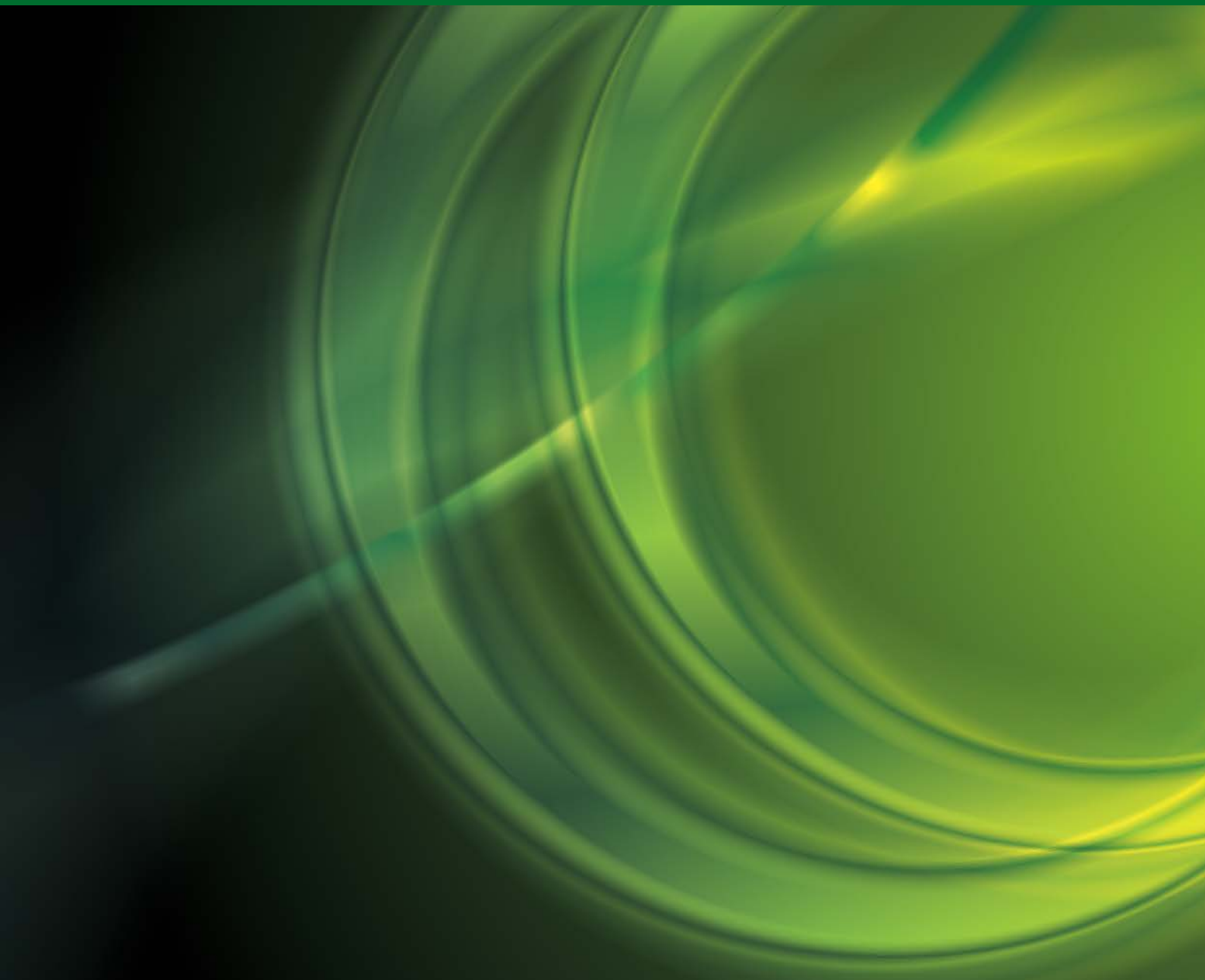
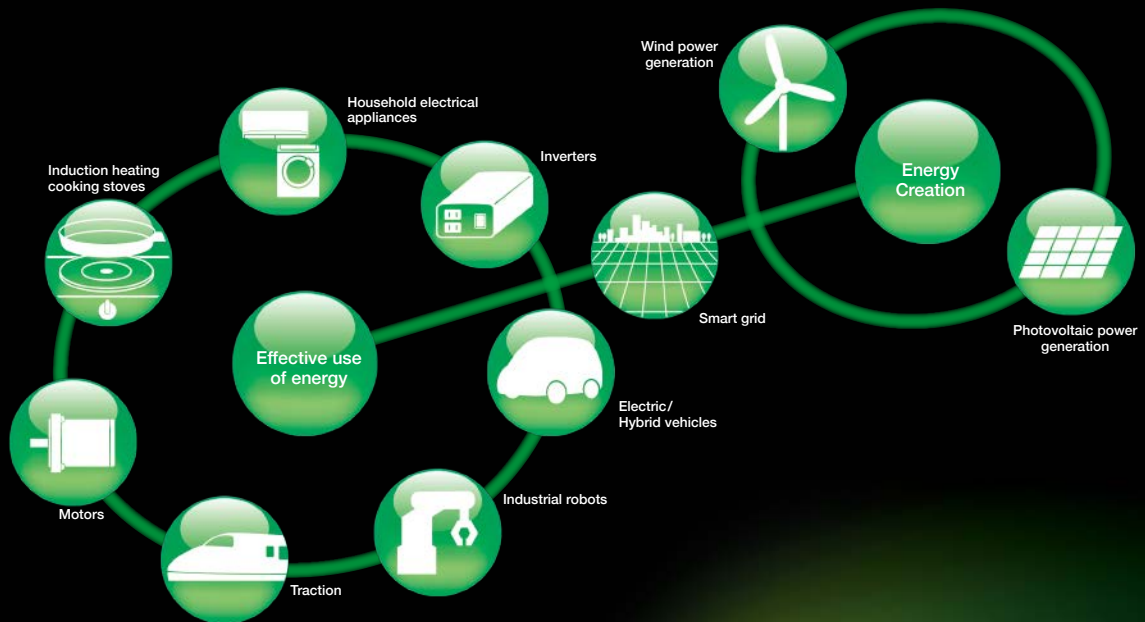


Power Modules



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.



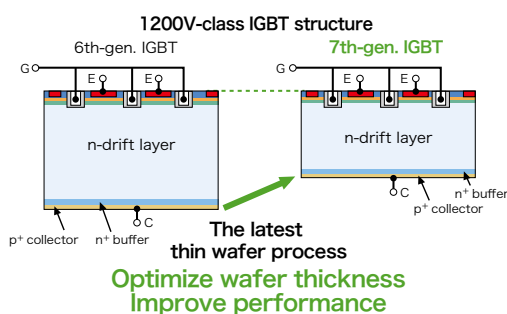


Focus Technology

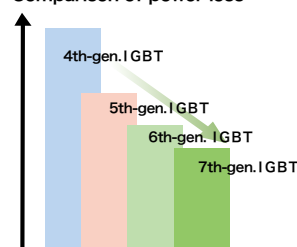
7th-Generation 1,200V-Class IGBT Chip Technology Cutting-edge technology realizes energy-saving inverter devices

- 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 using lower V_{CEsat} and E_{off}

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



Comparison of power loss

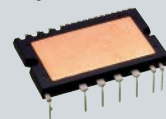


Modules realizing single-control power supply and photocoupler-less systems for household appliances and low-capacity inverters

Key Features

- Transfer-molded structure with insulation sheet having high heat conductivity simultaneously provides heat dissipation and insulation
- 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)

DIPIPM™
Dual-In-Line Package
Intelligent Power Modules



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

Key Features

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

IPM
Intelligent Power Modules

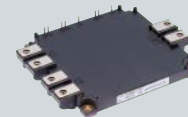


IGBT modules for general-purpose inverters used in various applications

Key Features

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

IGBT Modules
Insulated Gate Bipolar
Transistor Modules



Modules meeting the high voltage, current and insulation requirements of inverters for traction

Key Features

- High isolation package (10.2kVrms: AC60Hz 1min) matched to high catenary voltage
- Lightweight modules with aluminum silicon carbide (AlSiC) baseplate available
- Range of HV diode modules enabling highly efficient comprehensive converter design

HVIGBT Modules
High-Voltage Insulated Gate Bipolar
Transistor Modules



Modules realizing high performance and reliability as motor drives in HVs/EVs

Key Features

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

Power Modules for Vehicles
Power Modules for EV/PHEV





Feature Products

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

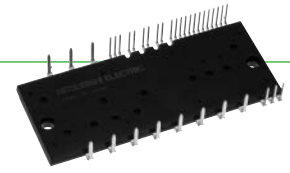
DIIPM+

PSS05MC1FT, PSS10MC1FT, PSS15MC1FT,
PSS25MC1FT, PSS35NC1FT, PSS50MC1F6

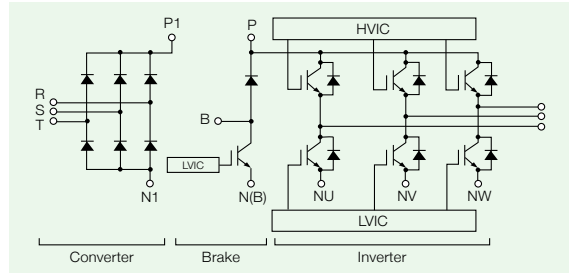
<Main Features>

- Encapsulated by 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



Internal circuit diagram



Feature Products

Contributing to reducing annual Power consumption of high-end air conditioners by incorporating SJ-MOSFET

SJ-MOSFET Super-mini DIIPM™

PSM10S94F6, PSM15S94H6, PSM20S94H6

<Main Features>

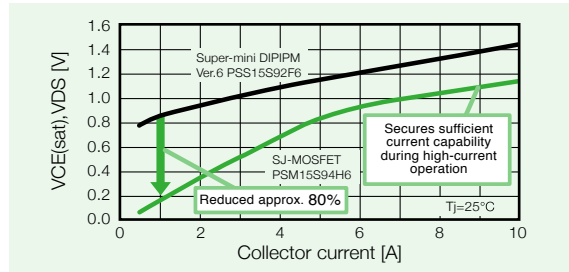
- SJ-MOSFET realizes approx. 80% smaller ON voltage during low-current operation compared to IGBT. It contributes to improving efficiency of air conditioner during steady-state operation especially
- Built-in IGBT function secures sufficient current capability during high-load operation
- Current rating lineup expanded to support 2.2-8.0kW class air conditioners
- External size, pin assignment, etc. secure compatibility with our Super-mini package^{*2} products
- Built-in BSD^{*3} for power supply to drive the P-side reduces number of external peripheral parts required

*1 Compared to Super-mini DIIPM Ver.6 PSS15S92F6 (15A/600V)

*2 Super-mini package such as Super-mini DIIPM Ver.6 Series, etc.

*3 BSD : Bootstrap diode

Output characteristics (Typical)



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

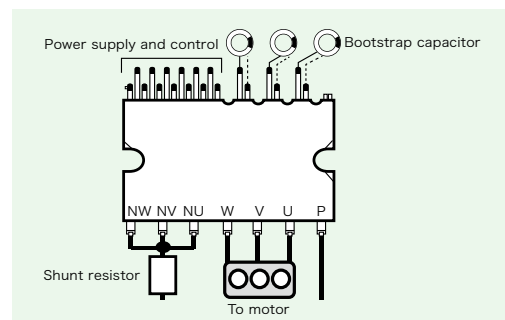
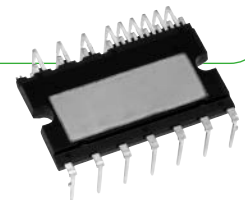
<Main Features>

- RC-IGBT^{*1} incorporated, reducing package size 30% compared to Super-mini DIIPM
- Maximum case temperature increased from 100°C to 115°C, raising 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



Line-up of DIIPM™

Series Matrix of 600V / 500V DIIPM™

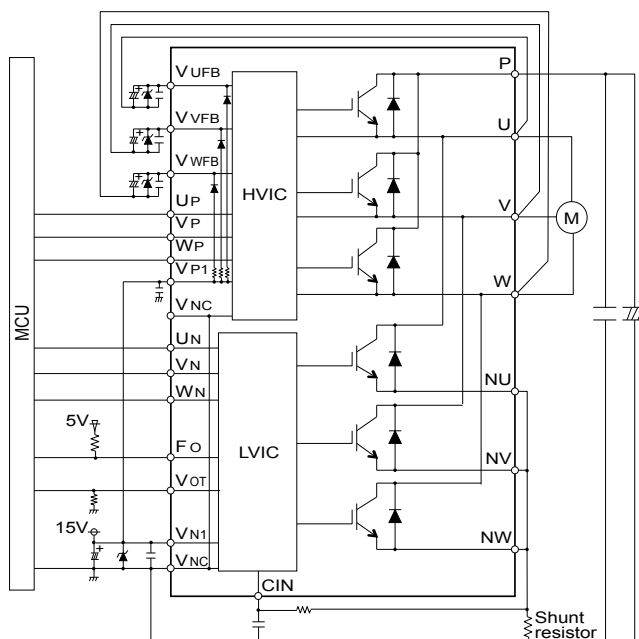
V _{CE} (V)	600V						500V	
	SLIMDIP	Ver.6	Industrial use	Ver.4	DIIPM+	MOSFET		
I _c (A)	SLIM	Super-mini	Mini	Large	CIB	Super-mini	Super-mini	
3								PSM03S93E5-A
5		PSS05S92F6-AG PSS05S92E6-AG	PSS05S51F6 PSS05S51F6-C					PSM05S93E5-A
10		PSS10S92F6-AG PSS10S92E6-AG	PSS10S51F6 PSS10S51F6-C					
15		PSS15S92F6-AG PSS15S92E6-AG	PSS15S51F6 PSS15S51F6-C					PSM15S94H6-A*
20	SLIMDIP-S* SLIMDIP-L*	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*7*			
75				PS21A7A				
Chip	IGBT/MOSFET	RC-IGBT	CSTBT	CSTBT	CSTBT	CSTBT	SJ-MOSFET	MOSFET
	HVIC	×1	×1	×3	×3	×1	×1	×1
	LVIC	×1	×1	×1	×1	×2 *8	×1	×1
	BSD	×3	×3	×3	—	×3	×3	×3
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} *2	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	1500Vrms*3	2500Vrms	2500Vrms	2500Vrms	1500Vrms*3	1500Vrms*3
	Insulation structure	Insulation sheet	Insulation sheet	Molding resin*6/Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive	Compliant *5	Compliant *5	Compliant *4,*5	Compliant *5	Compliant *5	Compliant *5	Compliant *5
	Pin type	Control side of zigzag	Long	C: Control side of zigzag None: Short	—	—	Long	Long

