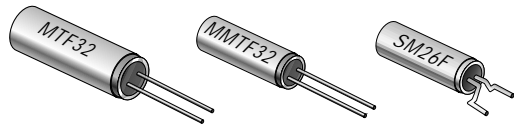


# Quartz Crystal • MTF



## Tuning Fork Quartz Crystal

### Features

- three different package versions
- surface mount version available

### General Data

type	MTF32		MMTF32		SM26F	
frequency	32.768 kHz (15.0 ~ 150.0 kHz)		32.768 kHz (28.0 ~ 80.0 kHz)		32.768 kHz (28.0 ~ 80.0 kHz)	
frequency tolerance at 25 °C	± 10 ppm	± 20 ppm	± 10 ppm	± 20 ppm	± 20 ppm	± 30 ppm
load capacitance C <sub>L</sub>	10 pF	12.5 pF	10 pF	12.5 pF	12.5 pF	12.5 pF
frequency temperature characteristic	f (ppm) = -0.036 (25°C - T*) <sup>2</sup>		f (ppm) = -0.036 (25°C - T*) <sup>2</sup>		f (ppm) = -0.036 (25°C - T*) <sup>2</sup>	
operating temperature range	-20°C ~ +70°C / -40°C ~ +85°C		-20°C ~ +70°C / -40°C ~ +85°C		-20°C ~ +70°C / -40°C ~ +85°C	
shunt capacitance C <sub>0</sub>	1.3 pF typical		1.1 pF typical		1.1 pF typical	
ratio C <sub>0</sub> / C <sub>1</sub>	530 typical		470 typical		570 typical	
series resistance max. ( ESR )	30.0 kΩ		30.0 kΩ		50.0 kΩ	
storage temperature	-40 °C ~ +90 °C		-40 °C ~ +90 °C		-40 °C ~ +90 °C	
drive level max.	1 μW		1 μW		1 μW	
aging first year	< ± 5 ppm		< ± 5 ppm		< ± 5 ppm	

\* T = requested temperature

### Frequency Stability vs. Temperature

		- 80 ppm	- 160 ppm		
-20 °C ~ +70 °C	STD.	●			
-40 °C ~ +85 °C	T1		●		

● standard

### Marking

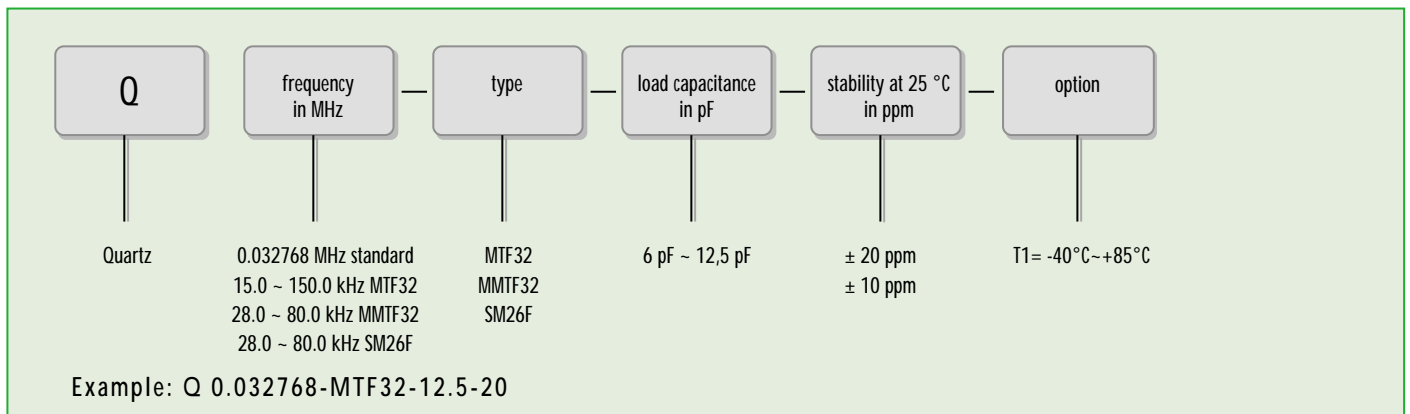
KDS 32.768 / date code ( month / year )

date code: A ~ M: Jan. - Dec.

2: 2002 / 3: 2003

Jan.	Febr.	Mar.	Apr.	May	June
A	B	C	D	E	F
July	Aug.	Sept.	Oct.	Nov.	Dec.
G	H	J	K	L	M

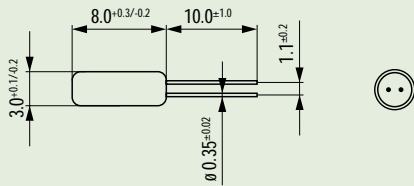
### Order Information



# Quartz Crystal • MTF32 • MMTF32 • SM26F

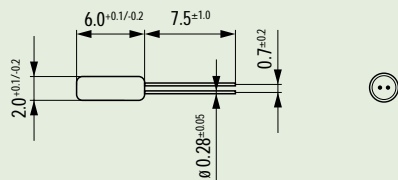
## Dimensions

### MTF32



in mm

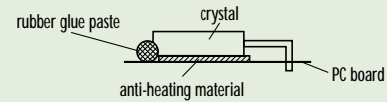
### MMTF32



in mm

## tuning fork crystal - handling note for through hole type

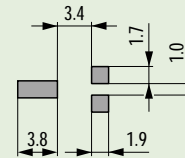
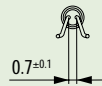
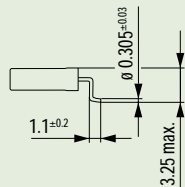
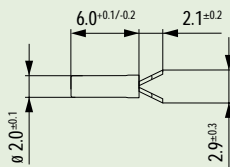
- mounting:**
  - if the crystal is mounted on board directly (orientation: lay down) or fixed by metal parts, the body of the crystal will be heated up
  - recommended mounting:



- soldering:**
  - pre-heating +130 °C ~ + 150 °C for 1 to 3 minutes
  - soldering +230 °C ~ + 250 °C for 5 seconds maximum
- cleaning:**
  - ultrasonic cleaning with organic solvents
  - ultrasonic frequency should not be equal to the resonance frequency of the crystal
- handling:**
  - handle the crystal carefully, it cannot stand heavy shock
- testing:**
  - if you test the whole board automatically do not apply pulse to the crystal oscillator circuit, especially high pulse level can break the crystal blank

### SM26F type A (1000 pcs per reel)

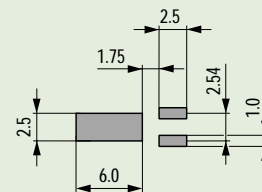
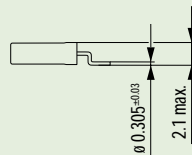
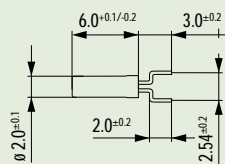
### pad layout



in mm

### SM26F type B (1000 pcs per reel)

### pad layout



in mm