



Preliminary

GENERAL DESCRIPTION

EM57200 is a series of 4 to 60 seconds single chip Voice/Dual tone Melody/Dual tone Sound Effect synthesizer IC. It contains one 4-bit input port, two 4-bit I/O ports and a tiny controller. User's applications, such as section combination, trigger modes, control outputs, keyboard matrix, and other logic functions, are easily implemented by programming through its tiny controller.

FEATURES

- Single power supply 2.4 V ~ 5 V.
- 4-60 seconds voice capacity is provided for EM57204/EM57206/EM57209/EM57212/EM57216/EM57220/EM57230/EM57240/EM57260.
- One 4-bit input port, two 4-bit I/O ports, and 32x4 bits RAM.
- 8K (maximum) program ROM.
- One 6-bit timer overflow control.
- ASPCM synthesizer and dual tone melody/sound effect generator .
- 4K~32K Hz playing speed for voice play-back .
- Multiple tempos for dual tone melody/sound effect play-back .
- Variable beats for dual tone melody/sound effect play-back.
- Multiple levels of volume control.
- Fixed current D/A output to drive external connected transistor for voice output.

PIN DESCRIPTIONS

Symbol	I/O	Function
P1.0	I	Bit 0 of Port 1.
P1.1	I	Bit 1 of Port 1.
P1.2	I	Bit 2 of Port 1.
P1.3	I	Bit 3 of Port 1.
P2.0	I/O	Bit 0 of Port 2.
P2.1	I/O	Bit 1 of Port 2.
P2.2	I/O	Bit 2 of Port 2.
P2.3	I/O	Bit 3 of Port 2.
P3.0	I/O	Bit 0 of Port 3.
P3.1	I/O	Bit 1 of Port 3.
P3.2	I/O	Bit 2 of Port 3.
P3.3	I/O	Bit 3 of Port 3.
V _{DD}	I	Positive power supply.
OSC	I	Oscillation component connection pin.
TEST	I	For testing only.
V _{SS}	I	Negative power supply.
VO	O	Voice output.



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ABSOLUTE MAXIMUM RATINGS

Items	Sym.	Min.	Max.	Unit
Supply Voltage	$V_{DD}-V_{SS}$	-0.3	6.0	V
Input Voltage	V_{IN}	$V_{SS}-0.3$	$V_{DD}+0.3$	V
Operating Temperature	T_{OP}	0	50	°C
Storage Temperature	T_{STG}	-55	+125	°C

ELECTRICAL CHARACTERISTICS ($V_{DD} = 3V, 25^{\circ}C$ unless otherwise specified)

Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Operating voltage	V_{DD}	2.4	3.0	5.1	V	
Standby current	I_{DDS}	-	-	1.0	μA	$V_{DD}=3V$
Operating current	I_{DDO}	-	-	280	μA	$V_{DD}=3V$, No load
Drive current of P2,P3	I_{OD}	1.0	-	-	mA	$V_{DD}=3V$, $V_O=2.4V$
Sink current of P2, P3	I_{OS}	1.6	-	-	mA	$V_{DD}=3V$, $V_O=0.4V$
Input current of P1	I_{IH}	-	3.0	10.0	μA	$V_{DD}=3V$
Output current of VO	I_{VO}	2.0	3.0	4.0	mA	$V_{DD}=3V$, $V_O=0.7V$ (Step 7)
Oscillation resistor	R	-	1.0	-	M Ω	$V_{DD}=3V$
Oscillator frequency	F_{osc}	-	1.0	-	MHz	$V_{DD}=3V$

