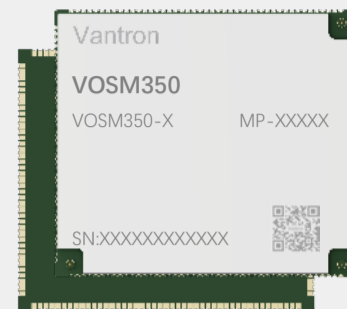


VOSM350 System-on-Module



Product Brief

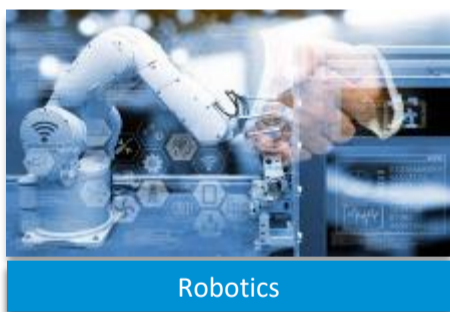
VOSM350 system-on-module is powered by MediaTek G350 chipset, which integrates a quad-core ARM Cortex-A53 processor, a Mali-G52 GPU, a VP6 APU for AI and computer vision algorithms, and a HiFi4 audio engine DSP to fit for edge AI applications that require voice and vision processing. Its support for Wi-Fi and Bluetooth wireless connectivity increases its versatility for IoT scenarios. The module features LGA packaging that allows for direct welding, eliminating the need for additional connectors. Additionally, it is Open Standard Module (OSM) V1.1 compliant, which enables seamless integration into various products. The module design conforms to industrial standards, ensuring an extended service life that meets the rigorous demands of industrial customers.

Customers have the option to choose between two variants that offer advanced and compact configurations. The module is designed to cater to a vast of application scenarios including but not limited to handheld devices, smart home appliances, industrial IoT devices, and gym instruments.

Features and benefits

VOSM350	
	Rich interfaces, robust system performance
	Internal DSP unit, low power design
	Wi-Fi & Bluetooth integrated, RF debug ready
	Android and Linux systems supported
	Compact size, LGA packaging
	Open Standard Module (OSM) V1.1 compliant
	Extended service life (7+ years)

Application Scenarios



Robotics



AIDC (handheld)



Fitness Console



Home Appliance

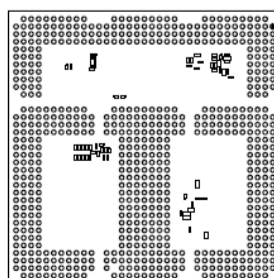
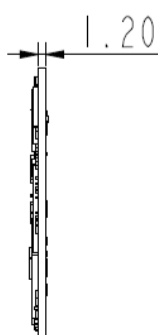
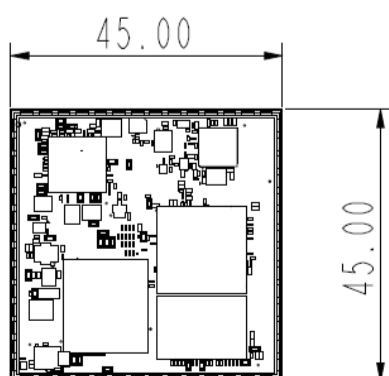


