



XtalTQ Technology

XTALTQ THE RATE OF THE WORLD'S BEATING

Company Profile

Xtaltq Technologies Co., Limited (abbreviated as Xtaltq Techlonogies), located in Chengdu, China. It is a company committed to providing customers with high performance frequency control products(TCXO, OCXO, VCXO) and services of professional high-tech enterprises.

Xtaltq Techlonogies is pleased to have many professionals of the very best in the industry, including the highly experienced engineers with oscillator background and the creative young hands in DSP, automatic control and software, mainly from the crystal-related research institutions of the military industry and renowned universities in China. We also invite experts and professors specializing in oscillator studies as advisors for theoretic support. With the thorough perspective on the frequency control device industry and the spirit of innovation deeply rooted in mind, the team is bringing leading-edge technologies and superior quality to its products.

Based on the traditional design philosophy, Xtaltq Techlonogies applies lots of new ideas and leading edge technologies to its products, such as soft oscillator, dual gradient compensation, DSP, digital PID, database technology, hence leading to the superiority of its products, and facilitating mass production of the products; Xtaltq Technologies is committed to provide customers with the best products and services through integrating the semiconductor industry production capacity and quality control capabilities.

Application Fields

- WIRELESS
- WIRELINE

- MILITARY
- INDUSTRIAL

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Features

- Ultra Stable
- High Frequency Stability
- Extremely Low Phase Noise
- Quick Start
- Small Package

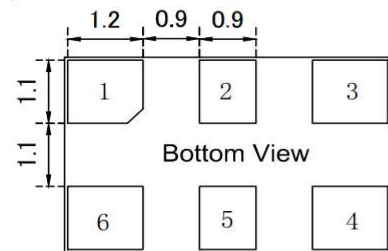
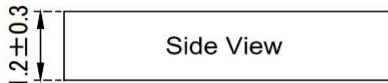
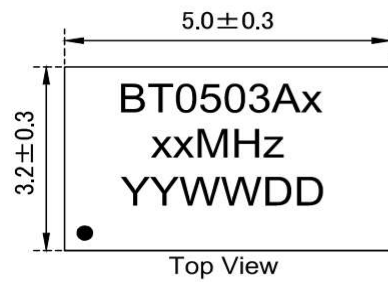
Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics

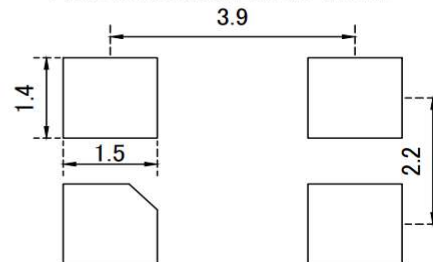
BT0503A Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
	–	5	–	V	V _{cc} ±5%	
Supply Current	–	–	3.5	mA	10MHz~26MHz (Including	
	–	–	10	mA	26MHz~60MHz	
Frequency Range	10~52			MHz		
Nominal Frequency	10, 16, 19.2, 20, 25, 26, 32, 38.4, 40, 48, 50			MHz		
Initial Frequency Tolerance	±0.3	±0.5	±1.0	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.05	–	±0.5	ppm	-40°C~+85°C	
Clipped Sine Wave	Output Level	0.8	–	V _{p-p}		
	Load	10kΩ//10pF				
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	0.4	–	1.5	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
SSB Phase Noise @10MHz	–	–	-105	dBc/Hz	Offset 10Hz	At +25°C
	–	–	-130		Offset 100Hz	
	–	–	-150		Offset 1kHz	
	–	–	-155		Offset 10kHz	
	–	–	-158		Offset 100kHz	
OE Function (Pin 5)	Enable	70% Min. of V _{dd} to Enable Output. Enable Time:100ns max.				
	Disable	20% Max of V _{dd} to Disable Output. Disable Time:100ns max. Disable Current: 2.3mA				
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	–	±15	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		
Phase Noise @1KHz						
Frequency Range	<-135dBc	<-140dBc	<-145dBc	<-150dBc	○=Available X= Not Available	
10MHz	○	○	○	○		
16MHz~40MHz	○	○	○	X		
50MHz	○	○	X	X		
Environmental Conditions						
Operating Temperature Range	-40°C~+85°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections


Pin Connections

Pin1	Vcon/NC
Pin2	NC
Pin3	GND
Pin4	Output
Pin5	OE/NC
Pin6	Vcc

Recommended Land Pattern

Note:

1. Leave pin 1 unconnected If Vcon is not used.
2. Without OE function leave Pin 5 unconnected.

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

* No pressure control function of warm crystal vibration, 1 foot suspended, C1 does not need to weld.

* The load during the test is the total load of the test terminal including the probe.

Ordering Guide

BT 0503 A X X X XXX X X XX.XX

Product:
TCXO

Outline:
5.0mm x 3.2mm

Package:
A:Package A

Output:
H: HCMOS
C: Clipped Sine Wave

Supply Voltage:
3: 3.3 Vdc
5: 5.0 Vdc

Temp. Range:
B: 0~+70°C
C: -20°C ~ +70°C
I: -40°C ~ +85°C
F: Customized

Frequency:
xx MHz

Tuning Range:
N:No Tuning
A: ±5ppm
B: ±7ppm
C: ±12ppm

Phase Noise:
X: No Requirement
A: -120dBc/Hz@1kHz
B: -125dBc/Hz@1kHz
C: -130dBc/Hz@1kHz
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz
G: -145dBc/Hz@1kHz
H: -150dBc/Hz@1kHz

Temp. Stability:
106: ±1ppm
507: ±0.5ppm
287: ±0.28ppm
107: ±0.1ppm
508: ±0.05ppm

Example: BT0503AH3C106CA30.72

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Features

- Ultra Stable
- Wide Temperature Range
- Fast Warming-up
- SMD Package (5.2×3.4mm)

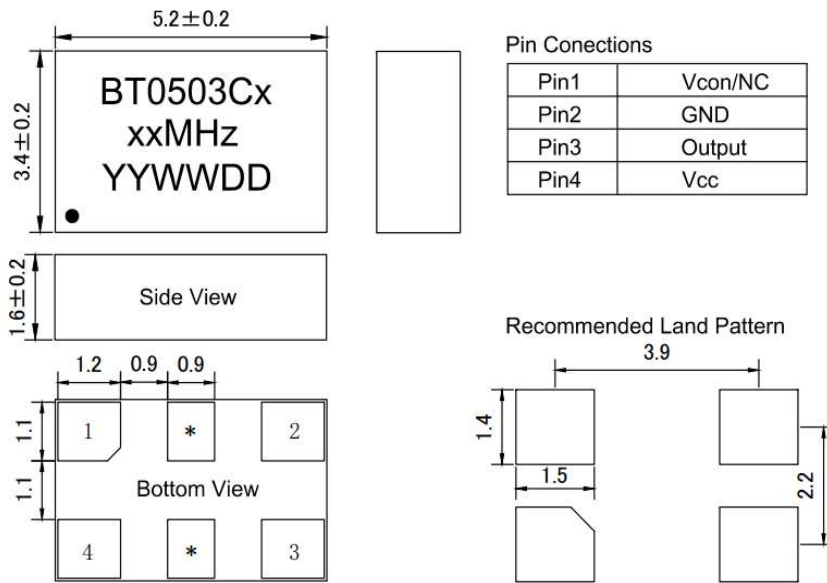
Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics


BT0503C Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
	–	5	–	V	V _{cc} ±5%	
Supply current	–	–	8	mA	10MHz~26MHz (Including26MHz)	
	–	–	12	mA	26MHz~60MHz	
Frequency Range	10~52			MHz		
Nominal Frequency	10, 12.8, 16.384, 19.2, 20, 24.576, 25, 26, 30.72, 40, 50			MHz		
Initial Frequency Tolerance	±0.3	–	±1	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.05	–	±0.5	ppm	-20°C~+70°C	
	±0.1	–	±0.5	ppm	-40°C~+85°C	
	±0.2	–	±1.0	ppm	-50°C~+90°C (except for 10MHz)	
	±0.5	–	±1.0	ppm	-55°C~+95°C (except for 10MHz)	
Clipped Sine Wave	Output Level	0.8	–	Vp-p		
	Load	10kΩ//10pF				
HCMOS	V _{OH}	2.4	–	V	HCMOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	0.4	–	1.3	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
SSB Phase Noise @10MHz	–	–	-92	dBc/Hz	Offset 10Hz	
	–	–	-120		Offset 100Hz	
	–	–	-140		Offset 1kHz	
	–	–	-145		Offset 10kHz	
	–	–	-150		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	–	±12	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		
Phase Noise @1KHz						
Frequency Range	<-125dBc	<-130dBc	<-135dBc	<-140dBc	○=Available X= Not Available	
10MHz	○	○	○	○		
12.8MHz~20MHz	○	○	○	X		
20.48MHz~38.4MHz	○	○	X	X		
≥40MHz	○	X	X	X		
Environmental Conditions						
Operating Temperature Range	-55°C ~ +95°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections


Note:

1. The pins with '*' are for factory test.
2. Leave pin 1 unconnected if Vcon is not used.

Maximum Ratings

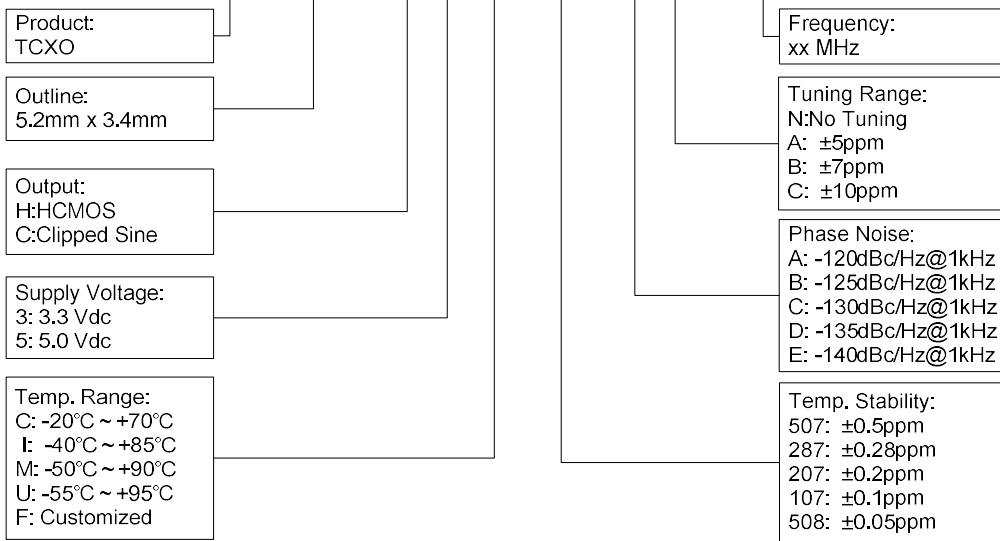
Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 0503C X X X XXX X X XX.XX



Example: BT0503CH3M287BN50

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Features

- Ultra Stable
- Industrial Temperature

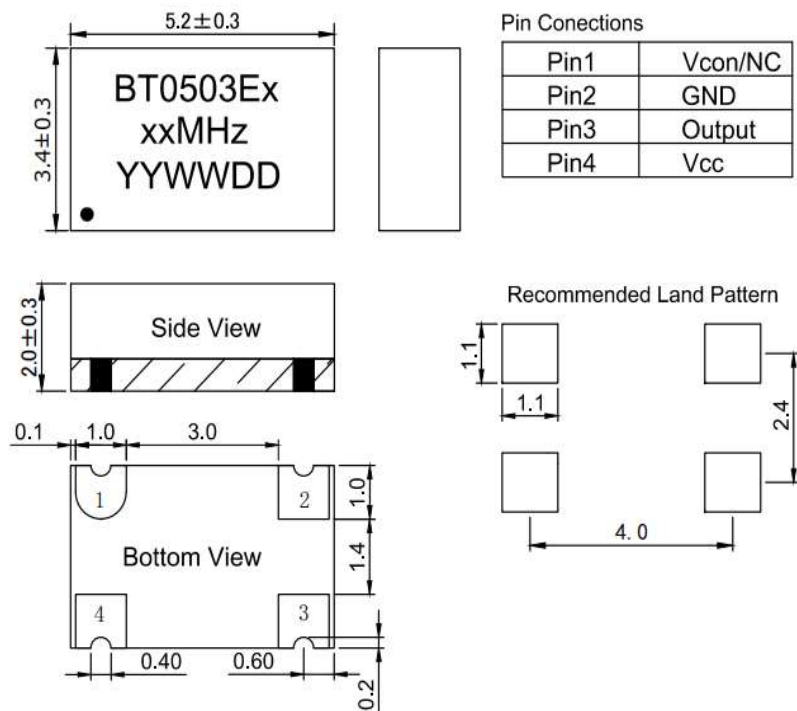
Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics


BT0503E Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	Vcc±5%	
	–	5	–	V	Vcc±5%	
Supply Current	–	–	8	mA	10MHz~26MHz (Including 26MHz)	
	–	–	12	mA	26MHz~60MHz	
Frequency Range	10~60			MHz		
Nominal Frequency	10, 16.384, 19.2, 20, 24.576, 25, 26, 30.72, 40, 50			MHz		
Initial Frequency Tolerance	±0.5	–	±1.5	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.2	–	±1.5	ppm	-20°C~+70°C	
	±0.28	–	±1.5	ppm	-40°C~+85°C	
	±1	–	±2.5	ppm	-50°C~+90°C	
	±2.5	–	±3.5	ppm	-55°C~+95°C	
Clipped Sine Wave	Output Level	0.8	–	Vp-p		
	Load	10kΩ//10pF				
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	–	–	1.3	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	Vcc±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
	–	–	±0.8	Customized		
SSB Phase Noise @10MHz	–	–	-95	dBc/Hz	Offset 10Hz	At +25°C
	–	–	-120		Offset 100Hz	
	–	–	-140		Offset 1kHz	
	–	–	-145		Offset 10kHz	
	–	–	-150		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	–	±12	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		
Phase Noise @1KHz						
Frequency Range	<-125dBc	<-130dBc	<-135dBc	<-140dBc	○=Available X= Not Available	
10MHz	○	○	○	○		
12.8MHz~20MHz	○	○	○	X		
20.48MHz~38.4MHz	○	○	X	X		
≥40MHz	○	X	X	X		
Environmental Conditions						
Operating Temperature Range	-40°C~+85°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections



Note: Leave pin 1 unconnected if Vcon is not used.

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 0503 E X X X XXX X X XX.XX

Product:
TCXO

Outline:
5.2mm x 3.4mm

Package:
E:Package E

Output:
H: HCMOS
C: Clipped Sine Wave

Supply Voltage:
3: 3.3 Vdc
5: 5.0 Vdc

Temp. Range:
C: -20°C ~ +70°C
I: -40°C ~ +85°C
F: Customized

Frequency:
xx MHz

Tuning Range:
N: No Tuning
A: ±5ppm
B: ±7ppm
C: ±12ppm

Phase Noise:
A: -120dBc/Hz@1kHz
B: -125dBc/Hz@1kHz
C: -130dBc/Hz@1kHz
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz

Temp. Stability:
106: ±1ppm
507: ±0.5ppm

Example: BT0503EH3C106CA30.72

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Features

- Ultra Stable
- Wide Temperature Range
- SMD Package (7.0×5.0mm)
- Provide Stratum III Level Frequency Stability

Applications

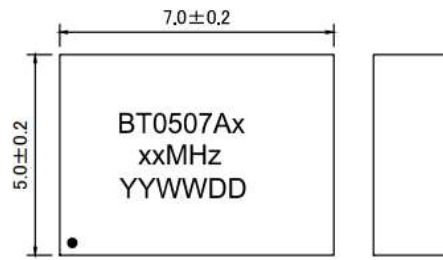
- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics


BT0507A&B Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	Vcc±5%	
	–	5	–	V	Vcc±5%	
Supply Current	–	–	8	mA	10MHz~26MHz (Including 26MHz)	
	–	–	12	mA	26MHz~60MHz	
Frequency Range	10 ~ 52			MHz		
Nominal Frequency	10, 12.8, 16, 16.384, 19.2, 20, 24.576, 25, 26, 30.72, 40, 50			MHz		
Initial Frequency Tolerance	±0.3	–	±0.5	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.05	–	±0.5	ppm	-20°C~+70°C	
	±0.1	–	±0.5	ppm	-40°C~+85°C	
	±0.2	–	±1.0	ppm	-50°C~+90°C	
	±0.5	–	±1.0	ppm	-55°C~+95°C	
Clipped Sine Wave	Output Level	0.8	–	Vp-p		
	Load	10kΩ/10pF				
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	0.4	–	1.3	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	Vcc±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
SSB Phase Noise @10MHz	–	–	-95	dBc/Hz	Offset 10Hz	At +25°C
	–	–	-120		Offset 100Hz	
	–	–	-140		Offset 1kHz	
	–	–	-145		Offset 10kHz	
	–	–	-150		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	–	±12	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		
Phase Noise @1KHz						
Frequency Range	<-125dBc	<-130dBc	<-135dBc	<-140dBc	○=Available X= Not Available	
10MHz	○	○	○	○		
12.8MHz~20MHz	○	○	○	X		
20.48MHz~38.4MHz	○	○	X	X		
≥40MHz	○	X	X	X		
Environmental Conditions						
Operating Temperature Range	-55°C~+95°C					
Storage Temperature Range	-55°C ~ +125°C					

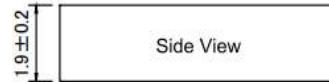
Outline Dimension & Pin Connections

BT0507A

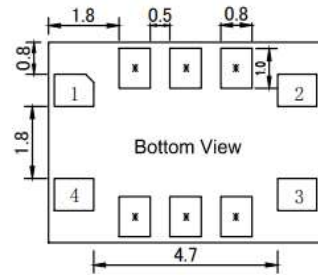
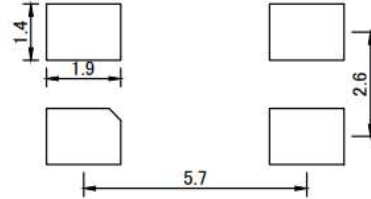


Pin Connections

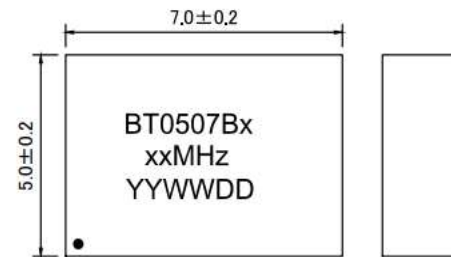
Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc



Recommended Land Pattern



BT0507B

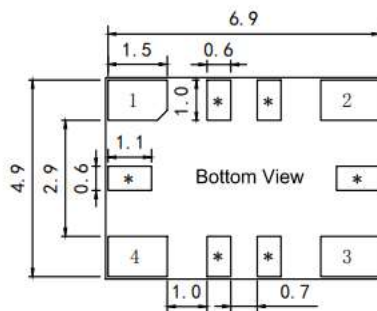
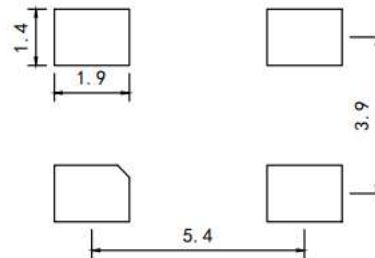


Pin Connections

Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc



Recommended Land Pattern



Note:

1. The pins with '*' are for factory test.
2. Leave pin 1 unconnected if Vcon is not used.

Maximum Ratings

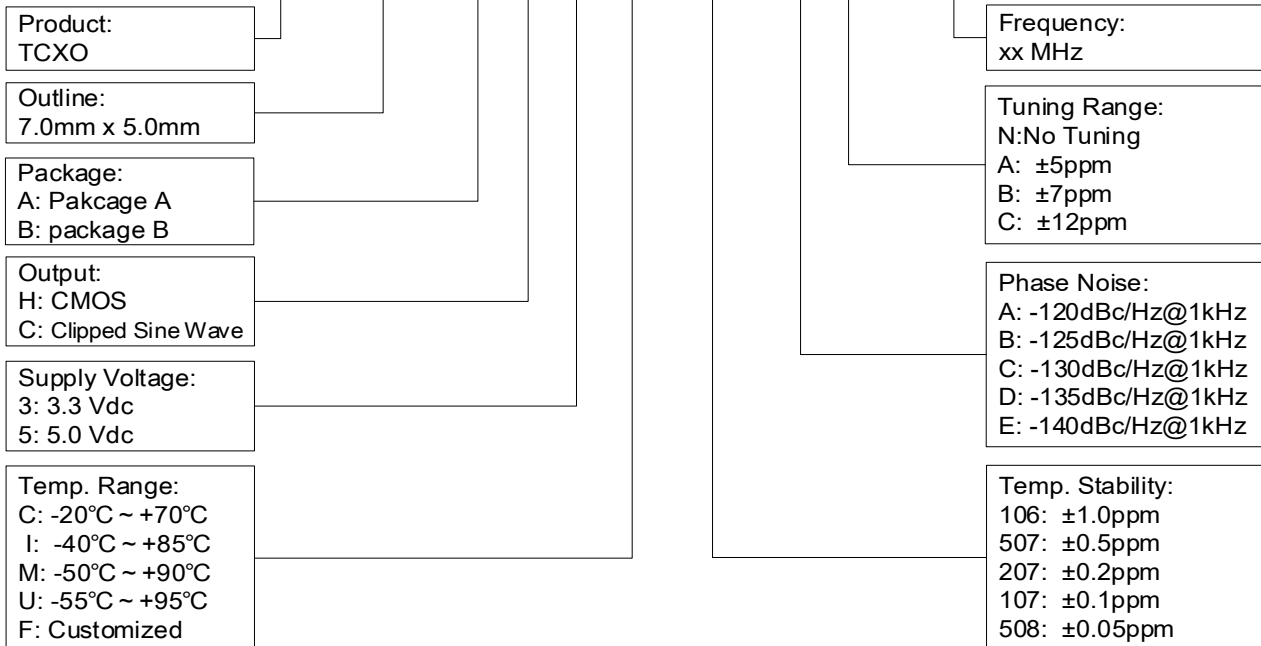
Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 0507 X X X X XXX X X XX.XX



Example: BT0507BH3M287DN16.384

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Features

- Industrial Temperature
- SMD Package(7.0×5.0mm)

Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics


BT0507C&D Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V		
	–	5	–	V		
Supply Current	–	–	8	mA	10MHz~26MHz (Including 26MHz)	
	–	–	12	mA	26MHz~60MHz	
Frequency Range	10 ~ 50			MHz		
Nominal Frequency	10, 16.384, 19.2, 20, 24.576, 25, 26, 30.72, 40, 50			MHz		
Initial Frequency Tolerance	±0.5	–	±1.0	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.5	–	±1.0	ppm	-20°C~+70°C	
	±0.5	–	±1.0	ppm	-40°C~+85°C	
Clipped Sine Wave	Output Level	0.8	–	Vp-p		
	Load	10kΩ//10pF				
HCMOS	V _{OH}	2.4	–	V	HCMOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	–	–	1.3	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	Vcc±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
	±0.3	–	±0.8		Customized	
SSB Phase Noise @10MHz	–	–	-95	dBc/Hz	Offset 10Hz	
	–	–	-120		Offset 100Hz	
	–	–	-140		Offset 1kHz	
	–	–	-145		Offset 10kHz	
	–	–	-150		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	–	±12	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		

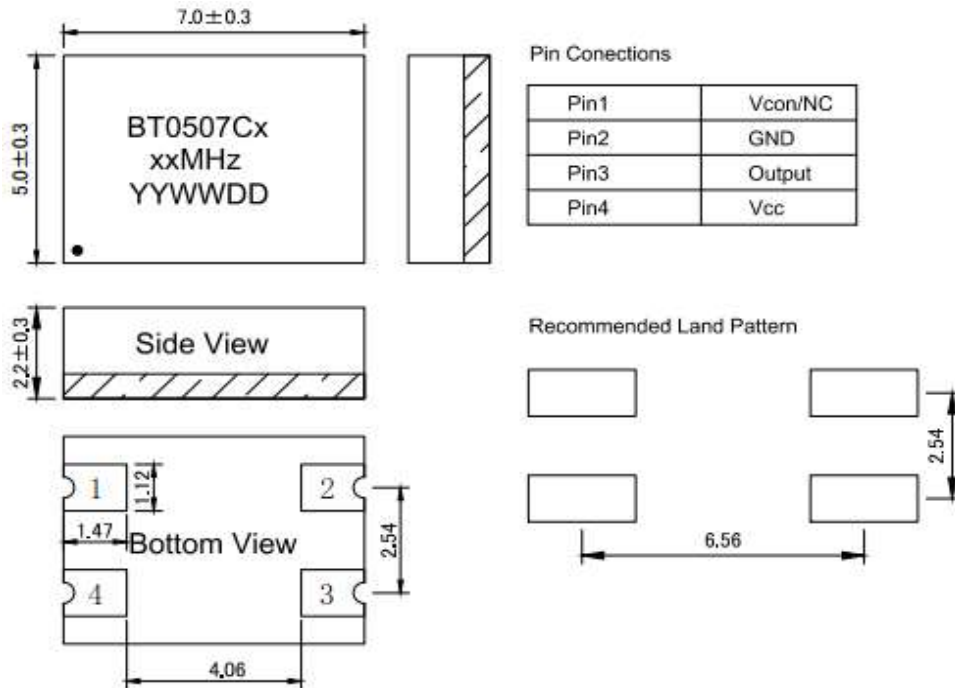
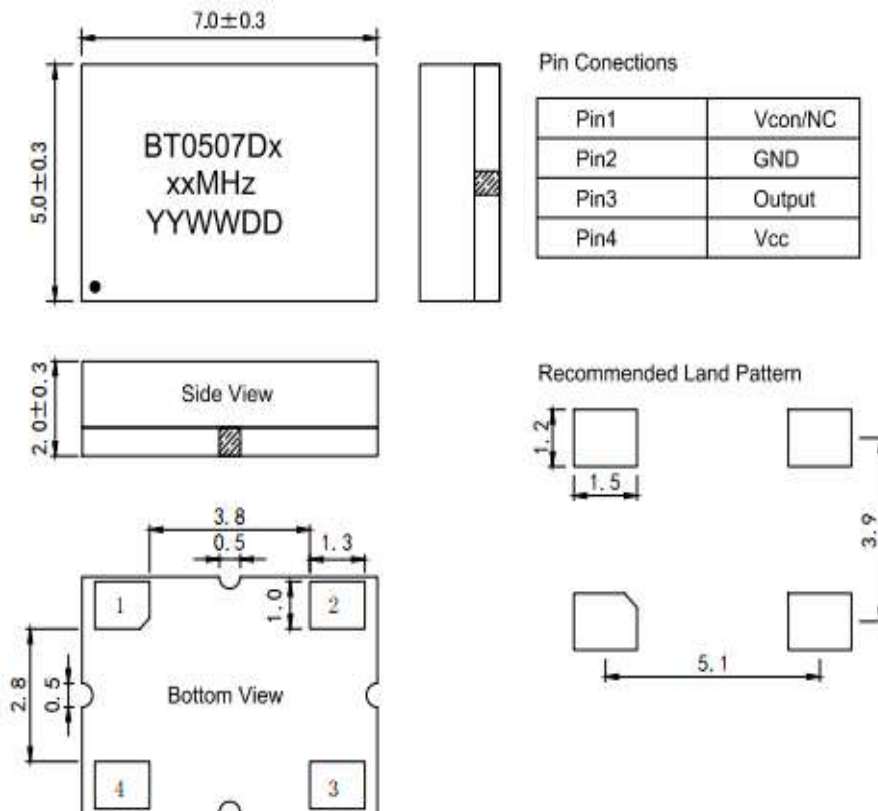
Phase Noise @1KHz

Frequency Range	<-125dBc	<-130dBc	<-135dBc	<-140dBc	
10MHz	○	○	○	○	○=Available X= Not Available
12.8MHz~20MHz	○	○	○	X	
20.48MHz~38.4MHz	○	○	X	X	
≥40MHz	○	X	X	X	

Environmental Conditions

Operating Temperature Range	-40°C ~ +85°C
Storage Temperature Range	-55°C ~ +125°C

Outline Dimension & Pin Connections

Package C:

Package D:


Note: Leave pin 1 unconnected If Vcon is not used.

