ITRI
ERSO

ES52096

8-bit A/D Converter

Features

- 8-Bit Resolution.
- Maximum conversion rate:5 MSPS.(TYP).
- Low power consumption:60 mW.
- 3-state TTL compatible output.
- Power supply : 5V single.
- Reference impedance : 300Ω(TYP)
- Low input capacitance : 20pF.
- Built-in reference voltage self bias circuit.

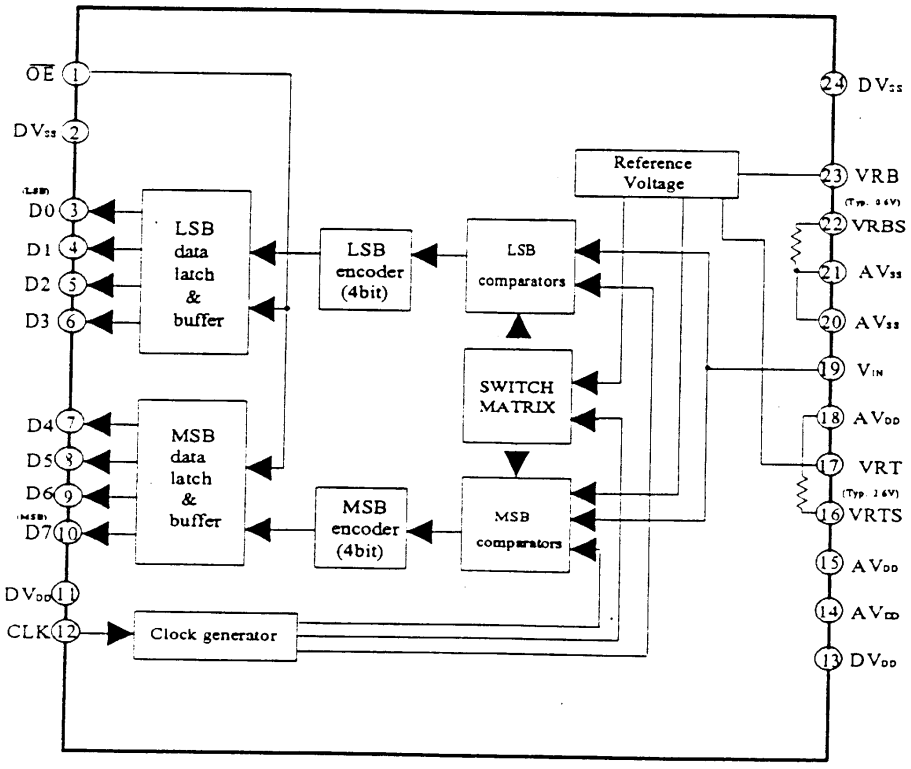
DESCRIPTION

ES52096 is an 8 Bit CMOS A / D converter for scanner use. Conversion rates up to 5 MSPS can be attained while operating at low power consumption. This A / D converter consists of a reference voltage, data latches, encoder, comparators and clock generator.

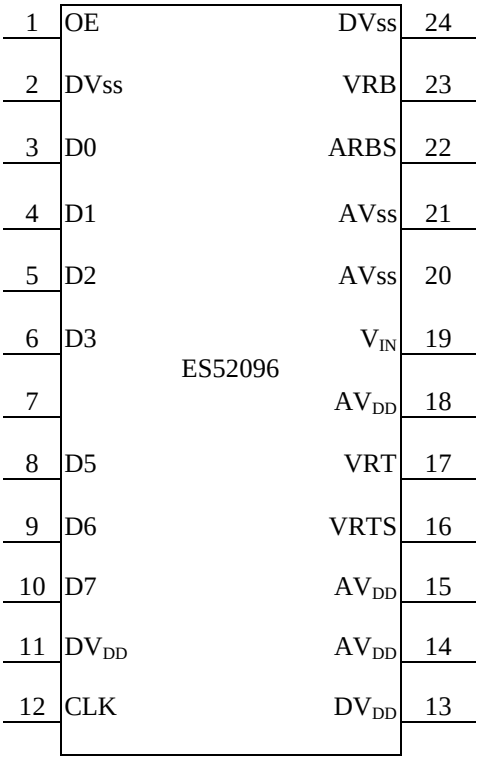
APPLICATIONS

- Scanner.

