



YMB1801(B)
IO Type 8 bit OTP MCU
with charging and NMOS
Datasheet

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Revision History

Revision	Date	Description
0.02	2025/01/20	1. Model upgrade 2. Modify the Programming Writing 3. Add the option of pull-low
0.03	2025/05/15	1. Update the official website link 2. Add Chapter 9 Precautions for SMT

Usage Warning

User must read all application notes of the IC by detail before using it. Please download the related application notes from the following link:

https://www.padauk.com.tw/en/product/search_list.aspx?kw=YMB

(The following picture are for reference only.)

YMB1801(B)

- ◆ SiP purpose series
- ◆ Operating temperature : -40°C ~ 85°C
- ◆ This product consists of a PMB180(B) MCU and a co-packaged NMOS

<div> <div>Feature</div> <div>Documents</div> <div>Software & Tools</div> <div>Application Note</div> </div>				
Content	Description	Download (CN)	Download (EN)	
APN002	Over voltage protection			
APN003	Over voltage protection			
APN004	Semi-Automatic writing handler			
APN007	Setting up LVR level			
APN011	Semi-Automatic writing Handler improve writing stability			
APN019	E-PAD PCB layout guideline			

1. General Description

The YMB1801(B)series mainly includes two parts:

- PMB180(B) MCU
- NMOS

Among them, PMB180(B) is a built-in 1.25KW OTP data memory and 64-byte data memory, a hardware comparator for comparing the signal or internal reference voltage $V_{internal-R}$ or internal bandgap reference voltage Band-gap between two pins. PMB180(B) also provides three hardware timers: a 16-bit timer, an 8-bit timer (can be output in PWM mode), and a set of 3 sets of 11-bit PWM timers/generators (LPWMG0, LPWMG1 and LPWMG2), support Mini-C/ASM language, easy to program. For details on the use of the PMB180(B), please refer to the "PMB180(B) Specification" on the official website of PADAUK Technology.

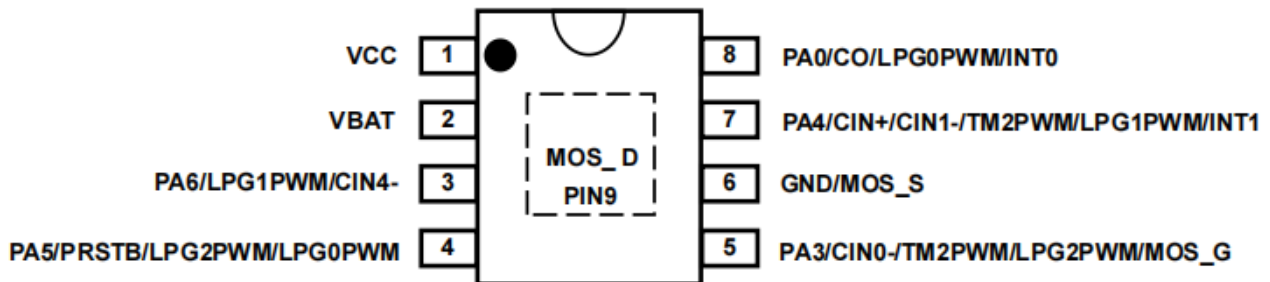
The main storage space of YMB1801(B)are as follows:

-
- OTP ROM (Word) : 1.25KW
- SRAM (Byte) : 64

2. Application

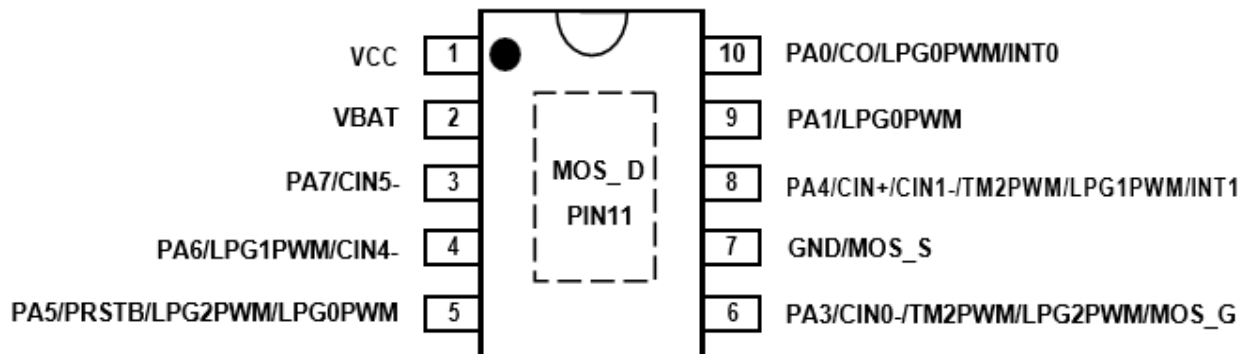
- toys
- home appliances
- LED lighting products
- General electronics

3. Ordering/ Package Information



YMB1801(B)-ES08A(ESOP8-150mil)

Note: PA3 and MOS_G share a pin, PIN9 MOS_D(E-PAD)



YMB1801(B)-EY10A(ESSOP10-150mil)

Note: PA3 and MOS_G share a pin, GND and MOS_S share a pin, PIN11 MOS_D(E-PAD)

Pin Name	Input / Output					Special features				
	I / O	Pull-high	Pull-low	Wake-up	External Interrupt	Comparator	PWM	Reset	MOS	Writing
PA0	√	√	√	√	INT0	CO	PG0			
PA1	√	√	√	√			PG0			
PA3/MOS-G	√	√	√	√		CIN0-	TM2 PG2		√	
PA4	√	√	√	√	INT1	CIN+ CIN1-	TM2 PG2			√
PA5	√	√	√	√			PG0 PG2	√		
PA6	√	√	√	√		CIN4-	PG1			√
PA7	√	√	√	√		CIN5-				
MOS-D									√	
V _{BAT}										√
VCC										
GND/MOS-S									√	√

