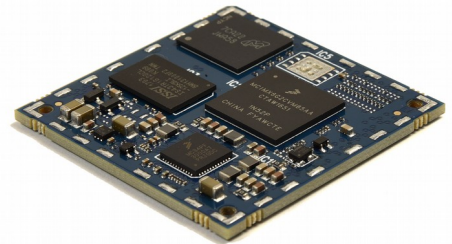


[Datasheet](#)

# VIGGEN TWO

System on module

<b>Processor:</b>	NXP iMX6UL @ 696 MHz
<b>Security features:</b>	TRNG, Crypto Engine (AES/TDES/SHA/RSA with DPA), Tamper Monitor, Secure Boot, SIMV2/EVMSIM X 2, OTF DRAM Encryption, PCI4.0 pre-certification
<b>RAM:</b>	16-bit 256 MB LvDDR3 (up to 2GB with TwinDie LvDDR3 SDRAM)
<b>ROM:</b>	2GB eMMC NAND Flash (opt. 256Mb Serial NOR Flash memory)
<b>Power Supply:</b>	3.7V to 5.5V
<b>Size:</b>	246 pin LGA, 43 mm x 43 mm
<b>Temp. Range:</b>	0°C + 85°C (optional extended range -40°C +85°C)



## Key Features

- ARM® Cortex®-A7 @ up to 696 MHz, 128 KB L2 cache
- Small size 43x43mm 246 pin LGA
- Security Block: TRNG, Crypto Engine (AES/TDES/SHA/RSA with DPA), Tamper Monitor, Secure Boot, SIMV2/EVMSIM X 2, OTF DRAM Encryption, PCI4.0 pre-certification, ARM TrustZone
- Shield with tamper detection (optional)
- 24-bit Parallel LCD Display up to WXGA (1366x768)
- 8-bit Parallel Camera Sensor Interface
- 2x MMC 4.5/SD 3.0/SDIO Port
- 2x USB 2.0 OTG, HS/FS, Device or Host with integrated PHY
- 2x 10/100 Ethernet with IEEE 1588
- 2x 12-bit ADC, up to 10 input channels, with resistive touch controller (4-wires/5-wires)
- 10x GPIOs
- 5x UARTS
- 2x CAN Interfaces
- 2x I2C
- **JTAG interface**

## OS Support

- Linux
- Bare Metal

## Board highlights:

- NXP ® iMX6UL microprocessor, up to 696 MHz
- 256 Mbyte LvDDR3-SDRAM (16 bit)
- 2 GByte eMMC NAND Flash memory
- several security features
- operating temperature range 0°C + 85°C
- small form factor 43 mm x 43 mm
- easy solderable 246 pads LGA
- suitable for Pick&Place mounting
- growing open-source software ecosystem

## Power supply:

- 3.7V - 5.5V single supply
- 3.3V power supply available
- VBAT pin for RTC backup (3.0V)

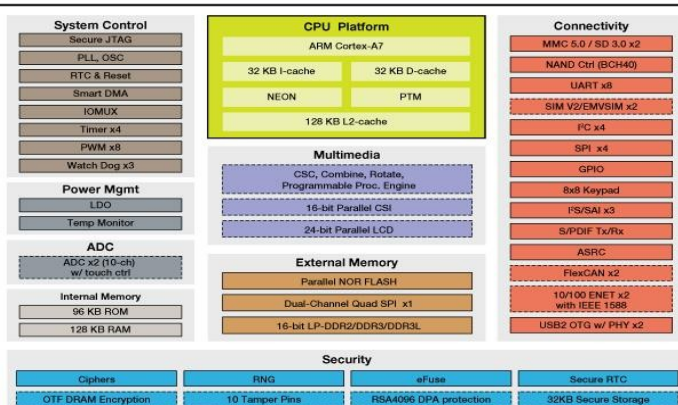
## Interfaces available:

- 4-wire UARTS (x3)
- 24-bit RGB LCD Interface
- 8-bit Camera Interface
- I2C (x2)
- 4-wire SDIO (x2)
- Audio interfaces (SAI, SPDIF)
- JTAG interface
- SIM interface
- CAN interfaces (x2)
- Tamper detection
- CSPI interface

