Dynamic Engineers Inc.
2550 Gray Falls Dr., Suite#128, Houston, TX, 77077 USA
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VCXO5300AJLP1
High Frequency Ultra-low Jitter VCXO

Features and Benefits

Standard and custom frequencies up to 2100 MHz
Femto-second (f sec.) RMS phase jitter
Short lead time

Typical Applications

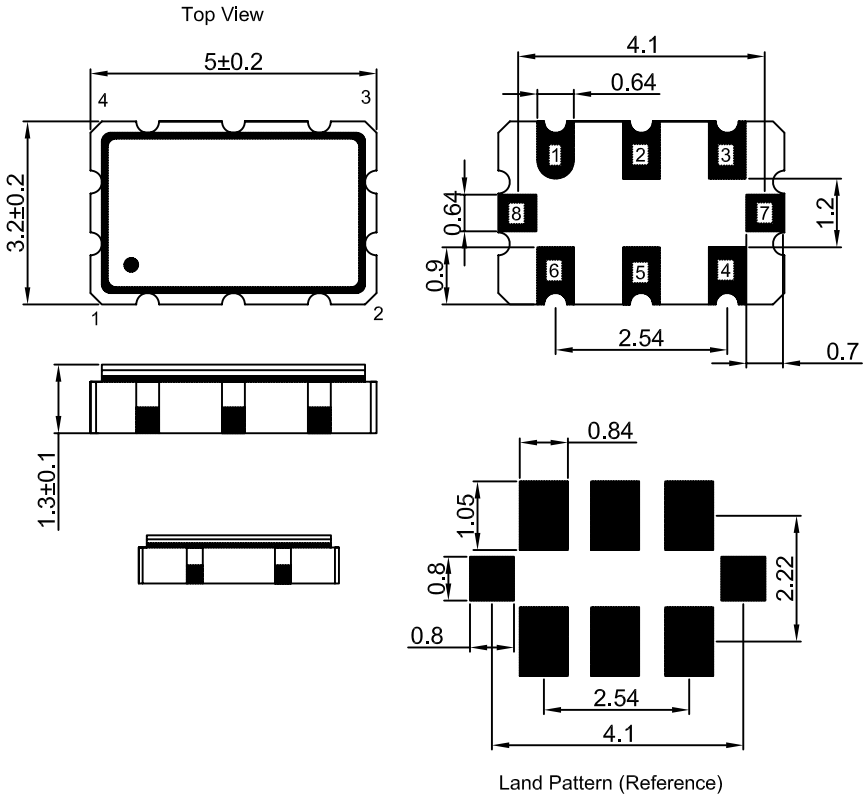
Low noise synthesizer VCO reference
Optical Communication
Test Instruments
High performance microwave synthesizer circuits

Description

VCXO5300AJLP1 offers high frequency and ultra-low phase jitter with short lead time in one simple package, ideal for optical communication, synthesizer VCO reference and synthesizer circuits applications.

Mechanical Drawing & Pin Connections

Drawing No: **MD160040-2**



Pin Connection

Pad 1	Control Voltage
Pad 2	OE
Pad 3	Ground
Pad 4	Output
Pad 5	Complementary Output
Pad 6	Supply Voltage
Pad 7	Do not Connect
Pad 8	Do not Connect

Unit in mm
1mm = 0.0394 inches

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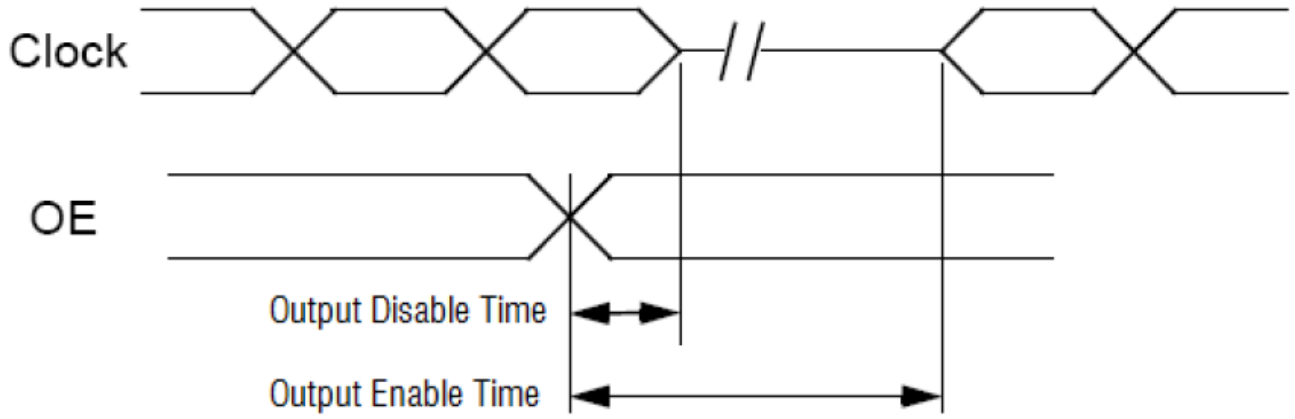
Specifications

