Low–Input-Current Operational Amplifier

PM108

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/PM108

2.0 Part Number.

The complete part number(s) of this specification follow:

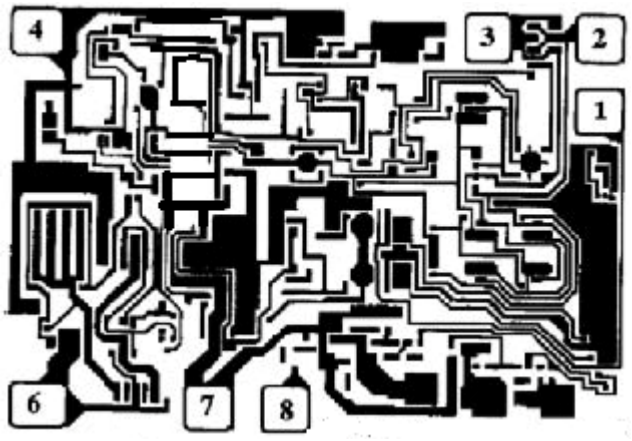
Part Number	Description
PM108-000C	Low-Input-Current Operational Amplifier
PM108R000C	Radiation tested Low-Input-Current Operational Amplifier

3.0 Die Information

3.1 Die Dimensions

Die Size	Die Thickness	Bond Pad Metalization
54 mil x 74 mil	19 mil ± 2 mil	Al/Cu

3.2 Die Picture



1. COMP
2. -IN
3. +IN
4. V-
5. NC
6. OUT
7. V+
8. COMP

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3.3 Absolute Maximum Ratings 1/

Supply Voltage (V_{CC})..... ±22V
Input Voltage (V_{IN}) 2/..... ±15V
Differential Input Current 3/..... ±10mA
Output Short-Circuit Duration..... Indefinite
Storage Temperature Range ..... -65°C to +150°C
Junction Temperature (T_J)..... +175°C
Ambient 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.

2/ For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

3/ The inputs are shunted with back-to-back diodes for overvoltage protection. Therefore, if a differential input voltage in excess of 1V is applied between the inputs, excessive current will flow, unless some limiting resistance is provided.

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 Notes:

Table I - Dice Electrical Characteristics

Parameter	Symbol	Conditions 1/	Limit Min	Limit Max	Units
Input Offset Voltage	V_{IO}		-0.5	0.5	mV
Input Offset Current	I_{IO}		-0.2	0.2	nA
Input Bias Current	$\pm I_{IB}$		-0.1	2	nA
Power Supply Rejection Ratio	+PSRR	$+V_{CC}$ = +10V to +20V, $-V_{CC}$ = -20V	-16	16	µV/V
	-PSRR	$+V_{CC}$ = +20V, $-V_{CC}$ = -10V to -20V	-16	16	
Input Voltage Range	IVR		±15		V
Input Voltage Common Mode Rejection	CMR	V_{CM} = IVR	96		dB
Supply Current	I_{CC}	$\pm V_{CC}$ = ±15V		0.6	mA
Output Voltage Swing	$\pm V_{OP}$	$\pm V_{CC}$ = ±20V, R_L = 10kΩ	±16		V
Open Loop Voltage Gain	A_{VS}	$\pm V_{CC}$ = ±15V, R_L = 10kΩ, V_{OUT} = ±10V	80		V/mV

Table I Notes:

1/ V_{CC} = ±20V, R_S = 50Ω, V_{CM} = 0V, 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}			1	-0.5	0.5	mV
				2, 3	-1	1	
			M, D, L, R	1	-2	2	
Input Offset Current	I_{IO}			1	-0.2	0.2	nA
				2, 3	-0.4	0.4	
			M, D, L, R	1	-1	1	
Input Bias Current	$\pm I_{IB}$			1	-0.1	2	
				2, 3	-0.4	0.4	
			M, D, L, R	1	-25	25	
Input Offset Voltage Temperature Sensitivity 2/	$\Delta V_{IO} / \Delta T$			2, 3	-5	5	µV/°C
Open Loop Voltage Gain	V_{VS}	$\pm V_{CC} = \pm 15V$, $R_L = 10K\Omega$, $V_{OUT} = \pm 10V$		4	80		V/mV
				5, 6	40		
			M, D, L, R	4	10		
Power Supply Rejection Ratio 2/	+PSRR	$+V_{CC} = +10V$ to $+20V$, $-V_{CC} = -20V$		1, 2, 3	-16	16	µV/V
	-PSRR	$+V_{CC} = +20V$, $-V_{CC} = -10V$ to $-20V$		1, 2, 3	-16	16	
Input Voltage Range 2/	IVR			1, 2, 3	±15		V
Supply Current 2/	I_{CC}	$V_{CC} = \pm 15V$		1, 2		0.6	mA
				3		0.8	
Input Voltage Common Mode Rejection Ratio 2/	CMRR	$V_{CM} = IVR$		1, 2, 3	96		dB
Output Short-Circuit Current 2/	$I_{OS(+)}$	$\pm V_{CC} = \pm 15V$, $t \leq 25mS$		1	-15		mA
	$I_{OS(-)}$					15	
Output Voltage Swing 2/	$\pm V_{OP}$	$\pm V_{CC} = \pm 20V$, $R_L = 10K\Omega$		4, 5, 6	±16		V

Table II Notes:
1/ $V_{CC} = \pm 20V$, $R_S = 50\Omega$, and $V_{CM} = 0V$, unless otherwise specified.
2/ 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		±0.75		±1	±0.25	mV
		2, 3				±1.5		
Input Bias Current	$\pm I_{IB}$	1	-0.1	2.5	-0.1	±3	±0.5	nA
		2			-1	±3		
		3			-0.1	±4		
Input Offset Current	I_{IO}	1		±0.3		±0.3		nA
		2, 3				±0.5		

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	7-Feb-02
B	Add radiation test limits. Update web address.	9-Jan-03
C	Make correction file names (see OP215)	9-Jan-03
D	Update 1.0 Scope description.	09-Jul-07
E	Update header/footer & add to 1.0 scope description.	19-Feb-08
F	Add Junction Temperature(T_J)…..175°C to 3.3 Absolute Maximum Ratings	March 31, 2008
G	Updated Section 4.0c note to indicate pre-screen temp testing being performed.	6-JUN-2009
H	Update fonts and sizes to ADI standard	3-Oct-2011

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