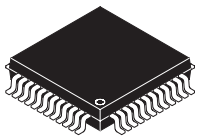
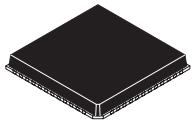
TEXAS INSTRUMENTS





SLES020 − DECEMBER 2001

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**
- **12-Bit Digital Data Output:**
  - **Up to 28-MHz Conversion Rate**
  - **No Missing Codes**
- **77-dB Signal-To-Noise Ratio**
- **Portable Operation:**
  - **Low Voltage: 2.7 V to 3.6 V**
  - **Low Power: 94 mW (Typ) at 3 V**
  - **Stand-By Mode: 6 mW**

APPLICATIONS

- **DSC, DVC, Security Camera**

DESCRIPTION

The VSP2272 device is a complete mixed-signal processing IC for digital cameras providing signal conditioning and analog-to-digital conversion for the output of a charge-coupled device (CCD) array. The primary CCD channel provides correlated double sampling (CDS) to extract the video information from the pixels, –6-dB to 42-dB gain range 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 are also performed. The stable gain control is linear in dB. Additionally, the black level is quickly recovered after gain change.

The VSP2272Y device is available in a 48-lead LQFP package and the VSP2272M device is available in a 48-lead P-VQFN package. Both devices operate from a single 3-V/3.3-V supply.

AVAILABLE OPTIONS

PRODUCT	PACKAGE	PACKAGE OUTLINE DESIGNATOR†	SPECIFIED TEMPERATURE RANGE	PACKAGE MARKING	ORDERING NUMBER‡	TRANSPORT MEDIA
VSP2272Y	48-Lead LQFP	PT	−25°C to 85°C	VSP2272Y	VSP2272Y	250-piece tray
VSP2272Y	48-Lead LQFP	PT	−25°C to 85°C	VSP2272Y	VSP2272Y/2K	Tape and reel
VSP2272M	48-Lead P-VQFN	RGN	−25°C to 85°C	VSP2272M	VSP2272M	250-piece tray
VSP2272M	48-Lead P-VQFN	RGN	−25°C to 85°C	VSP2272M	VSP2272M/2K	Tape and reel

† A detailed drawing and a dimension table are located at the end of the data sheet.

‡ Models with a slash (/) are available only in tape and reel in the quantities indicated (e.g., /2K indicates 2,000 devices per reel). Ordering 2,000 pieces of the VSP2272Y/2K device will get a single 2,000-piece tape and reel.

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
VSP2272M/2K	ACTIVE	VQFN	RGN	48	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-25 to 85	VSP2272M	Samples
VSP2272Y	ACTIVE	LQFP	PT	48	250	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-25 to 85	VSP2272Y	Samples

(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.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

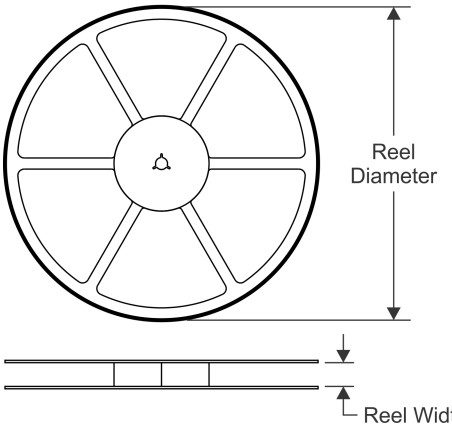
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

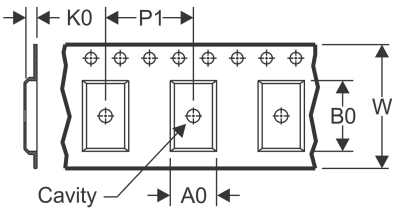
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

