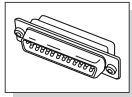


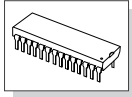
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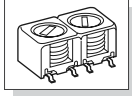
B



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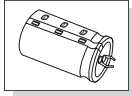
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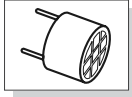
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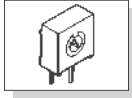


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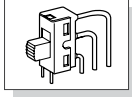
F



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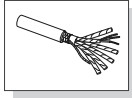
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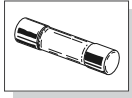
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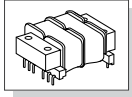


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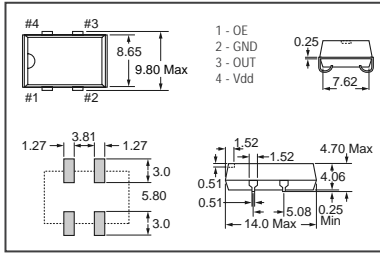
1-800-344-4539

218-681-6674 • FAX: 218-681-3380 • www.digikey.com

CMX309F Series Oscillators

SPECIFICATIONS:

• Frequency Stability: ±100ppm (-10°C to +70°C) • Operating Temperature Range: -10°C to +70°C • Storage Temperature Range: -55°C to +125°C • Supply Voltage: V_{DD}: 5.0V ±0.5V • Supply Current: 23mA Max. • Duty: TTL Level (1.4V): 45% to 55% • CMOS Level (V_{DD}/2): 40% to 60% • Output Voltage: V_{OH}: V_{DD} - 0.4V Min.; V_{OL}: 0.4V Max. • Output Load: TTL: 10TTL Max.; tr_{if}: 8nsec Max.; CMOS: tr_{if}: 8nsec Max. • Rise & Fall Time: TTL: tr_{if}: 8nsec Max.; CMOS: tr_{if}: 7nsec Max. • Start-up Time: 4msec Max. • Input (OE) Voltage: V_{ih}: 2.0V Min.; V_{il}: 0.8V Max. • Disable Current: 12mA Max. • Aging (first year): ±5ppm/year Max.

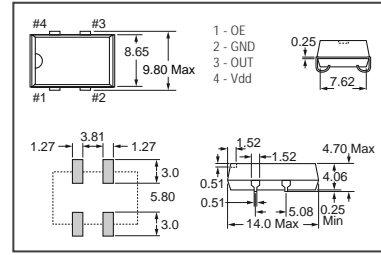


Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T & R Pricing 1,000	Citizen Part No.
		1	10	50			
1.544	300-7001-1-ND	3.00	2.80	1.80	300-7001-2-ND	1328.00	CMX309FLC1.544MT
1.8432	300-7002-1-ND	3.00	2.80	1.80	300-7002-2-ND	1328.00	CMX309FLC1.8432MT
2.000	300-7003-1-ND	3.00	2.80	1.80	300-7003-2-ND	1328.00	CMX309FLC2.000MT
2.048	300-7004-1-ND	3.00	2.80	1.80	300-7004-2-ND	1328.00	CMX309FLC2.048MT
2.4576	300-7005-1-ND	3.00	2.80	1.80	300-7005-2-ND	1328.00	CMX309FLC2.4576MT
3.072	300-7006-1-ND	3.00	2.80	1.80	300-7006-2-ND	1328.00	CMX309FLC3.072MT
3.579545	300-7007-1-ND	3.00	2.80	1.80	300-7007-2-ND	1328.00	CMX309FLC3.579545MT
3.6864	300-7008-1-ND	3.00	2.80	1.80	300-7008-2-ND	1328.00	CMX309FLC3.6864MT
4.000	300-7009-1-ND	3.00	2.80	1.80	300-7009-2-ND	1328.00	CMX309FLC4.000MT
4.096	300-7010-1-ND	3.00	2.80	1.80	300-7010-2-ND	1328.00	CMX309FLC4.096MT
4.9152	300-7011-1-ND	3.00	2.80	1.80	300-7011-2-ND	1328.00	CMX309FLC4.9152MT
5.000	300-7012-1-ND	3.00	2.80	1.80	300-7012-2-ND	1328.00	CMX309FLC5.000MT
6.000	300-7013-1-ND	3.00	2.80	1.80	300-7013-2-ND	1328.00	CMX309FLC6.000MT
6.144	300-7014-1-ND	3.00	2.80	1.80	300-7014-2-ND	1328.00	CMX309FLC6.144MT
7.3728	300-7015-1-ND	3.00	2.80	1.80	300-7015-2-ND	1328.00	CMX309FLC7.3728MT
8.000	300-7016-1-ND	3.00	2.80	1.80	300-7016-2-ND	1328.00	CMX309FLC8.000MT
8.192	300-7017-1-ND	3.00	2.80	1.80	300-7017-2-ND	1328.00	CMX309FLC8.192MT
9.8304	300-7018-1-ND	3.00	2.80	1.80	300-7018-2-ND	1328.00	CMX309FLC9.8304MT
10.000	300-7019-1-ND	3.00	2.80	1.80	300-7019-2-ND	1328.00	CMX309FLC10.000MT
11.000	300-7021-1-ND	3.00	2.80	1.80	300-7021-2-ND	1328.00	CMX309FLC11.000MT
11.0592	300-7022-1-ND	3.00	2.80	1.80	300-7022-2-ND	1328.00	CMX309FLC11.0592MT
11.2896	300-7023-1-ND	3.00	2.80	1.80	300-7023-2-ND	1328.00	CMX309FLC11.2896MT
12.000	300-7024-1-ND	3.00	2.80	1.80	300-7024-2-ND	1328.00	CMX309FLC12.000MT
12.288	300-7025-1-ND	3.00	2.80	1.80	300-7025-2-ND	1328.00	CMX309FLC12.288MT
12.352	300-7026-1-ND	3.00	2.80	1.80	300-7026-2-ND	1328.00	CMX309FLC12.352MT
13.500	300-7027-1-ND	3.00	2.80	1.80	300-7027-2-ND	1328.00	CMX309FLC13.500MT
14.31818	300-7028-1-ND	3.00	2.80	1.80	300-7028-2-ND	1328.00	CMX309FLC14.31818MT
14.7456	300-7029-1-ND	3.00	2.80	1.80	300-7029-2-ND	1328.00	CMX309FLC14.7456MT
15.360	300-7031-1-ND	3.00	2.80	1.80	300-7031-2-ND	1328.00	CMX309FLC15.360MT
16.000	300-7032-1-ND	3.00	2.80	1.80	300-7032-2-ND	1328.00	CMX309FLC16.000MT
16.384	300-7034-1-ND	3.00	2.80	1.80	300-7034-2-ND	1328.00	CMX309FLC16.384MT
16.6666	300-7035-1-ND	3.00	2.80	1.80	300-7035-2-ND	1328.00	CMX309FLC16.6666MT
17.34475	300-7036-1-ND	3.00	2.80	1.80	300-7036-2-ND	1328.00	CMX309FLC17.34475MT
18.000	300-7037-1-ND	3.00	2.80	1.80	300-7037-2-ND	1328.00	CMX309FLC18.000MT
18.432	300-7038-1-ND	3.00	2.80	1.80	300-7038-2-ND	1328.00	CMX309FLC18.432MT
19.6608	300-7039-1-ND	3.00	2.80	1.80	300-7039-2-ND	1328.00	CMX309FLC19.6608MT
20.000	300-7040-1-ND	3.00	2.80	1.80	300-7040-2-ND	1328.00	CMX309FLC20.000MT
22.1184	300-7041-1-ND	3.00	2.80	1.80	300-7041-2-ND	1328.00	CMX309FLC22.1184MT
24.000	300-7042-1-ND	3.00	2.80	1.80	300-7042-2-ND	1360.00	CMX309FLC24.000MT
24.576	300-7043-1-ND	3.00	2.80	1.80	300-7043-2-ND	1328.00	CMX309FLC24.576MT
25.000	300-7044-1-ND	3.00	2.80	1.80	300-7044-2-ND	1328.00	CMX309FLC25.000MT
25.175	300-7045-1-ND	3.00	2.80	1.80	300-7045-2-ND	1328.00	CMX309FLC25.175MT
27.000	300-7046-1-ND	3.00	2.80	1.80	300-7046-2-ND	1328.00	CMX309FLC27.000MT
28.322	300-7047-1-ND	3.00	2.80	1.80	300-7047-2-ND	1328.00	CMX309FLC28.322MT
28.63636	300-7048-1-ND	3.00	2.80	1.80	300-7048-2-ND	1328.00	CMX309FLC28.63636MT
29.498928	300-7049-1-ND	3.00	2.80	1.80	300-7049-2-ND	1328.00	CMX309FLC29.498928MT
30.000	300-7050-1-ND	3.00	2.80	1.80	300-7050-2-ND	1328.00	CMX309FLC30.000MT

CMX309H Series Oscillators

SPECIFICATIONS:

• Frequency Stability: ±100ppm (-10°C to +70°C) • Operating Temperature Range: -10°C to +70°C • Storage Temperature Range: -55°C to +125°C • Supply Voltage: V_{DD}: 5.0V ±0.5V • Supply Current: 35mA Max. • Duty: TTL Level (1.4V): 45% to 55% • CMOS Level (V_{DD}/2): 40% to 60% • Output Voltage: V_{OH}: V_{DD} - 0.5V Min.; V_{OL}: 0.5V Max. • Output Load: TTL: 10TTL Max.; tr_{if}: 5nsec Max.; CMOS: tr_{if}: 7nsec Max. • Rise & Fall Time: TTL: tr_{if}: 5nsec Max.; CMOS: tr_{if}: 7nsec Max. • Start-up Time: 10msec Max. • Input (OE) Voltage: V_{ih}: 2.0V Min.; V_{il}: 0.8V Max. • Disable Current: 28mA Max. • Aging (first year): ±5ppm/year Max.

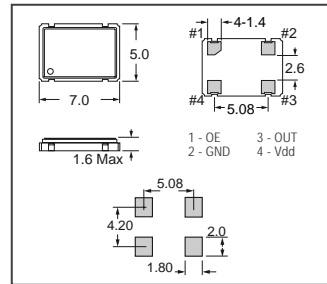


Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T & R Pricing 1,000	Citizen Part No.
		1	10	50			
32.000	300-7101-1-ND	3.00	2.80	1.80	300-7101-2-ND	1328.00	CMX309HWC32.000MT
32.768	300-7102-1-ND	3.00	2.80	1.80	300-7102-2-ND	1328.00	CMX309HWC32.768MT
33.000	300-7103-1-ND	3.00	2.80	1.80	300-7103-2-ND	1328.00	CMX309HWC33.000MT
33.3333	300-7104-1-ND	3.00	2.80	1.80	300-7104-2-ND	1328.00	CMX309HWC33.3333MT
33.8688	300-7105-1-ND	3.00	2.80	1.80	300-7105-2-ND	1328.00	CMX309HWC33.8688MT
40.000	300-7107-1-ND	3.00	2.80	1.80	300-7107-2-ND	1328.00	CMX309HWC40.000MT
44.2368	300-7108-1-ND	3.00	2.80	1.80	300-7108-2-ND	1328.00	CMX309HWC44.2368MT
48.000	300-7109-1-ND	3.00	2.80	1.80	300-7109-2-ND	1328.00	CMX309HWC48.000MT
49.152	300-7110-1-ND	3.00	2.80	1.80	300-7110-2-ND	1328.00	CMX309HWC49.152MT
50.000	300-7111-1-ND	3.19	2.98	1.92	300-7111-2-ND	1411.00	CMX309HWC50.000MT
53.125	300-7112-1-ND	3.00	2.80	1.80	300-7112-2-ND	1328.00	CMX309HWC53.125MT
60.000	300-7113-1-ND	3.00	2.80	1.80	300-7113-2-ND	1328.00	CMX309HWC60.000MT
64.000	300-7114-1-ND	3.00	2.80	1.80	300-7114-2-ND	1328.00	CMX309HWC64.000MT
66.000	300-7115-1-ND	3.00	2.80	1.80	300-7115-2-ND	1328.00	CMX309HWC66.000MT
66.6667	300-7116-1-ND	3.00	2.80	1.80	300-7116-2-ND	1328.00	CMX309HWC66.6667MT

CSX750PCC Series Oscillators

SPECIFICATIONS:

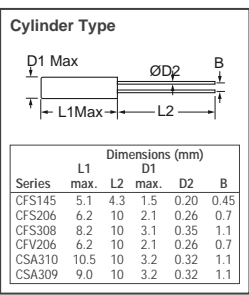
• Frequency Stability: ±100ppm (-20°C to +70°C) • Operating Temperature Range: -20°C to +70°C • Storage Temperature Range: -55°C to +125°C • Supply Voltage: V_{DD}: 5.0V ±0.5V • Supply Current: 45mA Max. • Duty: CMOS Level (V_{DD}/2): 45% to 55% • Output Voltage: V_{OH}: V_{DD} - 0.4V Min.; V_{OL}: 0.4V Max. • Output Load: CMOS: 25pF Max. • Rise & Fall Time: CMOS: tr_{if}: 4nsec Max. • Start-up Time: 10msec Max. • Input (OE) Voltage: V_{ih}: 2.0V Min.; V_{il}: 0.8V Max. • Disable Current: 30mA Max. • Stand-by Current: 50µA Max.



Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T & R Pricing 2,000	Citizen Part No.
		1	10	50			
1.5440	300-8001-1-ND	4.13	3.85	3.30	300-8001-2-ND	1540.00/M	CSX750PCC1.5440MT
1.8432	300-8002-1-ND	4.13	3.85	3.30	300-8002-2-ND	1540.00/M	CSX750PCC1.8432MT
3.6864	300-8003-1-ND	4.13	3.85	3.30	300-8003-2-ND	1540.00/M	CSX750PCC3.6864MT
4.0000	300-8004-1-ND	4.13	3.85	3.30	300-8004-2-ND	1540.00/M	CSX750PCC4.0000MT
6.1760	300-8005-1-ND	4.13	3.85	3.30	300-8005-2-ND	1540.00/M	CSX750PCC6.1760MT
7.3728	300-8006-1-ND	4.13	3.85	3.30	300-8006-2-ND	1540.00/M	CSX750PCC7.3728MT
8.0000	300-8007-1-ND	4.13	3.85	3.30	300-8007-2-ND	1540.00/M	CSX750PCC8.0000MT
10.0000	300-8008-1-ND	4.13	3.85	3.30	300-8008-2-ND	1540.00/M	CSX750PCC10.0000MT
12.0000	300-8009-1-ND	4.13	3.85	3.30	300-8009-2-ND	1540.00/M	CSX750PCC12.0000MT
12.2880	300-8010-1-ND	4.13	3.85	3.30	300-8010-2-ND	1540.00/M	CSX750PCC12.2880MT
12.3520	300-8011-1-ND	4.13	3.85	3.30	300-8011-2-ND	1540.00/M	CSX750PCC12.3520MT
14.31818	300-8012-1-ND	4.13	3.85	3.30	300-8012-2-ND	1540.00/M	CSX750PCC14.31818MT
15.3600	300-8013-1-ND	4.13	3.85	3.30	300-8013-2-ND	1540.00/M	CSX750PCC15.3600MT
16.0000	300-8014-1-ND	4.13	3.85	3.30	300-8014-2-ND	1540.00/M	CSX750PCC16.0000MT
16.3840	300-8015-1-ND	4.13	3.85	3.30	300-8015-2-ND	1540.00/M	CSX750PCC16.3840MT
18.4320	300-8016-1-ND	4.13	3.85	3.30	300-8016-2-ND	1540.00/M	CSX750PCC18.4320MT
19.4400	300-8017-1-ND	4.13	3.85	3.30	300-8017-2-ND	1540.00/M	CSX750PCC19.4400MT
20.0000	300-8018-1-ND	4.13	3.85	3.30	300-8018-2-ND	1540.00/M	CSX750PCC20.0000MT
24.0000	300-8019-1-ND	4.13	3.85	3.30	300-8019-2-ND	1540.00/M	CSX750PCC24.0000MT
24.7040	300-8020-1-ND	4.13	3.85	3.30	300-8020-2-ND	1540.00/M	CSX750PCC24.7040MT
25.0000	300-8021-1-ND	4.13	3.85	3.30	300-8021-2-ND	1540.00/M	CSX750PCC25.0000MT
29.4912	300-8022-1-ND	4.13	3.85	3.30	300-8022-2-ND	1540.00/M	CSX750PCC29.4912MT
30.0000	300-8023-1-ND	4.13	3.85	3.30	300-8023-2-ND	1540.00/M	CSX750PCC30.0000MT
32.0000	300-8024-1-ND	4.13	3.85	3.30	300-8024-2-ND	1540.00/M	CSX750PCC32.0000MT
32.7680	300-8025-1-ND	4.13	3.85	3.30	300-8025-2-ND	1540.00/M	CSX750PCC32.7680MT
33.3330	300-8026-1-ND	4.13	3.85	3.30	300-8026-2-ND	1540.00/M	CSX750PCC33.3330MT
40.0000	300-8027-1-ND	4.13	3.85	3.30	300-8027-2-ND	1540.00/M	CSX750PCC40.0000MT
44.7360	300-8028-1-ND	4.13	3.85	3.30	300-8028-2-ND	1540.00/M	CSX750PCC44.7360MT
45.0000	300-8029-1-ND	4.13	3.85	3.30	300-8029-2-ND	1540.00/M	CSX750PCC45.0000MT
49.1520	300-8						

**CFS, CFV, and CSA Series
Cylinder Type Crystals**

SPECIFICATIONS: • Frequency Tolerance: CFS Series: ±20ppm; CFV & CSA Series: ±30ppm • Operating Temperature Range: -10°C to +60°C • Storage Temperature Range: -40°C to +85°C • Drive Level: CFS & CFV Series: 1µW Max. • CSA Series: 50µW to 100µW • Insulation Resistance: 500MΩ Min. • Aging (first year): CFS Series: ±3ppm Max. • CFV & CSA Series: ±5ppm Max.



Equivalent Series Resistance (ESR, R1) (ΩMax.) for CSA Series

Frequency	ESR	Mode
3.5MHz ≤ f < 4MHz	200	Fundamental
4MHz ≤ f < 6MHz	150	
6MHz ≤ f < 10MHz	100	
10MHz ≤ f < 30MHz	50	
30MHz < f < 36MHz	100	
36MHz ≤ f < 66.6666MHz	80	3rd OT

Series	Frequency	Load Cap. (pF)	Shunt Cap. (pF)	Digi-Key Part No.	Price Each			Citizen Part No.
					1	10	50	
CFS145	32.768 KHz	12.5	1.00	300-1003-ND	.95	.81	.68	CFS145-32.768KDZF
CFS206	32.768 KHz	12.5	1.35	300-1002-ND	.42	.36	.24	CFS206-32.768KDZF
CFS308	32.768 KHz	12.5	1.60	300-1001-ND	.42	.36	.24	CFS308-32.768KDZF
CFV206	32.000 KHz	12.5	0.8-1.7	300-3007-ND	1.13	1.02	.73	CFV206-32.000KAZF
	40.000 KHz	12.5	0.8-1.7	300-3015-ND	1.13	1.02	.73	CFV206-40.000KAZF
	60.000 KHz	12.5	0.8-1.7	300-3018-ND	1.13	1.02	.73	CFV206-60.000KAZF
	60.005 KHz	12.5	0.8-1.7	300-3019-ND	1.13	1.02	.73	CFV206-60.005KAZF
	65.536 KHz	12.5	0.8-1.7	300-3020-ND	1.13	1.02	.73	CFV206-65.536KAZF
	75.000 KHz	12.5	0.8-1.7	300-3021-ND	1.13	1.02	.73	CFV206-75.000KAZF
	76.790 KHz	12.5	0.8-1.7	300-3022-ND	1.13	1.02	.73	CFV206-76.790KAZF
	76.800 KHz	12.5	0.8-1.7	300-3023-ND	1.13	1.02	.73	CFV206-76.800KAZF
	76.810 KHz	12.5	0.8-1.7	300-3024-ND	1.13	1.02	.73	CFV206-76.810KAZF
	77.500 KHz	12.5	0.8-1.7	300-3025-ND	1.13	1.02	.73	CFV206-77.500KAZF
CSA310	77.503 KHz	12.5	0.8-1.7	300-3028-ND	1.13	1.02	.73	CFV206-77.503KAZF
	96.000 KHz	12.5	0.8-1.7	300-3029-ND	1.13	1.02	.73	CFV206-96.000KAZF
	100.000 KHz	12.5	0.8-1.7	300-3030-ND	1.13	1.02	.73	CFV206-100.000KAZF
	3.579545 MHz	18.0	5.0	300-1008-ND	.91	.78	.65	CSA310-3.579545MABJ
	3.6864 MHz	18.0	5.0	300-1009-ND	.91	.78	.65	CSA310-3.6864MABJ
	4.000 MHz	18.0	5.0	300-1010-ND	.91	.78	.65	CSA310-4.000MABJ
	4.096 MHz	18.0	5.0	300-5001-ND	.91	.78	.65	CSA309-4.096MABJ
	4.800 MHz	18.0	5.0	300-5002-ND	.91	.78	.65	CSA309-4.800MABJ
	4.915 MHz	18.0	5.0	300-5003-ND	.91	.78	.65	CSA309-4.915MABJ
	5.120 MHz	18.0	5.0	300-5004-ND	.91	.78	.65	CSA309-5.120MABJ
5.5296 MHz	18.0	5.0	300-5005-ND	.91	.78	.65	CSA309-5.5296MABJ	
CSA309	6.000 MHz	18.0	5.0	300-5006-ND	.91	.78	.65	CSA309-6.000MABJ
	6.144 MHz	18.0	5.0	300-5007-ND	.91	.78	.65	CSA309-6.144MABJ
	7.3728 MHz	18.0	5.0	300-5008-ND	.91	.78	.65	CSA309-7.3728MABJ
	7.680 MHz	18.0	5.0	300-5009-ND	.91	.78	.65	CSA309-7.680MABJ
	8.000 MHz	18.0	5.0	300-5010-ND	.91	.78	.65	CSA309-8.000MABJ
	8.000156 MHz	18.0	5.0	300-5011-ND	.91	.78	.65	CSA309-8.000156MABJ
	8.192 MHz	18.0	5.0	300-5012-ND	.91	.78	.65	CSA309-8.192MABJ
	9.216 MHz	18.0	5.0	300-5013-ND	.91	.78	.65	CSA309-9.216MABJ
	9.60309 MHz	18.0	5.0	300-5014-ND	.91	.78	.65	CSA309-9.60309MABJ
	9.8304 MHz	18.0	5.0	300-5015-ND	.91	.78	.65	CSA309-9.8304MABJ
CSA309	10.000 MHz	18.0	5.0	300-5016-ND	.91	.78	.65	CSA309-10.000MABJ
	10.240 MHz	18.0	5.0	300-5017-ND	.91	.78	.65	CSA309-10.240MABJ
	11.000 MHz	18.0	5.0	300-5018-ND	.91	.78	.65	CSA309-11.000MABJ
	11.0592 MHz	18.0	5.0	300-5019-ND	.91	.78	.65	CSA309-11.0592MABJ
	11.2896 MHz	18.0	5.0	300-5020-ND	.91	.78	.65	CSA309-11.2896MABJ
	12.000 MHz	18.0	5.0	300-5021-ND	.91	.78	.65	CSA309-12.000MABJ
	12.288 MHz	18.0	5.0	300-5022-ND	.91	.78	.65	CSA309-12.288MABJ
	12.352 MHz	18.0	5.0	300-5023-ND	.91	.78	.65	CSA309-12.352MABJ
	12.500 MHz	18.0	5.0	300-5024-ND	.91	.78	.65	CSA309-12.500MABJ
	13.500 MHz	18.0	5.0	300-5025-ND	.91	.78	.65	CSA309-13.500MABJ
CSA309	14.31818 MHz	18.0	5.0	300-5026-ND	.91	.78	.65	CSA309-14.31818MABJ
	14.7456 MHz	18.0	5.0	300-5027-ND	.91	.78	.65	CSA309-14.7456MABJ
	15.000 MHz	18.0	5.0	300-5028-ND	.91	.78	.65	CSA309-15.000MABJ
	15.360 MHz	18.0	5.0	300-5029-ND	.91	.78	.65	CSA309-15.360MABJ
	16.000 MHz	18.0	5.0	300-5030-ND	.91	.78	.65	CSA309-16.000MABJ
	16.000312 MHz	18.0	5.0	300-5031-ND	.91	.78	.65	CSA309-16.000312MABJ
	16.257 MHz	18.0	5.0	300-5032-ND	.91	.78	.65	CSA309-16.257MABJ
	16.384 MHz	18.0	5.0	300-5033-ND	.91	.78	.65	CSA309-16.384MABJ
	16.6704 MHz	18.0	5.0	300-5034-ND	.91	.78	.65	CSA309-16.6704MABJ
	16.9344 MHz	18.0	5.0	300-5035-ND	.91	.78	.65	CSA309-16.9344MABJ
CSA309	17.34475 MHz	18.0	5.0	300-5036-ND	.91	.78	.65	CSA309-17.34475MABJ
	18.000 MHz	18.0	5.0	300-5037-ND	.91	.78	.65	CSA309-18.000MABJ
	18.432 MHz	18.0	5.0	300-5038-ND	.91	.78	.65	CSA309-18.432MABJ
	18.869 MHz	18.0	5.0	300-5039-ND	.91	.78	.65	CSA309-18.869MABJ
	19.6608 MHz	18.0	5.0	300-5040-ND	.91	.78	.65	CSA309-19.6608MABJ
	20.000 MHz	18.0	5.0	300-5041-ND	.91	.78	.65	CSA309-20.000MABJ
	20.480 MHz	18.0	5.0	300-5042-ND	.91	.78	.65	CSA309-20.480MABJ
	22.1184 MHz	18.0	5.0	300-5043-ND	.91	.78	.65	CSA309-22.1184MABJ
	24.000 MHz	18.0	5.0	300-5044-ND	.91	.78	.65	CSA309-24.000MABJ
	24.576 MHz	18.0	5.0	300-5045-ND	.91	.78	.65	CSA309-24.576MABJ
CSA309	25.000 MHz	18.0	5.0	300-5046-ND	.91	.78	.65	CSA309-25.000MABJ
	25.175 MHz	18.0	5.0	300-5047-ND	.91	.78	.65	CSA309-25.175MABJ
	27.000 MHz	18.0	5.0	300-5048-ND	.91	.78	.65	CSA309-27.000MABJ
	28.000 MHz	18.0	5.0	300-5049-ND	.91	.78	.65	CSA309-28.000MABJ
	28.322 MHz	18.0	5.0	300-5050-ND	.91	.78	.65	CSA309-28.322MABJ
	28.63636 MHz	18.0	5.0	300-5051-ND	.91	.78	.65	CSA309-28.63636MABJ
	29.4912 MHz	18.0	5.0	300-5052-ND	.91	.78	.65	CSA309-29.4912MABJ
	30.000 MHz	18.0	5.0	300-5053-ND	.91	.78	.65	CSA309-30.000MABJ
	32.000 MHz	18.0	5.0	300-5054-ND	.91	.78	.65	CSA309-32.000MABJ
	32.768 MHz	18.0	5.0	300-5055-ND	.91	.78	.65	CSA309-32.768MABJ
CSA309	33.000 MHz	18.0	5.0	300-5056-ND	.91	.78	.65	CSA309-33.000MABJ
	33.3333 MHz	18.0	5.0	300-5057-ND	.91	.78	.65	CSA309-33.3333MABJ
	33.8688 MHz	18.0	5.0	300-5058-ND	.91	.78	.65	CSA309-33.8688MABJ
	40.000 MHz	18.0	5.0	300-5060-ND	.91	.78	.65	CSA309-40.000MABJ
	48.000 MHz	18.0	5.0	300-5061-ND	.91	.78	.65	CSA309-48.000MABJ
	49.152 MHz	18.0	5.0	300-5062-ND	.91	.78	.65	CSA309-49.152MABJ
	50.000 MHz	18.0	5.0	300-5063-ND	.91	.78	.65	CSA309-50.000MABJ
	53.125 MHz	18.0	5.0	300-5064-ND	.91	.78	.65	CSA309-53.125MABJ
	60.000 MHz	18.0	5.0	300-5065-ND	.91	.78	.65	CSA309-60.000MABJ
	64.000 MHz	18.0	5.0	300-5066-ND	.91	.78	.65	CSA309-64.000MABJ
66.6666 MHz	18.0	5.0	300-5067-ND	.91	.78	.65	CSA309-66.6666MABJ	

CM100S, CM200S, CM201, and CM202 Series Crystals 32.768KHz

SPECIFICATIONS: • Frequency Tolerance: ±20ppm • Operating Temperature Range: -40°C to +85°C • Storage Temperature Range: -55°C to +125°C • Equivalent Series Resistance: 50kΩ Max. • Load Capacitance: 12.5pF • Drive Level: 1µW Max. • Insulation Resistance: 500MΩ Min. • Aging (first year) ±3ppm Max.

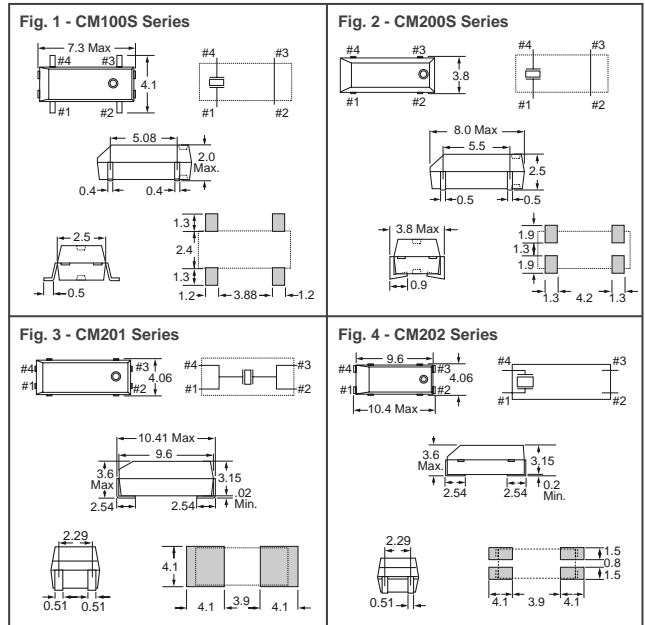
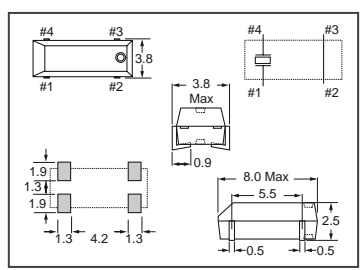


Fig.	Series	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing		Citizen Part No.
			1	10	50		2,000	3,000	
1	CM100S	300-1007-1-ND	1.58	1.35	1.02	300-1007-2-ND	—	819.23/M	CM100S32.768KDZFT
2	CM200S	300-1004-1-ND	1.19	1.02	.77	300-1004-2-ND	—	618.98/M	CM200S32.768KDZFT
3	CM201	300-1005-1-ND	1.19	1.02	.77	300-1005-2-ND	618.98/M	—	CM201-32.768KDZFT
4	CM202	300-1006-1-ND	1.19	1.02	.77	300-1006-2-ND	618.98/M	—	CM202-32.768KDZFT

CM250S Series Quartz Crystals

SPECIFICATIONS:

- Frequency Tolerance: ±50ppm
- Operating Temperature Range: -40°C to +85°C
- Storage Temperature Range: -55°C to +125°C
- Load Capacitance: 12.5pF
- Shunt Capacitance: 0.8 to 1.7pF
- Drive Level: 1µW Max.
- Insulation Resistance: ±500MΩ Min.
- Aging (first year): ±5ppm Max.



