Low Power, 12-Bit CMOS DACs

FEATURES
- 12-bits binary or 3-decades BDC
- Low power: 300mW
- Commercial, industrial and MIL-STD-883 models
- 5 pin selectable output ranges

DESCRIPTION
The DAC349 Series are versatile, low power 12-bit D/A converters that are intended for fixed reference applications. These units combine a novel CMOS switching technique with a precision, ultra-stable thin-film ladder to achieve accurate conversion with low power drain; improved reliability and near-instantaneous warmup are major advantages of reduced power consumption. All models include an internal precision reference and a gain-selectable output amplifier.

The DAC349 Series offers a choice of either 12-bit binary coding (-12 models) or 3 decade BCD coding (-3D models).

By external pin jumpering, the binary models can be connected for unipolar output ranges of 0 to –5V or 0 to –10V and for offset binary coded bipolar outputs of ±2.5V, ±5V and ±10V. For ratiometric applications, the units operate from an external fixed DC reference of –10V ± 10%.

Both binary and BCD models are available in commercial/industrial and MIL-STD-883 Rev. C, Level B versions. The DAC349B is specified over a temperature range of –55°C to +125°C. Both versions operate –55°C to +125°C.

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

**SERIES**
- DAC349

**TYPE**
- Fixed Reference, Voltage Output

**DIGITAL INPUT**
- Resolution: 12 Bits Binary (-12) or 3 Decades BCD (-3D)
- Unipolar Coding: Binary or BCD
- Bipolar Coding: Offset Binary
- Logic Levels
  - Binary: $V_{HI}=2.4V_{min}$, $V_{IL}=0.8V_{max}$
  - BCD: $V_{HI}=3.5V_{min}$, $V_{IL}=1.5V_{max}$
- Input Current: $\pm 1\mu$A max

**ANALOG OUTPUT**
- Voltage Range: 0 to –5V, 0 to –10V
- Current Compliance: $\pm 5mA$ (min)
- Impedance: 0.1
- Scale Factor$^{1}$: $\pm 0.1\%$ of F.S.R. (max)
- Unipolar Offset$^{1}$: $\pm 0.2\%$ of F.S.R. (max)
- Bipolar Offset$^{1}$: $\pm 0.1\%$ of F.S.R. (max)

**REFERENCE**
- Internal$^{2}$: -10V DC
- External (D.C. only): -10V DC ±10% @1mA

**STATIC PERFORMANCE**
- Linearity: $\pm 1/2$ LSB (max)
- Differential Linearity: $\pm 1$ LSB (max)

**DYNAMIC PERFORMANCE**
- Settling Time: 15μS (max)
- Slew Rate: 1V/μS

**STABILITY**
- Accuracy vs Temp.$^{3}$: 30ppm/°C (max)
- Linearity vs Temp.: 5ppm/°C (max)
- Differential Linearity vs Temp.: 2ppm/°C (max)

**POWER SUPPLY**
- Voltage @ Current: $+15V @ 5mA$ (nom); $10mA$ (max)
  - $+13V$ to $+18V$;
  - $-15V @ 15mA$ (nom); $20mA$ (max)
  - $-13V$ to $-18V$;
- Rejection Ratio: 0.005%/%
- Power Consumption: 375mW (max)

**TEMPERATURE RANGE**
- Specified
  - DAC349C: –25°C to +85°C
  - DAC349B: –55°C to +125°C
- Operating, All models: –55°C to +125°C
- Storage, All models: –65°C to +150°C

**MECHANICAL**
- Case Style: Ceramic
- Consult factory for application information.

**NOTES:**
1. Offset and gain are externally adjustable. See APPLICATIONS INFORMATION.
2. For specified overall performance, external loading of the reference output (Pin 8) must not exceed 1.0 mA.
3. Total effect of linearity, offset and gain tempo’s on the transfer characteristics of the unit.
4. In case of discrepancy between package shown in photograph and package outline dimension, the mechanical outline is correct. Specifications subject to change without notice.

**ORDERING INFORMATION**

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<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>DAC349C-12</td>
<td>Comm. 12-Bit, –25°C to +85°C</td>
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<tr>
<td>DAC349C-3D</td>
<td>Comm. 3-Decade, –25°C to +85°C</td>
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<tr>
<td>DAC349B-12</td>
<td>MIL, 12-Bit, –55°C to +125°C</td>
</tr>
<tr>
<td>DAC349B-3D</td>
<td>MIL, 3-Decade, –55°C to +125°C</td>
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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.