Clock OSC XG-2102CA **SEIKO EPSON CORPORATION**

Product name XG-2102CA 500.000000MHz +/-50ppm LGPA
Product Number / Ordering code X1M0003410016xx
Please refer to the 9.Packing information about xx (last 2 digits)

Output waveform LVDS
Pb free / Complies with EU RoHS directive
Reference weight Typ. 133 mg

1.Absolute maximum ratings

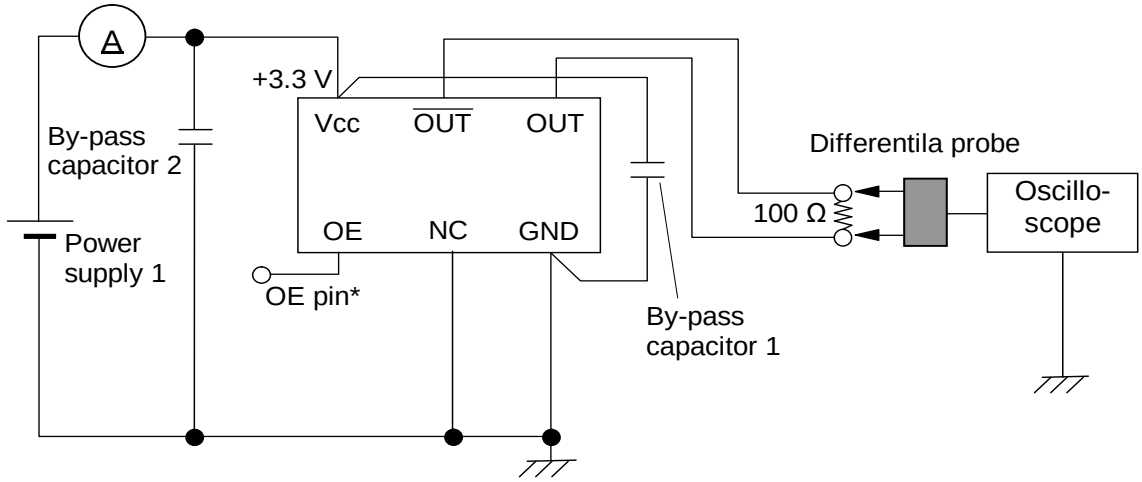
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Maximum supply voltage	Vcc-GND	-0.5	-	4	V	-
Storage temperature	T_stg	-55	-	125	ºC	Storage as single product
Input voltage	Vin	-0.5	-	Vcc+0.5	V	OE Terminal

2.Specifications(characteristics)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f0	-	500.0000	-	MHz	-
Supply voltage	Vcc	-0.5	-	4	V	-
Operating temperature	T_use	0	-	70	ºC	-
Frequency tolerance	f_tol	-50	-	50	$x10^{-6}$	-
Current consumption	Icc	-	-	30	mA	-
Stand-by current	I_std	-	-	-	mA	-
Disable current	I_dis	-	-	15.0	mA	-
Symmetry	SYM	45	-	55	%	-
Output voltage(LVDS)	VOD	247	-	454	mV	-
	dVOD	-	-	50	mV	-
	Vos	1.125	-	1.375	V	-
	dVos	-	-	150	mV	-
Output load condition(LVDS)	L_LVDS	-	100	-	Ω	-
Input voltage	V_{IH}	0.7Vcc	-	-		-
	V_{IL}	-	-	0.3Vcc		-
Rise time	t_r	-	-	400	ps	-
Fall time	tf	-	-	400	ps	-
Start-up time	t_str	-	-	10	ms	-
Jitter	t_{DJ}	-	-	N/A	ps	Deterministic Jitter
	T_{RJ}	-	-	N/A	ps	Random Jitter
	t_{RMS}	-	-	N/A	ps	δ(RMS of total distribution)
	t_{p-p}	-	-	N/A	ps	Peak to Peak
	t_{acc}	-	-	N/A	ps	Accumulated Jitter(δ) n=2 to 50000 cycles
Phase jitter	t_{PJ}	-	-	0.14	ps	Off set Frequency: 12kHz to 20MHz
Phase noise	L(f)	-	-	-	dBc/Hz	Off set 1Hz
		-	-36.6	-	dBc/Hz	Off set 10Hz
		-	-65.4	-	dBc/Hz	Off set 100Hz
		-	-95.1	-	dBc/Hz	Off set 1kHz
		-	-125.2	-	dBc/Hz	Off set 10kHz
		-	-146.4	-	dBc/Hz	Off set 100kHz
		-	-148.9	-	dBc/Hz	Off set 1MHz
Frequency aging	f_age	-	-	-	$x10^{-6}$/Year	Included in Frequency tolerance 10 years
		-	-	-		-

