ANADIGICS

FEATURES

- 2.7V Control Operation
- Tri-band Operation
- High Isolation
- High Power
- High Linearity
- Small Leadless Package

APPLICATIONS

- SP4T Antenna switch operating in the GSM 900 MHz, DCS 1800 MHz, and PCS 1900 MHz bands

PRODUCT DESCRIPTION

The AWS5508 SP4T high power antenna switch is designed to operate in the GSM 900Mhz, DCS 1800MHz, and PCS 1900MHz frequency bands. All 4 ports of the switch have identical electrical and linearity performance which allows flexibility in system design. Switching between ports is accomplished using 2.7 to 6 volts differential control voltages on the 4 control pins. The switch is provided in a leadless MLP-16 quad flat package.

1. DC blocking capacitors C_b and optional resistor Rs must be supplied externally.
2. C_b = 100 pF for operation >500MHz.
3. The use of resistor Rs to the positive voltage supply is optional. It is only required if it is necessary to have all RF ports in Isolation state at the same time. Also, using Rs will improve linearity performance to a small degree when V_{CTL} is at its lower limit. Rs = 10kΩ when used.

S19
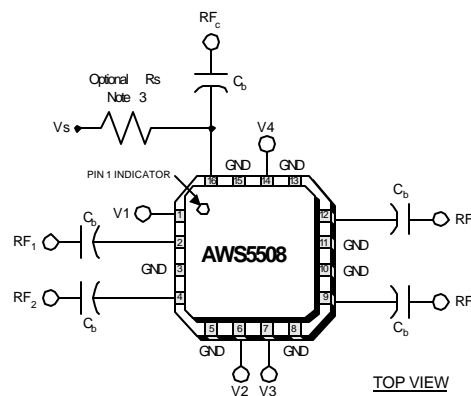**MLP-16 Multipin Leadless**
Plastic Package

Figure 1: Pin Out Diagram

Table 1: Pin Description

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	V1	Control for RF1 , pin 2.	9	RF3	RF port, controlled by V3.
2	RF1	RF port, controlled by V1.	10	GND	Ground connection, keep short as possible.
3	GND	Ground connection, keep short as possible.	11	GND	Ground connection, keep short as possible.
4	RF2	RF port, controlled by V2.	12	RF4	RF port, controlled by V4.
5	GND	Ground connection, keep short as possible.	13	GND	Ground connection, keep short as possible.
6	V2	Control for RF2, pin 4.	14	V4	Control for RF4, pin 12.
7	V3	Control for RF3, pin 9.	15	GND	Ground connection, keep short as possible.
8	GND	Ground connection, keep short as possible.	16	RFc	Common RF Port.

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
RF Input Power > 500 MHz, VCTL = 2.7V	-	8	W
Control Voltage	-0.4	10	V
Operating Temperature	-40	+125	℃
Storage Temperature	-65	+150	℃

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Notes:
1. *Control Voltage is the diffenterial voltage between any of pins V1, V2, V3, V4 and RFc.*

Table 3: Operating Ranges at 25° C

PARAMETER	CONDITION	FREQUENCY	MIN	TYP	MAX	UNIT
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90%/10% RF) Video Feedthru			100 100 50		ns ns mV
Intermodulation Intercept Point (IP3)	2 tone power levels 13dBm to 27dBm (selected to optimize dynamic range of test) V_{CTL} = 2.7V V_{CTL} = 5.0V	 1.0 GHZ 1.8 GHz 1.0 GHz 1.8 GHz	 +48 +48 +56 +56	 +51 +51 +59 +60		 dBm dBm dBm dBm
Control Voltage (VCTL)[3]			2.7		6	V
Leakage Current	V_{CTL} = 2.7V V_{CTL} = 5.0V			>5 >10	50 100	µA µA

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

Notes:
1. *All measurements made in a broadband 50 Ω system.*
2. *Video feedthru measured with 1 ns risetime pulse and 500MHz bandwidth.*
3. *VCTL is the differential voltage between any one of the control pins (V1 through V4) and the remaining three control pins. Changing which control pin is the most positive voltage selects the switch path as defined in the truth table below. Use of the optional resistor Rs on the common port limits VHigh to Vs ± 0.2V.*

Table 4: Electrical Specifications at 25 °C (V$_{CTL}$ = 2.7V)

