

1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

CN : Low Phase Noise Crystal Oscillator

Feature

- Ceramic surface mount with Metal Lid
- CMOS compatible logic levels
- Tri-state function available
- RMS Phase Jitter:0.3pSec max.
- RoHS Compliant / Pb Free

Applications

- Wireless Devices
- Internet of Things (IoT) devices
- Fibre Channel
- Ethernet/Gigabit Ethernet
- Portable Electronics



Electrical Specifications

Item	Symb.	Min.	Typ.	Max.	Unit	Notes
Frequency Range	Freq.	1.000		54.000	MHz	
Operating Temperature	T _{use}	-20		+70	°C	
		-40		+85	°C	
Storage Temperature Range	T _{stg}	-55		+125	°C	
Supply Voltage	V _{dd}	1.8		3.3	V	
Output Load	L _{CMOS}		15		pF	
Current Consumption	I _{cc}			10	mA	1MHz ≤ Freq. < 40MHz
				20		40MHz ≤ Freq. ≤ 54MHz
Duty Cycle	SYM	45		55	%	50 % V _{dd} level, L _{CMOS} ≤ 15 pF
Rise / Fall Time	T _R / T _F			5	nS	10% V _{dd} to 90% Level
Start-up Time	T _{str}			5	mS	To 90% of Final Amplitude
High output voltage	V _{OH}	0.9V _{dd}			V	
Low output voltage	V _{OL}			0.1V _{dd}	V	
Enable Voltage High(Logic 1)	V _{IH}	0.7V _{dd}			V	Output will be disable if OE is Logic 0 Output will be enable if OE is Logic 1 or open
Enable Voltage Low(Logic 0)	V _{IL}			0.3V _{dd}	V	
Enable Time	T _{PLZ}			150	uS	
RMS Phase Jitter	T _{RPJ}			0.3	pSec	Integrated 12KHz to 20MHz
Phase Noise @27MHz 3.3V 10 Hz	T _{PN}	-100			dBc/Hz	
100 Hz		-125			dBc/Hz	
1 KHz		-150			dBc/Hz	
10 KHz		-160			dBc/Hz	
Aging	f _{age}			3	ppm	1st. Year at 25°C

Frequency Stability & Operating Temperature Range

Temp. \ FT	±20ppm	±25ppm	±30ppm	±50ppm
-20°C to +70°C	△	★	★	★
-40°C to +85°C		△	★	★

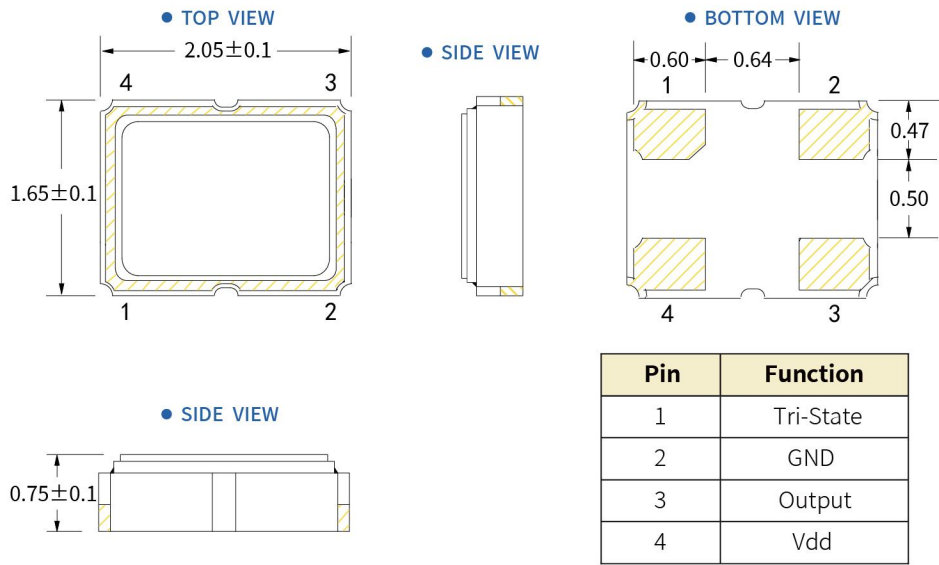
★: Available △: Conditional

All condition: Include 25°C tolerance, operating temperature range , input voltage change, aging, load change.

