

# PLLatinum™ Family of PLL and PLL + VCO Products

## Selection Guide

2006



 **National  
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The Sight & Sound of Information

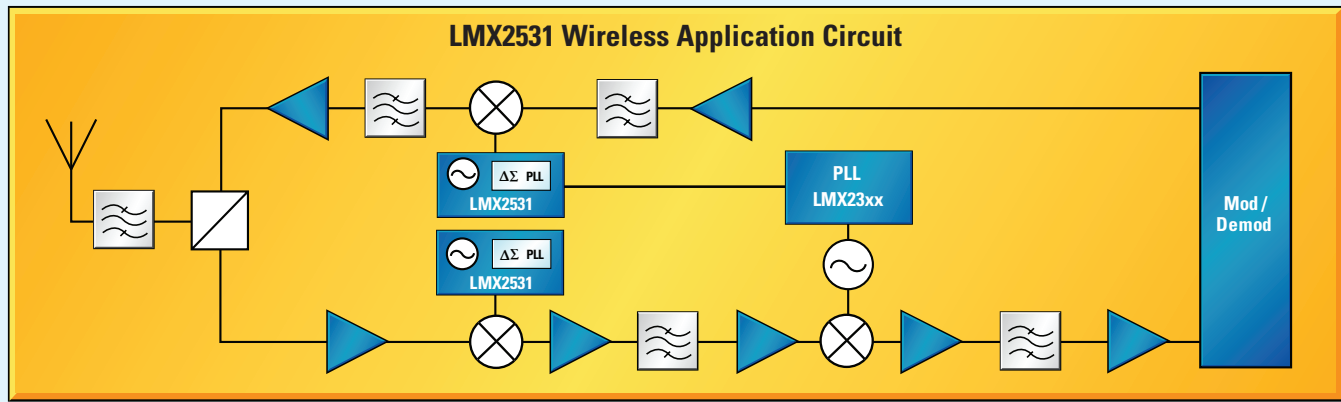
# Featured Products

## LMX2531 – Industry's Lowest Phase Noise Single-Chip PLL + VCO

High performance and wide frequency range (765 MHz to 2790 MHz) for various applications requiring a low-noise local oscillator

### Typical Applications

- 3G basestations
- Wireless LAN
- CATV equipment
- Bar code scanners
- Data converter clocking
- Broadband wireless access
- RFID
- Automotive applications

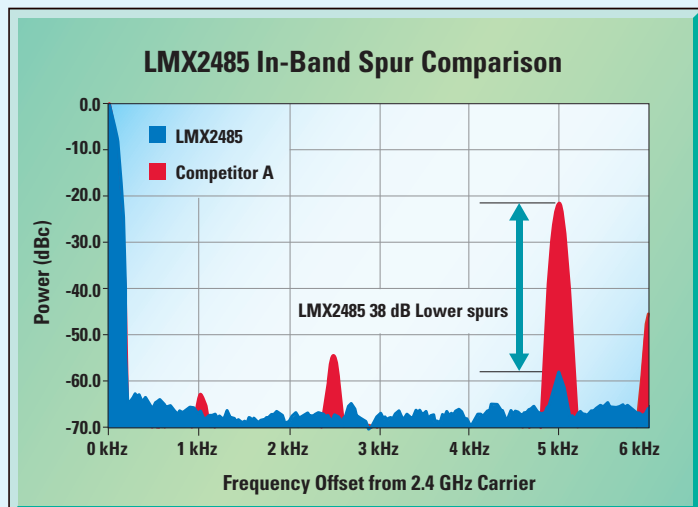


## LMX2485/86/87 – Latest RF Synthesizers Lead Industry with Lowest Power Consumption and Best System Performance

Frequency coverage of 50 MHz to 6.0 GHz with low power, high-performance delta-sigma fractional-N PLL including auxiliary integer-N PLL.

### Typical Applications

- Wireless basestations
- Applications that modulate data onto a signal such as WLAN, WiMAX, and OFDM
- Test and measurement equipment
- Satellite links
- Automotive applications



