

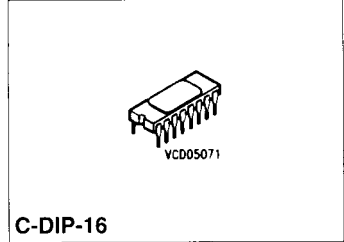
6-Bit A/D Converter, 100 MHz

SDA 5200

Bipolar IC

Features

- Strobe frequency 100 MHz
- 6-bit resolution (1.6 %)
- Overflow output (7th bit) at simultaneous blocking of the remaining outputs (SDA 5200 N), thus simple cascading for 7-bit or 8-bit A/D converters
- Broad analog bandwidth (140 MHz)
- High slew rate of the input stages (typ. 0.5 V/ns)
- Processing of analog signals up to Nyquist limit
- $\pm 1/2$ LSB max. linearity error
- No sample and hold required
- Dynamic driving of reference inputs for analog addition and multiplication
- Power dissipation 550 mW
- ECL compatible
- Logic-compatible supply voltage + 5 V; - 5.2 V



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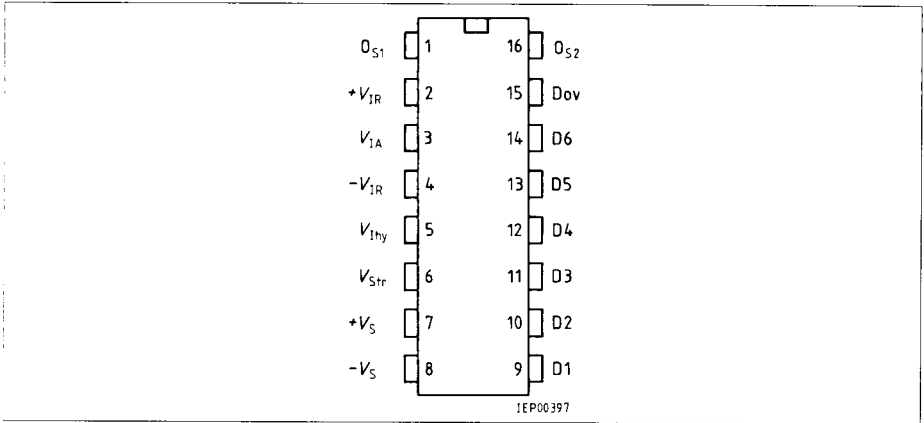
Type	Ordering Code	Package
■ S SDA 5200 N	Q67000-A2242	C-DIP-16
■ S SDA 5200 S	Q67000-A4243	C-DIP-16

■ Not for new design

The SDA 5200 is an ultrafast A/D converter with 6-bit resolution and overflow output. After cascading, it enables straightforward implementing of 7 or 8 bit A/D converters, respectively (refer to application circuit).

Apart from a guaranteed strobe frequency of 100 MHz and excellent linearity, the SDA 5200 is outstanding for a broad analog bandwidth which – from the analog side – permits application up to the limit of the Nyquist theorem.

