

# MN6556A, MN6556AS

## Low Power 8-Bit CMOS D/A Converters for Image Processing

### ■ Overview

The MN6556A and MN6556AS are 8-bit CMOS digital-to-analog converters with a maximum conversion rate of 20 MSPS.

They use both a matrix cell and weighted current technology to achieve a low power consumption of only 50 mW. Output has an amplitude of one volt above the ground level.

### ■ Features

- Maximum conversion rate: 20 MSPS (min.)
- Linearity error:  $\pm 0.3$  LSB (typ.)
- Differential linearity error:  $\pm 0.3$  LSB (typ.)
- Power supply voltage:  $5.0 \pm 0.5$  V
- Power consumption: 50 mW (typ.)
- Full scale current: 5 mA (typ.)

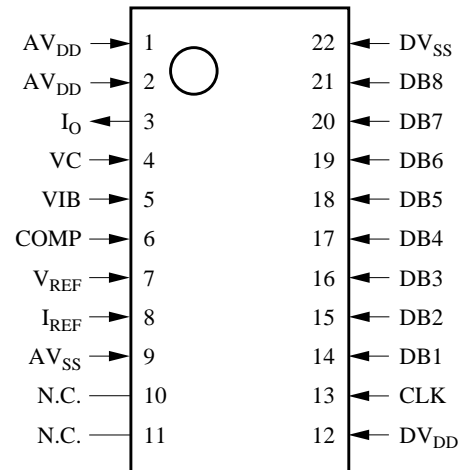
### ■ Applications

- Digital television
- Digital video equipment
- Digital image processing equipment
- Measuring instrument

