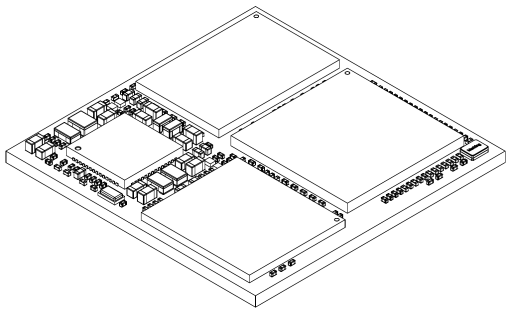
Grinn MiniSOM-8M Datasheet



1 Features

- LGA225 package
- Simple design of the end device
- Up to quad core Arm® Cortex®-A53
- Arm® Cortex®-M4
- up to 4GB LPDDR4
- up to 16GB eMMC storage
- 1x RGMII
- PCIe 2.0 x1
- USB 2.0 OTG
- 2x uSDHC interfaces (MMC/SD/SDIO/SDXC)
- 4x UART
- 4x I^2C
- 1x QSPI
- 2x SPI
- 1080p60 VP9 Profile 0, 2 (10-bit) Decoder
- 1080p60 HEVC/H.265 Decoder
- 1080p60 VP8 Decoder and Encoder
- 1080p60 AVC/H.264 Encoder and Baseline, Main, High Decoder
- TrustZone support
- GCNanoUltra + GC320 GPUs
- 4-lane MIPI CSI interface
- 4-lane MIPI DSI interface
- S/PDIF in/out
- 4x synchronous audio interface (SAI)
- 8-Channel Pulse Density Modulation (PDM) input
- Advanced security and debug capabilities
- Up to 123 GPIO

2 Applications

- Consumer and Professional Audio
- Industrial automation
- Building/Home automation
- Voice Assistance and Machine Vision
- General purpose consumer and healtcare

3 Description

The Grinn MiniSOM-8M combines high computing power with low power consumption, thanks to the i.MX 8M Mini processor at its core. It features a quad-core Arm Cortex-A53, Arm Cortex-M4, and GCNanoUltra + GC320 GPUs, supporting advanced video processing and AI applications. Its compact LGA225 package design ensures easy integration into end devices, making it suitable for a wide range of industrial and consumer uses.

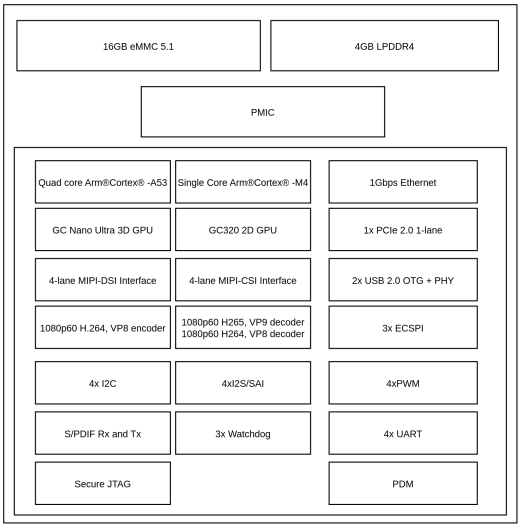


Figure 1: Functional block diagram

Contents

4 Boot Options

Grinn MiniSOM-8M can be booted from:

- eMMC Memory
- SPI NOR

Boot devices are selected via physical pin configurations. `AUD_SYNC_MOSI` is read after power-on and determines the boot flow. These pins should not be floating. Pull-up or pull-down resistors should be used to drive these inputs to the appropriate state.

Pin No	Pin Name
V20	`AUD_SYNC_MOSI`

4.1 System Boot Mode Selectors

AUD_SYNC_MOSI[0]	Description
0b	Boot eMMC
1b	Boot SPI NOR

5 Functional Description

5.1 Main Components

5.1.1 Hardware Resources

The Grinn MiniSOM-8M utilizes the i.MX 8M Mini application processor from NXP Semiconductors™. It is powered by:

- 4x Arm® Cortex®-A53
- 1x Arm® Cortex®-M4
- GCNanoUltra and GC320 GPUs
- Cortex M4 CPU supports low-power standby mode

The Grinn MiniSOM-8M can be equipped with up to 4GB of LPDDR4 RAM and 16GB of eMMC Flash storage.

5.2 Interfaces

Figure 2: Grinn MiniSOM-8M interfaces overwiew

- RGMII (Reduced gigabit media-independent interface)
- PCIe (Peripheral Component Interconnect Express) 2.0 x1
- 4x SAI (Synchronous Audio Interface)
- 2x USB OTG (Universal Serial Bus On-The-Go) 2.0
- 4-lane MIPI CSI (Camera Serial Interface)
- 4-lane MIPI DSI (Display Serial Interface)
- 3x uSDHC (Ultra Secured Digital Host Controller) interfaces (MMC/SD/SDIO/SDXC)
- 4x UART (universal asynchronous receiver-transmitter)
- 4x I2C (Inter-Integrated Circuit)
- 1x QSPI (Quad Synchronous Serial Interface)
- 2x SPI (Synchronous Serial Interface)
- S/PDIF (SONY/Philips Digital Interface Format) in/out
- 8-Channel PDM (Pulse Density Modulation) input

5.3 Padmap

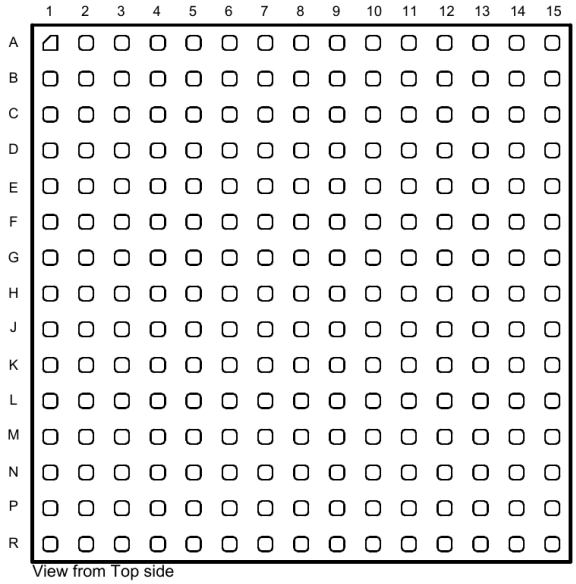


Figure 3: Grinn MiniSOM-8M pads (top view)

