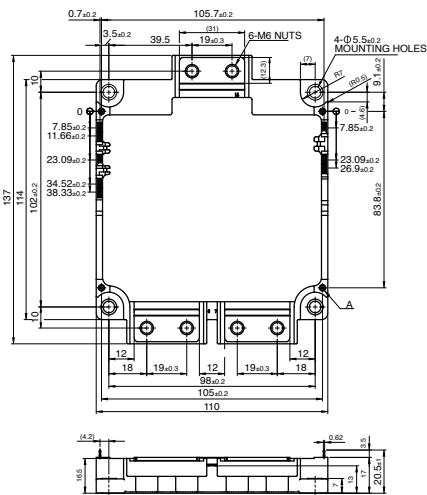
38
CM150,200RXP-13T
CM100,150RXP-24T



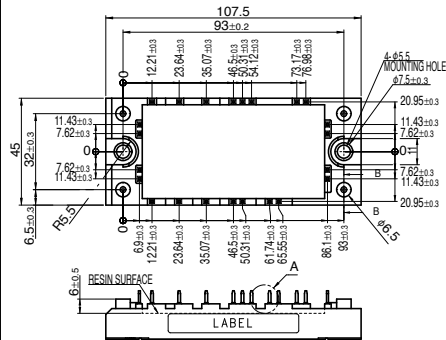
39
CM300,450,600DXP-13T
CM225,300,450,600DXP-24T



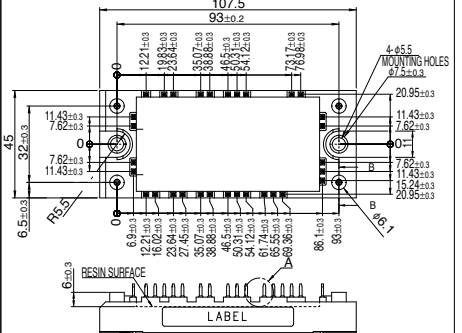
40
CM1000DXP-24T



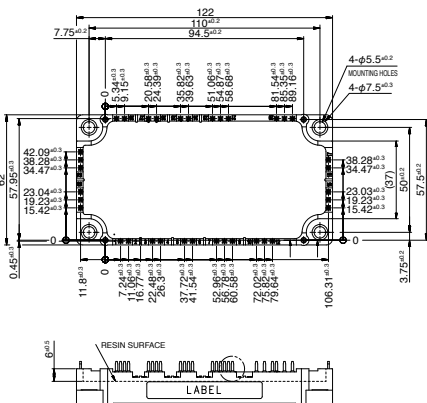
41
CM35,50MXUA-24T/24T1



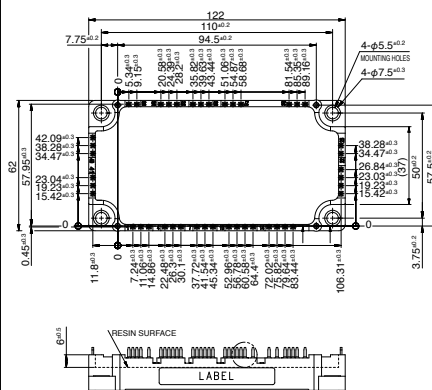
42
CM50,75,100MXUB-13T/13T1
CM75MXUB-24T/24T1



43
CM75,100MXUC-24T/24T1



44
CM100/150MXUD-13T/T1
CM150MXUD-24T/T1

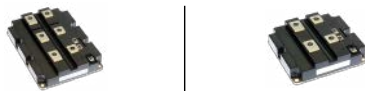




New Products

X Series HVIGBT Modules

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



	std. Type	
1.7kV	2400A/3600A	1600A/2400A
3.3kV	1200A/1800A	1200A
4.5kV	900A/1350A/1500A	900A/1000A
6.5kV	600A/900A/1000A	600A

<Main Features>

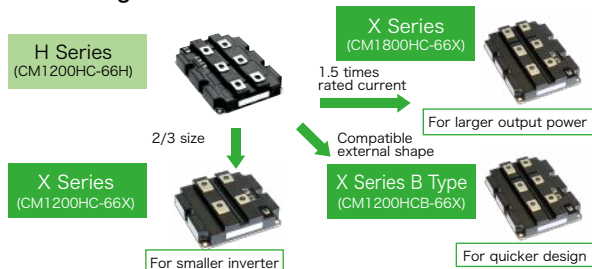
- Power loss reduced by incorporating 7th-generation IGBT and RFC¹ diode
- Industry-leading power² for increased inverter capacity
- External size reduced 33% while maintaining the same voltage resistance and rated current as conventional products,³ contributing to inverter downsizing
- Optimal package internal structure realizes improved heat dissipation, humidity resistance and flame retardance, increasing product life