Frequency	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 3,000	Citizen Part No.
		1	10	50			
32.000 KHz	300-2007-1-ND	1.65	1.35	1.20	300-2007-2-ND	864.00/M	CM250S32.000KAZFT
40.000 KHz	300-2015-1-ND	1.65	1.35	1.20	300-2015-2-ND	864.00/M	CM250S40.000KAZFT
60.000 KHz	300-2018-1-ND	1.65	1.35	1.20	300-2018-2-ND	864.00/M	CM250S60.000KAZFT
60.005 KHz	300-2019-1-ND	1.65	1.35	1.20	300-2019-2-ND	864.00/M	CM250S60.005KAZFT
65.536 KHz	300-2020-1-ND	1.65	1.35	1.20	300-2020-2-ND	864.00/M	CM250S65.536KAZFT
75.000 KHz	300-2021-1-ND	1.65	1.35	1.20	300-2021-2-ND	864.00/M	

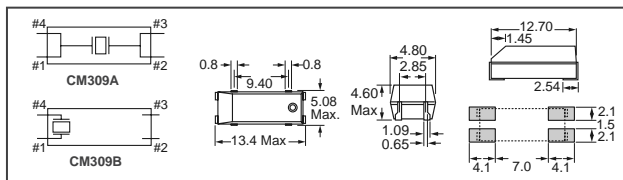
CITIZEN™ CM309 Series Crystals

SPECIFICATIONS:

- Frequency Tolerance: ±50ppm
- Operating Temperature Range: -40°C to +85°C
- Storage Temperature Range: -55°C to +125°C
- Load Capacitance: 18pF
- Shunt Capacitance: 7.0pF
- Drive Level: 50µW to 100µW
- Insulation Resistance: 500MΩ Min.
- Aging (first year): ±5ppm Max.

Equivalent Series Resistance (ESR, R1)

Frequency	ESR	Mode
3.5MHz ≤ fo < 4MHz	200	Fundamental
4MHz ≤ fo < 6MHz	150	
6MHz ≤ fo < 10MHz	100	
10MHz ≤ fo ≤ 32MHz	50	
30MHz < fo < 36MHz	100	3rd OT
36MHz ≤ fo < 66.6666MHz	80	



Frequency (MHz)	309A Series		309B Series		Cut Tape Price Each			Tape & Reel Pricing†
	Digi-Key Part No.	Citizen Part No.	Digi-Key Part No.	Citizen Part No.	1	10	50	1,000
3.579545	300-4001-1-ND	CM309A3.579545MABJT	300-4101-1-ND	CM309B3.579545MABJT	1.40	1.20	.90	700.00
3.6864	300-4002-1-ND	CM309A3.6864MABJT	300-4102-1-ND	CM309B3.6864MABJT	1.40	1.20	.90	700.00
4.000	300-4003-1-ND	CM309A4.000MABJT	300-4103-1-ND	CM309B4.000MABJT	1.40	1.20	.90	700.00
4.096	300-4004-1-ND	CM309A4.096MABJT	300-4104-1-ND	CM309B4.096MABJT	1.40	1.20	.90	700.00
4.800	300-4005-1-ND	CM309A4.800MABJT	300-4105-1-ND	CM309B4.800MABJT	1.40	1.20	.90	700.00
4.915	300-4006-1-ND	CM309A4.915MABJT	300-4106-1-ND	CM309B4.915MABJT	1.40	1.20	.90	700.00
5.120	300-4007-1-ND	CM309A5.120MABJT	300-4107-1-ND	CM309B5.120MABJT	1.40	1.20	.90	700.00
5.5296	300-4008-1-ND	CM309A5.5296MABJT	300-4108-1-ND	CM309B5.5296MABJT	1.40	1.20	.90	700.00
6.000	300-4009-1-ND	CM309A6.000MABJT	300-4109-1-ND	CM309B6.000MABJT	1.40	1.20	.90	700.00
6.144	300-4010-1-ND	CM309A6.144MABJT	300-4110-1-ND	CM309B6.144MABJT	1.40	1.20	.90	700.00
7.3728	300-4011-1-ND	CM309A7.3728MABJT	300-4111-1-ND	CM309B7.3728MABJT	1.40	1.20	.90	700.00
7.680	300-4012-1-ND	CM309A7.680MABJT	300-4112-1-ND	CM309B7.680MABJT	1.40	1.20	.90	700.00
8.000	300-4013-1-ND	CM309A8.000MABJT	300-4113-1-ND	CM309B8.000MABJT	1.40	1.20	.90	700.00
8.000156	300-4014-1-ND	CM309A8.000156MABJT	300-4114-1-ND	CM309B8.000156MABJT	1.40	1.20	.90	700.00
8.192	300-4015-1-ND	CM309A8.192MABJT	300-4115-1-ND	CM309B8.192MABJT	1.40	1.20	.90	700.00
9.216	300-4016-1-ND	CM309A9.216MABJT	300-4116-1-ND	CM309B9.216MABJT	1.40	1.20	.90	700.00
9.600	300-4017-1-ND	CM309A9.600MABJT	300-4117-1-ND	CM309B9.600MABJT	1.40	1.20	.90	700.00
9.8304	300-4018-1-ND	CM309A9.8304MABJT	300-4118-1-ND	CM309B9.8304MABJT	1.40	1.20	.90	700.00
10.000	300-4019-1-ND	CM309A10.000MABJT	300-4119-1-ND	CM309B10.000MABJT	1.40	1.20	.90	700.00
10.240	300-4020-1-ND	CM309A10.240MABJT	300-4120-1-ND	CM309B10.240MABJT	1.40	1.20	.90	700.00
11.000	300-4021-1-ND	CM309A11.000MABJT	300-4121-1-ND	CM309B11.000MABJT	1.40	1.20	.90	700.00
11.0592	300-4022-1-ND	CM309A11.0592MABJT	300-4122-1-ND	CM309B11.0592MABJT	1.40	1.20	.90	700.00
11.2896	300-4023-1-ND	CM309A11.2896MABJT	300-4123-1-ND	CM309B11.2896MABJT	1.40	1.20	.90	700.00
12.000	300-4024-1-ND	CM309A12.000MABJT	300-4124-1-ND	CM309B12.000MABJT	1.40	1.20	.90	700.00
12.288	300-4025-1-ND	CM309A12.288MABJT	300-4125-1-ND	CM309B12.288MABJT	1.40	1.20	.90	700.00
12.352	300-4026-1-ND	CM309A12.352MABJT	300-4126-1-ND	CM309B12.352MABJT	1.40	1.20	.90	700.00
12.500	300-4027-1-ND	CM309A12.500MABJT	300-4127-1-ND	CM309B12.500MABJT	1.40	1.20	.90	700.00
13.500	300-4028-1-ND	CM309A13.500MABJT	300-4128-1-ND	CM309B13.500MABJT	1.40	1.20	.90	700.00
14.31818	300-4029-1-ND	CM309A14.31818MABJT	300-4129-1-ND	CM309B14.31818MABJT	1.40	1.20	.90	700.00
14.7456	300-4030-1-ND	CM309A14.7456MABJT	300-4130-1-ND	CM309B14.7456MABJT	1.40	1.20	.90	700.00
15.000	300-4031-1-ND	CM309A15.000MABJT	300-4131-1-ND	CM309B15.000MABJT	1.40	1.20	.90	700.00
15.360	300-4032-1-ND	CM309A15.360MABJT	300-4132-1-ND	CM309B15.360MABJT	1.40	1.20	.90	700.00
16.000	300-4033-1-ND	CM309A16.000MABJT	300-4133-1-ND	CM309B16.000MABJT	1.40	1.20	.90	700.00
16.000312	300-4034-1-ND	CM309A16.000312MABJT	300-4134-1-ND	CM309B16.000312MABJT	1.40	1.20	.90	700.00
16.257	300-4035-1-ND	CM309A16.257MABJT	300-4135-1-ND	CM309B16.257MABJT	1.40	1.20	.90	700.00
16.384	300-4036-1-ND	CM309A16.384MABJT	300-4136-1-ND	CM309B16.384MABJT	1.40	1.20	.90	700.00
16.667	300-4037-1-ND	CM309A16.667MABJT	300-4137-1-ND	CM309B16.667MABJT	1.40	1.20	.90	700.00
16.9344	300-4038-1-ND	CM309A16.9344MABJT	300-4138-1-ND	CM309B16.9344MABJT	1.40	1.20	.90	700.00
17.734475	300-4039-1-ND	CM309A17.734475MABJT	300-4139-1-ND	CM309B17.734475MABJT	1.40	1.20	.90	700.00
18.000	300-4040-1-ND	CM309A18.000MABJT	300-4140-1-ND	CM309B18.000MABJT	1.40	1.20	.90	700.00
18.432	300-4041-1-ND	CM309A18.432MABJT	300-4141-1-ND	CM309B18.432MABJT	1.40	1.20	.90	700.00
18.869	300-4042-1-ND	CM309A18.869MABJT	300-4142-1-ND	CM309B18.869MABJT	1.40	1.20	.90	700.00
19.6608	300-4043-1-ND	CM309A19.6608MABJT	300-4143-1-ND	CM309B19.6608MABJT	1.40	1.20	.90	700.00
20.000	300-4044-1-ND	CM309A20.000MABJT	300-4144-1-ND	CM309B20.000MABJT	1.40	1.20	.90	700.00
20.480	300-4045-1-ND	CM309A20.480MABJT	300-4145-1-ND	CM309B20.480MABJT	1.40	1.20	.90	700.00
22.1184	300-4046-1-ND	CM309A22.1184MABJT	300-4146-1-ND	CM309B22.1184MABJT	1.40	1.20	.90	700.00
24.000	300-4047-1-ND	CM309A24.000MABJT	300-4147-1-ND	CM309B24.000MABJT	1.40	1.20	.90	700.00
24.576	300-4048-1-ND	CM309A24.576MABJT	300-4148-1-ND	CM309B24.576MABJT	1.40	1.20	.90	700.00
25.000	300-4049-1-ND	CM309A25.000MABJT	300-4149-1-ND	CM309B25.000MABJT	1.40	1.20	.90	700.00
25.175	300-4050-1-ND	CM309A25.175MABJT	300-4150-1-ND	CM309B25.175MABJT	1.40	1.20	.90	700.00
27.000	300-4051-1-ND	CM309A27.000MABJT	300-4151-1-ND	CM309B27.000MABJT	1.40	1.20	.90	700.00
28.000	300-4052-1-ND	CM309A28.000MABJT	300-4152-1-ND	CM309B28.000MABJT	1.40	1.20	.90	700.00
28.322	300-4053-1-ND	CM309A28.322MABJT	300-4153-1-ND	CM309B28.322MABJT	1.40	1.20	.90	700.00
28.63636	300-4054-1-ND	CM309A28.63636MABJT	300-4154-1-ND	CM309B28.63636MABJT	1.40	1.20	.90	700.00
29.4912	300-4055-1-ND	CM309A29.4912MABJT	300-4155-1-ND	CM309B29.4912MABJT	1.40	1.20	.90	700.00
30.000	300-4056-1-ND	CM309A30.000MABJT	300-4156-1-ND	CM309B30.000MABJT	1.40	1.20	.90	700.00
32.000	300-4057-1-ND	CM309A32.000MABJT	300-4157-1-ND	CM309B32.000MABJT	1.40	1.20	.90	700.00
32.768	300-4058-1-ND	CM309A32.768MABJT	300-4158-1-ND	CM309B32.768MABJT	1.40	1.20	.90	700.00
33.000	300-4059-1-ND	CM309A33.000MABJT	300-4159-1-ND	CM309B33.000MABJT	1.40	1.20	.90	700.00
33.3333	300-4060-1-ND	CM309A33.3333MABJT	300-4160-1-ND	CM309B33.3333MABJT	1.40	1.20	.90	700.00
33.8688	300-4061-1-ND	CM309A33.8688MABJT	300-4161-1-ND	CM309B33.8688MABJT	1.40	1.20	.90	700.00
40.000	300-4063-1-ND	CM309A40.000MABJT	300-4163-1-ND	CM309B40.000MABJT	1.40	1.20	.90	700.00
48.000	300-4064-1-ND	CM309A48.000MABJT	300-4164-1-ND	CM309B48.000MABJT	1.40	1.20	.90	700.00
49.152	300-4065-1-ND	CM309A49.152MABJT	300-4165-1-ND	CM309B49.152MABJT	1.40	1.20	.90	700.00
50.000	300-4066-1-ND	CM309A50.000MABJT	300-4166-1-ND	CM309B50.000MABJT	1.40	1.20	.90	700.00
53.125	300-4067-1-ND	CM309A53.125MABJT	300-4167-1-ND	CM309B53.125MABJT	1.40	1.20	.90	700.00
60.000	300-4068-1-ND	CM309A60.000MABJT	300-4168-1-ND	CM309B60.000MABJT	1.40	1.20	.90	700.00
64.000	300-4069-1-ND	CM309A64.000MABJT	300-4169-1-ND	CM309B64.000MABJT	1.40	1.20	.90	700.00
66.6666	300-4070-1-ND	CM309A66.6666MABJT	300-4170-1-ND	CM309B66.6666MABJT	1.40	1.20	.90	700.00

† For Tape & Reel part number, change -1-ND to -2-ND.

More Product Available Online: www.digikey.com

Toll-Free: 1-800-344-4539 • Phone: 218-681-6674 • Fax: 218-681-3380

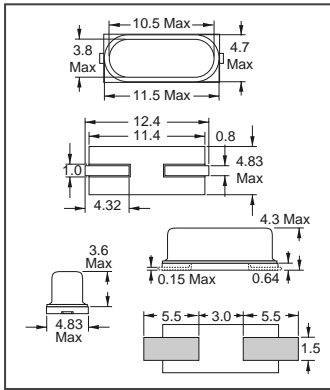
HCM49 Series Surface Mount Crystals

SPECIFICATIONS:

- Frequency Tolerance: ±50ppm
- Operating Temperature Range: -10°C to +60°C
- Storage Temperature Range: -40°C to +85°C
- Load Capacitance: 18pfd
- Shunt Capacitance: 7.0pF Max.
- Drive Level: 100µW
- Insulation Resistance: 500MΩ Min.
- Aging (first year): ±5ppm Max.

Equivalent Series Resistance (ESR, R1) (Ohm Max.)

Frequency	ESR
3.5MHz ≤ f < 4.0MHz	200
4.0MHz ≤ f < 6.0MHz	150
6.0MHz ≤ f < 10.0MHz	100
10.0MHz ≤ f < 14.0MHz	80
14.0MHz ≤ f ≤ 25.0MHz	50



Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 1,000	Citizen Part No.
		1	10	50			
3.579545	300-6101-1-ND	1.13	.98	.85	300-6101-2-ND	525.00	HCM49-3.579545MABJT
3.6864	300-6102-1-ND	1.13	.98	.85	300-6102-2-ND	525.00	HCM49-3.6864MABJT
4.000	300-6103-1-ND	1.13	.98	.85	300-6103-2-ND	525.00	HCM49-4.000MABJT
4.032	300-6104-1-ND	1.13	.98	.85	300-6104-2-ND	525.00	HCM49-4.032MABJT
4.096	300-6105-1-ND	1.13	.98	.85	300-6105-2-ND	525.00	HCM49-4.096MABJT
4.194304	300-6106-1-ND	1.13	.98	.85	300-6106-2-ND	525.00	HCM49-4.194304MABJT
4.433619	300-6107-1-ND	1.13	.98	.85	300-6107-2-ND	525.00	HCM49-4.433619MABJT
4.9152	300-6108-1-ND	1.13	.98	.85	300-6108-2-ND	525.00	HCM49-4.9152MABJT
5.000	300-6109-1-ND	1.13	.98	.85	300-6109-2-ND	525.00	HCM49-5.000MABJT
5.0688	300-6110-1-ND	1.13	.98	.85	300-6110-2-ND	525.00	HCM49-5.0688MABJT
5.9904	300-6111-1-ND	1.13	.98	.85	300-6111-2-ND	525.00	HCM49-5.9904MABJT
6.000	300-6112-1-ND	1.13	.98	.85	300-6112-2-ND	525.00	HCM49-6.000MABJT
6.144	300-6113-1-ND	1.13	.98	.85	300-6113-2-ND	525.00	HCM49-6.144MABJT
6.500	300-6114-1-ND	1.13	.98	.85	300-6114-2-ND	525.00	HCM49-6.500MABJT
7.3728	300-6115-1-ND	1.13	.98	.85	300-6115-2-ND	525.00	HCM49-7.3728MABJT
7.680	300-6116-1-ND	1.13	.98	.85	300-6116-2-ND	525.00	HCM49-7.680MABJT
8.000	300-6117-1-ND	1.13	.98	.85	300-6117-2-ND	525.00	HCM49-8.000MABJT
9.000	300-6118-1-ND	1.13	.98	.85	300-6118-2-ND	525.00	HCM49-9.000MABJT
9.8304	300-6120-1-ND	1.13	.98	.85	300-6120-2-ND	525.00	HCM49-9.8304MABJT
10.000	300-6121-1-ND	1.13	.98	.85	300-6121-2-ND	525.00	HCM49-10.000MABJT

Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 1,000	Citizen Part No.
		1	10	50			
10.240	300-6122-1-ND	1.13	.98	.85	300-6122-2-ND	525.00	HCM49-10.240MABJT
11.000	300-6123-1-ND	1.13	.98	.85	300-6123-2-ND	525.00	HCM49-11.000MABJT
11.0592	300-6124-1-ND	1.13	.98	.85	300-6124-2-ND	525.00	HCM49-11.0592MABJT
11.520	300-6125-1-ND	1.13	.98	.85	300-6125-2-ND	525.00	HCM49-11.520MABJT
12.000	300-6127-1-ND	1.13	.98	.85	300-6127-2-ND	525.00	HCM49-12.000MABJT
12.000393	300-6128-1-ND	1.13	.98	.85	300-6128-2-ND	525.00	HCM49-12.000393MABJT
12.288	300-6129-1-ND	1.13	.98	.85	300-6129-2-ND	525.00	HCM49-12.288MABJT
14.31818	300-6130-1-ND	1.13	.98	.85	300-6130-2-ND	525.00	HCM49-14.31818MABJT
14.7456	300-6131-1-ND	1.13	.98	.85	300-6131-2-ND	525.00	HCM49-14.7456MABJT
15.000	300-6132-1-ND	1.13	.98	.85	300-6132-2-ND	525.00	HCM49-15.000MABJT
15.360	300-6133-1-ND	1.13	.98	.85	300-6133-2-ND	525.00	HCM49-15.360MABJT
16.000	300-6134-1-ND	1.13	.98	.85	300-6134-2-ND	525.00	HCM49-16.000MABJT
16.000312	300-6135-1-ND	1.13	.98	.85	300-6135-2-ND	525.00	HCM49-16.000312MABJT
16.257	300-6136-1-ND	1.13	.98	.85	300-6136-2-ND	525.00	HCM49-16.257MABJT
16.384	300-6137-1-ND	1.13	.98	.85	300-6137-2-ND	525.00	HCM49-16.384MABJT
17.734475	300-6138-1-ND	1.13	.98	.85	300-6138-2-ND	525.00	HCM49-17.734475MABJT
18.000	300-6139-1-ND	1.13	.98	.85	300-6139-2-ND	525.00	HCM49-18.000MABJT
18.432	300-6140-1-ND	1.13	.98	.85	300-6140-2-ND	525.00	HCM49-18.432MABJT
19.6608	300-6141-1-ND	1.13	.98	.85	300-6141-2-ND	525.00	HCM49-19.6608MABJT
20.000	300-6142-1-ND	1.13	.98	.85	300-6142-2-ND	525.00	HCM49-20.000MABJT
21.47727	300-6143-1-ND	1.13	.98	.85	300-6143-2-ND	525.00	HCM49-21.47727MABJT
22.1184	300-6144-1-ND	1.13	.98	.85	300-6144-2-ND	525.00	HCM49-22.1184MABJT
24.000	300-6145-1-ND	1.13	.98	.85	300-6145-2-ND	525.00	HCM49-24.000MABJT
24.00014	300-6146-1-ND	1.13	.98	.85	300-6146-2-ND	525.00	HCM49-24.00014MABJT
24.576	300-6147-1-ND	1.13	.98	.85	300-6147-2-ND	525.00	HCM49-24.576MABJT
25.000	300-6148-1-ND	1.13	.98	.85	300-6148-2-ND	525.00	HCM49-25.000MABJT
25.175	300-6149-1-ND	1.13	.98	.85	300-6149-2-ND	525.00	HCM49-25.175MABJT
27.000	300-6150-1-ND	1.13	.98	.85	300-6150-2-ND	525.00	HCM49-27.000MABJT
28.63636	300-6152-1-ND	1.13	.98	.85	300-6152-2-ND	525.00	HCM49-28.63636MABJT
32.000	300-6153-1-ND	1.13	.98	.85	300-6153-2-ND	525.00	HCM49-32.000MABJT
33.8688	300-6156-1-ND	1.13	.98	.85	300-6156-2-ND	525.00	HCM49-33.8688MABJT
40.000	300-6157-1-ND	1.13	.98	.85	300-6157-2-ND	525.00	HCM49-40.000MABJT
48.000	300-6158-1-ND	1.13	.98	.85	300-6158-2-ND	525.00	HCM49-48.000MABJT
49.152	300-6159-1-ND	1.13	.98	.85	300-6159-2-ND	525.00	HCM49-49.152MABJT
50.000	300-6160-1-ND	1.13	.98	.85	300-6160-2-ND	525.00	HCM49-50.000MABJT

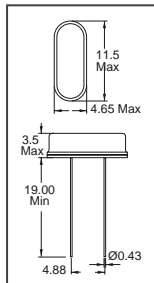
HC49US Series Through-Hole Crystals

SPECIFICATIONS:

- Frequency Tolerance: ±50ppm
- Operating Temperature Range: -10°C to +60°C
- Storage Temperature Range: -40°C to +85°C
- Load Capacitance: 18pfd
- Shunt Capacitance: 7.0pF Max.
- Drive Level: 100µW
- Insulation Resistance: 500MΩ Min.
- Aging (first year): ±5ppm Max.

Equivalent Series Resistance (ESR, R1) (Ohm Max.)

Frequency	ESR	Frequency	ESR
3.5MHz ≤ f < 4.0MHz	200	6.0MHz ≤ f < 10.0MHz	100
4.0MHz ≤ f < 6.0MHz	150	10.0MHz ≤ f < 14.0MHz	80
		14.0MHz ≤ f ≤ 25.0MHz	50



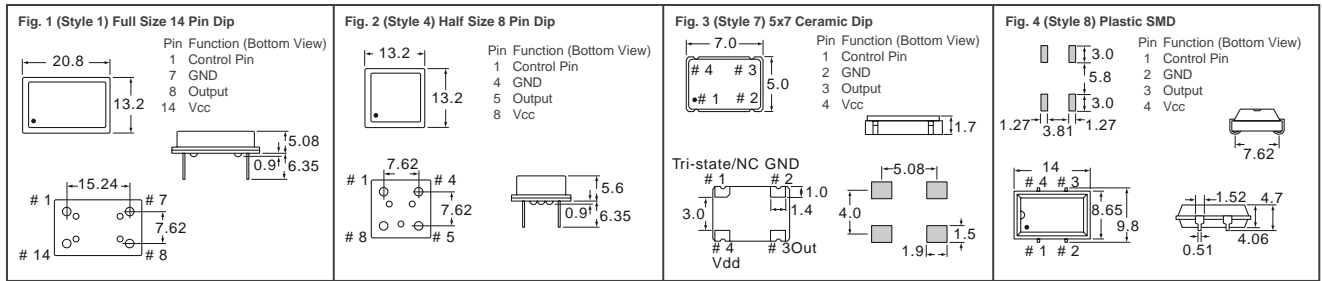
Frequency (MHz)	Digi-Key Part No.	Price Each			Citizen Part No.
		1	10	50	
3.579545	300-6001-ND	.88	.75	.69	HC49US3.579545MABJ
3.6864	300-6002-ND	.88	.75	.69	HC49US3.6864MABJ
4.000	300-6003-ND	.88	.75	.69	HC49US4.000MABJ
4.032	300-6004-ND	.88	.75	.69	HC49US4.032MABJ
4.096	300-6005-ND	.88	.75	.69	HC49US4.096MABJ
4.194304	300-6006-ND	.88	.75	.69	HC49US4.194304MABJ
4.433619	300-6007-ND	.88	.75	.69	HC49US4.433619MABJ
4.9152	300-6008-ND	.88	.75	.69	HC49US4.9152MABJ
5.000	300-6009-ND	.88	.75	.69	HC49US5.000MABJ
5.0688	300-6010-ND	.88	.75	.69	HC49US5.0688MABJ
5.9904	300-6011-ND	.88	.75	.69	HC49US5.9904MABJ
6.000	300-6012-ND	.88	.75	.69	HC49US6.000MABJ
6.144	300-6013-ND	.88	.75	.69	HC49US6.144MABJ
6.500	300-6014-ND	.88	.75	.69	HC49US6.500MABJ
7.3728	300-6015-ND	.88	.75	.69	HC49US7.3728MABJ
7.680	300-6016-ND	.88	.75	.69	HC49US7.680MABJ
8.000	300-6017-ND	.88	.75	.69	HC49US8.000MABJ
9.000	300-6018-ND	.88	.75	.69	HC49US9.000MABJ
9.216	300-6019-ND	.88	.75	.69	HC49US9.216MABJ
9.8304	300-6020-ND	.88	.75	.69	HC49US9.8304MABJ

Frequency (MHz)	Digi-Key Part No.	Price Each			Citizen Part No.
		1	10	50	
10.000	300-6021-ND	.88	.75	.69	HC49US10.000MABJ
10.240	300-6022-ND	.88	.75	.69	HC49US10.240MABJ
11.000	300-6023-ND	.88	.75	.69	HC49US11.000MABJ
11.0592	300-6024-ND	.88	.75	.69	HC49US11.0592MABJ
11.520	300-6025-ND	.88	.75	.69	HC49US11.520MABJ
12.000	300-6027-ND	.88	.75	.69	HC49US12.000MABJ
12.000393	300-6028-ND	.88	.75	.69	HC49US12.000393MABJ
12.288	300-6029-ND	.88	.75	.69	HC49US12.288MABJ
14.31818	300-6030-ND	.88	.75	.69	HC49US14.31818MABJ
14.7456	300-6031-ND	.88	.75	.69	HC49US14.7456MABJ
15.000	300-6032-ND	.88	.75	.69	HC49US15.000MABJ
15.360	300-6033-ND	.88	.75	.69	HC49US15.360MABJ
16.000	300-6034-ND	.88	.75	.69	HC49US16.000MABJ
16.000312	300-6035-ND	.88	.75	.69	HC49US16.000312MABJ
16.257	300-6036-ND	.88	.75	.69	HC49US16.257MABJ
16.384	300-6037-ND	.88	.75	.69	HC49US16.384MABJ
17.734475	300-6038-ND	.88	.75	.69	HC49US17.734475MABJ
18.000	300-6039-ND	.88	.75	.69	HC49US18.000MABJ
18.432	300-6040-ND	.88	.75	.69	HC49US18.432MABJ
19.6608	300-6041-ND	.88	.75	.69	HC49US19.6608MABJ
20.000	300-6042-ND	.88	.75	.69	HC49US20.000MABJ
21.47727	300-6043-ND	.88	.75	.69	HC49US21.47727MABJ
22.1184	300-6044-ND	.88	.75	.69	HC49US22.1184MABJ
24.000	300-6045-ND	.88	.75	.69	HC49US24.000MABJ
24.00014	300-6046-ND	.88	.75	.69	HC49US24.00014MABJ
24.576	300-6047-ND	.88	.75	.69	HC49US24.576MABJ
25.000	300-6048-ND	.88	.75	.69	HC49US25.000MABJ
25.175	300-6049-ND	.88	.75	.69	HC49US25.175MABJ
27.000	300-6050-ND	.88	.75	.69	HC49US27.000MABJ
28.224	300-6051-ND	.88	.75	.69	HC49US28.224MABJ
28.63636	300-6052-ND	.88	.75	.69	HC49US28.63636MABJ
32.000	300-6053-ND	.88	.75	.69	HC49US32.000MABJ
33.8688	300-6056-ND	.88	.75	.69	HC49US33.8688MABJ
40.000	300-6057-ND	.88	.75	.69	HC49US40.000MABJ
48.000	300-6058-ND	.88	.75	.69	HC49US48.000MABJ
50.000	300-6060-ND	.88	.75	.69	HC49US50.000MABJ

More Product Available Online: www.digikey.com

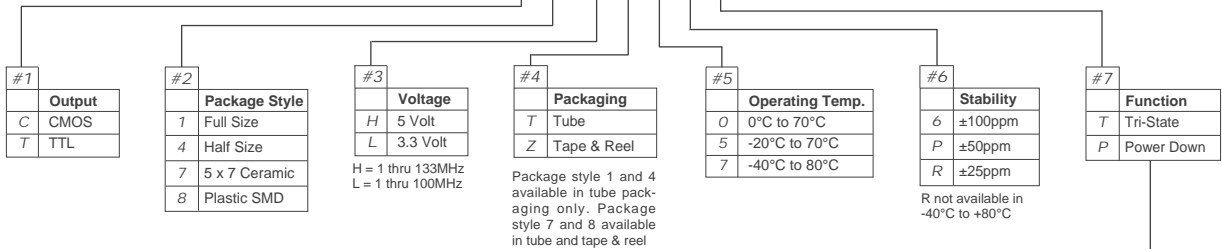
NEW! CARDINAL COMPONENTS, INC. FIPO™ Field Instantly Programmable Oscillators

The FIPO system from Cardinal is indispensable for such things as prototypes, early stage design, unexpected design problems, modification, immediate service, a sudden ramp in production and volume production. Cardinal Oscillator Blanks are "Twice Programmable" to correct errors or to reuse the same part for two separate applications with different frequency and/or different output characteristics without having to dispose of the original part. Oscillator Blanks are available in four different package styles: Full Size 14 Pin Dip, Half Size 8 Pin Dip, 5x7 Ceramic SMD, and a Plastic SMD package. Frequency ranges are available from 1MHz to 133MHz in 5V, and 1MHz to 100MHz in 3.3V, and in ±100ppm, 50ppm and ±25ppm frequency stability options.



Example Part Number:

CPP - -ND



How to Select Base Number:

- # 1 = Select Output
- # 2 = Select Package Style
- # 3 = Select Voltage
- # 4 = Select Packaging
- # 5 = Select Operating Temperature
- # 6 = Select Stability
- # 7 = Select Function

Tri-State Mode – The output of the part is weakly pulled low when the control pin goes low. The active circuitry continues to operate, allowing a rapid return to normal operation when the control pin goes high.

Power Down Mode – When the control pin goes low, all active circuitry on the chip within the oscillator is shut down. For reactivation, time in which the part regains its output is minimal.

