# NCS2561, NCV2561

# Video Amplifier, 1-Channel, With Reconstruction Filter and SAG Correction

The NCS2561 is a single high speed video driver including a 2−pole reconstruction filter and SAG correction capability. The NCS2561 is available in a space saving SC−88 package optimized for low voltage, portable applications. It is designed to be compatible with Digital−to−Analog Converters (DAC) embedded in most video processors.

The NCS2561 internally integrates an 8 MHz 2−pole video DAC reconstruction filter with a fixed gain of 2. The NCS2561 also has a built−in SAG correction circuit when used at the output in an AC −coupled mode. To further reduce power consumption, an enable pin is provided.

## Features

- Internal 8 MHz 2−Pole Reconstruction Filter
- Internal Fixed Gain: 6 dB
- Integrated Level Shifter
- SAG Correction Circuit for Reducing Coupling Capacitor Size
- Low Quiescent Current: 6 mA Typ
- Shutdown Current < 5 μA
- Wide Input Voltage Range
- Capability to Drive 2 CVBS Video Signals Together (2x150Ω Loads)
- Excellent Video Performance
- Operating Supply Voltage Range: +2.7 V to +3.3 V
- NCV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q100 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant

## Applications

- Portable Video, Digital Cameras & Camera Phones
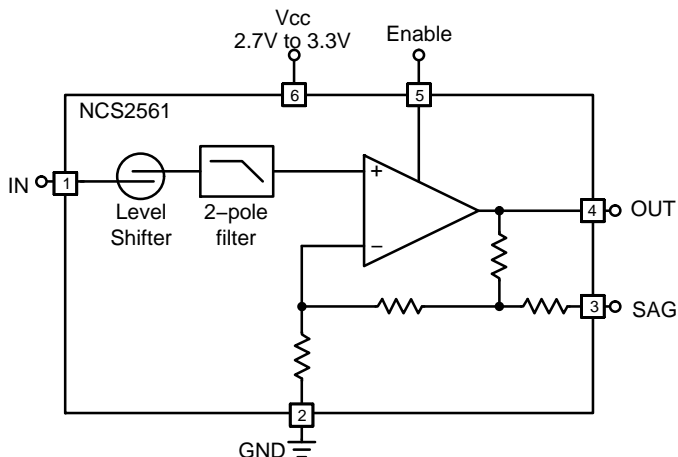- Set−Top Box Video Filters
- NTSC and PAL

**ON Semiconductor®**
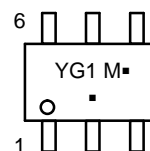
www.onsemi.com

**MARKING DIAGRAMS**

SC−88
SQ SUFFIX
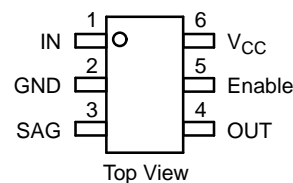CASE 419B

YG1 M▪

YG1 = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

## PIN CONNECTIONS

| 1 IN | 6 V$_{CC}$ |
| 2 GND | 5 Enable |
| 3 SAG | 4 OUT |

Top View

## ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| NCS2561SQT1G | SC−88 (Pb−Free) | 3000 / Tape & Reel |
| NCV2561SQT1G | SC−88 (Pb−Free) | 3000 / 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.

## Related Resource:

*Refer to Application Note AND8457/D for details regarding SAG Correction*



**Figure 1. Block Diagram**

## PIN FUNCTION AND DESCRIPTION

| Pin | Name | Type | Description |
|-----|------|------|-------------|
| 1 | IN | Input | Video Input |
| 2 | GND | Ground | Ground |
| 3 | SAG | Output | Sag Compensation |
| 4 | OUT | Output | Video Output |
| 5 | Enable | Input | Enable / Disable Function: High = Enable, Low = Disable. When left open the default state is High. |
| 6 | $V_{CC}$ | Power | Power Supply / 2.7 V $\leq V_{CC} \leq$ 3.3 V |

## ATTRIBUTES

| Characteristic | | Value |
|----------------|---|-------|
| ESD Protection (Note 1) | Human Body Model<br>Machine Model | 2 kV<br>200 V |
| Latch−up Current (Note 2) | | 75 mA |
| Moisture Sensitivity (Note 3) | | Level 1 |
| Flammability Rating | Oxygen Index: 28 to 34 | UL 94 V−0 @ 0.125 in |

1. This device series incorporates ESD protection and is tested by the following methods:
   ESD Human Body Model tested per JEDEC standard JS−001−2017 (AEC−Q100−002)
   ESD Charged Device Model tested per JEDEC standard JS−002−2014 (AEC−Q100−011).
2. Latch−up Current tested per JEDEC standard JESD78E (AEC−Q100−004).
3. For additional Moisture Sensitivity information, refer to Application Note AND8003/D.

## MAXIMUM RATINGS

| Rating | | Symbol | Value | Unit |
|--------|---|--------|-------|------|
| Power Supply Voltages | | $V_{CC}$ | 3.6 | Vdc |
| Input Voltage Range | | $V_I$ | −0.5 to $V_{CC}$ + 0.5 | Vdc |
| Output Short−Circuit to GND thru 75 Ω | | $I_{SC}$ | Continuous | − |
| Maximum Junction Temperature (Note 4) | | $T_J$ | 150 | °C |
| Operating Ambient Temperature | NCS2561<br>NCV2561 (Note 5) | $T_A$ | −40 to +125<br>−40 to +125 | °C |
| Storage Temperature Range | | $T_{stg}$ | −60 to +150 | °C |
| Thermal Resistance, Junction−to−Air | | $R_{\theta JA}$ | 250 | °C/W |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
4. Power dissipation must be considered to ensure maximum junction temperature ($T_J$) is not exceeded.
5. NCV prefix is for automotive and other applications requiring site and change control.

## MAXIMUM POWER DISSIPATION

The maximum power that can be safely dissipated is limited by the associated rise in junction temperature. For the plastic packages, the maximum safe junction temperature is 150°C. If the maximum is exceeded momentarily, proper circuit operation will be restored as soon as the die temperature is reduced. Leaving the device in the "overheated" condition for an extended period can result in device burnout. To ensure proper operation, it is important to observe the de−rating curves.