PARAMETER	CONDITION	FREQUENCY	MIN	TYP	MAX	UNIT
Insertion Loss	P$_{IN}$ = +34dBm	0.5 - 1.0 GHz 1.0 - 2.0 GHz		0.65 0.90	0.8 1.0	dB dB
Isolation	P$_{IN}$ = +34dBm	0.5 - 1.0 GHz 1.0 - 2.0 GHz	22 18	25 21		dB dB
VSWR	In Low Loss Path	0.5 - 2.0 GHz		1.20:1	1.35:1	

Table 5: Harmonics

CONTROL VOLTAGE (V$_{CTL}$)	HARMONIC LEVEL (DBC) TYP. [1]			
	1000MHz, Pin = +34dBm		2000MHz, Pin = +34dBm	
	2nd	3rd	2nd	3rd
2.7V	-58	-61	-59	-60
4.7V	-63	-64	-61	-63

1. Measured in broadband 50Ω system

Table 6: Functional Truth Table

V1	V2	V3	V4	RFc ↔ RF1	RFc ↔ RF2	RFc ↔ RF3	RFc ↔ RF4
V$_{HIGH}$	V$_{LOW}$	V$_{LOW}$	V$_{LOW}$	Low Loss	Isolation	Isolation	Isolation
V$_{LOW}$	V$_{HIGH}$	V$_{LOW}$	V$_{LOW}$	Isolation	Low Loss	Isolation	Isolation
V$_{LOW}$	V$_{LOW}$	V$_{HIGH}$	V$_{LOW}$	Isolation	Isolation	Low Loss	Isolation
V$_{LOW}$	V$_{LOW}$	V$_{LOW}$	V$_{HIGH}$	Isolation	Isolation	Isolation	Low Loss

V$_{CTL}$ = V$_{HIGH}$ - V$_{LOW}$ = +2.5V to +8V (V$_{HIGH}$ = Vs ±0.2V when Rs is used on RF$_C$ port.)

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PERFORMANCE DATA

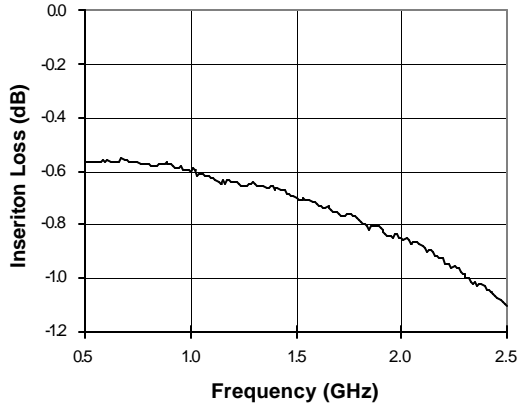**Figure 2: Insertion Loss vs. Frequency**
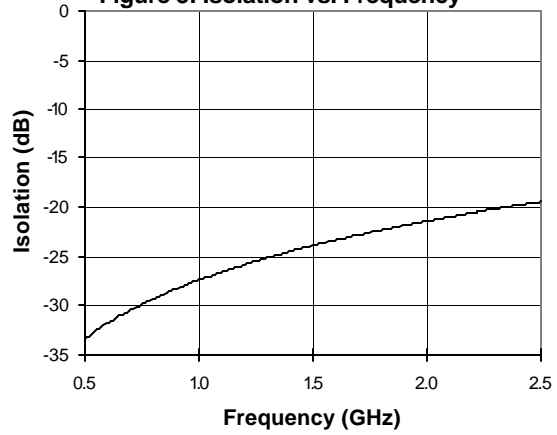

