



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





### Typical Applications

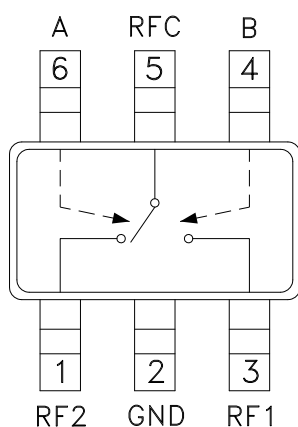
The HMC545 / HMC545E is ideal for:

- Cellular/3G Infrastructure
- Private Mobile Radio Handsets
- WLAN, WiMAX & WiBro
- Automotive Telematics
- Test Equipment

### Features

- Low Insertion Loss: 0.25 dB
- High Input IP3: +65 dBm
- Low DC Power Consumption
- Positive Control: 0/+3V to 0/+8V
- Ultra Small Package: SOT26

### Functional Diagram



### General Description

The HMC545 and HMC545E are low-cost SPDT switches in 6-lead SOT26 plastic packages for use in general switching applications which require very low insertion loss and very small size. With 0.25 dB typical loss, these devices can control signals from DC to 3.0 GHz and are especially suited for IF and RF applications including Cellular/3G, ISM, automotive and portables. The design provides exceptional insertion loss performance, ideal for filter and receiver switching. RF1 and RF2 are reflective shorts when "Off". The two control voltages require a minimal amount of DC current and offer compatibility with CMOS and some TTL logic families.

### Electrical Specifications

$T_A = +25^\circ\text{C}$ ,  $V_{ctl} = 0/+5\text{Vdc}$  (Unless Otherwise Stated), 50 Ohm System

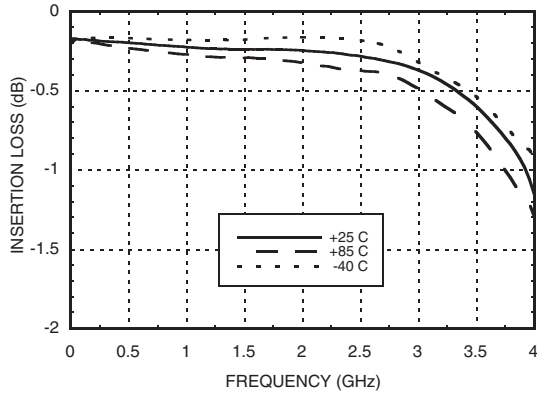
Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 1.0 GHz		0.25	0.4	dB
	DC - 2.5 GHz		0.3	0.5	dB
	DC - 3.0 GHz		0.4	0.7	dB
Isolation	DC - 2.2 GHz	26	31		dB
	DC - 2.5 GHz	22	27		dB
	DC - 3.0 GHz	20	24		dB
Return Loss	DC - 1.0 GHz		25		dB
	DC - 2.0 GHz		21		dB
	DC - 2.5 GHz		19		dB
	DC - 3.0 GHz		17		dB
Input Power for 1 dB Compression	0.5 - 3.0 GHz	$V_{ctl} = 0/+3\text{V}$	23	27	dBm
		$V_{ctl} = 0/+5\text{V}$	29	33	dBm
		$V_{ctl} = 0/+8\text{V}$	32	36	dBm
Input Third Order Intercept (Two-tone Input Power = +17 dBm Each Tone)	0.5 - 3.0 GHz	$V_{ctl} = 0/+3\text{V}$		45	dBm
		$V_{ctl} = 0/+5\text{V}$		65	dBm
		$V_{ctl} = 0/+8\text{V}$		65	dBm
Switching Characteristics	DC - 3.0 GHz	tRISE, tFALL (10/90% RF)		70	ns
		tON, tOFF (50% CTL to 10/90% RF)		90	ns