4. Device Characteristics

The main electrical characteristic parameters of MOSFET are as follows($T_J = 25^\circ\text{C}$):

Parameter	description	Min	Typ	Max	Test conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20V	-	-	$V_{GS}=0V, I_D=250\mu A$
I_D	Drain current			1A	Continuous (1)
				1.5A	Non-Continuous (1)
$R_{DS(on)} (CP)$	Static Drain-to-Source On-Resistance	-	41m Ω	54m Ω	$V_{GS}=4.5V, I_D=1A (2)$
			54m Ω	75m Ω	$V_{GS}=2.5V, I_D=1A (2)$
$R_{DS(on)} (FT)$	Static Drain-to-Source On-Resistance		58.5 m Ω	85 m Ω	$V_{GS}=2.5V, I_D=2A (2)$
$V_{GS(th)}$	Gate Threshold Voltage	0.5V	0.75V	1.0V	$V_{DS}=V_{GS}, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1 μA	$V_{DS}=20V, V_{GS}=0V$
I_{GSS}	Gate-to-Source Leakage Current	-	-	$\pm 100nA$	$V_{DS}=0V, V_{GS}=\pm 12V$
T_J, T_{STG}	Operating and storage temperature	-55 $^\circ\text{C}$ to 150 $^\circ\text{C}$ Max			

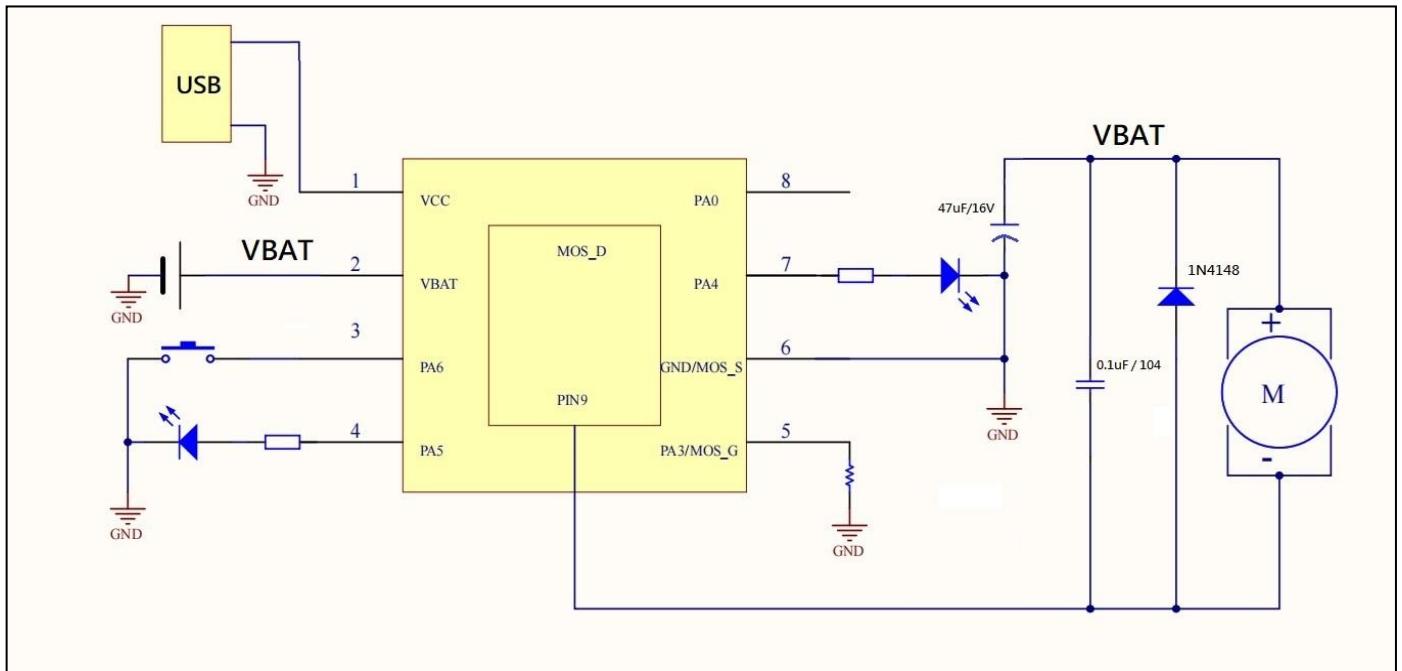
Notes:

- (1) The above parameter characteristics are affected by the packaging patch and PCBA heat dissipation, and the heat dissipation effect of the chip affects the performance and life of the product.
- (2) The above parameter characteristics are affected by packaging, patch, and PCBA heat dissipation. Actual performance may degrade during assembly.

