

## Clock OSC

## SG7050CAN

SEIKO EPSON CORPORATION

Product name SG7050CAN 38.400000 MHz TJGA  
 Product Number / Ordering code X1G0044810108xx

Please refer to the 8.Packing information about xx (last 2 digits)

Output waveform CMOS

Pb free / Complies with EU RoHS directive

Reference weight Typ. 147 mg

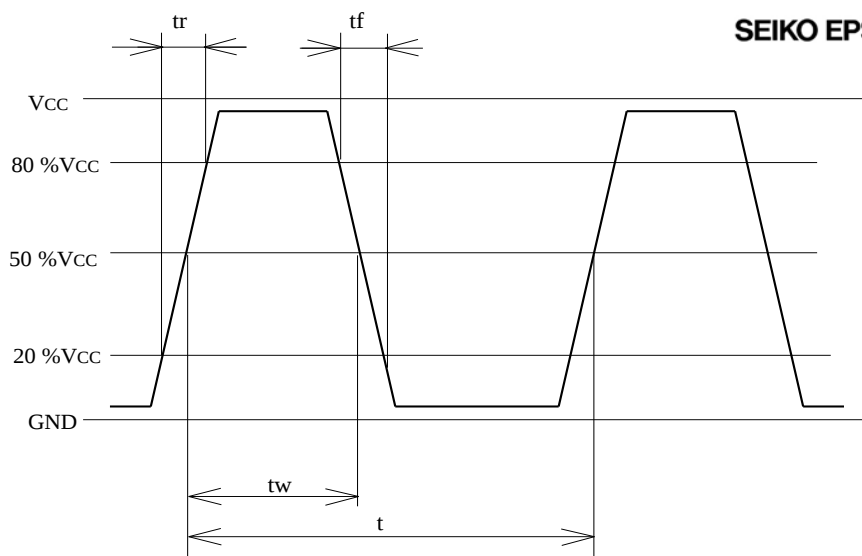
**1.Absolute maximum ratings**

| Parameter              | Symbol               | Min. | Typ. | Max.                 | Unit | Conditions / Remarks      |
|------------------------|----------------------|------|------|----------------------|------|---------------------------|
| Maximum supply voltage | V <sub>CC</sub> -GND | -0.3 | -    | 4                    | V    | -                         |
| Storage temperature    | T <sub>stg</sub>     | -40  | -    | +125                 | °C   | Storage as single product |
| Input voltage          | V <sub>in</sub>      | -0.3 | -    | V <sub>CC</sub> +0.3 | V    | ST terminal               |

