Clock OSC SG5032VAN

SEIKO EPSON CORPORATION

Product name SG5032VAN 312.500000MHz KEGA
Product Number / Ordering code X1G0042610034xx

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. 52 mg

**1.Absolute maximum ratings**

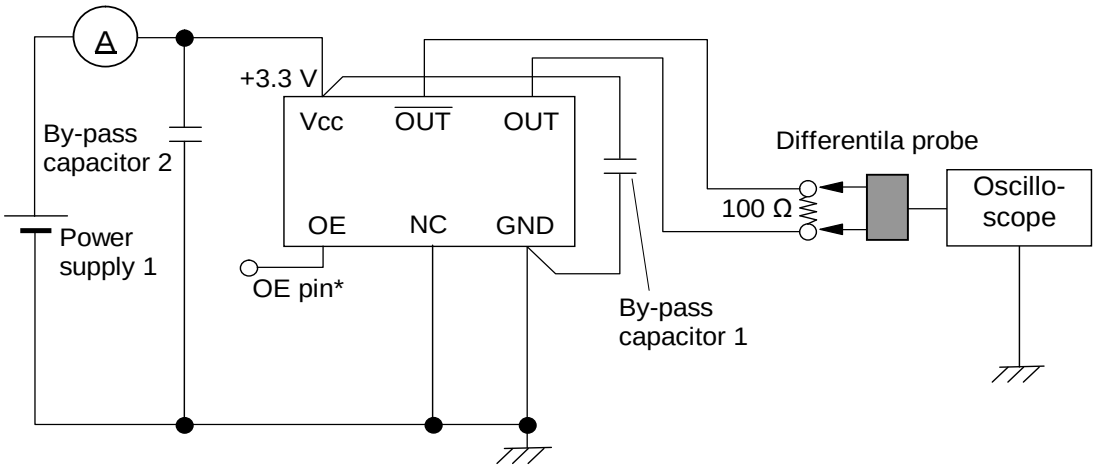
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions / Remarks |
|---|---|---|---|---|---|---|
| Maximum supply voltage | Vcc-GND | -0.3 | - | +4 | V | - |
| Storage temperature | T_stg | -40 | - | +125 | ºC | Storage as single product |
| Input voltage | Vin | -0.3 | - | Vcc+0.3 | V | OE Terminal |

**2.Specifications(characteristics)**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions / Remarks |
|---|---|---|---|---|---|---|
| Output frequency | f0 | - | 312.5000 | - | MHz | |
| Supply voltage | Vcc | 2.25 | - | 3.63 | V | - |
| Operating temperature | T_use | -40 | - | +85 | ºC | - |
| Frequency tolerance | f_tol | -30 | - | 30 | $x10^{-6}$ | - |
| Current consumption | Icc | - | - | 30 | mA | OE = Vcc, L_LVDS = 100 Ω |
| Stand-by current | I_std | - | - | - | mA | - |
| Disable current | I_dis | - | - | 20.0 | mA | OE = GND |
| Symmetry | SYM | 45 | - | 55 | % | At output crossing point |
| Output voltage(LVDS) | VOD | 250 | - | 450 | mV | - |
| | dVOD | - | - | 50 | mV | - |
| | Vos | 1.15 | - | 1.35 | V | - |
| | dVos | - | - | 150 | mV | - |
| Output load condition(LVDS) | L_LVDS | - | 100 | - | Ω | Connected between OUT and $\overline{OUT}$ |
| Input voltage | $V_{IH}$ | 70 % Vcc | - | - | | - |
| | $V_{IL}$ | - | - | 30 % Vcc | | - |
| Rise time | $t_r$ | - | - | 300 | ps | - |
| Fall time | tf | - | - | 300 | ps | - |
| Start-up time | t_str | - | - | 3 | ms | - |
| Jitter | $t_{DJ}$ | - | 12.1 | - | ps | Deterministic Jitter Vcc=2.5V |
| | $T_{RJ}$ | - | 1 | - | ps | Random Jitter Vcc=2.5V |
| | $t_{RMS}$ | - | 2.4 | - | ps | δ(RMS of total distribution) Vcc=2.5V |
| | $t_{p-p}$ | - | 14.3 | - | ps | Peak to Peak Vcc=2.5V |
| | $t_{acc}$ | - | 1 | - | ps | Accumulated Jitter(δ) n=2 to 50000 cycles Vcc=2.5V |
| Phase jitter | $t_{PJ}$ | - | 0.3 | - | ps | Offset Frequency: 12kHz to 20MHz Vcc=2.5V |
| Phase noise | L(f) | - | -42 | - | dBc/Hz | Offset 1Hz Vcc=2.5V |
| | | - | -76 | - | dBc/Hz | Offset 10Hz Vcc=2.5V |
| | | - | -102 | - | dBc/Hz | Offset 100Hz Vcc=2.5V |
| | | - | -115 | - | dBc/Hz | Offset 1kHz Vcc=2.5V |
| | | - | -125 | - | dBc/Hz | Offset 10kHz Vcc=2.5V |
| | | - | -130 | - | dBc/Hz | Offset 100kHz Vcc=2.5V |
| | | - | -131 | - | dBc/Hz | Offset 1MHz Vcc=2.5V |
| Frequency aging | f_age | -5 | - | 5 | $x10^{-6}$/Year | 25 °C, 1st year |
| | | - | - | - | | - |

