








Quartz Crystals - Selection Criteria

Generic Package Type			Series Type	Frequency Range
HC-49/U package		UMC Series (10.8x5.0x13.0mm)	Through Hole	1.8432 - 160.0 Mhz
HC-49/S Package (low Profile)		LPC Series (ATS-25/U package, 11.5x4.65x3.5mm)	Through Hole	3.5 - 85.0 Mhz
		LPD Series (ATS-49/U package, 11.5x4.65x2.5mm)	Through Hole	3.5 - 85.0 Mhz
		LPE Series (ATS-51/U package, 11.5x4.65x5.0mm)	Through Hole	3.5 - 85.0 Mhz
HC-49/SMD package		LPC3 Series (LPC-3 package, 10.0x5.0x3.2mm)	Surface Mount	3.5 - 85.0 Mhz
		LPC4 Series (LPC-4 package, 10.0x5.0x4.4mm)	Surface Mount	3.5 - 85.0 Mhz
		LPC5 Series (LPC-5 package, 10.0x5.3x5.2mm)	Surface Mount	3.5 - 85.0 Mhz
UM package		UM-1 Series (UM-1 package, 7.9x3.2x8.1mm)	Through Hole	7.0 - 200.00 Mhz
		UM-4 Series (UM-4 package, 7.9x3.2x4.5mm)	Through Hole	7.0 - 200.00 Mhz
		UM-5 Series (UM-5 package, 7.9x3.2x6.0mm)	Through Hole	7.0 - 200.00 Mhz
		UM-6 Series (UM-6 package, 6.3x2.5x4.5mm)	Through Hole	7.0 - 200.00 Mhz
		UM Gull wing packages (UM-1,4 & 5 SMD)		7.0 - 200.00 Mhz
Ceramic SMD package		US6 series (US-6 package, 6.0x3.5x1.2mm)	Surface Mount	8.0 - 125.0 Mhz
		US7 series (US-7 package, 7.0x5.0x1.3mm)	Surface Mount	8.0 - 125.0 Mhz
		US8 series (US-8 package, 5.0x3.2x1.0mm)	Surface Mount	8.0 - 125.0 Mhz
TF-26 & TF-38 cylindrical package		TF26 Series (CH-206 package, 2.0x6.0mm)	Through Hole	3.5 - 66.0 Mhz
		TF38 Series (CH-308 package, 3.0x8.0mm)	Through Hole	3.5 - 66.0 Mhz
Watch Crystal		TF26 Series (CH-206 package, 2.0x6.0mm)	Through Hole	32.768 Khz
		TF38 Series (CH-308 package, 3.0x8.0mm)	Through Hole	32.768 Khz
		TF306 series (CS-306 SMD package, 8.0x3.8x2.54mm)	Surface Mount	32.768 Khz
		TF406 series (CS-406 SMD package, 10.41x4.06x3.6mm)	Surface Mount	32.768 Khz

QUARTZ CRYSTALS

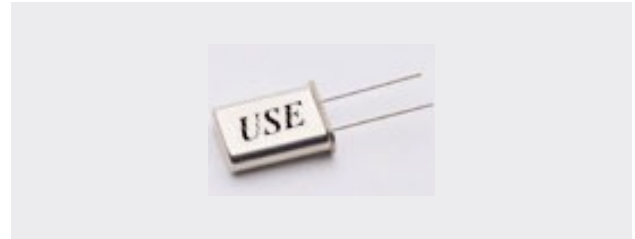
US ELECTRONICS INC.

HC49/U Package Crystals

PH:(314)423-7550

FAX:(314)423-0585

- HC-49/U package
- AT cut available
- Resistance weld seal
- Tape and reel, insulator tab, 3rd lead, and custom lead length options available



Standard Crystals available in HC-49/U case sizes:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
UMC018	1.8432	13	750
UMC020	2.0000	20	300
UMC024	2.4576	32	300
UMC036	3.5795	18	150
UMC037	3.6864	20	150
UMC040	4.0000	20	75
UMC041	4.0000	Series	75
UMC042	4.1943	12	75
UMC049	4.9152	20	75
UMC050	5.0000	20	50
UMC051	5.0000	Series	50
UMC052	5.0688	Series	50
UMC060	6.0000	20	50
UMC061	6.1440	20	50
UMC073	7.3728	Series	45
UMC080	8.0000	Series	45
UMC081	8.0000	20	45
UMC098	9.8304	20	45
UMC100	10.0000	Series	35

Standard Crystals available in HC-49/U case sizes:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
UMC101	10.0000	30	35
UMC107	10.7386	32	35
UMC110	11.0000	18	35
UMC111	11.0592	Series	35
UMC120	12.0000	Series	35
UMC122	12.2880	32	35
UMC143	14.3181	Series	35
UMC147	14.7456	Series	35
UMC150	15.0000	Series	35
UMC160	16.0000	Series	35
UMC184	18.4320	20	35
UMC185	18.4320	Series	35
UMC196	19.6608	Series	35
UMC200	20.0000	Series	35
UMC221	22.1184	Series	35
UMC240	24.0000	Series	35
UMC245	24.5760	Series	35
UMC250	25.0000	Series	35

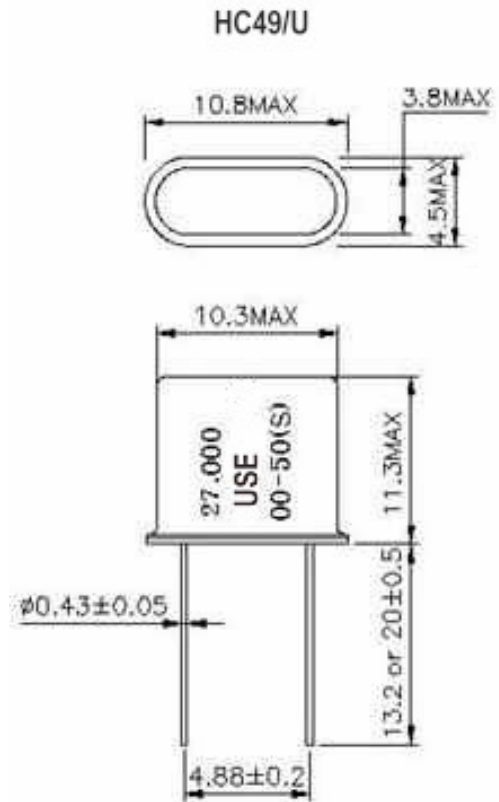
Standard Specifications:	
Frequency Range	1.5 - 160 MHz
Vibration Mode	Fundamental
Frequency Tolerance	+/- 0.005% (50 ppm) @ 25°C
Operating Temp Range and Frequency Stability	+/- 0.005% (50 ppm) over -20°C to 70°C
Shunt Capacitance	7pF maximum
Insulation Resistance	500Meg.Ohms
Aging	+/-5 ppm / year
Case Size	HC-49/U

How To Order: 1. Pick a part# from the standard parts table or pick a frequency with in the range specified in the table above and specify the properties you need from the tables below to configure the part# you need.

