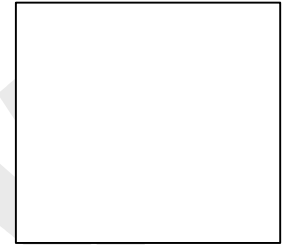


Low Power Color CMOS Image Sensors

Technical Data (Preliminary)

Part Numbers: HDCS-2020 (VGA) and HDCS-1020 (CIF)



Description

The HDCS-2020 and HDCS-1020 CMOS Image Sensors capture high quality images while consuming very low power. These parts integrate the digital timing control and voltage regulation to provide an all-digital interface. Available in either VGA (640x480) or CIF (352x288) resolution image arrays, the devices are ideally suited for a wide variety of applications.

These image sensors contain many features to simplify system design and reduce time to market for camera manufacturers. The highly integrated design incorporates all of the timing generators, analog-to-digital converters (ADC), voltage references, and Integrated Double Sampling into a single component. System integration is simplified by these sensors all digital I/O. Color specific programmable gain amplifiers permits full accesses to the ADC's dynamic range, regardless of scene illumination, assuring the capture of high quality images. The low power architecture of these sensors permits them to be easily incorporated in battery-powered devices.

The HDCS-2020 and HDCS-1020, when coupled with Agilent's HDCP family of image-processors, provide a complete imaging system to enable quick end-product development. Designed for low-cost consumer electronic applications, the HDCS-2020 and HDCS-1020 sensors deliver unparalleled performance for mainstream imaging applications.

Features

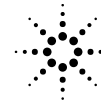
- 2 resolution arrays available - HDCS-2020 (VGA: 640x480) and HDCS-1020 (CIF: 352 x 288)
- Integrated Analog-to-Digital Converters - HDCS-2020 (10 bit), HDCS-1020 (8 bit)
- All Digital I/O - Fully integrated voltage references, timing controller and Analog-to-Digital Converters
- Single Voltage Requirement - 3.3 Volts only
- High frame rates - HDCS-2020: 15 frames/second, HDCS-1020: 30 frames/second
- Color Specific Programmable Gains for optimized imaging
- High Sensitivity, low noise design - Capturing excellent images in a wide variety of lighting conditions
- Versatile timing control - Programmable handshaking and synchronization signals
- Variable master clock rate: HDCS-2020 (up to 25 MHz), HDCS-1020 (up to 30 MHz)
- Industry standard Bayer color filter pattern
- I²C compatible and UART interfaces for configuration and control
- Package: 32 pin Optical Plastic J-Lead 13.5 x 14.5mm

Typical Applications

- PC camera
- Digital Still Cameras
- Toys
- Cellular Phones
- Handheld Computers
- Notebook Computers

Preliminary Product Disclaimer

These products are under development. Until Agilent Technologies releases these products for general sales, Agilent reserves the right at any time to alter prices, specifications, features, capabilities, functions, manufacturing release dates, and even general availability of the product. It is advisable to consult your local Agilent Technologies field sales engineer when considering these products for designs and production volumes.



Typical Electrical Specifications (Preliminary)

Specification	HDCS-2020	HDCS-1020	Units
Active Array Resolution	VGA 640x480	CIF 352x288	pixels
Color Filter Array	Yes – Color Bayer	Yes –Color Bayer	
Analog/Digital Converter Resolution	10	8	bits
ADC effective number of bits	9.3	7.8	bits
Pixel Size	7.4 x 7.4		μm
Fill Factor	40%		
Color channel programmable specific gain range	1 – 40 gain, 8 bit resolution		
Saturated Pixel Voltage	1.3		Volts
Peak Quantum Efficiency (G,R,B) ¹	22%, 19%, 19%		
Pixel Sensitivity @ 550 nm ³	0.77		V/Lux-sec
Full Well Capacity	60,000		electrons
Conversion Gain ³	22		μv/e ⁻
Dark signal @ 22°C ambient ⁵	1500		electrons/second
Effective noise floor ⁴	37 ²	63 ³	electrons
Effective Sensor Dynamic Range ⁴	64 ²	59 ³	dB
Effective Sensor Dynamic Range (including dark current shot noise @ 1/30 sec exposure)	64 ²	59 ³	dB
Minimal Exposure	1.8 ⁷	1.2 ⁶	μs
Exposure granularity	1.8 ⁷	1.2 ⁶	μs
Maximum Clock frequency	25	30 ⁶	MHz
Peak Data Output Rate	4.5 ⁷	3.3 ⁶	Million pixels/second
Supply Voltage	3.3 ±10%		Volts
Operating Power ⁵	150 nominal / 200 maximum	90 nominal / 125 maximum	mW
Standby Power Consumption (Clock on)	3.7 nominal/5.0 maximum		mW
Static Power Consumption (Clock off)	200 maximum		μW
Package	32 Pin J-lead 13.5 x 14.5		mm
Operating Temperature	-5° - +65°		C
Storage Temperature	-40° - +125°		C

