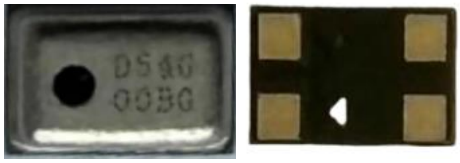
BG2718AT

Analog MEMS Microphone

BG2718AT is a small package, stable, low power, single-ended output top port analog MEMS microphone.

The BG2718AT is integrated with specialized Pre-amplification ASIC to provide high sensitivity, high SNR output from a capacitive audio sensor, which is suitable for cellphones, Bluetooth earphones, headsets, and other portable electronic devices. It's packaged for surface mounting and high temperature re-flow assembly.



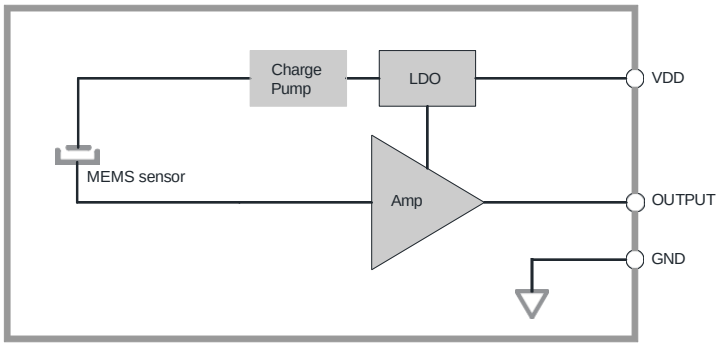


Fig. 1 Microphone block diagram

Features

- ✧ 2.75x1.85x0.95mm Top Port
- ✧ Single Ended Analog Output
- ✧ SNR of 58dBA
- ✧ RF Shielded
- ✧ Standard SMD Reflow

RoHS Compliance Halogen Free and meets all ray king's environmental requirements

Typical applications

- ✧ Smart Phones
- ✧ TWS Headsets
- ✧ Smart Speakers
- ✧ Wearable Electronics
- ✧ Portable Electronics
- ✧ Smart Home Electronics
- ✧ Laptop Computers

Absolute maximum ratings

Parameter	Maximum Ratings	Unit
Supply voltage	3.6	V
Operation temperature range	-40~85	℃
Storage temperature range	-40~125	℃

Note: Stresses at the maximum ratings shown in table may cause permanent damage to the device. These are stress ratings only at which the device may not function when an operation at these or any other condition beyond those specified under "Electro-Acoustic Specifications".

ESD CAUTION

ESD (electrostatic discharge) sensitive device.
Proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

1. Electrical specifications

Standard Conditions		Basic Test Conditions	
Ordinary Temperature	15 to 35℃	Temperature	20 ± 2℃
Ordinary Humidity	45 to 85%	Humidity	63 to 67%
Ordinary air pressure	86 to 106kPa	Ordinary air pressure	86 to 106kPa

Test condition: Vdd=2.0V, no load,unless otherwise specified.

Specification	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Directivity			Omni-directional			
Sensitivity Range	S	94dB SPL @1kHz,	-43	-42	-41	dB
Output Impedance	Z_{out}	@1kHz,			300	Ω
Current Consumption	I	Vdd =2.0V		120	160	uA
S/N Ratio	SNR	94dB SPL @1kHz, A-Weighted BW=20-20kHz		58		dB(A)
Operating Voltage	V_{DD}		1.6	2.0	3.6	V
Total Harmonic distortion	THD	94dB SPL @1kHz, S=Typ		0.1	0.5	%
Acoustic Overload Point	AOP	10% THD @1kHz S=Typ		132		dB
Power Supply Rejection	PSR	100mVpp Square wave @217Hz, A-weighted		-100		dB
Power Supply Rejection Ratio	PSRR	200mVpp Sine wave @1kHz, A-weighted		70		dB
Output load	C_{load}				150	pF
	R_{load}		10		100	KΩ

Note: Frequency response, sensitivity, phase and current consumption are tested by 100% on product line.