*1 RFC : Relaxed field of cathode

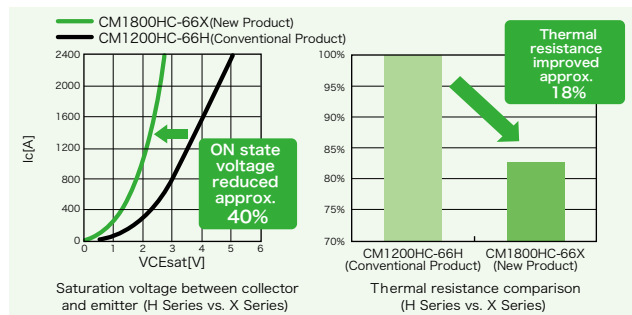
*2 3.3kV - 6.5kV (as of Apr. 5, 2018 based on Mitsubishi Electric research)

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

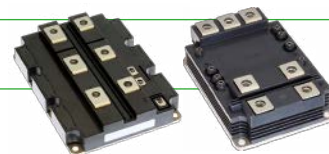
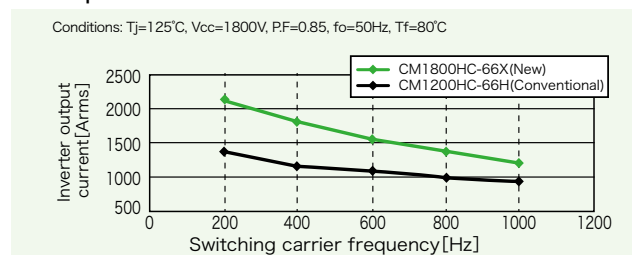
Positioning from conventional series



Characteristics graph



Output current characteristics



New common frame package: LV100/HV100 type
Class-leading current density contributes to increased power output in inverter systems



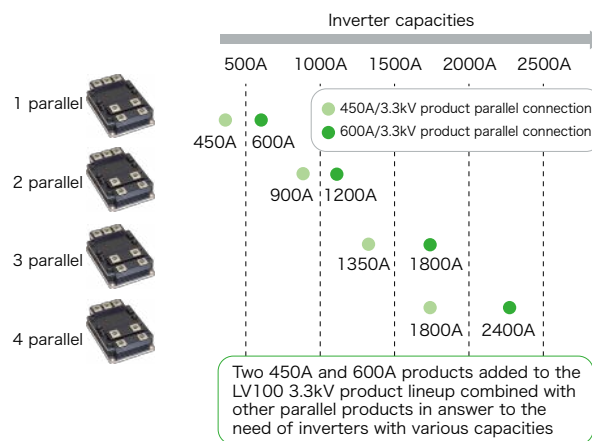
	LV100 Type	HV100 Type
1.7kV	1000A/1200A	
3.3kV	450A/600A	450A/600A
6.5kV		225A/300A

<Main Features>

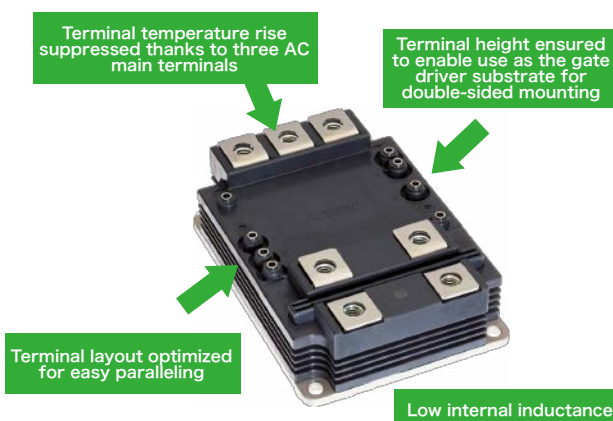
- Power loss reduced by incorporating 7th-generation IGBT and RFC¹ diode
- Industry's highest 3.3kV/600A Si module power density of 8.57A/cm² *4 contributes to increased power output and efficiency
- Terminal layout optimized for easy paralleling and flexible inverter configurations and capacities
- New package structure offers extra reliability

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

Various current ratings for optimal system design



Package features (LV100 type)

