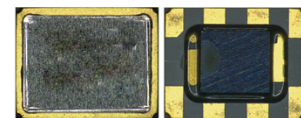# REAL TIME CLOCK MODULE WITH 32.768kHz TCXO

AB-RTCMK-32.768kHz

Moisture Sensitivity Level: MSL=1

Pb

RoHS Compliant

3.2 x 2.5 x 1.0 mm

▷ FEATURES:

- Ultra low profile, 3.2 x 2.5 x 1.0 mm, Seam sealed SMT package
- Exceptional Frequency Stability over temperature; ±5.0 ppm max. over -40ºC to +85ºC
- Operating Voltage; +1.30V to +5.50V
- 4.0μA max. current at no load
- I2C Communication
- Clock function : Hour/ Min / Sec
- Leap year automatic distinction calendar function till 2099
- Alarm interruption function for day, date, hour and minute settings
- A constant cycle timer interruption function : 244.14us to 255 min
- Time update interruption function：Min / Sec
- Clock output function：32.768kHz / 1024Hz / 32Hz / 1Hz

▷ APPLICATIONS:

- Smart cards
- Wireless sensors and tags
- Medical electronics
- Utility meters
- Data loggers
- Appliances
- Handsets
- Consumer electronics

▷ STANDARD SPECIFICATIONS:

Parameters		Minimum	Typical	Maximum	Units	Notes
Nominal Frequency (f0)			32.768		kHz	
Frequency Tolerance (df/f0)		-3.0		+3.0	ppm	Initial + 2 times reflow Ta=+25 ± 2 ºC
Frequency Stability vs Temp. (df/f0)		-5.0		+5.0	ppm	Ta=-40 to +85 ºC
Frequency Stability vs Voltage (df/dV)		-1.0		+1.0	ppm/V	Ta=+25 ºC V_{DD}=2.0 to 5.5V
Frequency Aging Rate (dfag)		-3.0		+3.0	ppm	Ta=+25 ºC, first year
Start Up Time (Tst)				1.0	sec	Ta=+25 ºC V_{DD}=1.3V
				3.0	sec	Ta=-40 to +85 ºC V_{DD}=1.3 to 5.5V
Power Supply Current 1 (I_{DD1})			0.6	2.0	uA	SCL=SDA=/INT=V_{DD} CLKOUT=V_{SS}, V_{DD}=3V
Power Supply Current 2 (I_{DD2})			1.5	4.0	uA	SCL=SDA=/INT=V_{DD} CLKOUT=V_{DD}, V_{DD}=3V, CL_{OUT}=0pF
Input Leak Current (I_{LK})		-0.5		+0.5	uA	CLKOE,SCL,SDA V_{IN}=V_{DD} or V_{SS}
Output Leak Current (I_{OZ})		-0.5		+0.5	uA	CLKOUT,/INT,SDA V_{OUT}=V_{DD} or V_{SS}
"H" Input Voltage (V_{IH})		0.8 x V_{DD}		5.5	V	CLKOE,SCL,SDA
"L" Input Voltage (V_{IL})		0.0		0.2 x V_{DD}	V	CLKOE,SCL,SDA
"H" Output Voltage (V_{OH})		2.2		3.0	V	CLKOUT, V_{DD}=3.0V, I_{OH}=-1mA
"L" Output Voltage	V_{OL1}	0.0		0.8	V	CLKOUT, V_{DD}=3.0V, I_{OL}=1mA
	V_{OL2}	0.0		0.4	V	/INT, V_{DD}=3.0V, I_{OL}=1mA
	V_{OL3}	0.0		0.4	V	SDA, V_{DD}≥2.0V, I_{OL}=3mA
Low Voltage Detection Voltage (V_{DET})		1.3	1.4	1.5	V	

For detail data sheet, please contact tech-support@abracon.com

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AB-RTCMK-32.768kHz

RoHS Compliant

3.2 x 2.5 x 1.0 mm

▷ AC ELECTRICAL CHARACTERISTICS

Parameters	Minimum	Typical	Maximum	Units	Notes
SCL Clock Frequency (f_{SCL})			400	kHz	
START Condition Setup Time ($t_{SU;STA}$)	0.6			sec	
START Condition Hold Time ($t_{HD;STA}$)	0.6			sec	
Data Input Setup Time ($t_{SU;DAT}$)	100			nsec	
Data Input Hold Time ($t_{HD;DAT}$)	0		900	nsec	
STOP Condition Setup Time ($t_{SU;STO}$)	0.6			sec	
Bus Idle Time Between START and STOP Condition (t_{BUF})	1.3			sec	
SCL Low Time (t_{LOW})	1.3			sec	
SCL High Time (t_{HIGH})	0.6			sec	
SCL, SDA Rise Time (t_r)			0.3	sec	20% to 80%
SCL, SDA Fall Time (t_f)			0.3	sec	80% to 20%
Allowable Spike Time on Bus (t_{SP})			50	nsec	

