



**MITSUBISHI  
ELECTRIC**

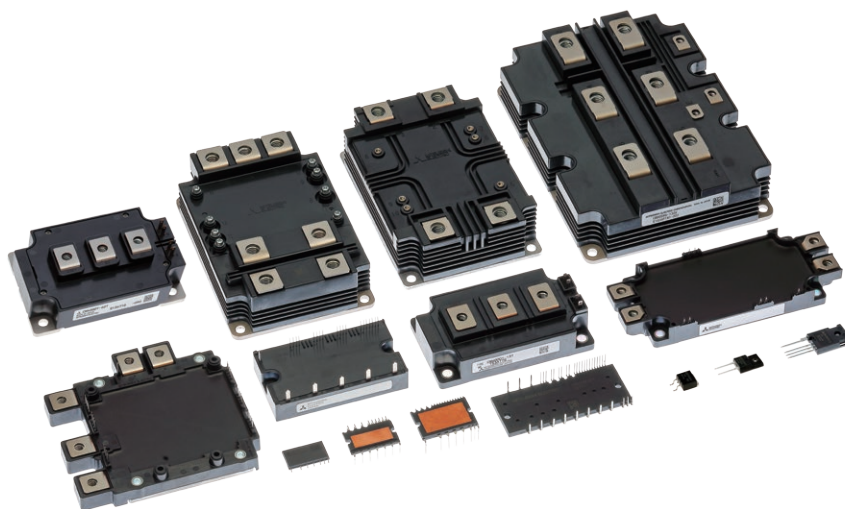
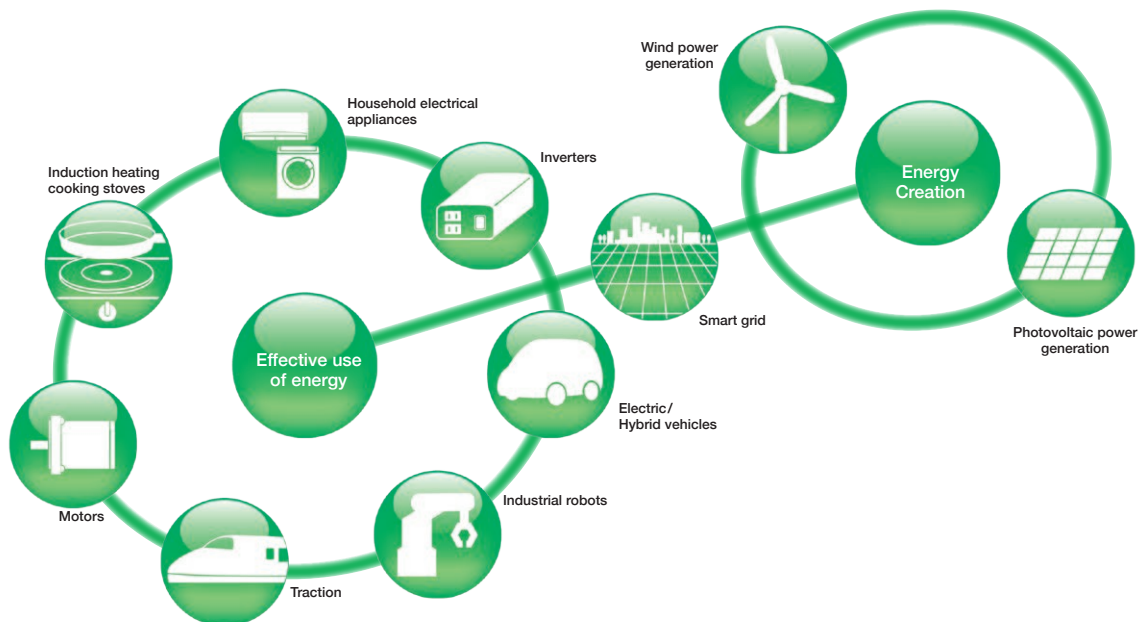
*Changes for the Better*

POWER DEVICES

Power Devices

# 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.



# Index

Product	Page	Connection						Rated voltage	Rated current	Main Application
		IGBT Module	Intelligent Power Module	MOSFET Module	Diode Module	Discrete Diode	Discrete MOSFET			
SiC Power Modules	5-11	✓ (Hybrid)	✓	✓				600V	15A-30A	 Home Appliance Industrial equipment Traction
								1200V	75A-1200A	
								1700V	300A,1200A	
								3300V	185A-750A	
SiC-MOSFET	12							1200V	38A-95A	 Home Appliance Industrial equipment xEV
SiC-SBD	13						✓	600V	20A	 Home Appliance Industrial equipment
SOIPM	14		✓					600V	2A	 Home Appliance
DIIPM	14-19		✓					600V	5A-75A	 Home Appliance
								1200V	5A-100A	
IPM	20-24		✓					600V	50A-800A	 Industrial equipment
								650V	50A-450A	
								1200V	25A-450A	
IGBT Modules	25-35	✓						600V	75A-600A	 Industrial equipment
								650V	50A-600A	
								1200V	35A-1400A	
								1700V	75A-1200A	
								2000V	400A,1200A	
HVIGBT Modules	36-40	✓						1700V	600A-2400A	 Traction High Power
								2500V	400A-1200A	
								3300V	400A-1800A	
								4500V	450A-1500A	
								6500V	200A-1000A	
HVDIODE Modules	41-42							1700V	1200A-1800A	 Traction High Power
								3300V	400A-1500A	
								4500V	300A-1500A	
								6500V	200A-1000A	
MOSFET Modules	43			✓				75V	100A-300A	 Industrial equipment
								100V		
								150V		
Power Modules for xEV*1	44-45	✓						650V	300A-700A	 xEV

\*1 EV: Electric Vehicle

\*2 SOIPM,DIIPM,SLIMDIP,DIIPM+,DIPFPC,CSTBT are trademarks of Mitsubishi Electric

# Development of Mitsubishi Electric SiC Power Devices and Power Electronics Equipment Incorporating Them

Mitsubishi Electric began developing SiC as a new material in the early 1990s. Pursuing special characteristics, we succeeded in developing various elemental technologies. In 2010, we commercialized the first air conditioner in the world equipped with a SiC power device. Furthermore, substantial energy-saving effects have been achieved for traction and FA machinery. We will continue to provide competitive SiC power modules with advanced development and achievements from now on.

Contributing to the realization of a low-carbon society and more affluent lifestyles

### 2010

January 2010  
Developed large-capacity power module equipped with SiC diode

October 2010  
Launched "Kirigamine" inverter air conditioner

### Early 1990s

Developed new material, silicon-carbide (SiC) power semiconductor, maintaining a lead over other companies

### 2011

January 2011  
Verified highest power conversion efficiency\*1 for solar power generation system power conditioner (domestic industry)\*2

October 2011  
Commercialized SiC inverter for use in railcars

### 2014

February 2014  
Developed EV motor drive system with built-in SiC inverter

May 2014  
Began shipping samples of hybrid SiC power modules for high-frequency switching applications

November 2014  
Launched Large Hybrid SiC DIPIPM™ for PV Applications

### 2017

March 2017  
Launched SiC-SBD

March 2017  
Develops World's smallest SiC Inverter for HEVs.

September 2017  
Develops SiC Power Device with Record Power Efficiency

December 2017  
Mitsubishi Electric and the University of Tokyo Quantify Factors for Reducing SiC Power Semiconductor Resistance by Two-Thirds

### 2018

January 2018  
New 6.5kV Full-SiC Power Semiconductor Module Achieves World's Highest Power Density

December 2018  
Mitsubishi Electric and the University of Tokyo Reveal New Mechanism for Enhancing Reliability of SiC Power Semiconductor Devices

### 2015

January 2015  
Launched power conditioner for PV equipped with full SiC-IPM\*2

June 2015  
Railcar traction system with full SiC power modules installed in Shinkansen bullet trains

### 2020

November 2020  
Launched 4-terminal SiC-MOSFETs

July 2020  
Launched SiC-MOSFET

July 2020  
Develops Accurate Circuit Simulation Technology for SiC-MOSFETs

### 2019

June 2019  
Began shipping samples of 1200V SiC-SBD

February 2019  
Develops Super Compact Power Unit for Hybrid Electric Vehicle

September 2019  
Trench-type SiC-MOSFET with unique electric-field-limiting structure developed

### 2000s

Developed various elemental technologies

### 2006

January 2006  
Successfully developed SiC inverter for driving motor rated at 3.7kW

### 2009

February 2009  
Verified 11kW SiC inverter, world's highest value\*1 with approx. 70% reduction in power loss

November 2009  
Verified 20kW SiC inverter, world's highest value\*1 with approx. 90% reduction in power loss

### 2012

March 2012  
Developed motor system with built-in SiC inverter

September 2012  
Verified built-in main circuit system for railcars

### 2013

February 2013  
Developed SiC for application in elevator control systems

March 2013  
Delivered auxiliary power supply systems for railcars

July 2012  
Began shipping samples of hybrid SiC

December 2012  
Launched CNC drive unit equipped with SiC power module

### 2013

February 2013  
Developed technologies to increase capacities of SiC power modules

May 2013  
Launched SiC power modules

December 2013  
Launched railcar traction inverter with full SiC power module

### 2016

April 2016  
Launched Super mini Full SiC DIPIPM™

May 2016  
Launched room air conditioners with full SiC DIPIPM™ in Japan

October 2016  
Launched package air conditioners with full SiC DIPIPM™ in Japan

Development of these modules and applications has been partially supported by Japan's Ministry of Economy, Trade and Industry (METI) and New Energy and Industrial Technology Development Organization (NEDO).

\*1 Researched in press releases by Mitsubishi Electric.

\*2 Mitsubishi Electric solar-power generation system discontinued on March 31, 2020.



## Lineup of SiC Power Modules

Application	Product name	Model	Rating		Connection	States	Page		
			Voltages[V]	Current[A]					
Industrial equipment	Full SiC Power Modules	FMF300BXZ-24B	1200	300	4in1	Commercially available	6		
		FMF400BX-24B		400					
		FMF400BXZ-24B		400					
		FMF400DY-24B		400	2in1				
		FMF600DXZ-24B		600					
		FMF800DX-24B		800					
		FMF800DXZ-24B		800					
		FMF1200DXZ-24B		1200					
		FMF300DXZ-34B		1700				300	2in1(Chopper)
		FMF300E3XZ-34B			300			Commercially available	
Full SiC-IPM	PMF75CGA120	1200	75	6in1	Under development	7			
	PMF75CGAL120								
Hybrid SiC Power Modules for High-frequency Switching Applications	CMH100DY-24NFH	1200	100	2in1	Commercially available				
	CMH150DY-24NFH		150						
	CMH200DU-24NFH		200						
	CMH300DU-24NFH		300						
	CMH400DU-24NFH		400						
	CMH600DU-24NFH		600						
	CMH400HC6-24NFM		400	1in1					
Traction inverter HVDC system	Full SiC Power Modules	FMF185DC-66A	3300	185	2in1	Under development			
		FMF375DC-66A		375					
		FMF750DC-66A		750					
	Hybrid SiC Power Modules	CMH600DC-66X	3300	600					
		CMH1200DC-34S	1700	1200					
Home appliances	Super mini Full SiC DIIPM	PSF15S92F6	600	15	6in1	Commercially available			
		PSF25S92F6		25					
	Super mini Hybrid SiC DIPPFM	PSH30L92C6-W	600	30Arms	Three-phase interleaved				
		PSH20L91A6-A		20Arms	Two-phase interleaved				
	Super mini Full SiC DIPPFM	PSF20L91A6-A							



## Full-SiC Power Modules for Industrial Equipment

Commercially available

### Contributes to reducing size/weight of industrial-use inverters

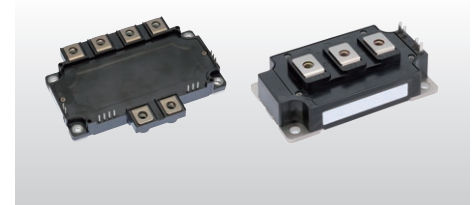
#### ■ Features

- Power loss reduced approx. 70% compared to the conventional product\*
- Low-inductance package(92.3mm x 121.7mm) adopted to deliver full SiC performance
- Package compatible with the conventional product(62mm x 108mm, 28mm terminal pitch)
- Contributes to increasing the output current and downsizing peripheral components by low power loss characteristics of SiC

\*Comparison with the same rated value of the conventional 7th Gen. IGBT modules

#### ■ Product lineup

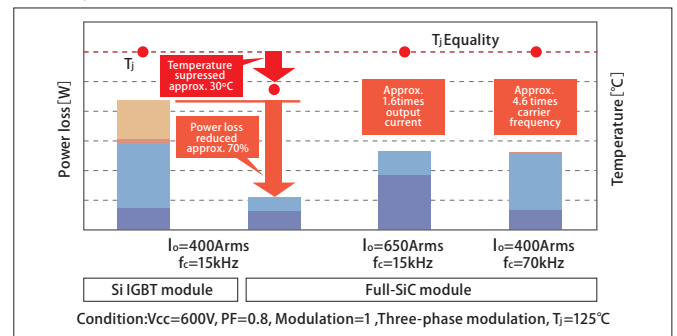
Model	Rated voltage	Rated current	Circuit configuration	Package size (D x W)
FMF400BX-24B	1200V	400A	4 in 1	92.3mmx121.7mm
FMF400DY-24B			2 in 1	62mm x 108mm
FMF800DX-24B		800A	92.3mmx121.7mm	



#### ■ Power loss comparison

1200V/800A Full SiC Power module

FWD\_SW Tr\_SW  
FWD\_DC Tr\_DC



## Full-SiC Power Modules for Industrial Equipment

### (built-in short-circuit protection function)

Commercially available

### Contributes to enhancing the performance of industrial-use inverters thanks to built-in protection function for short circuit

#### ■ Features

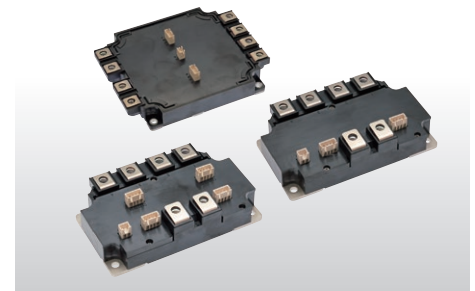
- By using short circuit monitoring circuit in the module it is possible to transfer a short circuit detection signal to the system side
- Power loss reduced approx.70% compared to the conventional product\*
- Low- inductance package adopted to deliver full SiC performance

\*Comparison with the same rated value of the conventional 7th Gen. IGBT modules

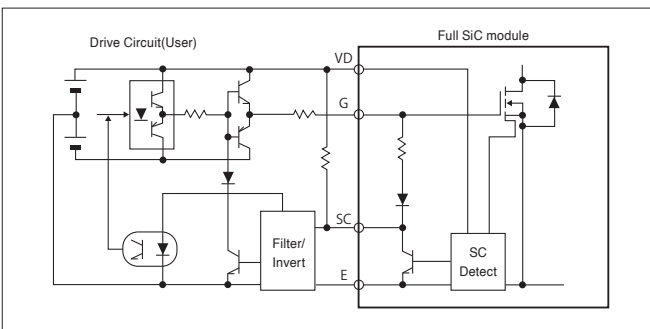
#### ■ Product lineup

Model	Rated voltage	Rated current	Circuit configuration	Package size (D x W)
FMF300BXZ-24B	1200V	300A	4 in 1	79.6mmx122mm
FMF400BXZ-24B		400A	4 in 1	
FMF600DXZ-24B		600A	2 in 1	
FMF800DXZ-24B		800A	2 in 1	
FMF1200DXZ-24B**	1200A	2 in 1	152mmx122mm	
FMF300DXZ-34B	1700V	300A	2 in 1	79.6mmx122mm
FMF300E3XZ-34B		300A	2 in 1(Chopper)	

★★:Under development



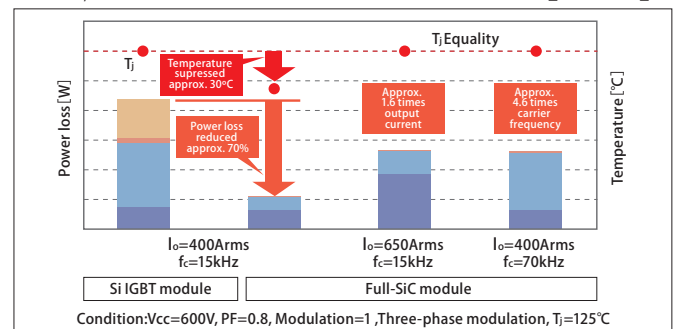
#### ■ Protection circuit diagram



#### ■ Power loss comparison

1200V/800A Full SiC Power module

FWD\_SW Tr\_SW  
FWD\_DC Tr\_DC





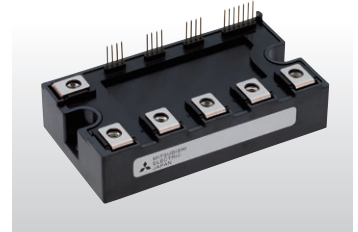
## 1200V/75A Full SiC-IPM for Industrial Equipment PMF75CGA120/PMF75CGAL120 Under development

SiC chips(MOSFET and Schottky Barrier Diode) incorporated in an IPM with a built-in drive circuit and protection functions Power loss reduction of approx.70% contributes to improving the performance of industrial equipment

### ■ Features

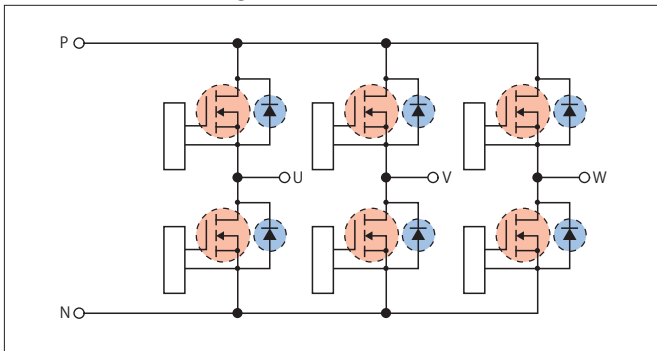
- Realized high performance and low power loss by 2nd. generation SiC-MOSFET and SiC-SBD with current sense and temperature sense
- External size is reduced approx.30% with the conventional Silicon IPM products\* of the same rating.
- Available to drive it by the equivalent I/F and power supply circuit with the Silicon IPM products.

