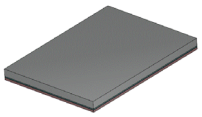
1/2.8-inch 2 MP CMOS Digital Image Sensor with Global Shutter AR0235CS



ODCSP62
CASE 570CY

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

Non−NDA Data Sheet

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Request Full Data Sheet

Description

The AR0235CS is a 1/2.8−inch CMOS digital image sensor with an active−pixel array of 1920 (H) x 1200 (V). It incorporates a new innovative global shutter pixel design optimized for accurate and fast capture of moving scenes. The sensor produces clear, low noise images in both low−light and bright scenes. It includes sophisticated camera functions such as auto exposure control, windowing, row skip mode, column−skip mode, pixel−binning and both video and single frame modes. It is programmable through a simple two−wire serial interface. The AR0235CS produces extraordinarily clear, sharp digital pictures, and its ability to capture both continuous video and single frames makes it the perfect choice for a wide range of applications, including scanning and industrial inspection.

Table 1. KEY PERFORMANCE PARAMETERS

Parameter	Typical Value
Optical Format	1/2.8−inch (6.34 mm)
Active Pixels	1920 (H) x 1200 (V) not including 8 border pixels on each side
Pixel Size	2.8 μm
Color Filter Array	Monochrome
Chief Ray Angle	0 or 28°
Shutter Type	Global Shutter
Input Clock Range	10−48 MHz
Output Interface	8−bit/10−bit MIPI 1, 2, or 4−lane
Output Data Rate	Maximum Serial Output Data Rate 850 Mbps/lane
Frame Rate Full Resolution	120 fps (10−bit)
Responsivity Monochrome	41.9 ke−/lux*s
SNR_{MAX}	37 dB
Dynamic Range	65.3 dB
Supply Voltage I/O Digital Analog	 1.8 V 1.25 V 2.8 V
Power Consumption	252 mW, at 120 FPS, Full Resolution
Operating Temperature	(−30°C < T_J < +85°C)
Optimal Performance Temperature Range	(0°C < T_J < +60°C)
Package Options	7.66 x 5.64 mm 62−ball CSP θ_{JA}: 32°C/W (Note 1) θ_{JB}: 11°C/W
	Bare Die

1. θ_{JA}" is dependent on the customer module design and should not be used for calculating junction temperature.

Features

- Superior Low−light and IR Performance
- 8−bit/10−bit MIPI, 1/2/4−lane MIPI
  8−bit/10−bit MIPI, 1/2/4−lane MIPI
- Automatic Black Level Calibration (ABLC)
- Horizontal and Vertical Mirroring, Windowing and Pixel Binning
- 5 x 5 Statistics Engine for On−chip Auto Exposure Control for Any Programmable Region of Interest (ROI)
- Flexible Control for Row and Column Skip Mode
- On−chip Trigger Mode for Synchronization
- Built in Flash Control
- Two On Chip Phase Lock Loop (PLL)
- Context Switching
- 1056 Bytes One−time Programmable Memory (OTPM)
- Simple Two−wire Fast−mode + Serial Interface

Applications

- Bar Code Scanner
- Factory Automation
- Autonomous Mobile Robot (AMR)
- Machine Vision
- 3D Scanning
- Biometrics

ORDERING INFORMATION

Table 2. AVAILABLE PART NUMBERS

Part Number	Product Description	Product Attribute Description
AR0235CSSM00SMKA0−CP	Mono, 0° CRA	CSP with Protective Film
AR0235CSSM00SMKA0−CP2	Mono, 0° CRA	CSP with Protective Film, MOQ 50 Pieces
AR0235CSSM00SMKA0−CR	Mono, 0° CRA	CSP without Protective Film
AR0235CSSM00SMKAH3−GEVB	Mono, 0° CRA	Demo Board
AR0235CSSM28SMKA0−CP	Mono, 28° CRA	CSP with Protective Film
AR0235CSSM28SMKA0−CR	Mono, 28° CRA	CSP without Protective Film
AR0235CSSM28SMKA0−CP2	Mono, 28° CRA	CSP Chip Tray with Protective Film, MOQ 50 Pieces
AR0235CSSM28SMKAH3−GEVB	Mono, 28° CRA	Demo Board

NOTE: Refer to AR0235 Die Data Sheet for Die Part Numbers and Ordering Information.

