

**1.1 Scope.**

This specification covers the detail requirements for Class B microcircuits in accordance with 1.2.1 of MIL-STD-883, provisions for the use of MIL-STD-883 in conjunction with complaint non-JAN devices. The device is a 40 MHz Monolithic 256 × 24 Color Palette RAM-DAC.

**1.2 Part Number.**

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

Device	Part Number
-1	ADV453TQ/883B
-2	ADV453TE/883B

**1.2.3 Case Outline.**

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

(X)	Package	Description	Lead Finish
Q	Q-40	40-Lead Dual-In-Line Package	Hot Solder DIP
E	E-44A	44-Lead LCC	Hot Solder DIP

**1.3 Absolute Maximum Ratings.**

Supply Voltage ( $V_{AA}$ )	+7.0 V
Digital Input Voltage ( $V_{IN}$ ) to AGND	-0.5 V to $V_{AA} + 0.5$ V
Analog Output Short Circuit Duration to Any Power Supply or Common	Indefinite
Power Dissipation	1575 mW
Storage Temperature	-65°C to +150°C
Lead Temperature (Soldering 10 sec)	+300°C
Junction Temperature	+175°C

**1.5 Thermal Characteristics.**

Thermal Resistance $\theta_{JC}$	= See MIL-M-38510 Appendix C
$\theta_{JA}$	= 120°C/W for Q
$\theta_{JA}$	= 50°C/W for E

# ADV453—SPECIFICATIONS

Table 1.

Test	Symbol	Limit		Group A Subgroups	Conditions <sup>1</sup> ( $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ unless otherwise noted)	Units
		Min	Max			
Resolution (Each DAC)		8.0	8.0	4		Bits
Relative Accuracy (Each DAC)	$I_L$		$\pm 2$	1, 2, 3	Conversion Rate is 1 MHz	LSB
Integral Nonlinearity			$\pm 1$	1, 2, 3		LSB
Differential Nonlinearity	$D_L$					
Gray Scale Error			$\pm 5$	1, 2, 3	White Level Relative to Blank	% Gray Scale
Digital Input High Voltage	$V_{IH}$	2.4		7, 8		V
Digital Input Low Voltage	$V_{IL}$		0.8	7, 8		V
Digital Input Current	$I_{IN}$		10	1, 2, 3	$V_{IN} = 0\text{ V or }V_{AA}$	$\mu\text{A}$
Digital Input Capacitance <sup>2</sup>	$C_{IN}$		10	4		pF
Digital Output High Voltage	$V_{OH}$	2.4		1, 2, 3	$I_{SOURCE} = 400\ \mu\text{A}$	V
Digital Output Low Voltage	$V_{OL}$		0.4	1, 2, 3	$I_{SINK} = 3.2\ \text{mA}$	V
Floating State Output Current	$I_{OZ}$		10	1, 2, 3	$V_{IN} = 0\text{ V or }V_{AA}$	$\mu\text{A}$
Floating State Output Capacitance <sup>2</sup>	$CD_{OUT}$		20	4		pF
Gray Scale Current Range		15	22	1, 2, 3		mA
Output Current						
White Level Relative to Blank		17.69	20.40	1, 2, 3		mA
White Level Relative to Black		16.74	18.50			
Black Level Relative to Blank		0.95	1.90			
Blank Level on IOR, IOB		0	50	1, 2, 3		$\mu\text{A}$
Blank Level on IOG		6.29	8.96			mA
Sync Level on IOG		0	50			$\mu\text{A}$
DAC to DAC Matching			6	1, 2, 3	White Level Relative to Blank	%
Output Compliance <sup>3</sup>	$V_{OC}$	-1.0	1.4	1, 2, 3		V
Output Capacitance <sup>2</sup>	$CA_{OUT}$		40	4	$I_{OUT} = 0\ \text{mA}$	pF
Voltage Reference Range <sup>3</sup>		1.14	1.26	1, 2, 3		V
Power Supply Current	$I_{AA}$		300	1, 2, 3		mA
Power Supply Rejection Ratio (White Level Relative to Black)	PSRR		30	1, 2, 3	$V_{AA} = 5.0\ \text{V}$ $\Delta V_{AA} = +5\% \text{ or } -5\%$ (0.5 V 1 kHz Sinewave Applied to $V_{AA}$ )	dB
$\overline{CS}$ C0, C1 Setup Time	$t_1$	35		9, 10, 11		ns
$\overline{CS}$ C0, C1 Hold Time	$t_2$	35		9, 10, 11		ns
$\overline{RD}$ , $\overline{WR}$ High Time	$t_3$	25		9, 10, 11		ns
$\overline{RD}$ Assert to Data Bus Driven	$t_4$	2		9, 10, 11		ns
$\overline{RD}$ Assert to Data Valid	$t_5$		100	9, 10, 11		ns
$\overline{RD}$ Negated to Data Bus Three Stated	$t_6$		20	9, 10, 11		ns
$\overline{RD}$ , $\overline{WR}$ Low Time	$t_7$	50		9, 10, 11		ns

