AWS5516

GaAs IC

SPDT Reflective Switch DC-2.0 GHz

PRELIMINARY DATA SHEET - Rev 1.2

FEATURES

- High Linearity (IP3 48 dBm @ 0.9 GHz)
- Low Insertion Loss (0.4 dB @ 0.9 GHz)
- 2.7 V to 6V Operation
- Low DC Power Consumption
- Ultra Miniature SOT-26 Package
- High Isolation



S14
SOT-26
6 Pin Plastic Package

APPLICATIONS

- Transmit/receive switch
- Diversity switching
- Antenna selection

PRODUCT DESCRIPTION

The AWS5516 is a Single Pole Double Throw (SPDT) GaAs MMIC switch assembled in a SOT-26 plastic package. The AWS5516 is designed for applications that require low insertion loss, high isolation, high linearity, and small size. The switch can be controlled with positive, negative, or a combination of both voltages.

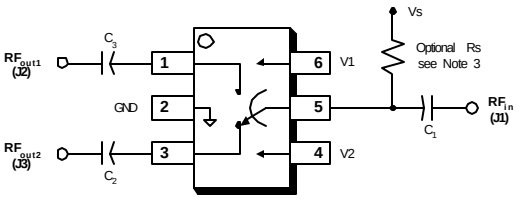


Figure 1: Pin Layout

Table 1: Pin Description

Pin	Function	Description
1	$RF_{OUT\ 1}$ (J2)	RF port can be used as an input or as an output.
2	GND	Ground connection. Keep as short as possible.
3	$RF_{OUT\ 2}$ (J3)	RF port can be used as an input or an ouput.
4	V2	Control Voltage 2, Low 0V , High 3V to 5V
5	RF_{IN} (J1)/Vs	RF common port and bias voltage for positive control (3V to 5V).
6	V1	Control Voltage 1, Low 0V , High 3V to 5V

Notes:

1. DC blocking capacitors C1,2,3 and optional resistor Rs must be supplied externally.

2. C1,2,3 = 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 independently control the RF ports, such as selecting both ports to be OFF at the same time.

ELECTRICAL CHARACTERISTICS

Table 2: Absolute Minimum and Maximum Ratings

PARAMETER	MIN	MAX	UNIT
RF Input Power > 900 MHz, V Control	-	6	W
Control Voltage	-0.2	+8	V
Operating Temperature	-40°	+85	°C
Storage Temperature	-65	+150	°C
Θ_{JC}	-	25°	C/W

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.

Table 3: Operating Ranges at 25° C

PARAMETER	CONDITION	FREQUENCY	MIN	TYP	MAX	UNIT
Switching Characteritics [2]	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru			100 100 100		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	 +45 +42 +55 +52	 +48 +46 +61 +56		 dBm dBm dBm dBm
Input power for 1dB Compression	V_{CTL} = 2.7V V_{CTL} = 5.0V	1.0 GHz 1.8 GHz 1.0 GHz 1.8GHz		+28 +27 +37 +37		dBm dBm dBm dBm
Harmonic Level	Input power = +30 dBm, V_{CTL} = 5.0V	1 & 1.8 GHz		-75		dBc
Control Voltage (V_{CTL})[3]	Nominal operation voltage		2.7		6	V
Leakage Current	V_{CTL} = 2.7V V_{CTL} = 5.0V				50 75	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 50 ohm system, unless other specified.*
2. *Video feedthru measured with 1 ns rise time pulse and 500 MHz bandwidth.*
3. *VCTL is the absolute value of the differential voltage from V1 to V2. Changing polarity 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 (VCTL = 2.7V)

PARAMETER [1]	FREQUENCY [2]	MIN	TYP	MAX	UNIT
Insertion Loss [3]	DC - 1.0 GHz DC - 2.0 GHz		0.35 0.45	0.45 0.55	dB
Isolation	DC - 1.0 GHz DC - 2.0 GHz	25 22	32 24		dB
VSWR [3]	0.5 - 2.0 GHz			1.4:1	dB

Notes:
1. *All measurements made in a 50 W system, unless other specified.*
2. *DC= 300 kHz*
3. *In low insertion loss path.*

Table 5: Truth Table

V_1	V_2	J_1 - J_2	J_1 - J_3
V_{Low}	V_{High}	Isolation	Low Loss
V_{High}	V_{Low}	Low Loss	Isolation

$V_{CTL} = V_{High} – V_{Low}$ = 2.7V to 8V (V_{High} = Vs ± 0.2V when Rs used on common port.)