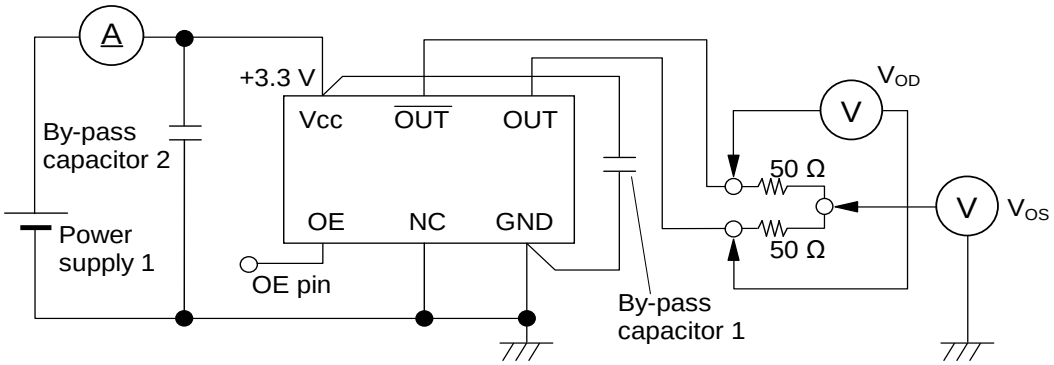
**3.Test circuit**

1) To observe waveform and current (case 1)




* The lines from OUT and $\overline{OUT}$ 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 $\overline{OUT}$ 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.

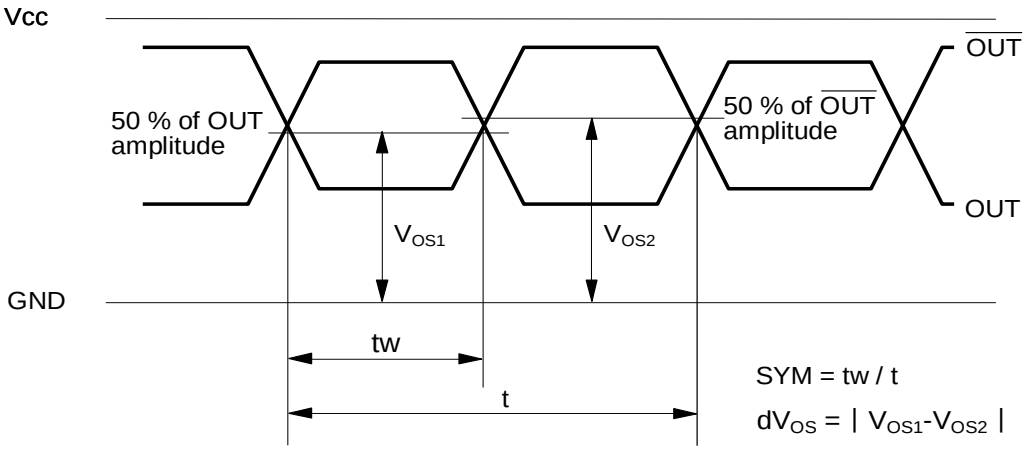
E) Power supply

• 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.

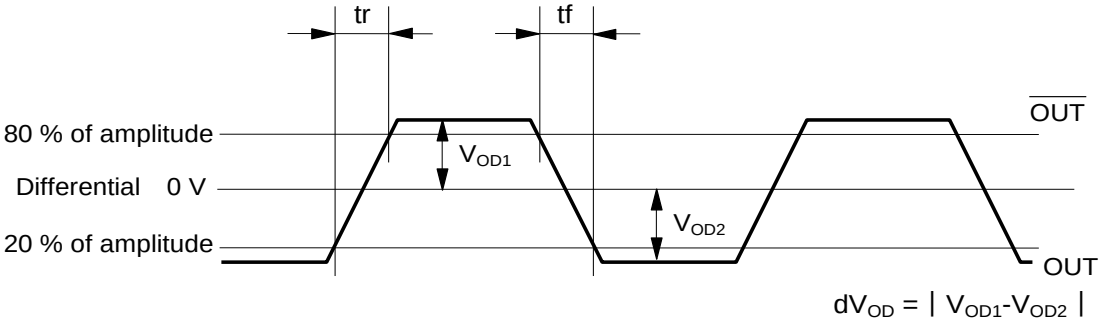
• Impedance of power supply should be as low as possible.