2. If you need Insulator, add "I" in the box specified.

3. If you need [Tape & Reel](#), add "TR" in the box specified at the end of the part number.

4. To [Place Order](#) specify part number and quantity required.



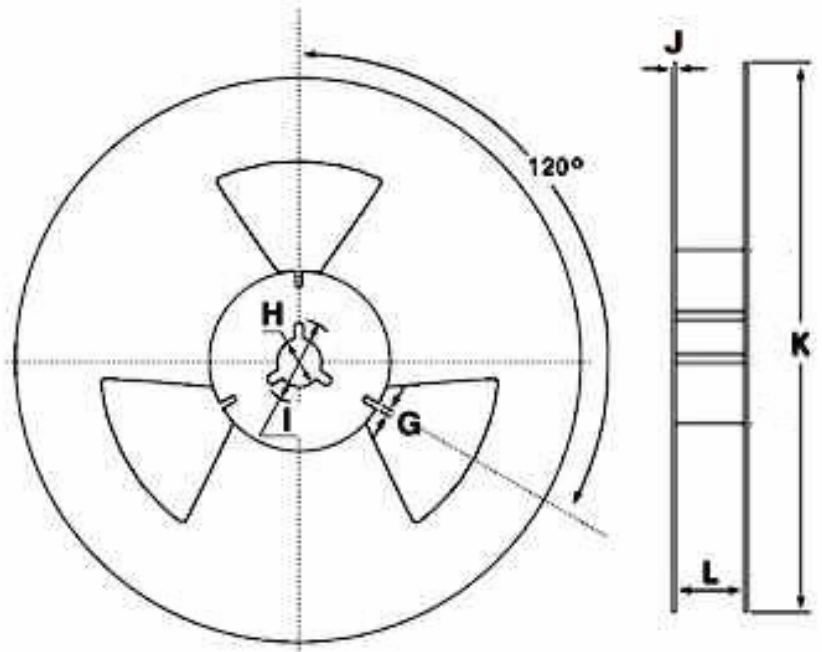
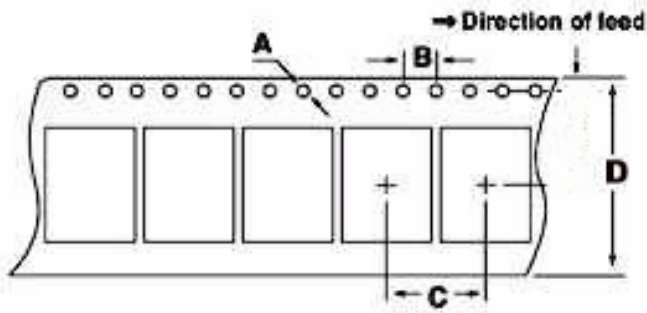
CUSTOM PART NUMBERING SYSTEM

Frequency(MHz)

Insulator

Tape & Reel

TAPE AND REEL SPECIFICATIONS:



TAPE SPECIFICATIONS:(millimeters)

MODEL	A	B	C	D
HC49/U	1.5	4.0	16.0	24.0

REEL SPECIFICATIONS:(millimeters)

MODEL	G	H	I	J	K	L
HC49/U	2.0	13.0	23.0	2.0	330	25.5

QUARTZ CRYSTALS

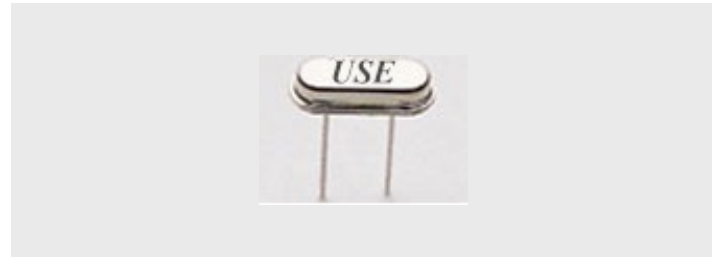
US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

HC49/S Package Crystals

- ATS Holder type package
- AT or BT cut available
- Resistance weld seal
- Tape and reel, insulator tab, 3rd lead, and custom lead length options available
- Tight tolerance / stability



Standard Frequencies for ATS25/U Package:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
LPC036	3.5795	16	180
LPC040	4.0000	20	150
LPC041	4.1943	16	150
LPC049	4.9152	20	120
LPC050	5.0688	20	120
LPC051	5.1850	32	120
LPC060	6.0000	32	100
LPC061	6.1440	20	100
LPC074	7.3728	20	100
LPC080	8.0000	Series	80
LPC081	8.0000	20	80
LPC090	9.0000	Series	80
LPC098	9.8300	20	80
LPC100	10.0000	Series	70
LPC101	10.0000	30	70

Standard Frequencies for ATS25/U Package:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
LPC107	10.7386	32	70
LPC110	11.0592	Series	70
LPC120	12.0000	32	60
LPC122	12.2880	32	60
LPC143	14.3181	Series	60
LPC147	14.7456	Series	60
LPC150	15.0000	Series	60
LPC160	16.0000	20	50
LPC180	18.0000	Series	50
LPC184	18.4320	20	50
LPC185	18.4320	Series	50
LPC196	19.6608	Series	50
LPC200	20.0000	20	40
LPC221	22.1184	Series	40
LPC240	24.0000	Series	40

Standard Specifications:

Frequency Range	3.5 - 85 MHz
Vibration Mode	At cut fundamental and third
Frequency Tolerance	+/- 0.005% (50 ppm) @ 25°C
Operating Temp Range and Frequency Stability	+/- 0.005% (50 ppm) over -20°C to 70°C
Shunt Capacitance	7pF maximum or special
Insulation Resistance	500Meg.Ohms
Aging	+/-5 ppm / year
Package	Resistance weld low profile, ATS25/U , 3.5mm tall

How To Order: 1. Pick a part# from the standard parts table or pick a frequency with in the range specified in the table above and specify the properties you need from the tables below to configure the part# you need.

2. If you need Insulator, add "I" in the box specified.

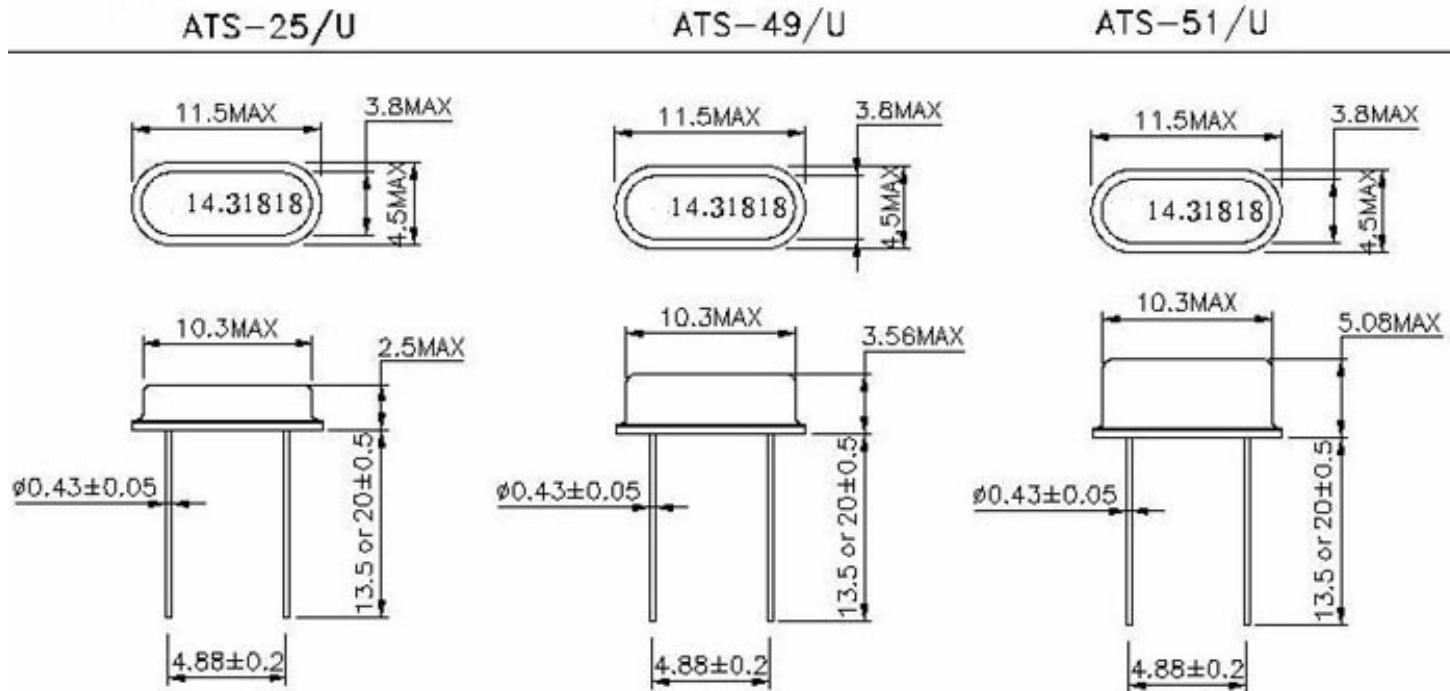
3. If you need [Tape & Reel](#), add "TR" in the box specified at the end of the part number.

