

AN8124SC

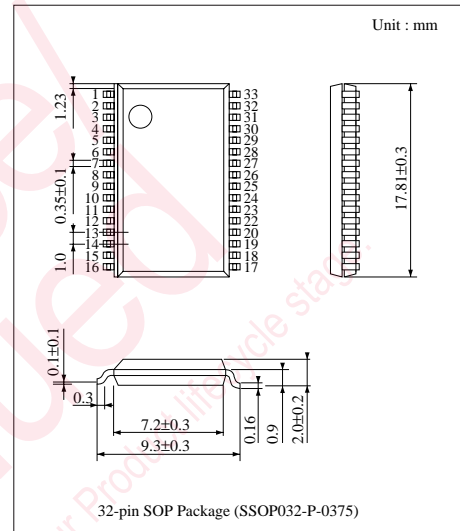
8-Bit A/D and D/A Compound Converter

■ Overview

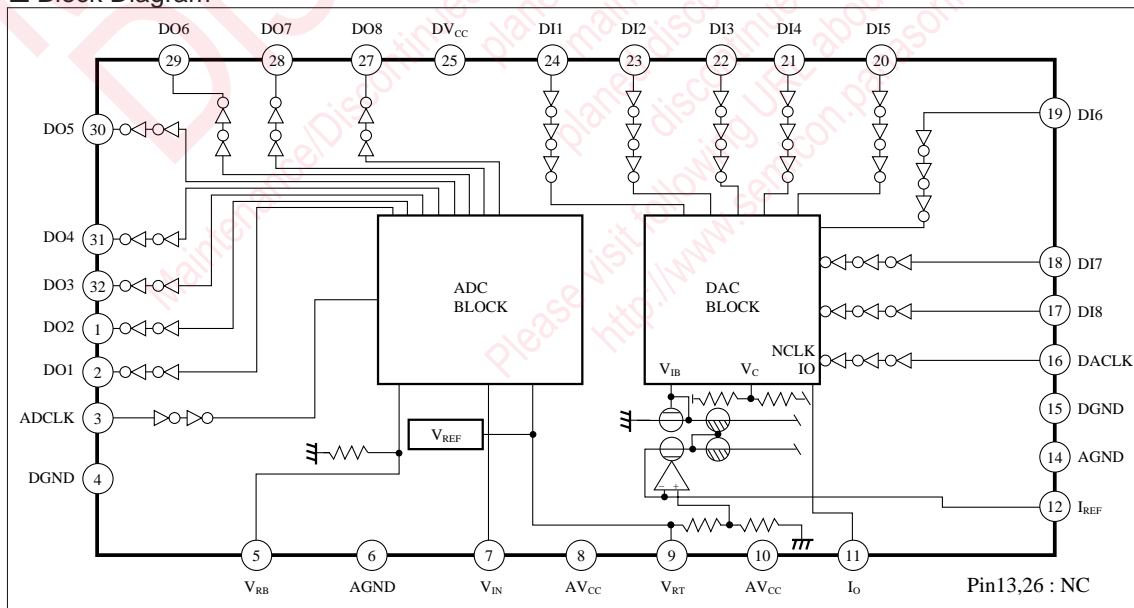
The AN8124SC is a 8-bit A/D and D/A compound converter for image processing.

■ Features

- Reference Voltage Source Built-in
- Maximum conversion rate : 20 MSPS (min.)
- Sample holding circuit not required
- Low consumption power : 250mW(typ.)
- Digital input/output level : TTL compatible



■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	5.5	V
Supply current	I _{CC}	90	mA
Analogue input voltage	V _{IN}	- 0.5 to V _{CC} + 0.3	V
Digital input voltage	V _{CLK}	- 0.5 to V _{CC} + 0.3	V
Digital output current	I _{OH}	-15	mA
Digital output current	I _{OL}	15	mA
Reference resistive voltage	V _{RT}	- 0.5 to V _{CC} + 0.3	V
	V _{RB}	- 0.5 to V _{CC} + 0.3	V
Digital input voltage	V _{DI}	- 0.5 to V _{CC} + 0.3	V
Analogue output current	I _O	30	mA
Reference current	I _{REF}	10	mA
Power dissipation	P _D	470	mW
Operating ambient temperature	T _{opr}	- 20 to + 70	°C
Storage temperature	T _{stg}	- 55 to + 150	°C

