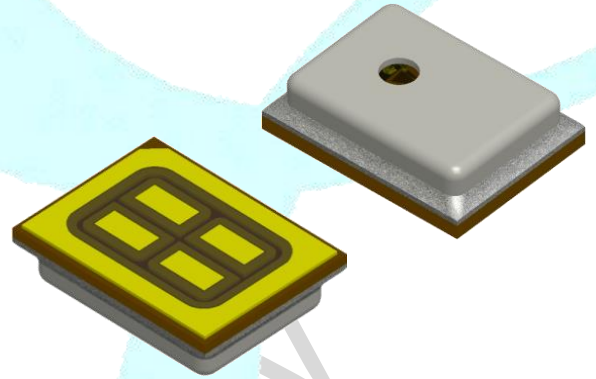


## F2-(A)HCDMO-D100T26-5P

High SNR / Wide Band  
Small Mini

OMNI-DIRECTIONAL  
BOTTOM PORT



### Best sound electronics

Value no1. Micro sound provider

Creative technology starts from respecting of life  
of the individuals

Creative technologies to respect human life

### Best sound electronics

Value no1. Micro sound provider

We offer you happiness with our excellent technology  
beyond an ordinary sound what you expect

Superior technology to deliver happiness

### Best sound electronics

Value no1. Micro sound provider

Keep basic fundamentals to fill sound with  
new innovations

Creative technologies to respect human life



## 1. INTRODUCTION

- Digital MEMS Microphone - ½ Cycle PDM 16bit, Full Scale=120dB SPL
- Top Port Type – Sensitivity is Typical -26dBFS
- **High Signal to Noise Ratio(SNR) – Typical 61dB (A-weighted, 20Hz~20kHz)**
- **Wideband Frequency - ±2dB at 50Hz ~ 12000 Hz (reference page 7)**
- Omni-directional
- Dual Channel supported
- RF Shielded – with embedded capacitor
- Compatible with Sn/Pb and Halogen-free solder process
- RoHS compliant
- SMD reflow temperature of up to 260 °C for over 30 seconds

## 2. APPLICATIONS

- Smartphones
- Ear-sets, Bluetooth Headsets
- Tablet Computers
- Wearable Devices
- Electrical Appliances
- Voice Recognition Systems of Appliances

## 3. MODEL NO.

**F2-(A)HCDMO-D100T26-5P**

## 4. GENERAL MICROPHONE SPECIFICATIONS

Test Condition : 23 ± 2 °C, Room Humidity = 55 ± 20 %, VDD=1.8V, fclk = 2.4MHz, SELECT Pin is grounded, CLOAD = 1µF, unless otherwise noticed.

Parameter	Conditions	Min	Typ	Max	Units
<b>Clock Frequency</b>		<b>1</b>	-	<b>3.25</b>	MHz
<b>Stand by Clock Frequency</b>		-	-	<b>1</b>	kHz
<b>Standby Current</b>	fclk < 1kHz, Vdd=3.3V	-	-	<b>1</b>	µA
<b>Fall-asleep Time</b>	fclk = 2.4MHz	-	-	<b>10</b>	ms
<b>Wake-up Time</b>	fclk = 1kHz	-	-	<b>10</b>	ms

## 5. ELECTRO-ACOUSTIC CHARACTERISTICS

Test Condition :  $23 \pm 2^\circ\text{C}$ , Room Humidity =  $55 \pm 20\%$ ,  $V_{DD}=1.8\text{V}$ ,  $f_{clk} = 2.4\text{MHz}$ , SELECT Pin is grounded,  $C_{LOAD} = 1\mu\text{F}$ , unless otherwise noticed.