5.4 Pad Description

Table 1: SOM Pinout

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
H6	AG14	GPIO1_IO00	GPIO1_IO00/CCM_ENET_PHY_REF_CLK_ROOT/CCM_REF_CLK_32K/CCM_EXT_CLK1	I/O	-	NVCC_GPIO1	-
J6	AF14	GPIO1_IO01	GPIO1_IO01/PWM1_OUT/CCM_REF_CLK_24M/CCM_EXT_CLK2	I/O	-	NVCC_GPIO1	-
K6	AF12	GPIO1_IO05	GPIO1_IO05/M4_NMI/CCM_PMIC_READY	I/O	-	NVCC_GPIO1	-
C4	AG11	GPIO1_IO06	GPIO1_IO06/ENET1_MDC/USDHC1_CD_B/CCM_EXT_CLK3	I/O	-	NVCC_GPIO1	-
K7	AF11	GPIO1_IO07	GPIO1_IO07/ENET1_MDIO/USDHC1_WP/CCM_EXT_CLK4	I/O	-	NVCC_GPIO1	-
E5	AG10	GPIO1_IO08	GPIO1_IO08/ENET1_1588_EVENT0_IN/USDHC2_RESET_B	I/O	-	NVCC_GPIO1	-
C5	AF10	GPIO1_IO09	GPIO1_IO09/ENET1_1588_EVENT0_OUT/USDHC3_RESET_B/SDMA2_EXT_EVENT0	I/O	-	NVCC_GPIO1	-
M4	AD10	GPIO1_IO10	GPIO1_IO10/USB1_OTG_ID	I/O	-	NVCC_GPIO1	-
A1	AC10	GPIO1_IO11	GPIO1_IO11/USB2_OTG_ID/USDHC3_VSELECT/CCM_PMIC_READY	I/O	-	NVCC_GPIO1	-
M3	AB10	GPIO1_IO12	GPIO1_IO12/USB1_OTG_PWR/SDMA2_EXT_EVENT1	I/O	-	NVCC_GPIO1	-
L4	AD9	GPIO1_IO13	GPIO1_IO13/USB1_OTG_OC/PWM2_OUT	I/O	-	NVCC_GPIO1	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
B1	AC9	GPIO1_IO14	GPIO1_IO14/USB2_OTG_PWR/USDHC3_CD_B/PWM3_OUT/CCM_CLKO1	I/O	-	NVCC_GPIO1	-
C3	AB9	GPIO1_IO15	GPIO1_IO15/USB2_OTG_OC/USDHC3_WP/PWM4_OUT/CCM_CLKO2	I/O	-	NVCC_GPIO1	-
M12	V26	SD1_CLK	USDHC1_CLK/GPIO2_IO00	I/O	100.41	NVCC_SD1	-
N11	V27	SD1_CMD	USDHC1_CMD/GPIO2_IO01	I/O	130.27	NVCC_SD1	-
M13	Y27	SD1_DATA0	USDHC1_DATA0/GPIO2_IO02	I/O	84.81	NVCC_SD1	-
J13	Y26	SD1_DATA1	USDHC1_DATA1/GPIO2_IO03	I/O	38.87	NVCC_SD1	-
K12	T27	SD1_DATA2	USDHC1_DATA2/GPIO2_IO04	I/O	79.63	NVCC_SD1	-
L11	T26	SD1_DATA3	USDHC1_DATA3/GPIO2_IO05	I/O	93.79	NVCC_SD1	-
N13	U27	SD1_DATA4	USDHC1_DATA4/GPIO2_IO06	I/O	112.92	NVCC_SD1	-
L13	U26	SD1_DATA5	USDHC1_DATA5/GPIO2_IO07	I/O	80.55	NVCC_SD1	-
M11	W27	SD1_DATA6	USDHC1_DATA6/GPIO2_IO08	I/O	114.52	NVCC_SD1	-
L12	W26	SD1_DATA7	USDHC1_DATA7/GPIO2_IO09	I/O	74	NVCC_SD1	-
K11	R23	SD1_RESET_B	USDHC1_RESET_B/GPIO2_IO10	I/O	-	NVCC_SD1	-
J12	R24	SD1_STROBE	USDHC1_STROBE/GPIO2_IO11	I/O	-	NVCC_SD1	-
D10	W23	SD2_CLK	USDHC2_CLK/GPIO2_IO13	I/O	66.86	NVCC_SD2	-
C10	W24	SD2_CMD	USDHC2_CMD/GPIO2_IO14	I/O	79	NVCC_SD2	-
C9	AB23	SD2_DATA0	USDHC2_DATA0/GPIO2_IO15	I/O	115.49	NVCC_SD2	-
B8	AB24	SD2_DATA1	USDHC2_DATA1/GPIO2_IO16	I/O	133.59	NVCC_SD2	-
D9	V24	SD2_DATA2	USDHC2_DATA2/GPIO2_IO17	I/O	90.77	NVCC_SD2	-
C8	V23	SD2_DATA3	USDHC2_DATA3/GPIO2_IO18	I/O	92.68	NVCC_SD2	-
A8	AA27	SD2_WP	USDHC2_WP/GPIO2_IO20	I/O	-	NVCC_SD2	-
B7	AA26	SD2_CD_B	USDHC2_CD_B/GPIO2_IO12	I/O	-	NVCC_SD2	-
A7	AB26	SD2_RESET_B	USDHC2_RESET_B/GPIO2_IO19	I/O	-	NVCC_SD2	-
M2	E9	I2C1_SCL	I2C1_SCL	I/O	-	NVCC_I2C	-
L2	F9	I2C1_SDA	I2C1_SDA	I/O	-	NVCC_I2C	-
D4	D9	I2C2_SDA	I2C2_SDA/ENET1_1588_EVENT1_OUT/USDHC3_WP/GPIO5_IO17	I/O	-	NVCC_I2C	-
D3	D10	I2C2_SCL	I2C2_SCL/ENET1_1588_EVENT1_IN/USDHC3_CD_B/GPIO5_IO16	I/O	-	NVCC_I2C	-
C7	E10	I2C3_SCL	I2C3_SCL/PWM4_OUT/GPT2_CLK/GPIO5_IO18	I/O	-	NVCC_I2C	-
D7	F10	I2C3_SDA	I2C3_SDA/PWM3_OUT/GPT3_CLK/GPIO5_IO19	I/O	-	NVCC_I2C	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
N14	E13	I2C4_SDA	I2C4_SDA/PWM1_OUT/GPIO5_IO21	I/O	-	NVCC_I2C	-
N15	D13	I2C4_SCL	I2C4_SCL/PWM2_OUT/PCIE1_CLKREQ_B/GPIO5_IO20	I/O	-	NVCC_I2C	-
B6	D6	ECSPI1_SCLK	ECSPI1_SCLK/UART3_RX/GPIO5_IO06	I/O	-	NVCC_ECSPI	-
B5	B7	ECSPI1_MOSI	ECSPI1_MOSI/UART3_TX/GPIO5_IO07	I/O	-	NVCC_ECSPI	-
A6	A7	ECSPI1_MISO	ECSPI1_MISO/UART3_CTS_B/GPIO5_IO08	I/O	-	NVCC_ECSPI	-
B4	B6	ECSPI1_SS0	ECSPI1_SS0/UART3_RTS_B/GPIO5_IO09	I/O	-	NVCC_ECSPI	-
A10	E6	ECSPI2_SCLK	ECSPI2_SCLK/UART4_RX/GPIO5_IO10	I/O	-	NVCC_ECSPI	-
A11	A8	ECSPI2_MISO	ECSPI2_MISO/UART4_CTS_B/GPIO5_IO12	I/O	-	NVCC_ECSPI	-
B9	B8	ECSPI2_MOSI	ECSPI2_MOSI/UART4_TX/GPIO5_IO11	I/O	-	NVCC_ECSPI	-
A9	A6	ECSPI2_SS0	ECSPI2_SS0/UART4_RST_B/GPIO5_IO13	I/O	-	NVCC_ECSPI	-
A4	E14	UART1_RXD	UART1_RX/ECSPI3_SCLK/GPIO5_IO22	I/O	-	NVCC_UART	-
A5	F13	UART1_TXD	UART1_TX/ECSPI3_MOSI/GPIO5_IO23	I/O	-	NVCC_UART	-
J1	F15	UART2_RXD	UART2_RX/ECSPI3_MISO/GPIO5_IO24	I/O	-	NVCC_UART	-
K1	E15	UART2_TXD	UART2_TX/ECSPI3_SS0/GPIO5_IO25	I/O	-	NVCC_UART	-
D11	E18	UART3_RXD	UART3_RX/UART1_CTS_B/USDHC3_RESET_B/GPIO5_IO26	I/O	-	NVCC_UART	-
C11	D18	UART3_TXD	UART3_TX/UART1_RTS_B/USDHC3_VSELECT/GPIO5_IO27	I/O	-	NVCC_UART	-
P15	F19	UART4_RXD	UART4_RX/UART2_CTS_B/PCIE1_CLKREQ_B/GPIO5_IO28	I/O	-	NVCC_UART	-
R15	F18	UART4_TXD	UART4_TX/UART2_RTS_B/GPIO5_IO29	I/O	-	NVCC_UART	-
