

AN8130K

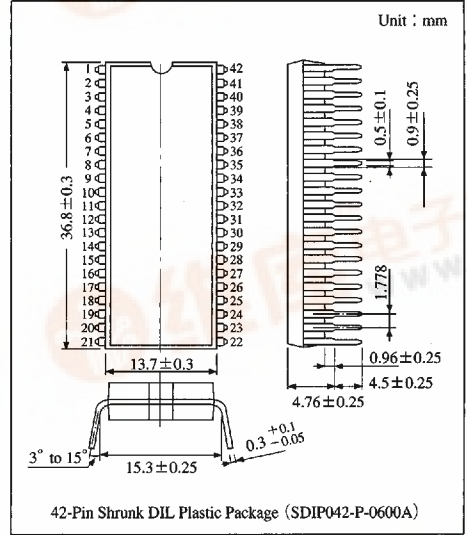
High-speed and Low Power Consumption 10-bit A/D Converter IC

Overview

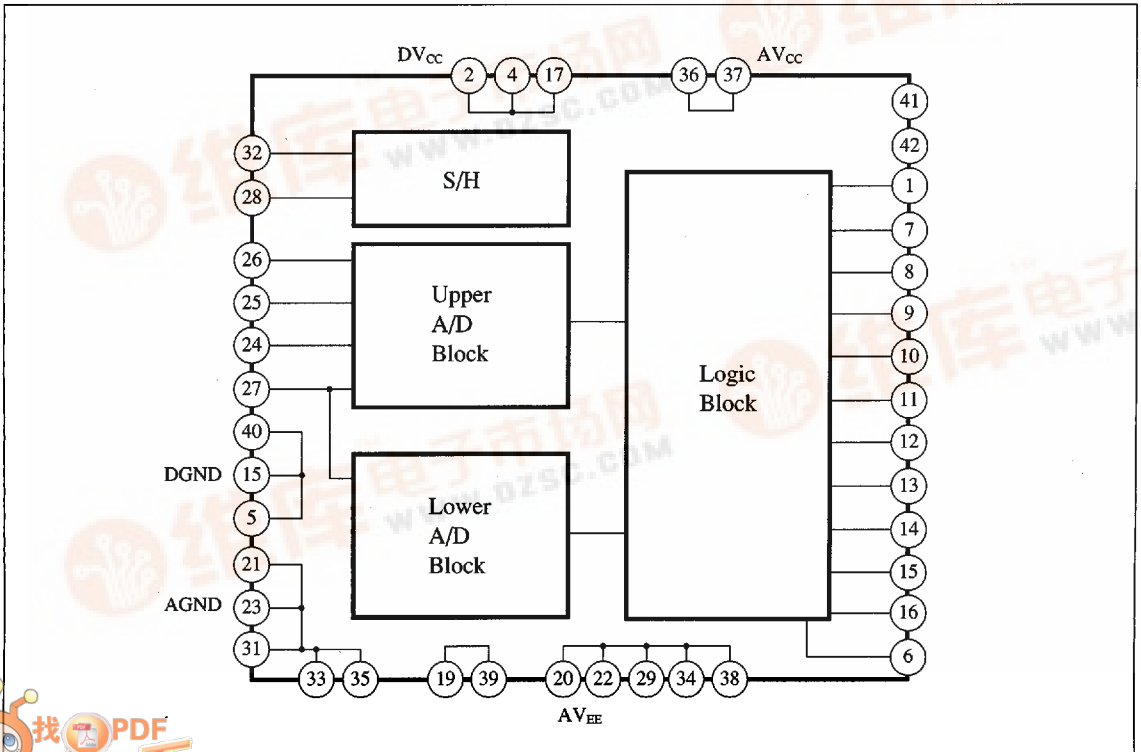
The AN8130K is a 10-bit A/D converter for video processing and it offers low power consumption adopting Bi-CMOS process.

