

AD7568

FEATURES

- Eight 12-Bit DACs in One Package
- 4-Quadrant Multiplication
- Separate References
- Single +5 V Supply
- Low Power: 1 mW
- Versatile Serial Interface
- Simultaneous Update Capability
- Reset Function
- 44-Pin PQFP and PLCC

APPLICATIONS

- Process Control
- Automatic Test Equipment
- General Purpose Instrumentation

GENERAL DESCRIPTION

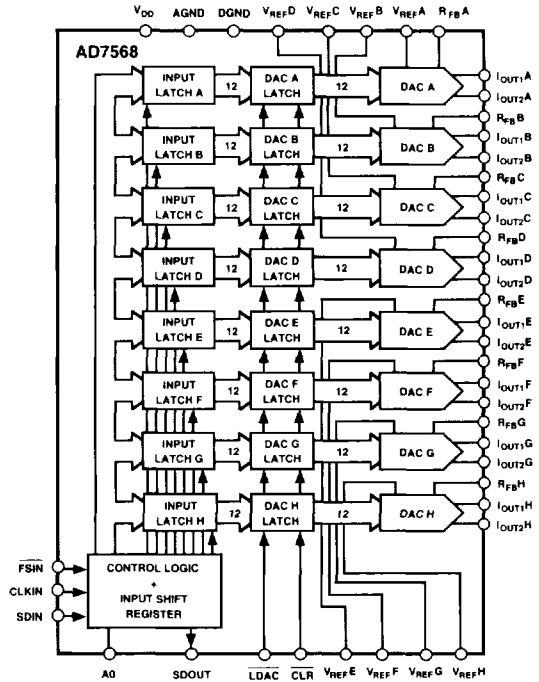
The AD7568 contains eight 12-bit DACs in one monolithic device. The DACs are standard current output with separate V_{REF} , I_{OUT1} , I_{OUT2} and R_{FB} terminals.

The AD7568 is a serial input device. Data is loaded using $FSIN$, $CLKIN$ and $SDIN$. One address pin, $A0$, sets up a device address, and this feature may be used to simplify device loading in a multi-DAC environment.

All DACs can be simultaneously updated using the asynchronous $LDAC$ input and they can be cleared by asserting the asynchronous CLR input.

The AD7568 is housed in a space-saving 44-pin plastic quad flatpack and 44-lead PLCC.

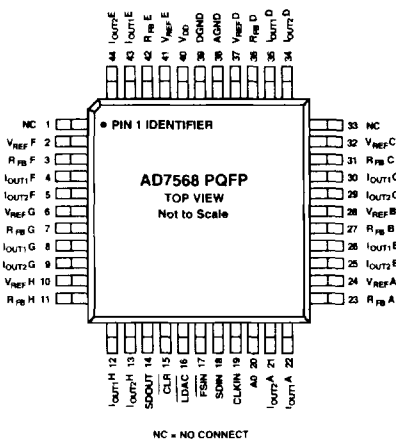
FUNCTIONAL BLOCK DIAGRAM



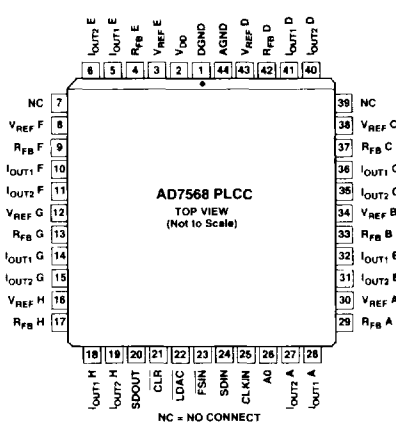
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PIN CONFIGURATIONS

Plastic Quad Flatpack



Plastic Leaded Chip Carrier



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AD7568—SPECIFICATIONS¹ ($V_{DD} = +4.75\text{ V to }+5.25\text{ V}$; $I_{OUT1} = I_{OUT2} = 0\text{ V}$; $V_{REF} = +5\text{ V}$; $T_A = T_{MIN}\text{ to }T_{MAX}$, unless otherwise noted)

