

# SPECIFICATION

Product Name : IGBT-IPM

Type Name : 7MBP50JA120

Spec. No. : MS6M0231

Issued date : Apr-14-'95

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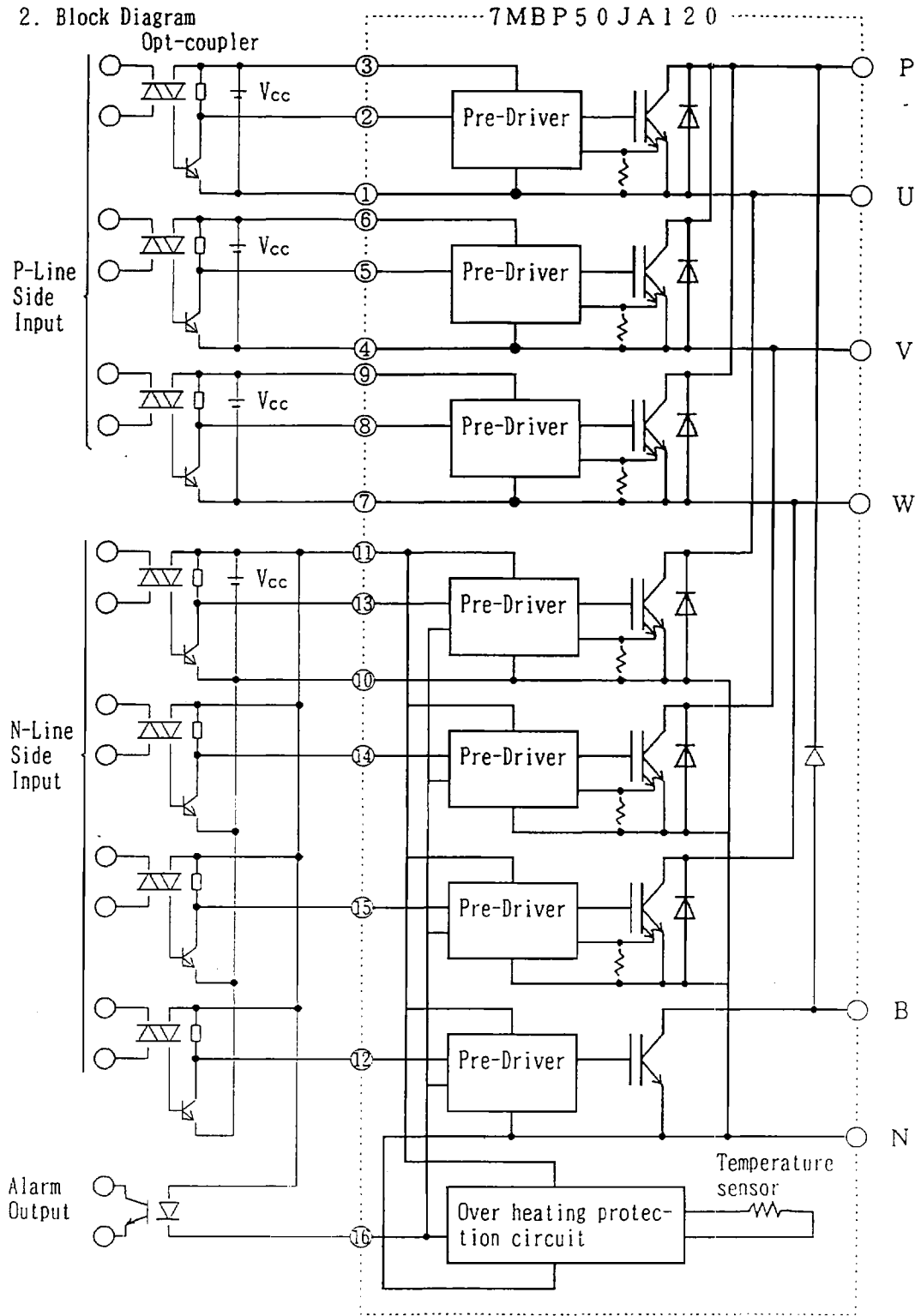
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2. Block Diagram