\* Conventional product: Mitsubishi Electric G1 Series PM75CG1B120



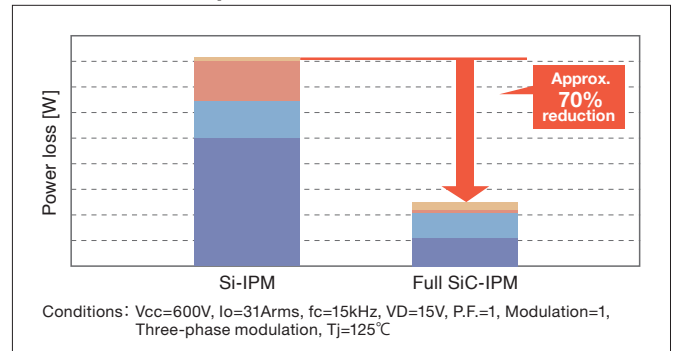
### ■ Internal circuit diagram

● :SiC-MOSFET ● : SiC-SBD



### ■ Power loss comparison

■ FWD\_SW ■ IGBT\_SW  
■ FWD\_DC ■ IGBT\_DC



## Hybrid SiC Power Modules for High-frequency Switching Applications Commercially available

For optimal operation of power electronics devices that conduct high-frequency switching

### ■ Features

- Power loss reduction of approx. 40% contributes to higher efficiency, smaller size and weight reduction of total system
- Suppresses surge voltage by reducing internal inductance
- Package compatible with the conventional product\*

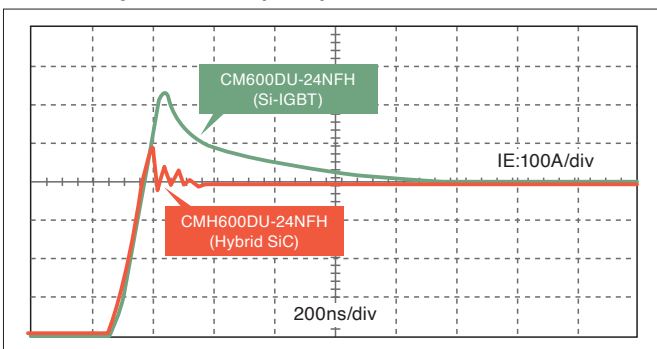
\* Conventional product: Mitsubishi Electric NFH Series IGBT Modules

### ■ Product lineup

Applications	Model	Rated voltage	Rated current	Circuit configuration	External size (D x W)
Industrial equipment	CMH100DY-24NFH	1200V	100A	2 in 1	48x94mm
	CMH150DY-24NFH		150A		48x94mm
	CMH200DU-24NFH		200A		62x108mm
	CMH300DU-24NFH		300A		62x108mm
	CMH400DU-24NFH		400A		80x110mm
	CMH600DU-24NFH		600A		80x110mm
	CMH400HC6-24NFM		400A	1 in 1	62x108mm

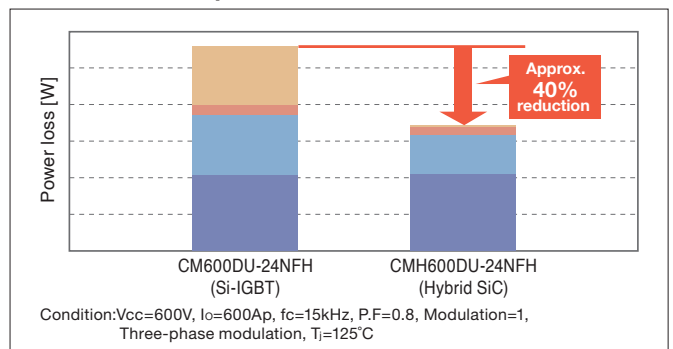


### ■ Recovery waveform (FWD)



### ■ Power loss comparison

■ FWD\_SW ■ Tr\_SW  
■ FWD\_DC ■ Tr\_DC





## 3300V Full/Hybrid SiC Power Modules for Traction Inverters and HVDC system

FMF185DC-66A **Under development**

FMF375DC-66A / FMF750DC-66A / CMH600DC-66X **Commercially available**

Contributes to energy saving and downsizing for inverters in traction motors, DC-power transmitters, large industrial machinery

### Features

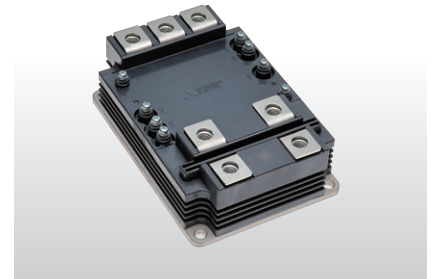
- Suitable chip set combination for high speed switching
- Reduced power loss compared to the conventional products\*
- Low inductance package maximize SiC performance

\* Si product: Mitsubishi Electric HVIGBT, CM600DC-66X

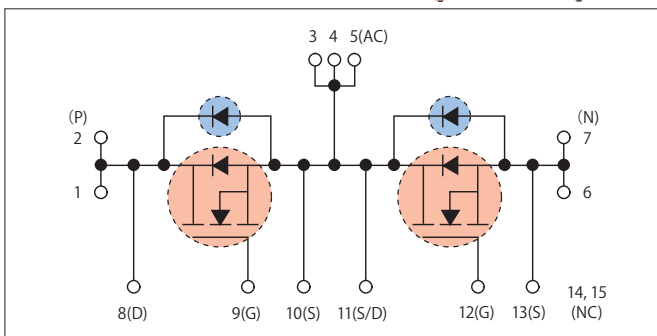
### Product lineup

	Model	Rated Voltage	Rated Current	Circuit configuration	External size (D x W)
Full SiC	FMF185DC-66A**	3300V	185A	2 in 1	100 x 140 mm
	FMF375DC-66A*		375A		
	FMF750DC-66A		750A		
Hybrid SiC	CMH600DC-66X		600A		

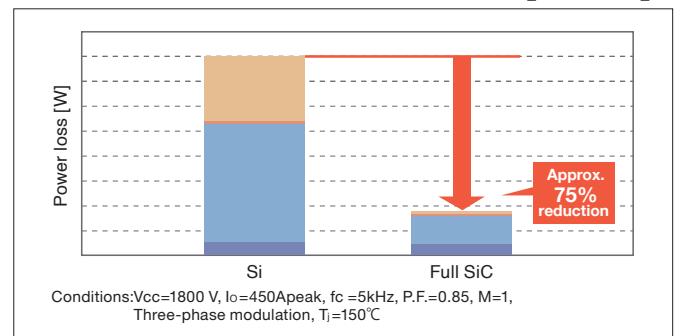
★:New Product  
★★:Under development



### Internal circuit diagram (e.g. Full SiC)



### Power loss comparison



FWD\_SW IGBT\_SW  
FWD\_DC IGBT\_DC



## 1700V/1200A Hybrid SiC Power Modules for Traction Inverters

CMH1200DC-34S **Commercially available**

High-power/low-loss/highly reliable modules appropriate for use in traction inverters

### Features

- Power loss reduced approximately 30% compared to the conventional product\*
- Highly reliable design appropriate for use in traction
- Package compatible with the conventional product\*

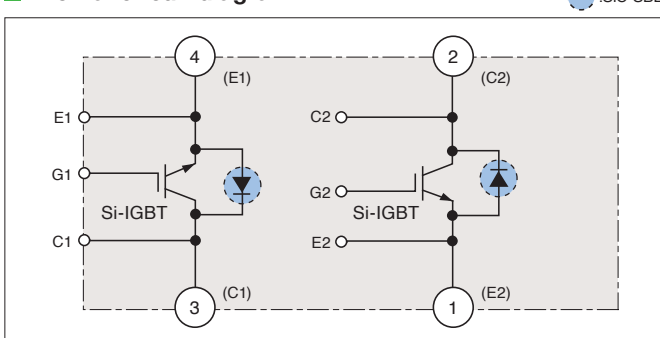
\* Conventional product: Mitsubishi Electric Power Module CM1200DC-34N

### Main specifications

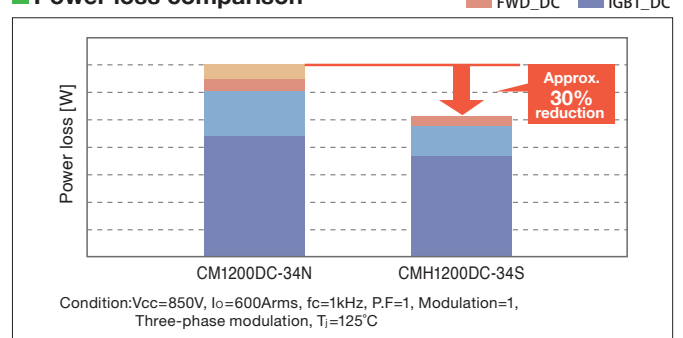
Module	Max. operating temperature		150°C
	Isolation voltage		4000Vrms
Si-IGBT @ 150°C	Collector-emitter saturation voltage		2.3V
	Switching loss 850V/1200V	turn-on	140mJ
		turn-off	390mJ
SiC-SBD @ 150°C	Emitter-collector voltage		2.3V
	Capacitive charge		9.0μC



### Internal circuit diagram



### Power loss comparison



FWD\_SW IGBT\_SW  
FWD\_DC IGBT\_DC





## 15A/25A Super mini Full / Hybrid SiC DIIPM™ for Home Appliances

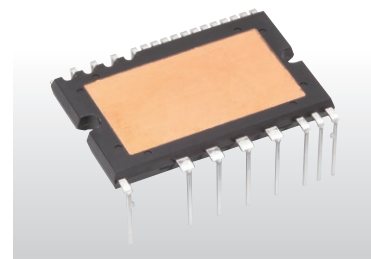
PSF15S92F6-A/PSF25S92F6-A Commercially available

Contributes to extremely high power-efficiency in air conditioners, and easily applicable to industrial equipment

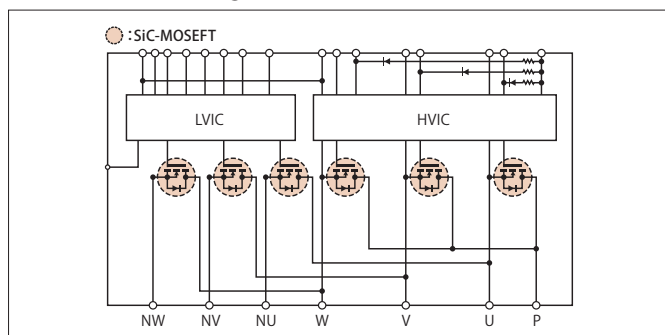
### ■ Features

- SiC-MOSFET achieves reduction in ON resistance, power loss reduced approx. 70% compared to conventional product\*
- Construct low-noise system by reducing recovery current
- Numerous built-in functions: Bootstrap diode for power supply to drive P-side, temperature information output, etc.
- Unnecessary minus-bias gate drive circuit using original high V<sub>th</sub> SiC-MOSFET technology
- As package and pin layout compatibility with conventional products\* is ensured, simply replace with this product to improve performance

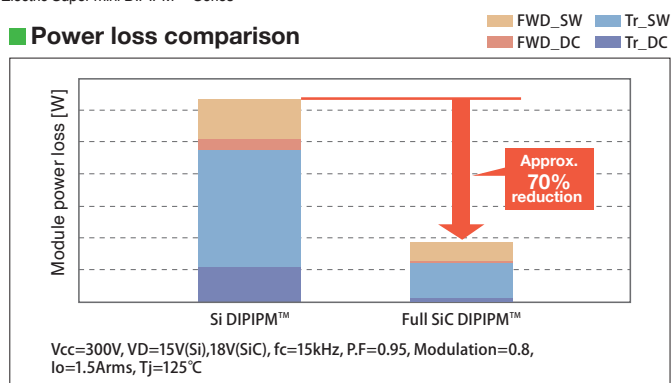
\*Conventional product: Mitsubishi Electric Super mini DIIPM™ Series



### ■ Internal block diagram



### ■ Power loss comparison



## Super mini Full / Hybrid SiC DIPPFCT™ for Home Appliances

PSH20L91A6-A / PSF20L91A6-A / PSH30L92C6-W Commercially available

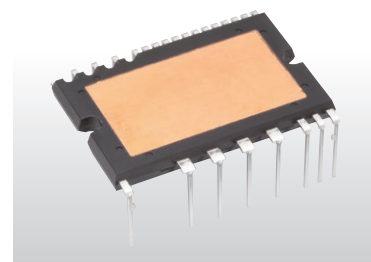
Utilizing SiC enables high-frequency switching and contributes to reducing the size of peripheral components

### ■ Features

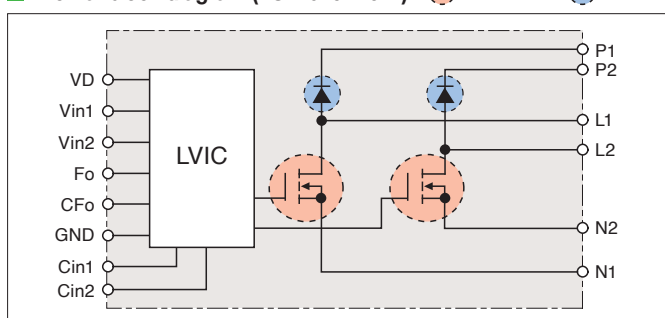
- Incorporating SiC chip in the Super mini package widely used in home appliances
- The SiC chip allows high-frequency switching (up to 40kHz) and contributes to downsizing the reactor, heat sink and other peripheral components
- Adopts the same package as the Super mini DIIPM™ to eliminate the need for a spacer between the inverter and heat sink, and to facilitate its implementation

### ■ Product lineup

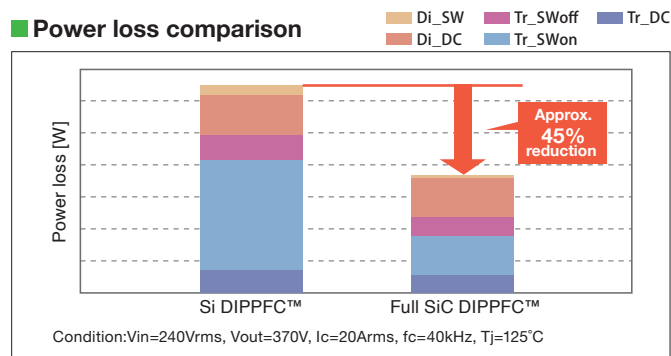
Model	Circuit configuration	Chips
PSH20L91A6-A	2phase Interleaved	Hybrid SiC
PSF20L91A6-A		Full SiC
PSH30L92C6-W	3phase Interleaved	Hybrid SiC



### ■ Internal block diagram (PSF20L91A6-A)

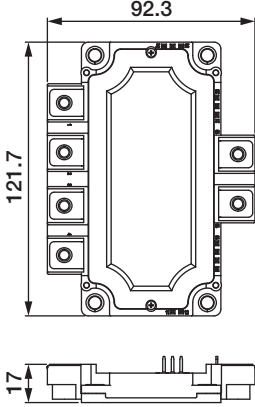
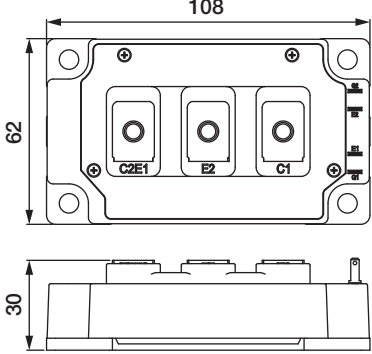
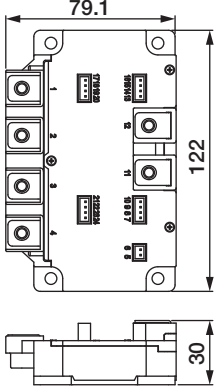
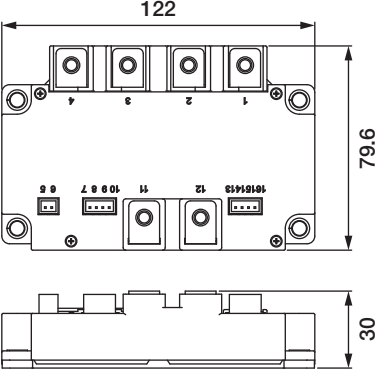
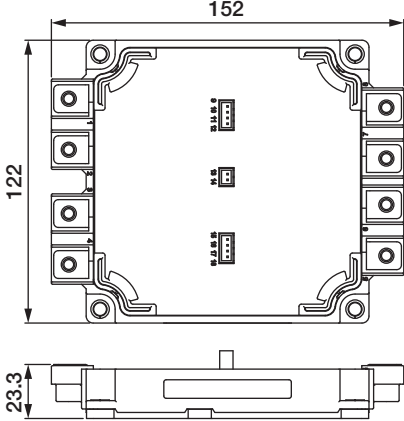
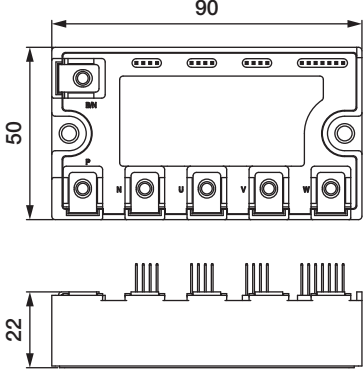
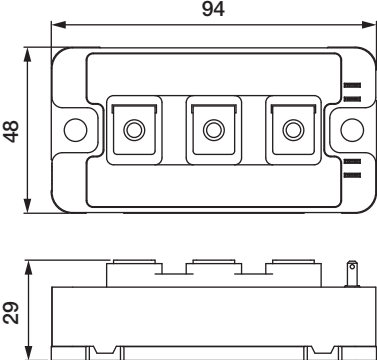
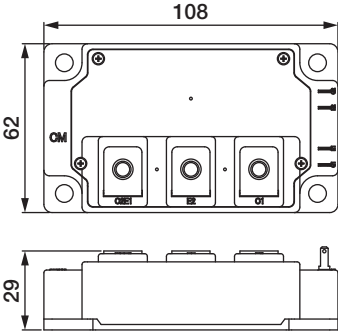
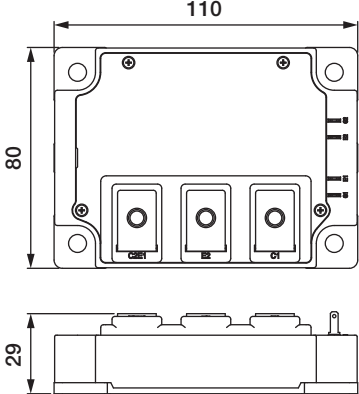


