

## AHX5408DS6 Data Sheet

0.05 ~ 4 GHz GaAs SPDT Switch

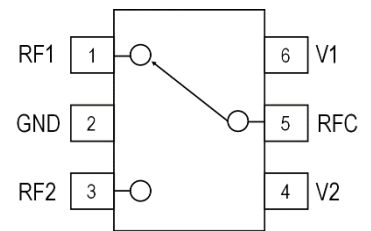
### 1. Product Overview

#### 1.1 General Description

The AHX5408DS6 is a GaAs pHEMT high linearity SPDT(Single Pole Double Throw). This device can operate in the frequency range of 0.05 ~ 4 GHz, having the low insertion loss, high isolation and high linearity. The AHX5408DS6 is manufactured in a compact, 2.1x2.0 mm<sup>2</sup>, SOT363 package.

#### 1.2 Features

- Positive Low Voltage Control: 0 and 3 V
- Low Insertion Loss: 0.5 dB @ 2.5 GHz
- High Linearity Performance: IP1dB = 32 dBm



AHX5408DS6 Block Diagram

#### 1.3 Applications

- WLAN 802.11 a/b/g/n/ac Networks
- Dual-band WLAN Systems
- ISM Band Radios
- GNSS/Navigation
- Wireless Control Systems

#### 1.1 Package Profile & RoHS Compliance



SOT363, 2.1x2.0 mm<sup>2</sup>, surface mount



RoHS-compliant

## 2. Summary on Product Performances

### 2.1 Electrical Specifications

V1, V2 = 0 to 3 V, T<sub>A</sub> = +25 °C, Z<sub>O</sub> = 50 Ω.

Parameter	Test Conditions	Min	Typ	Max	Unit
Insertion Loss <sup>1)</sup>	0.05 to 1 GHz		0.3		dB
	1 to 3 GHz		0.5		dB
	3 to 4 GHz		0.8		dB
Isolation	0.05 to 1 GHz		32		dB
	1 to 3 GHz		25		dB
	3 to 4 GHz		20		dB
Return Loss	0.05 to 1 GHz		23		dB
	1 to 3 GHz		18		dB
	3 to 4 GHz		20		dB
Switching Characteristics:					
Rise/Fall	90/10 % RF		120		ns
On/off Time	50% control to 90/10 % RF		160		ns
Input P1dB	0.05 to 4 GHz		32		dBm
IIP3	P <sub>IN</sub> = +22 dBm/tone f <sub>o</sub> = 1 GHz, Δf = 1 MHz		58		dBm
Control Current			10		uA

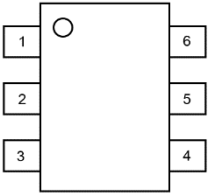
1) The losses with the evaluation board and the connectors are de-embedded.

### 2.2 Truth Table

V1	V2	RFC to RF1	RFC to RF2
High	Low	Insertion loss	Isolation
Low	High	Isolation	Insertion loss

"High" = 2.0 to 5.0 V, "Low" = 0.0 to 0.3 V.

## 2.3 Pin Configuration

Pin	Name	Description	Simplified Outline
1	RF1	RF port	
2	GND	RF ground	
3	RF2	RF port	
4	V2	DC control voltage	
5	RFC	RF port	
6	V1	DC control voltage	

## 2.4 Absolute Maximum Ratings, $T_A = +25\text{ }^\circ\text{C}$

Parameters	Max. Ratings
Operating Case Temperature	-40 to +85 $^\circ\text{C}$
Storage Temperature	-40 to +150 $^\circ\text{C}$
Control Voltage	+6 V
Input RF Power (At 1000 MHz, CW, 50 $\Omega$ matched)	+32 dBm

The operation of this device in excess of any of these limits may cause permanent damage.

\* Refer to the max. input RF power data at [https://www.asb.co.kr/pdf/Maximum\\_Input\\_Power\\_Analysis.pdf](https://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf). The max. input RF power, in principle, depends upon application frequency, matching circuit, and device voltage.

