

# Dynamic Engineers Inc.

Website: www.DynamicEngineers.com Email: Inquiry@DynamicEngineers.com

#### VCXO3225BM-LJ HCSL

Low Jitter VCXO\_Voltage Controlled Crystal Oscillator

### **Features and Benefits**

Frequency range: 15-700MHz Output waveform: HCSL Supply voltage: 1.8/2.5V/3.3V Current: 90mA Max.

Frequency stability vs. temperature: ±50PPM Operating temperature: -40°C to +85°C

Size: 3.2x2.5x1mm

Package type: Surface Mount



### **Typical Applications**

Defense Systems
Mobile Radar Station
Gigabit Ethernet, SONET/SDH
Server & Storage, Data Center
SD/HD Video, FPGA Clock Generation

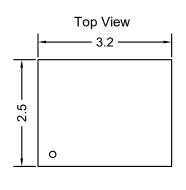
### **Description**

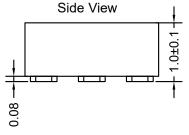
VCXO3225BM-LJ\_HCSL is the high frequency and low jitter differential VCXO. It can be widely used in digital circuits.

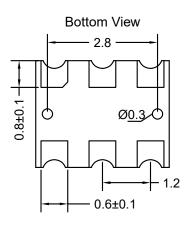
### **Mechanical Drawing & Pin Connections**

Drawing No:

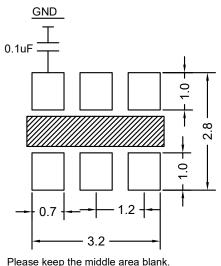
MD240085-1







PIN	Function	
#1	Control Voltage	
#2	OE	
#3	GND	
#4	OUTPUT	
#5	OUTPUT_N	
#6	Supply Voltage	,



Do not layout any lines in this space.

To ensure optimal oscillator performance, place a by-pass capacitor of 0.1µF as close to the part as possible between Vcc and GND pads