### ■ Power loss comparison



■ Outline Drawing of SiC Power Modules

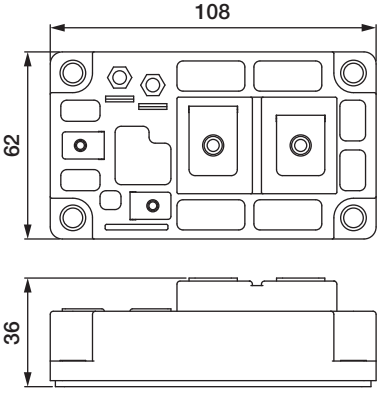
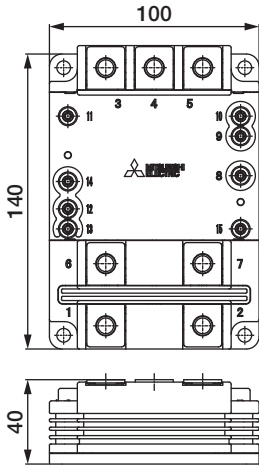
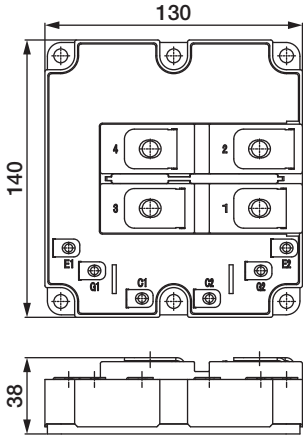
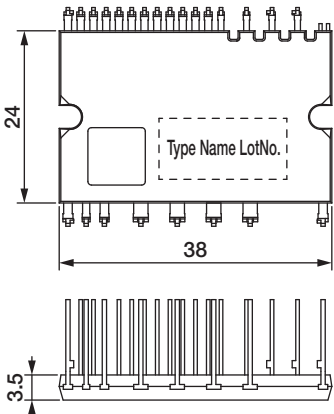
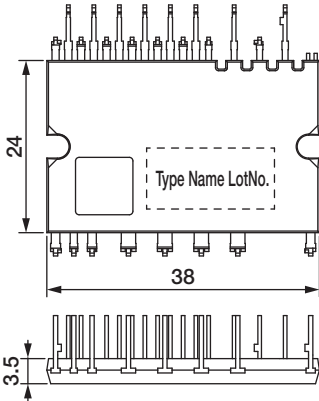
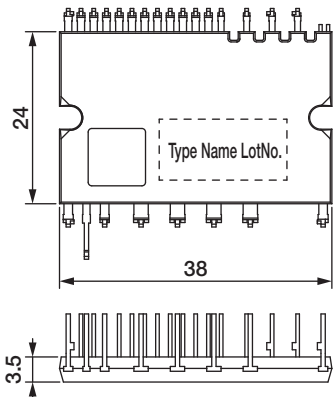
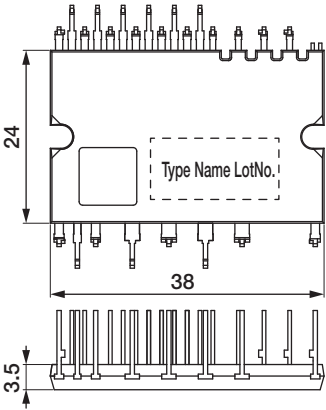
Unit:mm

<p>Full SiC Power Modules for Industrial Equipment FMF400BX-24B, FMF800DX-24B</p> 	<p>Full SiC Power Modules for Industrial Equipment FMF400DY-24B</p> 	<p>Full SiC Power Modules for Industrial Equipment FMF300BXZ-24B FMF400BXZ-24B</p> 
<p>Full SiC Power Modules for Industrial Equipment FMF600DXZ-24B/FMF800DXZ-24B FMF300DXZ-34B/FMF300E3XZ-34B</p> 	<p>Full SiC Power Modules for Industrial Equipment FMF1200DXZ-24B</p> 	<p>Full SiC IPM for Industrial Equipment PMF75CGA120 PMF75CGAL120</p> 
<p>Hybrid SiC Power Modules for High-frequency Switching Applications CMH100DY-24NFH CMH150DY-24NFH</p> 	<p>Hybrid SiC Power Modules for High-frequency Switching Applications CMH200DU-24NFH CMH300DU-24NFH</p> 	<p>Hybrid SiC Power Modules for High-frequency Switching Applications CMH400DU-24NFH CMH600DU-24NFH</p> 

# SiC Power Modules

## Outline Drawing of SiC Power Modules

Unit:mm

<p><b>Hybrid SiC Power Modules for High-frequency Switching Applications</b> CMH400HC6-24NFM</p> 	<p><b>3300V Full/Hybrid SiC Power Modules for Traction Inverters and HVDC system</b> FMF185/375/750DC-66A CMH600DC-66X</p> 	<p><b>1700V/1200A Hybrid SiC Power Module for Traction Inverters</b> CMH1200DC-34S</p> 
<p><b>Super mini Full SiC DIIPM™</b> PSF15S92F6-A / PSF25S92F6-A <b>Super mini Full/Hybrid SiC DIPPFCT™</b> PSH20L91A6-A/PSF20L91A6-A Long</p> 	<p><b>Super mini Full SiC DIIPM™</b> PSF15S92F6-C/PSF25S92F6-C <b>Control side of Zigzag</b></p> 	<p><b>Super mini Full SiC DIIPM™</b> PSF15S92F6/PSF25S92F6 Short</p> 
<p><b>Super mini Hybrid SiC DIPPFCT™</b> PSH30L92C6-W <b>Both side of Zigzag</b></p> 		



## SiC-MOSFET for power supply systems 1200V N-series

Sample available

### Contribute to reducing power loss and the size of power supply systems

#### Features

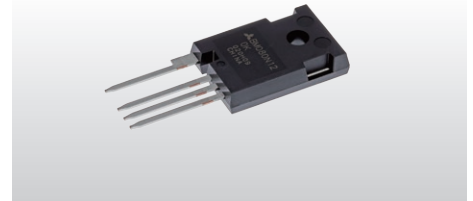
- Junction field effect transistor (JFET) doping technology reduces both switching loss and on-resistance, achieving power loss reduction by approx. 80%\* compared to the conventional silicon (Si) products.
- The SiC-MOSFET allows high frequency switching and contributes to downsizing the reactor, heat sink and other peripheral components

\* Conventional silicon (Si) product: Mitsubishi Electric 1200V IGBT

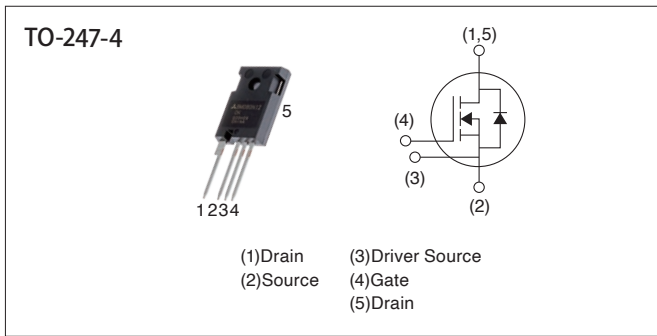
#### Product lineup

Application	Model	Rating			Package
		Voltage	RDS(on)	Current	
Automotive	BM080N120KJ**	1200V	80mΩ	38A	TO-247-4
	BM040N120KJ**		40mΩ	68A	
	BM022N120KJ**		22mΩ	95A	
Home appliance	BM080N120K**	1200V	80mΩ	38A	TO-247-4
Industrial equipment	BM040N120K**		40mΩ	68A	
	BM022N120K**		22mΩ	95A	

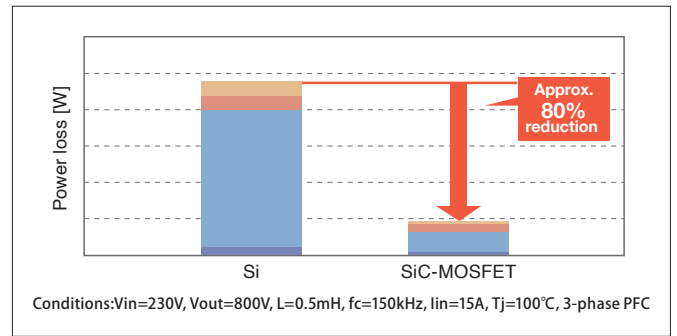
\*\* Under development



#### Inner circuit

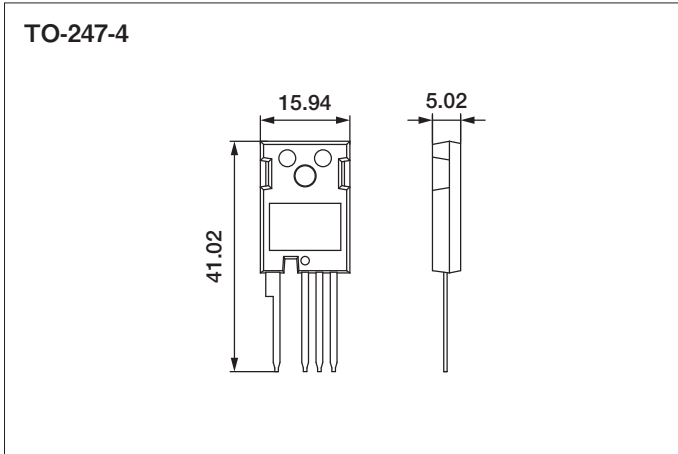


#### Power loss comparison



#### Outline Drawing of SiC-MOSFET

Unit:mm





## SiC-SBD(Schottky Barrier Diode) for power supply systems 600V series Commercially available

### Contribute to reducing power loss and the size of power supply systems

#### ■ Features

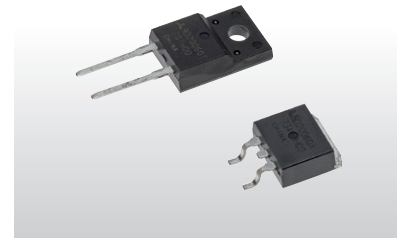
- Power loss is reduced by approx. 21%<sup>\*1</sup> compared to the conventional silicon (Si) products, contributing to energy conversion.
- The SiC-SBD allows high frequency switching and contributes to downsizing the reactor, heat sink and other peripheral components
- JBS<sup>\*2</sup> structure allows high forward surge capability and contributes to improving reliability

\*1 Conventional Si (Silicon) product: Si diode which is equipped with Mitsubishi Electric DIPFPC™

\*2 Junction Barrier Schottky

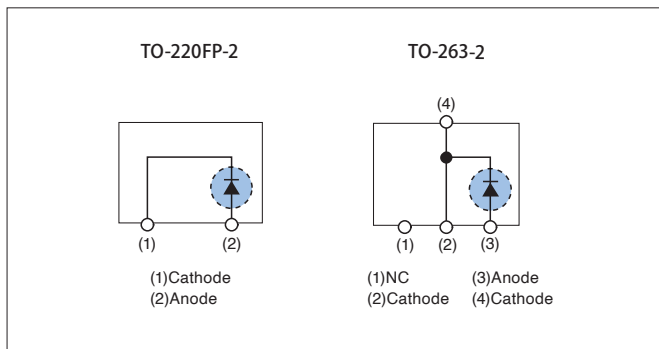
#### ■ Product lineup

Application	Model	Rated Voltage	Rated Current	Package
Home appliance	BD20060T	600V	20A	TO-220FP-2
Industrial equipment	BD20060A			TO-263-2



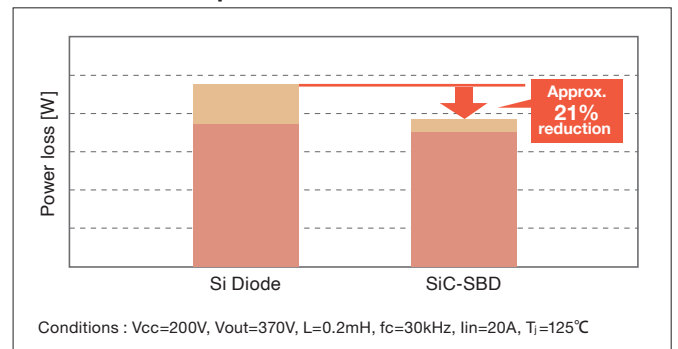
#### ■ Inner circuit

: SiC-SBD



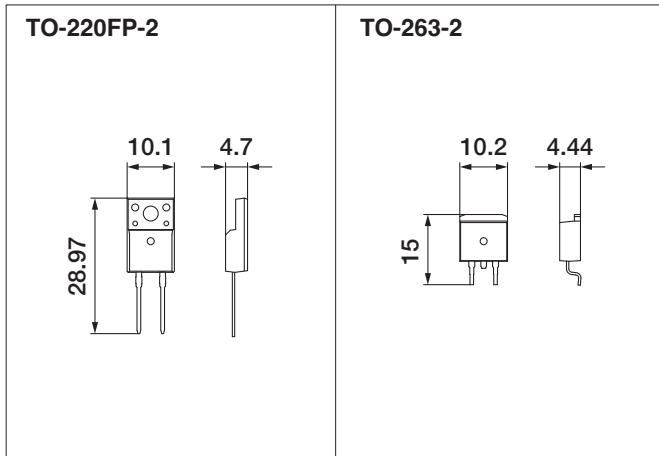
#### ■ Power loss comparison

■ Diode\_SW  
■ Diode\_DC



#### ■ Outline Drawing of SiC-SBD

Unit:mm



## Package, Main Application

Package		Main application
SOIPM		Fan motor
SLIMDIP		Air conditioner/Fan motor/Washing machine/Refrigerator
Super mini		Air conditioner/Washing machine/Servo/Robot
Mini		Air conditioner/Motion control
Large		Commercial air conditioner/Motion control
DIIPM+		Commercial air conditioner/Motion control
Large DIIPM+		Commercial air conditioner/Motion control

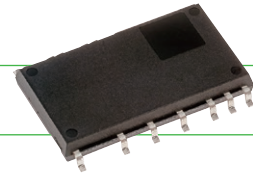
Data sheet  
here



## Rated Lineup



## Featured Products



### Surface mount package IPM SOIPM™

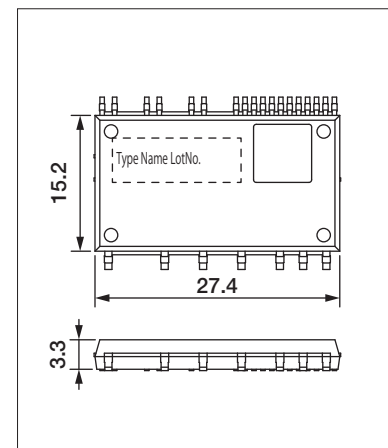
**A small surface mount package IPM enables easy system design by enough insulation distance and protection function for fan and low-power motor drive applications**

#### <Main Features>

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

\*1 Reverse-conducting IGBT

### Outline Drawing



### SOIPM™

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

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



## Featured Products

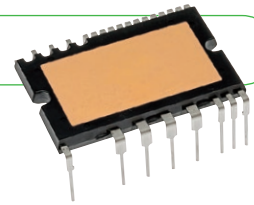
New design with expanded operating temperature range and lower noise contributes to easier system design and reduction in system cost

### Super Mini DIIPM™ Ver.7

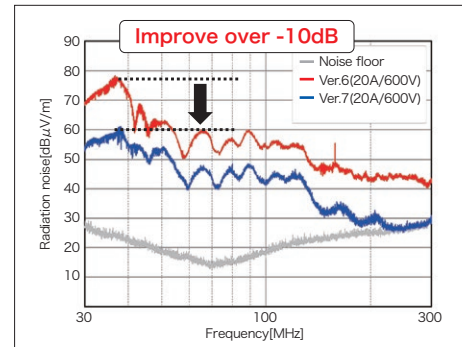
<Main Features>

- New low-noise 7th-generation CSTBT\*1 incorporated, keeping same efficiency as DIIPM Ver.6 Series. System cost reduction for noise suppression parts achieved.
- Maximum junction temperature range expanded to 175°C, supporting instantaneous overcurrent capability at overload operation
- Wider terminal base shape contributes to improved terminal strength and suppresses increase in temperature
- High compatibility for terminal layout, easy to replace from the conventional series

\*1 CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect



### Radiation noise



## Featured Products

Expanded line up for SLIMDIP series contributes system cost down for home appliances and fan drive application.

### SLIMDIP™

SLIMDIP-S, SLIMDIP-M, SLIMDIP-L, SLIMDIP-W, SLIMDIP-X

<Main Features>

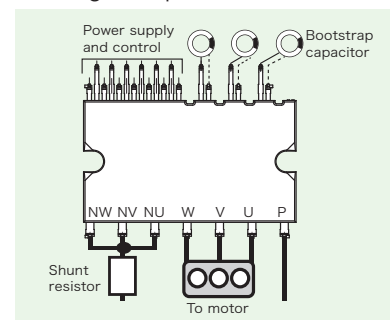
- RC-IGBT\*1 incorporated, reducing package size 30% compared to Super mini DIIPM
- Maximum case temperature expanded to 115°C, increasing the operating temperature range and leading to easier system design temperature range and leading to easier system design
- Additional terminals for floating supply and built-in bootstrap diodes simplify PCB wiring pattern
- Both  $V_{OT}^2$  and  $OT^3$  functions integrated for temperature protection
- Expanded lineup accommodates wide-ranging inverter capacities

\*1 Reverse conducting IGBT \*2  $V_{OT}$ : Analog Temperature Output \*3  $OT$ : Over Temperature protection

### Product lineup

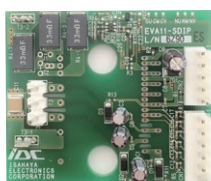
Type name	Main application
SLIMDIP-S	Fan, refrigerator
SLIMDIP-M	Fan, washing machine
SLIMDIP-L	Air conditioner
SLIMDIP-W	Washing machine, Fan
SLIMDIP-X	Air conditioner

### Wiring example

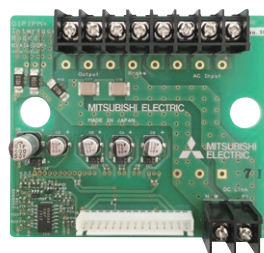


## Customer Support

EVA Series evaluation boards for each DIIPM Series to support system design



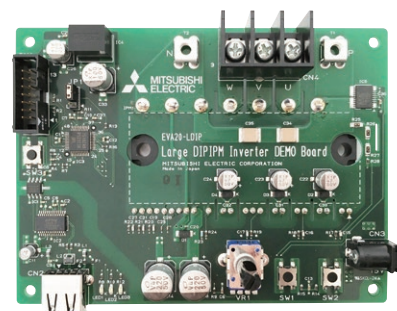
For Super mini DIIPM  
EVA11-SDIP



For DIIPM+  
EVA14-DIP+



For SOPIM  
EVA18-SOP



For Large DIIPM Series  
(Microcomputer-embedded demonstration board)  
EVA20-LDIP

\* For further information, please contact sales office.