4. To [Place Order](#) specify part number and quantity

CUSTOM PART NUMBERING SYSTEM

Frequency(MHz) Insulator Tape & Reel

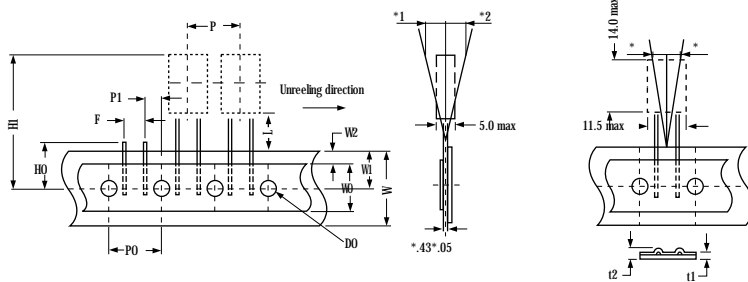
MECHANICAL DIMENSIONS



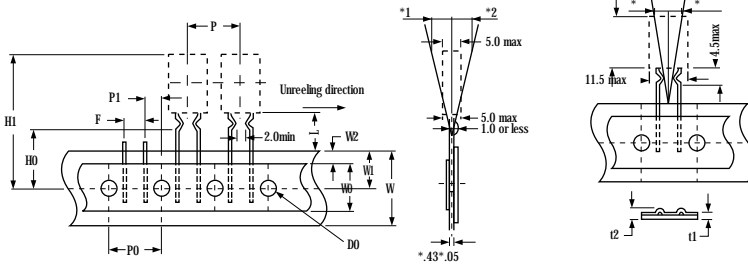
Tape and Reel Specifications For HC-49/S Package (DIP TYPE)

• **Tape specification**

Item 1:

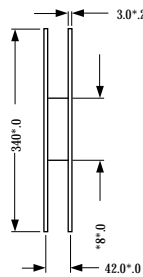
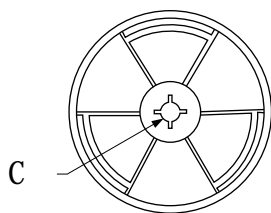


Item 2:

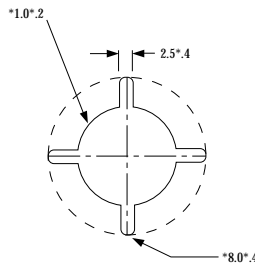


Symbol	Dimension tolerance(mm)	
P	12.7 *1.0	
P0	12.7 *0.3	
P1	3.85 *0.7	
F	5.0 *0.8	
W	18.0 + 1.0 / -0.5	
W0	12.5 or more	
W1	9.0 + 0.75 / -0.5	
W2	3.0 or less	
D0	4.0 *0.2	
L	9.5 or more	
t1	0.6 *0.3	
t2	1.5 or less	
*1	2.0 or less	
*2	2.0 or less	
*	2.0 or less	
H0		16.0 *0.5
H1	34.46 or less	

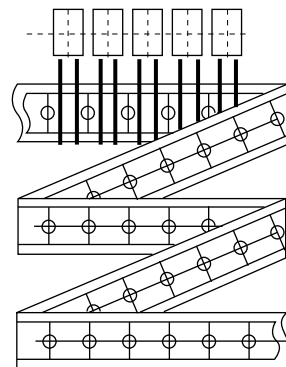
• **Reel specification**



C ENLARGE



• **TAPE ARRANGE**



QUARTZ CRYSTALS

US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

HC49/SMD Package Crystals

- o ATS SMD type package
- o AT or BT cut available
- o Resistance weld seal
- o Tape and reel available
- o Tight tolerance / stability



Standard Frequencies for LPC-3 Package:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
LPC3036	3.5795	16	180
LPC3040	4.0000	20	150
LPC3041	4.1943	16	150
LPC3049	4.9152	20	120
LPC3050	5.0688	20	120
LPC3051	5.1850	32	120
LPC3060	6.0000	32	100
LPC3061	6.1440	20	100
LPC3074	7.3728	20	100
LPC3080	8.0000	Series	80
LPC3081	8.0000	20	80
LPC3090	9.0000	Series	80
LPC3098	9.8300	20	80
LPC3100	10.0000	Series	70
LPC3101	10.0000	30	70

Standard Frequencies for LPC-3 Package:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
LPC3107	10.7386	32	70
LPC3110	11.0592	Series	70
LPC3120	12.0000	32	60
LPC3122	12.2880	32	60
LPC3143	14.3181	Series	60
LPC3147	14.7456	Series	60
LPC3150	15.0000	Series	60
LPC3160	16.0000	20	50
LPC3180	18.0000	Series	50
LPC3184	18.4320	20	50
LPC3185	18.4320	Series	50
LPC3196	19.6608	Series	50
LPC3200	20.0000	20	40
LPC3221	22.1184	Series	40
LPC3240	24.0000	Series	40

Standard Specifications:

Frequency Range	3.5 - 85 MHz
Vibration Mode	AT Cut Fundamental and third
Frequency Tolerance	+/- 0.005% (50 ppm) @ 25°C
Operating Temp Range and Frequency Stability	+/- 0.005% (50 ppm) over -20°C to 70°C
Shunt Capacitance	7pF maximum or special
Insulation Resistance	500Meg.Ohms
Aging	+/- 5 ppm / year
Package	Resistance weld low profile, HC-49/SMT, 3.2mx height

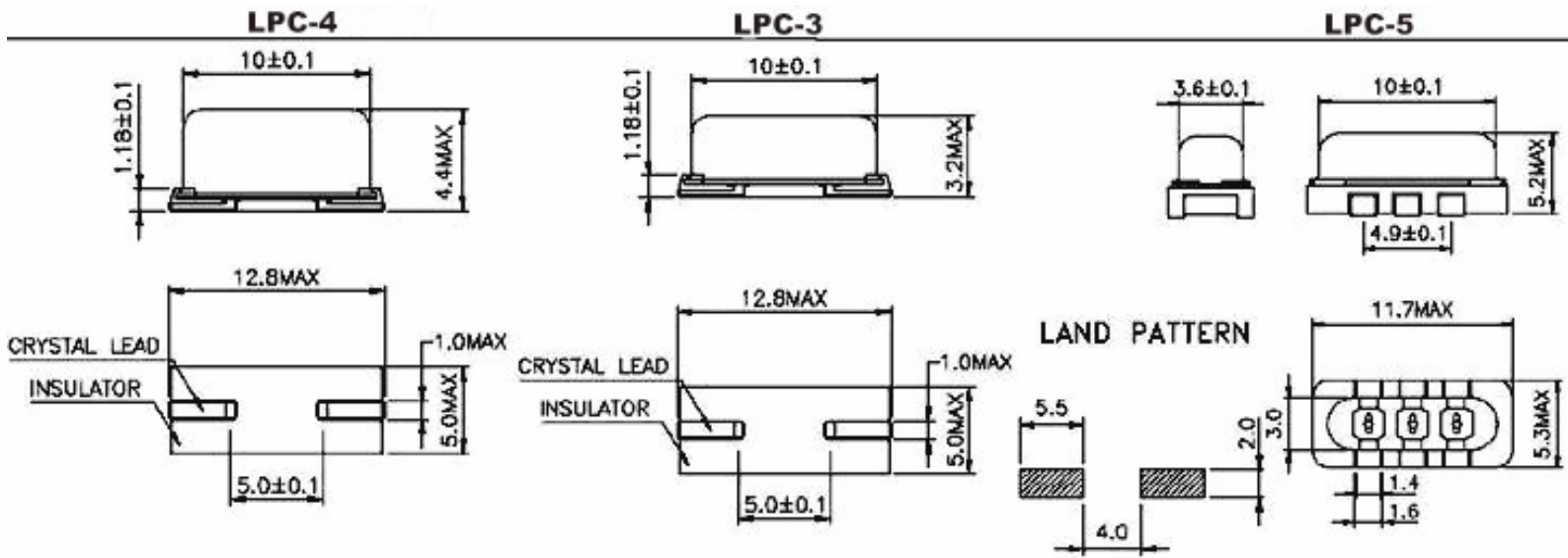
How To Order: 1. Pick a part# from the standard parts table or pick a frequency with in the range specified in the table above and specify the properties you need from the tables below to configure the part# you need.

