8M-AF Camera module specification

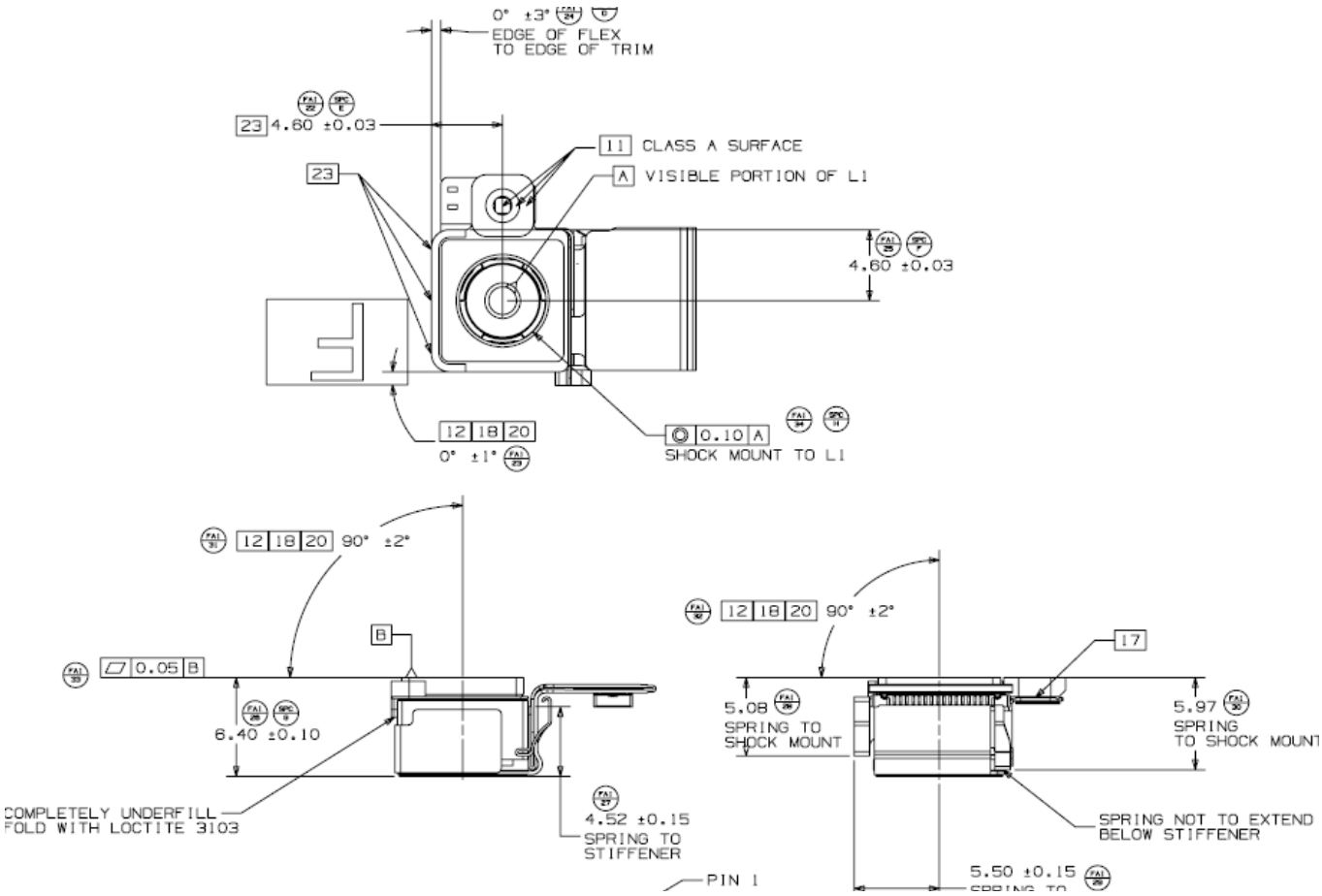
1. GENERAL OVERVIEW

Diagonal 5.7mm (Type 1/3.2) CMOS Image Sensor with Square Pixel for Color Cameras