Call Digi-Key with your Selected Base Part Number, and a Sales Representative will enter your desired frequency.

Digi-Key- Base Part No.	Price Each			
	1	10	50	100
CPPC1- <input type="checkbox"/> T <input type="checkbox"/> R <input type="checkbox"/> -ND	6.20	5.74	5.12	4.66
CPPC1- <input type="checkbox"/> T <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.40	5.00	4.46	4.05
CPPT1- <input type="checkbox"/> T <input type="checkbox"/> R <input type="checkbox"/> -ND	6.20	5.74	5.12	4.66
CPPT1- <input type="checkbox"/> T <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.40	5.00	4.46	4.05
CPPC4- <input type="checkbox"/> T <input type="checkbox"/> R <input type="checkbox"/> -ND	6.20	5.74	5.12	4.66
CPPC4- <input type="checkbox"/> T <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.40	5.00	4.46	4.05
CPPT4- <input type="checkbox"/> T <input type="checkbox"/> R <input type="checkbox"/> -ND	6.20	5.74	5.12	4.66
CPPT4- <input type="checkbox"/> T <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.40	5.00	4.46	4.05

Digi-Key- Base Part No.	Price Each				Tape & Reel Pricing		
	1	10	50	100	100	500	1000
CPPC7- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R <input type="checkbox"/> -ND	5.76	5.33	4.76	4.31	438.48	1627.78	2930.00
CPPC7- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.00	4.63	4.13	3.75	382.50	1417.80	2550.00
CPPT7- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R <input type="checkbox"/> -ND	5.76	5.33	4.76	4.31	438.48	1627.78	2930.00
CPPT7- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.00	4.63	4.13	3.75	382.50	1417.80	2550.00
CPPC8- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R <input type="checkbox"/> -ND	6.20	5.74	5.12	4.66	473.52	1752.83	3160.16
CPPC8- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.40	5.00	4.46	4.05	412.50	1527.78	2750.00
CPPT8- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> R <input type="checkbox"/> -ND	6.20	5.74	5.12	4.66	473.52	1752.83	3160.16
CPPT8- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> -ND	5.40	5.00	4.46	4.05	412.50	1527.78	2750.00

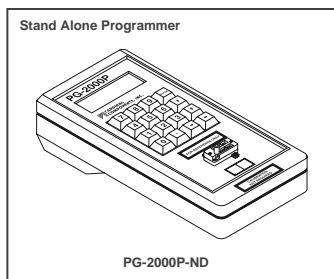
*Programmable parts are non-cancelable and non-returnable!

Stand-Alone Field Oscillator Programmer

Features:

- Create oscillators, at a user specified frequency, within seconds, IN THE FIELD
- No programming skills needed to create finished oscillators from sealed oscillator blanks
- Designed for low-volume program applications such as engineering, field sales, and sample quantity

- Internal frequency reference for single step programming
- Simple User Interface
- Cardinal 4-pin oscillators are easily inserted into a ZIF socket or SMD adapter for quick programming
- Oscillator characteristics are selected via keypad and 4-line LCD display



Description	Digi-Key Part No.	Price Each
Blank Oscillator, Full Size, ±50ppm or ±100ppm	CPPX1-A7BR-ND	4.73
Blank Oscillator, Full Size, ±25ppm	CPPX1-A5BC-ND	5.43
Blank Oscillator, Half Size, ±50ppm or ±100ppm	CPPX4-A7BR-ND	4.73
Blank Oscillator, Half Size, ±25ppm	CPPX4-A5BC-ND	5.43
Blank Oscillator, 5x7 Ceramic SMD, ±50ppm or 100ppm	CPPX7-A7BR-ND	4.38
Blank Oscillator, 5x7 Ceramic SMD, ±25ppm	CPPX7-A5BC-ND	5.04
Blank Oscillator, Plastic SMD, ±50ppm or ±100ppm	CPPX8-A7BR-ND	4.73
Blank Oscillator, Plastic SMD, ±25ppm	CPPX8-A5BC-ND	5.43
SMD Programming Socket for 5x7 Ceramic Oscillators	SC2000-ND	47.38
SMD Programming Socket for Plastic SMD Oscillators	SC2500-ND	88.00
Stand Alone Programmer	PG2000P-ND	1800.00

See Figures Above for Package Specifications

More Product Available Online: www.digikey.com

Toll-Free: 1-800-344-4539 • Phone: 218-681-6674 • Fax: 218-681-3380

SG-8002 Programmable Oscillators

The SG-8002 Series gives you the flexibility to solve many different application problems with a one time programmable device. Programmable Oscillators provide the ability to pick a custom frequency in one of five different packages available in SMD and Thru-Hole styles. These five packages are pin compatible with the

EPSON SG-615, SG-636, SG-51, SG-531 and SG-710 Oscillators. Frequency ranges are available from 1MHz to 125MHz, in $\pm 100\text{ppm}$ and $\pm 50\text{ppm}$ frequency stability options and 3.3 or 5V power supply levels.

Dim. in mm

<p>SG-615 Package (JA)</p> <p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>OE or ST</td></tr> <tr><td>2</td><td>GND</td></tr> <tr><td>3</td><td>OUT</td></tr> <tr><td>4</td><td>VDD</td></tr> </table> <p>Recommended Soldering Pattern</p>	1	OE or ST	2	GND	3	OUT	4	VDD	<p>SG-636 Package (JC)</p> <p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>OE or ST</td></tr> <tr><td>2</td><td>GND</td></tr> <tr><td>3</td><td>OUT</td></tr> <tr><td>4</td><td>VDD</td></tr> </table> <p>Recommended Soldering Pattern</p>	1	OE or ST	2	GND	3	OUT	4	VDD	<p>SG-51 Package (DB)</p> <p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>OE or ST</td></tr> <tr><td>7</td><td>GND</td></tr> <tr><td>8</td><td>OUT</td></tr> <tr><td>14</td><td>VDD</td></tr> </table>	1	OE or ST	7	GND	8	OUT	14	VDD
1	OE or ST																									
2	GND																									
3	OUT																									
4	VDD																									
1	OE or ST																									
2	GND																									
3	OUT																									
4	VDD																									
1	OE or ST																									
7	GND																									
8	OUT																									
14	VDD																									
<p>SG-531 Package (DC)</p> <p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>OE or ST</td></tr> <tr><td>4</td><td>GND</td></tr> <tr><td>5</td><td>OUT</td></tr> <tr><td>8</td><td>VDD</td></tr> </table>	1	OE or ST	4	GND	5	OUT	8	VDD	<p>SG-710 Package (CA)</p> <p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>OE or ST</td></tr> <tr><td>2</td><td>GND</td></tr> <tr><td>3</td><td>OUT</td></tr> <tr><td>4</td><td>VDD</td></tr> </table>	1	OE or ST	2	GND	3	OUT	4	VDD	<p>Package (JF) NEW!</p> <p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>OE or ST</td></tr> <tr><td>2</td><td>GND</td></tr> <tr><td>3</td><td>OUT</td></tr> <tr><td>4</td><td>VDD</td></tr> </table> <p>Recommended Soldering Pattern</p>	1	OE or ST	2	GND	3	OUT	4	VDD
1	OE or ST																									
4	GND																									
5	OUT																									
8	VDD																									
1	OE or ST																									
2	GND																									
3	OUT																									
4	VDD																									
1	OE or ST																									
2	GND																									
3	OUT																									
4	VDD																									

Example Part Number:
SG-8002 - -ND

How to order: #1 = Select Package.
#2 = Select Function.
#3 = Select Power Supply Duty Level.
#4 = Select Frequency Stability and Operating Temperature.
Call Digi-Key with your Base Part Number and an Operator will enter your desired frequency.

#1	Package
JA	SG-615
JC	SG-636
DB	SG-51
DC	SG-531
CA	SG-710
JF	—

#2	Function
P	Output Enable
S	Standby

#3	Power Supply Duty Level	Frequency Stability	Operating Temperature	Available Frequency Range	
H	5.0V, CMOS	B	$\pm 50\text{ppm}$	-20°C to +70°C	1.00MHz - 125.00MHz
		C	$\pm 100\text{ppm}$	-40°C to +85°C	1.00MHz - 55.00MHz
		M†	$\pm 100\text{ppm}$	-40°C to +85°C	1.00MHz - 55.00MHz
T	5.0V, TTL	B	$\pm 50\text{ppm}$	-20°C to +70°C	1.00MHz - 125.00MHz
		C	$\pm 100\text{ppm}$	-40°C to +85°C	1.00MHz - 55.00MHz
		M†	$\pm 100\text{ppm}$	-40°C to +85°C	1.00MHz - 55.00MHz
C	3.3V, CMOS	B	$\pm 50\text{ppm}$	-20°C to +70°C	1.00MHz - 106.25MHz
		C	$\pm 100\text{ppm}$	-40°C to +85°C	1.00MHz - 106.25MHz
		M†	$\pm 100\text{ppm}$	-40°C to +85°C	1.00MHz - 106.25MHz

Digi-Key-Base Part No.	Price Each			
	1	10	50	100
SG-8002JA- <input type="checkbox"/> <input type="checkbox"/> -ND	3.85	3.30	2.53	2.20
SG-8002JC- <input type="checkbox"/> <input type="checkbox"/> -ND	4.38	3.75	2.88	2.50
SG-8002DB- <input type="checkbox"/> <input type="checkbox"/> -ND	3.33	2.85	2.19	1.90
SG-8002DC- <input type="checkbox"/> <input type="checkbox"/> -ND	3.33	2.85	2.19	1.90
SG-8002CA- <input type="checkbox"/> <input type="checkbox"/> -ND	4.73	4.05	3.11	2.70
SG-8002JF- <input type="checkbox"/> <input type="checkbox"/> -ND NEW!	3.50	3.00	2.30	2.00

*Parts come marked with Manufacture Date Lot Code only. Marked parts are available as a non-catalog order only.

One Time Programmable parts are non-cancelable, non-returnable!

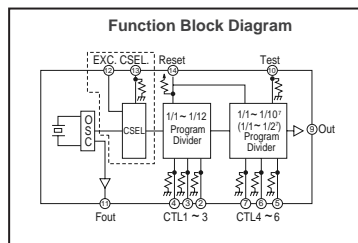
† Not available in JC Package

* For complete Base Part Number, substitute the corresponding letter for .

Programmable Crystal Oscillators/Frequency Dividers

- Electrical Characteristics:**
- Supply Voltage: 4.5V-5.5V
 - Operating Temp.: -10°C to +70°C
 - L. Output Voltage: VOL = 0.4V.
 - H. Output Voltage: VOH = VDD - 1.0V.
 - L. Output Current: IOL = 1.6mA.
 - H. Output Current: IOH = -40µA.
 - Rise Time: 30 nsec Typ.
 - Fall Time: 25 nsec Typ.
 - Start-up Time: 0.21 sec.

Features: • Provides 57 different frequencies from a single quartz crystal. • Packaged in standard 16-pin DIP containing both IC and quartz crystal. • SPG Series is high precision time-base frequency generators each comprised of a small quartz-crystal element and a CMOS monolithic chip integrated hybrid configuration.



Set of Output Frequency

CTL1	CTL2	CTL3	Dividing Ratio	CTL4	CTL5	CTL6	Dividing Ratio
0	0	0	1/1	0	0	0	1/1
0	0	1	1/10	0	0	1	1/10
0	1	0	1/2	0	1	0	1/10 ²
0	1	1	1/3	0	1	1	1/10 ³
1	0	0	1/4	1	0	0	1/10 ⁴
1	0	1	1/5	1	0	1	1/10 ⁵
1	1	0	1/6	1	1	0	1/10 ⁶
1	1	1	1/12	1	1	1	1/10 ⁷

Base Frequency	Digi-Key Part No.	Price Each				Epson Part No.
		1	10	50	100	
60kHz $\pm 5\text{ppm}$	SE3103-ND	19.20	16.00	11.38	10.24	SPG-8651A
100kHz $\pm 5\text{ppm}$	SE3104-ND	19.20	16.00	11.38	10.24	SPG-8651B

HG-1000 Oscillators

	<p>No. Pin Terminal</p> <table border="1"> <tr><td>1</td><td>Ts</td></tr> <tr><td>2</td><td>GND</td></tr> <tr><td>3</td><td>OUT</td></tr> <tr><td>4</td><td>VDD</td></tr> </table>	1	Ts	2	GND	3	OUT	4	VDD	<p>Recommended Soldering Pattern</p>
1	Ts									
2	GND									
3	OUT									
4	VDD									

Specifications:

• Max. Supply Voltage: -0.5V to +7.0V • Operating Voltage: 5.0V $\pm 25\%$ • Storage Temperature: $\pm 55\%$ to +125°C • Operating Temperature: -40°C to +85°C • Frequency Tolerance: $\pm 25\text{ppm}$ @ -40°C to +85°C • Current Consumption: 10mA Max. • Duty: 40% to 60% @ 1/2 VDD Level • Output Load Condition: 15pF Max. • Output Rise Time: 8ns Max. • Output Fall Time: 8ns Max. • Oscillation Startup Time: 4ms max.

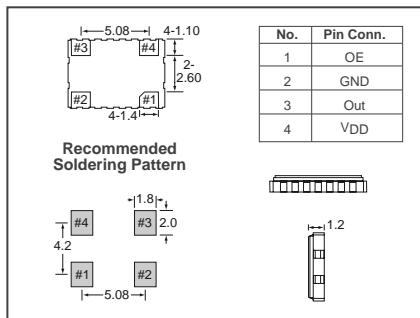
Frequency MHz	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 1,000	Epson Part No.
		1	10	50			
1.544	SE2861CT-ND	8.73	7.28	5.09	SE2861TR-ND	3850.00	HG-1012JA 1.544M-BX2
16.384	SE2864CT-ND	8.73	7.28	5.09	SE2864TR-ND	3850.00	HG-1012JA 16.38M-BX2
19.440	SE2865CT-ND	8.73	7.28	5.09	SE2865TR-ND	3850.00	HG-1012JA 19.44M-BX2
20.000	SE2866CT-ND	8.73	7.28	5.09	SE2866TR-ND	3850.00	HG-1012JA 20.00M-BX2

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Surface-Mount Quartz
Crystal Products

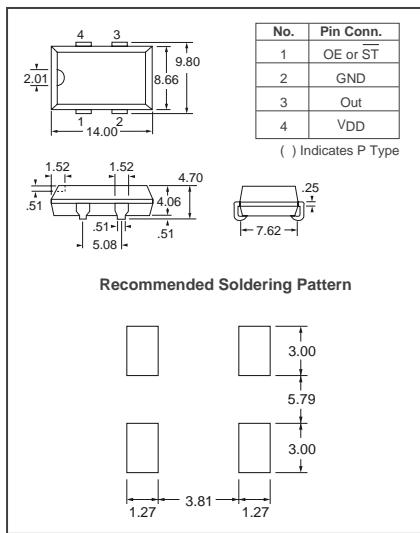
NEW! EG2001CA Series Oscillators



Specifications:
 • **Max. Supply Voltage:** -0.5 to +5.5 • **Operating Voltage:** 3.0 to 3.6
 • **Storage Temperature:** -55°C to +100°C • **Operating Temperature:** 0°C to +70°C • **Frequency Stability:** ±100ppm @ 0°C to +70°C
 • **Current Consumption:** 50mA Max. • **Duty:** 45% to 55% @ 50% VDD Level • **Output Load Condition:** 25pF Max. • **Output Rise/Fall Time:** 2ns Max. • **Oscillation Start Up Time:** 10ms Max.

SG-615 Series Oscillators

- SG-615/615P (C-MOS, TTL compatible type)
- 615PT (TTL compatible type)
- SG-615H/PCV (C-MOS compatible type)
- Provided with an OE (Output Enable) function (SG-615P/615PT) (Contains internal pull-up resistor.)



Specifications:
 • **Supply Voltage:** Operating: 5.0±0.5V; Maximum: -0.3~ +7.0V.
 • **Temperature Range:** Operating: -40°C to +85°C; Storage: -55°C to +125°C. • **Frequency Stability:** C: ±100ppm, -10°C to +70°C; C: ±200ppm, -40°C to +85°C. • **Current Consumption:** 25mA Max. (SG-615/615P); 35mA Max. (SG-615PT); 32mA Max. (SG-615H). Values are with no load. • **Duty Cycle:** 40~60%, 1.4V or 1/2VDD level. • **Output Voltage:** VDD -0.4V Min. (SG-615/615P), IOH = -400µA; VDD -0.4 Min. (SG-615PT), IOH = -400µA; VDD -0.37V Min. (SG-615H), IOH = 4mA; 0.4V Max. (SG-615/615P), IOL = 16mA; 0.4V Max. (SG-615PT), IOL = 16mA; 0.37V Max. (SG-615H), IOL = 4mA. • **OE Input Voltage** (SG-615P/615PT): 2.0V Min., IOH = 1µA (VIH = VDD); 0.8V Max., IIL = 100mA (VIL = GND). • **Rise Time:** 8 nsec Max., 5 nsec Typ. (SG-615/615P); 10 nsec Max., 5 nsec Typ. (SG-615PT); 7 nsec Typ. (SG-615H). • **Fall Time:** 8 nsec Max., 5 nsec Typ. (SG-615/615P); 8 nsec Max., 3 nsec Typ. (SG-615PT); 7 nsec Max., 3.5 nsec Typ. (SG-615H). • **Oscillation Start Time:** 4 msec Max., (SG-615/615P); 10 msec Max., (SG-615PT); 10 msec Max., (SG-615H).

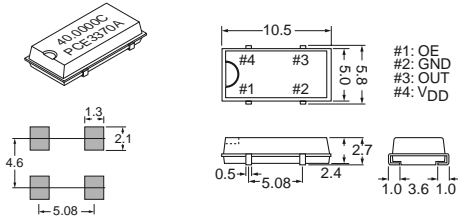
‡ Except when otherwise noted.

† SE3-KIT-ND Digi-Key® SMT Crystal Kit 2 each of values denoted (32 total pieces). Notebook style storage case and bin storage guide included\$109.00

Series	Frequency (MHz)†	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 1,000	Epson Part No.	
			1	10	50				100
EG2001CA	106.25	SE1008CT-ND NEW!	14.38	12.94	11.50	10.07	SE1008TR-ND NEW!	8050.00	EG2001CA 106.25MPC3
	125.000	SE1009CT-ND NEW!	15.63	14.07	12.50	10.94	SE1009TR-ND NEW!	8750.00	EG2001CA 125.00MPC3
SG-615	6.000	SE2107CT-ND	6.03	5.40	—	4.50	—	—	SG-615-6.0MCO
SG-615P (OE) (CMOS) (TTL)	1.544	SE2217CT-ND	3.45	2.88	2.00	1.81	SE2217TR-ND	1520.00	SG-615P 1.544MCO
	1.8432	SE2201CT-ND†	3.45	2.88	2.00	1.81	SE2201TR-ND	1520.00	SG-615P 1.843MCO
	2.000	SE2202CT-ND†	3.45	2.88	2.00	1.81	SE2202TR-ND	1520.00	SG-615P 2.000MCO
	2.048	SE2218CT-ND	3.45	2.88	2.00	1.81	SE2218TR-ND	1520.00	SG-615P 2.048MCO
	2.4576	SE2203CT-ND†	3.45	2.88	2.00	1.81	SE2203TR-ND	1520.00	SG-615P 2.457MCO
	3.072	SE2219CT-ND	3.45	2.88	2.00	1.81	SE2219TR-ND	1520.00	SG-615P 3.072MCO
	3.579	SE2222CT-ND	3.45	2.88	2.00	1.81	SE2222TR-ND	1520.00	SG-615P 3.579MCO
	3.6864	SE2204CT-ND†	3.45	2.88	2.00	1.81	SE2204TR-ND	1520.00	SG-615P 3.686MCO
	4.000	SE2205CT-ND†	3.45	2.88	2.00	1.81	SE2205TR-ND	1520.00	SG-615P 4.000MCO
	4.096	SE2223CT-ND	3.45	2.88	2.00	1.81	SE2223TR-ND	1520.00	SG-615P 4.096MCO
	5.000	SE2224CT-ND	3.45	2.88	2.00	1.81	SE2224TR-ND	1520.00	SG-615P 5.000MCO
	6.000	SE2207CT-ND†	3.45	2.88	2.00	1.81	SE2207TR-ND	1520.00	SG-615P 6.000MCO
	6.144	SE2226CT-ND	3.45	2.88	2.00	1.81	SE2226TR-ND	1520.00	SG-615P 6.144MCO
	7.372	SE2227CT-ND	3.45	2.88	2.00	1.81	SE2227TR-ND	1520.00	SG-615P 7.372MCO
	8.192	SE2228CT-ND	3.45	2.88	2.00	1.81	SE2228TR-ND	1520.00	SG-615P 8.192MCO
	9.830	SE2229CT-ND	3.45	2.88	2.00	1.81	SE2229TR-ND	1520.00	SG-615P 9.830MCO
	10.000	SE2209CT-ND†	3.45	2.88	2.00	1.81	SE2209TR-ND	1520.00	SG-615P 10.000MCO
	11.059	SE2232CT-ND	3.45	2.88	2.00	1.81	SE2232TR-ND	1520.00	SG-615P 11.059MCO
12.000	SE2210CT-ND†	3.45	2.88	2.00	1.81	SE2210TR-ND	1520.00	SG-615P 12.000MCO	
12.288	SE2233CT-ND	3.45	2.88	2.00	1.81	SE2233TR-ND	1520.00	SG-615P 12.288MCO	
14.31818	SE2211CT-ND†	3.45	2.88	2.00	1.81	SE2211TR-ND	1520.00	SG-615P 14.318MCO	
16.000	SE2212CT-ND†	3.45	2.88	2.00	1.81	SE2212TR-ND	1520.00	SG-615P 16.000MCO	
16.257	SE2236CT-ND	3.45	2.88	2.00	1.81	SE2236TR-ND	1520.00	SG-615P 16.257MCO	
18.432	SE2213CT-ND†	3.45	2.88	2.00	1.81	SE2213TR-ND	1520.00	SG-615P 18.432MCO	
18.869	SE2238CT-ND	3.45	2.88	2.00	1.81	SE2238TR-ND	1520.00	SG-615P 18.869MCO	
19.660	SE2239CT-ND	3.45	2.88	2.00	1.81	SE2239TR-ND	1520.00	SG-615P 19.660MCO	
20.000	SE2214CT-ND†	3.45	2.88	2.00	1.81	SE2214TR-ND	1520.00	SG-615P 20.000MCO	
20.480	SE2240CT-ND	3.45	2.88	2.00	1.81	SE2240TR-ND	1520.00	SG-615P 20.480MCO	
22.118	SE2241CT-ND	3.45	2.88	2.00	1.81	SE2241TR-ND	1520.00	SG-615P 22.118MCO	
24.000	SE2215CT-ND†	3.45	2.88	2.00	1.81	SE2215TR-ND	1520.00	SG-615P 24.000MCO	
25.000	SE2242CT-ND	3.45	2.88	2.00	1.81	SE2242TR-ND	1520.00	SG-615P 25.000MCO	
25.175	SE2216CT-ND†	3.45	2.88	2.00	1.81	SE2216TR-ND	1520.00	SG-615P 25.175MCO	
SG-615PT (OE)	36.000	SE2304CT-ND	6.20	5.55	—	4.63	—	—	SG-615PT36.000MCO
SG-615PTJ (TTL)	27.000	SE2326CT-ND	3.45	2.88	2.00	1.81	SE2326TR-ND	1520.00	SG-615PTJ 27.000MCO
	28.322	SE2327CT-ND	3.45	2.88	2.00	1.81	SE2327TR-ND	1520.00	SG-615PTJ 28.322MCO
	28.636	SE2328CT-ND	3.45	2.88	2.00	1.81	SE2328TR-ND	1520.00	SG-615PTJ 28.636MCO
	29.491	SE2329CT-ND	3.45	2.88	2.00	1.81	SE2329TR-ND	1520.00	SG-615PTJ 29.491MCO
	30.000	SE2330CT-ND	3.45	2.88	2.00	1.81	SE2330TR-ND	1520.00	SG-615PTJ 30.000MCO
SG-615PH (CMOS)	32.000	SE2337CT-ND	3.45	2.88	2.00	1.81	SE2337TR-ND	1520.00	SG-615PH 32.000MCO
	32.768	SE2338CT-ND	3.45	2.88	2.00	1.81	SE2338TR-ND	1520.00	SG-615PH 32.768MCO
	33.000	SE2339CT-ND	3.45	2.88	2.00	1.81	SE2339TR-ND	1520.00	SG-615PH 33.000MCO
	33.333	SE2340CT-ND	3.45	2.88	2.00	1.81	SE2340TR-ND	1520.00	SG-615PH 33.333MCO
	36.000	SE2341CT-ND	3.45	2.88	2.00	1.81	SE2341TR-ND	1520.00	SG-615PH 36.000MCO
	40.000	SE2343CT-ND	3.45	2.88	2.00	1.81	SE2343TR-ND	1520.00	SG-615PH 40.000MCO
	44.900	SE2344CT-ND	3.45	2.88	2.00	1.81	SE2344TR-ND	1520.00	SG-615PH 44.900MCO
	48.000	SE2345CT-ND	3.45	2.88	2.00	1.81	SE2345TR-ND	1520.00	SG-615PH 48.000MCO
	50.000	SE2346CT-ND	3.45	2.88	2.00	1.81	SE2346TR-ND	1520.00	SG-615PH 50.000MCO
	55.000	SE2347CT-ND	3.45	2.88	2.00	1.81	SE2347TR-ND	1520.00	SG-615PH 55.000MCO
60.000	SE2348CT-ND	3.63	3.03	2.13	1.92	SE2348TR-ND	1610.00	SG-615PH 60.000MCO	
66.000	SE2351CT-ND	3.63	3.03	2.13	1.92	SE2351TR-ND	1610.00	SG-615PH 66.000MCO	
66.666	SE2352CT-ND	3.63	3.03	2.13	1.92	SE2352TR-ND	1610.00	SG-615PH 66.666MCO	
SG-615PCV (OE) (CMOS)	50.000	SE3503CT-ND	5.25	4.38	3.10	2.80	SE3503TR-ND	2300.00	SG-615PCV 50.000MCO
	75.000	SE3511CT-ND	5.85	4.88	3.40	3.10	SE3511TR-ND	2550.00	SG-615PCV 75.000MCO
	80.000	SE3512CT-ND	5.85	4.88	3.40	3.10	SE3512TR-ND	2550.00	SG-615PCV 80.000MCO
	90.000	SE3513CT-ND	5.85	4.88	3.40	3.10	SE3513TR-ND	2550.00	SG-615PCV 90.000MCO
	100.000	SE3514CT-ND	5.85	4.88	3.40	3.10	SE3514TR-ND	2550.00	SG-615PCV 100.000MCO
SG-615PCV (OE)	106.250	SE3515CT-ND	6.45	5.38	3.85	3.45	SE3515TR-ND	2900.00	SG-615PCV 106.250MCO
	120.000	SE3516CT-ND	6.45	5.38	3.85	3.45	SE3516TR-ND	2900.00	SG-615PCV 120.000MCO

Surface-Mount Quartz
Crystal Products

SG636PCE/636PCV Oscillator



FEATURES:

- 3.3 volt operation, low current consumption. • 45/55% duty cycle. • Small type SMD, thus allowing high density mounting. • Suitable for small handy equipments, especially "Energy Star Computers Program" products.

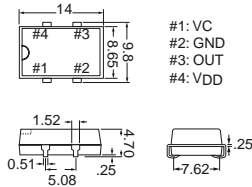
SPECIFICATIONS:

Max. Supply Voltage: -0.5V to +7.0V. **Operating Voltage:** 3.3V±0.3V, It is possible to work on 2.7 to 5.5 VDD. **Storage Temperature:** -55°C to +100°C, Stored without Tape and Reel. **Operating Temperature:** -10°C to +70°C. **Soldering Condition:** Under 260°C within 10 sec. x 2 times or under 230°C within 3 min. **Frequency Stability:** C: ±100ppm, -10°C to +70°C. **Current Consumption:** 9mA Max., No Load Condition. **Output Disable Current:** 5.0mA Max. **Duty:** 45% to 55%. **High Output Voltage:** VDD -0.4V Max., IOH=-4mA. **Low Output Voltage:** 0.4V Max., IOL=-4mA. **High Input Voltage:** 80% VDD Min., OE Terminal. **Low Input Voltage:** 20% VDD Max., OE Terminal. **Output Rise Time:** 5ns Max., 20% to 80% VDD Level. **Output Fall Time:** 5ns Max., 80% to 20% VDD Level. **Start Up Time:** 4ms Max. **Aging:** ±5ppm/year Max. **Shock Resistance:** ±20ppm Max.

Voltage Controlled Crystal Oscillator
(VCXO) VG-1011JA Series

FEATURES:

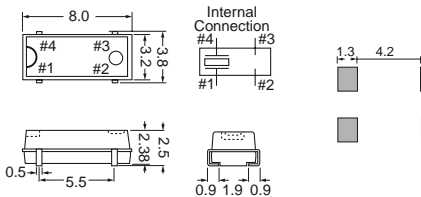
- Reflowable and high density mounting type SMD. • Using the heat-resisting type AT cut quartz crystal allows almost the same temperature soldering as universal SMD IC. • Using C-MOS IC allows low current consumption and assures high reliability. • Operating Supply Voltage: 5V. Control Voltage: 5V.



SPECIFICATIONS:

Supply Voltage (VDD): -0.5V Min, 7.0V Max, **Control Voltage (VC):** -0.5V Min, 7.0V Max. **Soldering Condition (Tsol):** Under 260°C within 10 sec. x 2 times. **Supply Voltage (VDD):** 4.5V Min, 5.5V Max. **Control Voltage (VC):** 0.5V Min, 4.5V Max. **Operable Temperature (Top):** -40°C Min, 85°C Max. **Frequency Stability:** AV: Ta=-20 to 70°C, AV: ±20 Max. **Frequency Adjustment Range:** K=±75ppm. **Frequency Control Sensitivity:** VC= 2.5±2.0V, ±10%. **Supply Current:** VDD=5.0V, No Load, 13mA Max. **Start-Up Time:** VDD=4.5V to be 0 sec., 10 msec Max. **Duty:** 1/2 VDD Level, 40% Min, 60% Max. **High Output Voltage:** IOH=-0.8mA, VDD-0.4V. **Low Output Voltage:** IOL=0.8mA, 0.4V Max. **Output Rise Time:** 20% to 80% VDD Level, 3 Typical, 8nS. **Output Fall Time:** 80% to 20% VDD Level 3 Typical, 8nS.

MA-306



SPECIFICATIONS:

Storage Temperature: -55°C to +100°C, Stored as naked product after unpacking. **Operating Temperature:** -20°C to +70°C. **Maximum Drive Level:** 2mW Max., Only crystal oscillation is guaranteed. **Recommended Drive Level:** 10µW to 100µW. **Soldering Condition:** Twice at under 260°C within 10 seconds or under 230°C within 3 minutes. **Frequency Tolerance (standard):** ±100ppm. **Frequency Temperature Characteristics (standard):** ±30ppm, -20°C to +70°C, DL=100µW. **Load Capacitance:** 18pF. **Series Resistance:** 60Ω Max., -20°C to +70°C, DL=100µW. **Shunt Capacitance:** 5pF Max. **Aging:** ±5ppm/Y Max.

