

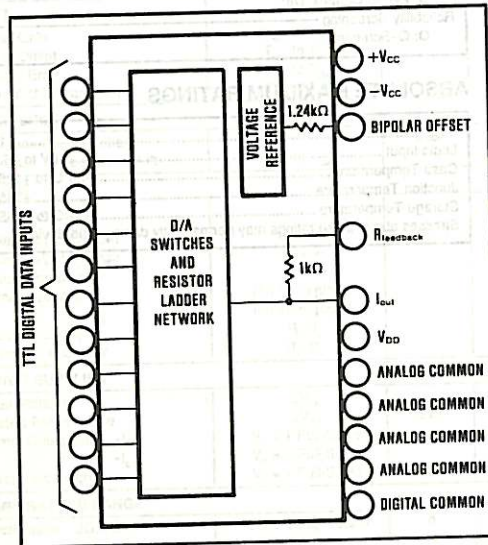


DAC812

Ultra-High Speed DIGITAL-TO-ANALOG CONVERTER

FEATURES

- 12-BIT RESOLUTION AND ACCURACY
- 55nsec CURRENT OUTPUT SETTLING TIME
- TTL-COMPATIBLE INPUTS
- MONOTONIC OVER ENTIRE TEMPERATURE RANGE
- LINEARITY ERROR LESS THAN $\pm 1/2$ LSB OVER TEMPERATURE RANGE (C GRADE)
- HERMETIC METAL PACKAGE



DESCRIPTION

The DAC812 is an ultra-fast-settling 12-bit current-output D/A converter with TTL-compatible inputs packaged in a 24-pin dual-wide dual-in-line hermetic metal package.

The current output settles to $\pm 0.012\%$ of full scale range in 55nsec, typical (65nsec, max., C grade; 80nsec, max., B grade).

The DAC812 utilizes a monolithic 12-bit switch chip with stable, compatible thin-film resistors to achieve fast settling time and excellent stability over temperature and time. An internal applications resistor for use with an external op amp is included to convert the output current into a voltage for 0V to +10V or -5V to +5V ranges.

An output voltage compliance range of +4V to -4V allows the generation of an output voltage without using an external output amplifier.

The DAC812 comes in two drift grades. The linearity error of the C grade is guaranteed to be within $\pm 1/2$ LSB over the temperature range of -25°C to +85°C. Gain drift of the C grade is ± 20 ppm/°C (max) and bipolar offset drift is ± 10 ppm/°C (max). The B grade has a linearity error of ± 1 LSB over the temperature range and a maximum gain drift and bipolar offset drift of ± 40 ppm/°C and ± 15 ppm/°C, respectively.

SPECIFICATIONS

ELECTRICAL

At $T_A = +25^\circ\text{C}$, rated power supplies, and after 5-minute warm-up unless otherwise noted.

MODEL	DAC812CM			DAC812BM			UNITS
	MIN	TYP	MAX	MIN	TYP	MAX	
INPUT							
DIGITAL INPUT							
Resolution; CSB, COB			12				Bits
Logic Inputs: V_{IH}	+2.0		+5.25				V
V_{IL}	0.0		+0.8				V
$I_{IH}, V_i = +2.7\text{V}$			+40				μA
$I_{IL}, V_i = +0.4\text{V}$			-1.8				mA
TRANSFER CHARACTERISTICS							
ACCURACY							
Linearity Error		± 0.006	± 0.012		± 0.009	± 0.018	% of FSR ⁽¹⁾
Differential Linearity Error			± 0.012			± 0.018	% of FSR
Gain Error ⁽²⁾		± 0.03	± 0.1				%
Offset Error ⁽²⁾ : Unipolar		± 0.02	± 0.04				% of FSR
Bipolar		± 0.03	± 0.1				% of FSR
Monotonicity Temp. Range (min)	-25		+85				°C
CONVERSION SPEED							
Settling Time to $\pm 1/2$ LSB into 150 Ω							
For FSR Change		55	65			80	nsec
For 1LSB Change		25					nsec
DRIFT							
Gain							
Offset: Unipolar		± 10	± 20		± 20	± 40	ppm/°C
Bipolar		± 0.25	± 0.5		± 0.5	± 1	ppm of FSR/°C
Linearity Error			± 10			± 15	ppm of FSR/°C
Differential Linearity Error		± 0.012 over Temp. Range (max)			± 0.025 over Temp. Range (max)		% of FSR
		± 0.025 over Temp Range (max)			± 0.04 over Temp. Range (max)		% of FSR
OUTPUT							
ANALOG OUTPUT							
Output Current: Unipolar		0 to -10					mA
Bipolar		-5 to +5					mA
Output Voltage Ranges							V
with External Op Amp: Unipolar		0 to +10					V
Bipolar		-5 to +5					V
Output Impedance: Unipolar		170					Ω
Bipolar		150					Ω
Output Compliance	-4		+4				V
POWER SUPPLIES							
Power Supply Sensitivity: +Vcc							
-Vcc			± 0.004				%FSR/%Vcc
VDD			± 0.001				%FSR/%Vcc
			± 0.0002				%FSR/%Vcc
Power Supply Voltages: +Vcc							
-Vcc	+11.4	+15	+18				V
VDD	-18	-15	-14				V
	+4.5	+5	+5.5				V
Power Supply Current: +Vcc							
-Vcc		+30	+40				mA
VDD		-40	-50				mA
		+25	+40				mA
Power Dissipation		1.2	1.6				W
PHYSICAL CHARACTERISTICS							
TEMPERATURE RANGE							
Specification	-25		+85				°C
Storage	-55		+150				°C
PACKAGE							
	24-pin Hermetic Metal DIP 0.6" Pin Row Spacing						

*Specification the same as for DAC812CM.

NOTES: (1) FSR is full-scale range. (2) Adjustable to zero with external potentiometer. Gain error is specified for unadjusted operation using internal resistor network. See Figure 5 and Figure 6.