## Series Matrix of 600V DIIPM™

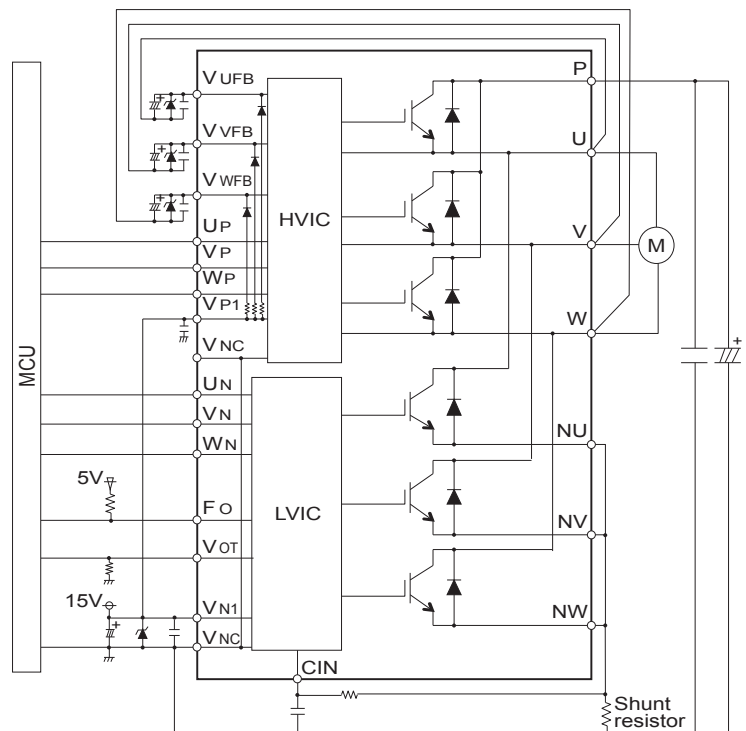
V <sub>CES</sub>		600V						
I <sub>c</sub>	Series	SLIMDIP	Super mini		Mini		Large	DIIPM+
			Ver.7	Ver.6	Ver.7	—	Ver.6	CIB/CI
5A	SLIMDIP-S			PSS05S92F6-AG PSS05S92E6-AG		PSS05S51F6		
10A	SLIMDIP-M*			PSS10S92F6-AG PSS10S92E6-AG		PSS10S51F6		
15A	SLIMDIP-L SLIMDIP-W	PSS15S93F6-AG PSS15S93E6-AG	PSS15S92F6-AG PSS15S92E6-AG			PSS15S51F6		
20A	SLIMDIP-X*	PSS20S93F6-AG PSS20S93E6-AG	PSS20S92F6-AG PSS20S92E6-AG	PSS20S73F6	PSS20S51F6 PSS20S71F6			
30A		PSS30S93F6-AG PSS30S93E6-AG	PSS30S92F6-AG PSS30S92E6-AG	PSS30S73F6	PSS30S71F6			
35A			PSS35S92F6-AG PSS35S92E6-AG					
40A		PSS40S93F6-AG PSS40S93E6-AG						
50A				PSS50S73F6	PSS50S71F6	PSS50SA2F6	PSS50MC1F6 PSS50NC1F6*5	
75A						PSS75SA2F6		
Chip	RC-IGBT	CSTBT	CSTBT	CSTBT	CSTBT	CSTBT	CSTBT	CSTBT
UV	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/ Brake
SC	N-side	N-side	N-side	N-side	N-side	N-side	N-side with sense	N-side
OT	N-side	N-side*1	N-side*1	—	—	—	—	—
VOT	N-side	N-side*1	N-side*1	N-side	N-side	N-side	N-side	N-side
Active input	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(3/5V)	High(5V)
Emitter pin of N-side	Open	Open	Open	Open	Open	Open	Open	Open
Fault output	N-side(UV,SC,OT)	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)
Insulation voltage	2000Vrms*2	1500Vrms*2	1500Vrms*2	2500Vrms	2500Vrms	2500Vrms	2500Vrms	2500Vrms
Insulation structure	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Molding resin*4/Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
RoHS directive*6	Compliant	Compliant	Compliant	Compliant	Compliant*3	Compliant	Compliant	Compliant
Pin type*7	Control side of Zigzag (Normal, Short)	Long	Long	Short	Control side of Zigzag, Short	—	—	—

★ : New Product

- [Notes] \*1 : PSSxxS9xE6 has OT function, PSSxxS9xF6 has V<sub>OT</sub> function  
 \*2 : AC60Hz,1minute. Corresponds to isolation voltage 2500Vrms in the case the convex-shaped heat sink  
 \*3 : High melting point solder (Lead Over 85%) is used for chip soldering of PSSxxS51F6 only.  
 \*4 : Molding resin insulation for PSSxxS51F6/-C  
 \*5 : PSS50NC1F6 is not included brake.  
 \*6 : RoHS directive (2011/65/EU and (EU) 2015/863)  
 \*7 : Refer the datasheet of each product for more detail

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

## Application circuit of super mini DIIPM™





## Series Matrix of 1200V DIIPM™

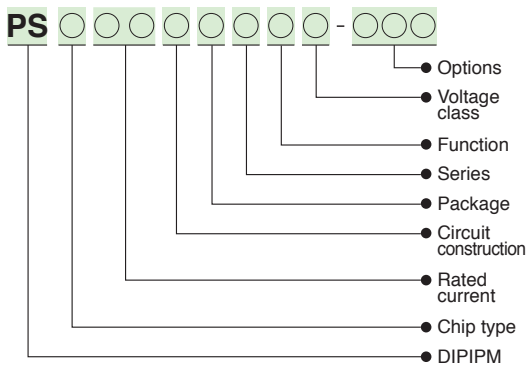
V <sub>CES</sub>		1200V				
I <sub>c</sub>	Series	Mini		Large	DIIPM+	Large DIIPM+
		Ver.7	—	Ver.6	CIB/CI	CI
5A	PSS05S73FT★	PSS05S72FT	PSS05SA2FT	PSS05MC1FT PSS05NC1FT*1		
10A	PSS10S73FT★	PSS10S72FT	PSS10SA2FT	PSS10MC1FT PSS10NC1FT*1		
15A	PSS15S73FT★		PSS15SA2FT	PSS15MC1FT PSS15NC1FT*1		
25A	PSS25S73FT★		PSS25SA2FT	PSS25MC1FT PSS25NC1FT*1		
35A			PSS35SA2FT	PSS35MC1FT PSS35NC1FT*1		
50A			PSS50SA2FT		PSS50NE1CT★	
75A			PSS75SA2FT		PSS75NE1CT★	
100A					PSS100NE1CT★	
Chip		CSTBT	CSTBT	CSTBT	CSTBT	CSTBT
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side/Brake	P-side/N-side
	SC	N-side	N-side	N-side	N-side	N-side
	OT	—	—	—	—	—
	V <sub>OT</sub>	N-side	N-side	N-side	N-side	N-side
Specifications	Active input	High(5V)	High(5V)	High(5V)	High(5V)	High(3/5V)
	Emitter pin of N-side	Open	Open	Open	Open	Open
	Fault output	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)	N-side (UV,SC)
	Insulation voltage	2500Vrms	2500Vrms	2500Vrms	2500Vrms	2500Vrms
	Insulation structure	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS directive*2	Compliant	Compliant	Compliant	Compliant	Compliant
	Pin type	—	—	—	—	—

★: New Product

[Notes] \* 1: PSS\*\*NC1FT is not included brake  
\* 2: RoHS directive (2011/65/EU and (EU) 2015/863)

[Term] CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect  
UV: Supply Under Voltage protection  
OT: Over Temperature protection  
SC: Short Circuit protection  
VOT: Analog Temperature Output  
RoHS: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment  
CIB: Converter Inverter Brake  
CI: Converter Inverter

## Type Name Definition of DIIPM™



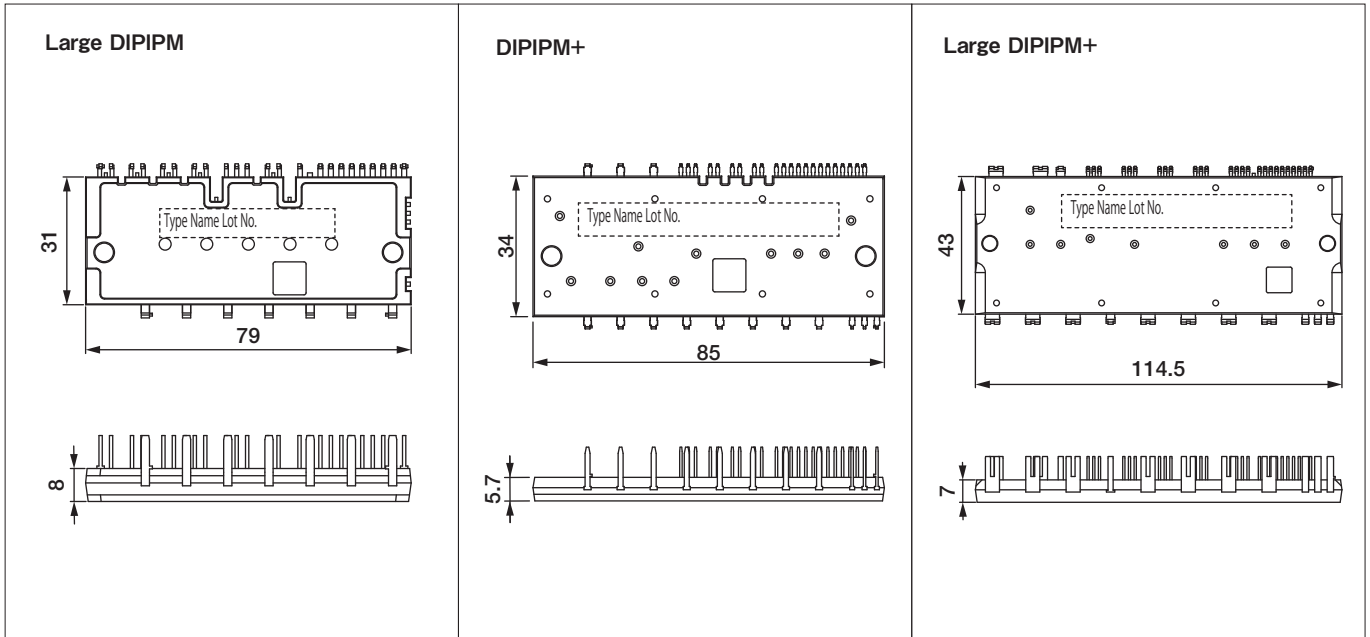
■ Outline Drawing of DIPIPM™

Unit:mm

<p><b>SLIMDIP Normal</b></p>	<p><b>SLIMDIP Short</b></p>	
<p><b>Super mini DIPIPM Ver.6 Long</b></p>	<p><b>Super mini DIPIPM Ver.7 Long</b></p>	
<p><b>Mini DIPIPM (PSSxxS51F6)</b></p>	<p><b>Mini DIPIPM(PSSxxS51F6) Control side of Zigzag</b></p>	<p><b>Mini DIPIPM (PSSxxS7xF6) 1200V Mini DIPIPM Ver.7 1200V Mini DIPIPM</b></p>

## ■ Outline Drawing of DIIPM™

Unit:mm



## Series , Main Application

Series		Main Application
G1		Motion control/Renewable energy/Power supply
L1		
S1		
V1		
Photovoltaic		Photovoltaic
L		Motion control/Renewable energy/Power supply

Data sheet here

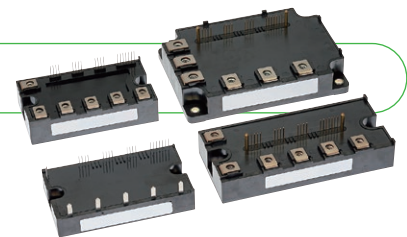


## Rated Lineup



## Featured Products

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



### G1 Series IPM with 7th-generation IGBT

#### <Main Features>

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

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

\*2 RFC: Relaxed field cathode

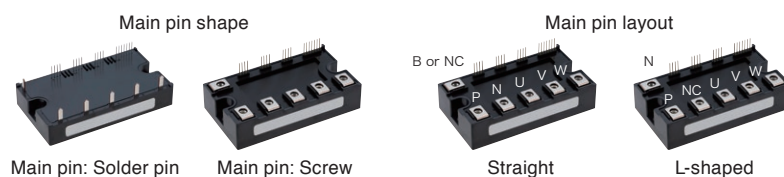
\*3 Conventional product: IPM L1-Series

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

### ■ "A" package main pin shape and layout

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

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



# Lineup of IPM


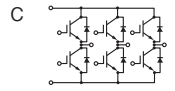
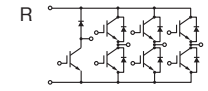
Matrix of IPM 650V/600V (No.: Number of outline drawing, see page 23 to 24)

Vces		650V						600V					
Series	G1 Series	L1 Series		S1 Series		V1 Series		Photovoltaic		L Series			
		Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.		
50A	PM50CG1A065	C	12						PM50B4LA060	B4	01		
	PM50RG1A065	R	12						PM50B5LA060	B5	01		
	PM50CG1B065	C	10	PM50CL1A060	C	01			PM50B6LA060	B6	01		
	PM50RG1B065	R	10	PM50CL1B060	C	02			PM50B4LB060	B4	02		
	PM50CG1AL065	C	12	PM50RL1A060	R	01	PM50CS1D060	C	05	PM50B5LB060	B5	02	
	PM50CG1AP065	C	09	PM50RL1B060	R	02			PM50B6LB060	B6	02		
	PM50CG1APL065	C	09	PM50RL1C060	R	03			PM50B4L1C060	B4	03		
	PM50RG1AP065	R	09						PM50B5L1C060	B5	03		
								PM50B6L1C060	B6	03			
75A	PM75CG1A065	C	12						PM75B4LA060	B4	01		
	PM75RG1A065	R	12						PM75B5LA060	B5	01		
	PM75CG1B065	C	10	PM75CL1A060	C	01			PM75B6LA060	B6	01		
	PM75RG1B065	R	10	PM75CL1B060	C	02			PM75B4LB060	B4	02		
	PM75CG1AL065	C	12	PM75RL1A060	R	01	PM75CS1D060	C	05	PM75B5LB060	B5	02	
	PM75CG1AP065	C	09	PM75RL1B060	R	02			PM75B6LB060	B6	02		
	PM75CG1APL065	C	09						PM75B4L1C060	B4	03		
	PM75RG1AP065	R	09						PM75B5L1C060	B5	03		
								PM75B6L1C060	B6	03			
100A	PM100CG1A065	C	12										
	PM100CG1B065	C	10	PM100CL1A060	C	01							
	PM100RG1B065	R	10	PM100CL1B060	C	02							
	PM100CG1AL065	C	12	PM100RL1A060	R	01	PM100CS1D060	C	05				
	PM100CG1AP065	C	09	PM100RL1B060	R	02							
PM100CG1APL065	C	09											
150A	PM150CG1B065	C	10	PM150CL1A060	C	01							
	PM150RG1B065	R	10	PM150CL1B060	C	02							
				PM150RL1A060	R	01	PM150CS1D060	C	05				
			PM150RL1B060	R	02								
200A	PM200CG1B065	C	10										
	PM200RG1B065	R	10	PM200CL1A060	C	04							
	PM200CG1C065	C	11	PM200RL1A060	R	04	PM200CS1D060	C	05				
	PM200RG1C065	R	11										
300A	PM300CG1C065	C	11	PM300CL1A060	C	04							
	PM300RG1C065	R	11	PM300RL1A060	R	04							
400A							PM400DV1A060	D	06				
450A	PM450CG1C065	C	11								PM450CLA060	C	08
	PM450RG1C065	R	11										
600A							PM600DV1A060	D	06		PM600CLA060	C	08
800A							PM800DV1B060	D	07				
IGBT chip	CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*1		CSTBT*2		
	Emitter sensor installed Temperature sensor installed		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		Built-in emitter sensor Built-in temperature sensor		
Fault output	UV	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side	
	OT	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side	
	SC	P-side/N-side		P-side/N-side		N-side		P-side/N-side		P-side/N-side		P-side/N-side	
Identification	P-side/N-side		-		-		-		-		-		
RoHS directive*3	Compliant		Compliant		Compliant		Compliant		Compliant		Compliant		
Compatibility	-		L Series		S-DASH SERVO		V Series		-		-		
Connection	D			B4		B5		B6		C		R	

[Notes] \*1: Full-gate CSTBT™ \*2: PCM (Plugged Cell Merged) CSTBT™  
\*3: RoHS directive (2011/65/EU and (EU) 2015/863)

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

Matrix of IPM 1200V (No.: Number of outline drawing, see page 23 to 24)

V <sub>CEs</sub>		1200V															
I <sub>c</sub>	Series	G1 Series			L1 Series			S1 Series			V1 Series			L Series			
		Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.				
25A	PM25CG1A120	C	12														
	PM25CG1B120	C	10														
	PM25RG1A120	R	12														
	PM25RG1B120	R	10														
	PM25CG1AL120	C	12	PM25CL1A120	C	01											
	PM25CG1AP120	C	09	PM25CL1B120	C	02											
	PM25CG1APL120	C	09	PM25RL1A120	R	01	PM25CS1D120	C	05								
	PM25RG1AP120	R	09	PM25RL1B120	R	02											
				PM25RL1C120	R	03											
35A	PM35CG1A120	C	12														
	PM35CG1B120	C	10														
	PM35RG1A120	R	12														
	PM35RG1B120	R	10														
	PM35CG1AL120	C	12														
	PM35CG1AP120	C	09														
	PM35CG1APL120	C	09														
	PM35RG1AP120	R	09														
50A	PM50CG1A120	C	12														
	PM50CG1B120	C	10														
	PM50RG1B120	R	10	PM50CL1A120	C	01											
	PM50CG1AL120	C	12	PM50CL1B120	C	02											
	PM50CG1AP120	C	09	PM50RL1A120	R	01	PM50CS1D120	C	05								
	PM50CG1APL120	C	09	PM50RL1B120	R	02											
75A	PM75CG1B120	C	10	PM75CL1A120	C	01											
	PM75RG1B120	R	10	PM75CL1B120	C	02											
				PM75RL1A120	R	01	PM75CS1D120	C	05								
				PM75RL1B120	R	02											
100A	PM100CG1B120	C	10														
	PM100CG1C120	C	11	PM100CL1A120	C	04											
	PM100RG1B120	R	10	PM100RL1A120	R	04	PM100CS1D120	C	05								
	PM100RG1C120	R	11														
150A	PM150CG1C120	C	11	PM150CL1A120	C	04											
	PM150RG1C120	R	11	PM150RL1A120	R	04											
200A	PM200CG1C120	C	11									PM200DV1A120	D	06	PM200CLA120	C	08
	PM200RG1C120	R	11														
300A												PM300DV1A120	D	06	PM300CLA120	C	08
450A												PM450DV1A120	D	06	PM450CLA120	C	08
IGBT chip	CSTBT*1 Emitter sensor installed Temperature sensor installed			CSTBT*1 Built-in current sensor Built-in temperature sensor			CSTBT*1 Built-in current sensor Built-in temperature sensor			CSTBT*1 Built-in current sensor Built-in temperature sensor			CSTBT*2 Built-in current sensor Built-in temperature sensor				
Fault output	UV	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side			
	OT	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side			
	SC	P-side/N-side			P-side/N-side			N-side			P-side/N-side			P-side/N-side			
	Identification	P-side/N-side			-			-			-			-			
RoHS directive*3	Compliant			Compliant			Compliant			Compliant			Compliant				
Compatibility	-			L Series			S-DASH SERVO			V Series			-				
Connection																	

[Notes] \*1: Full-gate CSTBT™ \*2: PCM (Plugged Cell Merged) CSTBT™  
\*3: RoHS directive (2011/65/EU and (EU) 2015/863)

