



LEOPARD IMAGING INC

Rev 1.0

LI-JETSON-KIT-IMX577M12-X

Data Sheet

Key Features

- Compatible with Nvidia Jetson TX1/TX2 Development Kit
- MIPI CSI-2 interface
- Support up to six cameras
- Two adapter board options
 - LI-JTX1-MIPI-ADPT
Includes three 4-lane interface
 - LI-JTX1-MIPI-ADPT-6CAM
Includes six 2-lane interface
- Sony Diagonal 7.857 mm (Type 1/2.3) CMOS Image Sensor IMX577
- Active pixels: 4056H x 3040V
- Pixel size: 1.55 um x 1.55 um
- Color camera
- Length of the I-PEX cable: 300mm
- Support multiple length cables
- Connector Part#: 20525-030E-02C
- Support M12 x P0.5 lens
- Provide customization services

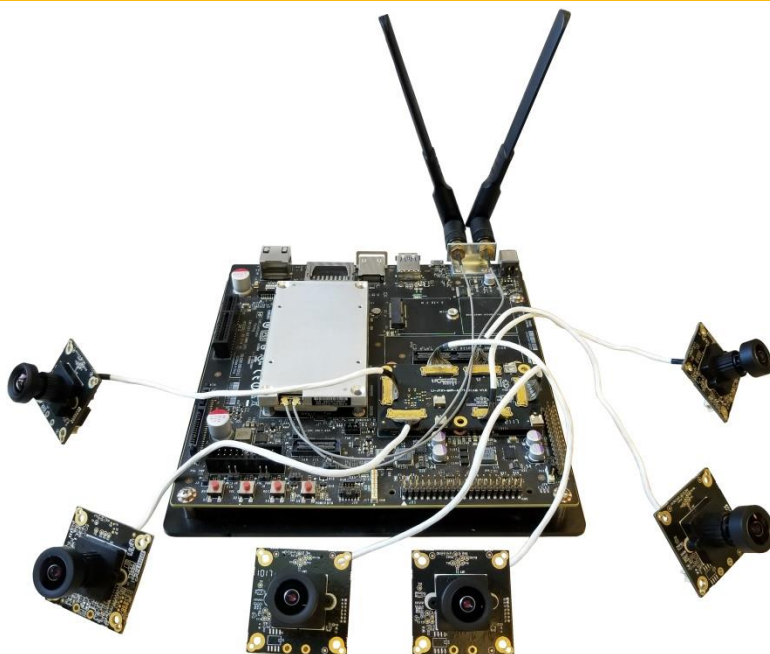
■ Part#:

(1 cam) **LI-JETSON-KIT-IMX577M12**

(2 cam) **LI-JETSON-KIT-IMX577M12-D**

(3 cam) **LI-JETSON-KIT-IMX577M12-T**

(6 cam) **LI-JETSON-KIT-IMX577M12-H**



Lens Spec

- Model: SYD1201A
- Focal length: 3.7 mm
- Aperture, F/#: 2.8 +/- 5%
- Built in 650nm IR cut filter
- FOV (D/H/V): 100 °/ 86 °/69 °
- TV Distortion: -1.0 %

BOM

Nvidia TX1/TX2 Development Kit not included

#	Items	QTY
1	LI-JTX1-MIPI-ADPT or LI-JTX1-MIPI-ADPT-6CAM	1
2	LI-IMX577-MIPI-M12	1,2,3 or 6
3	FAW-1233-03 cable	1,2,3 or 6



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LI-JETSON-KIT-IMX577M12

BOM

#	Items	QTY
1	LI-JTX1-MIPI-ADPT	1
2	LI-IMX577-MIPI-M12	1
3	FAW-1233-03 cable	1



LI-JETSON-KIT-IMX577M12-D

BOM

#	Items	QTY
1	LI-JTX1-MIPI-ADPT	1
2	LI-IMX577-MIPI-M12	2
3	FAW-1233-03 cable	2



LI-JETSON-KIT-IMX577M12-T

BOM

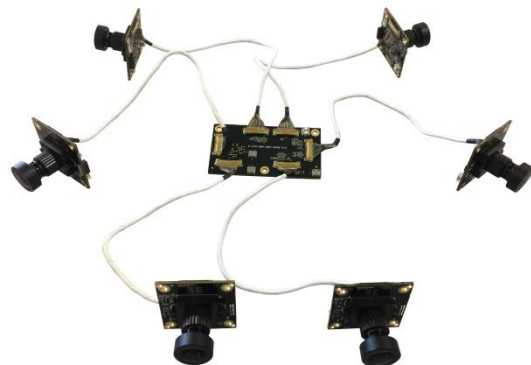
#	Items	QTY
1	LI-JTX1-MIPI-ADPT	1
2	LI-IMX577-MIPI-M12	3
3	FAW-1233-03 cable	3



