



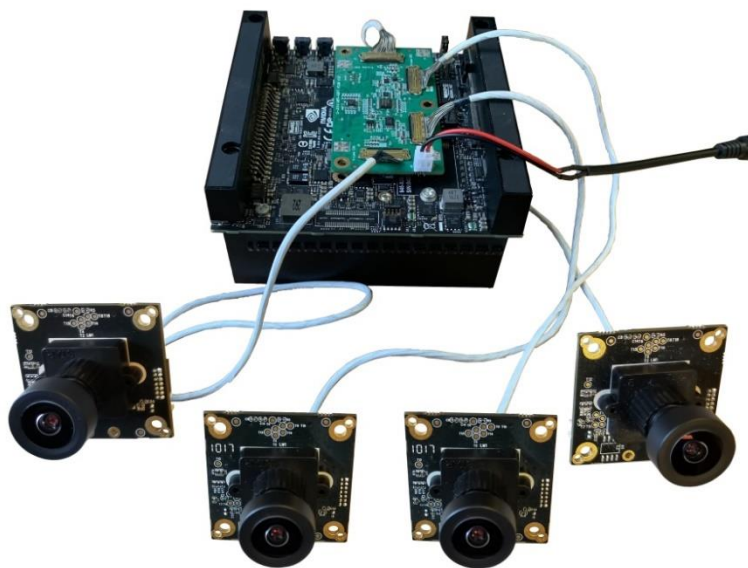
LEOPARD IMAGING INC

LI-XAVIER-KIT-IMX265M12-X

Data Sheet

Key Features

- Compatible with Nvidia® Jetson AGX Xavier™ Developer Kit
- MIPI CSI-2 interface
- Support up to six cameras
- Two adapter board options
 - LI-JXAV-MIPI-ADPT-4CAM
 - LI-JXAV-MIPI-ADPT-6CAM-FP
- Sony Diagonal 8.9 mm (Type 1/1.8) CMOS Image Sensor IMX265
- Global shutter
- Length of the I-PEX cable: 300mm
- Support multiple length cables
- Provide customization services
- Part#:
 - (1 cam) [LI-XAVIER-KIT-IMX265M12](#)
 - (2 cam) [LI-XAVIER-KIT-IMX265M12-D](#)
 - (3 cam) [LI-XAVIER-KIT-IMX265M12-T](#)
 - (4 cam) [LI-XAVIER-KIT-IMX265M12-Q](#)
 - (6 cam) [LI-XAVIER-KIT-IMX265M12-H](#)



Lens Spec

- Model: N118B05518W
- Focal length: 5.5 mm
- Aperture, F/#: 1.8
- Built in 650nm IR cut filter
- FOV (H): 64.5 °
- TV Distortion: 2.2 %
- Mount: M12 x P0.5

Applications

- Industrial Applications
- Intelligent Transportation System (ITS) Cameras

BOM

Nvidia AGX Xavier Developer Kit not included

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM or LI-JXAV-MIPI-ADPT-6CAM-FP	1
2	LI-IMX265-MIPI-M12	1, 2, 3, 4 or 6
3	FAW-1233-03 cable	1, 2, 3, 4 or 6



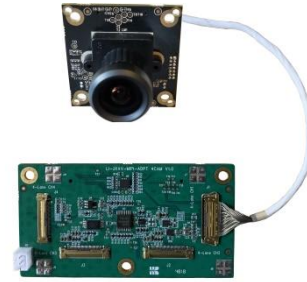
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Website: www.leopardimaging.com

LI-XAVIER-KIT-IMX265M12

BOM

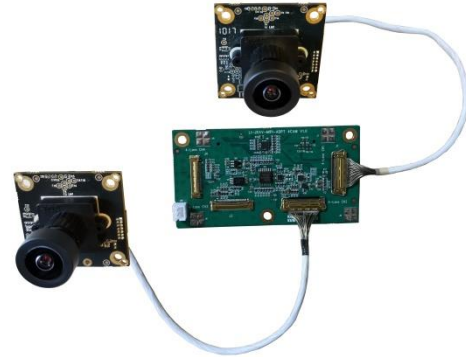
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1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX265-MIPI-M12	1
3	FAW-1233-03 cable	1



LI-XAVIER-KIT-IMX265M12-D

BOM

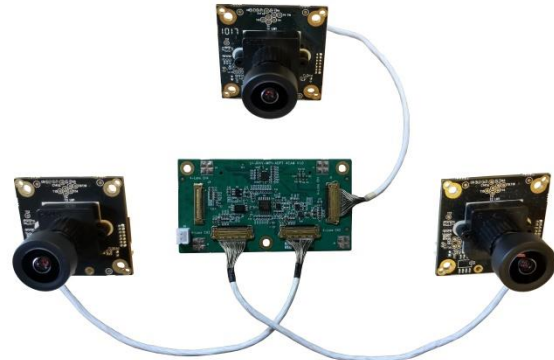
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1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX265-MIPI-M12	2
3	FAW-1233-03 cable	2



LI-XAVIER-KIT-IMX265M12-T

BOM

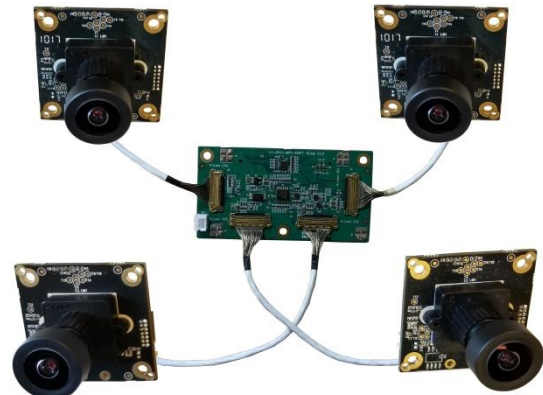
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1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX265-MIPI-M12	3
3	FAW-1233-03 cable	3



LI-XAVIER-KIT-IMX265M12-Q

BOM

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX265-MIPI-M12	4
3	FAW-1233-03 cable	4



