



DATA SHEET

(DOC No. ISM01Q-03M0098-DS)

>> **ISM01Q-03M0098**

WiseEye™ Module

Preliminary version 01 December, 2023

>> ISM01Q-03M0098

WiseEye™ Module



Himax Technologies, Inc.
<http://www.himax.com.tw>

Revision History

December, 2023

Version	Date	Description of changes
01	2023/12/04	New setup.

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Important Notice

December, 2023

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1. General Description

The ISM01Q-03M0098 WiseEye™ Module based on WiseEye™ AI accelerator-embedded platform is an easy use and development platform. It includes HM0360-MWB AoS sensor and HX6537-A (QFN72) WE-I Plus.

The HM0360 is an ultra-low power, Back Side Illuminated (BSI) CMOS image sensor designed for energy efficient smart version applications. It consists of full pixel array of 656 x 496. The sensor maximum active resolution is 640 x 480 which include 16 border pixels. The HM0360 Always on Sensor architecture delivers a target current consumption of 256μA in AoS monitor mode and 8.6mA in VGA 60 frames per second read out mode. In order to reduce host process loading, camera latency and system power consumption, the HM0360 features on-chip oscillator with automatic external reference clock detection, automatic frame mode switch, fast sensor initialization <2ms frame trigger time, context switching and instant frame update. The sensor offers several monitoring options with programmable interrupt thereby allowing the host processor to be placed in low power standby until notified by the sensor.

The HX6537-A is embedded with a powerful 400MHz ARC EM9D DSP core with Floating Point Unit (FPU) and XY local data memory architecture to accelerate convolution operation of neural network algorithm. There are internal 2MB Ultra-Low Leakage (ULL) SRAMs for system and program usage. With the benefit of DSP instruction and XY memory architecture, HX6537-A can operate at lower clock speed to achieve the same application performance for lower power consumption.

2. Block Diagram

The diagram below shows the functional modules in ISM01Q-03M0098.

