

# Single Band T/R Antenna Switch Module 800–1000 MHz



AM114-609

## Applications

- Transmit/Receive Antenna Switch for Wireless System with Integrated LPF and Coupler for Power Detection

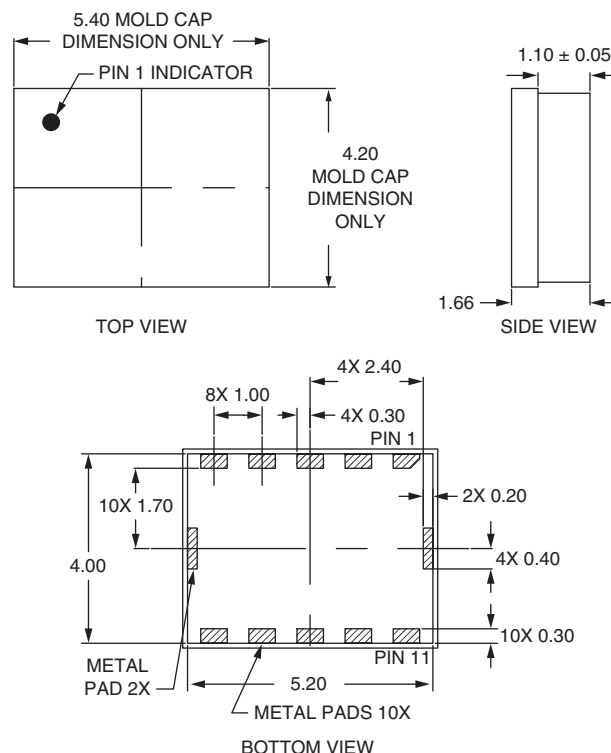
## Features

- LTCC Technology Integrating LPF/Coupler
- GaAs PHEMT Switch Technology
- SMD Package, 5.2 x 4 x 1.7 mm
- Single Control with Low Current Consumption

## Description

The AM114-609 is a high power antenna switch with an LTCC low pass filter and LTCC coupler included for power detection. The switches are PHEMT GaAs FETs that can operate at 2.5 V with low DC current drain.

## Outline Drawing



Dimensions in mm. Tolerance ± 0.2 unless otherwise specified.

## Electrical Specifications @ 25°C

### Receive Path

Parameter	Min.	Typ.	Max.	Unit
Frequency Range	851		941	MHz
Insertion Loss		0.6	0.8	dB
VSWR In-Band		1.5:1		
RF Input Power			0	dBm
R <sub>X</sub> Current @ V <sub>S</sub> = 3 V		30		μA
Supply Voltage (V <sub>S</sub> )	2.7	3.0	5.0	V

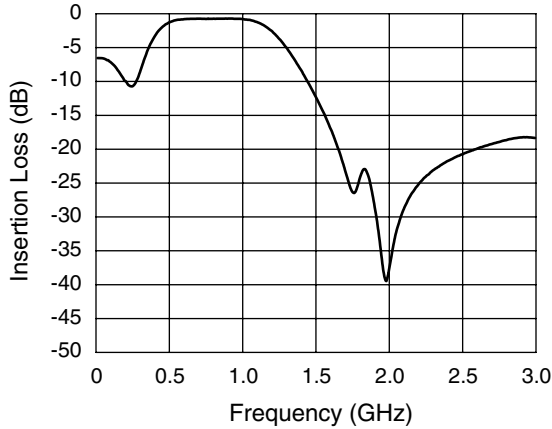
**Transmit Path**

Parameter	Min.	Typ.	Max.	Unit
Frequency Range	806		928	MHz
Insertion Loss		0.8	1.0	dB
Isolation $T_X - R_X$ in $T_X$ Mode ( $V_{CTL} = 0$ V)		25		dB
Inter-modulation 3rd/5th Order		-60		dBc
Inter-modulation 3rd/5th Order – Under VSWR		-55		dBc
Input VSWR In-Band		1.5:1		
Harmonic Rejection $2 \cdot F_O$		15		dB
$3 \cdot F_O$		20		dB
Directivity		15		dB
Coupling Factor	19	20	21	dB
$T_X$ Current		150		$\mu$ A
Supply Voltage ( $V_S$ )	2.7	3.0	5.0	V
RF Input Power		3.0		dBm