Unit in mm 1mm = 0.0394 inches



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### VCXO3225BM-LJ\_HCSL

Low Jitter VCXO\_Voltage Controlled Crystal Oscillator

# **Specifications**

Specification	Oscillator	Commo	Condition	Value			Unit	Note
RF Output         Output Waveform         Output high         0.66         1.15         V           Output Level         Output low         0         0.15         V           Duty Cycle         45         55         %           Rise & Fall Time         0.35         ns           Startup Time         8         ms           Tri-State (Input to Pin2)         Disable         0.7 V <sub>cc</sub> V           Power Supply           Voltage         V <sub>cc</sub> ±10%         1.8/2.5/ 3.3         V         See ordering section           Supply Current         V <sub>cc</sub> =3.3V         90         mA	Specification	Sym	Condition	Min.	Тур.	Max.		
Output Waveform         HCSL           Output Level         Output low         0         0.15         V           Duty Cycle         45         55         %           Rise & Fall Time         0.35         ns         Startup Time         8         ms           Startup Time         8         ms         Tri-State         Enable         0.7 V∞         V         V           Power Supply         Voltage         V∞         ±10%         1.8/2.5/         3.3         V         See ordering section           Supply Current         V∞         ±10%         1.8/2.5/         3.3         V         See ordering section           Supply Current         V∞         ±10%         1.8/2.5/         N         See ordering section           Supply Current         V∞         ±10%         70         mA         N         N         See ordering section         Section         N         N         Section         N         N         N         Section         N         N         N         N         Section         N         N </th <th>Operational Frequency</th> <th>f<sub>0</sub></th> <th></th> <th>15</th> <th></th> <th>700</th> <th>MHz</th> <th></th>	Operational Frequency	f <sub>0</sub>		15		700	MHz	
Output Level         Output low         0.66         1.15         V           Duty Cycle         45         55         %           Rise & Fall Time         45         55         %           Startup Time         8         ms         Tri-State         V           (Input to Pin2)         Disable         0.7 V <sub>cc</sub> V           Power Supply         Voc = 3.3V         0.3 V <sub>cc</sub> V           Voltage         V∞ = 2.5V         80 mA         MA           Voc = 2.5V         80 mA         MA           Voc = 3.3V         90 mA         MA           Stand by Current         V∞ = 2.5V         80 mA           Voc = 2.5V         80 mA         MA           Control Voltage         V∞ = 2.5V         80 mA           V∞ = 2.5V         80 mA         MA           Control Voltage         V∞ = 3.3V         0.3         1.65         3         V           Control Voltage         V∞ = 2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         pm         Energy Control Voltage         Linearity         Energy Control Voltage         Foreiod Michael         Energy Control Voltage         This <td>RF Output</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	RF Output							
Output Level         Output low         0         0.15         V           Duty Cycle         45         55         %           Rise & Fall Time         0.35         ns           Startup Time         8         ms           Tri-State         Enable         0.7 V∞         V           (Input to Pin2)         Disable         0.3 V∞         V           Power Supply           Voltage         V∞         ±10%         1.8/2.5/         3.3         V         See ordering section           Supply Current         V∞ =3.3V         90         mA	Output Waveform				HCSL			
Duty Cycle         Uty Cycle         45         55         %           Rise & Fall Time         0.35         ns           Startup Time         8         ms           Tri-State (Input to Pin2)         Enable         0.7 V <sub>cc</sub> V           (Input to Pin2)         Disable         0.3 V <sub>cc</sub> V           Power Supply           Vottage         V <sub>cc</sub> ±10%         1.8/2.5/ 3.3         V         See ordering section           Supply Current         V <sub>cc</sub> =3.3V         90         mA           V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =3.3V         90         mA           Stand by Current         V <sub>cc</sub> =3.3V         90         mA           V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =2.5V         80         mA           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm         ±162         V           Linearity         ±10         %         Mohm         Mohm         Mohm	Output Lovel		Output high	0.66		1.15	V	
Rise & Fall Time         0.35         ns           Startup Time         8         ms           Tri-State (Input to Pin2)         Disable         0.7 V <sub>cc</sub> V           Power Supply         1.8/2.5/3.33         V         See ordering section           Supply Current         V <sub>cc</sub> =3.3V         90         mA           Supply Current         V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =1.8V         70         mA           Stand by Current         V <sub>cc</sub> =3.3V         90         mA           Stand by Current         V <sub>cc</sub> =3.3V         80         mA           Control Voltage         V <sub>cc</sub> =1.8V         70         mA           Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm         Linearity         ±50         ±250         ppm           Modulation Bandwidth         5         20         KHz         KHz         V         V         Pulling Range         ±25         ppm         See ordering section         See ordering section         See ordering section	Output Level		Output low	0		0.15	V	
Startup Time	Duty Cycle			45		55	%	
Tri-State (Input to Pin2)         Enable Disable         0.7 V <sub>cc</sub> V         V           Power Supply           Voltage         V <sub>cc</sub> ±10%         1.8/2.5/ 3.3         V         See ordering section           Supply Current         V <sub>cc</sub> =3.3V         90 mA         MA           Supply Current         V <sub>cc</sub> =1.8V         70 mA         MA           V <sub>cc</sub> =3.3V         90 mA         MA           Stand by Current         V <sub>cc</sub> =3.3V         90 mA         MA           Control Voltage         V <sub>cc</sub> =2.5V         80 mA         MA           Control Voltage         V <sub>cc</sub> =3.3V         0.3 1.65 3 V         V           Control Voltage         V <sub>cc</sub> =3.3V         0.18 0.9 1.62 V         V           Pulling Range         ±50 ±2.5V         ±250 ppm           Linearity         ±10 %         Modulation Bandwidth         5         20 KHz           VC Input Impedance         5         Mohm         Frequency Stability           Versus Temperature         ±25 ppm         See ordering section           Phase Noise         1KHz         -107         dBc/Hz           At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -117         dBc/Hz           805.664MHz Frequency	Rise & Fall Time					0.35	ns	
Control Voltage	Startup Time					8	ms	
Power Supply         Voltage         V <sub>cc</sub> ±10%         1.8/2.5/ 3.3         V         See ordering section           Supply Current         V <sub>cc</sub> =3.3V         90         mA           Supply Current         V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =1.8V         70         mA           Stand by Current         V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =2.5V         80         mA           Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm         ±10         %           Modulation Bandwidth         5         20         KHz         VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         ±25         ppm         See ordering section           Phase Noise         1KHz         -117         dBc/Hz           At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         100KHz         -125         dBc/Hz           RMS Phase Jitter         Integrated 12KHz-20	Tri-State		Enable	0.7 V <sub>cc</sub>				
