

### GENERAL DESCRIPTION

The SGM11104S is a 2-bit control single-pole/four-throw (SP4T) switch, which supports from 0.1GHz to 5.8GHz. The device features low control voltage and high isolation.

The SGM11104S has the ability to integrate the ESD protection circuits to achieve high ESD tolerance.

No external DC blocking capacitors are required on the RF paths as long as no external DC voltage is applied, which can save PCB area and cost.

The SGM11104S is available in a Green ULGA-1.6×1.6-14L package.

### APPLICATIONS

- Multi-Mode 2G/3G/4G/5G and Receive System Applications
- Pre PA Switching, Reception Bands Switching Applications
- General Purpose Switching Applications
- Feedback RX Applications

### FEATURES

- **High Isolation:**
  - $f_0 = 1.0\text{GHz}, P_{IN} = 0\text{dBm}: 56\text{dB (TYP)}$
  - $f_0 = 2.0\text{GHz}, P_{IN} = 0\text{dBm}: 50\text{dB (TYP)}$
  - $f_0 = 2.7\text{GHz}, P_{IN} = 0\text{dBm}: 46\text{dB (TYP)}$
  - $f_0 = 3.8\text{GHz}, P_{IN} = 0\text{dBm}: 43\text{dB (TYP)}$
  - $f_0 = 5.8\text{GHz}, P_{IN} = 0\text{dBm}: 32\text{dB (TYP)}$
- **Low Insertion Loss:**
  - $f_0 = 1.0\text{GHz}, P_{IN} = 0\text{dBm}: 0.46\text{dB (TYP)}$
  - $f_0 = 2.0\text{GHz}, P_{IN} = 0\text{dBm}: 0.48\text{dB (TYP)}$
  - $f_0 = 2.7\text{GHz}, P_{IN} = 0\text{dBm}: 0.49\text{dB (TYP)}$
  - $f_0 = 3.8\text{GHz}, P_{IN} = 0\text{dBm}: 0.51\text{dB (TYP)}$
  - $f_0 = 5.8\text{GHz}, P_{IN} = 0\text{dBm}: 0.83\text{dB (TYP)}$
- Available in a Green ULGA-1.6×1.6-14L Package

### BLOCK DIAGRAM

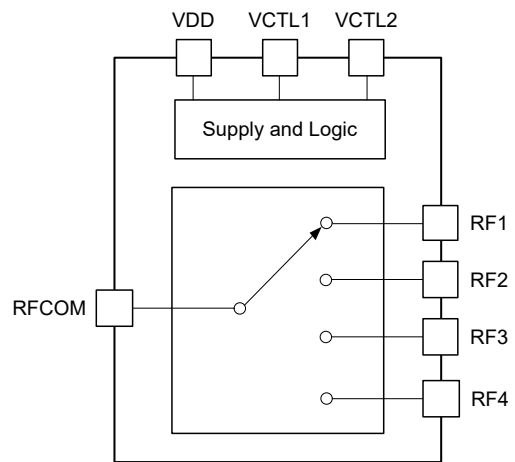


Figure 1. SGM11104S Block Diagram

**PACKAGE/ORDERING INFORMATION**

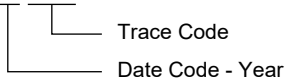
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM11104S	ULGA-1.6×1.6-14L	-40°C to +85°C	SGM11104SYULK14G/TR	G3X XXX	Tape and Reel, 4000

**MARKING INFORMATION**

NOTE: XXX = Date Code and Trace Code.

**YYY**— Serial Number

**XXX**



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

**ABSOLUTE MAXIMUM RATINGS**

- Supply Voltage,  $V_{DD}$ ..... 3.6V
- Control Voltage,  $V_{CTL}$ ..... 3.6V
- RF Input Power,  $P_{IN}$  ( $f_0 = 2.7\text{GHz}$ ) ..... 30dBm
- Junction Temperature ..... +150°C
- Storage Temperature Range ..... -55°C to +150°C
- Lead Temperature (Soldering, 10s) ..... +260°C
- ESD Susceptibility
- HBM..... 1000V

**RECOMMENDED OPERATING CONDITIONS**

- Operating Temperature Range ..... -40°C to +85°C
- Operating Frequency Range,  $f_0$  ..... 0.1GHz to 5.8GHz
- Supply Voltage,  $V_{DD}$ ..... 2.5V to 3.3V
- Control High Voltage,  $V_{CTL\_H}$ ..... 1.35V to 3.3V
- Control Low Voltage,  $V_{CTL\_L}$  ..... 0V to 0.3V

