

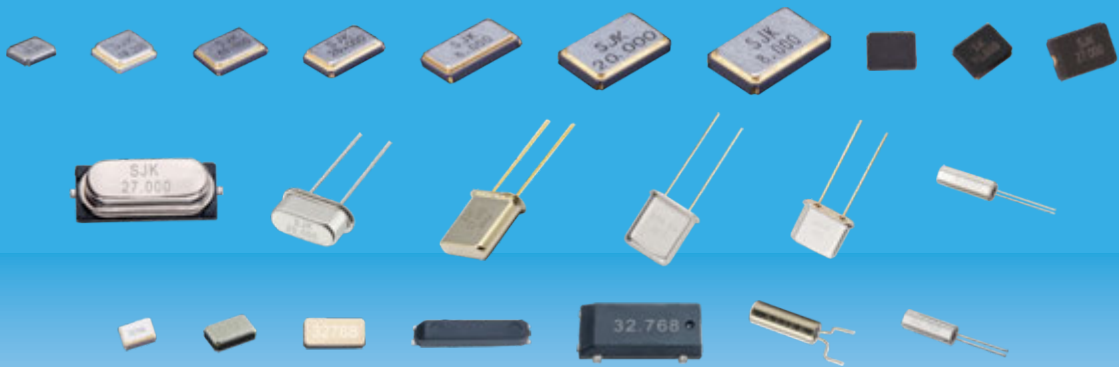


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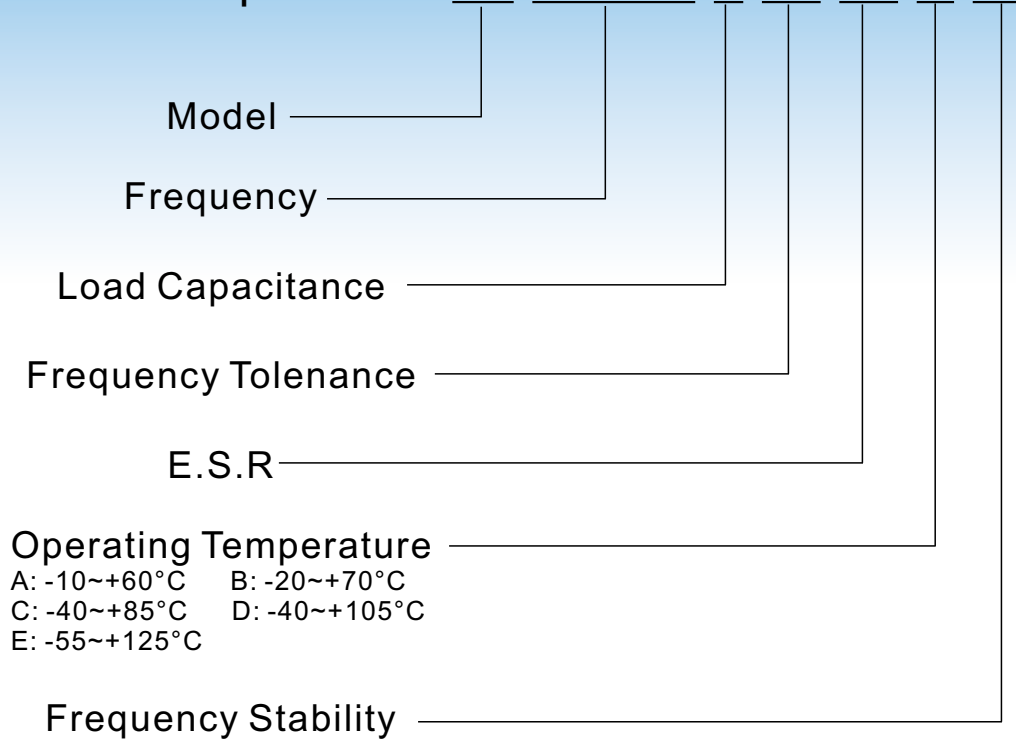
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# Crystal Units



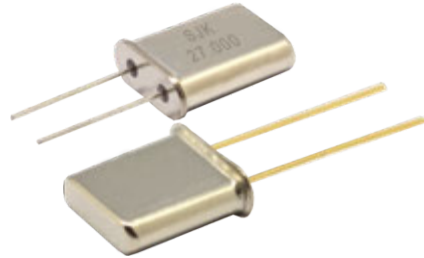
Example: SJK-7F-26.000-9-10-80-C-15



A: -10~+60°C    B: -20~+70°C  
 C: -40~+85°C    D: -40~+105°C  
 E: -55~+125°C

### Features

- Resistance welded type crystal units.
- A great number of standard frequencies.
- Wide frequency from 1.843MHz up to 150MHz.
- Offers excellent frequency stability.
- High frequency pullability and lower equivalent series resistance.
- Lower cost and highly mass production capability.
- The best choice of TV, STB, LCDM, Communication, Cable modem, etc.
- RoHS Compliant / Pb-Free.



### Electrical Specifications

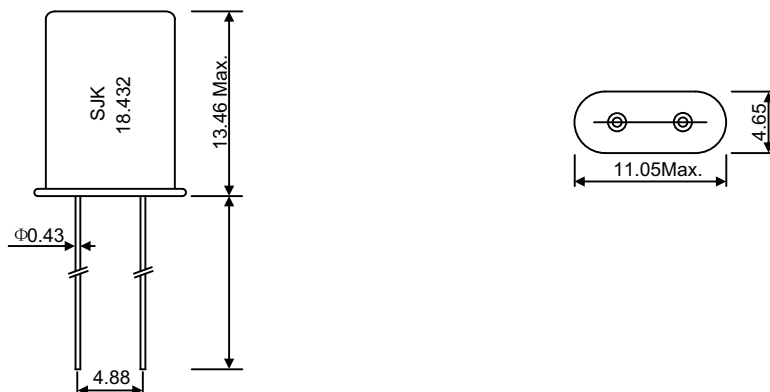
Item /Type	6A (HC-49U crystal resonator)
Frequency Range	1.843~150MHz
Frequency Tolerance(at 25 °C )	±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±30ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	7pF Max.
Drive Level	1~500μW Max.(100μW Typical)
Load Capacitance	16pF, 20pF,30pF, 32pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	1000pcs

### Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone		5th Overtone	
1.843~3.0MHz	350 Ω Max.	20~25MHz	50 Ω Max.	70~100MHz	60 Ω Max.
3.0~3.5MHz	150 Ω Max.	25~30MHz	40 Ω Max.	100~125MHz	60 Ω Max.
3.5~4.0MHz	90 Ω Max.	30~75MHz	40 Ω Max.	125~150MHz	60 Ω Max.
4.0~7.0MHz	60 Ω Max.	75~100MHz	60 Ω Max.		
7.0~15MHz	35 Ω Max.				
15~30MHz	25 Ω Max.				

### Dimensions

Units:mm



### Features

- Resistance welded type crystal units.
- A great number of standard frequencies.
- Wide frequency from 3MHz up to 100MHz.
- Offers excellent frequency stability.
- High frequency pullability and lower equivalent series resistance.
- Lower cost and highly mass production capability.
- The best choice of TV, STB, LCDM, Communication, Cable modem, etc.
- RoHS Compliant / Pb-Free.



### Electrical Specifications

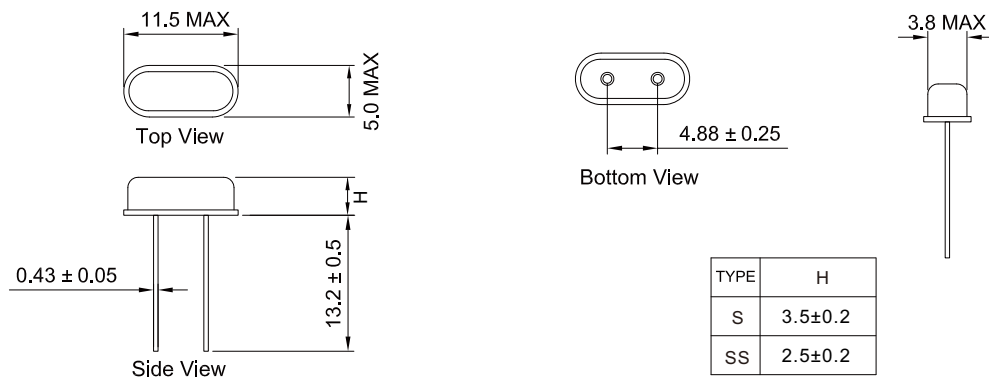
Item /Type	6B (HC-49S crystal resonator)
Frequency Range	3~100MHz
Frequency Tolerance(at 25 °C)	±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±30ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	7pF Max.
Drive Level	1~500μW Max.(100μW Typical)
Load Capacitance	16pF, 20pF,30pF, 32pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	1000pcs

### Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone	
3.0~3.686MHz	200 Ω Max.	27~30MHz	100 Ω Max.
3.686~5MHz	150 Ω Max.	30~50MHz	80 Ω Max.
5~10MHz	80 Ω Max.	50~100MHz	60 Ω Max.
10~14MHz	40 Ω Max.		
14~30MHz	30 Ω Max.		

### Dimensions

Units:mm



### Features

- Surface mounting type crystal resonators
- A great number of standard frequencies.
- Wide frequency from 3MHz up to 100MHz.
- Highly mass production capability.
- High frequency pullability equivalent series resistance.
- The best choice of PC, peripherals, STB, LCDM, Communication, Cable modem, etc.
- RoHS Compliant / Pb-Free.



### Electrical Specifications

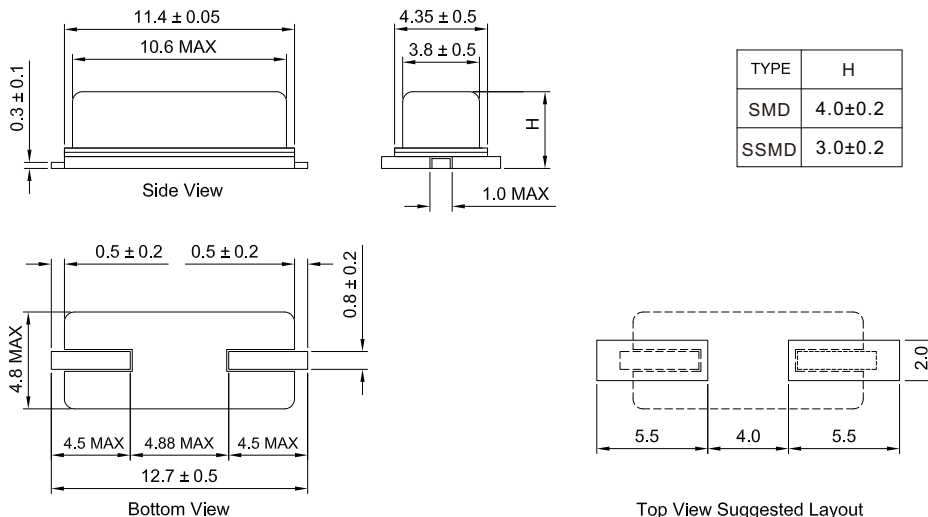
Item /Type	6C (HC-49SMD crystal resonator)
Frequency Range	3~100MHz
Frequency Tolerance(at 25 °C )	±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±30ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	7pF Max.
Drive Level	1~500μW Max.(100μW Typical)
Load Capacitance	16pF, 20pF,30pF, 32pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	1000pcs

### Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone	
3.0~3.686MHz	200 Ω Max.	27~30MHz	100 Ω Max.
3.686~5MHz	150 Ω Max.	30~50MHz	80 Ω Max.
5~10MHz	80 Ω Max.	50~100MHz	60 Ω Max.
10~14MHz	40 Ω Max.		
14~30MHz	30 Ω Max.		

### Dimensions

Units:mm



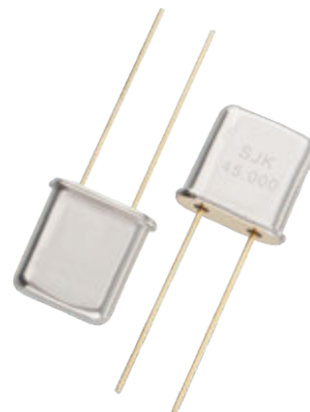
# UM-1/UM-5 Crystal Resonators



## Series 6D(UM-1), 6E(UM-5) Resistance Welded Package

### Features

- Resistance welded type crystal units.
- A great number of standard frequencies.
- Wide frequency from 4MHz up to 200MHz.
- Excellent aging characteristics.
- Uniform frequency tuning range and modulation sensitivity.
- The best choice of TV, STB, LCDM, Communication, Mobile radio communications, Cable modem, etc.
- RoHS Compliant / Pb-Free.



### Electrical Specifications

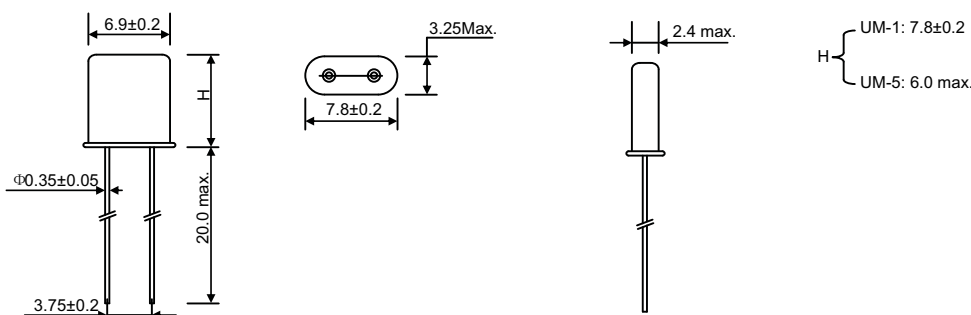
Item /Type	6D/6E (UM-1/UM-5 crystal resonator)
Frequency Range	4.000~200MHz
Frequency Tolerance(at 25 °C )	±10ppm~±50ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm~±50ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	7pF Max.
Drive Level	1~500μW Max.(100μW Typical)
Load Capacitance	Series or 9pF~50pF
Aging (at 25°C)	±5ppm / year Max.
Storage Temperature Range	-55~+125°C
Oscillator type	Fundamental /3rd /5th /7th Overtone

### Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone		5th /7th Overtone	
4~4.999MHz	100 Ω Max.	24~34.999MHz	40 Ω Max.	100~200MHz	100 Ω Max.
5~5.999MHz	90 Ω Max.	35~100MHz	80 Ω Max.		
6~6.999MHz	80 Ω Max.				
7~9.999MHz	60 Ω Max.				
10~13.999MHz	50 Ω Max.				
14~23.999MHz	40 Ω Max.				

### Dimensions

Units:mm



# Cylinder Type Crystal Units

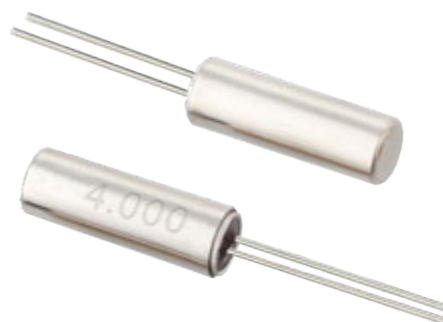


Size: 2×6 / 3×8 / 3×9 / 3×10mm

6Z Series Cylinder Crystal

## Features

- Wide frequency range from 3.579 up to 50MHz
- High shock tolerance.
- Small size.
- Applications in Security, PC and peripherals, Microprocessor systems, Instrumentation, Automotive electronics, etc.
- Reliable frequency stability.
- Low power consuming.
- RoHS Compliant.



## Electrical Specifications

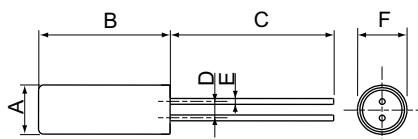
Item /Type	6Z (6Z Series Crystal Unit)	
	3×9 / 3×10	2×6 / 3×8
Size	3×9 / 3×10	2×6 / 3×8
Frequency Range	3.579MHz~4.000MHz	4.000MHz~50MHz
Load capacitance	12pF, 16pF, 20pF, or specify	
Drive level	10~100μW	
Frequency tolerance	±10~±30ppm, or specify	
Insulation Resistance	500MΩ AT DC200V	
Operating temperature range	-10~+60°C, -20~+70°C, ±40~+85°C	
Storage temperature range	±40~+85°C	
Aging (at 25°C)	±3ppm	
Shunting capacitance	5.0pF Typ.	

## Equivalent Series Resistance(ESR)

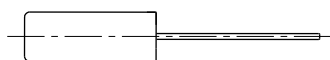
Fundamental		Fundamental / 3rd Overtone		
3.579~4.000MHz	180Ω Max.	7.000~9.999MHz	80Ω Max.	Fundamental
4.000~4.499MHz	150Ω Max.	10.000~11.999MHz	60Ω Max.	Fundamental
4.500~4.999MHz	120Ω Max.	12.000~29.999MHz	40Ω Max.	Fundamental
5.000~6.999MHz	100Ω Max.	30.000~50.000MHz	80Ω Max.	3rd Overtone

## Dimensions

Units:mm



Size	A	B	C	D	E	F
2×6	∅2.0	6.0±0.3	7.0±0.3	0.7±0.2	0.2±0.1	∅2.0±0.1
3×8	∅3.0	8.0±0.3	10.0±0.3	1.1±0.2	0.3±0.1	∅3.0±0.1
3×9	∅3.0	9.0±0.5	10.0±0.5	1.1±0.2	0.3±0.1	∅3.0±0.1
3×10	∅3.0	10.0±0.5	9.7±0.5	1.1±0.2	0.3±0.1	∅3.0±0.1





## Features

- 1210 size ultra miniature and lightweight SMD crystal resonator with a low profile of 0.30mm.
- Wide frequency range form a comparatively low 36MHz up to 54MHz.
- High precision and high frequency stability.
- High reliable environmental performance.
- Automatic mounting and reflow soldering.
- Applications for smart phone, sip module, variety of compact portable consumer products reference clocks.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

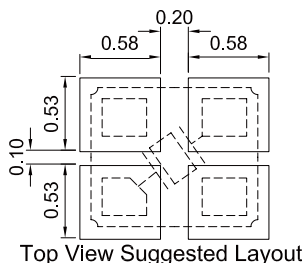
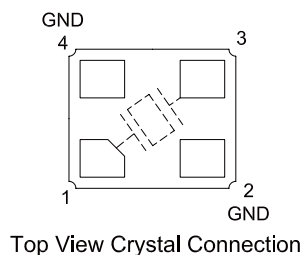
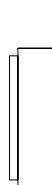
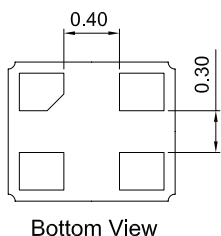
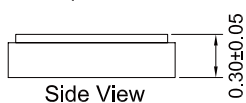
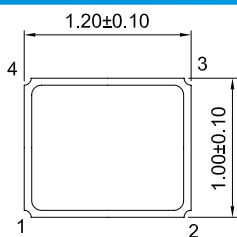
Item /Type	7S (SMD 1210 crystal resonator)
Frequency Range	36~54MHz
Frequency Tolerance(at 25 ºC )	±15ppm, ±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±15ppm, ±30ppm, or specify
Operating Temperature Range	-10~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~100µW Max.(50µW Typical)
Load Capacitance	8pF, 10pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-40~+85°C
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
36~54MHz	150 Ω Max.

## Dimensions

Units:mm



# SMD Crystal Resonators



Size: 1.6×1.2×0.35 mm

7Y Series SMD Crystal Resonator

## Features

- 1612 size miniature and light SMD crystal resonator with a low profile of 0.35mm.
- Wide frequency range form a comparatively low 24MHz up to 54MHz.
- High precision and high frequency stability.
- Automatic mounting and reflow soldering.
- Applications in smart phone, sip module, variety of compact portable consumer products.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

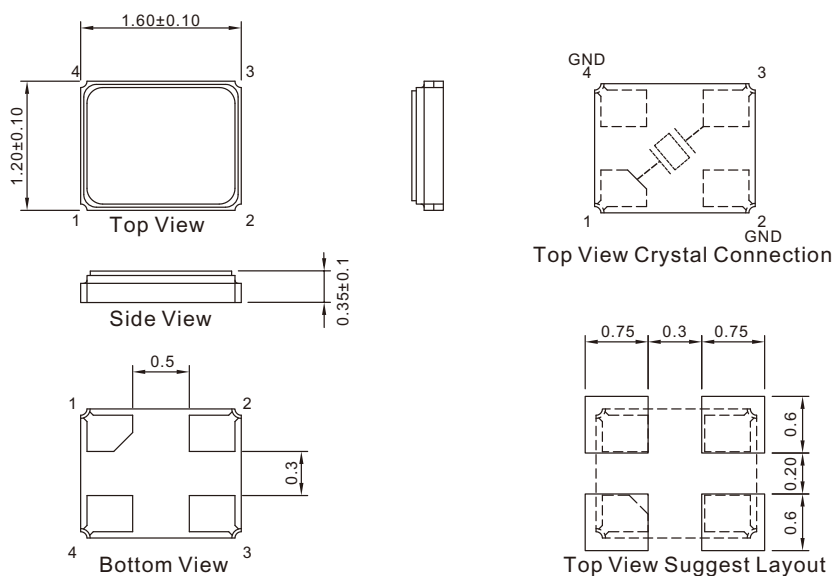
Item /Type	7Y (SMD 1612 crystal resonator)
Frequency Range	24~54MHz
Frequency Tolerance(at 25 ºC )	±10ppm, ±20ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm, ±20ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200µW Max.(50µW Typical)
Load Capacitance	8pF, 10pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
24~30MHz	100 Ω Max.
30~54MHz	80 Ω Max.

## Dimensions

Units:mm



## Features

- 2016 size miniature and light SMD crystal resonator with a low profile of 0.50mm.
- Wide frequency range form a comparatively low 16MHz up to 54MHz.
- High precision and high frequency stability.
- Automatic mounting and reflow soldering.
- Applications in smart phone, sip module, variety of compact portable consumer products.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

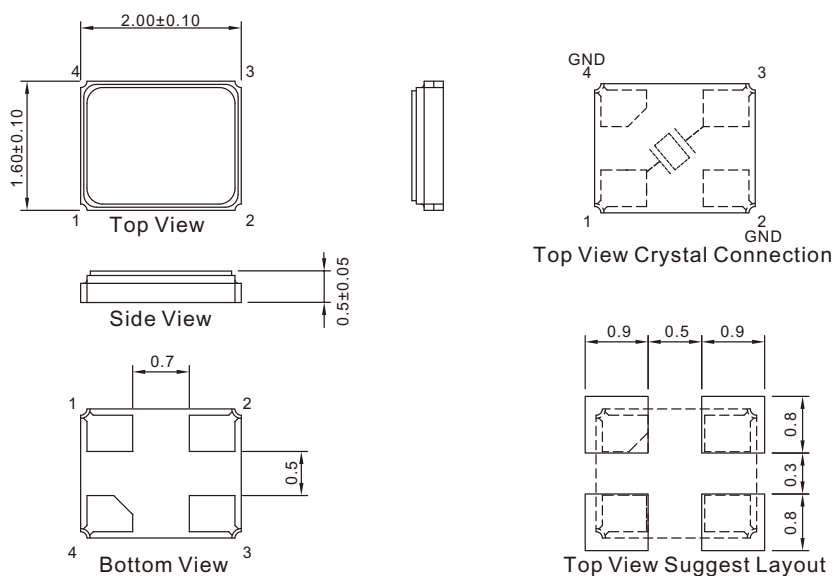
Item /Type	7F (SMD 2016 crystal resonator)
Frequency Range	16~54MHz
Frequency Tolerance(at 25 ºC )	±10ppm, ±20ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm, ±20ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200µW Max.(50µW Typical)
Load Capacitance	8pF, 10pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
16~19.2MHz	200 Ω Max.
19.2~30MHz	100 Ω Max.
30~54MHz	80 Ω Max.

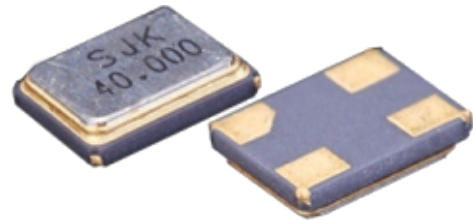
## Dimensions

Units:mm



## Features

- 2520 size miniature and light SMD crystal resonator with a low profile of 0.55mm.
- Wide frequency range form a comparatively low 12MHz up to 54MHz.
- High precision and high frequency stability.
- Excellent heat resistance and environmental characteristics.
- Automatic mounting and reflow soldering.
- Applications in smart phone, sip module, variety of compact portable consumer products.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

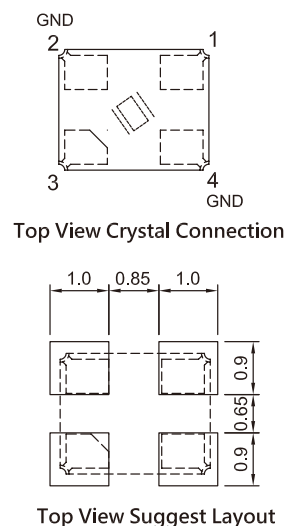
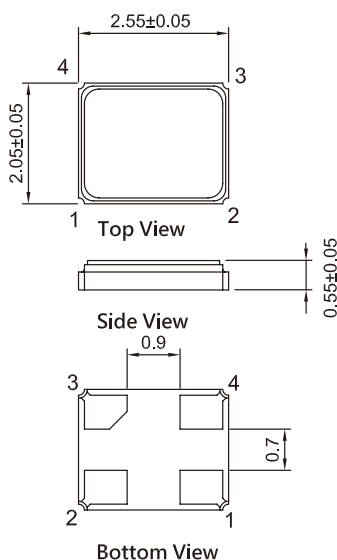
Item /Type	7E (SMD 2520 crystal resonator)
Frequency Range	12~54MHz
Frequency Tolerance(at 25 ºC )	±10ppm, ±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm, ±30ppm, or specify
Operating Temperature Range	-20~+70ºC, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200µW Max.(100µW Typical)
Load Capacitance	8pF, 10pF, 12pF, or specify
Aging (at 25ºC)	±3ppm / year Max.
Storage Temperature Range	-55~+125ºC
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
12~13MHz	150 Ω Max.
13~30MHz	100 Ω Max.
30~54MHz	60 Ω Max.

## Dimensions

Units:mm



# SMD Crystal Resonators



Size: 3.2×2.5×0.70 mm

7U Series SMD Crystal Resonator

## Features

- 3225 size miniature and light SMD crystal resonator with a low profile of 0.70mm.
- Wide frequency range form a comparatively low 10MHz up to 64MHz.
- High precision and high frequency stability.
- Excellent heat resistance and environmental characteristics.
- Automatic mounting and reflow soldering.
- Applications in PDA, DSC, DVC, Wireless communication, Mobile phone, PC, and more.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

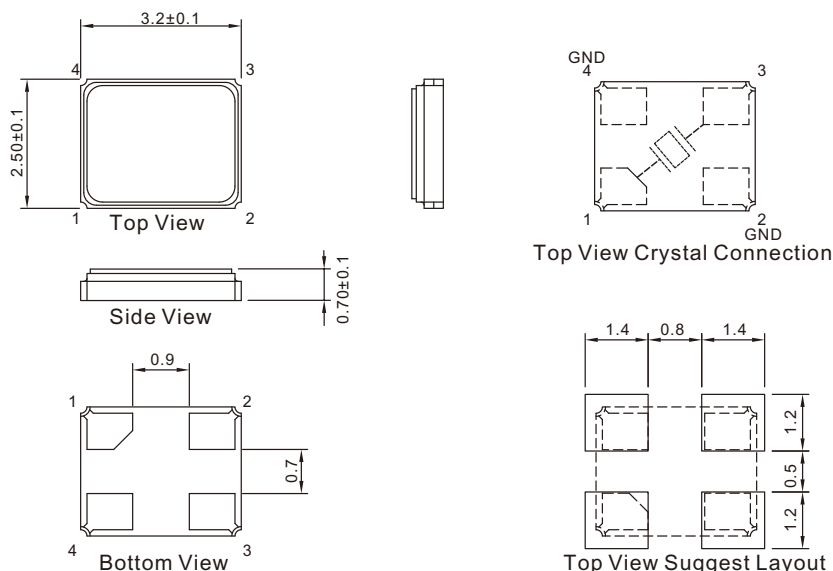
Item /Type	7U (3225 SMD crystal resonator)
Frequency Range	10~64MHz
Frequency Tolerance(at 25 °C)	±10ppm~±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm~±30ppm, or specify
Operating Temperature Range	-40~+85°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200µW Max.(100µW Typical)
Load Capacitance	8pF, 10pF, 12pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
10~16MHz	100 Ω Max.
16~20MHz	80 Ω Max.
20~64MHz	60 Ω Max.

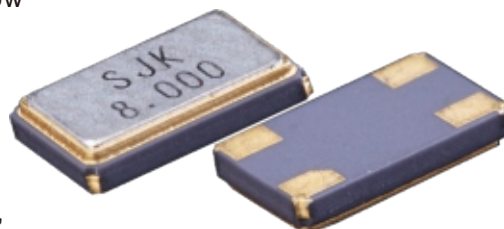
## Dimensions

Units:mm



## Features

- 5032 size miniature SMD crystal resonator with a low profile of 0.90mm.
- Wide frequency range from a comparatively low 8 MHz up to 125MHz.
- High precision and high frequency stability.
- Excellent for reducing EMI effect.
- Automatic mounting and reflow soldering.
- Applications for Bluetooth, wireless communication set, DSC, PDA, mobile phone, USB interface card, etc.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

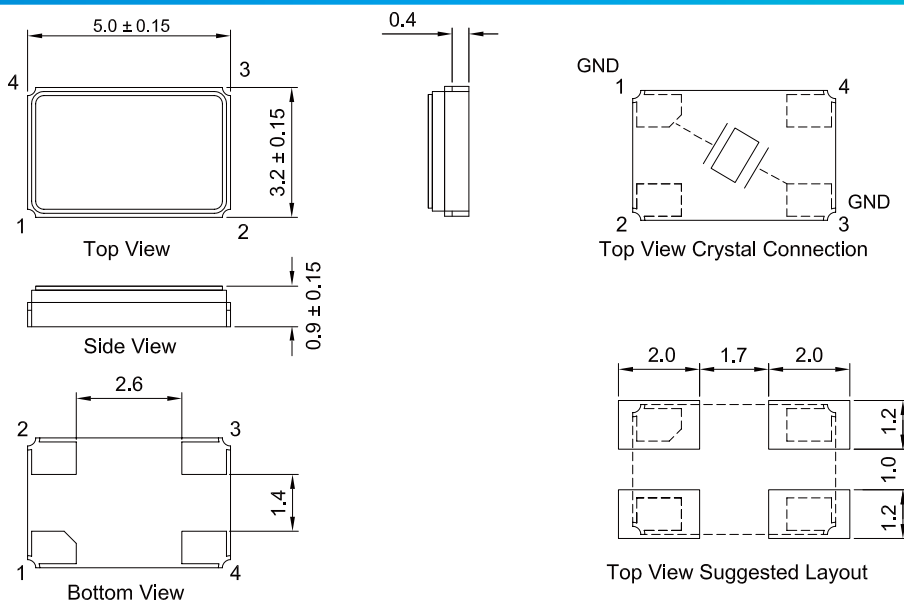
Item /Type	7I (SMD 5032 crystal resonator)
Frequency Range	8~125MHz
Frequency Tolerance(at 25 °C)	±10ppm, ±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm, ±30ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200μW Max.(100μW Typical)
Load Capacitance	10pF, 16pF, 20pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	1000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone	
8~11MHz	80Ω Max.	40~60MHz	120Ω Max.
12~54MHz	40Ω Max.	60~125MHz	80Ω Max.

## Dimensions

Units:mm



# SMD Crystal Resonators



Size: 6.0×3.5×1.00 mm

6G Series SMD Crystal Resonator

## Features

- 6035 size miniature SMD crystal resonator with a low profile of 1.00mm.
- Wide frequency range from a comparatively low 8 MHz up to 100MHz.
- High precision and high frequency stability.
- 2 Pads or 4 Pads.
- Automatic mounting and reflow soldering.
- Applications for Bluetooth, wireless communication set, DSC, PDA, mobile phone, USB interface card, etc.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

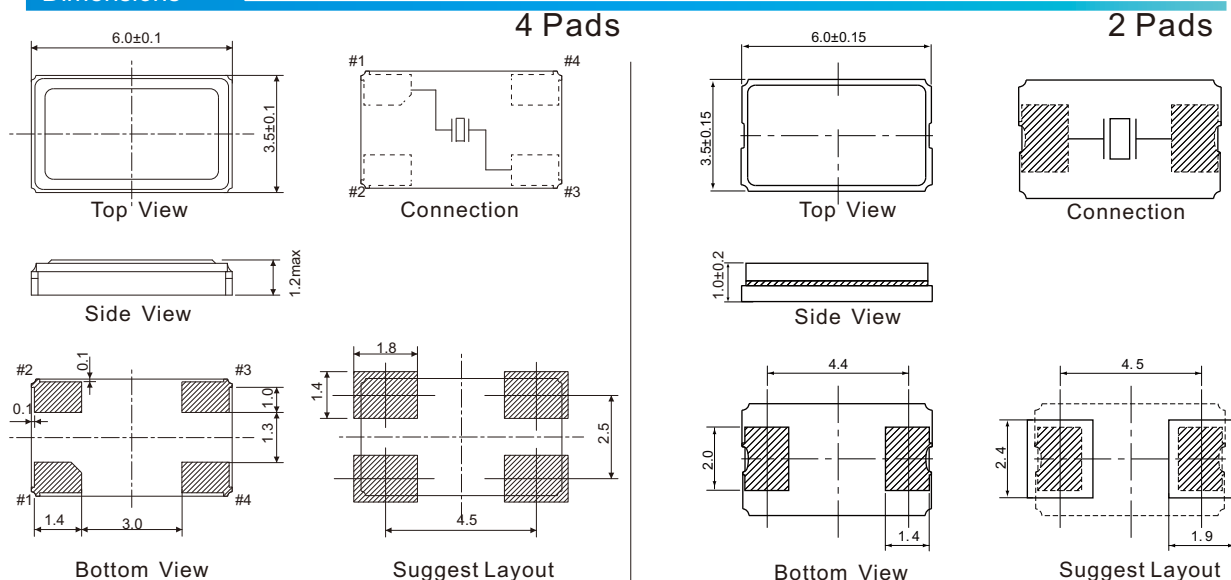
Item /Type	6G (SMD 6035 crystal resonator)
Frequency Range	8~100MHz
Frequency Tolerance(at 25 °C)	±10ppm, ±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm, ±30ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200μW Max.(100μW Typical)
Load Capacitance	10pF, 16pF, 20pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	1000pcs./Reel
Pad	2Pads / 4Pads

## Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone	
8~10MHz	150Ω Max.	40~100MHz	70Ω Max.
10~12MHz	80Ω Max.		
12~40MHz	50Ω Max.		

## Dimensions

Units:mm



# SMD Crystal Resonators



Size: 7.0×5.0×1.00 mm

6F Series SMD Crystal Resonator

## Features

- 7050 size SMD crystal resonator with a low profile of 1.00mm.
- Wide frequency range form a comparatively low 6MHz up to 160MHz.
- High precision and high frequency stability.
- Automatic mounting and reflow soldering.
- Applications for Bluetooth, wireless communication set, DSC, Radio communication, Office automation equipment, etc.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

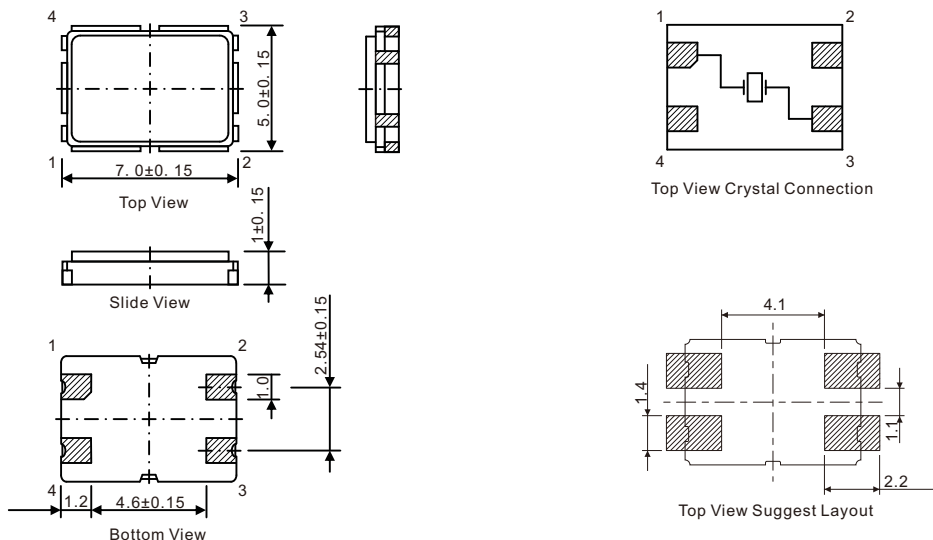
Item /Type	6F (SMD 7050 crystal resonator)
Frequency Range	6~160MHz
Frequency Tolerance(at 25 °C)	±10ppm~±50ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm~±50ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200μW Max.(100μW Typical)
Load Capacitance	16pF, 20pF,30pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-55~+125°C
Packing Unit	1000pcs./Reel
Pad	4Pads

## Equivalent Series Resistance(ESR)

Fundamental		3rd Overtone	
6~10MHz	100Ω Max.	30~80MHz	90Ω Max.
10~12MHz	60Ω Max.	80~100MHz	90Ω Max.
12~30MHz	50Ω Max.	100~160MHz	100Ω Max.

