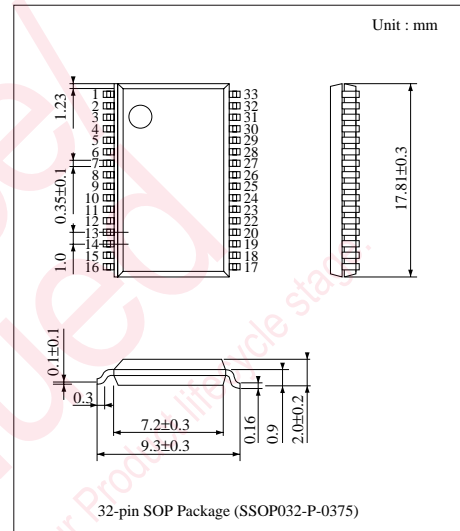A/D and D/A Converters

Panasonic

AN8124SC

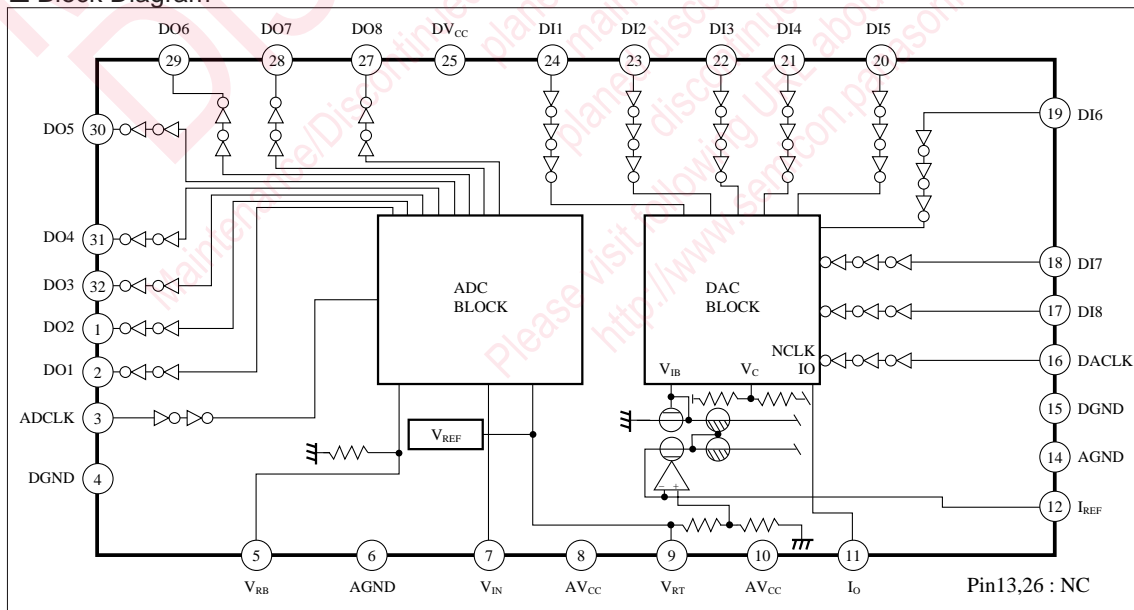## 8-Bit A/D and D/A Compound Convertor

■ Overview

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

■ Features

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

Unit : mm

32-pin SOP Package (SSOP032-P-0375)

■ Block Diagram

Pin13,26 : NC

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■ 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

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

Parameter	Symbol	Condition	min	typ	max	Unit
A/D						
Resolution	RES		—	8	—	bit
Maximum conversion rate	F_{CMAX}		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 impedane	R_{IN}	$V_{IN}=2.5V$	—	500	—	kΩ
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_{CMAX}	$R_{OUT}=220Ω$, $R_{REF}=1.8kΩ$	20	—	—	MSPS
Linearity error	E_L	$R_{OUT}=220Ω$, $R_{REF}=1.8kΩ$	—	—	± 0.5	LSB
Differential linearity error	E_D	$R_{OUT}=220Ω$, $R_{REF}=1.8kΩ$	—	—	± 0.5	LSB
Full-scale current	I_{FS}	$R_{OUT}=220Ω$, $R_{REF}=1.8kΩ$	3.64	4.55	5.45	mA
Settling time	t_{ST}	$R_{OUT}=220Ω$, $R_{REF}=1.8kΩ$	—	—	50	ns
Analogue output delay	τ_{d2}		—	25	—	ns

