

# SPECIFICATION FOR APPROVAL

## 承 認 書

Description : Electret Condenser Microphone

Kingstate Part No. : KECG2222TBN-AS1

Customer's Model No. :

Specification No. : PKO-7471

Number Of The Edition: 1.1

### CUSTOMER'S APPROVED SIGNATURE

志豐電子股份有限公司 **KINGSTATE ELECTRONICS CORP.**

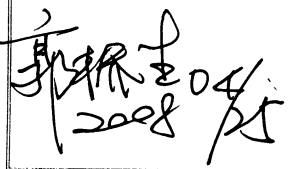
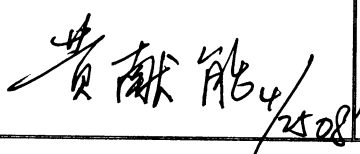
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		<b>Luo</b> <b>04/25/08'</b>

## 1 Electrical and Timing Specification

Unless otherwise specified, test conditions are:

- $V_{DD} = 3.3V$ ,
- $F_{CLK} = 1.024 \text{ MHz}$ . Clock jitter < 0.5 nsec

### 1.1 Absolute Maximum Ratings

**Table 1: Absolute Maximum Ratings**

Parameter	Symbol	Condition	Rating	Unit
Power Supply Voltage	VDD	3.3V tolerance	0 ~ 3.6	V
Clock Input voltage	CLK		0 ~ 3.6	V
Digital Output Voltage	DATA		0 ~ 3.6	V
ESD Tolerance		HBM*	4	kV
Storage temperature		40~65% RH	-40 ~ 85	°C
Operating temperature		40~65% RH	-20 ~ 70	°C

HBM\* = Human Body Mode (Contact mode)

### 1.2 Recommended Operating Conditions

**Table 2: Recommended Operating Conditions**

Parameters and Symbols		Specification			Unit	Conditions/Remarks
		Min	Typ	Max		
Power Supply	VDD	2.7	3.3	3.6	V	
Active Power Supply Current	$I_{SU}$		2.2		mA	
Power Down Current	$I_{PD}$		5		μA	
Input clock rate	$F_{clk}$	1	1.024	2.4	MHz	
Clock duty cycle	$T_{Duty}$	40	50	60	%	
Clock jitter	$T_{jitter}$		0.3	1	nsec	

To ensure best performance, the ripple on Vdd should be less than 200mVpp.

## 1.3 DC Characteristics

Table 3: DC Characteristics

Parameters and Symbols		Specification			Unit	Conditions/Remarks
		Min	Typ	Max		
Input Voltage High	$V_{IH}$		VDD - 0.3		V	
Input Voltage Low	$V_{IL}$			0.3	V	
Output Voltage High	$V_{OH}$		VDD - 0.3		V	
Output Voltage Low	$V_{OL}$			0.3	V	

## 1.4 Electro-Acoustic Characteristics

Table 4: Electro-Acoustic Characteristics

Parameters and Symbols		Specification			Unit	Conditions/Remarks
		Min	Typ	Max		
MIC Directivity		Omni-directional				
MIC SNR		60	-	-	dB	See note 1
MIC Sensitivity		-25	-22	-16	dBFS	See note 2
MIC Digital noise floor			-85		dBFS	See note 3
MIC Maximum Input S.P.L			114		dB SPL	See note 4
Peak Total Harmonic Distortion		-	-	-78	dB	See note 6
Acoustic Overload Point		107			dB SPL	THD<10%
Power Supply Rejection Rate		-	-55	-	dBFS	See note 7
Current Consumption		-	2.2	-	mA	Clock > 1MHz
		-	5	-	uA	Clock off
Power-up initialization		-	-	1	ms	

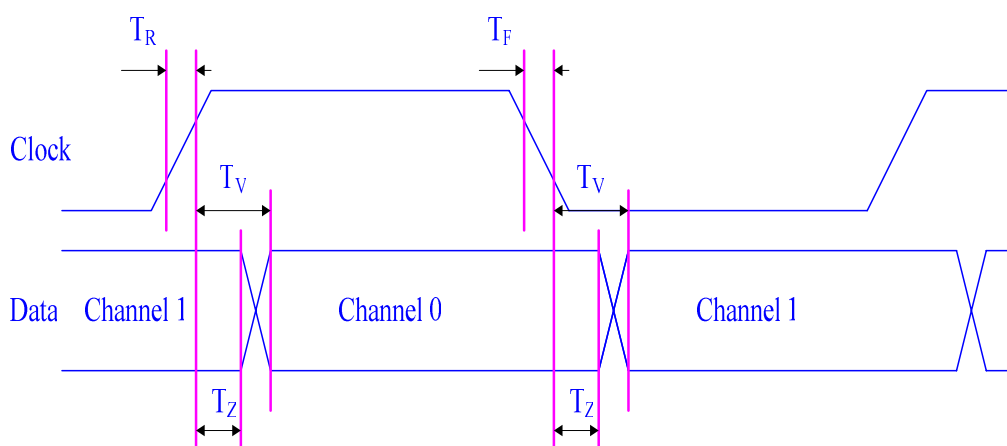
Note:

- (1) SNR: Signal to Noise Ratio. Measured with mono tone stimulus (frequency = 1 kHz, intensity = 94dB SPL).  
The SNR is calculated by integrating the power spectrum density in the range of 100 Hz ~ 7.2 kHz. SNR= (Sensitivity – Digital noise floor).
- (2) Sensitivity: Measured with mono tone stimulus (frequency = 1 kHz, intensity = 94 dB SPL).
- (3) Digital noise floor: Measured with silent environment.
- (4) SPL = Sound pressure level. Maximum input SPL = (94- Sensitivity) dB.
- (5) dBFS: decibel relative to Full Scale. For example, in 16 bit PCM format, sine wave with swing between -32767 ~ 32767 is 0dBFS.
- (6) Measured under mono tone stimulus (Frequency = 1 kHz, intensity = 74 dB SPL)
- (7) Measured under silent environment. Apply a square wave with amplitude = 100mVpp & clock rate = 217 Hz.

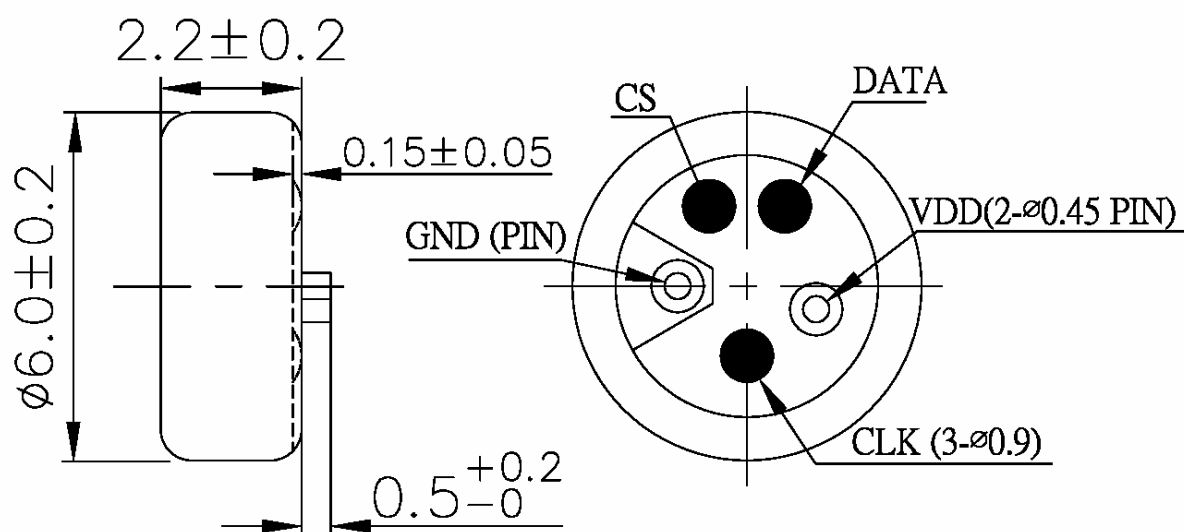
## 1.5 Timing Characteristics

Table 5: Timing Characteristics

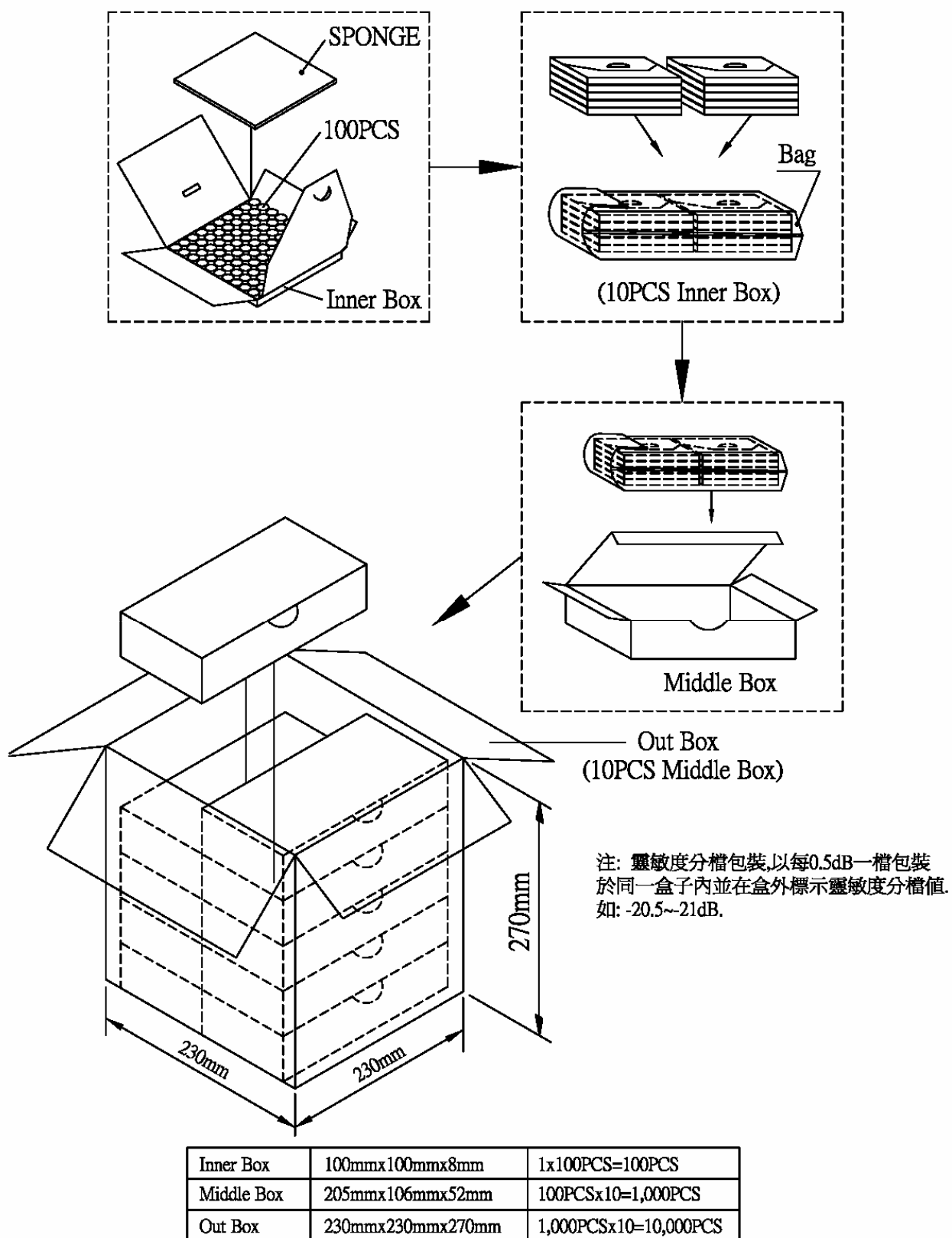
Parameter	Symbol	Min	Typ	Max	Unit	Comments
Clock rising time	$T_R$			10	ns	$R_L=1M$ , $C_L=12pF$
Clock falling time	$T_F$			10	ns	$R_L=1M$ , $C_L=12pF$
DATA into hi Z time	$T_Z$	0		15	ns	$R_L=1M$ , $C_L=12pF$
DATA valid time	$T_V$	18		40	ns	$R_L=1M$ , $C_L=12pF$
Clock jitter				0.5	ns	