## Dimensions

Units:mm





# Glass SMD Crystal Resonators



Size: 2.5×2.0×0.75 mm

7Z Series SMD Crystal Resonator

## Features

- 2520 size miniature and light SMD crystal resonator with a low profile of 0.75mm.
- Wide frequency range from a comparatively low 12MHz up to 64MHz.
- High precision and high frequency stability.
- High reliable environmental performance.
- Automatic mounting and reflow soldering.
- Applications in NB, DSC, USB, Variety of compact portable consumer products reference clocks.
- Contain Pb in sealed glass exempted by RoHS directive.



## Electrical Specifications

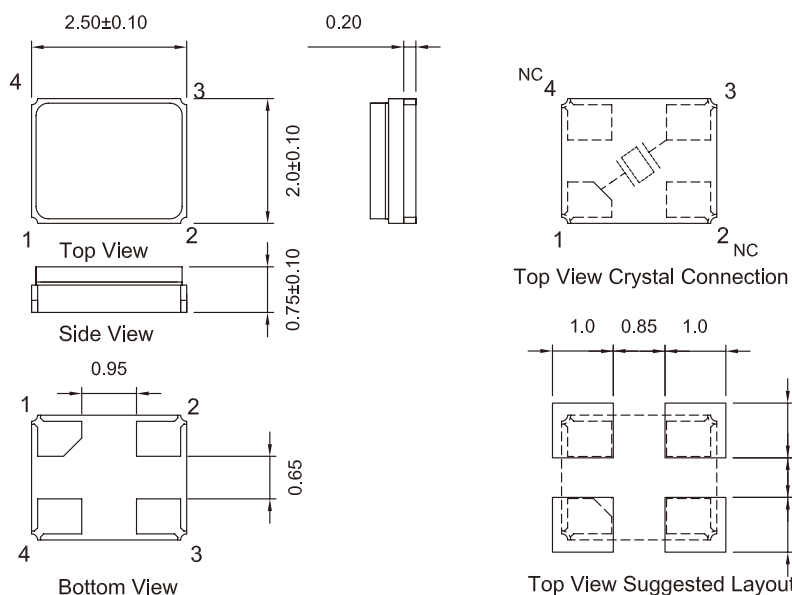
Item /Type	7Z (2520 Glass SMD crystal resonator)
Frequency Range	12~64MHz
Frequency Tolerance(at 25 °C)	±10ppm, ±20ppm, or specify
Frequency Stability Over Operating Temperature Range	±10ppm, ±20ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~50µW Max.(10µW Typical)
Load Capacitance	8pF, 10pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-40~+85°C
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental			
12~13MHz	200 Ω Max.	20~27MHz	80 Ω Max.
13~16MHz	150 Ω Max.	27~64MHz	60 Ω Max.
16~20MHz	100 Ω Max.		

## Dimensions

Units:mm



# Glass SMD Crystal Resonators

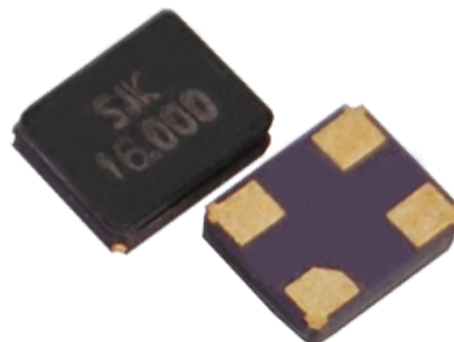


Size: 3.2×2.5×0.80 mm

7V Series SMD Crystal Resonator

## Features

- 3225 size miniature and light SMD crystal resonator with a low profile of 0.80mm.
- Wide frequency range form a comparatively low 10MHz up to 54MHz.
- High precision and high frequency stability.
- Excellent heat resistance and environmental characteristics.
- Automatic mounting and reflow soldering.
- Applications in DVC, Wireless communication, Mobile phone, PC, and more.
- Contain Pb in sealed glass exempted by RoHS directive.



## Electrical Specifications

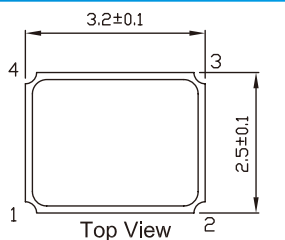
Item /Type	7V (3225 Glass SMD crystal resonator)
Frequency Range	10~54MHz
Frequency Tolerance(at 25 °C )	±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±30ppm, or specify
Operating Temperature Range	-20~+70°C, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~50μW Max.(10μW Typical)
Load Capacitance	8pF, 10pF, or specify
Aging (at 25°C)	±3ppm / year Max.
Storage Temperature Range	-40~+85°C
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

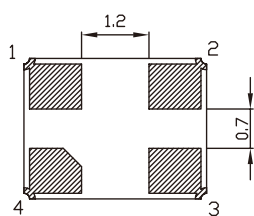
Fundamental	
10~12MHz	150 Ω Max.
12~16MHz	100 Ω Max.
16~54MHz	60 Ω Max.

## Dimensions

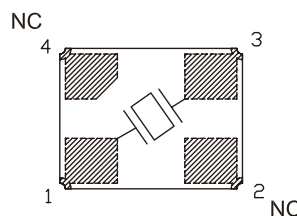
Units:mm



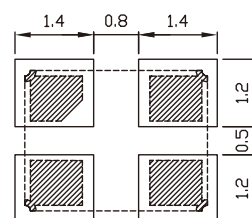
Side View



Bottom View



Top View Suggested Connection



Top View Suggested Layout

# Glass SMD Crystal Resonators



Size: 5.0×3.2×1.20 mm

6I Series SMD Crystal Resonator

## Features

- 5032 size miniature SMD crystal resonator with a low profile of 1.20mm.
- 2 pads SMD sealed crystal units.
- High reliable environmental performance.
- Tight tolerance and stability parts are available.
- Reasonable cost and good delivery performance.
- Automatic mounting and reflow soldering.
- Applications for portable PC, PDA, DSC, and USB interface card, etc.
- Contains Pb in sealing glass exempted by RoHS directive.



## Electrical Specifications

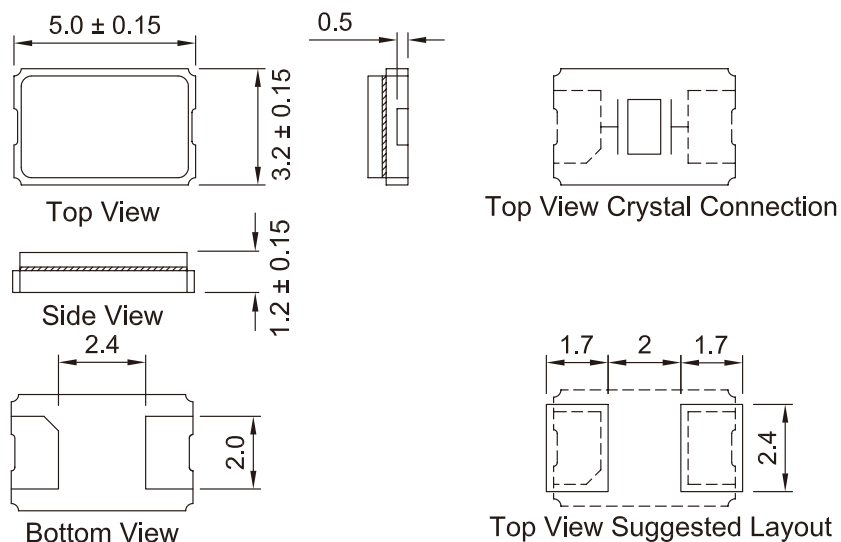
Item /Type	6I (Glass SMD 5032 crystal resonator)
Frequency Range	8~54MHz
Frequency Tolerance(at 25 ºC )	±30ppm, or specify
Frequency Stability Over Operating Temperature Range	±30ppm, or specify
Operating Temperature Range	-20~+70ºC, or specify
Shunt Capacitance(C <sub>0</sub> )	5pF Max.
Drive Level	1~200µW Max.(100µW Typical)
Load Capacitance	10pF, 16pF, 20pF, or specify
Aging (at 25ºC)	±3ppm / year Max.
Storage Temperature Range	-40~+85ºC
Packing Unit	1000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
8~12MHz	80Ω Max.
12~54MHz	50Ω Max.

## Dimensions

Units:mm



# SMD Tuning Fork Crystal



**Size: 1.6×1.0×0.50 mm      7K Series SMD Tuning Fork Crystal**

## Features

- 2 pads surface mount package.
- 1610 size miniature and lightweight SMD tuning fork crystal resonator with a low profile of 0.50mm.
- High reliable environmental performance.
- Automatic mounting and reflow soldering.
- Application for NB, Smart phone, Digital appliance, PDA, Wave clock, Wireless communication, RFID, NFC, etc.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

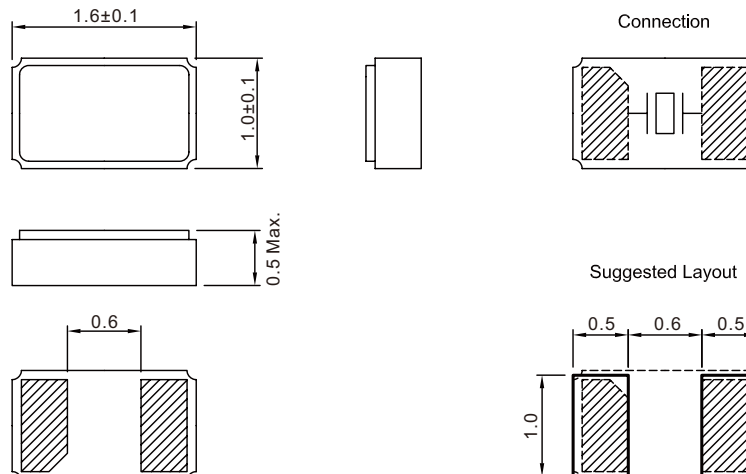
Item /Type	7K (7K Series SMD tuning fork crystal)
Frequency Range	32.768 kHz
Load capacitance	12.5pF, other spec.
Drive level	0.5μW Max.
Frequency tolerance	±20ppm, or specify
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.03±0.01)×10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±55~+125°C
Aging (at 25°C)	±3ppm at first year
Shunting capacitance	1.3pF Typ.
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
32.768kHz	90 KΩ Max.

## Dimensions

Units:mm



# SMD Tuning Fork Crystal



**Size: 2.0×1.2×0.60 mm      7R Series SMD Tuning Fork Crystal**

## Features

- 2 pads ceramic surface mount package.
- 2012 size miniature and lightweight SMD tuning fork crystal resonator with a low profile of 0.60mm.
- High reliable environmental performance.
- Automatic mounting and reflow soldering.
- Application for variety of automotive, Mobile communications, PDA, Wave clock, Wireless communications, digital appliance, etc.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

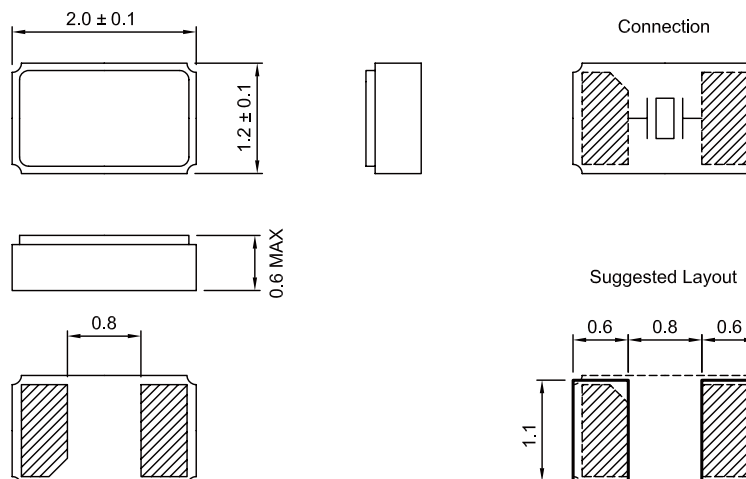
Item /Type	7R (7R Series SMD tuning fork crystal)
Frequency Range	32.768 kHz
Load capacitance	12.5pF, other spec.
Drive level	0.5μW Max.
Frequency tolerance	±20ppm, or specify
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.03±0.01) \times 10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±55~+125°C
Aging (at 25°C)	±3ppm at first year
Shunting capacitance	1.3pF Typ.
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
32.768kHz	90 KΩ Max.

## Dimensions

Units:mm



# SMD Tuning Fork Crystal



**Size: 3.2×1.5×0.75 mm      7L Series SMD Tuning Fork Crystal**

## Features

- 2 pads surface mount package.
- 3215 size miniature and lightweight SMD tuning fork crystal resonator with a low profile of 0.75mm.
- High reliable environmental performance.
- Automatic mounting and reflow soldering.
- Application for variety of automotive, Mobile communications, PDA, Wave clock, Wireless communications, digital appliance, etc.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

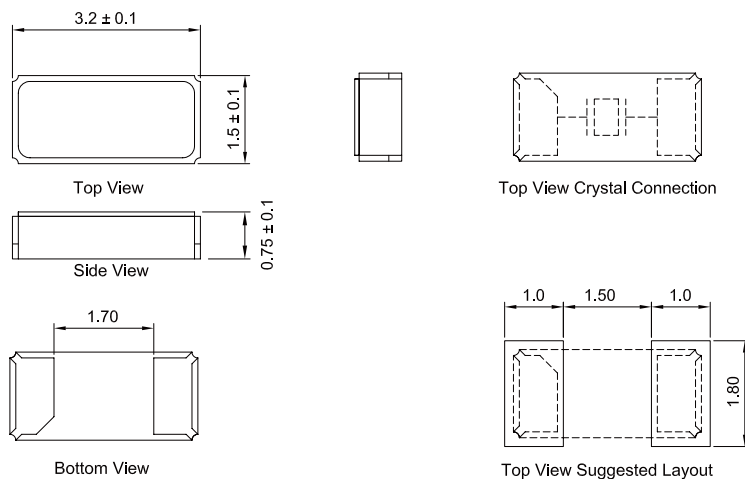
Item /Type	7L (7L Series SMD tuning fork crystal)
Frequency Range	32.768 kHz
Load capacitance	12.5pF, other spec.
Drive level	1.0μW Max.
Frequency tolerance	±20ppm, or specify
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.03±0.01)×10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±55~+125°C
Aging (at 25°C)	±3ppm at first year
Shunting capacitance	1.0pF Typ.
Packing Unit	3000pcs./Reel

## Equivalent Series Resistance(ESR)

Fundamental	
32.768kHz	70 KΩ Max.

## Dimensions

Units:mm



# SMD Tuning Fork Crystal



**Size: 6.9×1.4×1.40 mm      7M Series SMD Tuning Fork Crystal**

## Features

- Plastic molded SMD tuning fork crystal of heat-resistance.
- High precision and high frequency stability.
- Ultra thin type with height 1.4mm Max.
- Automatic mounting and reflow soldering.
- High reliable environmental performance.
- Applications in PC, gaming equipment, Radio communication, PDA, SmartGrid, etc.
- RoHS Compliant.



## Electrical Specifications

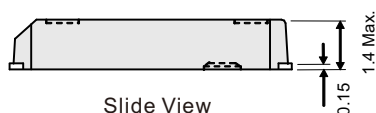
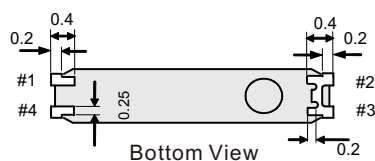
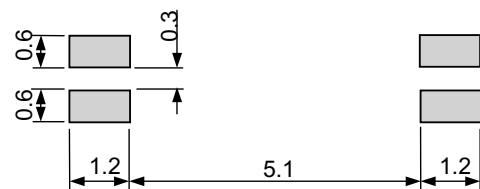
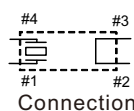
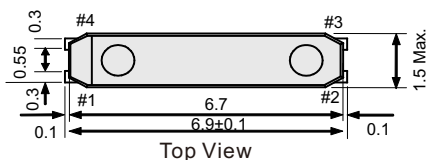
Item /Type	7M (7M Series SMD tuning fork crystal)
Frequency Range	32.768 kHz
Load capacitance	12.5pF
Drive level	1.0μW Max.
Frequency tolerance	±20ppm, or specify
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.035±0.005) \times 10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±55~+125°C
Aging (at 25°C)	±3ppm at first year
Shunting capacitance	0.8pF Typ.

## Equivalent Series Resistance(ESR)

Fundamental	
32.768kHz	65 KΩ Max.

## Dimensions

Units:mm



# SMD Tuning Fork Crystal



**Size: 3.8×8.0×2.40 mm    6LC Series SMD Tuning Fork Crystal**

## Features

- Plastic molded SMD tuning fork crystal of heat-resistance.
- High precision and high frequency stability.
- Small size with 3.8×8×2.4 mm.
- Automatic mounting and reflow soldering.
- High reliable environmental performance.
- Applications in PC, gaming equipment, Radio communication, PDA, Cellular phones, etc.
- RoHS Compliant.



## Electrical Specifications

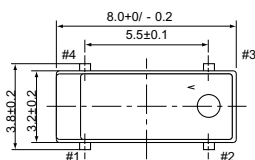
Item /Type	6LC (308C SMD tuning fork crystal)
Frequency Range	32.768 kHz
Load capacitance	6pF / 12.5pF
Drive level	1.0μW Max.
Frequency tolerance	±20ppm, or specify
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.034±0.005) \times 10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±55~+125°C
Aging (at 25°C)	±3ppm at first year
Shunting capacitance	1.3pF Typ.

## Equivalent Series Resistance(ESR)

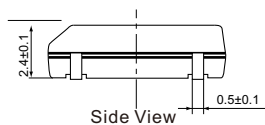
Fundamental	
32.768kHz	50 KΩ Max.

## Dimensions

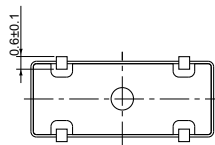
Units:mm



Top View

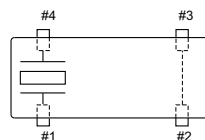


Side View

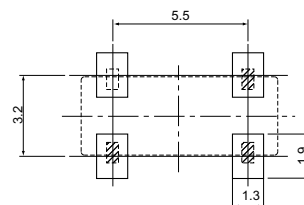


Bottom View

Top View Crystal Connection



Top View Suggested Layout





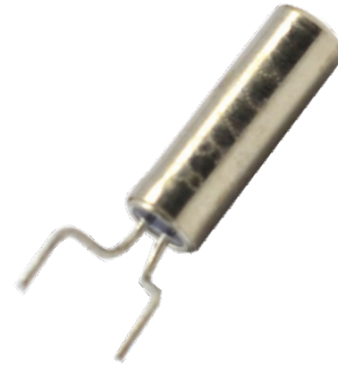
# SMD Tuning Fork Crystal



**Size: 2.0×6.0×2.6 mm      6LB Series SMD Tuning Fork Crystal**

## Features

- SMD tuning fork crystal of lead formed heat-resistance.
- Automatic mounting and reflow soldering.
- High reliable environmental performance.
- Applications in Mobile communication, E-book Internet of things, Security, SmartGrid, Consumer electronics, etc.
- Small size.
- Wide frequency range.



## Electrical Specifications

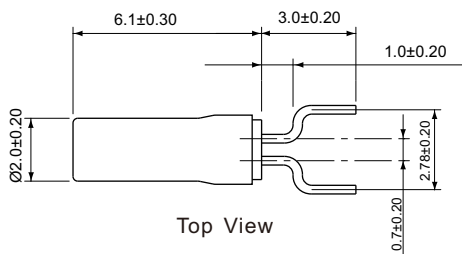
Item /Type	6LB (6LB Series SMD tuning fork crystal)
Frequency Range	32.768 kHz(30~350 kHz)
Load capacitance	6.0~12.5pF, or specify
Drive level	1.0μW Max.
Frequency tolerance	±20~±100ppm
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.034±0.006) \times 10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±55~+125°C
Aging (at 25°C)	±3ppm
Shunting capacitance	2.0pF Typ.

## Equivalent Series Resistance(ESR)

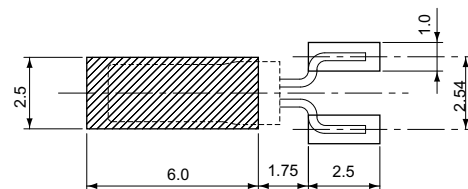
Fundamental	
30~350kHz	50 KΩ Max.

## Dimensions

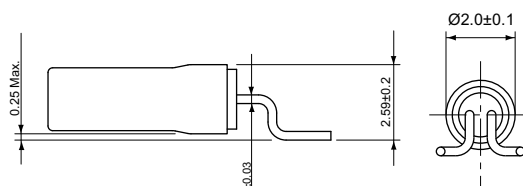
Units:mm



Top View



Suggest Layout



Side View

# Tuning Fork Crystal



**Size: 2×6mm /3×8 mm      6K6 /6K8 Series Tuning Fork Crystal**

## Features

- Tuning fork crystal of lead formed heat-resistance.
- Automatic mounting and reflow soldering.
- High reliable environmental performance.
- Applications in Mobile communication, E-book Internet of things, Security, SmartGrid, Consumer electronics, etc.
- Small size.
- Wide frequency range.



## Electrical Specifications

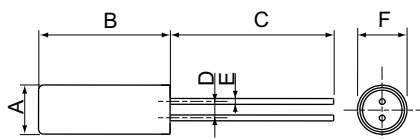
Item /Type	6K6 / 6K8 (Tuning fork crystal)
Frequency Range	32.768 kHz(30~350 kHz)
Load capacitance	6.0~12.5pF, or specify
Drive level	1.0μW Max.
Frequency tolerance	±20~±100ppm
Turnover Temperature	±25°C±5°C
Parabolic Coefficient	$(-0.034±0.006) \times 10^{-6}/^{\circ}\text{C}^2$
Operating temperature range	-20~+70°C, ±40~+85°C
Storage temperature range	±40~+85°C, ±55~+125°C
Aging (at 25°C)	±3ppm
Shunting capacitance	1.5pF Typ.

## Equivalent Series Resistance(ESR)

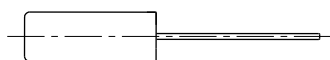
Fundamental	
30~350kHz	50 KΩ Max.

## Dimensions

Units:mm

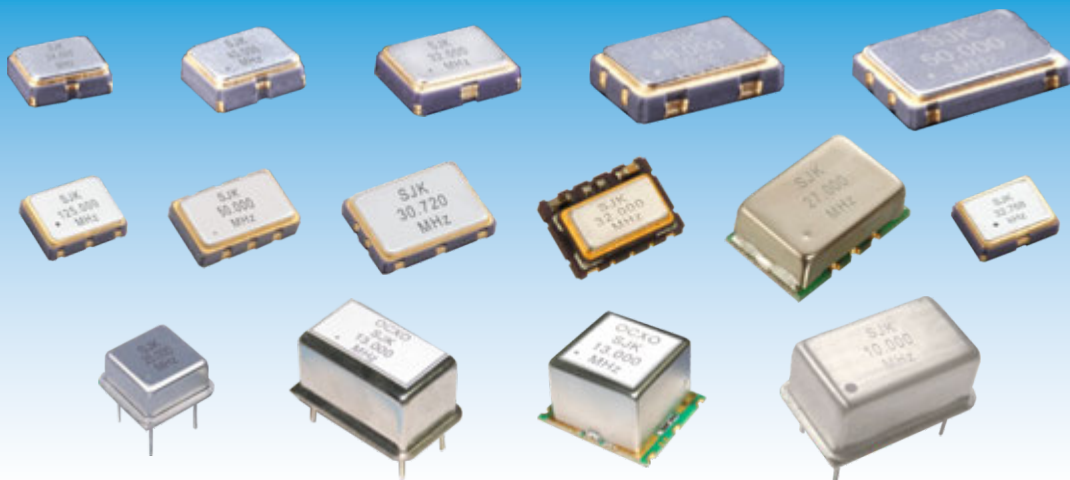


Type	A	B	C	D	E	F
6K6	∅2.0	6.0±0.3	7.0±0.3	0.7±0.2	0.2±0.1	∅2.0±0.1
6K8	∅3.0	8.0±0.3	10.0±0.3	1.1±0.2	0.3±0.1	∅3.0±0.1

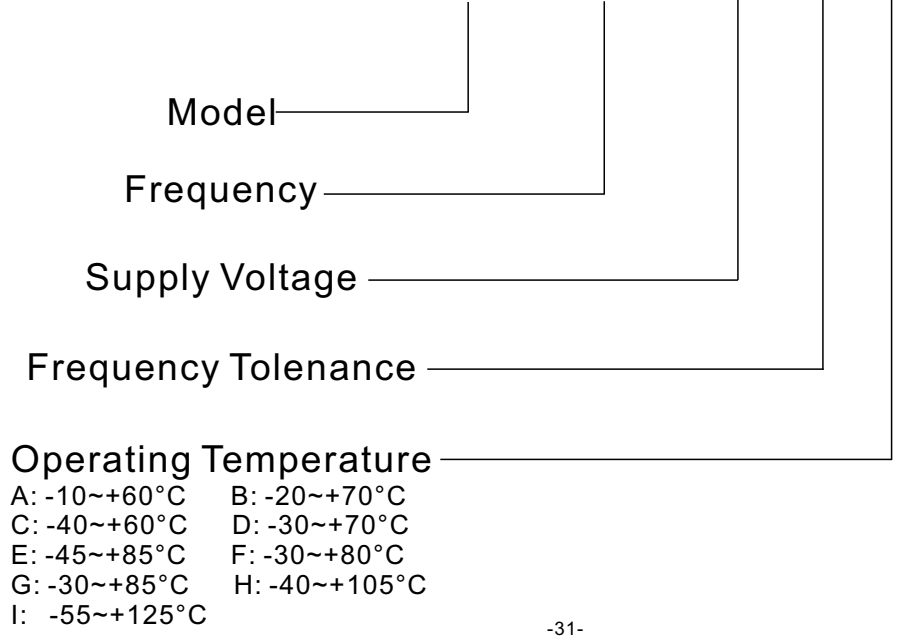




# Crystal Oscillators



SJK-6N-40.000-3.3-30-C



# SMD 2016 Crystal Oscillator



Size: 2.0×1.6×0.75 mm

1N Series SMD Crystal Oscillator

## Features

- 2016 size, 0.75mm high, extremely small SMD seam sealed clock oscillator unit.
- Low voltage operation.
- Available frequency range: 4MHz ~54MHz
- 2-state function.
- Automatic mounting and reflow soldering.
- High reliable environmental performance.
- Applications: GPS, WiMax, Cellular, Wireless communications, Smart Phone, etc.
- Low current consumption.
- RoHS Compliant / Pb-Free.

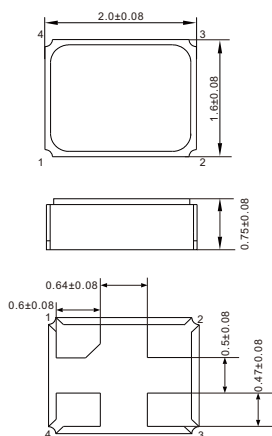


## Electrical Specifications

Item /Type	1N (SMD 2016 Crystal Oscillator)
Output Type	CMOS
Output Load	15pF, or specify
Oscillation Mode	Fundamental
Supply Voltage	3.3V (1.8V, 2.5V available)
Frequency Range	4 ~ 54 MHz
Frequency stability	±25ppm, ±50ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time	5ns Max.
Supply Current	5mA Max.
Symmetry	45~55%
Start-up Time	5ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.
Aging (at 25°C)	±3ppm/Year Max.

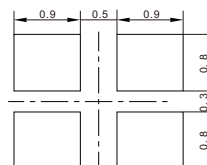
## Dimensions

Units:mm



PAD FUNCTION:

- 1: ENABLE CONTROL
- 2: GND
- 3: OUT
- 4: VDD



# SMD 2520 Crystal Oscillator

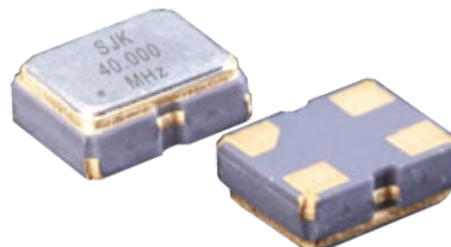


Size: 2.5×2.0×0.80 mm

2N Series SMD Crystal Oscillator

## Features

- 2520 size, 0.80mm high, ultra small SMD seam sealed clock oscillator unit.
- Low voltage operation.
- Frequency range: 4MHz ~75MHz
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: WLAN, Bluetooth, DSC, PC, Mobile phone, TV, DVC, Telecommunications, HDD , etc.
- Low current consumption.
- RoHS Compliant / Pb-Free.

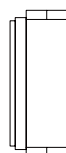
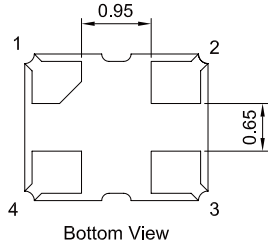
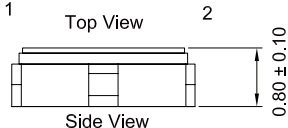
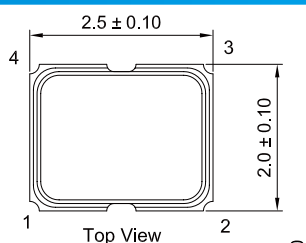


## Electrical Specifications

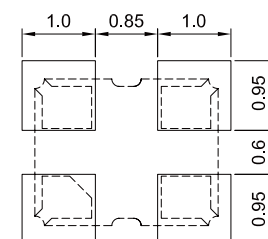
Item /Type	2N (SMD 2520 Crystal Oscillator)
Output Type	CMOS
Output Load	15pF, or specify
Oscillation Mode	Fundamental
Supply Voltage	3.3V (1.8V, 2.5V available)
Frequency Range	4 ~ 75 MHz
Frequency stability	±25ppm, ±50ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time	5ns Max.
Supply Current	10mA Max.
Symmetry	45~55%
Start-up Time	5ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.
Aging (at 25°C)	±3ppm/Year Max.

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL  
 2: GND  
 3: OUT  
 4: VDD



Top View Suggested Layout

# SMD 3225 Crystal Oscillator



Size: 3.2×2.5×1.00 mm

3N Series SMD Crystal Oscillator

## Features

- 3225 size, 1.0mm high, ultra small SMD seam sealed clock oscillator unit.
- Low voltage operation.
- Frequency range: 1MHz ~125MHz
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Peripherals, Bluetooth, DSC, PC, Mobile phone, PDA, DVC, Telecommunications, NFC, etc.
- Low current consumption.
- RoHS Compliant / Pb-Free.

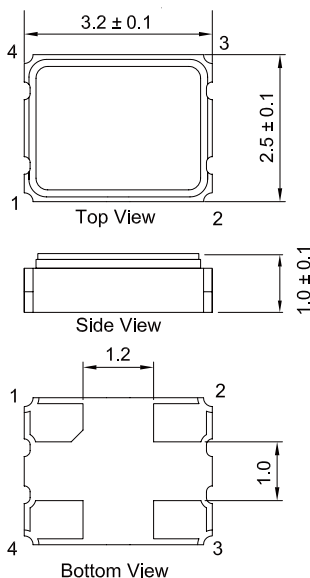


## Electrical Specifications

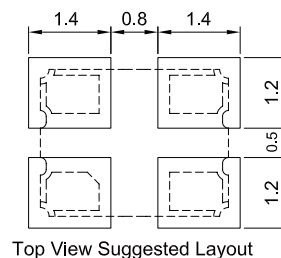
Item /Type	3N (SMD 3225 Crystal Oscillator)	
Output Type	CMOS	
Output Load	15pF, or specify	
Oscillation Mode	Fundamental / 3rd Overtone	
Supply Voltage	1.8V	2.5V, 2.8V, 3.3V
Frequency Range	1 ~ 125 MHz	
Frequency stability	±25ppm, ±50ppm	
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range	-55~+125°C	
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD	
Rise(Tr) / Fall(Tf) Time	8ns Max.	
Supply Current	15mA Max.	
Symmetry	45~55%	
Start-up Time	5ms Max.	
Phase Jitter (12KHz~20MHz)	1ps Max.	
Aging (at 25°C)	±3ppm/Year Max.	

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL  
 2: GND  
 3: OUT  
 4: VDD



# SMD 5032 Crystal Oscillator



Size: 5.0×3.2×1.20 mm

7N Series SMD Crystal Oscillator

## Features

- Package size: 5.0×3.2×1.2mm.
- Small size SMD seam sealed clock crystal oscillator units.
- Supply voltage: 1.8V~5.0V.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Wireless communication, PDA, DSC, PC, Server, SONET, Telecommunications, etc.
- High stability, low jitter, low power consumption.
- RoHS Compliant / Pb-Free.

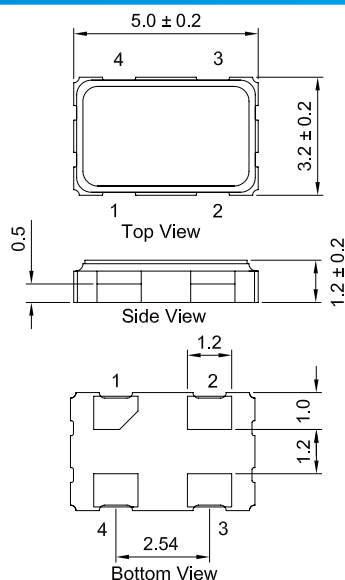


## Electrical Specifications

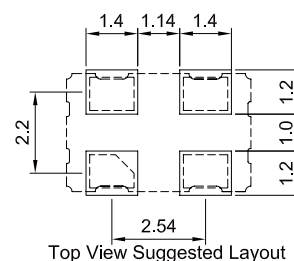
Item /Type		7N (SMD 5032 Crystal Oscillator)		
Output Type		CMOS		
Output Load		15pF, or specify		
Oscillation Mode		Fundamental / 3rd Overtone		
Supply Voltage		1.8V	2.5V, 2.8V, 3.3V	5.0V
Frequency Range		1 ~ 150 MHz		
Frequency stability		±20ppm, ±25ppm, ±30ppm, ±50ppm		
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify		
Storage Temperature Range		-55~+125°C		
Voltage Vol (Max.) / Voh (Min.)		0.1VDD / 0.9VDD		
Rise(Tr) / Fall(Tf) Time		8ns Max.		
Current Consumption	1~75MHz	5mA Max.	10mA Max.	20mA Max.
	75~150MHz	15mA Max.	20mA Max.	NA
Symmetry		40~60%		
Start-up Time		5ms Max.		
Phase Jitter (12KHz~20MHz)		1ps Max.		
Aging (at 25°C)		±3ppm/Year Max.		

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL  
 2: GND  
 3: OUT  
 4: VDD



# SMD 7050 Crystal Oscillator



Size: 7.0×5.0×1.30 mm

6N Series SMD Crystal Oscillator

## Features

- Package size: 7.0×5.0×1.3mm.
- High precision characteristic covering up to wide frequency range.
- Supply voltage: 1.8V~5.0V.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Wireless communication, FC-HBA, PC, LCDM, Server, SONET, Telecommunications, etc.
- High stability, low jitter, low power consumption.
- RoHS Compliant / Pb-Free.