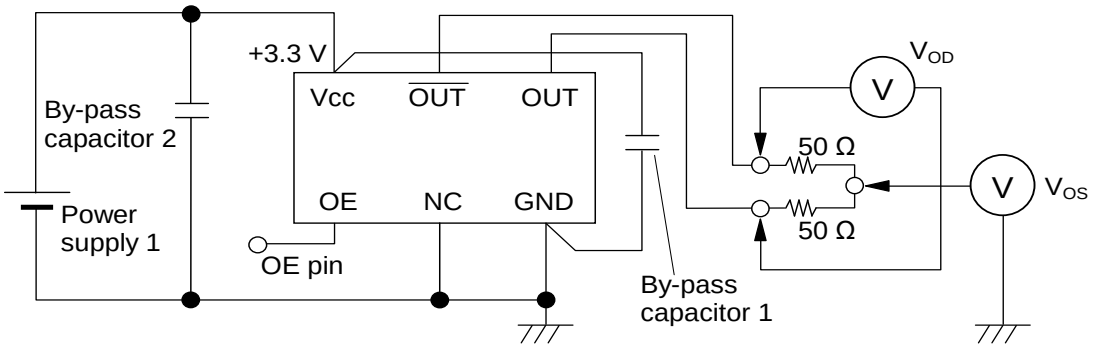
3.Test circuit

1) To observe waveform and current (case 1)



* The lines from OUT and OUT pin are same length.
* To measure the disable current, OE pin is connected to GND

2) To observe waveform and current (case 2)



* The lines from OUT and OUT pin are same length.

3) Measurement condition

A) Oscilloscope

•Bandwidth should be 5 times higher than DUT's output frequency (4 GHz).

•Probe ground should be placed closely from test point and lead length should be as short as possible.

B) By-pass capacitor 1 (approx. 0.01 µF to 0.1 µF) places closely between Vcc and GND.

C) By-pass capacitor 2 (approx. 10 µF) places closely between power supply terminals on the board.

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

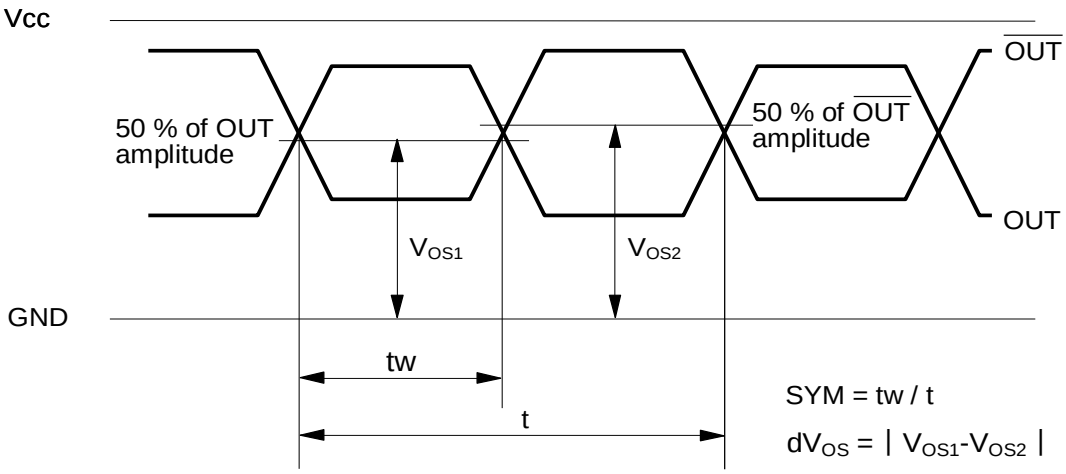
E) Power supply

• Start up time (0 Vg90 %Vcc) of power source should be more than 150 µs and slew rate should be less than 19.8 mV/µs.

