BGS12A

SPDT RF Switch

Small Signal Discretes

Never stop thinking

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BGS12A

Revision History: 2007-09-14, V1.1

Previous Version: 2006-10-19, V1.0

Page	Subjects (major changes since last revision)
All	Document layout change

BGS12A

Features

- Low insertion loss
- High port-to-port-isolation
- Low harmonic generation
- On-chip control logic
- Lead free solder bumps
- High ESD robustness
- No external components required
- General purpose switch for applications up to 3 GHz
- Pb-free (RoHS compliant) package

Description

The BGS12A General Purpose RF MOS switch is designed to cover a broad range of applications from 0.1 to 3 GHz. The symmetric design of its single pole double throw configuration, as shown in **Figure 1** offers high design flexibility. This single supply chip integrates on-chip CMOS logic driven by a simple, single-pin CMOS or TTL compatible control input signal. The 0.1 dB compression point exceeds the switch's maximum input power level of 21 dBm, resulting in linear performance at all signal levels. The RF switch has a very low insertion loss of 0.3 dB in the 1 GHz and 0.6 dB in the 2 GHz range.

Unlike GaAs technology, external DC blocking capacitors at the RF ports are only required if DC voltage is applied externally.

The BGS12A RF switch is manufactured in Infineon's patented MOS technology, offering the performance of GaAs with the economy and integration of conventional CMOS including the inherent higher ESD robustness.

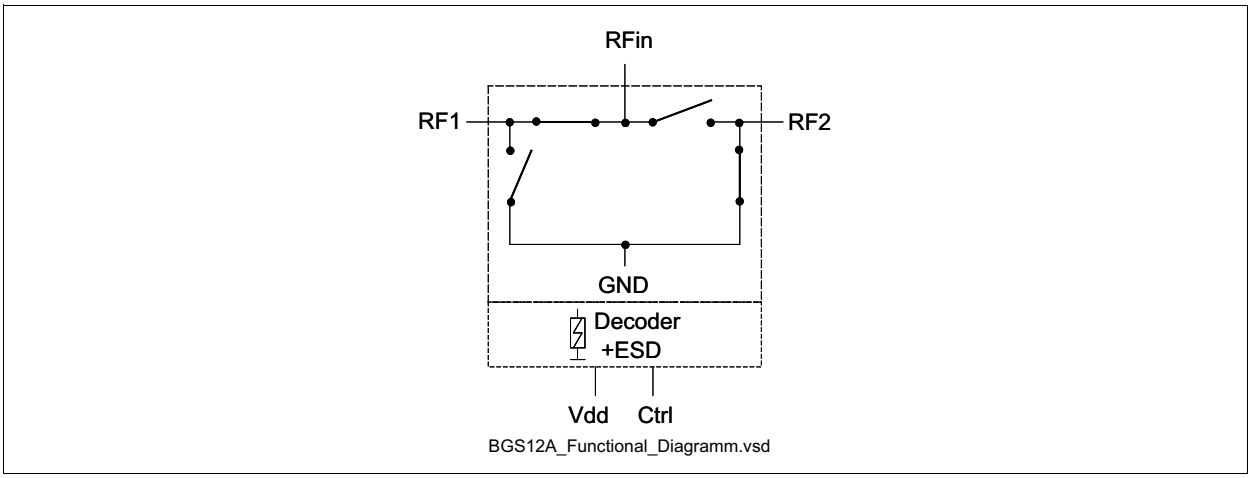

Figure 1 Functional Diagram

Type	Package	Marking	Chip
BGS12A	FWLP-6-1	12	N0735

Table 1 Maximum Ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Storage temperature range	T_{stg}	-65		150	°C	
DC Voltage at all pins to GND	V_{DC}			5	V	
RF power max. at all RF ports	P_{IN}			24	dBm	
ESD Capability						
Human Body-Model IEC61340-3-1 Machine-Model IEC61340-3-2	V_{ESD}			1000 100	V	

