

ECN/PCN No.: 3998

For Manufacturer			
<b>Product Description:</b> Real Time Clock Module	<b>Abracon Part Number / Part Series:</b> AB-RTCMK-32.768KHZ	<input type="checkbox"/> Documentation only <input type="checkbox"/> ECN <input checked="" type="checkbox"/> EOL	<input type="checkbox"/> Series <input checked="" type="checkbox"/> Part Number
<b>Affected Revision:</b> A	<b>New Revision:</b> EOL	<b>Application:</b>	<input type="checkbox"/> Safety <input checked="" type="checkbox"/> Non-Safety
<b>Prior to Change:</b> AB-RTCMK-32.768KHZ Rev. A			
<b>After Change:</b>  EOL			
<b>Cause/Reason for Change:</b> Discontinuation of manufacturing capability			
Change Plan			
<b>Effective Date:</b> Immediate	<b>Additional Remarks:</b> None		
<b>Change Declaration:</b>			
<b>Issued Date:</b> 10/25/2021	<b>Issued By:</b> Conor Healey	<b>Issued Department:</b> Engineering	
<b>Approval:</b> Thomas Culhane Engineering Director	<b>Approval:</b> Reuben Quintanilla Quality Director	<b>Approval:</b> Ying Huang Purchasing Director	
For Abracon EOL only			
<b>Last Time Buy (if applicable):</b> 11/30/2021		<b>Alternate Part Number / Part Series:</b> None	
<b>Additional Approval:</b>	<b>Additional Approval:</b>	<b>Additional Approval:</b>	
Customer Approval (If Applicable)			
<b>Qualification Status:</b> <div style="text-align: center;"><input type="checkbox"/> Approved <input type="checkbox"/> Not accepted</div> <i>Note: It is considered approved if there is no feedback from the customer 1 month after ECN/PCN is released.</i>			
<b>Customer Part Number:</b>		<b>Customer Project:</b>	
<b>Company Name:</b>	<b>Company Representative:</b>	<b>Representative Signature:</b>	
<b>Customer Remarks:</b>			

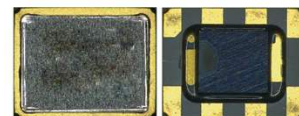
# REAL TIME CLOCK MODULE WITH 32.768kHz TCXO

AB-RTCMK-32.768kHz

Moisture Sensitivity Level: MSL=1



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;  $\pm 5.0$  ppm max. over  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Operating Voltage; +1.30V to +5.50V
- 4.0 $\mu\text{A}$  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 : 244.14 $\mu\text{s}$  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 $\pm$ 2 $^{\circ}\text{C}$
Frequency Stability vs Temp. (df/f0)	-5.0		+5.0	ppm	Ta=-40 to +85 $^{\circ}\text{C}$
Frequency Stability vs Voltage (df/dV)	-1.0		+1.0	ppm/V	Ta=+25 $^{\circ}\text{C}$ V <sub>DD</sub> =2.0 to 5.5V
Frequency Aging Rate (dfag)	-3.0		+3.0	ppm	Ta=+25 $^{\circ}\text{C}$ , first year
Start Up Time (Tst)			1.0	sec	Ta=+25 $^{\circ}\text{C}$ V <sub>DD</sub> =1.3V
			3.0	sec	Ta=-40 to +85 $^{\circ}\text{C}$ V <sub>DD</sub> =1.3 to 5.5V
Power Supply Current 1 (I <sub>DD1</sub> )		0.6	2.0	$\mu\text{A}$	SCL=SDA=/INT=V <sub>DD</sub> CLKOUT=V <sub>SS</sub> , V <sub>DD</sub> =3V
Power Supply Current 2 (I <sub>DD2</sub> )		1.5	4.0	$\mu\text{A}$	SCL=SDA=/INT=V <sub>DD</sub> CLKOUT=V <sub>DD</sub> , V <sub>DD</sub> =3V, CL <sub>OUT</sub> =0pF
Input Leak Current (I <sub>LK</sub> )	-0.5		+0.5	$\mu\text{A}$	CLKOE,SCL,SDA V <sub>IN</sub> =V <sub>DD</sub> or V <sub>SS</sub>
Output Leak Current (I <sub>OZ</sub> )	-0.5		+0.5	$\mu\text{A}$	CLKOUT,/INT,SDA V <sub>OUT</sub> =V <sub>DD</sub> or V <sub>SS</sub>
"H" Input Voltage (V <sub>IH</sub> )	0.8 x V <sub>DD</sub>		5.5	V	CLKOE,SCL,SDA
"L" Input Voltage (V <sub>IL</sub> )	0.0		0.2 x V <sub>DD</sub>	V	CLKOE,SCL,SDA
"H" Output Voltage (V <sub>OH</sub> )	2.2		3.0	V	CLKOUT, V <sub>DD</sub> =3.0V, I <sub>OH</sub> =-1mA
"L" Output Voltage	V <sub>OL1</sub>	0.0	0.8	V	CLKOUT, V <sub>DD</sub> =3.0V, I <sub>OL</sub> =1mA
	V <sub>OL2</sub>	0.0	0.4	V	/INT, V <sub>DD</sub> =3.0V, I <sub>OL</sub> =1mA
	V <sub>OL3</sub>	0.0	0.4	V	SDA, V <sub>DD</sub> $\geq$ 2.0V, I <sub>OL</sub> =3mA
Low Voltage Detection Voltage (V <sub>DET</sub> )	1.3	1.4	1.5	V	

