




















## SMD Quartz Crystals

FILTRONETICS SMD XTAL MODELS	SIZE (mm) L X W X H	CUT TYPE	MODE OF OPER.	CIRCUIT COND.	CALIBRATION AT 25°C	TEMPERATURE STABILITY OPTIONS	ESR	Co (PF) MAX.	DRIVE LEVEL MAX.	FREQUENCY RANGE
 <b>F865A</b>	13.1 X 5 X 5	AT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm	±100 ppm/-20 to 70°C (AT-CUT)	See Table	7	0.1mW	3.579545 MHz to 100.000000 MHz
 <b>F864H</b>	13 X 4.7 X 4.2	AT BT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm	±100 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7	100µW	4.000000 MHz to 70.000000 MHz
 <b>F864A</b>	13 X 4.7 X 4.2	AT BT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm	±100 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7	100µW	4.000000 MHz to 70.000000 MHz
 <b>F890A</b>	10.1 X 4 X 3.8	AT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±15 ppm ±20 ppm ±30 ppm	± 5 ppm/ 0 to 50°C    ±10 ppm/0 to 50°C ±10 ppm/-10 to 60°C    ±15 ppm/0 to 50°C ±20 ppm/-10 to 60°C    ±30 ppm/-20 to 70°C ±50 ppm/-20 to 70°C	See Table	7	100µW	3.579545 MHz to 100.000000 MHz
 <b>F910A</b>	9.1 X 4.1 X 3.3	X-CUT	FUND	12.5 PF	±30 ppm	-034 ppm/°C <sup>2</sup> /-20 to 70°C	50KΩ	1.35	1.0µW	32.768 KHz
 <b>F908A</b>	8 X 3.8 X 2.5	X-CUT	FUND	12.5 PF	±30 ppm ±50 ppm ±100 ppm	-034 ppm/°C <sup>2</sup> /-20 to 70°C	50KΩ	0.8 to 1.7	1.0µW	30 KHz to 100 KHz
 <b>F909H</b>	9 X 3.7 X 2.65	AT BT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm	±100 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	5	100µW	11.059200 MHz to 70.000000 MHz
 <b>F909A</b>	9 X 3.7 X 2.65	AT BT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm	±100 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	5	100µW	11.059200 MHz to 70.000000 MHz
 <b>F921H</b>	11 X 5 X 2.65	AT BT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±30 ppm ±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 70°C (BT-CUT)	See Table	5	100µW	11.059200 MHz to 70.000000 MHz
 <b>F920H</b>	11.6 X 5.5 X 2.2	AT	FUND	SEE ORDERING METHOD TABLE	±100 ppm	±100 ppm/-20 to 70°C	See Table	7	100µW	3.579545 MHz to 30.000000 MHz
 <b>F938H</b>	8 X 4.5 X 1.8	AT BT	FUND	SEE ORDERING METHOD TABLE	±100 ppm	±100 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	5	50µW	12.000000 MHz to 40.000000 MHz
 <b>F948X</b>	7.1 X 3.9 X 1.05	AT	FUND	SEE ORDERING METHOD TABLE	±10 ppm ±15 ppm ±20 ppm	±3.5 ppm/ 0 to 50°C    ±5.0 ppm/ 0 to 50° ±10 ppm/ 0 to 50°C	60KΩ	5	100µW	12.00, 12.80, 13.00 14.40, 15.36, 19.20 and 21.25 MHz
 <b>F947X</b>	7 X 5 X 1.30	AT	FUND 3OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/ 0 to 70°C	80KΩ	7	0.1µW	8.000000 MHz to 70.000000 MHz
 <b>F491H</b>	11 X 5 X 2.5	AT BT	FUND 3OT	SEE ORDERING METHOD TABLE	±20 ppm    ±25 ppm ±30 ppm    ±50 ppm	±30 ppm/-10 to 70°C (AT-CUT) ±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 70°C (BT-CUT)	See Table	7	0.1µW	3.579545 MHz to 70.000000 MHz
 <b>F494H</b>	12.7 X 4.7 X 3.9	AT BT	FUND 3OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7	0.1µW	3.276800 MHz to 70.000000 MHz
 <b>F493H</b>	12.7 X 4.7 X 3.0	AT BT	FUND 3OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7	0.1µW	8.000000 MHz to 70.000000 MHz
 <b>F492H</b>	12.7 X 4.7 X 2.6	AT BT	FUND 3OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7	0.1µW	20.000000 MHz to 70.000000 MHz
 <b>F864LH</b>	13 X 4.7 X 4.2	SL	FUND	SEE ORDERING METHOD TABLE	±100 ppm	±100 ppm/-10 to 60°C (SL-CUT)	See Table	7	0.1µW	1.000000 MHz
 <b>F865LA</b>	13 X 4.7 X 4.2	SL	FUND	SEE ORDERING METHOD TABLE	±100 ppm	±100 ppm/-10 to 60°C (SL-CUT)	See Table	7	0.1µW	1.000000 MHz

### PART NUMBER - ORDERING METHOD

\*ESR: SEE TABLE TO DETERMINE ESR FOR FREQUENCY RANGE DESIRED  
NOTE (1): REFLOW SOLDERING SPEC: 10 SECS. MAX. AT 260°C, EXCEPT F920H AND F938H AT 230°C.