**2.Specifications(characteristics)**

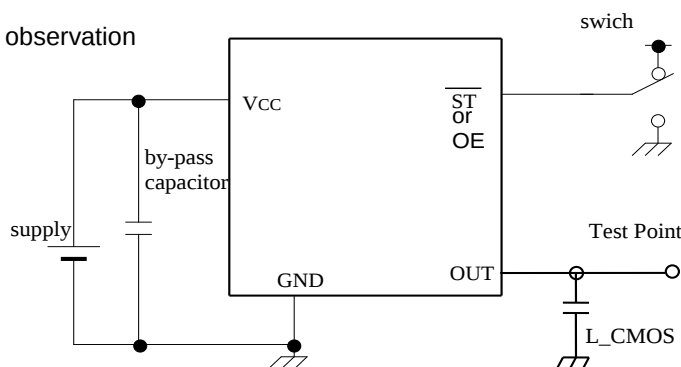
| Parameter             | Symbol            | Min.                 | Typ.    | Max.               | Unit              | Conditions / Remarks                                                                           |
|-----------------------|-------------------|----------------------|---------|--------------------|-------------------|------------------------------------------------------------------------------------------------|
| Output frequency      | f <sub>0</sub>    |                      | 38.4000 |                    | MHz               |                                                                                                |
| Supply voltage        | V <sub>CC</sub>   | 1.6                  | -       | 3.63               | V                 | -                                                                                              |
| Operating temperature | T <sub>use</sub>  | -40                  | -       | +85                | °C                | -                                                                                              |
| Frequency tolerance   | f <sub>tol</sub>  | -50                  | -       | 50                 | x10 <sup>-6</sup> | T <sub>use</sub>                                                                               |
| Current consumption   | I <sub>CC</sub>   | -                    | -       | 3                  | mA                | No load condition                                                                              |
| Stand-by current      | I <sub>std</sub>  | -                    | -       | 2.7                | μA                | ST = GND                                                                                       |
| Disable current       | I <sub>dis</sub>  | -                    | -       | -                  | mA                | -                                                                                              |
| Symmetry              | SYM               | 45                   | -       | 55                 | %                 | 50% V <sub>CC</sub> Level L <sub>CMOS</sub> =<15pF                                             |
| Output voltage        | V <sub>OH</sub>   | V <sub>CC</sub> -0.4 | -       | -                  |                   | -                                                                                              |
|                       | V <sub>OL</sub>   | -                    | -       | 0.4                |                   | -                                                                                              |
| Output load condition | L <sub>CMOS</sub> | -                    | -       | 15                 | pF                | CMOS Load                                                                                      |
| Input voltage         | V <sub>IH</sub>   | 0.8V <sub>CC</sub>   | -       | -                  |                   | ST terminal                                                                                    |
|                       | V <sub>IL</sub>   | -                    | -       | 0.2V <sub>CC</sub> |                   | ST terminal                                                                                    |
| Rise time             | t <sub>r</sub>    | -                    | -       | 4                  | ns                | V <sub>CC</sub> 1.6V : 0.2V <sub>CC</sub> to 0.8V <sub>CC</sub> Level, L <sub>CMOS</sub> =15pF |
| Fall time             | t <sub>f</sub>    | -                    | -       | 4                  | ns                | V <sub>CC</sub> 1.6V : 0.2V <sub>CC</sub> to 0.8V <sub>CC</sub> Level, L <sub>CMOS</sub> =15pF |
| Start-up time         | t <sub>str</sub>  | -                    | -       | 3                  | ms                | t = 0 at 0.9V <sub>CC</sub>                                                                    |
| Jitter                | t <sub>DJ</sub>   | -                    | 0       | -                  | ps                | Deterministic Jitter V <sub>CC</sub> =3.3V                                                     |
|                       | t <sub>RJ</sub>   | -                    | 2.4     | -                  | ps                | Random Jitter V <sub>CC</sub> =3.3V                                                            |
|                       | t <sub>RMS</sub>  | -                    | 2.3     | -                  | ps                | δ(RMS of total distribution) V <sub>CC</sub> =3.3V                                             |
|                       | t <sub>p-p</sub>  | -                    | 20      | -                  | ps                | Peak to Peak V <sub>CC</sub> =3.3V                                                             |
|                       | t <sub>acc</sub>  | -                    | 2.5     | -                  | ps                | Accumulated Jitter(δ) n=2 to 50000 cycles, V <sub>CC</sub> =3.3V                               |
| Phase jitter          | t <sub>pJ</sub>   | -                    | 0.27    | -                  | ps                | Off set Frequency: 12kHz to 20MHz, V <sub>CC</sub> =3.3V                                       |
| Phase noise           | L(f)              | -                    | -       | -                  | dBc/Hz            | -                                                                                              |
|                       |                   | -                    | -93     | -                  | dBc/Hz            | Off set 10Hz V <sub>CC</sub> =3.3V                                                             |
|                       |                   | -                    | -122    | -                  | dBc/Hz            | Off set 100Hz V <sub>CC</sub> =3.3V                                                            |
|                       |                   | -                    | -144    | -                  | dBc/Hz            | Off set 1kHz V <sub>CC</sub> =3.3V                                                             |
|                       |                   | -                    | -154    | -                  | dBc/Hz            | Off set 10kHz V <sub>CC</sub> =3.3V                                                            |
|                       |                   | -                    | -158    | -                  | dBc/Hz            | Off set 100kHz V <sub>CC</sub> =3.3V                                                           |
|                       |                   | -                    | -159    | -                  | dBc/Hz            | Off set 1MHz V <sub>CC</sub> =3.3V                                                             |
| Frequency aging       | f <sub>age</sub>  | -3                   | -       | 3                  | x10 <sup>-6</sup> | @+25°C first year                                                                              |
|                       |                   | -                    | -       | -                  |                   | -                                                                                              |

