Multi output OSC (4port) MG7050VAN **SEIKO EPSON CORPORATION**

Product name MG7050VAN 125.000000MHz 4ACJDN
Product Number / Ordering code X1M0004210011xx

Please refer to the 10.Packing information about xx (last 2 digits)

Output waveform LVDS
Pb free / Complies with EU RoHS directive
Reference weight Typ. 163 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 | - |

**2.Specifications(characteristics)**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions / Remarks |
|---|---|---|---|---|---|---|
| Output frequency | f0 | | 125.0000 | | MHz | 4 output |
| Supply voltage | Vcc | 2.97 | 3.3 | 3.63 | V | Vcc,Vcc1 and Vcc2 |
| Operating temperature | T_use | -5 | - | 85 | ºC | - |
| Frequency tolerance | f_tol | -50 | - | 50 | $x10^{-6}$ | - |
| Current consumption | Icc | - | 50 | 72 | mA | 4-output OE=Vcc L-LVDS=100Ω |
| Stand-by current | I_std | - | - | - | mA | - |
| Disable current | I_dis | - | 8 | 20.0 | mA | OE = GND |
| Symmetry | SYM | 45 | - | 55 | % | - |
| Output voltage(LVDS) | VOD | 247 | 350 | 454 | mV | - |
| | dVOD | - | - | 50 | mV | - |
| | Vos | 1.125 | 1.25 | 1.375 | V | - |
| | dVos | - | - | 150 | mV | - |
| Output load condition(LVDS) | L_LVDS | - | 100 | - | Ω | - |
| Input voltage | $V_{IH}$ | 70%Vcc | - | - | | OE and FSEL terminals |
| | $V_{IL}$ | - | - | 30%Vcc | | OE and FSEL terminals |
| Rise time | $t_r$ | - | 200 | 400 | ps | - |
| Fall time | tf | - | 200 | 400 | ps | - |
| Start-up time | t_str | - | 5 | 10 | ms | minimum supply voltage to be 0 s |
| 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(σ) n=2 to 50000 cycles |
| Phase jitter | $t_{PJ}$ | - | 0.15 | 0.3 | ps | Offset Frequency: 12 kHz to 20 MHz |
| Phase noise | L(f) | - | - | - | dBc/Hz | Offset 1 Hz |
| | | - | -53.7 | - | dBc/Hz | Offset 10 Hz |
| | | - | -87.4 | - | dBc/Hz | Offset 100 Hz |
| | | - | -115.8 | - | dBc/Hz | Offset 1 kHz |
| | | - | -144.5 | - | dBc/Hz | Offset 10 kHz |
| | | - | -151.0 | - | dBc/Hz | Offset 100 kHz |
| | | - | -153.4 | - | dBc/Hz | Offset 1 MHz |
| skew | t_skew | - | - | 50 | ps | - |
| Frequency aging | f_age | -10 | - | 10 | $x10^{-6}$/Year | @+25ºC first year |
| | | - | - | - | | - |

## 3.Test circuit

1) Measurement condition

(1) 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.

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

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

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

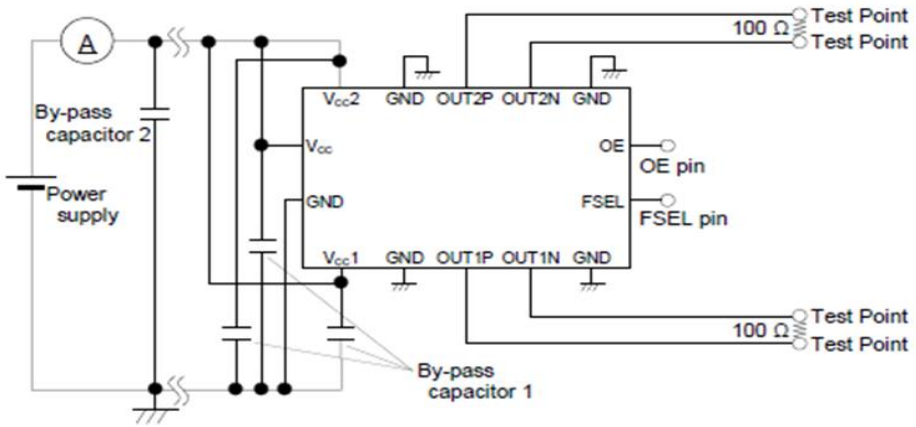
(5) Power supply

• Start up time (0 V→90 %Vcc) of power source should be more than 150 µs and slew rate should be less than 19.8 mV/µs.

