■ INTRODUCTION

SN69040B is a single chip voice/dual tone melody synthesizer IC with 4*32 LCD direct drive capability which contains two 4-bit I/O ports, two optional 4-bit output ports and a tiny controller. By programming through the tiny controller, user's applications including LCD display, section combination, trigger modes, output status, voice/melody playing and other logic functions and then be easily implemented.

■ FEATURES

- Single power supply 2.4V - 5V
- Built in a tiny controller
- Two 4-bit I/O ports and two optional 4-bit output ports are provided
- Built in 40K*10 ROM
- 256*4 bits RAM for programming usage are provided
- 32*4 bits RAM for LCD display usage are provided
- Maximum 16k program ROM is provided
- Readable ROM code data
- Built in direct 4*32 LCD driver
- LCD 1/3 bias, 1/4 duty
- Built in a high quality speech synthesizer
- Adaptive playing speed from 2.5k-40kHz is provided
- Built in a dual tone melody generator
- Speech/Dual tone melody mixer is provided which SN69040B can play speech and dual tone melody simultaneously
- Fixed current D/A output is provided to drive external connected transistor for sound output
- PWM output is provided to drive external connected piezo buzzer

■ PIN ASSIGNMENT

Symbol	I/O	Function Description
SEG1-SEG24	O	segment 1~24 for LCD driver
SEG25/P53-SEG28/P50	O	Optional to be SEG25-SEG28 or P53-P50 SEG25-28: segment25~28 for LCD driver. P53-P50: Bit3-bit0 for output port 5.
SEG29/P43-SEG32/P40	O	Optional to be SEG29~SEG32 or P43-P40 SEG29~32: segment29~32 for LCD driver. P43~P40: Bit3-bit0 for output port 4.
COM1-COM4	O	Com1-Com4 for LCD driver.
GND	I	Negative power supply.
P33-P30	I/O	Bit 3 to bit 0 of IO port 3.
P23-P20	I/O	Bit 3 to bit 0 of IO port 2.
BU1,BU2	O	Buzzer driver outputs.
VO	O	D/A current output.
RST	I	Reset pin with internal pull low.
OSC	I	Oscillation component connection pin.
TEST	I	For testing only.
XIN,XOUT		32768 Hz Crystal connection pins.
V_{DD}	I	Positive power supply.

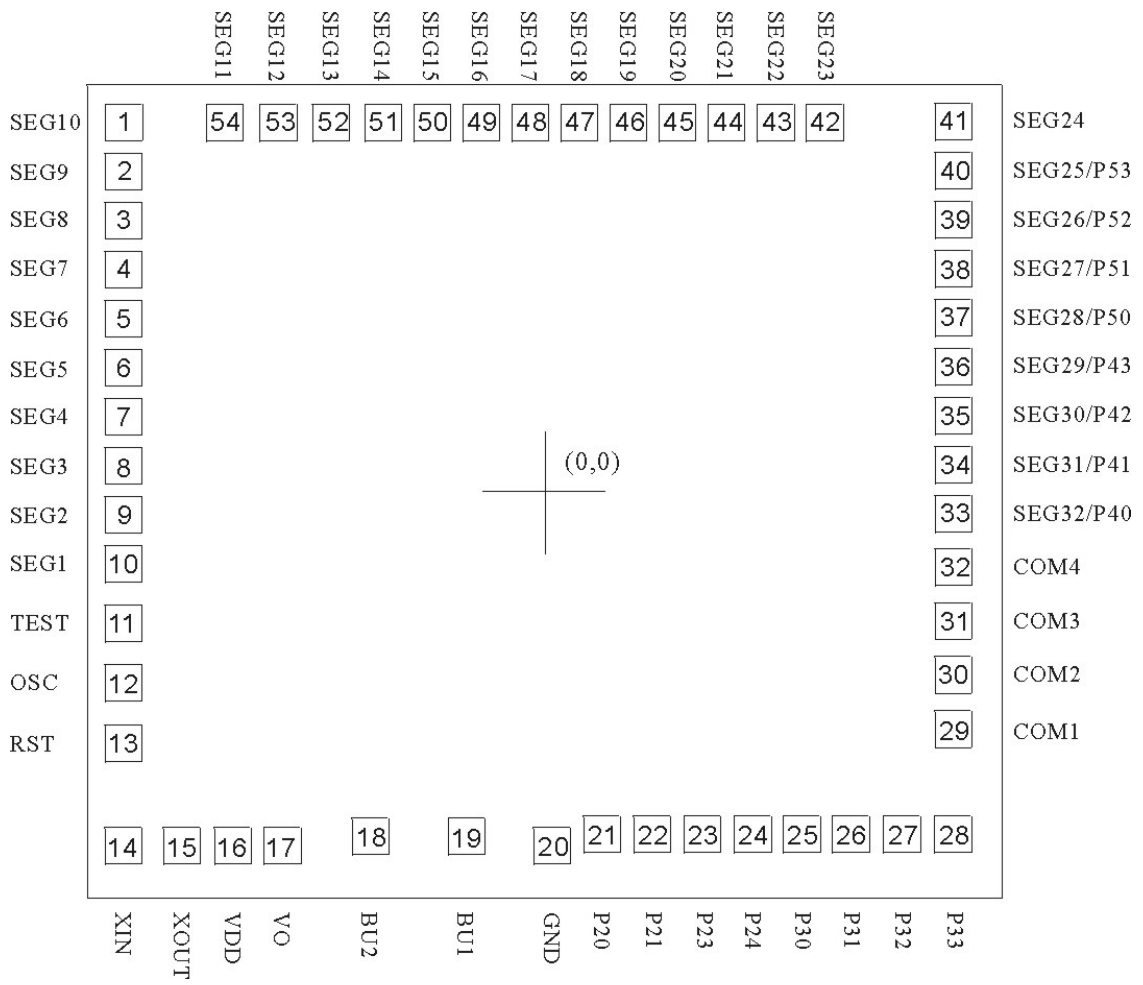
■ ABSOLUTELY MAXIMUM RATING

Items	Symbol	Min	Max	Unit.
Supply Voltage	V_{DD}-V	-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 CHARACTERISTIC

Item	Sym.	Min.	Typ.	Max.	Unit	Condition
Operating Voltage	V_{DD}	2.4	3.0	5.1	V	
Standby current 1	I_{SBY1}	-	2.5	3.5	*u*A	V_{DD}=3V,both system clk and 32768 Hz clk are off
Operating current	I_{OPR}	-	450		*u*A	V_{DD}=3V, no load
Input current of ,P2,P3	I_{IH}	-	3.0	10.0	*u*A	V_{DD}=3V,V_{IN}=3V
Drive current of P2,P3,P4,P5	I_{OD}	2	-	-	*m*A	V_{DD}=3V,V_O=2.6V
large Sink current of P2,P3,P4,P5	I_{OS1}	3	-	-	*m*A	V_{DD}=3V,V_O=0.4V
Input Pull Low Resistor	R	-	1	-	*M*Ω	V_{DD}=3V
D/A output current	I_{VO}	-	3.0	-	*m*A	V_{DD}=3V,V_O=0.7V
Buzzer drive current	I_{BZD}		15		*m*A	V_{DD}=3V,V_O=1.5V
Buzzer sink current	I_{BZS}		15		*m*A	V_{DD}=3V,V_O=1.5V
Oscillation resistor	R	-	330	-	KΩ	V_{DD}=3V
Oscillation Freq.	F_{OSC}	-	1.0	-	MHZ	V_{DD}=3V

■ BONDING PAD



SN69040B

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

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