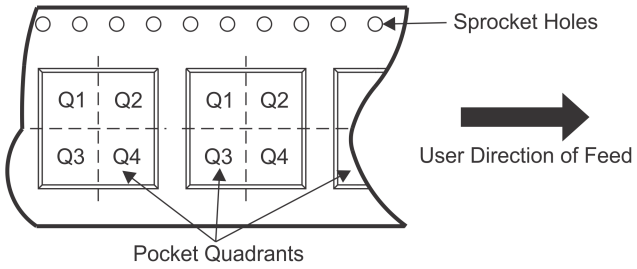


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

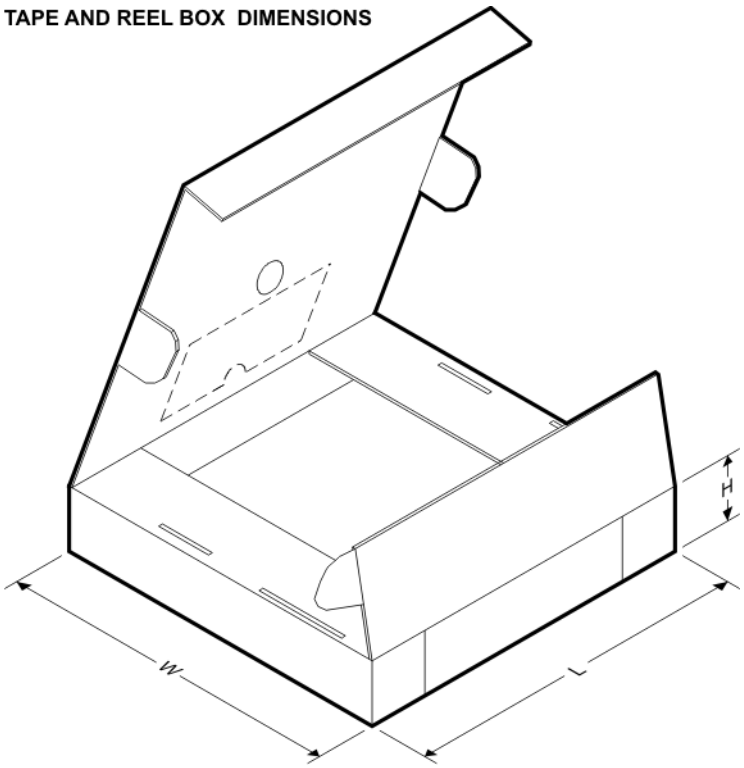
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
VSP2272M/2K	VQFN	RGN	48	2000	330.0	17.4	7.4	7.4	1.3	12.0	16.0	Q1

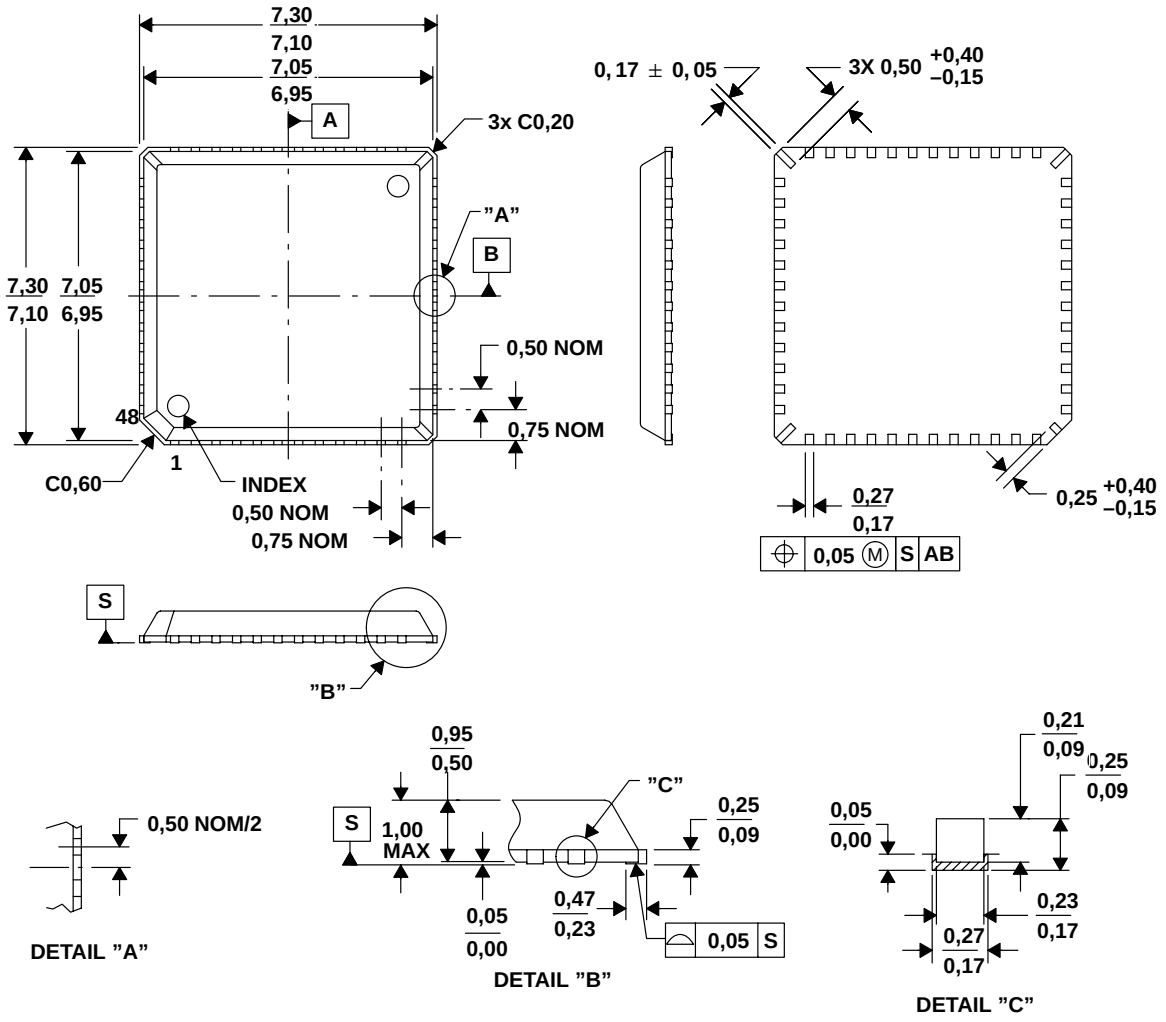
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
VSP2272M/2K	VQFN	RGN	48	2000	367.0	367.0	38.0

