

MN65531AS

Low Power 6-Bit CMOS A/D Converter for Image Processing

■ Overview

The MN65531AS is a totally parallel 6-bit CMOS analog-to-digital converter with a maximum conversion rate of 20 MSPS. It includes a built-in 3-input multiplexer, clamp circuit, and reference voltage power supply.

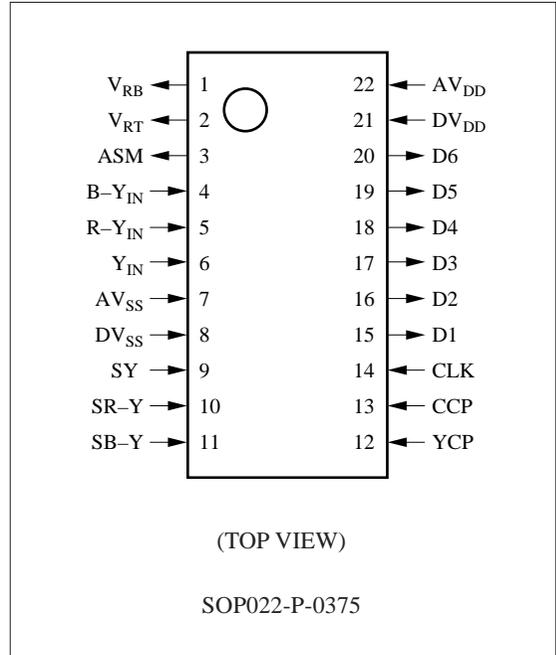
■ Features

- Maximum conversion rate: 20 MSPS (min.)
- Linearity error: ± 0.5 LSB (typ.)
- Differential linearity error: ± 0.5 LSB (typ.)
- Power supply voltage: 5.0 ± 0.5 V
- Power consumption: 100 mW (typ.)
- Built-in 3-input multiplexer, clamp circuit, and reference voltage power supply

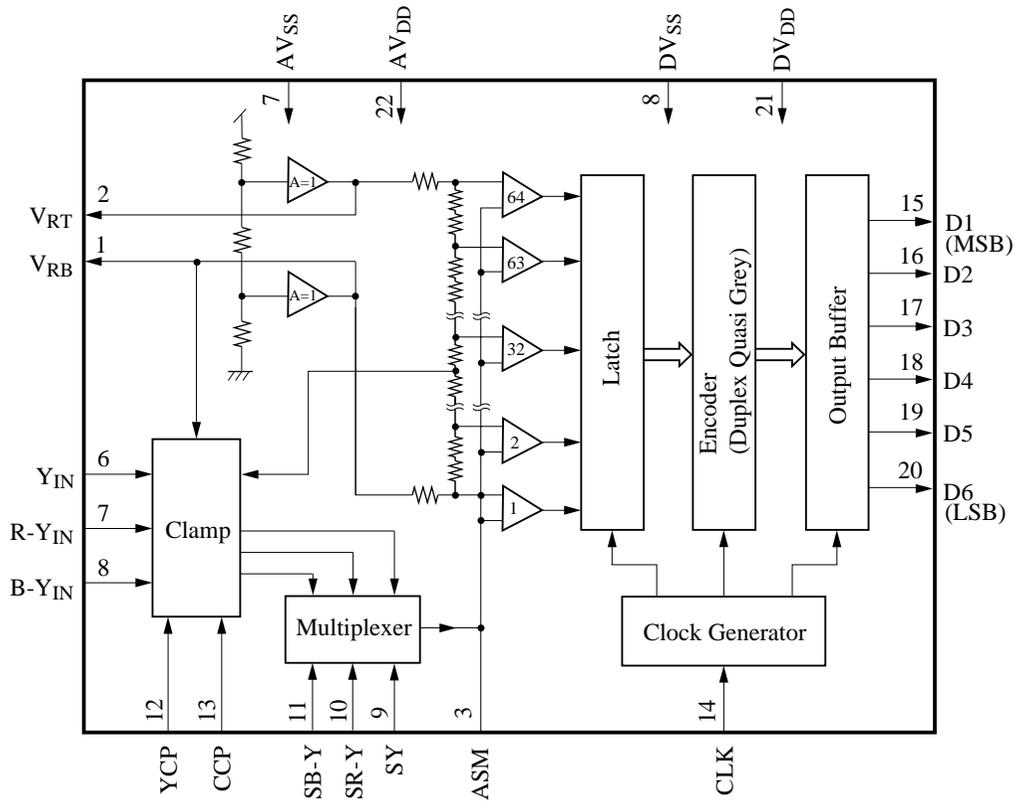
■ Applications

- Digital television receivers
- Digital video equipment
- Picture in picture systems
- Digital image processing equipment