## Communication interfaces:

- 2x USB OTG HS/FS
- 2x Ethernet 10/100 MAC
- 2x CAN
- 5x UART

## i.MX 6UltraLite Applications Processor Block Diagram



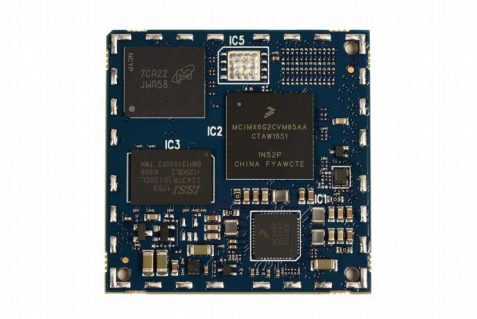
 Optional

## iMX6UL

Expanding the i.MX 6 series, the i.MX 6UltraLite is a high performance, ultra-efficient processor family featuring an advanced implementation of a single ARM® Cortex®-A7 core, which operates at speeds up to 528 MHz. The i.MX 6UltraLite applications processor provides various memory interfaces, including 16-bit LPDDR2, DDR3, DDR3L, raw and managed NAND flash, NOR flash, eMMC, QSPI SPI and a wide range of other interfaces for connecting peripherals such as WLAN, Bluetooth™, GPS, displays and camera.



**Mechanical dimensions**



Top view 43x 43 mm

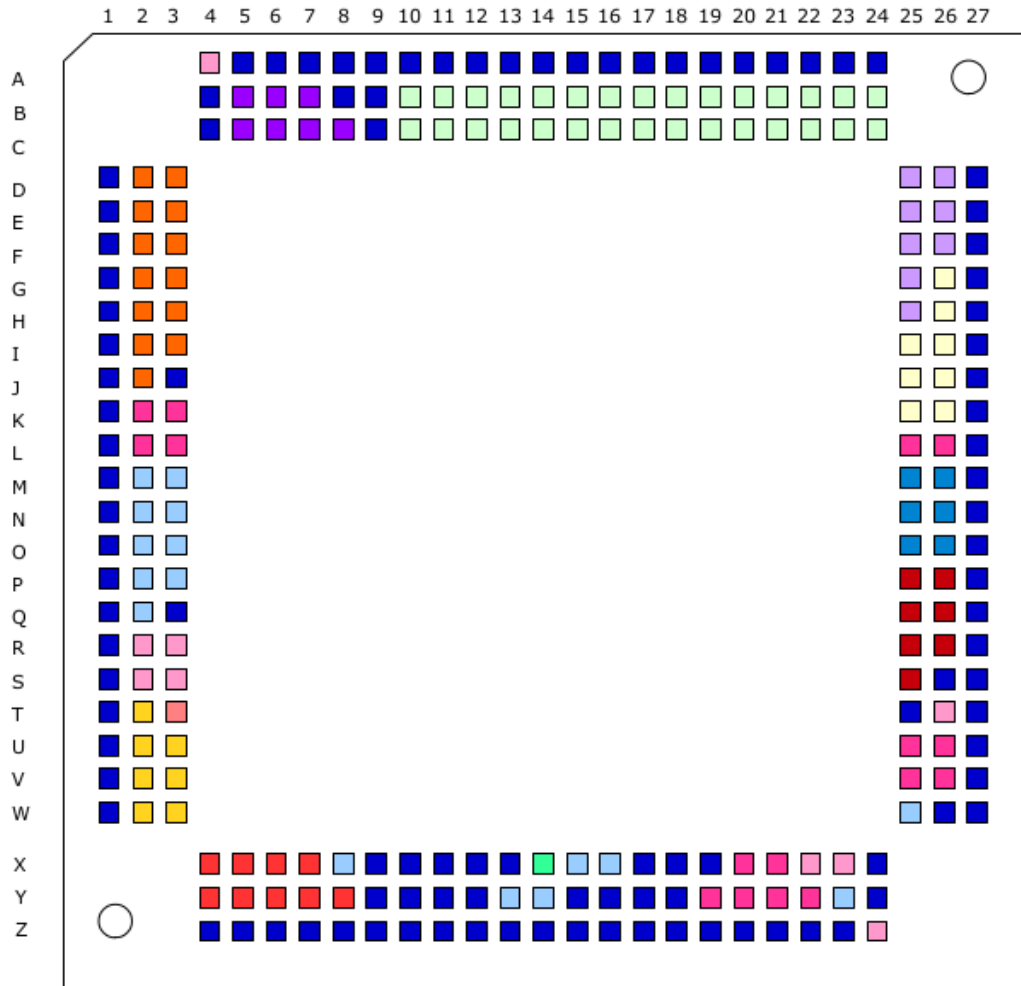


Bottom view 43 x 43 mm



# Pinout

Top view (pad on bottom side)



