

## 25 Key Piano/Organ with 15 Melodies

### Features

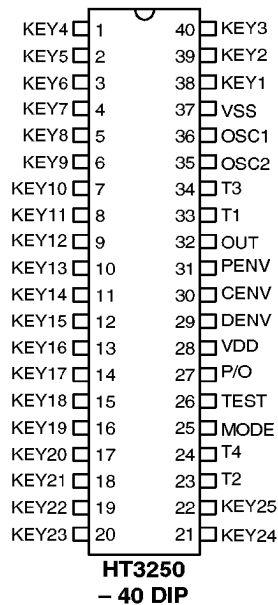
- CMOS Metal-Gate technology
- Operating voltage: 2.4V~5V
- Low stand-by current: 1μA (VDD=3V)
- 25 direct key inputs, tone area=F3~F5
- 2 instruments: piano and organ
- 15 built-in melodies controlled by 15 full scale keys
- Minimal external components required
- 40 pin dual-in-line package

### General Description

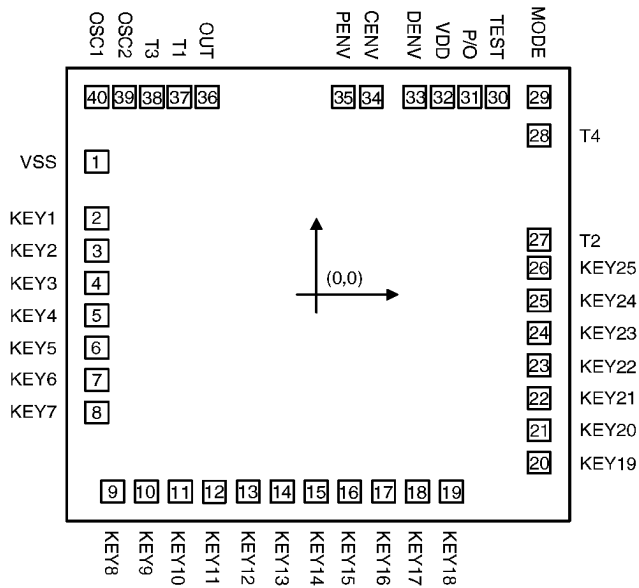
The HT3250 is a LSI CMOS chip designed for use in keyboard instrument applications. The chip is capable of playing both organ and piano, with 25 direct key inputs and 15 built-in melodies available. The HT3250 requires only one

capacitor, two transistors, and a few resistors for normal applications. The contents of the melodies can be modified by altering one mask layer during IC fabrication.

### Pin Assignment



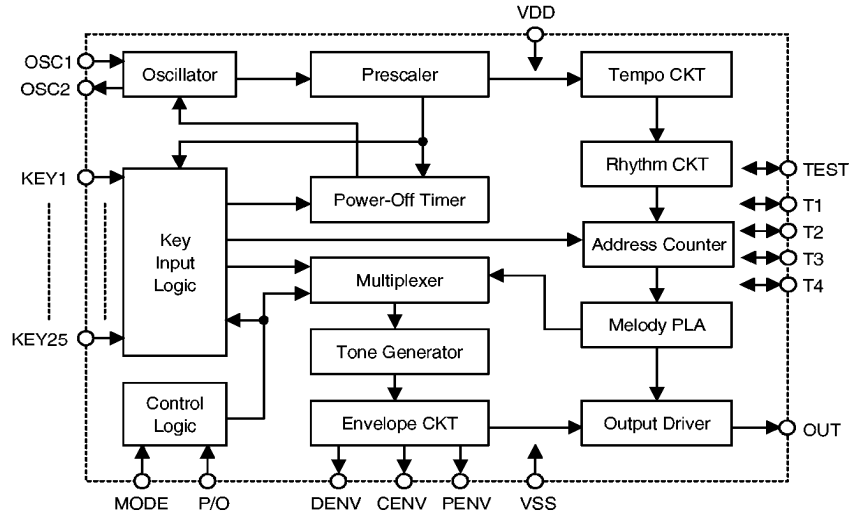
### Pad Assignment



Chip size: 129 × 121 (mil)<sup>2</sup>

\* The IC substrate should be connected to VDD in the PCB layout artwork.

