Sipex Corporation
SIGNAL PROCESSING EXCELLENCE

LOW POWER, WIDE TEMPERATURE RANGE DACs

FEATURES

- 10- and 12-bit models
- Very low power: less than 300 mW
- Wide operating temperature range: −55°C to +125°C
- MIL-STD-883 Rev. C, Level B or commercial processing
- 18 pin hermetic package

DESCRIPTION

This Series is specifically designed and tested for low power operation. The models feature low total power dissipation of less than 300 mW. Each unit incorporates a pretrimmed output amplifier and a low power internal reference.

The DAC347 Series are high performance, general purpose, digital-to-analog converters utilizing matched CMOS current switches and ultra stable thin-film nichrome resistor networks. All DAC347 Series models provide optimum stability in performance over the full −55°C to +125°C temperature range.
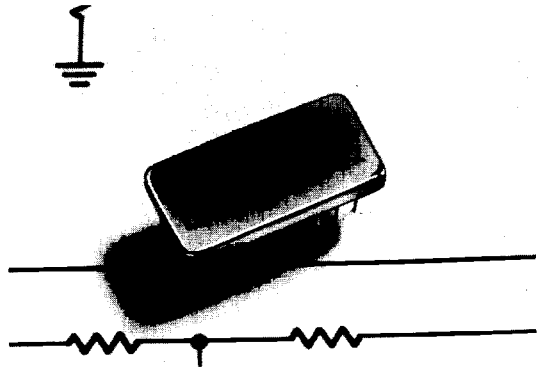
Unipolar models use complementary binary coding and bipolar models use complementary offset binary coding. Each DAC347 Series converter comes packaged in a hermetically-sealed 18-pin package, ideal for applications where maximum performance in minimum space is required.

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FUNCTIONAL DIAGRAM
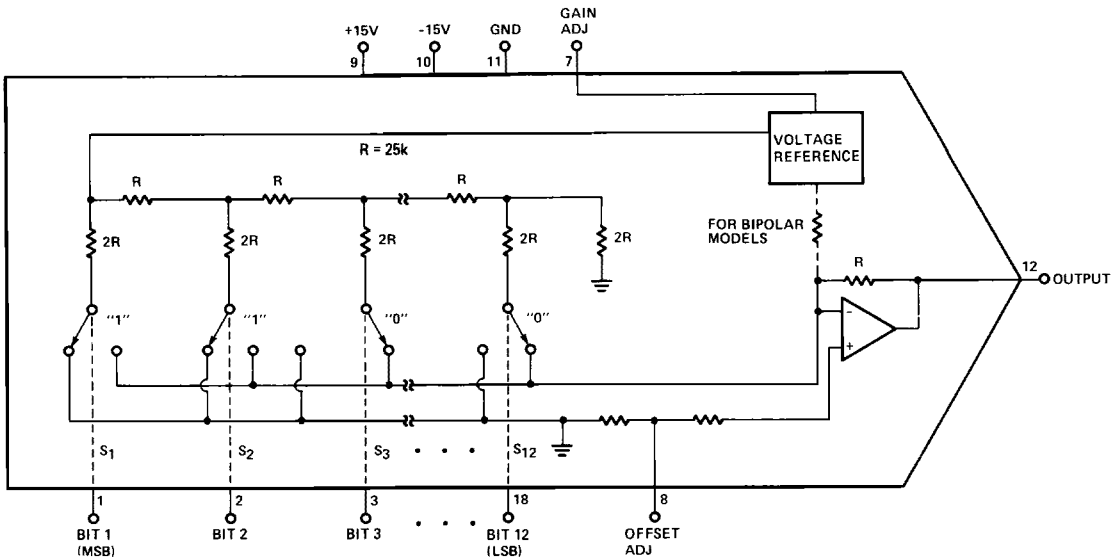
SPECIFICATIONS

(Typical @ +25°C using nominal supplies unless otherwise noted).

SERIES	DAC347
TYPE	Fixed Ref, Volt Output

DIGITAL INPUT

Resolution	
–10 option	10-bits
–12 option	12-bits
Coding Unipolar	Comp. Binary
Bipolar	Comp. Offset Binary
Logic Compatibility[1]	DTL, TTL, CMOS
	V_{IH}=2.4V (min),
	V_{IL}=0.8V (max)
	I_{IH}=I_{IL}=1µA (max)

ANALOG OUTPUT[2]

Voltage Output	
-U option	0 to +10V
-B option	±5V
-G option	±10V
Impedance	0.1Ω
Current	±5mA
REFERENCE	Internal

STATIC PERFORMANCE

Integral Linearity	±½LSB (max)
Differential Linearity	±½LSB ±1LSB (max)
End Point Accuracy	±0.1%

DYNAMIC PERFORMANCE

Settling Time for a Worst	
Case Digital Change	
–10 models (to ±0.05%)	20µS (max)
–12 models (to ±0.05%)	20µS (max)

–25°C TO +85°C OPERATION

Change in Accuracy[3]	
–10 models	±0.15% F.S.R.
–12 models	±0.1% F.S.R.
Differential Linearity	
–10 models	±0.1% F.S.R.
–12 models	±0.025% F.S.R.
Linearity Error	
–10 models	±0.05% F.S.R.
–12 models	±0.0125% F.S.R.

–55°C TO +125°C OPERATION

Change in Accuracy	
–10 models	±0.7% F.S.R.
–12 models	±0.35% F.S.R.
Differential Linearity	
–10 models	±0.1% F.S.R.
–12 models	±0.05% F.S.R.
Linearity Error	
–10 models	±0.05% F.S.R.
–12 models	±0.025% F.S.R.

