# CMC301-SERIES

- **Low Power Oscillator**
- **HCMOS/ LVCMOS output**
- **SMD package 3.2 x 2.5 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 | 1.0 | | 110.0 | MHz |
| Supply Voltage | Vs | | 1.8 | | 3.3 | V |
| Supply Current | Is | Vs = 1.8V, $f_0$=20MHz, no load<br>Vs = 2.5V, $f_0$=20MHz, no load<br>Vs = 2.8V, $f_0$=20MHz, no load<br>Vs = 3.3V, $f_0$=20MHz, no load | | 3.5<br>3.7<br>3.8<br>3.8 | 4.1<br>4.2<br>4.5<br>4.5 | mA<br>mA<br>mA<br>mA |
| Operating Temperature | $T_a$ | | -20<br>-40 | | +70<br>+85 | °C<br>°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<br>-25<br>-50 | | +20<br>+25<br>+50 | ppm<br>ppm<br>ppm |
| Enable / Disable/ Standby Function | E/D/St | Enable = Open or"1"($V_{IH}$≥0.75Vs) ( output signal active )<br>Disable = GND or "0"($V_{IL}$<0.25Vs ) ( output high impedance, oscillator operates )<br>Standby = GND or "0" $V_{IL}$<0.25Vs ) ( output weakly pulled down, oscillator sleep mode ) | 0.75Vs | | 0.25Vs<br>0.25Vs | V<br>V<br>V |
| Enable / Disable Time | $T_{E/D}$ | $f_0$=110MHz | | | 130 | ms |
| Enable / Disable Current | $I_{E/D}$ | Vs=1.8V, E/D =GND<br>Vs=2.5V to 3.3V, E/D =GND<br>Output in high impedance state | | | 4.0<br>4.2 | mA<br>mA |
| Standby Current | Istby | STBY=GND,Vs=1.8V<br>STBY=GND,Vs=2.5V<br>STBY=GND,Vs=2.8V to 3.3V<br>Output is weakly pulled down | | 0.2<br>1.1<br>2.1 | 1.3<br>2.5<br>4.3 | µA<br>µA<br>µA |
| Startup Time | $T_{ST}$ | | | | 5 | ms |
| RMS Phase Jitter | $J_{PH}$ | $f_0$=75MHz,BW 900KHz to 7.5MHz<br>$f_0$=75MHz,BW 12KHz to 20MHz | | 0.5<br>1.3 | 0.9<br>2.0 | ps<br>ps |
| RMS Period Jitter | $J_P$ | $f_0$=75MHz | | 1.8 | 3 | ps |
| Peak to Peak Period Jitter | $J_{PK-PK}$ | $f_0$=75MHz,Vs=2.5 to 3.3V<br>$f_0$=75MHz, Vs=1.8V | | 12<br>14 | 25<br>30 | ps<br>ps |

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## OUTPUT CHARACTERISTICS

| | PARAMETER | SYMBOL | CONDITION | VALUE | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ. | Max | |
| LVCMOS | Output Levels | $V_{OH}$ | $I_{oh}$= -2 mA ( Vs=1.8V )<br>$I_{oh}$= -3 mA ( Vs= 2.5V or 2.8V )<br>$I_{oh}$= -4 mA ( Vs=3.0V or 3.3V ) | 0.9 Vs | | | V |
| | | $V_{OL}$ | $I_{ol}$=2 mA ( Vs=1.8V )<br>$I_{ol}$=3 mA ( Vs= 2.5V or 2.8V )<br>$I_{ol}$=4 mA ( Vs=3.0V or 3.3V ) | | | 0.1Vs | V |
| | Duty Cycle | DC | 50% Output level | 45 | | 55 | % |
| | Output Load | $O_{CL}$ | Ta=25 °C | | 15 | 60 | pF |

**Table 1. Rise/Fall Time vs. CLoad ( CL ), Vs=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 ), Vs=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 |

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**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**

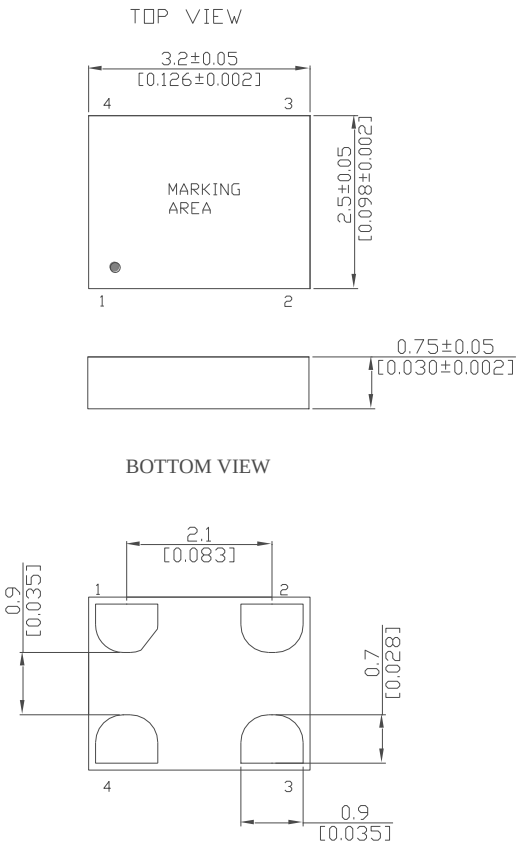
| CL | 5pF | 15pF | 30pF | 45pF | 60pF |
|---|---|---|---|---|---|
| Drive Strength | @20% to 80% | (ns) typ. | | | |
| D0 | 0.27 | 0.76 | 1.39 | 2.16 | 2.85 |
| D1 | 0.30 | 0.83 | 1.55 | 2.40 | 3.13 |
| D2 | 0.38 | 0.92 | 1.72 | 2.71 | 3.51 |
| D3, default | 0.51 | 1.00 | 1.97 | 3.07 | 3.90 |
| D4 | 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 |