Series	Frequency (MHz)	Digi-Key Part No.	Cut Tape Pricing				Digi-Key Part No.	T/R Pricing 1,000	Epson Part No.
			1	10	50	100			
SG636PCE/SG636PCV	2.4576	SE2801CT-ND	3.90	32.50	114.00	206.00	SE2801TR-ND	1730.00	SG-636PCE 2.4576MCO
	3.6864	SE2806CT-ND	3.90	32.50	114.00	206.00	SE2806TR-ND	1730.00	SG-636PCE 3.6864MCO
	4.0000	SE2807CT-ND	3.90	32.50	114.00	206.00	SE2807TR-ND	1730.00	SG-636PCE 4.0000MCO
	4.096	SE2808CT-ND	3.90	32.50	114.00	206.00	SE2808TR-ND	1730.00	SG-636PCE 4.096MCO
	5.000	SE2810CT-ND	3.90	32.50	114.00	206.00	SE2810TR-ND	1730.00	SG-636PCE 5.000MCO
	6.000	SE2812CT-ND	3.90	32.50	114.00	206.00	SE2812TR-ND	1730.00	SG-636PCE 6.000MCO
	7.372	SE2814CT-ND	3.90	32.50	114.00	206.00	SE2814TR-ND	1730.00	SG-636PCE 7.372MCO
	8.0000	SE2815CT-ND	3.90	32.50	114.00	206.00	SE2815TR-ND	1730.00	SG-636PCE 8.000MCO
	8.192	SE2816CT-ND	3.90	32.50	114.00	206.00	SE2816TR-ND	1730.00	SG-636PCE 8.192MCO
	10.000	SE2818CT-ND	3.90	32.50	114.00	206.00	SE2818TR-ND	1730.00	SG-636PCE 10.000MCO
	10.240	SE2819CT-ND	3.90	32.50	114.00	206.00	SE2819TR-ND	1730.00	SG-636PCE 10.240MCO
	12.000	SE2822CT-ND	3.90	32.50	114.00	206.00	SE2822TR-ND	1730.00	SG-636PCE 12.000MCO
	14.3181	SE2824CT-ND	3.90	32.50	114.00	206.00	SE2824TR-ND	1730.00	SG-636PCE 14.3181MCO
	14.7456	SE2825CT-ND	3.90	32.50	114.00	206.00	SE2825TR-ND	1730.00	SG-636PCE 14.7456MCO
	15.000	SE2826CT-ND	3.90	32.50	114.00	206.00	SE2826TR-ND	1730.00	SG-636PCE 15.000MCO
	16.000	SE2827CT-ND	3.90	32.50	114.00	206.00	SE2827TR-ND	1730.00	SG-636PCE 16.000MCO
	18.000	SE2829CT-ND	3.90	32.50	114.00	206.00	SE2829TR-ND	1730.00	SG-636PCE 18.000MCO
	18.432	SE2830CT-ND	3.90	32.50	114.00	206.00	SE2830TR-ND	1730.00	SG-636PCE 18.432MCO
20.000	SE2833CT-ND	3.90	32.50	114.00	206.00	SE2833TR-ND	1730.00	SG-636PCE 20.000MCO	
24.000	SE2836CT-ND	3.90	32.50	114.00	206.00	SE2836TR-ND	1730.00	SG-636PCE 24.000MCO	
25.000	SE2837CT-ND	3.90	32.50	114.00	206.00	SE2837TR-ND	1730.00	SG-636PCE 25.000MCO	
25.175	SE2838CT-ND	3.90	32.50	114.00	206.00	SE2838TR-ND	1730.00	SG-636PCE 25.175MCO	
27.000	SE2839CT-ND	3.90	32.50	114.00	206.00	SE2839TR-ND	1730.00	SG-636PCE 27.000MCO	
28.636	SE2841CT-ND	3.90	32.50	114.00	206.00	SE2841TR-ND	1730.00	SG-636PCE 28.636MCO	
29.491	SE2842CT-ND	3.90	32.50	114.00	206.00	SE2842TR-ND	1730.00	SG-636PCE 29.4912MCO	
30.000	SE2843CT-ND	3.90	32.50	114.00	206.00	SE2843TR-ND	1730.00	SG-636PCE 30.000MCO	
32.000	SE2844CT-ND	3.90	32.50	114.00	206.00	SE2844TR-ND	1730.00	SG-636PCE 32.000MCO	
33.000	SE2847CT-ND	3.90	32.50	114.00	206.00	SE2847TR-ND	1730.00	SG-636PCE 33.000MCO	
33.333	SE2848CT-ND	3.90	32.50	114.00	206.00	SE2848TR-ND	1730.00	SG-636PCE 33.333MCO	
36.000	SE2849CT-ND	3.90	32.50	114.00	206.00	SE2849TR-ND	1730.00	SG-636PCE 36.000MCO	
38.000	SE2850CT-ND	3.90	32.50	114.00	206.00	SE2850TR-ND	1730.00	SG-636PCE 38.000MCO	
40.000	SE2851CT-ND	3.90	32.50	114.00	206.00	SE2851TR-ND	1730.00	SG-636PCE 40.000MCO	
44.900	SE2852CT-ND	6.15	51.25	180.00	325.00	SE2852TR-ND	2700.00	SG-636PCV 44.900MCO	
48.000	SE2853CT-ND	6.15	51.25	180.00	325.00	SE2853TR-ND	2700.00	SG-636PCV 48.000MCO	
50.000	SE2854CT-ND	6.15	51.25	180.00	325.00	SE2854TR-ND	2700.00	SG-636PCV 50.000MCO	
55.000	SE2855CT-ND	6.15	51.25	180.00	325.00	SE2855TR-ND	2700.00	SG-636PCV 55.000MCO	
60.000	SE2856CT-ND	6.15	51.25	180.00	325.00	SE2856TR-ND	2700.00	SG-636PCV 60.000MCO	
66.000	SE2859CT-ND	6.15	51.25	180.00	325.00	SE2859TR-ND	2700.00	SG-636PCV 66.000MCO	
66.666	SE2860CT-ND	6.15	51.25	180.00	325.00	SE2860TR-ND	2700.00	SG-636PCV 66.6667MCO	
12.288	SE3601CT-ND	13.68	114.00	405.50	730.00	SE3601TR-ND	6080.00	VG-1011JA 12.288MAVK2	
16.384	SE3603CT-ND	13.68	114.00	405.50	730.00	SE3603TR-ND	6080.00	VG-1011JA 16.388MAVK2	
19.200	SE3605CT-ND	13.68	114.00	405.50	730.00	SE3605TR-ND	6080.00	VG-1011JA 19.200MAVK2	
19.440	SE3606CT-ND	13.68	114.00	405.50	730.00	SE3606TR-ND	6080.00	VG-1011JA 19.440MAVK2	
27.000	SE3607CT-ND	13.68	114.00	405.50	730.00	SE3607TR-ND	6080.00	VG-1011JA 27.000MAVK2	
18.000	SE2701CT-ND	1.89	15.75	55.50	100.00	SE2701TR-ND	830.00	MA-306 18.000M-CO	
18.432	SE2702CT-ND	1.89	15.75	55.50	100.00	SE2702TR-ND	830.00	MA-306 18.432M-CO	
19.660	SE2704CT-ND	1.89	15.75	55.50	100.00	SE2704TR-ND	830.00	MA-306 19.660M-CO	
20.000	SE2705CT-ND	1.89	15.75	55.50	100.00	SE2705TR-ND	830.00	MA-306 20.000M-CO	
22.118	SE2707CT-ND	1.89	15.75	55.50	100.00	SE2707TR-ND	830.00	MA-306 22.1180M-CO	
24.000	SE2708CT-ND	1.89	15.75	55.50	100.00	SE2708TR-ND	830.00	MA-306 24.000M-CO	
24.576	SE2709CT-ND	1.89	15.75	55.50	100.00	SE2709TR-ND	830.00	MA-306 24.576M-CO	
25.000	SE2710CT-ND	1.89	15.75	55.50	100.00	SE2710TR-ND	830.00	MA-306 25.000M-CO	
25.175	SE2711CT-ND	1.89	15.75	55.50	100.00	SE2711TR-ND	830.00	MA-306 25.175M-CO	
27.000	SE2712CT-ND	1.89	15.75	55.50	100.00	SE2712TR-ND	830.00	MA-306 27.000M-CO	
28.000	SE2713CT-ND	1.89	15.75	55.50	100.00	SE2713TR-ND	830.00	MA-306 28.000M-CO	
28.636	SE2715CT-ND	1.89	15.75	55.50	100.00	SE2715TR-ND	830.00	MA-306 28.636M-CO	
29.491	SE2716CT-ND	1.89	15.75	55.50	100.00	SE2716TR-ND	830.00	MA-306 29.491M-CO	
32.000	SE2718CT-ND	1.89	15.75	55.50	100.00	SE2718TR-ND	830.00	MA-306 32.000M-CO	
40.000	SE2725CT-ND	2.04	17.00	60.00	108.00	SE2725TR-ND	900.00	MA-306 40.000M-CO	

Cylinder-Type Quartz Crystals

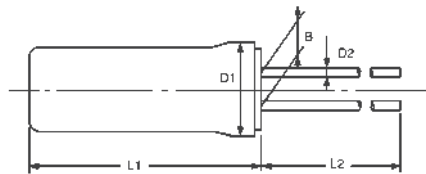
C-Type/C-2-Type

SPECIFICATIONS FOR C-TYPE (Characteristics):

• **Nominal Frequency:** 32.768KHz • **Operating Temperature:** -10°C ~ +60°C • **Maximum Drive Level:** 1.0µW Max. • **Frequency Tolerance (Standard):** ±20ppm • **Load Capacitance:** (SE3201, SE3202, SE3203) 12.5pF; (SE3204) 9pF • **Series Resistance:** C-001R ~ 35KΩ Max. (18KΩ Typ.); C-002RX and C-004R ~ 50KΩ Max. (30KΩ Typ.); and C-005R ~ 50KΩ Max. (37KΩ Typ.)

SPECIFICATIONS FOR C-2-TYPE (Characteristics):

• **Operating Temperature:** -10°C ~ +60°C • **Max. Drive Level:** 1.0µW Max. • **Crystal Load Capacitance/Tolerance:** All parts have 11 pfd. load capacitance, ±100 ppm except: (SE3307) C-2 31.200K-AG, 7 pfd., ±200 ppm; (SE3311) C-2 32.560K-AG, 7pfd., ±190 ppm; (SE3314) C-2 38.000KA-P 12.5 pfd., ±20 ppm • **Series Resistance Over 20KHz and Under 99KHz:** 35KΩ ~ 15KΩ • **Series Resistance Over 100KHz and Under 200KHz:** 12KΩ ~ 8KΩ.

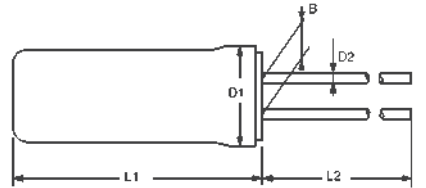


Model	L ₁	L ₂	D ₁	D ₂	B
C-2-Type	6.2 MAX	4.0 MIN	ø2.0 MAX	ø0.2	0.6
C-001R	8.0 MAX	9.0 MIN	ø3.1 MAX	ø0.3	1.1
C-002RX	6.0 MAX	4.0 MIN	ø2.0 MAX	ø0.2	0.6
C-004R	5.0 MAX	4.0 MIN	ø1.5 MAX	ø0.18	0.5
C-005R	4.6 MAX	4.0 MIN	ø1.2 MAX	ø0.15	0.3

CA-301 Type

SPECIFICATIONS (Characteristics):

• **Operating Temperature:** -20°C ~ +70°C • **Maximum Drive Level:** 2mW Max. • **Recommended Level:** 10µW ~ 100µW Typ. • **Frequency Tolerance (Standard):** ±30ppm • **Load Capacitance:** 18 pfd • **Series Resistance:** As per table below.



Model	L ₁	L ₂	D ₁	D ₂	B
Under 5.3MHz	10.3 MAX	9.0 MIN	ø3.1 MAX	ø0.3	1.1
Over 5.5 MHz	8.9 MAX	9.0 MIN	ø3.1 MAX	ø0.3	1.1

Frequency (MHz)	Series Resistance (Ω)	Mode
Over 4.0MHz	150 Ω MAX.	Fundamental
Under 5.3MHz		
Over 5.5MHz	100 Ω MAX.	
Under 6.0MHz		
Over 6.0MHz	80 Ω MAX.	
Under 10.0MHz		
Over 10.0MHz	60 Ω MAX.	
Under 12.0MHz		
Over 12.0MHz	50 Ω MAX.	
Under 16.0MHz		
Over 16.0MHz	40 Ω MAX.	
Under 26.0MHz		
Over 26.0MHz	100 Ω MAX.	3rd Overtone
Under 36.0MHz		
Exceeding 36.0MHz	80 Ω MAX.	
Below 60.0MHz		

Series	Frequency	Digi-Key Part No.	Pricing					Epson Part No.
			1	10	50	100	1,000	
C-Type	32.768KHz	SE3201-ND	.42	3.50	12.00	22.00	180.00	C-001R 32.768K-A
	32.768KHz	SE3202-ND	.42	3.50	12.00	22.00	180.00	C-002RX 32.768K-A
	32.768KHz	SE3203-ND	1.38	11.50	41.00	74.00	620.00	C-004R 32.768K-A
	32.768KHz	SE3204-ND	5.64	47.00	166.50	300.00	2500.01	C-005R 32.768K-AC
C-2 Type	20.000KHz	SE3301-ND	1.23	10.25	36.50	66.00	550.00	C-2 20.000K-P
	25.600KHz	SE3302-ND	1.23	10.25	36.50	66.00	550.00	C-2 25.600K-P
	26.667KHz	SE3303-ND	1.23	10.25	36.50	66.00	550.00	C-2 26.667K-P
	28.000KHz	SE3304-ND	1.23	10.25	36.50	66.00	550.00	C-2 28.000K-P
	30.000KHz	SE3305-ND	1.23	10.25	36.50	66.00	550.00	C-2 30.000K-P
	30.760KHz	SE3306-ND	1.23	10.25	36.50	66.00	550.00	C-2 30.760K-P
	31.200KHz	SE3307-ND	1.23	10.25	36.50	66.00	550.00	C-2 31.200K-AG
	31.250KHz	SE3308-ND	1.23	10.25	36.50	66.00	550.00	C-2 31.250K-P
	31.500KHz	SE3309-ND	1.23	10.25	36.50	66.00	550.00	C-2 31.500K-P
	32.000KHz	SE3310-ND	1.23	10.25	36.50	66.00	550.00	C-2 32.000K-P
	32.560KHz	SE3311-ND	1.23	10.25	36.50	66.00	550.00	C-2 32.560K-AG
	32.919KHz	SE3312-ND	1.23	10.25	36.50	66.00	550.00	C-2 32.919K-P
	36.000KHz	SE3313-ND	1.23	10.25	36.50	66.00	550.00	C-2 36.000K-P
	38.000KHz	SE3314-ND	1.35	11.25	36.50	66.00	550.00	C-2 38.000KA-P
	38.400KHz	SE3315-ND	1.23	10.25	36.50	66.00	550.00	C-2 38.400K-P
	40.000KHz	SE3316-ND	1.23	10.25	36.50	66.00	550.00	C-2 40.000K-P
46.6084KHz	SE3317-ND	1.23	10.25	36.50	66.00	550.00	C-2 46.6084K-P	
50.000KHz	SE3318-ND	1.23	10.25	36.50	66.00	550.00	C-2 50.000K-P	
59.787KHz	SE3319-ND	1.23	10.25	36.50	66.00	550.00	C-2 59.787K-P	
60.000KHz	SE3320-ND	1.23	10.25	36.50	66.00	550.00	C-2 60.000K-P	
60.002KHz	SE3321-ND	1.23	10.25	36.50	66.00	550.00	C-2 60.002K-P	
65.535KHz	SE3322-ND	1.23	10.25	36.50	66.00	550.00	C-2 65.535K-P	
75.000KHz	SE3323-ND	1.23	10.25	36.50	66.00	550.00	C-2 75.000K-P	
76.800KHz	SE3324-ND	1.23	10.25	36.50	66.00	550.00	C-2 76.800K-P	
83.000KHz	SE3330-ND	1.47	12.25	43.50	78.00	650.00	C-2 83.000K-P	
96.000KHz	SE3331-ND	1.47	12.25	43.50	78.00	650.00	C-2 96.000K-P	
100.000KHz	SE3333-ND	1.47	12.25	43.50	78.00	650.00	C-2 100.000K-P	
111.000KHz	SE3334-ND	1.47	12.25	43.50	78.00	650.00	C-2 111.000K-P	
120.000KHz	SE3335-ND	1.47	12.25	43.50	78.00	650.00	C-2 120.000K-P	
120.8475KHz	SE3336-ND	1.47	12.25	43.50	78.00	650.00	C-2 120.847K-P	
131.072KHz	SE3337-ND	1.77	14.75	52.00	94.00	780.00	C-2 131.072K-P	
149.475KHz	SE3338-ND	1.77	14.75	52.00	94.00	780.00	C-2 149.475K-P	
4.000MHz	SE3404-ND	1.89	15.75	55.50	100.00	830.00	CA-301 4.000M-C	
4.194304MHz	SE3405-ND	1.89	15.75	55.50	100.00	830.00	CA-301 4.194M-C	
4.433619MHz	SE3406-ND	1.89	15.75	55.50	100.00	830.00	CA-301 4.433M-C	
4.9152MHz	SE3407-ND	1.89	15.75	55.50	100.00	830.00	CA-301 4.915M-C	
5.500MHz	SE3408-ND	1.17	9.75	34.00	62.00	520.00	CA-301 5.500M-C	
6.000MHz	SE3409-ND	1.17	9.75	34.00	62.00	520.00	CA-301 6.000M-C	
6.144MHz	SE3410-ND	1.17	9.75	34.00	62.00	520.00	CA-301 6.144M-C	
6.757MHz	SE3411-ND	1.17	9.75	34.00	62.00	520.00	CA-301 6.757M-C	
7.200MHz	SE3412-ND	1.17	9.75	34.00	62.00	520.00	CA-301 7.200M-C	
7.3728MHz	SE3413-ND	1.17	9.75	34.00	62.00	520.00	CA-301 7.372M-C	
8.000MHz	SE3414-ND	1.17	9.75	34.00	62.00	520.00	CA-301 8.000M-C	
8.388608MHz	SE3415-ND	1.17	9.75	34.00	62.00	520.00	CA-301 8.388M-C	
8.432MHz	SE3416-ND	1.17	9.75	34.00	62.00	520.00	CA-301 8.432M-C	
9.600MHz	SE3418-ND	1.17	9.75	34.00	62.00	520.00	CA-301 9.600M-C	
9.8304MHz	SE3419-ND	1.17	9.75	34.00	62.00	520.00	CA-301 9.830M-C	
10.000MHz	SE3420-ND	1.17	9.75	34.00	62.00	520.00	CA-301 10.000M-C	
10.240MHz	SE3421-ND	1.17	9.75	34.00	62.00	520.00	CA-301 10.240M-C	
10.6244MHz	SE3422-ND	1.17	9.75	34.00	62.00	520.00	CA-301 10.624M-C	
11.0592MHz	SE3423-ND	1.17	9.75	34.00	62.00	520.00	CA-301 11.059M-C	
12.000MHz	SE3424-ND	1.17	9.75	34.00	62.00	520.00	CA-301 12.000M-C	
12.096MHz	SE3425-ND	1.17	9.75	34.00	62.00	520.00	CA-301 12.096M-C	
12.288MHz	SE3426-ND	1.17	9.75	34.00	62.00	520.00	CA-301 12.288M-C	
13.500MHz	SE3427-ND	1.17	9.75	34.00	62.00	520.00	CA-301 13.500M-C	
14.000MHz	SE3428-ND	1.17	9.75	34.00	62.00	520.00	CA-301 14.000M-C	
14.31818MHz	SE3429-ND	1.17	9.75	34.00	62.00	520.00	CA-301 14.318M-C	
14.500MHz	SE3430-ND	1.17	9.75	34.00	62.00	520.00	CA-301 14.500M-C	
14.7456MHz	SE3431-ND	1.17	9.75	34.00	62.00	520.00	CA-301 14.745M-C	
15.000MHz	SE3432-ND	1.17	9.75	34.00	62.00	520.00	CA-301 15.000M-C	
16.000MHz	SE3433-ND	1.17	9.75	34.00	62.00	520.00	CA-301 16.000M-C	
16.257MHz	SE3434-ND	1.17	9.75	34.00	62.00	520.00	CA-301 16.257M-C	
18.000MHz	SE3435-ND	1.17	9.75	34.00	62.00	520.00	CA-301 18.000M-C	
18.432MHz	SE3436-ND	1.17	9.75	34.00	62.00	520.00	CA-301 18.432M-C	
19.6608MHz	SE3437-ND	1.17	9.75	34.00	62.00	520.00	CA-301 19.660M-C	
20.000MHz	SE3438-ND	1.17	9.75	34.00	62.00	520.00	CA-301 20.000M-C	
22.1184MHz	SE3439-ND	1.17	9.75	34.00	62.00	520.00	CA-301 22.118M-C	
24.000MHz	SE3440-ND	1.17	9.75	34.00	62.00	520.00	CA-301 24.000M-C	
25.000MHz	SE3441-ND	1.17	9.75	34.00	62.00	520.00	CA-301 25.000M-C	
25.175MHz	SE3442-ND	1.17	9.75	34.00	62.00	520.00	CA-301 25.175M-C	
27.000MHz	SE3443-ND	1.20	10.00	35.00	63.00	530.00	CA-301 27.000M-C	
28.000MHz	SE3444-ND	1.20	10.00	35.00	63.00	530.00	CA-301 28.000M-C	
28.322MHz	SE3445-ND	1.20	10.00	35.00	63.00	530.00	CA-301 28.322M-C	
32.000MHz	SE3446-ND	1.20	10.00	35.00	63.00	530.00	CA-301 32.000M-C	
32.768MHz	SE3447-ND	1.20	10.00	35.00	63.00	530.00	CA-301 32.768M-C	
33.000MHz	SE3448-ND	1.20	10.00	35.00	63.00	530.00	CA-301 33.000M-C	
33.333MHz	SE3449-ND	1.20	10.00	35.00	63.00	530.00	CA-301 33.333M-C	
36.000MHz	SE3450-ND	1.20	10.00	35.00	63.00	530.00	CA-301 36.000M-C	
40.000MHz	SE3451-ND	1.20	10.00	35.00	63.00	530.00	CA-301 40.000M-C	
46.000MHz	SE3452-ND	1.20	10.00	35.00	63.00	530.00	CA-301 46.000M-C	
49.860MHz	SE3454-ND	1.20	10.00	35.00	63.00	530.00	CA-301 49.860M-C	
50.000MHz	SE3455-ND	1.20	10.00	35.00	63.00	530.00	CA-301 50.000M-C	
55.000MHz	SE3456-ND	1.20	10.00	35.00	63.00	530.00	CA-301 55.000M-C	
60.000MHz	SE3457-ND	1.29	10.75	37.00	67.00	560.00	CA-301 60.000M-C	

Surface-Mount Quartz Crystal Products

Storage Temperature: -55°C to +125°C.

MC-405

Internal Connection
#4 #3
#1 #2

Do not connect #2 and #3 to external device.

MA-505/MA-506

MA-505 Internal Connection
#4 #3
#1 #2

MA-506 Internal Connection
#4 #3
#1 #2

Do not connect #2 and #3 to external device.

MC-156

Internal Connection
#4 #3
#1 #2

Do not connect #2 and #3 to external device.

MC-206

Internal Connection
#4 #3
#1 #2

Do not connect #2 and #3 to external device.

MC-306

Internal Connection
#4 #3
#1 #2

Do not connect #2 and #3 to external device.

Recommended Soldering Pattern

- Capable of withstanding reflow temperatures of 260°C for 20 seconds
- Suitable for use in today's high density surface mount boards

Type	Dimensions (mm)			
	A	B	C	D
MC-405	4.09	3.91	4.09	—
MA-505	4.09	7.01	5.61	—
MA-506	4.09	6.86	2.06	1.52
MC-156	1.2	3.88	1.5	1.0
MC-206	1.2	3.88	1.3	2.4
MC-306	1.3	4.2	1.9	1.3

Series	Frequency (MHz) ¹	Digi-Key Part No.	Cut Tape Price Each				Digi-Key Part No.	T/R Pricing 1,000	Epson Part No.
			1	10	50	100			
MC-405	32.768kHz	SE2405CT-ND	2.04	1.70	1.20	1.08	SE2405TR-ND	900.00	MC-405 32.768K-A2
	4.000	SE2518CT-ND	2.37	1.98	1.38	1.25	SE2518TR-ND	1050.00	MA-505 4.000M-C0
	4.096	SE2519CT-ND	2.37	1.98	1.38	1.25	SE2519TR-ND	1050.00	MA-505 4.096M-C0
	4.915	SE2520CT-ND	2.37	1.98	1.38	1.25	SE2520TR-ND	1050.00	MA-505 4.915M-C0
	6.000	SE2501CT-ND†	1.56	1.30	.91	.83	SE2501TR-ND	690.00	MA-505 6.000M-C0
	6.144	SE2502CT-ND†	1.56	1.30	.91	.83	SE2502TR-ND	690.00	MA-505 6.144M-C0
	7.3728	SE2503CT-ND†	1.56	1.30	.91	.83	SE2503TR-ND	690.00	MA-505 7.372M-C0
	8.000	SE2504CT-ND†	1.56	1.30	.91	.83	SE2504TR-ND	690.00	MA-505 8.000M-C0
	9.830	SE2524CT-ND	1.56	1.30	.91	.83	SE2524TR-ND	690.00	MA-505 9.830M-C0
	10.000	SE2505CT-ND†	1.56	1.30	.91	.83	SE2505TR-ND	690.00	MA-505 10.000M-C0
	10.240	SE2525CT-ND	1.56	1.30	.91	.83	SE2525TR-ND	690.00	MA-505 10.240M-C0
	MA-505	11.0592	SE2506CT-ND†	1.56	1.30	.91	.83	SE2506TR-ND	690.00
12.000		SE2507CT-ND†	1.56	1.30	.91	.83	SE2507TR-ND	690.00	MA-505 12.000M-C0
14.318		SE2528CT-ND	1.56	1.30	.91	.83	SE2528TR-ND	690.00	MA-505 14.318M-C0
14.745		SE2529CT-ND	1.56	1.30	.91	.83	SE2529TR-ND	690.00	MA-505 14.745M-C0
16.000		SE2508CT-ND†	1.56	1.30	.91	.83	SE2508TR-ND	690.00	MA-505 16.000M-C0
18.432		SE2533CT-ND	1.56	1.30	.91	.83	SE2533TR-ND	690.00	MA-505 18.432M-C0
19.660		SE2535CT-ND	1.56	1.30	.91	.83	SE2535TR-ND	690.00	MA-505 19.660M-C0
20.000		SE2509CT-ND†	1.56	1.30	.91	.83	SE2509TR-ND	690.00	MA-505 20.000M-C0
24.000		SE2510CT-ND†	1.56	1.30	.91	.83	SE2510TR-ND	690.00	MA-505 24.000M-C0
24.576		SE2538CT-ND	1.56	1.30	.91	.83	SE2538TR-ND	690.00	MA-505 24.576M-C0
25.000		SE2539CT-ND	1.56	1.30	.91	.83	SE2539TR-ND	690.00	MA-505 25.000M-C0
27.000		SE2541CT-ND	1.56	1.30	.91	.83	SE2541TR-ND	690.00	MA-505 27.000M-C0
MA-506	28.636	SE2542CT-ND	1.56	1.30	.91	.83	SE2542TR-ND	690.00	MA-505 28.636M-C0
	29.491	SE2543CT-ND	1.56	1.30	.91	.83	SE2543TR-ND	690.00	MA-505 29.491M-C0
	30.000	SE2544CT-ND	1.56	1.30	.91	.83	SE2544TR-ND	690.00	MA-505 30.000M-C0
	32.768	SE2546CT-ND	1.62	1.35	.94	.85	SE2546TR-ND	710.00	MA-505 32.768M-C0
	33.3333	SE2514CT-ND†	1.62	1.35	.94	.85	SE2514TR-ND	710.00	MA-505 33.3330M-C0
	36.000	SE2548CT-ND	1.62	1.35	.94	.85	SE2548TR-ND	710.00	MA-505 36.000M-C0
	40.000	SE2515CT-ND†	1.62	1.35	.94	.85	SE2515TR-ND	710.00	MA-505 40.000M-C0
	60.000	SE2517CT-ND†	1.77	1.48	1.02	.92	SE2517TR-ND	770.00	MA-505 60.000M-C0
	64.000	SE2553CT-ND	1.77	1.48	1.02	.92	SE2553TR-ND	770.00	MA-505 64.000M-C0
	4.000	SE2618CT-ND	2.37	1.98	1.38	1.25	SE2618TR-ND	1050.00	MA-506 4.000M-C0
	4.096	SE2619CT-ND	2.37	1.98	1.38	1.25	SE2619TR-ND	1050.00	MA-506 4.096M-C0
	4.915	SE2620CT-ND	2.37	1.98	1.38	1.25	SE2620TR-ND	1050.00	MA-506 4.915M-C0
6.000	SE2601CT-ND*	1.56	1.30	.91	.83	SE2601TR-ND	690.00	MA-506 6.000M-C0	
6.144	SE2602CT-ND	1.56	1.30	.91	.83	SE2602TR-ND	690.00	MA-506 6.144M-C0	
7.3728	SE2603CT-ND*	1.56	1.30	.91	.83	SE2603TR-ND	690.00	MA-506 7.372M-C0	
8.000	SE2604CT-ND*	1.56	1.30	.91	.83	SE2604TR-ND	690.00	MA-506 8.000M-C0	
9.830	SE2624CT-ND	1.56	1.30	.91	.83	SE2624TR-ND	690.00	MA-506 9.8300M-C0	
10.000	SE2605CT-ND*	1.56	1.30	.91	.83	SE2605TR-ND	690.00	MA-506 10.000M-C0	
10.240	SE2625CT-ND	1.56	1.30	.91	.83	SE2625TR-ND	690.00	MA-506 10.240M-C0	
11.000	SE2626CT-ND	1.56	1.30	.91	.83	SE2626TR-ND	690.00	MA-506 11.000M-C0	
11.0592	SE2606CT-ND*	1.56	1.30	.91	.83	SE2606TR-ND	690.00	MA-506 11.059M-C0	
12.000	SE2607CT-ND*	1.56	1.30	.91	.83	SE2607TR-ND	690.00	MA-506 12.000M-C0	
12.288	SE2627CT-ND	1.56	1.30	.91	.83	SE2627TR-ND	690.00	MA-506 12.288M-C0	
14.318	SE2628CT-ND	1.56	1.30	.91	.83	SE2628TR-ND	690.00	MA-506 14.318M-C0	
14.745	SE2629CT-ND	1.56	1.30	.91	.83	SE2629TR-ND	690.00	MA-506 14.745M-C0	
15.000	SE2630CT-ND	1.56	1.30	.91	.83	SE2630TR-ND	690.00	MA-506 15.000M-C0	
16.000	SE2608CT-ND*	1.56	1.30	.91	.83	SE2608TR-ND	750.00	MA-506 16.000M-C0	
16.257	SE2631CT-ND	1.56	1.30	.91	.83	SE2631TR-ND	690.00	MA-506 16.257M-C0	
18.000	SE2632CT-ND	1.56	1.30	.91	.83	SE2632TR-ND	690.00	MA-506 18.000M-C0	
18.432	SE2633CT-ND	1.56	1.30	.91	.83	SE2633TR-ND	690.00	MA-506 18.432M-C0	
19.660	SE2635CT-ND	1.56	1.30	.91	.83	SE2635TR-ND	690.00	MA-506 19.660M-C0	
20.000	SE2609CT-ND*	1.56	1.30	.91	.83	SE2609TR-ND	690.00	MA-506 20.000M-C0	
20.480	SE2636CT-ND	1.56	1.30	.91	.83	SE2636TR-ND	690.00	MA-506 20.480M-C0	
22.118	SE2637CT-ND	1.56	1.30	.91	.83	SE2637TR-ND	690.00	MA-506 22.118M-C0	
24.000	SE2610CT-ND*	1.56	1.30	.91	.83	SE2610TR-ND	690.00	MA-506 24.000M-C0	
24.576	SE2638CT-ND	1.56	1.30	.91	.83	SE2638TR-ND	690.00	MA-506 24.576M-C0	
25.000	SE2639CT-ND	1.56	1.30	.91	.83	SE2639TR-ND	690.00	MA-506 25.000M-C0	
27.000	SE2641CT-ND	1.56	1.30	.91	.83	SE2641TR-ND	690.00	MA-506 27.000M-C0	
28.636	SE2642CT-ND	1.56	1.30	.91	.83	SE2642TR-ND	690.00	MA-506 28.636M-C0	
32.000	SE2613CT-ND*	1.62	1.35	.94	.85	SE2613TR-ND	710.00	MA-506 32.000M-C0	
33.000	SE2647CT-ND	1.62	1.35	.94	.85	SE2647TR-ND	710.00	MA-506 33.000M-C0	
40.000	SE2615CT-ND*	1.62	1.35	.94	.85	SE2615TR-ND	710.00	MA-506 40.000M-C0	
48.000	SE2651CT-ND*	1.62	1.35	.94	.85	SE2651TR-ND	710.00	MA-506 48.000M-C0	
50.000	SE2616CT-ND*	1.62	1.35	.94	.85	SE2616TR-ND	710.00	MA-506 50.000M-C0	
64.000	SE2653CT-ND	1.77	1.48	1.02	.92	SE2653TR-ND	770.00	MA-506 64.000M-C0	
MC-156	32.768kHz	SE2412CT-ND	2.64	2.20	1.56	1.40	SE2412TR-ND	1170.00	MC-156 32.768K-A2
MC-206	32.768kHz	SE2406CT-ND	1.77	1.48	1.04	.94	SE2406TR-ND	780.00	MC-206 32.768K-A2
MC-306	32.768kHz	SE2407CT-ND	1.17	.98	.71	.64	SE2407TR-ND	530.00	MC-306 32.768K-A2

† Except when otherwise noted.

