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MARKING DIAGRAM

14

NCS
2564
ALYW

TSSOP-14
TBD SUFFIX
CASE 948G

14

NCS
2564
ALYW

1

NCS2564 = Specific Device Code
A = Assembly Location
L = Wafer Lot
V = Year

Y = Year
W = Work Week
Pb-Free Package

PINOUT

14	CVBS_OUT
13	GND
12	GND
11	SD/HD_EN
10	SD/HD_OUT1
9	SD/HD_OUT2
8	SD/HD_OUT3
	12 11 10 9

ORDERING INFORMATION

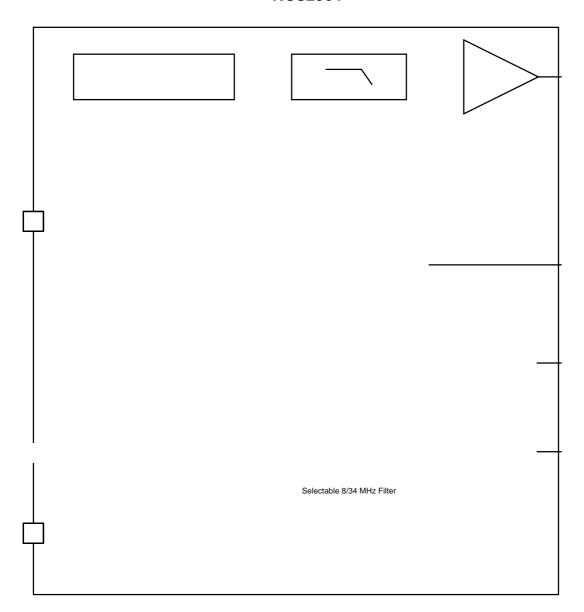
Device	Package	Shipping [†]
NCS2564DTBR2G	TSSOP-14 (Pb-Free)	2500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

- Internal Fixed Gain: 6 dB ± 0.2
- Integrated Level Shifter
- AC or DC Coupled Inputs and Outputs
- Low Quiescent Current
- Shutdown Current 42 μA Typical (Disabled)
- ullet Each channel Capable to Drive 2 by 150 Ω Loads
- Wide Operating Supply Voltage Range: +4.7 V to +5.3 V
- 8 kV ESD Protection (IEC61000 4 2 Compatible)
- TSSOP 14 Package
- These are Pb Free Devices

Typical Application

- Set Top Box Decoder
- DVD Player / Recorder
- HDTV



PIN DESCRIPTION

Pin No.	Name	Туре	Description
1	CVBS_IN	Input	Video Input for Video Signal featuring a frequency bandwidth compatible with NTSC / PAL / SECAM Video (8 MHz) – CVBS Channel
2	CVBS_EN	Input	CVBS Channel Enable /Disable Function: Low = Enable, High = Disable. When left open the default state is Enable.
3	VCC	Power	Power Supply / 4.7 V to 5.3 V
4	SD/HD	Input	Pin of selection enabling the Standard Definition or High Definition Filters (8 MHz / 34 MHz) for channels SD/HD – when Low SD filters are selected, when High HD filters are selected.
5	SD/HD_IN1	Input	Selectable SD or HD Video Input 1 – SD/HD Channel 1
6	SD/HD_IN2	Input	Selectable SD or HD Video Input 2 – SD/HD Channel 2
7	SD/HD_IN3	Input	Selectable SD or HD Video Input 3 – SD/HD Channel 3
8	SD/HD_OUT3	Output	SD/HD Video Output 3 – SD/HD Channel 3
9	SD/HD_OUT2	Output	SD/HD Video Output 2 – SD/HD Channel 2
10	SD/HD_OUT1	Output	SD/HD Video Output 1 – SD/HD Channel 1
11	SD/HD_ EN	Input	SD/HD Channel Enable/Disable Function: Low = Enable, High = Disable. When left open the default state is Enable.
12	GND	Ground	Ground
13	GND	Ground	Ground
14	CVBS_OUT	Output	CVBS Video Output – CVBS Channel

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltages	V _{CC}	$-0.3 \le V_{CC} \le 5.5$	Vdc
I/O Voltage Range	V _{IO}	$-0.3 \le V_{I} \le V_{CC}$	Vdc
Input Differential Voltage Range	V _{ID}	$-0.3 \le V_{I} \le V_{CC}$	Vdc
Output Current (Indefinitely) per Channel	Io	40	mA
Maximum Junction Temperature (Note 1)	T_J	150	<u>-</u>

DC ELECTRICAL CHARACTERISTICS (V_{CC} = +5.0 V, R_{source} = 37.5 Ω , T_A = 25°C, inputs AC–coupled with 0.1 μ F, all outputs AC–coupled with 220 μ F into 150 Ω referenced to 400 kHz; unless otherwise specified)

