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 < 200mW 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** uses an SC-cut crystal technology with arrangement of the whole oven system together with the crystal oscillator inside the TO-8 vacuum holder to radically reduce the OCXO size, power consumption, and its warm-up time. As a result, the **Model 148** provides excellent temperature stability, low phase-noise and aging. Special internal heating resonator (IHR) design enables extra-high shock resistance and durability - a distinctive feature of this model.

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		1Hz 10Hz 100Hz 1kHz 10kHz		-97 -127 -152 -162 -166		dBc/Hz	For 10MHz oscillator
Supply Voltage	V_{CC}		4.75 3.14	5.0 3.3	5.25 3.46	V	

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Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
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 ΔF/F=1 E^{-7}, @+25°C, V_{CC}=5.0V	45		60	sec	Ref. to frequency after 15mins.
HCMOS / TTL Output Levels			10kOhms // 15pF				10MHz output frequency
	V_H		3.8			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	4.5 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-202, 500G, half sine pulse, 11ms
Vibration	Per MIL-STD-202, 30G swept sine 10 to 2000Hz
Soldering Conditions	Hand solder only
Markings	Epoxy ink or laser engraved

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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
P	$2x10^{-7}$
R	$1x10^{-7}$
T	$5x10^{-8}$
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	

Frequency stability vs. temperature range for 10 MHz OCXOs

Temperature vs. Stability	$3x10^{-8}$	$2x10^{-8}$	$1x10^{-8}$	$5x10^{-9}$
0°C to 50°C	+	+	+	+
0°C to 70°C	+	+	+	-
-10°C to 60°C	+	+	+	+
-20°C to 70°C	+	+	+	-
-30°C to 70°C	+	+	+	-
-40°C to 85°C	+	-	-	-

Frequency stability vs. temperature range for 100 MHz OCXOs

Temperature vs. Stability	$1x10^{-7}$	$5x10^{-8}$	$3x10^{-8}$	$2x10^{-8}$
0°C to 50°C	+	+	+	+
0°C to 70°C	+	+	-	-
-10°C to 60°C	+	+	+	-
-20°C to 70°C	+	+	-	-
-30°C to 70°C	+	+	-	-
-40°C to 85°C	+	-	-	-

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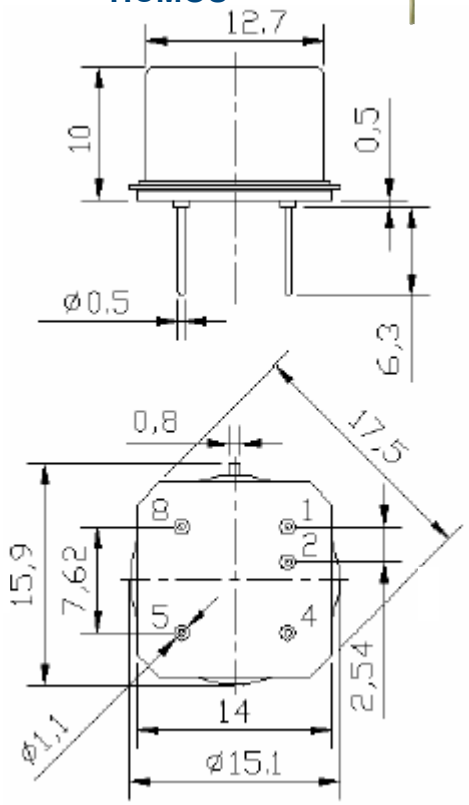
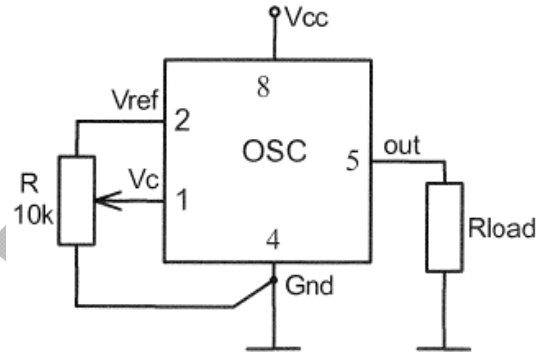
Package

Model 148
HCMOS





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