LI-JETSON-KIT-IMX577M12-H

BOM

#	Items	QTY
1	LI-JTX1-MIPI-ADPT-6CAM	1
2	LI-IMX577-MIPI-M12	6
3	FAW-1233-03 cable	6

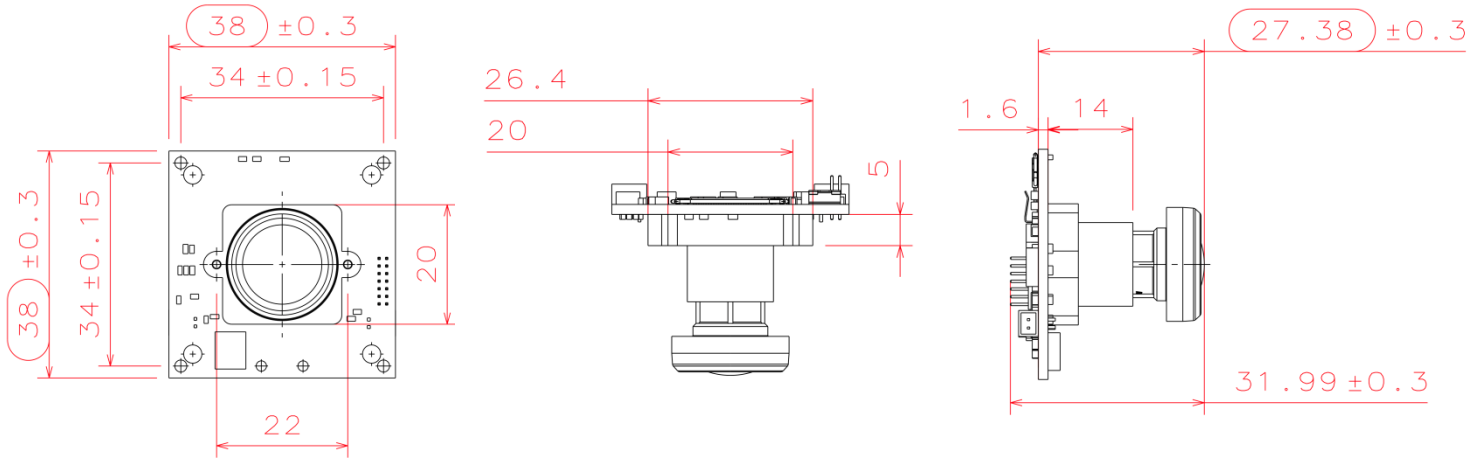


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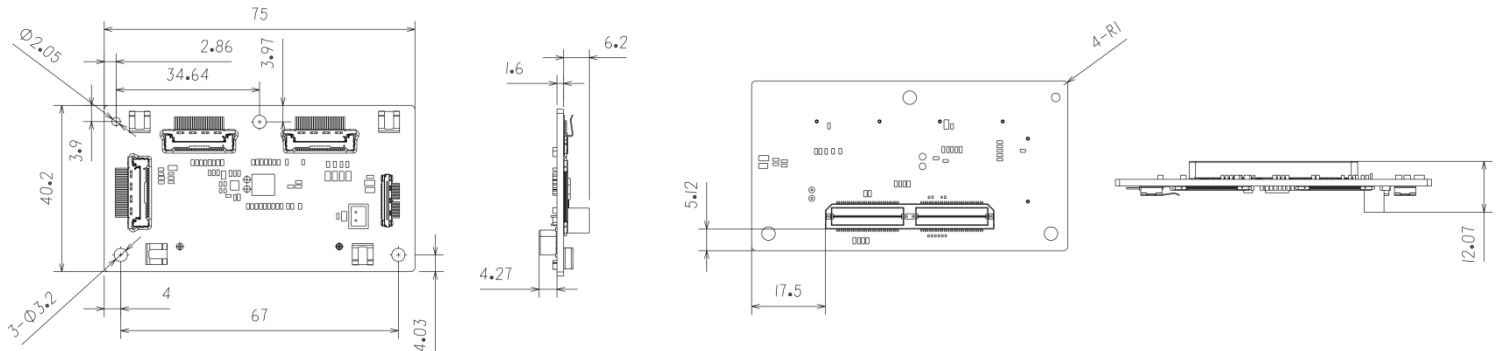
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Dimensions