*: New Product

- [Notes] *1: PSSxxS92E6 has OT function, PSSxxS92F6 has V_{OT} function
 *2: Analog temperature output
 *3: AC60Hz, 1minute. Corresponds to isolation voltage 2500Vrms in the case the convex-shaped heat sink
 *4: High melting point solder (Lead Over 85%) is used for chip soldering of PSSxxS51F6 only
 *5: Pin plating and chip soldering : Lead-free solder
 *6: Molding resin insulation for PSSxxS51F6/C
 *7: PSS50NC1F6 doesn't integrate brake part
 *8: LVIC 1pcs in case of PSS50NC1F6

[Term] CIB: Converter inverter brake

Application circuit of built-in BSD super-mini DIIPM™



Line-up of DIIPM™

Series Matrix of 1200V DIIPM™

V _{ces} (V)		1200V			
I _c (A)	Series	Mini Type	Ver.6	Ver.4	DIIPM+
		Mini	Large	Large	CIB
5	PSS05S72FT	PSS05SA2FT	PS22A72		PSS05MC1FT* PSS05NC1FT*
10	PSS10S72FT	PSS10SA2FT	PS22A73		PSS10MC1FT* PSS10NC1FT*
15		PSS15SA2FT	PS22A74		PSS15MC1FT* PSS15NC1FT*
25		PSS25SA2FT	PS22A76		PSS25MC1FT* PSS25NC1FT*
35		PSS35SA2FT	PS22A78-E		PSS35MC1FT* PSS35NC1FT*
50		PSS50SA2FT	PS22A79		

Chip	IGBT/MOSFET	CSTBT	CSTBT	CSTBT	CSTBT
	HVIC	×3	×3	×3	×3
LVIC	×1	×1	×1	×1	×2 *4
BSD	×3	×3	—	—	×3

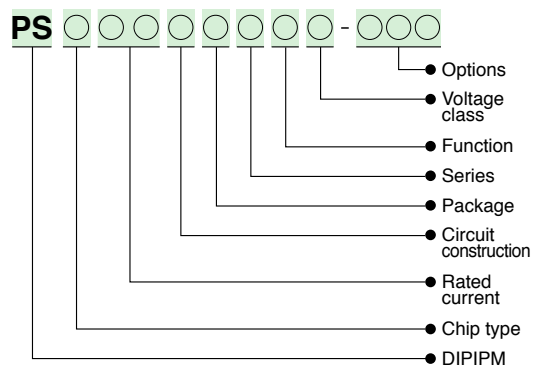
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side/Brake
	SC	N-side	N-side	N-side	N-side
	OT	—	—	—	—
Specifications	V _{OT} *1	N-side	N-side	N-side	N-side
	Active input	High(5V)	High(5V)	High(5V)	High(5V)
	Emitter pin of N-side	Open	Open	Open	Open
	Fault output	N-side (UV,SC)	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 *2	Compliant *2	Compliant *2	Compliant *2
Pin type	—	—	—	—	

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

- [Notes] *1: Analog temperature output
 *2: Pin plating and chip soldering : Lead-free solder
 *3: PSS**NC1FTis not included brake.
 *4: LVIC 1pcs in case of PSS**NC1FT

- [Term] CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect.
 BSD: Bootstrap diode, HVIC: High-voltage IC, LVIC: Low-voltage IC,
 UV: Supply Under Voltage protection,
 SC: Short circuit protection, OT: Over-temperature protection,
 RoHS: Restriction of hazardous substances in electrical and electronic equipment
 CIB: Converter inverter brake

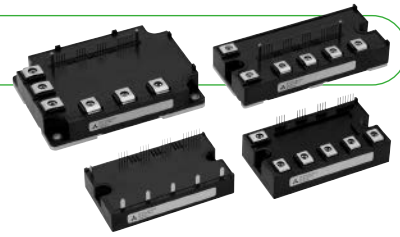
Type Name Definition of DIIPM™





New Products

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



IPM G1 Series with 7th-generation IGBT

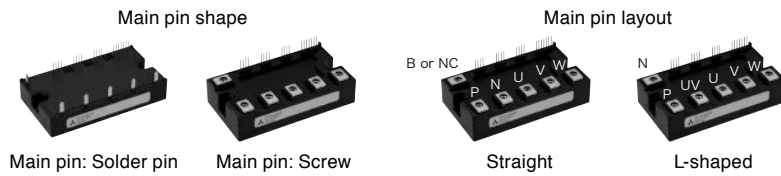
<Main Features>

- 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, the same as that for the 7th-generation IGBT modules introduced, eliminates the solder-attached section, and the thermal cycle lifetime has been increased, which contributes to improving inverter reliability.
- In addition to the built-in functions of the previous product,³ a low-noise drive, error detection function and bootstrap power source⁴ contribute to lowering inverter noise and shortening design time.
- The introduction of press-fit pins and 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 power supply: Optional products include 50A, 75A, 100A/650V, 25A, 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

Vces(V)	Package	Connection	Ic (A)							
			25	50	75	100	150	200	300	450
650V	A package	C		PM50CG1A065**	PM75CG1A065**	PM100CG1A065**				
		R		PM50RG1A065**	PM75RG1A065**					
	B package	C		PM50CG1B065**	PM75CG1B065**	PM100CG1B065**	PM150CG1B065**	PM200CG1B065**		
		R		PM50RG1B065**	PM75RG1B065**	PM100RG1B065**	PM150RG1B065**	PM200RG1B065**		
	C package	C						PM200CG1C065**	PM300CG1C065**	PM450CG1C065**
		R						PM200RG1C065**	PM300RG1C065**	
1200V	A package	C	PM25CG1A120**	PM50CG1A120**						
		R	PM25RG1A120**							
	B package	C	PM25CG1B120**	PM50CG1B120**	PM75CG1B120**	PM100CG1B120**				
		R	PM25RG1B120**	PM50RG1B120**	PM75RG1B120**	PM100RG1B120**				
	C package	C				PM100CG1C120**	PM150CG1C120**	PM200CG1C120**		
		R				PM100RG1C120**	PM150RG1C120**			

★★: Under Development

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

Line-up of IPM

Series Matrix of 600V IPM (No.: Number of outline drawing, see page 10 to 11)

V _{CE} (V)	Series	600V																					
		G Series			L1 Series			S1 Series			V1 Series			Photovoltaic			L Series						
I _c (A)		Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.						
50	PM50CGAP060*	C	09											PM50B4LA060	B4	01							
	PM50CGB060*	C	10											PM50B5LA060	B5	01							
	PM50RGAP060*	R	09	PM50CL1A060	C	01								PM50B6LA060	B6	01	PM50CLA060	C					
	PM50RGB060*	R	10	PM50CL1B060	C	02								PM50B4LB060	B4	02	PM50CLB060	C					
					PM50RL1A060	R	01	PM50CS1D060	C	05				PM50B5LB060	B5	02	PM50RLA060	R					
	PM50CGA060*	C	12	PM50RL1B060	R	02								PM50B6LB060	B6	02	PM50RLB060	R					
	PM50CGAL060*	C	12	PM50RL1C060	R	03								PM50B4L1C060	B4	03							
	PM50CGAPL060*	C	09											PM50B5L1C060	B5	03							
	PM50RGA060*	R	12											PM50B6L1C060	B6	03							
	75	PM75CGAP060*	C	09											PM75B4LA060	B4	01						
PM75CGB060*		C	10											PM75B5LA060	B5	01							
PM75RGAP060*		R	09	PM75CL1A060	C	01								PM75B6LA060	B6	01	PM75CLA060	C					
PM75RGB060*		R	10	PM75CL1B060	C	02								PM75B4LB060	B4	02	PM75CLB060	C					
					PM75RL1A060	R	01	PM75CS1D060	C	05				PM75B5LB060	B5	02	PM75RLA060	R					
PM75CGA060*		C	12	PM75RL1B060	R	02								PM75B6LB060	B6	02	PM75RLB060	R					
PM75CGAL060*		C	12											PM75B4L1C060	B4	03							
PM75CGAPL060*		C	09											PM75B5L1C060	B5	03							
PM75RGA060*	R	12											PM75B6L1C060	B6	03								
100	PM100CGAP060*	C	09																				
	PM100CGB060*	C	10	PM100CL1A060	C	01											PM100CLA060	C					
	PM100RGB060*	R	10	PM100CL1B060	C	02											PM100RLA060	R					
					PM100RL1A060	R	01	PM100CS1D060	C	05													
	PM100CGA060*	C	12	PM100RL1B060	R	02																	
150	PM150CGB060*	C	10	PM150CL1A060	C	01												PM150CLA060	C				
	PM150RGB060*	R	10	PM150CL1B060	C	02												PM150RLA060	R				
					PM150RL1A060	R	01	PM150CS1D060	C	05													
200	PM200CGBB060*	C	10	PM200CL1A060	C	04													PM200CLA060	C			
	PM200CGC060*	C	11	PM200RL1A060	R	04													PM200RLA060	R			
	PM200RGC060*	R	11																				
300	PM300CGC060*	C	11	PM300CL1A060	C	04													PM300CLA060	C			
	PM300RGC060*	R	11	PM300RL1A060	R	04													PM300RLA060	R			
400/450	PM450CGC060*	C	11									PM400DV1A060	D	06					PM450CLA060	C	08		
600																				PM600CLA060	C	08	
800																							
IGBT chip		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*2							
		Built-in emitter sensor		Built-in emitter sensor		Built-in emitter sensor		Built-in emitter sensor		Built-in emitter sensor		Built-in emitter sensor		Built-in emitter sensor		Built-in emitter sensor							
		Built-in temperature sensor		Built-in temperature sensor		Built-in temperature sensor		Built-in temperature sensor		Built-in temperature sensor		Built-in temperature sensor		Built-in temperature sensor		Built-in temperature sensor							
		UV	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side								
Fault output	OT	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side									
	SC	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side		P-side/N-side									
	OC	-		-		-		-		-		-		-									
RoHS directive	Compliant		Compliant		Compliant		Compliant		Compliant		Compliant		Compliant										
Compatibility	-		L Series		S-DASH SERVO		V Series		-		-												
Connection	D			B4				B5				B6				C				R			

★: Under Development ★: 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

Line-up of IPM

Series Matrix of 1200V IPM (No.: Number of outline drawing, see page 10 to 11)

V _{CE(S)} (V)		1200V														
Series	G Series			L1 Series			S1 Series			V1 Series			L Series			
	I _C (A)	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.			
25	PM25CGAP120*	C	09													
	PM25CGB120*	C	10													
	PM25RGAP120*	R	09													
	PM25RGB120*	R	10	PM25CL1A120	C	01						PM25CLA120	C			
				PM25CL1B120	C	02						PM25CLB120	C			
	PM25CGA120*	C	12	PM25RL1A120	R	01	PM25CS1D120	C	05			PM25RLA120	R			
	PM25CGAL120*	C	12	PM25RL1B120	R	02						PM25RLB120	R			
	PM25CGAPL120*	C	09	PM25RL1C120	R	03										
PM25RGA120*	R	12														
50	PM50CGAP120*	C	09													
	PM50CGB120*	C	10													
	PM50RGB120*	R	10	PM50CL1A120	C	01						PM50CLA120	C			
				PM50CL1B120	C	02	PM50CS1D120	C	05			PM50CLB120	C			
	PM50CGA120*	C	12	PM50RL1A120	R	01						PM50RLA120	R			
	PM50CGAL120*	C	12	PM50RL1B120	R	02						PM50RLB120	R			
75	PM75CGB120*	C	10	PM75CL1A120	C	01						PM75CLA120	C			
	PM75RGB120*	R	10	PM75CL1B120	C	02	PM75CS1D120	C	05			PM75CLB120	C			
				PM75RL1A120	R	01						PM75RLA120	R			
				PM75RL1B120	R	02						PM75RLB120	R			
100	PM100CGB120*	C	10	PM100CL1A120	C	04						PM100CLA120	C			
	PM100CGC120*	C	11	PM100RL1A120	R	04	PM100CS1D120	C	05			PM100RLA120	R			
	PM100RGC120*	R	11													
150	PM150CGC120*	C	11	PM150CL1A120	C	04						PM150CLA120	C			
	PM150RGC120*	R	11	PM150RL1A120	R	04						PM150RLA120	R			
200	PM200CGC120*	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 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*1 Built-in current sensor Built-in temperature sensor			CSTBT*2 Built-in current sensor Built-in temperature sensor			
	UV	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side		
Fault output	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		
	OC	-			-			-			-			-		
RoHS directive	Compliant			Compliant			Compliant			Compliant			Compliant			
Compatibility	-			L Series			S-DASH SERVO			V Series			-			
Connection	D				C			R								
	C				R											

