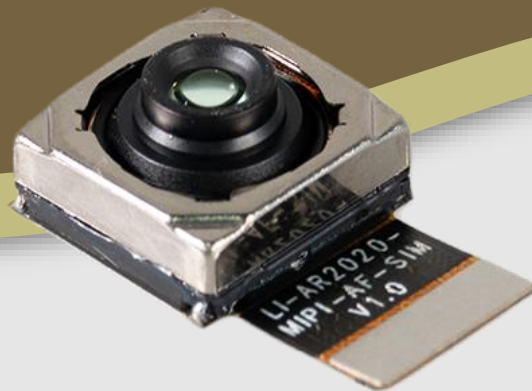




LEOPARD
IMAGING

LI-AR2020-MIPI-AF-SIM-79D



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INTRODUCTION

The LI-AR2020-MIPI-AF-SIM-79D features ONSEMI 20MP AR2020 sensor with BSI pixel technology and auto-focus (AF) function. It outputs 30 fps over a 4-lane MIPI interface, making it ideal for surveillance, video conferencing, and machine vision applications requiring high resolution and precise focusing.

SPECIFICATIONS

Maximum Frame Rate	30 fps @ full size, Linear mode
Focusing Range	10 cm ~ Infinity
Sensor	ONSEMI 20 Mp CMOS sensor AR2020
Optical Format	1/1.8"
Resolution	5120 (H) x 3840 (V) (active pixels)
Pixel Size	1.4 μ m Back Side Illuminated (BSI)
Output Format	10-bit RAW RGB
ADC resolution	10-bits, on die
Auto Focus	Supported
VCM for Auto Focus	Yes
Color / Mono	Color sensor
Interface	1x 4-lane MIPI
Power Consumption	TBD
Operating Temp	TBD
Storage Temp	TBD
Weight	~ 1 g

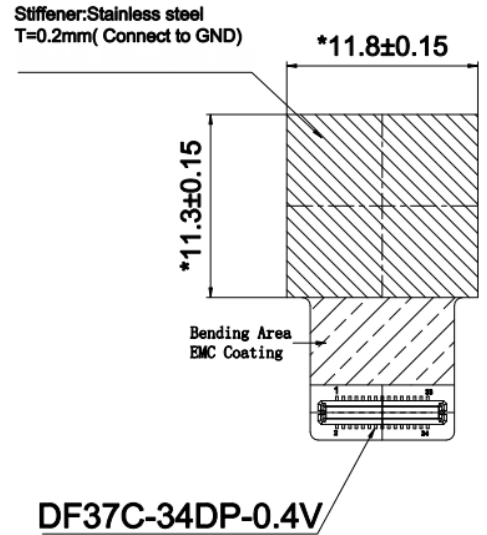
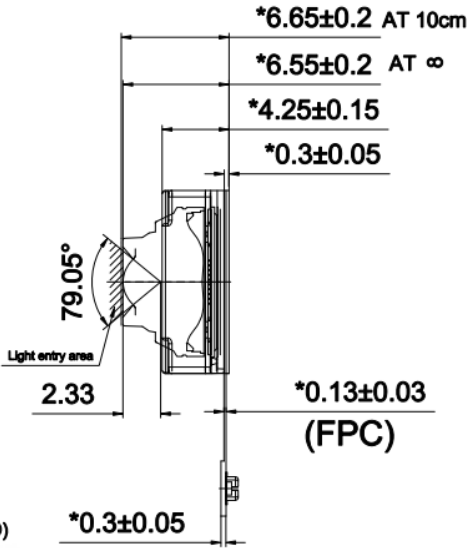
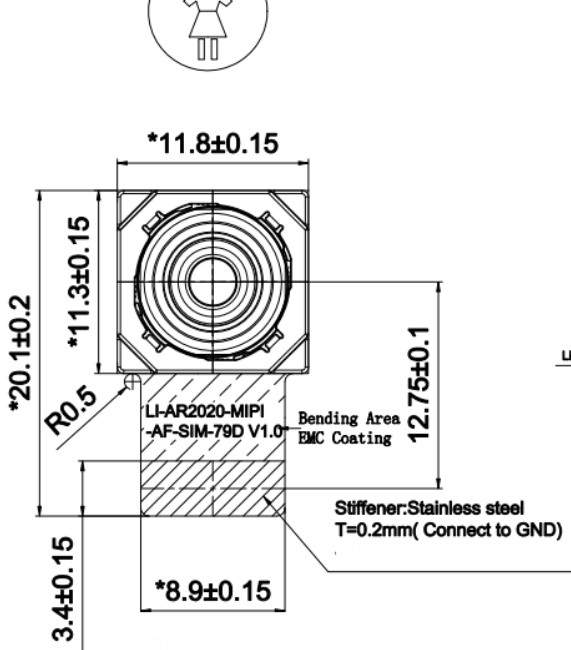
- Surveillance Camera
- Video Conferencing
- Machine Vision
- 3D and Stereo Imaging