Symbol	Characteristics	Conditions	Min	Тур	Max	Unit	
POWER S	UPPLY						
V _{CC}	Supply Voltage Range		4.7	5.0	5.3	V	
I _{CC}	Supply Current	SD Channels Selected + C_{vbs} HD Channels Selected + C_{vbs}		40 50	55 70	mA	
I _{SD}	Shutdown Current (CVBS_EN and SD/H10.81-0 Se06.3	06 636.831 11.112 .34015 refBT8	0 71 T27	6.4 570 36	30.7086	Tm.0027	Highi

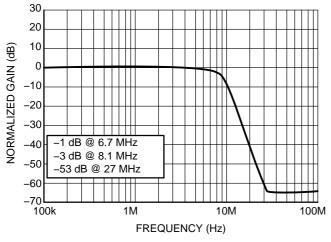
AC ELECTRICAL CHARACTERISTICS FOR HIGH DEFINITION CHANNELS (pin numbers (5, 10) (6, 9), (7, 8))

 $(V_{CC} = +5.0 \text{ V}, V_{in} = 1 \text{ V}_{PP}, R_{source} = 37.5 \ \Omega, T_A = 25^{\circ}C, \text{ inputs AC-coupled with } 0.1 \ \mu\text{F, all outputs AC-coupled with } 220 \ \mu\text{F into } 150 \ \Omega \\ \text{referenced to } 400 \ \text{kHz; unless otherwise specified}, \ \overline{SD}/\text{HD} = \text{High})$

Symbol	Characteristics	Conditions	Min	Тур	Max	Unit
A _{VHD}	Voltage Gain	V _{in} = 1 V – All HD Channels	5.8	6.0	6.2	dB
BW _{HD}	Low Pass Filter Bandwidth	-1 dB (Note 6) -3 dB (Note 7)	26 30	31 34		MHz
A _{RHD}		MdB (Note 7)MdB (Not6 7)				dB

TYPICAL CHARACTERISTICS

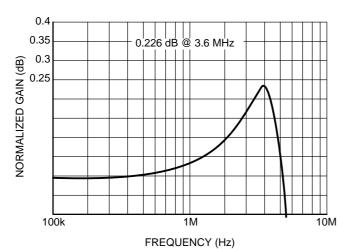
 V_{CC} = +5.0 V, V_{in} = 1 V_{PP} , R_{source} = 37.5 Ω , T_A = 25°C, Inputs AC–coupled with 0.1 μ F, All Outputs AC–coupled with 220 μ F into 150 Ω Referenced to 400 kHz; unless otherwise specified



30 20 10 NORMALIZED GAIN (dB) -10 -20 -30 -1 dB @ 31 MHz -40 -3 dB @ 33 MHz -50 -16 dB @ 44.25 MHz -37 dB @ 74.25 MHz -60 -70 , 100k 10M 100M FREQUENCY (Hz)

Figure 3. SD Normalized Frequency Response

Figure 4. HD Normalized Frequency Response



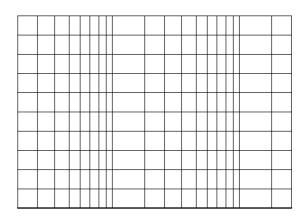


Figure 5. SD Passband Flatness

TYPICAL CHARACTERISTICS

 V_{CC} = +5.0 V, V_{in} = 1 V_{PP} , R_{source} = 37.5 Ω , T_A = 25°C, Inputs AC–coupled with 0.1 μ F, All Outputs AC–coupled with 220 μ F into 150 Ω Referenced to 400 kHz; unless otherwise specified