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

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

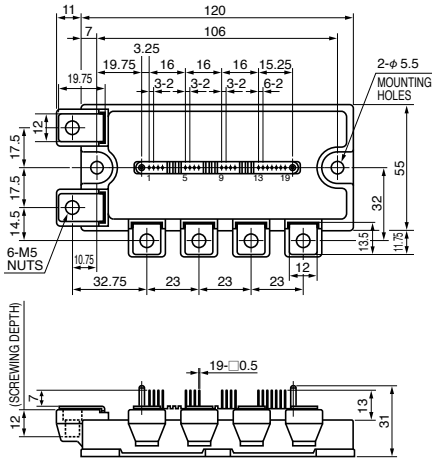
[Term] UV: Supply Under Voltage-lock protection, SC: Short-circuit protection, OT: Over-temperature protection, OC: Over-current protection, CSTBT™: Carrier stored trench-gate bipolar transistor.
RoHS: Restriction of hazardous substances in electrical and electronic equipment

Outline Drawing of IPM

Unit:mm

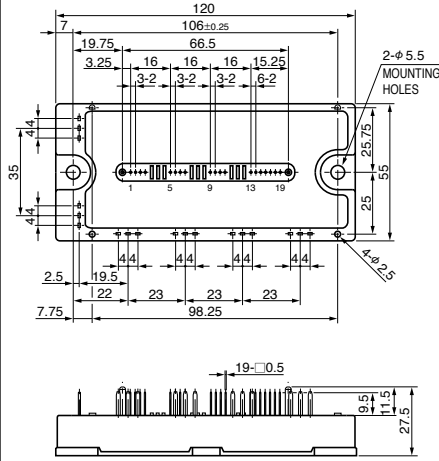
01

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



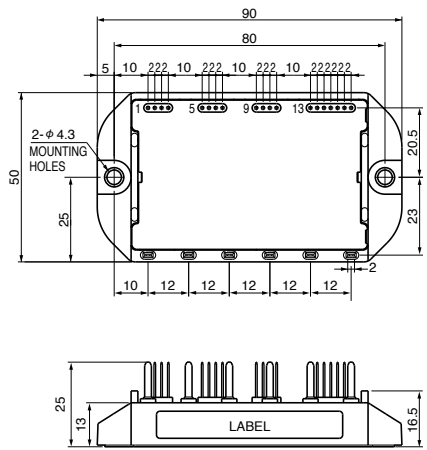
02

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



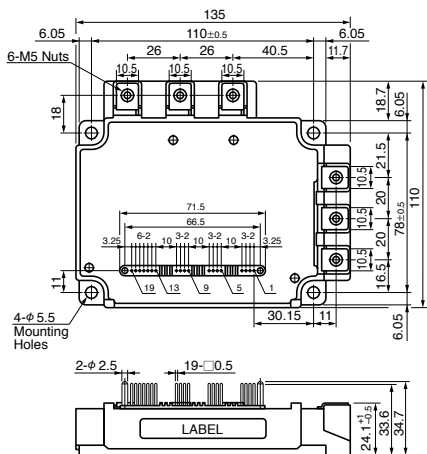
03

PM50RL1C060
PM25RL1C120
PM50,75,B4/B5/B6L1C060



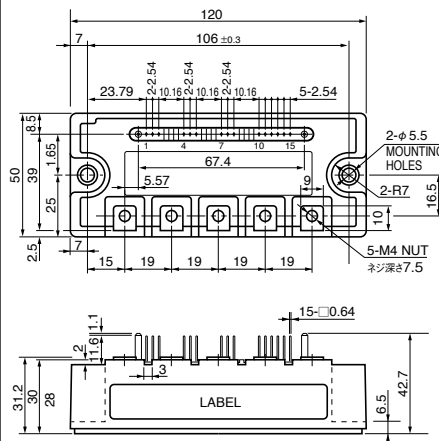
04

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



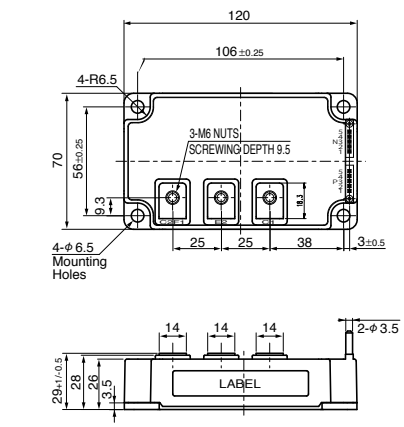
05

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



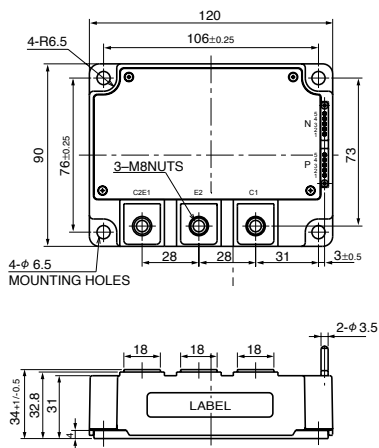
06

PM400,600DV1A060
PM200,300,450DV1A120



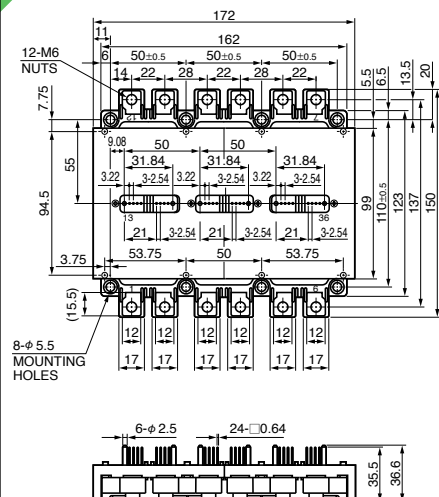
07

PM800DV1B060



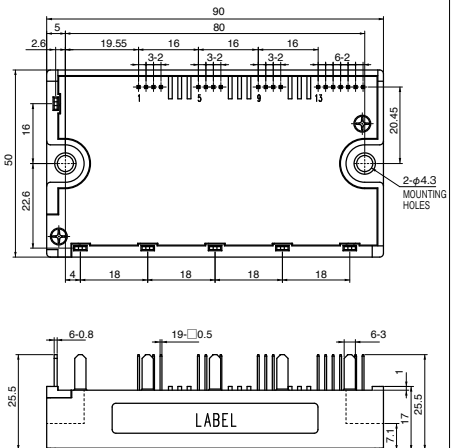
08

PM450,600CLA060
PM200,300,450CLA120



09

PM50,75,100CGAP/CGAPL/
RGAP060
PM25,50CGAP/CGAPL/
RGAP120



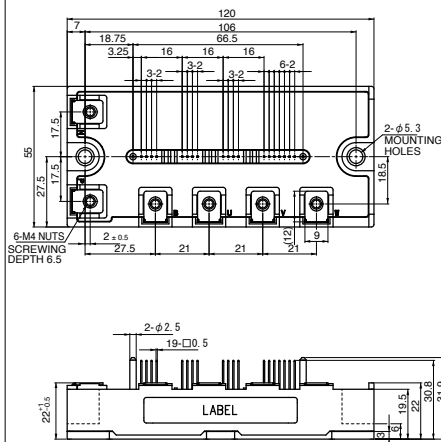
Line-up of IPM

Outline Drawing of IPM

Unit:mm

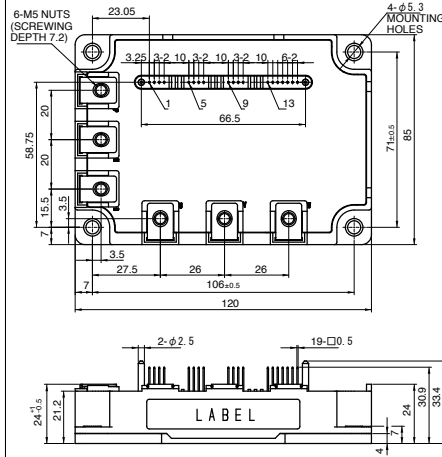
10

PM50,75,100,150CGB/RGB060
PM200CGBB060
PM25,50,75,100CGB/RGB120



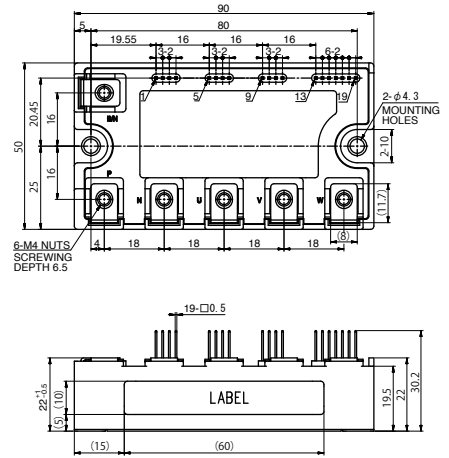
11

PM200,300CGC/RGC060
PM100,150,200CGC/RGC120



12

PM50,75,100CGA/CGAL060
PM50,75RGA060
PM25,50CGA/CGAL120
PM25RGA120



Line-up of MOSFET Modules

Series Matrix of MOSFET Modules

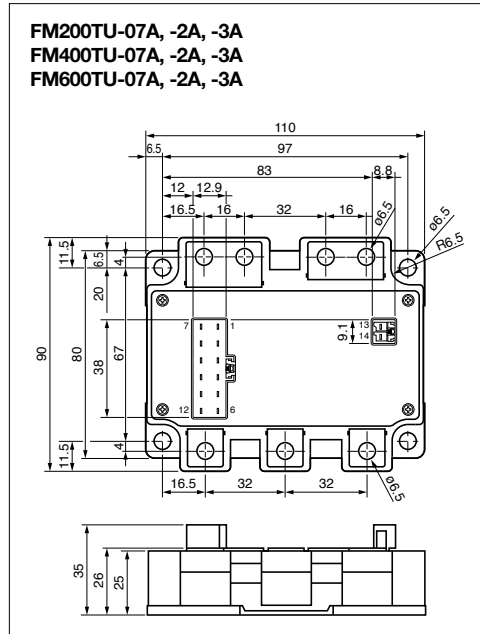
RoHS directive compliant

V_{DS} I_D (A)	75V		100V		150V	
	Part Number	Connection	Part Number	Connection	Part Number	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

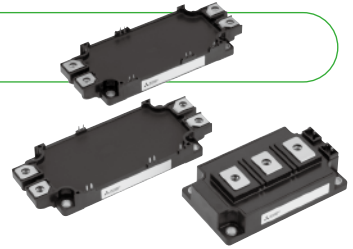




New Products

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

T Series 7th-generation IGBT Module



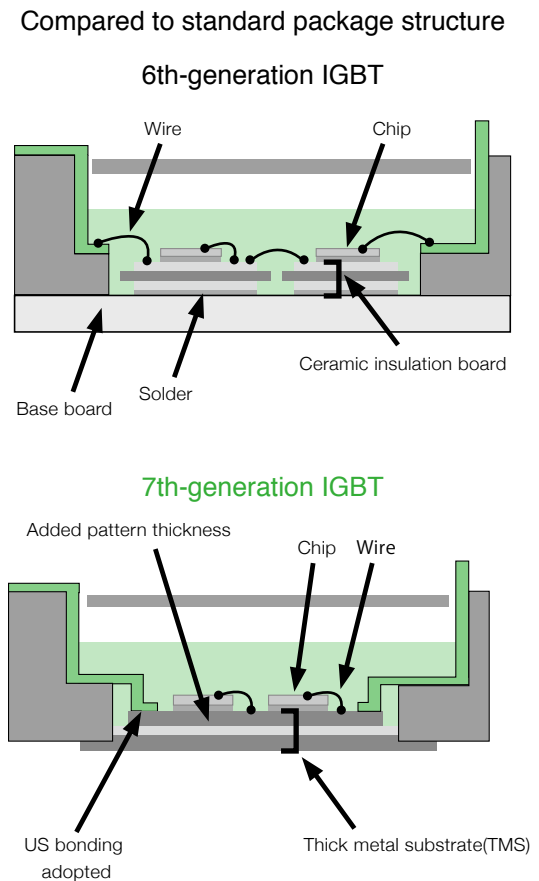
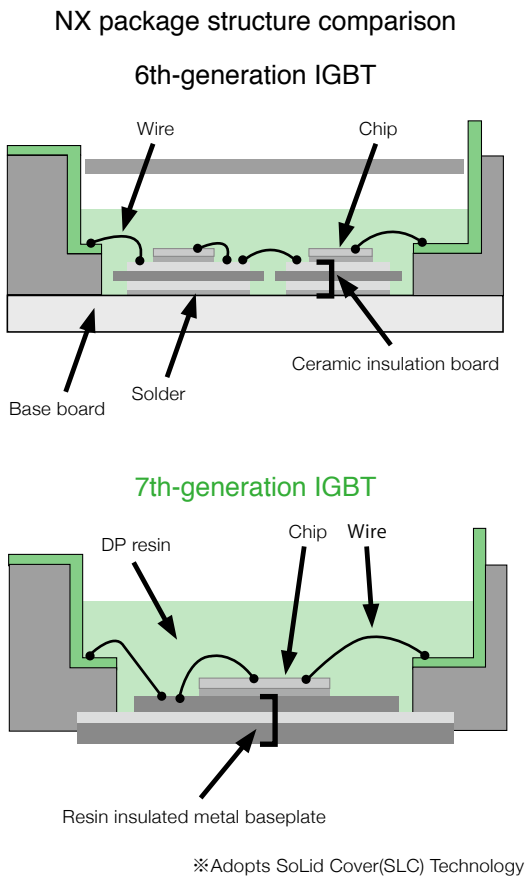
<Main Features>

