GENERAL DESCRIPTION

The SGM11103S is a 2-bit control single-pole/three-throw (SP3T) switch, which supports from 0.1GHz to 5.8GHz. The device features low control voltage and high isolation.

The SGM11103S 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 SGM11103S is available in a Green ULGA-1.15× 1.55-10L 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 = 1.0GHz, P_{IN} = 0dBm: **55dB (TYP)**
    f_0 = 2.0GHz, P_{IN} = 0dBm: **52dB (TYP)**
    f_0 = 2.7GHz, P_{IN} = 0dBm: **50dB (TYP)**
    f_0 = 3.8GHz, P_{IN} = 0dBm: **48dB (TYP)**
    f_0 = 5.8GHz, P_{IN} = 0dBm: **34dB (TYP)**
- **Low Insertion Loss:**
    f_0 = 1.0GHz, P_{IN} = 0dBm: **0.49dB (TYP)**
    f_0 = 2.0GHz, P_{IN} = 0dBm: **0.52dB (TYP)**
    f_0 = 2.7GHz, P_{IN} = 0dBm: **0.56dB (TYP)**
    f_0 = 3.8GHz, P_{IN} = 0dBm: **0.60dB (TYP)**
    f_0 = 5.8GHz, P_{IN} = 0dBm: **1.07dB (TYP)**
- **Available in a Green ULGA-1.15×1.55-10L Package**
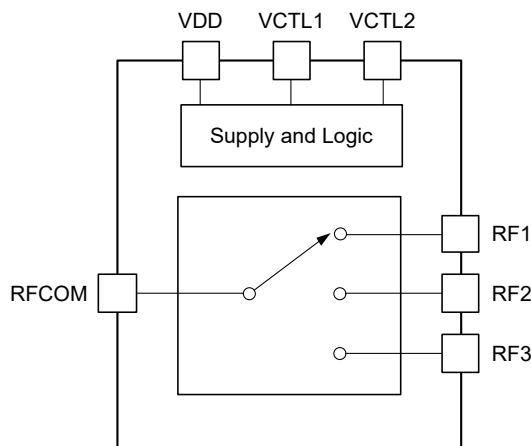
BLOCK DIAGRAM

Figure 1. SGM11103S Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM11103S	ULGA-1.15×1.55-10L	-40℃ to +85℃	SGM11103SYULJ10G/TR	ZX XX	Tape and Reel, 5000

MARKING INFORMATION

NOTE: XX = Date Code.

YY — Serial Number
X X

└─── Date Code - Week
└──── Date Code - Year

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 = 2.7GHz) 30dBm
Junction Temperature .... +150℃
Storage Temperature Range .... -55℃ to +150℃
Lead Temperature (Soldering, 10s) .... +260℃
ESD Susceptibility
HBM 1000V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range .... -40℃ to +85℃
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

(TOP VIEW)

GND

RFCOM	1	10	9	RF3
GND	2		8	VCTL2
VDD	3		7	VCTL1
RF1	4	5	6	RF2

GND

ULGA-1.15×1.55-10L
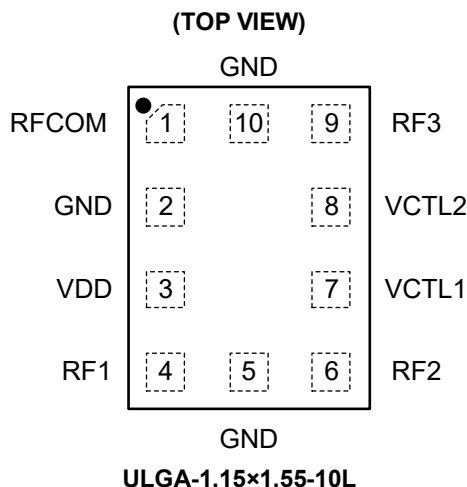
PIN DESCRIPTION

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

LOGIC TRUTH TABLE

VCTL1	VCTL2	ON PATH
High	Low	RFCOM-RF1
Low	High	RFCOM-RF2
High	High	RFCOM-RF3
Low	Low	*X*

X = Don't care.