■ Pin Assignment



■ Block Diagram



■ Pin Descriptions

Pin No.	Symbol	Function Description
1	V_{RB}	Reference voltage output (BOTTOM)
2	V_{RT}	Reference voltage output (TOP)
3	ASM	Analog monitor
4	$B-Y_{IN}$	Analog input (B-Y)
5	$R-Y_{IN}$	Analog input (R-Y)
6	Y_{IN}	Analog input (Y)
7	AV_{SS}	Ground for analog circuits
8	DV_{SS}	Ground for digital circuits
9	SY	Multiplexer control (Y)
10	SR-Y	Multiplexer control (R-Y)
11	SB-Y	Multiplexer control (B-Y)
12	YCP	Clamp pulse (Y)
13	CCP	Clamp pulse (R-Y, B-Y)
14	CLK	Clock input
15	D1	Digital output (MSB)
16	D2	Digital output
17	D3	Digital output
18	D4	Digital output
19	D5	Digital output
20	D6	Digital output (LSB)
21	DV_{DD}	Power supply for digital circuits
22	AV_{DD}	Power supply for analog circuits

■ Absolute Maximum Ratings $T_a=25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Power supply voltage for digital circuits	DV_{DD}	- 0.3 to +7.0	V
Power supply voltage for analog circuits	AV_{DD}	- 0.3 to +7.0	V
Input voltage	V_I	$AV_{SS} - 0.3$ to $AV_{DD} + 0.3$	V
Output voltage	V_O	$DV_{SS} - 0.3$ to $DV_{DD} + 0.3$	V
Operating ambient temperature	T_{opr}	-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +125	$^\circ\text{C}$

■ Recommended Operating Conditions $V_{DD}=DV_{DD}=AV_{DD}=5.0\text{V}$, $V_{SS}=DV_{SS}=AV_{SS}=0\text{V}$, $T_a=25^\circ\text{C}$, $C_C=1\mu\text{F}$

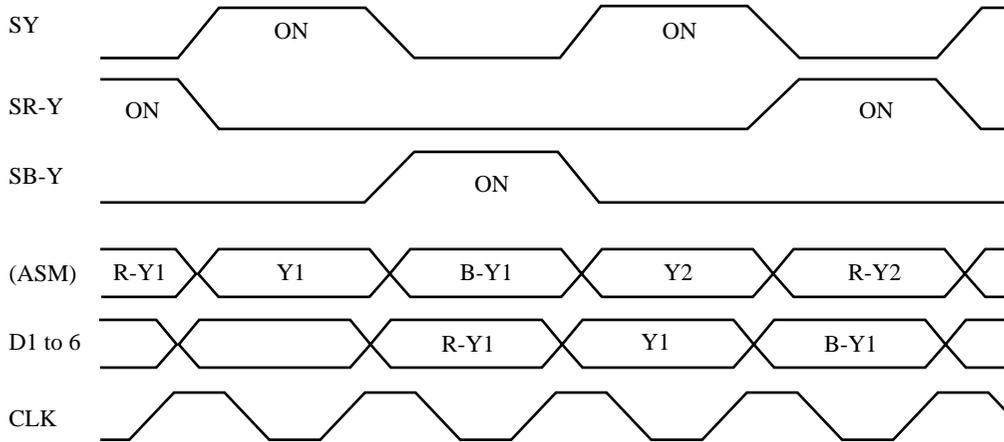
Parameter	Symbol	min	typ	max	Unit
Power supply voltage	V_{DD}	4.5	5.0	5.5	V
Clock input voltage	"H" level	$0.7 \times V_{DD}$		V_{DD}	V
	"L" level	V_{SS}		0.8	V
Digital input voltage	"H" level	$0.7 \times V_{DD}$		V_{DD}	V
	"L" level	V_{SS}		$0.2 \times V_{DD}$	V
Clamp pulse width	t_{CP}	1.5	2.0		μs

■ Electrical Characteristics $DV_{DD}=AV_{DD}=5.0V, DV_{SS}=AV_{SS}=0V, T_a=25^{\circ}C$

