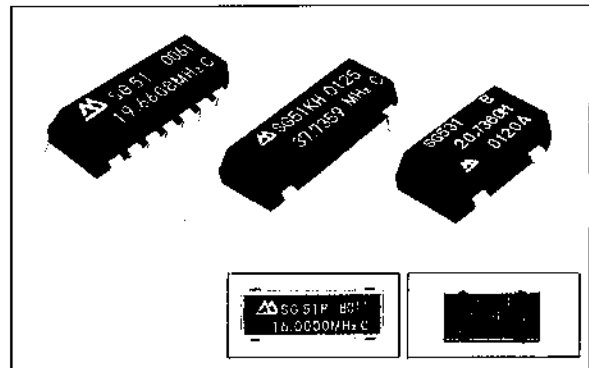


FULL SIZE DIP HIGH FREQUENCY CRYSTAL OSCILLATOR

**SG-51 series**

HALF SIZE DIP HIGH FREQUENCY CRYSTAL OSCILLATOR

**SG-531 series**

Actual size

**Specifications (characteristics)**

| Item                                | Symbol              | SG-51/51K/51P/51E,<br>SG-531/531P | SG-51T/51KT/51PT,<br>SG-531T/531PT | SG-51KT/51PT,<br>SG-531T/531PT | Remarks  |
|-------------------------------------|---------------------|-----------------------------------|------------------------------------|--------------------------------|--|
|                                     |                     | Specifications                    |                                    |                                |  |
| Output frequency range              | $f_o$               | 1.0250MHz to 26.0000MHz           | 26.0001MHz to 36.0000MHz           | 36.0001MHz to 50.3500MHz       |  |
| Power source voltage                | Max. supply voltage | $V_{DD-GND}$                      | -0.3V to +7.0V                     | -0.3V to +7.0V                 | -0.3V to +7.0V   |
|                                     | Operating voltage   | $V_{OH}$                          | 5.0V ± 0.5V                        | 5.0V ± 0.5V                    | 5.0V ± 0.5V  |
| Temperature range                   | Storage temp.       | $T_{STG}$                         | -55°C to +125°C                    | -65°C to +100°C                | -55°C to +100°C  |
|                                     | Operating temp.     | $T_{OPR}$                         | -10°C to +70°C                     | -10°C to +70°C                 | -10°C to +70°C   |
| Soldering condition (lead part)     | $T_{SOL}$           | Under 260°C within 10 sec.        | Under 260°C within 10 sec.         | Under 260°C within 10 sec.     | Package less than 150°C  |
| Frequency stability                 | $\Delta f/f_o$      | B: ± 50ppm,<br>C: ± 100ppm        | B: ± 50ppm,<br>C: ± 100ppm         | B: ± 50ppm,<br>C: ± 100ppm     | -10°C to +70°C   |
| Current consumption                 | $I_{OP}$            | 25mA MAX.                         | 35mA MAX.                          | 50mA MAX.                      | No load condition  |
| Duty                                | $T_w/T$             | 40% to 60% *<br>(45% to 55% **)   | 40% to 60% ** *<br>(45% to 55% **) | 40% to 60% ** *                | * : 1.4V or 1/2 $V_{DD}$ level<br>** : 1.4V level  |
| Output voltage                      | $V_{OH}$            | $V_{OH} - 0.4V$ MIN.              | $V_{OH} - 0.4V$ MIN.               | 2.4V MIN.                      | $t_{OH} = -400\mu A$   |
|                                     | $V_{OL}$            | 0.4V MAX. *                       | 0.4V MAX. *                        | 0.4V MAX. **                   | * : $I_{OL} = 16mA$ , ** : $I_{OL} = 8mA$  |
| Output load condition (fan out)     | TTL                 | N                                 | 10 TTL MAX.                        | 10 TTL (30pF) MAX.             |  |
|                                     | C-MOS               | CL                                | 50pF MAX.                          |                                |  |
| Output enable/standby input voltage | $V_{IH}$            | 2.0V MIN.                         | 2.0V MIN.                          | 2.0V MIN.                      |  |
|                                     | $V_{IL}$            | 0.8V MAX.                         | 0.8V MAX.                          | 0.8V MAX.                      |  |
| Output disable current              | $I_{OE}$            | 12mA MAX.                         | 20mA MAX.                          | 25mA MAX.                      | OE = GND   |
| Standby current                     | $I_{ST}$            | 310 $\mu A$ MAX.                  |                                    |                                | ST = GND   |
| Output rise time                    | $t_{RLH}$           | 8nsec. MAX.                       | 10nsec. MAX.                       | 6nsec. MAX.                    | Refer to output waveform chart (page 9)  |
| Output fall time                    | $t_{FL}$            | 8nsec. MAX.                       | 8nsec. MAX.                        | 6nsec. MAX.                    |  |
| Oscillation start time              | $t_{OSC}$           | 4msec. MAX.                       | 10msec. MAX.                       | 10msec. MAX.                   | More than for 1mS until $V_{OH} = 0V - 4.5V$ .<br>Time at 4.5V to be 0sec.   |
| Aging                               | $f_a$               | ± 5ppm/year MAX.                  | ± 5ppm/year MAX.                   | ± 5ppm/year MAX.               | $T_a = 25^\circ C$ , $V_{DD} = 5V$ , first year  |
| Shock resistance                    | S. R.               | ± 20ppm MAX.                      | ± 20ppm MAX.                       | ± 20ppm MAX.                   | Drop test of 3 times on a hard board from 75cm height or excitation test with 3000G × 0.3mS × 1/2 sine wave in 3 directions. |