For detail data sheet, please contact [tech-support@abracon.com](mailto:tech-support@abracon.com)

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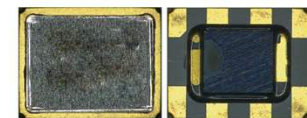
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Revised: 09.30.12

30332 Esperanza, Rancho Santa Margarita, California 92688

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3.2 x 2.5 x 1.0 mm

AB-RTCMK-32.768kHz

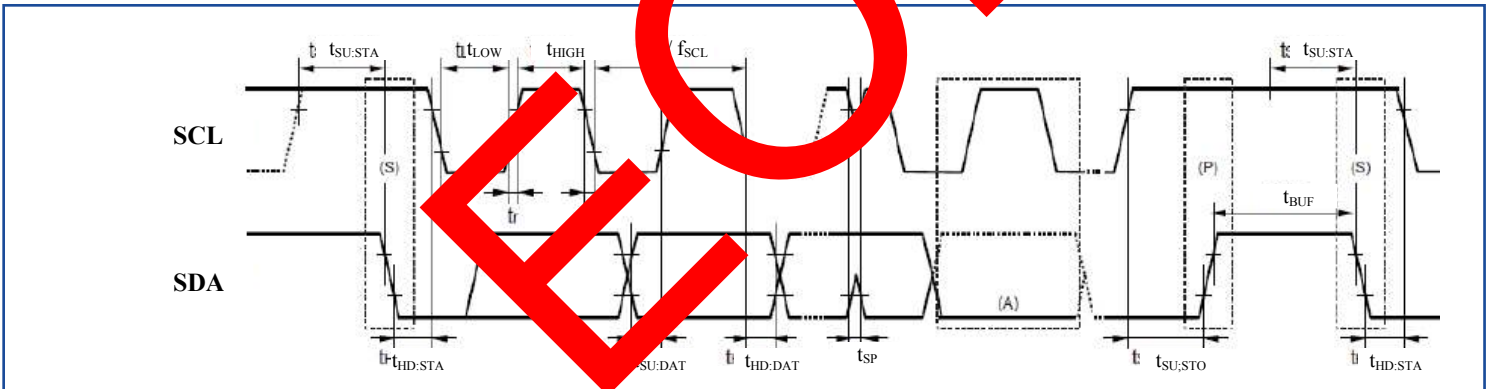


RoHS  
Compliant

## 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 IDENTIFICATION:

AB - RTCMK - 32.768 kHz -

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