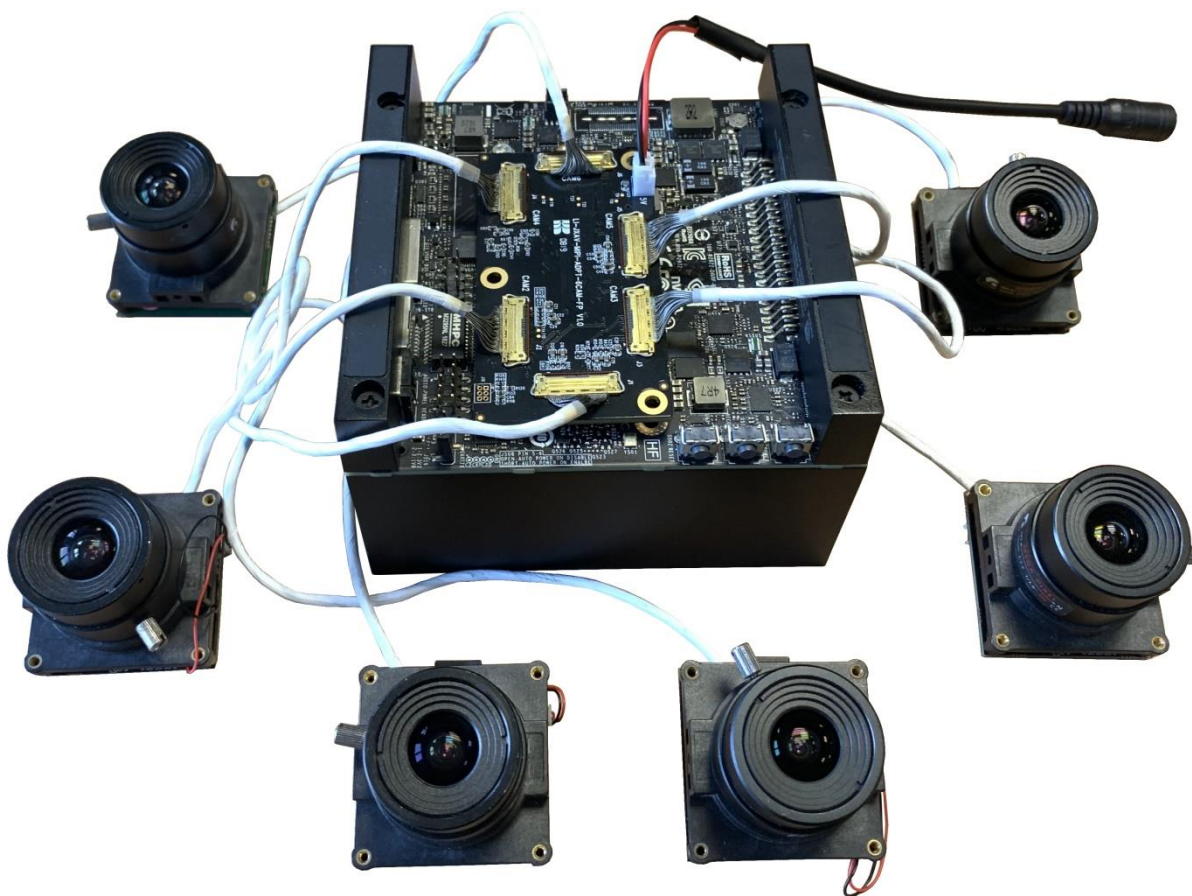
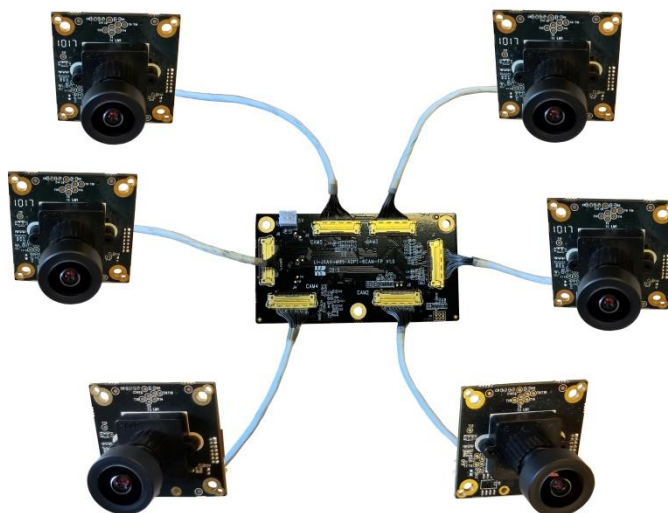
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LI-XAVIER-KIT-IMX265M12-H

BOM

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-6CAM-FP	1
2	LI-IMX265-MIPI-M12	6
3	FAW-1233-03 cable	6

