

SCOPE: CMOS HIGHSPEED 8-BIT A/D CONVERTER WITH TRACK AND HOLD

<u>Device Type</u>	<u>Generic Number</u>
01	MX7824T(x)/883B
02	MX7824U(x)/883B

Case Outline(s). The case outlines shall be designated in Mil-Std-1835 and as follows:

<u>Outline Letter</u>	<u>Mil-Std-1835</u>	<u>Case Outline</u>	<u>Package Code</u>
MAXIM SMD			
Q L	GDIP1-T24 or CDIP2-T24	24 LEAD Cerdip	J24

Absolute Maximum Ratings

Supply Voltage to GND	0V, +7V
Digital Input Voltage	-0.3V, V_{DD}
Digital Output Voltage	-0.3V, V_{DD}
Positive Reference Voltage	V_{REF-} to V_{DD}
Negative Reference Voltage	0V to V_{REF+}
Input Voltage (V_{IN})	-0.3V to V_{DD}

Lead Temperature (soldering, 10 seconds) +300°C

Storage Temperature -65°C to +150°C

Continuous Power Dissipation $T_A=+70^{\circ}\text{C}$

24 pin Cerdip(derate 12.5mW/°C above +70°C) 1000mW

Junction Temperature T_J +150°C

Thermal Resistance, Junction to Case, θ_{JC}

24 pin Cerdip..... 40°C/W

Thermal Resistance, Junction to Ambient, θ_{JA} :

24 pin Cerdip..... 80°C/W

Recommended Operating Conditions

Ambient Operating Range (T_A)	-55°C to +125°C
Supply Voltage Range (V_{DD})	+4.75V to 5.25V
Positive Reference Voltage (V_{REF+})	+5.0V
Negative Reference Voltage (V_{REF-})	0V
Ground Potential (GND)	0V

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TABLE 1. ELECTRICAL TESTS:

TEST	Symbol	CONDITIONS -55 °C ≤ T _A ≤ +125°C 1/ 2/ Unless otherwise specified	Group A Subgroup	Device type	Limits Min	Limits Max	Units
Resolution	RES	Guaranteed but not tested	1,2,3	All	8		LSB
Total Unadjusted Error NOTE 3	TUE		1,2,3	01 02		±1.0 ±0.5	LSB
Analog Input Voltage Range	V _{IN}		1	All	VREF-	VREF+	V
Analog Input Leakage Current	I _{IN}		1,2,3	All	-3.0	+3.0	μA
Analog Input Capacitance	C _{IN1}	0V, 5V, NOTE 4	4	All		45	pF
Reference Input Resistance	R _{IN}	NOTE 4	1,2,3	All	1.0	4.0	kΩ
Digital Input High Level Voltage	V _{IH}	A0, A1, RD, CS	1,2,3	All	2.4		V
Digital Input Low Level Voltage	V _{IL}	A0, A1, RD, CS	1,2,3	All		0.8	V
Digital Input High Current	I _{IH}	A0, A1, RD, CS	1,2,3	All		1.0	μA
Digital Input Low Current	I _{IL}	A0, A1, RD, CS	1,2,3	All	-1.0		μA
Digital Input Capacitance	C _{IN2}	NOTE 4 A0, A1, RD, CS	4	All		8.0	pF
Digital Output High Level Voltage	V _{OH}	DB0-DB7, INT, I _{SOURCE} =360μA	1,2,3	All	4.0		V
Digital Output Low Level Voltage	V _{OL}	DB0-DB7, INT, I _{SINK} =1.6mA RDY, I _{SINK} =2.6mA, NOTE 5	1,2,3	All		0.4 0.4	V
Floating State Leakage Current	I _{OUT}	DB0-DB7 only	1,2,3	All		±3.0	μA
Slew Rate, Tracking Capacitance NOTE 4			4	All		0.157	V/μs
Digital Output Capacitance	C _{OUT}	NOTE 4	4	All		8.0	pF
Supply Current	I _{DD}	CS=RD=2.4V	1,2,3	All		20.0	mA
Power Supply Sensitivity	PSS	V _{DD} =5.0V±5%	1,2,3	All		±0.25	LSB
CS to RD Setup Time	t _{CSS}	Figure 3	9,10,11	All	0		ns
CS to RD Hold Time	t _{CSH}	Figure 3	9,10,11	All	0		ns
CS to RDY delay	t _{RDY}	Pull-up resistor=5kΩ, CL=50pF, Figure 3	9 10,11	All		40 60	ns
Conversion Time, Mode 0	t _{CRD}	See Figure 3. NOTE 7	9 10,11	All		2.0 2.8	μs
Data Access Time ____ After RD, Mode 1	t _{ACC1}	NOTE 6 and 7 Figure 3 and 5	9 10,11	All		85 120	ns