Duty cycle		40	50	60	%	
Clock rate		1		2.5	MHz	



## 1.6 APPEARANCE DRAWING



## 1.7 Packaging



## 2 Environmental Specifications

### 2.1 Reliability Test

All tests are carried out on the same test batch in the order listed.

The sensitivity needs to be within  $\pm 3$  dBFs of initial sensitivity after 3 hours of operation at 20°C.

**Table 6: Reliability Test**

Temperature Test	After exposure to 85°C for 200 hours, the sensitivity should be within $\pm 3$ dB from the initial value.
	After exposure to -40°C for 200 hours the sensitivity should be within $\pm 3$ dB from the initial value.
Humidity Test	After exposure at 50°C and 90~95% relative humidity for 200 hours, the sensitivity should be within $\pm 3$ dB from the initial sensitivity.
Temperature Cycle Test	After exposure at -25°C for 30 minutes, at 20°C for 10 minutes, at +60°C for 30 minutes, at 20°C for 10 minutes, 5 cycles, the sensitivity to be within $\pm 3$ dB from the initial sensitivity.
Vibration Test	To be no interference in operation after vibrations, 10Hz to 50Hz for 1 minute full amplitude 1.52mm, for 2 hours at 3 anises.
Drop Test	To be no interference in operation after dropped to concrete floor each one time from 1-meter height at three directions in state of packing.