

Features	Applications
<ul style="list-style-type: none"> ● Overall dimensions 3.2*1.5*0.9 mm ● Small size and light weight ● High stability and reliability ● Low equivalent resistance ● SMD 	<ul style="list-style-type: none"> ● widely used in industrial electronic equipment ● AEC-Q200 is applicable ● Automotive Grade ● Pb Free ● Rohs Compliant



KHZ BC3215

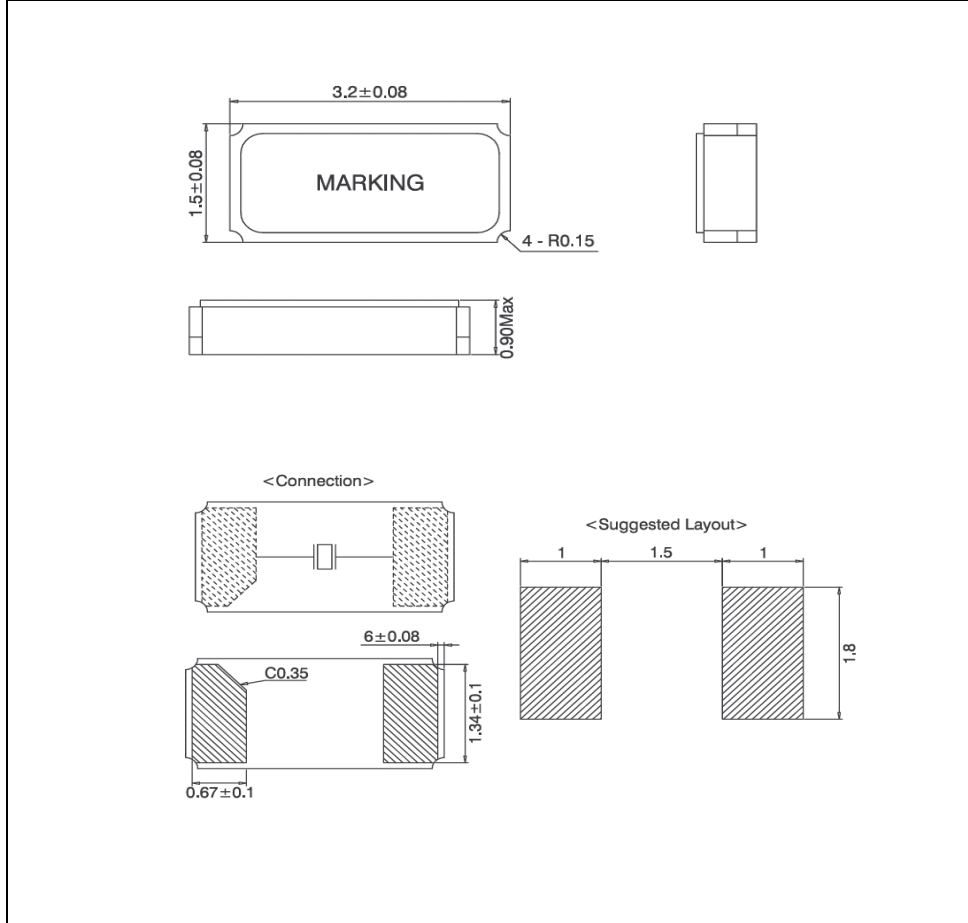
Electrical Characteristics

Parameter	Typical Value
Output Frequency	32.768KHz
Frequency accuracy @ 25°C	0.5ppm Min.(Conditional)
Operating Temperature	-40°C~125°C
Static capacitance	1.5pF Max.
Drive Level	0.1μW typical, 0.5μW Max.
Load Capacitance	7pF, 9pF, 12.5pF(Can be customized)
Year Aging rate (25°C)	3 ppm First year Max.
Storage Temperature	-55 ~ +125°C
Inflection point temperature	25±5°C
Temperature Coefficient	(-0.035±0.005) ppm/°C 2
Insulation Resistance	500MΩ Min.

Equivalent resistance (ESR)

Frequency	ESR
32.768KHz	80KΩ Max.

Outline Dimension & Pin Connections



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Features	Applications
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- | | |
|--|---|
| <ul style="list-style-type: none"> ● Overall dimensions 2.0 x 1.6 x 0.55 mm ● Small size and light weight ● High stability and reliability ● Wide Temperature Range ● SMD | <ul style="list-style-type: none"> ● widely used in industrial electronic equipment ● AEC-Q200 ● Automotive Grade ● Pb Free ● Rohs Compliant |
|--|---|



BC2016 Specifications	
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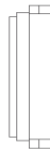
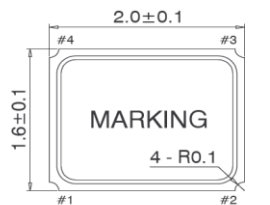
Electrical Characteristics	
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Parameter	Typical Value
Output Frequency	12 ~ 96 MHz
Frequency accuracy @ 25°C	±10ppm(Can be customized)
Frequency Stability Over Tempt.	0.5ppm Min.(Conditional)
Operating Temperature	-40°C~125°C Max.
Static capacitance	3pF Max.
Drive Level	100µW (typical)
Load Capacitance	6pF, 12pF, 16pF(Can be customized)
Year Aging rate (25°C)	±3 ppm/year Max.
Storage Temperature	-40 ~ +125°C

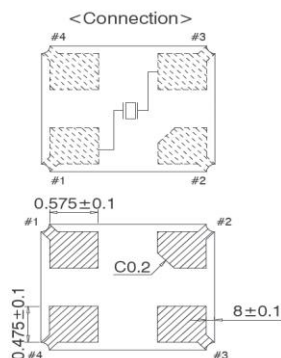
Equivalent resistance (ESR)	
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Frequency	ESR
12MHz≤Fo < 16MHz	300Ω Max.
16MHz≤Fo < 20MHz	120 Ω Max.
20MHz≤Fo < 30MHz	80Ω Max.
30MHz≤Fo < 60MHz	60Ω Max.
60MHz≤Fo < 96MHz	40Ω Max.