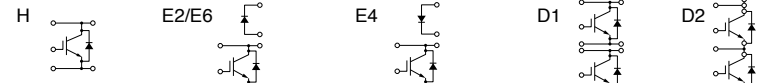


Line-up of HVIGBT Modules

Series Matrix of HVIGBT/HVIPM (No.: Number of outline drawing, see page 26 and 28)

V _{ces} I _c (A)	1700V				2500V				3300V				4500V				6500V										
	Model Number				Model Number				Model Number				Model Number				Model Number										
	Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.	Series	Connection	Type	No.							
200																											
225																											
300																											
400					H	CM400DY-50H	D1	B	15	H	CM400HG-66H	H	D	07													
										H	CM400DY-66H	D1	B	15													
										X	CM400HG-130H	H	D	12													
										X	CM400E2G-130H	E2	D	09													
										X	CM400E4G-130H	E4	D	09													
450										X	CM450DA-66X**	D2	A	20													
										X	CM450DE-66X**	D2	E	21													
600	H	CM600DY-34H	D1	B	01					X	CM600DA-66X**	D2	A	20	H	CM600HG-90H	H	D	12	H	CM600HG-130H	H	D	11			
	H	CM600E2Y-34H	E2	B	01					X	CM600DE-66X**	D2	E	21							X	CM600HG-130X**	H	D	18		
																					X	CM600HGB-130X**	H	D	19		
750																					R	CM750HG-130R	H	D	11		
800	N	CM800DZB-34N	D1	C	01					H	CM800HC-66H	H	C	03	R	CM800HC-90R	H	C	08								
	H	CM800DZ-34H	D1	C	01	H	CM800HB-50H	H	B	03	H	CM800E4C-66H	E4	C	06	R	CM800HG-90R	H	D	13							
	H	CM800HA-34H	H	B	-					H	CM800E6C-66H	E2	C	06													
900															H	CM900HC-90H	H	C	09								
															H	CM900HG-90H	H	D	13								
															X	CM900HG-90X**	H	D	18				X	CM900HG-130X**	H	D	19
															X	CM900HGB-90X**	H	D	19								
															X	CM900HG-90X**	H	D	19								
1000	X	CM1000DA-34X**	D2	A	20					R	CM1000HC-66R	H	C	08	X	CM1000HG-90X**	H	D	18	X	CM1000HG-130X**	H	D	19			
										R	CM1000E4C-66R	E4	C	10													
1200	H	CM1200HC-34H	H	C	02					H	CM1200HG-66H	H	D	09													
	N	CM1200HCB-34N	H	C	03					H	CM1200HC-66H	H	C	06													
	N	CM1200E4C-34N	E4	C	05	H	CM1200HC-50H	H	C	06	X	CM1200HC-66X**	H	C	16	R	CM1200HC-90R	H	C	10							
	N	CM1200DC-34N	D1	C	04					X	CM1200E4C-66X**	E4	C	16	R	CM1200HC-90RA	H	C	10								
	S	CM1200DC-34S	D1	C	04					X	CM1200HCB-66X**	H	B	17	R	CM1200HG-90R	H	D	11								
	X	CM1200DA-34X**	D2	A	20						PM1200HCE330-1	H	C	14													
1350															X	CM1350HC-90X**	H	C	17								
															X	CM1350HG-90X**	H	D	19								
1500										R	CM1500HC-66R	H	C	10	X	CM1500HC-90XA**	H	C	17								
										R	CM1500HG-66R	H	D	11	X	CM1500HG-90X**	H	D	19								
1600	H	CM1600HC-34H	H	C	02																						
	X	CM1600HC-34X**	H	C	16																						
1800	H	CM1800HC-34H	H	C	06					X	CM1800HC-66X**	H	C	17													
	N	CM1800HC-34N	H	C	05					X	CM1800HG-66X**	H	D	19													
	N	CM1800HCB-34N	H	C	06																						
2400	H	CM2400HC-34H	H	C	06																						
	X	CM2400HC-34X**	H	C	16																						
	N	CM2400HC-34N	H	C	05																						
	N	CM2400HCB-34N	H	C	06																						
	X	CM2400HCB-34X**	H	C	17																						
2400		CM3600HC-34X**	H	C	17																						

Connection



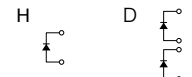
[Type] A: Al base plate / 6 kViso B:Cu base plate C:AISiC base plate / 6 kViso D:AISiC base plate / 10kViso E:Al base plate / 10kViso
 *There are possibility to change the type of auxiliary terminals.