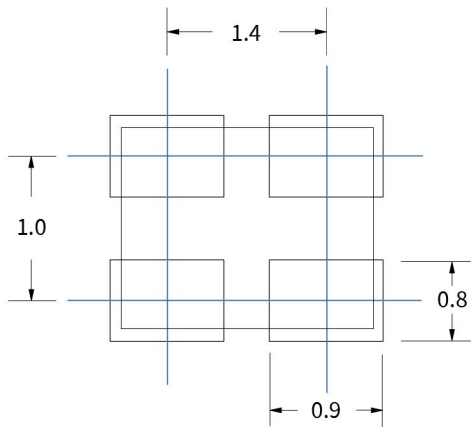
1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P CN : Low Phase Noise Crystal Oscillator

Dimensions (UNIT:mm)



Solder pad layout (UNIT:mm)



Options and Part Identification : Example SX1M11.2896B20F30TNF

Company	Ceramic Package	Frequency Code [MHz]	Supply Voltage	Frequency Tolerance	Operating Temperature	Frequency Drift	Output	Current Consumption	Phase Noise
SX	1M	X.XXX	B	20	F	30	T	N	F
Code Company		Frequency		Code Frequency Tolerance		Code Frequency Drift		Code Current	
SX SCTF		11.2896 19.200 25.000 49.152		10 ±10ppm 20 ±20ppm		15 ±15ppm 20 ±20ppm 30 ±30ppm		N Standard	
			Code Voltage		Code Frequency Tolerance		Code Output		Code Phase Noise
	7M 7.0×5.0×1.3mm 5M 5.0×3.2×1.2mm 3M 3.2×2.5×0.95mm 2M 2.5×2.0×0.81mm 1M 2.0×1.6×0.75mm		D 1.8V H 2.5V B 3.3V		E -20°C ~ +70°C F -40°C ~ +85°C		T CMOS		F -145dBc/Hz 1KHz offset G -150dBc/Hz 1KHz offset H -155dBc/Hz 1KHz offset

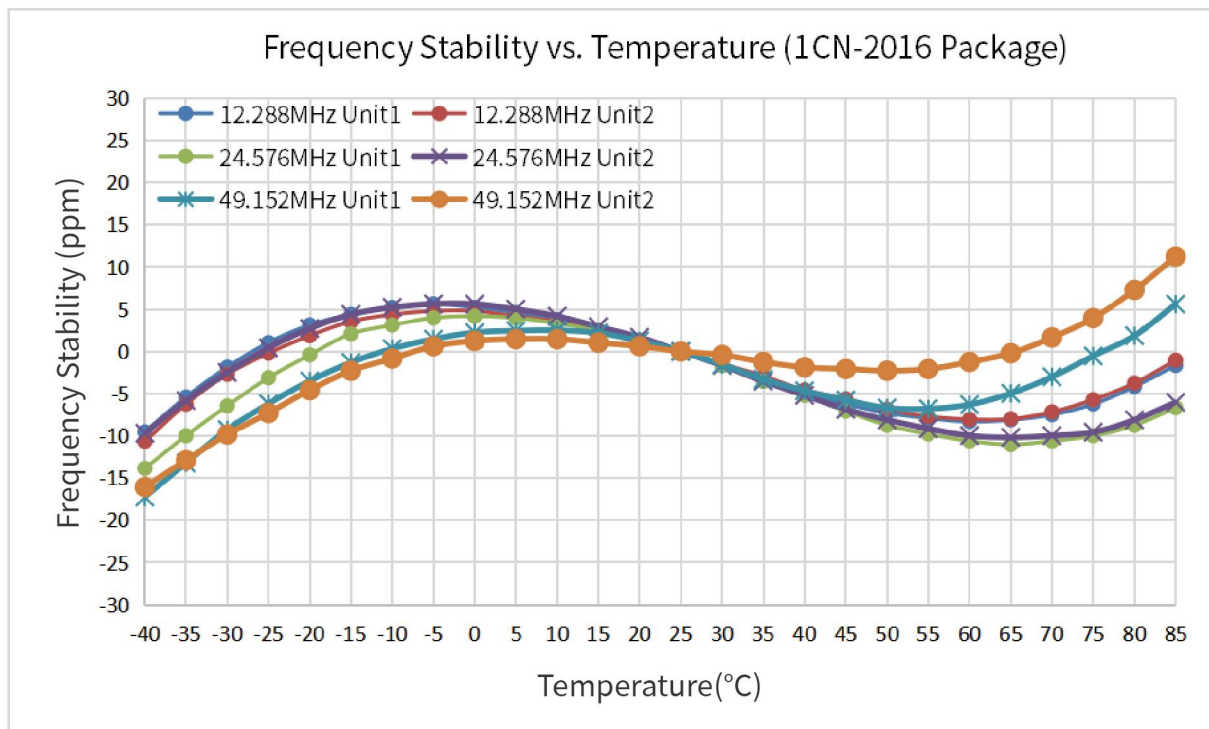
If you have other parameter requirements, you can contact **SCTF** at any time.