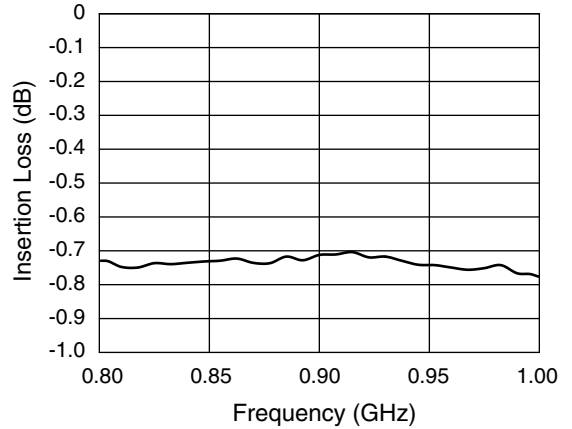
**Absolute Maximum Ratings**

Characteristic	Value
Operating Temperature Range ( $T_{OP}$ )	-30 to +85°C
Storage Temperature Range ( $T_{STG}$ )	-40 to +85°C
Input Power ( $P_{IN}$ )	38 dBm
Control Voltage Logic 0	-0.1 to 0.2 V
Supply Voltage ( $V_S$ )	5 V
Nominal I/O Impedance ( $T_X$ , $R_X$ , Ant)	50 $\Omega$

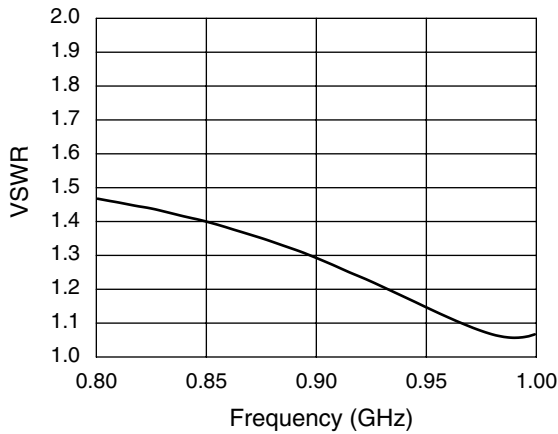
### Typical Performance Data



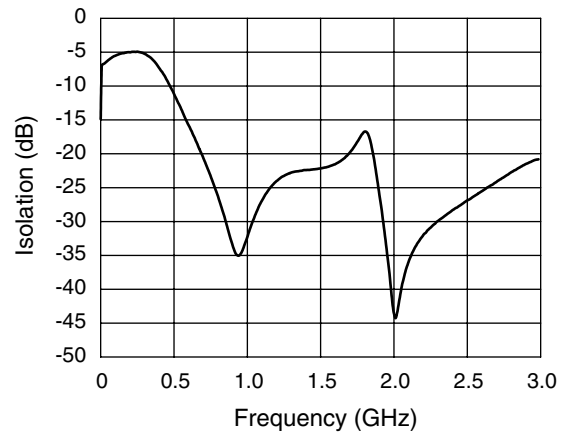
**T<sub>X</sub> Insertion Loss vs. Frequency**



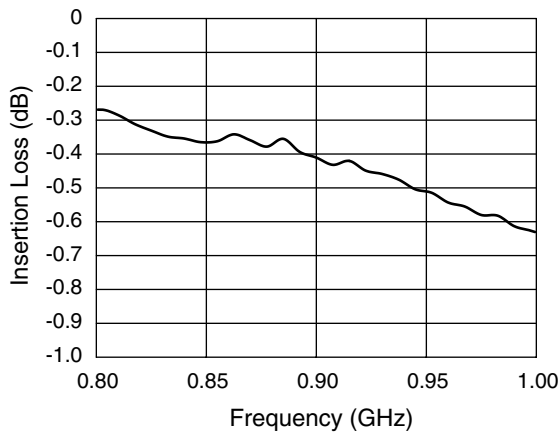
**T<sub>X</sub> Insertion Loss vs. Frequency**