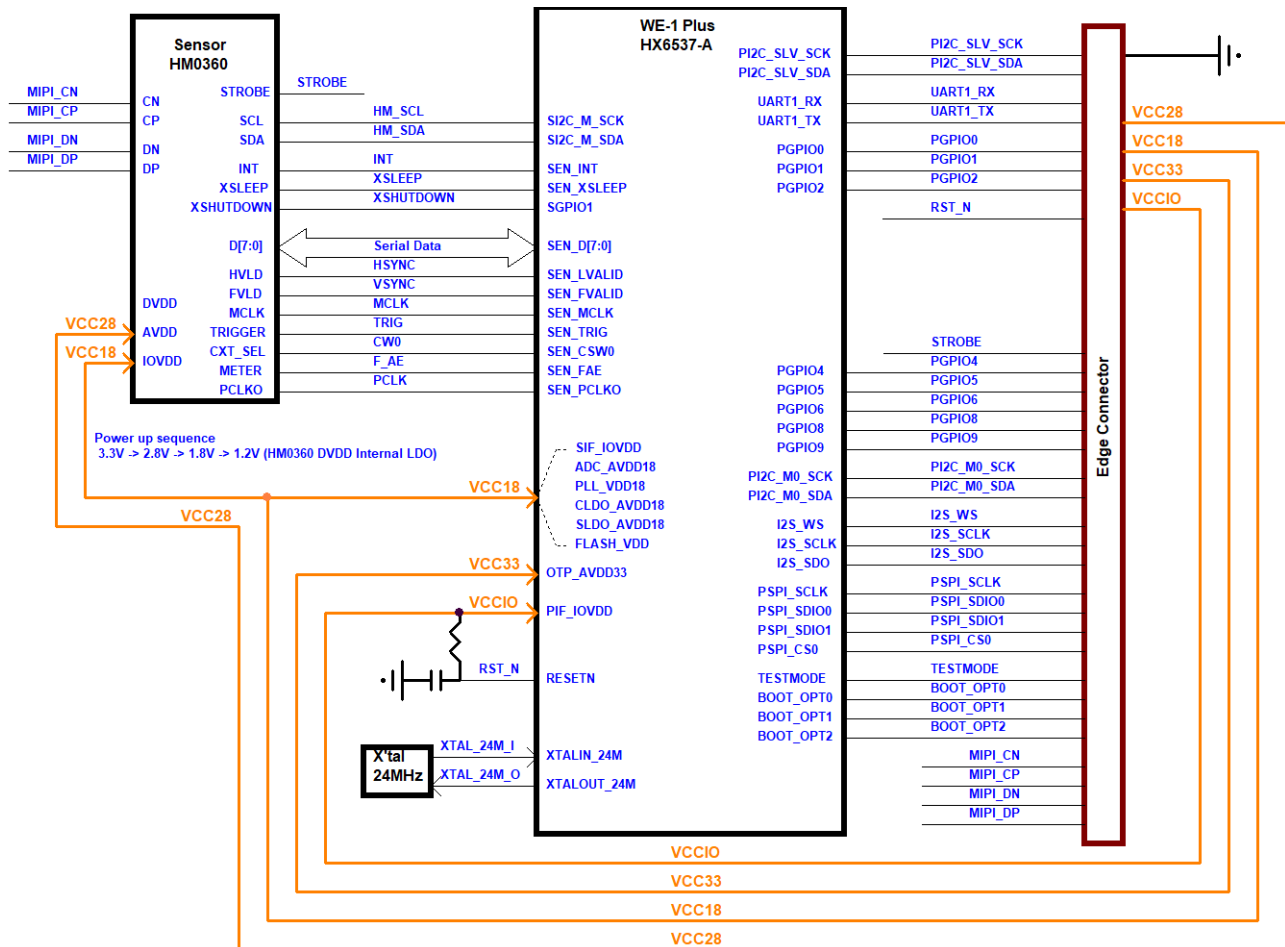
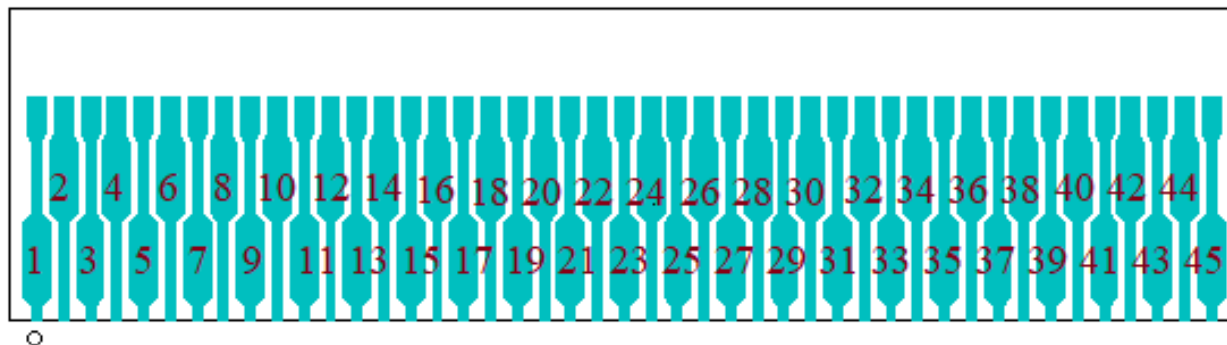


Figure 2.1: ISM01Q-03M0098 block diagram

3. Pin Assignment



Note: (1) 45-pin Gold finger and other parts are at the top side.

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Pin Types: **I**=Input, **O**=Output, **P**=Power, **G**=Ground