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

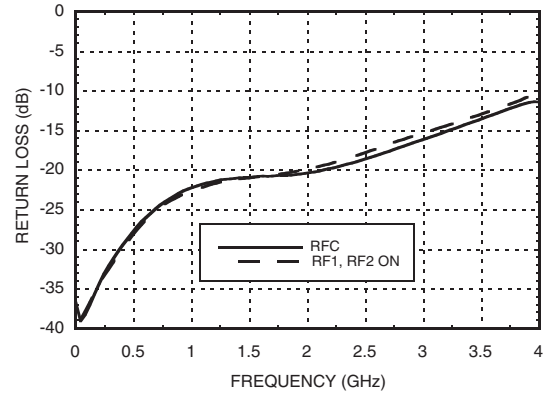
For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at [www.analog.com](http://www.analog.com) Application Support: Phone: 1-800-ANALOG-D



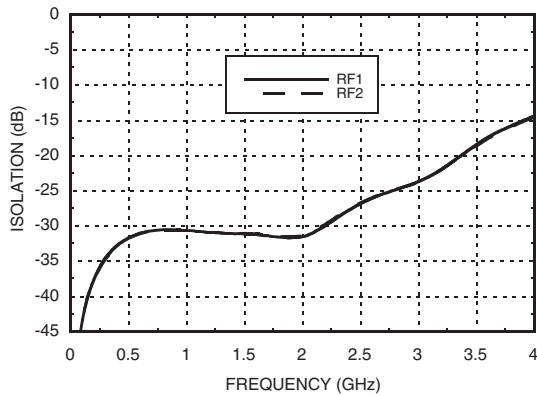
### Insertion Loss



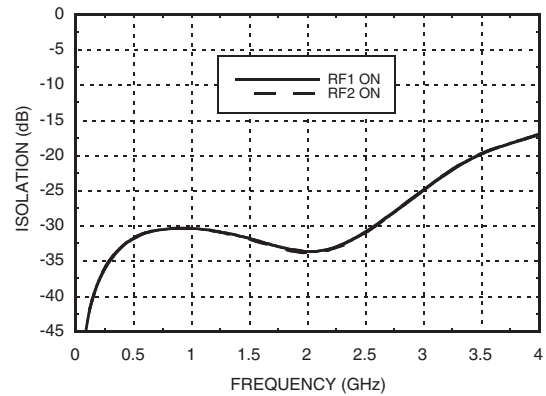
### Return Loss



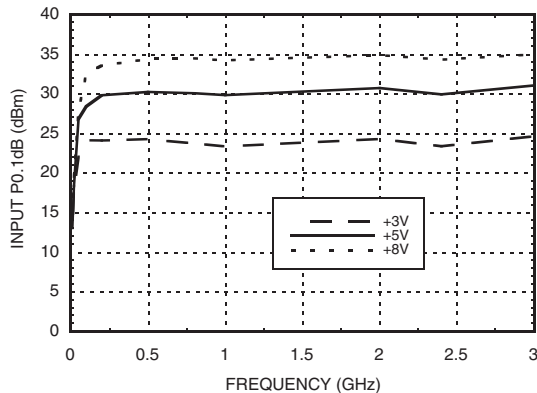
### Isolation Between Ports RFC and RF1/RF2



