

T-51-09-16



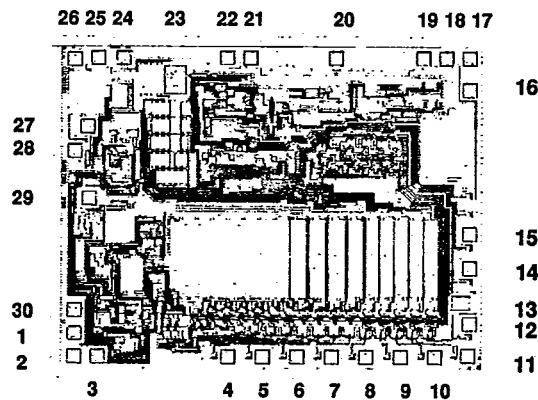
DAC703 DIE

Current Output 16-BIT DIGITAL-TO-ANALOG CONVERTER DIE

FEATURES

- HIGH ACCURACY
- MONOTONIC AT 14 BITS OVER FULL MILITARY TEMPERATURE RANGE

DIE TOPOGRAPHY



PAD	FUNCTION	PAD	FUNCTION
1	Bit 1 (MSB) Input	16	Bit 15 Input
2	Bit 2 Input	17	Bit 16 Input
3	Bit 3 Input	18	$R_{FB} - 10k\Omega$
4	Bit 4 Input	19	Voltage Output
5	Bit 5 Input	20	$R_{FB} - 10k\Omega$
6	Bit 6 Input	21	+5V Supply
7	Bit 7 Input	22	Digital Ground
8	Bit 8 Input	23	Analog Ground
9	Bit 9 Input	24	Current Output
10	Bit 10 Input	25	Bipolar Offset
11	Bit 11 Input	26	Gain Adjust
12	Bit 12 Input	27	+15V Supply
13	-15V Supply	28	Reference Output
14	Bit 13 Input	29	-15V Supply
15	Bit 14 Input	30	Zener test point. Do not use.

Die size: 153 x 120 mils
 Bonding pad size: 4 x 4 mils
 Backside contact: gold

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PDS-912

DESCRIPTION

The DAC703AD is a complete 16-bit digital-to-analog converter that includes a buried-zener voltage reference and a low-noise, fast-settling output operational amplifier on one small monolithic chip. A combination of current-switch design techniques accomplishes not only 14-bit monotonicity over the entire specified temperature range but also a maximum end-point linearity error of $\pm 0.003\%$ of full-scale range (at $+25^\circ\text{C}$). Differential linearity at $+25^\circ\text{C}$ is 0.006% of FSR.

Digital inputs are complementary binary coded and are TTL-, LSTTL-, 54/74C- and 54/74HC-compatible over the entire temperature range. Outputs of 0mA to -2mA and $\pm 1\text{mA}$ are available.

VISUAL

DAC703AD dice are visually inspected to MIL-STD-883, Method 2010, Test Condition B (AD, AD/LAT, SD, and MD-B) or Condition A (MD-S).

DAC703MD-S wafer lots are visually inspected to MIL-STD-883, Method 2018 (SEM Inspection of Metallization).

PACKAGING

Dice are packaged face-up in individually compartmented antistatic plastic carriers (waffle packs) and may be oriented for automated assembly. Carriers are heat-sealed in plastic bags with a dry atmosphere.

MARKING

Each die carrier is marked with:

1. Burr-Brown part number
2. Lot number
3. Wafer number
4. QA Seal and date
5. Quantity
6. QC identification number
7. Date code

If required, the customer part number and order number can be marked on each package.

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SPECIFICATIONS

ELECTRICAL LIMITS

At $T_A = +25^\circ\text{C}$; $\pm V_{CC} = \pm 15\text{VDC}$, unless otherwise specified

PARAMETERS	CONDITIONS	DAC703AD/SD (1)			DAC703AD/LAT, MD-B, -S (2)			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
INPUTS								
Resolution (3)				16			16	Bits
V_{OH}		+2.4		$+V_{CC}$	+2.4		$+V_{CC}$	V
V_{OL}		-1.0		+0.8	-1.0		+0.8	V
I_{OH}	$V_O = +2.7\text{V}$			+40			+40	μA
I_{OL}	$V_O = +0.4\text{V}$			-0.5			-0.5	mA
ACCURACY								
Linearity Error	$T_A = +25^\circ\text{C}$			± 0.003			± 0.004	%FSR
	$T_A = -55^\circ\text{C}, +125^\circ\text{C}$			± 0.008			± 0.01	%FSR
Diff. Lin. Error	$T_A = +25^\circ\text{C}$			± 0.006			± 0.007	%FSR
	$T_A = -55^\circ\text{C}, +125^\circ\text{C}$	-0.006		+0.009			± 0.01	%FSR
Gain Error	$T_A = +25^\circ\text{C}$			± 0.1			± 0.15	%FSR
Zero Error	$T_A = +25^\circ\text{C}$			± 0.1			± 0.15	%FSR
DRIFT								
Gain Drift	$T_A = -55^\circ\text{C}, +125^\circ\text{C}$			± 20			± 20	ppm/ $^\circ\text{C}$
Zero Error	$T_A = -55^\circ\text{C}, +125^\circ\text{C}$			± 15			± 15	ppm/ $^\circ\text{C}$
OUTPUT								
Output Voltage			± 10			± 10		V
Output Current								mA
Reference Voltage	$T_A = -55^\circ\text{C}, +125^\circ\text{C}$	± 6		± 6.6	± 6		± 6.6	V
POWER SUPPLY								
Quiescent Current	$\pm V_{CC}, T_A = -55^\circ\text{C}, +125^\circ\text{C}$			± 25			± 30	mA
	$\pm V_{DD}, T_A = -55^\circ\text{C}, +125^\circ\text{C}$			± 6			± 8	mA
Power Supply Rej	$\Delta \pm V_{CC} = \pm 1\text{V}$			± 4			± 4	mV/V
	$\Delta +V_{DD} = \pm 1\text{V}$			± 4			± 4	mV/V

NOTES: 1) Electrical Probe Limits — All dice are 100% probe tested to the specification limits listed. Due to possible wafer saw and assembly shifts, parameters are not guaranteed for assembled units. (2) Guaranteed Limits — Specification Limits are guaranteed for a sample plan of 10^{10} when die sample is prepared in the following manner: die attached eutectically to a 24-pin side braze package, wirebonded with 1-mil (.001 inches) aluminum wire, and sealed in nitrogen atmosphere resulting in an internal water vapor content of less than 5,000ppm. (3) 1 LSB = 0.305mV.

DAC703 DIE

ABSOLUTE MAXIMUM RATINGS

Supply V_{CC}	$\pm 18V$
Supply V_{DD}	0V to +18VDC
Digital Data Input Voltage	-1.0VDC to +7VDC
Storage Temperature Range	-65°C to +150°C
D/A Output Short-Circuit Duration	Continuous
Reference Output Short-Circuit Duration	Continuous
Junction Temperature	+175°C

ORDERING INFORMATION T-51-09-16

	DAC703	(A,S,M)	D	(LAT,-B,-S)
Basic Model Number	_____			
Grade Temperature Range	_____			
A =	-25°C to +85°C			
S =	-55°C to +125°C			
M =	-55°C to +125°C			
Package Code	_____			
D =	Die			
Screening Option	_____			
/LAT =	Lot Acceptance Testing (A grade only)			
-B =	MIL-STD-883, Method 5008, Class B Compliant (M grade only)			
-S =	MIL-STD-883, Method 5008, Class S Compliant (M grade only)			