POWER REQUIREMENTS

Power Supply	+15V, ±3% @ 6mA (typ),
	9mA (max)
	–15V, ±3% @ 9mA (typ),
	12mA (max)
Power Supply Rejection	
Ratio	0.001%/% (typ),
	0.002%/% (max)

ENVIRONMENTAL

Operating Temperature	–55°C to +125°C	B Versions
Range	0°C to 70°C	C Versions

MECHANICAL

Case Style	18 pin ceramic
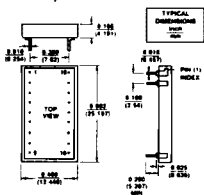
PIN	FUNCTION	PIN	FUNCTION
1	BIT 1 (MSB)	18	BIT 12 (LSB)
2	BIT 2	17	BIT 11
3	BIT 3	16	BIT 10
4	BIT 4	15	BIT 9
5	BIT 5	14	BIT 8
6	BIT 6	13	BIT 7
7	GAIN ADJ	12	OUTPUT
8	OFFSET ADJ	11	GND
9	+15V	10	-15V

Pin 1 is marked by a dot on the top of the package

NOTES:
1. Logic input should not exceed +5.5V or be below –0.3V.
2. Full scale range and offset voltage are externally adjustable.
3. Includes effects of scale factor, zero and linearity.
4. In case of discrepancy between package shown in photograph and package outline dimension, the mechanical outline is correct.
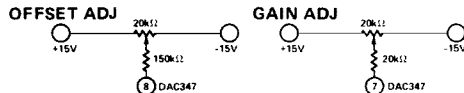
APPLICATIONS INFORMATION

RECOMMENDED POWER SUPPLY BYPASS CIRCUIT
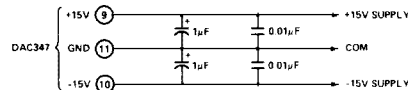
RECOMMENDED BURN-IN CIRCUIT
(Standard for MIL-STD-883 models)
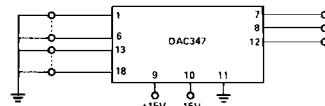
OPTIONAL OFFSET AND GAIN ADJUSTMENTS

Calibration Procedures

Unipolar models
1. Apply a 111...1 input code and set the OFFSET ADJUST potentiometer for 0 volt output.
2. Apply a 000...0 input code and set the GAIN ADJUST potentiometer for desired full scale output.

Bipolar models
1. Apply a 0111...1 input code and set the OFFSET ADJUST potentiometer for 0 volt output.
2. Apply a 000...0 input code and set the GAIN ADJUST potentiometer for desired (+) full scale output.

TRANSFER CHARACTERISTICS

UNIPOLAR, -U MODELS (0 to +10V OUTPUT)													
Complementary Binary Input Code												Analog Output	
MSB	2	3	4	5	6	7	8	9	10	11	LSB	Weighting	Voltage
1	1	1	1	1	1	1	1	1	1	1	1	Zero	+0.000V
1	1	1	1	1	1	1	1	1	1	1	0	+1 LSB	+0.0024V
0	1	1	1	1	1	1	1	1	1	1	1	+½ F.S.	+5.000V
0	0	0	0	0	0	0	0	0	0	0	0	+F.S. -1 LSB	+9.9976V

BIPOLAR, -B MODELS (±5V OUTPUT)													
Complementary Offset Binary Input Code												Analog Output	
MSB	2	3	4	5	6	7	8	9	10	11	LSB	Weighting	Voltage
1	1	1	1	1	1	1	1	1	1	1	1	-F.S.	-5.000V
1	0	0	0	0	0	0	0	0	0	0	0	-1 LSB	-0.0024V
0	1	1	1	1	1	1	1	1	1	1	1	Zero	+0.000V
0	0	0	0	0	0	0	0	0	0	0	0	+F.S. -1 LSB	+4.9976V

BIPOLAR, -G MODELS (±10V OUTPUT)													
Complementary Offset Binary Input Code												Analog Output	
MSB	2	3	4	5	6	7	8	9	10	11	LSB	Weighting	Voltage
1	1	1	1	1	1	1	1	1	1	1	1	-F.S.	-10.000V
1	0	0	0	0	0	0	0	0	0	0	0	-1 LSB	-0.0048V
0	1	1	1	1	1	1	1	1	1	1	1	Zero	+0.000V
0	0	0	0	0	0	0	0	0	0	0	0	+F.S. -1 LSB	+9.9951V

CAUTION: ESD (Electro-Static Discharge) sensitive device. Permanent damage may occur when unconnected devices are subjected to high energy electrostatic fields. Unless otherwise noted, the voltage at any digital input should never exceed the supply voltage by more than 0.5 volts or go below –0.5 volts.

ORDERING INFORMATION

MODEL	DESCRIPTION
DAC347LPB-12-U	MIL, 12-Bit, 0 to +10V
DAC347LPC-10-G	Comm, 10-Bit, ±10V
DAC347LPC-12-G	Comm, 12-Bit, ±10V
DAC347LPC-10-B	Comm, 10-Bit, ±5V
DAC347LPC-12-B	Comm, 12-Bit, ±5V
DAC347LPC-10-U	Comm, 10-Bit, 0 to +10V
DAC347LPC-12-U	Comm, 12-Bit, 0 to +10V

LPC models are commercially processed
LPB models are processed to MIL-STD-883 Rev. C, Level B. **X**

Specifications subject to change without notice.