HMC226

GaAs MMIC +3V SOT26 TRANSMIT/ RECEIVE SWITCH, DC - 2.0 GHz

Typical Applications

The HMC226 is ideal for:

- 900 MHz ISM/Cellular
- 1900 MHz PCS

Features

Low Insertion Loss: 0.6 dB

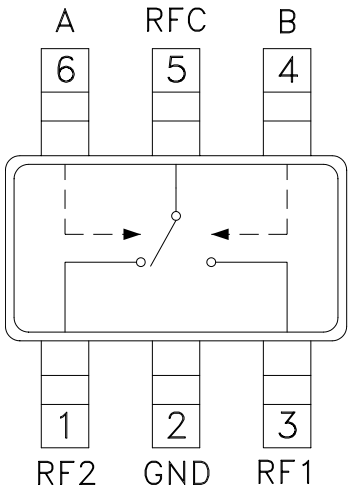
Ultra Small Package: SOT26

High Input P1dB: +35 to +38 dBm

High Input IP3: +55 to +61 dBm

Positive Control: 0/+3V to 0/+8V

Functional Diagram



General Description

The HMC226 is a low-cost SPDT switch in a 6-lead SOT26 package for use in transmit-receive applications which require very low distortion at high signal power levels. The device can control signals from DC to 2.0 GHz and is especially suited for 450 MHz, 900 MHz, and 1.8 - 2.0 GHz applications with 0.5 to 0.8 dB loss. The design provides exceptional P1dB and intermodulation performance; a +35 dBm 1dB compression point and +55 dBm third order intercept at +3 volt bias. RF1 and RF2 are reflective opens when “Off”. On-chip circuitry allows single positive supply operation at very low DC current with control inputs compatible with CMOS and most TTL logic families.

Electrical Specifications, T_A = +25° C, Vctl = 0/+3 Vdc, 50 Ohm System

Parameter		Frequency	Min.	Typ.	Max.	Units
Insertion Loss		DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz		0.5 0.6 0.8	0.8 0.9 1.2	dB dB dB
Isolation		DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz	23 17 12	26 20 15		dB dB dB
Return Loss		DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz	23 21 14	27 25 18		dB dB dB
Input Power for 1 dB Compression	0/5V Control 0/3V Control	0.3 - 2.0 GHz	34 31	38 35		dBm dBm
Input Third Order Intercept (Two-Tone Input Power = +26 dBm Each Tone)	0/5V Control 0/3V Control	0.3 - 2.0 GHz		61 55		dBm dBm
Switching Characteristics		DC - 2.0 GHz				
	tRISE, tFALL (10/90% RF)			70		ns
	tON, tOFF (50% CTL to 10/90% RF)			140		ns

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
12 Elizabeth Drive, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
Order Online at www.hittite.com

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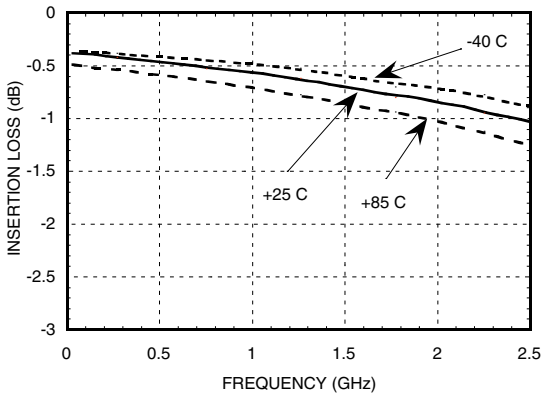
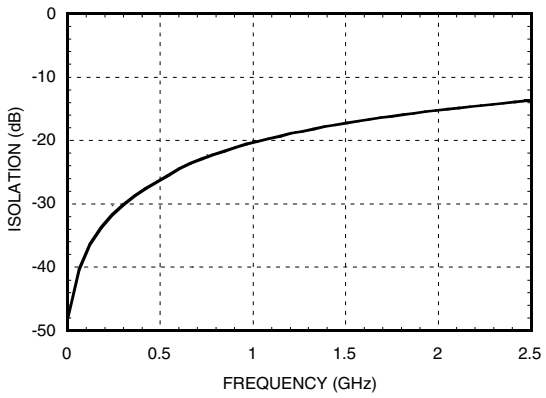
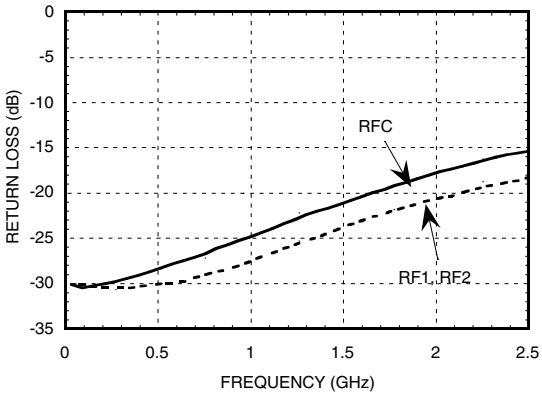
Insertion Loss vs Temperature



