## **Features and Benefits**

Frequency Range 10 MHz to 1450 MHz 5.0 mm x 3.2 mm 6 pads ceramic SMD package ±50 ppm total stability over -40°C to +85°C LVDS outputs 3.3V supply Integrated phase jitter of 1.0pS RMS

# **Typical Applications**

WiMax/WLAN xDSL/VoIP, cable modem Set-top Box, HDTV

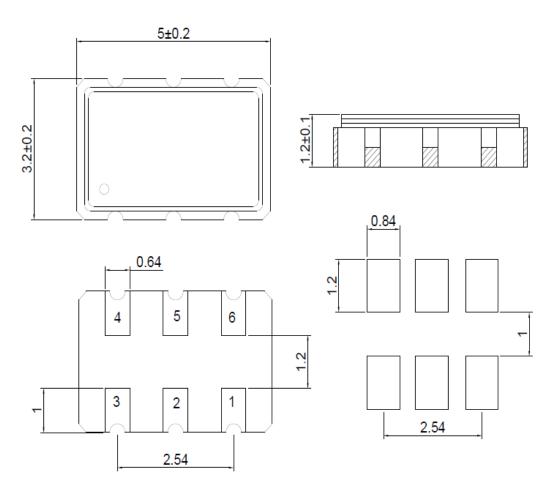
### **Description**

A new generation of voltage controlled oscillators with the latest tight symmetry topologies.

# **Mechanical Drawing & Pin Connections**

**Drawing No:** 

MD160040-1



#### Pin Connection

Pad 1	Control Voltage		
Pad 2	Tri-state		
Pad 3	Ground		
Pad 4	Differential		
Pad 5	Complementary		
Pad 6	Supply Voltage		

