

Changes for the Better

POWER MODULES

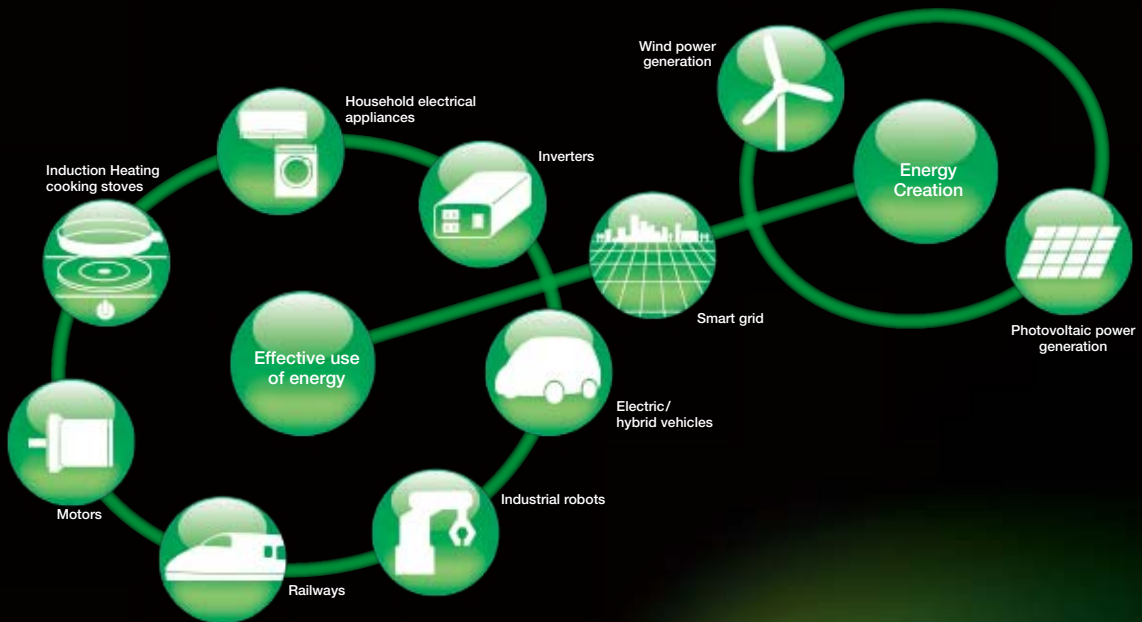
for a greener tomorrow



Power Modules

Innovative Power Devices for a Sustainable Future

Mitsubishi Electric power modules are at the forefront of the latest energy innovations that seek to solve global environmental issues while creating a more affluent and comfortable society for all. Some of these innovations are photovoltaic (PV) and wind power generation from renewable energy sources, smart grids realizing efficient supply of power, hybrid/electric vehicles (HVs/EVs) that take the next step in reducing carbon emissions and fuel consumption, and home appliances that achieve ground-breaking energy savings. Whether in appliances, railcars, EVs or industrial systems, our power modules are key elements in changing the way energy is used.





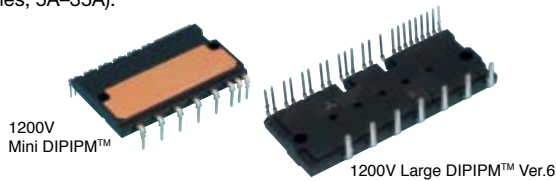
New Products

New highly efficient intelligent power modules for air conditioners and industrial applications

1,200V Large DIPIPM™ Ver.6 and 1,200V Mini DIPIPM™

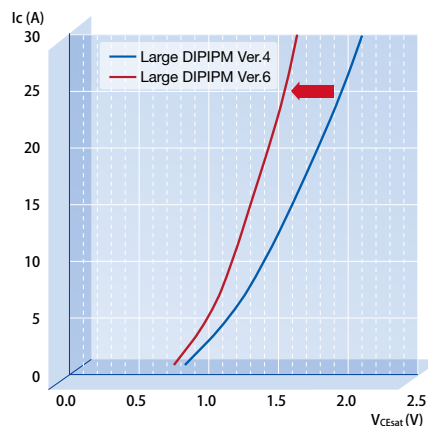
Key Features

- Reduced external components thanks to built-in bootstrap diodes (BSD) with a current limit resistor.
- Sixth-generation IGBT chips featuring the CSTBT™ structure enable power loss to be reduced by approximately 10% compared to conventional products (Large DIPIPM Ver. 4 series, 5A–35A).
- By employing a Mini DIPIPM™ package for the first time in a 1,200V product, the outline size has been reduced approximately 34% compared to conventional products (Large DIPIPM™ Ver. 4 series, 5A–35A).



CSTBT: Carrier Stored Trench-Gate Bipolar Transistor
 DIPIPM: Dual-in-line Package Intelligent Power Module

■ IGBT saturation voltage characteristics
 $T_j=25^\circ\text{C}$, $V_0=15\text{V}$, typical example

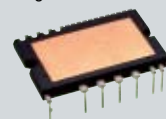


Modules realizing single-control power supply and photocoupler-less systems for household appliances and low-capacity inverters

Key Features

- Transfer-molded structure with insulation sheet having high heat conductivity simultaneously provides heat dissipation and insulation
- High-voltage IC equipped with drive, protection and level-shift circuits for direct control via input signals from a CPU or microcomputer
- Compact board and highly reliable equipment realized through single power-supply and photocoupler-less systems
- Includes built-in bootstrap diode (BSD)

DIPIPM™
 Dual In-Line Package
 Intelligent Power Modules



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

Key Features

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

IPM
 Intelligent Power Modules

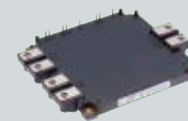


IGBT modules used in general-purpose inverters for various applications

Key Features

- Various low-inductance packages and power chips available
- Compatible with for high-frequency, high-voltage (1700V) applications
- Large-capacity modules available for renewable energy systems

IGBT Modules
 Insulated Gate Bipolar
 Transistor Modules



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

Key Features

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

HVIGBT Modules
 High Voltage Insulated Gate Bipolar
 Transistor Modules



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

Key Features

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

Power Modules for Vehicles
 Power Modules for EV/PHEV

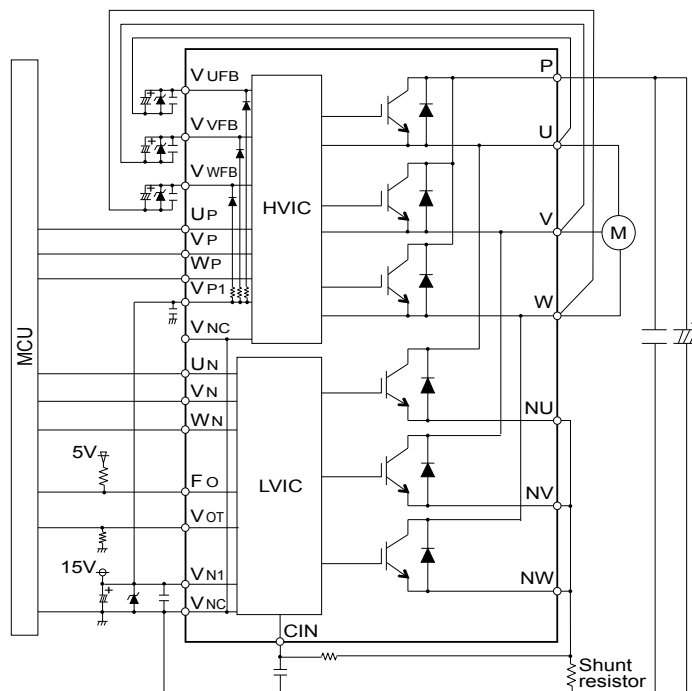


Series Matrix of 600V / 500V DIIPM

Ic (A)	Vces (V)		600V					500V	
	Series	Ver.6	Ver.5	For Industry	Ver. 4		PFC	MOSFET	
		Super mini type	Super mini type	Mini Type	Mini Type	Large Type	Mini Type	Mini Type	Super mini type
		Built-in BSD	Built-in BSD	Built-in BSD				Built-in BSD	
3									PSM03S93E5-A*
5	PSS05S92F6-AG* PSS05S92E6-AG*	PS219B2-S PS219B2-ST	PSS05S51F6* PSS05S51F6-C*						PSM05S93E5-A*
10	PSS10S92F6-AG* PSS10S92E6-AG*	PS219B3-S PS219B3-ST	PSS10S51F6* PSS10S51F6-C*						
15	PSS15S92F6-AG* PSS15S92E6-AG*	PS219B4-S PS219B4-ST	PSS15S51F6* PSS15S51F6-C*					PS41764	
20	PSS20S92F6-AG* PSS20S92E6-AG*		PSS20S51F6* PSS20S51F6-C* PSS20S71F6*	PS21765			PS51787		
25									
30	PSS30S92F6-AG* PSS30S92E6-AG*		PSS30S71F6*	PS21767/-V			PS51789		
35	PSS35S92F6-AG* PSS35S92E6-AG*								
50			PSS50S71F6*				PS21A79		
75							PS21A7A		
Chip	IGBT/MOSFET	Full-gate CSTBT	Full-gate CSTBT	CSTBT	CSTBT	Full-gate CSTBT	Trench	SJ-MOSFET	MOSFET
	HVIC	x1	x1	x3	x3	x3	-	x3	x1
	LVIC	x1	x1	x1	x1	x1	x1	x1	x1
	BSD	x3	x3	x3	x3	-	-	-	x3
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side	P-side/N-side	N-side	P-side/N-side	P-side/N-side
	SC	N-side	N-side	N-side	N-side	N-side w/sense	-	N-side	N-side
	OT	N-side ^{*1}	N-side <-T>	-	-	-	-	-	N-side
	V _{OT} ^{*2}	N-side ^{*1}	N-side <except-T>	N-side	-	N-side	-	-	-
Specification	Active Input	High (3/5V)	High (3/5V)	High (3/5V)	High (3/5V)	High (3/5V)	High (3/5V)	High (3/5V)	High (3/5V)
	Emitter pin of N-side	Open	Open	Open	Open	Open	-	Open	Open
	Fault Output	N-side (UV, SC, OT)	N-side (UV, SC, OT)	N-side (UV, SC)	N-side (UV, SC)	N-side (UV, SC)	-	N-side (UV, SC)	N-side (UV, SC, OT)
	Insulation voltage	1500Vrms ^{*3}	1500Vrms ^{*3}	2500Vrms	2500Vrms	2500Vrms	2500Vrms	2500Vrms	1500Vrms ^{*3}
	Insulation structure	Insulation sheet	Insulation sheet	Molding resin ^{*7} / Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS Directive	Compliant ^{*5}	Compliant ^{*5}	Compliant ^{*4 *5}	Compliant ^{*5}	Compliant ^{*5}	Compliant ^{*6}	Compliant ^{*5}	Compliant ^{*5}
	Pin Type	A: Long	A: Long	C: Control side of Zigzag None: Short	-	-	-	-	A: Long

Non-Recommended : Please refrain from adopting newly.
★★: Under Development **★**: New Products

Application circuit of Built-in BSD super mini DIIPM™



Series Matrix of 1200V DIIPM

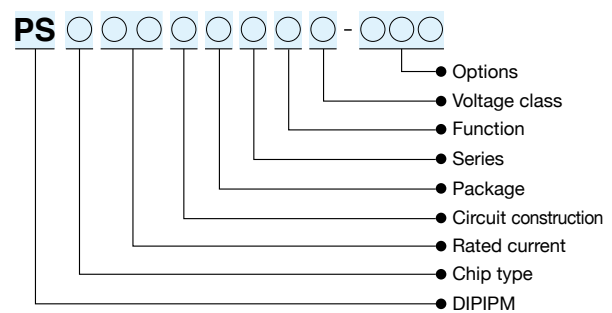
V _{ces} (V)		1200V		
I _c (A)	Series	Ver.6		Ver.4
	Mini Type	Large Type	Large Type	
3				
5	PSS05S72FT**	PSS05SA2FT**	PS22A72	
10	PSS10S72FT**	PSS10SA2FT**	PS22A73	
15		PSS15SA2FT**	PS22A74	
25		PSS25SA2FT**	PS22A76	
30				
35		PSS35SA2FT**	PS22A78-E	
50		PSS50SA2FT**	PS22A79	
75				
<hr/>				
Chip	IGBT/MOSFET	CSTBT	CSTBT	CSTBT
	HVIC	x3	x3	x3
	LVIC	x1	x1	x1
	BSD	x3	x3	-
Protective Function	UV	P-side/N-side	P-side/N-side	P-side/N-side
	SC	N-side	N-side	N-side
	OT	-	-	-
	V _{OT} *2	N-side	N-side	N-side
Specification	Active Input	High(5V)	High(5V)	High(5V)
	Emitter pin of N-side	Open	Open	Open
	Fault Output	N-side(UV,SC)	N-side(UV,SC)	N-side(UV,SC)
	Insulation voltage	2500Vrms	2500Vrms	2500Vrms
	Insulation structure	Insulation sheet	Insulation sheet	Insulation sheet
	RoHS Directive	Compliant*5	Compliant*5	Compliant*5
	Pin Type	-	-	-

★★: Under Development ★: New Products Non-Recommended: Please refrain from adopting newly.