**DC ELECTRICAL CHARACTERISTICS with $V_{CC}$ = 2.7 V to 3.3 V** ($T_A$ = +25°C, $R_L$ = 150 Ω to GND, unless otherwise specified)

| Symbol | Characteristic | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **DC PERFORMANCE** | | | | | | |
| $V_{OLS}$ | Offset Level–Shift Output Voltage $T_A$ = −40°C to +125°C (Note 6) | $V_{CC}$ = 3.3 V, $V_{IN}$ = 0 V | 10 | 60 60 | 80 | mV |
| $I_{IB}$ | Input Bias Current | | | ±3 | | pA |
| $V_{IN}$ | Input Voltage Range (Note 7) | $V_{CC}$ = 3.3 V | GND | | $V_{CC}$ − 1.5 | V |
| $A_V$ | Voltage Gain | $V_{CC}$ = 3.3 V, 0 < $V_{IN}$ < 1.5 V 40 IRE Sync, 100 IRE White Level | 5.8 | 6.0 | 6.2 | dB |
| $V_{IH}$ | Enable Input High Level Voltage | | 1.6 | | $V_{CC}$ | V |
| $V_{IL}$ | Enable Input Low Level Voltage | | GND | | 0.8 | V |
| **OUTPUT CHARACTERISTICS** | | | | | | |
| $V_{OH}$ | Output High Level Voltage | $R_L$ = 150 Ω to GND $R_L$ = 75 Ω to GND | $V_{CC}$ − 0.3 | $V_{CC}$ − 0.1 $V_{CC}$ − 0.3 | | V |
| $V_{OL}$ | Output Low Level Voltage (Note 8) | | | 60 | | mV |
| $I_O$ | Output Current | $V_{CC}$ = 3.3 V | | ±50 | | mA |
| **POWER SUPPLY** | | | | | | |
| $V_{CC}$ | Operating Voltage Range | | 2.7 | | 3.3 | V |
| $I_{CC, ON}$ | Power Supply Current – Enabled $T_A$ = −40°C to +125°C (Note 6) | $V_{IN}$ = 0 V, $V_{CC}$ = 3.3 V, $I_O$ = 0 mA | | 6.0 | 7.5 9.0 | mA |
| $I_{CC, OFF}$ | Power Supply Current – Disabled | $V_{IN}$ = 0 V, $V_{CC}$ = 3.3 V, $I_O$ = 0 mA | | 1.5 | 5.0 | μA |
| PSRR | Power Supply Rejection Ratio | $V_{CC}$ = 2.7 V to 3.3 V | | ±80 | | μV/V |

6. Guaranteed by design and/or characterization.
7. Limited by output swing and internal gain.
8. Output low voltage level is limited by the internal level shift circuitry.

**AC ELECTRICAL CHARACTERISTICS with $V_{CC}$ = 2.7 V to 3.3 V** ($T_A$ = +25°C, $R_L$ = 150 Ω to GND, unless otherwise specified)

| Symbol | Characteristic | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **FREQUENCY DOMAIN PERFORMANCE** | | | | | | |
| An | Normalized Passband Gain (Note 9) | $V_{CC}$=3.3 V, f=1.0 MHz , $V_O$=2 $V_{p-p}$ $V_{CC}$=3.3 V, f=4.5 MHz , $V_O$=2 $V_{p-p}$ f = 27 MHz, $V_O$ = 2 $V_{p-p}$ | −0.4 −0.2 −18 | 0 +0.4 −22 | +0.4 +0.8 | dB |
| dG | Differential Gain | $V_{CC}$ = 3.3 V, $A_V$ = +2, $R_L$ = 150 Ω, f = 3.58 MHz, 4.43 MHz | | 0.5 | | % |
| dP | Differential Phase | $V_{CC}$ = 3.3 V, $A_V$ = +2, $R_L$ = 150 Ω, f = 3.58 MHz, 4.43 MHz | | 1.0 | | ° |
| SNR | Signal to Noise Ratio | $V_{CC}$ = 3.3 V, 100% White Signal | | 70 | | dB |
| **TIME DOMAIN RESPONSE** | | | | | | |
| $\Delta T_g$ | Group Delay Variation | $V_{CC}$ = 3.3 V, 100 kHz to 5.0 MHz | | 15 | | ns |
| $t_{ON}$ | Turn ON Time | | | 1.5 | | μs |
| $t_{OFF}$ | Turn OFF Time | | | 50 | | ns |

9. The normalized gain is guaranteed by design and characterization. The max normalized gain of +0.8 dB is the result of smooth peaking (pre–emphasis, see figure 2) taking into account the increase of the losses at the highest frequencies into connectors and cable at the output. For frequencies lower than 2 MHz the max normalized gain is 0.4 dB.

**TYPICAL CHARACTERISTICS** (At $T_A$ = +25°C and $R_L$ = 150 Ω, unless otherwise specified)
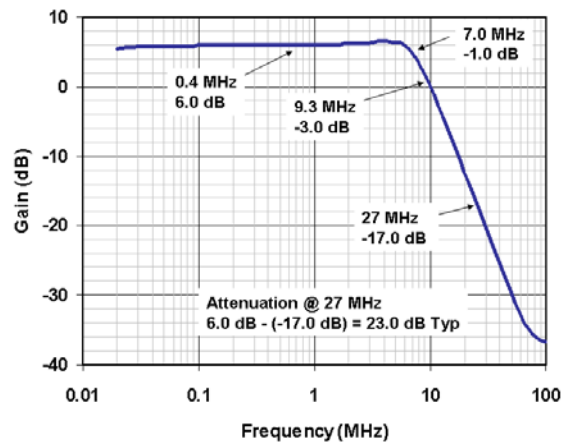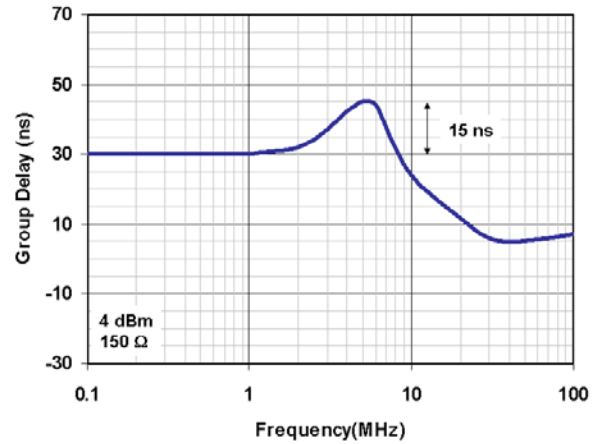