Pin name	Pin no.	Type	Pad	Description
VCC33	1	P	3.3V	OTP 3.3V power.
VCC28	2,3	P	2.8V	AVDD (Sensor).
VCC18	4,5	P	1.8V	ADC_AVDD18, SIF_IOVDD, FLASH_VDD, IOVDD (Sensor).
GND	6,21,36,39,42	G	Ground	Ground.
PGPIO0	7	I/O	-	PIF GPIO0 (AON).
PGPIO1	8	I/O	-	PIF GPIO1 (AON).
BOOT_OPT0	9	I/O	-	Boot option selection pin0.
BOOT_OPT1	10	I/O	-	Boot option selection pin1.
TESTMODE	11	I/O	-	Test Mode enable pin.
RST_N	12	I	-	Reset pin.
BOOT_OPT2	13	I/O	-	Boot option selection pin2.
VCCIO	14	P	1.8V/3.3V ⁽¹⁾	PIF IO power.
PGPIO2	15	I/O	-	PIF GPIO2 (AON).
PGPIO4	16	I/O	-	PIF GPIO4 (AON).
PGPIO5	17	I/O	-	PIF GPIO5 (AON).
PGPIO6	18	I/O	-	PIF GPIO6 (AON).
PI2C_SLV_SCK	19	I/O	-	PIF I2C slave clock.
PI2C_SLV_SDA	20	I/O	-	PIF I2C slave data.
PI2C_M0_SCK	22	I/O	-	PIF I2C master0 clock.
PI2C_M0_SDA	23	I/O	-	PIF I2C master0 data.
I2S_WS	24	I/O	-	I2S word selection.
I2S_SCLK	25	I/O	-	I2S clock.
I2S_SDO	26	I/O	-	I2S data out.
UART1_RX	27	I/O	-	UART1 RX pin.
UART1_TX	28	I/O	-	UART1 TX pin.
PSPI_CS0	29	I/O	-	A. PIF SPI master chip select0. B. PIF SPI slave chip select.
PSPI_SDIO0	30	I/O	-	A. PIF SPI master data0. B. PIF SPI slave data in.
PSPI_SDIO1	31	I/O	-	A. PIF SPI master data1. B. PIF SPI slave data out.
PSPI_SCLK	32	I/O	-	A. PIF SPI master clock. B. PIF SPI slave clock.
PGPIO8	33	I/O	-	PIF GPIO8.
PGPIO9	34	I/O	-	PIF GPIO9.
STROBE	35	I/O	-	Sensor strobe.
MIPI_DP	37	I/O	-	MIPI data positive output.
MIPI_DN	38	I/O	-	MIPI data negative output.
MIPI_CP	40	I/O	-	MIPI clock positive output.
MIPI_CN	41	I/O	-	MIPI clock negative output.
N.C.	43,44,45	-	-	No connection pin. It should be floating.

Note: (1) According to the host controller's I/O voltage.

4. DC Characteristics

4.1. Recommended operating conditions

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Supply voltage	VCC18	1.7	1.8	1.9	V
	VCC28	2.6	2.8	3.0	V
	VCC33	3.1	3.3	3.5	V
	VCCIO ⁽¹⁾	1.7	1.8	1.9	V
		3.1	3.3	3.5	V
Operating temperature	T _A	-10	25	85	°C

Note: (1) According to the host controller's I/O voltage.

4.1.1. GPIO

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
High level input voltage	V _{IH}	-	0.7VCC ⁽¹⁾	-	VCC ⁽¹⁾ + 0.3	V
Low level input voltage	V _{IL}	-	GND-0.3	-	0.3VCC ⁽¹⁾	V
High level output voltage	V _{OH}	I _{OH} =-2mA	0.8VCC ⁽¹⁾	-	-	V
Low level output voltage	V _{OL}	I _{OL} =2mA	-	-	0.2VCC ⁽¹⁾	V

