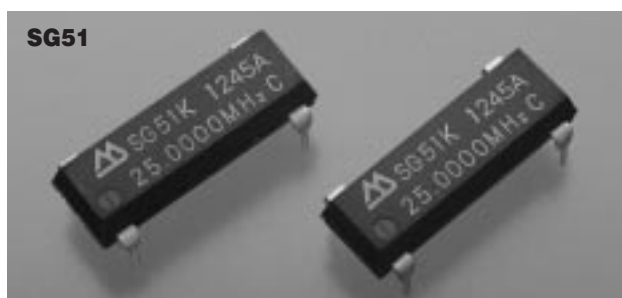
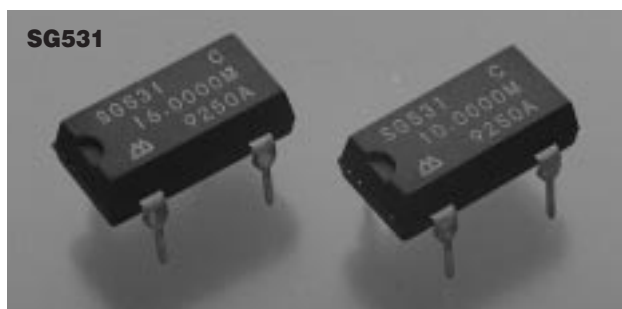


# Crystal Oscillators - Seiko Epson

HCMOS/TTL DUAL IN LINE PLASTIC FULL SIZE SG-51/ HALF SIZE SG-531

## SG-51/Half Size SG531



## Features

- Frequency range 1.025MHz-125.0MHz
- Cylindrical type AT cut crystal quartz built in, thereby assuring high reliability
- Suitable for automatic insertion
- Use of CMOS IC enables reduction of current consumption
- Output load 10LSTTL/30-50pF
- Available with output enable and standby functions - SG51P and SG531P series
- Pin compatible with 8 pin and 14 pin metal can versions
- Packaged in plastic DIP package saves board space
- Extensive stock holding on SG531 series