Note: 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.

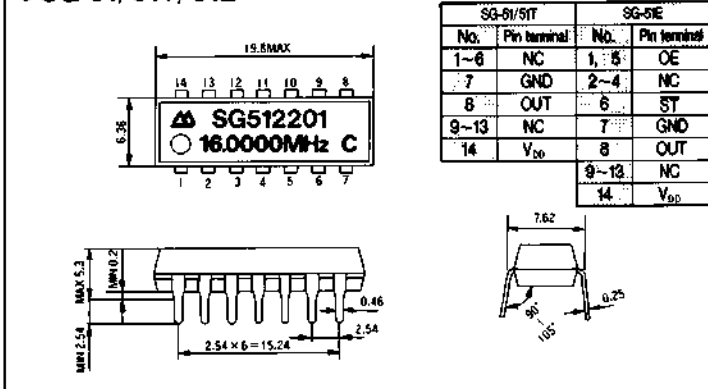
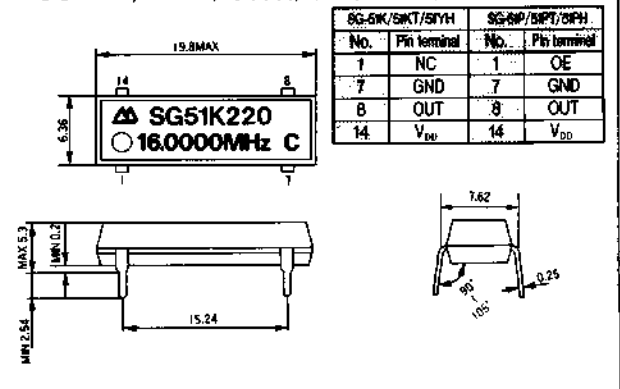
**Frequency correspondence table**

| Model                           | Frequency | 1MHz                 | 26MHz                | 60MHz                | 66.67MHz              |
|---------------------------------|-----------|----------------------|----------------------|----------------------|-----------------------|
| SG-51/51K/51E, SG-531/531P      |           | ████████████████████ | ████████████████████ |                      |                       |
| SG-51T/51KT/51ET, SG-531T/531PT |           |                      | ████████████████████ | ████████████████████ | (SG-51T: Up to 36MHz) |
| SG-51PH/51YH, SG-531PH/531YH    |           |                      |                      | ████████████████████ |                       |

**External Dimensions**

(Unit: mm)

(Unit: mm)

**SG-51/51T/51E****SG-51K/51KT/51YH/51P/51PT/51PH**

## Features

### SG-51 series

- Pin compatible with full size metal can
- Packaged in plastic 14 pin DIP
- Auto insertable
- Provided with output enable and standby functions

### SG-531 series

- Pin compatible with half size metal can
- Provided with output enable function

## Common

- Cylindrical type AT cut quartz crystal built-in, thus assuring high reliability
- Possible with 386 CPU
- Use of C-MOS IC enables reduction of current consumption