Figure 3: Isolation vs. Frequency

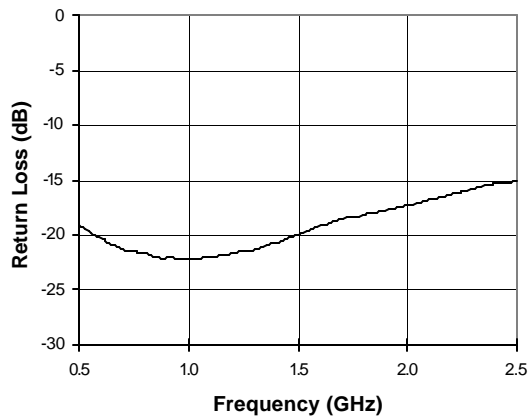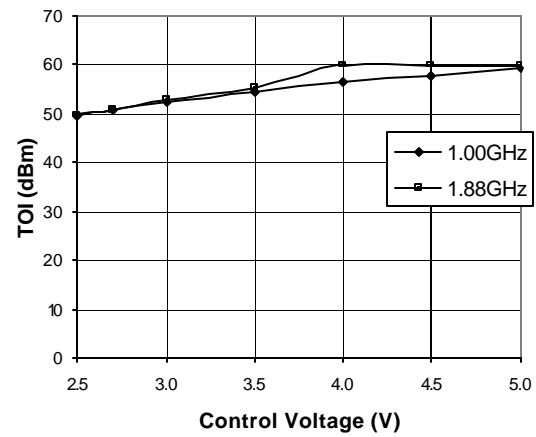**Figure 4:Return Loss vs. Frequency**

Figure 5: TOI vs Control Voltage

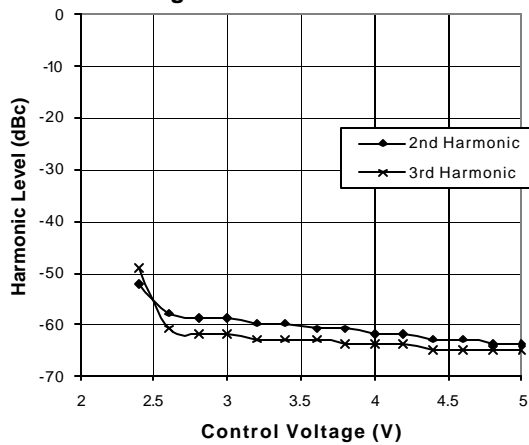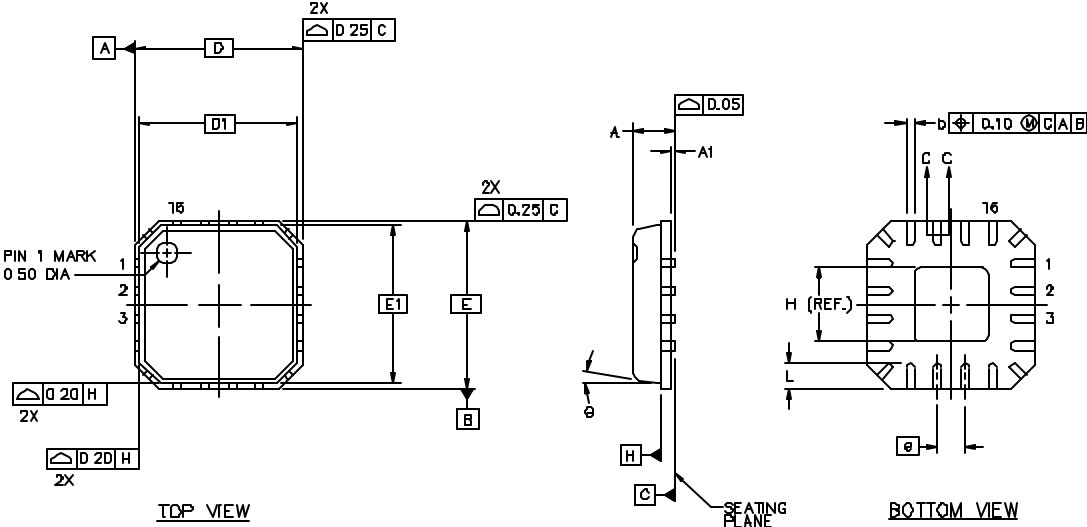**Figure 6: 2nd and 3rd Harmonic Levels vs Control Voltage at 1.0 GHz @ +34dBm**

Figure 7: 2nd and 3rd Harmonic Levels vs Control Voltage at 2.0 GHz @ +34dBm

ADVANCED PRODUCT INFORMATION - Rev 0.3
08/2001

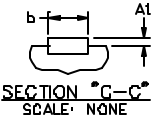ANADIGICS

PACKAGE OUTLINE

Figure 8: Package Outline Drawing

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ORDERING INFORMATION

ORDER NUMBER	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWS5508S19	S19	Multipin Leadless Plastic Package

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