ADC84/85/87H





ADC84 ADC85H ADC87H

IC ANALOG-TO-DIGITAL CONVERTERS

FEATURES

- INDUSTRY STANDARD 12-BIT A/D CONVERTERS
- COMPLETE WITH CLOCK AND INPUT BUFFER
- HIGH SPEED CONVERSION: 10µs (max)
- REDUCED CHIP COUNT—HIGH RELIABILITY
- LOWER POWER DISSIPATION: 450MW (typ)
- ±0.012% max LINEARITY ERROR
- THREE TEMPERATURE RANGES: 0°C to +70°C — ADC84 -25°C to +85°C — ADC85H -55°C to +125°C - ADC87H
- NO MISSING CODES OVER FULL TEMPERATURE RANGE
- PARALLEL AND SERIAL OUTPUTS
- ±12V OR ±15V POWER SUPPLY **OPERATION**
- HERMETIC 32-PIN CERAMIC SIDE-BRAZED DIP

DESCRIPTION

ADC84, ADC85H, and ADC87H analog-to-digital converters utilize state-of-the-art IC and laser-trimmed thin-film components, and are packaged in a 32-pin hermetic side-brazed package.

They are complete with internal reference and input buffer amplifier. Thin-film internal scaling resistors are provided for the selection of analog input signal ranges of $\pm 2.5V$, $\pm 5V$, $\pm 10V$, 0 to +5V, or 0 to +10V. Gain and offset errors may be externally trimmed to zero, offering initial accuracies of better than ±0.012%

The fast 10µs conversion speed for 12-bit resolution makes these ADCs excellent for a wide range of applications where system throughput sampling rates of 100kHz are required. In addition, they may be short cycled and the clock rate control may be used to obtain faster conversion speeds at lower resolutions.

Data is available in parallel and serial form with corresponding clock and status signals. All digital input and output signals are CMOS/TTL-compatible. Power supply voltages are ±12VDC or ±15VDC and

• Tucson, AZ 85734 • Street Address: 6730 S. Tucson Blvd. • Tucson, AZ 85706 Telex: 066-6491 • FAX: (602) 889-1510 • Immediate Product Info: (800) 548-6132 International Airport Industrial Park • Mailing Address: PO Box 11400 Tel: (602) 746-1111 • Twx: 910-952-1111 • Cable: BBRCORP •

