



Electret Condenser Microphone Units

深圳市豪恩电声科技有限公司

Shenzhen Horn Electroacoustic Technology Co.,Ltd

SPEC.SHEET NO: W040207001

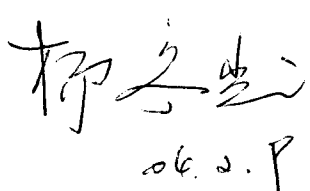
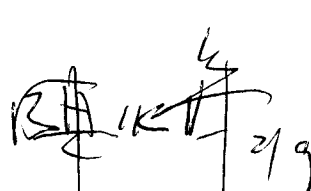
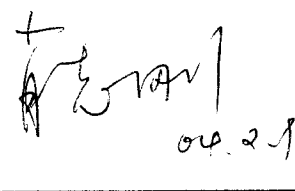
Address:  
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Village, Dalang, Longhua, Shenzhen,  
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E-mail: rd@horn.com.cn  
Website: www.horn.com.cn

**CUSTOMER: Digi-Key Corporation**

## APPROVAL SHEET

PRODUCT NAME	PART NUMBR	DIMENSION	REMARK
Electret Condenser Microphone	<b>EM4015-46BC10&amp;33</b>	Ø4.0×1.5(mm)	(SMT)

APPROVED BY	CHECKED BY	ISSUED BY
 06.2.9	 2/9	 04.2.9

**APPROVED BY:**

**DATE:**

**PART NUMBER :EM4015-46BC10&33**

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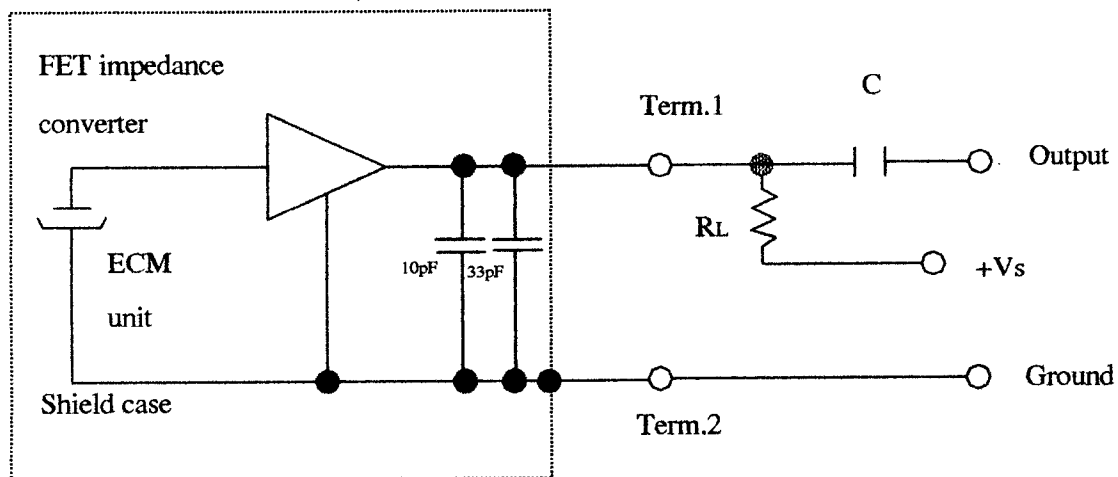
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## SPECIFICATION

Item	Symbol	Test conditions	Min	Standard	Max	Unit
Sensitivity	S	f=1KHz. P <sub>in</sub> =1Pa	-50	-46	-42	dB 0dB=1V/Pa
Directivity	Omnidirectional					
Impedance	Z <sub>out</sub>				2.2	K Ω
Input sound pressure level	S.P.L				100	dB
Operation voltage	V <sub>s</sub>	-	1.0	2	10	V
Current consumption	I	f=1KHz. P <sub>in</sub> =1Pa			500	uA
Sensitivity reduction	ΔS	f=1KHz. P <sub>in</sub> =1Pa V <sub>s</sub> =2→1.5V			-3	dB
S/N ratio	S/N(A)	f=1KHz. P <sub>in</sub> =1Pa A=curve	58			dB

### Measurement Circuit (Test Condition V<sub>s</sub>=2V R<sub>L</sub>=2.2KΩ)

T<sub>a</sub>=20°C R.H=65%)