Unit: mm

1mm=0.0394inch

VCXO5300R-LVDS LVDS 10 to 1450 MHz Voltage Controlled Oscillator

# **Specifications**

Dutput Logic Type			General Specifi	ications			
Min.   Typical   Max	Output Logic T	уре					
Min.   Typical   Max   Typical   Max   Typical   Max   Typical   Max	Parameter						
Differential				Typical		= -	
100MHz : 25mA   750MHz : 39mA   16Hz : 43mA   1.35GHz : 47mA   500MHz : 35mA   1.35GHz : 47mA   500MHz   1.6V   500MHz   500MH	Frequency Ran	ige	10MHz			1450MHz	
250MHz: 30mA	Load						
Vob = +3.3V    S250MHz: 30mA   1GHz: 43mA	Current Consumption (V <sub>DD</sub> = +3.3V)						
Output Level           Output "High" Voltage; VoL         0.9V         1.4V         1.6V           Current with Output         1.4V         1.6V         1.6V           Current with Output         18mA typical           10Hz         69dBc / Hz         1000MHz           10Hz         69dBc / Hz         46dBc / Hz           100Hz         -97dBc / Hz         -80dBc / Hz         -96dBc / Hz           10MHz         -114dBc / Hz         -96dBc / Hz         -96dBc / Hz           100KHz         -124dBc / Hz         -96dBc / Hz         -105dBc / Hz           100KHz         -129dBc / Hz         -108dBc / Hz         -108dBc / Hz           10MHz         -136dBc / Hz         -136dBc / Hz         -136dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz         -135dBc / Hz           Phase Jitter (12KHz ~ 20MHz, RMS)         0.5pS         0.7pS         0.4nS           Rise Time (Tr)/Fall Time (Tf) Tr/Tr/T: 20% ~ 80% waveform         0.2nS         0.4nS         0.4nS           Duty Cycle         Start-up Time         10ms max         -10ms max           Start-up Time         55°C to +150°C         ±2 ppm ±2 ppm         ±2 ppm ±10 ppm							
Output "High" Voltage; VoL Output "Low" Voltage; VoL         1.4V         1.6V           Current with Output         1.9V         1.1V         1.6V           Phase Noise         10Hz         -69dBc / Hz         -46dBc / Hz         -46dBc / Hz           10Hz         -69dBc / Hz         -46dBc / Hz         -80dBc / Hz         -80dBc / Hz           10 kHz         -14dBc / Hz         -96dBc / Hz         -96dBc / Hz           10 kHz         -12dBc / Hz         -105dBc / Hz         -105dBc / Hz           100KHz         -129dBc / Hz         -105dBc / Hz         -105dBc / Hz           10MHz         -136dBc / Hz         -116dBc / Hz         -135dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz         -175dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz         -175dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz         -175dBc / Hz           10MHz         -154dBc / Hz         -154dBc / Hz         -175dBc / Hz           10MHz         -800Mbc / Hz         -175dBc / Hz         -175dBc / Hz           10MHz         -800Mbc / Hz         -180Mbc / Hz         -180Mbc / Hz           10MHz         -800Mbc / Hz         -180Mbc / Hz         -180Mbc / Hz <th></th> <td></td> <td>500MHz</td> <td colspan="2">500MHz: 35mA</td> <td colspan="2">1.35GHz : 47mA</td>			500MHz	500MHz: 35mA		1.35GHz : 47mA	
Output "Low" Voltage; Vol.         0.99V         1.1V           Current with Output         125MHz         1000MHz           10Hz         1000MHz           10Hz         -69dBc / Hz         -46dBc / Hz           10Hz         -97dBc / Hz         -80dBc / Hz         -80dBc / Hz           10Hz         -97dBc / Hz         -80dBc / Hz         -80dBc / Hz           10WHz         -114dBc / Hz         -96dBc / Hz         -105dBc / Hz           10WHz         -124dBc / Hz         -108dBc / Hz         -108dBc / Hz           10WHz         -136dBc / Hz         -116dBc / Hz         -116dBc / Hz           10WHz         -154dBc / Hz         -135dBc / Hz         -135dBc / Hz           10WHz         -154dBc / Hz         -135dBc / Hz         -135dBc / Hz           10WHz         -154dBc / Hz         -135dBc / Hz         -179S           Rise Time (Tr)/Fall Time (Tf)         0.2nS         0.4nS         0.4nS           Try         -20 - 80% waveform         0.4nS         0.4nS         -10ms max           Aging at Ta = +25°C         ±2 ppm         ±2 ppm         ±10 ppm           Storage Temp. Range         -55°C to +150°C							
Test							