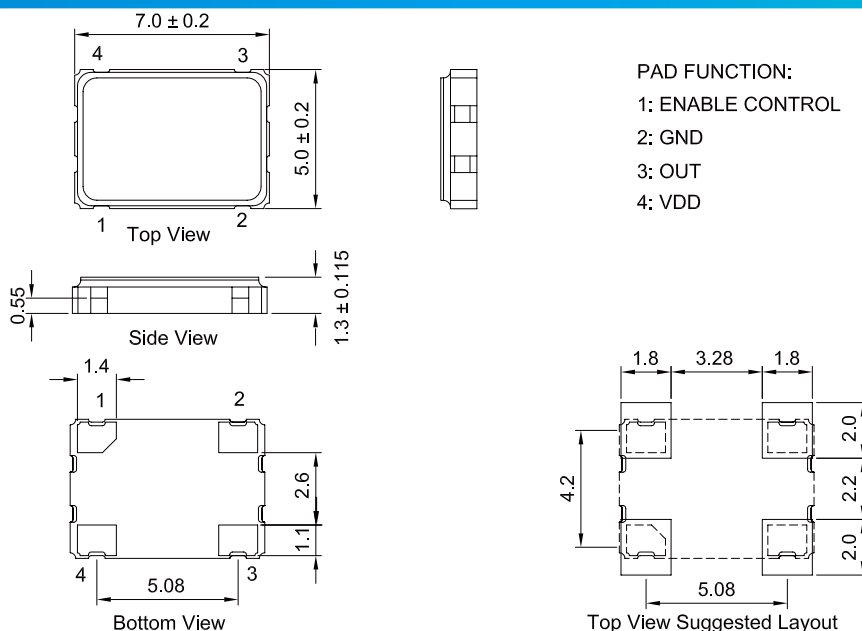


## Electrical Specifications

Item /Type	6N (SMD 7050 Crystal Oscillator)		
Output Type	CMOS		
Output Load	15pF	15pF, 30pF	15pF, 50pF
Oscillation Mode	Fundamental / 3rd Overtone		
Supply Voltage	1.8V	2.5V, 2.8V, 3.3V	5.0V
Frequency Range	1 ~ 170 MHz		
Frequency stability	±20ppm, ±25ppm		
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify		
Storage Temperature Range	-55~+125°C		
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD		
Rise(Tr) / Fall(Tf) Time	8ns Max.		
Supply Current	20mA Max.		
Symmetry	40~55%, 40~60%		
Start-up Time	5ms Max.		
Phase Jitter (12KHz~20MHz)	1ps Max.		
Aging (at 25°C)	±3ppm/Year Max.		

## Dimensions

Units:mm





# SMD Crystal Oscillator

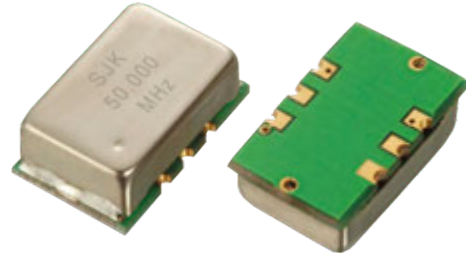


Size: 14.0×9.0×5.4 mm

9N Series SMD Crystal Oscillator

## Features

- Surface mount package.
- High precision characteristic covering up to wide frequency range from 1MHz up to 170MHz.
- Either fundamental and 3rd overtone solution.
- CMOS output.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Fibre channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Expree, SDH, SONET, etc.
- Excellent low phase noise and jitter.
- RoHS Compliant / Pb-Free.



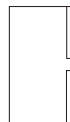
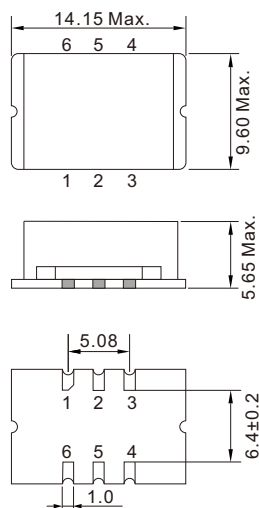
## Electrical Specifications

Item /Type	9N (9N Series SMD Crystal Oscillator)		
Output Type	CMOS		
Output Load	15pF	15pF, 30pF	15pF, 50pF
Oscillation Mode	Fundamental / 3rd Overtone		
Supply Voltage	1.8V	2.5V, 2.8V, 3.3V	5.0V
Frequency Range	1 ~ 170 MHz		
Overall Frequency stability*	±20ppm, ±25ppm		
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify		
Storage Temperature Range	-55~+125°C		
Rise(Tr) / Fall(Tf) Time(20%~80%)	10ns(1~10MHz), 7ns(20~50MHz), 5ns(>50MHz) Max.		
Supply Current	50mA Max.		
Symmetry	40~60%		
Start-up Time	10ms Max.		
Phase Jitter (12KHz~20MHz)	1ps Max.		

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

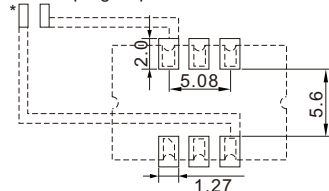
Units:mm



### PAD FUNCTION:

- 1: ENABLE CONTROL or NC
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: NC
- 6: VDD

\* External high frequency power supply decoupling required.



# Thru-Hole Crystal Oscillator



## Full Size Crystal Oscillator

## 6MF Series Crystal Oscillator

### Features

- All metal welded package.
- High precision characteristic covering up to wide frequency range from 0.25MHz up to 180MHz.
- 5V / 3.3V operating voltage.
- CMOS output.
- 3-state function.
- 14-Pin DIP (Full size).
- Applications: Telecommunications, Mobile communications, Avionics, Test equipments, Electronic instruments, etc.
- Low phase noise and jitter.
- RoHS Compliant / Pb-Free.

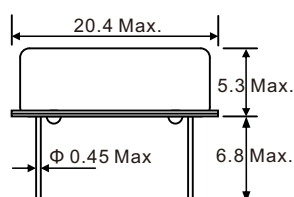
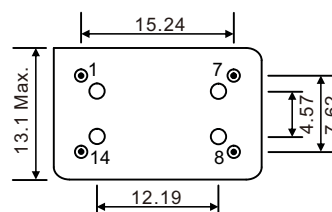
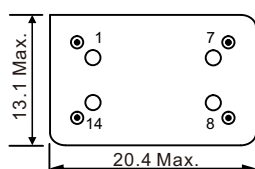


### Electrical Specifications

Item /Type		6M (6MF Thru-Hole Crystal Oscillator)	
Output Type		CMOS	
Output Load		15pF	15pF, 50pF
Oscillation Mode		Fundamental / 3rd Overtone	
Supply Voltage		3.3V	5.0V
Frequency Range		0.25 ~ 180 MHz	
Overall Frequency stability*		±10ppm, ±20ppm, ±25ppm, ±50ppm, ±100ppm	
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range		-55~+125°C	
Rise(Tr) / Fall(Tf) Time(AT 0.1Vdd~0.9Vdd)		5ns Max.	
Input Current	0.25MHz~9.999MHz	15mA Max.	10mA Max.
	10.00MHz~23.999MHz	15mA Max.	10mA Max.
	24.00MHz~49.999MHz	30mA Max.	20mA Max.
	50.00MHz~79.999MHz	40mA Max.	20mA Max.
	80.00MHz~180.000MHz	50mA Max.	30mA Max.
Symmetry(AT ½ Vdd)		40~60%	
Start-up Time		10ms Max.	

### Dimensions

Units:mm



**PAD Function:**  
 1: Control Voltage  
 7: GND  
 8: Out  
 14: Vdd (5V/3.3V)

# Thru-Hole Crystal Oscillator



## Half Size Crystal Oscillator

## 6MH Series Crystal Oscillator

### Features

- All metal welded package.
- High precision characteristic covering up to wide frequency range from 0.25MHz up to 180MHz.
- 5V / 3.3V operating voltage.
- CMOS output.
- 3-state function.
- 8-Pin DIP (Half-Size Package)
- Applications: Telecommunications, Mobile communications, Avionics, Test equipments, Electronic instruments, etc.
- Low phase noise and jitter.
- RoHS Compliant / Pb-Free.

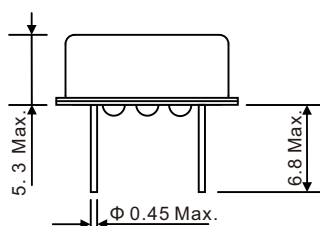
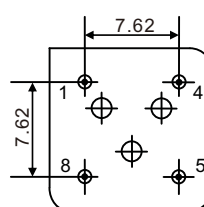
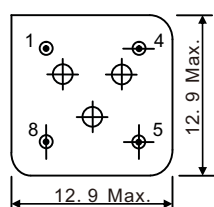


### Electrical Specifications

Item /Type		6MH (6MH Thru-Hole Crystal Oscillator)	
Output Type		CMOS	
Output Load		15pF	15pF, 50pF
Oscillation Mode		Fundamental / 3rd Overtone	
Supply Voltage		3.3V	5.0V
Frequency Range		0.25 ~ 180 MHz	
Overall Frequency stability*		±10ppm, ±20ppm, ±25ppm, ±50ppm, ±100ppm	
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range		-55~+125°C	
Rise(Tr) / Fall(Tf) Time(AT 0.1Vdd~0.9Vdd)		5ns Max.	
Input Current	0.25MHz~9.999MHz	15mA Max.	10mA Max.
	10.00MHz~23.999MHz	15mA Max.	10mA Max.
	24.00MHz~49.999MHz	30mA Max.	20mA Max.
	50.00MHz~79.999MHz	40mA Max.	20mA Max.
	80.00MHz~180.000MHz	50mA Max.	30mA Max.
Symmetry(AT ½ Vdd)		40~60%	
Start-up Time		10ms Max.	

### Dimensions

Units:mm



**PAD Function:**  
 1: Control Voltage  
 4: GND  
 5: Out  
 8: Vdd (5V/3.3V)

# SMD LVPECL Crystal Oscillator

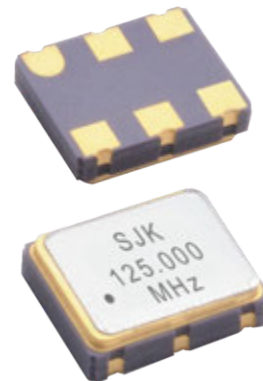


Size: 3.2×2.5×0.95 mm

3J Series SMD LVPECL Oscillator

## Features

- Fundamental solution or 3rd overtone solution.
- 3.3V / 2.5V operation voltage.
- Package size: 3.2×2.5×0.95 mm.
- LVPECL output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: Fiber channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Express, SDH, SONET, Server, etc.
- RoHS Compliant / Pb-Free.



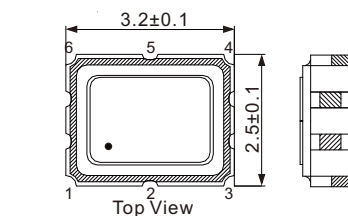
## Electrical Specifications

Item /Type	3J (SMD 3225 LVPECL Crystal Oscillator)
Output Type	LVPECL
Output Load	50 Ω to VDD-2V
Oscillation Mode	Fundamental / 3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V / VDD-1.025V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	1pS Max.

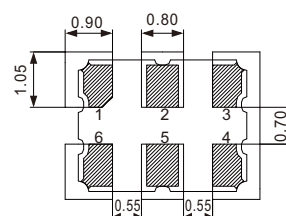
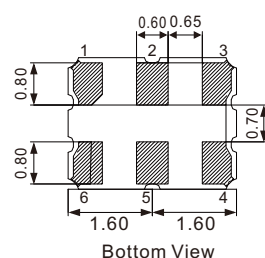
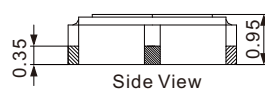
\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL or NC  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: OUTN  
 6: VDD



Top View Suggested Layout

# SMD LVDS Crystal Oscillator



Size: 3.2×2.5×0.95 mm

3D Series SMD LVDS Oscillator

## Features

- Fundamental solution or 3rd overtone solution.
- 3.3V / 2.5V operation voltage.
- Package size: 3.2×2.5×0.95 mm.
- LVDS output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: Fiber channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Express, SDH, SONET, etc.
- RoHS Compliant / Pb-Free.



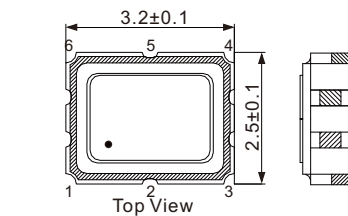
## Electrical Specifications

Item /Type	3D (SMD 3225 LVDS Crystal Oscillator)
Output Type	LVDS
Output Load	100 Ω
Oscillation Mode	Fundamental / 3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0.9V / 1.6V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	1pS Max.

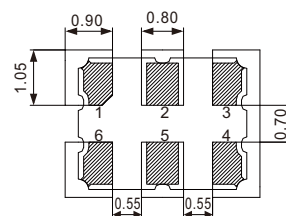
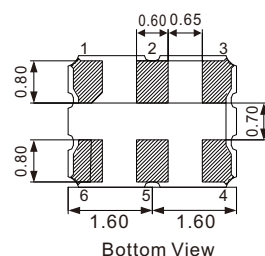
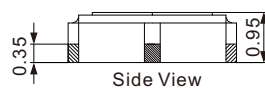
\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL or NC  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: OUTN  
 6: VDD



Top View Suggested Layout

# SMD HCSL Crystal Oscillator

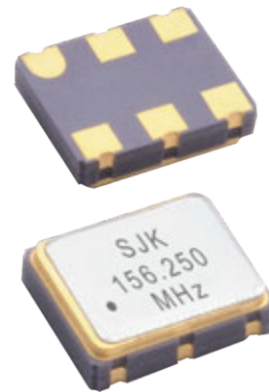


Size: 3.2×2.5×0.95 mm

3H Series SMD HCSL Oscillator

## Features

- Package size: 3.2×2.5×0.95mm.
- 3rd overtone solution.
- 3-state function.
- 3.3V and 2.5V operation available.
- HCSL output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- PCI-Express, PC, Peripherals, Server, SAS, SATA and other high-Speed interface applications.
- Low current consumption.
- RoHS Compliant / Pb-Free.



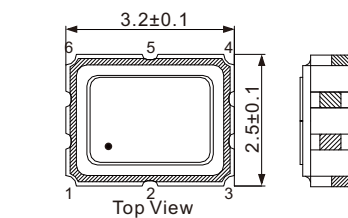
## Electrical Specifications

Item /Type	3H (SMD 3225 HCSL Crystal Oscillator)
Output Type	HCSL
Output Load	50 Ω
Oscillation Mode	3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0mV /740mV
Rise(Tr) / Fall(Tf) Time(20%~80%)	0.5ns Max.
Supply Current	30mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	0.2 pS Typ. , 1.0pS Max.

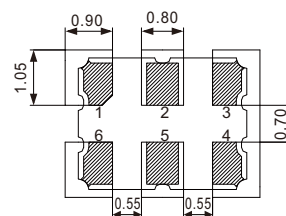
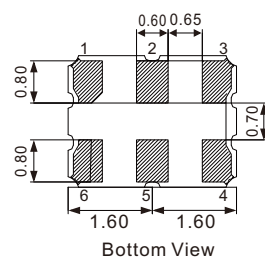
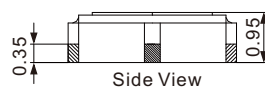
\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL or NC  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: OUTN  
 6: VDD



Top View Suggested Layout

# SMD 5032 LVPECL Crystal Oscillator



Size: 5.0×3.2×1.20 mm

5J Series SMD LVPECL Oscillator

## Features

- Fundamental /3rd overtone solution.
- 3.3V / 2.5V operation voltage.
- Package size: 5.0×3.2×1.20 mm.
- LVPECL output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: Ethernet, Server, SDH, SONET, PC, Mobile Telecommunications, etc.
- RoHS Compliant / Pb-Free.



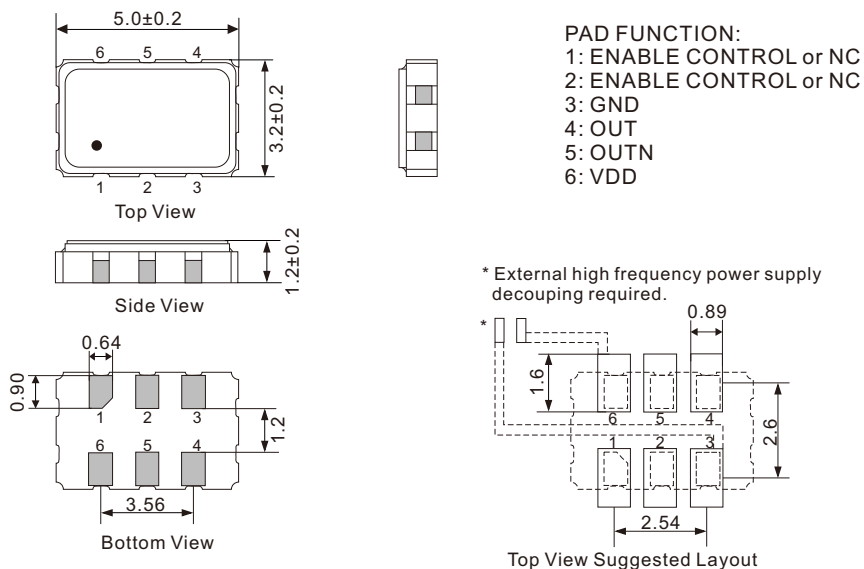
## Electrical Specifications

Item /Type	5J (SMD 5032 LVPECL Crystal Oscillator)
Output Type	LVPCEL
Output Load	50 Ω to VDD-2V
Oscillation Mode	Fundamental / 3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V / VDD-1.026V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	1pS Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

Units:mm



# SMD 5032 LVDS Crystal Oscillator



Size: 5.0×3.2×1.20 mm

5D Series SMD LVDS Oscillator

## Features

- Fundamental /3rd overtone solution.
- 3.3V / 2.5V operation voltage.
- Package size: 5.0×3.2×1.20 mm.
- LVDS output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: Ethernet, Server, SDH, SONET, PC, Mobile Telecommunications, etc.
- RoHS Compliant / Pb-Free.



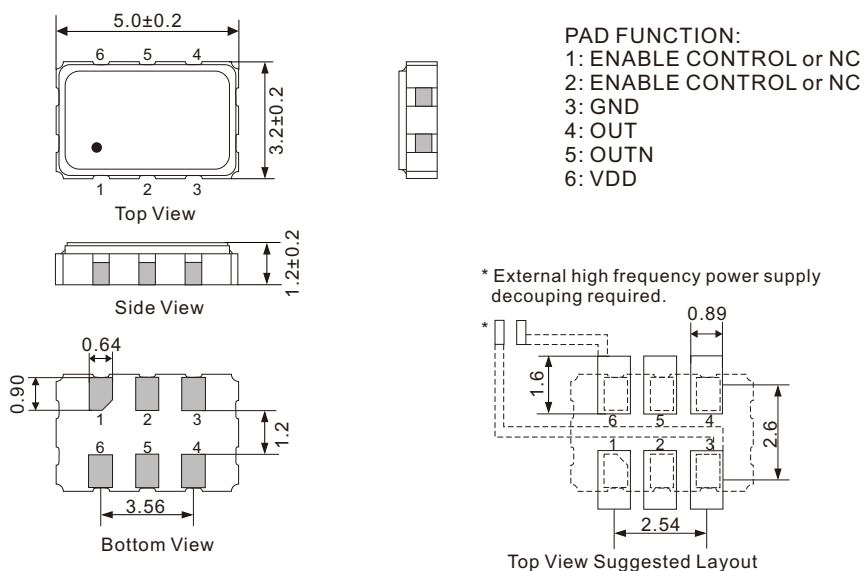
## Electrical Specifications

Item /Type	5D (SMD 5032 LVDS Crystal Oscillator)
Output Type	LVDS
Output Load	100 Ω
Oscillation Mode	Fundamental / 3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0.9V / 1.6V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	1pS Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

Units:mm





# SMD HCSL Crystal Oscillator



Size: 5.0×3.2×1.20 mm

5H Series SMD HCSL Oscillator

## Features

- 3rd overtone solution.
- 3.3V / 2.5V operation voltage.
- Package size: 5.0×3.2×1.20 mm.
- HCSL output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: PCI-Express, SAS, SATA, High speed network, Telecommunications, etc.
- RoHS Compliant / Pb-Free.



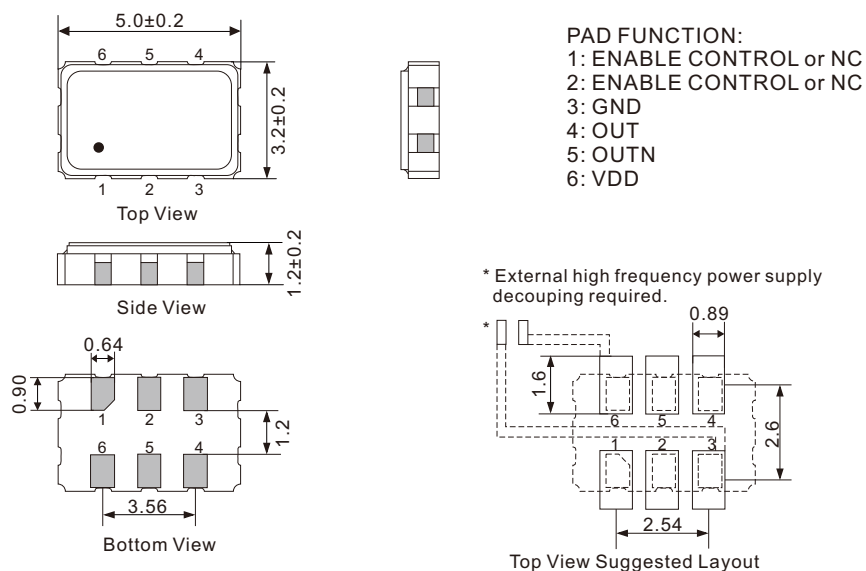
## Electrical Specifications

Item /Type	5H (SMD 5032 HCSL Crystal Oscillator)
Output Type	HCSL
Output Load	50 Ω
Oscillation Mode	3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0mV / 740mV
Rise(Tr) / Fall(Tf) Time(20%~80%)	0.5ns Max.
Supply Current	30mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	0.2pS Typ. , 1.0pS Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

Units:mm



# SMD 7050 LVPECL Crystal Oscillator

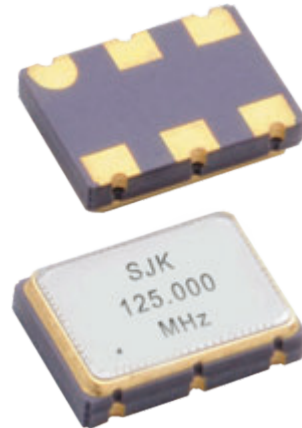


Size: 7.0×5.0×1.30 mm

7J Series SMD LVPECL Oscillator

## Features

- Fundamental /3rd overtone/PLL solution.
- 3.3V / 2.5V operation voltage.
- Package size: 7.0×5.0×1.30 mm.
- LVPECL output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: Ethernet, Server, SDH, SONET, PC, Mobile Telecommunications, etc.
- RoHS Compliant / Pb-Free.



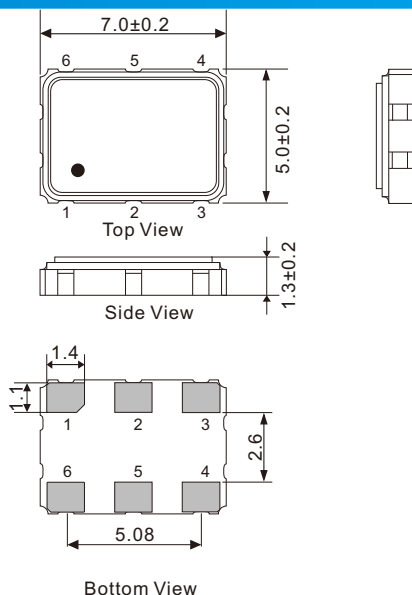
## Electrical Specifications

Item /Type	7J (SMD 7050 LVPECL Crystal Oscillator)		
Output Type	LVPECL		
Output Load	50 Ω to VDD-2V	50 Ω to VDD-2V	50 Ω to VDD-2V
Oscillation Mode	Fundamental	3rd Overtone	PLL
Supply voltage	2.5V, 3.3V		
Frequency range	25MHz~200MHz		75MHz~700MHz
Overall Frequency Stability*	±50ppm, or specify		
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify		
Storage Temperature Range	-55~+125°C		
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V / VDD-1.026V		
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.		
Supply Current	80mA Max.	99mA Max.	
Symmetry	45~55%		
Start-up Time	10ms Max.		
Phase Jitter(12KHz~20MHz)	1pS Max.		

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

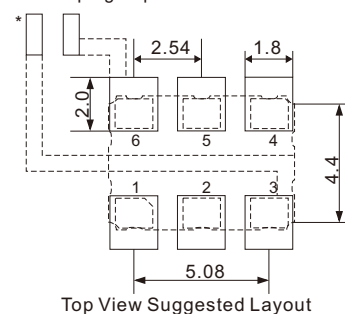
Units:mm



### PAD FUNCTION:

- 1: ENABLE CONTROL or NC
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: OUTN
- 6: VDD

\* External high frequency power supply decoupling required.



# SMD 7050 LVDS Crystal Oscillator

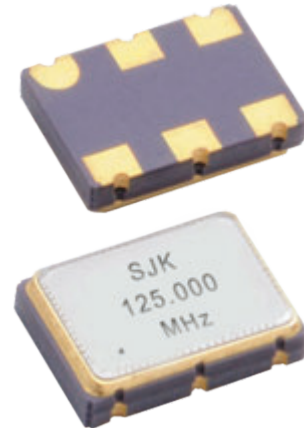


Size: 7.0×5.0×1.30 mm

7B Series SMD LVDS Oscillator

## Features

- Fundamental /3rd overtone/PLL solution.
- 3.3V / 2.5V operation voltage.
- Package size: 7.0×5.0×1.30 mm.
- LVDS output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: Ethernet, Server, SDH, SONET, PC, Mobile Telecommunications, etc.
- RoHS Compliant / Pb-Free.



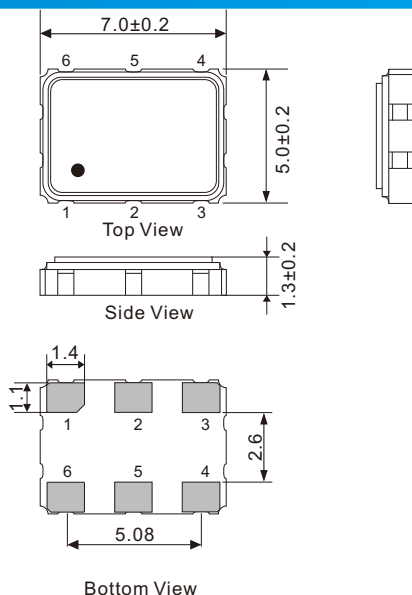
## Electrical Specifications

Item /Type	7B (SMD 7050 LVDS Crystal Oscillator)		
Output Type	LVDS		
Output Load	100Ω	100Ω	100Ω
Oscillation Mode	Fundamental	3rd Overtone	PLL
Supply voltage	2.5V, 3.3V		
Frequency range	25MHz~200MHz		75MHz~700MHz
Overall Frequency Stability*	±50ppm, or specify		
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify		
Storage Temperature Range	-55~+125°C		
Voltage Vol (Typ.) / Voh (Typ.)	0.9V / 1.6V		
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.		
Supply Current	80mA Max.	99mA Max.	
Symmetry	45~55%		
Start-up Time	10ms Max.		
Phase Jitter(12KHz~20MHz)	1pS Max.		

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

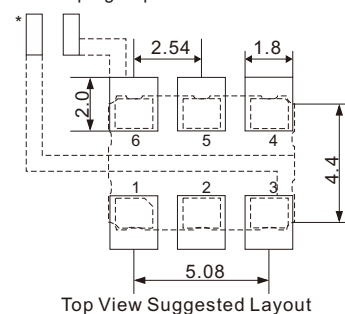
Units:mm



### PAD FUNCTION:

- 1: ENABLE CONTROL or NC
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: OUTN
- 6: VDD

\* External high frequency power supply decoupling required.



# SMD 7050 HCSL Crystal Oscillator

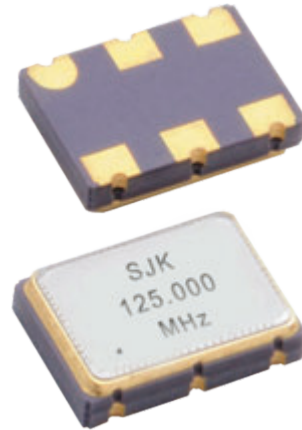


Size: 7.0×5.0×1.30 mm

7H Series SMD HCSL Oscillator

## Features

- 3rd overtone solution.
- 3.3V / 2.5V operation voltage.
- Package size: 7.0×5.0×1.30 mm.
- HCSL output, output frequencies 25MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: PCI-Express, SAS, SATA, High speed network interface applications , Telecommunications, etc.
- RoHS Compliant / Pb-Free.



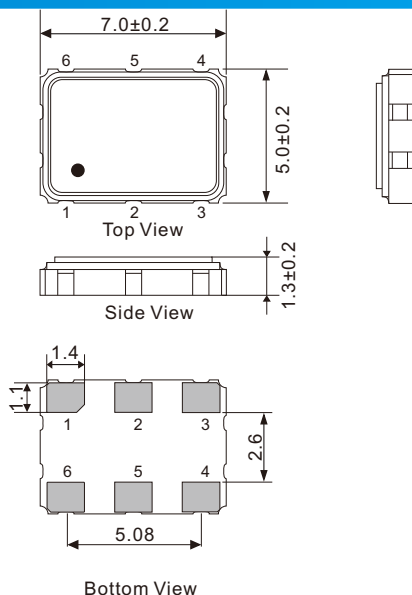
## Electrical Specifications

Item /Type	7H (SMD 7050 HCSL Crystal Oscillator)
Output Type	HCSL
Output Load	50 Ω
Oscillation Mode	3rd Overtone
Supply voltage	2.5V, 3.3V
Frequency range	25MHz~200MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0mV / 740mV
Rise(Tr) / Fall(Tf) Time(20%~80%)	0.5ns Max.
Supply Current	30mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Phase Jitter(12KHz~20MHz)	0.2pS Typ. , 1.0pS Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

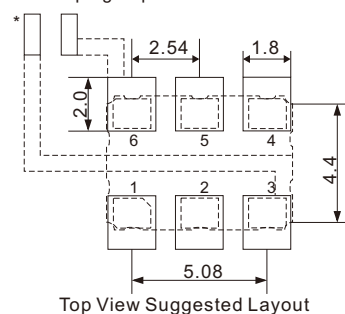
## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL or NC  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: OUTN  
 6: VDD

\* External high frequency power supply decoupling required.



# SMD LVPECL Crystal Oscillator

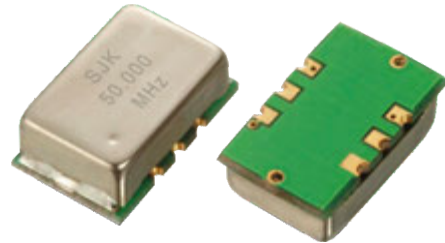


Size: 14.0×9.0×5.4 mm

9J Series SMD OSC

## Features

- Surface mount package.
- 3.3V and 2.5V operation available.
- LVDS, LVPECL Output, output frequencies 25MHz to 700MHz.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Fibre channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Expree, SDH, SONET, etc.
- Excellent low phase noise and jitter.
- RoHS Compliant / Pb-Free.



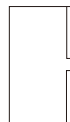
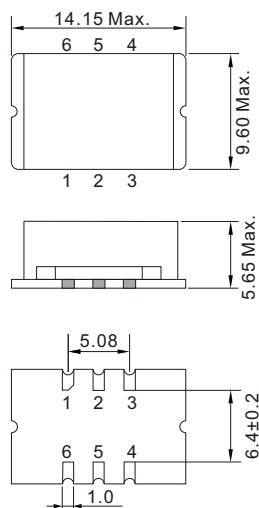
## Electrical Specifications

Item /Type	9J (9J Series SMD Crystal Oscillator)
Output Type	LVPECL
Output Load	50Ω to VDD-2V
Oscillation Mode	Fundamental /3rd Overtone /PLL
Supply Voltage (VDD)	2.5V, 3.3V
Frequency Range	25 ~ 700 MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.
Supply Current	80mA Max.
Symmetry	45~45%
Start-up Time	10ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.
Product Size	14.0×9.0×5.4 mm

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

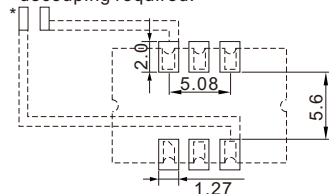
Units:mm



### PAD FUNCTION:

- 1: ENABLE CONTROL or NC
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: NC
- 6: VDD

\* External high frequency power supply decoupling required.



# SMD LVDS Crystal Oscillator

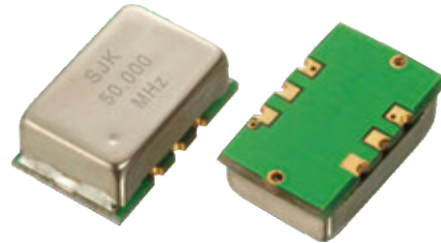


Size: 14.0×9.0×5.4 mm

9D Series SMD OSC

## Features

- Surface mount package.
- 3.3V and 2.5V operation available.
- LVDS, LVPECL Output, output frequencies 25MHz to 700MHz.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Fibre channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Expree, SDH, SONET, etc.
- Excellent low phase noise and jitter.
- RoHS Compliant / Pb-Free.



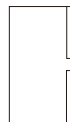
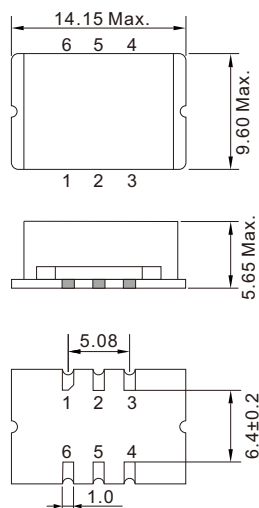
## Electrical Specifications

Item /Type	9D (9D Series SMD Crystal Oscillator)
Output Type	LVDS
Output Load	100Ω
Oscillation Mode	Fundamental /3rd Overtone /PLL
Supply Voltage (VDD)	2.5V, 3.3V
Frequency Range	25 ~ 700 MHz
Overall Frequency Stability*	±50ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Rise(Tr) / Fall(Tf) Time(20%~80%)	1ns Max.
Supply Current	80mA Max.
Symmetry	45~45%
Start-up Time	10ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.
Product Size	14.0×9.0×5.4 mm

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

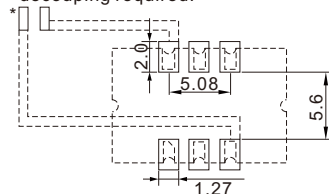
Units:mm



### PAD FUNCTION:

- 1: ENABLE CONTROL or NC
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: NC
- 6: VDD

\* External high frequency power supply decoupling required.



## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental solution.
- Package size: 3.2×2.5×0.95 mm.
- CMOS output, output frequencies 50MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.
- RoHS Compliant / Pb-Free.