[Term] CSTBT™: Mitsubishi Electric's unique IGBT that makes use of the carrier cumulative effect  
UV: Power supply Under Voltage protection  
SC: Short Circuit protection  
OT: Over Temperature protection  
RoHS: the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

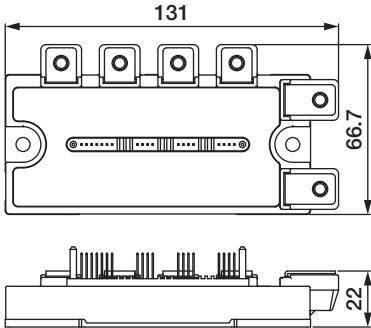
# Lineup of IPM

## Outline Drawing of IPM

Unit:mm

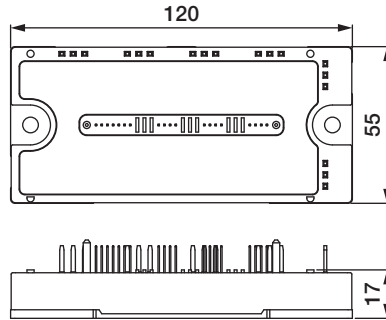
**01**

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



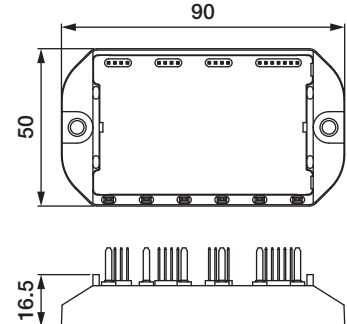
**02**

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



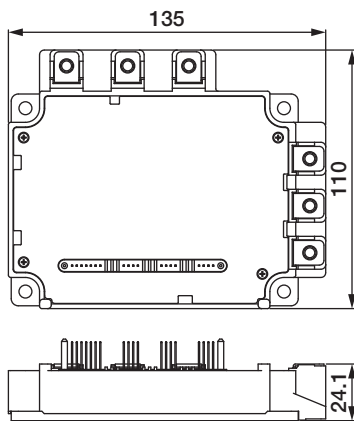
**03**

PM50RL1C060  
PM25RL1C120  
PM50,75,B4/B5/B6L1C060



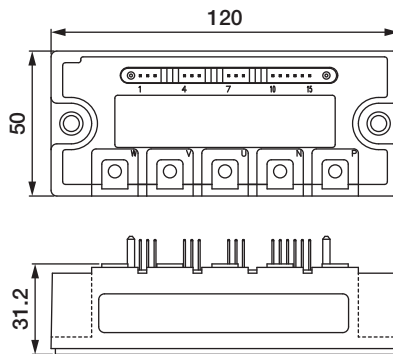
**04**

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



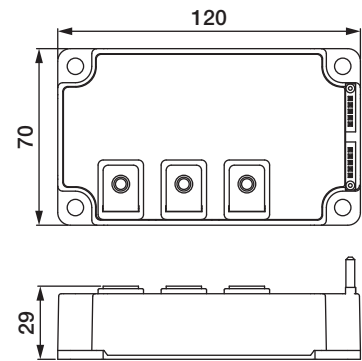
**05**

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



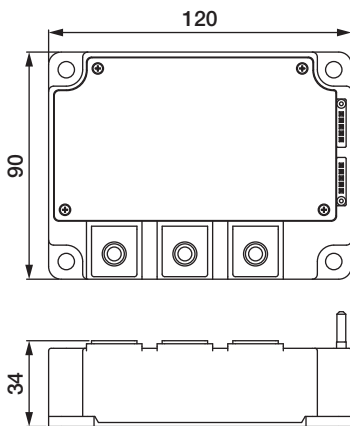
**06**

PM400,600DV1A060  
PM200,300,450DV1A120



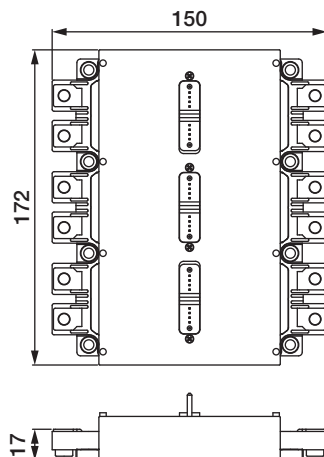
**07**

PM800DV1B060



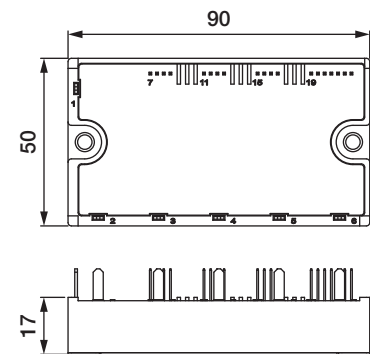
**08**

PM450,600CLA060  
PM200,300,450CLA120



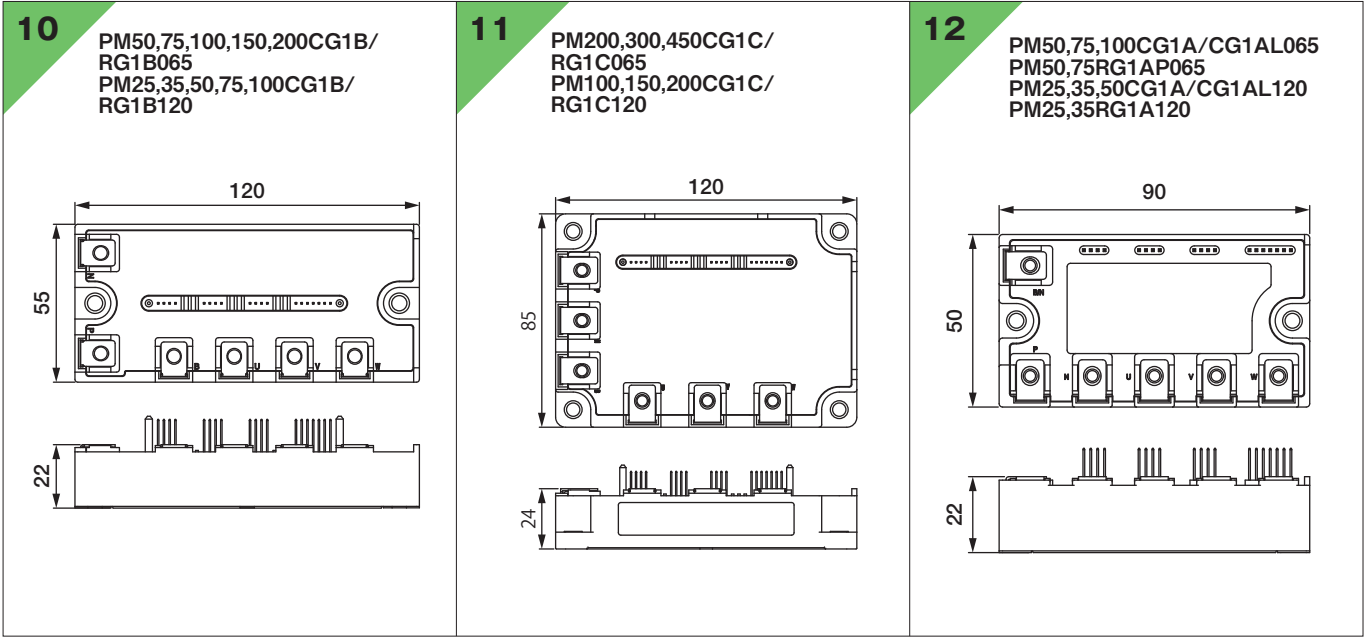
**09**

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



■ Outline Drawing of IPM

Unit:mm





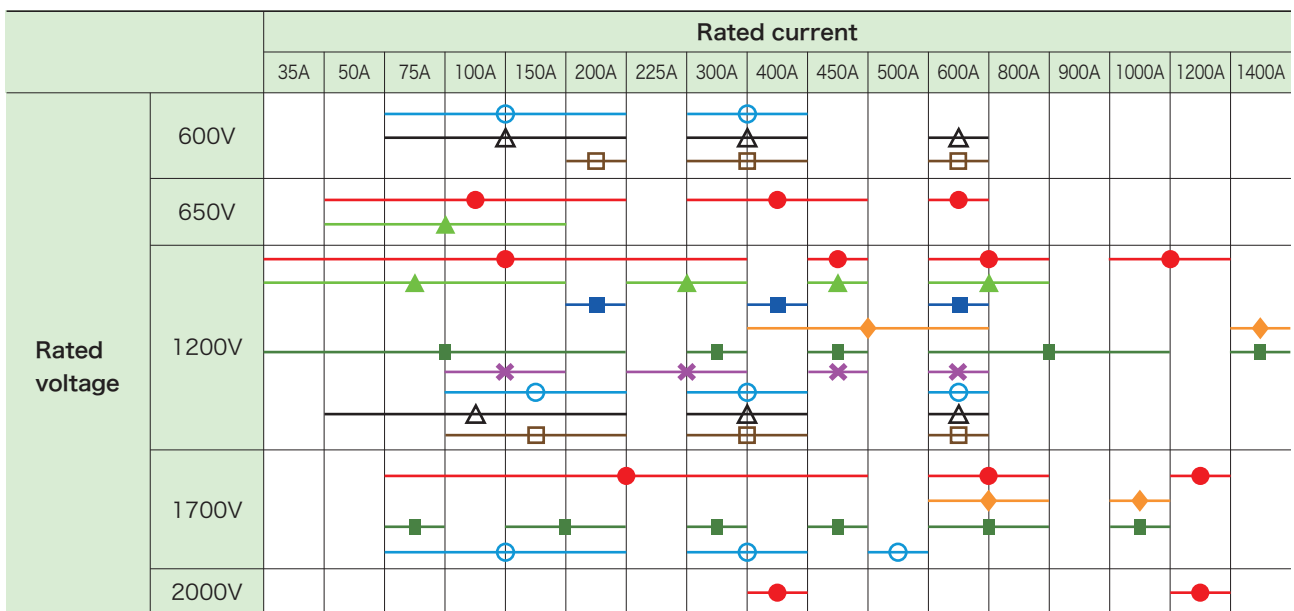
## Series , Main Application

Series	Main Application
T	Motion control/Renewable energy /Power supply
T1	
TH	
For 3-level Inverters	
S	
S1	
A	
NF	
NF(NFH type)	

Data sheet here



## Rated Lineup



## New Products

Industrial IGBT module with new standard package "LV100" for high power density inverter

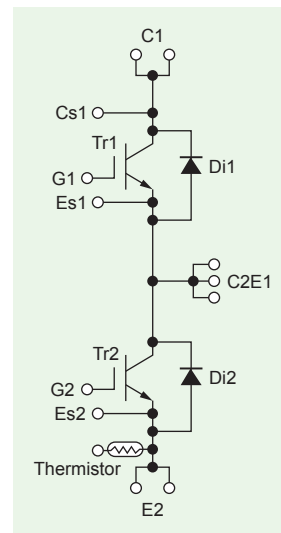
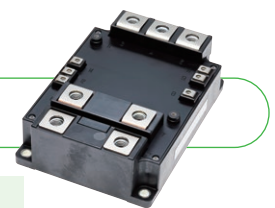
IGBT module T-series (LV100 for industrial)

IGBT module 2in1 type

■ Lineup  
 1200A/2000V (Under Development)  
 800A/1700V, 800A/1700V(with enhanced FWD), 1200A/1700V  
 800A/1200V, 1200A/1200V

〈Main Features〉

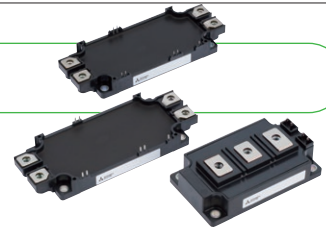
- Next generation high capacity standard package for industrial use
- Improved ease of use by applying low impedance package
- Reducing the switching loss and optimal for the applications that are used in 1 to 5KHz
- Isolation voltage 4kV





## Featured Products

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



### IGBT Module T/T1-Series

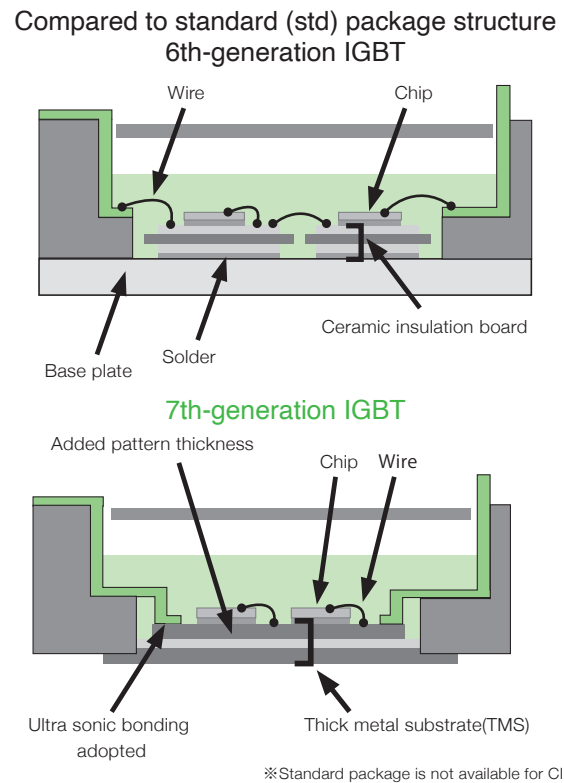
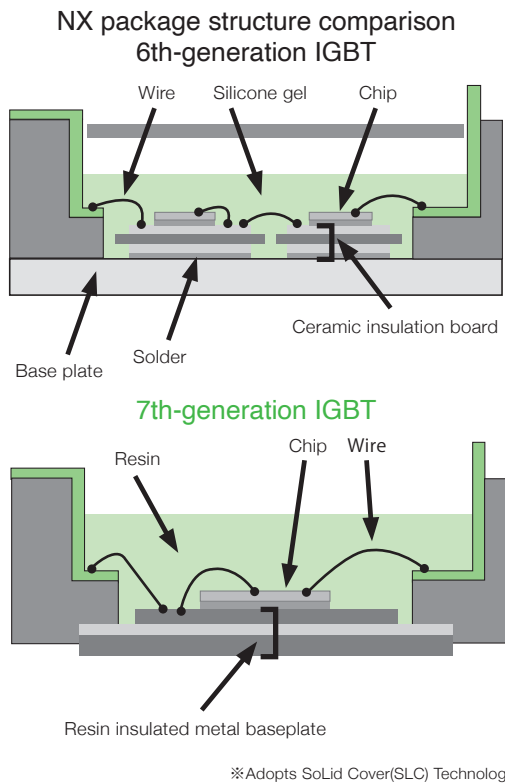
#### <Main Features>

- New modules equipped with three-phase converter, inverter, and brake circuit(CIB), contributes to simplifying design for inverter systems
- CIB modules contribute to compact inverter systems by reducing package size by 36% compared to the Mitsubishi Electric's existing module.(CIB)
- Power loss has been reduced with the introduction of the 7th-generation IGBT produced using CSTBT™<sup>2</sup> and a diode incorporating a relaxed field of cathode (RFC) structure
- The new structure introduced eliminates the solder-attached section, increasing the thermal cycle lifetime, which contributes to improving the reliability of inverters
- The introduction of press-fit pins and PC-TIM<sup>1</sup> contribute to simplifying the assembly process for inverters

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

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

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



#### ◆ Press-fit terminal support (NX)

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

#### ■ Press-fit pin



① Main pin



② Signal pin

# Lineup of IGBT Modules

■ Matrix of IGBT Modules 650V/600V (No.: Number of outline drawing, see page 30 to 35)

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

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

■ Matrix of Power Modules for 3-level Inverter (No.: Number of outline drawing, see page 31 to 33)

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

V <sub>ces</sub> /V <sub>RRM</sub>	1200 V IGBT Module			1700 V IGBT Module			1200 V Diode Module			1700 V Diode Module			
I <sub>c</sub> /I <sub>F</sub>	T/S/S1-Series std Type		Connection	No.	S/S1-Series std Type		Connection	No.	S/S1-Series std Type		Connection	No.	
400A	CM400ST-24S1 CM400C1Y-24S	S C1	35 11										
450A	CM450C1Y-24T	C1	32										
500A	CM500C2Y-24S	C2	36										
600A	CM600C1Y-24T	C1	32	CM600HA-34S	H	36					RM600DY-34S	D	32
800A				CM800HA-34S	H	36					RM800DY-34S	D	32
1000A				CM1000HA-34S	H	36							
1400A	CM1400HA-24S	H	36						RM1400HA-24S*	H	36		
Connection													