■ Recommended Operating Conditions (Ta=25°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Supply voltage	V _{CC}		4.75	5	5.25	V
Analogue input voltage	V _{IN}		V _{RB}	—	V _{RT}	V
Output load resistance	R _O		—	220	—	Ω
Digital input voltage	V _{IH}		2.4	—	—	V
	V _{IL}		—	—	0.8	V
Clock input pulse width	t _{WH}	Refer to the timing chart.	25	—	—	ns
	t _{WL}	Refer to the timing chart.	25	—	—	ns
Setting-up time	t _s	Refer to the timing chart.	20	—	—	ns
Holding time	t _H	Refer to the timing chart.	20	—	—	ns

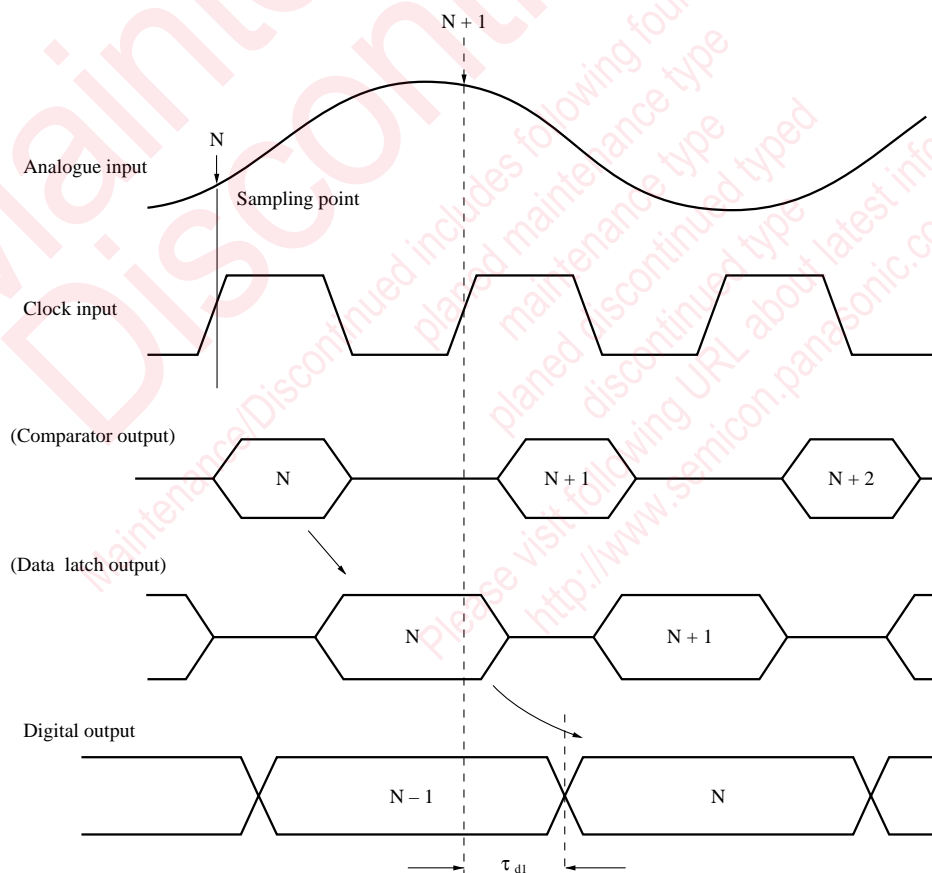
■ Electrical Characteristics (V_{CC}=5V, Ta=25°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Supply current	I _{CC}	f _{CLK} = 15MHz, R _{REF} = 1.8kΩ	—	50	80	mA
Reference voltage	V _{RT}		3.1	3.5	3.9	V
	V _{RB}		1.1	1.5	1.9	V
Input bias current	I _{IN}	V _{IN} = 2.5V	—	40	120	μA
Clock input current	I _{IH}	V _{IN} = 2.4V	—	—	30	μA
	I _{IL}	V _{IL} = 0.4V	-30	—	—	μA
Digital output voltage	V _{OH}	I _{OH} = -2mA	V _{CC} -0.8	—	—	V
	V _{OL}	I _{OL} = 2mA	—	—	0.4	V
A/D, D/A						
Differential gain	DC		—	1	—	%
Differential phase	DP		—	0.5	—	deg
Quantization noise	S/N	f _{IN} = 4MHz, f _s = 20MHz	33	40	—	dB

