

Intel® Core™ i9-12900 Processor (30M Cache- up to 5.10 GHz)

Essentials

Product Collection	12th Generation Intel® Core™ i9 Processors
Code Name	Products formerly Alder Lake
Vertical Segment	Desktop
Processor Number	i9-12900
Status	Launched
Launch Date	Q1'22
Lithography	Intel 7
Use Conditions	PC/Client/Tablet Workstation
Recommended Customer Price	\$489.00

CPU Specifications

Total Cores	16
# of Performance-cores	8
# of Efficient-cores	8
Total Threads	24
Max Turbo Frequency	5.10 GHz
Intel® Turbo Boost Max Technology 3.0 Frequency ‡	5.10 GHz
Performance-core Max Turbo Frequency	5.00 GHz
Efficient-core Max Turbo Frequency	3.80 GHz
Performance-core Base Frequency	2.40 GHz
Efficient-core Base Frequency	1.80 GHz
Cache	30 MB Intel® Smart Cache
Total L2 Cache	14 MB
Processor Base Power	65 W
Maximum Turbo Power	202 W

Supplemental Information

Embedded Options Available	Yes
Datasheet	View now

Memory Specifications

Max Memory Size (dependent on memory type)	128 GB
Memory Types	Up to DDR5 4800 MT/s Up to DDR4 3200 MT/s
Max # of Memory Channels	2
Max Memory Bandwidth	76.8 GB/s
ECC Memory Supported ‡	Yes

Processor Graphics

Processor Graphics ‡	Intel® UHD Graphics 770
Graphics Base Frequency	300 MHz
Graphics Max Dynamic Frequency	1.55 GHz
Graphics Output	eDP 1.4b DP 1.4a HDMI 2.1
Execution Units	32
Max Resolution (HDMI)‡	4096 x 2160 @ 60Hz

Max Resolution (DP)‡	7680 x 4320 @ 60Hz
Max Resolution (eDP - Integrated Flat Panel)‡	5120 x 3200 @ 120Hz
DirectX* Support	12
OpenGL* Support	4.5
Multi-Format Codec Engines	2
Intel® Quick Sync Video	Yes
Intel® Clear Video HD Technology	Yes
# of Displays Supported ‡	4
Device ID	0x4680
OpenCL* Support	2.1
Expansion Options	
Direct Media Interface (DMI) Revision	4
Max # of DMI Lanes	8
Scalability	1S Only
PCI Express Revision	5.0 and 4.0
PCI Express Configurations ‡	Up to 1x16+4 2x8+4
Max # of PCI Express Lanes	20
Package Specifications	
Sockets Supported	FCLGA1700
Max CPU Configuration	1
Thermal Solution Specification	PCG 2020C
TJUNCTION	100°C
Package Size	45.0 mm x 37.5 mm
Advanced Technologies	
Intel® Gaussian & Neural Accelerator	3
Intel® Thread Director	Yes
Intel® Deep Learning Boost (Intel® DL Boost)	Yes
Intel® Optane™ Memory Supported ‡	Yes
Intel® Speed Shift Technology	Yes
Intel® Turbo Boost Max Technology 3.0 ‡	Yes
Intel® Turbo Boost Technology ‡	2
Intel® Hyper-Threading Technology ‡	Yes
Intel® 64 ‡	Yes
Instruction Set	64-bit
Instruction Set Extensions	Intel® SSE4.1 Intel® SSE4.2 Intel® AVX2
Idle States	Yes
Enhanced Intel SpeedStep® Technology	Yes
Thermal Monitoring Technologies	Yes
Intel® Volume Management Device (VMD)	Yes
Security & Reliability	
Intel vPro® Platform Eligibility ‡	Yes
Intel vPro® Enterprise Platform Eligibility ‡	Yes
Intel vPro® Essentials Platform Eligibility ‡	Yes
Intel® Threat Detection Technology (TDT)	Yes
Intel® Active Management Technology (AMT) ‡	Yes
Intel® Standard Manageability (ISM) ‡	Yes

Intel® One-Click Recovery ‡	Yes
Intel® Hardware Shield Eligibility ‡	Yes
Intel® AES New Instructions	Yes
Secure Key	Yes
Intel® OS Guard	Yes
Intel® Trusted Execution Technology ‡	Yes
Execute Disable Bit ‡	Yes
Intel® Boot Guard	Yes
Mode-based Execute Control (MBEC)	Yes
Intel® Control-Flow Enforcement Technology	Yes
Intel® Total Memory Encryption - Multi Key	Yes
Intel® Total Memory Encryption	Yes
Intel® Stable IT Platform Program (SIPP)	Yes
Intel® Virtualization Technology with Redirect Protection (VT-rp) ‡	Yes
Intel® Virtualization Technology (VT-x) ‡	Yes
Intel® Virtualization Technology for Directed I/O (VT-d) ‡	Yes
Intel® VT-x with Extended Page Tables (EPT) ‡	Yes