

**Type TS smd high precision**  
**(5 ~ 40)MHz, (3.3 or 5.0)Vd.c. supply**  
**(7.0 x 5.0)mm, height typical 1.80mm**  
**temperature tolerance from  $\pm 0.05$ ppm**

A high precision, compact, smd VCTCXO, low ageing and low power consumption.

Supplied on tape and reel; 1000 or 3000 pieces per reel, RoHS compliant.

**Frequency stability -vs- temperature:**

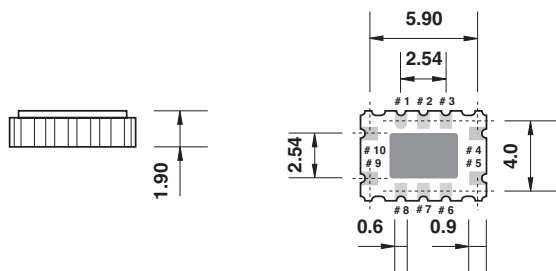
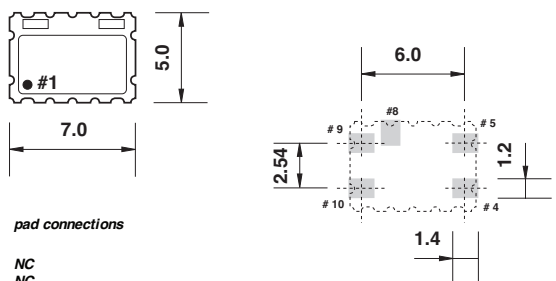
TEMP. RANGE	TOLERANCE
(0 +55)°C	$\pm 0.05$ ppm ~ $\pm 0.5$ ppm
(-10 +60)°C	$\pm 0.05$ ppm ~ $\pm 0.5$ ppm
(-20 +70)°C	$\pm 0.1$ ppm ~ $\pm 0.5$ ppm
(-40 +85)°C	$\pm 0.28$ ppm ~ $\pm 0.5$ ppm

**Electrical specification:**

	5.0Vd.c.		3.3Vd.c.		Units
	min.	max.	min.	max.	
supply voltage $V_{DD} \pm 5\%$	4.75	5.25	3.135	3.465	Vd.c.
frequency range	(5 ~ 40)MHz				MHz
frequency tolerance at +25°C	$\pm 2.0$ ppm one hour after re-flow				ppm
frequency stability vs supply $\pm 5\%$	$\pm 0.5$				ppm
frequency stability vs load $\pm 10\%$	$\pm 0.2$				ppm
frequency stability vs ageing	$\pm 1.0$ max.				ppm per year
supply current: CMOS output	6.0				mA
supply current: clipped sine output	3.5				mA
output level clipped sine wave	0.8				Vp-p
load clipped sine wave	10K $\Omega$ //10pF				
load CMOS	15pF				pF
output high (logic "1")	90% $V_{DD}$ min.				V
output low (logic "0")	10% $V_{DD}$ max.				V
duty cycle	45%/ 55%				%
$V_C$ voltage control range (VCTCXO)	0.5 ~ 2.5				V
pulling range (VCTCXO)	$\pm 5$		$\pm 12$		ppm
$V_C$ input impedance (VCTCXO)	100				K $\Omega$
phase noise @13.0MHz +100Hz	-120				dBc/Hz
phase noise @13.0MHz +1kHz	-140				dBc/Hz
phase noise @13.0MHz +10kHz	-148				dBc/Hz
start up time	2				milli sec
<b>tri-state option:</b>					
disable	0.3V max.				V
enable	0.7V min.				V
storage temperature range	(-55 +125)°C				°C

**Ordering information**

<b>EXAMPLE</b>	type TS smd VCTCXO, 20.0MHz, +3.3Vd.c., ±5ppm pulling range, ±0.5ppm(-20 +70)°C, clipped sine wave output
<b>TFC PART NUMBER</b>	<b>TS 20.0M E A A C S</b>
<b>TS</b>	type: TS = VCTCXO case style TC
<b>20.0M</b>	frequency: 20.0MHz, frequency range (10 ~ 50)MHz
<b>E</b>	supply voltage: E = +3.3Vd.c.
<b>A</b>	pulling range: A = ±5ppm for VCTCXO
<b>A</b>	frequency stability: A = ±0.5ppm
<b>C</b>	temperature range: C = (-20 +70)°C
<b>S</b>	output: S = clipped sine wave
<b>OPTIONS</b>	
<b>supply voltage</b>	E: +3.3Vd.c., C: +5Vd.c.
<b>pulling range</b>	A: ±5ppm, D: ±12ppm, T: TCXO
<b>frequency stability</b>	A: ±0.5ppm, B: ±8.0ppm, C: ±10ppm, M; ±0.1ppm, J: ±0.14ppm, R: ±0.2ppm, K: ±0.28ppm, L: ±0.37ppm
<b>temperature range</b>	B: (0 +55)°C, I: (-10 +60)°C, C: (-20 +70)°C, D: (-30 +85)°C, L: (-40 +85)°C
<b>output logic</b>	J: CMOS 15pF, S: clipped sine wave 10K//10pF

**Dimensions(mm) - case style TS**

**Pads viewed from bottom**

**Suggested land pattern**

pads are gold, 2.5µ min. over nickel, suitable for vapour phase or reflow soldering. To ensure optimal oscillator performance, place a 0.1µF by-pass capacitor as close as possible between V<sub>DD</sub> and ground pads: #9 and #4

- pad connections**
- # 1 NC
  - # 2 NC
  - # 3 NC
  - # 4 ground
  - # 5 output
  - # 6 NC
  - # 7 NC
  - # 8 Tri-State
  - # 9 V<sub>DD</sub>
  - # 10 TCXO: ground or NC

VCTCXO: ±5ppm min.  
for V<sub>c</sub> = +1.5V ±1.0V