

LI-IMX219-MIPI-AF-NANO SPECIFICATION

**Rev 1.0
Leopard Imaging Inc.**

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Version History

Version	Description	Release Date
1.0	First Release	16. Mar. 2019



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Key Information

Module Part#		LI-IMX219-MIPI-AF-NANO
Compatible Platform		NVIDIA® Jetson Nano™ Developer Kit
Module Size		150.0 mm (L) x 25.0 mm (W) x 4.5 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		2.2
Focal Length		2.5 mm
FOV		84 °(D)
TV Distortion		< 1.5%
Focusing Range		8cm - Infinity
Pixel size		1.12 um x 1.12 um
IR Cutter Filter		Yes
Temperature Range	Operating	-20 °C to +60 °C
	Storage	-30 °C to +80 °C
Data Output Interface		CSI-2 MIPI 2-lane
Maximum Image Transfer Rate		3280 x 2464 @ 21fps
Mating	Part#	1-1734248-5
Connector	Number of Positions	15
	Pitch	0.039" (1.00mm)



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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	



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Sensor Specifications

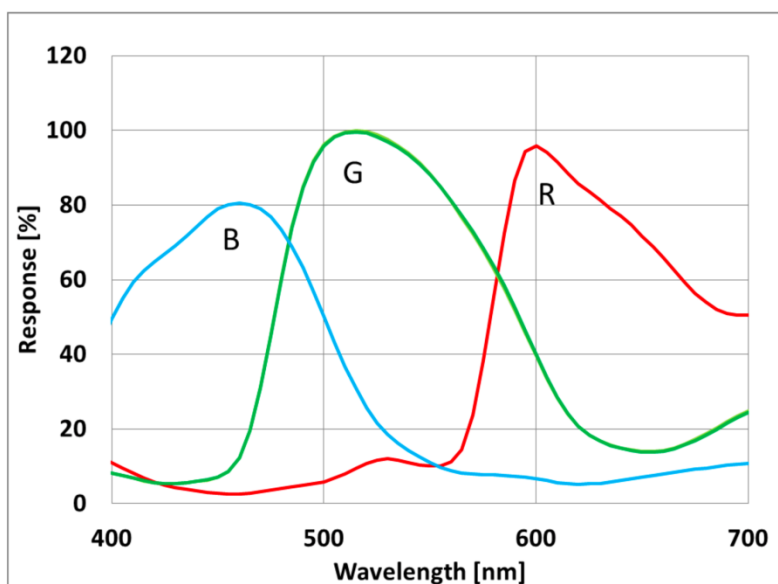
1. Absolute Maximum Ratings

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



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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	
	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	$0.65V_{DIG}$		$V_{DIG} + 0.3$		

5. Electrical Characteristics

($V_{ANA} = 3.0$ V, $V_{DDL} = 1.3$ V, $V_{DIG} = 1.98$ V, $T_j = 60$ °C)

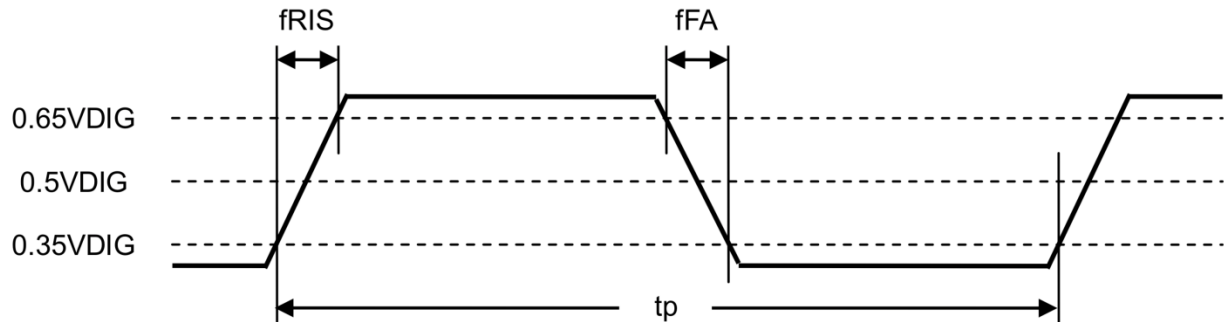
Item	Symbol	Min.	Typ.	Max.	Unit	Comment
Current consumption (Full, 30 frame/s)	IVAVA_strm		33	38	mA	VTmax is max speed read out from pixel array CSI2 4 lanes, V_{ANA} current
	IVDDL_strm		100	160	mA	VTmax is max speed read out from pixel array CSI2 4 lanes, V_{DDL} current Defect Correction, L.S.C. function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



