

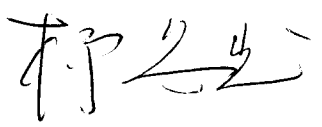
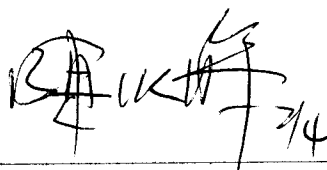
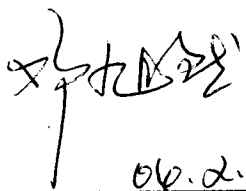
Address:
Block 9, Shuiwei Ind Zone, Shuiwei New
Village, Dalang, Longhua, Shenzhen,
Guangdong, China 518109

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	EM4020-48BC10&33	Ø4.0×2.0(mm)	(SMT)

APPROVED BY	CHECKED BY	ISSUED BY
 06.2.4	 7/4	 06.2.4

APPROVED BY:

DATE:

PART NUMBER :EM4020-48BC10&33

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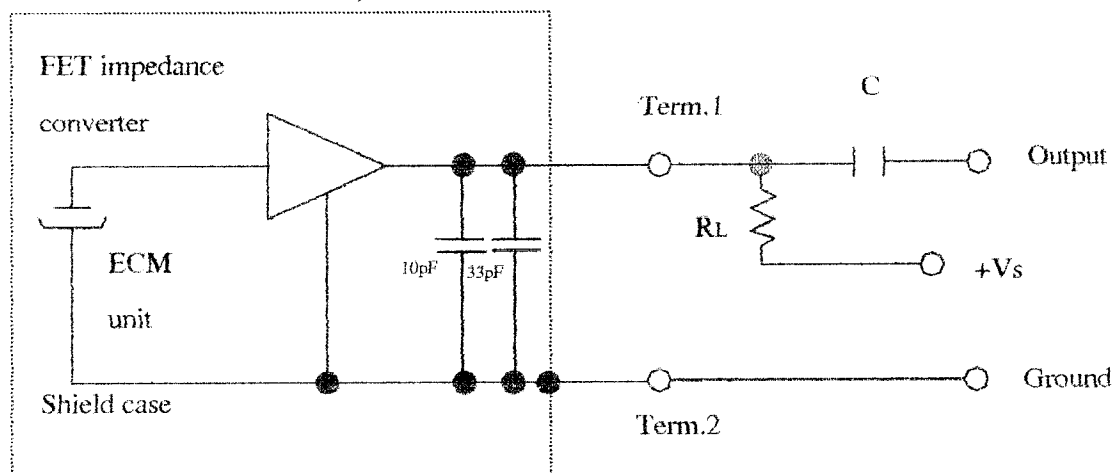
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SPECIFICATION

Item	Symbol	Test conditions	Min	Standard	Max	Unit
Sensitivity	S	$f=1\text{KHz}$, $P_{in}=1\text{Pa}$	-52	-48	-44	dB 0dB=1V/Pa
Directivity		Omnidirectional				
Impedance	Z_{out}				2.2	K Ω
Input sound pressure level	S.P.L				100	dB
Operation voltage	V_s	-	1.0	2	10	V
Current consumption	I	$f=1\text{KHz}$, $P_{in}=1\text{Pa}$			500	μA
Sensitivity reduction	ΔS	$f=1\text{KHz}$, $P_{in}=1\text{Pa}$ $V_s=2 \rightarrow 1.5\text{V}$			-3	dB
S/N ratio	S/N(A)	$f=1\text{KHz}$, $P_{in}=1\text{Pa}$ A=curve	58			dB

