

**LOW POWER, WIDE TEMPERATURE RANGE DACs**

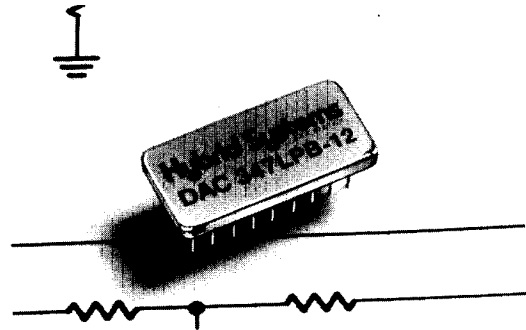
**FEATURES**

- 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.

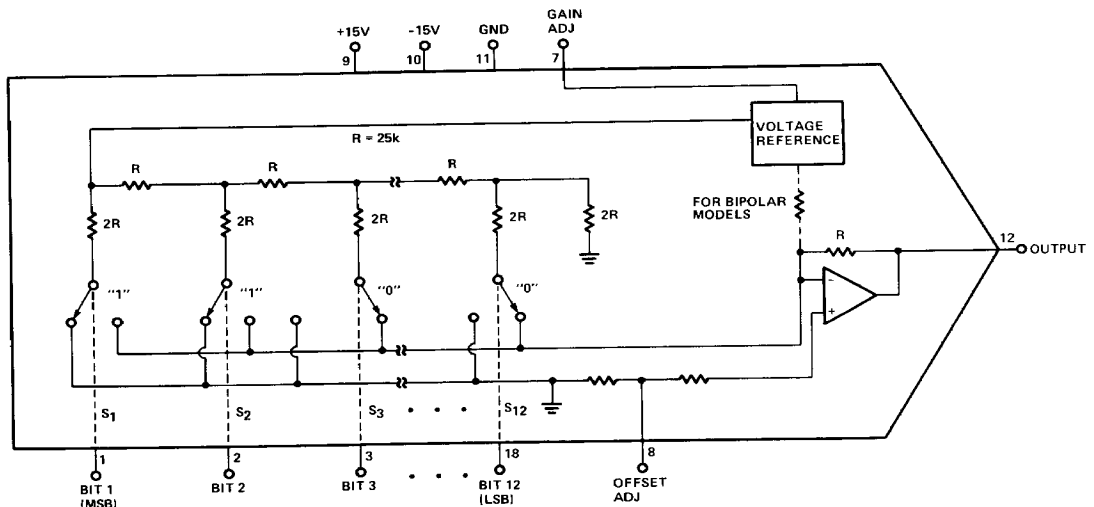
The DAC347 Series are high performance, general purpose, digital-to-analog converters utilizing matched CMOS current switches and ultra stable thin-film nichrome resistor networks. All DAC347 Series models provide optimum stability in performance over the full -55°C to +125°C temperature range.



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.



**FUNCTIONAL DIAGRAM**



# SPECIFICATIONS

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

<b>SERIES</b>	<b>DAC347</b>
<b>TYPE</b>	Fixed Ref, Volt Output
<b>DIGITAL INPUT</b>	
Resolution	10-bits
-10 option	12-bits
Coding	Unipolar Bipolar
Logic Compatibility <sup>1</sup>	Comp. Binary Comp. Offset Binary DTL, TTL, CMOS
	$V_{IH} = 2.4V$ (min), $V_{IL} = 0.8V$ (max) $I_{IH} = I_{IL} = 1\mu A$ (max)

<b>ANALOG OUTPUT<sup>2</sup></b>	
Voltage Output	0 to +10V
-U option	±5V
-B option	±10V
-G option	0.1Ω
Impedance	±5mA
Current	Internal
<b>REFERENCE</b>	

<b>STATIC PERFORMANCE</b>	
Integral Linearity	±½LSB (max)
Differential Linearity	±½LSB ±1LSB (max)
End Point Accuracy	±0.1%
<b>DYNAMIC PERFORMANCE</b>	
Settling Time for a Worst Case Digital Change	
-10 models (to ±0.05%)	20μs (max)
-12 models (to ±0.05%)	20μs (max)

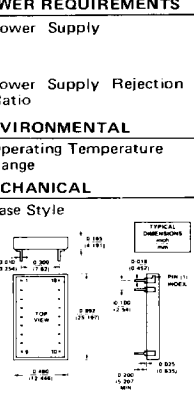
<b>-25°C TO +85°C OPERATION</b>	
Change in Accuracy <sup>3</sup>	
-10 models	±0.15% F.S.R.
-12 models	±0.1% F.S.R.
Differential Linearity	
-10 models	±0.1% F.S.R.
-12 models	±0.025% F.S.R.
Linearity Error	
-10 models	±0.05% F.S.R.
-12 models	±0.0125% F.S.R.

<b>-55°C TO +125°C OPERATION</b>	
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.

<b>POWER REQUIREMENTS</b>	
Power Supply	+15V, ±3% @ 6mA (typ), 9mA (max)
	-15V, ±3% @ 9mA (typ), 12mA (max)
Power Supply Rejection Ratio	0.001%/ (typ), 0.002%/ (max)

<b>ENVIRONMENTAL</b>	
Operating Temperature Range	-55°C to +125°C B Versions 0°C to 70°C C Versions

<b>MECHANICAL</b>	
Case Style	18 pin ceramic



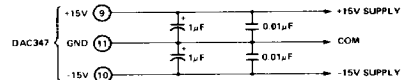
PIN	FUNCTION	PIN	FUNCTION
1	BIT 1 (MSB)	18	BIT 12 (LSB)
2	BIT 2	17	BIT 11
3	BIT 3	16	BIT 10
4	BIT 4	15	BIT 9
5	BIT 5	14	BIT 8
6	BIT 6	13	BIT 7
7	GAIN ADJ	12	OUTPUT
8	OFFSET ADJ	11	GND
9	+15V	10	-15V

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

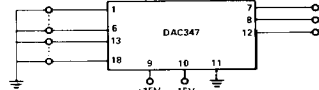
23B

# APPLICATIONS INFORMATION

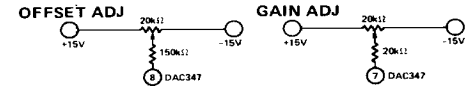
## RECOMMENDED POWER SUPPLY BYPASS CIRCUIT



## RECOMMENDED BURN-IN CIRCUIT (Standard for MIL-STD-883 models)



## OPTIONAL OFFSET AND GAIN ADJUSTMENTS



## Calibration Procedures

Unipolar models

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

Bipolar models

- Apply a 0111...1 input code and set the OFFSET ADJUST potentiometer for 0 volt output.
- 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)											Analog Output		
Complementary Binary Input Code											Weighting	Voltage	
MSB	2	3	4	5	6	7	8	9	10	11	LSB		
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)											Analog Output		
Complementary Offset Binary Input Code											Weighting	Voltage	
MSB	2	3	4	5	6	7	8	9	10	11	LSB		
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)											Analog Output		
Complementary Offset Binary Input Code											Weighting	Voltage	
MSB	2	3	4	5	6	7	8	9	10	11	LSB		
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-10-G	MIL, 10-Bit, ±10V
DAC347LPB-12-G	MIL, 12-Bit, ±10V
DAC347LPB-10-B	MIL, 10-Bit, ±5V
DAC347LPB-12-B	MIL, 12-Bit, ±5V
DAC347LPB-10-U	MIL, 10-Bit, 0 to +10V
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.

Specifications subject to change without notice.