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

★: New Product

# Matrix of IGBT Modules 1200V (No.: Number of Outline Drawing, see page 30 to 35)

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

V <sub>CE(S)</sub>		1200V																										
Series	T-Series LV100 Type				T/T1-Series NX Type				T-Series std Type				TH-Series				S/S1-Series NX Type				S/S1-Series std/MPD Type <sup>*2</sup>				A-Series <sup>*1</sup> NF-Series <sup>*1</sup>			
	I <sub>C</sub>	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.					
35A				CM35MXUA-24T	M	41											CM35MXA-24S	M	04									
				CM35MXUA-24T1	M	41																						
				CM35MXUAP-24T	M	45																						
				CM35MXUAP-24T1	M	45																						
50A				CM50MXUA-24T	M	41											CM50MXA-24S	M	04			CM50RL-24NF	R	07				
				CM50MXUA-24T1	M	41																CM50TL-24NF	T	07				
				CM50MXUAP-24T	M	45																						
				CM50MXUAP-24T1	M	45																						
75A				CM75MXUB-24T	M	42											CM75MXA-24S	M	04			CM75RL-24NF	R	07				
				CM75MXUB-24T1	M	42											CM75TX-24S	T	05			CM75TL-24NF	T	07				
				CM75MXUBP-24T	M	46											CM75RX-24S	R	02									
				CM75MXUBP-24T1	M	46																						
				CM75MXUC-24T	M	43																						
				CM75MXUC-24T1	M	43																						
				CM75MXUCP-24T	M	47																						
				CM75MXUCP-24T1	M	47																						
100A				CM100TX-24T	T	33											CM100MXA-24S	M	04			CM100DY-24A	D	08				
				CM100TXP-24T	T	37											CM100TX-24S1	T	25			CM100DY-24NF	D	08				
				CM100RX-24T	R	34				CM100DY-24T	D	30					CM100RX-24S1	R	26			CM100E3Y-24NF	E3	08				
				CM100RX-24T1	R	38																CM100RL-24NF	R	07				
				CM100MXUC-24T	M	43																CM100TL-24NF	T	07				
				CM100MXUC-24T1	M	43																CM100DU-24NFH	D	13				
				CM100MXUCP-24T	M	47																						
				CM100MXUCP-24T1	M	47																						
150A				CM150TX-24T	T	33											CM150DX-24S	D	03			CM150DY-24A	D	08				
				CM150TXP-24T	T	37											CM150EXS-24S	E	24			CM150DY-24NF	D	08				
				CM150RX-24T	R	34				CM150DY-24T	D	30					CM150TX-24S1	T	25			CM150E3Y-24NF	E3	08				
				CM150RX-24T1	R	38											CM150RX-24S1	R	26			CM150RL-24NF	R	09				
				CM150MXUD-24T	M	44																CM150TL-24NF	T	09				
				CM150MXUD-24T1	M	44																CM150DU-24NFH	D	13				
				CM150MXUDP-24T	M	48																						
				CM150MXUDP-24T1	M	48																						
200A				CM200TX-24T	T	33											CM200EXS-24S	E	24			CM200DY-24A	D	08				
				CM200TXP-24T	T	37				CM200DY-24T	D	31		CM200DY-24TH	D	08	CM200RXL-24S	R	21			CM200DY-24NF	D	10				
																						CM200RL-24NF	R	09				
																						CM200TL-24NF	T	09				
																						CM200DU-24NFH	D	14				
225A				CM225DX-24T	D	28											CM225DX-24S1	D	27									
				CM225DXP-24T	D	39																						
				CM225DX-24T1	D	28																						
				CM225DXP-24T1	D	39																						
300A				CM300DX-24T	D	28											CM300DX-24S1	D	27			CM300DY-24A	D	10				
				CM300DXP-24T	D	39											CM300EXS-24S	E	24			CM300DY-24NF	D	11				
				CM300DX-24T1	D	28				CM300DY-24T	D	31					CM300RXL-24S1	R	21			CM300DU-24NFH	D	14				
				CM300DXP-24T1	D	39																						
400A													CM400DY-24TH	D	10							CM400DY-24A	D	11				
													CM400DU-24TH	D	15							CM400HA-24A	H	16				
																						CM400DY-24NF	D	11				
																						CM400DU-24NFH	D	15				
450A				CM450DX-24T	D	28											CM450DX-24S1	D	27		CM450DY-24S	D	11					
				CM450DXP-24T	D	39				CM450DY-24T	D	32																
				CM450DX-24T1	D	28																						
				CM450DXP-24T1	D	39																						
600A				CM600DX-24T	D	28											CM600DX-24S1	D	27		CM600DY-24S	D	11	CM600DY-24A	D	11		
				CM600DXP-24T	D	39				CM600DY-24T	D	32		CM600DU-24TH	D	15	CM600DXL-24S	D	06			CM600HA-24A	H	16				
				CM600DX-24T1	D	28																CM600DU-24NF	D	12				
				CM600DXP-24T1	D	39																CM600DU-24NFH	D	15				
800A	CM800DW-24T	D	49	CM800DX-24T1	D	28															CM800DY-24S	D	12					
				CM800DXP-24T1	D	39																						
900A																						CM900DUC-24S	D	17				
1000A				CM1000DX-24T	D	29											CM1000DXL-24S	D	06									
				CM1000DXP-24T	D	40																						
1200A	CM1200DW-24T	D	49																									
1400A																						CM1400HA-24S	H	36				
																						CM1400DUC-24S	D	17				
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  
\* 2: std Type have model name "CM\*\*DY/HA-24S, MPD Type have model name "CM\*\*DUC-24S"

# Lineup of IGBT Modules

## Matrix of IGBT Modules 1700V (No.: Number of Outline Drawing, see page 30 to 35)

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

V <sub>CEs</sub>		1700V																	
Series	T-Series LV100 Type		T-Series NX Type		T-Series std Type		S/S1-Series NX Type		S/S1-Series std Type		S/S1-Series MPD Type		A-Series std Type						
	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.					
75A					CM75DY-34T	D	30	CM75MXA-34SA CM75RX-34SA	M	23					CM75DY-34A	D	08		
100A					CM100TX-34T CM100TXP-34T	T	33 37	CM100DY-34T	D	30					CM100DY-34A	D	08		
150A					CM150TX-34T CM150TXP-34T	T	33 37	CM150DY-34T	D	31	CM150DX-34SA CM150RXL-34SA	D	20 21		CM150DY-34A	D	10		
200A								CM200DY-34T	D	31	CM200DX-34SA CM200EXS-34SA	D	20 24		CM200DY-34A	D	10		
225A					CM225DX-34T CM225DXP-34T	D	28 39												
300A					CM300DX-34T CM300DXP-34T	D	28 39	CM300DY-34T	D	32	CM300DX-34SA	D	20		CM300DY-34A	D	11		
400A								CM400DY-34T	D	32					CM400DY-34A	D	18		
450A					CM450DX-34T CM450DXP-34T	D	28 39				CM450DXL-34SA	D	22						
500A															CM500HA-34A	H	16		
600A					CM600DX-34T CM600DXP-34T	D	28 39				CM600DXL-34SA	D	22	CM600HA-34S	H	36			
800A	CM800DW-34T CM800DW-34TA	D	49											CM800HA-34S	H	36			
1000A														CM1000HA-34S	H	36	CM1000DUC-34SA	D	17
1200A	CM1200DW-34T	D	49																

Connection

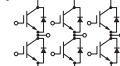
H



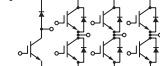
D



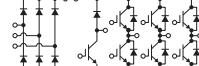
T



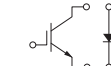
R



M



E



## Matrix of IGBT Modules 2000V (No.: Number of Outline Drawing, see page 33 to 35)

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

V <sub>CEs</sub>		2000V			
Series	T-Series LV100 Type		T-Series std Type		
	Connection	No.	Connection	No.	
400A			CM400DY-40T	D	3A
1200A	CM1200DW-40T**	D	49		

Connection

D

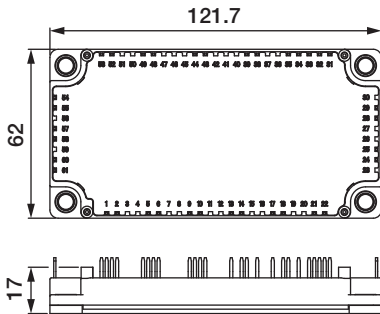


★★: Under Development

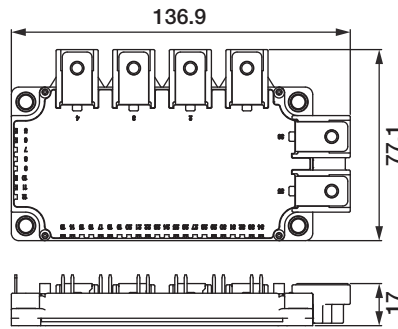
Outline Drawing of IGBT Modules

Unit:mm

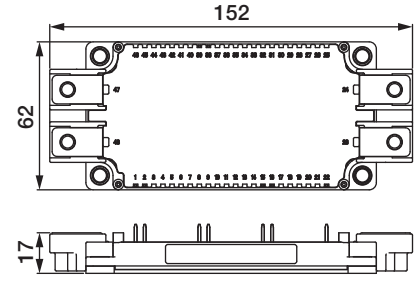
**01** CM75,100MX-12A



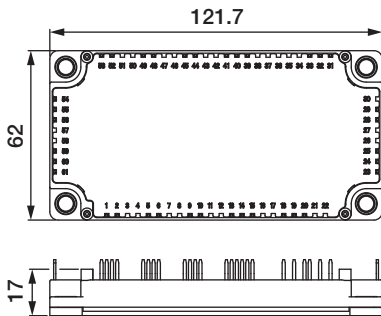
**02** CM100,150,200RX-12A  
CM75RX-24S



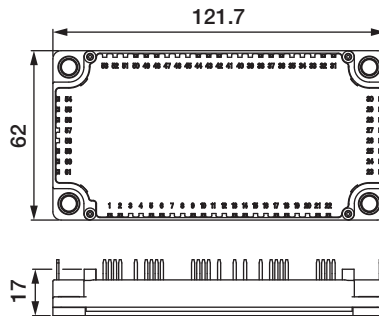
**03** CM300,400DX-12A  
CM150,200DX-24S



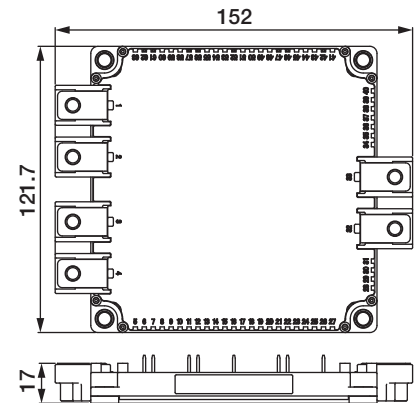
**04** CM35,50,75,100MXA-24S



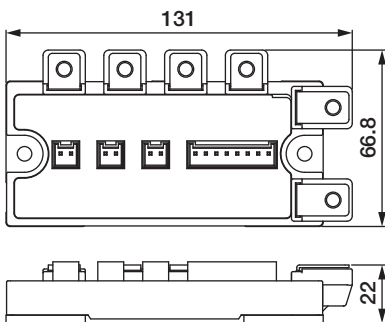
**05** CM75TX-24S



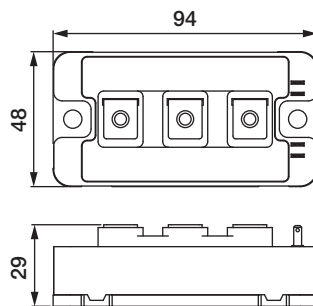
**06** CM600,1000DXL-24S



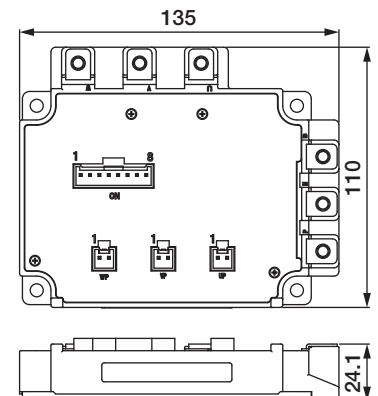
**07** CM75,100,150TL/RL-12NF  
CM50,75,100TL/RL-24NF



**08** CM150,200,300DY-12NF  
CM100,150DY-24NF  
CM100,150,200DY-24A  
CM75,100DY-34A  
CM100,150E3Y-24NF  
CM200DY-24TH



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



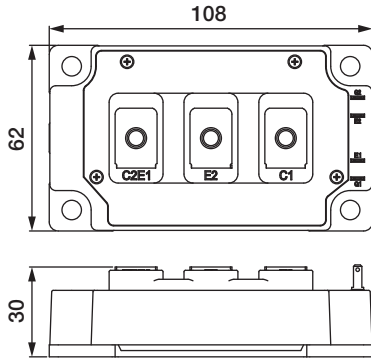
# Lineup of IGBT Modules

## Outline Drawing of IGBT Modules

Unit:mm

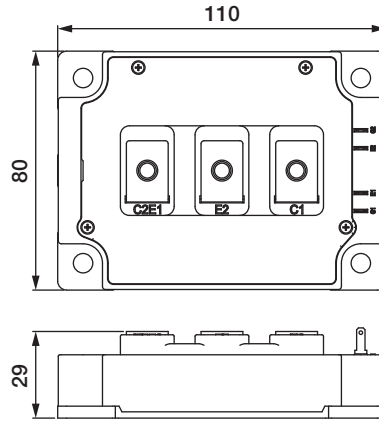
10

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



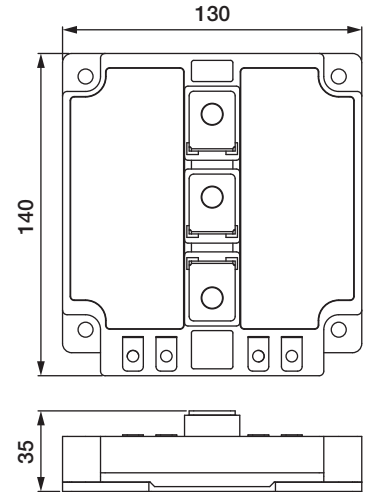
11

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



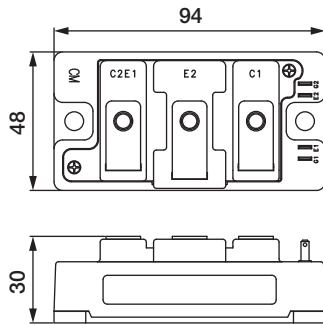
12

CM600DU-24NF  
CM800DY-24S



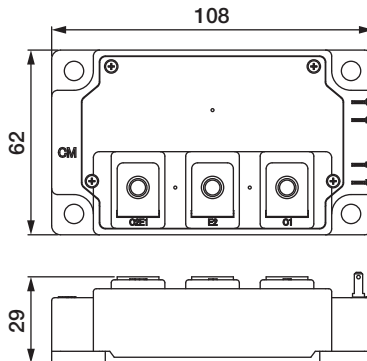
13

CM200DU-12NFH  
CM100,150DU-24NFH



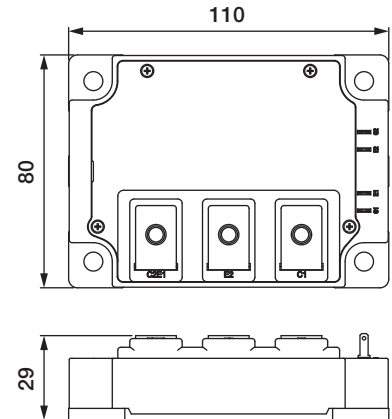
14

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



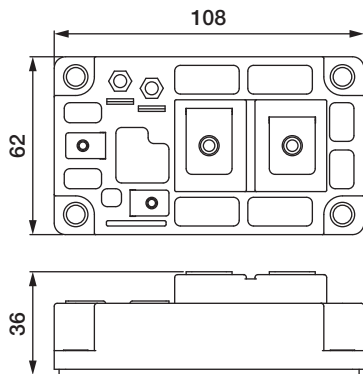
15

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



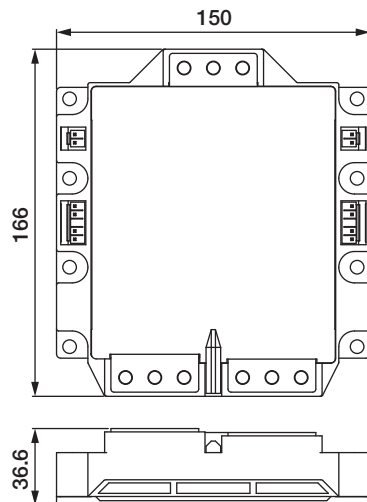
16

CM400,600HA-24A  
CM500HA-34A



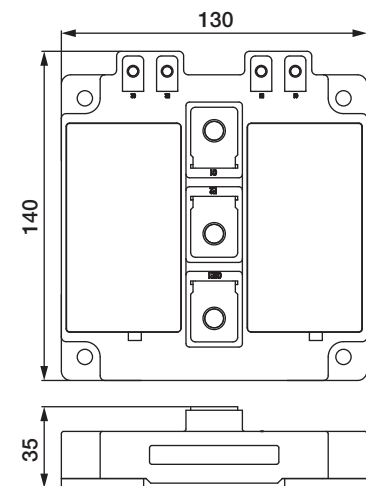
17

CM900,1400DUC-24S  
CM1000DUC-34SA



18

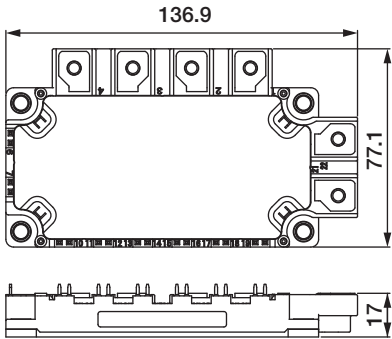
CM400DY-34A



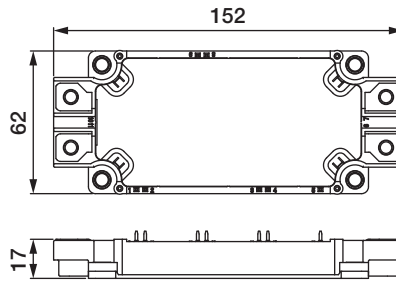
Outline Drawing of IGBT Modules

Unit:mm

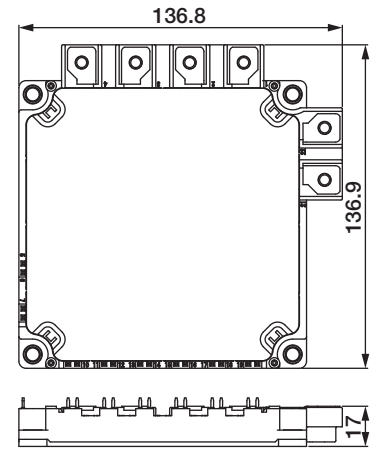
**19** CM75RX-34SA



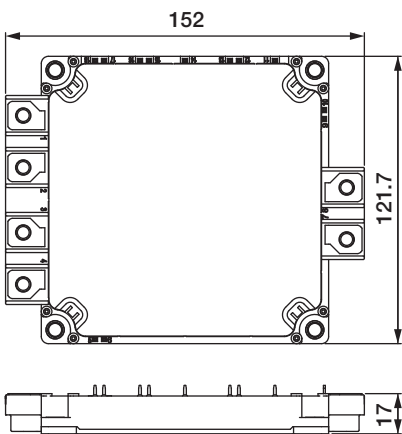
**20** CM150DX-34SA  
CM200DX-34SA  
CM300DX-34SA



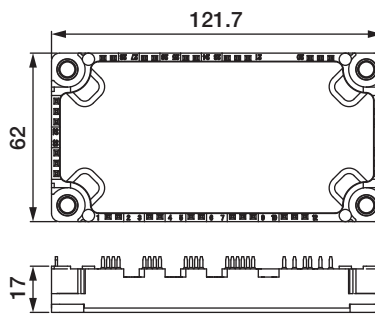
**21** CM200RXL-24S  
CM300RXL-24S1  
CM150RXL-34SA



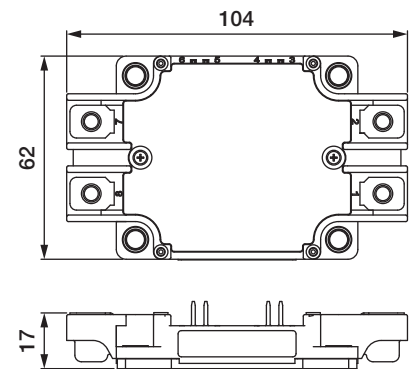
**22** CM450DXL-34SA  
CM600DXL-34SA



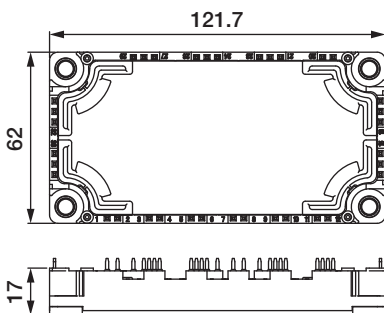
**23** CM75MXA-34SA



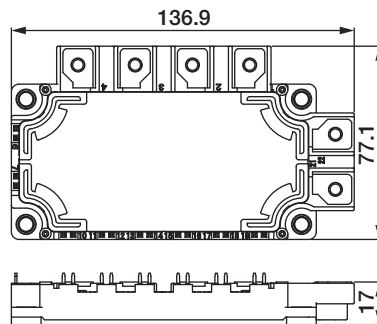
**24** CM150EXS-24S  
CM200EXS-24S  
CM300EXS-24S  
CM200EXS-34SA