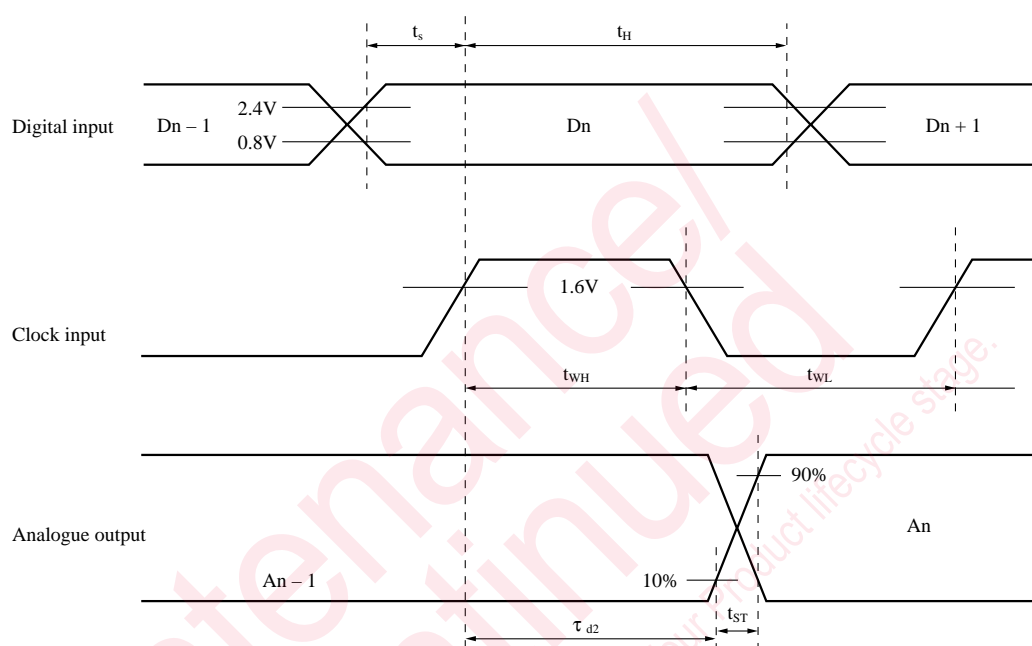
■ Electrical Characteristics (cont.) ($V_{CC}=5V$, $T_a=25^{\circ}C$)

Parameter	Symbol	Condition	min	typ	max	Unit
A/D						
Resolution	RES		—	8	—	bit
Maximum conversion rate	$F_{C_{MAX}}$		20	—	—	MSPS
Linearity error	E_L	$V_{RT}=3.5V$, $V_{RB}=1.5V$	—	± 0.5	± 1	LSB
Differential linearity error	E_D	$V_{RT}=3.5V$, $V_{RB}=1.5V$	—	—	± 0.5	LSB
Equivalent input impedance	R_{IN}	$V_{IN}=2.5V$	—	500	—	k Ω
Input capacitance	C_{IN}	$V_{IN}=2.5V$	—	40	—	pF
Digital output delay	τ_{d1}		—	25	—	ns
D/A						
Resolution	RES		—	8	—	bit
Maximum conversion rate	$F_{C_{MAX}}$	$R_{OUT}=220\Omega$, $R_{REF}=1.8k\Omega$	20	—	—	MSPS
Linearity error	E_L	$R_{OUT}=220\Omega$, $R_{REF}=1.8k\Omega$	—	—	± 0.5	LSB
Differential linearity error	E_D	$R_{OUT}=220\Omega$, $R_{REF}=1.8k\Omega$	—	—	± 0.5	LSB
Full-scale current	I_{FS}	$R_{OUT}=220\Omega$, $R_{REF}=1.8k\Omega$	3.64	4.55	5.45	mA
Settling time	t_{ST}	$R_{OUT}=220\Omega$, $R_{REF}=1.8k\Omega$	—	—	50	ns
Analogue output delay	τ_{d2}		—	25	—	ns