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6. AC Characteristics

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



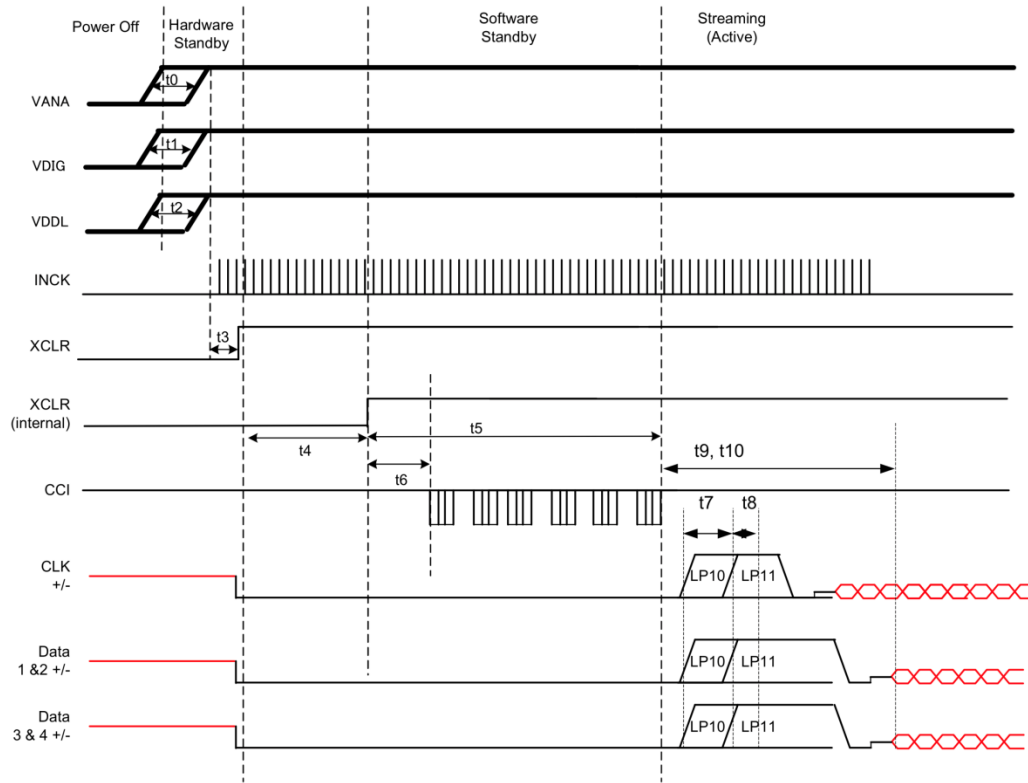
Master Clock Square Waveform Input Characteristics

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	fLEAK	-10		10	μA	



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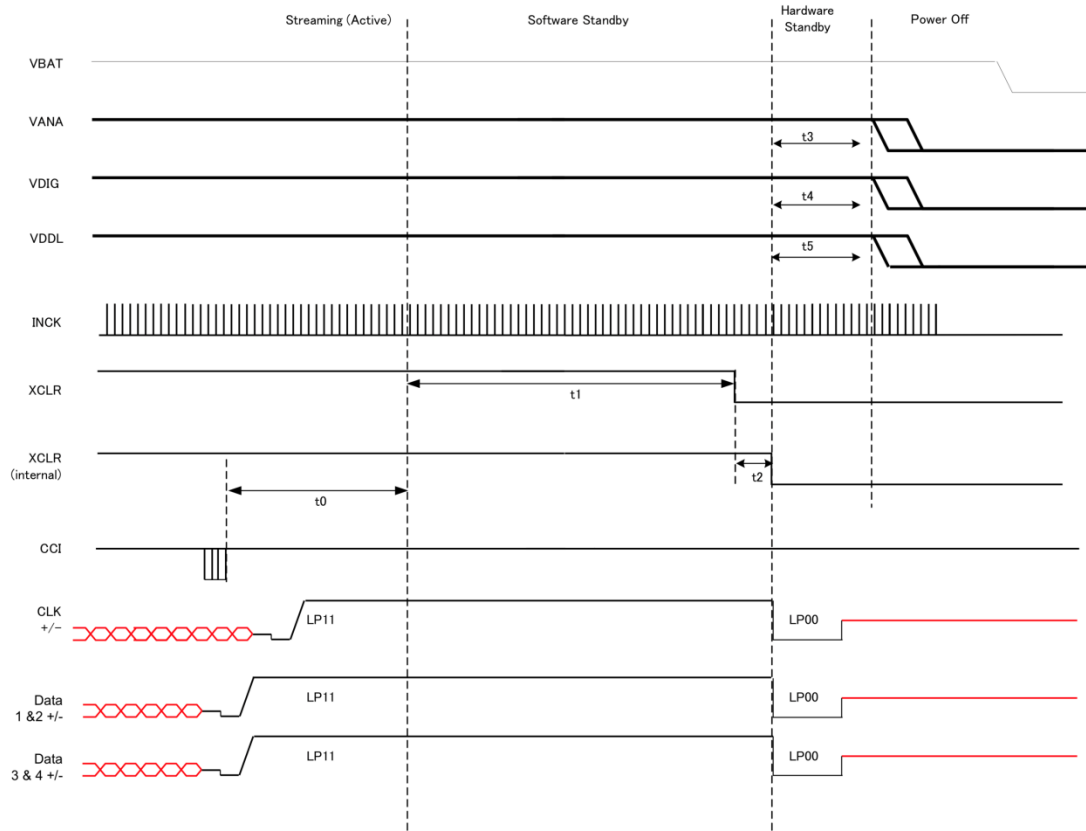
7. Power On Sequence



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	



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