Figure 2. Frequency Response



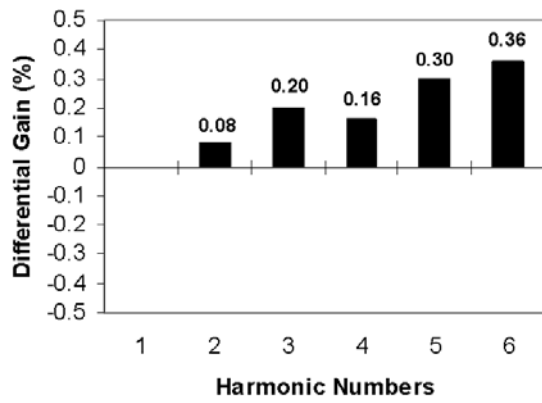Figure 3. Group Delay vs. Frequency
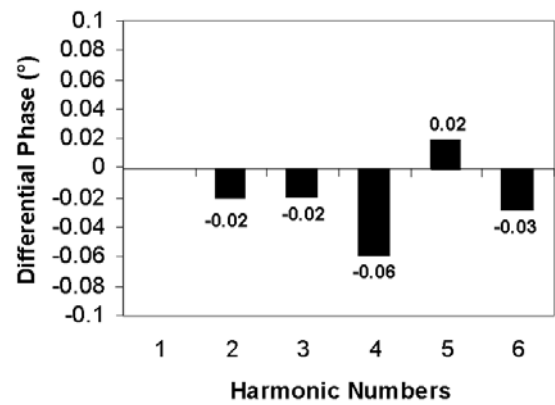


Figure 4. Differential Gain
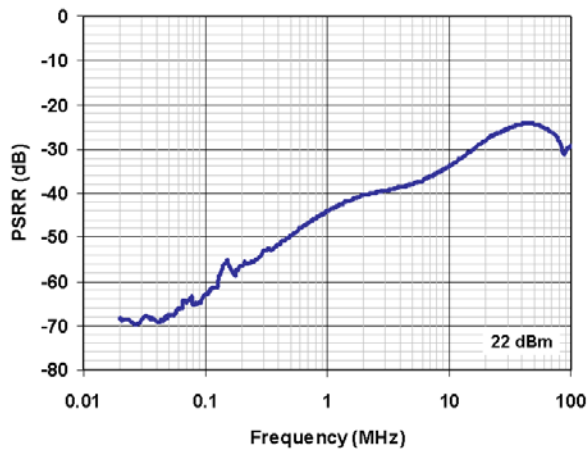


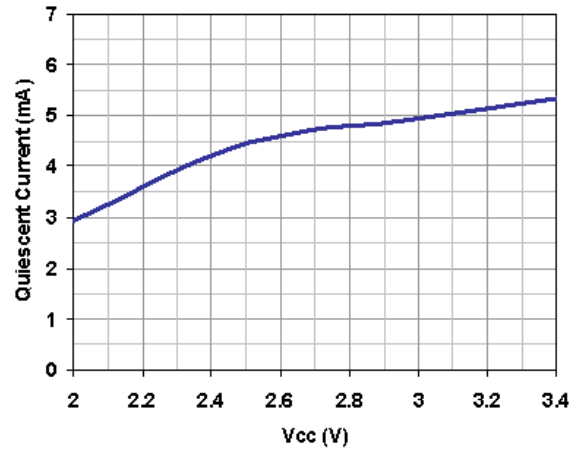Figure 5. Differential Phase



Figure 6. PSRR vs. Frequency
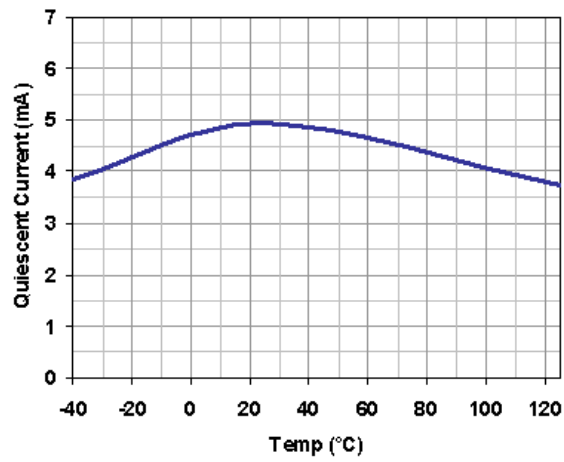


Figure 7. Quiescent Current vs. Supply Voltage

**Figure 8. Quiescent Current vs. Temperature (V$_{CC}$ = 3.0 V)**

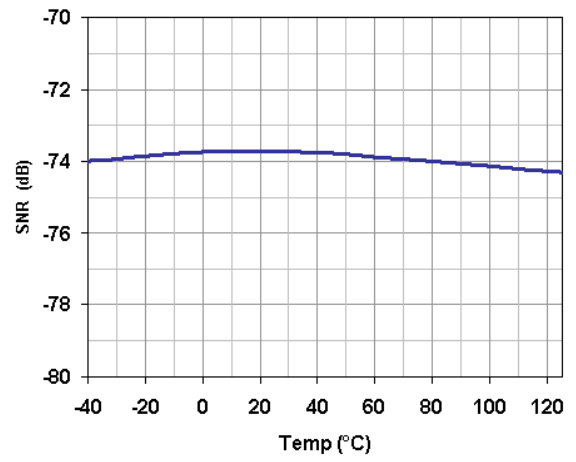**Figure 9. Signal−to−Noise Ratio vs. Temperature**

## APPLICATIONS INFORMATION

The NCS2561 is a single video driver optimized for portable applications with low power consumption in a space saving SC−88 package. It includes sag correction circuitry allowing significant reduction of the AC−coupled output capacitor.

