

SEIKO EPSON CORPORATION

SPXO

SG-3030LC

Product name SG-3030LC 32.768000 kHz B

Product Number / Ordering code Q3102LC020001xx

Please refer to the 8.Packing information about xx (last 2 digits)

Output waveform CMOS

Complies with EU RoHS directive

Reference weight Typ. 25 mg

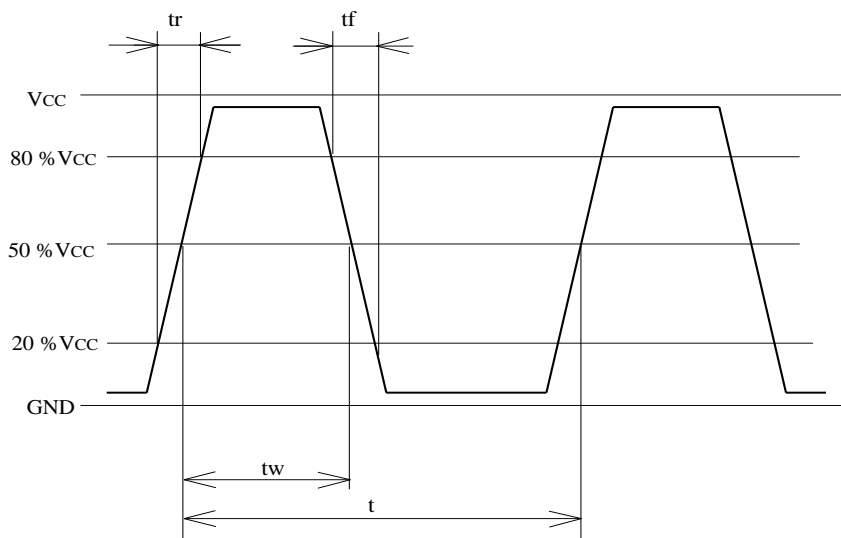
**1.Absolute maximum ratings**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Maximum supply voltage	V <sub>cc-GND</sub>	-0.3	-	7	V	V <sub>cc</sub> Pin
Storage temperature	T <sub>stg</sub>	-55	-	125	°C	Storage as single product

**2.Specifications(characteristics)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f <sub>0</sub>	-	32.7680	-	kHz	-
Supply voltage	V <sub>cc</sub>	1.5	-	5.5	V	V <sub>cc</sub> Pin
Interface power supply voltage	V <sub>IO</sub>	1.5	-	5.5		V <sub>IO</sub> Pin
Operating temperature	T <sub>use</sub>	-40	-	85	°C	No condensation
Frequency tolerance	f <sub>tol</sub>	-18	-	28	x10 <sup>-6</sup>	@+25°C, V <sub>cc</sub> =3.3V, 5+/-23x10 <sup>-6</sup>
Frequency temperature coefficient	f <sub>0-Tc</sub>	-120	-	10	x10 <sup>-6</sup>	-20°C to 70°C (+25°C is reference)
Frequency voltage coefficient	f <sub>0-Vcc</sub>	-2	-	2	x10 <sup>-6</sup> /V	@+25°C V <sub>cc</sub> =1.5V to 5.5V
Current consumption	I <sub>cc</sub>	-	-	2	mA	V <sub>cc</sub> =3.3V No load condition
Symmetry	SYM	45	50	55	%	1/2V <sub>cc</sub> (V <sub>IO</sub> ) Level
Output voltage	V <sub>OH</sub>	V <sub>IO</sub> -0.4	-	-		I <sub>OH</sub> =-400μA
	V <sub>OL</sub>	-	-	GND+0.4		I <sub>OL</sub> =400μA
Output load condition	L <sub>CMOS</sub>	-	-	15	pF	CMOS Load
Input voltage	V <sub>IH</sub>	80%V <sub>cc</sub>	-	-		-
	V <sub>IL</sub>	-	-	20%V <sub>cc</sub>		-
Rise time	t <sub>r</sub>	-	-	200	ns	20%V <sub>IO</sub> ⇄ 80%V <sub>IO</sub> 15pF V <sub>IO</sub> =1.5V to 5.5V
Fall time	t <sub>f</sub>	-	-	200	ns	20%V <sub>IO</sub> ⇄ 80%V <sub>IO</sub> 15pF V <sub>IO</sub> =1.8V to 5.5V
Start-up time	t <sub>str</sub>	-	-	1	ms	V <sub>cc</sub> =2.0V to 5.5V
Frequency aging	f <sub>age</sub>	-5	-	5	x10 <sup>-6</sup>	@+25°C V <sub>cc</sub> =3.3V First year