125MHz         1000MHz           10Hz         -69dBc / Hz         -46dBc / Hz           10Hz         -97dBc / Hz         -80dBc / Hz           10MHz         -97dBc / Hz         -96dBc / Hz           10 kHz         -114dBc / Hz         -105dBc / Hz           100KHz         -124dBc / Hz         -108dBc / Hz           10MHz         -136dBc / Hz         -116dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz           Phase Jitter (12KHz ~ 20MHz, RMS)         0.5pS         0.7pS           Rise Time (Tr)/Fall Time (Tf) Tr/Tf: 20% ~ 80% waveform         0.2nS         0.4nS           Duty Cycle         50% ±5%         0.4nS           Start-up Time         0.2nS         0.2nS           Start-up Time         0.2nS         0.2nS           Start-up	•	• •	0.9V	1.1	IV		
Phase Noise         10Hz         -69dBc / Hz         -46dBc / Hz           10Hz         -97dBc / Hz         -80dBc / Hz           1 kHz         -114dBc / Hz         -96dBc / Hz           100KHz         -124dBc / Hz         -105dBc / Hz           100KHz         -129dBc / Hz         -108dBc / Hz           10MHz         -136dBc / Hz         -116dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz           10Ans         0.7pS         0.4nS           Rise Time (Tr)/Fall Time (Tf) Tr/Tf: 20% - 80% waveform         0.2nS         0.4nS           Start-up Time         10ms max           Aging at Ta = +25°C         ±2 ppm           First year at 25°C         ±2 ppm           Over 10 years         50°C to +150°C	Current with O	utput		16mA typical			
Phase Noise         100Hz         -97dBc / Hz         -80dBc / Hz         -96dBc / Hz         -96dBc / Hz         -96dBc / Hz         -96dBc / Hz         -105dBc / Hz         -105dBc / Hz         -105dBc / Hz         -105dBc / Hz         -108dBc / Hz         -108dBc / Hz         -108dBc / Hz         -116dBc / Hz         -116dBc / Hz         -116dBc / Hz         -116dBc / Hz         -135dBc / Hz			125MHz	1000MHz		1000MHz	
Phase Noise         1 kHz         -114dBc / Hz         -96dBc / Hz           10 kHz         -124dBc / Hz         -105dBc / Hz           100KHz         -129dBc / Hz         -108dBc / Hz           10MHz         -136dBc / Hz         -116dBc / Hz           10MHz         -154dBc / Hz         -116dBc / Hz           10MHz         -154dBc / Hz         -116dBc / Hz           10MHz         -154dBc / Hz         -135dBc / Hz           Phase Jitter (12KHz ~ 20MHz, RMS)         0.5pS         0.7pS           Rise Time (Tr)/Fall Time (Tf) Tr/Tf: 20% ~ 80% waveform         0.2nS         0.4nS           Duty Cycle         Start-up Time         0.2nS         0.4nS           Start-up Time         10ms max           Aging at Ta = +25°C First year at 25°C Over 10 years         2 to +150°C           Storage Temp. Range         -55°C to +150°C           Supply Voltage (V <sub>DD</sub> )         VDD = +3.3V ; Vcon Center = +1.65V           Vcontrol Range         +0.3V → +3.0V           Frequency Pulling Range         ±100ppm (min). Up to ±200ppm (min.) available           Absolute Voltage         4.0V max.							
10 kHz							
10 kHz	Phase Noise						
1MHz	1 11400 110100					-105dBc / Hz	
10MHz							
Phase Jitter (12KHz ~ 20MHz, RMS)   0.5pS   0.7pS   0.7pS				-136dBc / Hz			
Control Voltage Function on Pad 1   Supply Voltage (VDD)   Supply VDD = +3.3V; VCON Center = +1.65V   Supply Voltage (VDD)   Supply VDD = +3.3V; VCON Center = +1.65V   Supply Voltage (VDD)   Supply VDD = +3.3V; VCON Center = +1.65V   Supply VDD = +1.65V   Supply VDD = +1.65V   Supply VDD =		10MHz	-154dBc / Hz		-135dBc / Hz		
Duty Cycle   50% ±5%			0.5pS		0.7pS		
Start-up Time         10ms max           Aging at Ta = +25°C         ±2 ppm           First year at 25°C         ±2 ppm           Over 10 years         -55°C to +150°C           Control Voltage Function on Pad 1           Supply Voltage (V <sub>DD</sub> )         VDD = +3.3V; Vcon Center = +1.65V           Vcontrol Range         +0.3V ~ +3.0V           Frequency Pulling Range         ±100ppm (min). Up to ±200ppm (min.) available           Absolute Voltage         4.0V max. for 3.3V VDD           Linearity         ±5% typical. ±10% max.           Input Impedance         1M Ω typical           Bandwidth         10KHz min. measured at -3dB	Rise Time (Tr)/Fall Time (Tf) Tr/Tf: 20% – 80% waveform			0.2	0.2nS 0.4nS		