**OVERSTRESS CAUTION**

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

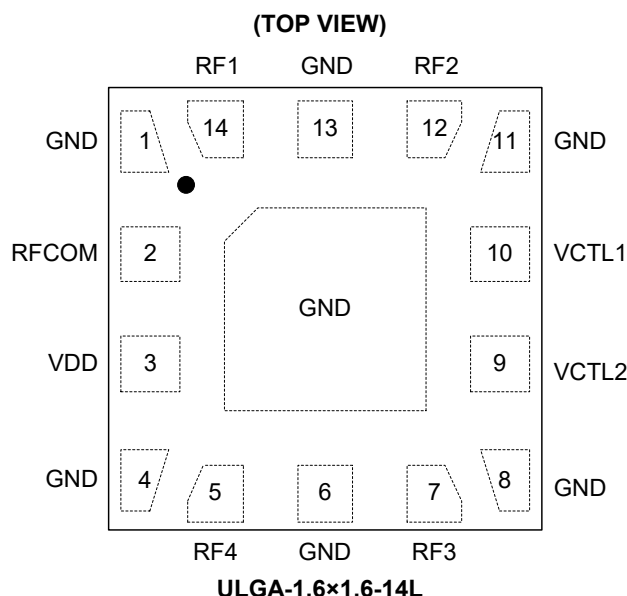
**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

**DISCLAIMER**

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

## PIN CONFIGURATION



## PIN DESCRIPTION

PIN	NAME	FUNCTION
1, 4, 6, 8, 11, 13	GND	Ground Terminal. Please connect this terminal with ground plane as close as possible for excellent RF performance.
2	RFCOM	RF Common Port.
3	VDD	DC Power Supply. Please connect a bypass capacitor with GND terminal for excellent RF performance.
5	RF4	RF I/O Port 4.
7	RF3	RF I/O Port 3.
9	VCTL2	DC Control Voltage2. Please connect a bypass capacitor with GND terminal for excellent RF performance.
10	VCTL1	DC Control Voltage1. Please connect a bypass capacitor with GND terminal for excellent RF performance.
12	RF2	RF I/O Port 2.
14	RF1	RF I/O Port 1.

## LOGIC TRUTH TABLE

VCTL1	VCTL2	ON PATH
High	Low	RFCOM-RF1
Low	Low	RFCOM-RF2
Low	High	RFCOM-RF3
High	High	RFCOM-RF4

**ELECTRICAL CHARACTERISTICS**

(T<sub>A</sub> = +25°C, V<sub>DD</sub> = 2.5V to 3.3V, typical values are at V<sub>DD</sub> = 2.8V, P<sub>IN</sub> = 0dBm, input and output resistance = 50Ω, V<sub>CTL\_L</sub> = 0V, V<sub>CTL\_H</sub> = 1.8V, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>DC Characteristics</b>						
Supply Voltage	V <sub>DD</sub>		2.5	2.8	3.3	V
Supply Current	I <sub>VDD</sub>			20	50	μA
Control Voltage	V <sub>CTL_L</sub>		0	0	0.3	V
Control Voltage	V <sub>CTL_H</sub>		1.35	1.8	3.3	V
Control Current	I <sub>CTL</sub>	V <sub>CTL_H</sub> = 1.8V		2	6	μA
Switching Time	t <sub>SW</sub>	50% V <sub>CTL</sub> to 10/90% RF		1	2	μs
<b>RF Characteristics</b>						
Insertion Loss	IL	f <sub>0</sub> = 1.0GHz, P <sub>IN</sub> = 0dBm		0.46	0.79	dB
		f <sub>0</sub> = 2.0GHz, P <sub>IN</sub> = 0dBm		0.48	0.82	
		f <sub>0</sub> = 2.7GHz, P <sub>IN</sub> = 0dBm		0.49	0.86	
		f <sub>0</sub> = 3.8GHz, P <sub>IN</sub> = 0dBm		0.51	0.97	
		f <sub>0</sub> = 5.8GHz, P <sub>IN</sub> = 0dBm		0.83	1.45	
Isolation (RFCOM to All RF Ports)	ISO	f <sub>0</sub> = 1.0GHz, P <sub>IN</sub> = 0dBm	47	56		dB
		f <sub>0</sub> = 2.0GHz, P <sub>IN</sub> = 0dBm	44	50		
		f <sub>0</sub> = 2.7GHz, P <sub>IN</sub> = 0dBm	38	46		
		f <sub>0</sub> = 3.8GHz, P <sub>IN</sub> = 0dBm	35	43		
		f <sub>0</sub> = 5.8GHz, P <sub>IN</sub> = 0dBm	26	32		
Input Power at 0.1dB Compression Point	P <sub>-0.1dB</sub>	f <sub>0</sub> = 0.1GHz to 3.0GHz		30		dBm
		f <sub>0</sub> = 3.0GHz to 5.8GHz		28		
Voltage Standing Wave Ratio	VSWR	f <sub>0</sub> = 0.1GHz to 3.0GHz		1.2		
		f <sub>0</sub> = 3.0GHz to 5.8GHz		1.6		