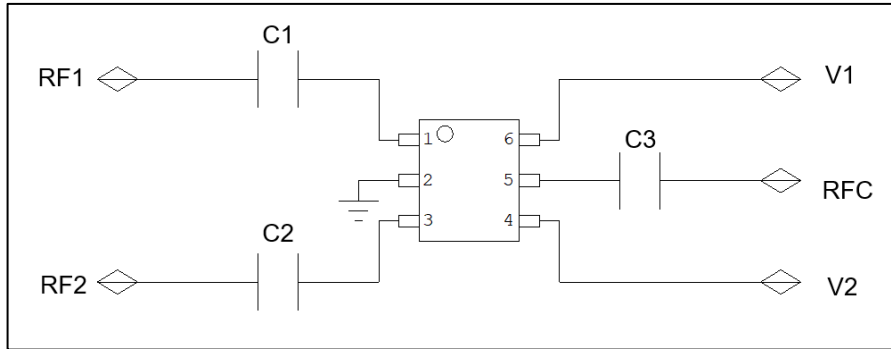
## 2.5 Moisture Sensitivity Level

Level 3 at 260  $^\circ\text{C}$  reflow

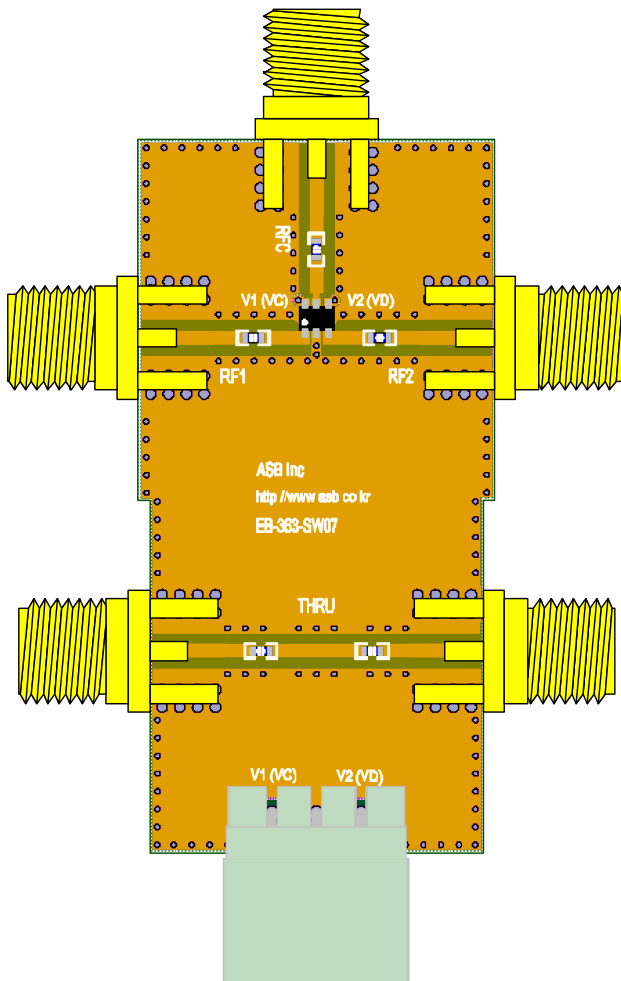
*(Intentionally Blanked)*

## 3. Application: 0.05 ~ 4 GHz

### 3.1 Application Circuit & Evaluation Board



- Note: 1. Refer to 'Surface Mount Recommendation' Section  
 2. C1, C2, C3 = 10 nF @ 0.05 to 1 GHz  
 = 100 pF @ 1 to 4 GHz

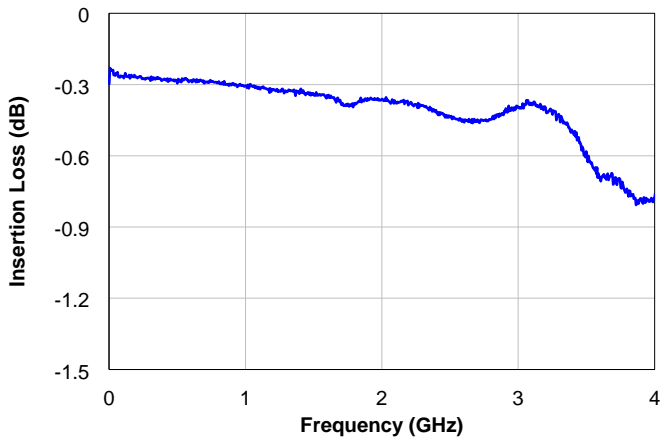


PCB Information (EB No.: EB-363-SW07)		
Layer	Material	Thickness (mm)
Top	Copper	0.0175
Dielectric	Rogers RO4003	0.305
Inner	Copper	0.0175
Dielectric	FR4	0.4
Bottom	Copper	0.0175