Isolation



Return Loss



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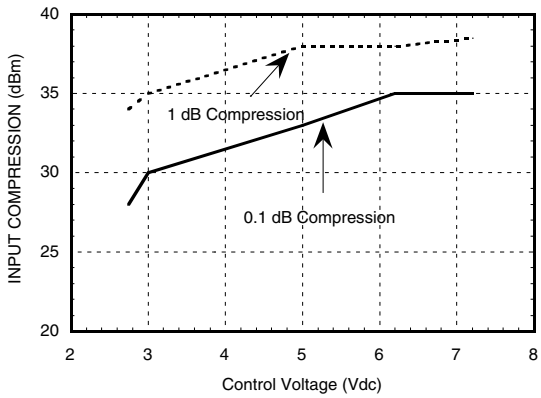
Input 0.1 and 1.0 dB Compression vs. Control Voltage @ 900 MHz



Compression vs. Control Voltage @ 900 MHz

Control Input	Input Power for 0.1 dB Compression	Input Power for 1.0 dB Compression
(Vdc)	(dBm)	(dBm)
+3	30	35
+5	33	38
+7	35	38.5

Caution: Do not operate continuously at power levels >1 dB compression and do not "hot switch" power levels greater than +23dBm (V_{CTL} = +3Vdc).

Truth Table

***Control Input Voltage Tolerances are ± 0.2 Vdc.**

Control Input*		Control Current		Signal Path State	
A (Vdc)	B (Vdc)	Ia (uA)	Ib (uA)	RF to RF1	RF to RF2
0	+3	-5	5	ON	OFF
+3	0	5	-5	OFF	ON
0	+5	-10	10	ON	OFF
+5	0	10	-10	OFF	ON
0	+8	-45	45	ON	OFF
+8	0	45	-45	OFF	ON

DC Blocks are required at ports RFC, RF1 and RF2.

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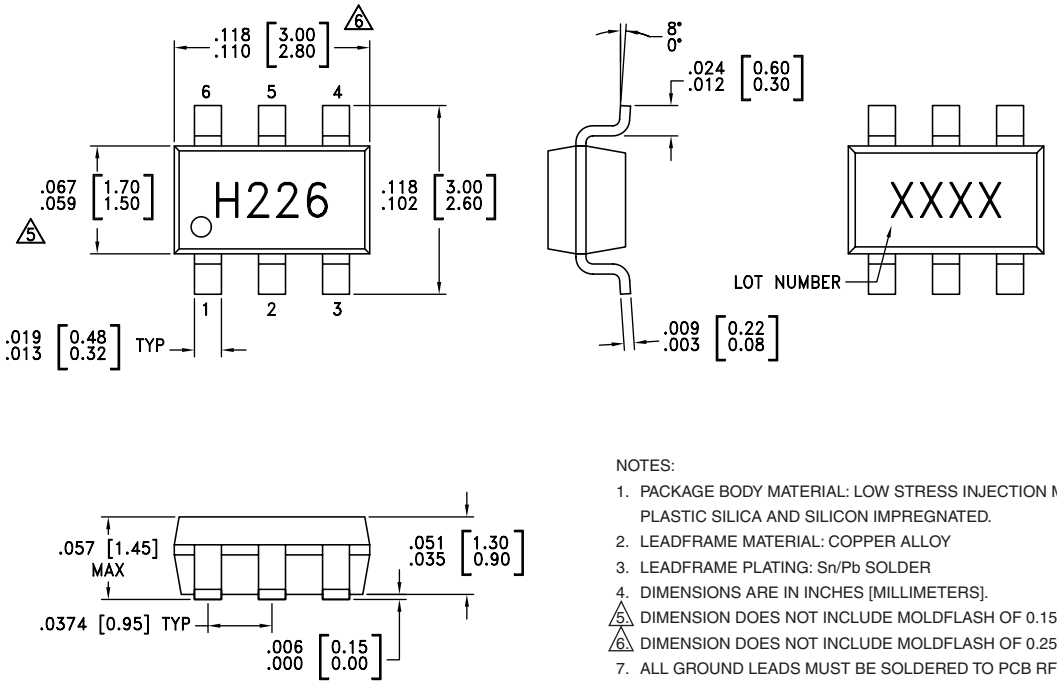
Absolute Maximum Ratings