TEST	Symbol	CONDITIONS	Group A Subgroup	Device type	Limits Min	Limits Max	Units
		-55 °C ≤ T _A ≤ +125°C 1/ 2/ Unless otherwise specified					
— — RD to INT Delay, NOTE 5	t _{INTH}	CL=50pF	9 10,11	All		75 100	ns
Data Hold Time	t _{DH}	NOTE 8, Figure 3,4	9 10,11	All		60 70	ns
Delay Time Between Conversion	t _p	Figure 3	9 10,11	All	500 600		ns
Read Pulse Width, Mode 1	t _{RD}	Figure 3	9 10,11	All	60 80	600 400	ns
Data Access Time After — INT, Mode 0	t _{ACC2}	NOTE 6, 7, Figure 3,5	9 10,11	All		50 70	ns
Multiplexer Address Setup Time	t _{AS}	Figure 3	9,10,11	All	0		ns
Multiplexer Address Hold Time	t _{AH}	Figure 3	9 10,11	All	30 40		ns

NOTE 1: V_{DD}=+5V, VREF(+)=+5V; VREF(-)=GND=0V, unless otherwise specified.

Specifications apply for mode 0. All input control signals are specified with tr=tf=20ns (10 percent to 90 percent of +5.0V) and timed from a voltage level of 1.6V.

NOTE 2: Subgroups 10 and 11, if not tested, shall be guaranteed to the limits specified in Table 1.

NOTE 3: Total unadjusted error includes offset, full-scale, and linearity errors.

NOTE 4: The (C_{IN1}, C_{IN2}, R_{IN}, C_{OUT}, and S_R measurements) are measured initially and after any process or design changes which may affect these tests.

NOTE 5: RDY is an open-drain output.

NOTE 6: Measured with load circuits of Figure 5 and defined as the time required for an output to cross 0.8V or 2.4V.

NOTE 7: If not tested, it shall be guaranteed to the limits specified in Table 1.

NOTE 8: Defined as the time required for the data lines to change 0.5V when loaded with the circuits of Figure 4 and is measured only for the initial test and after process or design change which may affect t_{DH}.

TERMINAL CONNECTIONS

	J24		J24
1	AIN4	13	VREF-
2	AIN3	14	VREF+
3	AIN2	15	RDY
4	AIN1	16	— CS
5	NC	17	DB4
6	DB0	18	DB5
7	DB1	19	DB6
8	DB2	20	DB7
9	DB3	21	A1
10	— RD	22	A0
11	— INT	23	NC
12	GND	24	V _{DD}

	Package	ORDERING INFORMATION:	SMD NUMBER
01	24 pin Cerdip	MX7824TQ/883B	5962-8876401LA
02	24 pin Cerdip	MX7824UQ/883B	5962-8876402LA

MODE SELECTION TABLE

CHANNEL	A1	A0
AIN1	0	0
AIN2	0	1
AIN3	1	0
AIN4	1	1

QUALITY ASSURANCE

Sampling and inspection procedures shall be in accordance with MIL-Prf-38535, Appendix A as specified in Mil-Std-883.

Screening shall be in accordance with Method 5004 of Mil-Std-883. Burn-in test Method 1015:

1. Test Condition, A, B, C, or D.
2. TA = +125°C minimum.
3. Interim and final electrical test requirements shall be specified in Table 2.

Quality conformance inspection shall be in accordance with Method 5005 of Mil-Std-883, including Groups A, B, C, and D inspection.

Group A inspection:

1. Tests as specified in Table 2.
2. Selected subgroups in Table 1, Method 5005 of Mil-Std-883 shall be omitted.

Group C and D inspections:

- a. End-point electrical parameters shall be specified in Table 1.
- b. Steady-state life test, Method 1005 of Mil-Std-883:
 1. Test condition A, B, C, D.
 2. TA = +125°C, minimum.
 3. Test duration, 1000 hours, except as permitted by Method 1005 of Mil-Std-883.

TABLE 2. ELECTRICAL TEST REQUIREMENTS

Mil-Std-883 Test Requirements	Subgroups per Method 5005, Table 1
Interim Electric Parameters Method 5004	1
Final Electrical Parameters Method 5005	1*, 2, 3, 4**, 9, 10, 11***
Group A Test Requirements Method 5005	1, 2, 3, 4**, 9, 10, 11***
Group C and D End-Point Electrical Parameters Method 5005	1

* PDA applies to Subgroup 1 only.

** Subgroup 4, Capacitance tests are performed at initial qual and upon redesign.
Sample size will be 116 units.

*** Subgroups 10 and 11 if not tested, are guaranteed to the limits specified in Table 1.