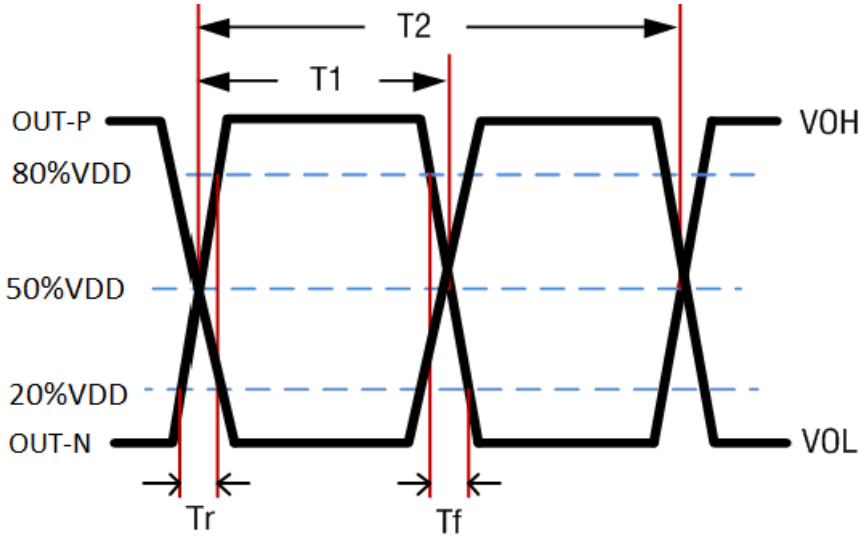
Oscillator Specification	Sym	Condition	Value			Unit	Note
			Min.	Typ.	Max.		
Frequency Range	F		15		2100	MHz	
Output Waveform				LVPECL			
Output Load		V_{TT} = 0.5V @ 2.5Vpp		50 Ω into VDD – 2.0V			
I_{DIFF}		@ 2.5Vpp		16		mA	
I_{CM}				6		mA	
Output "High" Voltage	V_{OH}	@ 2.5Vpp	1.335		1.700	V	
Output "Low" Voltage	V_{OL}	@ 2.5Vpp	0.500		0.950	V	
Pk – Pk Output Voltage Swing			0.550		0.993	V	
Supply Current	Ipp	@ 2.5Vpp		93	106	mA	
Rise / Fall Time	Tr / Tf	20% <-> 80% waveform			0.35	ns	
Duty Cycle		Measured at 50% differential level	45	50	55	%	
Start-up Time				5	10	m sec	
Phase Jitter, rms		12 KHz to 20 MHz		150	300	f sec	
Period Jitter	pk - pk				50	ps	
Cycle to Cycle Jitter	pk				50	ps	
Output Enable Function on Pad 2							
Output Enable Control			0.8 of V_{DD} minimum or no connection to enable output				
			0.2 of V_{DD} maximum to disable output (high impedance)				
Output Enable Time					2.5	m sec	
Output Disable Time					10	µ sec	
Frequency Deviation Control Voltage Function on Pad 1							
Control Voltage Center		V_{DD} = 2.5V		+1.25		V	
Control Voltage Range			+0.25		+2.25	V	
Frequency Pulling Range			±50		±250	ppm	
Linearity				±5	±10	%	
Transfer Function				Positive Transfer			
Input Impedance			5			MΩ	
Bandwidth		Measured at -3 dB		10		KHz	
Harmonics					-5.0	dBc	
Power Supply							
Voltage	V_{cc}	±5%		+2.5		V	
Current Consumption		At V_{DD} = 3.3V		98	106	mA	
Current with Output Disabled				99		mA	
Differential Output Voltage	V_{OT}	15 MHz ~ 325 MHz 325 MHz ~ 700 MHz 700 MHz ~ 2100 MHz	450 350 250			mV	
Change in V_{OT} between Complementary Output States	ΔV_{OT}				50	mV	
Frequency Stability							
Frequency Stability vs. Operating Temperature		-40°C to +85°C	±25		±100	ppm	Refer to ordering options
Aging – first year		At Ta = +25°C			±3	ppm	
Aging – per year thereafter					±2	ppm	