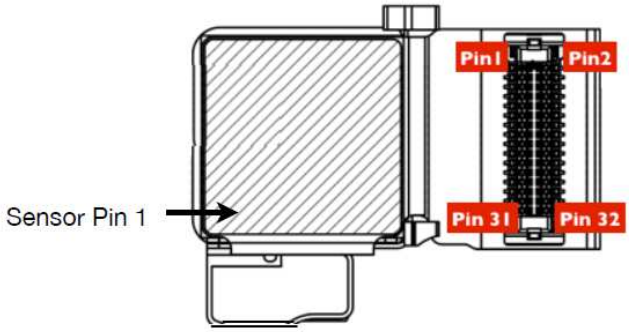
Features

- CMOS active pixel type dots
- 2-wire serial communication circuit on chip
- CSI2 serial data output
- Timing generator, H and V driver circuits on chip
- CDS/PGA on chip
- 10-bit A/D converter on chip
- Automatic optical black (OB) clamp circuit on chip
- PLL on chip(rectangular wave/sine wave)
- High sensitivity, low dark current, no smear
- Excellent anti-blooming characteristics
- Variable-speed shutter function (1H units)
- R, G, B primary color pigment mosaic filters on chip
- Max. 15 frame/s in all-pixel scan mode
- Pixel rate: 200MHz(All-pixel, 15 frame/s)

2. MECHANICS


0° ±3°
EDGE OF FLEX
TO EDGE OF TRIM
23 4.60 ±0.03
11 CLASS A SURFACE
A VISIBLE PORTION OF L1
23
4.60 ±0.03
12 18 20
0° ±1°
0.10 A
SHOCK MOUNT TO L1
12 18 20 90° ±2°
B
0.05 B
6.40 ±0.10
COMPLETELY UNDERFILL
FOLD WITH LOCTITE 3103
4.52 ±0.15
SPRING TO
STIFFENER
PIN 1
12 18 20 90° ±2°
17
5.08
SPRING TO
SHOCK MOUNT
5.97
SPRING
TO SHOCK MOUNT
SPRING NOT TO EXTEND
BELOW STIFFENER
5.50 ±0.15

3. CAMERA PINS



Number	Description	Description	Number
33	LED(-)	LED(-)	34
1	GND	CLK_IN	2
3	MIPI D3 N	I2C_C	4
5	MIPI D3 P	I2C_D	6
7	GND	VSYNC	8
9	MIPI D1 N	Thermistor(+)	10
11	MIPI D1 P	GND_AF	12
13	GND	AVDD_AF	14
15	MIPI CLK N	DVDD_CORE	16
17	MIPI CLK P	DVDD_CORE	18
19	GND	DVDD_IO	20
21	MIPI D0 N	DVDD_IO	22
23	MIPI D0 P	Shutdown	24
25	GND	Strobe	26
27	MIPI D2 N	NC	28
29	MIPI D2 P	AVDD	30
31	GND	AGND	32
35	LED (+)	LED(+)	36

4. FUNCTIONAL SPECIFICATIONS

4.1 Sensor

Parameter	Symbol	Min	Nom	Max	Unit
Horizontal Resolution	RESh	-	3264	-	pixels
		-	3264	-	pixels
Vertical Resolution	RESv	-	2448	-	pixels
		-	2448	-	pixels
Module Non Volatile Memory	NVM	492	-	-	bytes
		512	-	-	bytes
Defective Pixels (Light Field)	BPL	-	-	See test details	pixels
Defective Pixels (Dark Field)	BPD	-	-	See test details	pixels
Defective Line Test	DL_Y_ROW	0	-	1.0	%
	DL_Y_COL	0	-	0.8	%
	DL_Cr/ Cb_ROW/ COL	0	-	0.8	%
Relative Uniformity Center	RU_CEN	-	-	3.5	%
Relative Uniformity Edge	RU_EDG	-	-	4	%
Relative Uniformity Corner	RU_COR	-	-	5	%
Gray Spot Neighbor	GS_NEB	-	-	1.8	%
Gray Spot Block	GS_BLK	-	-	1.8	%
Color Uniformity Neighbor	CU1	-	-	5	%
Color Uniformity Max-Min	CU2	-	-	17	%
Signal To Noise Ratio	SNR	37	-	-	dB
Read Noise	RN	-	TBD	-	LSB