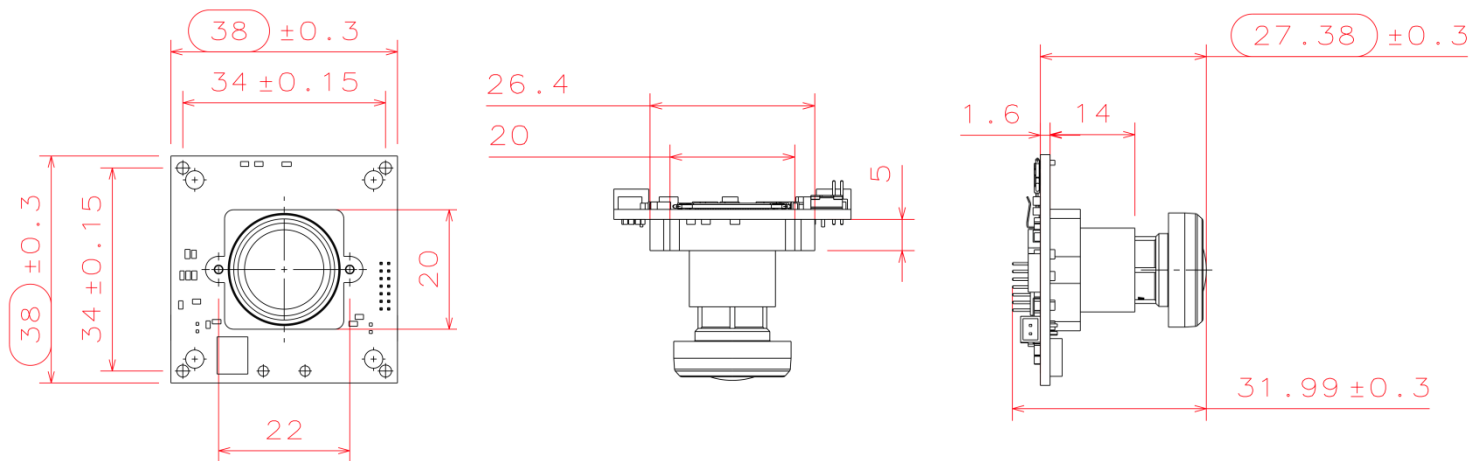


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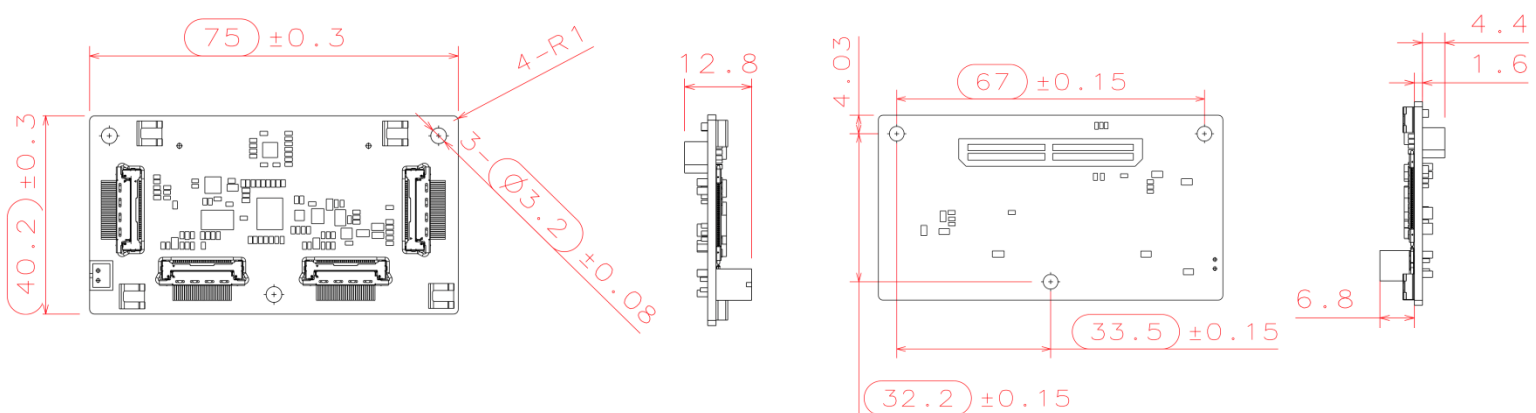
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Dimensions

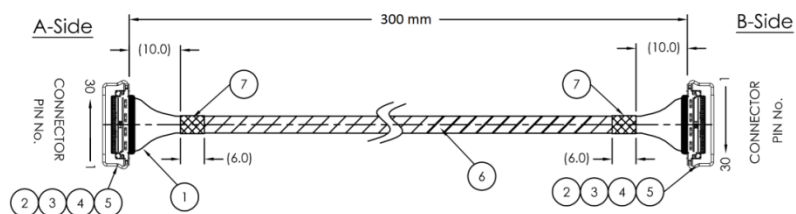
LI-IMX265-MIPI-M12



LI-JXAV-MIPI-ADPT-4CAM



FAW-1233-03



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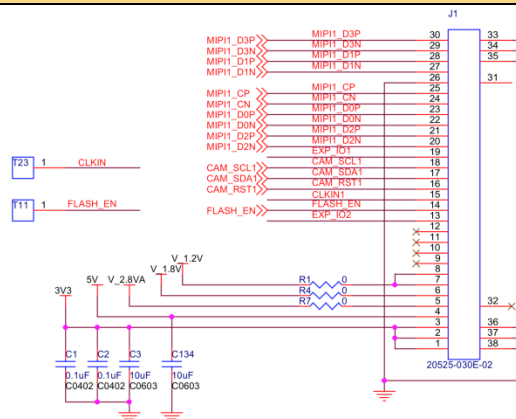
LI-JXAV-MIPI-ADPT-4CAM



Interfaces

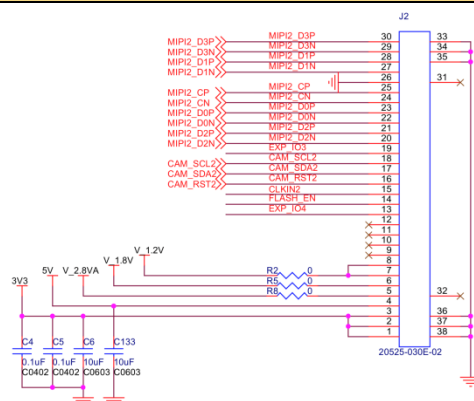
Interface J1

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



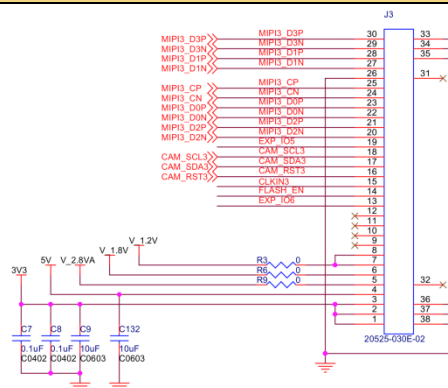
Interface J2

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



Interface J3

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)

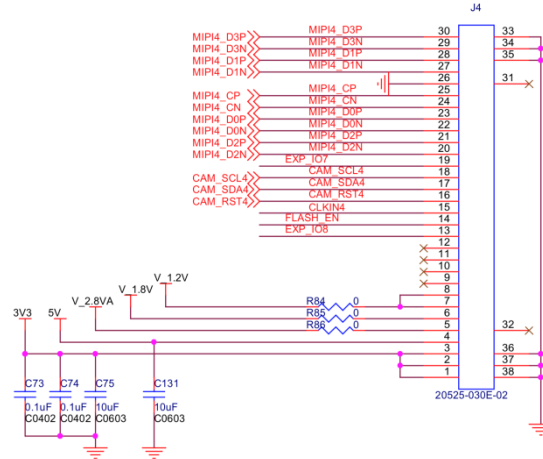


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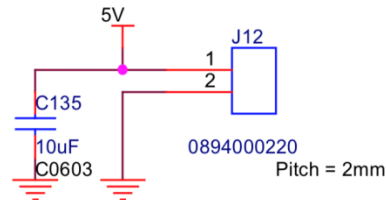
Interface J4

