

2.10 3rd Generation DIP and Mini-DIP-IPM (Dual-in-line Package Intelligent Power Modules)

Features:

- Employing 5th generation planar IGBT chips with 0.6µm design rule or CSTBT™ technology with superior loss performance
- Ultra compact dual or single-in-line transfer mold package (compatible with 2nd generation)
- Including driver and protection circuitry (UV, SC)
- DIP-IPM with reduction of thermal resistance by 20%
- 2500V_{rms} isolation voltage
- High-active interface logic for direct connection to a 3V or 5V MCU
- Highest reliability and optimised EMI performance
- Available from 3A to 50A / 600V for motor ratings from 0.1kW to 3.7kW
- Optional with open emitter topology for vector control
- All Mitsubishi DIP and Mini-DIP-IPMs have lead-free terminals
- From January 2006 onwards, all DIP and Mini-DIP-IPMs will be supplied with completely lead-free technology



Line-up DIP, Mini-DIP & SIP-IPM

Type	Isolation Voltage (V)	V _{CES} (V)	Motor Rating (kW)						
			0.1	0.2	0.4	0.75	1.5	2.2	3.7
Super-DIP	2500	600					PS21065	PS21067	PS21069
DIP						PS21864-P	PS21865-P	PS21867-P	PS21869-P
Mini-DIP				PS21562-P PS21562-SP*	PS21563-P PS21563-SP*	PS21564-P PS21564-SP*			
SIP			PS21661-FR PS21661-RZ						

* Open Emitter Topology

Type Number	Electrical Characteristics												Thermal & Mechanical Characteristics		Package-No.
	V _{CES} (V)	Applicable Motor Ratings (kW)	I _C (A)	f _C (kHz)	Isolation Voltage (V)	V _{CE(sat)} @ T _J =25°C (V)		Typical Switching Times					IGBT R _{th(j-f)} (°C/W)	Diode R _{th(j-f)} (°C/W)	
						Typ.	Max.	t _{on} (μs)	t _{rr} (μs)	t _{c(on)} (μs)	t _{off} (μs)	t _{c(off)} (μs)			
Mini-DIP-IPM 600 Volt															
PS21562-P	600	0.2	5	20	2500	1.6	2.1	1.20	0.30	0.40	1.30	0.50	6.0	6.5	D4
PS21563-P	600	0.4	10	20	2500	1.6	2.1	1.20	0.30	0.40	1.40	0.50	5.0	6.5	D4
PS21564-P	600	0.75	15	20	2500	1.45	1.95	1.20	0.30	0.40	1.50	0.50	4.5	6.5	D4
DIP-IPM 600 Volt															
PS21864-P	600	0.75	15	20	2500	1.7	2.2	1.50	0.30	0.50	1.40	0.50	2.30	3.2	D3
PS21865-P	600	1.5	20	20	2500	1.6	2.1	1.30	0.30	0.40	1.60	0.50	1.90	3.0	D3
PS21867-P	600	2.2	30	20	2500	1.6	2.1	1.30	0.30	0.40	1.70	0.50	1.65	3.0	D3
PS21869-P	600	3.7	50	20	2500	1.5	2.0	1.30	0.30	0.40	2.00	0.65	1.42	2.0	D3
Mini-DIP-IPM 600 Volt With Open Emitter Topology															
PS21562-SP	600	0.2	5	20	2500	1.6	2.1	1.20	0.30	0.40	1.30	0.50	6.0	6.5	D5
PS21563-SP	600	0.4	10	20	2500	1.6	2.1	1.20	0.30	0.40	1.40	0.50	5.0	6.5	D5
PS21564-SP	600	0.75	15	20	2500	1.45	1.95	1.20	0.30	0.40	1.50	0.50	4.5	6.5	D5
Super-DIP-IPM 600 Volt With Open Emitter TopologySIP-IPM 600 Volt															
PS21065	600	1.5	20	20	2500	1.6	2.1	1.30	0.30	0.40	1.60	0.50	1.90	2.85	D6*
PS21067	600	2.2	30	20	2500	1.6	2.1	1.30	0.30	0.40	1.70	0.50	1.65	2.55	D6*
PS21069	600	3.7	50	20	2500	1.5	2.0	1.30	0.30	0.40	2.00	0.65	1.42	2.30	D6*
SIP-IPM 600 Volt															
PS21661-RZ/-FR	600	0.1	3	15	2500	1.6	2.15	0.85	0.20	0.35	1.00	0.55	9.0	9.0	SIP1

