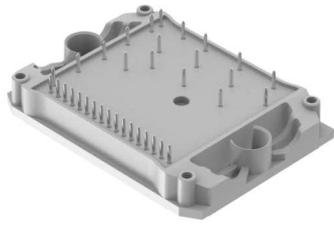
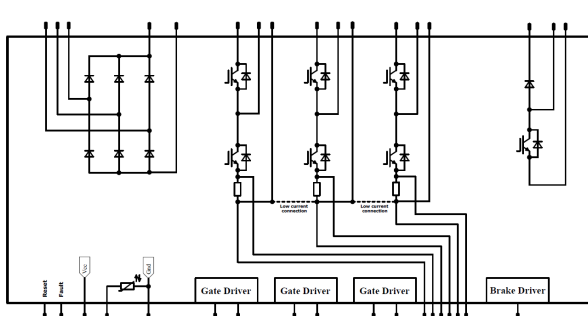




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<i>flow</i> IPM 1C	1200 V / 15 A
<div style="background-color: #eee; padding: 5px; margin-bottom: 5px;">Features</div> <ul style="list-style-type: none"> three-phase input rectifier three-phase inverter with emitter shunts gate drives with bootstrap circuit brake chopper with gate drive Overcurrent protection Undervoltage lockout Temperature sensor 	<div style="background-color: #eee; padding: 5px; margin-bottom: 5px;">flow 1C housing</div> 
<div style="background-color: #eee; padding: 5px; margin-bottom: 5px;">Target applications</div> <ul style="list-style-type: none"> Industrial Drives Embedded Drives 	<div style="background-color: #eee; padding: 5px; margin-bottom: 5px;">Schematic</div> 
<div style="background-color: #eee; padding: 5px; margin-bottom: 5px;">Types</div> <ul style="list-style-type: none"> 20-1C12IBA015SH-LB18A08 	

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$	14	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	45	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$	31	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$T_j \leq 150\text{ }^\circ\text{C}$	10	μs
	V_{CC}	$V_{GE} = 15\text{ V}$	800	V
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$



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Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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Inverter Diode

Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	12	A
Repetitive peak forward current	I_{FRM}		30	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	18	W
Maximum Junction Temperature	T_{jmax}		150	°C

Gate Driver Inverter

Supply voltage	V_{CC}	Common with inverter gate driver	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

Brake Switch

Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	14	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	45	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	31	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq 150\text{ °C}$ $V_{GE} = 15\text{ V}$	10 800	μs V
Maximum junction temperature	T_{jmax}		175	°C

Brake Diode

Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	8	A
Repetitive peak forward current	I_{FRM}		15	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	13	W
Maximum Junction Temperature	T_{jmax}		150	°C



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Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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Brake Sw. Protection Diode

Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	4	A
Repetitive peak forward current	I_{FRM}		6	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	8	W
Maximum Junction Temperature	T_{jmax}		150	°C

Gate Driver Brake

Supply voltage	V_{CC}		20	V
Logic input voltage	V_{in}		$-0,3 \dots V_{cc} + 0,3$	V
Junction Temperature	T_{jmax}		150	°C

Rectifier Diode

Peak Repetitive Reverse Voltage	V_{RRM}		1600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	20	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	230	A
Surge current capability	I_{t}		260	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	21	W
Maximum Junction Temperature	T_{jmax}		150	°C

Module Properties

Thermal Properties

Storage temperature	T_{stg}		$-40 \dots +125$	°C
Operation temperature under switching condition	T_{jop}		$-40 \dots (T_{jmax} - 25)$	°C

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage $t_p = 2\text{ s}$	4000	V
Creepage distance			min. 12,7	mm
Clearance			7,61	mm
Comparative Tracking Index	CTI		> 200	



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Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max		

Inverter Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,0005	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		15	25 150	1,78	1,89 2,28	2,42	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			2	μA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							875		pF
Output capacitance	C_{oes}	$f = 1$ MHz	0	25		25		75		
Reverse transfer capacitance	C_{res}							45		
Gate charge	Q_g		15	960	15	25		75		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						3,11		K/W
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Inverter Diode

Static

Forward voltage	V_F				15	25 125		1,76 1,73		V
Reverse leakage current	I_r			1200		25 150			250 -	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						3,87		K/W
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Characteristic Values