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{DD} = 2.5V to 3.3V, typical values are at V_{DD} = 2.8V, P_{IN} = 0dBm, input and output resistance = 50Ω, V_{CTL_L} = 0V, V_{CTL_H} = 1.8V, unless otherwise noted.)

| PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Characteristics						
Supply Voltage	V_{DD}		2.5	2.8	3.3	V
Supply Current	I_{VDD}			20	45	µA
Control Voltage	V_{CTL_L}		0	0	0.3	V
Control Voltage	V_{CTL_H}		1.35	1.8	3.3	V
Control Current	I_{CTL}	V_{CTL_H} = 1.8V		2	8	µA
Switching Time	t_{SW}	50% V_{CTL} to 10/90% RF		1	2	µs
RF Characteristics						
Insertion Loss	IL	f_0 = 1.0GHz, P_{IN} = 0dBm		0.49	0.79	dB
		f_0 = 2.0GHz, P_{IN} = 0dBm		0.52	0.82	
		f_0 = 2.7GHz, P_{IN} = 0dBm		0.56	0.86	
		f_0 = 3.8GHz, P_{IN} = 0dBm		0.60	0.97	
		f_0 = 5.8GHz, P_{IN} = 0dBm		1.07	1.45	
Isolation (RFCOM to All RF Ports)	ISO	f_0 = 1.0GHz, P_{IN} = 0dBm	47	55		dB
		f_0 = 2.0GHz, P_{IN} = 0dBm	44	52		
		f_0 = 2.7GHz, P_{IN} = 0dBm	38	50		
		f_0 = 3.8GHz, P_{IN} = 0dBm	35	48		
		f_0 = 5.8GHz, P_{IN} = 0dBm	26	34		
Input Power at 0.1dB Compression Point	$P_{0.1dB}$	f_0 = 0.1GHz to 3.0GHz		30		dBm
		f_0 = 3.0GHz to 5.8GHz		28		
Voltage Standing Wave Ratio	VSWR	f_0 = 0.1GHz to 3.0GHz		1.2		
		f_0 = 3.0GHz to 5.8GHz		1.6		

TYPICAL APPLICATION CIRCUIT
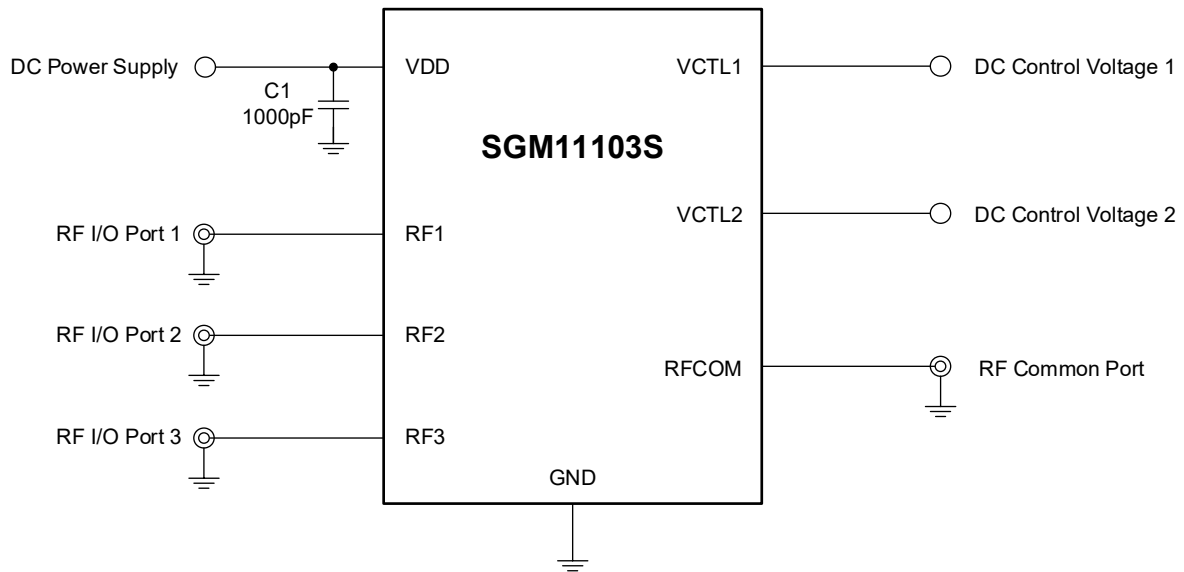
Figure 2. SGM11103S Typical Application Circuit

