

# CRYSTAL UNITS FOR MICROPROCESSOR (AT-51)

## ■ Features

- AT-51 crystal units can provide a great number of standard frequencies and have a wide range of applications. In addition, tapping type and gull-wing type are available for automatic mounting.



## ■ Specification

Frequency Range	Table 6 (AT-51)
Overtone	Table 6 (AT-51)
Temperature Characteristics	$\pm 50 \times 10^{-6}$
Operating Temp. Range	-10 ~ +60°C
Frequency Tolerance	$\pm 50 \times 10^{-6}$ (at 25°C)
Equivalent Series Resistance	Table 6 (AT-51)
Load Capacitance	Table 6 (AT-51)

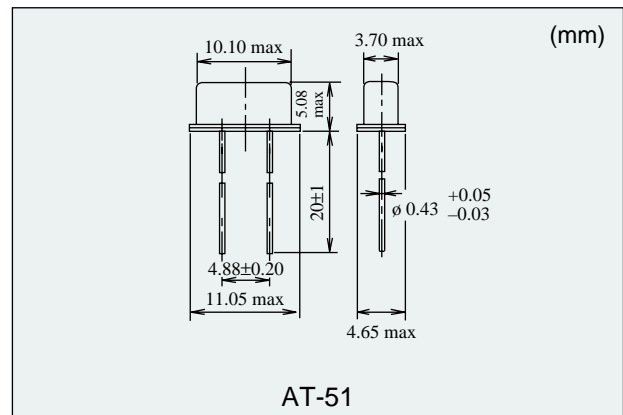
Measuring Circuit: CI Meter

	3.541 MHz min (Fundamental)	3.541 MHz max (Fundamental), 3rd Overtone
Drive Level	50 $\mu$ W (1000 $\mu$ W max)	500 $\mu$ W (1000 $\mu$ W max)

	Fundamental	3rd Overtone
Standard Load Capacitance	16pF	Series

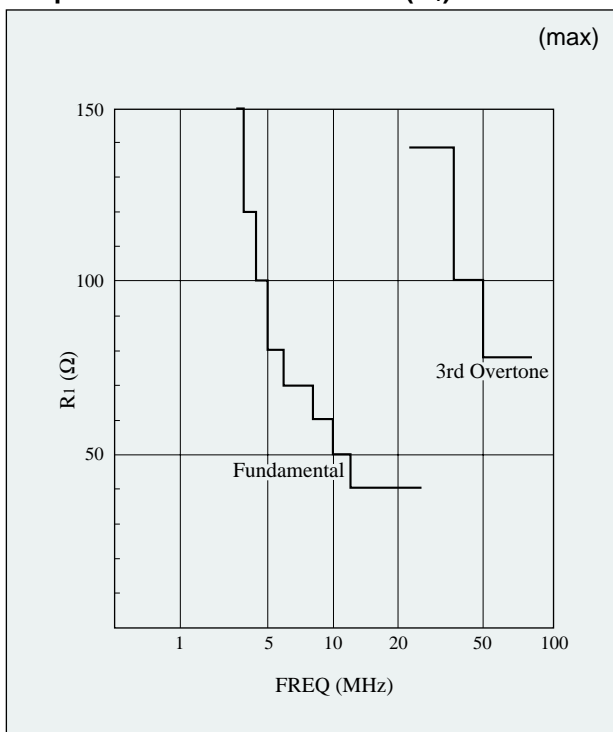
Standard load capacitance may vary depending on the frequency.

## ● Dimensions

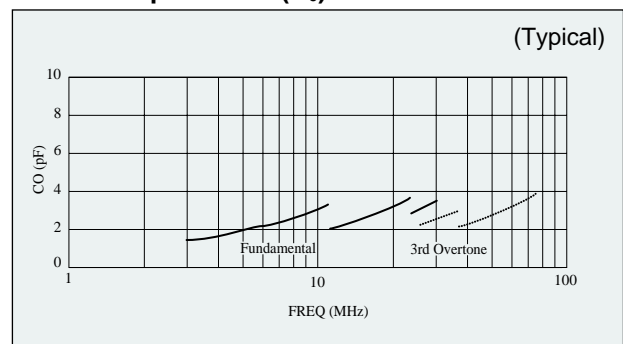


## ■ Technical Guidance (AT-51)

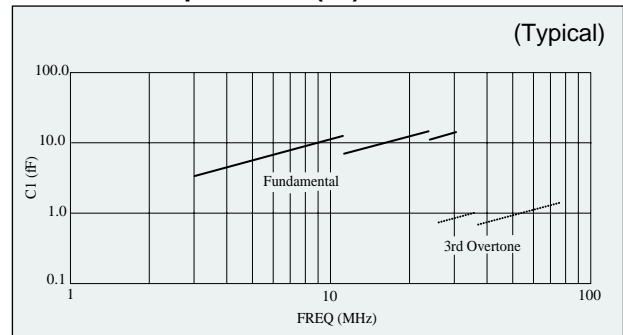
### ● Equivalent Series Resistance ( $R_1$ )