**Internal Level Shift**

The input common mode voltage range (see specifications $V_{IN}$) of the NCS2561 includes the lower rail (GND) and extends to $V_{CC} - 1.5V$ on a power supply range of 2.7 V to 3.3 V. Many video processors operate with a supply ranging from 0 V to a positive supply (typically 3.3 V), so the lowest voltage of the video signal provided by the DAC is 0 V. Although a 0 V (GND) signal is within the input common−mode range of the NCS2561, the output signal will be limited, specifically at the lower rail. Op amps use transistors with saturation voltage (Vsat) higher than 0 V. If the lowest level of the input voltage is lower than Vsat the signal will be clipped at the output.

To ensure the output signal is not clipped due to the lower rail limit, the NCS2561 has built−in level shift circuitry. The role of this circuitry is to avoid clipping of the sync signal at the output by shifting up the video signal by about 60 mV. The level shift circuitry level shifts the sync signal above the internal op amp transistor saturation limit. This function is particularly useful when the video signal is DC−coupled at the output.

**Built−in 2−Pole Reconstruction Filter**

The NCS2561 has a 2−pole reconstruction filter with a −3 dB cut−off frequency at 8 MHz. The filter serves as an anti−alias filter removing the unwanted over−sampling effects produced by the video DAC. The 27 MHz over−sampling frequency from the video DAC is attenuated by 22 dB typical. In order to improve the stop−band attenuation a small capacitor (Cs) of a few tenths pico Farads can be added in parallel with the source resistor (Rs) (See Figure 10).
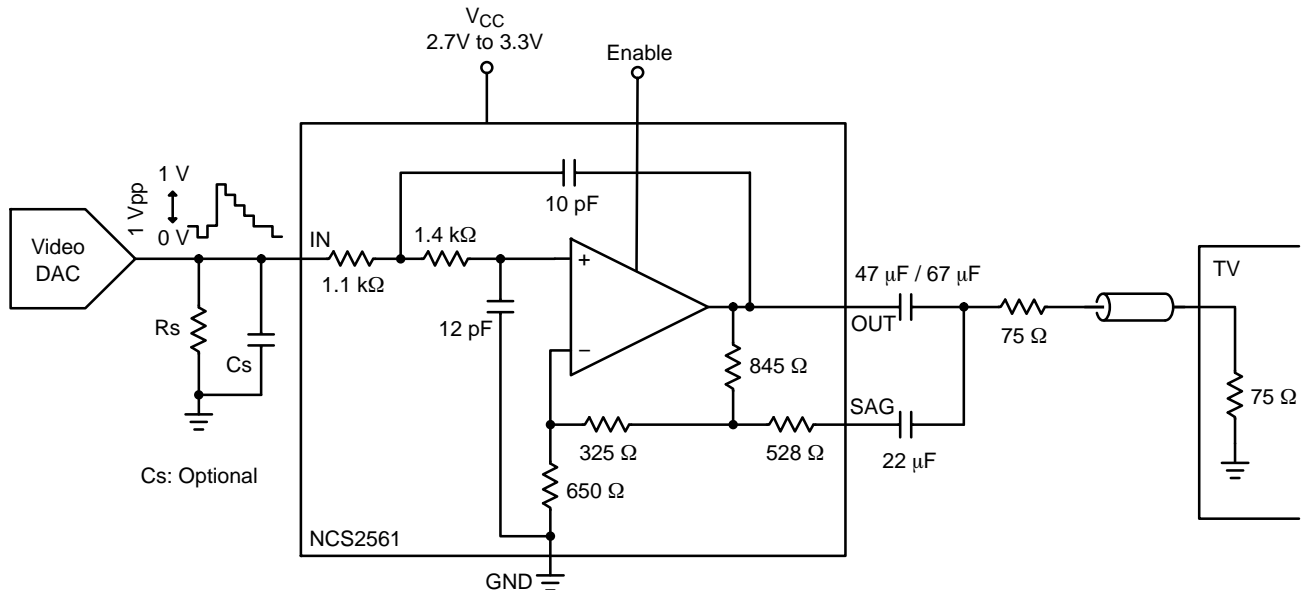


**Figure 10. Block Diagram Showing Filter and Sag Correction Circuits**

**Shutdown Mode**

If the Enable pin is left open by default the circuit will be enabled. The Enable pin offers a shutdown function, so the NCS2561 can consequently be disabled when not used. This is particularly important for digital still cameras or cell phones with camera having a video output feature. Indeed

this video output is not permanently used and actually used in very specific period of time when pictures or small movies want to be displayed on a bigger screen. The device's quiescent current drops typically down to 2.7 μA when the device is in the shutdown mode.

