



MITSUBISHI
ELECTRIC

Changes for the Better

POWER MODULES

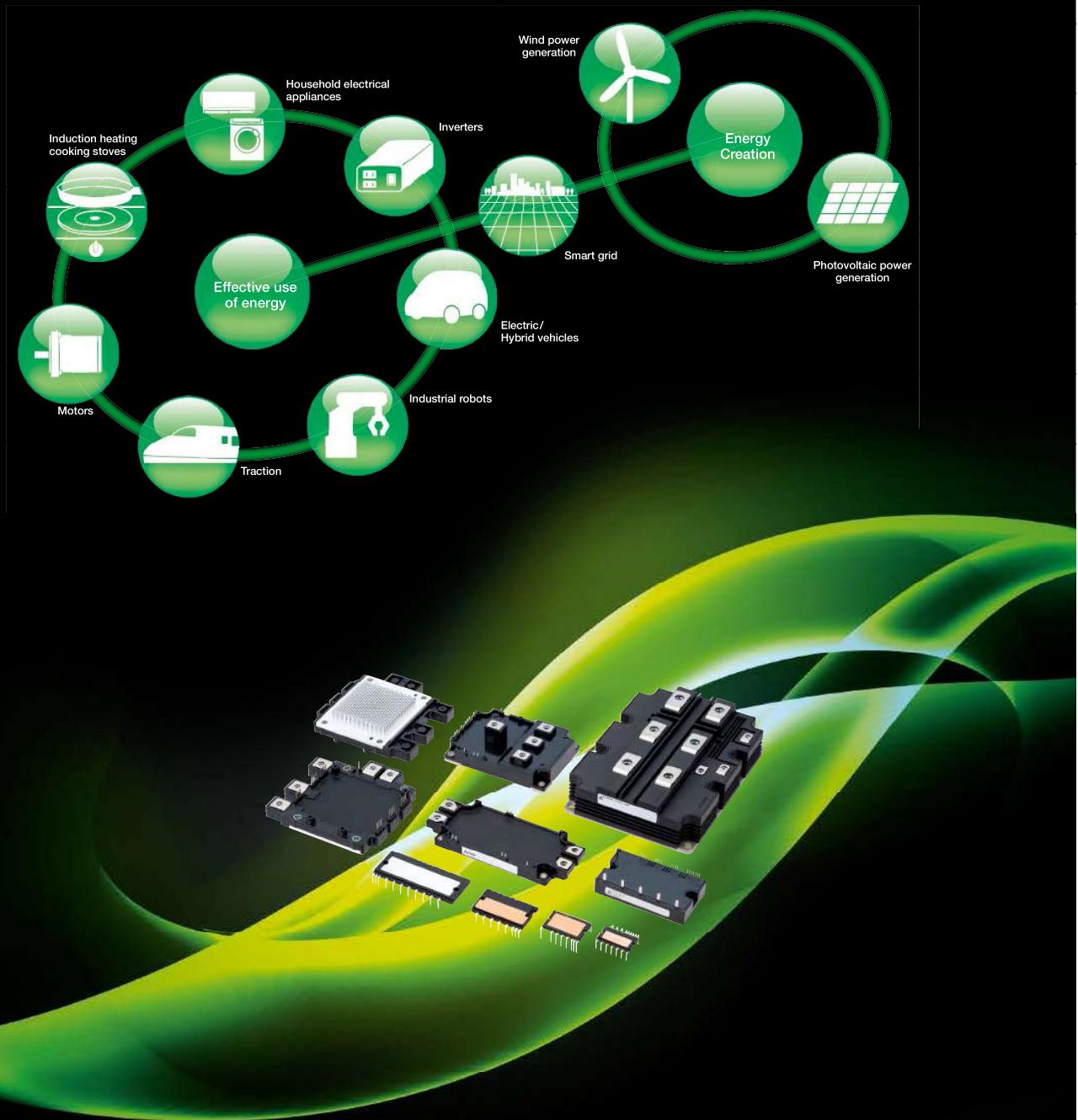
for a greener tomorrow



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.





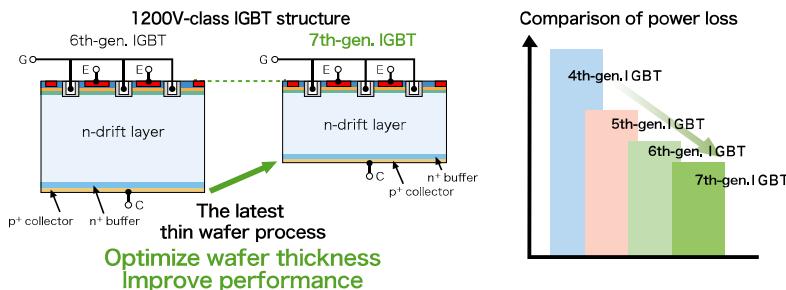
Focus Technology

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 $V_{CE(sat)}$ and E_{off})

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



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

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

SLIMDIPTM

SLIMDIP-S, SLIMDIP-L

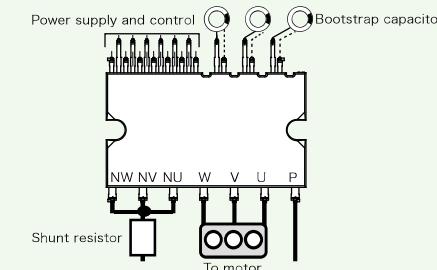
<Main Features>

- RC-IGBT¹ incorporated, reducing package size 30% compared to Super-mini DIPIPM
- 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 VOT² and OT³ 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

DIPIPM+TM

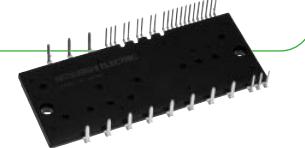
PSS05MC1FT, PSS10MC1FT, PSS15MC1FT,
PSS25MC1FT, PSS35MC1FT, PSS50MC1F6

<Main Features>

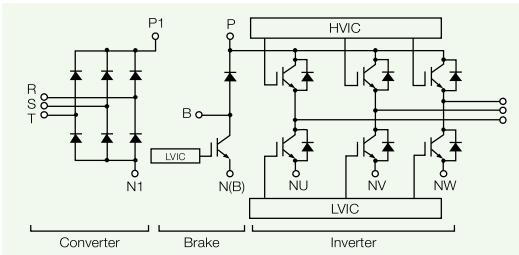
- Encapsulated by transfer molded resin, integrates three-phase converter, inverter, brake and control IC
- Built-in converter and brake enable system size to be reduced and save design cost, contributing to total cost reduction
- Lower PCB inductance pattern reduces noise, thereby reducing design time and countermeasure parts required for noise reduction
- Built-in BSD¹ with 1,200V withstand voltage reduces number of external parts and improves reliability

*1 BSD: Bootstrap diode

*2: Lineup of circuit configuration products without brake component.



Internal circuit diagram



Feature Products

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

SJ-MOSFET Super-mini DIPIPM™

PSM15S94H6, PSM20S94H6

<Main Features>

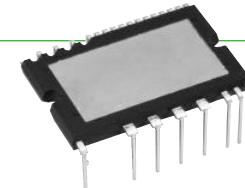
- SJ-MOSFET realizes approx. 80% smaller ON voltage during low-current operation compared to IGBT. It contributes to improving efficiency of air conditioner during steady-state operation especially
- Built-in IGBT function secures sufficient current capability during high-load operation
- Current rating lineup expanded to support 2.2-8.0kW class air conditioners
- External size, pin assignment, etc. secure compatibility with our Super-mini package² products
- Built-in BSD³ for power supply to drive the P-side reduces number of external peripheral parts required

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

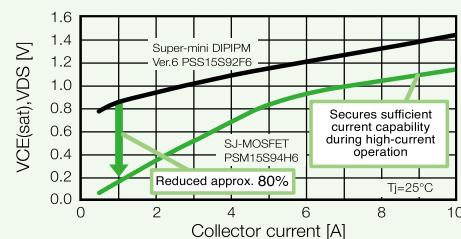
*2 Super-mini package such as Super-mini DIPIPM Ver.6 Series, etc.

*3 BSD : Bootstrap diode

*4 Please refer to SiC power device catalogue in case you need further high-efficiency products.



Output characteristics (Typical)



Line-up of DIPIPM™

■ Series Matrix of 600V / 500V DIPIPM™

V _{GES} (V)	Series I _c (A)	SLIMDIP	600V				500V
			Super mini		Mini	Large	CIB/CI
			Ver.6	Ver.4		DIPIPM+	Super mini
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* ⁷ *	
75					PS21A7A		
<hr/>							
Chip	IGBT/MOSFET	RC-IGBT	CSTBT	CSTBT	CSTBT	CSTBT	SJ-MOSFET
	HVIC	×1	×1	×3	×3	×1	×1
	LVIC	×1	×1	×1	×1	×1	×1
	BSD	×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
	SC	N-side	N-side	N-side	N-side with sense	N-side	N-side
	OT	N-side	N-side* ¹	—	—	—	N-side
	V _{OT} * ²	N-side	N-side* ¹	N-side	N-side	N-side	—
Specifications	Active input	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(5V)	High(3/5V)
	Emitter pin of N-side	Open	Open	Open	Open	Open	Open
	Fault output	N-side(UV,SC,OT)	N-side (UV,SC,OT)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC,OT)
	Insulation voltage	2000Vrms	1500Vrms* ³	2500Vrms	2500Vrms	1500Vrms* ³	1500Vrms* ³
<hr/>							
Protective Function	Insulation structure	Insulation sheet	Insulation sheet	Molding resin* ⁶ /Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive	Compliant * ⁵	Compliant * ⁵	Compliant * ^{4,*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, 1 minute. 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] 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, BSD: Bootstrap Diode

UV: Supply Under Voltage protection

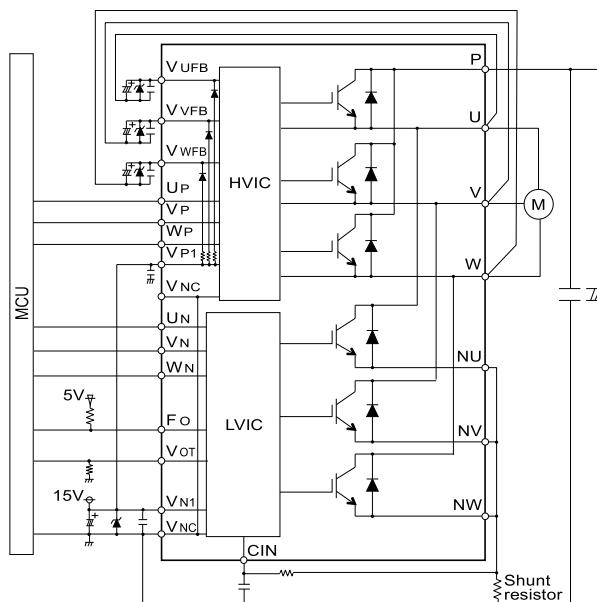
OT: Over Temperature protection

SC: Short Circuit protection

RoHS: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

CIB: Converter Inverter Brake, CI: Converter Inverter

■ Application circuit of built-in BSD super mini DIPIPM™



Line-up of DIPIPM™

■ Series Matrix of 1200V DIPIPM™

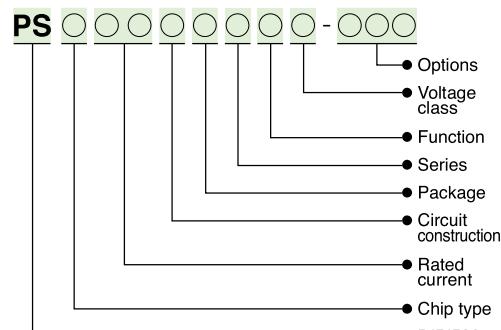
VCES(V)		1200V		
Ic (A)	Series	Mini	Large	
			Ver.6	Ver.4
5	PSS05S72FT	PSS05SA2FT	PS22A72	PSS05MC1FT* PSS05NC1FT*3*
10	PSS10S72FT	PSS10SA2FT	PS22A73	PSS10MC1FT* PSS10NC1FT*3*
15		PSS15SA2FT	PS22A74	PSS15MC1FT* PSS15NC1FT*3*
25		PSS25SA2FT	PS22A76	PSS25MC1FT* PSS25NC1FT*3*
35		PSS35SA2FT	PS22A78-E	PSS35MC1FT* PSS35NC1FT*3*
50		PSS50SA2FT	PS22A79	
Chip	IGBT/MOSFET	CSTBT	CSTBT	CSTBT
	HVIC	×3	×3	×1
	LVIC	×1	×1	×2 *4
	BSD	×3	×3	—
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side/Brake
	SC	N-side	N-side	N-side
	OT	—	—	—
	V _{or} *1	N-side	N-side	N-side
Specifications	Active input	High(5V)	High(5V)	High(5V)
	Emitter pin of N-side	Open	Open	Open
	Fault output	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)
	Insulation voltage	2500Vrms	2500Vrms	2500Vrms
	Insulation structure	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive	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*NC1FT doesn't included brake.
 *4: LVIC 1pcs in case of PSS*NC1FT