Outline Dimension & Pin Connections



Pin	Connect
#1 #3	Crystal
#2 #4	GND



Features	Applications
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- | | |
|---|---|
| <ul style="list-style-type: none"> ● Overall dimensions 1.6*1.2*0.65 mm ● Shock and Vibration Insensitive ● Low aging rate ● Built-in thermistor ● SMD | <ul style="list-style-type: none"> ● widely used in communication electronics ● AEC-Q200 ● Automotive Grade ● Pb Free ● Rohs Compliant |
|---|---|



BC1612 Specifications	
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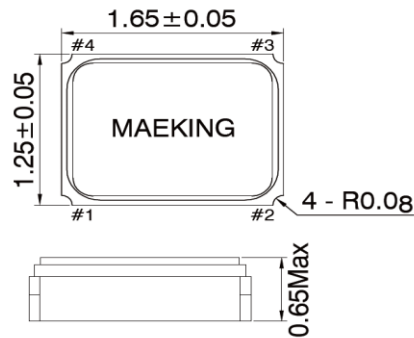
Electrical Characteristics	
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Parameter	Typical Value
Output Frequency	26 ~ 76.8MHz
Frequency accuracy @ 25°C	±10ppm(Can be customized)
Frequency Stability Over Temp.	0.5ppm Min.(Conditional)
Operating Temperature	-40°C~125°C Max.
Static capacitance	3pF Max.
Drive Level	100μW (typical)
Load Capacitance	7pF(Can be customized)
Year Aging rate (25°C)	±1 ppm/year Max.
Storage Temperature	-40 ~ +125°C(Conditional)

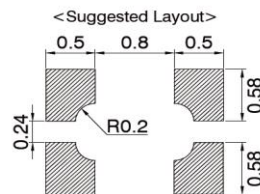
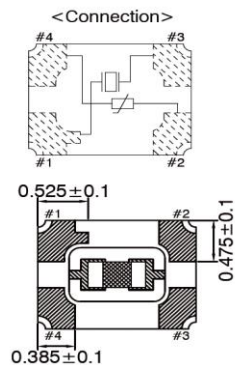
Equivalent resistance (ESR)	
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Frequency	ESR
26MHz ≤ f_nom < 40MHz	80Ω Max.
40MHz ≤ f_nom ≤ 52MHz	60 Ω Max.
52MHz < f_nom ≤ 76.8MHz	40Ω Max.

Outline Dimension & Pin Connections	
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Pin	Connect
#1	Crystal
#2	GND
#3	Crystal
#4	Sensor



Features	Applications
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- | | |
|---|---|
| <ul style="list-style-type: none"> ● Overall dimensions 2.0 x 1.6 x 0.65 mm ● Shock and Vibration Insensitive ● Low aging rate ● Built-in thermistor ● SMD | <ul style="list-style-type: none"> ● widely used in communication electronics ● AEC-Q200 ● Automotive Grade ● Pb Free ● Rohs Compliant |
|---|---|



BC2016 Specifications

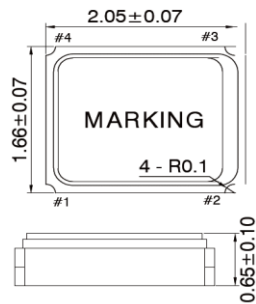
Electrical Characteristics

Parameter	Typical Value
Output Frequency	19.2MHz, 26MHz, 38.4MHz
Frequency accuracy @ 25°C	±10ppm(Can be customized)
Frequency Stability Over Temp.	0.5ppm Min.(Conditional)
Operating Temperature	-40°C~125°C Max.
Static capacitance	3pF Max.
Drive Level	100µW (typical)
Load Capacitance	7pF(Can be customized)
Year Aging rate (25°C)	±1 ppm/year Max.
Storage Temperature	-40 ~ +125°C(Conditional)

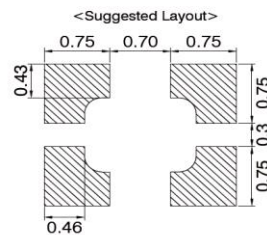
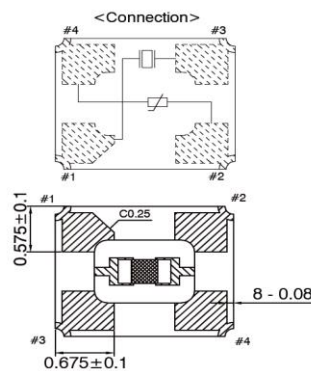
Equivalent resistance (ESR)

Frequency	ESR
19.2MHz ≤ f _{nom} < 30.0MHz	80Ω Max.
30.0MHz ≤ f _{nom} < 54.0MHz	60 Ω Max.

Outline Dimension & Pin Connections



Pin	Connect
#1	Crystal
#2	GND
#3	Crystal
#4	Sensor



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Features	Applications
<ul style="list-style-type: none"> ● Overall dimensions 2.5 x 2.0 x 0.55mm ● Small size and light weight ● High stability and reliability ● Wide Temperature Range ● SMD 	<ul style="list-style-type: none"> ● widely used in industrial electronic equipment ● AEC-Q200 ● Automotive Grade ● Pb Free ● Rohs Compliant

BC2520 Specifications

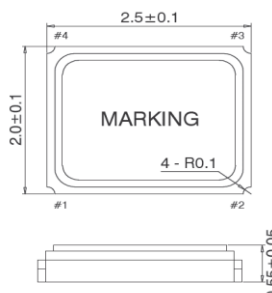
Electrical Characteristics

Parameter	Typical Value
Output Frequency	12 ~ 54 MHz
Frequency accuracy @ 25°C	±10ppm(Can be customized)
Frequency Stability Over Temp.	0.5ppm Min.(Conditional)
Operating Temperature	-40°C~125°C Max.
Static capacitance	3pF Max.
Drive Level	100μW (typical)
Load Capacitance	6pF, 12pF, 16pF(Can be customized)
Year Aging rate (25°C)	±3 ppm/year Max.
Storage Temperature	-40 ~ +125°C

Equivalent resistance (ESR)

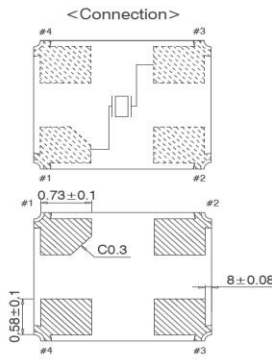
Frequency	ESR
12MHz≤Fo < 20MHz	150 Ω Max.
20MHz≤Fo < 30MHz	80 Ω Max.
30MHz≤Fo < 54MHz	60Ω Max.