[Term] CSTBT™: Carrier Stored Trench-Gate Bipolar Transistor
 BSD: Bootstrap Diode, HVIC: High Voltage IC, LVIC: Low Voltage IC,
 UV: Supply Under Voltage protection,
 SC: Short Circuit protection, OT: Over-Temperature protection,
 RoHS: Restriction of hazardous substances in electrical and electronic equipment

[Notes] *1: PSSxxS92E6 has OT function, PSSxxS92F6 has VOT function
 *2: Analog temperature output
 *3: AC60Hz, 1minute. Corresponds to isolation voltage 2500Vrms in the case the convex-shaped heat sink
 *4: High melting point solder (Lead Over 85%) is used for chip soldering of PSSxxS51F6 only.
 *5: Pin plating and Chip soldering : Lead-free solder
 *6: High melting point solder (Lead Over 85%) is used for chip soldering only and Pin plating is Lead-free.
 *7: Molding resin insulation for PSSxxS51F6/-C

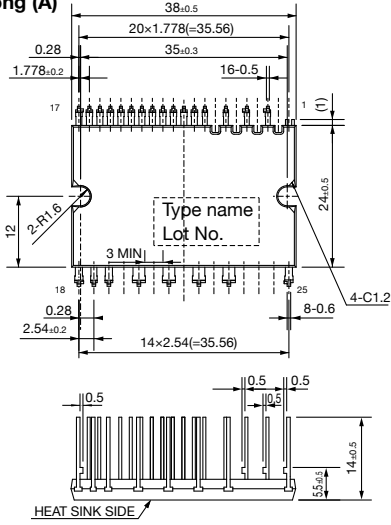
Type Name Definition of DIIPM™



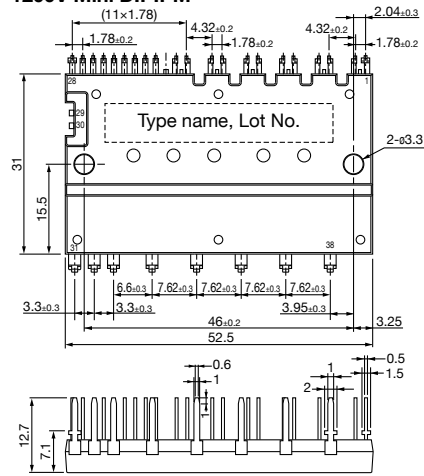
Outline Drawing of DIIPM™

Unit:mm

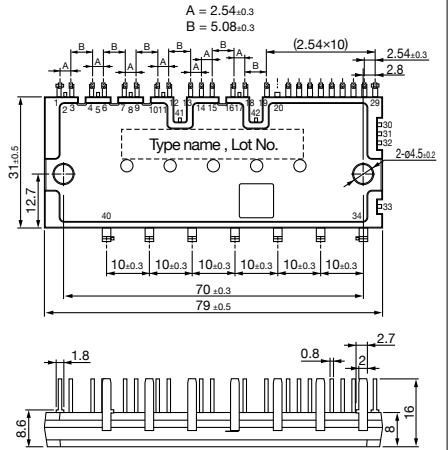
Super Mini DIIPM Ver.6
MOSFET Super Mini DIIPM
Super Mini DIIPM Ver.5
Long (A)



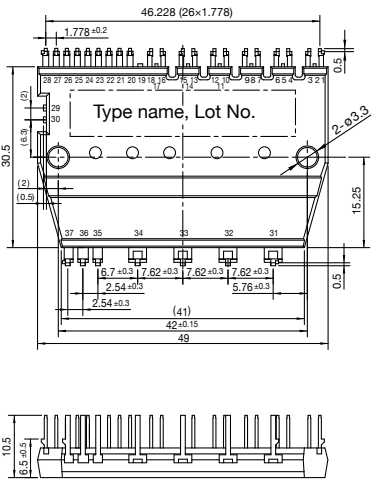
Industrial DIIPM (PSSxxS71F6)
Mini DIIPM Ver.4
MOSFET Mini DIIPM
DIPFC
1200V Mini DIIPM



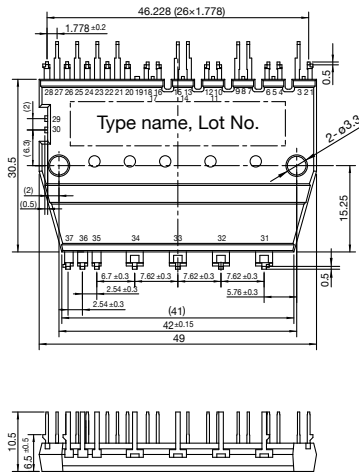
600V Large DIIPM
1200V Large DIIPM



Industrial DIIPM(PSSxxS51F6)



Industrial DIIPM(PSSxxS51F6-C)
Zigzag(C)



Line-up of MOSFET Modules

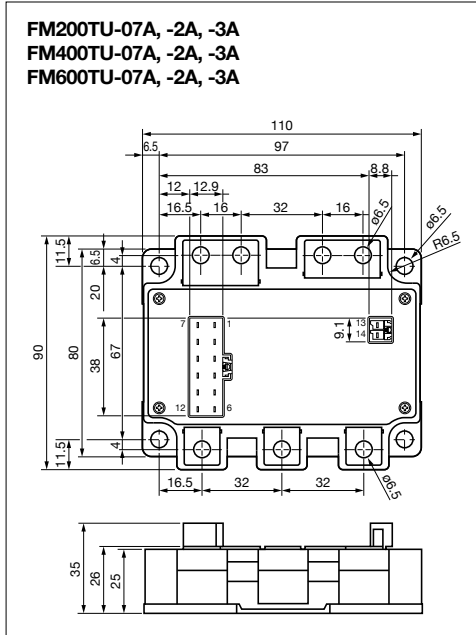
Series Matrix of MOSFET Modules

RoHS Directive Compliant

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

Outline Drawing of MOSFET Modules

Unit:mm



Line-up of IPM

Series Matrix of 600V IPM (No.: Number of Outline Drawing, see page 7)

V _{CE(S)} (V)	600V																					
	L1 Series			S1 Series			V1 Series			Photovoltaic			L Series			S-DASH Series						
I _C (A)	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.						
50	PM50CL1A060	C	01	PM50CS1D060	05				PM50B4LA060	B4	01	PM50CLA060	C	PM50CSD060	C							
	PM50CL1B060	C	02						PM50B5LA060	B5	01						PM50CSE060	C				
	PM50RL1A060	R	01						PM50B6LA060	B6	01						PM50RSD060	R				
	PM50RL1B060	R	02						PM50B4LB060	B4	02						PM50RSE060	R				
	PM50RL1C060	R	03						PM50B5LB060	B5	02											
									PM50B6LB060	B6	02											
75	PM75CL1A060	C	01	PM75CS1D060	05				PM75B4LA060	B4	01	PM75CLA060	C	PM75CSD060	C							
	PM75CL1B060	C	02						PM75B5LA060	B5	01						PM75CSE060	C				
	PM75RL1A060	R	01						PM75B6LA060	B6	01						PM75RSD060	R				
	PM75RL1B060	R	02						PM75B4LB060	B4	02						PM75RSE060	R				
									PM75B5LB060	B5	02											
									PM75B6LB060	B6	02											
100	PM100CL1A060	C	01	PM100CS1D060	C	05						PM100CLA060	C	PM100CSD060	C							
	PM100CL1B060	C	02														PM100RLA060	R	PM100CSE060	C		
	PM100RL1A060	R	01																		PM100RSD060	R
	PM100RL1B060	R	02																			
150	PM150CL1A060	C	01	PM150CS1D060	C	05						PM150CLA060	C	PM150CSD060	C							
	PM150CL1B060	C	02														PM150RLA060	R	PM150CSE060	C		
	PM150RL1A060	R	01																		PM150RSD060	R
	PM150RL1B060	R	02																			
200	PM200CL1A060	C	04	PM200CS1D060	C	05						PM200CLA060	C	PM200CSD060	C							
	PM200RL1A060	R	04														PM200RLA060	R	PM200CSE060	C		
300	PM300CL1A060	C	04									PM300CLA060	C	PM300CSD060	C							
	PM300RL1A060	R	04														PM300RLA060	R	PM300CSE060	C		
400/450							PM400DV1A060	D	06			PM450CLA060	C	08								
600							PM600DV1A060	D	06			PM600CLA060	C	08								
800							PM800DV1B060	D	07													
IGBT Chip	CSTBT*1 Built-in Emmitter Sensor Built-in Temperature Sensor			CSTBT*1 Built-in Emmitter Sensor Built-in Temperature Sensor			CSTBT*1 Built-in Emmitter Sensor Built-in Temperature Sensor			CSTBT*1 Built-in Emmitter Sensor Built-in Temperature Sensor			CSTBT*2 Built-in Emmitter Sensor Built-in Temperature Sensor			Planar Built-in Emmitter Sensor						
Fault Output	UV	P-side/N-side			N-side			P-side/N-side			P-side/N-side			P-side/N-side			N-side*3					
	OT	P-side/N-side			N-side			P-side/N-side			P-side/N-side			P-side/N-side			N-side					
	SC	P-side/N-side			N-side			P-side/N-side			P-side/N-side			P-side/N-side			N-side*3					
	OC	-			-			-			-			-			N-side*3					
RoHS Directive	Compliant			Compliant			Compliant			Compliant			Compliant			Compliant						
Compatibility	L Series			S-DASH SERVO			V Series			-			-			-						
Connection																						

[Term] UV: Supply Under Voltage-lock protection, SC: Short-Circuit Protection, OT: Over-temperature protection, OC: Over-current protection, CSTBT™: Carrier Stored Trench-Gate Bipolar Transistor. Non-Recommended : Please refrain from adopting newly. ★: New Products

