AN6855T

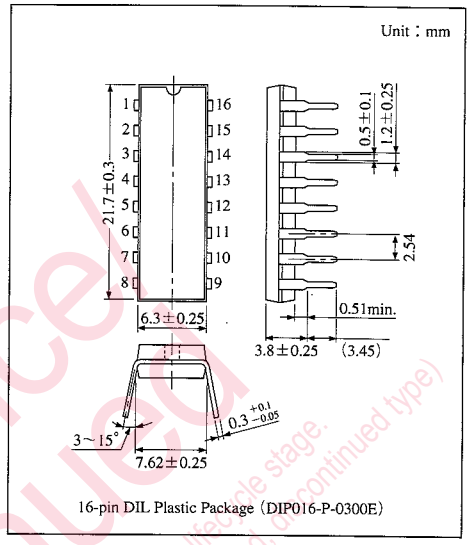
High-Speed 4-bit A/D Converter

■ Overview

The AN6855T is a high-speed and low power dissipation 4-bit monolithic IC (A/D converter parallel type) and is suitable for high-speed data conversion and computer input data conversion such as digitizer of video band signal.

■ Features

- 4-bit resolution (with overflow pin attached)
- High speed maximum conversion speed 20MSPS
- Sample and hold circuits are not necessary
- Input dynamic range is 2V
- Low power dissipation : 170mW typ
- Digital outputs are TTL compatible



16-pin DIL Plastic Package (DIP016-P-0300E)

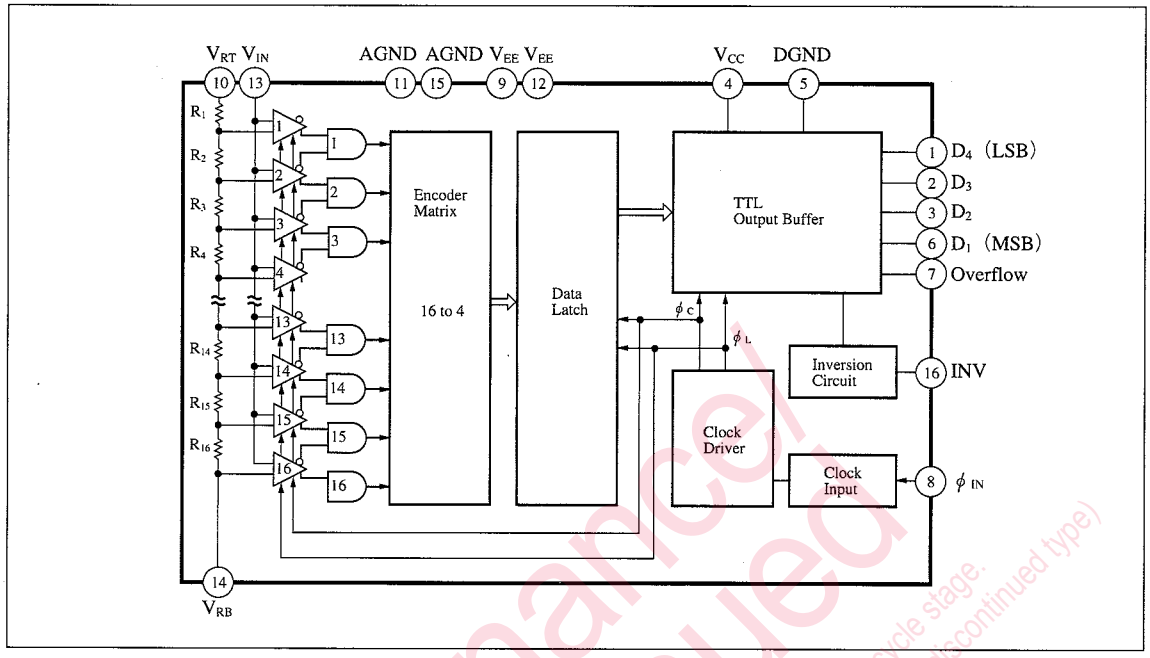
■ Main Characteristics (V_{EE} = −6.0V, V_{CC} = 5.0V, Ta = −20 to +70℃)