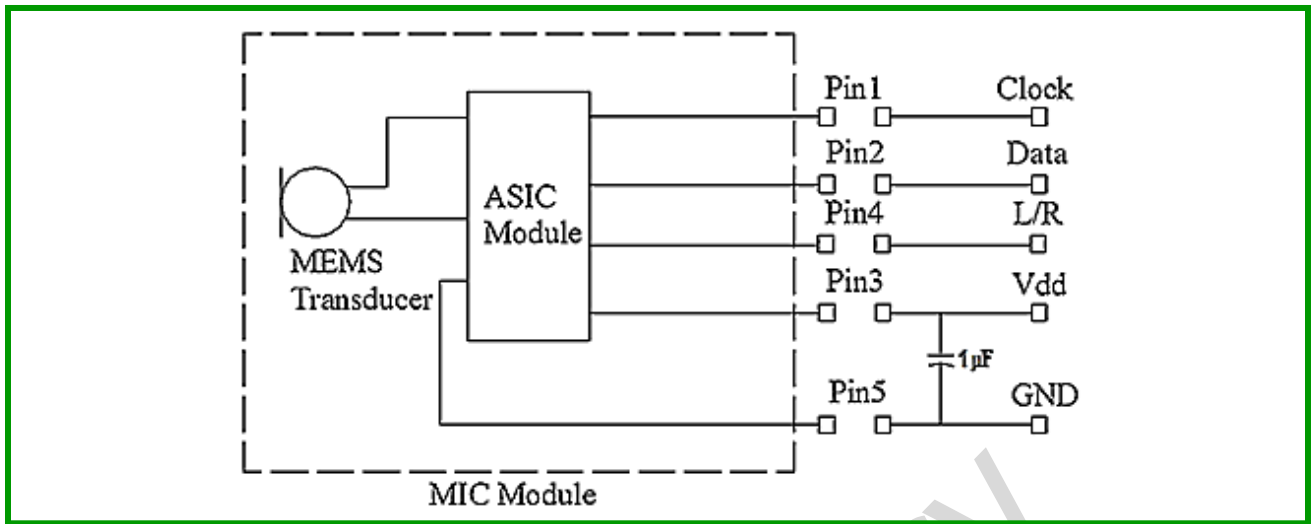
Parameter	Conditions	Min	Typ	Max	Units
Directivity		Omni-directional			
Supply Voltage		1.64	-	3.6	V
Data Format		½ Cycle PDM 16bit			-
Full Scale Acoustic Level		120			dB SPL
Current Consumption	$f_{clk} = 2.4\text{MHz}$ , load on DATA output	800	-	1200	$\mu\text{A}$
Sensitivity	94dB SPL at 1kHz	-29	-26	-23	dBFS
Signal to Noise Ratio (SNR)	94dB SPL at 1kHz, A-weighted (20Hz~20kHz)	-	61	-	dB(A)
Equivalent Input Noise (EIN)	94dB SPL at 1kHz, A-weighted (20Hz~20kHz)	-	33	-	dB(A) SPL
Total Harmonic Distortion (THD)	94dB SPL at 1kHz	-	-	0.2	%
	107dB SPL at 1kHz	-	-	1.0	%
	112dB SPL at 1kHz	-	-	3.0	%
	116dB SPL at 1kHz	-	-	5.0	%
Acoustic Overload Point (AOP)	THD>10%, at 1kHz	122	123	-	dB SPL
Power Supply Rejection Ratio (PSRR)	Measured with 1kHz sine wave and broad band noise, both 200mVpp	-	33	-	dBV/FS
Power Supply Rejection (PSR)	Measured with 217Hz square wave and broad band noise, both 100mVpp, A-weighted	-	-65	-	dBFS(A)

**6. INTERFACE PARAMETER**

Parameter	Conditions	Min	Typ	Max	Units
<b>Clock Frequency</b>		<b>1</b>	-	<b>3.25</b>	MHz
<b>Stand by Clock Frequency</b>		-	-	<b>1</b>	kHz
<b>Clock Duty Cycle</b>	fclk ≤ 2.4MHz	<b>40</b>	-	<b>60</b>	%
<b>Input Logic Low Level</b>		<b>-0.3</b>	-	<b>0.3 x V<sub>DD</sub></b>	V
<b>Input Logic High Level</b>		<b>0.65 x V<sub>DD</sub></b>	-	<b>V<sub>DD</sub> + 0.3</b>	V
<b>Output Logic Low Level</b>		<b>-0.3</b>	-	<b>0.3 x V<sub>DD</sub></b>	V
<b>Output Logic High Level</b>		<b>0.65 x V<sub>DD</sub></b>	-	<b>V<sub>DD</sub> + 0.3</b>	V
<b>Clock Rise / Fall Time</b>	Vdd=3.3V, fclk=2.4MHz, Fduty=50%	-	-	<b>10</b>	ns
<b>Delay Time for Data driven</b>	Vdd=3.3V, fclk=2.4MHz, Fduty=50%	<b>20</b>	<b>31</b>	<b>40</b>	ns
<b>Delay Time for High Z</b>	Vdd=3.3V, fclk=2.4MHz, Fduty=50%	-	<b>8</b>	<b>15</b>	ns