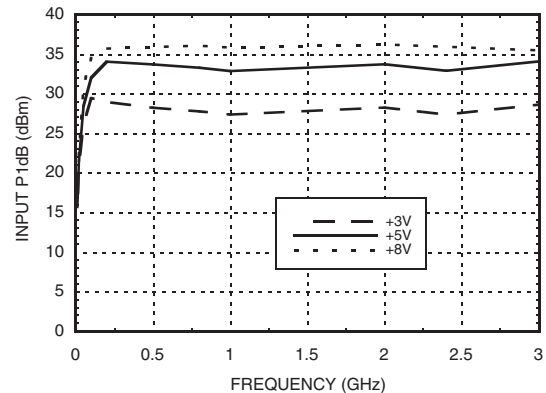
### Isolation Between Ports RF1 and RF2



### Input P0.1dB vs. Vctl



### Input P1dB vs. Vctl

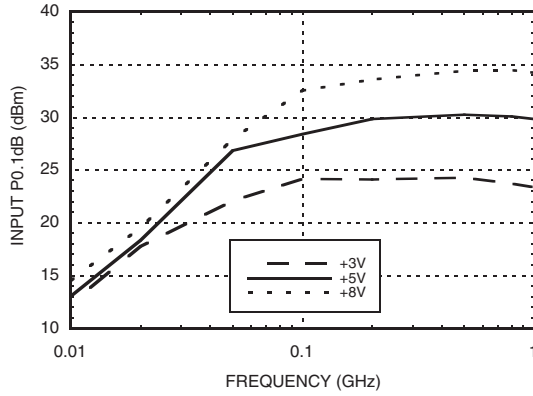


Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

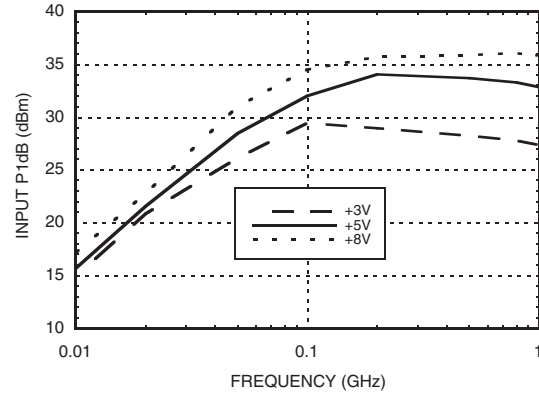
For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at [www.analog.com](http://www.analog.com) Application Support: Phone: 1-800-ANALOG-D



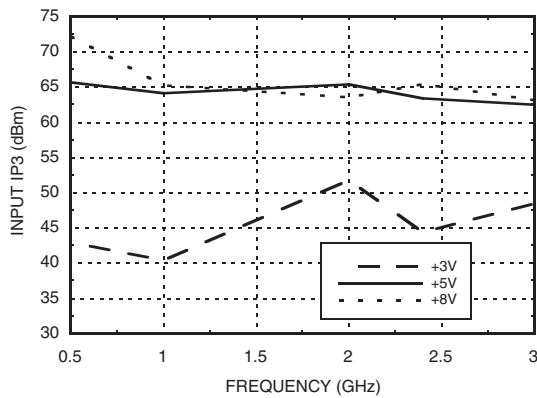
**Low Frequency Input P0.1dB vs. Vctl**



**Low Frequency Input P1dB vs. Vctl**



**Input Third Order Intercept Point vs. Control Voltage**



**Absolute Maximum Ratings**

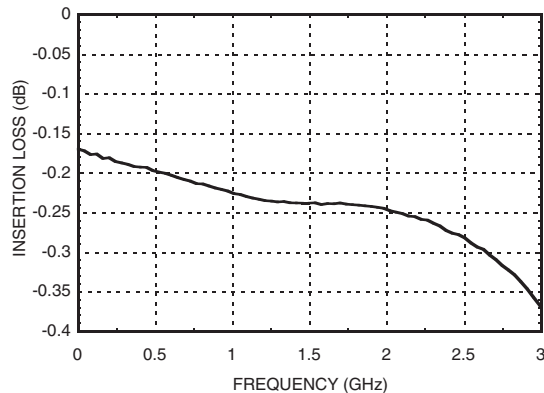
RF Input Power (Vctl = 0/+8V)	+34 dBm
Control Voltage Range (A & B)	-0.2 to +12 Vdc
Hot Switch Power Level (Vctl = 0/+8V)	+32 dBm
Channel Temperature	150 °C
Continuous P <sub>diss</sub> (T = 85 °C) (derate 3.5 mW/ °C above 85 °C)	0.23 W
Thermal Resistance	282 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

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



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Insertion Loss, T = +25 °C**



