



苏州敏芯微电子技术有限公司
MEMSensing Microsystems Co., Ltd

Data Sheet

V 1.4 / Aug. 2016

MSM261S4030HO

I²S digital output MEMS microphone with Multi-modes





GENERAL DESCRIPTION

MSM261S4030H0 is an omnidirectional, bottom-ported, I²S digital output MEMS microphone. It has high performance and reliability.

MSM261S4030H0 is available in a 4 mm × 3 mm × 1.0 mm metal cap LGA package. It is SMT compatible with no sensitivity degradation.

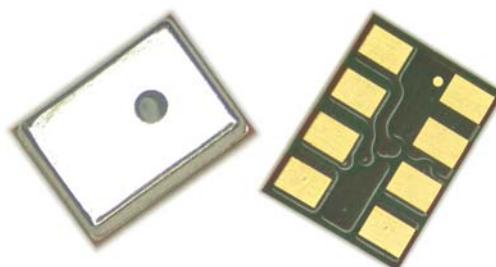
APPLICATIONS

- ✧ Mobile Phone
- ✧ Laptop
- ✧ Tablet computer
- ✧ Bluetooth headset
- ✧ Earphone
- ✧ Wearable intelligent equipment

FEATURES

- ✧ Cost effective
- ✧ Low Power mode
- ✧ Digital I²S output
- ✧ Compatible with Sn/Pb and Pb-free solder processes
- ✧ RoHS/Halogen free compliant
- ✧ Sensitivity Matching within +1dB

PRODUCT VIEW





ABSOLUTE MAXIMUM RATINGS

Parameter	Maximum value	Unit
Supply Voltage	-0.3 to 4.0	V
Sound Pressure Level	140	dB SPL
Temperature Range	-40 to 100	°C
Electrostatic discharge protection	2 (HBM)	kV

SPECIFICATIONS

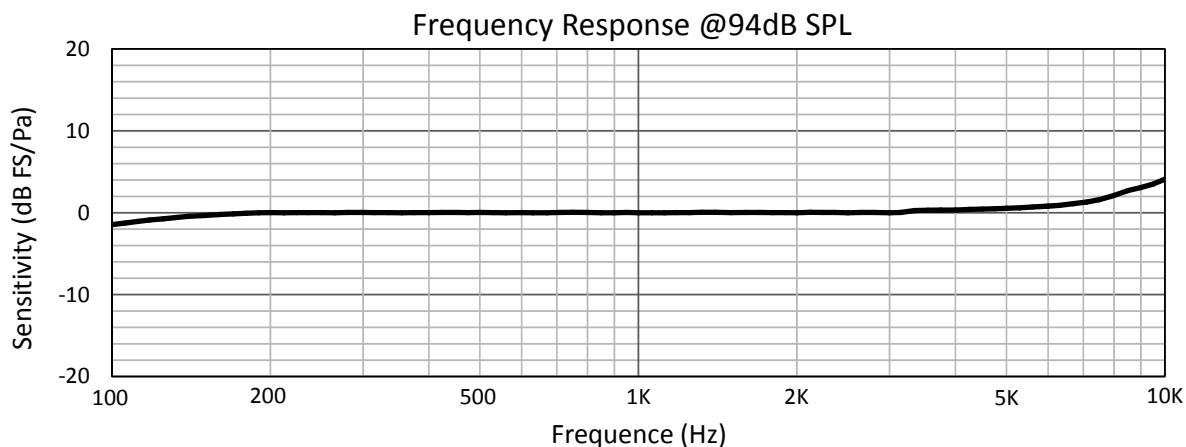
All data taken at 25°C, Relative Humidity 45±5% L/R pin grounded unless otherwise specified

Vdd=1.8V, clock frequency=3.072MHz

	Limits			unit	condition
	Min.	Nom.	Max.		
Directivity	Omni directional				
Sensitivity	-27	-26	-25	dB	dBFS @1kHz 1Pa
Operation voltage	1.6			V	
Freq. range	Refer to the frequency response			Hz	
Sensitivity loss across supply voltage	No change across the voltage range			dB	
Signal to noise ratio	-	57	-	dB	20 kHz bandwidth, A-weighted
THD	-	-	1	%	100dB SPL @1kHz S =Nom, Rload > 2 k
AOP	-	124	-	dB SPL	10% THD @1kHz S =Nom, Rload > 2 k
Polarity	Increasing sound				Increasing density of 1's
PSR	-72			dBFS(A)	
Current consumption	-	750	1000	µA	Normal mode
	-	400	-	µA	Low power mode
Clock frequency	1.0	3	4.0	MHz	Normal mode
	150	-	800	KHz	Low power mode
Storage temperature	-40	-	100	°C	