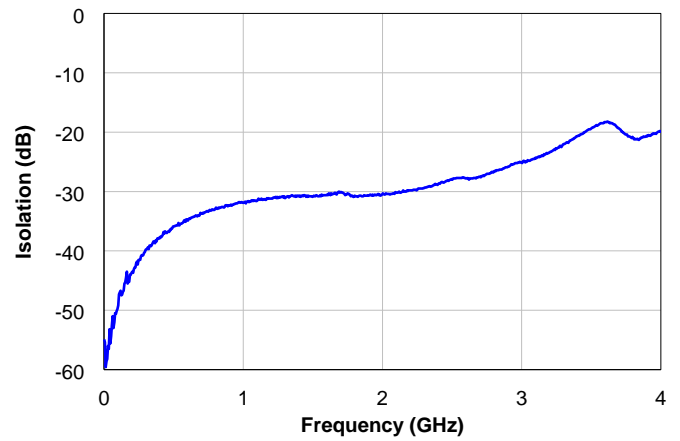
## 3.2 Plot of Performances

V1, V2 = 0 to 3 V, T<sub>A</sub> = +25 °C, Z<sub>O</sub> = 50 Ω, DC blocking capacitors (C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>) = 10 nF

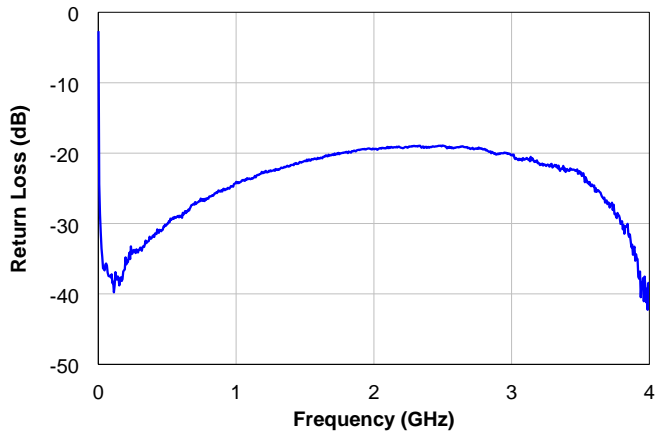
RFC - RF1/RF2 Insertion loss



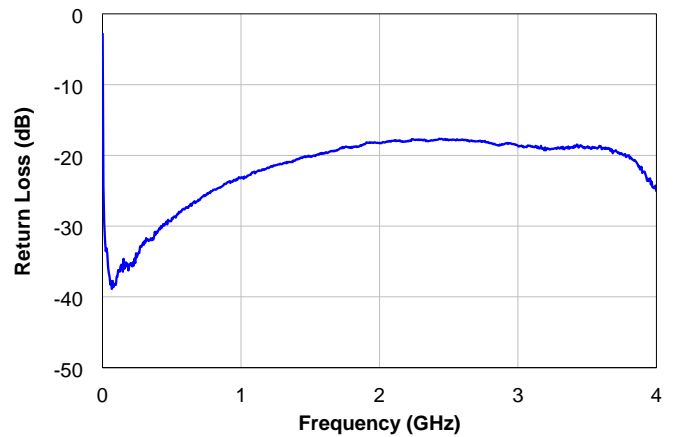
RFC - RF1/RF2 Isolation



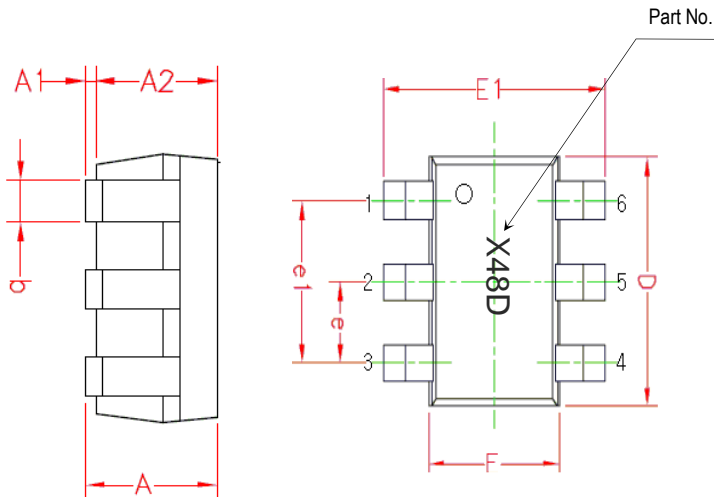
RFC Return loss



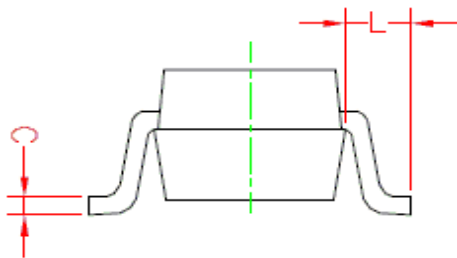
RF1/RF2 Return loss



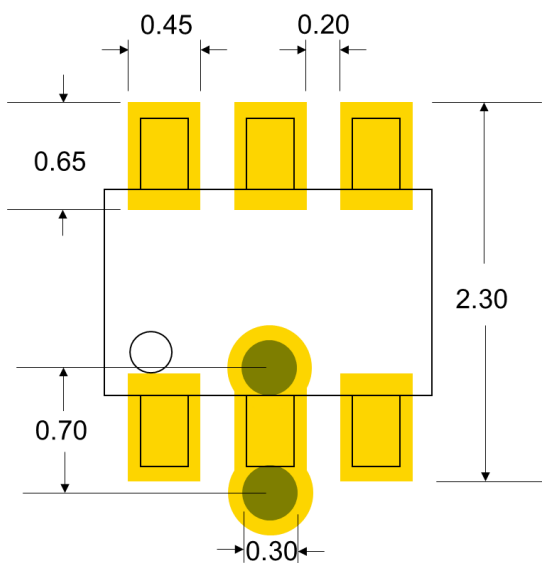
## 4. Package Outline (SOT363)



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.025	0.062	0.10