Outline Dimension & Pin Connections

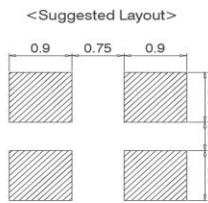


Pin Connect	
#1 #3	Crystal
#2 #4	GND

<Connection>



<Suggested Layout>



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Features	Applications
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- | | |
|---|---|
| <ul style="list-style-type: none"> ● Overall dimensions 3.2 x 2.5 x 0.7 mm ● Small size and light weight ● High stability and reliability ● Wide Temperature Range ● SMD | <ul style="list-style-type: none"> ● widely used in industrial electronic equipment ● AEC-Q200 ● Automotive Grade ● Pb Free ● Rohs Compliant |
|---|---|



MHz BC3225	
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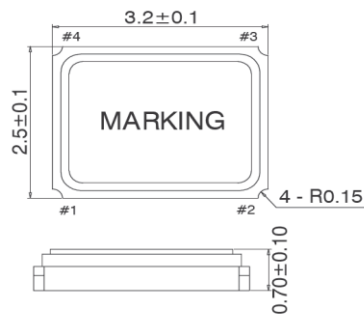
Electrical Characteristics	
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Parameter	Typical Value
Output Frequency	8 ~ 54 MHz
Frequency accuracy @ 25°C	±10ppm(Can be customized)
Frequency Stability Over Temp.	0.5ppm Min.(Conditional)
Operating Temperature	-40°C~125°C Max.
Static capacitance	3pF Max.
Drive Level	100µW (typical)
Load Capacitance	6pF, 10pF, 12pF, 16pF(Can be customized)
Year Aging rate (25°C)	±3 ppm/year Max.
Storage Temperature	-40 ~ +125°C

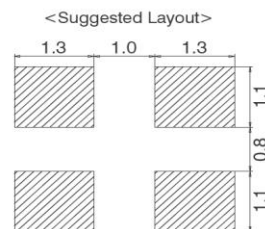
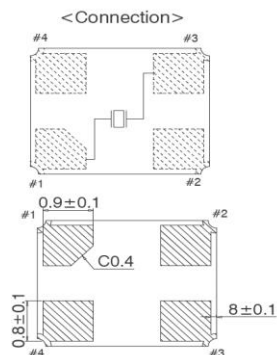
Equivalent resistance (ESR)	
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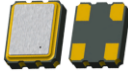
Frequency	ESR
8MHz≤Fo < 10MHz	300 Ω Max.
10MHz≤Fo < 15MHz	150 Ω Max.
15MHz≤Fo < 19.5MHz	80 Ω Max.
19.5MHz≤Fo < 27MHz	60 Ω Max.
27MHz≤Fo < 54MHz	50 Ω Max.

Outline Dimension & Pin Connections	
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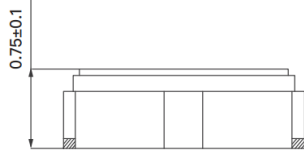
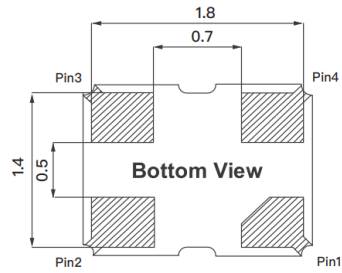
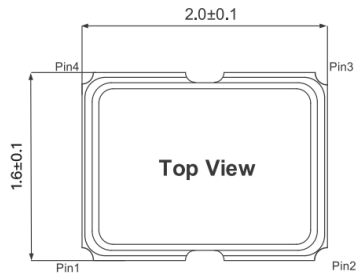


Pin Connect	
#1 #3	Crystal
#2 #4	GND



Features		Applications							
<ul style="list-style-type: none"> ● Typical ceramic SMD package ● 2.0*1.6*0.8mm ● Operating Temp.: -40°C to 125°C 		<ul style="list-style-type: none"> ● Computer Peripherals ● Set-top Box , HDTV ● DSC, PDA 							
BS2016A Specifications									
Parameter	Value						Unit	Conditions	
	3.3V		2.5V		1.8V				
	Min.	Max.	Min.	Max.	Min.	Max.			
Supply Voltage Variation	$V_{DD}-5\%$	$V_{DD}+5\%$	$V_{DD}-5\%$	$V_{DD}+5\%$	$V_{DD}-5\%$	$V_{DD}+5\%$	V		
Frequency Range	1	125	1	125	1	125	MHz		
Supply Current	–	25	–	25	–	20	mA	@15pf Loading	
Output Level (CMOS)	Output High	90% V_{DD}	–	90% V_{DD}	–	90% V_{DD}	–	V	
	Output Low	–	10% V_{DD}	–	10% V_{DD}	–	10% V_{DD}	V	
Rise Time / Fall Time	–	4	–	5	–	6	nS		
Duty Cycle	45	55	45	55	45	55	%		
Startup Time	–	5	–	5	–	5	mS		
Tri-state	Output Enable	0.7 x V_{DD}	–	0.7 x V_{DD}	–	0.7 x V_{DD}	–	V	
	Output Disable	–	0.3 x V_{DD}	–	0.3 x V_{DD}	–	0.3 x V_{DD}	V	
Stand by Current	–	100	–	100	–	100	uA		
Freq. Stability Vs. Temp.		±20	±50	±20	±50	±20	±50	ppm	-20°C~+70°C, reference 25°C
		±25	±50	±25	±50	±25	±50	ppm	-40°C~+85°C, reference 25°C
		–	±50	–	±50	–	±50	ppm	-40°C~+125°C, reference 25°C
Output Loading	15		15		15		pF		
RMS Phase Jitter	–	1	–	1	–	1	pSec	12KHz to 20MHz	
Aging/ First Year	–	±3	–	±3	–	±3	ppm	@ 25°C	
Environmental Conditions									
Operating Temperature Range	-40°C~+125°C								
Storage Temperature Range	-50°C ~ +125°C								
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

