

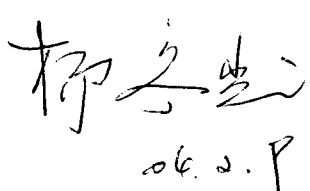
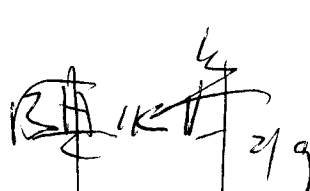
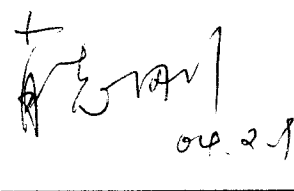
Address:
Block 9, Shuiwei Ind Zone, Shuiwei New
Village, Dalang, Longhua, Shenzhen,
Guangdong, China 518109

Tel: (86)755-28121370/ 28121371/28109416/28109419
Fax: (86)755-28109417
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	EM4015-46BC10&33	Ø4.0×1.5(mm)	(SMT)

APPROVED BY	CHECKED BY	ISSUED BY
 06.2.9	 21.9	 04.2.9

APPROVED BY:

DATE:

PART NUMBER :EM4015-46BC10&33

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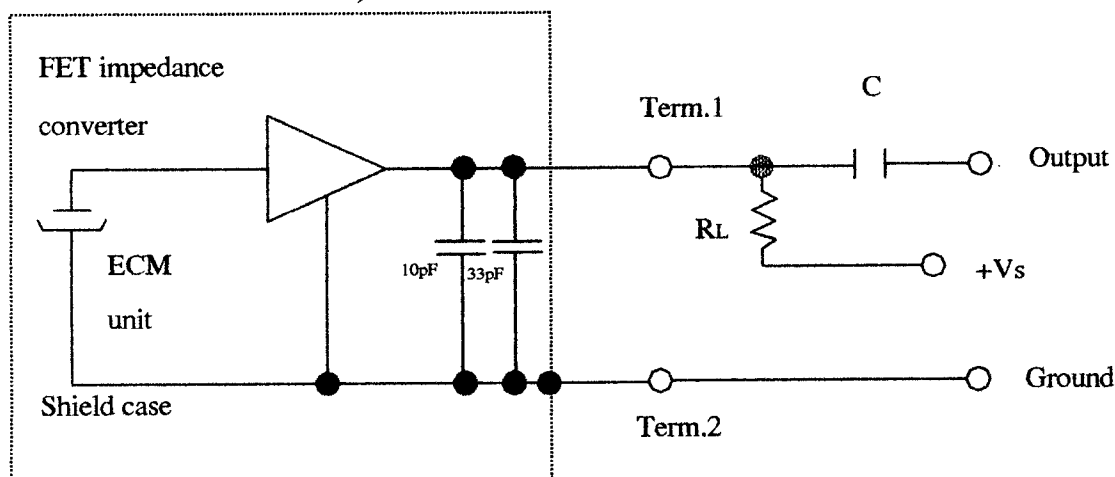
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SPECIFICATION

Item	Symbol	Test conditions	Min	Standard	Max	Unit
Sensitivity	S	f=1KHz. $P_{in}=1Pa$	-50	-46	-42	dB 0dB=1V/Pa
Directivity		Omnidirectional				
Impedance	Zout				2.2	K Ω
Input sound pressure level	S.P.L				100	dB
Operation voltage	Vs	-	1.0	2	10	V
Current consumption	I	f=1KHz. $P_{in}=1Pa$			500	μA
Sensitivity reduction	ΔS	f=1KHz. $P_{in}=1Pa$ $V_s=2 \rightarrow 1.5V$			-3	dB
S/N ratio	S/N(A)	f=1KHz. $P_{in}=1Pa$ A=curve	58			dB

Measurement Circuit (Test Condition $V_s=2V$ $R_L=2.2K\Omega$)

$T_a=20^\circ C$ R.H=65%)