* Package drawing D6 see under 2.8. 1200V DIP-IPM, p. 50

Technical drawing of a heat sink assembly, showing dimensions in millimeters (mm).

Top View:

- Overall width: $27 \times 2.8 = 75.6$
- Pin pitch: 2.8 ± 0.3
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) (2.4) (14.4) (2.5) (17.6) (2.4)
- Pin positions: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 22, 23, 24, 25, 26
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 37, 38, 39, 40, 41
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 42, 43, 44, 45, 46
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 47, 48, 49, 50, 51
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 52, 53, 54, 55, 56
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 57, 58, 59, 60, 61
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 62, 63, 64, 65, 66
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 67, 68, 69, 70, 71
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 72, 73, 74, 75, 76
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 77, 78, 79, 80, 81
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 82, 83, 84, 85, 86
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 87, 88, 89, 90, 91
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 92, 93, 94, 95, 96
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 97, 98, 99, 100, 101
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 102, 103, 104, 105, 106
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 107, 108, 109, 110, 111
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 112, 113, 114, 115, 116
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 117, 118, 119, 120, 121
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 122, 123, 124, 125, 126
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 127, 128, 129, 130, 131
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 132, 133, 134, 135, 136
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 137, 138, 139, 140, 141
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 142, 143, 144, 145, 146
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 147, 148, 149, 150, 151
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from left edge): (8.5) ± 0.3 10 ± 0.3 10 ± 0.3 20 ± 0.3
- Pin positions: 152, 153, 154, 155, 156
- Pin diameter: $\phi 4.5 \pm 0.2$
- Pin height: 12.8 ± 0.5 (16.0) ± 0.5
- Pin spacing (from right edge): (1) (1)
- Pin positions: 157, 158, 159, 160, 16

Figure 1: Dimensions of the heat sink. The figure consists of three views: a top view, a front view, and a side view. The top view shows a rectangular layout with dimensions (1.778 x 26) and (1.778) for the main body, and (0.5) for the side flange. It also shows a (30.5) width for the base and a (0.5) thickness for the top plate. The front view shows a trapezoidal shape with a top width of (41), a bottom width of (49), and a height of (30.5). It also shows a (7.62 x 4) spacing for the base holes and a (1) offset for the side flange. The side view shows a cross-section with a (5) top width, a (1.25) base width, and a (2.5) height. It also shows a (35°) angle for the side flange and a (1.2) offset for the base. Labels include 'HEAT SINK SIDE', 'DUMMY PIN', 'Type name, Lot No.', '(PH2 DEPTH 2)', and '(PH2.5)'.

Technical drawing of a container with dimensions: 17.5 x 26 cm x 40 cm x 28 cm. The drawing shows the top view with a grid of 17.5 x 26 cm and a side view with a height of 40 cm. The container has a lid with a handle and a label area. The label area is marked with 'Type name, Lot No.' and 'Q2 DEPTH'. The lid has a thickness of 1.5 cm and a height of 2.5 cm. The container has a width of 17.5 cm and a depth of 26 cm. The drawing also shows a 'HEAT SINK SIDE' view.

RZ

HEAT SINK SIDE

FR

HEAT SINK SIDE

Type name, Lot No.

Type name, Lot No.

RZ

FR

HEAT SINK SIDE

HEAT SINK SIDE