Industrial IoT



Smart Retail

Product Outlines



VOSM350 System-on-Module Datasheet

Specifications			
System	CPU	MTK MT8365 (G350), Quad-core ARM Cortex-A53 low-power processor, 2.0GHz (Max.)	
	GPU	ARM Mali-G52 GPU, 600MHz	
	APU	Cadence® Tensilica® VP6 processor, 700MHz at 0.825 V	
	Memory	4GB LPDDR4	
	Storage	32GB eMMC 5.1	
	EEPROM	2Kb (for hardware configuration information)	
	PMIC	MT6390	
Communication	Wi-Fi	802.11 a/b/g/n/ac	
	Bluetooth	Bluetooth 5.0	
Media	Video processing	1080p60, H.265/H.264/JPEG video encoder	1080p60, H.265/H.264/VP9 video decoder
	Audio DSP	Tensilica HiFi4	
Power	Input	5V/1A DC input	
Software	Operating system	Android 10+, Linux Yocto, Linux (Support by request)	
	Device management	BlueSphere MDM (Optional for Android version)	
Mechanical	Dimensions	45mm x 45mm x 1.2mm	
Environment Condition	Temperature	Operating: -20°C ~ +60°C	Storage: -30°C ~ +70°C
	Humidity	≤95% RH (Non-condensing)	
	Certification	CE, FCC, CCC	

I/Os			
Display	1 x 4-lane MIPI DSI, up to 1920 x 1080		
MIPI CSI	1 x 4-lane MIPI CSI, 13MP @30fps		
ADC	2 x ADC (Recovery button + Volume button)		
RGMIII (Ethernet)	1 x RMII/MII		
SPI	1 x SPI		
Debug UART	1 x UART for debugging (1.8V level)		
Communication UART	2 x UART (TTL)		
I ² S	1 x I ² S		
I ² C	2 x I ² C		
PWM	Supported		
USB	1 x USB 2.0 OTG	1 x USB 2.0 Host	
GPIO	25 x GPIO (max.)		
SDIO	1 x SDIO		
JTAG	Supported		

Electrical Characteristics

Absolute Maximum Ratings

Voltage beyond absolute maximum ratings may cause permanent damage to the module. Operation of the module outside of recommended conditions may result in reduced lifetime and/or reliability problems even if the absolute maximum ratings are not exceeded.

Parameter	Min.	Max.	Unit	
Voltage of the SOM	0	5.25	V	
Voltage on Wi-Fi/BT chip	AVDD18	-0.3	2.16	V
	AVDD28	-0.3	3.36	V
	AVDD33	-0.3	3.96	V
Voltage of LPDDR4	LPDDR4X VDD1	-0.4	2.3	V
	LPDDR4X VDD2	-0.4	1.6	V
	LPDDR4X VDDQ	-0.4	1.6	V
Storage temperature	-30	70	°C	

Recommended Operating Conditions

You are recommended to operate the module in the following conditions to achieve optimized performance of the module.

