



**THE DATASHEET OF  
VSP2232Y**



## CCD SIGNAL PROCESSOR FOR DIGITAL CAMERAS

### FEATURES

- **CCD Signal Processing**
  - Correlated Double Sampling (CDS)
  - Programmable Black Level Clamping
- **Programmable Gain Amplifier (PGA)**
  - –6-dB to 42-dB Gain Ranging
- **10-Bit Digital Data Output**
  - Up to 36-MHz Conversion Rate
  - No Missing Codes
- **76-dB Signal-to-Noise Ratio**
- **Portable Operation**
  - Low Voltage: 2.7 V to 3.6 V
  - Low Power: 130 mW (typ) at 3.0 V
  - Standby Mode: 6 mW

### DESCRIPTION

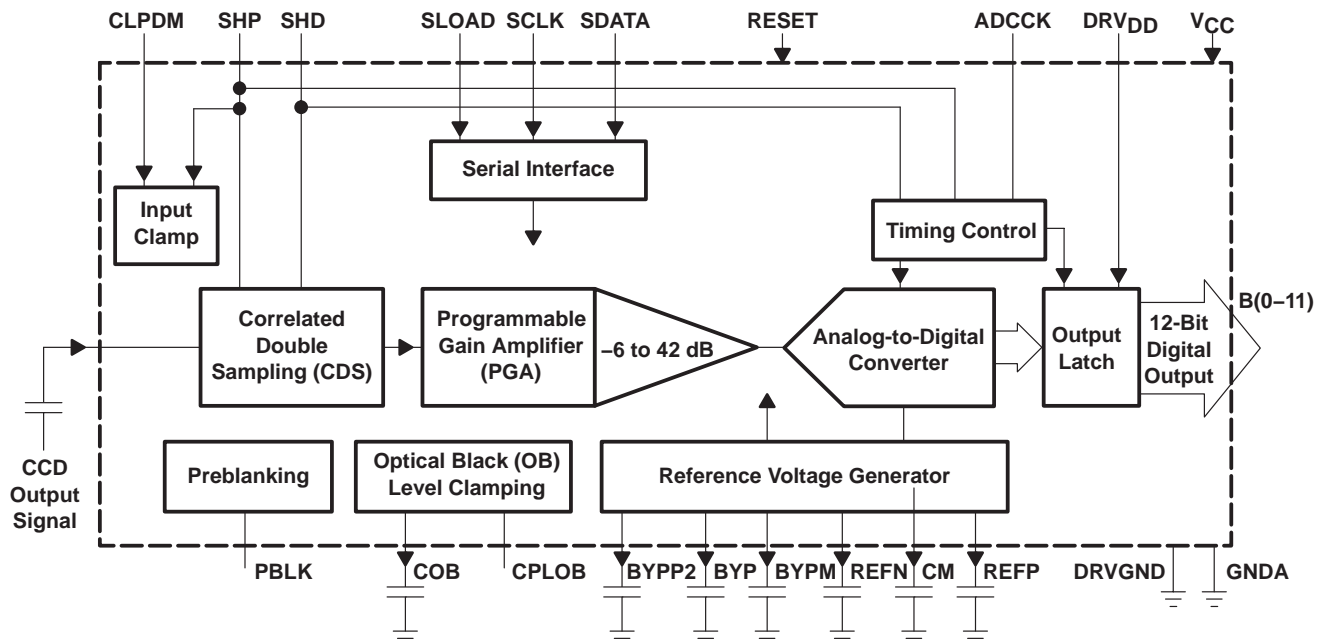
The VSP2232 is a complete mixed-signal processing IC for digital cameras that provides signal conditioning and analog-to-digital conversion for the output of a CCD array. The primary CCD channel provides correlated double sampling (CDS) to extract the video information from the pixels, a –6-dB to 42-dB gain with digital control for varying illumination conditions, and black level clamping for an accurate black level reference.

Input signal clamping and offset correction of the input CDS is also performed. The stable gain control is linear in dB. Additionally, the black level is quickly recovered after gain change.

The VSP2232Y is pin-to-pin compatible with the VSP2262Y (12-bit 20 MHz) one-chip product.

The VSP2232Y is available in a 48-pin LQFP package and operates from a single 3-V/3.3-V supply.

### VSP2232 block diagram



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
VSP2232Y	NRND	LQFP	PT	48	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 85	VSP2232Y	
VSP2232YG4	NRND	LQFP	PT	48	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 85	VSP2232Y	

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

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(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

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**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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