TYPICAL APPLICATION CIRCUIT

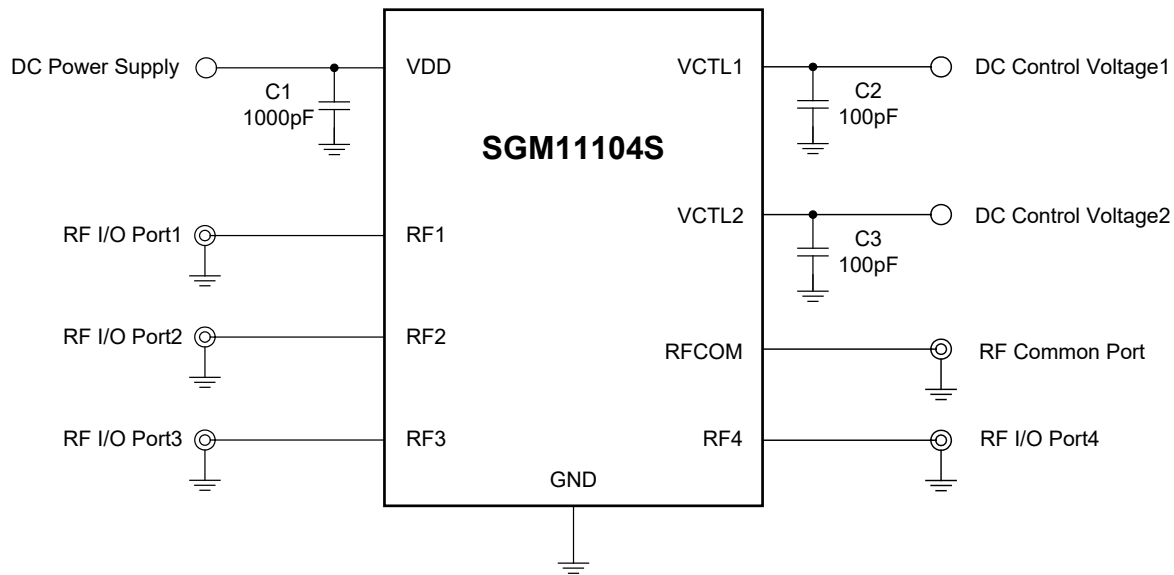


Figure 2. SGM11104S Typical Application Circuit

EVALUATION BOARD LAYOUT

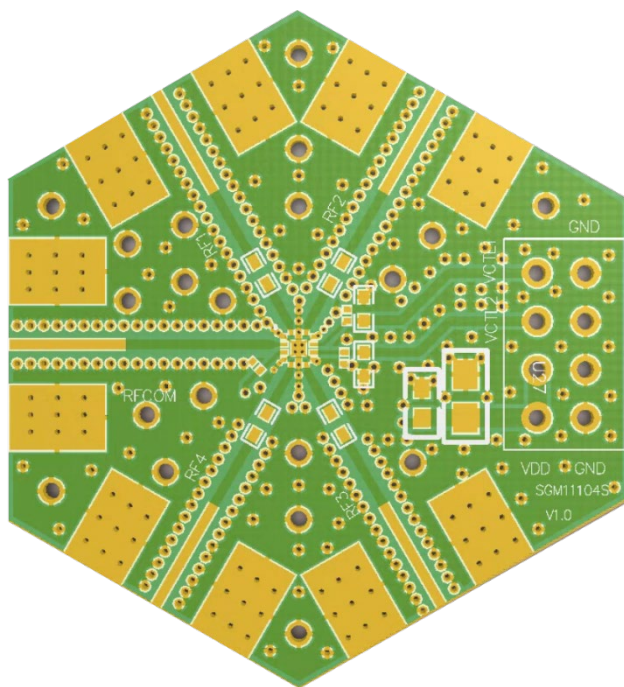
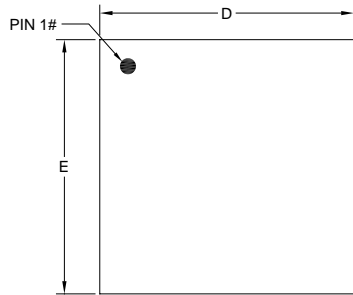