## Specifications

| Item                                |                     | Symbol               | Specifications              |                          |                            | Remarks                                                                                                                        |
|-------------------------------------|---------------------|----------------------|-----------------------------|--------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                                     |                     |                      | SG-51P/531P                 | SG-51PTJ/531 PTJ         | SG-51PH/531PH              |                                                                                                                                |
| Output frequency range              |                     | f <sub>o</sub>       | 1.0250MHz to 26.0000MHz     | 26.0001MHz to 66.6667MHz |                            |                                                                                                                                |
| Power source voltage                | Max. supply voltage | V <sub>PP</sub> -GND |                             | -0.3V to +7.0V           |                            |                                                                                                                                |
|                                     | Operating voltage   | V <sub>DD</sub>      |                             | 5.0V±0.5V                |                            |                                                                                                                                |
| Temperature range                   | Storage temp.       | T <sub>STG</sub>     | -55°C to +125°C             | -55°C to +100°C          |                            |                                                                                                                                |
|                                     | Operating temp.     | T <sub>OPR</sub>     |                             | -10°C to +70°C           |                            |                                                                                                                                |
| Soldering condition (lead part)     |                     | T <sub>SOL</sub>     | Under 260°C within 10 sec.  |                          |                            | Don't heat up the package more than 150°C                                                                                      |
| Frequency stability                 |                     | Δf/fo                |                             | B: ±50ppm<br>C: ±100ppm  |                            | -10°C to +70°C<br>B Type is possible up to 55.0MHz                                                                             |
| Current consumption                 |                     | I <sub>OP</sub>      | 23mA MAX.                   | 35mA MAX.                |                            | No load condition                                                                                                              |
| Duty                                | C-MOS level         | T <sub>w</sub> /T    | 40% to 60%                  | —                        | 40% to 60%                 | 1.2V <sub>DD</sub> level                                                                                                       |
|                                     | TTL level           |                      | 45% to 55%                  |                          | —                          | 1.4V level                                                                                                                     |
| Output voltage                      |                     | V <sub>OH</sub>      | V <sub>DD</sub> - 0.4V MIN. | 2.4V MIN.                | V <sub>DD</sub> -0.4V MIN. |                                                                                                                                |
|                                     |                     | (I <sub>OH</sub> )   | -400μA                      |                          | -4μA                       |                                                                                                                                |
|                                     |                     | V <sub>OL</sub>      | 0.4V MAX.                   |                          |                            |                                                                                                                                |
|                                     |                     | (I <sub>OL</sub> )   | 16mA                        | 8mA                      | 4mA                        |                                                                                                                                |
| Output load condition (fan out)     | C-MOS               | CL                   | 50pF MAX.                   | —                        | 50pF MAX.                  |                                                                                                                                |
|                                     | TTL                 | N                    | 10TTL MAX.                  | 5TTL MAX.                | —                          |                                                                                                                                |
| Output enable/disable input voltage |                     | V <sub>IH</sub>      | 2.0V MIN                    | 3.5V MIN.                | 2.0V MIN.                  | I <sub>IH</sub> = 1μ A MAX. (OE=V <sub>DD</sub> )                                                                              |
|                                     |                     | V <sub>IL</sub>      | 0.8V                        | 1.5V MAX.                | 0.8V MAX.                  | I <sub>IL</sub> =-100μ A MIN. (OE=GND), PTJ: -500μA                                                                            |
| Output disable current              |                     | I <sub>OE</sub>      | 12mA MAX.                   | 28mA MAX.                | 20mA MAX.                  | OE=GN                                                                                                                          |
| Output rise time                    | C-MOS level         | T <sub>TLH</sub>     | 8nsec.MAX                   | 5nsec. MAX               | 7nsec. MAX.                | C-MOS load : 20% to 80% V <sub>DD</sub>                                                                                        |
|                                     | TTL level           |                      |                             |                          |                            | TTL load : 0.4V to 2.4V                                                                                                        |
| Output fall time                    | C-MOS level         | T <sub>THL</sub>     | 8nsec.MAX                   | 5nsec. MAX               | 7nsec. MAX.                | C-MOS load : 80% to 20% V <sub>DD</sub>                                                                                        |
|                                     | TTL level           |                      |                             |                          |                            | TTL load : 2.4V to 0.4V                                                                                                        |
| Oscillation start up time           |                     | t <sub>OSC</sub>     | 4msec. MAX.                 | 10msec. MAX.             |                            | More than for 1ms until V <sub>DD</sub> =0V to 4.5V<br>Time at 4.5V to be 0sec.                                                |
| Aging                               |                     | f <sub>a</sub>       |                             | ±5ppm/year MAX.          |                            | T <sub>a</sub> = 25°C, V <sub>DD</sub> =5V, first year                                                                         |
| Shock resistance                    |                     | S.R.                 |                             | ±20ppm MAX.              |                            | Drop Test of three times on hard board from 75cm height or excitation test with 3000G x 0.3ms x 1/2 sine wave in 3 directions. |

## Notes

- Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.
- External by-pass capacitor is recommended.

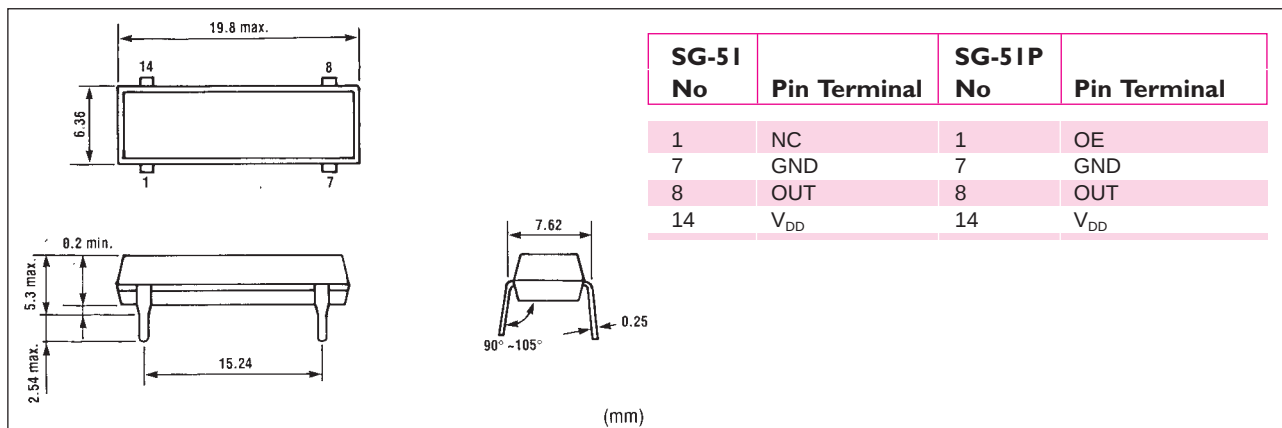


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# Crystal Oscillators - Seiko Epson