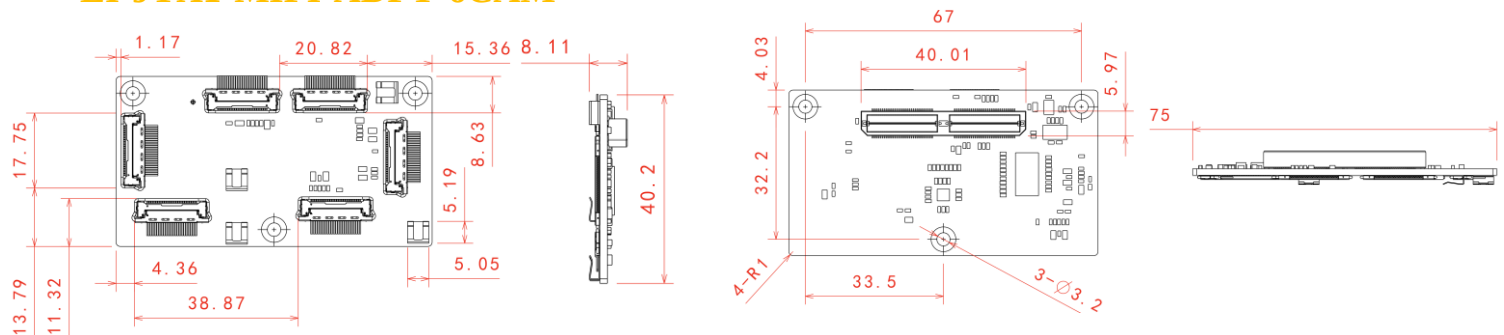
LI-IMX577-MIPI-M12



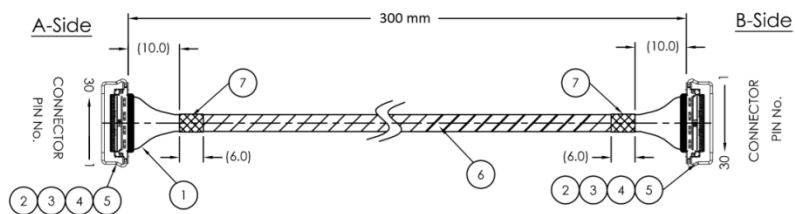
LI-JTX1-MIPI-ADPT



LI-JTX1-MIPI-ADPT-6CAM



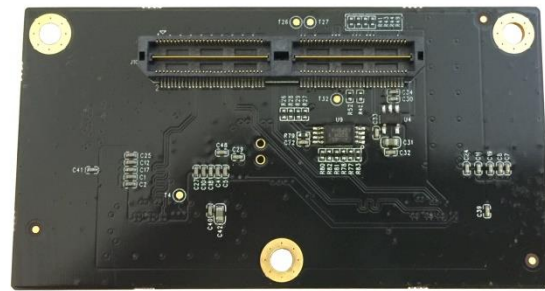
FAW-1233-03



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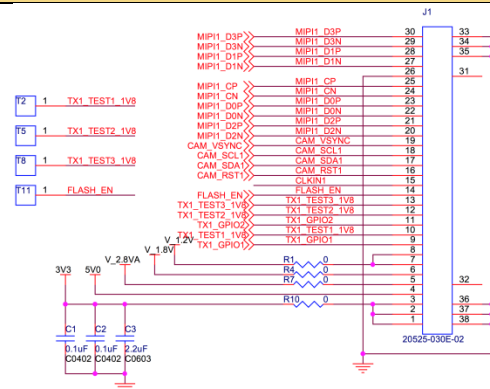
LI-JTX1-MIPI-ADPT



Interfaces

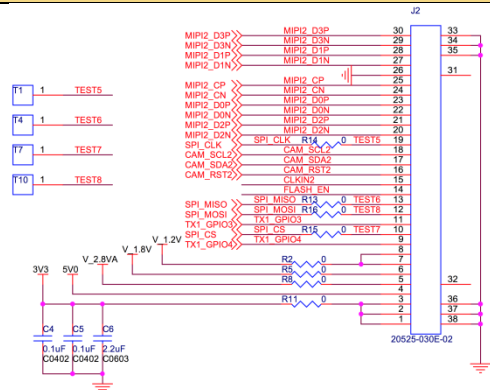
Interface J1

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



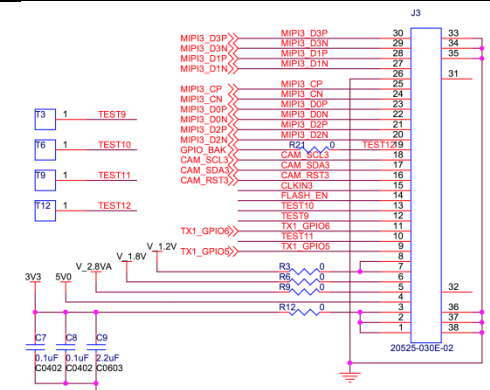
Interface J2

- 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)



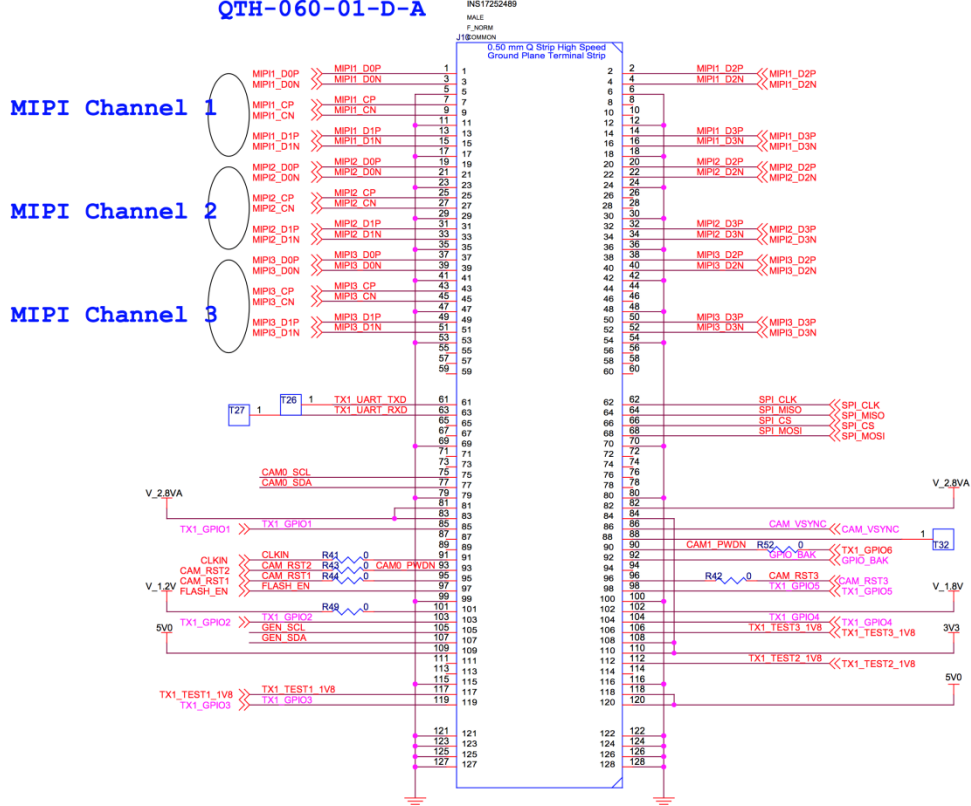
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Interface J10

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

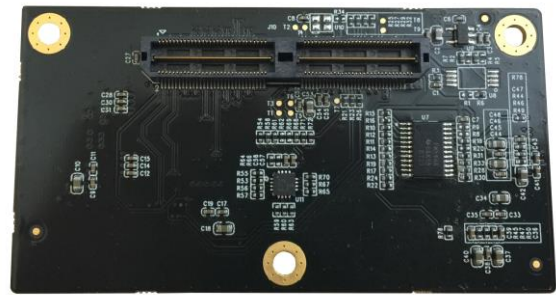
Vertical Mating connector of Jetson TX1 J22 QTH-060-01-D-A



