



**THE DATASHEET OF  
HMC245QS16ETR**





### Typical Applications

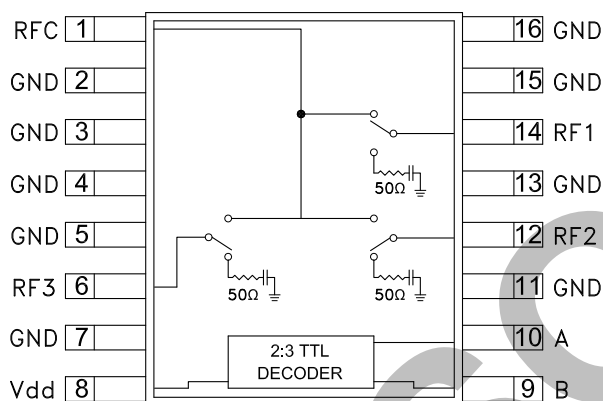
The HMC245QS16 / HMC245QS16E is ideal for:

- Basestation Infrastructure
- CATV / DBS
- Wireless Local Loop
- Test Equipment

### Features

- Low Insertion Loss: 0.5 dB @ 2.0 GHz
- Non-Reflective Design
- Integrated 2:3 TTL Decoder
- “All Off” Isolation State
- Single Positive Supply: Vdd = +5V
- 16 Lead QSOP SMT Package

### Functional Diagram



### General Description

The HMC245QS16 & HMC245QS16E are low cost non-reflective SP3T switches in 16-lead QSOP surface mount packages. Covering DC to 3.5 GHz, the switch offers 30 to 40 dB isolation and a low insertion loss of 0.5 dB. A 2:3 TTL/CMOS compatible decoder is integrated on the switch requiring only 2 control lines and a single +5V bias to select each path, replacing 6 control lines normally required by GaAs SP3T switches.

### Electrical Specifications,

$T_A = +25^\circ \text{C}$ , For TTL Control and Vdd = +5V in a 50 Ohm System

Parameter	Frequency	Min.	Typ.	Max.	Units
Insertion Loss	DC - 2.0 GHz		0.5	0.8	dB
	DC - 3.0 GHz		0.6	0.9	dB
	DC - 3.5 GHz		0.7	1.0	dB
Isolation	DC - 1.0 GHz	40	44		dB
	DC - 2.0 GHz	35	39		dB
	DC - 2.5 GHz	31	35		dB
	DC - 3.5 GHz	26	30		dB
Return Loss	“On State”	DC - 1.5 GHz	20		dB
		DC - 3.5 GHz	17		dB
Return Loss RF1 - 3	“Off State”	0.3 - 3.5 GHz	12		dB
		0.5 - 3.5 GHz	15		dB
Input Power for 1 dB Compression	0.3 - 2.5 GHz	23	26		dBm
	0.3 - 3.5 GHz	22	25		dBm
Input Third Order Intercept (Two-tone Input Power = +7 dBm each tone)	0.3 - 2.5 GHz	44	48		dBm
	0.3 - 3.5 GHz	40	44		dBm
Switching Characteristics	0.3 - 3.5 GHz	tRISE, tFALL (10/90% RF)	40		ns
		tON, tOFF (50% CTL to 10/90% RF)	150		ns

