



GSA4030H10-F26-4P

Features:

- Low Current
- Small package
- MaxRF protection
- Ultra-Stable Performance
- Standard SMD Reflow
- Omnidirectional



GSA4030H10-F26-4P

GENERAL DESCRIPTION

GSA4030H10-F26-4P is an omnidirectional, Top-ported, PDM digital output MEMS microphone. It has high performance and reliability.

GSA4030H10-F26-4P is available in a thin 4 mm × 3 mm × 1 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
- ✧ Fourth-order Σ - Δ modulator
- ✧ Digital PDM output
- ✧ Compatible with Sn/Pb and Pb-free solder processes
- ✧ RoHS/Halogen free compliant



GSA4030H10-F26-4P

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

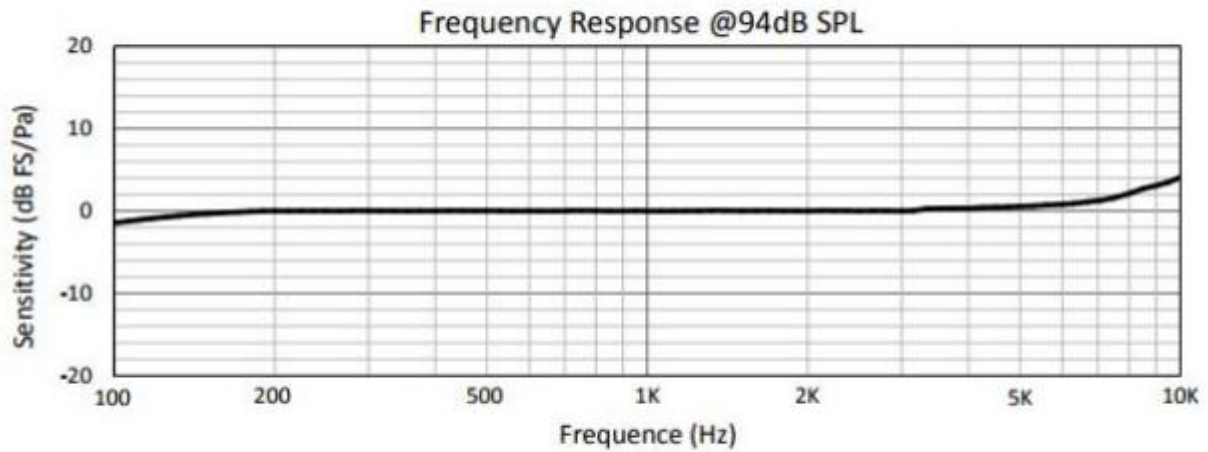
SPECIFICATIONS

All data taken at 25°C, Relative Humidity 45±5% unless otherwise specified				
	Limits			unit
	Min.	Nom.	Max.	condition
Directivity	Omni directional			
Sensitivity	-29	-26	-23	dB
Operation voltage	1.6		3.3	V
PSR		-72		dB
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
THD	-	-	1	%
AOP	-	124	-	dB SPL
Polarity	Increasing sound			Increasing density of 1's
Data format				1/2 cycle PDM
Clock frequency	1.5	2.4	3.5	MHz
Clock duty cycle	40		60	%
Logic low	-0.3		0.35xVdd	V
Logic high	0.65xVdd		Vdd+0.3	V
Delay time for valid data	20		40	ns
Delay time for High Z	0		15	ns
Current consumption	-	-	700	μA
	-	-	50	
Storage temperature	-40	-	100	°C

