

# PHEMT GaAs IC High Power SP3T 0.1–2.5 GHz Switch Chip



AS202-000

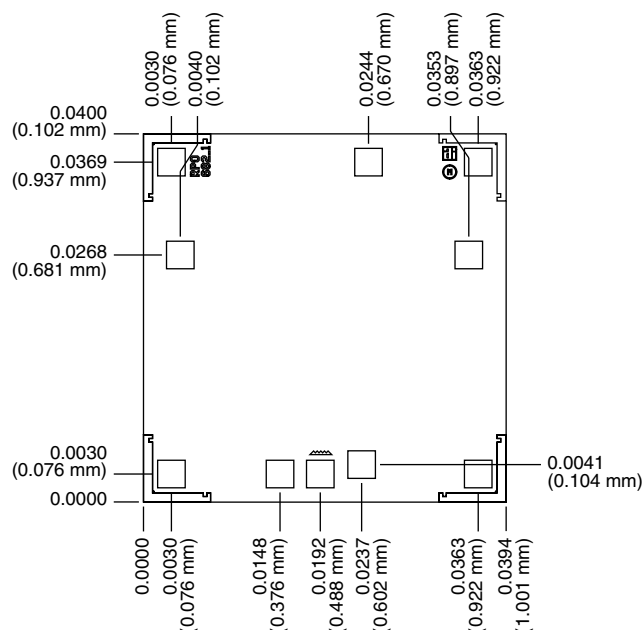
## Features

- Positive Low Voltage Control (0/2.75 V Operation)
- Low Insertion Loss (0.65 dB @ 2 GHz)
- High Isolation (27 dB at 1 and 2 GHz)
- Excellent Harmonics Performance (65 dBc @ 2.75 V 1 GHz  $P_{IN} = 34$  dBm)

## Description

The AS202-000 is a PHEMT GaAs IC SP3T antenna switch operating in the 800–2500 MHz frequency range. Switching between the antenna and  $T_X/R_X$  ports is accomplished with 3 control inputs. When the control inputs are driven with the appropriate voltages, a low insertion loss path is provided from an antenna port to an  $R_X$  or  $T_X$  port, while the other ports have high off isolation. The AS202-000 is an ideal switch chip for use in antenna switch and front-end modules.

## Outline Drawing



Dimensions in inches (mm). Thickness: 0.008 (0.200 mm)  $\pm$  0.001 (0.025 mm). Tolerance:  $\pm$  0.001 (0.025 mm).

## Electrical Specifications at 25°C (0, +2.75 V)

Parameter <sup>1</sup>	Frequency	Min.	Typ.	Max.	Unit	
Insertion Loss <sup>2</sup>	Ant-J <sub>1</sub> , J <sub>2</sub> , J <sub>3</sub>	0.1–0.5 GHz		0.45	0.60	dB
		0.5–1.0 GHz		0.50	0.65	dB
		1.0–2.0 GHz		0.65	0.80	dB
		2.0–2.5 GHz		0.75	0.95	dB
Isolation	Ant-J <sub>1</sub> , J <sub>2</sub> , J <sub>3</sub>	0.1–0.5 GHz	26	30		dB
		0.5–1.0 GHz	24	28		dB
		1.0–2.0 GHz	22	26		dB
		2.0–2.5 GHz	21	25		dB
VSWR <sup>3</sup>	Ant-J <sub>1</sub> , J <sub>2</sub> , J <sub>3</sub>	0.1–1.0 GHz		1.2:1	1.4:1	
		1.0–2.0 GHz		1.4:1	1.6:1	
		2.0–2.5 GHz		1.5:1	1.8:1	

## Operating Characteristics at 25°C (0, +2.75 V)

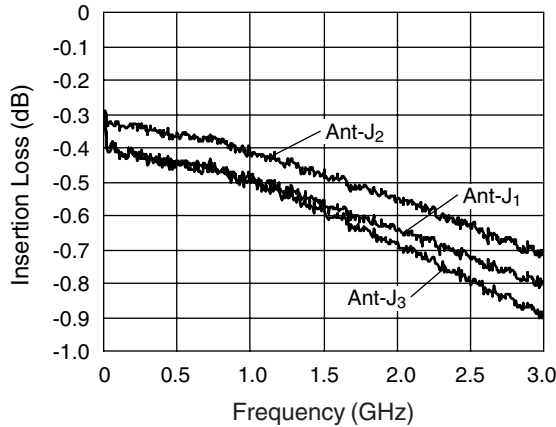
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
2nd Harmonic	$P_{IN} = 34$ dBm @ 2.75 V	1 GHz		72		dBc
3rd Harmonic	$P_{IN} = 34$ dBm @ 2.75 V	1 GHz		65		dBc
2nd Harmonic	$P_{IN} = 32$ dBm @ 2.75 V	2 GHz		70		dBc
3rd Harmonic	$P_{IN} = 32$ dBm @ 2.75 V	2 GHz		65		dBc
Control Voltages	$V_{Low}$		-0.20	0	0.25	V
	$V_{High}$		2.60	2.75	5.00	V
Control Currents	$V_{Low} = -0.2$ to 0.25 V			10	20	$\mu$ A
	$V_{High} = 2.5$ to 3.0 V			25	50	$\mu$ A
	$V_{High} = 5.0$ V			50	100	$\mu$ A

1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.