TYPICAL FREQUENCY RESPONSE



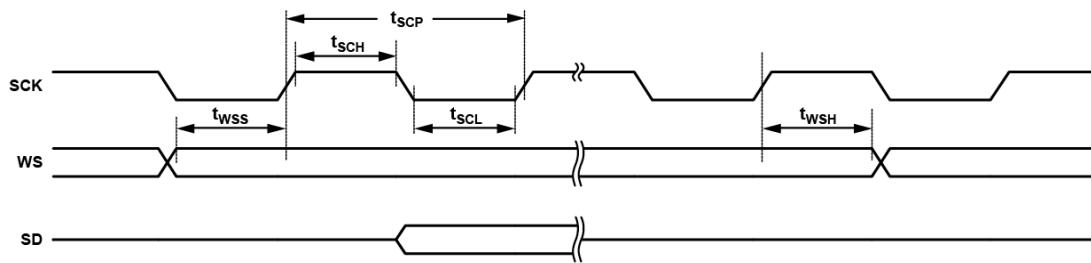
LOGIC TABLE

Parameter		Symbol	Min	Max	Unit
Digital Input	Low Voltage Input(L/R, WS, SCK)	VIL	0	$0.25 \times VDD$	V
	High Voltage Input(L/R, WS, SCK)	VIH	$0.7 \times VDD$	VDD	V
SD Digital Output	Voltage Output Low	VOL		$0.1 \times VDD$	V
	Voltage Output Low	VOL		$0.3 \times VDD$	V
	Voltage Output High	VOH	$0.7 \times VDD$		V
	Voltage Output High	VOH	$0.9 \times VDD$		V
	Voltage Output Low	VOL		$0.1 \times VDD$	V
	Voltage Output Low	VOL		$0.3 \times VDD$	V
	Voltage Output High	VOH	$0.7 \times VDD$		V
	Voltage Output High	VOH	$0.9 \times VDD$		V



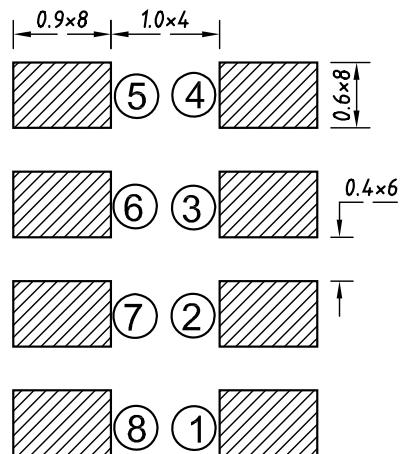
TIMING DIAGRAM

Parameter	Description	Min.	Norm.	Max.	Unit
tSCH	SCK High	—	50	—	ns
tSCL	SCK Low	—	50	—	ns
tSCP	SCK Period	—	325	—	ns
fSCK	SCK Frequency	—	3.072	—	MHz
tWSS	WS Setup	—	0	—	ns
tWSH	WS Hold	—	20	—	ns
fWS	WS Frequency	—	7.8	—	kHz



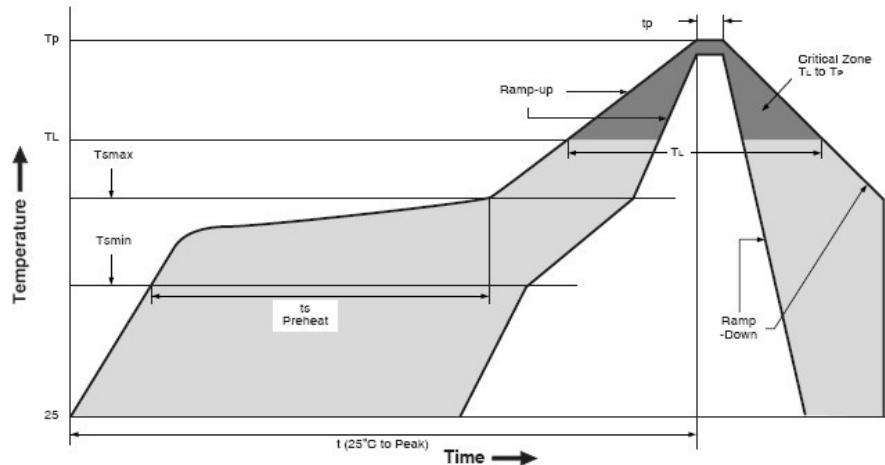
SMT Parameters:

