



*Analog Semiconductor IC*

# CM32768BNA

32.768KHz CMO  
CMOS Monolithic Clock Oscillator

Rev. E09-10

*AnaSem Inc.*  
..... *Future of the analog world*



#### 32.768KHz CMOS Monolithic Clock Oscillator

# CM32768BNA

## GENERAL DESCRIPTIONS

CMO series is CMOS monolithic clock oscillator which is molded in a micro SON-4. CMO series can be applied to the system in which level of stability as quartz crystal oscillator is not required because the stability of CMO series is same as ceramic oscillator in the wide frequency range from 32KHz to 200MHz.

Because CMO series is produced in CMOS process only not using quartz crystal, the low power consumption and long life time can be achieved with short delivery time and low price. And also, CMO series is very strong against with impact.



## FEATURES

- CMOS high accuracy monolithic oscillator ..... 32.768KHz / 3.3V
- Frequency stability .....  $\pm 1000\text{ppm}$  at  $T_a = -40^\circ\text{C} \sim +85^\circ\text{C}$ ,  $V_{DD} = 3.3\text{V} \pm 5\%$
- Oscillation start time ..... 50 $\mu\text{sec}$  **quick start**
- Low power consumption ..... 5 $\mu\text{A}$  / 3.3V
- Operating voltage ..... 3.3V $\pm 5\%$
- Ultra small package ..... SON-4 (2.0 $\times$ 2.1 $\times$ 0.6mm)
- Stability Option .....  $\pm 500\text{ppm} \sim \pm 10000\text{ppm}$
- Standby Current ..... 1 $\mu\text{A}$  (Max)

## APPLICATIONS

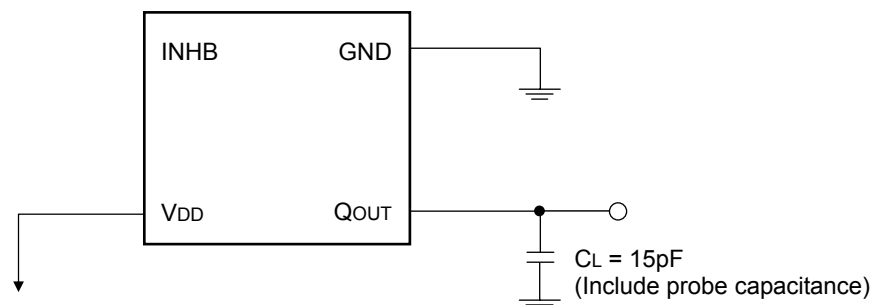
- Note-Book/Desk-Top PC
- Cellular phone
- Portable games
- Electronic equipment

## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,  $V_{DD}=3.3V$ ,  $T_a=25^{\circ}C$ )

Items	Symbol	Min.	Typ.	Max.	Conditions	Unit
Output frequency	QOUT	-	32.768	-		KHz
Frequency stability		-	$\pm 500$	$\pm 1000$	$T_a=-40^{\circ}C \sim +85^{\circ}C$ , $V_{DD}=3.3V \pm 5\%$	ppm
Frequency temperature deviation		-	$\pm 250$	-	$T_a=-40 \sim +85^{\circ}C$ , $V_{DD}=3.3V$	ppm
Frequency room temperature deviation		-	$\pm 250$	-	$T_a=25^{\circ}C$ , $V_{DD}=3.3V$	ppm
Oscillation start time	Tstart	-	50	-		$\mu sec$
Operating voltage	$V_{DD}$	3.135	3.3	3.465		V
Power consumption	$I_{DD}$	-	5.0	8.0	No load	$\mu A$
Output load		-	15	-		pF
"H"-level input voltage	$V_{IH}$	3.0	-	-		V
"L"-level input voltage	$V_{IL}$	-	-	0.3		V
"H"-level output voltage	$V_{OH}$	3.0	-	-		V
"L"-level output voltage	$V_{OL}$	-	-	0.3		V
Operating temperature range	$T_{opr}$	-40	-	85		$^{\circ}C$
Storage temperature range	$T_{stg}$	-50	-	125		$^{\circ}C$
Assembly temperature range	$T_{assy}$	Peak temperature $255^{\circ}C \pm 5^{\circ}C$ for 5sec Max. Maximum temperature : $260^{\circ}C$				

