Data Sheet

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MSM261S4030H0R

I²S digital output MEMS microphone with Multi-modes

苏州敏芯微电子技术股份有限公司
MEMSensing Microsystems (Suzhou, China) Co., Ltd.

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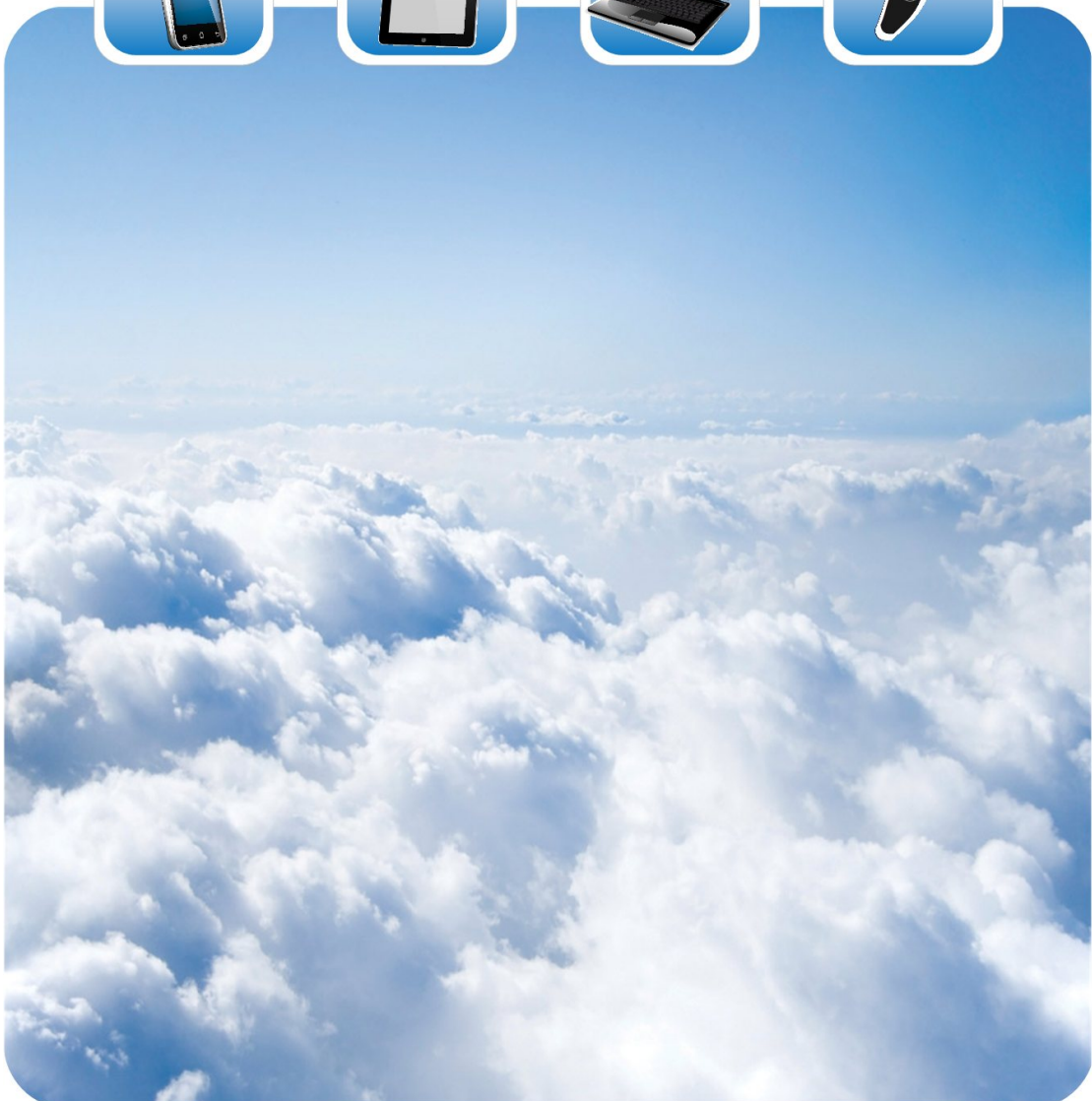
GENERAL DESCRIPTION

MSM261S4030H0R is an omnidirectional, Top-ported, I²S digital output MEMS microphone. It has high performance and reliability.