- 1 SE1-KIT-ND *Digi-Key® SMT Crystal Kit* 3 each of values denoted (51 total pieces). Notebook style storage case and bin storage guide included. **\$89.00**
- SE2-KIT-ND *Digi-Key® SMT Crystal Kit* 3 each of values denoted (51 total pieces). Notebook style storage case and bin storage guide included. **\$89.00**

Package	MC-405	MA-505	MA-506	MC-156	MC-206	MC-306
Operating Temperature	-40°C to +85°C	-20°C to +70°C	-20°C to +70°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Maximum Drive Level	1.0µW	2mW	2mW	1.0µW	1.0µW	1.0µW
Frequency Tolerance	±20ppm @ 25°C	±50ppm @ 25°C	±50ppm @ 25°C	±20ppm @ 25°C	±20ppm @ 25°C	±20ppm @ 25°C
Load Capacitance	12.5pf	18pf	18pf	12.5pf	12.5pf	12.5pf
Series Resistance	50K Ohm Max.	50 Ohm Max.	50 Ohm Max.	65K Ohm Max.	50K Ohm Max.	50K Ohm Max.
Shunt Capacitance	0.85pf Typ.	5pf Max.	5pf Max.	—	0.9pf max.	0.9pf Max.

CTS Reeves ATP-SM Series SMT Crystals

Electrical Specifications:

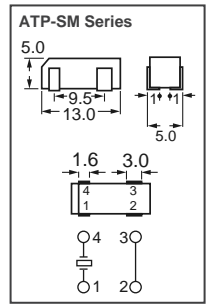
- Calibration Tolerance: ±0.005 ppm @ 25°C
- Temperature Tolerance: ±100 ppm

- Operating Temperature Range: 0°C to 70°C
- Drive Level: 100 Microwatts, typ.

- Shunt Capacitance: 7 pF, Max.
- Aging: <10 ppm/Yr

Freq. (MHz)	Load Cap.	Digi-Key Part No.	Price Each				CTS Reeves Part No.
			1	10	50	100	
3.579545	18pf	CTX600-ND	2.89	2.51	2.17	1.51	ATP036SM
3.686400	20pf	CTX601-ND	2.89	2.51	2.17	1.51	ATP037SM
4.000000	20pf	CTX602-ND	2.89	2.51	2.17	1.51	ATP040SM
4.915200	20pf	CTX603-ND	2.89	2.51	2.17	1.51	ATP042SM
5.068800	20pf	CTX604-ND	2.89	2.51	2.17	1.51	ATP050SM
6.000000	20pf	CTX605-ND	2.89	2.51	2.17	1.51	ATP060SM
8.000000	20pf	CTX606-ND	2.89	2.51	2.17	1.51	ATP084SM
9.830400	20pf	CTX607-ND	2.89	2.51	2.17	1.51	ATP098SM
10.000000	Series	CTX608-ND	2.89	2.51	2.17	1.51	ATP100SM
10.000000	20pf	CTX609-ND	2.89	2.51	2.17	1.51	ATP104SM

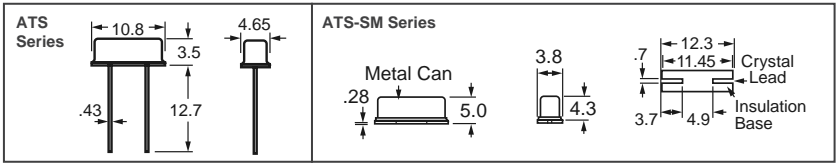
Freq. (MHz)	Load Cap.	Digi-Key Part No.	Price Each				CTS Reeves Part No.
			1	10	50	100	
11.05920	20pf	CTX610-ND	2.89	2.51	2.17	1.51	ATP111SM
12.00000	Series	CTX611-ND	2.89	2.51	2.17	1.51	ATP120SM
12.28800	20pf	CTX612-ND	2.89	2.51	2.17	1.51	ATP122SM
14.31818	Series	CTX613-ND	2.89	2.51	2.17	1.51	ATP143SM
15.36000	20pf	CTX614-ND	2.89	2.51	2.17	1.51	ATP153SM
16.00000	Series	CTX615-ND	2.89	2.51	2.17	1.51	ATP160SM
16.00000	20pf	CTX616-ND	2.89	2.51	2.17	1.51	ATP164SM
20.00000	Series	CTX617-ND	3.15	2.73	2.36	1.64	ATP200SM
20.48000	20pf	CTX618-ND	3.15	2.73	2.48	1.72	ATP204SM
24.57600	Series	CTX619-ND	3.15	2.73	2.48	1.72	ATP245SM



ATS and ATS-SM Series Crystals

Electrical Specifications:

- Frequency Tolerance: ±50ppm
- Shunt Capacitance: 7.0 pF, Max.
- Drive Level: 100 Microwatts
- Operating Temperature Range: 0°C to 70°C
- Operating Mode: Fundamental



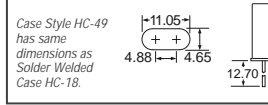
Freq. (MHz)	Load Cap.	Digi-Key Part No.	Price Each				CTS Reeves Part No.
			1	10	50	100	
ATS Series							
3.579545	18pf	CTX400-ND	1.31	1.14	1.03	.72	ATS036
3.686400	20pf	CTX401-ND	1.31	1.14	1.03	.72	ATS037
4.000000	20pf	CTX402-ND	1.31	1.14	1.03	.72	ATS040
4.915200	20pf	CTX403-ND	1.31	1.14	1.03	.72	ATS042
5.068800	20pf	CTX404-ND	1.31	1.14	1.03	.72	ATS050
6.000000	20pf	CTX405-ND	1.31	1.14	1.03	.72	ATS060
8.000000	20pf	CTX406-ND	1.31	1.14	1.03	.72	ATS084
9.830400	20pf	CTX407-ND	1.31	1.14	1.03	.72	ATS098
10.000000	Series	CTX408-ND	1.31	1.14	1.03	.72	ATS100
11.059200	20pf	CTX409-ND	1.31	1.14	1.03	.72	ATS111
12.000000	Series	CTX410-ND	1.31	1.14	1.03	.72	ATS120
12.288000	20pf	CTX411-ND	1.31	1.14	1.03	.72	ATS122
14.318180	Series	CTX412-ND	1.31	1.14	1.03	.72	ATS143
15.360000	20pf	CTX413-ND	1.31	1.14	1.03	.72	ATS15A
16.000000	Series	CTX414-ND	1.31	1.14	1.03	.72	ATS160
16.000000	20pf	CTX415-ND	1.31	1.14	1.03	.72	ATS16A
20.000000	Series	CTX416-ND	1.31	1.14	1.03	.72	ATS200
20.480000	20pf	CTX417-ND	1.69	1.47	1.33	.92	ATS204
24.576000	Series	CTX418-ND	1.69	1.47	1.33	.92	ATS245
25.000000	Series	CTX419-ND	1.69	1.47	1.33	.92	ATS250
Base Insulator		HC49INS-ND	—	.09	—	.08	700-9001

Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each				Digi-Key Part No.	Tape & Reel Pricing 1,000	CTS Reeves Part No.
			1	10	50	100			
ATS-SM Series — Surface Mount									
3.579545	18pf	CTX500-ND	1.50	1.30	1.13	.79	CTX500TR-ND	540.00	ATS036SM-T
3.686400	20pf	CTX501-ND	1.50	1.30	1.13	.79	CTX501TR-ND	540.00	ATS037SM-T
4.000000	20pf	CTX502-ND	1.50	1.30	1.13	.79	CTX502TR-ND	540.00	ATS040SM-T
4.915200	20pf	CTX503-ND	1.50	1.30	1.13	.79	CTX503TR-ND	540.00	ATS042SM-T
5.068800	20pf	CTX504-ND	1.50	1.30	1.13	.79	CTX504TR-ND	540.00	ATS050SM-T
6.000000	20pf	CTX505-ND	1.50	1.30	1.13	.79	CTX505TR-ND	540.00	ATS060SM-T
8.000000	20pf	CTX506-ND	1.50	1.30	1.13	.79	CTX506TR-ND	540.00	ATS084SM-T
9.830400	20pf	CTX507-ND	1.50	1.30	1.13	.79	CTX507TR-ND	540.00	ATS098SM-T
10.000000	Series	CTX508-ND	1.50	1.30	1.13	.79	CTX508TR-ND	540.00	ATS100SM-T
11.059200	20pf	CTX509-ND	1.50	1.30	1.13	.79	CTX509TR-ND	540.00	ATS111SM-T
12.000000	Series	CTX510-ND	1.50	1.30	1.13	.79	CTX510TR-ND	540.00	ATS120SM-T
12.288000	20pf	CTX511-ND	1.50	1.30	1.13	.79	CTX511TR-ND	540.00	ATS122SM-T
14.318180	Series	CTX512-ND	1.50	1.30	1.13	.79	CTX512TR-ND	540.00	ATS143SM-T
15.360000	20pf	CTX513-ND	1.50	1.30	1.13	.79	CTX513TR-ND	540.00	ATS15A-SM-T
16.000000	Series	CTX514-ND	1.50	1.30	1.13	.79	CTX514TR-ND	540.00	ATS160SM-T
20.000000	Series	CTX515-ND	1.50	1.30	1.13	.79	CTX515TR-ND	540.00	ATS200SM-T
20.480000	20pf	CTX516-ND	1.88	1.63	1.43	1.00	CTX516TR-ND	680.00	ATS204SM-T
24.576000	Series	CTX517-ND	1.88	1.63	1.43	1.00	CTX517TR-ND	680.00	ATS245SM-T

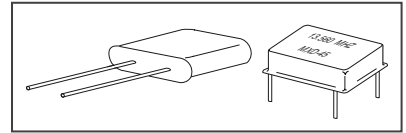
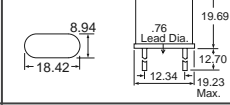
Microprocessor Crystals

- Frequency Tolerance ±.005% (50PPM) @ 25°C
- ±.005% (50PPM) 0°C to +70°C
- Fully Hermetic Package
- Low Start-Up Resistance

HC-49/U Case



HC-33/U Case



Freq. (MHz)	Case	Load Capacit.	Max. Series Resist.	Digi-Key Part No.	Price Each			Microprocessor	CTS Reeves Part No.
					1	10	100		
1.843200	HC49	13pF	540	CTX067-ND	3.22	2.69	1.97	—	MP018S
2.000000	HC49	20pF	300	CTX068-ND	3.22	2.69	1.97	—	MP020S
2.457600	HC49	32pF	300	CTX069-ND	2.08	1.74	1.27	—	MP024S
3.276800	HC33/51	15pF	100	CTX094-ND	3.92	3.28	2.40	IM6100C, 1CM7205; CDP1802, 1802C, 1804, 1804C; MC6802	MP032
3.579545	HC49	18pF	150	CTX049-ND	.94	.79	.57	MM5369 (Color burst); IM6102; PPS-8; MC6801, 6803, MC6802, 6809; CDP1802, 1802C, 1804, 1804C	MP036S
3.686400	HC49	20pF	150	CTX071-ND	.94	.79	.57	—	MP037
4.000000	HC49	20pF	75	CTX006-ND	.94	.79	.57	MCS-40, 4004, 4040, 4201; MC-6802, 6808, 6809; MK-3870, 3872, 3883, 3876; IM 6102; CDP1802, 1802C, 1804, 1804C	MP040
4.000000	HC49	Series	75	CTX080-ND	.94	.79	.57	Face: MC6875; Z80, Z80A; TMS9940	MP04A
4.194304	HC49	12pF	75	CTX007-ND	.94	.79	.57	ICM7038, 7213, 7049; CDP1802, 1802C, 1804, 1804C	MP041
4.915200	HC49	20pF	75	CTX050-ND	.94	.79	.57	CDP1802, 1802C, 1804, 1804C	MP042
5.000000	HC49	20pF	50	CTX051-ND	.94	.79	.57	General Purpose; CDP1802, 1802C, 1804, 1804C	MP05A
5.000000	HC49	Series	50	CTX081-ND	.94	.79	.57	CDP1802, 1803, 1802C, 1804, 1804C; TMS 9985, 9940; IM6100A	MP05B
5.068800	HC49	Series	50	CTX052-ND	.94	.79	.57	COM5016, 5016T Dual Brg.	MP050
6.000000	HC49	20pF	50	CTX026-ND	.94	.79	.57	MCS-48, 8035, 8041, 8048, 8741, 8748; IM8048, IM8748; CDP1802, 1802C, 1804, 1804C, MC68A09	MP060
6.144000	HC49	20pF	50	CTX054-ND	.94	.79	.57	MCS-85, 8086; CDP1802, 1802C, 1804, 1804C	MP061
7.372800	HC49	Series	45	CTX074-ND	.94	.79	.57	—	MP073
8.000000	HC49	Series	45	CTX056-ND	.94	.79	.57	8 x 300; MC6875, 68000; Z8000; AMZ8000	MP080
8.000000	HC49	20pF	45	CTX082-ND	.94	.79	.57	IM6100A; CDP1807; Z8; 9940-B; MC68B09	MP080A
9.830400	HC49	20pF	45	CTX084-ND	.94	.79	.57	General Purpose	MP098
10.000000	HC49	Series	35	CTX057-ND	.94	.79	.57	General Purpose	MP100
10.000000	HC49	30pF	35	CTX083-ND	.94	.79	.57	MCS-85, 8085A-2; 9940-10	MP101
10.738635	HC49	32pF	35	CTX085-ND	.94	.79	.57	T19918A	MP107
11.000000	HC49	18pF	35	CTX086-ND	.94	.79	.57	MCS-48, 8039, 8049	MP110
11.059200	HC49	Series	35	CTX078-ND	.94	.79	.57	—	MP111
12.000000	HC49	Series	35	CTX058-ND	.94	.79	.57	MCS-86, 8086/8284; 8202 Ram Controller; 9940-12	MP120
12.288000	HC49	32pF	35	CTX087-ND	.94	.79	.57	General Purpose	MP122
14.318180	HC49	Series	35	CTX088-ND	.94	.79	.57	General Purpose	MP143
14.745600	HC49	Series	35	CTX089-ND	.94	.79	.57	General Purpose	MP147
15.000000	HC49	Series	35	CTX059-ND	.94	.79	.57	MCS-86, 8086/8284; 8202 Ram Controller	MP150
16.000000	HC49	Series	35	CTX077-ND	.94	.79	.57	General Purpose	MP160
18.432000	HC49	Series	35	CTX061-ND	.94	.79	.57	MCS-80, 8080A/8224	MP184
19.668000	HC49	Series	35	CTX090-ND	.94	.79	.57	General Purpose	MP196
20.000000	HC49	Series	35	CTX062-ND	.94	.79	.57	MCS-80, 8080A/8224	MP200
22.118400	HC49	Series	35	CTX063-ND	1.51	1.26	.92	MCS-80, 8080A/8224	MP221
24.000000	HC49	Series	35	CTX091-ND	1.51	1.26	.92	MCS-86, 8086, 8284	MP240
24.576000	HC49	Series	35	CTX092-ND	1.51	1.26	.92	General Purpose	MP245
25.000000	HC49	Series	35	CTX093-ND	1.51	1.26	.92	8202 Ram Controller	MP250
Base Insulators				HC49INS-ND	—	.09	.08	—	700-9001

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CTS Reeves CB3 and CB3LV Series — Surface Mount Clock Oscillator

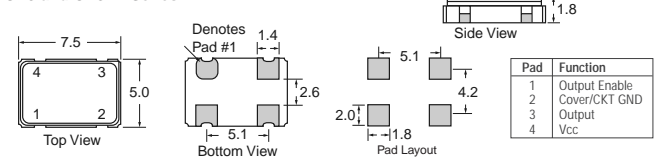
FEATURES:

• Standard miniature surface mount footprint • PCMCIA Type II and III compatible • CMOS/ TTL compatible • 16mm Tape and Reel • Ceramic construction for long-term reliability • Seam welded and shielded with Kovar cover

SPECIFICATIONS:

• **Frequency Stability:** ±50ppm • **Supply Voltage:** CB3: 4.5V Min., 5.5V Max.; CB3LV: 3.0V Min., 3.6V Max. • **Supply Current:** 1.5440MHz to 20.000MHz: CB3 (25mA), CB3LV (12mA); >20.000MHz: CB3 (50mA), CB3LV (40mA) • **Operating Temperature:** 0°C to +70°C • **Rise and Fall Time:** 1.5440MHz to 20.000MHz: 10ns; >20.000MHz to <50MHz: 8ns; >50.000MHz to 80.000MHz: 5ns • **Output Load:** 1.5440MHz to 50.000MHz: 50pF; 50.10MHz to 80.000MHz: 30pF • **Enable Input Voltage:** 2V Min. • **Disable Input Voltage:** 0.8V Max.

CB3 and CB3LV Series



Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each				Digi-Key Part No.	Tape & Reel Pricing 1,000	CTS Reeves Part No.
		1	10	50	100			
<i>CB3 SMD Clock Oscillator — 5V</i>								
1.54400	CTX290CT-ND	8.08	7.44	4.27	2.97	CTX290TR-ND	2260.00	CB3-3C-1.5440-T
1.84320	CTX291CT-ND	8.08	7.44	4.27	2.97	CTX291TR-ND	2260.00	CB3-3C-1.8432-T
3.68640	CTX260CT-ND	8.08	7.44	4.27	2.97	CTX260TR-ND	2260.00	CB3-3C-3.6864-T
4.00000	CTX261CT-ND	8.08	7.44	4.27	2.97	CTX261TR-ND	2260.00	CB3-3C-4.0000-T
6.17600	CTX262CT-ND	8.08	7.44	4.27	2.97	CTX262TR-ND	2260.00	CB3-3C-6.1760-T
7.37280	CTX263CT-ND	8.08	7.44	4.27	2.97	CTX263TR-ND	2260.00	CB3-3C-7.3728-T
8.00000	CTX264CT-ND	8.08	7.44	4.27	2.97	CTX264TR-ND	2260.00	CB3-3C-8.0000-T
10.00000	CTX265CT-ND	8.08	7.44	4.27	2.97	CTX265TR-ND	2260.00	CB3-3C-10.0000-T
12.00000	CTX292CT-ND	8.08	7.44	4.27	2.97	CTX292TR-ND	2260.00	CB3-3C-12.0000-T
12.28800	CTX266CT-ND	8.08	7.44	4.27	2.97	CTX266TR-ND	2260.00	CB3-3C-12.2880-T
12.35200	CTX267CT-ND	8.08	7.44	4.27	2.97	CTX267TR-ND	2260.00	CB3-3C-12.3520-T
14.31818	CTX268CT-ND	8.08	7.44	4.27	2.97	CTX268TR-ND	2260.00	CB3-3C-14.31818-T
15.36000	CTX269CT-ND	8.08	7.44	4.27	2.97	CTX269TR-ND	2260.00	CB3-3C-15.3600-T
16.00000	CTX270CT-ND	8.08	7.44	4.27	2.97	CTX270TR-ND	2260.00	CB3-3C-16.0000-T
16.38400	CTX271CT-ND	8.08	7.44	4.27	2.97	CTX271TR-ND	2260.00	CB3-3C-16.3840-T
18.43200	CTX293CT-ND	8.08	7.44	4.27	2.97	CTX293TR-ND	2260.00	CB3-3C-18.4320-T
19.44000	CTX272CT-ND	8.08	7.44	4.27	2.97	CTX272TR-ND	2260.00	CB3-3C-19.4400-T
20.00000	CTX273CT-ND	8.08	7.44	4.27	2.97	CTX273TR-ND	2260.00	CB3-3C-20.0000-T
20.48000	CTX274CT-ND	8.08	7.44	4.27	2.97	CTX274TR-ND	2260.00	CB3-3C-20.4800-T
24.00000	CTX294CT-ND	8.08	7.44	4.27	2.97	CTX294TR-ND	2260.00	CB3-3C-24.0000-T
24.70400	CTX275CT-ND	8.08	7.44	4.27	2.97	CTX275TR-ND	2260.00	CB3-3C-24.7040-T
25.00000	CTX276CT-ND	8.08	7.44	4.27	2.97	CTX276TR-ND	2260.00	CB3-3C-25.0000-T
29.49120	CTX295CT-ND	8.08	7.44	4.27	2.97	CTX295TR-ND	2260.00	CB3-3C-29.4912-T
30.00000	CTX296CT-ND	8.08	7.44	4.27	2.97	CTX296TR-ND	2260.00	CB3-3C-30.0000-T
32.00000	CTX277CT-ND	8.08	7.44	4.27	2.97	CTX277TR-ND	2260.00	CB3-3C-32.0000-T
32.76800	CTX278CT-ND	8.08	7.44	4.27	2.97	CTX278TR-ND	2260.00	CB3-3C-32.7680-T
33.33300	CTX279CT-ND	8.08	7.44	4.27	2.97	CTX279TR-ND	2260.00	CB3-3C-33.3330-T
40.00000	CTX280CT-ND	8.08	7.44	4.27	2.97	CTX280TR-ND	2260.00	CB3-3C-40.0000-T
44.73600	CTX281CT-ND	8.08	7.44	4.27	2.97	CTX281TR-ND	2260.00	CB3-3C-44.7360-T
45.00000	CTX297CT-ND	8.08	7.44	4.27	2.97	CTX297TR-ND	2260.00	CB3-3C-45.0000-T
49.15200	CTX282CT-ND	8.08	7.44	4.27	2.97	CTX282TR-ND	2260.00	CB3-3C-49.1520-T
50.00000	CTX283CT-ND	8.08	7.44	4.27	2.97	CTX283TR-ND	2260.00	CB3-3C-50.0000-T
51.84000	CTX284CT-ND	8.08	7.44	4.27	2.97	CTX284TR-ND	2260.00	CB3-3C-51.8400-T
60.00000	CTX285CT-ND	8.88	8.19	4.59	3.19	CTX285TR-ND	2486.00	CB3-3C-60.0000-T
64.00000	CTX286CT-ND	8.88	8.19	4.59	3.19	CTX286TR-ND	2486.00	CB3-3C-64.0000-T
66.66660	CTX287CT-ND	8.88	8.19	4.59	3.19	CTX287TR-ND	2486.00	CB3-3C-66.6666-T
72.00000	CTX288CT-ND	11.26	10.37	6.03	4.19	CTX288TR-ND	3150.70	CB3-3C-72.0000-T
80.00000	CTX289CT-ND	11.26	10.37	6.03	4.19	CTX289TR-ND	3150.70	CB3-3C-80.0000-T
<i>CB3LV SMD Clock Oscillator — 3.3V</i>								
1.54400	CTX290LVCT-ND	8.08	7.44	4.27	2.97	CTX290LVTR-ND	2260.00	CB3LV-3C-1.5440-T
1.84320	CTX291LVCT-ND	8.08	7.44	4.27	2.97	CTX291LVTR-ND	2260.00	CB3LV-3C-1.8432-T
3.68640	CTX260LVCT-ND	8.08	7.44	4.27	2.97	CTX260LVTR-ND	2260.00	CB3LV-3C-3.6864-T
4.00000	CTX261LVCT-ND	8.08	7.44	4.27	2.97	CTX261LVTR-ND	2260.00	CB3LV-3C-4.0000-T
6.17600	CTX262LVCT-ND	8.08	7.44	4.27	2.97	CTX262LVTR-ND	2260.00	CB3LV-3C-6.1760-T
7.37280	CTX263LVCT-ND	8.08	7.44	4.27	2.97	CTX263LVTR-ND	2260.00	CB3LV-3C-7.3728-T
8.00000	CTX264LVCT-ND	8.08	7.44	4.27	2.97	CTX264LVTR-ND	2260.00	CB3LV-3C-8.0000-T
10.00000	CTX265LVCT-ND	8.08	7.44	4.27	2.97	CTX265LVTR-ND	2260.00	CB3LV-3C-10.0000-T
12.00000	CTX292LVCT-ND	8.08	7.44	4.27	2.97	CTX292LVTR-ND	2260.00	CB3LV-3C-12.0000-T
12.28800	CTX266LVCT-ND	8.08	7.44	4.27	2.97	CTX266LVTR-ND	2260.00	CB3LV-3C-12.2880-T
12.35200	CTX267LVCT-ND	8.08	7.44	4.27	2.97	CTX267LVTR-ND	2260.00	CB3LV-3C-12.3520-T
14.31818	CTX268LVCT-ND	8.08	7.44	4.27	2.97	CTX268LVTR-ND	2260.00	CB3LV-3C-14.31818-T
15.36000	CTX269LVCT-ND	8.08	7.44	4.27	2.97	CTX269LVTR-ND	2260.00	CB3LV-3C-15.3600-T
16.00000	CTX270LVCT-ND	8.08	7.44	4.27	2.97	CTX270LVTR-ND	2260.00	CB3LV-3C-16.0000-T
16.38400	CTX271LVCT-ND	8.08	7.44	4.27	2.97	CTX271LVTR-ND	2260.00	CB3LV-3C-16.3840-T
18.43200	CTX293LVCT-ND	8.08	7.44	4.27	2.97	CTX293LVTR-ND	2260.00	CB3LV-3C-18.4320-T
19.44000	CTX272LVCT-ND	8.08	7.44	4.27	2.97	CTX272LVTR-ND	2260.00	CB3LV-3C-19.4400-T
20.00000	CTX273LVCT-ND	8.08	7.44	4.27	2.97	CTX273LVTR-ND	2260.00	CB3LV-3C-20.0000-T
20.48000	CTX274LVCT-ND	8.08	7.44	4.27	2.97	CTX274LVTR-ND	2260.00	CB3LV-3C-20.4800-T
24.00000	CTX294LVCT-ND	8.08	7.44	4.27	2.97	CTX294LVTR-ND	2260.00	CB3LV-3C-24.0000-T
24.70400	CTX275LVCT-ND	8.08	7.44	4.27	2.97	CTX275LVTR-ND	2260.00	CB3LV-3C-24.7040-T
25.00000	CTX276LVCT-ND	8.08	7.44	4.27	2.97	CTX276LVTR-ND	2260.00	CB3LV-3C-25.0000-T
29.49120	CTX295LVCT-ND	8.08	7.44	4.27	2.97	CTX295LVTR-ND	2260.00	CB3LV-3C-29.4912-T
30.00000	CTX296LVCT-ND	8.08	7.44	4.27	2.97	CTX296LVTR-ND	2260.00	CB3LV-3C-30.0000-T
32.00000	CTX277LVCT-ND	8.08	7.44	4.27	2.97	CTX277LVTR-ND	2260.00	CB3LV-3C-32.0000-T
32.76800	CTX278LVCT-ND	8.08	7.44	4.27	2.97	CTX278LVTR-ND	2260.00	CB3LV-3C-32.7680-T
33.33300	CTX279LVCT-ND	8.08	7.44	4.27	2.97	CTX279LVTR-ND	2260.00	CB3LV-3C-33.3330-T
40.00000	CTX280LVCT-ND	8.08	7.44	4.27	2.97	CTX280LVTR-ND	2260.00	CB3LV-3C-40.0000-T
44.73600	CTX281LVCT-ND	8.08	7.44	4.27	2.97	CTX281LVTR-ND	2260.00	CB3LV-3C-44.7360-T
45.00000	CTX297LVCT-ND	8.08	7.44	4.27	2.97	CTX297LVTR-ND	2260.00	CB3LV-3C-45.0000-T
49.15200	CTX282LVCT-ND	8.08	7.44	4.27	2.97	CTX282LVTR-ND	2260.00	CB3LV-3C-49.1520-T
50.00000	CTX283LVCT-ND	8.08	7.44	4.27	2.97	CTX283LVTR-ND	2260.00	CB3LV-3C-50.0000-T
51.84000	CTX284LVCT-ND	8.08	7.44	4.27	2.97	CTX284LVTR-ND	2260.00	CB3LV-3C-51.8400-T
60.00000	CTX285LVCT-ND	8.88	8.19	4.70	3.27	CTX285LVTR-ND	2486.00	CB3LV-3C-60.0000-T
64.00000	CTX286LVCT-ND	8.88	8.19	4.70	3.27	CTX286LVTR-ND	2486.00	CB3LV-3C-64.0000-T
66.66660	CTX287LVCT-ND	8.88	8.19	4.70	3.27	CTX287LVTR-ND	2486.00	CB3LV-3C-66.6666-T
72.00000	CTX288LVCT-ND	11.26	10.37	5.95	4.14	CTX288LVTR-ND	3150.70	CB3LV-3C-72.0000-T
80.00000	CTX289LVCT-ND	11.26	10.37	5.95	4.14	CTX289LVTR-ND	3150.70	CB3LV-3C-80.0000-T

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CTS[®] Reeves **MXO45 Clock Oscillators**

Tri-State Output

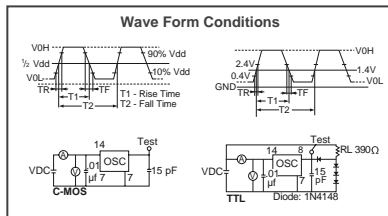
Tri-State Logic uses the two standard logic levels of high (logic 1) and low (logic 0) but has added a third state that is not a logic level but has an open circuit condition that effectively disconnects the output from your circuit with a high impedance (floating) state. Thereby enabling the use of numerous oscillators on the same bus line. Also, by using the enable pin to control the output, the crystal is still running even when the output is disabled (stand-by mode), thus eliminating any start-up time for the oscillator.