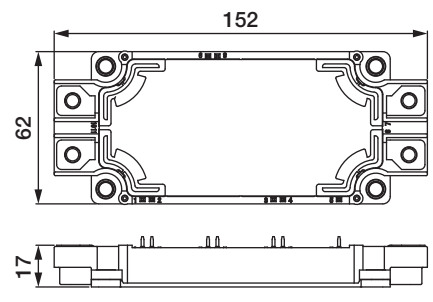
**25** CM100TX-24S1  
CM150TX-24S1



**26** CM100RX-24S1  
CM150RX-24S1



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





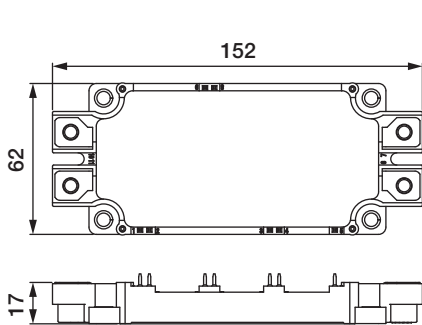
# Lineup of IGBT Modules

## Outline Drawing of IGBT Modules

Unit:mm

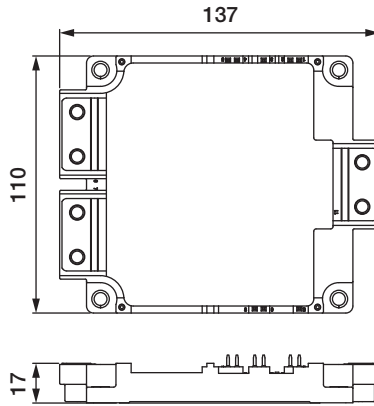
**28**

CM300,450,600DX-13T  
CM225,300,450,600DX-24T  
CM225,300,450,600,800DX-24T1  
CM225,300,450DX,600DX-34T



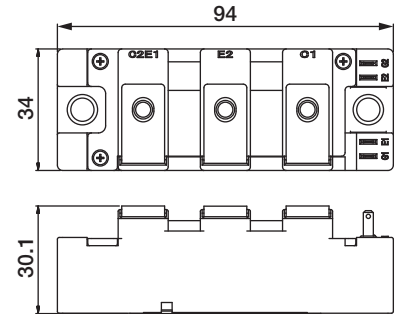
**29**

CM1000DX-24T



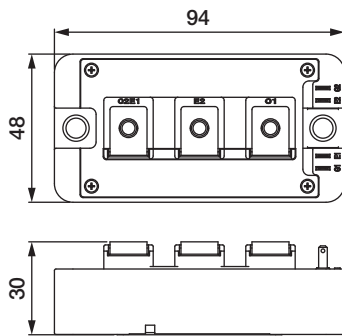
**30**

CM100,150,200DY-13T  
CM100,150DY-24T  
CM75,100DY-34T



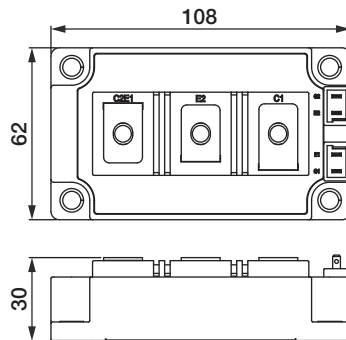
**31**

CM300,400DY-13T  
CM200,300DY-24T  
CM150,200DY-34T



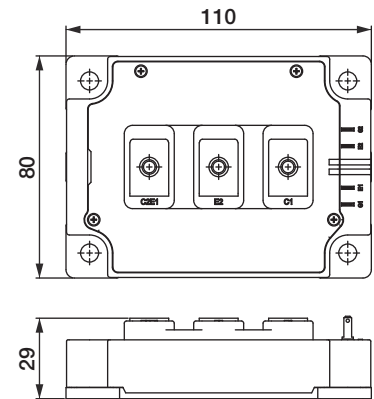
**32**

CM600DY-13T  
CM450,600DY-24T  
CM450,600C1Y-24T  
CM300,400DY-34T  
RM600,800DY-34S



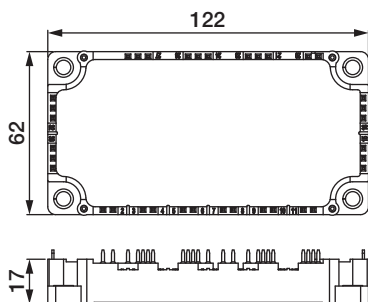
**3A**

CM400DY-40T



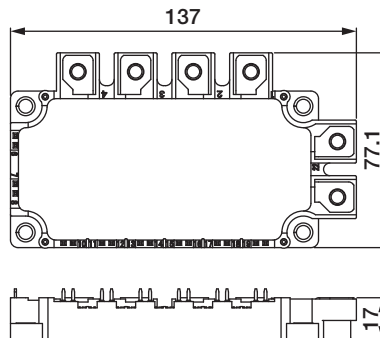
**33**

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



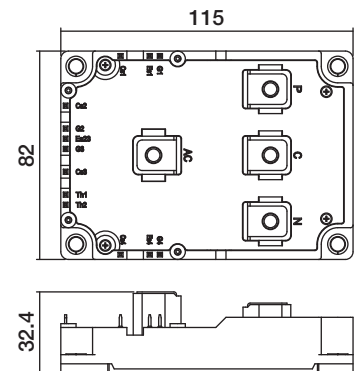
**34**

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



**35**

CM400ST-24S1

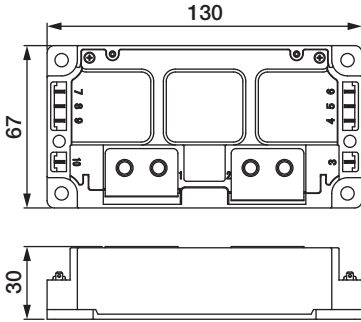


Outline Drawing of IGBT Modules

Unit:mm

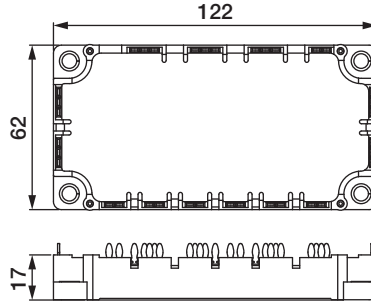
**36**

CM500C2Y-24S  
CM1400HA-24S  
CM600,800,1000HA-34S  
RM1400HA-24S



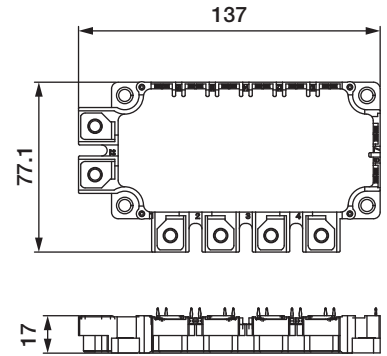
**37**

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



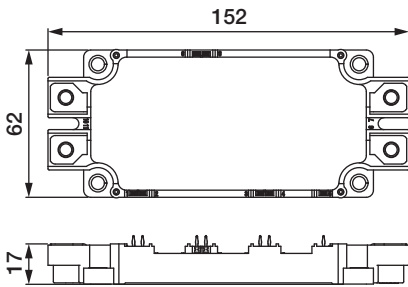
**38**

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



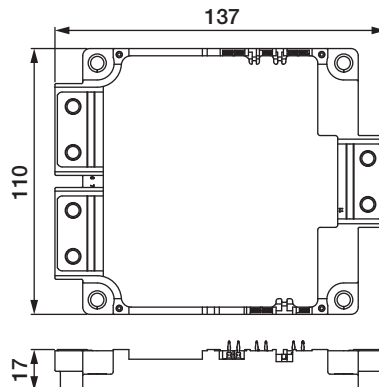
**39**

CM300,450,600DXP-13T  
CM225,300,450,600DXP-24T  
CM225,300,450,600,800DXP-24T1  
CM225,300,450,600DXP-34T



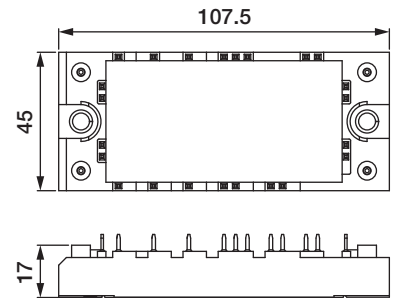
**40**

CM1000DXP-24T



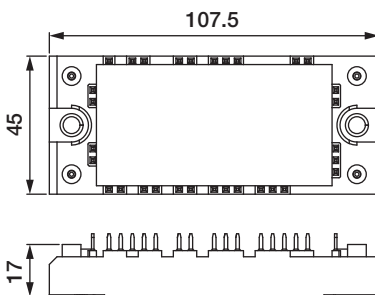
**41**

CM35,50MXUA-24T/24T1



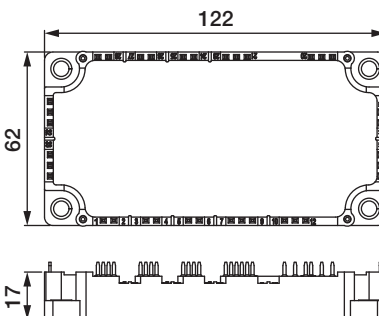
**42**

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



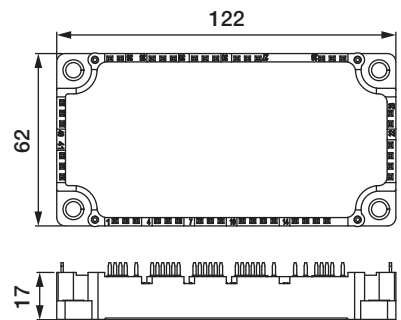
**43**

CM75,100MXUC-24T/24T1



**44**

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



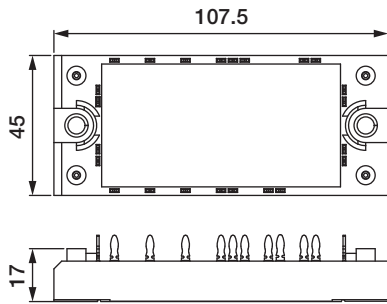
# Lineup of IGBT Modules

## Outline Drawing of IGBT Modules

Unit:mm

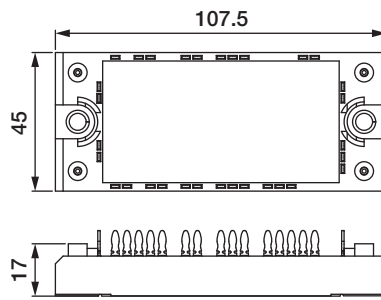
**45**

CM35/50MXUAP-24T/T1



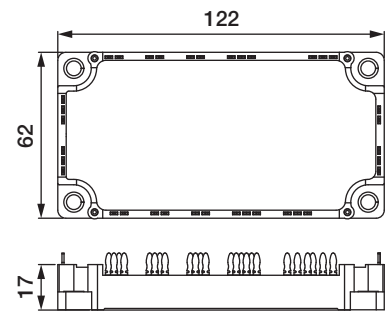
**46**

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



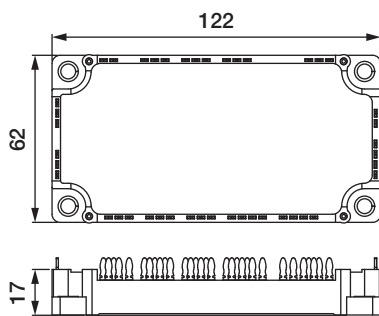
**47**

CM75/100MXUCP-24T/T1



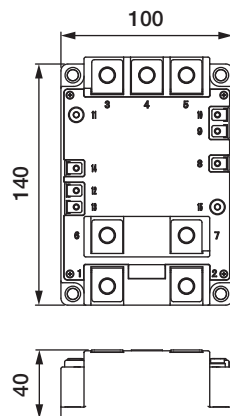
**48**

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








**49**

CM800,1200DW-24T  
CM800,1200DW-34T/TA  
CM1200DW-40T



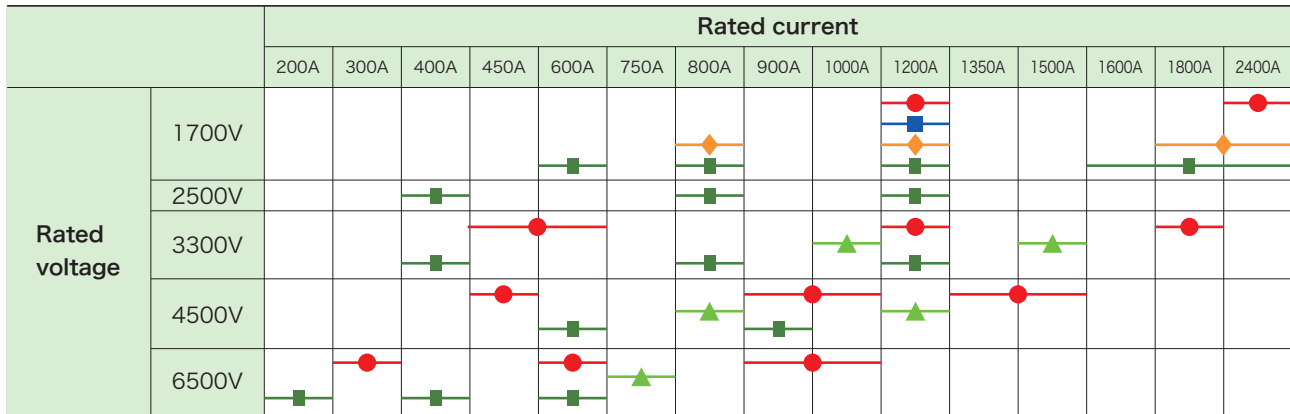
## Series , Main Application

Series		Main Application
X		Traction/Power transmission/Motion control
R		
S		
N		
H		

Data sheet here



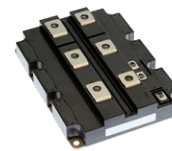
## Rated Lineup



## New Products

### X Series HVIGBT Modules std type

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





#### <Main Features>

- Power loss reduced by incorporating 7th-generation IGBT and RFC<sup>\*1</sup> diode
- Compared to the existing CM900HC-90H and CM1350HC-90X, the new models' rated output currents are 50% greater but external dimensions are the same.
- Compared to existing CM900HC-90H, new CM900HC-90X, etc. are 33% smaller but achieve the same voltage and current ratings.
- Optimal package internal structure realizes improved heat dissipation, humidity resistance and flame retardance, increasing product life

\*1 RFC : Relaxed field of cathode

#### Product lineup

std type	1.7kV	3.3kV	4.5kV	6.5kV
	2400A	1200A	900A 1000A	600A
	2400A	1200A 1800A	900A 1350A 1500A	600A 900A 1000A

### X Series HVIGBT Modules dual type

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





#### <Main Features>

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

\*2 As of Dec. 17, 2020 based on Mitsubishi Electric research

#### Product lineup

LV100	1.7kV	3.3kV	HV100	3.3kV	4.5kV	6.5kV
	1200A	450A 600A		450A 600A	450A	300A

# Lineup of HVIGBT Modules

Series Matrix of HVIGBT (No.: Number of Outline Drawing, see page 39 to 40)

Ic	V <sub>CES</sub>			1700V									2500V									3300V														
	X-Series			S-Series N-Series			H-Series			H-Series			X-Series			R-Series			H-Series																	
	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.															
400A										CM400DY-50H	D1	B	-							CM400HG-66H	H	G	05	CM400DY-66H	D1	B	08									
450A																CM450DA-66X	D2	A	09																	
600A							CM600DY-34H	D1	B	01	CM600E2Y-34H	E2	B	01				CM600DA-66X	D2	A	09				CM600DE-66X	D2	E	10								
800A				CM800DZB-34N	D1	C	01	CM800DZ-34H	D1	C	01	CM800HB-50H	H	B	-							CM800HC-66H	H	C	03	CM800E4C-66H	E4	C	04							
1000A																			CM1000HC-66R	H	C	03				CM1000E4C-66R	E4	C	04							
1200A	CM1200DA-34X	D2	A	09	CM1200HCB-34N	H	C	03	CM1200DC-34N	D1	C	01	CM1200E4C-34N	E4	C	03	CM1200DC-34S	D1	C	01	CM1200HC-34H	H	C	02	CM1200HC-50H	H	C	-	CM1200HC-66X	H	C	03	CM1200HG-66H	H	C	06
																															CM1200HC-66H	H	C	04		
1500A																			CM1500HC-66R	H	C	04														
																			CM1500HG-66R	H	G	-														
1600A							CM1600HC-34H	H	C	02																										
1800A				CM1800HC-34N	H	C	03	CM1800HCB-34N	H	C	04	CM1800HC-34H	H	C	04				CM1800HC-66X	H	C	04				CM1800HG-66X	H	G	06							
2400A	CM2400HC-34X	H	C	03	CM2400HCB-34X*	H	C	04	CM2400HC-34N	H	C	03	CM2400HCB-34N	H	C	04	CM2400HC-34H	H	C	04																
Connection	H		E2/E6			E4			D1			D2																								

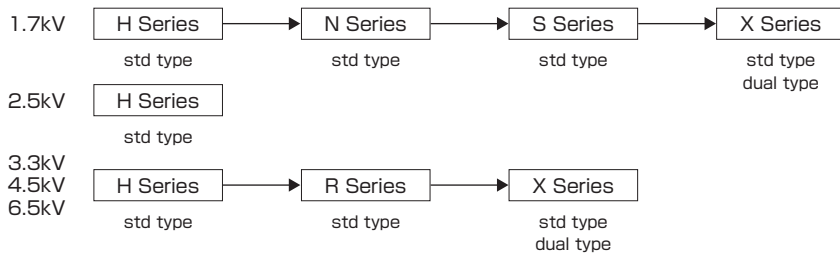
[Type]

- A: Al base plate 6kV Isolation
- B: Cu base plate 6kV Isolation
- C: AISiC base plate 6kV Isolation
- G: AISiC base plate 10kV Isolation
- E: Al base plate 10kV Isolation

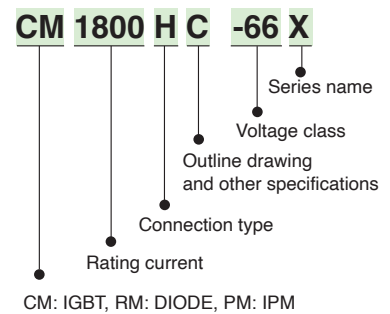
The outline drawing is written the figure of principal part numbers that have a common dimension. ★: New Product

Non-recommended: Please contact to the sales offices.