MSM261S4030H0R is available in a 4 mm × 3 mm × 1.25 mm metal can LGA package. It is SMT compatible with no sensitivity degradation.
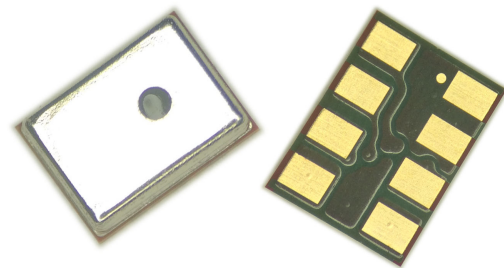
APPLICATIONS

✧ 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

PRODUCT VIEW

ABSOLUTE MAXIMUM RATINGS

| Parameter	Maximum value	Unit
Supply Voltage	−0.3 to 4.0	V
Sound Pressure Level	140	dB SPL
Storage temperature	−40 to 100	°C

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		3.6	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	-	59	-	dB	20 kHz bandwidth, A-weighted
THD	-	0.1	-	%	94Db 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
Power-up time	-	6	20	ms	

TYPICAL FREQUENCY RESPONSE

Frequency Response @94dB SPL
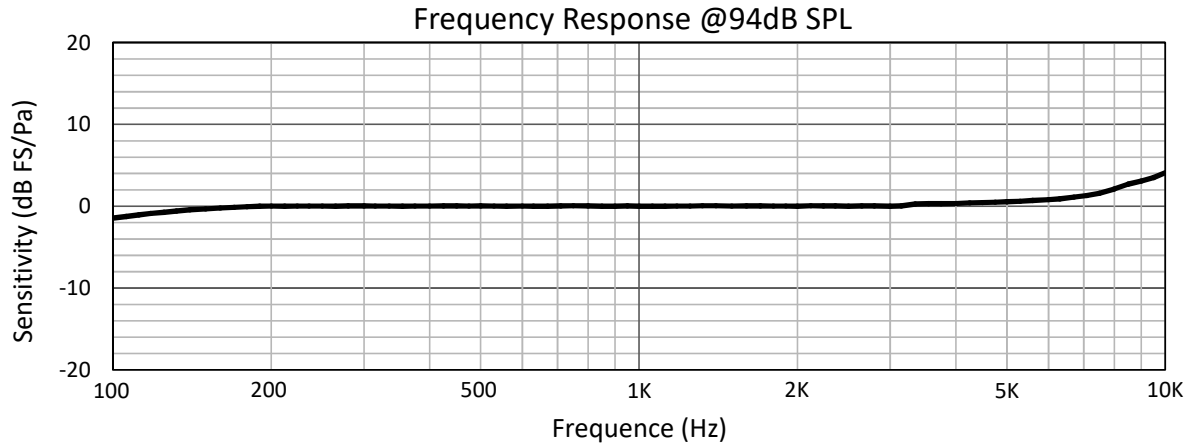
LOGIC TABLE

	Parameter	Symbol	Min	Max	Unit
Digital	Low Voltage Input(L/R, WS, SCK)	VIL	0	0.25 × VDD	V
Input	High Voltage Input(L/R, WS, SCK)	VIH	0.7 × VDD	VDD	V
SD	Voltage Output Low	VOL		0.1 × VDD	V
	Voltage Output Low	VOL		0.3 × VDD	V
	Voltage Output High	VOH	0.7 × VDD		V
Digital	Voltage Output High	VOH	0.9 × VDD		V
	Voltage Output Low	VOL		0.1 × VDD	V
Output	Voltage Output Low	VOL		0.3 × VDD	V
	Voltage Output High	VOH	0.7 × VDD		V
	Voltage Output High	VOH	0.9 × 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	—	48	—	kHz
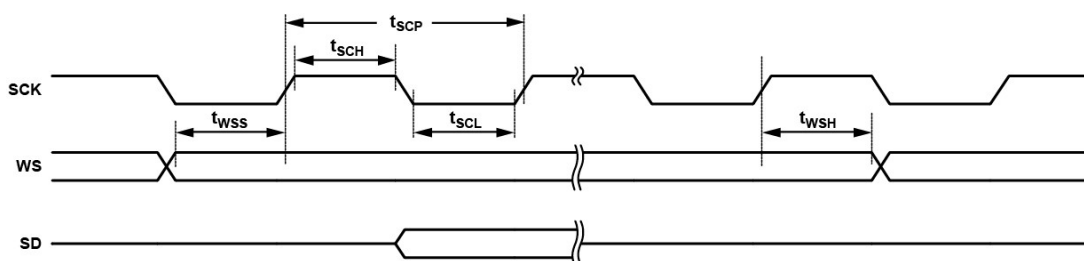
SMT Parameters：

