

LH50511

CMOS 8-Bit D/A Converter

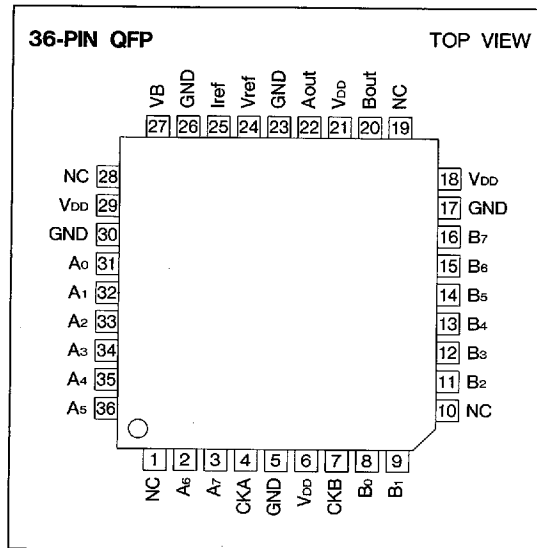
DESCRIPTION

LH50511 is a dual channel matrix current cell type 8-bit D/A converter using high speed $0.8\ \mu\text{m}$ CMOS process.

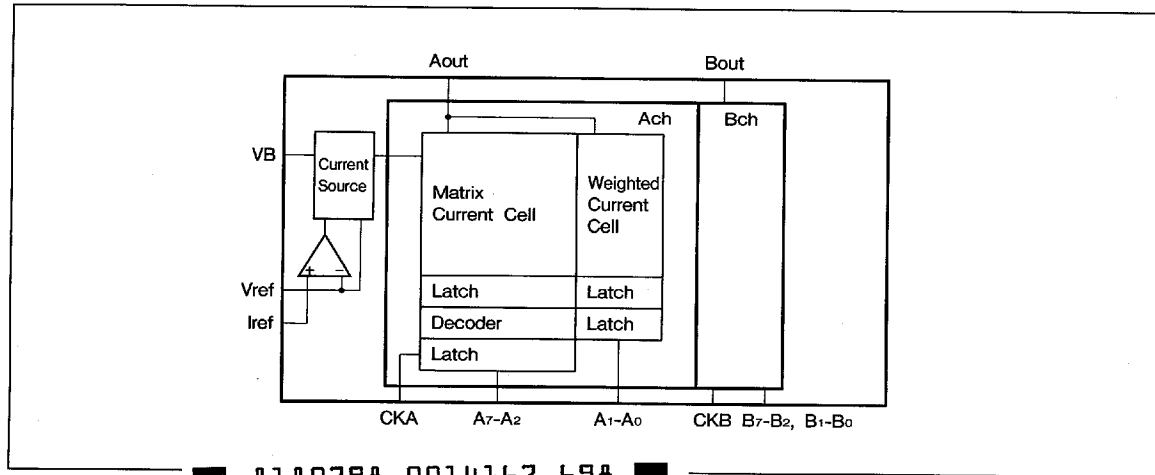
FEATURES

- Maximum conversion rate : 20 MHz
- Low power consumption : 180 mW (TYP.)
- Current output : 13.3 mA
- Operating temperature : -20 to $+70^\circ\text{C}$
- Process : CMOS
- Package : 36-pin QFP(QFP036-P-1010)

PIN CONNECTIONS



BLOCK DIAGRAM



8180798 0014167 698

PIN DESCRIPTION

PIN NO.	NAME	FUNCTION	I/O
1	NC	No Connection	—
2	A ₆	Ach Digital Input	I
3	A ₇	Ach (MSB) Digital Input	I
4	CKA	Ach Clock Input	I
5	GND	Ground	—
6	V _{DD}	Power Supply	—
7	CKB	Bch Clock Input	I
8	B ₀	Bch (LSB) Digital Input	I
9	B ₁	Bch Digital Input	I
10	NC	No Connection	—
11	B ₂	Bch Digital Input	I
12	B ₃	Bch Digital Input	I
13	B ₄	Bch Digital Input	I
14	B ₅	Bch Digital Input	I
15	B ₆	Bch Digital Input	I
16	B ₇	Bch (MSB) Digital Input	I
17	GND	Ground	—
18	V _{DD}	Power Supply	—

