

### 1.1 Scope.

This specification covers the detail requirements for a monolithic CMOS 10-bit multiplying digital-to-analog converter with an input buffer and a holding register, allowing direct interface with microprocessors.

### 1.2 Part Number.

The complete part number per Table 1 of this specification is as follows:

Device	Part Number
-1	AD7522SQ/883B
-2	AD7522TQ/883B
-3	AD7522UQ/883B

### 1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline: Q-28

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

$V_{REF}$ to GND	$\pm 25\text{V}$
$V_{DD}$ to DGND	0V, +17V
$V_{CC}$ to GND	$\pm 17\text{V}$
$V_{CC}$ to $V_{DD}$	$\pm 0.4\text{V}$
Output Voltage (Pins 6 and 7)	-0.3V, $V_{DD}$
Digital Input Voltage Range	$V_{DD}$ to GND
Power Dissipation	
Up to $+50^\circ\text{C}$	1000mW
Derates above $+75^\circ\text{C}$	10mW/ $^\circ\text{C}$
Operating Temperature Range	$-55^\circ\text{C}$ to $+125^\circ\text{C}$
Storage Temperature Range	$-65^\circ\text{C}$ to $+150^\circ\text{C}$

### 1.5 Thermal Characteristics.

Thermal Resistance  $\theta_{JC} = 35^\circ\text{C}/\text{W}$   
 $\theta_{JA} = 120^\circ\text{C}/\text{W}$

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Test	Symbol	Device	Design Limit $T_{min}-T_{max}$	Sub Group 1	Sub Group 2, 3	Sub Group 4	Test Condition <sup>1</sup>	Units
Resolution	RES	-1, 2, 3	10				SC8 = "1"	Bits
Nonlinearity	NL	-1 -2 -3	2 1 1/2	2 2 2	2 1 1/2	1 1/2		± LSB max
Nonlinearity Tempco	TC <sub>NL</sub>	-1, 2, 3	2					± ppm/°C max
Gain Tempco	TC <sub>GA</sub>	-1, 2, 3	30					± ppm/°C max
Output Leakage Current Pin 6 Pin 7	I <sub>OUT1</sub> I <sub>OUT2</sub>	-1, 2, 3 -1, 2, 3	200 200	200 200	200 200		DB0 thru DB9 = 0 DB0 thru DB9 = 1	± nA max ± nA max
Feedthrough Error	FT	-1, 2, 3	10				V <sub>REF</sub> = 20V p-p, 10kHz @ +25°C	mV p-p max
Reference Input Resistance	R <sub>IN</sub>	-1, 2, 3	5 20	5 20	5 20			kΩ min kΩ max
Digital Input High Voltage	V <sub>IH</sub>	-1, 2, 3	2.4 13.5	2.4 13.5	2.4 13.5		V <sub>CC</sub> = +5V V <sub>CC</sub> = +15V	V min V min
Digital Input Low Voltage	V <sub>IL</sub>	-1, 2, 3	0.8 1.5	0.8 1.5	0.8 1.5		V <sub>CC</sub> = +5V V <sub>CC</sub> = +15V	V max V max
LDAC Pulse Width	t <sub>LD</sub>	-1, 2, 3	500				LDAC: 0 to +3V	ns min
HBS, LBS Pulse Width	t <sub>BS</sub>	-1, 2, 3	500				HBS, LBS: 0 to +3V	ns min
Serial Clock Frequency	f <sub>CLK</sub>	-1, 2, 3	1					MHz max
HBS, LBS Data Setup <sup>2</sup>	t <sub>DS</sub>	-1, 2, 3	250					ns min
Data Hold Time <sup>3</sup>	t <sub>DH</sub>	-1, 2, 3	500					ns min
Supply Current from V <sub>DD</sub>	I <sub>DD</sub>	-1, 2, 3	2	2	2		In Quiescent State at +25°C All Logic Input V <sub>IL</sub> or V <sub>IH</sub> .	mA max
Supply Current from V <sub>CC</sub>	I <sub>CC</sub>	-1, 2, 3	2	2	2		In Quiescent State at +25°C All Logic Input V <sub>IL</sub> or V <sub>IH</sub> .	mA max