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



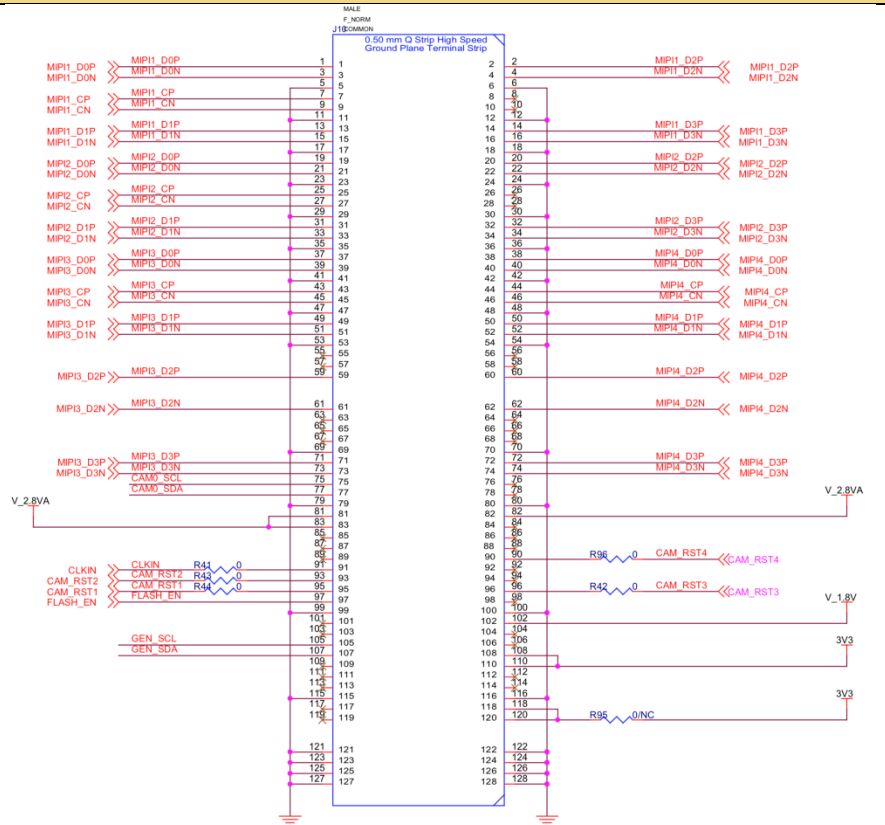
Interface J5

- Part#: 0894000220
- Number of Positions: 2
- Pitch: 2mm



Interface J10

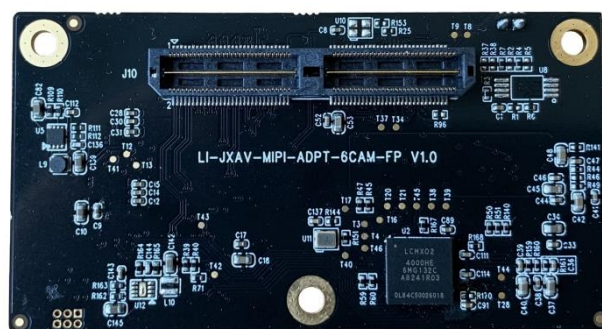
- Part#: QTH-060-01-L-D-A
- Number of Positions: 120
- Number of Rows: 2
- Pitch: 0.5 mm



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The image shows a black printed circuit board (PCB) for a camera system. The board is populated with various components including connectors, capacitors, and integrated circuits. Key labels include 'CAM5', 'CAM3', 'CAM2', 'CAM4', 'CAM1', 'LI-JXAV-MPI-ADPT-6CAM-FP V1.0', and '08/19'. The board has four mounting holes and a blue component in the top left corner.



Interface J1 (camera channel 1)

-
- The schematic diagram illustrates the internal circuitry of the 20525-030E-02 module. It features several power input pins on the left: 3V3, 5V, V_2.8VA, V_1.8V, and V_1.2V. These are connected to a network of capacitors (C9, C10, C12, C13, C14, C15, C16) and resistors (R157, R158, R4). The module also has a series of signal input pins labeled MIPI1_D1P, MIPI1_D1N, MIPI1_CP, MIPI1_CN, MIPI1_D0P, MIPI1_D0N, CAM1_GPIO1, CAM1_SCL, CAM1_SDA, CAM1_RST, CAM1_MCLK, FLASH_EN, CAM1_GPIO2, CAM1_GPIO3, CAM1_GPIO4, and CAM1_GPIO5. These are connected to a central bus system. On the right, the module is connected to a J1 connector with pins 30 through 38. The module identifier 20525-030E-02 is printed at the bottom right.

Interface J2 (camera channel 2)

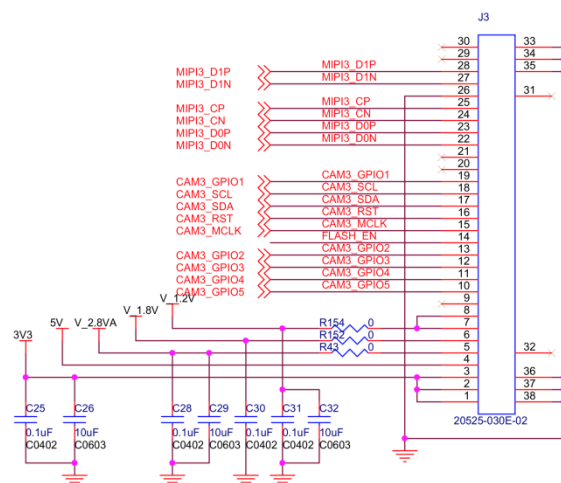
-
- The diagram illustrates the pin configuration for the J2 connector. It shows a series of power and ground connections at the bottom, with various signal lines branching off to different components. The power pins are 3V3, 5V, V_2.8VA, V_1.8V, and V_1.2V. The ground pins are labeled GND. The signal pins are MIPI2_D1P, MIPI2_D1N, MIPI2_CP, MIPI2_CN, MIPI2_D0P, MIPI2_D0N, CAM2_GPIO1, CAM2_SCL, CAM2_SDA, CAM2_RST, CAM2_MCLK, FLASH_EN, CAM2_GPIO2, CAM2_GPIO3, CAM2_GPIO4, and CAM2_GPIO5. The connector is labeled J2 and the module is labeled 2052S-030E-02.