2. If you need Insulator, add "I" in the box specified.

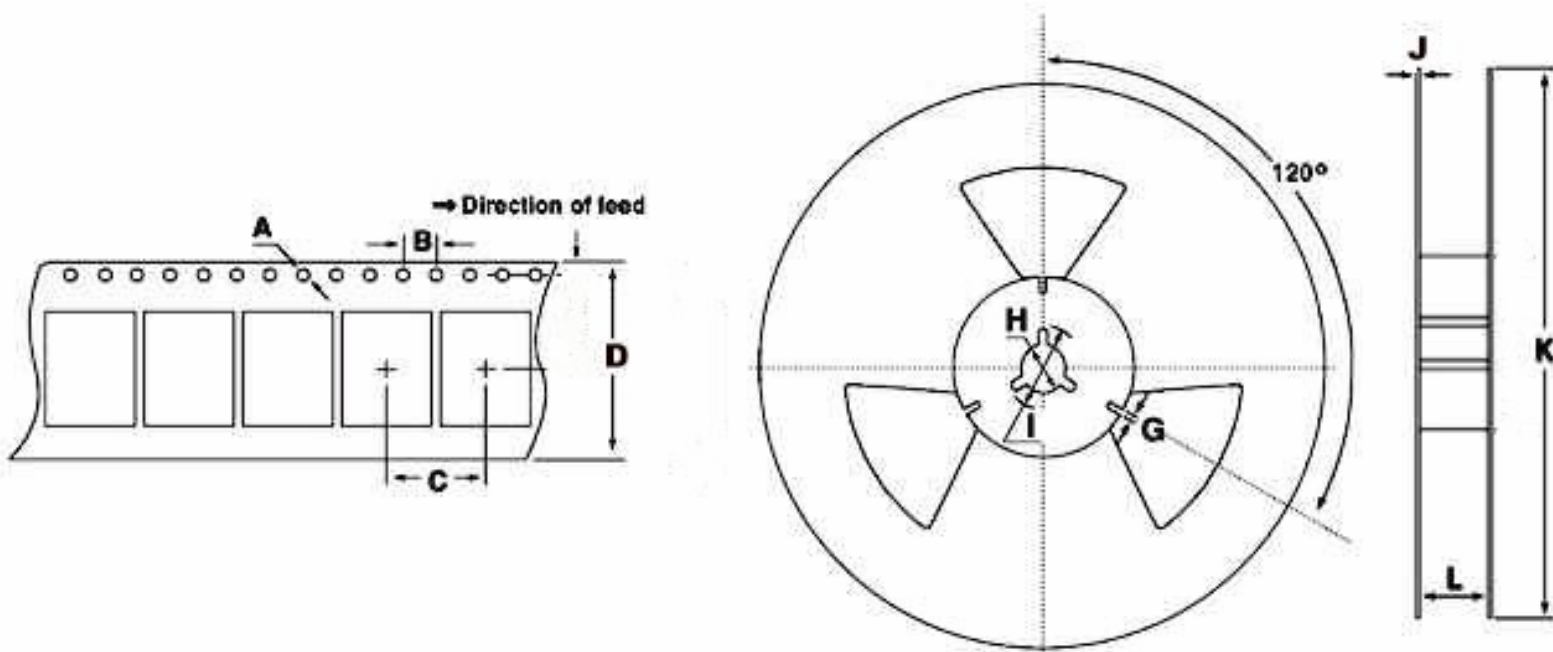
3. If you need [Tape & Reel](#), add "TR" in the box specified at the end of the part number.

4.To [Place Order](#) specify part number and quantity required.

MECHANICAL DRAWING:



TAPE AND REEL SPECIFICATIONS:



TAPE SPECIFICATIONS:(millimeters)

MODEL	A	B	C	D
LPC3	1.5	4.0	12.0	24.0
LPC4	1.5	4.0	12.0	24.0
LPC5	1.5	4.0	12.0	24.0

REEL SPECIFICATIONS:(millimeters)

MODEL	G	H	I	J	K	L
LPC3	2.0	13.0	23.0	2.0	330	25.5
LPC4	2.0	13.0	23.0	2.0	330	25.5
LPC5	2.0	13.0	23.0	2.0	330	25.5

QUARTZ CRYSTALS

US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

UM Package Crystals

- UM type Package
- AT cut available
- Tight tolerance / stability
- Wide temperature range
- Frequencies to 200.000MHz available



Standard Specifications:	
Frequency Range	3.5 - 200 MHz
Vibration Mode	Fundamental , third and fifth
Frequency Tolerance	+/- 0.005% (50 ppm) @ 25°C
Operating Temp Range and Frequency Stability	+/- 0.005% (50 ppm) over -20°C to 70°C
Series Resistance	See table below
Shunt Capacitance	7pF maximum or special
Load Capacitance	See How to Order Section
Insulation Resistance	500Meg.Ohms
Aging	+/-1 or 3 or 5 ppm / year
Package	Resistance weld

Equivalent Series Resistance (ESR)			
Frequency Range (MHz)	ESR (Ohms Max)	Mode of Oscillation	Package
7.000 ~ 9.999	80	Fundamental	UM-1
10.000 ~ 15.999	60	Fundamental	UM-1/UM-5/UM-4 (TR-6)
16.000 ~ 60.000	30/40/50	Fundamental	UM-1/UM-5/UM-4 (TR-6)
30.000 ~ 79.999	80/80	3rd Overtone	UM-1/UM-5
80.000 ~ 150.000	80/80/80	3rd Overtone	UM-1/UM-5/UM-4 (TR-6)
80.000 ~ 200.000	100/100	5th Overtone	UM-1/UM-5

How To Order: 1. Pick a part# from the standard parts table or pick a frequency with in the range specified in the table above and specify the properties you need from the tables below to configure the part# you need.

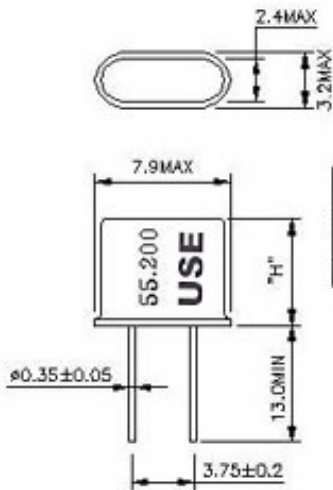
2. If you need Insulator "I" or Gullwing "G" specify it after frequency at the end of part number.

3. If you need [Tape & Reel](#), for the UM-1 case style, add "TR" at the end of the part number.

4.To [Place Order](#) specify part number and quantity required.