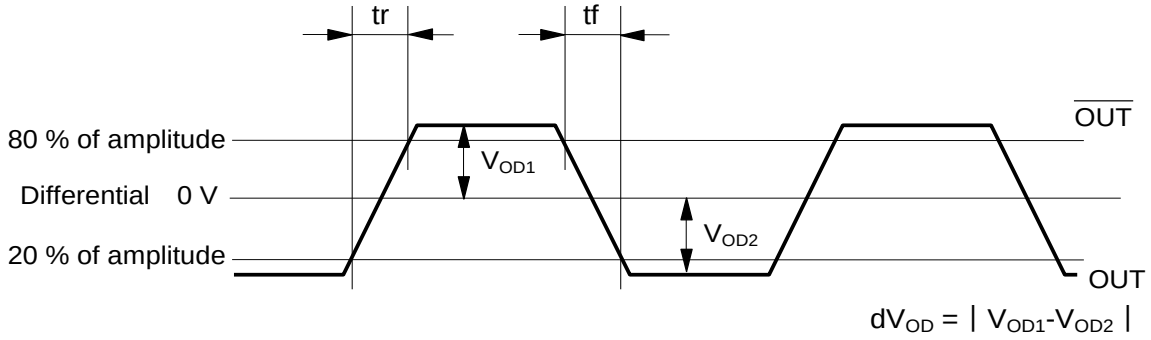
• Impedance of power supply should be as low as possible.

4.Timing chart

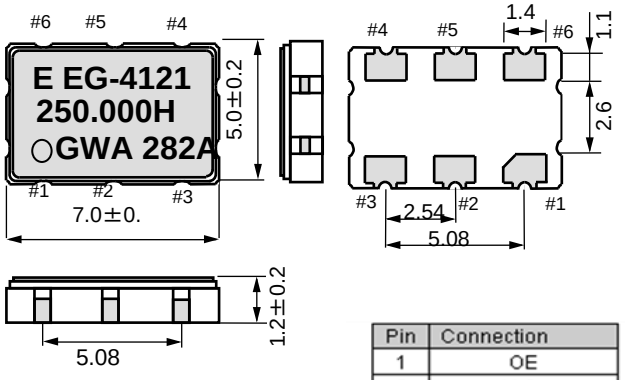
Each output waveform (OUT, and $\overline{OUT}$)



Differential output waveform (OUT – $\overline{OUT}$)

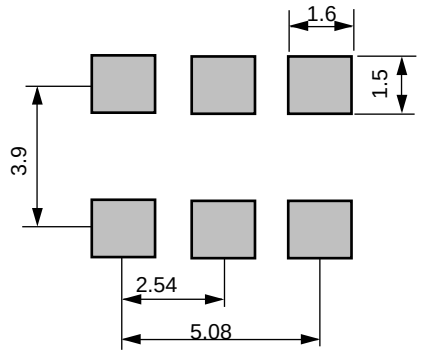


5.External dimensions (Unit: mm)



Pin	Connection
1	OE
2	N.C.
3	GND
4	OUT
5	$\overline{OUT}$
6	VCC

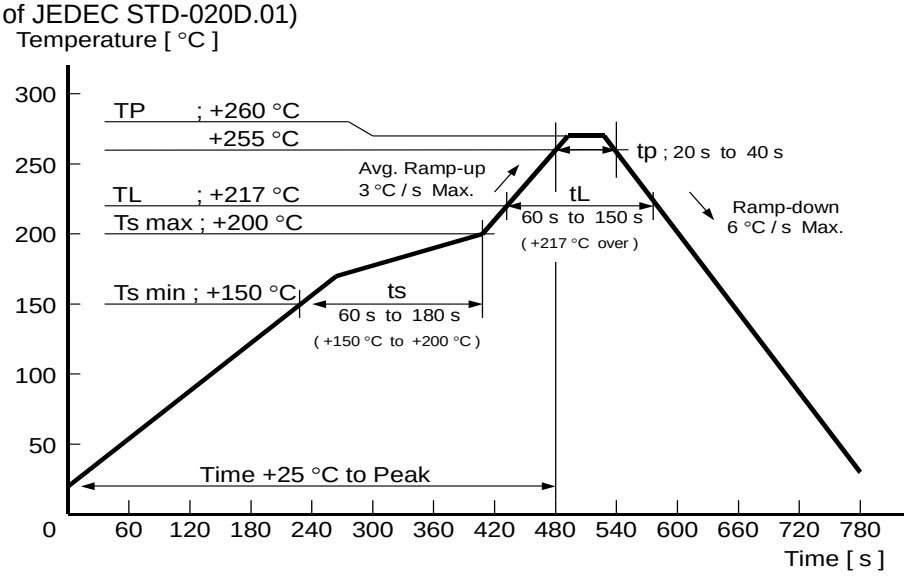
6.Footprint(Recommended) (Unit: mm)