B14	A25	ONOFF		Input	-	NVCC_SNVS_1P8	PU 100k
J8	B24	POR_B		Input	-	NVCC_SNVS_1P8	PU 100k
P14	A24	PMIC_ON_REQ		Output	-	NVCC_SNVS_1P8	-
C12	G26	BOOT_MODE0		Input	-	VDD_3V3	-
D12	G27	BOOT_MODE1		Input	-	NVCC_JTAG	-
B13	D26	TEST_MODE		Input	-	NVCC_JTAG	PD 100k
L7	F26	JTAG_TCK		Input	-	NVCC_JTAG	PD 8k2
L6	F27	JTAG_TMS		Input	-	NVCC_JTAG	-
K5	E27	JTAG_TDI		Input	-	NVCC_JTAG	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
L5	E26	JTAG_-TDO		Output	-	NVCC_-JTAG	-
K4	C27	JTAG_-TRST_B		Input	-	NVCC_-JTAG	-
A12	H27	CLKIN1		Input	-	VDD_3V3	-
A13	J27	CLKIN2		Input	-	NVCC_-CLK	-
A15	H26	CLKOUT1		Output	-	NVCC_-CLK	-
A14	J26	CLKOUT2		Output	-	NVCC_-CLK	-
L3	-	SYS_-RSTn		Input	-	-	PU 100k
E11	-	RESERVED		Passive	-	-	-
E9	H10	NVCC_-ECSPI		Power	-	-	-
G11	W22	NVCC_-ENET		Power	-	-	-
G10	W12	NVCC_-GPIO1		Power	-	-	-
F10	J11	NVCC_-I2C		Power	-	-	-
F11	W18/V19/V	NVCC_-SAI		Power	-	-	-
D8	Y10	NVCC_-SAI3		Power	-	-	-
H10	V20	NVCC_-SD1		Power	-	-	-
J7	V22	NVCC_-SD2		Power	-	-	-
E10	J12	NVCC_-UART		Power	-	-	-
B10	-	GND		Power	-	-	-
B11	-	GND		Power	-	-	-
B12	-	GND		Power	-	-	-
B15	-	GND		Power	-	-	-
C2	-	GND		Power	-	-	-
C13	-	GND		Power	-	-	-
D13	-	GND		Power	-	-	-
E6	-	GND		Power	-	-	-
E7	-	GND		Power	-	-	-
E8	-	GND		Power	-	-	-
E13	-	GND		Power	-	-	-
F6	-	GND		Power	-	-	-
F7	-	GND		Power	-	-	-
F8	-	GND		Power	-	-	-
F15	-	GND		Power	-	-	-
G6	-	GND		Power	-	-	-
G7	-	GND		Power	-	-	-
G8	-	GND		Power	-	-	-
H7	-	GND		Power	-	-	-
H8	-	GND		Power	-	-	-
H9	-	GND		Power	-	-	-
H13	-	GND		Power	-	-	-
K13	-	GND		Power	-	-	-
M14	-	GND		Power	-	-	-
M15	-	GND		Power	-	-	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
N1	-	GND		Power	-	-	-
N2	-	GND		Power	-	-	-
N10	-	GND		Power	-	-	-
N12	-	GND		Power	-	-	-
P3	-	GND		Power	-	-	-
P8	-	GND		Power	-	-	-
R3	-	GND		Power	-	-	-
R14	-	GND		Power	-	-	-
R1	-	VIN		Power	-	-	-
R2	-	VIN		Power	-	-	-
P1	-	VIN		Power	-	-	-
P2	-	VIN		Power	-	-	-
M1	-	VDD_1V8		Power	-	-	-
L1	-	VDD_3V3		Power	-	-	-
G9	-	VDD_1V8		Power	-	-	-
F9	-	VDD_3V3		Power	-	-	-
N4	F22	USB1_VBUS		Input	-	VDD_USB_3P3	-
P4	A22	USB1_DN		I/O	409.11	VDD_USB_3P3	-
R4	B22	USB1_DP		I/O	408.5	VDD_USB_3P3	-
N3	D22	USB1_ID		Input	-	VDD_USB_1P8	-
A3	F23	USB2_VBUS		Input	-	VDD_USB_3P3	-
B2	A23	USB2_DN		I/O	176.36	VDD_USB_3P3	-
A2	B23	USB2_DP		I/O	177.07	VDD_USB_3P3	-
B3	D23	USB2_ID		Input	-	VDD_USB_1P8	-
P5	AC27	ENET_MDC	ENET1_MDC/GPIO1_IO16	I/O	236.42	NVCC_ENET	-
R5	AB27	ENET_MDIO	ENET1_MDIO/GPIO1_IO17	I/O	244.67	NVCC_ENET	-
R6	AF24	ENET_TX_CTL	ENET1_RGMII_TX_CTL/GPIO1_IO22	I/O	221.51	NVCC_ENET	-
P6	AG24	ENET_TXC	ENET1_RGMII_TXC/ENET1_TX_ER/GPIO1_IO23	I/O	223.95	NVCC_ENET	-
N6	AG26	ENET_TD0	ENET1_RGMII_TD0/GPIO1_IO21	I/O	231.01	NVCC_ENET	-
M6	AF26	ENET_TD1	ENET1_RGMII_TD1/GPIO1_IO20	I/O	238.57	NVCC_ENET	-
N5	AG25	ENET_TD2	ENET1_RGMII_TD2/ENET1_TX_CLK/CCM_ENET_REF_CLK_ROOT/GPIO1_IO19	I/O	231.95	NVCC_ENET	-
M5	AF25	ENET_TD3	ENET1_RGMII_TD3/GPIO1_IO18	I/O	230.54	NVCC_ENET	-
N7	AF27	ENET_RX_CTL	ENET1_RGMII_RX_CTL/GPIO1_IO24	I/O	222.2	NVCC_ENET	-
M7	AE26	ENET_RXC	ENET1_RGMII_RXC/ENET1_RX_ER/GPIO1_IO25	I/O	225.66	NVCC_ENET	-
P7	AE27	ENET_RD0	ENET1_RGMII_RD0/GPIO1_IO26	I/O	221.3	NVCC_ENET	-
R7	AD27	ENET_RD1	ENET1_RGMII_RD1/GPIO1_IO27	I/O	229.41	NVCC_ENET	-
N8	AD26	ENET_RD2	ENET1_RGMII_RD2/GPIO1_IO28	I/O	222.74	NVCC_ENET	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
R8	AC26	ENET_RD3	ENET1_RGMII_RD3/GPIO1_IO29	I/O	221.87	NVCC_ENET	-
H12	N24	NAND_CE0_B	RAWNAND_CE0_B/QSPI_A_SS0_B/GPIO3_IO01	I/O	-	VDD_1V8	-
G12	N22	NAND_ALE	RAWNAND_ALE/QSPI_A_SCLK/GPIO3_IO00	I/O	-	NVCC_NAND_1P8	-
F12	P23	NAND_DATA00	RAWNAND_DATA00/QSPI_A_DATA0/GPIO3_IO06	I/O	-	NVCC_NAND_1P8	-
F14	K24	NAND_DATA01	RAWNAND_DATA01/QSPI_A_DATA1/GPIO3_IO07	I/O	-	NVCC_NAND_1P8	-
G13	K23	NAND_DATA02	RAWNAND_DATA02/QSPI_A_DATA2/USDHC3_CD_B/GPIO3_IO08	I/O	-	NVCC_NAND_1P8	-
E12	N23	NAND_DATA03	RAWNAND_DATA03/QSPI_A_DATA3/USDHC3_WP/GPIO3_IO09	I/O	-	NVCC_NAND_1P8	-
F13	R22	NAND_DQS	RAWNAND_DQS/QSPI_A_DQS/GPIO3_IO14	I/O	-	NVCC_NAND_1P8	-
F1	AB18	SAI1_MCLK	SAI1_MCLK/SAI5_MCLK/SAI1_TX_BCLK/PDM_CLK/GPIO4_IO20	I/O	-	NVCC_SAI1	-
G4	AB19	SAI1_TXFS	SAI1_TX_SYNC/SAI5_TX_SYNC/CORESIGHT_EVENTO/GPIO4_IO10	I/O	-	NVCC_SAI1	-
G5	AC18	SAI1_TXC	SAI1_TX_BCLK/SAI5_TX_BCLK/CORESIGHT_EVENTI/GPIO4_IO11	I/O	-	NVCC_SAI1	-
