

**AKM** = Preliminary = **AK4250/52**  
**Output Coupling Capacitor-less Video Amp with LPF**

**GENERAL DESCRIPTION**

The AK4250/52 are a Video Amp with LPF. The output coupling capacitor can be removed because the AK4250/52 include the negative power supply circuit. The AK4250/52 are housed in a space-saving 8-pin USON package.

**FEATURE**

1. Video Function
  - A Composite Video Input
  - A Video-Amp for Composite Video Signal  
 AK4250: +6dB  
 Ak4252: +12dB
  - Low Pass Filter
  - Charge pump circuit for negative power supply
2. Ta = -40 ~ 85 °C
3. Power Supply: 2.7 ~ 3.6V (typ. 3.0V)
4. Power Supply Current: 10 mA
5. Package: 8 pin USON

■ Block Diagram

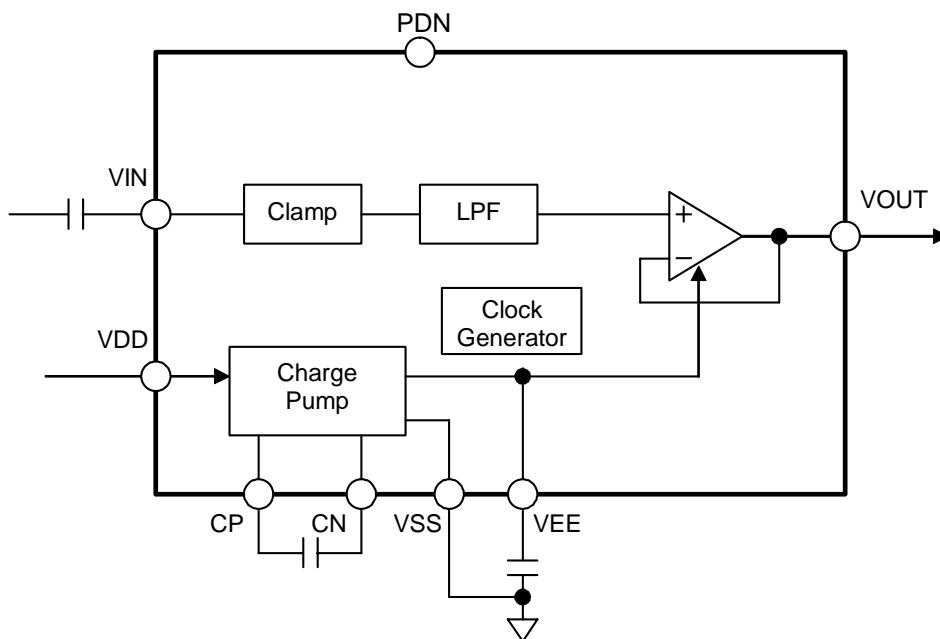
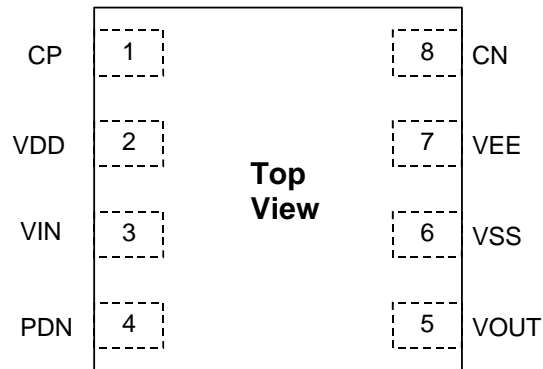


Figure 1. AK4250/52 Block Diagram

■ **Ordering Guide**

AK4250VU	-40 ~ +85°C	8 pin USON (0.5mm pitch)
AK4252VU	-40 ~ +85°C	8 pin USON (0.5mm pitch)
AKD4250/52	Evaluation board for AK4250/52	

■ **Pin Layout**



<b>PIN/FUNCTION</b>
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No.	Pin Name	I/O	Function
1	CP	O	Positive Charge Pump Capacitor Terminal Pin
2	VDD	-	Power Supply Pin.
3	VIN	I	Composite Video Signal Input Pin
4	PDN	I	Power-Down Mode Pin. Internal Pull Down 100kΩ. “H”: Power up, “L”: Power down.
5	VOUT	O	Composite Video Signal Driver Pin
6	VSS	-	Ground Pin
7	VEE	O	Negative Voltage Output Pin for Video Amplifier
8	CN	I	Negative Charge Pump Capacitor Terminal Pin

