



Electret Condenser Microphone Units

深圳市豪恩电声科技有限公司

SHENZHEN HORN ELECTROACOUSTIC TECHNOLOGY CO., LTD

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E-mail: rd@horn.com.cn

Certificate of Confirmed Products

Date: Feb. 04. 2004

NO: W04011403

SUPPLIER	HORN	BUYER	Digi-Key Corporation	
TITLE	ECM	MODEL	EM4011-52FC10&33	
SIZE	φ 4.0 × 1.1mm	TEST CONDITION	2.2K Ω 2V	
QUANTITY		SAMPLE: 15PCS		
SPECIFICATIONS				
Sensitivity		-52 ± 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! *****

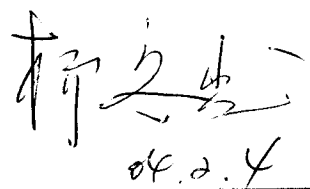
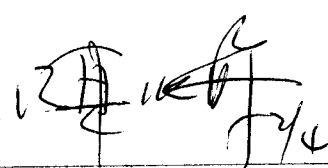
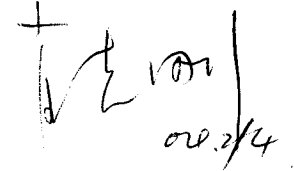
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Guangdong, China 518109

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CUSTOMER: Digi-Key Corporation

APPROVAL SHEET

PRODUCT NAME	PART NUMBR	DIMENSION	REMARK
Electret Condenser Microphone	EM4011-52FC10&33	Ø4.0×1.1(mm)	(SMT)

APPROVED BY	CHECKED BY	ISSUED BY
 04.2.4	 04.2.4	 04.2.4

APPROVED BY:

DATE:

PART NUMBER :EM4011-52FC10&33

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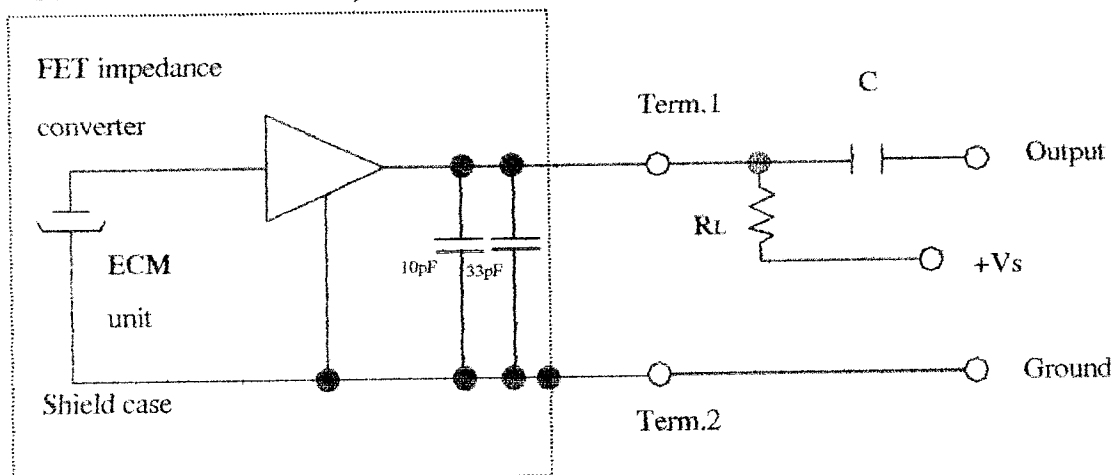
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SPECIFICATION

Item	Symbol	Test conditions	Min	Standard	Max	Unit
Sensitivity	S	f=1KHz. $P_{in}=1Pa$	-56	-52	-48	dB <small>0dB=1V/Pa</small>
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%)



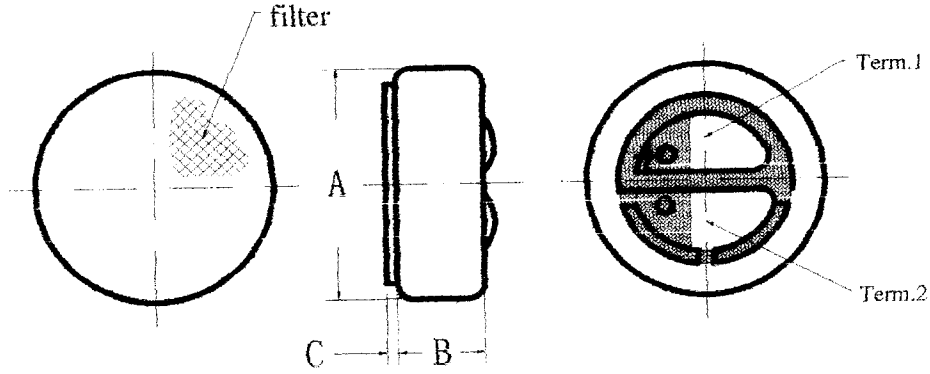
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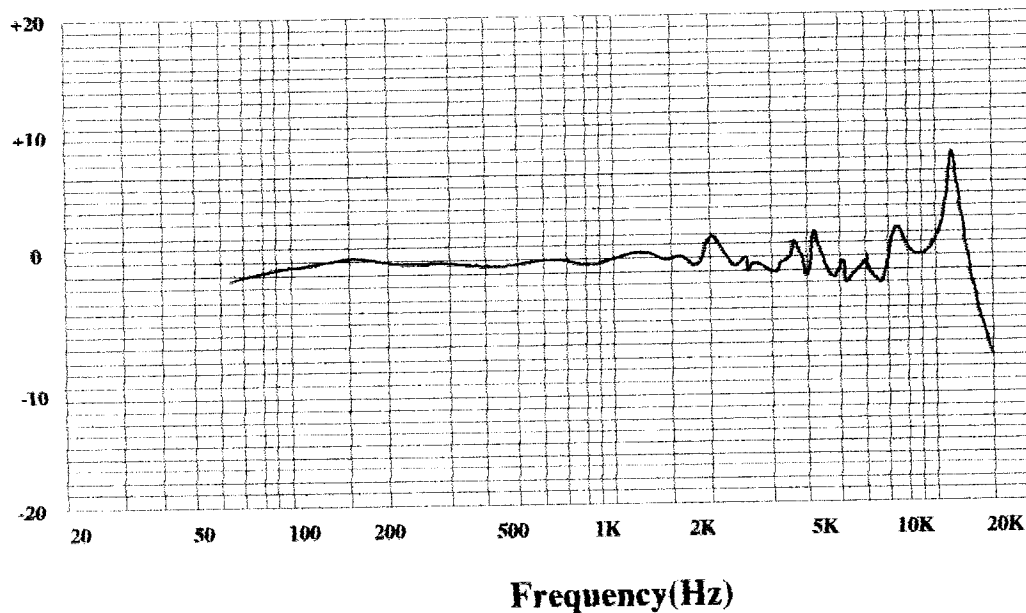
Dimensional Drawing