G2	AG20	SAI1_TXD0	SAI1_TX_DATA0/SAI5_TX_DATA0/CORESIGHT_TRACE8/GPIO4_IO12/SRC_BOOT_CFG8	I/O	-	NVCC_SAI1	-
H2	AF20	SAI1_TXD1	SAI1_TX_DATA1/SAI5_TX_DATA1/CORESIGHT_TRACE9/GPIO4_IO13/SRC_BOOT_CFG9	I/O	-	NVCC_SAI1	-
J3	AG21	SAI1_TXD2	SAI1_TX_DATA2/SAI5_TX_DATA2/CORESIGHT_TRACE10/GPIO4_IO14/SRC_BOOT_CFG10	I/O	-	NVCC_SAI1	-
K3	AF21	SAI1_TXD3	SAI1_TX_DATA3/SAI5_TX_DATA3/CORESIGHT_TRACE11/GPIO4_IO15/SRC_BOOT_CFG11	I/O	-	NVCC_SAI1	-
K2	AG22	SAI1_TXD4	SAI1_TX_DATA4/SAI6_RX_BCLK/SAI6_TX_BCLK/CORESIGHT_TRACE12/GPIO4_IO16/SRC_BOOT_CFG12	I/O	-	NVCC_SAI1	-
H1	AF22	SAI1_TXD5	SAI1_TX_DATA5/SAI6_RX_DATA0/SAI6_TX_DATA0/CORESIGHT_TRACE13/GPIO4_IO17/SRC_BOOT_CFG13	I/O	-	NVCC_SAI1	-
J2	AG23	SAI1_TXD6	SAI1_TX_DATA6/SAI6_RX_SYNC/SAI6_TX_SYNC/CORESIGHT_TRACE14/GPIO4_IO18/SRC_BOOT_CFG14	I/O	-	NVCC_SAI1	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
G1	AF23	SAI1_TXD7	SAI1_TX_DATA7/SAI6_MCLK/PDM_CLK/CORESIGHT_TRACE15/GPIO4_IO19/SRC_BOOT_CFG15	I/O	-	NVCC_SAI1	-
F2	AG16	SAI1_RXFS	SAI1_RX_SYNC/SAI5_RX_SYNC/CORESIGHT_TRACE_CLK/GPIO4_IO00	I/O	-	NVCC_SAI1	-
F4	AF16	SAI1_RXC	SAI1_RX_BCLK/SAI5_RX_BCLK/CORESIGHT_TRACE_CTL/GPIO4_IO01	I/O	-	NVCC_SAI1	-
F3	AG15	SAI1_RXD0	SAI1_RX_DATA0/SAI5_RX_DATA0/SAI1_TX_DATA1/PDM_BIT_STREAM0/CORESIGHT_TRACE0/GPIO4_IO02/SRC_BOOT_CFG0	I/O	-	NVCC_SAI1	-
F5	AF15	SAI1_RXD1	SAI1_RX_DATA1/SAI5_RX_DATA1/PDM_BIT_STREAM1/CORESIGHT_TRACE1/GPIO4_IO03/SRC_BOOT_CFG1	I/O	-	NVCC_SAI1	-
G3	AG17	SAI1_RXD2	SAI1_RX_DATA2/SAI5_RX_DATA2/PDM_BIT_STREAM2/CORESIGHT_TRACE2/GPIO4_IO04/SRC_BOOT_CFG2	I/O	-	NVCC_SAI1	-
H5	AF17	SAI1_RXD3	SAI1_RX_DATA3/SAI5_RX_DATA3/PDM_BIT_STREAM3/CORESIGHT_TRACE3/GPIO4_IO05/SRC_BOOT_CFG3	I/O	-	NVCC_SAI1	-
J5	AG18	SAI1_RXD4	SAI1_RX_DATA4/SAI6_TX_BCLK/SAI6_RX_BCLK/CORESIGHT_TRACE4/GPIO4_IO06/SRC_BOOT_CFG4	I/O	-	NVCC_SAI1	-
H4	AF18	SAI1_RXD5	SAI1_RX_DATA5/SAI6_TX_DATA0/SAI6_RX_DATA0/SAI1_RX_SYNC/CORESIGHT_TRACE5/GPIO4_IO07/SRC_BOOT_CFG5	I/O	-	NVCC_SAI1	-
J4	AG19	SAI1_RXD6	SAI1_RX_DATA6/SAI6_TX_SYNC/SAI6_RX_SYNC/CORESIGHT_TRACE6/GPIO4_IO08/SRC_BOOT_CFG6	I/O	-	NVCC_SAI1	-
H3	AF19	SAI1_RXD7	SAI1_RX_DATA7/SAI6_MCLK/SAI1_TX_SYNC/SAI1_TX_DATA4/CORESIGHT_TRACE7/GPIO4_IO09/SRC_BOOT_CFG7	I/O	-	NVCC_SAI1	-
L10	AD19	SAI2_MCLK	SAI2_MCLK/SAI5_MCLK/GPIO4_IO27	I/O	-	NVCC_SAI2	-
M9	AD23	SAI2_TXFS	SAI2_TX_SYNC/SAI5_TX_DATA1/SAI2_TX_DATA1/UART1_CTS_B/GPIO4_IO24	I/O	-	NVCC_SAI2	-
L8	AD22	SAI2_TXC	SAI2_TX_BCLK/SAI5_TX_DATA2/GPIO4_IO25	I/O	-	NVCC_SAI2	-
M10	AC22	SAI2_TXD0	SAI2_TX_DATA0/SAI5_TX_DATA3/GPIO4_IO26	I/O	-	NVCC_SAI2	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
L9	AC19	SAI2_RXFS	SAI2_RX_SYNC/SAI5_TX_SYNC/SAI5_TX_DATA1/SAI2_RX_DATA1/UART1_TX/GPIO4_IO21	I/O	-	NVCC_SAI2	-
M8	AB22	SAI2_RXC	SAI2_RX_BCLK/SAI5_TX_BCLK/UART1_RX/GPIO4_IO22	I/O	-	NVCC_SAI2	-
N9	AC24	SAI2_RXD0	SAI2_RX_DATA0/SAI5_TX_DATA0/UART1_RTS_B/GPIO4_IO23	I/O	-	NVCC_SAI2	-
H11	AD15	SAI5_MCLK	SAI5_MCLK/SAI1_TX_BCLK/GPIO3_IO25	I/O	-	NVCC_SAI5	-
J11	AB15	SAI5_RXFS	SAI5_RX_SYNC/SAI1_TX_DATA0/GPIO3_IO19	I/O	-	NVCC_SAI5	-
K10	AC15	SAI5_RXC	SAI5_RX_BCLK/SAI1_TX_DATA1/PDM_CLK/GPIO3_IO20	I/O	-	NVCC_SAI5	-
K8	AD18	SAI5_RXD0	SAI5_RX_DATA0/SAI1_TX_DATA2/PDM_BIT_STREAM0/GPIO3_IO21	I/O	-	NVCC_SAI5	-
K9	AC14	SAI5_RXD1	SAI5_RX_DATA1/SAI1_TX_DATA3/SAI1_TX_SYNC/SAI5_TX_SYNC/PDM_BIT_STREAM1/GPIO3_IO22	I/O	-	NVCC_SAI5	-
J9	AD13	SAI5_RXD2	SAI5_RX_DATA2/SAI1_TX_DATA4/SAI1_TX_SYNC/SAI5_TX_BCLK/PDM_BIT_STREAM2/GPIO3_IO23	I/O	-	NVCC_SAI5	-
J10	AC13	SAI5_RXD3	SAI5_RX_DATA3/SAI1_TX_DATA5/SAI1_TX_SYNC/SAI5_TX_DATA0/PDM_BIT_STREAM3/GPIO3_IO24	I/O	-	NVCC_SAI5	-
E3	AD6	SAI3_MCLK	SAI3_MCLK/PWM4_OUT/SAI5_MCLK/GPIO5_IO02	I/O	-	NVCC_SAI3	-
C1	AC6	SAI3_TXFS	SAI3_TX_SYNC/GPT1_CAPTURE2/SAI5_RX_DATA1/SAI3_TX_DATA1/UART2_RX/GPIO4_IO31	I/O	-	NVCC_SAI3	-
E1	AG6	SAI3_TXC	SAI3_TX_BCLK/GPT1_COMPARE2/SAI5_RX_DATA2/UART2_TX/GPIO5_IO00	I/O	-	NVCC_SAI3	-
E2	AF6	SAI3_TXD	SAI3_TX_DATA0/GPT1_COMPARE3/SAI5_RX_DATA3/GPIO5_IO01	I/O	-	NVCC_SAI3	-
D1	AG8	SAI3_RXFS	SAI3_RX_SYNC/GPT1_CAPTURE1/SAI5_RX_SYNC/SAI3_RX_DATA1/GPIO4_IO28	I/O	-	NVCC_SAI3	-
E4	AG7	SAI3_RXC	SAI3_RX_BCLK/GPT1_CLK/SAI5_RX_BCLK/UART2_CTS_B/GPIO4_IO29	I/O	-	NVCC_SAI3	-
D2	AF7	SAI3_RXD	SAI3_RX_DATA0/GPT1_COMPARE1/SAI5_RX_DATA0/UART2_RTS_B/GPIO4_IO30	I/O	-	NVCC_SAI3	-
C6	AF9	SPDIF_TX	SPDIF1_OUT/PWM3_OUT/GPIO5_IO03	I/O	-	NVCC_SAI3	-
D5	AG9	SPDIF_RX	SPDIF1_IN/PWM2_OUT/GPIO5_IO04	I/O	-	NVCC_SAI3	-