Main Pin location

- |   |  |  |
|---|--|--|
| <span style="color: blue;">■</span> GND               | <span style="color: orange;">■</span> CSI        | <span style="color: red;">■</span> USB   |
| <span style="color: red;">■</span> VIN                | <span style="color: purple;">■</span> ETH 2      | <span style="color: cyan;">■</span> JTAG |
| <span style="color: yellow;">■</span> 3V3-OUT         | <span style="color: lightyellow;">■</span> ETH 1 |  |
| <span style="color: pink;">■</span> VDD-SNVS-IN       | <span style="color: lightgreen;">■</span> LCD    |  |
| <span style="color: lightgreen;">■</span> VDD-COIN-3V | <span style="color: purple;">■</span> SD CARD    |  |
| <span style="color: pink;">■</span> TAMPER PIN        | <span style="color: magenta;">■</span> UARTs     |  |

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>PRIMARY FUNCTION</b>	<b>SECONDARY FUNCTION</b>
A4	SNVS_TAMP0/ACC_INT	Tamper pin 0 (connected to shield)	Accelerometer Input
A5 ~ A24	GND	Ground	NA
B4	GND	Ground	NA
B5	SD1_DATA0	SD CARD Data 0	NA
B6	SD1_CMD	SD CARD Command	NA
B7	SD1_CLK	SD CARD Clock	NA
B8 ~ B9	GND	Ground	NA
B10	LCD_DE	LCD Data Enable	NA
B11	LCD_PCLK	LCD Pixel Clock	NA
B12	LCD_DATA1	LCD Data 1	NA
B13	LCD_DATA0	LCD Data 0	NA
B14	LCD_DATA2	LCD Data 2	NA
B15	LCD_DATA4	LCD Data 4	NA
B16	LCD_DATA6	LCD Data 6	NA
B17	LCD_DATA5	LCD Data 5	NA
B18	LCD_DATA3	LCD Data 3	NA
B19	LCD_DATA18	LCD Data 18	NA
B20	LCD_DATA11	LCD Data 11	NA
B21	LCD_DATA15	LCD Data 15	NA
B22	LCD_DATA10	LCD Data 10	NA
B23	LCD_DATA19	LCD Data 29	NA
B24	LCD_DATA23	LCD Data 23	NA
C4	GND	Ground	NA
C5	NVCC_SD	SD Power Supply (default 3V3)	NA
C6	SD1_DATA2	SD1 Data 2	NA
C7	SD1_DATA1	SD1 Data 1	NA
C8	SD1_DATA3	SD1 Data 3	NA
C9	GND	Ground	NA
C10	LCD_HSYNC	LCD HSYNC	NA
C11	LCD_VSYNC	LCD VSYNC	NA
C12	LCD_RST	LCD Reset signal	NA
C13	NVCC_LCDIF	LCD Power supply (default 3V3)	NA
C14	LCD_DATA9	LCD Data 9	NA
C15	LCD_DATA8	LCD Data 8	NA
C16	LCD_DATA7	LCD Data 7	NA
C17	LCD_DATA14	LCD Data 14	NA
C18	LCD_DATA13	LCD Data 13	NA
C19	LCD_DATA12	LCD Data 12	NA
C20	LCD_DATA17	LCD Data 17	NA
C21	LCD_DATA22	LCD Data 22	NA
C22	LCD_DATA21	LCD Data 21	NA
C23	LCD_DATA20	LCD Data 20	NA
C24	LCD_DATA16	LCD Data 16	NA