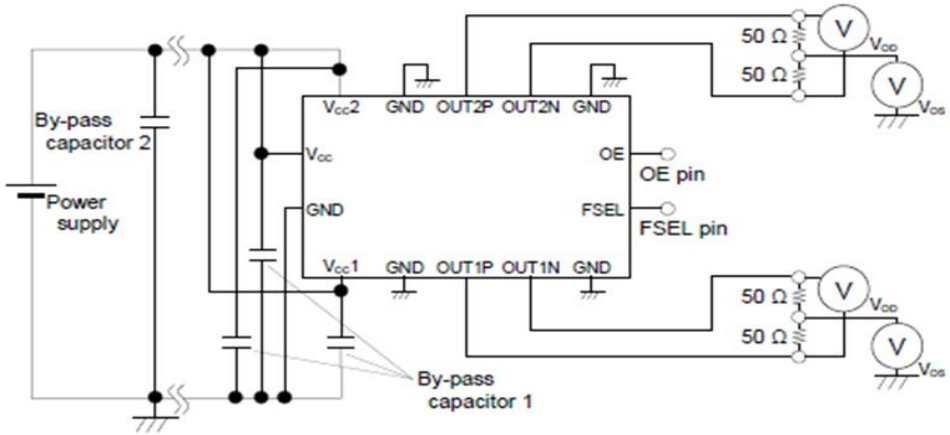
• Impedance of power supply should be as low as possible.