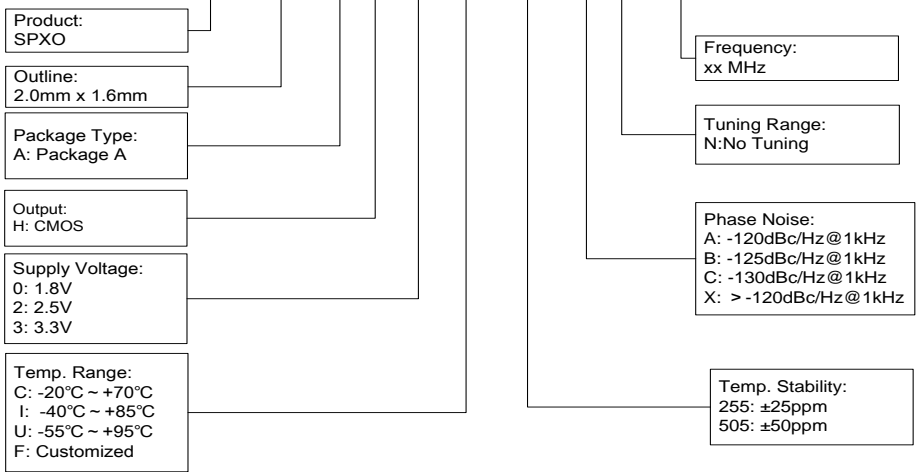


Pin Connections

Pin1	Tri-State
Pin2	GND
Pin3	Output
Pin4	Vcc

Ordering Guide

BS2016A X X X XXX X X XX.XX



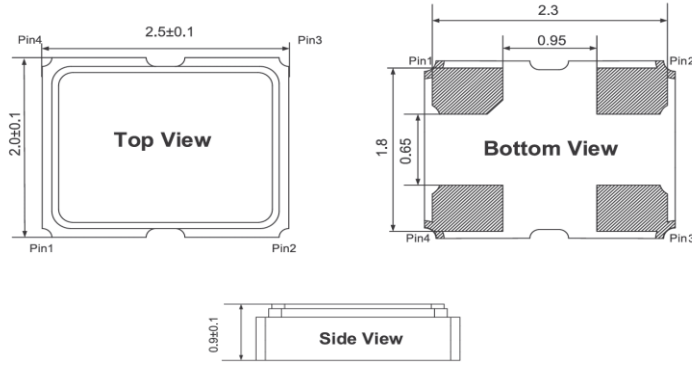
Example: BS2016AH3I505XN27

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Features		Typical Application						
<ul style="list-style-type: none"> ● Typical 2.5 x 2.0 x 0.9 SMD package. ● Conforms to AEC-Q100&AEC-Q200 ● Wide supply voltage: 1.7-3.6V ● Tri-State 		<ul style="list-style-type: none"> ● WLAN/WiMAX ● Mobile Phone ● DSC, Set-Top Box, HDTV ● Industrial communications, navigation, radar 						
BS2520A Series								
Parameter	3.3v		2.5V		1.8V		Unit	Conditions
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage (VDD)	VDD-5%	VDD+5%	VDD-5%	VDD+5%	VDD-5%	VDD+5%	V	
Frequency Range	1	125	1	125	1	125	MHz	
Transition Time Rise Time / Fall Time	-	4	-	5	-	6	nSec	1.25MHz Fo < 10MHz
	-	4	-	5	-	6		10MHz Fo < 20MHz
	-	4	-	5	-	6		20MHz Fo < 80MHz
	-	4	-	5	-	6		80MHz Fo < 125MHz
Supply Current	-	25	-	25	-	20	uA	At 15pF Load
	-	1.0	-	1.0	-	0.75		No Load Condition, 1MHz Fo < 10MHz
	-	1.0	-	1.0	-	0.75		No Load Condition, 10MHz Fo < 20MHz
	-	1.3	-	1.3	-	1.0		No Load Condition, 20MHz Fo < 80MHz
	-	6	-	6	-	3		No Load Condition, 80MHz Fo < 125MHz
Duty Cycle	45	55	45	55	45	55	%	
Output Level	Output High	2.97	-	2.25	-	1.62	V	
	Output Low	-	0.33	-	0.25	-		0.18
Startup Time	-	5	-	5	-	5	mSec	
Tri-State Mode (Input to Pin 1)	Enable	0.7VDD	-	0.7VDD	-	0.7VDD	V	
	Disable	-	0.3VDD	-	0.3VDD	-		0.3VDD
Stand by Current	-	100	-	100	-	100	uA	
Output Loading	15		15		15		pF	
Period Jitter (Pk-Pk)	-	40	-	40	-	40	pSec	
RMS Phase Jitter	-	1	-	1	-	1	pSec	12kHz to 20MHz
Aging	-	±3	-	±3	-	±3	ppm	@ 25°C, First Year
Storage Temp. Range	-55	125	-55	125	-55	125	°C	
FREQ. STABILITY vs. TEMP. RANGE		±20ppm		±25ppm		±50ppm		
	-10~+60	Available		Available		Available		
	-20~+70	Available		Available		Available		
	-40~+85	Conditional		Available		Available		
	-40~+125	Not Available		Not Available		Available		
Note: not all combination of options are available. Other specifications may be available upon request.								