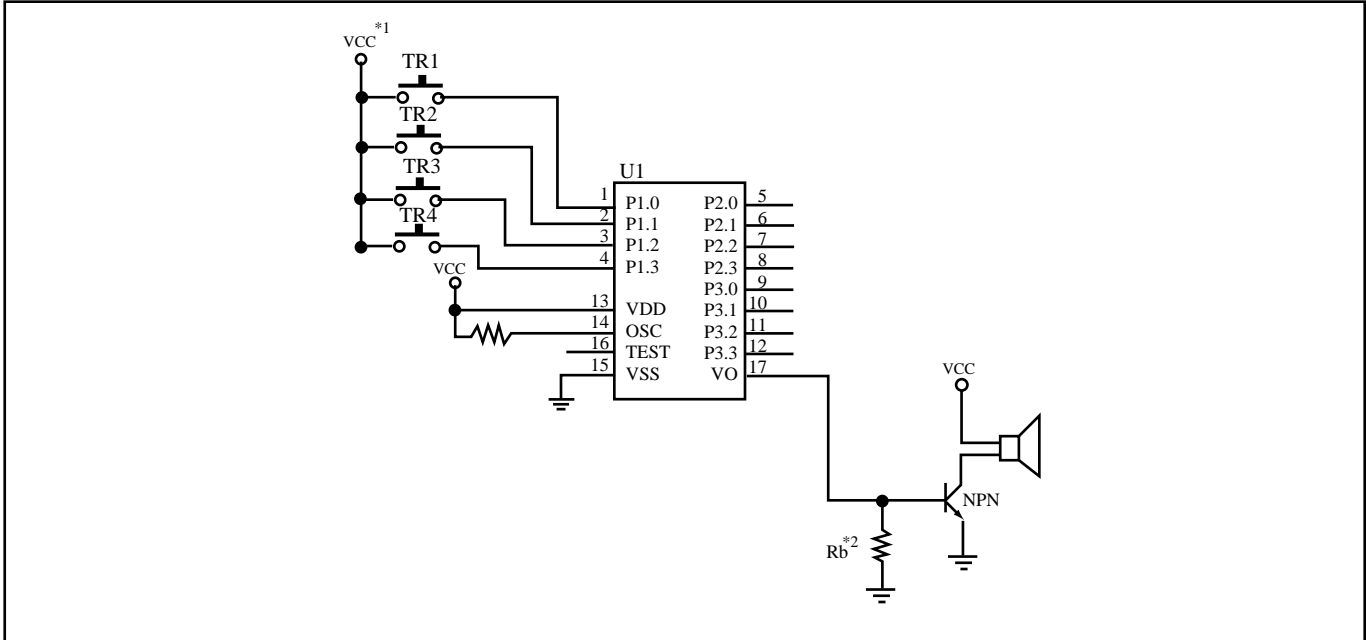
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APPLICATION CIRCUIT

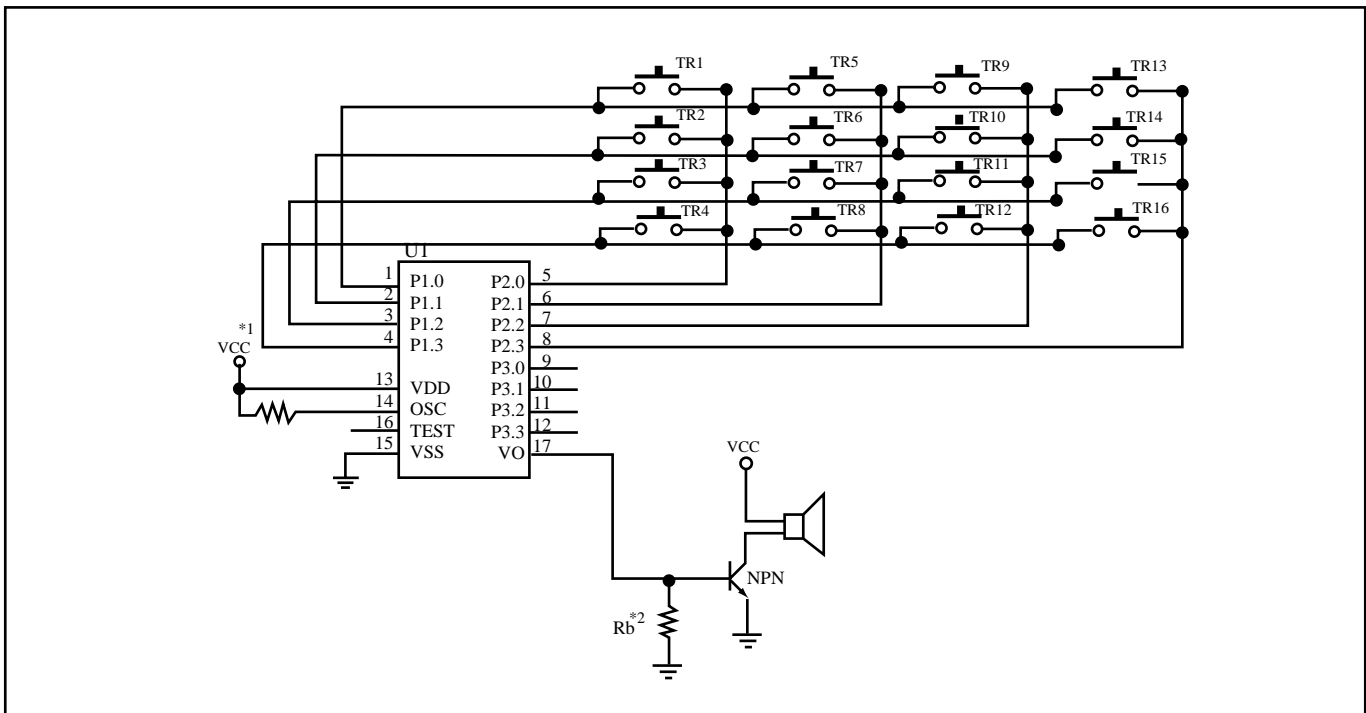
In the following application circuits:

- *1 : For heavy loading application, adding an electrolytic capacitor between Vcc and Ground is recommended. The recommended value for button cell application is 10 μ F.
- *2 : The recommended value for button cell application is 750 Ω or less.

4-key Application Circuit



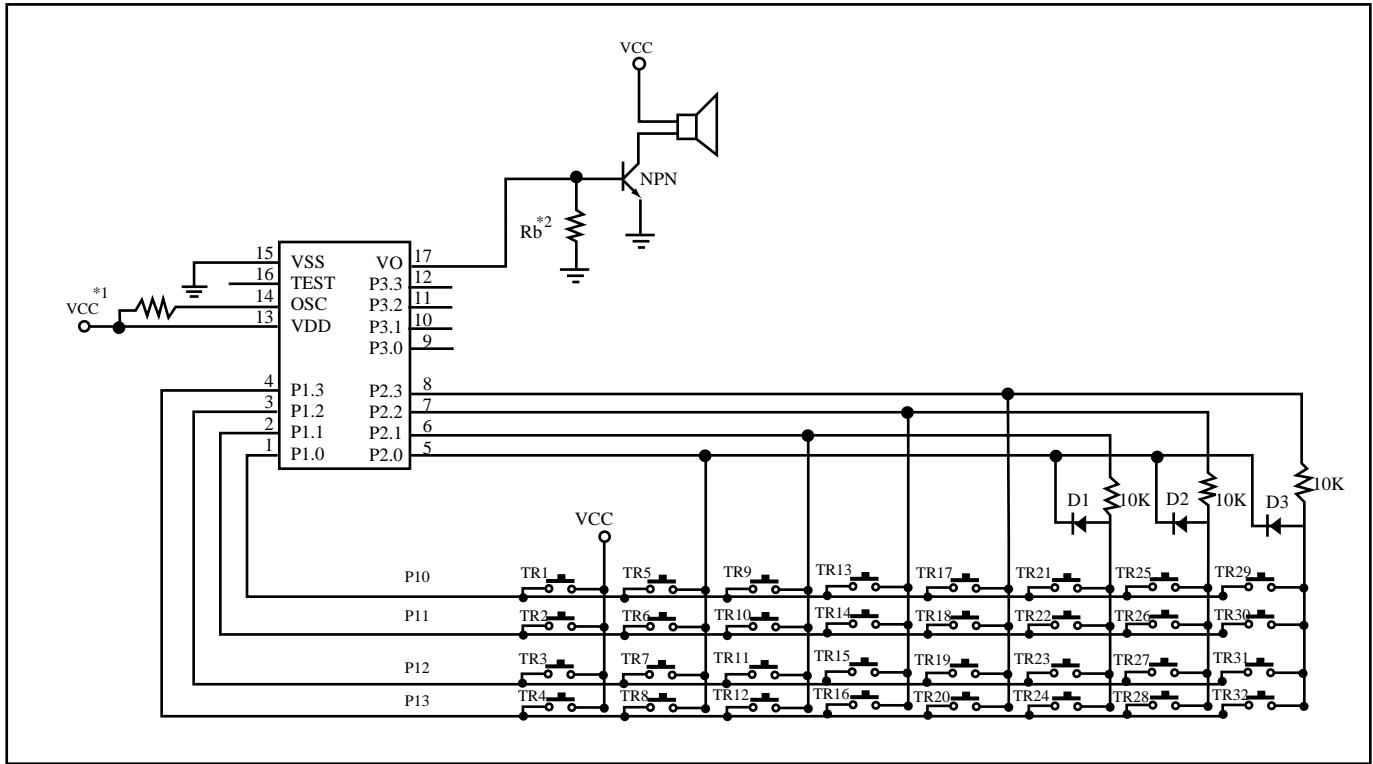
16-key Application Circuit



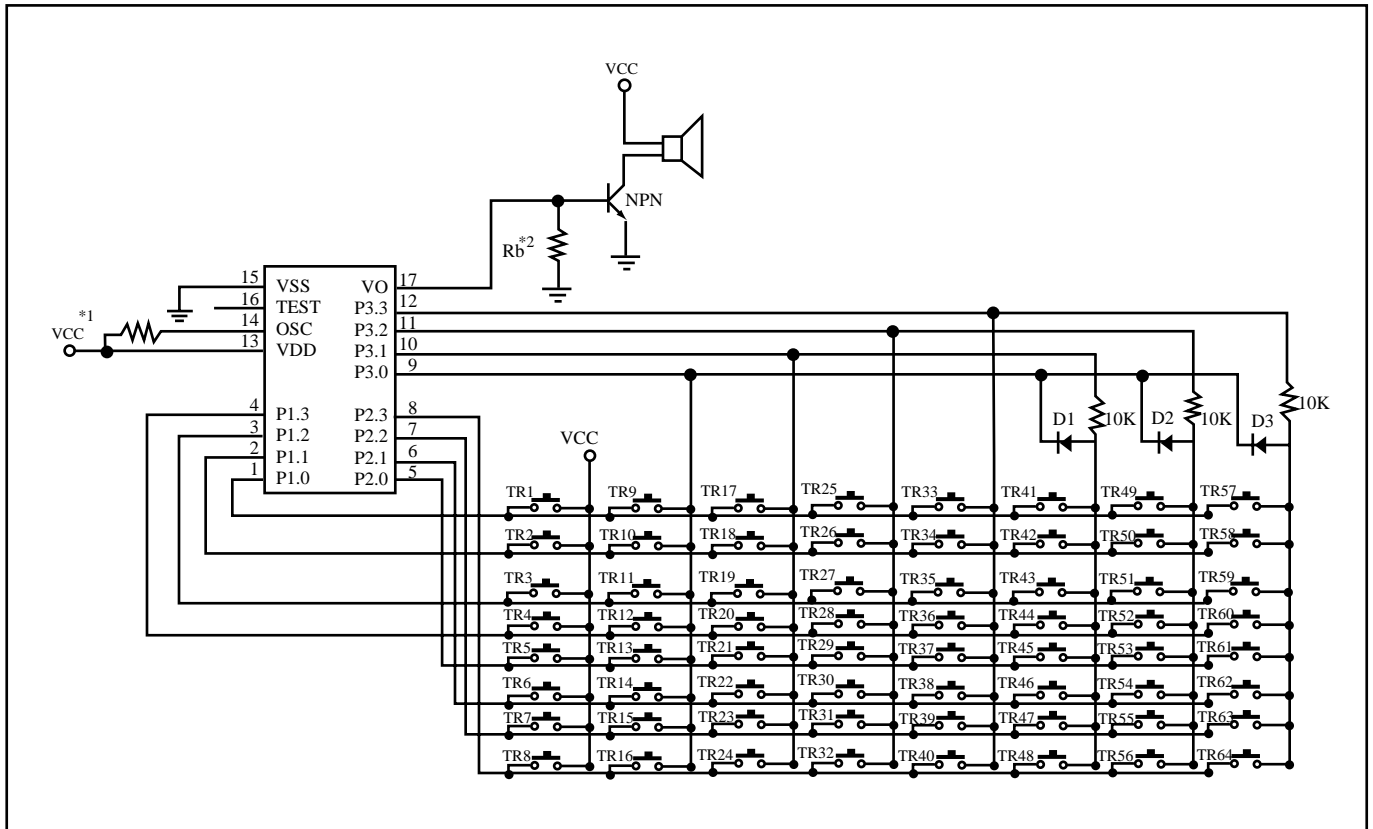
* This specification are subject to be changed without notice.