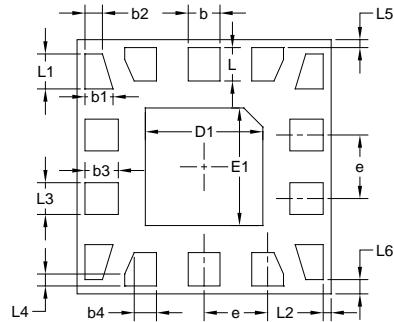
Figure 3. SGM11104S Evaluation Board Layout

PACKAGE OUTLINE DIMENSIONS

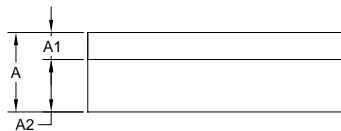
ULGA-1.6x1.6-14L



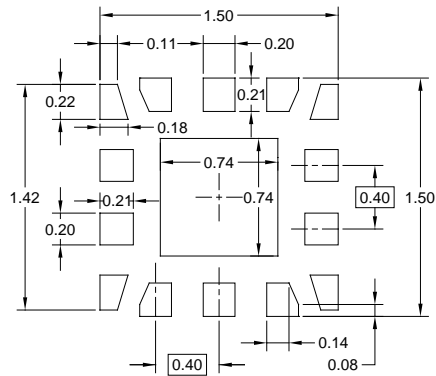
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

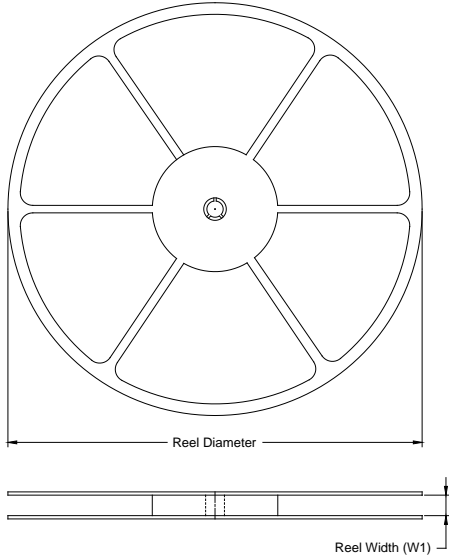
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.450	0.500	0.550
A1	0.140	0.170	0.200
A2	0.290	0.330	0.370
b	-	0.200	-
b1	-	0.176	-
b2	-	0.110	-
b3	-	0.210	-
b4	-	0.140	-
D	1.550	1.600	1.650
D1	-	0.740	-
E	1.550	1.600	1.650
E1	-	0.740	-
e	0.400 BSC		
L	-	0.210	-
L1	-	0.220	-
L2	-	0.050	-
L3	-	0.200	-
L4	-	0.075	-
L5	-	0.050	-
L6	-	0.090	-

NOTE: This drawing is subject to change without notice.

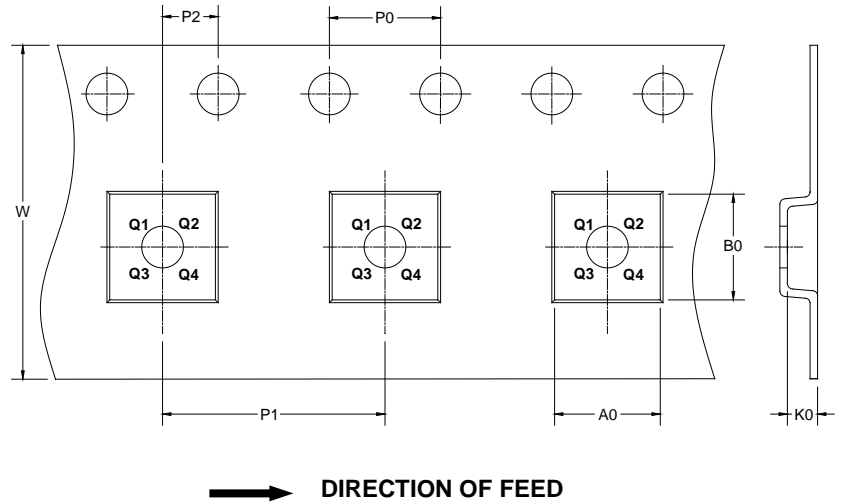
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
ULGA-1.6x1.6-14L	7"	9.5	1.81	1.81	0.76	4.0	4.0	2.0	8.0	Q2

DD0001

# PACKAGE INFORMATION

## CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002