CTS HCMOS/TTL products utilize an Application Specific Integrated Circuit (ASIC) design strategy. Employing a single design family supporting both HCMOS/TTL applications helps in reducing costs and lead times. Utilizing ASIC technology reduces the number of components inside the XO (crystal oscillator), thus increasing reliability and further reducing cost.

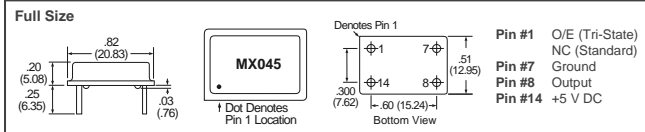
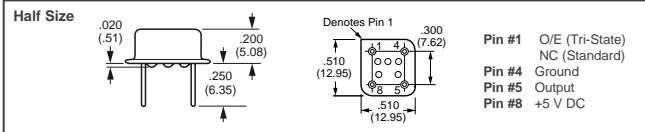
Features:
 • C-MOS/TTL compatible • Drives up to 10 standard TTL loads • 100 PPM tolerance • Tri-State output • Fully hermetic resistance weld package

Standard Output

• Frequency Tolerance: ±100 PPM 0°C to 70°C • C-MOS compatible • Fully hermetic resistance weld package • 8/14-pin compatible • Drives up to 10 standard TTL Loads • Input Voltage: +5 V DC ±.5V



Parameter	Symbol	Condition	Minimum	Typical	Maximum	Units
Supply Voltage	VCC	—	4.5	5.0	5.5	V
Supply Current	ICC	1.0->7.0MHz	—	5	12	mA
		>7.0->25MHz	—	15	25	mA
		>25->50MHz	—	30	40	mA
Output Load	—	—	—	—	10	TTL
Output Current	IOH IOH	V _{OH} = 3.9V	—	—	-16	mA
		V _{OH} = 0.4V	—	—	16	mA
Symmetry	Duty	1.0->50MHz	45	—	55	%
		>50->70MHz	40	—	60	%
Rise & Fall Time	Tr/Tf Tr/Tf	1.0->25MHz	—	3	8	ns
		>25->70MHz	—	5	5	ns
Enable Input V	VIH VIL	—	2.0	—	—	V
		—	—	—	0.8	V
Enable Input Load	Cin	—	—	—	10	pF
Tri-state Leakage	Iz	VIL = 0.8V	—	—	0.05	mA
Jitter	—	Peak-Peak	—	30	50	ps
Temperature	—	—	0-70°C			—



Frequency (MHz)	Digi-Key Part No.	Price Each				CTS Reeves Part No.
		1	10	100	500	
Half Size Clock Oscillator with Tri-State Output						
1.00000	CTX180-ND	2.78	2.47	1.87	1.66	1.42
1.84320	CTX181-ND	2.78	2.47	1.87	1.66	1.42
2.00000	CTX182-ND	2.78	2.47	1.87	1.66	1.42
2.45760	CTX183-ND	2.78	2.47	1.87	1.66	1.42
3.68640	CTX184-ND	2.78	2.47	1.87	1.66	1.42
4.00000	CTX185-ND	2.78	2.47	1.87	1.66	1.42
4.91520	CTX186-ND	2.78	2.47	1.87	1.66	1.42
5.00000	CTX187-ND	2.78	2.47	1.87	1.66	1.42
5.06880	CTX188-ND	2.78	2.47	1.87	1.66	1.42
6.00000	CTX189-ND	2.78	2.47	1.87	1.66	1.42
6.14400	CTX190-ND	2.78	2.47	1.87	1.66	1.42
7.37280	CTX191-ND	2.78	2.47	1.87	1.66	1.42
8.00000	CTX192-ND	2.78	2.47	1.87	1.66	1.42
10.00000	CTX193-ND	2.78	2.47	1.87	1.66	1.42
12.00000	CTX194-ND	2.78	2.47	1.87	1.66	1.42
14.31818	CTX195-ND	2.78	2.47	1.87	1.66	1.42
16.00000	CTX196-ND	2.78	2.47	1.87	1.66	1.42
18.43200	CTX197-ND	2.78	2.47	1.87	1.66	1.42
19.66080	CTX198-ND	2.78	2.47	1.87	1.66	1.42
20.00000	CTX199-ND	2.78	2.47	1.87	1.66	1.42
24.00000	CTX250-ND	2.78	2.47	1.87	1.66	1.42
25.00000	CTX251-ND	2.78	2.47	1.87	1.66	1.42
25.17500	CTX252-ND	2.78	2.47	1.87	1.66	1.42
28.32000	CTX253-ND	2.78	2.47	1.87	1.66	1.42
32.00000	CTX254-ND	2.78	2.47	1.87	1.66	1.42
40.00000	CTX255-ND	2.78	2.47	1.87	1.66	1.42
50.00000	CTX256-ND	2.78	2.47	1.87	1.66	1.42
64.00000	CTX257-ND	3.64	3.22	2.45	2.17	1.86
66.66660	CTX258-ND	3.64	3.22	2.45	2.17	1.86
80.00000	CTX259-ND	5.85	5.18	3.94	3.49	2.99

Frequency (MHz)	Digi-Key Part No.	Price Each				CTS Reeves Part No.
		1	10	100	500	
Full Size Clock Oscillator with Tri-State Output						
1.00000	CTX139-ND	2.78	2.47	2.19	1.87	1.66
1.84320	CTX140-ND	2.78	2.47	2.19	1.87	1.66
2.00000	CTX141-ND	2.78	2.47	2.19	1.87	1.66
2.45760	CTX142-ND	2.78	2.47	2.19	1.87	1.66
3.68640	CTX143-ND	2.78	2.47	2.19	1.87	1.66
4.00000	CTX144-ND	2.78	2.47	2.19	1.87	1.66
4.91520	CTX145-ND	2.78	2.47	2.19	1.87	1.66
5.00000	CTX146-ND	2.78	2.47	2.19	1.87	1.66
5.06880	CTX147-ND	2.78	2.47	2.19	1.87	1.66
6.00000	CTX148-ND	2.78	2.47	2.19	1.87	1.66
6.14400	CTX200-ND	2.78	2.47	2.19	1.87	1.66
7.37280	CTX201-ND	2.78	2.47	2.19	1.87	1.66
8.00000	CTX202-ND	2.78	2.47	2.19	1.87	1.66
10.00000	CTX203-ND	2.78	2.47	2.19	1.87	1.66
12.00000	CTX204-ND	2.78	2.47	2.19	1.87	1.66
14.31818	CTX205-ND	2.78	2.47	2.19	1.87	1.66
16.00000	CTX206-ND	2.78	2.47	2.19	1.87	1.66
18.43200	CTX207-ND	2.78	2.47	2.19	1.87	1.66
19.66080	CTX208-ND	2.78	2.47	2.19	1.87	1.66
20.00000	CTX209-ND	2.78	2.47	2.19	1.87	1.66
24.00000	CTX210-ND	2.78	2.47	2.19	1.87	1.66
25.00000	CTX211-ND	2.78	2.47	2.19	1.87	1.66
25.17500	CTX212-ND	2.78	2.47	2.19	1.87	1.66
28.32000	CTX213-ND	2.78	2.47	2.19	1.87	1.66
32.00000	CTX214-ND	2.78	2.47	2.19	1.87	1.66
40.00000	CTX215-ND	2.78	2.47	2.19	1.87	1.66
50.00000	CTX216-ND	2.78	2.47	2.19	1.87	1.66
64.00000	CTX217-ND	3.64	3.22	2.87	2.45	2.17
66.66660	CTX218-ND	3.64	3.22	2.87	2.45	2.17
80.00000	CTX219-ND	5.85	5.18	4.61	3.94	3.49

Frequency (MHz)	Digi-Key Part No.	Price Each				CTS Reeves Part No.
		1	10	100	500	
Half Size Clock Oscillator with Standard Output						
1.00000	CTX150-ND	2.78	2.47	1.87	1.66	1.42
1.84320	CTX151-ND	2.78	2.47	1.87	1.66	1.42
2.00000	CTX152-ND	2.78	2.47	1.87	1.66	1.42
2.45760	CTX153-ND	2.78	2.47	1.87	1.66	1.42
3.68640	CTX154-ND	2.78	2.47	1.87	1.66	1.42
4.00000	CTX155-ND	2.78	2.47	1.87	1.66	1.42
4.91520	CTX156-ND	2.78	2.47	1.87	1.66	1.42
5.00000	CTX157-ND	2.78	2.47	1.87	1.66	1.42
5.06880	CTX158-ND	2.78	2.47	1.87	1.66	1.42
6.00000	CTX159-ND	2.78	2.47	1.87	1.66	1.42
6.14400	CTX160-ND	2.78	2.47	1.87	1.66	1.42
7.37280	CTX161-ND	2.78	2.47	1.87	1.66	1.42
8.00000	CTX162-ND	2.78	2.47	1.87	1.66	1.42
10.00000	CTX163-ND	2.78	2.47	1.87	1.66	1.42
12.00000	CTX164-ND	2.78	2.47	1.87	1.66	1.42
14.31818	CTX165-ND	2.78	2.47	1.87	1.66	1.42
16.00000	CTX166-ND	2.78	2.47	1.87	1.66	1.42
18.43200	CTX167-ND	2.78	2.47	1.87	1.66	1.42
19.66080	CTX168-ND	2.78	2.47	1.87	1.66	1.42
20.00000	CTX169-ND	2.78	2.47	1.87	1.66	1.42
24.00000	CTX170-ND	2.78	2.47	1.87	1.66	1.42
25.00000	CTX171-ND	2.78	2.47	1.87	1.66	1.42
25.17500	CTX172-ND	2.78	2.47	1.87	1.66	1.42
28.32000	CTX173-ND	2.78	2.47	1.87	1.66	1.42
32.00000	CTX174-ND	2.78	2.47	1.87	1.66	1.42
40.00000	CTX175-ND	2.78	2.47	1.87	1.66	1.42
50.00000	CTX176-ND	2.78	2.47	1.87	1.66	1.42
64.00000	CTX177-ND	3.64	3.22	2.45	2.17	1.86
66.66660	CTX178-ND	3.64	3.22	2.45	2.17	1.86
80.00000	CTX179-ND	5.85	5.18	3.94	3.49	2.99

Frequency (MHz)	Digi-Key Part No.	Price Each				CTS Reeves Part No.
		1	10	100	500	
Full Size Clock Oscillator with Standard Output						
1.00000	CTX101-ND	2.78	2.47	2.19	1.87	1.66
1.84320	CTX103-ND	2.78	2.47	2.19	1.87	1.66
2.00000	CTX104-ND	2.78	2.47	2.19	1.87	1.66
2.45760	CTX105-ND	2.78	2.47	2.19	1.87	1.66
3.68640	CTX106-ND	2.78	2.47	2.19	1.87	1.66
4.00000	CTX107-ND	2.78	2.47	2.19	1.87	1.66
4.91520	CTX108-ND	2.78	2.47	2.19	1.87	1.66
5.00000	CTX109-ND	2.78	2.47	2.19	1.87	1.66
5.06880	CTX110-ND	2.78	2.47	2.19	1.87	1.66
6.00000	CTX111-ND	2.78	2.47	2.19	1.87	1.66
6.14400	CTX122-ND	2.78	2.47	2.19	1.87	1.66
7.37280	CTX123-ND	2.78	2.47	2.19	1.87	1.66
8.00000	CTX112-ND	2.78	2.47	2.19	1.87	1.66
10.00000	CTX114-ND	2.78	2.47	2.19	1.87	1.66
12.00000	CTX131-ND	2.78	2.47	2.19	1.87	1.66
14.31818	CTX115-ND	2.78	2.47	2.19	1.87	1.66
16.00000	CTX116-ND	2.78	2.47	2.19	1.87	1.66
18.43200	CTX118-ND	2.78	2.47	2.19	1.87	1.66
19.66080	CTX124-ND	2.78	2.47	2.19	1.87	1.66
20.00000	CTX119-ND	2.78	2.47	2.19	1.87	1.66
24.00000	CTX125-ND	2.78	2.47	2.19	1.87	1.66
25.00000	CTX126-ND	2.78	2.47	2.19	1.87	1.66
25.17500	CTX127-ND	2.78	2.47	2.19	1.87	1.66
28.32000	CTX128-ND	2.78	2.47	2.19	1.87	1.66
32.00000	CTX129-ND	2.78	2.47	2.19	1.87	1.66
40.00000	CTX120-ND	2.78	2			

Surface Mount Crystals and Oscillators

Fig.	Frequency (MHz)	Load Cap.	Digi-Key Part No.	Price Each				Connor-Winfield Part No.
				1	10	100	500	
SMT Quartz Crystals								
1	10.000	16pf	CW401-ND	4.73	3.94	3.15	2.54	XL-1C-10.0000
	12.000	16pf	CW402-ND	4.73	3.94	3.15	2.54	XL-1C-12.0000
	16.000	16pf	CW403-ND	4.73	3.94	3.15	2.54	XL-1C-16.0000
	18.432	16pf	CW404-ND	4.73	3.94	3.15	2.54	XL-1C-18.4320
	20.000	16pf	CW405-ND	4.73	3.94	3.15	2.54	XL-1C-20.0000
	29.4912	16pf	CW407-ND	5.54	4.62	3.69	2.98	XL-1C-29.4912
	40.000	Series	CW408-ND	5.13	4.28	3.42	2.76	XL-1C-40.0000
	44.2368	Series	CW409-ND	5.13	4.28	3.42	2.76	XL-1C-44.2368
	50.000	Series	CW410-ND	5.13	4.28	3.42	2.76	XL-1C-50.0000
	2	10.000	16pf	CW421-ND	7.83	6.53	5.22	4.21
12.000		16pf	CW422-ND	7.83	6.53	5.22	4.21	XM-1-12.0000
16.000		16pf	CW423-ND	7.83	6.53	5.22	4.21	XM-1-16.0000
18.432		16pf	CW424-ND	7.83	6.53	5.22	4.21	XM-1-18.4320
20.000		16pf	CW425-ND	7.83	6.53	5.22	4.21	XM-1-20.0000
29.4912		Series	CW427-ND	9.32	7.77	6.21	5.01	XM-1-29.4912
40.000		Series	CW428-ND	8.51	7.09	5.67	4.57	XM-1-40.0000
44.2368		Series	CW429-ND	8.51	7.09	5.67	4.57	XM-1-44.2368
50.000		Series	CW430-ND	8.51	7.09	5.67	4.57	XM-1-50.0000
SMT Oscillator								
3	4.9152	—	CW301-ND	11.61	9.68	7.74	6.24	HSM93-4.9152
	8.000	—	CW302-ND	11.61	9.68	7.74	6.24	HSM93-8.0000
	10.000	—	CW303-ND	11.61	9.68	7.74	6.24	HSM93-10.0000
	16.000	—	CW304-ND	11.61	9.68	7.74	6.24	HSM93-16.0000
	20.000	—	CW305-ND	11.61	9.68	7.74	6.24	HSM93-20.0000
	25.000	—	CW306-ND	11.61	9.68	7.74	6.24	HSM93-25.0000
	29.4912	—	CW341-ND	12.15	10.13	8.10	6.53	HSM92-29.4912
	32.000	—	CW307-ND	11.61	9.68	7.74	6.24	HSM93-32.0000
	40.000	—	CW308-ND	11.61	9.68	7.74	6.24	HSM93-40.0000
	44.2368	—	CW342-ND	12.15	10.13	8.10	6.53	HSM92-44.2368
4	50.000	—	CW309-ND	11.61	9.68	7.74	6.24	HSM93-50.0000
	60.000	—	CW310-ND	13.23	11.03	8.82	7.11	HSM93-60.0000
	8.000	—	CW320-ND	10.80	9.00	7.20	5.80	HSM536-8.0000
	10.000	—	CW321-ND	10.80	9.00	7.20	5.80	HSM536-10.0000
	18.432	—	CW322-ND	10.80	9.00	7.20	5.80	HSM536-18.4320
	20.000	—	CW323-ND	10.80	9.00	7.20	5.80	HSM536-20.0000
	25.000	—	CW324-ND	10.80	9.00	7.20	5.80	HSM536-25.0000
	32.000	—	CW325-ND	10.80	9.00	7.20	5.80	HSM536-32.0000
	40.000	—	CW326-ND	10.80	9.00	7.20	5.80	HSM536-40.0000
	50.000	—	CW327-ND	10.80	9.00	7.20	5.80	HSM536-50.0000
60.000	—	CW328-ND	11.07	9.23	7.38	5.95	HSM536-60.0000	
64.000	—	CW329-ND	11.07	9.23	7.38	5.95	HSM536-64.0000	
66.6666	—	CW330-ND	11.07	9.23	7.38	5.95	HSM536-66.6666	

Fig. 1
XL-1C Series

Specifications:
 Frequency Tolerance: ±50ppm (@ 25°C)
 Temperature Stability: ±50 ppm
 Operating Temp.: -10°C to +65°C
 Drive Level: .1MW Typical

Fig. 2
XM-1 Series

Specifications:
 Frequency Tolerance: ±50ppm (@ 25°C)
 Temperature Stability: ±50 ppm
 Operating Temperature: -10°C to +65°C
 Drive Level: .1 MW Typical

Fig. 3
HSM92 - HSM93 Series

Specifications:
 • Frequency Stability: HSM92: ±50ppm; HSM93: ±100ppm.
 • Temperature Range: 0°C to +70°C.
 • Waveform: HCMOS Squarewave, Tri-State
 • Output: Voh: 4.5V Min., Vol: 0.5V Max.
 • Current: Ioh: 16mA; Iol: 16mA.
 • Rise/Fall Time: 7ns Max.
 • Duty Cycle: 45/55 max.
 • Start Up Time: 10ms Max.
 • Supply Voltage: +5VDC ±10%.
 • Enable/Disable Time: 100ns Max.
 • Output Load: 50pF

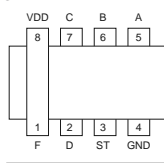
Fig. 4
HSM 536 Series

Specifications:
 • Frequency Stability: ±100ppm.
 • Temperature Range: 0°C to +70°C.
 • Waveform: HCMOS Squarewave.
 • Output: Voh: 4.5V Min., Vol: 0.5V Max.
 • Rise/Fall Time: 7ns Max.
 • Duty Cycle: 50/50% ±10%.
 • Start Up Time: 10ms Max.
 • Supply Voltage: +5VDC ±10%.
 • Output Load: 50pF

ECS INC. Dual Output Oscillator - ECS-300C Series

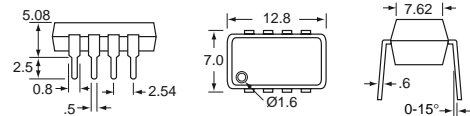
- Electrical Characteristics:**
 • Frequency Stability: 0.01%
 • Operating Temperature Range: Ta = -10°C to +70°C
 • Storage Temperature Range: Ta = -55°C to +125°C
 • Supply Voltage: 5V ±0.5V; 3-5V ±5%
 • Current Consumption: 20mA Max.
 • Input Current: 35mA max.
 • Output Load: 15pF
 • Output Level: Voh: 4.5V min. Vol: 0.5V max.

- Output Symmetry: 40% to 60%
 • Rise Time/Fall Time: 15ns
 • Start-up Time: 2ms



SETTING OF DIVIDING OUTPUT

Input				Output	
Select				F (Original Frequency)	D (Divided Waveform)
C	B	A	ST		
X	X	X	L	L	L
L	L	L	H	fo clock	fo 1/2 clock
L	L	H	H	fo clock	fo 1/2 ² clock
L	H	L	H	fo clock	fo 1/2 ³ clock
L	H	H	H	fo clock	fo 1/2 ⁴ clock
H	L	L	H	fo clock	fo 1/2 ⁵ clock
H	L	H	H	fo clock	fo 1/2 ⁶ clock
H	H	L	H	fo clock	fo 1/2 ⁷ clock
H	H	H	H	fo clock	fo 1/2 ⁸ clock



Frequency (MHz)	Digi-Key Part No.	Price Each				ECS Part No.
		1	10	100	500	
12.000	XC301-ND	5.54	4.62	3.69	2.98	OECS-120-3-C3X1A
12.288	XC302-ND	5.54	4.62	3.69	2.98	OECS-122.8-3-C3X1A
12.800	XC303-ND	5.54	4.62	3.69	2.98	OECS-128-3-C3X1A
14.31818	XC304-ND	5.54	4.62	3.69	2.98	OECS-143-3-C3X1A
14.7456	XC305-ND	5.54	4.62	3.69	2.98	OECS-147.4-3-C3X1A
15.9744	XC306-ND	5.54	4.62	3.69	2.98	OECS-159.7-3-C3X1A
16.000	XC307-ND	5.54	4.62	3.69	2.98	OECS-160-3-C3X1A
16.3840	XC308-ND	5.54	4.62	3.69	2.98	OECS-163.8-3-C3X1A
17.734476	XC309-ND	5.54	4.62	3.69	2.98	OECS-177.3-3-C3X1A
18.432	XC310-ND	5.54	4.62	3.69	2.98	OECS-184-3-C3X1A
19.6608	XC311-ND	5.54	4.62	3.69	2.98	OECS-196.6-3-C3X1A
20.000	XC312-ND	5.54	4.62	3.69	2.98	OECS-200-3-C3X1A
24.000	XC313-ND	5.54	4.62	3.69	2.98	OECS-240-3-C3X1A

ECS INC. SMD Clock Oscillator - 32.768 KHz ECS-327SMO Series

- Electrical Characteristics:**
 • Frequency Stability:
 -10°C ~ +60°C: -60ppm min., +30ppm max.;
 -40°C ~ +85°C: -140ppm min., +30ppm max.
 • Operating Temperature Range: -40°C ~ +85°C
 • Storage Temperature Range: -40°C ~ +85°C
 • Input Voltage (Vcc): +3.3V DC typ.

- Input Current: 15µA max. (with 15pF load)
 • Symmetry: 40% to 60% (at 1/2 Vcc Level and +25°C)
 • Rise and Fall Time: 200ns
 • "0" Level: Vcc x 0.1V max.
 • "1" Level: Vcc x 0.9V min.
 • Load: 15pF CMOS

Frequency (KHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 1,000	ECS Part No.
		1	10	100			
32.768	XC777CT-ND	6.74	5.52	4.90	XC777TR-ND	3430.00	ECS-327SMO

Package Thickness: 2.0mm

Electrical Specifications:

	ECS-3953C	ECS-3951C	ECS-3953M	ECS-3951M
Frequency Stability @ 25°C and over Operating Temp.	±100ppm	±100ppm	±50ppm	±50ppm
Supply Voltage - Min. to Max.	3.0V to 3.6V	4.5V to 5.5V	3.0V to 3.6V	4.5V to 5.5V
Input Current	20.00-32.00MHz - 8mA max. 32.00-50.00MHz - 12mA max. 66.666-80.00MHz - 30mA max.	1.8432 - 20.00MHz - 10mA max. 33.00MHz - 15mA max. 40.00-65.00MHz - 30mA max. 66.666MHz - 50mA max.	1.8432-32.00MHz - 15mA max. 40.00-66.666MHz - 25mA max. 80.00MHz - 30mA max.	1.8432-33.00MHz - 20mA max. 40.00-66.666MHz - 55mA max.
Output Symmetry @ 1/2 Vcc Level	40% min., 60% max.	40% min., 60% max.	40% min., 60% max.	40% min., 60% max.
Operating Temperature	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C	-10°C to +70°C
Storage Temperature	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C
Rise and Fall Time	15nS	10nS	5nS	Up to 66.666MHz - 15nS 80.000MHz - 5nS
Output Current (IOL) VOL=0.5V/0.33V	4mA	4mA	4mA	4mA
Output Current (IOH) VOL=4.5V/2.97V	-4mA	-4mA	-4mA	-4mA
Output Load HCMOS	15pF	30pF	15pF	30pF
Enable/Disable Time	100nS	100nS	100nS	100nS

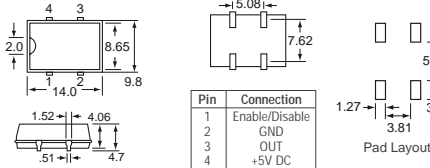
NOTE:

Frequency Stability for ECS-8FM, ECS-3953C, ECS-3953M, ECS-3951C, and ECS-3951M Series inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.

NOTE:

For the Enable/Disable Function in the ECS-8FM, ECS-3953C, ECS-3953M, ECS-3951C, and ECS-3951M Series, an internal pullup resistor from Pin 1 to Pin 4 allows active output if Pin 1 is left open. A 0.01µF bypass capacitor should be placed between VDD (Pin 4) and GND (Pin 2) to minimize power supply line noise.

ECS-8FM Oscillator

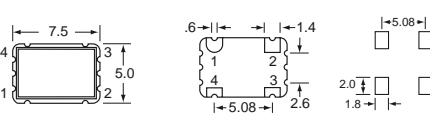


Pin	Connection
1	Enable/Disable
2	GND
3	OUT
4	+5V DC

ELECTRICAL CHARACTERISTICS:

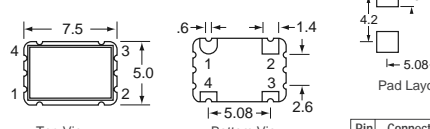
- Frequency Stability: ±100ppm @ 25°C and over operating temperature range
- Supply Voltage: 4.5V min., 5.5V max.
- Input Current: 1.00 - 32.00MHz: 27mA; 32.00+ - 50.00MHz: 45mA; 50.00+ - 66.666MHz: 60mA
- Output Symmetry @ 2.5V: 1.00 - 50.00MHz: 45% min., 55% max.; 50.00+ - 66.666MHz: 40% min., 60% max.
- Operating Temperature: -10°C to +70°C
- Storage Temp.: -55°C to +125°C
- Rise Time (0.5V to 4.5V): 7nS
- Fall Time (4.5V to 0.5V): 7nS
- Output Voltage: IOL = 16mA; 0.5V max.; IOH = -16mA; 4.5V min.
- Output Current: VOL = 0.5V; 16mA max.; VOH = 4.5V; -16mA max.
- Output Load: TTL: 10 TTL max.; HCMOS: 50pF max.
- Start-up Time: 10mS max.
- Enable/Disable Time: 100nS max.

ECS-3953C and ECS3953M 3.3 Volt Oscillator



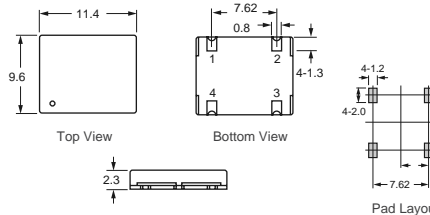
Pin	Connection
1	Enable/Disable
2	GND
3	Output
4	5.0V DC

ECS-3951C and ECS-3951M Oscillator



Pin	Connection
1	Enable/Disable
2	GND
3	Output
4	5.0V DC

VC-TCXO Oscillator



Pin	Connection
1	Vcontrol
2	GND
3	Output
4	Vcc

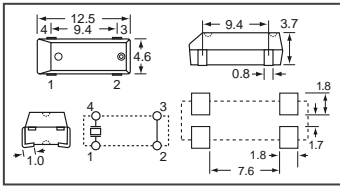
ELECTRICAL CHARACTERISTICS:

- Frequency Range: 10,000-19.440MHz
- Frequency Stability (@ -30°C to +75°C): 2.5ppm max.
- Supply Voltage: ±2.85 V min., 3.15 V max.
- Storage Temperature: -40°C to +85°C
- Output Voltage: 0.8 Vp-p min.
- Output Load: 10kΩ ±10%/10pF ±10%
- Control Voltage: +1.5V typ.