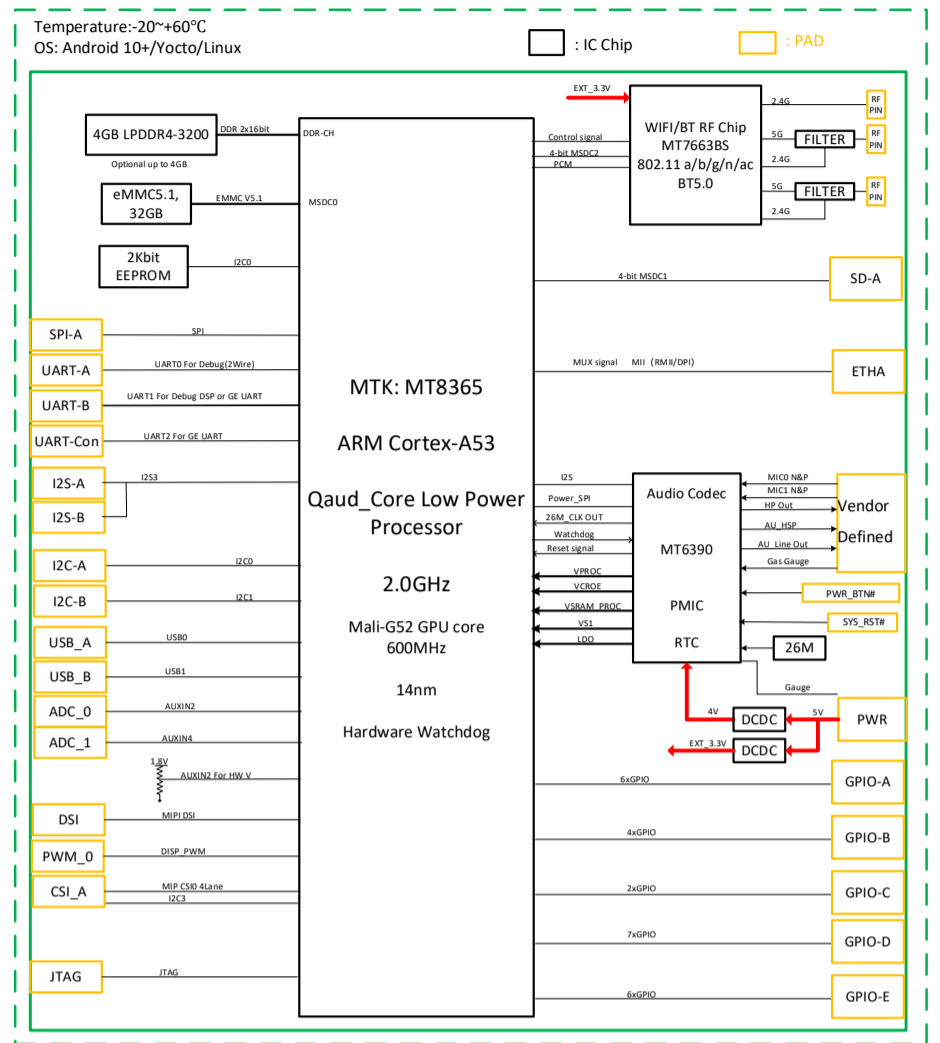
Parameter	Min.	Typ.	Max.	Unit	
Voltage of the SOM	2.6	3.7	5.25	V	
Voltage of EMCP	eMMC VCC	2.7	3.3	3.6	V
	eMMC VCCQ	1.7	1.8	1.95	V
	LPDDR4 VDD1	1.7	1.8	1.95	V
	LPDDR4 VDD2	1.06	1.1	1.17	V
LPDDR4 VDDQ	1.06	1.1	1.17	V	

(To be continued...)

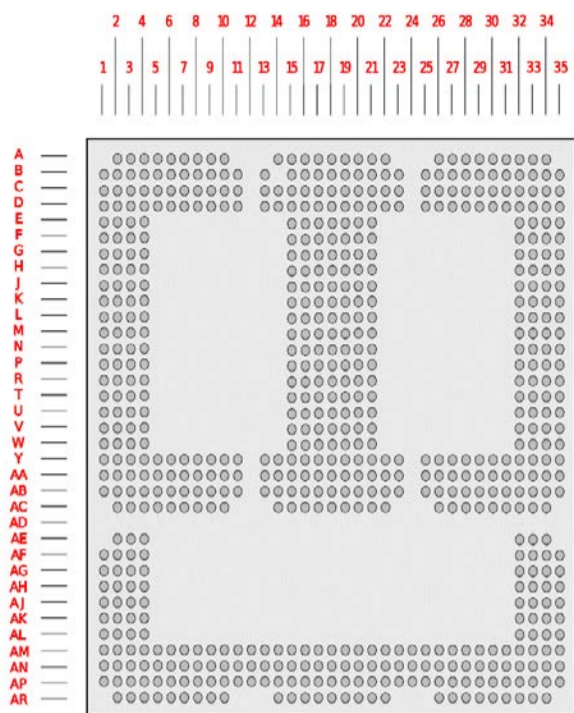
Recommended Operating Conditions (Cont'd)