\*3000pcs/reel: standard reel quantity

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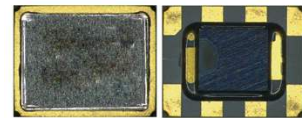
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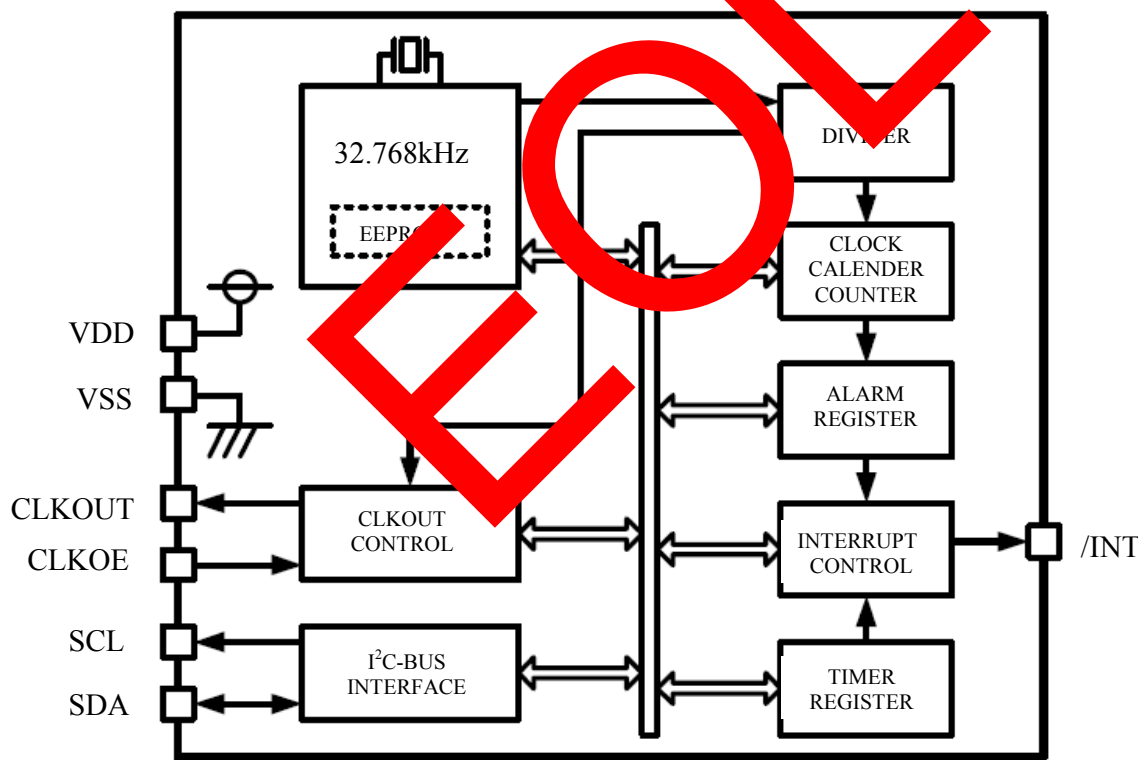


3.2 x 2.5 x 1.0 mm

## 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 <sup>2</sup> C BUS communications.
7	SDA	I/O	This is the serial data input/output for I <sup>2</sup> 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 <sup>2</sup> 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:

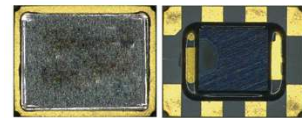


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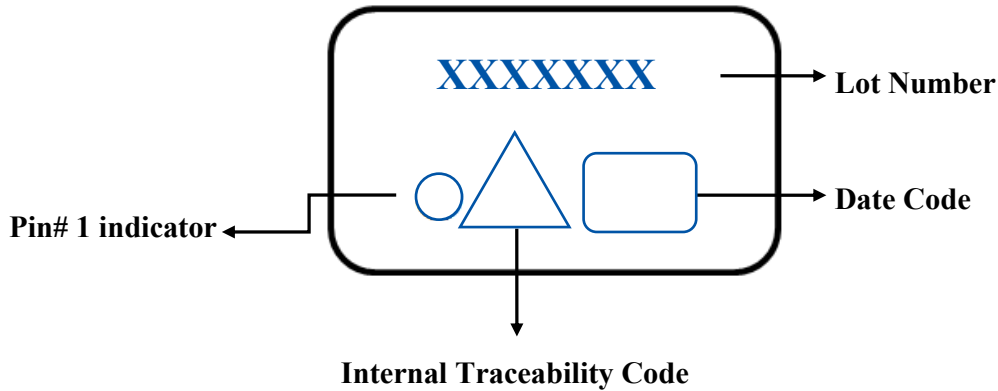


