BOCSAR0833-MIC9080 Scanner Engine Specification	Division Ⅵ
	Revision 1.0

SCANNER MODULE SPECIFICATION

CUSTOMER NAME: MSI
CUSTOMER PRODUCT NAME: FUTON+
BYD PRODUCT NAME: EMC9080O
BYD MODULE NAME: BOCSAR0833-MIC9080

Customer Service Unit
Division Ⅵ
BYD COMPANY LIMITED

Rev 1.0
Last update: 05. Dec. 2014

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NOTICE

This document is a general product description and maybe changed basing on customer's requirement.

Revision History

Version	Date [D/M/Y]	Notes	Writer
1.0	05/07/2014	Initial released	Wang li

APPROVALS		
PREPARED BY	CHECKED BY	APPROVED BY
WANG LI	WANG LI	LUO CHEN

Table of Contents

General description

The Aptina AR0833 is a 1/3.2-inch BSI (back side illuminated) CMOS active-pixel digital image sensor with a pixel array of 3264H x 2448V (3280H x 2464V including border pixels). It incorporates sophisticated on-chip camera functions such as mirroring, column and row skip modes, and snapshot mode. It is programmable through a simple two-wire serial interface and has very low power consumption.

The AR0833 digital image sensor features Aptina's breakthrough low-noise CMOS imaging technology that achieves near-CCD image quality (based on signal-to-noise ratio and low-light sensitivity) while maintaining the inherent size, cost, and integration advantages of CMOS.

The AR0833 sensor can generate full resolution image at up to 30 frames per second (fps). An on-chip analog-to-digital converter (ADC) generates a 10-bit value for each pixel.