[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
 RoHS: Restriction of hazardous substances in electrical and electronic equipment
 CIB: Converter Inverter Brake, CI: Converter Inverter

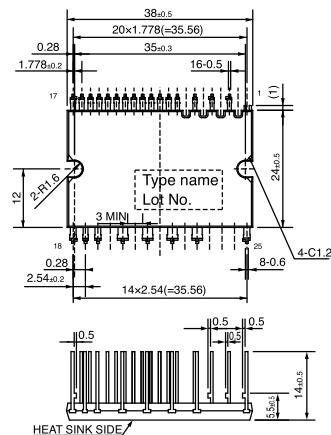
■ Type Name Definition of DIPIPM™



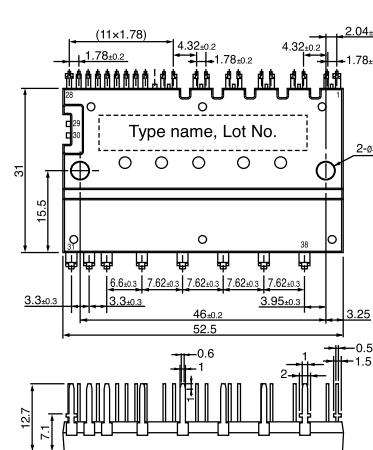
■ Outline Drawing of DIPIPM™

Unit:mm

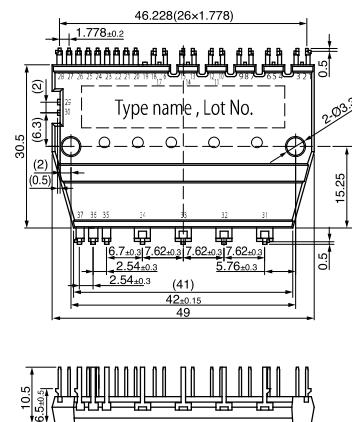
**Super mini DIP1PM Ver.6
MOSFET Super mini DIP1PM
Super mini DIP1PM Ver.5
Long (A)**



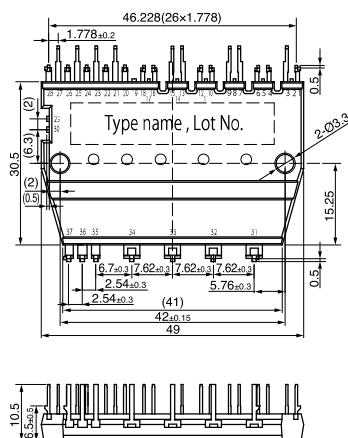
Mini DIPIM (PSSxxS71F6) 1200V Mini DIPIM



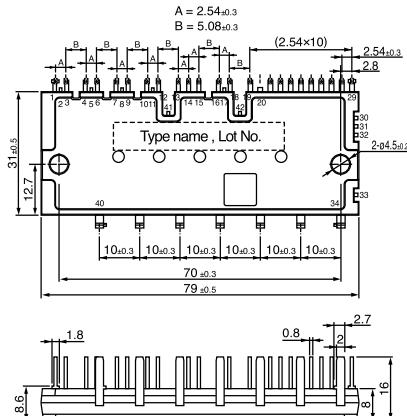
Mini DIP1PM (PSSxxS51F6)



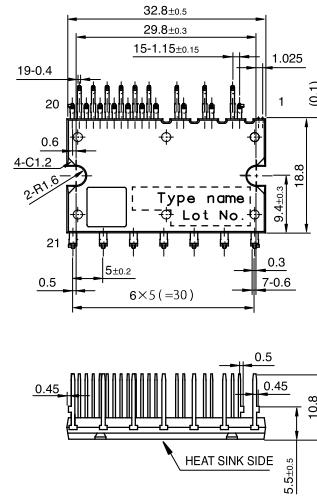
Mini DIPPM(PSSxxS51F6-C) Zigzag(C)



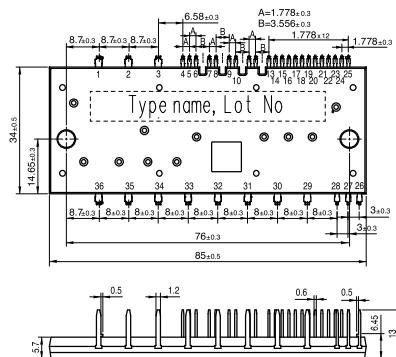
Large DIPIPM



SLIMDIP-S/L



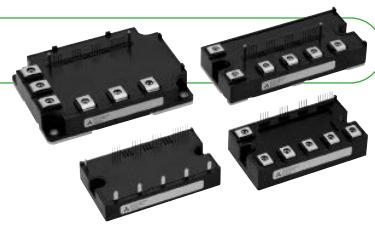
DIP|PM+





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)

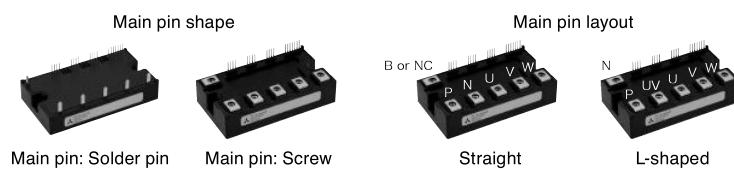
*4 Bootstrap power supply: Optional products include 50A, 75A, 100A/650V, 25A, 50A/1200V

*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

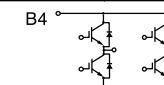
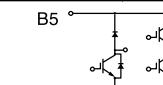
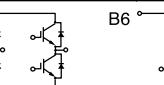
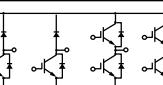
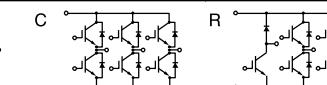
V _{CES} (V)	Package	Main pin shape	Main pin layout	I _c (A)							
				25	50	75	100	150	200	300	450
650V	A package	Screw	Straight		PM50CG1A065** PM50RG1A065**	PM75CG1A065** PM75RG1A065**	PM100CG1A065**				
			L-shaped		PM50CG1AL065**	PM75CG1AL065**	PM100CG1AL065**				
		Solder pin	Straight		PM50CG1AP065** 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**	PM50CG1A120**						
			L-shaped	PM25CG1AL120**	PM50CG1AL120**						
		Solder pin	Straight	PM25CG1AP120** PM25RG1AP120**	PM50CG1AP120**						
			L-shaped	PM25CG1APL120**	PM50CG1APL120**						
	B package	Screw	L-shaped	PM25CG1B120** PM25RG1B120**	PM50CG1B120** PM50RG1B120**	PM75CG1B120** PM75RG1B120**	PM100CG1B120** PM100RG1B120**				
	C package	Screw	L-shaped				PM100CG1C120** PM100RG1C120**	PM150CG1C120** PM150RG1C120**	PM200CG1C120** PM200RG1C120**		

★★: Under Development

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 10 to 11)

V _{CES(V)} I _{C(A)}	650V		600V		Photovoltaic		L Series		
	G1 Series Connection No.	L1 Series Connection No.	S1 Series Connection No.	V1 Series Connection No.	Photovoltaic Connection No.	L Series Connection No.			
50	PM50CG1A065** PM50RG1A065** PM50CG1B065** PM50RG1B065** PM50CG1AL065** PM50CG1AP065** PM50CG1APL065** PM50RG1AP065**	C 12 R 12 C 10 R 10 C 12 C 09 C 09 R 09	PM50CL1A060 PM50CL1B060 PM50RL1A060 PM50RL1B060 PM50RL1C060	C 01 C 02 R 01 R 02 R 03	PM50CS1D060	C 05	PM50B4LA060 PM50B5LA060 PM50B6LA060 PM50B4LB060 PM50B5LB060 PM50B6LB060 PM50B4L1C060 PM50B5L1C060 PM50B6L1C060	B4 01 B5 01 B6 01 B4 02 B5 02 B6 02 B4 03 B5 03 B6 03	PM50CLA060 PM50CLB060 PM50RLA060 PM50RLB060
	PM75CG1A065** PM75RG1A065** PM75CG1B065** PM75RG1B065** PM75CG1AL065** PM75CG1AP065** PM75CG1APL065** PM75RG1AP065**	C 12 R 12 C 10 R 10 C 12 C 09 C 09 R 09	PM75CL1A060 PM75CL1B060 PM75RL1A060 PM75RL1B060	C 01 C 02 R 01 R 02	PM75CS1D060	C 05	PM75B4LA060 PM75B5LA060 PM75B6LA060 PM75B4LB060 PM75B5LB060 PM75B6LB060 PM75B4L1C060 PM75B5L1C060 PM75B6L1C060	B4 01 B5 01 B6 01 B4 02 B5 02 B6 02 B4 03 B5 03 B6 03	PM75CLA060 PM75CLB060 PM75RLA060 PM75RLB060
	PM100CG1A065** PM100CG1B065** PM100RG1B065** PM100CG1AL065** PM100CG1AP065** PM100CG1APL065**	C 12 C 10 R 10 C 12 C 09 C 09	PM100CL1A060 PM100CL1B060 PM100RL1A060 PM100RL1B060	C 01 C 02 R 01 R 02	PM100CS1D060	C 05		PM100CLA060 PM100RLA060	
	PM150CG1B065** PM150RG1B065**	C 10 R 10	PM150CL1A060 PM150CL1B060 PM150RL1A060 PM150RL1B060	C 01 C 02 R 01 R 02	PM150CS1D060	C 05		PM150CLA060 PM150RLA060	
	PM200CG1B065** PM200RG1B065** PM200CG1C065** PM200RG1C065**	C 10 R 10 C 11 R 11	PM200CL1A060 PM200CL1A060 PM200RL1A060 PM200RL1A060	C 04 R 04	PM200CS1D060	C 05		PM200CLA060 PM200RLA060	
	PM300CG1C065** PM300RG1C065**	C 11 R 11	PM300CL1A060 PM300RL1A060	C 04 R 04				PM300CLA060 PM300RLA060	
	PM450CG1C065** PM450RG1C065**	C 11 C 11				PM400DV1A060	D 06	PM450CLA060	
	600					PM600DV1A060	D 06	PM600CLA060	
	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*2 Built-in emitter sensor Built-in temperature sensor						
Fault output	UV OT SC	P-side/N-side P-side/N-side P-side/N-side	P-side/N-side P-side/N-side P-side/N-side	N-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 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	Compliant	Compliant	
Compatibility	—	L Series	S-DASH SERVO	V Series	—	—	—	—	
Connection	D 	B4 	B5 	B6 	C 	R 			

★★: Under Development ★: New Product

Non-recommended

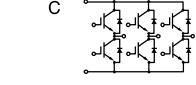
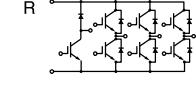
Please contact to the sales offices.