Parameter	Symbol	Condition	Value	Unit
Resolution	RES		4	bit
Input dynamic range	$V_{i(max)}$		2	V
Linearity error	LE	$V_{in}=2V_{P-P}$	$\pm\frac{1}{4}$	LSB
Max conversion speed	$f_{MSPS(max)}$		20	MSPS

■ Pin Descriptions

Pin No.	Pin name	Pin No.	Pin name
1	Digital output LSB	9	Negative supply voltage
2	Digital output 3-bit	10	Reference high level
3	Digital output 2-bit	11	Analog ground
4	Supply voltage	12	Negative supply voltage
5	Digital ground	13	Analog input
6	Digital output MSB	14	Reference low level
7	Overflow output	15	Analog ground
8	Clock input	16	Output signal reversal control

Block Diagram



Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	−0.3 to +5.5	V
Supply voltage	V_{EE}	−6.6 to +0.3	V
Analog input voltage	V_i	V_{EE} to +0.3	V
Digital input voltage	V_ϕ	−0.3 to V_{CC}	V
Reference voltage	V_{REF}	V_{EE} to +0.3	V
Power dissipation	P_D	540	mW
Operating ambient temperature	T_{opr}	−20 to +70	℃
Storage temperature	T_{stg}	−40 to +150	℃

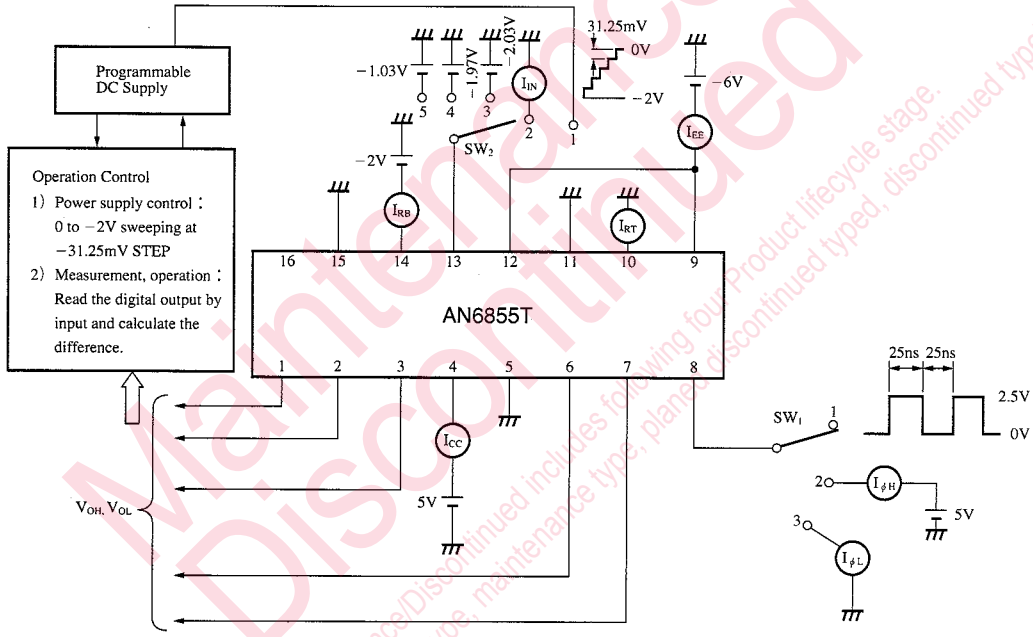
Recommended Operating Conditions

Parameter	Symbol	min	typ	max	Unit
Supply voltage	V_{CC}	4.5	5	5.5	V
	V_{EE}	−6.6	−6	−5.4	V
Reference voltage	V_{RT}	−0.1	0	+0.1	V
	V_{RB}	−2.1	−2	−1.9	V
Analog input voltage	V_i	−2.1	—	+0.1	V
Digital input voltage	$V_{\phi H}$	2.5	—	5	V
	$V_{\phi L}$	0	—	0.4	V
Digital output current	I_{OH}	−2	—	—	mA
Clock input pulse width (Clock input)	τ_H	25	—	—	ns
	τ_L	25	—	—	ns