Environmental Conditions		
Operating Temperature Range	-40°C to +85°C	
Storage Temperature Range	-55°C to +125°C	
Green Requirement	RoHS 3 (2015/863/EU) compliant, no exemptions, Pb (lead) free	
Humidity	85% RH, +85°C, 48 hours	
Fine Leak / Gross Leak	MIL-STD-883, Method 1014, Condition A and Condition C	
Solderability	MIL-STD-202F method 208E	
Reflow	+260°C for 10 sec max. Two times	
Vibration	MIL-STD-202F Method 204, 35G, 50 to 2000 Hz	
Shock	MIL-STD-202F Method 213B, test condition E, 1000GG ½sine wave	
Resistance to Solvent	MIL-STD-202 Method 215	
Temperature Cycling	MIL-STD-883, Method 1010	
ESD Rating	HBM (Human Body Model) per JEDEC JS-001-2012): 2000 V min MM (Machine Model) per JEDEC JESD22-A115B: 200V min	
Pad Surface Finish	Gold (0.3 µm to 1.0 µm) over nickel (1.27 µm to 8.89 µm)	
Weight	0.045 grams (average)	
Absolute Maximum Ratings		
Supply Voltage to Ground Potential	-0.5V to +3.8V	Operation conditions exceed the absolute maximum ratings listed may cause permanent damage to the device
Input Voltage	-0.5V to +3.8V	

Output OE function on Pad 2



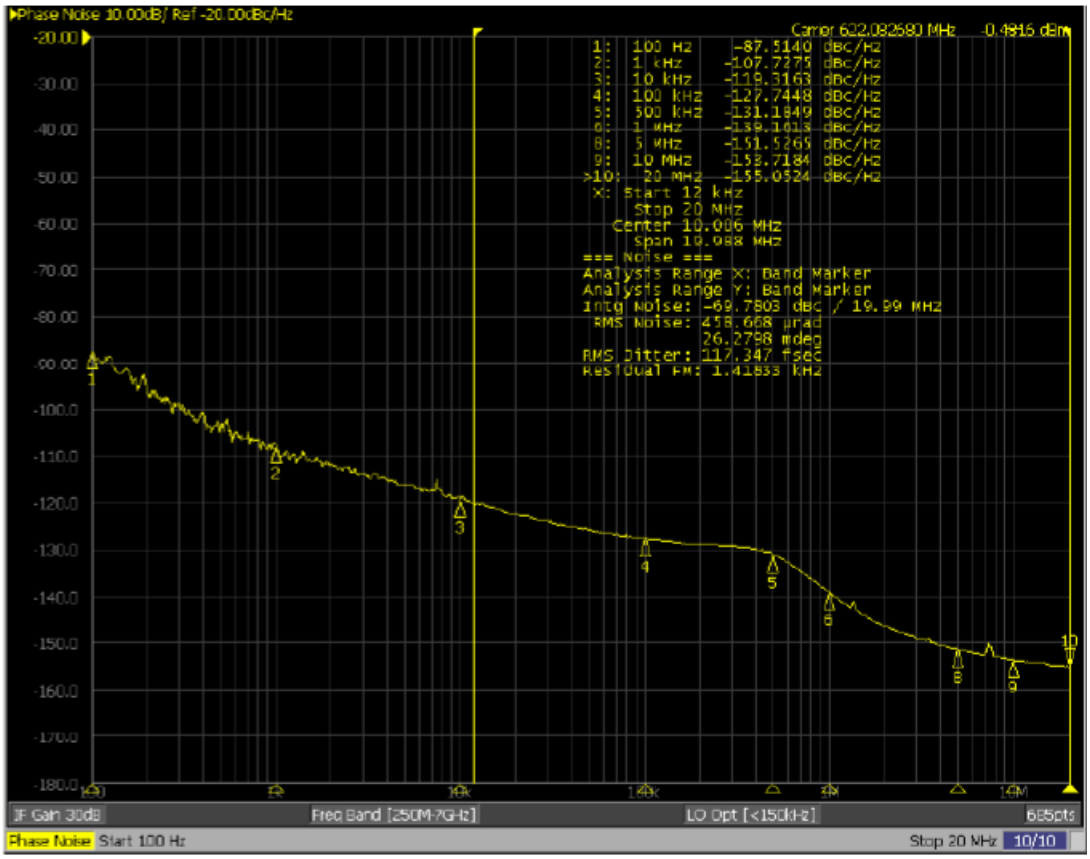
Differential Output Waveforms Duty Cycle = (T1/T2) + 100% Measured at 50% V_{DD}



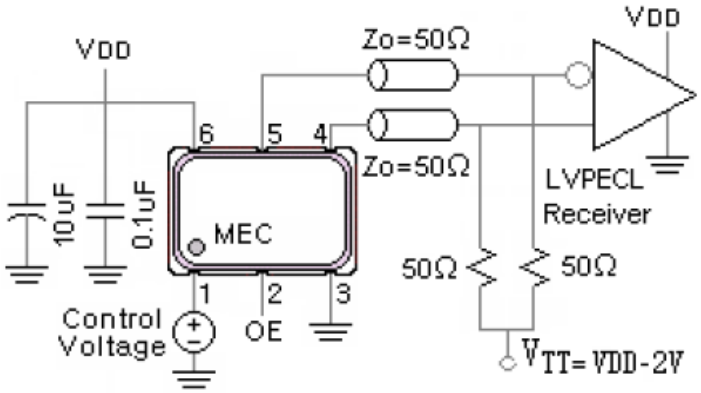
Phase Noise and Phase Jitter Data (typical), V_{DD} = +3.3V, LVPECL, Voltage Control = Ground

