LI-IMX219-MIPI-FF-NANO SPECIFICATION

Model:
LI-IMX219-MIPI-FF-NANO-H90
LI-IMX219-MIPI-FF-NANO-H136
LI-IMX219-MIPI-FF-NANO-H145

Rev 1.4
Leopard Imaging Inc.

Contents

Version History

Version	Description	Release Date
1.0	First Release	16. Mar. 2019
1.1	Add H90 and H135 version	22. Mar. 2019
1.2	Update the dimensions of H90 and H135 modules	14. Apr. 2019
1.3	Remove H135 module	26. Apr. 2019
1.4	Add H136 module	18. Oct. 2019

Key Information

Module Part#		LI-IMX219-MIPI-FF-NANO
Compatible Platform		NVIDIA® Jetson Nano™ Developer Kit
Module Size	H90	150.0 mm (L) x 25.0 mm (W) x 15.27 mm(H)
	H136	150.0 mm (L) x 25.0 mm (W) x 15.3 mm(H)
	H145	150.0 mm (L) x 25.0 mm (W) x 14.1 mm(H)
Sensor Type		Sony IMX219 8.08MP Color sensor
Active Pixels		3280 (H) x 2464 (V)
Image Size		Diagonal 4.60 mm (Type 1/4.0)
F/No		2.6 (H90) / 2.0 (H136) / 2.5 (H145)
Focal Length		2.3mm (H90) / 1.58mm (H136) / 1.55 mm (H145)
FOV		90 ℉(H) / 136 ℉(H) /145 ℉(H)
TV Distortion		< -10% (H90) / < -15%(H136) / < -15% (H145)
Focusing Range		30cm - Infinity
Pixel size		1.12 um x 1.12 um
IR Cutter Filter		Yes
Temperature Range	Operating	-20 ℃ to +60 ℃
	Storage	-30 ℃ to +80 ℃
Data Output Interface		CSI-2 MIPI 2-lane
Maximum Image Transfer Rate		3280 x 2464 @ 21fps
Mating Connector	Part#	1-1734248-5
	Number of Positions	15
	Pitch	0.039" (1.00mm)

Pin Assignment

No.	Name	Pin type	Description
1	GND	Ground	
2	MDN0	O	MIPI data positive output
3	MDP0	O	MIPI data negative output
4	GND	Ground	
5	MDN1	O	MIPI data positive output
6	MDP1	O	MIPI data negative output
7	GND	Ground	
8	MCN	O	MIPI clock negative output
9	MCP	O	MIPI clock positive output
10	GND	Ground	
11	RESET	I	Reset
12	FSTROBE	O	Strobe output
13	SCL	I	
14	SDA	I/O	
15	VCC3.3V	Power	

Sensor Specifications

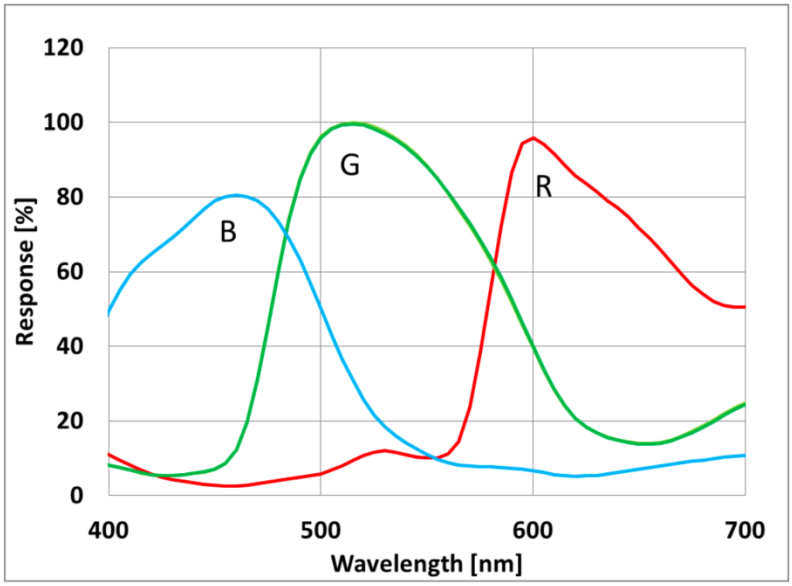
1. Absolute Maximum Ratings

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

2. 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	

3. Spectral Sensitivity Characteristics



4. 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	
	VDDLCN1,2						
	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		