PIN NO.	NAME	FUNCTION	I/O
19	NC	No Connection	—
20	Bout	Bch Current Output	O
21	V _{DD}	Power Supply	—
22	Aout	Ach Current Output	O
23	GND	Ground	—
24	V _{ref}	Reference Voltage Input	I
25	I _{ref}	Fullscale Adjust Resistance	O
26	GND	Ground	—
27	V _s	Connect to Capacitance	O
28	NC	No Connection	—
29	V _{DD}	Power Supply	—
30	GND	Ground	—
31	A ₀	Ach (LSB) Digital Input	I
32	A ₁	Ach Digital Input	I
33	A ₂	Ach Digital Input	I
34	A ₃	Ach Digital Input	I
35	A ₄	Ach Digital Input	I
36	A ₅	Ach Digital Input	I

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Supply voltage	V _{DD}	−0.3 to 0.7	V
Input voltage	V _I	−0.3 to V _{DD} + 0.3	V
Storage temperature	T _{stg}	−50 to +150	°C

RECOMMENDED OPERATING CONDITIONS

(Ta = 25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage	V _{DD}	4.75	5.0	5.25	V
Reference voltage	V _{ref}		1.0		V
Reference resistance	R _{ref}		4.8		kΩ
Output load resistance	R _{OUT}		75		Ω
Operating temperature range	T _{opr}	-20		70	°C
Logical LOW input voltage	V _{IL}			V _{DD} × 0.1	V
Logical HIGH input voltage	V _{IH}	V _{DD} × 0.85			V

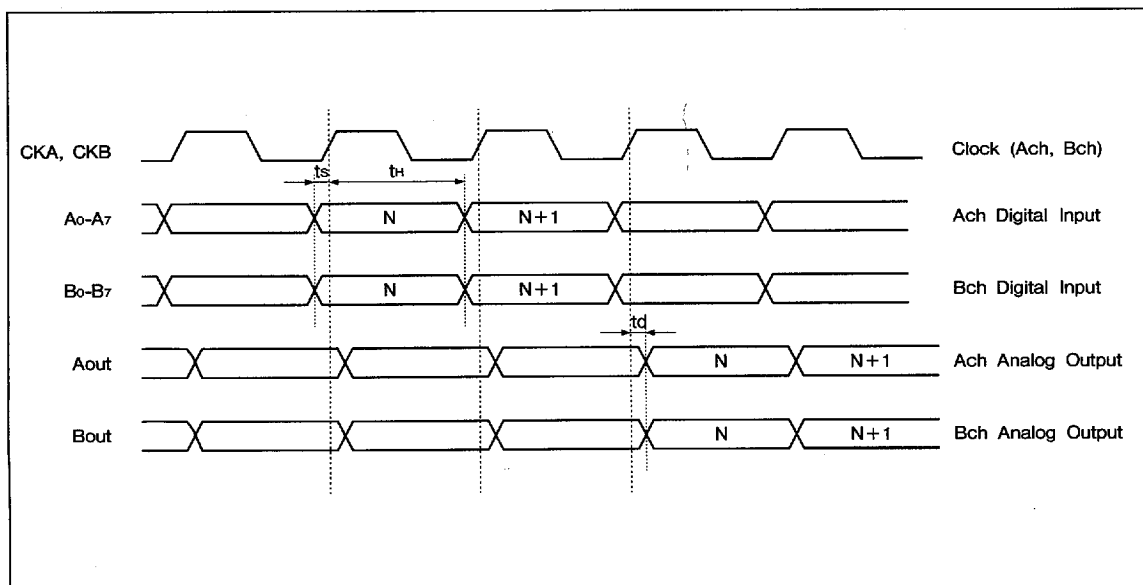
ELECTRICAL CHARACTERISTICS

(V_{DD} = 5.0 V, Ta = 25°C, R_{ref} = 75 Ω)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Resolution	RES		8		bit
Supply current	I _{DD}		36.0		mA
Linearity	EL			± 1.0	LSB
Differential linearity error	ED			± 0.5	LSB
Fullscale current	I _{FS}		13		mA
Setup time	t _S	5.0			ns
Hold time	t _H	5.0			ns
Settling time	t _{ST}			30.0	ns
Delay time	t _d			10.0	ns
Maximum conversion Rate	f _{max}			20.0	MHz

FUNCTIONAL OPERATION

1. On the rising edge of the clock, input digital data is latched and is shifted into a decoder for matrix current cell selection.
 2. On the rising edge of the next clock, the decoded data is latched.
 3. A current source cell is selected according to an input code, and then an analog current output is obtained.
 4. The analog current is output at 2-clock after the input data.
- * A single-phase input with 50% duty ratio is enough for the clock. However, it should be designed so that "High" period is 10 ns or more at least.



SYSTEM CONFIGURATION EXAMPLE

