



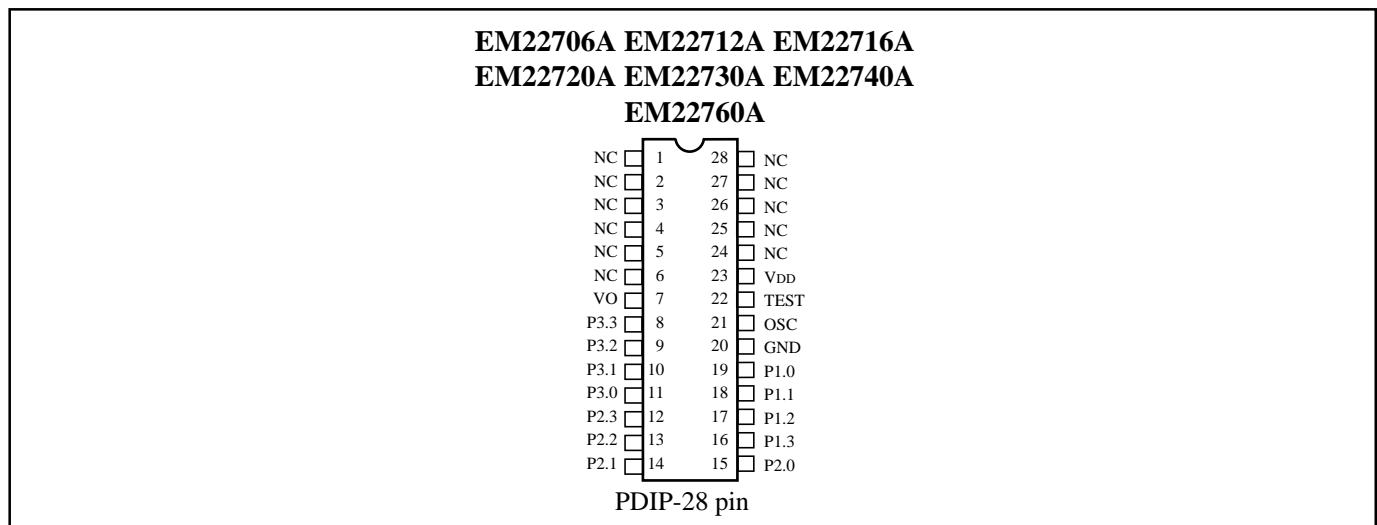
GENERAL DESCRIPTION

EM22700A is a series of 6 to 60 seconds single chip Voice/Dual tone synthesizer IC which contains 1 4-bit input port, 2 4-bit I/O ports and a tiny controller. By programming through the tiny controller, user's application includes section combination, trigger mode, control outputs ,keyboard matrix and other logic function can be easily implemented.

FEATURES

- Single power supply 2.4 V - 5 V.
- 6-60 seconds voice capacity is provided for EM22706A,EM22712A,EM22716A ,EM22720A, EM22730A, EM22740A and EM22760A.
- Dual tone melody generator is provided.
- 1 4-bit input port , 2 4-bit I/O ports and 32*4 bits RAM are provided.
- Maximum 8 K program ROM is provided.
- One 6 bit timer overflow control is provided.
- 4 playing speed for voice playing 5K,6K,7K,8K Hz are provided.
- Several tempos for dual tone melody playing are provided.
- 8 different beats for dual tone melody playing are provided.
- 8 steps of volume control are provided.
- Fixed Current D/A output is provided to drive external connected transistor for voice output.

PIN ASSIGNMENTS





PIN DESCRIPTIONS

Symbol	I/O	Function Description
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.

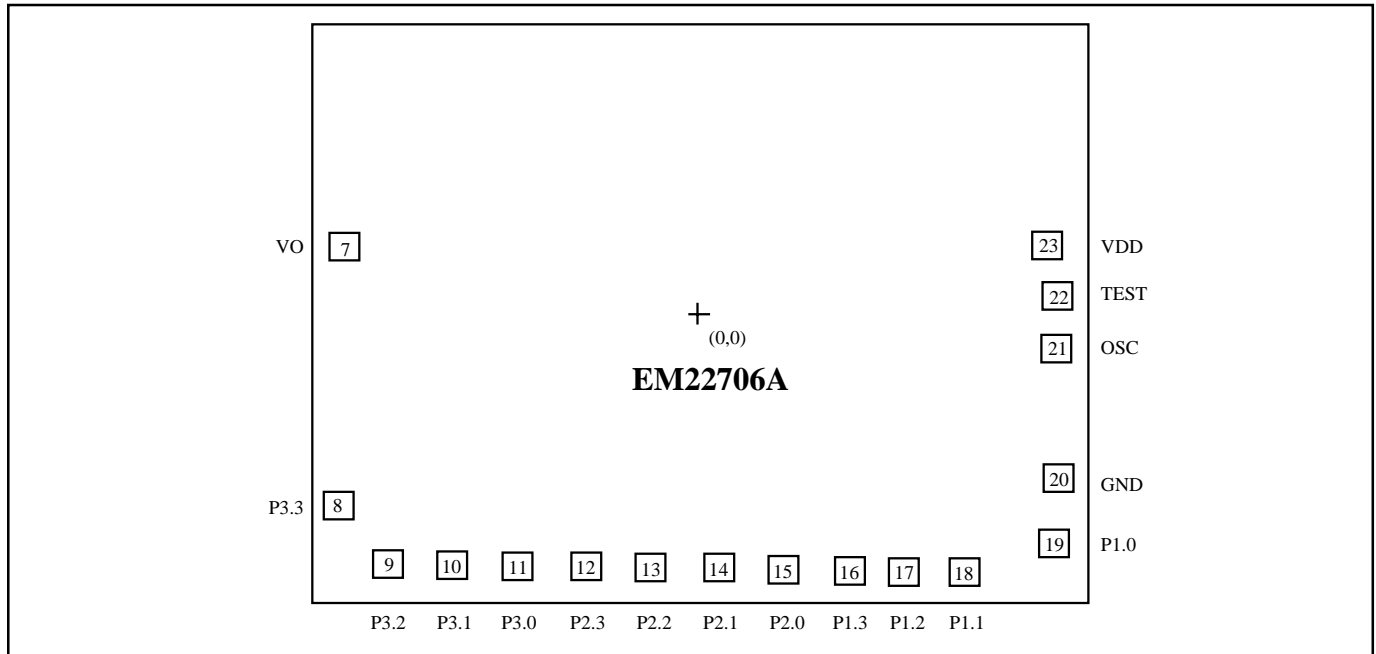
ABSOLUTE MAXIMUM RATINGS

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 _{OPR}	0	50	°C
Storage temperature	T _{STR}	-55	+125	°C

