

**1.0 SCOPE**

This specification documents the detail requirements for space qualified die per MIL-PRF-38534 class K except as modified herein.

The manufacturing flow described in the SPACE DIE BROCHURE is to be considered a part of this specification.

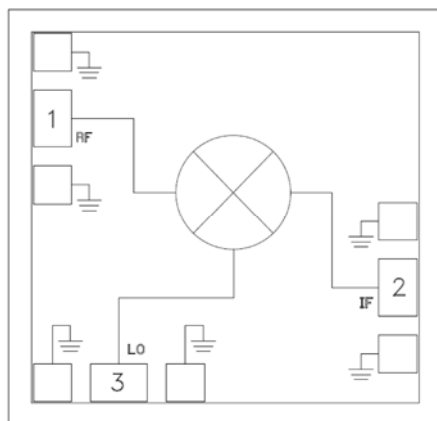
This datasheet specifically details the space grade version of this product. A more detailed operational description and a complete datasheet for commercial product grades can be found at [www.analog.com/HMC1015](http://www.analog.com/HMC1015)

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

<u>Part Number</u>	<u>Description</u>
HMC8805	MMIC Triple Balanced Mixer 26-32GHz Die

**3.0 Die Information**
**3.1 Die Dimensions**

<b>Die Size</b>	<b>Die Thickness</b>	<b>Bond Pad and Backside Metalization</b>
43.3 mil x 44.9 mil	4 mil $\pm$ 0.5 mil	Au

**3.2 Die Picture**


1. RF (AC coupled, matched to 50 ohms)
2. IF (AC coupled, matched to 50 ohms)
3. LO (AC coupled, matched to 50 ohms)

Backside (must be connected to RF/DC GND)

Connection to unlabeled bond pads not required

**ASD0016555**
**Rev. B**

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# ADH1015S

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

RF/IF Input (LO = +18dBm) .....	+15.5 dBm
LO Drive .....	+20 dBm
Maximum Junction Temperature .....	150°C
Continuous P <sub>DISS</sub> (T <sub>A</sub> = 85°C, derate 2.5mW/°C above 85°C) .....	79 mW
Thermal Resistance (Junction to Die Bottom) .....	392°C/W
Ambient Operating Temperature Range (T <sub>A</sub> ).....	-40°C to +85°C
Storage Temperature .....	-65°C to +125°C

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) Pre-screen test post assembly required prior to die qualification, to remove all assembly related rejects.
- (b) Mechanical Shock or Constant Acceleration not performed; die qualification is performed in an open carrier.
- (c) Interim and post burn-in electrical tests will include static tests screened at +25°C only.

Table I - Dice Electrical Characteristics					
Parameter	Symbol	Conditions <sup>1/</sup> , <sup>2/</sup> , <sup>3/</sup> 50 Ω System	Limit Min	Limit Max	Units
Conversion Loss	CL	RF=26-32 GHz, IF=16- 22 GHz, LO=7-11 GHz		13	dB
LO to RF Isolation	ISO <sub>LO-RF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	30		dB
LO to IF Isolation	ISO <sub>LO-IF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	28		dB
2LO to IF Isolation	ISO <sub>2LO-IF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	41		dB
RF to IF Isolation	ISO <sub>RF-IF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	29		dB

Table I Notes:

- <sup>1/</sup> Limits apply at +25°C only.
- <sup>2/</sup> Tested as Up Converter only
- <sup>3/</sup> S-par data to be swept and tabulated as follows:
  - a. LO Pin = +13 dBm, IF Pin = -10 dBm
  - b. Conversion Loss
    - i. LO=7.0GHz, RF=23, 27.5, 31 GHz
    - ii. LO=9.0GHz, RF=26, 29.5, 32 GHz
    - iii. LO=11.0GHz, RF=29.0, 31.5, 34 GHz
  - c. Isolations
    - i. LO-RF Isolation: LO @ 7.0, 9.0, 11.0 GHz
    - ii. LO-IF Isolation: LO @ 7.0, 9.0, 11.0 GHz
    - iii. 2LO-IF Isolation: LO @ 14.0, 18.0, 22.0 GHz
    - iv. RF-IF Isolation: RF @ 26.0, 29.5, 32.0 GHz