Features

- 10-bit resolution
- High speed : max. conversion rate 20MSPS
- Low power consumption : 750mW
- S/H circuit built-in
- Serial/parallel type



Block Diagram



Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{EE}	-6 to +0.5	V
	V _{CC}	-0.5 to +6	V
Analog input voltage	V _{IN}	V _{EE} to V _{CC}	V
Digital input voltage	V _{CLKSH} /V _{CLKAD}	-0.5 to V _{CC} +0.5	V
Reference voltage	V _{RB} /V _{RT}	V _{EE} to +0.5	V
Digital output current	I _{OH}	-15	mA
Power dissipation	P _D	1100	mW
Operating ambient temperature	T _{opr}	-20 to +70	°C
Storage temperature	T _{stg}	-55 to +150	°C

Recommended Operating Range (Ta = 25°C)

Parameter	Symbol	min	typ	max	Unit
Positive supply voltage	V _{CC}	4.75	5	5.25	V
Negative supply voltage	V _{EE}	-5.25	-5	-4.75	V
Reference voltage	V _{RT}	—	0	—	V
	V _{RB}	—	-2	—	V
Analog input voltage	V _{IN}	V _{RB}	—	V _{RT}	V
Digital input voltage	V _{IH}	2	—	4	V
	V _{IL}	0	—	0.8	V
Digital output current	I _{OH}	—	-0.4	—	mA
	I _{OL}	—	1.6	—	mA
S/H clock input pulse width	t _H *	15	20	—	ns
A/D clock input pulse width	t _H *	35	40	—	ns

* At f_{CLK} = 16MHz

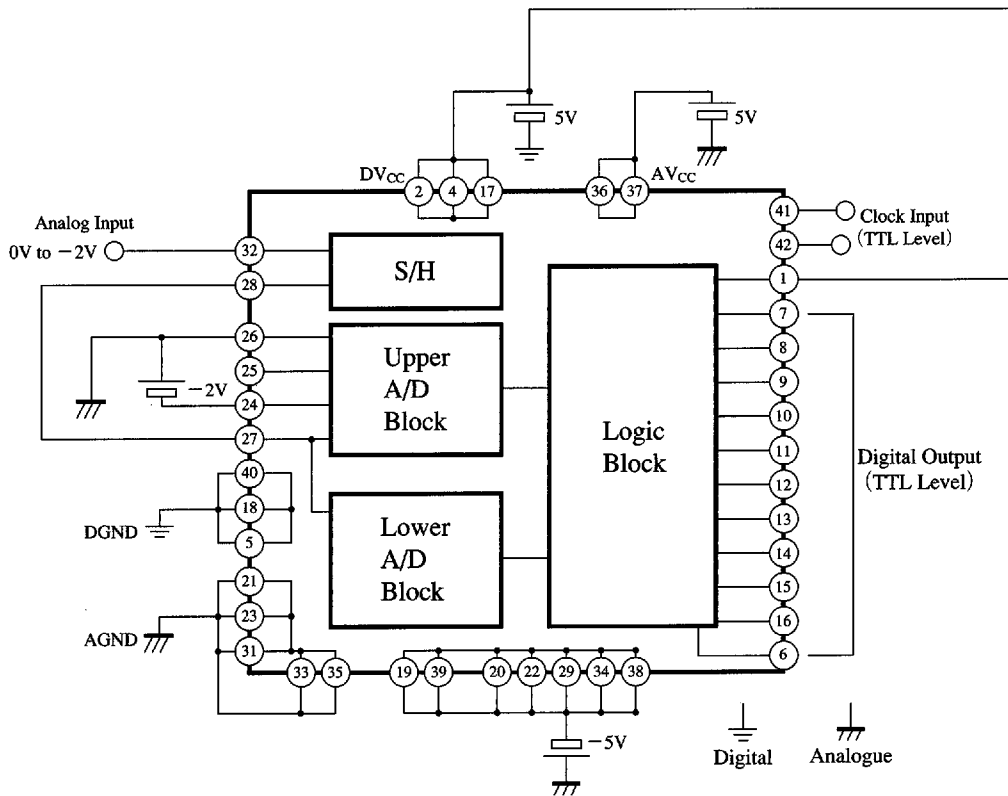
Electrical Characteristics (V_{CC} = 5V, V_{EE} = -5V, Ta = 25°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Supply current	DI _{CC}		—	5	10	mA
	AI _{CC}		—	14	28	mA
	I _{EE}		-164	-131	—	mA
Reference resistor current	I _{RT}	V _{RT} = 0V	2.4	3	3.6	mA
	I _{RB}	V _{RB} = -2V	-3.6	-3	-2.4	mA
Input bias current	I _{IN}	V _{INSB} = -1V	—	10	100	μA
Clock input current	I _{IH}	V _{CLKAD} = V _{CLKSH} = 2.7V	—	1	8	μA
	I _{IL}	V _{CLKAD} = V _{CLKSH} = 0.4V	—	1	8	μA
Digital output voltage	V _{OH}	I _{OB} = -400 μA	2.7	3.4	—	V
	V _{OL}	I _{OL} = 1.6mA	—	—	0.4	V
Linearity error	E _L	V _{IN} = 2V _{PP}	—	±1	—	LSB
Differential linearity error	E _D	V _{IN} = 2V _{PP}	—	±0.5	±1	LSB
Maximum conversion rate	F _C	V _{IN} = 2V _{PP}	20	—	—	MSPS
Quantization noise	S/N	f _{CLK} = 16MHz, f _{IN} = 1MHz	—	53	—	dB
		f _{CLK} = 16MHz, f _{IN} = 8MHz	—	49	—	dB
		f _{CLK} = 20MHz, f _{IN} = 1MHz	—	52	—	dB
		f _{CLK} = 20MHz, f _{IN} = 8MHz	—	47	—	dB