## 4.Timing chart

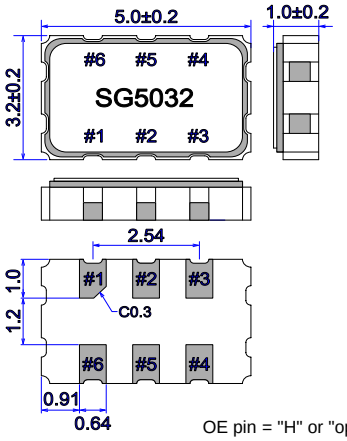
Each output waveform (OUT, and $\overline{OUT}$)




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



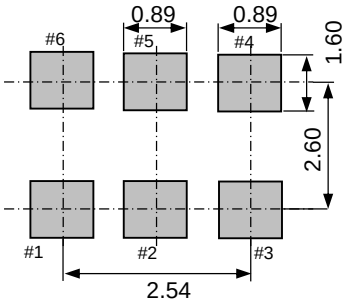

## 5.External dimensions (Unit: mm)




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

OE pin = "H" or "open" : Specified frequency output.
OE pin = "L" : Output is high impedance.
#2 pin connection = GND is acceptable.
The metal cap is connected to #3 pin.

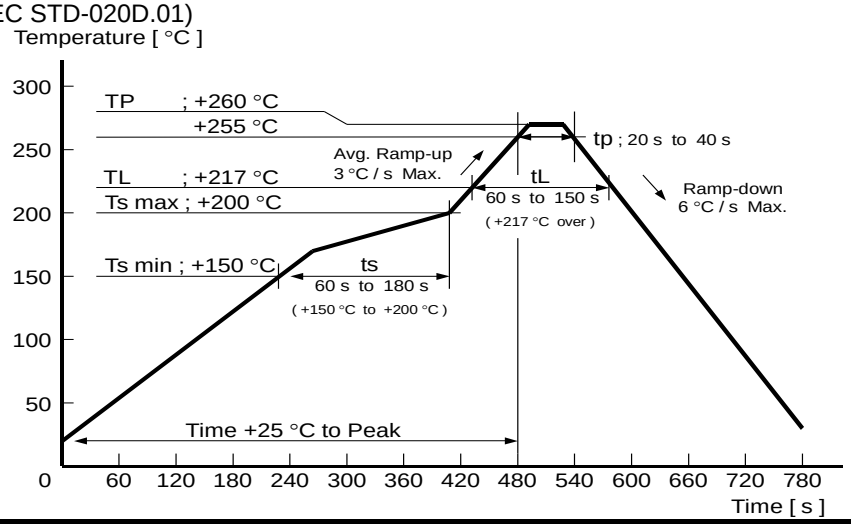
## 6.Footprint(Recommended) (Unit: mm)




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).