**Sag Correction**

Video drivers that do not incorporate sag compensation traditionally recommend a large coupling capacitor (220 μF) on the output of the video driver. Larger output coupling capacitors (≥ 470 μF) are often chosen by design engineers when the application allows this (Set−Top Box). A larger output coupling capacitor allows a lower cut−off frequency to avoid field tilt effects; however in portable applications there is a trade−off between large and expensive coupling capacitors, and a coupling configuration to saving space. The sag compensation circuitry allows the reduction of this output coupling capacitor value by inducing peaking at the lower cutoff frequency of the high pass filter. The high−pass filter is created by the coupling capacitor and the load resistor ($1/(2\pi R_L C_{out})$), and this peaking lowers the cutoff frequency. Simulation results provided in Figure 11 show the effect of the sag compensation at the low cut−off frequency.
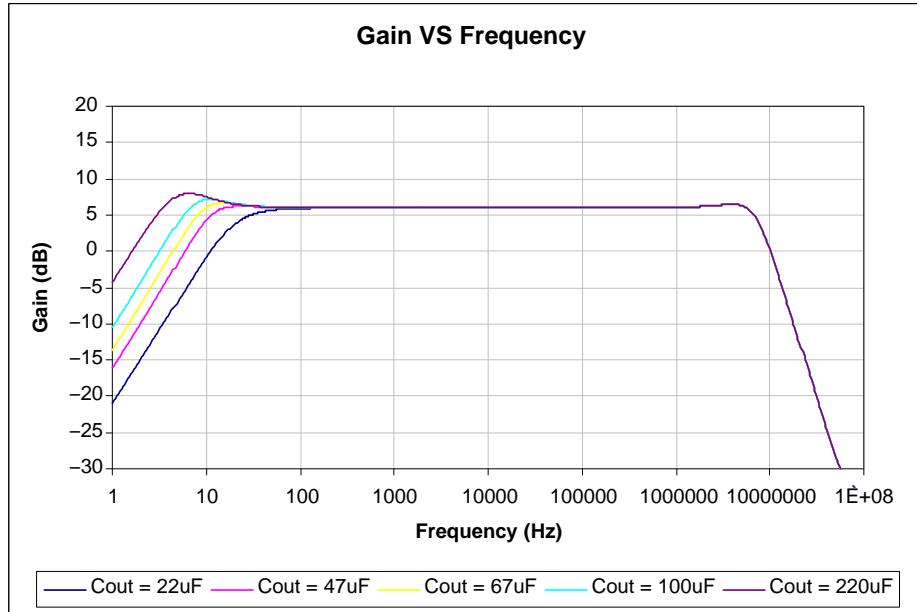


**Figure 11. Simulation Results with Csag = 22 μF and Variable Cout**

Calculations show that a 220 μF output capacitor produces a low cutoff frequency of 5 Hz, and a 470 μF capacitor will give a low cutoff frequency at 2.6 Hz. The cutoff frequency (−3 dB) is defined by the equation: $1/(2\pi R_L C_{out})$. In the case where no sag is used (Figure 14), a low Cout value can adversely affect the low cutoff frequency; the cut−off frequency will be in the critical 50 Hz or 60 Hz frequencies. This undesirable affect will manifest itself as field tilt. Due to the SAG correction the large output capacitor is reduced without degrading the video performances by the use of two smaller and cheaper output capacitors.
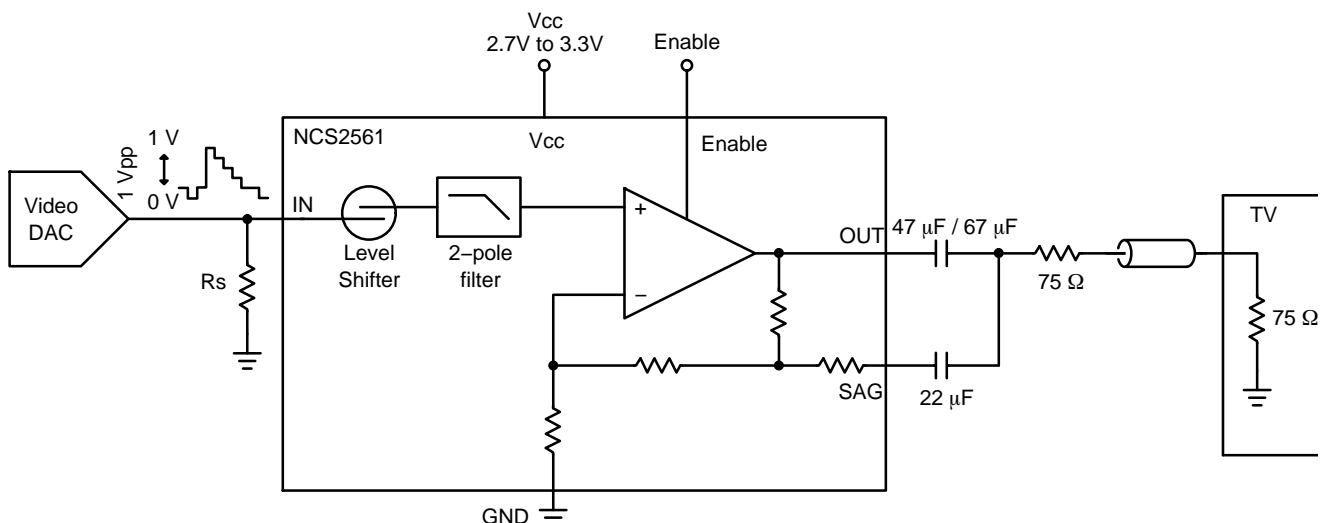


**Figure 12. Sag Correction Configuration**

The Csag value has no significant impact on the coupling even as the value increases. A value of 22 μF is recommended for optimal performance.

To achieve similar behavior to an output coupling capacitor value Cout = 220 μF (no sag) the nominal equivalent sag combination is Csag = 22 μF and Cout = 67 μF. A value of 47 μF for Cout will yield equivalent results. If we consider a coupling cap of 470 μF, the best compromise for sag combination is Csag = 22 μF and Cout = 100 μF. A value of 67 μF for Cout will yield equivalent results.