Maximum Ratings

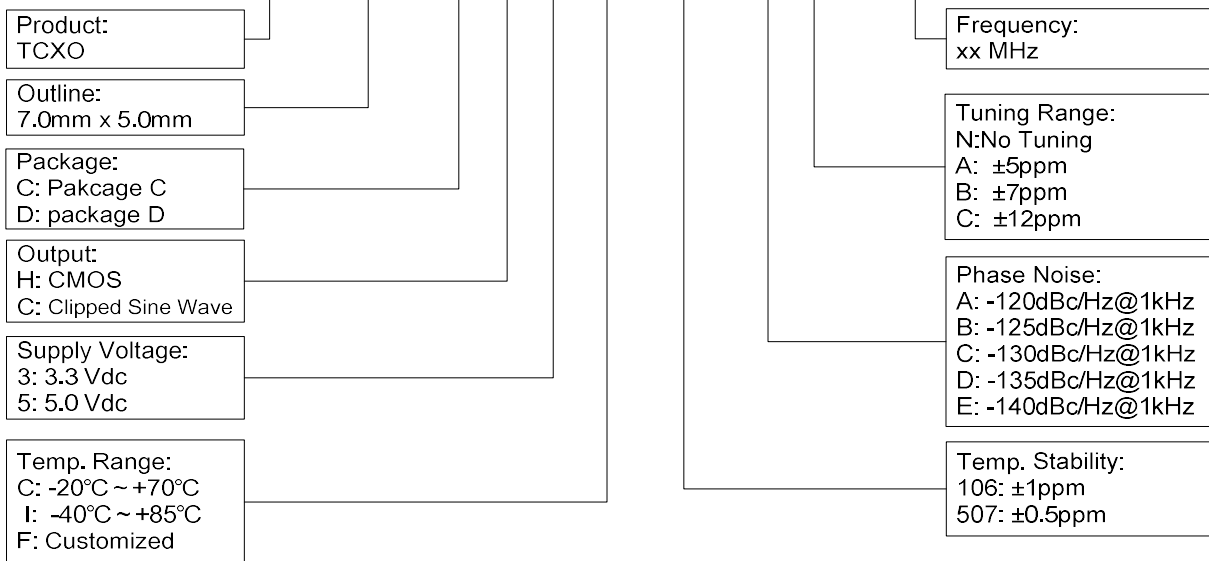
Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 0507 X X X X XXX X X XX.XX



Example: BT0507DH3C106CA30.72

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Features

- Ultra Stable
- Wide Temperature Range
- SMD Package(7.0×5.0mm)

Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics

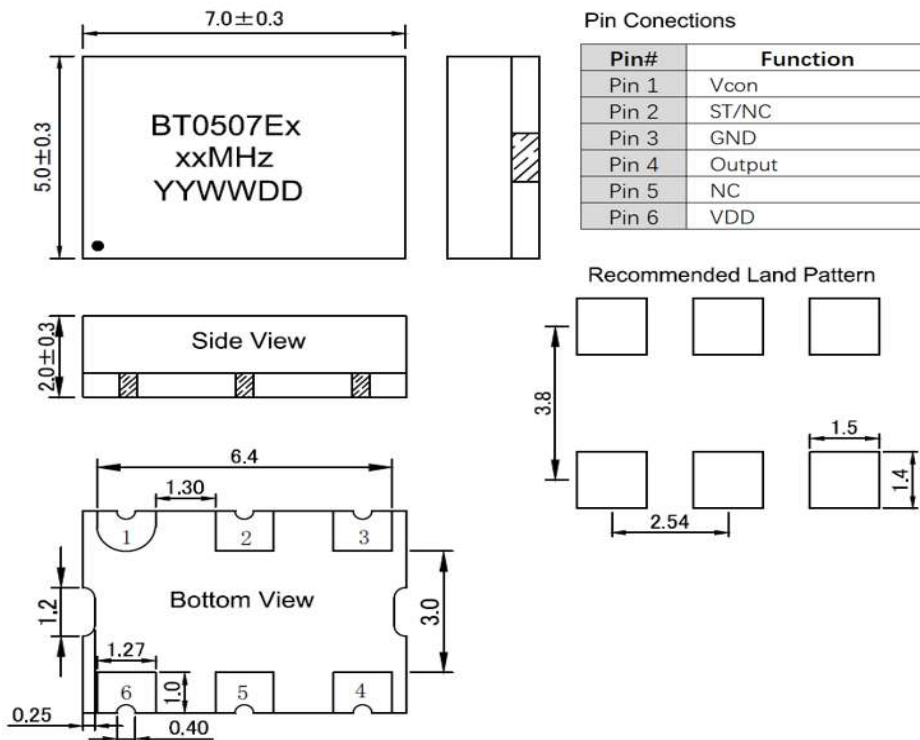

BT0507E Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-	V	V _{cc} ±5%	
	-	5	-	V	V _{cc} ±5%	
Supply Current	-	-	15	mA	-40°C~+85°C	
	-	-	80	mA		
Frequency Range	10~60			MHz		
Nominal Frequency	10,20,40,50			MHz		
Initial Frequency Tolerance	±0.50	±1.0	±2.0	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.28	-	±2	ppm	-40°C ~ +85°C	
	±0.28	±0.5	±2.0	ppm	-50°C ~ +85°C	
	±0.28	±0.5	±2.0	ppm	-55°C ~ +85°C	
	±0.50	±1.0	±2.0	ppm	-60°C ~ +85°C	
HCMOS	V _{OH}	2.4	-	-	V	HCMOS Output, Load=15pf
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	-	15	pf	
Clipped Sine Wave	Output Level	0.8	-	-	Vp-p	
	Load	10kΩ//10pF				
Sine Wave	Output Level	7	-	-	dbm	
	Harmonious			-30	dBc	
	Spurious			-70	dBc	
	Load	50ohm				
RMS Jitter(By E5052B)	-	-	1.3	ps	12KHz~5MHz	
Supply Sensitivity	-	-	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	-	-	±0.2		Load±5%	
Aging/ First Year	-	-	±1.0		Standard	
SSB Phase Noise @10MHz	-	-	-110	dBc/Hz	Offset 10Hz	At +25°C
	-	-	-130		Offset 100Hz	
	-	-	-150		Offset 1kHz	
	-	-	-155		Offset 10kHz	
	-	-	-155		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	-	±12	ppm		
Tuning Slope	positive					
Non-linearity	-	-	10	%		
Input impedance	100	-	-	KΩ		
Phase Noise @1KHz						
Frequency Range	<-125dBc	<-130dBc	<-135dBc	<-140dBc	○=Available X= Not Available	
10MHz	○	○	○	○		
12.8MHz~20MHz	○	○	○	X		
20.48MHz~38.4MHz	○	○	X	X		
≥40MHz	○	X	X	X		

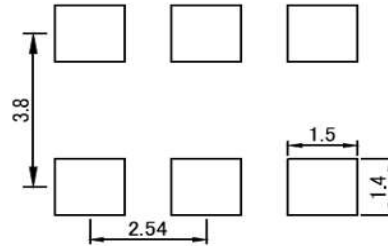
Environmental Conditions

Operating Temperature Range	-60°C ~ +85°C
Storage Temperature Range	-55°C ~ +125°C

Outline Dimension & Pin Connections

Package E

Pin Connections

Pin#	Function
Pin 1	Vcon
Pin 2	ST/NC
Pin 3	GND
Pin 4	Output
Pin 5	NC
Pin 6	VDD

Recommended Land Pattern


- Note:**
1. Leave pin 1 unconnected if Vcon is not used.
 2. Leave Pin 2 unconnected if OE function is not applied.
 3. Leave Pin 5 unconnected with non-differential

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 0507 E X X X XXX X X XX.XX

Product:
TCXO

Outline:
7.0mm x 5.0mm

Package Type:
E: Package E

Output:
H: CMOS
C: Clipped Sine Wave
S: Sine Wave

Supply Voltage:
3: 3.3 V
5: 5.0 V

Temp. Range:
I: -40~+85°C
M: -50°C ~ +90°C
U: -55°C ~ +95°C
W: -60°C ~ +85°C
F: Customized

Frequency:
xx MHz
e.g.: 10 (10MHz)

Tuning Range:
N: No Tuning
A: ±5ppm min.
B: ±7ppm min.

Phase Noise:
A: -120dBc/Hz@1kHz
B: -125dBc/Hz@1kHz
C: -130dBc/Hz@1kHz
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz
G: -145dBc/Hz@1kHz

Temp. Stability:
206: ±2.0ppm
106: ±1.0ppm
507: ±0.5ppm
287: ±0.28ppm

Example: BT0507EH3C106CA30.72

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Features

- Ultra Low Phase Noise
- Wide Temperature Range
- SMD Package(7.0×5.0mm)

Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics


BT0507M Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
	–	5	–	V	V _{cc} ±5%	
Supply Current	–	–	35	mA	-40°C~+85°C	
Frequency Range	80~ 125			MHz		
Nominal Frequency	80, 100, 120, 122.88			MHz		
Initial Frequency Tolerance	±0.50	±1.0	±2.0	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.28	±0.5	±2	ppm	-40°C ~ +85°C	
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	–	–	1.3	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
SSB Phase Noise @100MHz	–92	–85	–80	dBc/Hz	Offset 10Hz	At +25°C
	–125	–120	–110		Offset 100Hz	
	–146	–142	–140		Offset 1kHz	
	–159	–157	–155		Offset 10kHz	
	–167	–165	–162		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	–	–	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		
Input impedance	100	–	–	KΩ		

Environmental Conditions

Operating Temperature Range	-55°C~+95°C
Storage Temperature Range	-40~+85°C

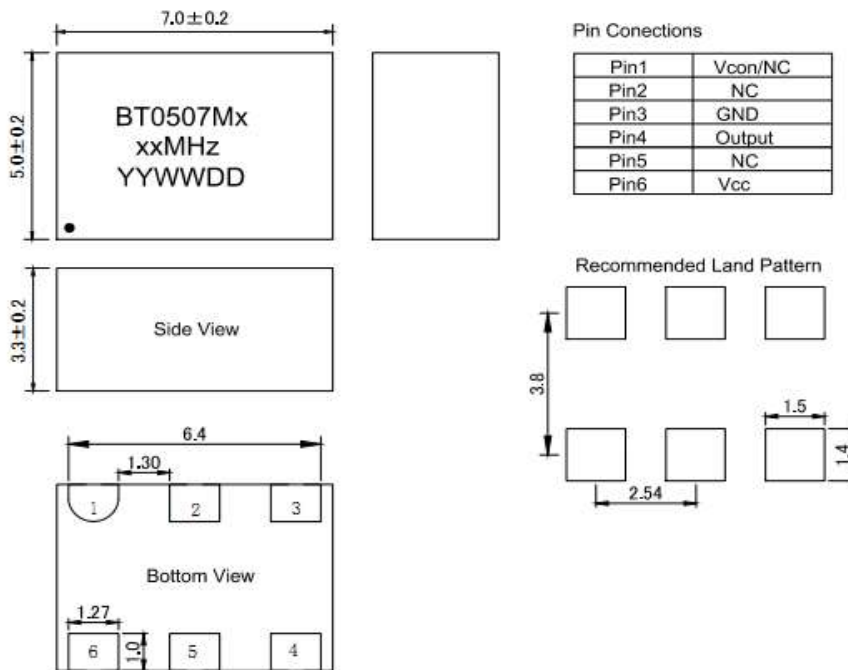
Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	V _{dd}	-0.5V / 6V
Control Voltage	V _{con}	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

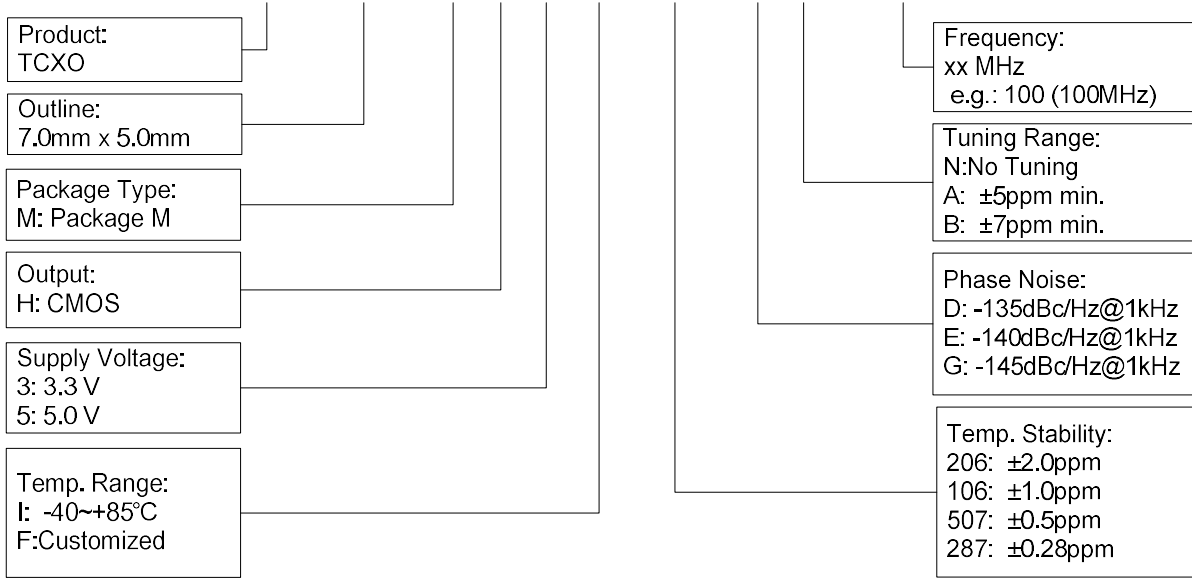
Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Outline Dimension & Pin Connections



Ordering Guide

BT 0507 M X X X XXX X X XX.XX



Example: BT0507MH3I287CN100

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Features

- Ultra Stable
- Low Phase Noise
- SMD Package(9.35*14.65mm)

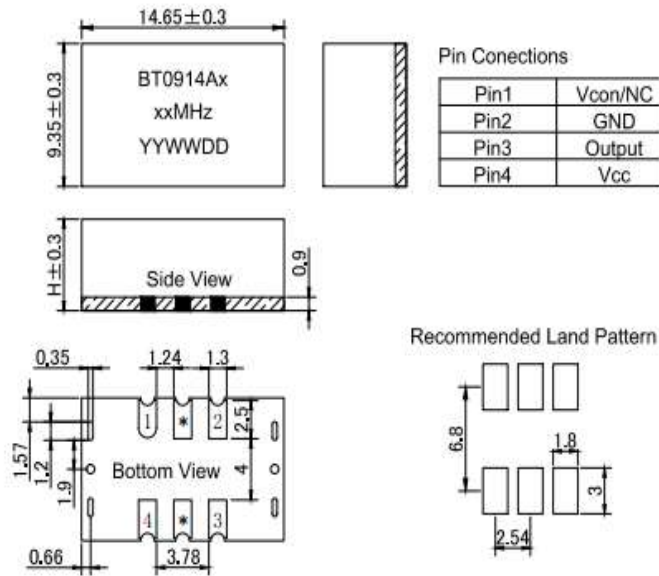
Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET


BT0914A Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-		V _{cc} ±5%	
	-	5	-	V	V _{cc} ±5%	
Current with Output	-	-	45	mA		
Frequency Range	10 ~ 125			MHz		
Nominal Frequency	10, 20, 40, 50, 100, 122.88, 125			MHz		
Initial Frequency Tolerance	±0.3	±0.5	±1	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.20	±0.5	±2	ppm	-20°C~+70°C	
	±0.20	±0.5	±2	ppm	-40°C~+85°C	
	±0.10	-	±2	ppm	-40°C~+85°C	
	±0.28	±0.5	±2	ppm	-50°C~+85°C	
Sine Wave	Output Level	7	-	-	dBm	
	Harmonics	-	-	-30	dBc	
	Spurious	-	-	-70	dBc	
	Load	-	50	-	Ω	
HCMOS	V _{OH}	2.4	-	-	V	HCMOS Output, Load=15pf
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	-	15	pf	
RMS Jitter(By E5052B)	20	-	40	fs	12KHz~5MHz	
Supply Sensitivity	-	-	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	-	-	±0.2		Load±5%	
Aging/ First Year	-	-	±1.0		Standard	
SSB Phase Noise @10MHz	-	-77	-75	dBc/Hz	Offset 10Hz	At +25°C
	-	-112	-110		Offset 100Hz	
	-	-142	-140		Offset 1kHz	
	-	-158	-155		Offset 10kHz	
	-	-163	-158		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	-	-	ppm		
Tuning Slope	Positive					
Linearity	-	-	10	%		
Phase Noise @1KHz						
Frequency Range	<-135dBc	<-140dBc	<-145dBc	<-150dBc	○=Available X= Not Available	
10MHz~20MHz(Including 20MHz)	○	○	○	○		
20MHz~100MHz(Including 100MHz)	○	○	○	X		
>100MHz	○	○	X	X		
Environmental Conditions						
Operating Temperature Range	-50°C ~ +85°C					
Storage Temperature Range	-55°C ~ +105°C					

Outline Dimension & Pin Connections



Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc

Note:

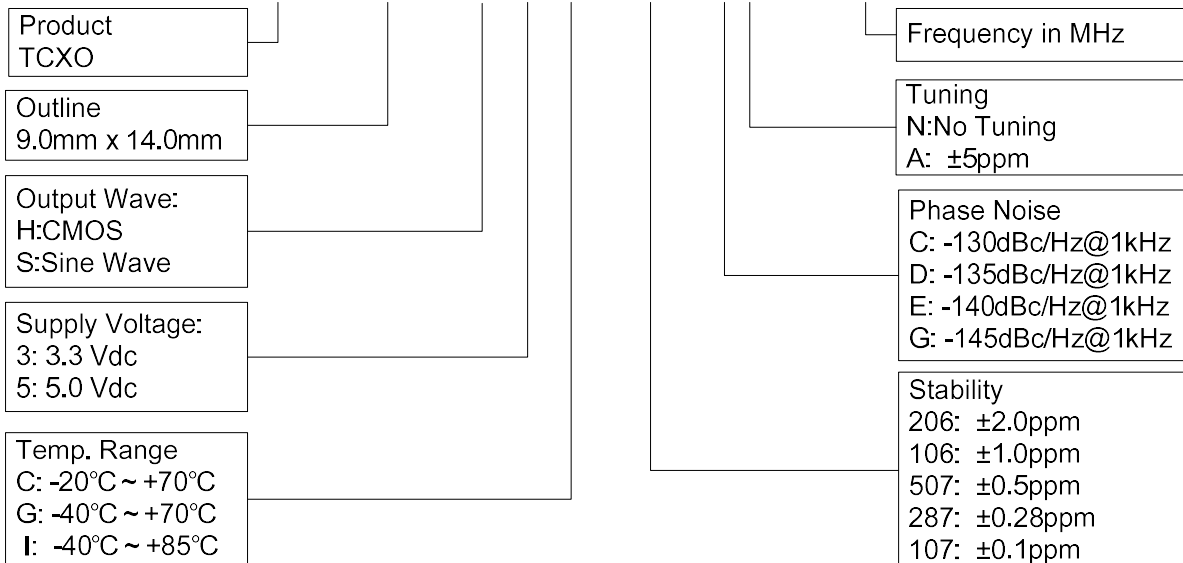
1. The pins with '*' are for factory test.
2. Leave pin 1 unconnected if Vcon is not used.
3. The height is 7mm(min) once Frequency stability is $\pm 0.05 \sim \pm 0.1 \text{ ppm} @ -40 \sim +85^\circ\text{C}$, others is 6mm(min).

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 0914A X X X XXX X X XX.XX



Example: BT0914AS5I287AA100

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Features

- Ultra Wide Operating Temp.
- Low Phase Noise
- DIP Package(12.6*20.2mm)

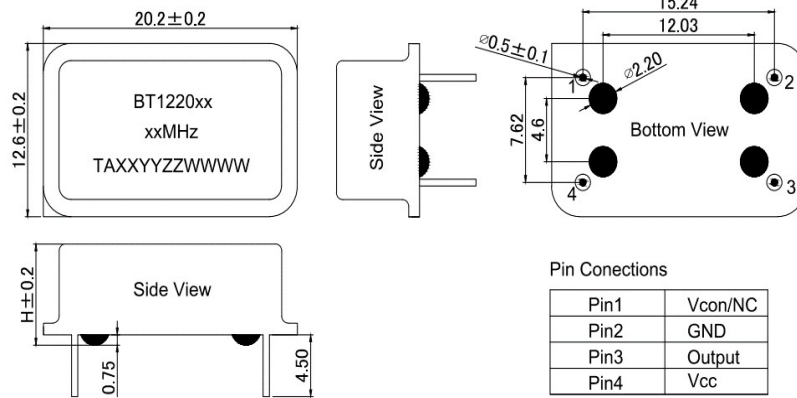
Applications

- Base Stations
- Instrumentations
- Synthesizer
- WiMax/LTE/BTS


BT1220 Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-	V	V _{cc} ±5%	
	-	5	-	V	V _{cc} ±5%	
Current with Output	-	-	45	mA		
Frequency Range	10 ~ 125			MHz		
Nominal Frequency	10, 20, 40, 50, 80, 100, 102.4, 120, 122.88, 125			MHz		
Initial Frequency Tolerance	±0.3	±0.5	±1.0	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.1	±0.5	±2.0	ppm	-40°C ~ +85°C	
	±0.28	±0.5	±2.0	ppm	-50°C ~ +85°C	
	±0.5	±1.0	±2.0	ppm	-55°C ~ +95°C	
Sine Wave	Output Level	7	-	-	dBm	
	Harmonics	-	-	-30	dBc	
	Spurious	-	-	-70	dBc	
	Load	-	50	-	Ω	
HCMOS	V _{OH}	2.4	-	-	V	HCMOS Output, Load=15pf
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	-	15	pf	
RMS Jitter(By E5052B)	20	-	40	fs	12KHz~5MHz @100MHz	
Supply Sensitivity	-	-	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	-	-	±0.2		Load±5%	
Aging/ First Year	-	-	±1.0		Standard	
SSB Phase Noise @100MHz	-	-77	-75	dBc/Hz	Offset 10Hz	At +25°C
	-	-112	-110		Offset 100Hz	
	-	-142	-140		Offset 1kHz	
	-	-158	-155		Offset 10kHz	
	-	-163	-158		Offset 100kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±5	-	±12	ppm		
Tuning Slope	Positive					
Linearity	-	-	10	%		
Phase Noise@1KHz						
Frequency Range	<-135dBc	<-140dBc	<-145dBc	<-150dBc	○=Available X= Not Available	
10MHz~20MHz(Including 20MHz)	○	○	○	○		
20MHz~100MHz(Including 100MHz)	○	○	○	X		
>100MHz	○	○	X	X		
Environmental Conditions						
Operating Temperature Range	-55°C ~ +95°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections



- Note:**
1. Leave pin 1 unconnected If Vcon is not used.
 2. The height 6mm or 8mm is available.