## MEASUREMENT CIRCUIT

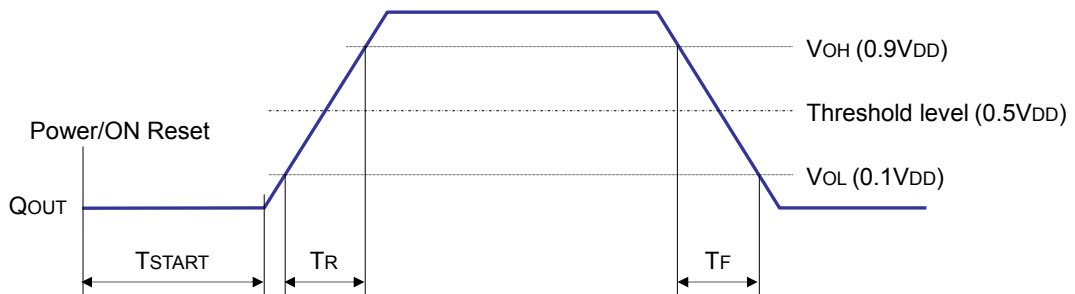


**SWITCHING CHARACTERISTICS**

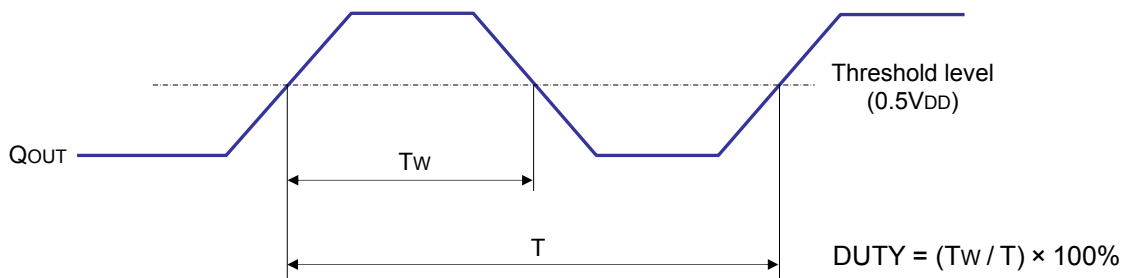
(Unless otherwise specified, VDD=3.3V, Ta=25°C, Load=15pF)

Items	Symbol	Min.	Typ.	Max.	Conditions	Unit
Oscillation start time	TSTART	-	50	-		μsec
Output rising time	TR	-	80	-	0.1VDD ~ 0.9VDD	nsec
Output falling time	TF	-	80	-	0.9VDD ~ 0.1VDD	nsec
Output duty cycle	Duty	45	-	55	VDD/2	%

**[Fig.1] Output wave form**



**[Fig.2] Output duty cycle**

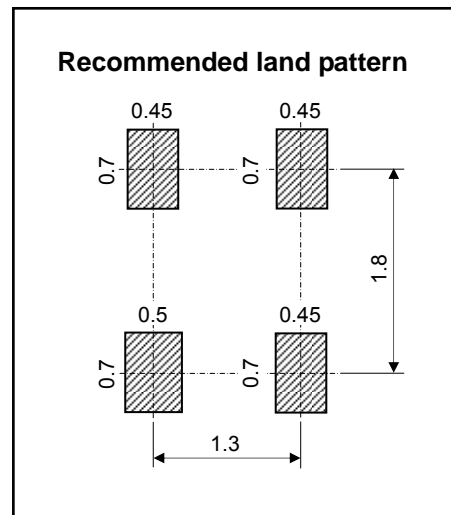
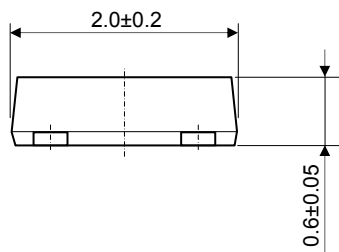
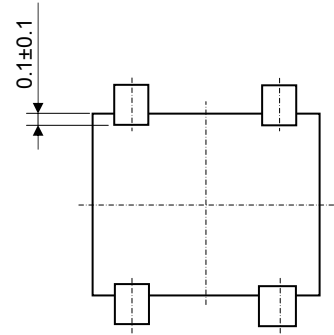
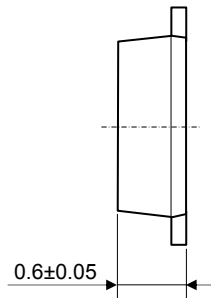
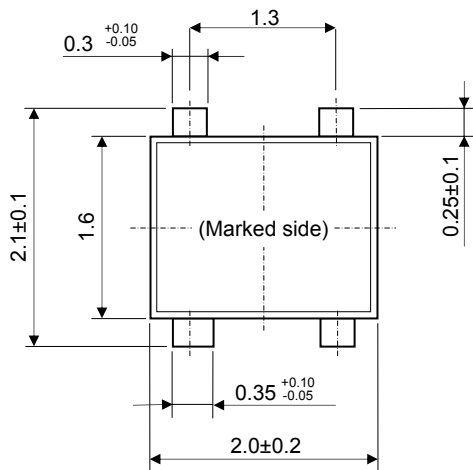


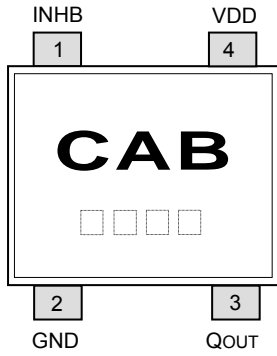
**[Table 1] INHB/Qout logics**

INHB	“H”-level or Open	“L”-level
QOUT	Output frequency	High impedance

**PACKAGE DIMENSIONS (SON-4)**

(Unit : mm)