### 3. Timing chart

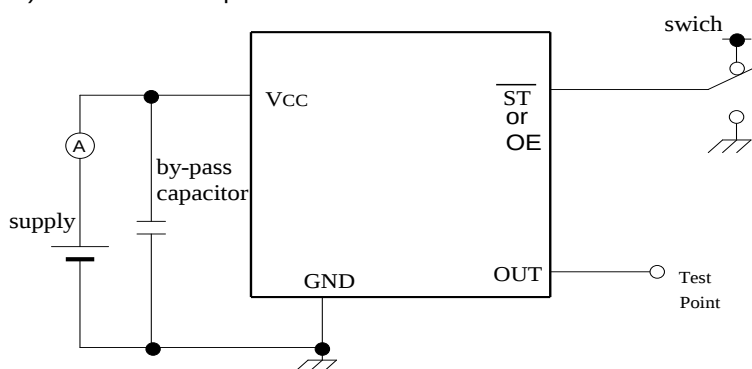


### 4. Test circuit

#### 1) Waveform observation



#### 2) Current consumption



\*Current consumption under the disable function should be = GND.

#### 3) Condition

##### (1) Oscilloscope

- Band width should be minimum 5 times higher (wider) than measurement frequency.
- Probe earth should be placed closely from test point and lead length should be as short as possible
- \* Recommendable to use miniature socket. (Don't use earth lead.)

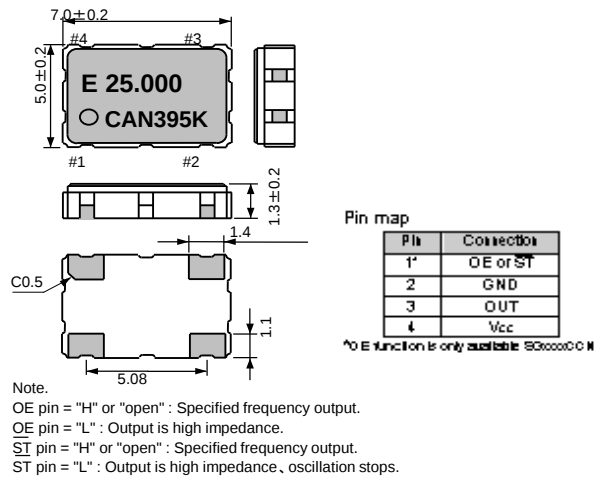
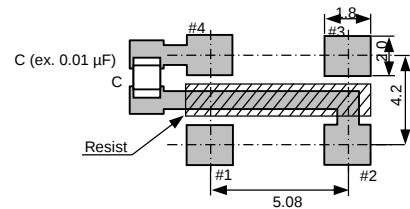
##### (2) L\_CMOS also includes probe capacitance.

##### (3) By-pass capacitor (0.01 $\mu$ F to 0.1 $\mu$ F) is placed closely between VCC and GND.

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

##### (5) Power supply

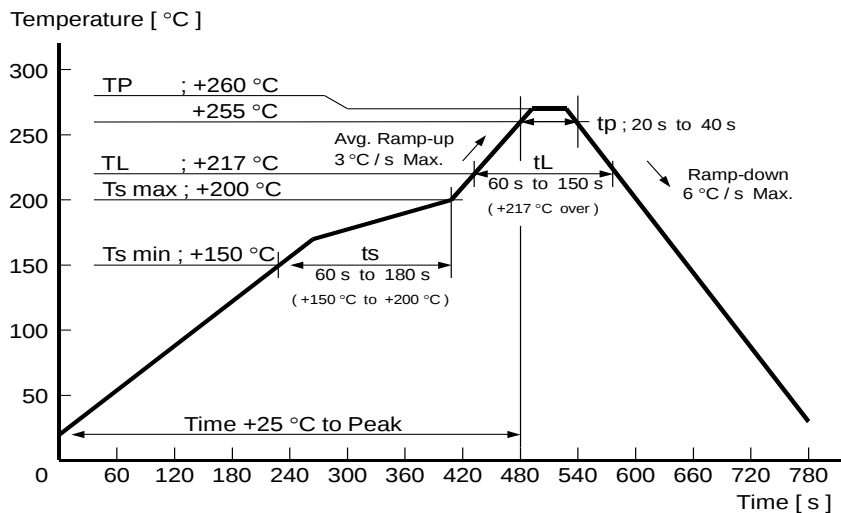
- Start up time (0 %VCC to 90 %VCC) of power source should be more than 150  $\mu$ s.
- Impedance of power supply should be as lowest as possible.