5. Typical Application

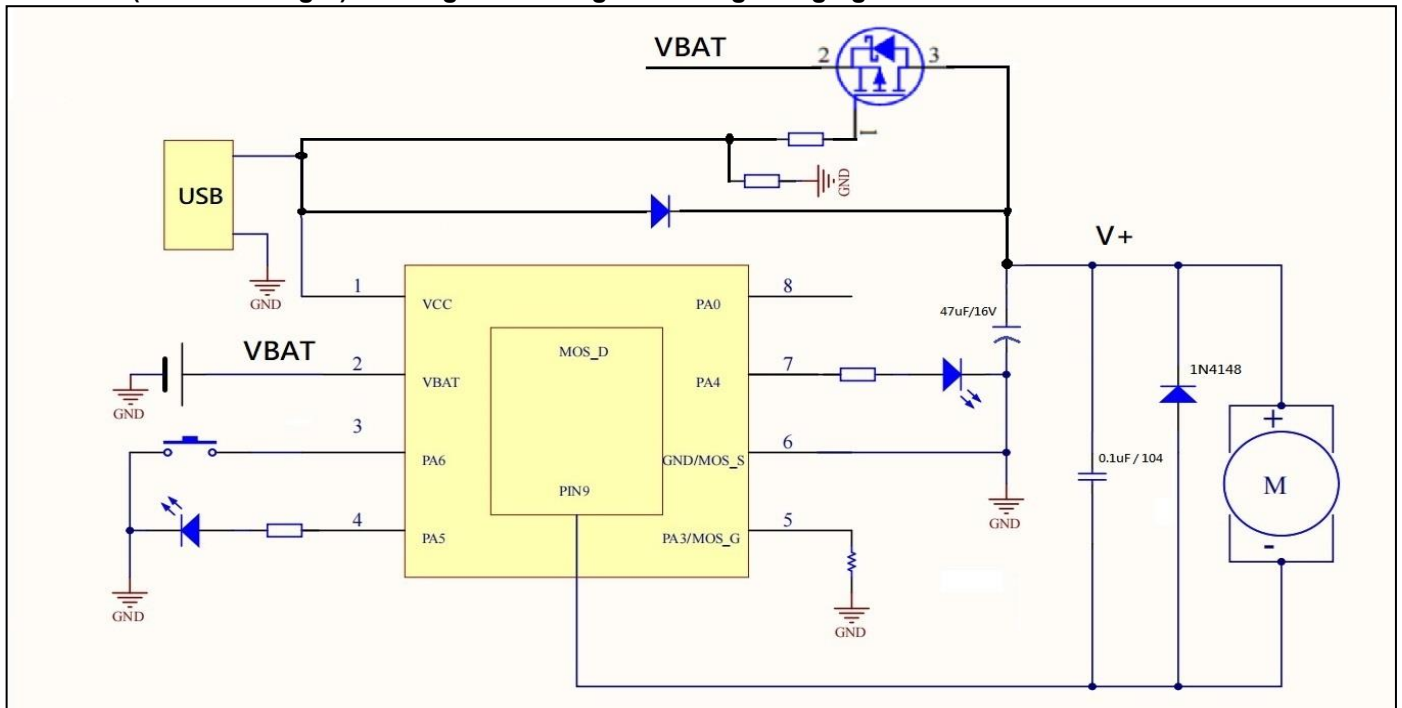
The typical application circuit diagram of YMB1801(B) is as follows, which is for user reference only.

Load (motor/LED light) stop circuit diagram during charging:



Typical application circuit diagram 1

Load (motor/LED light) working circuit diagram during charging:



Typical application circuit diagram 2

6. Precautions

Precautions for the use of YMB1801(B):

1. The 9th Pin of YMB1801(B)-ES08A is located at the bottom of the package, and The 11th Pin of YMB1801(B)-EY10A is located at the bottom of the package. It is the drain of NMOS, which has the function of carrying large current and heat dissipation so special attention should be paid to the wiring and heat dissipation effect during PCB layout. When soldering the YMB1801(B), special attention should be paid to the connection and conduction of the 9th pin, and no false soldering or floating connection is allowed.
2. For the PCB layout guide of E-PAD products, please refer to the APN019 application manual on PADAUK Technology's official website.
<http://www.padauk.com.tw/en/technical/index.aspx?kind=9>
3. Discharging / charging the lithium battery with a large current at the same time in the application circuit may cause serious ripple disturbance to the voltage of the lithium battery. This may cause the YMB1801(B) charging module to malfunction, and the charging state flag may be unstable. When YMB1801(B) charges the lithium battery, it is recommended that the software turn off NMOS. Such as typical application circuit diagram 1.
4. When the product must be able to turn on the load during charging the lithium battery due to product functional requirements, it is necessary to add components and circuits to the application circuit, such as the typical application circuit diagram 2.
5. The PA3 of the MCU is co-pinned with the GATE of the NMOS. When applying, a pull-down resistor needs to be connected externally to avoid the malfunction of the NMOS during the power-on reset of the MCU.
6. If you have any questions about using the product, please consult the FAE of PADAUK Technology.

7. Programming Writing

There are 4 pins for using the writer to program: PA4, PA6, V_{BAT} and GND.

Please use 5S-P-003x or later version to program YMB1801(B) real chip. (3S-P-002 or elder versions do not support programming YMB1801(B))

