



LEOPARD IMAGING INC

LI-NANO-CB-IMX219-xxxH-X

Data Sheet

Key Features

- Compatible with Nvidia® Jetson NANO™
- MIPI CSI-2 interface
- Support up to four cameras
- Sony Diagonal 4.60 mm (Type 1/4) 8MP CMOS Image Sensor IMX219
- Active pixels: 3280H x 2464V
- Pixel size: 1.12 um x 1.12 um
- Color camera
- FOV H: 90° / 136°
- Support 3264x2464@21fps, 3264x1848@28fps, 1920x1080@30fps and 1280x720@60fps
- Support PoE (options)
- I-PEX cable part#: FAW-1233-01
- Length of the I-PEX cable: 100mm
- Support multiple length cables
- MIPI connector part#: 20525-030E-02C
- Provide driver binary and source code
- Provide customization services
- Part#:

LI-NANO-CB-IMX219-xxxH-X

LI-NANO-CB-POE-IMX219-xxxH-X



BOM

#	Items	QTY
1	LI-NANO-CB V1.2 or LI-NANO-CB-POE V1.2	1
2	Nvidia Jetson Nano SOM	1
3	LI-IMX219-MIPI-FF-NANO	1,2,3 or 4
4	LI-PI-IPEX-1233-ADPT	1,2,3 or 4
5	DC 12V power supply	1
6	USB 2.0 Type A - Micro B cable	1



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Order Information

LI-NANO-CB-IMX219-xxxH / LI-NANO-CB-POE-IMX219-xxxH

BOM

#	Items	QTY
1	LI-NANO-CB or LI-NANO-CB-POE	1
2	Nvidia Jetson Nano SOM	1
3	LI-IMX219-MIPI-FF-NANO	1
4	LI-PI-IPEX-1233-ADPT	1
5	DC 12V power supply	1
6	USB 2.0 Micro B cable	1



LI-NANO-CB-IMX219-xxxH-D / LI-NANO-CB-POE-IMX219-xxxH-D

BOM

#	Items	QTY
1	LI-NANO-CB or LI-NANO-CB-POE	1
2	Nvidia Jetson Nano SOM	1
3	LI-IMX219-MIPI-FF-NANO	2
4	LI-PI-IPEX-1233-ADPT	2
5	DC 12V power supply	1
6	USB 2.0 Micro B cable	1



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LI-NANO-CB-IMX219-xxxH-T / LI-NANO-CB-POE-IMX219-xxxH-T

BOM

#	Items	QTY
1	LI-NANO-CB or LI-NANO-CB-POE	1
2	Nvidia Jetson Nano SOM	1
3	LI-IMX219-MIPI-FF-NANO	3
4	LI-PI-IPEX-1233-ADPT	3
5	DC 12V power supply	1
6	USB 2.0 Micro B cable	1



LI-NANO-CB-IMX219-xxxH-Q / LI-NANO-CB-POE-IMX219-xxxH-Q

BOM

#	Items	QTY
1	LI-NANO-CB or LI-NANO-CB-POE	1
2	Nvidia Jetson Nano SOM	1
3	LI-IMX219-MIPI-FF-NANO	4
4	LI-PI-IPEX-1233-ADPT	4
5	DC 12V power supply	1
6	USB 2.0 Micro B cable	1



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Register Information

Device (on LI-NANO-CB)	I2C address (7-bit)
tca9548 (I2C switcher)	0x70
J13 (CAM1)	0x00
J3 (CAM2)	0x01
J25 (CAM3)	0x02
J26 (CAM4)	0x03

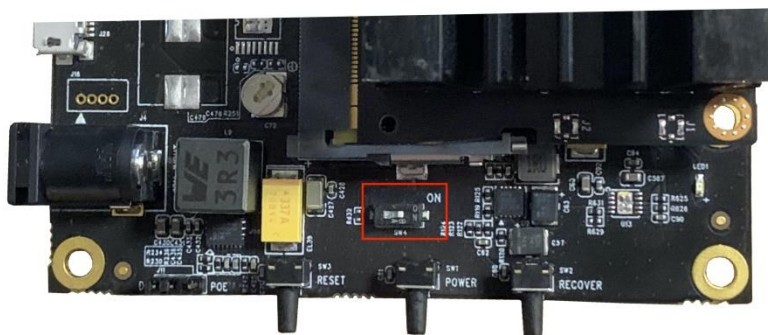
Device (on LI-IMX219-MIPI-FF-NANO)	I2C address (7-bit)
IMX219 sensor	0x10

Power Consumption

Opened Cameras	Power consumption
No camera	Around 200mA @ 12V
1 camera (3264x2464@21fps)	TBD
2 cameras (3264x2464@21fps)	TBD
3 cameras (3264x2464@21fps)	TBD
4 cameras (3264x2464@21fps)	TBD