Maximum Ratings

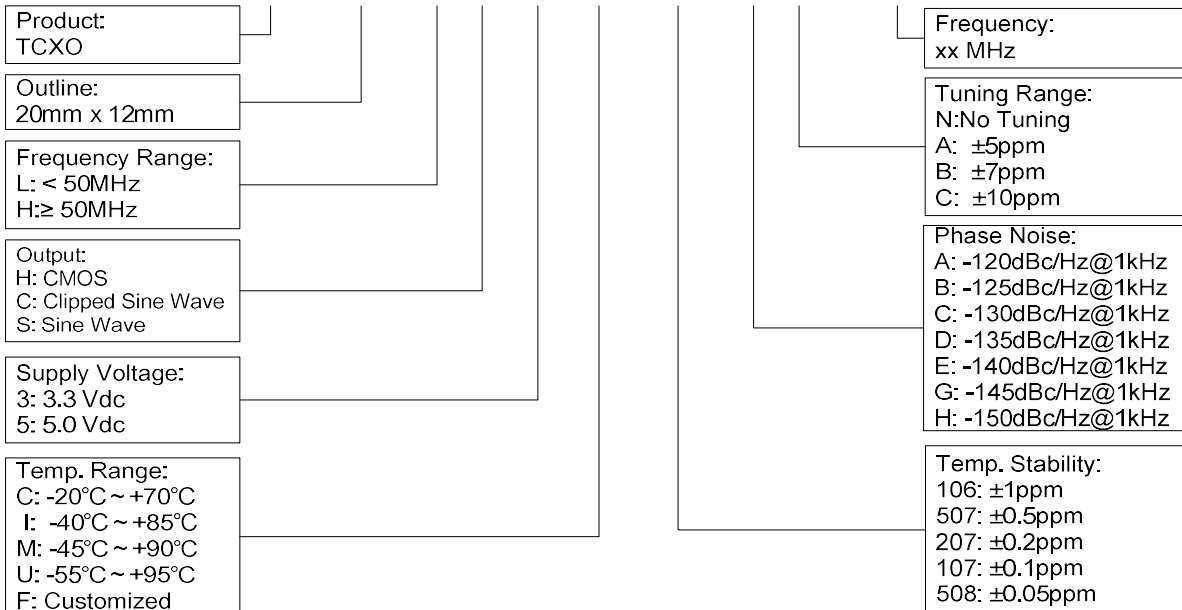
Parameter		Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Symbol	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 1220 X X X X XXX X X XX.XX



Example: BT1220LS5C107DN10 / BT1220HS3I106CN100

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Features

- Ultra Stable
- Wide Temperature Range
- SMD Package (3.2×2.5mm)
- Provide Stratum III Level Frequency

Applications

- Base Stations
- Instrumentations
- Synthesizer
- SDH/SONET
- Medical Electronics


BT3225AH Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3	–	V		
Supply Current	10	–	18	mA		
Frequency Range	16~60			MHz		
Nominal Frequency	20, 25, 40			MHz		
Initial Frequency Tolerance	–	±0.5	±1	ppm	At 1.6V Center Voltage, +25°C	
Freq. Stability Vs. Temp.	±0.28	±0.5	±1	ppm	-40°C~+105°C	
CMOS	V _{OH}	2.4	–	V	LVC MOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	LVC MOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	LVC MOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	0.4	–	1.3	ps	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Customized (The test was conducted after 60 days of pre aging at 85 °C)	
Aging/Day	–	–	–	ppb		
SSB Phase Noise @20MHz	–	–	-95	dBc/Hz	Offset 10Hz	
	–	–	-120		Offset 100Hz	
	–	–	-140		Offset 1kHz	
	–	–	-150		Offset 10kHz	
	–	–	-155		Offset 100kHz	
Control Voltage Range	1.5 ± 1.5			V		
Frequency Turning Range	±5	–	±12	ppm		
Tuning Slope	positive					
Non-linearity	–	–	10	%		

Phase Noise @1KHz

Freq. Range	<-125dBc	<-130dBc	<-135dBc	<-140dBc	
20MHz	○	○	○	○	○=Available X= Not Available
25MHz	○	○	○	X	
40MHz	○	○	X	X	

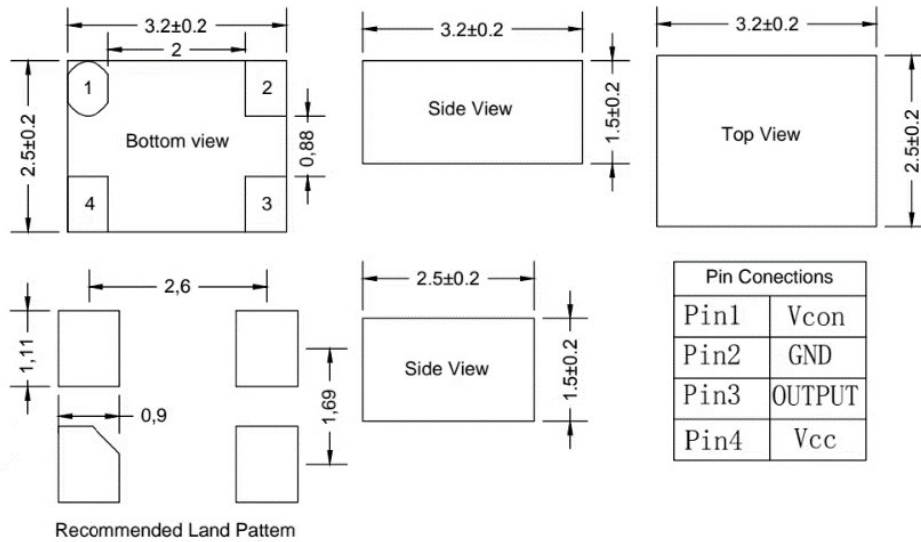
Environmental Conditions

Operating Temperature Range	-40°C~+105°C
Storage Temperature Range	-55°C ~ +125°C
Moisture Sensitive Level	MSL2

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	V _{dd}	-0.5V / 6V
Control Voltage	V _{con}	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Outline Dimension & Pin Connections



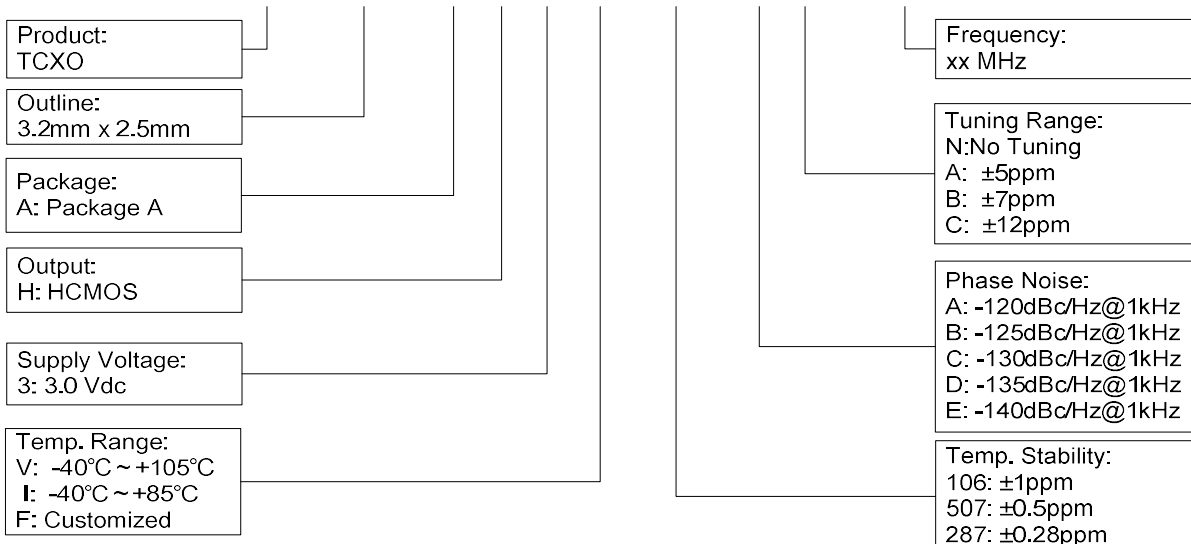
Note: Leave pin 1 unconnected if Vcon is not used.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 3225 A H X X XXX X X XX.XX



Example: BT3225AH3I106CA20

Disclaimer

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Features

- Ultra Stable
- Low Phase Noise
- Freq. Range 50~156.25MHz
- High Precision
- SMD 9.2×14.2mm

Applications

- Satellite navigation
- wireless communication system
- High definition television system
- Low phase noise signal source
- Low jitter radio frequency communication circuit


BT0914A Vibration Insensitive Specifications

Parameter		Value			Unit	Conditions	
		Min.	Typ.	Max.			
Supply Voltage		-	3.3	-	V	Vcc±5%	
		-	5	-	V		
Supply Current		-	-	45	mA		
Frequency Range		50~ 156.25			MHz		
Nominal Frequency		50,80,100,122.88			MHz		
Initial Frequency Tolerance		±0.5	-	±1.5	ppm	At shipment, nominal EFC, +25°C	
Freq.Stability Vs.Temp.		±0.28	±0.28	±2	ppm	-20°C~+70°C@Height above 6mm	
		±0.28	±0.5	±2	ppm	-40°C~+85°C@Height above 6mm	
		±0.5	±1.0	±2	ppm	-50°C~+85°C@Height above 6mm	
Sine Wave	Output	7	-	-	dBm		
	Harmonic Suppression	-	-	-30	dBc		
	Spur Suppression	-	-	-70	dBc		
	Load	-	50	-	Ω		
HCMOS	Voh	2.4	-	-	V	HCMOS Output, Load=15pf	
	Vol	-	-	0.4	V	HCMOS Output, Load=15pf	
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2	
	Rise/Fall Edge	-	-	6	ns	HCMOS Output, Load=15pf	
	Load	-	-	15	pf		
RMS Jitter(E5052B)		-	-	1000	fs	12KHz~20MHz	
Supply Sensitive		-	-	±0.2	ppm	Vcc±5%	
Load Sensitive		-	-	±0.2		Load±5%	
Aging/First Year		-	-	±1.0		Standard	
SSB Phase Noise @100MHz		-	-80	-75	dBc/Hz	Offset 10Hz	Static phase noise at +25°C
		-	-112	-110		Offset 100Hz	
		-	-142	-140		Offset 1kHz	
		-	-158	-155		Offset 10kHz	
		-	-161	-158		Offset 100kHz	
		-	-161	-160		Offset 1000kHz	
SSB Phase Noise @100MHz		-	-75	-70	dBc/Hz	Offset 10Hz	X-axis dynamic phase noise at +25°C
		-	-102	-95		Offset 100Hz	
		-	-110	-100		Offset 1kHz	
		-	-150	-145		Offset 10kHz	
		-	-158	-155		Offset 100kHz	
		-	-160	-158		Offset 1000kHz	
SSB Phase Noise @100MHz		-	-72	-70	dBc/Hz	Offset 10Hz	Y-axis dynamic phase noise at +25°C
		-	-96	-95		Offset 100Hz	
		-	-110	-100		Offset 1kHz	
		-	-150	-145		Offset 10kHz	
		-	-158	-155		Offset 100kHz	
		-	-160	-158		Offset 1000kHz	

SSB Phase Noise @100MHz	-	-74	-70	dBc/Hz	Offset 10Hz	Z-axis dynamic phase noise at +25°Cse)
	-	-96	-95		Offset 100Hz	
	-	-102	-100		Offset 1kHz	
	-	-147	-145		Offset 10kHz	
	-	-158	-155		Offset 100kHz	
	-	-160	-158		Offset 1000kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±3	±5	±10	ppm		
Tuning Slope	Positive					
Non-Linearity	-	-	10	%		

Phase Noise @1kHz

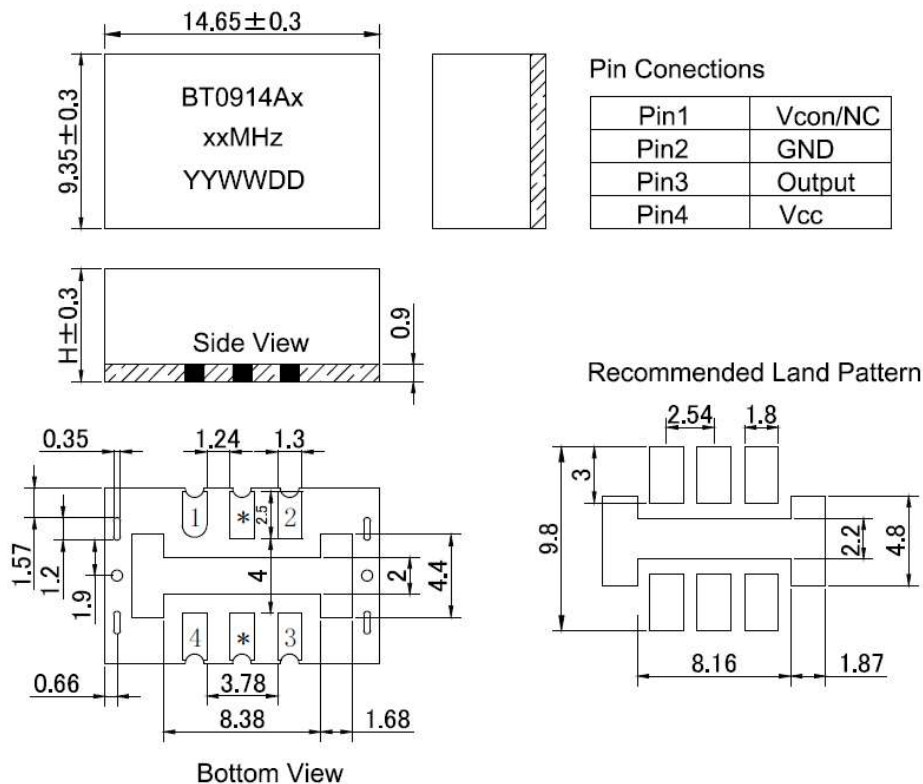
Frequency Range	<-130dBc	<-135dBc	<-140dBc	<-145dBc	○ = Availavle X = Not Available
50 ~ 100MHz	○	○	○	○	
102.4 ~ 122.88MHz	○	○	○	X	
125 ~ 156.25MHz	○	○	X	X	

Environmental Conditions

Operating Temp. Range	-50°C ~ +85°C
Storage Temp. Range	-55°C ~ +125°C

Note: The minimum to maximum value indicates the range of indicators

Outline Dimension & Pin Connections



Note:

1. The pins with "*" are for factory test.
2. Leave pin 1 unconnected if Vcon is not used.

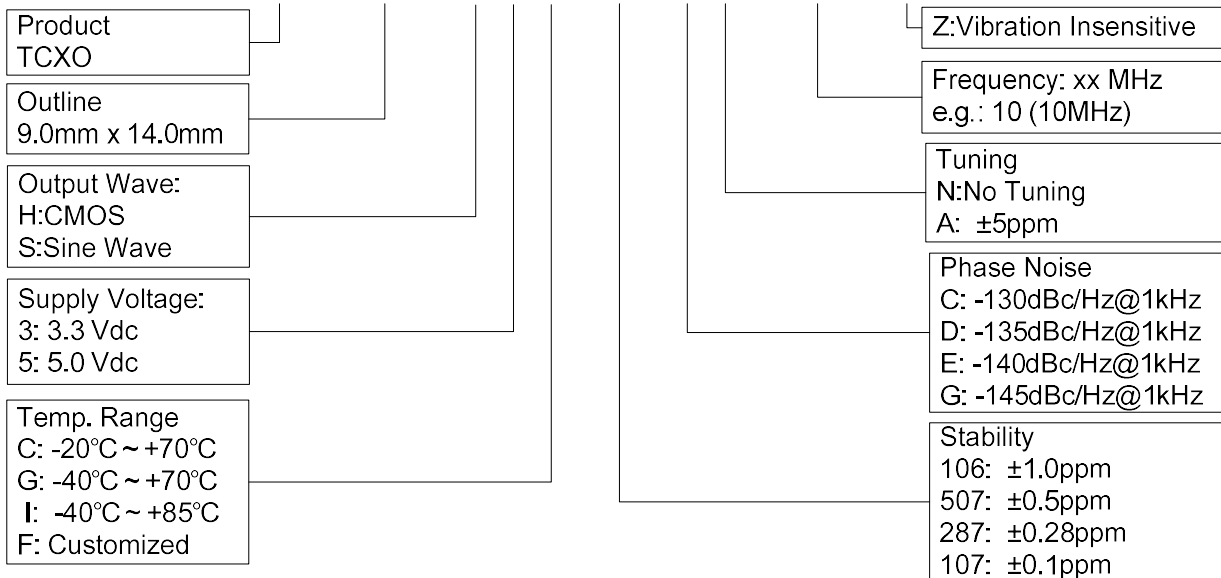
Maximun Ratings

Parameter	Symbol	Rating
Supply Voltage	Vcc	3.3V/5V
Control Voltage	Vcon	0V/3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability	
Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT0914AXXXXXXXXXX.XXZ



Example: BT0914AS5I106DA100Z

Random Vibration Condition

The crystal oscillator is subjected to the random vibration tests specified in Table 1 and Figure 1

Direction of Vibration	Time of Vibration
X、Y、Z	1 minute per axis

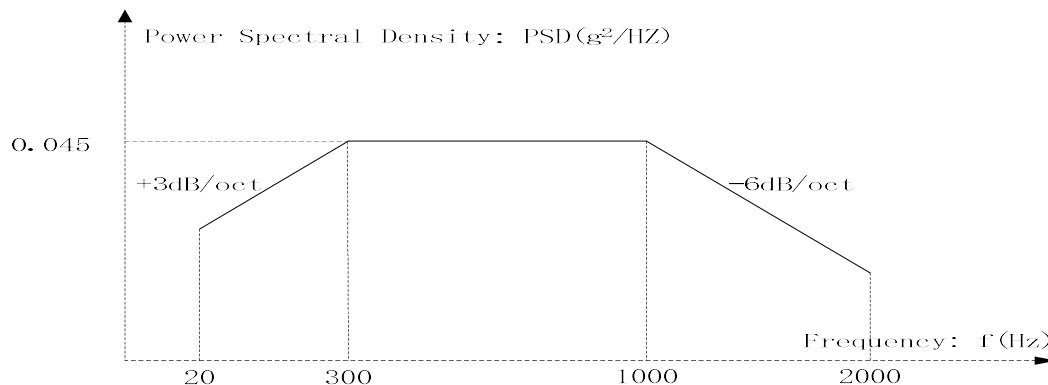


Figure 1. Random vibration test curve

Features

- Ultra Stable
- Low Phase Noise
- Freq. Range 50~156.25MHz
- High Precision
- DIP 20*12mm

Applications

- Wireless Communication System
- instruments and apparatus
- Navigation


BT1220H Vibration Insensitive Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-	V	Vcc±5%	
	-	5	-	V		
Supply Current	-	-	45	mA		
Frequency Range	50~ 156.25			MHz		
Nominal Frequency	50,80,100,122.88			MHz		
Initial Frequency Tolerance	±0.5	-	±1.5	ppm	At shipment, nominal EFC, +25°C	
Freq.Stability Vs.Temp.	±0.20	±0.28	±2	ppm	-20°C~70°C@Height above 6mm	
	±0.28	±0.50	±2	ppm	-40°C~85°C@Height above 6mm	
	±0.5	±1.0	±2	ppm	-50°C~85°C@Height above 6mm	
Sine Wave	Output	7	-	-	dBm	
	Harmonic Suppression	-	-	-30	dBc	
	Spur Suppression	-	-	-70	dBc	
	Load	-	50	-	Ω	
HCMOS	Voh	2.4	-	-	V	HCMOS Output, Load=15pf
	Vol	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	-	15	pf	
RMS Jitter(E5052B)	-	-	1000	fs	12KHz~20MHz	
Supply Sensitive	-	-	±0.2	ppm	Vcc±5%	
Load Sensitive	-	-	±0.2		Load±5%	
Aging/First Year	-	-	±1.0		Standard	
SSB Phase Noise @100MHz	-	-80	-75	dBc/Hz	Offset 10Hz	Static phase noise at +25°C
	-	-112	-110		Offset 100Hz	
	-	-142	-140		Offset 1kHz	
	-	-158	-155		Offset 10kHz	
	-	-161	-158		Offset 100kHz	
	-	-162	-160		Offset 1000kHz	
SSB Phase Noise @100MHz	-	-75	-70	dBc/Hz	Offset 10Hz	X-axis dynamic phase noise at +25°C
	-	-102	-95		Offset 100Hz	
	-	-115	-100		Offset 1kHz	
	-	-155	-145		Offset 10kHz	
	-	-158	-155		Offset 100kHz	
	-	-160	-158		Offset 1000kHz	
SSB Phase Noise @100MHz	-	-75	-70	dBc/Hz	Offset 10Hz	Y-axis dynamic phase noise at +25°C
	-	-102	-95		Offset 100Hz	
	-	-115	-100		Offset 1kHz	
	-	-155	-145		Offset 10kHz	
	-	-158	-155		Offset 100kHz	
	-	-160	-158		Offset 1000kHz	

SSB Phase Noise @100MHz	-	-74	-70	dBc/Hz	Offset 10Hz	Z-axis dynamic phase noise at +25°Cse)
	-	-96	-95		Offset 100Hz	
	-	-102	-100		Offset 1kHz	
	-	-150	-145		Offset 10kHz	
	-	-158	-155		Offset 100kHz	
	-	-160	-158		Offset 1000kHz	
Control Voltage Range	1.5 ± 1.0			V		
Frequency Tuning Range	±3	±5	±10	ppm		
Tuning Slope	Positive					
Non-Linearity	-	-	10	%		

Phase Noise @1kHz

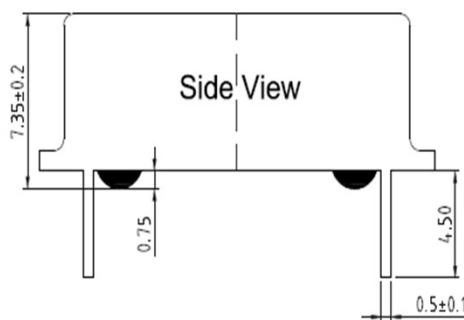
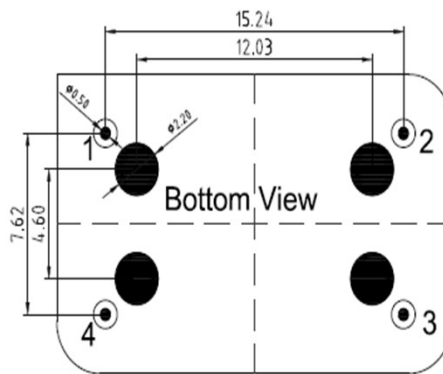
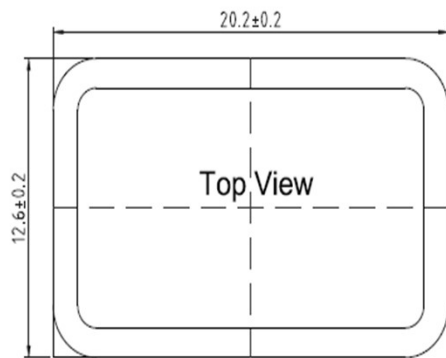
Frequency Range	<-130dBc	<-135dBc	<-140dBc	<-145dBc	○= Availavle X= Not Available
50~100MHz	○	○	○	○	
102.4~122.88MHz	○	○	○	X	
125~156.25MHz	○	○	X	X	

Environmental Conditions

Operating Temp. Range	-50°C ~ +85°C
Storage Temp. Range	-55°C ~ +125°C

Note: The minimum to maximum value indicates the range of indicators

Outline Dimension & Pin Connections



Pin Conections

Pin1	Vcon
Pin2	GND
Pin3	Output
Pin4	Vcc

Note:

- 1、 Leave pin 1 unconnected if Vcon is not used.
- 2、 The height can be 7.5mm and 11mm

Maximun Ratings

Parameter	Symbol	Rating
Supply Voltage	Vcc	3.3V/5V
Control Voltage	Vcon	0V/3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Features

- Ultra Stable
- Low Phase Noise
- Freq. Range 50~156.25MHz
- High Precision
- DIP 20×20mm

Applications

- Satellite navigation
- wireless communication system
- High definition television system
- Low phase noise signal source
- Low jitter radio frequency communication circuit

BT2020H Vibration Insensitive Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	Vcc±5%	
	–	5	–	V		
Supply Current	–	–	45	mA		
Frequency Range	50~ 156.25			MHz		
Nominal Frequency	50,100,120,122.88			MHz		
Initial Frequency Tolerance	–	±0.50	±1.00	ppm	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±0.28	–	±1.00	ppm	-20°C~+70°C	
	±0.28	–	±1.00	ppm	-40°C~+70°C	
	±0.28	–	±1.00	ppm	-40°C~+85°C	
	±0.50	–	±2.00	ppm	-50°C~+85°C	
Sine Wave	Output	5	8	–	dBm	
	Harmonic Suppression	–	-40	-30	dBc	
	Spur Suppression	–	-80	-70	dBc	
	Load	–	50	–	Ω	
HCMOS	Voh	2.4	–	–	V	HCMOS Output, Load=15pf
	Vol	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(E5052B)	–	–	1000	fs	12KHz~20MHz	
Supply Sensitive	–	–	±0.2	ppm	Vcc±5%	
Load Sensitive	–	–	±0.2		Load±5%	
Aging/First Year	–	–	±1.0		Standard	
SSB Phase Noise @100MHz	–	–	–	dBc/Hz	Offset 10Hz	Static phase noise at +25°C
	–	–	–		Offset 100Hz	
	–	-146	-140		Offset 1kHz	
	–	-157	-155		Offset 10kHz	
	–	-160	-158		Offset 100kHz	
SSB Phase Noise @100MHz	–	–	–	dBc/Hz	Offset 10Hz	X-axis dynamic phase noise at +25°C
	–	–	–		Offset 100Hz	
	–	-129	-120		Offset 1kHz	
	–	-158	-145		Offset 10kHz	
	–	-161	-155		Offset 100kHz	
SSB Phase Noise @100MHz	–	–	–	dBc/Hz	Offset 10Hz	Y-axis dynamic phase noise at +25°C
	–	–	–		Offset 100Hz	
	–	-125	-120		Offset 1kHz	
	–	-157	-145		Offset 10kHz	
	–	-160	-155		Offset 100kHz	
SSB Phase Noise @100MHz	–	–	–	dBc/Hz	Offset 10Hz	Z-axis dynamic phase noise at +25°C
	–	–	–		Offset 100Hz	
	–	-132	-120		Offset 1kHz	
	–	-157	-145		Offset 10kHz	
	–	-160	-155		Offset 100kHz	

Control Voltage Range	1.5 ± 1.0			V
Frequency Tuning Range	±5	±7	–	ppm
Tuning Slope	Positive			
Non-Linearity	–	–	10	%

Static Phase Noise @1kHz

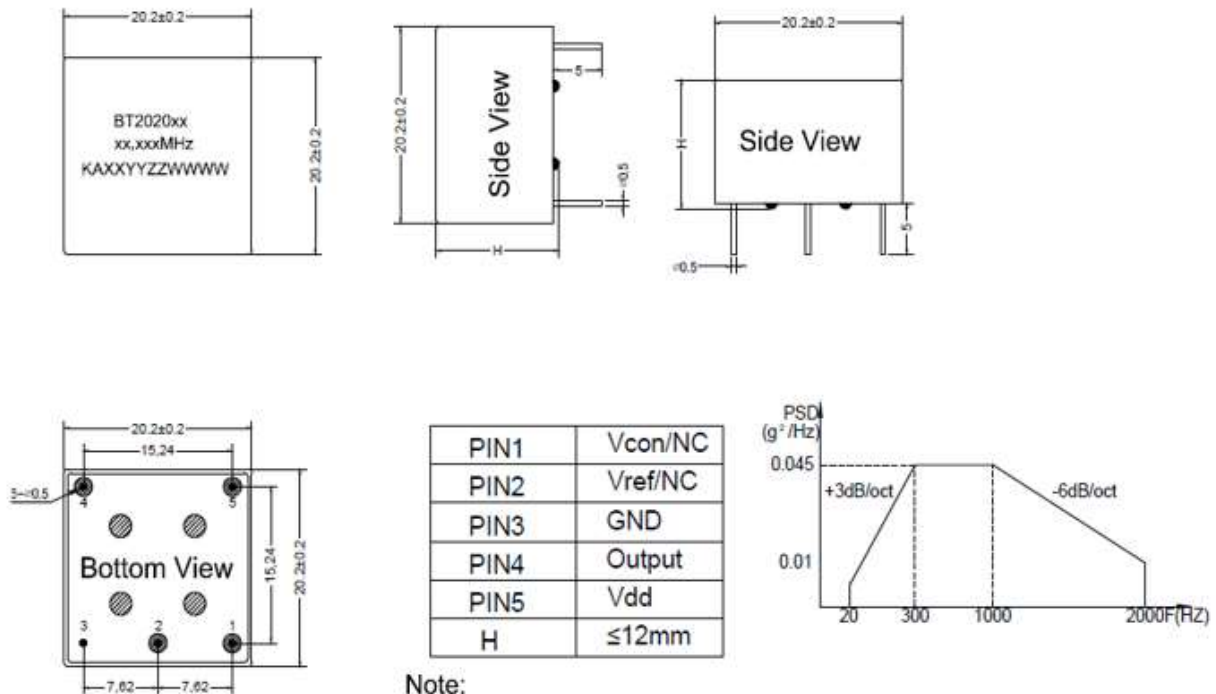
Frequency Range	<-130dBc	<-135dBc	<-140dBc	<-145dBc	○= Availavle X= Not Available
50 ~ 100MHz	○	○	○	○	
102.4 ~ 122.88MHz	○	○	○	X	
125 ~ 156.25MHz	○	○	X	X	

Environmental Conditions

Operating Temp. Range	-50°C ~ +85°C
Storage Temp. Range	-55°C ~ +125°C

Note: The minimum to maximum value indicates the range of indicators

Outline Dimension & Pin Connections



Note:
 Leave Pin 1 unconnected if Vcon is not used.
 Leave Pin 2 unconnected if Vref is not used.