Add package information and OS settings to the writing file

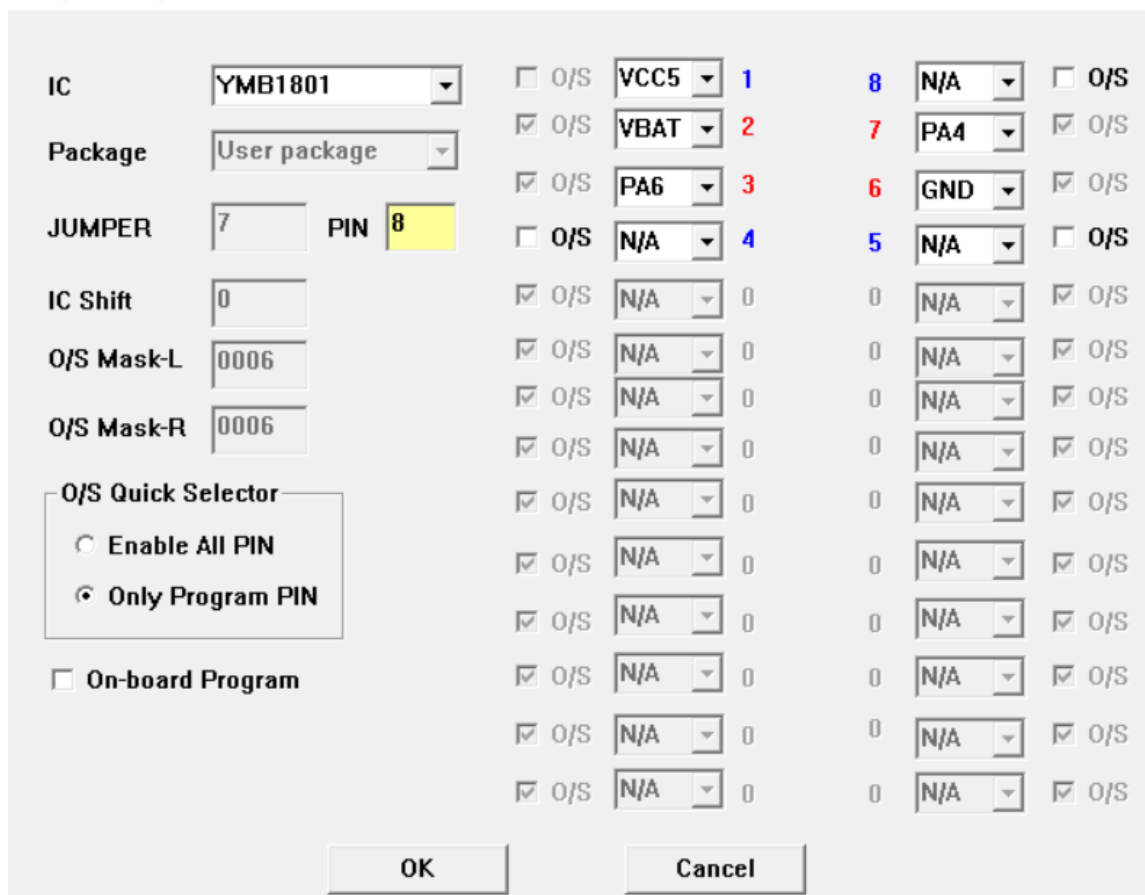
Use 5S-P-003x to burn YMB1801(B), and use Jumper7 to transfer the program signal. The connection of the signals depends on the IC package. Please refer to Chapter 5 of the Writer User Manual to create a Jumper7 adapter board for the target IC package. Users can obtain the user manual from the following web link:

<http://www.padauk.com.tw/cn/technical/index.aspx?kind=27>

1. How to program YMB1801(B)-ES08

Load the PDK from the GUI, insert JP7, then insert the IC on the socket, no shifting required. After the LCDM shows that the IC is ready, it can be programmed.

Package Setting

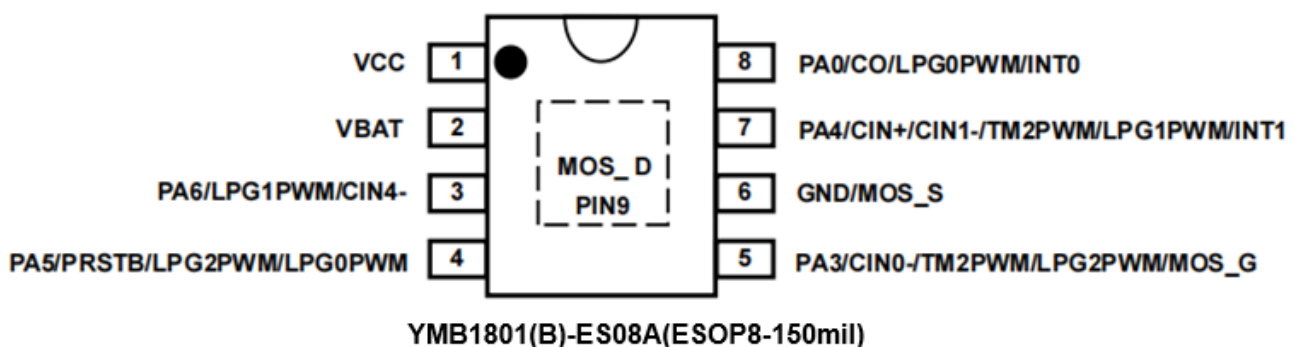
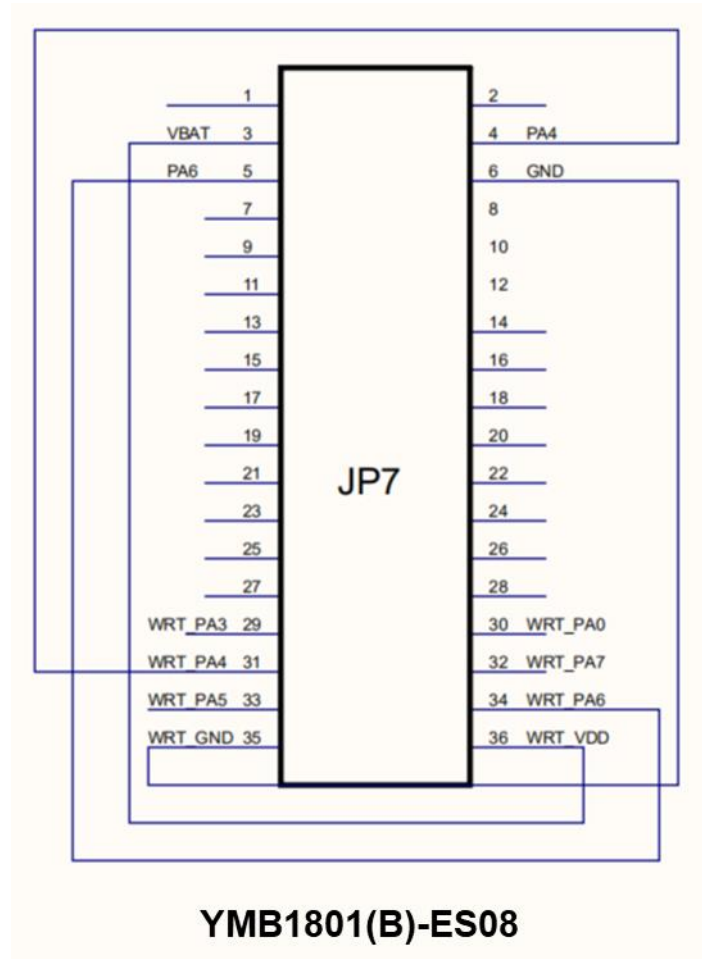