Table 2 Operation Ranges

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Ambient temperature	T_A	-30		85	°C	
RF Frequency	f	0.1		3	GHz	
Control voltage low	V_{CtrL}	-0.3		0.3	V	
Control voltage high	V_{CtrlH}	1.4		2.8	V	
Supply voltage[1)]	V_{dd}	tbd		2.8	V	
Current consumption Vdd Pin (over temperature)	I_{Vdd}	80		350	µA	
Current Consumption Vctrl Pin	I_{Ctrl}			30	µA	
Power Range (VSWR ∞: 1)) (VSWR 3: 1) (VSWR 1: 1)	P_{in}			 15 18 21	dBm	

1) Supply voltage must be connected before Control Voltage

Table 3 Pin description

Pin	Name	Description
1	RF1	RF Port 1 Out
2	GND	Ground
3	RF2	RF Port 2 Out
4	CTRL	Control Pin
5	RFIN	RF Port In
6	Vdd	Supply Voltage

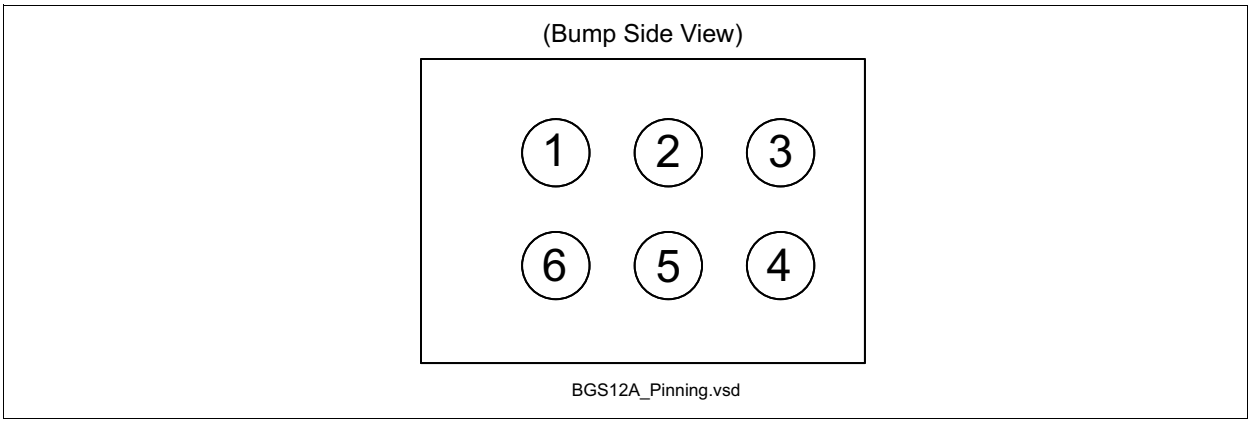

Figure 2 Pinning

Table 4 Truth Table

Ctrl 1	RF 1	RF 2
0	1	0
1	0	1

Electrical Specifications

- Termination port impedance: Z_0 = 50 Ω
- Temperature range: T = 25 °C
- Supply Voltage: V_{dd} = 2.8 V
- P_{in} = 15 dBm
- Across operating range of control voltages: V_{CtrH} = 1.4...2.8 V

