



soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

**Page 1**  
Electrical Characteristics

**Page 2**  
Typical Frequency Response Curve  
Measurement Circuit

**Page 3**  
Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

**Page 4**  
Exploded Drawing  
Material Table

**Page 5**  
Temperature Conditions  
Reliability Test

**Page 6**  
Reflow Process Condition

**Page 7**  
Packing

## Electrical Characteristics

### Sensitivity

Symbol: S      Unit: dB

Condition: 0dB=1V/Pa at 1kHz

Limits: Min: -45    **Center: -42**    Max: -39

### Output impedance

Symbol: Z out    Unit: KΩ

Condition: f= 1kHz

Limits: Max: 2.2

### Current Consumption

Symbol: IDSS    Unit: μA

Condition: VCC = 2.0V, RL= 2.2KΩ

Limits: Max: 500

### Signal to Noise Ratio

Symbol: S/N    Unit: dB

Condition: at 1kHz S.P.L = 1Pa (A-Weighted Curve)

Limits: Min: 58

### Decreasing Voltage

Symbol: ΔS-VS    Unit: dB

Condition: VCC= 3.0V to 2.0V

Limits: Max: -3

### Operating Voltage

Unit: V

Limits: Min: 1.4    Max: 5

### Maximum input S.P.L

Unit: dB

Condition: THD<3% at kHz

Limits: Max: 110

### Testing condition

Temperature: 20±2°C

Humidity: 65±5%

Air Pressure: 86 ~ 106KPa

