



DATA SHEET

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>> **ISM028-03M0098**

WiseEye™ Module

Preliminary version 01 November, 2023

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>> ISM028-03M0098

WiseEye™ Module



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Revision History

November, 2023

Version	Date	Description of changes
01	2023/11/13	New setup.

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1. General Description

The ISM028-03M0098 WiseEye™ Module based on WiseEye™ AI accelerator-embedded platform is an easy use and development platform. It includes HM0360-MWB AoS sensor and HX6538-A(QFN-88) WE-2.

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 HX6538-A is embedded with a powerful dual ARM Cortex-M55 processors with Helium vector and floating-point extensions and an ARM Ethos-U55 microNPU core to accelerate convolution operation of neural network model. There are internal 2.5MB Ultra-Low Leakage (ULL) SRAMs for system and program usage. With the benefit of Ethos-U55 microNPU and Helium vector extended Cortex-M55 architecture, the HX6538-A provides maximum computing capability with the lowest power consumption and latency.

2. Block Diagram

The diagram below shows the functional modules in ISM028-03M0098.

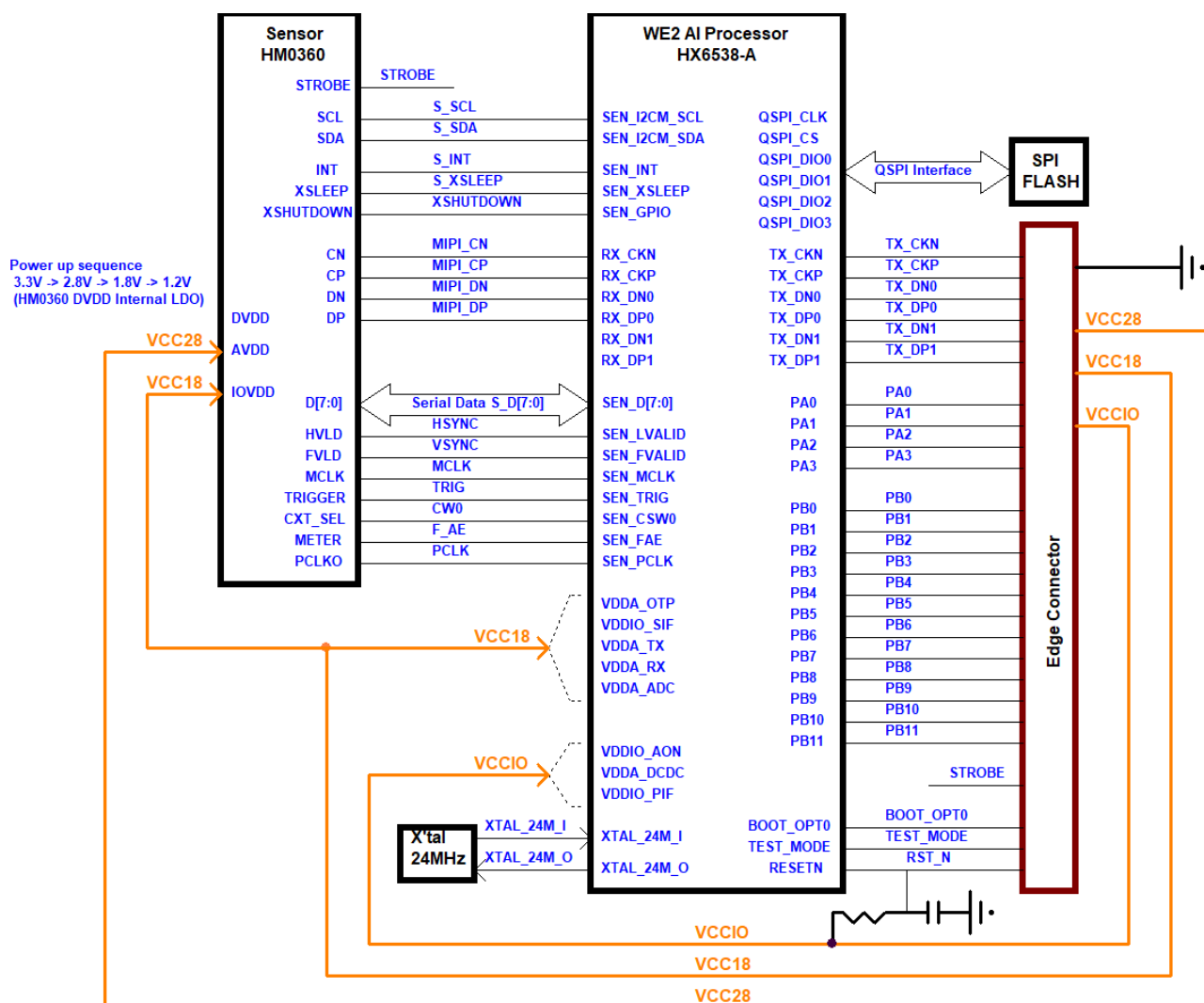
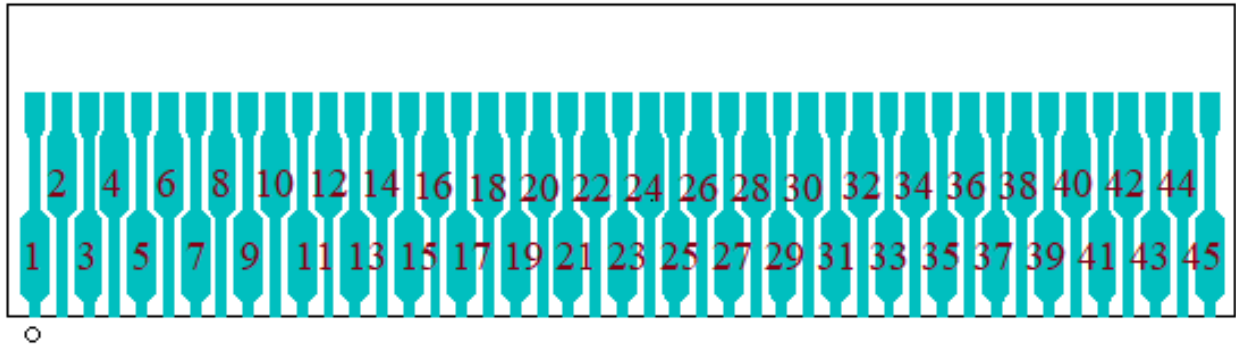


