

SCOPE: LOW POWER, MONOLITHIC, CMOS ANALOG MULTIPLEXER

<u>Device Type</u>	<u>Generic Number</u>	<u>Circuit Function</u>
01	MX7501S(x)/883B	8-Channel Analog Multiplexer
02	MX7502S(x)/883B	Differential 4-Channel Analog Multiplexer
03	MX7503S(x)/883B	8-Channel Analog Multiplexer, enable logic is inverted

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>
Q	GDIP1-T16 or CDIP2-T16	16 LEAD CERDIP	J16
E	CQCC1-N20	20-Pin Ceramic LCC	L20

Absolute Maximum Ratings 2/

Voltage Referenced to V⁻

V ⁺ to GND	+18V
V ⁻ to GND	-18V
V Between Any Switch Terminals 1/.....	25V
Digital Input Voltage Range.....	V ⁺ to GND
Max Overvoltage at V _{OUT} (V _S)	V ⁻ , V ⁺
Switch Current (I _S , Continuous 1 Channel)	20mA
Switch Current (I _S , Surge 1 Channel, 1ms duration, 10% duty cycle)	35mA
Lead Temperature (soldering, 10 seconds)	+300°C
Storage Temperature	-65°C to +150°C

Continuous Power Dissipation T_A=+70°C

16 lead CERDIP(derate 10.0mW/°C above +70°C) 800mW

20 lead LCC (derate 9.1mW/°C above +70°C) 727mW

Junction Temperature T_J

Thermal Resistance, Junction to Case, Θ_{JC}:

Case Outline 16 lead CERDIP..... 50°C/W

Case Outline 20 lead LCC 20°C/W

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

Case Outline 16 lead CERDIP..... 100°C/W

Case Outline 20 lead LCC 110°C/W

Recommended Operating Conditions

Ambient Operating Range (T _A)	-55°C to +125°C
Positive Supply Voltage (V ⁺)	+15V
Negative Supply Voltage (V ⁻)	-15V
V _{AL} (max)	0.8V
V _{AH} (min)	2.4V

NOTE 1: Do not apply voltages higher than V⁺ and V⁻ to any other terminal, especially when V⁻=V⁺=0V. All other pins should be 0V.

NOTE 2: The digital control inputs are diode protected; however damage may occur on unconnected units under high energy electrostatic fields. Keep unused units in conduction foam at all times.

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: DUAL SUPPLIES

TEST	Symbol	CONDITIONS		Group A Subgroup	Device type	Limits Min	Limits Max	Units
		-55 °C ≤ T _A ≤ +125°C V ⁺ =+15V, V ⁻ =-15V, GND=0V Unless otherwise specified						
ANALOG SWITCH								
Drain-Source On Resistance	I _{DS(ON)}	I _S =1.0mA, V _S =±10V Switch condition ON	1 2,3	All		300 450	Ω	
Source-Off Leakage Current	I _{S(OFF)}	V _D =+10V V _S =-10V V _D =-10V V _S =+10V, Enable Low. Switch condition OFF.	1 2,3	All		±0.5 ±50	nA	
Drain-Off Leakage Current	I _{D(OFF)}	V _S =+10V, V _D =-10V. V _S =-10V, V _D =+10V. Enable Low. Switch condition OFF.	1 2,3	01,03		±5 ±250	nA	
			1 2,3	02		±3 ±125		
Channel-On Leakage Current I _{D(ON)} -I _S	I _{D(ON)}	V _S =+10V, Switch condition ON.	1 2,3	01,03		±5.5 ±300	nA	
			1 2,3	02		±3.5 ±175		
DIGITAL CONTROL								
Address-Input Threshold (Low)	V _{INL}		1,2,3	All		0.8	V	
Address-Input Threshold (High)	V _{INH}		1,2,3	All	2.4		V	
Input Logic Current	I _{INL} or I _{INH}		1 2,3	All		10 30	μA	
POWER SUPPLY								
Power Supply Range	V _{OP}	For Continuous Operation NOTE 3		All	±4.5	±18	V	
Positive Supply Current	I+	Digital Inputs=0V. Switch Conditions OFF.	1 2,3	All		0.1 0.2	mA	
Negative Supply Current	I-	Digital Inputs=0V. Switch Conditions OFF.	1 2,3	All		0.1 0.2	mA	
Positive Supply Current	I+	Digital Inputs=5V. Switch Conditions ON.	1 2,3	All		0.3 0.5	mA	
Negative Supply Current	I-	Digital Inputs=5V. Switch Conditions ON.	1 2,3	All		0.1 0.2	mA	
DYNAMIC								
Switching Time of Multiplexers	t _{TRANS}	V _{IN} =0V to 5V Switch Conditions OFF.	9 10,11	All		1000 1500	ns	
Enable Turn-On Time	t _{ON}	V _{EN} =0V to 5V Switch Conditions ON.	9 10,11	All		1.5 2.0	μs	
Enable Turn-Off Time	t _{OFF(EN)}	V _{EN} =0V to 5V Switch Conditions OFF.	9 10,11	All		1.0 1.5	μs	

NOTE 3: Guaranteed but not tested at 25°C. Electrical characteristics will change when power supplies other than ±15V are used.

	pkg	ORDERING INFORMATION:	pkg	
01	16 CDIP	MX7501SQ/883B	20 LCC	MX7501SE/883B
02	16 CDIP	MX7502SQ/883B	20 LCC	MX7502SE/883B
03	16 CDIP	MX7503SQ/883B	20 LCC	MX7503SE/883B

TRUTH TABLE

TERMINAL CONNECTION

A2	A1	A0	EN	MX7501 ON SWITCH	TERMINAL NUMBER	01/03 MX7501/03	01/03 MX7501/03	02 MX7502	02 MX7502
X	X	X	0	None		J16	20LCC	J16	20LCC
0	0	0	1	1	1	A1	NC	A1	NC
0	0	1	1	2	2	GND	A1	GND	A1
0	1	0	1	3	3	EN	GND	EN	GND
0	1	1	1	4	4	A2	EN	OUT5-8	EN
1	0	0	1	5	5	S8	A2	S8	OUT5-8
1	0	1	1	6	6	S7	NC	S7	NC
1	1	0	1	7	7	S6	S8	S6	S8
1	1	1	1	8	8	S5	S7	S5	S7
					9	S4	S6	S4	S6
				MX7502	10	S3	S5	S3	S5
	A1	A0	EN	ON SWITCH	11	S2	NC	S2	NC
	X	X	0	None	12	OUT	S4	OUT1-4	S4
	0	0	1	1 & 5	13	S1	S3	S1	S3
	0	1	1	2 & 6	14	V+	S2	V+	S2
	1	0	1	3 & 7	15	V-	OUT	V-	OUT1-4
	1	1	1	4 & 8	16	A0	NC	A0	NC
					17		S1		S1
				MX7503	18		V+		V+
A2	A1	A0	EN	ON SWITCH	19		V-		V-
X	X	X	1	None	20		A0		A0
0	0	0	0	1					
0	0	1	0	2					
0	1	0	0	3					
0	1	1	0	4					
1	0	0	0	5					
1	0	1	0	6					
1	1	0	0	7					
1	1	1	0	8					

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, 9
Group A Test Requirements Method 5005	1, 2, 3, 9, 10, 11
Group C and D End-Point Electrical Parameters Method 5005	1

* PDA applies to Subgroup 1 only.