Figures 13 and 14 show the impact of the output coupling capacitor on a video signal corresponding to a worst case situation regarding the low frequency bandwidth. The video signal used is a 50 Hz 1/2 black – 1/2 white video pattern. This signal is obtained using the PAL Flat Field Square wave signal option available with the video generator TG700 from Tektronix. These measurements show how the sag function can help to reduce the field tilt problem using lower value coupling capacitor than traditional approach.
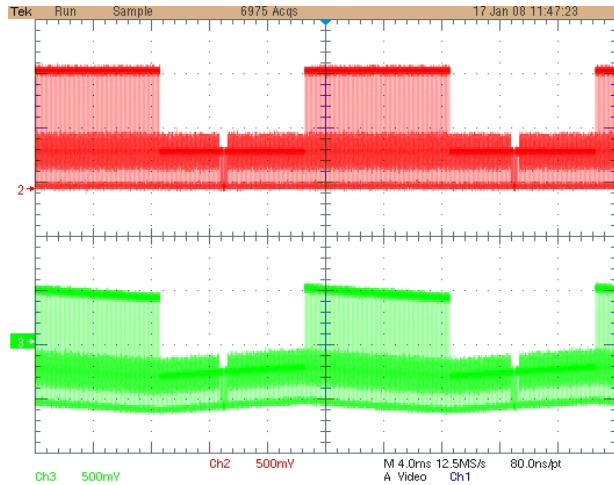
**Figure 13. No sag, Cout = 220 μF**
**(Top : Input, Bottom : Output)**
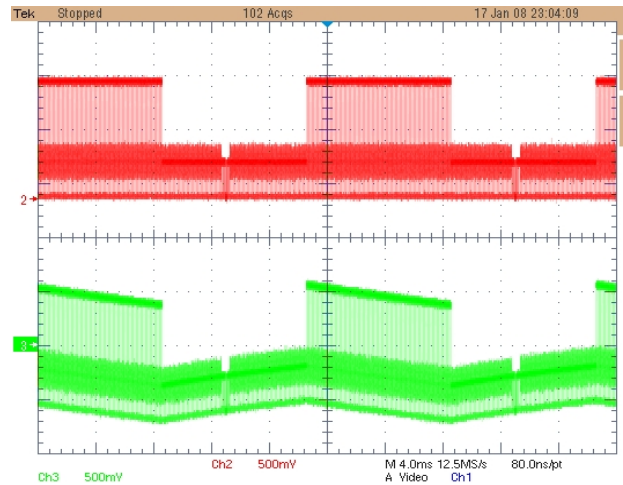
**Figure 14. Csag = 22 μF, Cout = 47 μF**
**(Top : Input, Bottom : Output)**
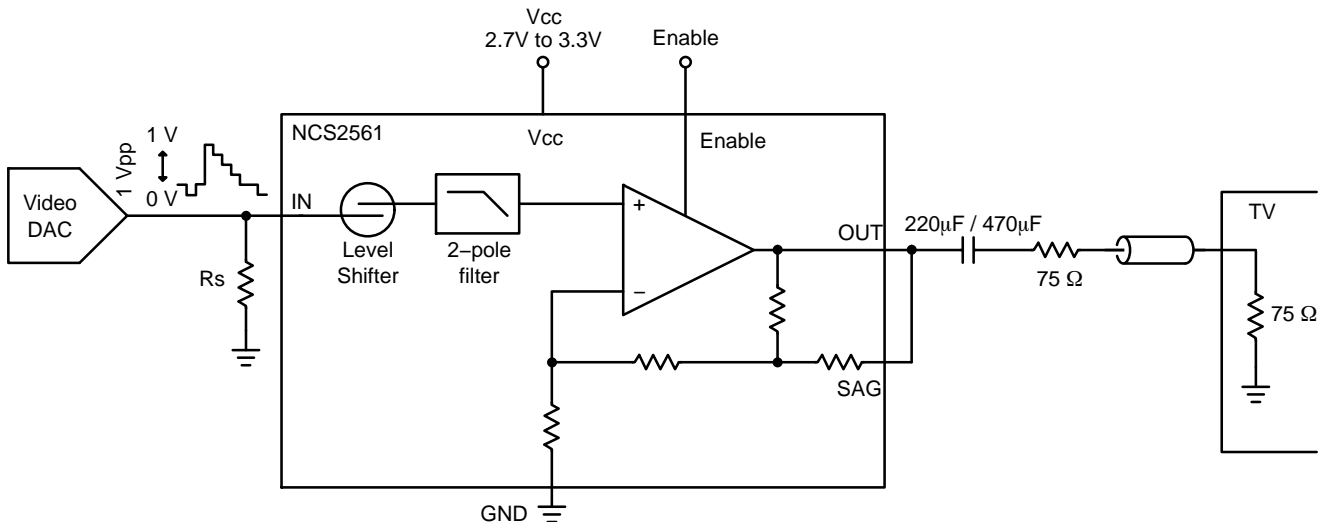
**Figure 15. NCS2561 in an AC−Coupled Configuration with no sag**

**DC−Coupled Output**

Having efficient output AC−coupled capability thanks to the sag correction option, with the built−in level shifter, the NCS2561 can also be DC−coupled to a 150 Ω load. This has the advantage of eliminating the AC−coupling capacitors at the output by reducing the number of external components and saving space on the board. This can be a key advantage for some portable applications with limited space.

The problems of field tilt effects on the video signal are also eliminated providing the best video quality with optimal dynamic or peak−to−peak amplitude of the video signal allowing operating at the lower power supply voltage (2.7 V) without risk of signal clipping. In this coupling configuration the average output voltage is higher than 0 V and the power consumption can be a little higher than with an AC−coupled configuration.
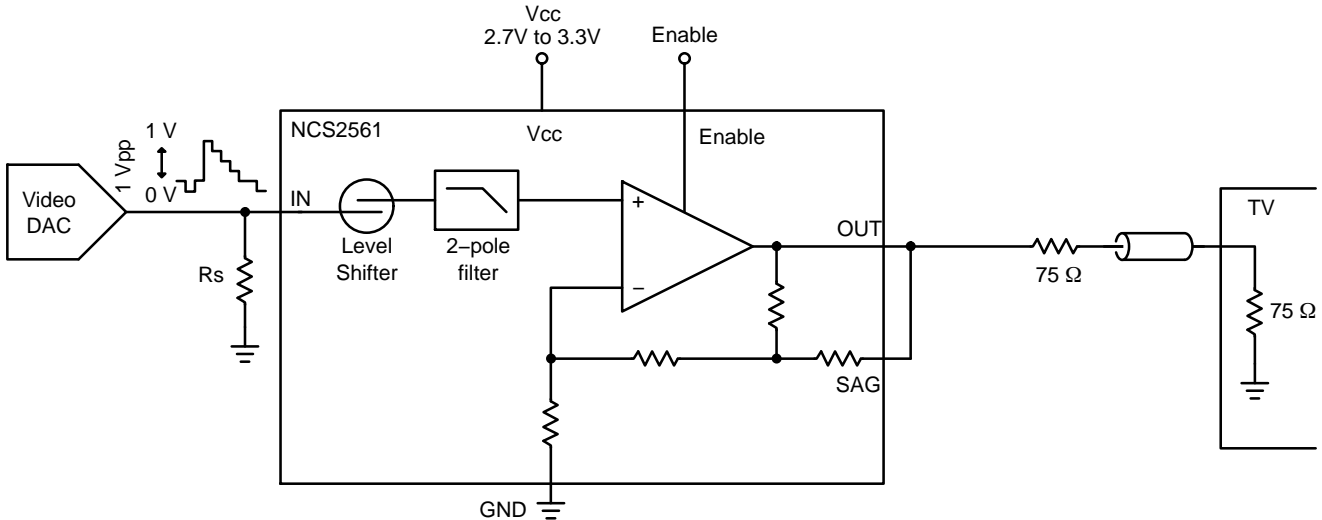