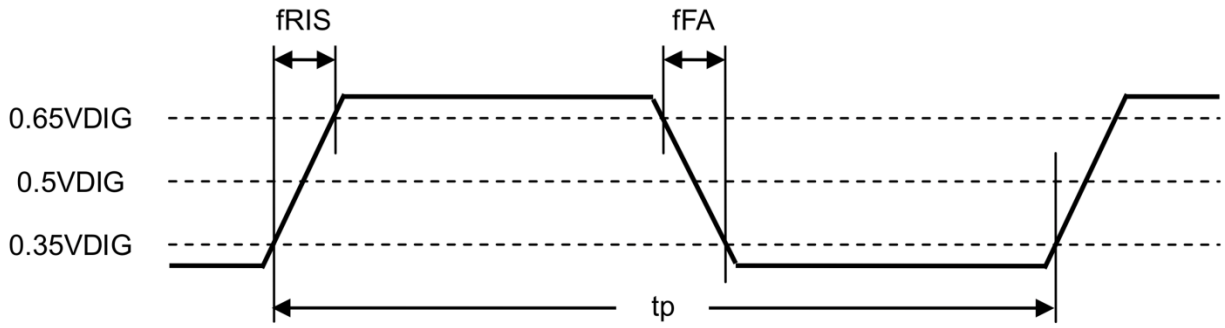
5. Electrical Characteristics

(V_{ANA} = 3.0 V, V_{DDL} = 1.3 V, V_{DIG} = 1.98 V, Tj = 60 ˚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_lddl			50	μA	XCLR = Lo, V_{DDL} current

6. AC Characteristics

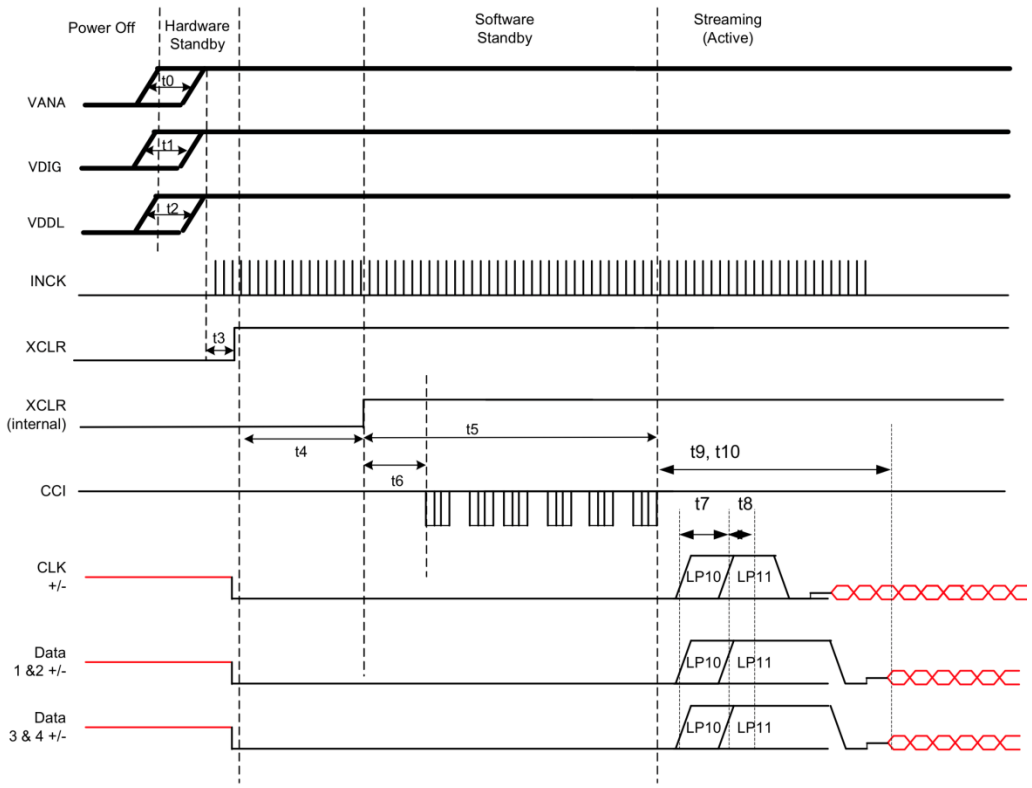
Input specifications are shown below when square-wave inputs directly into the external pin INCK.