2) 2 output type

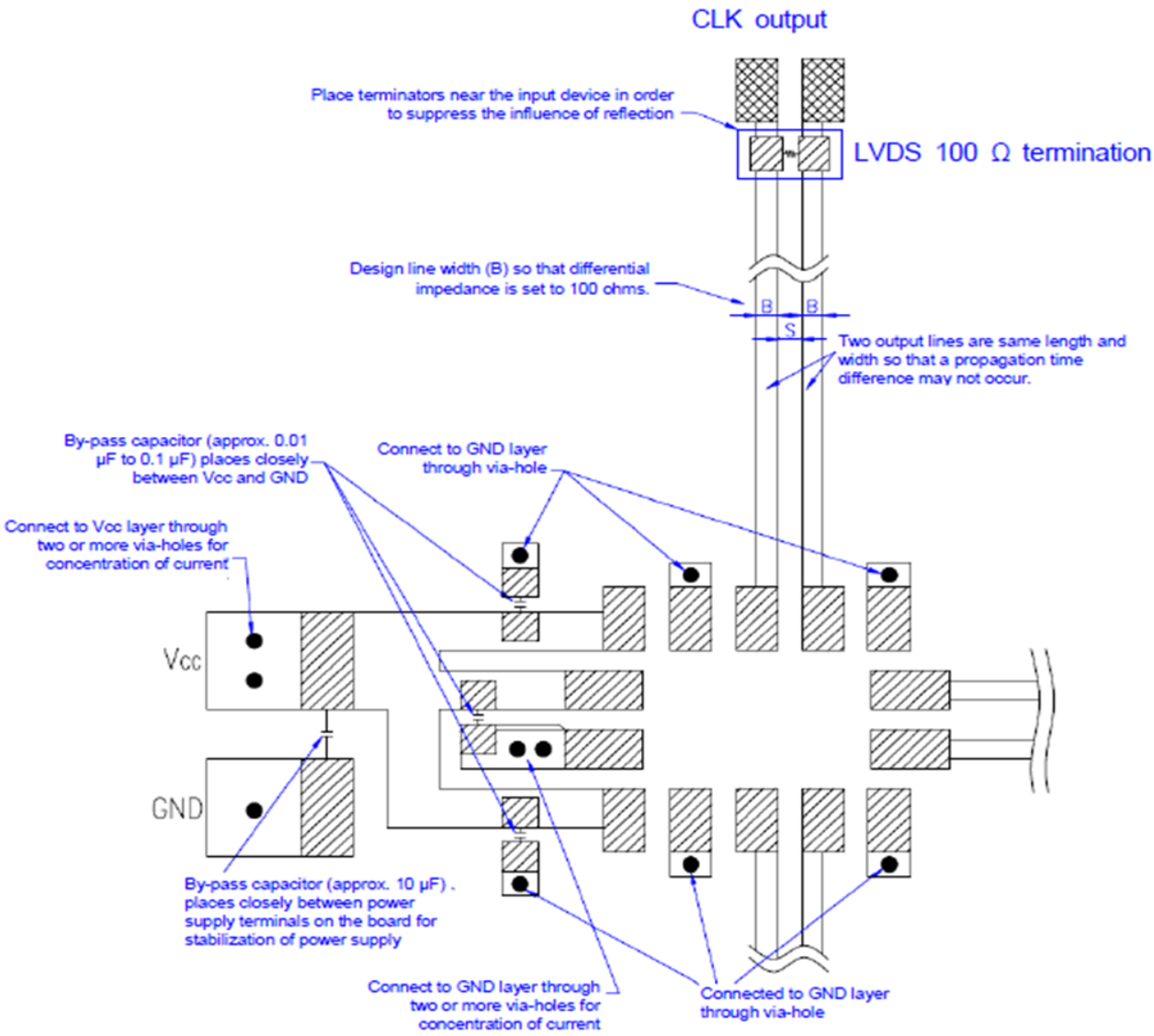
1) AC and current measurement




2) DC measurement

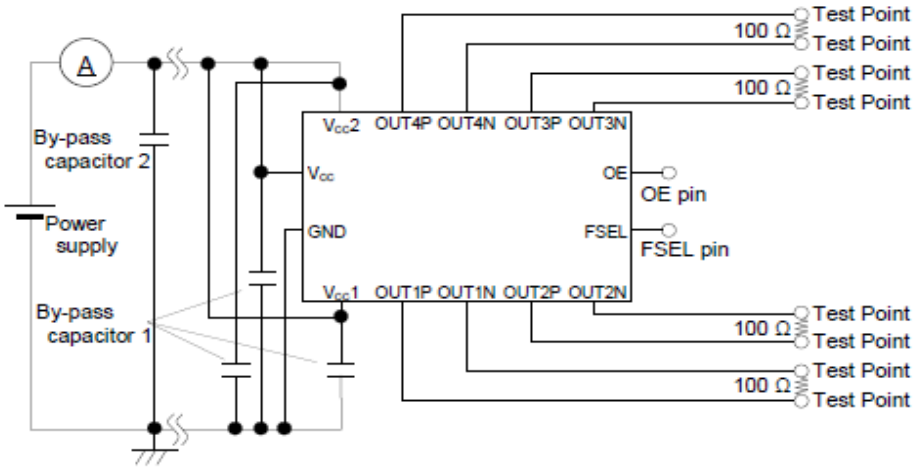


(3)PCB layout (multilayers, with Vcc and GND layer inside)