# PLLatinum™ Family of PLL Products

Product ID	Main Operating Frequency Range (GHz)	Aux. Operating Frequency Range (MHz)	Main Normalized Phase Noise (dBc/Hz)	Supply Current (mA)	Supply Voltage Range (V)	Package Size (mm)
<b>Single Integer PLLs</b>						
LMX2326	0.1 to 2.8	—	-210	4.7	2.3 to 5.5	3.5 x 3.5 x 1.0
LMX2310U	0.5 to 2.5	—	-212	2.3	2.7 to 5.5	3.5 x 3.5 x 0.8
LMX2347	0.2 to 2.5	—	-217	3.6	2.7 to 5.5	3.5 x 3.5 x 0.6
LMX2311U	0.5 to 2.0	—	-212	2.0	2.7 to 5.5	3.5 x 3.5 x 0.8
LMX2346	0.2 to 2.0	—	-217	3.0	2.7 to 5.5	3.5 x 3.5 x 1.0
LMX2312U	0.2 to 1.2	—	-212	1.4	2.7 to 5.5	3.5 x 3.5 x 0.8
LMX2316	0.1 to 1.2	—	-210	2.5	2.3 to 5.5	3.5 x 3.5 x 1.0
LMX2313U	45 to 600 MHz	—	-212	1.0	2.7 to 5.5	3.5 x 3.5 x 0.8
LMX2306	25 to 550 MHz	—	-210	1.7	2.3 to 5.5	3.5 x 3.5 x 1.0
<b>Dual Integer PLLs</b>						
LMX2434	1.0 to 5.0	500 to 2500	-219	7.0	2.35 to 2.75	3.5 x 3.5 x 0.6
LMX2433	0.5 to 3.6	250 to 1700	-219	5.2	2.25 to 2.75	3.5 x 3.5 x 0.6
LMX2430	0.25 to 3.0	100 to 800	-219	4.2	2.25 to 2.75	3.5 x 3.5 x 0.6
LMX2330L	0.5 to 2.5	45 to 510	-211	5	2.7 to 5.5	3.5 x 3.5 x 0.8
LMX2336L	0.2 to 2.0	50 to 1100	-211	5.5	2.7 to 5.5	4.5 x 3.5 x 1.0
LMX2331L	0.2 to 2.0	45 to 510	-211	4	2.7 or 5.5	3.5 x 3.5 x 0.8
LMX1600	0.2 to 2.0	40 to 500	-197	5	2.7 to 3.6	3.5 x 3.5 x 1.0
LMX2332L	0.1 to 1.2	45 to 510	-211	3	2.7 to 5.5	3.5 x 3.5 x 0.8
LMX1601	0.1 to 1.1	40 to 500	-197	4	2.7 to 3.6	3.5 x 3.5 x 1.0
LMX1602	0.1 to 1.1	100 to 1100	-197	5	2.7 to 3.6	3.5 x 3.5 x 1.0
LMX2335L	0.1 to 1.1	50 to 1100	-211	4	2.7 to 5.5	3.5 x 3.5 x 1.0
<b>Fractional PLLs</b>						
New LMX2487	3.0 to 6.0	250 to 2300	-209	8.2	2.5 to 3.6	4.0 x 4.0 x 0.75
New LMX2486	1.0 to 4.5	250 to 3000	-210	8.3	2.5 to 3.6	4.0 x 4.0 x 0.75
New LMX2485	0.5 to 3.0	75 to 800	-209	5	2.5 to 3.6	4.0 x 4.0 x 0.75
New LMX2485E	0.05 to 3.0	75 to 800	-209	5	2.5 to 3.6	4.0 x 4.0 x 0.75
LMX2364	0.5 to 2.6	50 to 850	-210	7	2.7 to 5.5	4.5 x 3.5 x 0.6
LMX2470	0.5 to 2.6	75 to 800	-210	4.1	2.25 to 2.75	4.5 x 3.5 x 0.6
LMX2353	0.5 to 2.5	—	-201	5.5	2.7 to 5.5	3.5 x 3.5 x 1.0
LMX2350	0.5 to 2.5	10 to 550	-201	6.5	2.7 to 5.5	4.5 x 3.5 x 1.0
LMX2354	0.5 to 2.5	10 to 550	-204	6	2.7 to 5.5	4.5 x 3.5 x 1.0
LMX2352	0.25 to 1.2	10 to 550	-201	4.75	2.7 to 5.5	4.5 x 3.5 x 1.0