Pad	CPU Pin	Signal Name	Mux	Type	Signal Lenght[ps]	Power Domain	
D6	AF8	SPDIF_EXT_CLK	SPDIF1_EXT_CLK/PWM1_OUT/GPIO5_IO05	I/O	-	NVCC_SAI3	-
E14	A21	PCIE_CLK_N		I/O	75.93	-	-
E15	B21	PCIE_CLK_P		I/O	77.08	-	-
D14	A19	PCIE_RXN_N		Input	-	-	-
D15	B19	PCIE_RXN_P		Input	74.58	-	-
C15	B20	PCIE_TXN_P		Output	75.25	-	-
C14	A20	PCIE_TXN_N		Output	74.98	-	-
J14	A16	MIPI_CSI_CLK_N		Input	159.89	VDD_MIPI_1P8	-
J15	B16	MIPI_CSI_CLK_P		Input	159.61	VDD_MIPI_1P8	-
L14	A14	MIPI_CSI_D0_N		Input	162.5	VDD_MIPI_1P8	-
L15	B14	MIPI_CSI_D0_P		Input	162.38	VDD_MIPI_1P8	-
K14	A15	MIPI_CSI_D1_N		Input	158.79	VDD_MIPI_1P8	-
K15	B15	MIPI_CSI_D1_P		Input	158.69	VDD_MIPI_1P8	-
H14	A17	MIPI_CSI_D2_N		Input	158.51	VDD_MIPI_1P8	-
H15	B17	MIPI_CSI_D2_P		Input	158.2	VDD_MIPI_1P8	-
G14	A18	MIPI_CSI_D3_N		Input	160.43	VDD_MIPI_1P8	-
G15	B18	MIPI_CSI_D3_P		Input	160.57	VDD_MIPI_1P8	-
P11	A11	MIPI_DSI_CLK_N		Output	208.33	VDD_MIPI_1P8	-
R11	B11	MIPI_DSI_CLK_P		Output	207.84	VDD_MIPI_1P8	-
P9	A9	MIPI_DSI_D0_N		Output	206.43	VDD_MIPI_1P8	-
R9	B9	MIPI_DSI_D0_P		Output	208.67	VDD_MIPI_1P8	-
P10	A10	MIPI_DSI_D1_N		Output	206.71	VDD_MIPI_1P8	-
R10	B10	MIPI_DSI_D1_P		Output	207.34	VDD_MIPI_1P8	-
P12	A12	MIPI_DSI_D2_N		Output	206.9	VDD_MIPI_1P8	-
R12	B12	MIPI_DSI_D2_P		Output	206.4	VDD_MIPI_1P8	-
P13	A13	MIPI_DSI_D3_N		Output	209.67	VDD_MIPI_1P8	-
R13	B13	MIPI_DSI_D3_P		Output	209.21	VDD_MIPI_1P8	-