▷ TIMING CHART
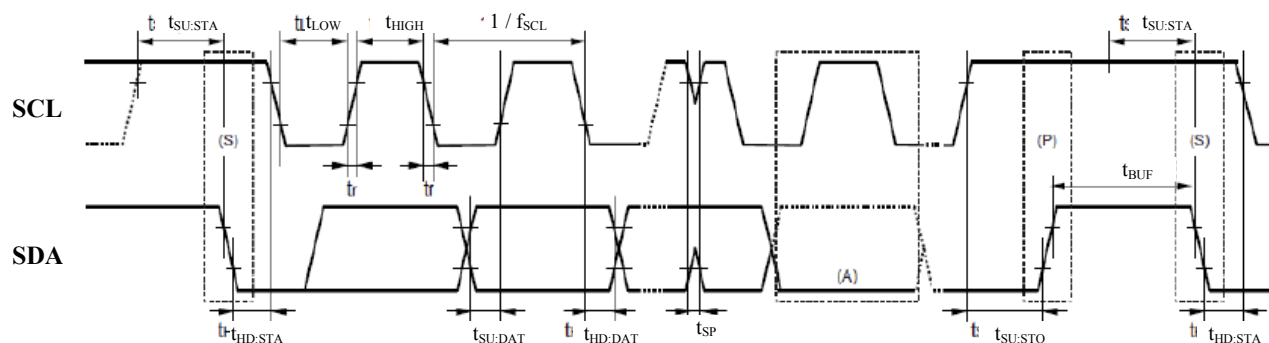
▷ PART IDENTIFCATION:

AB - RTCMK - 32.768 kHz - ☐

Packaging
Blank: Bulk
T: 1000pcs/reel
T3*: 3000pcs/reel

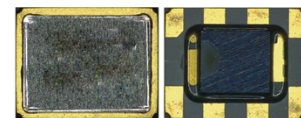*3000pcs/reel: standard reel quantity
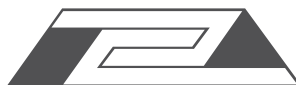
REAL TIME CLOCK MODULE WITH 32.768kHz TCXO
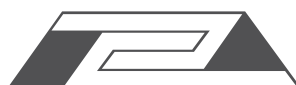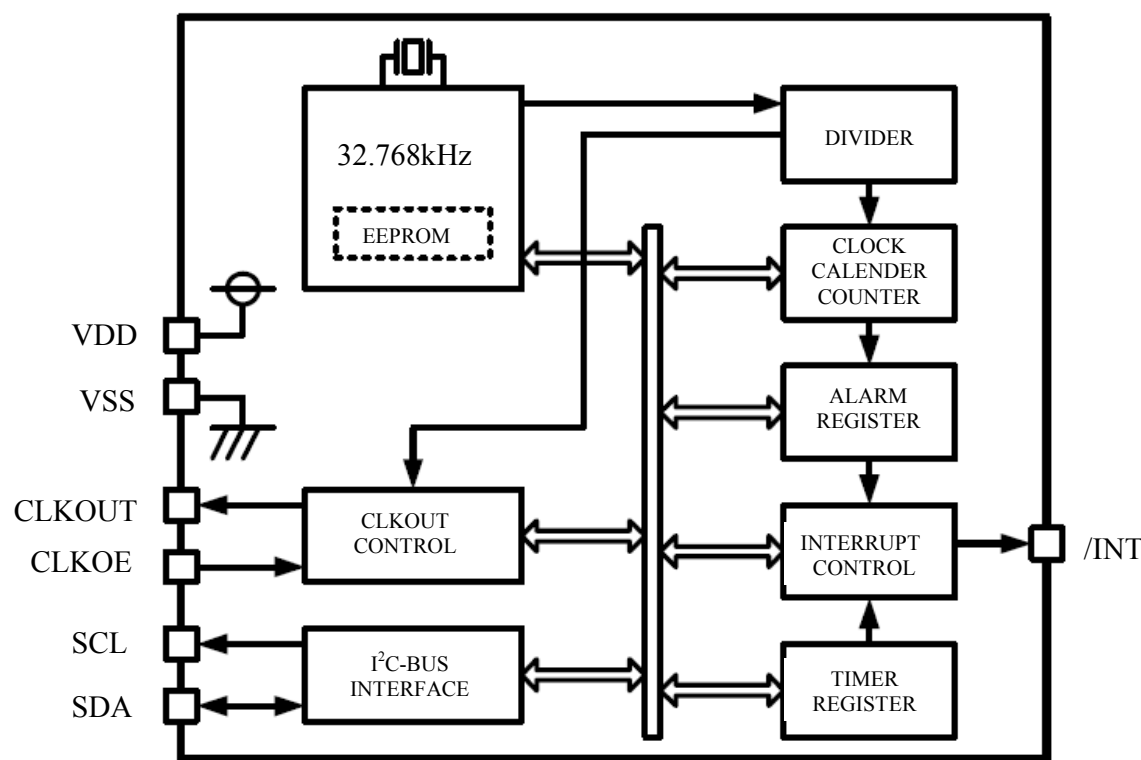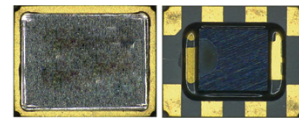
AB-RTCMK-32.768kHz