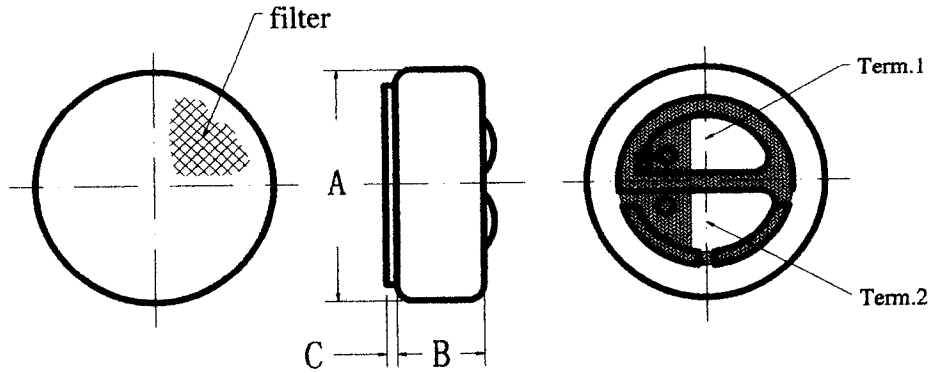
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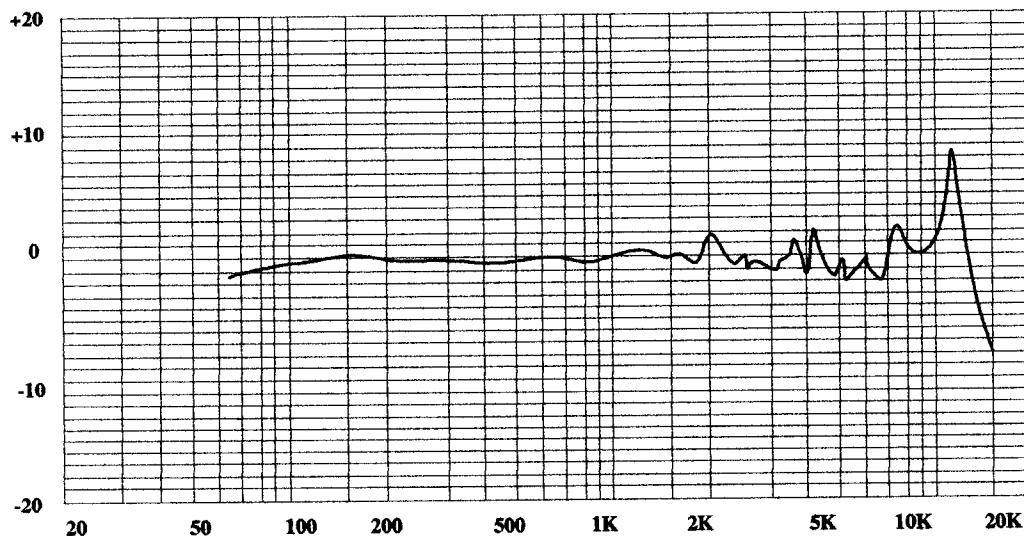
## Dimensional Drawing

unit: mm



PART	MIN	STANDARD	MAX	REMARK
A	Ø3.8	Ø4.0	Ø4.2	
B	1.4	1.5	1.6	
C	-	-	0.2	

## Typical Frequency Response Curve



Frequency(Hz)

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## Ambient condition

### (1) Operating condition

Ambient temperature:  $-10^{\circ}\text{C} \sim +45^{\circ}\text{C}$   
Relative humidity:  $\leq 85\%$

### (2) Storage condition

Ambient temperature:  $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$   
Relative humidity:  $45\% \sim 75\%$

## Reliability Test

### 1) Vibration Test

To be no interference in operation after vibration of full amplitude 2mm for 30 minutes at three axis, the sensitivity to be within  $\pm 3\text{dB}$  from initial sensitivity.

### 2) Drop test

To be no interference in operation after dropped to concrete floor each time from 1 meter height of three directions in state of packing, the sensitivity to be within  $\pm 3\text{dB}$  from initial sensitivity.

### 3) High Temperature Storage:

To be no interference in operation after high temperature test  $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$  for 48 hours. The sensitivity to be within  $\pm 3\text{dB}$  from initial sensitivity.

### 4) Isotherm & Iso-humidity Storage

To be no interference in operation after storage test at temperature  $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$  and relative humidity ( $93 \pm 3\%$ ) for 48 hours, the sensitivity to be within  $\pm 3\text{dB}$  from initial sensitivity, the test is performed at temperature  $20^{\circ}\text{C}$  after operation for 6 hours.

### 5) Low Temperature Storage

To be no interference in operation after test at temperature  $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$  for 48 hours, the sensitivity to be within  $\pm 3\text{dB}$  from initial sensitivity

### 6) Temperature Cycle Test

After exposure at  $55 \pm 2^{\circ}\text{C}$  for 1 hour, at  $20 \pm 2^{\circ}\text{C}$  for 1 hour. at  $-10 \pm 2^{\circ}\text{C}$  for 1 hour, at  $20 \pm 2^{\circ}\text{C}$  for 1 hour, with 5 cycles. Change of sensitivity within  $\pm 3\text{dB}$  from initial measuring should be done after 2 hours exposed to  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ .

### 7) Collision Test

After collided with the acceleration  $100 \pm 10\text{m/s}$ , at the vertical & horizontal directions for  $1000 \pm 10$  times. at the state of packing. Change of sensitivity within  $\pm 3\text{dB}$  from initial.