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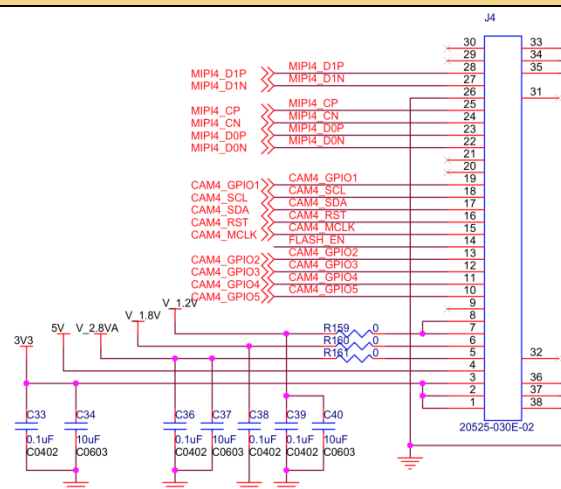
Interface J3 (camera channel 3)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable:
FAW-1233-xx



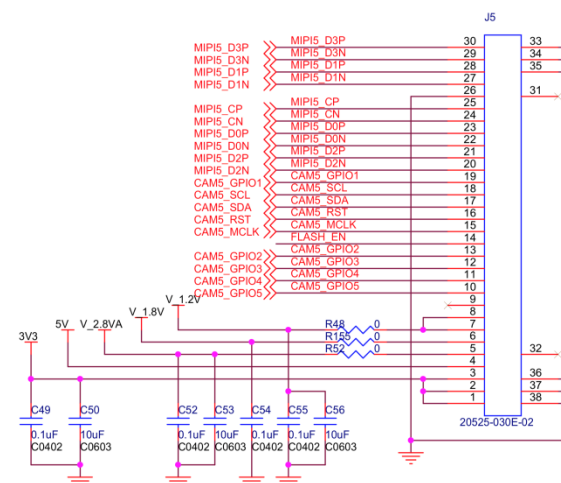
Interface J4 (camera channel 4)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable:
FAW-1233-xx



Interface J5 (camera channel 5)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable:
FAW-1233-xx

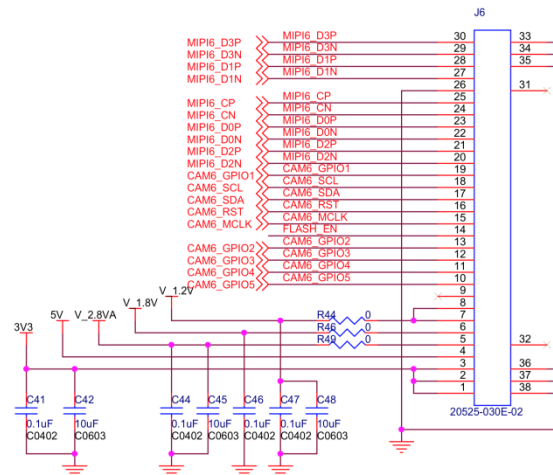


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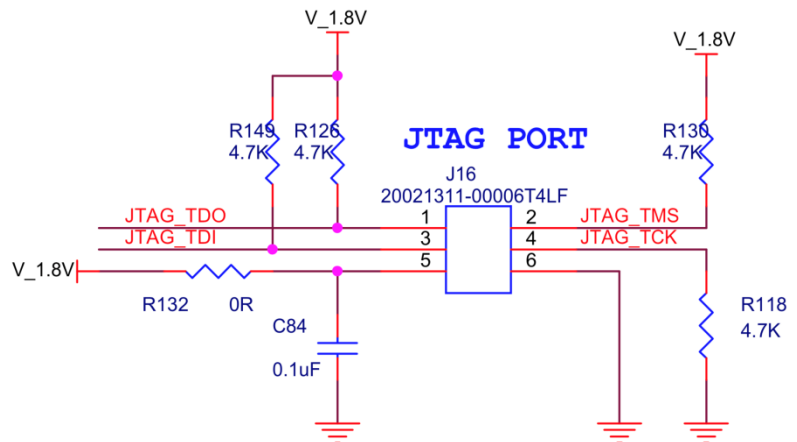
Interface J6 (camera channel 6)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable:
FAW-1233-xx



Interface J16 (FPGA programming interface)

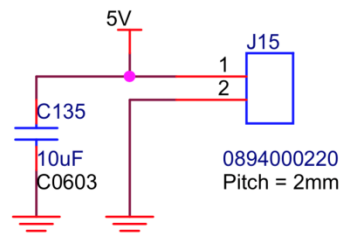
- Part#: 20021311-00006T4LF
- Number of Positions: 6
- Pitch: 0.050" (1.27mm)
- Number of Rows: 2



Interface J15 (External power input interface)

