



LEOPARD IMAGING INC

LI-OV9712-FF-65

Data Sheet

Features

- OmniVision 1/4" CMOS 1MP HD sensor OV9712
- Active array size: 1280 x 800
- Pixel size: 3um x 3um
- Sensitivity: 3300 mV/(Lux*sec)
- S/N ratio: 39 dB
- Dynamic range: 69 dB
- High sensitivity for low-light operation
- Ultra low power and low cost
- Output format: RGB output
- Supports image sizes: WXGA (1280 x 800) and 640 x 400
- Automatic image control functions: automatic exposure control(AEC), automatic gain control (AGC), automatic white balance (AWB), automatic band filter (ABF), automatic black level calibration (ABLC)
- Programmable controls: frame rate, AEC/AGC 16-zone size/ position/ weight control, mirror, flip, cropping, and windowing
- Image quality controls: lens correction and defective pixel canceling

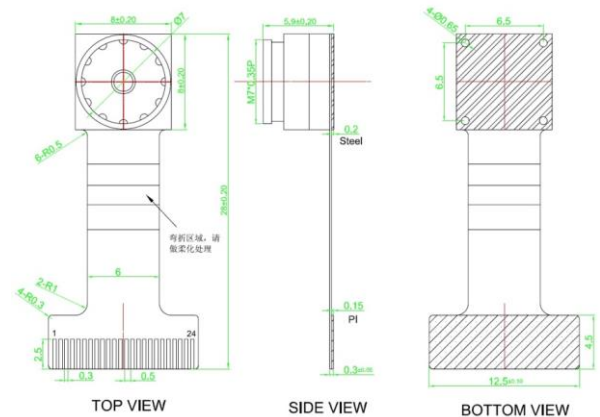
Lens Specification



- Focusing Range: 60cm to infinity
- Focal Length: 3.5mm
- F Number: 2.8
- Fov (D): 65 °
- TV Distortion: <1%
- Sensor: OV9712
- Connector: FH12-24S-0.5SH
- Module Size: 6.5mm x 6.5mm

Interface

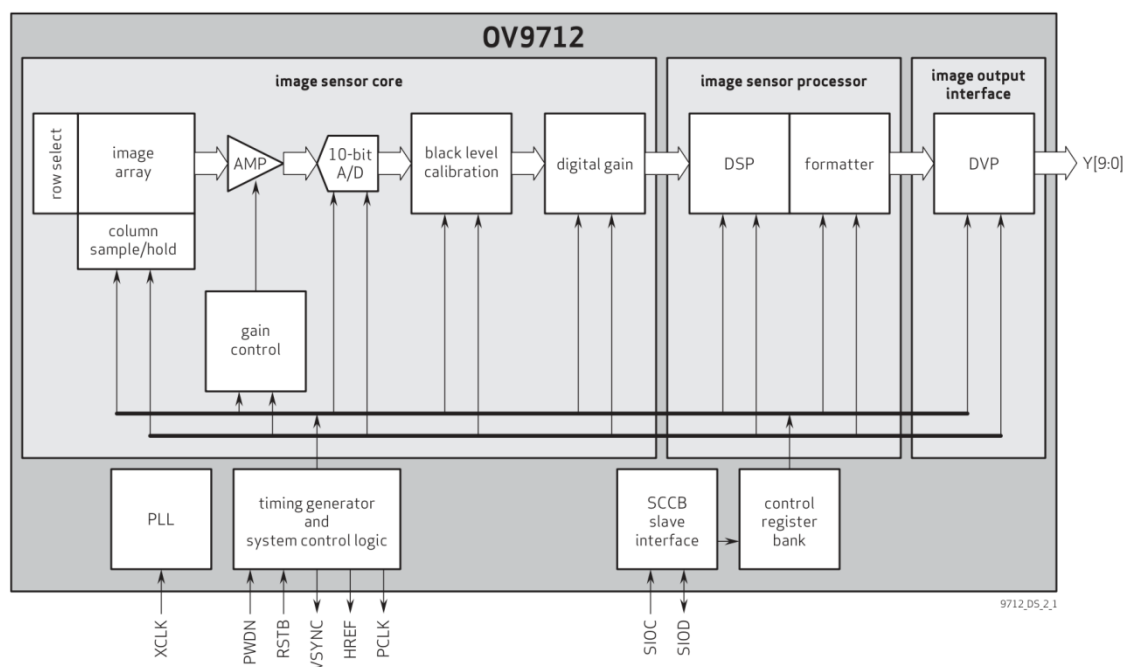
No.	Name	No.	Name	No.	Name	No.	Name
1	LED-(NC)	7	VSYNC	13	MCLK	19	Y2
2	AGND	8	PWDN	14	Y8	20	Y5
3	SDA	9	HSYNC	15	DGND	21	Y3
4	AVDD3.3V/LED+	10	DVDD 1.5V	16	Y7	22	Y4
5	SCL	11	DOVDD 1.8 V	17	PCLK	23	Y1
6	RESET	12	Y9	18	Y6	24	Y0



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OV9712 Block Diagram



Absolute Maximum Ratings

parameter	absolute maximum rating ^a	
operating temperature range ^b	-30°C to +70°C	
stable image temperature range ^c	0°C to 50°C	
ambient storage temperature	-40°C to +125°C	
supply voltage (with respect to ground)	V_{DD-A}	4.5V
	V_{DD-IO}	4.5V
electro-static discharge (ESD)	human body model	2000V
	machine model	200V
all input/output voltages (with respect to ground)	-0.3V to $V_{DD-IO} + 1V$	
I/O current on any input or output pin	± 200 mA	
peak solder temperature (10 second dwell time)	245°C	