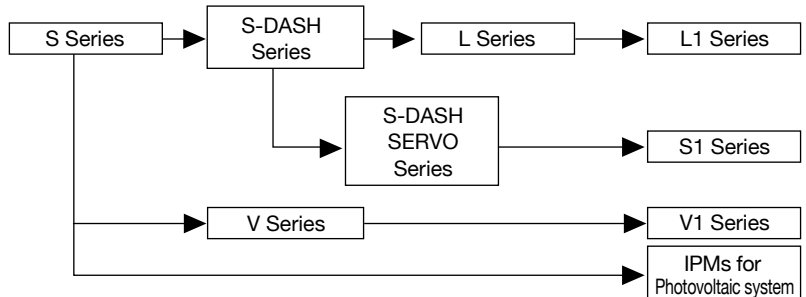
[Notes] *1: Full-gate CSTBT™ *2: PCM (Plugged Cell Merged) CSTBT™ *3: CSD/RSD have P-side

Type Name Definition of IPM

PM 100 R L1 A 120



Evolution of IPM Series



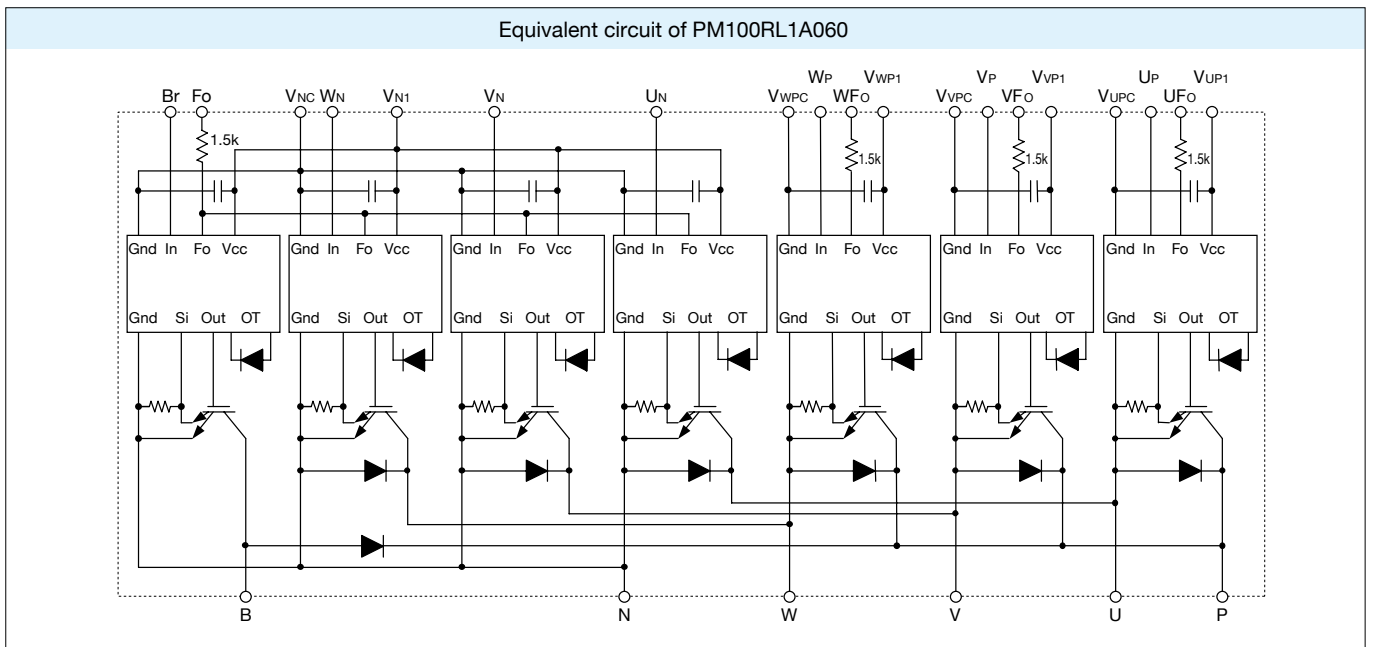
Series Matrix of 1200V IPM (No.: Number of Outline Drawing, see page 7)

V _{CE(S)} (V) Series	1200V														
	L1 Series			S1 Series			V1 Series			L Series			S-DASH Series		
I _C (A)	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection		
25	PM25CL1A120	C	01	PM25CS1D120	C	05			PM25CLA120	C					
	PM25CL1B120	C	02						PM25CLB120	C					
	PM25RL1A120	R	01						PM25RLA120	R					
	PM25RL1B120	R	02						PM25RLB120	R					
	PM25RL1C120	R	03												
50	PM50CL1A120	C	01	PM50CS1D120	C	05			PM50CLA120	C		PM50CSD120	C		
	PM50CL1B120	C	02						PM50CLB120	C		PM50CSE120	C		
	PM50RL1A120	R	01						PM50RLA120	R		PM50RSD120	R		
	PM50RL1B120	R	02						PM50RLB120	R		PM50RSE120	R		
75	PM75CL1A120	C	01	PM75CS1D120	C	05			PM75CLA120	C		PM75CSD120	C		
	PM75CL1B120	C	02						PM75CLB120	C		PM75CSE120	C		
	PM75RL1A120	R	01						PM75RLA120	R		PM75RSD120	R		
	PM75RL1B120	R	02						PM75RLB120	R		PM75RSE120	R		
100	PM100CL1A120	C	04	PM100CS1D120	C	05			PM100CLA120	C		PM100CSD120	C		
	PM100RL1A120	R	04						PM100RLA120	R		PM100RSD120	R		
150	PM150CL1A120	C	04						PM150CLA120	C		PM150CSD120	C		
	PM150RL1A120	R	04						PM150RLA120	R		PM150RSD120	R		
200									PM200DV1A120	D	06	PM200CLA120	C	08	
300									PM300DV1A120	D	06	PM300CLA120	C	08	
450									PM450DV1A120	D	06	PM450CLA120	C	08	
IGBT Chip	CSTBT*1 Built-in Current Sensor Built-in Temperature Sensor			CSTBT*1 Built-in Current Sensor Built-in Temperature Sensor			CSTBT*1 Built-in Current Sensor Built-in Temperature Sensor			CSTBT*2 Built-in Current Sensor Built-in Temperature Sensor			Planar Built-in Current Sensor		
	UV	P-side/N-side			N-side			P-side/N-side			P-side/N-side			N-side*3	
	Fault Output	P-side/N-side			N-side			P-side/N-side			P-side/N-side			N-side	
	SC	P-side/N-side			N-side			P-side/N-side			P-side/N-side			N-side*3	
OC	-			-			-			-			N-side*3		
RoHS Directive	Compliant			Compliant			Compliant			Compliant			Compliant		
Compatibility	L Series			S-DASH SERVO			V Series			-			-		
Connection	D				C				R						

[Term] UV: Supply Under Voltage-lock protection, SC: Short-Circuit Protection, OT: Over-temperature protection, OC: Over-current protection, CSTBT™: Carrier Stored Trench-Gate Bipolar Transistor. Non-Recommended : Please refrain from adopting newly.

RoHS: Restriction of hazardous substances in electrical and electronic equipment

[Notes] *1: Full-gate CSTBT™ *2: PCM (Plugged Cell Merged) CSTBT™ *3: CSD/RSD have P-side

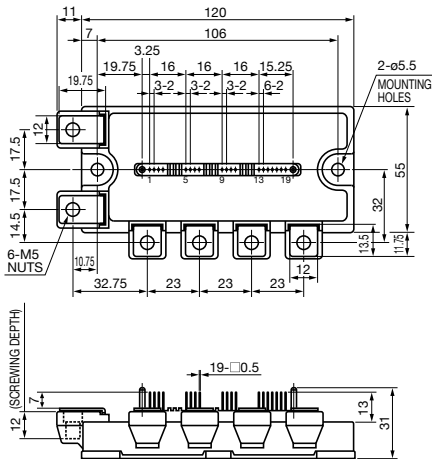


Line-up of IPM

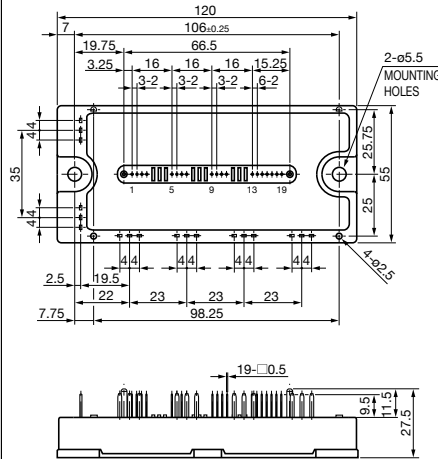
Outline Drawing of IPM

Unit: mm

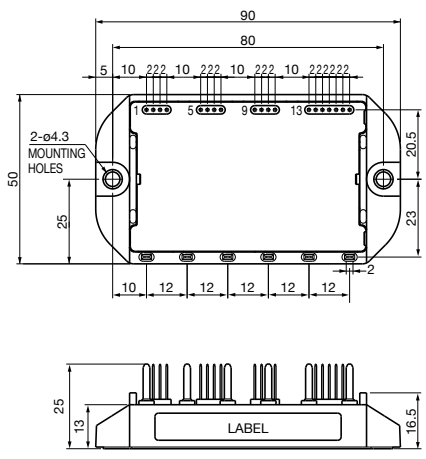
01 PM50, 75, 100, 150CL1A/RL1A060
PM25, 50, 75CL1A/RL1A120
PM50, 75B4/B5/B6LA060



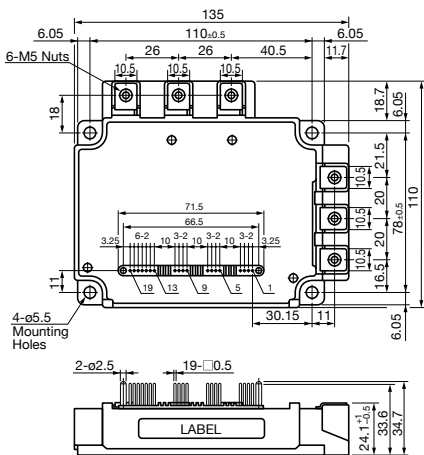
02 PM50, 75, 100, 150CL1B/RL1B060
PM25, 50, 75CL1B/RL1B120
PM50, 75B4/B5/B6LB060



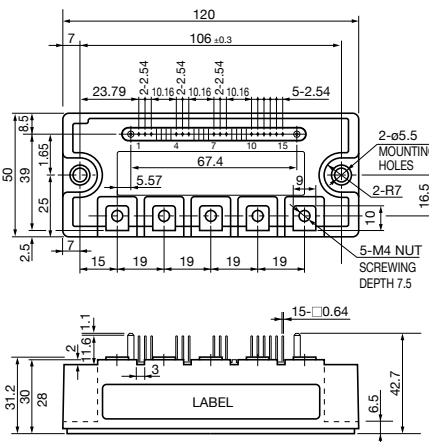
03 PM50RL1C060
PM25RL1C120
PM50, 75, B4/B5/B6L1C060



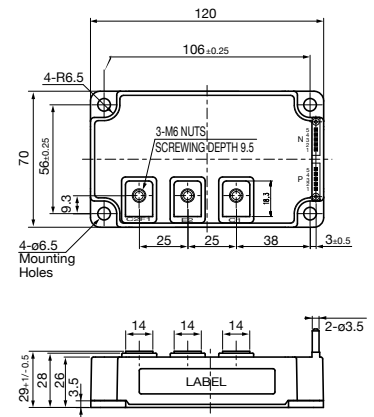
04 PM200, 300CL1A/RL1A060
PM100, 150CL1A/RL1A120