Auto Boot

SW4	Boot mode
ON	Manual boot
OFF	Auto boot

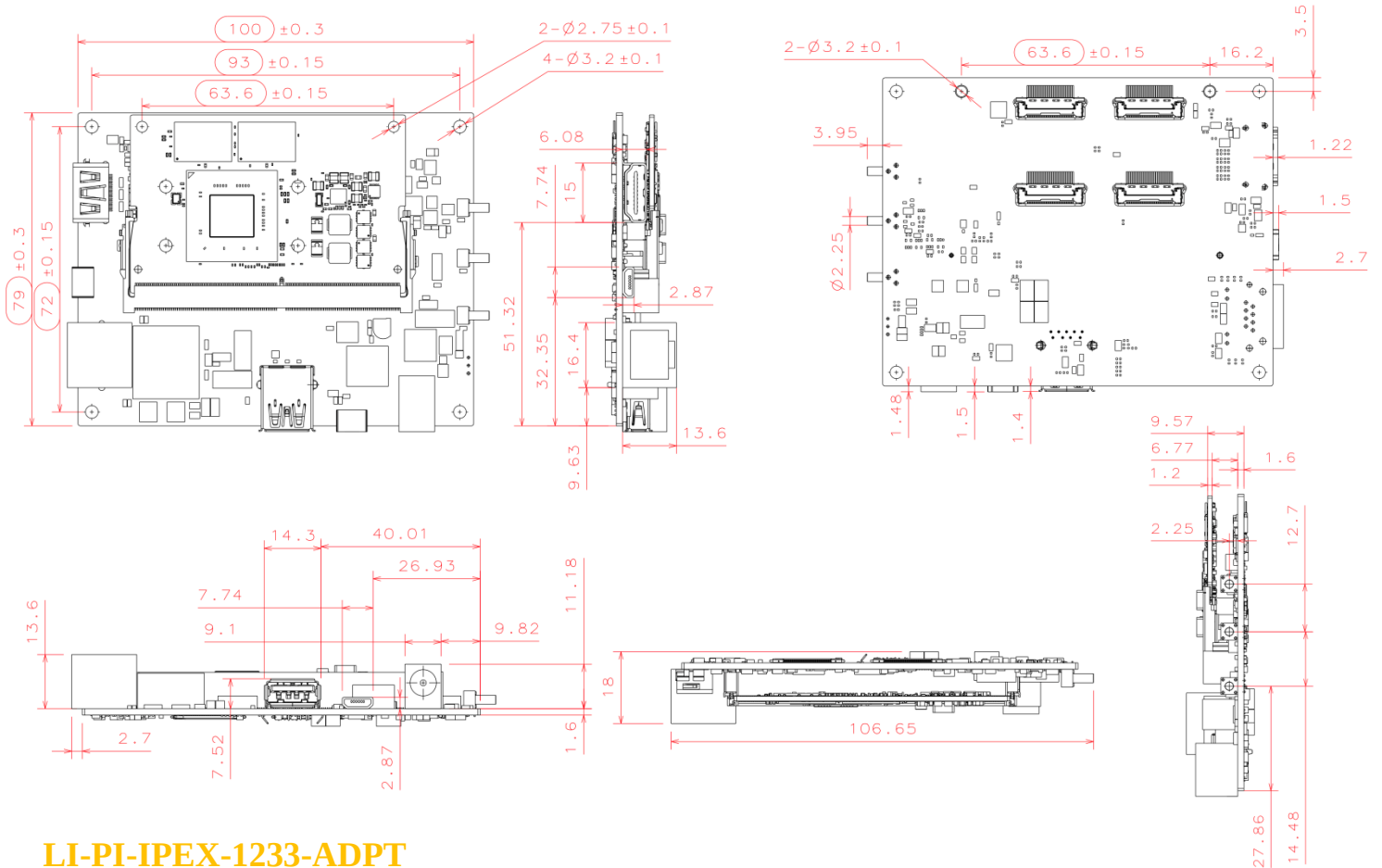


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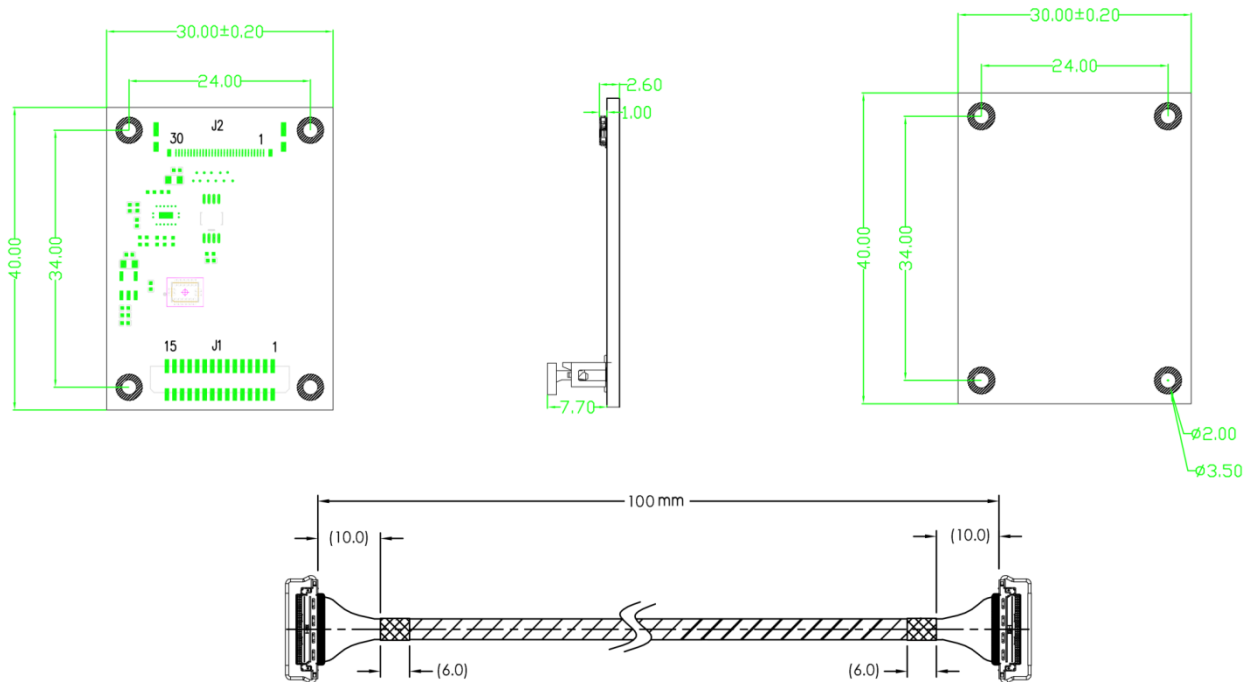
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Dimensions