■ Electrical Characteristics (Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
Supply current	I_{CC}	V_{CC}=5V, V_{EE}=−6V	10	20	30	mA
	I_{EE}		11	17	23	mA
Reference resistance current	$I_{Bias(RT)}$	V_{RT}=0V, V_{RB}=−2V	0.8	1.5	2.1	mA
	$I_{Bias(RB)}$		−2.1	−1.5	−0.8	mA
Input bias current	I_{Bias}	V_{CC}=5V, V_{EE}=−6V	1.5	6	15	μA
Clock input current	$I_{\phi H}$	V_{CC}=5V, V_{EE}=−6V	0.3	0.7	2.4	mA
	$I_{\phi L}$		−1.4	−0.9	−0.6	mA
Digital output voltage	V_{OH}	V_{CC}=5V, V_{EE}=−6V, I_{OH}=−2mA	2.5	3.5	5.0	V
	V_{OL}	V_{CC}=5V, V_{EE}=−6V, I_{OL}=−2mA	—	—	0.4	V
Linearity error	LE		—	—	±1/4	LSB

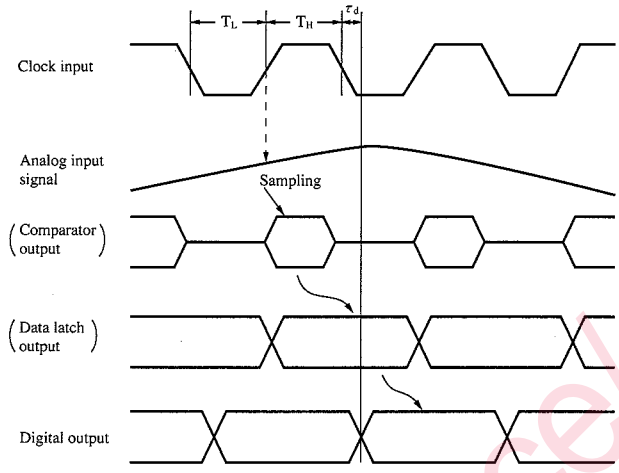
Test Circuit



Test Conditions Table

Parameter \ Specified item		SW1	SW2
Supply current	I_{CC}	1	5
	I_{EE}	1	5
Reference resistance current	$I_{Bias(RT)}$	1	5
	$I_{Bias(RB)}$	1	5
Input bias current	I_{Bias}	1	2
Clock input current	$I_{\phi H}$	2	3
	$I_{\phi L}$	3	3
Digital output voltage V_{OH}		1	4
	$V_{OH⑦}$	1	3
V_{OL}		1	2
Linearity error	LE	1	1

■ Sampling Timing Chart



Note) Because the comparator output and data latch output are internal signals, the external pin is not provided.

■ Output Code Table

Comparator No.	Comparator threshold voltage	Digital output									
		INV = "High" or Open (Pin⑯)						INV = "Low" (Pin⑯)					
	Input 2.000VFS 0.125Vstep	Over Flow	M 1	2	3	L 4		Over Flow	M 1	2	3	L 4	
01	−0.125	0	0	0	0	0		1	1	1	1	1	
02	−0.250	0	0	0	0	1		1	1	1	1	0	
03	−0.375	0	0	0	1	0		1	1	1	0	1	
04	−0.500	0	0	0	1	1		1	1	1	0	0	
05	−0.625	0	0	1	0	0		1	1	0	1	1	
06	−0.750	0	0	1	0	1		1	1	0	1	0	
07	−0.875	0	0	1	1	0		1	1	0	0	1	
08	−1.000	0	0	1	1	1		1	1	0	0	0	
09	−1.125	0	1	0	0	0		1	0	1	1	1	
10	−1.250	0	1	0	0	1		1	0	1	1	0	
11	−1.375	0	1	0	1	0		1	0	1	0	1	
12	−1.500	0	1	0	1	1		1	0	1	0	0	
13	−1.625	0	1	1	0	0		1	0	0	1	1	
14	−1.750	0	1	1	0	1		1	0	0	1	0	
15	−1.875	0	1	1	1	0		1	0	0	0	1	
16	−2.000	0	1	1	1	1		1	0	0	0	0	
		1	0	0	0	0		0	1	1	1	1	

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