Voltage         V <sub>cc</sub> ±10%         1.8/2.5/ 3.3         V         See ordering section           Supply Current         V <sub>cc</sub> =3.3V         90         mA           V <sub>cc</sub> =2.5V         80         mA           V <sub>cc</sub> =1.8V         70         mA           Stand by Current         V <sub>cc</sub> =3.3V         90         mA           Control Voltage         V <sub>cc</sub> =2.5V         80         mA           Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm         ±10         %           Modulation Bandwidth         5         20         KHz         KHz           VC Input Impedance         5         Mohm         Mohm         Frequency Stability         ±25         ppm         See ordering section           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -117         dBc/Hz         dBc/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         Integrated 12KHz-20MHz         150         50         ps	(Input to Pin2)		Disable			0.3 V <sub>cc</sub>	V	
Voc   2.33V   90    mA	Power Supply							
Supply Current         V <sub>cc</sub> = 2.5 V         80         mA           V <sub>cc</sub> = 1.8 V         70         mA           V <sub>cc</sub> = 3.3 V         90         mA           V <sub>cc</sub> = 2.5 V         80         mA           V <sub>cc</sub> = 2.5 V         80         mA           Control Voltage           V <sub>cc</sub> = 3.3 V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> = 2.5 V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm         ±250         ppm           Linearity         ±10         %         Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         20         KHz         Mohm         Tequency Stability           Versus Temperature         ±25         ppm         See ordering section           Phase Noise         1KHz         -117         dBc/Hz           At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         1MHz         -135         4Bc/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         50         ps	Voltage	Vcc	±10%				V	See ordering section
V <sub>cc</sub> = 1.8V			V <sub>cc</sub> =3.3V			90	mA	
Voc = 1.8V   70    mA	Supply Current		V <sub>cc</sub> =2.5V			80	mA	
Stand by Current         V <sub>cc</sub> =2.5V         80         mA           Control Voltage           Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         V <sub>cc</sub> =1.8V         0.18         0.9         1.62         V           Pulling Range         ±50         ±250         ppm         Expm           Linearity         ±10         %         Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm         Mohm         Frequency Stability         ±25         ppm         See ordering section           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -107         -117         4BC/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         Integrated 12KHz-20MHz         150         300         fs	11,7		V <sub>cc</sub> =1.8V			70	mA	
Control Voltage           Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm           Linearity         ±10         %           Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         ±25         ppm         See ordering section           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -117         dBc/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         Integrated 12KHz-20MHz         150         50         ps			V <sub>cc</sub> =3.3V			90	mA	
Control Voltage           Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm           Linearity         ±10         %           Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         ±25         ppm         See ordering section           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -117         4Bc/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         Integrated 12KHz-20MHz         150         50         ps	Stand by Current		V <sub>cc</sub> =2.5V			80	mA	]
Control Voltage         V <sub>cc</sub> =3.3V         0.3         1.65         3         V           V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±250         ppm           Linearity         ±10         %           Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         ±25         ppm         See ordering section           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -107         -117         dBc/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         50         ps	, , , , , , , , , , , , , , , , , , , ,		V <sub>cc</sub> =1.8V			70	mΑ	
Control Voltage         V <sub>cc</sub> =2.5V         0.25         1.25         2.25         V           Pulling Range         ±50         ±50         ±250         ppm           Linearity         ±10         %           Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         1KHz         -107           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -117           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         Integrated 12KHz-20MHz         150         50         ps	Control Voltage							
V <sub>cc</sub> =1.8V   0.18   0.9   1.62   V	_			0.3	1.65			
Pulling Range         ±50         ±250         ppm           Linearity         ±10         %           Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         ±25         ppm         See ordering section           Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         10KHz         -107         At V <sub>cc</sub> =3.3V, 100KHz         -117         At V <sub>cc</sub> =3.3V, 100KHz         -125         At V <sub>cc</sub> =3.3V, 100KHz         -135         At V <sub>cc</sub> =3.3V, 100KHz         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         <	Control Voltage		V <sub>cc</sub> =2.5V	0.25	1.25	2.25	V	
Linearity         ±10         %           Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         1KHz         -107         ppm         See ordering section           Phase Noise At V∞=3.3V, 805.664MHz Frequency         10KHz         -117         At Has a section         At Has a section			V <sub>cc</sub> =1.8V	0.18	0.9	1.62	V	
Modulation Bandwidth         5         20         KHz           VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature         \$\frac{1 \text{KHz}}{2}\$         -107         -107         -107         -117         -117         -117         -125         -125         -125         -125         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135	Pulling Range			±50		±250	ppm	
VC Input Impedance         5         Mohm           Frequency Stability           Versus Temperature						±10		
Frequency Stability           Versus Temperature         \$\frac{1}{25}\$         ppm         See ordering section           Phase Noise At \$V_{cc}=3.3\$V, 805.664MHz Frequency         \$10KHz         -117         \$48C/Hz           RMS Phase Jitter         \$100KHz         -125         \$300         fs           Period Jitter         \$50         ps	Modulation Bandwidth			5		20	KHz	
Versus Temperature         ±25         ppm         See ordering section           Phase Noise At V∞=3.3V, 805.664MHz Frequency         10KHz         -117         -117         -125         -125         -125         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135         -135 <t< td=""><td>VC Input Impedance</td><td></td><td></td><td>5</td><td></td><td></td><td>Mohm</td><td></td></t<>	VC Input Impedance			5			Mohm	
Phase Noise At V <sub>cc</sub> =3.3V, 805.664MHz Frequency         1KHz 10KHz 100KHz         -107 -117 100KHz         dBc/Hz           RMS Phase Jitter Period Jitter         Integrated 12KHz-20MHz         150         300         fs           Popini         section           10KHz         -117         -125         -125           10MHz         -135         -135         -135           10MS Phase Jitter         10MS Phase Jitter         150         300         fs           10MS Phase Jitter         50         ps	Frequency Stability							
Phase Noise         10KHz         -117         dBc/Hz           805.664MHz Frequency         100KHz         -125         dBc/Hz           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         50         ps	Versus Temperature					±25	ppm	
At V <sub>cc</sub> =3.3V, 805.664MHz Frequency       10KHz       -117       dBc/Hz         RMS Phase Jitter       Integrated 12KHz-20MHz       150       300       fs         Period Jitter       50       ps	Diama Nata		1KHz		-107			
805.664MHz Frequency         100KHz         -125           RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         50         ps			10KHz		-117		-ID - /I I-	
RMS Phase Jitter         Integrated 12KHz-20MHz         150         300         fs           Period Jitter         50         ps			100KHz		-125		aBc/HZ	
Period Jitter 50 ps	oub.ob4WIHZ Frequency		1MHz		-135			
Period Jitter 50 ps	RMS Phase Jitter		Integrated 12KHz-20MHz	150		300	fs	
	Period Jitter					50	ps	
Environmental Conditions	<b>Environmental Conditio</b>	ns						
Operating temperature range -40°C to +85°C (See ordering section)	Operating temperature ra	nge	-40°C to +85°C (See orderi	ng section)				