**Truth Table**

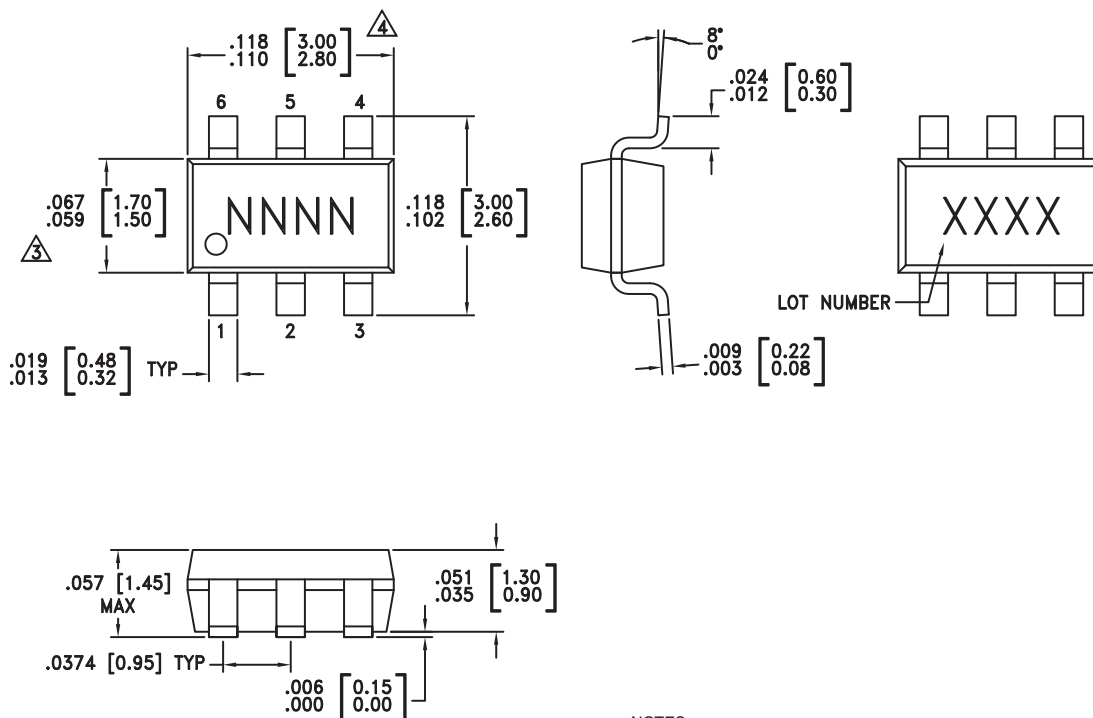
Control Input		Control Current	
A	B	RFC to RF1	RFC to RF2
Low	High	Off	On
High	Low	On	Off

**Control Voltages**

State	Bias Condition
Low	0 to 0.2 Vdc @ 1 μA Typical
High	+3 Vdc @ 0.5 μA Typical to +8 Vdc @ 3 μA Typical (±0.2 Vdc)



### Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

### Package Information

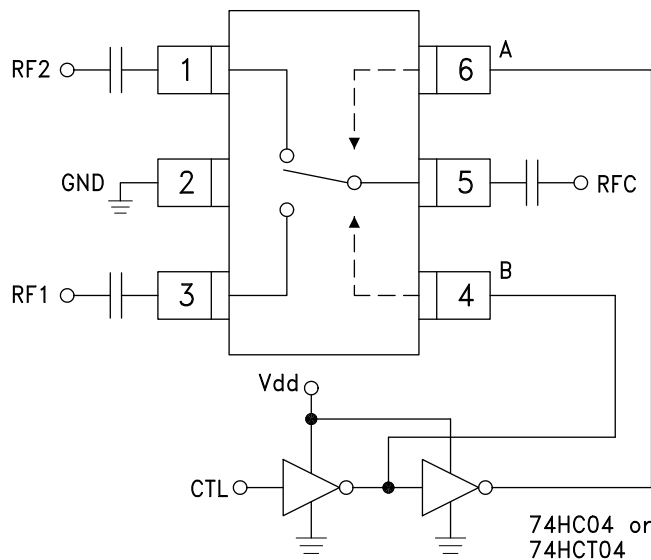
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking
HMC545	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H545
HMC545E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	545E

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C



### Typical Application Circuit



**Notes:**

1. Set logic gate 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 +3V to +8V 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 Vdd = +8V and A/B set to 0/+8V.