1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

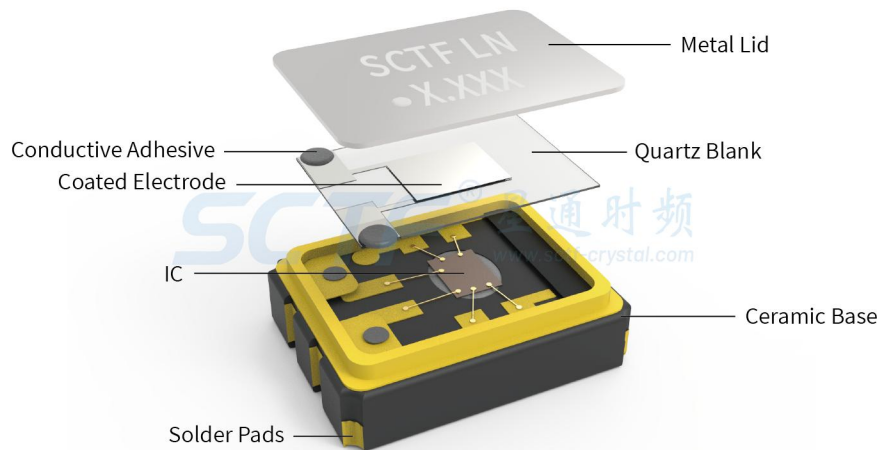
CN : Low Phase Noise Crystal Oscillator

Frequency Temperature Characteristics

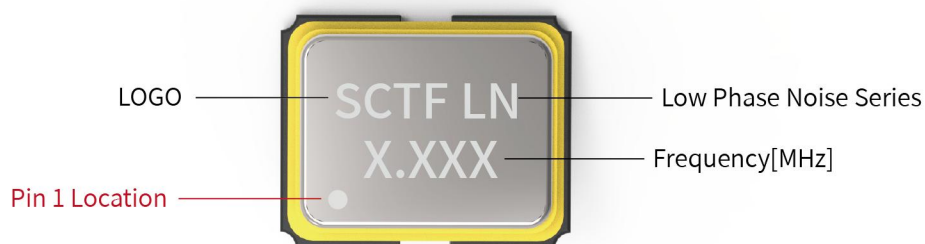


Product Structure&Marking Information

• Product Structure



• Marking Information

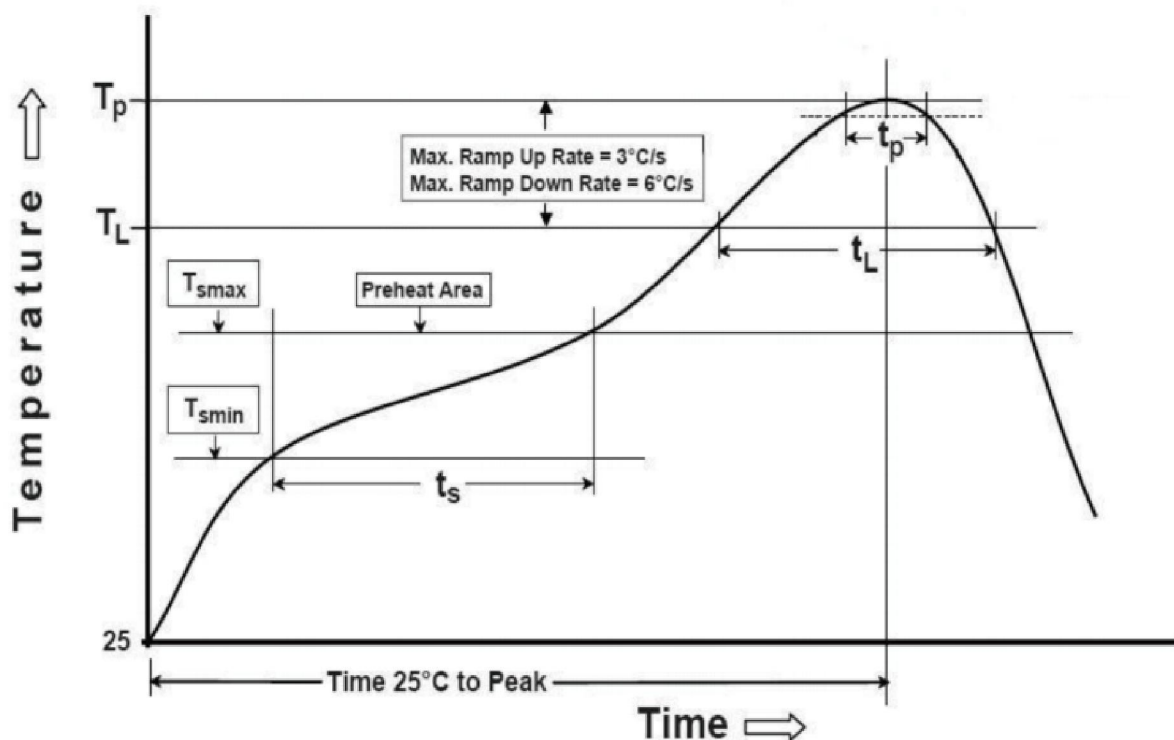


1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

CN : Low Phase Noise Crystal Oscillator

Suggested Reflow Profile



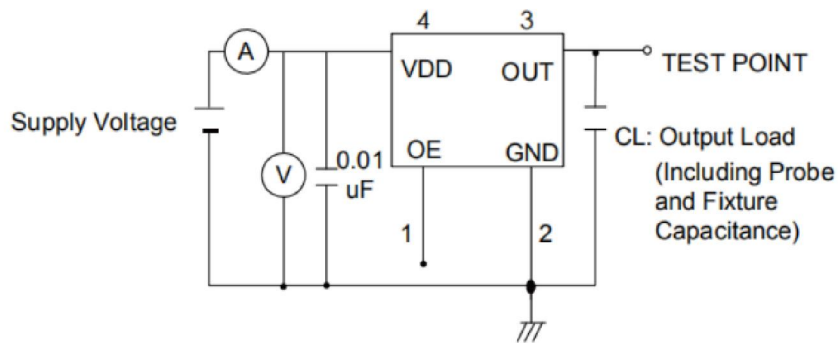
Profile Feature	Sn - Pb Eutectic Assembly	Preheat / Soak
Preheat / Soak ● Temperature Min (Ts min) ● Temperature Max (Ts max) ● Time (Ts min to Ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-120 seconds
Ramp - up rate (TL to Tp)	3°C/ second max.	3°C/ second max.
Time maintained above ● Liquidous temperature (TL) ● Time (tL) maintained above TL	183°C 60-150 seconds	217°C 60-150 seconds
Peak package body temperature (Tp)	235°C	260°C
Time within 5° C of the specified classification temperature (Tp)	20 seconds	30 seconds
Ramp - down rate (Tp to TL)	6°C/ second max.	6°C/ second max.
Time 25° C to peak temperature	6 minutes max.	8 minutes max.
Suggest reflow times	2 Times max.	