Maximun Ratings

Parameter	Symbol	Rating
Supply Voltage	Vdd	3.3V/5V
Control Voltage	Vcon	0V/3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BT 2020 X X X X X X X X X X . X X Z

Product:
TCXO

Outline:
20mm x 20mm

Frequency Range:
L: < 50MHz
H: ≥ 50MHz

Output:
H: CMOS
S: Sine Wave

Supply Voltage:
3: 3.3 Vdc
5: 5.0 Vdc

Temp. Range:
C: -20°C ~ +70°C
I: -40°C ~ +85°C
M: -50°C ~ +85°C
F: Customized

Z:
Vibration Insensitive

Frequency:
xx MHz

Tuning Range:
N: No Tuning
A: Typ. ±5ppm

Phase Noise:
A: -120dBc/Hz@1kHz
B: -125dBc/Hz@1kHz
C: -130dBc/Hz@1kHz
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz
G: -145dBc/Hz@1kHz

Temp. Stability:
206: ±2ppm
106: ±1ppm
507: ±0.5ppm
287: ±0.28ppm

Example: BT2020HS3I507GA100Z

Random Vibration Condition

The crystal oscillator is subjected to the random vibration tests specified in Table 1 and Figure 1

Table 1. Flight Vibration Requirements	
Direction of Vibration	Time of Vibration
X、Y、Z	1 minute per axis

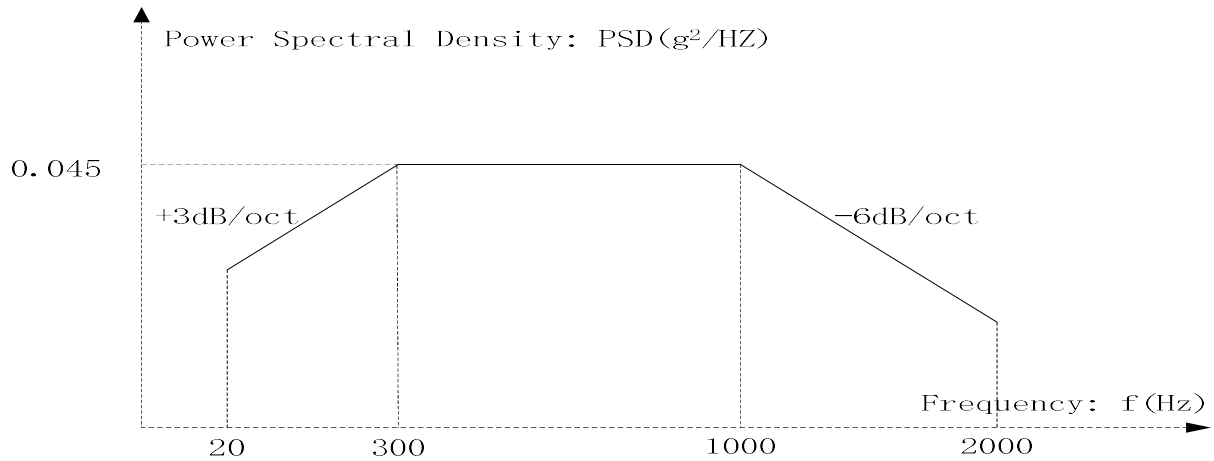
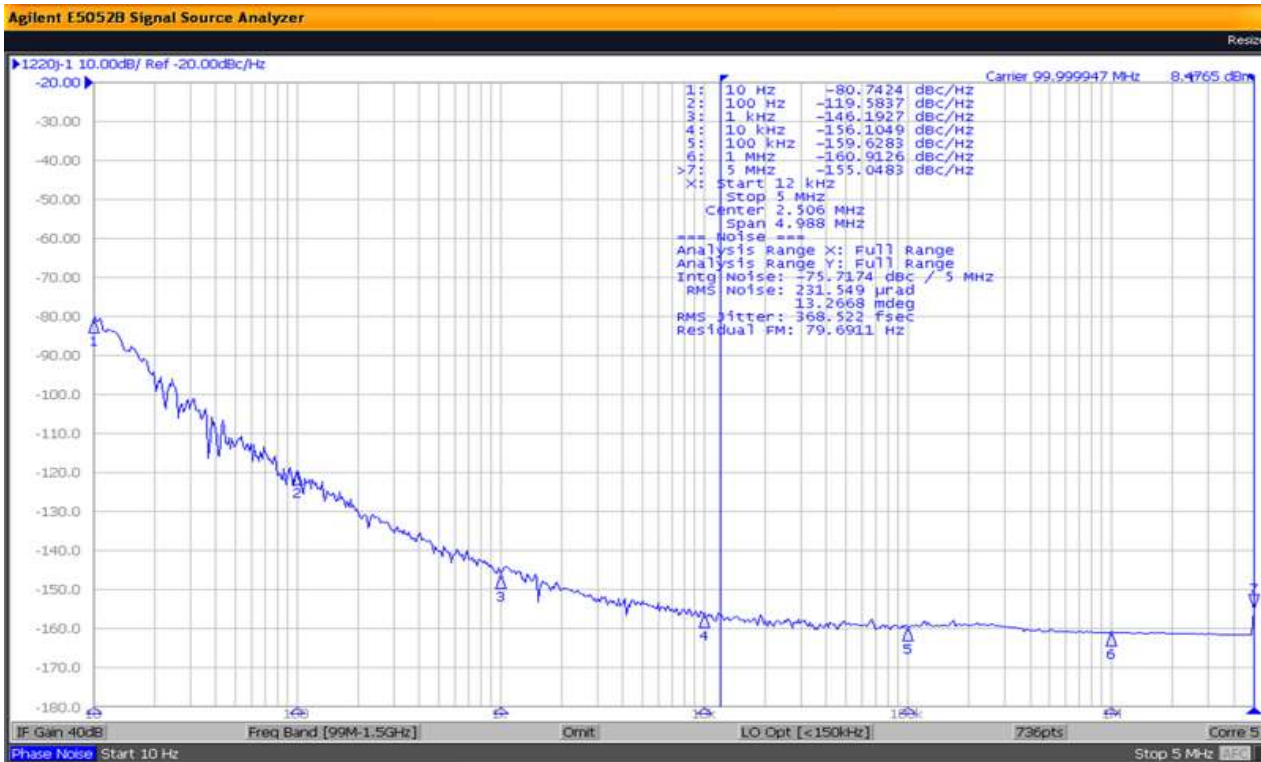


Figure 1. Random vibration test curve

Phase Noise Test Figure (Static Status)



Phase Noise Test Figure (Vibration Status)



Features

- Ultra Stable
- Low Phase Noise
- Freq. Range 50~156.25MHz
- High Precision
- SMD 25×25mm

Applications

- Satellite navigation
- wireless communication system
- High definition television system
- Low phase noise signal source
- Low jitter radio frequency communication circuit

BT2525H Vibration Insensitive Specifications

Parameter		Value			Unit	Conditions
		Min.	Typ.	Max.		
Supply Voltage		–	3.3	–	V	Vcc±5%
		–	5	–	V	
Supply Current		–	–	45	mA	
Frequency Range		50~ 156.25			MHz	
Nominal Frequency		50, 100, 120, 122.88			MHz	
Initial Frequency Tolerance		–	±0.50	±1.00	ppm	At shipment, nominal EFC, +25°C
Freq. Stability Vs. Temp.		±0.28	–	±1.00	ppm	-20°C~+70°C
		±0.28	–	±1.00	ppm	-40°C~+70°C
		±0.28	–	±1.00	ppm	-40°C~+85°C
		±0.50	–	±2.00	ppm	-50°C~+85°C
Sine Wave	Output	5	8	–	dBm	
	Harmonic Suppression	–	-40	-30	dBc	
	Spur Suppression	–	-80	-70	dBc	
	Load	–	50	–	Ω	
HCMOS	Voh	2.4	–	–	V	HCMOS Output, Load=15pf
	Vol	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(E5052B)		–	–	1000	fs	12KHz~20MHz
Supply Sensitive		–	–	±0.2	ppm	Vcc±5%
Load Sensitive		–	–	±0.2		Load±5%
Aging/First Year		–	–	±1.0		Standard
SSB Phase Noise @100MHz		–	–	–	dBc/Hz	Offset 10Hz
		–	–	–		Offset 100Hz
		–	-146	-140		Offset 1kHz
		–	-157	-155		Offset 10kHz
		–	-160	-158		Offset 100kHz
SSB Phase Noise @100MHz		–	–	–	dBc/Hz	Offset 10Hz
		–	–	–		Offset 100Hz
		–	-129	-120		Offset 1kHz
		–	-157	-145		Offset 10kHz
		–	-160	-155		Offset 100kHz
SSB Phase Noise @100MHz		–	–	–	dBc/Hz	Offset 10Hz
		–	–	–		Offset 100Hz
		–	-125	-120		Offset 1kHz
		–	-156	-145		Offset 10kHz
		–	-159	-155		Offset 100kHz
SSB Phase Noise @100MHz		–	–	–	dBc/Hz	Offset 10Hz
		–	–	–		Offset 100Hz
		–	-129	-120		Offset 1kHz
		–	-156	-145		Offset 10kHz
		–	-160	-155		Offset 100kHz

Control Voltage Range	1.5 ± 1.0			V
Frequency Tuning Range	±5	±7	-	ppm
Tuning Slope	Positive			
Non-Linearity	-	-	10	%

Static Phase Noise @1kHz

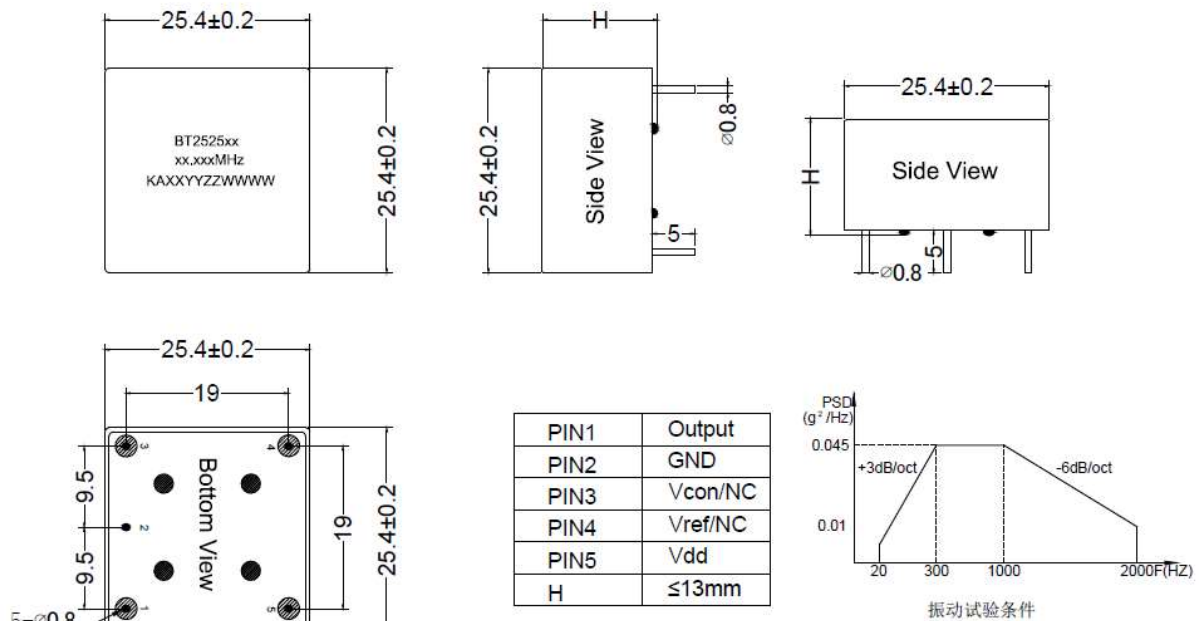
Frequency Range	<-130dBc	<-135dBc	<-140dBc	<-145dBc	○ = Available X = Not Available
50 ~ 100MHz	○	○	○	○	
102.4 ~ 122.88MHz	○	○	○	X	
125 ~ 156.25MHz	○	○	X	X	

Environmental Conditions

Operating Temp. Range	-50°C ~ +85°C
Storage Temp. Range	-55°C ~ +125°C

Note: The minimum to maximum value indicates the range of indicators

Outline Dimension & Pin Connections



Note:

Leave Pin 3 unconnected if Vcon is not used.
Leave Pin 4 unconnected if Vref is not used.

Note: If you do not use the pull function, leave Pin 1 unconnected.

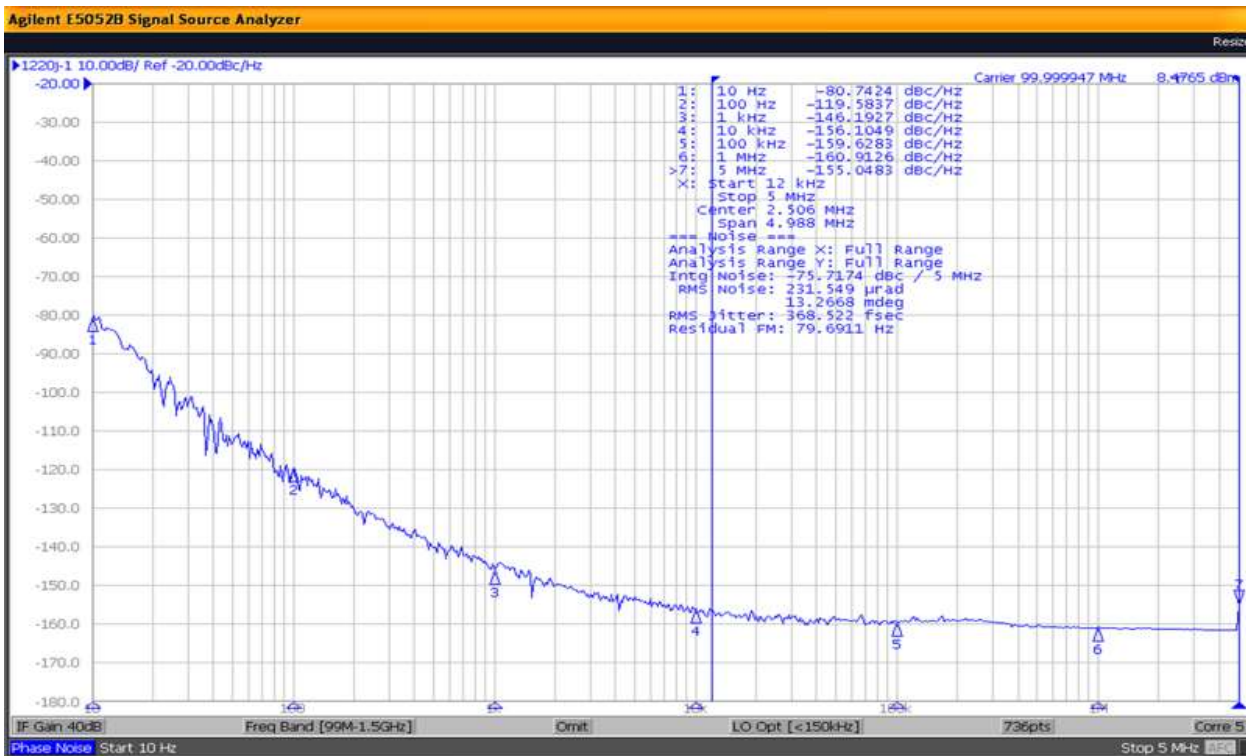
Maximun Ratings

Parameter	Symbol	Rating
Supply Voltage	Vdd	3.3V/5V
Control Voltage	Vcon	0V/3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Phase Noise Test Figure (Static Status)

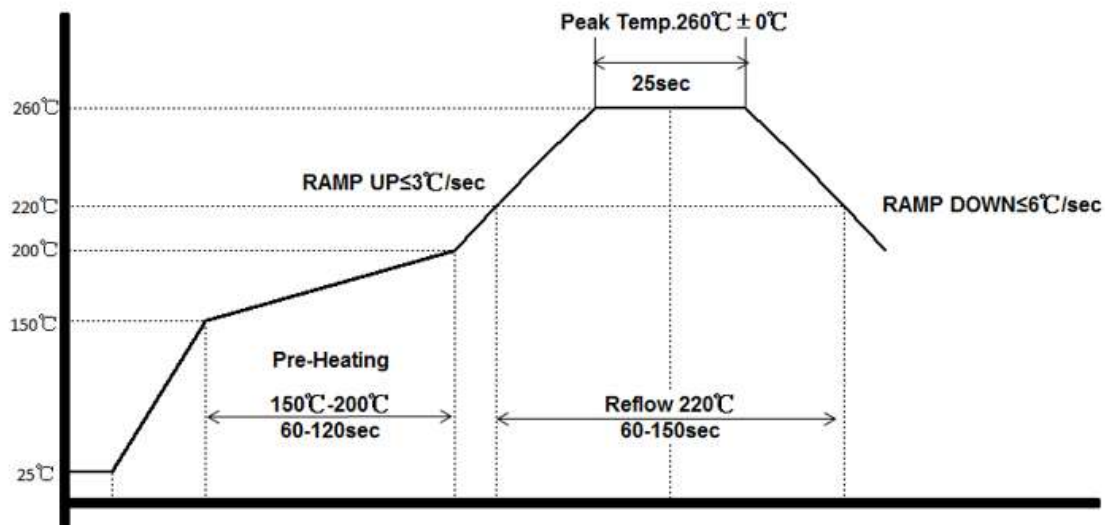


Phase Noise Test Figure (Vibration Status)



SOLDERING MANUAL

1. Reflow Profile



2. Manual Soldering and Temperature

***Please keep the whole oscillator(including the bottom) being moved or pulled by tweezers during heating process.**

- 1) Electric soldering iron setting at 300°C~350°C welds PCB pads and TCXO pads by solder paste, and the paste thickness is 0.1~0.2mm;
- 2) The soldering station sets at 300°C with the low level of air velocity. Take out one solder plated product and place it on the PCB with a pair of anti-static tweezers. To prevent the products from blowing off and affecting the assembly, you need to use tweezers to fix the product ;
- 3) The heat gun is reheated 10s vertically above the welded PCB 10cm. The height is slowly reduced to 5cm to heat and weld around the PCB pad. (Note that the specific height depends on the PCB design. The main purpose of this step is to make the temperature of the welded PCB rise to about 240~260°C. It is necessary to appropriately increase the preheating time or reduce the height of the heat gun when the PCB is very thick with high heat absorption, or there is a large heat dissipation block. On the contrary, it should be reduced the preheating time and increase the height of the heat gun.)
- 4) Careful observing the change of solder paste, the paste on the TCXO pad will be fused with the paste on the PCB pad after reaching melting point. The height of the heat gun should be properly raised to keep the melting point. Meanwhile, you should need to use tweezers to adjust TCXO's position. The assembly is completed after taking away tweezers and heat gun. (Note that it should be kept at least 5S from paste melting to completed welding)

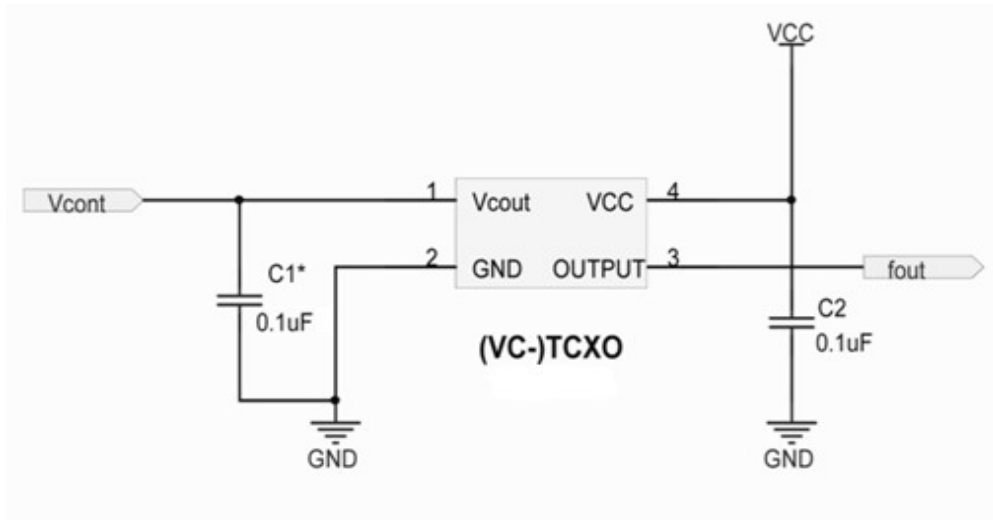
MOISTURE-SENSITIVE DEVICES

Storage and usage of MSL3 Oscillators

1. Calculated shelf life in sealed damp-proof bag or drying oven: **6 months**.
2. Peak package body temperature: **260°C/10s**.
3. After vacuum bag is opened and parts exposed under below conditions, devices that will be subjected to reflow soldering or other high temperature process must be baked:
 - a) Mounted outside **168 hours** of factory conditions ≤ 30°C/60% RH;
 - b) Humidity Indicator Card reads **>10%** (Any test point shows lighter color).
4. Baking Conditions:
 - a) Exposed devices: Drying temperature **125°C**, Baking time **12 hours**;
 - b) Taped devices: Drying temperature **70°C**, Baking time **24 hours**.
5. Stored per J-STD-033.
6. Level and body (reflow) temperature defined by IPC/JEDEC J-STD-020.

(VC)TCXO TEST CIRCUIT

Test Circuit



Leave pin 1 and C1 unconnected if Vcon is not used

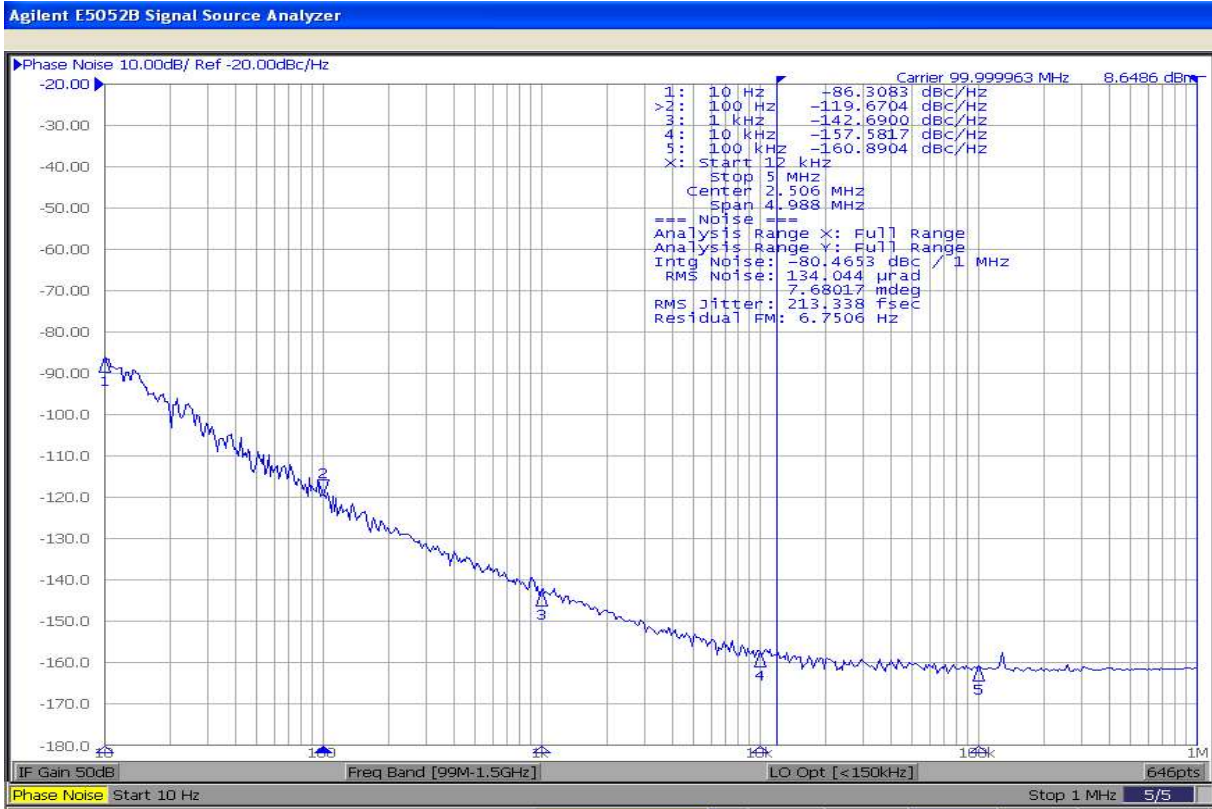
Load_L: Total fixture and probe capacitance

Load_c: Total fixture and probe resistance

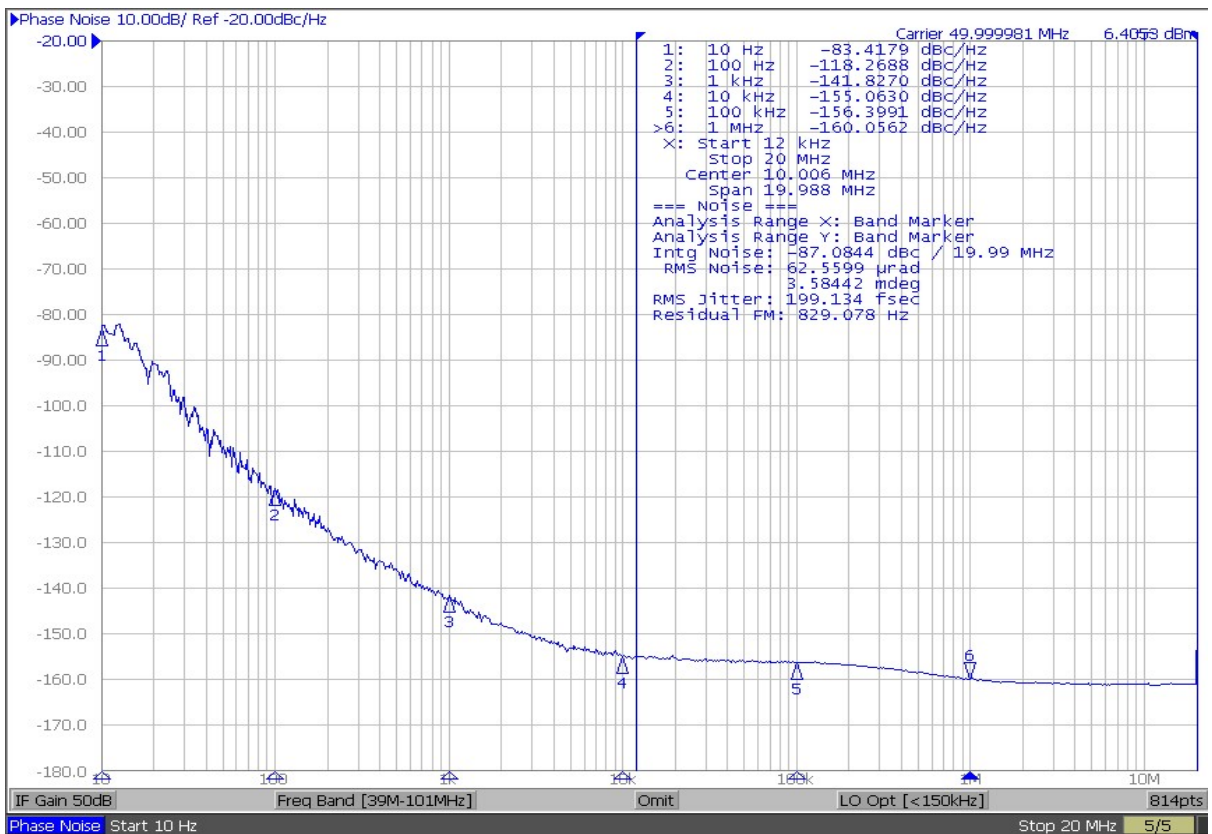
CMOS	Clipped Sinewave	Sinewave
<p>CMOS Output 方波输出</p>	<p>Clipped Sine Output 削顶正弦波输出</p>	<p>Sine Wave Output 正弦波输出</p>

LOW PHASE NOISE OF TCXO

100MHz Carrier



50MHz Carrier

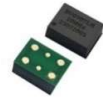


Features

- Ultra Stable
- Wide Temperature Range
- SMD(9.0mm*7.0mm)