Table 3. FRAME RATE OF DIFFERENT MODES OF OPERATION

Resolution	Mode	Frame Rate (frames per sec)
Full_Resolution 1920 x 1200	Master	120
	Slave Integration Start	90
	Slave Integration Time	90
	Slave Integration Start and Readout Start	90
	Slave Integration Start and Integration	depends on exp (not constant frame rate)
2x2_Subsampling 960 x 600	Master	245
	Slave Integration Start	160
	Slave Integration Time	160
	Slave Integration Start and Readout Start	160
	Slave Integration Start and Integration	depends on exp (not constant frame rate)

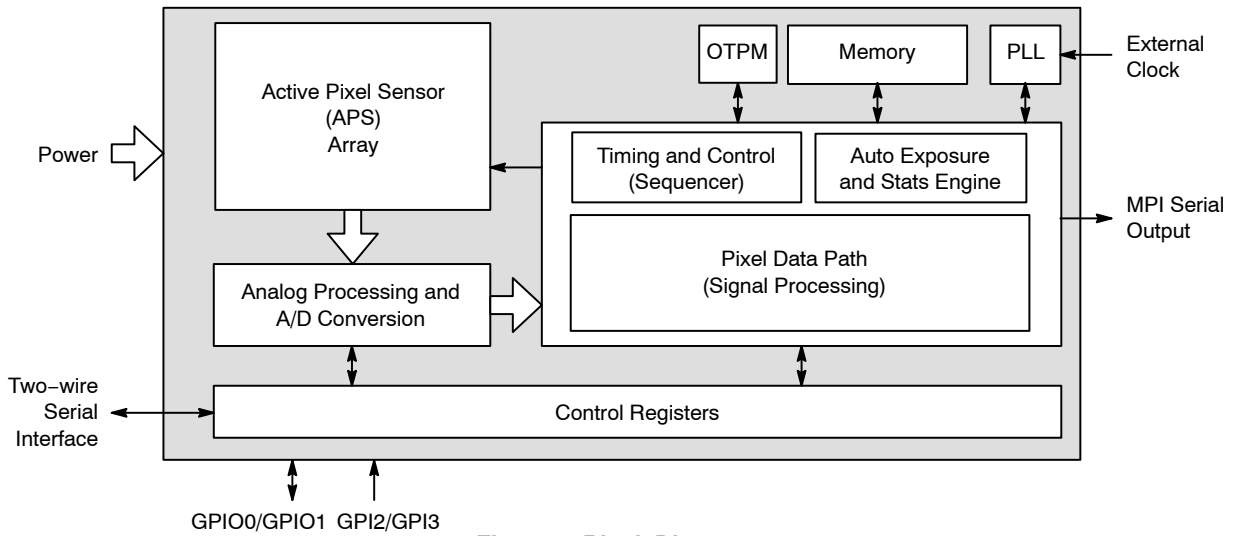
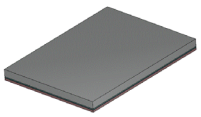


Figure 1. Block Diagram

PACKAGE DIMENSIONS



ODCSP62 7.659x5.643
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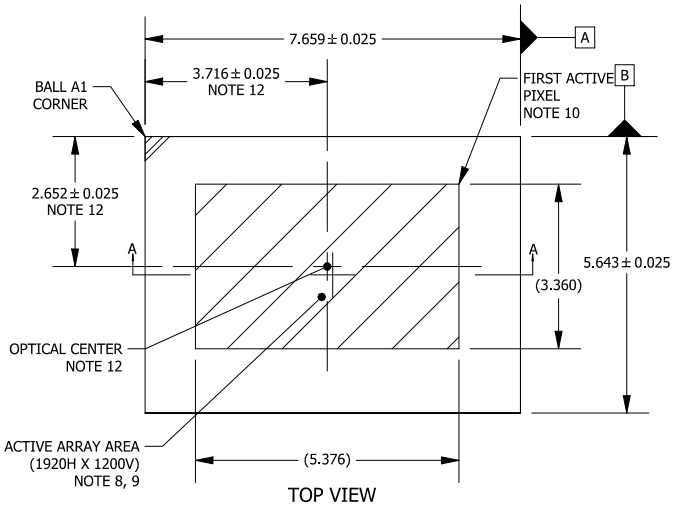
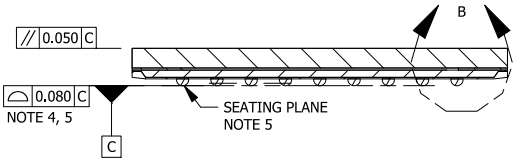
ISSUE O



