

CMC502-SERIES



- Low Power Consumption of 3.5mA typical at 1.8V
- 52 Standard frequencies between 3.57MHz and 77.760 MHz
- HCMOS/ LVC MOS compatible output
- SMD package 5.0 x 3.2 mm

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
			Min.	Typ.	Max.	
Frequency Range	f_0	52 standard frequencies between 3.57MHz and 77.760MHz	3.57		77.760	MHz
Supply Voltage	V_s	$V_s \pm 5\%$	1.8		3.3	V
Supply Current	I_s	$V_s = 1.8V, f_0=20MHz, no load$ $V_s = 2.5V, f_0=20MHz, no load$ $V_s = 2.8V, f_0=20MHz, no load$ $V_s = 3.3V, f_0=20MHz, no load$		3.5 3.7 3.8 3.8	4.1 4.2 4.5 4.5	mA mA mA mA
Operating Temperature	T_a		-20 -40		+70 +85	°C °C
Frequency Stability	$\Delta f/f_0$	Including First Year aging, initial frequency tolerance at 25°C, Frequency stability over temperature range, supply variation, load variation	-20 -25 -50		+20 +25 +50	ppm ppm ppm
Enable / Disable/ Standby Function	E/D/St	Enable = Open or "1" ($V_{IH} \geq 0.75V_s$) (output signal active) Disable = GND or "0" ($V_{IL} < 0.25V_s$) (output high impedance, oscillator operates) Standby = GND or "0" ($V_{IL} < 0.25V_s$) (output weakly pulled down, oscillator sleep mode)	0.75Vs		0.25Vs 0.25Vs	V V V
Enable / Disable Time	$T_{E/D}$	$f_0=110MHz$			130	ms
Enable / Disable Current	$I_{E/D}$	$V_s=1.8V, E/D = GND$ $V_s=2.5V$ to 3.3V, E/D =GND Output in high impedance state			4.0 4.2	mA mA
Standby Current	I_{stby}	STBY=GND, $V_s=1.8V$ STBY=GND, $V_s=2.5V$ STBY=GND, $V_s=2.8V$ to 3.3V Output is weakly pulled down		0.2 1.1 2.1	1.3 2.5 4.3	μA μA μA
Startup Time	T_{ST}				5	ms
RMS Phase Jitter	J_{PH}	$f_0=75MHz, BW 900KHz$ to 7.5MHz $f_0=75MHz, BW 12KHz$ to 20MHz		0.5 1.3	0.9 2.0	ps ps
RMS Period Jitter	J_P	$f_0=75MHz$		1.8	3	ps
Peak to Peak Period Jitter	J_{PK-PK}	$f_0=75MHz, V_s=2.5$ to 3.3V $f_0=75MHz, V_s=1.8V$		12 14	25 30	ps ps

CMC502-SERIES

OUTPUT CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVC MOS	Output Levels	V_{OH}	$I_{oh} = -2 \text{ mA (} V_s = 1.8V \text{)}$ $I_{oh} = -3 \text{ mA (} V_s = 2.5V \text{ or } 2.8V \text{)}$ $I_{oh} = -4 \text{ mA (} V_s = 3.0V \text{ or } 3.3V \text{)}$	0.9 V_s			V
		V_{OL}	$I_{ol} = 2 \text{ mA (} V_s = 1.8V \text{)}$ $I_{ol} = 3 \text{ mA (} V_s = 2.5V \text{ or } 2.8V \text{)}$ $I_{ol} = 4 \text{ mA (} V_s = 3.0V \text{ or } 3.3V \text{)}$			0.1 V_s	V
	Duty Cycle	DC	50% Output level	45		55	%
	Output Load	O_{CL}	$T_a = 25^\circ C$		15	60	pF

Table 1. Rise/Fall Time vs. CLoad (CL), $V_s = 1.8V$

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@20% to 80% (ns) typ.				
D0, default	0.65	1.30	2.40	3.35	4.56
D1	0.70	1.48	2.64	3.68	5.09
D2	0.78	1.66	2.94	4.09	5.74
D3	0.93	1.91	3.32	4.66	6.48
D4	1.65	3.23	5.79	8.18	11.08
D5	2.11	4.31	7.65	10.77	14.47
D6	3.19	6.35	11.00	16.01	21.52
D7	6.16	11.61	22.00	31.27	39.91

Table 2. Rise/Fall Time vs. CLoad (CL), $V_s = 2.5V$

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@20% to 80% (ns) typ.				
D0	0.34	0.88	1.64	2.54	3.32
D1	0.43	0.96	1.81	2.79	3.65
D2, default	0.54	1.00	2.01	3.10	4.01
D3	0.62	1.28	2.27	3.51	4.45
D4	1.09	2.20	3.88	5.86	7.57
D5	1.45	2.81	5.16	7.65	9.88
D6	2.11	4.27	7.64	11.20	14.49
D7	4.13	8.25	12.82	21.45	27.79