Applications

- Base Stations
- Instrumentations
- Others


BO0907L Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
Power Consumption	–	–	2.5	W		
	–	–	1.0	W		
Frequency Range	5~50			MHz		
Nominal Frequency	10, 40					
Initial Frequency Tolerance	–	–	±500	ppb	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±5	–	–	ppb	-20°C ~ +70°C	
	±10	–	–	ppb	-45°C ~ +85°C	
CMOS	V _{OH}	2.7	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.3	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	–	–	5	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Short-term Stability@10MHz	–	–	1×10 ⁻¹¹	ppb/s	After 60 mins of operation	
Supply Sensitivity	–	–	±2.0	ppb	V _{cc} ±5%	
Load Sensitivity	–	–	±2.0		Load±5%	
Aging per Day	–	–	±2.0		After 30 days of operation	
Aging per Year	–	–	±500		After 30 days of operation	
SSB Phase Noise @10MHz	–	–	-110	dBc/Hz	Offset 10Hz	At +25°C
	–	–	-135		Offset 100Hz	
	–	–	-150		Offset 1kHz	
	–	–	-155		Offset 10kHz	
	–	–	-155		Offset 100kHz	
Control Voltage Range	–	1.5	2.5	V		
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					
Input impedance	100	–	–	KΩ		

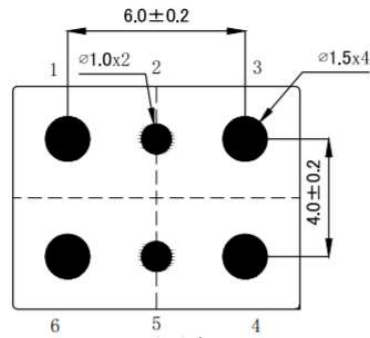
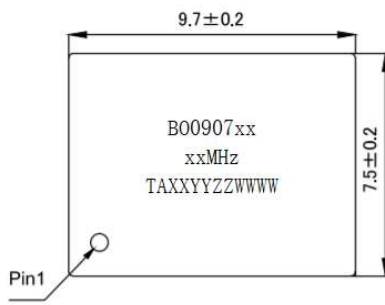
Environmental Conditions

Operating Temperature Range	-45°C~+85°C
Storage Temperature Range	-55°C~+125°C

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Outline Dimension & Pin Connections



Bottom View



PIN FUNCTIONS	
1	NC
2	NC
3	GND
4	Fout
5	NC
6	VCC

Ordering Guide

BO 0907 L X X X XXX X X XX.XX

Product
OCXO

Outline
9.0mm x 0.7mm

Freq. Range:
L: <50MHz

Output:
H: CMOS
S: Sine Wave

Supply Voltage:
5: 5.0 Vdc
3: 3.3 Vdc

Temp. Range:
C: -20°C ~ +70°C
G: -40°C ~ +70°C
I: -40°C ~ +85°C

Frequency:
xx MHz

Tuning:
N: No Tuning
E: ≥±500ppb
D: ≥±1000ppb

Phase Noise
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz
G: -145dBc/Hz@1kHz
H: -150dBc/Hz@1kHz

Stability
107: ±100ppb
508: ±50ppb
208: ±20ppb

Example: BO0907LH5C107DN10

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Features

- Ultra Stable
- Wide Temperature Range
- SMD(14.0mm*9.0mm)

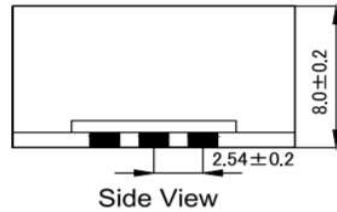
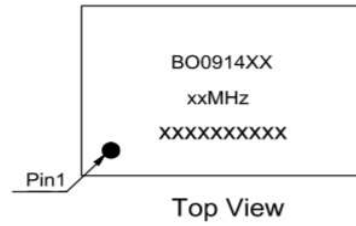
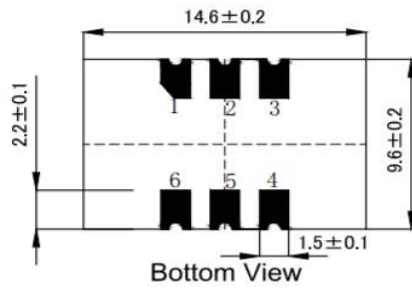
Applications

- Base Stations
- Instrumentations
- Others


BO0914L Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-	V	V _{cc} ±5%	
	-	5.0	-	V	V _{cc} ±5%	
Power Consumption	-	-	3.0	W		
	-	-	1.0	W		
Frequency Range	5~50			MHz		
Nominal Frequency	10			MHz		
Initial Frequency Tolerance	-	-	±100	ppb	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±3	-	-	ppb	-40°C ~ +70°C	
	±5	-	-	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	-	-	dBm	
	Harmonious	-	-	-40	dBc	
	Spurious	-	-	-70	dBc	
	Load	-	50	-	Ω	
HCMOS	V _{OH}	2.4	-	-	V	HCMOS Output, Load=15pf
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	15	-	pf	
Short-term Stability@10MHz	-	-	1×10 ⁻¹¹	ppb/s	After 60 mins of operation	
Supply Sensitivity	-	-	±2.0	ppb	V _{cc} ±5%	
Load Sensitivity	-	-	±2.0		Load±5%	
Aging per Day	-	-	±1.0		After 30 days of operation	
Aging per Year	-	-	±500		After 30 days of operation	
SSB Phase Noise @10MHz	-	-	-120	dBc/Hz	Offset 10Hz	At +25°C
	-	-	-140		Offset 100Hz	
	-	-	-150		Offset 1kHz	
	-	-	-155		Offset 10kHz	
	-	-	-155		Offset 100kHz	
Control Voltage Range	0	-	3	V	3.3V	
	0	-	5			
Frequency Tuning Range	±0.5	-	-	ppm		
Tuning Slope	Positive					
Input impedance	100			KΩ		
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-60°C~+110°C					

Outline Dimension & Pin Connections



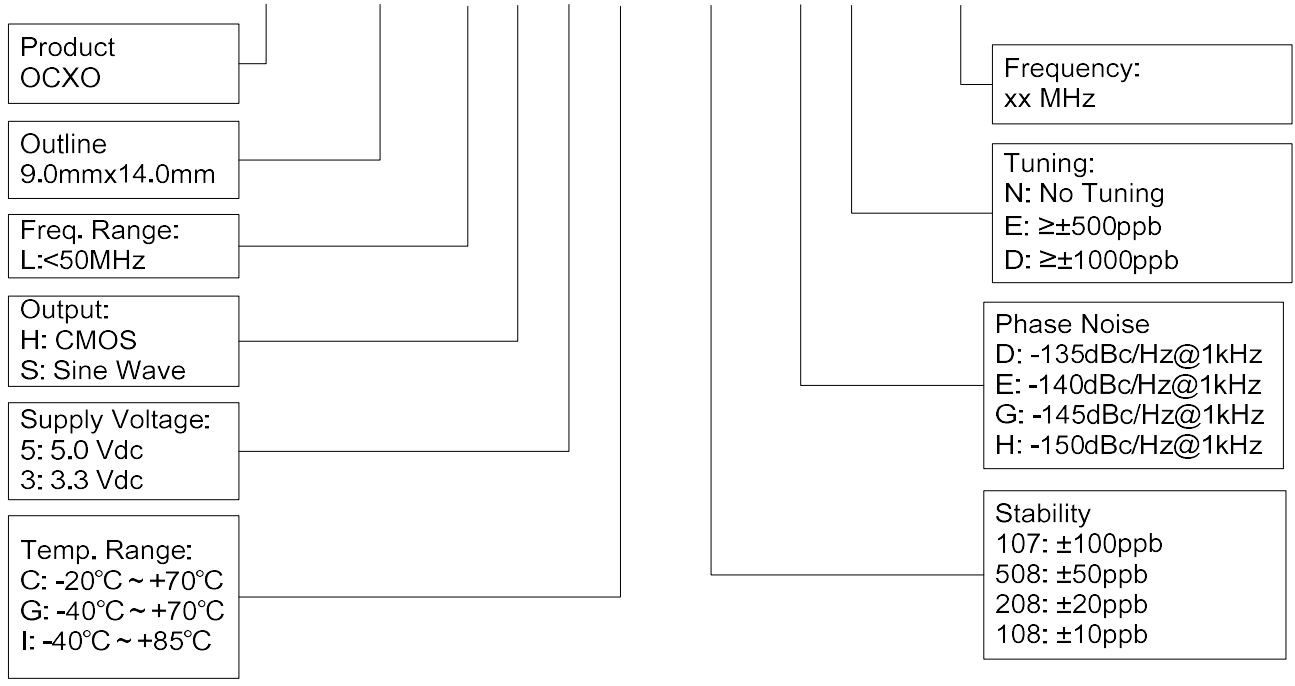
PIN FUNCTIONS	
1	Vcon/NC
2	NC
3	GND
4	Fout
5	NC
6	VCC

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 0914 L X X X XXX X X XX.XX



Example: BO0914LH5C107DN10

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Features

- Ultra Stable
- Wide Temperature Range
- SMD(14.0mm*9.0mm)

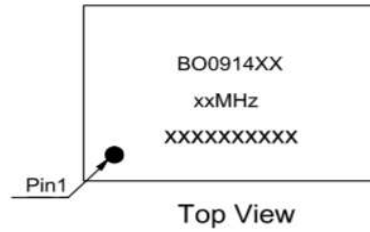
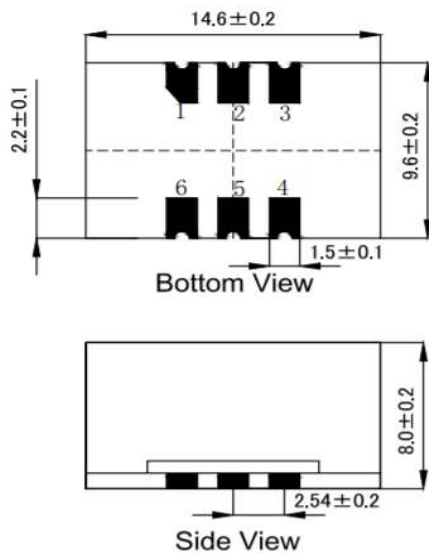
Applications

- Base Stations
- Instrumentations
- Others


BO0914H Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-	V	V _{cc} ±5%	
	-	5.0	-	V	V _{cc} ±5%	
Power Consumption	-	-	3.0	W		
	-	-	1.0	W		
Frequency Range	50~200			MHz		
Nominal Frequency	100			MHz		
Initial Frequency Tolerance	±100	-	-	ppb	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±30	-	-	ppb	-40°C ~ +70°C	
	±50	-	-	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	5	-	dBm		
	Harmonious	-	-	-40	dBc	
	Spurious	-	-	-70	dBc	
	Load	-	50	-	Ω	
HCMOS	V _{OH}	2.4	-	V	HCMOS Output, Load=15pf	
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	15	-	pf	
Short-term Stability@100MHz	-	-	5×10 ⁻¹¹	ppb/s	After 60 mins of operation	
Supply Sensitivity	-	-	±5.0	ppb	V _{cc} ±5%	
Load Sensitivity	-	-	±5.0		Load±5%	
Aging per Day	-	-	±1.0		After 30 days of operation	
Aging per Year	-	-	±500		After 30 days of operation	
SSB Phase Noise @100MHz	-	-	-100		dBc/Hz	Offset 10Hz
	-	-	-130	Offset 100Hz		
	-	-	-160	Offset 1kHz		
	-	-	-165	Offset 10kHz		
	-	-	-170	Offset 100kHz		
Control Voltage Range	0	-	3	V	3.3V	
	0	-	5			
Frequency Tuning Range	±5	-	-	ppm		
Tuning Slope	Positive					
Input impedance	100			KΩ		
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-60°C~+110°C					

Outline Dimension & Pin Connections



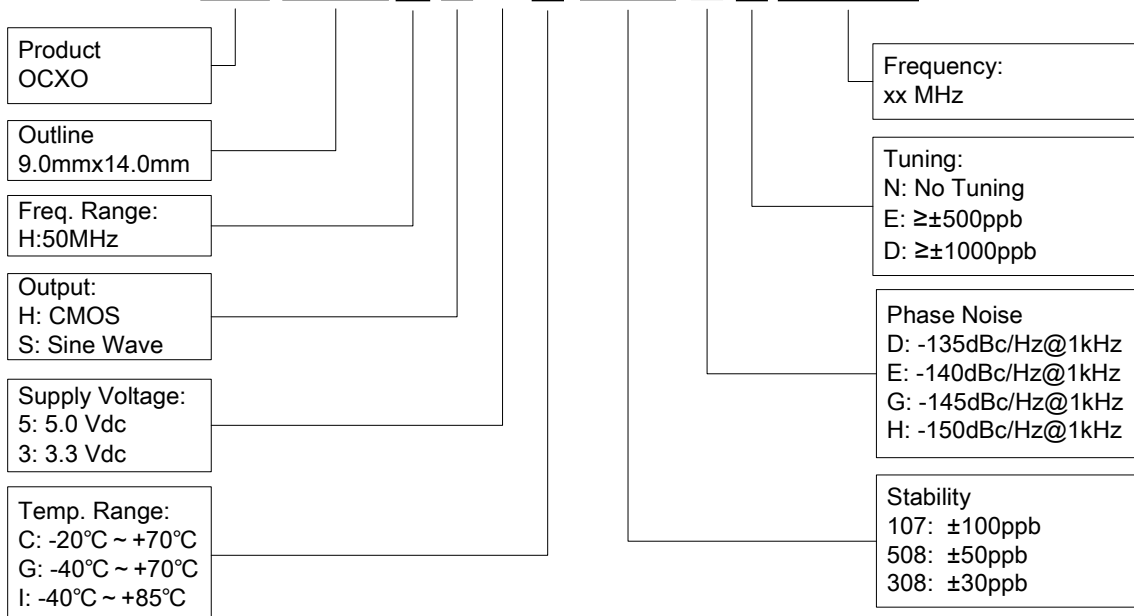
PIN FUNCTIONS	
1	Vcon/NC
2	NC
3	GND
4	Fout
5	NC
6	VCC

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 0914 H X X X XXX X X XX.XX



Example: BO0914HH5C107DN10

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Features

- Ultra Stable
- Wide Temperature Range
- DIP(20.2mm*12.6mm)

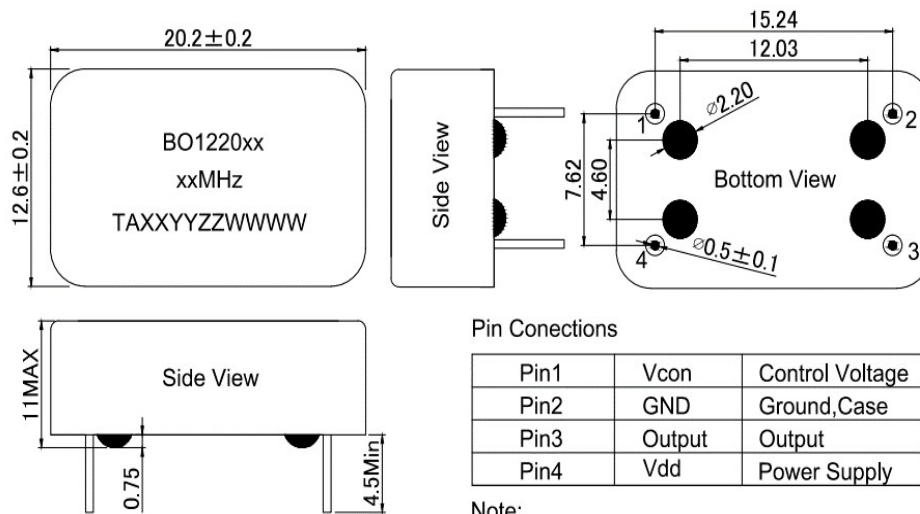
Applications

- Base Stations
- Instrumentations
- Others


BO1220L Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	Vcc±5%	
	–	5.0	–	V	Vcc±5%	
Power Consumption	–	–	3.0	W		
	–	–	1.5	W		
Frequency Range	10 ~ 40			MHz		
Nominal Frequency	10					
Initial Frequency Tolerance	–	–	±100	ppb	At shipment, nominal EFC, +25°C	
Freq. Stability Vs. Temp.	±5	–	±100	ppb	-40°C ~ +70°C	
	±50	–	±100	ppb	-40°C ~ +85°C	
	–	–	±200	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	–	–	dBm	
	Harmonious	–	–	-40	dBc	
	Spurious	–	–	-80	dBc	
	Load	–	50	–	Ω	
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Warm-up Time	–	–	3	Min	At +25°C, with accuracy of ±100ppb	
Supply Sensitivity	–	–	±5	ppb	Vcc±5%	
Load Sensitivity	–	–	±5		Load±5%	
Aging per Day	–	–	±1		After 30 days of operation	
Aging per Year	–	–	±100		After 30 days of operation	
SSB Phase Noise @10MHz	–	–	-115	dBc/Hz	Offset 10Hz	At +25°C
	–	–	-130		Offset 100Hz	
	–	–	-150		Offset 1kHz	
	–	–	-155		Offset 10kHz	
	–	–	-160		Offset 100kHz	
Control Voltage Range	0	–	3	V	3.3V	
	0	–	5	V	5V	
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-55°C~+125°C					

Outline Dimension & Pin Connections



Pin Connections

Pin	Symbol	Description
Pin1	Vcon	Control Voltage
Pin2	GND	Ground, Case
Pin3	Output	Output
Pin4	Vdd	Power Supply

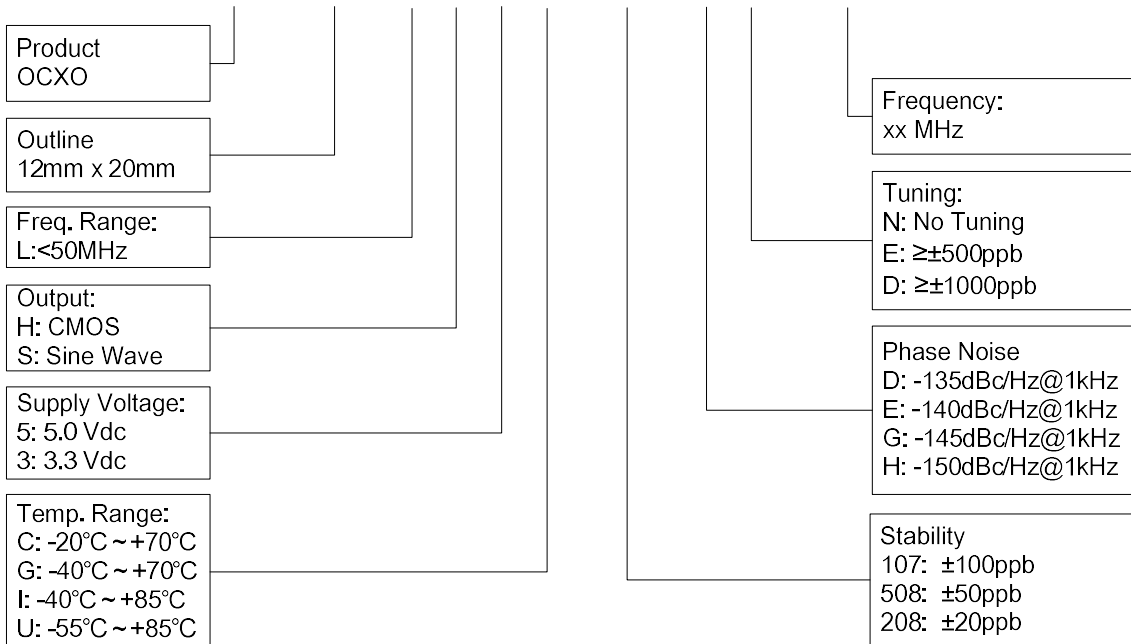
Note:
Leave Pin 1 unconnected if Vcon is not used.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 1220 L X X X XXX X X XX.XX



Example: BO1220LH5C107DN10

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Features

- Ultra Stable
- Wide Temperature Range
- DIP(20.2mm*12.6mm)

Applications

- Base Stations
- Instrumentations
- Others

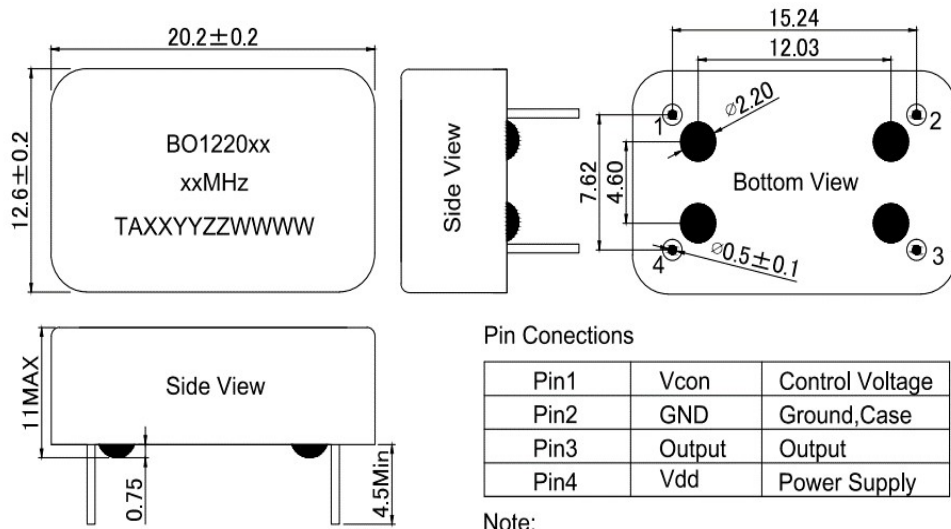

BO1220H Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	–	5.0	–	V	V _{cc} ±5%	
	–	12.0	–	V	V _{cc} ±5%	
Power Consumption	–	–	3.0	W		
	–	–	1.5	W		
Frequency Range	50 ~ 120			MHz		
Nominal Frequency	50, 80, 100			MHz		
Initial Frequency Tolerance	–	–	±300	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±50	–	±200	ppb	-20°C ~ +70°C	
	±100	–	±300	ppb	-40°C ~ +85°C	
	±200	–	±500	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	–	dBm		
	Harmonious	–	–	dBc		
	Spurious	–	–	dBc		
	Load	–	50	Ω		
HCMOS	V _{OH}	2.4	–	V	HCMOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Warm-up Time	–	–	3	Min	At +25°C, with tolerance ±100ppb	
Supply Sensitivity	–	–	±10	ppb	V _{cc} ±5%	
Load Sensitivity	–	–	±10		Load±5%	
Aging per Day	–	–	±2		After 30 days of operation	
Aging per Year	–	–	±200		After 30 days of operation	
SSB Phase Noise @100MHz	–	–	-85	dBc/Hz	Offset 10Hz	At +25°C
	–	–	-115		Offset 100Hz	
	–	–	-145		Offset 1kHz	
	–	–	-155		Offset 10kHz	
	–	–	-155		Offset 100kHz	
Control Voltage Range	0	–	5	V		
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					

Environmental Conditions

Operating Temperature Range	-55°C~+85°C
Storage Temperature Range	-55°C~+125°C

Outline Dimension & Pin Connections



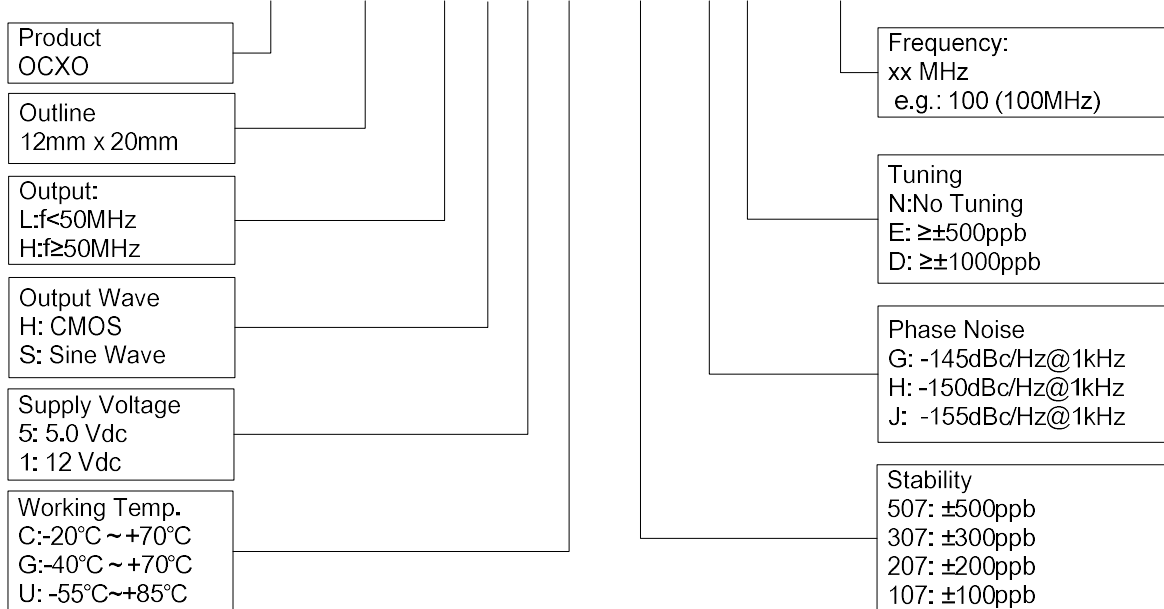
Note:
Leave Pin 1 unconnected if Vcon is not used.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 1220 H X X X X X X X X X . X X



Example: BO1220HS1C507HN100

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Features

- Ultra Stable
- Wide Temperature Range
- DIP (20mm*20mm)

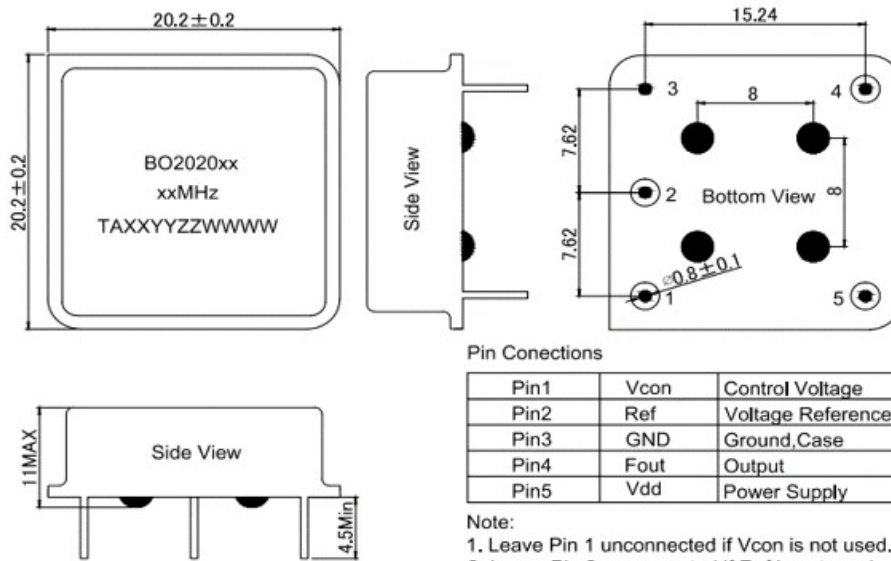
Applications

- Base Stations
- Instrumentations
- Medical Electronics
- Satellite communication