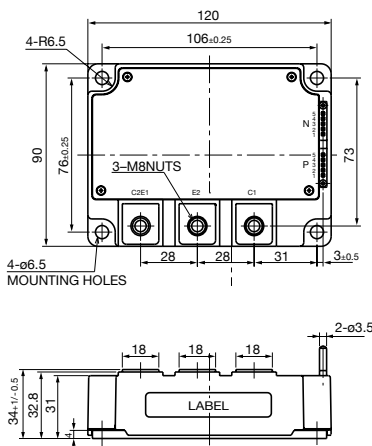
05 PM50, 75, 100, 150, 200CS1D060
PM25, 50, 75, 100CS1D120



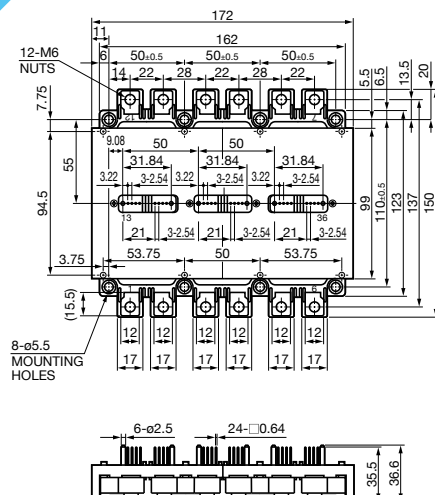
06 PM400, 600DV1A060
PM200, 300, 450DV1A120



07 PM800DV1B060

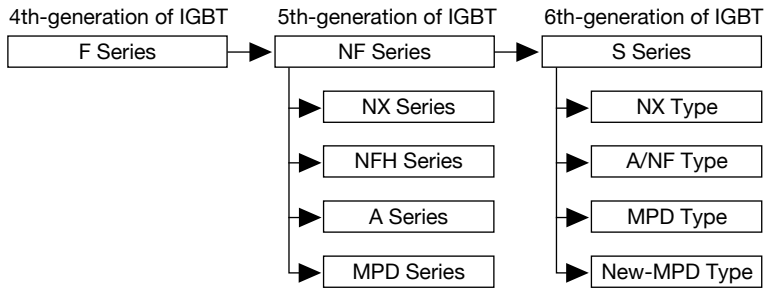


08 PM450, 600CLA060
PM200, 300, 450CLA120

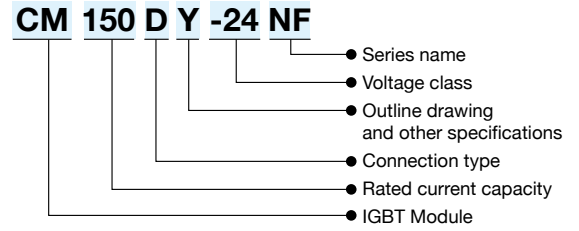


Line-up of IGBT Modules

Evolution of IGBT Module Series



Type Name Definition of IGBT Modules



Features of IGBT Module Series

S Series

- Lineup includes various package types.
- 6th-generation CSTBT delivers low-loss performance.
- Thinner package. (Height: 17mm) (NX type)
- Suited to large-capacity applications (2500A/1200V, 1800A/1700V) (New-MPD type)

MPD: Mega Power Dual

NFH Series

- High-speed CSTBT™ delivers low-loss performance.
- Soft switching (resonant) turn-off function (ZVS)
- Enhanced inner wiring (skin effect)

CSTBT™: Carrier Stored Trench-Gate Bipolar Transistor.
Our unique IGBT that makes use of the carrier cumulative effect.

Series Matrix of 600V IGBT Modules (No.: Number of Outline Drawing, see page 13 to 16)

RoHS Directive Compliant

VCES (V) Series Ic (A)	600V											
	5th-generation NX Series			NF Series			NFH Series			F Series		
	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.		
75	CM75MX-12A	M	01	CM75TL-12NF CM75RL-12NF	T R	08 08				CM75DU-12F CM75TU-12F	D T	14 17
	CM100MX-12A CM100RX-12A	M R	01 02	CM100TL-12NF CM100RL-12NF	T R	08 08	CM100DUS-12F	D	14	CM100DU-12F CM100TU-12F	D T	14 17
150	CM150RX-12A	R	02	CM150DY-12NF CM150TL-12NF CM150RL-12NF	D T R	09 08 08	CM150DUS-12F	D	14	CM150DU-12F CM150TU-12F	D T	14 18
	CM200RX-12A	R	02	CM200DY-12NF CM200TL-12NF CM200RL-12NF	D T R	09 10 10	CM200DU-12NFH	D	14	CM200DU-12F CM200TU-12F	D T	14 18
300	CM300DX-12A	D	03	CM300DY-12NF	D	09	CM300DU-12NFH	D	15	CM300DU-12F	D	15
400	CM400DX-12A	D	03	CM400DY-12NF	D	11	CM400DU-12NFH	D	15	CM400DU-12F	D	15
600	CM600HX-12A	H	04	CM600DY-12NF	D	12	CM600DU-12NFH	D	16	CM600HU-12F	H	20
Connection	H	D	T	R	M							

Non-Recommended : Please refrain from adopting newly.

Line-up of IGBT Modules

Series Matrix of 6th/6.1th-generation of IGBT Modules <S Series> 1200V/1700V (No.: Number of Outline Drawing, see page 13 to 16)
RoHS Directive Compliant



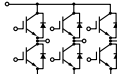
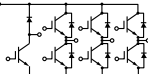
V _{CE} (V)	Series	1200V												1700V									
		NX Type			A/NF Type			MPD Type			New-MPD Type			NX Type			MPD Type			New-MPD Type			
I _c		Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.	Connection	No.		
35	CM35MXA-24S	M	05																				
50	CM50MXA-24S	M	05																				
75	CM75MXA-24S	M	05											CM75MXA-34SA	M	31							
	CM75TX-24S	T	06											CM75RX-34SA	R	27							
	CM75RX-24S	R	02																				
100	CM100MXA-24S	M	05																				
	CM100TX-24S1*	T	33																				
	CM100TX-24S	T	06																				
	CM100RX-24S1*	R	34																				
	CM100RX-24S	R	02																				
150	CM150DX-24S	D	03																				
	CM150EXS-24S	E	32																				
	CM150TX-24S1*	T	33											CM150DX-34SA	D	28							
	CM150TX-24S	T	06											CM150RXL-34SA	R	29							
	CM150RX-24S1*	R	34																				
	CM150RX-24S	R	02																				
200	CM200DX-24S	D	03											CM200DX-34SA	D	28							
	CM200EXS-24S	E	32											CM200EXS-34SA	E	32							
	CM200RXL-24S	R	29																				
225	CM225DX-24S1*	D	35																				
300	CM300DX-24S1*	D	35	CM300DY-24S	D	11																	
	CM300DX-24S	D	03											CM300DX-34SA	D	28							
	CM300EXS-24S	E	32																				
400			CM400C1Y-24S	C1	12																		
450	CM450DX-24S1*	D	35																				
	CM450DX-24S	D	03	CM450DY-24S	D	12								CM450DXL-34SA	D	30							
600	CM600DX-24S1*	D	35	CM600DY-24S	D	12																	
	CM600DXL-24S	D	07											CM600DXL-34SA	D	30							
800			CM800DY-24S	D	13																		
900									CM900DUC-24S*	D	24												
1000	CM1000DXL-24S	D	07													CM1000DUC-34SA	D	24					
1400									CM1400DUC-24S	D	24												
1800																					CM1800DY-34S	D	26
2500													CM2500DY-24S*	D	26								
Connection																							

Non-Recommended : Please refrain from adopting newly.

★★: Under Development ★: New Products ★▼: UL unauthenticated

Series Matrix of 5th-generation of IGBT Modules 1200V/1700V (No.: Number of Outline Drawing, see page 13 to 16)

RoHS Directive Compliant

V _{GES} (V)	1200V												1700V				
	Series	NF Series	Connection	No.	A Series	Connection	No.	NFH Series	Connection	No.	F Series	Connection	No.	A Series	Connection	No.	
50		CM50TL-24NF	T	08							CM50DU-24F	D	14				
		CM50RL-24NF	R	08							CM50TU-24F	T	17				
75		CM75TL-24NF	T	08							CM75DU-24F	D	14	CM75DY-34A	D	09	
		CM75RL-24NF	R	08							CM75TU-24F	T	18				
											CM75E3U-24F	E3	14				
100		CM100DY-24NF	D	09	CM100DY-24A	D	09	CM100DU-24NFH	D	14		CM100DU-24F	D	14	CM100DY-34A	D	09
		CM100E3Y-24NF	E3	09								CM100TU-24F	T	18			
		CM100TL-24NF	T	08								CM100E3U-24F	E3	14			
		CM100RL-24NF	R	08													
150		CM150DY-24NF	D	09	CM150DY-24A	D	09	CM150DU-24NFH	D	14		CM150DU-24F	D	15	CM150DY-34A	D	11
		CM150E3L-24NF	E3	09								CM150E3U-24F	E3	15			
		CM150TL-24NF	T	10													
		CM150RL-24NF	R	10													
200		CM200DY-24NF	D	11	CM200DY-24A	D	09	CM200DU-24NFH	D	15		CM200DU-24F	D	15	CM200DY-34A	D	11
		CM200TL-24NF	T	10								CM200E3U-24F	E3	15			
		CM200RL-24NF	R	10													
300					CM300DY-24A	D	11	CM300DU-24NFH	D	15	CM300DU-24F	D	19	CM300DY-34A	D	12	
400		CM400DY-24NF	D	12	CM400HA-24A	H	21	CM400DU-24NFH	D	16		CM400HU-24F	H	20	CM400DY-34A	D	25
					CM400DY-24A	D	12					CM400DU-24F	D	22			
500														CM500HA-34A	H	21	
600		CM600DU-24NF	D	13	CM600HA-24A	H	21	CM600DU-24NFH	D	16		CM600HU-24F	H	23			
					CM600DY-24A	D	12					CM600DU-24F	D	13			
Connection		H			D			T			R						