5.5 Power Managment Unit

The Grinn MiniSOM-8M is powered by a single voltage of 4.5..5.5V, the PMIC present on the PCB supplies the relevant circuits and controls the reference voltages necessary for the correct operation of the SoC. Two 3.3V and 1.8V lines are available to the user. However, care must be taken not to exceed the maximum current consumption for these lines of 3A and 1.5A respectively, where the consumption of the components present on the board using these lines must be taken into account.

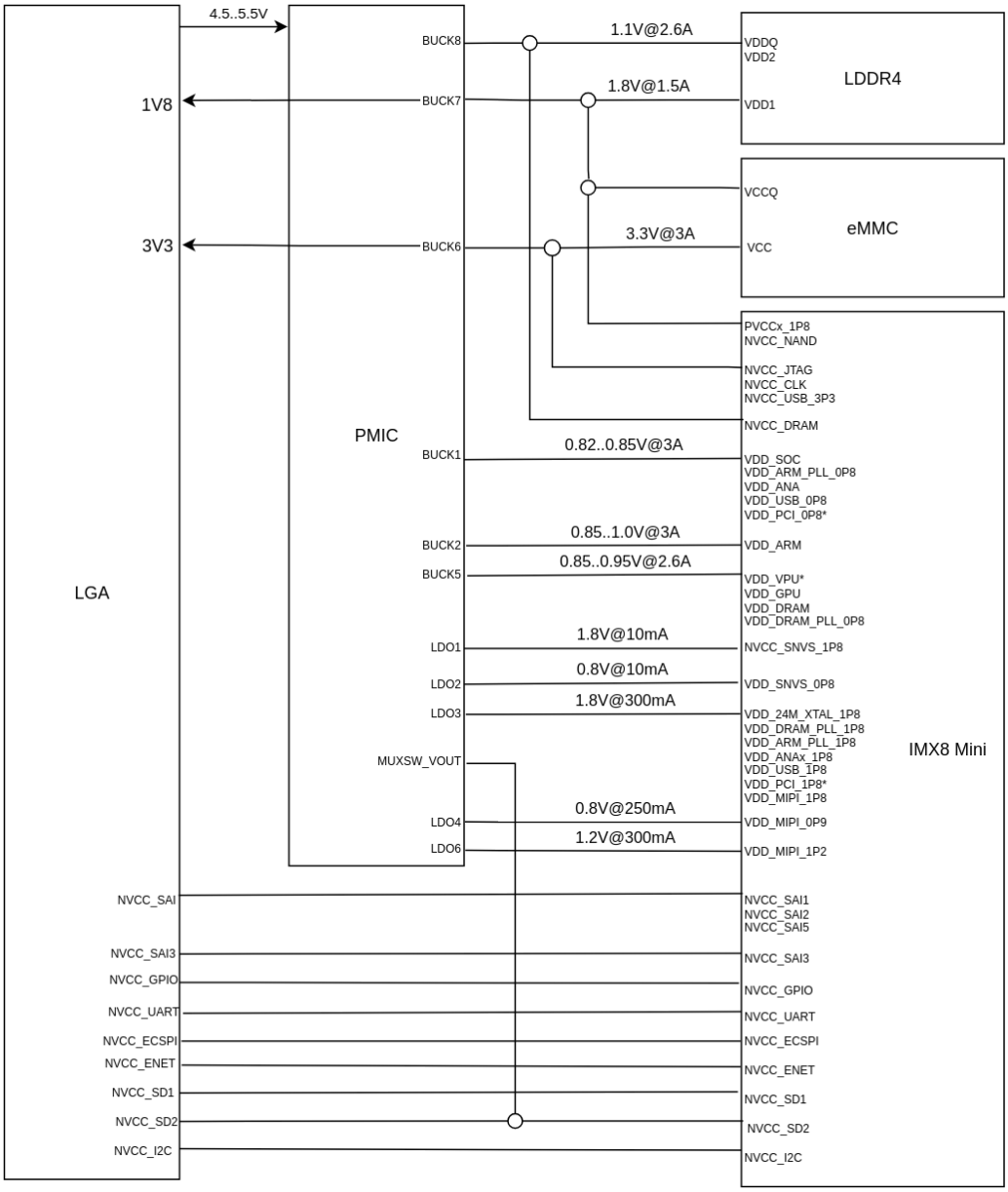


Figure 4: Grinn MiniSOM-8M power delivery scheme

See section 6 - Electrical characteristics for additional informations.

