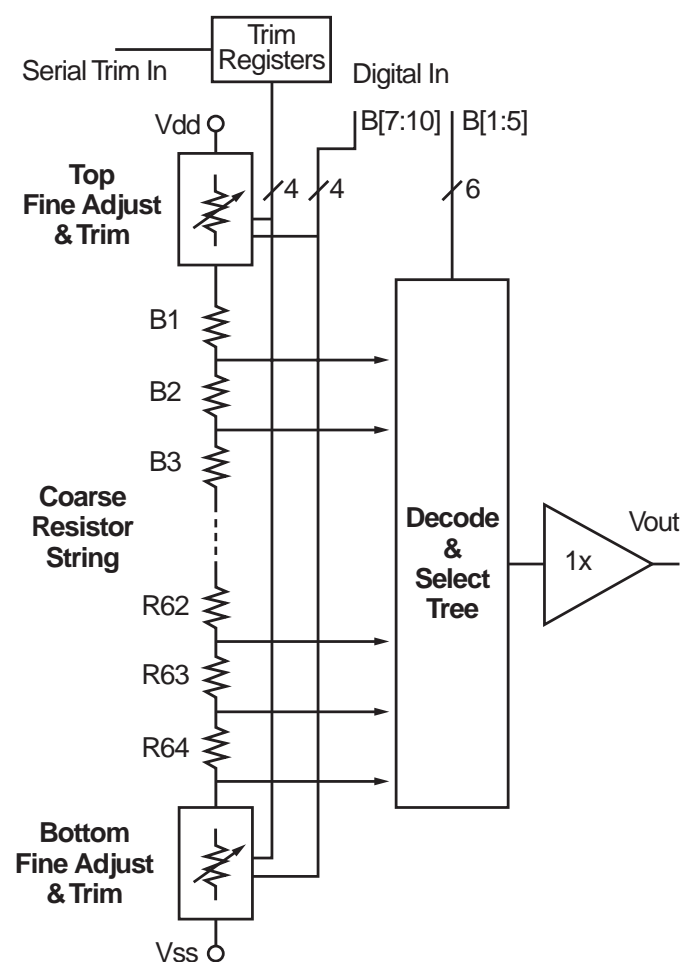


Features

- High resolution, single 10-Bit DAC
- High speed, 100 MSPS
- On-chip trim circuitry
- Low input capacitance, < 1pF
- Guaranteed monotonic by design
- On-Chip Output Buffer Amplifier
- Standard CMOS interface

Functional Block Diagram



Notes: Digital Input
Fine Adjust and Trim
Coarse Resistor String
Trim Registers
Decode and Select Tree
1X Buffer
VOUT
VDD, VSS

General Description

The DAC10R03 is a single, 10-bit, Modified Resistor String DAC that operates from a single +4.5 V to +5.5 V supply. Power dissipation is only 20 mW with 5V supplies. The part is fabricated on a 0.6μ CMOS process. Its on-chip precision output amplifier allows a typical full-scale range of 2.5V to be achieved.

The DAC10R03 utilizes 64 coarse resistors and fine-adjust circuitry to achieve 10-bit dc accuracy. At the maximum output update rate of 100 MSPS, 8-bit accuracy is guaranteed.

The output buffer consists of a new high-speed, low-offset fixed-gain amplifier design that is capable of driving capacitive loads as large as 0.4pF at 100 MSPS.

Applications

- High-speed data conversion
- Instrumentation
- Transmitter modulator
- T1 / E1 applications
- High-speed LAN / WAN
- HDSL transmitter

Product Highlights

- Low power, single supply operation. This part operates from a single +4.5 V to +5.5 V supply.
- The on-chip output buffer amplifier allows the output of the DAC to swing 2.5V and drive 0.4pF at 100 MSPS.
- Operates on a single +4.5V to +5.5V supply.