Pin	Signal	Check	Value	Pin	Signal	Check	Value
1	VCC5	<input type="checkbox"/>	O/S	8	N/A	<input type="checkbox"/>	O/S
2	VBAT	<input checked="" type="checkbox"/>	O/S	7	PA4	<input checked="" type="checkbox"/>	O/S
3	PA6	<input checked="" type="checkbox"/>	O/S	6	GND	<input checked="" type="checkbox"/>	O/S
4	N/A	<input type="checkbox"/>	O/S	5	N/A	<input type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S
0	N/A	<input checked="" type="checkbox"/>	O/S	0	N/A	<input checked="" type="checkbox"/>	O/S

YMB1801(B)

IO Type 8 bit OTP MCU with charging and NMOS

Taking ESO8A as an example, the wiring on the back adapter board is as follows:



JP7 jumper schematic for P003B

Place the top grid of the chip into the front socket and do not shift it. After the LCDM shows that the IC is ready, it can be programmed.

2. How to program YMB1801(B)-EY10A

Enter 10 in the PIN box, and then customize the chip pins, as shown in the figure below:

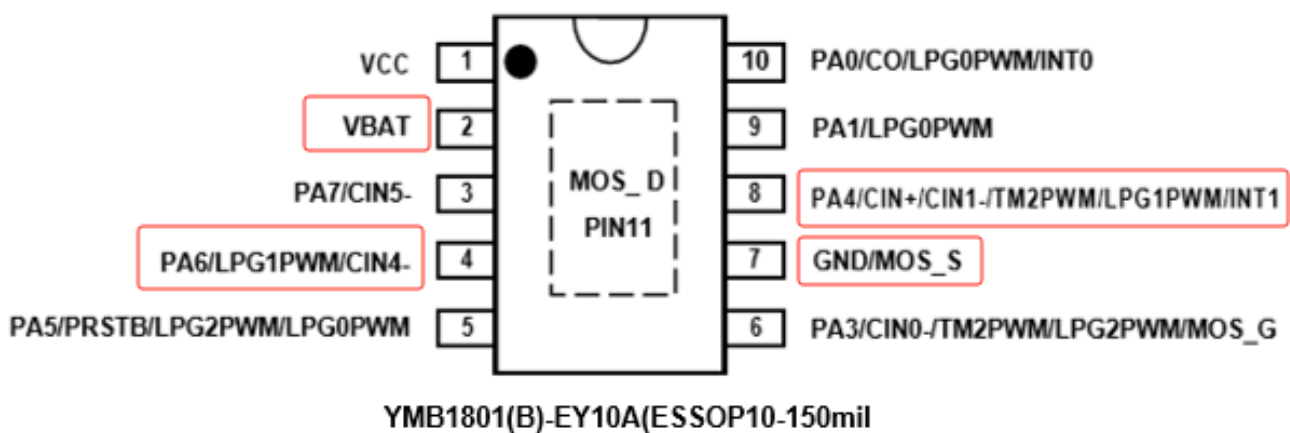
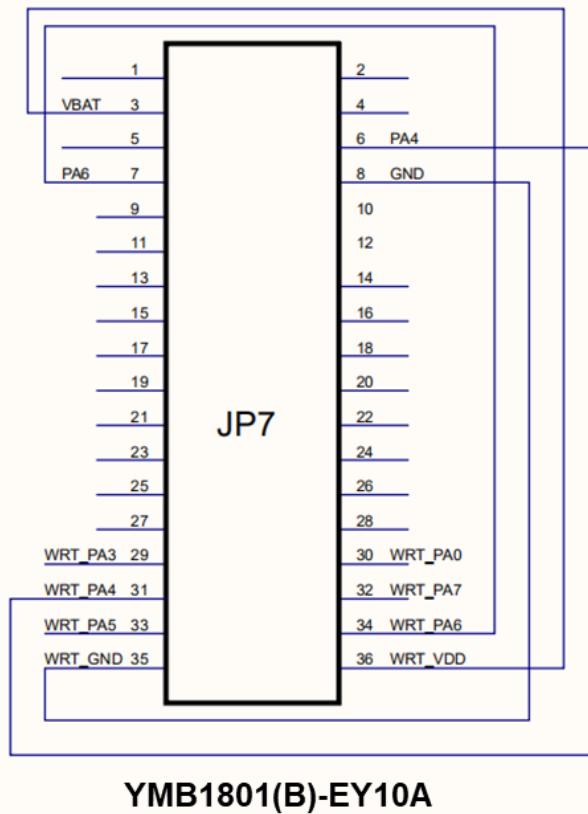
Package Setting

IC	YMB1801	<input type="checkbox"/> O/S	N/A	1	10	N/A	<input type="checkbox"/> O/S
Package	User package	<input checked="" type="checkbox"/> O/S	VBAT	2	9	N/A	<input type="checkbox"/> O/S
JUMPER	7	<input type="checkbox"/> O/S	N/A	3	8	PA4	<input checked="" type="checkbox"/> O/S
	PIN 10	<input checked="" type="checkbox"/> O/S	PA6	4	7	GND	<input checked="" type="checkbox"/> O/S
IC Shift	0	<input type="checkbox"/> O/S	N/A	5	6	N/A	<input type="checkbox"/> O/S
O/S Mask-L	000A	<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
O/S Mask-R	000C	<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
O/S Quick Selector		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
<input type="radio"/> Enable All PIN		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
<input checked="" type="radio"/> Only Program PIN		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
<input type="checkbox"/> On-board Program		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S
		<input checked="" type="checkbox"/> O/S	N/A	0	0	N/A	<input checked="" type="checkbox"/> O/S

OK Cancel

YMB1801(B)-ES08A in P003x package setting

For example, make JP7 writer signal connection of YMB1801(B)-ES08A, as the following:



JP7 jumper schematic for P003B

Place the top grid of the chip into the front socket and do not shift it. After the LCDM shows that the IC is ready, it can be programmed.