Parameter		Min.	Typ.	Max.	Unit
Voltage on Wi-Fi/BT chip	AVDD18	1.62	1.8	1.98	V
	AVDD28	2.5	2.8	3.1	V
	AVDD33	NA	3.3	3.6	V
Voltage on CPU	Processor	0.81	0.9	0.99	V
	Processor SRAM	0.65	0.8	1.025	V
	Core	0.8	0.9	1.05	V
	Core logic	0.8	0.9	0.94	V
	DSI/CSI/USB/WBG/PLLGP	0.55	0.8V	0.84	V
	DSI/CSI/USB/WBG/PLLGP/AP	0.81	0.9	0.99	V
	IO/MSDC0/MSDC2	1.14	1.2	1.26	V
	IO/MSDC1/EEPROM	1.7	1.8	1.9	V
	VQPS	1.7	1.8	1.9	V
	EMIO	1.7	1.8	1.9	V
	EMI	1.7	1.8	1.9	V

Block Diagram



Pinout



Pin	Name	Type	Description
U19, R18, W17, M19	NC		No connection
V17	EXT_EN	Passive	3.3V power enable signal output on EVB
T17	SARADC_VINO_KEY/RECOVERY	Passive	AD keyboard input, for recovery
AA9	MT6390_PWRON	Passive	PMIC MT6390 power on
U17	RESETN	Passive	System reset input, active low
AB18	VCC_BAT+	Power	VCC_BAT+
AA18	VCC_BAT+	Power	VCC_BAT+
Y16, Y20, Y3, C5, AA33, B29	NC		No connection
Y17, Y8, Y9	NC		No connection
Y10, Y11, AE4, AF4, AG4	NC		No connection
Y25	VBUS	Power	Power in
Y26	VBUS	Power	Power in
Y27	VBUS	Power	Power in
Y28	VBUS	Power	Power in
AH3, AH4, AJ3, AJ4, AK4, Y19, U18	NC		No connection
D18, E15, E21, F16, F20, J16	GND	GND	Ground
J20, L18, M16, M20, P18	GND	GND	Ground
R16, R20, V16, V20, Y18	GND	GND	Ground

Pin	Name	Type	Description
AA14, AA17, AA19, AA22, AB15, AB21	GND	GND	Ground
A4, A7, A10, B2, B5, B8, B9, C11, D1, D5	GND	GND	Ground
D8, E2, H2, H4, L2, L4, P2, P4, R1, U2	GND	GND	Ground
U4, V1, W3, Y2, AA1, AA4, AA7, AA8, AB3	GND	GND	Ground
AA10, AA11, AB6, AB9, AC4, AC7, AC10	GND	GND	Ground
A26, A29, A32, B27, B28, B30, B33, C25	GND	GND	Ground
C32, C35, D28, D34, F33, F35, G34, H32	GND	GND	Ground
J33, J35, K34, M35, N34, T34, W34, AE2	GND	GND	Ground
AA25, AA26, AA27, AA28, AA32, AB28	GND	GND	Ground
AB31, AB34, AC27, AC30, AC33, AE34	GND	GND	Ground
AG3, AH2, AK3, AL2, AF35, AH34, AJ35	GND	GND	Ground
AL34, AM13, AM16, AM19, AM22, AM35	GND	GND	Ground
AN3, AN6, AN9, AP2, AN11, AN15, AN18	GND	GND	Ground
AN21, AN33, AP5, AP8, AP13, AP16	GND	GND	Ground
AP19, AP22, AP25, AP28, AP31, AP34	GND	GND	Ground
AR14, AR17, AR20, AR26, AR29, AR32	GND	GND	Ground
T18, T19, Y13, Y14, AA13, N2, AA2, J32	NC		No connection
K32, K33, L32, M32, M33, N32, P32, P34	NC		No connection
R32, R33, T32, T33, AB25, AB26, AE32	NC		No connection
AL3, AL4, AM3, AM4, AM5, AM6	NC		No connection
AM7, AM8, AM9, AM10, AM23, AM24	NC		No connection
AM25, AM26, R18, AM27, AM28, AM29	NC		No connection
AM30, AM31, AN2, AN5, AN7, AN8	NC		No connection
AN24, AN25, AN26, AN27, AN28, AN29	NC		No connection

(To be continued...)