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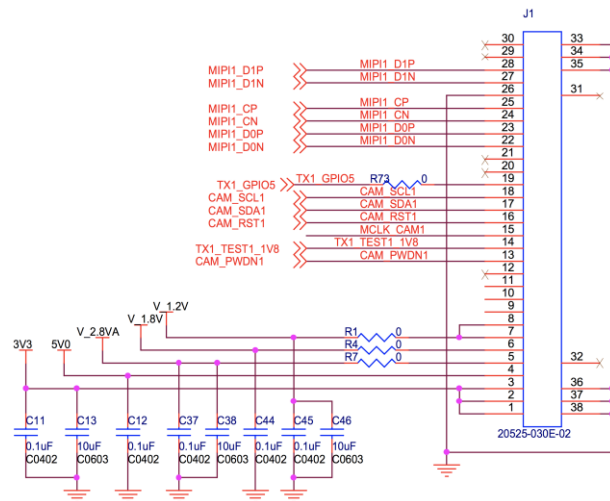
LI-JTX1-MIPI-ADPT-6CAM



Interfaces

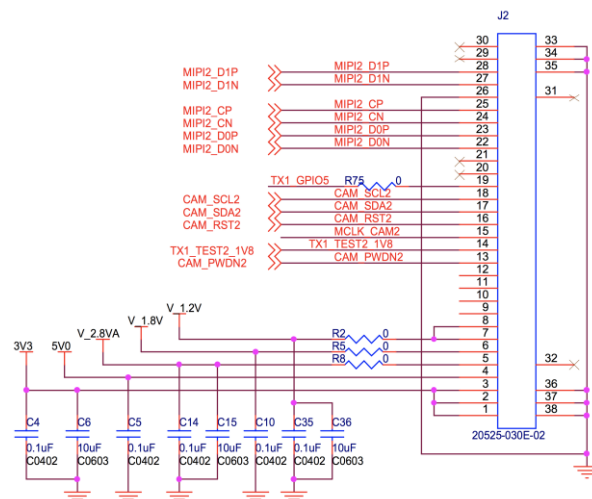
Interface J1

- 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)

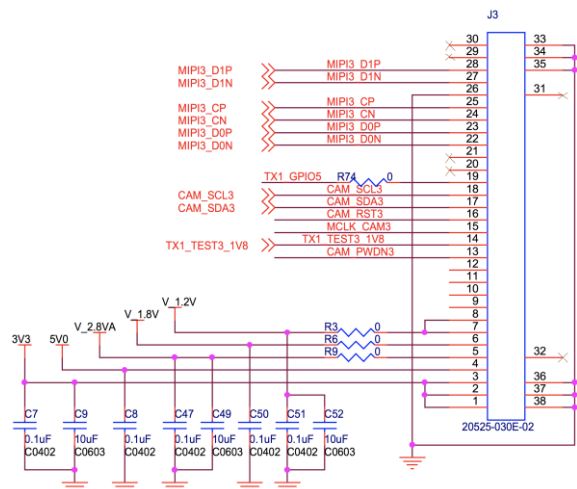


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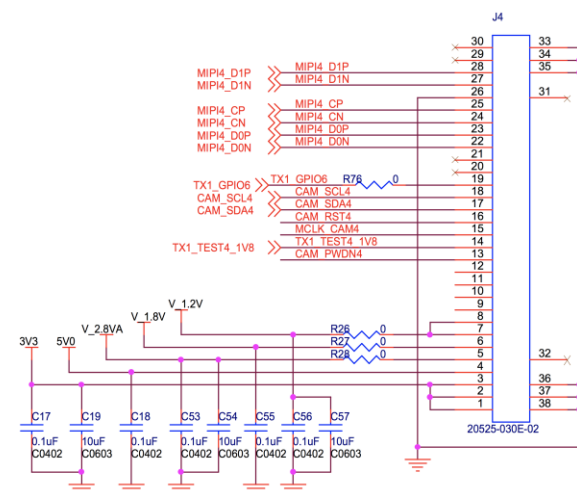
Interface J3