ELECTRICAL CHARACTERISTICS

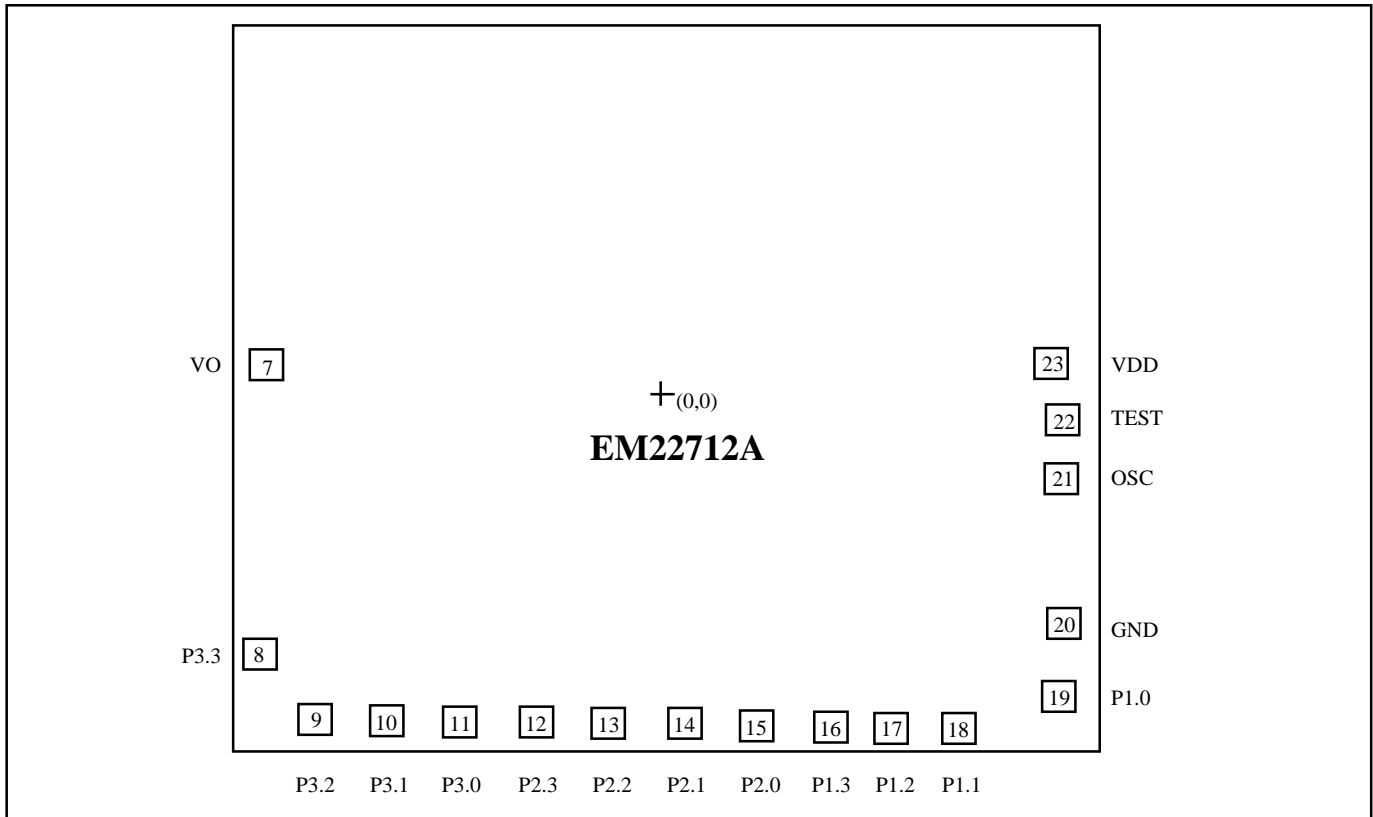
Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Operating Voltage	V _{DD}	2.4	3.0	5.1	V	
Standby current	I _{DDS}	-	-	1.0	μA	V _{DD} =3V
Operating current	I _{DDO}	-	250	-	μA	V _{DD} =3V,no load
Drive current of P2,P3	I _{OD}	1.0	-	-	mA	V _{DD} =3V,VO=2.4V
Sink current of P3	I _{OS}	1.6	-	-	mA	V _{DD} =3V,VO=0.4V
Input current of P2	I _{IH2}	-	3.0	10.0	μA	V _{DD} =3V
Output current of VO	I _{VO}	2.0	3.0	4.0	mA	V _{DD} =3V,VO=0.7V(Step 7)
Oscillation resistor	R	-	1.0	-	MΩ	V _{DD} =3V
Oscillation freq.	F _{OSC}	-	1.0	-	MHz	V _{DD} =3V