FILTRONETICS SMD CRYSTAL MODELS	CRYSTAL CUTS	MODE OF OPER.	CIRCUIT COND.	CALIBRATION AT 25°C	TEMPERATURE STABILITY OPTIONS	FREQUENCY RANGE
F865A F864A ----- ----- F864LA See above table	A: AT-CUT B: BT-CUT X: X-CUT L: SL-CUT	1: FUND 3: 3OT 5: 5OT	S: SERIES 16: 16 PF 18: 18 PF ----- ----- * 18 PF is standard load capacity. Custom available upon request in most cases	10: ±10 ppm 15: ±15 ppm 20: ±20 ppm ----- ----- 100: ±100 ppm	A: ±100 ppm/-20 to 70°C    H: ± 20 ppm/-10 to 60°C B: ±100 ppm/-10 to 70°C    K: ± 15 ppm/ 0 to 50°C C: ±100 ppm/-10 to 60°C    L: ± 10 ppm/-10 to 60°C D: ± 50 ppm/-20 to 70°C    M: ± 10 ppm/ 0 to 50°C E: ± 50 ppm/ 0 to 70°C    N: ± 5 ppm/ 0 to 50°C F: ± 30 ppm/-20 to 70°C    P: ± 3.5 ppm/ 0 to 50°C G: ± 30 ppm/-10 to 60°C    S: -0.034 ppm/°C <sup>2</sup> -20 to 70°C	(1) For custom frequencies see above table for frequency range for each model (2) For standard frequencies see table

F865A	-	A	1	S	-	10	A	-	10 MHz
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EXAMPLE:

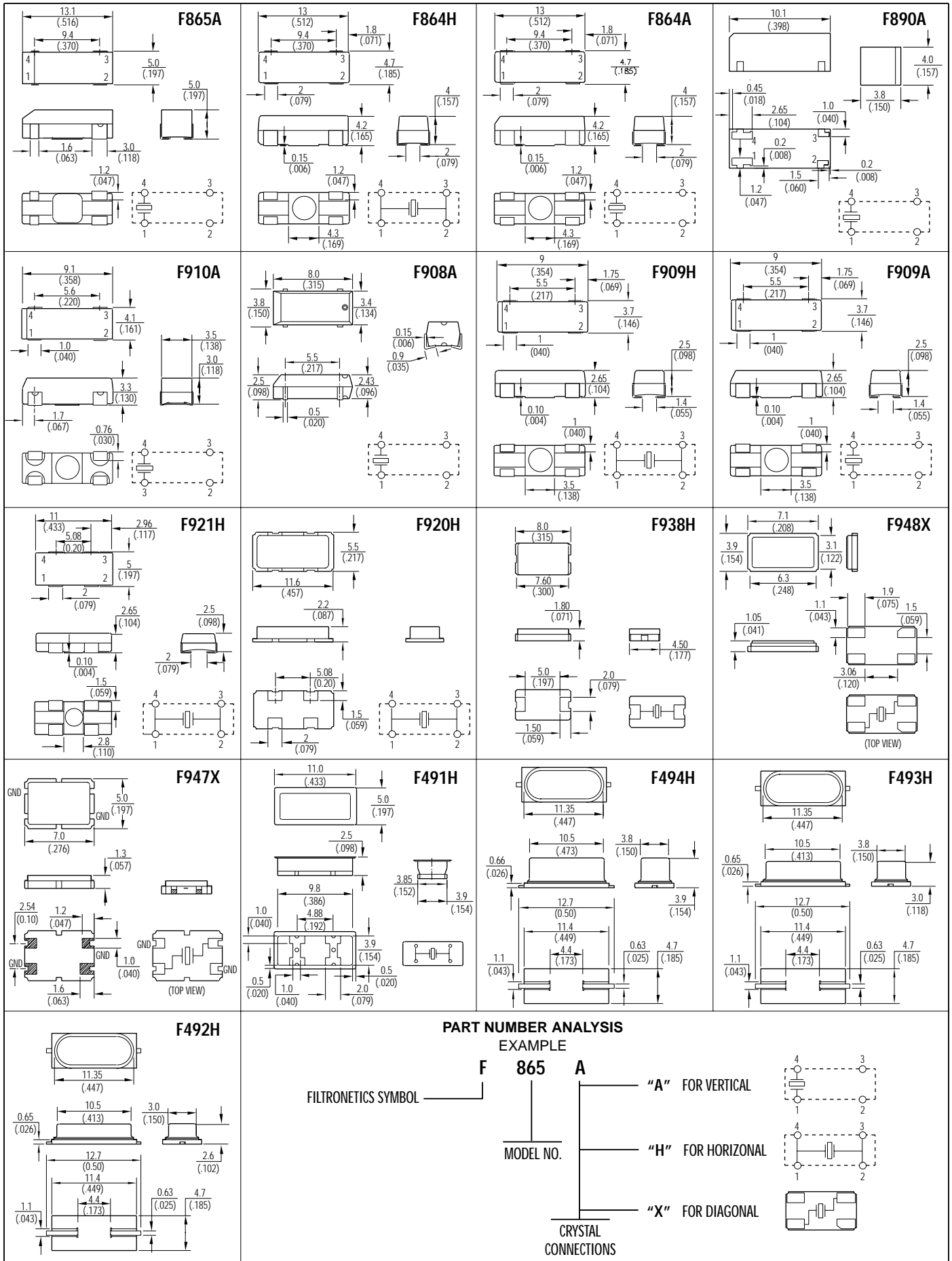
**F865A-A1S-10A-10 MHz**

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**SMD CRYSTALS / OUTLINE DRAWINGS**