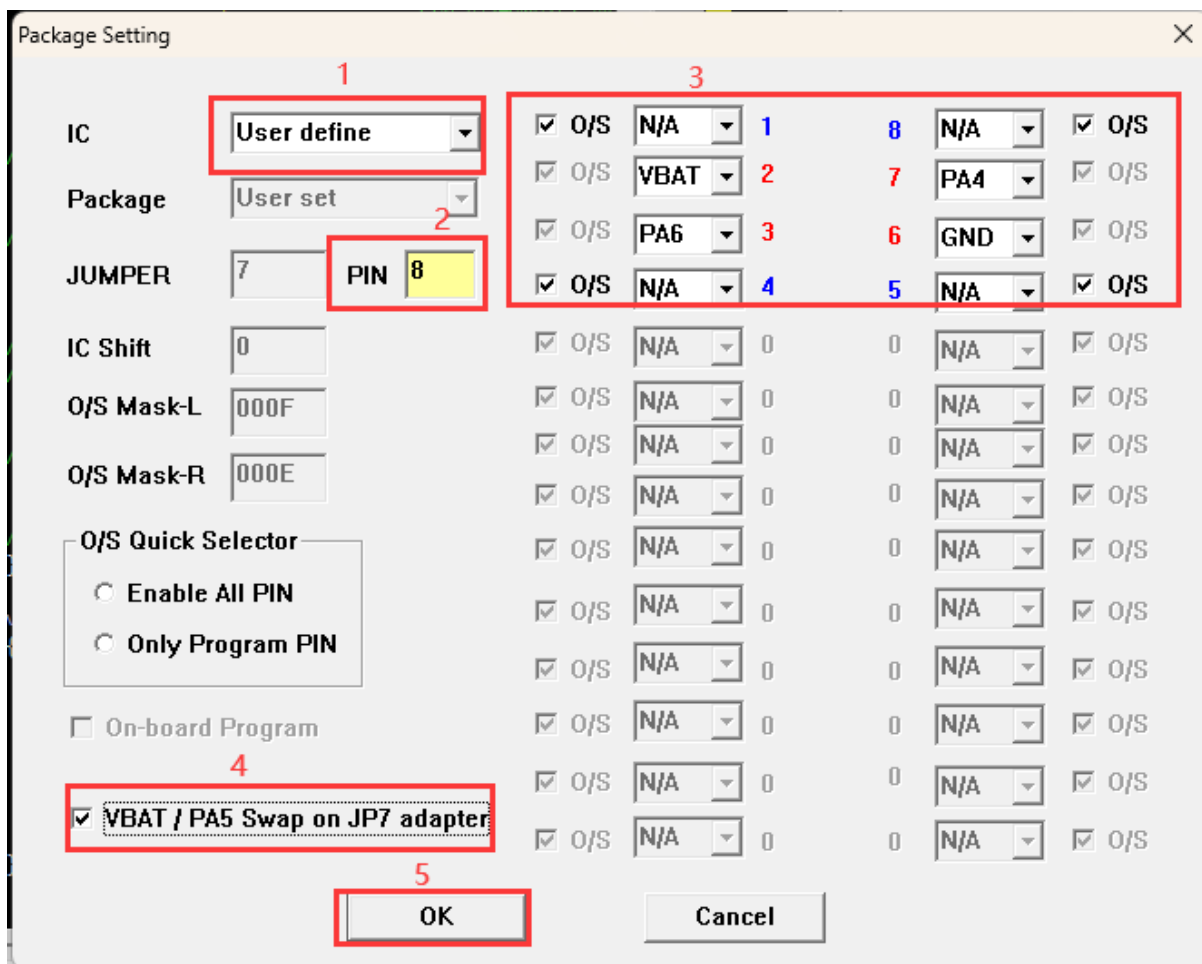
Using 5S-P-003 to write YMB1801(B)

5S-P-003 and 5S-P-003x writing YMB1801(B) in the likely way. But user should be take care the following thing.

1. Use the. writer package 8, 0, 0, 0, 7, 2, 3, 0, 6, 0x0006, 0x0006, 0, 0x14 //P003x commands for package setting. (ES08A Package)

2. Convert the PDK file from GUI

Enter the writing interface from the IDE, then click "Convert" -> "To Package". In the "Package Setting" interface, select the "user defined", then click **"VBAT /PA5 Swap on JP7 adapter"**. After confirming information about the IC pin, save and use the newly generated PDK file. Please refer to picture for specific operation steps.