RoHS Compliant

3.2 x 2.5 x 1.0 mm

▷ FUNCTION:

Pin No.	Pin Name	I/O	Function
1	CLKOE	Input	This is an input pin used to control the output mode of the CLKOUT pin. When this pin's level is high, the CLKOUT pin is in output mode. When it is low, the CLKOUT pin is "Hi-Z" (High Impedance).
2	/INT	Output	This pin is used to output alarm signals, timer signals, timer update signals, and other signals. This pin is an open drain pin.
3	N.C.		This pin is open.
4	VSS		This pin is connected to ground.
5	CLKOUT	Output	This pin outputs a 32.768kHz signal. This is the C-MOS output pin with output control provided via the CLKOE pin.
6	SCL	Input	This is the serial clock input for I^{2}C BUS communications.
7	SDA	I/O	This is the serial data input/output for I^{2}C BUS communications. This pin's signal is used for input and output of address, data, and ACK bits, synchronized with the serial clock used for I^{2}C communication. This pin is an N-ch open drain pin during output.
8	VDD		This pin is connected to a positive power supply.

▷ BLOCK DIAGRAM:

ABRACON IS
ISO 9001 : 2008
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Visit www.abracon.com for Terms & Conditions of Sale
30332 Esperanza, Rancho Santa Margarita, California 92688
tel 949-546-8000 | fax 949-546-8001 | www.abracon.com

Revised: 09.30.12

REAL TIME CLOCK MODULE WITH 32.768kHz TCXO

AB-RTCMK-32.768kHz

Pb **RoHS** Compliant

3.2 x 2.5 x 1.0 mm

▷ MARKING:

XXXXXXX → Lot Number

Pin# 1 indicator ←

○ △ ☐ → Date Code

Internal Traceability Code

▷ OUTLINE DRAWING:

3.2 ± 0.2

#8 #7 #6 #5

2.5 ± 0.2

Marking

#1 #2 #3 #4

Top View

1.0 max.
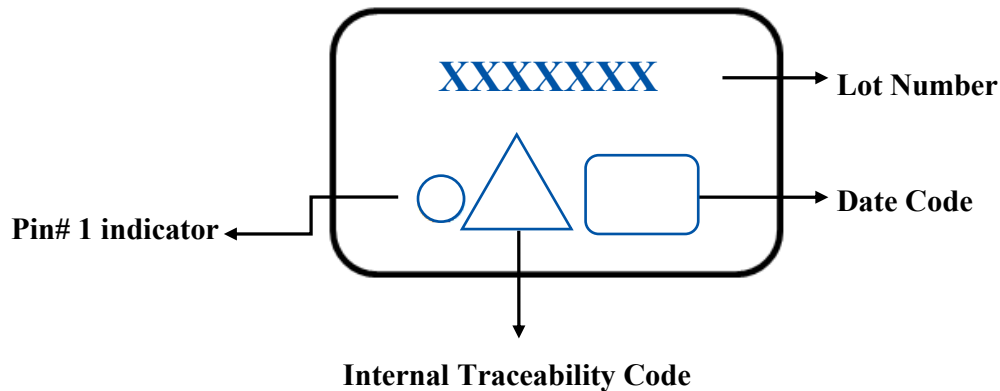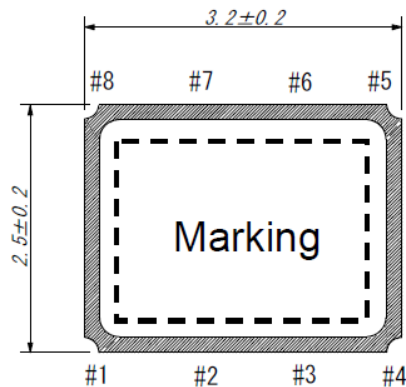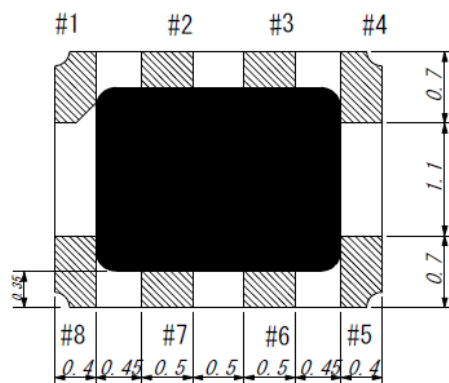
Side View