### ■ Pin Assignment

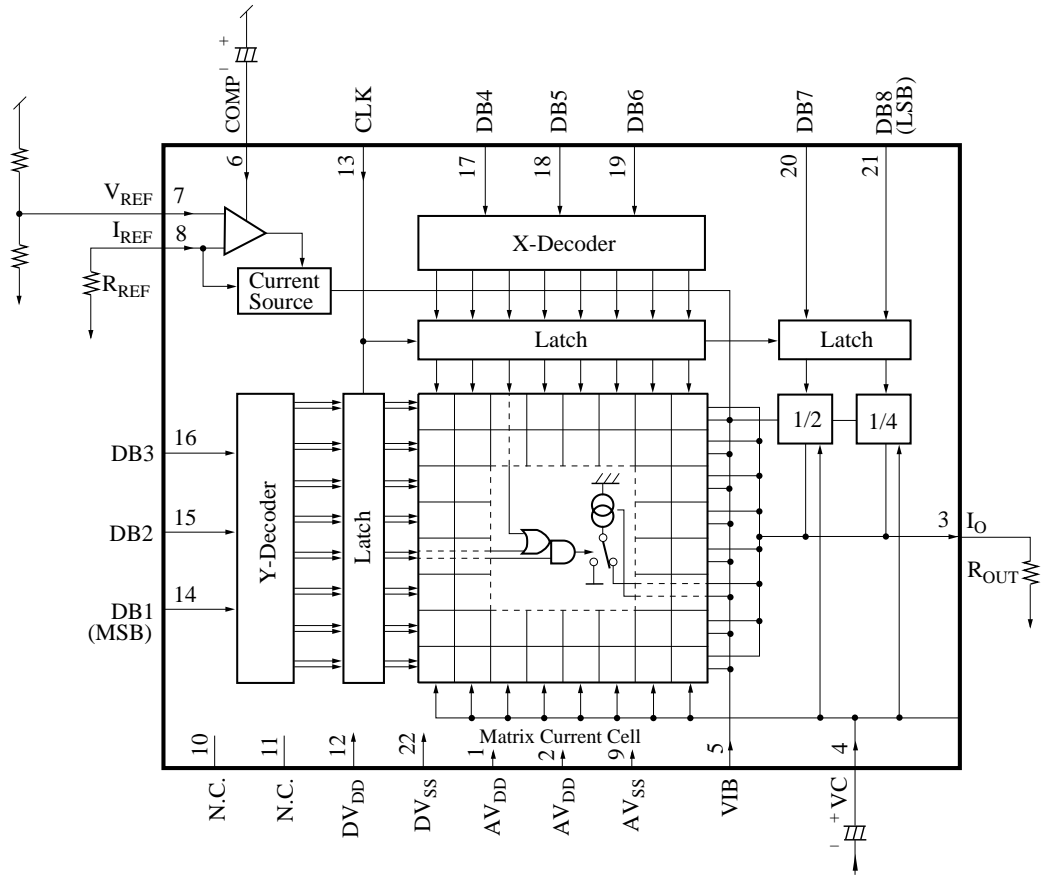
MN6556A : DIP022-P-0400

MN6556AS : SOP022-P-0375



(TOP VIEW)

■ Block Diagram



### ■ Pin Descriptions

Pin No.	Symbol	Function Description
1	$AV_{DD}$	Power supply for analog circuits
2	$AV_{DD}$	Power supply for analog circuits
3	$I_O$	Analog current output
4	VC	Capacitor connection
5	VIB	Capacitor connection
6	COMP	Phase compensation
7	$V_{REF}$	Reference voltage input pin
8	$I_{REF}$	Reference resistor
9	$AV_{SS}$	Ground for analog circuits
10	N.C.	No connection
11	N.C.	No connection
12	$DV_{DD}$	Ground for digital circuits
13	CLK	Sampling clock
14	DB1	Digital input (MSB)
15	DB2	Digital input
16	DB3	Digital input
17	DB4	Digital input
18	DB5	Digital input
19	DB6	Digital input
20	DB7	Digital input
21	DB8	Digital input (LSB)
22	$DV_{SS}$	Power supply for digital circuits

### ■ Absolute Maximum Ratings $T_a=25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Power supply voltage for digital circuits	$DV_{DD}$	- 0.3 to +7.0	V
Power supply voltage for analog circuits	$AV_{DD}$	- 0.3 to +7.0	V
Input voltage	$V_I$	$DV_{SS} - 0.3$ to $DV_{DD} + 0.3$	V
Output voltage	$V_O$	$AV_{SS} - 0.3$ to $AV_{DD} + 0.3$	V
Operating ambient temperature	$T_{opr}$	-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +125	$^\circ\text{C}$

**Recommended Operating Conditions**  $V_{DD}=AV_{DD}=DV_{DD}=5.0V, V_{SS}=AV_{SS}=DV_{SS}=0V, T_a=25^{\circ}C$ 

Parameter	Symbol	min	typ	max	Unit
Power supply voltage	$V_{DD}$	4.5	5.0	5.5	V
Reference voltage	$V_{REF}$		1.8		V
Reference resistance	$R_{REF}$	1.5			k $\Omega$
External compensation capacitor	$C_{COMP}$		1		$\mu$ F
Output load resistance	$R_{OUT}$		200		$\Omega$
Digital input voltage	"H" level	$V_{IH}$	2.4	$V_{DD}$	V
	"L" level	$V_{IL}$	$V_{SS}$	0.8	V
Clock	"H" level pulse width	$t_{WH}$	20		ns
	"L" level pulse width	$t_{WL}$	20		ns

**Electrical Characteristics**  $DV_{DD}=AV_{DD}=5.0V, DV_{SS}=AV_{SS}=0V, T_a=25^{\circ}C$ 

Parameter	Symbol	Conditions	min	typ	max	Unit
Power supply current	$I_{DD}$			10	20	mA
Resolution	RES			8		bit
Linearity error	$E_L$	$R_{REF}=1.5k\Omega, R_{OUT}=200\Omega$		$\pm 0.3$	$\pm 0.5$	LSB
Differential linearity error	$E_D$	$V_{REF}=1.8V$		$\pm 0.3$	$\pm 0.5$	LSB
Full scale current	$I_{FS}$	$R_{REF}=1.5k\Omega, V_{REF}=1.8V$	4.5	5.0	5.5	mA
Setup time	$t_S$		15			ns
Hold time	$t_H$		15			ns
Settling time	$t_{ST}$	$R_{REF}=1.5k\Omega, R_{OUT}=200\Omega$			50	ns
Maximum conversion speed	$F_{C(max.)}$	$V_{REF}=1.8V$	20			MSPS

## ■ Timing Chart