<b>ABSOLUTE MAXIMUM RATINGS</b>
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(VSS=0V; Note1)

Parameter	Symbol	min	max	Units
Power Supplies:	VDD	-0.3	4.0	V
Input Current, Any Pin Except Supplies	IIN	-	±10	mA
Input Voltage (Note 2)	VIN	-0.3	(VDD+0.3) or 4.0	V
Ambient Temperature (powered applied)	Ta	-40	85	°C
Storage Temperature	Tstg	-65	150	°C

Note 1. All voltages with respect to ground.

Note 2. VIN, PDIN pins. Max is smaller value between (VDD+0.3)V and 4.0V

VOUT pin becomes Hi-Z at PDN pin = “L”. Therefore VOUT pin is available to signal line from another device by Wired-OR. Then the input signal to VOUT pin mustn't exceeds this input voltage range.  
The voltage must not be applied to the CN pin.

WARNING: Operation at or beyond these limits may result in permanent damage to the device.  
Normal operation is not guaranteed at these extremes.

<b>RECOMMENDED OPERATING CONDITIONS</b>
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(VSS=0V; Note1)

Parameter	Symbol	min	typ	max	Units
Power Supplies	VDD	2.7	3.0	3.6	V

Note 1. All voltages with respect to ground.

\* AKM assumes no responsibility for the usage beyond the conditions in this datasheet.

**ANALOG CHARACTERISTICS**

(Ta=25°C; VDD =3.0V; VSS = 0V; unless otherwise specified)

Parameter	Conditions	Min	typ	max	Units	
<b>V Input Characteristics</b>						
Input Voltage		AK4250	-	-	1.5	Vpp
		AK4252	-	-	0.75	Vpp
Input Sync Chip Clamp Voltage	(Note 3)	AK4250	-0.386	-0.286	-0.186	V
		AK4252	TBD	-0.143	TBD	V
<b>V Output Characteristics (Note 4)</b>						
Output Gain	VIN=100kHz, 0.2Vpp	AK4250	5.0	6.0	7.0	dB
	VIN=100kHz, TBD Vpp	AK4252	TBD	12.0	TBD	dB
Maximum output voltage	VIN=100kHz, THD=-30dB	AK4250	2.52	-	-	Vpp
		AK4252	2.52	-	-	Vpp
S/N	BW=100kHz ~ 6MHz, (Note 5)	AK4250	-	65	-	dB
		AK4252	-	62	-	dB
Secondary Distortion	VIN=3.58MHz, 0.2Vpp(Sin Wave)	-	-45	-	dB	
Load Resistance		140	150	-	Ω	
Load Capacitance	C1(see Figure 2)	-	-	15	pF	
	C2(see Figure 2)	-	-	400	pF	
<b>LPF</b>						
Frequency Response Input= 0.2Vpp, Sin Wave (0dB at 100kHz)	Response at 6.75MHz	TBD	-0.5	-	dB	
	Response at 27MHz	-	-40	TBD	dB	
Group Delay	GD3MHz - GD6MHz	-	10	TBD	nsec	
<b>Power Supplies</b>						
Power Up	Black signal is output and no load resistance.	-	10	TBD	mA	
Power Down	PDN pin = 0V	-	1	TBD	μA	

Note 3. The Charge Pump circuit doesn't work well, if the sync chip clamp voltage input to VIN pin isn't within this voltage range. This sync chip clamp voltage is the voltage from the pedestal voltage

Note 4. The measurement point is the point A in Figure 2

Note 5. The reference signal is the 100% white signal.

