

■ INTRODUCTION

SN6A512 is a series of single chip voice/dual tone melody synthesizer IC with 16*64/8*64 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 application 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 – 5.1V
- ◆ Built in a tiny controller
- ◆ Two 4-bit I/O ports, two optional 4-bit output ports are provided
- ◆ 256*4 bits RAM for programming usage are provided
- ◆ 256*4 bits RAM for LCD display usage are provided
- ◆ Maximum 512k*10 program ROM is provided
- ◆ Readable ROM code data
- ◆ Built in direct 16*64/8*64 LCD driver
- ◆ LCD 1/4 bias, 1/5 bias; 1/8 duty, 1/16 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 SN6A512 series 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 ~ SEG56 | O | Segment1~ 56 for LCD driver |
| SEG57/P53 ~ SEG60/P50 | O | Optional to be Segment57 ~ 60 or P53-P50 Seg57-60: segment57 ~ 60 for LCD driver. P53-P50: bit3-bit0 for output port 5. |
| SEG61/P43 ~ SEG64/P40 | O | Optional to be segment61 ~ 64 or P43-P40 SEG61-64: segment61 ~ 64 for LCD driver. P43-P40: Bit3-bit0 for output port 4. |
| COM1-COM16 | O | Com1-Com16 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. |
| VLCDR | | LCD voltage adjusting pin. |
| VLC1-VLC4 | | LCD voltage bias connection pins. |
| WSUB | I | Well substrate of chip. Connected to the highest voltage of chip (VDD or VLCDR). |

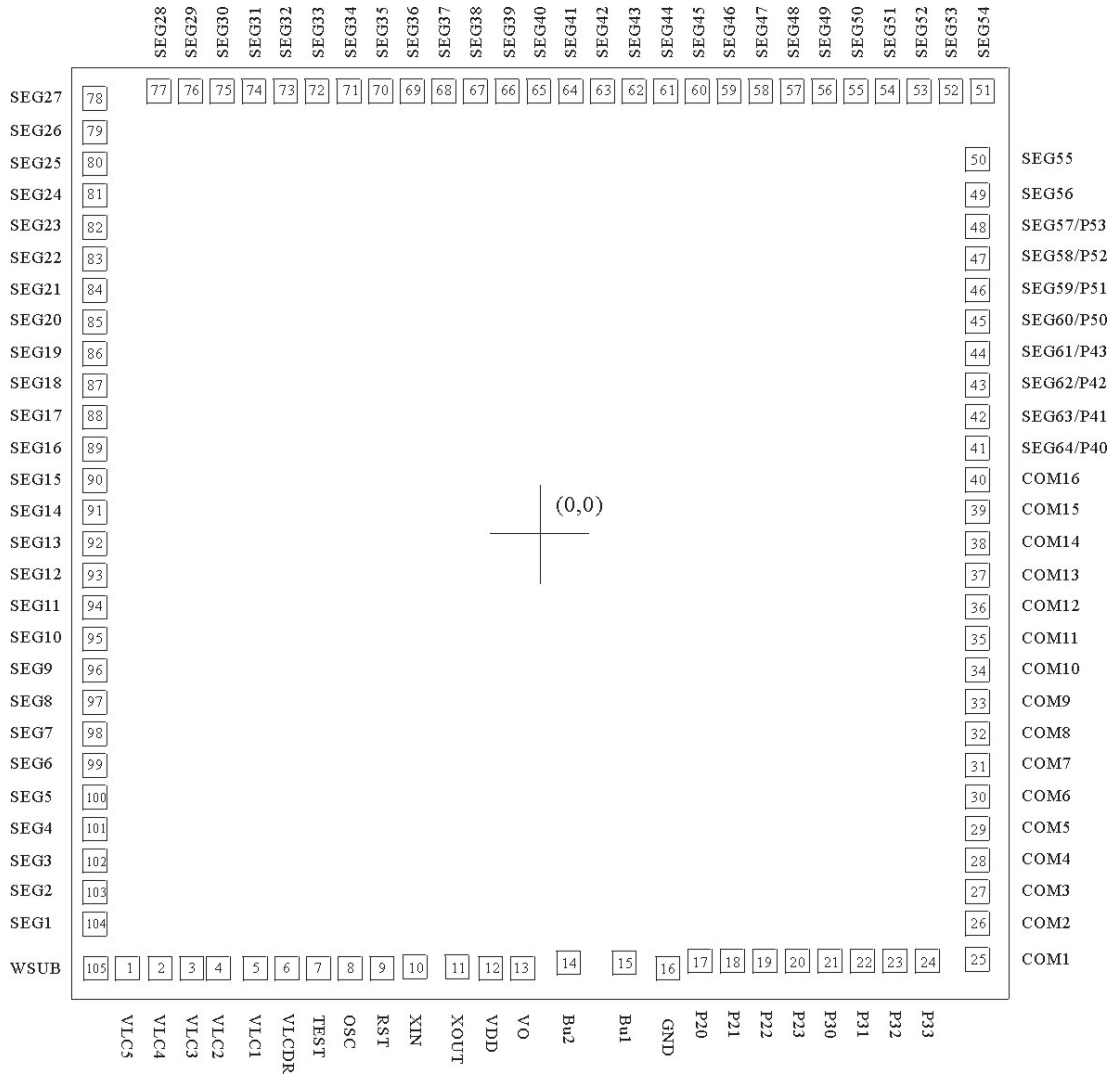
■ **ABSOLUTELY MAXIMUM RATING**

| 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} | - | - | 1.0 | μA | $V_{DD}=3V$, both system clk and 32768 Hz clk are off |
| Standby current 2 | I_{SBY2} | - | 20 | 50 | μA | $V_{DD}=3V$, system clk is off, 32768 Hz clk is on for LCD display and timer. |
| Operating current | I_{OPR} | - | 350 | 500 | μA | $V_{DD}=3V$, no load |
| Input current of ,P2,P3 | I_{IH} | - | 3.0 | 10.0 | μA | $V_{DD}=3V, V_{IN}=3V$ |
| Drive current of P2,P3,P4,P5 | I_{OD} | -1.5 | -2 | - | mA | $V_{DD}=3V, V_O=2.6V$ |
| Large Sink current of P2,P3,P4,P5 | I_{OS1} | 2.0 | 3 | - | mA | $V_{DD}=3V, V_O=0.4V$ |
| Small Sink current of P2,P3,P4,P5 | I_{OS2} | - | 0.4 | - | μA | $V_{DD}=3V, V_O=0.4V$ |
| D/A output current | I_{VO} | 2.0 | 3.0 | 4.0 | mA | $V_{DD}=3V, V_O=0.7V$ |
| Buzzer drive current | I_{BZD} | | -15 | | mA | $V_{DD}=3V, V_O=1.5V$ |
| Buzzer sink current | I_{BZS} | | 15 | | mA | $V_{DD}=3V, V_O=1.5V$ |
| Oscillation resistor | R | - | 1.0 | - | MHZ | $V_{DD}=3V$ |
| Oscillation Freq. | F_{OSC} | - | 1.0 | - | MHZ | $V_{DD}=3V$ |

■ **BONDING PAD**



SN6A512

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

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