1. **Recommend PCB land pattern layout：（unit: mm）**
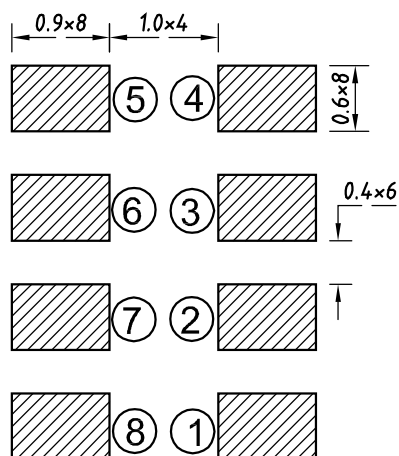
2. Recommend reflow profile:
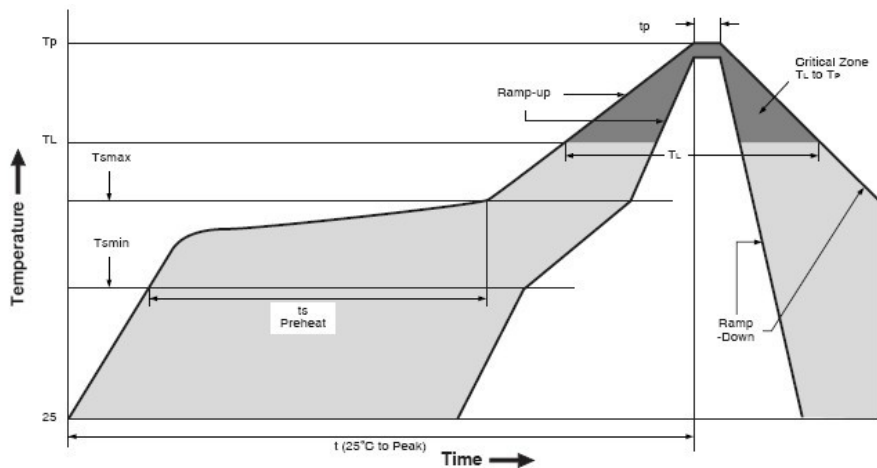
Description	Parameter	Pb free
Average ramp rate	T_L to T_P	3 °C/sec max
Preheat		
Minimum temperature	T_{SMIN}	150 °C
Maximum temperature	T_{SMAX}	200 °C
Time(T_{SMIN} to T_{SMAX})	t_S	60 sec to 120 sec
Ramp-up rate	T_{SMAX} to T_L	1.25 °C/sec
Time maintained above liquidus temperature	t_L	60 sec to 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 (t25 °C) to peak temperature	t	8 minutes max

OUTLINE DIMENSIONS AND PIN DEFINITION：

TOP VIEW SIDE VIEW BOTTOM VIEW
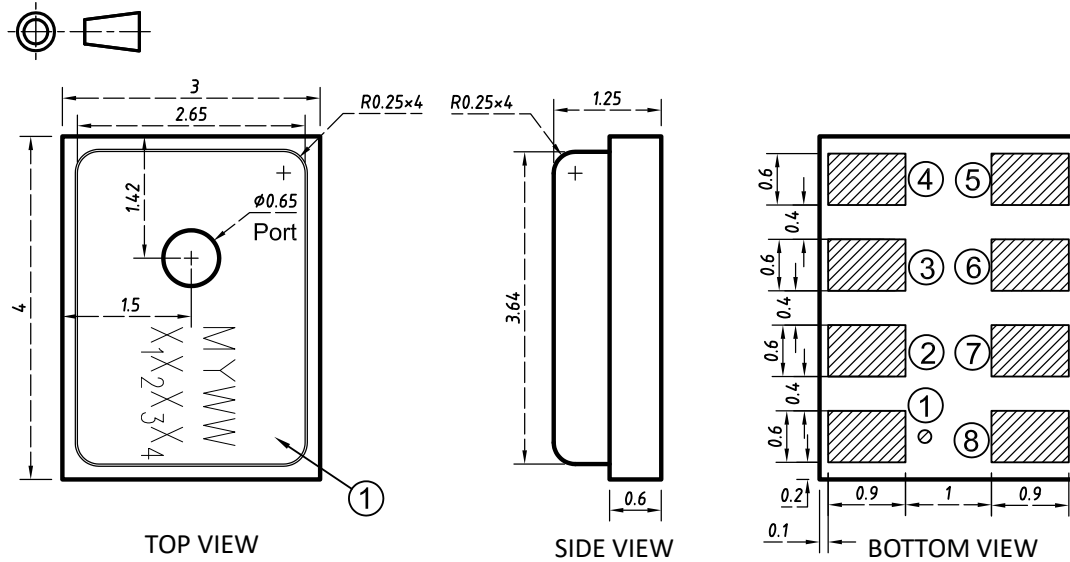
1	GND	Ground	Connect to ground on the PCB.
2	N/C	—	Do not connect
3	WS	Input	Serial Data-Word Select for I²S Interface.
4	CHIPEN	Input	Microphone Enable. When set low (ground), the microphone is disabled and put in power-down mode. When set high (VDD), the microphone is enabled.
5	L/R	Input	Left/Right Channel Select. When set low, the microphone outputs its signal in the left channel of the I²S frame; when set high, the microphone outputs its signal in the right channel.
6	SCK	Input	Serial Data Clock for I²S Interface.
7	SD	Output	Serial Data Output for I²S 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.