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



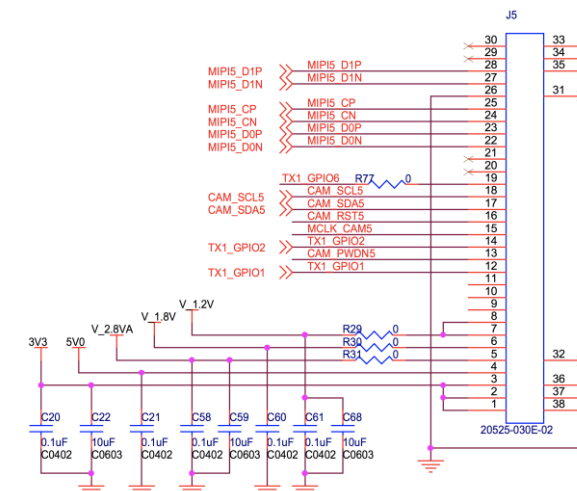
Interface J4

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



Interface J5

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

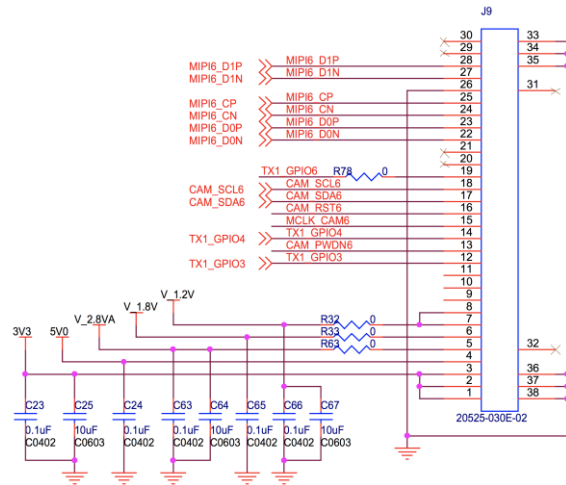


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Interface J9

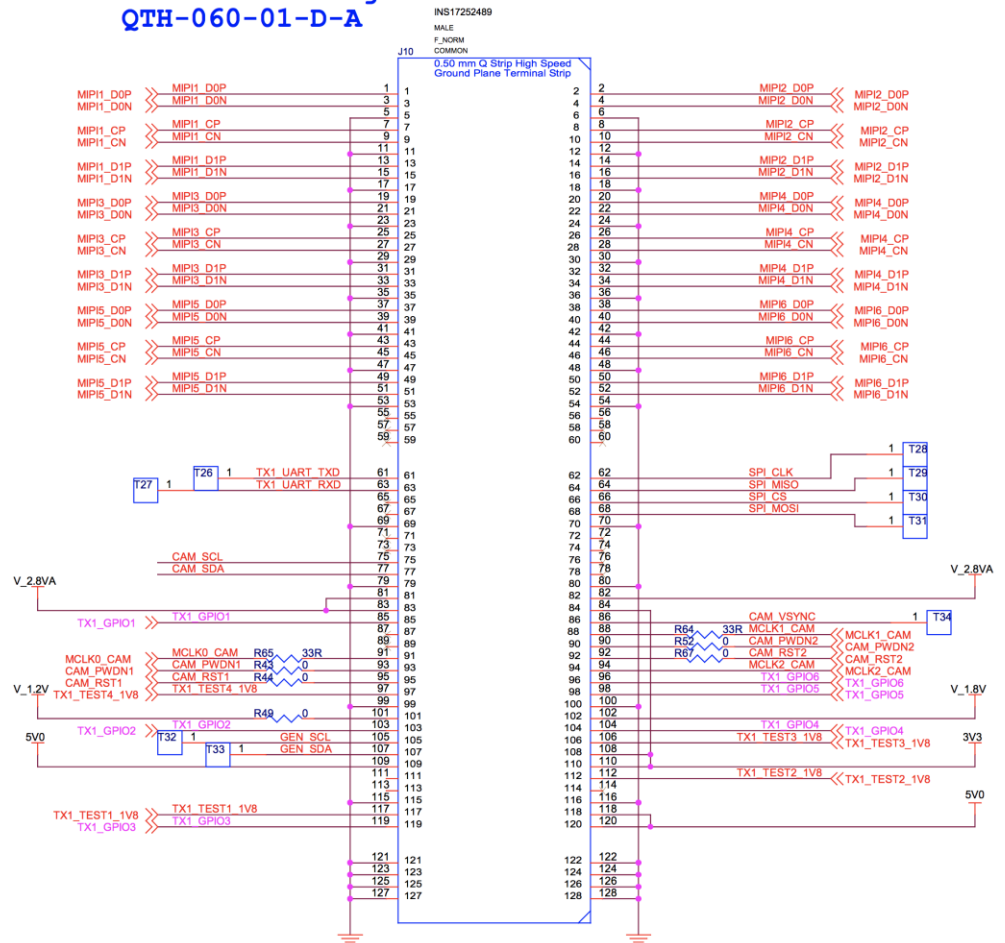
- Part#: 20525-030E-02C
 - Number of Positions: 30
 - Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



Interface J10

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

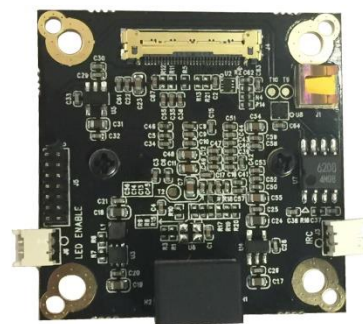
Vertical Mating connector of Jetson TX1 J22 QTH-060-01-D-A



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LI-IMX577-MIPI-M12



Camera Spec	
Image Sensor	Sony Diagonal 7.857 mm (Type 1/2.3) CMOS Image Sensor IMX577
Optical format	1/2.3"
Number of active pixels	4056 (H) x 3040(V)
Pixel size	1.55um (H) x 1.55um (V)
Color or Mono	Color
Interface	MIPI interface
Lens mount	M12
Weight	14 g
Interfaces	
Interface J3: ■ Part#: 20525-030E-02C ■ Number of Positions: 30 ■ Pitch: 0.4mm ■ Mating I-PEX cable: FAW-1233-03 (300mm)	The schematic for Interface J3 shows a 30-pin connector (J3) connected to various components. Pins 1-4 are GPO, STROBE, XVS, and CAM_RST respectively. Pins 6-11 are MIPI D/P/N signals. Pins 13-14 are CAM SCL and CAM SDA. Pins 15-16 are CAM RST and CLK_TMP. Pins 17-18 are FLASH_EN and GPO. Pins 19-21 are TX1 GPIO signals. Pins 23-24 are 2V8A1V8 and 3V3. Pins 26-28 are 5V0 and 0.1uF capacitors. Pins 30-31 are 0.1uF and 16V capacitors. The connector is labeled 20525-030E-02C.
Interface J4: ■ Part#: 1734829-2 ■ Number of Positions: 2 ■ Pitch: 1.25mm	The schematic for Interface J4 shows a 2-pin connector (J4) connected to IRC_DRIVE+ and IRC_DRIVE- signals. Pin 1 is connected to IRC_DRIVE- via a 0.1uF capacitor (C62). Pin 2 is connected to IRC_DRIVE+ via a resistor (R31) and a 0 ohm jumper. The connector is labeled CON2-1.25RAT.
Interface J1: ■ Part#: 1734829-2 ■ Number of Positions: 2 ■ Pitch: 1.25mm	The schematic for Interface J1 shows a 2-pin connector (J1) connected to a FLASH_EN signal. Pin 1 is connected to ground. Pin 2 is connected to FLASH_EN. The connector is labeled CON2-1.25RAT.