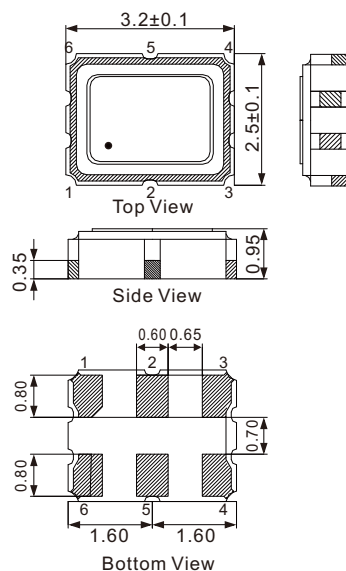
## Electrical Specifications

Item /Type	3S (SMD 3225 VCXO)
Output Type	CMOS
Output Load	15pF, or specify
Oscillation Mode	Fundamental
Supply voltage	3.3V
Frequency range	50MHz~200MHz
Frequency Stability*	±25ppm, ±50ppm, ±100ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time(20%~80%)	5nS Max.
Supply Current	60mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Absolute Pulling Range (APR)*	±50ppm Min., or specify
Nominal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10% Max.
Phase Jitter(12KHz~20MHz)	1pS Max

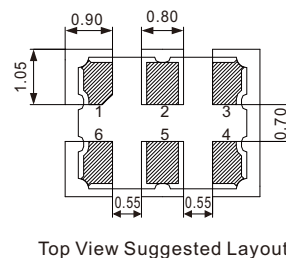
\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

## Dimensions

Units:mm



PAD FUNCTION:  
 1: CONTROL VOLTAGE  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: NC  
 6: VDD



# SMD 3225 LVPECL VCXO

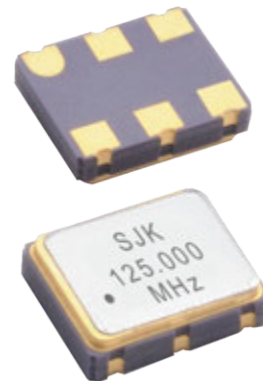


Size: 3.2×2.5×0.95 mm

3P Series SMD 3225 VCXO

## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental solution.
- Package size: 3.2×2.5×0.95 mm.
- LVPECL output, output frequencies 50MHz to 200MHz.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.
- RoHS Compliant / Pb-Free.



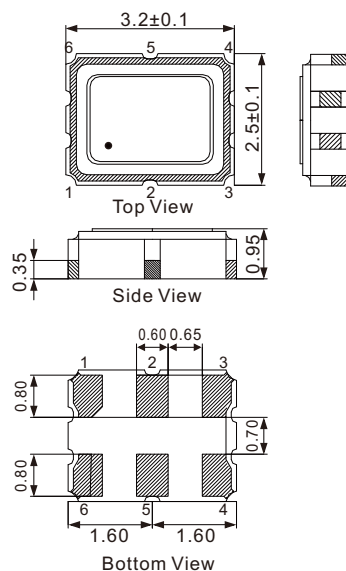
## Electrical Specifications

Item /Type	3P (SMD 3225 VCXO)
Output Type	LVPECL
Output Load	50Ω to VDD-2V
Oscillation Mode	Fundamental
Supply voltage	3.3V
Frequency range	50MHz~200MHz
Frequency Stability*	±25ppm, ±50ppm, ±100ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V / VDD-1.025V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1nS Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
Absolute Pulling Range (APR)*	±50ppm Min., or specify
Nominal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10% Max.
Phase Jitter(12KHz~20MHz)	1pS Max

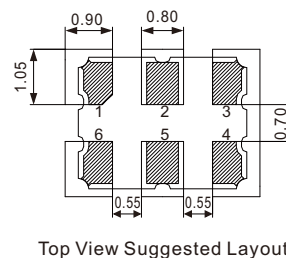
\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

## Dimensions

Units:mm



PAD FUNCTION:  
 1: CONTROL VOLTAGE  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: NC  
 6: VDD





## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental solution.
- Package size: 5.0×3.2×1.2 mm.
- CMOS output, output frequencies 50MHz to 200MHz.
- Wide pull range and good linearity.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.



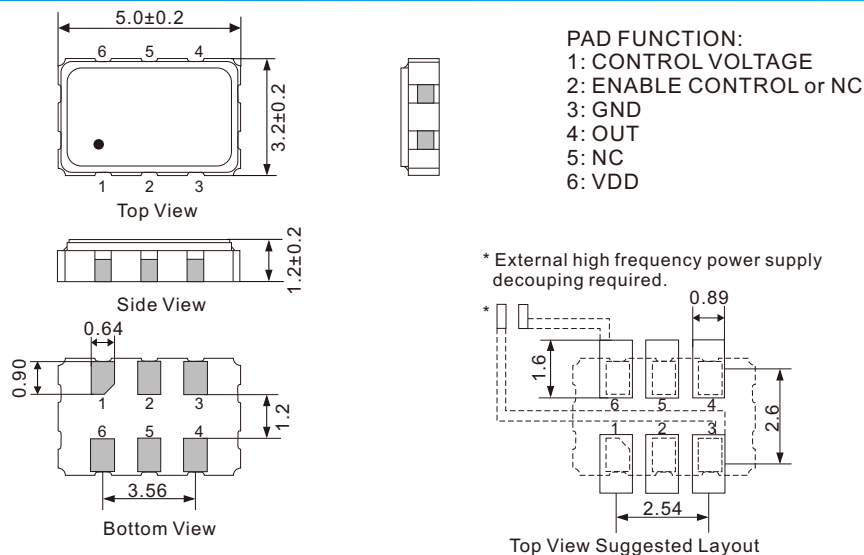
## Electrical Specifications

Item /Type	5S (SMD 5032 VCXO)
Output Type	CMOS
Output Load	15pF, or specify
Oscillation Mode	Fundamental
Supply voltage	3.3V
Frequency range	50MHz~200MHz
Frequency Stability*	±25ppm, ±50ppm, ±100ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time(20%~80%)	5nS Max.
Supply Current	60mA Max.
Symmetry	45~55%
Start-up Time	10mS Max.
Absolute Pulling Range (APR)*	±50ppm Min., or specify
Nominal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10% Max.
Phase Jitter(12KHz~20MHz)	1pS Max

\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

## Dimensions

Units:mm



# SMD 5032 LVPECL VCXO



Size: 5.0×3.2×1.2 mm

5P Series SMD 5032 VCXO

## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental solution.
- Package size: 5.0×3.2×1.2 mm.
- LVPECL /LVDS output, output frequencies 50MHz to 200MHz.
- Wide pull range and good linearity.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.



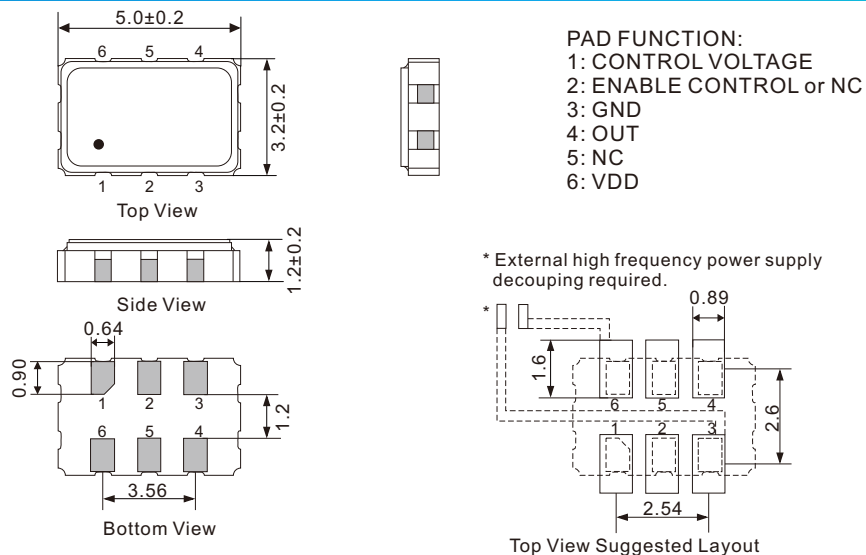
## Electrical Specifications

Item /Type	5P (SMD 5032 VCXO)
Output Type	LVPECL
Output Load	50Ω to VDD-2V
Oscillation Mode	Fundamental
Supply voltage	3.3V
Frequency range	50MHz~200MHz
Frequency Stability*	±25ppm, ±50ppm, ±100ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V /VDD-1.025V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1nS Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10mS Max.
Absolute Pulling Range (APR)*	±50ppm Min., or specify
Nominal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10% Max.
Phase Jitter(12KHz~20MHz)	1pS Max

\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

## Dimensions

Units:mm



## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental solution.
- Package size: 5.0×3.2×1.2 mm.
- LVPECL /LVDS output, output frequencies 50MHz to 200MHz.
- Wide pull range and good linearity.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.



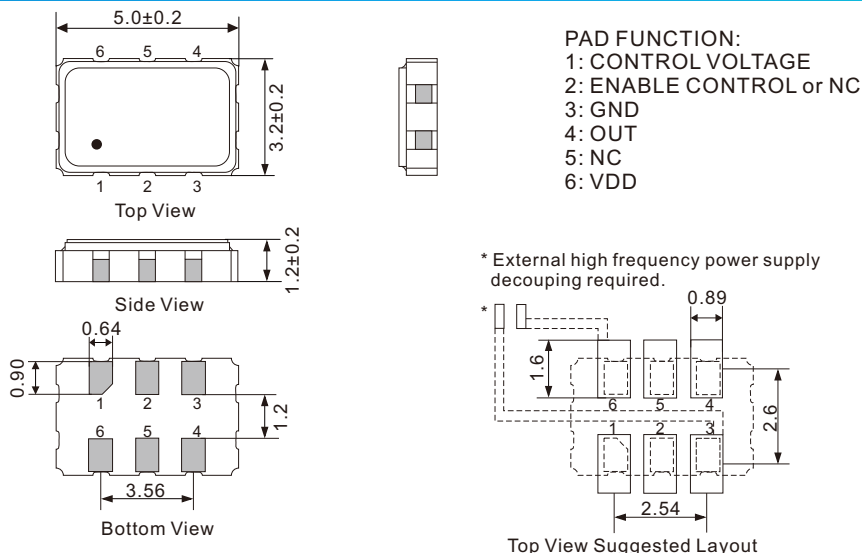
## Electrical Specifications

Item /Type	5V (SMD 5032 VCXO)
Output Type	LVDS
Output Load	100Ω
Oscillation Mode	Fundamental
Supply voltage	3.3V
Frequency range	50MHz~200MHz
Frequency Stability*	±25ppm, ±50ppm, ±100ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Typ.) / Voh (Typ.)	0.9V /1.6V
Rise(Tr) / Fall(Tf) Time(20%~80%)	1nS Max.
Supply Current	80mA Max.
Symmetry	45~55%
Start-up Time	10mS Max.
Absolute Pulling Range (APR)*	±50ppm Min., or specify
Nominal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10% Max.
Phase Jitter(12KHz~20MHz)	1pS Max

\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

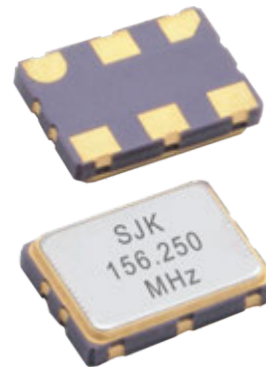
## Dimensions

Units:mm



## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental solution.
- Package size: 7.0×5.0×1.3 mm.
- CMOS output, output frequencies 50MHz to 200MHz.
- Wide pull range and good linearity.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.
- RoHS Compliant / Pb-Free.



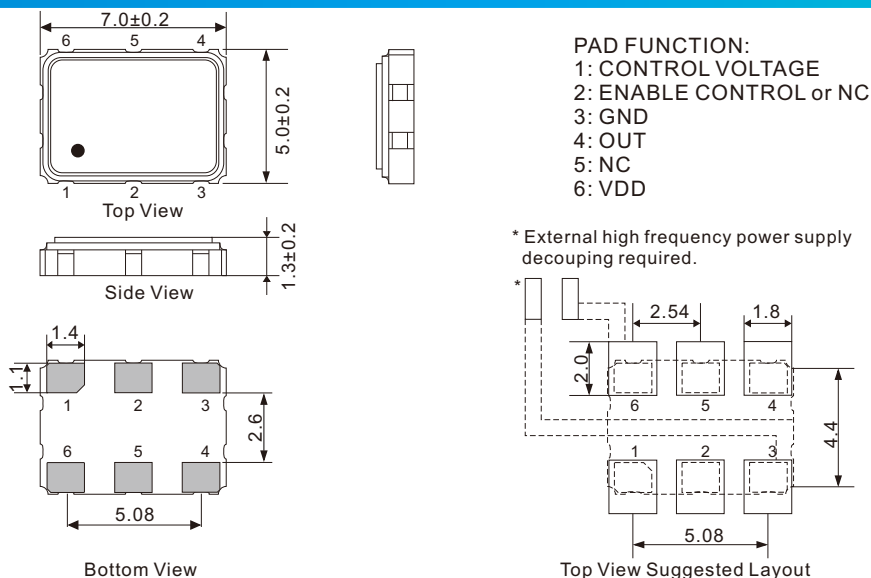
## Electrical Specifications

Item /Type	6S (SMD 7050 VCXO)	
Output Type	CMOS	
Output Load	15pF~30pF	15pF or specify
Oscillation Mode	Fundamental	
Supply voltage	3.3V, 5V	3.3V
Frequency range	1MHz~59MHz	50MHz~200MHz
Frequency Stability*	±25ppm, ±50ppm, ±100ppm	
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range	-55~+125°C	
Voltage Vol (Typ.) / Voh (Typ.)	0.1VDD / 0.9VDD	
Rise(Tr) / Fall(Tf) Time(20%~80%)	5nS Max.	
Supply Current	10~45mA Max.	60mA Max.
Symmetry	40~60%, 45~55%	45~55%
Start-up Time	10ms Max.	
Absolute Pulling Range (APR)*	±50ppm Min. or specify	
Nominal Control Voltage	0.5VDD	
Control Voltage Range	0~VDD	
Linearity	10% Max.	
Phase Jitter(12KHz~20MHz)	1pS Max	

\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging.)

## Dimensions

Units:mm



# SMD 7050 LVPECL VCXO

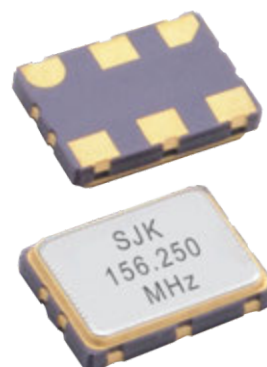


Size: 7.0×5.0×1.3mm

7P Series SMD 7050 VCXO

## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental /PLL solution.
- Package size: 7.0×5.0×1.3 mm.
- LVPECL output, output frequencies 50MHz to 700MHz.
- Wide pull range and good linearity.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.
- RoHS Compliant / Pb-Free.



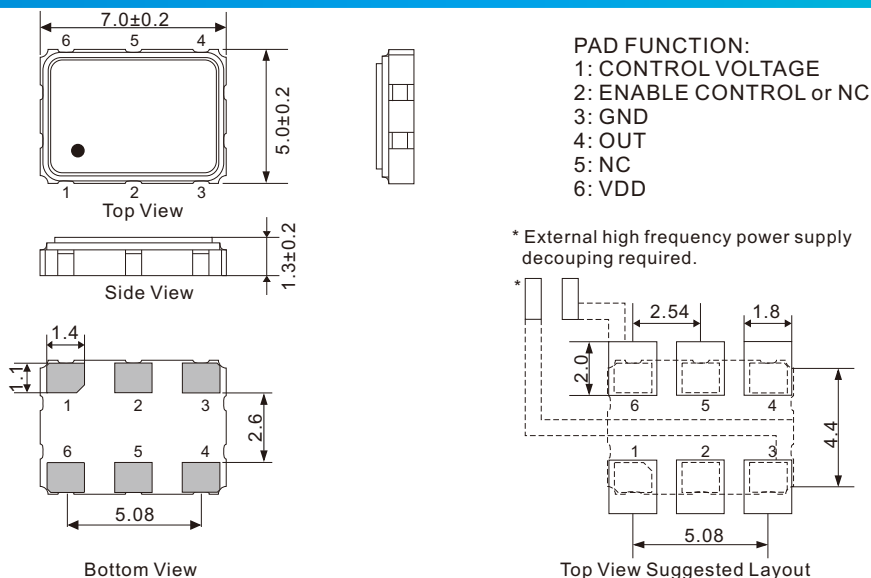
## Electrical Specifications

Item /Type	7P (SMD 7050 VCXO)		
Output Type	LVPECL		
Output Load	50Ω to VDD-2V	50Ω to VDD-2V	100Ω
Oscillation Mode	Fundamental	PLL	Multiplier
Frequency range	50MHz~200MHz	60MHz~700MHz	200MHz~700MHz
Supply voltage	3.3V		
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify		
Storage Temperature Range	-55~+125°C		
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V /VDD-1.025V		
Rise(Tr) / Fall(Tf) Time(20%~80%)	1nS Max.		
Supply Current	80mA Max.	99mA Max.	80mA Max.
Symmetry	45~55%		
Start-up Time	10ms Max.		
Absolute Pulling Range (APR)*	±50ppm Min., or specify		
Nominal Control Voltage	0.5VDD		
Control Voltage Range	0~VDD		
Linearity	10% Max.		
Phase Jitter(12KHz~20MHz)	1pS Max	1pS Max	±10pS Max

\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

## Dimensions

Units:mm



## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Fundamental /PLL solution.
- Package size: 7.0×5.0×1.3 mm.
- LVPECL output, output frequencies 50MHz to 700MHz.
- Wide pull range and good linearity.
- Excellent low phase noise and jitter.
- 3-state function available.
- Automatic mounting and reflow soldering.
- Applications: SDH, SONET, Ethernet, Base Stations, Femtocell, Satellite, etc.
- RoHS Compliant / Pb-Free.



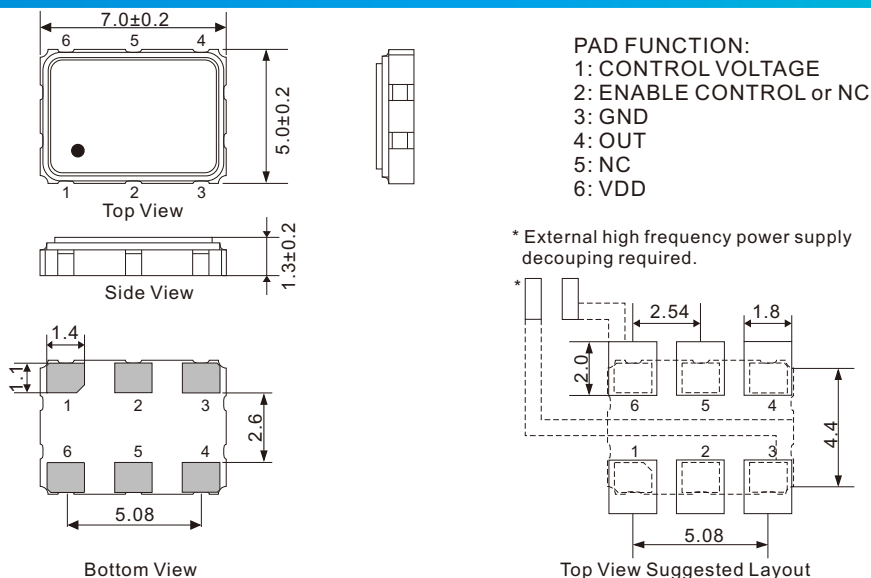
## Electrical Specifications

Item /Type	6V (SMD 7050 VCXO)	
Output Type	LVDS	
Output Load	100Ω	
Oscillation Mode	Fundamental	PLL
Frequency range	50MHz~200MHz	60MHz~700MHz
Supply voltage	3.3V	
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range	-55~+125°C	
Voltage Vol (Typ.) / Voh (Typ.)	VDD-1.62V /VDD-1.025V	
Rise(Tr) / Fall(Tf) Time(20%~80%)	1nS Max.	
Supply Current	80mA Max.	99mA Max.
Symmetry	45~55%	
Start-up Time	10ms Max.	
Absolute Pulling Range (APR)*	±50ppm Min., or specify	
Nominal Control Voltage	0.5VDD	
Control Voltage Range	0~VDD	
Linearity	10% Max.	
Phase Jitter(12KHz~20MHz)	±10pS Max	1pS Max

\* APR=(Pull Range)-(Frequency tolerance at 25°C, variation over temperature, supply voltage variation, and aging. )

## Dimensions

Units:mm



# SMD CMOS Output VCXO

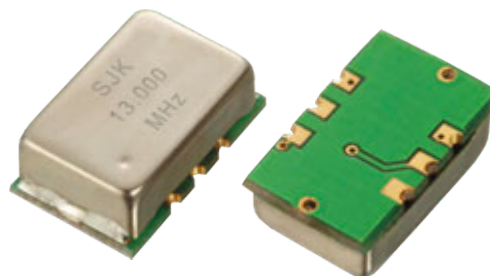


Size: 14.0×9.0×5.4 mm

9S Series SMD VCXO

## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Standard 14.0×9.0 mm PCB package.
- Meet Pb free high temperature SMT reflow soldering profile.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Fibre channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Expree, SDH, SONET, etc.
- Excellent low phase noise and jitter.
- RoHS Compliant / Pb-Free.



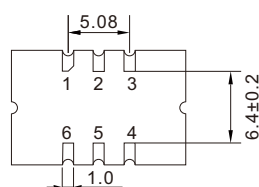
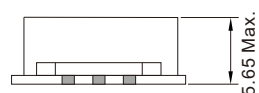
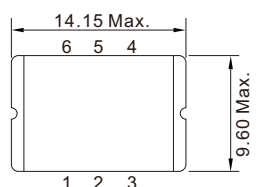
## Electrical Specifications

Item /Type	9S (9S Series SMD VCXO)
Output Type	CMOS
Output Load	15pF or specify
Oscillation Mode	Fundamental
Supply Voltage	3.3V
Frequency Range	50 ~ 700 MHz
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Rise(Tr) / Fall(Tf) Time(20%~80%)	5ns Max.
Symmetry	45~45%
Start-up Time	10ms Max.
Absolute Pulling Range(APR)*	±50ppm, ±10ppm Min. or specify
Norminal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

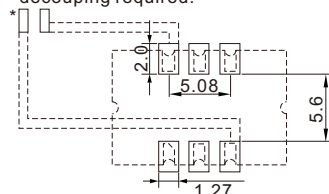
Units:mm



### PAD FUNCTION:

- 1: CONTROL VOLTAGE
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: NC
- 6: VDD

\* External high frequency power supply decoupling required.



# SMD LVPECL Output VCXO

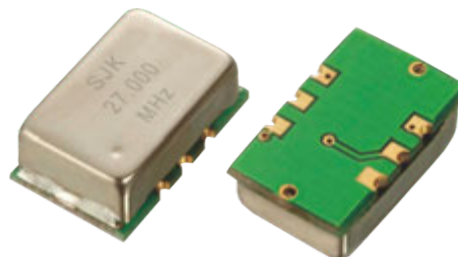


Size: 14.0×9.0×5.4 mm

9P Series SMD VCXO

## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Standard 14.0×9.0 mm PCB package.
- Meet Pb free high temperature SMT reflow soldering profile.
- LVPECL output VCXO.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Fibre channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Expree, SDH, SONET, etc.
- Excellent low phase noise and jitter.
- RoHS Compliant / Pb-Free.



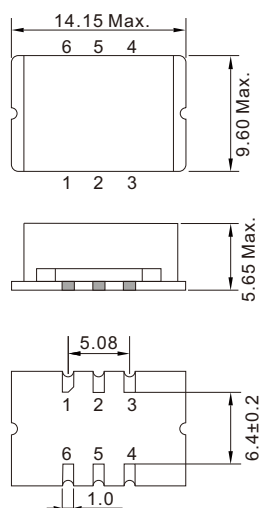
## Electrical Specifications

Item /Type	9P (9P Series SMD VCXO)
Output Type	LVPECL
Output Load	50Ω to VDD-2V
Oscillation Mode	Fundamental
Supply Voltage	3.3V
Frequency Range	50 ~ 700 MHz
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Rise(Tr) / Fall(Tf) Time(20%~80%)	5ns Max.
Symmetry	45~45%
Start-up Time	10ms Max.
Absolute Pulling Range(APR)*	±50ppm, ±10ppm Min. or specify
Norminal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

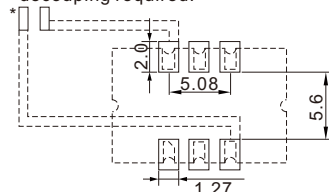
## Dimensions

Units:mm



PAD FUNCTION:  
 1: CONTROL VOLTAGE  
 2: ENABLE CONTROL or NC  
 3: GND  
 4: OUT  
 5: NC  
 6: VDD

\* External high frequency power supply decoupling required.





# SMD LVDS Output VCXO



Size: 14.0×9.0×5.4 mm

9V Series SMD VCXO

## Features

- Voltage Controlled Crystal Oscillator (VCXO).
- Standard 14.0×9.0 mm PCB package.
- Meet Pb free high temperature SMT reflow soldering profile.
- LVDS Output VCXO.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Fibre channel, Gigabit ethernet, Serial ATA, Serial attached SCSI, PCI-Expree, SDH, SONET, etc.
- Excellent low phase noise and jitter.
- RoHS Compliant / Pb-Free.



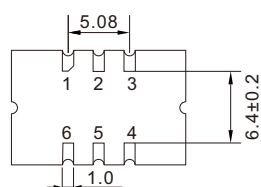
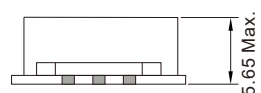
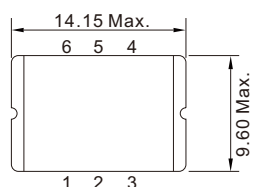
## Electrical Specifications

Item /Type	9V (9V Series SMD VCXO)
Output Type	LVDS
Output Load	100Ω
Oscillation Mode	Fundamental
Supply Voltage	3.3V
Frequency Range	50 ~ 700 MHz
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Rise(Tr) / Fall(Tf) Time(20%~80%)	5ns Max.
Symmetry	45~45%
Start-up Time	10ms Max.
Absolute Pulling Range(APR)*	±50ppm, ±10ppm Min. or specify
Norminal Control Voltage	0.5VDD
Control Voltage Range	0~VDD
Linearity	10ms Max.
Phase Jitter (12KHz~20MHz)	1ps Max.

\* Inclusive of frequency tolerance at 25°C, variation over temperature, supply voltage variation, aging and vibration.

## Dimensions

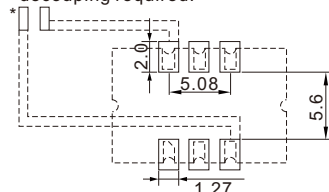
Units:mm



### PAD FUNCTION:

- 1: CONTROL VOLTAGE
- 2: ENABLE CONTROL or NC
- 3: GND
- 4: OUT
- 5: NC
- 6: VDD

\* External high frequency power supply decoupling required.



### Features

- All metal welded package.
- High precision characteristic covering up to wide frequency range from 1MHz up to 80MHz.
- 5V / 3.3V operating voltage.
- CMOS output.
- 3-state function.
- 14-Pin DIP (Full-Size Package)
- Applications: Telecommunications, Mobile communications, Avionics, Test equipments, Electronic instruments, etc.
- RoHS Compliant / Pb-Free.

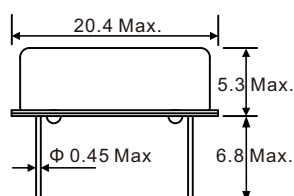
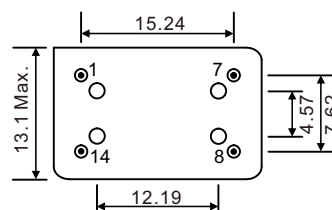
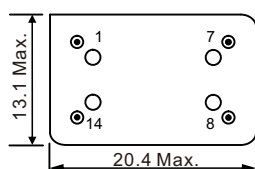


### Electrical Specifications

Item /Type		6RF (6RF Thru-Hole VCXOs)	
Output Type		CMOS	
Package		All metal, hermetically sealed, welt package	
Supply current		40mA Max.	60mA Max.
Supply Voltage		3.3V	5.0V
Frequency Range		1 ~ 80 MHz	
Frequency stability		±25ppm, ±50ppm	
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range		-55~+125°C	
Load		15pF	
	Voltage Voh	3.0V Min.	4.5V Min.
	Voltage Vol	0.3V Max.	0.4V Max.
	Current Ioh	-4.0mA	-8.0mA
	Current Iol	4.0mA	8.0mA
	Duty Cycle	40/60 Max.	
	Rise/Fall time	5ns Max.	
Frequency Control		Positive Transfer Characteristic	
	Pullability	±50ppm, ±100ppm, ±150ppm, ±200ppm Min.	
	Control Voltage	0.3Vdc to 3.0Vdc	0.5Vdc to 4.5Vdc
	Center Voltage	1.65Vdc	2.5Vdc
	Monotonic Linearity	<±15%	<±15%
	Input impedance	50K ohms Normal	50K ohms Normal
Size		20.3×12.6×5.0 mm	

### Dimensions

Units:mm



**PAD Function:**  
 1: Control Voltage  
 7: GND  
 8: Out  
 14: Vdd (5V/3.3V)

# Voltage Controlled Crystal Oscillator



Thru-hole half Size VCXOs

6RH Series Thru-hole VCXOs

## Features

- All metal welded package.
- High precision characteristic covering up to wide frequency range from 1MHz up to 80MHz.
- 5V / 3.3V operating voltage.
- CMOS output.
- 3-state function.
- 8-Pin DIP (Half-Size Package)
- Applications: Telecommunications, Mobile communications, Avionics, Test equipments, Electronic instruments, etc.
- RoHS Compliant / Pb-Free.

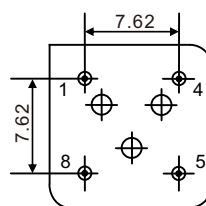
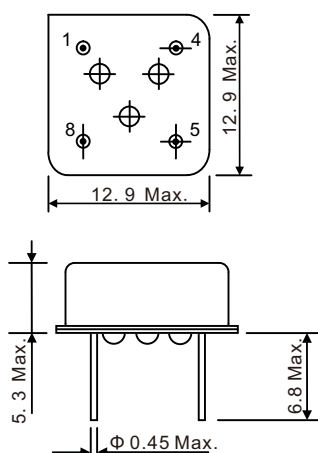


## Electrical Specifications

Item /Type		6RH (6RH Thru-Hole VCXOs)	
Output Type		CMOS	
Package		All metal, hermetically sealed, welt package	
Supply current		40mA Max.	60mA Max.
Supply Voltage		3.3V	5.0V
Frequency Range		1 ~ 80 MHz	
Frequency stability		±25ppm, ±50ppm	
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range		-55~+125°C	
Load		15pF	
	Voltage Voh	3.0V Min.	4.5V Min.
	Voltage Vol	0.3V Max.	0.4V Max.
	Current Ioh	-4.0mA	-8.0mA
	Current Iol	4.0mA	8.0mA
	Duty Cycle	40/60 Max.	
	Rise/Fall time	5ns Max.	
Frequency Control		Positive Transfer Characteristic	
	Pullability	±50ppm, ±100ppm, ±150ppm, ±200ppm Min.	
	Control Voltage	0.3Vdc to 3.0Vdc	0.5Vdc to 4.5Vdc
	Center Voltage	1.65Vdc	2.5Vdc
	Monotonic Linearity	<±15%	<±15%
	Input impedance	50K ohms Normal	50K ohms Normal
Size		12.6×12.6×5.0 mm	

## Dimensions

Units:mm



**PAD Function:**  
 1: Control Voltage  
 4: GND  
 5: Out  
 8: Vdd (5V/3.3V)

## Features

- 2016 size, 0.75mm high ultra miniature and lightweight SMD TCXO.
- Low voltage operation and low phase noise.
- Temperature Stability:  $\pm 0.5\text{ppm} \sim \pm 2.0\text{ppm}$ .
- Automatic mounting and reflow soldering.
- Voltage Control Function Available.
- Applications: GPS, WiMax, Cellular, Wireless communications, Smart Phone, etc.
- World's Thinnest Package.
- RoHS Compliant / Pb-Free.



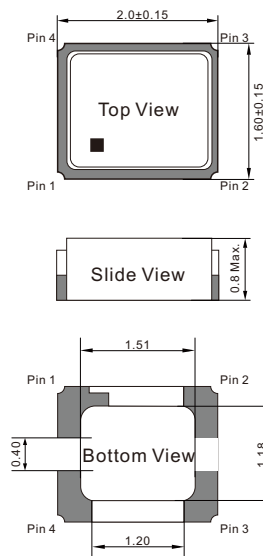
## Electrical Specifications

Item /Type		7X (SMD 2016 TCXO)
Output Type		Clipped Sinewave
Output Load		10K $\Omega$ // 10pF
Oscillation Mode		Fundamental
Supply Voltage		1.8~3.3V
Frequency Range		26 ~ 52 MHz
Clipped Sinewave Output Voltage		0.8 Vp-p Typical
Frequency Stability	Vs. Temperature (-30~+85°C)	$\pm 0.5 / \pm 2.0$ ppm
	Vs. Load (Load varies $\pm 10\%$ )	$\pm 0.2\text{ppm Max.}$
	Vs. Supply Voltage (Vcc = Typical $\pm 0.1\text{V}$ )	$\pm 0.2\text{ppm Max.}$
Frequency Tolerance	as 25°C after 2 Reflows with Typical Applied to Auto Frequency Control Pin	$\pm 2.5\text{ppm Max.}$
Slope of Frequency Drift		$\pm 0.1\text{ppm}/^\circ\text{C}$ Typical; $\pm 0.5\text{ppm}/^\circ\text{C}$ Max.
Operating Temperature Range		-30~+85°C
Auto Frequency Control (AFC)Range*		$\pm 7 \sim \pm 16\text{ppm}$ (1.4 $\pm 1\text{V}$ )
Supply Current		2.0mA Max.
Start-up Time		5ms Max.
Harmonics		-5dBc Max.
Phase Noise at 1kHz Offset		-130dBc/Hz
Aging (at 25°C)		$\pm 1\text{ppm/Year}$ Max.

\*AFC Range is selective and disable is acceptable.

## Dimensions

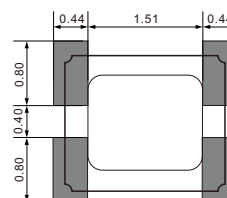
Units:mm



### Pin Connection

Name	Connection
Pin 1	AFC or GND
Pin 2	GND
Pin 3	Output
Pin 4	VCC

### Recommended Land Pattern



# SMD 2520 TCXO /VC-TCXO



Size: 2.5×2.0×0.80mm

7Q Series SMD TCXO Oscillators

## Features

- 2520 size, 0.80mm high ultra miniature and lightweight SMD TCXO.
- Low voltage operation and low phase noise.
- Temperature Stability:  $\pm 0.5\text{ppm} \sim \pm 2.0\text{ppm}$ .
- Automatic mounting and reflow soldering.
- Voltage Control Function Available.
- Applications: GPS, WiMax, Cellular, Wireless communications, Smart Phone, etc.
- Single package structure.
- RoHS Compliant / Pb-Free.



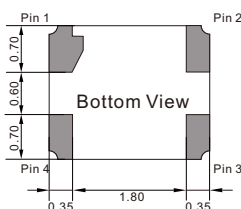
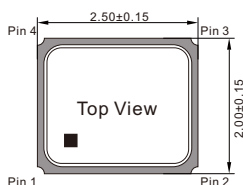
## Electrical Specifications

Item /Type		7W (SMD 2520 TCXO)
Output Type		Clipped Sinewave
Output Load		10K $\Omega$ // 10pF
Oscillation Mode		Fundamental
Supply Voltage		1.8~3.3V
Frequency Range		13 ~ 52 MHz
Clipped Sinewave Output Voltage		0.8 Vp-p Typical
Frequency Stability	Vs. Temperature (-30~+85°C)	$\pm 0.5 / \pm 2.0$ ppm
	Vs. Load (Load varies $\pm 10\%$ )	$\pm 0.2\text{ppm Max.}$
	Vs. Supply Voltage (Vcc = Typical $\pm 0.1\text{V}$ )	$\pm 0.2\text{ppm Max.}$
Frequency Tolerance	as 25°C after 2 Reflows with Typical Applied to Auto Frequency Control Pin	$\pm 2.5\text{ppm Max.}$
Slope of Frequency Drift		$\pm 0.1\text{ppm}/^\circ\text{C}$ Typical; $\pm 0.5\text{ppm}/^\circ\text{C}$ Max.
Operating Temperature Range		-30~+85°C
Auto Frequency Control (AFC)Range*		$\pm 7 \sim \pm 16\text{ppm}$ (1.4 $\pm 1\text{V}$ )
Supply Current		2.0mA Max.
Start-up Time		5ms Max.
Harmonics		-5dBc Max.
Phase Noise at 1kHz Offset		-130dBc/Hz
Aging (at 25°C)		$\pm 1\text{ppm/Year}$ Max.