EVALUATION BOARD LAYOUT
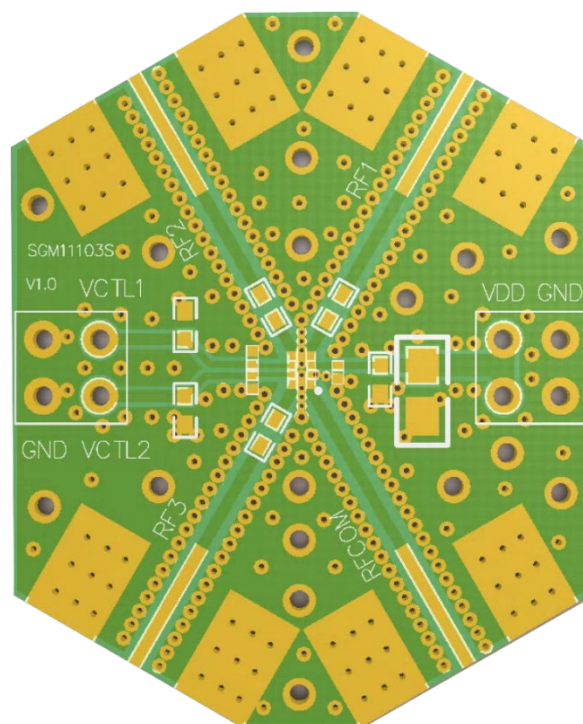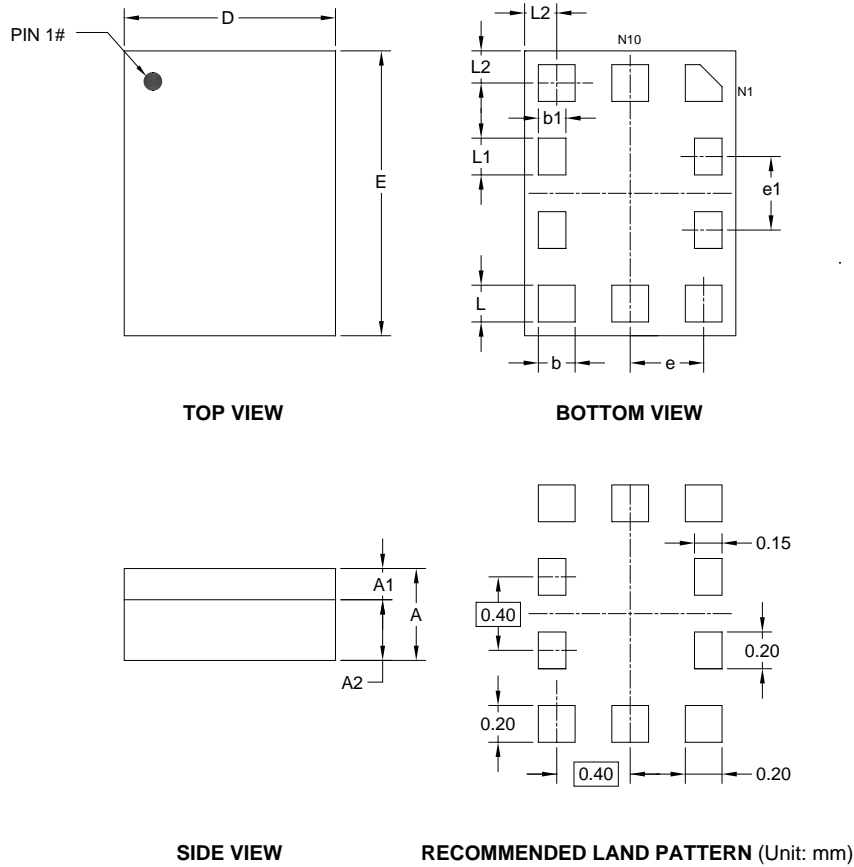