Frequency (MHz)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing		ECS Part No.
		100	500	1,000		1,000	500	
<i>ECS-8FM Series Oscillators</i>								
1.000	XC703CT-ND	2.97	2.48	1.98	1.82	XC703TR-ND	—	1503.00
1.8432	XC704CT-ND	2.97	2.48	1.98	1.82	XC704TR-ND	—	1503.00
2.000	XC705CT-ND	2.97	2.48	1.98	1.82	XC705TR-ND	—	1503.00
2.4576	XC706CT-ND	2.97	2.48	1.98	1.82	XC706TR-ND	—	1503.00
3.579545	XC707CT-ND	2.97	2.48	1.98	1.82	XC707TR-ND	—	1503.00
3.6864	XC708CT-ND	2.97	2.48	1.98	1.82	XC708TR-ND	—	1503.00
4.000	XC635CT-ND	3.30	2.97	2.48	1.98	XC635TR-ND	—	1503.00
4.9152	XC636CT-ND	3.30	2.97	2.48	1.98	XC636TR-ND	—	1503.00
6.000	XC637CT-ND	3.30	2.97	2.48	1.98	XC637TR-ND	—	1503.00
7.3728	XC709CT-ND	2.97	2.48	1.98	1.82	XC709TR-ND	—	1503.00
8.000	XC638CT-ND	3.30	2.97	2.48	1.98	XC638TR-ND	—	1503.00
9.8304	XC710CT-ND	2.97	2.48	1.98	1.82	XC710TR-ND	—	1503.00
10.000	XC639CT-ND	3.30	2.97	2.48	1.98	XC639TR-ND	—	1503.00
11.0592	XC711CT-ND	2.97	2.48	1.98	1.82	XC711TR-ND	—	1503.00
12.000	XC640CT-ND	3.30	2.97	2.48	1.98	XC640TR-ND	—	1503.00
12.288	XC712CT-ND	2.97	2.48	1.98	1.82	XC712TR-ND	—	1503.00
14.31818	XC641CT-ND	3.30	2.97	2.48	1.98	XC641TR-ND	—	1503.00
16.000	XC642CT-ND	3.30	2.97	2.48	1.98	XC642TR-ND	—	1503.00
18.432	XC643CT-ND	3.30	2.97	2.48	1.98	XC643TR-ND	—	1503.00
19.6608	XC713CT-ND	2.97	2.48	1.98	1.82	XC713TR-ND	—	1503.00
20.000	XC644CT-ND	3.30	2.97	2.48	1.98	XC644TR-ND	—	1503.00
24.000	XC645CT-ND	3.30	2.97	2.48	1.98	XC645TR-ND	—	1503.00
25.000	XC714CT-ND	2.97	2.48	1.98	1.82	XC714TR-ND	—	1503.00
25.175	XC646CT-ND	3.30	2.97	2.48	1.98	XC646TR-ND	—	1503.00
28.322	XC647CT-ND	3.30	2.97	2.48	1.98	XC647TR-ND	—	1503.00
32.000	XC648CT-ND	3.30	2.97	2.48	1.98	XC648TR-ND	—	1503.00
32.514	XC649CT-ND	3.30	2.97	2.48	1.98	XC649TR-ND	—	1503.00
40.000	XC650CT-ND	3.30	2.97	2.48	1.98	XC650TR-ND	—	1503.00
48.000	XC651CT-ND	3.30	2.97	2.48	1.98	XC651TR-ND	—	1503.00
50.000	XC652CT-ND	3.30	2.97	2.48	1.98	XC652TR-ND	—	1503.00
66.666	XC715CT-ND	2.97	2.48	1.98	1.82	XC715TR-ND	—	1503.00
<i>ECS-3953C Series Oscillators</i>								
20.000	XC721CT-ND	5.25	4.73	3.94	3.15	XC721TR-ND	—	2625.00
24.000	XC722CT-ND	5.25	4.73	3.94	3.15	XC722TR-ND	—	2625.00
25.000	XC723CT-ND	5.25	4.73	3.94	3.15	XC723TR-ND	—	2625.00
32.000	XC724CT-ND	5.25	4.73	3.94	3.15	XC724TR-ND	—	2625.00
40.000	XC725CT-ND	5.25	4.73	3.94	3.15	XC725TR-ND	—	2625.00
50.000	XC726CT-ND	5.25	4.73	3.94	3.15	XC726TR-ND	—	2625.00
66.666	XC727CT-ND	5.25	4.73	3.94	3.15	XC727TR-ND	—	2625.00
80.000	XC728CT-ND	5.25	4.73	3.94	3.15	XC728TR-ND	—	2625.00
<i>ECS-3953M Series Oscillators</i>								
1.8432	XC284CT-ND	5.25	4.73	3.94	3.15	XC284TR-ND	—	2625.00
3.6864	XC285CT-ND	5.25	4.73	3.94	3.15	XC285TR-ND	—	2625.00
4.000	XC286CT-ND	5.25	4.73	3.94	3.15	XC286TR-ND	—	2625.00
8.000	XC287CT-ND	5.25	4.73	3.94	3.15	XC287TR-ND	—	2625.00
10.000	XC288CT-ND	5.25	4.73	3.94	3.15	XC288TR-ND	—	2625.00
12.000	XC289CT-ND	5.25	4.73	3.94	3.15	XC289TR-ND	—	2625.00
16.000	XC290CT-ND	5.25	4.73	3.94	3.15	XC290TR-ND	—	2625.00
20.000	XC790CT-ND	5.25	4.73	3.94	3.15	XC790TR-ND	—	2625.00
24.000	XC791CT-ND	5.25	4.73	3.94	3.15	XC791TR-ND	—	2625.00
25.000	XC792CT-ND	5.25	4.73	3.94	3.15	XC792TR-ND	—	2625.00
32.000	XC793CT-ND	5.25	4.73	3.94	3.15	XC793TR-ND	—	2625.00
40.000	XC794CT-ND	5.25	4.73	3.94	3.15	XC794TR-ND	—	2625.00
50.000	XC795CT-ND	5.25	4.73	3.94	3.15	XC795TR-ND	—	2625.00
66.666	XC796CT-ND	5.25	4.73	3.94	3.15	XC796TR-ND	—	2625.00
80.000	XC797CT-ND	5.25	4.73	3.94	3.15	XC797TR-ND	—	2625.00
<i>ECS-3951M Series Oscillators</i>								
1.8432	XC780CT-ND	5.25	4.73	3.94	3.15	XC780TR-ND	—	2625.00
3.6864	XC781CT-ND	5.25	4.73	3.94	3.15	XC781TR-ND	—	2625.00
12.000	XC782CT-ND	5.25	4.73	3.94	3.15	XC782TR-ND	—	2625.00
16.000	XC783CT-ND	5.25	4.73	3.94	3.15	XC783TR-ND	—	2625.00
20.000	XC784CT-ND	5.25	4.73	3.94	3.15	XC784TR-ND	—	2625.00
33.000	XC785CT-ND	5.25	4.73	3.94	3.15	XC785TR-ND	—	2625.00
40.000	XC786CT-ND	5.25	4.73	3.94	3.15	XC786TR-ND	—	2625.00
50.000	XC787CT-ND	5.25	4.73	3.94	3.15	XC787TR-ND	—	2625.00
65.000	XC788CT-ND	5.25	4.73	3.94	3.15	XC788TR-ND	—	2625.00
66.666	XC789CT-ND	5.25	4.73	3.94	3.15	XC789TR-ND	—	2625.00
<i>ECS-3951C Series Oscillators</i>								
1.8432	XC653CT-ND	5.25	4.73	3.94	3.15	XC653TR-ND	—	2625.00
3.6864	XC654CT-ND	5.25	4.73	3.94	3.15	XC654TR-ND	—	2625.00
12.000	XC655CT-ND	5.25	4.73	3.94	3.15	XC655TR-ND	—	2625.00
16.000	XC656CT-ND	5.25	4.73	3.94	3.15	XC656TR-ND	—	2625.00
20.000	XC657CT-ND	5.25	4.73	3.94	3.15	XC657TR-ND	—	2625.00
33.000	XC658CT-ND	5.25	4.73	3.94	3.15	XC658TR-ND	—	2625.00
40.000	XC659CT-ND	5.25	4.73	3.94	3.15	XC659TR-ND	—	2625.00
50.000	XC660CT-ND	5.25	4.73	3.94	3.15	XC660TR-ND	—	2625.00
65.000	XC661CT-ND	5.25	4.73	3.94	3.15	XC661TR-ND	—	2625.00
66.666	XC662CT-ND	5.25	4.73	3.94	3.15	XC662TR-ND	—	2625.00
<i>VC-TXO Series Oscillators</i>								
10.000	X493CT-ND	15.13	12.38	11.00	—	X493TR-ND	4950.00	7700.00
12.800	X489CT-ND	15.13	12.38	11.00	—	X489TR-ND	4950.00	7700.00
13.000	X490CT-ND	15.13	12.38	11.00	—	X490TR-ND	4950.00	7700.00
16.800	X491CT-ND	15.13	12.38	11.00	—	X491TR-ND	4950.00	7700.00
19.440	X492CT-ND	15.13</						

ECX-3S

The ECX-3S Series has a special high temperature seal which is able to withstand SMD soldering techniques. Housing for this crystal is made from the same rugged thermoplastic that is standard for integrated circuits.



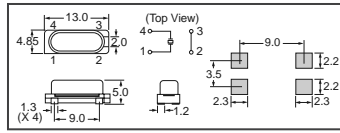
ELECTRICAL CHARACTERISTICS: • Frequency Tolerance: ± 50 ppm @ $+25^\circ\text{C}$ and over operating temp. range • Shunt Capacitance: 7.0pF • Drive Level: 0.1mW • Operating Temperature: -10°C to $+70^\circ\text{C}$ • Storage Temp.: -40°C to $+85^\circ\text{C}$ • Mode of Operation: Fundamental

Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
3.579545	17pF	XC501CT-ND	2.03	1.69	1.35	XC501TR-ND	1012.50	ECS-35-17-7S
3.579545	Series	XC529CT-ND	2.03	1.69	1.35	XC529TR-ND	1012.50	ECS-35-S-7S
3.6864	20pF	XC503CT-ND	2.03	1.69	1.35	XC503TR-ND	1012.50	ECS-36-S-7S
3.6864	20pF	XC503CT-ND	2.03	1.69	1.35	XC503TR-ND	1012.50	ECS-36-20-7S
4.000	Series	XC504CT-ND	2.03	1.69	1.35	XC504TR-ND	1012.50	ECS-40-S-7S
4.000	20pF	XC505CT-ND	2.03	1.69	1.35	XC505TR-ND	1012.50	ECS-40-20-7S
4.096	16pF	XC500CT-ND	2.03	1.69	1.35	XC500TR-ND	1125.00	ECS-41-16-7S
4.194304	12pF	XC530CT-ND	2.03	1.69	1.35	XC530TR-ND	1012.50	ECS-42-12-7S
4.433618	20pF	XC506CT-ND	2.03	1.69	1.35	XC506TR-ND	1012.50	ECS-44-20-7S
4.9152	Series	XC507CT-ND	2.03	1.69	1.35	XC507TR-ND	1012.50	ECS-49-S-7S
4.9152	20pF	XC508CT-ND	2.03	1.69	1.35	XC508TR-ND	1012.50	ECS-49-20-7S
5.000	20pF	XC499CT-ND	2.03	1.69	1.35	XC499TR-ND	1125.00	ECS-50-20-7S
6.000	32pF	XC498CT-ND	2.03	1.69	1.35	XC498TR-ND	1125.00	ECS-60-32-7S
6.000	Series	XC497CT-ND	2.03	1.69	1.35	XC497TR-ND	1125.00	ECS-80-S-7S
6.144	32pF	XC509CT-ND	2.03	1.69	1.35	XC509TR-ND	1012.50	ECS-61-32-7S

• XC-Kit-ND Digi-Key® SMT Low Profile Quartz Crystal Kit 3 each of values denoted (81 total pieces). Notebook style storage case and bin storage guide included.....\$169.00

CSM-4A

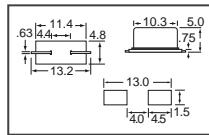
ELECTRICAL CHARACTERISTICS: • Freq. Tolerance: ± 50 ppm @ $+25^\circ\text{C}$ and over operating temperature range • Shunt Capacitance: 7.0pF • Drive Level: 0.1mW • Operating Temp.: -10°C to $+70^\circ\text{C}$ • Storage Temp.: -40°C to $+85^\circ\text{C}$ • Mode of Operation: Fundamental. The CSM-4A is also pin-out compatible with the Epson MA-506.



Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
3.579545	17pF	XC747CT-ND	1.35	1.24	1.02	XC747TR-ND	675.00	ECS-35-17-28A
3.6864	20pF	XC748CT-ND	1.35	1.24	1.02	XC748TR-ND	675.00	ECS-36-20-28A
4.000	20pF	XC749CT-ND	1.35	1.24	1.02	XC749TR-ND	675.00	ECS-40-20-28A
4.9152	20pF	XC751CT-ND	1.35	1.24	1.02	XC751TR-ND	675.00	ECS-49-20-28A
5.000	20pF	XC750CT-ND	1.35	1.24	1.02	XC750TR-ND	675.00	ECS-50-20-28A
6.000	32pF	XC752CT-ND	1.35	1.24	1.02	XC752TR-ND	675.00	ECS-60-32-28A
7.3728	20pF	XC753CT-ND	1.35	1.24	1.02	XC753TR-ND	675.00	ECS-73-20-28A
8.000	16pF	XC754CT-ND	1.35	1.24	1.02	XC754TR-ND	675.00	ECS-80-16-28A
8.9304	20pF	XC778CT-ND	1.35	1.24	1.02	XC778TR-ND	675.00	ECS-98.3-20-28A
10.000	Series	XC775CT-ND	1.35	1.24	1.02	XC775TR-ND	675.00	ECS-100-S-28A
10.000	20pF	XC756CT-ND	1.35	1.24	1.02	XC756TR-ND	675.00	ECS-100-20-28A

CSM-7 Case — HC-49USMD

ELECTRICAL CHARACTERISTICS: • Frequency Tolerance: ± 50 ppm @ $+25^\circ\text{C}$ and over operating temperature range • Frequency Stability (Extended Temp. Version): ± 100 ppm, -40°C to $+85^\circ\text{C}$ • Shunt Capacitance: 7.0pF • Drive Level: 0.5mW • Operating Temperature: -10°C to $+70^\circ\text{C}$ (Extended Temperature Version: -40°C to $+85^\circ\text{C}$) • Storage Temperature: -30°C to $+85^\circ\text{C}$ (Extended Temp. Version: -55°C to $+125^\circ\text{C}$) • Aging Characteristics (first year): ± 5.0 ppm @ 25°C • Mode of Operation: Fundamental

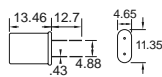


Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
CSM-7 Case								
3.579545	17pF	XC560CT-ND	1.00	0.84	0.67	XC560TR-ND	499.50	ECS-35-17-5P
3.579545	Series	XC663CT-ND	1.00	0.84	0.67	XC663TR-ND	555.00	ECS-35-5-5P
3.6864	Series	XC561CT-ND	1.00	0.84	0.67	XC561TR-ND	499.50	ECS-36-5-5P
3.6864	20pF	XC562CT-ND	1.00	0.84	0.67	XC562TR-ND	499.50	ECS-36-20-5P
4.000	Series	XC563CT-ND	1.00	0.84	0.67	XC563TR-ND	499.50	ECS-40-5-5P
4.000	20pF	XC564CT-ND	1.00	0.84	0.67	XC564TR-ND	499.50	ECS-40-20-5P
4.032	20pF	XC664CT-ND	1.00	0.84	0.67	XC664TR-ND	555.00	ECS-40-3-20-5P
4.032	Series	XC665CT-ND	1.00	0.84	0.67	XC665TR-ND	555.00	ECS-40-3-5-5P
4.096	20pF	XC666CT-ND	1.00	0.84	0.67	XC666TR-ND	555.00	ECS-41-20-5P
4.194304	12pF	XC667CT-ND	1.00	0.84	0.67	XC667TR-ND	555.00	ECS-42-12-5P
4.433618	16pF	XC668CT-ND	1.00	0.84	0.67	XC668TR-ND	555.00	ECS-42-16-5P
4.433618	Series	XC669CT-ND	1.00	0.84	0.67	XC669TR-ND	555.00	ECS-44-20-5P
4.9152	Series	XC665CT-ND	1.00	0.84	0.67	XC665TR-ND	499.50	ECS-49-5-5P
4.9152	20pF	XC566CT-ND	1.00	0.84	0.67	XC566TR-ND	499.50	ECS-49-20-5P
5.000	Series	XC670CT-ND	1.00	0.84	0.67	XC670TR-ND	555.00	ECS-50-5-5P
5.000	20pF	XC671CT-ND	1.00	0.84	0.67	XC671TR-ND	555.00	ECS-50-20-5P
5.0688	Series	XC672CT-ND	1.00	0.84	0.67	XC672TR-ND	555.00	ECS-51-5-5P
5.0688	20pF	XC673CT-ND	1.00	0.84	0.67	XC673TR-ND	555.00	ECS-51-20-5P
5.185	Series	XC674CT-ND	1.00	0.84	0.67	XC674TR-ND	555.00	ECS-52-5-5P
5.185	32pF	XC675CT-ND	1.00	0.84	0.67	XC675TR-ND	555.00	ECS-52-32-5P
5.9904	Series	XC676CT-ND	1.00	0.84	0.67	XC676TR-ND	555.00	ECS-59-5-5P
5.9904	20pF	XC677CT-ND	1.00	0.84	0.67	XC677TR-ND	555.00	ECS-59-20-5P
6.000	Series	XC678CT-ND	1.00	0.84	0.67	XC678TR-ND	555.00	ECS-60-5-5P
6.000	32pF	XC679CT-ND	1.00	0.84	0.67	XC679TR-ND	555.00	ECS-60-32-5P
6.144	32pF	XC567CT-ND	1.00	0.84	0.67	XC567TR-ND	499.50	ECS-61-32-5P
7.3728	Series	XC568CT-ND	1.00	0.84	0.67	XC568TR-ND	499.50	ECS-73-5-5P
7.3728	20pF	XC680CT-ND	1.00	0.84	0.67	XC680TR-ND	555.00	ECS-73-20-5P
8.000	Series	XC682CT-ND	1.00	0.84	0.67	XC682TR-ND	499.50	ECS-80-5-5P
8.000	18pF	XC681CT-ND	1.00	0.84	0.67	XC681TR-ND	555.00	ECS-80-18-5P
8.000	32pF	XC682CT-ND	1.00	0.84	0.67	XC682TR-ND	555.00	ECS-80-32-5P
9.216	Series	XC683CT-ND	1.00	0.84	0.67	XC683TR-ND	555.00	ECS-92.1-5-5P
9.216	20pF	XC684CT-ND	1.00	0.84	0.67	XC684TR-ND	555.00	ECS-92.1-20-5P
9.8304	Series	XC570CT-ND	1.00	0.84	0.67	XC570TR-ND	499.50	ECS-98.3-5-5P
9.8304	20pF	XC571CT-ND	1.00	0.84	0.67	XC571TR-ND	499.50	ECS-98.3-20-5P
10.000	Series	XC572CT-ND	1.00	0.84	0.67	XC572TR-ND	499.50	ECS-100-5-5P
10.000	18pF	XC716CT-ND	1.00	0.84	0.67	XC716TR-ND	499.50	ECS-100-18-5P
11.000	Series	XC685CT-ND	1.00	0.84	0.67	XC685TR-ND	555.00	ECS-110-5-5P

Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
6.5536	12pF	XC496CT-ND	2.03	1.69	1.35	XC496TR-ND	1125.00	ECS-65-12-7S
7.3728	20pF	XC536CT-ND	2.03	1.69	1.35	XC536TR-ND	1012.50	ECS-73-20-7S
7.3728	Series	XC510CT-ND	2.03	1.69	1.35	XC510TR-ND	1012.50	ECS-73-S-7S
8.000	Series	XC511CT-ND	2.03	1.69	1.35	XC511TR-ND	1012.50	ECS-80-S-7S
8.000	16pF	XC495CT-ND	2.03	1.69	1.35	XC495TR-ND	1125.00	ECS-80-16-7S
9.8304	Series	XC512CT-ND	2.03	1.69	1.35	XC512TR-ND	1012.50	ECS-98.3-S-7S
9.8304	20pF	XC513CT-ND	2.03	1.69	1.35	XC513TR-ND	1012.50	ECS-98.3-20-7S
10.000	Series	XC514CT-ND	2.03	1.69	1.35	XC514TR-ND	1012.50	ECS-100-S-7S
10.000	Series	XC515CT-ND	2.03	1.69	1.35	XC515TR-ND	1012.50	ECS-110-S-7S
11.0592	20pF	XC516CT-ND	2.03	1.69	1.35	XC516TR-ND	1012.50	ECS-110.5-20-7S
12.000	18pF	XC548CT-ND	2.03	1.69	1.35	XC548TR-ND	1012.50	ECS-120-18-7S
12.000	Series	XC517CT-ND	2.03	1.69	1.35	XC517TR-ND	1012.50	ECS-120-S-7S
12.000	32pF	XC494CT-ND	2.03	1.69	1.35	XC494TR-ND	1125.00	ECS-120-32-7S
12.288	Series	XC518CT-ND	2.03	1.69	1.35	XC518TR-ND	1012.50	ECS-122.8-S-7S
12.288	20pF	XC493CT-ND	2.03	1.69	1.35	XC493TR-ND	1125.00	ECS-122.8-20-7S
14.31818	Series	XC519CT-ND	2.03	1.69	1.35	XC519TR-ND	1012.50	ECS-143.5-7S
14.31818	20pF	XC492CT-ND	2.03	1.69	1.35	XC492TR-ND	1125.00	ECS-143-20-7S
14.7456	Series	XC520CT-ND	2.03	1.69	1.35	XC520TR-ND	1012.50	ECS-147.4-S-7S
14.7456	20pF	XC491CT-ND	2.03	1.69	1.35	XC491TR-ND	1125.00	ECS-147.4-20-7S
16.000	20pF	XC550CT-ND	2.03	1.69	1.35	XC550TR-ND	1012.50	ECS-160-20-7S
16.000	Series	XC521CT-ND	2.03	1.69	1.35	XC521TR-ND	1012.50	ECS-160-5-7S
18.432	Series	XC522CT-ND	2.03	1.69	1.35	XC522TR-ND	1012.50	ECS-184-S-7S
19.6608	Series	XC523CT-ND	2.03	1.69	1.35	XC523TR-ND	1012.50	ECS-196.6-S-7S
19.6608	20pF	XC490CT-ND	2.03	1.69	1.35	XC490TR-ND	1125.00	ECS-196.6-20-7S
20.000	Series	XC524CT-ND	2.03	1.69	1.35	XC524TR-ND	1012.50	ECS-200-S-7S
20.000	16pF	XC489CT-ND	2.03	1.69	1.35	XC489TR-ND	1125.00	ECS-200-16-7S
20.000	20pF	XC525CT-ND	2.03	1.69	1.35	XC525TR-ND	1012.50	ECS-200-20-7S
23.592	Series	XC559CT-ND	2.03	1.69	1.35	XC559TR-ND	1012.50	ECS-235.92-S-7S
24.000	Series	XC526CT-ND	2.03	1.69	1.35	XC526TR-ND	1012.50	ECS-240-S-7S
24.000	20pF	XC527CT-ND	2.03	1.69	1.35	XC527TR-ND	1012.50	ECS-240-20-7S
24.000	16pF	XC528CT-ND	2.03	1.69	1.35	XC528TR-ND	1012.50	ECS-240-16-7S

Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
11.0592	Series	XC757CT-ND	1.35	1.24	1.02	XC757TR-ND	675.00	ECS-110.5-S-28A
11.0592	20pF	XC758CT-ND	1.35	1.24	1.02	XC758TR-ND	675.00	ECS-110.5-20-28A
12.000	Series	XC760CT-ND	1.35	1.24	1.02	XC760TR-ND	675.00	ECS-120-S-28A
12.000	18pF	XC759CT-ND	1.35	1.24	1.02	XC759TR-ND	675.00	ECS-120-18-28A

Electrical Characteristics: • Frequency Tolerance: ±50ppm @ +25°C and over operating temperature range • Shunt Capacitance: 7.0pF • Drive Level: 1.0mW • Operating Temp.: -10°C to +70°C • Storage Temperature: -40°C to +85°C • Aging Characteristics (first year): ±5.0ppm @ +25°C

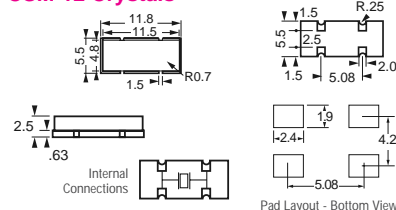


Series resonance appears resistive in the circuit and impedance at fs is at its minimum value. Unless load capacitance is specified, all crystals are manufactured at series resonance. When a crystal is operating at parallel resonance (fl) it will look inductive in a circuit. Crystal frequency varies depending on the value of load capacitance. The load capacitance is the dynamic capacitance of the total circuit as measured or computed across the crystal terminals. Always specify the load capacitance if the crystal will be operated in the parallel mode.

Frequency (MHz)	Load Cap.	Digi-Key Part No.	Price Each			ECS Part No.	
			1	100	500		
<i>HC-49U/A</i>							
1.000	13pF	X066B-ND*	17.88	14.85	8.09	7.54	
1.8432	13pF	X067-ND	2.83	2.35	1.88	1.45	
1.8432	Series	X002-ND	3.02	2.52	2.00	1.55	
2.000	20pF	X068-ND	2.57	2.14	1.70	1.32	
2.000	Series	X004-ND	2.73	2.27	1.81	1.40	
2.048	12pF	X098-ND	2.73	2.27	1.81	1.40	
2.4576	32pF	X069-ND	2.57	2.14	1.70	1.32	
2.500	Series	X070-ND	2.57	2.14	1.70	1.32	
3.000	Series	X009-ND	3.02	2.52	2.00	1.55	
3.2768	17pF	X022-ND	1.37	1.14	.91	.70	
3.579545	17pF	X049-ND	.64	.58	.52	.46	
3.579545	Series	X011-ND	.64	.58	.52	.46	
3.6864	17-18pF	X071-ND	.64	.58	.52	.46	
3.6864	Series	X080-ND	.64	.58	.52	.46	
3.932160	17pF	X013-ND	.64	.58	.52	.46	
4.000	20pF	X006-ND	.64	.58	.52	.46	
4.000	Series	X081-ND	.64	.58	.52	.46	
4.032	20pF	X072-ND	.64	.58	.52	.46	
4.032	Series	X015-ND	.64	.58	.52	.46	
4.096	20pF	X082-ND	.64	.58	.52	.46	
4.194304	12pF	X007-ND	.64	.58	.52	.46	
4.433618	20pF	X083-ND	.64	.58	.52	.46	
4.9152	Series	X050-ND	.64	.58	.52	.46	
4.9152	20pF	X084-ND	.64	.58	.52	.46	
5.000	Series	X099-ND	.64	.58	.52	.46	
5.000	20pF	X051-ND	.64	.58	.52	.46	
5.0688	Series	X052-ND	.64	.58	.52	.46	
5.0688	20pF	X085-ND	.64	.58	.52	.46	
5.185	Series	X053-ND	.64	.58	.52	.46	
5.185	32pF	X016-ND	.64	.58	.52	.46	
5.9904	Series	X073-ND	.64	.58	.52	.46	
5.9904	20pF	X017-ND	.64	.58	.52	.46	
6.000	Series	X026-ND	.64	.58	.52	.46	
6.000	32pF	X086-ND	.64	.58	.52	.46	
6.144	32pF	X054-ND	.64	.58	.52	.46	
6.5536	12pF	X018-ND	.64	.58	.52	.46	
7.3728	Series	X074-ND	.64	.58	.52	.46	
7.3728	20pF	X019-ND	.64	.58	.52	.46	
7.680	20pF	X020-ND	.64	.58	.52	.46	
8.000	Series	X056-ND	.64	.58	.52	.46	
8.000	18pF	X100-ND	.64	.58	.52	.46	
8.000	20pF	X021-ND	.64	.58	.52	.46	
8.000	32pF	X137-ND	.64	.58	.52	.46	
9.216	Series	X075-ND	.64	.58	.52	.46	
9.216	20pF	X138-ND	.64	.58	.52	.46	
9.8304	20pF	X087-ND	.64	.58	.52	.46	
9.8304	Series	X023-ND	.64	.58	.52	.46	
10.000	Series	X057-ND	.64	.58	.52	.46	
10.738635	Series	X024-ND	.64	.58	.52	.46	
11.000	Series	X088-ND	.64	.58	.52	.46	
11.046	Series	X025-ND	.64	.58	.52	.46	
11.0592	Series	X078-ND	.64	.58	.52	.46	
11.0592	20pF	X089-ND	.64	.58	.52	.46	
11.0592	32pF	X139-ND	.64	.58	.52	.46	
11.228	Series	X028-ND	.64	.58	.52	.46	
11.52	Series	X140-ND	.64	.58	.52	.46	
11.98135	Series	X029-ND	.64	.58	.52	.46	
12.000	Series	X058-ND	.64	.58	.52	.46	
12.000	32pF	X030-ND	.64	.58	.52	.46	
12.000393	18pF	X147-ND	.64	.58	.52	.46	
12.096	Series	X031-ND	.64	.58	.52	.46	
12.288	Series	X090-ND	.64	.58	.52	.46	
12.288	20pF	X141-ND	.64	.58	.52	.46	
13.5168	Series	X032-ND	.64	.58	.52	.46	
14.31818	Series	X091-ND	.64	.58	.52	.46	
14.690	Series	X033-ND	.64	.58	.52	.46	
14.7456	Series	X092-ND	.64	.58	.52	.46	
14.7456	20pF	X142-ND	.64	.58	.52	.46	
15.000	Series	X059-ND	.64	.58	.52	.46	
16.000	Series	X077-ND	.64	.58	.52	.46	
16.000	20pF	X143-ND	.64	.58	.52	.46	
16.000312	18pF	X148-ND	.64	.58	.52	.46	
18.000	Series	X060-ND	.64	.58	.52	.46	
18.000	20pF	X144-ND	.64	.58	.52	.46	
18.432	Series	X061-ND	.64	.58	.52	.46	
18.432	18pF	X145-ND	.64	.58	.52	.46	
18.432	20pF	X146-ND	.64	.58	.52	.46	
19.6608	Series	X094-ND	.64	.58	.52	.46	
19.6608	20pF	X035-ND	.64	.58	.52	.46	
20.000	Series	X062-ND	.64	.58	.52	.46	
20.000	20pF	X036-ND	.64	.58	.52	.46	
22.1184	Series	X063-ND	.64	.58	.52	.46	
24.000	20pF	X037-ND	.64	.58	.52	.46	
24.000	Series	X095-ND	.64	.58	.52	.46	
24.00014	18pF	X149-ND	.64	.58	.52	.46	
35.2512	18pF	X151-ND	.80	.72	.58	.52	
38.000530	18pF	X150-ND	.80	.72	.58	.52	
40.32	18pF	X152-ND	.80	.72	.58	.52	
48.000	Series	X065-ND	.64	.58	.52	.46	
49.860	20pF	X038-ND	.64	.58	.52	.46	
Base Insulator		HC49INS-ND	—	.09	.08	.06	700-9001

* 1.0 Frequency (#X066B-ND): 100ppm @ +25°C; ±100ppm from 0°C to +60°C.