■ Electrical Characteristics (cont.) ($V_{CC}=5V, V_{EE}=-5V, T_a=25^{\circ}C$)

Parameter	Symbol	Condition	min	typ	max	Unit
Differential gain	DG	IRE standard 15kHz Sawtooth 40% subcarrier $f_{CLK}=20MHz$, Nolock	—	0.5	1	%
Differential phase	DP		—	0.5	1	deg
Digital output delay	τ_d		—	33	—	ns
Clock delay	τ_{CLK}	$f_{CLK}=16MHz$	-5	0	5	ns
Input capacitance	C_{IN}		—	10	—	pF
Input offset voltage	V_{OFS}		—	0	—	V

■ Application Circuit



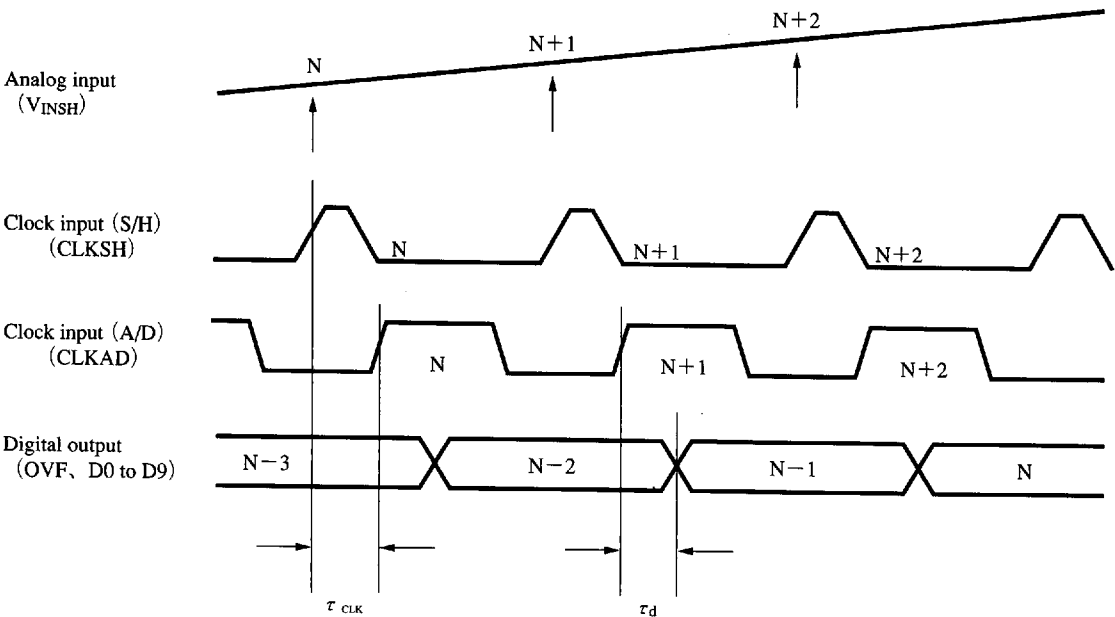
Pin Descriptions

Pin No.	Symbol	Description	Typ. waveform	Voltage level	Pin No.	Symbol	Description	Typ. waveform	Voltage level
1	INV	Digital output inversion pin	—	TTL	22	AV _{EE}	Analog negative supply voltage	—	-5V
2	DV _{CC}	Digital positive supply voltage	—	5V	23	AGND	Analog GND	—	0V
3	N.C.	Non connection	—	—	24	V _{RB}	Reference voltage low level	—	-2V
4	DV _{CC}	Digital positive supply voltage	—	5V	25	V _{RM}	Reference voltage midpoint level	—	—
5	DGND	Digital GND	—	0V	26	V _{RT}	Reference voltage high level	—	0V
6	OVF	Overflow pin	Refer to the timing chart.	TTL	27	V _{INAD}	Analog input (A/D)		0 to -2V
7	D0	Digital output (LSB)			28	V _{OSH}	Analog output (S/H)		0 to -2V
8	D1	Digital output			29	AV _{EE}	Analog negative supply voltage	—	-5V