# SMD CRYSTALS

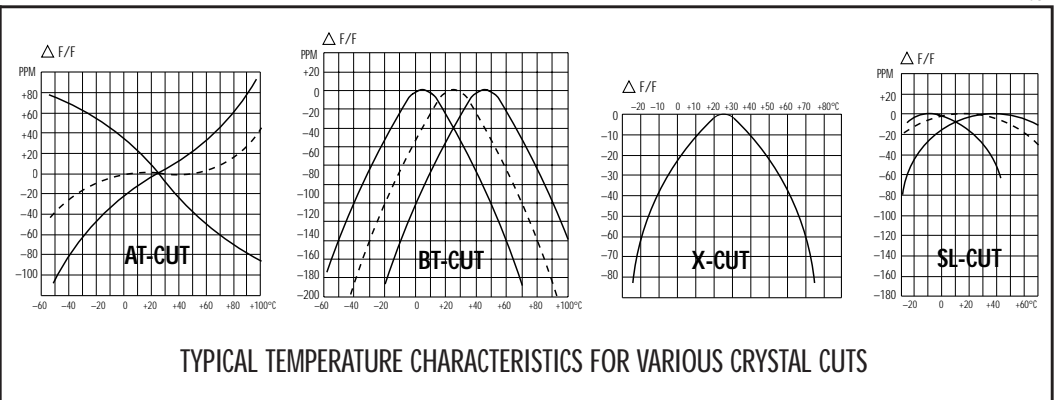
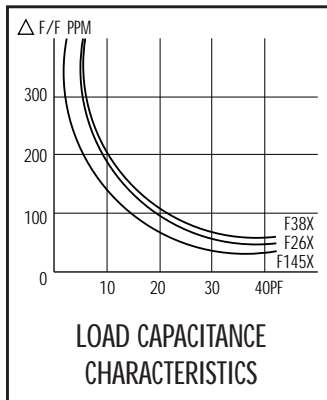
## STANDARD FREQUENCIES AND ESR TABLE

FREQUENCY MHz	AVAILABLE IN PACKAGES	ESR $\Omega$
0.032768	F910A, F908A	50K
1.000000	F864LH, F865LA	50K
3.579545	F865A, F494H, F493H, F491H	200
3.600000	F494H, F491H	200
3.634195	F494H, F491H	200
3.686400	F865A, F494H, F491H	200
3.840000	F865A, F494H, F491H	200
3.932160	F865A	200
3.932200	F865A	200
4.000000	F865A, F494H, F491H	150
4.032000	F865A, F494H, F491H	150
4.096000	F865A, F494H, F491H	150
4.194304	F865A	150
4.340198	F865A	150
4.433000	F865A	150
4.433619	F865A, F494H, F491H	150
4.608000	F865A, F494H, F491H	150
4.915200	F865A, F494H, F491H	150
5.000000	F865A	120
5.033000	F865A	120
5.068800	F865A	120
5.120000	F494H, F491H	120
5.970000	F865A	120
5.990400	F494H, F491H	120
6.000000	F865A, F494H, F491H	100
6.080000	F865A	100
6.144000	F865A, F494H, F491H	100
6.500000	F865A	100
6.553600	F494H, F491H	100
7.159090	F865A, F494H, F491H	80
7.250000	F845A	80
7.372800	F865A, F494H, F491H	80
7.680000	F865A	80
7.864320	F865A, F494H, F491H	80
8.000000	F865A, F494H, F491H	80
8.002000	F865A	80
8.192000	F865A	80
8.867238	F865A, F494H, F491H	80

FREQUENCY MHz	AVAILABLE IN PACKAGES	ESR $\Omega$
9.000000	F865A	60
9.216000	F865A	60
9.600000	F865A	60
9.830400	F865A, F494H, F491H	60
10.000000	F865A, F494H, F491H	60
10.185000	F865A	60
10.240000	F865A, F494H, F493H, F491H	60
10.245000	F865A	60
10.700000	F865A	60
11.000000	F865A	60
11.059200	F865A, F494H, F493H, F491H	60
11.868000	F865A	60
11.980800	F865A	60
12.000000	F865A, F494H, F493H, F491H	60
12.059200	F865A	60
12.096000	F865A	60
12.272700	F865A	60
12.288000	F865A, F494H, F493H, F491H	60
12.296000	F865A	60
12.800000	F865A	60
13.000000	F865A	60
13.500000	F865A	50
13.700000	F865A	50
14.000000	F865A	50
14.318180	F865A, F494H, F493H, F491H	50
14.400000	F494H, F493H, F491H	50
14.745600	F865A, F494H, F493H, F491H	50
14.985500	F865A	50
15.000000	F865A, F494H, F493H, F491H	50
15.360000	F865A	50
16.000000	F865A, F494H, F493H, F491H	50
16.044000	F865A	50
16.147200	F494H, F493H, F491H	50
16.257000	F865A	50
16.384000	F865A, F494H, F493H, F491H	50
16.670000	F865A	50
16.934400	F865A	50
17.600000	F865A	50