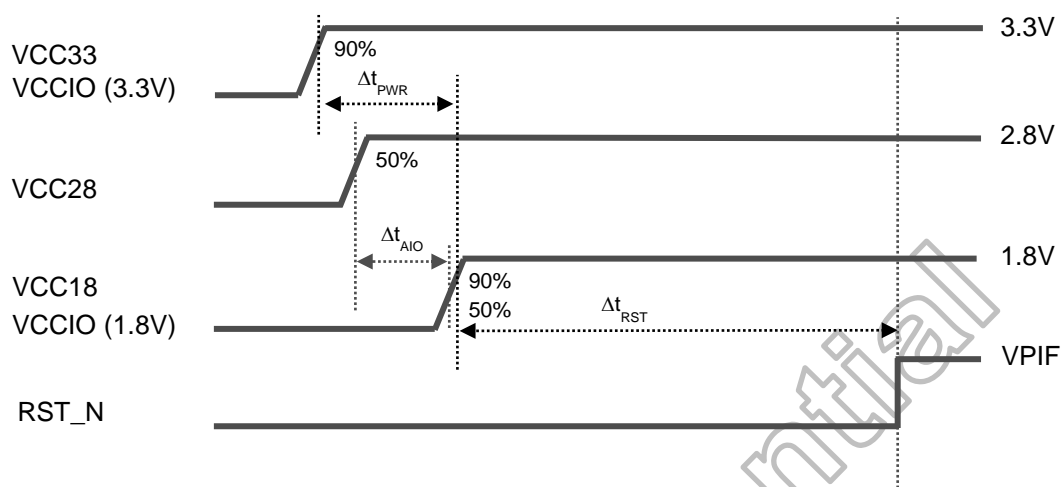
Note: (1) VCC dependent on GPIO belongs to VCCIO.

4.1.2. Power consumption

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Power consumption	I _{VCC18} (VCC18=1.8V)	Note ⁽¹⁾	-	46.5	-	mA
	I _{VCC28} (VCC28=2.8V)		-	0.237	-	mA
	I _{VCC33} (VCC33=3.3V)		-	0.03	-	μA
	I _{VCCIO} (VCCIO=1.8V/3.3V)		-	3.9	-	mA

Note: (1) Test condition is under ambient temperature and OTP is disable.

5. Power On Sequence



Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Delta time of power ramp up	Δt_{PWR}	VCCIO=3.3V	0	-	-	ms
Delta time of sensor AVDD to IOVDD	Δt_{AIO}	-	0	-	∞	s
Reset time	Δt_{RST}	-	150	-	-	μ s

Figure 5.1: Power on sequence & timing

6. Image Input/Output Specification

6.1. Image input specification

Parameter	Spec.
Detection resolution	640x480
Horizontal detection range (angle of view)	98.1°
Vertical detection range (angle of view)	73.2°

6.2. Image output specification

Parameter	Spec.
Output image resolution	640x480
Image format	8-bit RAW

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7. Optical Specification (With Lens)

View Angle	Horizontal (deg)	98.1	deg
	Vertical (deg)	73.2	deg
	Diagonal (deg)	129.4	deg

