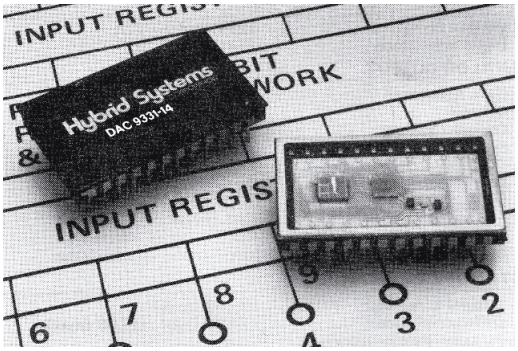
DAC9331-14

Data Converter Line

14-Bit Multiplying DAC

FEATURES

- 14-bit resolution and accuracy
- 2 and 4-quadrant multiplication
- Precision laser trimmed ladder
- Low power
- Single power supply operation
- Reliable



DESCRIPTION

The DAC9331-14 is a low cost 14-bit multiplying digital-to-analog converter packaged in a unique 24-pin double DIP. Capable of 2 and 4-quadrant multiplication, the unit is TTL/DTL and CMOS compatible with power consumption less than 30mW. Power supply options include +5V (-1) or + 15V (-2). Outstanding features of the DAC9331-14 include:

True 14-bit performance —Up to 14-bit resolution and accuracy over the 0° to 70°C operating range.

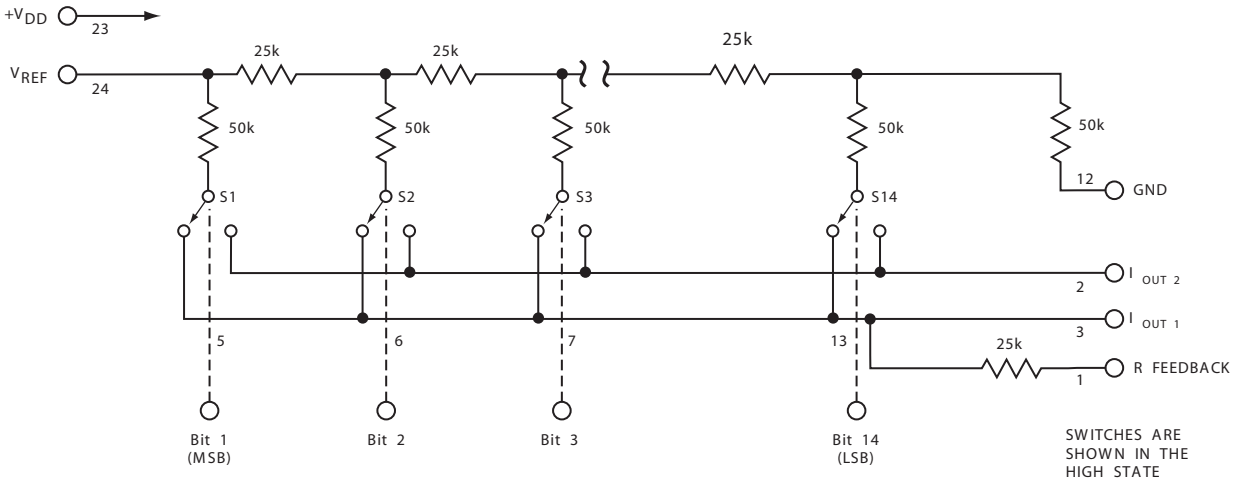
2 and 4-quadrant multiplication —Reference input range to ±25 volts.

Low power — CMOS technology provides less than 30mW total power dissipation — a real battery saver.

Reliability plus — Packaged in a unique enclosure that has undergone extensive environmental testing during its development. The DAC9331-14 is continuously monitored during all assembly and test operations by our quality control organization.

Reliability is enhanced by batch-processed, precision laser-trimmed resistor networks fabricated in our own facility. Similar to monolithic circuits, the networks are processed and functionally trimmed to assure consistent performance.

