

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/HMC232

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

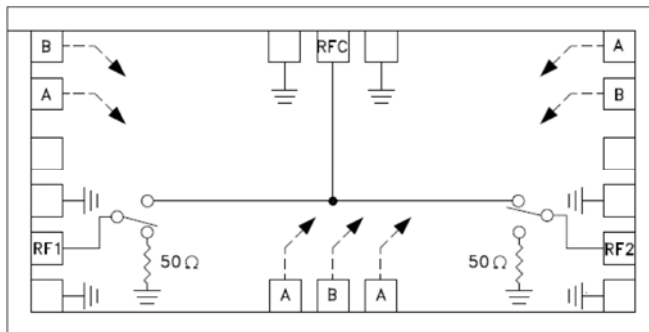
Part Number	Description
HMC8800	DC-15GHz High Isolation SPDT Switch Die

3.0 Die Information

3.1 Die Dimensions

Die Size	Die Thickness	Bond Pad and Backside Metalization
41 mil x 81 mil	4 mil ± 0.5 mil	Au

3.2 Die Picture



Control Input		Signal Path State	
A	B	RFC to RF1	RFC to RF2
High	Low	ON	OFF
Low	High	OFF	ON

Caution: Do not "Hot Switch" power levels greater than +26 dBm (VCTL = 0/-5 VDC)

1. RF1*
2. A**
3. B**
4. RFC*
5. A**
6. B**
7. RF2*
8. A**
9. B**
10. A**

- Die bottom must be connected to RF ground
- No connection required for unlabeled pads
- * (DC coupled, matched to 50 ohms, blocking cap required if RF line potential not equal to 0V)
- ** Using any one of the A and any one of the B Pads connection is acceptable

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Rev. D

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3.3 Absolute Maximum Ratings 1/

RF Input Power (Vctl = -5V) (0.5 – 15GHz)	+30dBm (@ +50°C)
Control Voltage Range (A & B)	+1 V to -7.5 Vdc
Channel Temperature	150°C
Thermal resistance	92°C/W
Storage Temperature	-65°C to +150°C
Operating Temperature	-55°C to +85°C
ESD Sensitivity (HBM)	Class 1A

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.

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.

Parameter	Symbol	Conditions 1/, 2/, 3/, 4/ 50 Ω System	Limit Min	Limit Max	Units
Insertion Loss	IL	DC – 6 GHz DC – 10 GHz DC – 15 GHz		1.6 2.2 2.9	dB
Isolation	Iso	DC – 6 GHz DC – 10 GHz DC – 15 GHz	50 45 40		dB
Return Loss "On State"	S11(on)	DC – 6 GHz DC – 15 GHz	17 9		dB
Return Loss RF1, RF2 "Off State"	S11(off)	DC – 6 GHz DC – 15 GHz	12 9		dB
Input Power for 1dB Compression	IP1dB	0.5 – 15 GHz	21		dBm

Table I Notes:

- 1/ Limits apply at +25°C only.
- 2/ Tested with VCTLA/B Low = -0.2V, High = -5V
- 3/ S-par data to be tabulated at 50MHz and every 1GHz, 1GHz to 15GHz. Pin = -25dBm
- 4/ P1dB shall be measured at 5GHz, 10GHz, 15GHz, Go-No-Go