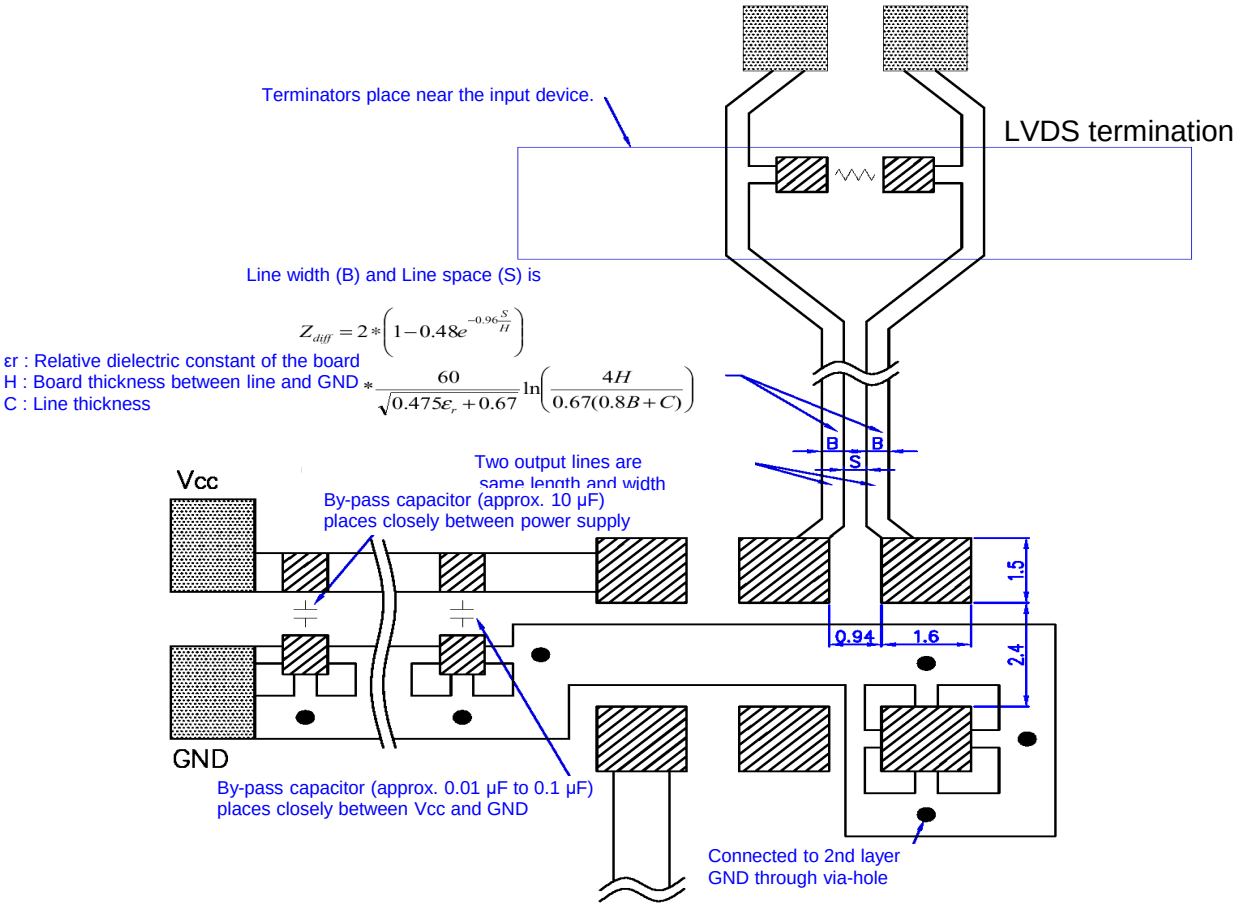
To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).

