8-Bit, Wide Temperature  2.5μS ADCs

FEATURES

• 2.5μS conversion time
• Low Power: 650mW
• Wide temperature range models: -55°C to +125°C operation
• MIL-STD-883 or commercial/industrial processing
• Plug-in replacements for ADC82

DESCRIPTION

The ADC541/542 Series are fast, low power, hybrid IC analog-to-digital converters (ADCs). The series features 8-bit resolution and accuracy with 2.5μS typical conversion time. The lower power drain of 650 mW is from standard ±15 VDC and +5VDC power supplies. All models are hermetically seated in 24-pin DIP style packages and are complete with precision thin-film DAC, clock, comparator reference and successive approximation register.

The ADC541C-8 and ADC542C-8 are processed to commercial/industrial standards and operate −25°C to +85°C. ADC541B-8 and ADC542B-8 are processed to MIL-STD-883 Rev.C, Level B requirements, and operate −55°C to +125°C. In addition, the ADC542 versions are plug-in replacements for the ADC82.

All models can be externally pin-connected for 3 unipolar and 3 bipolar input ranges. Output coding in the bipolar mode is user selectable as either offset binary or 2’s complement. ADC541/542 feature an overall temperature coefficient of ± 45 ppm/°C and long-term stability if 0.1%/year.

ADC541/542 models provide systems designers with greater flexibility savings in space and weight and the ultimate in reliability. Their compact size, 8-bit resolution, accuracy an extensive self-contained features are particularly well suited to microprocessor applications.
SPECIFICATIONS

(Typical @ +25°C and nominal power supplies unless otherwise noted)

SERIES ADC541/542
RESOLUTION 8-Bits
TYPE Successive Approximation
ANALOG INPUT
Unipolar 0 to +5V, 0 to +10V. 0 to +20V
Bipolar ±2.5V, ±5V, ±10V
Impedance 500 kΩ
DIGITAL INPUTS
Start Command Pulse Input 100nS wide, min
Logic "1" > +2.0V;
Logic "0" < -0.8
Logic Loading 2 TTL Loads
Clock in (ADC542 only) 2 TTL Loads
DIGITAL OUTPUTS
Data Coding, ADC541 Parallel Outputs Only
Unipolar Binary
Bipolar 2's Complimentary Offset Binary
Data Coding, ADC542 Parallel and Serial Output
Unipolar Complimentary Binary
Bipolar Complimentary Offset Binary
Data Output Drive Capability 3 TTL Loads
Logic "1" > +2.4V
Logic "0" < 0.4V
Status Output Drive Capability 2 TTL Loads;
Logic "1" during conversion
Clock Out (ADC542 only) Frequency 2.85 MHz
REFERENCE Internal
CONVERSION TIME/THROUGHPUT RATE 2.5µS, typ; 2.8µS max/400 kHz

ACCURACY
Quantization ±1/2 LSB max
Linearity ±0.2% of F.S.R. max
Offset, Unipolar and Bipolar1 ±0.2% of F.S.R. max
Gain1 ±0.2% of F.S.R. max
STABILITY
Over Specified Temperature Range
Linearity ±10ppm/°C
Gain ±40ppm/°C
Offset ±10ppm/°C
Transfer Accuracy2 ±45ppm/°C
Long Term ±0.1%/year @ +25°C

POWER SUPPLY
Requirements +15V ±3%
-15V ±3%
+5V ±5%
Rejection Ratio 0.05%/%/ (+15V); 0.01%/%/ (-15V)
Power Consumption 1W max

TEMPERATURE RANGE
Specified ADC541C/542C 0°C to 70°C
ADC541B/542B -55°C to +125°C
Storage, All Models -65°C to +150°C

MECHANICAL
Case Style Case A (ceramic); ADC542
Case Envelope Dimensions Case B (metal): ADC541

Consult factory for application information.

Pin Assignment

<table>
<thead>
<tr>
<th>ADC541</th>
<th>FUNCTION</th>
<th>PIN</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>BIPOLAR OFFSET</td>
<td>24</td>
<td>+10V INPUT</td>
</tr>
<tr>
<td>2</td>
<td>ANALOG GND</td>
<td>23</td>
<td>+20V INPUT</td>
</tr>
<tr>
<td>3</td>
<td>SUMMING JCT.</td>
<td>22</td>
<td>+15V</td>
</tr>
<tr>
<td>4</td>
<td>ANALOG GND</td>
<td>21</td>
<td>-15V</td>
</tr>
<tr>
<td>5</td>
<td>BIT 1 (MSB)</td>
<td>20</td>
<td>-15V</td>
</tr>
<tr>
<td>6</td>
<td>BIT 2</td>
<td>19</td>
<td>BIT 8 (LSB)</td>
</tr>
<tr>
<td>7</td>
<td>BIT 3</td>
<td>18</td>
<td>BIT 7</td>
</tr>
<tr>
<td>8</td>
<td>BIT 4</td>
<td>17</td>
<td>BIT 6</td>
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<tr>
<td>9</td>
<td>BIT 1 (MSB)</td>
<td>16</td>
<td>BIT 5</td>
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<tr>
<td>10</td>
<td>STATUS</td>
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<td>+5V</td>
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<td>11</td>
<td>DIGITAL GND</td>
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<td>12</td>
<td>DIGITAL GND</td>
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<td>START</td>
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<table>
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<th>ADC542</th>
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<tbody>
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<td>1</td>
<td>CLOCK OUT</td>
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<td>+5V</td>
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<td>DIGITAL GND</td>
<td>23</td>
<td>SRART</td>
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<tr>
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<td>STATUS</td>
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<td>CLOCK IN</td>
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<td>13</td>
<td>GAIN ADJUST</td>
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NOTES
1. Initial offset and gain errors are externally adjustable. See APPLICATIONS INFORMATION.
2. Includes effects of Linearity, offset, and gain errors.

ORDERING INFORMATION

MODEL DESCRIPTION
ADC541C-8 Commercial/Industrial Process
ADC541B-8 MIL-STD-883 Rev. C, Level B Process;
Commercial/Industrial Process
ADC542C-8 ADC82 Pin Out Comp.
ADC82 Pin Out Comp.

Specifications subject to change without notice.