HA19507

T-51-10-07

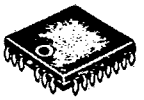
6-Bit D/A Converter with Clock Generation Circuit

The HA19507 series consists of high-speed, low-power 6-bit D/A converters with built-in clock generators. The digital inputs and clock outputs of this monolithic bipolar LSI are TTL/CMOS compatible. These devices are suitable for high-speed video signal processing.

HA19507NT

(DP-30S)

HA19507MP



(MP-28)

Features

- Internal 4 × f_{sc} VCO circuit which can be synchronized with an external f_{sc} input
- 4 × f_{sc} is available as a clock for peripheral circuits
- High-precision 6-bit D/A conversion
- Single power supply: 5V
- TTL/CMOS compatible clock outputs and digital inputs

Applications

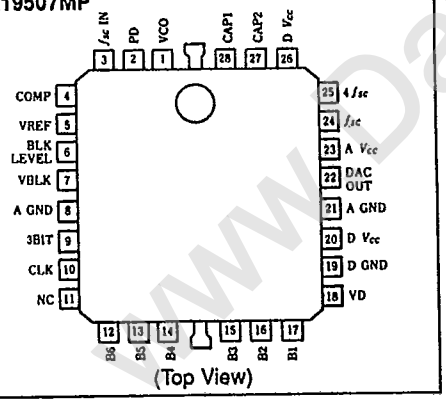
- High-speed video processing applications.

Ordering Information

Type No.	Package
HA19507NT	400mil 30-pin plastic shrink DIP (DP-30S)
HA19507MP	28-pin plastic QFI (MP-28)

Pin Arrangement

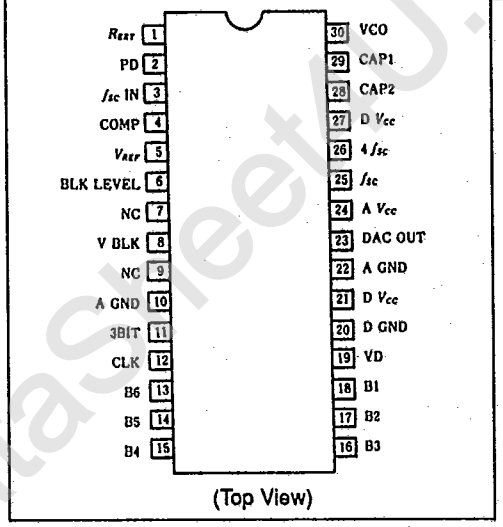
• HA19507MP



(Top View)

