Clock OSC XG-2121CA

SEIKO EPSON CORPORATION

Product name XG-2121CA 125.000000MHz +/-50ppm LGPN

Product Number / Ordering code X1M0003510034xx

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**

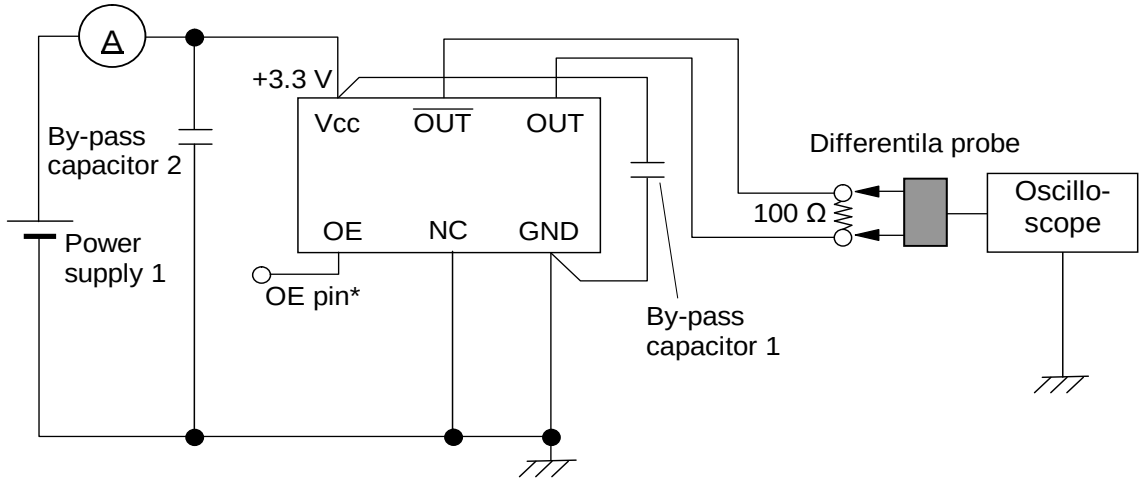
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions / Remarks |
|---|---|---|---|---|---|---|
| Maximum supply voltage | Vcc-GND | -0.5 | - | 4 | V | - |
| Storage temperature | T_stg | -55 | - | 125 | ºC | Storage as single product |
| Input voltage | Vin | -0.5 | - | Vcc+0.5 | V | OE Terminal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

**2.Specifications(characteristics)**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions / Remarks |
|---|---|---|---|---|---|---|
| Output frequency | f0 | - | 125.0000 | - | 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 | $t_{PJ}$ | - | - | 0.27 | ps | Off set Frequency: 12kHz to 20MHz |
| Phase noise | L(f) | - | - | - | dBc/Hz | Off set 1Hz |
| | | - | -53.2 | - | dBc/Hz | Off set 10Hz |
| | | - | -84.6 | - | dBc/Hz | Off set 100Hz |
| | | - | -115.5 | - | dBc/Hz | Off set 1kHz |
| | | - | -143.5 | - | dBc/Hz | Off set 10kHz |
| | | - | -151.6 | - | dBc/Hz | Off set 100kHz |
| | | - | -153.1 | - | dBc/Hz | Off set 1MHz |
| Frequency aging | f_age | -10 | - | 10 | $x10^{-6}$/Year | @+25ºC first year |
| | | - | - | - | | - |

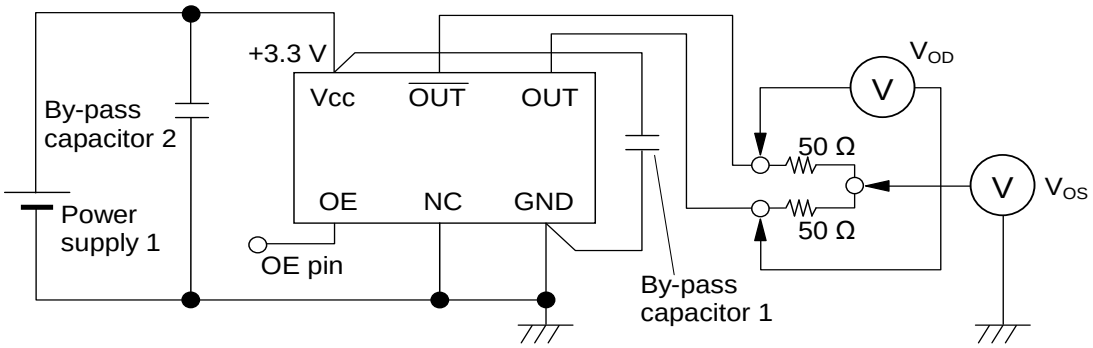
## 3.Test circuit

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.