PERFORMANCE DATA

Figure 2: Insertion Loss vs Frequency

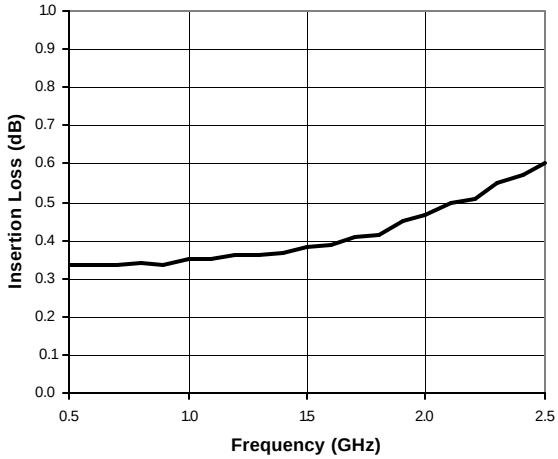


Figure 3: Isolation vs Frequency

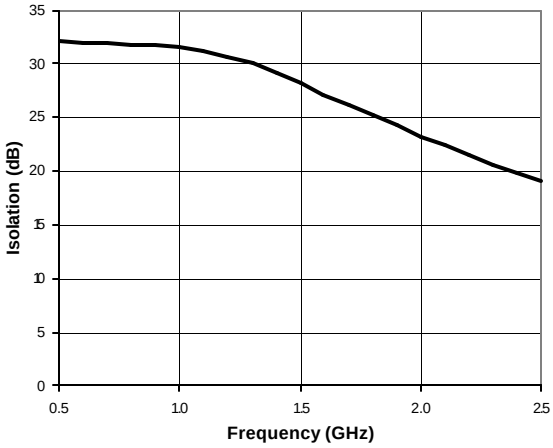


Figure 4: VSWR vs Frequency

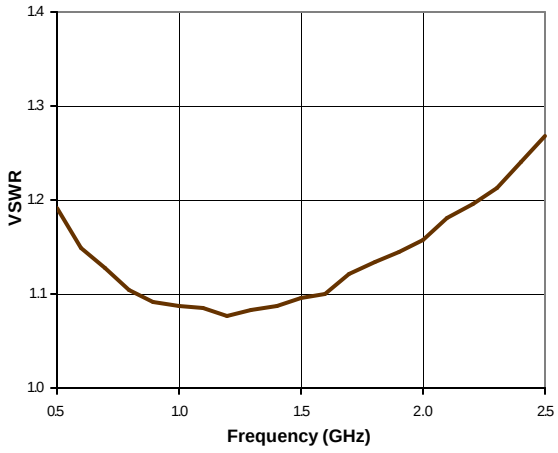
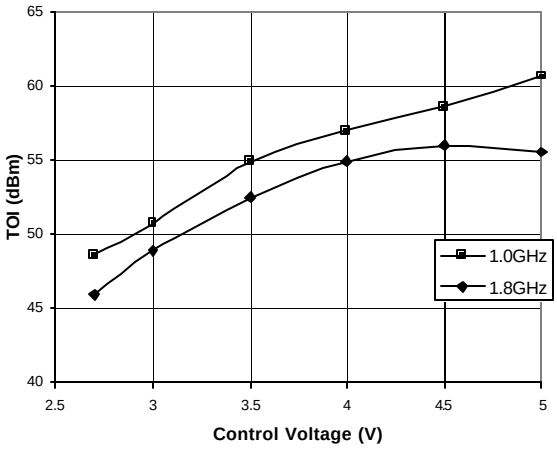
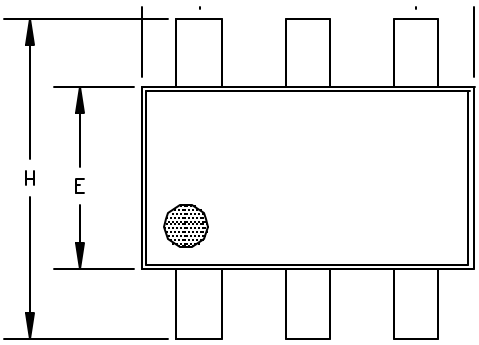
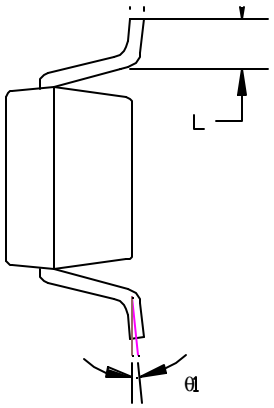


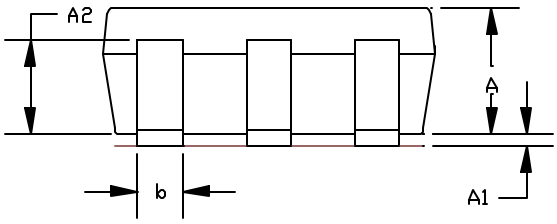
Figure 5: TOI vs Control Voltage



PACKAGE OUTLINE







SYMBOLS	DIMENSIONS IN MILLIMETERS		DIMENSIONS IN INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.30	0.039	0.051
A1	0.00	0.10	0.00	0.004
A2	0.70	0.90	0.027	0.035
b	0.35	0.50	0.014	0.020
C	0.10	0.25	0.004	0.010
D	2.70	3.10	0.106	0.122
E	1.40	1.80	0.055	0.071
e	1.90(TYP)		0.075(TYP)	
H	2.60	3.00	0.102	0.118
L	0.37	–––	0.015	–––
θ1	1°	9°	1°	9°

NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS
2. DIMENSION L IS MEASURED IN GAGE PLANE
3. COPLANARITY : 0.1000 mm
4. TOLERANCE ±0.1000 mm(4 mil) UNLESS OTHERWISE SPECIFIED

Figure 6: S14 Package Outline Diagram

NOTES

NOTES

ORDERING INFORMATION

ORDER NUMBER	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWS5516S14	S14	6 Pin Plastic Package

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