2. Typical frequency response

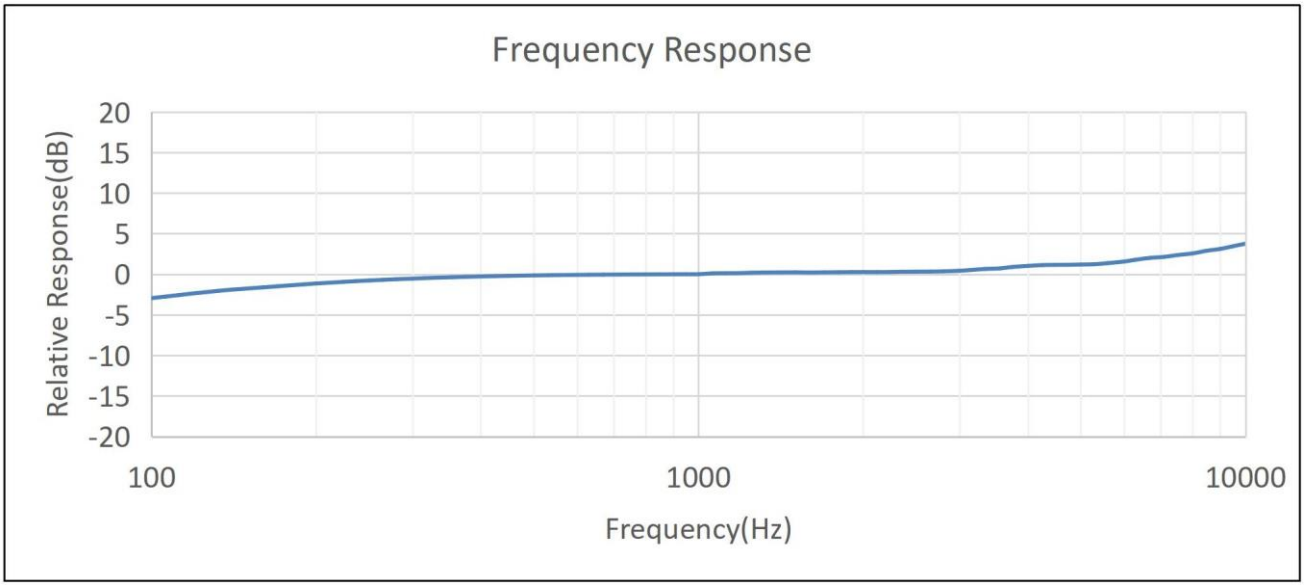
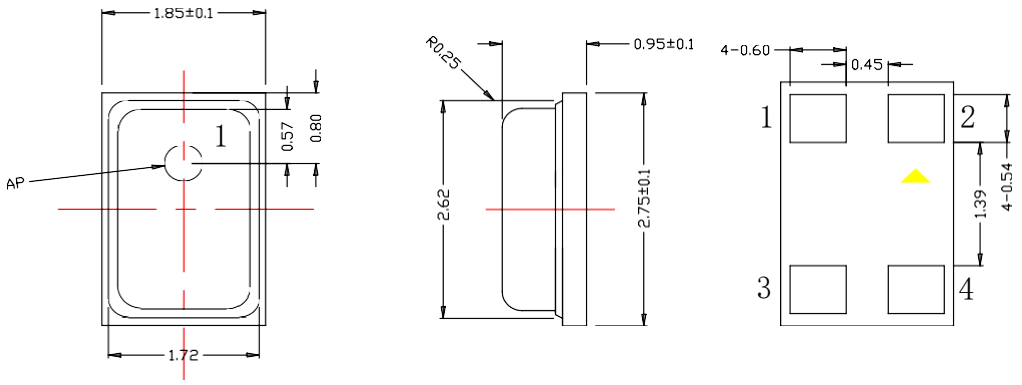


Fig. 2 Frequency response curve normalized to 1kHz

Frequency(Hz)	LSL	USL	Unit
100	-5	0	dB
900	-1	1	dB
1000	0	0	dB
1100	-1	1	dB
8000	-1	4	dB
10000	-1	6	dB

3. Mechanical Characteristics



Top View　　Side View　　Bottom View

Unit：mm　Unmarked Tolerance: ± 0.1 (mm)

Fig. 4 Dimension

Item	Dimension	Tolerance(+/-)	Units
Length(L)	2.75	0.10	mm
Width(W)	1.85	0.10	mm
Height(H)	0.95	0.10	mm
Acoustic Port(AP)	Ø0.5	0.05	mm

Pin #	Pin Name	Type	Description
1	V_{DD}	Power	Power Supply
2	Output	Signal	Output Signal
3	GND	Ground	Ground
4	GND	Ground	Ground

Note: All Ground Pin must be connected to the ground in end application

4. Reliability test

The sensitivity should be within ±3dB from initial sensitivity after 2 hours recovering on the conditioning of 20±5°C.