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>PRIMARY FUNCTION</b>	<b>SECONDARY FUNCTION</b>
D1	GND	Ground	NA
D2	CSI_PIXCLK	Camera Sensor Pixel Clock	NA
D3	CSI_D5/\SIM2_RST\	Camera Sensor Data 5	SIM Card interface 2 Reset
D25	ENET2_TXD0	Ethernet 2 Transmit Data 0	NA
D26	ENET2_TXEN/ECSPI4_MOSI	Ethernet 2 Transmit Enable	CSPI4 MOSI
D27	GND	Ground	NA
E1	GND	Ground	NA
E2	CSI_D0	Camera Sensor Data 0	NA
E3	CSI_D4/SIM2_CLK	Camera Sensor Data 4	SIM Card interface 2 clock
E25	ENET2_TXD1/ECSPI4_SCLK	Ethernet 2 Transmit Data 1	CSPI4 clock
E26	ENET2_CRS_DV	Ethernet 2 Carrier sense	NA
E27	GND	Ground	NA
F1	GND	Ground	NA
F2	CSI_D7/SIM2_TXDR	Camera Sensor Data 7	SIM Card interface 2 TXDR
F3	CSI_D6/SIM2_SVEN	Camera Sensor Data 6	SIM Card interface 2 SVEN
F25	ENET2_RXD1	Ethernet 2 Receive Data 1	NA
F26	ENET2_RXD0	Ethernet 2 Receive Data 1	NA
F27	GND	Ground	NA
G1	GND	Ground	NA
G2	CSI_HSYNC	Camera Sensor HSYNC	NA
G3	CSI_D2/SIM2_VSEL	Camera Sensor Data 2	SIM Card Interface 2 Voltage Selection
G25	ENET2_RXER/ECSPI4_SS0	Ethernet 2 Receive Error	CSPI4 chip select 0
G26	ENET1_RXER	Ethernet 1 Receive Error	NA
G27	GND	Ground	NA
H1	GND	Ground	NA
H2	CSI_VSYNC	Camera Sensor VSYNC	NA
H3	CSI_D3/SIM2_PD	Camera Sensor Data 3	SIM Card Interface 2 PD
H25	ENET2_TX_CLK/ECSPI4_MISO	Ethernet 2 Transmit Clock	CSPI4 MISO
H26	ENET1_CRS_DV	Ethernet 1 Carrier Sense	NA
H27	GND	Ground	NA
I1	GND	Ground	NA
I2	CSI_D1/\SIM_IRQ\	Camera Sensor Data 1	SIM Card Interface Interrupt
I3	NVCC_CSI	Camera Sensor Power Supply (Default 3V3)	NA
I25	ENET1_RXD1	Ethernet 1 Receive Data 1	NA
I26	ENET1_TXD0	Ethernet 1 Receive Data 0	NA
I27	GND	Ground	NA
J1	GND	Ground	NA
J2	CSI_MCLK	Camera Sensor Master Clock	NA
J3	GND	Ground	NA
J25	ENET1_TX_CLK	Ethernet 1 Transmit Clock	NA
J26	ENET1_TXD1	Ethernet 1 Transmit Data 1	NA
J27	GND	Ground	NA