LI-NANO-CB / LI-NANO-CB-POE



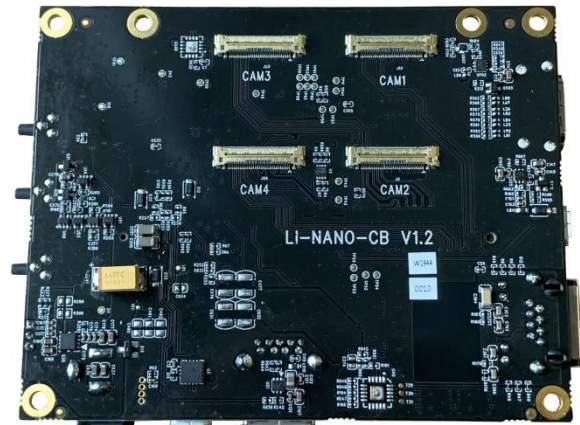
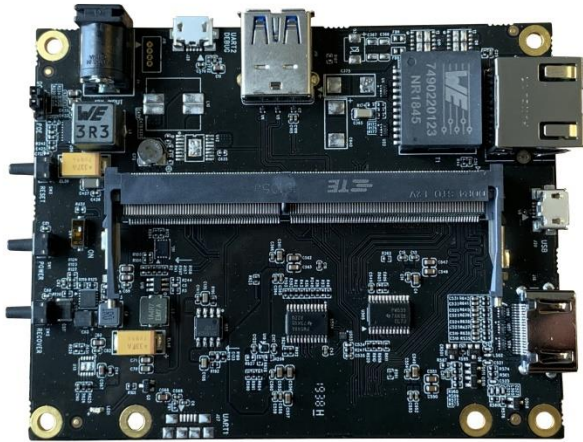
LI-PI-IPEX-1233-ADPT



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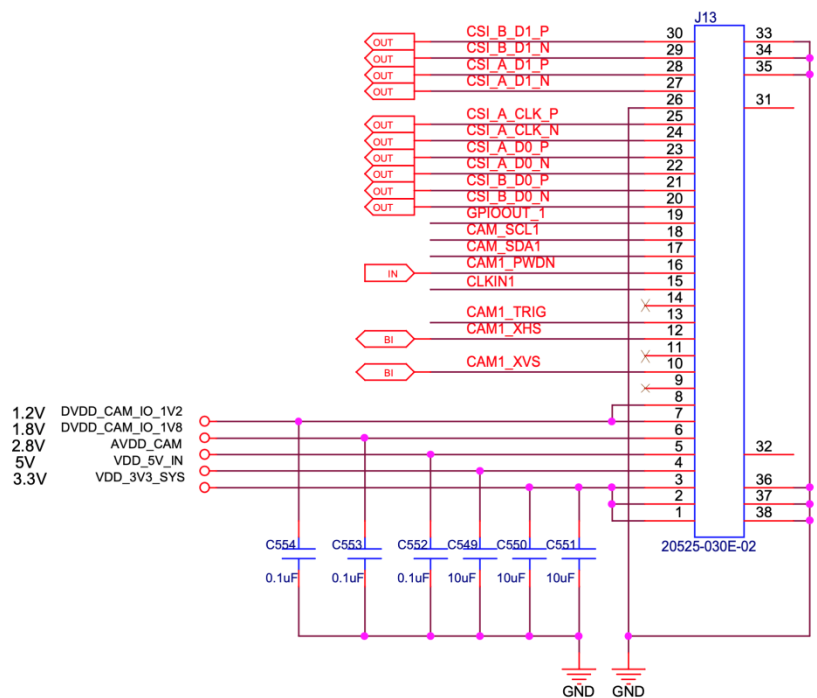
LI-NANO-CB / LI-NANO-CB-POE



Camera Interfaces

Interface J13 (CAM1)