Figure 2.1: ISM028-03M0098 block diagram

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
N.C.	1,10,13,15, 16,17,18,34	-	-	No connection pin. It should be floating.
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, 42,45	G	Ground	Ground.
PA0	7	I/O	-	General-purpose IO, group A.
PA1	8	I/O	-	
BOOT_OPT0	9	I/O	-	Boot option selection pin0.
TESTMODE	11	I/O	-	Test Mode enable pin.
RST_N	12	I	-	Reset pin.
VCCIO	14	P	1.8V/3.3V ⁽¹⁾	PIF IO power.
PA2	19	I/O	-	I2CS0_SCL/I3CS0_SCL.
PA3	20	I/O	-	I2CS0_SDA/I3CS0_SDA.
PB0	22	I/O	-	UART_RX.
PB1	23	I/O	-	UART_TX.
PB2	24	I/O	-	I2CM_SDA/SD_DAT1.
PB3	25	I/O	-	I2CM_SCLK/SD_DAT0.
PB4	26	I/O	-	SPI_CLK/SD_DAT2.
PB5	27	I/O	-	SPI_CS0/SD_DAT3.
PB6	28	I/O	-	SPI_DIO1/SD_CMD.
PB7	29	I/O	-	SPI_DIO0/SD_CLK.
PB8	30	I/O	-	GPIO/PWM2.
PB9	31	I/O	-	PDM_CLK.
PB10	32	I/O	-	PDM_DATA0.
PB11	33	I/O	-	GPIO.
STROBE	35	I/O	-	Sensor strobe.
MIPI_DN0	37	I/O	-	MIPI data lane 0 negative output.
MIPI_DP0	38	I/O	-	MIPI data lane 0 positive output.
MIPI_CP	40	I/O	-	MIPI clock positive output.
MIPI_CN	41	I/O	-	MIPI clock negative output.
MIPI_DN1	43	I/O	-	MIPI data lane 1 negative output.
MIPI_DP1	44	I/O	-	MIPI data lane 1 positive output.

