Dual Precision JFET-Input Operational Amplifier

OP215

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/OP215

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

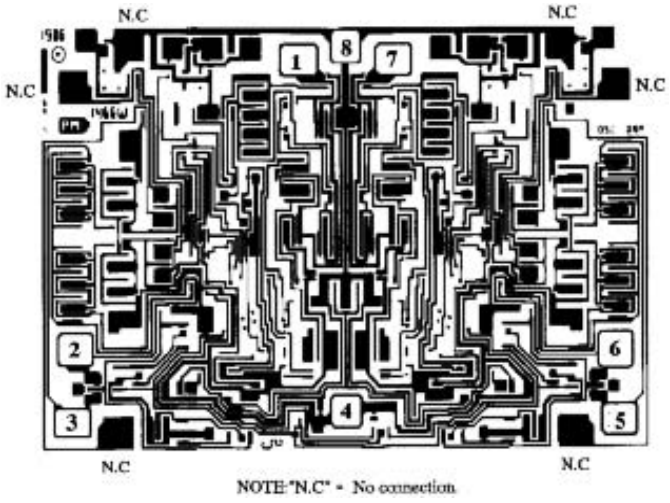
Part Number	Description
OP215-000C	Dual Precision JFET-Input Operational Amplifier
OP215R000C	Radiation Tested Dual Precision JFET-Input Operational Amplifier

3.0 Die Information

3.1 Die Dimensions

Die Size	Die Thickness	Bond Pad Metalization
75 mil x 110 mil	**19 mil ± 2 mil**	**Al/Cu**

3.2 Die Picture



1 OUTPUT A
2 -INPUT A
3 +INPUT A
4 $-V_S$
5 +INPUT B
6 -INPUT B
7 OUTPUT B
8 $+V_S$

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3.3 Absolute Maximum Ratings 1/

Supply Voltage (V_S) .....±22V
Differential Input Voltage .....±40V
Input Voltage (V_{IN}) 2/.....±20V
Output Short-Circuit Duration.....Indefinite
Storage Temperature Range .....-65°C to +150°C
Junction Temperature (T_J).....+150°C
Ambient Operating Temperature.....-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.

2/ Unless otherwise specified, the absolute maximum negative input voltage is equal to the negative power supply.

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_{IO}	$R_S = 50\Omega$		±1	mV
Input Offset Current	I_{IO}			±50	pA
Input Bias Current	I_{IB}			±100	pA
Large Signal Voltage Gain	A_{VO}	$V_{OUT} = \pm 10V$, $R_L \geq 2k\Omega$	150		V/mV
Output Voltage Swing	V_O	$R_L \geq 2k\Omega$	±11		V
Supply Current	I_S	$V_O = 0$ V		8.5	mA
Slew Rate	SR	$A_{VCL} = +1$, $RL \geq 2k\Omega$, $C_L = 100pF$	10		V/µs
Common-Mode Rejection Ratio	CMRR	V_{CM} = IVR	86		dB
Power Supply Rejection Ratio	PSRR	$V_S = \pm 10V$ to $\pm 16V$		51	µV/V
Input Voltage Range	IVR		±10.2		V

Table I Notes:

1/ $V_S = \pm 15V$, $V_{CM} = 0$ V, and $T_A = +25°C$, unless otherwise specified.

Table II - Electrical Characteristics for Qual Samples						
Parameter	Symbol	Conditions 1/	Sub-groups	Limit Min	Limit Max	Units
Input Offset Voltage	V_{IO}	$R_S = 50\Omega$	1		±1	mV
			2,3		±2	
		M, D, L, R	1		±3	
Input Offset Current 2/	I_{IO}	T_J = +25°C, -55°C	1, 3		±50	pA
		T_J = +125°C	2		±8	nA
		M, D, L, R	1		±300	pA
Input Bias Current 2/	I_{IB}	T_J = +25°C, -55°C	1, 3		±100	pA
		T_J = +125°C	2		±10	nA
		M, D, L, R	1		±6	
Large Signal Voltage Gain	A_{VO}	$V_{OUT} = \pm10V$, $R_L \geq 2k\Omega$	4	150		V/mV
			5, 6	30		
		M, D, L, R	1	10		
Output Voltage Swing 3/	V_O	$R_L \geq 2k\Omega$	4	±11		V
		$R_L \geq 10k\Omega$	5, 6	±12		
Supply Current	I_S	V_O = 0 V	1		8.5	mA
		M, D, L, R	4		8.5	
Slew Rate 3/	SR	$A_{VCL} = +1$, $R_L \geq 2k\Omega$, C_L = 100pF	4	10		V/µs
Common-Mode Rejection Ratio 3/	CMRR	V_{CM} = IVR	1	86		dB
			2, 3	82		
Power Supply Rejection Ratio 3/	PSRR	$V_S = \pm10V$ to ±16V	1		51	µV/V
			2, 3		100	
Input Voltage Range 3/	IVR		1, 2, 3	±10.2		V

Table II Notes:

. 1/ $V_S = \pm15V$ and V_{CM} = 0V, unless otherwise specified.

2/ T_A = -55°C for I_{IO} and I_{IB} tests, subgroup 3, is guaranteed by T_A = +25°C test.

3/ Not tested post irradiation.

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_{IO}	1		±2		±3	±1	mV
		2, 3				±4		
Input Bias Current	I_{IB}	1, 3		±175		±250	±75	pA
		2				±10		nA
Input Offset Current	I_{IO}	1, 3		±87		±125		pA
		2				±8		nA

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	06-NOV-01
B	Add radiation limits. Update web address. Exchange file name with PM108.	9-JAN-03
C	Update 1.0 Scope Description	20-Jul-2007
D	Update header/footer and add to 1.0 Scope description.	Mar. 3, 2008
E	Add Junction Temperature (T_J).....+150°C to 3.3 Absolute Max. Ratings	April 2, 2008
F	Updated Section 4.0c note to indicate pre-screen temp testing being performed	5-JUN-2009

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