PIN / Function

#1 : CLKOE	#5 : CLKOUT
#2 : /INT	#6 : SCL
#3 : N.C.	#7 : SDA
#4 : VSS	#8 : VDD

#1 #2 #3 #4

0.7

1.1

0.7

ø.35

#8 #7 #6 #5

0.4 0.45 0.5 0.5 0.5 0.45 0.4

Bottom View

Recommended Land Pattern
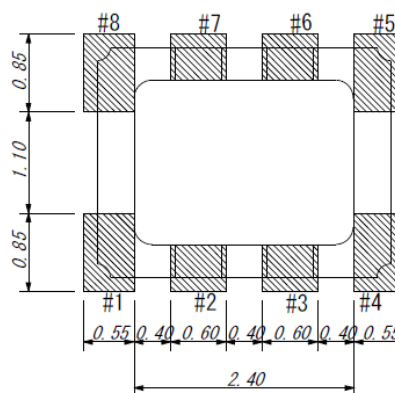
#8 #7 #6 #5

0.85

1.10

0.85

#1 #2 #3 #4

0.55 0.40 0.60 0.40 0.60 0.40 0.55

2.40

Dimension : mm

AB-RTCMK-32.768kHz

RoHS Compliant
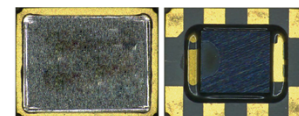
3.2 x 2.5 x 1.0 mm

▷ **TAPE & REEL:**

T: 1000pcs/reel
T3: 3000pcs/reel (standard reel quantity)

Feeding Direction
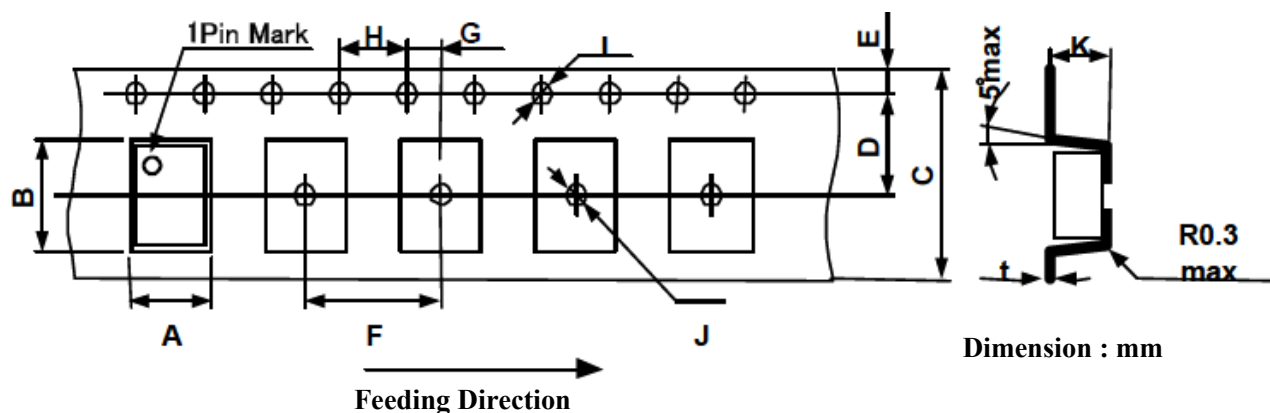
Dimension : mm

A	B	C	D	E	F
2.80 ± 0.1	3.50 ± 0.1	8.00 ± 0.3	3.50 ± 0.05	1.75 ± 0.1	4.00 ± 0.1
G	**H**	**I**	**J**	**K**	**T**
2.00 ± 0.05	4.00 ± 0.1	ø1.5 +1.0/-0	ø 1.5 +1.0/-0	1.10 ± 0.1	0.25 ± 0.05

Reel Dimensions

9.0+/-1.0

2.0+/-0.5

Ø13+/-0.2

Ø60+1/-0

Ø21+/-0.8

11.4+/-1.0

Ø180+/-2

Dimension : mm

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