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SPECIFICATIONS

ELECTRICAL

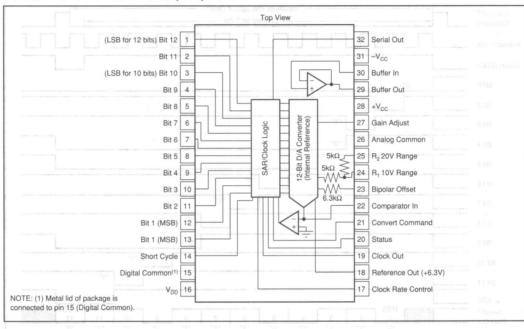
| TRANSFER CHARACTERISTICS ACCURACY | pecified at +25°C and rated supplies, unless | otherwise r | noted. | 43500 | | Drown. | | 8 M | IWOF | 784 - 9 | HUE |
|--|--|---------------------------|---------------|-----------------------------|-------------------|----------------|------------------|-------------|--------------|--------------------------|-------------------------|
| 12 12 15 15 15 15 15 15 | and the same of the | ADC84KG-12 ⁽¹⁾ | | | ADC85H-12 | | ADC87H-12 | | out to | | |
| ANALOG RIPUTS Voltage Ranges: Sipolar Unipolar U | PARAMETER | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | UNITS |
| Voltage Ranges: Bipolar | RESOLUTION | | | 12 | | | * | | | * | Bits |
| Voltage Ranges: Bipolar | ANALOG INPUTS | | | | 17593 | 237 | | | | | |
| Unipolar Unipola | | 1 3 | 2.5, ±5, ±1 | 0 | | | | | * | | V |
| Impedance (Direct Input): 10 to +5V, ±2.5V 2.45 2.5 2.5 5.1 | | | | | | | | | * | | |
| 0 to +10V; ±5V 4.9 5 5.1 | | | | | * | * | * | * | * | * | kΩ |
| ## 10V 9.8 10 10.2 | | | | | | * | | | * | | |
| Buffer Ampliffer: Impedance Bissa Current Settling Time to 0.01% 50 | | | | | E MEDIT OF CHIEFE | 1500000000000 | act organization | FA COMPANIE | CONTRACTOR | TO SOUTH WAY | |
| Bilas Current Sot | | | 10 | 10.2 | | | | | | | |
| DIGITAL INPUTS [®] Convert Command Postive pulse 50ns (min), trailing edge initiates conversion Logic Loading 1 | | 100 | EO | | | | | | | | |
| DIGITAL INPUTS | | 1 2 2 2 2 2 | 50 | 0 35 0000 | F 1870 B 1 | POR 2000 T | 982 ASTA | | 12 27 78 | 200 N | IIA |
| Postive pulse 50ns (min), trailing edge initiates conversion | | MMIC | | 1.0.1 | E MI | () | m go 3 | 0.14 | NAA | 100 | |
| Postive pulse 50ns (min), trailing edge initiates conversion TITL Loa | | W 10 10 10 | 2 | NO 8 9. W | 0.1600, 15 | V-0 -000 | S. 15,1940. | 450, 8010 D | 14 10 10 10 | (387° 11 | μs |
| TRANSFER CHARACTERISTICS ACCURACY ±0.1 ±0.25 ±0.2 | | | | | | | | | | | |
| TRANSFER CHARACTERISTICS ACCURACY Gain Error (9) Offset Error (9) Offset Error (9) Offset Unipolar | Convert Command | A THE CONTRACTOR | | ostive puls | e 50ns (mi | n), trailing e | edge initiate | es convers | ion | | |
| ACCURACY Gain Error ¹⁰ Unipolar Bipolar Bipolar Differential Linearity Error No Missing Codes Temperature Range 0 | Logic Loading | | 1 | | | | | | | | TTL Load |
| ACCURACY Gain Error Morbisel Error M | TRANSFER CHARACTERISTICS | | | | | | | | | | , |
| Sain Error ⁽⁴⁾ Unipolar | | | | | | | | | 200 00 | | 17 (b. 250) MARK |
| Offset Error**! Unipolar Bipolar Bipolar Linearity Error No Missing Codes Temperature Range POWER SUPPLY SENSITIVITY Gain and Offset: ±15V ±0.004 ±30 ±30 ±30 ±115 ±15 ±15 ±15 ±16 5 ppm of FSi ppm o | | | | | | | | | part in | 174.11 | AHH |
| Bipolar | | | | | | | | | | | |
| Dispolar | | A COCKORA | | | | (3) | A TISE | Th man | CHARTS | Varo | % of FSR ⁽⁵⁾ |
| Inherent Quantization Error | Bipolar | 17 Tank 17 17 18 | | | | | *1011 | CO STATE | WALKE TO | 1 *11.0 | % of FSR |
| Differential Linearity Error No Missing Codes Temperature Range 0 | Linearity Error ⁽⁶⁾ 480 0/ | 4 mm 0° | | ±0.012 | | | . * | | 28 | BLHEA | % of FSR |
| Differential Linearity Error No. Missing Cockes Temperature Range 0 | Inherent Quantization Error | - O'RE | ±0.5 | 25 | | * | | | | nog styre trees a second | |
| POWER SUPPLY SENSITIVITY Sain and Offset: ±15V | Differential Linearity Error | | ±0.5 | 1 | | 1638 | LUMA | MOOR | 11 * 11/V | 31377 | LSB |
| POWER SUPPLY SENSITIVITY Gain and Offset: ±15V | No Missing Codes Temperature Range | 0 | - 01 D | +70 | -25 | | +85 | -55 | | +125 | 9 °C |
| Conversion Con | | 000 01 | RATOVESTA | (317.0) | | - | | | | | |
| Sain and Oriset: ±15V | | 100 000 | RECERT | CM OF | | karn) a | 10t : 10t | MERSIC | CON | SPEE | 0/ -4 FOD (0/)/ |
| DRIFT Gain Offset: Unipolar Bipolar Linearity Monotonicity CONVERSION TIME DIGITAL OUTPUT® (All Modes Complementary) Parallel Output Codes: Unipolar Bipolar Cutput Drive Serial Data Codes (NRZ) Output Drive Serial Data Codes (NRZ) Output Drive Status Coutput Drive Status Coutput Drive Status Frequency® 1.35 INTERNAL REFERENCE VOLTAGE Reference Output Max. External Current with No Degradation Tempor of Drift POWER SUPPLY REQUIREMENTS Rated Supply Voltages Supply Ranges: Ven Code Code Code Code Code Code Code Code | - T + 2 27 4A 2 | BAUT | | TEA | | | | | | | |