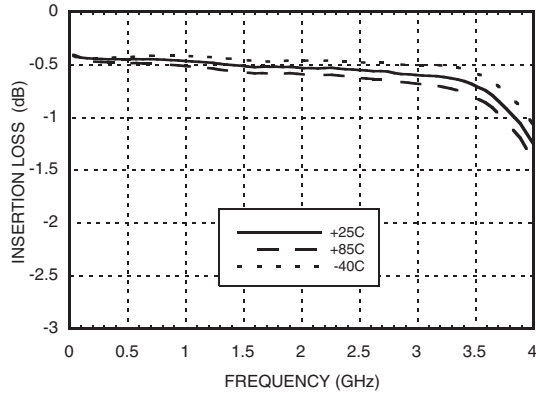
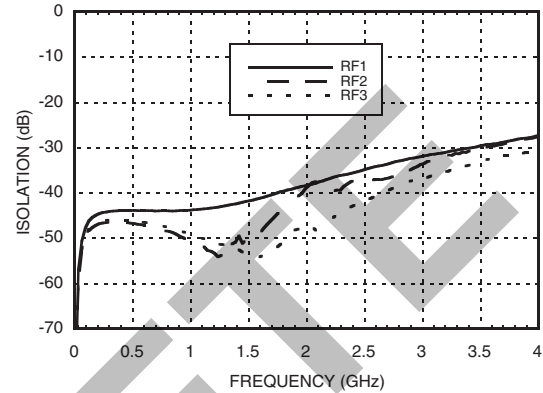
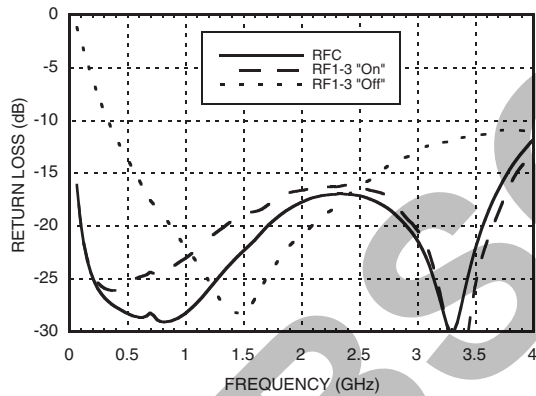
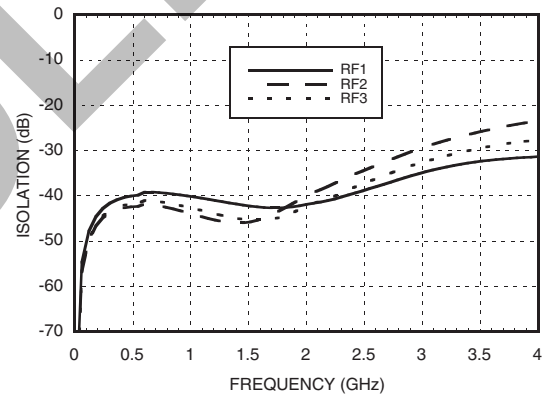
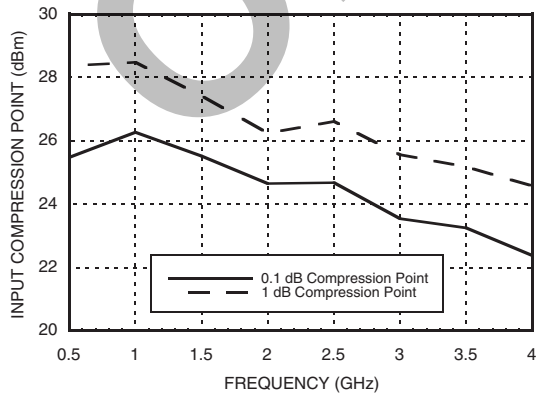
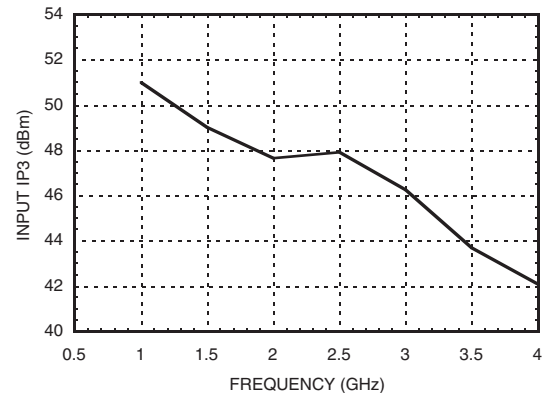
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# HMC245QS16 / 245QS16E

## GaAs MMIC SP3T NON-REFLECTIVE SWITCH, DC - 3.5 GHz

**Insertion Loss vs. Temperature**

**Isolation**

**Return Loss**

**Off State Isolation**

**0.1 and 1 dB Input Compression Point**

**Input Third Order Intercept Point**




## HMC245QS16 / 245QS16E

### GaAs MMIC SP3T NON-REFLECTIVE SWITCH, DC - 3.5 GHz

#### Bias Voltage & Current

Vdd Range= +5.0 Vdc ±10%		
Vdd (Vdc)	Idd (Typ) (mA)	Idd (Max) (mA)
+5.0	3.0	6.0

#### TTL/CMOS Control Voltages

State	Bias Condition
Low	0 to +0.8 Vdc @ 5 uA Typ.
High	+2.0 to +5.0 Vdc @ 70 uA Typ.