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Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	V _{ANA}	-0.3 to +3.3	V	refer to V _{SS} level
Supply voltage (digital)	V _{DIG}	-0.3 to +1.8	V	
Supply voltage (interface)	V _{IF}	-0.3 to +3.3	V	
Input voltage (digital)	V _I	-0.3 to +3.3	V	
Output voltage (digital)	V _O	-0.3 to +3.3	V	
Guaranteed operating temperature	T _{OPR}	-20 to +75	°C	
Guaranteed storage temperature	T _{STG}	-30 to +80	°C	
Guaranteed performance temperature	T _{SPEC}	-20 to +60	°C	

Recommended Operating Conditions

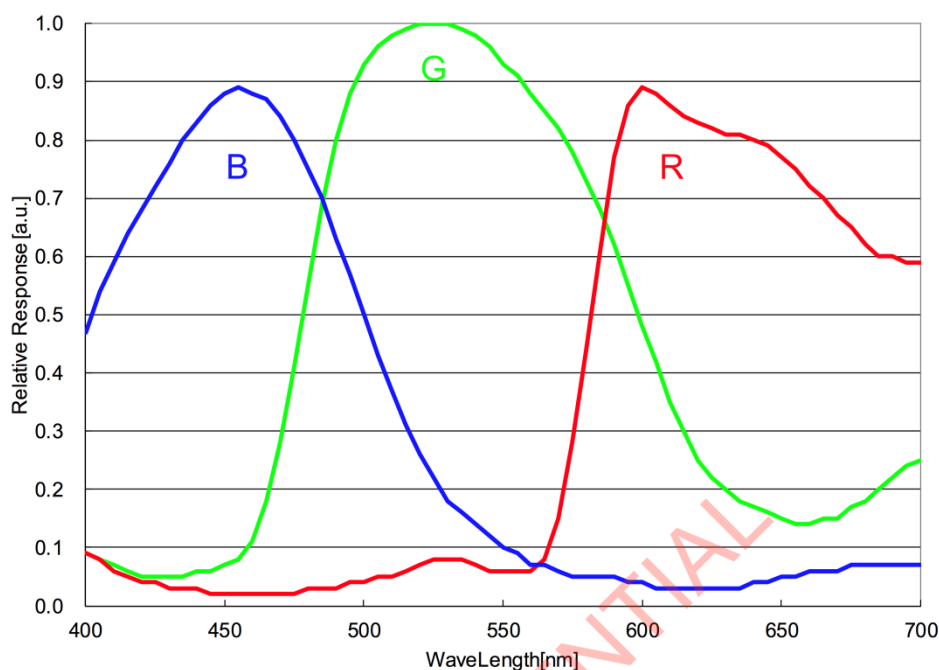
Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	V _{ANA} ^{*1}	2.8 ± 0.1	V	refer to V _{SS} level
Supply voltage (digital)	V _{DIG} ^{*2}	1.05 ± 0.1	V	
Supply voltage (interface)	V _{IF} ^{*3}	1.8 ± 0.1	V	

^{*1} V_{ANA}: V_{DDSUB}, V_{DDHAN}, V_{DDHCM1} to 2, V_{DDHSN1} to 4 (2.8 V power supply)

^{*2} V_{DIG}: V_{DDLSC1} to 4, V_{DDLCN1} to 2, V_{DDLPL1} to 2, V_{DDLIF} (1.05 V power supply)

^{*3} V_{IF}: V_{DDMIO1} to 2, V_{DDMIF} (1.8 V power supply)

Spectral Sensitivity Characteristics



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DC Characteristics

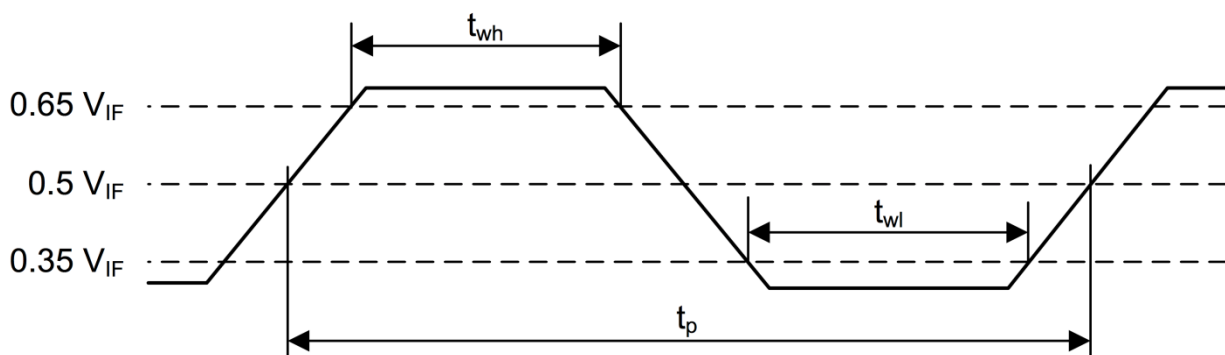
Item	Pins	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	V _{DD} SUB, V _{DD} HCM1 to 2, V _{DD} HSN1 to 4, V _{DD} HAN	V _{ANA}		2.7	2.8	2.9	V
	V _{DD} LCN1 to 2, V _{DD} LSC1 to 4, V _{DD} LIF, V _{DD} LPL1 to 2	V _{DIG}		0.95	1.05	1.15	V
	V _{DD} MIO1 to 2, V _{DD} MIF	V _{IF}		1.7	1.8	1.9	V
Digital input voltage	SDA,	V _{IH}		0.7 V _{IF}		2.9	V
	SCL	V _{IL}		- 0.3		0.3 V _{IF}	V
Digital input voltage	XCLR, INCK, GYINT,	V _{IH}		0.65 V _{IF}		V _{IF} + 0.3	V
	SDI,SLASEL	V _{IL}		- 0.3		0.35 V _{IF}	V
Digital output voltage	SDA	V _{OH}		V _{IF} - 0.4			V
		V _{OL}				0.4	V
Digital output voltage	GPO,SDO, SCSB, FSTROBE	V _{OH}		V _{IF} - 0.4			V
		V _{OL}				0.4	V