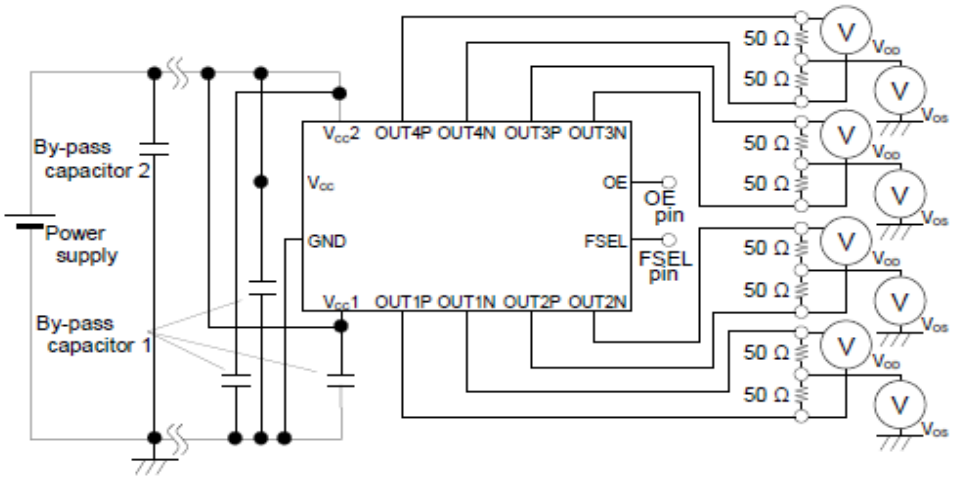


3) 4 output type

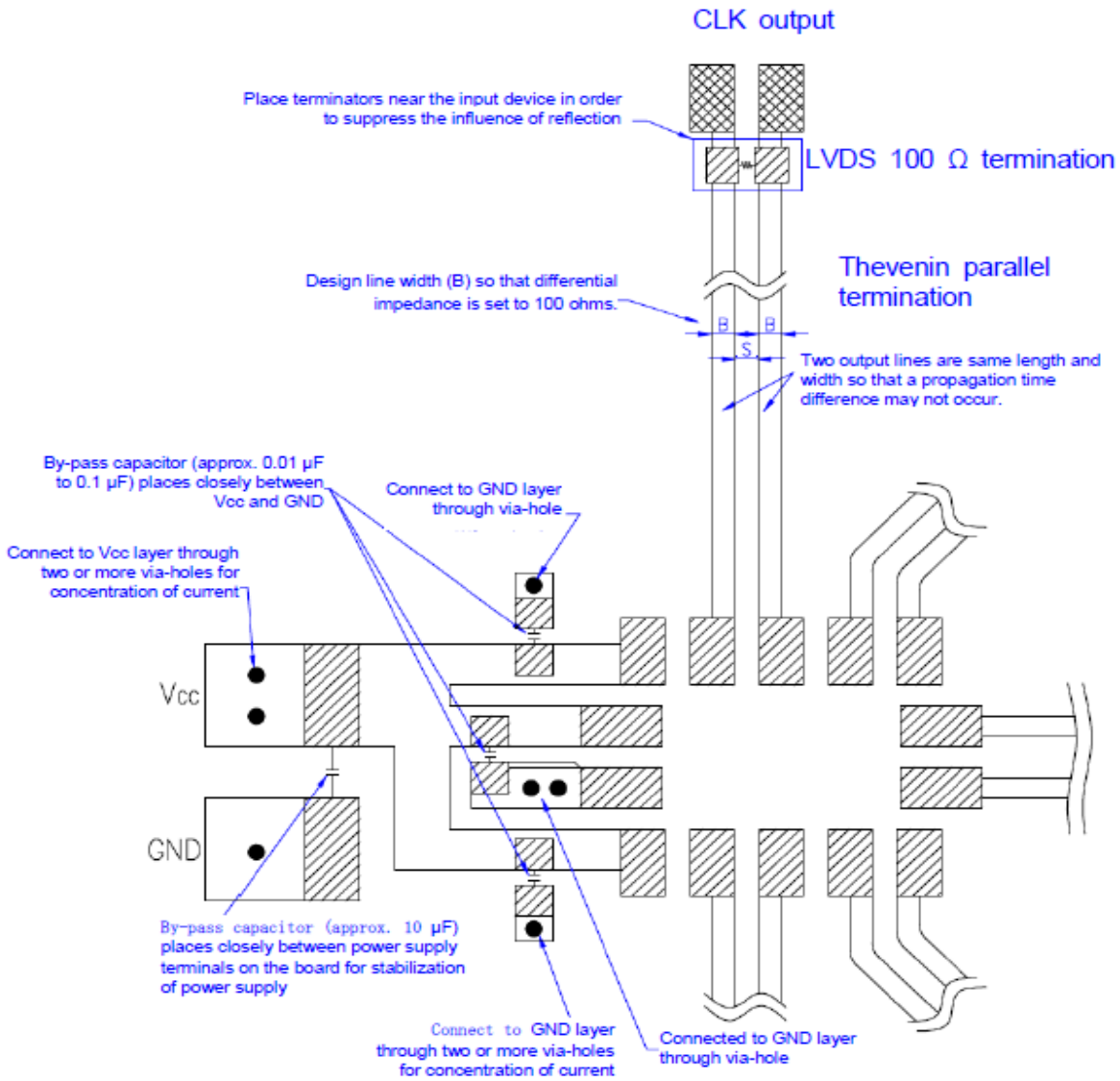
1) AC and current measurement




2) DC measurement



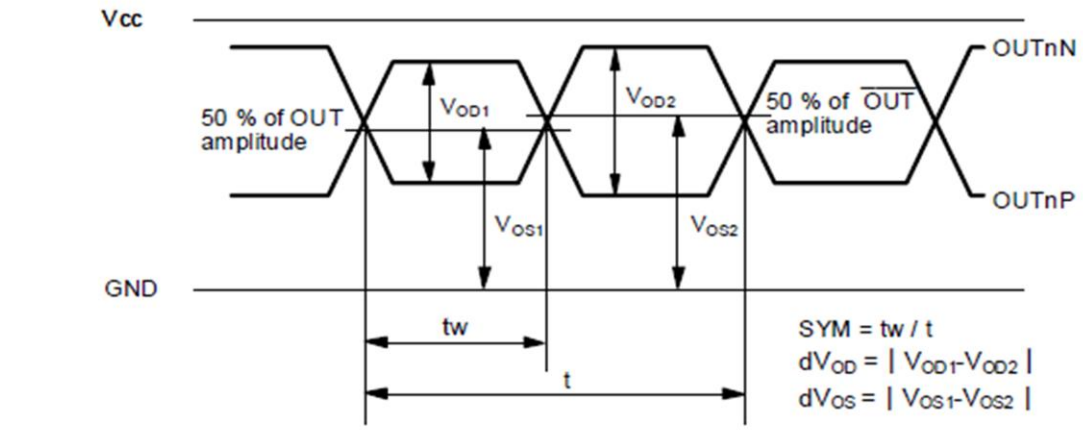
