



AWS5518

GaAs IC

SPDT Reflective Switch DC-2.0 GHz

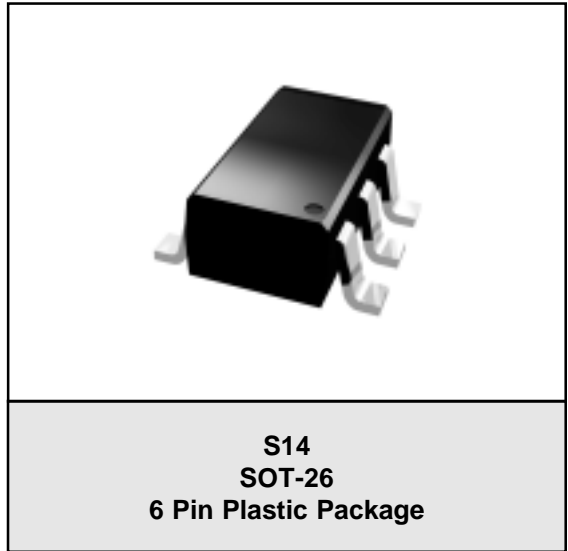
PRELIMINARY DATA SHEET - Rev 1.0

FEATURES

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

APPLICATIONS

- Transmit/Receive Switch
- Diversity Switching
- Antenna Selection



PRODUCT DESCRIPTION

The AWS5518 is a Single Pole Double Throw (SPDT) GaAs MMIC switch assembled in a SOT-26 plastic package. The AWS5518 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.

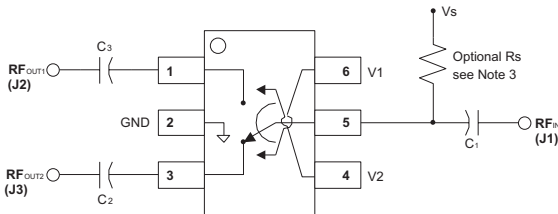


Figure 1: Pinout Diagram

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1	RF _{OUT2} (J2)	RF port (can be used as an input or as an output)
2	GND	Ground connection (keep as short as possible)
3	RF _{OUT1} (J2)	RF port (can be used as an input or an output)
4	V1	Control voltage 1 (Low 0 V, High 2.7 V to 5 V)
5	RF _{IN} (J1)/V _S	RF common port and bias voltage for positive control (3 V to 5 V)
6	V2	Control voltage 2 (Low 0 V, High 2.7 V to 5 V)

Notes:

1. DC blocking capacitors C_{1,2,3} and optional resistor R_s must be supplied externally.
2. C_{1,2,3} = 100 pF for operation >500 MHz.
3. The use of resistor R_s 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 Characteristics ⁽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) $V_{CTL} = 2.7 V$ $V_{CTL} = 5.0 V$	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	$V_{CTL} = 2.7 V$ $V_{CTL} = 5.0 V$	1.0 GHz 1.8 GHz 1.0 GHz 1.8 GHz		+28 +27 +37 +37		dBm dBm dBm dBm
Harmonic Level	Input power = +30 dBm, $V_{CTL} = 5.0 V$	1 & 1.8 GHz		-75		dBc
Control Voltage (V_{CTL}) ⁽³⁾	Nominal operation voltage		2.7		6	V
Leakage Current	$V_{CTL} = 2.7 V$ $V_{CTL} = 5.0 V$				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) V_{CTL} 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 R_s on the common port limits V_{HIGH} to $V_s \pm 0.2 V$.

Table 4: Electrical Specifications at 25 °C
(VCTL = 2.7 V)

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

Notes:

(1) All measurements made in a 50 Ω system, unless other specified.

(2) DC = 300 kHz

(3) In low insertion loss path.

Table 5: Truth Table
Positive Operation

V1	V2	J1 - J2	J1 - J3
V _{High}	V _{Low}	Isolation	Low Loss
V _{Low}	V _{High}	Low Loss	Isolation

V_{High} = 2.7 to 5 V (V_s = V_{High} ± 0.2 V)