Master Clock Square Waveform Input Characteristics

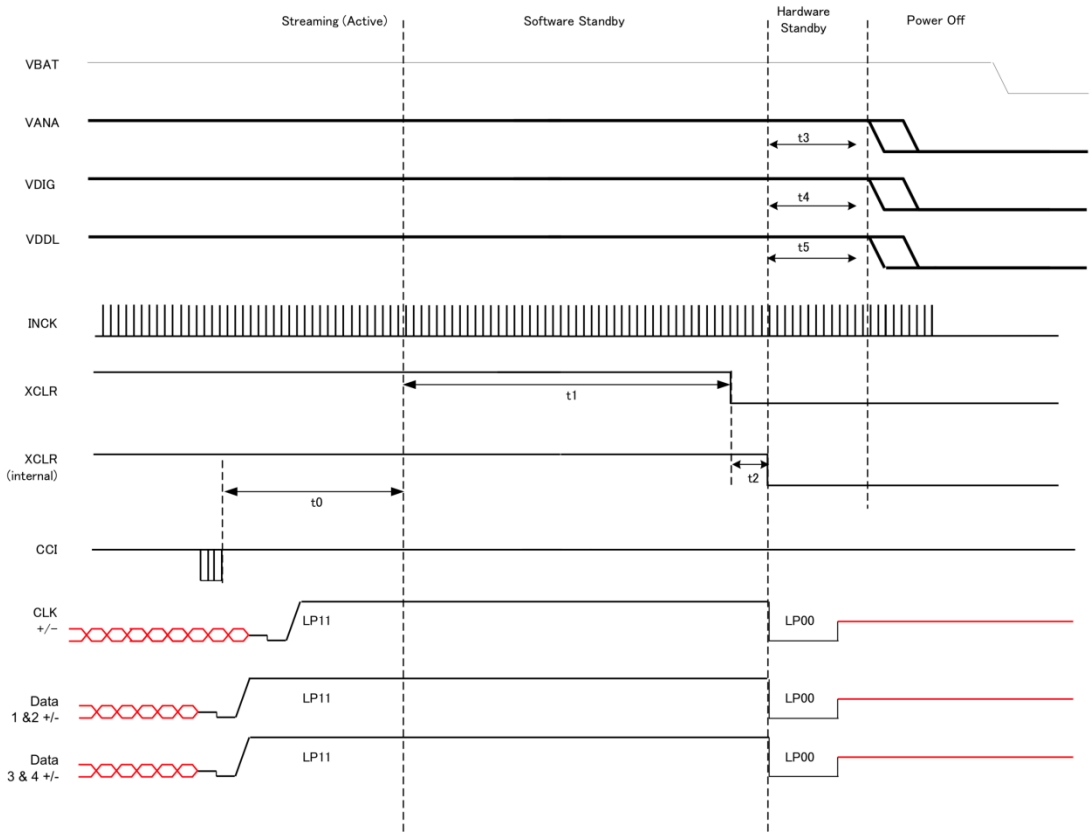
Item	Symbol	Min.	Typ.	Max.	Unit	Comment
Frequency	fSCK	6	18	27	MHz	
jitter (period, peak-to-peak)	Tjitter			600	ps	
Rise Time	fRISE	1		10	ns	
Fall Time	fFALL	1		10	ns	
Duty Cycle	fDUTY	40		60	%	
Input Leakage	fILEAK	-10		10	μA	