BO2020L Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	-	5.0	-	V	Vcc±5%	
	-	12.0	-	V	Vcc±5%	
Power Consumption	-	-	4.5	W		
	-	-	1.5	W		
Frequency Range	10 ~40			MHz		
Nominal Frequency	10, 20, 40			MHz		
Initial Frequency Tolerance	±100	-	±300	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±3	-	±10	ppb	-20°C ~ +70°C	
	±5	-	±20	ppb	-40°C ~ +70°C	
	±10	-	±50	ppb	-40°C ~ +85°C	
	±50	-	±100	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	-	-	dBm	
	Harmonics	-	-	-40	dBc	
	Spurious	-	-	-80	dBc	
	Load	-	50	-	Ω	
HCMOS	V _{OH}	2.4	-	-	V	HCMOS Output, Load=15pf
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	15	-	pf	
Short-term Stability@10MHz	-	-	5×10 ⁻¹²	ppb/s	Test after 15 Min.	
Warm-up Time	-	-	5	Min	At +25°C, with tolerance ±100ppb	
Supply Sensitivity	-	-	±1	ppb	Vcc±5%	
Load Sensitivity	-	-	±1		Load±5%	
Aging per Day	-	-	±0.5		After 30 days of operation	
Aging per Year	-	-	±50		After 30 days of operation	
SSB Phase Noise @10MHz	-	-	-125	dBc/Hz	Offset 10Hz	At +25°C, 12V
	-	-	-145		Offset 100Hz	
	-	-	-160		Offset 1kHz	
	-	-	-165		Offset 10kHz	
	-	-	-168		Offset 100kHz	
Control Voltage Range	0	-	5	V		
Frequency Tuning Range	±0.5	-	±2.0	ppm		
Tuning Slope	Positive					
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-55°C~+125°C					

Outline Dimension & Pin Connections



Pin Connections

Pin1	Vcon	Control Voltage
Pin2	Ref	Voltage Reference
Pin3	GND	Ground, Case
Pin4	Fout	Output
Pin5	Vdd	Power Supply

Note:

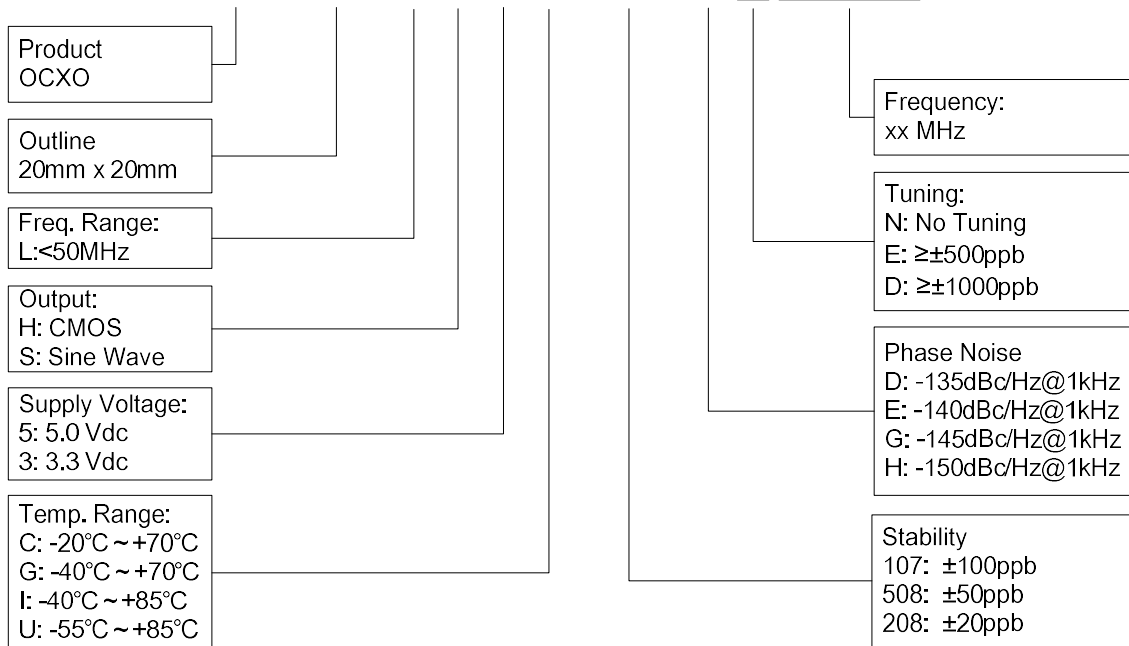
1. Leave Pin 1 unconnected if Vcon is not used.
2. Leave Pin 2 unconnected if Ref is not used.
3. Reference connection of voltage control circuit.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 2020 L X X X XXX X X XX.XX



Example: BO1220LH5C107DN10

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Features

- Ultra Stable
- Wide Temperature Range
- Fast Warming-up
- Ultra Low Phase Noise

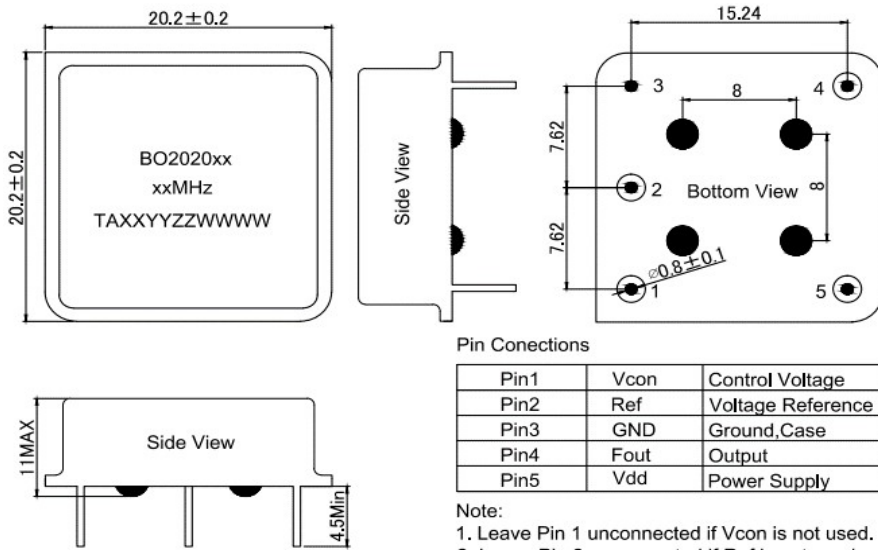
Applications

- Base Stations
- Instrumentations
- Synthesizer
- Medical Electronics


BO2020H Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	–	5.0	–	V	V _{cc} ±5%	
	–	12.0	–	V	V _{cc} ±5%	
Power Consumption	–	–	4.5	W		
	–	–	1.5	W		
Frequency Range	50 ~ 120			MHz		
Nominal Frequency	50, 80, 100, 120			MHz		
Initial Frequency Tolerance	±100	–	±300	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±50	–	±100	ppb	-40°C ~ +70°C	
	±100	–	±200	ppb	-40°C ~ +85°C	
	±200	–	±500	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	–	dBm		
	Harmonics	–	–	-40	dBc	
	Spurious	–	–	-80	dBc	
	Load	–	50	–	Ω	
HCMOS	V _{OH}	2.4	–	V	HCMOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Short-term Stability@100MHz	–	–	1×10 ⁻¹¹	ppb/s	Test after 15 Min.	
Warm-up Time	–	–	5	Min	At +25°C, with tolerance ±100ppb	
Supply Sensitivity	–	–	±10	ppb	V _{cc} ±5%	
Load Sensitivity	–	–	±10		Load±5%	
Aging per Day	–	–	±2		After 30 days of operation	
Aging per Year	–	–	±200		After 30 days of operation	
SSB Phase Noise @100MHz	–	–	-100	dBc/Hz	Offset 10Hz	
	–	–	-130		Offset 100Hz	
	–	–	-160		Offset 1kHz	
	–	–	-170		Offset 10kHz	
	–	–	-170		Offset 100kHz	
Control Voltage Range	0	–	5	V		
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-55°C~+125°C					

Outline Dimension & Pin Connections



Pin Connections

Pin1	Vcon	Control Voltage
Pin2	Ref	Voltage Reference
Pin3	GND	Ground, Case
Pin4	Fout	Output
Pin5	Vdd	Power Supply

Note:

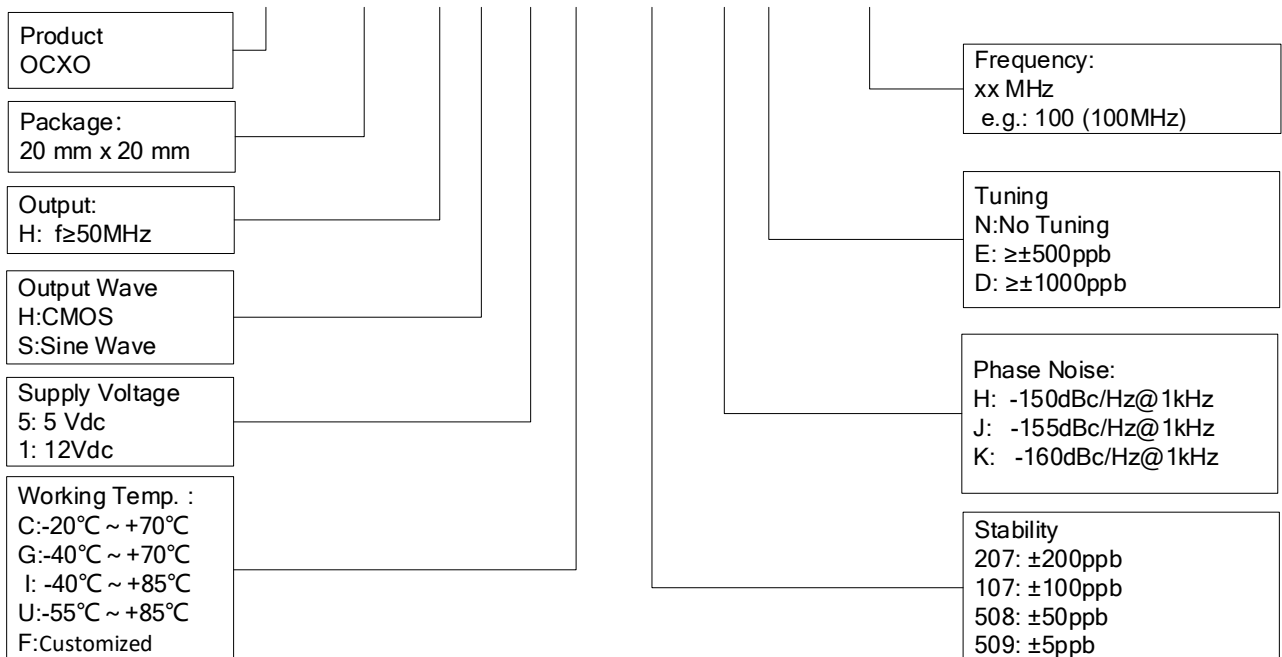
1. Leave Pin 1 unconnected if Vcon is not used.
2. Leave Pin 2 unconnected if Ref is not used.
3. Reference connection of voltage control circuit.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 2020H X X X XXX X X XXX.X



Example: BO2020HS1C107KN100

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Features

- Ultra Stable
- Wide Temperature Range
- Fast Warming-up

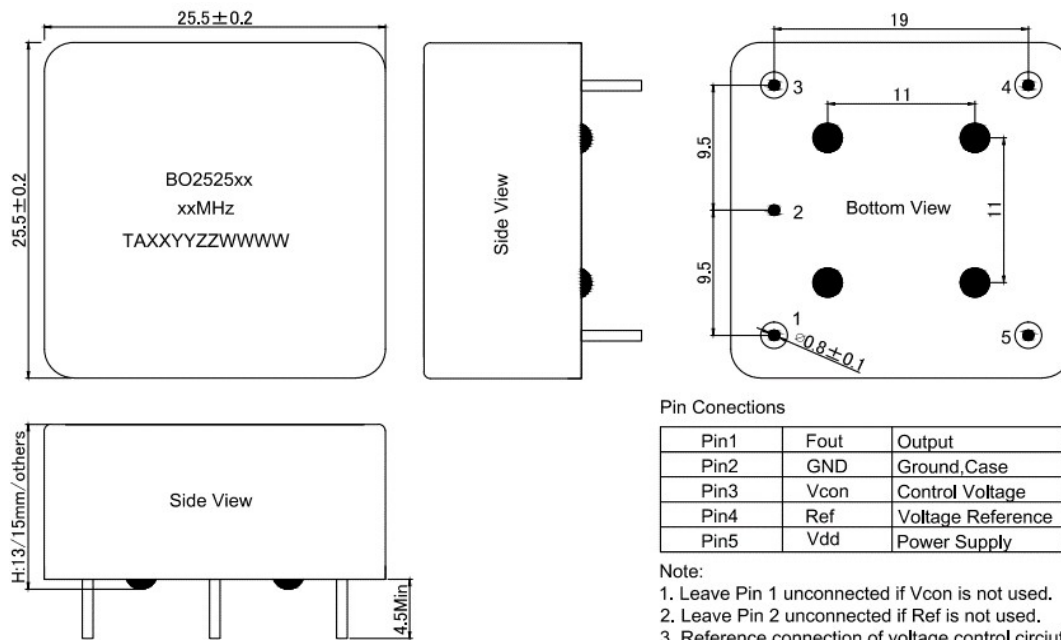
Applications

- Base Stations
- Instrumentations
- Synthesizer
- Medical Electronics


BO2525L Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	–	5.0	–	V	V _{cc} ±5%	
	–	12.0	–	V	V _{cc} ±5%	
Power Consumption	–	–	3.0	W		
	–	–	1.0	W		
Frequency Range	10 ~ 40			MHz		
Nominal Frequency	10, 20, 40			MHz		
Initial Frequency Tolerance	–	–	±100	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±3	–	±10	ppb	-20°C ~ +70°C	
	±5	–	±10	ppb	-40°C ~ +70°C	
	±10	–	±50	ppb	-40°C ~ +85°C	
	–	–	±100	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	–	dBm		
	Harmonics	–	–	-40	dBc	
	Spurious	–	–	-80	dBc	
	Load	–	50	–	Ω	
HCMOS	V _{OH}	2.4	–	V	HCMOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Short-term Stability@10MHz	–	–	3×10 ⁻¹²		Test after 15 Min.	
Warm-up Time	–	–	5	Min	At +25°C, with tolerance ±100ppb	
Supply Sensitivity	–	–	±5	ppb	V _{cc} ±5%	
Load Sensitivity	–	–	±5		Load±5%	
Aging per Day	–	–	±0.5		After 30 days of operation	
Aging per Year	–	–	±50		After 30 days of operation	
SSB Phase Noise @10MHz	–	–	-120	dBc/Hz	Offset 10Hz	@+25°C
	–	–	-140		Offset 100Hz	
	–	–	-160		Offset 1kHz	
	–	–	-165		Offset 10kHz	
	–	–	-168		Offset 100kHz	
Control Voltage Range	0	–	5	V		
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					
Environmental Conditions						
Operating Temperature Range		-55°C~+85°C				
Storage Temperature Range		-55°C~+125°C				

Outline Dimension & Pin Connections

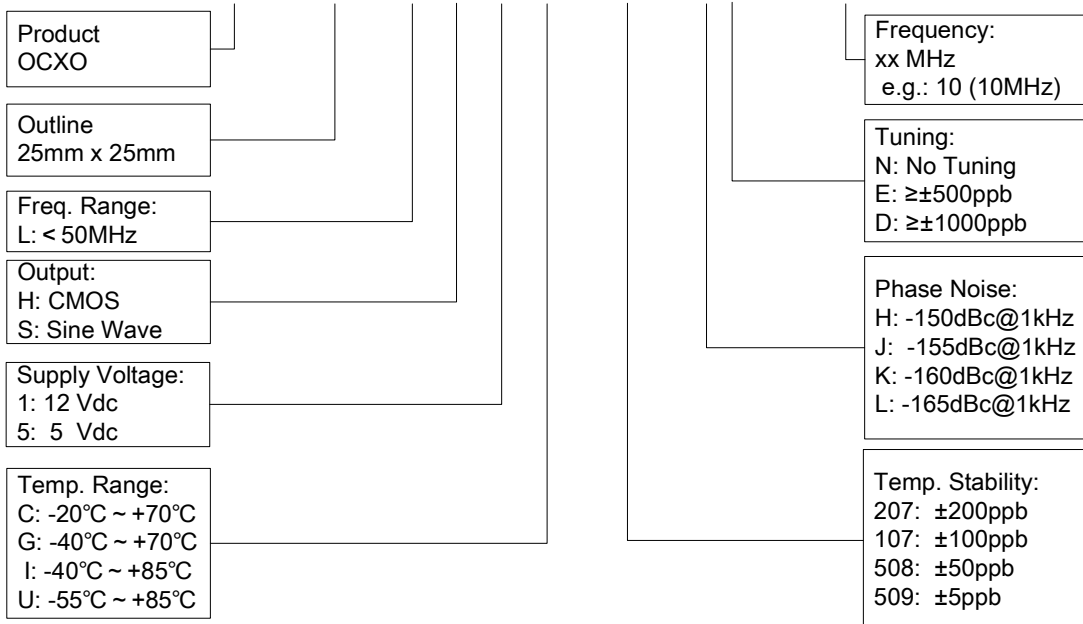


Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 2525 L X X X XXX X X XX.XX



Example: BO2525LH5C108HN10

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Features

- Ultra Stable
- Wide Temperature Range
- Fast Warming-up

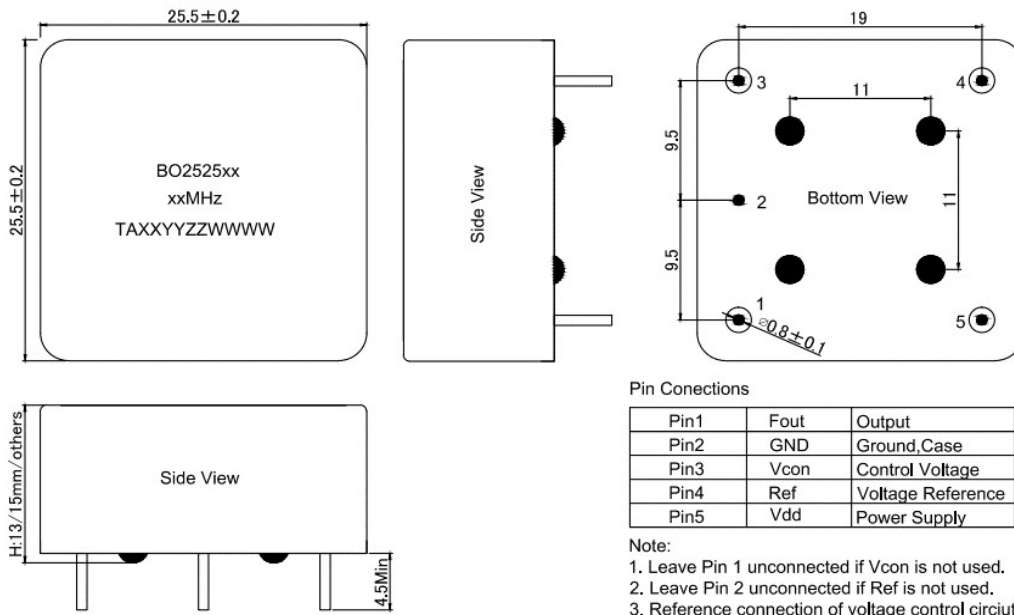
Applications

- Base Stations
- Instrumentations
- Synthesizer
- Medical Electronics


BO2525H Series Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	–	5.0	–	V	V _{cc} ±5%	
	–	12.0	–	V	V _{cc} ±5%	
Power Consumption	–	–	4.0	W		
	–	–	1.5	W		
Frequency Range	50 ~ 120			MHz		
Nominal Frequency	50, 80, 100, 120			MHz		
Initial Frequency Tolerance	–	–	±300	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±50	–	±100	ppb	-40°C ~ +70°C	
	±100	–	±200	ppb	-40°C ~ +85°C	
	±200	–	±500	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	–	dBm		
	Harmonics	–	–	-40	dBc	
	Spurious	–	–	-80	dBc	
	Load	–	50	–	Ω	
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Short-term Stability@100MHz	–	–	1×10 ⁻¹¹	ppb/s	Test after 15 Min.	
Warm-up Time	0	–	5	Min	At +25°C, with accuracy of ±100ppb	
Supply Sensitivity	–	–	±5	ppb	V _{cc} ±5%	
Load Sensitivity	–	–	±5		Load±5%	
Aging per Day	–	–	±2		After 30 days of operation	
Aging per Year	–	–	±200		After 30 days of operation	
SSB Phase Noise @100MHz	–	–	-100	dBc/Hz	Offset 10Hz	At +25°C Sinewave
	–	–	-135		Offset 100Hz	
	–	–	-160		Offset 1kHz	
	–	–	-170		Offset 10kHz	
	–	–	-173		Offset 100kHz	
Control Voltage Range	0	–	5	V		
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					
Tuning Slope	Positive					
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-55°C~+125°C					

Outline Dimension & Pin Connections



Pin Connections

Pin1	Fout	Output
Pin2	GND	Ground, Case
Pin3	Vcon	Control Voltage
Pin4	Ref	Voltage Reference
Pin5	Vdd	Power Supply

Note:

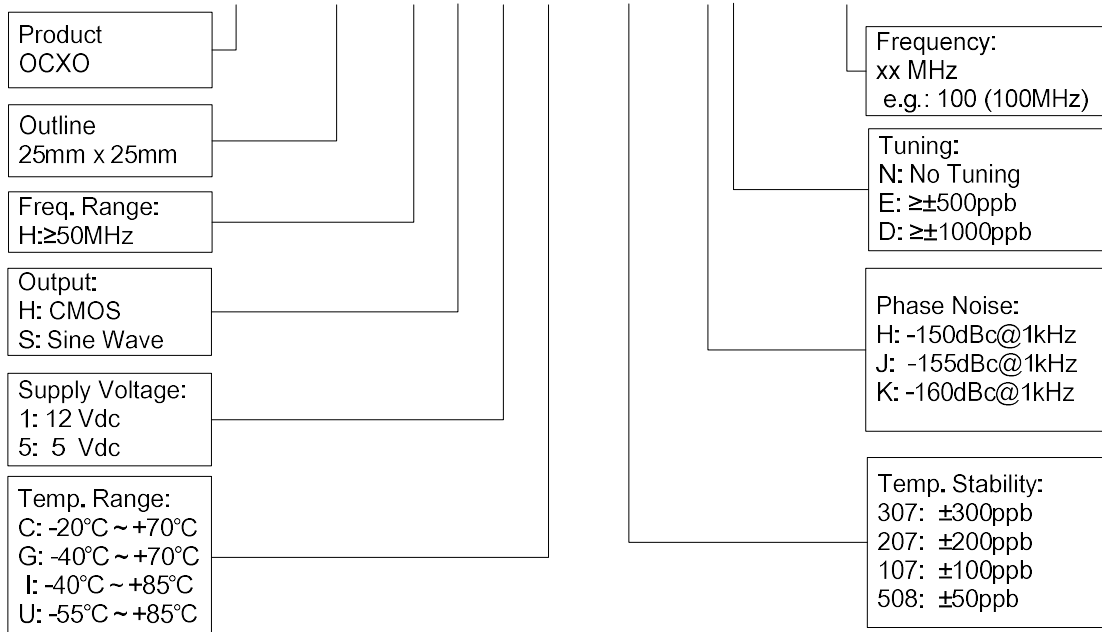
1. Leave Pin 1 unconnected if Vcon is not used.
2. Leave Pin 2 unconnected if Ref is not used.
3. Reference connection of voltage control circuit.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 2525 H X X X XXX X X XX.XX



Example: BO2525HS1C508HN100

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Features

- Ultra Stable
- Wide Temperature Range
- Fast Warming-up
- DIP(36mm*27mm)

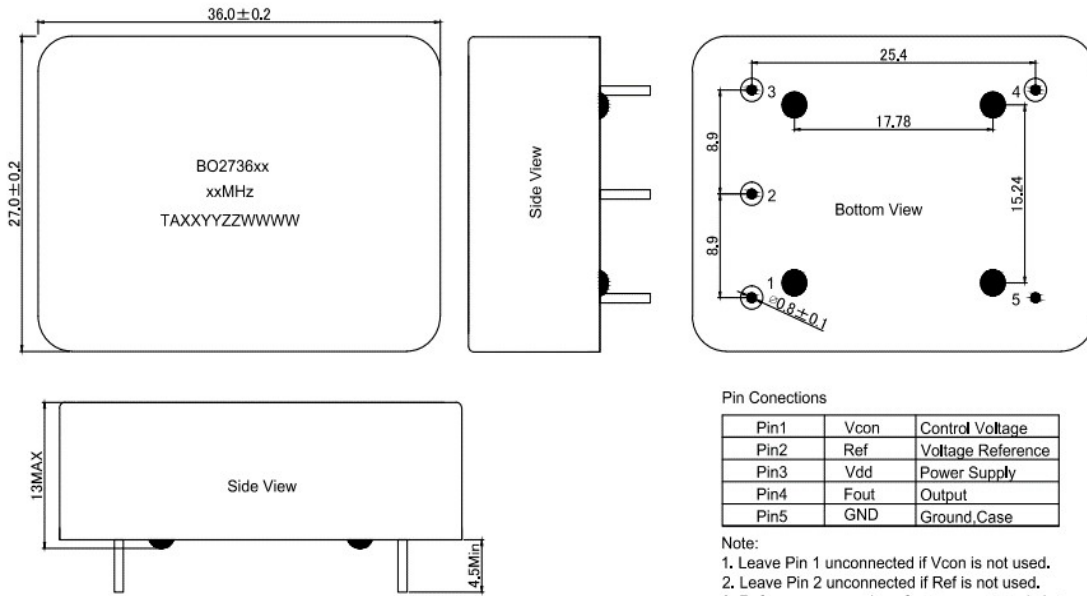
Applications

- Base Stations
- Instrumentations
- Medical Electronics


BO2736L Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	–	5.0	–	V	V _{cc} ±5%	
	–	12.0	–	V	V _{cc} ±5%	
Power Consumption	–	–	5.0	W		
	–	–	1.5	W		
Frequency Range	10 ~ 40			MHz		
Nominal Frequency	10, 20, 40			MHz		
Initial Frequency Tolerance	–	–	±100	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±1	–	±10	ppb	-20°C ~ +70°C	
	±3	–	±10	ppb	-40°C ~ +70°C	
	±5	–	±20	ppb	-40°C ~ +85°C	
	–	–	±50	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	–	dBm		
	Harmonics	–	–	-40	dBc	
	Spurious	–	–	-80	dBc	
	Load	–	50	–	Ω	
HCMOS	V _{OH}	2.4	–	–	V	HCMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	HCMOS Output, Load=15pf
	Load	–	15	–	pf	
Short-term Stability@10MHz	–	–	2×10 ⁻¹²	ppb/s	Test after 15 Min.	
Warm-up Time	–	–	5	Min	At +25°C, with tolerance ±100ppb	
Supply Sensitivity	–	–	±0.5	ppb	V _{cc} ±5%	
Load Sensitivity	–	–	±0.5		Load±5%	
Aging per Day	–	–	±0.5		After 30 days of operation	
Aging per Year	–	–	±50		After 30 days of operation	
SSB Phase Noise @10MHz	–	–	-130	dBc/Hz	Offset 10Hz	@+25°C
	–	–	-150		Offset 100Hz	
	–	–	-165		Offset 1kHz	
	–	–	-170		Offset 10kHz	
	–	–	-173		Offset 100kHz	
Control Voltage Range	0	–	5	V		
Frequency Tuning Range	±0.5	–	±2.0	ppm		
Tuning Slope	Positive					
Environmental Conditions						
Operating Temperature Range		-55°C~+85°C				
Storage Temperature Range		-55°C~+125°C				