[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

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

V _{CE(s)} (V) I _{C(A)}	1200V														
	G1 Series			L1 Series			S1 Series			V1 Series			L Series		
	Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.	
25	PM25CG1A120**	C 12		PM25CL1A120	C 01		PM25CS1D120		C 05				PM25CLA120	C	
	PM25CG1B120**	C 10		PM25CL1B120	C 02								PM25CLB120	C	
	PM25RG1A120**	R 12		PM25RL1A120	R 01								PM25RLA120	R	
	PM25RG1B120**	R 10		PM25RL1B120	R 02								PM25RLB120	R	
	PM25CG1AL120**	C 12		PM25RL1C120	R 03										
	PM25CG1AP120**	C 09													
	PM25CG1APL120**	C 09													
	PM25RG1AP120**	R 09													
50	PM50CG1A120**	C 12		PM50CL1A120	C 01		PM50CS1D120		C 05				PM50CLA120	C	
	PM50CG1B120**	C 10		PM50CL1B120	C 02								PM50CLB120	C	
	PM50RG1B120**	R 10		PM50RL1A120	R 01								PM50RLA120	R	
	PM50CG1AL120**	C 12		PM50RL1B120	R 02								PM50RLB120	R	
	PM50CG1AP120**	C 09													
	PM50CG1APL120**	C 09													
75	PM75CG1B120**	C 10		PM75CL1A120	C 01		PM75CS1D120		C 05				PM75CLA120	C	
	PM75RG1B120**	R 10		PM75CL1B120	C 02								PM75CLB120	C	
	PM75RG1A120**	R 01		PM75RL1A120	R 01								PM75RLA120	R	
	PM75RG1B120**	R 02		PM75RL1B120	R 02								PM75RLB120	R	
100	PM100CG1B120**	C 10		PM100CL1A120	C 04		PM100CS1D120		C 05				PM100CLA120	C	
	PM100CG1C120**	C 11		PM100RL1A120	R 04								PM100RLA120	R	
	PM100RG1B120**	R 10													
	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		
										PM450DV1A120	D 06	PM450CLA120	C 08		
IGBT chip	CSTBT* ¹ Emitter sensor installed			CSTBT* ¹ Built-in current sensor			CSTBT* ¹ Built-in current sensor			CSTBT* ¹ Built-in current sensor			CSTBT* ² Built-in current sensor		
	Temperature sensor installed			Built-in temperature sensor			Built-in temperature sensor			Built-in temperature 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	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	
Identification	P-side/N-side	—			—			—			—			—	
	Compliant	Compliant			Compliant			Compliant			Compliant			Compliant	
Compatibility	—	L Series			S-DASH SERVO			V Series			—			—	
	Connection	D				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™

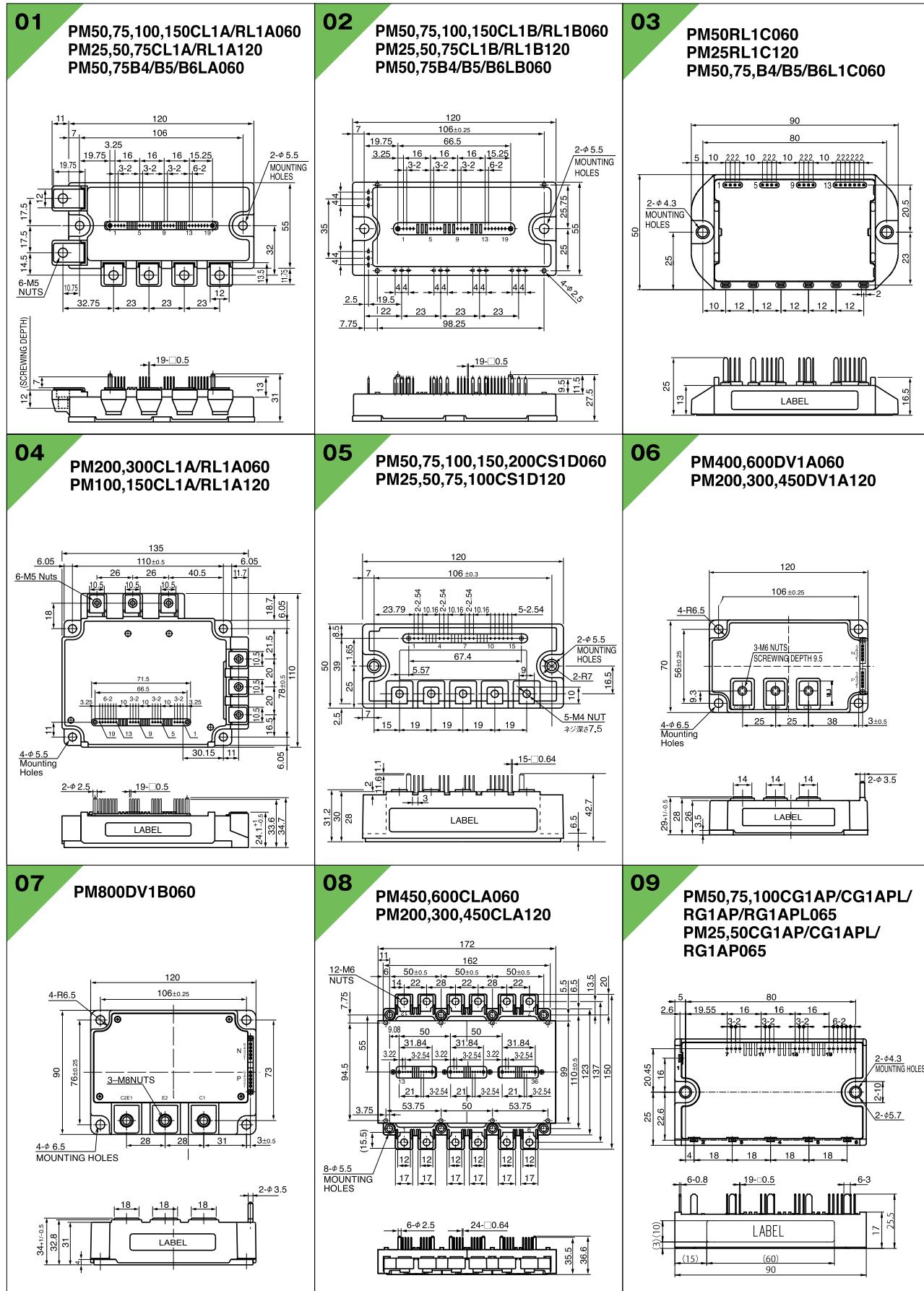
[Term] UV: Supply Under Voltage-lock protection, SC: Short-circuit protection, OT: Over-temperature protection,

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

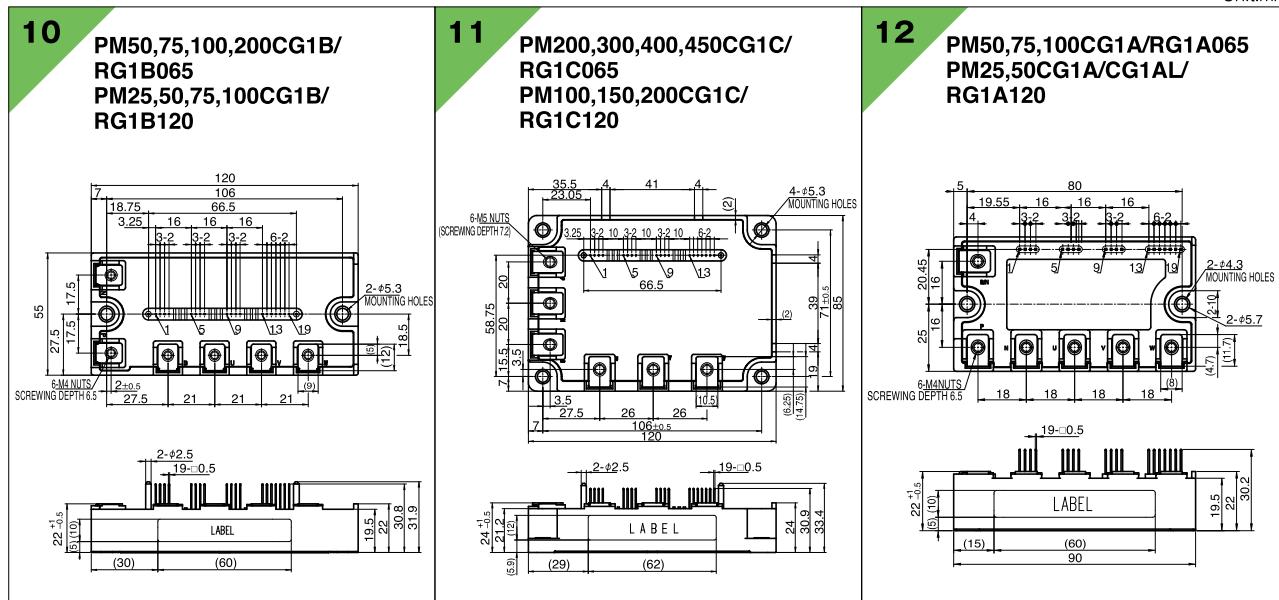
Unit:mm



Line-up of IPM

Outline Drawing of IPM

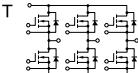
Unit:mm



Line-up of MOSFET Modules

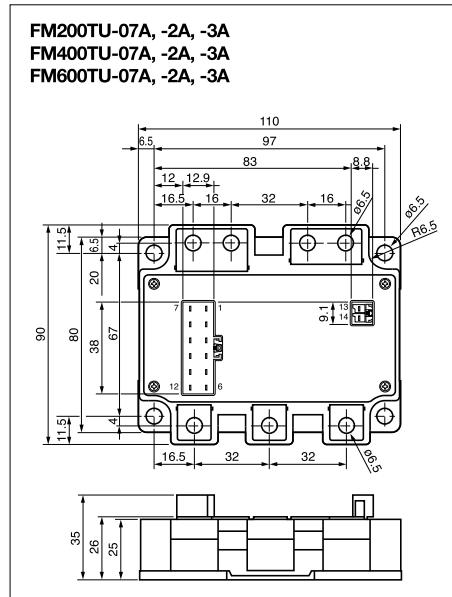
■ Series Matrix of MOSFET Modules

RoHS directive compliant

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

■ Outline Drawing of MOSFET Modules

Unit:mm





New Products

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



IGBT Module T-Series

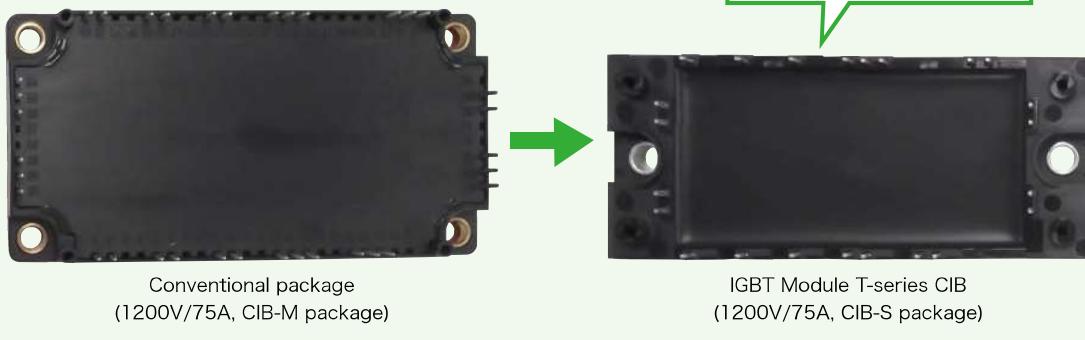
<Main Features>

- New modules equipped with three-phase converter, inverter, and brake circuit(CIB), contributes to simplifying design for inverter systems.
- CIB modules Contributing 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 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.

