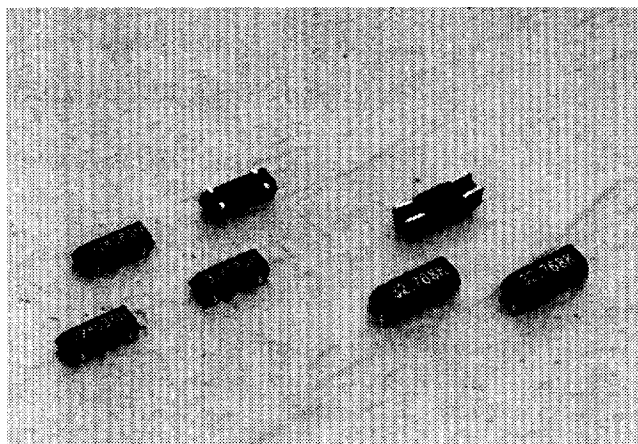




### FEATURES

- Plastic mold package incorporated tubular type quartz crystal.
- Suitable for automatic and high density surface mounting.
- Excellent shock and heat resistance.

### APPLICATIONS

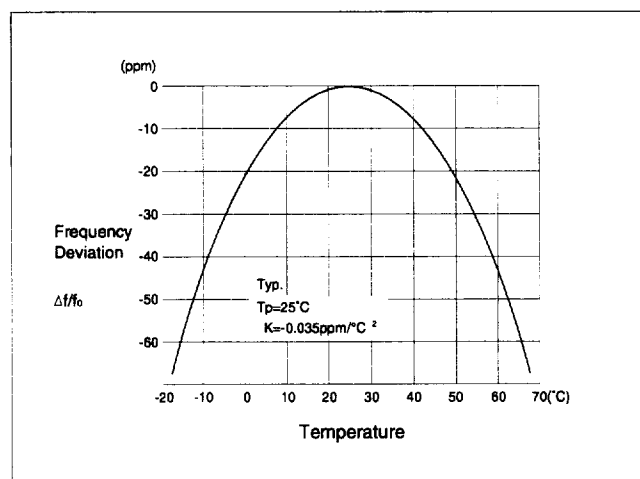
- Radio Communication Equipment, Pagers, Cellular Phones, Camcorders, Portable Applications, Clock Source for Micro-Computers

### STANDARD SPECIFICATION

Conditions without notice (Temperature: +25°C±2°C)

| Item                         | Symbol         | SP-T1A/B, SP-T2A/B                                      |                   |                   | Conditions / Note     |
|------------------------------|----------------|---------------------------------------------------------|-------------------|-------------------|-----------------------|
| Nominal Frequency            | $f_0$          | 32.768kHz                                               | 24kHz to 350kHz   | 351kHz to 615kHz  |                       |
| Frequency Tolerance          | $\Delta f/f_0$ | $\pm 20\text{ppm}, \pm 50\text{ppm}, \pm 100\text{ppm}$ |                   |                   |                       |
| Turnover Temperature         | $T_p$          | +25°C±5°C                                               | +25°C±8°C         | +25°C±15°C        |                       |
| Temperature Coefficient      | K              | $(-3.5 \pm 0.8) \times 10^{-8}/^\circ\text{C}^2$        |                   |                   |                       |
| Load Capacitance             | $C_L$          | 6.0 to 12.5pF                                           |                   |                   |                       |
| Equivalent Series Resistance | $R_1$          | 50k $\Omega$ max.                                       | 50k $\Omega$ max. | 20k $\Omega$ max. |                       |
| Excitation Level             | DL             | 1 $\mu\text{W}$ max.                                    |                   |                   |                       |
| Shunt Level                  | $C_0$          | 1.0pF typ.                                              | 0.95pF typ.       | 0.9pF typ.        |                       |
| Aging                        | $\Delta f/f_0$ | $\pm 5\text{ppm}$ max.                                  |                   |                   | +25°C±3°C, First Year |
| Operating Temperature Range  | $T_{op}$       | -40°C ~ +85°C                                           |                   |                   |                       |
| Storage Temperature Range    | $T_{st}$       | -55°C ~ +125°C                                          |                   |                   |                       |
| Reflow Profile               | $T_{sol}$      | 230°C max., 20sec. max. x 2times                        |                   |                   | IR Reflow             |