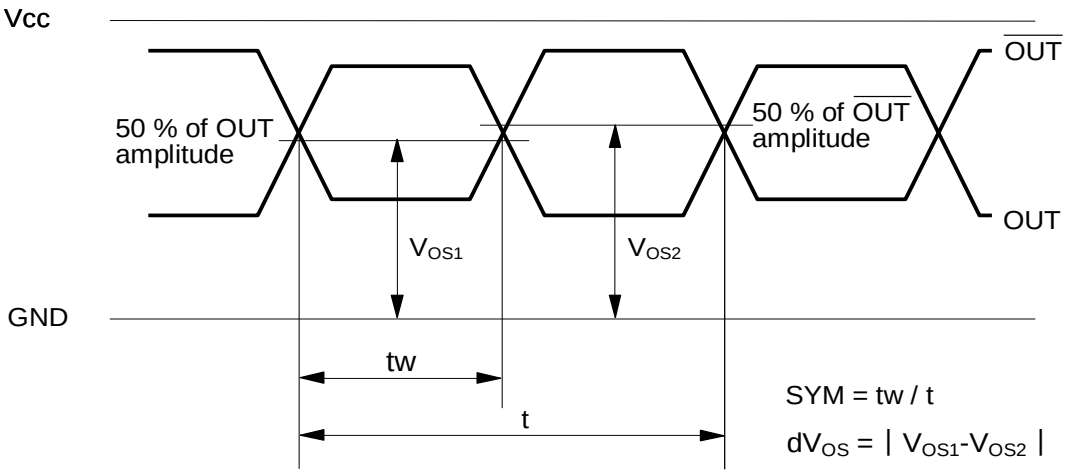
E) Power supply

• 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.

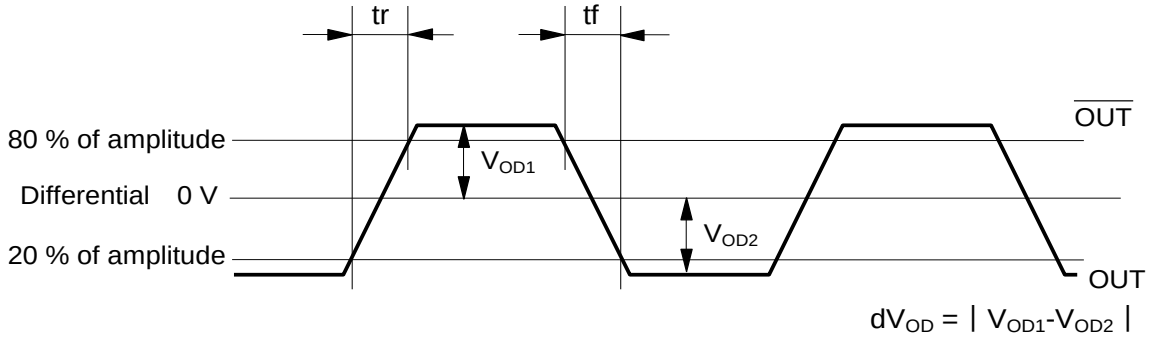
• Impedance of power supply should be as low as possible.

## 4.Timing chart

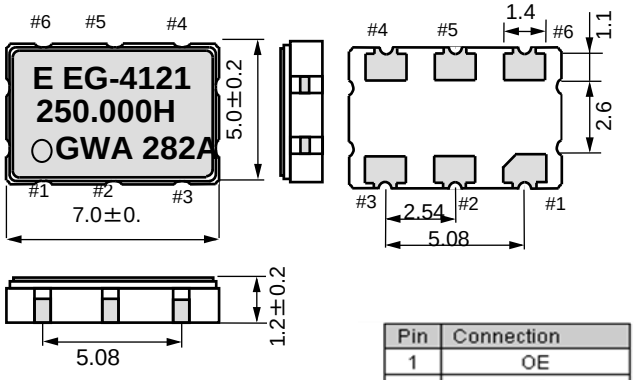
Each output waveform (OUT, and $\overline{OUT}$)




