

1.0 SCOPE

This specification documents the detailed requirements for Analog Devices space qualified die including die qualification as described for Class K in MIL-PRF-38534, Appendix C, Table C-II except as modified herein.

The manufacturing flow described in the STANDARD DIE PRODUCTS PROGRAM brochure at http://www.analog.com/marketSolutions/militaryAerospace/pdf/Die_Broc.pdf is to be considered a part of this specification.

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/OP11

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

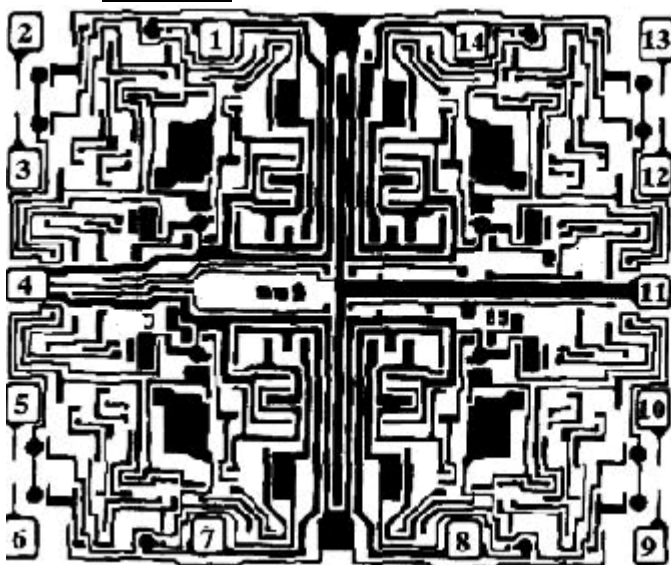
Part Number	Description
OP11-000C	Quad Matched 741-Type Operational Amplifier

3.0 Die Information

3.1 Die Dimensions

Die Size	Die Thickness	Bond Pad Metalization
72 mil x 86 mil	19 mil $\pm$ 2 mil	Al/Cu

3.2 Die Picture



1. OUTPUT 1
2. -INPUT 1
3. +INPUT 1
4. $+V_s$
5. +INPUT 2
6. -INPUT 2
7. OUTPUT 2
8. OUTPUT 3
9. -INPUT 3
10. +INPUT 3
11. $-V_s$
12. +INPUT 4
13. -INPUT 4
14. OUTPUT 4

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Rev. H

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3.3 Absolute Maximum Ratings ^{1/}

Positive Supply Voltage (+V _S).....	+22V dc
Negative Supply Voltage (-V _S)	-22V dc
Differential Input Voltage	±30V dc
Input Voltage (V _{IN}).....	Supply Voltage
Output Short Circuit Duration.....	Continuous
Junction Temperature (T _J).....	+150°C
Storage Temperature Range	-65°C to +150°C
Ambient Operational Temperature Range.....	-55°C to +125°C

Absolute Maximum Ratings Notes:

- ^{1/} Stresses above the absolute maximum rating may cause permanent damage to the device.
Extended operation at the maximum levels may degrade performance and affect reliability.

4.0 Die Qualification

In accordance with class-K version of MIL-PRF-38534, Appendix C, Table C-II, except as modified herein.

(a) Qual Sample Size and Qual Acceptance Criteria – 10/0

(b) Qual Sample Package – DIP

(c) Pre-screen electrical test over temperature performed post-assembly prior to die qualification.

Table I - Dice Electrical Characteristics

Parameter	Symbol	Conditions ^{1/}	Limit Min	Limit Max	Units
Input Offset Voltage	V _{OS}	R _S = 50Ω, 10kΩ		±0.5	mV
Input Offset Current	I _{OS}			±20	nA
Input Bias Current	I _{IB}			±300	nA
Input Voltage Range	IVR		±12		V
Common Mode Rejection Ratio	CMRR	V _{CM} = IVR R _S = 50Ω and 10kΩ	100		dB
Power Supply Rejection Ratio	PSRR	V _S = ±5V, ±15V R _S = 50Ω and 10kΩ		32	μV/V
Large Signal Voltage Gain	A _{VOL}	V _{OUT} = ±10V, R _L = 2kΩ	100		V/mV
Output Voltage Swing	V _{OUT}	R _L = 2kΩ	±11		V
Supply Current (All Four Amplifiers)	I _{SY}	V _O = 0V		6	mA

Table I Notes:

^{1/} ±V_S = ±15V, R_S = 50Ω, T_A = +25°C, and V_{CM} = 0V, unless otherwise specified.

Table II - Electrical Characteristics for Qual Samples

Parameter	Symbol	Conditions <u>1/</u>	Subgroups	Limit Min	Limit Max	Units
Input Offset Voltage	V_{OS}	$R_S = 50\Omega, 10k\Omega$	1		± 0.5	mV
			2, 3		± 1.0	
Input Offset Current	I_{OS}		1		± 20	nA
			2, 3		± 40	
Input Bias Current	I_{IB}		1		± 300	nA
			2, 3		± 375	
Input Voltage Range	IVR		1, 2, 3	± 12		V
Common Mode Rejection Ratio	CMRR	$R_S = 50\Omega$ and $10k\Omega$, $V_{CM} = IVR$	1, 2, 3	100		dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 5V, \pm 15V$ $R_S = 50\Omega$ and $10k\Omega$	1, 2, 3		32	$\mu V/V$
Large Signal Voltage Gain	A_{VOL}	$V_{OUT} = \pm 10V, R_L = 2k\Omega$	4	100		V/mV
			5, 6	50		
Output Voltage Swing	V_{OUT}	$R_L = 2k\Omega$	4, 5, 6	± 11		V
Supply Current (All Four Amplifiers)	I_{SY}	$V_O = 0V$	1		6	mA
			2, 3		6.7	

Table II Notes:

1/ $\pm V_S = \pm 15V$, $R_S = 50\Omega$, and $V_{CM} = 0V$, unless otherwise specified.

Table III -Life Test Endpoint and Delta Parameter
(Product is tested in accordance with Table II with the following exceptions)

Parameter	Symbol	Sub-groups	Post Burn In Limit		Post Life Test Limit		Life Test Delta	Units
			Min	Max	Min	Max		
Input Offset Voltage	V_{OS}	1		± 0.7		± 0.9	± 0.2	mV
		2, 3				± 1.4		
Input Bias Current	I_{IB}	1		± 350		± 400	± 50	nA
		2, 3				± 475		
Input Offset Current	I_{OS}	1		± 25		± 30		nA
		2, 3				± 50		

5.0 Life Test/Burn-In Information

- 5.1 HTRB is not applicable for this drawing.
- 5.2 Burn-in is per MIL-STD-883 Method 1015 test condition B or C.
- 5.3 Steady state life test is per MIL-STD-883 Method 1005.

Rev	Description of Change	Date
A	Initiate	15-NOV-01
B	Update web address	Jan. 25, 2002
C	Update web address	Aug. 5, 2003
D	Update 1.0 Scope description.	26 July 2007
E	Update header/footer and add to 1.0 scope description.	19 Feb. 2008
F	Add Junction Temperature (T_J) +150°C to 3.3 Absolute Max. Ratings	March 31, 2008
G	Updated Section 4.0c note to indicate pre-screen temp testing being performed.	6-JUN-2009
H	Updated fonts and sizes to ADI standard	01-Nov-2011

