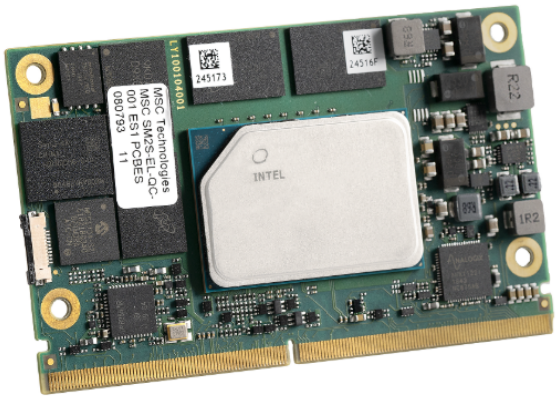
TRIA SM2S-EL

Intel® Atom™ x6000 / Pentium® / Celeron® N and J Series SOC



82 x 50 mm

6 / 12 W

-40 +85 °C

Highlights

- Integrated Intel UHD Graphics (Gen11)
- Up to 16GB LPDDR4x SDRAM with IBECC (only Atom SKU´s)
- Up to 256GB eMMC 5.1, Flash (optional)
- SATA-III interface (6Gbps)
- 1x DisplayPort 1.4 / HDMI™ 2.0b
- 1x DisplayPort 1.4
- LVDS / Embedded DisplayPort and MIPI-DSI
- Triple Independent Display support
- DirectX, OpenGL 4.5, OpenCL 1.2, Vulkan v1.1
- Up to 4x PCI Express x1/x2/x4 Gen. 3
- 2x USB 3.1 Host interfaces (1x Host/Device)
- 6x USB 2.0 Host interfaces (1x Host/Device)
- 2x Gigabit Ethernet with TSN/TCC
- 1x SGMII Interface on PCIE-D (optional)
- UART, SPI, I2C, SMBus
- 2x CAN-FD
- HD/I2S Audio, SD Card interface
- Trusted Platform Module (optional)
- SMARC 2.1.1 compliant

Technical Data

Technology	x86
Formfactor	SMARC™ Short Size
CPU	Intel Atom x6425RE Processor, quad-core, 1.9GHz, 32EU, TCC, IBECC, 12W, IUC Intel Atom x6416RE Processor, quad-core, 1.7GHz, 16EU, TCC, IBECC, 9W, IUC Intel Atom x6414RE Processor, quad-core, 1.5GHz, 16EU, TCC, IBECC, 9W, IUC Intel Atom x6214RE Processor, dual-core, 1.4GHz, 16EU, TCC, IBECC, 6W, IUC Intel Atom x6212RE Processor, dual-core, 1.2GHz, 16EU, TCC, IBECC, 6W, IUC Intel Atom x6425E Processor, quad-core, 2.0/3.0GHz, 32EU, IBECC, 12W, EUC Intel Atom x6413E Processor, quad-core, 1.5/3.0GHz, 16EU, IBECC, 9W, EUC Intel Atom x6211E Processor, dual-core, 1.3/3.0GHz, 16EU, IBECC, 6W, EUC Intel Pentium J6426 Processor, quad-core,2.0/3.0GHz, 32EU, 10W, PUC Intel Pentium N6415 Processor, quad-core, 1.2/3.0GHz, 16EU, 6W, PUC Intel Celeron J6413 Processor, quad-core, 1.8/3.0GHz, 16EU, 10W, PUC Intel Celeron N6211 Processor, quad-core, 1.2/3.0GHz, 16EU, 6W, PUC Intel® Technologies: Enhanced Intel® SpeedStep® Technology Intel® Virtualization Technology (VTx-2, VT-d) Intel® Trusted Execution Engine (TXE) Intel® Time Coordinated Computing (TCC) Precision Time Measurement (PTM) Precision Time Protocoll (PTP) IUC - Intel Industrial Use Conditions EUC - Intel Embedded Use Conditions PUC - Intel PC Client Use Conditions
Chipset	Integrated in SOC
RAM	Up to 16GB LPDDR4x SDRAM, up to 4267MT/s, IBECC (only Atom SKU´s), soldered
Flash	Up to 256GB eMMC V5.1 Flash, soldered (optional)
Storage Interfaces	1x SATA-III 6Gbps 1x SD 3.01/SDIO 3.0
USB	2x USB 3.1 Host interfaces (1x Host/Device) 6x USB 2.0 Host interfaces (1x Host/Device)
Serial Interfaces	4x UART (two with handshake)
Bus Interfaces	Up to 4x PCI-Express x1 Gen. 3 lanes 1x I2C Bus 1x SPI Bus (Boot) 1x SPI Bus (general purpose)/ eSPI (optional) 1x SMBus 2x CAN-FD (Flexible Data-Rate)
Display Controller	Integrated Intel UHD Graphics (Gen11) Up to 32 execution units (EU) 3D Acceleration: DirectX, OpenGL 4.5, OpenCL 1.2, Vulkan 1.0 Video Decode: MPEG-2, H.265/HEVC (L5.1), H.264, (L5.2), VC-1, WMV9, VP8, VP9, MVC, JPEG/MJPEG
Display Interfaces	Three independent displays supported 2x DP++ Dual-Channel LVDS 24/18 bit up to 1920 x 1200 @ 60Hz or Embedded DisplayPort 1.3 up to 4096 x 2160 @ 60Hz and MIPI-DSI x4 Interface up to 2560 x 1600 @ 60Hz (optional)
Network Interface	2x 10/100/1000Base-T 1x SGMII Interface on PCIE-D (optional)
Audio Interface	High Definition Audio and I2S Audio or 2x I2S Audio