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

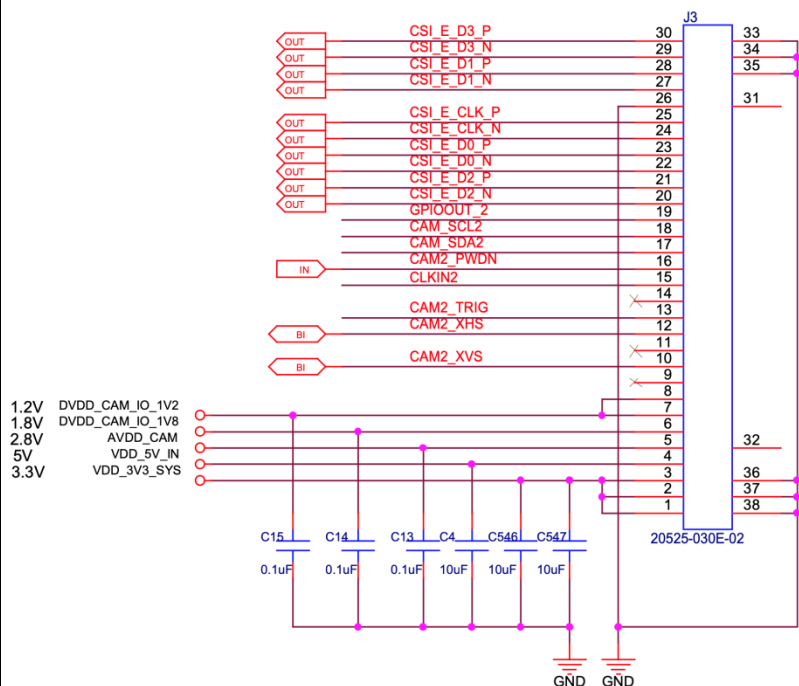


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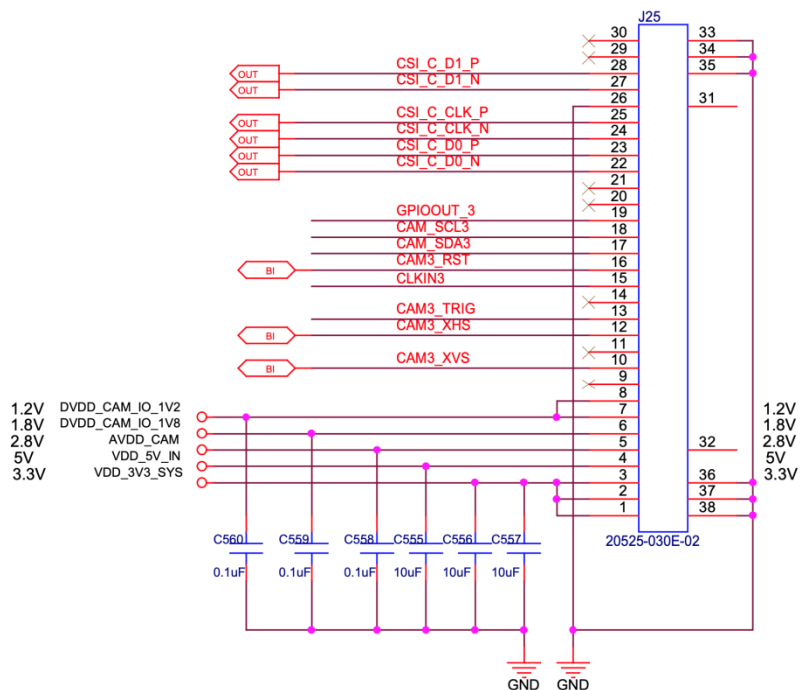
Interface J3 (CAM2)

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



Interface J25 (CAM3)

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

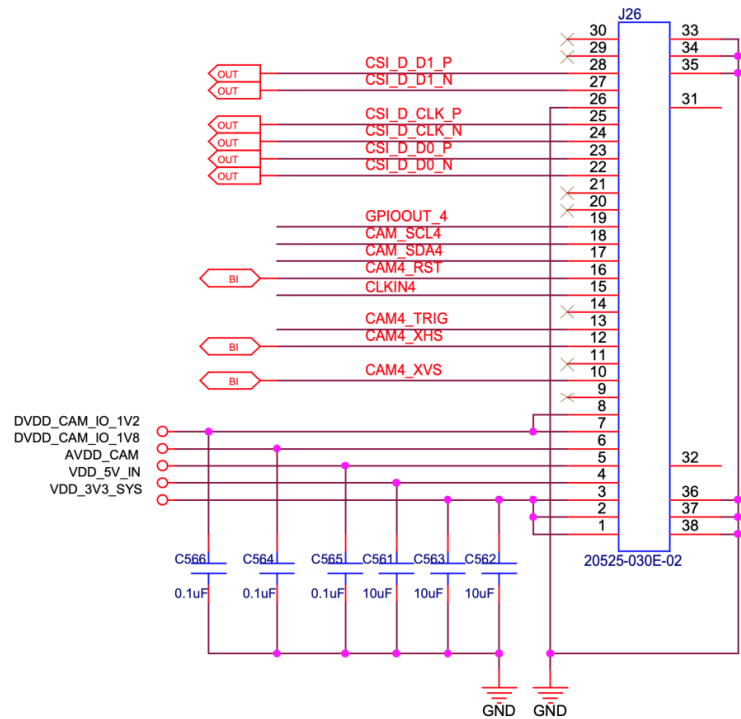


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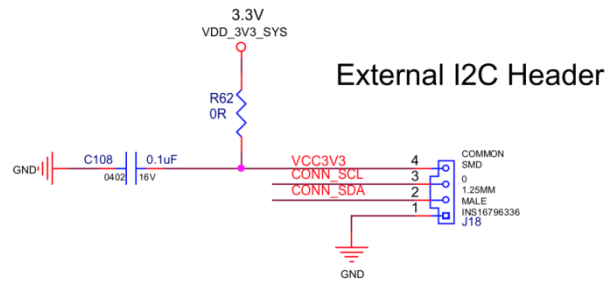
Interface J26 (CAM4)

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



Interface J18 (I2C header)