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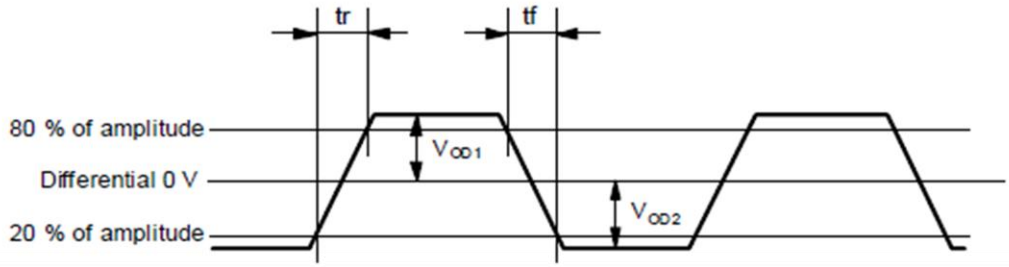
## 4.Timing chart

1) Output waveform

Output wave form (OUTnP and OUTnN)

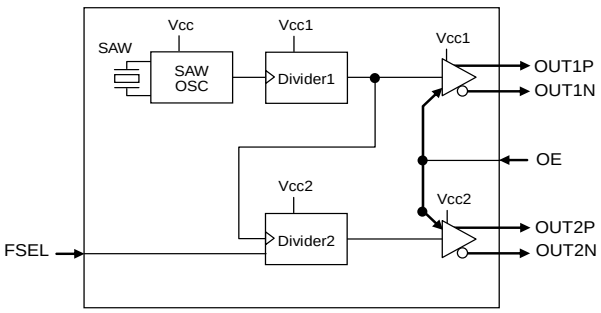



Differential output wave form (OUTnP−OUTnN)