Pin	Name	Type	Description
AN30, AN31, AP10	NC		No connection
C2	MIPI_CSI_CLK	Passive	Camera clock output
G3	MIPI_CSI_PDN	Passive	MIPI_CSI power down signal output
G4	MIPI_CSI_RST	Passive	MIPI_CSI reset signal output
B3	MIPI_CSI_CLKN	Passive	MIPI_CSI_CLKN
B4	MIPI_CSI_CLKP	Passive	MIPI_CSI_CLKP
C1	MIPI_CSI_DN0	Passive	MIPI_CSI_DN0
B1	MIPI_CSI_DP0	Passive	MIPI_CSI_DP0
A2	MIPI_CSI_DN1	Passive	MIPI_CSI_DN1
A3	MIPI_CSI_DP1	Passive	MIPI_CSI_DP1
A5	MIPI_CSI_DN2	Passive	MIPI_CSI_DN2
A6	MIPI_CSI_DP2	Passive	MIPI_CSI_DP2
B6	MIPI_CSI_DN3	Passive	MIPI_CSI_DN3
B7	MIPI_CSI_DP3	Passive	MIPI_CSI_DP3
C4	I2C3_SCL	Passive	I2C3 clock signal
C3	I2C3_SDA	Passive	I2C3 data signal
F4	DSI_BL_EN	Passive	MIPI_DSI 1V8 backlight enable signal output
E18	MIPI_DSI_PWM	Passive	MIPI_DSI backlight PWM signal output
F3	MIPI_DSI_PWR	Passive	MIPI_DSI 3V3 power enable signal output
AB8	MIPI_TX_CLKN	Passive	MIPI_DSI differential clock lane -
AB7	MIPI_TX_CLKP	Passive	MIPI_DSI differential clock lane +
AB11	MIPI_TX_D0N	Passive	MIPI_DSI differential lane 0 -
AB10	MIPI_TX_D0P	Passive	MIPI_DSI differential lane 0 +
AC9	MIPI_TX_D1N	Passive	MIPI_DSI differential lane 1 -
AC8	MIPI_TX_D1P	Passive	MIPI_DSI differential lane 1 +
AC6	MIPI_TX_D2N	Passive	MIPI_DSI differential lane 2 -
AC5	MIPI_TX_D2P	Passive	MIPI_DSI differential lane 2 +
AB5	MIPI_TX_D3N	Passive	MIPI_DSI differential lane 3 -
AB4	MIPI_TX_D3P	Passive	MIPI_DSI differential lane 3 +
AA3	DSI_TE	Passive	MIPI_DSI tearing effect signal input, not used
M18	ADC_0	Passive	ADC0 signal input, for power check on EVB
N18	ADC_1	Passive	ADC1 signal input, for power check on EVB

Pin	Name	Type	Description
AC18, P19, C18, P16	NC		No connection
R19	JTRST	Passive	JTAG reset
N17	JTCK	Passive	JTAG clock
P17	JTDI	Passive	JTAG data input
R17	JTDO	Passive	JTAG data output
N19	JTMS	Passive	JTAG mode select
B22	SPDIF_IN	Passive	SPDIF data input, not use
C16	SPDIF_OUT	Passive	SPDIF data output, not use
D6	ACCDDET	Passive	Headphone hook data input on EVB
D7	HP_EINT	Passive	Headphone detect signal input
Y29	AU_VIN0_N	Passive	Negative input of the Microphone
Y30	AU_VIN1_N	Passive	Negative input of the headphone mic
Y31	AU_LOLN	Passive	Negative speaker driver output
AA29	AU_VIN0_P	Passive	Positive input of the Microphone
AA30	AU_VIN1_P	Passive	Positive input of the headphone mic
AA31	AU_LOLP	Passive	Positive speaker driver output
AK32	FCHR_ENB	Passive	Volume key signal input
AK33	AU_HPL	Passive	Left channel output of the headphone
AL32	AU_HPR	Passive	Right channel output of the headphone
AL33	AU_REFN	Passive	Reference ground for the headphone
AM32	CS_N	Passive	Bat charging and discharging current sense negative
AM33	CS_P	Passive	Bat charging and discharging current sense positive
F18	PWM10	Passive	PWM_C signal output, LED control on EVB
G18, H18, J18, K18, AB17, AC17, AB19, AC19, C14, C13	NC		No connection
A14	URXD1	Passive	UART1 receive data
B13	UTXD1	Passive	UART1 transmit data
D16	NC		No connection
D15	NC		No connection
D14	URXD2	Passive	UART2 receive data
D13	UTXD2	Passive	UART2 transmit data