FREQUENCY MHz	AVAILABLE IN PACKAGES	ESR $\Omega$
18.432000	F865A, F494H, F493H, F491H	50
18.600000	F865A	50
18.867000	F865A	50
19.069929	F865A	50
19.164000	F865A	50
19.200000	F865A	50
19.660800	F865A, F494H, F493H, F491H	50
19.800000	F865A	50
20.000000	F865A, F494H, F493H, F491H	50
20.800000	F494H, F493H, F491H	40
22.118400	F865A	40
22.190000	F865A	40
22.500000	F865A	40
23.347200	F865A	40
24.000000	F865A, F494H, F493H, F491H	40
24.576000	F865A, F494H, F493H, F491H	40
25.000000	F865A	40
25.175000	F865A	40
25.750000	F865A	40
27.000000	F865A	40
28.322000	F865A	40
29.491200	F865A, F494H, F493H, F491H	40*
30.000000	F494H, F493H, F491H (FUND)	40*
30.000000	F865A (30T)	100
31.350000	F494H, F493H, F491H (FUND)	40*
32.000000	F865A (30T)	100
32.424000	F494H, F493H, F491H (FUND)	40*
32.424000	F865A (30T)	100
36.000000	F494H, F493H, F491H (FUND)	40*
36.000000	F865A (30T)	100
38.400000	F865A (30T)	100
40.000000	F494H, F493H, F491H (FUND)	40*
40.000000	F865A (30T)	100
48.000000	F865A (30T)	100
50.000000	F865A (30T)	100
57.600000	F865A (30T)	100
60.000000	F865A (30T)	100
70.000000	F865A (30T)	100

\* BT - CUT



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# TAPE AND REAL SPECIFICATIONS FOR SMD CRYSTALS AND CLOCKS

## REAL SPECIFICATIONS (mm)

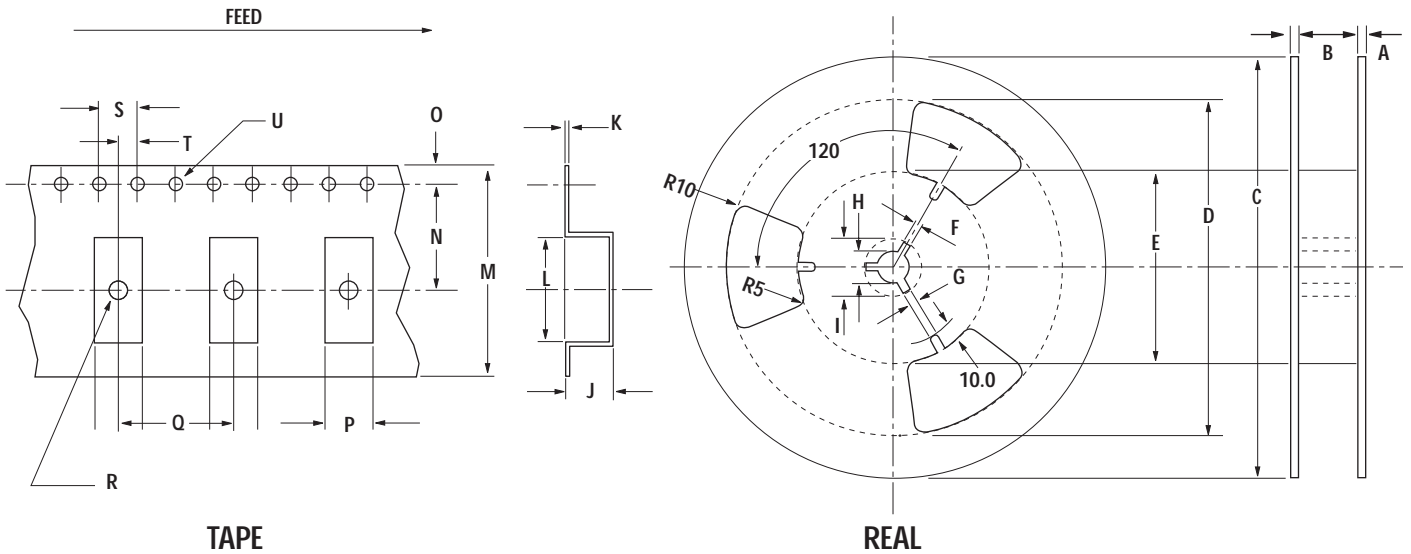
XTAL MODEL	A	B	C	D	E	F	G	H	I
865A	2.0	25.5	300	190	80.2	2.0	2.5	13.0	23.0
864H	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
864A	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
890A	2.0	25.5	330	190	80.0	2.0	2.5	13.0	23.0
910A	2.0	17.5	330	190	80.0	2.0	2.0	13.0	21.0
908A	2.0	17.5	329	190	100	2.0	2.0	13.0	21.0
909H	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
909A	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
921A	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
920H	3.0	24.4	328	190	80.0	2.5	3.0	13.0	21.0
938H	2.0	16.0	250	-	80.0	-	-	13.0	21.0
948X	1.5	16.4	178	-	80.0	2.5	2.5	13.0	21.0
947X	1.6	17.5	178	-	80.0	2.0	2.0	13.0	21.0
491H	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
494H	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
493H	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0
492H	2.0	24.4	330	190	80.0	2.0	2.5	13.0	21.0