PERFORMANCE DATA

Figure 2: Insertion Loss vs. Frequency

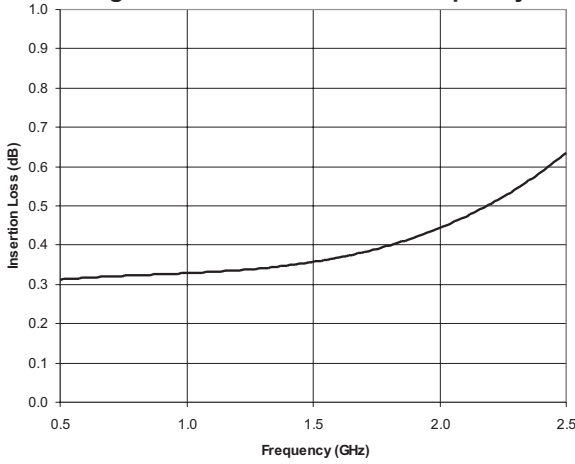


Figure 3: Isolation vs. Frequency

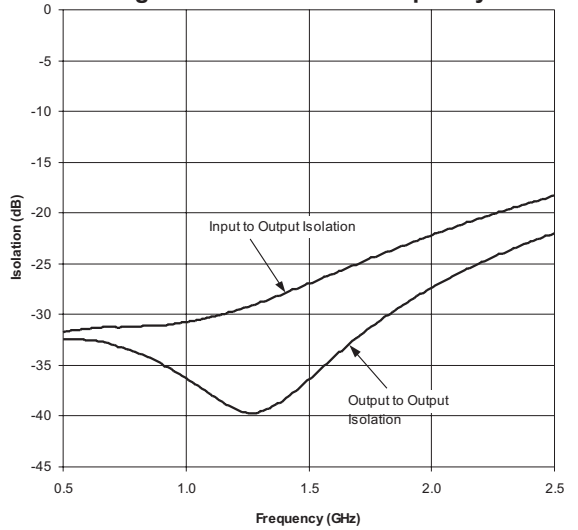


Figure 4: VSWR vs. Frequency

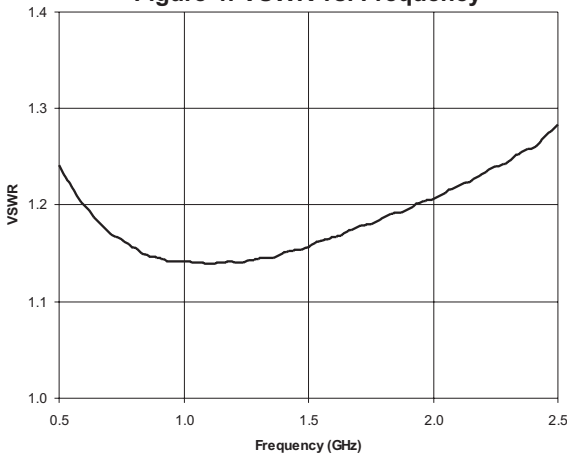
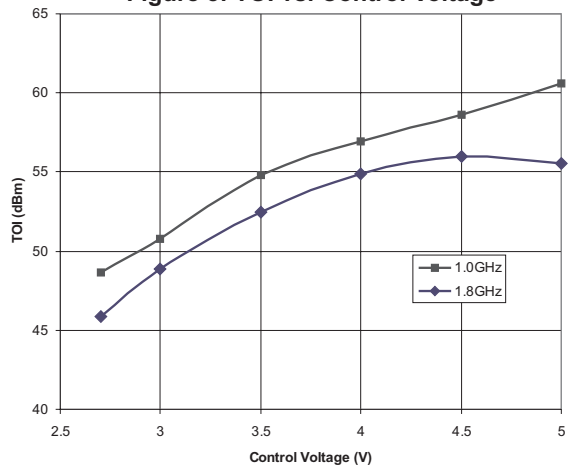
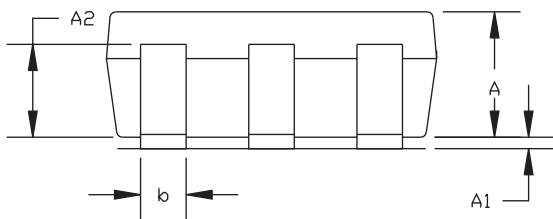
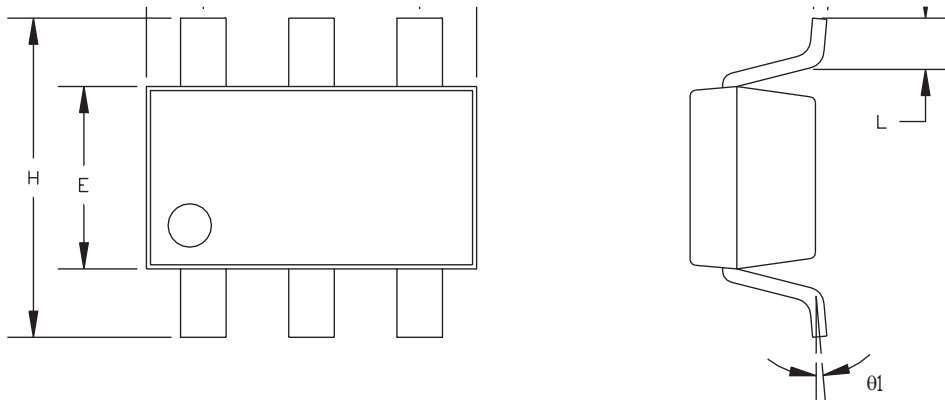


Figure 5: TOI vs. Control Voltage



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

AWS5518

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NOTES

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ORDERING INFORMATION

ORDER NUMBER	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWS5518S14	S14	6 Pin Plastic Package



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