### Dimension

Ø4.0 x 1.5mm

### IP Level

IP50



soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

### Page 1

Electrical Characteristics

### Page 2

Typical Frequency Response Curve  
Measurement Circuit

### Page 3

Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

### Page 4

Exploded Drawing  
Material Table

### Page 5

Temperature Conditions  
Reliability Test

### Page 6

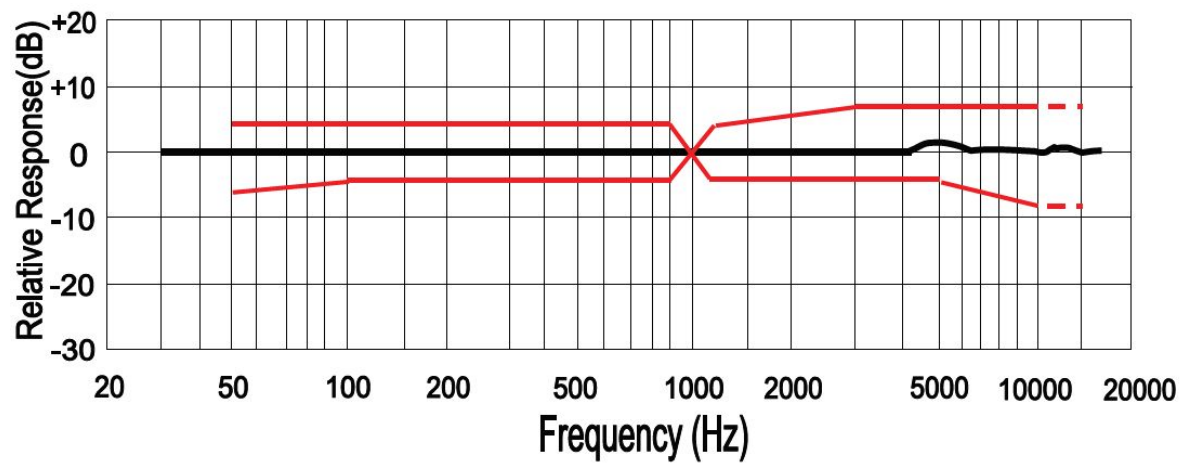
Reflow Process Condition

### Page 7

Packing

## Typical Frequency Response Curve

### Frequency Response

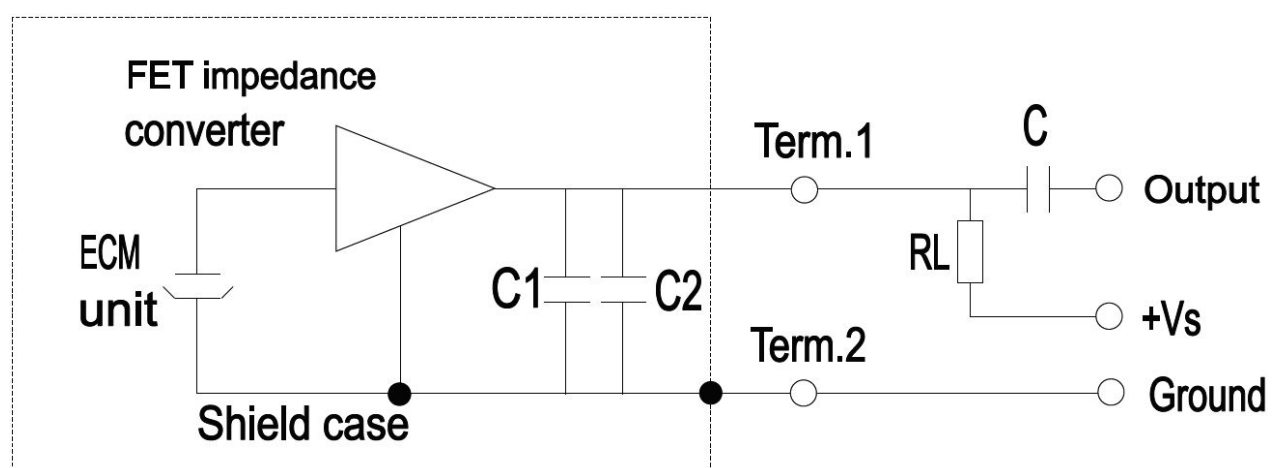


### Standard Test Fixture

Frequency(Hz)	Lower Limit(dB)	Upper Limit(dB)
50	-6	+3
100	-3	+3
800	-3	+3
1000	0	0
1200	-3	+3
3000	-3	+8
5000	-3	+8
10000	-8	+8

## Measurement Circuit

$RL = 2.2K\Omega$   $V_s = 2.0V$   $C1 = 10pF$   $C2 = 33pF$   $C = 1\mu F$





soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

**Page 1**  
Electrical Characteristics

**Page 2**  
Typical Frequency Response Curve  
Measurement Circuit

**Page 3**  
Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

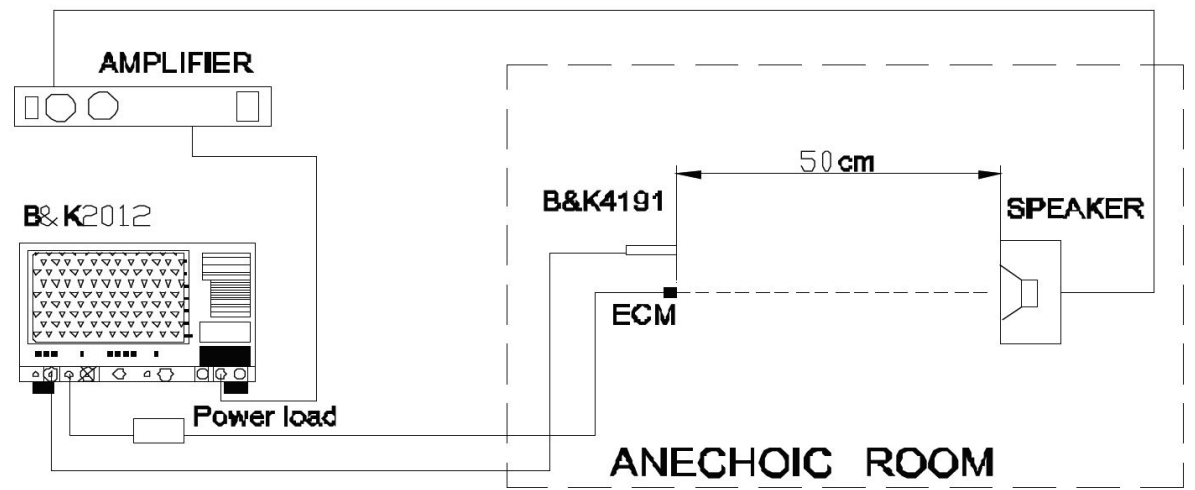
**Page 4**  
Exploded Drawing  
Material Table