| Sain | | | ±0.001 | | | | HOIH | -TMUC | 10 GIH: | 0.501 | % of FSH/%V |
| Supply | SERIAL OUTPUTS TRING | CAND | BLLLE | A9 P | | | | | V | THERE | 1.1533 |
| Supply | Gain | | | ±30 | | | ±15 | | | ±15 | ppm/°C |
| Bipolar | | DA ASD | ±3 | ZIT B | | ±3 | | 19122 | O SBW | ±5 | ppm of FSR/°C |
| ±3 | | 1/41 | | +15 | | | | 11000 | 100 11000 | | |
| Monotonicity Guaranteed Monotonicity Guaranteed Monotonicity Guaranteed Monotonicity Guaranteed Monotonicity Guaranteed Monotonicity Monotonicity Guaranteed Monotonicity | | | | | | | | | 4 | | |
| CONVERSION TIME 10 | | 32-21 | Guarantee | | | * | | VTICA | SERVE | 000 000 | 0.04.0 |
| DIGITAL OUTPUT ^{co} | | d das | A FI 8 - 9 | 10.000 | | | * | 1.1.0.125 | ad Villada A | * | IIS |
| All Modes Complementary Parallel Output Codes: Unipolar Bipolar COB, CTC Utput Drive CSB, COB COB, CTC Utput Drive CSB, COB Utput Drive Utput Driv | | + | | 10 | - | - | | | | | μο |
| Parallel Output Codes: Unipolar Bipolar Bipolar COB, CTC Output Drive 2 1 1 1 1 1 1 1 1 1 | | | | | | | | | | | |
| Bipolar | | | | | | | | | | | |
| Output Drive CSB, COB CSB, | | 1 | | | | | | | | | |
| CSB, COB | | 1 | | 7 | | | | 1.7 | MIT | OF CO. | 227 |
| Output Drive Status Output Drive Coutput Drive Coutput Drive Internal Clock: Output Drive Frequency Frequency Frequency 1.35 | | | | | | | | 07 | 0.00 | 20129 | TTL Loads |
| Logic "1" During Conversion | | 1 | CSB, COE | 3 | | | | | | con et | a normalization |
| Output Drive Internal Clock: Output Drive 2 2 2 3 5 5 5 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Output Drive Set Ind-21 101 Deeds III | | | 61 50 1 | 1.831 | 810-61-81 | olana H | STA | bm* . H | ADCE | TTL Loads |
| Output Drive 2 | cellent for a wide range clasts | Logic "1 | " During Co | onversion | bed | mirit-rea | and la | his-ani | -to-State | suffice | converte |
| Internal Clock: Output Drive 2 1.35 | Output Drive | | 2 | lo ilmo | | 00 . | | or new to | | 00.000 | TTL Loads |
| 1.35 | Internal Clock: Output Drive | vefe alan | 2 | aniden | HIIG | SC B CH | naginan | d am n | en fândar | | TTL Loads |
| NTERNAL REFERENCE VOLTAGE Heference Output He | Frequency(7) . HOLLIDES OF | beriuper | | 05.100 | | * | | cage. | DET PRO | side-bri | MHz |
| Reference Output | | I dock i | and the | cyclec | | ni ban - | | | 270 mg 24 | - Leron o | an market |
| Max. External Current with No Degradation Tempor of Drift 200 ±5 ±10 μA ±10 ppm/°C POWER SUPPLY REQUIREMENTS Rated Supply Voltages +5, ±12 or ±15 Supply Ranges; V _{bo} ±2°c ±4,75 ±16.5 * * * * * * * * * * * * * * * * * * * | | +62 | +63 | +6.4 | * und | m pins o | NUM (0193 | 16H 15HH | | ndnto. | V |
| POWER SUPPLY REQUIREMENTS | | 10.2 | 10.0 | | SIQ | eiest en | day iso | m inter | d-nidT | nellifier | or con United |
| POWER SUPPLY REQUIREMENTS | | of oil also | diam . | | Loren | nio Jeno | | 1.5 | | | |
| Rated Supply Voltages 1 | | | PATITION OF C | _ | | | ±10 | 10 12071 | T2 | DE10 | ррпі/-С |
| Supply Ranges: Vop 1 to 000 V 1 to 100 to | | | 4.3 | | , .V(| 11+ of () | 0.V34 | pro 'AO | tt, VCt | VE.AI | ranges of |
| Supply Ranges: Vop 1 to 000 V 1 to 100 to | Rated Supply Voltages | a siona + | 5, ±12 or ± | 15 | of | minime: | vHannea | (9 9d 0% | m Aore | 1907in | DITTS TRUST A |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | +4.75 | 1 -1 | | | | | | | . * | V |
| Supply Drain: +l _{cc} 25 | are 112 VIDC or 11.0V DC and | | Kiddas | Tr. C. L. V. J. R. V. C. S. | * 0/67 | U.U.The | III 12000 | actes of | m accus | n u god | VIO, OIL |
| -I _{cc} 25 * mA I _{bb} 10 * mA Total Power Dissipation 450 725 * * * mW | Supply Drain: +L | 1 | | | | | * | | | . (| Am 21 |
| Total Power Dissipation 450 725 * * * mA | | 1 | | | | | | | | | |
| Total Power Dissipation 450 725 * * * * * mW | -'cc | | | | | | * | | | | |
| Total Power Dissipation 450 725 IIIIV | Total Bower Discinstion | | 450 | | | | | | | | |
| TEMPERATURE PANCE | | - | 450 | 725 | - | - | | | - | - | mvv |
| | TEMPERATURE RANGE | | | | | | | | | | |
| Specification 0 +70 -25 +85 -55 +125 °C | Specification | | | +70 | | | | -55 | | +125 | |
| Operating (with Derated Specs) -25 +85 -55 +125 0°C | Operating (with Derated Specs) | -25 | | +85 | -55 | 4.5 | +125 | I | | | °C |
| Storage -65 +150 * * * °C | | | | | | | | | | | |