■ A/D Sampling Timing Chart
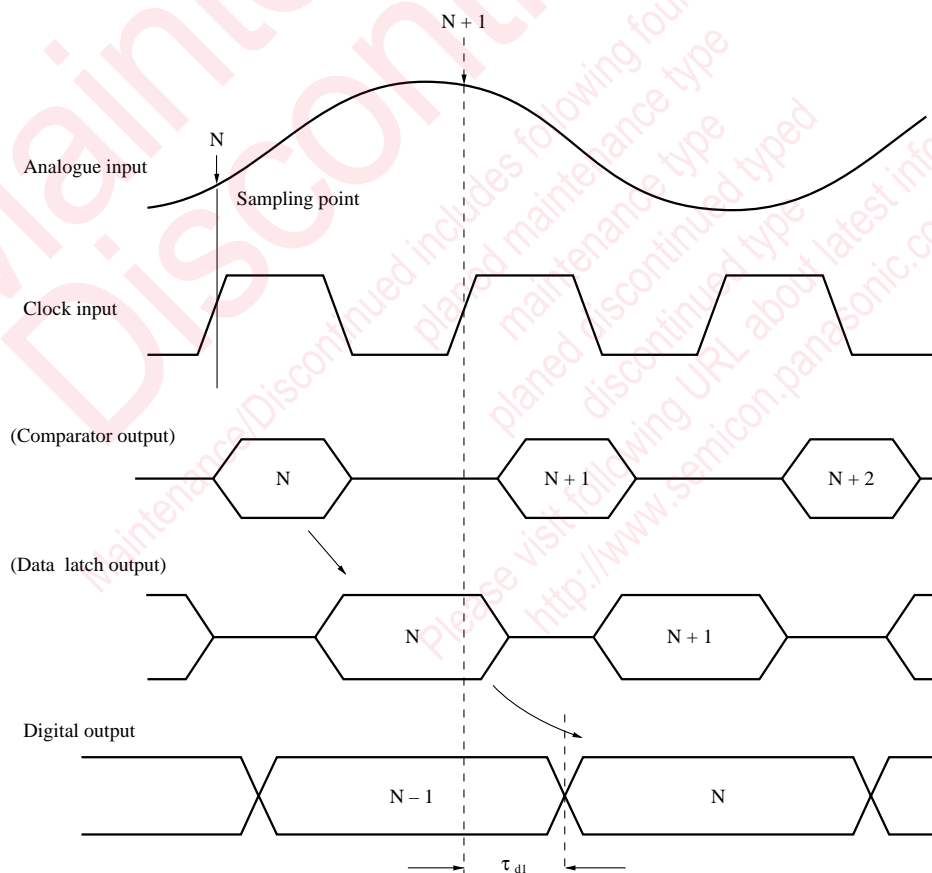
■ D/A Timing Chart
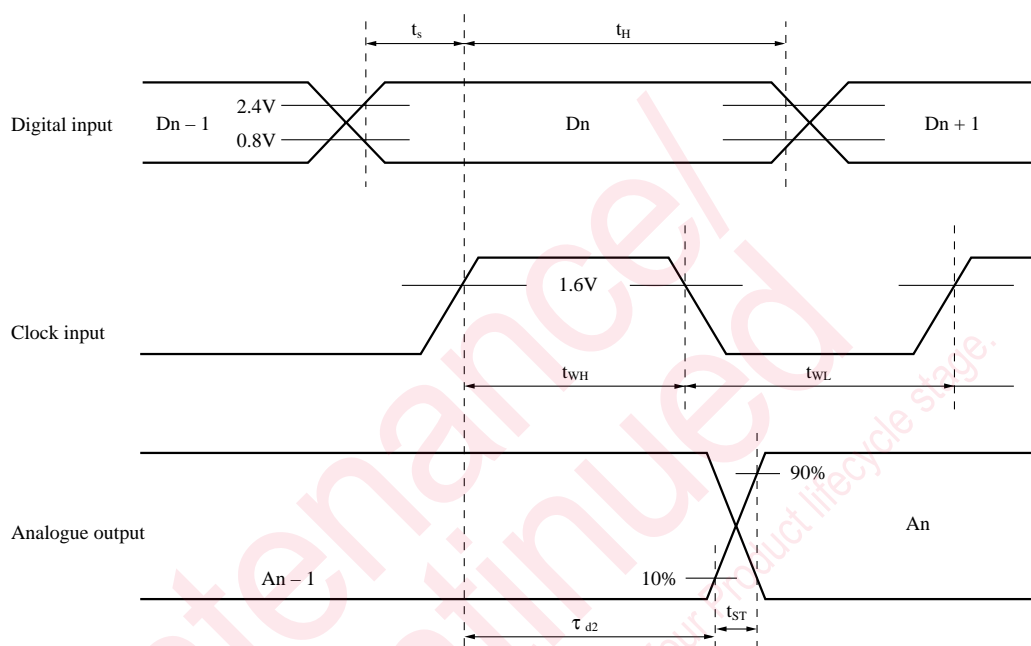
■ Pin Descriptions