■ A/D Sampling Timing Chart



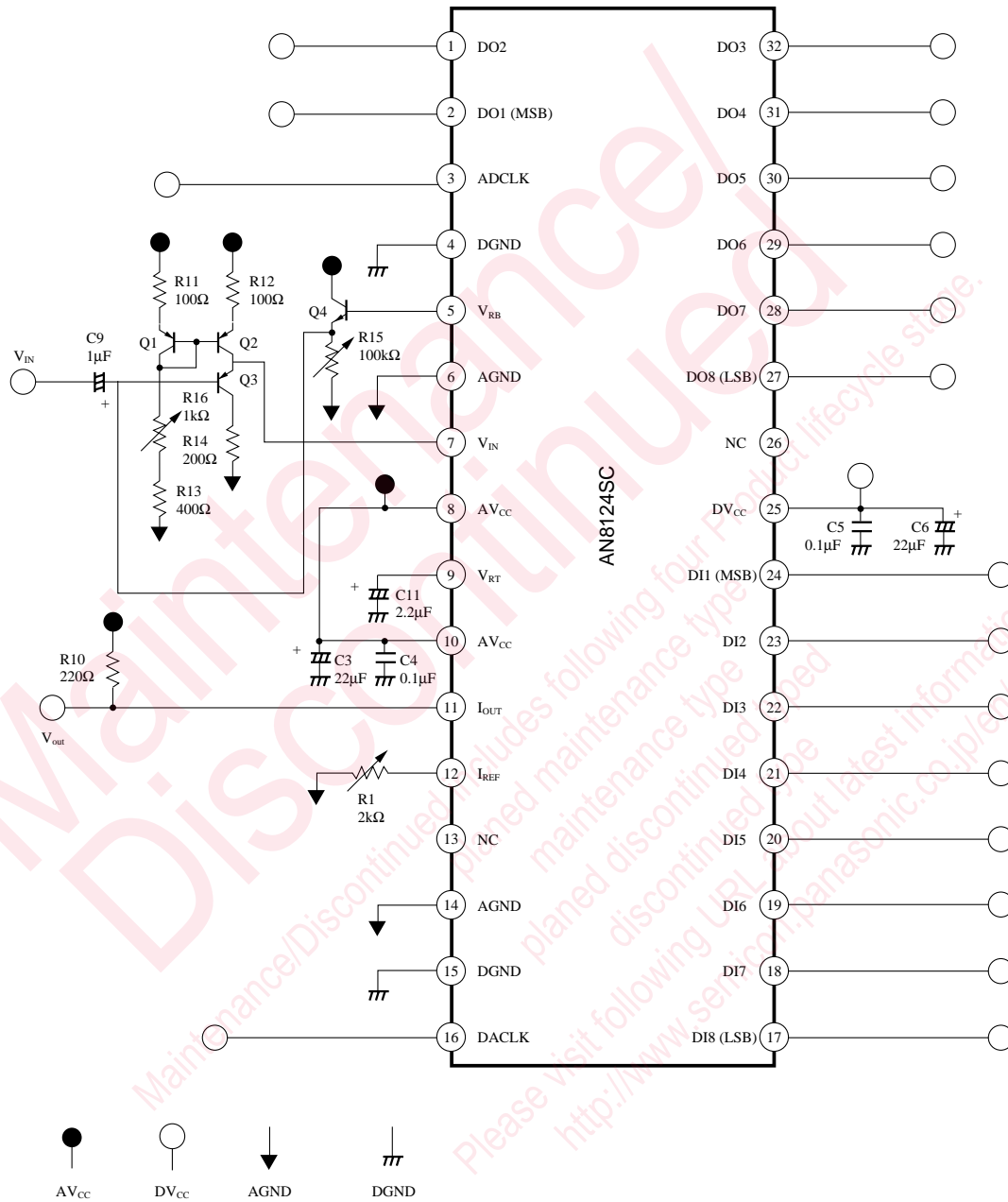
■ D/A Timing Chart



■ Pin Descriptions

Pin No.	Symbol	Pin name	Pin No.	Symbol	Pin name
1	DO2	Digital output 2-bit	17	DI8	Digital input 8-bit (LSB)
2	DO1	Digital output 1-bit	18	DI7	Digital input 7-bit
3	ADCLK	A/D convertor clock input	19	DI6	Digital input 6-bit
4	DGND	Digital ground	20	DI5	Digital input 5-bit
5	V_{RB}	Reference voltage low level	21	DI4	Digital input 4-bit
6	AGND	Analogue ground	22	DI3	Digital input 3-bit
7	V_{IN}	Analogue input pin	23	DI2	Digital input 2-bit
8	AV_{CC}	Analogue power supply pin	24	DI1	Digital input 1-bit (MSB)
9	V_{RT}	Reference voltage high level	25	DV _{CC}	Digital power supply pin
10	AV_{CC}	Analogue power supply pin	26	NC	No connection
11	I_{OUT}	Analogue output	27	DO8	Digital output 8-bit
12	I_{REF}	Reference current setting	28	DO7	Digital output 7-bit
13	NC	No connection	29	DO6	Digital output 6-bit
14	AGND	Analogue ground	30	DO5	Digital output 5-bit
15	DGND	Digital ground	31	DO4	Digital output 4-bit
16	DACLK	D/A convertor clock input	32	DO3	Digital output 3-bit

■ Application Circuit



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