Specification

Lens Specification

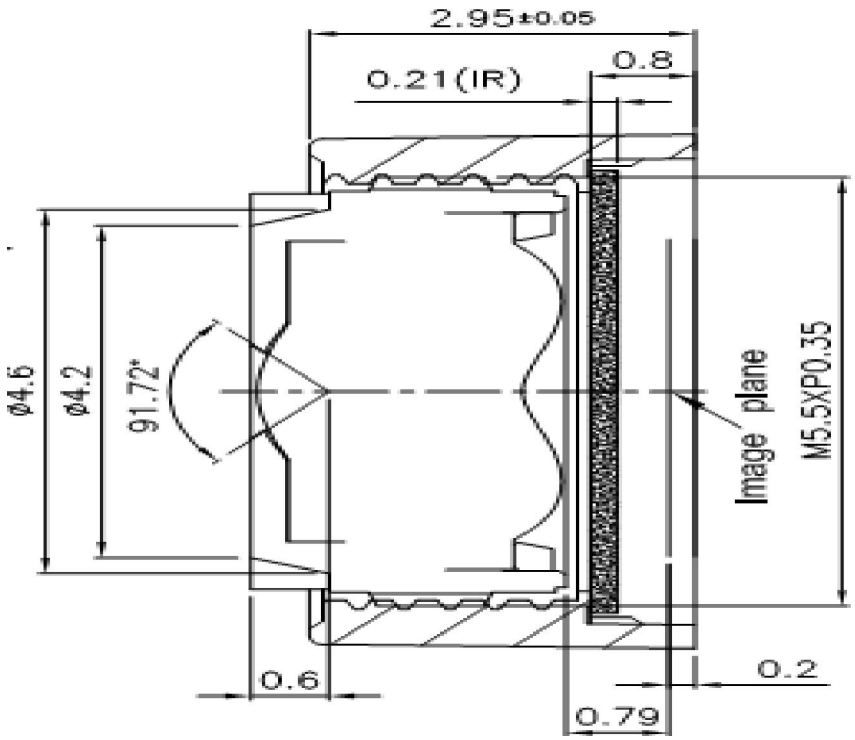
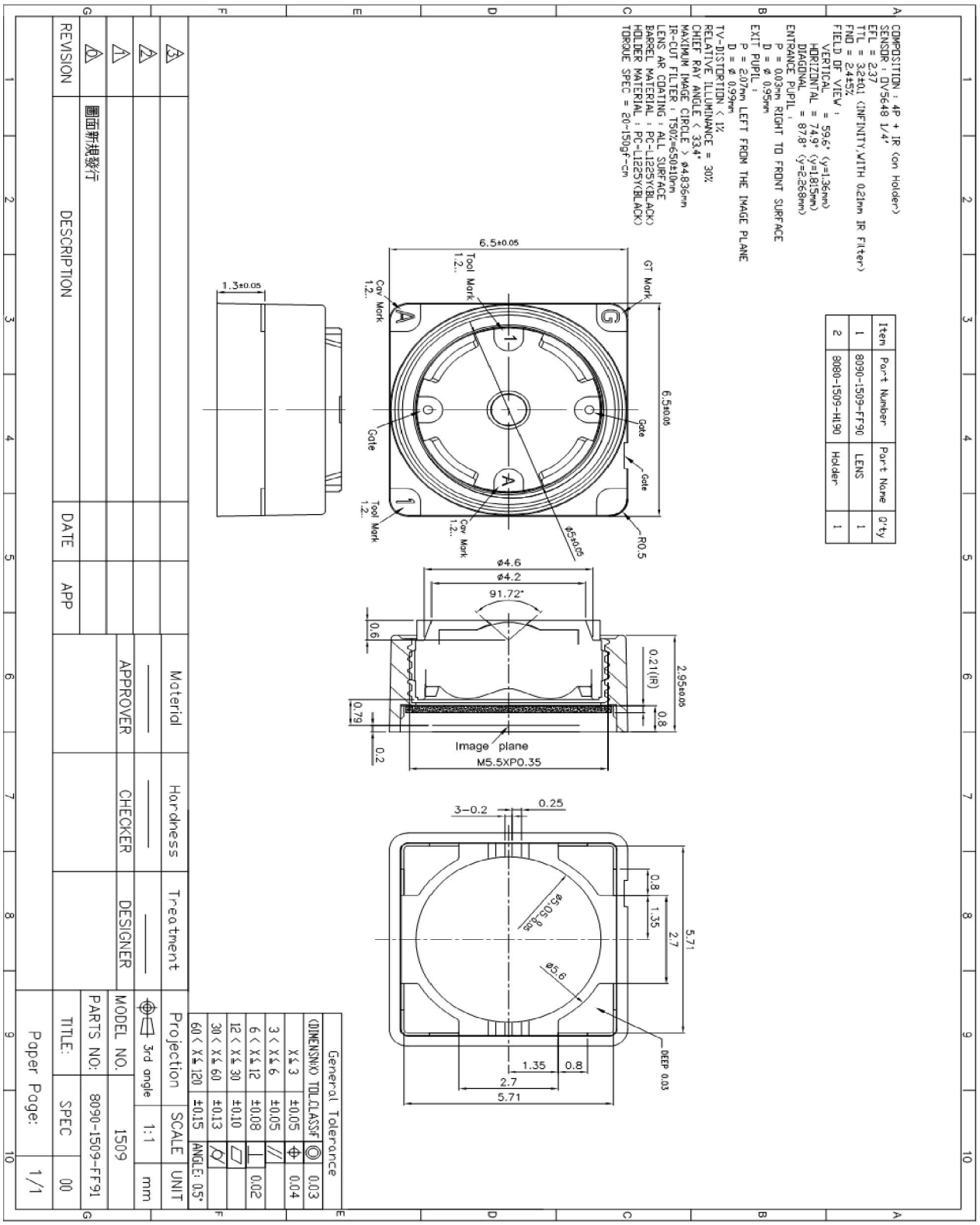