MECHANICAL DIMENSIONS

UM-1, 5, 4

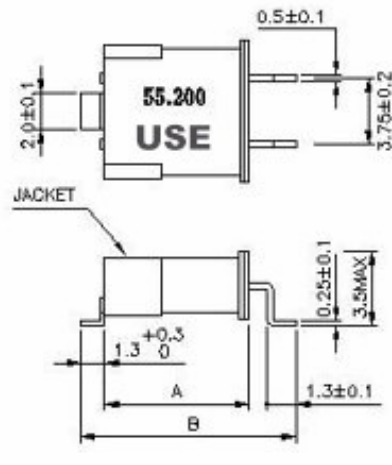


TYPE	SIZE "H" (mm MAX)
UM-1	8.1
UM-5	6.0
UM-4	4.5

TR-6

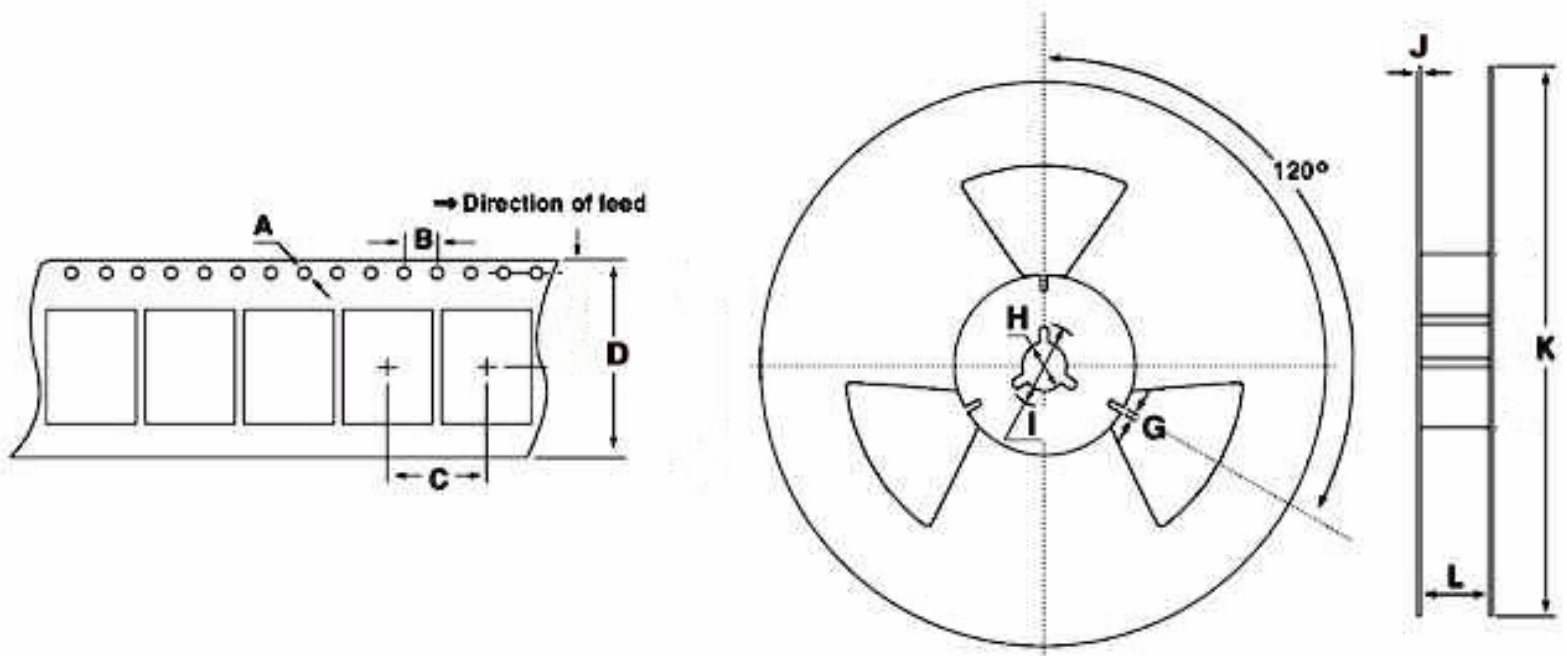


UM GULL WING



TYPE	DIMENSION (mm MAX)	
	A	B
UM-1	8.1	12.75
UM-5	5.8	10.55
UM-4	4.7	9.45

TAPE AND REEL SPECIFICATIONS:



TAPE SPECIFICATIONS:(millimeters)

MODEL	A	B	C	D
UM1	1.5	4.0	12.0	24.0
UM5	1.5	4.0	12.0	24.0
UM4	1.5	4.0	12.0	24.0

REEL SPECIFICATIONS:(millimeters)

MODEL	G	H	I	J	K	L
UM1	2.0	13.0	23.0	2.0	330	25.5
UM5	2.0	10.8	23.0	2.0	330	25.5
UM4	2.0	9.7	23.0	2.0	330	25.5

QUARTZ CRYSTALS

Ceramic SMD Crystal

US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

- Four pad ceramic surface mount package
- AT cut
- Tight tolerance / stability
- Using highly reliable seam weld method
- Tape and reel available, automatic mountable



Standard Frequencies for US7050 Package:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
US7-080	8.0000	Series	70
US7-081	8.0000	20	70
US7-090	9.0000	Series	70
US7-098	9.8300	20	80
US7-100	10.0000	Series	70
US7-101	10.0000	30	70
US7-107	10.7386	32	70
US7-110	11.0592	Series	70
US7-120	12.0000	32	60
US7-122	12.2880	32	60
US7-143	14.3181	Series	60

Standard Frequencies for US7050 Package:

USE Part #	Frequency (MHz)	Load cap.	Max.ESR
US7-147	14.7456	Series	60
US7-150	15.0000	Series	60
US7-160	16.0000	20	50
US7-180	18.0000	Series	50
US7-184	18.4320	20	50
US7-185	18.4320	Series	50
US7-196	19.6608	Series	50
US7-200	20.0000	20	40
US7-221	22.1184	Series	40
US7-240	24.0000	Series	40

Standard Specifications:

Frequency Range	8.0 - 160 MHz
Vibration Mode	AT Cut Fundamental and third
Frequency Tolerance	+/- 0.005% (50 ppm) @ 25°C
Operating Temp Range and Frequency Stability	+/- 0.005% (50 ppm) over -20°C to 70°C
Shunt Capacitance	7pF maximum or special
Insulation Resistance	500Meg.Ohms
Aging	+/- 5 ppm / year
Package	Resistance weld low profile, 7.0x5.0x1.3mm SMD package

How To Order: 1. Pick a part# from the standard parts table or pick a frequency with in the range specified in the table above and specify the properties you need from the tables below to configure the part# you need.

2. If you need [Tape & Reel](#), add "TR" in the box specified at the end of the part number.

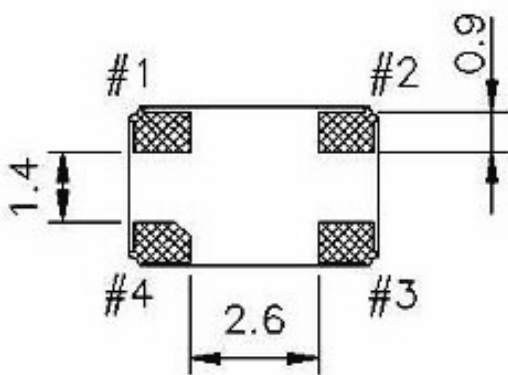
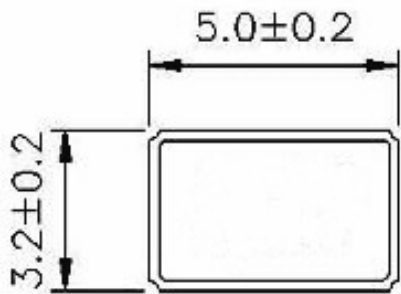
3.To [Place Order](#) specify part number and quantity.