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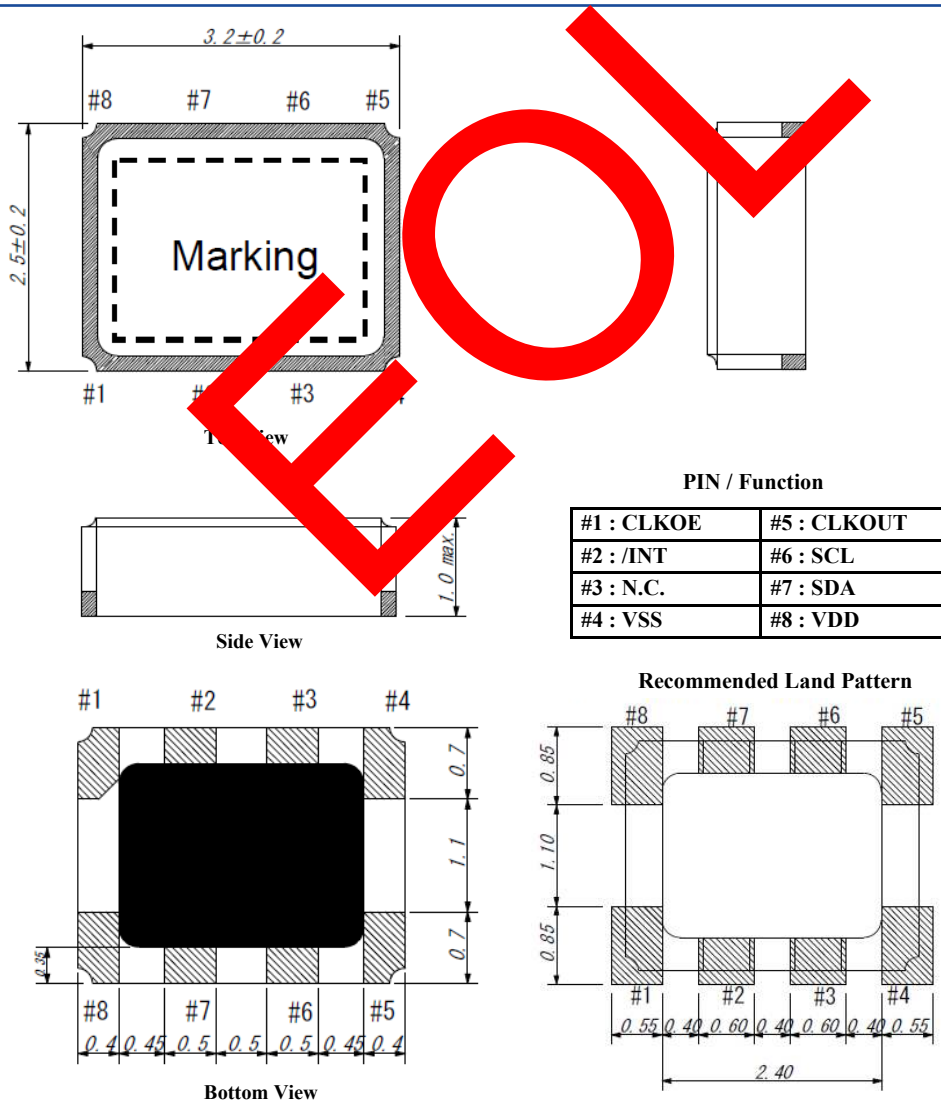