Outline Dimension & Pin Connections

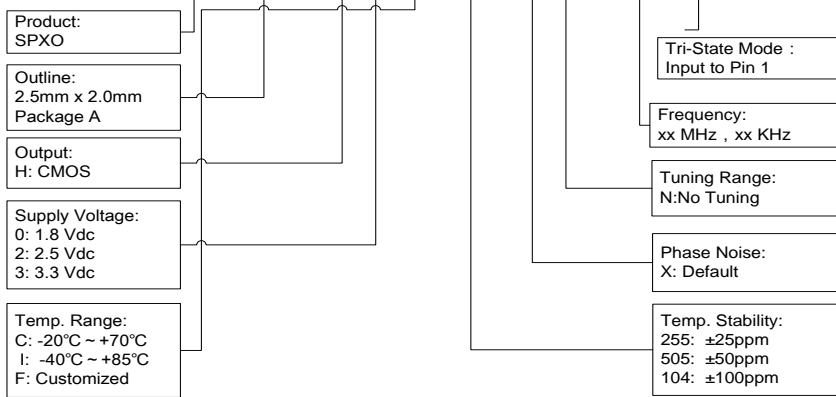


Pin Connection

Name	Connection
pin 1	Tri -State
pin 2	GND
pin 3	Fout
pin 4	Vdd

Ordering Guide

BS2520A X X X XXX X XXX.XX X



Example: BS3225AD3I505CN20

Disclaimer

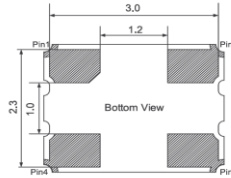
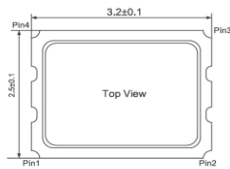
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Features		Typical Application							
<ul style="list-style-type: none"> ● Typical 3.2 x 2.5 x 1.0 mm SMD package. ● Conforms to AEC-Q100&AEC-Q200 ● Wide operating temperature range: -40 ~ +125°C ● Tri-State 		<ul style="list-style-type: none"> ● WLAN/WiMAX ● Mobile Phone ● DSC, Set-Top Box, HDTV ● Industrial communications, navigation, radar 							
BS3225A Series									
Parameter	3.3v		2.5V		1.8V		Unit	Conditions	
	Min.	Max.	Min.	Max.	Min.	Max.			
Supply Voltage (VDD)	VDD-5%	VDD+5%	VDD-5%	VDD+5%	VDD-5%	VDD+5%	V		
Frequency Range	1	125	1	125	1	125	MHz		
Standard Frequency	24, 26, 30, 40						MHz		
Transition Time Rise Time / Fall Time	-	4	-	5	-	6	nSec	1.25MHz Fo < 10MHz	
	-	4	-	5	-	6		10MHz Fo < 20MHz	
	-	4	-	5	-	6		20MHz Fo < 80MHz	
	-	4	-	5	-	6		80MHz Fo < 125MHz	
Supply Current	-	25	-	25	-	20	uA	At 15pF Load	
	-	1.0	-	1.0	-	0.75		No Load Condition, 1MHz Fo < 10MHz	
	-	1.0	-	1.0	-	0.75		No Load Condition, 10MHz Fo < 20MHz	
	-	1.3	-	1.3	-	1.0		No Load Condition, 20MHz Fo < 80MHz	
	-	6	-	6	-	3		No Load Condition, 80MHz Fo < 125MHz	
Duty Cycle	45	55	45	55	45	55	%		
Output Level	Output High	2.97	-	2.25	-	1.62	-	V	
	Output Low	-	0.33	-	0.25	-	0.18		
Tri-State Mode (Input to Pin 1)	Enable	2.31	-	1.75	-	1.26		V	
	Disable	-	0.99	-	0.75	-	0.54		
Stand by Current	-	10	-	10	-	10	uA	@ -40°C to 85°C	
	-	20	-	20	-	20	uA	@ -40°C to 125°C	
Output Loading	15		15		15		pF		
Period Jitter (Pk-Pk)	-	40	-	40	-	40	pSec		
RMS Phase Jitter	-	1	-	1	-	1	pSec	12kHz to 20MHz	
Aging	-	±3	-	±3	-	±3	ppm	@ 25°C, First Year	
Storage Temp. Range	-55	125	-55	125	-55	125	°C		
FREQ. STABILITY vs. TEMP. RANGE		±20ppm		±25ppm		±50ppm			
	-10~+60	Available		Available		Available			
	-20~+70	Conditional		Available		Available			
	-40~+85	Not Available		Available		Available			
Note: not all combination of options are available. Other specifications may be available upon request.									

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

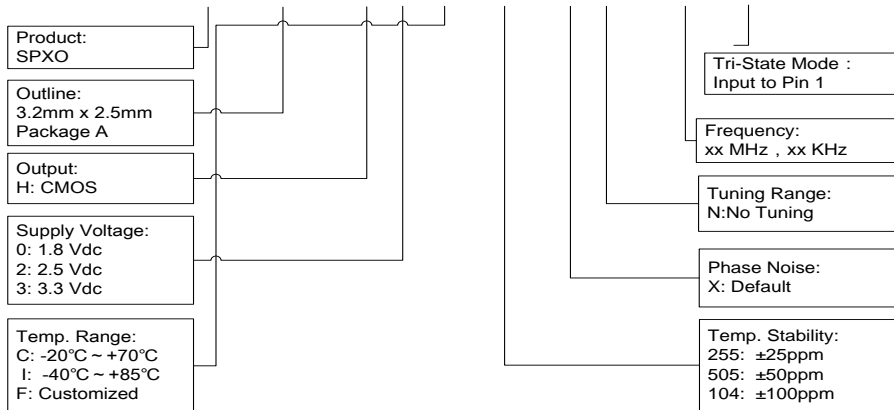


Pin Connection

Name	Connection
pin 1	Tri - State
pin 2	GND
pin 3	Fout
pin 4	Vdd

Ordering Guide

BS 3225A X X X XXX X XXX.XX X



Example: BS3225AD31505CN20

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Features	Typical Application
<ul style="list-style-type: none"> ● Overall dimensions 1.6x 1.2 x 0.65 mm ● Small size, light weight ● low power consumption ● Wide output frequency coverage (26MHz to 52MHz) 	<ul style="list-style-type: none"> ● H architecture ● AEC-Q100 & AEC

BT2016 Specifications

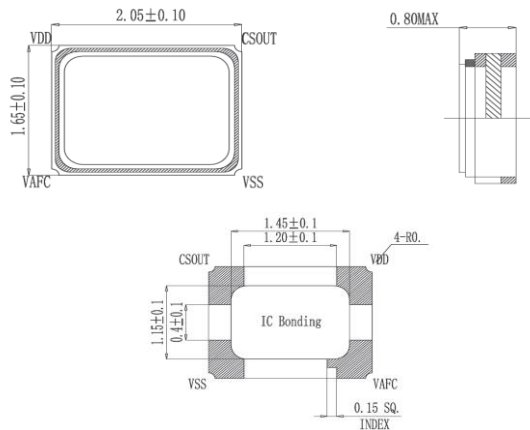
Parameter	3.3/3.0/2.8V		2.5V		1.8V		Unit	Conditions
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage (VDD)	2.66	3.465	2.375	2.625	1.71	1.89	V	
Frequency Range	10	52	10	52	10	52	MHz	
Standard Frequency	19.2, 26.0, 32.0, 38.4							
Frequency accuracy (25°C)	-	±1.5	-	±1.5	-	±1.5	ppm	
Frequency Stability	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	ppm	Vs Supply voltage (±5%)
	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2		Vs load (±10%)
	-	±1.0	-	±1.0	-	±1.0		Vs aging rate (@ first year)
Supply Current	-	1.5	-	1.5	-	1.5	uA	10 MHz < F0 ≤ 26 MHz
	-	2.0	-	2.0	-	2.0		26 MHz < F0 ≤ 52 MHz
Output level (Clipped sine wave)	0.8	-	0.8	-	0.8	-	Vp-p	
Load	10KΩ // 10pF		10KΩ // 10pF		10KΩ // 10pF		V	
Voltage control range(VCTCXO)	0.5	2.5	0.4	2.4	0.3	1.5	V	
Tuning range (VCTCXO)	±5.0	±17.0	±5.0	±17.0	±5.0	±17.0	ppm	
Voltage controlled input impedance	500	-	500	-	500	-	KΩ	
Phase noise @ 19.2 MHz	100 Hz	-115	-115		-115		dBc/Hz	
	1 KHz	-135	-135		-135			
	10 KHz	-148	-148		-148			
Startup Time	-	2	-	2	-	2	mSec	
Storage temperature	-55	125	-55	125	-55	125	°C	

Note: not all combination of options are available. Other specifications may be available upon request.