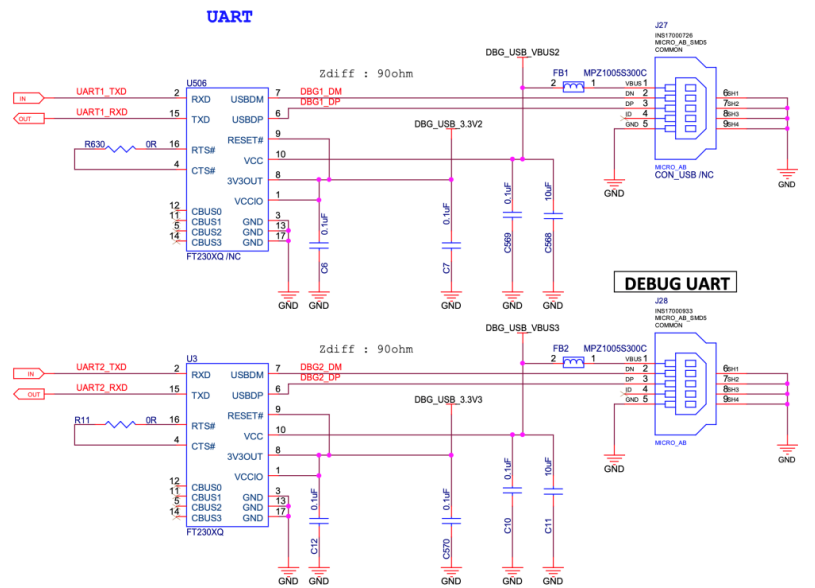
- Number of Positions: 4
- Pitch: 1.25mm



J27, J28 (UART)

- USB 2.0 micro-B interface

Note: R27 is not populated.



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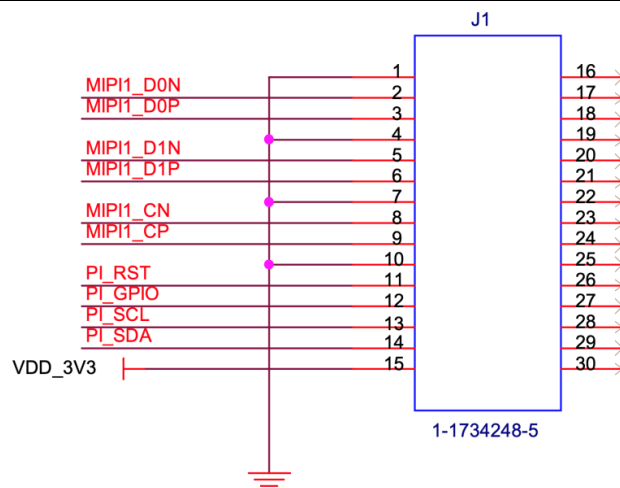
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LI-PI-IPEX-1233-ADPT



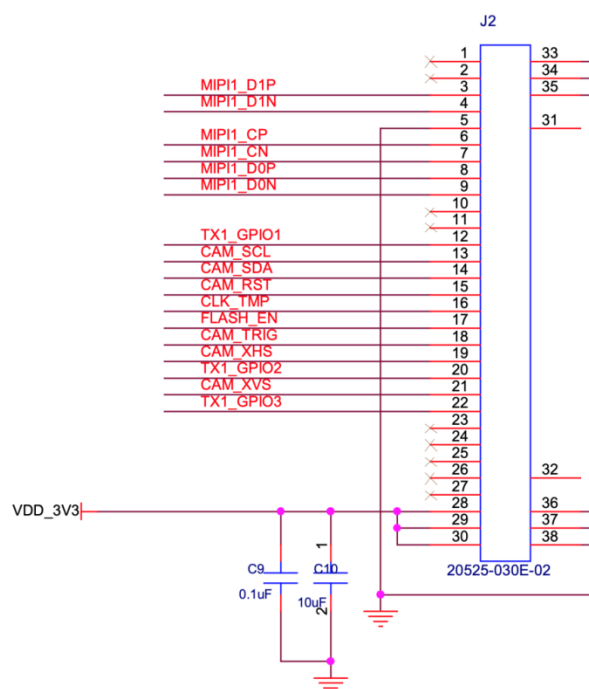
Interface J1 (To camera module)

- Part#: 1-1734248-5
- Number of Positions: 15
- Pitch: 1 mm
- FFC, FCB Thickness: 0.30mm



Interface J2 (To FAW-1233 cable)

