**Panasonic**

AN8124K

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

■ Overview

The AN8124K 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 : 250 mW (typ.)
- Digital input/output level : TTL compatible

Unit : mm

30-pin SDIP Package (SDIP030-P-0400)
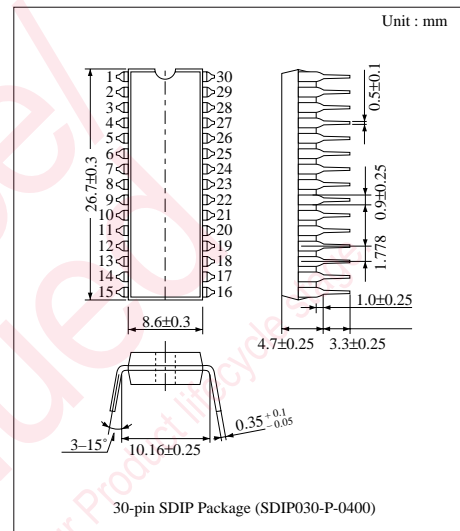
■ Block Diagram
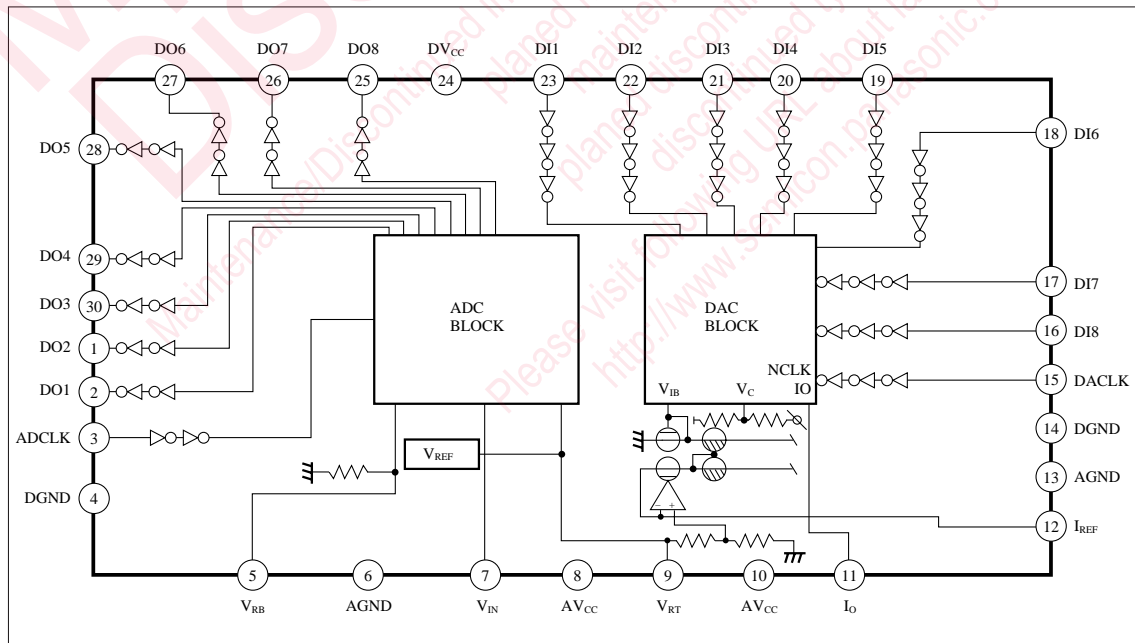
■ Absolute Maximum Rating (Ta=25˚C)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	7	V
Supply current	I_{CC}	100	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	700	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}	$V_{IN}=2.5$V	1.1	1.5	1.9	V
Input bias current	I_{IN}	$V_{IN}=2.4$V	——	40	120	μA
Clock input current	I_{IH}	$V_{IL}=0.4$V	——	——	30	μA
	I_{IL}	$I_{OH}=-2$mA	-30	——	——	μA
Digital output voltage	V_{OH}	$I_{OL}=2$mA	$V_{CC}-0.8$	——	——	V
	V_{OL}		——	——	0.4	V
A/D, D/A						
Differential gain	DG		——	1	——	%
Differential phase	DP	$f_{IN}=4$MHz, $f_S=20$MHz	——	0.5	——	deg
Quantization noise	S/N		33	40	——	dB