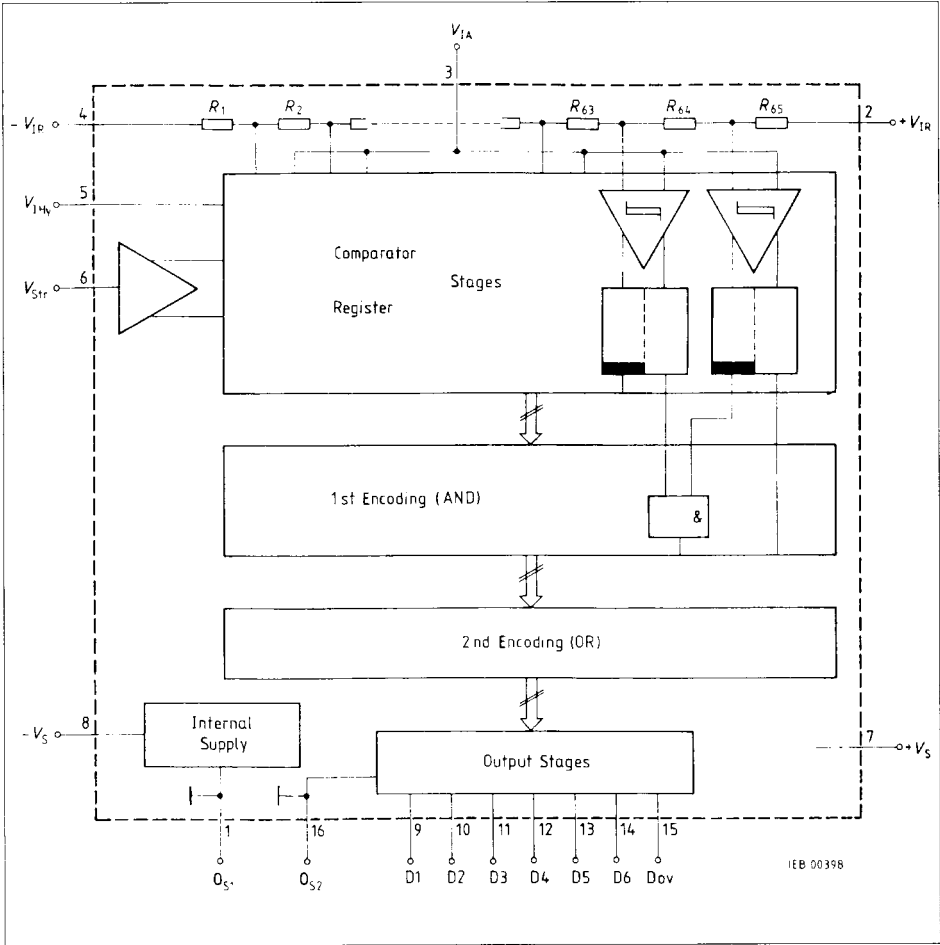
The SDA 5200 is pin-compatible with the SDA 6020.



Pin Configuration
(top view)

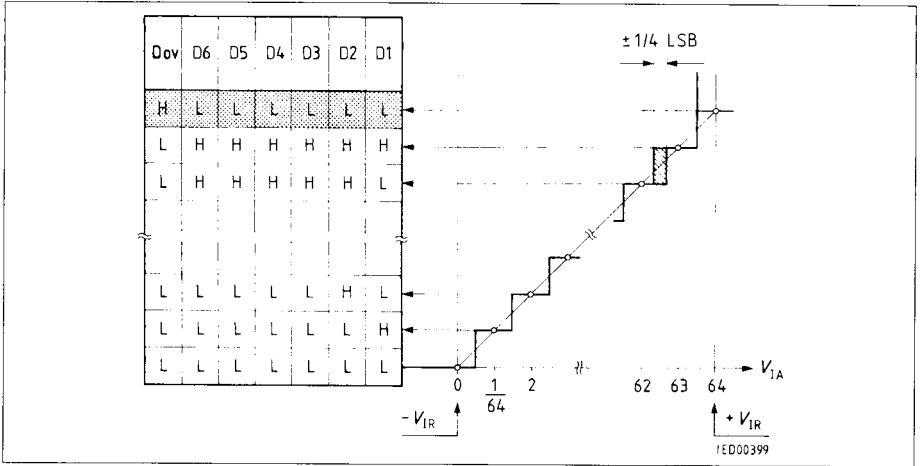
Pin Definitions and Functions

Pin	Symbol	Function
1	0_{S1}	Digital ground
2	$+V_{1R}$	Positive reference voltage (+ 2 V)
3	V_{1A}	Analog signal input (max. + 2 V; - 3 V)
4	$-V_{1R}$	Negative reference voltage (- 3 V)
5	V_{1hy}	Hysteresis control (0 V to + 2.5 V)
6	Strobe	Strobe input (ECL)
7	$+V_S$	Positive supply voltage (+ 5 V)
8	$-V_S$	Negative supply voltage (- 5.2 V)
9 to 14	D1 to D6	Data outputs, bits 1 to 6 (ECL)
15	D_{OV}	Overflow output
16	0_{S2}	Digital ground 2