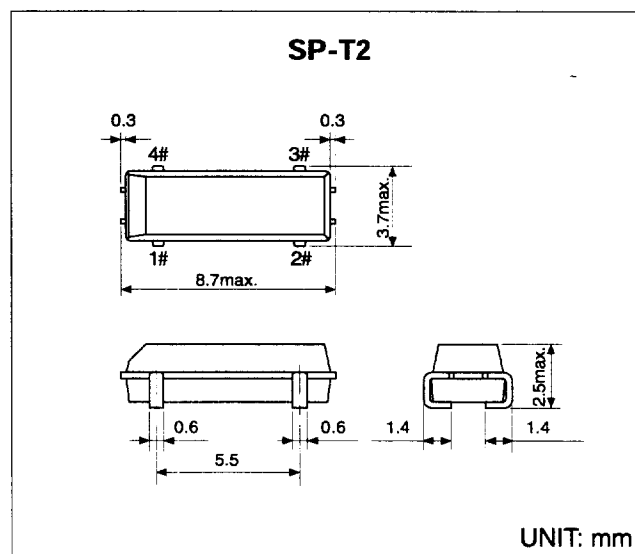
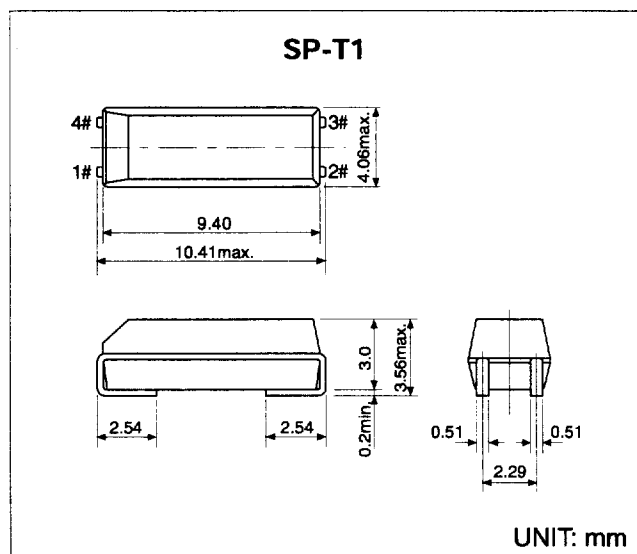
### FREQUENCY-TEMPERATURE CURVE