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



Features	Typical Application
<ul style="list-style-type: none"> ● Overall dimensions 2.0 x 1.6 x 0.8 mm ● Small size, light weight ● low power consumption ● Wide output frequency coverage (26MHz to 52MHz) 	<ul style="list-style-type: none"> ● H architecture ● AEC-Q100 & AEC

BT1612 Specifications

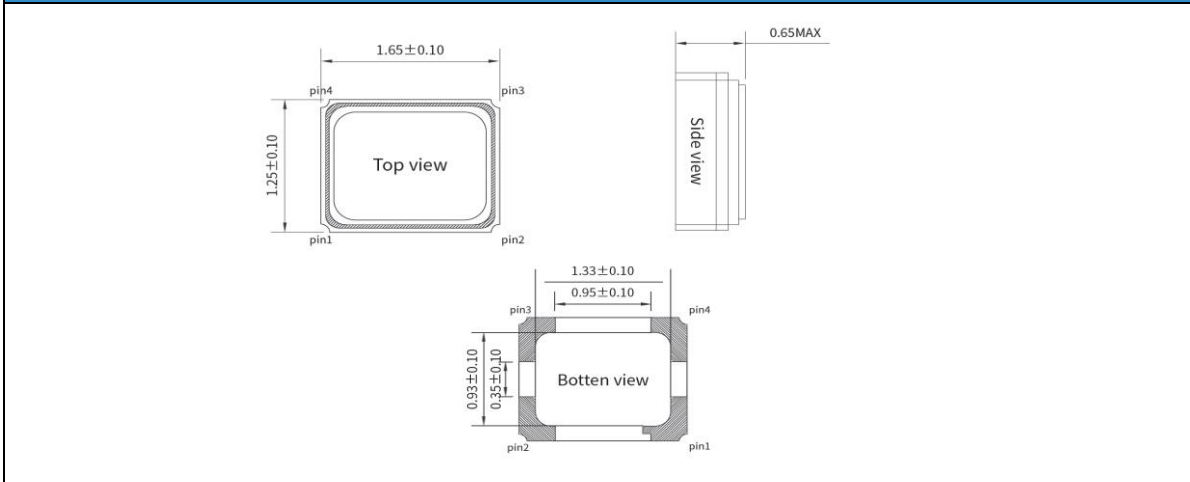
Parameter	3.3/3.0/2.8V		2.5V		1.8V		Unit	Conditions
	Min.	Max.	Min.	Max.	Min.	Max.		
Supply Voltage (VDD)	2.66	3.465	2.375	2.625	1.71	1.89	V	
Frequency Range	26	52	26	52	26	52	MHz	
Standard Frequency	26.0, 38.4, 52						MHz	
Frequency accuracy (25°C)	-	±1.5	-	±1.5	-	±1.5	ppm	
Frequency Stability	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	ppm	Vs Supply voltage (±5%)
	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2		Vs load (±10%)
	-	±1.0	-	±1.0	-	±1.0		Vs aging rate (@ first year)
Supply Current	-	2.0	-	2.0	-	2.0	uA	26 MHz < F0 ≤ 52 MHz
Output level (Clipped sine wave)	0.8	-	0.8	-	0.8	-	Vp-p	
Load	10KΩ // 10pF		10KΩ // 10pF		10KΩ // 10pF		V	
Voltage control range(VCTCXO)	0.5	2.5	0.4	2.4	0.3	1.5	V	
Tuning range (VCTCXO)	±5.0	±17.0	±5.0	±17.0	±5.0	±17.0	ppm	
Voltage controlled input impedance	500	-	500	-	500	-	KΩ	
Phase noise @ 26 MHz	100 Hz	-110	-110		-110		dBc/Hz	
	1 KHz	-130	-130		-130			
	10 KHz	-145	-145		-145			
Startup Time	-	2	-	2	-	2	mSec	
Storage temperature	-40	125	-40	125	-40	125	°C	


Note: not all combination of options are available. Other specifications may be available upon request.

Reliability

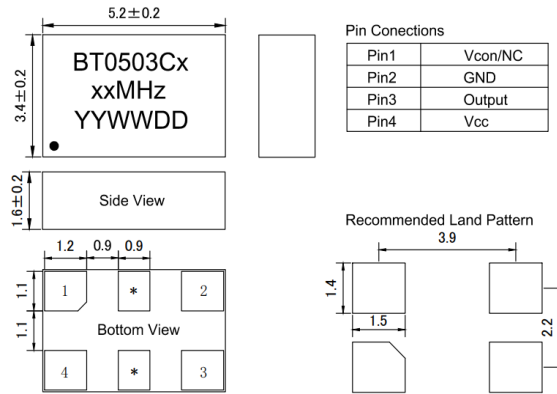
Parameter	Condition
Temperature Stress Test	IEC60068, GJB360B
Mechanical Stress Test	IEC60068, GJB360B
EMC Test (ESD)	IEC61000, JESD22
Solderability	EIA/JESD22-B102-C
Contact Pads	Gold over Nickel
RoHS	RoHS Directive 2011/65/EU Annex II Recasting 2002/95/EC

Outline Dimension & Pin Connections



Features		Applications				
<ul style="list-style-type: none"> ● Ultra Stable ● Wide Temperature Range ● Fast Warming-up ● SMD Package (5.2x3.4mm) 		<ul style="list-style-type: none"> ● 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, 12.0, 15, 15.56, 16, 16.52, 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)	
	±0.5	-	-	ppm	-40°C~105°C (except for 10MHz)	
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	-	1.3	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	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~+105°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections



Pin Connections	
Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc

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

Maximum Ratings

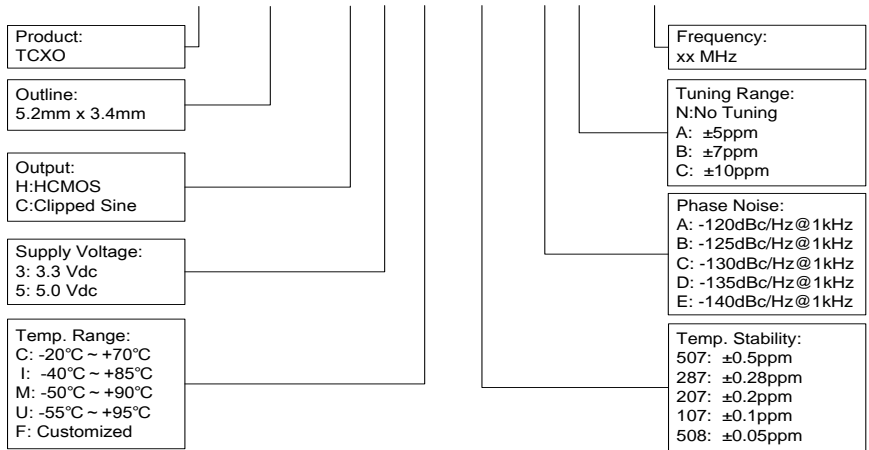
Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

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



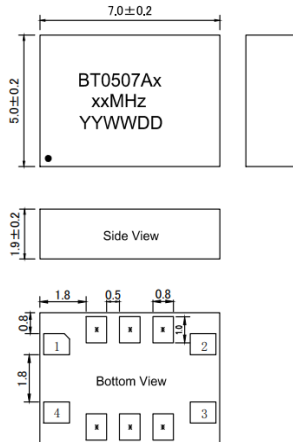
Example: BT0503CH3M287BN50

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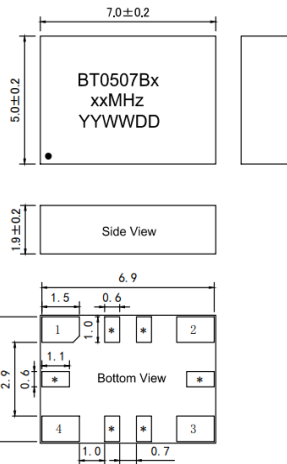
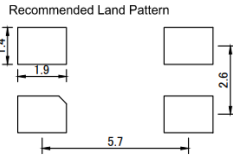
Features				Applications		
<ul style="list-style-type: none"> ● Ultra Stable ● Wide Temperature Range ● SMD Package (7.0x5.0mm) ● Provide Stratum III Level Frequency Stability 				<ul style="list-style-type: none"> ● Base Stations ● Instrumentations ● Synthesizer ● SDH/SONET ● Medical Electronics 		
BT0507A&B 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 (Including 26MHz)	
	-	-	12	mA	26MHz~60MHz	
Frequency Range	10 ~ 52			MHz		
Nominal Frequency	10, 12.8, 13, 15.36, 16, 16.32, 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	
	±0.5	-	-	ppm	-40°C~105°C (except for 10MHz)	
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	-	1.3	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	-	-	-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	○=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~+105°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections



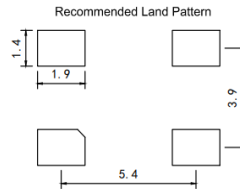
Pin Connections

Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc



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.

Maximum Ratings

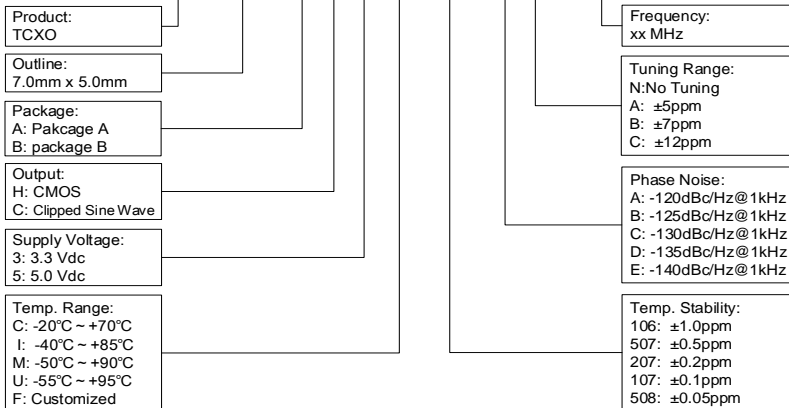
Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Vcon	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

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



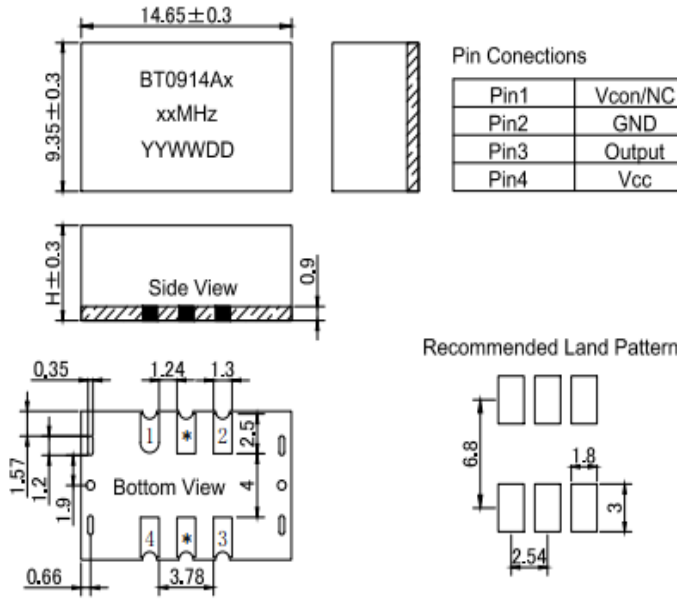
Example: BT0507BH3M287DN16.384

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Features		Applications				
<ul style="list-style-type: none"> ● Ultra Stable ● Low Phase Noise ● SMD Package(9.35*14.65mm) 		<ul style="list-style-type: none"> ● 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 *Height≥4mm	
	±0.20	±0.5	±2	ppm	-40°C~+85°C *Height≥4mm	
	±0.10	-	±2	ppm	-40°C~+85°C *Height≥7mm	
	±0.28	±0.5	±2	ppm	-50°C~+85°C *Height≥6mm	
	±0.5	-	-	ppm	-40°C~105°C (except for 10MHz) *Height≥6mm	
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	At +25°C	
	-	-112	-110			
	-	-142	-140			
	-	-158	-155			
	-	-163	-158			
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	O=Available X= Not Available	
10MHz~20MHz(Including 20MHz)	O	O	O	O		
20MHz~100MHz(Including 100MHz)	O	O	O	X		
>100MHz	O	O	X	X		
Environmental Conditions						
Operating Temperature Range	-50°C ~ +105°C					
Storage Temperature Range	-55°C ~ +125°C					

