

Clock OSC

XG-2102CA

SEIKO EPSON CORPORATION

Product name XG-2102CA 144.000000MHz +/-100ppm LHSA

Product Number / Ordering code X1M0003410049xx

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

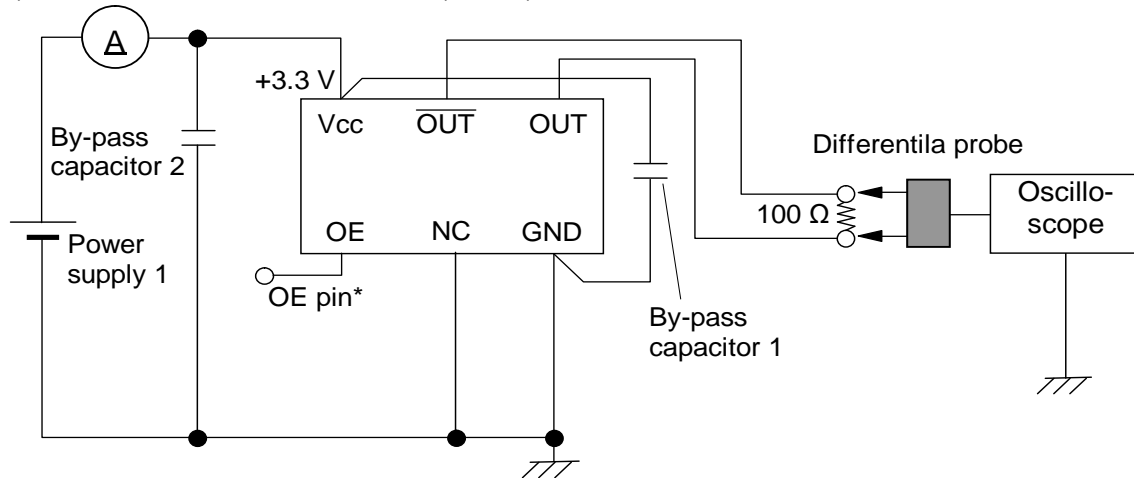
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Maximum supply voltage	V _{cc} -GND	-0.5	-	4	V	-
Storage temperature	T _{stg}	-55	-	125	°C	Storage as single product
Input voltage	V _{in}	-0.5	-	V _{cc} +0.5	V	OE Terminal

2.Specifications(characteristics)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f ₀	-	144.0000	-	MHz	-
Supply voltage	V _{cc}	-0.5	-	4	V	-
Operating temperature	T _{use}	-20	-	70	°C	-
Frequency tolerance	f _{tol}	-100	-	100	x10 ⁻⁶	-
Current consumption	I _{cc}	-	-	30	mA	-
Stand-by current	I _{std}	-	-	-	mA	-
Disable current	I _{dis}	-	-	15.0	mA	-
Symmetry	SYM	45	-	55	%	-
Output voltage(LVDS)	V _{OD}	247	-	454	mV	-
	dV _{OD}	-	-	50	mV	-
	V _{os}	1.125	-	1.375	V	-
	dV _{os}	-	-	150	mV	-
Output load condition(LVDS)	L _{LVDS}	-	100	-	Ω	-
Input voltage	V _{IH}	0.7V _{cc}	-	-		-
	V _{IL}	-	-	0.3V _{cc}		-
Rise time	t _r	-	-	400	ps	-
Fall time	t _f	-	-	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}	-	-	0.27	ps	Off set Frequency: 12kHz to 20MHz
Phase noise	L(f)	-	-	-	dBc/Hz	Off set 1Hz
		-	-45.1	-	dBc/Hz	Off set 10Hz
		-	-75.2	-	dBc/Hz	Off set 100Hz
		-	-106.5	-	dBc/Hz	Off set 1kHz
		-	-137.0	-	dBc/Hz	Off set 10kHz
		-	-149.4	-	dBc/Hz	Off set 100kHz
		-	-152.4	-	dBc/Hz	Off set 1MHz
Frequency aging	f _{age}	-	-	-	x10 ⁻⁶ /Year	Included in Frequency tolerance 10 years
		-	-	-		-