- Power loss has been reduced with the introduced of the 7th-generation IGBT produced using CSTBT™² and a diode incorporating a relaxed field of cathode (RFC) structure, which contributes to reducing the power consumed in inverters.
- The new structure introduced eliminates the solder-attached section, and the thermal cycle lifetime has been increased, 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 - pin 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)

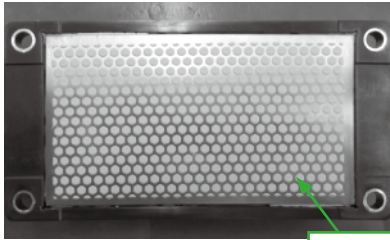


■ Assembly process simplified

◆ PC-TIM support

- Handling simple using heat dissipation grease
- Heat dissipation application process eliminated
- Contact heat resistance reduced through high thermal conductivity
- High heat resistance improves quality
- Disparity in contact heat resistance reduced by managing thickness

■ PC-TIM application



Fixed at room temperature

■ After face change



Liquefied and spread like grease

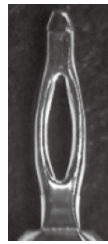
◆ Press-fit terminal support (NX)

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

■ Press-fit pin (under development)



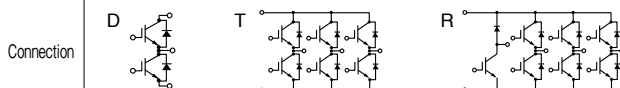
① Main pin



② Signal pin

■ Series atrix of 7th-generation IGBT Modules (No.: Number of outline drawing, see page 22, 23)

V _{CE} (V) Series I _c (A)	650V						1200V						1700V					
	NX type	Connection	No.	Std type	Connection	No.	NX type	Connection	No.	Std type	Connection	No.	NX type	Connection	No.	Std type	Connection	No.
75																CM75DY-34T**	D	—
100	CM100TX-13T** CM100TXP-13T**	T T	34 38	CM100DY-13T**	D	31	CM100TX-24T** CM100TXP-24T** CM100RX-24T** CM100RXP-24T**	T T R R	34 38 35 39	CM100DY-24T**	D	31	CM100TX-34T** CM100TXP-34T**	T T	— —	CM100DY-34T**	D	—
150	CM150TX-13T** CM150TXP-13T** CM150RX-13T** CM150RXP-13T**	T T R R	34 38 35 39	CM150DY-13T**	D	31	CM150TX-24T** CM150TXP-24T** CM150RX-24T** CM150RXP-24T**	T T R R	34 38 35 39	CM150DY-24T**	D	31	CM150TX-34T** CM150TXP-34T**	T T	— —	CM150DY-34T**	D	—
200	CM200TX-13T** CM200TXP-13T** CM200RX-13T** CM200RXP-13T**	T T R R	34 38 35 39	CM200DY-13T**	D	31	CM200TX-24T** CM200TXP-24T**	T T	34 38	CM200DY-24T**	D	32				CM200DY-34T**	D	—
225							CM225DX-24T** CM225DXP-24T**	D D	29 40				CM225DX-34T** CM225DXP-34T**	D D	— —			
300	CM300DX-13T* CM300DXP-13T*	D D	29 40	CM300DY-13T*	D	32	CM300DX-24T* CM300DXP-24T*	D D	29 40	CM300DY-24T**	D	32	CM300DX-34T** CM300DXP-34T**	D D	— —	CM300DY-34T**	D	—
400				CM400DY-13T*	D	32												
450	CM450DX-13T* CM450DXP-13T*	D D	29 40				CM450DX-24T* CM450DXP-24T*	D D	29 40	CM450DY-24T*	D	33	CM450DX-34T** CM450DXP-34T**	D D	— —			
600	CM600DX-13T* CM600DXP-13T*	D D	29 40	CM600DY-13T*	D	33	CM600DX-24T* CM600DXP-24T*	D D	29 40	CM600DY-24T*	D	33	CM600DX-34T** CM600DXP-34T**	D D	— —			
1000							CM1000DX-24T** CM1000DXP-24T**	D D	30 41									



★★: Under Development ★: New Product



Feature Products

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

Power Module for 3-level Inverter

<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.

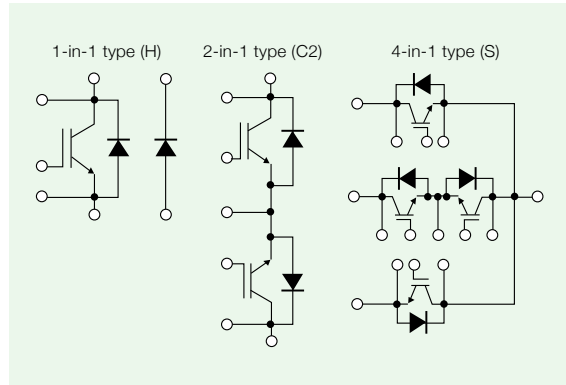


1-in-1 / 2-in-1 type



4-in-1 type

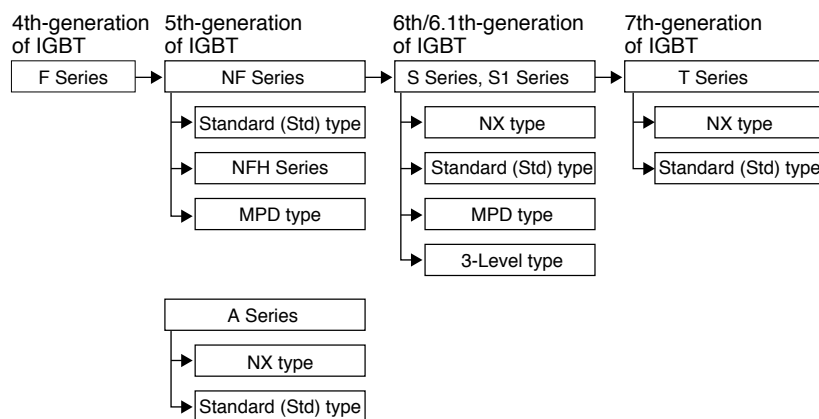
Internal circuit diagram



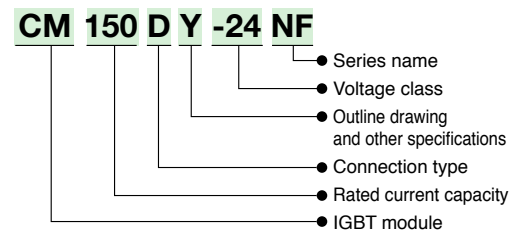
Lineup

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	115×82
500kW - inverter	CM1400HA-24S	IGBT	1200V	1400A	1-in-1	130×67
	RM1400HA-24S	Diode	1200V	1400A	1-in-1	130×67
	CM1000HA-34S	IGBT	1700V	1000A	1-in-1	130×67
	CM500C2Y-24S	IGBT	1200V	500A	2-in-1	130×67

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 (1200V/2500A, 1700V/1800A) (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 / Diode Modules

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

RoHS directive (2011/65/EU) compliant

V _{CE(S)} (V)	600V											
	NX Series			NF Series			NFH Series			F Series		
I _C (A)	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.		
75	CM75MX-12A	M	01	CM75TL-12NF CM75RL-12NF	T R	07 07				CM75DU-12F CM75TU-12F	D T	
100	CM100MX-12A CM100RX-12A	M R	01 02	CM100TL-12NF CM100RL-12NF	T R	07 07	CM100DUS-12F	D	13	CM100DU-12F CM100TU-12F	D T	
150	CM150RX-12A	R	02	CM150DY-12NF CM150TL-12NF CM150RL-12NF	D T R	08 07 07	CM150DUS-12F	D	13	CM150DU-12F CM150TU-12F	D T	
200	CM200RX-12A	R	02	CM200DY-12NF CM200TL-12NF CM200RL-12NF	D T R	08 09 09	CM200DU-12NFH	D	13	CM200DU-12F CM200TU-12F	D T	
300	CM300DX-12A	D	03	CM300DY-12NF	D	08	CM300DU-12NFH	D	14	CM300DU-12F	D	
400	CM400DX-12A	D	03	CM400DY-12NF	D	10	CM400DU-12NFH	D	14	CM400DU-12F	D	
600				CM600DY-12NF	D	11	CM600DU-12NFH	D	15	CM600HU-12F	H	
Connection												

Non-recommended : Please contact to the sales offices.

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

RoHS directive (2011/65/EU) compliant

V _{CE(S)} /V _{RRM}	1200V IGBT Module			1700V IGBT Module			1200V Diode Module		
	Connection	No.	Connection	No.	Connection	No.	Connection	No.	
400	CM400ST-24S1*	S	36						
	CM400C1Y-24S	C1	11						
500	CM500C2Y-24S*	C	37						
1000				CM1000HA-34S*	H	37			
1400	CM1400HA-24S*	H	37				RM1400HA-24S*	H 37	
Connection									


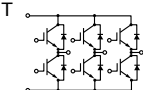
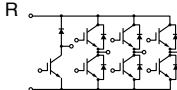
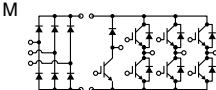
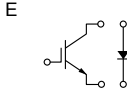
★: New Product *Connection H of diode module and IGBT module are different.

Line-up of IGBT Modules

Matrix of 6th/6.1th-generation of IGBT Modules <S Series / S1 Series> 1200V/1700V

(No.: Number of Outline Drawing, see page 19 to 23)



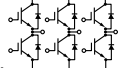
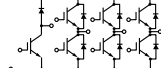

RoHS directive (2011/65/EU) compliant

V _{CE} (V)	1200V												1700V					
	Series	NX type			Std type			MPD type			NX type			MPD type				
		I _c	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.				
35		CM35MXA-24S	M	04														
50		CM50MXA-24S	M	04														
75		CM75MXA-24S	M	04								CM75MXA-34SA	M	24				
		CM75TX-24S	T	05								CM75RX-34SA	R	20				
		CM75RX-24S	R	02														
100		CM100MXA-24S	M	04														
		CM100TX-24S1	T	26														
		CM100RX-24S1	R	27														
150		CM150DX-24S	D	03								CM150DX-34SA	D	21				
		CM150EXS-24S	E	25								CM150RXL-34SA	R	22				
		CM150TX-24S1	T	26														
		CM150RX-24S1	R	27														
200		CM200EXS-24S	E	25								CM200DX-34SA	D	21				
		CM200RXL-24S	R	22								CM200EXS-34SA	E	25				
225		CM225DX-24S1	D	28														
300		CM300DX-24S1	D	28														
		CM300EXS-24S	E	25	CM300DY-24S	D	10					CM300DX-34SA	D	21				
		CM300RXL-24S1★	R	22														
450		CM450DX-24S1	D	28	CM450DY-24S	D	11				CM450DXL-34SA	D	23					
600		CM600DX-24S1	D	28	CM600DY-24S	D	11					CM600DXL-34SA	D	23				
		CM600DXL-24S	D	06														
800					CM800DY-24S	D	12											
900								CM900DUC-24S	D	17								
1000		CM1000DXL-24S	D	06								CM1000DUC-34SA	D	17				
1400								CM1400DUC-24S	D	17								
1800												CM1800DY-34S	D	19				
2500								CM2500DY-24S	D	19								
Connection		D		T		R		M		E								

★: New Product

Series Matrix of IGBT Modules 1200V/1700V

RoHS directive (2011/65/EU) compliant

V _{CEs} (V)	1200V								1700V							
	Std type			NFH Series			F Series			MPD Series			Std type			
	Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.		
50	CM50RL-24NF	T	07				CM50DU-24F	D								
	CM50TL-24NF	R	07													
75	CM75RL-24NF	T	07				CM75DU-24F	D				CM75DY-34A	D	08		
	CM75TL-24NF	R	07				CM75TU-24F	T								
100	CM100DY-24NF	D	08									CM100DY-34A	D	08		
	CM100DY-24A	D	08									CM100DU-34KA	D			
	CM100E3Y-24NF	E3	08	CM100DU-24NFH	D	13	CM100DU-24F	D								
	CM100RL-24NF	R	07													
	CM100TL-24NF	T	07													
150	CM150DY-24NF	D	08									CM150DY-34A	D	10		
	CM150DY-24A	D	08													
	CM150E3Y-24NF	E3	08	CM150DU-24NFH	D	13	CM150DU-24F	D								
	CM150TL-24NF	T	09													
	CM150RL-24NF	R	09													
200	CM200DY-24NF	D	10									CM200DY-34A	D	10		
	CM200DY-24A	D	08													
	CM200TL-24NF	T	09	CM200DU-24NFH	D	14	CM200DU-24F	D								
	CM200RL-24NF	R	09													
300	CM300DY-24NF	D	11									CM300DY-34A	D	11		
	CM300DY-24A	D	10	CM300DU-24NFH	D	14	CM300DU-24F	D								
400	CM400DY-24NF	D	11									CM400DY-34A	D	18		
	CM400DY-24A	D	11	CM400DU-24NFH	D	15										
	CM400HA-24A	H	16													
500											CM500HA-34A	H	16			
600	CM600DU-24NF	D	12													
	CM600DY-24A	D	11	CM600DU-24NFH	D	15	CM600DU-24F	D								
	CM600HA-24A	H	16													
900	CM900DUC-24NF	D														
1000										CM1000DUC-34NF	D					
1400	CM1400DUC-24NF	D														
Connection	H		D		T		R		E3							

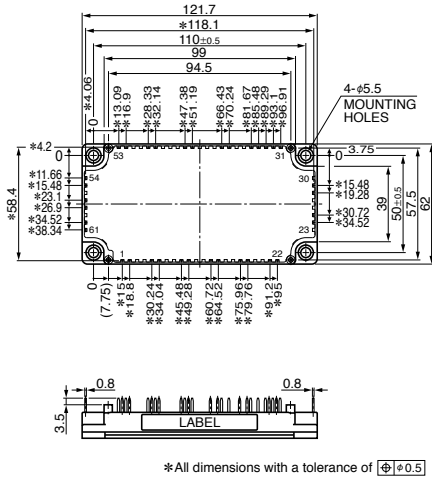
Non-recommended : Please contact to the sales offices.