**Figure 16. DC−Coupled Input and Output Configuration**

**Video Driving Capability**

With an output current capability of ±50 mA the NSC2561 was designed to be able to drive at least 2 video display loads in parallel (2 different display or 1 display + 1 VCR). This

applications is illustrated in the Figure 17. Figure 18 (multiburst) and Figure 19 (linearity) show that the video signal can efficiently drive a 75 Ω equivalent load and not degrade the video performance.
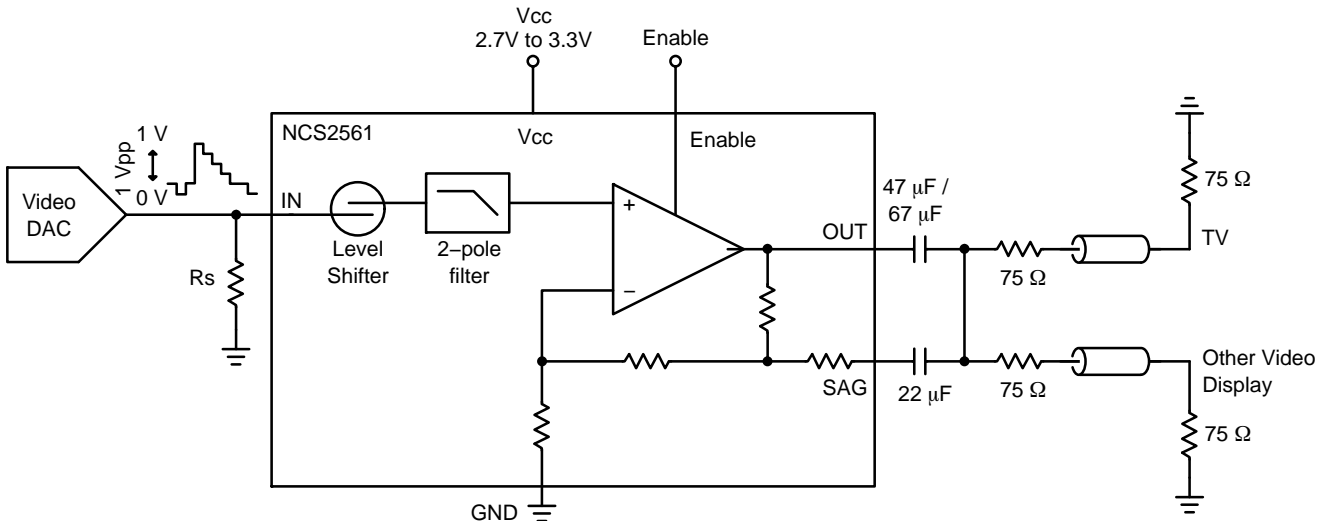


**Figure 17. NCS2561 Driving 2 Video Display (two 150 Ω loads)**
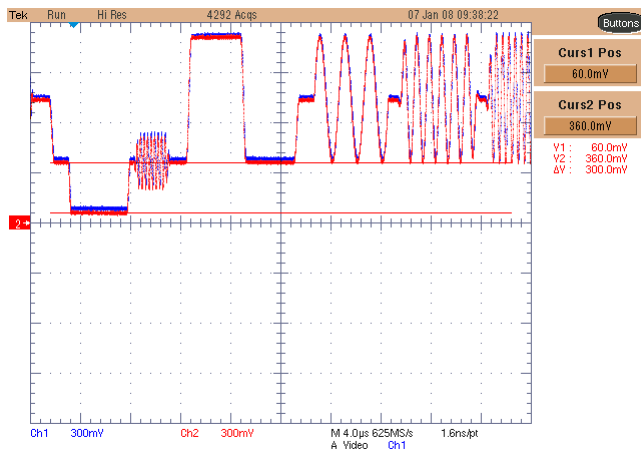
**Figure 18. Multiburst Test with two 150 Ω loads**



**Figure 19. Linearity Test with two 150 Ω loads**

**ESD Protection**

All the device pins are protected against electrostatic discharge at a level of 2 kV HBM. The output has been considered with a particular attention with ESD structure able to sustain typically more than 2 kV HBM. Actually more than 4 kV has been measured on this specific output pin. This feature is particularly important for video driver which usually constitutes the last stage in the video chain before the video output connector.