**5.External dimensions (Unit: mm)****6.Footprint(Recommended) (Unit: mm)**

To maintain stable operation, provide a 0.01μF to 0.1μF 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.Packing information**

[ 1 ] Product number last 2 digits code(xx) description

The recommended code is "00"

X1G0044810108xx

| 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

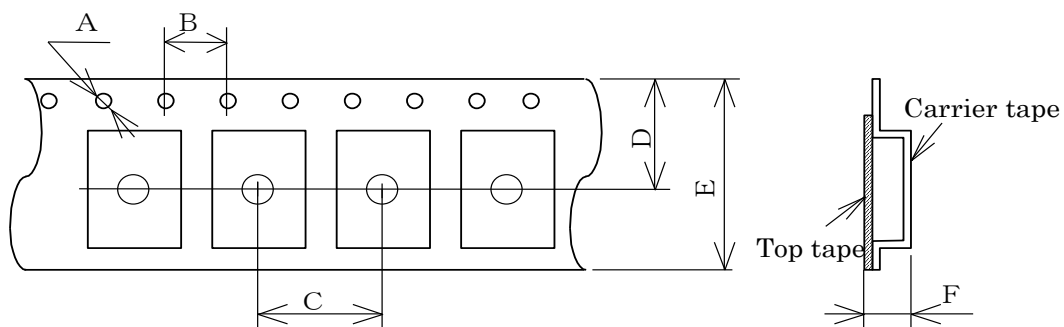
Subject to EIA-481 &amp; IEC-60286

## (1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

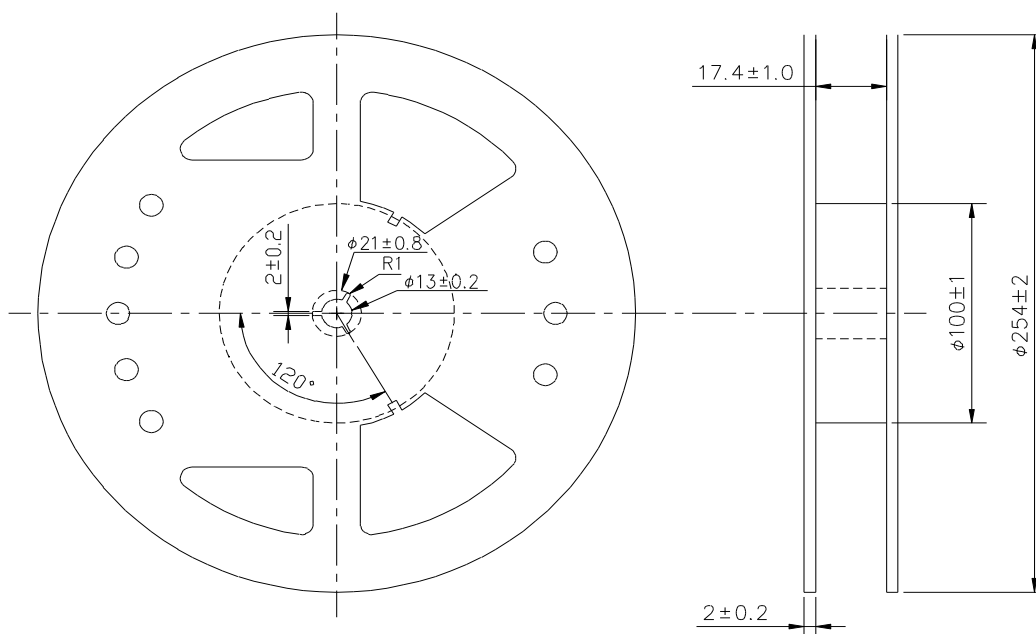


| Symbol | A          | B | C | D    | E  | F   |
|--------|------------|---|---|------|----|-----|
| Value  | $\phi 1.5$ | 4 | 8 | 9.25 | 16 | 2.3 |

## (2) Reel dimensions

Center material : PS

Material of the Reel : PS



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