\*AFC Range is selective and disable is acceptable.

## Dimensions

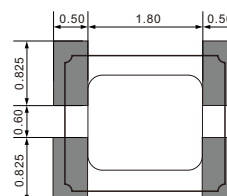
Units:mm



### Pin Connection

Name	Connection
Pin 1	AFC or GND
Pin 2	GND
Pin 3	Output
Pin 4	VCC

### Recommended Land Pattern



# SMD 3225 TCXO /VC-TCXO



Size: 3.2×2.5×1.00mm

7T Series SMD TCXO Oscillators

## Features

- 3225 size, 1.00mm high ultra miniature and lightweight SMD TCXO.
- Operating temperature range: -30~85°C.
- Temperature Stability:  $\pm 0.5\text{ppm} \sim \pm 2.0\text{ppm}$ .
- Automatic mounting and reflow soldering.
- Voltage Control Function Available.
- Applications: GPS, WiMax, Cellular, Wireless communications, Smart Phone, etc.
- Supply voltage: 1.8V~3.3V.
- RoHS Compliant / Pb-Free.



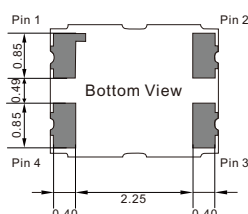
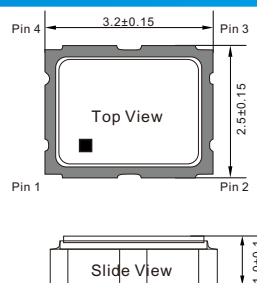
## Electrical Specifications

Item /Type		7T (SMD 3225 TCXO)
Output Type		Clipped Sinewave
Output Load		10K $\Omega$ // 10pF
Oscillation Mode		Fundamental
Supply Voltage		1.8~3.3V
Frequency Range		13 ~ 52 MHz
Clipped Sinewave Output Voltage		0.8 Vp-p Typical
Frequency Stability	Vs. Temperature (-30~+85°C)	$\pm 0.5 / \pm 2.0$ ppm
	Vs. Load (Load varies $\pm 10\%$ )	$\pm 0.2\text{ppm}$ Max.
	Vs. Supply Voltage (Vcc = Typical $\pm 0.1\text{V}$ )	$\pm 0.2\text{ppm}$ Max.
Frequency Tolerance	as 25°C after 2 Reflows with Typical Applied to Auto Frequency Control Pin	$\pm 2.5\text{ppm}$ Max.
Slope of Frequency Drift		$\pm 0.1\text{ppm}/^\circ\text{C}$ Typical; $\pm 0.5\text{ppm}/^\circ\text{C}$ Max.
Operating Temperature Range		-30~+85°C
Auto Frequency Control (AFC)Range*		$\pm 7 \sim \pm 16\text{ppm}$ (1.4 $\pm 1\text{V}$ )
Supply Current		2.0mA Max.
Start-up Time		5ms Max.
Harmonics		-5dBc Max.
Phase Noise at 1kHz Offset		-130dBc/Hz
Aging (at 25°C)		$\pm 1\text{ppm}/\text{Year}$ Max.

\*AFC Range is selective and disable is acceptable.

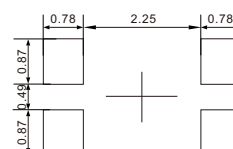
## Dimensions

Units:mm



## Pin Connection

Name	Connection
Pin 1	AFC or GND
Pin 2	GND
Pin 3	Output
Pin 4	VCC



# High Precision TCXO /VC-TCXO



Size: 5.0×3.2×1.5mm

5T Series SMD TCXO Oscillators

## Features

- CMOS and clipped sine wave output optional.
- Typical 5.0×3.2×1.5mm ceramic SMD package.
- Supply voltage: 2.7V~5.5V
- High precision for -40~+85°C, ±0.2ppm.
- Voltage control function available.
- Automatic mounting and reflow soldering.
- Applications: Base station, Femtocell, Wireless communications, Telecommunication, etc.
- High stability and high reliability.
- RoHS Compliant / Pb-Free.



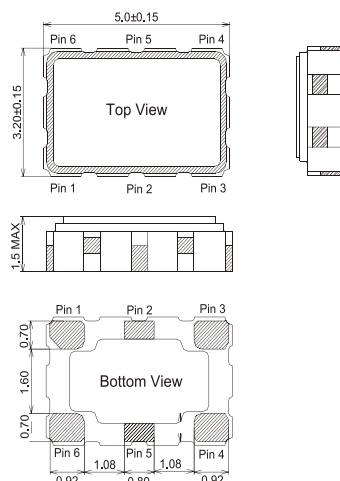
## Electrical Specifications

Item /Type		5T (SMD 5032 TCXO)	
Output Type		Clipped Sinewave	CMOS
Output Load		10KΩ /10pF	15pF
Output Voltage		0.8 Vp-p Min.	Output Low (VOL) 0.1 * Vcc Max. Output High (VOH) 0.9 * Vcc Min.
Supply Current		3.5mA Max.	6mA Max.
Oscillation Mode		Fundamental	
Supply Voltage		2.7 ~ 5.5V	
Frequency Range		5 ~ 52MHz	
Initial Frequency Tolerance at 25°C after 2 Reflows		±2.0ppm	
Frequency Tolerance	Vs. Temperature ( - 40 ~ + 85°C )	±0.2ppm	
	Vs. Load ( ±5% )	±0.1ppm	
	Vs. Supply Voltage ( ±5% )	±0.1ppm	
Storage Temperature Range		-55 ~ +125°C	
Auto Frequency Control Range (Option)		±5 ~ ±10ppm (1.5 ±1 V)	
Start-up Time		2.0ms Max.	
Harmonics		-5dBc Max.	
Phase Noise at 1KHz Offset		-145dBc/Hz	
Aging		±1ppm/Year Max.	
24 Hr Holdover Stability (Option) [#1]		±40ppb	
Free Run Stability for 20 Years (Option) [#2]		±4.6ppm	

[#1] 24 hours at constant temperature after 48 hours operation.

[#2] Inclusive of initial tolerance at 25°C, temperature, supply voltage ± 5%, load ± 5%, reflow soldering and ageing 20 years.

## Dimensions

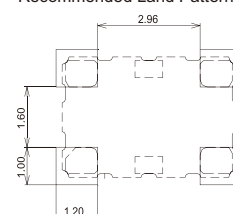


Units:mm

### Pin Connection

Name	Function
Pin 1	AFC or GND
Pin 2	NC
Pin 3	GND
Pin 4	OUTPUT
Pin 5	NC
Pin 6	VCC

### Recommended Land Pattern



# High Precision TCXO /VC-TCXO

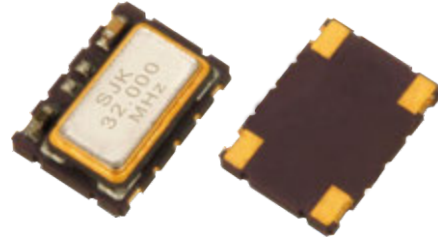


Size: 7.0×5.0×2.0mm

8T Series SMD TCXO Oscillators

## Features

- CMOS and clipped sine wave output optional.
- Typical 7.0×5.0×2.0mm ceramic SMD package.
- Supply voltage: 2.7V~5.5V
- High precision for -40~+85°C, ±0.2ppm.
- Voltage control function available.
- Automatic mounting and reflow soldering.
- Applications: Base station, Femtocell, Wireless communications, Telecommunications, etc.
- High stability and high reliability.
- RoHS Compliant / Pb-Free.



## Electrical Specifications

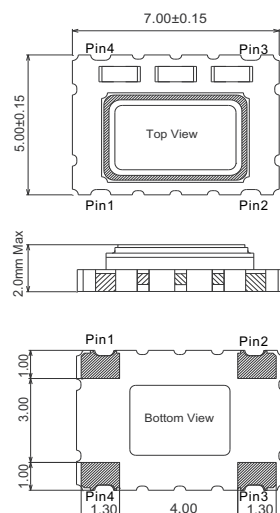
Item /Type		8T (SMD 7050 TCXO)	
Output Type		Clipped Sinewave	CMOS
Output Load		10KΩ /10pF	15pF
Output Voltage		0.8 Vp-p Min.	Output Low (VOL) 0.1 * Vcc Max. Output High (VOH) 0.9 * Vcc Min.
Supply Current		3.5mA Max.	6mA Max.
Oscillation Mode		Fundamental	
Supply Voltage		2.7 ~ 5.5V	
Frequency Range		5 ~ 52MHz	
Initial Frequency Tolerance at 25°C after 2 Reflows		±2.0ppm	
Frequency Tolerance	Vs. Temperature ( - 40 ~ + 85°C )	±0.2ppm	
	Vs. Load ( ±5% )	±0.1ppm	
	Vs. Supply Voltage ( ±5% )	±0.1ppm	
Storage Temperature Range		-55 ~ +125°C	
Auto Frequency Control Range (Option)		±5ppm (1.5 ±1 V)	
Start-up Time		2.0ms Max.	
Harmonics		-5dBc Max.	
Phase Noise at 1KHz Offset		-145dBc/Hz	
Aging		±1ppm/Year Max.	
24 Hr Holdover Stability (Option) [#1]		±40ppb	
Free Run Stability for 20 Years (Option) [#2]		±4.6ppm	

[#1] 24 hours at constant temperature after 48 hours operation.

[#2] Inclusive of initial tolerance at 25°C, temperature, supply voltage ± 5%, load ± 5%, reflow soldering and ageing 20 years.

## Dimensions

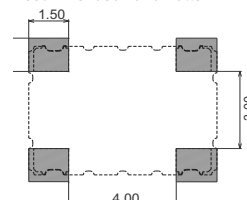
Units:mm



Pin Connection

Name	Function
Pin 1	AFC or GND
Pin 2	GND
Pin 3	OUTPUT
Pin 4	VCC

Recommended Land Pattern

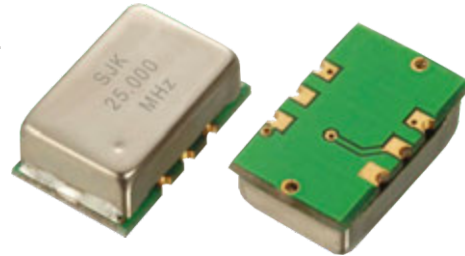




## 9T Series Temperature Compensated Crystal Oscillator

### Features

- Typical 14.3×8.7×4.9mm.
- Metal cover, FR-4 PCB based.
- Output: TTL/CMOS or Clipped Sine Wave.
- Low current option(2mA for Clipped Sine Wave).
- VC-TCXO available.
- Automatic mounting and reflow soldering.
- Applications: Marine communication, Mobile communication, Aerial radio, Satellite, Femtocell, Test equipment, Avionics, etc.
- High stability and high reliability.
- RoHS Compliant / Pb-Free.

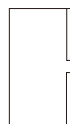
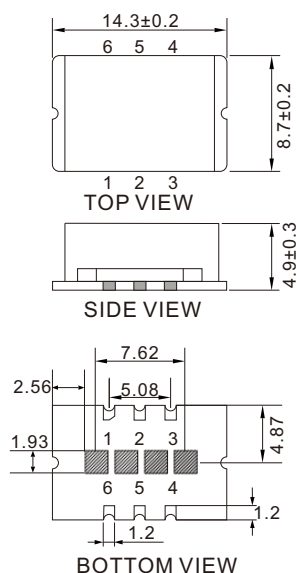


### Electrical Specifications

Item /Type		9T (Thru-Hole TCXO)	
Output Type		TTL/CMOS	Clipped Sine Wave
Output Load		15pF	10KΩ //10pF
Oscillation Mode		Fundamental	
Supply Voltage		3.3V /5.0V	
Frequency Range		5 ~ 40 MHz	
Frequency Tolerance		±2.0ppm	
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range		-55~+125°C	
Control Voltage Range (VC-TCXO)		0.5~2.5V	
Supply Current		6mA Max.	3.5mA Max.
Frequency Stability	.Vs Supply Voltage(±5%) Change	±0.3ppm Max.	
	.Vs Load(±10%) Change	±0.2ppm Max.	
	.Vs Aging (@ 1st year)	±1.0ppm Max.	
Start-up Time		2ms Max.	
Pulling Range (VC-TCXO)		±5.0ppm Min.	
Product Size		14.3×8.7×4.9 mm	

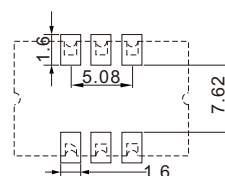
### Dimensions

Units:mm



**PAD FUNCTION:**  
 1: Voltage Control / NC  
 2: 3-state / NC  
 3: GND & Case  
 4: OUT  
 5: NC  
 6: Supply Voltage

### Solder Pad Layout



### Features

- Typical 20.4×12.8×7.8 mm.
- Compatible with 14-Pin dual in line.
- 5V / 3.3V operating voltage.
- HCMOS or Clipped Sine Wave output.
- Double sealed metal case and high reliability.
- Applications: Telecommunications, Mobile communications, Avionics, Test equipments, Electronic instruments, etc.
- VC-TCXO available.
- RoHS Compliant / Pb-Free.

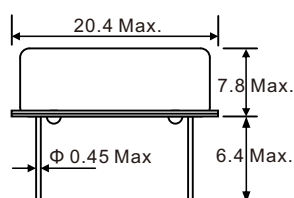
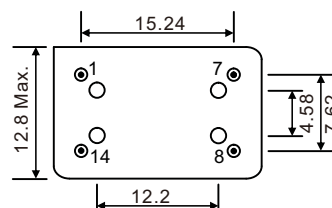
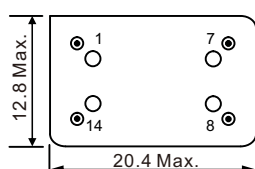


### Electrical Specifications

Item /Type		6T (Thru-Hole TCXO)	
Output Type		HCMOS	Clipped Sine Wave
Output Load		15pF	10KΩ //10pF
Output Level		0.8 Vp-p	
Supply Voltage		3.3V /5.0V	
Frequency Range		10 ~ 40 MHz	
Frequency Tolerance		±2.0ppm	
Operating Temperature Range		-20~+70°C, -40~+85°C, or specify	
Storage Temperature Range		-55~+125°C	
Supply Current			2.0mA Max.
Frequency Stability	Vs. Supply Voltage(±5%) Change	±0.2ppm Max.	
	Vs. Load(±10%) Change	±0.2ppm Max.	
	Vs. Aging (@ 1st year)	±1.0ppm Max.	
Pulling Range (VC-TCXO)			±5.0ppm Min.
Control Voltage Range (VC-TCXO)			±0.5~±2.5ppm
Start-up Time		2ms Max.	
VC input Impedance (VC-TCXO)			100KΩ Min.
Phase Noise at 13MHz	100Hz	-115dBc /Hz Typ.	
	1KHz	-135dBc /Hz Typ.	
	10KHz	-148dBc /Hz Typ.	
Product Size		20.4×12.8×7.8 mm	

### Dimensions

Units:mm



#### PAD Function:

- 1: VCON /NC
- 7: GND
- 8: Out
- 14: Vdd (5V/3.3V)

# Oven Controlled Crystal Oscillator

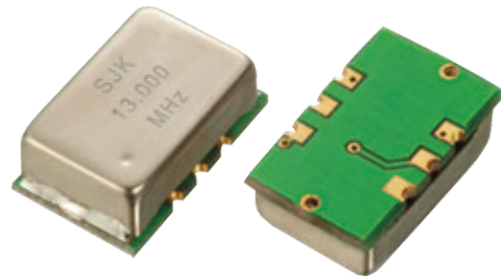


Size: 14.3×9.3×6.5 mm

9X Series SMD OCXO

## Features

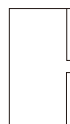
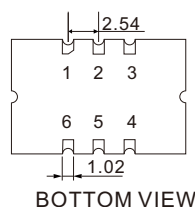
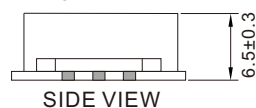
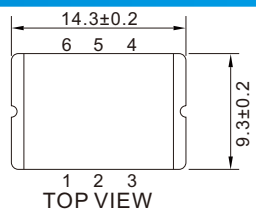
- Small size SMD OCXO 14.3×9.3×6.5mm.
- Low phase noise.
- Stratum 3 (Overall ±4.6 ppm including 10 years aging.)
- Application for Base station, Measuring equipment, Synthesizer, Digital switch, Reference Timing Circuit, etc.



## Electrical Specifications

Item /Type		9X (SMD OCXO)
Output Type		HCMOS
Output Load		15pF
Output Frequency range		5MHz~40MHz
Output Wave Form		Rectangular
Supply Voltage		3.3V / 5.0V
Operating Temperature Range		-30~+70°C, or specify
Frequency Stability	Frequency Tolerance	±0.1ppm Max.
	Vs. Temperature	±0.1ppm Max.
	Vs. Supply Voltage	±20ppb Max.
	Vs. Aging	±1.0ppm Max.
0 Level Output Voltage (Max.)		10% VDD
1 Level Output Voltage (Min.)		90% VDD
Symmetry		45~55%
Spurious		-60dBc
Warm-up		±0.1ppm (In 5 minutes @ +25°C, referenced to 1 hour)
Power Consumption (Steady state)		0.6W Max.
Phase Noise	Offset 10Hz	-90Bc/Hz
	Offset 100Hz	-115dBc/Hz
	Offset 1KHz	-135dBc/Hz
	Offset 10KHz	-145dBc/Hz
Dimension (L×W×H)		14.3×9.3×6.5 mm

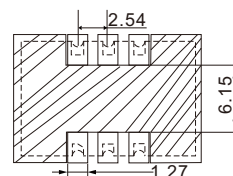
## Dimensions



Units:mm

- PAD FUNCTION:
- 1: Voltage Control / NC
  - 2: 3-state / NC
  - 3: GND & Case
  - 4: OUT
  - 5: NC
  - 6: Supply Voltage

### Solder Pad Layout



# Oven Controlled Crystal Oscillator

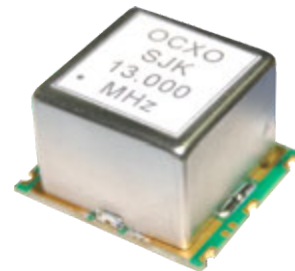


Size: 25.4×22.1×11.0 mm

5X Series SMD OCXO

## Features

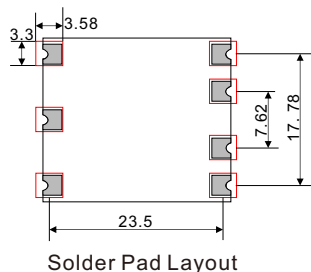
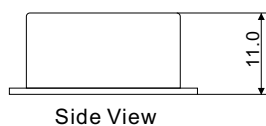
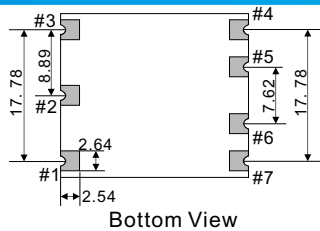
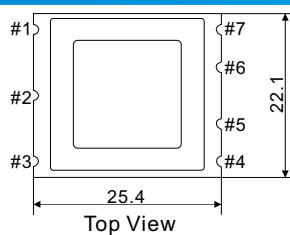
- Dimension 25.4×22.1×11.0mm.
- SC or AT Cut crystal
- Low phase noise.
- Surface Mount Package.
- Reflow soldering and automatic mounting.
- Application for Base station, Measuring equipment, Synthesizer , Digital switch , Test equipment, etc.



## Electrical Specifications

Item /Type		5X (SMD OCXO)
Output Type		HCMOS
Output Load		15pF
Output Frequency range		5MHz~40MHz
Output Wave Form		Rectangular
Supply Voltage		3.3V / 5.0V
Operating Temperature Range		-30~+70°C, or specify
Frequency Stability	Frequency Tolerance	±10ppb Max.
	Vs. Temperature	±10ppb Max.
	Vs. Supply Voltage	±0.5ppb Max.
	Vs. Aging	Daily
Yearly		±50ppb Max.
10 years		±0.4ppm Max.
0 Level Output Voltage (Max.)		10% VDD
1 Level Output Voltage (Min.)		90% VDD
Symmetry		45~55%
Spurious		-60dBc
Warm-up		±10ppb (In 5 minutes @ +25°C,referenced to 1 hour)
Power Consumption (Steady state)		1.2W Max.
Phase Noise	Offset 10Hz	-120Bc/Hz
	Offset 100Hz	-135dBc/Hz
	Offset 1KHz	-145dBc/Hz
	Offset 10KHz	-150dBc/Hz
Dimension (L×W×H)		25.4×22.1×11.0 mm

## Dimensions



PAD FUNCTION: Units:mm

- #1: Vco Input /NC
- #2: Reference Voltage /NC
- #3: +VDD
- #4: R.F Output
- #5: Oven Monitor / NC
- #6: 0 Volts & Case
- #7: 0 Volts & Case

## Features

- Dimension 20.3×12.7×11.0mm typical.
- Stratum 3(Overall ±4.6ppm including 10 years aging.)
- Low phase noise.
- Fast warm-up.
- Application for Base station, SDH/SONET, RTC clock, Synthesizer , Digital switch , Test equipment, etc.

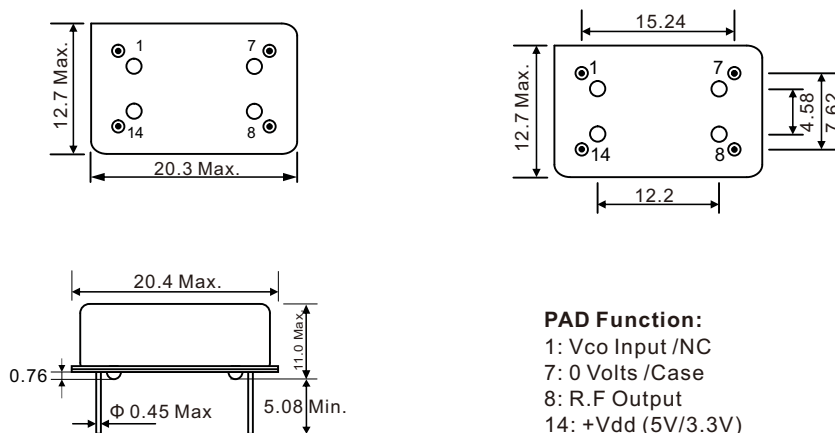


## Electrical Specifications

Item /Type		2X (Thru-Hole OCXO)
Output Type		HCMOS
Output Load		15pF
Output Frequency range		10MHz~40MHz
Output Wave Form		Rectangular
Supply Voltage		3.3V / 5.0V
Operating Temperature Range		-30~+70°C, or specify
Frequency Stability	Frequency Tolerance	±0.2ppm Max.
	Vs. Temperature	±0.2ppm Max.
	Vs. Supply Voltage	±50ppb Max.
	Vs. Aging	Daily
Yearly		±0.5ppm Max.
10 years		±3.0ppm Max.
0 Level Output Voltage (Max.)		10% VDD
1 Level Output Voltage (Min.)		90% VDD
Symmetry		45~55%
Spurious		-60dBc
Warm-up		±0.1ppm (In 2 minutes @ +25°C,referenced to 1 hour)
Power Consumption (Steady state)		0.8W Max.
Phase Noise	Offset 10Hz	-115Bc/Hz
	Offset 100Hz	-140dBc/Hz
	Offset 1KHz	-152dBc/Hz
	Offset 10KHz	-154dBc/Hz
Dimension (L×W×H)		20.3×12.7×11.0 mm

## Dimensions

Units:mm



# Oven Controlled Crystal Oscillator



Size: 25.4×25.4×12.7 mm

9M Series Thru-Hole OCXO

## Features

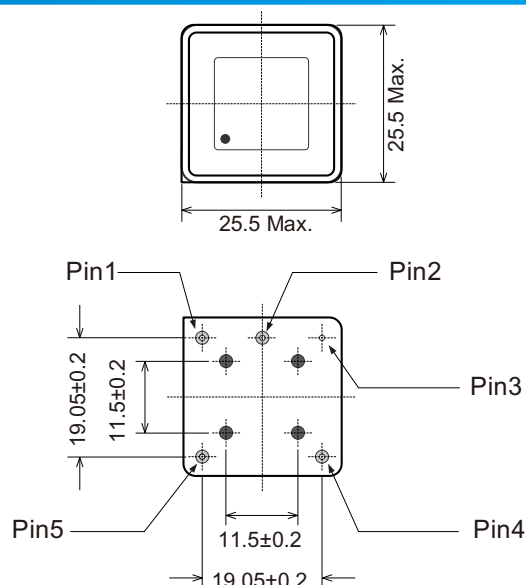
- Small size OCXO 25.4×25.4×12.7mm.
- AT-cut crystal and SC-cut crystal.
- Low phase noise.
- Voltage control(Electronic Frequency Tuning) is standard.
- Application for Base station, Measuring equipment, Synthesizer , Digital switch , Reference Timing Circuit, etc.
- RoHS Compliant.



## Electrical Specifications

Item /Type		9M (Thru-Hole OCXO)
Output Type		LVTTL /Sine Wave
Output Load		15pF
Output Frequency range		5MHz~100MHz
Frequency Control Voltage		5V±0.2V / 12V±0.5V
Supply Voltage		5.0V / 12V
Operating Temperature Range		-30~+70°C, or specify
Frequency Stability	Frequency Tolerance	±100ppb Max.
	Vs. Temperature	±20ppb Max.
	Vs. Supply Voltage	±5ppb Max.
	Vs. Aging	±10ppb Max.
0 Level Output Voltage (Max.)		10% VDD
1 Level Output Voltage (Min.)		90% VDD
Symmetry		20~80%
Frequency Adjustment Range		±0.5ppm
Power Consumption	Warm-up	3W Max.
	Steady State	1W Max.
Phase Noise	Offset 10Hz	-120Bc/Hz
	Offset 100Hz	-140dBc/Hz
	Offset 1KHz	-145dBc/Hz
	Offset 10KHz	-150dBc/Hz
Dimension (L×W×H)		25.4×25.4×12.7 mm

## Dimensions



Units:mm  
 Pin function:  
 Pin 1: Output  
 Pin 2: Ground  
 Pin 3: Vc  
 Pin 4: N.C./Vref (Option)  
 Pin 5: Vcc

# Oven Controlled Crystal Oscillator



Size: 36.3×27.2×12.7 mm

6X Series Thru-Hole OCXO

## Features

- Small size OCXO 36.3×27.2×12.7mm.
- Adobt SC-Cut resonator.
- Low phase noise.
- Stratum 3 (Overall ±4.6 ppm including 10 years aging.)
- Application for Base station, Measuring equipment, Synthesizer , Digital switch , Reference Timing Circuit, etc.
- RoHS Compliant.

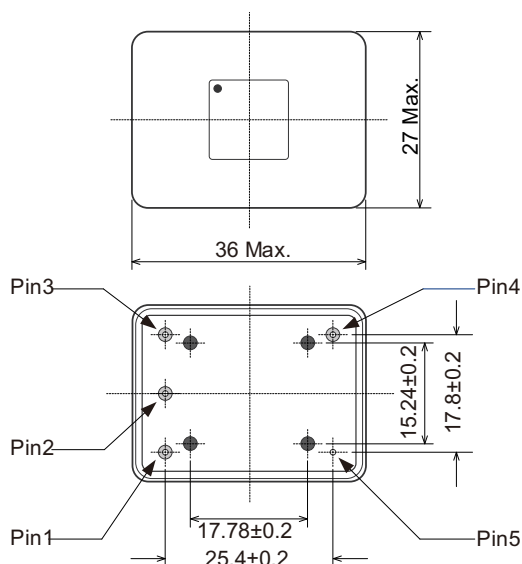


## Electrical Specifications

Item /Type		6X (Thru-Hole OCXO)
Output Type		LVTTL /Sine Wave
Output Load		15pF
Output Frequency range		5MHz~100MHz
Frequency Control Voltage		5V±0.2V / 12V±0.5V
Supply Voltage		5.0V / 12V
Operating Temperature Range		-30~+70°C, or specify
Frequency Stability	Frequency Tolerance	±100ppb Max.
	Vs. Temperature	±20ppb Max.
	Vs. Supply Voltage	±5ppb Max.
	Vs. Aging	±10ppb Max.
0 Level Output Voltage (Max.)		10% VDD
1 Level Output Voltage (Min.)		90% VDD
Symmetry		45~55%
Frequency Adjustment Range		±0.5ppm
Power Consumption	Warm-up	3W Max.
	Steady State	1W Max.
Phase Noise	Offset 10Hz	-130Bc/Hz
	Offset 100Hz	-140dBc/Hz
	Offset 1KHz	-145dBc/Hz
	Offset 10KHz	-150dBc/Hz
Dimension (L×W×H)		36.3×27.2×12.7 mm

## Dimensions

Units:mm



- Pin function:
- Pin 1: Vc
  - Pin 2: N.C./Vref (Option)
  - Pin 3: Vcc
  - Pin 4: Output
  - Pin 5: Ground

# SMD 2520 RTC Crystal Oscillator

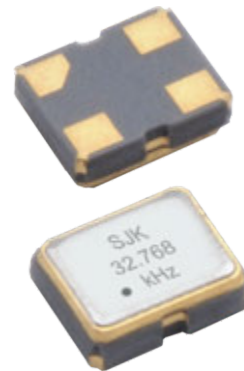


Size: 2.5×2.0×0.90 mm

2D Series SMD RTC Oscillator

## Features

- 2520 size, 0.90mm high, ultra small 32.768kHz SMD RTC oscillator in seam sealed ceramic package.
- Low voltage operation: 1.8V~3.3V.
- Use AT crystal as the resonator for good temperature performance.
- 3-state function.
- Automatic mounting and reflow soldering.
- Applications: Mobile phone, WLAN, WiMAX, DSC, HDTV, Automotive multimedia device, Timer module, etc.
- Low power consumption.
- RoHS Compliant / Pb-Free.

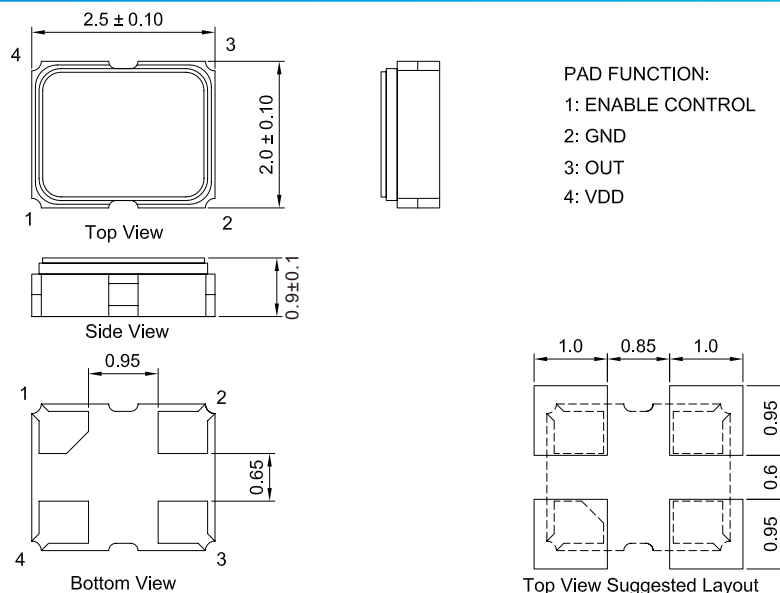


## Electrical Specifications

Item /Type	9D (SMD 2520 RTC Crystal Oscillator)
Norminal Frequency	32.768 kHz
Oscillator Mode	AT Fundamental
Oscillation Mode	CMOS
Output Type	15pF, or specify
Supply voltage	1.8V, 2.8V, 3.3V
Frequency Stability	±25ppm, or specify
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time	200ns Max.
Current Consumption	3mA Max.
Symmetry	45~55%
Start-up Time	2ms Max
3-state Voltage Vol (Max.) / Voh (Min.)	0.3VDD / 0.7VDD
Aging (at 25°C)	±3ppm/Year Max.

## Dimensions

Units:mm





# SMD 3225 RTC Crystal Oscillator

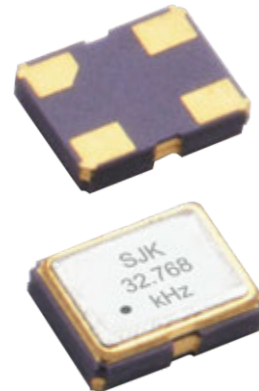


Size: 3.2×2.5×1.00 mm

3C Series SMD RTC Oscillator

## Features

- 3225 size, 1.0mm high, ultra small 32.768kHz RTC oscillator in seam sealed ceramic package.
- 4 pads design to achieve good soldering contact on PCB.
- 3-state function available for power saving.
- Automatic mounting and reflow soldering.
- Applications: Peripherals, Bluetooth, DSC, PC, Mobile phone, PDA, DVC, Telecommunications, NFC, etc.
- Use AT crystal as the resonator for good temperature performance.
- RoHS Compliant / Pb-Free.

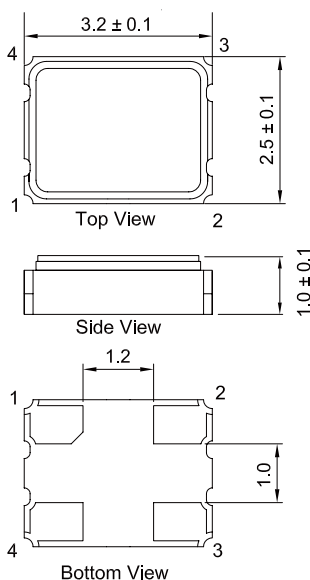


## Electrical Specifications

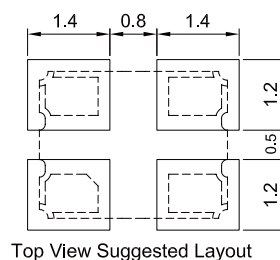
Item /Type	9C (SMD 3225 RTC Crystal Oscillator)
Norminal Frequency	32.768 kHz
Oscillator Mode	AT Fundamental
Oscillation Mode	CMOS
Output Type	15pF, or specify
Supply voltage	2.8V, 3.3V
Frequency Stability	±25ppm, ±50ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time	300ns Max.
Current Consumption	3mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
3-state Voltage Vol (Max.) / Voh (Min.)	0.3VDD / 0.7VDD
Aging (at 25°C)	±3ppm/Year Max.

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL  
 2: GND  
 3: OUT  
 4: VDD



# SMD 5032 RTC Crystal Oscillator

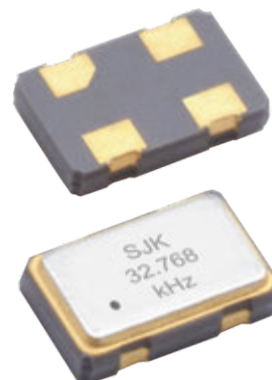


Size: 5.0×3.2×1.20 mm

5B Series SMD RTC Oscillator

## Features

- Small Real Time Clock oscillator in SMD seam sealed ceramic package.
- 5032 size, 4 pads design to achieve good soldering contact on PCB
- 3-state function available for power saving.
- Automatic mounting and reflow soldering.
- Applications: Wireless communication, Timer module, Automotive multimedia device, Telecommunication, etc.
- High stability, low jitter, low power consumption.
- RoHS Compliant / Pb-Free.

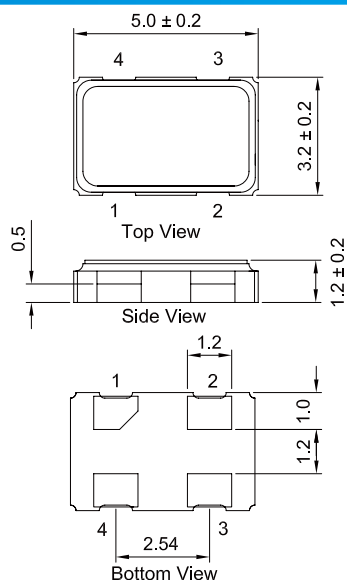


## Electrical Specifications

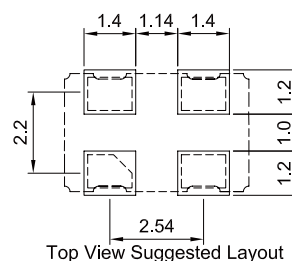
Item /Type	9B (SMD 5032 RTC Crystal Oscillator)
Norminal Frequency	32.768 kHz
Oscillator Mode	AT Fundamental
Oscillation Mode	CMOS
Output Type	15pF, or specify
Supply voltage	2.5V, 2.8V, 3.3V
Frequency Stability	±25ppm
Operating Temperature Range	-40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time	200ns Max.
Current Consumption	3mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
3-state Voltage Vol (Max.) / Voh (Min.)	0.3VDD / 0.7VDD
Aging (at 25°C)	±3ppm/Year Max.