5.6 Interfaces

5.6.1 Video Interfaces

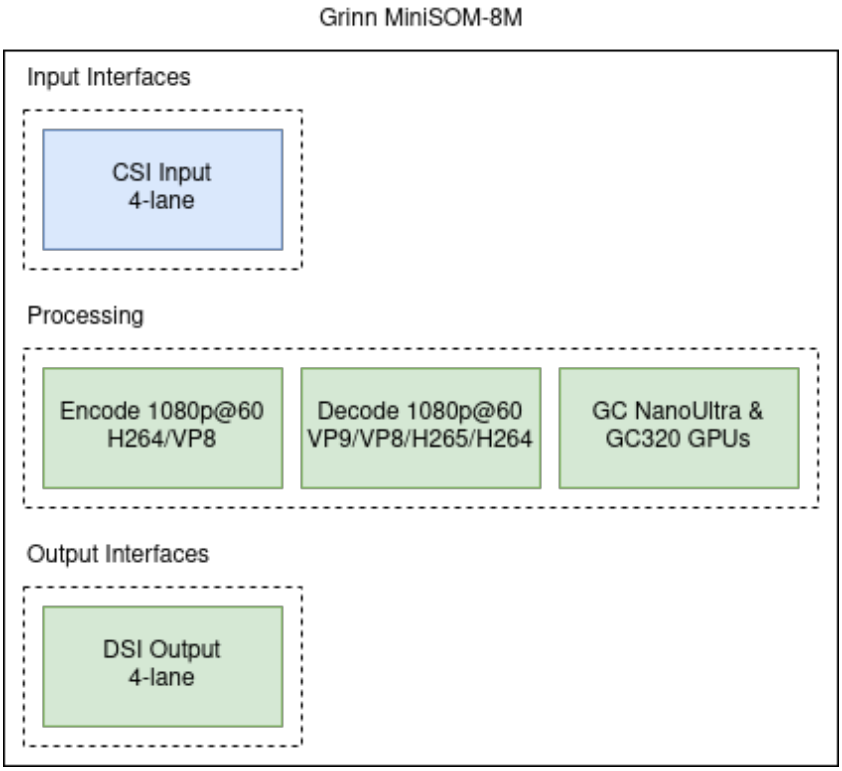


Figure 5: Grinn MiniSOM-8M video processing

- 1x MIPI DSI 4-lane
- 1x MIPI CSI 4-lane

5.6.2 Audio Interfaces

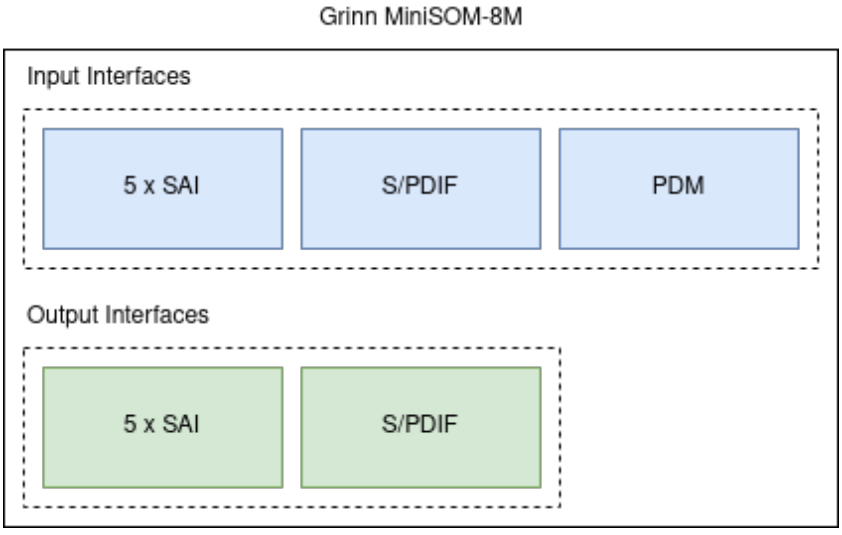


Figure 6: Grinn MiniSOM-8M audio interfaces

- SPDIF IN/OUT
- 5x SAI
- PDM input

5.6.3 Peripherial Interfaces

The Grinn MiniSOM-8M provides a variety of interfaces:

- up to two USB 2.0 OTG
- PCIe 2.0 1-lane
- 1x RGMII
- up to 2x SPI and 1x QSPI interfaces
- up to 4x high-speed UART
- up to 4x I^2C interfaces
- up to 3x MSDC/eMMC/SD/SDIO
- up to 4x PWM outputs

6 Electrical Characteristics

6.1 Absolute Maximum Ratings

	Minimum	Maximum	Unit
Supply voltage `VSYS`	3.0	5.0	V
Storage temperature		40	°C

6.2 Recommended Operating Conditions

	Minimum	Nominal	Maximum	Unit
Supply voltage `VSYS`	4.5	5.0	5.5V	V
Ambient storage temperature	-30	—	85	°C
Ambient operating temperature	-30	—	85	°C