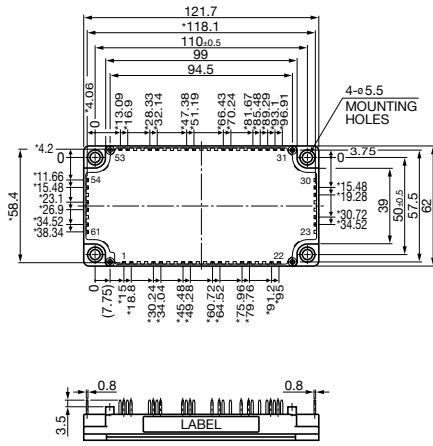
Line-up of IGBT Modules

Outline Drawing of IGBT Modules

Unit: mm

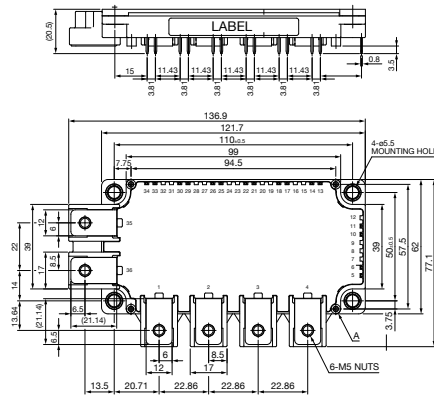
01

CM75, 100MX-12A



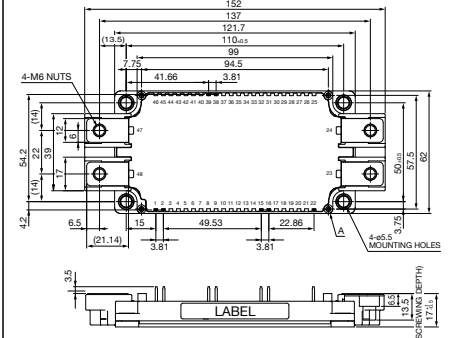
02

CM100, 150, 200RX-12A
CM75, 100, 150RX-24S



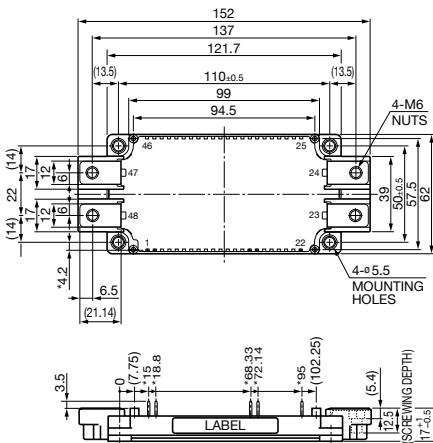
03

CM300, 400DX-12A
CM150, 200, 300, 450DX-24S



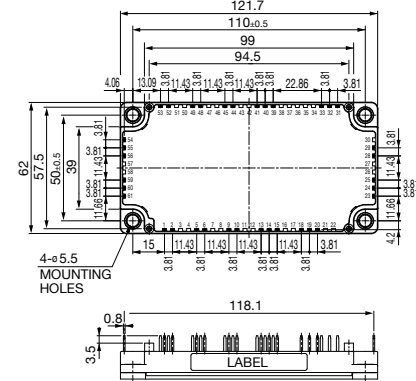
04

CM600HX-12A



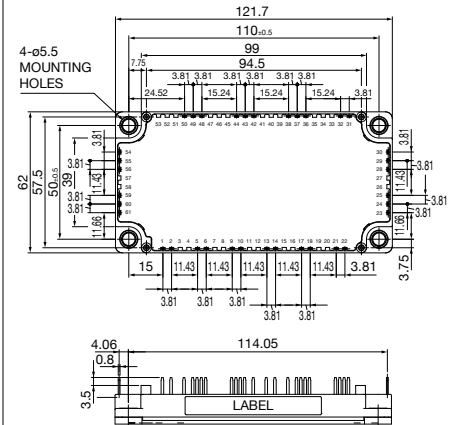
05

CM35, 50, 75, 100MXA-24S



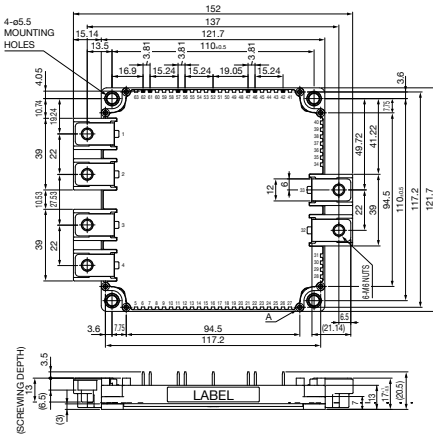
06

CM75, 100, 150TX-24S



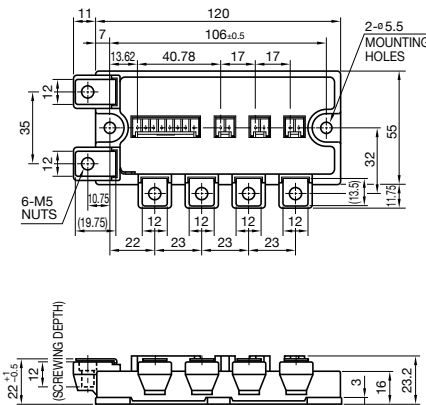
07

CM600, 1000DXL-24S



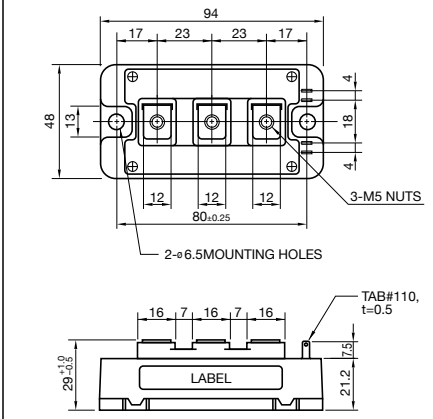
08

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

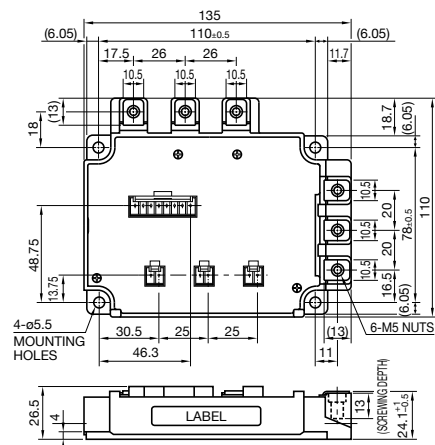


09

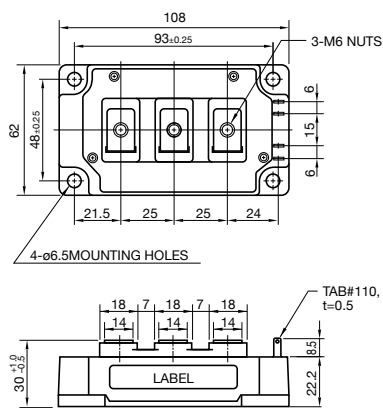
CM150, 200, 300DY-12NF
CM100, 150DY-24NF
CM100, 150, 200DY-24A
CM75, 100DY-34A
CM100E3Y-24NF
CM150E3L-24NF



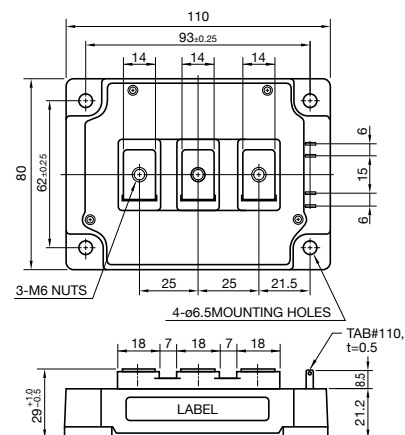
10 CM200TL/RL-12NF
CM150, 200TL/RL-24NF



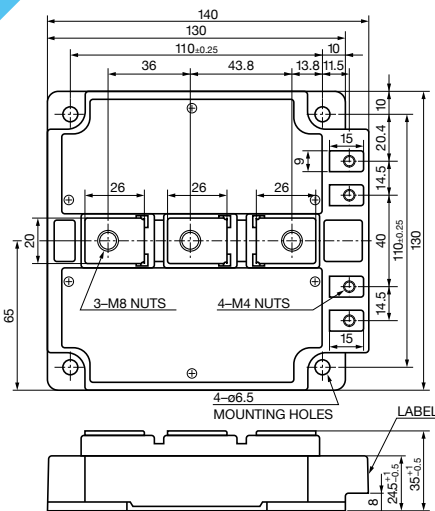
11 CM400DY-12NF
CM200DY-24NF
CM300DY-24A
CM300DY-24S
CM150, 200DY-34A



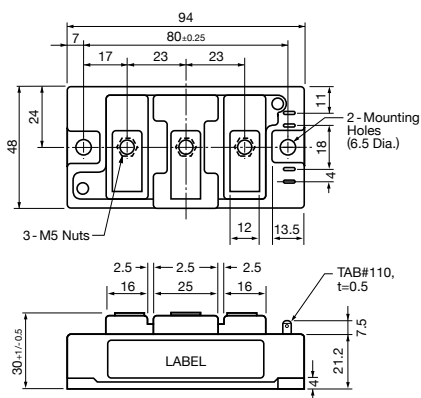
12 CM600DY-12NF
CM400DY-24NF
CM400, 600DY-24A
CM300DY-34A
CM450DY-24S
CM600DY-24S



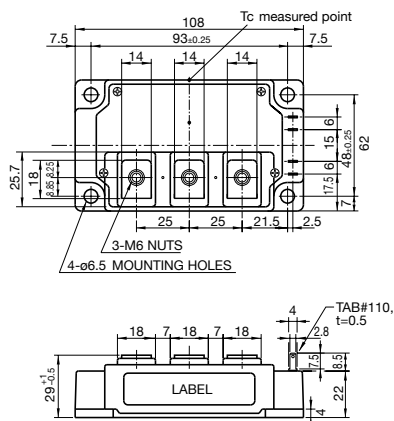
13 CM600DU-24NF/24F
CM800DY-24S



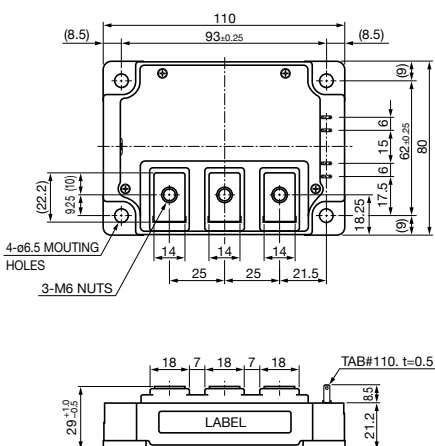
14 CM100, 150DUS-12F
CM200DU-12NFH
CM75, 100, 150, 200DU-12F
CM100, 150DU-24NFH
CM50, 75, 100DU-24F
CM75, 100E3U-24F



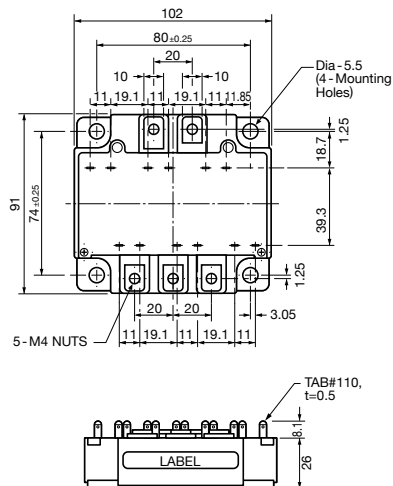
15 CM300, 400DU-12NFH/12F
CM200, 300DU-24NFH
CM150, 200DU-24F
CM150, 200E3U-24F