Table1. Lens Specification

COMPOSITION : 4P + IR (on Holder)
SENSOR : OV5648 1/4"
EFL = 2.37
TTL = 3.2±0.1 (INFINITY,WITH 0.21mm IR Filter)
FNO = 2.4±5%
FIELD OF VIEW :
VERTICAL = 59.6° (y=1.36mm)
HORIZONTAL = 74.9° (y=1.815mm)
DIAGONAL = 87.8° (y=2.268mm)
ENTRANCE PUPIL :
P = 0.03mm RIGHT TO FRONT SURFACE
D = ø 0.95mm
EXIT PUPIL :
P = 2.07mm LEFT FROM THE IMAGE PLANE
D = ø 0.99mm
TV-DISTORTION < 1%
RELATIVE ILLUMINANCE = 30%
CHIEF RAY ANGLE < 33.4°
MAXIMUM IMAGE CIRCLE > ø4.836mm
IR-CUT FILTER : T50%=650±10nm
LENS AR COATING : ALL SURFACE
BARREL MATERIAL : PC-L1225Y(BLACK)
HOLDER MATERIAL : PC-L1225Y(BLACK)
TORQUE SPEC = 20~150gf-cm

BOCSAR0833-MIC9080 Scanner Engine Specification	Division VI
	Revision 1.0



Sensor Specification

Features

- 8Mp (4:3) still images at 30 fps
- 1.4µ pixel with Aptina™ A-PixHS™ technology providing best-in-class low-light performance.
- Optional on-chip high-quality bayer scaler resizes 6Mp 30 fps HD video to 1080p30 (2Mp 30 fps).
- Serial MIPI interface supports either 4-lane, 3-lane, or 2-lane configurations and speeds up to 1Gbps/ lane.
- On-chip temperature sensor
- Support for external mechanical shutter
- Support for external LED or Xenon flash
- Programmable controls: gain, horizontal and vertical blanking, auto black level offset correction, frame size/rate, exposure, left–right and top–bottom image reversal, window size, and panning
- On-die phase-locked loop (PLL) oscillator
- Integrated position and color-based shading correction
- 8Kb one-time programmable memory (OTPM) for storing shading correction coefficients of three light sources and module information
- Internal VCM driver
- Slave mode for precise frame-rate control and for synchronizing two sensor

Applications

- Mobile phones
- PC cameras

Ordering Information

Table 1: Available Part Numbers

Part Number	Description
AR0833MBSC27SMD20	Bare die

Table 2: Key Performance Parameters

Parameter	Typical Value
Array Format	3264 x 2448

Table 2: Key Performance Parameters

Parameter		Typical Value
Primary modes		Full Resolution: 4:3 - 8Mp at 30 fps
		16:9 - 6Mp at 30 fps
		16:9 - 1080p HD at 30 fps
Pixel size		1.4µm Back Side Illuminated (BSI)
Optical format		1/3.2"
Die size		6.86mm x 6.44mm (Area: 44.17mm^2)
Input Clock Frequency		6 - 27 MHz
Interface		4-lane MIPI (2-lane and 3-lane modes supported); Max data rate: 1Gbps/lane
Subsampling modes		X - Bin2, Sum2 Skip: 2x, 4x
		Y - Sum2, Skip: 2x, 4x, 8x
Output data depth		10 bits
Analog gain		1x, 2x, 3x, 4x, 6x, 8x
High Quality Bayer Scalar		Adjustable scaling up to 1/6x scaling
Temperature sensor		10-bit, single instance on chip, controlled by two-wire serial I/F
Compression		DPCM: 10-8-10, 10-6-10
VCM AF driver		8-bit resolution
3-D support		Frame rate and exposure synchronization
Supply Voltage	Analog	2.5 - 3.1 V (2.8V nominal)
	Digital	1.14 - 1.3 V (1.2V nominal)
	Pixel	2.5 - 3.1 V (2.8V nominal)
	OTPM	1.7 - 1.9 V (1.8V nominal)
	I/O	1.7 - 1.9 V (1.8V nominal) or 2.5 - 3.1 V (2.8V nominal)
	MIPI	1.14 - 1.3 V (1.2V nominal)
Power consumption		400mW at 30 fps, 8Mp
Responsivity		0.7 V/lux-sec
SNR_{MAX}		36 dB
Dynamic Range		65 dB
Operating Temperature Range (at junction) - T_J		-30°C to +70°C