3. Test circuit

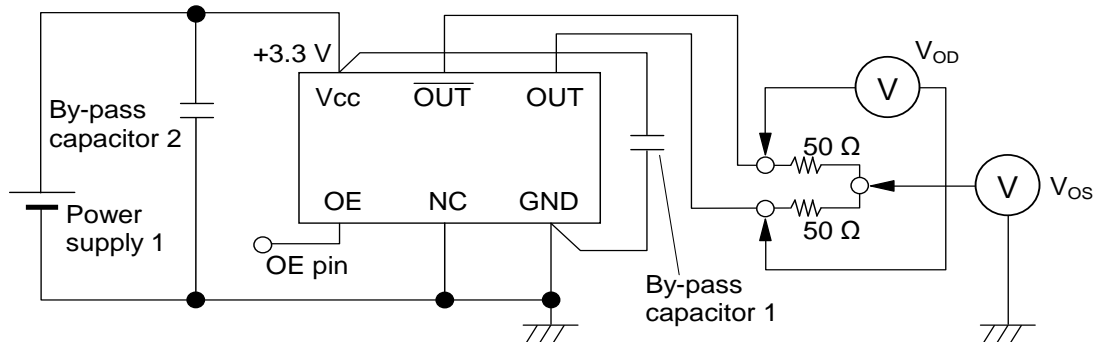
1) To observe waveform and current (case 1)



* 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 μ F to 0.1 μ F) places closely between Vcc and GND.

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

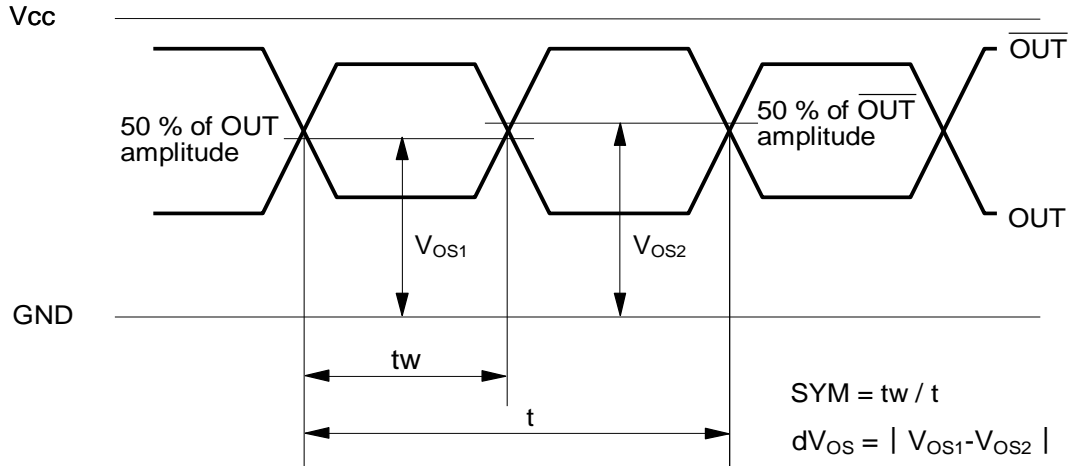
D) Use the current meter whose internal impedance value is small.