- Part#: 0894000220
- Number of Positions: 2
- Pitch: 2 mm

External Input Power

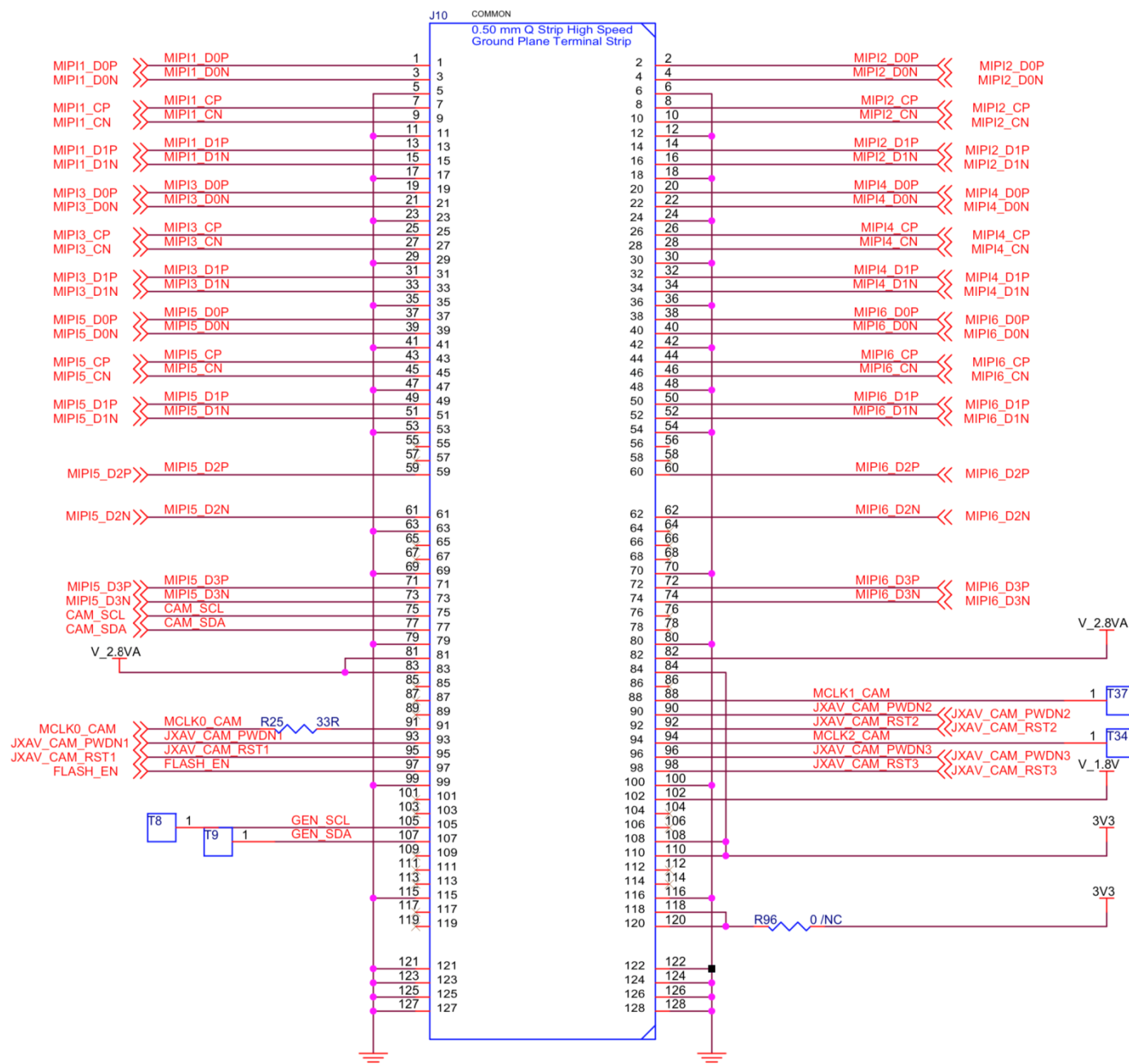


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Interface J10 (To Xavier)

- Part#: QTH-060-01-L-D-A
- Number of Positions: 120
- Number of Rows: 2
- Pitch: 0.5 mm



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LI-IMX265-MIPI-M12



Camera Spec	
Image Sensor	Sony Diagonal 8.9 mm (Type 1/1.8) CMOS Image Sensor IMX265
Optical format	1/1.8"
Number of active pixels	2064 (H) x 1544(V)
Pixel size	3.45um (H) x 3.45um (V)
Color or Mono	Color
Interface	MIPI interface
Lens mount	M12
Weight	15 g
Interfaces	
Interface J4: - Part#: 20525-030E-02C - Number of Positions: 30 - Pitch: 0.4mm - Mating I-PEX cable: FAW-1233-03 (300mm)	
Interface J8: - Part#: 1734829-2 - Number of Positions: 2 - Pitch: 1.25mm	
Interface J2: - Part#: 20021321-00010C4LF - Number of Positions: 10 - Pitch: 1.27mm	
Interface J3: - Part#: 20021321-00006C4LF - Number of Positions: 6 - Pitch: 1.27mm	



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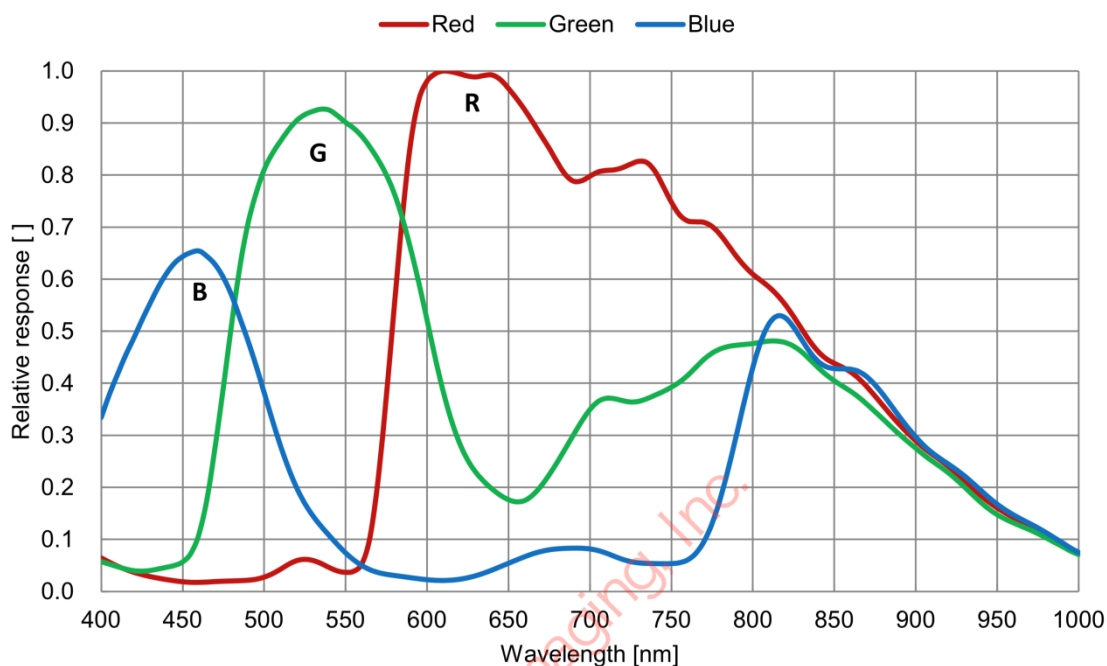
Absolute Maximum Ratings

Item	Symbol	Rating			Unit	Remarks
Supply voltage (Analog 3.3 V)	AV _{DD}	-0.3	to	+4.0	V	
Supply voltage (Interface 1.8 V)	OV _{DD}	-0.3	to	+3.3	V	
Supply voltage (Digital 1.2 V)	DV _{DD}	-0.3	to	+2.0	V	
Input voltage	VI	-0.3	to	OV _{DD} +0.3	V	Not exceed 3.3 V
Output voltage	VO	-0.3	to	OV _{DD} +0.3	V	Not exceed 3.3 V
Operating temperature	Topr	-30	to	+75	°C	
Storage temperature	Tstg	-40	to	+85	°C	
Performance guarantee temperature	Tspec	-10	to	+60	°C	

Recommended Operating Conditions

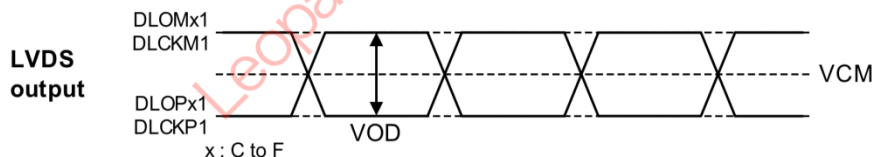
Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage (Analog 3.3 V)	AV _{DD}	3.15	3.30	3.45	V
Supply voltage (Interface 1.8 V)	OV _{DD}	1.70	1.80	1.90	V
Supply voltage (Digital 1.2 V)	DV _{DD}	1.10	1.20	1.30	V