★★: Under Development

Series Matrix of HVDIODE Modules (No.: Number of outline drawing, see page 28)

V _{PRM} I _F (A)	1700V			3300V			4500V			6500V		
	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.
200												
250												
300												
400												
450												
600												
800												
900												
1000												
1200												
1500												
1800												

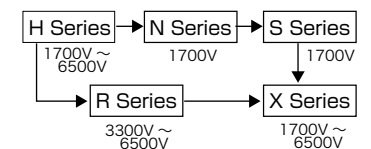
Connection



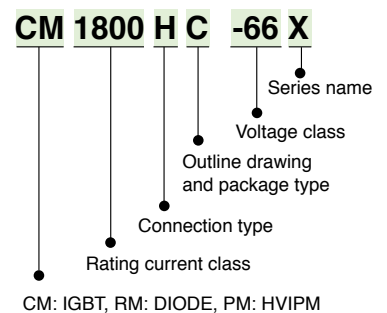
[Type] B:Cu base plate C:AISiC base plate / 6 kViso D:AISiC base plate / 10kViso

★★: Under Development

Evolution of HVIGBT Module Series

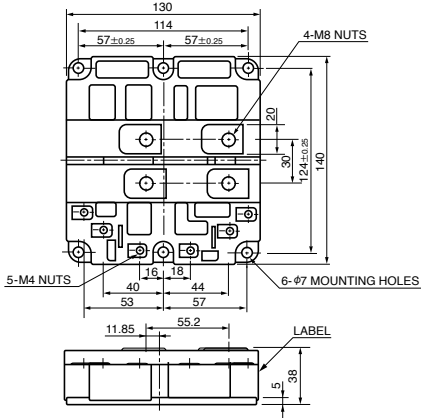


Type Name Definition of IGBT Modules

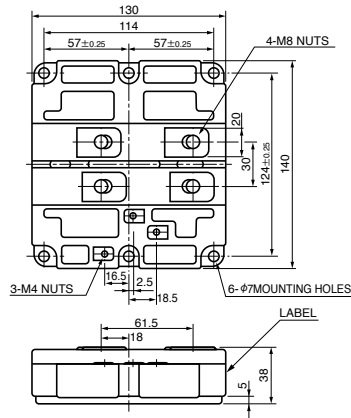


CM: IGBT, RM: DIODE, PM: HVIPM

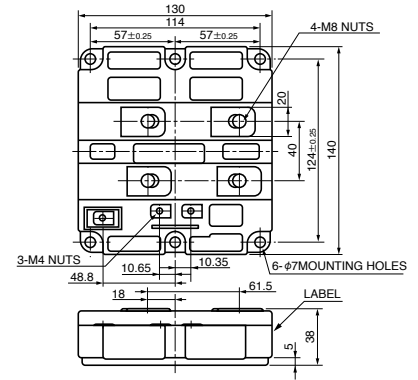
01 CM600DY-34H
CM600E2Y-34H
CM800DZ-34H
CM800DZB-34H



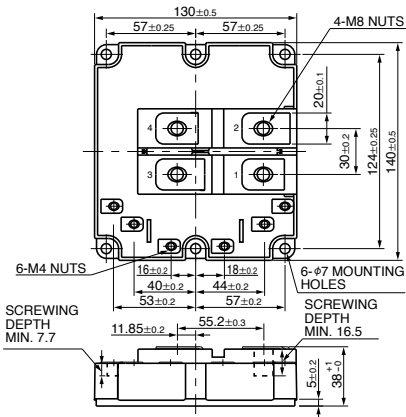
02 CM1200,1600HC-34H



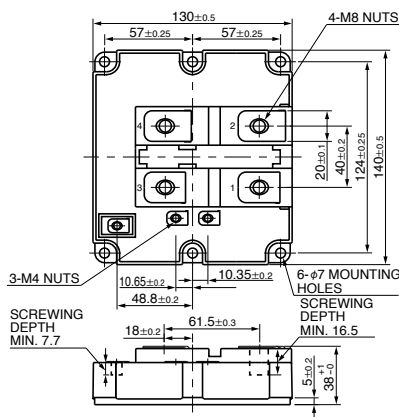
03 CM1200HCB-34N
CM800HB-50H,-66H
CM800HC-66H