7.Reflow profile

Reflow condition (Follow of JEDEC STD-020D.01)



8.PCB layout (2 layers, 2nd layer is all GND pattern)



* By-pass capacitor (approx. 0.01 µF to 0.1 µF) places closely between Vcc and GND.
* By-pass capacitor (approx. 10 µF) places closely between power supply terminals on the board.
* Please design the two output lines by characteristic impedance 100 Ω and same length, and try to make the output lines as short as possible.

9.Packing information

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

X1M0003410016xx

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

[2] Taping specification

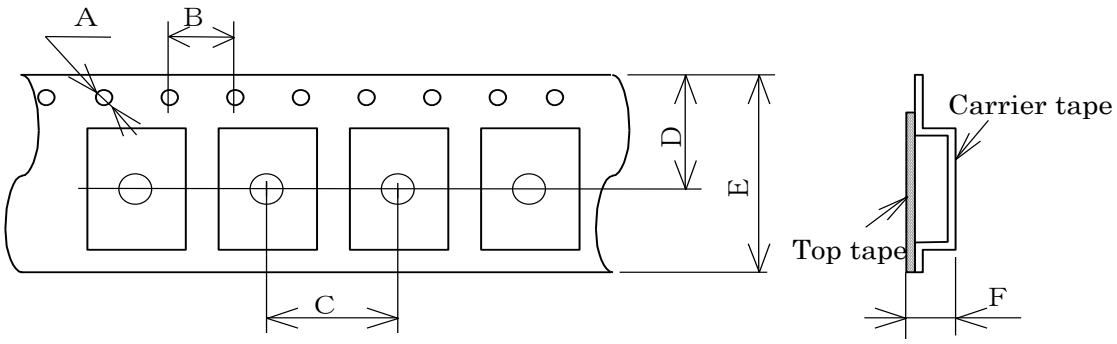
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm



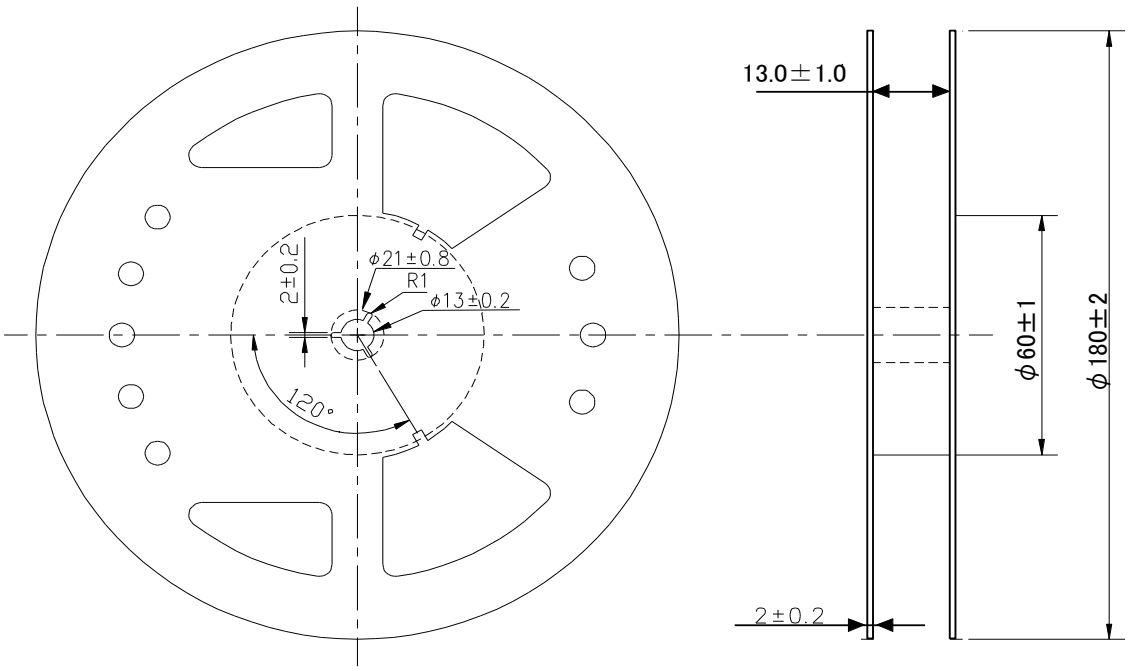
Symbol	A	B	C	D	E	F
Value	φ1.5	4	8	9.25	16	2.3

(2) Reel dimensions

Center material : PS

Material of the Reel : PS

Unit: mm



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