Intel Core i9-12900F processor

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Intel

Intel® Deep Learning Boost (Intel® DL Boost)
A new set of embedded processor technologies designed to accelerate AI deep learning use cases. It extends Intel AVX-512 with a new Vector Neural Network Instruction (VNNI) that significantly increases deep learning inference performance over previous generations.

Intel® Optane™ Memory Supported
Intel® Optane™ memory is a revolutionary new class of non-volatile memory that sits in between system memory and storage to accelerate system performance and responsiveness. When combined with the Intel® Rapid Storage Technology Driver, it seamlessly manages multiple tiers of storage while presenting one virtual drive to the OS, ensuring that data frequently used resides on the fastest tier of storage. Intel® Optane™ memory requires specific hardware and software configuration.

Intel® Speed Shift Technology
Intel® Speed Shift Technology uses hardware-controlled P-states to deliver dramatically quicker responsiveness with single-threaded, transient (short duration) workloads, such as web browsing, by allowing the processor to more quickly select its best operating frequency and voltage for optimal performance and power efficiency.

Intel® Turbo Boost Max Technology 3.0
Intel® Turbo Boost Max Technology 3.0 identifies the best performing core(s) on a processor and provides increased performance on those cores through increasing frequency as needed by taking advantage of power and thermal headroom.

Intel® Turbo Boost Technology
Intel® Turbo Boost Technology dynamically increases the processor's frequency as needed by taking advantage of thermal and power headroom to give you a burst of speed when you need it, and increased energy efficiency when you don’t.

Intel® Hyper-Threading Technology
Intel® Hyper-Threading Technology (Intel® HT Technology) delivers two processing threads per physical core. Highly threaded applications can get more work done in parallel, completing tasks sooner.

Intel® Virtualization Technology (VT-x)
Intel® Virtualization Technology (VT-x) allows one hardware platform to function as multiple “virtual” platforms. It offers improved manageability by limiting downtime and maintaining productivity by isolating computing activities into separate partitions.

Intel® Virtualization Technology for Directed I/O (VT-d)
Intel® Virtualization Technology for Directed I/O (VT-d) continues from the existing support for IA-32 (VT-x) and Itanium® processor (VT-i) virtualization adding new support for I/O-device virtualization. Intel VT-d can help end users improve security and reliability of the systems and also improve performance of I/O devices in virtualized environments.

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Intel® VT-x with Extended Page Tables (EPT)
Intel® VT-x with Extended Page Tables (EPT), also known as Second Level Address Translation (SLAT), provides acceleration for memory intensive virtualized applications. Extended Page Tables in Intel® Virtualization Technology platforms reduces the memory and power overhead costs and increases battery life through hardware optimization of page table management.

Intel® 64
Intel® 64 architecture delivers 64-bit computing on server, workstation, desktop and mobile platforms when combined with supporting software. Intel 64 architecture improves performance by allowing systems to address more than 4 GB of both virtual and physical memory.

Idle States
Idle States (C-states) are used to save power when the processor is idle. C0 is the operational state, meaning that the CPU is doing useful work. C1 is the first idle state, C2 the second, and so on, where more power saving actions are taken for numerically higher C-states.

Enhanced Intel SpeedStep® Technology
Enhanced Intel SpeedStep® Technology is an advanced means of enabling high performance while meeting the power-conservation needs of mobile systems. Conventional Intel SpeedStep® Technology switches both voltage and frequency in tandem between high and low levels in response to processor load. Enhanced Intel SpeedStep® Technology builds upon that architecture using design strategies such as Separation between Voltage and Frequency Changes, and Clock Partitioning and Recovery.

Thermal Monitoring Technologies
Thermal Monitoring Technologies protect the processor package and the system from thermal failure through several thermal management features. An on-die Digital Thermal Sensor (DTS) detects the core's temperature, and the thermal management features reduce package power consumption and thereby temperature when required in order to remain within normal operating limits.

Intel® Volume Management Device (VMD)
Intel® Volume Management Device (VMD) provides a common, robust method of hot plug and LED management for NVMe-based solid state drives.

Intel® AES New Instructions
Intel® AES New Instructions (Intel® AES-NI) are a set of instructions that enable fast and secure data encryption and decryption. AES-NI are valuable for a wide range of cryptographic applications, for example: applications that perform bulk encryption/decryption, authentication, random number generation, and authenticated encryption.

Secure Key
Intel® Secure Key consists of a digital random number generator that creates truly random numbers to strengthen encryption algorithms.

Execute Disable Bit
Execute Disable Bit is a hardware-based security feature that can reduce exposure to viruses and malicious-code attacks and prevent harmful software from executing and propagating on the server or network.