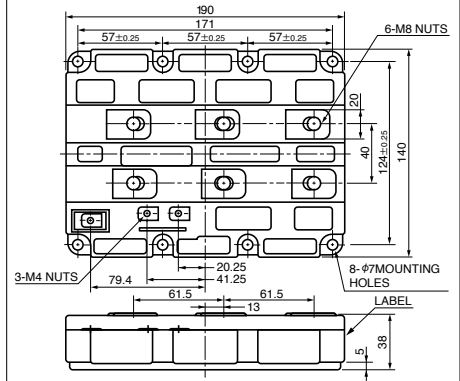
04 CM1200DB/DC-34N
CM1200DC-34S



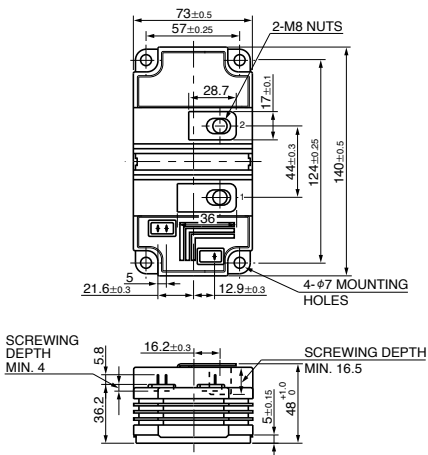
05 CM1200E4C-34N
CM1800,2400HC-34N



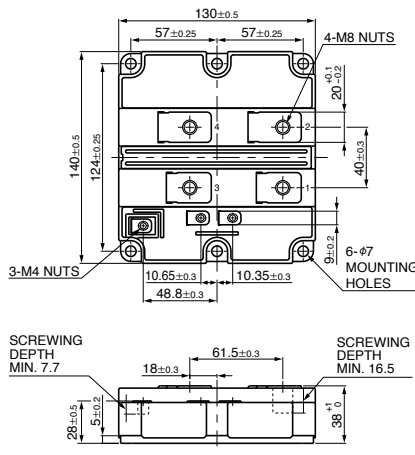
06 CM1800,2400HCB-34N
CM1800,2400HC-34H
CM1200HB/HC-50H,-66H
CM800E4C/E6C-66H
CM900HB/HC-90H



