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

Device Type	Generic Number
01	MX7828T(x)/883B
02	MX7828U(x)/883B

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

Outline Letter		Mil-Std-1835	Case Outline	Package Code
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°C

28 pin CERDIP(derate 16.67mW/°C above +70°C) 1333mW

Junction Temperature T_J ..... +150°C

Thermal Resistance, Junction to Case, ΘJC

28 pin CERDIP..... 25°C/W

Thermal Resistance, Junction to Ambient, ΘJA:

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 -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		±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, $\overline{RD}$, $\overline{CS}$	1,2,3	All	2.4		V
Digital Input Low Level Voltage	V_{IL}	A0, A1, A2, $\overline{RD}$, $\overline{CS}$	1,2,3	All		0.8	V
Digital Input High Current	I_{IH}	A0, A1, A2, $\overline{RD}$, $\overline{CS}$	1,2,3	All		+1.0	µA
Digital Input Low Current	I_{IL}	A0, A1, A2, $\overline{RD}$, $\overline{CS}$	1,2,3	All	-1.0		µA
Digital Input Capacitance	C_{IN2}	A0, A1, A2, $\overline{RD}$, $\overline{CS}$ NOTE 4	4	All		8.0	pF
Digital Output High Level Voltage	V_{OH}	DB0-DB7, $\overline{INT}$, I_{SOURCE}=360µA	1,2,3	All	4.0		V
Digital Output Low Level Voltage	V_{OL}	DB0-DB7, $\overline{INT}$, 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}	$\overline{CS}$=$\overline{RD}$=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
$\overline{CS}$ to $\overline{RD}$ Setup Time	t_{CSS}	Figure 3	9,10,11	All	0		ns
$\overline{CS}$ to $\overline{RD}$ Hold Time	t_{CSH}	Figure 3	9,10,11	All	0		ns
$\overline{CS}$ 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 $\overline{CS}$ After RD, Mode 1	t_{ACC1}	NOTE 6 and 7 Figure 3 and 5	9 10,11	All		85 120	ns

TEST	Symbol	CONDITIONS -55 °C ≤T_A≤ +125°C 1/ 2/ Unless otherwise specified	Group A Subgroup	Device type	Limits Min	Limits Max	Units
$\overline{RD}$ to $\overline{INT}$ 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 $\overline{INT}$, 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: $\overline{RDY}$ 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	$\overline{CS}$
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	$\overline{RD}$	26	V_{DD}
13	$\overline{INT}$	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.