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

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



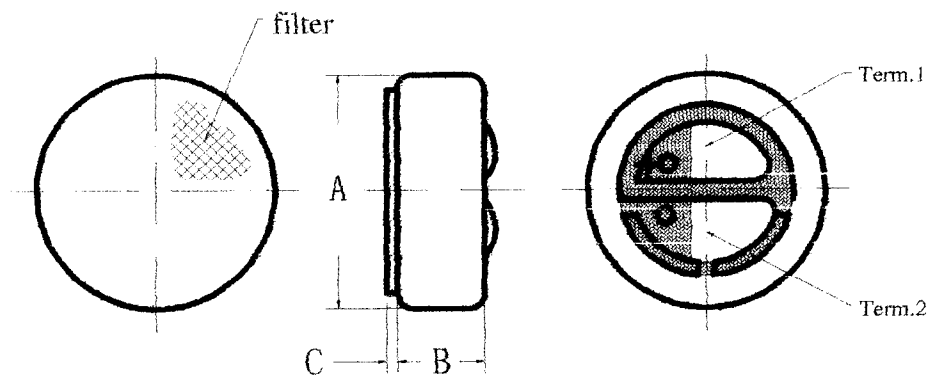
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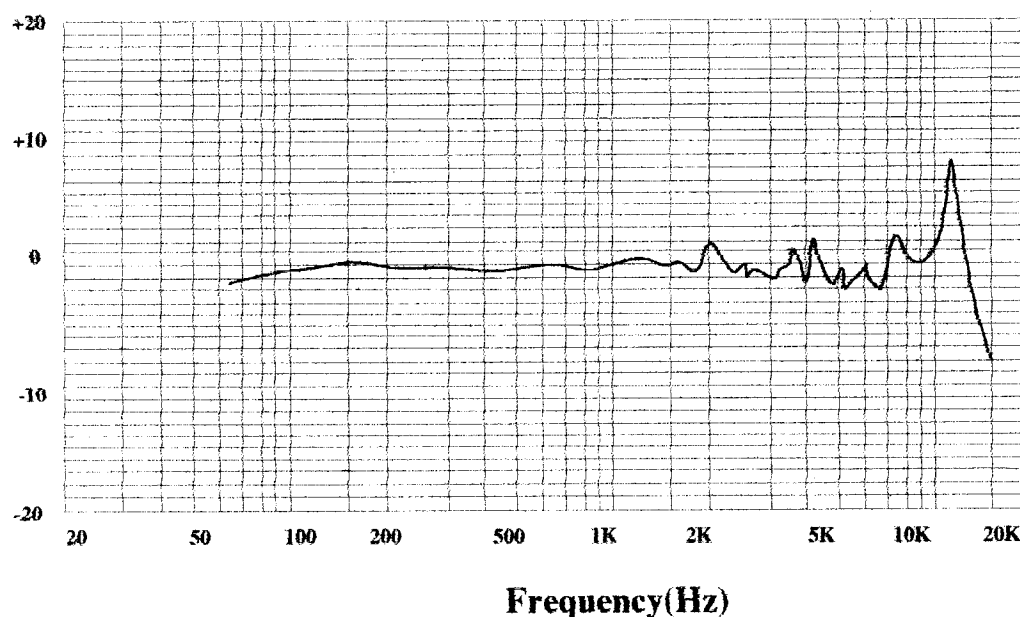
Dimensional Drawing

unit: mm



PART	MIN	STANDARD	MAX	REMARK
A	Ø3.8	Ø4.0	Ø4.2	
B	1.8	2.0	2.0	
C	0.1	0.2	0.3	

Typical Frequency Response Curve



PART NUMBER :EM4020-48BC10&33



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: W04011402

Address:

Block 9, Shuiwei Ind Zone, Shuiwei New
Village, Dalang, Longhua, Shenzhen,
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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.

