

SCOPE: CMOS, 12-Bit Multiplying D/A Converter

<u>Device Type:</u>	<u>Generic Number:</u>
-01	MX7541S(x)/883B
-02	MX7541T(x)/883B

Case Outline(s).

<u>Outline Letter</u>	<u>Mil-Std-1835</u>	<u>Case Outline</u>	<u>Package Code</u>
Q	GDIP1-T18 or CDIP2-T18	18 Lead CERDIP	J18
E	CQCC1-N20	20-Pin Ceramic LCC	L20

Absolute Maximum Ratings: ($T_A=+25^{\circ}\text{C}$, unless otherwise noted.)

V_{DD} to GND	+ 17V
V_{REF} to GND	-25V to +25V
V_{RFB} to GND	-25V to +25V
Digital Input Voltage to GND	-0.3V, V_{DD}
V_{OUT1} , V_{OUT2} to GND (Note 1)	-0.3V, V_{DD}

Lead Temperature (soldering, 10 seconds)	+300°C
Storage Temperature	-65°C to +150°C

Continuous Power Dissipation	$T_A=+70^{\circ}\text{C}$
18 pin CERDIP(derate 10.53mW/°C above +70°C)	842mW
20 pin LCC(derate 9.09mW/°C above +70°C)	727mW
Junction Temperature T_J	+150°C
Thermal Resistance, Junction to Case, θ_{JC}	
18 pin CERDIP	45°C/W
20 pin LCC	20°C/W
Thermal Resistance, Junction to Ambient, θ_{JA} :	
18 pin CERDIP	95°C/W
20 pin LCC	110°C/W

Recommended Operating Conditions

Ambient Operating Range (T_A)	-55°C to +125°C
---	-----------------

NOTE 1: V_{OUT1} , V_{OUT2} may exceed the Absolute Maximum Voltage rating if the current is limited to 30mA or less.

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.

-----	Electrical Characteristics of	19-1052	Rev. B
	MX7541/883B	Page 2 of	6

TABLE 1. ELECTRICAL TESTS:

TEST	Symbol	CONDITIONS -55°C ≤ T _A ≤ +125°C 2/ Unless otherwise specified	GROUP A Subgroup	Device type	Limits Min	Limits Max	Units
Resolution	RES		1,2,3	All	12		Bits
Relative Accuracy	RA	Note 3 Note 4	1,2,3	-01 -02	-1 -0.5	1 0.5	LSB
Gain Error NOTE 5	AE		1 2,3	All	-12.5 -16.7	12.5 16.7	LSB
Gain Tempco NOTE 6	TC _{AE}			All	-13	13	ppm/°C
Power-Supply Rejection	PSRR	V _{DD} =14.5V to 15.5V	1 2,3	All	-0.01 -0.02	0.01 0.02	%/%V _{DD}
OUT1 Leakage Current	I _{OUT1}	Digital inputs at V _{IL} , VREF=+10V	1 2,3	All	-50 -200	50 200	nA
OUT2 Leakage Current	I _{OUT2}	Digital inputs at V _{IH} , VREF=+10V	1 2,3	All	-50 -200	50 200	nA
Output Current Settling Time NOTE 6		To ±0.5LSB, OUT1 load is 100Ω 13pF, digital inputs = V _{IH} to V _{IL} or V _{IL} to V _{IH}	4	All		1.0	μs
Feedthrough Error NOTES 6	FT	VREF=20Vp-p at 100kHz sine wave	4	All		1.0	mVp-p
Reference Input Resistance	R _{IN}		1,2,3	All	5	20	kΩ
Digital Input High Voltage	V _{IH}		1,2,3	All	2.4		V
Digital Input Low Voltage	V _{IL}		1,2,3	All		0.8	V
Digital Input Leakage Current	I _{IN}	V _{IN} =0V or V _{DD}	1,2,3	All	-1	1	μA
Digital Input Capacitance NOTE 6	C _{IN}		4	All		8	pF
Output Capacitance NOTE 6	C _{OUT1}	Digital inputs at V _{IH} Digital inputs at V _{IL}	4	All		200 60	pF
Output Capacitance NOTE 6	C _{OUT2}	Digital inputs at V _{IH} Digital inputs at V _{IL}	4	All		60 200	pF
Supply Current	I _{DD}	Digital inputs at V _{IH} or V _{IL}	1,2,3	All		2	mA

NOTE 2: V_{DD}=+15V, V_{OUT1}=V_{OUT2}=0V, VREF=+10V, unless otherwise noted.

NOTE 3: For -01, MX7541S are monotonic to 11 bits.

NOTE 4: For -02, MX7541T are monotonic to 12 bits.

NOTE 5: Measured using internal feedback resistor; includes effects of leakage current and gain TC.

NOTE 6: Characteristics supplied for use as a typical design limit but not production tested.

-----	Electrical Characteristics of	19-1052	Rev. B
	MX7541/883B	Page 3 of	6

TERMINAL CONNECTIONS:

	MX7541	MX7541
	J18	L20
1	OUT1	NC
2	OUT2	OUT1
3	GND	OUT2
4	D1(MSB)	GND
5	D2	D1(MSB)
6	D3	D2
7	D4	D3
8	D5	D4
9	D6	D5
10	D7	D6
11	D8	NC
12	D9	D7
13	D10	D8
14	D11	D9
15	D12(LSB)	D10
16	V _{DD}	D11
17	VREF	D12(LSB)
18	R _{FB}	V _{DD}
19		VREF
20		R _{FB}

ORDERING INFORMATION:

01	J18	MX7541SQ/883B
01	L20	MX7541SE/883B
02	J18	MX7541TQ/883B
02	L20	MX7541TE/883B

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. $T_A = +125^{\circ}\text{C}$, 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. $T_A = +125^{\circ}\text{C}$, 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
Group A Test Requirements Method 5005	1, 2, 3, 4**
Group C and D End-Point Electrical Parameters Method 5005	1

* PDA applies to Subgroup 1 only.

** Subgroup 4 shall be tested at initial qualification and upon redesign. Sample size will be 116 units.

-----	Electrical Characteristics of	19-1052	Rev. B
	MX7541/883B	Page 5 of	6