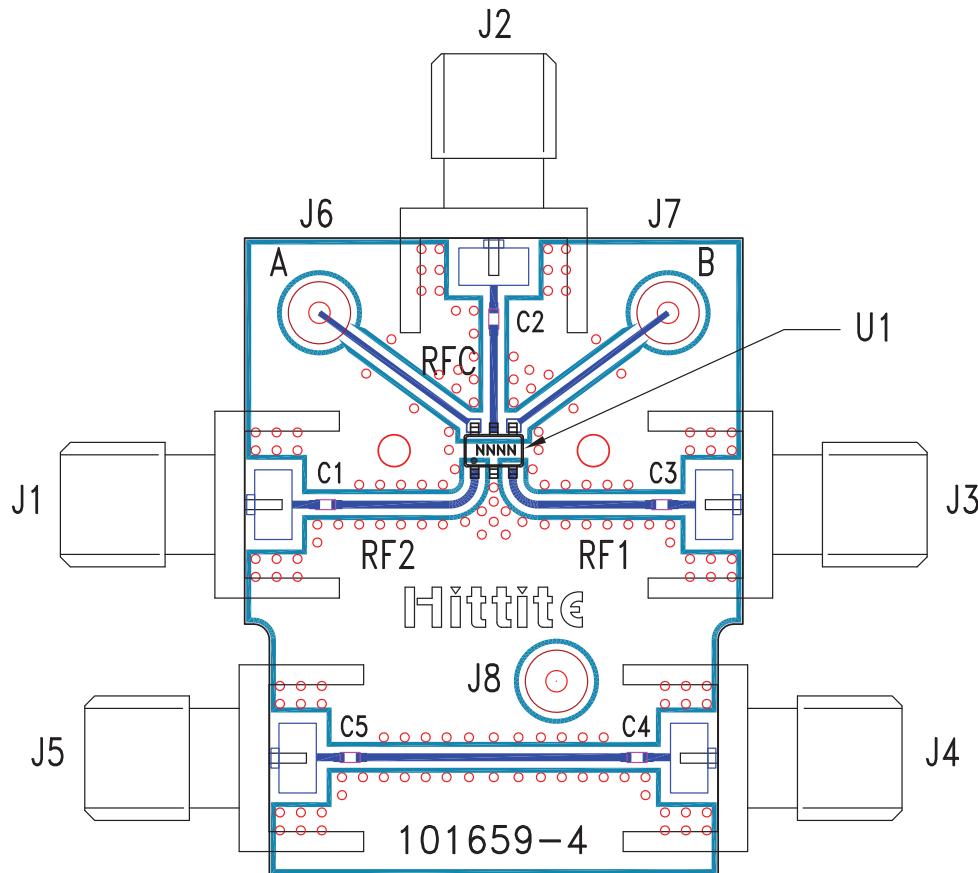
### Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 3, 5	RF2, RF1, RFC	These pins are DC coupled and matched to 50 Ohms. Blocking capacitors are required.	
2	GND	This pin must be connected to RF/DC ground.	
4	B	See truth and control voltage tables.	
6	A	See truth and control voltage tables.	

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at [www.analog.com](http://www.analog.com) Application Support: Phone: 1-800-ANALOG-D

### Evaluation PCB



### List of Materials for Evaluation PCB 101675 [1]

Item	Description
J1 - J5	PCB Mount SMA RF Connector
J6 - J8	DC Pin
C1 - C5	330 pF capacitor, 0402 Pkg.
U1	HMC545 / HMC545E SPDT Switch
PCB [2]	101659 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] 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 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.