(To be continued...)

Pin	Name	Type	Description
A22	NC		No connection
B23	NC		No connection
D22	UART0_RX_M0_DEBUG	Passive	UART0 receive data, for debug
D23	UART0_TX_M0_DEBUG	Passive	UART0 transmit data, for debug
C22	NC		No connection
C23	NC		No connection
V21	NC		No connection
W21	I2S3_DO	Passive	I2S3 data 0 output to LT9611 on EVB board
V19	NC		No connection
W19	NC		No connection
W20	I2S3_BCK	Passive	I2S3 serial clock to LT9611 on EVB
W18	I2S3_LRCK	Passive	I2S3 Left/right channel clock to LT9611 on EVB
V18	I2S3_MCK	Passive	I2S3 Master clock to LT9611 on EVB
AB2, AB1, AC3, AC2, V2, M34	NC		No connection
L34, L35, K35, L33, W2, Y1, W1	NC		No connection
R2, T1, U1, T2, D11, D10, C10	NC		No connection
D9, C8, B11, B10, A9, A8, C9	NC		No connection
D26, D25, C26, D27, C28, B26	NC		No connection
B25, A28, A27, C27, AB22, AB20	NC		No connection
AA15	I2C2_SCL	Passive	I2C2 bus clock, for ET7301BY PD and SGM41510 charge on EVB
AA16	I2C2_SDA	Passive	I2C2 bus data/address, for ET7301BY PD and SGM41510 charge on EVB
AA20	I2C1_SCL	Passive	I2C1 bus clock, for LT9611 eDP to HDMI and TP on EVB
AA21	I2C1_SDA	Passive	I2C1 bus data/address, for LT9611 eDP to HDMI and TP on EVB

Pin	Name	Type	Description
AB13	USB_DM_P0	Passive	USB OTG0 HS/FS/LS data -
AC14	USB_DP_P0	Passive	USB OTG0 HS/FS/LS data +
AC16	USB3_OTG0_EN	Passive	USB OTG enable signal output
AB14	OTG_ID	Passive	USB3 OTG0 ID detect, not used
AC15	USB_OTG_OC	Passive	USB OTG over current signal input, not used
AB16	OTG_DET	Passive	USB3 OTG connected VBUS power detect (valid voltage range: 2.7~3.3V)
AB23	USB_DM_P1	Passive	USB HOST data -
AC22	USB_DP_P1	Passive	USB HOST data +
AC20	USB_B_EN	Passive	USB host power enable signal output
AB22	NC		No connection
AC21	USB_HOST_OC	Passive	USB HOST over current signal input, not used
AB20	NC		No connection
J21	MSDC1_DET	Passive	SD card input detect
F21	MSDC1_CLK	Passive	MSDC1_CLK
E20	MSDC1_CMD	Passive	MSDC1 CMD
G20	MSDC1_D0	Passive	MSDC1 data0
G21	MSDC1_D1	Passive	MSDC1 data1
H20	MSDC1_D2	Passive	MSDC1 data2
H21	MSDC1_D3	Passive	MSDC1 data3
C20	MSDC1_SD	power	1.8V power of SD Card 1
D21	NC		No connection
D20	NC		No connection
T21	MSDC2_DSL	Passive	SD card input detect
K20	MSDC2_CLK	Passive	MSDC2_CLK
K21	MSDC2_CMD	Passive	MSDC2_CMD
L20	MSDC2_DAT0	Passive	MSDC2 data0
L21	MSDC2_DAT1	Passive	MSDC2 data1
M21	MSDC2_DAT2	Passive	MSDC2 data2
N20	MSDC2_DAT3	Passive	MSDC2 data3
N21, P20, P21, R21, U21, U20	NC		No connection
T20	MSDC2_SD	Passive	1.8V power of SD Card 2