High Temperature Test	After exposure at 105°C for1000 hours, the sensitivity should be within ±3 dB from the initial value.
Low Temperature Test	After exposure at –40°C for 1000 hours, the sensitivity should be within ±3 dB from the initial value.
High Humidity &High Heat Test	After exposure at 85±3°C and 85% relative humidity for 1000 hours, the sensitivity should be within ±3 dB from the initial value.
Thermal Shocking Test	100 cycles air-to-air thermal shock from -40°C to +125°C with 15 minute soaks. The sensitivity should be within ±3 dB from the initial value.
Vibration Test	4 cycles of 20 to 2,000 Hz sinusoidal sweep with 20 G peak acceleration lasting 12 minutes in X, Y, and Z directions.
Drop Test	Height:1.5m Fixture Weight:150g (Sound Hole Diameter in the fixture is >=0.8mm) Reference Surface: slippery marble floor Duration:4 corners*4 times, 6 faces*4 times The sensitivity change should be less than 1dB after testing
ESD Test	3 discharges of ±8 kV direct contact to lid while unit is grounded.(According to standard of IEC61000-4-2) 3 discharges of ±2.5 kV direct contact to I/O pins.(HBM mode) 3 discharges of ±200 V direct contact to I/O pins. (MM mode)

5. Reflow profile:

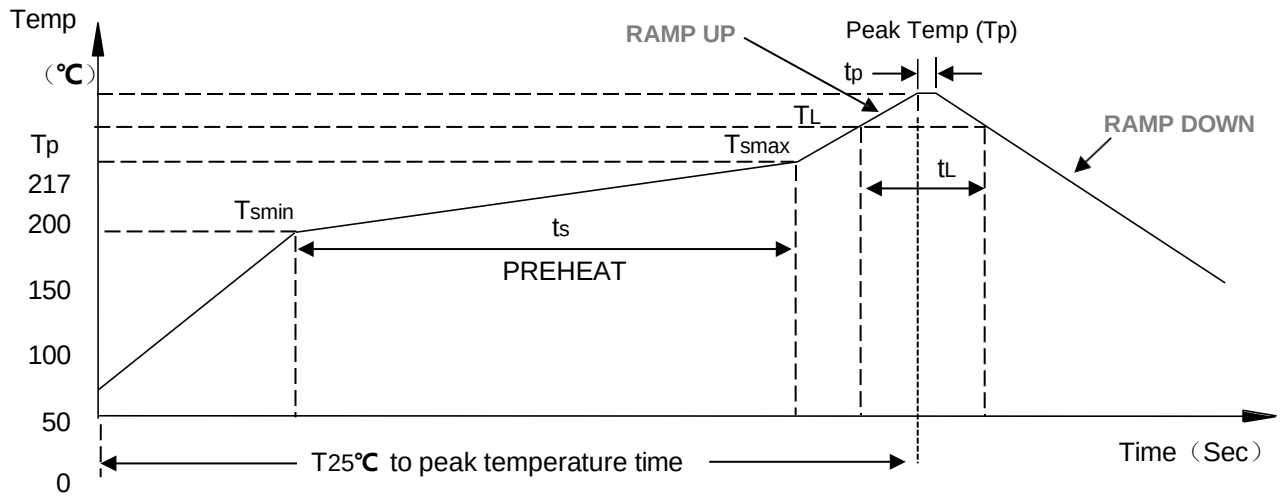


Fig. 5 Reflow Profile

Parameter		Reference	Specification
Average Ramp Rate		T_{smax} 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 180 sec
Time Maintained Above Liquidous		t_L	60 sec to 150 sec
Liquidous Temperature		T_L	217°C
Peak Temperature		T_P	260°C +0°C/−5°C
Time Within +5°C of Actual Peak Temperature		t_P	20 sec to 40 sec
Ramp-Down Rate		T_P to T_{SMAX}	3°C/sec max
Time +25°C ($t_{25°C}$) to Peak Temperature			8 min max

