Vincotech

20-1B12IPA008SC-L239C09
20-PB12IPA008SC-L239C09Y
target datasheet

flow IPM 1B (CI) — 1200 V / 8 A

Features

Power
- 3 Phase Inverter
- 3 Phase Input Rectifier
- Open Emitter or Emitter Shunt

Gate Driver
- Booststrap circuit
- Overcurrent protection
- Undervoltage lockout

NTC
- Temperature sensor

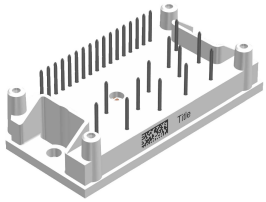
Target applications

- Industrial motor drive
- Embedded Drive (fan, pump, compressor, etc.)

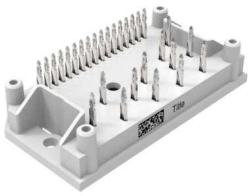
Types

- 20-1B12IPA008SC-L239C09
- 20-PB12IPA008SC-L239C09Y

flow 1B 17mm housing

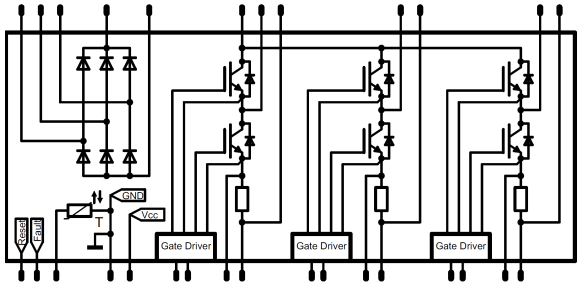


Solder pin variation



Press-fit pin variation

Schematic



Maximum Ratings

T_j=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Inverter Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current	I_C	T_j=$T_j$max	T_S=80°C	9	A
Repetitive peak collector current	I_{CRM}	t_p limited by $T_j$max		24	A
Total power dissipation	P_{tot}	T_j=$T_j$max	T_S=80°C	24	W
Gate-emitter voltage	V_{GES}			±20	V
Maximum Junction Temperature	T_{jmax}			175	°C

Parameter	Symbol	Conditions	Value	Unit
Inverter Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j=T_{jmax}$ T_h=80°C	8	A
Repetitive peak forward current	I_{FRM}		15	A
Total power dissipation	P_{tot}	$T_j=T_{jmax}$ T_h=80°C	13	W
Maximum Junction Temperature	T_{jmax}		150	°C

Parameter	Symbol	Conditions	Value	Unit
Gate driver				
Supply voltage	V_{CC}		24	V
Logic input voltage	V_{in}	U-HIN, U-LIN, V-HIN, V-LIN, W-HIN, W-LIN FAULT, RESET	-0,5...V_{cc}+0,5	V
Junction Temperature	T_{jmax}		125	°C

Parameter	Symbol	Conditions	Value	Unit
Inverter Shunt				
Max DC current	I_{MAX}		tbd	A
Power dissipation	P_{tot}	T_c=70°C	tbd	W

Parameter	Symbol	Conditions	Value	Unit
Rectifier Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ T_h = 80°C	15	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave T_j = 45°C	150	A
Surge current capability	I^2t	t_p = 10 ms 50 Hz sine	110	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_h = 80°C	17	W
Maximum Junction Temperature	T_{jmax}		150	°C

Parameter	Symbol	Conditions		Value	Unit
Module Properties					
Thermal Properties					
Storage temperature	T_{stg}			-40...+125	°C
Operation Junction Temperature	T_{jop}			-40...+(T_{jmax} - 25)	°C
Isolation Properties					
Isolation voltage	V_{isol}	DC voltage	t_p=2s	4000	V
Creepage distance				min 12,7	mm
Clearance				min 12,7	mm
Comparative Tracking Index	CTI			>200	