AC Characteristics

Master Clock Square Waveform Input Diagram

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

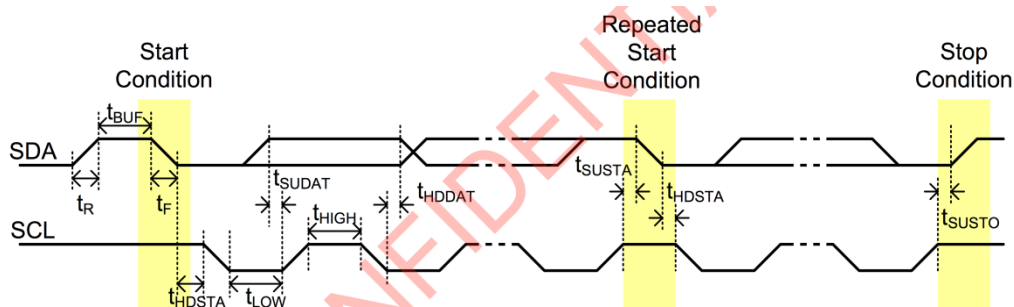


Master Clock Square Waveform Input Characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
INCK clock frequency	f_{SCK}	6		27	MHz
INCK clock period	t_p	37.0		166.7	ns
INCK low level width	t_{wl}	$0.4 t_p$		$0.6 t_p$	ns
INCK high level width	t_{wh}	$0.4 t_p$		$0.6 t_p$	ns
INCK jitter	T_{jitter}			600	ps



2-wire serial communication block characteristics



2-wire serial communication block specification

Parameter	Symbol	Conditions	Min. (Fast-mode Plus)	Max. (Fast-mode Plus)	Unit
Low level input voltage	V_{IL}		-0.5	0.3 V_{IF}	V
High level input voltage	V_{IH}		0.7 V_{IF}	2.9	V
Low level output voltage	V_{OL1}	$V_{IF} > 2$ V, Sink 3 mA	0	0.4	V
	V_{OL2}	$V_{IF} < 2$ V, Sink 3 mA	0	0.2 V_{IF}	V
Output fall time	t_{of}	Load 10 pF – 400 pF, 0.7 $V_{IF} \rightarrow$ 0.3 V_{IF}		250 (120)	ns
Input current	I_I	0.1 $V_{IF} \rightarrow$ 0.9 V_{IF}	-10	10	μ A
SDA I/O capacitance	$C_{I/O}$			10	pF
SCL Input capacitance	C_I			10	pF

2-wire serial communication block AC specification

Parameter	Symbol	Min. (Fast-mode Plus)	Max. (Fast-mode Plus)	Unit
SCL clock frequency	f_{SCL}	0	400 (1000)	kHz
Rise time (SDA and SCL)	t_R	—	300 (120)	ns
Fall time (SDA and SCL)	t_F	—	300 (120)	ns
Hold time (start condition)	t_{HDSTA}	0.6 (0.26)	—	μ s
Setup time (rep.-start condition)	t_{SUSTA}	0.6 (0.26)	—	μ s
Setup time (stop condition)	t_{SUSTO}	0.6 (0.26)	—	μ s
Data setup time	t_{SUDAT}	100 (50)	—	ns
Data hold time	t_{HDDAT}	0	—	μ s
Bus free time between Stop and Start condition	t_{BUF}	1.3 (0.5)	—	μ s
Low period of the SCL clock	t_{LOW}	1.3 (0.5)	—	μ s
High period of the SCL clock	t_{HIGH}	0.6 (0.26)	—	μ s