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>PRIMARY FUNCTION</b>	<b>SECONDARY FUNCTION</b>
K1	GND	Ground	NA
K2	\UART2_CTS\CAN2_TX	UART 2 Clear To Send	CAN Interface 2 Transmit Data
K3	UART2_RXD	UART 2 Receive Data	NA
K25	ENET1_RXD0	Ethernet 1 Receive Data 0	NA
K26	ENET1_TXEN	Ethernet 1 Transmit Data Enable	NA
K27	GND	Ground	NA
L1	GND	Ground	NA
L2	UART2_TXD	UART 2 Transmit Data	NA
L3	\UART2_RTS\CAN2_RX	UART 2 Request to Send	CAN Interface 2 Receive Data
L25	UART5_TXD/I2C2_SCL	UART 5 Transmit Data	I2C2 clock
L26	UART5_RXD/I2C2_SDA	UART 5 Receive Data	I2C2 Data
L27	GND	Ground	NA
M1	GND	Ground	NA
M2	GPIO_0/USB_OTG1_ID	GPIO 0	USB OTG1 ID
M3	GPIO_2/USB_OTG2_PWR	GPIO 2	USB OTG2 Power
M25	JTAG_TDO/SAI2_SYNC	JTAG Interface TDO	Serial Audio interface 2 Sync
M26	\JTAG_RST\SAI2_TXD	JTAG Interface Reset	Serial Audio interface 2 Transmit Data
M27	GND	Ground	NA
N1	GND	Ground	NA
N2	GPIO_1/USB_OTG1_OC	GPIO 1	USB OTG1 overcurrent
N3	GPIO_9/\SD1_RST\	GPIO 9	SD Card 1 Interface Reset
N25	JTAG_TMS/SAI2_MCLK	JTAG Interface TMS	Serial Audio interface 2 Master Clock
N26	JTAG_TDI/SAI2_BCLK	JTAG Interface TDI	Serial Audio interface 2 bit Clock
N27	GND	Ground	NA
O1	GND	Ground	NA
O2	GPIO_3/USB_OTG2_OC	GPIO 3	USB OTG2 overcurrent
O3	GPIO7/ENET_MDC	GPIO 7	Ethernet MDC
O25	JTAG_MOD/SPDIF_TX	JTAG Interface MOD	Sony Digital interface Transmit
O26	JTAG_TCK/SAI2_RXD	JTAG Interface Clock	Serial Audio interface 2 Receive
O27	GND	Ground	NA
P1	GND	Ground	NA
P2	GPIO_4/USB_OTG1_PWR	GPIO 4	USB OTG1 Power
P3	GPIO_8/BLT_PWM	GPIO 8	Bluetooth PWM
P25	USB_OTG1_DP	USB OTG1 Data Positive (Differential)	NA
P26	USB_OTG1_DN	USB OTG1 Data Negative (Differential)	NA
P27	GND	Ground	NA
Q1	GND	Ground	NA
Q2	GPIO_6/ENET_MDIO	GPIO 6	Ethernet MDIO
Q3	GND	Ground	NA
Q25	USB_OTG2_DN	USB OTG2 Data Negative (Differential)	NA
Q26	USB_OTG2_DP	USB OTG2 Data Positive (Differential)	NA

PIN	SIGNAL NAME	PRIMARY FUNCTION	SECONDARY FUNCTION
Q27	GND	Ground	NA
R1	GND	Ground	NA
R2	SNVS_TAMP7/SHIFT_STCP	Tamper 7	SHIFT STCP
R3	SNVS_TAMP5/\ENET1_INT\	Tamper 5	Ethernet 1 Interrupt
R25	USB_OTG2_VBUS	USB OTG2 VBUS Detect	NA
R26	USB_OTG1_VBUS	USB OTG1 VBUS Detect	NA
R27	GND	Ground	NA
S1	GND	Ground	NA
S2	SNVS_TAMP8/\SHIFT_OE\	Tamper 8	SHIFT output enable
S3	SNVS_TAMP6/\ENET2_INT	Tamper 6	Ethernet 2 Interrupt
S25	\USB_OTG_CHD	USB OTG CHD	NA
S26	GND	Ground	NA
S27	GND	Ground	NA
T1	GND	Ground	NA
T2	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
T3	VDD_SNVS_IN	Power supply for Bootstrap pin pull up	NA
T25	GND	Ground	NA
T26	SNVS_TAMP9/LCD_DISP	Tamper 9	LCD Disp
T27	GND	Ground	NA
U1	GND	Ground	NA
U2	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
U3	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
U25	UART1_RXD	UART 1 Receive Data	NA
U26	UART1_TXD	UART 1 Transmit Data	NA
U27	GND	Ground	NA
V1	GND	Ground	NA
V2	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
V3	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
V25	\UART1_RTS\SD1_CD	UART 1 Request to send	SD CARD 1 Card Detect
V26	\UART1_CTS\HDMI_INT	UART 1 Clear to send	HDMI Interrupt
V27	GND	Ground	NA
W1	GND	Ground	NA
W2	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
W3	VPERI_3V3	Power Supply Output 3,3V - 1000mA max	NA
W25	\POR	Power On Reset Input (use open collector)	NA
W26	GND	Ground	NA
W27	GND	Ground	NA
X4 - X7	VSYS	Power supply input 3,3V - 5V	NA
X8	\IMX6_POR_EXT	External Power On Reset request (use OC)	NA
X9 - X13	GND	Ground	NA
X14	VDD_COIN_3V	Coin cell power supply input for RTC Backup	NA
X15	BOOT1/SHIFTSDCP	Bootstrap pin 1	SHIFT SDCP
X16	BOOT0/SHIFT_SDI	Bootstrap pin 1	SHIFT SDI

