

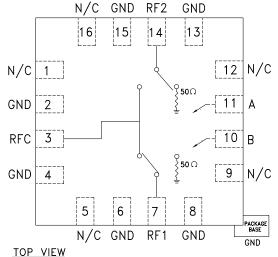
GaAs MMIC SPDT NON-REFLECTIVE SWITCH, DC - 20.0 GHz

Typical Applications

The HMC547LP3 is ideal for:

- Basestation Infrastructure
- Fiber Optics & Broadband Telecom
- Microwave Radio & VSAT
- Military Radios, Radar, & ECM
- Test Instrumentation

Functional Diagram



Features

High Isolation: >50 dB up to 5 GHz >45 dB up to 15 GHz Low Insertion Loss: 1.6 dB @ 10 GHz 2.0 dB @ 20 GHz Fast Switching

Non-Reflective Design QFN SMT Package, 9 mm²

General Description

The HMC547LP3 is a general purpose broadband high isolation non-reflective GaAs MESFET SPDT switch in a low cost leadless QFN surface mount plastic package. Covering DC to 20 GHz, the switch offers high isolation and low insertion loss. The switch features >50 dB isolation up to 5 GHz and >45 dB isolation up to 15 GHz. The switch operates using complementary negative control voltage logic lines of -5/0V and requires no bias supply. The HMC547LP3 is packaged in a leadless QFN 3 x 3 mm surface mount package.

Electrical Specifications, $T_A = +25^{\circ}$ C, With 0/-5V Control, 50 Ohm System

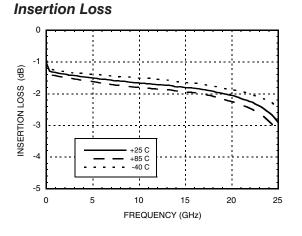
Parameter	Frequency	Min.	Тур.	Max.	Units
Insertion Loss	DC - 5.0 GHz DC - 10.0 GHz DC - 15.0 GHz DC - 20.0 GHz		1.5 1.6 1.8 2.0	1.9 2.0 2.2 2.5	dB dB dB dB
Isolation	DC - 5.0 GHz DC - 15.0 GHz DC - 20.0 GHz	45 40 33	50 45 38		dB dB dB
Return Loss "On State"	DC - 20.0 GHz		17		dB
Return Loss RF1, RF2 "Off State"	DC - 5.0 GHz DC - 15.0 GHz DC - 20.0 GHz		25 17 13		dB dB dB
Input Power for 1 dB Compression	0.5 - 20.0 GHz	20	23		dBm
Input Third Order Intercept (Two-Tone Input Power= +7 dBm Each Tone)	0.5 - 10.0 GHz 0.5 - 20.0 GHz		48 45		dBm dBm
Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF)	DC - 20 GHz		3 6		ns ns

14

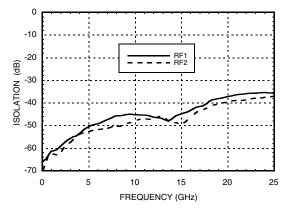
SWITCHES - SMT

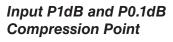


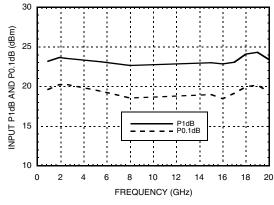
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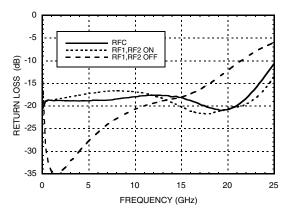
Isolation Between Ports RFC and RF1/RF2



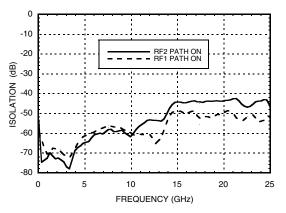




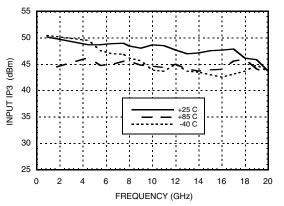
Return Loss



Isolation Between Ports RF1 and RF2



Input Third Order Intercept Point





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Absolute Maximum Ratings

RF Input Power (VctI = -5V)	+23 dBm
Control Voltage Range (A & B)	+0.5V to -7.5 Vdc
Hot Switch Power Level (Vctl = -5V)	+23 dBm
Channel Temperature	150 °C
Continuous Pdiss (T=85°C) (derate 4 mW/°C about 85°C)	0.26 W
Thermal Resistance (Insertion Loss Path)	420 °C/W
Thermal Resistance (Terminated Path)	250 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C
ESD Sensitivity (HBM)	Class 1C