**Page 5**  
Temperature Conditions  
Reliability Test

**Page 6**  
Reflow Process Condition

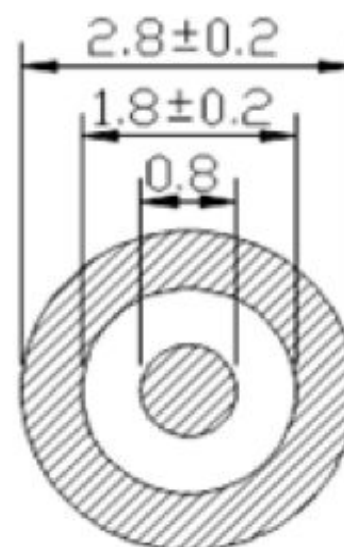
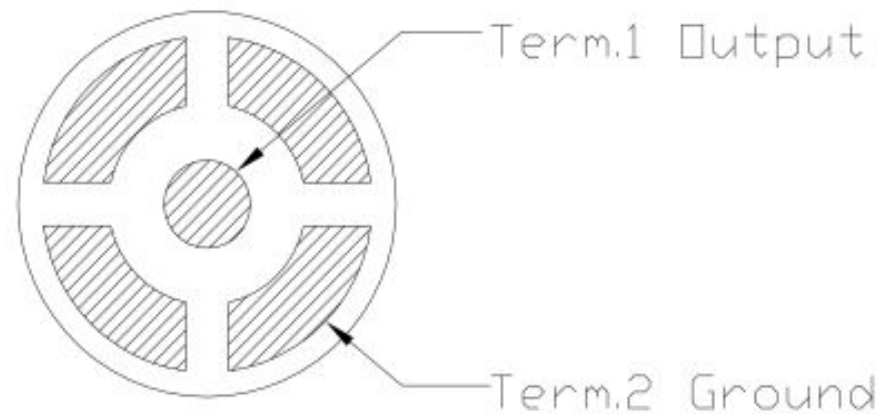
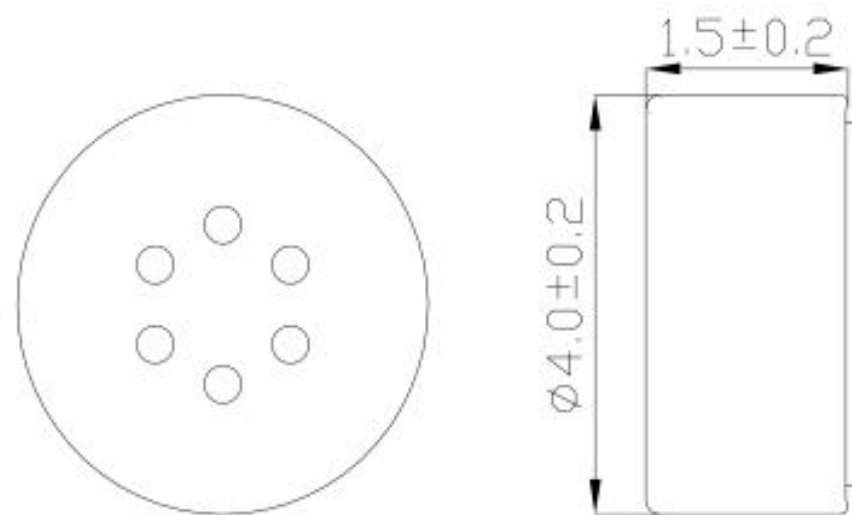
**Page 7**  
Packing