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32-key Application Circuit



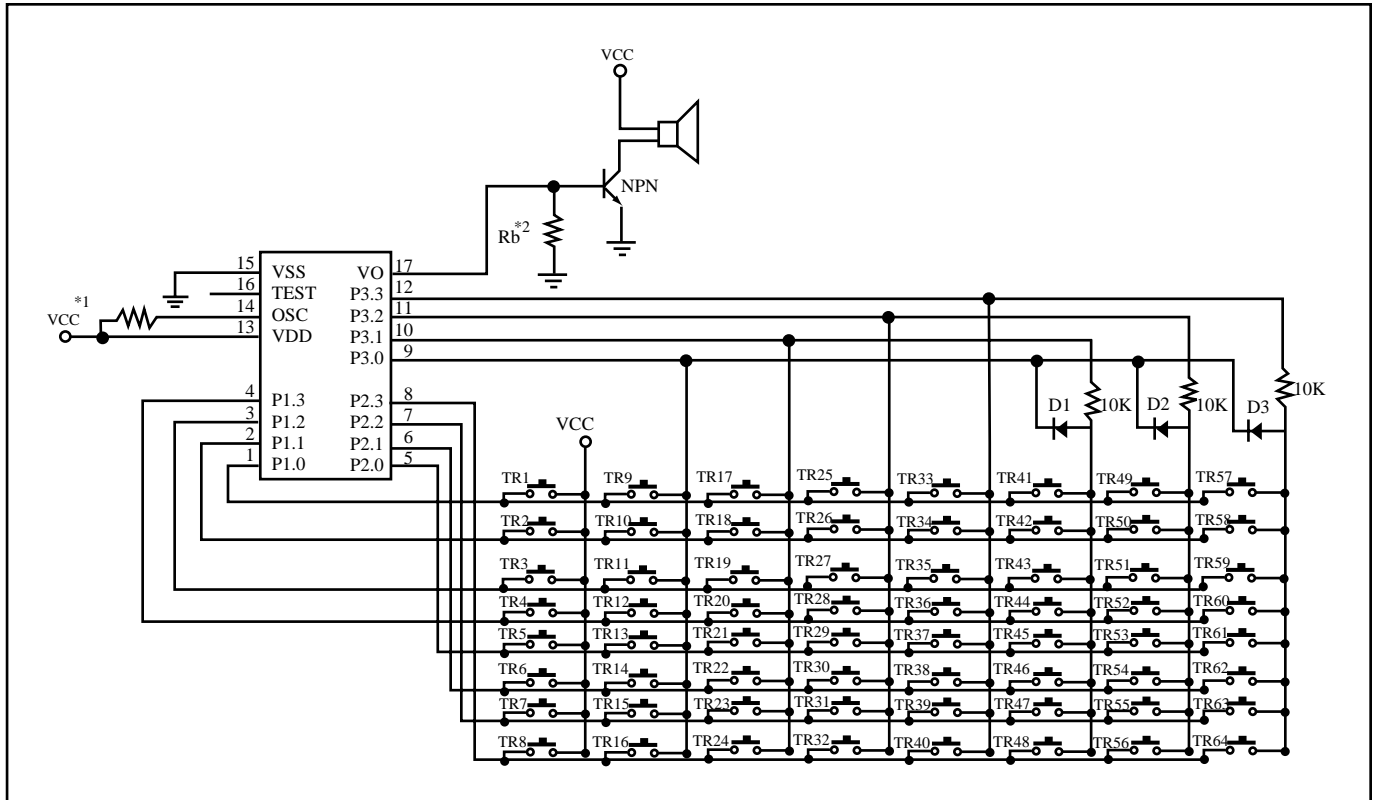
64-key Application Circuit