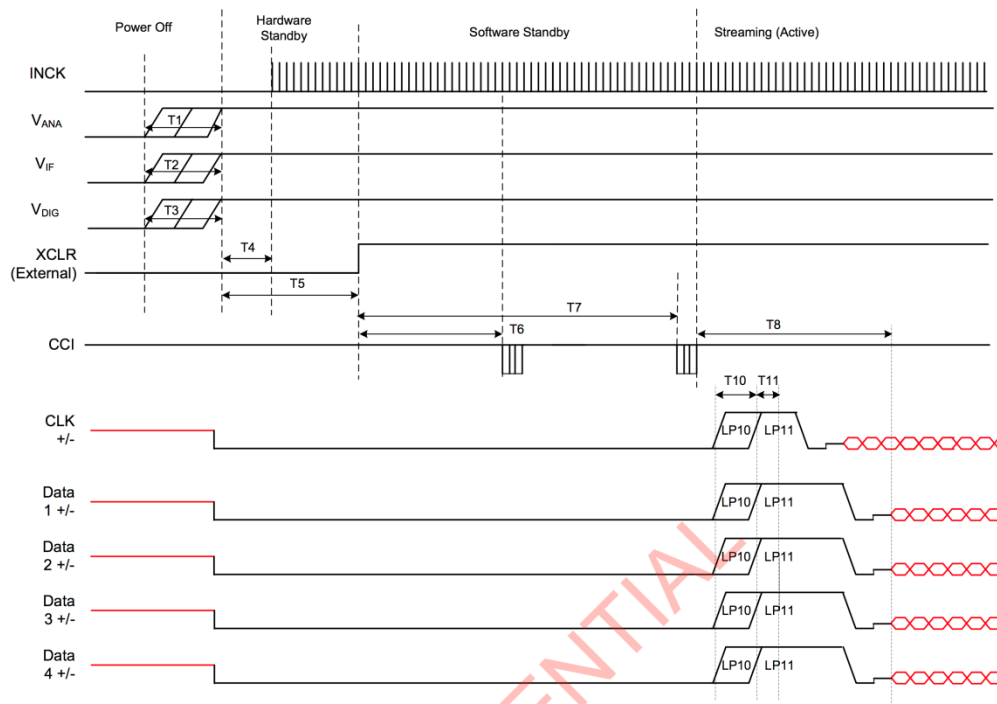
Note) Fast-mode Plus supports only available with INCK $\geq$ 8.0 MHz



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Power-on Sequence



Item	Label	Min.	Max.	Unit	Comment
V _{ANA} rising – V _{ANA} ON	T1	V _{ANA} and V _{IF} and V _{DIG} may rise in any order.		μs	Slew rate of V _{ANA} , V _{IF} and V _{DIG} (0 % - 100 %): Max. 50 mV/μs
V _{IF} rising – V _{IF} ON	T2			μs	
V _{DIG} rising – V _{DIG} ON	T3			μs	
V _{ANA} and V _{IF} and V _{DIG} rising - INCK start	T4	0		μs	Presence of INCK during Power off is acceptable
V _{ANA} and V _{IF} and V _{DIG} rising - XCLR rising	T5	0		ms	After T1, T2 and T3
INCK start and XCLR rising till CCI Read version ID register wait time	T6	0.6		ms	
INCK start and XCLR rising till Send Streaming Command wait time (To complete reading all parameters from NVM)	T7	8		ms	
Start of first streaming from Sending Streaming Command.	T8		4.0 ms + The delay of the coarse integration time value		
D-PHY power up	T10	1	1.1	ms	
D-PHY init.	T11	100	110	μs	

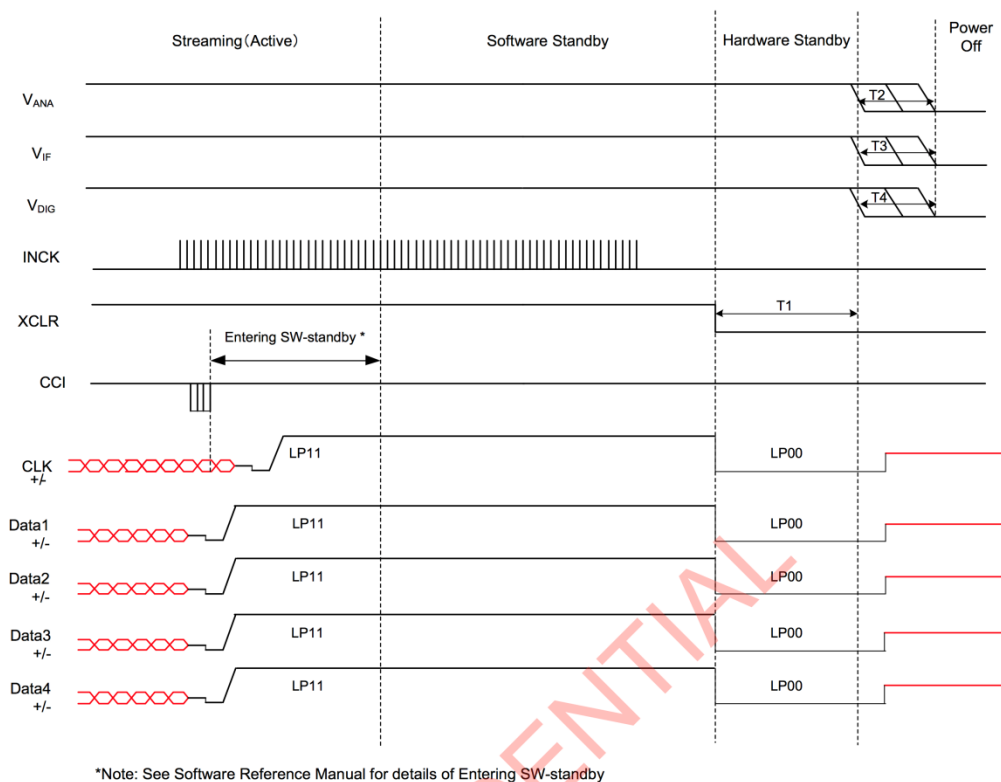
Note) XCLR needs to be Low until all power supplies complete power-on



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Power-off Sequence



Item	Label	Min.	Max.	Unit	Comment
XCLR Neg-edge - V _{ANA} (V _{IF} or V _{DIG}) fall	T1	0		μs	Presence of INCK during Power Off is acceptable.
Sequence free of V _{ANA} falling and V _{IF} falling and V _{DIG} falling	T2,T3,T4	V _{ANA} and V _{IF} and V _{DIG} may fall in any order.		μs	



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