Characteristic Values

Inverter Switch

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{CE}$			0,0005	25 125	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		8	25 125 150	1,58	1,85 - 2,25	2,07	V
Collector-emitter cut-off current	I_{CES}		0	1200		25 125			1	µA
Gate-emitter leakage current	I_{GES}		20	0		25 125			120	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	f=1 MHz	0	25		25		490		pF
Reverse transfer capacitance	C_{res}							30		
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						3,88		K/W

Inverter Diode

Parameter	Symbol	Conditions				Value			Unit
				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				7,5	25 125 150		1,65 1,61 -		V
Reverse leakage current	I_r			1200		25 150			250 -	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						5,25		K/W

Gate driver

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Static						
Recommended supply voltage	V_{CC}		13,5	15	20	V
Power on reset trip voltage	V_{POR}		4,0	5,5	7,5	V
Internal current limit	I_{MAX}		13,3	16,7	20	A
Quiescent supply current	I_q			3	4,5	mA
Logic "1" input threshold voltage	V_{inH}	U-HIN, U-LIN, V-HIN, V-LIN, W-HIN, W-LIN, RESET	2,2	3	4	V
Logic "0" input threshold voltage	V_{inL}		0,6	1,5	2,1	V
Logic "1" input current	I_{inH}	V_{in}=5V	0,6	1	1,4	mA
Logic "0" input current	I_{inL}	V_{in}=0V	0	0	0,01	mA
Input signal filter time	t_{Filt}	U-HIN, U-LIN, V-HIN, V-LIN, W-HIN, W-LIN, FAULT(in), RESET(pulse)	80	200	500	ns
Logic "1" FAULT output*	$V_{outFAULTH}$				0,95	V
Logic "1" FAULT input threshold voltage*	$V_{inFAULTH}$		0,6	1,5	2,1	V
Logic "0" FAULT input threshold voltage*	$V_{inFAULTL}$		2,2	3	4	V
Under voltage reset voltage	$V_{UVreset}$		10	10,8	11,6	V
Under voltage trip voltage	V_{UVtrip}		10,5	11,3	12,1	V
Under voltage hysteresis voltage	$V_{UVhysteresis}$		0,2	0,5	0,8	V
Under voltage filter time	t_{UVfilt}		4	8	16	µs
Internal dead time	t_{UVfilt}	Delay matching, high side turn-on and low side turn off	-100	80	300	ns
Internal dead time	t_{UVfilt}	Delay matching, low side turn-on and high side turn off	-20	180	400	ns

*FAULT pin is inverse logic with open drain output
for more information see Mitsubishi's M81738FP preliminary (Jan 2012) datasheet

Inverter Shunt

Parameter	Symbol	Conditions					Value			Unit
						T_j[°C]	Min	Typ	Max	
Static										
Resistance	R					25		30		mΩ

Rectifier diode

Parameter	Symbol	Conditions					Value			Unit
				V_r [V]	I_F [A]	T_j [°C]	Min	Typ	Max	
Static										
Forward voltage	V_F				7	25 125 150		1,04 0,97 -	1,14	V
Reverse leakage current	I_r			1600		25 150			20 -	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material λ=3,4W/mK						4,03		K/W

Thermistor

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	
Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R100=1486 Ω				100	-12		+12	%
Power dissipation	P					25		200		mW
Power dissipation constant						25		2		mW/K
B-value	$B_{(25/50)}$	Tol. ±3%				25		3950		K
B-value	$B_{(25/100)}$	Tol. ±3%				25		3998		K
Vincotech NTC Reference									B	

Vincotech

20-1B12IPA008SC-L239C09
20-PB12IPA008SC-L239C09Y
target datasheet

Ordering Code & Marking

Version	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 17mm housing	20-1B12IPA008SC-L239C09	L239C09	L239C09
w/o thermal paste with Press-fit pin 17mm housing	20-PB12IPA008SC-L239C09Y	L239C09Y	L239C09Y