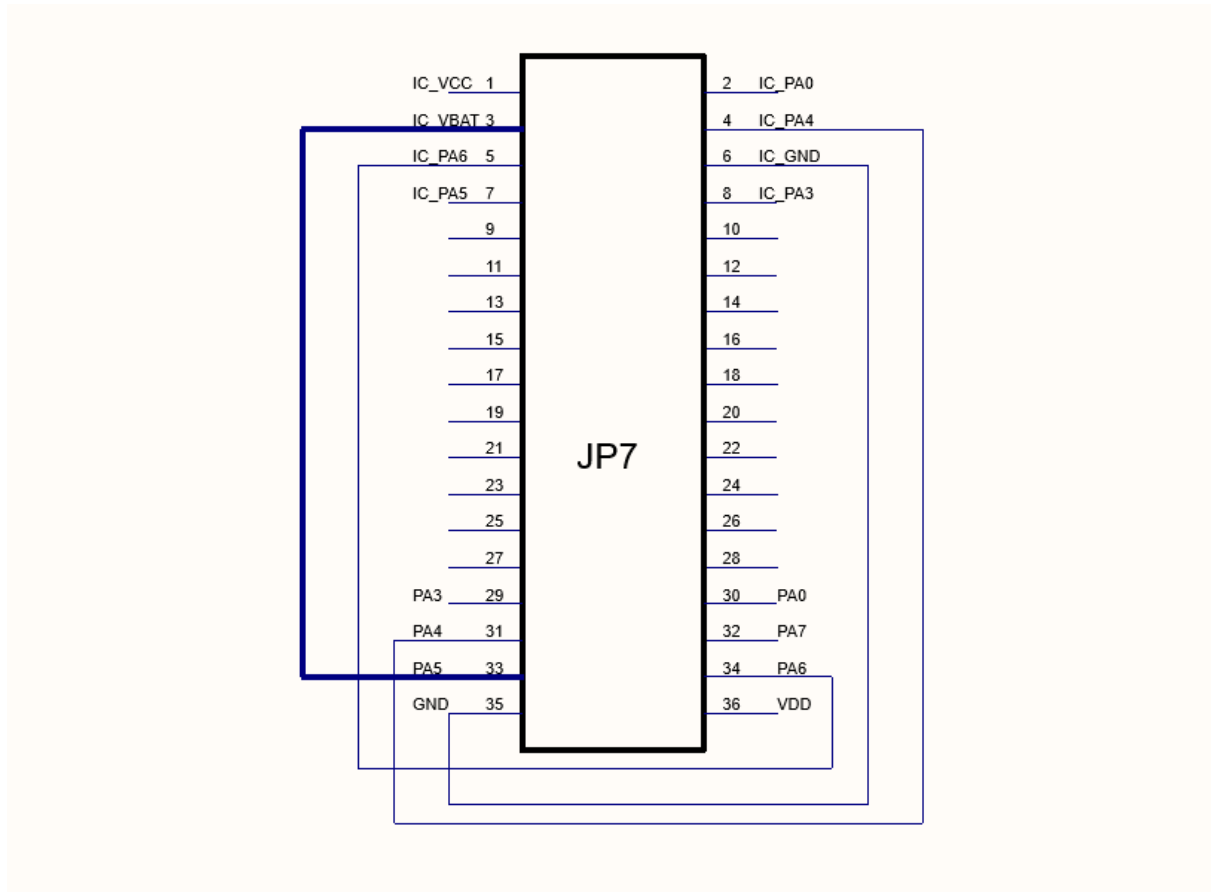


IC	Package	JUMPER	PIN	IC Shift	O/S Mask-L	O/S Mask-R	O/S Quick Selector	On-board Program	VBAT / PA5 Swap on JP7 adapter
User define	User set	7	8	0	000F	000E	Enable All PIN	<input type="checkbox"/>	<input checked="" type="checkbox"/>

O/S	Pin	Color	Pin	O/S
<input checked="" type="checkbox"/>	N/A	1	8	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	VBAT	2	7	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	PA6	3	6	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	N/A	4	5	<input checked="" type="checkbox"/>

YMB1801(B)-ESOP10 in P003 package setting

For example, make JP7 writer signal connection of YMB1801(B)-ES08A, as the following:

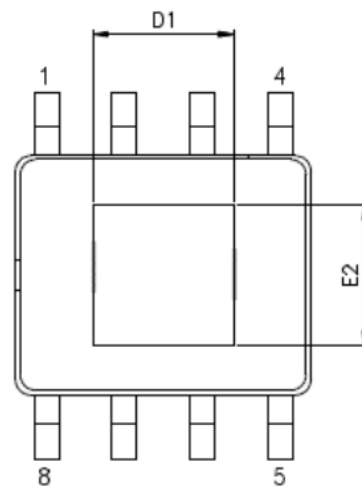
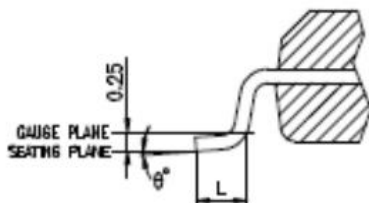
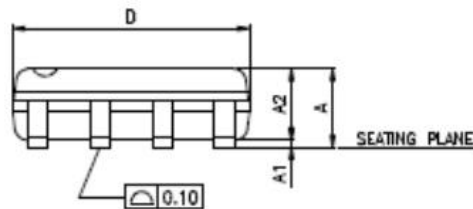
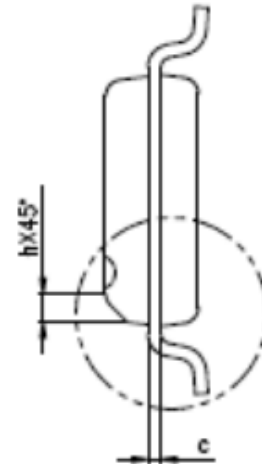
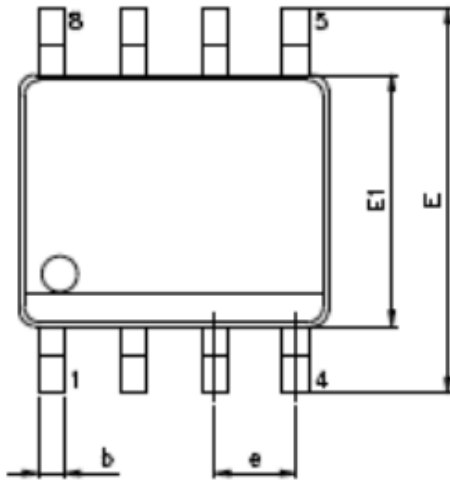


