

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

<u>Device Type</u>	<u>Generic Number</u>
01	MX7828T(x)/883B
02	MX7828U(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 X	GDIP1-T28 or CDIP2-T28	28 LEAD CERDIP	J28

Absolute Maximum Ratings

Supply Voltage to GND	0V, +7V
Digital Input Voltage to GND (\overline{RD} , \overline{CS} , A0, A1, A2)	-0.3V, V_{DD}
Digital Output Voltage to GND (D0-D7, \overline{RDY} , \overline{INT})	-0.3V, V_{DD}
Positive Reference Voltage	VREF- to V_{DD}
Negative Reference Voltage	0V to VREF+
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	$T_A=+70^\circ\text{C}$
28 pin CERDIP(derate 16.67mW/°C above +70°C)	1333mW
Junction Temperature T_J	+150°C
Thermal Resistance, Junction to Case, Θ_{JC}	
28 pin CERDIP.....	25°C/W
Thermal Resistance, Junction to Ambient, Θ_{JA} :	
28 pin CERDIP.....	60°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 (VREF+)	+5.0V
Negative Reference Voltage (VREF-)	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	Group A Subgroup	Device type	Limits Min	Limits Max	Units
		-55 °C ≤ T _A ≤ +125°C 1/ 2/ Unless otherwise specified					
Resolution	RES	Guaranteed but not tested	1,2,3	All	8		LSB
Total Unadjusted Error NOTE 3	TUE		1,2,3	01		±1.0	LSB
				02		±0.5	
Analog Input Voltage Range	V _{IN}		1	All	VREF-	VREF+	V
Analog Input Leakage Current	I _{IN}	Any channel	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, A2, RD, CS	1,2,3	All	2.4		V
Digital Input Low Level Voltage	V _{IL}	_____ A0, A1, A2, RD, CS	1,2,3	All		0.8	V
Digital Input High Current	I _{IH}	_____ A0, A1, A2, RD, CS	1,2,3	All		+1.0	µA
Digital Input Low Current	I _{IL}	_____ A0, A1, A2, RD, CS	1,2,3	All	-1.0		µA
Digital Input Capacitance	C _{IN2}	_____ A0, A1, A2, RD, CS NOTE 4	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	1,2,3	All		0.4	V
		_____ RDY, I _{SINK} =2.6mA, NOTE 5				0.4	
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 <u>1</u> / <u>2</u> / Unless otherwise specified						
$\overline{\text{RD}}$ 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 $\overline{\text{INT}}$, 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

	J28		J28
1	AIN6	15	VREF-
2	AIN5	16	VREF+
3	AIN4	17	RDY
4	AIN3	18	$\overline{\text{CS}}$
5	AIN2	19	D4
6	AIN1	20	D5
7	NC	21	D6
8	D0	22	D7
9	D1	23	A2
10	D2	24	A1
11	D3	25	A0
12	$\overline{\text{RD}}$	26	V _{DD}
13	$\overline{\text{INT}}$	27	AIN8
14	GND	28	AIN7

	Package	ORDERING INFORMATION:	SMD NUMBER
01	28 pin CERDIP	MX7828TQ/883B	5962-8876403LA
02	28 pin CERDIP	MX7828UQ/883B	5962-8876404LA

MODE SELECTION TABLE

CHANNEL	A2	A1	A0
AIN1	0	0	0
AIN2	0	0	1
AIN3	0	1	0
AIN4	0	1	1
AIN5	1	0	0
AIN6	1	0	1
AIN7	1	1	0
AIN8	1	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.