Aging at Ta = +25°C First year at 25°C Over 10 years  Storage Temp. Range  Control Voltage Function on Pad 1  Supply Voltage (V <sub>DD</sub> )  VDD = +3.3V; Vcon Center = +1.65V  Vcontrol Range +0.3V ~ +3.0V  Frequency Pulling Range 4.0V max. for 3.3V VDD  Linearity Linearit	Duty Cycle		50% ±5%				
First year at 25°C         description         ±2 ppm ±10 ppm           Storage Temp. Range         -55°C to +150°C           Control Voltage Function on Pad 1           Supply Voltage (V <sub>DD</sub> )         VDD = +3.3V; Vcon Center = +1.65V           Vcontrol Range         +0.3V ~ +3.0V           Frequency Pulling Range         ±100ppm (min). Up to ±200ppm (min.) available           Absolute Voltage         4.0V max. for 3.3V VDD           Linearity         ±5% typical. ±10% max.           Input Impedance         1M Ω typical           Bandwidth         10KHz min. measured at -3dB						10ms max	
Over 10 years         ±10 ppm           Storage Temp. Range         -55°C to +150°C           Control Voltage Function on Pad 1           Supply Voltage (V <sub>DD</sub> )         VDD = +3.3V; Vcon Center = +1.65V           Vcontrol Range         +0.3V ~ +3.0V           Frequency Pulling Range         ±100ppm (min). Up to ±200ppm (min.) available           Absolute Voltage         4.0V max. for 3.3V VDD           Linearity         ±5% typical. ±10% max.           Input Impedance         1M Ω typical           Bandwidth         10KHz min. measured at -3dB	Aging at Ta = +25°C					0	
Over 10 yearsControl Voltage Function on Pad 1Supply Voltage (VDD)VDD = +3.3V; Vcon Center = +1.65VVcontrol Range+0.3V ~ +3.0VFrequency Pulling Range±100ppm (min). Up to ±200ppm (min.) availableAbsolute Voltage4.0V max. for 3.3V VDDLinearity±5% typical. ±10% max.Input Impedance1M Ω typicalBandwidth10KHz min. measured at -3dB	First year at 25°C					±∠ ppm +10 nnm	
Control Voltage Function on Pad 1Supply Voltage (VDD)VDD = $+3.3V$ ; Vcon Center = $+1.65V$ Vcontrol Range $+0.3V \sim +3.0V$ Frequency Pulling Range $\pm 100ppm$ (min). Up to $\pm 200ppm$ (min.) availableAbsolute Voltage $4.0V$ max. for $3.3V$ VDDLinearity $\pm 5\%$ typical. $\pm 10\%$ max.Input Impedance $10KHz$ min. measured at $-3dB$						±10 bb	
Supply Voltage ( $V_{DD}$ ) $V_{DD} = +3.3V$ ; $V_{CON}$ Center = $+1.65V$ Vcontrol Range $+0.3V \sim +3.0V$ Frequency Pulling Range $\pm 100 \text{ppm}$ (min). Up to $\pm 200 \text{ppm}$ (min.) availableAbsolute Voltage $4.0V$ max. for $3.3V$ VDDLinearity $\pm 5\%$ typical. $\pm 10\%$ max.Input Impedance $1M \Omega$ typicalBandwidth $10KHz$ min. measured at $-3dB$	Storage Temp.						
Vcontrol Range+0.3V ~ +3.0VFrequency Pulling Range±100ppm (min). Up to ±200ppm (min.) availableAbsolute Voltage4.0V max. for 3.3V VDDLinearity±5% typical. ±10% max.Input Impedance1M Ω typicalBandwidth10KHz min. measured at -3dB							
Frequency Pulling Range       ±100ppm (min). Up to ±200ppm (min.) available         Absolute Voltage       4.0V max. for 3.3V VDD         Linearity       ±5% typical. ±10% max.         Input Impedance       1M Ω typical         Bandwidth       10KHz min. measured at -3dB			,				
Absolute Voltage         4.0V max. for 3.3V VDD           Linearity         ±5% typical. ±10% max.           Input Impedance         1M Ω typical           Bandwidth         10KHz min. measured at -3dB							
Linearity     ±5% typical. ±10% max.       Input Impedance     1M Ω typical       Bandwidth     10KHz min. measured at -3dB			11 7 1 17 7				
Input Impedance     1M Ω typical       Bandwidth     10KHz min. measured at -3dB		ge					
Bandwidth 10KHz min. measured at -3dB			21				
		ce					
Transfer Function Positive Transfer							
	Transfer Funct	ransfer Function Positive Transfer					

Output Enable Function					
05.0	0.7 of VDD (min.) or no connection to enable output.				
OE Control on Pad 1	0.3 of VDD (max.) to disable output (high impedance)				
Output Enable Time / Disable Time	200 nS. Max / 50 nS. Max.				
Integrated Phase Jitter	0.6 pS typical (12 KHz to 20 MHz) ; <100 fS (1.875 KHz to 20 MHz)				
	Stability vs. Temperature Range Availabi	lity			
	Temperature Range				
Stability in ppm	-10°C to +70°C	-40°C to +85°C			
±100	Available	Available			
±50	Available	Available			

Other customized specifications may be available. Please contact Dynamic Engineers Inc. for further details.

## **Test Data**

# **125 MHz LVDS Outputs**



# 1000 MHz LVDS Output