(To be continued...)

Pin	Name	Type	Description
D17	GPIOA0	Passive	GPIOA0 signal/Flash write protect signal output on EVB. Set low for write protect
E17	GPIOA1	Passive	GPIOA1 signal/Audio amplifier enable signal output on EVB
F17	GPIOA2	Passive	GPIOA2 signal/LT9611 interrupt request signal input on EVB
G17	GPIOB1	Passive	GPIOB1 signal/LT9611 reset signal output on EVB
H17	GPIOA4	Passive	GPIOB1 signal/MIPI DSI switch control signal output on EVB. Set high for HDMI output, low for MIPI output (low by default)
J17	GPIOA5	Passive	GPIOA5 signal/MIPI_DSI reset signal output on EVB
D19	GPIOB0	Passive	GPIOB0 signal/5V power enable signal output on EVB
E19	GPIOB1	Passive	GPIOB1 signal/SGM41510 charger state signal input on EVB
F19	GPIOB2	Passive	GPIOB2 signal/LED control signal output on EVB
G19	GPIOB3	Passive	GPIOB3 signal/LED control signal output on EVB
H19	GPIOB4	Passive	GPIOB4 signal/LED control signal output on EVB
J19	GPIOB5	Passive	GPIOB5 signal/LED control signal output on EVB
K19	GPIOB6	Passive	GPIOB6 signal/LED control signal output on EVB
L19	GPIOB7	Passive	GPIOB7 signal/LED control signal output on EVB
D3	GPIOC0	Passive	GPIOC0 signal/TP interrupt signal input on EVB
D4	NC		No connection
E3	GPIOC2	Passive	GPIOC2 signal/TP reset signal output on EVB
E4	NC		No connection
U32	GPIOD0	Passive	GPIOD0 signal/LED control signal output on EVB
U33	GPIOD1	Passive	GPIOD1 signal/LED control signal output on EVB
V32	GPIOD2	Passive	GPIOD2 signal/LED control signal output on EVB
V33	GPIOD3	Passive	GPIOD3 signal/LED control signal output on EVB
W32	GPIOD4	Passive	GPIOD4 signal/LED control signal output on EVB
W33	GPIOD5	Passive	GPIOD5 signal/LED control signal output on EVB