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
	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

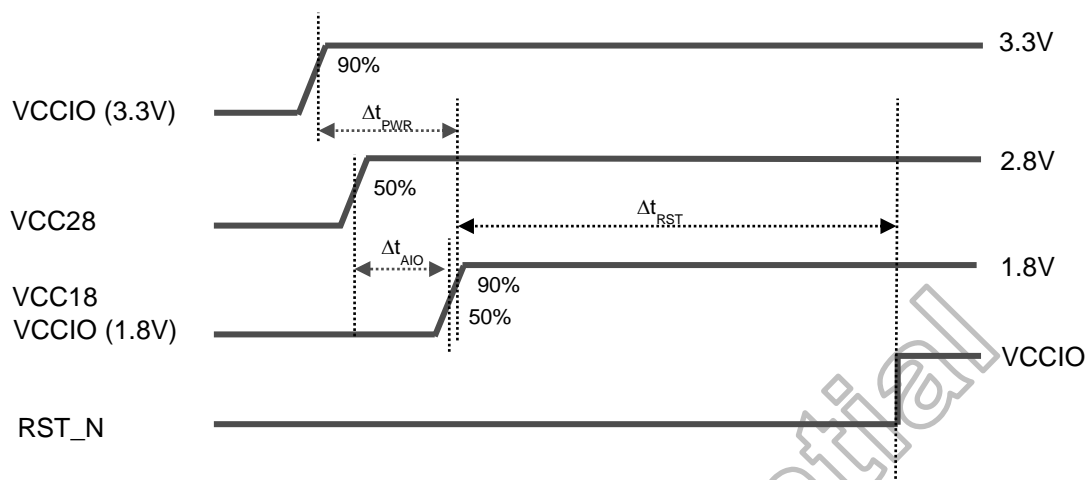
Note: (1) VCC dependent on GPIO belongs to VCCIO.

4.1.2. Power consumption

Parameter	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Power consumption	I _{VCC18} (VCC18=1.8V)	Note ⁽¹⁾	-	9.14	-	mA
	I _{VCC28} (VCC28=2.8V)		-	2.08	-	mA
	I _{VCCIO} (VCCIO=3.3V)		-	24.32	-	mA

Note: (1) Test condition is under ambient temperature and Standard Demo FW (BD + FD + Head-Pose).