CSM-12 Crystals

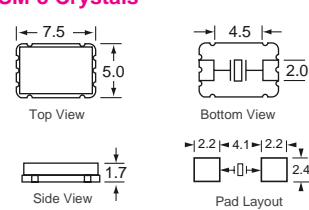


ELECTRICAL CHARACTERISTICS:
• Frequency Tolerance: ±50 ppm @ 25°C and over operating temperature range
• Shunt Capacitance: 7.0pF • Drive Level: 0.5mW • Operating Temp.: -10°C to +70°C • Storage Temp.: -40°C to +85°C • Aging Characteristics (first year): ±5.0ppm @ 25°C • Mode of Operation: Fundamental

ECX-19A Crystals

ELECTRICAL CHARACTERISTICS:
• Frequency Tolerance: ±50 ppm @ 25°C and over operating temp. range • Shunt Capacitance: 7.0pF • Drive Level: 0.5mW • Operating Temp.: -10°C to +70°C • Storage Temp.: -30°C to +85°C • Aging Characteristics (first year): ±5.0ppm @ 25°C

CSM-8 Crystals

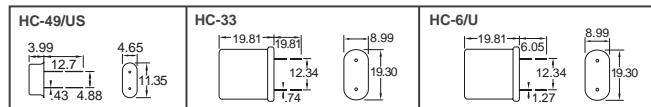


ELECTRICAL CHARACTERISTICS:
• Frequency Tolerance: ±50ppm @ 25°C and over operating temp. range • Shunt Capacitance: 5.0pF • Drive Level: 0.5mW • Operating Temp.: -10°C to +70°C • Storage Temp.: -40°C to +85°C • Aging Characteristics (first year): ±5.0ppm @ 25°C

Frequency (MHz)	Load Cap.	Max. ESR (Ω)	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	Tape & Reel Pricing 1,000	ECS Part No.
				1	100	500			
<i>CSM-12 Series Crystals</i>									
3.579545	17pF	—	XC584CT-ND	1.95	1.76	1.47	1.17	XC584TR-ND	975.00
3.6864	Series	200	XC585CT-ND	1.95	1.76	1.47	1.17	XC585TR-ND	975.00
3.6864	20pF	—	XC586CT-ND	1.95	1.76	1.47	1.17	XC586TR-ND	975.00
4.000	20pF	—	XC587CT-ND	1.95	1.76	1.47	1.17	XC587TR-ND	975.00
4.000	Series	200	XC588CT-ND	1.95	1.76	1.47	1.17	XC588TR-ND	975.00
4.9152	20pF	—	XC589CT-ND	1.95	1.76	1.47	1.17	XC589TR-ND	975.00
4.9152	Series	150	XC590CT-ND	1.95	1.76	1.47	1.17	XC590TR-ND	975.00
6.144	32pF	—	XC591CT-ND	1.95	1.76	1.47	1.17	XC591TR-ND	975.00
7.3728	Series	100	XC592CT-ND	1.95	1.76	1.47	1.17	XC592TR-ND	975.00
8.000	Series	100	XC593CT-ND	1.95	1.76	1.47	1.17	XC593TR-ND	975.00
9.8304	Series	100	XC594CT-ND	1.95	1.76	1.47	1.17	XC594TR-ND	975.00
9.8304	20pF	—	XC595CT-ND	1.95	1.76	1.47	1.17	XC595TR-ND	975.00
10.000	Series	80	XC596CT-ND	1.95	1.76	1.47	1.17	XC596TR-ND	975.00
11.0592	Series	80	XC597CT-ND	1.95	1.76	1.47	1.17	XC597TR-ND	975.00
11.0592	20pF	—	XC598CT-ND	1.95	1.76	1.47	1.17	XC598TR-ND	975.00
12.000	Series	80	XC599CT-ND	1.95	1.76	1.47	1.17	XC599TR-ND	975.00
14.31818	Series	50	XC600CT-ND	1.95	1.76	1.47	1.17	XC600TR-ND	975.00
16.000	Series	50	XC601CT-ND	1.95	1.76	1.47	1.17	XC601TR-ND	975.00
18.432	Series	50	XC602CT-ND	1.95	1.76	1.47	1.17	XC602TR-ND	975.00
19.6608	Series	50	XC603CT-ND	1.95	1.76	1.47	1.17	XC603TR-ND	975.00
20.000	Series	50	XC604CT-ND	1.95	1.76	1.47	1.17	XC604TR-ND	975.00
20.000	20pF	—	XC605CT-ND	1.95	1.76	1.47	1.17	XC605TR-ND	975.00
24.000	20pF	—	XC606CT-ND	1.95	1.76	1.47	1.17	XC606TR-ND	975.00
24.000	16pF	—	XC607CT-ND	1.95	1.76	1.47	1.17	XC607TR-ND	975.00
<i>CSM-8 Series Crystals</i>									
9.8304	Series	60	XC608CT-ND	3.30	2.97	2.48	1.98	XC608TR-ND	1650.00
9.8304	20pF	—	XC609CT-ND	3.30	2.97	2.48	1.98	XC609TR-ND	1650.00
10.000	Series	60	XC610CT-ND	3.30	2.97	2.48	1.98	XC610TR-ND	1650.00
11.0592	Series	60	XC611CT-ND	3.30	2.97	2.48	1.98	XC611TR-ND	1650.00
11.0592	20pF	—	XC612CT-ND	3.30	2.97	2.48	1.98	XC612TR-ND	1650.00
12.000	Series	60	XC613CT-ND	3.30	2.97	2.48	1.98	XC613TR-ND	1650.00
14.31818	Series	60	XC614CT-ND	3.30	2.97	2.48	1.98	XC614TR-ND	1650.00
14.7456	Series	60	XC615CT-ND	3.30	2.97	2.48	1.98	XC615TR-ND	1650.00
16.000	Series	40	XC616CT-ND	3.30	2.97	2.48	1.98	XC616TR-ND	1650.00
18.432	Series	40	XC617CT-ND	3.30	2.97	2.48	1.98	XC617TR-ND	1650.00
19.6608	Series	40							

Quartz Crystals

ELECTRICAL CHARACTERISTICS: • Frequency Tolerance: ±50ppm @ +25°C and over operating temp. range • Frequency Stability (Extended Temp. Version): ±100ppm from -40°C to +85°C • Shunt Capacitance: 7.0pF • Drive Level: 0.5mW • Operating Temp.: -10°C to +70°C (Extended Temperature Version: -40°C to +85°C) • Storage Temp.: -40°C to +85°C (Fundamental Temp. Version: -55°C to +125°C) • Aging Characteristics (first year): ±5.0ppm @ +25°C • Mode of Operation: Fundamental



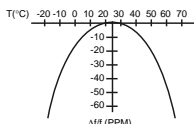
Frequency (MHz)	Load Cap.	Digi-Key Part No.	Price Each				ECS Part No.
			1	10	100	500	
<i>HC-49/US</i>							
3.579545	17pF	X079-ND	.80	.72	.58	.52	ECS-35-17-4
3.579545	Series	X153-ND	.80	.72	.58	.52	ECS-35-S-4
3.6864	18pF	X402-ND	.80	.72	.58	.52	ECS-36-18-4
3.6864	Series	X403-ND	.80	.72	.58	.52	ECS-36-S-4
4.000	Series	X404-ND	.80	.72	.58	.52	ECS-40-S-4
4.000	20pF	X405-ND	.80	.72	.58	.52	ECS-40-20-4
4.032	20pF	X154-ND	.80	.72	.58	.52	ECS-40.3-20-4
4.032	Series	X155-ND	.80	.72	.58	.52	ECS-40.3-S-4
4.096	20pF	X156-ND	.80	.72	.58	.52	ECS-41-20-4
4.194304	12pF	X406-ND	.80	.72	.58	.52	ECS-42-12-4
4.194304	16pF	X157-ND	.80	.72	.58	.52	ECS-42-16-4
4.433618	20pF	X407-ND	.80	.72	.58	.52	ECS-44-20-4
4.9152	Series	X408-ND	.80	.72	.58	.52	ECS-49-S-4
4.9152	20pF	X409-ND	.80	.72	.58	.52	ECS-49-20-4
5.000	20pF	X410-ND	.80	.72	.58	.52	ECS-50-20-4
5.000	Series	X158-ND	.80	.72	.58	.52	ECS-50-S-4
5.0688	20pF	X411-ND	.80	.72	.58	.52	ECS-51-20-4
5.0688	Series	X159-ND	.80	.72	.58	.52	ECS-51-S-4
5.185	32pF	X064-ND	1.04	.87	.69	.54	ECS-52-32-4
5.185	Series	X160-ND	.80	.72	.58	.52	ECS-52-S-4
5.9904	Series	X161-ND	.80	.72	.58	.52	ECS-59-S-4
5.9904	20pF	X162-ND	.80	.72	.58	.52	ECS-59.9-20-4
6.000	Series	X412-ND	.80	.72	.58	.52	ECS-60-S-4
6.000	32pF	X413-ND	.80	.72	.58	.52	ECS-60-32-4
6.144	32pF	X414-ND	.80	.72	.58	.52	ECS-61-32-4
6.500	20pF	X415-ND	.80	.72	.58	.52	ECS-65-20-4
7.3728	20pF	X076-ND	1.04	.87	.69	.54	ECS-73-20-4
7.3728	Series	X416-ND	.80	.72	.58	.52	ECS-73-S-4
7.68	20pF	X163-ND	.80	.72	.58	.52	ECS-76.8-20-4
8.000	18pF	X164-ND	.80	.72	.58	.52	ECS-80-18-4
8.000	20pF	X165-ND	.80	.72	.58	.52	ECS-80-20-4
8.000	32pF	X166-ND	.80	.72	.58	.52	ECS-80-32-4
8.000	Series	X417-ND	.80	.72	.58	.52	ECS-80-S-4
8.500	Series	X418-ND	.80	.72	.58	.52	ECS-85-S-4
9.000	Series	X419-ND	.80	.72	.58	.52	ECS-90-S-4
9.216	Series	X167-ND	.80	.72	.58	.52	ECS-92.1-S-4
9.216	20pF	X168-ND	.80	.72	.58	.52	ECS-92.1-20-4
9.545	Series	X420-ND	.80	.72	.58	.52	ECS-95.4-S-4
9.8304	20pF	X169-ND	.80	.72	.58	.52	ECS-98.3-20-4
9.8304	Series	X421-ND	.80	.72	.58	.52	ECS-98.3-S-4
10.000	Series	X422-ND	.80	.72	.58	.52	ECS-100-S-4
10.000	18pF	X443-ND	.80	.72	.58	.52	ECS-100-18-4
10.000	Series	X423-ND	.80	.72	.58	.52	ECS-107.3-S-4
11.000	Series	X424-ND	.80	.72	.58	.52	ECS-110-S-4
11.0592	Series	X425-ND	.80	.72	.58	.52	ECS-110.5-S-4
11.0592	20pF	X426-ND	.80	.72	.58	.52	ECS-110.5-20-4

Frequency (MHz)	Load Cap.	Digi-Key Part No.	Price Each			ECS Part No.
			1	10	100	
11.0592	32pF	X170-ND	.80	.72	.58	.52
11.520	Series	X171-ND	.80	.72	.58	.52
11.98135	Series	X427-ND	.80	.72	.58	.52
12.000	20pF	X227-ND	.80	.72	.58	.52
12.000	32pF	X172-ND	.80	.72	.58	.52
12.000	Series	X428-ND	.80	.72	.58	.52
12.000393	18pF	X173-ND	.80	.72	.58	.52
12.096	Series	X429-ND	.80	.72	.58	.52
12.288	20pF	X228-ND	.80	.72	.58	.52
12.288	Series	X174-ND	.80	.72	.58	.52
12.960	18pF	X097-ND	1.04	.87	.69	.54
14.31818	Series	X430-ND	.80	.72	.58	.52
14.31818	20pF	X444-ND	.80	.72	.58	.52
14.7456	Series	X431-ND	.80	.72	.58	.52
14.7456	20pF	X175-ND	.80	.72	.58	.52
15.000	Series	X432-ND	.80	.72	.58	.52
15.360	20pF	X099-ND	1.04	.87	.69	.54
16.000	Series	X433-ND	.80	.72	.58	.52
16.000	20pF	X176-ND	.80	.72	.58	.52
16.000312	18pF	X177-ND	.80	.72	.58	.52
16.257	20pF	X039-ND	1.04	.87	.69	.54
16.257	Series	X434-ND	.80	.72	.58	.52
18.000	Series	X435-ND	.80	.72	.58	.52
18.000	20pF	X178-ND	.80	.72	.58	.52
18.432	Series	X436-ND	.80	.72	.58	.52
18.432	18pF	X179-ND	.80	.72	.58	.52
18.432	20pF	X180-ND	.80	.72	.58	.52
19.6608	Series	X437-ND	.80	.72	.58	.52
19.6608	20pF	X181-ND	.80	.72	.58	.52
20.000	Series	X438-ND	.80	.72	.58	.52
20.000	20pF	X439-ND	.80	.72	.58	.52
21.47727	Series	X044-ND	1.04	.87	.69	.54
22.1184	Series	X182-ND	.80	.72	.58	.52
24.000	Series	X440-ND	.80	.72	.58	.52
24.000	16pF	X441-ND	.80	.72	.58	.52
24.000	20pF	X442-ND	.80	.72	.58	.52
24.00014	18pF	X183-ND	.80	.72	.58	.52
20.480	20pF	X229-ND	.80	.72	.58	.52
24.576	20pF	X230-ND	.80	.72	.58	.52
25.000	18pF	X231-ND	.80	.72	.58	.52
<i>HC-49/US Industrial Temperature Range</i>						
3.579545	17pF	X184-ND	.98	.88	.71	.63
3.6864	20pF	X185-ND	.98	.88	.71	.63
4.000	20pF	X186-ND	.98	.88	.71	.63
6.000	32pF	X187-ND	.98	.88	.71	.63
7.3728	20pF	X188-ND	.98	.88	.71	.63
8.000	18pF	X189-ND	.98	.88	.71	.63
12.000	20pF	X190-ND	.98	.88	.71	.63
14.31818	20pF	X191-ND	.98	.88	.71	.63
16.000	20pF	X192-ND	.98	.88	.71	.63
18.432	20pF	X193-ND	.98	.88	.71	.63
19.6608	20pF	X194-ND	.98	.88	.71	.63
20.000	20pF	X195-ND	.98	.88	.71	.63
24.000	20pF	X196-ND	.98	.88	.71	.63
<i>HC-33</i>						
2.4576	Series	X043-ND	6.34	5.27	4.20	3.24
2.94912	32pF	X014-ND	1.37	1.14	.91	.70
3.000	32pF	X048-ND	4.39	3.65	2.91	2.25
<i>HC-6/U</i>						
2.560	32pF	X003-ND	1.24	1.03	.82	.64
3.640	32pF	X008-ND	1.24	1.03	.82	.64
3.700	32pF	X012-ND	1.24	1.03	.82	.64
4.433	32pF	X034-ND	1.24	1.03	.82	.64
Base Insulator		HC49INS-ND	—	.09	.08	.06
						700-9001

Quartz Crystals – 32.768KHz and 1.000MHz

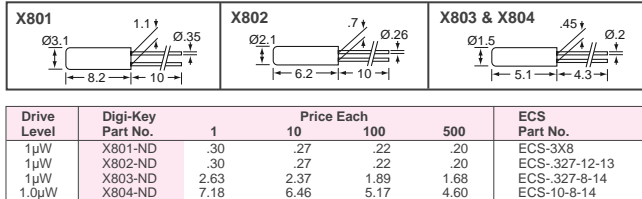
Parabolic Temperature Curve

To determine frequency stability, use parabolic curvature. For example: What is the stability at 45°C?
 (1) Change in T (°C) = 45 - 25 = 20°C
 (2) Change in frequency = 0.04 PPM x (ΔT)²
 = 0.04 PPM x (20)²
 = -16.0 PPM



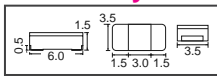
Cylinder Type

	X801-ND	X802-ND	X803-ND	X804-ND
Frequency	32.768KHz	32.768KHz	32.768KHz	1.000MHz
Frequency Tolerance @ 25°C	±20ppm	±20ppm	±20ppm	±3000ppm
Load Capacitance	12.5pF	12.5pF	8.0pF	8.0pF
Equivalent Series Resistance	35K Ohm	35K Ohm	40K Ohm	3K Ohm
Shunt Capacitance	1.6pF Typ.	1.35pF Typ.	1.00pF Typ.	0.4pF Typ.
Operating Temperature Range	-10°C to +60°C	-10°C to +60°C	-10°C to +60°C	-10°C to +60°C
Storage Temperature Range	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-30°C to +70°C



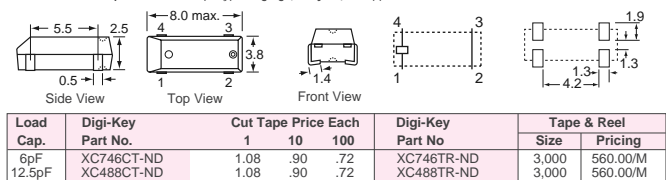
SMT Ultra-Low Profile Quartz Crystals

ELECTRICAL CHARACTERISTICS: • Mode: Fundamental • Drive Level: 1.0µW • Frequency Tolerance: ±50 ppm@25°C and over operating temp. range • Frequency Stability: ±50 ppm • Operating Temp. Range: -10°C to +70°C



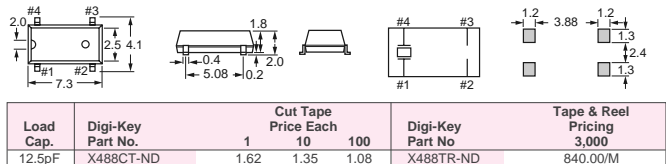
ECX-306 Series — SMT

Specifications: • Frequency: 32.768KHz • Frequency Tolerance @ 25°C: ±20ppm • Equivalent Series Resistance: 50KΩ max. • Shunt Capacitance: 1.3pF typ. • Drive Level: 1µW max. • Calibration Tolerance: ±20 ppm @ 25°C • Temperature Coefficient: -0.040 ppm/°C max. • Operating Temperature Range: -40°C to +85°C Max. • Storage Temperature Range: -55°C to +125°C • Q Factor: 50,000 min. • Turnover Temperature: +25°C (±5°C) • Insulation Resistance: 500MΩ min./DC 100V • Motional Capacitance: 0.003pF typ. • Aging (first year): ±3 ppm max. @ +25°C



ECX-3TA Series — SMT

Specifications: • Frequency: 32.768KHz • Freq. Tolerance @ 25°C: ±20ppm • Equivalent Series Resistance: 50KΩ max. • Shunt Capacitance: 2.0pF typ. • Operating Temperature Range: -40°C to +85°C • Storage Temp. Range: -55°C to +125°C



Frequency (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			ECS Part No.
			1	10	100	
15.000	Series	XC801CT-ND	3.91	3.56	3.16	ECS-150-S-15
18.000	Series	XC804CT-ND	3.91	3.56	3.16	ECS-180-S-15
24.000	Series	XC808CT-ND	3.91	3.56	3.16	ECS-240-S-1

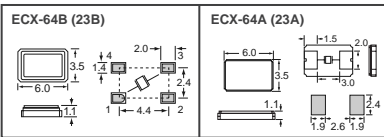


SMT Low Profile Quartz Crystals

ECX-64 1.1mm

ELECTRICAL CHARACTERISTICS:

- **Freq. Tolerance:** ±50ppm @ +25°C and over operating temp. range • **Shunt Capacitance:** 7.0pF • **Drive Level:** 0.1mW • **Operating Temp.:** -40°C to +70°C • **Storage Temp.:** -40°C to +85°C • **Aging Characteristics (first year):** ±2.0 ppm @ 25°C • **Max. ESR:** 40Ω • **Mode of Operation:** Fundamental



Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
ECX-64B								
14.31818	20pF	XC809CT-ND	3.75	3.38	2.82	XC809TR-ND	1875.00	ECS-143-20-23B-TR
14.31818	Series	XC810CT-ND	3.75	3.38	2.82	XC810TR-ND	1875.00	ECS-143-S-23B-TR
14.7456	20pF	XC811CT-ND	3.75	3.38	2.82	XC811TR-ND	1875.00	ECS-147-20-23B-TR
16.000	20pF	XC812CT-ND	3.75	3.38	2.82	XC812TR-ND	1875.00	ECS-160-20-23B-TR
16.000	Series	XC813CT-ND	3.75	3.38	2.82	XC813TR-ND	1875.00	ECS-160-S-23B-TR

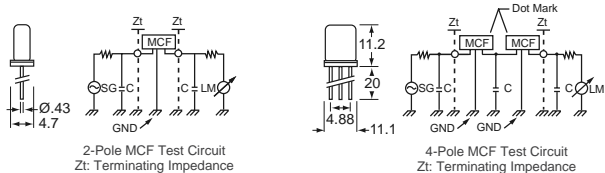
Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			T&R Digi-Key Part No.	Pricing 1,000	ECS Part No.
			1	10	100			
18.432	20pF	XC814CT-ND	3.75	3.38	2.82	XC814TR-ND	1875.00	ECS-184-20-23B-TR
18.432	Series	XC815CT-ND	3.75	3.38	2.82	XC815TR-ND	1875.00	ECS-184-S-23B-TR
19.608	20pF	XC816CT-ND	3.75	3.38	2.82	XC816TR-ND	1875.00	ECS-196-20-23B-TR
19.608	Series	XC817CT-ND	3.75	3.38	2.82	XC817TR-ND	1875.00	ECS-196-S-23B-TR
20.000	20pF	XC818CT-ND	3.75	3.38	2.82	XC818TR-ND	1875.00	ECS-200-20-23B-TR
20.000	Series	XC819CT-ND	3.75	3.38	2.82	XC819TR-ND	1875.00	ECS-200-S-23B-TR
24.000	Series	XC820CT-ND	3.75	3.38	2.82	XC820TR-ND	1875.00	ECS-240-S-23B-TR

Freq. (MHz)	Load Cap.	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T&R Pricing 1,000	ECS Part No.
			1	10	100			
ECX-64A								
14.31818	20pF	XC821CT-ND	3.30	2.97	2.48	XC821TR-ND	1650.00	ECS-143-20-23A-TR
14.31818	Series	XC822CT-ND	3.30	2.97	2.48	XC822TR-ND	1650.00	ECS-143-S-23A-TR
14.7456	20pF	XC823CT-ND	3.30	2.97	2.48	XC823TR-ND	1650.00	ECS-147-20-23A-TR
16.000	20pF	XC824CT-ND	3.30	2.97	2.48	XC824TR-ND	1650.00	ECS-160-20-23A-TR
16.000	Series	XC825CT-ND	3.30	2.97	2.48	XC825TR-ND	1650.00	ECS-160-S-23A-TR
18.432	20pF	XC826CT-ND	3.30	2.97	2.48	XC826TR-ND	1650.00	ECS-184-20-23A-TR
18.432	Series	XC827CT-ND	3.30	2.97	2.48	XC827TR-ND	1650.00	ECS-184-S-23A-TR
19.608	20pF	XC828CT-ND	3.30	2.97	2.48	XC828TR-ND	1650.00	ECS-196-20-23A-TR
19.608	Series	XC829CT-ND	3.30	2.97	2.48	XC829TR-ND	1650.00	ECS-196-S-23A-TR
20.000	20pF	XC830CT-ND	3.30	2.97	2.48	XC830TR-ND	1650.00	ECS-200-20-23A-TR
20.000	Series	XC831CT-ND	3.30	2.97	2.48	XC831TR-ND	1650.00	ECS-200-S-23A-TR
24.000	Series	XC832CT-ND	3.30	2.97	2.48	XC832TR-ND	1650.00	ECS-240-S-23A-TR



Monolithic Crystal Filters - "10.7MHz"

- 12.5KHz Channel Spacing:** • Operating Temp. Range: -20°C to +70°C • Pass Bandwidth: 3dB ±3.75KHz min. • Stop Bandwidth: 20dB ±18KHz for Model 10.7-7.5A; 40dB ±14KHz for Model 10.7-7.5B
- 25KHz Channel Spacing:** • Operating Temp. Range: -20°C to +70°C • Pass Bandwidth: 3dB ±7.5KHz min. • Stop Bandwidth: 18dB ±25KHz for Model 10.7-15A; 40dB ±25KHz for Model 10.7-15B
- 50KHz Channel Spacing:** • Operating Temperature Range: -20°C to +70°C • Pass Bandwidth: 3dB ±15KHz min. • Stop Bandwidth: 15dB ±50KHz for Model 10.7-30A; 30dB ±40KHz for Model 10.7-30B



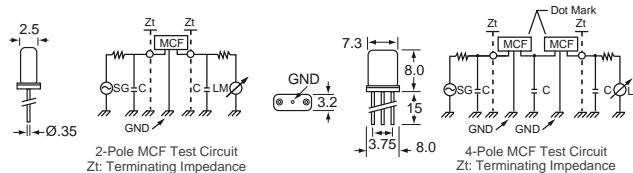
No. of Pole	Ripple (Max.)	Insert. Loss	Term. Impedance OHMS/pf	Digi-Key Part No.	Price Each			ECS Part No.	
					1	100	500		
12.5KHz Channel Spacing									
2	0.5dB	1.5dB	1.8K/5	X701-ND	5.53	4.59	3.66	2.83	ECS-10.7-7.5A
4	1dB	2.5dB	1.8K/4	X702-ND†	12.51	10.40	8.28	6.40	ECS-10.7-7.5B
25KHz Channel Spacing									
2	0.5dB	2.0dB	3K/2	X703-ND	3.41	2.84	2.26	1.75	ECS-10.7-15A
4	1dB	2.5dB	3K/2	X704-ND†	6.66	5.54	4.41	3.41	ECS-10.7-15B
50KHz Channel Spacing									
2	0.5dB	1.5dB	5K/0	X705-ND	4.23	3.51	2.80	2.16	ECS-10.7-30A
4	1dB	2.5dB	5.5K/1	X706-ND†	8.78	7.29	5.81	4.49	ECS-10.7-30B

† Package is HC-49/U x 2



Monolithic Crystal Filters - "21.4MHz"

- 12.5KHz Channel Spacing:** • Operating Temp. Range: -20°C to +70°C • Pass Bandwidth: 3dB ±3.75KHz min. • Stop Bandwidth: 18dB ±12.5KHz for Model 21K-7.5A; 35dB ±12.5KHz for Model 21K7.5B
- 25KHz Channel Spacing:** • Operating Temperature Range: -20°C to +70°C • Pass Bandwidth: 3dB ±7.5KHz min. • Stop Bandwidth: 18dB ±25KHz for Model 21K15A; 40dB ±25KHz for Model 21K15B
- 50KHz Channel Spacing:** • Operating Temperature Range: -20°C to +70°C • Pass Bandwidth: 3dB ±15KHz min. • Stop Bandwidth: 15dB ±45KHz for Model 21K30A; 40dB ±50KHz for Model 21K30B



No. of Pole	Ripple (Max.)	Insert. Loss	Term. Impedance OHMS/pf	Digi-Key Part No.	Price Each			ECS Part No.	
					1	100	500		
12.5KHz Channel Spacing									
2	0.5dB	2.0dB	1.5K/6	X707-ND	4.39	3.65	2.91	2.25	ECS-21K7.5A
4	1dB	2.5dB	850/5	X708-ND†	10.24	8.51	6.78	5.23	ECS-21K7.5B
25KHz Channel Spacing									
2	0.5dB	1.5dB	1.5K/3	X709-ND	4.39	3.65	2.91	2.25	ECS-21K15A
4	1dB	2.5dB	1.5K/2	X710-ND†	10.24	8.51	6.78	5.23	ECS-21K15B
50KHz Channel Spacing									
2	0.5dB	1.5dB	1.5K/1	X711-ND	4.39	3.65	2.91	2.25	ECS-21K30A
4	1dB	2.5dB	1.8K/0.5	X712-ND†	10.24	8.51	6.78	5.23	ECS-21K30B

† Package is UM-1 x 2



SMD Monolithic Crystal Filters

No. of Pole	Term. Impedance OHMS/pf	Digi-Key Part No.	Cut Tape Price Each			T & R Pricing 1,000	ECS Part No.
			1	10	100		
2	1500/2.5	X713CT-ND	21.94	18.23	14.52	X713TR-ND	5950.00
2	1100/0	X714CT-ND	27.30	22.68	18.06	X714TR-ND	7350.00

21.4MHz

- Ripple: 1dB max.
- Insertion Loss: 2.5dB
- Operating Temperature: -30°C to +85°C
- Fo: 21.4MHz
- Pass Bandwidth: 3dB ±7.5KHz min.
- Stop Bandwidth: 10dB ±25KHz

45MHz

- Ripple: 1dB max.
- Insertion Loss: 3dB
- Operating Temp.: -30°C to +85°C
- Fo: 45.0MHz
- Pass Bandwidth: 3dB ±15KHz min.
- Stop Bandwidth: 15dB ±60KHz



Ceramic Resonators

ZTT and SR1-B Series:

- Frequency Accuracy: ±0.5%
- Stability in Temperature: -20°C to +80°C, ±0.3%
- Aging for Ten Years: ±0.3%
- Built-in Capacitance: 30pF ±20%

ZTA, ZTB and SR1-A Series:

- Frequency Accuracy: ±0.5%
- Stability in Temperature: -20°C to +80°C, ±0.3%
- Aging for Ten Years: ±0.5%
- Operating Temperature: -20°C to +80°C

Series	Fig.	Frequency	Digi-Key Part No.	Price Each			ECS Part No.
				1	10	100	
ZTT Series with Caps	1	3.58MHz	X901-ND	.68	.57	.45	ZTT-3.58MG
		4.00MHz	X902-ND	.68	.57	.45	ZTT-4.00MG
		4.19MHz	X903-ND	.81	.68	.54	ZTT-4.19MG
		6.00MHz	X904-ND	.68	.57	.45	ZTT-6.00MT
		8.00MHz	X905-ND	.68	.57	.45	ZTT-8.00MT
		10.00MHz	X906-ND	.70	.59	.47	ZTT-10.00MT
		12.00MHz	X907-ND	.81	.68	.54	ZTT-12.00MT
		16.00MHz	X908-ND	.81	.68	.54	ZTT-16.00MX
		20.00MHz	X909-ND	.81	.68	.54	ZTT-20.00MX
		ZTA Series without Caps	3	3.58MHz	X910-ND	.54	.45
4.00MHz	X911-ND			.54	.45	.36	ZTA-4.00MG
4.19MHz	X912-ND			.68	.57	.45	ZTA-4.19MG
6.00MHz	X913-ND			.54	.45	.36	ZTA-6.00MT
8.00MHz	X914-ND			.59	.50	.40	ZTA-8.00MT
10.00MHz	X915-ND			.59	.50	.40	ZTA-10.00MT
12.00MHz	X916-ND			.68	.57	.45	ZTA-12.00MT
16.00MHz	X917-ND			.68	.57	.45	ZTA-16.00MX011
20.00MHz	X918-ND			.68	.57	.45	ZTA-20.00MX011
ZTB Series without Caps	4			200KHz	X919-ND	.84	.70
		400KHz	X920-ND	.68	.57	.45	ZTB400D
		455KHz	X921-ND	.68	.57	.45	ZTB455E
		500KHz	X922-ND	.68	.57	.45	ZTB500E
		540KHz	X923-ND	.68	.57	.45	ZTB540P
		640KHz	X924-ND	.68	.57	.45	ZTB640P
		800KHz	X925-ND	.68	.57	.45	ZTB800J
		800KHz	X926-ND	.68	.57	.45	ZTB1000J

Fig. 1

Dim. in () is for Freq. Range 3.58-4.19

Fig. 2

Fig. 3

Fig. 4

Frequency Range	Dimensions					
	W	T	H	P	L	R
200	13.5	3.8	14.7	10.0	8.0	8.0
400	7.9	3.6	9.3	5.0	4.0	4.0
455-640	7.0	3.5	9.0	5.0	4.0	4.0
800-1000	5.2	2.8	6.0	2.5	3.5	3.5

ECS-SR1 Series

SR1-A

SR1-B

Series	Fig.	Freq.	Internal Cap. C1 & C2	Digi-Key Part No.	Cut Tape Price Each			Digi-Key Part No.	T & R Pricing 2,500	ECS Part No.
					1	10	100			
ECS-SR1-A Series	1	3.58	—	X932CT-ND	.70	.60	.47	X932TR-ND	280.00M	ECS-SR1-3.58-A
		4.000	—	X933CT-ND	.70	.60	.47	X933TR-ND	280.00M	ECS-SR1-4.00-A
		4.19	—	X934CT-ND	.70	.60	.47	X934TR-ND	280.00M	ECS-SR1-4.19-A
		6.000	—	X935CT-ND	.70	.60	.47	X935TR-ND	280.00M	ECS-SR1-6.00-A
		8.000	—	X936CT-ND	.70	.60	.47	X936TR-ND	280.00M	ECS-SR1-8.00-A
ECS-SR1-B Series	2	3.58	30 pF	X927CT-ND	.77	.66	.52	X927TR-ND	308.00M	ECS-SR1-3.58-B
		4.000	30 pF	X928CT-ND	.77	.66	.52	X928TR-ND	308.00M	ECS-SR1-4.00-B
		4.19	30 pF	X929CT-ND	.77	.66	.52	X929TR-ND	308.00M	ECS-SR1-4.19-B
		6.000	30 pF	X930CT-ND	.77	.66	.52	X930TR-ND	308.00M	ECS-SR1-6.00-B
		8.000	30 pF	X931CT-ND	.77	.66	.52	X931TR-ND	308.00M	ECS-SR1-8.00-B

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