Notes

¹ Defined over complete pixel

² Gain of PGA gain of 1.45

³ PGA gain of 1.0

⁴ Excludes dark current shot noise

⁵ At maximum frame rate

⁶ 8 Bit

⁷ 10 Bit

Note: Dynamic range defined as the ratio of well capacity to noise floor excluding photon shot noise

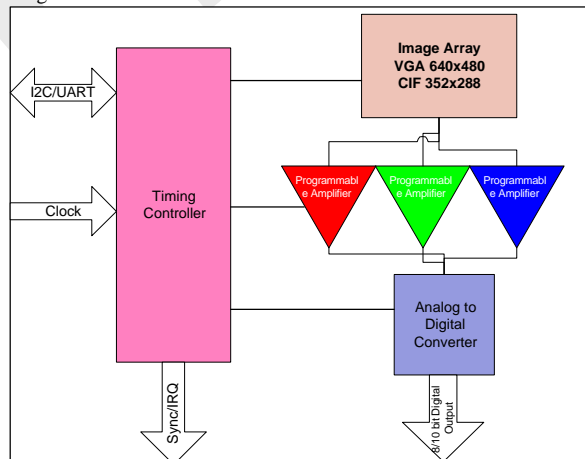


Figure 1 – Block Diagram

For more information contact:

<http://www.agilent.com/view/imagingelectronics>

Americas/Canada: 1-800-235-0312

Far East/Australia/Asia: Call your local Agilent Sales Office

Japan: Call your local Agilent Sales Office

Europe: Call your local Agilent Sales Office

Data subject to change

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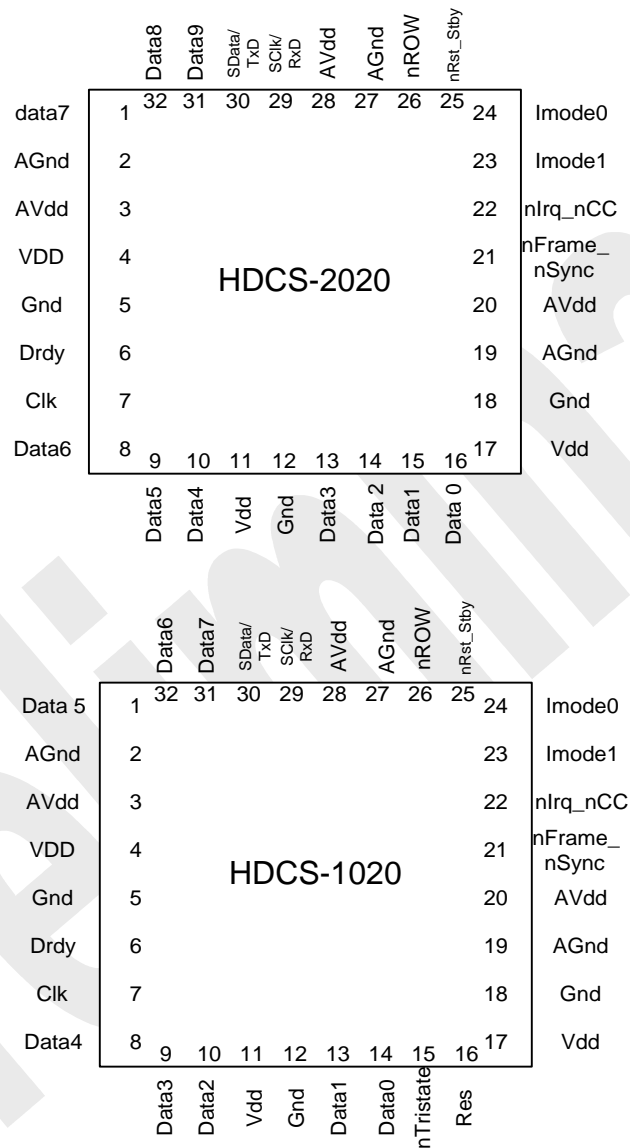
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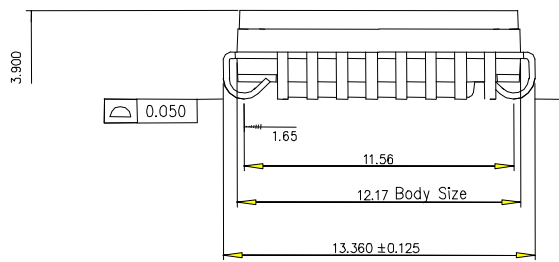
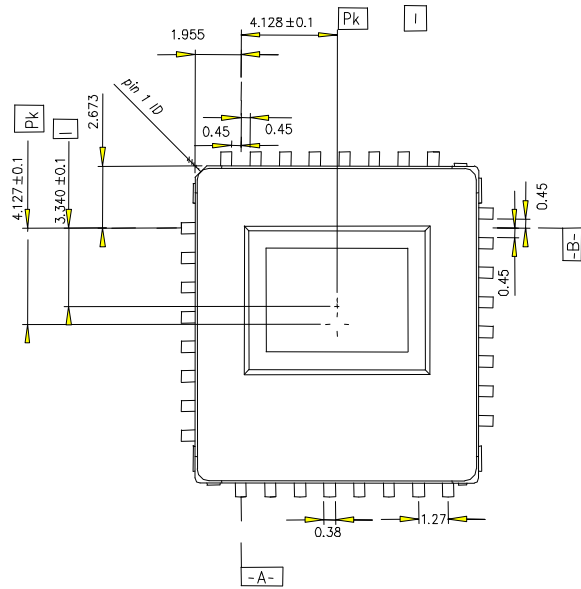