ELECTROSTATIC SENSITIVE DEVICE OBSERVE HANDLING PRECAUTIONS

Outline Drawing

BOTTOM VIEW 3.10 2.90 .122 .114 HMC PART -.016 [0.40] REF PIN 16 NUMBER .012 0.30 .008 [0.20] MIN (DIGITS ONLY) 0.18 13 PIN 1 12 0.56 0.44 .022 .122 3.10 2.90 .061 1.56 .017 .114 1.44 9 4 **EXPOSED** 5 8 1.95 1.50 .077 .059 GROUND LOT NUMBER PADDLE SQUARE 039 1.00 NOTES: 1. MATERIAL PACKAGE BODY: LOW STRESS INJECTION MOLDED .031 0.80 PLASTIC SILICA AND SILICON IMPREGNATED. .002 0.05 2. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY .000 0.00 3. LEAD AND GROUND PADDLE PLATING: Sn/Pb SOLDER 4. DIMENSIONS ARE IN INCHES [MILLIMETERS]. SEATING 5. LEAD SPACING TOLERANCE IS NON-CUMULATIVE PLANE 6. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. .003[0.08] С PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM. C-7. PACKAGE WARP SHALL NOT EXCEED 0.05mm. 8. ALL GROUND LEADS, N.C. LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND. 9. CLASSIFIED AS MOISTURE SENSITIVITY LEVEL (MSL) 1.

For price, delivery, and to place orders, please contact Hittite Microwave Corporation: 20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373 Order On-line at www.hittite.com

Control Voltages

State	Bias Condition
Low	0 to -0.2V @ 10 uA Max.
High	-5V @ 3 uA Typ. to -7V @ 10 uA Typ. (± 0.5 Vdc)

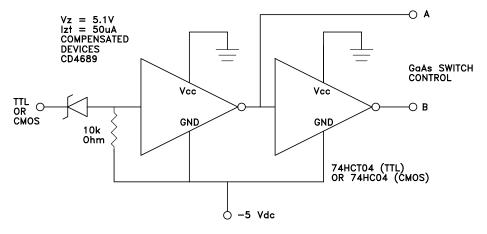
Truth Table

Control Input		Signal Path State		
A	В	RFC to RF1	RFC to RF2	
High	Low	On	Off	
Low	High	Off	On	



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Suggested Driver Circuit



Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 5, 9, 12, 16	N/C	This pin should be connected to PCB RF ground to maximize isolation	
2, 4, 6, 8, 13, 15	GND	Package bottom has exposed metal paddle that must also be connected to PCB RF ground.	
3, 7, 14	RFC, RF1, RF2	This pin is DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V.	
10	В	See truth table and control voltage table.	R
11	A	See truth table and control voltage table.	⊥ c ⊥ c

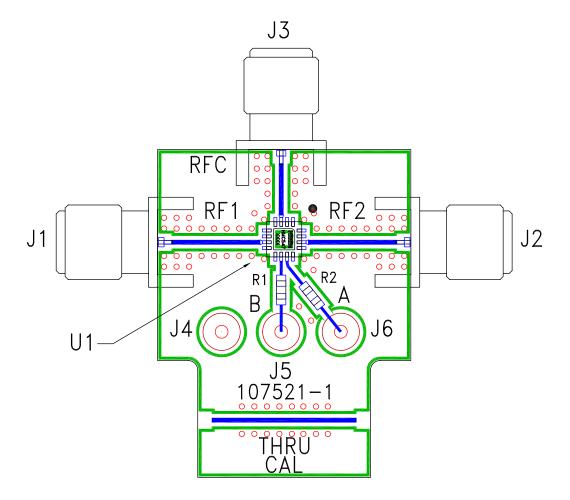
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Evaluation PCB



List of Materials for Evaluation PCB 105711 [1]

Item	Description	
J1 - J3	PC Mount SRI SMA Connector	
J4 - J6	DC Pin	
R1 - R2	100 Ohm Resistor, 0603 Pkg.	
U1	HMC547LP3 SPDT Switch	
PCB [2]	107521 Evaluation PCB	

Reference this number when ordering complete 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.



HMC547LP3

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Notes:

SWITCHES - SMT