**Block Diagram**



**Pad Coordinates**

Unit: mil

Pad No.	X	Y	Pad No.	X	Y
1	-58.20	36.55	21	58.18	-37.47
2	-58.18	20.98	22	58.18	-28.55
3	-58.18	12.00	23	58.18	-19.62
4	-58.18	3.13	24	58.18	-10.69
5	-58.18	-5.80	25	58.18	-1.77
6	-58.18	-14.73	26	58.18	7.38
7	-58.18	-23.65	27	58.18	15.12
8	-58.18	-32.57	28	58.20	46.92
9	-54.09	-54.50	29	58.20	54.40
10	-45.16	-54.40	30	47.22	54.42
11	-36.24	-54.40	31	39.99	54.42
12	-27.31	-54.46	32	32.77	54.41
13	-18.38	-54.40	33	25.54	54.42
14	-9.46	-54.40	34	14.07	54.42
15	-0.54	-54.40	35	6.66	54.40
16	8.39	-54.40	36	-29.27	54.40
17	17.32	-54.40	37	-36.51	54.42
18	26.24	-54.40	38	-43.74	54.41
19	35.17	-54.40	39	-50.96	54.42
20	58.19	-46.40	40	-58.19	54.42

**Pin Description**

Pin No.	Pin Name	I/O	Internal Connection	Description
1~22	KEY4~KEY25	I	CMOS Pull-High	Direct keyboard input pins The full scale key can play the demo-melody in the melody mode.
23, 24	T2, T4	I/O	CMOS	For IC test only
25	MODE	I	CMOS Pull-High	Selection of key play mode or melody play mode Open=Key play mode VSS=Melody play mode
26	TEST	I	CMOS	For IC test only
27	P/O	I	CMOS Pull-High	Selection of piano or organ sound Open=Piano VSS=Organ
28	VDD	I	—	Power supply (positive)
29	DENV	O	NMOS Open Drain	Organ envelope pin for attacking time control
30	CENV	O	PMOS Open Drain	Organ envelope pin for releasing time control
31	PENV	O	NMOS Open Drain	Piano envelope pin
32	OUT	O	Transmission Gate	Piano/Organ sound output pins
33, 34	T1, T3	I/O	CMOS	For IC test only
35	OSC2	O	—	Oscillator output
36	OSC1	I	—	Oscillator input
37	VSS	I	—	Power supply (ground)
38~40	KEY1~KEY3	I	CMOS Pull-High	Direct keyboard input pins The full scale key can play the demo melody in the melody mode.

**Absolute Maximum Ratings**

Supply Voltage ..... -0.3V to 5.5V

Storage Temperature..... -50°C to 125°C

 Input Voltage.....  $V_{SS}-0.3V$  to  $V_{DD}+0.3V$ 

Operating Temperature..... 0°C to 70°C

**Electrical Characteristics**

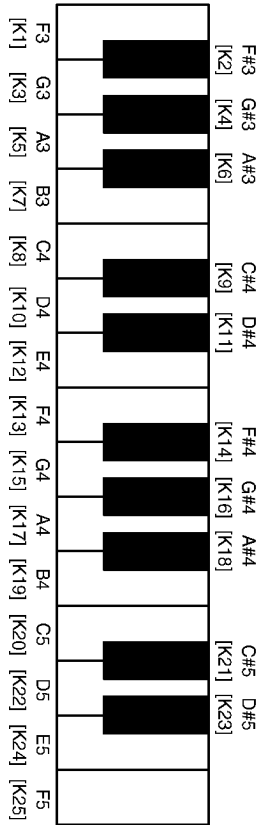
(Ta=25°C)

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
		V <sub>DD</sub>	Condition				
V <sub>DD</sub>	Operating Voltage	—	—	2.4	3	5	V
I <sub>STB</sub>	Stand-by Current	3V	—	—	1	10	μA
I <sub>DD</sub>	Operating Current	3V	No load	—	200	400	μA
I <sub>OH1</sub>	OUT Source Current	3V	V <sub>OL</sub> =0.3V	-0.4	-0.8	—	mA
I <sub>OH2</sub>	CENV Source Current	3V	V <sub>OH</sub> =2.7V	-0.6	-1.2	—	mA
I <sub>OL1</sub>	DENV Sink Current	3V	V <sub>OL</sub> =0.3V	1	2	—	mA
I <sub>OL2</sub>	PENV Sink Current	3V	V <sub>OL</sub> =0.3V	1.5	4	—	mA
I <sub>IL1</sub>	MODE Input Current	3V	V <sub>IL</sub> =0V	—	0.3	—	μA
I <sub>IL2</sub>	KEY Input Current	3V	V <sub>IL</sub> =0V	—	5	—	μA
V <sub>IL</sub>	“L” Input Voltage	—	—	—	—	0.2V <sub>DD</sub>	V
V <sub>IH</sub>	“H” Input Voltage	—	—	0.7V <sub>DD</sub>	—	—	V
F <sub>OSC</sub>	Oscillator Frequency	3V	R <sub>OSC</sub> =180KΩ	—	125	—	KHz