Preliminary

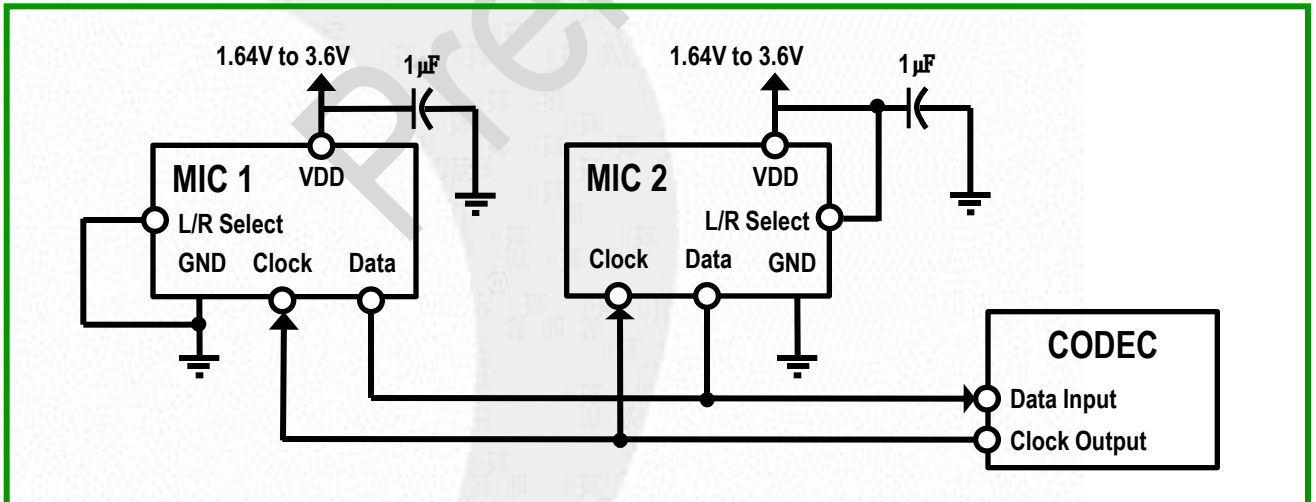
## 7. MEASUREMENT CIRCUIT



## 8. PIN DESCRIPTION

Pin Name	Description
VDD	Supply and IO voltage for the microphone
L/R Select	Left/Right ( DATA2 / DATA1 ) Channel selection
CLOCK	Clock input to the microphone
DATA	PDM data output from the microphone
GND	Ground