Test	Symbol	Limit		Group A Subgroups	Conditions <sup>1</sup> (-55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise noted)	Units
		Min	Max			
Write Data Setup Time	t <sub>8</sub>	35		9, 10, 11		ns
Write Data Hold Time	t <sub>9</sub>	10		9, 10, 11		ns
Pixel and Control Setup Time	t <sub>10</sub>	7		9, 10, 11		ns
Pixel and Control Hold Time	t <sub>11</sub>	3		9, 10, 11		ns
Clock Cycle Time <sup>3</sup>	t <sub>12</sub>	25		9, 10, 11		ns
Clock Pulse Width High Time	t <sub>13</sub>	7		9, 10, 11		ns
Clock Pulse Width Low Time	t <sub>14</sub>	7		9, 10, 11		ns
Analog Output Delay	t <sub>15</sub>		30	9, 10, 11	CLK = 4 MHz	ns
Analog Output Rise/Fall Time	t <sub>16</sub>		8	9, 10, 11	CLK = 4 MHz	ns
Pipeline Delay <sup>3</sup>	t <sub>PD</sub>		2 × t <sub>12</sub>	9, 10, 11		ns
Analog Output Skew	t <sub>SK</sub>		2	9, 10, 11	CLK = 4 MHz	ns

**NOTES**

<sup>1</sup>V<sub>AA</sub> = +4.75 V to +5.25 V, V<sub>REF</sub> = 1.235 V, R<sub>SET</sub> = 280 Ω, I<sub>SYNC</sub> connected to IOG, unless otherwise specified.

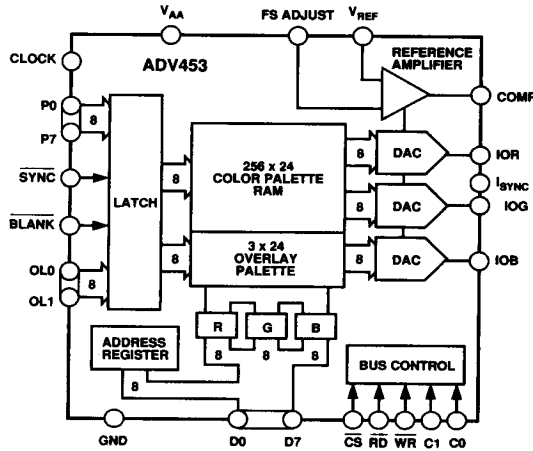
<sup>2</sup>Tested on initial release and after any redesign which may affect this parameter.

<sup>3</sup>These tests are done on a pass/fail basis only. Minimum and/or maximum conditions (as appropriate) are used as input conditions.

\*Digital input values are 0 to 3 V, with input rise/fall time, < 3 ns measured between the 10% and 90% points. Timing reference points are at 50% for inputs and outputs. See Figure 1.