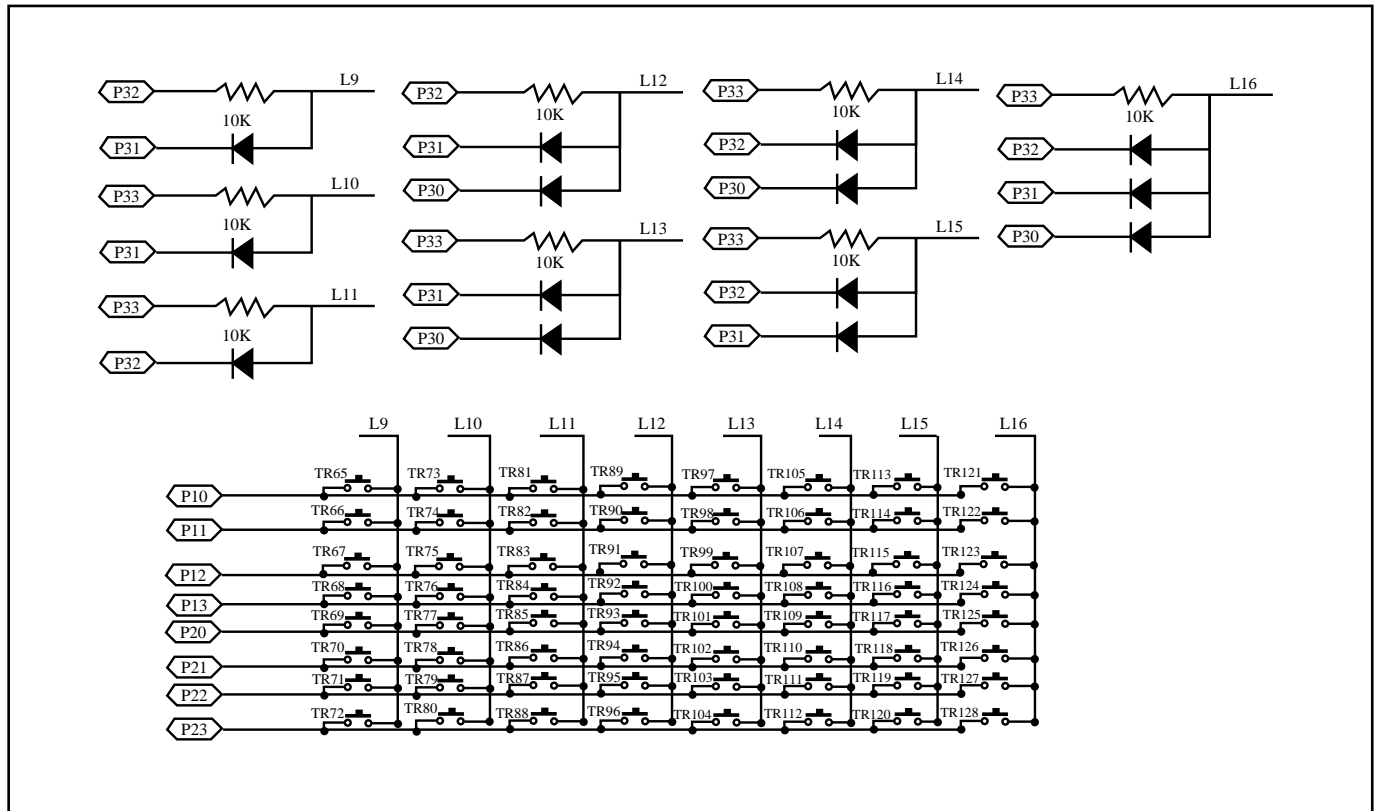
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128-key Application Circuit (A)