CMC502-SERIES

Table 3. Rise/Fall Time vs. CLoad (CL), Vs=2.8V

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@20% to 80% (ns) typ.				
D0	0.29	0.81	1.48	2.29	2.99
D1	0.34	0.88	1.64	2.52	3.30
D2, default	0.44	1.00	1.83	2.82	3.67
D3	0.55	1.12	2.08	3.22	4.08
D4	0.97	2.00	3.54	5.43	6.93
D5	1.29	2.57	4.72	7.01	9.06
D6	1.94	3.90	7.03	10.24	13.34
D7	3.77	7.54	12.28	19.57	25.27

Table 4. Rise/Fall Time vs. CLoad (CL), Vs=3.0V

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@20% to 80% (ns) typ.				
D0	0.27	0.76	1.39	2.16	2.85
D1	0.30	0.83	1.55	2.40	3.13
D2	0.38	0.92	1.72	2.71	3.51
D3, default	0.51	1.00	1.97	3.07	3.90
D4	0.89	1.92	3.39	5.20	6.64
D5	1.22	2.46	4.54	6.76	8.62
D6	1.84	3.71	6.72	9.86	12.68
D7	3.60	7.21	11.97	18.74	24.30

Table 5. Rise/Fall Time vs. CLoad (CL), Vs=3.3V

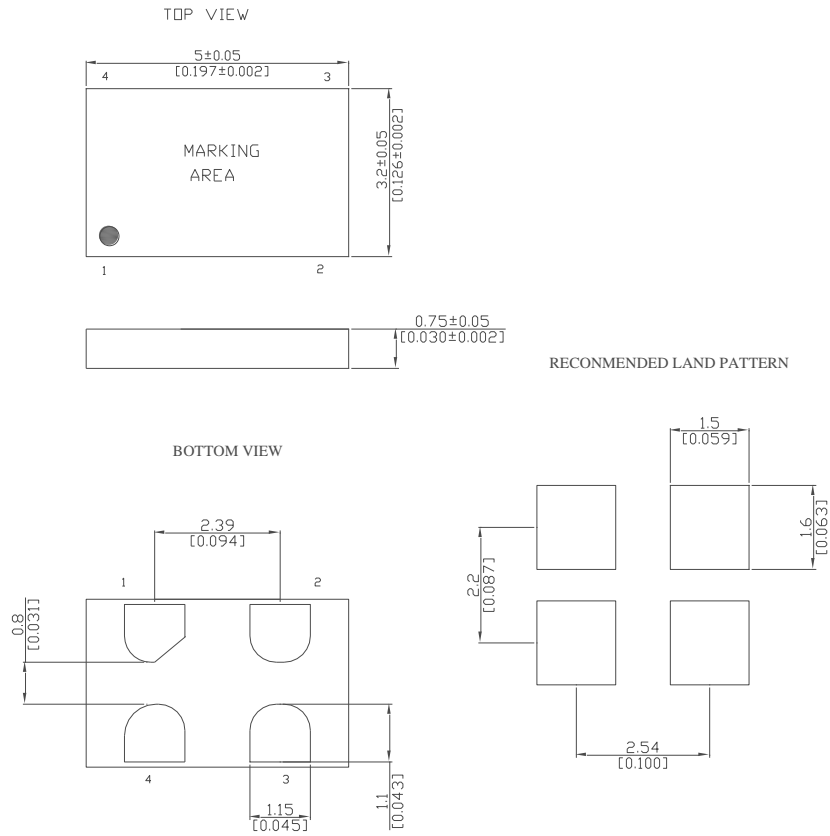
CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@20% to 80% (ns) typ.				
D0	0.25	0.72	1.31	1.83	2.61
D1	0.28	0.79	1.46	2.05	2.93
D2	0.33	0.87	1.64	2.30	3.35
D3, default	0.46	1.00	1.86	2.60	3.84
D4	0.81	1.82	3.22	4.52	6.33
D5	1.16	2.33	4.29	6.04	8.34
D6	1.74	3.50	6.38	8.98	12.19
D7	3.39	6.88	11.63	17.56	23.59

Table 6. List of Supported Frequencies

3.57 MHz	4 MHz	4.096 MHz	6 MHz	7.3728 MHz	8.192 MHz	10 MHz	12 MHz	14 MHz
18.432MHz	19.2 MHz	20 MHz	24 MHz	24.576MHz	25 MHz	25.000625MHz	26 MHz	27 MHz
28.6363 MHz	30 MHz	31.25 MHz	32.768 MHz	33 MHz	33.3 MHz	33.33MHz	33.333 MHz	33.3333MHz
33.33333MHz	35.84MHz	37.5 MHz	38 MHz	38.4 MHz	40 MHz	40.5MHz	48 MHz	50 MHz
54 MHz	60 MHz	62.5 MHz	65 MHz	66 MHz	66.6 MHz	66.66 MHz	66.666MHz	66.6666MHz
66.66666MHz	72 MHz	74.175824MHz	74.176 MHz	74.25 MHz	75 MHz	77.760 MHz		

