










# MachXO3™ Family Overview

The MachXO3™ Family is Lattice's newest instant-on, non-volatile FPGAs, perfect for simplifying the implementation of evolving connectivity interfaces such as LVDS displays, MIPI CSI-2, DSI and more. Spanning from 640 to 6900 LUTs and available in lower power E (1.2V core) version or C (3.3/2.5V core) versions, the MachXO3 Family brings the latest in small packaging, micro-watt power consumption and high I/O count needed for integrating systems capable of supporting the high-bandwidth and high-resolution requirements for mobile consumer, industrial, servers and medical applications. MachXO3 includes multi-time programmable Non Volatile Configuration Memory (NVCm) and MachXO3LF supports infinitely reconfigurable Flash.

## Key Features

- Densities span from 640 – 6900 LUTs
- Up to 335 I/Os
- Hard I<sup>2</sup>C & SPI cores
- Built in oscillator
- High performance PLLs
- Low skew edge clock routing
- Wafer level chip scale packages as small as 2.5mm x 2.5mm
- 0.5mm spaced BGA that deliver maximum I/O, small size and low cost
- 0.8mm spaced BGA packages with very high I/O count



36 WLCSP	49 WLCSP	81 WLCSP	121 csfBGA	256csfBGA	324csfBGA	256caBGA	324caBGA	400caBGA
								
2.5 x 2.5mm 0.4mm pitch	3.2 x 3.2mm 0.4mm pitch	3.8 x 3.8mm 0.4mm pitch	6.0 x 6.0mm 0.5mm pitch	9.0 x 9.0mm 0.5mm pitch	10 x 10mm 0.5mm pitch	14 x 14mm 0.8mm pitch	15 x 15mm 0.8mm pitch	17 x 17mm 0.8mm pitch

MachXO3 devices are available in 0.4mm, 0.5mm & 0.8mm spaced BGA packages.

- **Maximum control. Minimum boot-up.**
  - Instant-on 1ms boot-up
  - Low voltage core 1.2V or choose a single 3.3/2.5V power supply
  - Hysteresis on inputs provides noise immunity with slow signals
- **Need to bridge MIPI DSI or CSI-2?**
  - Complete reference designs available
  - Low power and small sizes allow use in consumer products
  - Allows bridging to/from legacy interfaces

MachXO3L Family	XO3LF				
Features	XO3LF-640	XO3LF-1300	XO3LF-2100	XO3LF-4300	XO3LF-6900
Density LUTs	640	1300	2100	4300	6900
EBR RAM (Kbits)	64	64	74	92	240
PLL	1	1	1	2	2
Multi Time Programmable NVCm	Yes	Yes	Yes	Yes	Yes
Flash	XO3L-640	XO3L-1300	XO3L-2100	XO3L-4300	XO3L-6900
SPI Interface	1	1	1	1	1
I <sup>2</sup> C interface	2	2	2	2	2
Oscillator	1	1	1	1	1
Timer/Counter	1	1	1	1	1
MIPI D-PHY Support	Yes	Yes	Yes	Yes	Yes

Explore MachXO3, visit [www.latticesemi.com/MachXO3](http://www.latticesemi.com/MachXO3)

MIPI CSI-2 Image Sensor



## CSI-2 Image Sensor Interfacing

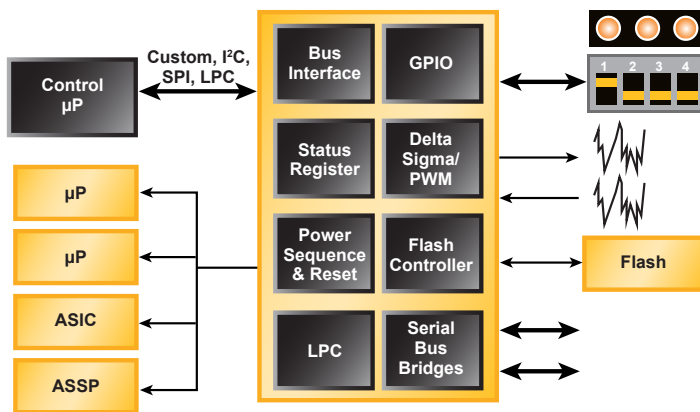
- Supports CSI-2 High Speed Differential Signaling
  - Both Rx and Tx interfaces available
- From 1-4 lanes of CSI-2 at up to 800 Mbps
- Can be implemented in a WLCSP (3.2 x 3.2mm)
- RAW, YUV or RGB supported

Processor



## DSI LCD Display Interfacing

- Supports DSI transmit signaling
  - HS (High Speed) Mode transmit
  - LP (Low Power) Mode transmit and receive
- Can be implemented in a 49 WLCSP (3.2 x 3.2mm)
- Supports DSI formats RGB, YCbCr and User Defined
- Input can also be DSI to enable LCD screen replacements



## Microprocessor I/O Expansion

- Save cost by adding GPIO to low-cost microcontrollers
- Add additional SPI and I²C interfaces to system control processors
- Perform voltage level translation with ease
- Simplify system management with PLD implementation of system status registers

MachXO3L Family	XO3LF				
Features	XO3LF-640	XO3LF-1300	XO3LF-2100	XO3LF-4300	XO3LF-6900
Density LUTs	640	1300	2100	4300	6900
36-ball WLCSP (0.4, 2.5 x 2.5)		25			
49-ball WLCSP (0.4, 3.2 x 3.2)			38		
81-ball WLCSP (0.4, 3.8 x 3.8)				60	
121-ball csFBGA (0.5, 6 x 6)	100	100	100		
256-ball csFBGA (0.5, 9 x 9)		206	206	206	206
324-ball csFBGA (0.5, 10 x 10)			269	269	269
256-ball caBGA (0.8, 14 x 14)		206	206	206	206
324-ball caBGA (0.8, 15 x 15)			269	269	269
400-ball caBGA (0.8, 17 x 17)				325	325

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### Applications Support

[techsupport@latticesemi.com](mailto:techsupport@latticesemi.com)



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