Block Diagram



PIN Assignment



24PIN SOP, 24 PIN DIP

Pin Designation & Function

NO	Symbol	Description
2, 24	DVss	Digital GND
3 to 10	Do to D7	D0(LSB)to D7 (MSB)output
12	CLK	Clock input
1	$\overline{OE}$	When OE = LOW , data is output When OE =HIGH , D0 to D7 Pin turn to high impedance
16	V_{RTS}	Shorted with V_{RT}, generates+ 2.6v
20, 21	AV_{SS}	Analog GND
11,13	DV_{DD}	Digital+5v
14, 15, 18	AV_{DD}	Analog +5v
17	V_{RT}	Reference voltage(Top)
22	V_{RBS}	Shorted with V_{RB},generates +0.6v
19	V_{IN}	Analog input
23	V_{RB}	Reference voltage (Bottom)

Absolute Maximum Rating

Supply voltage(V_{DD}) ---------- 7V
Reference voltage(V_{RT}, V_{RB})---------- V_{DD}~V_{SS}
Analog input voltage(V_{IN})---------- V_{DD}~V_{SS}
Digital input voltage(CLK)---------- V_{DD}~V_{SS}
Digital output voltage(V_{OH}, V_{OL})---------- V_{DD}~V_{SS}
Storage temperature(T_{STG})---------- -55~+150℃
Operating temperature(T_{OP}) ---------- -20~75℃
Lead Temperature(Soldering 10seconds) ---------- +300℃

Recommended Operating Conditions

Supply voltage	AV_{DD}, AV_{SS}	4.75 to 5.25	V
	DV_{DD}, AV_{SS}	4.75 to 5.25	V
	D_{GND}, A_{GND}	0 to 100	mV
Reference input voltage	V_{RB}	0 and above	V
	V_{RT}	V_{DD} and below	V
	V_{RT} -V_{RB}	1.0 to V_{DD}	V
Analog input voltage	V_{IN}	V_{RB} to V_{RT}	V

Electrical Characteristics

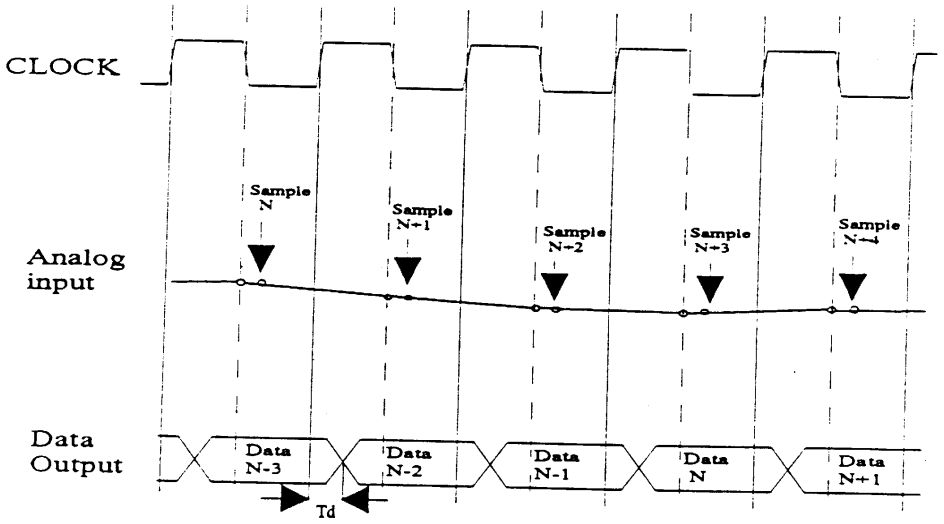
Ta = 25℃ , Fc = 5MSPS , V_{DD} = +5V , V_{RB} = 0.6V , V_{RT} = 2.6V

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Maximun conversion speed	Fc	V_{IN} =0.6V TO 2.6V Fin = 1kHz ramp	—	5	—	MSPS
Reference resistance	Rref	V_{RT} to V_{RB}	230	300	450	Ω
Digital input voltage	V_{IH}		4.0	—	—	V
Digital input voltage	V_{IL}		—	—	1.0	V
Digital output current	I_{OH}	$\overline{OE}$ = V_{SS}, V_{DD} = 4.75V V_{OH} = V_{DD}~0.5V	-1.1	—	—	mA
Digital output current	I_{OL}	OE = V_{SS}, V_{DD} = 4.75V V_{OL} = 0.4V	3.7	—	—	mA
Differential Non-linearity	E_D	Fc = 5MSPS Vin = 0.6v to 2.6v	—	±0.3	±0.5	LSB
Integral Non-linearity	E_L	Fc = 5MSPS Vin = 0.6v to 2.6v	—	±0.5	±1.3	LSB