CUSTOM PART NUMBERING SYSTEM

Frequency(MHz)

Tape & Reel

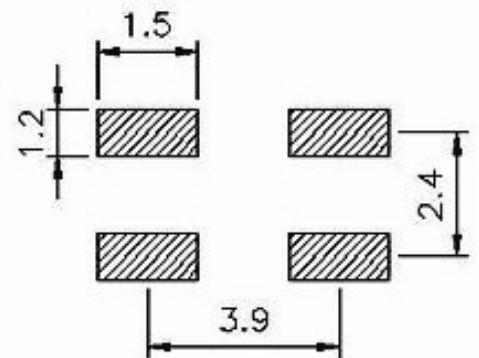
MECHANICAL DRAWING - S5032



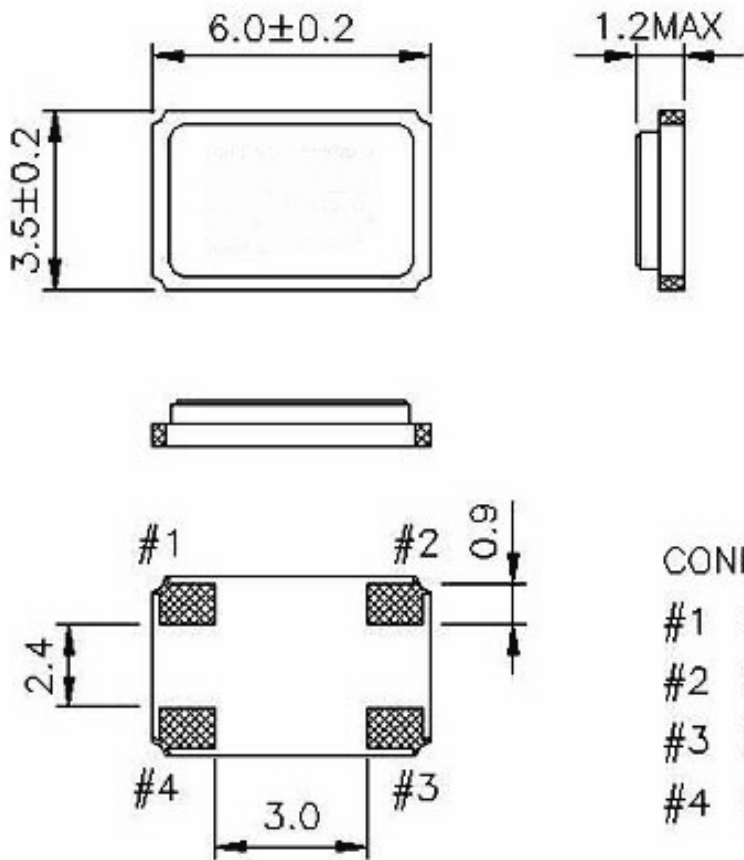
CONNECTION

- #1 X-TAL
- #2 GND
- #3 X-TAL
- #4 GND

LAND PATTERN

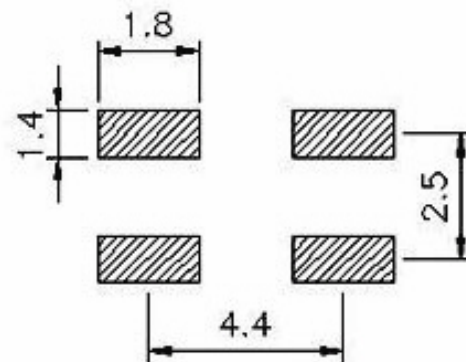


Ceramic SMD
MECHANICAL DRAWING - S6035

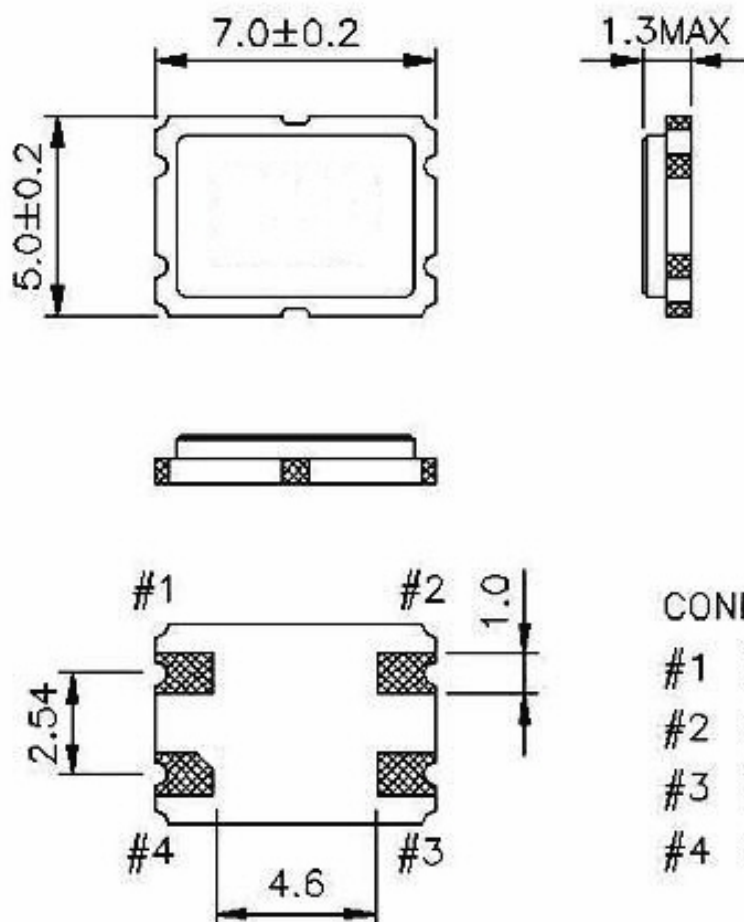


CONNECTION
 #1 X-TAL
 #2 GND
 #3 X-TAL
 #4 GND

LAND PATTERN

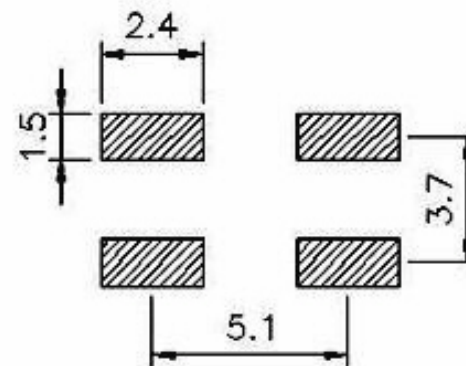


MECHANICAL DRAWING - S7050

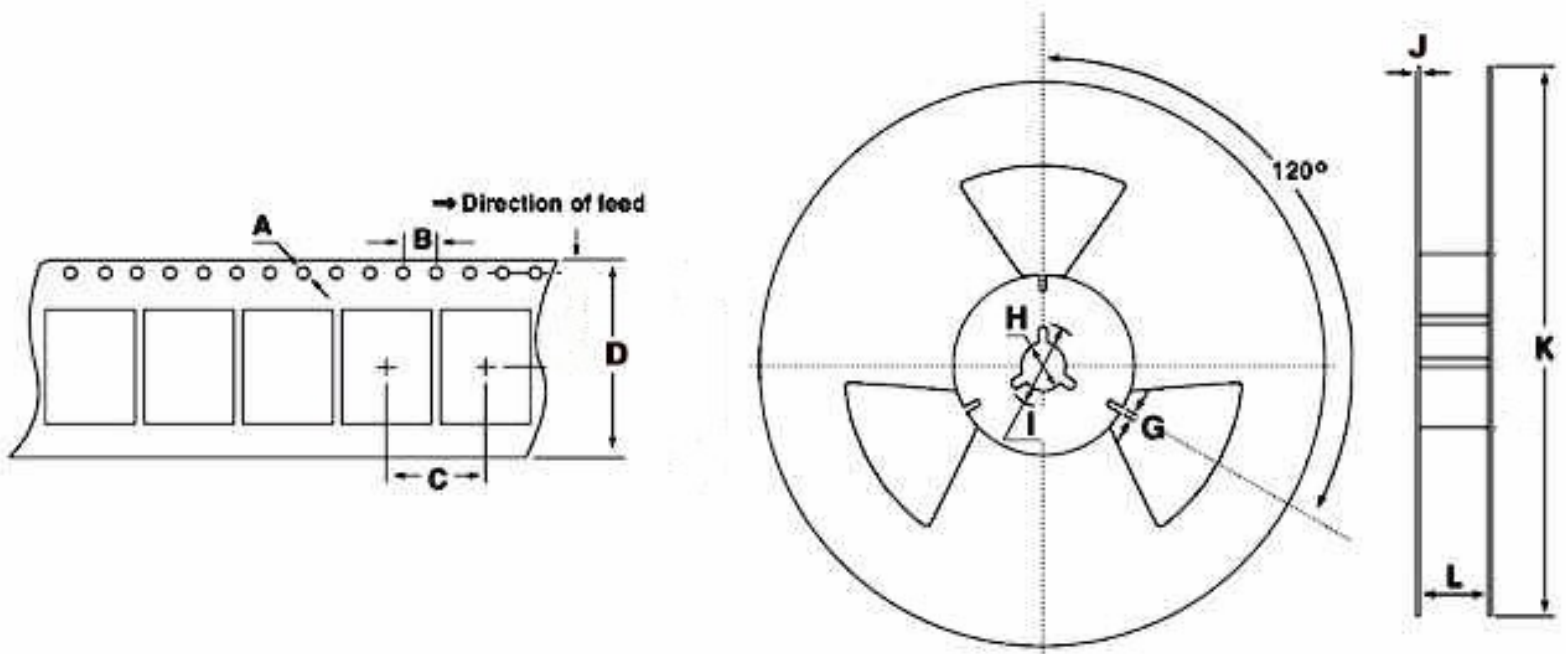


CONNECTION
 #1 X-TAL
 #2 GND
 #3 X-TAL
 #4 GND

LAND PATTERN



TAPE AND REEL SPECIFICATIONS:



TAPE SPECIFICATIONS:(millimeters)

MODEL	A	B	C	D
US5032	1.5	4.0	8.0	16.0
US6035	1.5	4.0	8.0	16.0
US7050	1.5	4.0	8.0	16.0

REEL SPECIFICATIONS:(millimeters)

MODEL	G	H	I	J	K	L
US5032	2.0	13.0	23.0	2.0	330 or 178	17.5
US6035	2.0	13.0	23.0	2.0	330 or 178	17.5
US7050	2.0	13.0	23.0	2.0	330 or 178	17.5

QUARTZ CRYSTALS

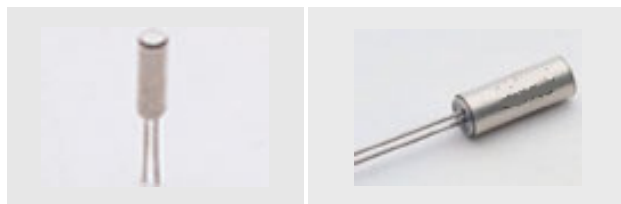
US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

Cylindrical Package Crystals

- Photolithography finished allows uniform stable performance
- Excellent shock resistance and environmental capability
- Low power consumption
- Suitable for time-keeping of clock and microcomputer



Electrical Specifications:

Frequency Range (Fo)	3.500MHz to 66.000MHz		
Frequency Tolerance at 25°C	±50ppm (typ)	±30ppm	±50ppm
Temperature Stability (REF To 25°C)	±50ppm (typ)	±50ppm	±100ppm
Operating Temperature Range (TOPR)	-10°C to 70°C		