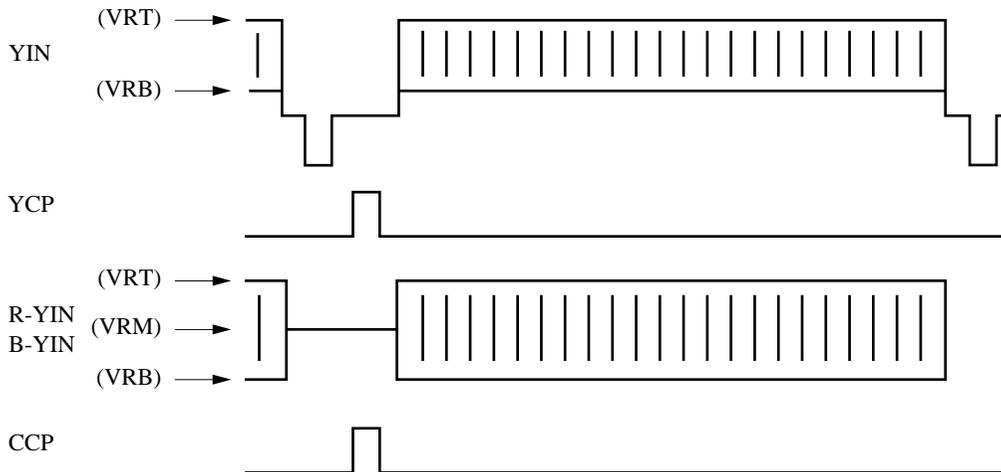
Parameter	Symbol	Conditions	min	typ	max	Unit
Power supply current	I_{DD}	$f_{CLK}=20MHz$		20	40	mA
Resolution	RES			6		bit
Linearity error	E_L				± 1.0	LSB
Differential linearity error	E_D				± 1.0	LSB
Maximum conversion rate	$F_{c(max.)}$		20			MSPS
Reference voltage output (bottom)	V_{RB}		$0.38 \times V_{DD}$	$0.40 \times V_{DD}$	$0.42 \times V_{DD}$	V
Reference voltage output (top)	V_{RT}		$0.78 \times V_{DD}$	$0.80 \times V_{DD}$	$0.82 \times V_{DD}$	V
Clamp current	I_{CP}	$\Delta V_{CP} \pm 0.1V$	± 0.5	± 0.8		mA
Output current	"H" level	$V_{OH}=V_{DD}-0.8V$			-2	mA
	"L" level	$V_{OL}=0.4V$	2			mA
Output delay time	t_d	$C_L=50pF$	10		35	ns
Analog input capacitance	C_I			15		pF

■ Timing Chart

1. A/D converter and multiplexer timing

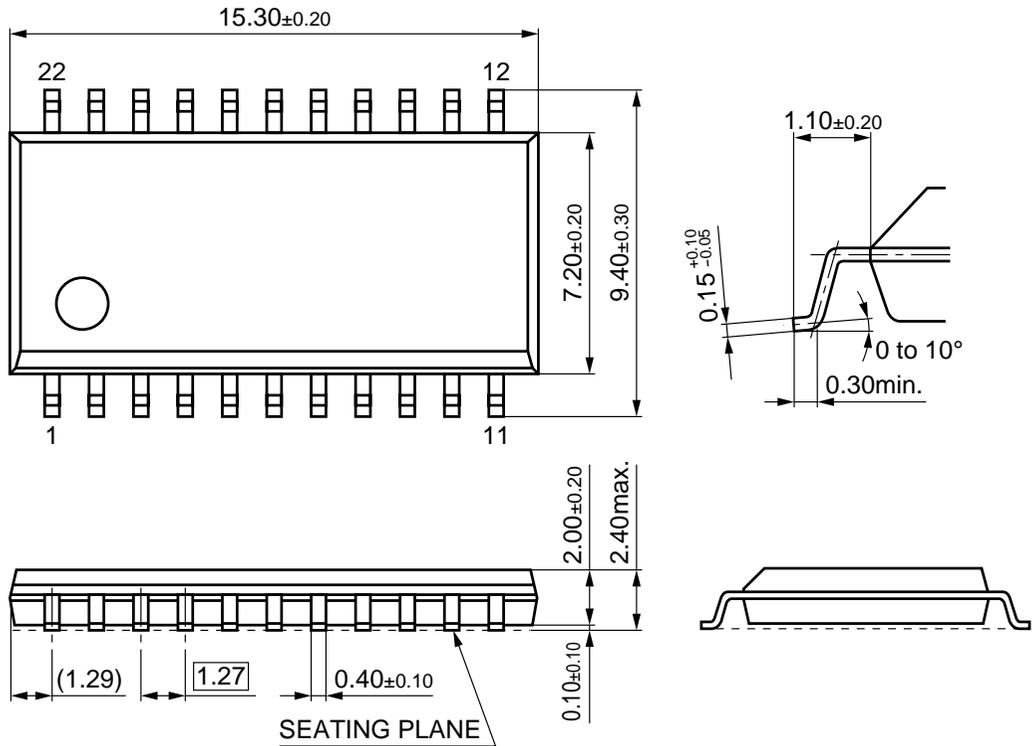


2. Clamp timing



■ Package Dimensions (Unit:mm)

SOP022-P-0375



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