E) Power supply

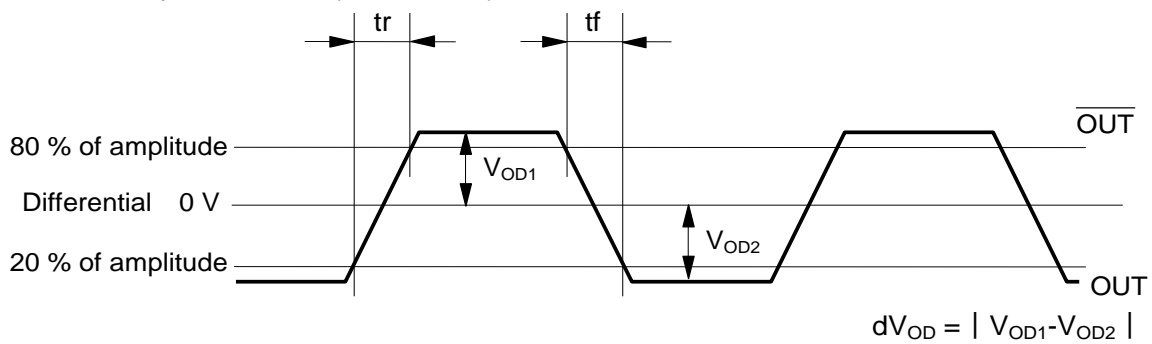
- Start up time (0 Vg90 %Vcc) of power source should be more than 150 μ s and slew rate should be less than 19.8 mV/ μ s.
- Impedance of power supply should be as low as possible.

4. Timing chart

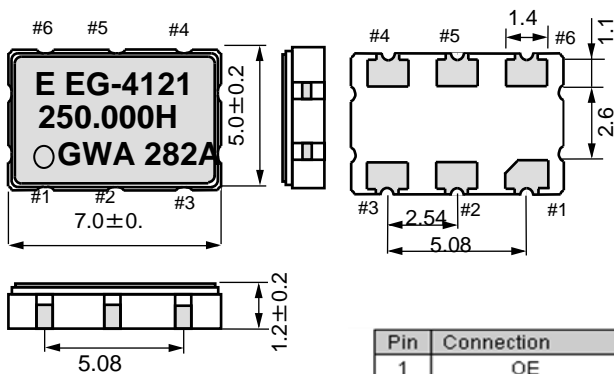
Each output waveform (OUT, and $\overline{\text{OUT}}$)



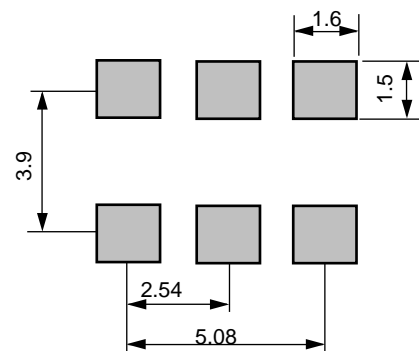
Differential output waveform ($\text{OUT} - \overline{\text{OUT}}$)



5. External dimensions (Unit: mm)



6. Footprint (Recommended) (Unit: mm)

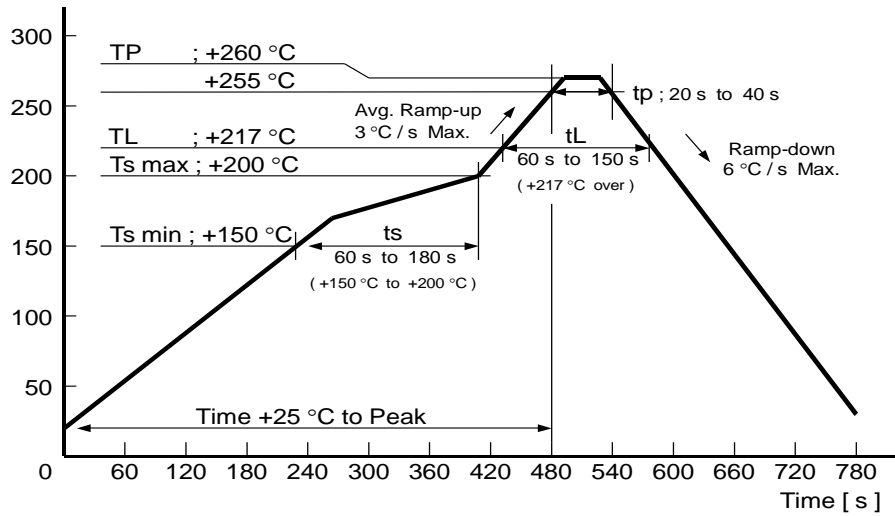


To maintain stable operation, provide a 0.01 μF to 0.1 μF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V_{CC} - GND).