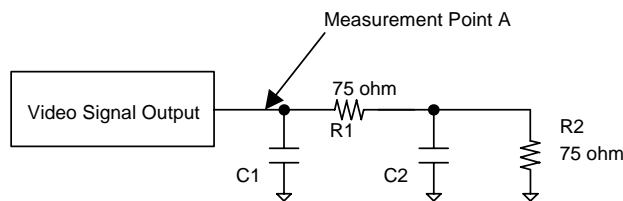


Figure 2. Load Capacitance C1 and C2

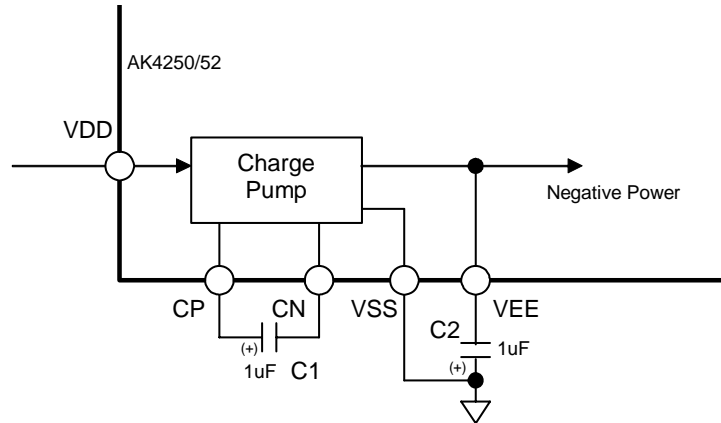
**DC CHARACTERISTICS**

(Ta=25°C; VDD=2.7 ~ 3.6V)

Parameter		Symbol	min	typ	max	Units
High-Level Input Voltage	(PDN pin)	VIH	1.5	-	-	V
Low-Level Input Voltage	(PDN pin)	VIL	-	-	0.6	V

■ Video Block

The Video Amp has a drivability for a load resistance of 150Ω. The AK4250/52 have a composite input and output and includes a low pass filter (LPF). Internal negative power supply circuit supplies the negative voltage to the video amp and the video amp 0V output is used for a pedestal level. Therefore, the output coupling capacitor can be removed.



Note 6. C1 and C2 capacitors should have the low ESR (Equivalent Series Resistance) over all temperature range. When these capacitors have the polarity, the positive polarity pin should be connected to the CP pin and the VSS pin. Non polarity capacitors can also be used.

Figure 3. Negative Power Supply circuit

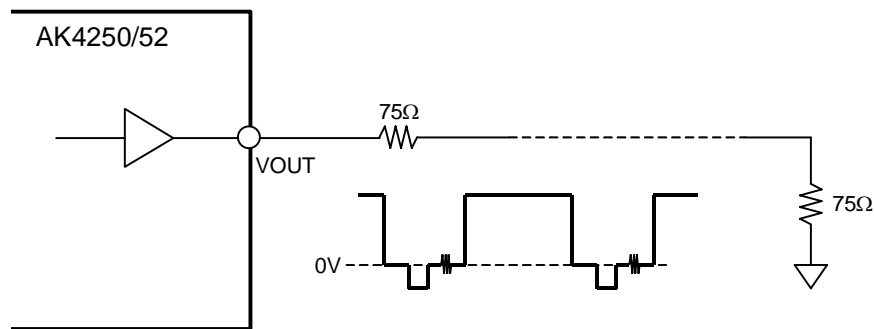


Figure 4. Video signal output

■ Power Down Control

When the PDN pin is “L”, the AK4250/52 are forced to the Power Down Mode (Power consumption: typ 1μA). VOUT pin becomes Hi-Z at PDN pin = “L”. The AK4250/52 include a power-on-reset function. Therefore any reset isn’t required externally.

**SYSTEM DESIGN**

Figure 5 shows the system connection diagram for the AK4250/52. An evaluation board [AKD4250/52] is available which demonstrates the optimum layout, power supply arrangements and measurement results.