## Measurement Setup Drawing



## Product External and Dimension

Unit: mm



P.C.B Layout



soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

### Page 1

Electrical Characteristics

### Page 2

Typical Frequency Response Curve  
Measurement Circuit

### Page 3

Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

### Page 4

Exploded Drawing  
Material Table

### Page 5

Temperature Conditions  
Reliability Test

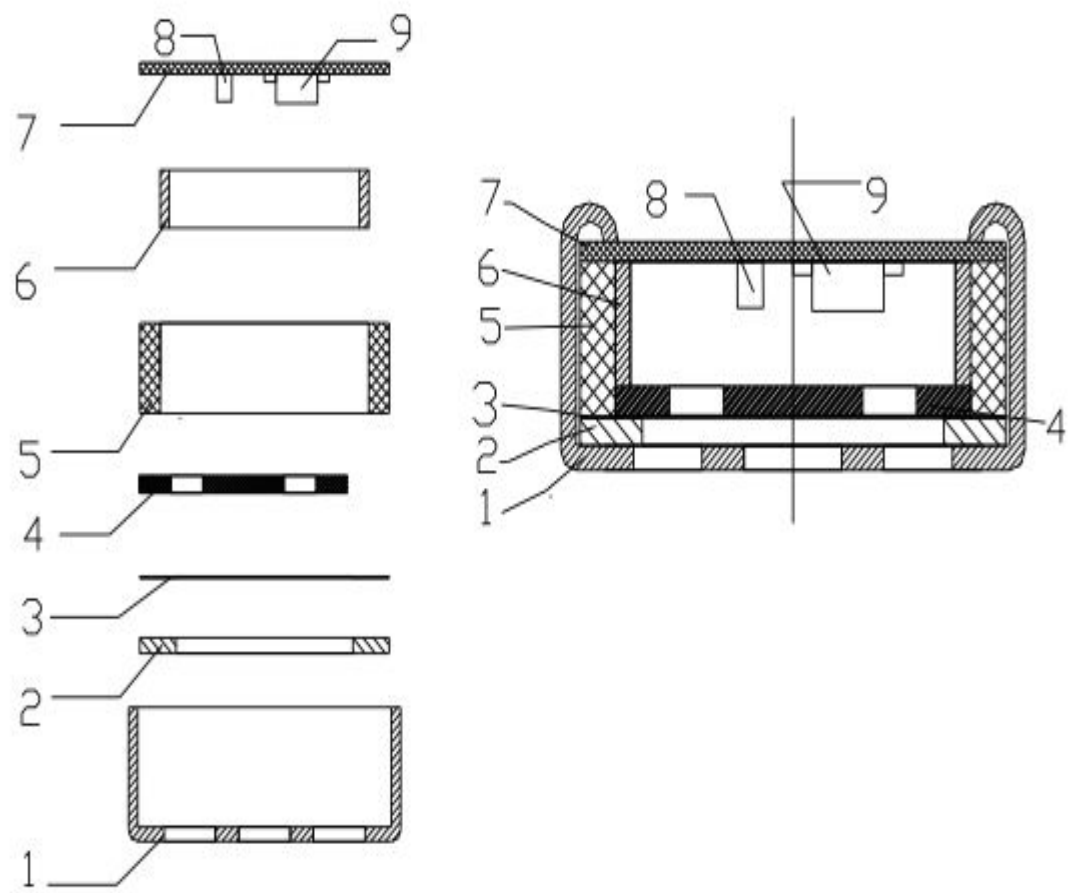
### Page 6

Reflow Process Condition

### Page 7

Packing

## Exploded Drawing and Material Table



No.	Part Name	Material	Quantity	Remark
1	Case		1	
2	Diaphragm	Al & Mg Alloy	1	
3	Spacer		1	
4	Electret Plate		1	
5	Chamber		1	
6	Copper Ring		1	
7	PCB	FR-4	1	
8	Chip Capacitor		1	33pF
9	FET	Built in Capacitor	1	10pF



soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

**Page 1**  
Electrical Characteristics

**Page 2**  
Typical Frequency Response Curve  
Measurement Circuit

**Page 3**  
Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

**Page 4**  
Exploded Drawing  
Material Table

**Page 5**  
Temperature Conditions  
Reliability Test

**Page 6**  
Reflow Process Condition

**Page 7**  
Packing

## Temperature Conditions

### Operating Temperature Range

-40°C~+75°C

### Storage Temperature Range

-20°C~+60°C

Note: Store in electronic warehouse.

## Reliability Test

After each of the following tests, the sensitivity of the microphone should be within  $\pm 3\text{dB}$  of initial sensitivity after 3 hours of conditioning at 20°C.

### Vibration Test

Frequency : 10Hz~55Hz

Amplitude: 1.52mm

Change of Frequency : 1 octave/min

2 hours in each of axis

### High Temperature Test

+70°C for 72hours.

### Low Temperature Test

-20°C for 72 hours.

### Humidity Test

90%~95%RH, +40°C for 240 hours.

### Thermal Shock Test

-20°C, 30 minutes  $\leftrightarrow$  +70°C, 30 minutes, repeated 32 cycles  $\rightarrow$  room temperature, 3 hours.

### Temperature Cycles

-20°C  $\leftrightarrow$  +20°C  $\leftrightarrow$  +75°C  $\leftrightarrow$  +20°C  $\leftrightarrow$  -20°C  
(2h) (0.5h) (2h) (0.5h) (2h) (0.5h) (2h) (0.5h) (2h) for 10 cycles.