Parameter	Symbol	Conditions				Value			Unit
		V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max	
Gate Driver Inverter									
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}	$V_{in} = 5\text{ V}$				0,6	1	1,4	mA
Logic "0" input current	I_{inL}	$V_{in} = 0\text{ V}$				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),				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



Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_C [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max		

Brake Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,0005	25	5,3	5,8	6,3	V
Collector-emitter saturation voltage	V_{CEsat}		15		15	25 150	1,78	1,89 2,28	2,42	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			2	μA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							875		pF
Output capacitance	C_{oes}	$f = 1$ MHz	0	25		25		75		
Reverse transfer capacitance	C_{res}							45		
Gate charge	Q_g	Gate charge	15	960	15	25		75		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						3,11		K/W
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Brake Diode

Static

Forward voltage	V_F				7,5	25 125		1,65 1,61		V
Reverse leakage current	I_r			1200		25			250	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						5,34		K/W
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Brake Sw. Protection Diode

Static

Forward voltage	V_F				3	25 150		1,65 1,51	2,3	V
Reverse leakage current	I_r			1200		25			250	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						8,70		K/W
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Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
		V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V]	I_C [A] I_D [A]	I_F [A]	T_j [°C]	Min	Typ	Max	

Gate Driver Brake

Static

Recommended supply voltage	V_{DD}					4,5		18	V
Turn-On Voltage	V_{ON}					3,5	3,9	4,3	V
Turn-Off Voltage	V_{OFF}					3,3	3,7	4,1	V
Logic "1" input threshold voltage	V_{inH}							70	% V_{DD}
Logic "0" input threshold voltage	V_{inL}					30			% V_{DD}
Logic "1" input current	I_{inH}	$V_{in} = 5$ V						2,7	mA
Logic "0" input current	I_{inL}	$V_{in} = 0$ V				-175		1	μ A
Logic Hysteresis Voltage	V_{HYS}						17		V

for more information see Fairchild's

Rectifier Diode

Static

Forward voltage	V_F				30	25 125		1,25 1,24	1,29	V
Reverse leakage current	I_r			1600		25 150			10 1000	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						3,31		K/W
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Thermistor

Rated resistance	R					25		22		k Ω
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1486 \Omega$				100	-12		+14	%
Power dissipation	P					25		200		mW
Power dissipation constant						25		2		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 3\%$				25		3950		K
B-value	$B_{(25/100)}$	Tol. $\pm 3\%$				25		3998		K
Vincotech NTC Reference									B	