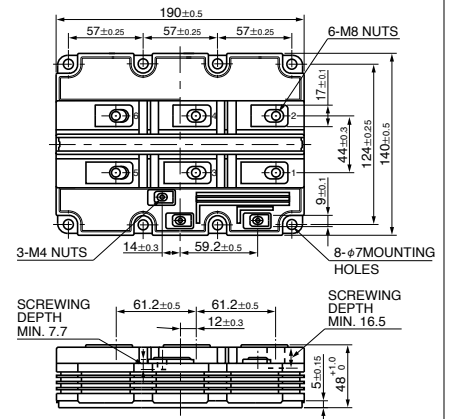
07 CM400HG-66H
CM200HG-130H



08 CM1000HC-66R
CM800HC-90R



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



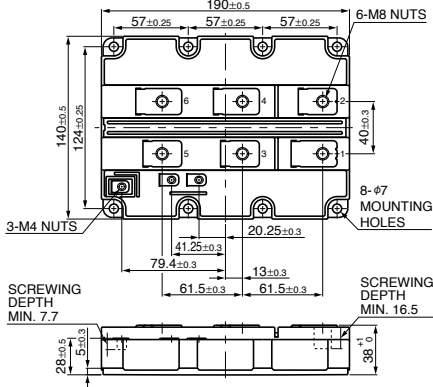
Line-up of HVIGBT Modules

Outline Drawing of HVIGBT Modules

Unit:mm

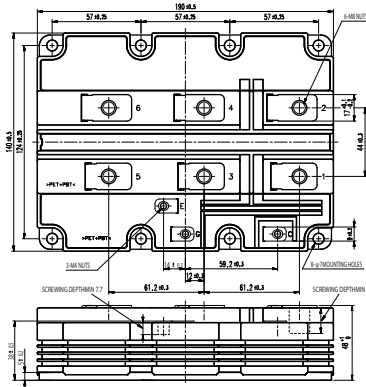
10

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



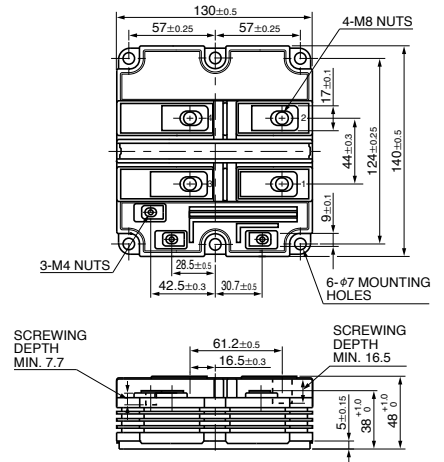
11

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



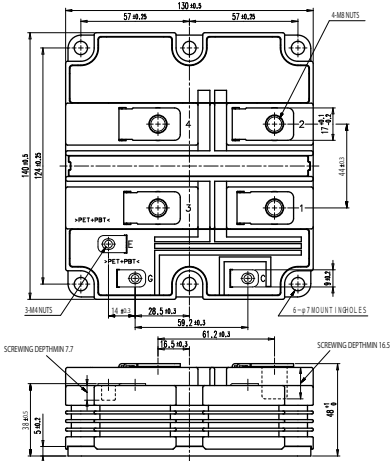
12

CM600HG-90H
CM400HG-130H



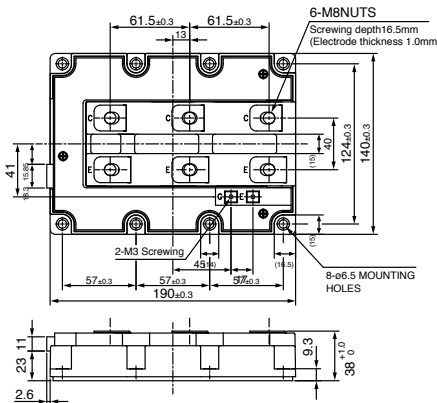
13

CM800HG-90R



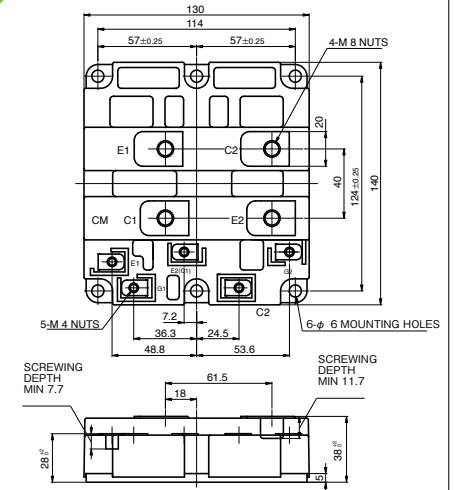
14

PM1200HCE330-1



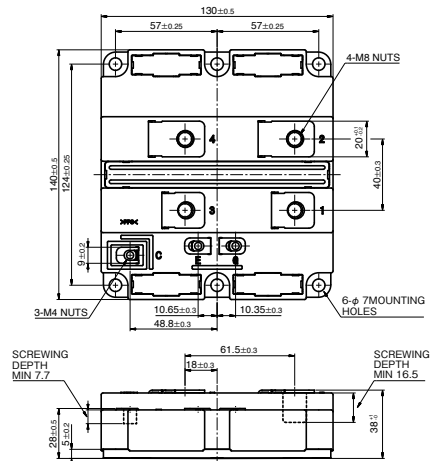
15

CM400DY-50H/66H



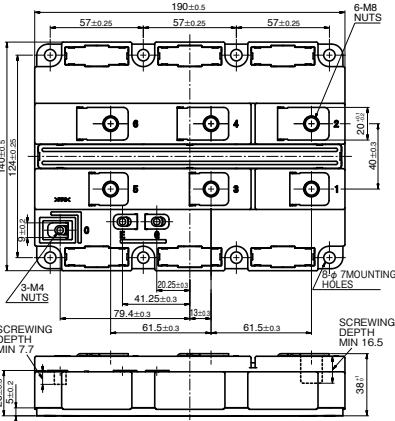
16

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



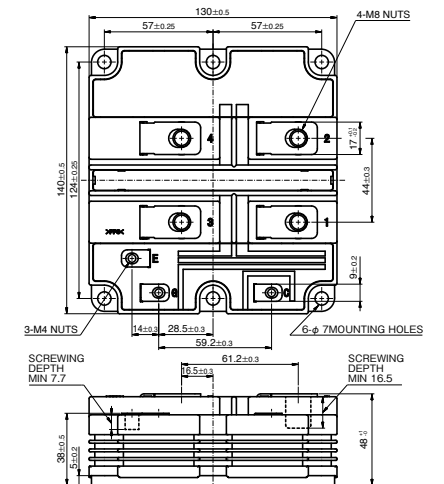
17

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



18

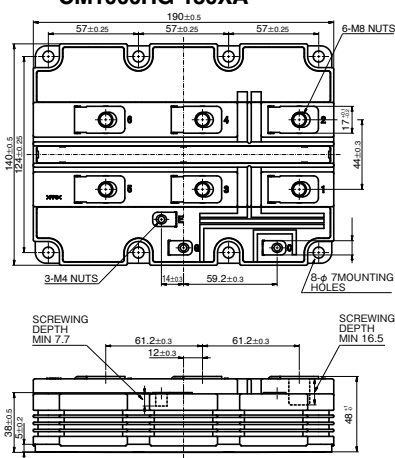
CM900HG-90X
CM1000HG-90X
CM600HG-130X



*There are possibility to change the type of auxiliary terminals.