Security Device	Infineon Trusted Platform Module 2.0 (optional)
Miscellaneous	Watchdog Timer: Initiates system reset, (programmable, 1s ... 255h) Fan Supply: PWM Speed Control for system fan on carrier board RTC battery: external System Monitoring: Voltage, Temperature, CPU Fan, System Fan
Feature Highlights	SMARC™ 2.1.1 compliant
Firmware	AMI Aptio UEFI
OS Support	Windows 10 IoT Enterprise LTSC 2021 Windows 11 IoT Enterprise LTSC 2024 Linux (Yocto Project)
Power Requirement	+5V +/-5%
Environment	Temperature Range: 0° ... 60°C (operating) -25° ... 85°C (storage) -40° ... 85°C (operating industrial) Humidity: 5 ... 95% (operating, non-condensing) 5 ... 95% (storage, non-condensing)
Dimensions	82 x 50 mm
Certificates	UL / CE
Cooling	Heatspreader Heatsink
Carrier	TRIA SM2-MB-EP1

Technical Data for TRIA SM2S-EL

Order Reference

Order No.	Description	Reference	Status*
88129	SMARC 2.1.1 module with Intel Atom x6425RE, Quad-Core (1.9GHz), 12W, 16GB LPDDR4x (3200 MT/s) IBECC, 32EU, TCC, 64GB eMMC, 2x GbE LAN, 1x SATA, 2xUSB 3.1 (1x Host/ Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, IUC (Industrial use conditions), industrial temperature -40...+85°C	MSC SM2S-EL-x6425RE-46N0281I PCBFTX	PV
87436	SMARC 2.1.1 module with Intel Atom x6425RE, Quad-Core (1.9GHz), 12W, 4GB LPDDR4x (3733 MT/s) IBECC, 32EU, TCC, 4GB eMMC, 2x GbE LAN, SGMII on PCIe_D, no SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), 2x DP++, TPM 2.0, eDP, IUC (Industrial use conditions), extended temperature -25°C...+85°C	MSC SM2S-EL-x6425RE-22N0191E PCBFTX	OR
88125	SMARC 2.1.1 module with Intel Atom x6414RE, Quad-Core (1.5GHz), 9W, 4GB LPDDR4x (3733 MT/s) IBECC, 16EU, TCC, 32GB eMMC, 2x GbE LAN, SGMII on PCIe_D, no SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, IUC (Industrial use conditions), industrial temperature -40...+85°C	MSC SM2S-EL-x6414RE-25N0291I PCBFTX	PV
88121	SMARC 2.1.1 module with Intel Atom x6212RE, Dual-Core (1.2GHz), 6W, 4GB LPDDR4x (3733 MT/s) IBECC, 16EU, TCC, 16GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/ Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, IUC (Industrial use conditions), industrial temperature -40...+85°C	MSC SM2S-EL-x6212RE-24N0281I PCBFTX	PV
88127	SMARC 2.1.1 module with Intel Atom x6425E, Quad-Core (2.0GHz/3.0GHz), 12W, 16GB LPDDR4x (3200 MT/s), IBECC, 32EU, 64GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, EUC (Embedded use conditions), extended temperature -25°C...+85°C	MSC SM2S-EL-x6425E-46N0281E PCBFTX	PV
88123	SMARC 2.1.1 module with Intel Atom x6413E, Quad-Core (1.5GHz/3.0GHz), 9W, 8GB LPDDR4x (3733 MT/s), IBECC, 16EU, 32GB eMMC, 2x GbE LAN, SGMII on PCIe_D, no SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, EUC (Embedded use conditions), extended temperature -25°C...+85°C	MSC SM2S-EL-x6413E-35N0291E PCBFTX	PV
88119	SMARC 2.1.1 module with Intel Atom x6211E, Dual-Core (1.3GHz/3.0GHz), 6W, 4GB LPDDR4x (3733 MT/s), IBECC, 16EU, 16GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, EUC (Embedded use conditions), extended temperature -25°C...+85°C	MSC SM2S-EL-x6211E-24N0281E PCBFTX	PV
88116	SMARC 2.1.1 module with Intel Pentium J6426, Quad-Core (2.0GHz/ 3.0GHz), 10W, 16GB LPDDR4x (3200 MT/s), 32EU, 64GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/ Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, PUC (PC Client use conditions), standard temperature 0...+60°C	MSC SM2S-EL-J6426-46N0281C PCBFTX	PV
88114	SMARC 2.1.1 module with Intel Celeron J6413, Quad-Core (1.8GHz/ 3.0GHz), 10W, 8GB LPDDR4x (3733 MT/s), 16EU, 16GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/ Device), 6x USB 2.0 (1x Host/ Device), TPM 2.0, LVDS, PUC (PC Client use conditions), standard temperature 0...+60°C	MSC SM2S-EL-J6413-34N0281C PCBFTX	PV
96349	SMARC 2.1.1 module with Intel Atom x6413E, Quad-Core (1.5GHz/3.0GHz), 9W, 4GB LPDDR4x (3733 MT/s), IBECC, 16EU, 128GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, EUC (Embedded use conditions), industrial temperature -40...+85°C	MSC SM2S-EL-x6413E-27N0281I PCBFTX	PV