PAD DIAGRAM



Chip Size : 2800 x 2090 μm

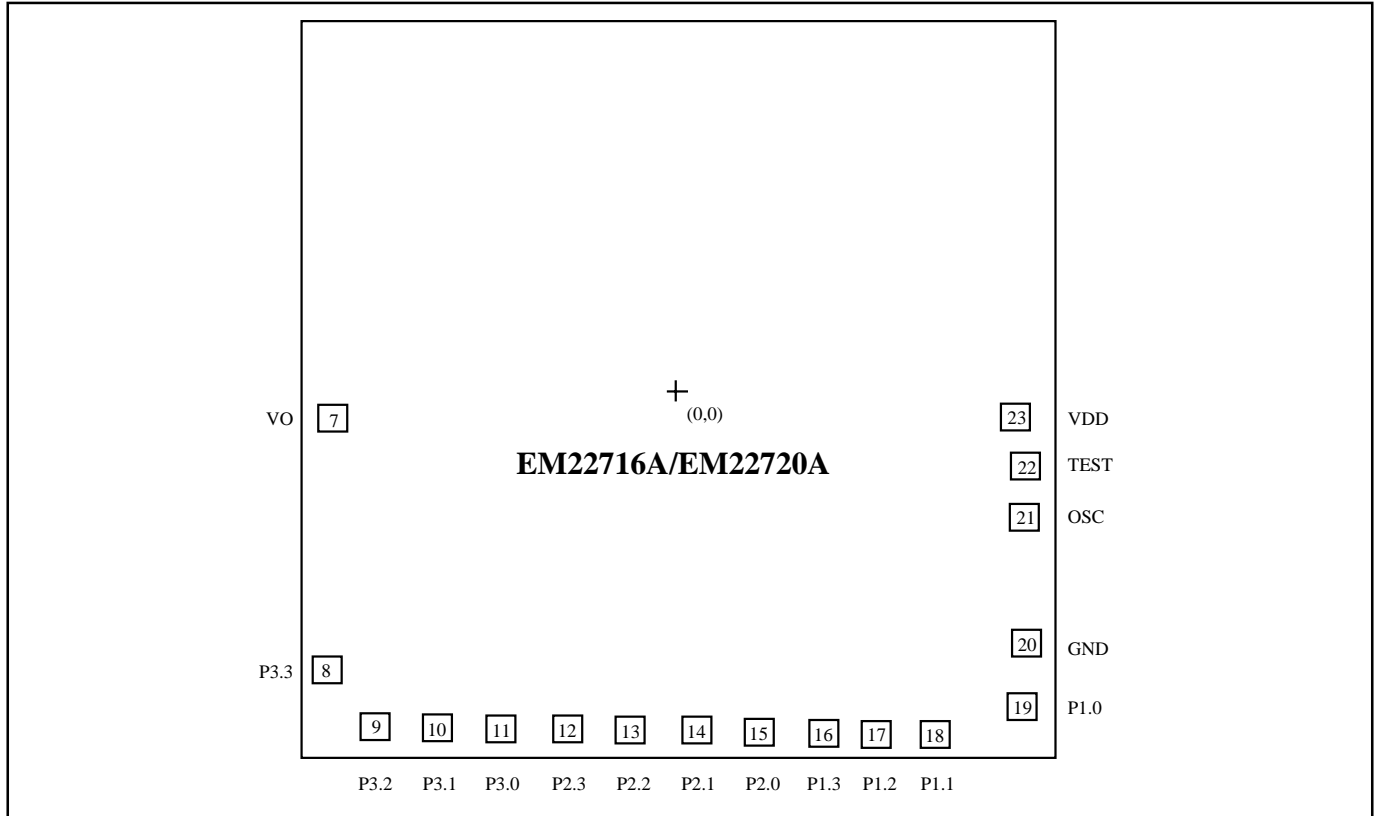
Pad No.	Symbol	X	Y
7	VO	-1222.1	216.1
8	P3.3	-1236.0	-680.1
9	P3.2	-1058.5	-881.0
10	P3.1	-839.2	-881.0
11	P3.0	-617.5	-881.0
12	P2.3	-383.4	-881.0
13	P2.2	-161.6	-881.0
14	P2.1	85.5	-881.0
15	P2.0	307.3	-881.0
16	P1.3	536.9	-886.4
17	P1.2	724.5	-886.4
18	P1.1	933.5	-886.4
19	P1.0	1243.1	-779.6
20	GND	1255.7	-553.6
21	OSC	1243.1	-109.2
22	TEST	1243.1	78.4
23	V _{DD}	1202.4	250.7