FUNCTIONAL DIAGRAM



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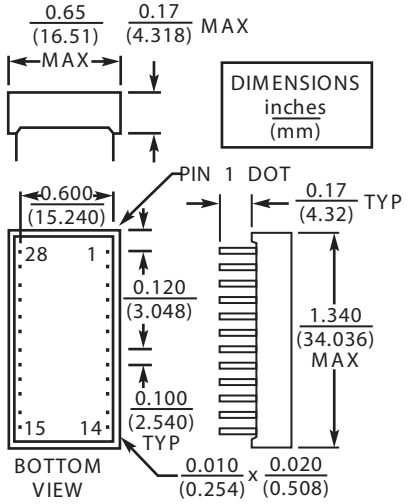
SPECIFICATIONS

(Typical @ +25°C and nominal power supply. V_{REF} = +10V, unless otherwise noted)

MODEL	DAC9331-14
TYPE	Multiplying
DIGITAL INPUT	
Resolution	14-Bits
2-Quad. Unipolar Coding	Binary
4-Quad. Bipolar Coding	Offset Binary
Logic Compatibility	DTL, TTL, CMOS
Logic Thresholds	V_{IH}=3.5V(min), V_{IL}=1.0V(max)[1]
Input Leakage Current	±1µA (max)
REFERENCE INPUT	
Voltage Range	±25V (max)
Input Impedance	25k
ANALOG OUTPUT	
Gain Accuracy[2]	0.1%
Offset[3]	50µV (max)
Output Leakage	40nA (max)
Small Signal	
3dB Bandwidth	600kHz (min)
Output Capacitance	
C_{out1}	100pF (max) all inputs high
C_{out2}	30pF (max) all inputs high
C_{out1}	30pF (max) all inputs low
C_{out2}	100pF (max) all inputs low
STATIC PERFORMANCE	
Integral Linearity[4]	±1/2 LSB (max)
Differential Linearity	±1/2 LSB (typ), ±1 LSB (max)
DYNAMIC PERFORMANCE	
Major Carry Transition	
Settling to ±0.05%	3.0µS (max)
Reference Feedthrough Error	
(Vref=20Vpp @ 10kHz)	10mVpp
STABILITY[3] (Over Specified Temp. Range)	
Scale Factor[5]	±3ppm/°C F.S.R. (max)
Linearity	±3ppm/°C F.S.R. (max)
Differential Linearity	±2ppm/°C F.S.R. (max)
POWER SUPPLY (V_{DD})[6]	
Voltage Range @ Current	
-1 Option	+5V (nom); +4.75V to +7V @ <1mA
-2 Option	+15V (nom); +11.5V to +15.5V @ 2mA
Rejection Ratio	0.005%/% (typ), 0.007%/% (max)
Total Dissipation (inputs at GND)	30mW (max)

Consult factory for application information.

TEMPERATURE RANGE	
Operating	0°C to +70°C
Storage	0°C to +85°C
MECHANICAL	
Case Style	24-pin double-DIP
Case Dimensions	



PIN	FUNCTION	PIN	FUNCTION
1	R FEEDBACK	24	V_{REF}
2	IOUT 2	23	$+V_{DD}$
3	IOUT 1	22	BIT 5
4	N.C.	21	BIT 6
5	BIT 1 (MSB)	20	BIT 7
6	BIT 2	19	BIT8
7	BIT 3	18	BIT 9
8	BIT 4	17	BIT 10
9	N.C.	16	BIT11
10	N.C.	15	BIT 13
11	N.C.	14	BIT 13
12	GROUND	13	BIT 14 (LS8)

Note: N.C. means no connection

NOTES

1. The switching threshold is typically V_{DD}/2 for –1 models and V_{DD}/6 for –2 models. The logic input must never exceed V_{DD}/3 (or –2 models.
2. Using internal feedback resistor.
3. Using the internal $F_{feedback}$ with nulled external amplifier in a constant 25°C ambient. (Offset doubles every 10°C).
4. Best straight line method of test.
5. The DAC9331-14 Series is designed to be used only in those applications where the current output is virtual ground: i.e., the summing junction of an op amp in the inverting mode. The internal feedback resistor (R feedback) must be used to achieve temperature tracking. See APPLICATIONS INFORMATION for recommended circuit configurations.
6. The power supply voltage must not exceed +10V for the –1 versions or +15.5V for the –2 versions.

ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
OAC9331-14-1	14-Bit MDAC, +5V Operation
DAC9331-14-2	14-Bit MDAC, +15V Operation

Specifications subject to change without notice.