Storage Temperature Range (TSTG)	-40°C to 85°C		
Shunt Capacitance (Co)	7pF Max		
Load Capacitance (CL)	10 to 32pF or Series Resonant		
Insulation Resistance	500Meg.Ohms Minimum at 100VDC		
Drive Level	1 mWatts Max		
Aging (at 25°C)	+/-5 ppm / year Max		

EQUIVALENT SERIES RESISTANCE (ESR) AND MODE OF OPERATION (MODE):

Frequency Range	Max ESR (Ohms)	Mode
3.579MHz to 4.999MHz	200	Fundamental/AT
5.000MHz to 5.999MHz	150	Fundamental/AT
6.000MHz to 7.999MHz	120	Fundamental/AT
8.000MHz to 8.999MHz	90	Fundamental/AT
9.000MHz to 9.999MHz	80	Fundamental/AT
10.000MHz to 14.999MHz	70	Fundamental/AT
15.000MHz to 15.999MHz	60	Fundamental/AT
16.000MHz to 23.999MHz	50	Fundamental/AT
24.000MHz to 30.000MHz	40	Fundamental/AT
30.000MHz to 66.000MHz	100	Fundamental/AT

How To Order: 1. Pick a part# from the standard parts table or pick a frequency with in the range specified in the table above and specify the properties you need from the tables below to configure the part# you need.

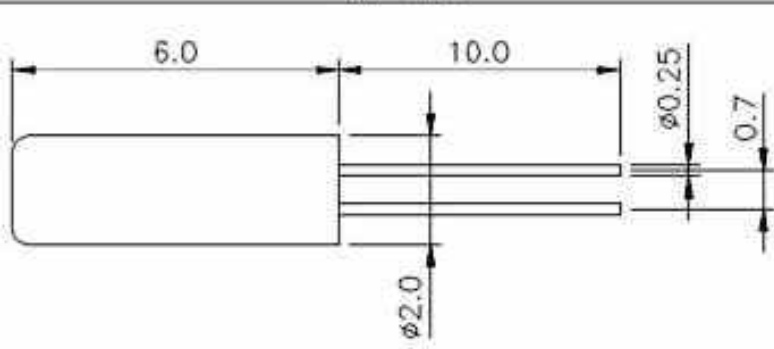
2.To [Place Order](#) specify part number and quantity required.

CUSTOM PART NUMBERING SYSTEM

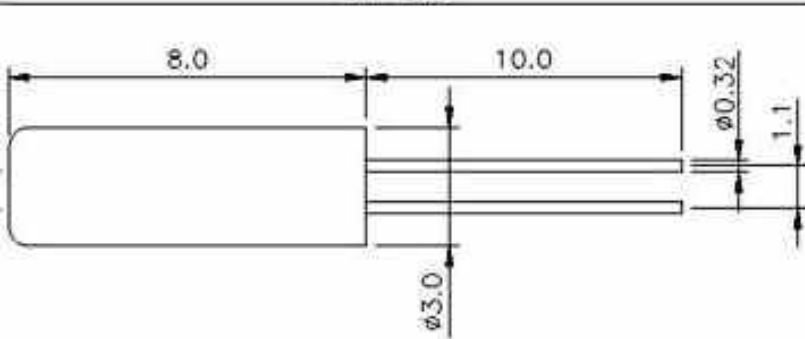
Frequency(MHz)

MECHANICAL DIMENSIONS

CH-206



CH-308



QUARTZ CRYSTALS

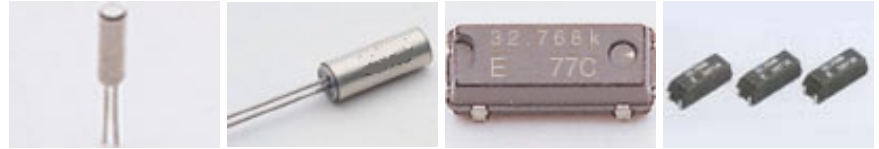
US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

Watch Crystals

- Photolithography finished allows aniform stable performance
- Excellent shock resistance and environmental capability
- Low power consumption
- Suitable for time-keeping of clock and microcomputer