Chip Size : 2800 x 2370 μm

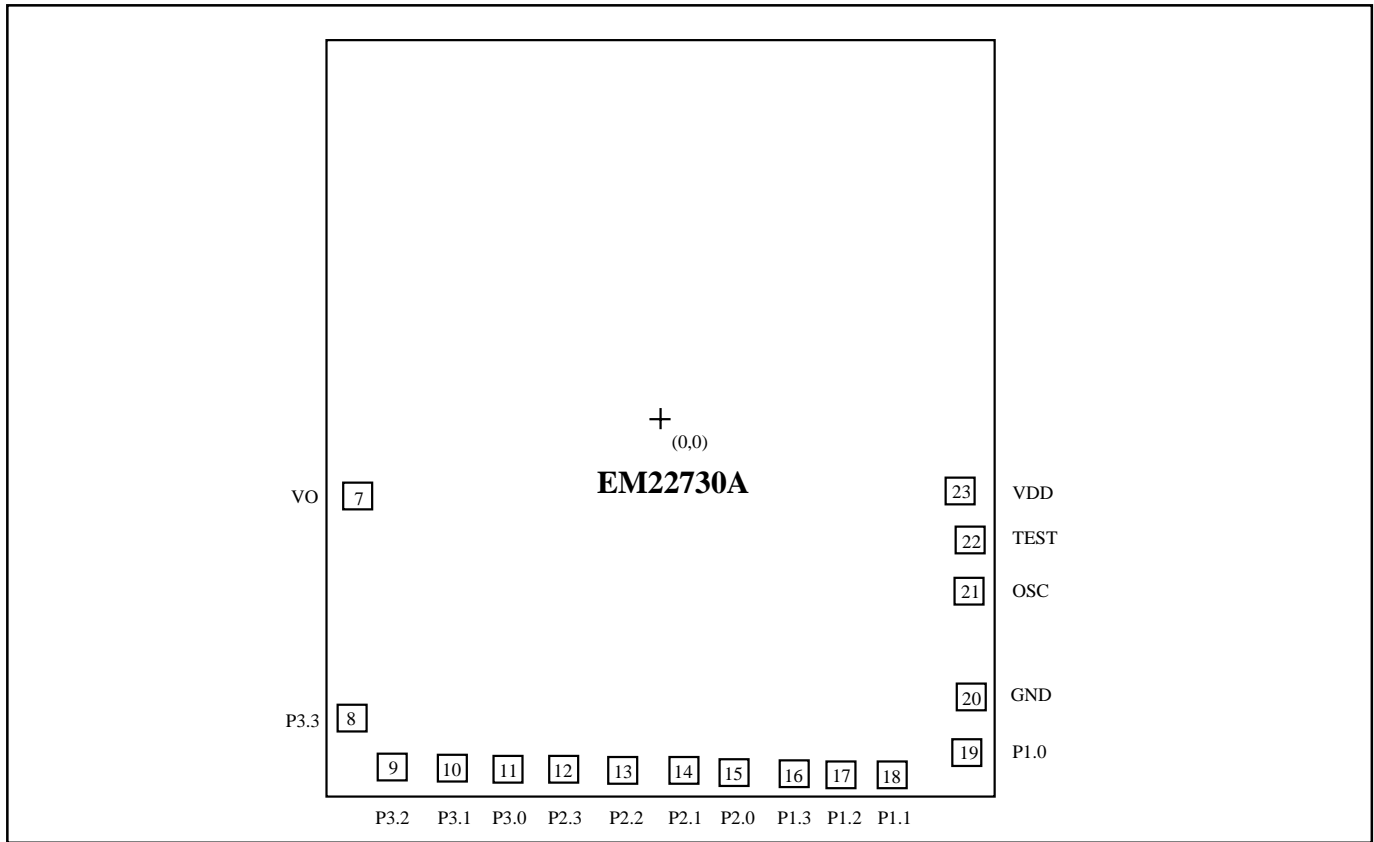
Pad No.	Symbol	X	Y
7	VO	-1222.1	76.0
8	P3.3	-1236.0	-820.2
9	P3.2	-1058.5	-1021.0
10	P3.1	-839.2	-1021.0
11	P3.0	-617.5	-1021.0
12	P2.3	-383.4	-1021.0
13	P2.2	-161.6	-1021.0
14	P2.1	85.5	-1021.0
15	P2.0	307.3	-1021.0
16	P1.3	536.9	-1026.4
17	P1.2	724.5	-1026.4
18	P1.1	933.5	-1026.4
19	P1.0	1243.1	-919.6
20	GND	1255.7	-693.6
21	OSC	1243.1	-249.2
22	TEST	1243.1	-61.6
23	V _{DD}	1202.4	110.6

* This specification are subject to be changed without notice.



Chip Size : 2800 x 2730 μm

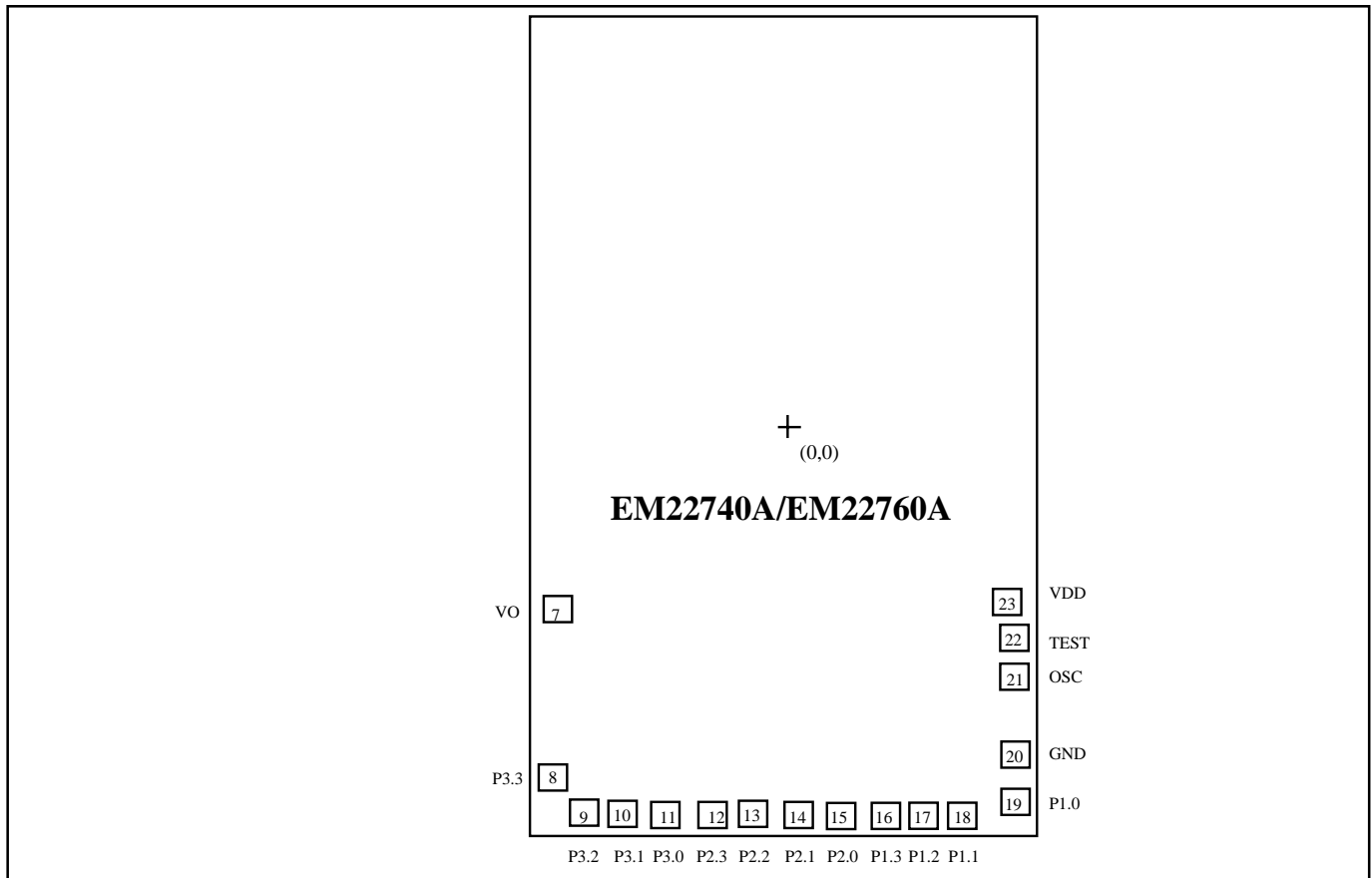
Pad No.	Symbol	X	Y
7	VO	-1222.1	-103.9
8	P3.3	-1236.0	-1000.2
9	P3.2	-1058.5	-1201.0
10	P3.1	-839.2	-1201.0
11	P3.0	-617.5	-1201.0
12	P2.3	-383.4	-1201.0
13	P2.2	-161.6	-1201.0
14	P2.1	85.5	-1201.0
15	P2.0	307.3	-1201.0
16	P1.3	536.9	-1206.4
17	P1.2	724.5	-1206.4
18	P1.1	933.5	-1206.4
19	P1.0	1243.1	-1099.6
20	GND	1255.7	-873.6
21	OSC	1243.1	-429.2
22	TEST	1243.1	-241.6
23	V _{DD}	1202.4	-69.4