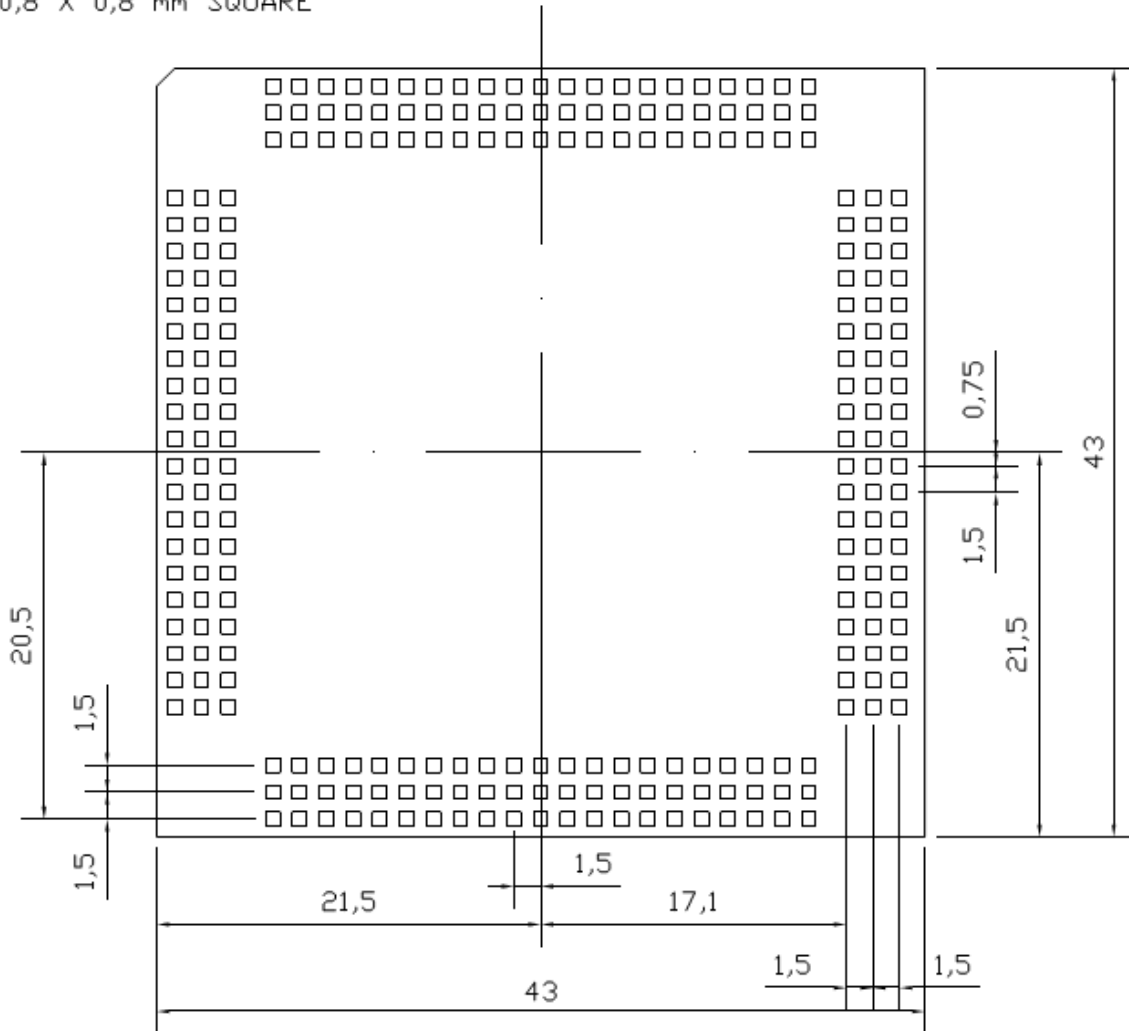


<b>PIN</b>	<b>SIGNAL NAME</b>	<b>PRIMARY FUNCTION</b>	<b>SECONDARY FUNCTION</b>
X17 - X19	GND	Ground	NA
X20	\UART3_CTS\CAN1_TX	UART 3 Clear to Send	CAN 1 Transmit Data
X21	\UART3_RTS\CAN1_RX	UART 3 Request to Send	CAN 1 Receive Data
X22	SNVS_TAMP3/GPIO_DVFS	Tamper 3	GPIO DVFS
X23	SNVS_TAMP2/PERI_PWEN	Tamper 2	Peripherals power enable
X24	GND	Ground	NA
Y4 - Y8	VSYS	Power supply input 3,3V - 5V	NA
Y9 - Y12	GND	Ground	NA
Y13	CLK1_P	Differential Clock Positive	NA
Y14	CLK1_N	Differential Clock Negative	NA
Y15 - Y18	GND	Ground	NA
Y19	UART4_RXD/I2C1_SDA	UART 4 Receive Data	I2C1 Data
Y20	UART4_TXD/I2C1_SCL	UART 4 Transmit Data	I2C1 Clock
Y21	UART3_RXD/\UART2_RTS	UART 3 Receive Data	UART 2 Request To Send
Y22	UART3_TXD/\UART2_CTS	UART 3 Transmit Data	UART 2 Clear to Send
Y23	ONOFF	ONOFF signal for PMIC	NA
Y24	GND	Ground	NA
Z4 - Z23	GND	Ground	NA
Z24	SNVS_TAMP1/BT_WKUP	Tamper 1	Bluetooth Wakeup



### Soldering Information

246 PADS  
0,8 X 0,8 mm SQUARE



## Ordering Information

Part Number	BW code	Description
V2-SECURE		Viggen Two SOM, Microprocessor NXP iMX6ULG3 full features security, 256MB DDR3LV, 2GB eMMC
V2-LITE		Viggen Two SOM, Microprocessor NXP iMX6ULG0 basic features security, 128MB DDR3LV, 2GB eMMC