PART NUMBER :EM4020-48BC10&33



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	-47.5	0.20	(1KHz、0dB=1V/Pa)
2	-47.4	0.20	
3	-48.0	0.22	
4	-49.6	0.17	
5	-48.9	0.23	
6	-48.1	0.25	
7	-47.5	0.20	
8	-49.0	0.20	
9	-49.0	0.17	
10	-47.8	0.15	
11	-46.0	0.16	
12	-45.5	0.18	
13	-46.1	0.18	
14	-46.0	0.15	
15	-46.2	0.20	

Customer: Digi-Key Corporation

Date: 2004.02.03

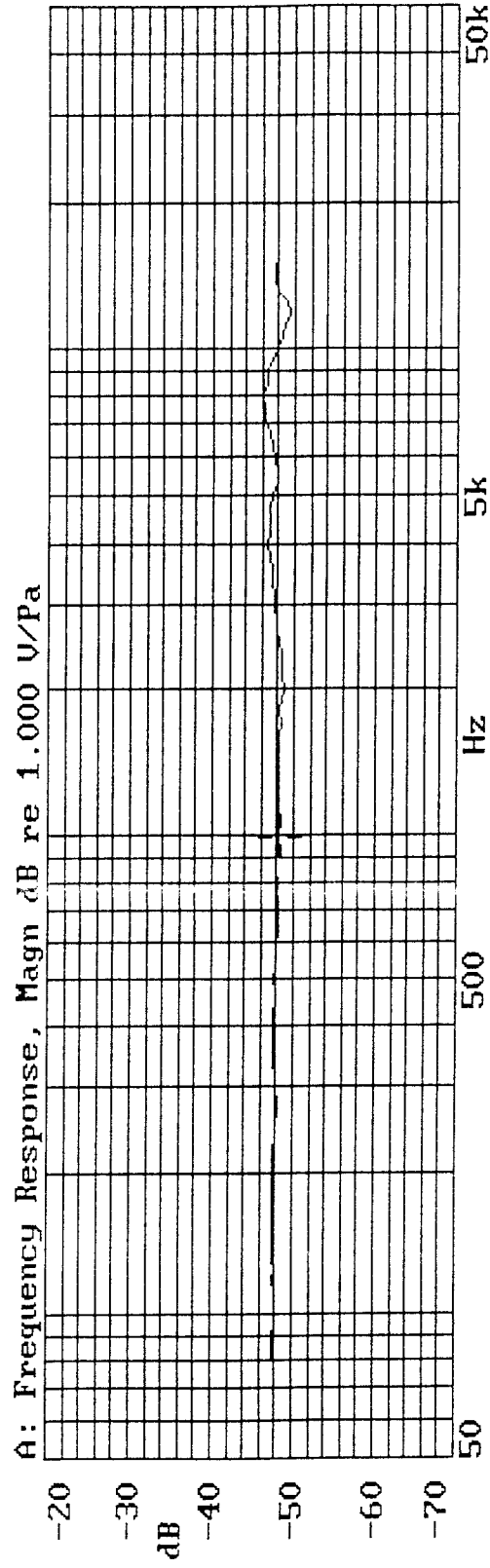
Part number: EM4020-48BC10&33

Sensitivity: -48±4dB

Test condition: 2.2K Ω 2V

Tester: G1

SHENZHEN HORN ELECTROACOUSTIC TECHNOLOGY CO.,LTD.
X:1.0000kHz *Y:-48.10dB* ZA:Live Curve SSR Fund.



MODEL: EM4020-48BC10&33
CODE: 6#
SENSITIVITY: -48.10dB (1kHz)
TEST CONDITION: 2.2KΩ 2V

03-FEB-2004 08:37:29

Mode: SSR





Electret Condenser Microphone Units

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Certificate of Confirmed Products

Date: Feb. 03. 2004

NO: W04011402

SUPPLIER	HORN	BUYER	Digi-Key Corporation	
TITLE	ECM	MODEL	EM4020-48BC10&33	
SIZE	$\phi 4.0 \times 2.0\text{mm}$	TEST CONDITION	2.2K Ω 2V	
QUANTITY		SAMPLE: 15PCS		
SPECIFICATIONS				
Sensitivity		$-48 \pm 4\text{dB}$ (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! *****