HD49307

Three-Channel 8-bit D/A Converter

HITACHI

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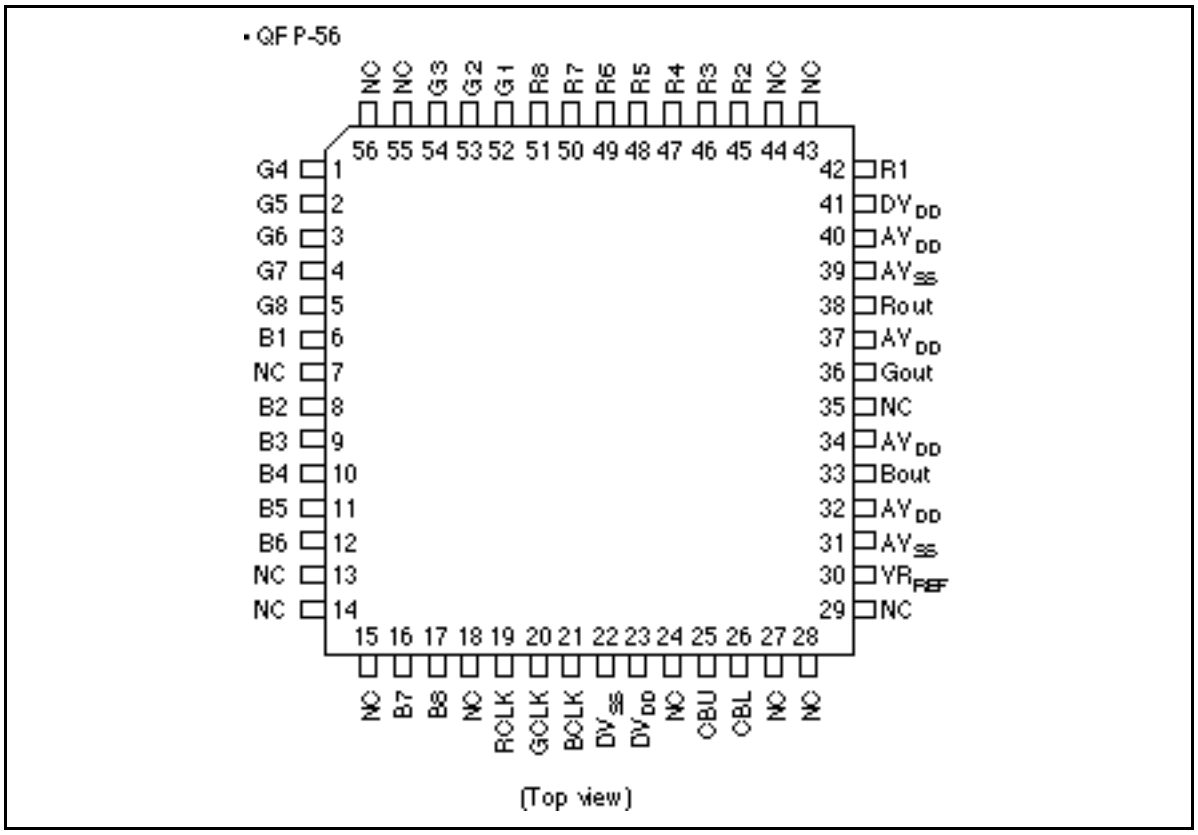
Description

The HD49307 is a high-speed, low-power 8-bit D/A converter monolithic CMOS LSI which has three channels of clock and RGB data inputs. It is appropriate for applications which require three channel systems, such as digital TV and graphical displays.

Functions

- Resolution: 8 bits
- Linearity error: ±0.2%
- Current output type: 13.3 mA × 3 channels
- Maximum conversion rate: 30 MHz (Min)
- Analogue output voltage range: V_{DD} to V_{DD} – 1 V
- Digital input voltage: TTL and CMOS level
- Power supply voltage: +5.0 V single
- Power consumption: 300 mW (Typ)