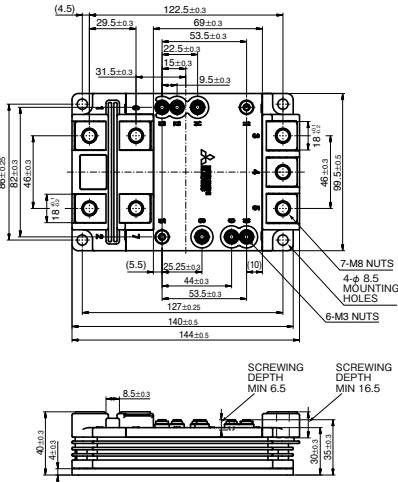
19

CM1800HG-66X, CM900HGB-90X
CM1350, 1500HG-90X
CM600HGB-130X
CM900HG-130X
CM1000HG-130XA



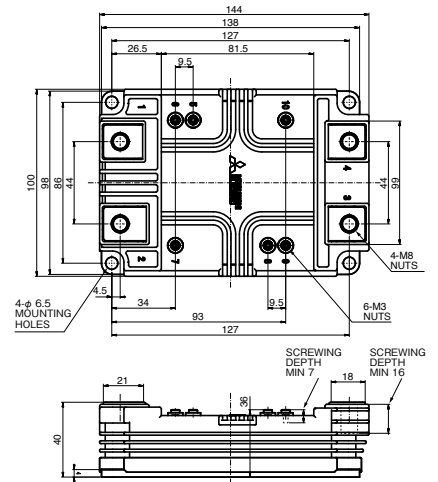
20

CM1000DA-34X
CM1200DA-34X
CM450DA-66X
CM600DA-66X



21

CM450DE-66X
CM600DE-66X
CM225DE-130XA
CM300DE-130XA

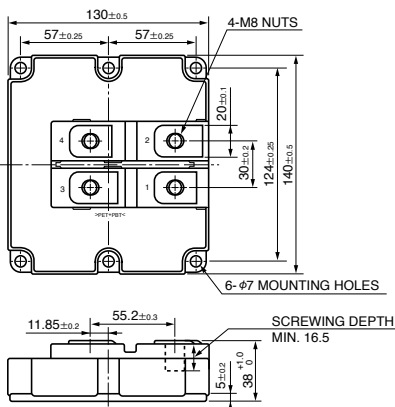


Outline Drawing of HVDIODE Modules

Unit:mm

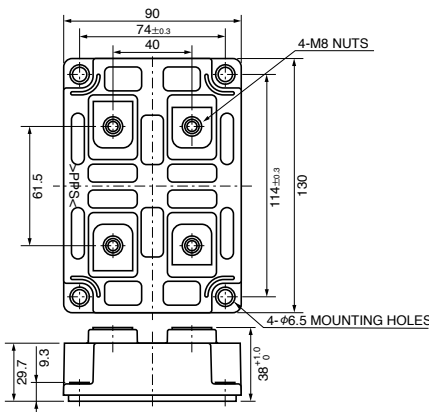
22

RM1200DB-34S



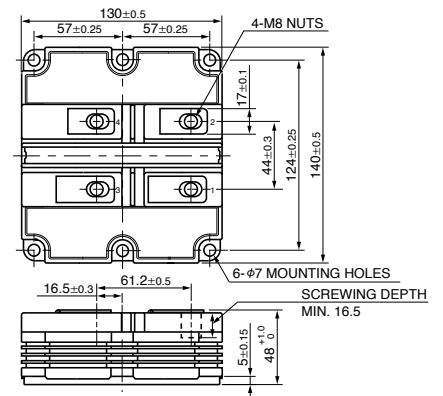
23

RM1800HE-34S
RM1200HE-66S
RM600HE-90S



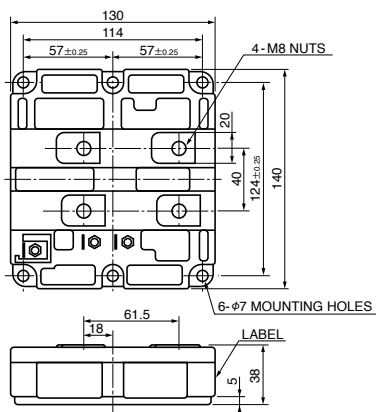
24

RM400,1200DG-66S
RM1200DG-66X
RM300DG-90S
RM400,800,1200DG-90F
RM450DG-90X
RM200,600DG-130S
RM300DG-130X
RM1000DG-130XA



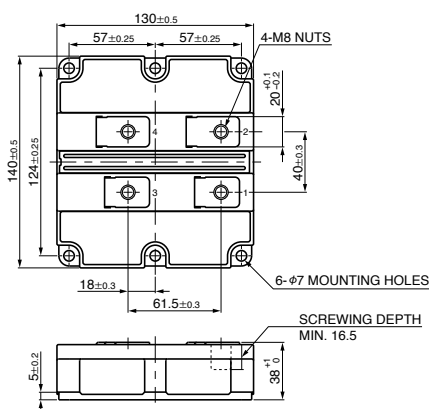
25

RM400,600DY-66S



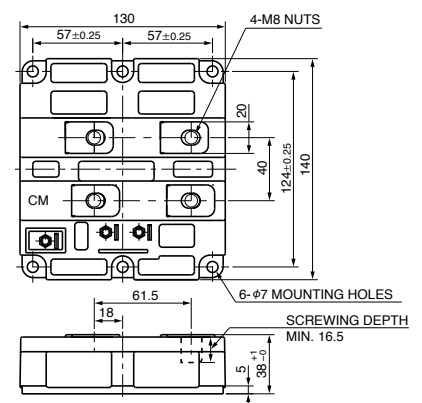
26

RM1000,1500DC-66F



27

RM1200DB-66S
RM900DB/HC-90S

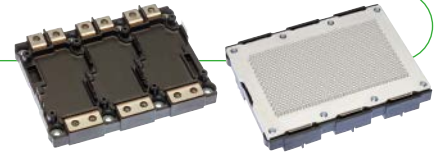


Power Modules for Electric and Hybrid Vehicles



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