7 Mechanical Characteristics

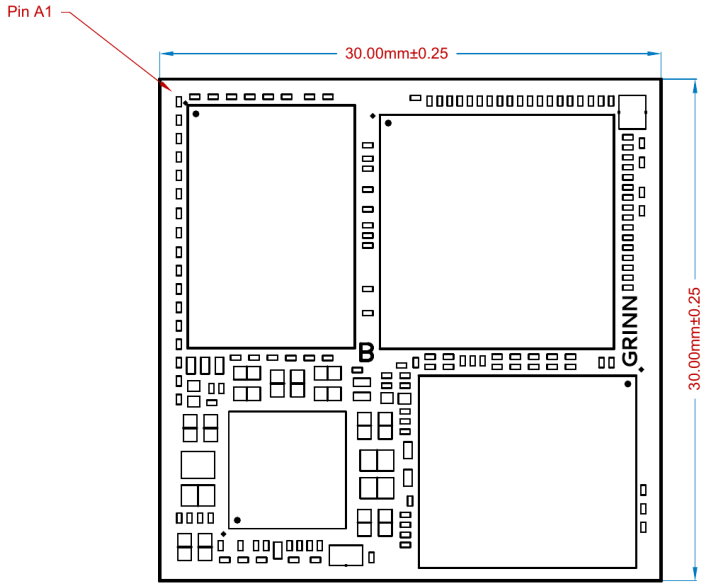


Figure 7: Grinn MiniSOM-8M dimensions top-view

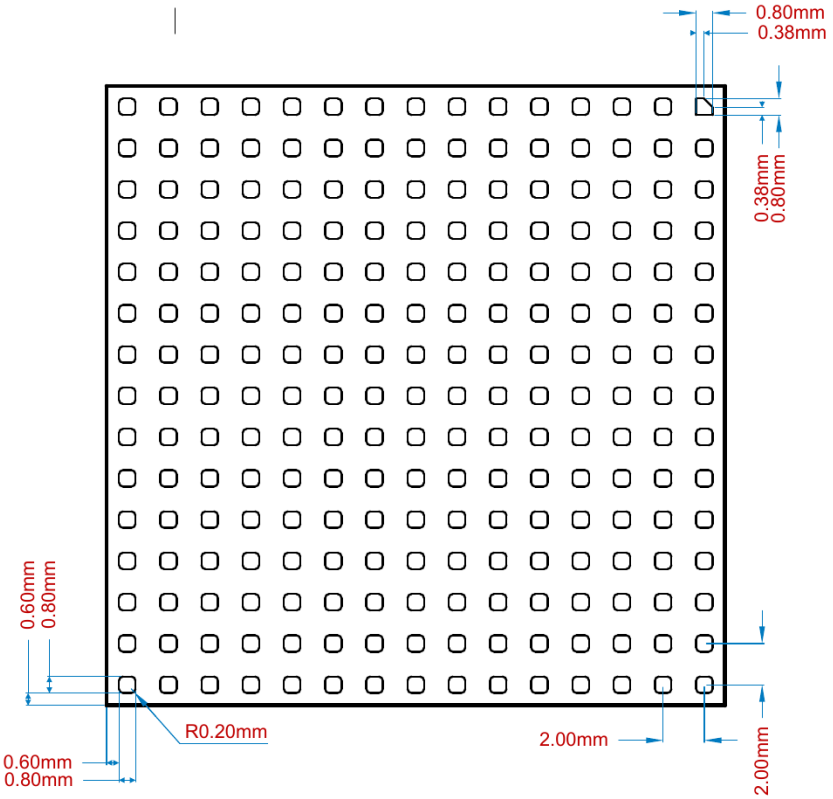
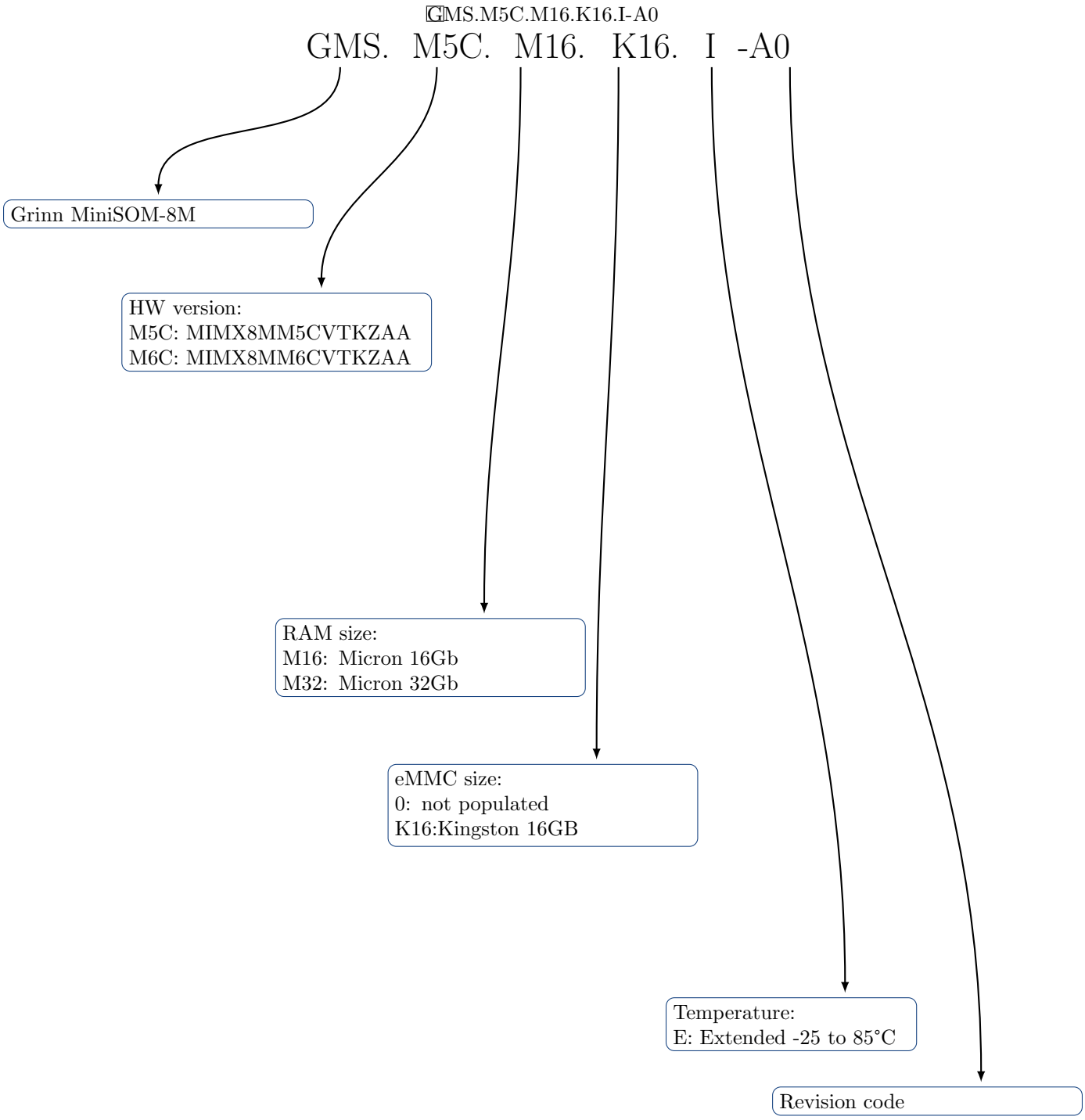


Figure 8: Grinn MiniSOM-8M dimensions bottom-view

8 Ordering Information



9 Revision History

Revision	Changes
1.0	Initial revision.
1.1	Update SOM name.

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