CMC503-SERIES

- **Ultra low phase jitter: 0.5ps (12 kHz to 20MHz)**
- **LVCMOS/ LVTTL compatible output**
- **SMD package 5.0 x 3.2 mm**

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
			Min.	Typ.	Max.	
Frequency Range	f_0	Any Frequency between Frequency range, accurate to 6 decimal places	1		80	MHz
Supply Voltage	Vs	Supply voltages between 2.5V and 3.3V can be supported in increments of 0.1V	1.71 2.25 2.52 2.97	1.8 2.5 2.8 3.3	1.89 2.75 3.08 3.63	V V V V
Supply Current	Is	Vs = 1.8V, f_0=20MHz, no load condition Vs = 2.5V,2.8V and 3.3V f_0=20MHz, no load condition		29 31	31 33	mA mA
Operating Temperature	T_a	Extended Commercial Industrial	-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	-10 -20 -25 -50		+10 +20 +25 +50	ppm ppm ppm ppm
Long term stability, aging	$\Delta f/\Delta t_y$ $\Delta f/\Delta t_y$	First year 10 years	-1.5 -5.0		1.5 5.0	ppm ppm
Enable / Disable Time	$T_{E/D}$	f_0=80MHz, for other frequencies, $T_{E/D}$ =100ns+ 3 cycles			150	ms
Enable / Disable Current	$I_{E/D}$	Vs=1.8V, E/D =GND, output is weakly pulled down Vs=2.5V,2.8Vor 3.3V, E/D =GND output is weakly pulled down			30 31	mA mA
Standby Current	Istby	STBY=GND,Vs=1.8V STBY=GND,Vs=2.5V,2.8V or 3.3V Output is weakly pulled down			10 70	µA µA
Startup Time	T_{ST}	Measured from the time Vs reaches its rated minimum value		7	10	ms
Resume Time	T res	Measured from the time STBY pin crosses 50% threshold		6	10	ms
Rise/ Fall Time	Tr / Tf	C_L = 15pF, 10% - 90% Vs		1.5	2.0	ns
RMS Phase Jitter	J_{PH}	f_0=10MHz,BW 12KHz to 20MHz		0.5	1.0	ps
RMS Period Jitter	J_P	f_0=75 MHz,Vs=2.5V,2.8V or 3.3V f_0=75 MHz, Vs=1.8V		1.5 2.0	2.0 3.0	ps ps
Input Voltage High	VIH	Pin 1, E/D or STBY	70%			Vs
Input Voltage Low	VIL	Pin 1, E/D or STBY			30%	Vs
Input pull-up impedance	Z in	Pin 1 E/D High or Low, STBY= High STBY = Low	2	100	250	kΩ MΩ

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OUTPUT CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVCMOS	Output Levels	V_{OH}	I_{oh}= -3 mA (Vs=1.8V) I_{oh}= -6 mA (Vs= 2.5V, 2.8V or 3.3V)	0.9 Vs			V
		V_{OL}	I_{ol}=3 mA (Vs=1.8V) I_{ol}=6 mA (Vs= 2.5V, 2.8V or 3.3V)			0.1Vs	V
	Duty Cycle	DC	all Vs	45		55	%
	Output Load	CL	Ta=25 °C		15		pF

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

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@10% to 90%	(ns) typ.			
D0	0.51	1.09	1.76	2.45	3.24
D1	0.66	1.15	1.84	2.58	3.41
D2	0.77	1.20	1.94	2.72	3.61
D3 , default	0.82	1.24	2.07	2.89	3.82
D4	0.86	1.29	2.24	3.04	4.06
D5	0.88	1.34	2.39	3.25	4.32
D6	0.92	1.41	2.56	3.52	4.64
D7	0.97	1.50	2.74	3.80	4.98
D8	1.01	1.64	2.95	4.12	5.40
D9	1.07	1.88	3.23	4.50	5.87
D10	1.22	2.10	3.57	5.00	6.46
D11	1.49	2.28	3.96	5.55	7.15
D12	1.59	2.59	4.49	6.25	7.98
D13	1.76	3.01	5.14	7.10	9.15
D14	2.19	3.52	6.00	8.31	10.59
D15	2.62	4.25	7.20	9.81	12.65
D16	3.27	5.30	8.89	12.18	15.75
D17	4.38	7.05	11.61	16.17	20.83
D18	6.50	10.27	16.21	23.92	30.73
D19	12.45	17.68	19.48	46.21	57.82