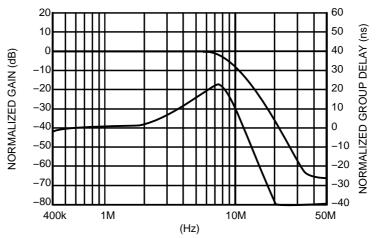


Figure 18. SD Frequency Response and Group Delay

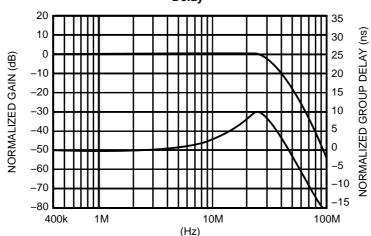


Figure 19. HD Frequency Response and Group Delay

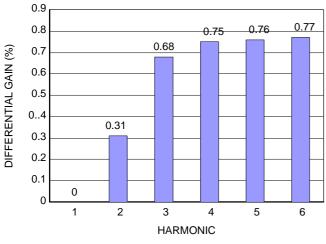


Figure 20. SD Differential Gain

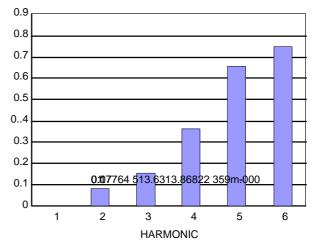


Figure 21. SD Differential Phase

APPLICATIONS INFORMATION

The NCS2564 quad video driver has been optimized for Standard and High Definition video applications covering the requirements of the standards Composite video (CVBS), S Video, Component Video (480i/525i, 576i/625i, 720p/1080i) and related (RGB). The three SD/HD channels have selectable filters (8 MHz and 34 MHz) for covering either standard definition like video applications or High Definition video applications. These frequencies are selectable using the pin $\overline{\text{SD}}/\text{HD}$.

In the regular mode of operation each channel provides an internal voltage to voltage gain of 2 from input to output. This effectively reduces the number of external components

required as compared to discrete approached implemented with stand alone op amps. An internal level shifter is employed shifting up the output voltage by adding an offset of 200 mV. This prevents sync pulse clipping and allows DC coupled output to the 150 Ω video load. In addition, the NCS2564 integrates a 6th order Butterworth filter for each. This allows rejection of the aliases or unwanted over-sampling effects produced by the video DAC. Similarly for the case of DVD recorders which use an ADC, this anti aliasing filter (reconstruction filter) will avoid picture quality issue and will aide filtration of parasitic signals caused by EMI interference.

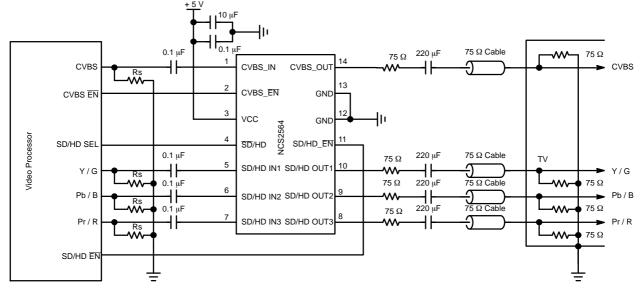


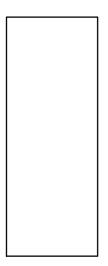
Figure 22. AC-Coupled Configuration at the Input and Output

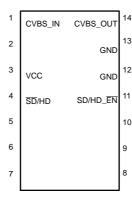
A built in diode like clamp is used into the chip for each channel to support the AC coupled mode of operation. The clamp is active where the active where the clamp is used into the chip for each channel to support the AC coupled mode of operation. The

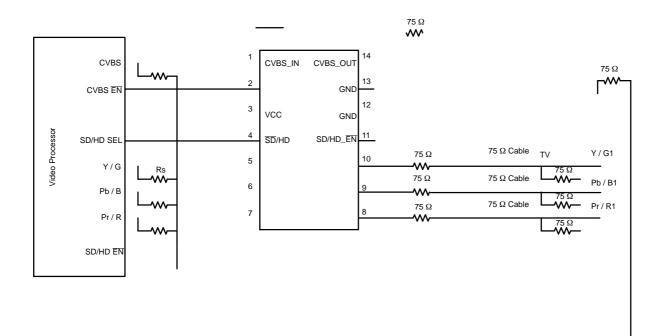
The built in clamp and level shifter allow the device to operate in different configuration modes depending on the DAC output signal level and the input common mode voltage of the video driver. When the configuration is DC Coupled at the Inputs and Outputs the 0.1 μF and 220 μF coupling capacitors are no longer used, and the clamps are in that case inactive; this configuration provides a low cost solution which can be implemented with few external components (Figure 23).

The input is AC coupled when either the input signal amplitude goes over the range 0 V to 1.4 V or the video source requires such a coupling. In some circumstances it may be necessary to auto bias signals with the addition of a pullup and pulldown resistors or only pullup resistor (Typical 7.5 $M\Omega$









Video Driving Capability

With an output current capability of 40 mA the NCS2564 was designed to be able to drive at least 2 video display loads in parallel. This type of application is illustrated Figure 24. Figure 26 (multiburst) and Figure 27 (linearity) show that the video signal can efficiently drive a 75 Ω equivalent load and not degrade the video performance.

ESD Protection

All the device pins are protected against electrostatic discharge at a level of 4 kV HBM and 8 kV according to IEC61000 4 2. This feature has been considered with a particular attention with ESD structure able to sustain the typical values requested by the systems like Set Top Boxes or Blue Ray players. This parameter is particularly important for video driver which usually constitutes the last