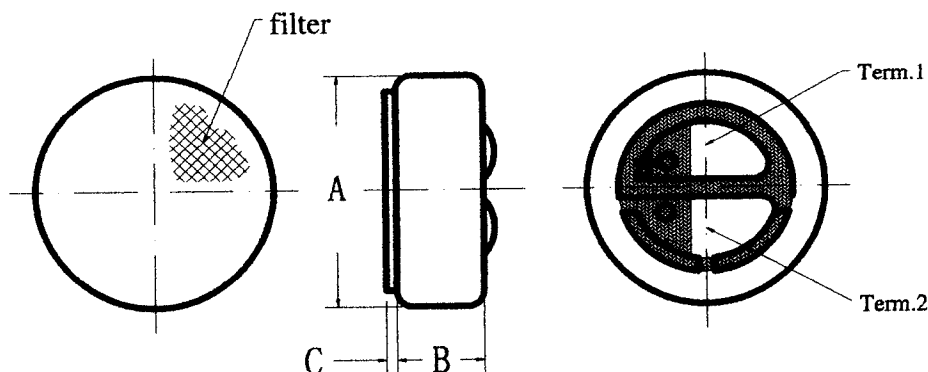
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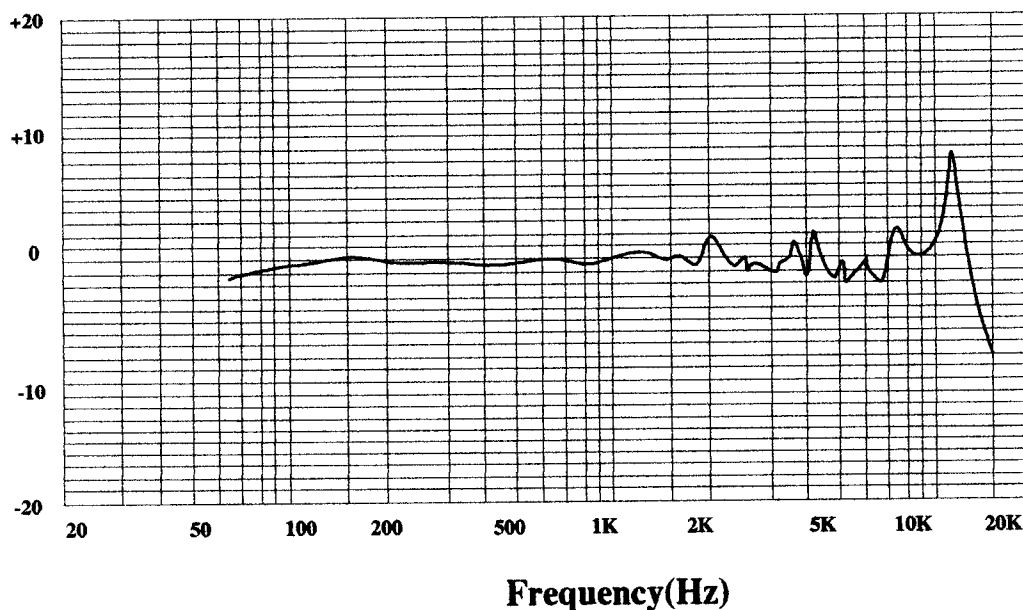
Dimensional Drawing

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



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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°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 ± 10 times. at the state of packing. Change of sensitivity within $\pm 3\text{dB}$ from initial.



Electret Condenser Microphone Units

深圳市豪恩电声科技有限公司
SHENZHEN HORN ELECTROACOUSTIC TECHNOLOGY CO.,LTD

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

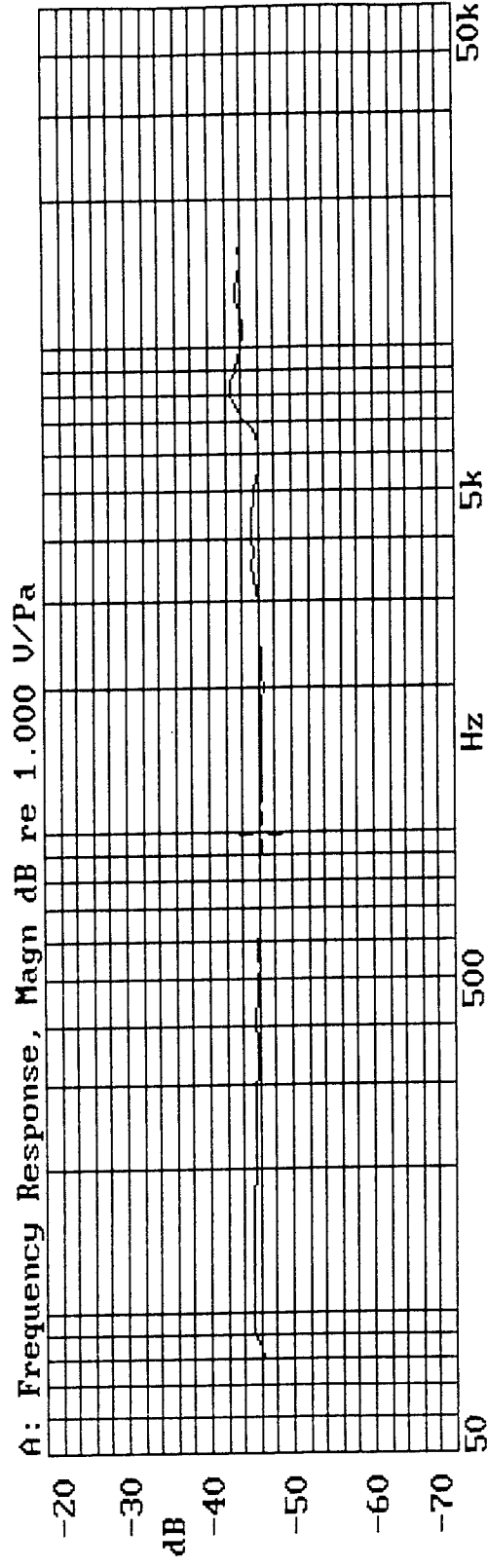
Part number: EM4015-46BC10&33

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: 2.2KΩ 2V

09-FEB-2004 09:01:05

Mode: SSR





Electret Condenser Microphone Units

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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	$\phi 4.0 \times 1.5\text{mm}$	TEST CONDITION	2.2K Ω 2V	
QUANTITY		SAMPLE: 15PCS		
SPECIFICATIONS				
Sensitivity		$-46 \pm 4\text{dB}$ (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! *****