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

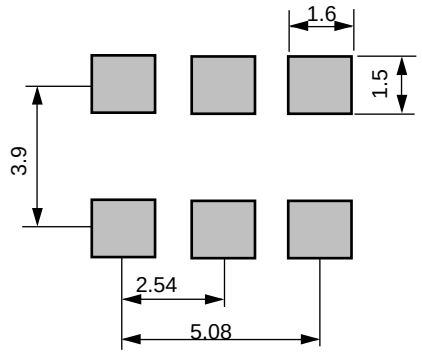



## 5.External dimensions (Unit: mm)




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

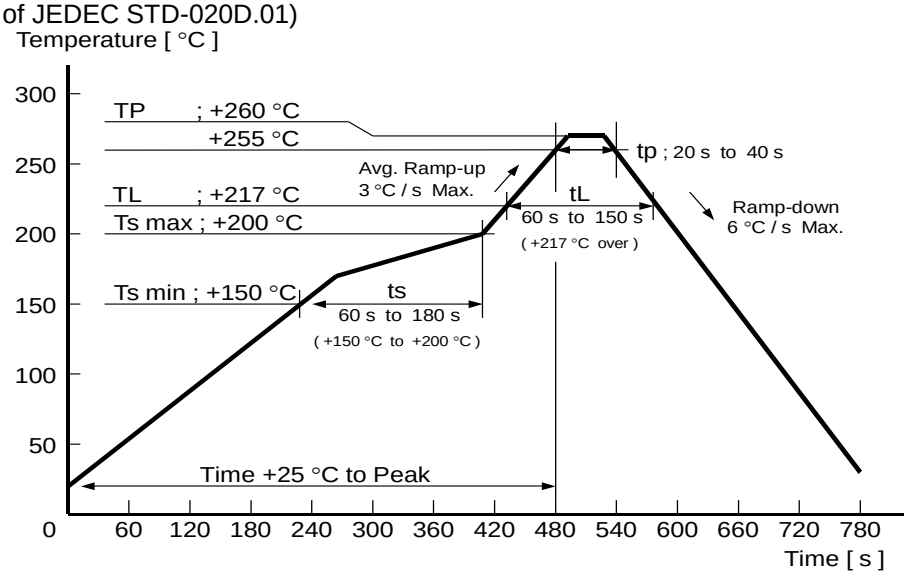
## 6.Footprint(Recommended) (Unit: mm)