Panasonic

■ Electrical Characteristic (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 impedance	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
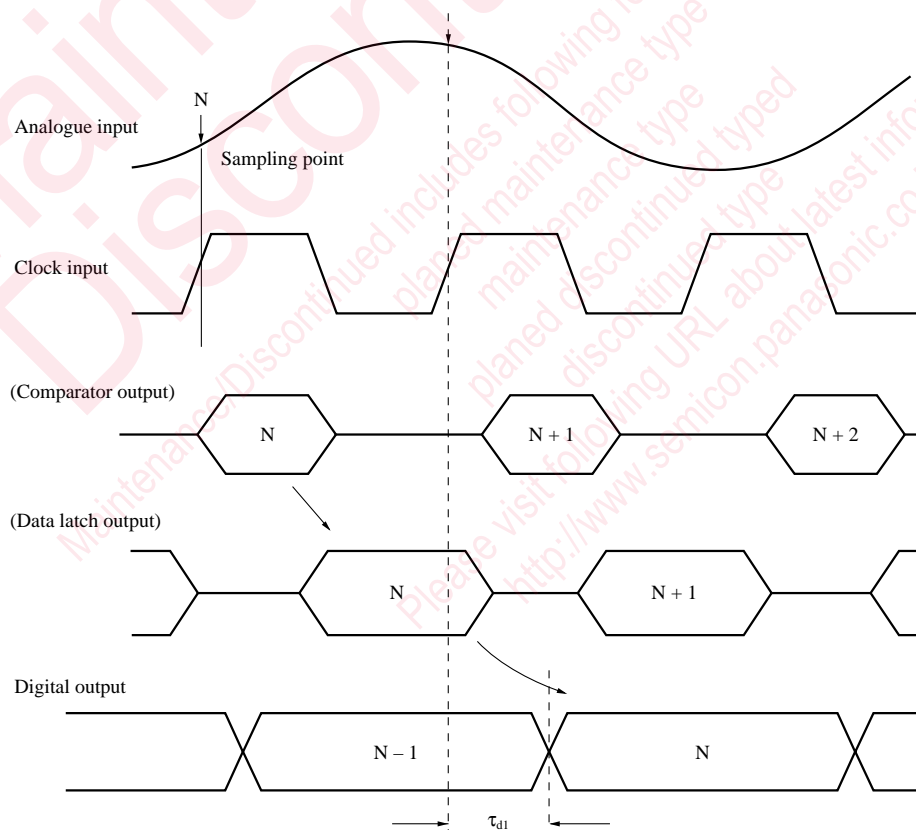
■ D/A Timing Chart
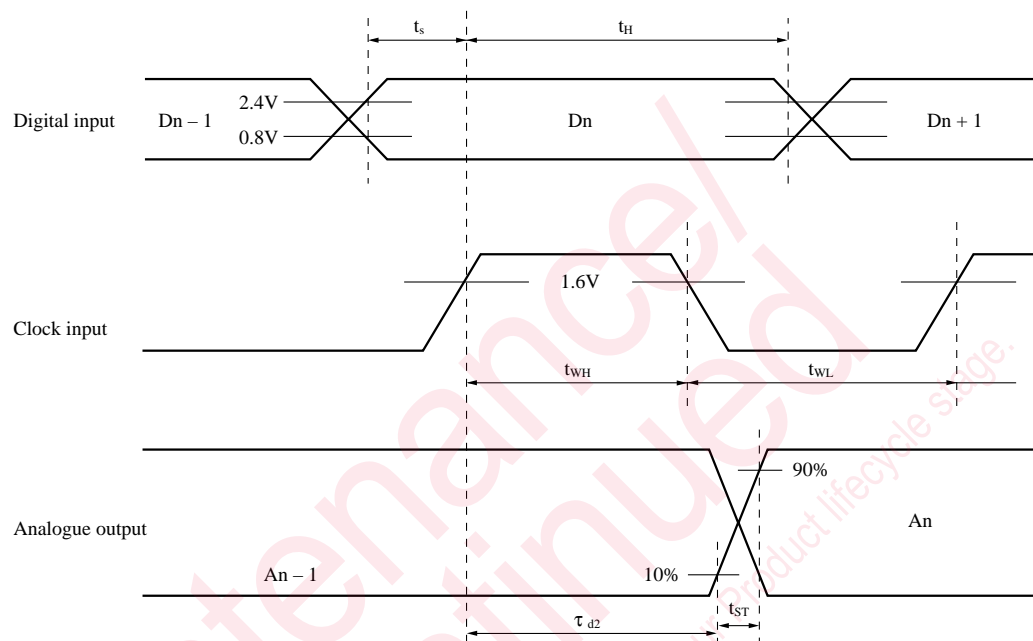
■ Pin Descriptions