A2	0.875	0.937	1.00
b	0.20	0.30	0.40
C	0.10	0.125	0.15
D	1.90	2.00	2.10
F	1.15	1.25	1.35
E1	2.00	2.10	2.20
e	--	0.65BSC	--
e1	--	1.30BSC	--
L	--	0.425REF	--



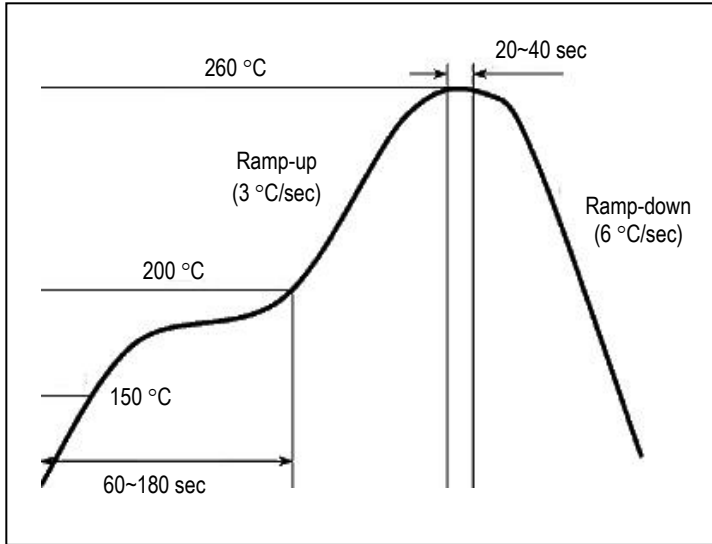
## 5. Surface Mount Recommendation (In mm)



### NOTE

1. It is recommended that the ground via holes be placed on the bottom of exposed pad of the device for better RF performance, as shown in the drawing at the left side.

## 6. Recommended Soldering Reflow Profile



*(End of Datasheet)*

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