CMC502-SERIES

MECHANICAL DIMENSIONS AND PIN FUNCTIONING



PIN	SYMBOL	FUNCTION
1	E/D/STBY/N	H :Enable output frequency L:Disable output frequency , high impedance In E/D or STBY mode connect a pull-up resistor of 10kΩ to pin 1, in case not externally driven. In case pin1 is left floating, use N option
2	GND	Electrical Ground
3	OUTPUT	Output Signal
4	Vs	Supply Voltage

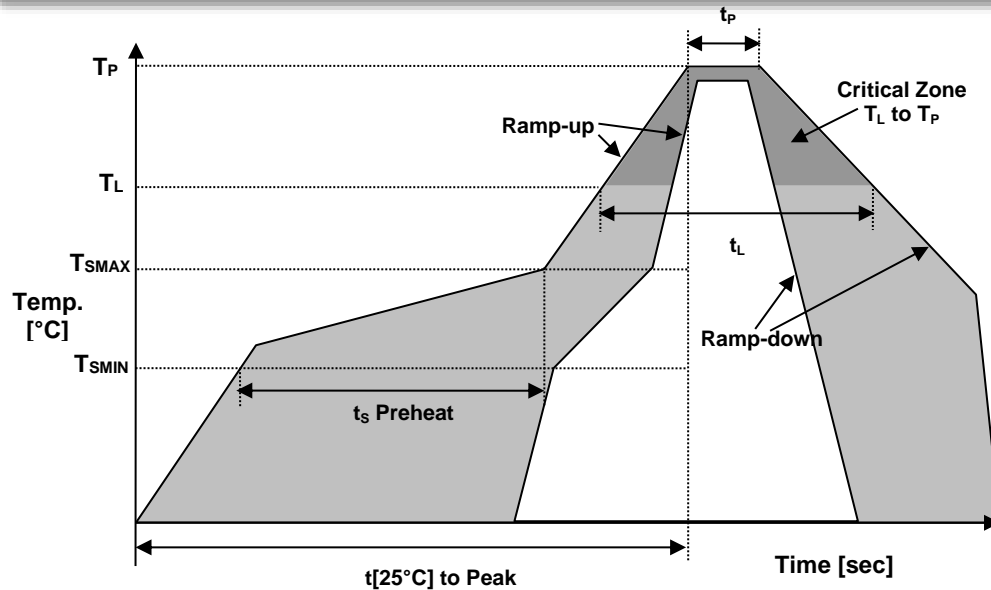
Note: Connect a capacitor of 0.1µF or higher value between Vs and GND

CMC502-SERIES

ENVIRONMENTAL

Soldering	MIL-STD-883F, Method 2003
Moisture Sensitivity Level	MSL 1 at 260°C
Temperature Cycle	JESD22, Method A104
Vibration	MIL-STD-883F, Method 2007
Mechanical Shock	MIL-STD-883F, Method 2002
Storage Temperature	-65° +150°C

REFLOW PROFILE



Recommended Solder Reflow Profile		
Temperature Min Preheat	T_{SMIN}	150°C
Temperature Max Preheat	T_{SMAX}	200°C
Time (T_{SMIN} to T_{SMAX})	t_s	60-180 sec.
Temperature	T_L	217°C
Peak Temperature	T_P	260°C
Ramp-up rate	R_{UP}	3°C/sec max.
Ramp-down rate	R_{DOWN}	6°C/sec max.
Time within 5°C of Peak Temperature	t_p	10 sec
Time $t[25°C]$ to Peak Temperature	$t[25°C]$ to Peak	480 sec.
Time	t_L	60-150 sec.

CMC502-SERIES

ORDERING INFORMATION

SERIES	SUPPLY VOLTAGE (V)	Frequency Stability	TEMP RANGE (°C)	Output Drive	Enable/Disable Function	-	OUTPUT FREQUENCY (MHz)
CMC502	18: Vs=1.8V 25: Vs=2.5V 28: Vs=2.8V 30: Vs=3.0V 33: Vs=3.3V XX: Vs=2.5V-10% to 3.3V+10%	A:±20ppm B:±25ppm C:±50ppm	U: -20~70 V: -40~85	1:D0 2:D1 3:D2 4:D3 5:D4 6:D5 7:D6 8:D7 See table 1 to 5	E: E/D output S:Standby N: No connect	-	See table 6

APPROVALS

Eng. approval, date: SP, 07/05/2016

Created by, date: SP, 07/05/2016

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