Features

Table 5: Independent Power and Ground Domains

Pad Name	Power Supply	Description
Grounds		
DGND (GNDPHY, GND_IO)	0V	Digital
VCM_GND	0V	VCM driver
AGND	0V	Analog
Power		
VAA	2.8V	Analog/VCM driver/OTPM
VAA_PIX	2.8V	Pixel/Analog
DVDD_1V2	1.2V	Digital
VDD_IO	1.8v/2.8V	IO
DVDD_1V2_PHY	1.2V	MIPI
DVDD_1V8	1.8V	OTPM

Table 7: Power-down Sequence

Definition	Symbol	Minimum	Typical	Maximum	Unit
EXTCLK to XSHUTDOWN	t_0	100	–	–	µs
XSHUTDOWN to supply 2.8V/1.8V	t_1	200	–	–	µs
Supply 2.8V/1.8V to supply 1.2V	t_2	0	200	–	µs
Supply 1.2V to VDD_IO	t_3	200	–	–	µs

Hard Standby and Hard Reset

The hard standby state is reached by the assertion of the XSHUTDOWN pad (hard reset). Register values are not retained by this action, and will be returned to their default values once hard reset is completed. The minimum power consumption is achieved by the hard standby state. The details of the sequence are described below and shown in Figure 6.

1. Disable streaming if output is active by setting mode_select 0x301A[2] = 0.
2. The soft standby state is reached after the current row or frame, depending on configuration, has ended.
3. Assert XSHUTDOWN (active LOW) to reset the sensor.
4. The sensor remains in hard standby state if XSHUTDOWN remains in the logic "0" state.