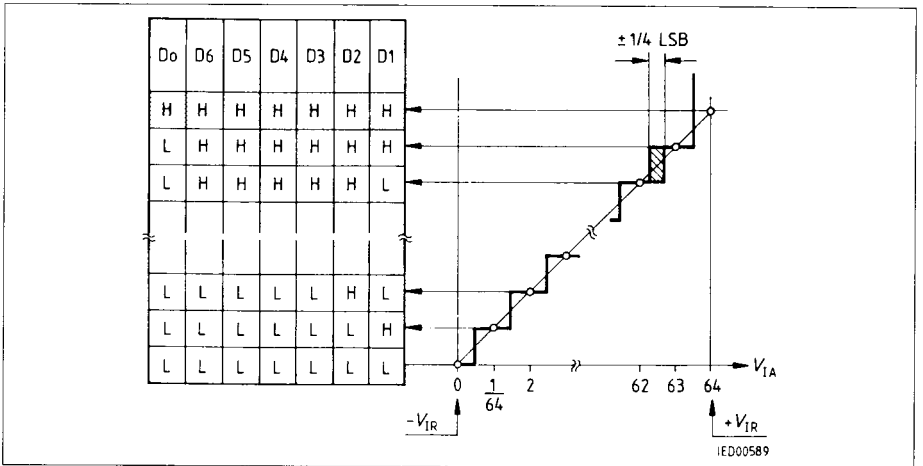


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Block Diagram



Transfer Characteristic and Truth Table (SDA 5200 N)



Transfer Characteristic and Truth Table (SDA 5200 S)

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit
		min.	max.	
Supply voltage	$+V_S$	-0.3	6.0	V
Supply voltage	$-V_S$	-6.0	0.3	V
Input voltages	$V_{IA} + V_{IR} - V_{IR}$	-3.5	2.5	V
Strobe	V_{strobe}	$-V_S$	0	V
Hysteresis control	V_{hy}	0	3.0	V
Voltage difference	$0S_1 - 0S_2$	-0.5	0.5	V
Ambient temperature	T_A	0	70	°C
Junction temperature	T_J		150	°C
Storage temperature	T_{stg}	-55	125	°C
Thermal resistance system – air junction	$R_{th SA}$ $R_{th J}$		70 16	K/W K/W

Characteristics

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	

Power Supply

Positive supply voltage	$+V_S$	4.5	5.0	5.5	V
Negative supply voltage	$-V_S$	-5.7	-5.2	-4.7	V
Current consumption at $+V_S = +5.0$ V; $V_{IA} \leq -V_{IR}$	I_{S+}		50	80	mA
at $-V_S = -5.2$ V; $V_{IA} \leq -V_{IR}$	I_{S-}		55	80	mA

Analog Section

Signal Input

Maximum input voltage	$V_{IA max}$	$-V_{IR min}$		$+V_{IR max}$	V
$V_{IA max} = 1 (+V_{IR max}) - (-V_{IR min})$				5	V
V_{IA} for 6 bit resolution			0.3		V
V_{IA} for 1/2 LSB linearity		1.2	0.6		V
V_{IA} for 1/4 LSB linearity		2.4	1.2		V
Input current			150	500	μA
at $V_{IA} = +V_{IR}$	I_{IA}				
at $V_{IA} < -V_{IR}$	I_{IA}	-500		500	nA
Input capacitance					
at $V_{IA} < -V_{IR}$	C_{IA}		25		pF

Reference Input

Pos. reference voltage	$+V_{IR}$	-2.5		2	V
Negative reference voltage	$-V_{IR}$	-3.0		1.5	V
Reference resistance	R_{REF}	96	128	195	Ω

Characteristics (cont'd)

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	

Digital Section

Strobe Input

H-input voltage	V_{IH}	-1.1	-0.9	-0.6	V
L-input voltage	V_{IL}	-2.0	-1.7	-1.6	V
H-input current	I_{IH}		6	50	μA
L-input current	I_{IL}		6	50	μA

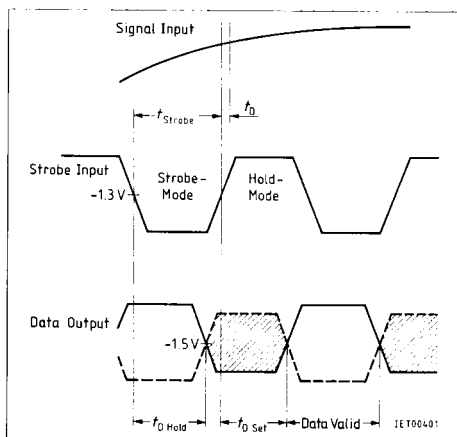
Data Outputs

100 Ω to -2 V

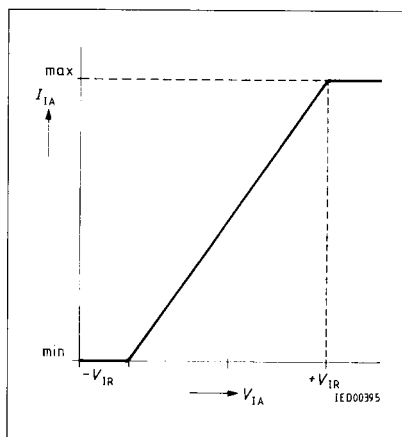
H-output voltage	V_{OH}	-1.1	-0.9	-0.7	V
L-output voltage	V_{OL}	-2.0	-1.7	-1.5	V