Pin Arrangement



Pin Functions

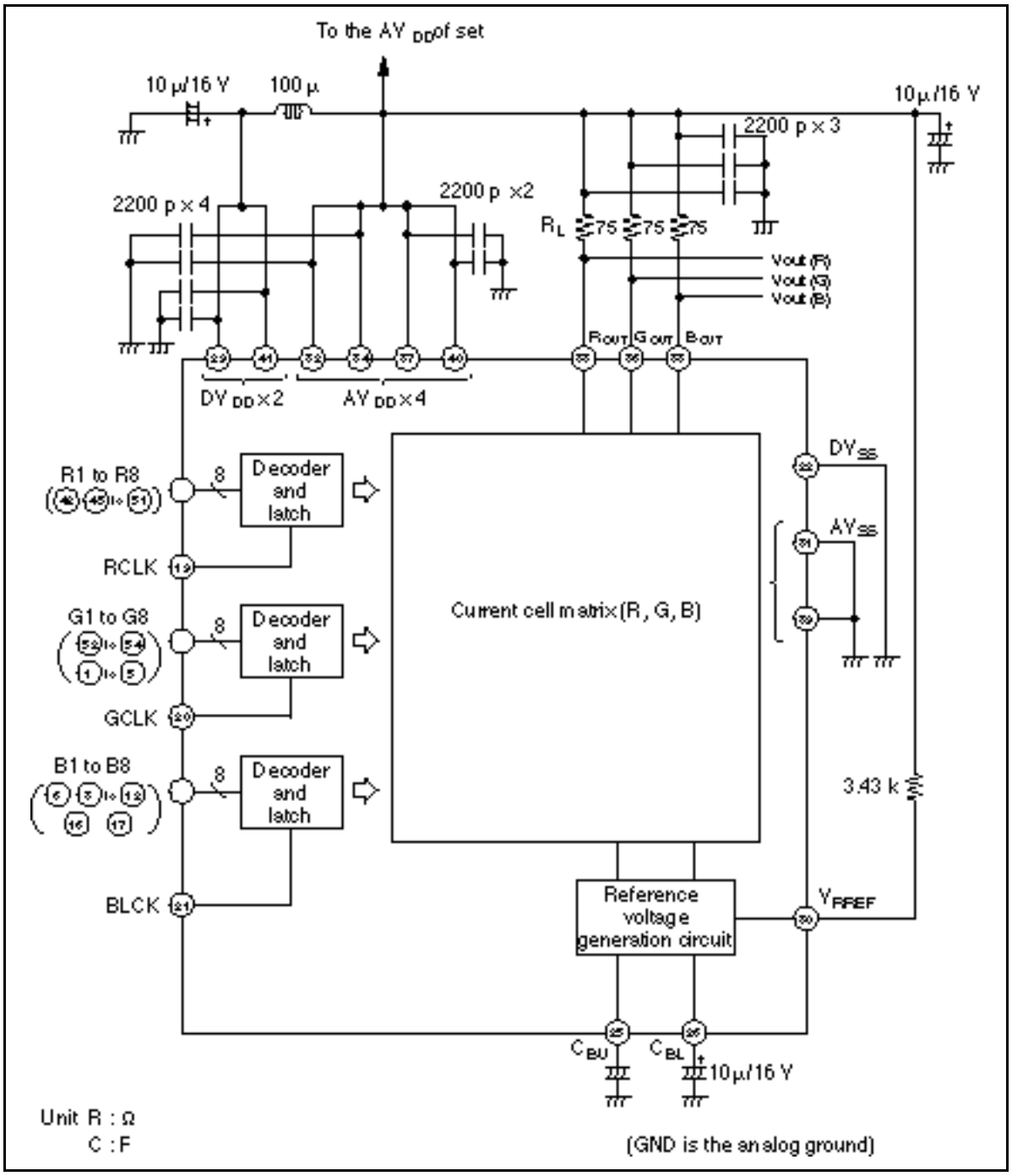
Pin No.	Symbol	Function
42, 45 to 51	R1 to R8	R channel digital signal input: R1 = MSB, R8 = LSB
52 to 54, 1 to 5	G1 to G8	G channel digital signal input: G1 = MSB, G8 = LSB
6, 8 to 12, 16, 17	B1 to B8	B channel digital signal input: B1 = MSB, B8 = LSB
38	Rout	R channel analog signal output
36	Gout	G channel analog signal output
33	Bout	B channel analog signal output
19	RCLK	R channel clock input
20	GCLK	G channel clock input
21	BCLK	B channel clock input
26	CBL	Bypass capacitor pin
25	CBU	Phase compensation capacitance pin
23, 41	DV_{DD}	Digital power supply
31, 39	AV_{SS}	Analog ground
32, 34, 37, 40	AV_{DD}	Analog power supply
22	DV_{SS}	Digital ground
30	V_{RREF}	Reference voltage input pin
7, 13 to 15, 18, 24, 27 to 29 35, 43, 44, 55, 56	NC	No connections*[1]

Note: 1. Do not connect anything to the NC pins.