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}	Analoge 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
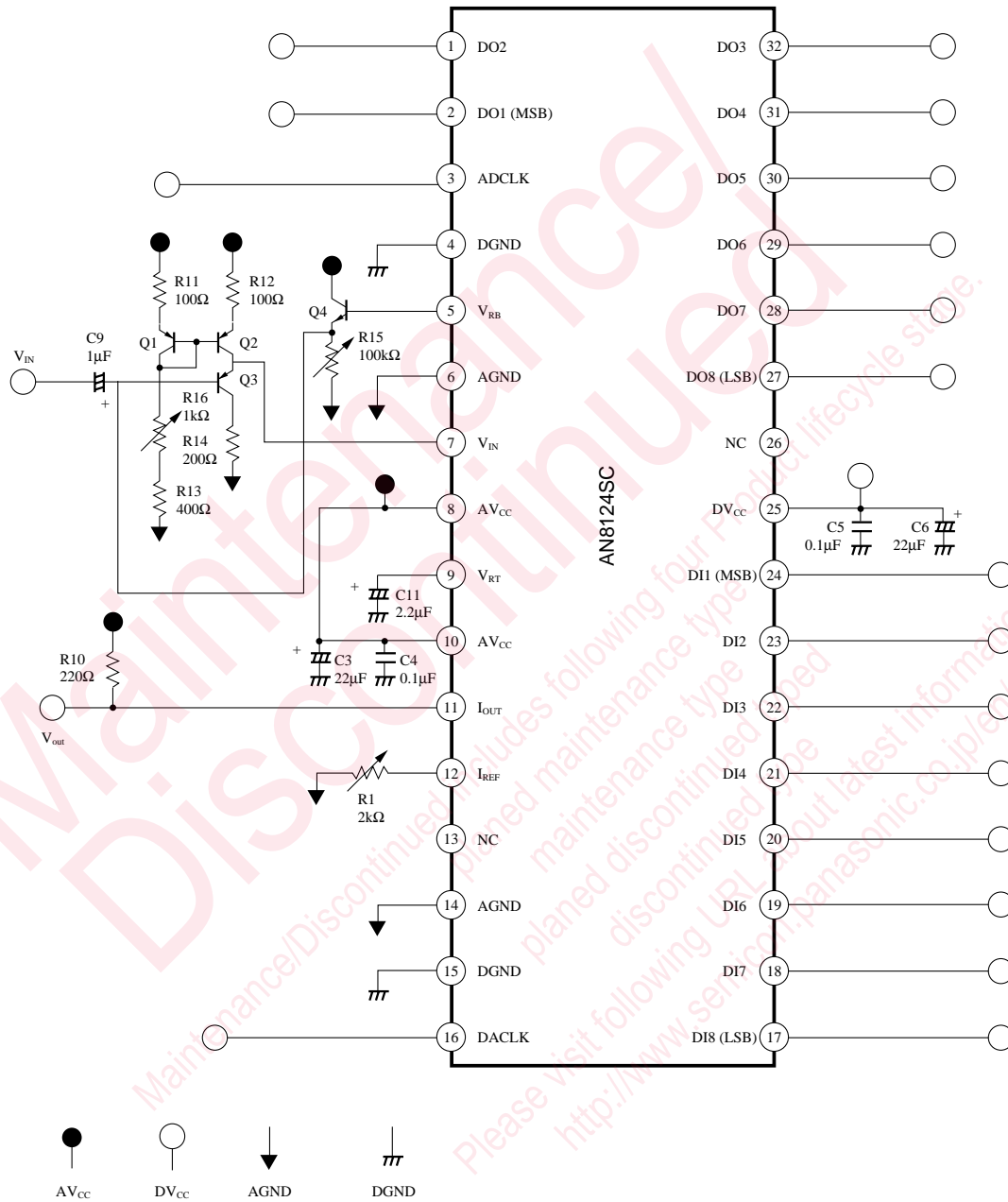
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