Spectral Sensitivity Characteristics



DC Characteristics

Item		Pins	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	Analog	V _{DDHx}	AV _{DD}	—	3.15	3.30	3.45	V
	Interface	V _{DDMx}	OV _{DD}	—	1.70	1.80	1.90	V
	Digital	V _{DDLx}	DV _{DD}	—	1.10	1.20	1.30	V
Digital input voltage		XHS XVS XCLR INCK XMASTER SLAMODE	VIH	XVS / XHS in Slave mode	0.8 × OV _{DD}	—	—	V
		SCK SDI XCE XTRIG	VIL		—	—	0.2 × OV _{DD}	V
Digital output voltage		DLOPx1 DLOMx1 DCKP1	VCM	Low voltage LVDS (termination resistance: 100 Ω)	—	OV _{DD} /2	—	V
		DCKM1 x: C to F	VOD		100	150	210	mV
		XHS XVS SDO	VOH	XVS / XHS in Master mode	OV _{DD} -0.4	—	—	V
		TOUT1 TOUT2	VOL		—	—	0.4	V



Power Consumption

Item	Pins	Symbol	Typ.	Max.	Unit
Operating current Serial LVDS 4 ch 12 bit 55.6 frame/s	V _{DDH}	IAV _{DD}	120	175	mA
	V _{DDM}	IOV _{DD}	11	20	mA
	V _{DDL}	IDV _{DD}	120	180	mA
Standby current	V _{DDH}	IAV _{DD_STB}	—	0.5	mA
	V _{DDM}	IOV _{DD_STB}	—	0.5	mA
	V _{DDL}	IDV _{DD_STB}	—	20	mA

Operating current:

(Typical value condition) : Supply voltage: 3.30 V / 1.80 V / 1.20 V, T_j = 25 °C

(Maximum value condition) : Supply voltage: 3.45 V / 1.90 V / 1.30 V, T_j = 60 °C

Worst state of internal circuit operating current consumption.

Standby current:

(Maximum value condition) : Supply voltage: 3.45 V / 1.90 V / 1.30 V, T_j = 60 °C, INCK = 0 V,

The device in the light-obstructed state.



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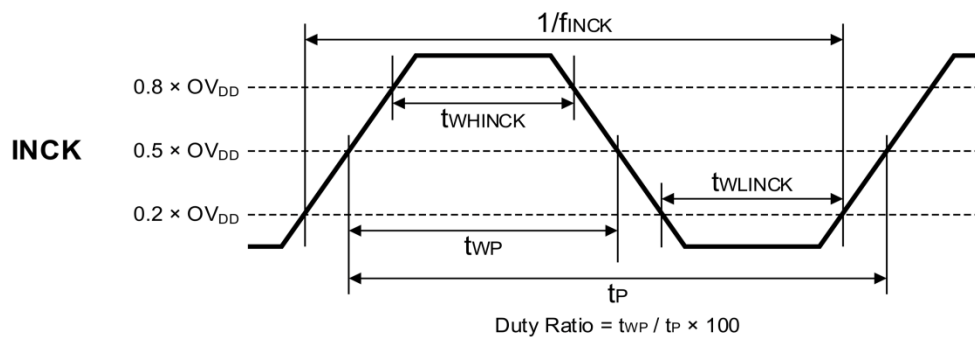
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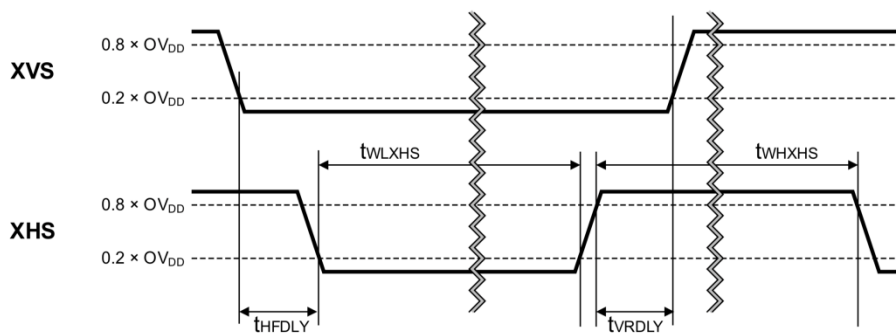
AC Characteristics



Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
INCK clock frequency	f_{INCK}	$f_{INCK} \times 0.96$	f_{INCK}	$f_{INCK} \times 1.02$	MHz	$f_{INCK} =$ 37.125 MHz, 74.25 MHz, 54 MHz
INCK Low level pulse width	t_{WLINCK}	4	—	—	ns	
INCK High level pulse width	t_{WHINCK}	4	—	—	ns	
INCK clock duty	—	45.0	50.0	55.0	%	Define with $0.5 \times OV_{DD}$

* The INCK fluctuation affects the frame rate.

XVS / XHS Input Characteristics in Slave Mode (XMASTER = High)



Item	Symbol	Min.	Typ.	Max.	Unit
XHS Low level pulse width	t_{WDXHS}	$4/f_{INCK}$	—	—	ns
XHS High level pulse width	t_{WDXVS}	$4/f_{INCK}$	—	—	ns
XVS - XHS fall width	t_{HFDLY}	$1/f_{INCK}$	—	—	ns
XHS - XVS rise width	t_{VRDLY}	$1/f_{INCK}$	—	—	ns

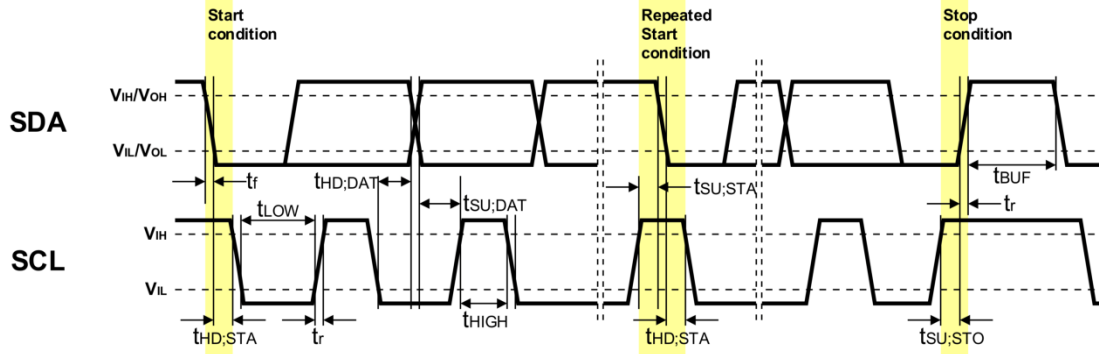
Synchronization cannot be performed from XVS and XHS signal in mater mode. Detect the sync code.