Chip Size : 2800 x 3160 μm

Pad No.	Symbol	X	Y
7	VO	-1222.1	-318.9
8	P3.3	-1236.0	-1215.1
9	P3.2	-1058.5	-1416.0
10	P3.1	-839.2	-1416.0
11	P3.0	-617.5	-1416.0
12	P2.3	-383.4	-1416.0
13	P2.2	-161.6	-1416.0
14	P2.1	85.5	-1416.0
15	P2.0	307.3	-1416.0
16	P1.3	536.9	-1421.4
17	P1.2	724.5	-1421.4
18	P1.1	933.5	-1421.4
19	P1.0	1243.1	-1314.6
20	GND	1255.7	-1088.6
21	OSC	1243.1	-644.2
22	TEST	1243.1	-456.6
23	V _{DD}	1202.4	-284.4

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Chip Size : 2800 x 4440 μm

Pad No.	Symbol	X	Y
7	VO	-1222.1	-959.0
8	P3.3	-1235.9	-1855.2
9	P3.2	-1058.4	-2056.1
10	P3.1	-839.2	-2056.1
11	P3.0	-617.4	-2056.1
12	P2.3	-383.4	-2056.1
13	P2.2	-161.6	-2056.1
14	P2.1	85.5	-2056.1
15	P2.0	307.3	-2056.1
16	P1.3	537.0	-2061.5
17	P1.2	724.5	-2061.5
18	P1.1	933.5	-2061.5
19	P1.0	1243.1	-1954.6
20	GND	1255.7	-1728.6
21	OSC	1243.1	-1284.2
22	TEST	1243.1	-1096.7
23	V _{DD}	1202.4	-924.4

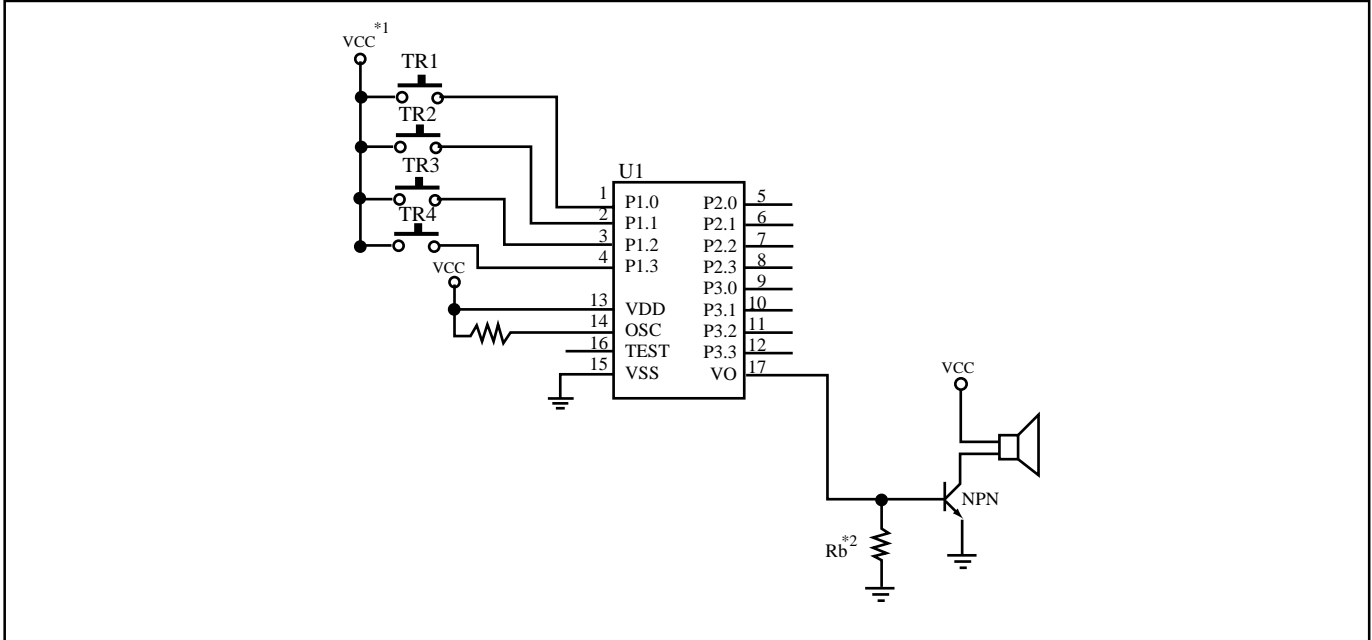
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APPLICATION CIRCUIT