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



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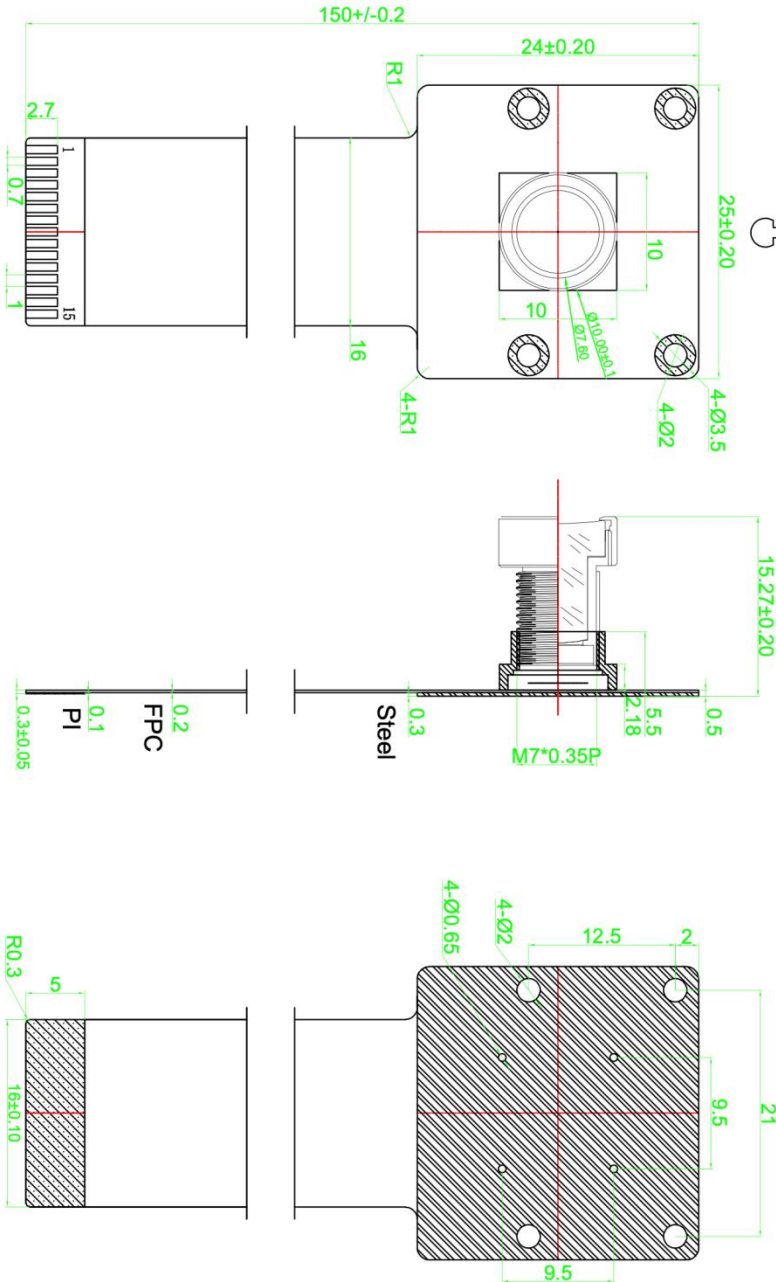
RoHS

LI-IMX219-MIPI-FF-NANO-H90

QR-RD-F002 Rev-A

advert:
basic tolerance: $\pm 0.1\text{mm}$
label have ""'s emphasis dimension

Optical Lens Specification:
Focusing Range 30cm to Infinity
Focal Length 2.3mm
F Number 2.6
Fov(H) 90°
TV Distortion <10%



NO.	SYMBOL
1	GND
2	MDNO
3	MDPO
4	GND
5	MDN1
6	MDP1
7	GND
8	MCN
9	MCP
10	GND
11	RESET
12	FTROBE
13	SCL
14	SDA
15	VCC3.3V

TOP VIEW

SIDE VIEW

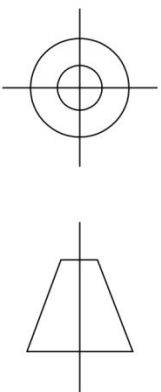
BOTTOM VIEW

Note: # Image direction register use default settings.
Output format: RGB output

NO	变更资料	版本	时间	制作:	时间:	项目名称:	补强:	版本:
	Original	V1.0	2019-02-28		2019-03-20		10F1	1.2
	Change the FPC from 2 layers to 4layers	V1.1	2019-03-09		2019-03-20		比例:	1:1
	Change Lens and Holder	V1.2	2019-03-21		2019-03-20		单位:	MM
				批准:				



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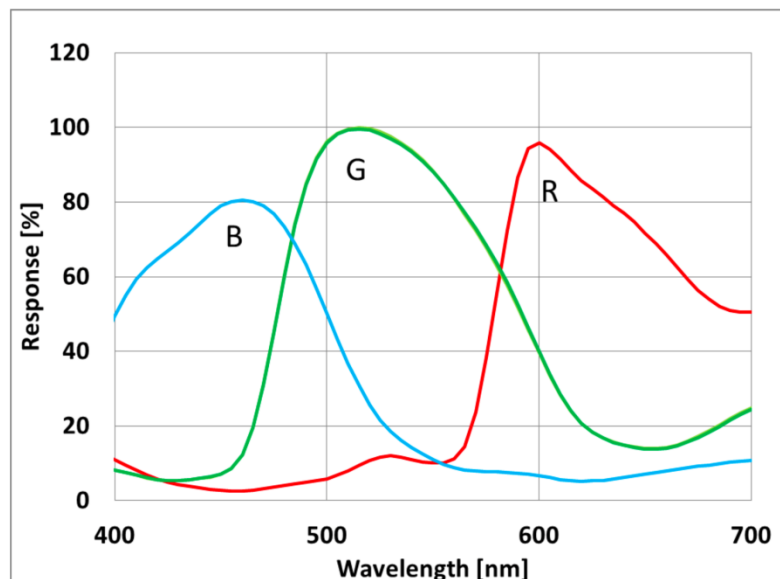
Absolute Maximum Ratings

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply voltage (analogue)	V _{ANA}	-0.3		3.3	V	
Supply voltage (Core)	V _{DDL}	-0.3		2.0	V	
Supply voltage (IF)	V _{DIG}	-0.3		3.3	V	
Input voltage	V _I	-0.3		3.3	V	
Output voltage	V _O	-0.3		3.3	V	
Operating temperature (function)	Topr	-20		60	°C	Junction temperature
Storage temperature	Tstg	-30		80	°C	Junction temperature
Performance guarantee temperature	Tspec	-20		60	°C	Junction temperature

Recommended Operating Conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply voltage (analogue)	V _{ANA}	2.6	2.8	3.0	V	
Supply voltage (Core)	V _{DDL}	1.08	1.2	1.3	V	
Supply voltage (IF)	V _{DIG}	1.62	1.8	1.98	V	