- Pre-Drivers include following functions
- ① Short Circuit Protection Circuit
  - ② Amplifier for Driver
  - ③ Under Voltage Lockout Circuit
  - ④ Over current Protection Circuit

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3. Absolute Maximum Ratings (Tc=25°C)

Items		Symbols	Ratings	Unit	
DC Bus Voltage		V <sub>DC</sub>	900	V	
DC Bus Voltage (Short Circuit Operating)		V <sub>SC</sub>	800	V	
Collector - Emitter Voltage		V <sub>CEs</sub>	1200	V	
I N V	Collector Current	DC	I <sub>C</sub>	50	A
		1ms	I <sub>CP</sub>	100	A
		Duty 83.3%	-I <sub>C</sub>	50	A
Collector Power Dissipation		One Transistor	P <sub>C</sub>	240	W
B R A K E	Collector Current	DC	I <sub>C</sub>	15	A
		1ms	I <sub>CP</sub>	30	A
Forward Current of Diode		I <sub>F</sub>	15	A	
Collector Power Dissipation		One Transistor	P <sub>C</sub>	80	W
Junction Temperature		T <sub>J</sub>	150	°C	
Input Voltage of Power Supply for Pre-Driver		V <sub>CC</sub> #1	20	V	
Input Signal Voltage		V <sub>in</sub> #2	V <sub>CC</sub>	V	
Alarm signal output Voltage		V <sub>ALM</sub> #3	V <sub>CC</sub>	V	
Alarm signal current		I <sub>ALM</sub> #4	10	mA	
Storage Temperature		T <sub>stg</sub>	-40~125	°C	
Operating Case Temperature		T <sub>OP</sub>	-20~100	°C	
Isolation Voltage (Case-Terminal)		V <sub>iso</sub> #5	AC2500	V	
Screw Torque	Mounting (M5)	—	2.0 #6	N·m	
	Terminal (M5)	—	2.0 #6	N·m	

- \* 1 : V<sub>CC</sub> shall be applied to the input Voltage between terminal No. 3 and 1, 6 and 4, 9 and 7, 11 and 10.
- \* 2 : V<sub>in</sub> shall be applied to the input Voltage between terminal No. 2 and 1, 5 and 4, 8 and 7, 12 13 14 15 and 10.
- \* 3 : V<sub>ALM</sub> shall be applied to the Voltage between terminal No. 16 and 10.
- \* 4 : I<sub>ALM</sub> shall be applied to the input current to terminal No. 16.
- \* 5 : 50Hz/60Hz sine wave 1 minute.
- \* 6 : Recommendable Value :1.5~1.7N·m

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#### 4. Electrical Characteristics

##### 4.1 Electrical Characteristics of Power Circuit (T<sub>i</sub> = 25°C, V<sub>CC</sub> = 15V)

Items		Symbols	Conditions	Min.	Typ.	Max.	Unit
I N V	Collector Current at OFF Signal Input	I <sub>CE(S)</sub>	V <sub>CE</sub> = 1200V Input Terminal Open	—	—	1.0	mA
	Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> = 50A	—	2.2	3.0	V
	Forward Voltage of FWD	V <sub>F</sub>	-I <sub>C</sub> = 50A	—	2.5	3.0	V
B R A K E	Collector Current at OFF Signal Input	I <sub>CE(S)</sub>	V <sub>CE</sub> = 1200V Input Terminal Open	—	—	1.0	mA
	Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	I <sub>C</sub> = 15A	—	—	3.5	V
	Forward Voltage of Diode	V <sub>F</sub>	I <sub>F</sub> = 15A	—	—	2.5	V

##### 4.2 Electrical Characteristics of Control Circuit (T<sub>c</sub> = 25°C, V<sub>CC</sub> = 15V)

Items		Symbols	Conditions	Min.	Typ.	Max.	Unit
Operating Power Supply Voltage Range of Pre-Driver		V <sub>CC</sub>	Recommendable Value	13	15	17	V
Power Supply Current of P-Line Side Pre-driver (One Unit)		I <sub>CCP</sub>	f <sub>sw</sub> = 15kHz	*7	—	35	mA
Power Supply Current of N-Line Side Three Pre-Drivers and Protection Circuits		I <sub>CCN</sub>	f <sub>sw</sub> = 15kHz	*7	—	120	mA