1. Recommend PCB land pattern layout: (unit: mm)





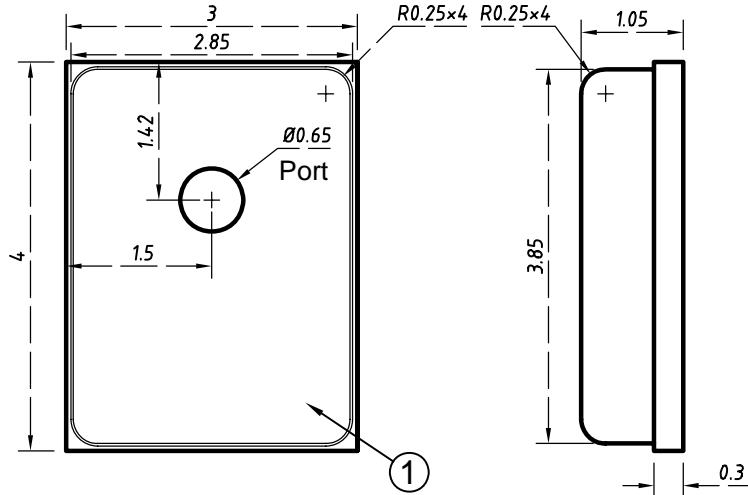
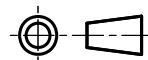
2. Recommend reflow profile:



Description	Parameter	Pb free
Average ramp rate	T_L to T_P	3 °C/sec max
Preheat		
Minimum temperature	T_{SMIN}	150 °C
Maximum temperature	T_{SMAX}	200 °C
Time(T_{SMIN} to T_{SMAX})	t_S	60 sec to 120 sec
Ramp-up rate	T_{SMAX} to T_L	1.25 °C/sec
Time maintained above liquidus temperature	t_L	60 sec to 150 sec
Liquidus temperature	T_L	217 °C
Peak temperature	T_P	260 °C
Time within 5°C of actual peak temperature	t_P	20 sec to 40 sec
Ramp-down rate	T_P to T_{Smax}	6 °C/sec max
Time 25 °C (t_{25} °C) to peak temperature	t	8 minutes max

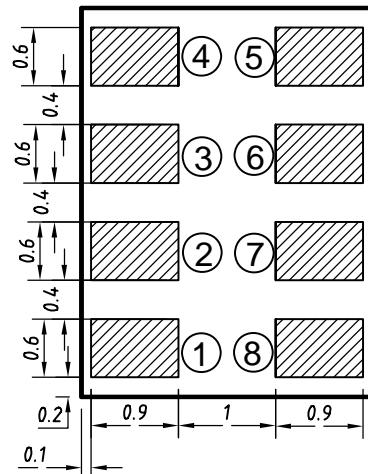


OUTLINE DIMENSIONS AND PIN DEFINITION:



TOP VIEW

SIDE VIEW



BOTTOM VIEW

1	GND	Ground	Connect to ground on the PCB.
2	N/C	—	Do not connect
3	WS	Input	Serial Data-Word Select for I ² S Interface.
4	CHIPEN	Input	Microphone Enable. When set low (ground), the microphone is disabled and put in power-down mode. When set high (VDD), the microphone is enabled.
5	L/R	Input	Left/Right Channel Select. When set low, the microphone outputs its signal in the left channel of the I ² S frame; when set high, the microphone outputs its signal in the right channel.
6	SCK	Input	Serial Data Clock for I ² S Interface.
7	SD	Output	Serial Data Output for I ² S Interface. This pin tristates when not actively driving the appropriate output channel. The SD trace should have a 100 kΩ pull-down resistor to discharge the line during the time that all microphones on the bus have tristated their outputs.
8	VDD	Power	1.8 to 3.3 V. This pin should be decoupled to Pin 1 with a 0.1 μF capacitor and a 10μF capacitor.

Item	Dimension	Tolerance
Length (L)	4.0	±0.10
Width (W)	3.0	±0.10
Height (H)	1.05	±0.10
Acoustic Port (AP)	Ø0.65	±0.05

Dimensions are in millimeters

Tolerance is ±0.1mm unless otherwise specified.