## Dimensions

Units:mm



PAD FUNCTION:  
 1: ENABLE CONTROL  
 2: GND  
 3: OUT  
 4: VDD



# SMD 7050 RTC Crystal Oscillator

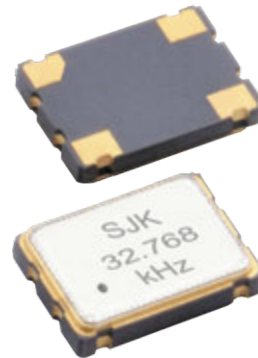


Size: 7.0×5.0×1.30 mm

7A Series SMD RTC Oscillator

## Features

- Package size: 7.0×5.0×1.3mm.
- Meet 32.768kHz RTC clock signal for tight tolerance requirement.
- Easy to use SMD seam sealed ceramic package.
- 3-state function.
- Automatic mounting and reflow soldering.
- 4 Pads designed to achieve good soldering contact on PCB.
- Use AT crystal as the resonator for good temperature performance.
- RoHS Compliant / Pb-Free.

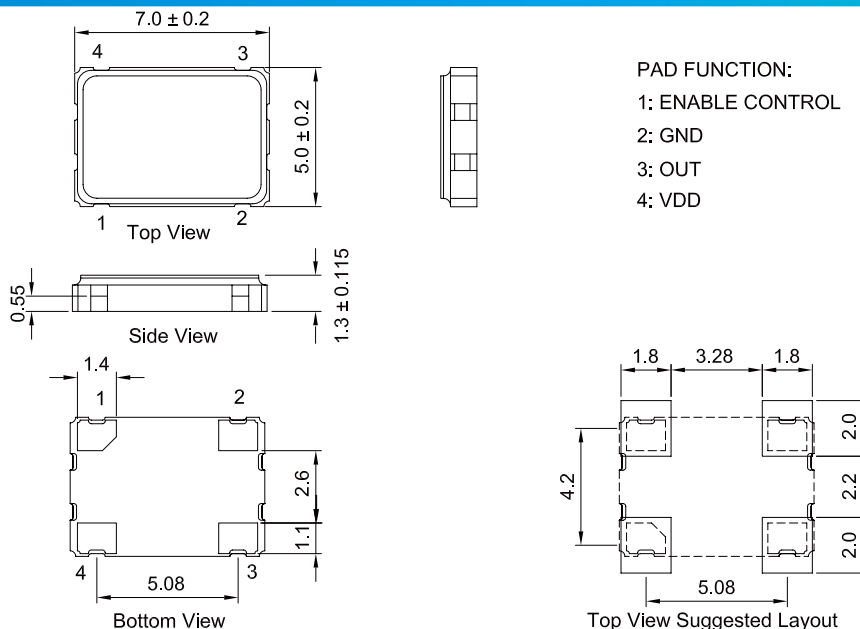


## Electrical Specifications

Item /Type	9A (SMD 7050 RTC Crystal Oscillator)
Norminal Frequency	32.768 kHz
Oscillator Mode	AT Fundamental
Oscillation Mode	CMOS
Output Type	15pF, or specify
Supply voltage	1.8V, 2.5V, 2.8V, 3.3V
Frequency Stability	±25ppm, ±50ppm
Operating Temperature Range	-20~+70°C, -40~+85°C, or specify
Storage Temperature Range	-55~+125°C
Voltage Vol (Max.) / Voh (Min.)	0.1VDD / 0.9VDD
Rise(Tr) / Fall(Tf) Time	250ns Max.
Current Consumption	3mA Max.
Symmetry	45~55%
Start-up Time	10ms Max.
3-state Voltage Vol (Max.) / Voh (Min.)	0.3VDD / 0.7VDD
Aging (at 25°C)	±3ppm/Year Max.

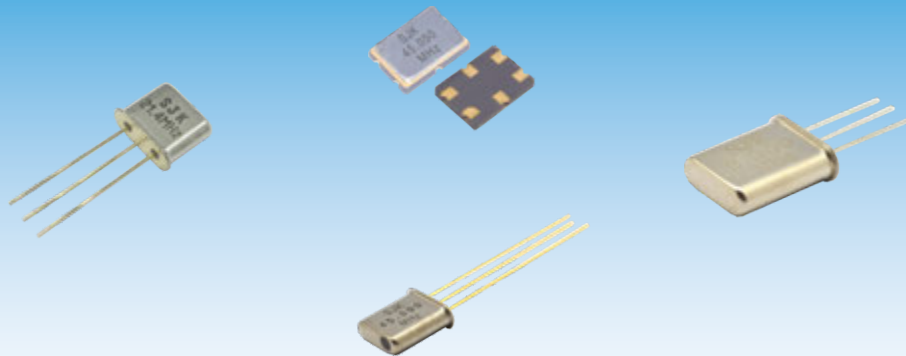
## Dimensions

Units:mm



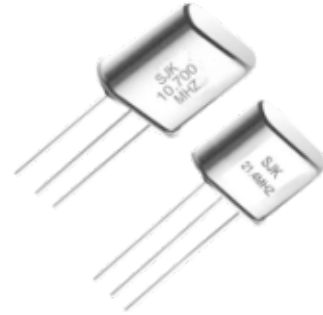


# Monolithic Crystal Filters



### Features

- Low Insertion Loss
- High Selectivity
- Applications in UHF & VHF Radio, Wireless Telemetry, Pagers, Wireless Lan, Radio Communications, etc.



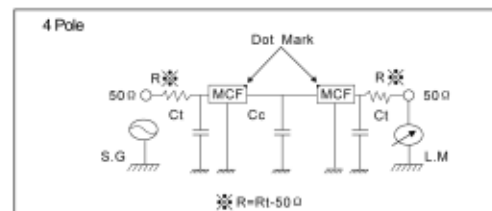
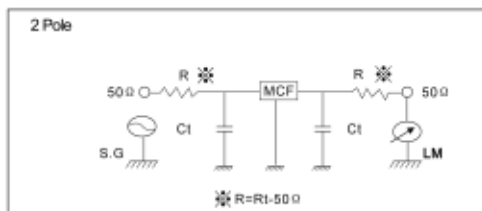
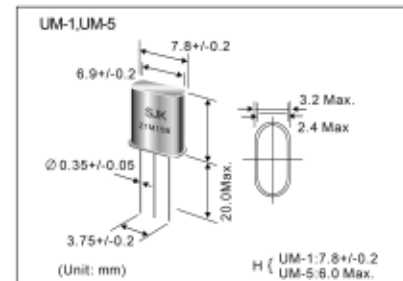
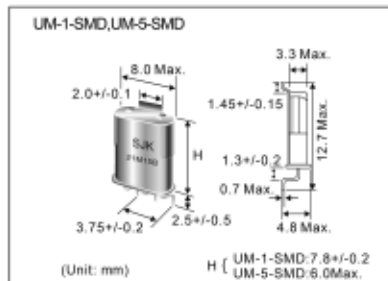
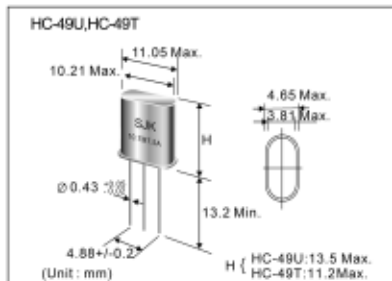
### Electrical Specifications

Model	Centre Frequency (MHz)	Poles	Passband Width at-3dB (KHz)	Ripple (dB)	Insertion Loss (dB)	Stop Width (KHz/dB)	Guaranteed Attenuation (dB/KHz)	Terminating Impedance (Kohm//pF)	Case* Outline	
10M7. 5A	10.700000	2	±3.75	0.5	1.5	±18/20	35/+300~-+1000 50/-200~-1000	1.8//5.0	HC-49U	
10M7. 5B		4		1.0	2.5	±14/40	65/+300~-+1000 80/-200~-1000	1.8//4.0	HC-49U×2	
21M7. 5A	2	0.5		2.0	±18/20	35/+350~-+1000 50/-200~-1000	0.85//6.0	UM-1		
21M7. 5B	4	1		2.5	±14/40	65/+300~-+1000 80/-200~-1000	0.85//5.0	UM-1×2		
45M7. 5A	45.0 3 O/T	2		1	2.0	±12.5/10	35/+900~-+920 35/-900~-920	2.5//0.5	UM-1	
45M7. 5B		4		1	4.0	±12.5/300	75/+900~-+920 35/-900~-920	25//0.5	UM-1×2	
45M7. 5A	45.0Fundamental	2		1	2.5	±12.5/1.0	65/-900~-920	0.3//10	UM-1	
45M7. 5B		4		1	4.0	±12.5/30	90/+900~-+920 90/-900~-920	0.3//8.0	UM-1×2	
10M15A	10.700000	2		±7.5	0.5	1.5	±25/18	35/+300~-+1000 40/-200~-1000	3.0//2.0	HC-49U
10M15B		4			1	2.5	±25/40	55/+300~-+1000 80/-200~-1000		HC-49U×2
21M15A	2	0.5	2.0		±25/18	35/+350~-+1000 50/-200~-1000	1.5//3.0	UM-1		
21M15B	4	1	2.5		±25/40	65/+300~-+1000 80/-200~-1000	1.5//2.0	UM-1×2		
45M15A	45.0 3 O/T	2	1		2.0	±25/18	35/+500~-+1000 35/-200~-1000	4.0//1.0	UM-1	
45M15B		4	1		4.0	±25/40	70/+500~-+1000 70/-200~-1000	4.0//1.1	UM-1×2	
45M15A	45.0Fundamental	2	1		2.5	±25/15	35/+500~-+1000 40/-200~-1000	0.65//4.5	UM-1	
45M15B		4	1		4.0	±12.5/30	70/+500~-+1000 70/-200~-1000	0.7//2.5	UM-1×2	

\*Case outline HC-49T, UM-1-SMD and UM-5-SMD is available

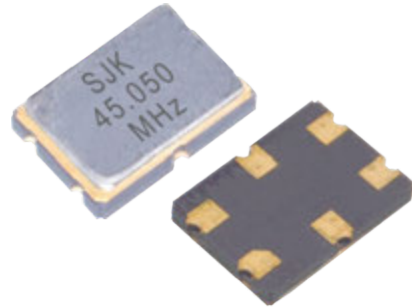
### Dimensions

Units:mm



## Features

- 7.0×5.0×1.3mm, light weight and miniature SMD crystal filter.
- 2 pole function in a single package.
- Excellent guaranteed attenuation.
- Excellent shock and vibration resistance.
- Automatic mounting, solder reflow capable.
- Applications in mobile, wireless communications, cellular, cordless phones, radio communications.
- RoHS Compliant / Pb-Free.

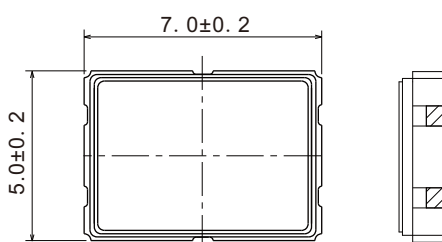


## Electrical Specifications

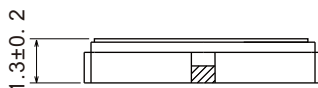
Item /Type	CF (7050 SMD Crystal Filters)			
Normal Frequency	21.400MHz	21.7000MHz	45.000MHz	45.000MHz
Pole	2 Pole	2 Pole	2 Pole	2 Pole
Overtone Order	Fundamental	Fundamental	Fundamental	Fundamental
Pass Bandwidth	±7.5kHz min./3dB	±7.5kHz min./3dB	±15kHz min./3dB	±15kHz min./3dB
Stop Bandwidth	±25kHz min./18dB	±28kHz min./18dB	±60kHz min./15dB	±60kHz min./15dB
Ripple	0.5dB max.	1dB max.	1dB max.	1dB max.
Insertion Loss	1.5dB max.	2dB max.	2.0dB max.	2dB max.
Guaranteed Attenuation	70dB min.	70dB min.	70dB min.	70dB min.
Operating Temperature Range	-20~+70°C			
Size (L×W×H)	7.0×5.0×1.3 mm			
Packing Unit	1000 pcs. / Reel			

## Dimensions

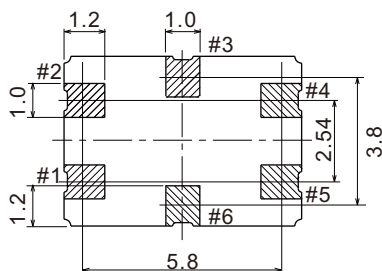
Units:mm



Top View



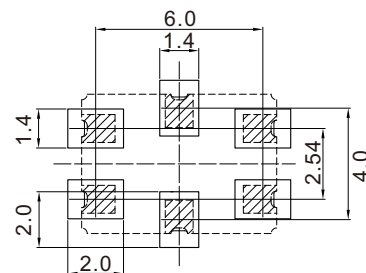
Side View



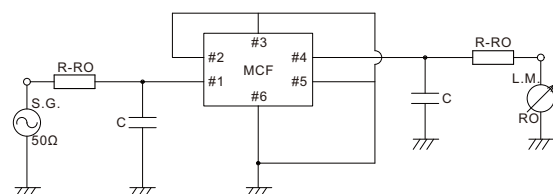
Bottom View

Pin No.	Connection
#1	INPUT
#2	GND
#3	GND
#4	OUTPUT
#5	GND
#6	GND

## Recommended Land Pattern Top View



## Measurement Circuit



# SMD Monolithic Crystal Filters

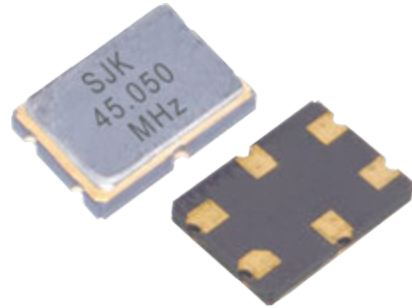


Size: 7.0×5.0×1.3 mm

CF Series 3Pole 7050 SMD MCF

## Features

- 7.0×5.0×1.3mm, light weight and miniature SMD crystal filter.
- 3 pole function in a single package.
- Excellent shock and vibration resistance.
- Automatic mounting, solder reflow capable.
- Applications in mobile, wireless communications, cellular, cordless phones, radio communications.
- RoHS Compliant / Pb-Free.

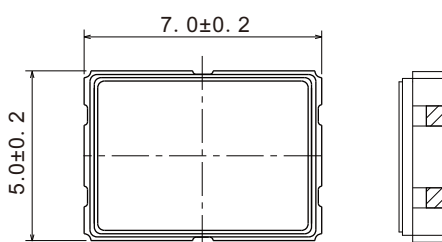


## Electrical Specifications

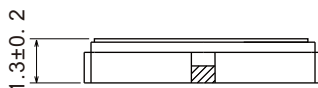
Item /Type	CF (7050 SMD Crystal Filters)
Norminal Frequency	45.000MHz
Pole	3 Pole
Overtone Order	Fundamental
Pass Bandwidth	±15kHz min./3dB
Stop Bandwidth	±50kHz min./20dB
Ripple	1dB max.
Insertion Loss	3dB max.
Guaranteed Attenuation	70dB min.
Operating Temperature Range	-20~+70°C
Size (L×W×H)	7.0×5.0×1.3 mm
Packing Unit	1000 pcs. / Reel

## Dimensions

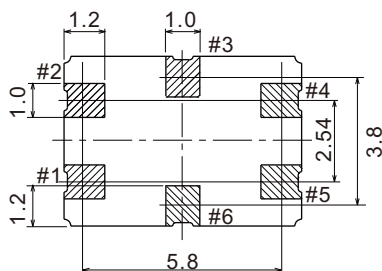
Units:mm



Top View



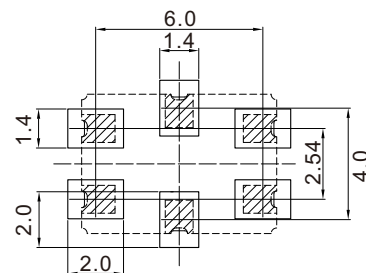
Slide View



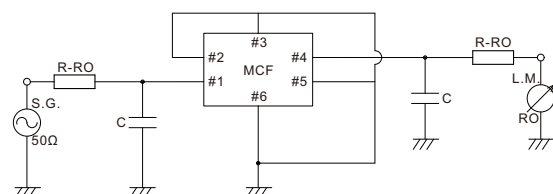
Bottom View

Pin No.	Connection
#1	INPUT
#2	GND
#3	GND
#4	OUTPUT
#5	GND
#6	GND

## Recommended Land Pattern Top View



## Measurement Circuit



# SMD Monolithic Crystal Filters

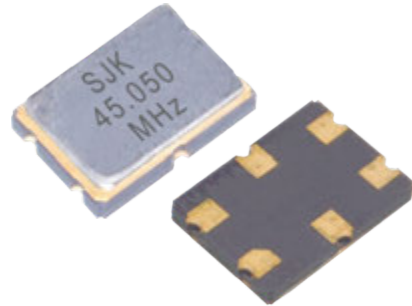


Size: 7.0×5.0×1.3 mm

CF Series 4 Pole 7050 SMD MCF

## Features

- 7.0×5.0×1.3mm, light weight and miniature SMD crystal filter.
- 2~4 pole function in a single package.
- Excellent guaranteed attenuation.
- Excellent shock and vibration resistance.
- Automatic mounting, solder reflow capable.
- Applications in mobile, wireless communications, cellular, cordless phones, radio communications.
- RoHS Compliant / Pb-Free.

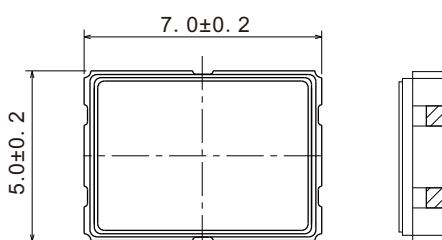


## Electrical Specifications

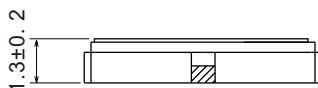
Item /Type	CF (7050 SMD Crystal Filters)			
Normal Frequency	38.850MHz	45.000MHz	49.950MHz	51.650MHz
Pole	4 Pole	4 Pole	4 Pole	4 Pole
Overtone Order	Fundamental	Fundamental	Fundamental	Fundamental
Pass Bandwidth	±3.75kHz min./3dB	±7.5kHz min./3dB	±7.5kHz min./3dB	±5kHz min./3dB
Stop Bandwidth	±15kHz min./35dB	±22kHz min./25dB	±25kHz min./35dB	±22kHz min./30dB
Ripple	1dB max.	1dB max.	1dB max.	1dB max.
Insertion Loss	4dB max.	4dB max.	4dB max.	4dB max.
Guaranteed Attenuation	80dB min.	80dB min.	80dB min.	80dB min.
Operating Temperature Range	-20~+70°C			
Size (L×W×H)	7.0×5.0×1.3 mm			
Packing Unit	1000 pcs. / Reel			

## Dimensions

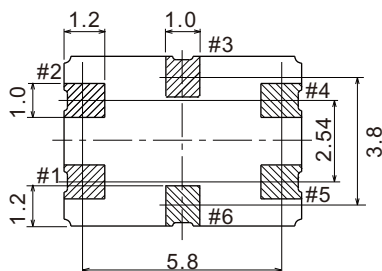
Units:mm



Top View



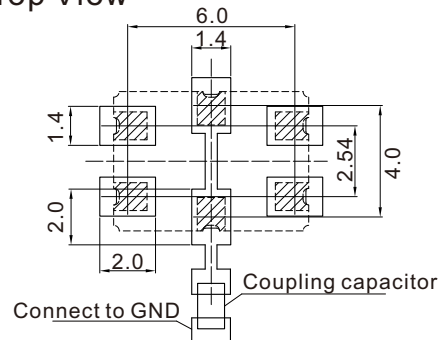
Slide View



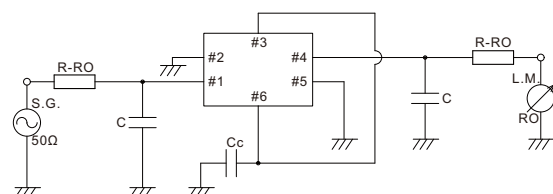
Bottom View

Pin No.	Connection
#1	INPUT
#2	GND
#3	Connect with #6
#4	OUTPUT
#5	GND
#6	Connect with #3

## Recommended Land Pattern Top View



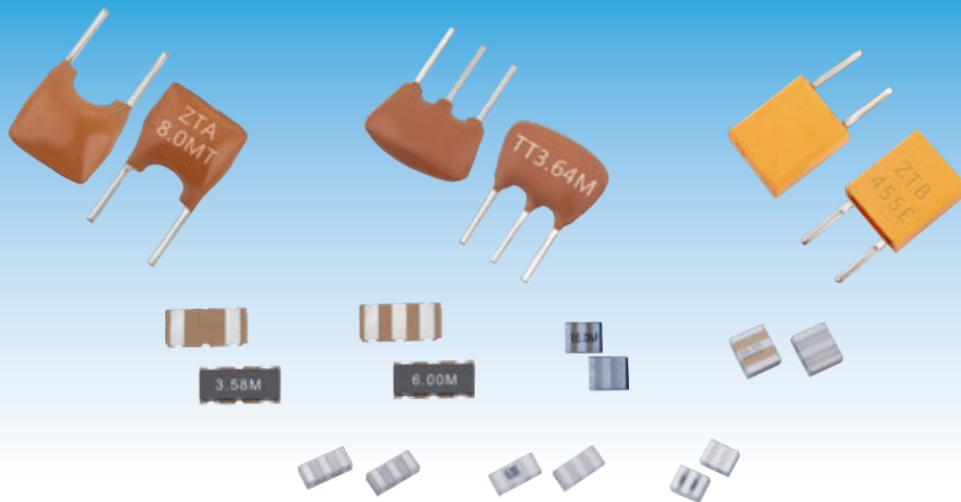
## Measurement Circuit

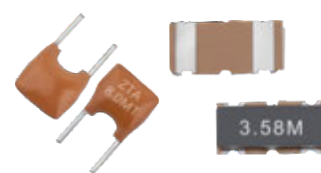






# Ceramic Resonators





### Electrical Characteristics For DIP Type

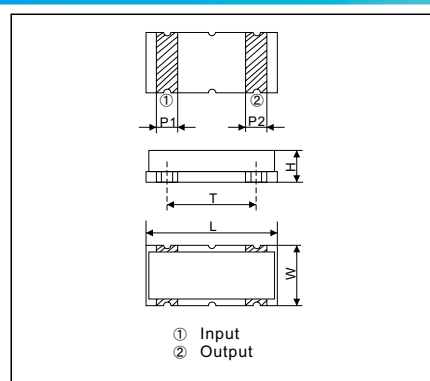
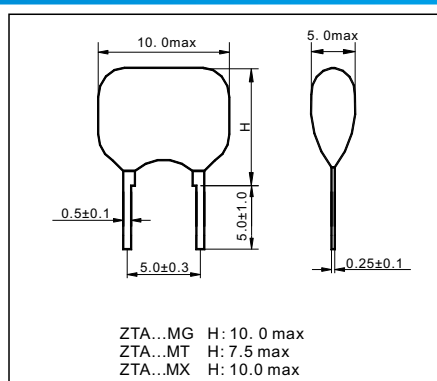
Part Number	Frequency Range(MHz)	Frequency Accuracy(at25°C)	Frequency Stability	Operating Temperature	Aging for Ten Year(%)
ZTA...MG	1.79~6.00	±0.5	±0.3	-25~+85°C	±0.3
ZTA...MT	6.00~13.00	±0.5	±0.3	-25~+85°C	±0.3
ZTA...MX	13.00~60.00	±0.5	±0.3	-25~+85°C	±0.3

### Electrical Characteristics For SMD Type

Part Number	Frequency Range(MHz)	Frequency Accuracy(at25°C)	Frequency Stability	Operating Temperature	Aging for Ten Year(%)
ZTACC...MG	2.00~8.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACR...MG	4.00~8.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACE...MG	8.00~12.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACS...MT/MX	6.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACV...MT/MX	8.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACW...MX	20.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACZ...MX	24.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTACP...MG	2.00~12.00	±0.5	±0.3	-25~+85°C	±0.3

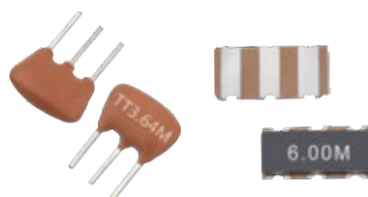
### Dimensions

Units:mm



Part Number	Size (mm)					
	L	W	H	P1	P2	T
ZTACC...MG	7.4±0.2	3.4±0.2	1.8±0.2	1.2±0.2	1.2±0.2	5.0±0.2
ZTACR...MG	4.5±0.2	2.0±0.2	1.2max	0.8±0.2	0.8±0.2	1.5±0.2
ZTACE...MG	3.2±0.2	1.3±0.2	1.0max	0.4±0.2	0.4±0.2	1.2±0.2
ZTACS...MX/MT	4.7±0.2	4.1±0.2	(1.2+A)±0.2	1.0±0.2	0.8±0.2	3.9±0.2
ZTACV...MT/MX	3.7±0.2	3.1±0.2	(1.0+A)±0.2	0.9±0.2	0.7±0.2	3.0±0.2
ZTACW...MX	2.5±0.2	2.0±0.2	1.2max	0.5±0.2	0.4±0.2	2.0±0.2
ZTACZ...MX	2.2±0.2	1.8±0.2	1.2max	0.4±0.2	0.5±0.2	1.7±0.2
ZTACP...MG	6.0±0.2	3.0±0.2	1.8±0.2	1.2±0.2	1.2±0.2	5.0±0.2

Note: A stands for thickness of the ceramic element, which varies with the frequency. The range of the thickness difference is 0.1 to 0.7mm.  
 No middle terminal for ZTA series.



### Electrical Characteristics For DIP Type

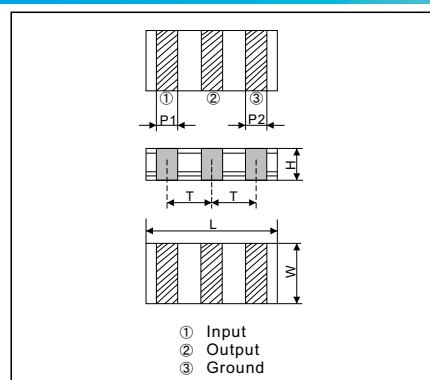
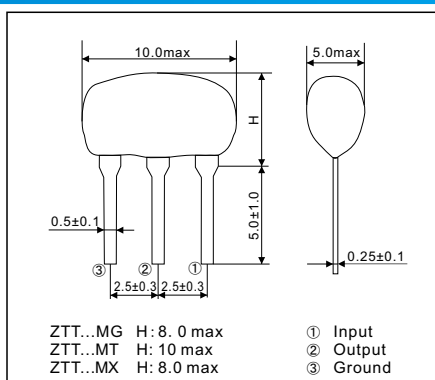
Part Number	Frequency Range(MHz)	Frequency Accuracy(at25°C)	Frequency Stability	Operating Temperature	Aging for Ten Year(%)
ZTT...MG	1.79~6.00	±0.5	±0.3	-25~+85°C	±0.3
ZTT...MT	6.00~13.00	±0.5	±0.3	-25~+85°C	±0.3
ZTT...MX	13.00~60.00	±0.5	±0.3	-25~+85°C	±0.3

### Electrical Characteristics For SMD Type

Part Number	Frequency Range(MHz)	Frequency Accuracy(at25°C)	Frequency Stability	Operating Temperature	Aging for Ten Year(%)
ZTTCC...MG	2.00~8.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCR...MG	4.00~8.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCE...MG	8.00~12.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCS...MT/MX	6.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCV...MT/MX	8.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCW...MX	20.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCZ...MX	24.00~60.00	±0.5	±0.3	-25~+85°C	±0.3
ZTTCP...MG	2.00~12.00	±0.5	±0.3	-25~+85°C	±0.3

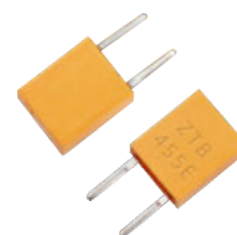
### Dimensions

Units:mm



Part Number	Size (mm)					
	L	W	H	P1	P2	T
ZTTCC...MG	7.4±0.2	3.4±0.2	1.8±0.2	1.2±0.2	1.2±0.2	2.5±0.2
ZTTCR...MG	4.5±0.2	2.0±0.2	1.2max	0.8±0.2	0.8±0.2	1.5±0.2
ZTTCE...MG	3.2±0.2	1.3±0.2	1.0max	0.4±0.2	0.4±0.2	1.2±0.2
ZTTCS...MX/MT	4.7±0.2	4.1±0.2	(1.2+A)±0.2	1.0±0.2	0.8±0.2	1.95±0.2
ZTTCV...MT/MX	3.7±0.2	3.1±0.2	(1.0+A)±0.2	0.9±0.2	0.7±0.2	1.0±0.2
ZTTCW...MX	2.5±0.2	2.0±0.2	1.2max	0.5±0.2	0.4±0.2	1.0±0.2
ZTTCZ...MX	2.2±0.2	1.8±0.2	1.2max	0.4±0.2	0.5±0.2	0.85±0.2
ZTTCP...MG	6.0±0.2	3.0±0.2	1.8±0.2	1.2±0.2	1.2±0.2	2.5±0.2

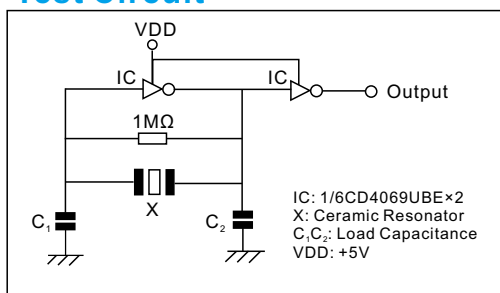
Note: A stands for thickness of the ceramic element, which varies with the frequency. The range of the thickness difference is 0.1 to 0.7mm.  
 No middle terminal for ZTA series.



### Electrical Characteristics

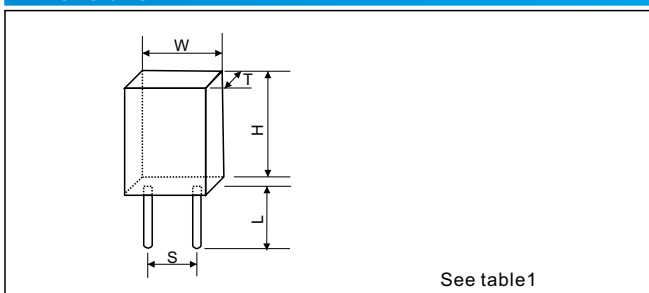
Part Number		Frequency Accuracy (at 25°C)	Resonator Impedance	Frequency Stability	Aging for ten years	Load Capacitance C <sub>1</sub> (pF)	Load Capacitance C <sub>2</sub> (pF)
DIP Type	SMD Type						
ZTB190-249E		±1KHz	≤20	±0.3%	±0.3%	330	470
ZTB250-374E		±1KHz	≤20	±0.3%	±0.3%	220	470
ZTB375-429E	ZTB375-429Y	±1KHz	≤20	±0.3%	±0.3%	120	470
ZTB430-509E	ZTB430-509Y	±2KHz	≤20	±0.3%	±0.3%	100	100
ZTB510-699E	ZTB510-699Y	±2KHz	≤20	±0.3%	±0.3%	100	100
ZTB700-1250E	ZTB700-1250Y	±0.5%	≤70	±0.3%	±0.3%	100	100

### Test Circuit

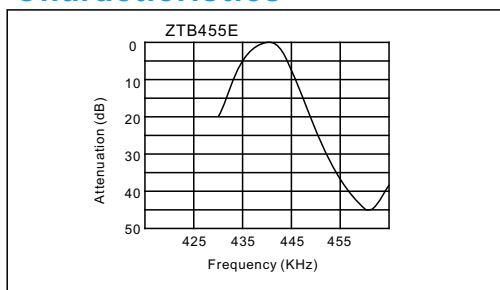


### Dimensions

Units:mm



### Characteristics

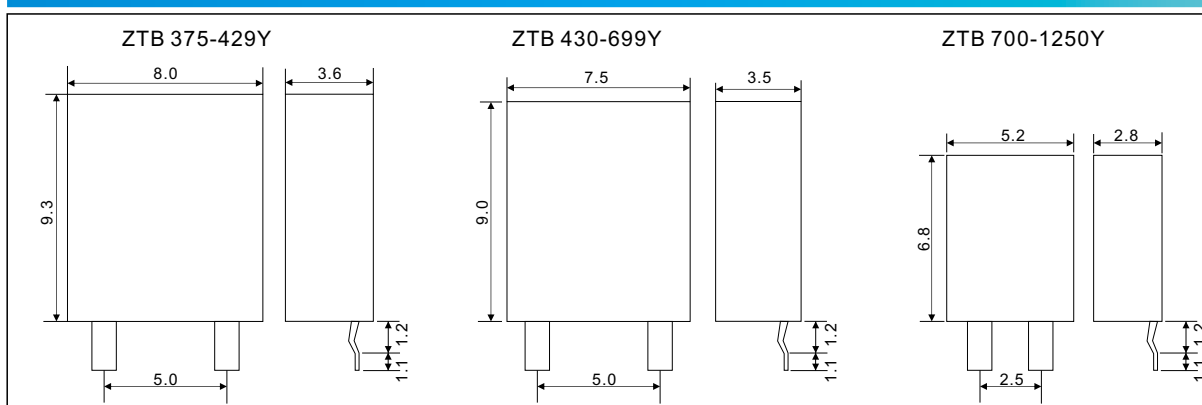


### Table1

Frequency Range (KHz)	Width W (mm)	Thickness T (mm)	Height H (mm)	Lead Space S (mm)	Lead Length L (mm)
190-249	13.5	3.8	14.7	10.0	8.0
250-374	11.0	3.8	12.2	10.0	7.0
375-400	7.9	3.6	9.3	7.7	7.0
401-699	7.0	3.5	9.0	5.0	4.0(6.0)
700-1250	5.2	2.8	6.8	2.5	3.5

### Dimensions

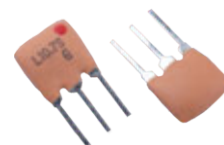
Units:mm





# Ceramic Filters



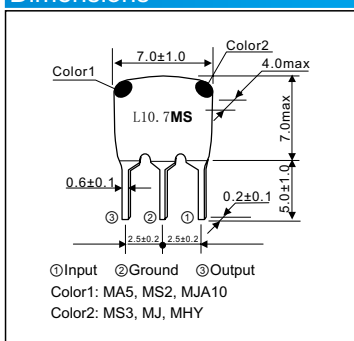


### Electrical Characteristics

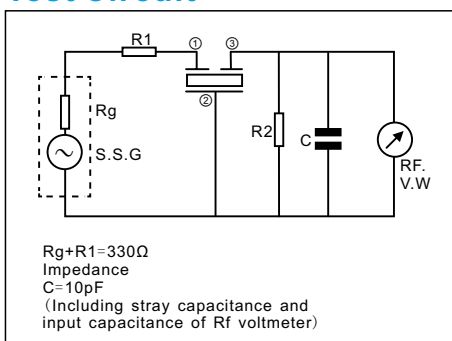
Part Number		3dB Band Width(KHz)	20dB Band Width(KHz)	Insertion Loss(dB)	Spurious Attenuation(9-12MHz) (dB) min
DIP Type	SMD Type				
LT10.7MA5	LTCA10.7MA5	280±50	650	6	30
LT10.7MS2	LTCA10.7MS2	230±50	600	6	40
LT10.7MS3		180±40	520	7	40
LT10.7MJ		150±40	400	10	38
LT10.7MA5A10	LTCV10.7MA5	280±50	590	2.5±2.0	30
LT10.7MS2A10	LTCV10.7MS2	230±50	520	3.0±2.0	35
LT10.7MS3A10	LTCV10.7MS3	180±40	470	3.5±1.5	35
LT10.7MJA10		150±50	360	4.5±2.0	35
LT10.7MA19		≥350	950	3±2	20
LT10.7MA20		330±50	680	4±2	30
LT10.7MHY		110±30	350	7±2	30
LT10.7MFP		≤20	95	6.0max	24

