



actual size

# SMQ series • SMU4

## surface mount quartz crystal

### features

- wide frequency range
- extended temperature range

type	SMU4 (HC49/U4H - SMD)		
frequency	3.579545 MHz ~ 25 MHz fundamental AT-cut		24.0 MHz ~ 40.0 MHz
	27.0 MHz ~ 50.0 MHz 3rd overtone AT-cut		fundamental BT-cut
frequency tolerance at 25 °C	± 30 ppm	± 30 ppm	± 50 ppm
frequency temp. characteristic	± 50 ppm (< 8.0 MHz)	± 30 ppm (< 8.0 MHz)	+10/-100 ppm
operating temperature	-20 °C ~ +70 °C		-20 °C ~ +70 °C
storage temperature	-40 °C ~ +90 °C		-40 °C ~ +90 °C
load capacitance $C_L$	12 pF ~ 30 pF / series		12 pF ~ 30 pF / series
shunt capacitance $C_0$	< 7 pF		< 7 pF
drive level max.	100 µW		100 µW
aging	< ± 5 ppm		< ± 5 ppm

### order information example:

**Q - 25.0 - SMU4 - 30 - 30 / 50 - BT**

1. 2. 3. 4. 5. 6. 7.

1. quartz: Q
2. frequency: 25.0 MHz
3. type: SMU4
4. load capacitance: 30 pF
5. frequency stability at 25 °C: ± 50 ppm
6. frequency vs temperature: ± 50 ppm
7. special requirement: BT-cut (see option table)

### option table:

- FUND – fundamental tone
- BT – BT-cut
- 3 OT – 3rd overtone
- T1 – -40 °C ~ +85 °C

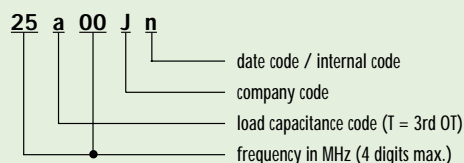
### date code

	Jan.	Febr.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1999	a	b	c	d	e	f	g	h	j	k	l	m
2000	n	p	q	r	s	t	u	v	w	x	y	z
2001	A	B	C	D	E	F	G	H	J	K	L	M
2002	N	P	Q	R	S	T	U	V	W	X	Y	Z

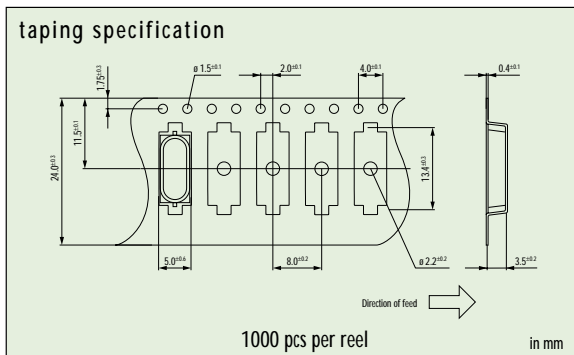
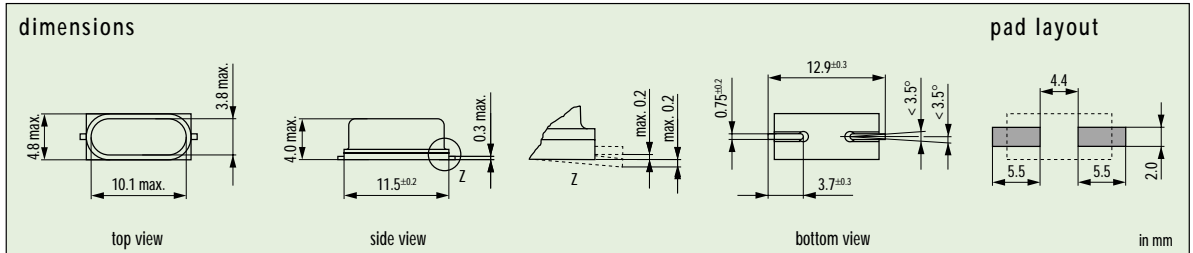
### marking:

frequency with  $C_L$  code / company code / date code / internal code

### example:



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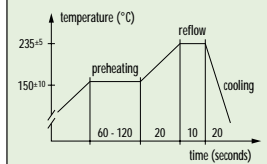
**test conditions:**

- a) acceleration: 1000 g / 0.5 ms, 1/2 sine wave
- b) shock (random drop): height 75 cm, 3 times to hardwood surface ( $\Delta R/R \leq 20\%$ ;  $\Delta f/f \leq \pm 5$  ppm)
- c) vibration:  $f = 10$  Hz ~ 55 Hz; amplitude = 1.5 mm; period = about 1 minute; time = 2 h each direction
- d) solderability: according to DIN 68-2-58

**standard load capacitance codes**

- 12 pF: a      24 pF: d
- 16 pF: b      30 pF: .
- 18 pF: f      32 pF: e
- 20 pF: c      series: s
- 22 pF: g

**reflow soldering profile**



**series resistance (Rs) / motional capacitance (C1) table**

frequency in MHz	cut	vibration mode	Rs max. in $\Omega$	Rs typ. in $\Omega$	C1 typ. in fF
3.5 ~ 3.69	AT	fund	180	70 ~ 100	3.5 ~ 4.0
3.7 ~ 3.99	AT	fund	150	60 ~ 80	4.0 ~ 4.5
4.0 ~ 4.09	AT	fund	150	50 ~ 70	4.5 ~ 4.8
4.1 ~ 4.39	AT	fund	130	50 ~ 70	4.8 ~ 5.0
4.4 ~ 4.99	AT	fund	120	40 ~ 60	5.0 ~ 5.5
5.0 ~ 5.99	AT	fund	120	40 ~ 60	5.5 ~ 6.0
6.0 ~ 6.99	AT	fund	80	35 ~ 55	6.0 ~ 7.0
7.0 ~ 7.99	AT	fund	75	25 ~ 45	7.0 ~ 10
8.0 ~ 9.99	AT	fund	70	20 ~ 40	10 ~ 12
10.0 ~ 11.99	AT	fund	50	15 ~ 35	12 ~ 14
12.0 ~ 13.99	AT	fund	50	15 ~ 35	12 ~ 16
14.0 ~ 15.99	AT	fund	50	10 ~ 15	16 ~ 17
16.0 ~ 17.99	AT	fund	50	10 ~ 15	18 ~ 20
18.0 ~ 19.99	AT	fund	50	10 ~ 15	20 ~ 22
20.0 ~ 25.0	AT	fund	50	10 ~ 15	22 ~ 26
27.0 ~ 50.0	BT	fund	50	10 ~ 15	10 ~ 15
24.0 ~ 40.0	AT	3rd OT	120	80 ~ 100	0.8 ~ 2.5