Parameter	AD7568B ²	Units	Test Conditions/Comments
ACCURACY			
Resolution	12	Bits	1 LSB = $V_{REF}/2^{12} = 1.22\text{ mV}$ when $V_{REF} = 5\text{ V}$
Relative Accuracy	±0.5	LSB max	All Grades Guaranteed Monotonic over Temperature
Differential Nonlinearity	±0.9	LSB max	
Gain Error			
+25°C	±4	LSBs max	
$T_{MIN}\text{ to }T_{MAX}$	±5	LSBs max	
Gain Temperature Coefficient	2	ppm FSR/°C typ	
	5	ppm FSR/°C max	
Output Leakage Current			
I_{OUT1}			
@ +25°C	10	nA max	See Terminology Section
$T_{MIN}\text{ to }T_{MAX}$	200	nA max	
REFERENCE INPUT			
Input Resistance	5	kΩ min	Typical Input Resistance = 7 kΩ
	9	kΩ max	
Ladder Resistance Mismatch	2	% max	Typically 0.6%
DIGITAL INPUTS			
V_{INH} , Input High Voltage	2.4	V min	
V_{INL} , Input Low Voltage	0.8	V max	
I_{INH} , Input Current	±1	μA max	
C_{IN} , Input Capacitance	10	pF max	
POWER REQUIREMENTS			
V_{DD} , Range	4.75/5.25	V min/V max	
Power Supply Sensitivity			
$\Delta\text{Gain}/\Delta V_{DD}$	75	dB typ	
I_{DD}	300	μA max	$V_{INH} = 4.0\text{ V min}$, $V_{INL} = 0.4\text{ V max}$ $V_{INH} = 2.4\text{ V min}$, $V_{INL} = 0.8\text{ V max}$
	3.5	mA max	

AC PERFORMANCE CHARACTERISTICS (These characteristics are included for Design Guidance and are not subject to test. DAC output op amp is AD843.)

Parameter	AD7568B ²	Units	Test Conditions/Comments
DYNAMIC PERFORMANCE			
Output Voltage Settling Time	500	ns typ	To 0.01% of Full-Scale Range. DAC Latch Alternately Loaded with All 0s and All 1s.
Digital to Analog Glitch Impulse	40	nV s typ	Measured with $V_{REF} = 0\text{ V}$. DAC Register Alternately Loaded with All 0s and All 1s.
Multiplying Feedthrough Error	66	dB max	$V_{REF} = 20\text{ V pk-pk}$, 10 kHz Sine Wave. DAC Latch Loaded with All 0s.
Output Capacitance	60	pF max	All 1s Loaded to DAC.
	30	pF max	All 0s Loaded to DAC.
Channel-to-Channel Isolation	76	dB typ	Feedthrough from Any One Reference to the Others with 20 V pk-pk, 10 kHz Sine Wave Applied.
Digital Crosstalk	40	nV s typ	Effect of all 0s to all 1s Code Transition on Nonselected DACs.
Digital Feedthrough	40	nV s typ	Feedthrough to Any DAC Output with \overline{FSIN} High and Square Wave Applied to $SDIN$ and $SCLK$.
Total Harmonic Distortion	83	dB typ	$V_{REF} = 6\text{ V rms}$, 1 kHz Sine Wave.
Output Noise Spectral Density @ 1 kHz	20	nV/√Hz	All 1s Loaded to the DAC. $V_{REF} = 0\text{ V}$. Output Op Amp is AD OP07.

NOTES

¹Temperature range as follows: B Version: -40°C to +85°C.

²All specifications also apply for $V_{REF} = +10\text{ V}$, except relative accuracy which degrades to ±1 LSB.

Specifications subject to change without notice.

ORDERING GUIDE

Model	Temperature Range	Linearity Error (LSBs)	Package Option*
AD7568BS	-40°C to +85°C	±0.5	S-44
AD7568BP	-40°C to +85°C	±0.5	P-44A

*S = Plastic Quad Flatpack (PQFP), P = Plastic Leaded Chip Carrier (PLCC).
For outline information see Package Information section.