### Packing Drop Test

Height: 1.0m

Procedure: 5 times from each of axis

### Electrostatic Discharge

Tested to IEC61000-4-2 Level 3:

#### a)Contact Discharge

The microphone shall operate normally after 10 discharges to is 6KV DC and the discharge network is 150pF and 330Ω.

#### b)Air Discharge

The microphone shall operate normally after 10 discharges to is 8KV DC and the discharge network is 150pF and 330Ω.





soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

**Page 1**  
Electrical Characteristics

**Page 2**  
Typical Frequency Response Curve  
Measurement Circuit

**Page 3**  
Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

**Page 4**  
Exploded Drawing  
Material Table

**Page 5**  
Temperature Conditions  
Reliability Test

**Page 6**  
Reflow Process Condition

**Page 7**  
Packing

## Reflow Process Condition

The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder reflow. There are four zones:

### Preheat Zone

This zone brings the temperature at a controlled rate, typically 1~2.5°C/s.

### Equilibrium Zone

This zone brings the board to be a uniform temperature and also activates the flux. The duration in this zone (typically 2~3 minutes) will need to be adjusted to optimize the outgassing of the flux.

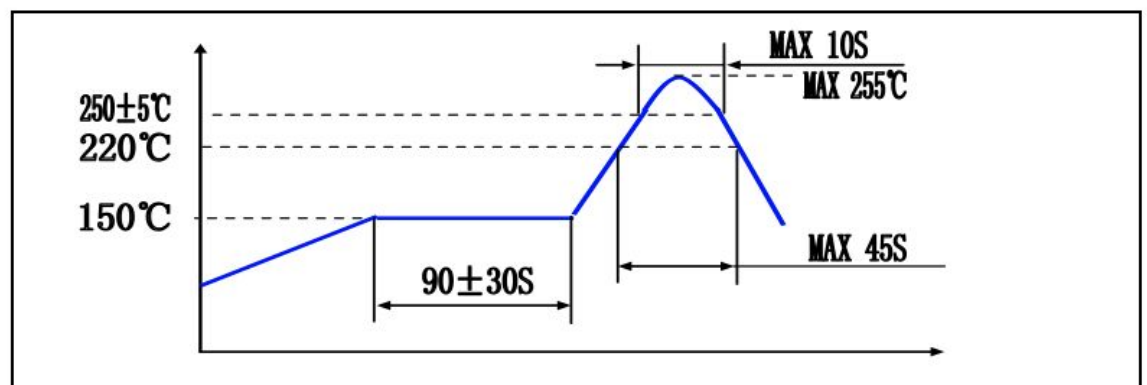
### Reflow Zone

The peak temperature should be high enough to achieve good wetting but not so high as to cause component discoloration or damage (255°C for maximum 10 seconds). Excessive soldering time can lead to inter-metallic growth which can result in a brittle joint.

### Cooling Zone

The cooling rate should be fast, to keep the solder grains small which will give a longer lasting joint. Typically will be 2~5°C/s. Sensitivity change should be within ±3dB after reflow process and at room temperature for 30 minutes at least.

Sensitivity change should be within ±3dB after reflow process and at room temperature for 30 minutes at least.





soberton inc.

# EM ELECTRET CONDENSER MICROPHONE

Acoustic Product Specification

Product Number: EM-4015S



Release | Revision: B/2018

## CONTENTS

This document contains the technical specifications for the omni directional back electret condenser microphone.