| Item                                | Symbol                | SG-51PH/51YH, SG-531PH/531YH   |   |
|-------------------------------------|-----------------------|--------------------------------|---|
|                                     |                       | Specifications                 | Remarks   |
| Output frequency range              | $f_o$                 | 26.0001MHz to 66.6667MHz       |   |
| Power source voltage                | Max. supply voltage   | $V_{DD-GND}$                   | -0.3V to +7.0V  |
|                                     | Operating voltage     | $V_{DD}$                       | 5.0V $\pm$ 0.5V *2  |
| Temperature range                   | Storage temperature   | $V_{STG}$                      | -55°C to +100°C   |
|                                     | Operating temperature | $T_{OPR}$                      | -10°C to +70°C  |
| Soldering condition (lead part)     | $T_{SOL}$             | Under 260°C within 10sec       | Package less than 150°C   |
| Frequency stability                 | $\Delta f/f_o$        | (B: $\pm$ 50ppm)C $\pm$ 100ppm | -10°C to +70°C. B type is possible up to 55MHz, please consult us.  |
| Current consumption                 | Iop                   | 35mA MAX.                      | No load condition Up to 45MHz : 21mA MAX.   |
| Duty                                | TW/T                  | 40% to 60%                     | 1/2 $V_{DD}$ level  |
| Output voltage                      | $V_{OH}$              | $V_{DD} - 0.4V$ MIN.           | $I_{OH} = -4mA$   |
|                                     | $V_{OL}$              | 0.4V MAX.                      | $I_{OL} = 4mA$  |
| Output load condition (Fan out)     | TTL                   | N                              |   |
|                                     | C-MOS                 | CL                             | 50pF MAX.   |
| Output enable/standby input voltage | $V_{IH}$              | 2.0V MIN.                      |   |
|                                     | $V_{IL}$              | 0.8V MAX.                      |   |
| Output disable current              | $I_{OE}$              | 20mA MAX.                      | OE=GND. Up to 45MHz : 15mA MAX.   |
| Standby current                     | $I_{ST}$              |                                |   |
| Output rise time                    | $t_{RLH}$             | 7nsec. MAX. *2                 | Over 45MHz : 5nS. MAX. Refer to output waveform chart (page 9)  |
| Output fall time                    | $t_{FHL}$             | 7nsec. MAX. *2                 |   |
| Oscillation start time              | $t_{OSC}$             | 10msec. MAX.                   | More than for 1mS until<br>$V_{DD} = 0V \rightarrow 4.5V$ Time at 4.5V to be 0sec.  |
| Aging                               | fa                    | $\pm$ 5ppm/year MAX.           | $T_a = 25^\circ C$ $V_{DD} = 5V$ , first year   |
| Shock resistance                    | S.R.                  | $\pm 200$ m MAX.               | Drop test of 3 times on a hard board from 75cm height or excitation test with 3000G $\times$ 0.3mS $\times$ 1/2 sine wave in 3 directions in 3 directions |

\*1 It is possible depending on condition, reference data (page 22).

\*2 AC characteristics of 386 CPU.

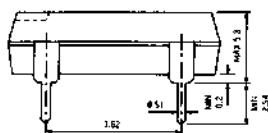
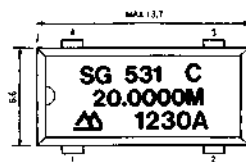
( $V_{DD} = 5V \pm 0.25V$ , Load :  $CL \leq 50pF$ ,  $T_a = -10$  to  $+70^\circ C$ , Refer to output waveform chart of 386 CPU)

| Item          | Symbol | 26.001MHz to 36.000MHz |      | 40.000MHz |      | 45.000MHz to 60.000MHz |      | 50.001MHz to 66.667MHz |      | Unit | Remarks   |
|---------------|--------|------------------------|------|-----------|------|------------------------|------|------------------------|------|------|---|
|               |        | Min.                   | Max. | Max.      | Min. | Min.                   | Max. | Min.                   | Max. |      |   |
| CLK high time | t2a    | 9                      |      | 8         |      | 7                      |      | 6.25                   |      | ns   | 2V level  |
| CLK high time | t2b    | 5                      |      | 5         |      | 4                      |      | 4.5                    |      | ns   | Under 45MHz : $V_{DD} - 0.8V$ level<br>Over 45MHz : 3.7V level                |
| CLK low time  | t3a    | 9                      |      | 8         |      | 7                      |      | 6.25                   |      | ns   | 2V level  |
| CLK low time  | t3b    | 7                      |      | 6         |      | 5                      |      | 4.5                    |      | ns   | 2v level  |
| CLK fall time | t4     |                        | 8    |           | 8    |                        | 7    |                        | 4    | ns   | Under 45MHz : $V_{DD} - 0.8V$ to 0.8V<br>Over 45MHz : 3.7V to 0.8V            |
| CLK rise time | t5     |                        | 9    |           | 9    |                        | 7    |                        | 4    | ns   | Under 45MHz : $V_{DD} - 0.8V$ to $V_{DD} - 0.8V$<br>Over 45MHz : 0.8V to 3.7V |

## External Dimensions

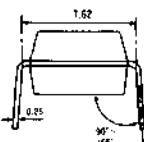
(Unit : mm)

### SG-531 series



| No. | Pin terminal |
|-----|--------------|
| 1   | NC (OE)      |
| 2   | GND          |
| 3   | OUT          |
| 4   | $V_{DD}$     |

( ) shows P type



## Waveform Chart of 386 CPU