### ● Shunt Capacitance ( $C_0$ )



### ● Motional Capacitance ( $C_1$ )



■ Table 6  
Standard Frequencies and Specifications (AT-51)

<Fundamental>

Standard Frequency (MHz)								
3.1875	4.5511	6.510	8.545	10.43847	13.560	15.994	18.285714	21.120
3.2000	4.5568	6.5268	8.550	10.500	13.574	15.996	18.2912	21.173
3.250	4.58496	6.545	8.6436	10.620	13.600	16.000	18.355	21.245
3.2768	4.608	6.550	8.664	10.6935	13.631488	16.0096	18.432	21.400
3.3939	4.619	6.552	8.867238	10.695	13.750	16.010	18.4408	21.4631
3.541	4.6957	6.5536	8.80435	10.700	13.760	16.020	18.560	21.47727
3.5712	4.700	6.570	9.000	10.73863	13.80030	16.104	18.62514	21.524476
3.575611	4.704	6.573882	9.015	10.752	13.824	16.11182	18.69217	21.5606
3.579545	4.750	6.575	9.0744	10.7803	13.86092	16.128	18.752	21.600
3.581	4.767	6.5863	9.0905	11.000	13.875	16.200	18.816	21.811
3.582056	4.7727	6.6667	9.110192	11.0592	14.180	16.257	18.868	22.000
3.583125	4.790594	6.68767	9.14076	11.112	14.1875	16.273	18.9375	22.1184
3.600	4.800	6.75663	9.216	11.150	14.21875	16.281	19.005408	22.500
3.6385	4.807284	6.76438	9.233016	11.1552	14.2375	16.3006	19.045	22.550
3.640	4.883	6.77219	9.30213	11.160	14.280	16.325376	19.069928	22.5792
3.648	4.900	6.810	9.3389	11.250	14.2848	16.345	19.0856	22.7692
3.666	4.90625	6.815744	9.342812	11.268	14.30244	16.380	19.0909	22.800
3.6864	4.907029	6.8985	9.371603	11.2896	14.31818	16.384	19.13856	22.846
3.700	4.9152	6.9666	9.392	11.400	14.320	16.385	19.180	22.902
3.72827	4.917	6.9707	9.408	11.500	14.328224	16.416	19.200	22.909088
3.7343	4.9378	6.9732	9.437184	11.520	14.3728	16.5567	19.25	22.90988
3.794	4.955	6.9988	9.475	11.534336	14.400	16.5888	19.3125	22.953
3.802	4.981	7.0013	9.495	11.54127	14.484	16.590	19.350	23.040
3.840	5.000	7.15909	9.53125	11.580224	14.500	16.600	19.401256	23.067
3.862625	5.011	7.175	9.50938	11.6736	14.572268	16.610	19.434904	23.178
3.8912	5.013504	7.200	9.5808	11.71876	14.576198	16.615	19.440	23.19314
3.928231	5.0688	7.250	9.600	11.7375	14.592	16.620	19.456	23.328
3.93216	5.0706	7.352	9.658	11.80128	14.6102	16.625	19.500	23.684
3.9672	5.089	7.3728	9.8122	11.880	14.700	16.630	19.600	23.940
3.976	5.103	7.3764	9.820	11.890	14.721	16.640	19.6608	24.000
3.992	5.1056	7.38641	9.82656	11.8951	14.725	16.6433	19.670	24.192
3.9935	5.120	7.67386	9.8304	11.9318	14.744	16.64728	19.71495	24.300
3.996	5.2553	7.680	9.84375	11.94375	14.7456	16.6567	19.800	24.450
4.000	5.333333	7.86432	9.84498	11.9808	14.770	16.6633	19.8437	24.540
4.0015	5.390623	7.984	9.85781	11.98135	14.800	16.666	19.8975	24.576
4.00896	5.439488	7.9872	9.915597	12.000	14.815	16.670	19.90656	24.586
4.011	5.5296	7.994	9.924	12.0072	14.850	16.77721	19.9465	25.000
4.021	5.6196	8.000	9.92674	12.057	14.865	16.800	19.968	25.172
4.02797	5.6448	8.0048	9.951	12.1528	14.910504	16.820	19.975	25.175
4.032	5.699525	8.008	9.97699	12.15871	14.9946	16.900	19.9825	25.42656
4.045	5.72727	8.009	9.982	12.160	15.000	16.9344	19.9937	26.800
4.048	5.7285	8.015	9.984	12.288	15.0528	16.99301	19.995	26.900
4.055	5.760	8.0256	9.998	12.352	15.1983	17.100	20.000	27.000
4.096	5.824	8.042	10.000	12.3678	15.300	17.2032	20.0013	27.500
4.1334	5.850	8.050	10.002	12.480	15.360	17.2872	20.005	27.600
4.138	5.85938	8.062	10.005	12.500	15.500	17.30778	20.0125	27.750
4.1472	5.910	8.064	10.008	12.544	15.520	17.445	20.013	27.97185
4.192	5.94755	8.065	10.010	12.58291	15.5367	17.57814	20.025	28.224
4.194304	5.955	8.188	10.012	12.586875	15.5433	17.625	20.134875	28.375
4.200	5.9904	8.192	10.0187	12.5884	15.5567	17.6632	20.13985	28.4961
4.202	5.993	8.200	10.050	12.740625	15.570	17.700	20.200	28.4971
4.210	6.000	8.215	10.157	12.754843	15.5767	17.734475	20.250	28.500
4.286	6.017	8.250	10.17813	12.800	15.590	17.776	20.284	28.63636
4.2944	6.144	8.2944	10.200	12.8832	15.600	17.800	20.400	
4.2986	6.176	8.318091	10.215	12.9024	15.610	17.842656	20.4066	
4.3008	6.2308	8.319315	10.220	13.000	15.6233	17.860	20.460	
4.332	6.236	8.3809	10.240	13.050	15.625	17.900	20.480	
4.380	6.291	8.388	10.245	13.150	15.6433	17.920	20.517813	
4.400	6.29365	8.388608	10.250	13.2256	15.6567	18.000	20.61612	
4.40625	6.300	8.3935	10.255	13.300	15.6672	18.080	20.736	
4.4112	6.3488	8.400	10.258888	13.336	15.800	18.084	20.791387	
4.430	6.400	8.410	10.260	13.400	15.900	18.140	20.945	
4.433619	6.4512	8.448	10.320	13.40155	15.970	18.200	20.950	
4.4361875	6.47168	8.4672	10.350	13.500	15.9744	18.2202	21.000	
4.500	6.500	8.486	10.368	13.5168	15.990784	18.229153	21.0526	