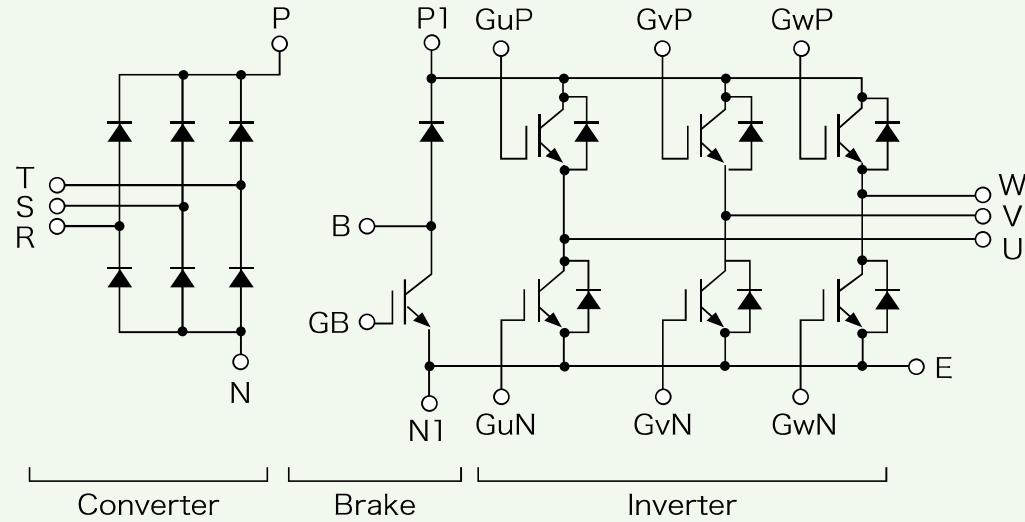
*1 PC-TIM: Phase change - thermal interface material

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

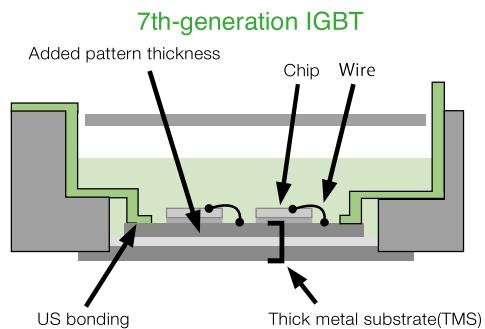
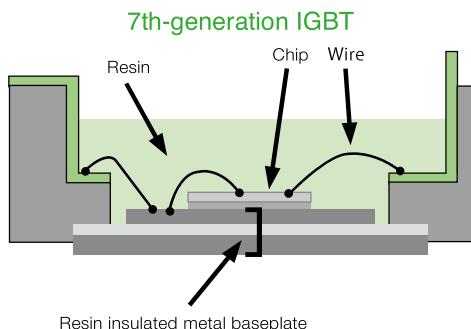
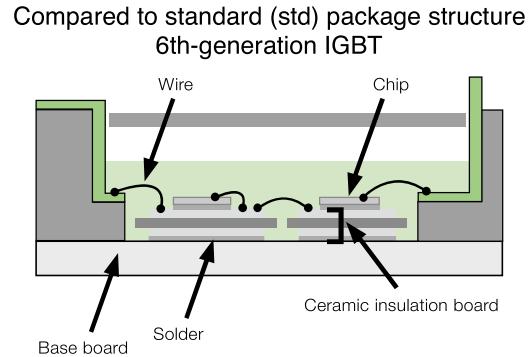
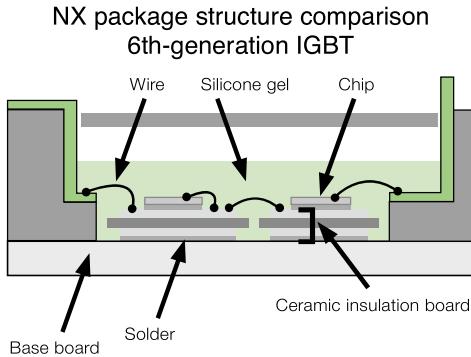
Compared package size of IGBT Module (CIB)



Internal circuit diagram of IGBT Module T-Series (CIB)



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



※Adopts SoLid Cover(SLC) Technology

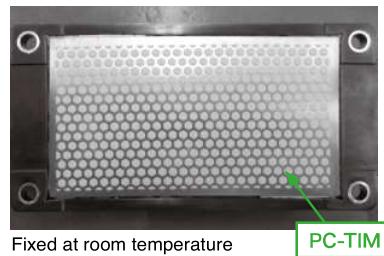
※Standard package has not available for CIB

■ Assembly process simplified

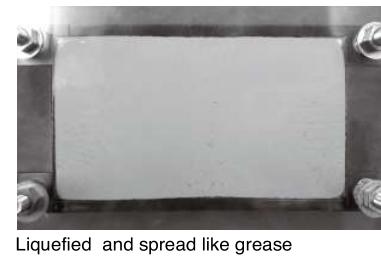
◆ PC-TIM support

- 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



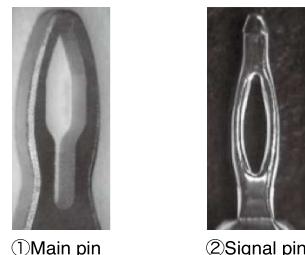
■ After temperature rise



◆ Press-fit terminal support (NX)

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

■ Press-fit pin





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

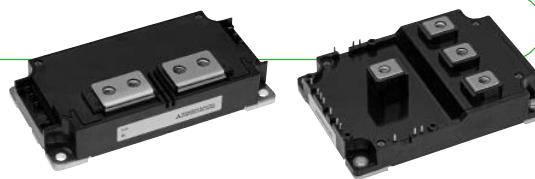
*1 Comparison between 3-level inverter incorporated in this device and 2-level inverter in conventional device.

*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.

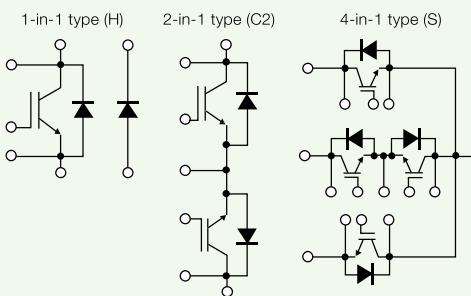
*5 Bidirectional switch model as emitter common connection.



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

4-in-1 type

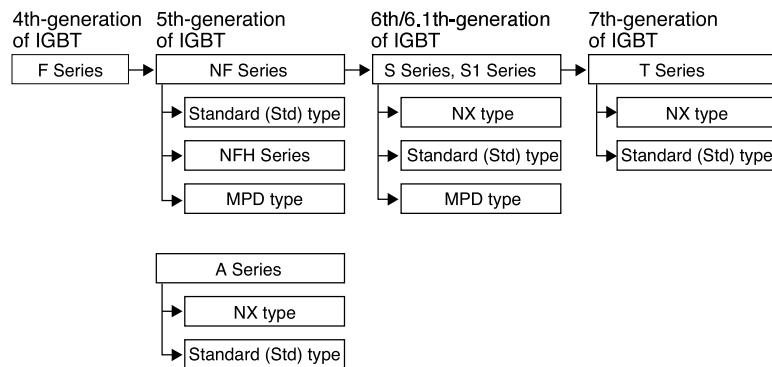
Internal circuit diagram



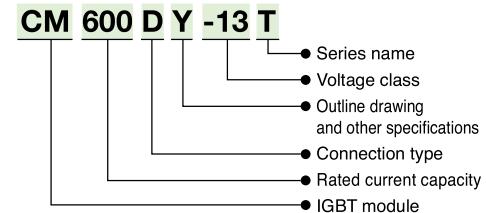
Lineup

Main application	Model	Module type	Rated voltage	Rated current	Circuit structure	External dimensions W×D(mm)
125-500kW inverter	CM400ST-24S1	IGBT	1200V	400A	4-in-1	115×82
	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 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) I _{C(A)}	650V						600V					
	T/T1-Series NX Type		T-Series Std Type		A-Series NX Type		NF-Series		NF-Series NFH Type			
	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.
50	CM50MXUB-13T** CM50MXUB-13T1** CM50MXUBP-13T** CM50MXUBP-13T1**	M 43 M 43 M - M -										
75	CM75MXUB-13T** CM75MXUB-13T1** CM75MXUBP-13T** CM75MXUBP-13T1**	M 43 M 43 M - M -			CM75MX-12A	M 01	CM75TL-12NF CM75RL-12NF	T 07 R 07				
100	CM100TX-13T* CM100TXP-13T* CM100MXUB-13T** CM100MXUB-13T1** CM100MXUBP-13T** CM100MXUBP-13T1** CM100MXUD-13T** CM100MXUD-13T1** CM100MXUD-13T1** CM100MXUDP-13T** CM100MXUDP-13T1**	T 34 T 38 M 43 M 43 M - M - M 45 M 45 M - M -	CM100DY-13T*	D 31	CM100MX-12A CM100RX-12A	M R 01 02	CM100TL-12NF CM100RL-12NF	T 07 R 07	CM100DUS-12F	D 13		
150	CM150TX-13T* CM150TXP-13T* CM150RX-13T* CM150RXP-13T* CM150MXUD-13T** CM150MXUD-13T1** CM150MXUDP-13T** CM150MXUDP-13T1**	T 34 T 38 R 35 R 39 M 45 M 45 M - M -	CM150DY-13T*	D 31	CM150RX-12A	R 02	CM150DY-12NF CM150TL-12NF CM150RL-12NF	D 08 T 07 R 07	CM150DUS-12F	D 13		
200	CM200TX-13T* CM200TXP-13T* CM200RX-13T* CM200RXP-13T*	T 34 T 38 R 35 R 39	CM200DY-13T*	D 31	CM200RX-12A	R 02	CM200DY-12F CM200TL-12NF CM200RL-12NF	D 08 T 09 R 09	CM200DU-12NFH	D 13		
225												
300	CM300DX-13T* CM300DXP-13T*	D 29 D 40	CM300DY-13T*	D 32	CM300DX-12A	D 03	CM300DY-12NF	D 08	CM300DU-12NFH	D 14		
400			CM400DY-13T*	D 32	CM400DX-12A	D 03	CM400DY-12NF	D 10	CM400DU-12NFH	D 14		
450	CM450DX-13T* CM450DXP-13T*	D 29 D 40										
600	CM600DX-13T* CM600DXP-13T*	D 29 D 40	CM600DY-13T*	D 33			CM600DY-12NF	D 11	CM600DU-12NFH	D 15		
1000												
Connection		D	T	R	M							

★★: 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			
	I _C /I _F	T/S/S1-Series std Type	Connection		S/S1-Series std Type	Connection		S/S1-Series std Type	Connection		S/S1-Series std Type	Connection		S/S1-Series std Type	Connection	
			Connection	No.		Connection	No.		Connection	No.		Connection	No.		Connection	No.
400	CM400ST-24S*	S	36													
	CM400C1Y-24S	C1	11													
450	CM450C1Y-24T**	C1	33													
500	CM500C2Y-24S*	C	37													
600	CM600C1Y-24T*	C1	33		CM600HA-34S*	H	37								RM600DY-34S*	D 33
800					CM800HA-34S*	H	37								RM800DY-34S*	D 33
1000					CM1000HA-34S*	H	37									
1400	CM1400HA-24S*	H	37					RM1400HA-24S*	H	37						
Connection	IGBT module	C1			C2			H			S		Diode module	H	D	

*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 _{GES} (V)	1200V																	
	T/T1-Series			T-Series			S/S1-Series			S/S1-Series			S/S1-Series			A-Series ^{*1}		
Series I _c	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.
	CM35MXUA-24T** CM35MXUA-24T1** CM35MXUAP-24T** CM35MXUAP-24T1**	M M M M	42 42 - -				CM35Mxa-24S		M M	04 04								
35	CM50MXUA-24T** CM50MXUA-24T1** CM50MXUAP-24T** CM50MXUAP-24T1**	M M M M	42 42 - -				CM50Mxa-24S		M T R	04 05 02					CM50RL-24NF CM50TL-24NF	R T	07 07	
	CM75MXUB-24T** CM75MXUB-24T1** CM75MXUBP-24T** CM75MXUBP-24T1** CM75MXUC-24T** CM75MXUC-24T1** CM75MXUCP-24T** CM75MXUCP-24T1**	M M M M M M M M	43 43 - - 44 44 - -				CM75Mxa-24S CM75Tx-24S CM75Rx-24S								CM75RL-24NF CM75TL24NF	R T	07 07	
50	CM100TX-24T* CM100TP-24T* CM100RX-24T* CM100RXP-24T* CM100MXUC-24T** CM100MXUC-24T1** CM100MXUCP-24T** CM100MXUCP-24T1**	T T R R M M M M	34 38 35 39 44 44 - -	CM100DY-24T*	D D	31	CM100Mxa-24S CM100Tx-24S1 CM100Rx-24S1		M T R	04 26 27					CM100DY-24A CM100DY-24NF CM100E3Y-24NF CM100RL-24NF CM100TL-24NF CM100DU-24NFH	D D E3 R T D	08 08 08 07 07 13	
	CM150TX-24T* CM150TP-24T* CM150RX-24T* CM150RP-24T* CM150MXUD-24T** CM150MXUD-24T1** CM150MXUDP-24T** CM150MXUDP-24T1**	T T R R M M M M	34 38 35 39 45 45 - -				CM150DX-24S CM150Exs-24S CM150Tx-24S1 CM150Rx-24S1		D E T R	03 25 26 27					CM150DY-24A CM150DY-24NF CM150E3Y-24NF CM150RL-24NF CM150TL-24NF CM150DU-24NFH	D D E3 R T D	08 08 08 09 09 13	
100	CM200TX-24T* CM200TP-24T*	T T	34 38	CM200DY-24T*	D	32	CM200Exs-24S CM200RXL-24S		E R	25 22					CM200DY-24A CM200DY-24NF CM200RL-24NF CM200TL-24NF CM200DU-24NFH	D D R T D	08 08 09 09 14	
	CM225DX-24T* CM225XP-24T*	D D	29 40				CM225DX-24S1		D	28								
150	CM300DX-24T* CM300DP-24T*	D D	29 40	CM300DY-24T*	D	32	CM300DX-24S1 CM300Exs-24S CM300RXL-24S1*		D E R	28 25 22	CM300DY-24S	D	10		CM300DY-24A CM300DY-24NF CM300DU-24NFH	D D D	10 11 14	
															CM400DY-24A CM400HA-24A CM400DY-24NF CM400DU-24NFH	D H D D	11 16 11 15	
200															CM600DY-24A CM600HA-24A CM600DU-24NF CM600DU-24NFH	D H D D	11 16 12 15	
	CM800DY-24S								D	12								
225															CM900DUC-24S	D	17	
300																		
400																		
450	CM450DX-24T* CM450DP-24T*	D D	29 40	CM450DY-24T*	D	33	CM450DX-24S1		D	28	CM450DY-24S	D	11					
600	CM600DX-24T* CM600DP-24T*	D D	29 40	CM600DY-24T*	D	33	CM600DX-24S1 CM600DXL-24S		D D	28 26	CM600DY-24S	D	11					
800																		
900																		
1000	CM1000DX-24T* CM1000DP-24T*	D D	30 41				CM1000DXL-24S		D	06								
1400											CM1400HA-24S*	H	37	CM1400DUC-24S	D	17		
1800																		
2500															CM2500DY-24S	D	19	
Connection	H	D	T	R	M	E									E3			