RGN (S-PQFP-N48) **PLASTIC QUAD FLATPACK**



NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. These dimensions include package bend.

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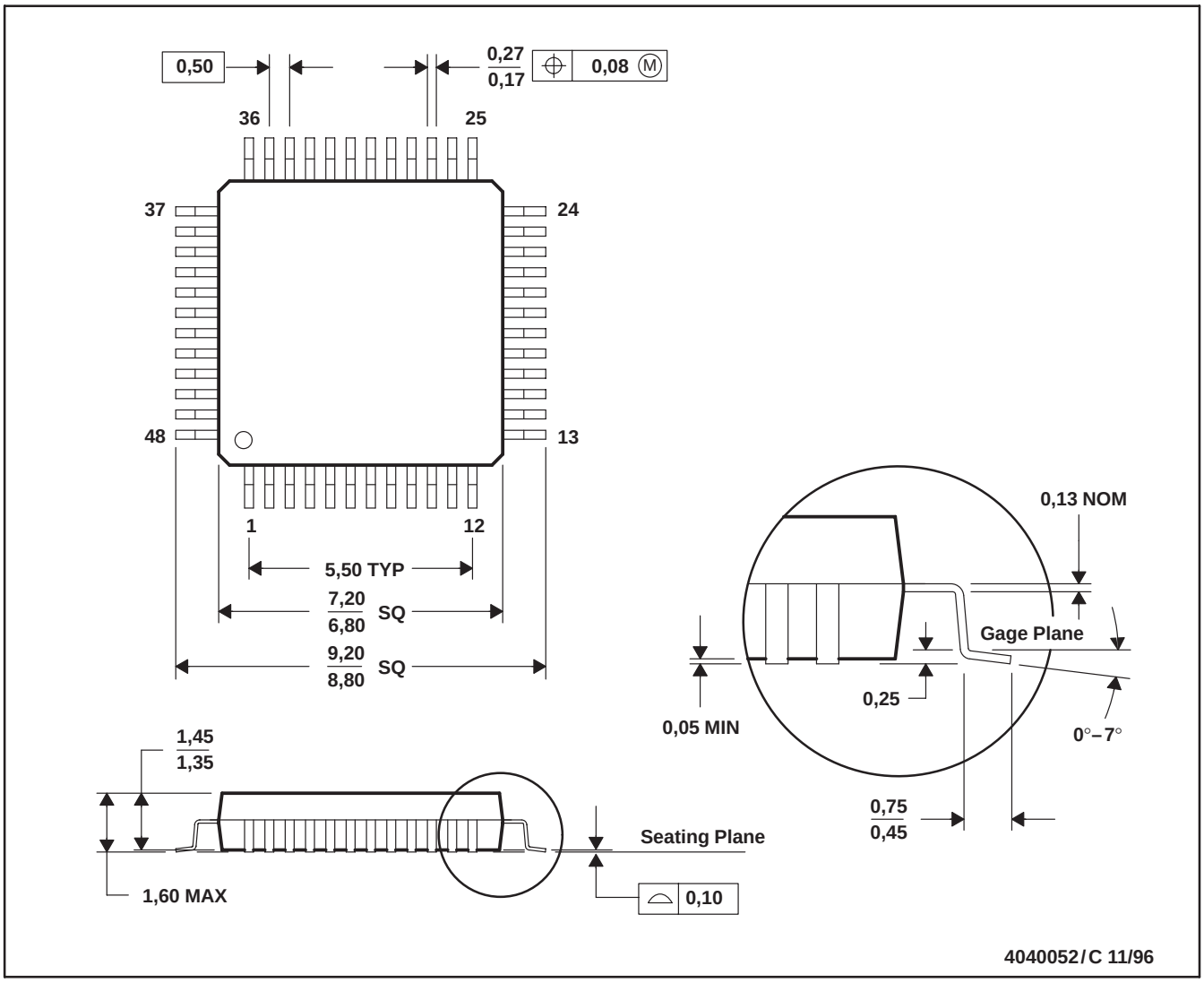
PT (S-PQFP-G48) **PLASTIC QUAD FLATPACK**



NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS-026
D. This may also be a thermally enhanced plastic package with leads conected to the die pads.

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