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I²C Communication



I²C Specification

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Low level input voltage	V_{IL}	-0.3	—	$0.3 \times OV_{DD}$	V	
High level input voltage	V_{IH}	$0.7 \times OV_{DD}$	—	1.9	V	
Low level output voltage	V_{OL}	0	—	$0.2 \times OV_{DD}$	V	$OV_{DD} < 2$ V, Sink 3 mA
High level output voltage	V_{OH}	$0.8 \times OV_{DD}$	—	—	V	
Output fall time	t_{of}	—	—	250	ns	Load 10 pF – 400 pF, $0.7 \times OV_{DD} - 0.3 \times OV_{DD}$
Input current	I_i	-10	—	10	μ A	$0.1 \times OV_{DD} - 0.9 \times OV_{DD}$
Capacitance for SCK (/SCL) , SDI (/SDA)	C_i	—	—	10	pF	

I²C AC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
SCL clock frequency	f_{SCL}	0	—	400	kHz
Hold time (Start Condition)	t_{HDSTA}	0.6	—	—	μ s
Low period of the SCL clock	t_{LOW}	1.3	—	—	μ s
High period of the SCL clock	t_{HIGH}	0.6	—	—	μ s
Set-up time (Repeated Start Condition)	t_{SUSTA}	0.6	—	—	μ s
Data hold time	t_{HDDAT}	0	—	0.9	μ s
Data set-up time	t_{SUDAT}	100	—	—	ns
Rise time of both SDA and SCL signals	t_R	—	—	300	ns
Fall time of both SDA and SCL signals	t_F	—	—	300	ns
Set-up time (Stop Condition)	t_{SUSTO}	0.6	—	—	μ s
Bus free time between a Stop and Start Condition	t_{BUF}	1.3	—	—	μ s



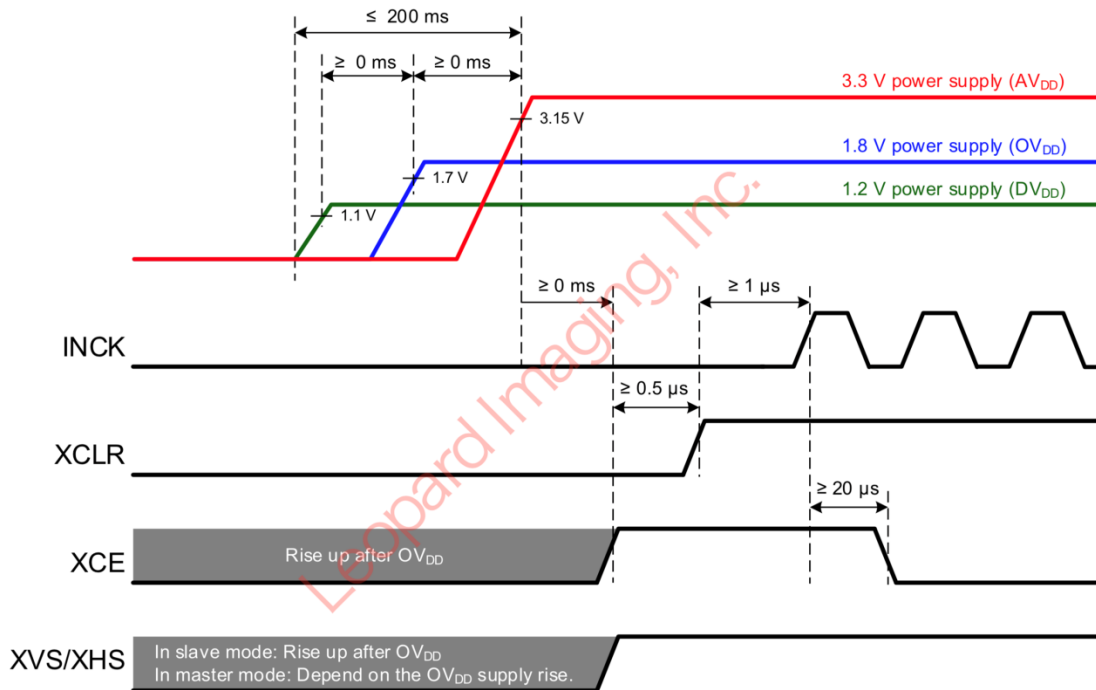
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Power-on Sequence

Follow the sequence below to turn On the power supplies.

1. Turn On the power supplies so that the power supplies rise in order of 1.2 V power supply (DV_{DD}) → 1.8 V power supply (OV_{DD}) → 3.3 V power supply (AV_{DD}). In addition, all power supplies should finish rising within 200 ms.
2. The register values are undefined immediately after power-on, so the system must be cleared. Hold XCLR at Low level for 500 ns or more after all the power supplies have finished rising. (The register values after a system clear are the default values.)
In addition, hold XCE to High level during this period. Rise XCE after 1.8 V power supply (OV_{DD}), so hold XCE at High level until INCK is input.
3. Start the input of INCK after turning the level of XCLR into the high.
4. Make the sensor setting by register communication after the system clear. A period of 0 μ s or more should be provided after setting XCLR High before inputting the communication enable signal XCE.

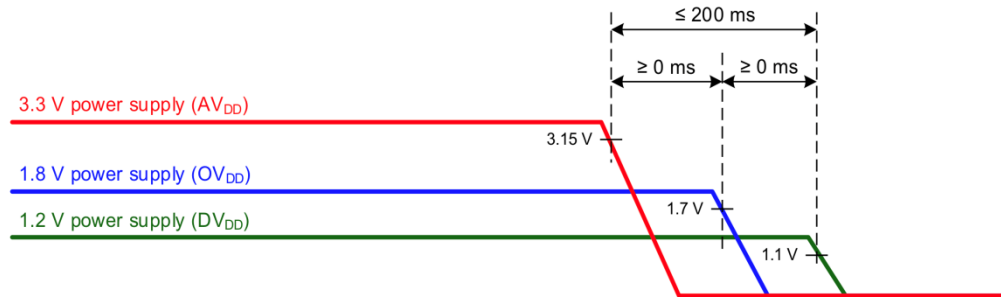


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Power-off Sequence

Turn Off the power supplies so that the power supplies fall in order of 3.3 V power supply (AV_{DD}) → 1.8 V power supply (OV_{DD}) → 1.2 V power supply (DV_{DD}). In addition, all power supplies should finish falling within 200 ms. Set each digital input pin (INCK, XCE, SCK, SDI, XCLR, XMASTER, XTRIG, SLAMODE, XVS, XHS) to 0 V or high impedance before the 1.8 V power supply (OV_{DD}) falls.



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Revision History

Revision	Description	Release Date
1.0	First Release	02. Aug. 2019



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