Table II - Electrical Characteristics for Qual Samples						
Parameter	Symbol	Conditions 1/ 2/ 3/4/5/ -40°C ≤ T <sub>A</sub> ≤ 85°C unless otherwise specified, 50 Ohm System	Sub- groups	Min Limit	Max Limit	Units
Conversion Loss	CL	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4		13	dB
			5,6		13.5	
LO to RF Isolation	ISO <sub>LO-RF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4,5,6	30		dB
LO to IF Isolation	ISO <sub>LO-IF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4,5,6	28		dB
2LO to IF Isolation	ISO <sub>2LO-IF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4,5,6	41		dB
RF to IF Isolation	ISO <sub>RF-IF</sub>	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4,5,6	29		dB
Input Third Order Intercept Point	IIP3	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4,5,6	16		dBm
Input 1dB Compression	IP1dB	RF=26-32 GHz, IF=16-22 GHz, LO=7-11 GHz	4,5,6	7		dBm

Table II Notes:

- 1/ Pre burn-in and Post burn-in electrical require S-parameter testing only as defined. Final electrical tests shall incorporate power tests as defined.
- 2/ Temperature testing required for Final Electrical testing only
- 3/ Tested as Up Converter only
- 4/ S-par data to be swept and tabulated as follows:
  - LO Pin = +13 dBm, IF Pin = -10 dBm
  - Conversion Loss
    - o LO=9.0GHz, RF=26, 29.5, 32 GHz
  - Isolations
    - o LO-RF Isolation: LO @ 7.0, 9.0, 11.0 GHz
    - o LO-IF Isolation: LO @ 7.0, 9.0, 11.0 GHz
    - o 2LO-IF Isolation: LO @ 14.0, 18.0, 22.0 GHz
    - o RF-IF Isolation: RF @ 26.0, 29.5, 32.0 GHz
- 5/ IP3 & P1dB data to be swept and tabulated at RF = 26, 29.5, 32 GHz
  - IF: 17.0, 20.5, 23.0 GHz, Pin = -10 dBm
  - LO: 9 GHz, Pin = +13 dBm

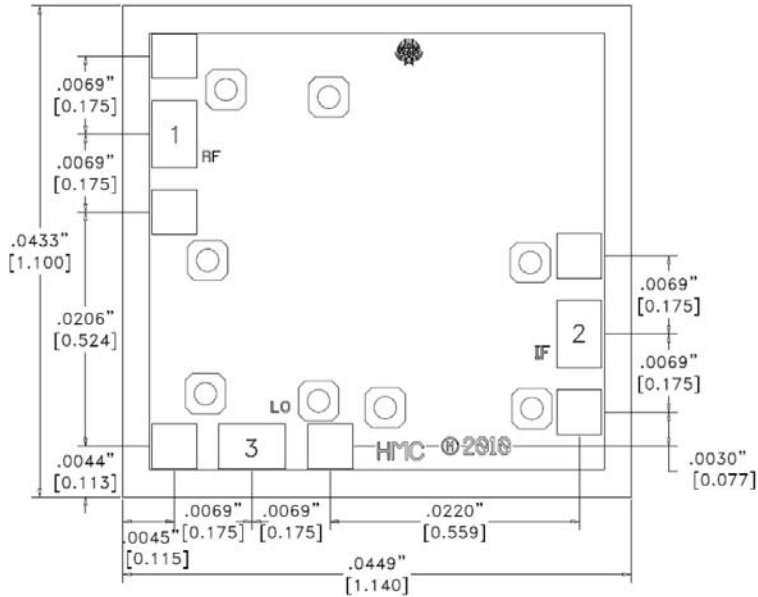
Table III - Endpoint and Delta Limits (+25°C)						
(Product is tested in accordance with Table II with the following exceptions)						
Parameter	Symbol	Sub- groups	End-point		Delta	Units
			Min	Max		
Conversion Loss	CL	4		13	±1.0	dB

Table III Notes:

- 1/ Table II limits will not be exceeded
- 2/ 240 hour burn in and Group C end point electrical parameters. Deltas are performed at T<sub>A</sub> = 25°C

# ADH1015S

## 5.0 Die Outline



- NOTES:
1. ALL DIMENSIONS ARE IN INCHES [MM].
  2. DIE THICKNESS IS 0.004"
  3. BOND PADS 1, 2 & 3 are 0.0059" [0.150] X 0.0039" [0.099].
  4. BACKSIDE METALLIZATION: GOLD.
  5. BOND PAD METALLIZATION: GOLD.
  6. BACKSIDE METAL IS GROUND.
  7. CONNECTION NOT REQUIRED FOR UNLABELED BOND PADS.
  8. OVERALL DIE SIZE = 0.002

1. RF (AC coupled, matched to 50 ohms)
2. IF (AC coupled, matched to 50 ohms)
3. LO (AC coupled, matched to 50 ohms)

Backside (must be connected to RF/DC GND)

Connection to unlabeled bond pads not required

Rev	Description of Change	Date
A	Initiate	26-October-2015
B	Add note to exceptions section to clarify test temperatures for interim and post burn-in electrical tests	4-June-2019