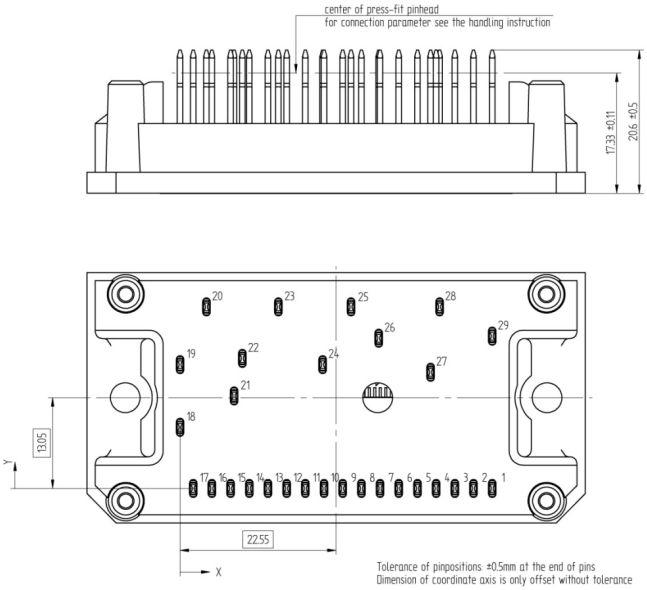
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Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]

Pin	X	Y	Function
1	45,1	0	W-HIN
2	42,4	0	W-LIN
3	39,7	0	RW+
4	37	0	RW-
5	34,3	0	GND
6	31,6	0	VCC
7	28,9	0	V-HIN
8	26,2	0	V-LIN
9	23,5	0	RV+
10	20,8	0	RV-
11	18,1	0	U-HIN
12	15,4	0	U-LIN
13	12,7	0	RU+
14	10	0	RU-
15	7,3	0	RESET
16	4,6	0	FAULT
17	1,9	0	NTC
18	0	8,8	L3
19	0	17,8	L2
20	3,8	26,1	L1
21	7,8	13,3	EU
22	9	18,7	DC1-
23	14,2	26,1	DC1+
24	20,6	17,8	EV
25	24,7	26,1	U
26	28,7	21,6	DC2+
27	36,2	16,7	EW
28	37,5	26,1	V
29	45,1	21,9	W