Line-up of IGBT Modules

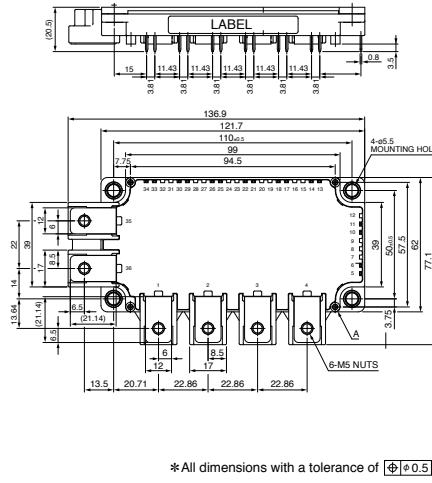
Outline Drawing of IGBT Modules

Unit:mm

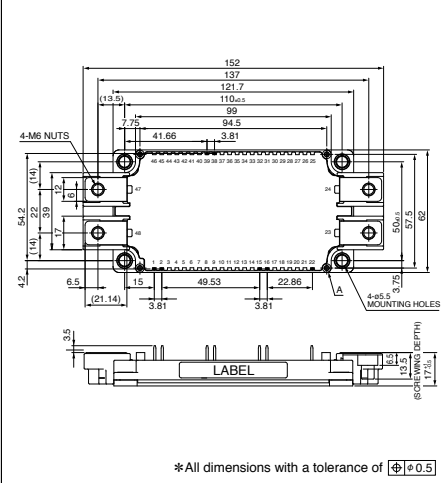
01 CM75,100MX-12A



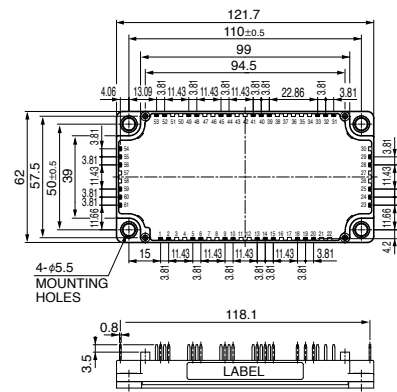
02 CM100,150,200RX-12A
CM75RX-24S



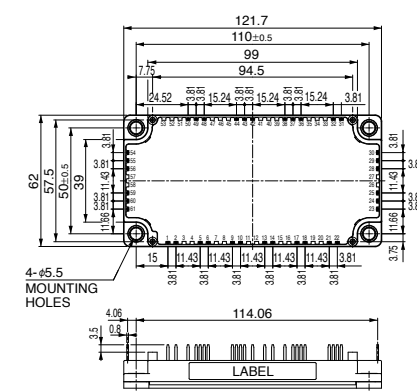
03 CM300,400DX-12A
CM150,200DX-24S



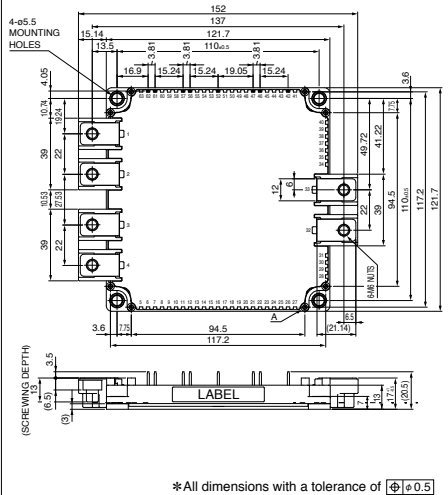
04 CM35,50,75,100MXA-24S



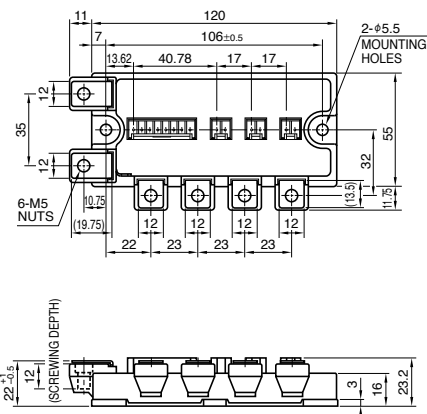
05 CM75TX-24S



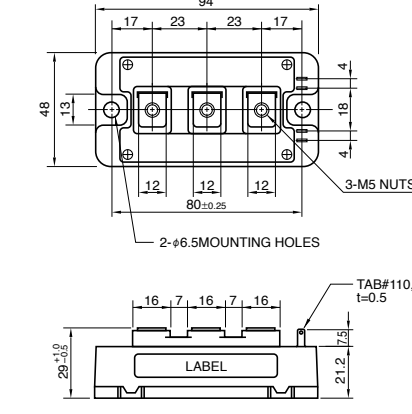
06 CM600,1000DXL-24S



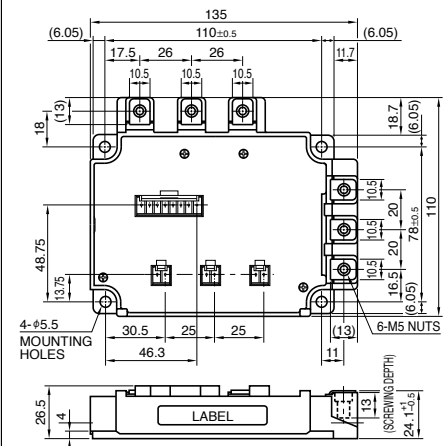
07 CM75,100,150TL/RL-12NF
CM50,75,100TL/RL-24NF



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

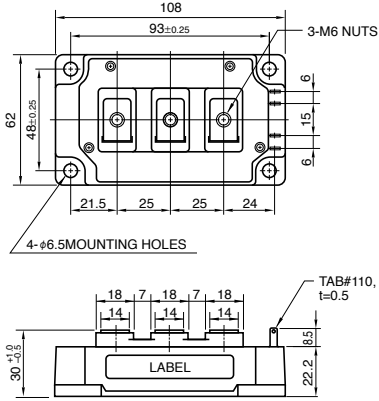


09 CM200TL/RL-12NF
CM150,200TL/RL-24NF



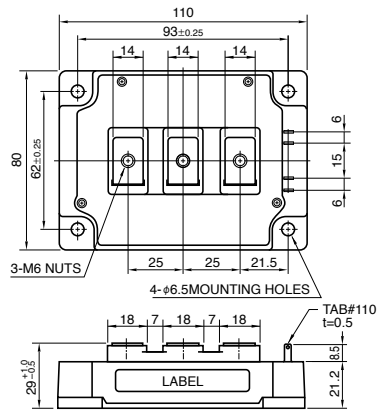
10

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



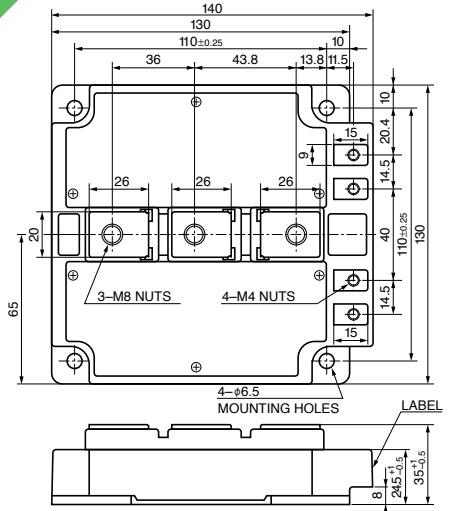
11

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



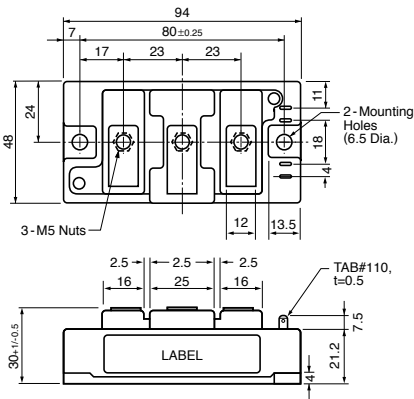
12

CM600DU-24NF
CM800DY-24S



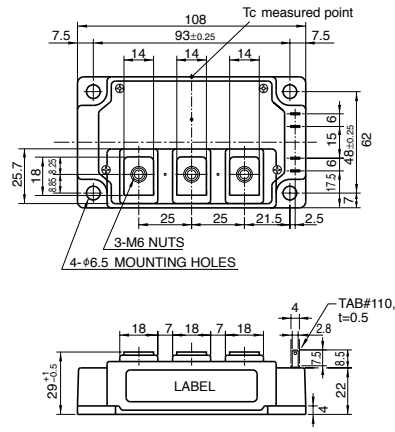
13

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



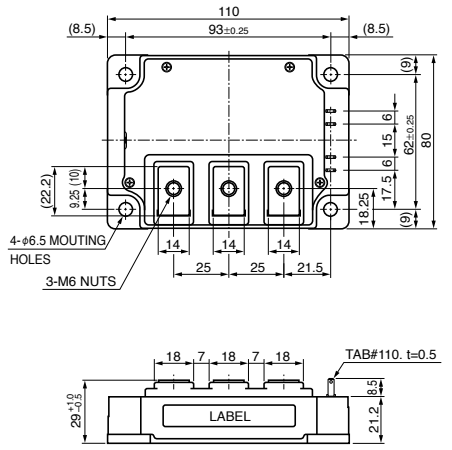
14

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



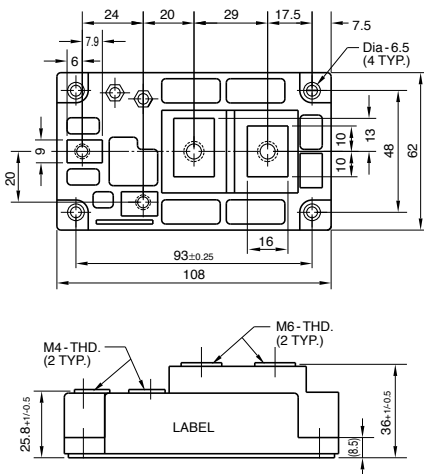
15

CM600DU-12NFH
CM400,600DU-24NFH



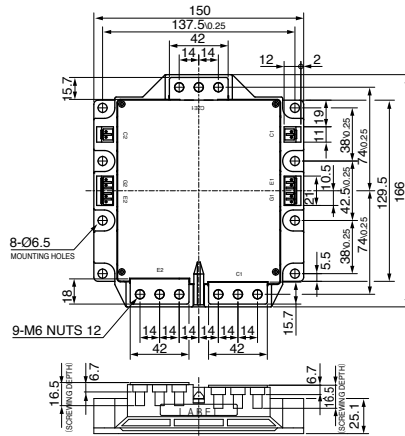
16

CM400,600HA-24A
CM500HA-34A



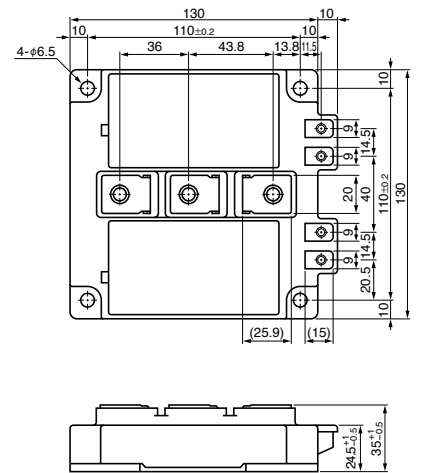
17

CM900,1400DUC-24S
CM1000DUC-34SA



18

CM400DY-34A

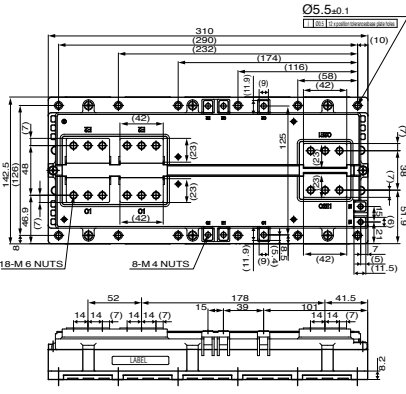


Line-up of IGBT Modules

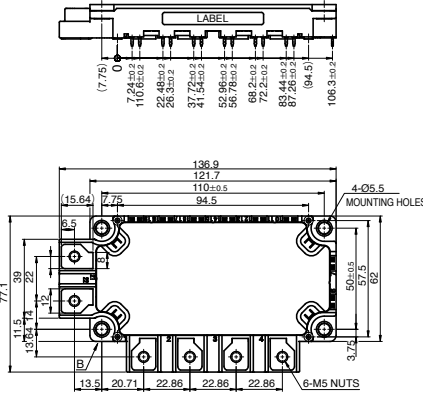
Outline Drawing of IGBT Modules

Unit:mm

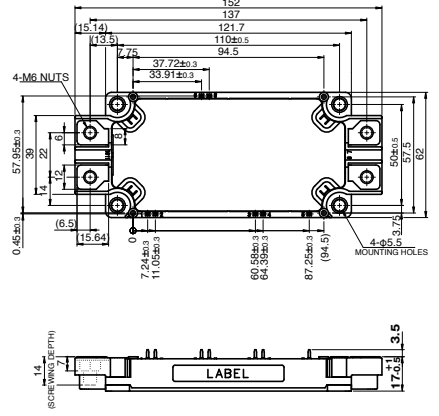
19 CM1800DY-34S
CM2500DY-24S



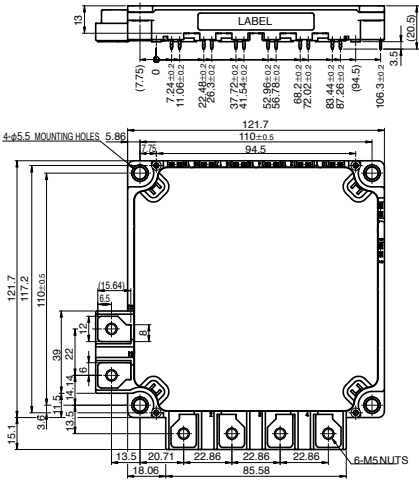
20 CM75RX-34SA



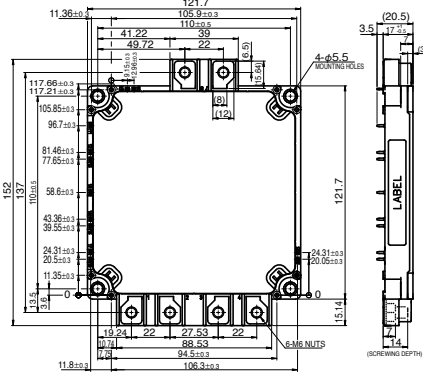
21 CM150DX-34SA
CM200DX-34SA
CM300DX-34SA