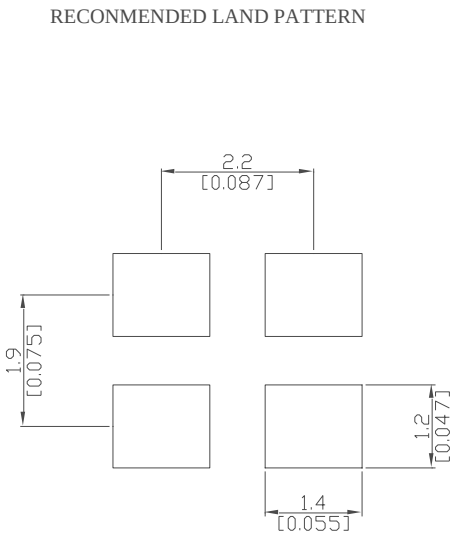
**Table 5. Rise/Fall Time vs. CLoad ( CL ), Vs=3.3V**

| 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 |

# CMC301-SERIES

## MECHANICAL DIMENSIONS AND PIN FUNCTIONING




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

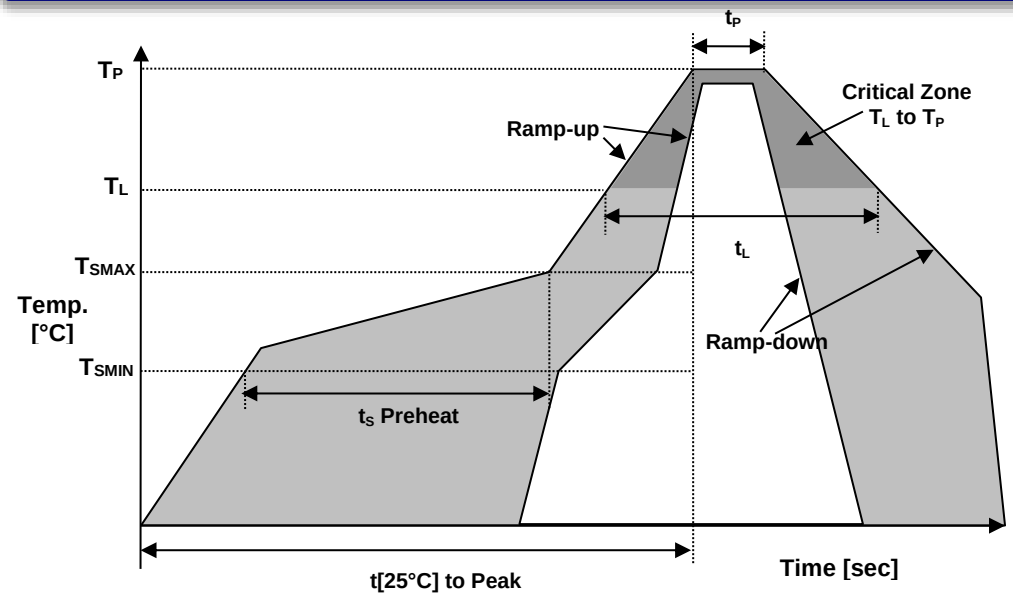
**Note: Connect a capacitor of 0.1µF or higher value between Vs and GND**

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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. |

# CMC301-SERIES

## ORDERING INFORMATION

| SERIES | SUPPLY VOLTAGE (V) | Frequency Stability | TEMP RANGE (°C ) | Output Drive | Enable/ Disable Function | - | OUTPUT FREQUENCY (MHz) |
|---|---|---|---|---|---|---|---|
| CMC30 | 18:Vs=1.8V<br>25: Vs=2.5V<br>28: Vs=2.8V<br>30: Vs=3.0V<br>33: Vs=3.3V<br>XX: Vs=2.5V-10% to 3.3V+10% | A:±20ppm<br>B:±25ppm<br>C:±50ppm | U: -20~70<br>V: -40~85 | 1:D0<br>2:D1<br>3:D2<br>4:D3<br>5:D4<br>6:D5<br>7:D6<br>8:D7<br>See table 1 to 5 | E: E/D output<br>S:Standby<br>N: No connect | - | |

| APPROVALS | |
|---|---|
| Eng. approval, date: | SP, 07/05/2016 |
| Created by, date: | SP, 07/05/2016 |
| Revision: A | |