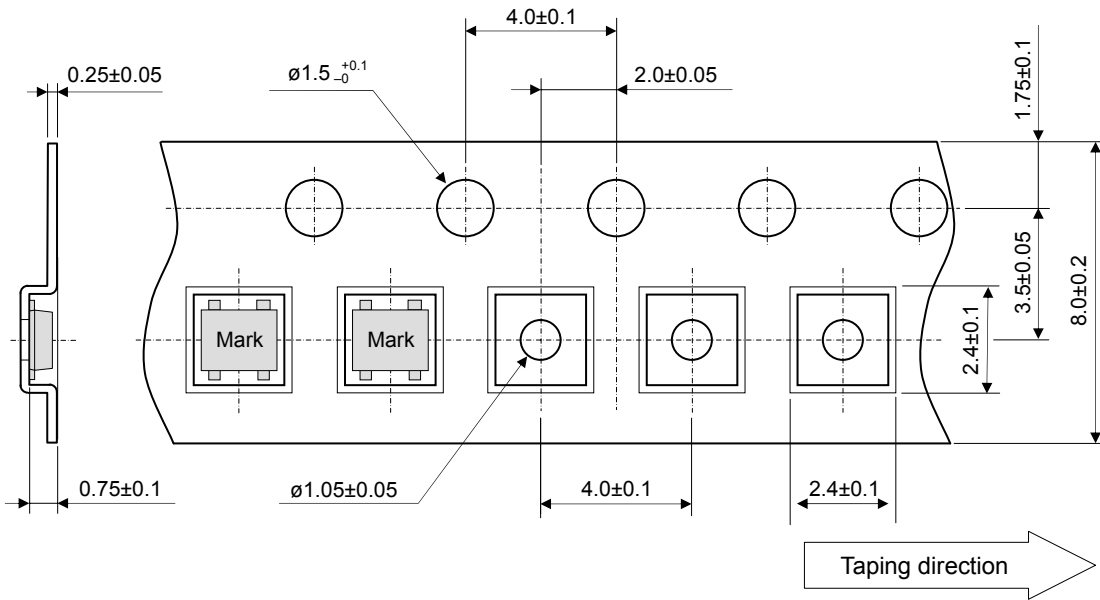


**PIN CONFIGURATION (SON-4)**

No.	Symbol	Descriptions
1	INHB	Output state control
2	GND	Power ground
3	QOUT	Frequency output
4	VDD	Power source (3.3V)

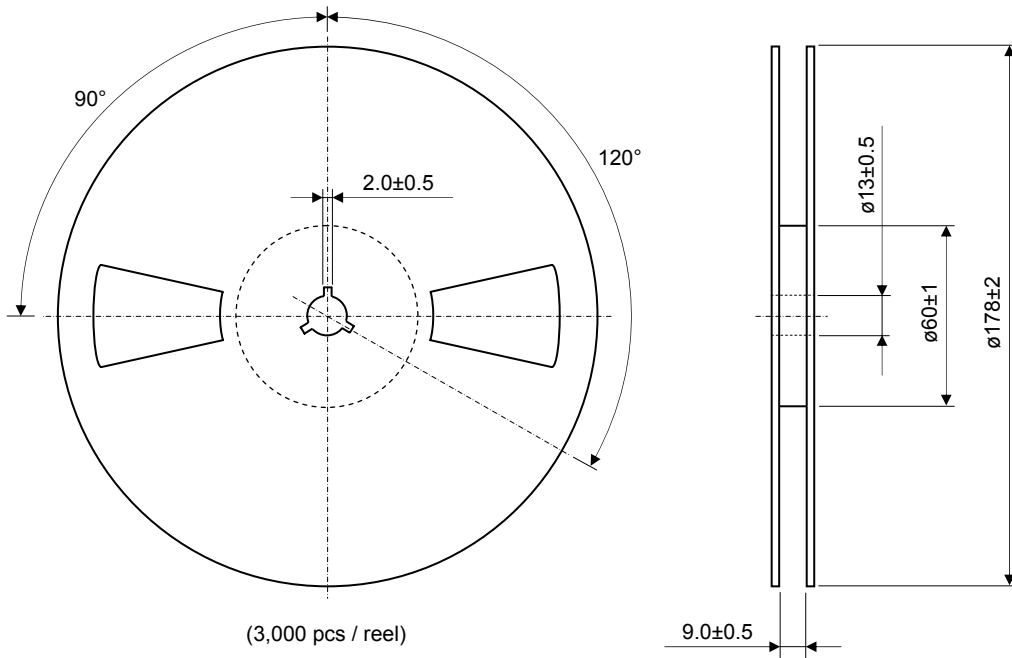
**TAPING AND LOADING SPECIFICATIONS (SON-4)**

(Unit : mm)



**REEL DIMENSIONS (SON-4)**

(Unit : mm)





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