

## CMC253-SERIES



- Ultra low phase jitter: 0.5ps ( 12 kHz to 20MHz )
- LVCMOS/ LVTTTL compatible output
- SMD package 2.5 x 2.0 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	$V_s$	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	$I_s$	$V_s = 1.8V, f_0=20MHz$ , no load condition $V_s = 2.5V, 2.8V$ 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	$I_{E/D}$	$V_s=1.8V, E/D=GND$ , output is weakly pulled down $V_s=2.5V, 2.8V$ or $3.3V, E/D=GND$ output is weakly pulled down			30 31	mA mA
Standby Current	$I_{stby}$	STBY=GND, $V_s=1.8V$ STBY=GND, $V_s=2.5V, 2.8V$ or $3.3V$ Output is weakly pulled down			10 70	$\mu A$ $\mu A$
Startup Time	$T_{ST}$	Measured from the time $V_s$ 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	$T_r / T_f$	$CL = 15pF, 10\% - 90\% V_s$		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	$J_P$	$f_0=75 MHz, V_s=2.5V, 2.8V$ or $3.3V$ $f_0=75 MHz, V_s=1.8V$		1.5 2.0	2.0 3.0	ps ps
Input Voltage High	$V_{IH}$	Pin 1, E/D or STBY	70%			Vs
Input Voltage Low	$V_{IL}$	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		100	250	k $\Omega$ M $\Omega$

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### OUTPUT CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVCMOS	Output Levels	$V_{OH}$	$I_{OH} = -3 \text{ mA ( } V_S = 1.8 \text{ V )}$ $I_{OH} = -6 \text{ mA ( } V_S = 2.5 \text{ V, } 2.8 \text{ V or } 3.3 \text{ V )}$	0.9 $V_S$			V
		$V_{OL}$	$I_{OL} = 3 \text{ mA ( } V_S = 1.8 \text{ V )}$ $I_{OL} = 6 \text{ mA ( } V_S = 2.5 \text{ V, } 2.8 \text{ V or } 3.3 \text{ V )}$			0.1 $V_S$	V
	Duty Cycle	DC	all $V_S$	45		55	%
	Output Load	CL	$T_a = 25 \text{ }^\circ\text{C}$		15		pF

Table 1. Rise/Fall Time vs. CLoad ( CL ),  $V_S = 1.8 \text{ V}$

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 ),  $V_S = 2.5 \text{ V}$

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

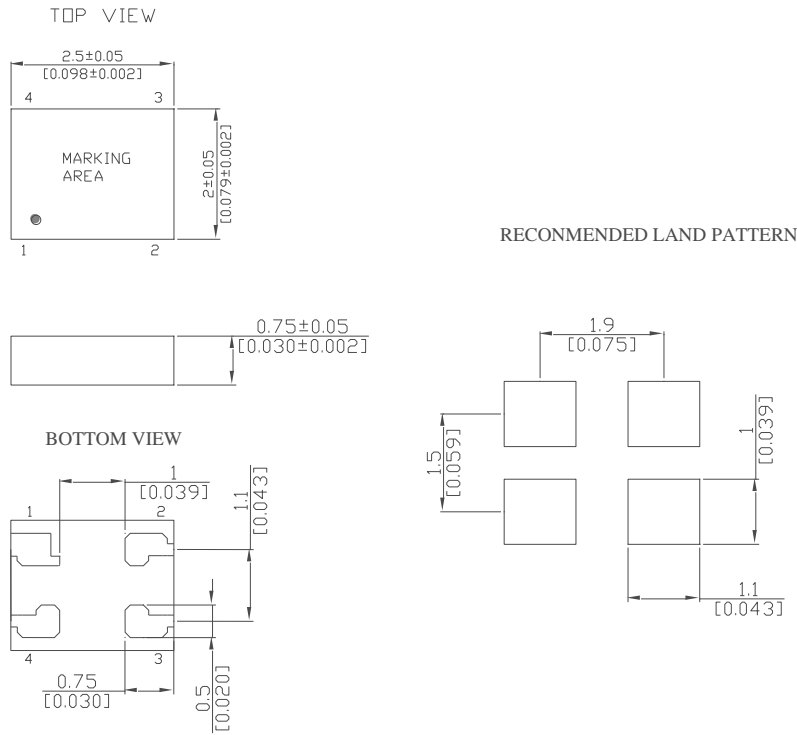
CL	5pF	15pF	30pF	45pF	60pF
Drive Strength	@10% to 90%	(ns) typ.			
D0	0.29	0.54	1.13	1.55	2.13
D1	0.30	0.56	1.22	1.63	2.22
D2	0.30	0.57	1.31	1.72	2.30
D3	0.31	0.60	1.39	1.80	2.43
D4	0.32	0.63	1.46	1.89	2.57
D5	0.33	0.67	1.54	2.00	2.75
D6	0.35	0.78	1.63	2.15	2.92
D7	0.37	0.96	1.72	2.33	3.15
D8, default	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

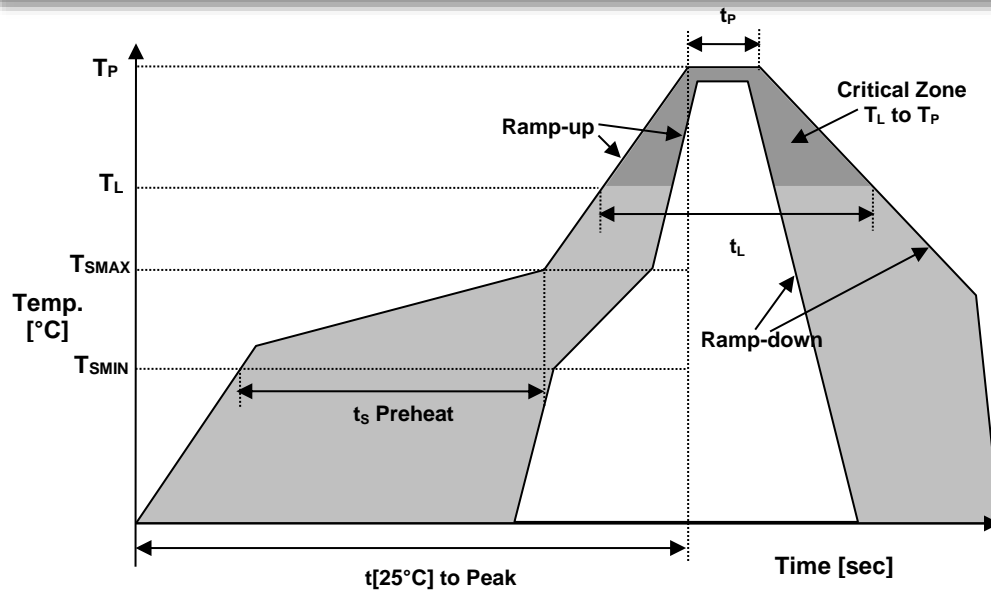
Note: \*A pull-up resistor of <10kΩ between ED/STBY pin and Vs is recommended in high noise environment.

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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)
CMC253	18: Vs=1.8V	A:±10ppm	U: -20~70 V: -40~85	1:D0 11:D11	E: E/D output S:Standby	-	
	25: Vs=2.5V	B:±20ppm		2:D1 12:D12			
	28: Vs=2.8V	C:±25ppm		3:D2 13:D13			
	33: Vs=3.3V	D:±50ppm		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			

**APPROVALS**

Eng. approval, date: SP, 07/11/2016

Created by, date: SP, 07/11/2016

Revision: A