ADDITIONAL NOTES

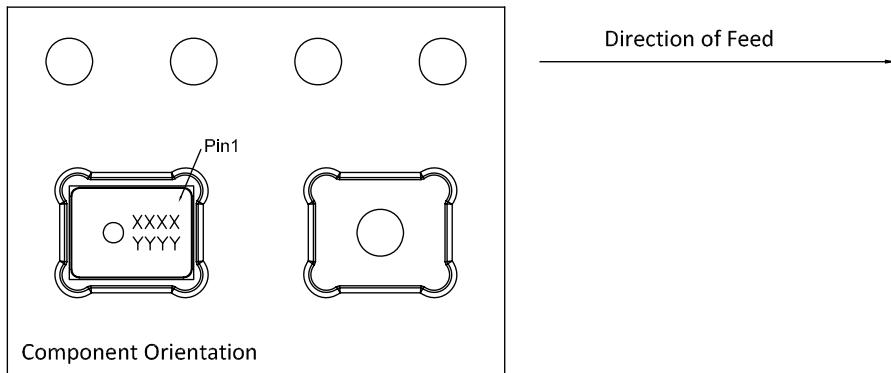
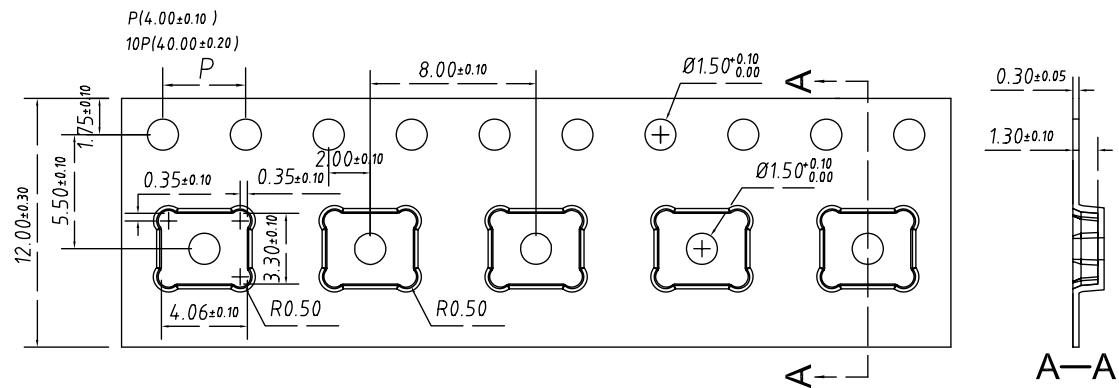
- (A) MSL (moisture sensitivity level) Class 2a.
- (B) Maximum of 3 reflow cycles is recommended.
- (C) In order to minimize device damage:
 - Do not board wash or clean after the reflow process.
 - Do not brush board with or without solvents after the reflow process.
 - Do not directly expose to ultrasonic processing, welding, or cleaning.
 - Do not insert any object in port hole of device at any time.
 - Do not apply air pressure into the port hole.
 - Do not pull a vacuum over port hole of the microphone.

MATERIALS STATEMENT

Meets the requirements of the European RoHS and Halogen-Free.



PACKAGING & MARKING DETAIL:



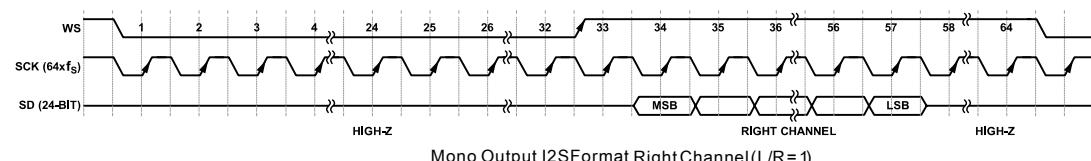
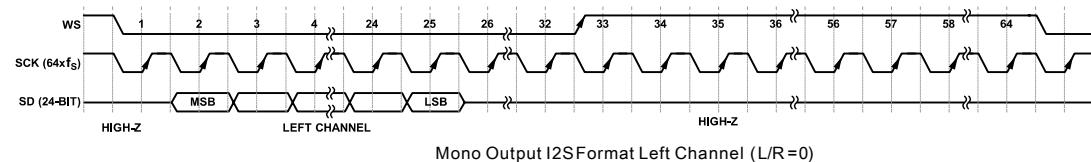
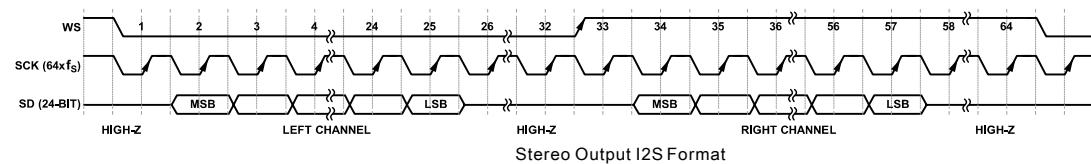
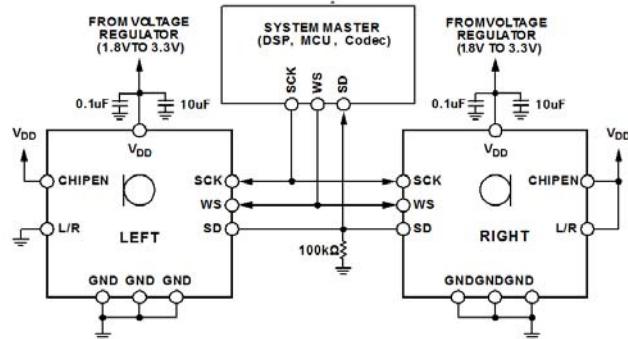
Note:

- 1) Dimensions are in mm;
- 2) Don't put the vacuum suction nozzle alignment the port hole;
- 3) Type & Reel Per EIA-481 standard;
- 4) Label applied to external package and direct to reel;
- 5) Static voltage <100V;

Model Number	Reel Diameter	Quantity Per Reel
MSM261S4030H0	13 inch	5000



RECOMMENDED INTERFACE CIRCUIT:



I²S DATA INTERFACE

The serial data is in slave mode I²S format, which has 24-bit depth in a 32 bit word. In a stereo frame there are 64 SCK cycles, or 32 SCK cycles per data-word. When L/R=0, the output data in the left channel, while L/R=Vdd, data in the right channel. The output data pin (SD) is tri-stated after the LSB is output so that another microphone can drive the common data line.

Data Word Length

The output data-word length is 24 bits per channel. The Mic must always have 64 clock cycles for every stereo data-word ($f_{SCK} = 64 \times f_{WS}$).

Data-Word Format

The default data format is I²S, MSB-first. In this format, the MSB of each word is delayed by one SCK cycle from the start of each half-frame.



RELIABILITY SPECIFICATIONS

Test	Description
Thermal Shock	100 cycles air-to-air thermal shock from -40°C to +125°C with 15 minute soaks. (IEC 68-2-4)
High Temperature Storage	1,000 hours at +105°C environment (IEC 68-2-2 Test Ba)
Low Temperature Storage	1,000 hours at -40°C environment (IEC 68-2-2 Test Aa)
Reflow	5 reflow cycles with peak temperature of +260°C
ESD-HBM/LID-GND	3 discharges of ±2 kV direct contact to I/O pins. (MIL 883E, Method 3015.7) & 3 discharges of ±8 kV direct contact to lid while unit is grounded. (IEC 61000-4-2)
Vibration	4 cycles of 20 to 2,000 Hz sinusoidal sweep with 20 G peak acceleration lasting 12 minutes in X, Y and Z directions. (Mil-Std-883E, Method 2007.2 A)
Mechanical Shock	3 pulses of 10,000 G in the X, Y and Z direction (IEC 68-2-27, Test Ea)
High Temperature Bias	1,000 hours at +105°C under bias (IEC 68-2-2 Test Ba)
Low Temperature Bias	1,000 hours at -40°C under bias (IEC 68-2-2 Test Aa)
Temperature/Humidity Bias	1,000 hours at +85°C/85% R.H. under bias. (JESD22-A101A-B)
Drop Test	To be no interference in operation after dropped to 1.0cm steel plate 18 times from 1.5 meter height

NOTE: Sensitivity should vary within ±3dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at 20±2°C, R.H 60%~70%)

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REVISION HISTORY:

Revision	Subjects (major changes since last revision)	Date
1.0	Initial release	2015-1
1.1	Modified the outline dimension	2015-02-12
1.2	Modified the application circuit	2015-07-17
1.3	Modified the package of product & Add Additional Notes	2015-11-18
2.0	Modified the reliability test items	2016-8-8

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