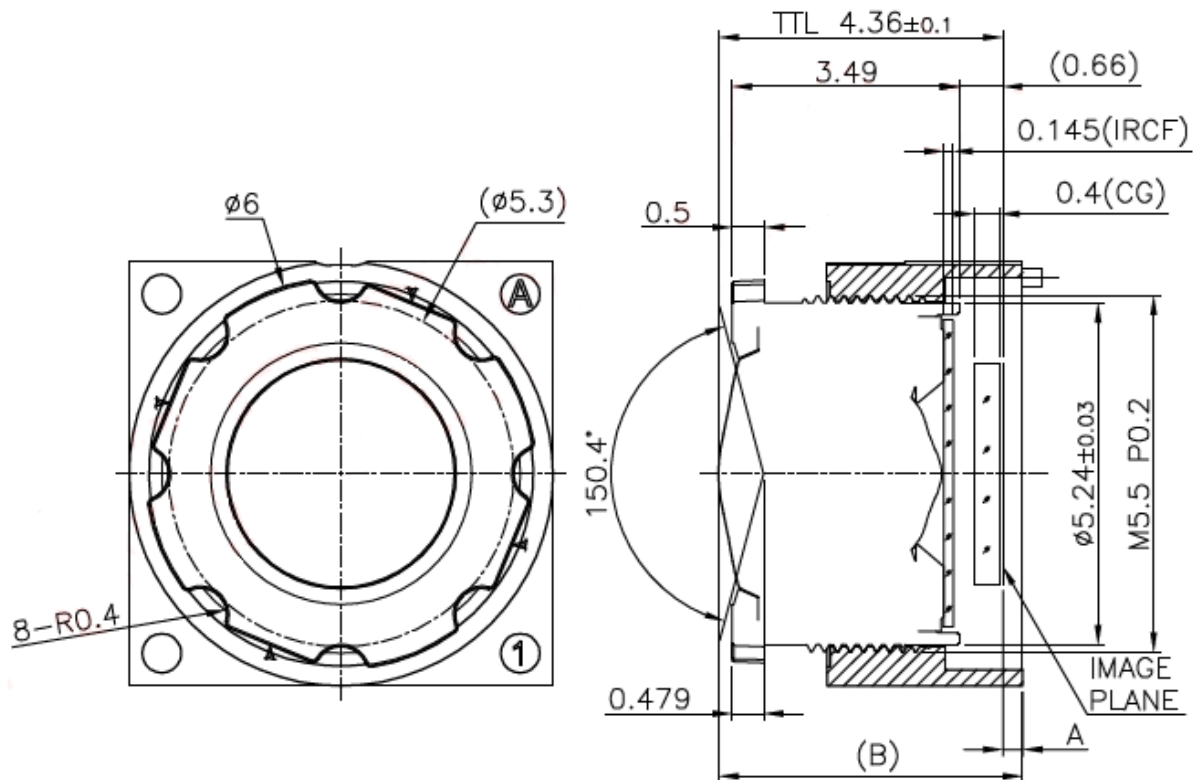
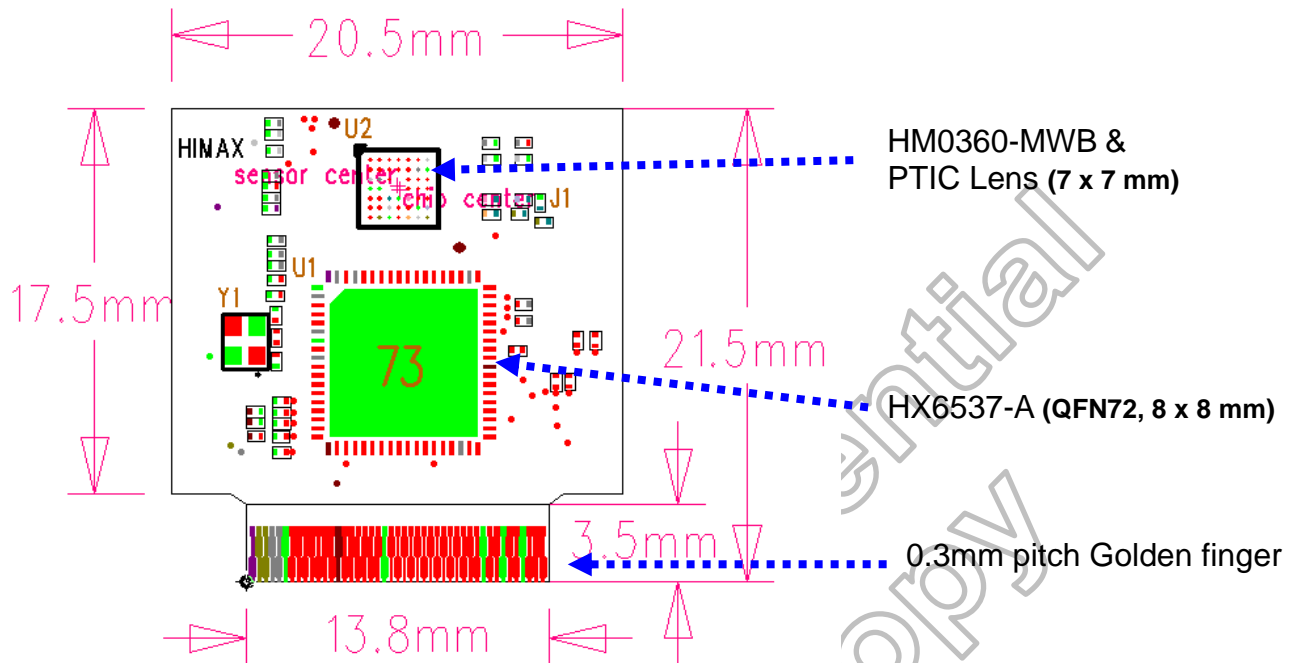