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### VCXO3225BM-LJ\_HCSL

Low Jitter VCXO\_Voltage Controlled Crystal Oscillator

## **Ordering Information**

VCXO3225BM-LJ_HCSL	-	xMHz-	01	02	03
Group			C	ode	-

For example, VCXO3225BM-LJ-HCSL-155.52MHz-111 denotes the XO has the following specifications:

Frequency: 155.52MHz
Temperature Range: -10°C to +60°C
Stability Over Temperature: ±20 ppm
Supply Voltage: 1.8V

01	Temperature Range
Code	Specification
1	-10°C to +60°C
2	-20°C to +70°C
3	-40°C to +85°C

02	Frequency Stability			
Code	Specification			
1	±20 ppm			
2	±25 ppm			
3	±50 ppm			
4	±100 ppm			

03	Supply Voltage
Code	Specification
1	1.8 V
2	2.5 V
3	3.3 V

Frequency Stability vs. Temperature

Temperature Range	Frequency Stability				
[°C]	±20 ppm	±25 ppm	±50 ppm	±100 ppm	
-10°C to +60°C	Available	Available	Available	Available	
-20°C to +70°C	Conditional	Available	Available	Available	
-40°C to +85°C	Not Available	Conditional	Available	Available	

Inclusive of calibration@ 25°C, operating temperature range, input Voltage variation, load variation, aging (1st year), shock and vibration