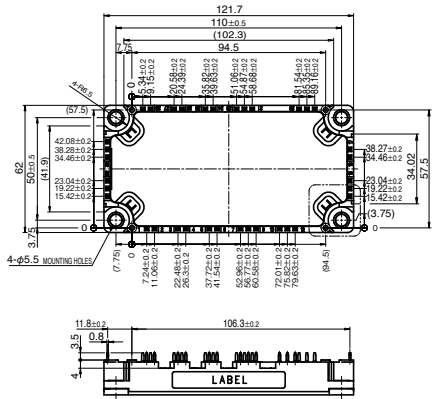
22 CM200RXL-24S
CM300RXL-24S1
CM150RXL-34SA



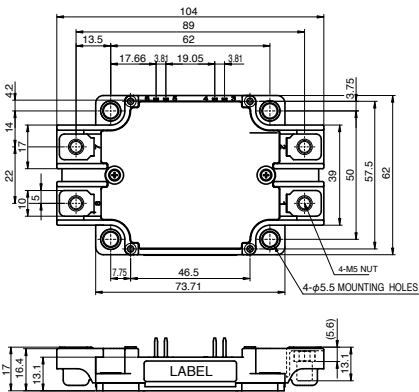
23 CM450DXL-34SA
CM600DXL-34SA



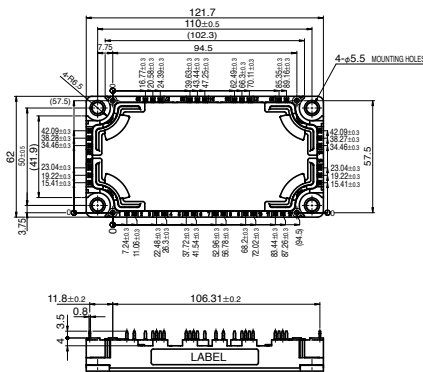
24 CM75MXA-34SA



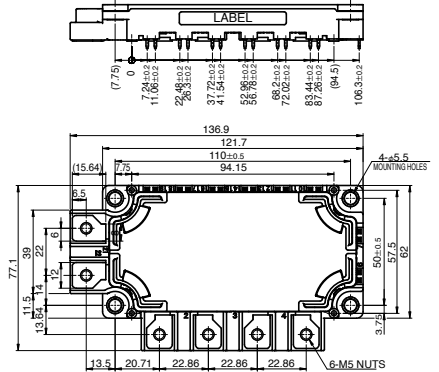
25 CM150EXS-24S
CM200EXS-24S
CM300EXS-24S
CM200EXS-34SA



26 CM100TX-24S1
CM150TX-24S1

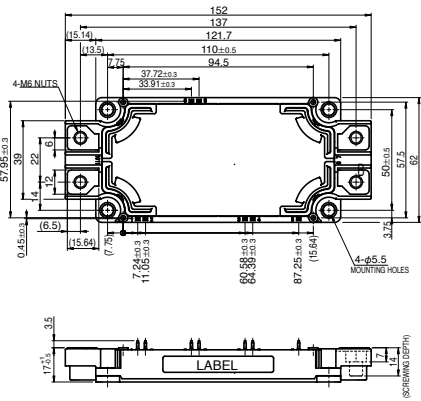


27 CM100RX-24S1
CM150RX-24S1



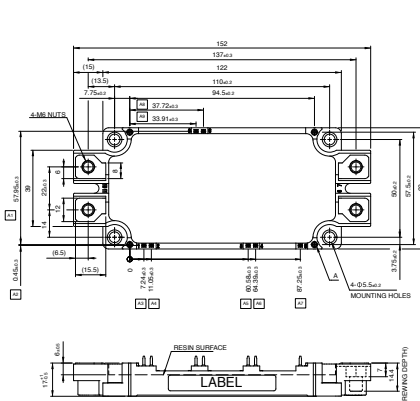
28

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



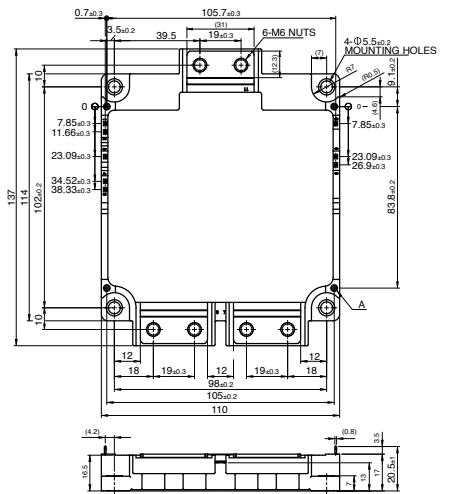
29

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



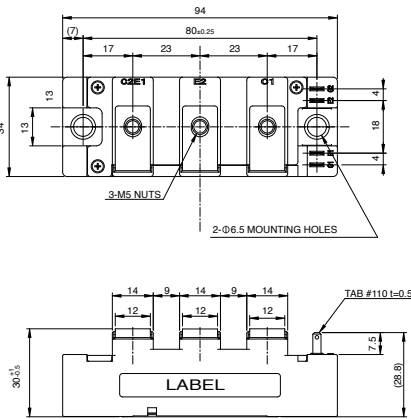
30

CM1000DX-24T



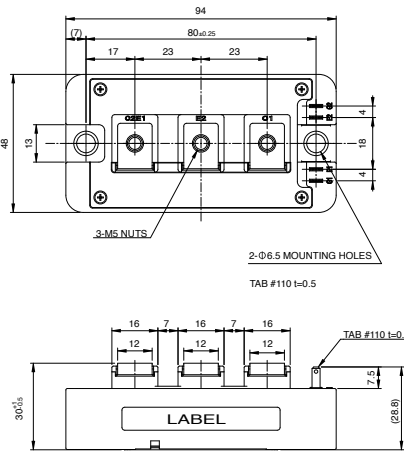
31

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



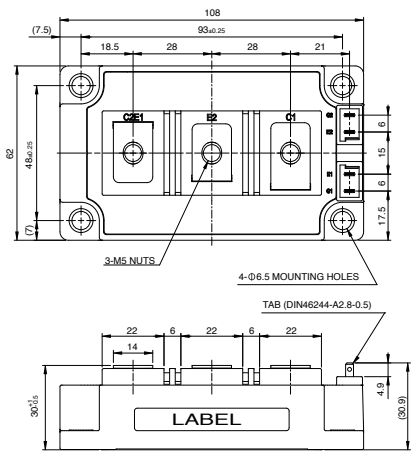
32

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



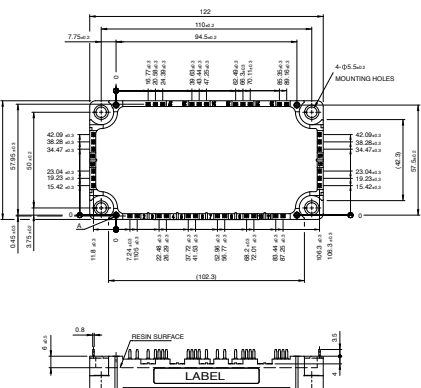
33

CM600DY-13T
CM450,600DY-24T



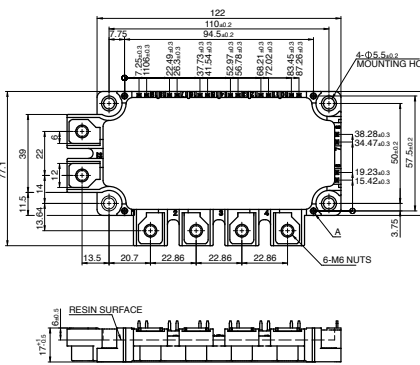
34

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



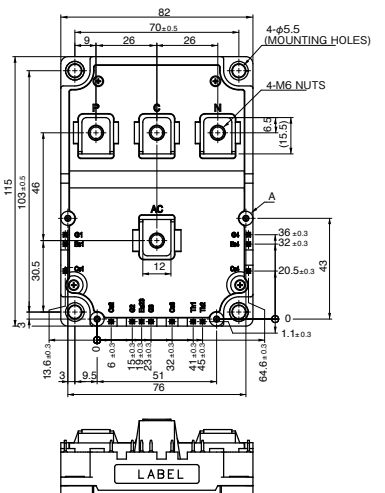
35

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



36

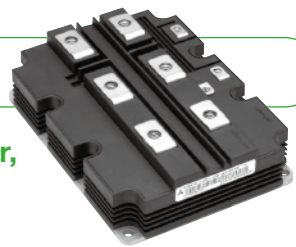
CM400ST-24S1





New Products

Industry-leading power and operating temperature range for smaller, higher-capacity inverter systems



X Series HVIGBT Modules (6,500V/1,000A)

<Main Features>

- Power loss reduced by incorporating 7th-generation IGBT and RFC^{*1} diode
- Maximum operation temperature of 150 degrees Celsius, a world's first^{*2} for the 6.5kV class
- High SOA capability, high snap-off tolerance
- Thermal resistance improved approx. 10% compared to using LNFLR structure^{*3} (CM750HG-130R)
- Replacement is simple using package compatible with IGBT H Series and R Series modules

*1 RFC: Relaxed field of cathode

*2 As of May 2015, based on Mitsubishi Electric research

*3 LNFLR: Linearly-Narrowed Field Limiting Ring

Increased current capacity

(190mm x 140mm)

(130mm X 140mm)

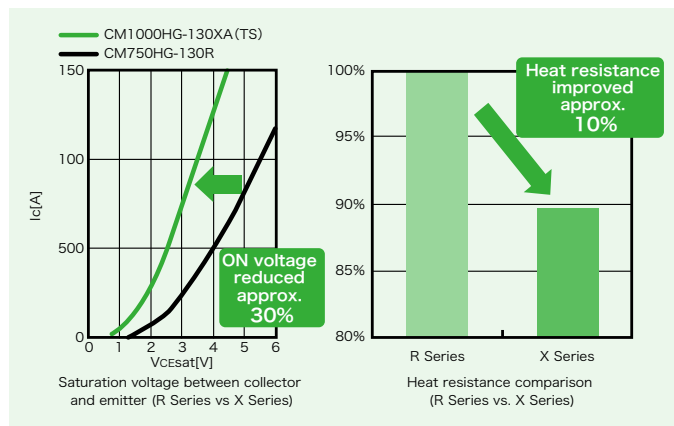


V	H Series (190mm x 140mm)	X Series (190mm x 140mm)	X Series (130mm X 140mm)
3.3kV	1200A (400A/segment)	1800A (600A/segment)	1200A (600A/segment)
4.5kV	900A (300A/segment)	1350A (450A/segment)	900A (450A/segment)
6.5kV	600A (200 A/segment)	900A (300A/segment)	600A (300A/segment)

① Current capability is increased 1.5 times for the same package size.

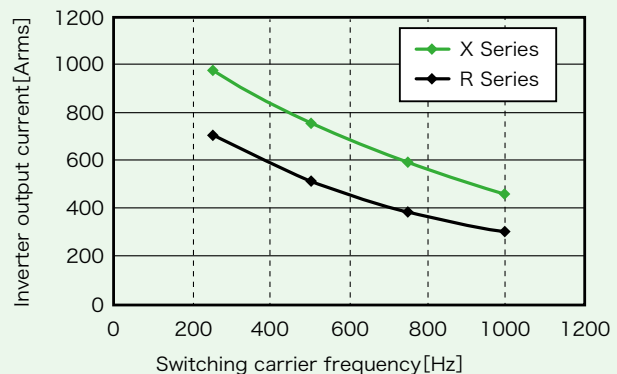
② Same current capability is realized in smaller package.

Characteristics graph



Output current characteristics

Condition: T_j=125°C, V_{cc}=3600V, P.F=0.85, f_o=50Hz, T_f=80°C



LNFLR structure(edge termination optimized)



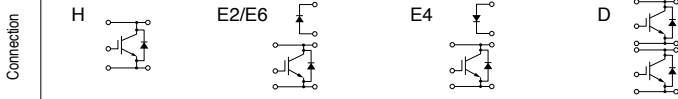
Compared to previous product*, active chip area is increased 28% by optimizing edge termination.

