



actual size

# SMD Quartz Crystal · SMU2

2 Pad Version · 11.5 x 4.8 mm

- recommended for automotive applications
- reflow soldering temperature: 260 °C max.
- package height 3.0 mm max.



## General Data

| type                         | SMU2                        |                   |
|------------------------------|-----------------------------|-------------------|
| frequency range              | 4.1943 ~ 40.0 MHz           | ( fund. AT-cut )  |
|                              | 27.0 ~ 60.0 MHz             | ( 3rd OT AT-cut ) |
|                              | 30.0 ~ 50.0 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 $C_0$      | < 5 pF                      |                   |
| storage temperature          | -40 °C ~ +125 °C            |                   |
| drive level max.             | 500 µW (100 µW recommended) |                   |
| aging                        | < ± 5 ppm first year        |                   |

## ESR (series resistance Rs)

| frequency in MHz | vibration mode | ESR max. in Ω | ESR typ. in Ω |
|------------------|----------------|---------------|---------------|
| 4.19 ~ 9.9999    | fund.- AT      | 70            | 30            |
| 10.0 ~ 13.999    | fund.- AT      | 50            | 25            |
| 14.0 ~ 40.000    | fund.- AT      | 40            | 15            |
| 27.0 ~ 60.000    | 3rd OT - AT    | 100           | 80            |
| 30.0 ~ 50.000    | fund.- BT      | 50            | 20            |

## Frequency Stability vs. Temperature

|                  |      | ± 30 ppm | ± 50 ppm | ± 100 ppm | ± 150 ppm | +10/-100 ppm |
|------------------|------|----------|----------|-----------|-----------|--------------|
| -20 °C ~ +70 °C  | STD. | ○        | ●        |           |           | ○ BT-cut     |
| -40 °C ~ +85 °C  | T1   | ○        | ○        | ●         |           |              |
| -40 °C ~ +105 °C | T2   |          | ○        | ○         |           |              |
| -40 °C ~ +125 °C | T3   |          |          |           | ○         |              |

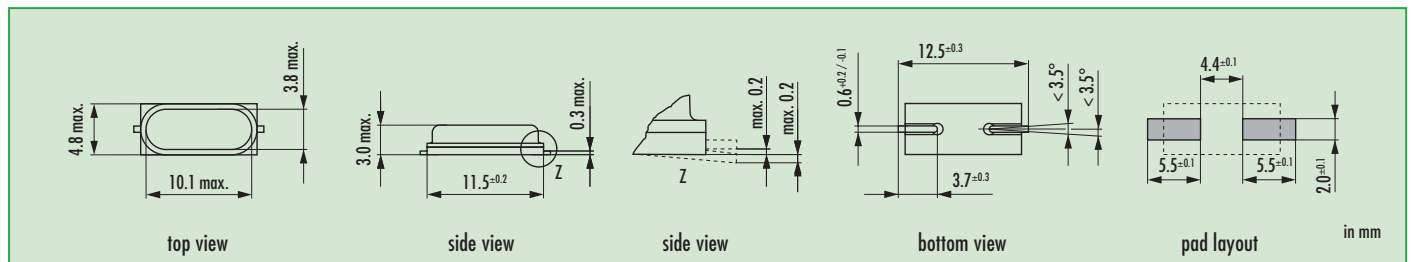
● standard  
○ available

## Marking

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

|      | Jan. | Febr. | Mar. | Apr. | May | June | July | Aug. | Sept. | Okt. | Nov. | Dec. |
|------|------|-------|------|------|-----|------|------|------|-------|------|------|------|
| 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    |
| 2008 | n    | p     | q    | r    | s   | t    | u    | v    | w     | x    | y    | z    |

## Dimensions



## Order Information

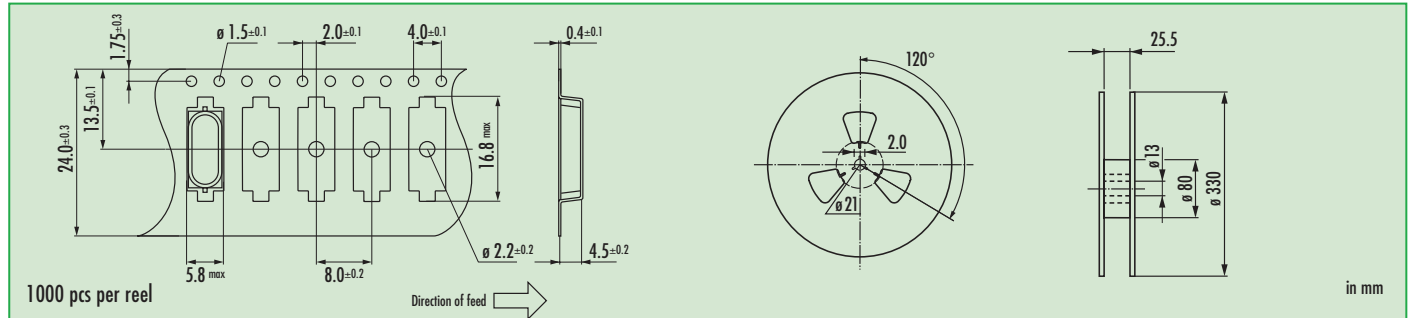
| Q      | frequency       | type | load capacitance                                | stability at 25 °C | stability vs. temp. range | option  |
|--------|-----------------|------|---|--------------------|---------------------------|---|
| Quartz | 4.19 ~ 60.0 MHz | SMU2 | 30 pF standard<br>12 pF ~ 32 pF<br>S for series | 30 = ± 30 ppm std  | see table                 | blank = -20 °C ~ +70 °C<br>T1 = -40 °C ~ +85 °C<br>T2 = -40 °C ~ +105 °C<br>T3 = -40 °C ~ +125 °C<br>FU = for fundamental frequencies ≥ 20 MHz<br>30T = 3rd overtone<br>BT = fundamental BT-cut |

Example: Q 25.0-SMU2-30-30/50-FU (Suffix LF = RoHS compliant / Pb free pins or pads)

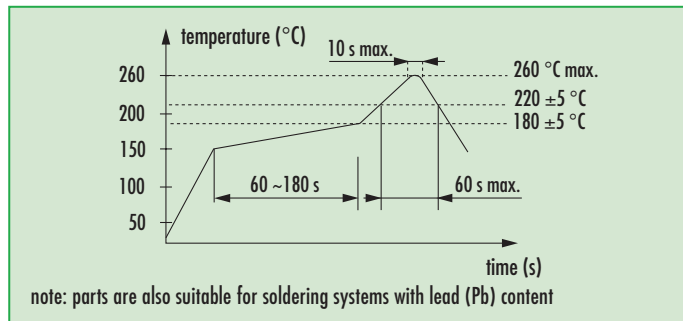


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## Taping Specification



## 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 10.0 MHz / 12 pF: 10a000

## Automotive application note

- automotive quartz crystals have superior environmental performance in case of shock, vibration and temperature
- extended operating temperatures up to +125 °C
- production is certified according to: ISO 9001 / QS 9000 / QS 14000