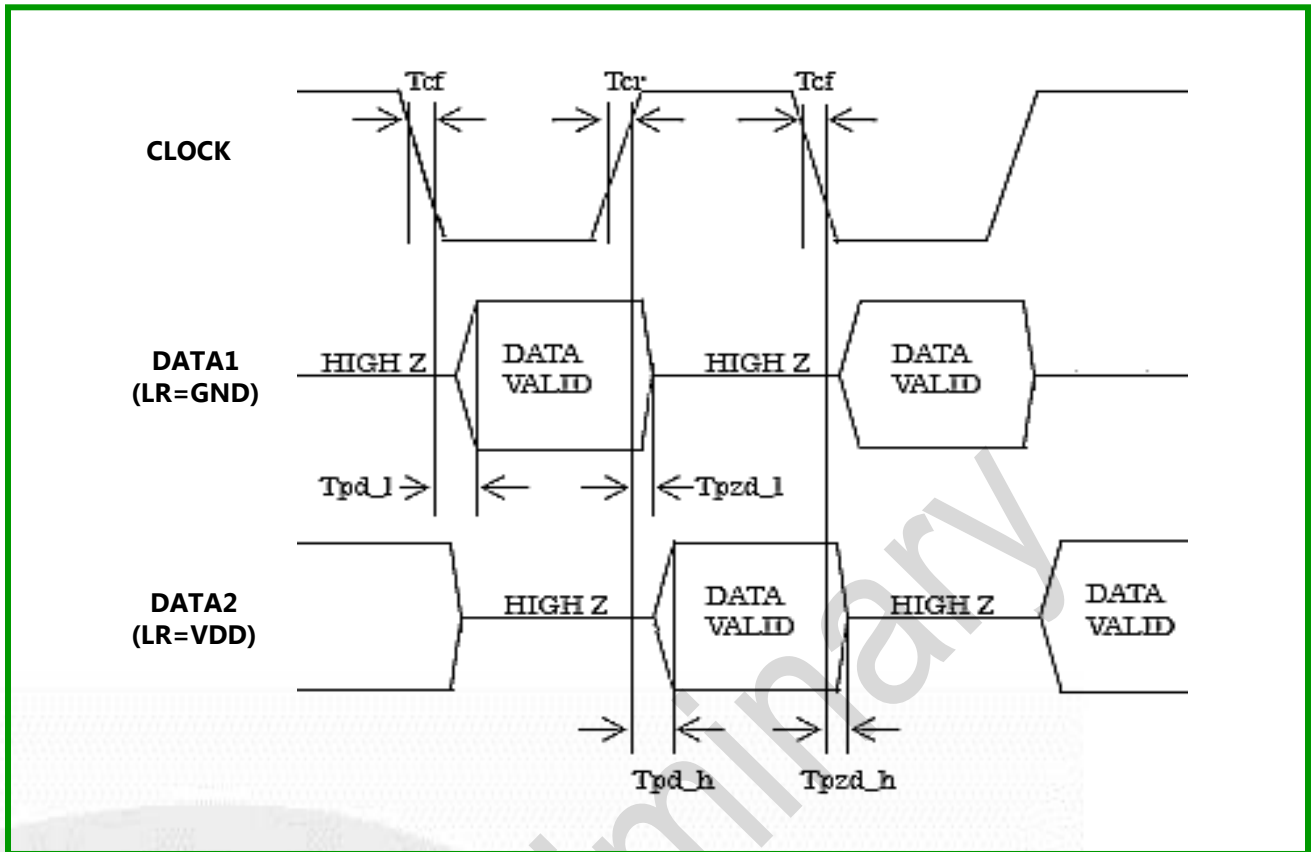
## 9. INTERFACE CIRCUIT & CHANNEL DATA CONFIGURATION



Data symbol in interface timing chart	L/R Select connected to	Data asserted at	Data sampled at
DATA1 [MIC1(Low)]	GND	Falling clock edge	Rising clock edge
DATA2 [MIC2(High)]	V <sub>DD</sub>	Rising clock edge	Falling clock edge

Note : Stereo operation is accomplished by connecting the L/R Sel. pin either to VDD or GND on the phone PWB. Bypass Capacitors near each MIC. on VDD are recommended to provide maximum SNR performance.

**10. INTERFACE TIMING CHART**



Test Conditions : Vdd=3.3V, fclk=2.4MHz, Fduty=50%

Parameter	Symbol	Min	Typ	Max	Unit
Clock rise time	$T_{CR}$	-	-	10	ns
Clock fall time	$T_{CF}$	-	-	10	ns
Output Data Delay	$T_{pd_l}, T_{pd_h}$	20	31	40	ns
Output HIGH Z Delay	$T_{pzd_l}, T_{pzd_h}$	0	8	15	ns

**11. ENVIRONMENTAL CHARACTERISTICS AND STANDARD CONDITIONS**

Item	Min	Typ	Max	Unit
Operating temperature range	-40	-	+100	°C
Storage temperature range	-40	-	+100	°C
Relative humidity	25	-	85	%
Air Pressure	860	-	1060	mBar
Standard temperature range	15	20	25	°C
Standard Relative humidity	40	-	60	%