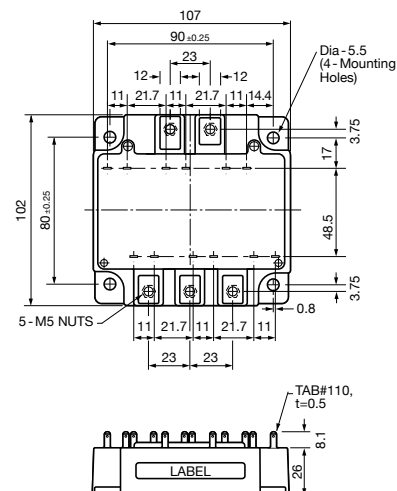
16 CM600DU-12NFH
CM400, 600DU-24NFH



17 CM75, 100TU-12F
CM50TU-24F



18 CM150, 200TU-12F
CM75, 100TU-24F

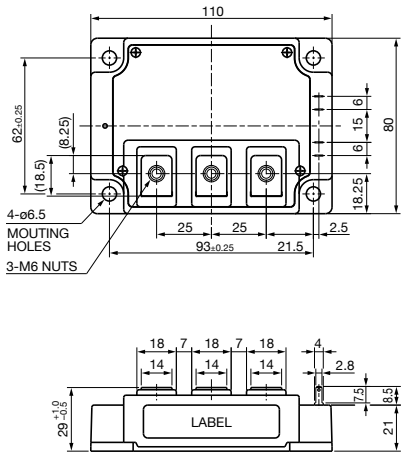


Line-up of IGBT Modules

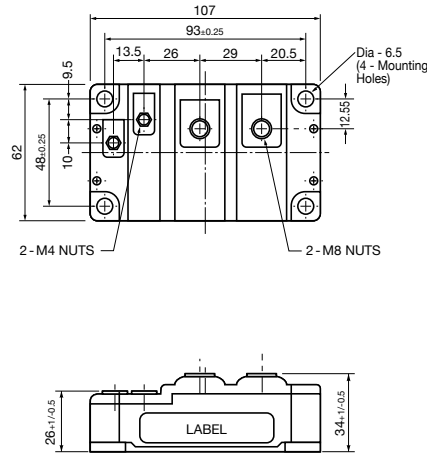
Outline Drawing of IGBT Modules

Unit: mm

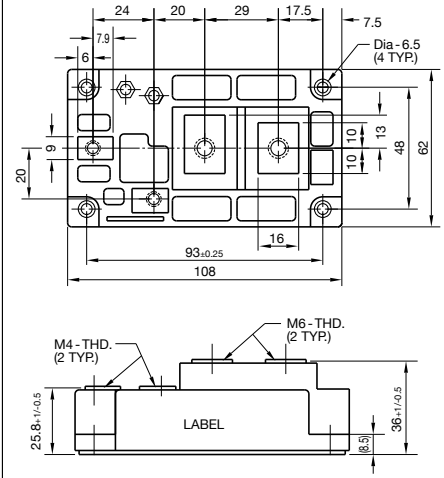
19 CM300DU-24F



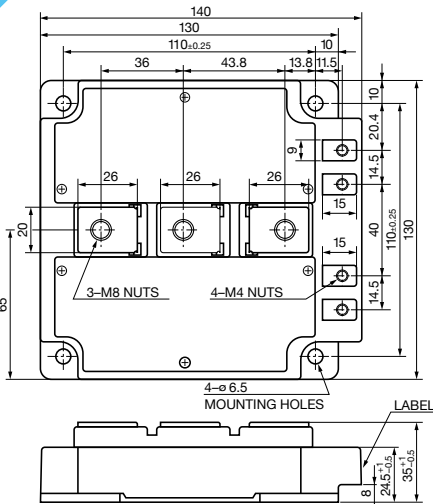
20 CM600HU-12F
CM400HU-24F



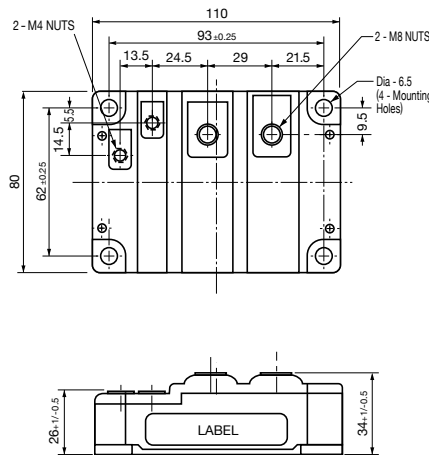
21 CM400, 600HA-24A
CM500HA-34A



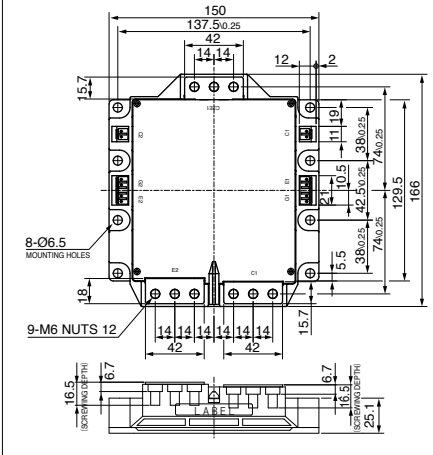
22 CM400DU-24F



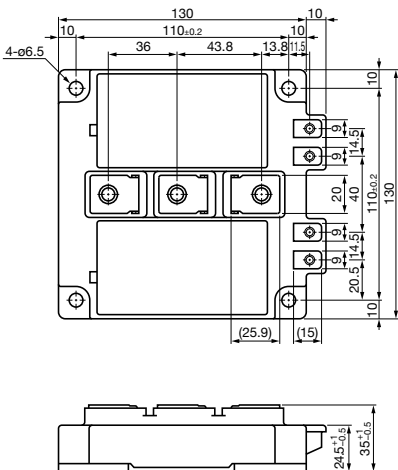
23 CM600HU-24F



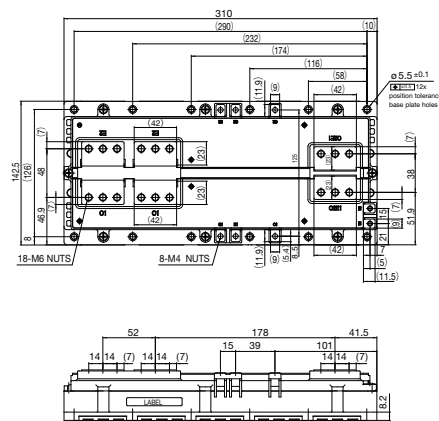
24 CM900, 1400DUC-24S
CM1000DUC-34SA



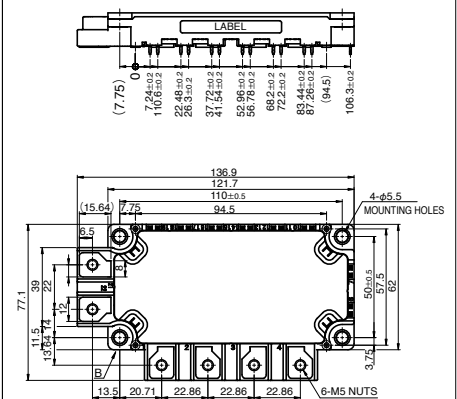
25 CM400DY-34A



26 CM1800DY-34S
CM2500DY-24S

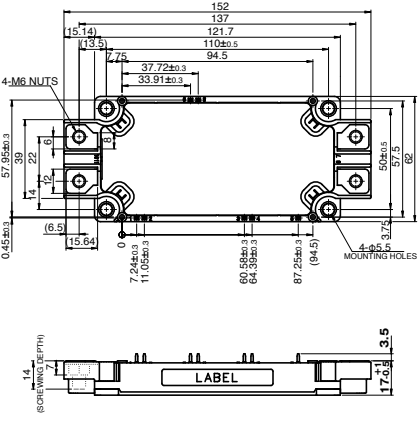


27 CM75RX-34SA



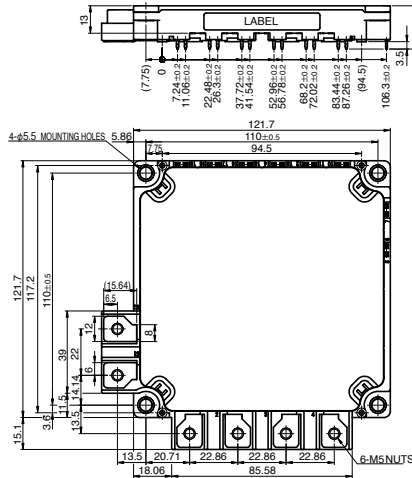
28

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



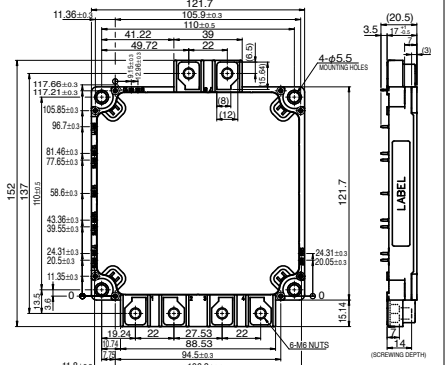
29

CM200RXL-24S
CM150RXL-34SA



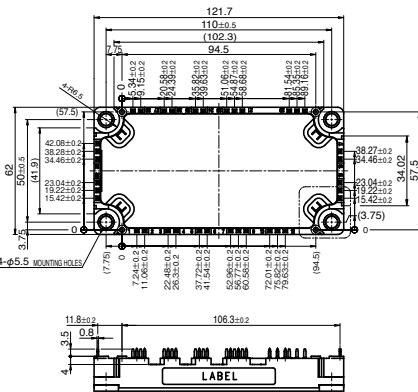
30

CM450DXL-34SA
CM600DXL-34SA



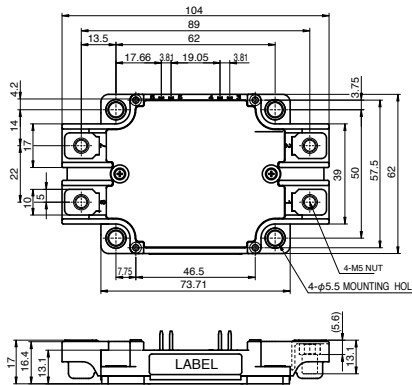
31

CM75MXA-34SA



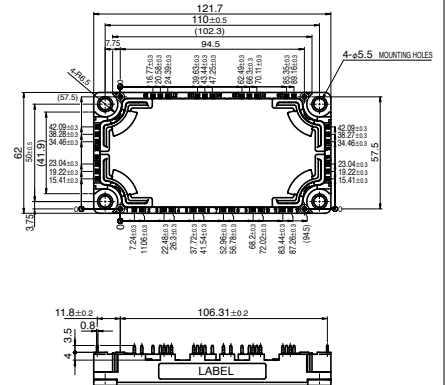
32

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



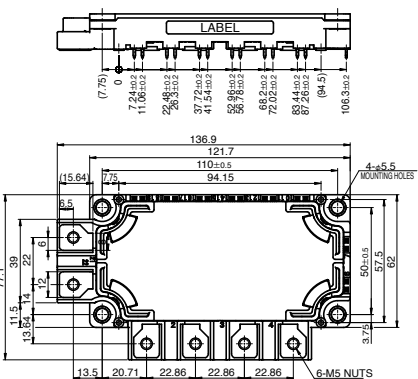
33

CM100TX-24S1
CM150TX-24S1



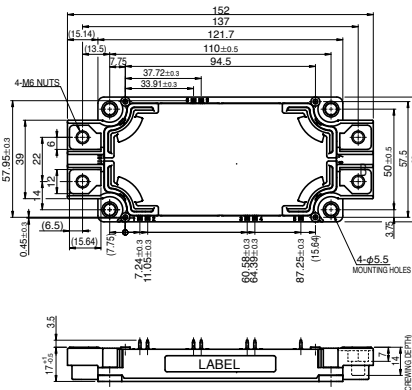
34

CM100RX-24S1
CM150RX-24S1



35

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



Line-up of HV Modules

Series Matrix of HVIGBT/HVIPM (No.: Number of Outline Drawing, see page 16 and 17)