Outline Dimension & Pin Connections

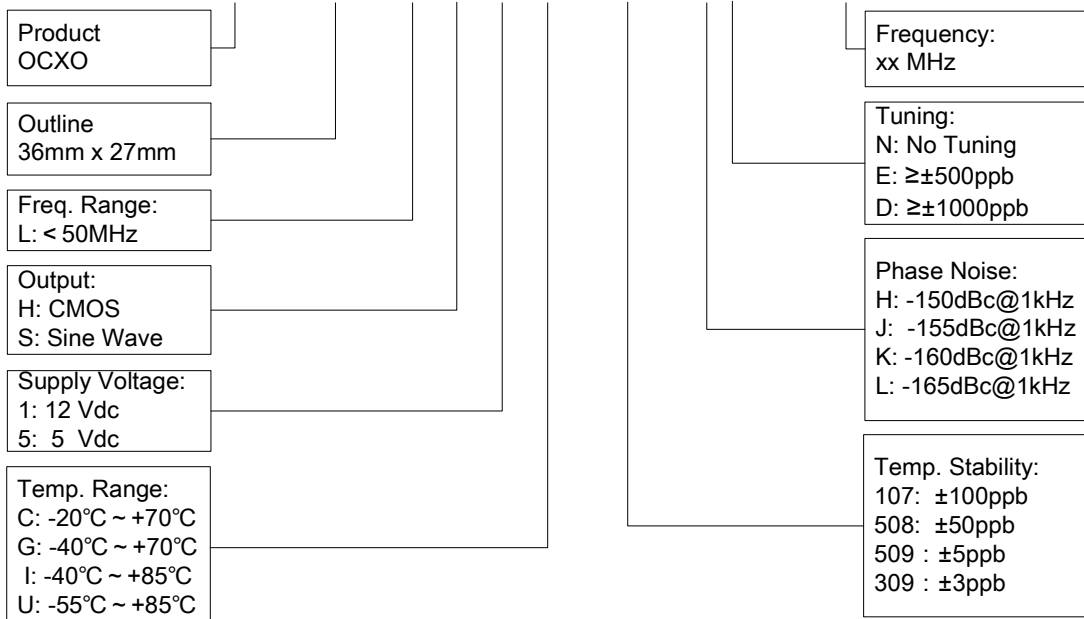


Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 2736 L X X X XXX X X XX.XX



Example: BO2736LH5C509HN10

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Features

- High Stability
- Wide Temperature Range
- Low Phase Noise
- DIP(36mm*27mm)

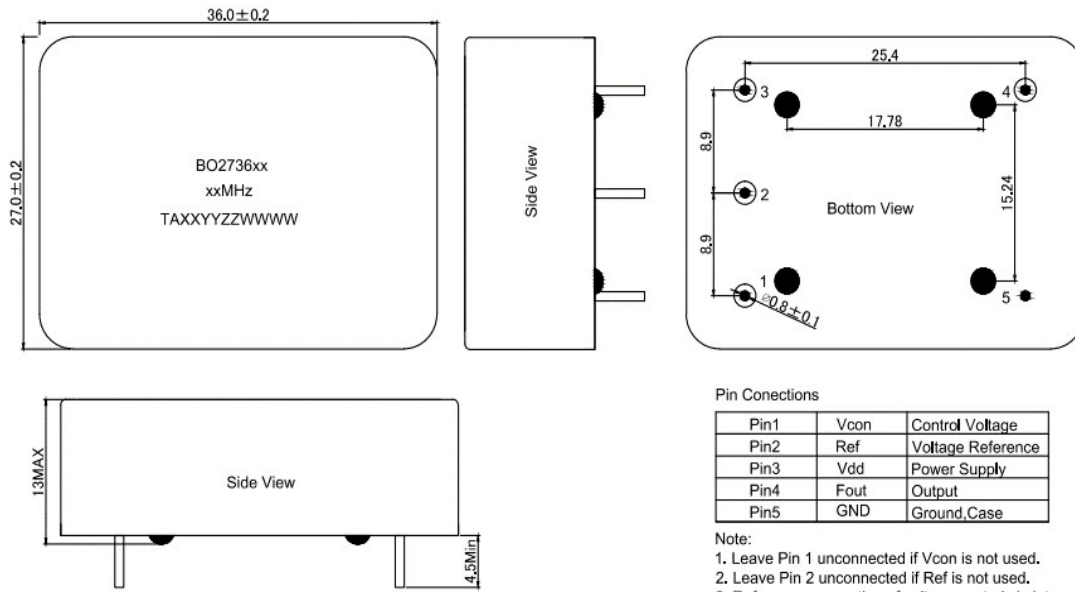
Applications

- Base Stations
- Instrumentations
- Synthesizer
- Medical Electronics


BO2736H Specifications

Parameter	Value			Unit	Condition	
	Min.	Typ.	Max.			
Supply Voltage	-	5.0	-	V	V _{cc} ±5%	
	-	12.0	-	V	V _{cc} ±5%	
Power Consumption	-	-	4.5	W		
	-	-	1.5	W		
Frequency Range	50 ~ 120			MHz		
Nominal Frequency	50,80,100,120			MHz		
Initial Frequency Tolerance	-	-	±300	ppb	At shipment, nominal EFC	
Freq. Stability Vs. Temp.	±10	-	±50	ppb	-20°C ~ +70°C	
	±10	-	±200	ppb	-40°C ~ +85°C	
	±100	-	±300	ppb	-55°C ~ +85°C	
Sine Wave	Output Level	7	-	-	dBm	
	Harmonics	-	-	-40	dBc	
	Spurious	-	-	-80	dBc	
	Load	-	50	-	Ω	
HCMOS	V _{OH}	2.4	-	-	V	HCMOS Output, Load=15pf
	V _{OL}	-	-	0.4	V	HCMOS Output, Load=15pf
	Duty Cycle	45	-	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	-	-	6	ns	HCMOS Output, Load=15pf
	Load	-	15	-	pf	
Short-term Stability@100MHz	-	-	1×10 ⁻¹¹	ppb/s	Test after 15 Min.	
Warm-up Time	-	-	5	Min	At +25°C, with accuracy of ±100ppb	
Supply Sensitivity	-	-	±10	ppb	V _{cc} ±5%	
Load Sensitivity	-	-	±10		Load±5%	
Aging per Day	-	-	±5		After 30 days of operation	
Aging per Year	-	-	±500		After 30 days of operation	
SSB Phase Noise @100MHz	-	-	-105		dBc/Hz	Offset 10Hz
	-	-	-135	Offset 100Hz		
	-	-	-165	Offset 1kHz		
	-	-	-170	Offset 10kHz		
	-	-	-173	Offset 100kHz		
Control Voltage Range	0	-	5	V		
Frequency Tuning Range	±0.5	-	±2.0	ppm		
Tuning Slope	positive					
Environmental Conditions						
Operating Temperature Range	-55°C~+85°C					
Storage Temperature Range	-55°C~+125°C					

Outline Dimension & Pin Connections

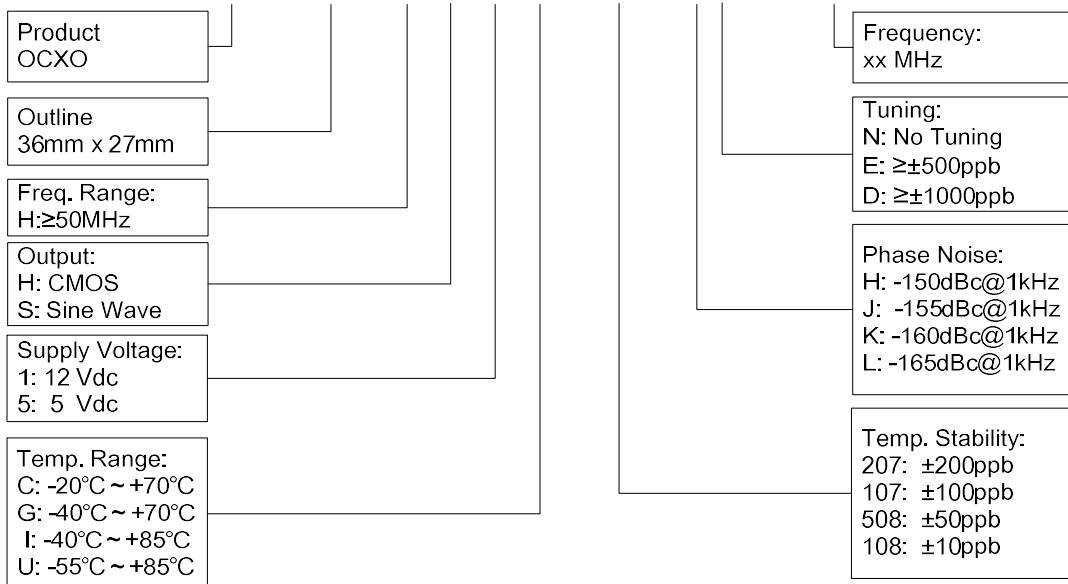


Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BO 2736H X X X XXX X X XX.XX



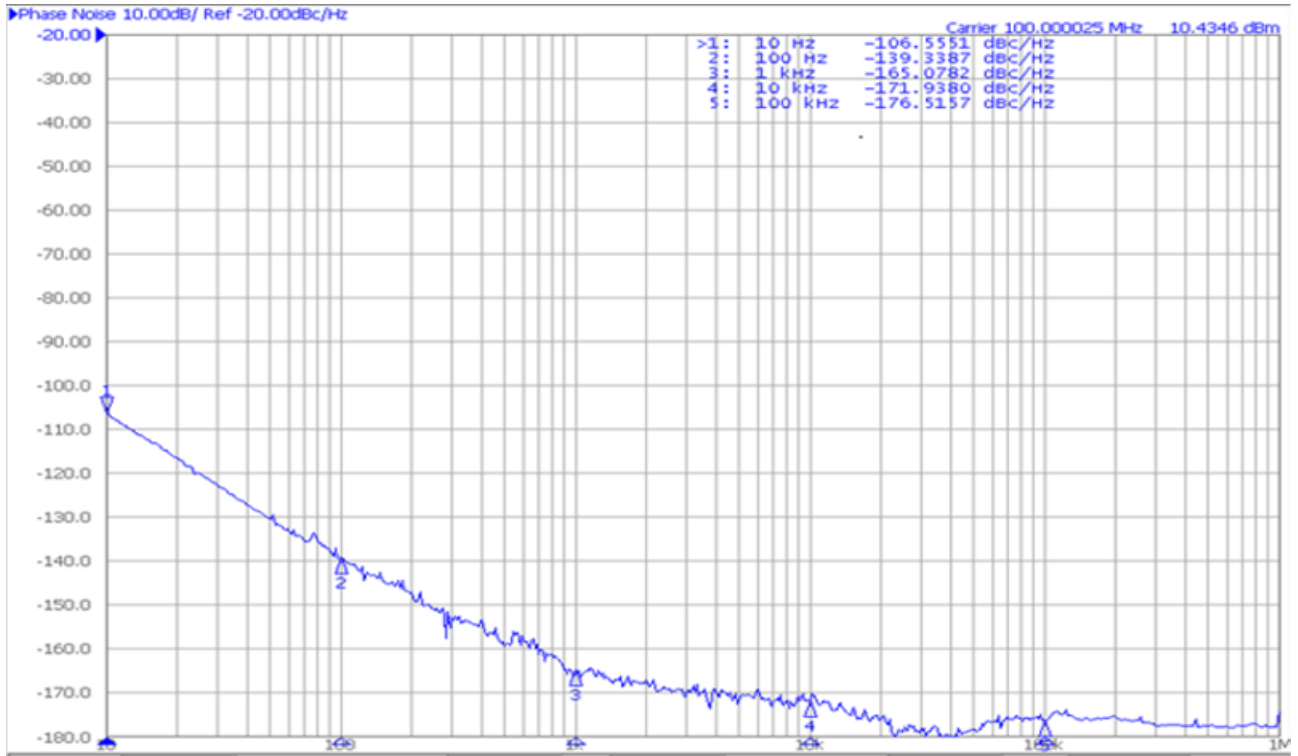
Example: BO2736HS5C107HN100

Disclaimer

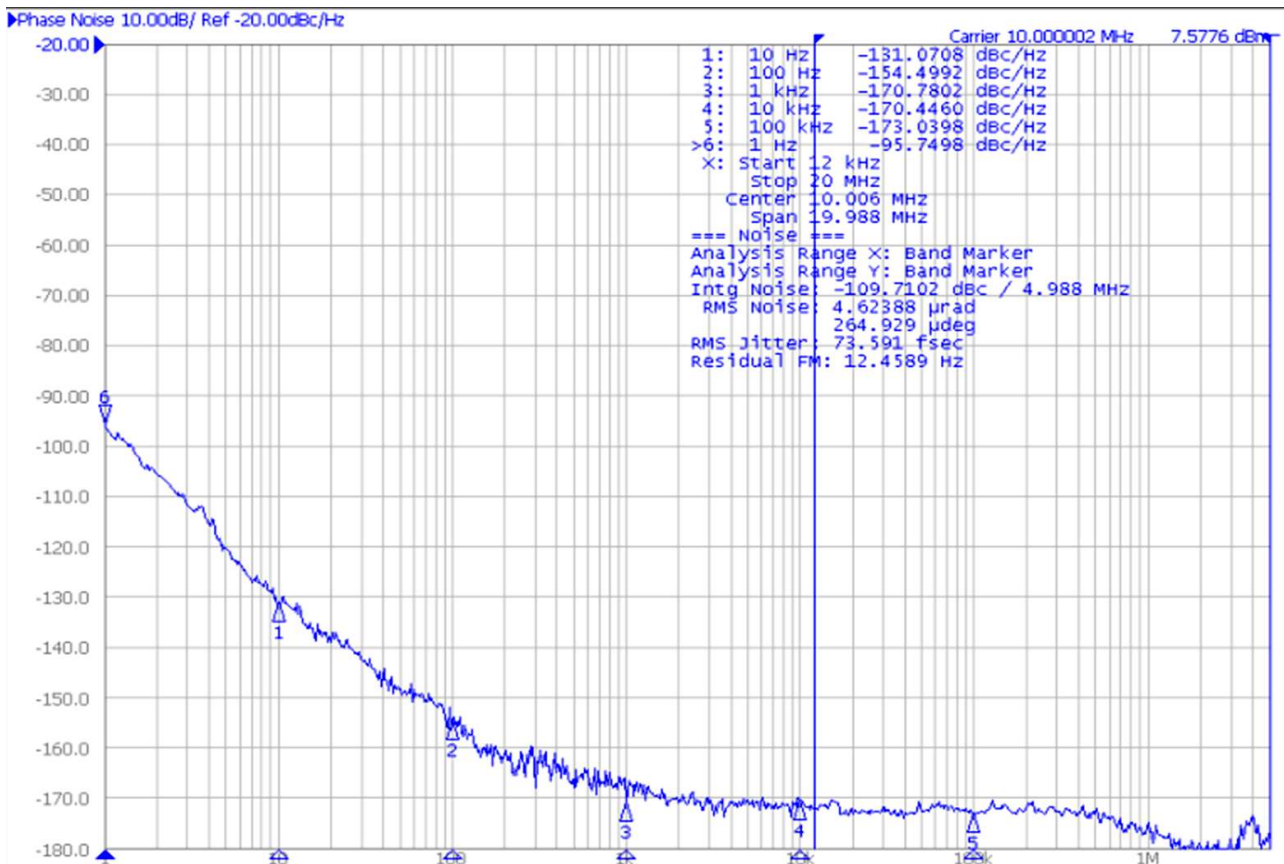
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PHASE NOISE OF OCXO

100MHz Carrier



10MHz Carrier



Features

- High frequency & Low Noise
- SMD Package (7.0×5.0mm)
- Quick Warm-up

Applications

- Low vibration RF Communication
- Wireless Communication
- Low Phase Noise Signal Resource
- SDH/SONET
- GNSS


BV0507D Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
	–	5	–	V	V _{cc} ±5%	
Supply Current	20	–	30	mA		
Frequency Range	10 ~ 156.52			MHz		
Nominal Frequency	40,80, 100, 120, 122.88			MHz		
Freq. Stability Vs. Temp.	±10	±12	±15	ppm	-40°C~+85°C	
CMOS	V _{OH}	2.4	–	V	CMOS Output, Load=15pf	
	V _{OL}	–	–	0.4	V	CMOS Output, Load=15pf
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	3	ns	CMOS Output, Load=15pf
	Load	–	–	15	pf	
RMS Jitter(By E5052B)	20	–	45	fs	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	±0.3	–	±1.0		Standard	
SSB Phase Noise @100MHz	–	-80	-75	dBc/Hz	Offset 10Hz	At +25°C
	–	-112	-110		Offset 100Hz	
	–	-142	-140		Offset 1kHz	
	–	-158	-155		Offset 10kHz	
	–	-160	-158		Offset 100kHz	
Control Voltage Range	0~3.3			V		
Frequency Tuning Range	±20	±30	±40	ppm	At shipment, nominal EFC, +25°C	
Tuning Slope	–					
Non-linearity	–	–	10	%		

Environmental Conditions

Operating Temperature Range	-40°C~+85°C
Storage Temperature Range	-55°C ~ +125°C

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	V _{dd}	-0.5V / 6V
Control Voltage	V _{con}	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Reliability

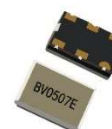
Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Features

- High frequency & Low Noise
- SMD Package (7.0×5.0mm)
- Quick Warm-up

Applications

- Low vibration RF Communication
- Wireless Communication
- Low Phase Noise Signal Resource
- SDH/SONET
- GNSS


BV0507E Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
	–	5	–	V	V _{cc} ±5%	
Supply Current	20	–	80	mA		
Frequency Range	10 ~ 156.52			MHz		
Nominal Frequency	40,80, 100, 120, 122.88			MHz		
Freq. Stability Vs. Temp.	±10	±12	±15	ppm	-40°C~+85°C	
LVPECL	V _{OH}	1.86	–	2.11	V	
	V _{OL}	1.06	–	1.31	V	
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	0.2	1	ns	
	Load	–	–	50	pf	
LVDS	V _{pp}	250	350	450	mV	
	V _{os}	1.125.	1.25	1.375	V	
	Duty Cycle	45	–	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	0.2	1	ns	Tr/Tf:20% ← → 80% waveform
	Load	–	–	100	Ω	
RMS Jitter(By E5052B)@100MHz	200	–	700	fs	12KHz~5MHz	
Supply Sensitivity	–	–	±0.1	ppm	V _{cc} ±5%	
Load Sensitivity	–	–	±0.2		Load±5%	
Aging/ First Year	–	–	±1.0		Standard	
SSB Phase Noise @100MHz	–	-78	-75	dBc/Hz	Offset 10Hz	At +25°C
	–	-112	-110		Offset 100Hz	
	–	-140	-135		Offset 1kHz	
	–	-150	-145		Offset 10kHz	
	–	-155	-150		Offset 100kHz	
Control Voltage Range	0~3.3			V		
Frequency Tuning Range	±20	±30	±40	ppm	At shipment, nominal EFC, +25°C	
Tuning Slope	positive					
Non-linearity	–	–	10	%		

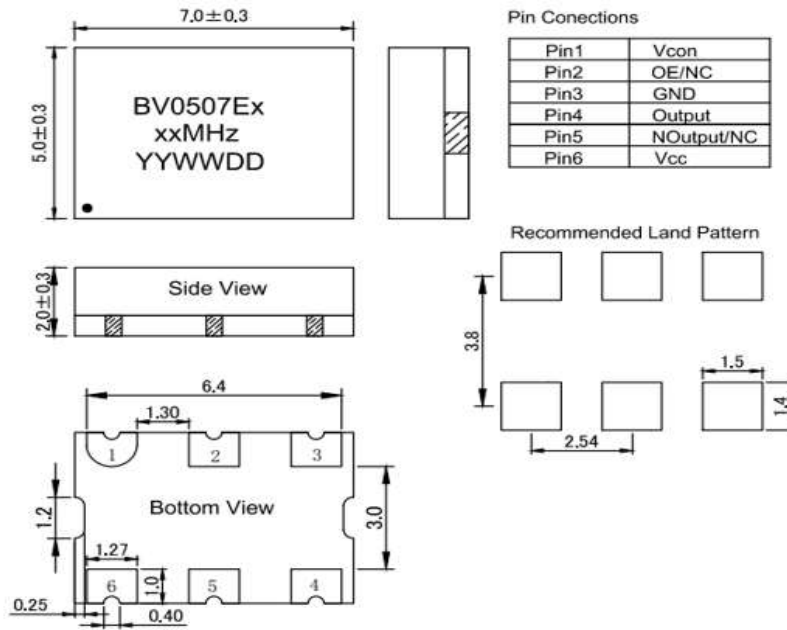
Environmental Conditions

Operating Temperature Range	-40°C ~ +85°C
Storage Temperature Range	-55°C ~ +125°C

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	V _{dd}	-0.5V / 6V
Control Voltage	V _{con}	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Outline Dimension & Pin Connections



Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BV 0507E XXXXXXXXXX XX.XX

Product:
VCXO

Outline:
7.0 × 5.0mm

Output:
P: LVPECL
D: LVDS

Supply Voltage:
3: 3.3 V
5: 5.0 V

Frequency in MHz

Tuning Range:
XXXN: XXX ppm Min.
eg: 020N

Phase Noise:
C: -130dBc/Hz@1kHz
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz

Stability vs. Temp.
155: ±15ppm

Temp. Range:
C: -20°C ~ +70°C
I: -40°C ~ +85°C

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Features

- Ultra Stable
- Low Phase Noise
- SMD Package(14.65×9.35mm)

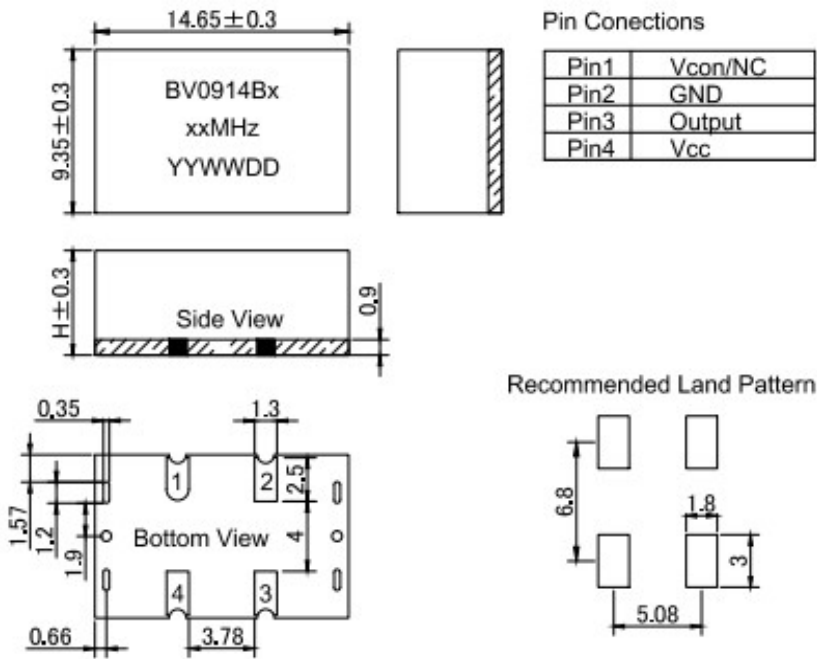
Applications

- Low phase noise signal source
- Wireless Communication System
- Low jitter RF Communication
- GNSS


BV0914B Series Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	-	3.3	-	V	Vcc±5%	
	-	5	-	V	Vcc±5%	
Output Current	-	-	30	mA		
Frequency Range	40 ~ 150			MHz		
Nominal Frequency	80, 100, 120, 122.88			MHz		
Freq. Stability Vs. Temp.	±10	±12	±15	ppm	-40°C~+85°C	
CMOS	V _{OH}	2.4	-	V	CMOS Output, Load=15pf	
	V _{OL}	-	-	0.4	V	CMOS Output, Load=15pf
	Duty Cycle	45	50	55	%	
	Rise/Fall Edge	-	-	6	ns	90%~10% Vdd
	Load	-	-	15	pf	
Sine Wave	Output Level	7	-	-	dbm	
	Harmonious			-30	dBc	
	Spurious			-70	dBc	
	Load	50ohm				
RMS Jitter(By E5052B)	20	-	40	fs	12KHz~5MHz	
Supply Sensitivity	-	-	+0.2	ppm	Supply voltage varied ±5% at 25°C	
Load Sensitivity	-	-	+0.2		±5% load change	
Aging/ First Year	-	-	±1.0			
SSB Phase Noise @100MHz		-	-85	dBc/Hz	Offset 10Hz	at 25°C
		-	-118		Offset 100Hz	
		-	-145		Offset 1kHz	
		-	-155		Offset 10kHz	
		-	-160		Offset 100kHz	
Control Voltage	0~3.3			V		
Frequency Tuning Range	±20	±30	±40	ppm	At shipment, nominal EFC, +25°C	
Tuning Slope	Positive					
Linearity	-	-	10	%		
Environmental Conditions						
Operating Temperature Range	-40°C ~ +85°C					
Storage Temperature Range	-55°C ~ +105°C					
Maximum Ratings						
Parameter	Symbol	Rating				
Supply Voltage	Vdd	-0.5V / 6V				
Control Voltage	Vcon	0V / 3V				
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V				

Outline Dimension & Pin Connections



Pin Connections

Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc

* Height 2.5mm/4mm/6mm is available or be customized.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BV 0914B X X X X X X X X X X X X . X X

Product:
VCXO

Outline:
14.65mm×9.35mm

Output:
H: CMOS
S: Sine Wave

Supply Voltage:
3: 3.3 V
5: 5.0 V

Temp. Range:
C: -20°C ~ +70°C
I: -40°C ~ +85°C

Frequency in MHz

Tuning Range:
XXXN: XXX ppm Min.
eg: 020N

Phase Noise:
C: -130dBc/Hz@1kHz
D: -135dBc/Hz@1kHz
E: -140dBc/Hz@1kHz

Stability vs. Temp.
155: ±15ppm

Example: BV0914BH5I155E010N100

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Features

- Ultra Stable
- Low Phase Noise
- SMD Package(14.65×9.35mm)

Applications

- Low phase noise signal source
- Wireless Communication System
- Low jitter RF Communication
- GNSS


BV0914A Series Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	Vcc ±5%	
	–	5	–	V	Vcc ±5%	
Output Current	–	30	–	mA		
Frequency Range	40 ~ 150			MHz		
Nominal Frequency	80, 100, 120, 122.88			MHz		
Freq. Stability Vs. Temp.	±10	±12	±15	ppm	-40°C ~ +85°C	
LVPECL	V _{OH}	1.86	–	2.11	V	CMOS Output, Load=15pf
	V _{OL}	1.06	–	1.31	V	CMOS Output, Load=15pf
	Duty Cycle	45	50	55	%	
	Rise/Fall Edge	–	0.2	1	ns	20%~80% Vdd
	Load	–	–	50	Ω	Vcc -2V or equivalent Kelvin Connections
LVDS	V _{pp}	250	350	450	dbm	
	V _{os}	1.125	1.25	1.375	dBc	
	Duty Cycle	45	–	55	dBc	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	0.2	1	ns	20%←→80%
	Load	–	–	100	Ω	
OE Function	Enable	2			V	Pin 2 no connection or Vdd > 2V
	Disable			0.4	V	
RMS Jitter(By E5052B)	200	–	700	fs	12KHz~5MHz@100MHz	
Supply Sensitivity	–	–	+0.2	ppm	Vcc ±5%	
Load Sensitivity	–	–	+0.2		±5% load change	
Aging/ First Year	–	–	±1.0			
SSB Phase Noise @100MHz	–	-78	-75	dBc/Hz	Offset 10Hz	at 25°C
	–	-112	-110		Offset 100Hz	
	–	-140	-135		Offset 1kHz	
	–	-150	-145		Offset 10kHz	
	–	-155	-150		Offset 100kHz	
Control Voltage	0~3.3			V		
Frequency Tuning Range	±20	±30	±40	ppm	At shipment, nominal EFC, +25°C	
Tuning Slope	Positive					
Linearity	–	–	10	%		