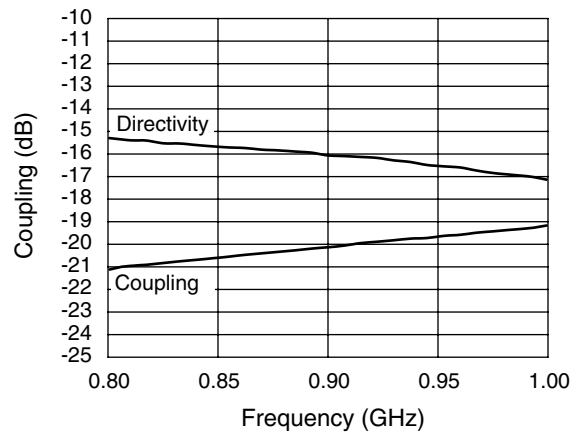
**T<sub>X</sub> VSWR vs. Frequency**



**T<sub>X</sub> to R<sub>X</sub> Isolation vs. Frequency**

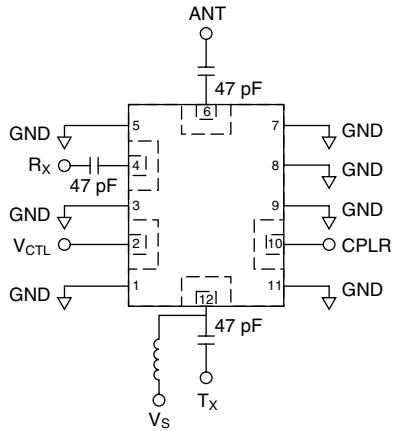


**R<sub>X</sub> Insertion Loss vs. Frequency**



**Coupling vs. Frequency**

**Pin Out (Top View)**

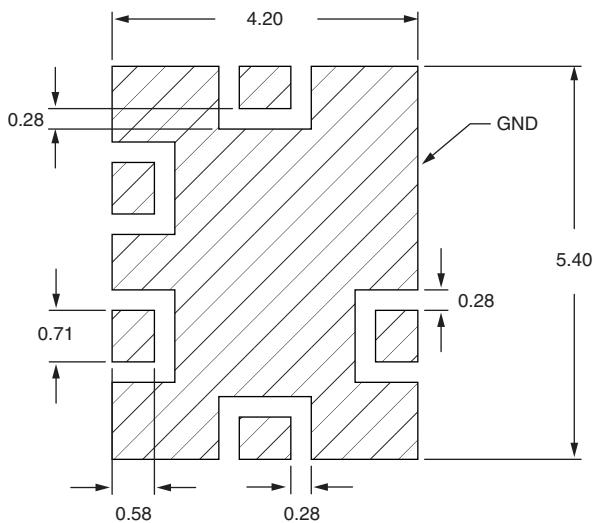


Blocking capacitors (47 pF) and inductor (82 nH) to be supplied externally.

**Pin Out Table**

Pin	Description	Pin	Description
1	GND	7	GND
2	V <sub>CTL</sub>	8	GND
3	GND	9	GND
4	R <sub>X</sub>	10	Coupler
5	GND	11	GND
6	Ant	12	T <sub>X</sub>

**Suggested Land Pattern**



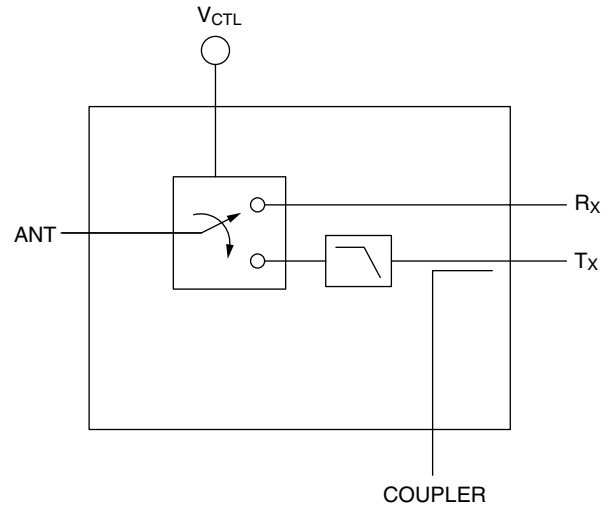
Dimensions are in mm.

**Truth Table**

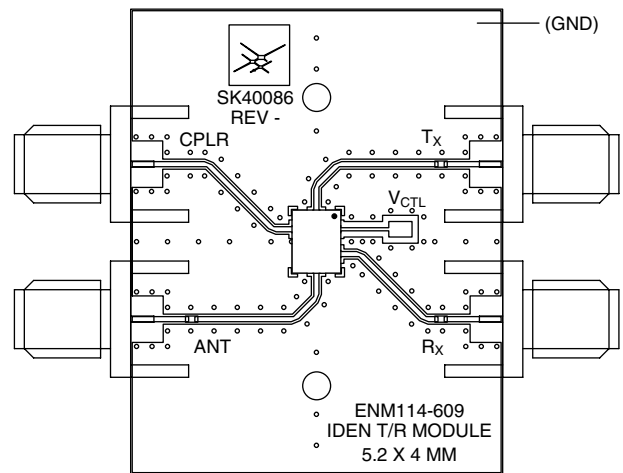
Mode	V <sub>CTL</sub>
T <sub>X</sub>	0
R <sub>X</sub>	Open Circuit

V<sub>S</sub> = 2.7 to 5 V supplied externally to T<sub>X</sub> port.

**Block Diagram**



**Evaluation PCB**



PCB # SK40086, Material: FR4, Dielectric constant: 4.1. The circuit board used in the final application should employ RF circuit design techniques. RF signal lines should have 50 Ω impedance. The package bottom ground plane should be connected directly to PCB ground plane. A sufficient number of via holes should be used to connect the top and bottom ground planes of the PCB. The evaluation circuit board shown is available upon request.