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

■ Application Circuit
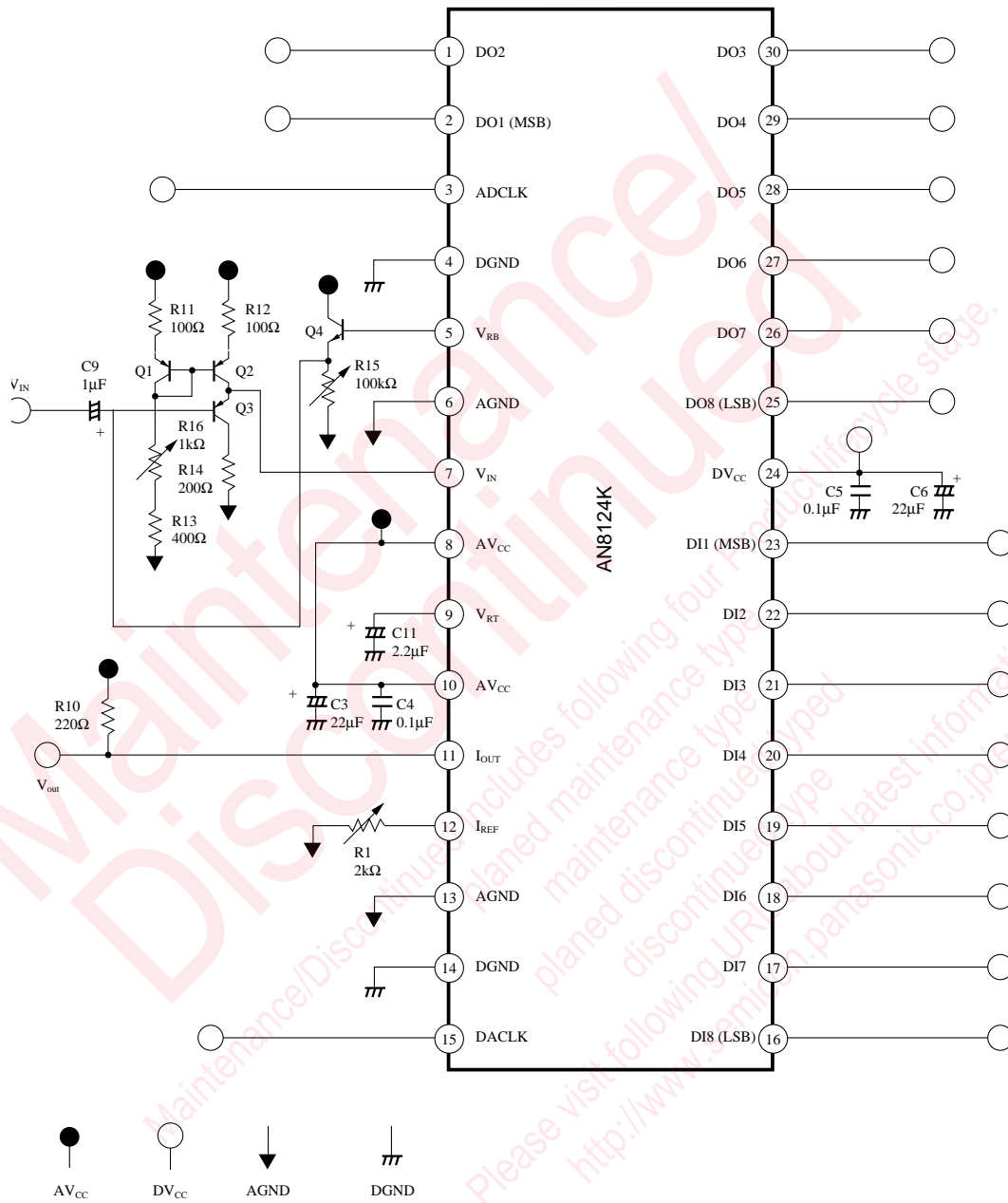
Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
・Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
・Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

(7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.