Figure 3. SGM11103S Evaluation Board Layout
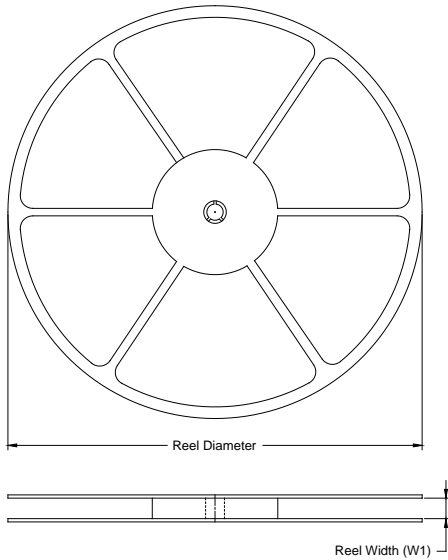
PACKAGE OUTLINE DIMENSIONS

ULGA-1.15×1.55-10L

TOP VIEW

BOTTOM VIEW

SIDE VIEW

RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.460	0.500	0.540
A1	0.170 REF		
A2	0.330 REF		
b	0.150	0.200	0.250
b1	0.100	0.150	0.200
D	1.100	1.150	1.200
E	1.500	1.550	1.600
e	0.400 BSC		
e1	0.400 BSC		
L	0.150	0.200	0.250
L1	0.150	0.200	0.250
L2	-	0.175	-

NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS
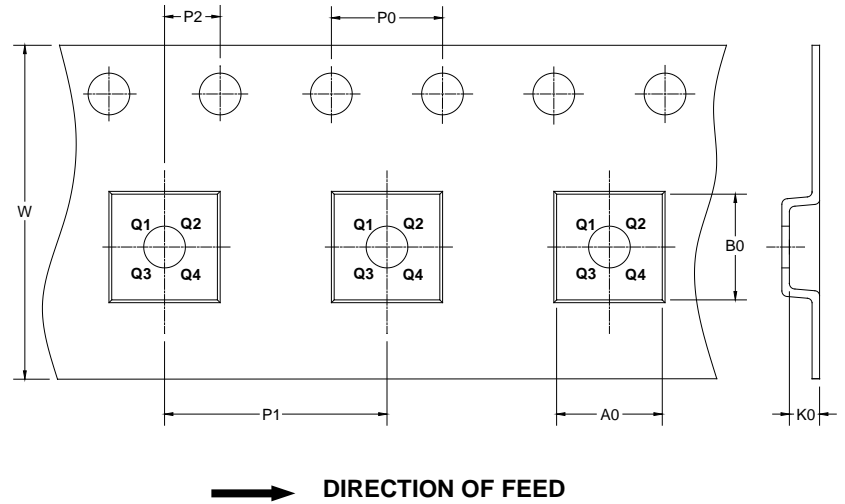
Reel Diameter

Reel Width (W1)

TAPE DIMENSIONS

DIRECTION OF FEED

NOTE: The picture is only for reference. Please make the object as the standard.
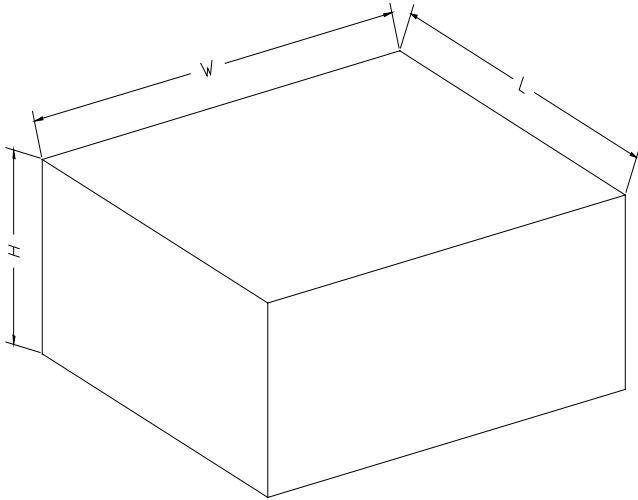
KEY PARAMETER LIST OF TAPE AND REEL

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-1.15×1.55-10L	7″	9.5	1.30	1.70	0.60	4.0	4.0	2.0	8.0	Q1

DD0001

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