



# DAC-06/883

## TWO'S-COMPLEMENT 10-BIT VOLTAGE-OUTPUT D/A CONVERTER

Precision Monolithics Inc.

### 1.0 SCOPE

This specification covers the detail requirements for a complete 10-bit two's complement digital-to-analog converter.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace spec control drawings.

### 1.2 Part Number. The complete part numbers per Table I of this specification follow:

<u>Device</u>	<u>Part Number</u>	<u>Package</u>
B	DAC-06BX/883	X

### 1.2.3 Case Outline.

<u>Letter</u>	<u>Case Outline (Lead finish per MIL-M-38510)</u>
X	18-lead ceramic dual-in-line package (CERDIP)

### 1.3 Absolute Maximum Ratings. ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

Operating Temperature Range .....	-55°C to +125°C
DICE Junction Temperature Range ( $T_J$ ) .....	-65°C to +150°C
Storage Temperature Range .....	-65°C to +150°C
Internal Power Dissipation .....	500mW
Lead Temperature (Soldering, 60 sec).....	+300°C
V+ Supply to Analog Ground .....	0 to +18V
V- Supply to Analog Ground .....	0 to -18V
Analog Ground to Digital Ground.....	0 to $\pm 0.5\text{V}$
Logic Inputs to Digital Ground.....	-5V to ( $V+ - 0.7\text{V}$ )
Reference Input Voltage .....	0 to +10V
Bipolar Offset Input Voltage .....	0 to +10V
Internal Reference Output Current .....	300 $\mu\text{A}$
Output Short-Circuit Duration .....	Indefinite
(Short circuit may be to ground or either supply)	

### 1.5 Thermal Characteristics:

Thermal Resistance, CERDIP (X) package:

Junction-to-Case ( $\theta_{JC}$ ) = 35°C/W MAX

Junction-to-Ambient ( $\theta_{JA}$ ) = 120°C/W MAX

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**TABLE 1**

$V_S = \pm 15V$ ;  $-55^\circ C \leq T_A \leq +125^\circ C$  unless otherwise specified.

Characteristics	Symbol	Special Conditions	DAC-06/883		Units
			LIMITS B		
			Min	Max	
Supply Current	I+		-	10	mA
	I-		-	-10	mA
Full-Range Output Voltage (Unipolar)	$V_{FR}$	Connect Pin 15 to Pin 17 $R_L = 2k\Omega$	10	11.5	V
Bipolar Output Voltage	$V_{FR}^+$		5	5.75	V
	$V_{FR}^-$		-5.75	-5	V
Unipolar Zero-Scale Output	$V_{ZS}$	Short Pin 18 to ground	-	$\pm 10$	mV
		Short Pin 18 to ground $T_A = +25^\circ C$	-	$\pm 5$	mV
Bipolar Offset Voltage	BPOFF	Connect Pins 15, 17, and 18	-5	2.5	%Range
Logic Input "1"	$V_{IH}$		2	-	V
Logic Input "0"	$V_{IL}$		-	0.8	V
Power Supply Sensitivity	PSS	$V_S = \pm 12V$ to $\pm 18V$	-	$\pm 0.1$	$\%V_{FS}/V$
		$V_S = \pm 12V$ to $\pm 18V$ ; $T_A = +25^\circ C$	-	$\pm 0.05$	$\%V_{FS}/V$
Logic Input Current	$I_{IN}$	Each input; -5V to (V+ - 0.7V)	-	$\pm 10$	$\mu A$
Monotonicity			9	-	Bits
Average Nonlinearity	NL	$T_A = +25^\circ C$	-	$\pm 0.3$	%FS
			-	$\pm 0.2$	%FS
Full Scale Tempco	$TCV_{FS}$	Total internal REF connected	-	$\pm 90$	ppm/ $^\circ C$
Power Dissipation	$P_d$	(Note 1)	-	300	mW

NOTES:

1. Power dissipation ( $P_d$ ) guaranteed by supply current testing.



**TABLE 2**

**DAC-06/883**

**Electrical Test Requirements  
For Class B Devices**

MIL-STD-883 Test Requirements	Subgroups (see Table 3)
Interim Electrical Parameters (pre Burn-In)	1
Final Electrical Test Parameters	1*, 2, 3
Group A Test Requirements	1, 2, 3

\* PDA applies to Subgroup 1 only.  
No other Subgroups are included in PDA.



**TABLE 3**

**Group A Inspection**

$V_S = \pm 15V$  unless otherwise specified.

