

2.5V operation LVDS SAW Oscillator EG-2121CA-L

◆ Features

- Generates high frequency clock from a high stability SAW (surface acoustic wave) resonator.
- 2.5V-LVDS output.
- Very low jitter/low phase noise.
- Small SMD in 7x5mm, Max1.4mm height, ceramic package.

◆ Applications

- Gigabit Ethernet, Fibre channel, Infini Band, PCI-express, Rapid IO, Hyper Transport, Memory clock, CPU clock

◆ Absolute Maximum Ratings

| Item | Symbol | Unit | MIN. | TYP. | MAX. | Condition | |
|------------------------|------------------|---------------------------------|------|------|------|------------------------|--|
| Supply Voltage | V _{CC} | V | -0.5 | | +4.0 | V _{CC} – GND | |
| Storage temperature | T _{stg} | °C | -40 | | +100 | Stored as bare product | |
| Solder heat resistance | T _{sol} | Max. 240°C x Max. 10s x 2 times | | | | | |

◆ Operating range

| Item | Symbol | Unit | MIN. | TYP. | MAX. | Condition |
|-----------------------|------------------|------|-------|------|-------|-----------------------|
| Supply voltage | V _{CC} | V | 2.375 | 2.5 | 2.625 | |
| Operating temperature | T _{opr} | °C | 0 | | +70 | P version |
| | | | -5 | | +85 | R version |
| Output load | RL | Ω | 100 | | | Differential resistor |

◆ Frequency characteristics

(V_{CC}=2.375 to 2.625, GND=0.0V, Load=100Ω)

| Item | Symbol | Unit | MIN. | TYP. | MAX. | Condition |
|------------------------|-------------------|------|--------|------|------|---------------|
| Output frequency Range | f _{osc} | MHz | 53.125 | | 700 | |
| Frequency Stability | df/f ₀ | ppm | -100 | | +100 | H version, *1 |
| | | | -50 | | +50 | G version, *1 |

*1 This includes initial frequency tolerance, temperature, supply voltage variation and loading variation. Please refer to Part Numbering Guide (page3).

◆ Electrical characteristics

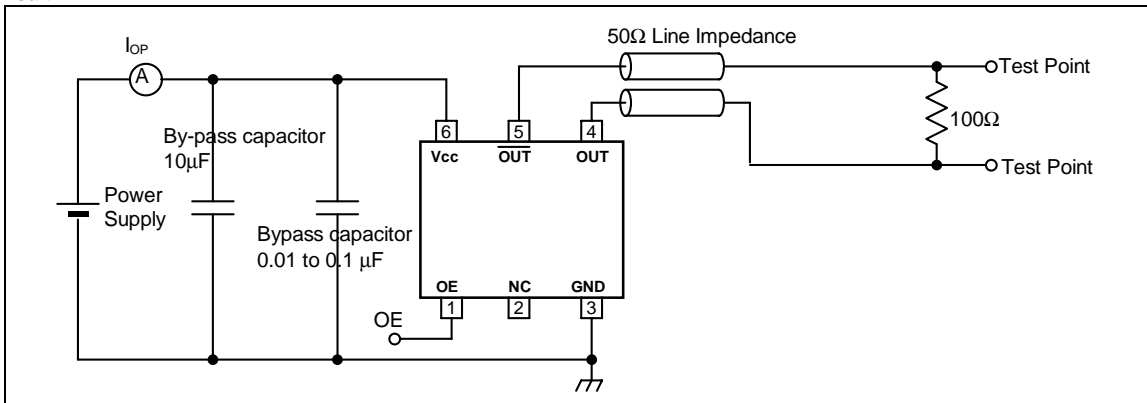
(V_{CC}=2.375 to 2.625, GND=0.0V, Load=100Ω)

| Item | Symbol | Unit | MIN. | TYP. | MAX. | Condition |
|--|------------------|------|--------------------|------------------------|--------------------|--|
| Start up time | T _{osc} | ms | | | 10 | t=0 at V _{CC} =2.375V |
| Current consumption | I _{OP} | mA | | 20 | 30 | f _{osc} ≤500MHz |
| | | | | 25 | 35 | f _{osc} >500MHz |
| OE High level input voltage | V _{IH} | V | 0.7V _{CC} | | | |
| OE Low level input voltage | V _{IL} | V | | | 0.3V _{CC} | |
| OE High level input current | I _{IH} | μA | | | 1 | OE=V _{CC} |
| OE Low level input current | I _{IL} | μA | -100 | | -10 | OE=GND |
| Differential output voltage | V _{OD} | mV | 247 | 350 | 454 | V _{OD1} , V _{OD2} |
| Change to V _{OD} | dV _{OD} | mV | | | 50 | dV _{OD} = V _{OD1} - V _{OD2} |
| Offset Voltage | V _{OS} | V | 1.125 | 1.25 | 1.375 | V _{OS1} , V _{OS2} |
| Change to V _{OS} | dV _{OS} | mV | | | 150 | dV _{OS} = V _{OS1} - V _{OS2} |
| Duty at outputs crossing point | tw/t | % | 48 | | 52 | V version: ≤175MHz |
| | | | 45 | | 55 | 53.125M to 350MHz |
| | | | 40 | | 60 | >350M |
| Output Rise time | t _{TLH} | ps | | | 400 | 20-80% of V _{OD} |
| Output Fall time | t _{THL} | ps | | | 400 | 80-20% of V _{OD} |
| Phase Jitter *2 Offset = 12KHz to 20MHz | T _{PJ} | UI | | 0.044x10 ⁻³ | | 53.125 to 700MHz |
| | | | | 0.29 | 1 | @156.25MHz |
| Period Jitter *3 n=50000 samples | t _{RJ} | ps | | 3 | 4 | σ of Random Jitter |
| | | | t _{p-p} | ps | 25 | 40 |
| Accumulated Jitter *3 n=2 to 50000 cycles | t _{acc} | ps | | 4 | 5 | σ of Total jitter distribution |

