



# 160MHz Rail-to-Rail Amplifier with Disable Die

**AD8041S**

## 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](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/AD8041](http://www.analog.com/AD8041)

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

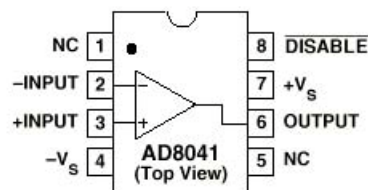
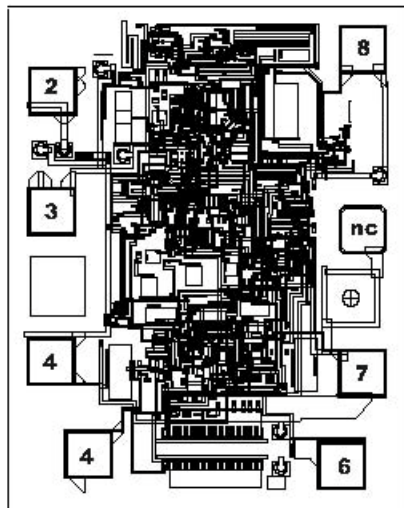
<u>Part Number</u>	<u>Description</u>
AD8041-000C	160MHz Rail-to-Rail Amplifier with Disable
AD8041R000C	Radiation Tested 160MHz Rail-to-Rail Amplifier with Disable

## 3.0 Die Information

### 3.1 Die Dimensions

Die Size	Die Thickness	Bond Pad Metallization
42 mil x 50 mil	19 mil $\pm$ 2 mil	Al/Cu

### 3.2 Die Picture



NC = NO CONNECT

Note: Connect backside  
of die to +V<sub>S</sub>

ASD0012808

Rev. H

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One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.  
Tel: 781.329.4700 [www.analog.com](http://www.analog.com)  
Fax: 781.326.8703 © 2015 Analog Devices, Inc. All rights reserved.

# AD8041S

### 3.3 Absolute Maximum Ratings <sup>1/</sup>

Supply Voltage (VS).....	+12.6V
Input Common Mode Range (VIN) .....	±Vs
Storage Temperature.....	-65°C to +125°C
Junction Temperature (TJ).....	+175°C
Operating Ambient Temperature Range (TA) .....	-55°C to +125°C

Absolute Maximum Ratings Notes:

Absolute Maximum Ratings Notes:

<sup>1/</sup> 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

Parameters	Symbol	Conditions <u>1/</u>	Limit Min	Limit Max	Units
Input Offset Voltage	$V_{OS}$			9.5	mV
Input Bias Current	$I_{IB}$			3.4	$\mu A$
Input Offset Current	$I_{OS}$			0.7	$\mu A$
Input Voltage Range	IVR		$\pm 1$		V
Common Mode Rejection Ratio	CMRR	$V_{CM} = IVR$	65		dB
Power Supply Rejection Ratio	PSRR	$V_S = 0V; +5V, \pm 1V$	65		dB
Open Loop Gain	$A_{OL}$	$V_O = \pm 1V, R_L = 1k\Omega$	15		kV/V
Output Swing Voltage	$V_{OUT}$	$R_L = 2k\Omega$	$\pm 2$		V
Quiescent Supply Current	$I_S$			6.1	mA
		Disabled Mode		1.7	

Table I Notes:

1/  $V_S = \pm 2.5V$ ,  $T_A = 25^\circ C$  unless otherwise noted

**Table II – Dice Electrical Characteristics for Qual Samples**

Parameters	Symbol	Conditions	Group A Subgroup	Limits Min	Limits Max	Units
		<b>unless otherwise specified</b> <b>-55°C ≤ TA ≤ +125°C 1/ 2/ 3/</b>				
Quiescent supply current	IS		1, 2, 3		6.1	mA
		M, D, P, L, R	1		6.1	
		Disabled mode 4/	1, 2, 3		1.7	
		M, D, P, L, R	1		1.7	
Input Offset Voltage	VOS		1, 2, 3		±9.5	mV
		M, D, P, L, R	1		±9.5	
Input Offset Current	Ios		1, 2, 3		±0.7	µA
		M, D, P, L, R	1		±0.7	
Common mode rejection ratio	CMRR	VCM = -1 V to 2.5 V	1, 2, 3	70		dB
		M, D, P, L, R	1	70		
Power supply rejection ratio	PSRR	Vs = ±2.5V to ±5.0V	1, 2, 3	68		dB
		M, D, P, L, R	1	68		
Input bias current	IIB		1, 2, 3		±3.4	µA
		M, D, P, L, R	1		±3.4	
Open Loop Gain	Aol	RL=1kΩ	1, 2, 3	15		kV/V
		M, D, P, L, R	1	15		
Positive output swing voltage	+Vout	RL=1kΩ	1, 2, 3	1.75		V
		M, D, P, L, R	1	1.75		
		RL=50 Ω	1, 2, 3	1.45		
		M, D, P, L, R	1	1.45		
Negative output swing voltage	-Vout	RL=1kΩ	1, 2, 3		-2.15	
		M, D, P, L, R	1		-2.15	
		RL=50 Ω	1, 2, 3		-1.5	
		M, D, P, L, R	1		-1.5	

Table II Notes:

1/ Unless otherwise specified, Vs = ±2.5V and load resistance (RL) = 2kΩ to 0.0V. This is equivalent to +Vs = +5V, -Vs = 0V, and load resistance (RL) = 2kΩ to 2.5V.

2/ Device supplied to this drawing has been characterized through all levels M, D, P, L, R of irradiation. However the device is only tested at the R level. Pre and Post irradiation are identical unless otherwise specified in Table I. When performing post irradiation electrical measurements for any RHA level, TA = +25°C.

3/ This part may be dose rate sensitive in a space environment and may demonstrate enhanced low dose rate effects. Radiation endpoint limits for the noted parameters are guaranteed only for the conditions specified in MIL-STD-883, method 1019, condition A.

4/ Disabled mode: the device has an active low disable bar pin which can be used to three state the output of the part and also lower its supply current. If the disable pin is pulled to 2.5V (minimum) below the positive supply, the output of the device will be disabled and the Is supply current will drop to Is disabled specification. For best isolation, the disable pin should be pulled to as low as possible, ideally the -Vs supply rail.

TABLE III. Life test and burn in delta limits. 1/

Parameter	Delta limits	Units
$V_{OS}$	$\pm 1$	mV
$I_S$	$\pm 1$	mA
$\pm I_{IB}$	$\pm 0.5$	$\mu A$

1/ Deltas are performed at room temperature

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

Rev	Description of Change	Date
A	Initiate	7-Feb-02
B	Updated 1.0 Scope Description	30-July-07
C	Update header/footer and to 1.0 Scope description	19-Feb-08
D	Add Junction Temperature (T) <sub>J</sub> ... 175°C to 3.3 Absolute Max. Rating	31-Mar-08
E	Updated Section 4.0c note to indicate pre-screen temp testing being performing.	6-June-09
F	Update fonts and sizes to ADI standards	27-Sept-11
G	Added Radiation testing Model.	8-Aug-15
H	Remove Internal Use Only from page 1 of ASD	29-Sep-2015