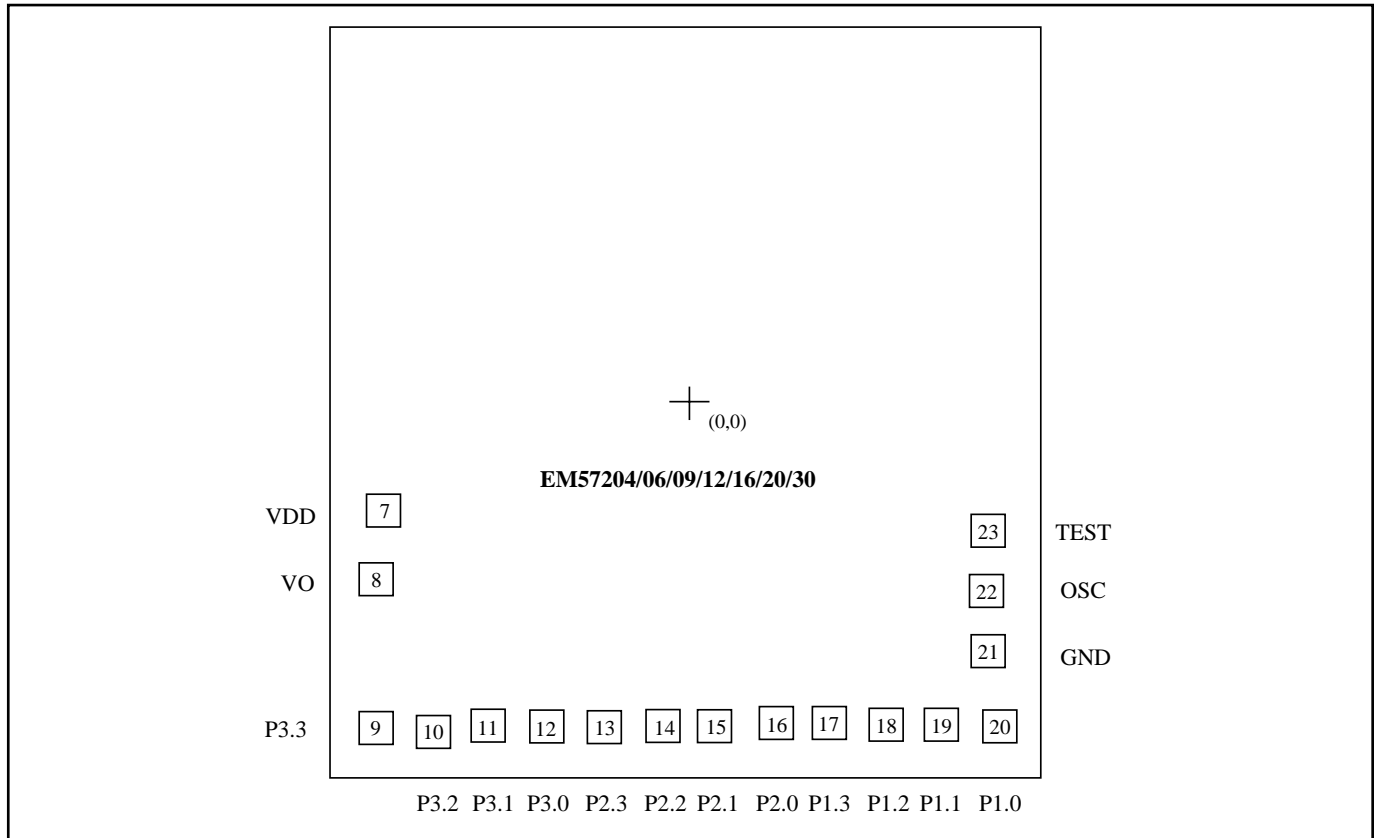
128-key Application Circuit (B)



