

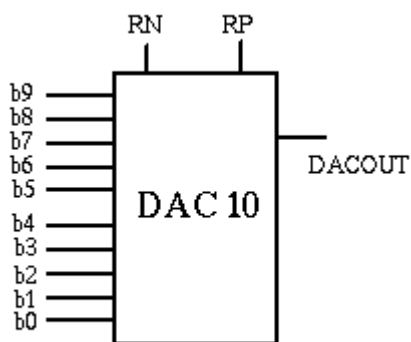
Process

C35 (0.35µm)

Key Features

- Full 10-Bit Resolution and Linearity
- Small Area 0.032 mm²
- Size x = 167µm, y = 193µm
- Supply Voltage 3.3V ± 10%
- Only Single Power Supply Required

Symbol



General Description

DAC10 is a 10-Bit digital to analog converter.

Functional Description

The architecture is based on two resistor dividers. Because of its high output impedance, which is also code dependent, it must be used together with a low offset operational amplifier at the output (e.g. OP05B). VRN and VRP must be within the common mode range of the opamp (e.g. between 0.8V and 2.4V).

Pinlist

Pin	Description	Cap.
RP	Positive Reference Voltage	
RN	Negative Reference Voltage	
DACOUT	Analog Output	
b<9:0	Data Input b(0) = LSB	

POWER SUPPLIES

The converter requires one power supply (vdda, gnd).

TECHNICAL DATA FOR 5V SUPPLY

($T_{\text{junction}} = 0$ to $+85^{\circ}\text{C}$, $V_{\text{DDA}} = 3.3\text{V} \pm 10\%$, unless otherwise specified)

GENERAL PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
	Resolution		10			Bit
V_{in}	Input Voltage Range		VSS		VDD	V
DNL	Differential Nonlinearity	VRP = 2.4V VRN = 0.8V VDD = 3.3V temp = 25°C		± 0.25		LSB
INL	Integral Nonlinearity	VRP = 2.4V VRN = 0.8V VDD = 3.3V temp = 25°C		± 0.5		LSB
V_{os}	Input Offset Voltage	VRP = 2.4V VRN = 0.8V VDD = 3.3V temp = 25°C		± 0.25		LSB
R_{ref}	Reference Impedance		6.2	8	9.8	kOhms
V_{dd}	Power Supply Range		3.0	3.3	3.6	V
I_{dd}	Power Supply Current			0.13 ¹⁾		mA
P_{Vdd}	Power Consumption			0.13 ¹⁾		mW
R_{out}	Output Resistance			21 ²⁾		kOhms

¹⁾ $V_{\text{refp}} - V_{\text{refn}} = 1\text{V}$

²⁾ Middle of the resistor string; Code: 01 1111 0111
(output resistance is code-dependent)
 I_{dd} includes the current through the resistor string

TRANSIENT PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T _s	Settling Time	3.3V, 25°C C _{load} = 30pF	<1			μs

Output Code	Input Voltage
00 0000 0000	VRN...1LSB
00 0000 0001	1...2LSB
00 0000 0010	2...3LSB
...	...
11 1111 1111	1023LSB...VRP

$$V_{out} = (VRP - VRN) / 1024 * code_{in} + VRN$$

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