HCMOS/TTL DUAL IN LINE PLASTIC FULL SIZE SG51/ HALF SIZE SG531

## Dimensions SG51 Series



## Frequency correspondence table

| Model             | Frequency 1MHz | 26MHz | 40MHz | 67MHz | 125MHz |
|-------------------|----------------|-------|-------|-------|--------|
| SG51P, SG531P     |                |       |       |       |        |
| SG51PTJ, SG531PTJ |                |       |       |       |        |
| SG51PH, SG531PH   |                |       |       |       |        |
| SG531PCV          |                |       |       |       |        |

## Specifications SG-531PCV

| Item                                | Symbol                                                                         | Specifications                                        | Remarks                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Output frequency range              | $f_0$                                                                          | 40.0001MHz to 80.0000MHz<br>40.0001MHz to 125.0000MHz | V <sub>DD</sub> =2.7V to 5.5V<br>V <sub>DD</sub> =4.5V to 5.5V                                                         |
| Power source voltage                | Max. supply voltage<br>Operating voltage                                       | V <sub>DD</sub> -GND<br>V <sub>DD</sub>               | -0.5V to +7.0V<br>2.7V to 5.5V                                                                                         |
| Temperature range                   | Storage temp.<br>Operating temp.                                               | T <sub>STG</sub><br>T <sub>OPR</sub>                  | -55°C to +125°C<br>-10°C to +70°C                                                                                      |
| Soldering condition (lead part)     | T <sub>SOL</sub>                                                               | Under 260°C within 10sec                              | Don't heat package more than 150°C                                                                                     |
| Frequency stability                 | $\Delta f/f_0$                                                                 | C: ±100ppm                                            | -10°C to +70°C, V <sub>DD</sub> : 2.7V to 5.5V                                                                         |
| Current consumption                 | I <sub>OP</sub>                                                                | 50mA MAX.                                             | No load condition                                                                                                      |
| Duty                                | T <sub>W</sub> /T                                                              | 35% to 60%                                            | 1/2V <sub>DD</sub>                                                                                                     |
| Output voltage                      | V <sub>OH</sub><br>(I <sub>OH</sub> )<br>V <sub>OL</sub><br>(I <sub>OL</sub> ) | V <sub>DD</sub> -0.5V<br>-16mA<br>0.4V MAX.<br>-16mA  |                                                                                                                        |
| Output load condition(fan out)      | CL                                                                             | 25pF MAX.<br>15pF MAX.                                | V <sub>DD</sub> =4.5V to 5.5V<br>V <sub>DD</sub> =2.7V to 4.5V                                                         |
| Output enable/disable input voltage | V <sub>IH</sub><br>V <sub>IL</sub>                                             | 0.7 V <sub>DD</sub> MIN.<br>0.2V <sub>DD</sub> MAX.   |                                                                                                                        |
| Output disable current              | I <sub>OE</sub>                                                                | 27mA MAX.                                             | OE=GND                                                                                                                 |
| Output rise time                    | T <sub>TLH</sub>                                                               | 4nsec.                                                | 20% to 80% V <sub>DD</sub>                                                                                             |
| Output fall time                    | T <sub>THL</sub>                                                               | 4nsec.                                                | 80% to 10% V <sub>DD</sub>                                                                                             |
| Oscillation start up time           | t <sub>OSC</sub>                                                               | 10msec. MAX.                                          | Time at 2.7V to Osec.                                                                                                  |
| Aging                               | fa                                                                             | ±5ppm/year MAX.                                       | Ta = 25°C, first year                                                                                                  |
| Shock resistance                    | S.R.                                                                           | ±20ppm MAX.                                           | Drop test of 3 times on a board from 75cm height or excitation test with 3000G x 0.3ms x 1/2 sine wave in 3 directions |