6. Pickup Tool Pick Location& PCB Solder Pad Layout

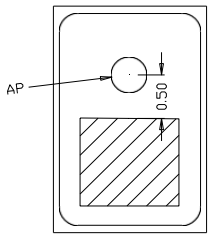


Fig.6 Pick up area

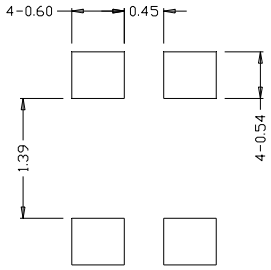


Fig.7 PCB Land pattern

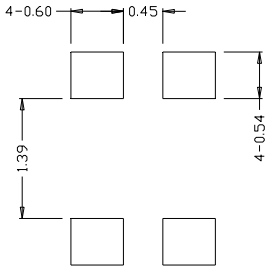


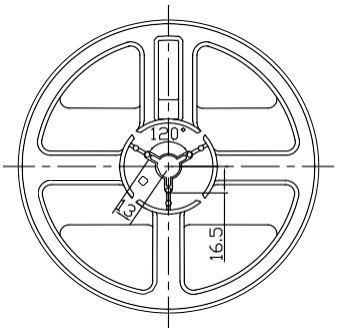
Fig.8 Solder stencil pattern

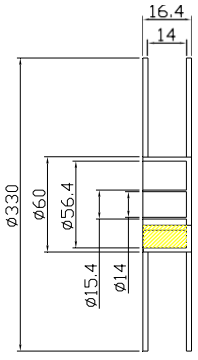
Notes:

- Dimensions are in millimeters(mm) unless otherwise specified.
- Tolerance is ±0.1mm unless otherwise specified.

7. Packing (Unit : mm)

13'' Reel drawing:





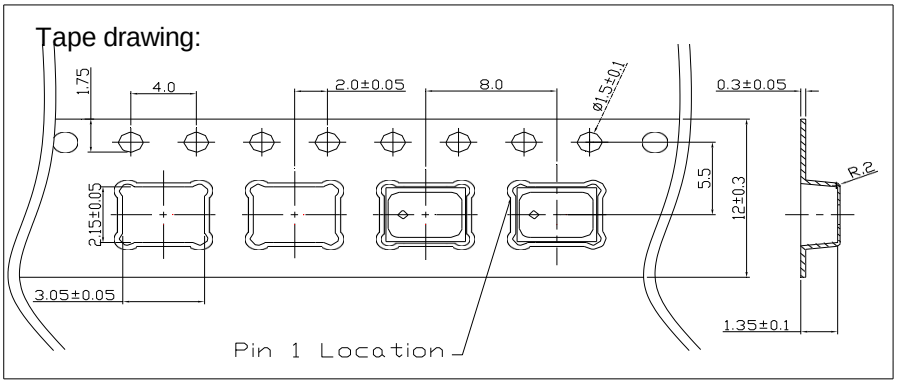
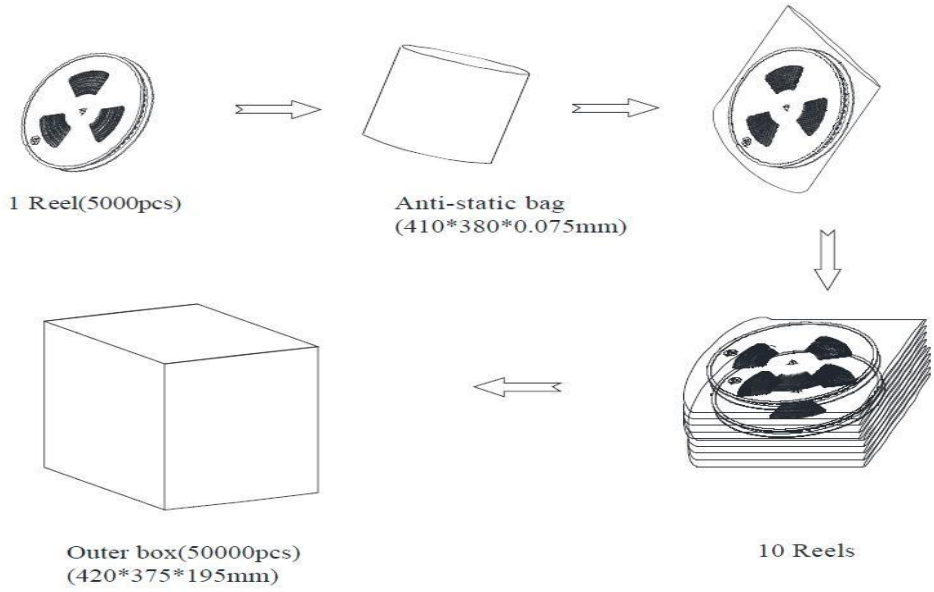