*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

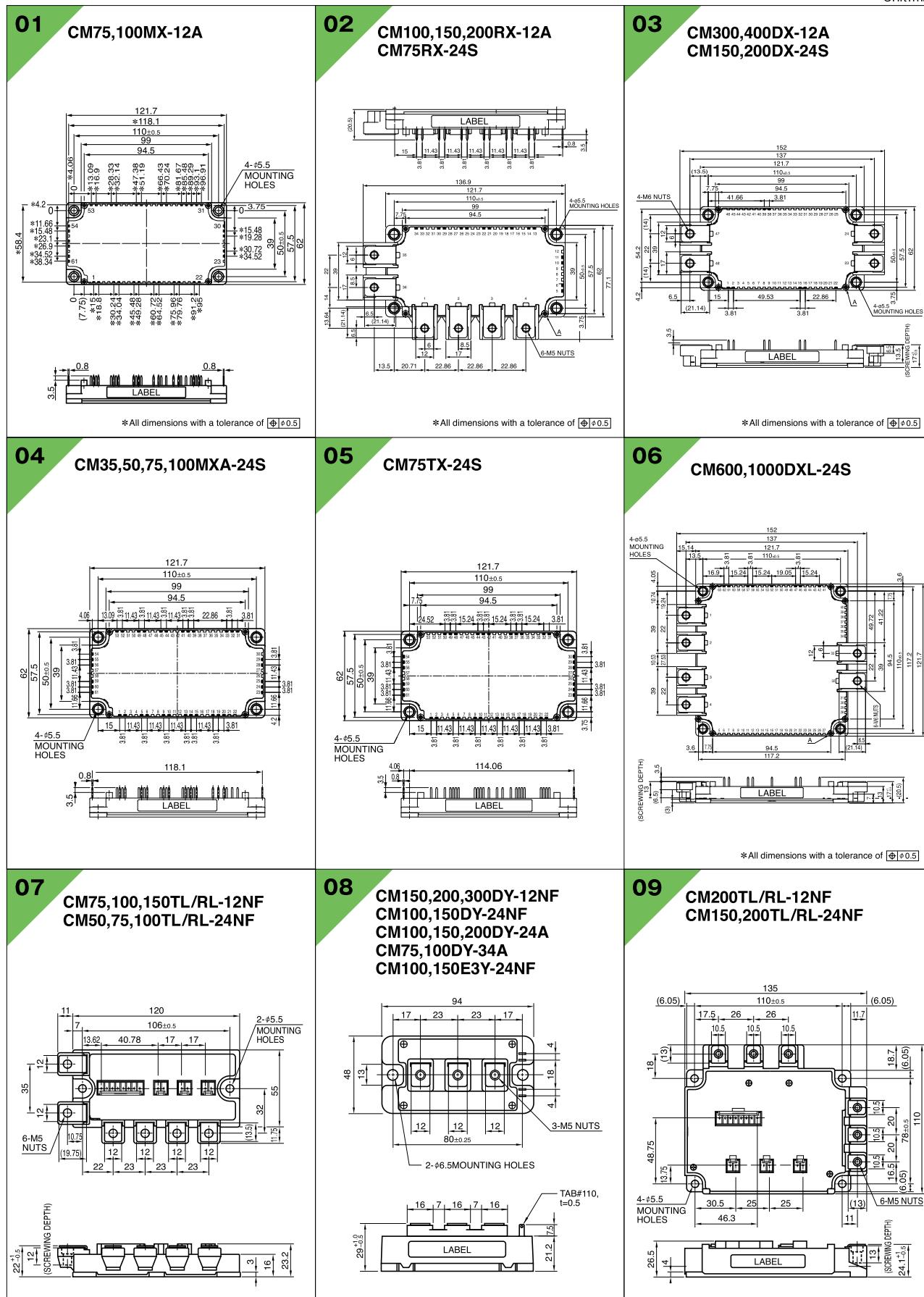
V _{GES} (V)	1700V																	
	T-Series			T-Series			S/S1-Series			S/S1-Series			A-Series					
I _c	NX Type	Connection	No.	std Type	Connection	No.	NX Type	Connection	No.	std Type	Connection	No.	MPD Type	Connection	No.	std Type	Connection	No.
35																		
50																		
75				CM75DY-34T**	D	31	CM75Mxa-34SA CM75RX-34SA	M R	24 20					CM75DY-34A	D	08		
100	CM100TX-34T** CM100TXP-34T**	T T	34 38	CM100DY-34T**	D	31								CM100DY-34A	D	08		
150	CM150TX-34T** CM150TXP-34T**	T T	34 38	CM150DY-34T**	D	32	CM150DX-34SA CM150RXL-34SA	D R	21 22					CM150DY-34A	D	10		
200				CM200DY-34T**	D	32	CM200DX-34SA CM200EXS-34SA	D E	21 25					CM200DY-34A	D	10		
225	CM225DX-34T** CM225DXP-34T**	D D	29 40															
300	CM300DX-34T** CM300DXP-34T**	D D	29 40	CM300DY-34T**	D	33	CM300DX-34SA	D	21					CM300DY-34A	D	11		
400				CM400DY-34T**	D	33								CM400DY-34A	D	18		
450	CM450DX-34T** CM450DXP-34T**	D D	29 40				CM450DXL-34SA	D	23									
500														CM500HA-34A	H	16		
600	CM600DX-34T** CM600DXP-34T**	D D	29 40				CM600DXL-34SA	D	23	CM600HA-34S*	H	37						
800										CM800HA-34S*	H	37						
900																		
1000										CM1000HA-34S*	H	37	CM1000DUC-34SA	D	17			
1400																		
1800														CM1800DY-34S	D	19		
2500																		
Connection	H		D		T		R		M		E							