\*7 : Switching frequency of IPM

##### Over Heating Protective Section (T<sub>c</sub> = 25°C, V<sub>CC</sub> = 15V)

Items		Symbols	Conditions	Min.	Typ.	Max.	Unit
Over Heating Protection Tempe- rature Level		T <sub>OH</sub>	—	100	—	125	°C
Hysteresis		T <sub>H</sub>	—	—	10	—	°C

##### Over Current Protective Section (T<sub>c</sub> = 25°C, V<sub>CC</sub> = 15V)

Items		Symbols	Conditions	Min.	Typ.	Max.	Unit
Over Current Protection Level	INV	I <sub>OC</sub>		75	—	—	A
Protection Delay Time		t <sub>DOC</sub>			20	—	μs

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Alarm Signal Output Section (Tc=25°C, Vcc=15V)

Items	Symbols	Conditions	Min.	Typ.	Max.	Unit
Alarm Signal Hold Time	t <sub>ALM</sub>		—	2	—	ms

Under Voltage Lockout Section (Tc=25°C, Vcc=15V)

Items	Symbols	Conditions	Min.	Typ.	Max.	Unit
Under Voltage Protection Level	V <sub>UVT</sub>	—	11.0	—	12.5	V
Hysterisis	V <sub>H</sub>	—	0.2	—	—	V

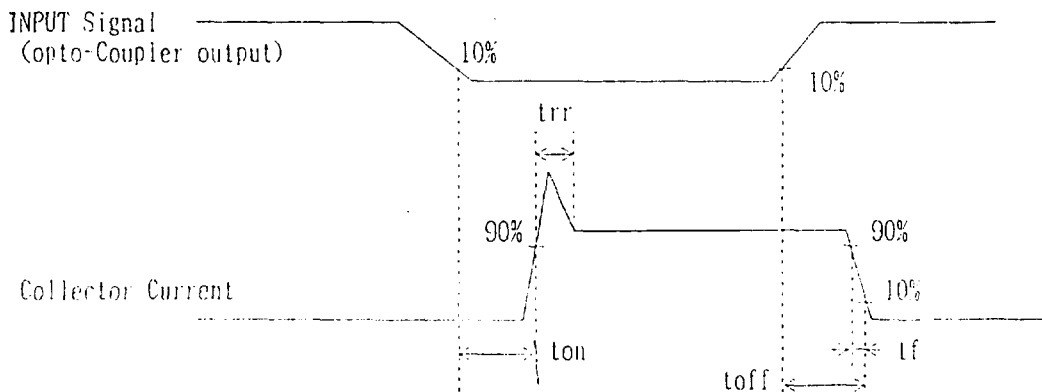
5. Dynamic Characteristics (Tj =25 °C, Vcc=15V)

Items	Symbols	Conditions	Min.	Typ.	Max.	Unit
Switching Time	t <sub>on</sub>	I <sub>C</sub> =50A V <sub>DC</sub> =600V  Fig.1	—	—	2.0	μs
	t <sub>off</sub>		—	—	3.0	μs
	t <sub>r</sub>		—	—	0.5	μs
	t <sub>rr</sub>		—	—	300	ns

6. Thermal Characteristics (Tc=25°C)

Items		Symbols	Min.	Typ.	Max.	Unit
Junction to Case Thermal Resistance	INV	IGBT	R <sub>th(j-c)</sub>	—	—	0.52 °C/W
		FWD	R <sub>th(j-c)</sub>	—	—	1.00 °C/W
	BRAKE	IGBT	R <sub>th(j-c)</sub>	—	—	1.56 °C/W
Case to Fin Thermal Resistance with Compound			R <sub>th(c-f)</sub>	—	0.05	°C/W

Fig.1 : Definition of switching time



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