Fig. 9 Packaging

The Content of Box:



Reel	5,000PCS×1=5,000PCS
Outer Box	5,000PCS×10=50,000PCS

8. Typical Application Circuit:

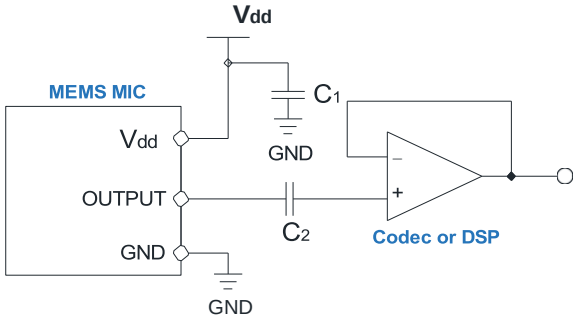


Fig. 10 Single ended input interface circuit

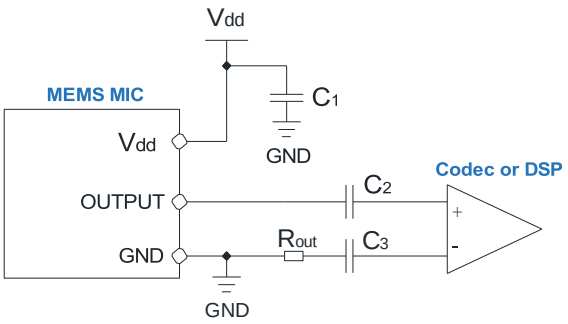


Fig. 11 Differential input interface circuit

Notes:

1. A 0.1uF ceramic type decoupling capacitor C_1 is strongly recommended for every microphone and it should be placed as close to the VDD pad to reduce the noise on power supply;
2. DC-blocking capacitor C_2/C_3 is required on the output signal line. The 3-dB cut-off frequency can be calculated using follow equation which is related to DC-blocking capacitor C_2 and input resistance of the input amplifier.

$$3dB\ cut\text{-}off\ frequency = 1/2\pi R_L C_2$$

In order to get a cut-off frequency below 20 Hz, minimum 1uF value of C_2 and minimum 20KΩ value of input resistance of the input amplifier is recommended.

3. In general, the output trace should be kept as short as possible, differential input application can eliminate circuit interference better.

9. Cautions

9.1 Board Wash Forbidden

- Do not board wash by liquid or ultrasonic after the reflow process, otherwise this could damage the microphone.

9.2 Negative Pressure Forbidden

- Do not pull a vacuum such as nozzle over port hole of the microphone.
- Do not vacuum seal static bags used to store unused portions of reels.

9.3 Blowing Forbidden

- Not to blow the acoustic port of the microphone directly, otherwise, this could damage the microphone. If have to, air pressure should less than 0.3MPa,distance more than 5cm, and time less than 5 seconds.

9.4 Rework

- 250℃～270℃, maximum 30 sec，Peak temperature 330℃.
- Wind speed: 15L/m.
- It is very important not to put a heatgun over the acoustic port of the microphone directly.

9.5 Other Application Notes

- Maximum of 3 reflow cycles is recommended.
- Suggest SMT the microphone at last time if double side PCBA used.
- Do not insert any object in port hole of device at any time.

9.6 Storage

- MSL (moisture sensitivity level) Class 1.
- Twelve months when devices are to be stored in factory supplied, unopened ESD moisture sensitive bag under maximum environmental conditions of 30° C, 70% R.H. and floor life(out of bag) at factory no more than 4 weeks.
- 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.
- Please take proper measures against ESD in the process of assembly and transportation.
- Please use the shipping package for long-term storage.