Figure 6: Hard Standby and Hard Reset

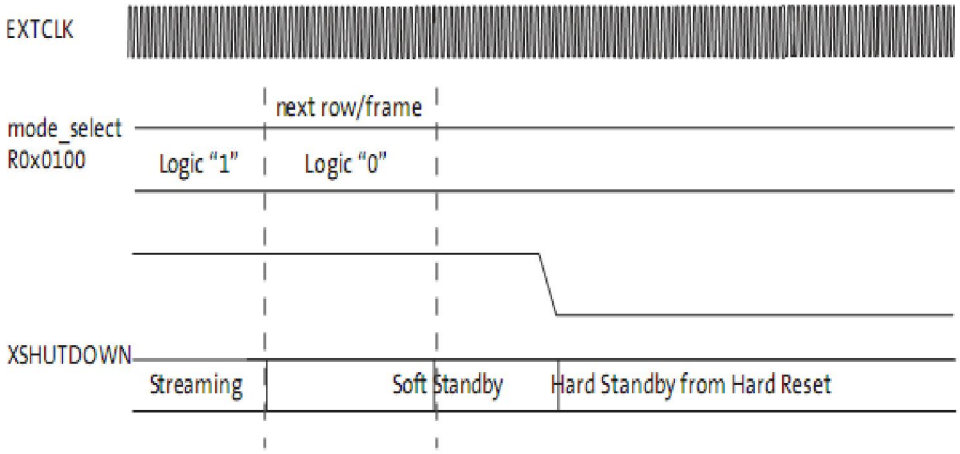
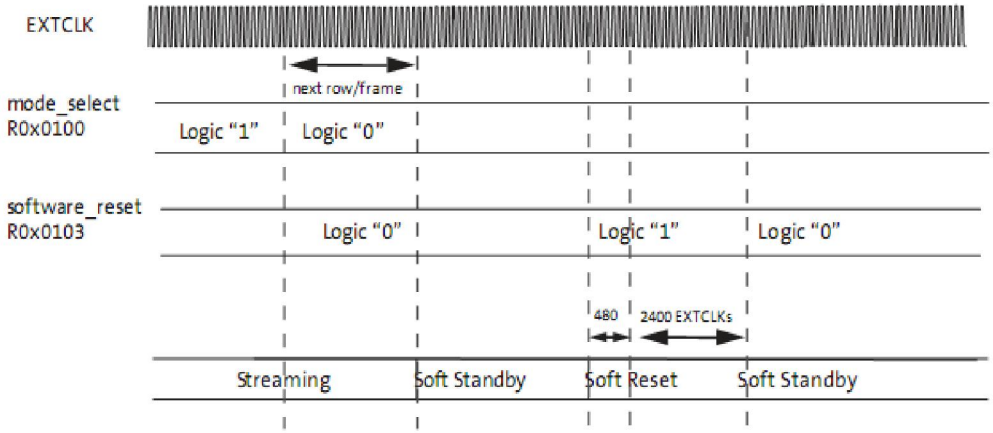
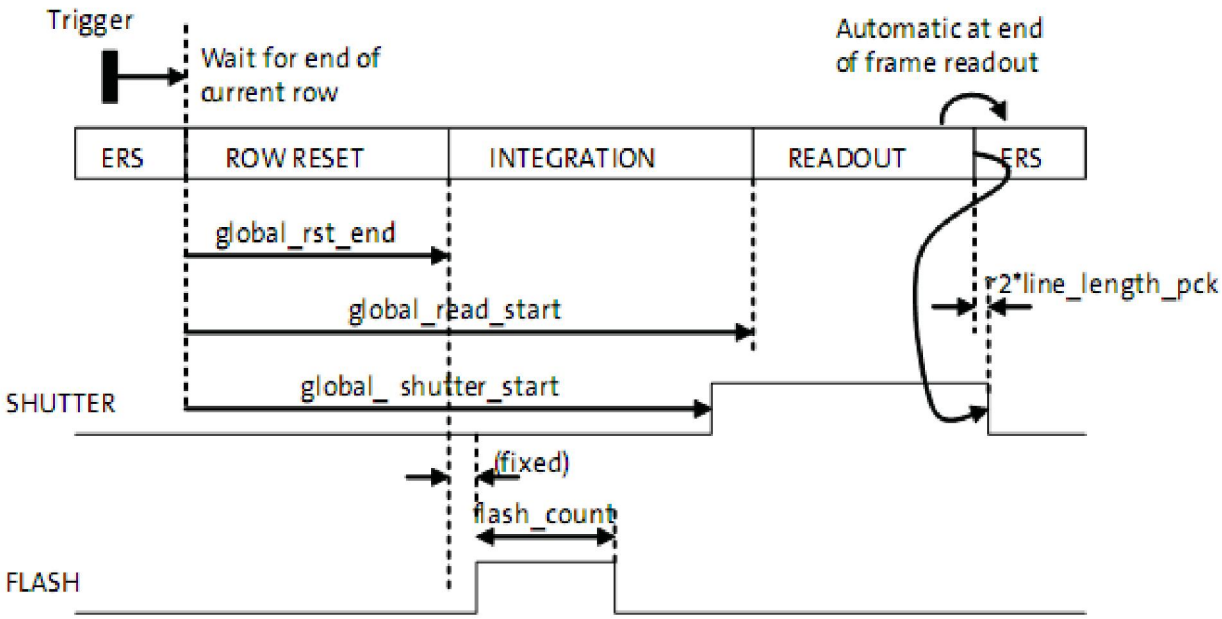


