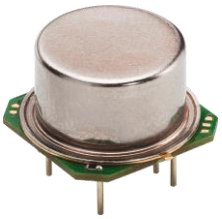
Model 148

OCXO - Ultra Miniature, Ultra Low Power
Shock Resistant

Features

- 8MHz to 100MHz frequency range
- Industry's smallest OCXO
- Fast warm-up (to 45s)
- Eco-friendly < 250mW power consumption
- HCMOS output
- Shock and vibration resistant construction



RoHS Status

RoHS 6/6

Applications

- Airborne and Ground Mobile
- PLL Reference for Telecommunication Systems
- Portable (Battery Operated) Devices
- Guidance Systems
- Instrumentation / Test and Measurement

Description

The Model 148 is a high stability, low power OCXO that utilizes an SC-cut quartz resonator. The SC resonator insures excellent phase noise and low aging rates. The novel design featuring the oscillator and oven control circuitry inside of the vacuum sealed TO-8 crystal enclosure provides reduced size, fast warm-up, and excellent temperature stability. In addition to improved performance characteristics, the compact design of Model 148 offers increased resilience to mechanical shock and vibration.

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Frequency Range	F		8		100	MHz	
Initial Calibration	ΔF/F				±0.1 ±0.2	ppm	For 10MHz oscillator For 100MHz oscillator
Frequency Stability	ΔF/F	Vs. Operating temp. C: -10°C to 60°C			± 5	ppb	See "How to Order"
		Vs. Supply voltage		±2		ppb	V_{CC} ±5%
		Vs. Aging / Day Vs. Aging / Year			0.5 ±0.05	ppb ppm	After 30 days. See "How to Order"
Operating Temperature Range	T		-40°		+85°	°C	See "How to Order"
G-sensitivity		Worst direction			±1	ppb/G	
SSB Phase Noise (typical)		Offset 1Hz 10Hz 100Hz 1kHz 10kHz	10 MHz -90 -120 -140 -160 -165		100 MHz - -90 -120 -140 -165	dBc/Hz	For additional phase noise options, consult factory

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Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Supply Voltage	V_{CC}		4.75 3.14	5.0 3.3	5.25 3.46	V	
Power Consumption	P	warm-up state steady state, at +25°C		1.0 0.23	1.1 0.25	W	
Warm-up Time	τ	to $\Delta F/F=1\ E^{-7}$, @+25°C, V_{CC}=5.0V	45	60		sec	Ref. to frequency after 15mins.
HCMOS Output Levels			10kOhms // 15pF				10MHz output frequency
	V_H	V_{CC} = 5V V_{CC} = 3.3V	3.8 2.4			V	
	V_L				0.4	V	
Rise / Fall time	T_R/T_F	At 10MHz output frequency			10	ns	
Duty Cycle			45		55	%	
Control Voltage	V_C	V_{CC} = 5V V_{CC} = 3.3V	0 0		4.2 2.8	V	Tuning slope - positive
Frequency Tuning Range			±0.5	±1.0		ppm	Monotonic
Reference Output	V_{REF}	V_{CC} = 5V V_{CC} = 3.3V	4.1 2.7	4.2 2.8	4.3 2.9	V	

Environmental and Mechanical Conditions

Parameter	Condition
Storage Temperature	-60°C to +90°C
Humidity	Non-condensing 95%
Mechanical Shock	Per MIL-STD-202G, method 213B, 500G, 1ms, half sine pulse
Vibration	Per MIL-STD-202G, method 204D, 1.5mm DA 10 to 100Hz, 30G peak swept sine 100 to 2000Hz
Soldering Conditions	Hand solder only – not reflow compatible. 260°C, 10s (pins only)
Markings	Epoxy ink or laser engraved

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Your Partner in Smart Solutions

How to Order

Model	Stability	Temperature Range	Supply Voltage	Aging	Frequency, MHz
148	W	D	E	C	10

Package	Dimensions (mm)
148	14 x 14

Code	Specification
R	$1x10^{-7}$
T	$5x10^{-8}$
30	$3x10^{-8}$
U	$2x10^{-8}$
V	$1x10^{-8}$
W	$5x10^{-9}$

Code	Specification
A	0°C to 50°C
B	0°C to 70°C
C	-10°C to 60°C
D	-20°C to 70°C
E	-30°C to 70°C
G	-40°C to 85°C

Code	Specification
D	5V ± 5%
E	3.3V± 5%

Code	Per day	Per year	For Frequencies
L	0.3ppb	0.03ppm	Above 8MHz
J	0.5ppb	0.05ppm	
C	1ppb	0.1ppm	Above 20MHz
I	1.5ppb	0.15ppm	
K	2.5ppb	0.25ppm	Above 50MHz
B	2ppb	0.2ppm	Above 80MHz
F	3ppb	0.3ppm	
A	5ppb	0.5ppm	

Available Frequency Stabilities over Operating Temperature Ranges

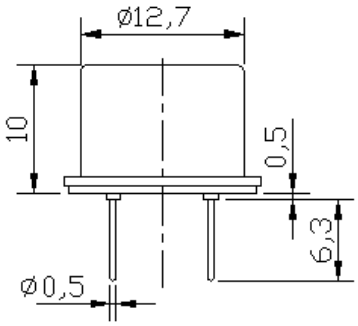
Order Code	Temperature Range	Stability					
		R	T	30	U	V	W
		$1x10^{-7}$	$5x10^{-8}$	$3x10^{-8}$	$2x10^{-8}$	$1x10^{-8}$	$5x10^{-9}$
A	0°C to 50°C	*	*	*	C	B	B
B	0°C to 70°C	*	*	*	C	B	A
C	-10°C to 60°C	*	*	C	B	B	A
D	-20°C to 70°C	*	C	B	B	A	A
E	-30°C to 70°C	*	C	B	B	A	
G	-40°C to 85°C	*	B	B	B	A	

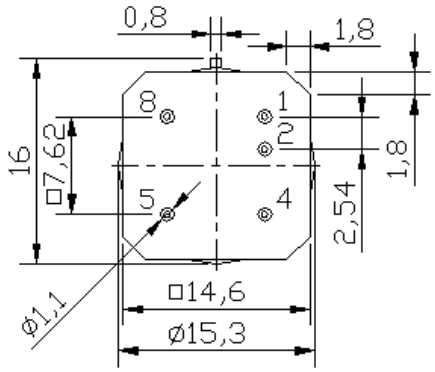
Stability Legend

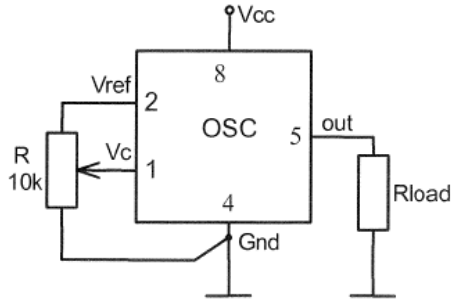
* = Available for all frequencies
A = Available only for frequencies ≤10 MHz
B = Available only for frequencies ≤30 MHz
C = Available only for frequencies ≤50 MHz

Package

Model 148 HCMOS







Pin	Connection
1	$V_{CONTROL}$
2	$V_{REF.}$
4	GND
5	Output
8	V_{CC}