### Dimensions

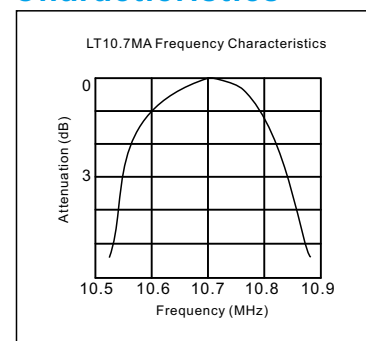
Units:mm



### Test Circuit

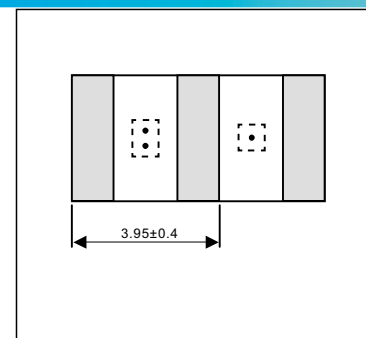
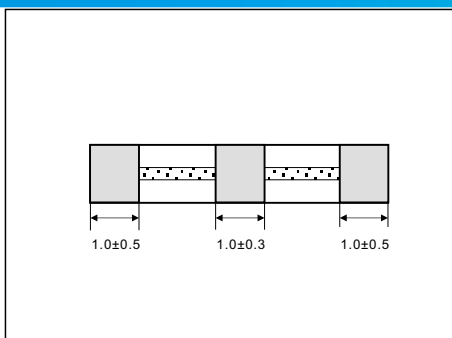
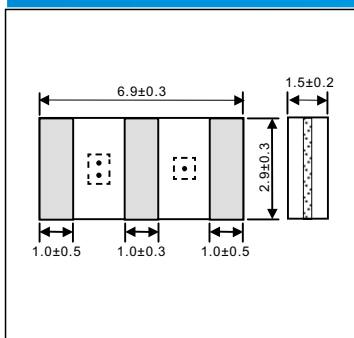


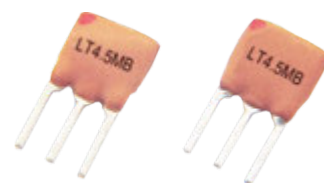
### Characteristics



### Dimensions

Units:mm



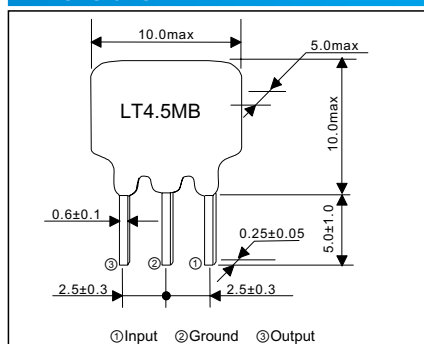


### Electrical Characteristics

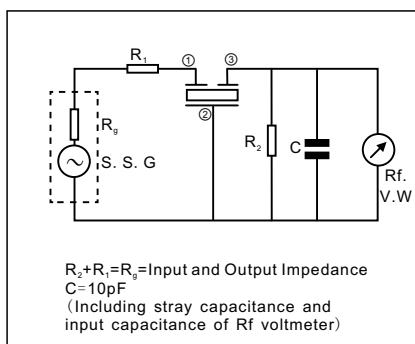
Part Number	3dB Band Width(KHz)	20dB Band Width(KHz)	Insertion Loss(dB)	Spurious Attenuation(9-12MHz) (dB) min	Input-Output Impedance
LT4.5MB	$\geq \pm 60(\pm 105)$	$\leq 530(420)$	$\leq 6(4)$	$\geq 20(4.5\text{MHz})$	1000Ω
LTS5.5MB	$\geq \pm 75(\pm 120)$	$\leq 550(470)$	$\leq 6(3)$	$\geq 25(5.5 \pm 1.0\text{MHz})$	600Ω
LTS6.0MB	$\geq \pm 80(\pm 130)$	$\leq 600(500)$	$\leq 6(2.5)$	$\geq 25(6.5 \pm 1.0\text{MHz})$	470Ω
LTS6.5MB	$\geq \pm 80(\pm 130)$	$\leq 630(530)$	$\leq 6(2.5)$	$\geq 25(6.5 \pm 1.0\text{MHz})$	470Ω

### Dimensions

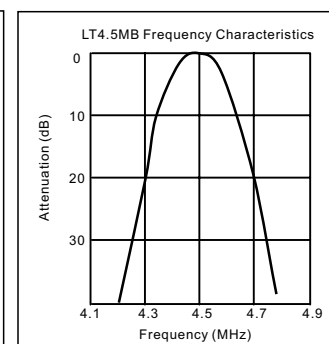
Units:mm



### Test Circuit



### Characteristics



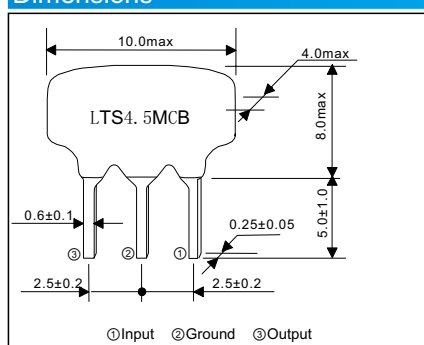
## LTS Series Ceramic Filter for TV/VCR Stage

### Electrical Characteristics

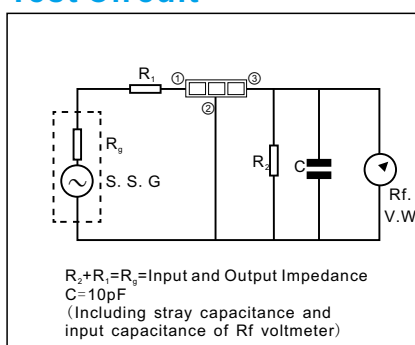
Part Number	3dB Band Width(KHz)	20dB Band Width(KHz)	Insertion Loss(dB)	Spurious Attenuation(9-12MHz) (dB) min	Input-Output Impedance
LT4.5MCB	$\pm 60(\pm 110)$	600(470)	6(3.2)	30(0~4.5MHz)	1000Ω
LTS5.5MCB	$\pm 60(\pm 115)$	600(500)	6(3.6)	30(0~5.5MHz)	600Ω
LTS6.0MCB	$\pm 60(\pm 115)$	600(500)	6(4.0)	30(0~6.0MHz)	470Ω
LTS6.5MCB	$\pm 75(\pm 115)$	600(530)	6(3.6)	30(0~6.5MHz)	470Ω
LTSH4.5MDB	$\geq \pm 70$	$\leq 750$	$\leq 6$	$\geq 30$	
LTSH5.5MDB	$\geq \pm 80$	$\leq 750$	$\leq 6$	$\geq 30$	
LTSH6.0MDB	$\geq \pm 80$	$\leq 750$	$\leq 6$	$\geq 30$	
LTSH6.5MDB	$\geq \pm 80$	$\leq 800$	$\leq 6$	$\geq 30$	

### Dimensions

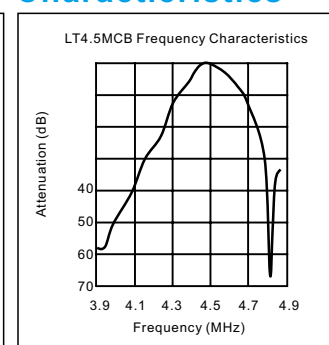
Units:mm



### Test Circuit



### Characteristics





### Electrical Characteristics (455KHz Series)

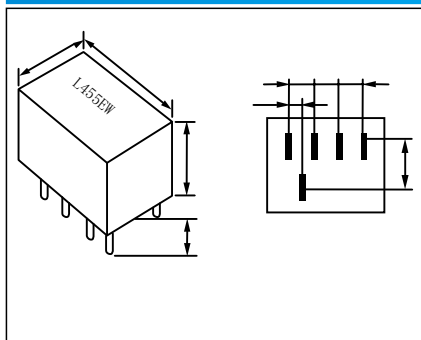
Part Number	Center Frequency (KHz)	Insertion Loss (dB) max	Pass Band Ripple (dB) max	6dB Bandwidth (KHz) min	50dB Bandwidth (KHz) min	Stop Band Att. $\pm 100$ KHz (dB) min	Input-Output Impedance
LT455BW	455 $\pm$ 2.0	4	2	$\pm 15$	$\pm 30$	40	1500 $\Omega$
LT455CW	455 $\pm$ 2.0	4	2	$\pm 12.5$	$\pm 24$	40	1500 $\Omega$
LT455DW	455 $\pm$ 1.5	4	2	$\pm 10$	$\pm 20$	40	1500 $\Omega$
LT455EW	455 $\pm$ 1.5	6	2	$\pm 7.5$	$\pm 15$	40	1500 $\Omega$
LT455FW	455 $\pm$ 1.5	6	2	$\pm 6$	$\pm 12.5$	40	2000 $\Omega$
LT455GW	455 $\pm$ 1.5	6	2	$\pm 4.5$	$\pm 10$	40	2000 $\Omega$
LT455HW	455 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	40	2000 $\Omega$
LT455IW	455 $\pm$ 1.0	6	2	$\pm 2$	$\pm 7.5$	40	2000 $\Omega$
LT455HTW	455 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	60	2000 $\Omega$

### Electrical Characteristics (450KHz Series)

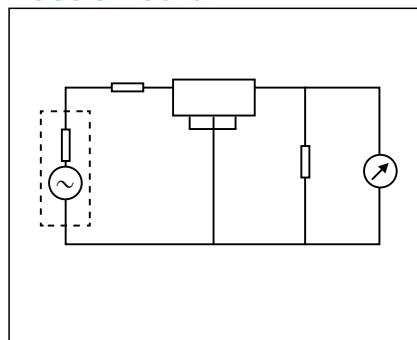
Part Number	Center Frequency (KHz)	Insertion Loss (dB) max	Pass Band Ripple (dB) max	6dB Bandwidth (KHz) min	50dB Bandwidth (KHz) min	Stop Band Att. $\pm 100$ KHz (dB) min	Input-Output Impedance
LT450BW	450 $\pm$ 2.0	4	2	$\pm 15$	$\pm 30$	40	1500 $\Omega$
LT450CW	450 $\pm$ 2.0	4	2	$\pm 12.5$	$\pm 24$	40	1500 $\Omega$
LT450DW	450 $\pm$ 1.5	4	2	$\pm 10$	$\pm 20$	40	1500 $\Omega$
LT450EW	450 $\pm$ 1.5	6	2	$\pm 7.5$	$\pm 15$	40	1500 $\Omega$
LT450FW	450 $\pm$ 1.5	6	2	$\pm 6$	$\pm 12.5$	40	2000 $\Omega$
LT450GW	450 $\pm$ 1.5	6	2	$\pm 4.5$	$\pm 10$	40	2000 $\Omega$
LT450HW	450 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	40	2000 $\Omega$
LT450IW	450 $\pm$ 1.0	6	2	$\pm 2$	$\pm 7.5$	40	2000 $\Omega$
LT450HTW	450 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	60	2000 $\Omega$

### Dimensions

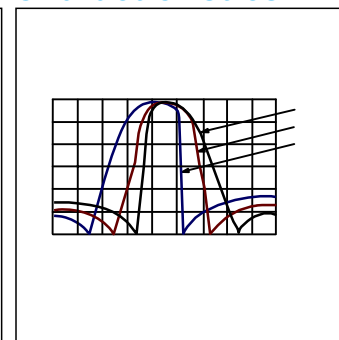
Units:mm



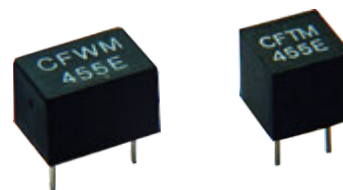
### Test Circuit



### Characteristics







### Electrical Characteristics (455KHz Series)

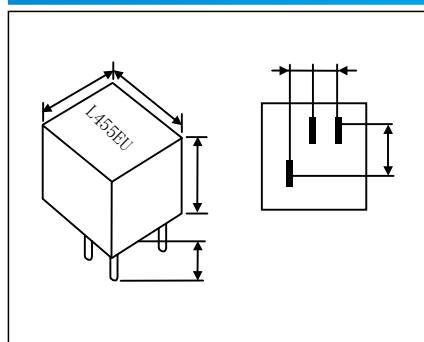
Part Number	Center Frequency (KHz)	Insertion Loss (dB) max	Pass Band Ripple (dB) max	6dB Bandwidth (KHz) min	50dB Bandwidth (KHz) min	Stop Band Att. $\pm 100$ KHz (dB) min	Input-Output Impedance
LT455BU	455 $\pm$ 2.0	4	2	$\pm 15$	$\pm 30$	30	1500 $\Omega$
LT455CU	455 $\pm$ 2.0	4	2	$\pm 12.5$	$\pm 24$	30	1500 $\Omega$
LT455DU	455 $\pm$ 1.5	4	2	$\pm 10$	$\pm 20$	30	1500 $\Omega$
LT455EU	455 $\pm$ 1.5	6	2	$\pm 7.5$	$\pm 15$	30	1500 $\Omega$
LT455FU	455 $\pm$ 1.5	6	2	$\pm 6$	$\pm 12.5$	30	2000 $\Omega$
LT455GU	455 $\pm$ 1.5	6	2	$\pm 4.5$	$\pm 10$	30	2000 $\Omega$
LT455HU	455 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	30	2000 $\Omega$
LT455IU	455 $\pm$ 1.0	6	2	$\pm 2$	$\pm 7.5$	30	2000 $\Omega$
LT455HTU	455 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	40	2000 $\Omega$

### Electrical Characteristics (450KHz Series)

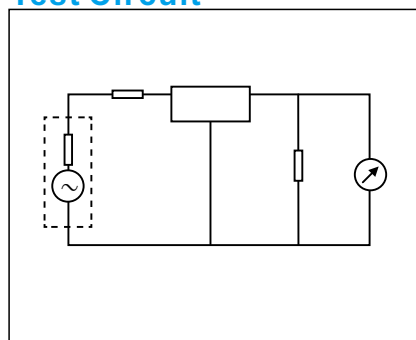
Part Number	Center Frequency (KHz)	Insertion Loss (dB) max	Pass Band Ripple (dB) max	6dB Bandwidth (KHz) min	50dB Bandwidth (KHz) min	Stop Band Att. $\pm 100$ KHz (dB) min	Input-Output Impedance
LT450BU	450 $\pm$ 2.0	4	2	$\pm 15$	$\pm 30$	30	1500 $\Omega$
LT450CU	450 $\pm$ 2.0	4	2	$\pm 12.5$	$\pm 24$	30	1500 $\Omega$
LT450DU	450 $\pm$ 1.5	4	2	$\pm 10$	$\pm 20$	30	1500 $\Omega$
LT450EU	450 $\pm$ 1.5	6	2	$\pm 7.5$	$\pm 15$	30	1500 $\Omega$
LT450FU	450 $\pm$ 1.5	6	2	$\pm 6$	$\pm 12.5$	30	2000 $\Omega$
LT450GU	450 $\pm$ 1.5	6	2	$\pm 4.5$	$\pm 10$	30	2000 $\Omega$
LT450HU	450 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	30	2000 $\Omega$
LT450IU	450 $\pm$ 1.0	6	2	$\pm 2$	$\pm 7.5$	30	2000 $\Omega$
LT450HTU	450 $\pm$ 1.0	6	2	$\pm 3$	$\pm 9$	35	2000 $\Omega$

### Dimensions

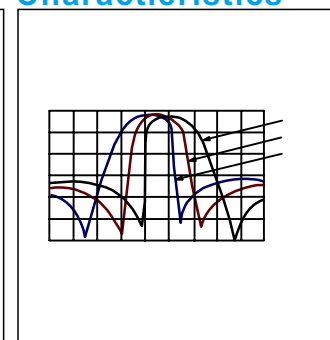
Units:mm

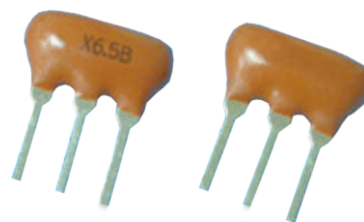


### Test Circuit



### Characteristics



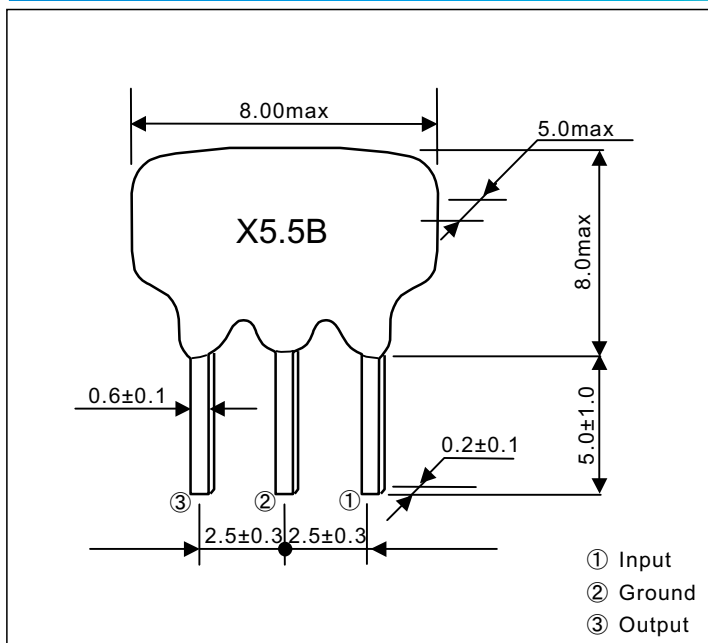


### Electrical Characteristics

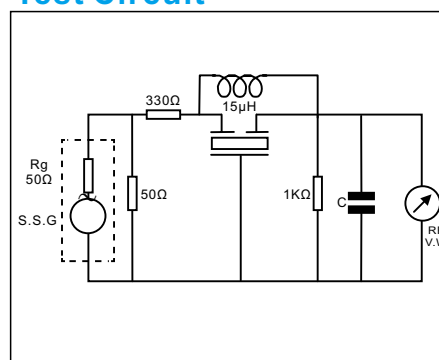
Part Number	Trap Attenuation (at nominal frequency) (dB)	20dB Attenuation Band Width (KHz)	30dB Attenuation Band Width (KHz)
XT3.58MB	25		≥40(70)
XT4.43MB	30		≥50(80)
XT4.5MB	35		≥70(120)
XT5.5MB	35		≥90(120)
XT5.74MB	35		≥90(120)
XT6.0MB	20		≥90(120)
XT6.5MB	20		≥90(120)
XT4.5MB	20	≥30	35
XT5.5MB	20	≥30	20

### Dimensions

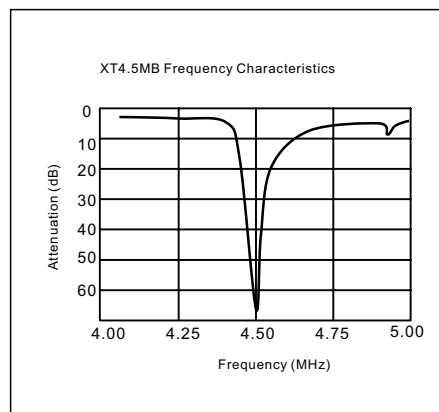
Units:mm



### Test Circuit

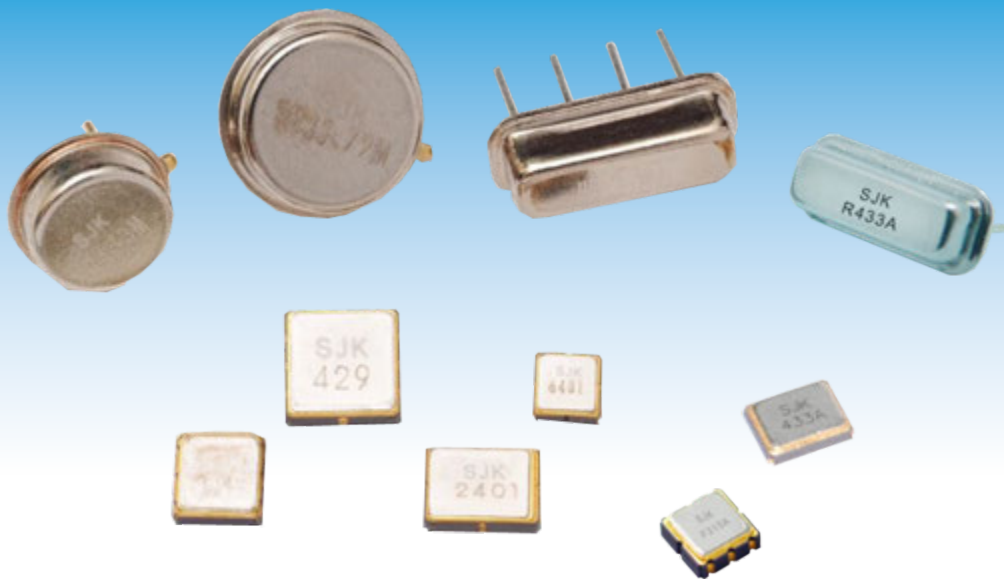


### Characteristics



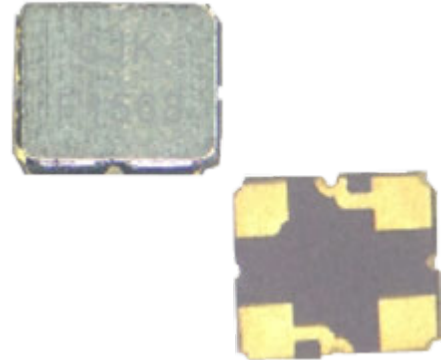


# SAW Device



## Features

- Ultra smallest size 2.5×2.0×0.65mm, surface mounting package.
- Very low cost than other SMD package.
- Electrostatic Sensitive Devices (ESD).
- Other frequency available.
- Automatic mounting, solder reflow capable.
- Applications for amplitude, low-loss SAW component, etc.
- RoHS Compliant / Pb-Free.

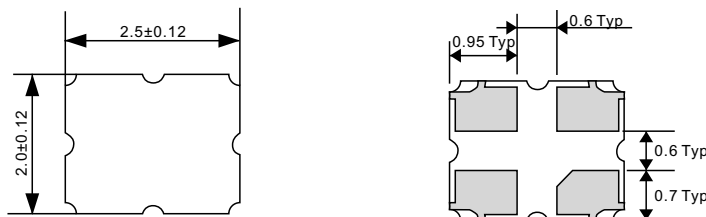


## Electrical Specifications

Item		Minimum	Type	Maximum	Unit
Center Frequency	$F_c$	1568.00			MHz
Insertion Loss (Min.)	IL		1.4	2.0	dB
Insertion Loss	1559.098~1563.098MHz	IL	1.6	2.5	dB
Insertion Loss	1573.420~1577.420MHz	IL	1.7	2.5	dB
Amplitude Ripple <sub>(p-p)</sub>	1559.098~1577.420MHz	$\Delta\alpha$	0.5	1.0	dB
3dB Bandwidth		35	43		MHz
Group Delay Ripple	1559.098~1577.420MHz	GDR	10	30	ns
Absolute Attenuation	$\alpha$				
	DC-1463.00MHz	32	38		dB
	1463.00~1493.00MHz	38	43		dB
	1493.00-1512.00MHz	35	40		dB
	1512.00-1624.00MHz	50	55		dB
	1643.00-1673.00MHz	48	53		dB
	1673.00-2000.00MHz	40	45		dB
	2000.00-1463.00MHz	25	30		dB
Input VSWR	1559.098-1577.420MHz		1.5:1	2.0:1	/
Output VSWR	1559.098-1577.420MHz		1.5:1	2.0:1	/
Operating Temperature Range	T	-40		+85	°C
Storage Temperature Range	T <sub>stg</sub>	-55		+125	°C

## Dimensions

Units:mm



## Pin Connection

Name	Connection
Pin 1	Input
Pin 2	GND
Pin 3	Output
Pin 4	GND

## Features

- Ultra smallest size 3.2×2.5×0.68mm, surface mounting package.
- 1-port resonator.
- Very low cost than other SMD package.
- Electrostatic Sensitive Devices (ESD).
- Other frequency available.
- Automatic mounting, solder reflow capable.
- Applications for automotive electronics, Remote control, and more.
- RoHS Compliant / Pb-Free.

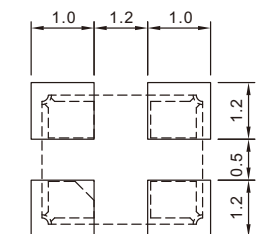
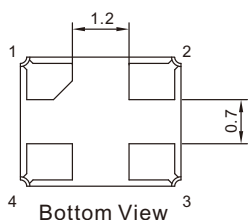
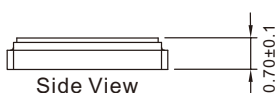
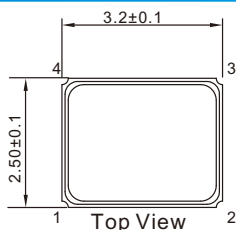


## Electrical Specifications

Item			Minimum	Type	Maximum	Unit
Center Frequency	Absolute Frequency	$F_C$	315,433.92			MHz
	Tolerance form 433.92MHz	$\Delta F_C$		$\pm 75$		KHz
Insertion Loss (Min.)		IL		1.5	2.0	dB
Quality Factor	Unloaded Q	$Q_U$	18362			
	50Ω loaded Q	$Q_L$	2150			
Temperature Stability	Turnover temperature	$T_0$	20	40	55	°C
	Turnover frequency	$F_0$	$F_C$			
	Frequency temperature coefficient	FTC		0.032		ppm/°C
Frequency Aging	Absolute value during the first year	$ F_A $		$\leq 10$		ppm/yr
DC Insulation Resistance between Any Two Pins			1.0			MΩ
RF Equivalent RLC Model	Motional Resistance	$R_M$		13.2	18.0	Ω
	Motional Inductance	$L_M$		89.4	110.2	μH
	Motional Capacitance	$C_M$		1.5		fF
	Static Capacitance	$C_0$	1.45	1.75	2.05	pF
Operating Temperature Range		T	-40		+85	°C
Storage Temperature Range		$T_{stg}$	-55		+125	°C
DC Voltage		$V_{DC}$		10		V

## Dimensions

Units:mm



Top View Suggest Layout

### Pin Connection

Name	Connection
Pin 1	Input
Pin 2	GND
Pin 3	Output
Pin 4	GND

### Features

- HC-49SMD case package.
- one-port resonator.
- Low profile 49SMD case.
- Electrostatic Sensitive Devices (ESD).
- Other frequency available.
- Automatic mounting, solder reflow capable.
- Applications for automotive electronics, Remote control, Alarm, Consumer electronics ,and more.
- RoHS Compliant.

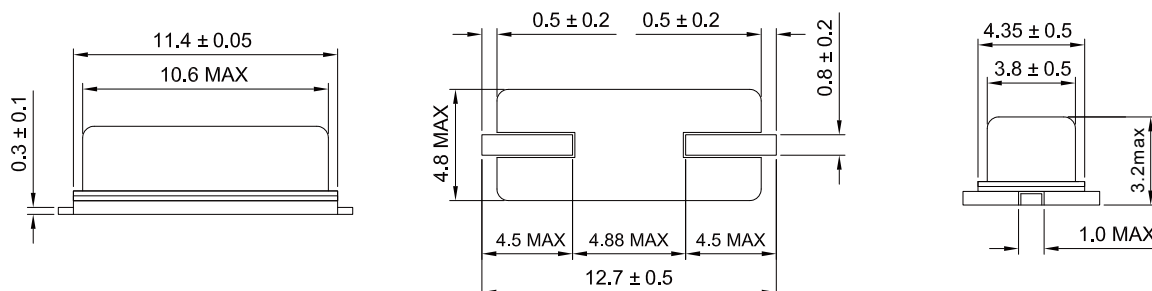


### Electrical Specifications

Item			Minimum	Type	Maximum	Unit
Center Frequency	Absolute Frequency	$F_c$	315,433.92			MHz
	Tolerance form 433.92MHz	$\Delta F_c$		$\pm 75$		KHz
Insertion Loss (Min.)		IL		1.5	2.0	dB
Quality Factor	Unloaded Q	$Q_u$		18362		
	50Ω loaded Q	$Q_L$		2150		
Temperature Stability	Turnover temperature	$T_0$	20	40	55	°C
	Turnover frequency	$F_0$		$F_c$		
	Frequency temperature coefficient	FTC		0.032		ppm/°C
Frequency Aging	Absolute value during the first year	$ F_A $		$\leq 10$		ppm/yr
DC Insulation Resistance between Any Two Pins			1.0			MΩ
RF Equivalent RLC Model	Motional Resistance	$R_M$		13.2	18.0	Ω
	Motional Inductance	$L_M$		89.4	110.2	μH
	Motional Capacitance	$C_M$		1.5		fF
	Static Capacitance	$C_0$	1.45	1.75	2.05	pF
Operating Temperature Range		T	-40		+85	°C
Storage Temperature Range		$T_{stg}$	-55		+125	°C
DC Voltage		$V_{DC}$		10		V

### Dimensions

Units:mm



# SAW Products



## SAW Product for GPS/GLONASS/BD-1/BD-2

P/N	Center Frequency (MHz)	Pass Band (dB)	Insertion Loss (MHz)	Package	Application
SF9070	1176	20	1.7	DCC6C	GPS
SF9068	1207	20	1.6	DCC6C	北斗二代B2
SF9013	1218	40	2.9	DCC6C	北斗B2+GPS(L2)
SF9036	1228	62	3.8	DCC6C	北斗B2+GPS(L2)+GLONASS L2
SF9069	1228	20	1.8	DCC6C	GPS-L2
SF9030	1237	80	3.0	DCC6C	北斗B2+B3+GPS(L2)
SF9006	1240	20	1.9	DCC6C	GPS(L2)+GLONASS L2 宽频
SF9028	1240	8	3.5	DCC6C	GPS(L2)+GLONASS L2
SF9029	1246	8	3.5	DCC6C	GLONASS-L2
SF9026	1252	25	2.6	DCC6C	北斗(B3)+GPS(L2)
SF9129	1268	20	1.8	DCC6C	北斗二代B3
SF9098	1278	20	1.9	DCC6C	北斗二代
SF9153	1550	20	4.5	DCC6C	GPS(L1)+GLONASS L2
SF9024	1561	21	2.3	DCC6C	北斗二代B1
SF9148	1561	21	4.0	DCC6C	北斗二代B1
SF9155	1568	18	1.9	DCC6C	北斗B1+GPS(L1)
SF9032	1572	30	2.0	DCC6C	北斗B1+GPS(L1)宽频
SF9159	1575	2	2.0	DCC6C	GPS-L1
SF9031	1584	50	2.4	DCC6C	北斗B1+GPS(L1)+GLONASS L1
SF9101	1584	50	1.9	DCC6C	北斗B1+GPS(L1)+GLONASS L1
SF9025	1585	59	2.6	DCC6C	北斗B1+GPS(L1)+GLONASS L1
SF9016	1602	20	4.2	DCC6C	GLONASS-L1
SF9080	1602	20	2.0	DCC6C	GLONASS-L1
SF9022	1615	20	4.5	DCC6C	北斗一代
SF9027	1615	20	2.0	DCC6C	北斗一代
SF9057	2492	10	2.2	DCC6C	北斗一代

## SAW Product for RF data transportation

P/N	Center Frequency (MHz)	Frequency Accuracy (KHz)	Pass Band (dB)	Insertion Loss (dB)	Package
R433	433.92	±75		1.7	F-11
R433	433.92	±75		1.9	TO-39
R433	433.92	±75		1.2	QCC8C
R433	433.92	±75		1.3	QCC4A
R433	433.92	±75		1.5	DCC6
R433	433.92	±75		1.4	DCC6C
SF4199	472.2		23	13.0	QCC12
SF4033	476		6	2.3	F-11
SF4158	477.6		3	1.9	DCC6C
SF4053	479.5		18	18	TO39
SF4014	480		4	2.0	DCC6C
SF4168	480		20	2.0	DCC6C
SF4010	480		8	2.0	DCC6C
SF4012	490		4	2.0	DCC6
SF5117	500		5	2.2	DCC6C
SF5001	500		8	2.8	DCC6C
SF5002	507.5		15	2.0	DCC6C
SF9638	915		10	2.6	DCC6C
SF9134	915		26	2.4	DCC6C
R915	915	±150		1.0	F-11
SF8042	864		2.0	2.8	DCC6C

# SAW Products



## SAW Product for Communication Terminal

P/N	Center Frequency (MHz)	Pass Band (dB)	Insertion Loss (MHz)	Package	Application
SF8022	823	4	3.1	DCC6C	CDMA
SF8129	829.8	10	2.4	DCC6C	CDMA
SF8028	830	6	2.4	DCC6C	CDMA
SF8002	835	10	2.6	DCC6C	CDMA
SF8008	836.5	25	2.4	DCC6C	CDMA
SF8009	842.5	5	2.5	DCC6C	CDMA
SF8021	875	10	2.3	DCC6C	CDMA
SF8012	876	10	2.3	DCC6C	CDMA
SF8011	881.5	25	2.3	DCC6C	CDMA
SF8007	887	4	2.5	DCC6C	CDMA/GSM
SF8017	897	24	2.6	DCC6C	GSM
SF8013	897.5	35	1.9	DCC6C	GSM
SF8024	899	20	2.0	DCC6C	GSM
SF8037	899	10	2.4	DCC6C	GSM
SF9073	900	30	2.5	DCC6C	GSM
SF9606	902.5	25	2.2	DCC6C	GSM
SF9044	932	4	2.7	DCC6C	GSM
SF9628	942	24	2.0	DCC6C	GSM
SF9003	942.5	35	2.2	DCC6C	GSM
SF9629	944	20	1.8	DCC6C	GSM
SF9064	945	30	2.7	DCC6C	GSM
SF9613	947.5	25	2.1	DCC6C	GSM
SF9607	1722.5	25	1.8	DCC6C	DCS
SF9096	1722.5	25	2.0	DCC6C	FDD
SF9623	1732.5	45	2.5	DCC6C	DCS/FDD
SF9621	1740	45	2.3	DCC6C	FDD
SF9620	1747.5	75	2.8	DCC6C	DCS/FDD
SF9053	1765	20	2.2	DCC6C	DCS/FDD
SF9075	1800	20	2.2	DCC6C	DCS
SF9633	1827.5	45	2.4	DCC6C	DCS/FDD
SF9643	1832.5	60	2.5	DCC6C	DCS/FDD
SF9077	1842.5	75	3.0	DCC6C	DCS/FDD
SF9055	1860	20	2.2	DCC6C	DCS/FDD
SF9066	1865	30	2.5	DCC6C	DCS/FDD
SF9093	1890	20	2.1	DCC6C	TDD
SF9083	1900	40	1.8	DCC6C	TDD
SF9072	1950	60	1.9	DCC6C	FDD
SF9049	1960	60	2.0	DCC6C	FDD
SF9067	1965	50	2.6	DCC6C	FDD
SF9090	1970	30	2.1	DCC6C	FDD
SF9043	2017.5	15	2.1	DCC6C	FDD/TDD
SF9061	2140	60	1.8	DCC6C	FDD/TDD
SF9050	2145	30	2.7	DCC6C	TDD
SF9640	2313.5	27	2.3	DCC6C	TDD
SF9087	2345	50	2.3	DCC6C	TDD
SF9062	2515	30	2.5	DCC6C	TDD
SF9622	2555	40	2.7	DCC6C	TDD
SF9086	2595	40	3.0	DCC6C	TDD
SF9639	2605	60	2.8	DCC6C	TDD
SF9614	1655	40	3.0	DCC6C	TDD