Spectral Sensitivity Characteristics



DC Characteristics

Item	Pins	Symbol	Min.	Typ.	Max.	Unit	Comment
Supply voltage	VDDHFIL1,2	V_{ANA}	2.6	2.8	3.0	V	
	VDDHCM1,2						
	VDDHAN						
	VDDHPL						
	VDDHSN1,2						
	VDDMCO	V_{DIG}	1.62	1.8	1.98	V	
	VDDLSC1-8	V_{DDL}	1.08	1.20	1.30	V	
	VDDL CN1,2						
	VDDLIO1,2						
Digital input/output voltage	SCL, SDA, GPO	VIL	-0.5		$0.3V_{DIG}$	V	
		VIH	$0.7V_{DIG}$		$V_{DIG} + 0.5$	V	
		VOL			$0.25V_{DIG}$	V	
		VOH	$0.75V_{DIG}$			V	
Digital output voltage	FSTROBE	VOL			0.45	V	
		VOH	$V_{DIG} - 0.45$				
Digital input voltage	XCLR, INCK	VIL	-0.3		$0.35V_{DIG}$	V	
		VIH	$0.65V_{DIG}$		$V_{DIG} + 0.3$		

Electrical Characteristics

($V_{ANA} = 3.0\text{ V}$, $V_{DDL} = 1.3\text{ V}$, $V_{DIG} = 1.98\text{ V}$, $T_j = 60\text{ }^{\circ}\text{C}$)

Item	Symbol	Min.	Typ.	Max.	Unit	Comment
Current consumption (Full, 30 frame/s)	IVAVA_strm		33	38	mA	VTmax is max speed read out from pixel array CSI2 4 lanes, V_{ANA} current
	IVDDL_strm		100	160	mA	VTmax is max speed read out from pixel array CSI2 4 lanes, V_{DDL} current Defect Correction, L.S.C. function off
HW-Standby current	ISTB_ana			50	μA	XCLR = Lo, V_{ANA} current
	ISTB_dig			10	μA	XCLR = Lo, V_{DIG} current
	ISTB_iddl			50	μA	XCLR = Lo, V_{DDL} current

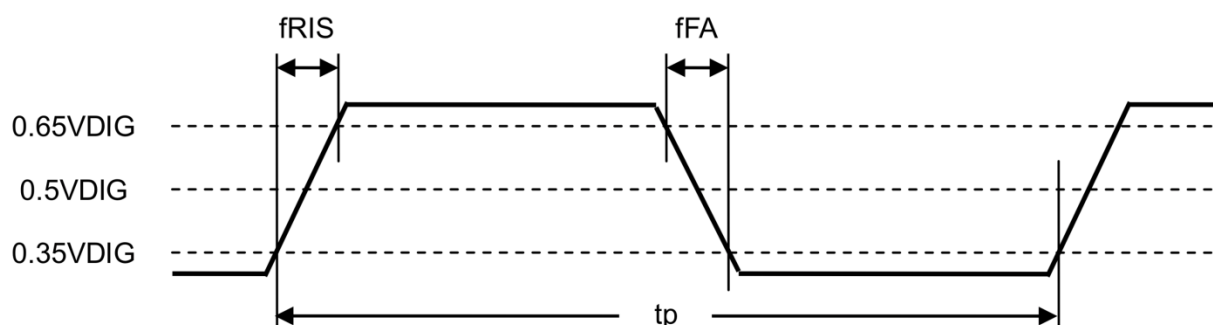


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AC Characteristics

Input specifications are shown below when square-wave inputs directly into the external pin INCK.



Master Clock Square Waveform Input Characteristics

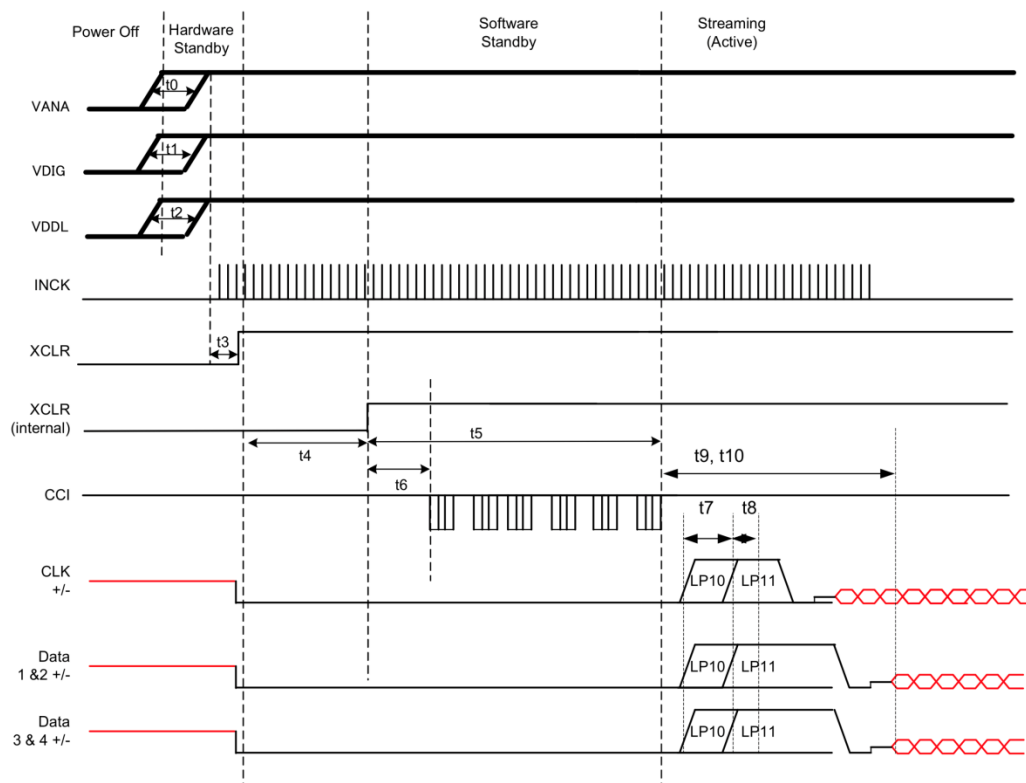
Item	Symbol	Min.	Typ.	Max.	Unit	Comment
Frequency	fSCK	6	18	27	MHz	
jitter (period, peak-to-peak)	Tjitter			600	ps	
Rise Time	fRISE	1		10	ns	
Fall Time	fFALL	1		10	ns	
Duty Cycle	fDUTY	40		60	%	
Input Leakage	fILEAK	-10		10	μA	