* CM750HG-130R

Line-up of HV Modules

Series Matrix of HVIGBT/HVIPM (No.: Number of outline drawing, see page 26 and 27)

Vces Ic(A)	1700V				2500V				3300V				4500V				6500V															
	Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.													
200																					CM200HG-130H	H	HG	07								
400					CM400DY-50H	D	HA	15	CM400HG-66H	H	HG	07	CM400DY-66H	D	HA	15					CM400HG-130H	H	HG	12	CM400E2G-130H	E2	HG	09	CM400E4G-130H	E4	HG	09
600	CM600DY-34H	D	HA	01													CM600HG-90H	H	HG	12					CM600HG-130H	H	HG	09				
	CM600E2Y-34H	E2	HA	01																												
750																									CM750HG-130R	H	HG	11				
800	CM800DZB-34N	D	NB	01					CM800HC-66H	H	HC	03	CM800E4C-66H	E4	HC	06	CM800HC-90R	H	R	08												
	CM800DZ-34H	D	HC	01	CM800HB-50H	H	HB	03	CM800E6C-66H	E2	HC	06	CM800HG-90R	H	RG	13																
	CM800HA-34H	H	HA	-					CM800E6C-66H	E2	HC	06																				
									CM800HB-66H	H	HB	03																				
900													CM900HG-90H	H	HG	13																
													CM900HC-90H	H	HG	09																
													CM900HB-90H	H	HC	06																
													CM900HG-90X★★	H	HB	06																
1000									CM1000HC-66R	H	R	08													CM1000HG-130XA★	H	HG	11				
									CM1000E4C-66R	E4	R	10																				
1200	CM1200HCB-34N	H	NB	03					CM1200HG-66H	H	HG	09	CM1200HC-90R	H	R	10																
	CM1200DB-34N	D	N	04	CM1200HC-50H	H	HC	06	CM1200HC-66H	H	HC	06	CM1200HC-90RA	H	R	10																
	CM1200DC-34N	D	N	04	CM1200HB-50H	H	HB	06	CM1200HB-66H	H	HB	06	CM1200HG-90R	H	RG	11																
	CM1200E4C-34N	E4	N	05					PM1200HCE330-1	H	HC	14																				
	CM1200HC-34H	H	HC	02																												
	CM1200DC-34S★	D	S	04																												
1500									CM1500HC-66R	H	R	10																				
									CM1500HG-66R	H	RG	11																				
1600	CM1600HC-34H	H	HC	02																												
1800	CM1800HCB-34N	H	NB	06					CM1800HC-66X★★	H	HC	10																				
	CM1800HC-34N	H	N	05																												
	CM1800HC-34H	H	HC	06																												
2400	CM2400HCB-34N	H	NB	06																												
	CM2400HC-34N	H	N	05																												
	CM2400HC-34H	H	HC	06																												

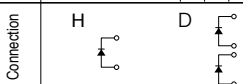


[Type Description] (H Series: Standard) HA: Cu base plate, HB: Cu base plate, HC: AISiC base plate, HG*: AISiC base plate
 (N Series: CSTBT™) N: AISiC base plate (CM1200DB-34N: Cu base plate), NB: AISiC base plate (Outline of H Series)
 (R Series: Low-loss) R: AISiC base plate, RG*: AISiC base plate
 (S Series: CSTBT™ (III)) S: AISiC base plate
 *: High-Insulation package (10.2kV, AC 1min.)

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

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

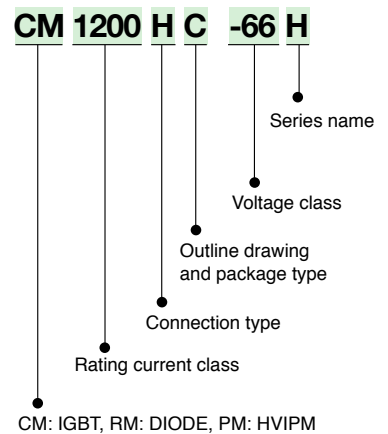
VFRM IF(A)	1700V			3300V			4500V			6500V						
	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.				
200										RM200DG-130S	D	SG	18			
250										RM250DG-130F	D	FG	18			
300							RM300DG-90S	D	SG	18						
400				RM400DG-66S	D	SG	18	RM400DG-90F	D	FG	18					
				RM400DY-66S	D	SD	19									
600				RM600DY-66S	D	SD	19	RM600HE-90S	H	SH	17	RM600DG-130S	D	SG	18	
800								RM800DG-90F	D	F6	18					
900								RM900HC-90S	H	SH	21					
								RM900DB-90S	D	SD	21					
1000				RM1000DC-66F	D	F	20									
1200	RM1200DB-34S	D	SD	16	RM1200DG-66S	D	SG	18	RM1200DG-90F	D	FG	18				
				RM1200HE-66S	H	SH	17									
				RM1200DB-66S	D	SD	21									
1500				RM1500DC-66F	D	F	20									
1800	RM1800HE-34S	H	SH	17												



[Type Description] (F Series: Low-loss) F: AISiC base plate, FG*: AISiC base plate
 (S Series: Standard) SH: AISiC base plate, SD: Cu base plate, SG*: AISiC base plate
 *: High-Insulation package (10.2kV, AC 1min.)