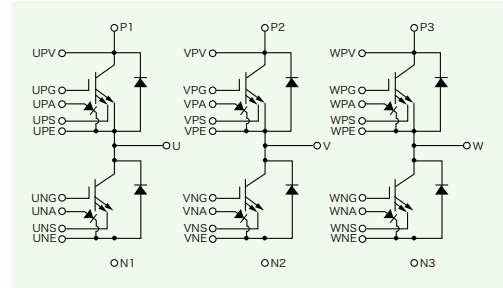
CT1000CJ1B060,
CT600CJ1B120

<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 _{CEs} (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	CT600DJH060**	D	03	
700	CT700CJ1A060*	C	01	-	-	-	
1000	CT1000CJ1B060*	C	04	-	-	-	

Connection

Connection

★: New Product ★★: Under Development

Matrix of 1200V Power Modules

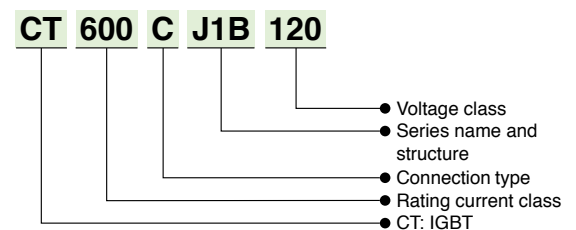
(No. : Number of Outline Drawing, please refer to page 30)

V _{CEs} (V)	1200V			
	Series	J1 Series		
		Power Module with pin fin	Connection	No.
300	CT300CJ1A120**	C	01	
600	CT600CJ1B120*	C	04	

Connection

★: New Product ★★: Under Development

Type Name Definition of Power Modules for Electric and Hybrid Vehicles



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for a greener tomorrow

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HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
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