## Evolution of HVIGBT Module Series



## Type Name Definition of IGBT Modules



Series Matrix of HVIGBT (No.: Number of Outline Drawing, see page 39 to 40)

Ic	4500V												6500V															
	X-Series				R-Series				H-Series				X-Series				R-Series				H-Series							
	Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.		Connection	Type	No.					
200A																									CM200HG-130H	H	G	05
300A													CM300DE-130X*	D2	E	10												
400A																									CM400HG-130H	H	G	07
																									CM400E2G-130H	E2	G	06
																									CM400E4G-130H	E4	G	06
450A	CM450DE-90X**	D2	E	10																								
600A									CM600HG-90H	H	G	07	CM600HG-130X	H	G	07									CM600HG-130H	H	G	06
750A																	CM750HG-130R	H	G	-								
800A					CM800HC-90R	H	C	03	CM800HG-90R	H	G	07																
900A	CM900HC-90X*	H	C	03									CM900HG-90H	H	C	04	CM900HG-130X	H	G	06								
	CM900HG-90X	H	G	07									CM900HG-90H	H	G	06												
	CM900E2G-90X	E2	G	06																								
1000A	CM1000HG-90X	H	G	07									CM1000HG-130XA	H	G	06												
1200A					CM1200HC-90R	H	C	-																				
					CM1200HC-90RA	H	C	04																				
					CM1200HG-90R	H	G	06																				
1350A	CM1350HC-90X	H	C	04																								
	CM1350HG-90X	H	G	06																								
1500A	CM1500HC-90XA	H	C	04																								
	CM1500HG-90X	H	G	06																								
Connection	H		E2/E6		E4		D2																					

[Type]

- A: Al base plate 6kV Isolation
- B: Cu base plate 6kV Isolation
- C: AISiC base plate 6kV Isolation
- G: AISiC base plate 10kV Isolation
- E : Al base plate 10kV Isolation

★: New Product ★★: Under Development  
 (※) Under consideration for development

The outline drawing is written the figure of principal part numbers that have a common dimension.

Non-recommended : Please contact to the sales offices.

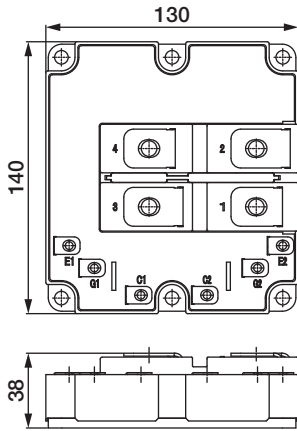
# Lineup of HVIGBT Modules

## Outline Drawing of HVIGBT Modules

Unit:mm

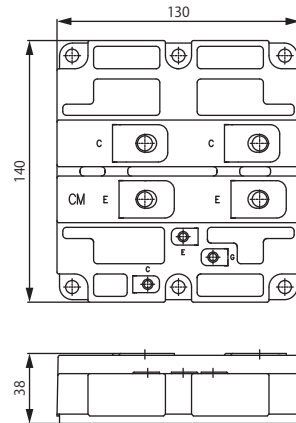
01

CM1200DC-34N/S  
CM800DZB-34N  
CM600DY/E2Y-34H  
CM800DZ-34H



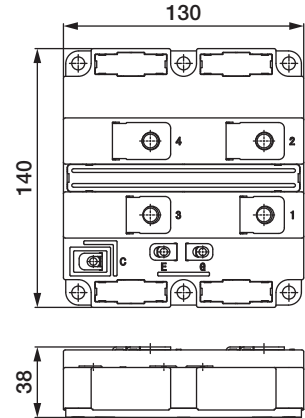
02

CM1200,1600HC-34H



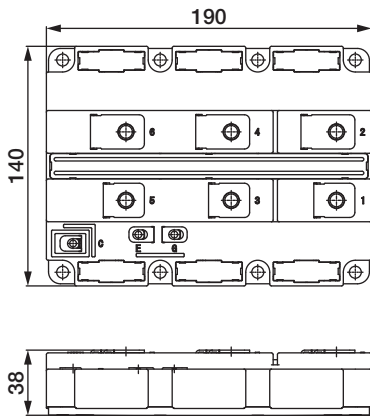
03

CM2400HC-34X  
CM1200HC-66X  
CM900HC-90X  
etc.



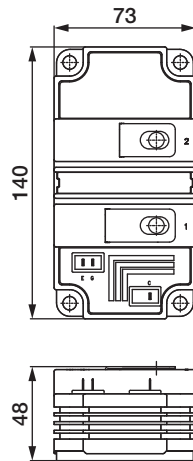
04

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



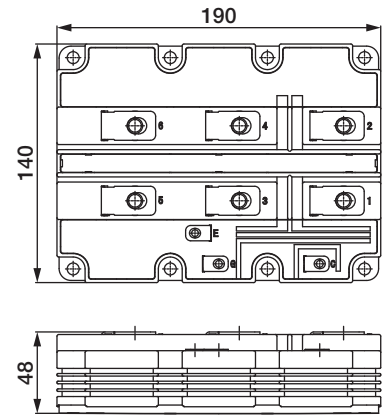
05

CM400HG-66H  
CM200HG-130H



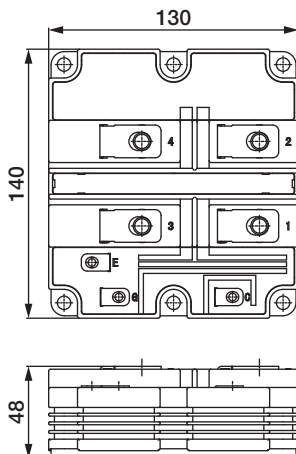
06

CM1800HG-66X, CM900E2G-90X  
CM1350HG-90X, CM1500HG-90X  
CM900HG-130X, CM1000HG-130XA  
etc.



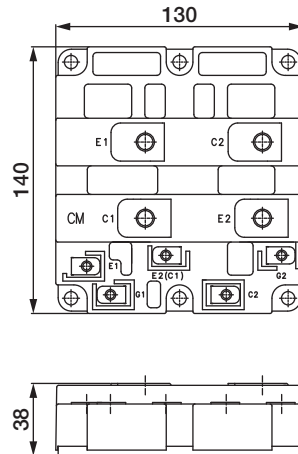
07

CM900, 1000HG-90X  
CM800HG-90R  
CM600HG-90H/130X  
CM400HG-130H



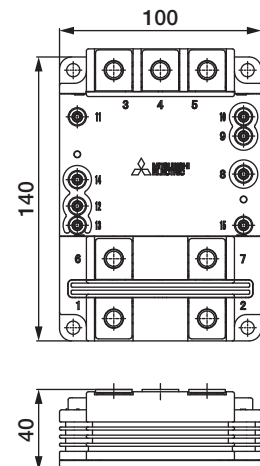
08

CM400DY-66H



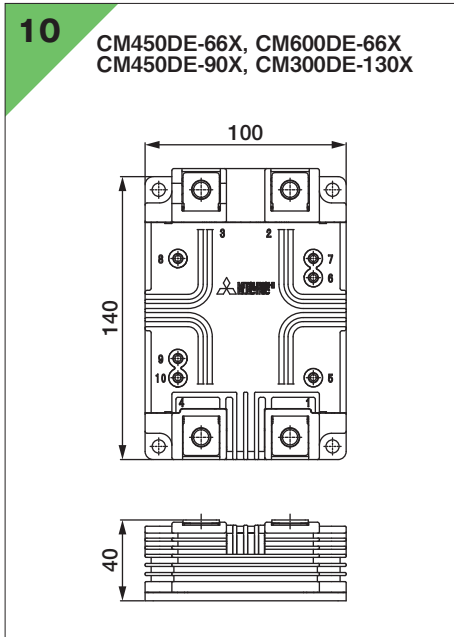
09

CM1200DA-34X  
CM450DA-66X, CM600DA-66X



10 Outline Drawing of HVIGBT Modules

Unit:mm





## Series , Main Application

Series	Main Application
HV DIODE Modules ●—	Traction/Power transmission/Motion control

Data sheet here

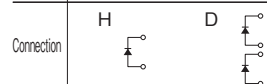


## Rated Lineup

		Rated current											
		200A	250A	300A	400A	450A	600A	800A	900A	1000A	1200A	1500A	1800A
Rated voltage	1700V										●—		●—
	3300V				●—		●—			●—	●—		
	4500V			●—	●—	●—	●—	●—	●—	●—	●—	●—	
	6500V	●—	●—				●—	●—		●—			

## Series Matrix of HV DIODE Modules (No.: Number of outline drawing, see page 42)

V <sub>PRM</sub> If	1700V			3300V			4500V			6500V																													
	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.	Connection	Type	No.																											
200A													RM200DG-130S	D	G	-																							
250A																	RM250DG-130F	D	G	-																			
300A																	RM300DG-90S	D	G	-	RM300DG-130X*	D	G	13															
400A																	RM400DG-66S RM400DY-66S	D	G	13 D	B	14	RM400DG-90F	D	G	-													
450A																							RM450DG-90X	D	G	13	RM450DG-130X*	D	G	13									
600A																	RM600DY-66S RM600DC-66X	D	B	14 D	C	14	RM600HE-90S	H	C	-	RM600DG-130S RM600DG-130X*	D	G	13 D	G	13							
800A																										RM800DG-90F	D	G	13										
900A																										RM900HC-90S RM900DB-90S RM900DG-90X*	H	C	14 D	B	14 G	13							
1000A																										RM1000DC-66F	D	C	14					RM1000DG-130XA	D	G	13		
1200A	RM1200DB-34S	D	B	11														RM1200DG-66S RM1200HE-66S RM1200DB-66S RM1200DG-66X	D	G	13 H	C	12 D	B	14 G	13	RM1200DG-90F	D	G	13									
1500A																										RM1500HE-66F RM1500DC-66F	H	C	12 D	C	14	RM1500DG-90X*	D	G	13				
1800A	RM1800HE-34S	H	C	12																																			



[Type]

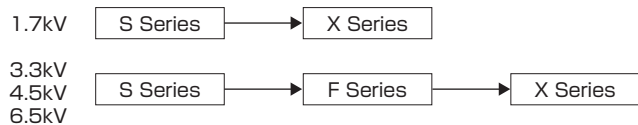
B: Cu base plate 6kV Isolation  
C: AISiC base plate 6kV Isolation  
G: AISiC base plate 10kV Isolation

The outline drawing is written the figure of principal part numbers that have a common dimension.

★: New Product

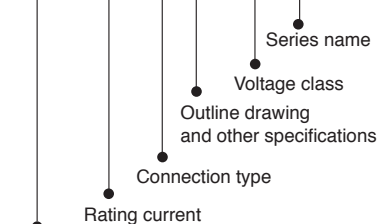
Non-recommended: Please contact to the sales offices.

## Evolution of HV DIODE Module Series



## Type Name Definition of IGBT Modules

**RM 1200 D G -66 X**



CM: IGBT, RM: DIODE, PM: IPM

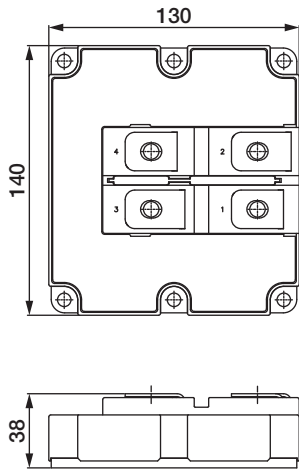
# Lineup of HVDIODE Modules

## Outline Drawing of HVDIODE Modules

Unit:mm

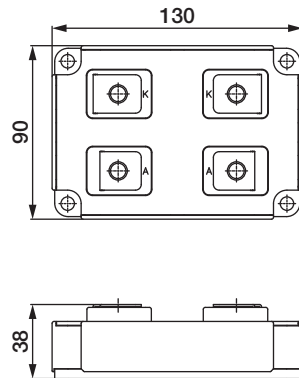
**11**

RM1200DB-34S



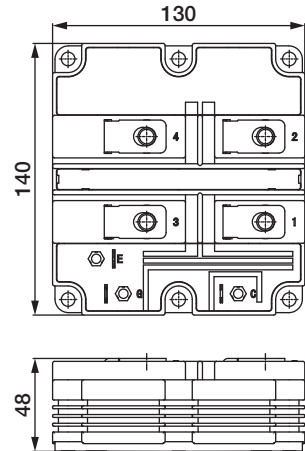
**12**

RM1800HE-34S, RM1500HE-66F  
RM1200HE-66S



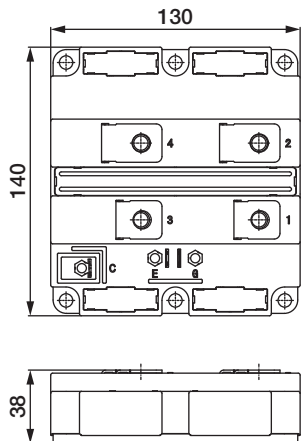
**13**

RM1200DG-66X  
RM450/900/1500DG-90X  
RM300/450/600DG-130X  
RM1000DG-130XA  
etc.



**14**

RM600DC-66X  
RM1000/1500DC-66F  
RM400/600DY-66S  
RM1200DB-66S, RM900DB/HC-90S



# Lineup of MOSFET Modules

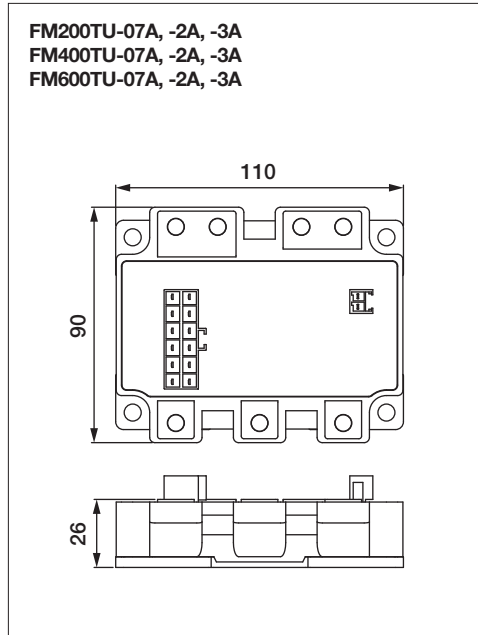
## Series Matrix of MOSFET Modules

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

$V_{DS}$ $I_D$	75V		100V		150V	
		Connection		Connection		Connection
100A	FM200TU-07A	T	FM200TU-2A	T	FM200TU-3A	T
200A	FM400TU-07A	T	FM400TU-2A	T	FM400TU-3A	T
300A	FM600TU-07A	T	FM600TU-2A	T	FM600TU-3A	T
Connection						

## Outline Drawing of MOSFET Modules

Unit:mm





Data sheet  
here





# Power Modules for xEV

## Series , Main Application

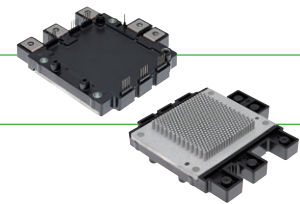
Series	Main Application
J1 	xEV
J 	

## Rated Lineup

		Rated current		
		300A	600A	700A
Rated voltage	650V			
				



## Featured Products



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

### J1 Series power Modules for xEV

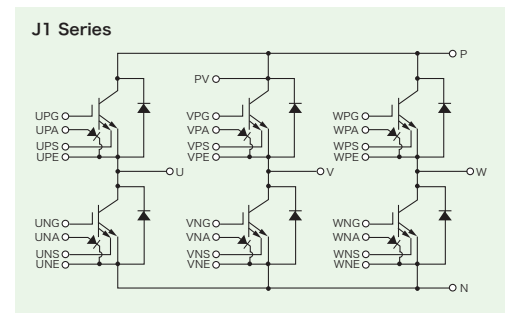
CT600C1A060-A, CT700CJ1A060-A

#### <Main Features>

- Integrated direct water-cooling structure with cooling fins and 6-in-1 connection contribute to more compact inverters for xEV
- Direct lead bonding (DLB) structure ensures high reliability
- Loss further reduced by incorporating 7th-generation IGBT built with a CSTBT™ structure
- On-chip current sensor that enables high-speed current-cutoff protection is installed
- Completely lead-free, confirms to RoHS directive (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)

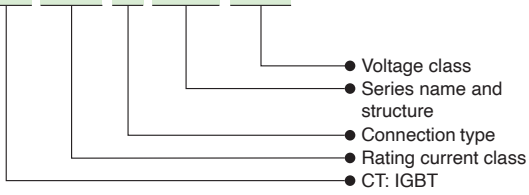
# Power Modules for xEV

## Matrix of 650V Power Modules

V <sub>CES</sub>		650V					
I <sub>c</sub>	Series	J1 Series			J Series		
		Power Module with pin fin	Connection	No.	T-PM	Connection	No.
300A	—	—	—	—	CT300DJG060	D	02
600A	CT600CJ1A060-A	C	01	—	—	—	—
700A	CT700CJ1A060-A	C	01	—	—	—	—
Connection							

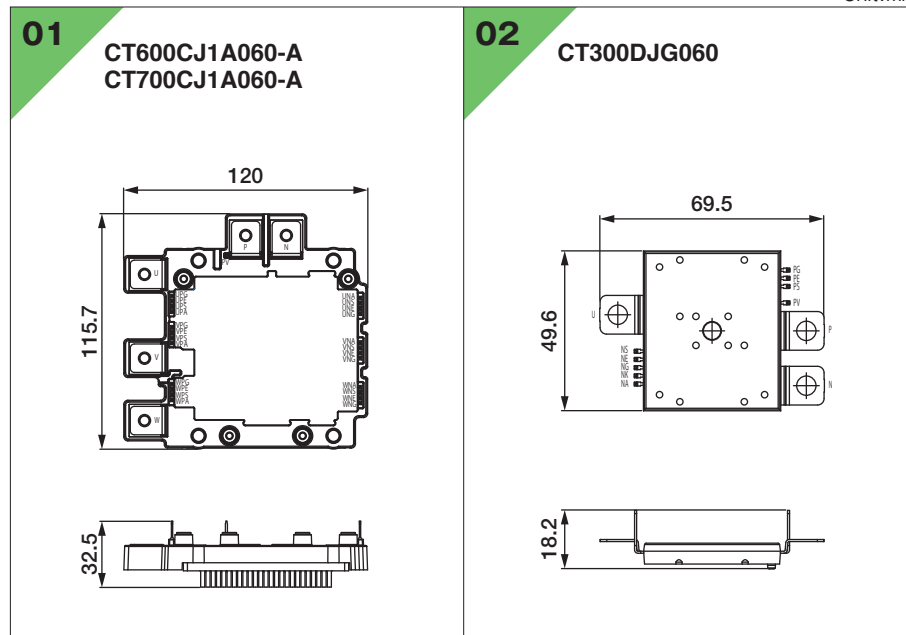
## Type Name Definition of Power Modules for xEV

**CT 600 C J1A 060**



## Outline Drawing of Power Modules for xEV

Unit:mm





## Mitsubishi Electric Semiconductors & Devices Website

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



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