schematic diagram of Jumper7 for P003



8. Package information

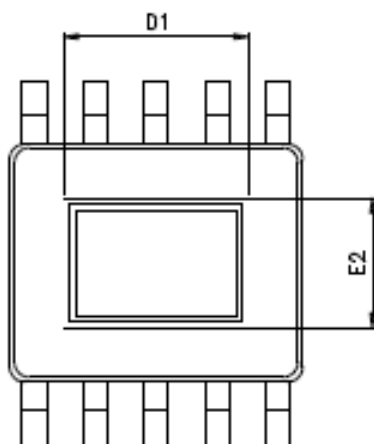
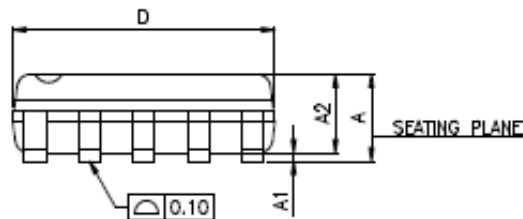
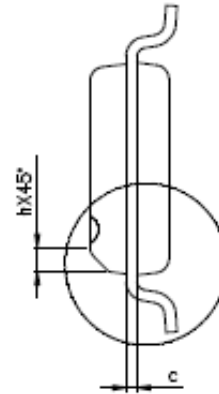
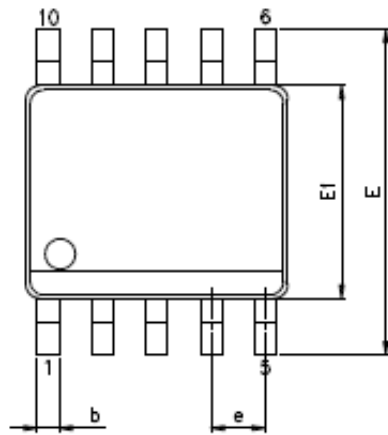
8.1. ESOP8A (Pitch=1.27mm=0.05inch, Body Width=3.9mm=150mil)



SYMBOLS	MILLIMETERS	
	MIN	MAX
A	-	1.75
A1	0.10	0.25
A2	1.25	-
b	0.31	0.51
c	0.10	0.25
D	4.90 BSC	
E	6.00 BSC	
E1	3.90 BSC	
e	1.27 BSC	
L	0.40	1.27
h	0.25	0.50
θ°	0	8
D1	3.20	3.40
E2	2.10	2.50

1. E-PAD dimensions are for reference only

2. E-PAD : Refer to PMC-APN-019 E-PAD product PCB layout guideline

**8.2. ESSOP10 (Pitch=1mm, Body Width=150mil) with E-PAD**

	MILLIMETERS		
SYMBOLS	MIN	TYP	MAX
A	1.50	1.60	1.70
A1	0.04	-	0.12
A2	1.35	1.45	1.55
A3	0.65	0.70	0.75
b	0.30	-	0.50
c	0.19	-	0.25
D	4.80	4.90	5.00
D1	2.60	3.30	3.40
E	5.90	6.00	6.10
E1	3.84	3.94	4.04
E2	1.80	2.15	2.50
e	1.00		
h	0.25	-	0.50
L	0.52	-	0.72
θ°	0	-	8

1. E-PAD dimensions are for reference only

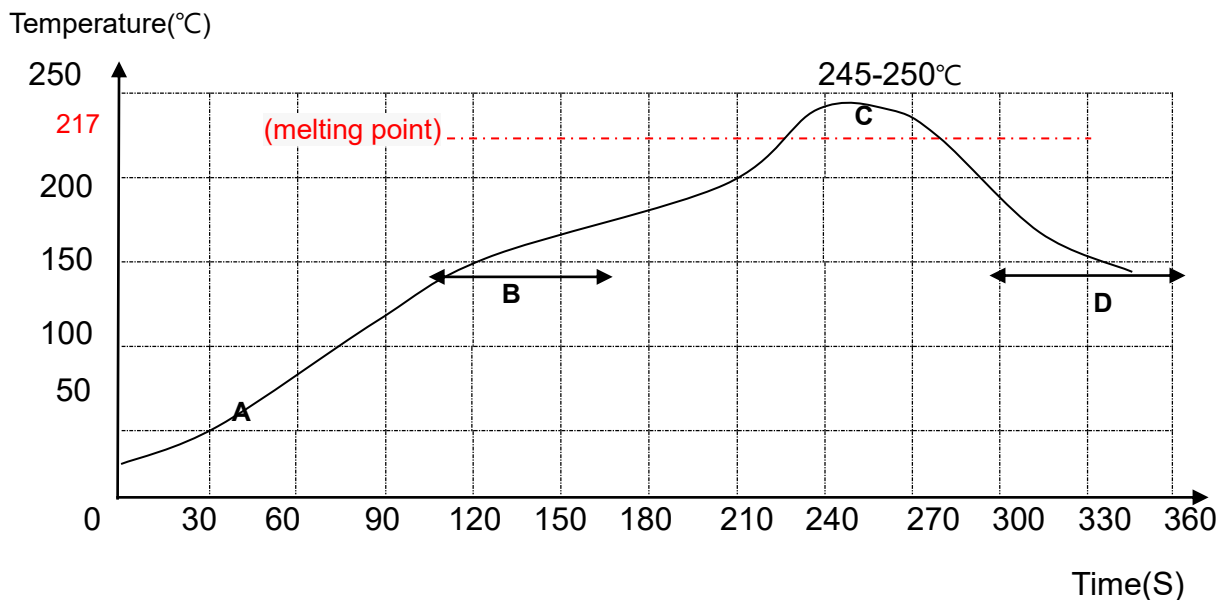
2. E-PAD : Refer to PMC-APN-019 E-PAD product PCB layout guideline

9. Precautions for SMT

When soldering this model of product, please refer to the following reflow profile for production:

Reflow temperature curve chart[Ag3.0/Cu0.5/SN96.5]

The following is the temperature curve used in our recommended hot air reflow soldering process, which can serve as a reference for setting the reflow oven temperature. This temperature profile can effectively reduce the slump of solder paste and the occurrence of solder balls, making it suitable for the vast majority of products and process conditions.



- A. Preheat Zone : 1.0~3.0°C/s
- B. Soak Zone : Temperature : 140~180°C Time : 70~130s Temperature rise rate : < 3°C/s
- C. Reflow Zone : Maximum temperature: 245~250°C Time: Above 230°C for 30~70s (Important) Above 240°C for 20~30s.
- D. Cooling Zone : Cooling rate < 4°C The termination temperature of cooling should not exceed 75 °C