Dynamic Parameters

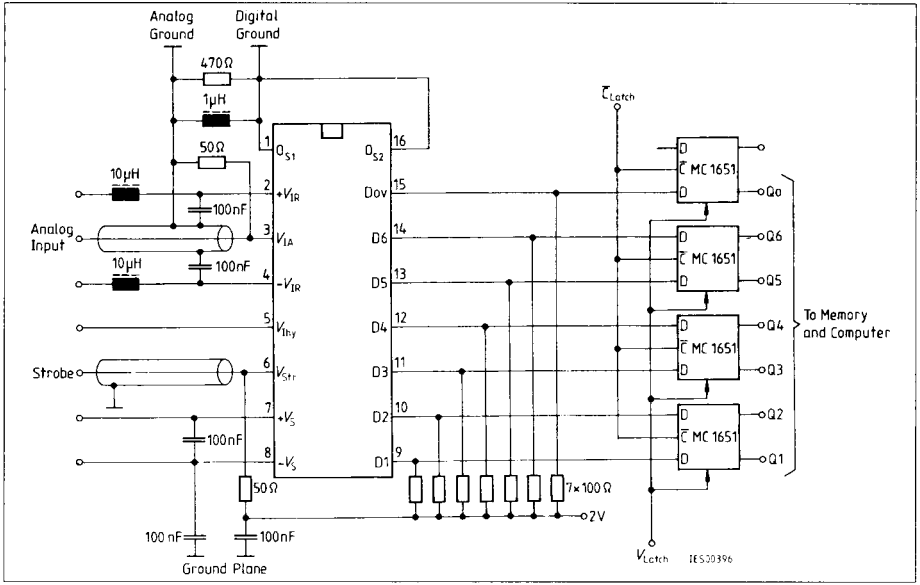
Aperture time	t_D		2		ns
Aperture jitter			25		ps
Strobe	t_{strobe}		5		ns
Signal transition time SDA 5200 N; S	$t_{D \text{ Hold}}$		12	17	ns
Signal transition time SDA 5200 N; S	$t_{D \text{ Set}}$		12	17	ns
Max. strobe frequency SDA 5200 N; S	f_{strobe}	100			MHz
Max. slew rate	SR		0.5		V/ns
Bandwidth (-3dB)	B		140		MHz



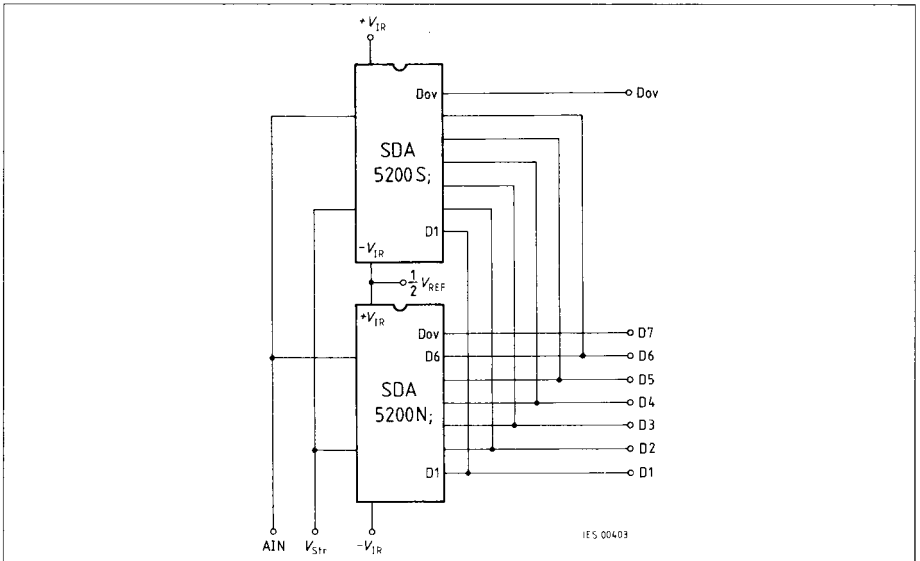
Pulse Diagram of Strobe Input and Data Outputs



Input Current versus Input Voltage



Test Circuit



Application Circuit

7-bit A/D converter with SDA 5200 S, N