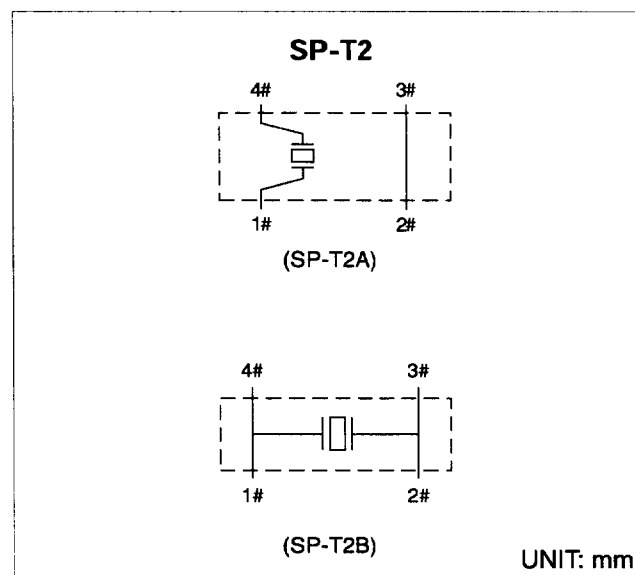
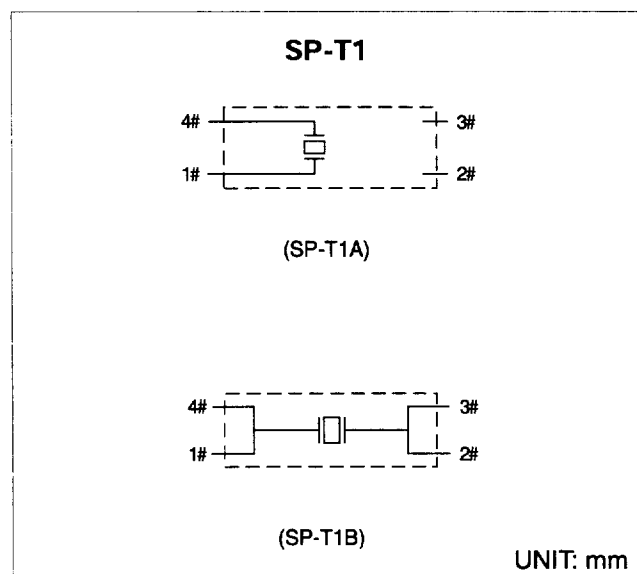
### STANDARD FREQUENCIES (kHz)

| SP-T1/SP-T2 |        |         |         |
|-------------|--------|---------|---------|
| 24.000      | 40.000 | 77.500  | 150.000 |
| 26.667      | 65.536 | 96.000  | 153.600 |
| 31.200      | 75.000 | 99.660  | 200.000 |
| 32.000      | 76.800 | 100.000 | 307.200 |
| 32.768      | 77.025 | 106.000 | 614.400 |
| 38.000      | 770.40 | 130.000 |         |
| 38.400      | 77.056 | 131.072 |         |

## DIMENSIONS (For details, please refer to individual specification)

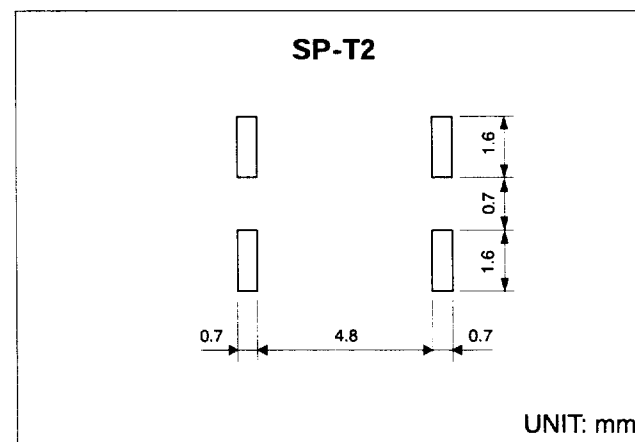
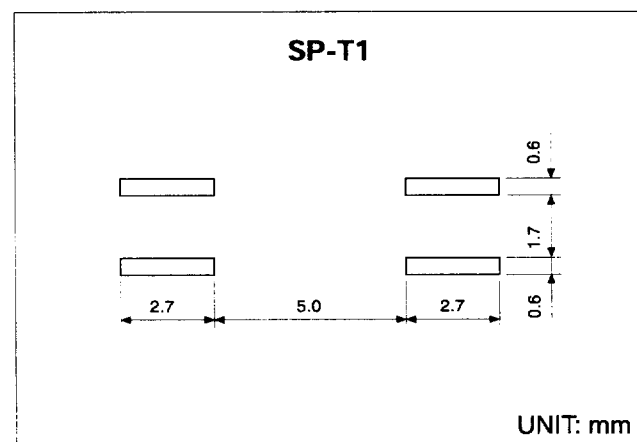


## LEAD CONNECTION



Note: Do not connect terminals #2, #3 of T1A and T2A to the outside electrode. These are dummy terminals.

## TERMINAL LAND AREA (Projection to the PCB surface of the electrode lead)



Note: The drawings are not a PCB layout.