## TAPE SPECIFICATIONS (mm)

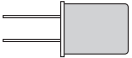
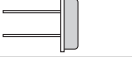

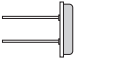
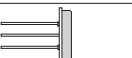
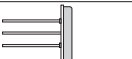
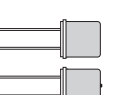









J	K	L	M	N	O	P	Q	R	S	T	U	STD. QTY.
5.5	0.4	13.4	24.0	10.75	1.75	5.3	8.0	2.2	4.0	2.0	1.5	1000
4.3	0.4	13.1	24.0	11.5	1.75	5.3	12.0	2.2	4.0	2.0	1.5	1000
4.3	0.4	13.1	24.0	11.5	1.75	5.3	12.0	2.0	4.0	2.0	1.5	1000
4.1	0.4	10.5	24.0	11.5	1.75	4.4	8.0	1.6	4.0	2.0	1.5	1000
4.1	0.5	9.4	16.0	7.5	1.75	4.0	8.0	-	4.0	2.0	1.5	2000
2.7	0.3	8.3	16.0	7.5	1.75	4.0	8.0	-	4.0	2.0	1.5	3000
3.0	0.4	9.5	24.0	11.5	1.75	4.0	8.0	-	4.0	2.0	1.5	2000
3.0	0.4	9.5	24.0	11.5	1.75	4.0	8.0	-	4.0	2.0	1.5	2000
2.7	0.3	11.3	24.0	11.5	1.75	5.3	12.0	1.7	4.0	2.0	1.5	2000
2.4	0.4	12.0	24.0	11.5	1.75	5.9	12.0	1.6	4.0	2.0	1.5	2000
2.1	0.3	8.4	16.0	7.5	1.75	5.7	8.0	1.55	4.0	2.0	1.5	1000
1.4	0.3	7.45	16.0	7.3	1.75	4.3	8.0	-	4.0	2.0	1.5	1000
1.5	0.3	7.9	16.0	7.5	1.75	5.4	8.0	1.7	4.0	2.0	1.5	1000
2.7	0.3	11.3	24.0	11.5	1.75	5.3	12.0	1.7	4.0	2.0	1.5	2000
4.3	0.4	13.1	24.0	11.5	1.75	5.3	12.0	2.2	4.0	2.0	1.5	1000
3.1	0.4	13.1	24.0	11.5	1.75	5.3	12.0	1.7	4.0	2.0	1.5	1000
3.1	0.4	13.1	24.0	11.5	1.75	5.3	12.0	-	4.0	2.0	1.5	1000

CLOCK MODEL	A	B	C	D	E	F	G	H	I
F900	3.0	25.5	330	190	80.0	2.0	2.5	13.0	21.0
F910	3.0	16.4	180	-	80.0	2.0	2.5	13.0	21.0

J	K	L	M	N	O	P	Q	R	S	T	U	STD. QTY.
4.8	-	13.4	24.0	13.25	-	-	12.0	-	4.0	2.0	1.5	1000
3.4	0.3	7.4	16.0	7.5	1.75	5.4	8.0	1.5	4.0	2.0	1.5	500