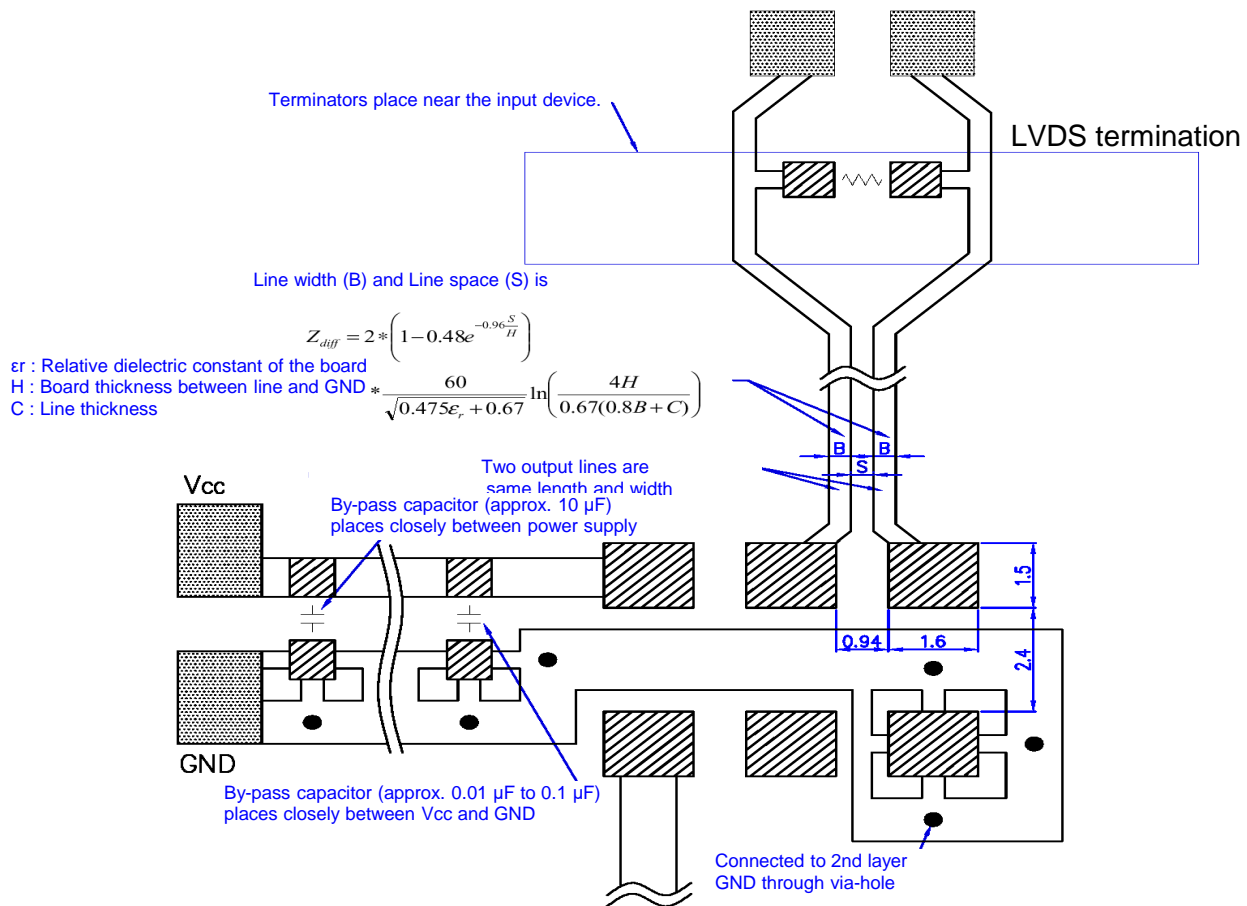
7.Reflow profile

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

Temperature [°C]



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



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- * By-pass capacitor (approx. 0.01 μ F to 0.1 μ F) places closely between Vcc and GND.
- * By-pass capacitor (approx. 10 μ F) 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"