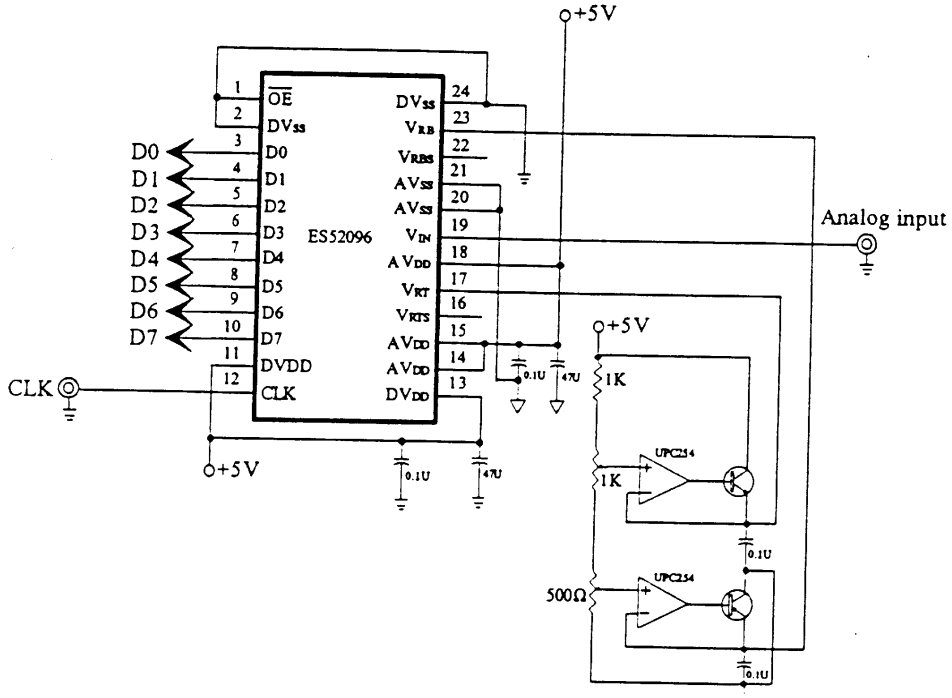
Ta = 25℃，Fc = 20MSPS，V_{DD} = +5V，V_{RB} = 0.6V，V_{RT} = 2.6V

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Digital input Current	I_{IH}	V_{DD} = 5.25V V_{IH} = V_{DD}	—	—	5	μA
Digital input Current	I_{IL}	V_{DD} = 5.25V V_{IL} = 0V	—	—	5	μA
Supply current	I_{DD}	Fc = 20MSPS NTSC ramp wave input	—	22	25	mA
Analog input Capacitance	C_{IN}	Vin = 1.5V +0.07Vms	—	11	—	pF
Reference pin current	I_{REF}		4.5	6.6	8.7	mA
Digital output current	I_{OZH}	$\overline{OE}$ = V_{SS}, V_{DD} = 5.25V V_{OH} = V_{DD}	—	—	16	μA
Digital output current	I_{OZH}	$\overline{OE}$ = V_{SS}, V_{DD} = 5.25V V_{OL} = 0V	—	—	16	μA
Self bias 1	V_{RB} 1	Short V_{RB} and V_{RBS}	0.6	0.64	0.68	V
	VRT 1-VRB 1	Short V_{RT} and V_{RTS}	1.96	2.09	2.21	
Self bias 2	V_{RT}2	VRB = AGND Short V_{RT} and V_{RTS}	2.25	2.39	2.53	V
Offset voltage	E_{OT}		-10	-35	-60	mV
Offset voltage	E_{OB}		0	15	45	mV
Output data delay	Td		—	15	30	ns