## Functional Description

### Scales

K1~K25 and their corresponding keyboard tone outputs are as shown:



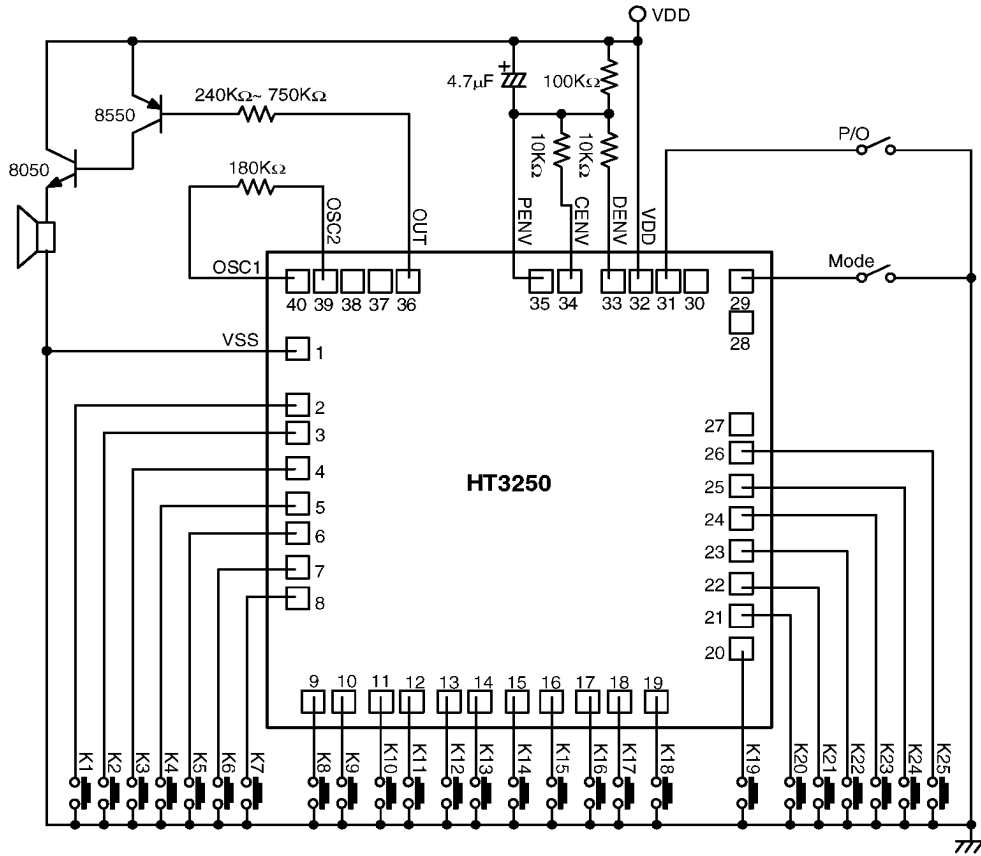
### Demo Songs

There are 15 built-in melodies for demonstration in the HT3250 as listed below:

Select Key	Melody Name
K1	Twinkle, Twinkle, Little Star
K3	Mary Had a Little Lamb
K5	Happy Birthday
K7	Row, Row, Row your Boat
K8	London Bridge Is Falling down
K10	Thumb Kin
K12	My Darling Clementine
K13	Swanee River
K15	OH! Susanna
K17	My Bonnie
K19	This Old Man
K20	Billy Boy
K22	Eensy Weensy Spider
K24	Cradle Song
K25	I'm so Happy

**Application Circuits**

**Chip form**



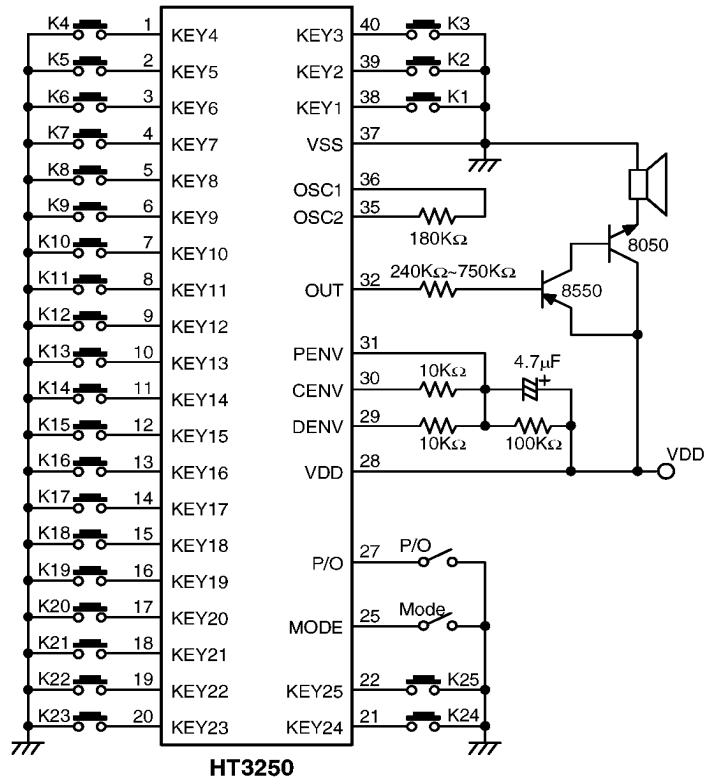
\* The IC substrate should be connected to VDD in the PCB layout artwork.