# PLLatinum™ Family of PLL Products

## High-Performance PLL + VCO Products

Product IDs	Frequency Range (MHz)	Alternate Frequency Range (MHz)	Phase Noise at Offset Frequency	Supply Current (mA)	Supply Voltage Range (V)	Package Size (mm)
<b>New</b> LMX2531-2570E	2336 to 2790	—	-149 dBc/Hz at 5 MHz	38	2.8 to 3.2	6 x 6 x 0.75
	—	1168 to 1395	-152 dBc/Hz at 5 MHz	41		
<b>New</b> LMX2531-2265E	2178 to 2400	—	-150 dBc/Hz at 5 MHz	38	2.8 to 3.2	6 x 6 x 0.75
	—	1089 to 1200	-154 dBc/Hz at 5 MHz	41		
<b>New</b> LMX2531-2080E	1904 to 2274	—	-150 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	952 to 1137	-154 dBc/Hz at 5 MHz	37		
<b>New</b> LMX2531-1910E	1834 to 2028	—	-151 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	917 to 1014	-155 dBc/Hz at 5 MHz	37		
<b>New</b> LMX2531-1742	1760 to 1866	—	-152 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	880 to 933	-152 dBc/Hz at 5 MHz	37		
<b>New</b> LMX2531-1778E	1726 to 1840	—	-152 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	863 to 920	-154 dBc/Hz at 5 MHz	37		
<b>New</b> LMX2531-1700E	1662 to 1770	—	-153 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	831 to 885	-154 dBc/Hz at 5 MHz	37		
<b>New</b> LMX2531-1650E	1590 to 1700	—	-154 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	795 to 850	-155 dBc/Hz at 5 MHz	37		
<b>New</b> LMX2531-1570E	1530 to 1636	—	-154 dBc/Hz at 5 MHz	34	2.8 to 3.2	6 x 6 x 0.75
	—	765 to 818	-155 dBc/Hz at 5 MHz	37		
LMX2542-2121	2087 to 2155	—	-134 dBc/Hz at 900 kHz	22	2.7 to 3.3	5 x 5 x 0.75
LMX2522-1635	1619 to 1650	1355	-138 dBc/Hz at 1.25 MHz	17	2.7 to 3.3	5 x 5 x 0.75
LMX2502-1635	1619 to 1650	—	-138 dBc/Hz at 1.25 MHz	17	2.7 to 3.3	5 x 5 x 0.75
LMX2525-1321	1270 to 1395	633 to 768	-137 dBc/Hz at 1 MHz	14	2.5 to 3.3	4 x 5 x 0.75
LMX2505-1321	1270 to 1395	633 to 768	-137 dBc/Hz at 1 MHz	14	2.5 to 3.3	5 x 5 x 0.75
LMX2515-1321	1270 to 1395	—	-137 dBc/Hz at 1 MHz	14	2.5 to 3.3	5 x 5 x 0.75
LMX2532-1065	1052 to 1078	1392	-139 dBc/Hz at 900 kHz	17	2.7 to 3.3	5 x 5 x 0.75
LMX2512-1065	1052 to 1078	—	-139 dBc/Hz at 900 kHz	17	2.7 to 3.3	5 x 5 x 0.75
LMX2532-0967	954 to 980	1490	-139 dBc/Hz at 900 kHz	17	2.7 to 3.3	5 x 5 x 0.75
LMX2512-0967	954 to 980	—	-139 dBc/Hz at 900 kHz	17	2.7 to 3.3	5 x 5 x 0.75
LMX2515-0701	633 to 768	—	-137 dBc/Hz at 1 MHz	10	2.5 to 3.3	5 x 5 x 0.75

# Frequency Band Solution Finder

Frequency Bands (MHz)	10	50	100	200	400	600	800	1000	1400	1600	1800	2000	2200	2400	2600	2800	3000	3600	3800	4000	5800	6000	
LMX2306																							
LMX2313U																							
LMX2335L																							
LMX1601																							
LMX1602																							
LMX2312U																							
LMX2316																							
LMX2332L																							
LMX2352																							
LMX2515																							
LMX2512																							
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LMX2522																							
LMX2336L																							
LMX1600																							
LMX2331L																							
LMX2346																							
LMX2311U																							
LMX2542																							
LMX2347																							
LMX2310U																							
LMX2330L																							
LMX2350																							
LMX2353																							
LMX2354																							
LMX2364																							
LMX2470																							
LMX2326																							
LMX2531																							
LMX2485																							
LMX2430																							
LMX2433																							
LMX2434																							
LMX2486																							
LMX2487																							