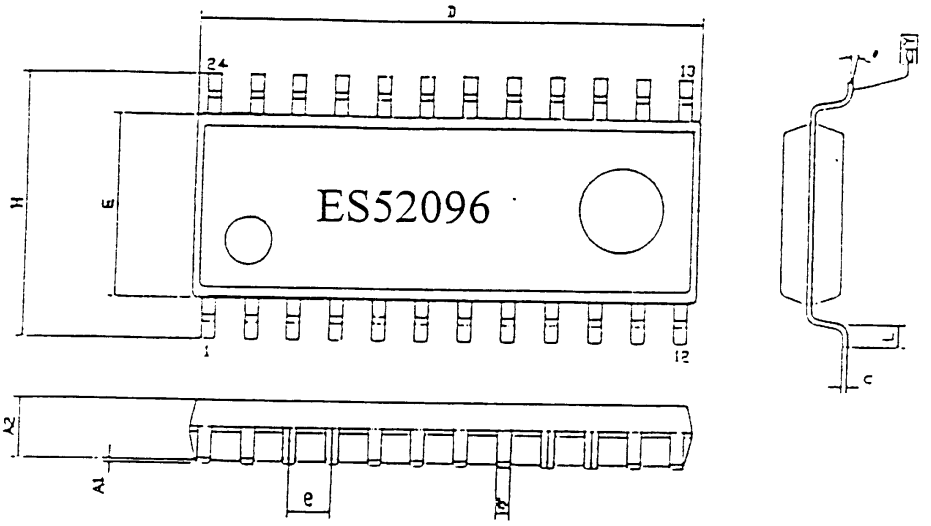
Timing Diagram



Application Circuit

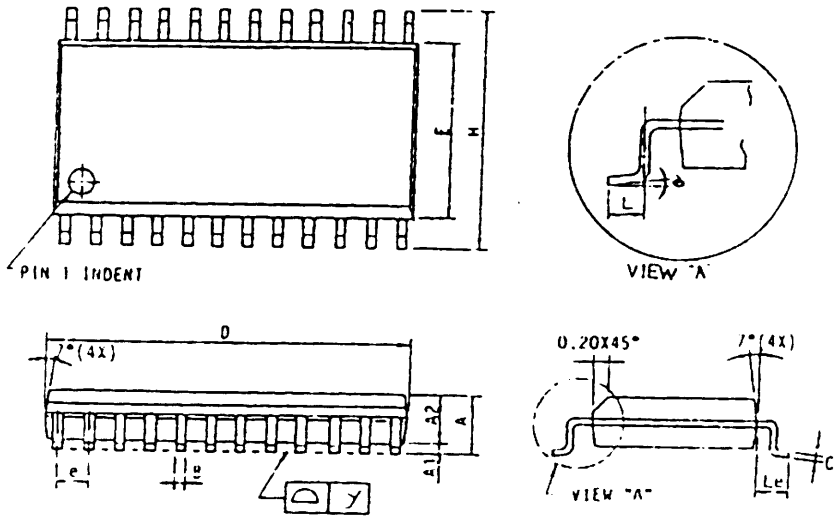


ES52096 (24 PINS SOP)



SYMBOL	MILLIMETER			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A1	0.06	0.11	0.21	0.002	0.004	0.008
A2	1.70	1.80	1.90	0.067	0.071	0.075
b	0.35	0.40	0.50	0.014	0.016	0.020
c	0.10	0.15	0.25	0.004	0.006	0.010
D	14.80	14.90	15.00	0.583	0.587	0.591
E	5.30	5.40	5.50	0.209	0.213	0.217
e	1.17	1.27	1.37	0.046	0.050	0.054
H	7.55	7.80	8.05	0.297	0.307	0.317
L	——	0.50	——	——	0.020	——
Y	——	——	0.10	——	——	0.004
θ	0°	——	10°	0°	——	10°

ES52096S3



PACKAGE NAME	LEAD TREATMENT	WIGHT(g)	EIAJ CODE NO.	JEDEC CODE NO.
24L-W/B	SOLDER PLATING	—	—	MS-013 AD

SYMBOLS	DIMENTSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.35	2.49	2.65	0.092	0.098	0.105
A1	0.10	0.20	0.30	0.003	0.008	0.012
A2	2.20	2.28	2.36	0.087	0.090	0.093
B	0.35	0.40	0.50	0.014	0.016	0.020
C	0.22	0.25	0.33	0.009	0.010	0.013
D	15.20	15.40	15.49	0.598	0.606	0.610
E	7.37	7.50	7.60	0.290	0.295	0.299
e	—	1.27	—	—	0.050	—
H	10.00	10.35	10.65	0.393	0.407	0.420
L	0.40	—	1.27	0.015	—	0.050
Le	0.76	—	—	0.030	—	—
y	—	—	0.10	—	—	0.004
θ	0°	—	8°	0°	—	8°