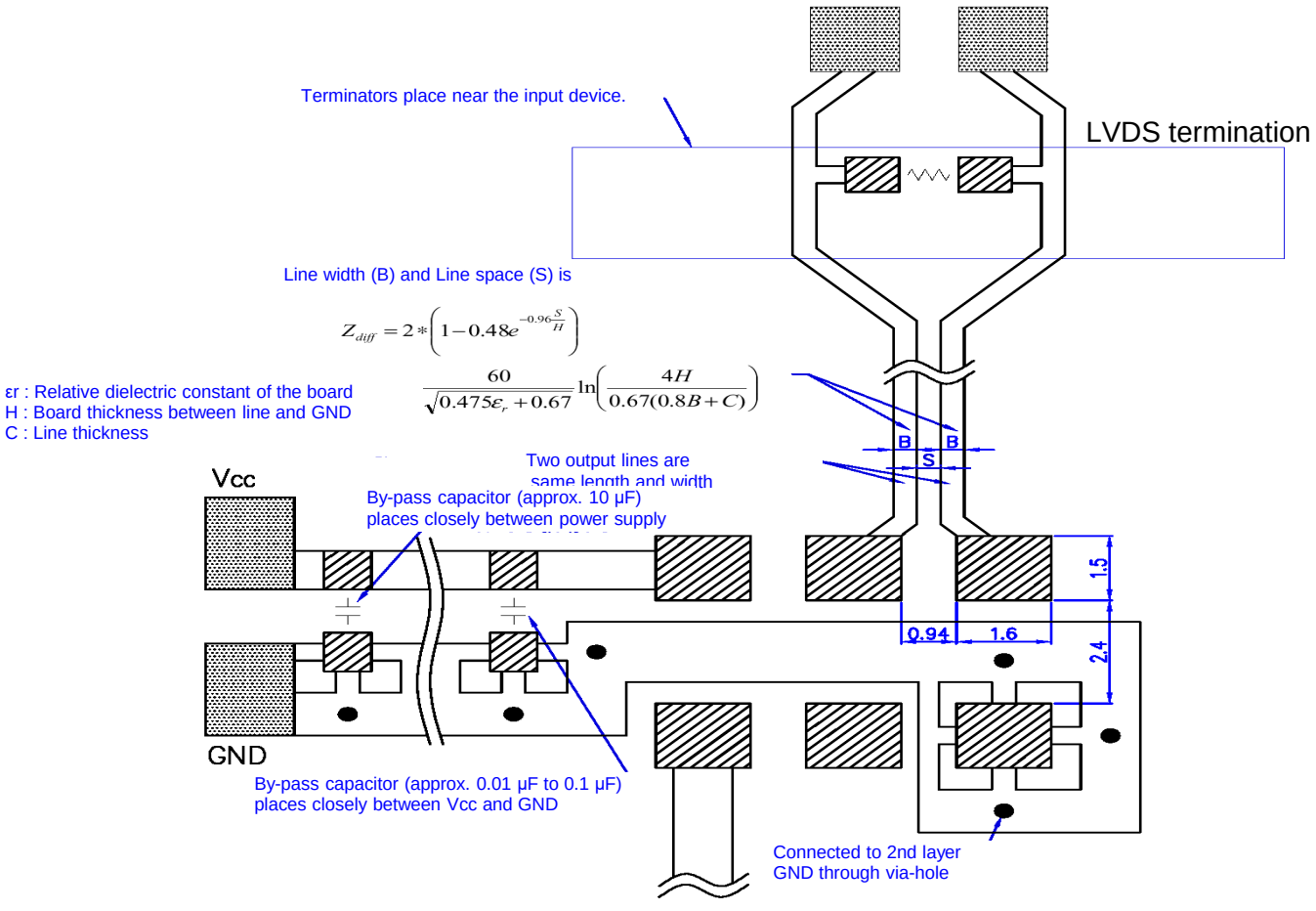

To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).

## 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"

X1M0003510034xx

| 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

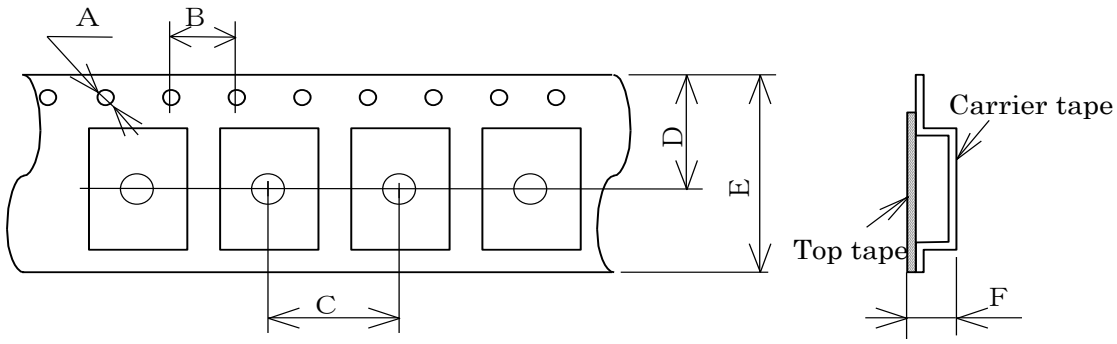
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

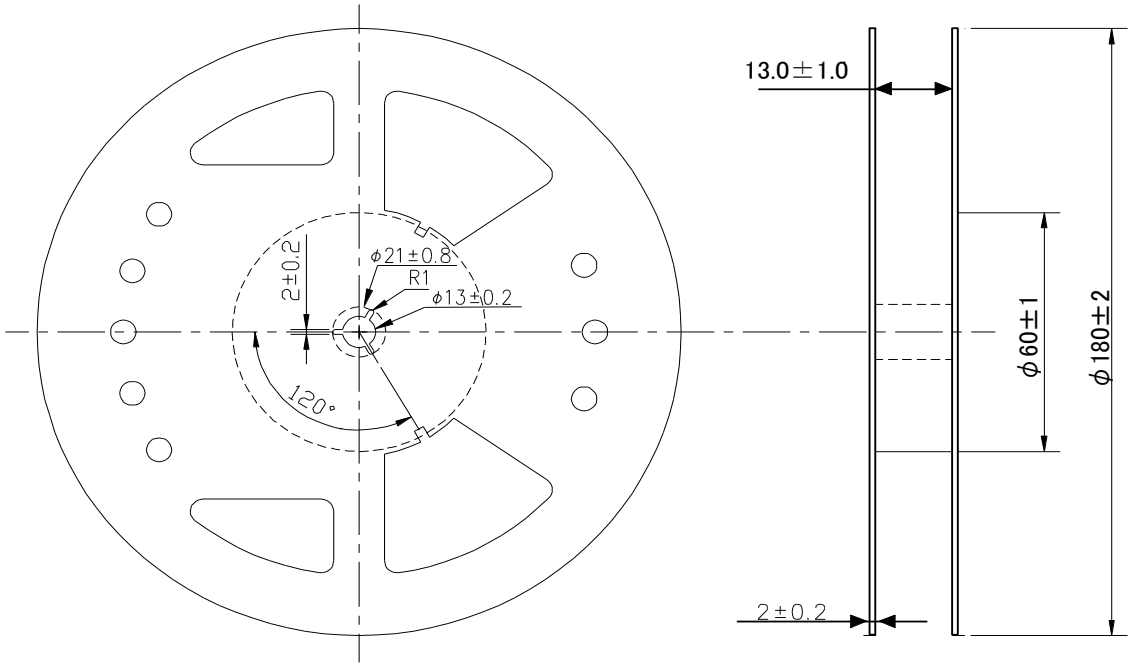



| Symbol | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Value | φ1.5 | 4 | 8 | 9.25 | 16 | 2.3 |

(2) Reel dimensions

Center material : PS

Material of the Reel : PS



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