Item	Dimension	Tolerance
Length (L)	4.0	±0.10
Width (W)	3.0	±0.10
Height (H)	1.25	±0.10
Acoustic Port (AP)	Ø0.65	±0.05

Dimensions are in millimeters, tolerance is ±0.1mm unless otherwise specified.

MYWW $X_1X_2X_3X_4$	M	Memsensing
	Y	Year(A~Z)
	WW	Week
	$X_1X_2X_3X_4$	Serial Number

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ADDITIONAL NOTES

(A) MSL (moisture sensitivity level) Class 1.

(B) Maximum of 3 reflow cycles is recommended.

I 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.

STORAGE AND TRANSPORTATION

(A) Keep MEMS MIC in warehouse with less than 75% humidity and without sudden temperature change, acid air, any other harmful air or strong magnetic field.

Recommend floor life (out of bag) at factory no more than 4 weeks.

(B) The MEMS MIC with normal pack can be transported by ordinary conveyances. Please protect products against moist, shock, sunburn and pressure during transportation.

MATERIALS STATEMENT

Meet the requirements of MEMSensing standard on hazard substances control (including RoHS2.0+REACH+Halogen-Free, etc.), with "HSF" identification on label.

PACKAGING & MARKING DETAIL：
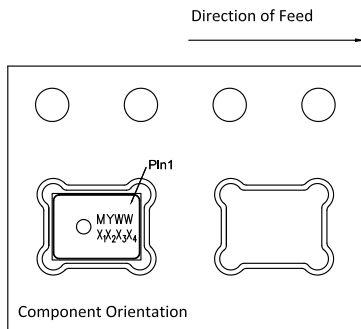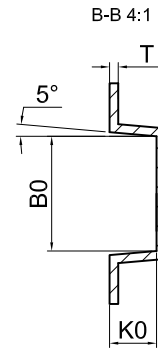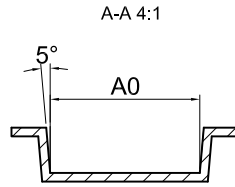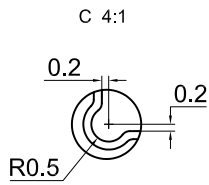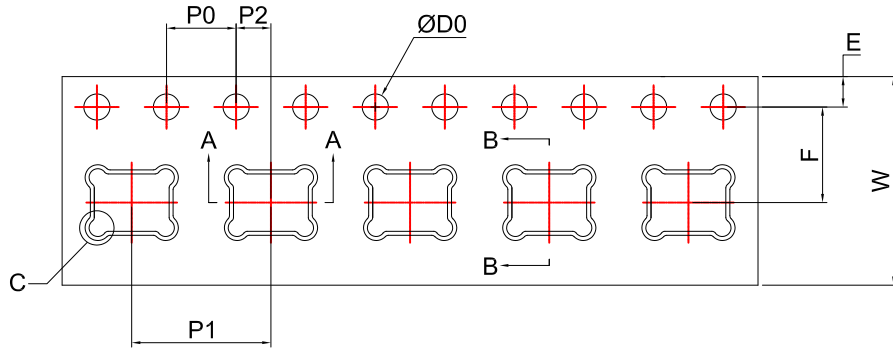
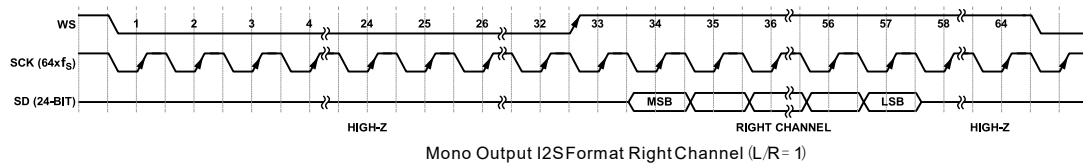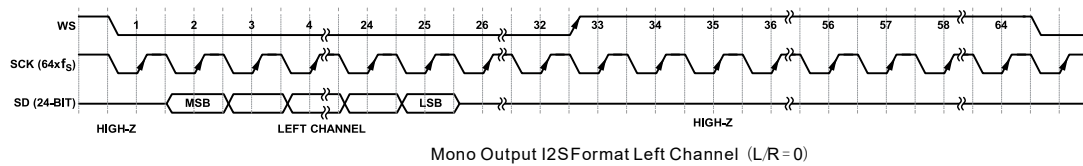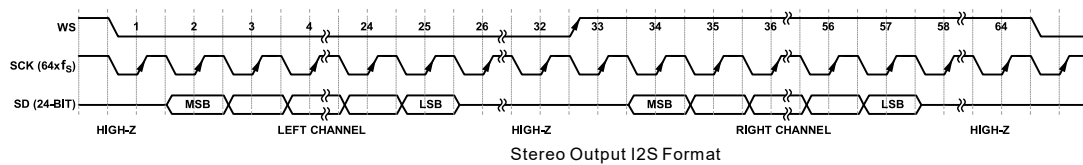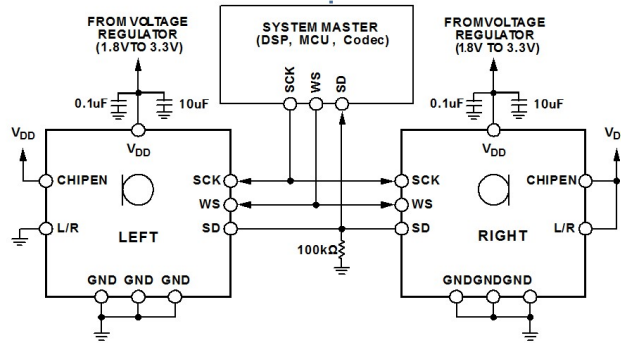| ITEM	W	E	F	ØD0	K0
DIM(mm)	12.00±0.30	1.75±0.10	5.50±0.10	$1.50_0^{+0.10}$	1.35±0.10
ITEM	P0	10P0	P1	A0	B0
DIM(mm)	4.00±0.10	40.00±0.20	8.00±0.10	4.30±0.10	3.30±0.10
ITEM	P2	T			
