

■ INTRODUCTION

SN69040 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 SN69040 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	0	segment 1~24 for LCD driver		
SEG25/P53-SE	0	Optional to be SEG25-SEG28 or P53-P50		
G28/P50		SEG25-28: segment25~28 for LCD driver.		
		P53-P50: Bit3-bit0 for output port 5.		
SEG29/P43-SE	0	Optional to be SEG29~SEG32 or P43-P40		
G32/P40		SEG29~32: segment29~32 for LCD driver.		
		P43~P40: Bit3-bit0 for output port 4.		
COM1-COM4	0	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	0	Buzzer driver outputs.		
VO	0	D/A current output.		
RST	I	Reset pin with internal pull low.		
OSC	I	Oscillation component connection pin.		
TEST	ļ	For testing only.		
XIN,XOUT		32768 Hz Crystal connection pins.		
V _{DD}	I	Positive power supply.		



■ ABSOLUTELY MAXIMUM RATING

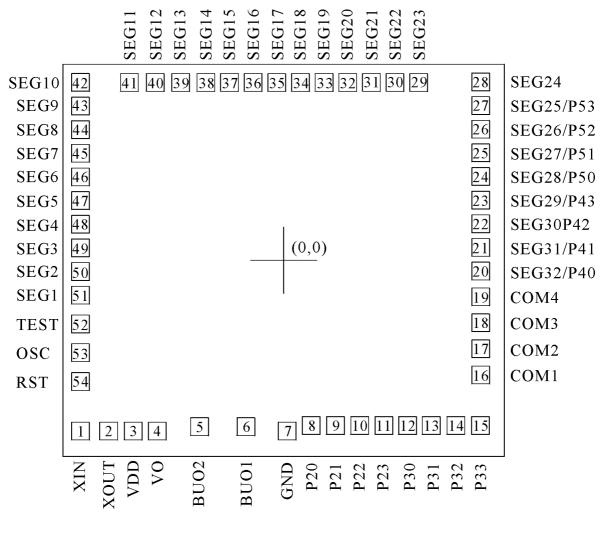
Items	Symbol	Min	Мах	Unit.
Supply Voltage	V_{DD} -V	-0.3	6.0	V
Input Voltage	V _{IN}	V _{SS} -0.3	V _{DD} +0.3	V
Operating	T _{OP}	-20.0	70.0	°C
Temperature				
Storage Temperature	T _{STG}	-55.0	125.0	°C

■ ELECTRICAL CHARACTERISTIC

ltem	Sym.	Min.	Тур.	Max.	Unit	Condition
Operating Voltage	V_{DD}	2.4	3.0	5.1	V	
Standby current 1	I _{SBY1}	-	-	1.0	иА	V _{DD} =3V,both system clk and 32768 Hz clk are off
Standby current 2	I _{SBY2}	-	20	50	иA	V _{DD} =3V, system clk is off, 32768 Hz clk is on for LCD display and timer.
Operating Current	I _{OPR}	-	350	500	иA	V _{DD} =3V, no load
Input current of ,P2,P3	Ι _{ΙΗ}	-	3.0	10.0	иA	V _{DD} =3V,V _{IN} =3V
Drive current of P2,P3,P4,P5	I _{OD}	-1.5	-2	-	mА	V _{DD} =3V,V _O =2.6V
large Sink current of P2,P3,P4,P5	I _{OS1}	2.0	3	-	mА	V _{DD} =3V,V _O =0.4V
Small Sink current of P2,P3,P4,P5	I _{OS2}	-	0.4	-	иA	V _{DD} =3V,V _O =0.4V
D/A output current	I _{VO}	2.0	3.0	4.0	mА	V _{DD} =3V,V _O =0.7V
Buzzer drive current	I _{BZD}		-15		mА	V _{DD} =3V,V _O =1.5V
Buzzer sink current	I _{BZS}		15		mΑ	V _{DD} =3V,V _O =1.5V
Oscillation resistor	R	-	1.0	-	MHz	V _{DD} =3V
Oscillation Freq.	Fosc	-	1.0	-	MHz	V _{DD} =3V



BONDING PAD



SN69040

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



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