LENS SPECIFICATIONS

Effective Focal Length	5.43 mm
Aperture, F/#	1.89 \pm 5%
FOV	79.05° diagonal
	66.85° horizontal
	52.67° vertical
TV Distortion	< -1.5%



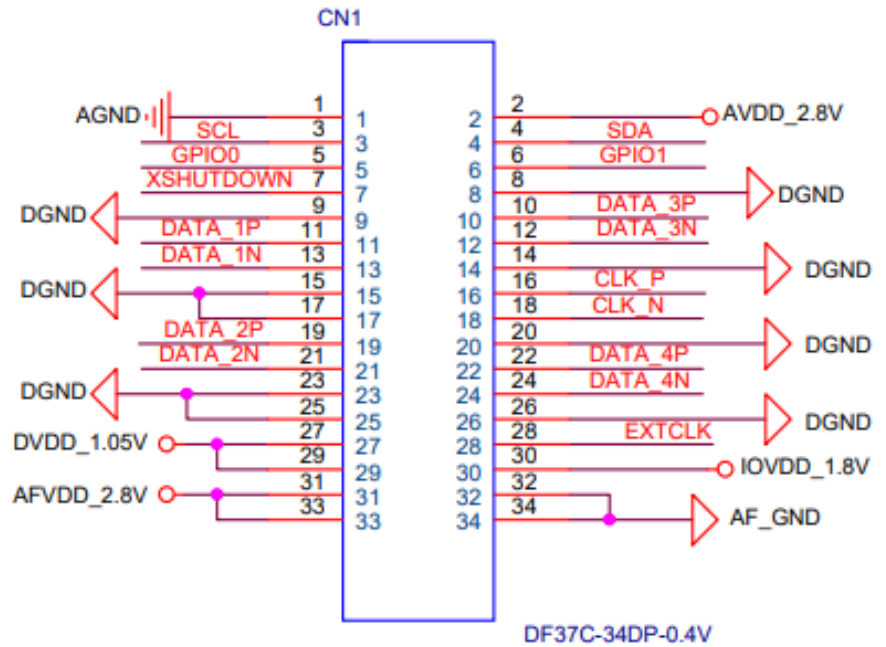
DIMENSIONS



Unit: mm

INTERFACE

- Part#: DF37C-34DP-0.4V
- Number of Positions: 34
- Number of Rows: 2
- Pitch: 0.4 mm
- Sensor I2C Address (W / R):
0x6C / 0x6D (8-bit)
- VCM Driver Address(W / R):
0x18 / 0x19 (8-bit)
- EEPROM Address(W / R):
0x0C / 0x0D (8-bit)