## 12. TYPICAL FREQUENCY RESPONSE CURVE

### Far Field Measurement Condition

Temperature : 23 ± 2 °C

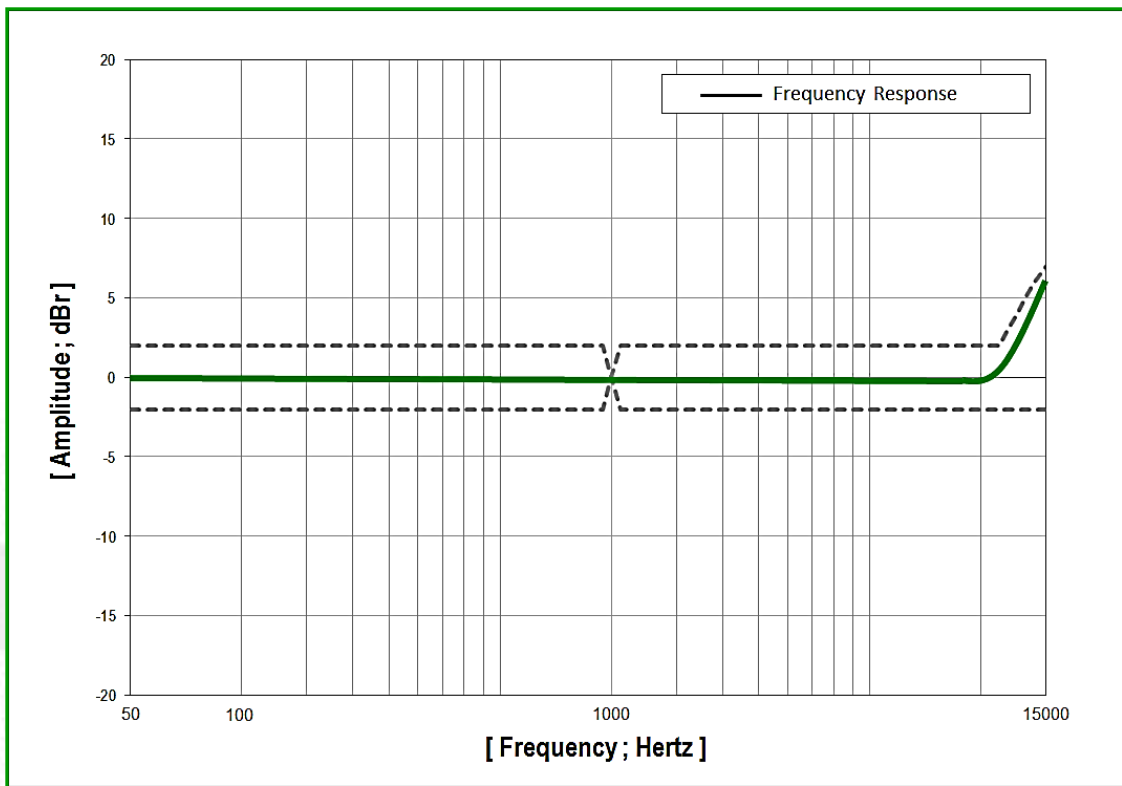
Supply Voltage : 1.8V

Clock Frequency : 2.4MHz

Acoustic stimulus : 1Pa ( 94dB SPL at 1kHz ) at 50 cm from the loud-speaker.

The loud-speaker must be calibrated to make a flat frequency response input signal.

Position : The frequency response of microphone unit measured at 50cm from the loud-speaker



### ■ Frequency Mask Specification

Frequency [Hz]	Lower Limit [dBr]	Upper Limit [dBr]	Note
50 ~ 1000	-2	+2	0dBr = dBFS at 1kHz
1000	0	0	
1000 ~ 12000	-2	+2	
15000	-2	+7	

#### Note : Band Frequency Range

1. Narrow Band : 300Hz ~ 3.4kHz

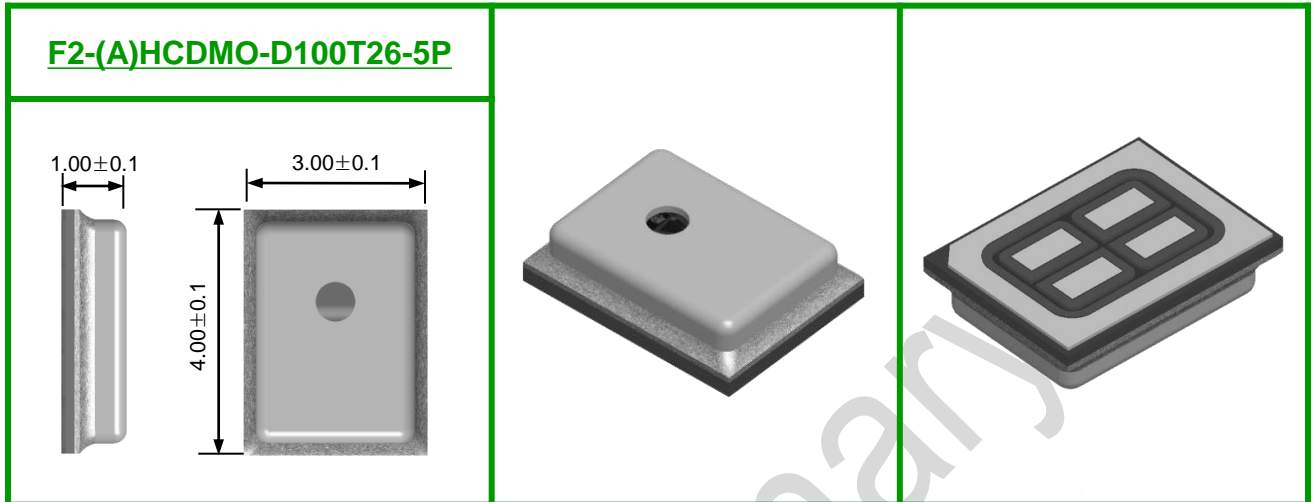
2. Wide Band : 100Hz ~ 7kHz

3. Super Wide Band : 50Hz ~ 14kHz

### 13. MECHANICAL CHARACTERISTICS

※ PCB design & Pin size can be changed by model No.

#### SMD Type



#### Lettering