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}	-	3	-	-	ms

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°

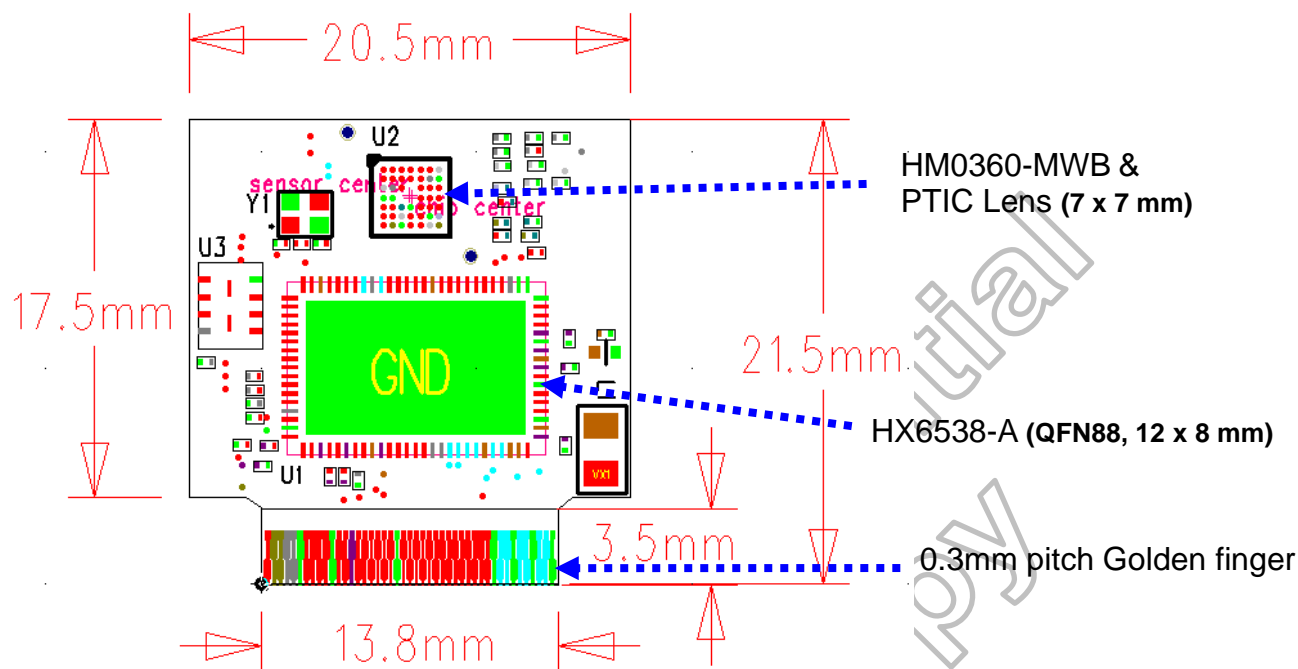
6.2. Image output specification

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

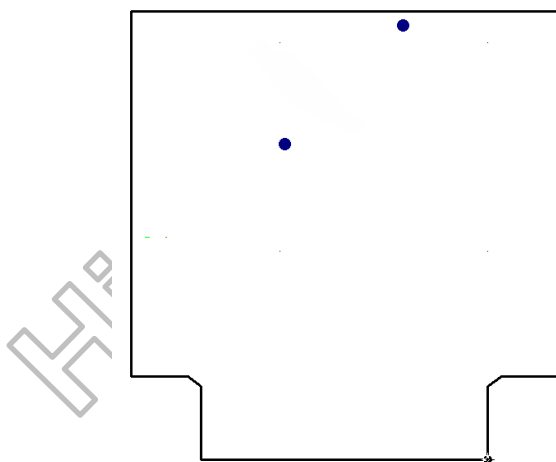
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8. Parts and Functions

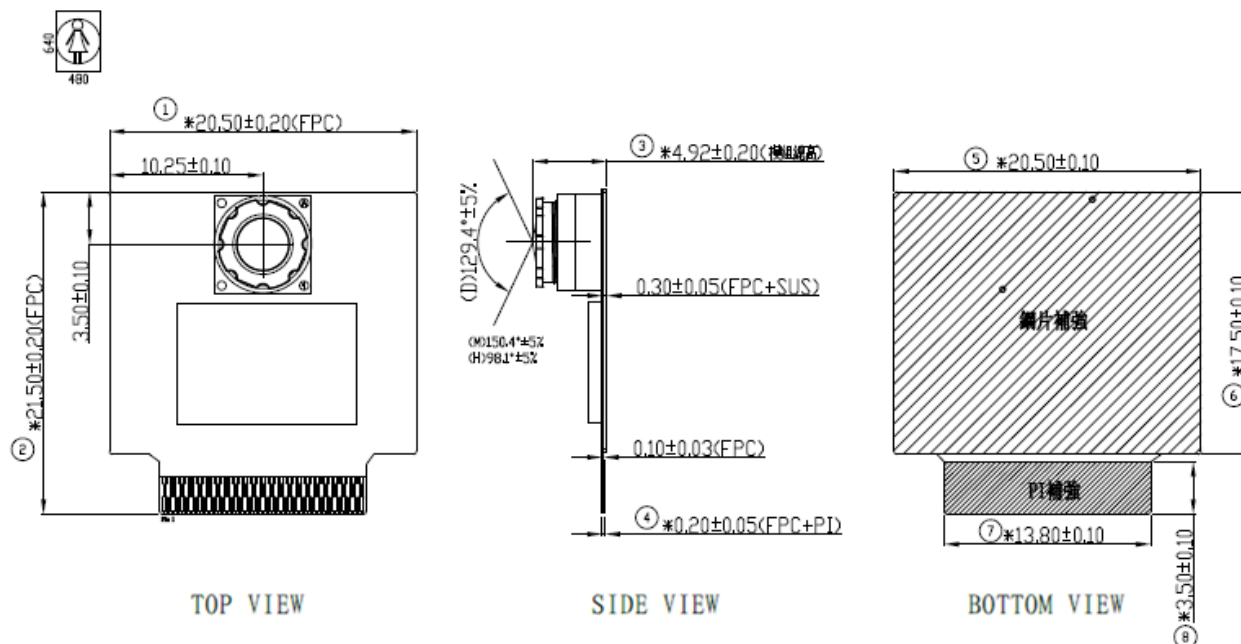
8.1. 4-layer PCB (top view)



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: ISM028-03M0098 mechanical drawing