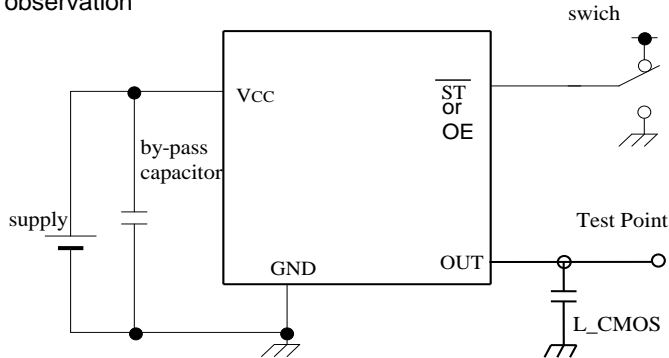
**3.Timing chart**



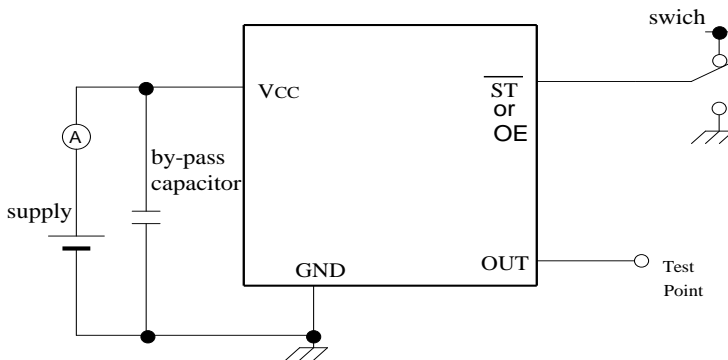
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4. Test circuit

1) Waveform observation



2) Current consumption



\*Current consumption under the disable function should be = GND.

3) Condition

(1) Oscilloscope

- Band width should be minimum 5 times higher (wider) than measurement frequency.
- Probe earth should be placed closely from test point and lead length should be as short as possible.

\* Recommendable to use miniature socket. (Don't use earth lead.)

(2) L\_CMOS also includes probe capacitance.

(3) By-pass capacitor (0.01 mF to 0.1 mF) is placed closely between VCC and GND.

(4) Use the current meter whose internal impedance value is small.

(5) Power supply

- Start up time (0 %VCC @ 90 %VCC) of power source should be more than 150 ms.
- Impedance of power supply should be as lowest as possible.

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**5.External dimensions (Unit: mm)**

Pin	Connection	Pin	Connection
1	V <sub>IO</sub>	12	V <sub>CC</sub>
2	N.C.	11	N.C.
3	N.C.	10	N.C.
4	N.C.	9	N.C.
5	N.C.	8	N.C.
6	GND	7	OUT

**6.Footprint(Recommended) (Unit: mm)**

To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V<sub>CC</sub> - GND).

**7.Reflow profile**

Pre Heating Temperature  
Tp1 ~ Tp2 = + 170 °C

Heating Temperature  
TMI = + 220 °C

Peek Temperature  
TMax. = + 260 °C

Point of measuring  
In case of Solder ability

Terminal.  
In case of Resistance to soldering heat Surface.

