

1.0 SCOPE

This specification documents the detail requirements for space qualified die manufactured on Analog Devices, Inc.'s QML certified line per MIL-PRF-38534 class K except as modified herein.

The manufacturing flow described in the Aerospace Dice brochure at <http://www.analog.com/aerospace> 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 datasheet 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:

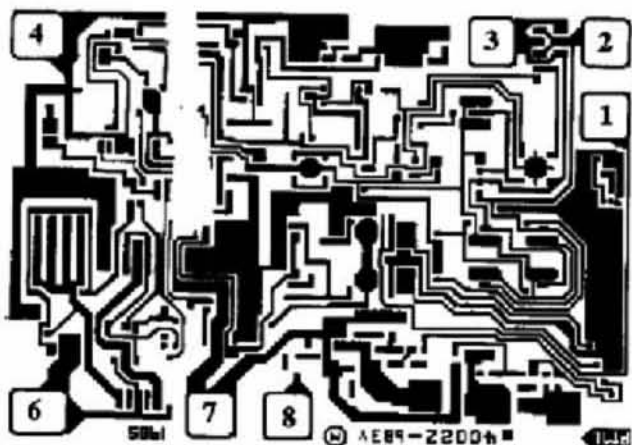
<u>Part Number</u>	<u>Description</u>
PM108-000C	Low-Input-Current Operational Amplifier
PM108R000C	Radiation tested Low-Input-Current Operational Amplifier

3.0 Die Information

3.1 Die Dimensions

Die Size	Die Thickness	Bond Pad Metalization
54 mil x 74 mil	19 mil $\pm$ 2 mil	Al/Cu

3.2 Die Picture



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

3.3 Absolute Maximum Ratings 1/

Supply Voltage (V_{CC})		$\pm 22V$
Input Voltage (V_{IN}) <u>2/</u>		$\pm 15V$
Differential Input Current <u>3/</u>		$\pm 10mA$
Output Short-Circuit Duration		Indefinite
Storage Temperature Range		$-65^{\circ}C$ to $+150^{\circ}C$
Ambient Temperature Range		$-55^{\circ}C$ to $+125^{\circ}C$

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 $\pm 15V$, 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 test post assembly required prior to die qualification, to remove all assembly related rejects.

Table I - Dice Electrical Characteristics

Parameter	Symbol	Conditions <u>1/</u>	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	$\mu V/V$
	-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}	$\pm V_{CC} = \pm 15V$		0.6	mA
Output Voltage Swing	$\pm V_{OP}$	$\pm V_{CC} = \pm 20V$, $R_L = 10k\Omega$	± 16		V
Open Loop Voltage Gain	A_{VS}	$\pm V_{CC} = \pm 15V$, $R_L = 10k\Omega$ $V_{OUT} = \pm 10V$	80		V/mV

Table I Notes:

1/ $V_{CC} = \pm 20V$, $R_S = 50\Omega$, $V_{CM} = 0V$, and $T_A = 25^{\circ}C$, unless otherwise specified.

Table II - Electrical Characteristics for Qual Samples

Parameter	Symbol	Conditions <u>1/</u>	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	-2	2	
Input Offset Voltage Temperature Sensitivity <u>2/</u>	$\Delta V_{IO} / \Delta T$		2, 3	-5	5	$\mu V/^{\circ}C$
Input Offset Current	I_{IO}		1	-0.2	0.2	nA
			2, 3	-0.4	0.4	
			M, D, L, R	-1	1	
Input Bias Current	$\pm I_{IB}$		1	-0.1	2	nA
			2	-1	2	
			3	-0.1	3	
			M, D, L, R	-25	25	
Power Supply Rejection Ratio <u>2/</u>	+PSRR	$+V_{CC} = +10V$ to $+20V$, $-V_{CC} = -20V$	1, 2, 3	-16	16	$\mu V/V$
	-PSRR	$+V_{CC} = +20V$, $-V_{CC} = -10V$ to $-20V$	1, 2, 3	-16	16	
Input Voltage Range <u>2/</u>	IVR		1, 2, 3	± 15		V
Input Voltage Common Mode Rejection <u>2/</u>	CMR	$V_{CM} = IVR$	1, 2, 3	96		dB
Output Short-Circuit Current <u>2/</u>	$I_{OS(+)}$	$\pm V_{CC} = \pm 15V$, $t \leq 25ms$	1	-15		mA
	$I_{OS(-)}$				15	
Supply Current <u>2/</u>	I_{CC}	$\pm V_{CC} = \pm 15V$	1, 2		0.6	mA
			3		0.8	
Output Voltage Swing <u>2/</u>	$\pm V_{OP}$	$\pm V_{CC} = \pm 20V$, $R_L = 10k\Omega$	4, 5, 6	± 16		V
Open Loop Voltage Gain	A_{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		

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