7. Power On Sequence

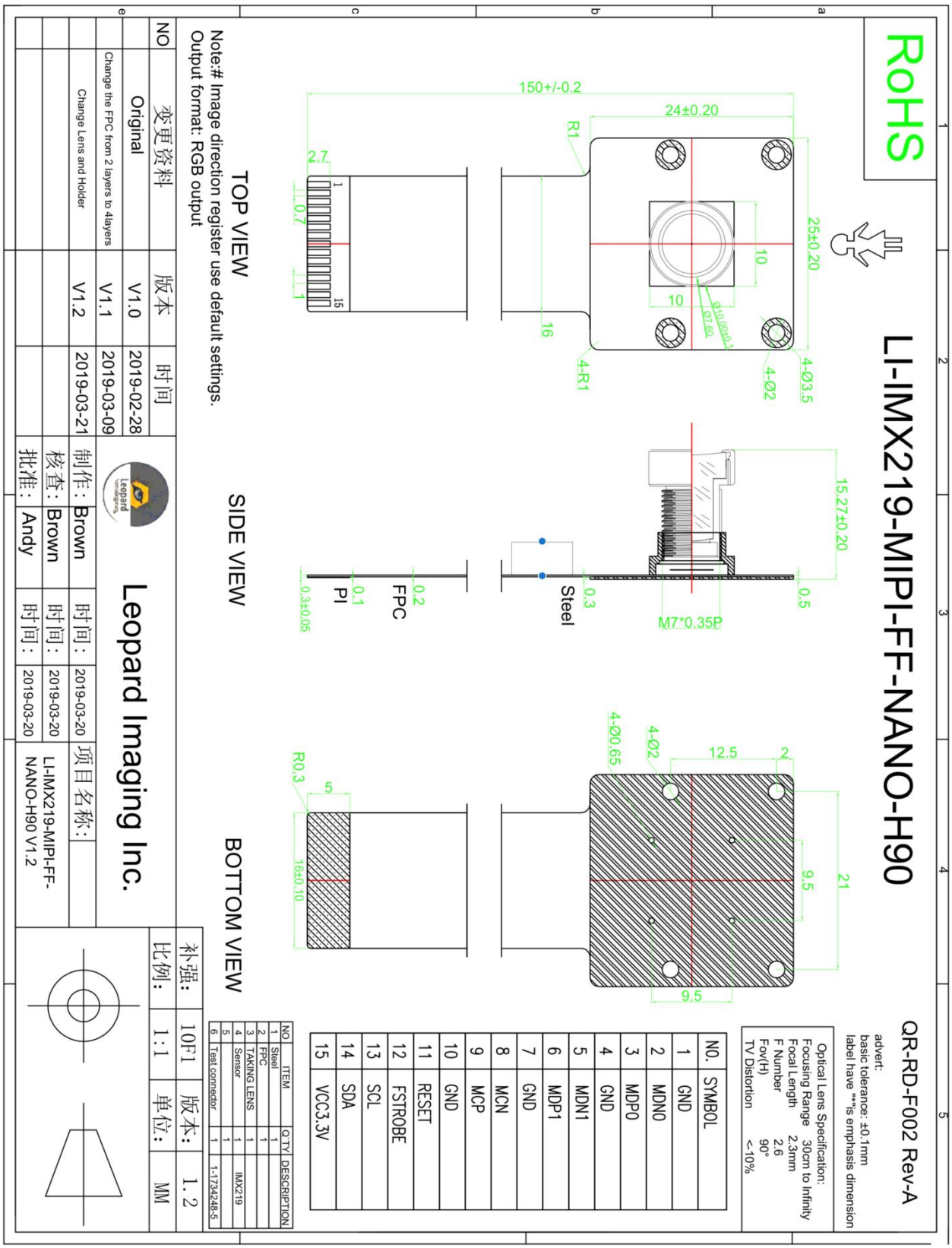


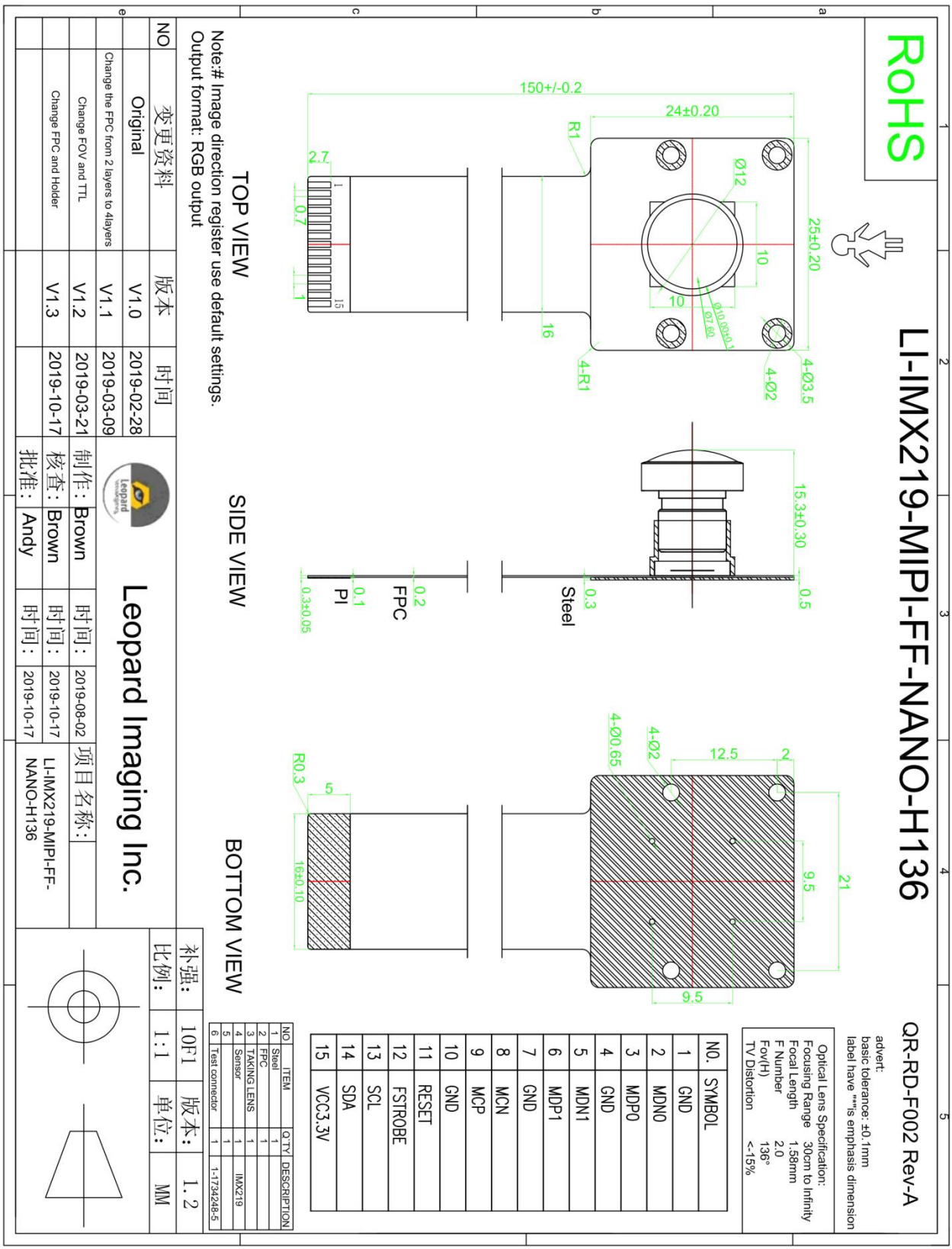
Constraint	Label	Min.	Max.	Units	Comment
Sequence free of VDDs rising	t0, t1, t2	VANA, VDIG, VDDL may rise in any order.		ns	
XCLR rising	t3	0.5	—	µs	
Internal XCLR is Low to High after VDDs & XCLR supplied	t4		200	µs	
releasing software standby after XCLR Low to High	t5	6	—	ms	charge up VRL
Initializing time of silicon	t6	—	32000	clocks	clock is INCK Case of INCK = 6[MHz], 5.3[msec]
D-PHY power-up	t7	1	1.1	ms	
D-PHY init	t8	100	110	µs	
After releasing software standby to data streaming time	t9	1.2 ms + exposure time	—		
Quick launch up time	t10	—	1	frame	stable time until optimal image quality