Pin Arrangement

• HA19507NT

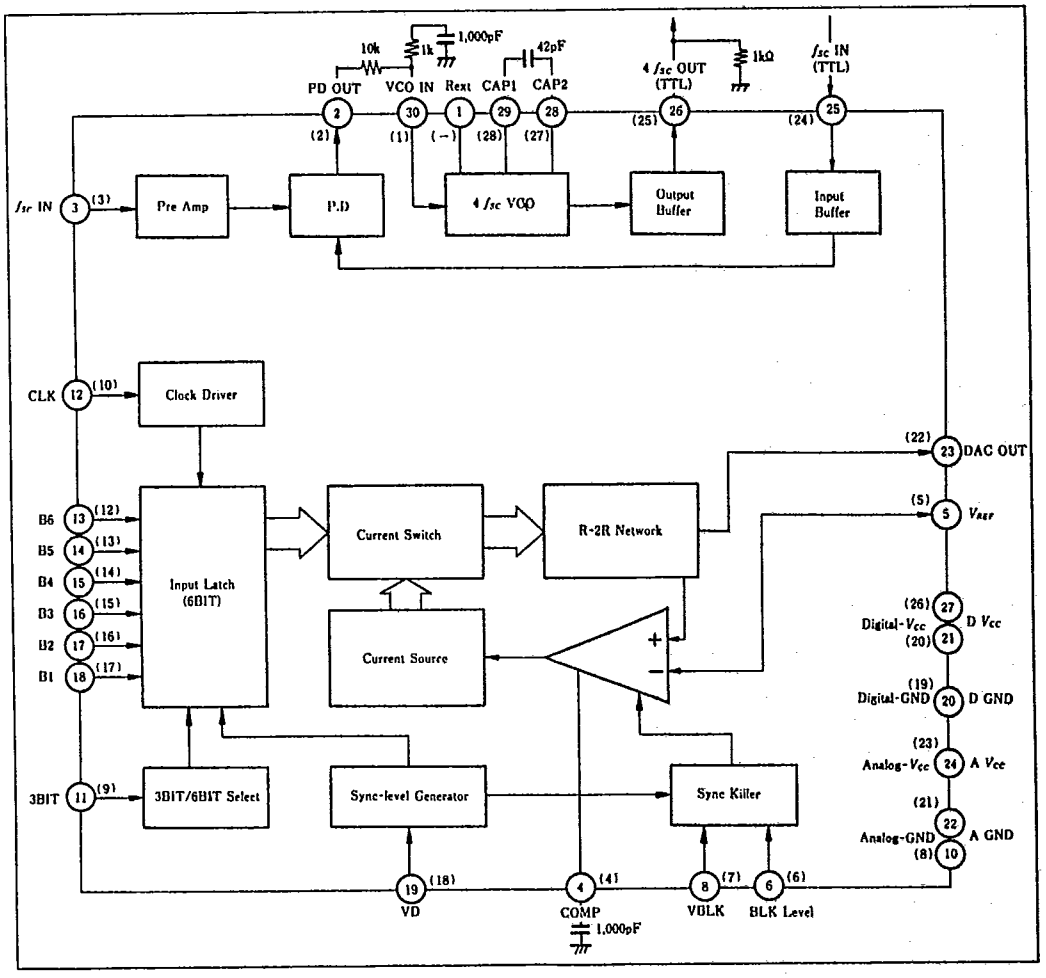


(Top View)

Pin Descriptions

Pin		Symbol	Function
HA19507NT	HA19507MP		
1	—	REXT	4 × f_{sc} oscillator resistor
2	2	PD	f_{sc} phase detector output
3	3	f_{sc}IN	Subcarrier (f_{sc}) output
4	4	COMP	Op amp phase compensation
5	5	VREF	DAC reference voltage input
6	6	BLK LEVEL	BLK LEVEL input
7	—	NC	No connected
8	7	VBLK	Block sync. signal input
9	11	NC	No connected
10	8	AGND	Analog ground
11	9	3BIT	DAC resolution 3-bit/6-bit select
12	10	CLK	DAC clock input
13	12	B6	DAC digital input (MSB)
14	13	B5	DAC digital input
15	14	B4	DAC digital input
16	15	B3	DAC digital input
17	16	B2	DAC digital input
18	17	B1	DAC digital input (LSB)
19	18	VD	Add sync. signal input
20	19	DGND	Digital ground
21	20	D Vcc	Digital power supply (+5V)
22	21	AGND	Analog ground
23	22	DAC OUT	DAC output
24	23	A Vcc	Analog power supply (+5V)
25	24	f_{sc}	f_{sc} signal input
26	25	4f_{sc}	4 × f_{sc} signal input
27	26	DVcc	Digital power supply (+5V)
28	27	CAP2	4 × f_{sc} VCO capacitor
29	28	CAP1	4 × f_{sc} VCO capacitor
30	1	VCO	4 × f_{sc} VCO frequency control input

Block Diagram



Note: Pin numbers in parentheses are for the HA19507MP.

Absolute Maximum Ratings (Ta = 25°C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Power supply voltage	Vcc	+7.0	V
Digital input voltage	V_I	0 to Vcc	V
Power dissipation	P_T	600	mW
Operating temperature	T_{opr}	0 to +70	°C
Storage temperature	T_{stg}	−55 to +125	°C

Electrical Characteristics (Ta = 25°C, Vcc = 5.0 V, unless otherwise specified)

• VCO Block

Parameter	Symbol	Min	Typ	Max	Unit	Test conditions
Pin 3 input voltage	$V_{in\,3}$	100	—	—	mVpp	Input voltage necessary for the PLL
Pin 3 impedance	$Z_{in\,3}$	—	13	—	kΩ	
Digital output voltage high	V_{OH}	—	4.1	—	V	I_{OH} = −0.4 mA
Digital output voltage low	V_{OL}	—	0.6	—	V	I_{OL} = 2 mA
Duty cycle pin 26	DTY 26	—	50	—	%	
Lead-in range (top)	$+f_{in}$	3.239	—	—	MHz	
Lead-in range (bottom)	$-f_{in}$	—	—	3.919	MHz	

• DAC Block

Parameter		Symbol	Min	Typ	Max	Unit	Test conditions
Resolution			6	6	6	bit	
Digital input voltage H-level		V_{IH}	2.0	—	Vcc	V	
Digital input voltage L-level		V_{IL}	0	—	0.8	V	
Digital input current H-level		I_{IH}	−0.4	—	0.4	mA	V_{IH} = 2.7 V
Digital input current L-level		I_{IL}	−0.8	—	0.4	mA	V_{IL} = 0.4 V
DAC output voltage	Full scale	V_{FS}	Vcc −15m	Vcc	Vcc +15m	V	V_{REF} = 4.0 V
	Zero scale	V_{ZS}	3.956	4.016	4.076	V	V_{REF} = 4.0 V
DAC output impedance		Z_{out}	60	80	100	W	
Pin 5 voltage		V_{REF}	—	4.0	—	V	
Pin 5 input current		I_{REF}	−20	—	20	µA	V_{REF} = 4.0 V
Conversion rate		f_{SPL}	15	20		Msps	
Linearity error		LE	−0.2	—	+0.2	% FS	

• VCO and DAC Blocks

Parameter	Symbol	Min	Typ	Max	Unit	Test conditions
Power supply voltage	Vcc	4.75	5.0	5.25	V	
Power supply current	Icc	—	45.0	55.0	mA	