★★: Under Development ★: New Product

Line-up of IGBT Modules

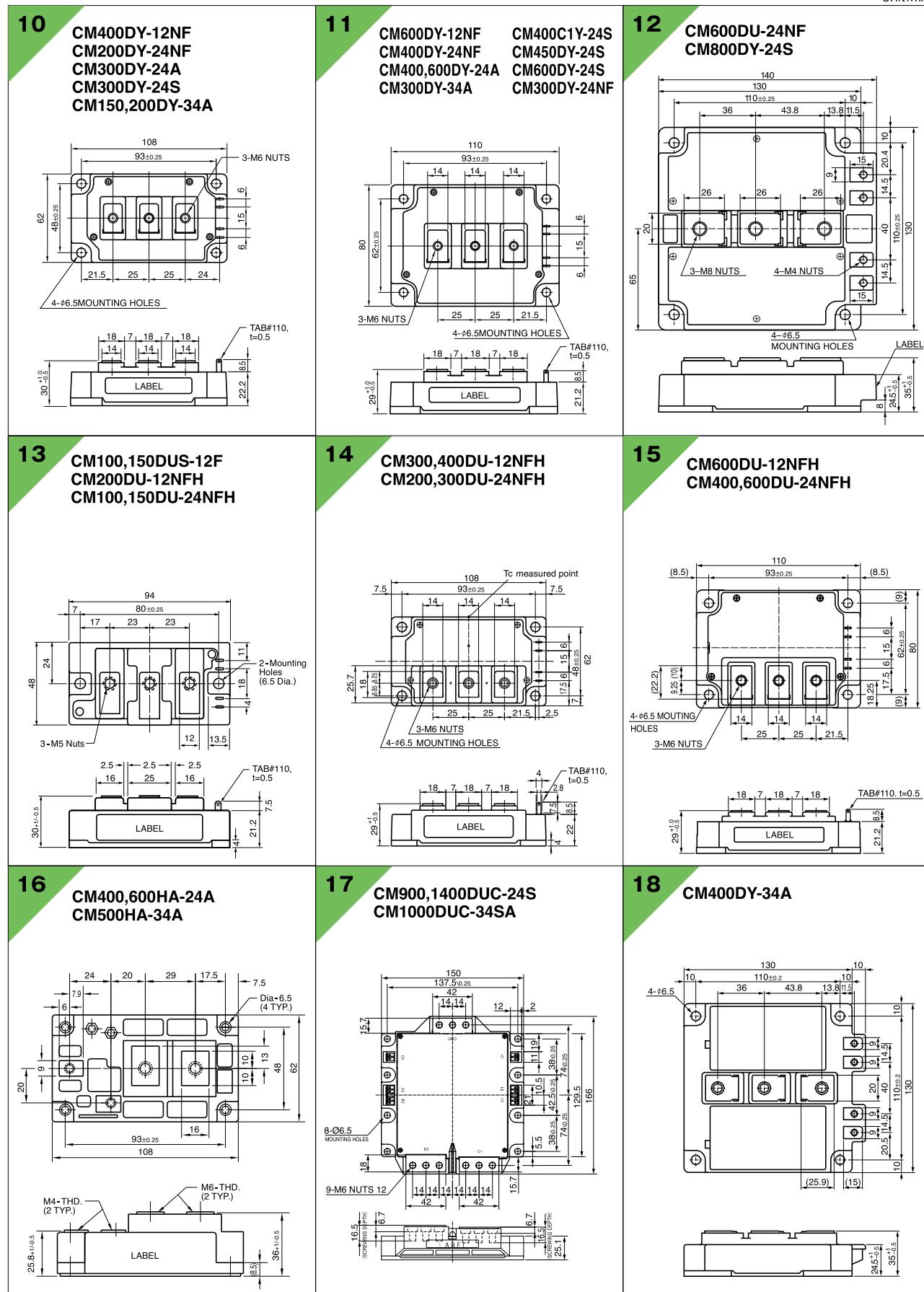
Outline Drawing of IGBT Modules

Unit:mm



Outline Drawing of IGBT Modules

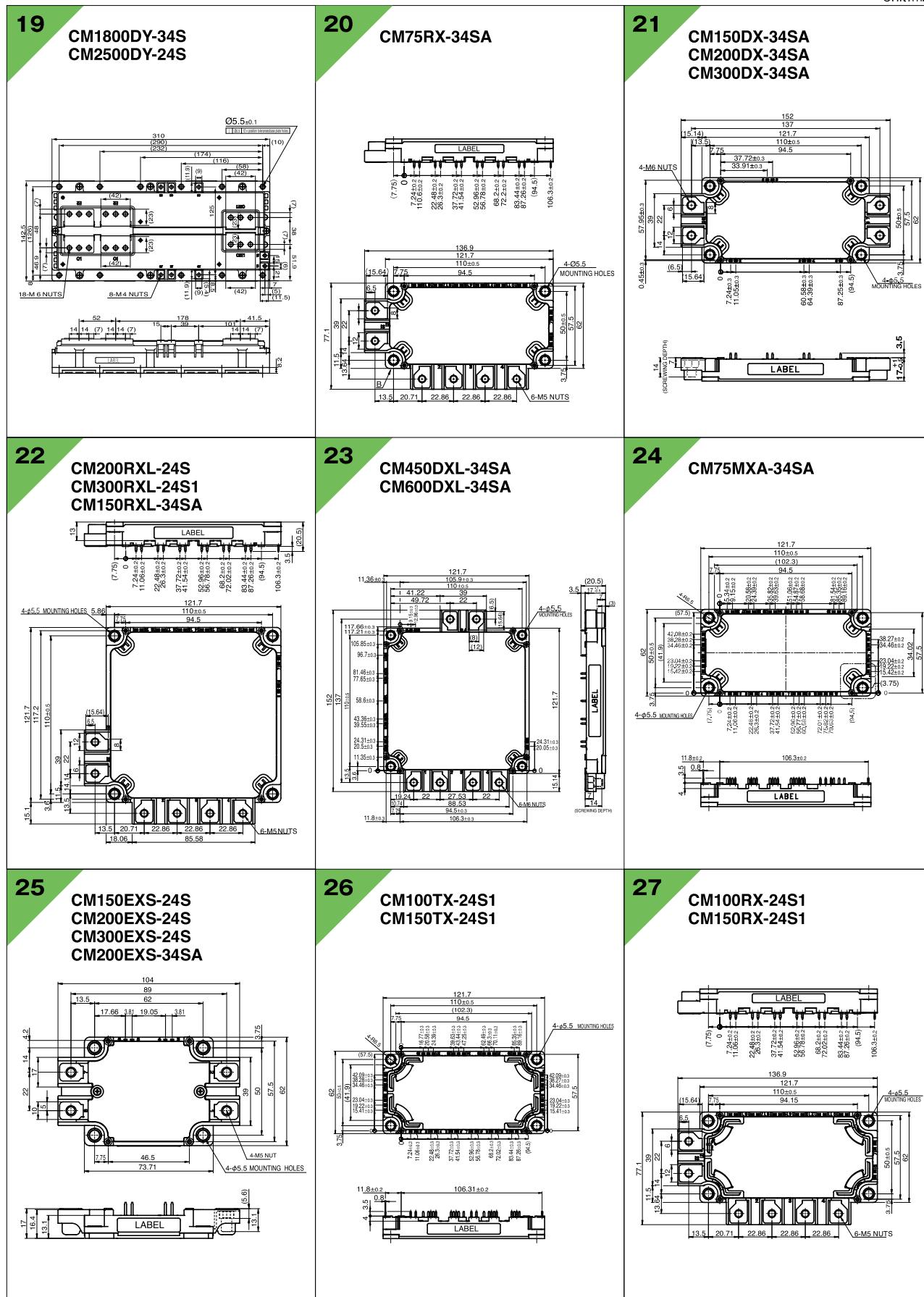
Unit:mm



Line-up of IGBT Modules

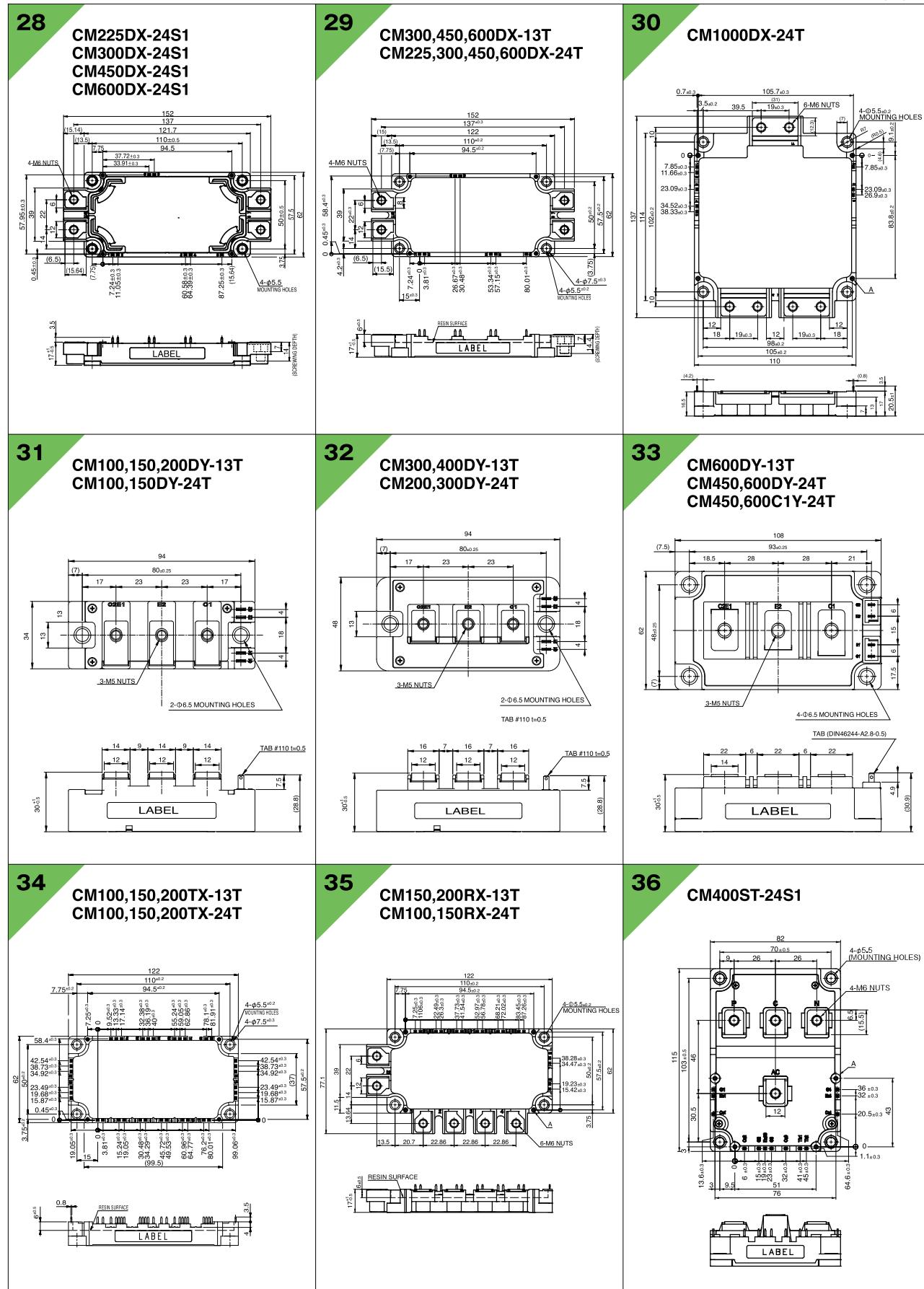
■ Outline Drawing of IGBT Modules

Unit:mm



Outline Drawing of IGBT Modules

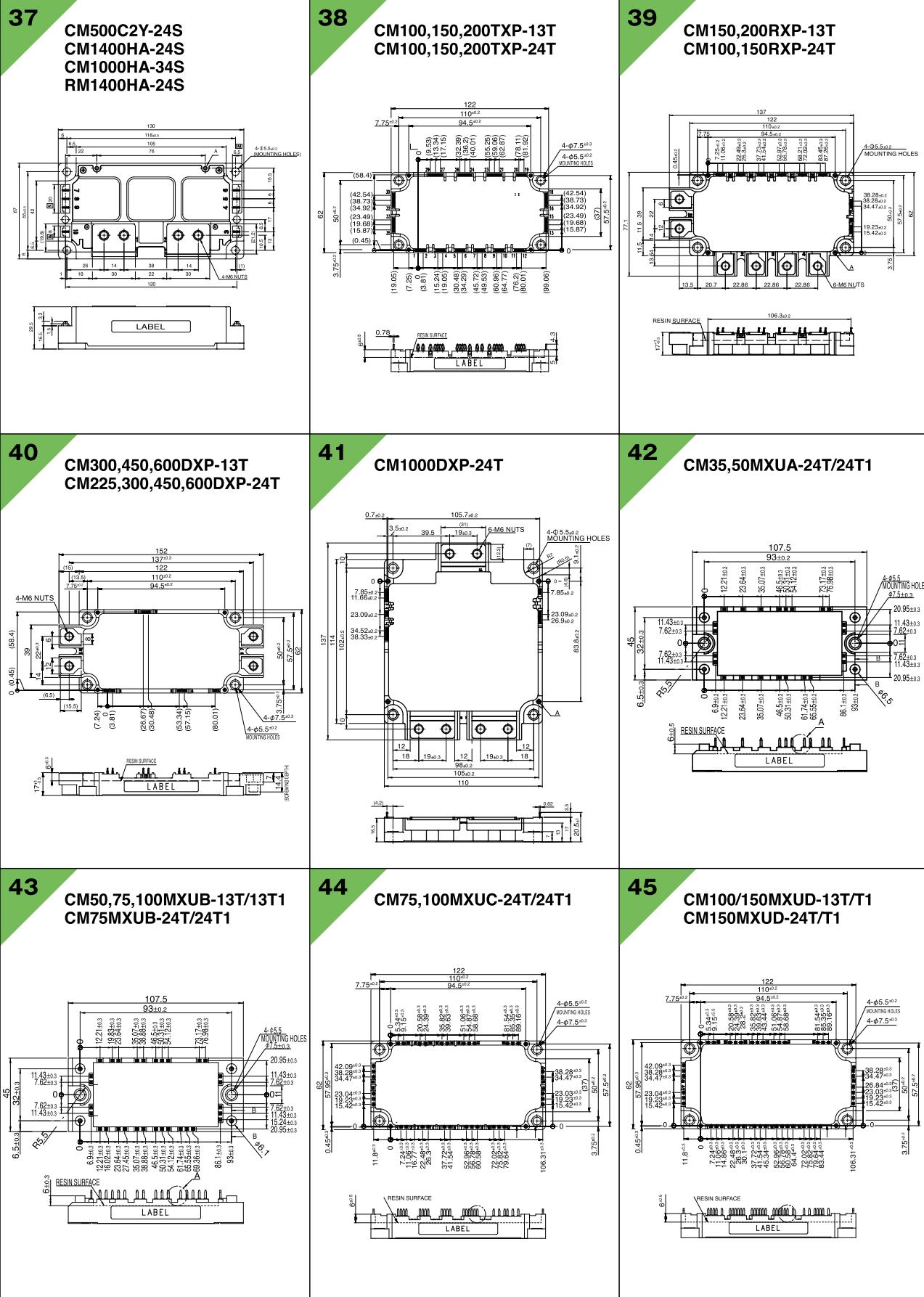
Unit:mm



Line-up of IGBT Modules

Outline Drawing of IGBT Modules

Unit:mm





New Products

X Series HVIGBT Modules

Compatible package for smaller, higher-capacity inverter systems



	Standard (std) Type	
1.7kV		
3.3kV	1800A	1200A
4.5kV	1350A/1500A	900A
6.5kV	900A/1000A	600A

New common frame size supports more diverse inverter configurations and capacity



	HV100 Type	LV100 Type
1.7kV		900A
3.3kV	450A	450A
4.5kV	330A	
6.5kV	225A	

<Main Features>

- Power loss reduced by incorporating 7th-generation IGBT and RFC^{*1} diode
- Current capacity improved 50% compared to conventional package
- Latest package technology enhances power cycle lifetime
- Compatible package^{*2} for simplified design and easy replacement
- Maximum operation temperature of 150 degrees Celsius, from 1.7kV to 6.5kV class^{*3}