# SAW Products



## SAW Product for Base State

P/N	Center Frequency (MHz)	Bandwidth 1dB (MHz)	Bandwidth 3dB (MHz)	Bandwidth 40dB (MHz)	Insertion Loss (dB)	Passband Ripple (dB)	Package
SF0175	70		0.3	1	12	1	QCC12
SF0272	70		0.4		13	0.8	QCC12
SF0316	70		0.6		7	0.8	QCC12
SF0177	70	1.0	2.5	6.8	13.5	0.5	QCC12
SF0346	70		3.5	6	8	1	QCC12
SF0347	70			8	10	3	QCC12
SF0348	70			15	10	3	QCC12
SF0349	70				12	3	QCC12
SF0269	70		3.9		10	1	QCC12
SF0268	70		4.3		7	1	QCC12
SF0267	70		6.5		10	1	QCC12
SF0294	70	6.2	3.8	9.6	12	0.5	QCC12
SF0337	70	18.9	20	25.5	16	1	QCC12
SF0320	70		20		15	1.5	QCC12
SF0203	70	38		46	20	1.5	QCC12
SF0305	70	37		46	20	1	QCC12
SF0359	70	37		46.5	22	1	QCC12
SF0307	70		38	48	21	1.5	QCC12
SF1270	100	0.04			5	1	QCC12
SF1131	100		3.5	10	5	1	QCC12
SF1154	120	4		18	5	1	QCC12
SF1274	120	7	9	25	3	1	QCC12
SF1182	140		7	22	3	1	QCC12
SF1166	140		15		25	1	QCC12

## SAW Product for Wireless Telecommunication Device

P/N	Center Frequency (MHz)	Pass Band (dB)	Insertion Loss (MHz)	Package
SF1119	110	1	4.4	F-11
SF1003	110.592	1.5	2.6	QCC8C
SF1118	110.6	1.5	4.8	F-11
SF4053	479.5	17	18	TO-39
SF4010	480	8	20	QCC8C
SF4014	480	4	2	DC6
SF4168	480	20	2	DCC6
SF6008	675	25	1.7	DCC6
SF7010	740	12	3.1	DCC6
SF7020	750	50	3	DCC6
SF7126	750	5	2.8	DCC6C
SF7139	750	50	3	QCC8B
SF7011	752.5	25	2.4	QCC6C
SF7012	752.5	25	2.5	F-11
SF7022	752.5	25	1.4	F-11
SF7024	752.5	18	1.8	DCC6C
SF7128	768	20	2.2	QCC8B
SF8023	868	4	3.2	DCC6C
SF8010	869	2	2.4	DCC6C
SF9008	914	4	3.2	F-11
SF9134	915	26	2.4	DCC6
SF9135	915	26	2.6	DCC6C
SF9638	915	10	2.6	DCC6C

# SAW Products

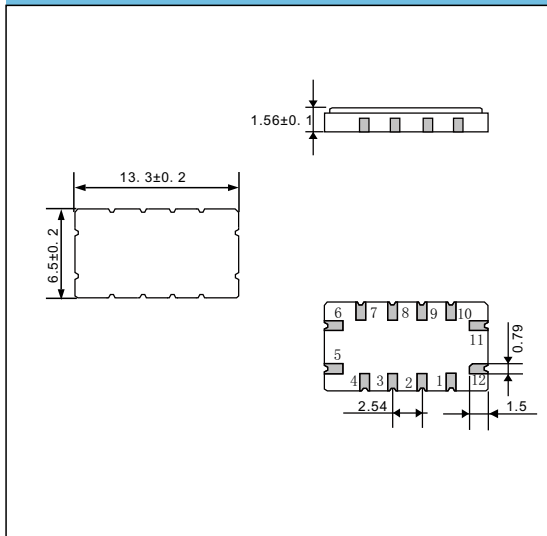


## SAW Product for Wireless Remote Control /Alarm

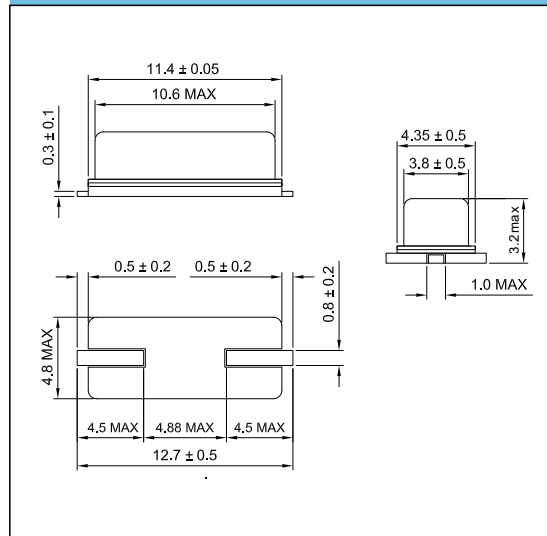
P/N	Center Frequency (MHz)	Frequency Accuracy (dB)	Insertion Loss (dB)	Package
R303.825	303.825	±75	1.5	F-11
R303.825	303.825	±75	1.3	TO-39
R303.825	303.825	±75	1.5	QCC8C
R303.875	303.875	±75	1.5	F-11
R303.875	303.875	±75	1.2	TO-39
R303.875	303.875	±75	1.4	QCC8C
R310	310	±75	1.5	F-11
R310	310	±75	1.5	TO-39
R315	315	±75	1.3	F-11
R315	315	±75	1.5	TO-39
R315	315	±75	1.3	QCC8C
R315	315	±75	1.2	QCC4A
R315	315	±75	1.5	DCC6
R315	315	±75	1.4	DCC6C
R316.8	316.8	±75	1.2	F-11
R316.8	316.8	±75	1.2	TO-39
R330	330	±75	1.6	F-11
R330	330	±75	1.6	TO-39
R330	330	±75	1.6	QCC8C
R350	350	±75	1.5	F-11
R350	350	±75	1.3	TO-39
R360	360	±75	1.3	F-11
R360	360	±75	1.4	TO-39
R370	370	±75	1.7	F-11
R370	370	±75	1.5	TO-39
R370	370	±75	1.4	QCC4A
R390	390	±75	1.5	F-11
R390	390	±75	1.4	TO-39
R390	390	±75	1.4	QCC8C
R407.3	407.3	±75	1.4	F-11
R407.3	407.3	±75	1.3	TO-39
R418	418	±75	1.5	F-11
R418	418	±75	1.4	TO-39
R433	433.92	±75	1.7	F-11
R433	433.92	±75	1.9	TO-39
R433	433.92	±75	1.2	QCC8C
R433	433.92	±75	1.3	QCC4A
R433	433.92	±75	1.5	DCC6
R433	433.92	±75	1.4	DCC6C
R868.35	868.35	26	2.4	F-11
R868.35	868.35	26	2.6	TO-39
R868.35	868.35	10	2.6	QCC8C
R868.35	868.35	4	3.2	QCC4A
R868.35	868.35	26	2.4	DCC6
R868.35	868.35	26	2.6	DCC6C

§ If you want to know more info, please contact with our sales department directly.

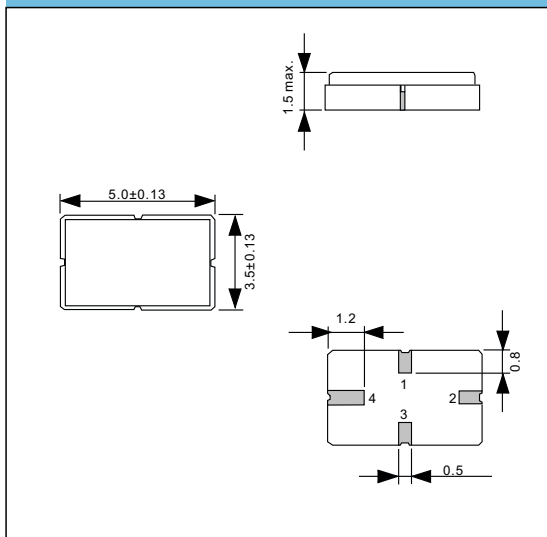
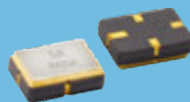
## QCC12



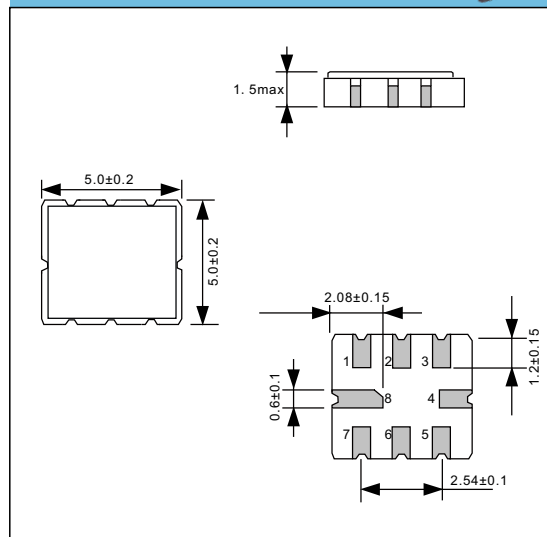
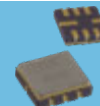
## 49SMD



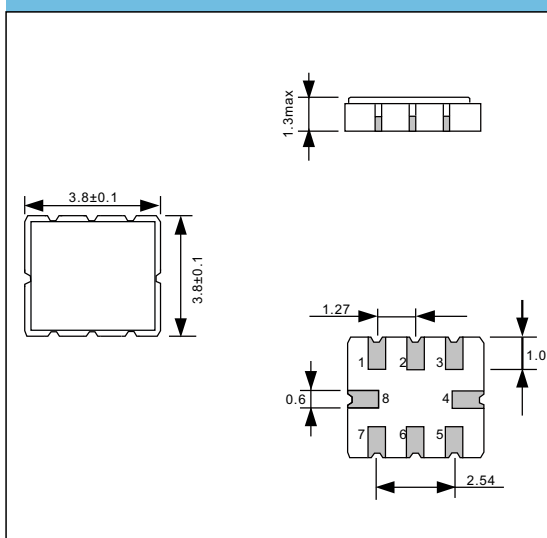
## QCC4A



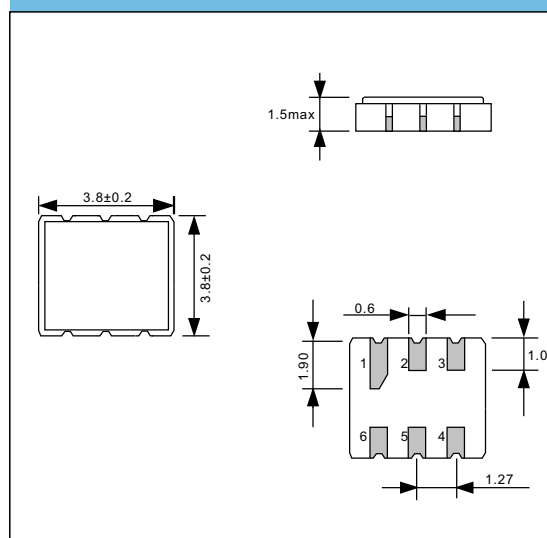
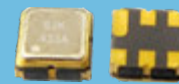
## QCC8C



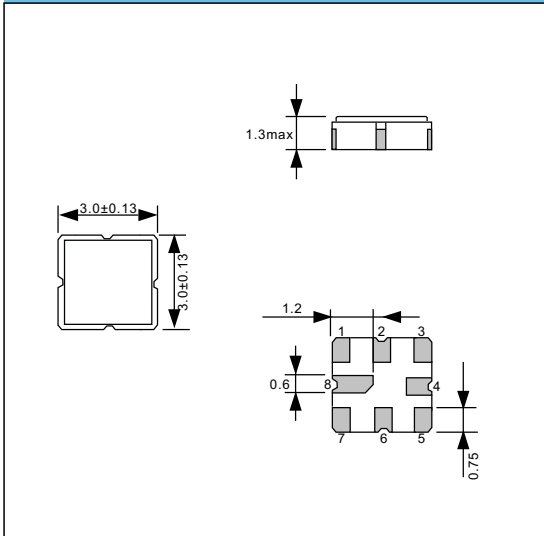
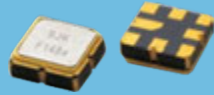
## QCC8B



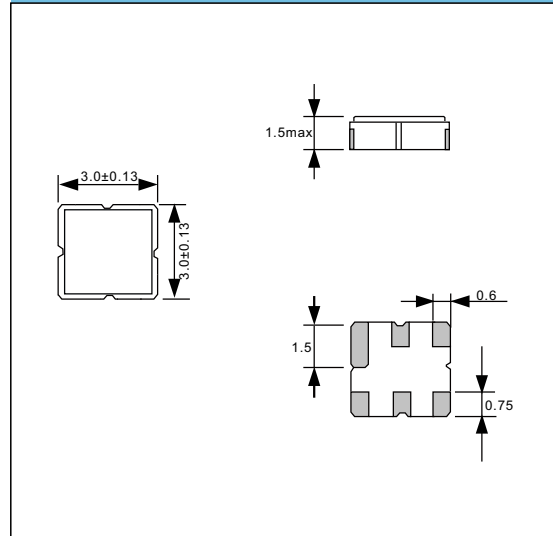
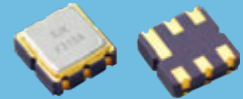
## DCC6



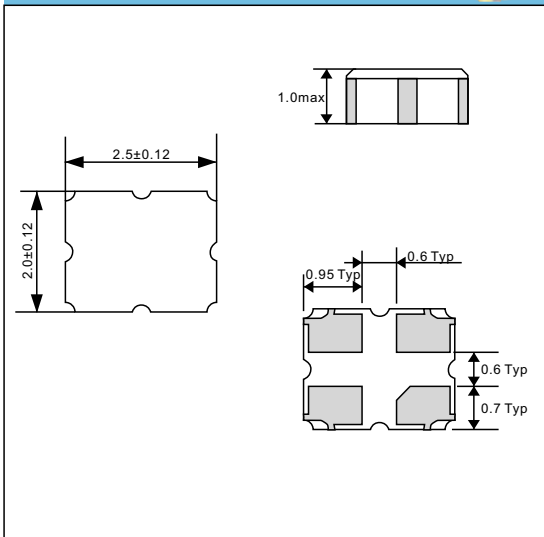
## DCC8D



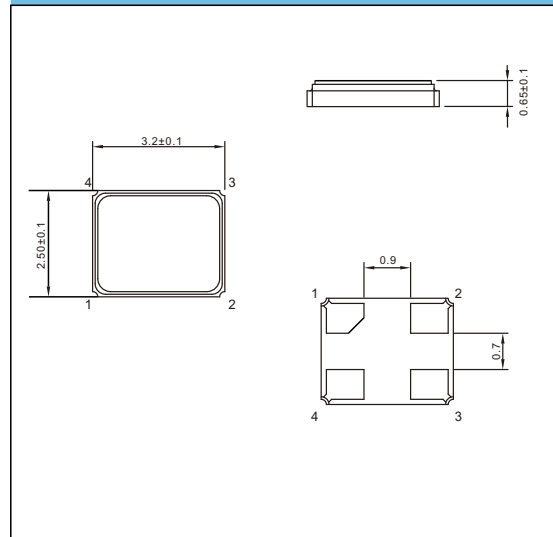
## QCC6C



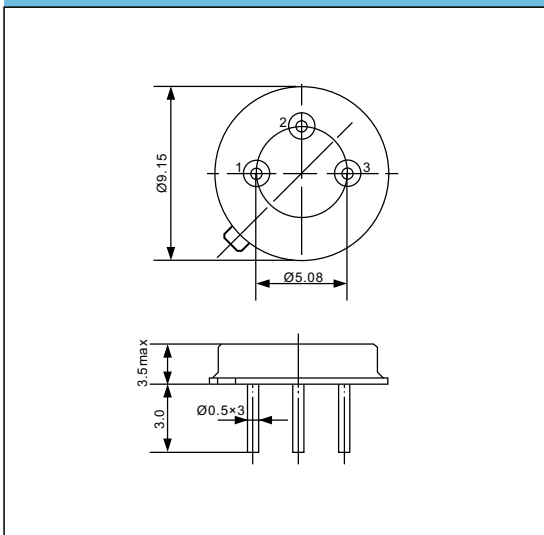
## 5AW



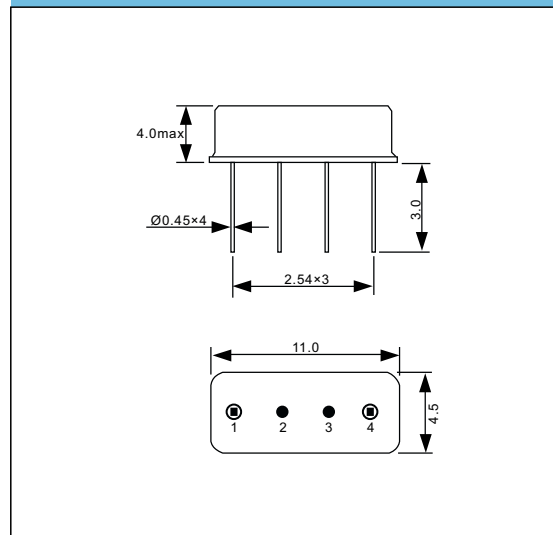
## 6AW



## TO-39



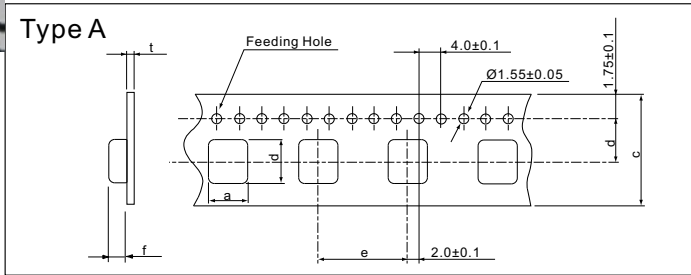
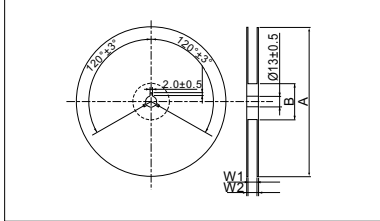
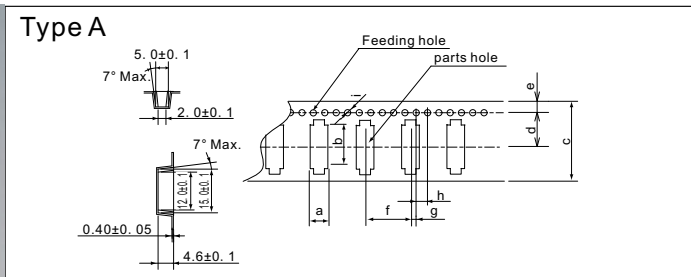
## F-11





# Taping & Reflow etc.





Type A	a	b	c	d	e	f	g	h	i	A	B	W1	W2
6C (49SMD)	5.0 ±0.1	12.0 ±0.1	24.0 ±0.1	11.5 ±0.1	1.75 ±0.1	8.0 ±0.1	2.0 ±0.1	4.0 ±0.1	1.5 ±0.1	Ø330 ±2.0	Ø80 ±1.0	25.5 ±1.0	29.5 ±1.0

### Crystal Resonator

Type B	a	b	c	d	e	f	t	A	B	W1	W2
7S (1210)	1.30 ±0.15	1.50 ±0.15	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	0.45 ±0.15	0.20 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7Y (1612)	1.45 ±0.15	1.85 ±0.15	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	0.45 ±0.15	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7F (2016)	1.90 ±0.10	2.35 ±0.10	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	0.85 ±0.15	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7E (2520)	2.25 ±0.10	2.80 ±0.10	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	1.0 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7U (3225)	2.70 ±0.10	3.50 ±0.10	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	1.0 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7I (5032)	3.50 ±0.10	5.30 ±0.15	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.0 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0
6G (6035)	3.90 ±0.10	6.40 ±0.10	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.70 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0
6F (7050)	5.40 ±0.10	7.90 ±0.10	16.0 ±0.2	7.50 ±0.05	8.0 ±0.1	1.85 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	17.5 ±0.3	21.5 ±1.0
7Z (2520G)	2.3 ±0.1	2.8 ±0.1	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	1.0 ±0.1	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7V (3225G)	2.8 ±0.1	3.5 ±0.1	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	1.0 ±0.1	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
6I (5032G)	3.6 ±0.1	5.45 ±0.10	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.55 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0

### Monolithic Crystal Filter

CF (7050)	5.40 ±0.10	7.20 ±0.10	16.0 ±0.2	7.50 ±0.05	8.0 ±0.1	1.80 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	16.5 ±0.3	19.6 ±1.0
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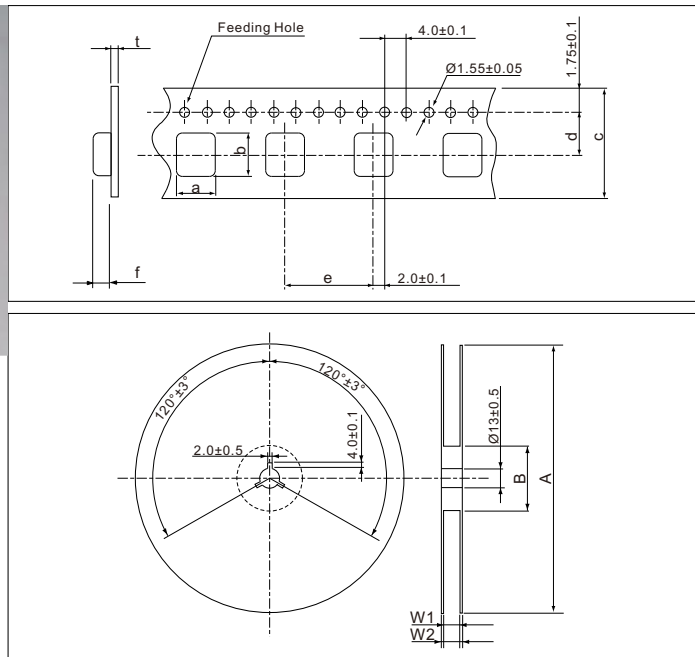
### 32.768 kHz Crystal Unit

	±0.10										
7K (1610)	1.28 ±0.05	1.79 ±0.05	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	0.65 ±0.10	0.20 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7R (2012)	1.45 ±0.05	2.3 ±0.1	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	0.65 ±0.10	0.20 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
7L (3215)	1.70 ±0.05	3.40 ±0.05	12.0 ±0.2	5.50 ±0.05	4.0 ±0.1	0.95 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.5 ±1.0
7M (7015)	1.70 ±0.1	7.20 ±0.10	16.0 ±0.2	7.50 ±0.05	8.0 ±0.1	1.60 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
6LC (308C)	4.1 ±0.1	8.5 ±0.1	16.0 ±0.3	7.50 ±0.1	8.0 ±0.1	2.7 ±0.1	0.30 ±0.05	Ø330 +0/-3	Ø80 +1/-0	17.5 ±0.3	21.5 ±1.0
6LB (206B)	4.0 ±0.1	9.5 ±0.1	16.0 ±0.3	7.5 ±0.1	8.0 ±0.1	2.15 ±0.10	0.30 ±0.05	Ø330 +0/-3	Ø80 +1/-0	17.5 ±0.3	21.5 ±1.0

### SAW Device

5AW (2520)	2.25 ±0.10	2.80 ±0.10	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	1.0 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
6AW (3225)	2.70 ±0.10	3.50 ±0.10	8.0 ±0.2	3.50 ±0.05	4.0 ±0.1	1.0 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	9.0 ±0.3	11.4 ±1.0
DCC6C&QCC8D	3.35 ±0.10	3.35 ±0.10	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.4 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0
DCC6&QCC8B	4.10 ±0.10	4.10 ±0.10	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.6 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0
QCC8C	5.35 ±0.10	5.35 ±0.10	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.4 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0
QCC4A	3.35 ±0.10	3.35 ±0.10	12.0 ±0.2	5.50 ±0.05	8.0 ±0.1	1.4 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	13.0 ±0.3	15.4 ±1.0
QCC12	13.77 ±0.10	6.96 ±0.10	24.0 ±0.2	11.50 ±0.05	12.0 ±0.1	2.0 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	25.0 ±0.3	28.4 ±1.0

\* The design, manufacturing process, and specifications of this device and subject to change without notice.



## Crystal Oscillator /VCXO /RTC Oscillator

	a	b	c	d	e	f	t	A	B	W1	W2
1N (2016)	1.95 $\pm 0.10$	2.35 $\pm 0.10$	8.0 $\pm 0.2$	3.50 $\pm 0.05$	4.0 $\pm 0.1$	0.85 $\pm 0.10$	0.20 $\pm 0.05$	$\varnothing 180$ +0/-3	$\varnothing 60$ +1/-0	9.0 $\pm 0.3$	11.4 $\pm 1.0$
2N (2520) 2D (2520 RTC)	2.3 $\pm 0.10$	2.8 $\pm 0.10$	8.0 $\pm 0.2$	3.5 $\pm 0.05$	4.0 $\pm 0.1$	1.15 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 180$ +0/-3	$\varnothing 60$ +1/-0	9.0 $\pm 0.3$	11.4 $\pm 1.0$
3N /3J /3D /3H (3225) 3C (3225 RTC) 3S /3P (3225 VCXO)	2.8 $\pm 0.10$	3.5 $\pm 0.10$	8.0 $\pm 0.2$	3.5 $\pm 0.05$	4.0 $\pm 0.1$	1.5 $\pm 0.10$	0.25 $\pm 0.05$	$\varnothing 180$ +0/-3	$\varnothing 60$ +1/-0	9.0 $\pm 0.3$	11.4 $\pm 1.0$
7N /5J /5D /5H (5032) 5B (5032 RTC) 5S /5V /5P (5032 VCXO)	3.5 $\pm 0.10$	5.4 $\pm 0.10$	12.0 $\pm 0.2$	5.50 $\pm 0.05$	8.0 $\pm 0.1$	1.7 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	13.5 $\pm 0.3$	18.5 $\pm 1.0$
6N /7J /7B /7H (7050) 7A (7050 RTC) 6S /7P /6V (7050 VCXO)	5.4 $\pm 0.10$	7.2 $\pm 0.10$	16.0 $\pm 0.2$	7.50 $\pm 0.05$	16.0 $\pm 0.1$	2.1 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	16.5 $\pm 0.3$	19.6 $\pm 1.0$
9N /9D /9J (1490) 9S /9V /9P (1490 VCXO)	10.0 $\pm 0.10$	15.0 $\pm 0.10$	24.0 $\pm 0.2$	11.50 $\pm 0.05$	16.0 $\pm 0.1$	6.9 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	25.0 $\pm 0.3$	29.0 $\pm 1.0$

## TCXO /VC-TCXO

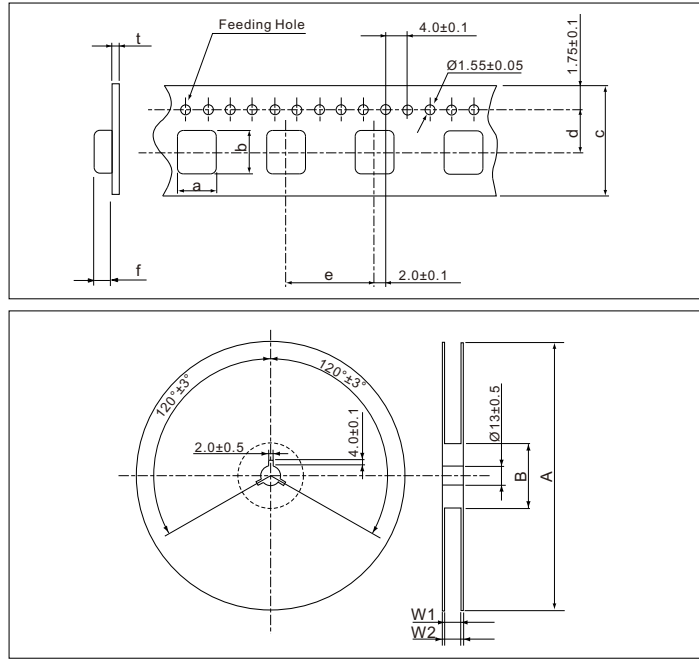
	a	b	c	d	e	f	t	A	B	W1	W2
7X (2016)	1.95 $\pm 0.10$	2.35 $\pm 0.10$	8.0 $\pm 0.2$	3.50 $\pm 0.05$	4.0 $\pm 0.1$	0.85 $\pm 0.10$	0.20 $\pm 0.05$	$\varnothing 180$ +0/-3	$\varnothing 60$ +1/-0	9.0 $\pm 0.3$	11.4 $\pm 1.0$
7Q (2520)	2.3 $\pm 0.10$	2.8 $\pm 0.10$	8.0 $\pm 0.2$	3.5 $\pm 0.05$	4.0 $\pm 0.1$	1.15 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 180$ +0/-3	$\varnothing 60$ +1/-0	9.0 $\pm 0.3$	11.4 $\pm 1.0$
7T (3225)	2.8 $\pm 0.10$	3.5 $\pm 0.10$	8.0 $\pm 0.2$	3.5 $\pm 0.05$	4.0 $\pm 0.1$	1.5 $\pm 0.10$	0.25 $\pm 0.05$	$\varnothing 180$ +0/-3	$\varnothing 60$ +1/-0	9.0 $\pm 0.3$	11.4 $\pm 1.0$
5T (5032)	3.5 $\pm 0.10$	5.4 $\pm 0.10$	12.0 $\pm 0.2$	5.50 $\pm 0.05$	8.0 $\pm 0.1$	1.7 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	13.5 $\pm 0.3$	18.5 $\pm 1.0$
8T (7050)	5.4 $\pm 0.10$	7.2 $\pm 0.10$	16.0 $\pm 0.2$	7.50 $\pm 0.05$	16.0 $\pm 0.1$	2.1 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	16.5 $\pm 0.3$	19.6 $\pm 1.0$
9T (1490)	10.0 $\pm 0.10$	15.0 $\pm 0.10$	24.0 $\pm 0.2$	11.50 $\pm 0.05$	16.0 $\pm 0.1$	6.9 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	25.0 $\pm 0.3$	29.0 $\pm 1.0$

## OCXO

	a	b	c	d	e	f	t	A	B	W1	W2
9X (1490)	10.0 $\pm 0.10$	15.0 $\pm 0.10$	24.0 $\pm 0.2$	11.50 $\pm 0.05$	16.0 $\pm 0.1$	6.9 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	25.0 $\pm 0.3$	29.0 $\pm 1.0$
5X (2522)	23.0 $\pm 0.10$	26.0 $\pm 0.10$	44.0 $\pm 0.2$	20.20 $\pm 0.05$	32.0 $\pm 0.1$	12.0 $\pm 0.10$	0.30 $\pm 0.05$	$\varnothing 330$ +0/-3	$\varnothing 100$ +1/-0	44.4 $\pm 0.3$	48.4 $\pm 1.0$

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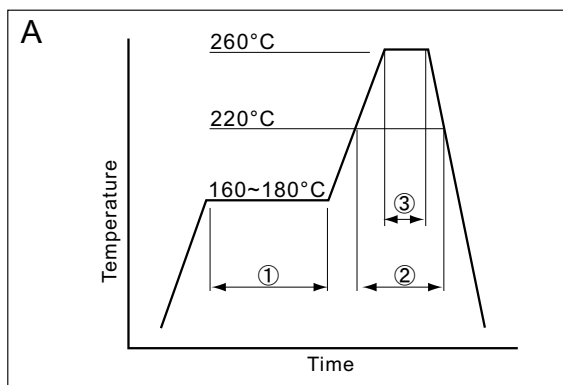
## SMD Ceramic Resonator

	a	b	c	d	e	f	t	A	B	W1	W2
ZTA/ZTTCC	3.8 ±0.20	7.8 ±0.20	16.0 ±0.3	7.5 ±0.1	8.0 ±0.1	2.10 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	16.4 ±0.3	22.4 ±1.0
ZTA/ZTTCS	5.0 ±0.20	4.4 ±0.20	12.0 ±0.3	5.5 ±0.1	8.0 ±0.1	1.80 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	12.4 ±0.3	19.4 ±1.0
ZTA/ZTTCR	2.2 ±0.20	4.7 ±0.20	12.0 ±0.3	5.5 ±0.1	4.0 ±0.1	1.30 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	12.4 ±0.3	19.4 ±1.0
ZTA/ZTTCV	3.4 ±0.20	4.0 ±0.20	12.0 ±0.3	5.5 ±0.1	8.0 ±0.1	1.30 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	12.4 ±0.3	19.4 ±1.0
ZTA/ZTTCE	1.5 ±0.20	3.4 ±0.20	8.0 ±0.3	3.5 ±0.1	4.0 ±0.1	1.30 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	8.4 ±0.3	14.0 ±1.0
ZTA/ZTTCW	2.3 ±0.20	2.8 ±0.20	8.0 ±0.3	3.5 ±0.1	4.0 ±0.1	1.30 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	8.4 ±0.3	14.0 ±1.0
ZTA/ZTT CZ	2.1 ±0.20	2.5 ±0.20	8.0 ±0.3	3.5 ±0.1	4.0 ±0.1	1.30 ±0.10	0.25 ±0.05	Ø180 +0/-3	Ø60 +1/-0	8.4 ±0.3	14.0 ±1.0
ZTA/ZTTCP	3.4 ±0.20	6.4 ±0.20	16.0 ±0.3	7.5 ±0.1	8.0 ±0.1	1.80 ±0.10	0.30 ±0.05	Ø180 +0/-3	Ø60 +1/-0	16.4 ±0.3	22.4 ±1.0

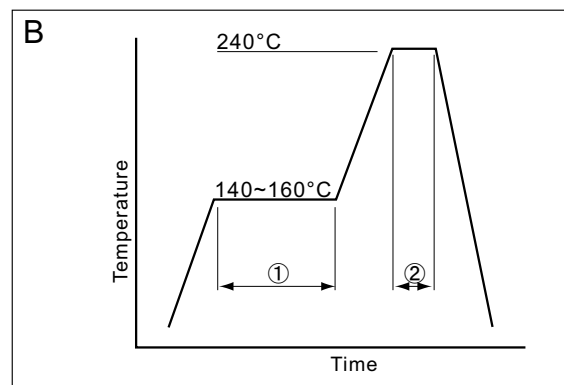
\* The design, manufacturing process, and specifications of this device and subject to change without notice.



	Reflow Temperature Profile A	Reflow Temperature Profile B
<b>Crystal Resonator</b>	7S (1210 size) 7Y (1612 size) 6G (6035 size) 7F (2016 size) 6F (7050 size) 7E (2520 size) 7Z (2520 glass size) 7U (3225 size) 7V (3225 glass size) 7I (5032 size) 6I (5032 glass size) 6C (HC-49SMD)	
<b>Tuning Fork Crystal</b>	7K (1610 size) 7M (7015 size) 7R (2012 size) 6LC (308C) 7L (3215 size)	6LB (206B)
<b>M.C.F</b>	CF (7050 size)	
<b>Ceramic Resonator</b>		ZTA/ZTTCC ZTA/ZTTCR ZTA/ZTTCE ZTA/ZTTCS ZTA/ZTTCV ZTA/ZTTCW
<b>Crystal Oscillator / Differential Output</b>	1N (2016 size) LVPECL LVDS HCSL 2N (2520 size) 3N (3225 size) 3J (3225 size) 3D (3225 size) 3H (3225 size) 7N (5032 size) 5J (5032 size) 5D (5032 size) 5H (5032 size) 6N (7050 size) 7J (7050 size) 7B (7050 size) 7H (7050 size) 9N (1490 size) 9J (1490 size) 9D (1490 size) 9H (1490 size)	
<b>RTC Oscillator</b>	2D (2520 size) 3C (3225 size) 5B (5032 size) 7A (7050 size)	
<b>TCXO /VC-TCXO</b>	7X (2016 size) 9T (1490 size) 7Q (2520 size) 7T (3225 size) 5T (5032 size) 8T (7050 size)	
<b>VCXO</b>	CMOS LVPECL LVDS 3S (3225 size) 3P (3225 size) 5V (5032 size) 5S (5032 size) 5P (5032 size) 6V (7050 size) 6S (7050 size) 7P (7050 size) 9V (1490 size) 9S (1490 size) 9P (1490 size)	
<b>SAW Device</b>	6AW (3225 size) DCC6 QCC8B DCC4A QCC8D DCC6C QCC8B QCC12	
<b>OCXO</b>	9X(1490 size) 5X (2522 size)	



①	Preheat	160~180°C	120sec.
②	Primary heat	220°C	60sec.
③	Peak	260°C	10sec. max



①	Preheat	140~160°C	120sec.
②	Peak	240°C	10sec.

※ The reflow temperature profile may vary depending on the product model, specifications and frequency range. Refer to individual product specifications for details.