### Page 1

Electrical Characteristics

### Page 2

Typical Frequency Response Curve  
Measurement Circuit

### Page 3

Measurement Setup Drawing  
Product External and Dimensions  
Pad Layout

### Page 4

Exploded Drawing  
Material Table

### Page 5

Temperature Conditions  
Reliability Test

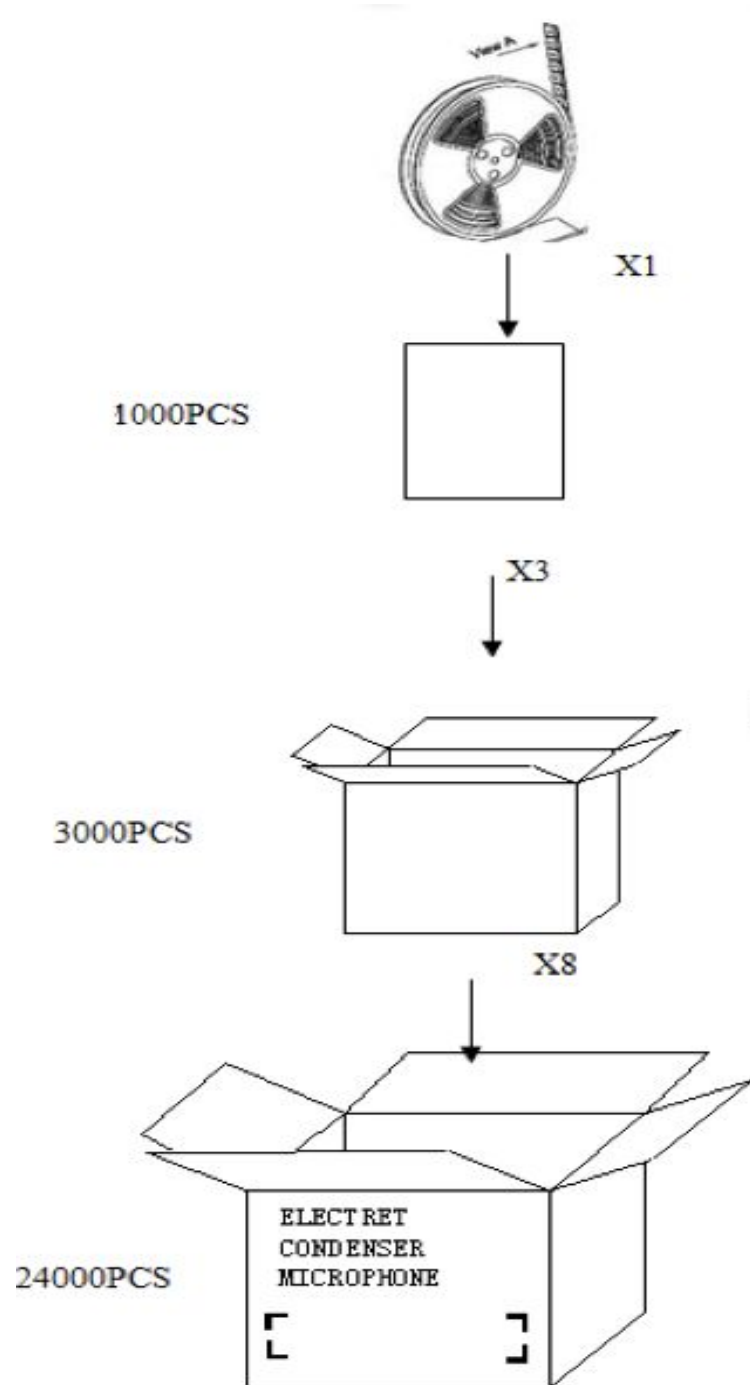
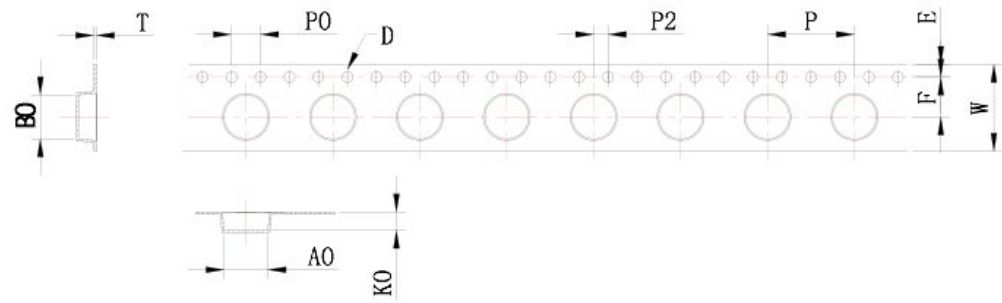
### Page 6

Reflow Process Condition

### Page 7

Packing

## Packing



## Details

### Quantity and Weight:

Anti-Static Foam Box: 1,000 pcs/per reel

Mid Packet: 3,000 pcs

Carton: 24,000pcs

1PC: 0.1g

Net Weight: 2.4kg

Gross Weight: 6.0kg