Standard Electrical Specifications

Nominal Frequency	32.768kHz
Operating Temperature Range	-10 to +60 °C
Storage Temperature Range	-20 to +70 °C
Frequency Tolerance (at 25 °C)	+/- 20 ppm
Peak Temperature (frequency)	25 ± 5 °C
Temperature Coefficient (frequency)	-0.04 ppm /°C ² Max
Load Capacitance (CL)	12.5pF
Drive Level	10 μW Max
Series Resistance	500 kOhms Max
Motional Capacitance	1.80 to 2.10pF
Shunt Capacitance (Co)	0.80 to 0.90pF
Insulation Resistance	500 MOhms Min
Aging (at 25 °C)	±3.0ppm / year Max

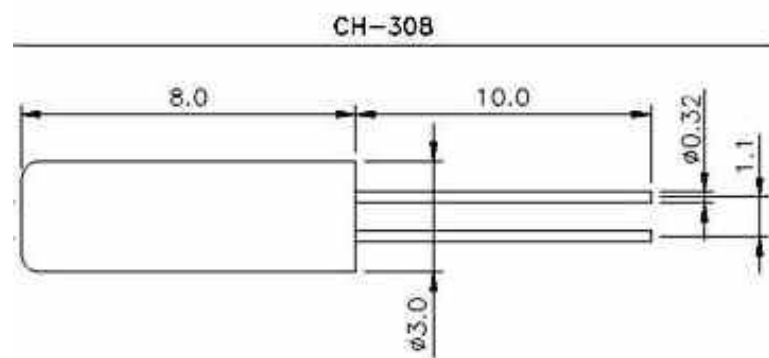
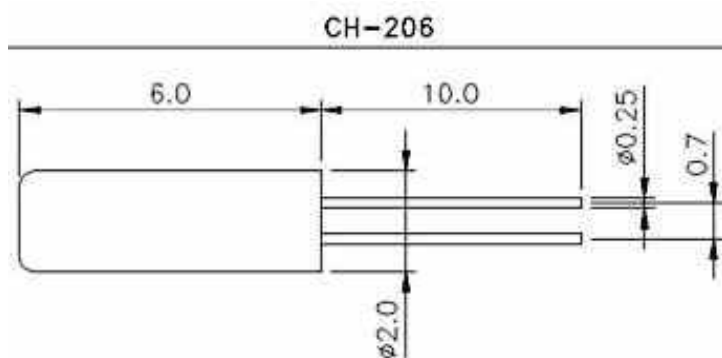
Standard 32.768KHz Crystal Part Numbers

Part #	Dimensions	Package Style	Packaging
TF26-327	2.0D x 6.0	CH-206	Bulk
TF38-327	3.0D x 8.0	CH-308	Bulk
TF306-327TR	8.0 x 3.2 x 2.5	CS-306	Tape & Reel
TF406-327TR	9.6 x 4.06 x 3.6	CS-406	Tape & Reel

How To Order:

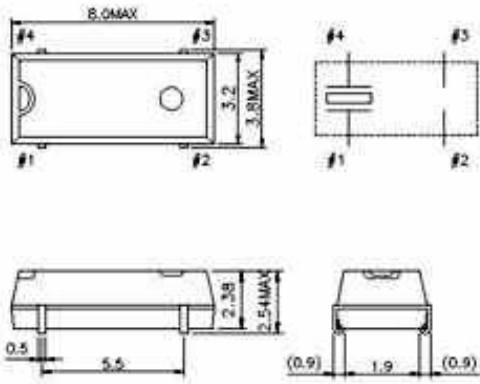
1. Pick a part# from the standard parts table above.
2. To [Place Order](#) specify part number and quantity required.

MECHANICAL DIMENSIONS:



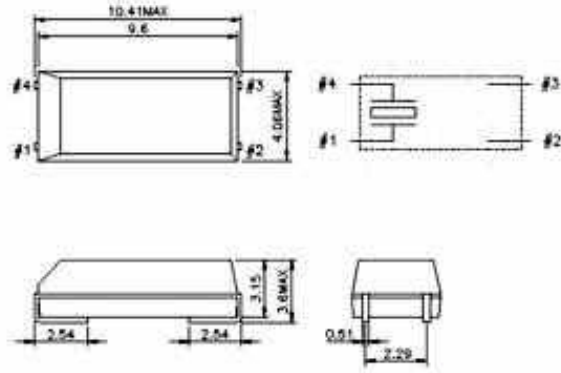
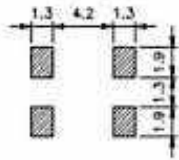
CS-306

CS-406

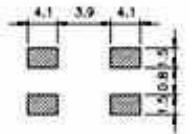


LAND PATTERN

CS-306



CS-406
LAND PATTERN



QUARTZ CRYSTALS

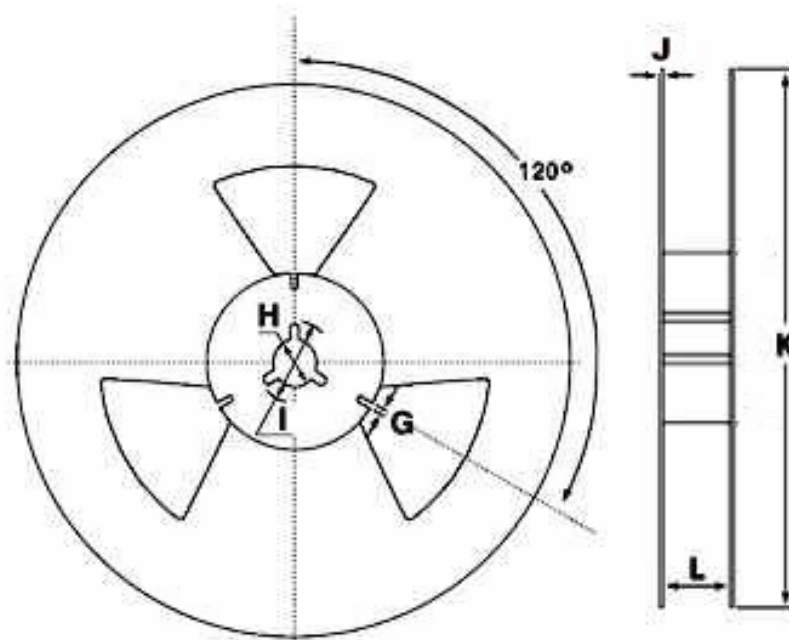
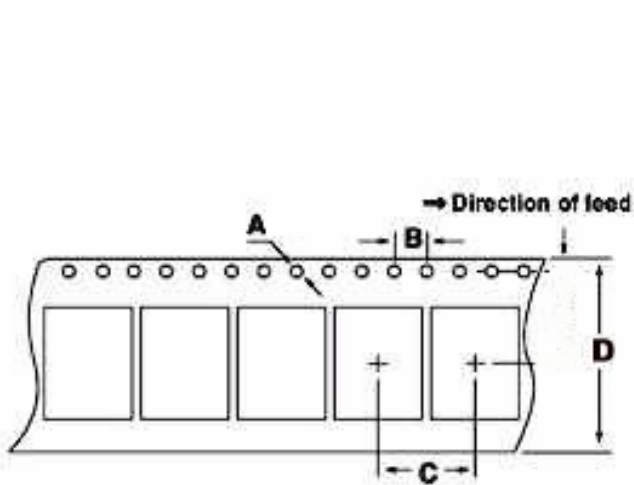
US ELECTRONICS INC.

PH:(314)423-7550

FAX:(314)423-0585

WATCH CRYSTALS

TAPE AND REEL SPECIFICATIONS:



TAPE SPECIFICATIONS:(millimeters)

MODEL	A	B	C	D
TF306-327TR	1.5	4.0	8.0	24.0
TF406-327TR	1.5	4.0	8.0	24.0

REEL SPECIFICATIONS:(millimeters)

MODEL	G	H	I	J	K	L
TF306-327TR	2.0	13.0	23.0	2.0	330 or 178	25.5
TF406-327TR	2.0	13.0	23.0	2.0	330or 178	25.5