	Frequency (MHz) Offset	156.250	491.520	644.530	1480.000	2100.000
SSB Phase Noise Data (dBc /Hz; typical)	10 Hz	-39	-16	-31	-12	-18
	100 Hz	-74	-48	-58	-54	-49
	1 KHz	-99	-83	-86	-80	-77
	10 KHz	-123	-112	-110	-104	-100
	100 KHz	-139	-128	-126	-119	-116
	1 MHz	-149	-140	-137	-130	-125
	5 MHz	-156	-151	-150	-145	-141
	10 MHz	-157	-153	-153	-148	-145
	20 MHz	-157	-154	-153	-150	-147
Phase Jitter fsec (12 KHz ~ 20 MHz, RMS, typical)		159	155	151	147	163

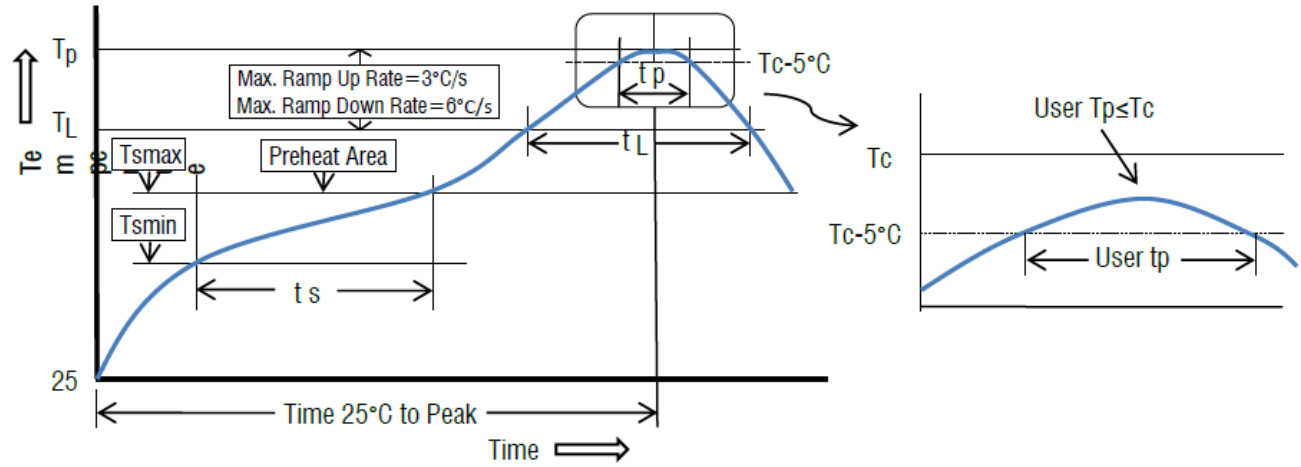
Phase Noise Plot of 156.250 MHz and 622.080 MHz, Voltage Control = Ground



Differential Outputs Terminating Schematics : LVPECL 2.5V



Recommended Solder Reflow Profile (per IPC/JEDEC J-STD-020D.1)



Profile Feature	Sn-Pb Eutectic Assembly	Pb-free Assembly
Preheat / Soak - Temperature min. (Ts min.) - Temperature max. (Ts max) - Time (ts) (Ts min. to Ts max)	 100°C 150°C 60 to 120 seconds	 150°C 200°C 60 to 180 seconds
Ramp-up rate (T_L to T_P)	3°C / sec. max	
Liquidous Temperature (T_L)	183°C	217°C
Time (t_L) maintained above T_L	60 to 150 seconds	
Peak package body temperature (T_P)	235°C	260°C
Time (T_P) within 5°C of the classification temperature T_C	10 to 30 seconds	20 to 40 seconds
Ramp-down rate (T_P to T_L)	6°C / second max	
Time +25°C to peak temperature	6 minutes max	8 minutes max.

All temperatures refer to topside of the package, measured on the package body surface

Ordering Options: Frequency Stability

Frequency Stability (w)	
Code	Stability [ppm]
1	±25
2	±50
3	±100

Ordering Codes

Model	Frequency in MHz (up to 4 digits)	Frequency Stability
VCXO5300AJLP1	xx.yyyy	w

Example:VCXO5300AJLP1-100.0000-2 has the following specifications

Operating Frequency = 100.0000 MHz
Frequency Stability = ±50 ppm