V2-BASIC		Viggen Two SOM, Microprocessor NXP iMX6ULG0 basic features security, 128MB DDR3LV, No internal memory storage (external SD CARD available)

For more detail about differences between G0 and G3 processor visit NXP web page at the following address:

[http://cache.nxp.com/files/32bit/doc/fact\\_sheet/IMX6ULTRALITEFS.pdf?fsp=1&WT\\_TYPE=Fact%20Sheets&WT\\_VENDOR=FREESCALE&WT\\_FILE\\_FORMAT=pdf&WT\\_ASSET=Documentation&fileExt=.pdf](http://cache.nxp.com/files/32bit/doc/fact_sheet/IMX6ULTRALITEFS.pdf?fsp=1&WT_TYPE=Fact%20Sheets&WT_VENDOR=FREESCALE&WT_FILE_FORMAT=pdf&WT_ASSET=Documentation&fileExt=.pdf)

## Feature set

Features	V2-SECURE	V2-LITE	V2-BASIC
Microprocessor	MCIMX6G3	MCIMX6G0	MCIMX6G0
DRAM	DDR3LV 256 MB	DDR3LV 128 MB	DDR3LV 128 MB
EMMC	2 GB	2 GB	Opt
NOR Flash	Opt	Opt	Opt
Security	TRNG, Crypto Engine (AES with DPA/TDES/SHA/RSA), Secure Boot, tamper monitor, PCI4.0 pre-certification, OTF DRAM encryption	Basic	Basic
Graphic	PxP	None	None
CSI	8-bit Parallel CSI	None	None
LCD	24-bit Parallel LCD	None	None
Ethernet	10/100 Mbit/s x 2	10/100 Mbit/s x 1	10/100 Mbit/s x 1
CAN	2	0	0
USB	OTG, HS/FS x 2	OTG, HS/FS x 1	OTG, HS/FS x 1
QUAD SPI	1	1	1
SDIO	2	2	2
UART	8	4	4
I2C	4	2	2
SPI	4	2	2
I2S/SAI	3	1	1
S/PDIF	1	1	1
Timer/PWM	Timer x 4, PWM x 8	Timer x 2, PWM x 4	Timer x 2, PWM x 4
12-bit ADC	2 x 10 ch.	1 x 10 ch.	1 x 10 ch.

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