Subgroup	Symbol	Special Conditions	DAC-06/883		Units
			LIMITS B		
			Min	Max	
Subgroup 1  $T_A = +25^\circ C$	I+		--	10	mA
	I-		--	-10	mA
	$V_{FR}$	Connect Pin 15 to Pin 17 $R_L = 2k\Omega$	10	11.5	V
	$V_{FR}^+$		5	5.75	V
	$V_{FR}^-$		-5.75	-5	V
	$V_{ZS}$	Short Pin 18 to ground	--	$\pm 5$	mV
	BPOFF	Connect Pins 15, 17 and 18	-5	2.5	%Range
	$V_{IH}$		2	--	V
	$V_{IL}$		--	0.8	V
	PSS	$V_S = \pm 12V, \pm 18V$	--	$\pm 0.05$	$\%V_{FS}/V$
	$I_{IN}$	Each input, -5V, ( $V^+ - 0.7V$ )	--	$\pm 10$	$\mu A$
	Monotonicity		9	--	Bits
	NL		--	$\pm 0.2$	%FS
Subgroup 2  $T_A = +125^\circ C$	I+		--	10	mA
	I-		--	-10	mA
	$V_{FR}$	Connect Pin 15 to Pin 17 $R_L = 2k\Omega$	10	11.5	V



**TABLE 3**

**Group A Inspection**

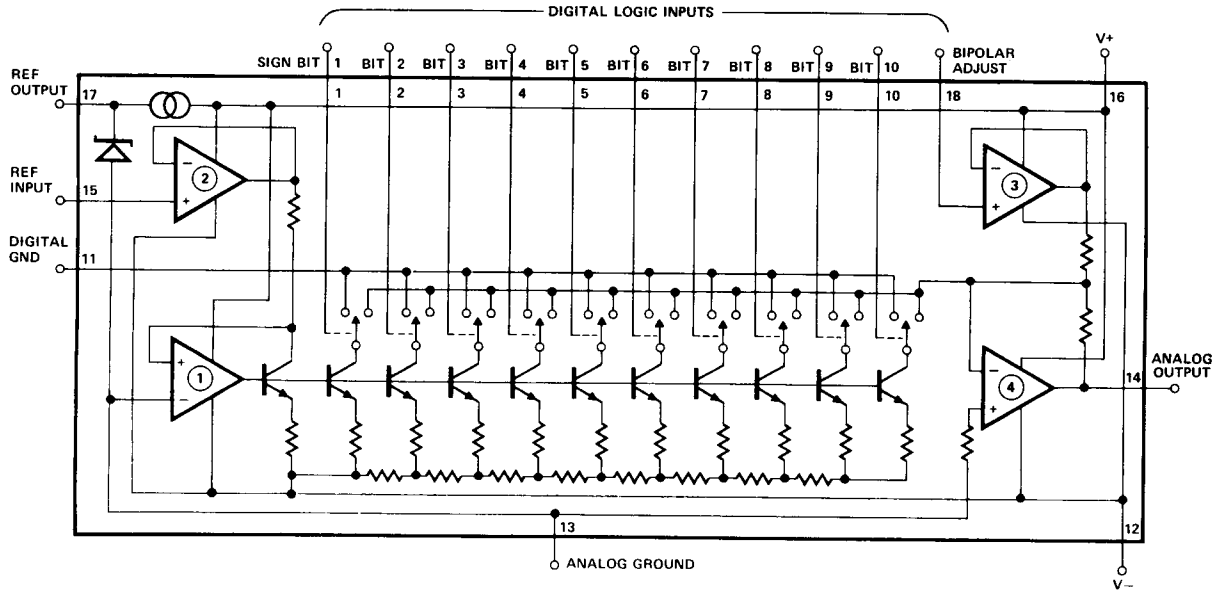
$V_S = \pm 15V$  unless otherwise specified.

Subgroup	Symbol	Special Conditions	DAC-06/883		Units
			LIMITS B		
			Min	Max	
Subgroup 2	$V_{FR}^+$		5	5.75	V
$T_A = +125^\circ C$	$V_{FR}^-$		-5.75	-5	V
(Continued)	$V_{ZS}$	Short Pin 18 to ground	-	$\pm 10$	mV
	BPOFF	Connect Pins 15, 17 and 18	-5	2.5	%Range
	$V_{IH}$		2	-	V
	$V_{IL}$		-	0.8	V
	PSS	$V_S = \pm 12V, \pm 18V$	-	$\pm 0.1$	$\%V_{FS}/V$
	$I_{IN}$	Each input, -5V, ( $V^+ - 0.7V$ )	-	$\pm 10$	$\mu A$
	Monotonicity		9	-	Bits
	NL		-	$\pm 0.3$	%FS
	$TCV_{FS}$	Total internal REF connected	-	$\pm 90$	ppm/ $^\circ C$
Subgroup 3	All Tests, Limits and Conditions are the same as for Subgroup 2.				
$T_A = -55^\circ C$					

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**3.2.1 Simplified Schematic and Pin Connections.**



SIGN BIT 1	1	18	BIPOLAR ADJUST
BIT 2	2	17	REFERENCE OUTPUT
BIT 3	3	16	POSITIVE POWER SUPPLY
BIT 4	4	15	REFERENCE INPUT
BIT 5	5	14	ANALOG OUTPUT
BIT 6	6	13	ANALOG GROUND
BIT 7	7	12	NEGATIVE POWER SUPPLY
BIT 8	8	11	DIGITAL GROUND
BIT 9	9	10	BIT 10 LSB

**18-PIN DIP  
(X-Suffix)**



**3.2.4 Microcircuit Group Assignment.** This microcircuit is covered by microcircuit group 56.

**4.2 Life Test/Burn-In Circuit.**