3.2 x 2.5 x 1.0 mm

## MARKING:



## OUTLINE DRAWING:



Dimension : mm

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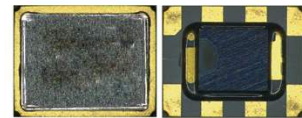
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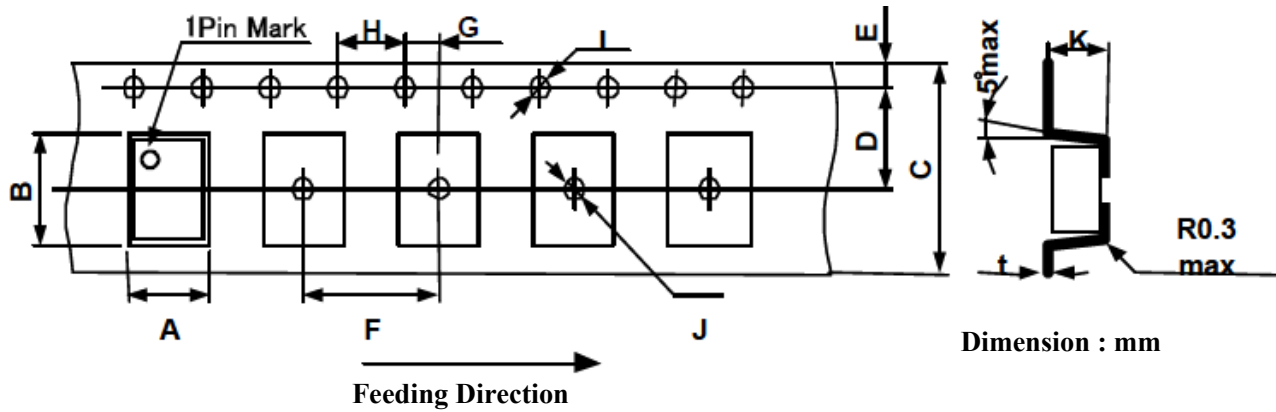


3.2 x 2.5 x 1.0 mm

## TAPE & REEL:

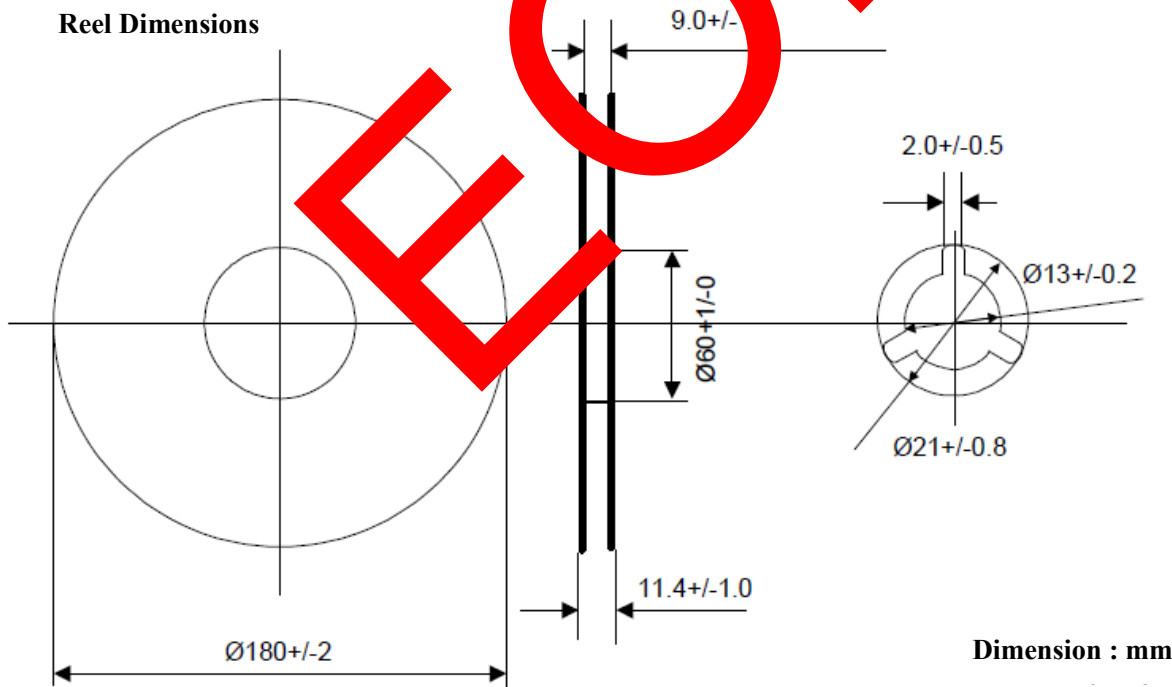
T: 1000pcs/reel

T3: 3000pcs/reel (standard reel quantity)



A	B	C	D	E	F
2.80 ± 0.1	3.50 ± 0.1	8.00 ± 0.3	3.50 ± 0.1	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	ø1.5 +1.0/-0	1.10 ± 0.1	0.25 ± 0.05

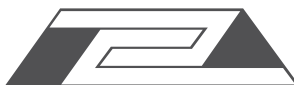
## Reel Dimensions



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