



actual size

# Quartz Crystal · SMU4

## Surface Mount Quartz Crystal

### Features

■ RoHS compliant

■ low profile type

### General Data

| type                         | SMU4                        |                    |
|------------------------------|-----------------------------|--------------------|
| frequency range              | 3.2768 ~ 33.0 MHz           | ( fund. AT-cut )   |
|                              | 27.0 ~ 60.0 MHz             | ( 3rd OT. AT-cut ) |
|                              | 24.0 ~ 40.0 MHz             | ( fund. BT-cut )   |
| frequency tolerance at 25 °C | ± 10 ppm ~ ± 30 ppm         |                    |
| load capacitance $C_L$       | 12 pF ~ 32 pF or series     |                    |
| shunt capacitance $C_0$      | < 7 pF                      |                    |
| storage temperature          | -40 °C ~ +90 °C             |                    |
| drive level max.             | 500 µW (100 µW recommended) |                    |
| aging                        | < ±5 ppm first year         |                    |

### ESR (series resistance $R_s$ )

| frequency<br>in MHz | vibration<br>mode | ESR max.<br>in $\Omega$ | ESR typ.<br>in $\Omega$ |
|---------------------|-------------------|-------------------------|-------------------------|
| 3.2768 ~ 3.999      | fund.- AT         | 150                     | 80                      |
| 4.000 ~ 4.499       | fund.- AT         | 120                     | 60                      |
| 4.500 ~ 5.999       | fund.- AT         | 100                     | 50                      |
| 6.000 ~ 6.999       | fund.- AT         | 80                      | 40                      |
| 7.000 ~ 9.999       | fund.- AT         | 70                      | 35                      |
| 10.00 ~ 13.99       | fund.- AT         | 50                      | 25                      |
| 14.00 ~ 33.000      | fund.- AT         | 40                      | 20                      |
| 27.00 ~ 60.00       | 3rd OT - AT       | 120                     | 80                      |
| 24.00 ~ 40.00       | fund.- BT         | 50                      | 20                      |

### Frequency Stability vs. Temperature

|                 |    | ± 20 ppm    | ± 30 ppm    | ± 50 ppm    | ± 100 ppm | +10/-100 ppm |
|-----------------|----|-------------|-------------|-------------|-----------|--------------|
| -20 °C ~ +70 °C |    | ○ > 8.0 MHz | ● ≥ 8.0 MHz | ● < 8.0 MHz |           | ○ BT-cut     |
| -40 °C ~ +85 °C | T1 | ○ > 8.0 MHz | ○ < 8.0 MHz | ●           |           |              |

● standard  
 ○ on request

### Marking

frequency with load capacitance code  
company code / date code / internal code

|      | Jan. | Febr. | Mar. | Apr. | May | June | July | Aug. | Sept. | Okt. | Nov. | Dec. |
|------|------|-------|------|------|-----|------|------|------|-------|------|------|------|
| 2004 | n    | p     | q    | r    | s   | t    | u    | v    | w     | x    | y    | z    |
| 2005 | A    | B     | C    | D    | E   | F    | G    | H    | J     | K    | L    | M    |
| 2006 | N    | P     | Q    | R    | S   | T    | U    | V    | W     | X    | Y    | Z    |
| 2007 | a    | b     | c    | d    | e   | f    | g    | h    | i     | k    | l    | m    |