## QUARTZ CRYSTALS WITH THRU-HOLE LEADS

FILTRONETICS LEADED CRYSTAL MODELS	SIZE (mm) L X W X H	CUT TYPE	MODE OF OPER.	CIRCUIT COND.	CALIBRATION AT 25 °C	TEMPERATURE STABILITY OPTIONS	ESR	Co (PF) MAX.	DRIVE LEVEL MAX.	FREQUENCY RANGE
 <b>F490U</b>	11.2 X 4.8 X 13.6	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7 PF	0.1mW	3.276800 MHz to 70.000000 MHz
 <b>F494U</b>	11.35 X 5 X 3.5	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7 PF	0.1mW	3.276800 MHz to 70.000000 MHz
 <b>F494UL</b>	11.35 X 5 X 3.5	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7 PF	0.1mW	3.2768000 MHz to 70.000000 MHz
 <b>F493U</b>	11.35 X 5 X 2.5	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7 PF	0.1mW	8.000000 MHz to 70.000000 MHz
 <b>F493UL</b>	11.35 X 5 X 2.5	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7 PF	0.1mW	8.000000 MHz to 70.000000 MHz
 <b>F492U</b>	11.35 X 5 X 2.1	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	7 PF	1.0 mW	20.000000 MHz to 70.000000 MHz
 <b>FUM1 FUM1L</b>	7.9 X 3.4 X 8	AT SL	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm ±30 ppm ±20 ppm ±15 ppm ±10 ppm	±30 ppm/-20 to 70°C (AT-CUT) ±25 ppm/-20 to 70°C (AT-CUT) ±20 ppm/-20 to 60°C (AT-CUT) ±15 ppm/-20 to 60°C (AT-CUT) ±10 ppm/-20 to 60°C (AT-CUT) ± 7 ppm/-20 to 60°C (AT-CUT)	See Table	7 PF	1.0 mW	1.000000 MHz to 150.000000 MHz
 <b>FUM1T</b>	7.8 X 3.1 X 6	AT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±20 ppm ±15 ppm ±10 ppm	±30 ppm/-20 to 70°C; ±25 ppm/-20 to 60°C ±20 ppm/-20 to 60°C; ±15 ppm/-20 to 60°C ±10 ppm/-20 to 60°C; ± 7 ppm/-20 to 60°C	See Table	7 PF	1.0 mW	12.000000 MHz to 150.000000 MHz
 <b>F39 F39F</b>	L: 9, D: 3	AT BT	FUND 3 OT 5 OT	SEE ORDERING METHOD TABLE	±50 ppm ±30 ppm ±25 ppm ±20 ppm ±15 ppm	±100 ppm/-10 to 60°C (BT-CUT) ±50 ppm/-20 to 70°C (AT-CUT) ±30 ppm/-20 to 70°C (AT-CUT) ±20 ppm/-10 to 70°C (AT-CUT) ±10 ppm/-10 to 60°C (AT-CUT) ± 5 ppm/-10 to 50°C (AT-CUT)	See Table	7 PF	0.1 mW	3.579545 MHz to 100.000000 MHz
 <b>F26AB</b>	L: 6, D: 2	AT BT	FUND 3 OT	SEE ORDERING METHOD TABLE	±50 ppm	±50 ppm/-20 to 70°C (AT-CUT) ±100 ppm/-10 to 60°C (BT-CUT)	See Table	5 PF	0.1mW	11.059200 MHz to 70.000000 MHz
 <b>F38X</b>	L: 8, D: 3	X	FUND	12.5 PF	±50 ppm	-0.34 ppm/°C², Typical	35 K to 60 K	1.7 PF	1.0 µW	16 KHz to 150 KHz
 <b>F26X</b>	L: 6, D: 2	X	FUND	11 PF	±100 ppm	-0.34 ppm/°C², Typical	20 K to 40 K	1 PF	1.0 µW	20KHz to 165 KHz
 <b>F145X</b>	L: 5, D: 1.4	X	FUND	12.5 PF	±3000 ppm	±3000 ppm/-10 to 60°C	3 K to 10 K	1 PF	1.0 µW	144 KHz to 3000 KHz
 <b>F38S</b>	L: 8, D: 3	X	FUND	12.5 PF	±15 ppm ±20 ppm ±30 ppm	-0.34 ppm/°C², Typical /-10 to 60°C	35 K	1.6 PF	1.0 µW	32.768 KHz
 <b>F26S</b>	L: 6, D: 2	X	FUND	12.5 PF	±15 ppm ±20 ppm ±30 ppm	-0.34 ppm/°C², Typical /-10 to 60°C	35 K	1.35 PF	1.0 µW	32.768 KHz
 <b>F145S</b>	L: 5, D: 1.4	X	FUND	8 PF	±15 ppm ±20 ppm ±30 ppm	-0.34 ppm/°C², Typical /-10 to 60°C	40 K	1.PF	1.0 µW	32.768 KHz

NOT TO SCALE

### PART NUMBER - ORDERING METHOD

FILTRONETICS THRU-HOLE CRYSTAL MODELS	CRYSTAL CUTS	MODE OF OPER.	CIRCUIT COND.	CALIBRATION AT 25 °C	TEMPERATURE STABILITY OPTIONS	FREQUENCY RANGE
F490U F494U ----- ----- ----- F145S See above table	A: AT-CUT B: BT-CUT X: X-CUT L: SL-CUT	1: FUND 3: 3OT 5: 5OT	S: SERIES 16: 16 PF 18: 18 PF ----- ----- * 18 PF is standard load capacity. Custom available upon request in most cases	10: ±10 ppm 15: ±15 ppm 20: ±20 ppm ----- ----- 100: ±100 ppm ----- -----	A: ±100 ppm/-20 to 70°C B: ±100 ppm/-10 to 70°C C: ±100 ppm/-10 to 60°C D: ± 50 ppm/-20 to 70°C E: ± 50 ppm/ 0 to 70°C F: ± 30 ppm/-20 to 70°C G: ± 30 ppm/-10 to 60°C H: ± 20 ppm/-10 to 60°C K: ± 15 ppm/ 0 to 50°C L: ± 10 ppm/-10 to 60°C M: ± 10 ppm/ 0 to 50°C N: ± 5 ppm/ 0 to 50°C P: ± 3.5 ppm/ 0 to 50°C S: -0.034 ppm/°C² -20 to 70°C	(1) For custom frequencies see above table for frequency range for each model (2) For standard frequencies see table

F490U	—	A	1	S	—	10	A	—	10 MHz
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EXAMPLE:

F490U-A1S-10A-10 MHz

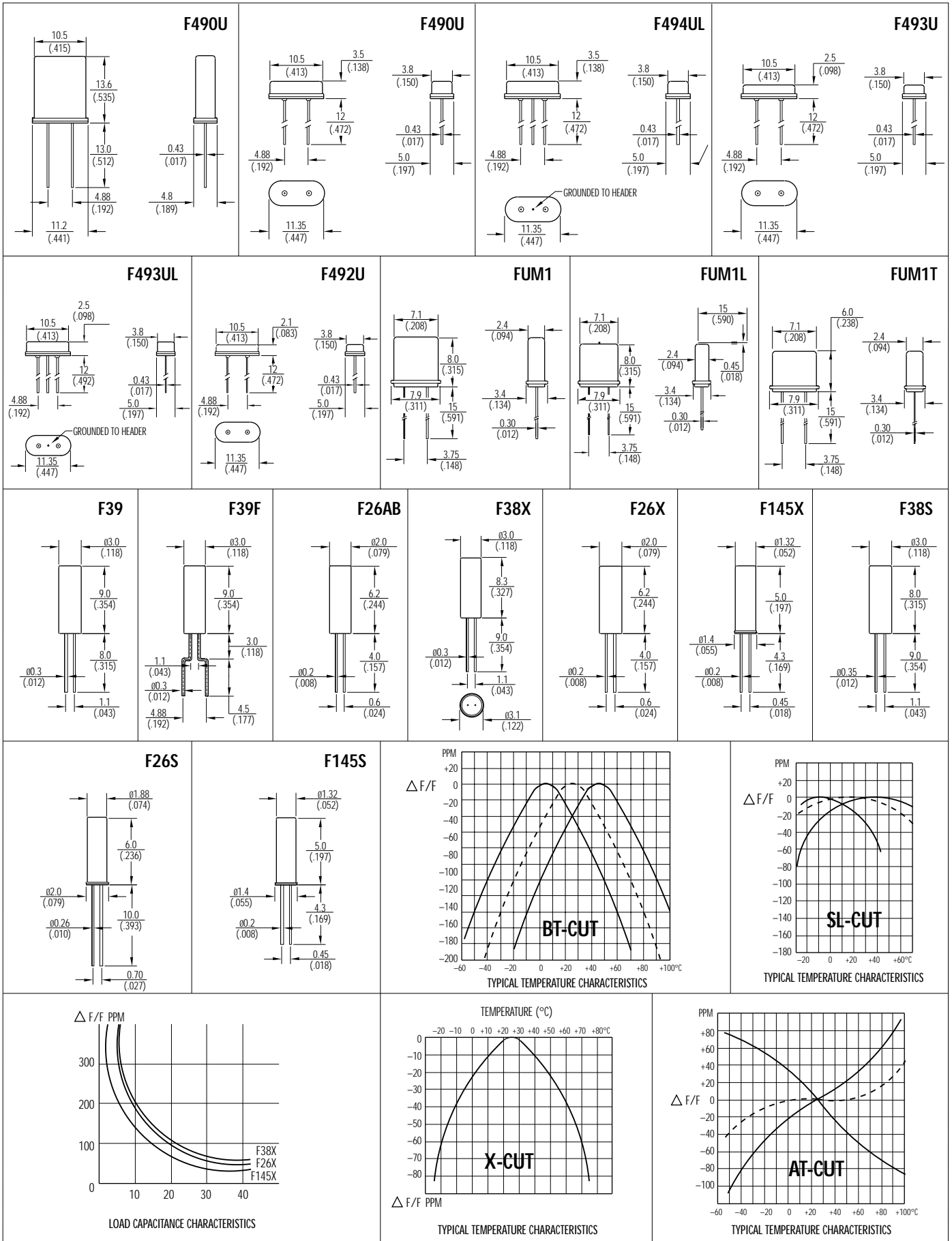
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# THRU-HOLE CRYSTALS

## OUTLINE DRAWINGS



## STANDARD FREQUENCIES THRU-HOLE CRYSTALS

FREQUENCY K: KHz M: MHz	AVAILABLE IN PACKAGES	ESR Ω
16.000 K	F38X	60K
18.641 K	F38X	60K
20.000 K	F38X	60K
20.480 K	F38X	50K
22.000 K	F38X	50K
24.000 K	F38X, F26X (40K)	50K
24.576 K	F38X	50K
25.000 K	F38X	50K
25.300 K	F38X	50K
25.600 K	F38X, F26X (40K)	50K
26.000 K	F38X	50K
26.300 K	F38X	50K
26.304 K	F38X	50K
27.000 K	F38X	50K
28.000 K	F38X	50K
29.600 K	F38X	50K
30.000 K	F38X	40K
30.720 K	F38X	40K
31.200 K	F26X	40K
31.250 K	F38X, F26X	40K
31.468K	F38X	40K
31.500 K	F38X, F26X	40K
32.000 K	F38X, F26X	40K
32.325 K	F38X	35K
32.768 K	F38S, F26S, F145S	35K
32.857 K	F38X	35K
33.750 K	F38X	35K
34.680 K	F38X	35K
35.000 K	F38X	35K
37.449 K	F38X	35K
37.813 K	F38X	35K
38.000 K	F38X	35K
38.400 K	F38X (25K), F26X (40K)	35K
39.768 K	F38X	35K
40.000 K	F38X, F26X (30K)	35K
40.680 K	F38X	35K
40.960 K	F38X	35K
42.000 K	F38X	35K
43.000 K	F38X	35K
44.000 K	F38X	35K
45.000 K	F38X	35K
46.080 K	F38X	35K
49.000 K	F38X	35K
49.710 K	F26X	30K
50.000 K	F38X, F26X (30K)	35K
54.000 K	F38X	35K
56.800 K	F38X	35K
59.789 K	F26X	30K
60.000 K	F38X, F26X (30K)	35K
60.004 K	F26X	30K
65.536 K	F38X, F26X (30K)	35K
70.000 K	F38X	35K
75.000 K	F38X, F26X (30K)	35K
76.800 K	F26X	30K
77.282 K	F38X	35K

