Intel® Stratix® 10

INTEL® STRATIX® 10 GX/SX PRODUCT TABLE

	PRODUCT LINE	GX 400 SX 400	GX 650 SX 650	GX 850 SX 850	GX 1100 SX 1100	GX 1650 SX 1650	GX 2100 SX 2100	GX 2500 SX 2500	GX 2800 SX 2800	GX 1660	GX 2110	GX 10M
Resources	Logic elements (LEs)[1]	378,000	612,000	841,000	1,325,000	1,624,000	2,005,000	2,422,000	2,753,000	1,679,000	2,073,000	10,200,000
	Adaptive logic modules (ALMs)	128,160	207,360	284,960	449,280	550,540	679,680	821,150	933,120	569,200	702,720	3,466,080
	ALM registers	512,640	829,440	1,139,840	1,797,120	2,202,160	2,718,720	3,284,600	3,732,480	2,276,800	2,810,880	13,864,320
	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										
	M20K memory blocks	1,537	2,489	3,477	5,461	5,851	6,501	9,963	11,721	6,162	6,847	12,950
	M20K memory size (Mb)	30	49	68	107	114	127	195	229	120	134	253
	MLAB memory size (Mb)	2	3	4	7	8	11	13	15	9	11	55
	Variable-precision digital signal processing (DSP) blocks	648	1,152	2,016	2,592	3,145	3,744	5,011	5,760	3,326	3,960	3,456
	18 x 19 multipliers	1,296	2,304	4,032	5,184	6,290	7,488	10,022	11,520	6,652	7,920	6,912
	Peak fixed-point performance (TMACS)[2]	2.6	4.6	8.1	10.4	12.6	15.0	20.0	23.0	13.3	15.8	13.8
	Peak floating-point performance (TFLOPS)[3]	1.0	1.8	3.2	4.1	5.0	6.0	8.0	9.2	5.3	6.3	5.5
I/O and Architectural Features	Secure device manager	AES-256/SHA-256 bitsream encryption/authentication, physically unclonable function (PUF), ECDSA 256/384 boot code authentication, side channel attack protection										–
	Hard processor system[4]	Quad-core 64-bit ARM* Cortex*-A53 up to 1.5 GHz with 32KB 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, SPI x4, I2C x5, general purpose timers x7, watchdog timer x4								–	–	–
		SX 400	SX 650	SX 850	SX 1100	SX 1650	SX 2100	SX 2500	SX 2800			
	Maximum user I/O pins	392	392	688	688	704	704	1160	1160	688	688	2,304
	Maximum LVDS pairs 1.6 Gbps (RX or TX)	192	192	336	336	336	336	576	576	336	336	1152[5]
	Total full duplex transceiver count	24	24	48	48	96	96	96	96	48	48	48
	GXT full duplex transceiver count (up to 28.3 Gbps)	16	16	32	32	64	64	64	64	32	32	–
	GX full duplex transceiver count (up to 17.4 Gbps)	8	8	16	16	32	32	32	32	16	16	48
	PCI Express* (PCIe*) hard intellectual property (IP) blocks (Gen3 x16)	1	1	2	2	4	4	4	4	2	2	4[6]
	Memory devices supported	DDR4, DDR3, DDR2, DDR, QDR II, QDR II+, RLDRAM II, RLDRAM 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[7,8]

F1152 pin (35 mm x 35 mm, 1.0 mm pitch)	392,8,192,24	392,8,192,24	–	–	–	–	–	–	–	–	
F1760 pin (42.5 mm x 42.5 mm, 1.0 mm pitch)	–	–	688,16,336,48	688,16,336,48	688,16,336,48	688,16,336,48	688,16,336,48	688,16,336,48	688,16,336,48	688,16,336,48	
F2397 pin (50 mm x 50 mm, 1.0 mm pitch)	–	–	–	–	704,32,336,96	704,32,336,96	704,32,336,96	704,32,336,96	–	–	
F2912 pin (55 mm x 55 mm, 1.0 mm pitch)	–	–	–	–	–	–	1160,8,576,24	1160,8,576,24	–	–	
F4938 pin (70 mm x 74 mm, 1.0 mm pitch)											2304,0,1152,48

Notes:
1. LE counts valid in comparing across Intel FPGA devices, and are conservative vs. competing FPGAs.
2. Fixed point performance assumes the use of pre-adder.
3. Floating point performance is IEEE-754 compliant single-precision.
4. Quad-core ARM Cortex-A53 hard processor system only available in Stratix 10 SX SoCs.
5. 1.4 Gbps LVDS maximum rate for GX 10M.
6. PCIe Gen3 x 8 support for GX 10M.
7. A subset of pins for each package are used for high-voltage 3.0 V and 2.5 V interfaces.
8. All data is preliminary and subject to change without prior notice.

392,8,192,24 Numbers indicate total GPIO count, high-voltage I/O count, LVDS pairs, and transceiver count.

Indicates pin migration path.

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PRODUCT LINE	SX 400	SX 650	SX 850	SX 1100	SX 1650	SX 2100	SX 2500	SX 2800
Processor	Quad-core 64 bit ARM Cortex-A53 MPCore* processor							
Maximum processor frequency	1.5 GHz[1]							
Processor cache and co-processors	• 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 (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^2C controller	5X I^2C							
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	• 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.