X1M0003410049xx

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

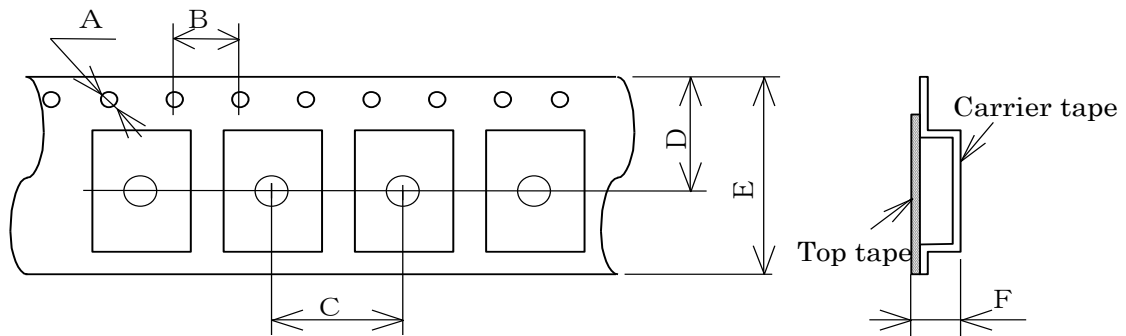
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm



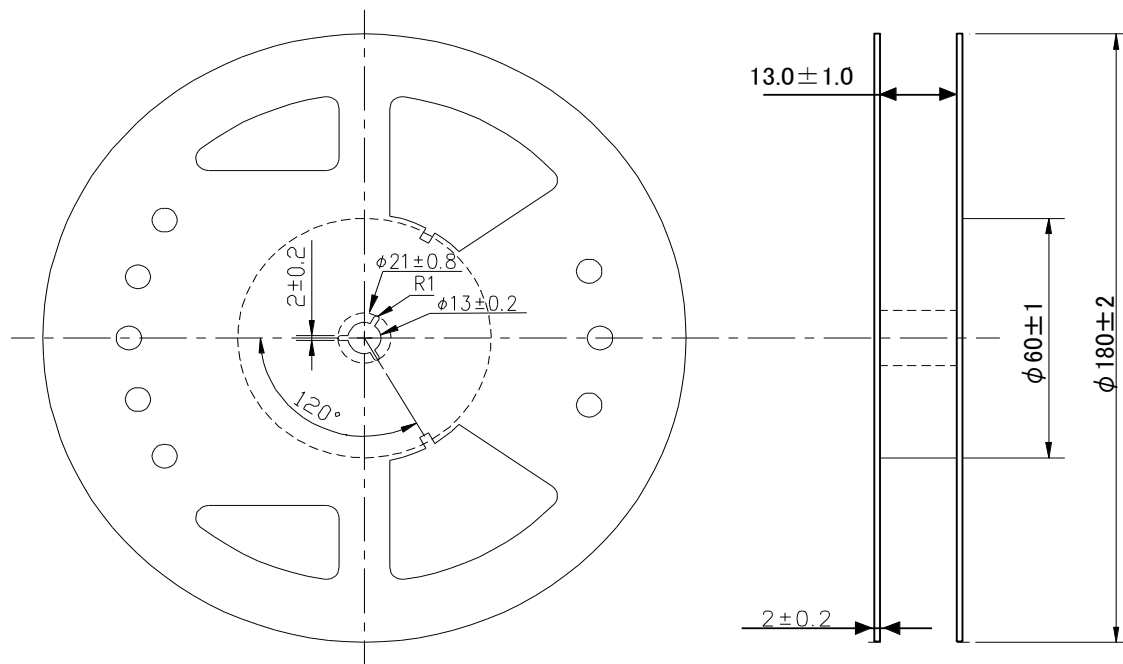
Symbol	A	B	C	D	E	F
Value	$\phi 1.5$	4	8	9.25	16	2.3

(2) Reel dimensions

Center material : PS

Material of the Reel : PS

Unit: mm



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