Figure 7: Soft Standby and Soft Reset



Using FLASH with Global Reset

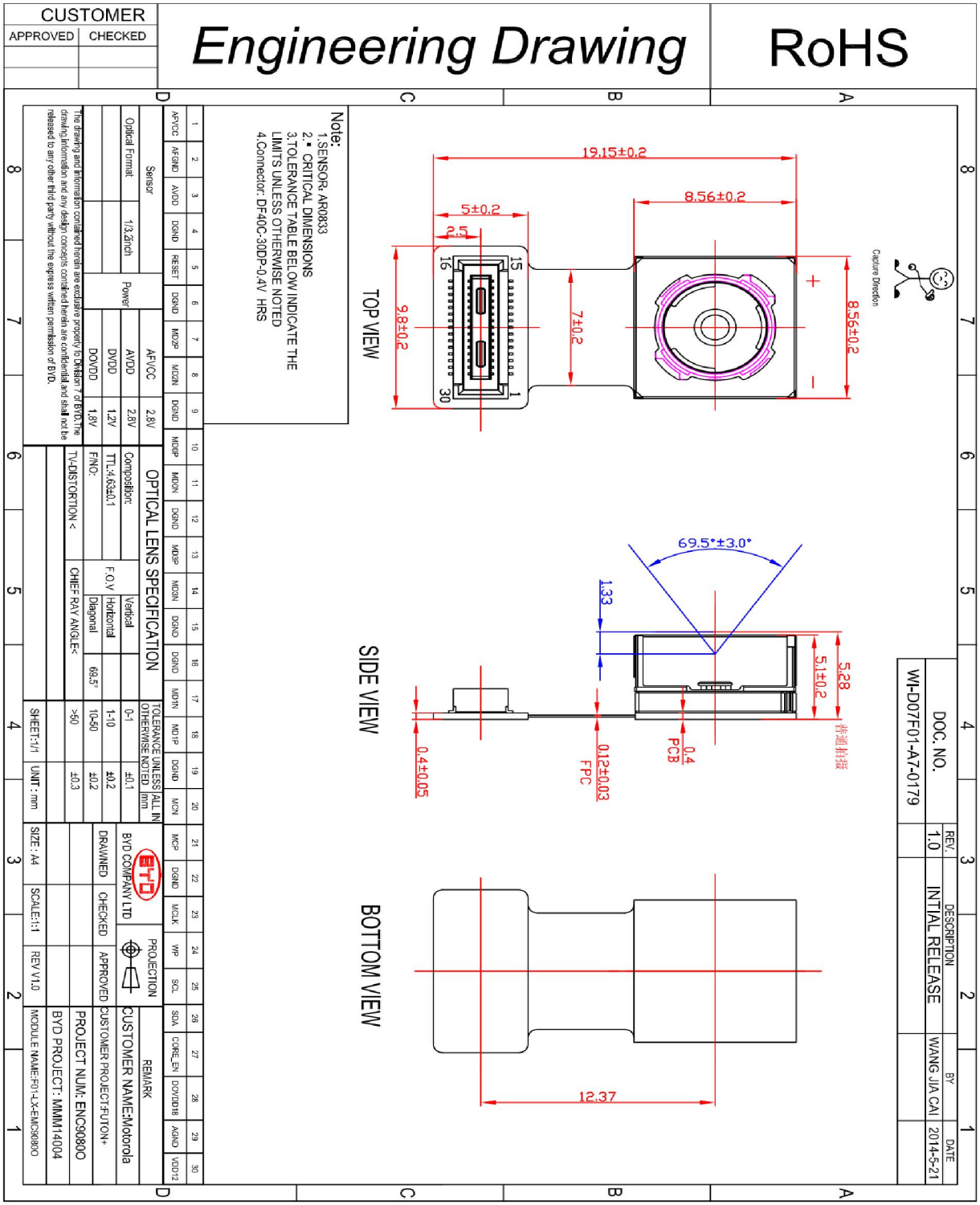


Testing

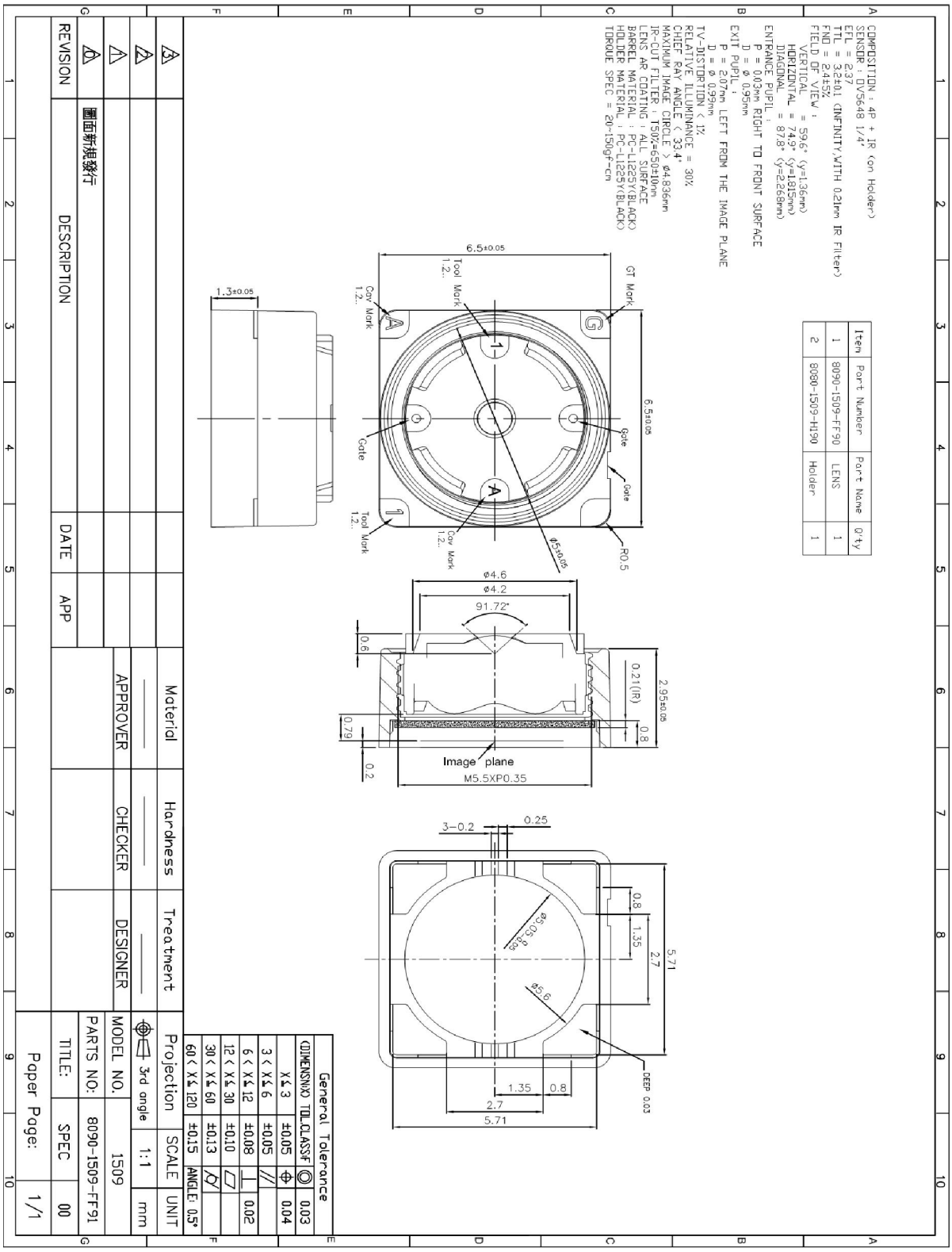
Table6. Reliability testing

No	Test Item	Test Conditions	Judge standard
1	Temperature Change shock test	High Temp.：80 ± 3°C Low Temp.：－30 ± 3°C Temp. changeover time：30min Test duration：24 cycles	No image distort and good color rendition.
2	High Temp & Damp test	Temp.：60°C ± 2°C Damp：90% ± 3%RH Test duration：48h	No image distort and good color rendition. Not to be dewy
3	Low Temperature Storage	Temp.：－30°C ± 3°C Test duration：48h	No image distort and good color rendition.
4	High Temperature Storage	Temp.：80± 3°C Test duration：48h	No image distort and good color rendition.
5	ESD(Electrostatic Discharge)	Voltage：10kv time：3	No image distort and good color rendition.