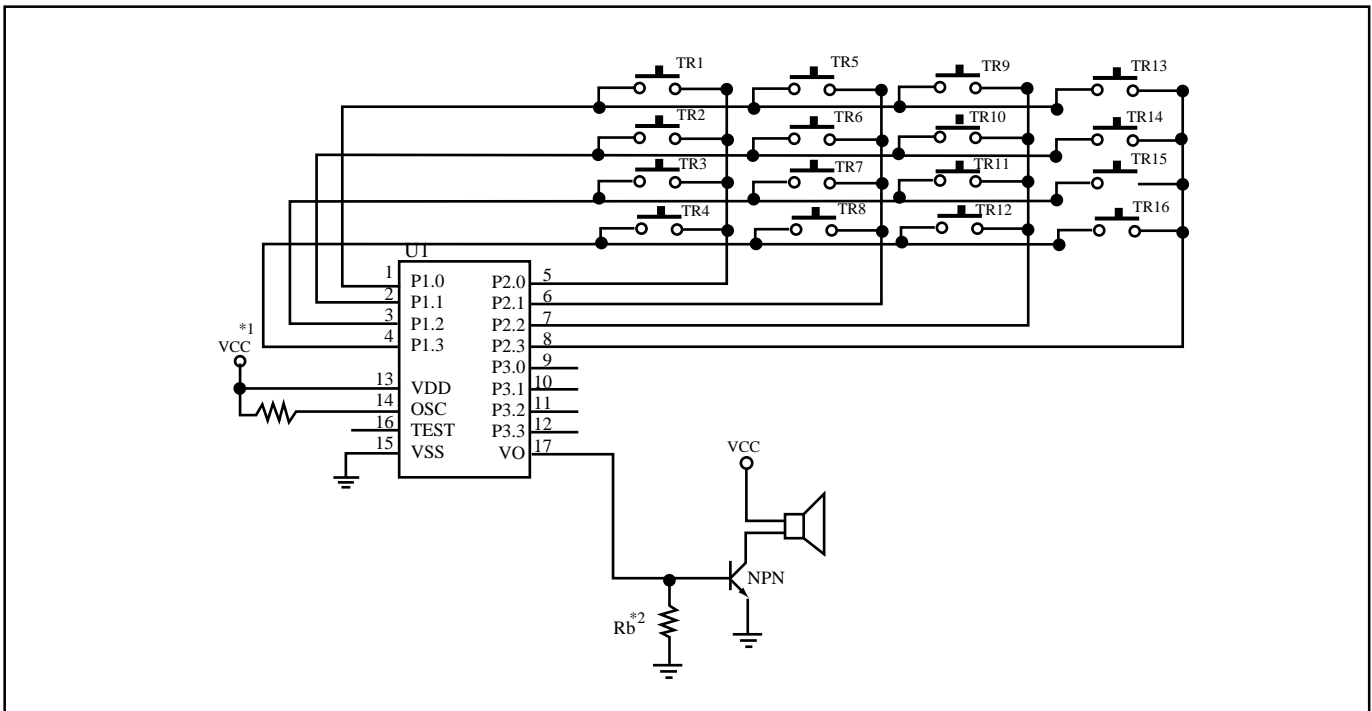
In the following application circuits:

- *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

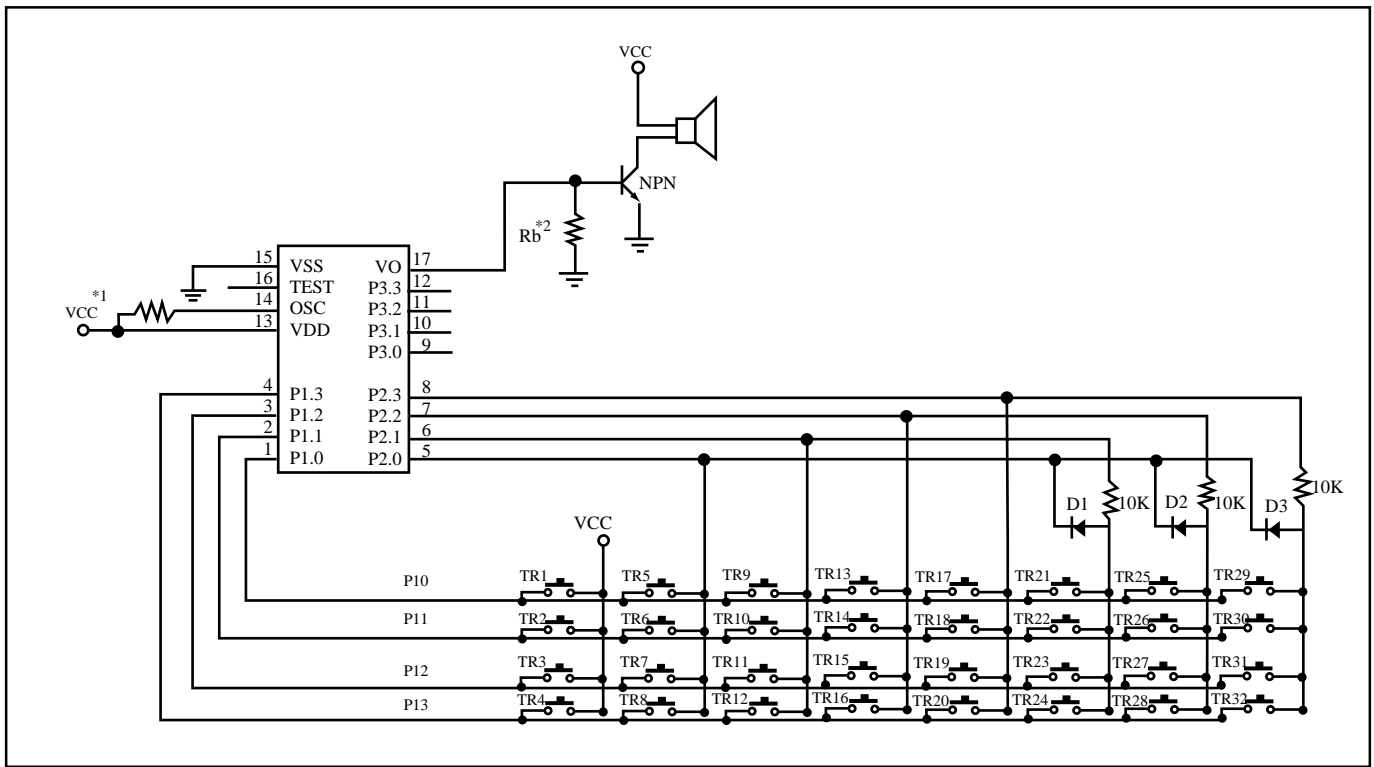


16-key Application Circuit

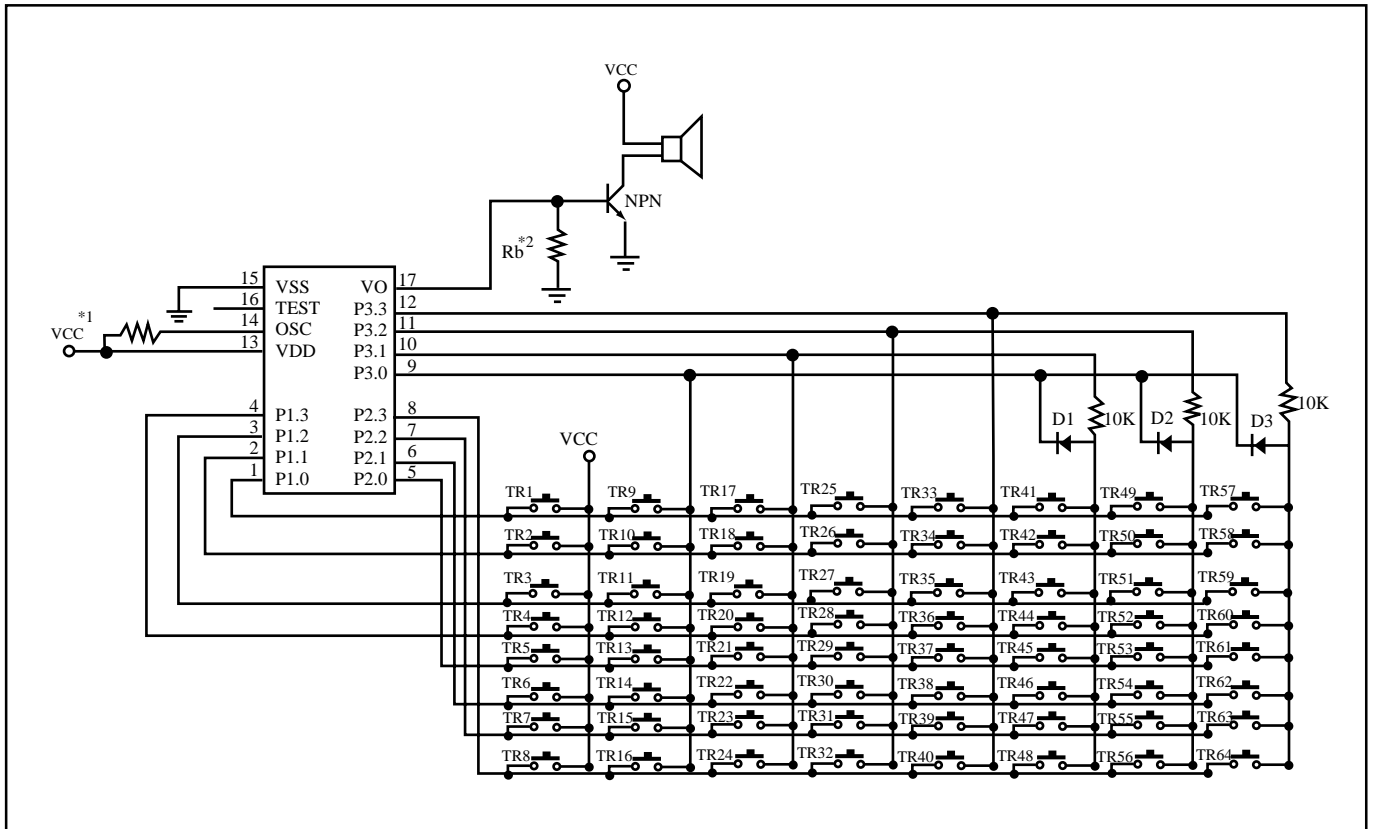


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32-key Application Circuit