1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

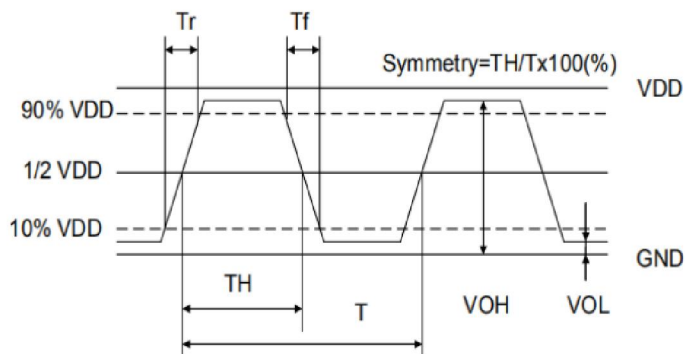
CN : Low Phase Noise Crystal Oscillator

Testing Circuit



※ Notes: PIN 1 connected to Vdd or floating, the product is working properly; connected to GND, stops working.

Waveform Conditions



Waveform measurement system should have a min. bandwidth of 5 times the frequency being tested.

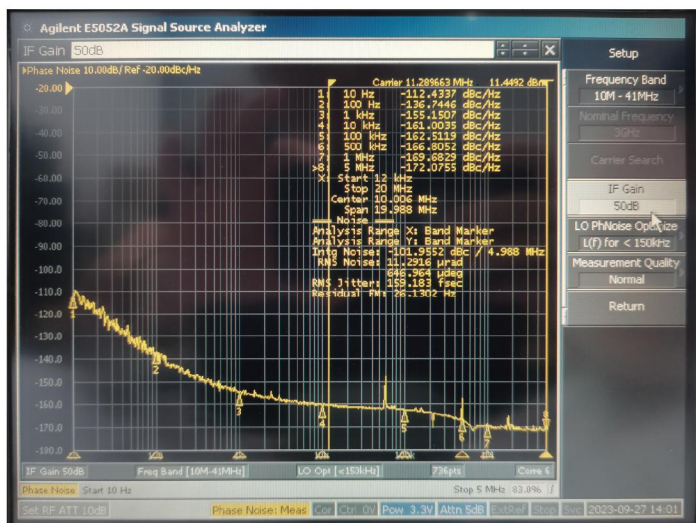
1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