DAC10R03

+4.5V TO +5.5V, 10-Bit 100 MSPS Modified Resistor String DAC



DAC/ADC

AMI 0.6 micron CMOS

Electrical Characteristics

PARAMETER	MIN	TYP	MAX	UNITS
RESOLUTION	10			Bits
DC ACCURACY				
Integral Linearity Error (INL)	-1	+/- 0.5	+1	LSB
Differential Nonlinearity (DNL)	-0.5	+/- 0.1	+0.5	LSB
MONOTONICITY	Guaranteed over specified temperature range			
ANALOG OUTPUT				
Offset Error	-0.05		+0.05	% of FSR
Gain Error	-0.5	0.15	+0.7	% of FSR
Output Resistance	0.026	0.04	0.6	k Ω
Output Capacitance		0.2		pF
TEMPERATURE COEFFICIENTS				
Offset Drift		+/- 0.5		ppm of FSR/ $^{\circ}$ C
Gain Drift		+/- 10		ppm of FSR/ $^{\circ}$ C
POWER SUPPLY				
Supply Voltages				
AVDD	4.5	5	5.5	V
DVDD	4.5	5	5.5	V
Analog Supply Current (IAVDD)		2		mA
Digital Supply Current (IDVDD) @ 50 MSPS		0.5		mA
Power Dissipation @ 100 MSPS		TBD		mW
Power Dissipation, static		10		mW
Power Supply Rejection Ratio	-0.1		+0.1	% of FSR/V
OPERATING RANGE	0	27	85	$^{\circ}$ C
DYNAMIC PERFORMANCE				
Maximum Output Update Rate (fCLOCK)	100			MSPS
Output Settling Time to 0.1% ¹		8		ns
Output Propagation Delay		1		ns
Glitch Impulse [1]		100		pV-s
Output Rise Time (10% to 90%) ¹		5		ns
Output Fall Time (10% to 90%) ¹		5		ns
Output Noise		10		nV/(Hz ^{1/2})
AC LINEARITY				
Spurious-Free Dynamic Range (SFDR)				
fCLOCK = 100 MSPS; fOUT = 2 MHz	>72			dBc
fCLOCK = 100 MSPS; fOUT = 20 MHz	>60			dBc
Total Harmonic Distortion (THD)			<-60	dBc

Electrical Characteristics

PARAMETER	MIN	TYP	MAX	UNITS
DIGITAL INPUTS				
Logic "1" Voltage	3.5	5		V
Logic "0" Voltage		0	1.3	V
Logic "1" Current	-10		10	uA
Logic "0" Current	-10		10	uA
Input Capacitance		0.02		pF
Input Setup Time		0.4		ns
Input Hold Time		0.4		ns
Latch Pulse Width		0.5		ns

Absolute Maximum Ratings

PARAMETER	WITH RESPECT TO	TYP	MAX	UNITS
AVDD (Analog Supply Voltage)	ACOM			V
DVDD (Digital Supply Voltage)	DCOM			V
ACOM (Analog Common)	DCOM			V
AVDD (Analog Supply Voltage)	DVDD			V
CLOCK, SLEEP	DCOM			V
Digital Inputs (Common)	DCOM			V
Junction Temperature				°C
Storage Temperature				°C
Lead Temperature (10 sec)				°C

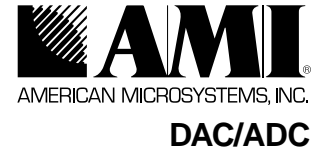
Specific Output Buffer Performance: W/ 0.4 pF load

PARAMETER	WITH RESPECT TO	TYP	MAX	UNITS
3dB Bandwidth	168	260	383	MHz
Settling Time to 1% accuracy	5	7	10	ns
Output Swing to .5% accuracy	67	75	82	% of Vdd
Output Noise		10		nV/(Hz ^{1/2})
Input Capacitance		0.02		pF

Notes: ¹ Measured with a 40 mV step @ Vout at 2.5 V

DAC10R03

+4.5V TO +5.5V, 10-Bit 100 MSPS Modified Resistor String DAC



AMI 0.6 micron CMOS

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GA98094PM8/98