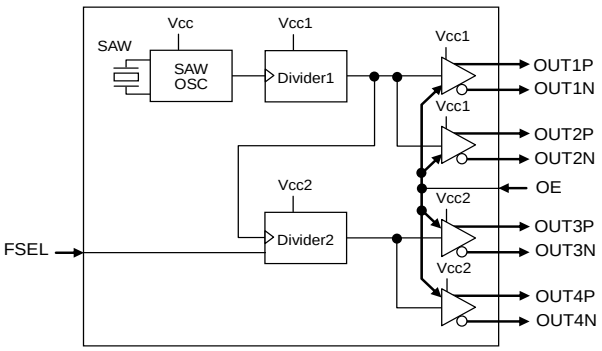



## 5.Block diagram

2 outputs



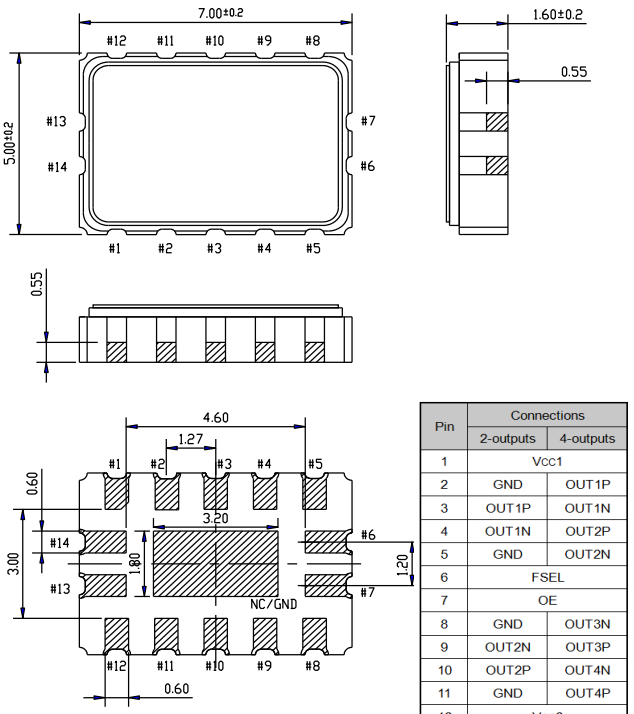

4 outputs




## 6. FSEL function

| 2-outputs | | OUT1 | OUT2 |
|---|---|---|---|
| 4-outputs | | OUT1 / OUT2 | OUT3 / OUT4 |
| FSEL | H | fo | fo |
| | L | fo | fo/2 |

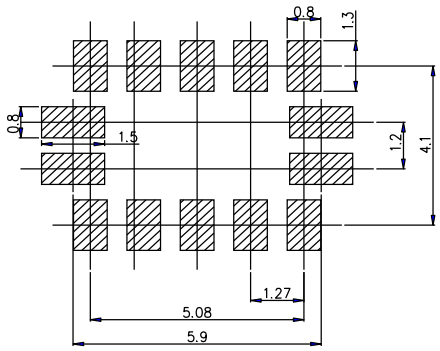
## 7.External dimensions (Unit: mm)




| Pin | Connections | |
|---|---|---|
| | 2-outputs | 4-outputs |
| 1 | Vcc1 | |
| 2 | GND | OUT1P |
| 3 | OUT1P | OUT1N |
| 4 | OUT1N | OUT2P |
| 5 | GND | OUT2N |
| 6 | FSEL | |
| 7 | OE | |
| 8 | GND | OUT3N |
| 9 | OUT2N | OUT3P |
| 10 | OUT2P | OUT4N |
| 11 | GND | OUT4P |
| 12 | Vcc2 | |
| 13 | Vcc | |
| 14 | GND | |

OE pin = "H" : Specified frequency output.
OE pin = "L" : Output is high impedance

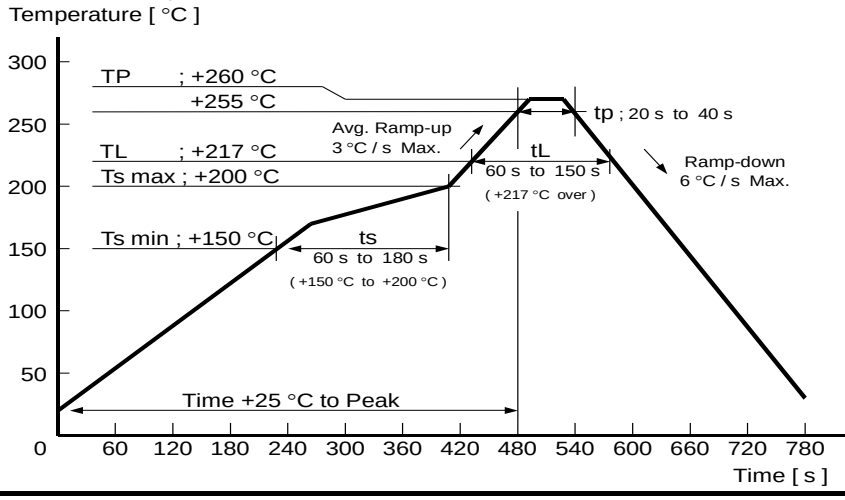
## 8.Footprint(Recommended) (Unit: mm)




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 $V_{CC}$, $V_{CC}1$, $V_{CC}2$ - GND).

