



INTEL® STRATIX® 10 MX (DRAM SYSTEM-IN-PACKAGE) PRODUCT TABLE

PRODUCT LINE		MX 1100	MX 1650	MX 1650	MX 1650	MX 2100	MX 2100	MX 2100	MX 2100	
Resources	Logic elements (LEs) ¹	1,092,000	1,679,000	1,679,000	1,679,000	2,073,000	2,073,000	2,073,000	2,073,000	
	Adaptive logic modules (ALMs)	370,080	569,200	569,200	569,200	702,720	702,720	702,720	702,720	
	ALM registers	1,480,320	2,276,800	2,276,800	2,276,800	2,810,880	2,810,880	2,810,880	2,810,880	
	Hyper-Registers from Intel® HyperFlex™ FPGA architecture	Millions of Hyper-Registers distributed throughout the monolithic FPGA fabric								
	Programmable clock trees synthesizable	Hundreds of synthesizable clock trees								
	HBM2 high-bandwidth DRAM memory (GBytes)	3.25	8	16	8	8	8	16	8	
	eSRAM memory blocks	1	2	2	2	2	2	2	2	
	eSRAM memory size (Mb)	45	90	90	90	90	90	90	90	
	M20K memory blocks	4,401	6,162	6,162	6,162	6,847	6,847	6,847	6,847	
	M20K memory size (Mb)	86	120	120	120	134	134	134	134	
	MLAB memory size (Mb)	6	9	9	9	11	11	11	11	
	Variable-precision digital signal processing (DSP) blocks	2,520	3,326	3,326	3,326	3,960	3,960	3,960	3,960	
	18 x 19 multipliers	5,040	6,652	6,652	6,652	7,920	7,920	7,920	7,920	
	Peak fixed-point performance (TMACS) ²	10.1	13.3	13.3	13.3	15.8	15.8	15.8	15.8	
Peak floating-point performance (TFLOPS) ³	4.0	5.3	5.3	5.3	6.3	6.3	6.3	6.3		
I/O and Architectural Features	Secure device manager	AES-256/SHA-256 bitstream encryption/authentication, physically unclonable function (PUF), ECDSA 256/384 boot code authentication, side channel attack protection								
	Hard processor system	Quad-core 64 bit ARM* Cortex*-A53 up to 1.5 GHz with 32 KB I/D cache, NEON* coprocessor, 1 MB L2 cache, direct memory access (DMA), system memory management unit, cache coherency unit, hard memory controllers, USB 2.0 x2, 1G EMAC x3, UART x2, serial peripheral interface (SPI) x4, I ² C x5, general-purpose timers x7, watchdog timer x4								
		Yes	-	-	-	-	-	-	-	-
	Maximum user I/O pins	448	656	656	584	640	656	656	584	
	LVDS pairs 1.6 Gbps (RX or TX)	216	312	312	288	312	312	312	288	
	Total full duplex transceiver count	48	96	96	96	48	96	96	96	
	GXE transceiver count - PAM4 (up to 56 Gbps) or NRZ (up to 30 Gbps)	0	0	0	72	0	0	0	72	
	GXT transceiver count - NRZ (up to 28.3 Gbps)	32	64	64	16	32	64	64	16	
	GX transceiver count - NRZ (up to 17.4 Gbps)	16	32	32	8	16	32	32	8	
	PCI Express* (PCIe*) hard intellectual property (IP) blocks (Gen3 x16)	2	4	4	1	2	4	4	1	
	100G Ethernet MAC (no FEC) hard IP blocks	2	4	4	1	2	4	4	1	
	100G Ethernet MAC + FEC hard IP blocks	0	0	0	12	0	0	0	12	
Memory devices supported	DDR4, DDR3, DDR2, DDR, QDR II, QDR II+, RLD RAM II, RLD RAM 3, HMC, MoSys									
Package Options and I/O Pins: General-Purpose I/O (GPIO) Count, High-Voltage I/O Count, LVDS Pairs, and Transceiver Count ^{4,5}										
F1760 pin (42.5 mm x 42.5 mm, 1.0 mm pitch)	448,16,216,48	-	-	-	-	-	-	-	-	
F2597 pin (52.5 mm x 52.5 mm, 1.0mm pitch)	-	656, 32, 312, 96	656, 32, 312, 96	-	640, 16, 312, 48	656, 32, 312, 96	656, 32, 312, 96	-	-	
F2912 pin (55 mm x 55 mm, 1.0 mm pitch)	-	-	-	584, 8, 288, 96	-	-	-	-	584, 8, 288, 96	

Notes:

- LE counts valid in comparing across Intel FPGA devices, and are conservative vs. competing FPGAs.
- Fixed-point performance assumes the use of pre-adder.
- Floating-point performance is IEEE 754 compliant single precision.
- A subset of pins for each package are used for high-voltage, 3.0 V and 2.5 V interfaces.
- All data is preliminary, and may be subject to change without prior notice.

448,16,216,48 Numbers indicate total GPIO count, high-voltage I/O count, LVDS pairs, and transceiver count.

Indicates pin migration path.



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Processor	Quad-core 64 bit ARM Cortex-A53 MPCore* processor
Maximum processor frequency	1.5 GHz ¹
Processor cache and co-processors	<ul style="list-style-type: none">• L1 instruction cache (32 KB)• L1 data cache (32 KB) with error correction code (ECC)• Level 2 cache (1 MB) with ECC• Floating-point unit (FPU) single and double precision• ARM NEON media engine• ARM CoreSight* debug and trace technology• System Memory Management Unit (SMMU)• Cache Coherency Unit (CCU)
Scratch pad RAM	256 KB
HPS DDR memory	DDR4, DDR3, and LP DDR3 (Up to 64 bit with ECC)
Direct memory access (DMA) controller	8 channels
EMAC	3X 10/100/1000 Ethernet media access controller (EMAC) with integrated DMA
USB on-the-go (OTG) controller	2X USB OTG with integrated DMA
UART controller	2X UART 16550 compatible
Serial peripheral interface (SPI) controller	4X SPI
I ² C controller	5X I ² C
Quad SPI flash controller	1X SIO, DIO, QIO SPI flash supported
SD/SDIO/MMC controller	1X eMMC 4.5 with DMA and CE-ATA support
NAND flash controller	<ul style="list-style-type: none">• 1X ONFI 1.0 or later• 8 and 16 bit support
General-purpose timers	4X
Software-programmable general-purpose I/Os (GPIOs)	Maximum 48 GPIOs
HPS DDR Shared I/O	3X 48 - May be assigned to HPS for HPS DDR access
Direct I/Os	48 I/Os to connect HPS peripherals directly to I/O
Watchdog timers	4X
Security	Secure device manager, Advanced Encryption Standard (AES) AES-256/SHA-256 bitsream encryption/authentication, PUF, ECDSA 256/384 boot code authentication, side channel attack protection

Notes:

1. With overdrive feature.