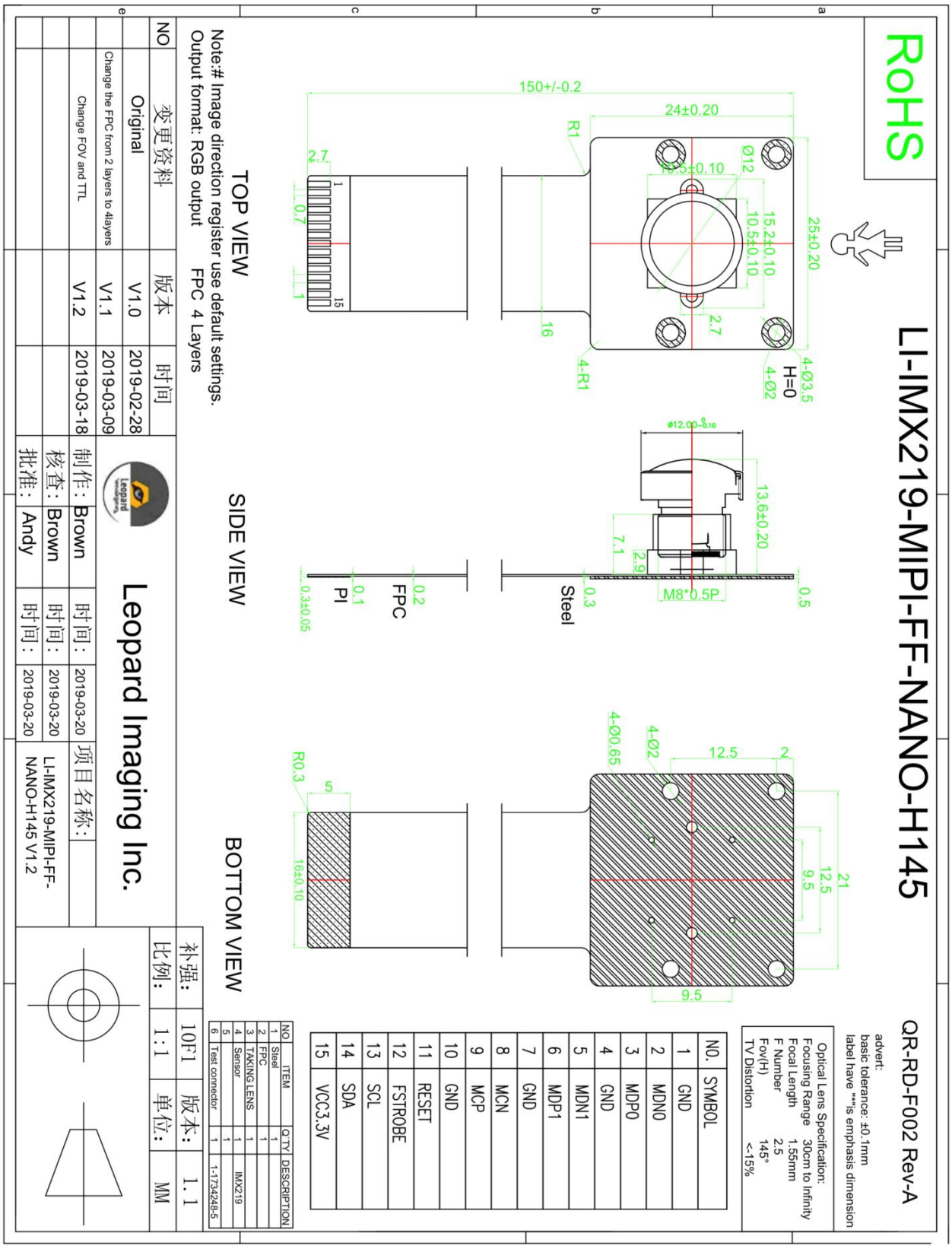
8. Power Off Sequence



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	


RoHS
LI-IMX219-MIPI-FF-NANO-H90
QR-RD-F002 Rev-A
advert:
basic tolerance: ±0.1mm
label have "*"is emphasis dimension
Optical Lens Specification:
Focusing Range 30cm to Infinity
Focal Length 2.3mm
F Number 2.6
Fov(H) 90°
TV Distortion <-10%
150+/-0.2
24±0.20
25±0.20
10
10
16
R1
4-R1
4-Ø3.5
4-Ø2
2.7
0.7
15
1
15.27±0.20
0.5
0.3
Steel
M7*0.35P
0.2
FPC
0.1
PI
0.3±0.05
4-Ø0.65
12.5
2
21
9.5
9.5
R0.3
5
16±0.10
TOP VIEW
SIDE VIEW
BOTTOM VIEW
Note:# Image direction register use default settings.
Output format: RGB output
NO. SYMBOL
1 GND
2 MDN0
3 MDP0
4 GND
5 MDN1
6 MDP1
7 GND
8 MCN
9 MCP
10 GND
11 RESET
12 FSTROBE
13 SCL
14 SDA
15 VCC3.3V
NO ITEM QTY DESCRIPTION
1 Steel 1
2 FPC 1
3 TAKING LENS 1
4 Sensor 1 IMX219
5
6 Test connector 1 1-1734248-5
NO 变更资料 版本 时间
Original V1.0 2019-02-28
Change the FPC from 2 layers to 4layers V1.1 2019-03-09
Change Lens and Holder V1.2 2019-03-21
制作: Brown 时间: 2019-03-20
核查: Brown 时间: 2019-03-20
批准: Andy 时间: 2019-03-20
Leopard Imaging Inc.
项目名称:
LI-IMX219-MIPI-FF-NANO-H90 V1.2
补强: 10F1 版本: 1. 2
比例: 1:1 单位: MM


RoHS
LI-IMX219-MIPI-FF-NANO-H136
QR-RD-F002 Rev-A
advert:
basic tolerance: ±0.1mm
label have "*"is emphasis dimension
Optical Lens Specification:
Focusing Range 30cm to Infinity
Focal Length 1.58mm
F Number 2.0
Fov(H) 136°
TV Distortion <-15%
NO. SYMBOL
1 GND
2 MDN0
3 MDP0
4 GND
5 MDN1
6 MDP1
7 GND
8 MCN
9 MCP
10 GND
11 RESET
12 FSTROBE
13 SCL
14 SDA
15 VCC3.3V
