



Features:

- Very small and flat package
- Hermetical sealed enclosure
- very fast warm-up
- AT- and SC-Cut versions available
- SMD-versions available
- Stability as low as $\pm 5 \times 10^{-9}$ over -20 to +70°C

Typical Applications:

- Test Equipment
- Pico-Base Stations
- Telecommunication Systems
- GPS

Base models can be modified to your specification within the performance ranges shown below.

General Performance of **QO202_..series**

		available	from	typ.	to			
1.	Frequency range		2		80	MHz		
2.	HF- Output		HC-MOS or Sine Wave					
3.	Frequency stability in op. Temp. range	$\leq \pm$	0,005	0,05	0,1	ppm		
3.1	Frequency overall tolerances ¹⁾	$\leq \pm$	0,4		4,6	ppm		
3.2	Aging ²⁾	$\leq \pm$	0,3	1,0	3,0	$\times 10^{-9}$ day		
		$\leq \pm$	0,05	0,1	0,2	ppm first year		
4.	Phase noise (10 MHz) ³⁾		1 Hz	-90	-80	-70	dBc/Hz	
			10 Hz	-120	-110	-105	dBc/Hz	
			100 Hz	-140	-135	-130	dBc/Hz	
			1 kHz	-145	-140	-135	dBc/Hz	
			>10 kHz	-150	-145	-140	dBc/Hz	
5.1	Operating temperature range		0 ... +50	-20...+70	-40...+85	°C		
5.2	Storage temperature range		-55 ...+105			°C		
6.1	Frequency tuning range	$> \pm$	1	3	10	ppm		
6.2	Tuning voltage		0 ... 4			V		
6.3	Reference Voltage		3,0	4,0	5,0	V $\pm 1\%$		
7.	Supply voltage		3,3	5	12	V $\pm 5\%$		
8.1	Power consumption ⁴⁾	\leq	500			mW @ 25°C		
		\leq	700			mW @ 0°C		
8.2	Power consumption during warm-up	\leq	1000	2000	3000	mW		
8.3	Stabilization time to be within 0.1ppm of final frequency ⁵⁾	\leq	40			s @ 25°C		
		\leq	300			s @ 0°C		
9.	Enclosure		20 x 20 x 10			mm ³		
10.	Weight	\leq	8			g		

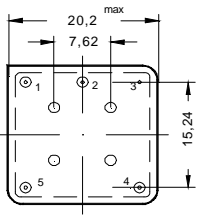
Contact factory for improved stabilities or additional product options

Notes:

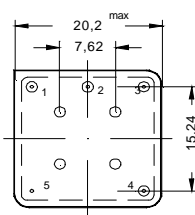
- 1) Including adj. tol., tol. vs temperature range, vs supply voltage change, vs. load change and 15 years aging
- 2) depends on specification; after 15 days continuous operation
- 3) Phase Noise degrades with increasing output frequency
- 4) depends on operating temperature range and actual temperature
- 5) depends on operating temperature range, temperature and warm-up-powerconsumption

Drawing:

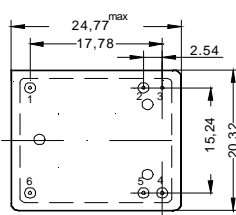
QO20200



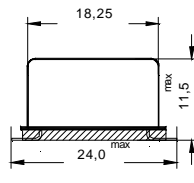
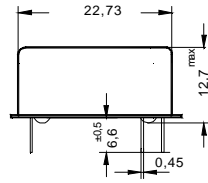
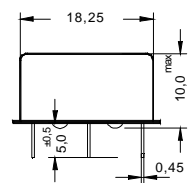
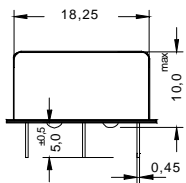
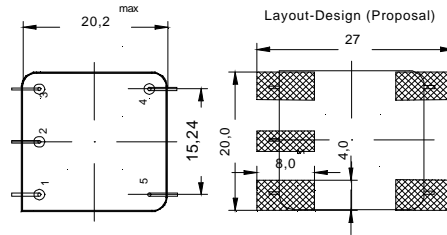
QO20240



QO20250



QO2024S SMD-Version

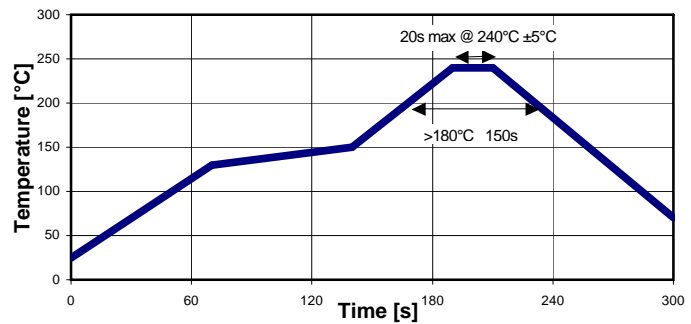


all dimensions in mm

Pin connection:

Pin	Version QO 2020	Version QO 2024	Version QO 2025
1	Vcc	Frequ. adj.	Frequ. adj.
2	RF out	Vref.	Vref.
3	Case / GND	Vcc	GND
4	Frequ. Adj.	RF out	GND
5	Vref.	Case/GND	RF out
6			Vcc

Recommended Soldering Profile:



Marking:

Manufacturer name, Article/Series code, Center Frequency, date code and series no.

This profile is adjusted to the requirements of higher temperatures at unleaded soldering.

Environmental conditions:

The ovenized crystal oscillators are approved in the following environmental conditions:

Test	IEC 60068 -	MILSTD-	Test conditions
Sealing test	2-17	883E - Meth. 1014	Fine leak: A1 2 x 10-8
Shock	2-27	202F - Meth. 213B A:	50g; 11ms; half-sine
Vibration, sinus	2-6	202F - Meth. 204D B:	10..55Hz 0,75mm; 55..2kHz 10g; 30 min/axis
Thermal Shock	2-14	883E - Meth. 1014 A:	100°C to 0°C, water, 15 cycles

Endurance tests- aging- extended aging 20 days @ 55°C (100%) >1000 days @ 55°C (approval samples)

The oscillator hybrid microcircuit design and construction is in accordance with applicable design and construction requirements.

The final test procedure includes all points of electrical specification especially a 100% test of

- frequency adjustment – calibration
- frequency stability vs. operating temperature range
- long-term stability measurement
- short-term stability measurement
- output waveform