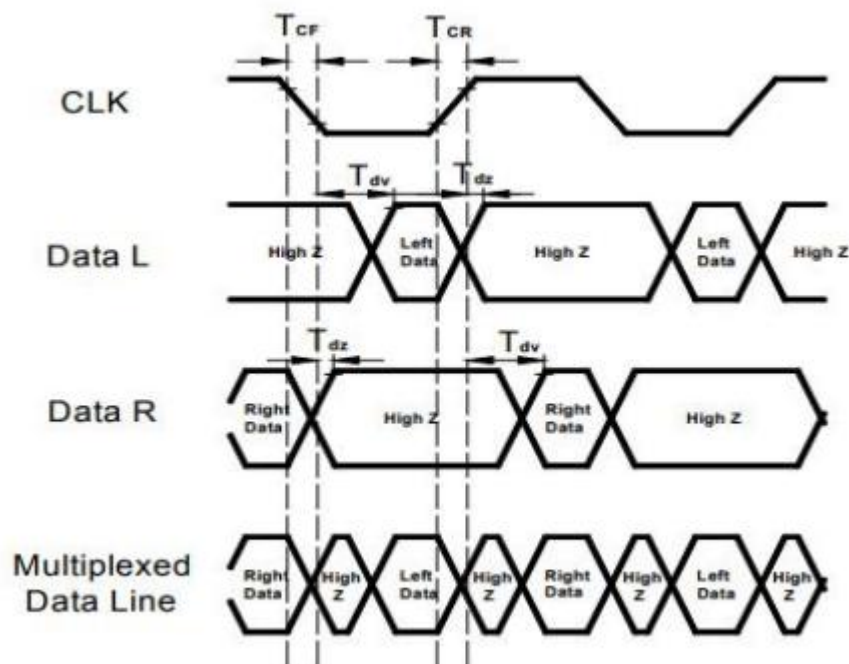


GSA4030H10-F26-4P

TYPICAL FREQUENCY RESPONSE



TIMING DIAGRAM

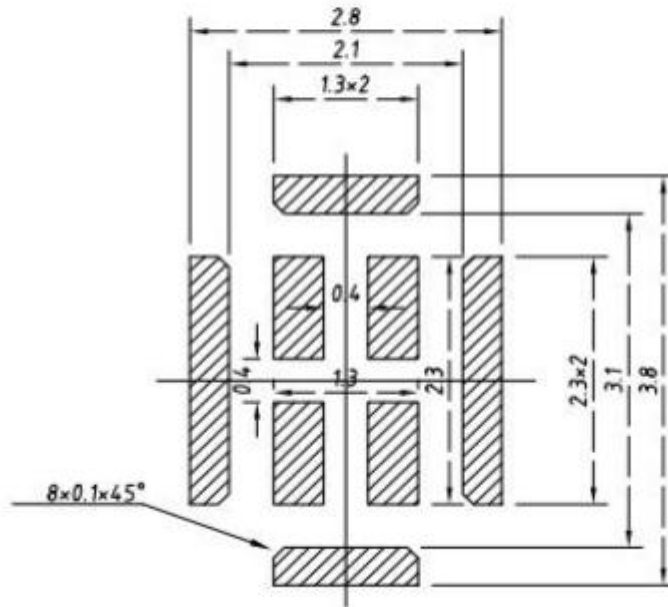




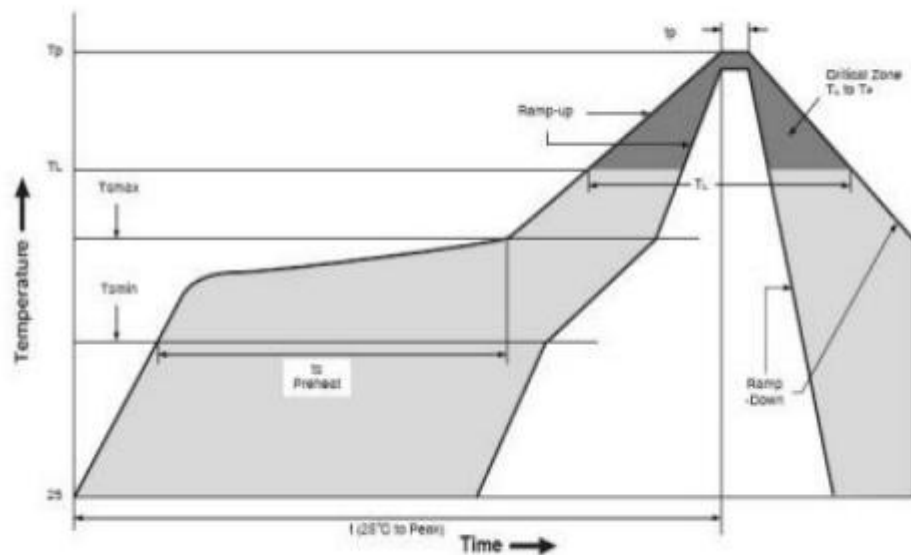
GSA4030H10-F26-4P

SMT Parameters:

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



2. Recommend reflow profile:





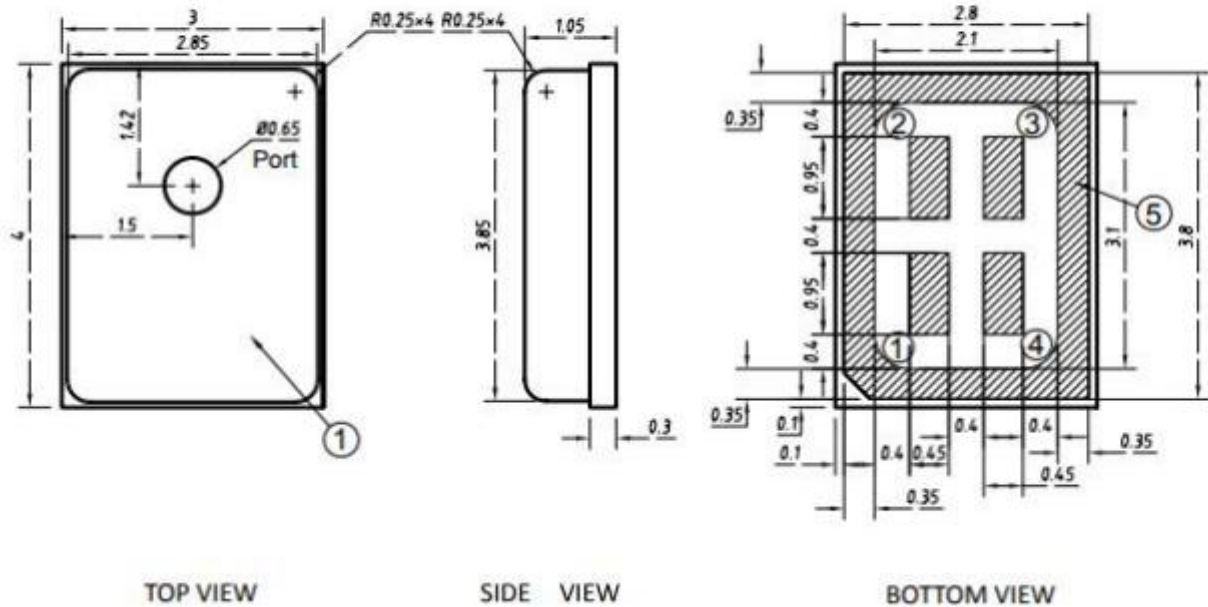
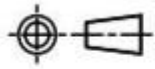
GSA4030H10-F26-4P

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 max
Time maintained above liquidous temperature	t_L	60 sec to 150 sec
Liquidous temperature	T_L	217 °C
Peak temperature	T_P	260 °C max
Time within 5°C of actual peak temperature	t_P	20 sec to 40 sec
Ramp-down rate	T_L to T_P	6 °C/sec max
Time 25 °C (t_{25} °C) to peak temperature	t	8 minutes max



GSA4030H10-F26-4P

OUTLINE DIMENSIONS AND PIN DEFINITION:



PIN function description

PIN#	Function
1	VDD
2	L/R
3	CLK
4	DATA
5	GND

Item	Dimension	Tolerance
Length (L)	4.00	±0.10
Width (W)	3.00	±0.10
Height (H)	1.05	±0.10
Acoustic Port (AP)	Ø0.65	±0.05

Dimensions are in millimeters

Tolerance is ±0.15mm unless otherwise specified.



GSA4030H10-F26-4P

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.