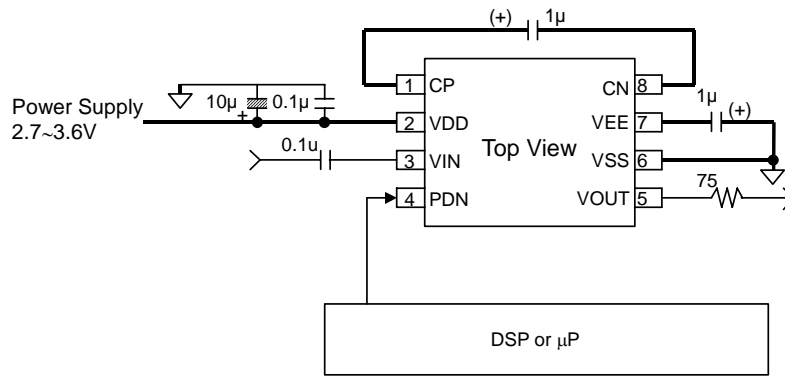


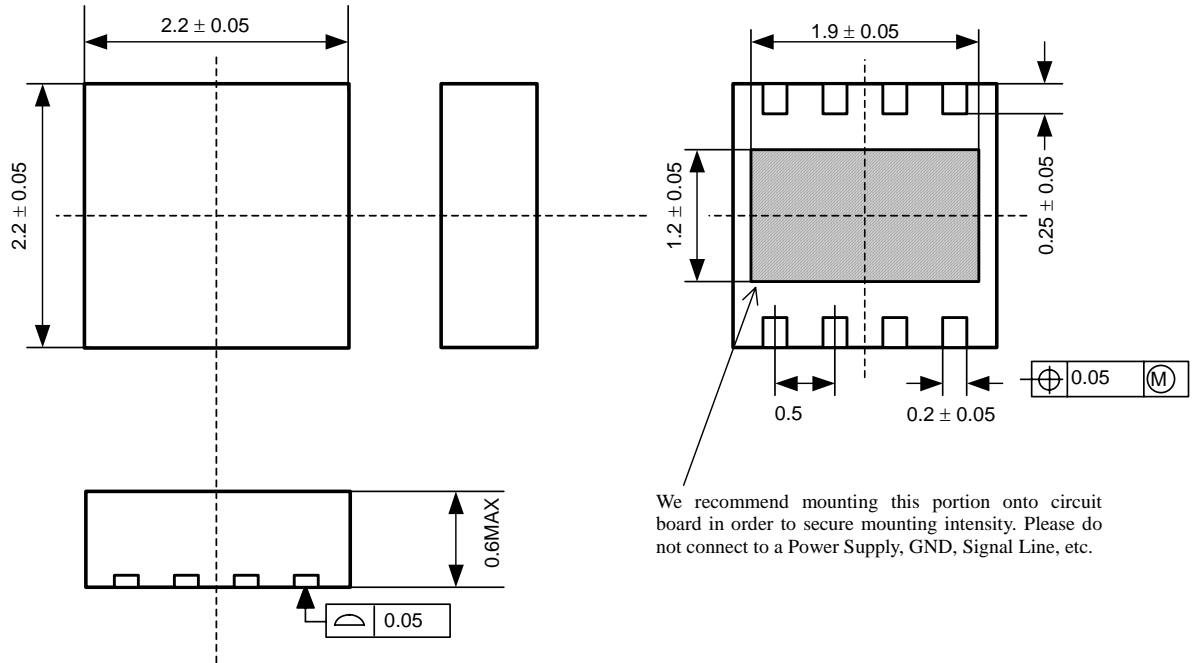
Figure 4. Typical Connection Diagram

Note:

- The voltage must not be applied to the CN pin.

Package

8pin USON (Unit : mm)

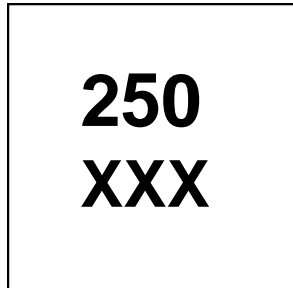


■ Material & Lead finish

Package molding compound:	Epoxy
Lead frame material:	Ni
Lead frame surface treatment:	Ag plate

**MARKING**

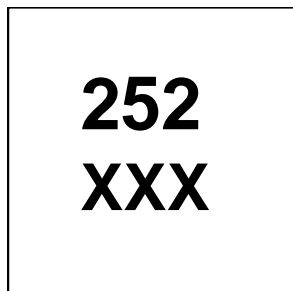
■ AK4250VU



1

XXX: Date code (3 digit)

■ AK4252VU



1

XXX: Date code (3 digit)



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