20-1C12IBA015SH-LB18A08

target datasheet

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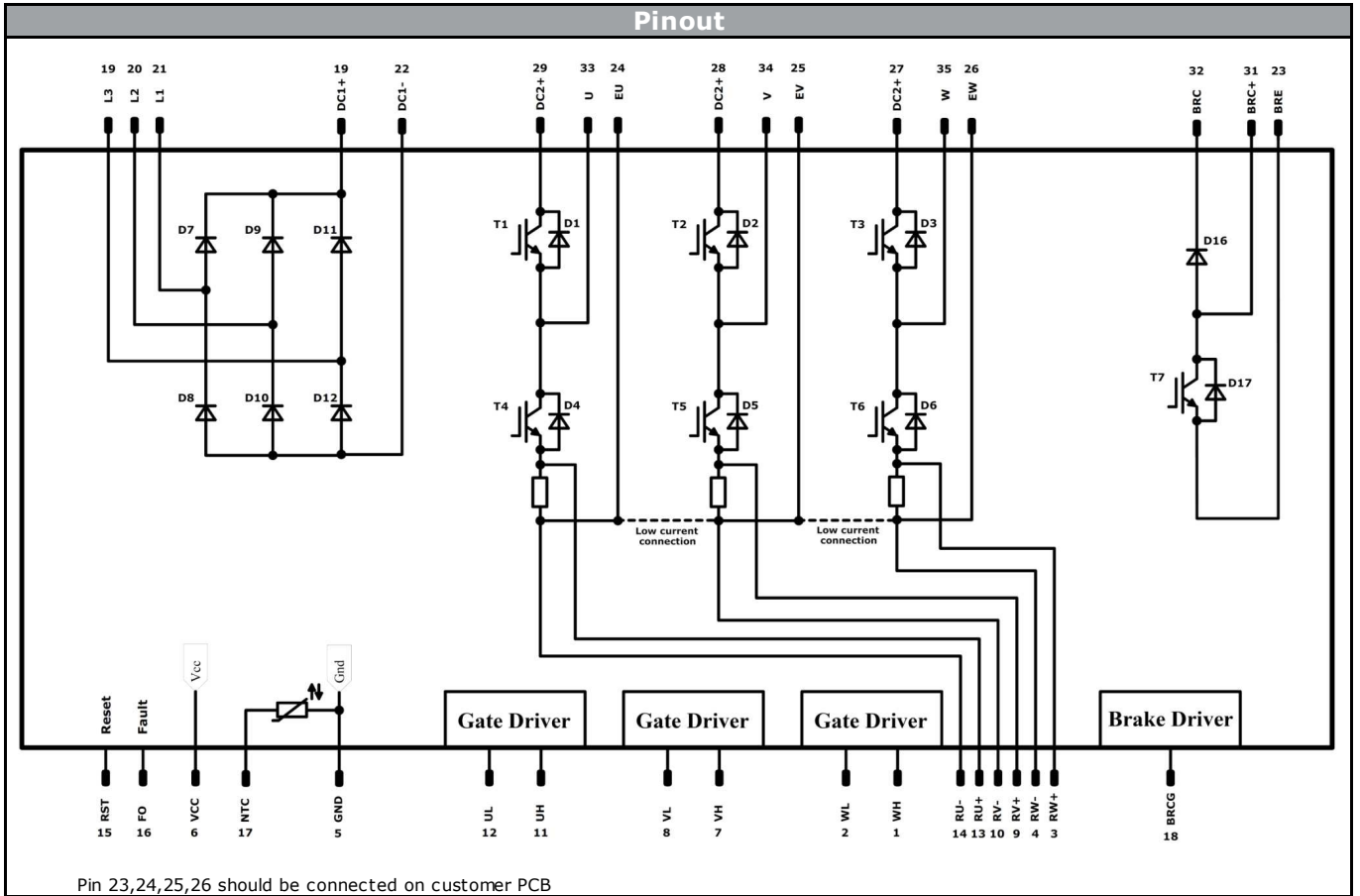
Ordering Code & Marking						
Version				Ordering Code		
without thermal paste 12mm housing with solder pins				20-1C12IBA015SH-LB18A08		
Text	Name		Date code	UL & VIN	Lot	Serial
	NN-NNNNNNNNNNNNNNN-TTTTIVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code	
	TTTTTIVV	LLLLL	SSSS	WWYY		

Outline							
Pin table [mm]				Pin table [mm]			
Pin	X	Y	Function	Pin	X	Y	Function
1	45,1	0	WH	30	0	38,55	DC1+
2	42,4	0	WL	31	0	42,1	BRC+
3	39,7	0	RW+	32	8,4	42,1	BRC
4	37	0	RW-	33	16,7	42,1	U
5	34,3	0	GND	34	29,2	42,1	V
6	31,6	0	VCC	35	41,35	42,1	W
7	28,9	0	VH				
8	26,2	0	VL				
9	23,5	0	RV+				
10	20,8	0	RV-				
11	18,1	0	UH				
12	15,4	0	UL				
13	12,7	0	RU+				
14	10	0	RU-				
15	7,3	0	RST				
16	4,6	0	FO				
17	1,9	0	NTC				
18	0	2,6	BRCG				
19	0	11,5	L3				
20	0,55	20,4	L2				
21	0	29,55	L1				
22	8,15	20,9	DC1-				
23	8,4	33,03	BRE				
24	12,4	26,45	EU				
25	24,1	26,45	EV				
26	37,1	26,65	EW				
27	45,1	35,05	DC2+				
28	32,85	35,05	DC2+				
29	20,35	35,05	DC2+				

Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



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Identification					
ID	Component	Voltage	Current	Function	Comment
T1-T6	IGBT	1200 V	15 A	Inverter Switch	
D1-D6	FWD	1200 V	15 A	Inverter Diode	
T7	IGBT	1200 V	15 A	Brake Switch	
D16	FWD	1200 V	7,5 A	Brake Diode	
D7-D12	FWD	1600 V	20 A	Rectifier Diode	



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

UL recognition and file number	
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.	

Document No.:	Date:	Modification:	Pages
20-1C12IBA015SH-LB18A08-T1-14	23 May. 2016		

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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