Model 144

OCXO - Ultra Miniature, Ultra Low Power

DIL-14

Features

- 8MHz to 120MHz frequency range
- Industry's smallest OCXO, 8 mm height
- Very short - warm-up time (to 30 sec)
- Eco-friendly < 150mW power consumption
- HCMOS output

RoHS Status

RoHS 6/6

Applications

- Portable Wireless Communications
- Portable Wireless Devices
- Synthesizers
- Battery Powered Applications

Description

The **Model 144** uses the internal heating resonator (IHR) technology with arrangement of the whole oven control system together with the crystal plate inside the TO-8 vacuum holder to radically reduce the OCXO size, power consumption, and its warm-up time. In addition, the **Model 144** offers excellent temperature stability, low phase-noise and aging rate despite its miniature size and extremely low power consumption. The oscillator has the performance of high-end OCXOs which use conventional oven designs.

Electrical Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Frequency Range	F		8		120	MHz	
Initial calibration	ΔF/F	@ 25°C			±0.1 ±0.2	ppm	For 10MHz oscillator For 100MHz oscillator
Frequency Stability	ΔF/F	vs. Operating temp. E: -30°C to +70°C			± 5	ppb	See "How to Order"
		vs. Supply voltage		±2		ppb	V_{CC} ±5%
		vs. Aging / Day vs. Aging / Year			0.3 ±50	ppb ppb	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 100kHz		-97 -127 -152 -162 -166 -166		dBc/Hz	For 10MHz oscillator
		10Hz 100Hz 1kHz 10kHz 100kHz		-95 -127 -153 -165 -170		dBc/Hz	For 100MHz oscillator

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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		0.8 0.15	1.1 0.25	W	
Warm-up Time	τ	to $\Delta F/F=10^{-7}$, at +25°C, V_{CC} = 5.0V	30	60	90	sec	Ref. to frequency after 15mins.
HCMOS / TTL Output Levels		10MHz oscillator 100MHz oscillator	10kOhms // 10pF 10kOhms // 5pF				
	V_H		3.8			V	
	V_L				0.4	V	
Sub-harmonics			None				
Rise / Fall time	T_R/T_F	10MHz oscillator 100MHz oscillator			10 3	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 30G, 11ms, half sine pulse
Vibration	Per MIL-STD-202G, method 204D, 1.5mm DA 10 to 55Hz, 10G peak swept sine 55 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
144	W	D	E	C	10

Package	Dimensions (mm)
144	21.85 x 15.1

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

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
D = Available only for frequencies ≤100 MHz

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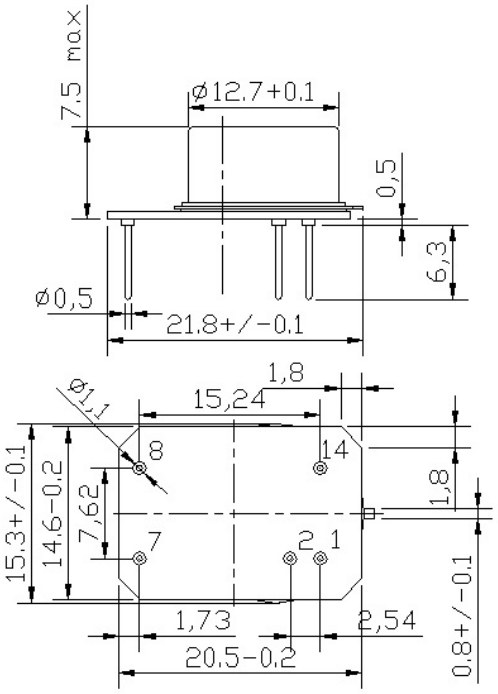
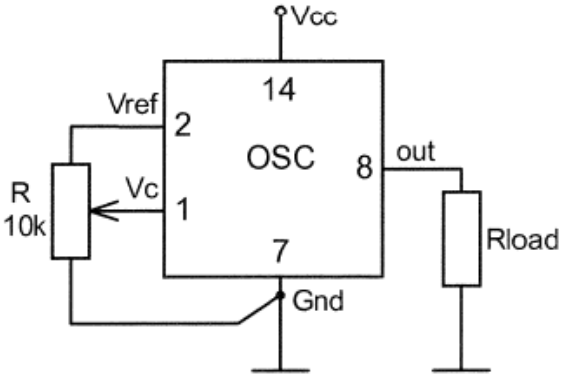
Package

Model 144
HCMOS





Pin	Connection
1	$V_{CONTROL}$
2	$V_{REF.}$
7	GND
8	Output
14	V_{CC}