BURR-BROWN®

ADC803

High Speed ANALOG-TO-DIGITAL CONVERTER

FEATURES

- 12-BIT RESOLUTION
- LINEARITY ERROR: ±0.12%, max (C Grade)
- NO MISSING CODES: –55°C to +125°C (S Grade)
- HIGH SINAD RATIO: 72dB
- LOW HARMONIC DISTORTION: –73dB
- CONVERSION TIME: 500ns, 8 Bits
  670ns, 10 Bits
  1.5µs, 12 Bits

DESCRIPTION

The ADC803 is a high speed hybrid successive approximation analog-to-digital converter utilizing laser-trimmed thin film components.

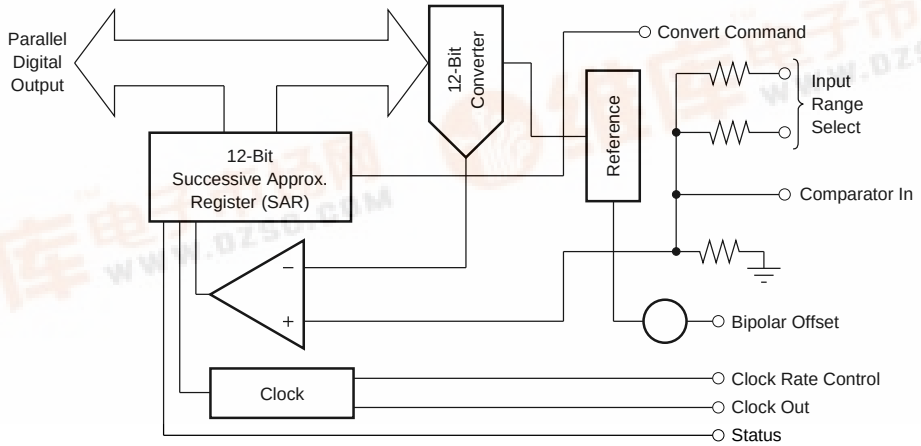
It is complete with internal reference, clock, and comparator, and is packaged in a 32-pin metal package. Conversion time is set at the factory to 1.5µs.

With user-adjusted conversion time set at 1µs, ±1LSB accuracy can be achieved. The gain and offset errors may be externally trimmed to zero.

Internal scaling resistors are provided for the selection of analog signal input ranges of 0V to –10V, ±5V, and ±10V.

Output codes available are complementary binary for unipolar inputs and bipolar offset binary for bipolar inputs.

All digital inputs and outputs are TTL-compatible. Power supply requirements are ±15V and +5V.



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SPECIFICATIONS

At +25°C, rated power supplies, 1.5µs conversion time, and after 6-minute warm-up, unless otherwise noted.

PARAMETER	ADC803CM MIN	ADC803CM TYP	ADC803CM MAX	ADC803BM MIN	ADC803BM TYP	ADC803BM MAX	ADC803SM MIN	ADC803SM TYP	ADC803SM MAX	UNITS
RESOLUTION			12			12			12	Bits
INPUTS										
ANALOG										
Voltage Ranges: Bipolar		±5, ±10			*			*		V
Unipolar		0 to –10			*			*		V
Impedance: –10V to 0V, ±5V		1.4			*			*		kΩ
±10V		2.4			*			*		kΩ
DIGITAL										
Convert Command		Negative pulse 50ns wide (min) trailing edge (0 to 1) initiates conversion.								
Logic Loading			4			*			*	TTL Loads
TRANSFER CHARACTERISTICS										
ACCURACY										
Gain Error [1]		±0.04	±0.1		±0.08	±0.2		±0.04	±0.1	%
Offset Error[1]: Unipolar		±0.05	±0.2		±0.07	±0.3		*	*	% of FSR[2]
Bipolar		±0.02	±0.1		*	±0.2		*	*	% of FSR
Linearity Error:										
1.5µs Conversion Time		±0.009	±0.012			±0.020		±0.012	±0.015	% of FSR
1.0µs Conversion Time		±0.015	±0.020		±0.020					% of FSR
Differential Linearity Error:										
1.5µs Conversion Time		±0.012	±0.015			±0.020		*	*	% of FSR
1.0µs Conversion Time			±0.024		±0.024			*		% of FSR
Inherent Quantization Error		1/2			*			*		LSB
POWER SUPPLY SENSITIVITY										
Gain and Offset: +15VDC		±0.0036			*			*		% of FSR/%V_{CC}
–15VDC		±0.0005			*			*		% of FSR/%V_{CC}
+5VDC		±0.001			*			*		% of FSR/%V_{DD}
Conversion Time: +15VDC		±0.7			*			*		%/%V_{CC}
–15VDC		None			*			*		%/%V_{CC}
+5VDC		±0.8			*			*		%/%V_{DD}
CONVERSION TIME										
Factory Set	1.3		1.5	*		*	*		*	µs
Range of Adjustments	0.8		2.2	*		*	*		*	µs
DRIFT										
Gain		±10	±30		±15	*		*	*	ppm of FSR/°C
Offset: Unipolar		±2	±7		±3	*		*	*	ppm of FSR/°C
Bipolar		±3	±10		±5	*		*	*	ppm of FSR/°C
Linearity Error										
–25°C to +85°C:										
1.5µs Conversion Time		±0.012	±0.018			±0.024			*	% of FSR
1.0µs Conversion Time		±0.015			±0.020				*	% of FSR
–55°C to +125°C:										
1.7µs Conversion Time, max[4]								±0.015	±0.024	% of FSR
Differential Linearity Error										
–25°C to +85°C:										
1.5µs Conversion Time		±0.012	±0.018			±0.024				% of FSR
1.0µs Conversion Time		±0.015			±0.024					% of FSR
–55°C to +125°C:										
1.7µs Conversion Time, max[4]		±0.1						±0.015	±0.024	% of FSR
Conversion Time					*			*		% of FSR
No Missing Code Temp. Range:										
1.5µs Conversion Time	–25		+85	*		*				°C
1.7µs Conversion Time, max[4]							–55		+125	°C
OUTPUT										
DIGITAL DATA										
Parallel										
Output Codes: Unipolar		Complementary Straight Binary			*			*		
Bipolar		Bipolar Offset Binary			*			*		
Output Drive		6		*			*			TTL Loads
Status		Logic "1" During Conversion			*			*		
Status Output Drive		6		*			*			TTL Loads
Internal Clock										
Clock Output Drive		3		*			*			TTL Loads
Frequency (without external clock adj.)		8			*			*		MHz