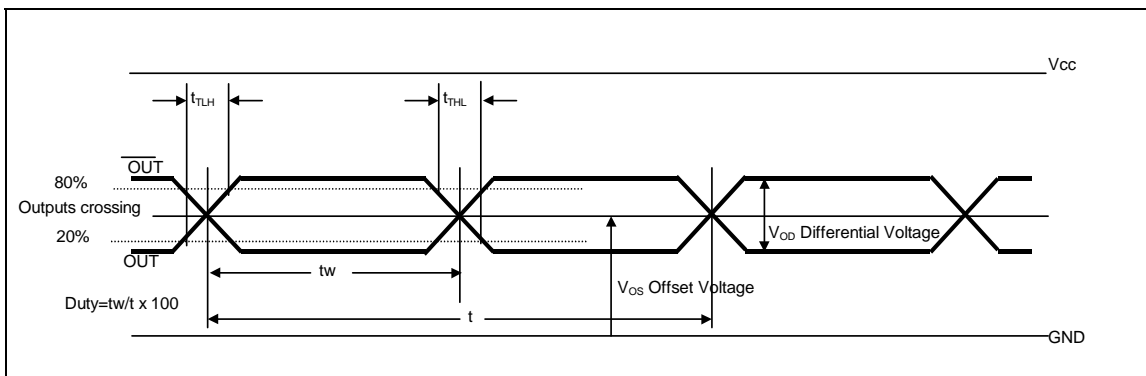
*2 Measured by SSB phase noise test equipment.

*3 Measured by Time interval analyzer or oscilloscope.

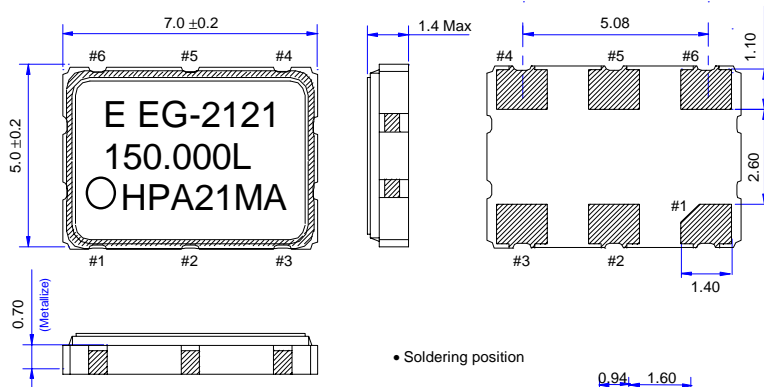
◆ Test circuit



◆ Timing chart



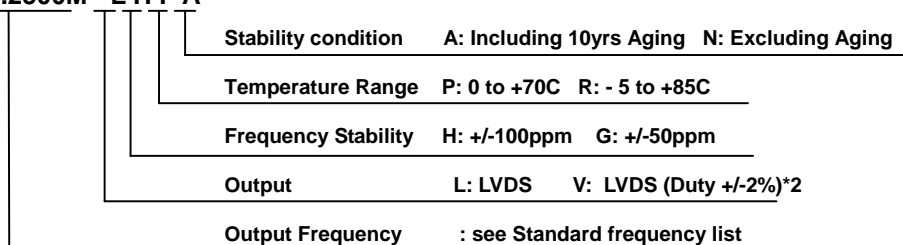
◆ External Dimensions (Unit : mm)



| No. | Pin Name |
|-----|-----------------|
| #1 | OE |
| #2 | N.C. |
| #3 | GND |
| #4 | OUT |
| #5 | OUT |
| #6 | V _{cc} |

◆ Part Numbering Guide

EG-2121CA - 156.2500M - L H P A



*1 Available combination : xHPA, xHPN, xHRA, xHRN, xGPN
 For xGPA and xGRN stability, please contact Epson.
 xGRA is not available.
 *2 V (Duty +/-2%) version is available under 175MHz.

◆ Standard Frequency List

| | | | | | |
|------------|-------------|-------------|----------|----------|----------|
| 53.1250 *3 | 62.5000 *3 | | | | |
| 100.0000 | 106.2500 | 125.0000 | 133.0000 | 155.5200 | 156.2500 |
| 159.3750 | 161.1328 *4 | 200.0000 | 212.5000 | 250.0000 | 311.0400 |
| 312.5000 | 322.2656 *5 | 400.0000 | 425.0000 | 500.0000 | |
| 622.0800 | 625.0000 | 644.5313 *6 | | | |

Please round off 5th digit and specify 4-digit accuracy under decimal point.

*3 available only xHPA and xHPN.
 Nominal frequency: *4=161.1328125MHz, *5=322.265625MHz, *6=644.53125MHz