9	D2	Digital output			30	NC	Non connection	—	—
10	D3	Digital output			31	AGND	Analog GND	—	0V
11	D4	Digital output			32	V _{INSH}	Analog input (S/H)		0 to -2V
12	D5	Digital output			33	AGND	Analog GND	—	0V
13	D6	Digital output			34	AV _{EE}	Analog negative supply voltage	—	-5V
14	D7	Digital output			35	AGND	Analog GND	—	0V
15	D8	Digital output			36	AV _{CC}	Analog positive supply voltage	—	5V
16	D9	Digital output (MSB)	37	AV _{CC}	Analog positive supply voltage	—	5V		
17	DV _{CC}	Digital positive supply voltage	—	5V	38	AV _{EE}	Analog negative supply voltage	—	-5V
18	DGND	Digital GND	—	0V	39	AV _{EE}	Analog negative supply voltage	—	-5V
19	AV _{EE}	Analog negative supply voltage	—	-5V	40	DGND	Digital GND	—	0V
20	AV _{EE}	Analog negative supply voltage	—	-5V	41	CLKSH	Clock input (S/H)	Refer to the timing chart.	TTL
21	AGND	Analog GND	—	0V	42	CLKAD	Clock input (A/D)		

ICs for TV

Supplementary Explanation

• Timing Chart



■ Supplementary Explanation (cont.)

• Output Code

Step	Input signal	Digital output
	2.000VFS 1.953mV STEP	OVFM L 0123456789
	INV = "H"	
000	-0.000000	0000000000
001	-0.001953	0000000001
.	.	.
.	.	.
511	-0.998047	0011111111
512	-1.000000	0100000000
513	-1.001953	0100000001
.	.	.
.	.	.
1023	-1.998047	0111111111
1024	-2.000000	1111111111