★★: Under Development ★: New Product

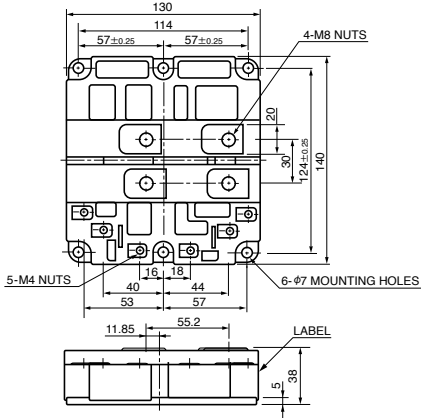
Type Name Definition of IGBT Modules



CM: IGBT, RM: DIODE, PM: HVIPM

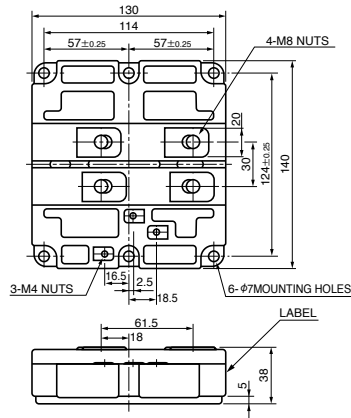
01

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



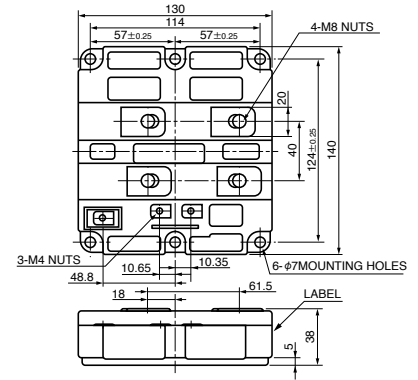
02

CM1200,1600HC-34H



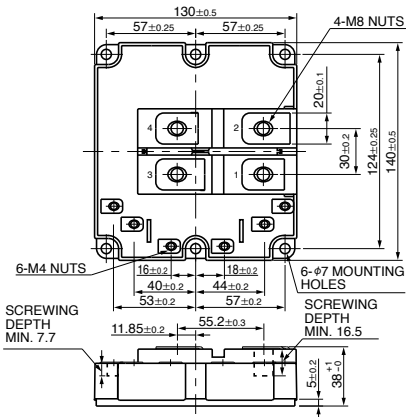
03

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



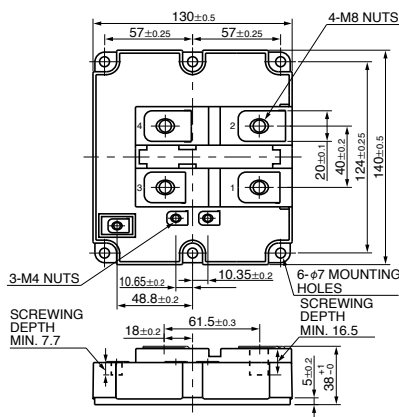
04

CM1200DB/DC-34N
CM1200DC-34S



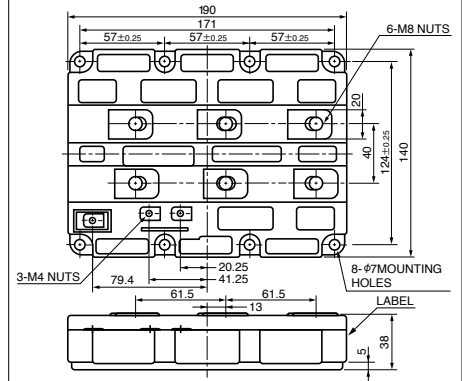
05

CM1200E4C-34N
CM1800,2400HC-34N



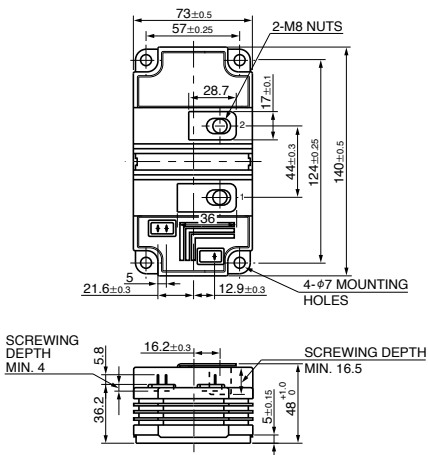
06

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



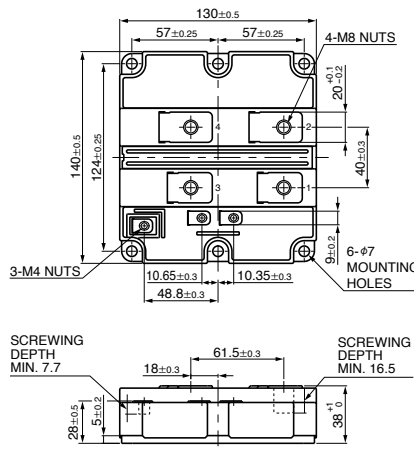
07

CM400HG-66H
CM200HG-130H



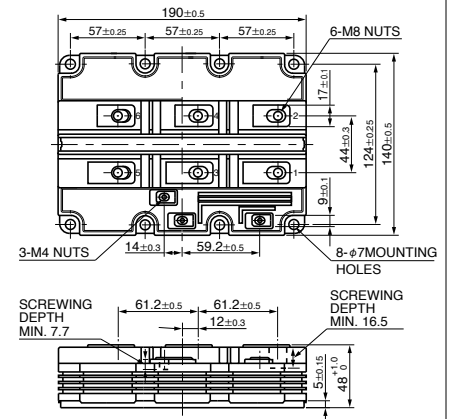
08

CM1000HC-66R
CM800HC-90R



09

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



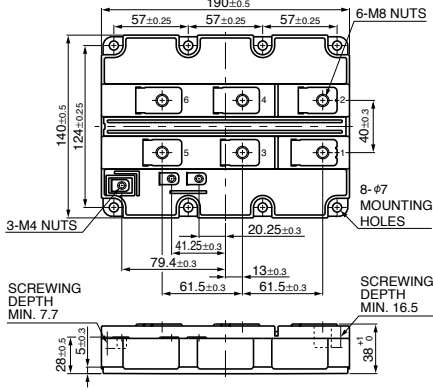
Line-up of HV Modules

Outline Drawing of HVIGBT Modules

Unit:mm

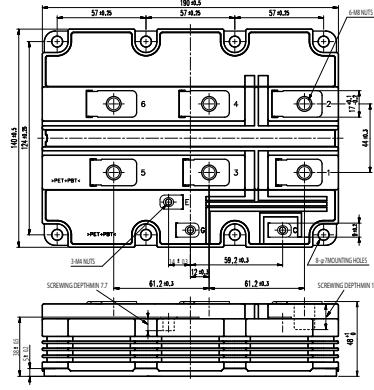
10

CM1000E4C-66R
CM1500HC-66R
CM1800HC-66X
CM1200HC-90R
CM1200HC-90RA



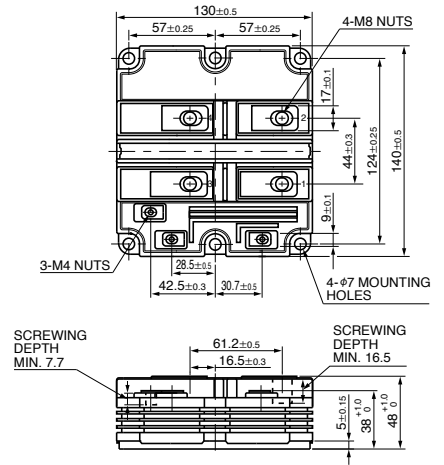
11

CM1500HG-66R
CM1200HG-90R
CM750HG-130R
CM1000HG-130XA



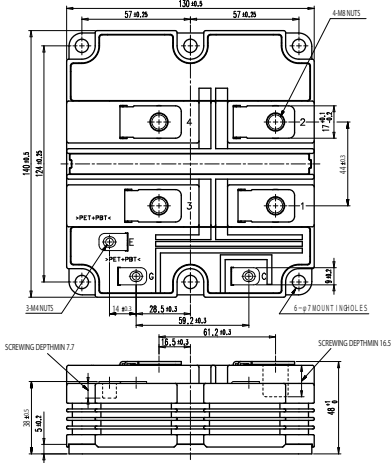
12

CM600HG-90H
CM400HG-130H



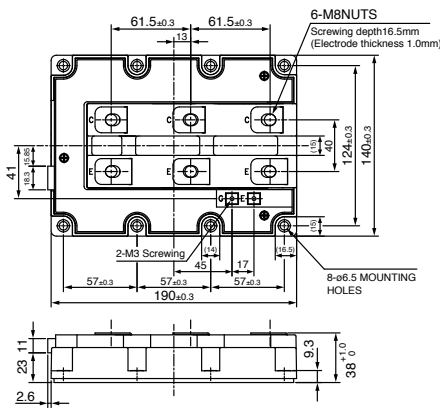
13

CM800HG-90R
CM900HG-90X



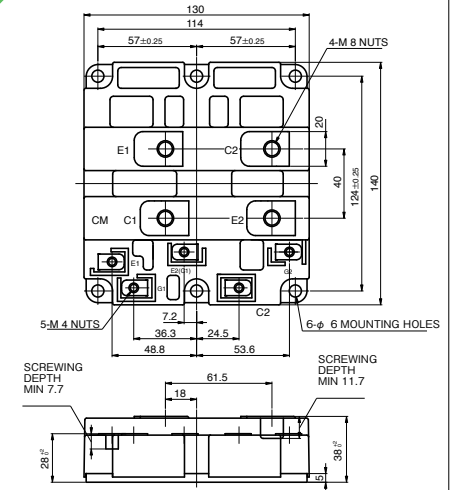
14

PM1200HCE330-1



15

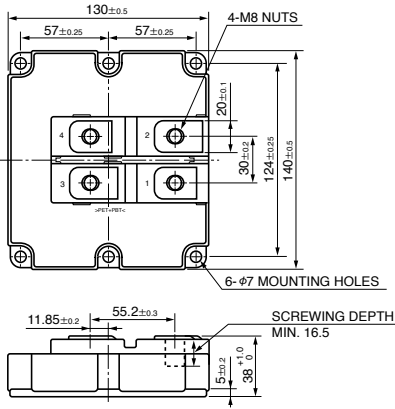
CM400DY-50H/66H



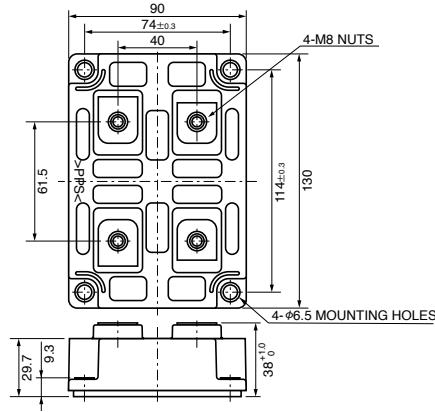
Outline Drawing of HVDIODE Modules

Unit:mm

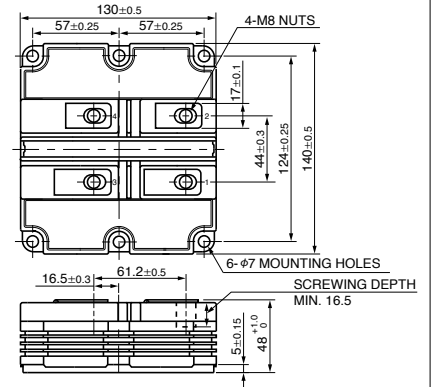
16 RM1200DB-34S



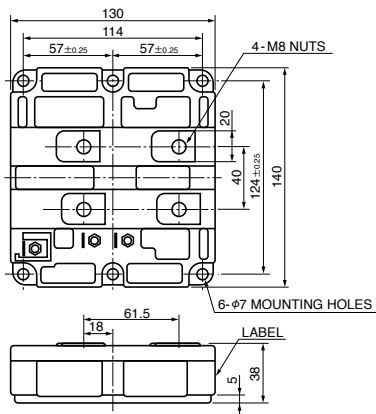
17 RM1800HE-34S
RM1200HE-66S
RM600HE-90S



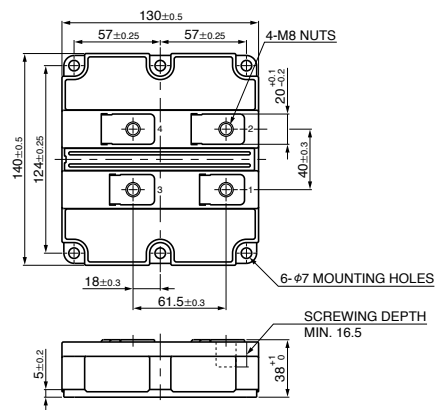
18 RM400,1200DG-66S
RM300DG-90S
RM400,800,1200DG-90F
RM200,600DG-130S
RM250DG-130F



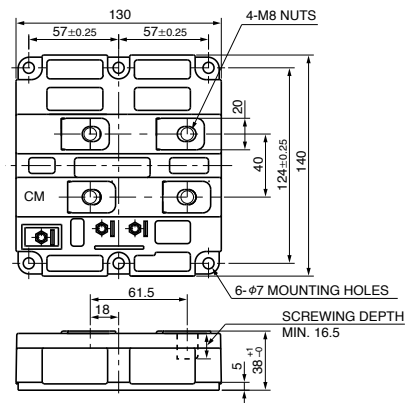
19 RM400,600DY-66S



20 RM1000,1500DC-66F



21 RM1200DB-66S
RM900DB/HC-90S

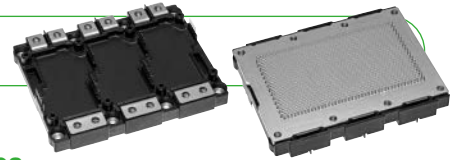


Power Modules for Electric and Hybrid Vehicles



New Products

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



High Power J1 Series Power Modules for Automobiles

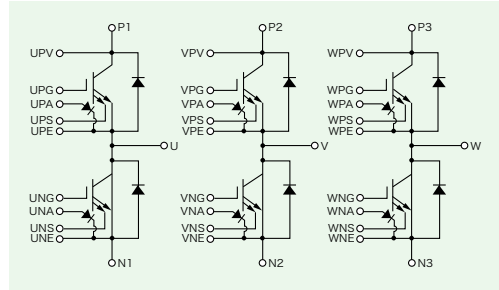
CT1000CJ1B060,
CT600CJ1B120

<Main Features>

- Integrated direct water-cooling structure with cooling fins and 6-in-1 connection contribute to more compact inverters for automobiles
- 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 modeling and original direct lead bonding (DLB) technique
- DLB structure reduces internal wiring resistance and inductance
- Completely Pb-free (including the pins)

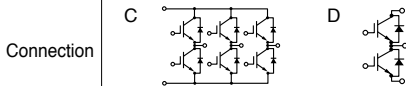
J Series IPM

- Drive circuit and protection circuits for short-circuiting, power supply* undervoltage and overheating
- Built-in isolated switching power supply for IGBT drive and IPM control functions (PM800CJG060G、PM500CJG120G)
- Redundancy function for failsafe design and high system performance, chip temperature analog output function and DC-link voltage analog output function
- Built-in automotive-grade photocouplers and interface connector(s)

* PM800CJG060G, PM500CJG120G only

Matrix of 650V and 900V Power Modules (No. : Number of outline drawing, please refer to page 30)

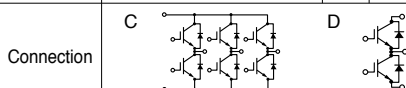
V _{CE(S)} (V)	650V										900V		
	J1 Series				J Series						J1 Series		
I _C (A)	PM with pin fin	Connection	No.	T-PM	Connection	No.	IPM	Connection	No.	PM with pin fin	Connection	No.	
300	CT300CJ1A060**	C	01	CT300DJG060**	D	02	PM300CJG060G**	C	04	-	-	-	
400	-	-	-	-	-	-	-	-	-	CT400CJ1A090**	C	01	
500	-	-	-	-	-	-	-	-	-	-	-	-	
600	CT600CJ1A060**	C	01	CT600DJH060**	D	03	PM600CJG060G**	C	05	-	-	-	
800	-	-	-	-	-	-	PM800CJG060G**	C	06	-	-	-	
1000	CT1000CJ1B060**	C	07	-	-	-	-	-	-	-	-	-	



※ PM : Power module, ★★ Under Development

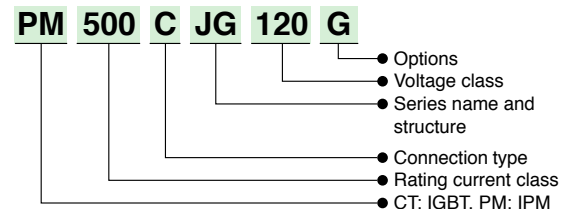
Matrix of 1200V Power Modules (No. : Number of Outline Drawing, please refer to page 30)

V _{CE(S)} (V)	1200V					
	J1 Series			J Series		
I _C (A)	PM with pin fin	Connection	No.	IPM	Connection	No.
300	CT300CJ1A120**	C	01	-	-	-
400	-	-	-	-	-	-
500	-	-	-	PM500CJG120G**	C	06
600	CT600CJ1B120**	C	07	-	-	-
800	-	-	-	-	-	-



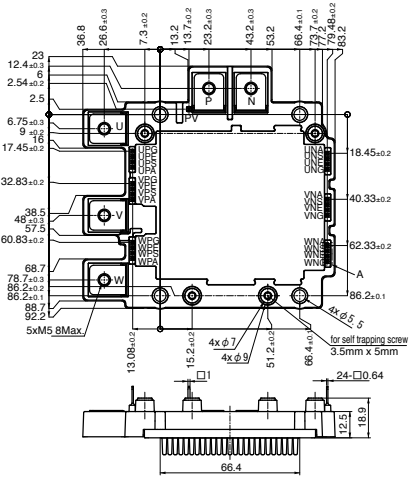
※ PM : Power module, ★★ Under Development

Type Name Definition of Power Modules for Electric and Hybrid Vehicles



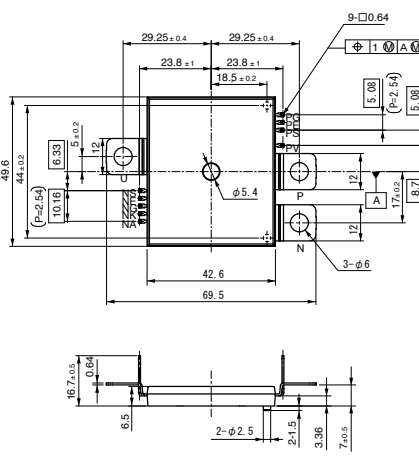
01

**CT300CJ1A060
CT300CJ1A120
CT400CJ1A090
CT600CJ1A060**



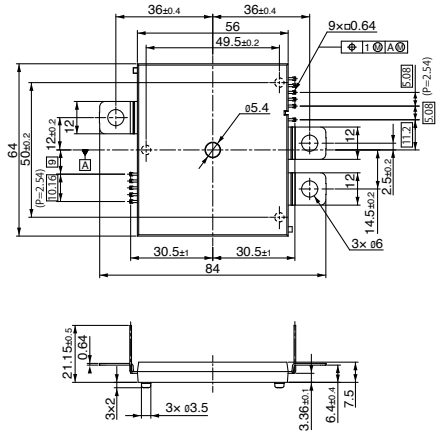
02

CT300DJG060



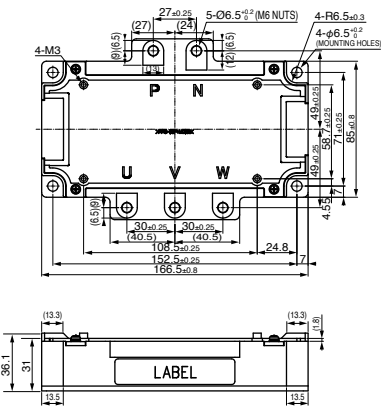
03

CT600DJH060



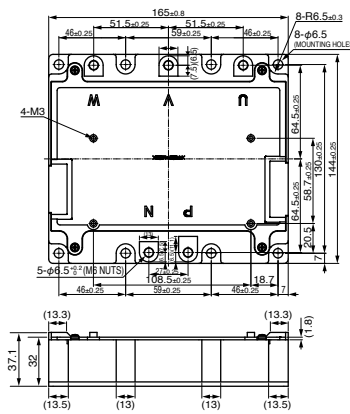
04

PM300CJG060G



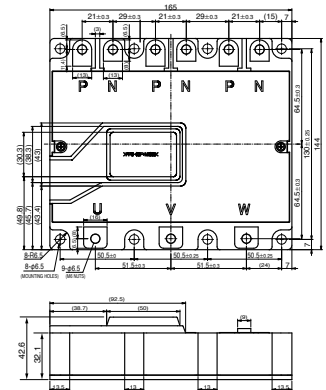
05

PM600CJG060G



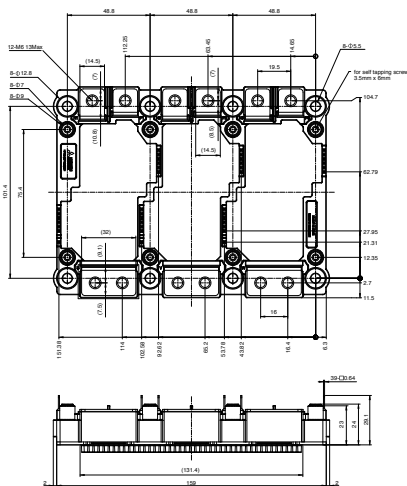
06

**PM500CJG120G
PM800CJG060G**



07

**CT1000CJ1B060
CT600CJ1B120**



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for a greener tomorrow

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