PINOUT DETAILS

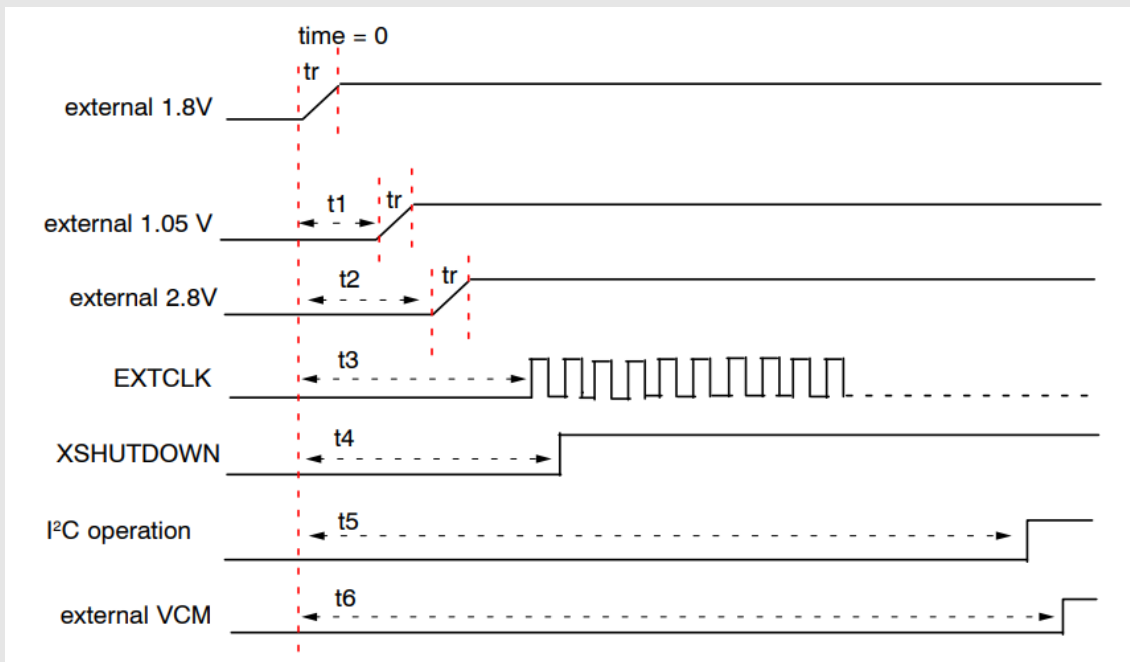
Pin No	Signal Name	Pin Type	Description	Voltage Level
1	AGND	GND	Analog GND	-
2	AVDD_2.8V	POWER	2.8V Analog Power supply (Must be provided from host side)	2.8V
3	SCL	INPUT	1.8V IO Camera I2C SCL signal (Require pull-up at the host)	1.8 V
4	SDA	I/O	1.8V IO Camera I2C SDA signal (Require pull-up at the host)	1.8 V
5	GPIO0	I/O	General purpose inputs and outputs	1.8 V
6	GPIO1	I/O	General purpose inputs and outputs	1.8 V
7	XSHUTDOWN	INPUT	Asynchronous active LOW reset (Require pullup at host side)	1.8 V
8	DGND	GND	Ground signal for digital	-
9	DGND	GND	Ground signal for digital	-
10	DATA_3P	OUTPUT	MIPI Data3 Differential Pair +	MIPI DPHY
11	DATA_1P	OUTPUT	MIPI Data1 Differential Pair +	MIPI DPHY
12	DATA_3N	OUTPUT	MIPI Data3 Differential Pair -	MIPI DPHY
13	DATA_1N	OUTPUT	MIPI Data1 Differential Pair -	MIPI DPHY