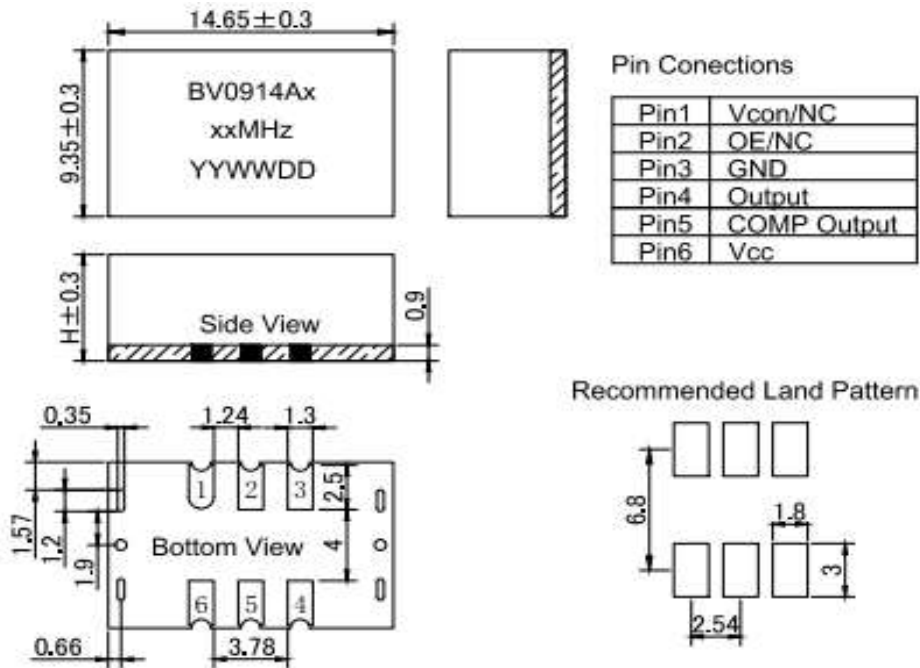
Environmental Conditions

Operating Temperature Range	-40°C ~ +85°C
Storage Temperature Range	-55°C ~ +105°C

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Outline Dimension & Pin Connections



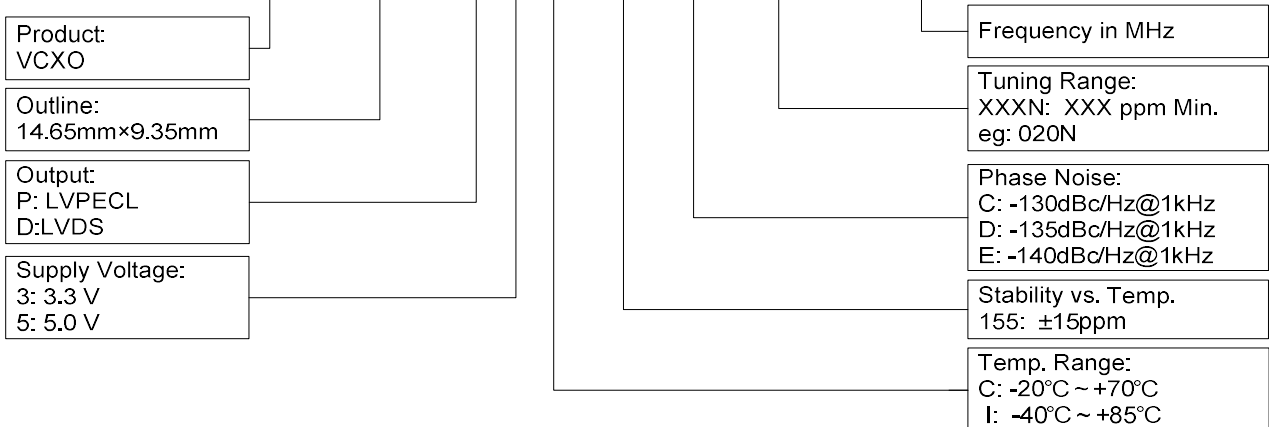
* Height 4mm or 6mm is available and 2.5mm can be customized.

Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BV0914A XXXXXXXXXX XX.XX



Example: BV0914AP5I155D010N100

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Features

- Ultra Stable
- Low Phase Noise
- SMD Package(12.6×20.2mm)

Applications

- Low phase noise signal source
- Wireless Communication System
- Low jitter RF Communication
- GNSS


BV1220 Specifications

Parameter	Value			Unit	Conditions	
	Min.	Typ.	Max.			
Supply Voltage	–	3.3	–	V	V _{cc} ±5%	
	–	5	–	V	V _{cc} ±5%	
Output Current	–	–	45	mA		
Frequency Range	40 ~ 150			MHz		
Nominal Frequency	80,100,120,122.88			MHz		
Freq. Stability Vs. Temp.	–	±12	–	ppm	-40°C~+85°C	
CMOS	V _{OH}	2.4	–	–	V	CMOS Output, Load=15pf
	V _{OL}	–	–	0.4	V	CMOS Output, Load=15pf
	Duty Cycle	45	50	55	%	(V _{OH} - V _{OL})/2
	Rise/Fall Edge	–	–	6	ns	CMOS Output, Load=15pf
	Load	–	–	15	pf	
Sine Wave	Output Level	7	–	–	dbm	
	Harmonious			-30	dBc	
	Spurious			-70	dBc	
	Load	50ohm				
RMS Jitter(By E5052B)	20	–	40	fs	12KHz~5MHz	
Supply Sensitivity	–	–	+0.2	ppm	Supply voltage varied ±5% at 25°C	
Load Sensitivity	–	–	+0.2			
Aging/ First Year	–	–	±1.0			
SSB Phase Noise @100MHz	–	-77	-75	dBc/Hz	at 25°C	
	–	-110	-110			
	–	-142	-140			
	–	-158	-155			
	–	-160	-158			
Control Voltage	0~3.3			V		
Frequency Tuning Range	±20	±30	±40	ppm	At shipment, nominal EFC, +25°C	
Tuning Slope	Positive					
Linearity	–	–	10	%		

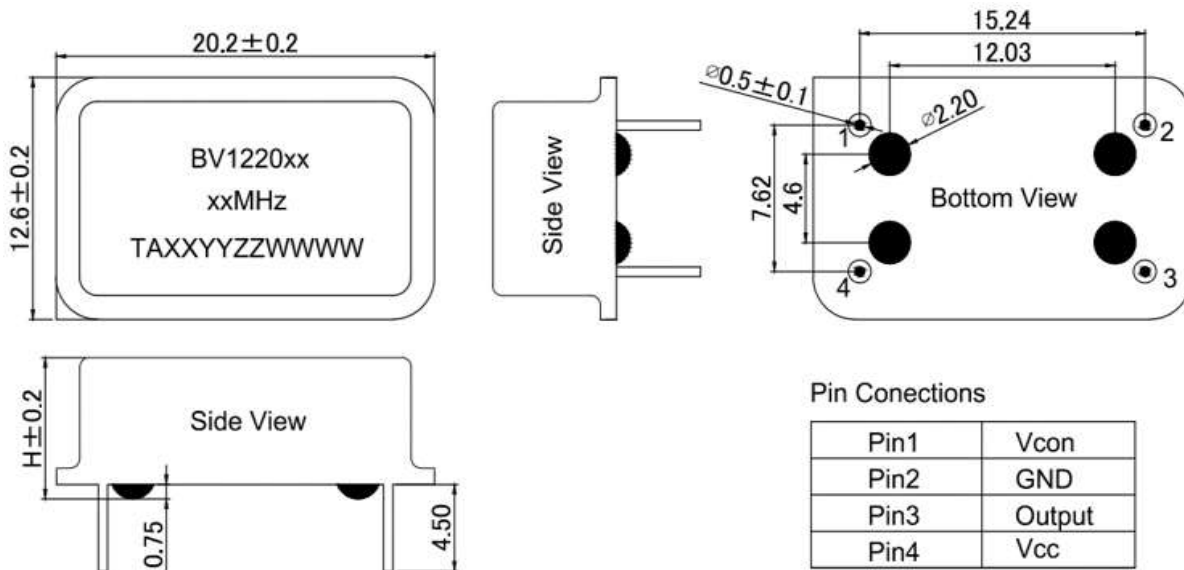
Environmental Conditions

Operating Temperature Range	-40°C ~ +85°C
Storage Temperature Range	-55°C ~ +105°C

Maximum Ratings

Parameter	Symbol	Rating
Supply Voltage	V _{dd}	-0.5V / 6V
Control Voltage	V _{con}	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

Outline Dimension & Pin Connections

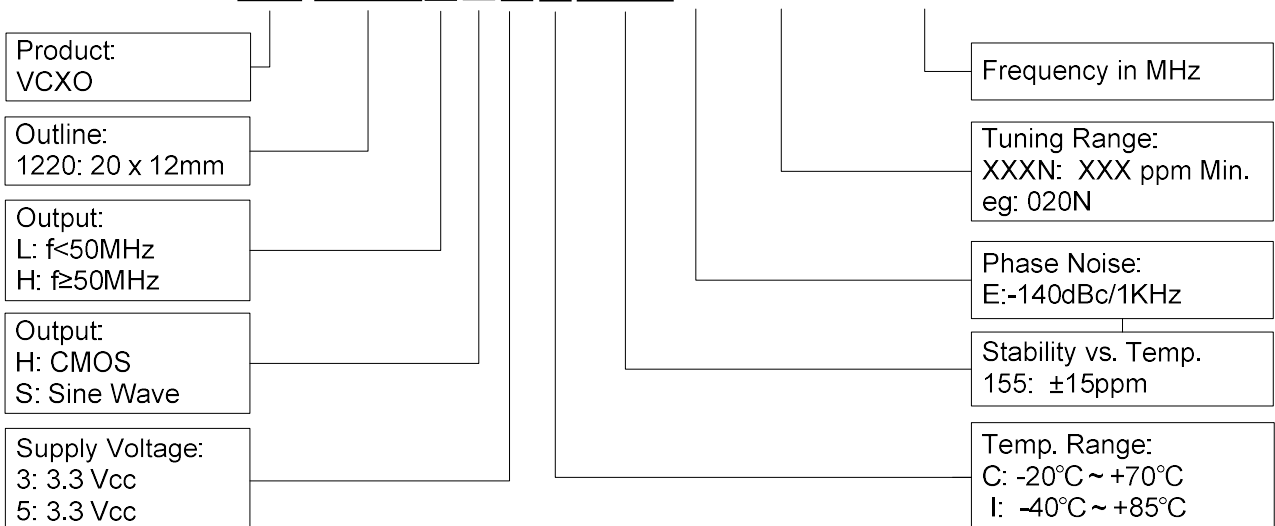


Reliability

Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solder Ability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RHOS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Ordering Guide

BV 1220XXXXXXX XXXX XX.XX



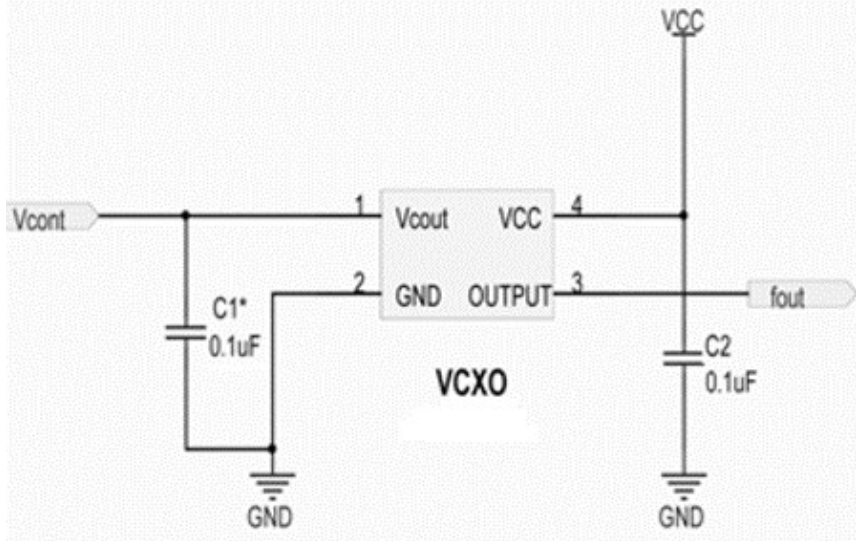
Example: BV1220HH5I125E010N100

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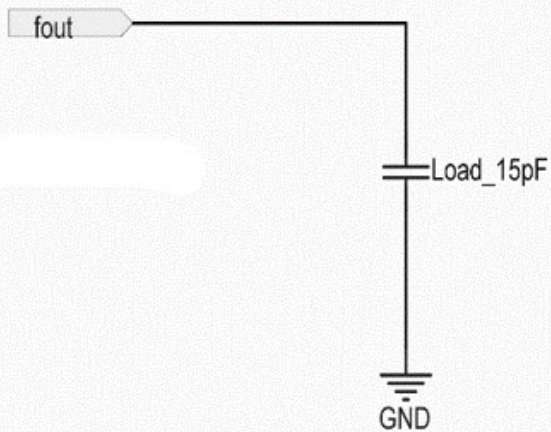
VCXO TEST CIRCUIT

Test Circuit



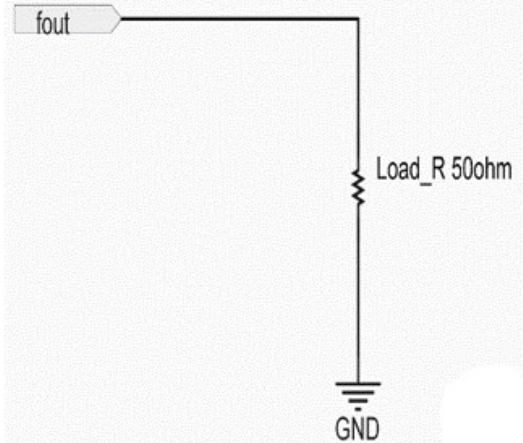
CMOS

CMOS Output
方波输出



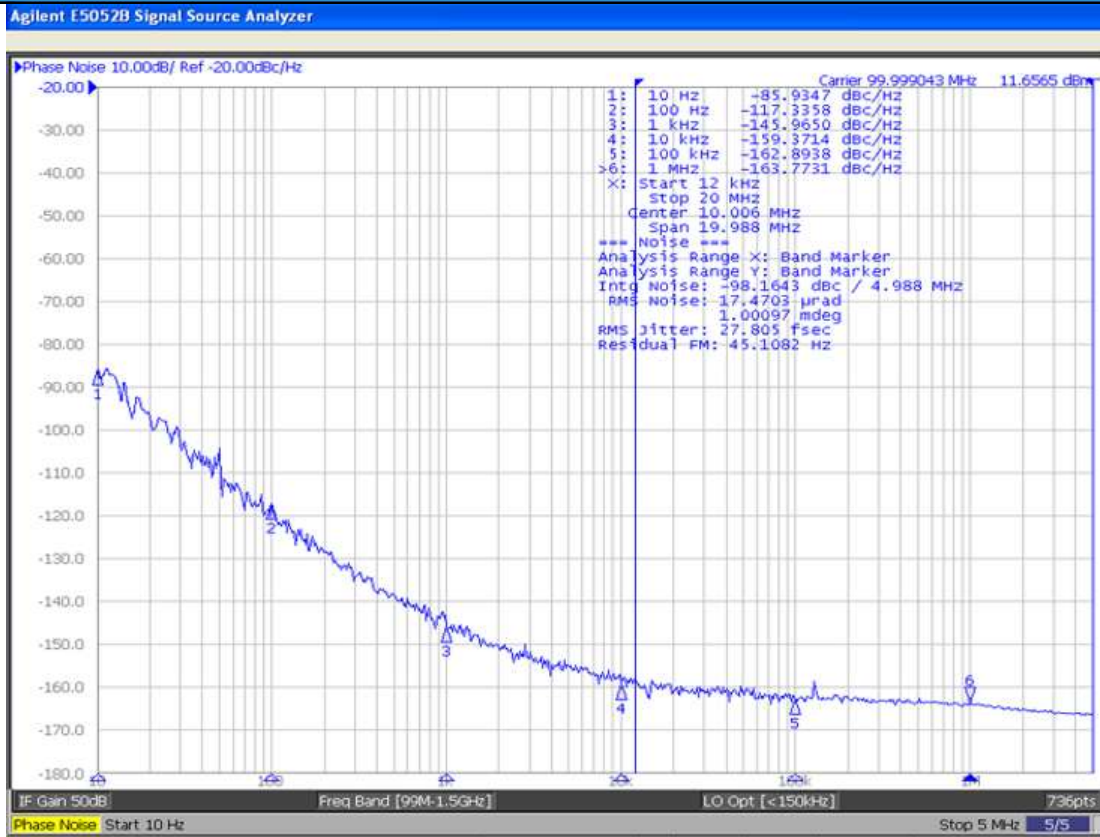
SINEWAVE

Sine Wave Output
正弦波输出

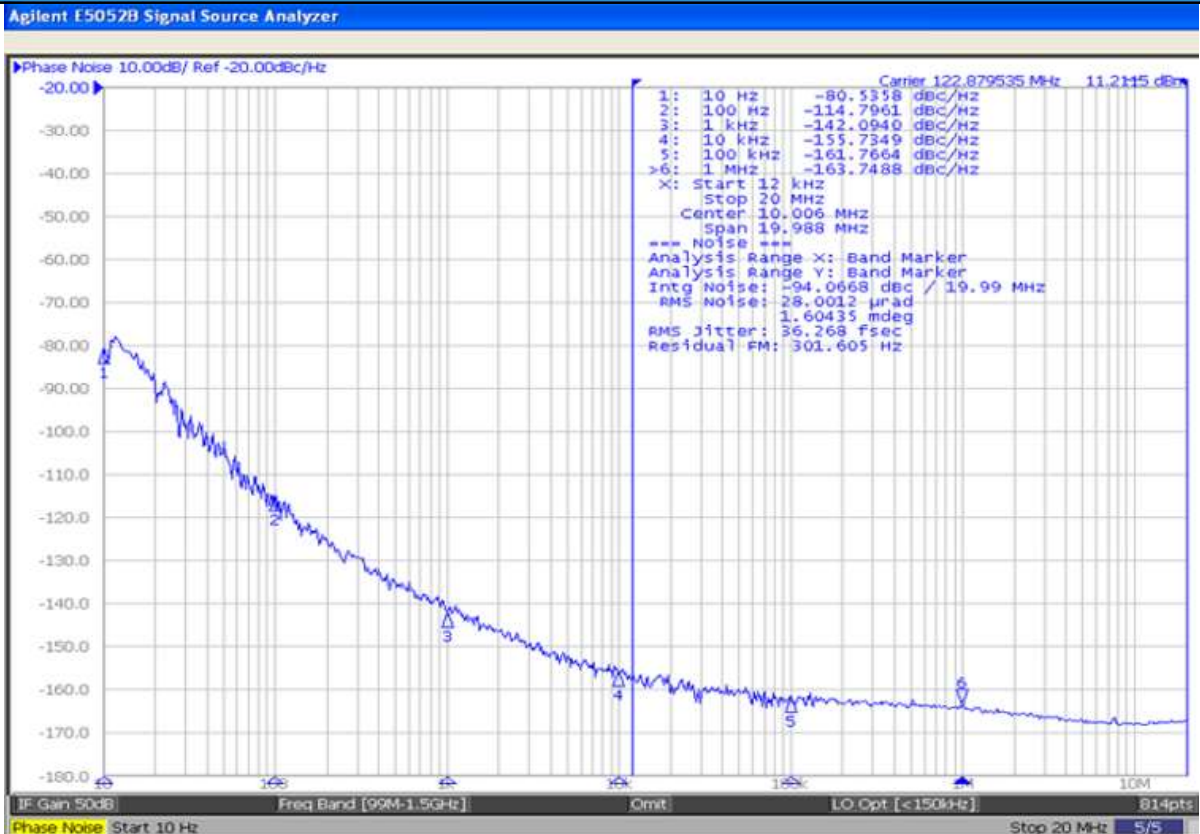


TYPICAL PHASE NOISE

100MHz Carrier

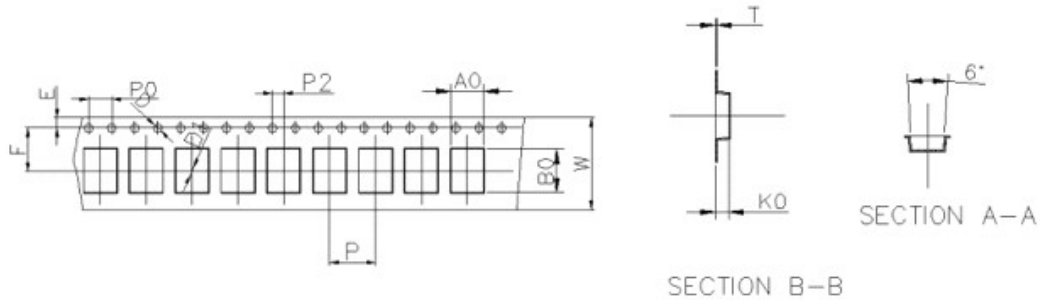


122.88MHz Carrier



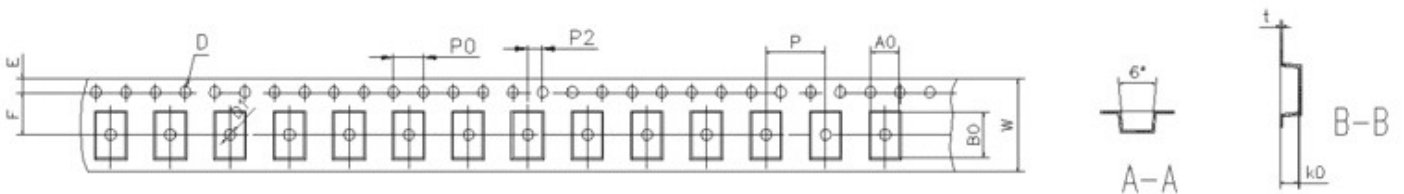
SMD TAPE AND REEL DIMENSIONS

7050 (7.0*5.0mm) Tape Size(mm)



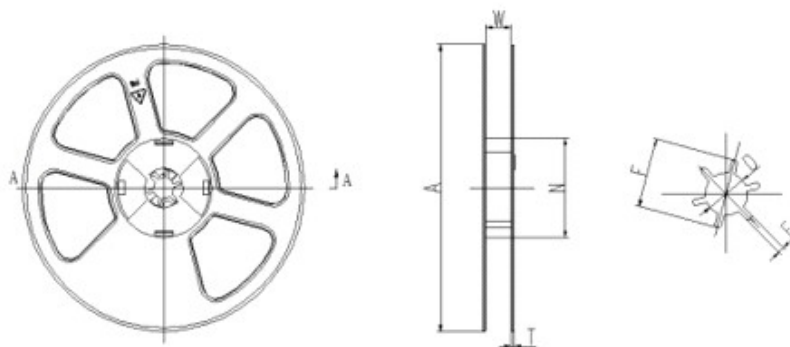
ITEM	W	A0	B0	K0	P	F	E	D	P0	P2	t	7°	
DIM	16.0	5.7	7.6	2.4	8	7.5	1.75	1.50	4.00	2.00	0.30	L/R	QTY/PCS
TOLE	+0.30 -0.30	+0.15 -0.15	+0.15 -0.15	+0.15 -0.15	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.00 -0.10	+0.10 -0.10	+0.10 -0.10	+0.05 -0.05	5M/R	500 PCS

5032 (5.0*3.2mm) Tape Size(mm)



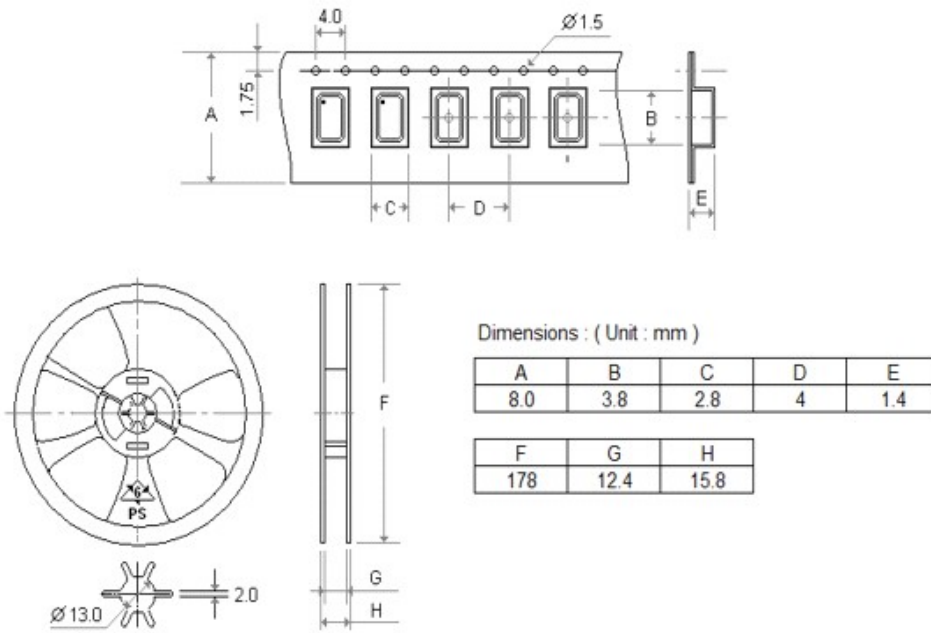
ITEM	W	A0	B0	K0	P	F	E	D	D1	P0	P2	t	7°	
DIM	16.0	3.7	5.6	2.0	8.00	7.50	1.75	1.50	1.50	4.00	2.00	0.3	L/R	QTY/PCS
TOLE	+0.30 -0.30	+0.15 -0.15	+0.15 -0.15	+0.15 -0.15	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.00 -0.10	+0.10 -0.00 -0.10	+0.10 -0.10	+0.10 -0.10	+0.05 -0.05	4M	500PCS

7050 & 5032 Reel Size(mm)



Item	W	A	N	T	E	F	D
Size	16.4	178	62	1.8	2	21.8	13.5
TOL	±0.3	±0.5	±0.4	±0.2	±0.5	±0.8	±0.3

3225 (3.2*2.5mm) Tape and Reel Size(mm)



1409 (14.0*9.0mm) Tape and Reel Size(mm)

ITEM	W	A0	B0	*K0	P	F	E	D	D1	P0	P2	T	13°
DIM	24.0	9.55	14.5	7.3(H) 2.9(L)	16	11.5	1.75	1.50		4.00	2.00	0.3	长度/盘 元件/盘
TOLE	+0.30 -0.30	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.00	+0.10 -0.00	+0.10 -0.10	+0.10 -0.10	+0.05 -0.05	9.45M/R 590PCS