Outline Dimension & Pin Connections



Pin Connections	
Pin1	Vcon/NC
Pin2	GND
Pin3	Output
Pin4	Vcc

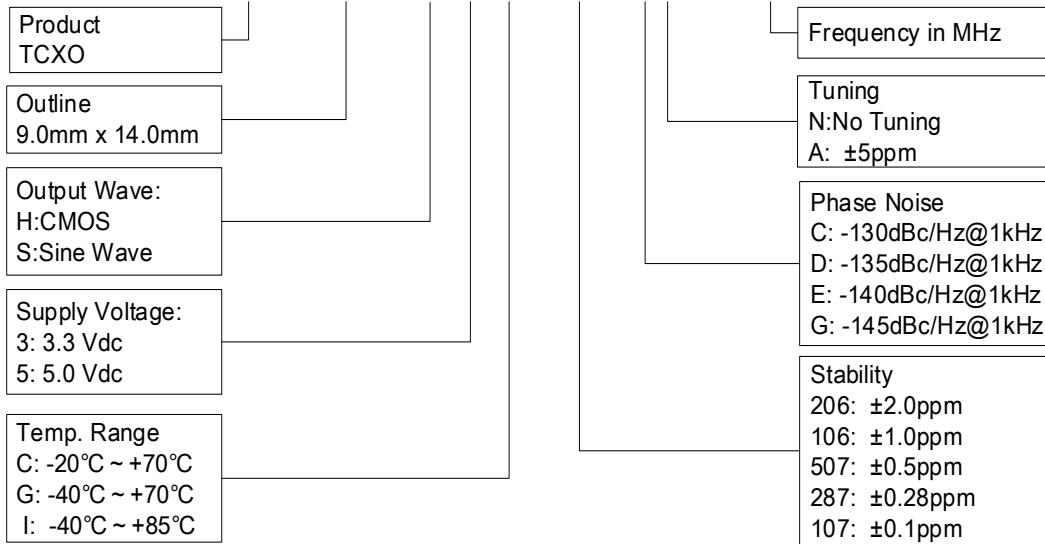
Note:

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).

Parameter	Reliability	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



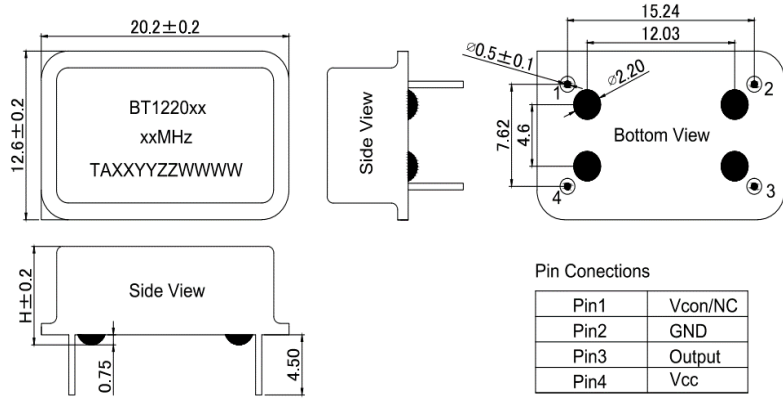
Example: BT0914AS5I287AA100

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Features		Applications				
<ul style="list-style-type: none"> ● Ultra Wide Operating Temp. ● Low Phase Noise ● DIP Package(12.6*20.2mm) 		<ul style="list-style-type: none"> ● 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	
	±0.5	-	-	ppm	-40°C ~ 105°C (except for 10MHz)	
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 = No Available	
10MHz~20MHz(Including 20MHz)	○	○	○	○		
20MHz~100MHz(Including 100MHz)	○	○	○	X		
>100MHz	○	○	X	X		
Environmental Conditions						
Operating Temperature Range	-55°C ~ +105°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

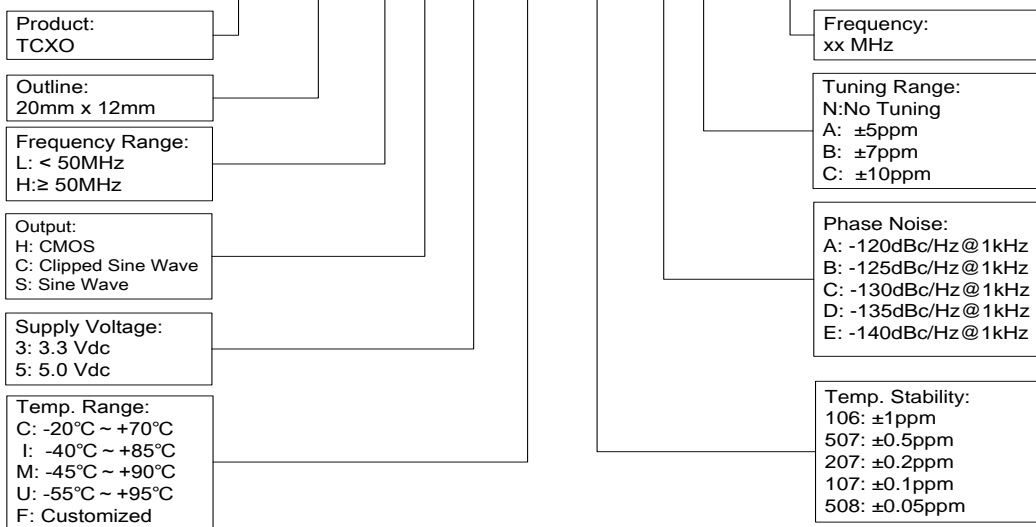
Parameter	Symbol	Rating
Supply Voltage	Vdd	-0.5V / 6V
Control Voltage	Symbol	0V / 3V
ESD, HBM/CDM/MM		4KV/ 2KV/ 200V

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 L X X X XXX X X XX.XX



Example: BT1220LS5C107DN10

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