Pin No	Signal Name	Pin Type	Description	Voltage Level
14	DGND	GND	Ground signal for digital	-
15	DGND	GND	Ground signal for digital	-
16	CLK_P	OUTPUT	MIPI Clock Differential Pair +	MIPI DPHY
17	DGND	GND	Ground signal for digital	-
18	CLK_N	OUTPUT	MIPI Clock Differential Pair -	MIPI DPHY
19	DATA_2P	OUTPUT	MIPI Data2 Differential Pair +	MIPI DPHY
20	DGND	GND	Ground signal for digital	-
21	DATA_2N	OUTPUT	MIPI Data2 Differential Pair -	MIPI DPHY
22	DATA_4P	OUTPUT	MIPI Data4 Differential Pair +	MIPI DPHY
23	DGND	GND	Ground signal for digital	-
24	DATA_4N	OUTPUT	MIPI Data4 Differential Pair -	MIPI DPHY
25	DGND	GND	Ground signal for digital	-
26	DGND	GND	Ground signal for digital	-
27	DVDD_1.05V	POWER	1.05V Power supply for camera board (Must be provided from host side)	1.05V
28	EXTCLK	INPUT	Sensor Clock	1.8V
29	DVDD_1.05V	POWER	1.05V Power supply (Must be provided from host side)	1.05V
30	IOVDD_1.8V	POWER	1.8V I/O Power supply (Must be provided from host side)	1.8V
31	AFVDD_2.8V	POWER	2.8V Power supply for VCM (Must be provided from host side)	2.8V
32	AF_GND	GND	Ground signal for digital	-
33	AFVDD_2.8V	POWER	2.8V Power supply for VCM (Must be provided from host side)	2.8V
34	AF_GND	GND	Ground signal for digital	-

External Power supply Power On Sequence

The recommended power-up sequence for the AR2020 as shown:

1. Set XSHUTDOWN LOW
2. Power up IOVDD_1.8V
3. After 1–500 ms, power up DVDD_1.05V and AFVDD_2.8V (any order).
4. Apply EXTCLK (can be applied anytime).
5. After 1–500 ms, set XSHUTDOWN HIGH
6. HOST configuration through I2C (PLL, output,etc).
7. Set mode_select = 1 bit.
8. PLL internally enables and locks.
9. AR2020 enters streaming mode.



Timing	Min.	Max.
t1	1 ms	-
T2	t1+1 ms	-
T3	-	< t4
T4	t2+1 ms	-
T5	T4+2.5 ms	
tr	100 μ s	

NOTE: A minimum ramping time of 100 μ s for “tr” is needed to minimize surge of supply current when powering up the 1.05 V, 1.8 V, and 2.8 V external power supplies.

Power Consumption

AR2020 Conditions 1x4 Lanes	Symbol	Typ.	Max.	Unit
20M Linear mode (5120x3840), 30 fps	I_{AVDD}	21		mA
	I_{OVDD}	25		mA
	I_{DVDD}	153		mA
M LI-HDR mode (5120x3840), 15 fps	I_{AVDD}	21		mA
	I_{OVDD}	25		mA
	I_{DVDD}	151		mA
5M (Bin2) Linear (2560x1920), 120 fps	I_{AVDD}	42		mA
	I_{OVDD}	43		mA
	I_{DVDD}	153		mA
M (Bin4) Linear (1280x960), 1 fps	I_{AVDD}	1		mA
	I_{OVDD}	1		mA
	I_{DVDD}	2		mA
P Linear mode (1920x1080), 120 fps Bin2 + Scaler	I_{AVDD}	17		mA
	I_{OVDD}	22		mA
	I_{DVDD}	124		mA
20M eDR mode (5120x3840), 15 fps	I_{AVDD}	19		mA
	I_{OVDD}	27		mA
	I_{DVDD}	152		mA
20M SLP Linear mode (5120x3840), 1 fps	I_{AVDD}	1		mA
	I_{OVDD}	0.9		mA
	I_{DVDD}	5		mA
Wake on Motion with streaming mode (1280x960) 1 fps	I_{AVDD}	1		mA
	I_{OVDD}	1		mA
	I_{DVDD}	3		mA
Wake on Motion without streaming mode (640x480), 1 fps	I_{AVDD}	0.1		mA
	I_{OVDD}	1		mA
	I_{DVDD}	2		mA

● REVISION HISTORY

Revision	Description	Release Date
0.1	Initial draft.	27 May 2026

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