*1 RFC: Relaxed field of cathode

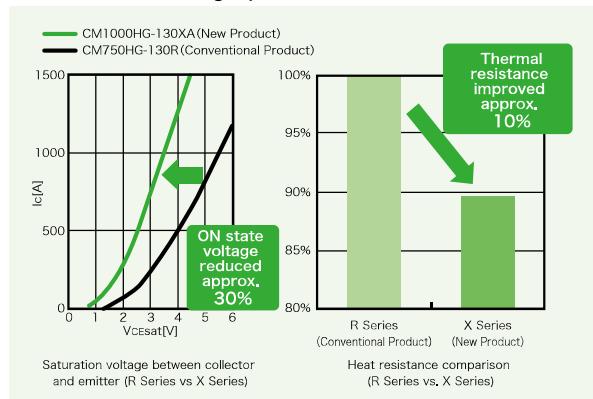
*2 : HVIGBT H series/R Series

*3 : A world's first for the 6.5kV class Based on Mitsubishi Electric research

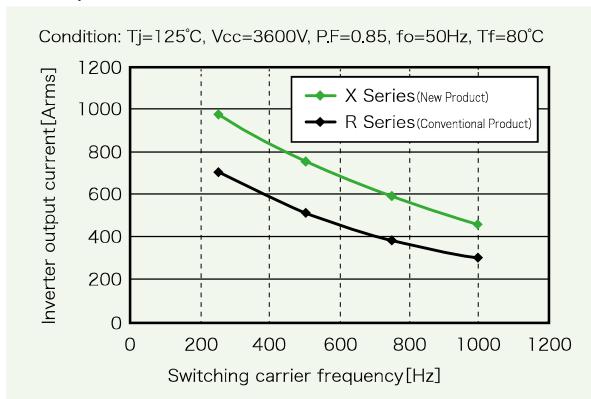
<Main Features>

- Power loss reduced by incorporating 7th-generation IGBT and RFC^{*1} diode
- Contributing to high energy efficiency and high power density by improving package technology for low parasitic inductance and thermal resistance
- LV100 and HV100 modules have a common package design
- Simple, standard connections allow for optimal system design and a range of current ratings

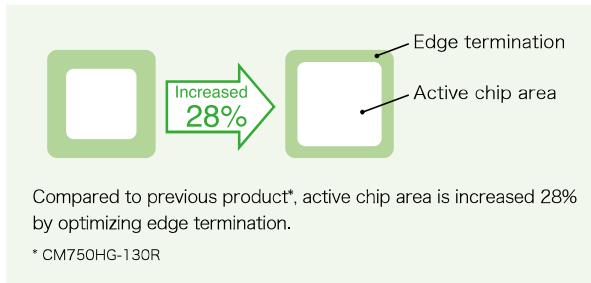
Characteristics graph



Output current characteristics



LNFLR structure (edge termination optimized)



Line-up of HVIGBT Modules

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

V _{ces} I _{c(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	D 07
400				CM400DY-50H	D	B 15	CM400HG-66H CM400DY-66H	H	D 07 D B 15				CM400HG-130H	H	D 12
450							CM450DA-66X★★	D	A 16				CM400E2G-130H CM400E4G-130H	E2 D 09 E4 D 09	
600	CM600DY-34H CM600E2Y-34H	D B 01 E2 B 01								CM600HG-90H	H	D 12	CM600HG-130H CM600HG-130X★★	H D 11 H D 13*	
750													CM750HG-130R	H	D 11
800	CM800DZB-34N CM800DZ-34H CM800HA-34H	D C 01 D C 01 H B -	CM800HB-50H	H B 03	CM800HC-66H CM800E4C-66H CM800E6C-66H CM800HB-66H	H C 03 E4 C 06 E2 C 06 H B 03	CM800HC-90R CM800HG-90R	H C 08 H D 13							
900										CM900HG-90H CM900HC-90H CM900HB-90H CM900HG-90X★★	H D 13 H C 09 H B 06 H D 13*		CM900HG-130X★★	H D 11*	
1000							CM1000HC-66R CM1000E4C-66R	H C 08 E4 C 10					CM1000HG-130XA★	H D 11	
1200	CM1200HCB-34N CM1200DB-34N CM1200DC-34N CM1200E4C-34N CM1200HC-34H CM1200DC-34S	H C 03 D B 04 D C 04 E4 C 05 H C 02 D C 04	CM1200HC-50H CM1200HB-50H	H C 06 H B 06	CM1200HG-66H CM1200HC-66H CM1200HB-66H CM1200HC-66X★★	H D 09 H C 06 H B 06 H C 08*	CM1200HC-90R CM1200HC-90RA CM1200HG-90R	H C 10 H C 10 H D 11							
1350										CM1350HG-90X★★	H D 11*				
1500							CM1500HC-66R CM1500HG-66R	H C 10 H D 11					CM1500HC-90XA★★	H C 10*	
1600	CM1600HC-34H	H C 02													
1800	CM1800HCB-34N CM1800HC-34N CM1800HC-34H	H C 06 H C 05 H C 06					CM1800HC-66X★★ CM1800HG-66X★★	H C 10* H D 11*							
2400	CM2400HCB-34N CM2400HC-34N CM2400HC-34H	H C 06 H C 05 H C 06													
Connection		H	E2/E6	E4	D										

[Type Description] A: Al base plate B: Cu base plate C: AISIC base plate / 6 kViso D: AISIC base plate / 10kViso

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

★★: Under Development ★: New Product

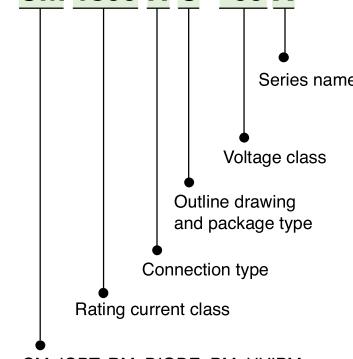
■ Series Matrix of HVDIODE Modules (No.: Number of outline drawing, see page 28)

V _{FPM} I _{c(A)}	1700V			3300V			4500V			6500V		
	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.
200										RM200DG-130S	D	D 19
250										RM250DG-130F	D	D 19
300							RM300DG-90S	D	D 19			
400				RM400DG-66S RM400DY-66S	D D 19 D B 20		RM400DG-90F	D	D 19			
600				RM600DY-66S	D B 20	RM600HE-90S	H C 18	RM600DG-130S	D D 19			
800							RM800DG-90F	D	D 19			
900							RM900HC-90S RM900DB-90S	H C 22 D B 22				
1000				RM1000DC-66F	D F 21							
1200	RM1200DB-34S	D B 17	RM1200DG-66S	D D 19	RM1200HE-66S	H C 18	RM1200DG-90F	D D 19				
1200				RM1200DB-66S	D B 22							
1500							RM1500DC-66F	D C 21				
1800	RM1800HE-34S	H C 18										
Connection		H	D									

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

■ Type Name Definition of IGBT Modules

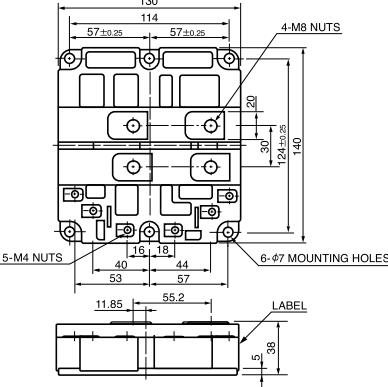
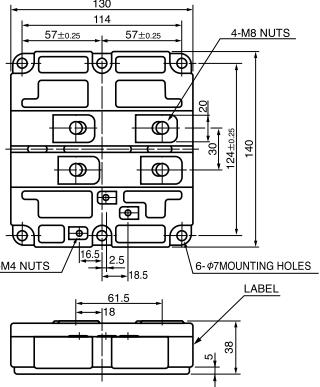
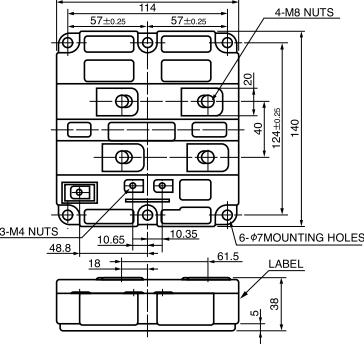
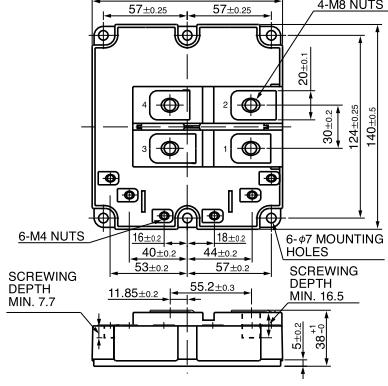
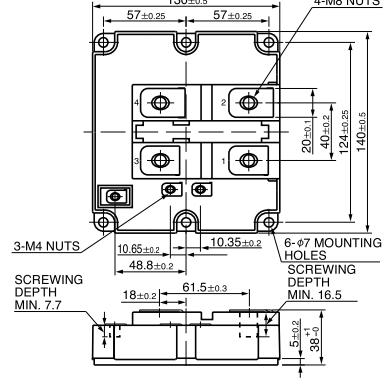
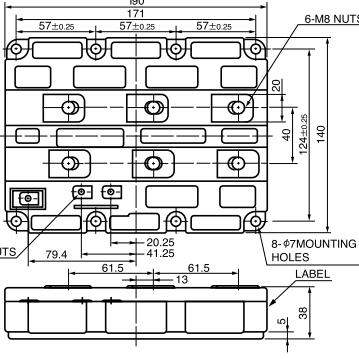
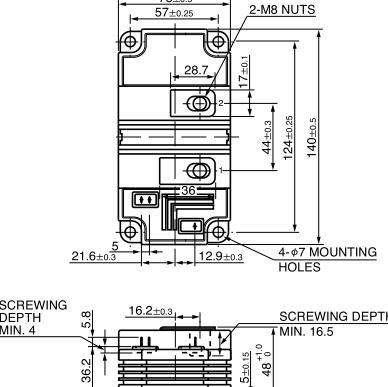
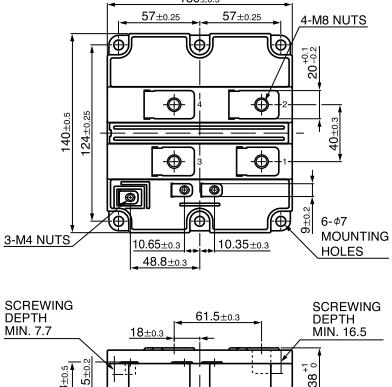
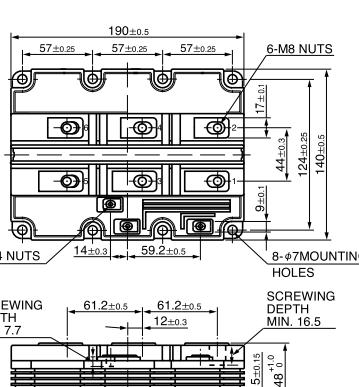
CM 1800 H C -66 X