Order No.	Description	Reference	Status*
90305	SMARC 2.1.1 module with Intel Atom x6414RE, Quad-Core (1.5GHz), 9W, 4GB LPDDR4x (3733 MT/s) IBECC, 32EU, TCC, 4GB eMMC, 2x GbE LAN, SGMII on PCIe_D, no SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), 2x DP++, TPM 2.0, eDP, IUC (Industrial use conditions), extended temperature -25°C...+85°C	MSC SM2S-EL-x6414RE-22N0191E PCBFTX	PV
110394	SMARC 2.1.1 module with Intel Atom x6413E, Quad-Core (1.5GHz/3.0GHz), 9W, 4GB LPDDR4x (3733 MT/s), IBECC, 16EU, 32GB eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/ Device), TPM 2.0, LVDS, EUC (Embedded use conditions), industrial temperature -40...+85°C	MSC SM2S-EL-x6413E-25N0180I PCBFTX	PV
111756	SMARC 2.1.1module with Intel Atom x6425E, Quad-Core (2.0GHz/3.0GHz), 12W, 16GB LPDDR4x (3200 MT/s), IBECC, 32EU, no eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/ Device), 6x USB 2.0 (1x Host/Device), TPM 2.0, LVDS, EUC (Embedded use conditions), extended temperature -25...+85°C	MSC SM2S-EL-x6425E-4NN0281E PCBFTX	PV
111991	SMARC 2.1.1 module with Intel Atom x6414RE, quad-core (1.5GHz), 9W, 8GB LPDDR4x (3733 MT/s) IBECC, 16EU, TCC, no eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), LVDS, TPM 2.0, IUC (Industrial use conditions), industrial temperature -40...+85°C	MSC SM2S-EL-x6414RE-3NN0281I PCBFTX	PV
117234	SMARC 2.1.1 module with Intel Atom x6413E, quad-core (1.5GHz/3.0GHz), 9W, 8GB LPDDR4x (3733 MT/s) IBECC, 16EU, no TCC, no eMMC, 2x GbE LAN, 1x SATA, 2x USB 3.1 (1x Host/Device), 6x USB 2.0 (1x Host/Device), 2x DP++ and eDP, TPM 2.0, EUC (Embedded use conditions), extended temperature -25...+85°C	MSC SM2S-EL-x6413E-3NN0181E PCBFTX	PV

Ordering Information for TRIA SM2S-EL

*PV = Preferred variant; OR = on Request (in OEM quantities only)