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PAD DIAGRAM

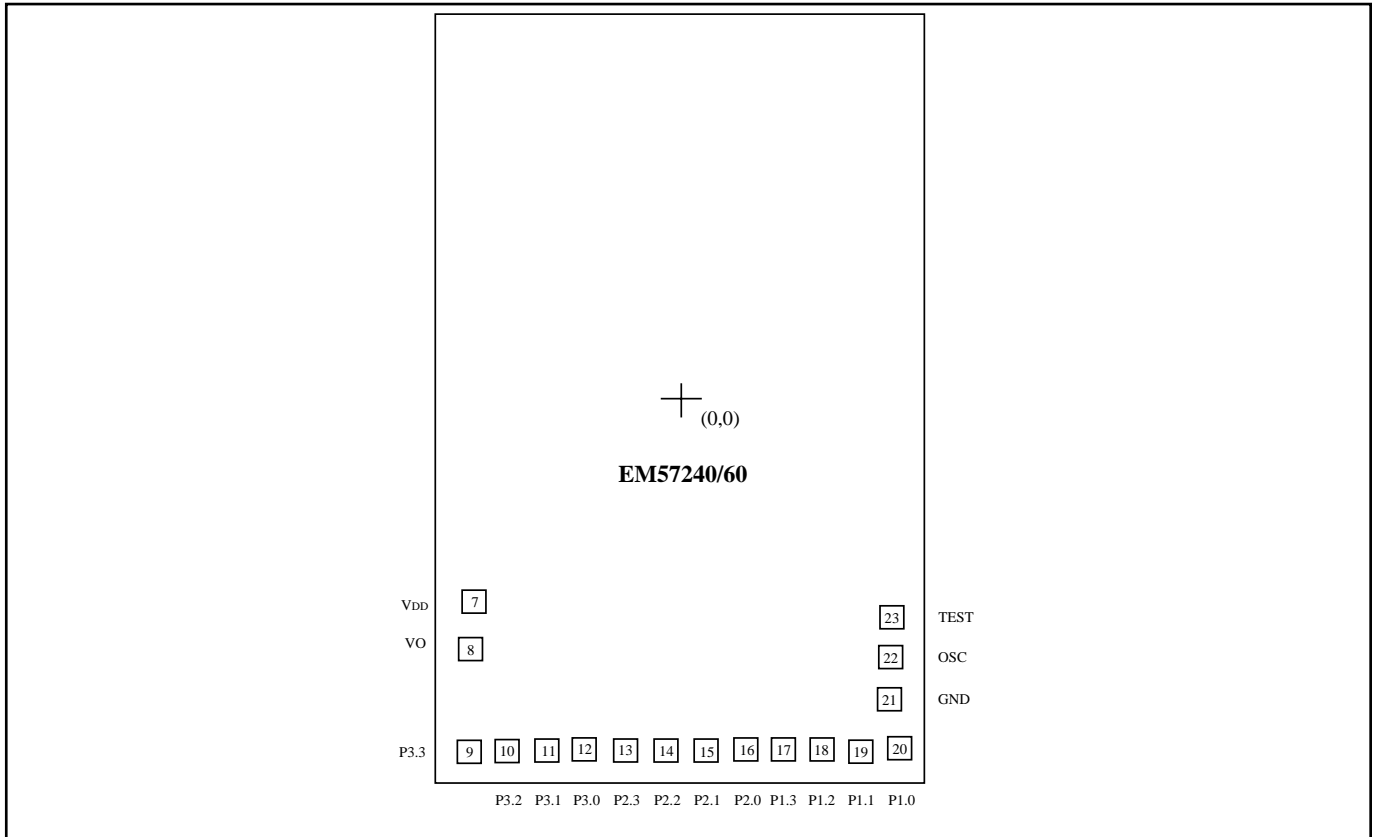


Chip Size : 1850 x 1950 μm

Pad No.	Symbol	X	Y
7	VDD	-745.3	-266.7
8	VO	-767.1	-432.4
9	P3.3	-772.3	-802.5
10	P3.2	-633.7	-802.5
11	P3.1	-495.1	-798.3
12	P3.0	-356.5	-798.3
13	P2.3	-217.9	-798.3
14	P2.2	-72.9	-798.3
15	P2.1	65.7	-798.3
16	P2.0	210.7	-798.3
17	P1.3	349.3	-799.7
18	P1.2	487.9	-799.7
19	P1.1	626.5	-799.7
20	P1.0	765.1	-799.7
21	GND	740.3	-622.0
22	OSC	740.3	-467.0
23	TEST	740.3	-322.8

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Chip Size : 1850 x 2850 μm

Pad No.	Symbol	X	Y
7	VDD	-745.3	-716.7
8	VO	-767.1	-882.4
9	P3.3	-772.3	-1252.5
10	P3.2	-633.7	-1252.5
11	P3.1	-495.1	-1248.3
12	P3.0	-356.5	-1248.3
13	P2.3	-217.9	-1248.3
14	P2.2	-72.9	-1248.3
15	P2.1	65.7	-1248.3
16	P2.0	210.7	-1248.3
17	P1.3	349.3	-1249.7
18	P1.2	487.9	-1249.7
19	P1.1	626.5	-1249.7
20	P1.0	765.1	-1249.7
21	GND	740.3	-1072.0
22	OSC	740.3	-917.0
23	TEST	740.3	-772.8