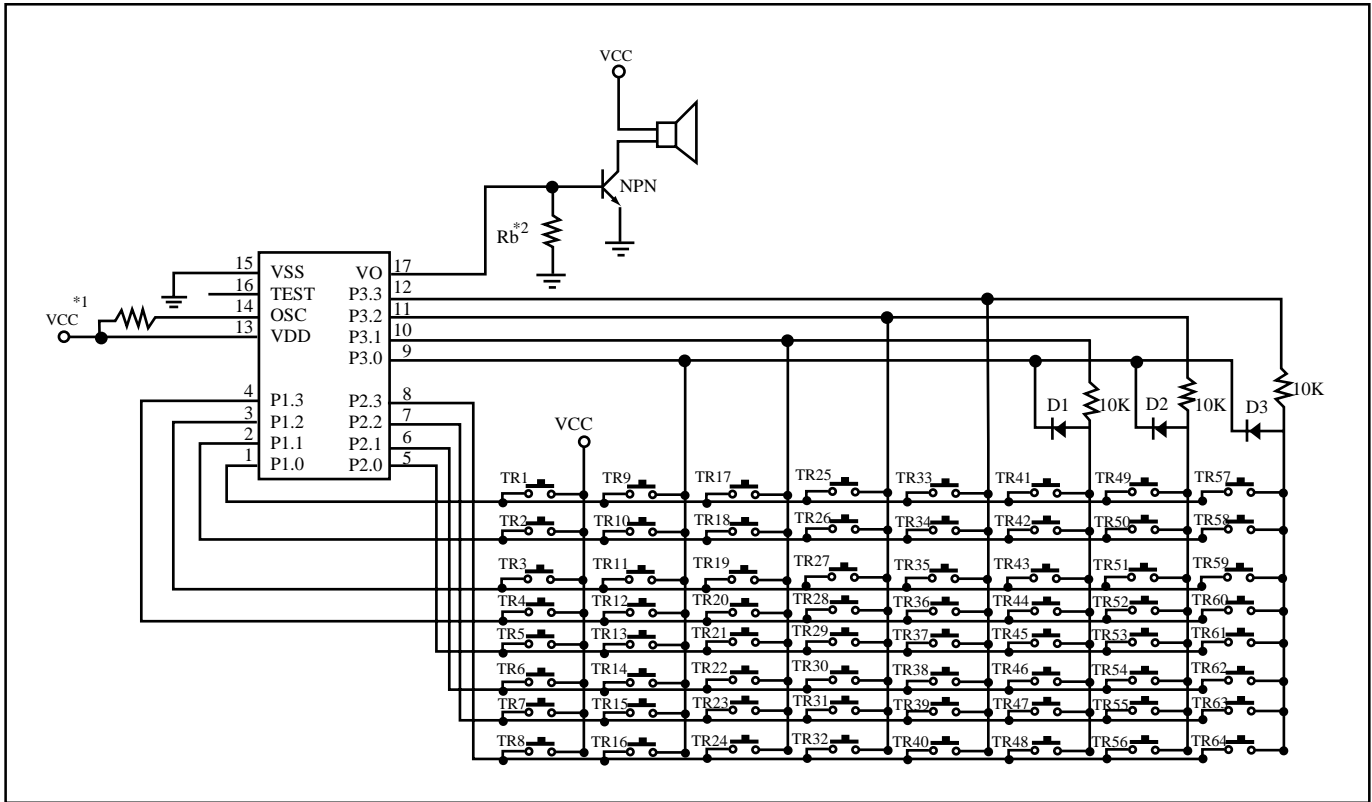


64-key Application Circuit

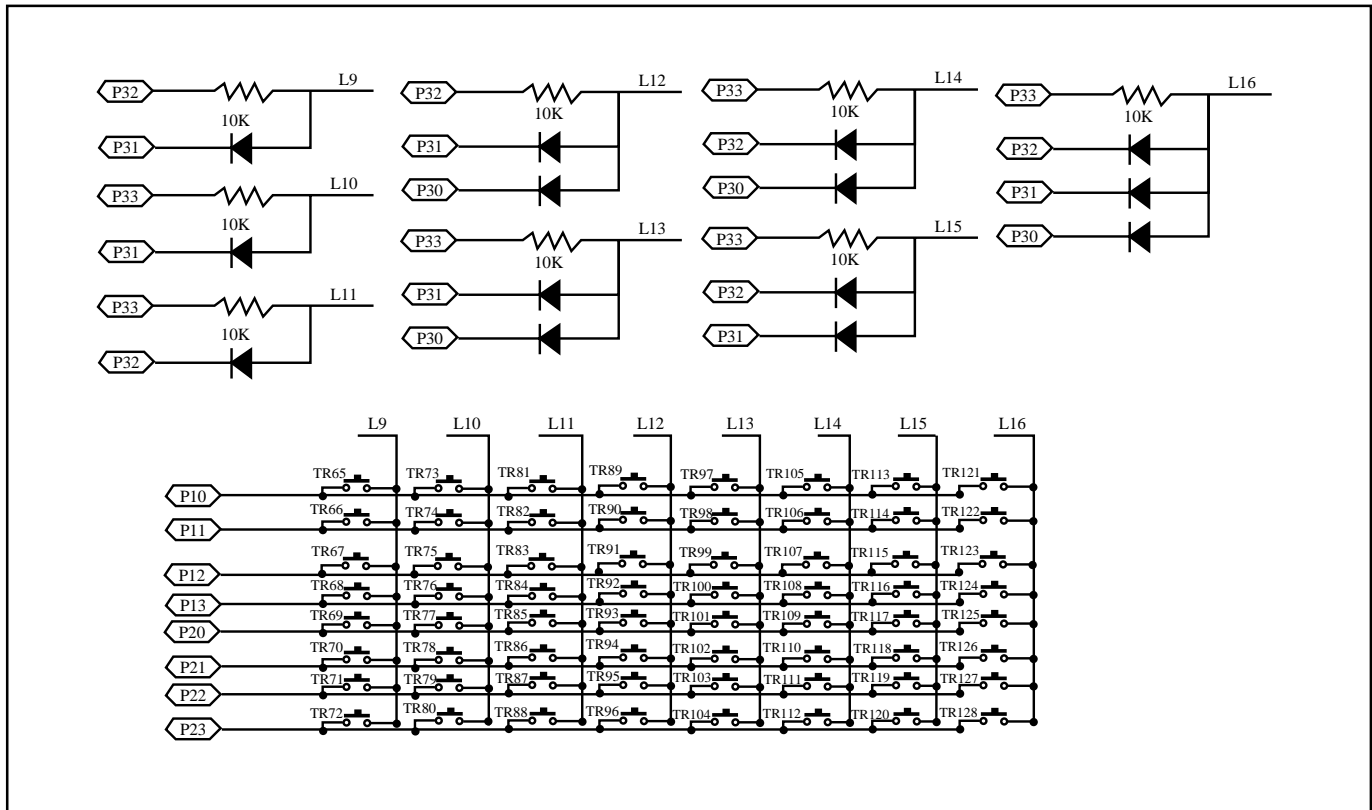


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128-key Application Circuit (A)



128-key Application Circuit (B)



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