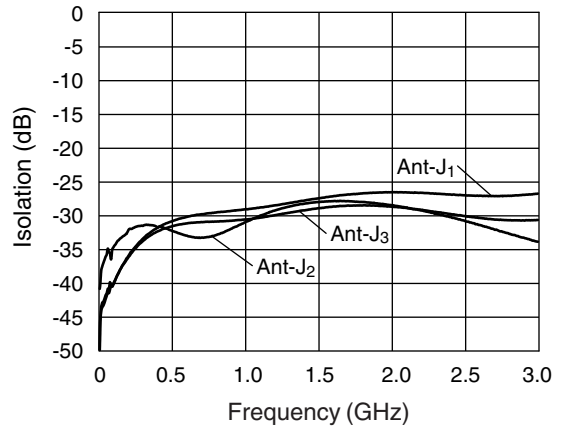
3. Insertion loss state.

2. Insertion loss changes by 0.003 dB/°C.

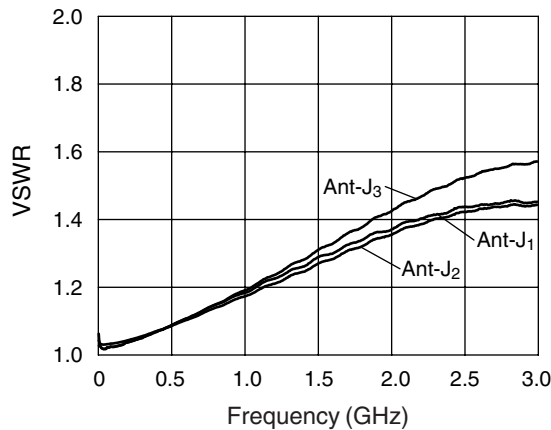
**Typical Performance Data (0, +2.75 V,  $C_{BL} = 47$  pF)**



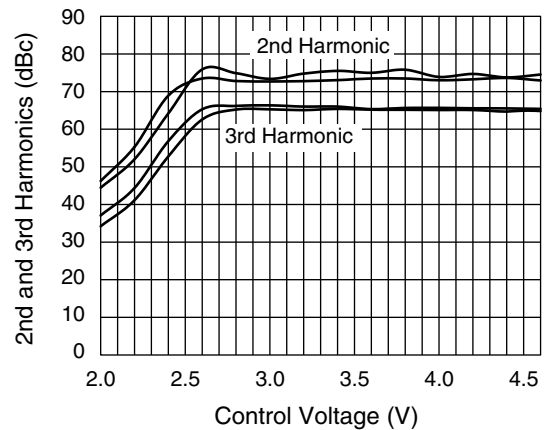
**Insertion Loss vs. Frequency**



**Isolation vs. Frequency**



**VSWR vs. Frequency**



**2nd and 3rd Harmonics vs. Control Voltage**

Note: Contact factory for S-parameter data.

**Absolute Maximum Ratings**

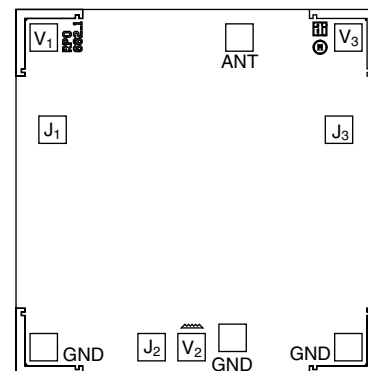
Characteristic	Value
RF Input Power	6 W Max. > 900 MHz, 0/+5 V Control
Control Voltage	-0.2 V, +8 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
$\Theta_{JC}$	25°C/W

**Truth Table**

$V_1$	$V_2$	$V_3$	Ant-J <sub>1</sub>	Ant-J <sub>2</sub>	Ant-J <sub>3</sub>
$V_{High}$	$V_{Low}$	$V_{Low}$	Ins. Loss	Isolation	Isolation
$V_{Low}$	$V_{High}$	$V_{Low}$	Isolation	Ins. Loss	Isolation
$V_{Low}$	$V_{Low}$	$V_{High}$	Isolation	Isolation	Ins. Loss

$V_{Low} = 0-0.2$  V.  
 $V_{High} = 2.6-5$  V.

**Pin Out**



Notes:  
Bond pad metalization: gold.  
Bond pad dimensions: 0.003 (0.075 mm) x 0.003 (0.075 mm).  
Back side metalization: none.  
See application note, Handling GaAs MMIC Die.