# ADV453

## 3.2.1 Functional Block Diagram and Terminal Assignments.



Q Package (DIP)

E Package (LCC)

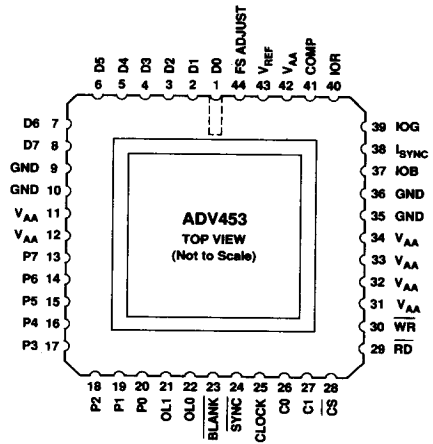
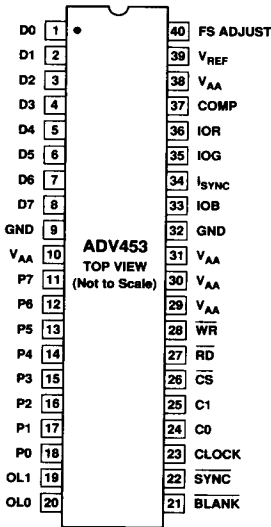


Table 2. Electrical Test Requirements

MIL-STD-883 Test Requirements	Subgroups (Per Method 5005 Table 1)
Interim Electrical Parameters (Method 5004)	1, 7, 9
Final Electrical Test Parameters (Method 5004)	1*, 2, 3, 7, 8, 9, 10, 11
Group A Test Requirements (Method 5005)	1, 2, 3, 7, 8A, 8B, 9, 10, 11
Group C and D Endpoint Electrical Parameters (Method 5005)	1, 7, 9

\*PDA applies to subgroup 1.

#### 4.3.2 Group C and D Inspections

- a. Endpoint electrical parameters shall be as specified in Table 2 herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
  - Test Condition A, B, C or D using the circuit in E Package Drawing.
  - $T_A = 125^\circ\text{C}$ , Min
  - Test Duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

## 5. Packing

### 5.1 Packaging Requirements

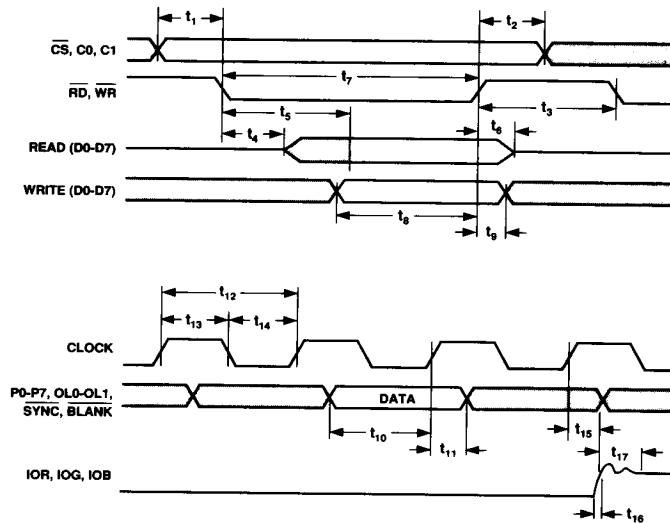
The requirements for packaging shall be in accordance with MIL-M-38510.

**Table 3.**

Description	IOG (mA)	IOR, IOB (mA)	$\overline{\text{SYNC}}$	$\overline{\text{BLANK}}$	DAC Input Data
White Level	26.67	19.05	1	1	FFH
Video	Video + 9.05	Video + 1.44	1	1	Data
Video to Blank	Video + 1.44	Video + 1.44	0	1	Data
Black Level	9.05	1.44	1	1	00H
Black to Blank	1.44	1.44	0	1	00H
Blank Level	7.62	0	1	0	XXH
SYNC Level	0	0	0	0	XXH

**Notes**

1. Typical with full scale IOG = 26.67 mA.
2.  $V_{\text{REF}} = +1.235 \text{ V}$ ,  $R_{\text{SET}} = 280 \Omega$ .  $I_{\text{SYNC}}$  connected to IOG.



**NOTES**

1. OUTPUT DELAY ( $t_{15}$ ) MEASURED FROM THE 50% POINT OF THE RISING EDGE OF CLOCK TO THE 50% POINT OF FULL SCALE TRANSITION.
2. SETTLING TIME ( $t_{17}$ ) MEASURED FROM THE 50% POINT OF FULL SCALE TRANSITION TO THE OUTPUT REMAINING WITHIN  $\pm 1\text{LSB}$ .
3. OUTPUT RISE/FALL TIME ( $t_{16}$ ) MEASURED BETWEEN THE 10% AND 90% POINTS OF FULL SCALE TRANSITION.

*Figure 1. Timing Diagrams*