CM: IGBT, RM: DIODE, PM: HVIPM

Outline Drawing of HVIGBT Modules

Unit:mm

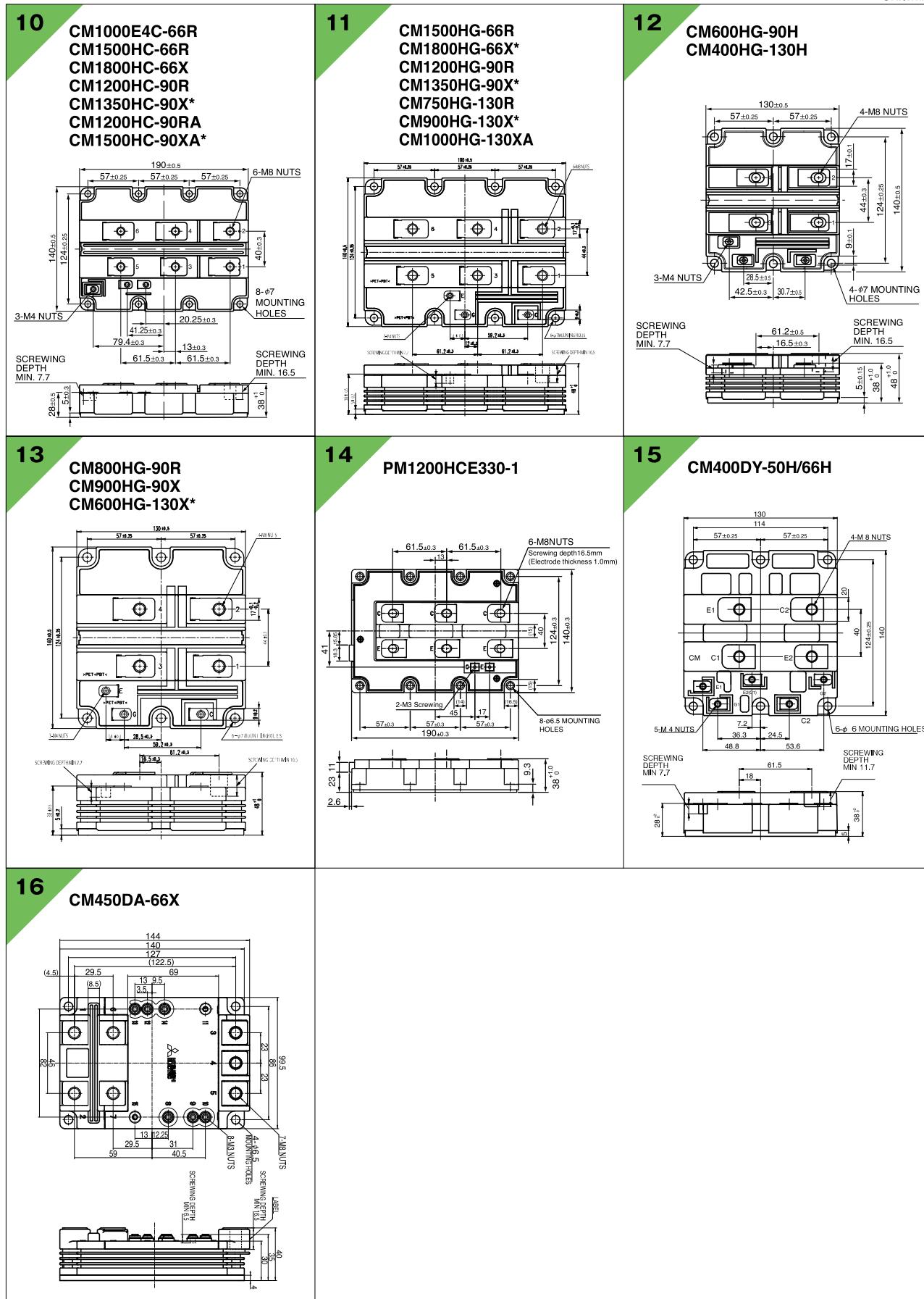
01 CM600DY-34H CM600E2Y-34H CM800DZ-34H CM800DZB-34N	02 CM1200,1600HC-34H	03 CM1200HCB-34N CM800HB-50H,-66H CM800HC-66H
		
04 CM1200DB/DC-34N CM1200DC-34S	05 CM1200E4C-34N CM1800,2400HC-34N	06 CM1800,2400HCB-34N CM1800,2400HC-34H CM1200HB/HC-50H,-66H CM800E4C/E6C-66H CM900HB/HC-90H
		
07 CM400HG-66H CM200HG-130H	08 CM1000HC-66R CM1200HC-66R* CM800HC-90R CM900HC-90X*	09 CM1200HG-66H CM900HG-90H CM400E2G/E4G-130H CM600HG-130H
		

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

Line-up of HVIGBT Modules

Outline Drawing of HVIGBT Modules

Unit:mm

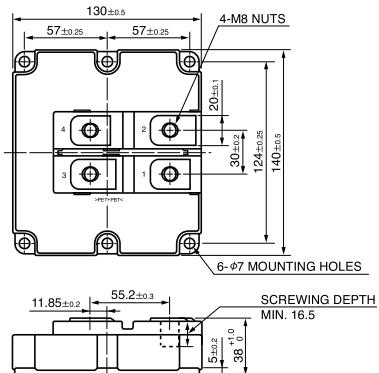


*There are possibility to change the type of auxiliary terminals.

Outline Drawing of HVDIODE Modules

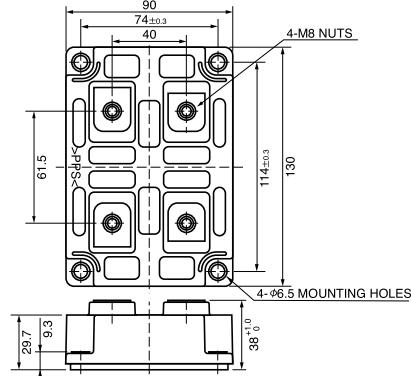
Unit:mm

17 RM1200DB-34S



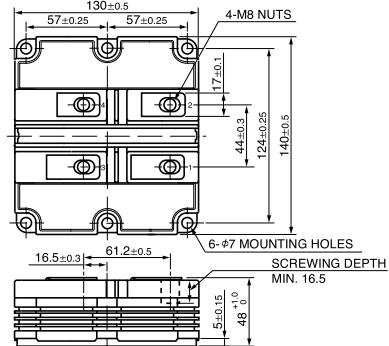
18

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

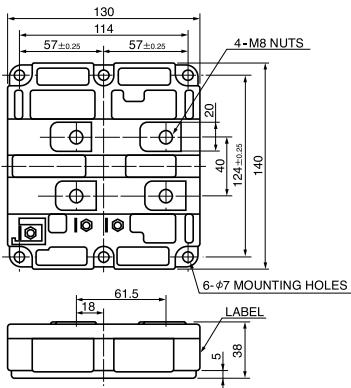


19

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

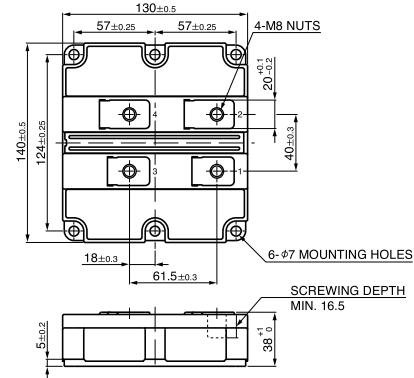


20 RM400,600DY-66S



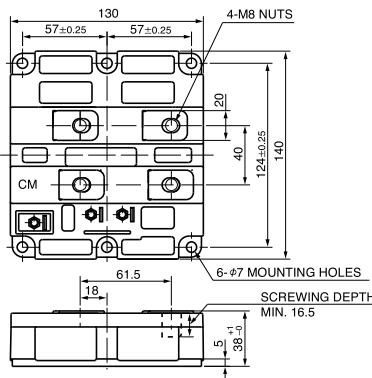
21

RM1000,1500DC-66F



22

RM1200DB-66S
RM900DB/HC-90S



Power Modules for Electric and Hybrid Vehicles

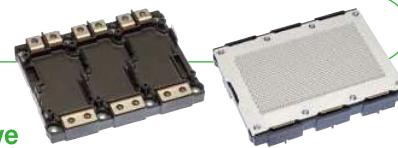


New Products

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

High Power J1 Series Power Modules for Automotive

CT1000CJ1B060,
CT600CJ1B120

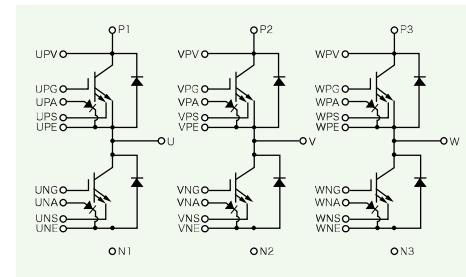


<Main Features>

- Integrated direct water-cooling structure with cooling fins and 6-in-1 connection contribute to more compact inverters for Automotive
- 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*1 structure realizes high reliability
- Installation of the 7th generation IGBT adapting the CSTBT™*2 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		
I _{c(A)}		Power Module with pin fin	Connection	No.	T-PM	Connection	No.
300		CT300CJ1A060**	C	01	CT300DJG060**	D	02
600		CT600CJ1A060	C	01	CT600DJH060**	D	03
1000		CT1000CJ1B060**	C	04	-	-	-
	Connection	C			D		

★★ Under Development

Matrix of 1200V Power Modules

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

V _{CES(V)}	1200V			
	Series	J1 Series		
I _{c(A)}		Power Module with pin fin	Connection	No.
600		CT600CJ1B120**	C	04
	Connection	C		

★★ Under Development

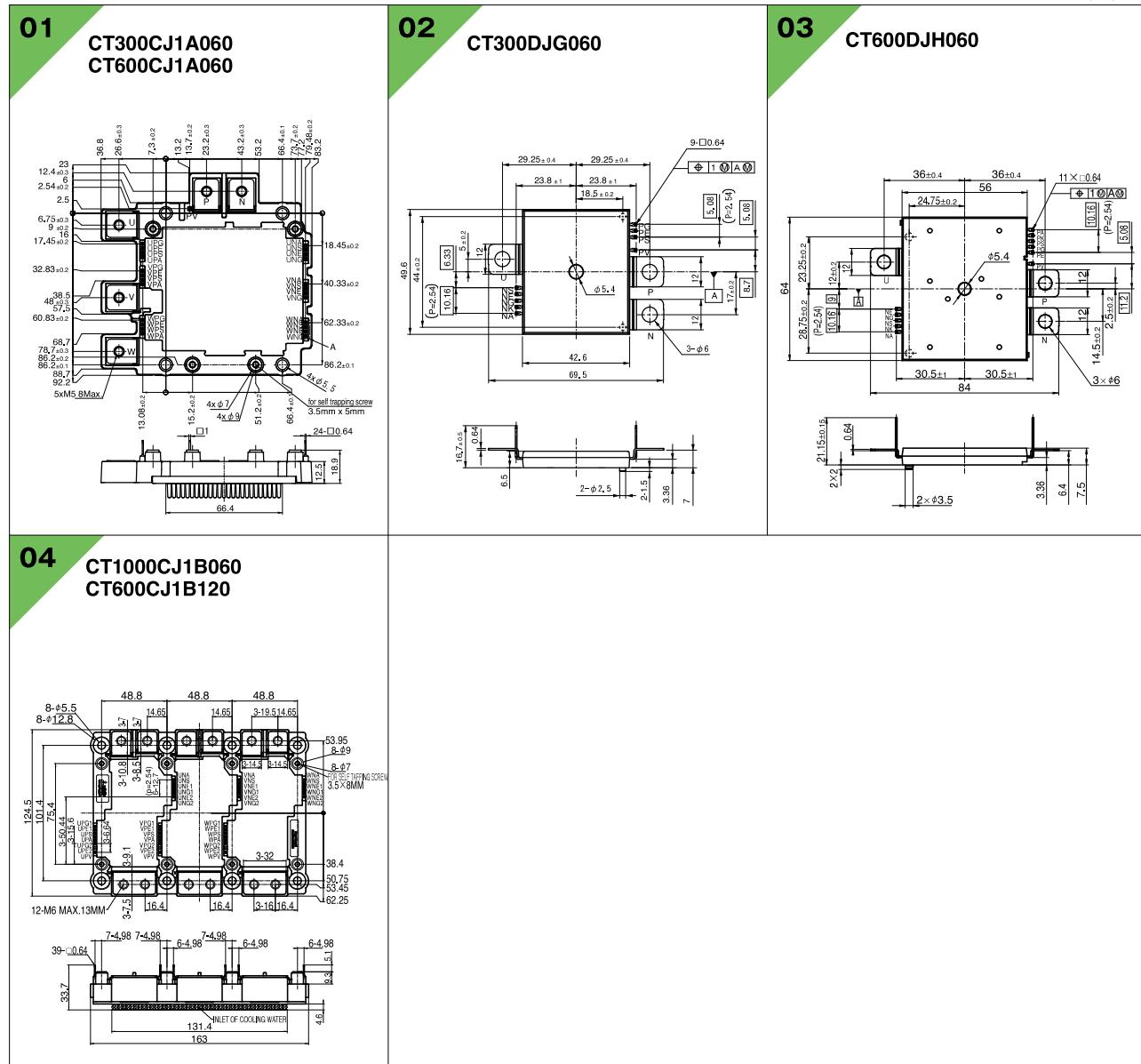
Type Name Definition of Power Modules for Electric and Hybrid Vehicles

CT 600 C J1B 120

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

Outline Drawing of Power Modules for Electric and Hybrid Vehicles

Unit:mm



POWER MODULES

Please visit our website for further details.

www.MitsubishiElectric.com

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MITSUBISHI ELECTRIC CORPORATION

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



6121 Baker Rd.
Suite 108
Minnetonka, MN 55345

Phone: 800-274-4284
Fax: 952-933-6223
www.chtechnology.com



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