SPECIFICATIONS (CONT)

At +25°C, rated power supplies, 1.5µs conversion time, and after 6-minute warm-up, unless otherwise noted.

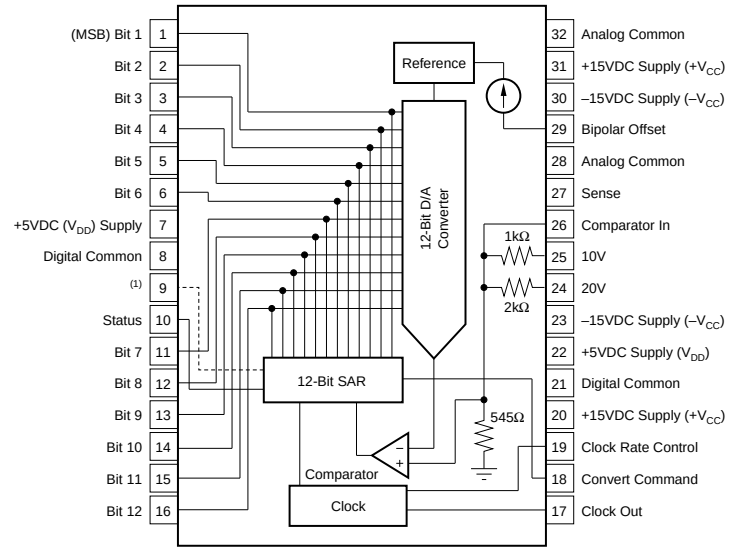
PARAMETER	ADC803CM			ADC803BM			ADC803SM			UNITS
	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
POWER SUPPLY REQUIREMENTS										
Power Consumption										
Rated Voltage: Analog ($\pm V_{CC}$)	±14.25	±15	±15.75	*	*	*	*	*	*	VDC
Digital (V_{DD})	+4.75	+5	+5.25	*	*	*	*	*	*	VDC
Supply Drain: +15V		+27	+32		*	*		*	*	mA
–15V		–38	–55		*	*		*	*	mA
+5V		+180	+210		*	*		*	*	mA
TEMPERATURE RANGE (Ambient)										
Specification	–25		+85	*		*	–55		+125	°C
Storage	–55		+125	*		*	*		*	°C

* Same specification as for ADC803CM.

NOTES: (1) Adjustable to zero. See Optional Gain and Offset Adjustment section. (2) FSR means Full Scale Range. For example, unit connected for ±10V has 20V FSR. (3) See Optional Clock Rate Control section. For faster conversion time at less resolution, see section on External Short Cycle. (4) Conversion time is factory-set at approximately 1.4µs at +25°C. As temperature increases, the conversion time increases. At +125°C the conversion time will be no more than 1.7µs. No Missing Codes is guaranteed over –55°C to +125°C provided the conversion time is allowed to increase with temperature.

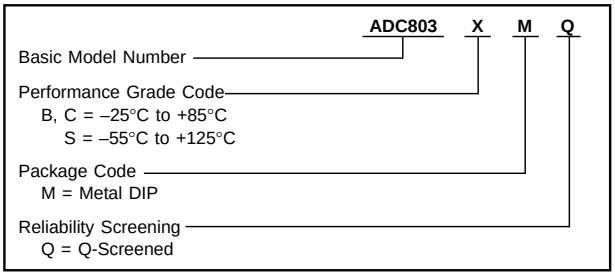
ADC803 dynamic performance characteristics are described in a report titled "Analogue-to-Digital Converter Performance Tests Using the Fast Fourier Transform" by R. A. Belcher, University College of Swansea, Wales, UK. (available from Burr-Brown on letterhead request).

CONNECTION DIAGRAM



NOTE: (1) Serial data is not guaranteed.

ORDERING INFORMATION



ABSOLUTE MAXIMUM RATINGS

Analog Supply Voltage To Analog Common	±18V
Digital Supply Voltage To Digital Common	+7V
Digital Controls Inputs	+5.5V
Analog Inputs	±15V
Operating Temperature: Ambient	+125°C
Case	+135°C
Storage Temperature	+125°C

PACKAGE INFORMATION

MODEL	PACKAGE	PACKAGE DRAWING NUMBER(1)
ADC803	32-Pin Metal	116

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix D of Burr-Brown IC Data Book.