**TEST RESULT OF SAMPLES**

NO.	1KHz (dB)	CURRENT (mA)	NOTES
1	-45.9	0.15	(1KHz、0dB=1V/Pa)
2	-45.5	0.22	
3	-46.2	0.18	
4	-46.5	0.16	
5	-46.4	0.17	
6	-46.0	0.21	
7	-45.5	0.15	
8	-46.4	0.17	
9	-46.0	0.15	
10	-46.5	0.15	
11	-46.5	0.21	
12	-46.0	0.15	
13	-46.0	0.20	
14	-46.0	0.16	
15	-46.5	0.15	

Customer: **Digi-Key Corporation**

Date: 2004.02.09

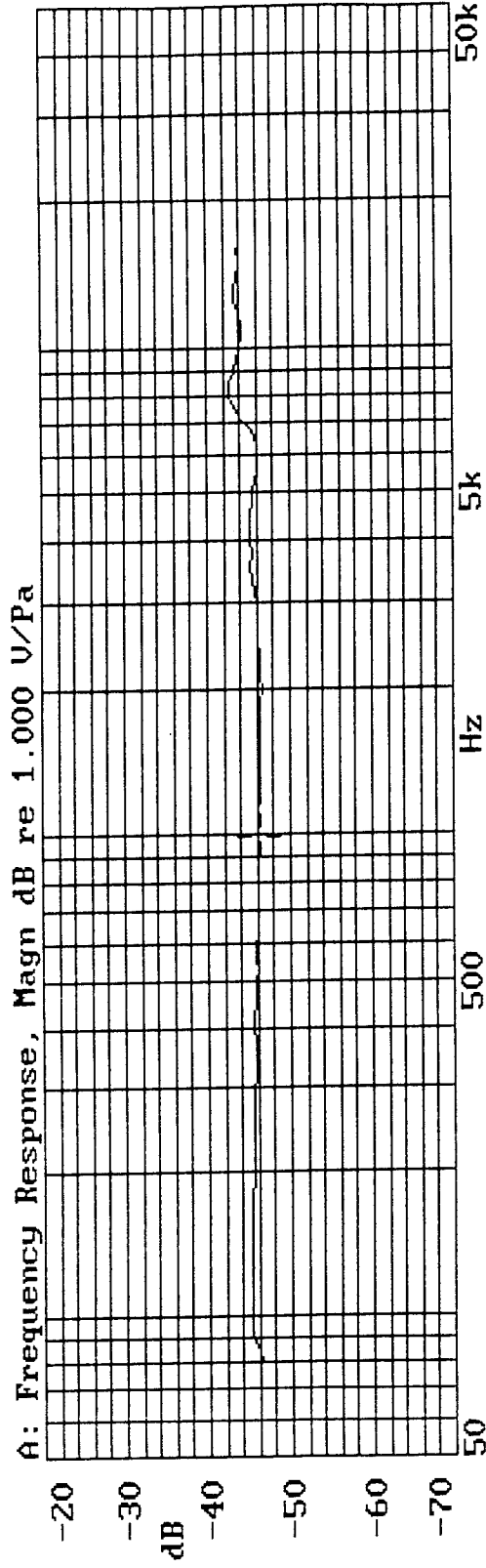
Part number: EM4015-46BC10&33

Sensitivity: -46±4dB

Test condition: 2.2K Ω 2V

Tester: G1

SHENZHEN HORN ELECTROACOUSTIC TECHNOLOGY CO., LTD.  
X:1.0000kHz \*Y:-46.21dB\* ZA:Live Curve SSR Fund.



MODEL: EM4015-46BC10&33  
CODE: 3#  
SENSITIVITY: -46.21dB (1kHz)  
TEST CONDITION: 2.2K $\Omega$  2V

09-FEB-2004 09:01:05

Mode: SSR





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## Certificate of Confirmed Products

Date: Feb. 08. 2004

NO: W0400207001

SUPPLIER	HORN	BUYER	Digi-Key Corporation	
TITLE	ECM	MODEL	EM4015-46BC10&33	
SIZE	φ 4.0 × 1.5mm	TEST CONDITION	2.2K Ω 2V	
QUANTITY		SAMPLE: 15PCS		
<b>SPECIFICATIONS</b>				
Sensitivity		-46 ± 4dB (0dB=1V/Pa. 1KHz )		
Directivity		Omnidirectional		
Impedance		Low impedance		
Standard operation voltage		2V		
Operation voltage		1. 0-10V		
Current consumption		Max500uA		
Maximum input S.P.L		100dB		
S/N ratio		More than 58dB		
Sensitive reduction		within-3dB at 1.5V		
The test result from customers		Signature: _____ . _____ . 2004		
Final confirmed	Pass	Refuse	Accepted basis on	
Remarks				

\*\*\*\*\* The form must be confirmed by return fax after your test as your best regards! \*\*\*\*\*