**SC−88 2.00x1.25x0.90, 0.65P**
CASE 419B−02
ISSUE Z

DATE 18 APR 2024



TOP VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

SIDE VIEW

END VIEW

DETAIL A
SCALE 2:1
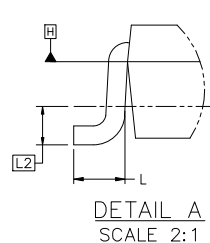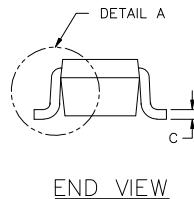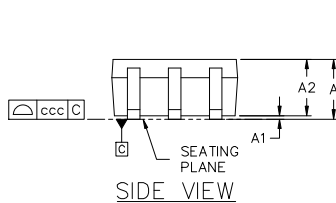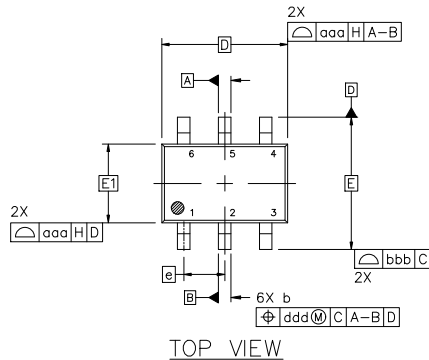
| DIM | MILLIMETERS | | |
|-----|------|------|------|
|     | MIN. | NOM. | MAX. |
| A | ——— | ——— | 1.10 |
| A1 | 0.00 | ——— | 0.10 |
| A2 | 0.70 | 0.90 | 1.00 |
| b | 0.15 | 0.20 | 0.25 |
| c | 0.08 | 0.15 | 0.22 |
| D | 2.00 BSC | | |
| E | 2.10 BSC | | |
| E1 | 1.25 BSC | | |
| e | 0.65 BSC | | |
| L | 0.26 | 0.36 | 0.46 |
| L2 | 0.15 BSC | | |
| aaa | 0.15 | | |
| bbb | 0.30 | | |
| ccc | 0.10 | | |
| ddd | 0.10 | | |

RECOMMENDED MOUNTING FOOTPRINT*
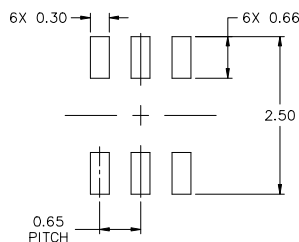
\* FOR ADDITIONAL INFORMATION ON OUR Pb−FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**GENERIC MARKING DIAGRAM\***

XXXM■
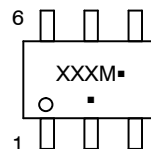
XXX = Specific Device Code
M = Date Code*
■ = Pb−Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or position may vary depending upon manufacturing location.

\*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

**STYLES ON PAGE 2**

| DOCUMENT NUMBER: | 98ASB42985B | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. | |
|---|---|---|---|
| DESCRIPTION: | SC−88 2.00x1.25x0.90, 0.65P | | PAGE 1 OF 2 |

STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

STYLE 2:
CANCELLED

STYLE 3:
CANCELLED

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. COLLECTOR
4. EMITTER
5. BASE
6. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 6:
PIN 1. ANODE 2
2. N/C
3. CATHODE 1
4. ANODE 1
5. N/C
6. CATHODE 2

STYLE 7:
PIN 1. SOURCE 2
2. DRAIN 2
3. GATE 1
4. SOURCE 1
5. DRAIN 1
6. GATE 2

STYLE 8:
CANCELLED

STYLE 9:
PIN 1. EMITTER 2
2. EMITTER 1
3. COLLECTOR 1
4. BASE 1
5. BASE 2
6. COLLECTOR 2

STYLE 10:
PIN 1. SOURCE 2
2. SOURCE 1
3. GATE 1
4. DRAIN 1
5. DRAIN 2
6. GATE 2

STYLE 11:
PIN 1. CATHODE 2
2. CATHODE 2
3. ANODE 1
4. CATHODE 1
5. CATHODE 1
6. ANODE 2

STYLE 12:
PIN 1. ANODE 2
2. ANODE 2
3. CATHODE 1
4. ANODE 1
5. ANODE 1
6. CATHODE 2

STYLE 13:
PIN 1. ANODE
2. N/C
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 14:
PIN 1. VREF
2. GND
3. GND
4. IOUT
5. VEN
6. VCC

STYLE 15:
PIN 1. ANODE 1
2. ANODE 2
3. ANODE 3
4. CATHODE 3
5. CATHODE 2
6. CATHODE 1

STYLE 16:
PIN 1. BASE 1
2. EMITTER 2
3. COLLECTOR 2
4. BASE 2
5. EMITTER 1
6. COLLECTOR 1

STYLE 17:
PIN 1. BASE 1
2. EMITTER 1
3. COLLECTOR 2
4. BASE 2
5. EMITTER 2
6. COLLECTOR 1

STYLE 18:
PIN 1. VIN1
2. VCC
3. VOUT2
4. VIN2
5. GND
6. VOUT1

STYLE 19:
PIN 1. I OUT
2. GND
3. GND
4. V CC
5. V EN
6. V REF

STYLE 20:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 21:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. N/C
6. CATHODE 1

STYLE 22:
PIN 1. D1 (i)
2. GND
3. D2 (i)
4. D2 (c)
5. VBUS
6. D1 (c)

STYLE 23:
PIN 1. Vn
2. CH1
3. Vp
4. N/C
5. CH2
6. N/C

STYLE 24:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 25:
PIN 1. BASE 1
2. CATHODE
3. COLLECTOR 2
4. BASE 2
5. EMITTER
6. COLLECTOR 1

STYLE 26:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 27:
PIN 1. BASE 2
2. BASE 1
3. COLLECTOR 1
4. EMITTER 1
5. EMITTER 2
6. COLLECTOR 2

STYLE 28:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 29:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE/ANODE
6. CATHODE

STYLE 30:
PIN 1. SOURCE 1
2. DRAIN 2
3. DRAIN 2
4. SOURCE 2
5. GATE 1
6. DRAIN 1

Note: Please refer to datasheet for
style callout. If style type is not called
out in the datasheet refer to the device
datasheet pinout or pin assignment.

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|---|---|---|---|
| DESCRIPTION: | **SC−88 2.00x1.25x0.90, 0.65P** | | **PAGE 2 OF 2** |

### ADDITIONAL INFORMATION

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