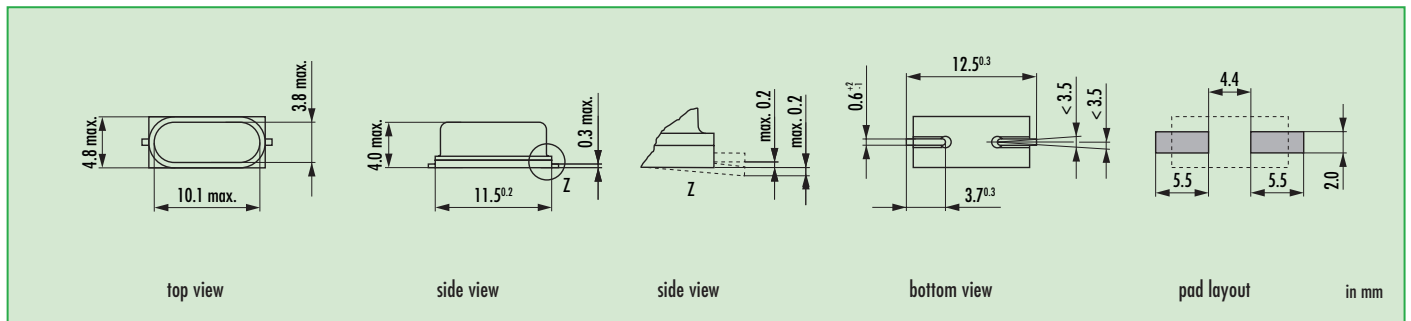
### Order Information

| Q      | frequency<br>in MHz | type | load capacitance<br>in pF                      | stability at 25 °C<br>in ppm | stability vs.<br>temp. range<br>in ppm | option                                                                                                                                                                |
|--------|---------------------|------|------------------------------------------------|------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quartz | 3.2768 ~ 60.0 MHz   | SMU4 | 30 pF standard<br>12pF ~ 32 pF<br>S for series | ± 30 ppm standard            | see table                              | blank = -20°C ~ +70°C<br>FU = fundamental AT-cut<br>3OT = 3rd overtone AT-cut<br>BT = fundamental BT-cut<br>T1 = -40°C ~ +85°C<br>LF = Pb free contact<br>pins / pads |

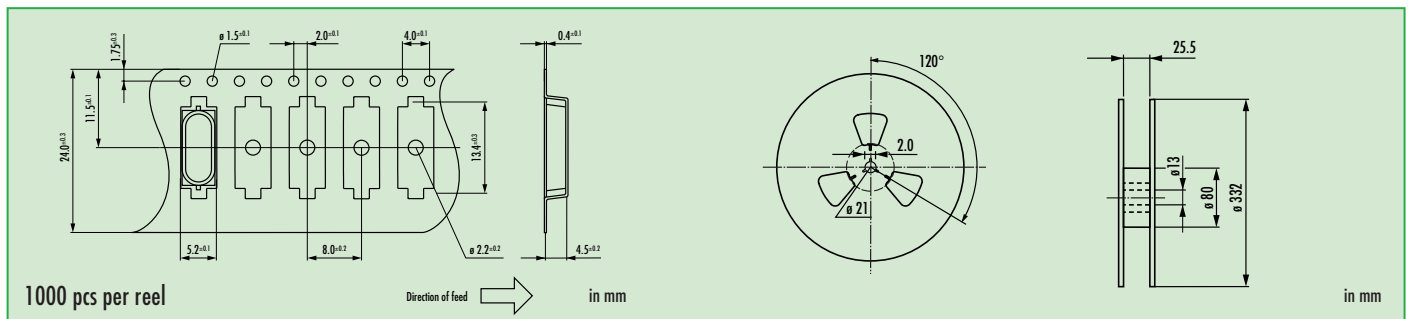
Example: Q 30.0-SMU4-30-30/30-FU

# Quartz Crystal · SMU4

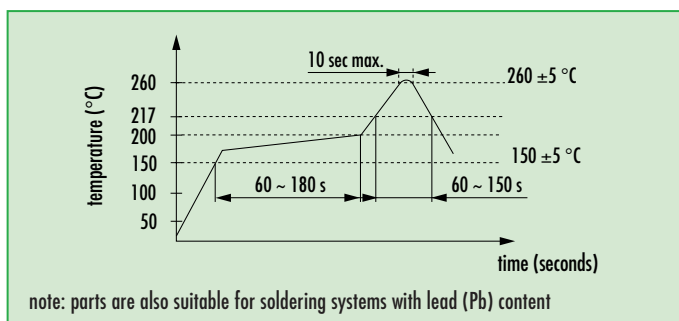
## Dimensions



## Taping Specification



## Reflow Soldering Profile



## Load Capacitance Codes

|          |          |          |           |
|----------|----------|----------|-----------|
| 7 pF: m  | 13 pF: v | 20 pF: c | 32 pF: e  |
| 8 pF: k  | 14 pF: x | 22 pF: g | series: s |
| 9 pF: n  | 15 pF: j | 24 pF: d | T: 3rd OT |
| 10 pF: h | 16 pF: b | 25 pF: r |           |
| 11 pF: l | 17 pF: t | 27 pF: w |           |
| 12 pF: a | 18 pF: f | 30 pF: . |           |

example 4.0 MHz / 12 pF: 4a000