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Power-on Sequence



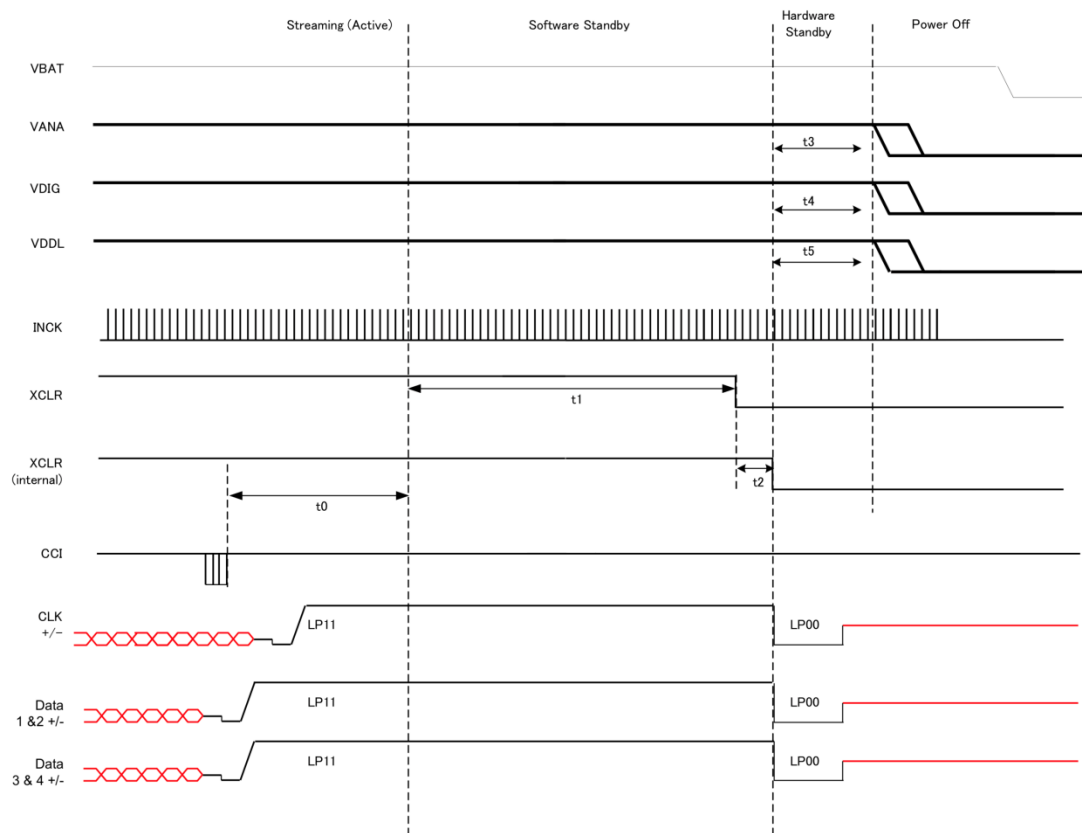
Constraint	Label	Min.	Max.	Units	Comment
Sequence free of VDDs rising	t_0, t_1, t_2	VANA, VDIG, VDDL may rise in any order.		ns	
XCLR rising	t_3	0.5	—	μ s	
Internal XCLR is Low to High after VDDs & XCLR supplied	t_4		200	μ s	
releasing software standby after XCLR Low to High	t_5	6	—	ms	charge up VRL
Initializing time of silicon	t_6	—	32000	clocks	clock is INCK Case of INCK = 6[MHz], 5.3[msec]
D-PHY power-up	t_7	1	1.1	ms	
D-PHY init	t_8	100	110	μ s	
After releasing software standby to data streaming time	t_9	1.2 ms + exposure time	—		
Quick launch up time	t_{10}	—	1	frame	stable time until optimal image quality



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Power-off Sequence



Constraint	Label	Min.	Max.	Units	Comment
Communication end – Software standby	t0		One frame time (*1)	s	Until frame output
Software standby - XCLR H → L	t1	0		ns	
Falling time of internal XCLR after XCLR H → L	t2		10	μs	
VANA falling - VDIG falling - VDDL falling	t3,t4,t5		VANA, VDIG and VDDL may fall in any order.	ns	



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Revision History

Revision	Description	Release Date
1.0	First Release	3. Feb. 2020



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