Accessories

Carrier Options

Order No.	Description	Reference
68488	SMARC 2.0 Embedded Platform with PCI Express x4 slot, GbE, SATA, USB 3.0, USB 2.0, USB 2.0 OTG, RS232, CAN, SPI, eSPI, SMBus, I2C and GPIO interface, LVDS/eDP, DisplayPort and HDMI display interface, regulated backlight supply, HD/I2S audio interface, MIPI CSI-2 camera interface, mini PCI Express card slot, SD card slot, fan connector, CMOS battery, Mini-ITX form factor (170 x 170 mm), ATX power connector and single 12V/24V power jack, commercial temperature range 0..+70°C	MSC SM2-MB-EP1-001 PCBFTX
85087	SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 3x RS232, 1x RS485, dual RJ45 LAN with LED (1 x LAN i210), 1x M.2 2280 Key M slot, mPCIe slot, 1x USB 3.0 Type A, 1x USB 3.0/ DisplayPort Type C , 1x USB 2.0 Type A, 1x USB 2.0 internal, 1x µUSB 2.0 Host/Device, 2x SPI, I²C, 12 GPIO on FC, 1x DisplayPort++ , LVDS/ eDP/DSI on JILI30 connector, µSD Card Slot, regulated backlight supply, HD Audio with amplifier, system fan connector, camera connector, RTC battery. Industrial temperature range -40..+85°C, x86 full version	MSC SM2S-MB-EP5-001 PCBFTX
83979	SMARC 2.x compatible embedded platform (146 x 80mm), 12V input voltage, 3x RS232, 1x RS485, dual RJ45 LAN with LED, 1x M.2 2280 Key M slot , 1x USB 2.0 Type A, 1x USB3.0 Type A, 1x USB 2.0 internal, 1x µUSB 2.0 Host/Device, 2x SPI, 12 GPIO on FC, 1x DisplayPort++ , LVDS/eDP/DSI on JILI30 connector, regulated backlight supply, RTC battery, Industrial temperature range -40..+85°C, x86 slim version	MSC SM2S-MB-EP5-003 PCBFTX

Carrier Options TRIA SM2S-ASL/ALN/EL/AL/RYZ

Order No.	Description	Reference
68488	SMARC 2.0 Embedded Platform with PCI Express x4 slot, GbE, SATA, USB 3.0, USB 2.0, USB 2.0 OTG, RS232, CAN, SPI, eSPI, SMBus, I2C and GPIO interface, LVDS/eDP, DisplayPort and HDMI display interface, regulated backlight supply, HD/I2S audio interface, MIPI CSI-2 camera interface, mini PCI Express card slot, SD card slot, fan connector, CMOS battery, Mini-ITX form factor (170 x 170 mm), ATX power connector and single 12V/24V power jack, commercial temperature range 0..+70°C	MSC SM2-MB-EP1-001 PCBFTX
85087	SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 3x RS232, 1x RS485, dual RJ45 LAN with LED (1 x LAN i210), 1x M.2 2280 Key M slot, mPCIe slot, 1x USB 3.0 Type A, 1x USB 3.0/ DisplayPort Type C , 1x USB 2.0 Type A, 1x USB 2.0 internal, 1x µUSB 2.0 Host/Device, 2x SPI, I²C, 12 GPIO on FC, 1x DisplayPort++ , LVDS/ eDP/DSI on JILI30 connector, µSD Card Slot, regulated backlight supply, HD Audio with amplifier, system fan connector, camera connector, RTC battery. Industrial temperature range -40..+85°C, x86 full version	MSC SM2S-MB-EP5-001 PCBFTX
83979	SMARC 2.x compatible embedded platform (146 x 80mm), 12V input voltage, 3x RS232, 1x RS485, dual RJ45 LAN with LED, 1x M.2 2280 Key M slot , 1x USB 2.0 Type A, 1x USB3.0 Type A, 1x USB 2.0 internal, 1x µUSB 2.0 Host/Device, 2x SPI, 12 GPIO on FC, 1x DisplayPort++ , LVDS/eDP/DSI on JILI30 connector, regulated backlight supply, RTC battery, Industrial temperature range -40..+85°C, x86 slim version	MSC SM2S-MB-EP5-003 PCBFTX

Carrier Options TRIA SM2S-ASL/ALN/EL/AL/RYZ

Cooling Options

Order No.	Description	Reference
82414	Passive Heatsink for SM2S-EL variants with Atom processor, consisting of a single-piece aluminium pin cooler and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-EL-01 HSI-001

Order No.	Description	Reference
85122	Heatspreader for SM2S-EL variants with Atom processor, consisting of a single-piece aluminium plane and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-EL-01 HSP-001
88512	Passive Heatsink for SM2S-EL variants with Pentium/Celeron processor, consisting of a single-piece aluminium pin cooler and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-EL-02 HSI-001
88511	Heatspreader for SM2S-EL variants with Pentium/Celeron processor, consisting of a single-piece aluminium plane and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-EL-02 HSP-001

Cooling Options TRIA SM2S-EL

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