Table 5 Electrical Characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Insertion Loss[1)]	IL		0.3		dB	f = 1 GHz TX
			0.6		dB	f = 2 GHz TX
			0.4		dB	f = 1 GHz TX, T_A = 85 °C
			0.8		dB	f = 2 GHz TX, T_A = 85 °C
Return Loss	RL	15			dB	f = 1 GHz
		10			dB	f = 2 GHz
Isolation RFin - RF1	$ISO_{RFin-RF1}$	30	34		dB	f = 1 GHz
		22	27		dB	f = 2 GHz
Isolation RFin - RF2	$ISO_{RFin-RF2}$	30	34		dB	f = 1 GHz
		22	27		dB	f = 2 GHz
Isolation RF1 - RF2	$ISO_{RF1-RF2}$	30	43		dB	f = 1 GHz
		28	34		dB	f = 2 GHz
Isolation RF ports - Vdd, Vctrl	ISO_{RF-DC}	30	35		dB	f = 1 GHz
		20	35		dB	f = 2 GHz
Harmonic Generation up to 12.75 GHz	P_{Harm}		-75	-50	dBm	f = 1 GHz
			-80	-50	dBm	f = 2 GHz
On Switching Time (10-90%) RF	t_{on}			4	µs	f = 1 GHz
Off Switching Time (10-90%) RF	t_{off}			4	µs	f = 1 GHz
Current Consumption at Vdd Pin	I_{dd}		120		µA	
Input 0.1 dB compression	$P_{0.1dB}$	21			dBm	f = 1 GHz

1) With external matching at antenna port

Package Outlines

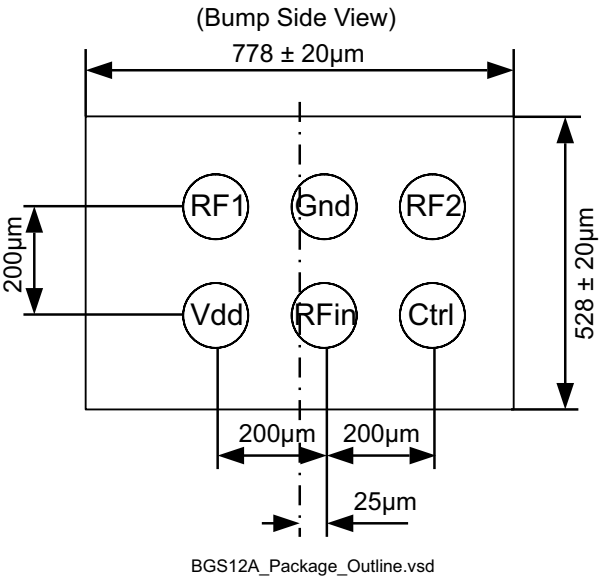

Figure 3 Package outline

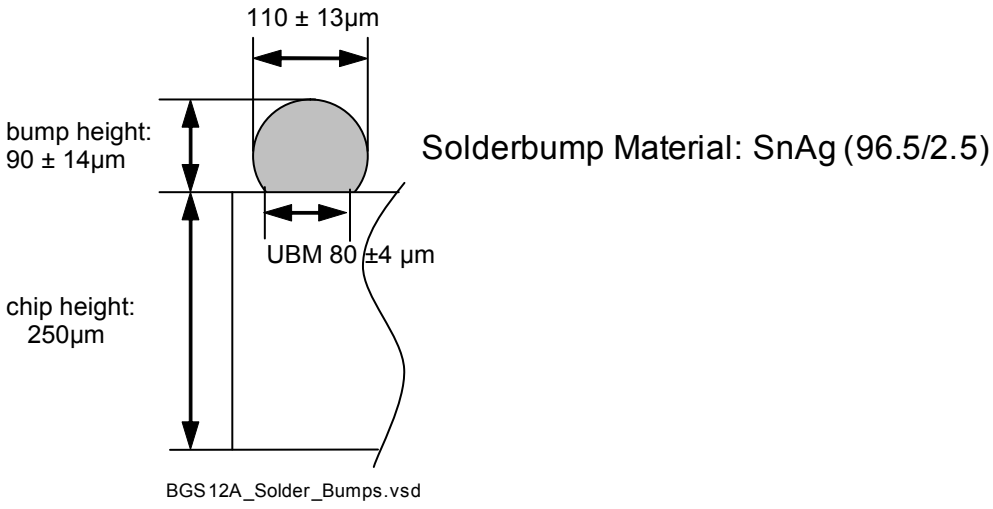

Figure 4 Solder bumps

Dimensions in mm

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