Intel® Boot Guard
Intel® Device Protection Technology with Boot Guard helps protect the system’s pre-OS environment from viruses and malicious software attacks.

Mode-based Execute Control (MBE)
Mode-based Execute Control can more reliably verify and enforce the integrity of kernel level code.

Intel® Control-Flow Enforcement Technology
CET - Intel Control-flow Enforcement Technology (CET) helps protect against the misuse of legitimate code snippets through return-oriented programming (ROP) control-flow hijacking attacks.

Zusammenfassung

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Intel Core i9-12900F, Intel® Core™ i9, LGA 1700, Intel, i9-12900F, 64-bit, 12th gen Intel® Core™ i9

Intel Core i9-12900F. Processor family: Intel® Core™ i9, Processor socket: LGA 1700, Processor manufacturer: Intel. Memory channels: Dual-channel, Maximum internal memory supported by processor: 128 GB, Memory types supported by processor: DDR4-SDRAM, DDR5-SDRAM. Market segment: Desktop, Use conditions: PC/Client/Tablet, PCI Express slots version: 4.0, 5.0. Intel® Turbo Boost Max Technology 3.0 frequency: 5.1 GHz. Package type: Retail box

Merkmale

Logistics data

Harmonized System (HS) code	85423119

Operational conditions

Tjunction	100 °C

Other features

Maximum internal memory	128 GB

Packaging data

Package type	Retail box

Weight & dimensions

Processor package size	45 x 37.5 mm

Graphics

On-board graphics card	N
Discrete graphics card	N
On-board graphics card model	Not available
Discrete graphics card model	Not available

Memory

Maximum internal memory supported by processor	128 GB
Memory types supported by processor	DDR4-SDRAM, DDR5-SDRAM
Memory channels	Dual-channel
Memory bandwidth (max)	76.8 GB/s

Features

Execute Disable Bit	Y
Idle States	Y
Thermal Monitoring Technologies	Y
Market segment	Desktop
Use conditions	PC/Client/Tablet
Maximum number of PCI Express lanes	20

Technical details

Target market	Gaming, Content Creation
Launch date	Q1'22
Status	Launched

PCI Express slots version	4.0, 5.0
PCI Express configurations	1x16+1x4, 2x8+1x4
Supported instruction sets	SSE4.1, SSE4.2, AVX 2.0
Scalability	1S
CPU configuration (max)	1
Embedded options available	N
Direct Media Interface (DMI) Revision	4.0
Export Control Classification Number (ECCN)	5A992CN3
Commodity Classification Automated Tracking System (CCATS)	G167599

Processor special features

Intel® Hyper Threading Technology (Intel® HT Technology)	Y
Intel® Turbo Boost Technology	2.0
Intel® AES New Instructions (Intel® AES-NI)	Y
Enhanced Intel SpeedStep Technology	Y
Intel® Speed Shift Technology	Y
Intel® Turbo Boost Max Technology 3.0 frequency	5.1 GHz
Intel® Gaussian & Neural Accelerator (Intel® GNA) 3.0	Y
Intel® Control-flow Enforcement Technology (CET)	Y
Intel® Thread Director	Y
Intel VT-x with Extended Page Tables (EPT)	Y
Intel® Secure Key	Y
Intel® OS Guard	Y
Intel 64	Y
Intel Virtualization Technology (VT-x)	Y
Intel Virtualization Technology for Directed I/O (VT-d)	Y
Intel Turbo Boost Max Technology 3.0	Y
Intel® Optane™ Memory Ready	Y
Intel® Boot Guard	Y
Intel® Deep Learning Boost (Intel® DL Boost)	Y
Intel® Volume Management Device (VMD)	Y
Mode-based Execute Control (MBE)	Y
Intel® Standard Manageability (ISM)	Y

Processor

Processor manufacturer	Intel
Processor generation	12th gen Intel® Core™ i9
Processor model	i9-12900F
Processor family	Intel® Core™ i9
Processor cores	16
Processor socket	LGA 1700
Processor threads	24

Processor operating modes	64-bit
Performance cores	8
Efficient cores	8
Processor boost frequency	5.1 GHz
Performance-core boost frequency	5 GHz
Performance-core base frequency	2.4 GHz
Efficient-core boost frequency	3.8 GHz
Efficient-core base frequency	1.8 GHz
Processor cache	30 MB
Processor cache type	Smart Cache
Box	N
Processor base power	65 W
Maximum turbo power	202 W
Stepping	C0
Bus type	DMI4
Maximum number of DMI lanes	8
Memory bandwidth supported by processor (max)	76.8 GB/s
Processor codename	Alder Lake
Processor ARK ID	134598