NOTES: (1) Model ADC84KG-10 is the same as model ADC84KG-12 except for the following: (a) Resolution: 10 bits (max), (b) Linearity Error: ±0.048% of FSR (max), (c) Conversion Time: 6µs (max), (d) Internal Clock Frequency: 1.9MHz (typ). (2) If the buffer is used, delay Convert Command until amplifier settles. (3) DTL/TTL compatible. For digital inputs Logic "0" = 0.8V (max) and Logic "1" = 2.0V (min). For digital outputs Logic "0" = 0.4V (max) and Logic "1" = 2.4V (min). (4) Adjustable to zero. (5) FSR means Full Scale Range. (6) The error shown is the same as ±1/2LSB max linearity error in % of FSR. (7) Internal clock is externally adjustable. (7) A mean full scale Range. (8) The error shown is the same as ±1/2LSB max linearity error in % of FSR. (7) Internal clock is externally adjustable.



Or, Call Customer Service at 1-800-548-6132 (USA Only)





ORDERING INFORMATION

| MODEL | RESOLUTION (Bits) | TEMPERATURE RANGE | | | |
|------------|-------------------|----------------------|--|--|--|
| ADC84KG-10 | 10 | 0°C to +70°C | | | |
| ADC84KG-12 | 12 | 0°C to +70°C | | | |
| ADC85H-12 | 12 | -25°C to +85°C | | | |
| ADC87H-12 | 12 | -55°C to +125°C | | | |

PACKAGE INFORMATION(1)

| MODEL | PACKAGE | PACKAGE DRAWING NUMBER | | | |
|------------|--------------------|---------------------------|--|--|--|
| ADC84KG-10 | Case Ceramic DIP | 172-5 | | | |
| ADC84KG-12 | Case Ceramic DIP | 172-5 | | | |
| ADC85H-12 | 32-Pin Side-brazed | 172-5 | | | |
| ADC87H-12 | 32-Pin Side-brazed | 172-5 | | | |

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

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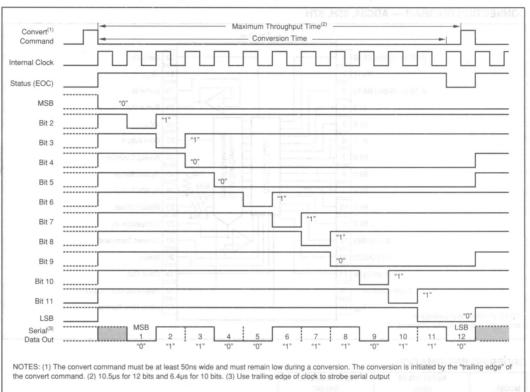


FIGURE 1. Timing Diagram.