- exceeding the absolute maximum ratings shown above invalidates all AC and DC electrical specifications and may result in permanent damage to the device. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
- sensor functions but image quality may be noticeably different at temperatures outside of stable image range
- image quality remains stable throughout this temperature range



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DC Characteristics (-30 °C < T_A < 70 °C)

symbol	parameter	min	typ	max	unit
supply					
V _{DD-A}	supply voltage (analog)	3.0	3.3	3.6	V
V _{DD-D}	supply voltage (digital core)	1.425	1.5	1.575	V
V _{DD-IO}	supply voltage (digital I/O)	1.7	1.8	3.6	V
I _{DD-A}	active (operating) current		22	30	mA
I _{DD-D}			6	10	mA
I _{DD-IO}			8	14	mA
I _{DDS-SCCB}	standby current		250	600	μA
I _{DDS-PWDN}			50	100	μA
digital inputs (typical conditions: AVDD = 3.3V, DVDD = 1.5V, DOVDD = 1.8V)					
V _{IL}	input voltage LOW			0.54	V
V _{IH}	input voltage HIGH	1.26			V
C _{IN}	input capacitor			10	pF
digital outputs (standard loading 25 pF)					
V _{OH}	output voltage HIGH	1.62			V
V _{OL}	output voltage LOW			0.18	V
serial interface inputs					
V _{IL} ^a	SIOC and SIOD	-0.5	0	0.54	V
V _{IH} ^a	SIOC and SIOD	1.26	1.8	2.3	V

a. based on DOVDD = 1.8V.

Timing Characteristics

symbol	parameter	min	typ	max	unit
oscillator and clock input					
f _{OSC}	frequency (XCLK)	6	24	27	MHz
t _r , t _f	clock input rise/fall time			5 (10 ^a)	ns

a. if using the internal PLL



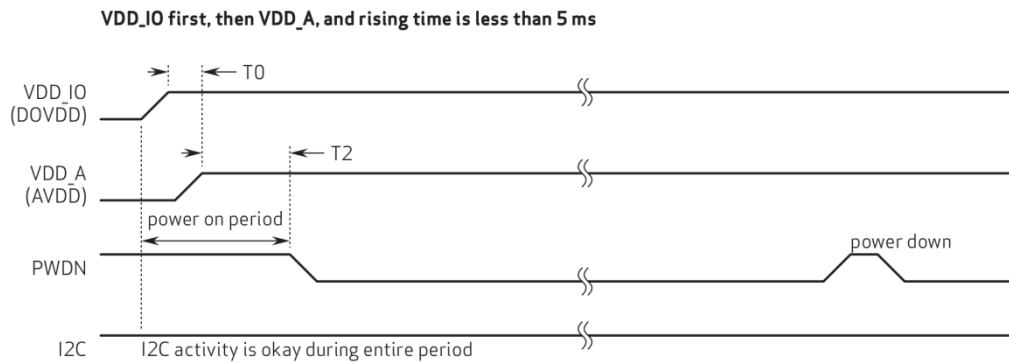
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AC Characteristics ($T_A = 25\text{ }^\circ\text{C}$, $V_{DD-A} = 2.8\text{V}$)

symbol	parameter	min	typ	max	unit
ADC parameters					
B	analog bandwidth		30		MHz
DLE	DC differential linearity error		0.5		LSB
ILE	DC integral linearity error		1		LSB
	settling time for hardware reset			<1	ms
	settling time for software reset			<1	ms
	settling time for resolution mode change			<1	ms
	settling time for register setting			<300	ms

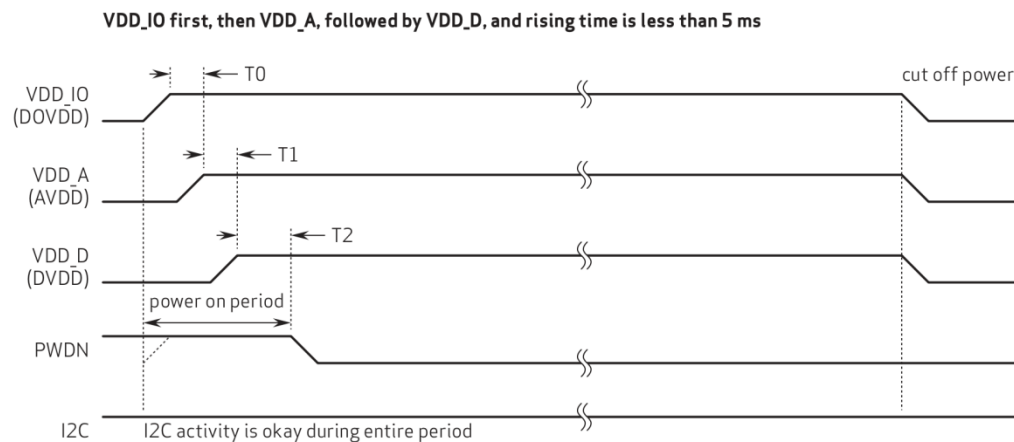
Power Up Timing with internal DVDD



note $T_0 \geq 0$ ms: delay from VDD_IO stable to VDD_A stable
 $T_2 \geq 5$ ms: delay from VDD_A stable to sensor power up stable

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Power Up Timing with external DVDD source



note $T_0 \geq 0$ ms: delay from VDD_IO stable to VDD_A stable
 $T_1 \geq 0$ ms: delay from VDD_A stable to VDD_C stable
 $T_2 \geq 5$ ms: delay from VDD_C stable to sensor power up stable

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