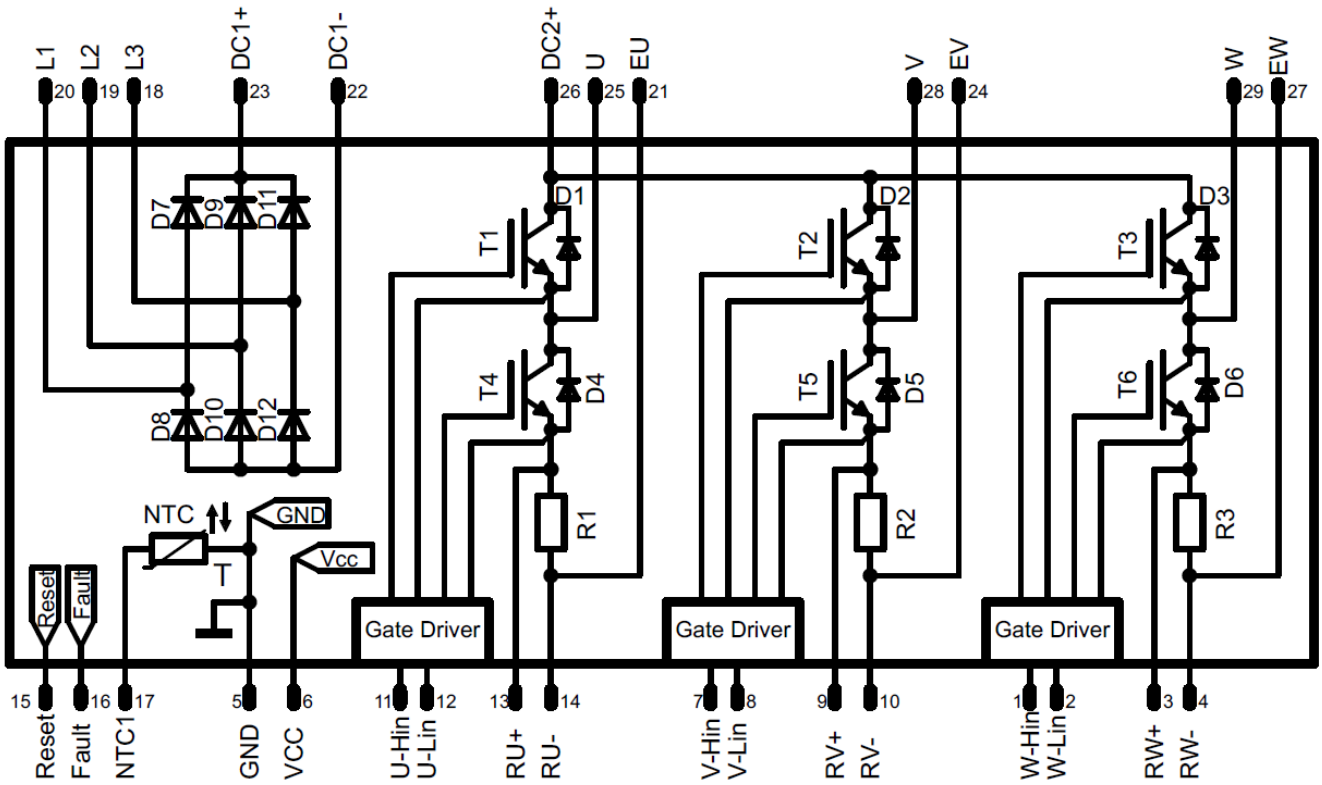
Pin Descriptions

Pin	Function	Description
1	W-HIN	Signal input for high-side W phase
2	W-LIN	Signal input for low-side W phase
3	RW+	W phase shunt +
4	RW-	W phase shunt -
5	GND	Signal ground
6	VCC	Driver circuit supply voltage
7	V-HIN	Signal input for high-side V phase
8	V-LIN	Signal input for low-side V phase
9	RV+	V phase shunt +
10	RV-	V phase shunt -
11	U-HIN	Signal input for high-side U phase
12	U-LIN	Signal input for low-side U phase
13	RU+	U phase shunt +
14	RU-	U phase shunt -
15	RESET	Fault latch reset (min. 500ns pulse)
16	¬FAULT	Fault latch input/output (negative logic, open drain)
17	NTC	Temperature sensor connector

Power pin descriptions

Pin	Function	Description
18	L3	Rectifier input L3
19	L2	Rectifier input L2
20	L1	Rectifier input L1
21	EU	Open emitter U phase
22	DC1-	Rectifier output DC+
23	DC1+	Rectifier output DC-
24	EV	Open emitter V phase
25	U	Output U phase
26	DC2+	Inverter input DC+
27	EW	Open emitter W phase
28	V	Output V phase
29	W	Output W phase

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1,T2,T3,T4,T5,T6	IGBT	1200V	8A	Inverter Switch	
D1,D2,D3,D4,D5,D6	FWD	1200V	7,5A	Inverter Diode	
D7,D8,D9, D10,D11,D12	Rectifier	1600V	12A	Boost Inverse Diode	
R1,R2,R3	Resistor	-	-	Inverter Shunt	
NTC	NTC	-	-	Thermistor	

Packaging instruction					
Standard packaging quantity (SPQ)	100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 1B packages see vincotech.com website.

Document No.:	Date:	Modification:	Pages
20-1B12IPA008SC-L239C09 -T2-14	22 May. 2015	Press-fit variation	1, 7

Product status definition		
Datasheet Status	**Product Status**	**Definition**
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.

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