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

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@10% to 90%	(ns) typ.			
D0	0.30	0.57	1.29	1.70	2.28
D1	0.31	0.59	1.37	1.77	2.39
D2	0.32	0.62	1.44	1.85	2.50
D3	0.33	0.65	1.51	1.96	2.65
D4	0.34	0.71	1.58	2.07	2.80
D5	0.36	0.83	1.66	2.20	2.98
D6	0.38	0.99	1.76	2.37	3.18
D7	0.44	1.10	1.86	2.56	3.43
D8, default	0.67	1.20	2.00	2.79	3.69
D9	0.87	1.29	2.21	3.04	4.02
D10	0.90	1.37	2.44	3.34	4.42
D11	0.93	1.48	2.69	3.73	4.92
D12	0.98	1.69	3.03	4.20	5.51
D13	1.06	2.04	3.50	4.84	6.26
D14	1.50	2.33	4.11	5.68	7.33
D15	1.67	2.87	4.94	6.85	8.80
D16	2.21	3.57	6.19	8.55	11.04
D17	2.93	4.78	8.15	11.19	14.59
D18	4.42	7.18	11.93	16.60	21.38
D19	8.68	13.59	18.36	32.70	42.06

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

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@10% to 90%	(ns) typ.			
D0	0.29	0.54	1.13	1.55	2.13
D1	0.30	0.56	1.22	1.63	2.22
D2	0.30	0.57	1.31	1.72	2.30
D3	0.31	0.60	1.39	1.80	2.43
D4	0.32	0.63	1.46	1.89	2.57
D5	0.33	0.67	1.54	2.00	2.75
D6	0.35	0.78	1.63	2.15	2.92
D7	0.37	0.96	1.72	2.33	3.15
D8, default	0.41	1.08	1.84	2.52	3.36
D9	0.62	1.19	1.99	2.76	3.68
D10	0.87	1.29	2.21	3.03	4.05
D11	0.90	1.38	2.48	3.40	4.50
D12	0.94	1.51	2.78	3.84	5.06
D13	1.00	1.79	3.20	4.43	5.77
D14	1.19	2.14	3.76	5.21	6.72
D15	1.59	2.57	4.54	6.27	8.07
D16	2.00	3.25	5.66	7.84	10.11
D17	2.68	4.40	7.53	10.29	13.37
D18	4.06	6.66	11.04	15.31	19.80
D19	7.93	12.69	17.94	30.10	38.89

Table 4. Rise/Fall Time vs. CLoad (CL), Vs=3.3V

CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@10% to 90%	(ns) typ.			
D0	0.29	0.52	0.95	1.41	1.90
D1	0.30	0.54	1.02	1.47	1.97
D2	0.30	0.55	1.12	1.54	2.07
D3	0.30	0.56	1.22	1.62	2.17
D4	0.32	0.58	1.31	1.69	2.28
D5	0.32	0.60	1.40	1.79	2.43
D6	0.33	0.63	1.48	1.89	2.61
D7	0.34	0.70	1.56	2.04	2.80
D8	0.36	0.87	1.66	2.23	3.03
D9	0.38	1.04	1.77	2.47	3.31
D10, default	0.48	1.15	1.95	2.72	3.65
D11	0.86	1.25	2.21	3.03	4.07
D12	0.90	1.36	2.50	3.46	4.58
D13	0.94	1.51	2.86	3.97	5.25
D14	1.01	1.91	3.38	4.69	6.14
D15	1.43	2.26	4.09	5.66	7.34
D16	1.65	2.92	5.12	7.10	9.17
D17	2.31	3.95	6.88	9.42	12.24
D18	3.61	6.02	10.19	13.98	18.10
D19	7.18	11.59	17.24	27.57	35.57

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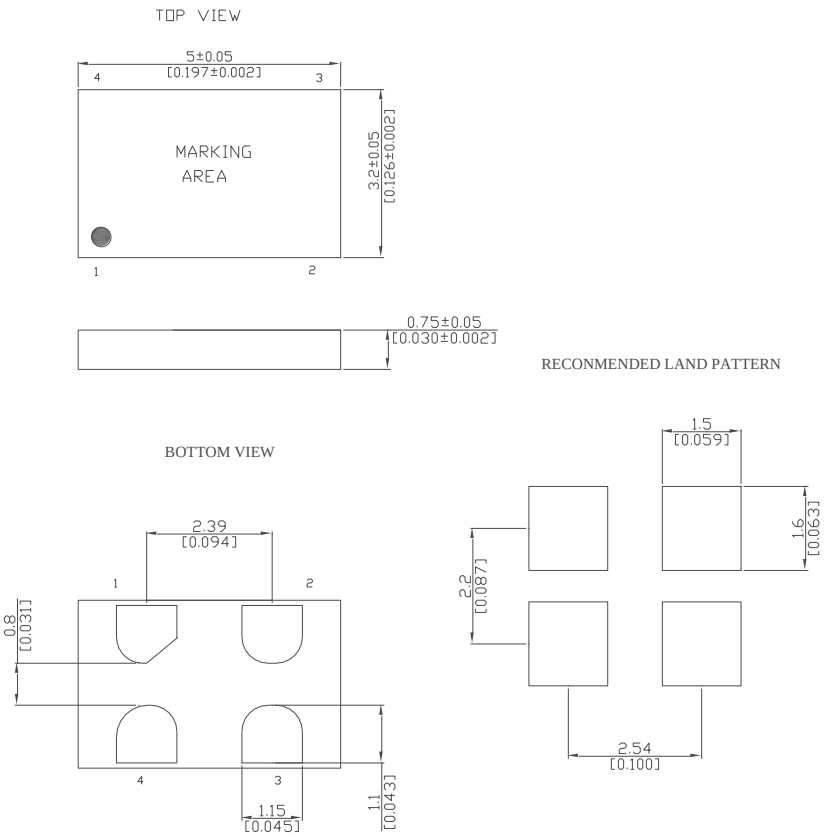
MECHANICAL DIMENSIONS AND PIN FUNCTIONING