DIM(mm)	2.00±0.10	0.25±0.05			

Note:

1) Dimensions are in mm;

2) Don't put the vacuum suction nozzle alignment the port hole;

3) Tape &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
MSM261S4030H0R	13 inch	5700

RECOMMENDED INTERFACE CIRCUIT：

Stereo Output I2S Format

Mono Output I2S Format Left Channel（L/R＝0）

Mono Output I2S Format Right Channel（L/R＝1）

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 (Fsck = 64 × Fws).

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.
High Temperature Storage	1,000 hours at +105°C environment
Low Temperature Storage	1,000 hours at -40°C environment
Reflow	5 reflow cycles with peak temperature of +260°C
ESD-HBM	3 discharges of ±2 Kv direct contact to I/O pins.
ESD- LID-GND	3 discharges of ±8 Kv direct contact to lid while unit is grounded.
ESD-MM	3 discharges of±200V direct contact to I/O pins.
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.
Mechanical Shock	3 pulses of 10,000 G in the X, Y and Z direction
High Temperature Bias	1,000 hours at +105°C under bias
Low Temperature Bias	1,000 hours at -40°C under bias
Temperature/Humidity Bias	1,000 hours at +85°C/85% R.H. under bias.
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%)

REVISION HISTORY:

Revision	Subjects (major changes since last revision)	Date
0.8	Preliminary Edition	2017-02-14
1.0	Initial release	2017-05-02
1.1	Update packaging detail	2017-10-24
1.2	Add Power-up time	2018-02-12
1.3	Update Marking rule	2018-06-22
1.4	Update the typical of SNR	2018-08-22
1.5	Update Outline dimensions	2018-09-05
1.6	Update typical of SNR	2018-09-17
1.7	Update typical of THD	2018-12-29

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