# Wireless Evaluation Boards

Product ID	Order ID	Description
—	LMX-UTILITY-BD	Blank utility board designed complement evaluation boards
LMX1600/01/02	LMX1600/01/02EVAL	2.0 GHz Dual RF/IF, 1.1 GHz dual RF/IF, 1.1 GHz dual RF/RF integer PLLs
LMX2306	LMX2306EVAL	550 MHz single integer PLL
LMX2310U	LMX2310UEVAL	2.5 GHz Ultra-low power, single integer PLL
LMX2311U	LMX2311UEVAL	2.0 GHz Ultra-low power, single integer PLL
LMX2312U	LMX2312UEVAL	1.2 GHz Ultra-low power, single integer PLL
LMX2313U	LMX2313UEVAL	600 MHz Ultra-low power, single integer PLL
LMX2316	LMX2316EVAL	1.2 GHz Single integer PLL
LMX2326	LMX2326EVAL	2.8 GHz Single integer PLL
LMX2330L	LMX2330LEVAL	2.5 GHz Low-power, dual RF/IF integer PLL
LMX2331L	LMX2331LEVAL	2.0 GHz Low-power, dual RF/IF integer PLL
LMX2332L	LMX2332LEVAL	1.2 GHz Low-power, dual RF/IF integer PLL
LMX2335L	LMX2335LEVAL	1.1 GHz Low-power, dual RF integer PLL
LMX2336L	LMX2336LEVAL	2.0 GHz Low-power, dual RF integer PLL
LMX2346	LMX2346EVAL	2.0 GHz Low phase noise, single integer PLL
LMX2347	LMX2347EVAL	2.5 GHz Low phase noise, single integer PLL
LMX2354	LMX2354EVAL	2.5 GHz Dual RF/IF Frac-N PLL
LMX2364	LMX2364EVAL	2.6 GHz High-performance, dual RF/IF Frac-N PLL
LMX2430	LMX2430EVAL	3.0 GHz Ultra low phase noise, dual RF/IF integer PLL
LMX2433	LMX2433EVAL	3.6 GHz Ultra low phase noise, dual RF integer PLL
LMX2434	LMX2434EVAL	5.0 GHz Ultra low phase noise, dual RF integer PLL
LMX2470	LMX2470EVAL	2.6 GHz Dual RF/IF Delta-Sigma PLL
LMX2485	LMX2485EVAL	3.0 GHz High-performance, dual RF/IF Delta-Sigma PLL
LMX2485E	LMX2485E EVAL	50 to 3000 MHz High-performance, dual RF/IF Delta-Sigma PLL
LMX2486	LMX2486EVAL	4.5 GHz High-performance, dual RF Delta-Sigma PLL
LMX2487	LMX2487EVAL	6.0 GHz High-performance, dual RF Delta-Sigma PLL
LMX2502-1635	LMX25021635EVAL	Frequency synthesizer system with integrated RF/IF PLLs, and RF VCO
LMX2505-1321	LMX25051321EVAL	Frequency synthesizer system with dual integrated VCOs
LMX2512-0967	LMX25120967EVAL	Frequency synthesizer system with integrated RF/IF PLLs and RF VCO
LMX2512-1065	LMX25121065EVAL	Frequency synthesizer system with integrated RF/IF PLLs and RF VCO
LMX2522-1635	LMX25221635EVAL	Frequency synthesizer system with integrated RF/IF PLLs, RF, and GPS VCOs
LMX2525-1321	LMX25251321EVAL	Frequency synthesizer system with dual integrated VCOs
LMX2531-1570	LMX25311570EVAL	Frequency synthesizer system with integrated VCO
LMX2531-1650	LMX25311650EVAL	Frequency synthesizer system with integrated VCO
LMX2531-1700	LMX25311700EVAL	Frequency synthesizer system with integrated VCO
LMX2531-1742	LMX25311742EVAL	Frequency synthesizer system with integrated VCO
LMX2531-1778	LMX25311778EVAL	Frequency synthesizer system with integrated VCO
LMX2531-1919	LMX25311910EVAL	Frequency synthesizer system with integrated VCO
LMX2531-2080	LMX25312080EVAL	Frequency synthesizer system with integrated VCO
LMX2531-2265	LMX25312265EVAL	Frequency synthesizer system with integrated VCO
LMX2531-2570	LMX25312570EVAL	Frequency synthesizer system with integrated VCO
LMX2532-0967	LMX25320967EVAL	Frequency synthesizer system with integrated RF/IF PLLs, RF, and GPS VCOs
LMX2532-1065	LMX25321065EVAL	Frequency synthesizer system with integrated RF/IF PLLs, RF, and GPS VCOs
LMX2542-2121	LMX25422121EVAL	Cellular and GPS frequency synthesizer system with integrated VCO

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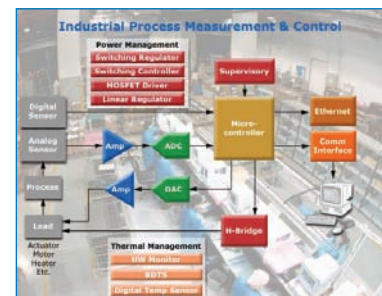
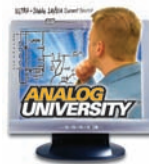
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# Packaging Solutions

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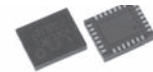


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As small as - 4.0 mm  
x 4.0 mm x 0.75 mm

National's LLP® provides excellent power dissipation capability in a very small package footprint. Unlike conventional leaded plastic packages, the LLP contains pads on the bottom of the package for PCB mounting.



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(TSSOP)  
As small as - 6.4 mm x 5.0 mm x 1.1 mm



Chip Scale Packaging  
(CSP, TCSP, UTCSP)  
As small as - 3.5 mm x 3.5 mm x 0.6 mm