# CRYSTAL UNITS

## <3rd overtone>

Standard Frequency (MHz)		
26.000	35.557	53.693175
26.412	36.000	53.750
26.5625	36.750	54.000
26.600	36.860	54.050
26.66488	36.864	54.165
26.718	37.632	54.200
26.800	38.000	54.315
27.000	38.880	55.000
27.040	38.900	56.000
27.145	38.912	56.125
27.300	39.000	56.448
27.320	39.168	57.000
27.648	39.3216	58.250
27.778	39.590	60.000
27.780	39.750	61.500
28.30150	39.800	61.560
28.319	39.820	62.000
28.63636	39.950	62.500
28.800	39.960	64.000
29.000	39.965	65.000
29.044	40.000	65.536
29.1429	40.230	66.000
29.200	40.235	66.660
29.40416	40.320	66.6667
29.4912	40.5	70.000
29.498928	40.570	75.000
29.650	40.609	
29.974	40.960	
30.000	41.472	
30.720	41.539	
30.875	42.000	
30.900	42.336	
31.000	42.9145	
31.330	42.9545	
31.334	43.550	
31.500	44.2368	
31.700	44.400	
31.9488	44.440	
31.950	44.4444	
32.000	44.545	
32.164	44.900	
32.215905	45.000	
32.256	45.1584	
32.514	45.600	
32.576	45.900	
32.579	46.200	
32.768	46.4333	
32.800	47.9232	
33.000	48.000	
33.030	48.384	
33.300	48.540	
33.330	48.640	
33.333	49.152	
33.340	49.34268	
33.8688	49.381	
34.000	49.500	
34.200	49.535	
34.368	49.800	
34.540	49.830	
34.5744	50.000	
34.992	50.350	
35.000	50.691667	
35.190	51.200	
35.2512	52.000	
35.328	52.416	

## <Equivalent Series Resistance (Ω)>

Overtone	Standard Frequency (MHz)	Equivalent Series Resistance (Ω)
Fundamental	3.1875~3.2	400max
	3.2~3.5	250max
	3.5~4.0	150max
	4.0~4.5	120max
	4.5~5.0	100max
	5.0~6.0	80max
	6.0~8.0	70max
	8.0~10.0	60max
	10.0~12.0	50max
	12.0~	40max
3rd overtone	26.0~35.0	140max
	35.0~48.0	100max
	48.0~	80max