## Notes

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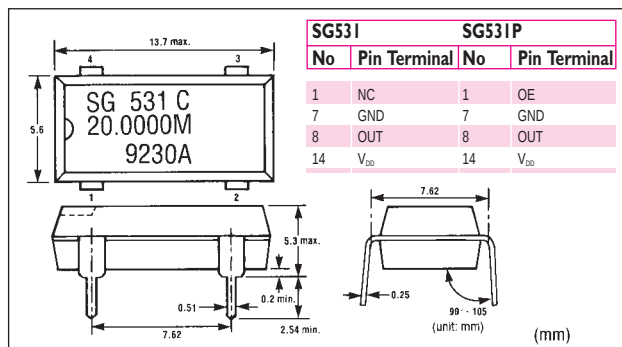


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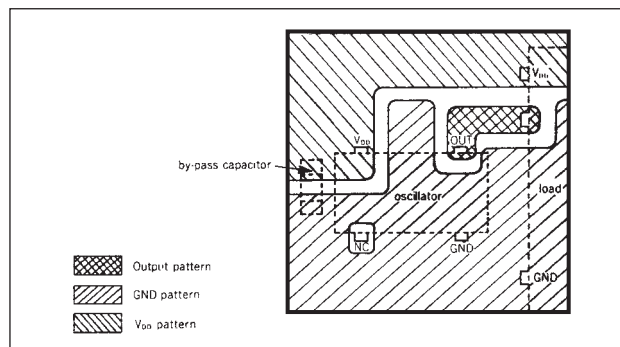
# Crystal Oscillators - Seiko Epson

HCMOS/TTL DUAL IN LINE PLASTIC FULL SIZE SG51/ HALF SIZE SG531

## Dimensions SG531



## Typical Oscillator Application



## Standard Frequencies SG-531 Series

| Frequency (MHz) | Description | Stock Number |
|-----------------|-------------|--------------|
| 1.8432          | SG531P      | AX0184A      |
| 3.6864          | SG531P      | AX0368A      |
| 4.00            | SG531P      | AX0400A      |
| 4.9152          | SG531P      | AX0491A      |
| 5.00            | SG531       | AI0500A      |
| 5.00            | SG531P      | AX0500A      |
| 6.00            | SG531       | AI0600A      |
| 6.144           | SG531P      | AX0614A      |
| 7.3728          | SG531P      | AX0737A      |
| 8.00            | SG531P      | AX0800A      |
| 9.8304          | SG531P      | AX0983A      |
| 10.00           | SG531P      | AX1000A      |
| 12.00           | SG531P      | AX1200A      |
| 14.31818        | SG531P      | AX1431A      |
| 14.7456         | SG531P      | AX1474A      |
| 16.00           | SG531P      | AX1600A      |
| 16.257          | SG531P      | AX1625A      |
| 20.00           | SG531P      | AX2000A      |
| 20.2752         | SG531P      | AX2027A      |
| 23.587          | SG531P      | AX2358A      |
| 24.00           | SG531P      | AX2400A      |
| 25.00           | SG531       | AI2500A      |
| 25.00           | SG531P      | AX2500A      |
| 25.175          | SG531       | AI2517A      |
| 28.322          | SG531T      | AK2832A      |
| 32.00           | SG531PH     | CD3200A      |
| 33.33           | SG531PH     | CD3333A      |
| 36.00           | SG531PH     | CD3600A      |
| 40.00           | SG531PH     | CD4000A      |
| 42.00           | SG531H      | AJ4200A      |
| 44.90           | SG531H      | AJ4490A      |
| 48.00           | SG531H      | AJ4000A      |
| 50.00           | SG531       | AJ5000A      |
| 50.00           | SG531PH     | CD5000A      |
| 60.00           | SG531YH     | BK6000A      |
| 64.00           | SG531PH     | CD6400A      |
| 66.00           | SG531YH     | BK6600A      |
| 66.00           | SG531PH     | CD6600A      |
| 66.66           | SG531PH     | CD6666A      |



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