## NOTES

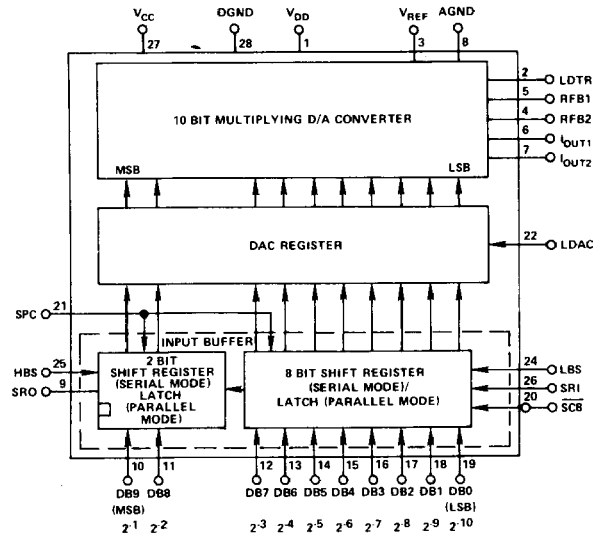
<sup>1</sup>V<sub>DD</sub> = +15V; V<sub>CC</sub> = +5V, V<sub>REF</sub> = +10V unless otherwise stated.

<sup>2</sup>Data setup time is the minimum amount of time required for DB0-DB9 to be stable prior to strobing HBS, LBS.

<sup>3</sup>Data hold time is the minimum amount of time required for DB0-DB9 to be stable after strobing HBS, LBS.

Table 1.

### 3.2.1 Functional Block Diagram and Terminal Assignments.

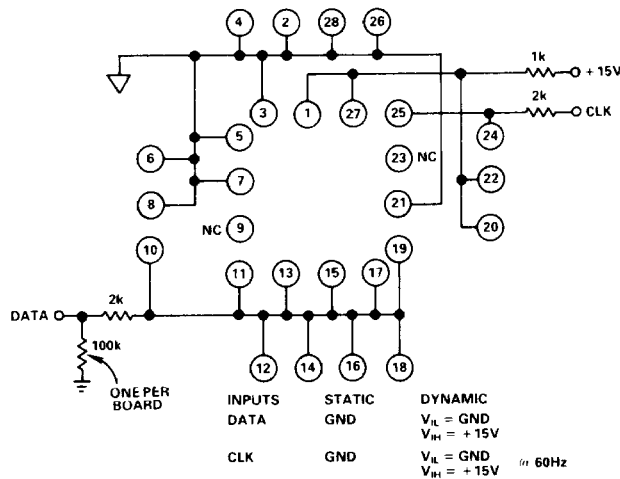


### 3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (80).

### 4.2.1 Life Test/Burn-In Circuit.

Steady state life test is per MIL-STD-883 Method 1005. Burn-in is per MIL-STD-883 Method 1015 test condition (B).



NOTE:  
IF CLK INPUT IS USED, THEN DATA INPUT MAY BE TIED TO GROUND OR TO +15V. OR MAY BE EXERCISED DYNAMICALLY BY PRESENTING A LOGIC DIVISION BY TWO OF THE CLK INPUT.

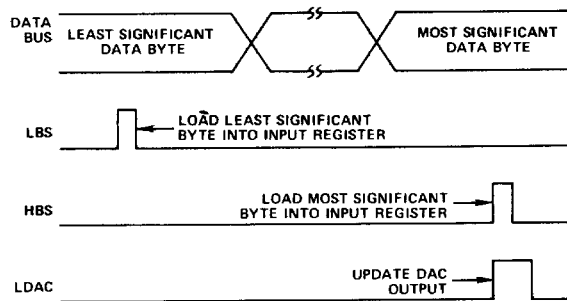


Figure 1. Timing Diagram

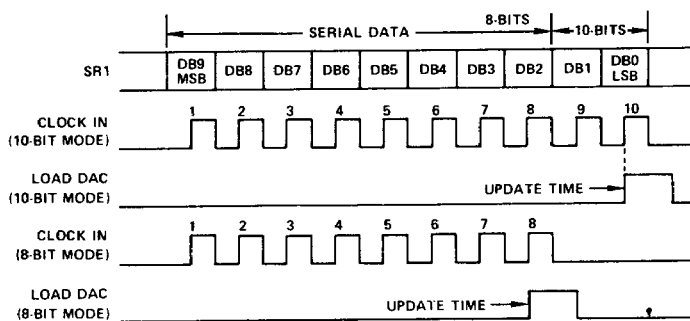


Figure 2. Timing Diagram for Serial 8- and 10-Bit Loading