V _{ces} I _c (A)	1700V				2500V				3300V				4500V				6500V							
	Connection		Type	No.	Connection		Type	No.	Connection		Type	No.	Connection		Type	No.	Connection		Type	No.				
200																			CM200HG-130H	H	HG	07		
400									CM400DY-50H	D	HA	15	CM400HG-66H	H	HG	07	CM400HB-90H	H	HB	03	CM400HG-130H	H	HG	12
													CM400DY-66H	D	HA	15					CM400E2G-130H	E2	HG	09
																					CM400E4G-130H	E4	HG	09
600	CM600DY-34H	D	HA	01													CM600HG-90H	H	HG	12				
	CM600E2Y-34H	E2	HA	01													CM600HB-90H	H	HB	03				
750																								
800	CM800DZB-34N	D	NB	01									CM800HC-66H	H	HC	03								
	CM800DZ-34H	D	HC	01	CM800HB-50H	H	HB	03	CM800E4C-66H	E4	HC	06	CM800E6C-66H	E2	HC	06	CM800HC-90R★	H	R	08				
	CM800HA-34H	H	HA	-	CM800HA-50H	H	HA	-	CM800HB-66H	H	HB	03	CM800HG-90R★	H	RG	13								
									CM800HA-66H	H	HA	-												
900																	CM900HG-90H	H	HG	09				
																	CM900HC-90H	H	HC	06				
																	CM900HB-90H	H	HB	06				
1000													CM1000HC-66R★	H	R	08								
													CM1000E4C-66R★	E4	R	10								
1200	CM1200HCB-34N	H	NB	03									CM1200HG-66H	H	HG	09								
	CM1200DB-34N	D	N	04	CM1200HC-50H	H	HC	06	CM1200HC-66H	H	HC	06	CM1200HC-90R★	H	R	10								
	CM1200DC-34N	D	N	04	CM1200HB-50H	H	HB	06	CM1200HB-66H	H	HB	06	CM1200HC-90RA	H	R	10								
	CM1200E4C-34N	E4	N	05	CM1200HA-50H	H	HA	-	CM1200HA-66H	H	HA	-	CM1200HG-90R★	H	RG	11								
	CM1200HC-34H	H	HC	02																				
	CM1200DC-34S★	D	S	04					PM1200HCE330-1	H	HC	14												
1500													CM1500HC-66R	H	R	10								
													CM1500HG-66R★	H	RG	11								
1600	CM1600HC-34H	H	HC	02																				
1800	CM1800HCB-34N	H	NB	06																				
	CM1800HC-34N	H	N	05																				
	CM1800HC-34H	H	HC	06																				
2400	CM2400HCB-34N	H	NB	06																				
	CM2400HC-34N	H	N	05																				
	CM2400HC-34H	H	HC	06																				
Connection	H	E2/E6			E4				D															

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

[Non-Recommended] : Please refrain from adopting newly. ★★: Under Development ★: New Products

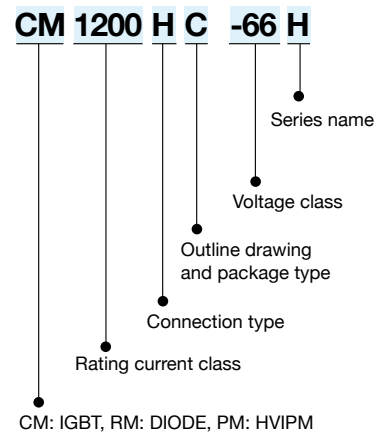
Series Matrix of HVDIODE Modules (No.: Number of Outline Drawing, see page 18)

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

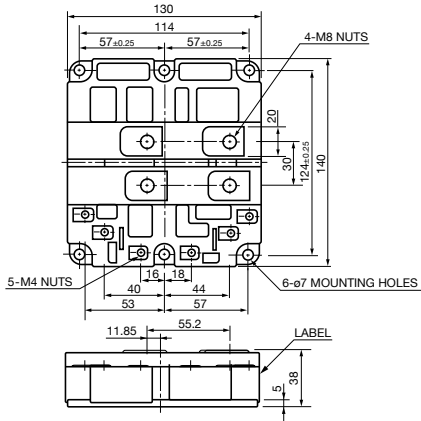
[Type Description] (F Series: Low Loss) F: AISiC Base plate, FG*: AISiC Base plate (S Series: standard) SH: AISiC Base plate, SD: Cu Base plate, SG*: AISiC Base plate *: High-Insulation Package (10.2kV, AC 1min.)

★★: Under Development ★: New Products

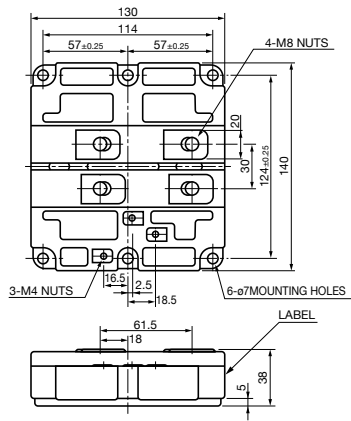
Type Name Definition of IGBT Modules



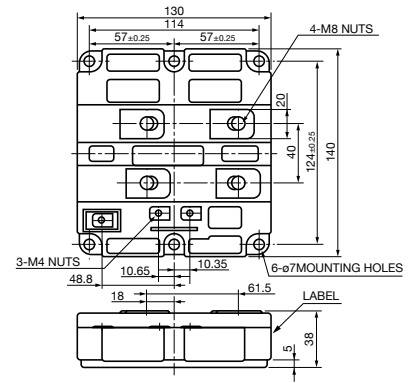
01
CM600DY-34H
CM600E2Y-34H
CM800DZ-34H
CM800DZB-34H



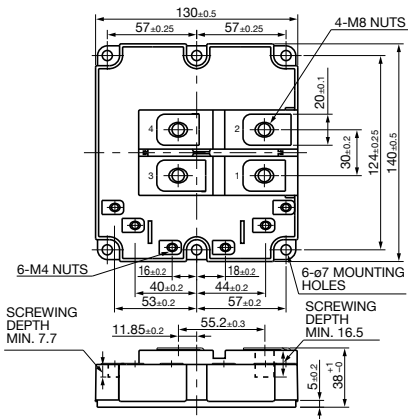
02
CM1200, 1600HC-34H



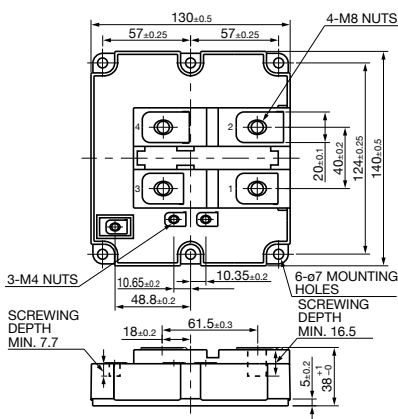
03
CM1200HCB-34N
CM800HB-50H, -66H
CM800HC-66H
CM400, 600HB-90H



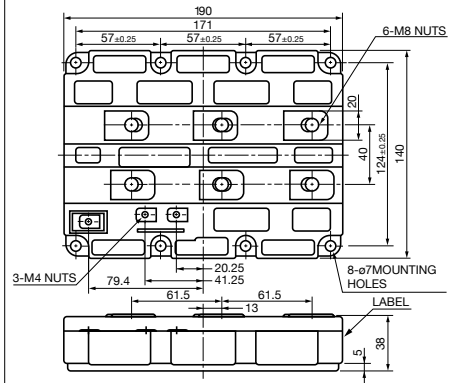
04
CM1200DB/DC-34N
CM1200DC-34S



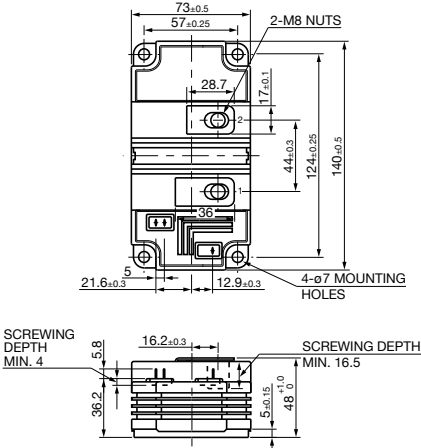
05
CM1200E4C-34N
CM1800, 2400HC-34N



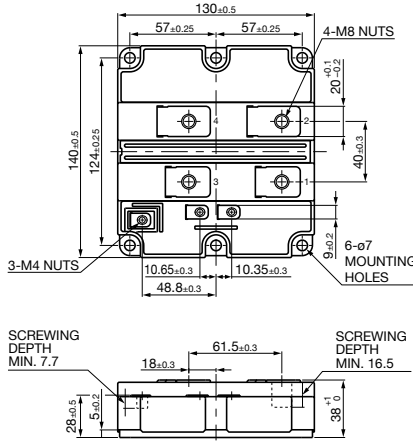
06
CM1800, 2400HCB-34N
CM1800, 2400HC-34H
CM1200HB/HC-50H, -66H
CM800E4C/E6C-66H
CM900HB/HC-90H