Max. Input Power (V_{CTL} = 0/+3V)	0.05 GHz 0.5 - 2 GHz	+27 dBm +36 dBm
Control Voltage Range (A & B)		-0.2 to +12 Vdc
Storage Temperature		-65 to +150 °C
Operating Temperature		-40 to +85 °C

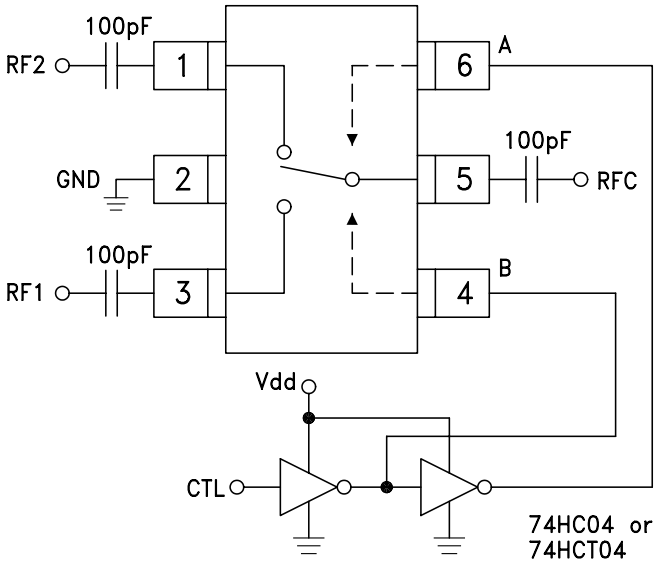
Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

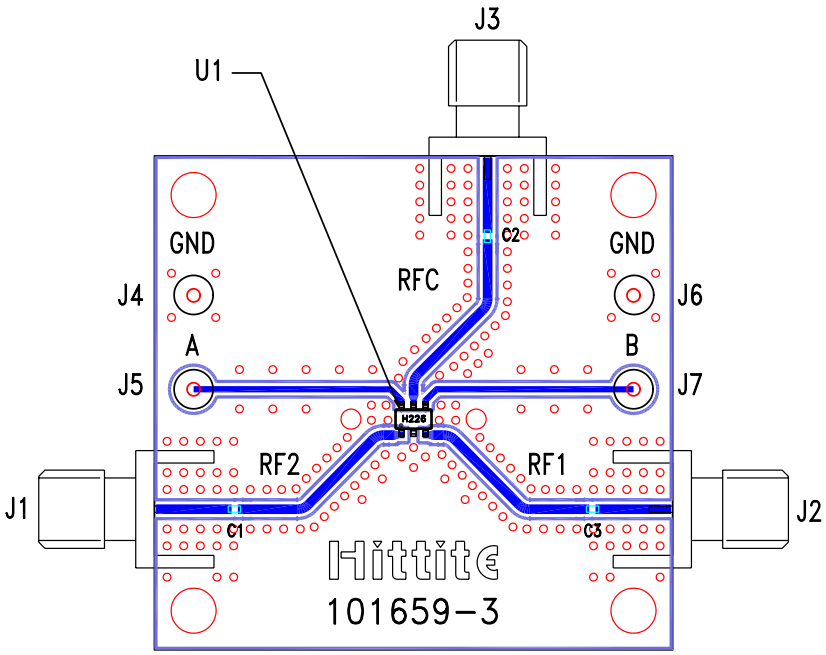
Typical Application Circuit



Notes:

1. Set logic gate and switch Vdd = +3V to +5V and use HCT series logic to provide a TTL driver interface.
2. Control inputs A/B can be driven directly with CMOS logic (HC) with Vdd of 3 to 8 Volts applied to the CMOS logic gates.
3. DC Blocking capacitors are required for each RF port as shown. Capacitor value determines lowest frequency of operation.
4. Highest RF signal power capability is achieved with V set to +10V. The switch will operate properly (but at lower RF power capability) at bias voltages down to +3V.

Evaluation Circuit Board



List of Material

Item	Description
J1 - J3	PC Mount SMA RF Connector
J4 - J7	DC Pin
C1 - C3	330 pF capacitor, 0402 Pkg.
U1	HMC226 T/R Switch
PCB*	101659 Evaluation PCB
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads and package bottom should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.