NO ITEM QTY DESCRIPTION
1 Steel 1
2 FPC 1
3 TAKING LENS 1
4 Sensor 1 IMX219
5
6 Test connector 1 1-1734248-5
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
Original V1.0 2019-02-28
Change the FPC from 2 layers to 4layers V1.1 2019-03-09
Change FOV and TTL V1.2 2019-03-21
Change FPC and Holder V1.3 2019-10-17
制作: Brown 时间: 2019-08-02
核查: Brown 时间: 2019-10-17
批准: Andy 时间: 2019-10-17
项目名称: LI-IMX219-MIPI-FF-NANO-H136
Leopard Imaging Inc.
补强: 1OF1 版本: 1. 2
比例: 1 : 1 单位: MM


RoHS
LI-IMX219-MIPI-FF-NANO-H145
QR-RD-F002 Rev-A
advert:
basic tolerance: ±0.1mm
label have "*"is emphasis dimension
Optical Lens Specification:
Focusing Range 30cm to Infinity
Focal Length 1.55mm
F Number 2.5
Fov(H) 145°
TV Distortion <-15%
NO. SYMBOL
1 GND
2 MDN0
3 MDP0
4 GND
5 MDN1
6 MDP1
7 GND
8 MCN
9 MCP
10 GND
11 RESET
12 FSTROBE
13 SCL
14 SDA
15 VCC3.3V
NO ITEM QTY DESCRIPTION
1 Steel 1
2 FPC 1
3 TAKING LENS 1
4 Sensor 1 IMX219
5 1
6 Test connector 1 1-1734248-5
TOP VIEW
SIDE VIEW
BOTTOM VIEW
Note:# Image direction register use default settings.
Output format: RGB output FPC 4 Layers
Steel
FPC
PI
M8*0.5P
4-Ø3.5
4-Ø2
4-R1
4-Ø0.65
150+/-0.2
24±0.20
25±0.20
21
12.5
9.5
16±0.10
13.6±0.20
Leopard Imaging Inc.
NO 变更资料 版本 时间
Original V1.0 2019-02-28
Change the FPC from 2 layers to 4layers V1.1 2019-03-09
Change FOV and TTL V1.2 2019-03-18
制作: Brown 时间: 2019-03-20
核查: Brown 时间: 2019-03-20
批准: Andy 时间: 2019-03-20
项目名称: LI-IMX219-MIPI-FF-NANO-H145 V1.2
补强: 10F1
比例: 1:1
版本: 1.1
单位: MM

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