4.2 Optical

Parameter	Symbol	44 lp/mm	89 lp/mm	Distance
SFR Center Focus	SFR_C_f *	0.78	0.57	60cm, 10cm, 200cm
SFR 0.6 Field Focus	SFR_60_f *	0.75	0.45	60cm, 200cm
		0.72	0.40	10cm
SFR 0.9 Field Focus	SFR_90_f *	0.58	0.35	60cm, 200cm
		0.55	0.30	10cm
SFR Max 0.6 Field Delta	SFR_60_Delta_f *	0.10	0.15	60cm, 200cm
		0.13	0.20	10cm
SFR Max 0.9 Field Delta	SFR_90_Delta_f *	-	-	60cm, 10cm, 200cm data collection

Parameter	Symbol	Min	Nom	Max	Unit
Diagonal Field of View	DFOV	64	66	68	degrees
Optical Center X	OCX	1594	1632.5	1671	pixels
Optical Center Y	OCY	1186	1224.5	1263	pixels
Relative Illumination	RI	0.38	-	-	
Relative Illumination Delta	RI_Delta	-	-	0.1	
Flare	FLARE	-	-	-	
Distortion	DIST	-1.5	-	1.5	%
F Number	F#	-	2.4	-	
IR Filter Cut Off	IRcut	640	650	660	nm
Lens Color	LENScolor	450	460	470	nm
Lens Reflection	LENSref	2.5	-	4	%
Chromatic Aberration	CA	-	-	1.5	pixels

4.3 Module Auto Focus

Parameter	Symbol	Min	Nom	Max	Unit	Note
Lens Travel	D	202			um	Up to 80mA
Linearity	L			12.5	um	30-202 um
Hysteresis	H			16	um	0-202 um

4.4 Module LED

Parameter	Symbol	Min	Nom	Max	Unit	Note
Forward Voltage	Vf	2		3	V	If=100mA
LED Illuminance	LI2	120			Lux	@ 100mA, distance 24 cm
LED color difference	LC			50	K	color temp
CCT Range	LCR	5250		5750	K	@ 100mA*

5. ELECTRICAL SPECIFICATIONS

5.1 Absolute Maximum Rating

Parameter	Symbol	Min	Max	Unit	Note
Supply to digital core	VDD_MAX	-0.3	3.2	V	
Supply to digital IO	VDD_IO_MAX	-0.3	2.0	V	
Supply to analog core	VDDA_MAX	-0.3	3.2	V	
Voltage to any input pin	Vin	-0.3	3.2	V	
Storage Temperature	Tstore	-40	85	°C	
Humidity (non-condensing)	Humid_Max	20	95	%	
Altitude	Alt_max	0	35,000	Ft.	
ESD Human Body Model (A114-A)	ESD_HBM		2	kV	

5.2 Recommended Operating Conditions

All specifications must be met within the ratings below.

Parameter	Symbol	Min	Max	Unit	Note
Operating Temperature	Top	-15	+65	°C	
Humidity (non-condensing)	Humid_Op	20%	95%		
Altitude	Alt_Op	0	10,000	Ft.	

5.3 Clock

Clock	Frequency
Sensor Input	7.6 MHz
Sensor output	90.58 MHz
MIPI	256.12 Mhz

5.4 Electrical Specifications

Parameter	Symbol	IMX145			OV8830			Unit	Note
		Min	Nom	Max	Min	Nom	Max		
Analog Voltage	Va	2.6	2.7	2.9	2.6	2.8	3.0	V	
Digital Voltage	Vd	1.65	1.8	1.92	1.7	1.8	3.0	V	
Core Voltage	Vc	1.1	1.2	1.3	1.14	1.2	1.28	V	
AF Voltage	Vaf	2.6	2.8	3	2.6	2.8	3	V	
Analog Operational current	Ia_op			50				mA	
Analog Standby Current (using PWDN)	Ia_stdby			100				uA	
Digital Operational current	Id_op			1				mA	
Digital Standby current (using PWDN)	Id_stdby			10				uA	
Digital Core Operational current	Ic_op			165				mA	
Digital Core Standby current (using PWDN)	Ic_stdby			10,000				uA	
AF Operational current	Iaf_op			80			80	mA	
AF Standby current (using PWDN)	Iaf_stdby			600			600	uA	
Analog Ripple	Va_pk			±50mV				mV	10kHz-10MHz, needs to be protected by system
Digital Ripple	Vd_pk			±100mV				mV	10kHz-10MHz, needs to be protected by system
AF Ripple	Vd_pk			±50mV				mV	