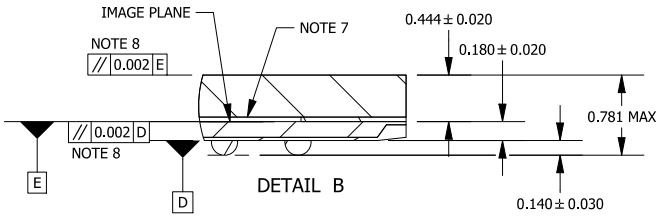
TOP VIEW

NOTES:

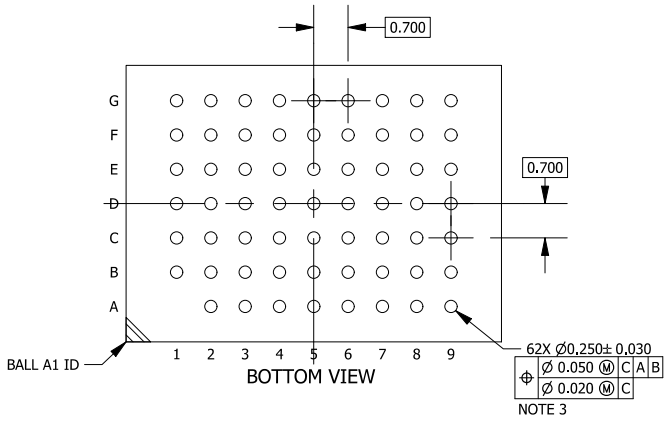
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS [mm].
3. SOLDER BALL DIAMETER IS MEASURED AT THE MAXIMUM SOLDER BALL DIAMETER PARALLEL TO DATUM C.
4. COPLANARITY APPLIES TO THE SPHERICAL CROWNS OF THE SOLDER BALLS.
5. DATUM C, THE SEATING PLANE IS DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
6. GLASS: 0.400 THICKNESS; REFRACTIVE INDEX = 1.52.
7. AIR GAP BETWEEN GLASS AND PIXEL ARRAY: 0.044 THICKNESS.
8. PARALLELISM APPLIES ONLY TO THE ACTIVE ARRAY.
9. MAXIMUM ROTATION OF ACTIVE ARRAY RELATIVE TO DATUMS A AND B IS ± 0.1°.
10. REFER TO THE DEVICE DATA SHEET FOR TOTAL PIXEL ARRAY DEFINITIONS.
11. PACKAGE CENTER (X, Y) = (0.000, 0.000).
12. OPTICAL CENTER RELATIVE TO PACKAGE CENTER (X, Y) = (-0.114, 0.170).



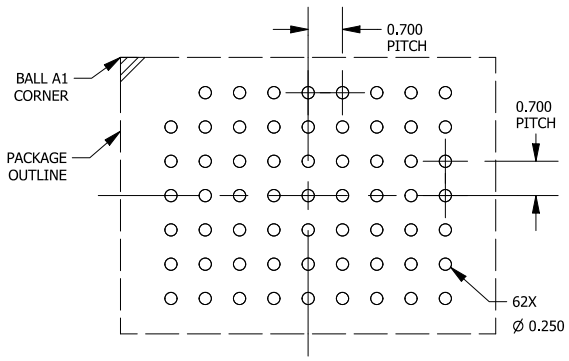
SECTION A-A



DETAIL B



BOTTOM VIEW



RECOMENDED MOUNTING FOOTPRINT*

*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
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