Pin	Name	Type	Description
Y32	GPIOD6	Passive	GPIOD6 signal/LED control signal output on EVB
AF32	GPIOE0	Passive	GPIOE0 signal/LAN8720A reset signal output on EVB
AF33	GPIOE1	Passive	GPIOE1 signal/PD interrupt signal input on EVB
AG32	GPIOE2	Passive	GPIOE2 signal/Camera power enable signal output on EVB
AG33	GPIOE3	Passive	GPIOE3 signal/SGM41510 charger interrupt signal input on EVB
AH32	GPIOE4	Passive	GPIOE4 signal/1.8V power enable signal output on EVB
AH33	GPIOE5	Passive	GPIOE5 signal/SGM41510 charger enable signal output on EVB
AJ32	NC		No connection
AJ33	NC		No connection
W15	NC		No connection
W16	NC		No connection
Y15	SPI_CS0_M1	Passive	Flash chip select 0 signal output on EVB
K17	NC		No connection
U16	SPI_CLK_M1	Passive	Flash clock signal output on EVB
U15	SPI_MISO_M1	Passive	Flash master input slave output signal on EVB
V15	SPI3_MOSI_M1	Passive	Flash master output slave input signal on EVB
AA23	NC		No connection
L17	NC		No connection
Y21	NC		No connection
Y22	NC		No connection
Y23	NC		No connection
C30	NC		No connection
Y33	NC		No connection
D29	NC		No connection
C29	NC		No connection
D30	NC		No connection
F15	NC		No connection
E16	CRS_DV	Passive	LAN8720A chip carrier sense /receive data validation input signal on EVB
R15	ENET_RMII_RXCLK	Passive	RMII receive CLK
M15	ENET_RMII_RXDV	Passive	RMII receive data validation

(To be continued...)

Pin	Name	Type	Description
L16	ENET_RMII_RXER	Passive	RMII receive error signal
N15	ENET_RMII_RXD2	Passive	RMII received data 2
P15	ENET_RMIII_RXD3	Passive	RMII received data 3
J15	ENET_RMII_TXCLK	Passive	RMII transmit CLK
K16	ENET_RMII_TXCTL	Passive	RMII transmit enable
K15	ENET_RMII_RXD0	Passive	RMII received data 0
L15	ENET_RMII_RXD1	Passive	RMII received data 1
H15	ENET_RMII_TXD0	Passive	RMII transmit data 0
G15	ENET_RMIII_TXD1	Passive	RMII transmit data 1
H16	ENET_RMII_TXD2	Passive	RMII transmit data 2
G16	ENET_RMII_TXD3	Passive	RMII transmit data 3

Pin	Name	Type	Description
N16, E1, D2, P1, L1, K2, M1, N1, H1	NC		No connection
J2, J1, K1, G1, F1, G2, F2, C6, C7, M2	NC		No connection
M17	VCC_1V8	Passive	1.8V IO power for Ethernet
T16	ENET_MDC	Passive	Management bus clock signal for Ethernet
T15	ENET_MDIO	Passive	Management bus data signal for Ethernet
AR21	ANT	Passive	RF IN connector
AB35, AC34, W35, T35, U34, R35, P35, N35, V34, V35, U35	NC		No connection

* Apart from those specified here, any pins not included in these sheets are not connected.

Ordering Information

Ordering No.	Chipset	Description	Operating system
VOSM350-A	MT8365	4GB LPDDR4, 32GB eMMC, MIPI DSI, UART, USB, SPI, I ² C, GPIO	Android
VOSM350-Y	MT8365		Yocto
VT-SBC-VOSM350-EVB	MT8365	VOSM350 + carrier board, 4GB LPDDR4, 32GB eMMC, HDMI/MIPI DSI, UART, USB, SPI, I ² C, GPIO	Android (default), Linux optional

* More variants are available, please contact the sales executive for details.

Packing list	
VOSM350 system-on-module	1

Optional accessories	
Adapter and power cord	1 kit
Wi-Fi and BT antenna	1

Company Profile

Since its establishment in 2002 by two Silicon Valley entrepreneurs, Vantron Technology has been at the forefront of the connected IoT devices and IoT platform solutions. Today, Vantron boasts a global customer base that includes many Fortune Global 500 companies. Its product lines cover edge intelligent hardware, IoT communication devices, industrial displays and BlueSphere cloud platforms.

With over 20 years of experience in R&D of intelligent edge hardware including SOMs, motherboards, and embedded industrial computers, Vantron has provided users with diverse embedded solutions featuring ARM and X86 architectures. Its offerings range from Linux, Android to Windows, from embedded level to desktop level, and from gateways to servers. In addition, it provides services such system trimming, driver transplantation and more to cater to the unique needs of its users.