6	Vibration (Package State)	Frequency range：5-200HZ amplitude：0.75mm Duration 3 h for each position. Test all 3 axes (X, Y, Z)	No image distort，good color rendition ，no white、black、colorful dot.
7	Drop test Free fall (Package State)	Surface (floor)：Concrete or steel Number of drops：6 face*2 Positions：Random Height：150cm	No image distort，good color rendition ，no white、black、colorful dot.

Appendix1: Drawing



Picture 2: LENS Drawing

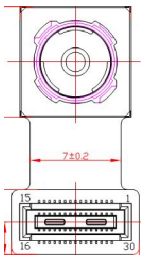


Appendix 1: Packaging

The package must prevent damage to the components during transport and must be suitable for electrostatic-sensitive devices. The single camera modules shall be delivered in a reusable tray of antistatic plastic material. Several cameras shall be packed in one tray. The tray has separate holders for each camera-module.

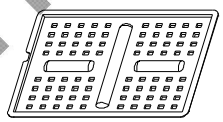
Example:

1



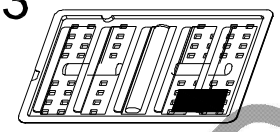
QA PASSED
PRODUCTION

2



120 UNITS PLAY PVC TRAY
PVC TRAY BOTTOM

3

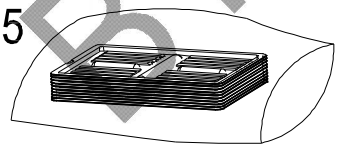


PVC TRAY COVER

4

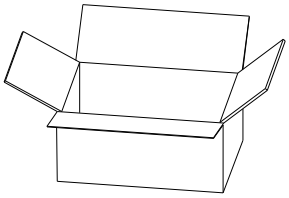
10 units (1200pcs camera module)

5



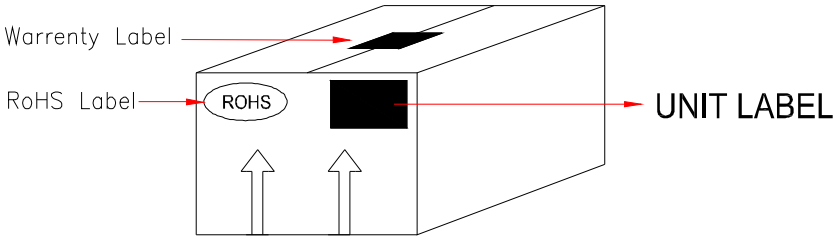
PLASTIC BAG
VACCUM-PACKED

6



1200 UNITS IN 1 CARTON
TRAY SPONGE

7



Warranty label, ROHS label,和 UNIT label.

TRAY SPECIFICATION:
Material: black antistatic PS
Resistance: <1010 Ω
Dimension:260 (W) x 180 (D) x 11 (H) mm (Top tray and bottom tray assembly)
Capacity: 120 units (120pcs camera module)

ESD SHIELDING BAG SPECIFICATION:
Resistance: 107~1010 Ω
Dimension:430 (W) x 380 (D) x 0.075 (T) mm
Capacity : 10 units (1200pcs camera module)

CARTON SPECIFICAITON:
Dimension:276 (W) x 198 (D) x 113 (H) mm

PAPER SHEET SPECIFICAITON:
Capacity : 1 units (1200pcs camera module)
Dimension:270 (W) x 192 (D) x 2.5 (T) mm

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