PIN	SYMBOL	FUNCTION
1	E/D/STBY	E/D H or Open* :Enable output frequency L :Disable output frequency , high impedance STBY H or Open* : Enable output frequency L : Output is low (weak pull down) Device goes to sleep mode. Supply current (Is) reduces to Istby
2	GND	Electrical Ground
3	OUTPUT	Output Signal
4	Vs	Supply Voltage

Note: *A pull-up resistor of <10kΩ between ED/STBY pin and Vs is recommended in high noise environment.

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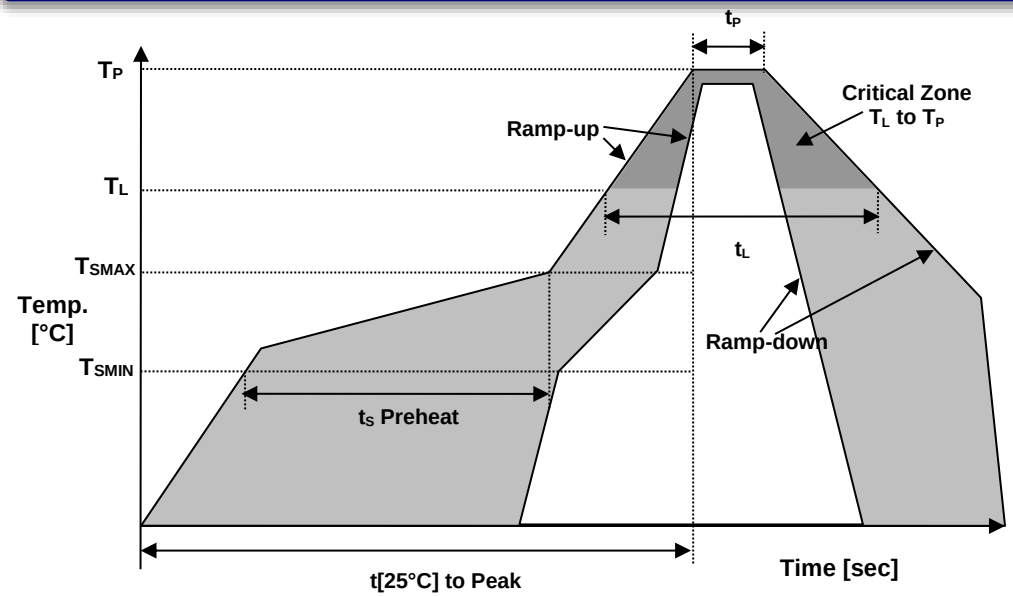
ENVIRONMENTAL

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.

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ORDERING INFORMATION

SERIES	SUPPLY VOLTAGE (V)	Frequency Stability	TEMP RANGE (°C)	Output Drive	Enable/ Disable Function	-	OUTPUT FREQUENCY (MHz)
CMC503	18: Vs=1.8V 25: Vs=2.5V 28: Vs=2.8V 33: Vs=3.3V	A:±10ppm B:±20ppm C:±25ppm D:±50ppm	U: -20~70 V: -40~85	1:D0 11:D11 2:D1 12:D12 3:D2 13:D13 4:D3 14:D14 5:D4 15:D15 6:D5 16:D16 7:D6 17:D17 8:D7 18:D18 9: D8 19:D19 10:D9 See table 1 to 4	E: E/D output S:Standby	-	

APPROVALS	
Eng. approval, date:	SP, 07/11/2016
Created by, date:	SP, 07/11/2016
Revision: A	