#### Truth Table

Control Input		Signal Path State
A	B	RF COM to:
Low	Low	RF1
High	Low	RF2
Low	High	RF3
High	High	All Off

OBSOLETE



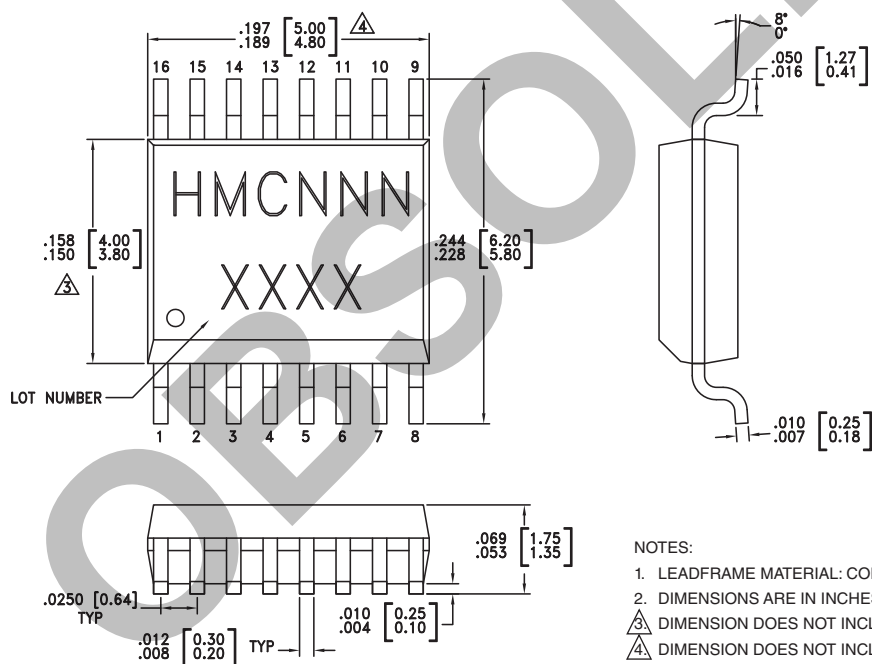
### Absolute Maximum Ratings

Bias Voltage Range (Port Vdd)	+7.0 Vdc
Control Voltage Range (A & B)	-0.5V to Vdd +1 Vdc
Channel Temperature	150 °C
Thermal Resistance (Insertion Loss Path)	210 °C/W
Thermal Resistance (Terminated Path)	250 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
Maximum Input Power Vdd = +5 Vdc	+20 dBm (0.05 - 0.5 GHz) +27 dBm (0.5 - 3.5 GHz)
ESD Sensitivity (HBM)	Class 1A



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

### Outline Drawing



NOTES:

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

### Package Information


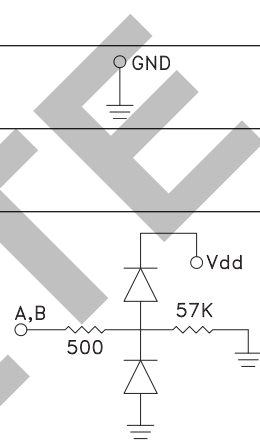
Part Number	Package Body Material	Leadframe Plating	MSL Rating	Package Marking <sup>[3]</sup>
HMC245QS16	Low Stress Injection Molding Plastic Silica and Silicon Impregnated	Sn/Pb Solder	MSL1 <sup>[1]</sup>	HMC245 XXXX
HMC245QS16E	RoHS-compliant Low Stress Injection Molding Plastic Silica and Silicon Impregnated	100% Matte Tin	MSL1 <sup>[2]</sup>	HMC245 XXXX

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX




**Pin Descriptions**

Pin Number	Function	Description	Interface Schematic
1, 6, 12, 14	RF3, RF2, RF1, RFC	This pin is DC coupled and matched to 50 Ohms. Blocking capacitors are required.	
2 - 5, 7, 11, 13, 15, 16	GND	This pin must be connected to PCB RF ground to maximize isolation.	
8	Vdd	Supply Voltage +5.0 Vdc ±10%	
9	B	See truth table and control voltage table.	
10	A	See truth table and control voltage table.	



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