Precision Low-Input Current Operational Amplifier (Internally Compensated)

OP12

1.0 SCOPE

This specification documents the detail requirements for space qualified product manufactured on Analog Devices, Inc.'s QML certified line per MIL-PRF-38535 Level V except as modified herein.

The manufacturing flow described in the STANDARD SPACE LEVEL PRODUCTS PROGRAM brochure is to be considered a part of this specification. http://www.analog.com/aerospace

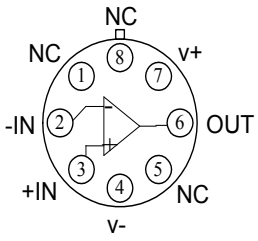
This data sheet specifically details the space grade version of this product. A more detailed operational description and a complete data sheet for commercial product grades can be found at www.analog.com/OP12

2.0 Part Number. The complete part number(s) of this specification follow:

Part Number	Description
OP12-903J	Precision Low-Input Current Operational Amplifier

2.1 Case Outline.

Letter	Descriptive designator	Case Outline (Lead Finish per MIL-PRF-38535)
J	MACY1-X8	8-Lead metal can (TO)



TO-99 (J)

Figure 1 - Terminal connections.

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3.0 Absolute Maximum Ratings. (T_A = 25°C, unless otherwise noted)

Supply Voltage ..... ±20V
Power Dissipation 500mW
Differential Input Current (Note 1) ..... ±10mA
Input Voltage (Note 2) ..... ±15V
Output Short-Circuit Duration ..... Indefinite
Operating Temperature Range ..... -55°C to +125°C
Storage Temperature Range ..... -65°C to +150°C
Lead Temperature (Soldering, 60 sec.) ..... +300°C
Dice Junction Temperature (T_J) ..... -65°C to +150°C
Thermal resistance, junction to case (Θ_{JC}) ..... see MIL-STD-1835
Thermal resistance, junction to ambient (Θ_{JA})
8-lead metal can (TO) ..... 150°C/W
8-lead cerdip ..... 119°C/W

NOTES:
1. The inputs are shunted with back-to-back diodes for over voltage protection. Therefore, excessive current will flow if a differential input voltage in excess of 1V is applied between the inputs without some limiting resistance.
2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltages.

4.0 Electrical Table:

Table I

Parameter See notes at end of table	Symbol	Conditions V_S = ±15V, R_S = 50Ω Unless otherwise specified		Sub-group	Limit Min	Limit Max	Units
Input Offset Voltage	V_{OS}			1		0.15	mV
				2, 3		0.35	
Input Offset Current	I_{OS}			1		0.20	nA
				2, 3		0.40	
Input Bias Current	I_B			1		±2.0	
				2, 3		±3.0	
Input Voltage Range 1/	I_{VR}			1, 2, 3	±13		V
Common-Mode Rejection	CMR	V_{CM} = ±13V		1	104		dB
				2, 3	100		
Power Supply Rejection	PSRR	V_S = ±5V, ±15V		1		7	µV/V
				2, 3		10	
Output Voltage Swing	V_O	R_L = 10kΩ		4, 5, 6	±13		V
		R_L = 5kΩ		4, 5, 6	±10		
Large-Signal Voltage Gain	A_{VO}	V_O = ±10V	R_L = 10kΩ	4	80		V/mV
			R_L = 2kΩ	4	50		
			R_L = 5kΩ	5, 6	40		
Supply Current	I_{SY}	No Load	V_S = ±5V	1		0.6	mA
			V_S = ±15V	2, 3		0.6	

1/ IVR is defined as the VCM range used for the CMR test.

4.1 Electrical Test Requirements:

Table II	
Test Requirements	Subgroups (in accordance with MIL-PRF-38535, Table III)
Interim Electrical Parameters	1
Final Electrical Parameters	1, 2, 3, 4, 5, 6 1/ 2/
Group A Test Requirements	1, 2, 3, 4, 5, 6
Group C end-point electrical parameters	1 2/
Group D end-point electrical parameters	1
Group E end-point electrical parameters	1

1/ PDA applies to Subgroup 1. Delta's excluded from PDA.

2/ See Table III for delta parameters. See table I for conditions.

4.2 Table III. Burn-in test delta limits.

Table III				
TEST TITLE	BURN-IN LIMIT	LIFETEST LIMIT	DELTA LIMIT	UNITS
VOS	±0.15	±0.225	0.075	mV
±IB	±2.0	±2.5	0.5	nA

5.0 Life Test/Burn-In Circuit:

5.1 HTRB is not applicable for this drawing.

5.2 Burn-in is per MIL-STD-883 Method 1015 test condition A, B, or C.

5.3 Steady state life test is per MIL-STD-883 Method 1005.

Rev	Description of Change	Date
A	Initiate	Feb. 29, 2000
B	Add flatpack. Add radiation part number. Exclude Delta's from PDA. Delete reference to unused subgroups in table II. Update Table III.	Aug. 21, 2001
C	Update web address.	Feb. 14, 2002
D	Change Table I AC parameters from subgroups 1, 2, 3 to subgroups 9, 10, 11. (SINAD, THD, PS, Σ 2^{nd}, and Σ 3^{nd}.	Jan. 9, 2003
E	Delete burn-in circuit	Aug. 5, 2003
F	Update header/footer and add to 1.0 scope description.	Feb. 15, 2008