FREQUENCY K: KHz M: MHz	AVAILABLE IN PACKAGES	ESR Ω
77.287 K	F26X	30K
77.500 K	F38X	35K
77.503 K	F26X	30K
81.920 K	F38X	35K
86.000 K	F38X	35K
96.000 K	F38X, F26X (30K)	35K
96.006 K	F26X	30K
99.660 K	F26X	30K
100.000 K	F38X, F26X (30K)	35K
102.400 K	F38X	35K
112.640 K	F38X	35K
120.000 K	F38X	35K
120.8475 K	F26X	20K
130.000 K	F26X	20K
131.072 K	F38X, F26X (20K)	35K
144.000 K	F145X	10K
149.000 K	F145X	10K
150.000 K	F38X	35K
153.600 K	F26X	20K
200.000 K	F145X	5K
910.000 K	F145X	3K
920.000 K	F145X	3K
1.000000 M	F145X	3K
1.000000 M	FUM1	SL-CUT 5K
1.008000 M	F145X	3K
1.008000 M	FUM1	SL-CUT 5K
1.043576 M	FUM1	SL-CUT 5K
1.080000 M	FUM1	SL-CUT 5K
1.200000 M	FUM1	SL-CUT 5K
3.000000 M	F145X	SL-CUT 3K
3.276800 M	F494U	300
3.579545 M	FUM1, F494U, F39	200
3.648000 M	F494U, F39	200
3.686400 M	F494U	200
3.840000 M	F494U	200
3.932160 M	F494U, F39	200
4.000000 M	FUM1, F494U, F39	180
4.032000 M	F494U	150
4.080900 M	F494U	150
4.080000 M	F494U	150
4.096000 M	F494U	150
4.194304 M	F494U, F39	150
4.380000 M	F39	150
4.406250 M	FUM1	150
4.433619 M	F494U, F39	150
4.718550 M	F39	150
4.787961 M	F39	150
4.883300 M	F494U	150
4.913700 M	F39	150
4.915200 M	F494U	150
5.000000 M	FUM1	150
5.003000 M	FUM1	150
5.068800 M	F494U	150
5.120000 M	FUM1	150
5.567000 M	F39	120

FREQUENCY K: KHz M: MHz	AVAILABLE IN PACKAGES	ESR Ω
5.669280 M	F494U	120
5.997000 M	FUM1	150
6.000000 M	FUM1, F494U, F39	120
6.000300 M	FUM1	120
6.144000 M	FUM1, F494U, F39	120
6.250000 M	F494U	100
6.400000 M	FUM1	120
6.500000 M	F494U	100
6.510000 M	F39	100
6.553000 M	FUM1	120
6.570000 M	F39	100
6.780000 M	F39	100
6.781867 M	F39	100
7.000000 M	F494U	80
7.159090 M	F39	80
7.250000 M	F39	80
7.372800 M	F39, F494U	80
7.864300 M	F39, F494U	80
8.000000 M	FUM1, F494U, F39	80
8.192000 M	FUM1, F494U	80
9.090500 M	F494U	60
9.216000 M	FUM1, F494U	60
9.319060 M	F494U	60
9.600000 M	FUM1, F494U	60
9.756000 M	F494U	60
9.827500 M	FUM1	60
9.830000 M	F39	60
9.830400 M	F494U	60
10.000000 M	FUM1, F494U, F493U, F39	60
10.004600 M	FUM1	60
10.005000 M	FUM1	60
10.050000 M	F39	60
10.215000 M	F39	60
10.245000 M	FUM1, F494U	60
10.702800 M	FUM1	60
10.730000 M	FUM1, F494U, F493U	60
11.000000 M	F494U, F493U, F39	60
11.059200 M	FUM1, F493U, F39, F26AB	60
11.060000 M	F494U, F493U	60
11.080608 M	F494U, F493U	60
11.520000 M	F494U, F493U	60
11.673600 M	F494U, F493U	60
11.700000 M	F39	60
11.980800 M	F494U, F493U	60
11.981350 M	FUM1, F494U, F493U	60
12.000000 M	FUM1, F494U, F493U, F39	60
12.000000 M	F26AB	80
12.096000 M	F494U, F493U, F39	60
12.288000 M	FUM1, F494U, F493U	60
12.288000 M	F26AB	80
12.352000 M	FUM1	60
12.500000 M	F39	60
12.800000 M	FUM1, F494U, F493U	60
13.107200 M	FUM1	60
13.500000 M	FUM1	60

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