



<i>flow</i> IPM 1B (CI)	1200 V / 8 A											
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Maximum Ratings

$T_j=25^{\circ}\text{C}$, unless otherwise specified

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



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

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	$-0,5 \dots V_{cc} + 0,5$	V
Junction Temperature	T_{jmax}		125	$^\circ\text{C}$

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

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



Vincotech

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

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 -	2,07	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}							490		pF
Reverse transfer capacitance	C_{res}	f=1 MHz	0	25		25		30		

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	Phase-Change Material $\lambda=3,4W/mK$						3,88		K/W
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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 $\lambda=3,4W/mK$						5,25		K/W
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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
			Min	Typ	Max	

Static

Resistance	R				25	30	$m\Omega$
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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 $\lambda=3,4W/mK$					4,03			K/W

Thermistor

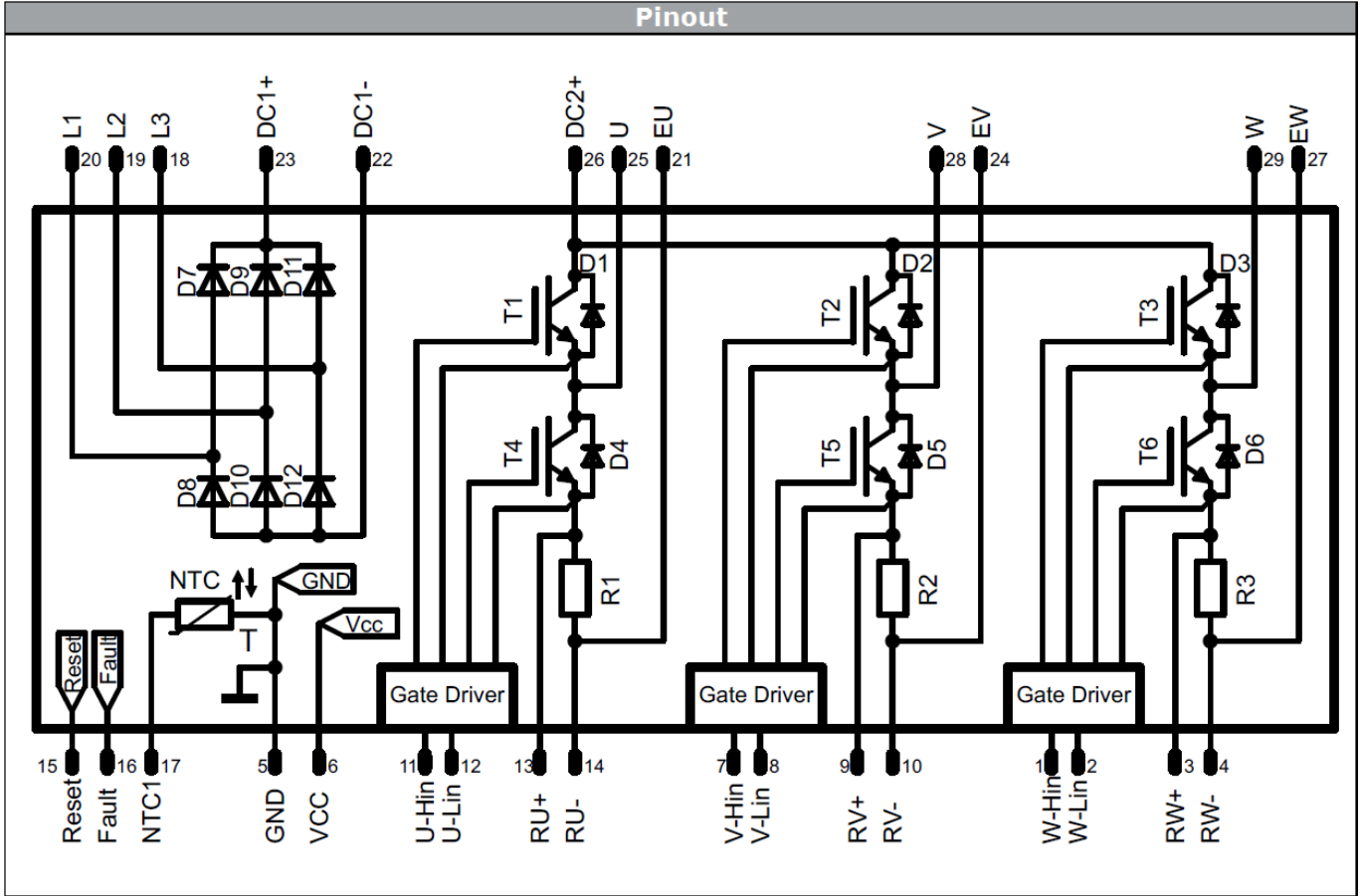
Parameter	Symbol	Conditions					Value			Unit
		V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max		
Rated resistance	R				25		22			kΩ
Deviation of R100	$\Delta_{R/R}$	R100=1486 Ω			100	-12		+12		%
Power dissipation	P				25		200			mW
Power dissipation constant					25		2			mW/K
B-value	$B_{(25/50)}$	Tol.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



Ordering Code & Marking							
Version	Ordering Code	in DataMatrix as		in packaging barcode as			
without thermal paste 17 mm housing	20-1B12IPA008SC-L239C09	L239C09		L239C09			
w/o thermal paste with Press-fit pin 17 mm housing	20-PB12IPA008SC-L239C09Y	L239C09Y		L239C09Y			
NN-NNNNNNNN NNNN-TTTTTVV Vinco LLLLL WWYY SSSS UL		Text	Name	Type&Ver	Date code	Vinco&Lot	Serial&UL
			NN-NNNNNNNNNNNNNN	TTTTTTTVV	WWYY	Vinco LLLLL	SSSS UL
		Datamatrix	Type&Ver	Lot number	Serial	Date code	
		TTTTTTTVV	LLLLL	SSSS	WWYY		

Pin table [mm]				Outline	
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	Power pin descriptions		
1	W-HIN	Signal input for high-side W phase	Pin	Function	Description
2	W-LIN	Signal input for low-side W phase	18	L3	Rectifier input L3
3	RW+	W phase shunt +	19	L2	Rectifier input L2
4	RW-	W phase shunt -	20	L1	Rectifier input L1
5	GND	Signal ground	21	EU	Open emitter U phase
6	VCC	Driver circuit supply voltage	22	DC1-	Rectifier output DC+
7	V-HIN	Signal input for high-side V phase	23	DC1+	Rectifier output DC-
8	V-LIN	Signal input for low-side V phase	24	EV	Open emitter V phase
9	RV+	V phase shunt +	25	U	Output U phase
10	RV-	V phase shunt -	26	DC2+	Inverter input DC+
11	U-HIN	Signal input for high-side U phase	27	EW	Open emitter W phase
12	U-LIN	Signal input for low-side U phase	28	V	Output V phase
13	RU+	U phase shunt +	29	W	Output W phase
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			



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 <i>flow</i> 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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