Output Function Table (V_{DD} = 5 V, R_L = 75 Ω, R_{EX} = 3.43 kΩ)

Step	B1 (MSB)	B2	B3	B4	B5	B6	B7	B8 (LSB)	Vout (V)
0	0	0	0	0	0	0	0	0	4.000
1	0	0	0	0	0	0	0	1	4.004
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
127	0	1	1	1	1	1	1	1	4.498
128	1	0	0	0	0	0	0	0	4.502
129	1	0	0	0	0	0	0	1	4.506
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
254	1	1	1	1	1	1	1	0	4.996
255	1	1	1	1	1	1	1	1	5.000

Block Diagram



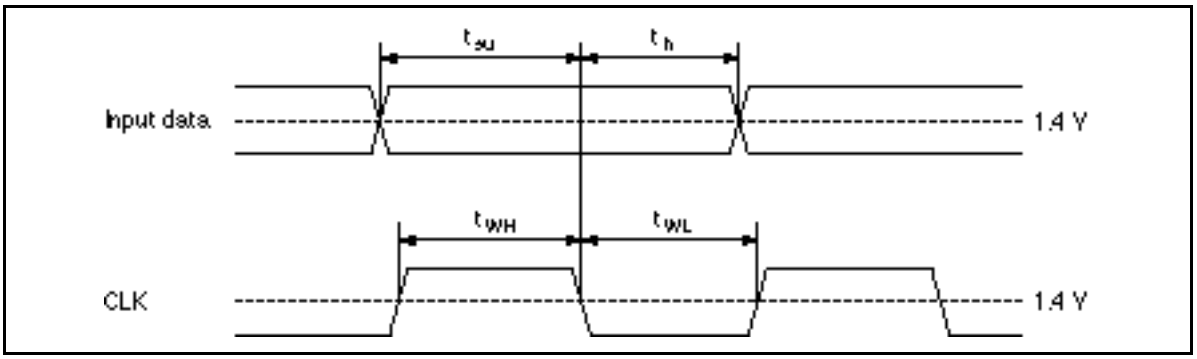
Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Rated value	Unit
Power supply voltage	V_{DD}	+6.0	V
Digital input voltage	V_{IN}	–0.3 to V_{DD} + 0.3	V
Allowable dissipation	P_T	600	mW
Operating temperature	Topr	0 to +70	°C
Storage temperature	Tstg	–55 to +125	°C

Electrical Characteristics (Ta = 25°C, V_{DD} = 5.0 V, R_L = 75 Ω, R_{EX} = 3.43 kΩ)

Item		Symbol	Min	Typ	Max	Unit	Test conditions
Resolution			8	8	8	bits	
Maximum conversion speed		$f_{CLK\ (Max)}$	30	—	—	MHz	
Minimum conversion speed		$f_{CLK\ (Min)}$	—	—	0.5	MHz	
Linearity error		LE	–0.2	—	0.2	LSB	
High level clock pulse width		t_{WH}	15	—	—	ns	
Low level clock pulse width		t_{WL}	15	—	—	ns	
Data setup time		t_{SU}	15	—	—	ns	
Data hold time		t_h	15	—	—	ns	
Power supply voltage		V_{DD}	4.75	5.00	5.25	V	
Current dissipation		I_{DD}	—	60	70	mA	f_{CLK} = 30 MHz
Digital input voltage		V_{IH}	2	—	V_{DD}	V	
		V_{IL}	0	—	0.8	V	
Analog output voltage	Full scale	$V_{A\ (Full)}$	4.99	5.00	5.01	V	
	Zero scale	$V_{A\ (Zero)}$	3.95	4.00	4.05	V	

Timing Chart



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