

## ■ INTRODUCTION

SN68090 is a 90 seconds single chip voice synthesizer IC which contains I/O pins and a tiny controller. By programming through the tiny controller, user's applications including section combination, trigger modes, output status, and other logic functions can then be easily implemented.

## ■ FEATURES

- ◆ Single power supply 2.4V - 5.1V
- ◆ Built in a tiny controller
- ◆ 90 seconds voice capacity are provided
- ◆ Two 4-bit I/O ports and two 4-bit output ports are provided
- ◆ 64\*4 bits RAM are provided
- ◆ Maximum 16k program ROM is provided
- ◆ Readable ROM code data
- ◆ Built in a high quality speech synthesizer
- ◆ Adaptive playing speed from 2.5k-20kHz is provided
- ◆ Built in a dual tone melody generator
- ◆ Speech/Dual tone melody mixer is provided
- ◆ Fixed current D/A output is provided to drive external connected transistor for sound output
- ◆ Low Voltage Reset

**■ PIN ASSIGNMENT**

Symbol	I/O	Function Description
P20	I/O	Bit0 of I/O port 2
P21	I/O	Bit1 of I/O port 2
P22	I/O	Bit2 of I/O port 2
P23	I/O	Bit3 of I/O port 2
P30	I/O	Bit0 of I/O port 3
P31	I/O	Bit1 of I/O port 3
P32	I/O	Bit2 of I/O port 3
P33	I/O	Bit3 of I/O port 3
P40	O	Bit0 of output port 4
P41	O	Bit1 of output port 4
P42	O	Bit2 of output port 4
P43	O	Bit3 of output port 4
P50	O	Bit0 of output port 5
P51	O	Bit1 of output port 5
P52	O	Bit2 of output port 5
P53	O	Bit3 of output port 5
V <sub>DD</sub>	I	Positive power supply
OSC	I	Oscillation component connection pin
TEST	I	For testing only
GND	I	Negative power supply
V <sub>O</sub>	O	D/A current output

**■ ABSOLUTE MAXIMUM RATING**

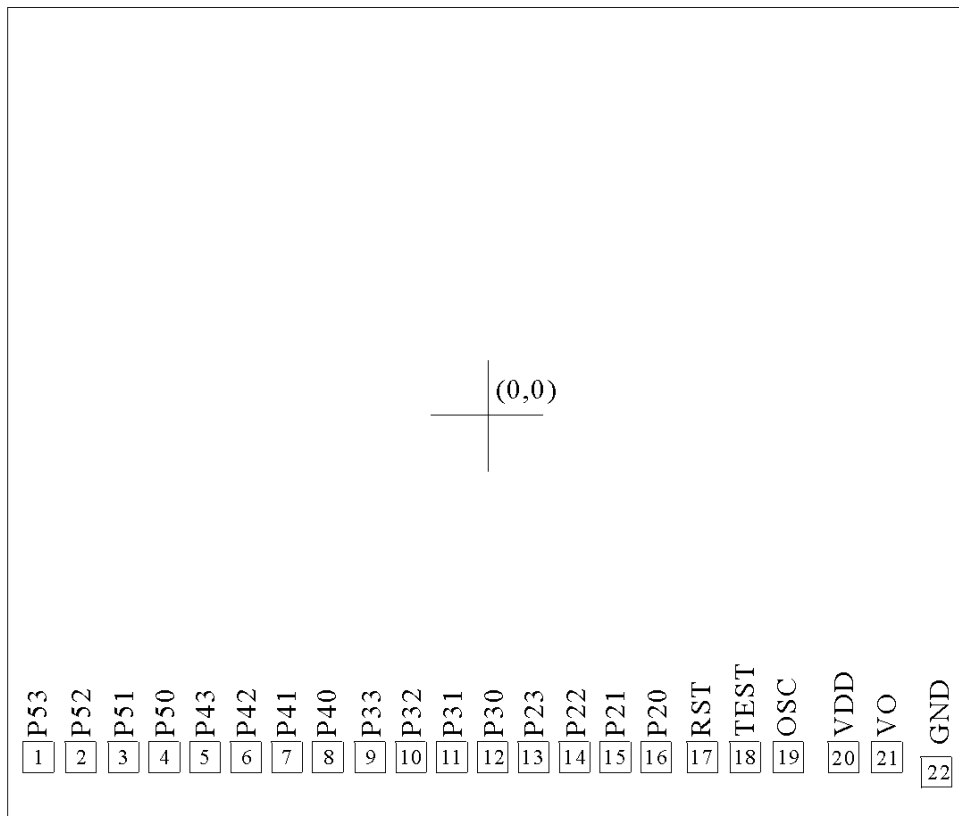
Items	Symbol	Min	Max	Unit.
Supply Voltage	$V_{DD}$	-0.3	6.0	V
Input Voltage	$V_{IN}$	$V_{SS}-0.3$	$V_{DD}+0.3$	V
Operating Temperature	$T_{OP}$	-20.0	70.0	°C
Storage Temperature	$T_{STG}$	-55.0	125.0	°C

**■ ELECTRICAL CHARACTERISTICS**

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Operating Voltage	$V_{DD}$	2.4	3.0	5.1	V	
Standby Current	$I_{SBY}$	-	-	2.0	$\mu A$	$V_{DD}=3V$ , no load
Operating Current	$I_{OPR}$	-	-	250	$\mu A$	$V_{DD}=3V$ , no load
Input Current of P1	$I_i$	-	3	-	$\mu A$	$V_{DD}=3V$
Drive Current of P2,P3	$I_{OD}$	1.5	2	-	$mA$	$V_{DD}=3V, V_O=2.4V$
Sink Current of P2,P3	$I_{OS}$	2.0	3	-	$mA$	$V_{DD}=3V, V_O=0.4V$
D/A Output Current	$I_{VO}$	2.0	3.0	4.0	$mA$	$V_{DD}=3V, V_O=0.7V$
Oscillation Freq.	$F_{OSC}$	-	1.0	-	MHz	$V_{DD}=3V$

■ **BONDING PAD LOCATION**

Pad No.	Pad Name	X(um)	Y(um)	Pad No.	Pad Name	X(um)	Y(um)
1	P53	-1320	-1006	12	P30	15	-1006
2	P52	-1195	-1006	13	P23	135	-1006
3	P51	-1070	-1006	14	P22	255	-1006
4	P50	-950	-1006	15	P21	375	-1006
5	P43	-830	-1006	16	P20	495	-1006
6	P42	-710	-1006	17	RST	631	-1006
7	P41	-590	-1006	18	TEST	756	-1006
8	P40	-470	-1006	19	OSC	883	-1006
9	P33	-345	-1006	20	VDD	1045	-1006
10	P32	-225	-1006	21	VO	1172	-1006
11	P31	-105	-1006	22	GND	1318	-1050



(2820,2400)um

**SN68090**

Note : The substrate MUST be connected to Vss in PCB layout.