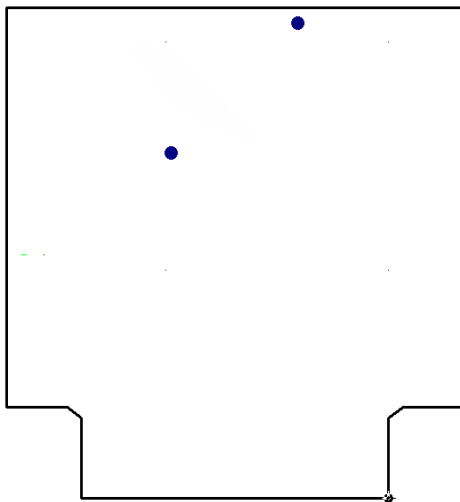
Figure 7.1: View angle & lens optical specification

8. Parts and Functions

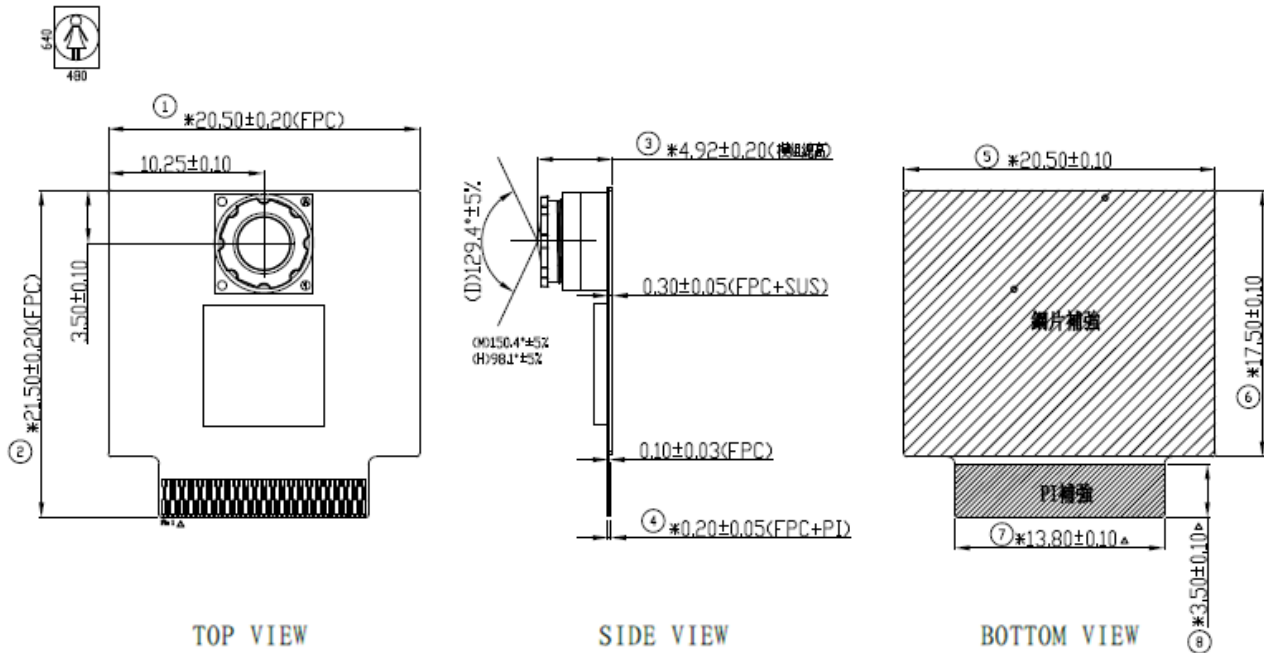
8.1. 4-layer PCB (top view)



8.2. 4-layer PCB (bottom view)



9. Mechanical Drawing



Note: (1) Compatible connector: 45 pins, 0.3mm pitch Golden finger (Top Contact / Molex 5025984593 or equivalent).

Figure 9.1: ISM01Q-03M0098 mechanical drawing