## 9.Reflow profile

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




## 10.Packing information

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

X1M0004210011xx

| 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

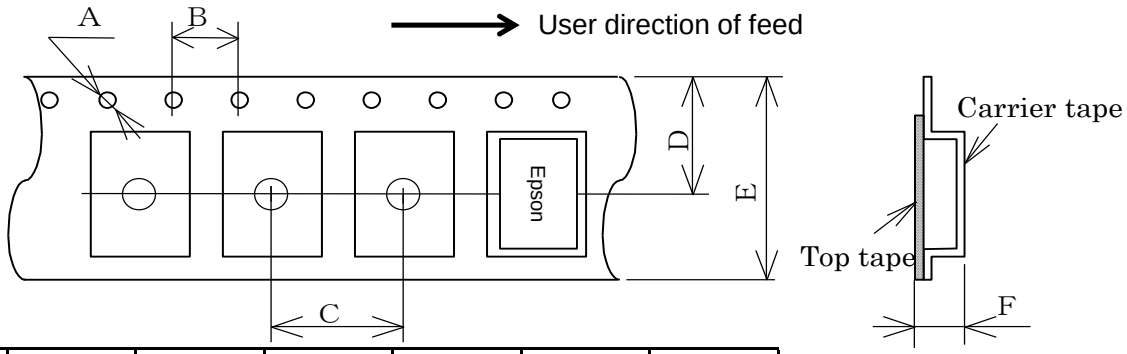
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

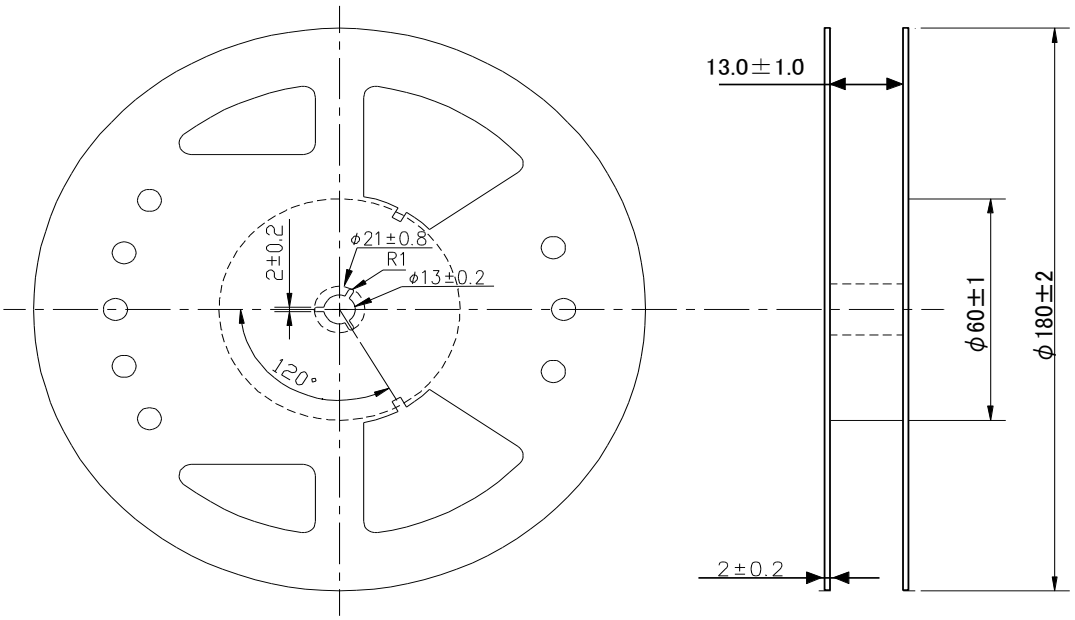



| Symbol | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Value | Φ1.5 | 4 | 8 | 9.25 | 16 | 2.3 |

(2) Reel dimensions

Center material : PS

Material of the Reel : PS



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