unit: mm



PART	MIN	STANDARD	MAX	REMARK
A	Ø3.8	Ø4.0	Ø4.2	
B	1.0	1.1	1.2	
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.



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TEST RESULT OF SAMPLES

NO.	1KHz (dB)	CURRENT (mA)	NOTES
1	-51	0.19	
2	-52.5	0.23	
3	-53.2	0.18	
4	-51.3	0.18	
5	-53.8	0.22	
6	-51	0.19	
7	-53	0.2	
8	-52.5	0.17	
9	-51.5	0.17	
10	-52.5	0.18	
11	-50.8	0.24	
12	-52.4	0.17	
13	-51.5	0.22	
14	-52.5	0.23	
15	-51.8	0.17	

Customer: Digi-Key Corporation

Date: 2004.02.04

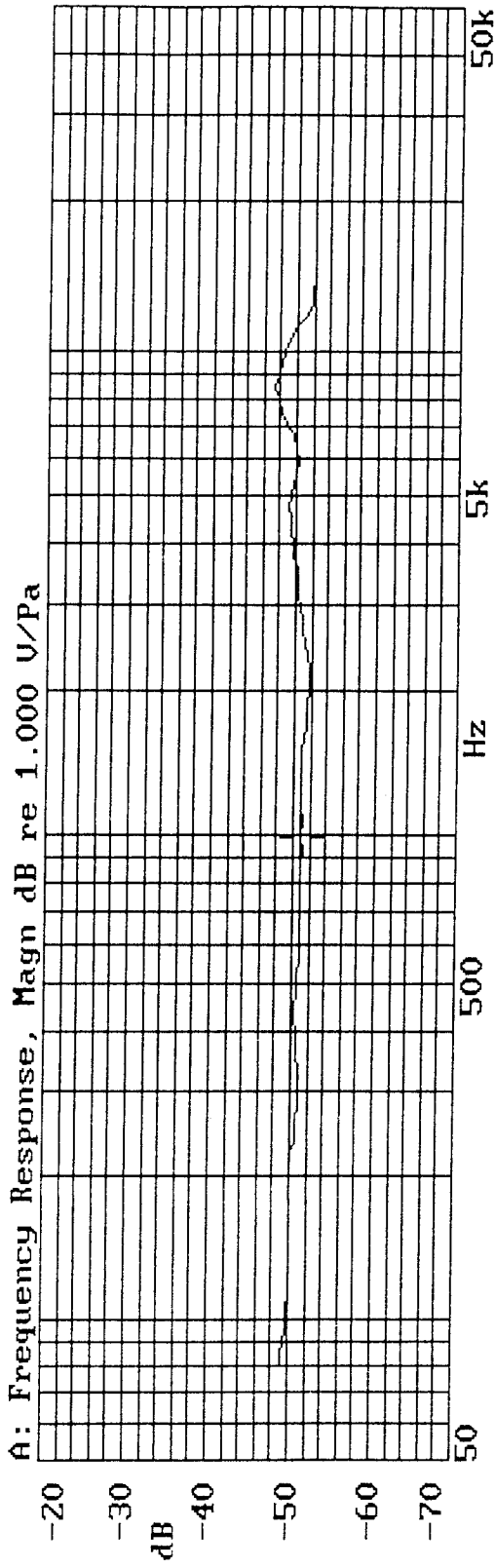
Part number: EM4011-52FC10&33

Sensitivity: -52±4dB

Test condition: 2.2K Ω 2V

Tester: G1

SHENZHEN HORN ELECTROACOUSTIC TECHNOLOGY CO., LTD.
X:1.0000kHz *Y:-50.96dB* ZA:Live Curve SSR Fund.



MODEL: EM4011-52FC10833
CODE: 6#
SENSITIVITY: -50.96dB (1KHz)
TEST CONDITION: 2.2K Ω 2V

03-FEB-2004 08:51:22

Mode: SSR