\*Note1:

Mode	State
Open	Play Mode
VSS	Melody Mode

P/O	Timbre
Open	Piano
VSS	Organ

Package form

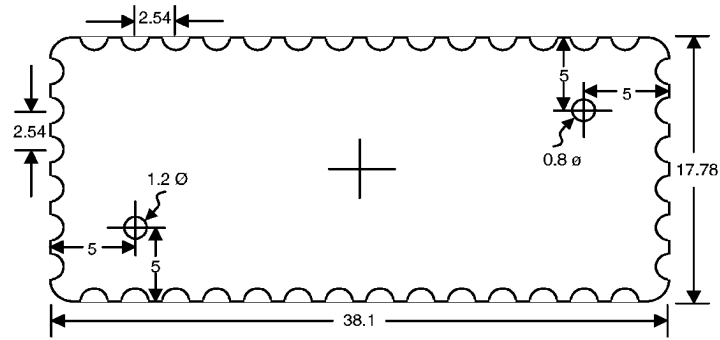


\*Note 1:

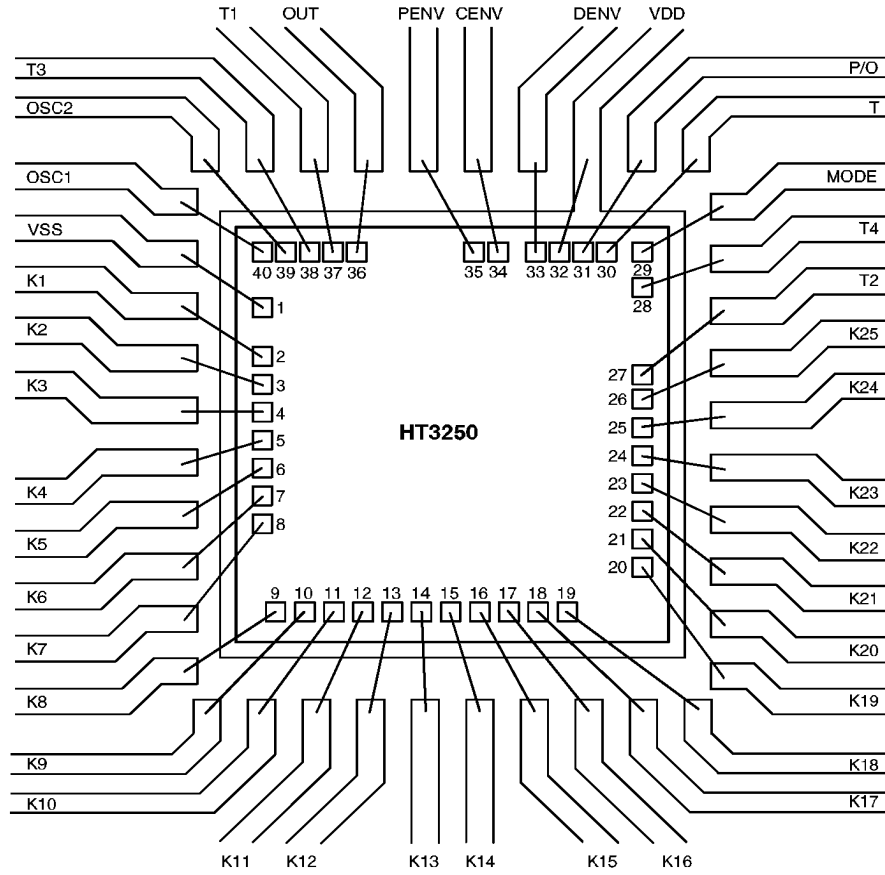
Mode	State
Open	Play Mode
VSS	Melody Mode

P/O	Timbre
Open	Piano
VSS	Organ

**COB information**



Unit:  $\mu\text{m}$



Note : The pin assignment and application are compatible to package type.