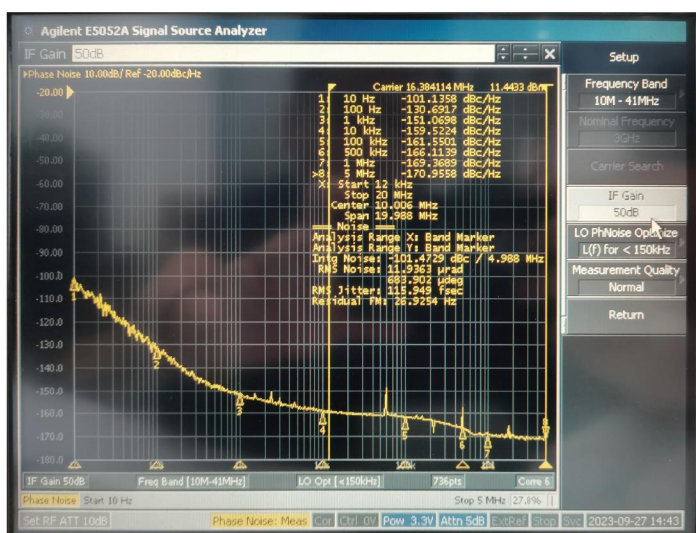
CN : Low Phase Noise Crystal Oscillator

Representative Phase Noise Plots @ +25°C

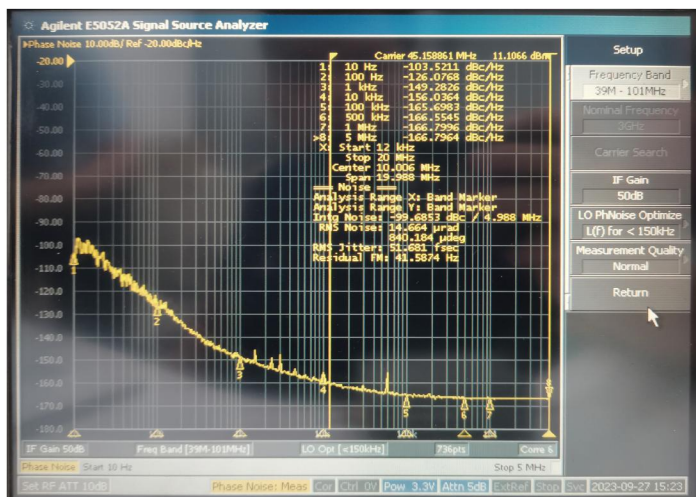
- F=11.2896 MHz Vdd=3.3V CMOS Output RMS Phase Jitter=159.183 fsec



- F=16.384 MHz Vdd=3.3V CMOS Output RMS Phase Jitter=115.949 fsec



- F=45.1584 MHz Vdd=3.3V CMOS Output RMS Phase Jitter=51.681 fsec



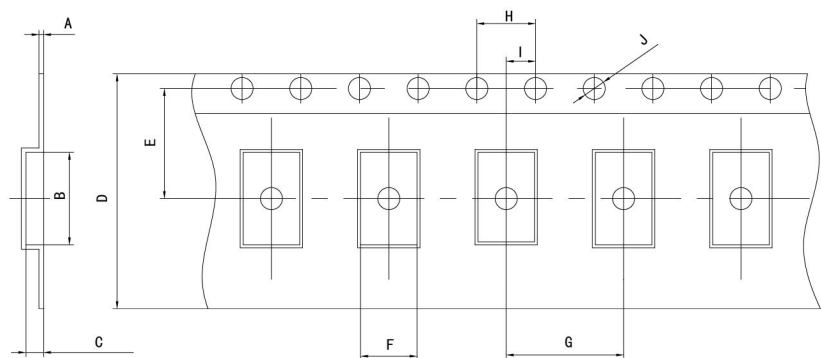
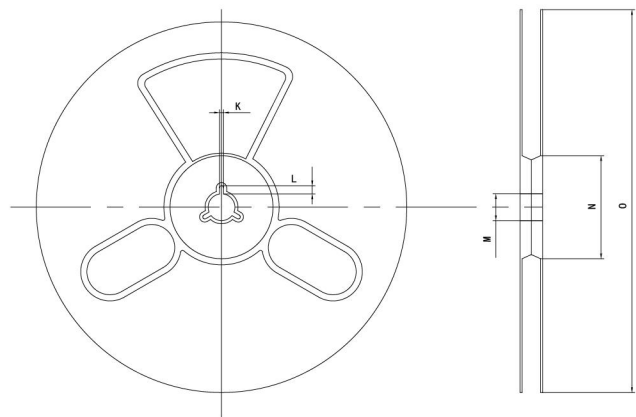
1CN Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

CN : Low Phase Noise Crystal Oscillator

Packaging Information

T=Tape and reel (3,000pcs/reel)



Pocket Tape Dimensions(mm)

Series	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1CN	0.25±0.05	2.3±0.1	1.0±0.1	8.0±0.1	3.5±0.1	1.9±0.1	4.0±0.1	4.0±0.1	2.0±0.1	φ1.5±0.1	2.0±0.2	4.0±1.0	φ13±0.5	φ60±1	φ180±1

Common Frequencies – MHz

1CN Series				
1.000	1.024	1.8432	2.000	2.048
3.6864	4.000	4.096	4.9152	6.0000
6.144	7.3728	8.0000	8.192	10.000
11.2896	12.000	12.288	13.000	13.560
14.7456	16.000	16.384	19.200	19.440
20.000	22.5792	24.000	24.576	25.000
26.000	27.000	28.63636	30.000	30.720
32.000	32.768	33.000	33.333	33.3333
38.400	40.000	45.1584	48.000	49.152
50.000				