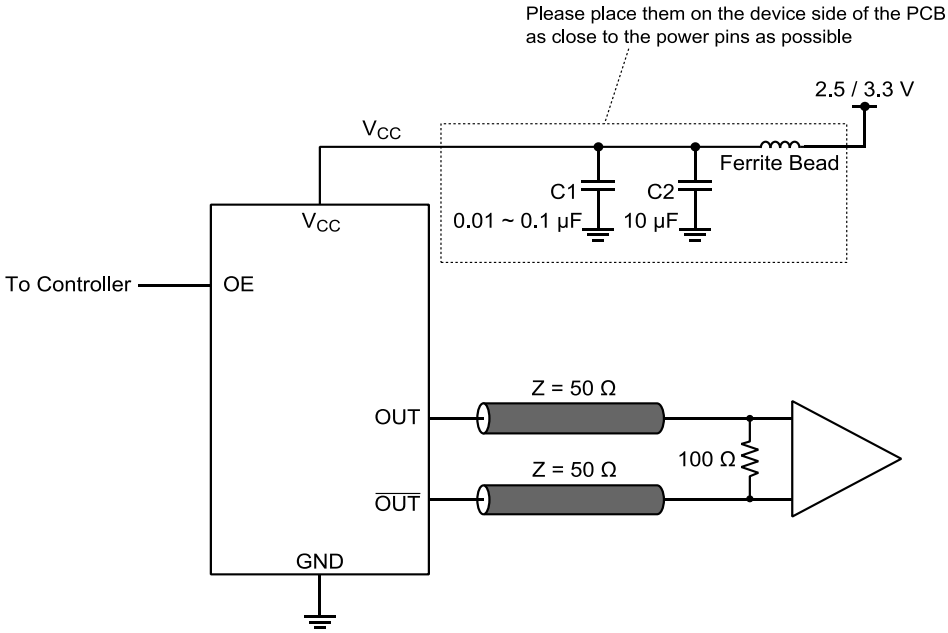
## 7.Reflow profile

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




8.Example of schematic layout

This figure shows an example of this product's application schematic.
As with any high speed analog circuitry, the power supply pins for this device are vulnerable to noise. In order to achieve optimum jitter performance, power isolation with filter device is required for power supply pins.
In order to achieve best performance of the power isolation filter, it is recommended that the filter composing devices is placed on the device side of the PCB as close to the power pins as possible.
The component value of this filter is just an example, it may have to be adjusted.



* 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"

X1G0042610034xx

| 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

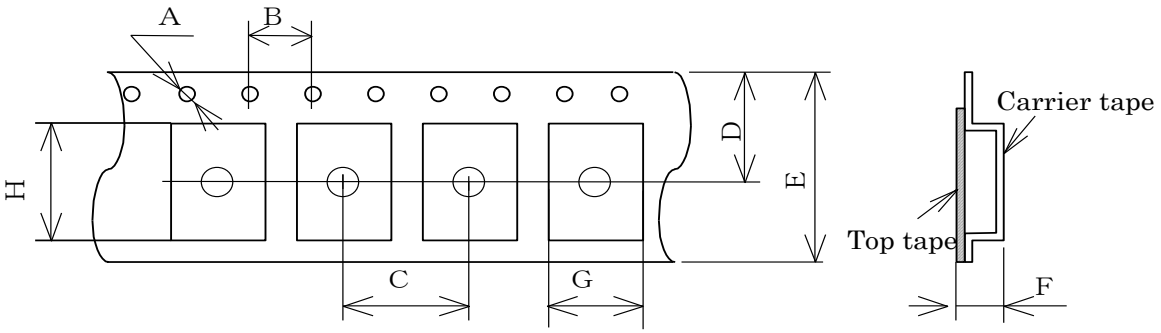
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

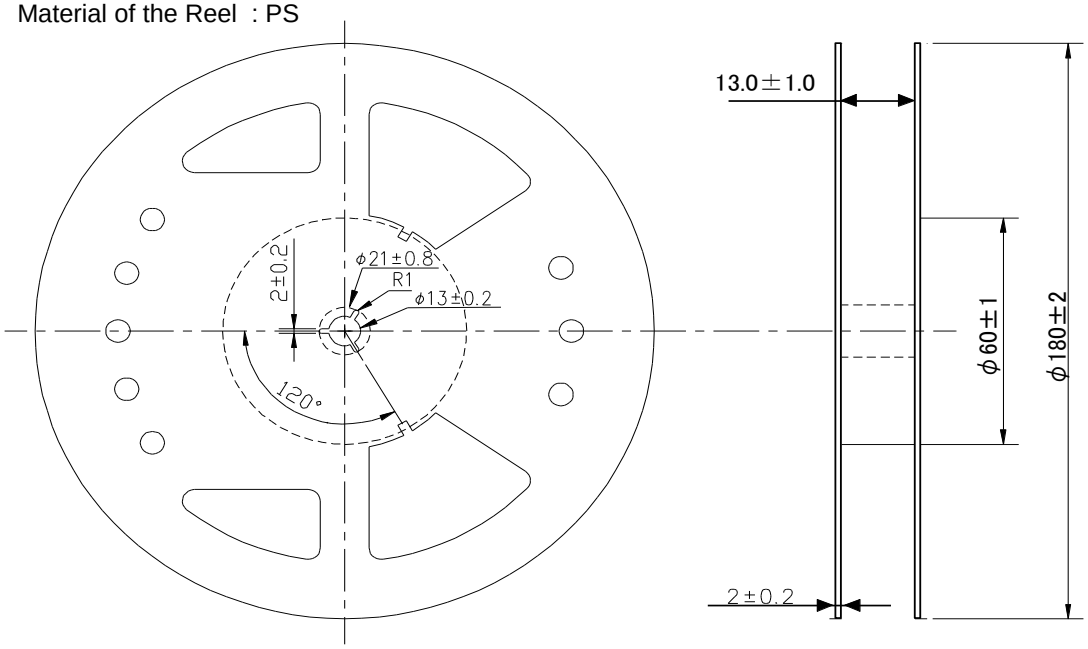



| Symbol | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| Value | φ1.5 +0.1/-0 | 4.0±0.1 | 8.0±0.1 | 7.25±0.2 | 12.0±0.2 | 1.40±0.1 | 3.5±0.1 | 5.4±0.1 |

(2) Reel dimensions

Center material : PS

Material of the Reel : PS



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