Component Pin-out

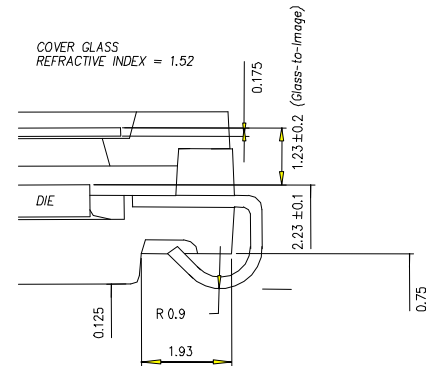
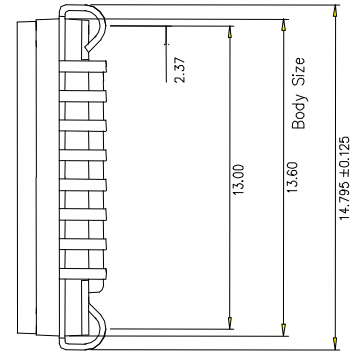


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CROSS-SECTION DETAIL

- 352x288 PIXELS - 2.605 MM x 2.131 MM.
 - IC SURFACE TO SEATING PLANE SEPARATION IS 2.23 MM.
 - DATUM A, AND B DEFINED AT TOP LEAD SHOULDER AND PLASTIC BODY INTERFACE.
 - LEADFRAME PLATING NI-Pd-AU.
 - ADDITIONAL PACKAGING, LABELING AND QUALITY REQUIREMENTS ARE AS SPECIFIED ON PART ORDER.
 - GEOMETRIC DIMENSIONING & TOLERANCING SYMBOLOLOGY PER ANSI Y14.9M-1982.
 - DIMENSIONS ARE RELATED TO DATUM A (PRIMARY), DATUM B (SECONDARY), AND DATUM C (TERTIARY).
- NOTES: (UNLESS OTHERWISE SPECIFIED)

Symbols:

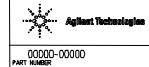
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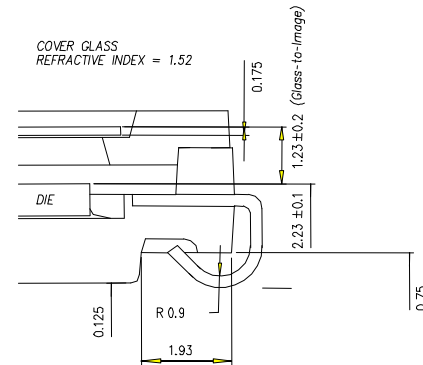
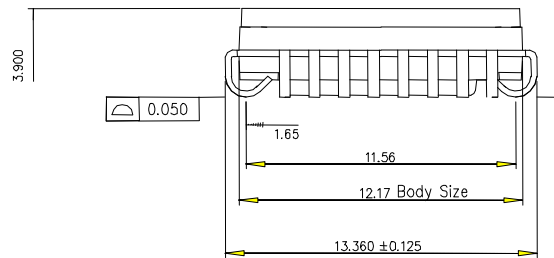
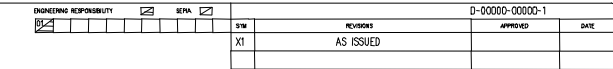
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• THIRD ANGLE PROJECTION													
TOLERANCES													
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ALL DIMENSIONS													
STRIKE OUT OR FILL IN AS NEEDED													
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ENGINEER/DESIGNER													
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7. 640x480 PIXELS - 4.736 MM X 3.352 MM.
6. IC SURFACE TO SEATING PLANE SEPARATION IS 2.23 MM.
5. DATUM A, AND B DEFINED AT TOP LEAD SHOULDER AND PLASTIC BODY INTERFACE.
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TOLERANCES		FRACTIONS		DATE		MATERIAL	
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ALL UNLESS NOTED		CHAMFER, PREPARED				 Agilent Technologies	
NEEDED TO PROVE						00000-00000	
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