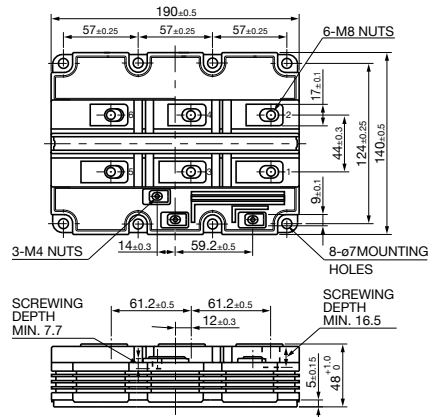
07
CM400HG-66H
CM200HG-130H



08
CM800HC-90R
CM1000HC-66R



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



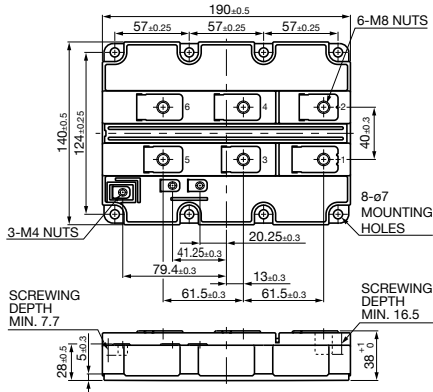
Line-up of HV Modules

Outline Drawing of HVIGBT Modules / HVIPM

Unit: mm

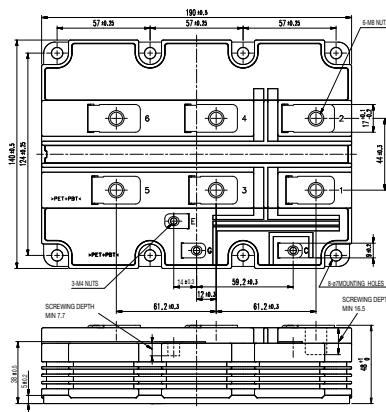
10

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



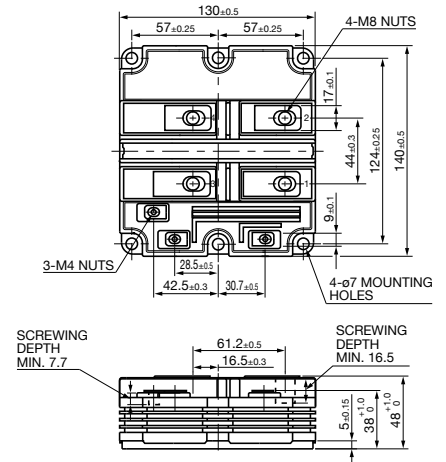
11

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



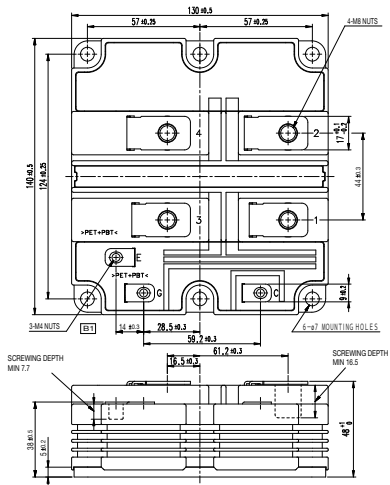
12

CM600HG-90H
CM400HG-130H



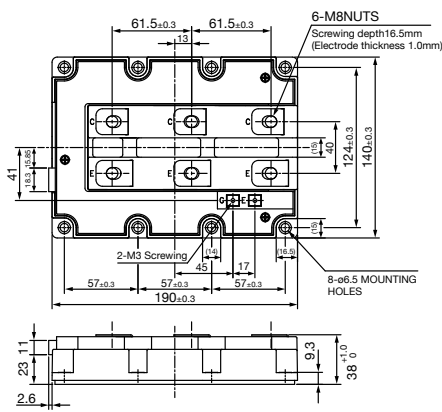
13

CM800HG-90R



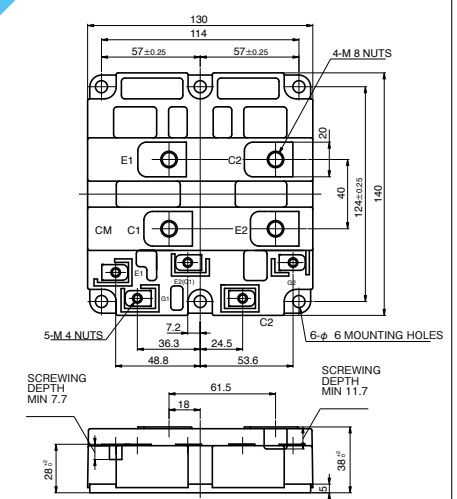
14

PM1200HCE330-1

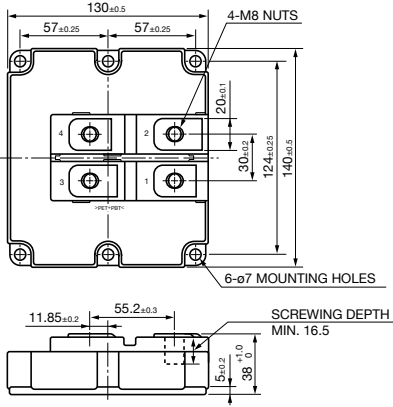


15

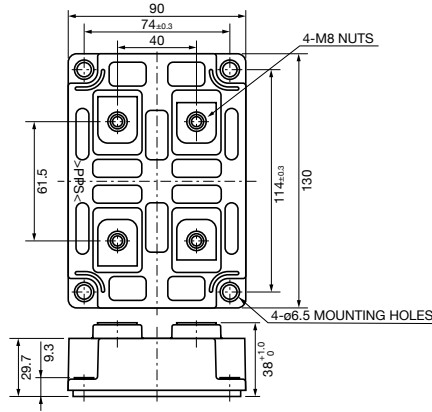
CM400DY-50H/66H



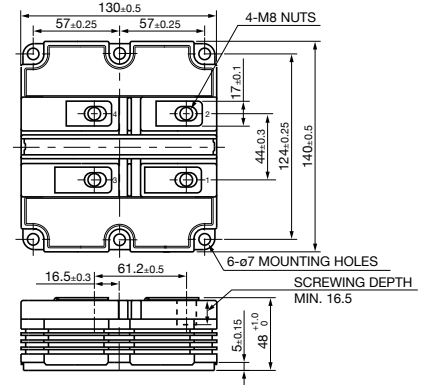
16 RM1200DB-34S



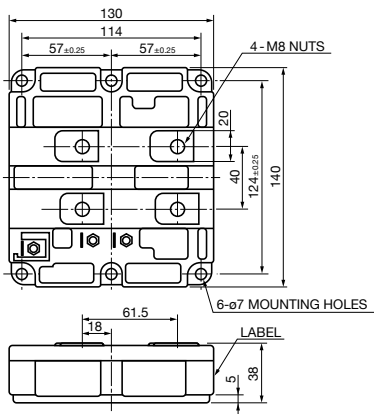
17 RM1800HE-34S
RM1200HE-66S
RM600HE-90S



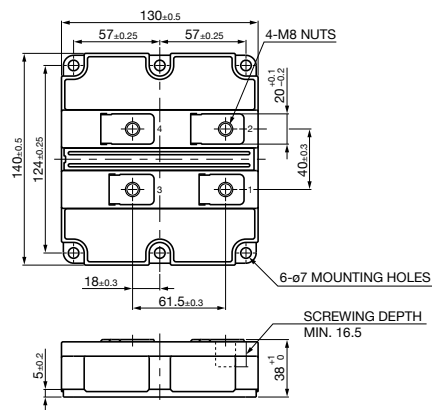
18 RM400, 1200DG-66S
RM300DG-90S
RM400, 800, 1200DG-90F
RM200, 600DG-130S
RM250DG-130F



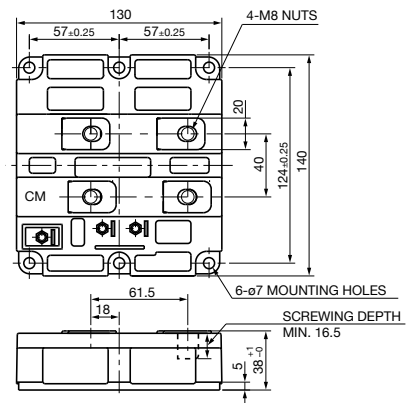
19 RM400, 600DY-66S



20 RM1000, 1500DC-66F



21 RM1200DB-66S
RM900DB/HC-90S



Power Modules for Electric and Hybrid Vehicles

Features

Common

- Long power/temperature cycle life
- High-precision on-chip temperature sensor
- High traceability in managing materials/components throughout the entire production process for each product
- Package structure compliant with the End-of-Life-Vehicles Directive, regulations relating to substances of environmental concern

J Series T-PM (Transfer-molded Power Module)

- Structure incorporates Transfer modeling and original direct lead bonding (DLB) technique
- DLB structure reduces internal wiring resistance and inductance
- Completely Pb-free (including the pins)

J1 Series (Power Module with Pin-fin)

- Direct cooling package with cooling fin
- Highly reliable DLB package for automotive inverters
- Low power loss 7th-generation CSTBT™ chip technology
- Compact, lightweight, high-power-density module

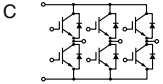

[Term] CSTBT™: Carrier Stored Trench-Gate Bipolar Transistor.

J Series IPM

- Drive circuit and protection circuits for short-circuiting, power supply* undervoltage and overheating
- Built-in Isolated Switching Power Supply for IGBT drive and IPM control functions (PM800CJG060G, PM500CJG120G)
- Redundancy function for failsafe design and high system performance, chip temperature analog output function and DC-link voltage analog output function (optional specifications)
- Built-in automotive grade photocouplers and interface connector(s)
- High noise tolerance as a result of built-in shield-plate and circuit pattern optimization

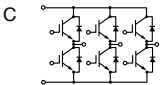

T-PM : Transfer-molded Power Module

Matrix of 650V and 900V Power Modules (No. : Number of Outline Drawing, please refer to page 22)

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

※ PM : Power Module, ★★ Under Development

Matrix of 1200V Power Modules (No. : Number of Outline Drawing, please refer to page 22)

V _{CE} (V)	1200V								
	J1 Series			J Series					
I _C (A)	PM with Pin-Fin	Connection	No.	T-PM	Connection	No.	IPM	Connection	No.
300	CT300CJ1A120**	C	01	CT300DJH120**	D	03	-	-	-
400	-	-	-	-	-	-	-	-	-
500	-	-	-	-	-	-	PM500CJG120G**	C	06
600	-	-	-	-	-	-	-	-	-
800	-	-	-	-	-	-	-	-	-
Connection									

※ PM : Power Module, ★★ Under Development

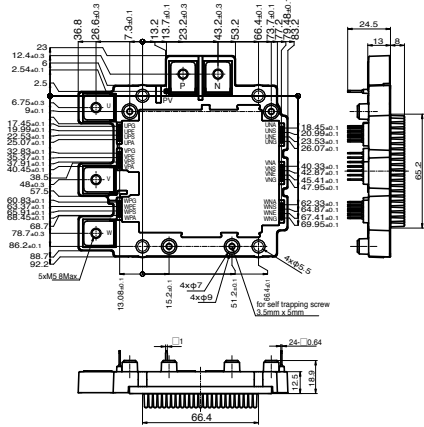
Type Name Definition of Power Modules for Electric and Hybrid Vehicles

PM 500 C JG 120 G

- Options
- Voltage class
- Series Name and Structure
- Connection Type
- Rating current class
- CT: IGBT, PM: IPM

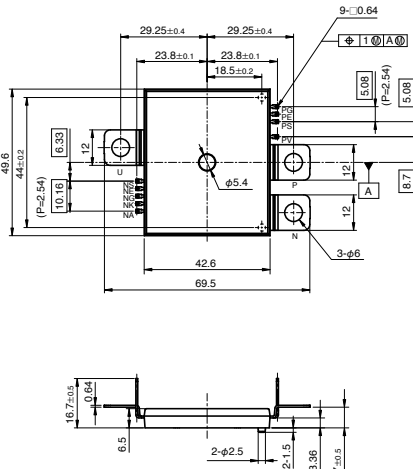
01

CT300CJ1A060
CT300CJ1A120
CT400CJ1A090
CT600CJ1A060



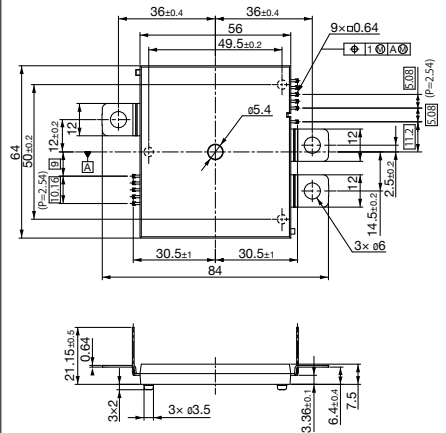
02

CT300DJG060



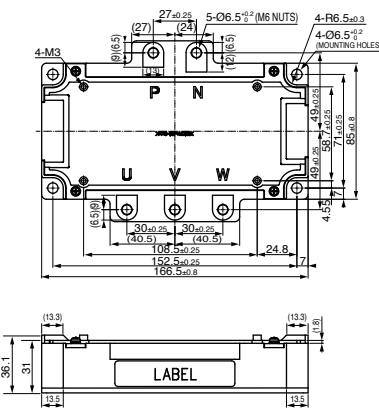
03

CT300DJH120
CT600DJH060



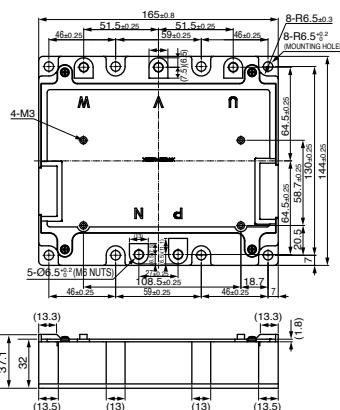
04

PM300CJG060G



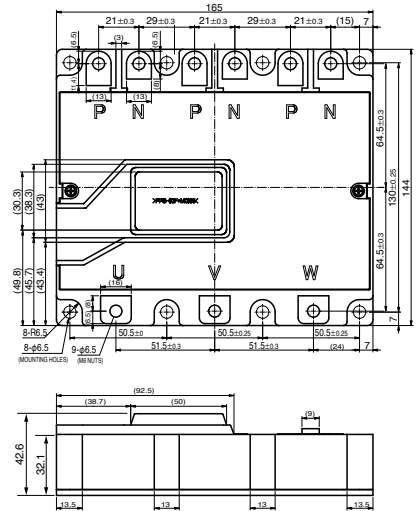
05

PM600CJG060G



06

PM500CJG120G
PM800CJG060G



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