Table II - Electrical Characteristics for Qualification Samples						
Parameter	Symbol	Conditions 1/, 2/, 3/, 4/, 5/, 6/ -40C ≤ T _A ≤ 85°C, 50 ohm system unless otherwise specified	Sub- groups	Min Limit	Max Limit	Units
Insertion Loss	IL	DC – 6.0 GHz	4		1.6	dB
			5,6		1.7	
		DC – 10.0 GHz	4		2.2	
			5,6		2.3	
		DC – 15.0 GHz	4		2.9	
			5,6		3.0	
Isolation	ISO	DC – 6.0 GHz	4,5,6	55		dB
		DC – 10.0 GHz	4,5,6	50		
		DC – 15.0 GHz	4,5,6	45		
Return Loss "On State"	RL(on)	DC – 6.0 GHz	4	18		dB
			5,6	17		
Return Loss RF1, RF2, "Off State"	RL(off)	DC – 6.0 GHz	4,5,6	14		dB
			DC – 15.0 GHz	4,5,6		
Input Power for 1dB Compression	IP1dB	0.5 – 15.0 GHz	4,5,6	21		dBm
Input Third Order Intercept (Two-Tone P _{IN} = 7 dBm each tone, 1MHz Separation)	IIP3	0.5 – 15.0 GHz	4,5,6	42		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 with VCTLA/B Low = -0.2 V, High = -5 V
- 4/ S-par data to be tabulated at 50MHz and every 1 GHz, 1 GHz to 15 GHz. Pin = -25 dBm
- 5/ P1dB shall be measured at 1 GHz to 15 GHz, 2 GHz steps
- 6/ IP3 shall be measured at 1 GHz to 15GHz, 2 GHz steps

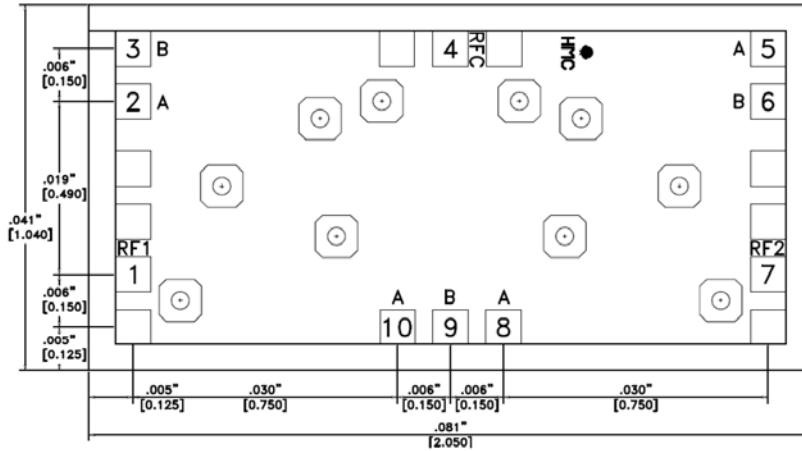
Table III - Endpoint and Delta Limits (+25°C)						
(Product is tested in accordance with Table II with the following exceptions)						
Parameter	Symbol	Sub- groups	End-point		Delta	Units
			Min	Max		
Insertion Loss	IL	4		2.9	±0.5	dB

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_A = 25°C

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5.0 Die Outline



NOTES:

1. ALL DIMENSIONS IN INCHES [MILLIMETERS]
2. BOND PADS ARE 0.004" SQUARE
3. TYPICAL BOND PAD SPACING CENTER TO CENTER IS .006"
4. BACKSIDE METALIZATION: GOLD
5. BOND PAD METALIZATION: GOLD
6. BACKSIDE OF DIE IS GROUND
7. DIE THICKNESS IS .004"
8. NO CONNECTION REQUIRED FOR UNLABELED BOND PADS

1. RF1*
 2. A**
 3. B**
 4. RFC*
 5. A**
 6. B**
 7. RF2*
 8. A**
 9. B**
 10. A**
- Die bottom must be connected to RF ground
 - No connection required for unlabeled pads
 - * (DC coupled, matched to 50 ohms, blocking cap required if RF line potential not equal to 0V)
 - ** Using any one of the A and any one of the B Pads connection is acceptable

Rev	Description of Change	Date
A	Initiate	27-October-2015
B	Changes to Section 3.2 (Absolute Maximum Ratings) and added clarification to sections 3.3 and 5.0	12-December-2015
C	Corrected minimum operating temperature from -40°C to -55°C, and corrected maximum operating temperature from 80°C to 85°C, corrected IP3 test conditions and notes in Table II, corrected numbering in Die Outline pin descriptions	26-February-2018
D	Add note to exceptions list clarifying test temperatures for interim and post burn-in electrical tests	4-June-2019