GSA4030H10-F26-4P

Figuer 1. JSM4030T4P263 electrical connections

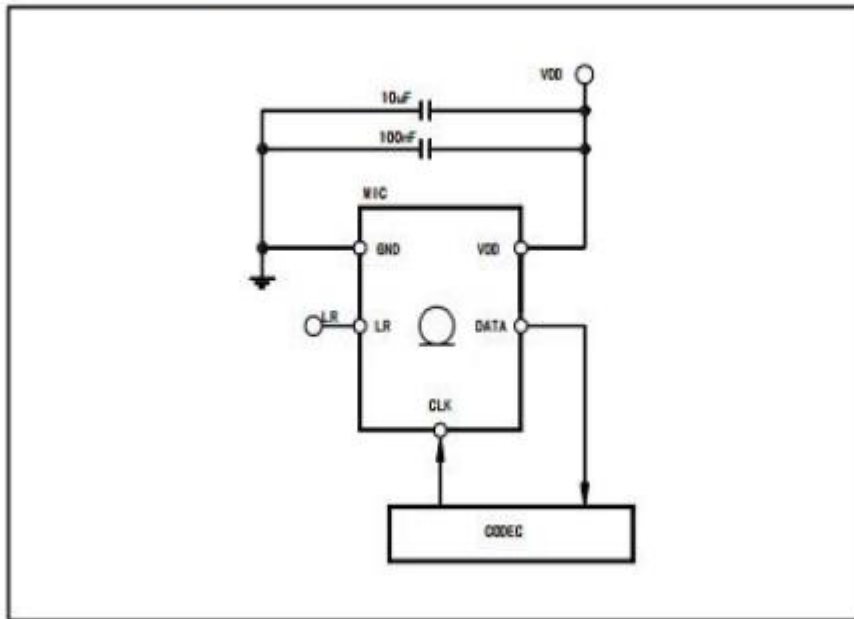
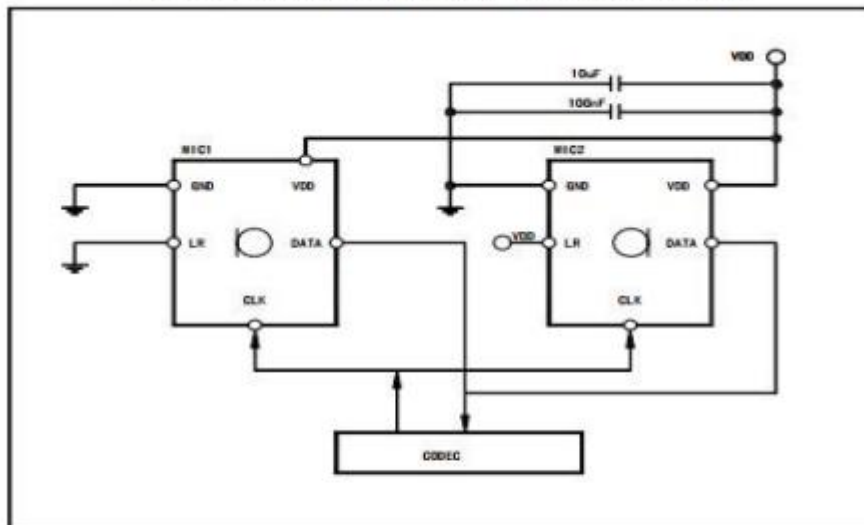


Figure 2. Electrical connections for stereo configurations



Power supply decoupling capacitors (100nF ceramic, 10uF ceramic) should be placed as near as possible to VDD of the device. (common design practice)

Label:	L/R:	Drives data after:	High-Z after:
Data2	High	Rising clock edge	Falling clock edge
Data1	Low	Falling clock edge	Rising clock edge



GSA4030H10-F26-4P

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 ± 3 dB from initial sensitivity. (The measurement to be done after 2 hours of conditioning at $20 \pm 2^\circ\text{C}$, R.H 60%~70%)



GSA4030H10-F26-4P

REVISION HISTORY:

Revision	Subjects (major changes since last revision)	Date
1.0	Initial Release	2013-7-25
1.1	Update the outline drawing.(increase the distance from the acoustic port to the edge)	2013-10-11
1.2	Update the packaging detail. (increase the laser text)	2013-10-22
1.3	Update page layout & contact information	2013-11-21
1.4	Update the outline drawing.(increase the dimension of the cap and the specific tolerance)	2014-2-20
1.5	Update the version number	2014-6-24
1.6	Update the outline drawing	2014-12-9
1.7	Update the SNR test condition and the min value of CLK Frequency	2015-01-21
1.8	Modified the outline dimension	2015-02-12
1.9	Modified the application circuit	2015-07-17
2.0	Modified the package of product & Add Additional Notes	2015-11-18
2.1	Modified the reliability test items	2016-8-8