**8.Packing information**

[ 1 ]Product number last 2 digits code(xx) description                      The recommended code is "00"

Q3102LC020001xx

Code	Condition	Code	Condition
01	Any Q'ty vinyl bag(Tape cut)	13	500pcs / Reel
11	Any Q'ty / Reel	14	1000pcs / Reel
12	250pcs / Reel	00	2000pcs / Reel

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[ 2 ] Taping specification

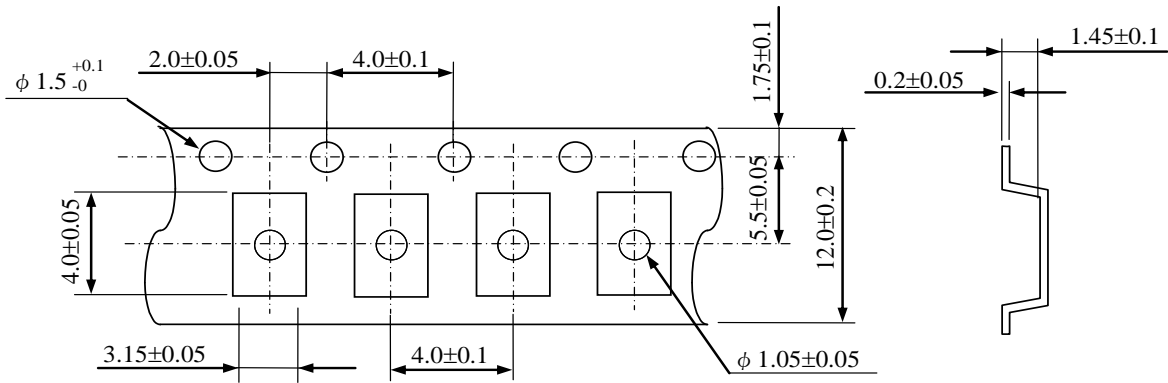
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

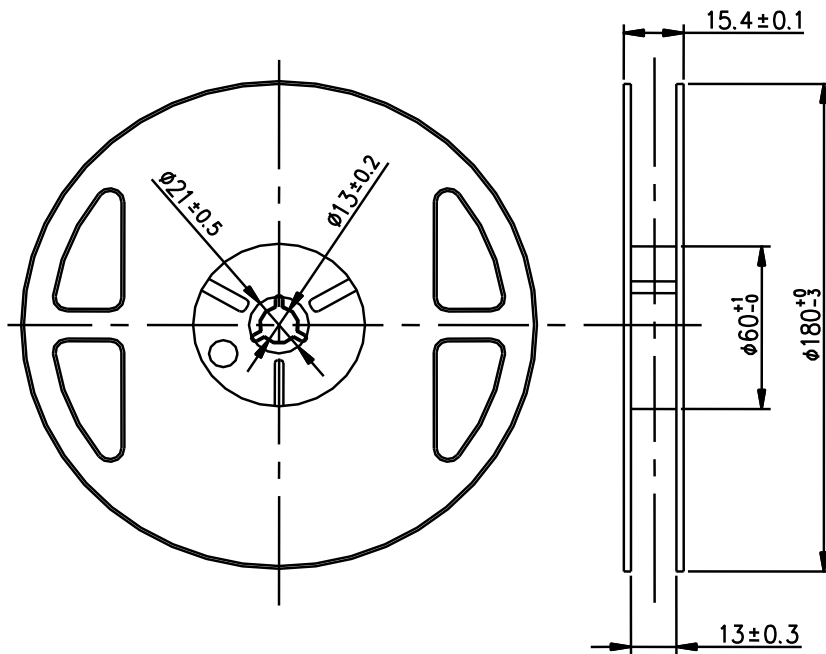
Unit: mm



(2) Reel dimensions

Center material : PS

Material of the Reel : PS



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