

### GENERAL DESCRIPTION

The SGM21102A is a single-pole/double-throw (SPDT) switch for mode switching in WLAN applications. The device features low insertion loss and high isolation. The SGM21102A uses advanced switching technologies and supports 0.7GHz to 6.0GHz.

The SGM21102A has the ability to integrate SPDT RF switch and GPIO controller on an SOI chip. Internal driver and decoder for switch control signals are offered by the GPIO controller, which makes it flexible in RF path band and routing selection.

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

The SGM21102A is available in a Green ULGA-0.7×1.1-6L package.

### APPLICATIONS

- WLAN 802.11 a/b/g/n/ac/ax Networks
- Low Power Transmit Receive Systems
- WLAN Repeaters

### FEATURES

- **Supply Voltage Range: 2.4V to 3.3V**
- **High Switching Speed**
- **Operating Frequency Range: 0.7GHz to 6.0GHz**
- **Low Insertion Loss**
- **High Isolation**
- **Advanced Silicon-On-Insulator (SOI) Process**
- **No External DC Blocking Capacitors Required**
- **Available in a Green ULGA-0.7×1.1-6L Package**

### BLOCK DIAGRAM

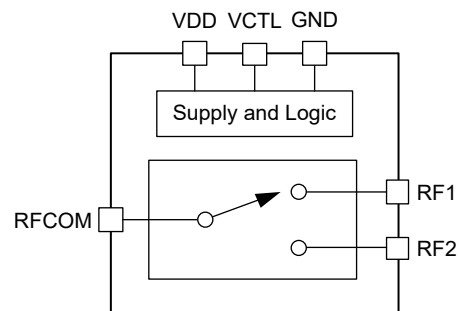


Figure 1. SGM21102A Block Diagram

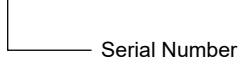
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM21102A	ULGA-0.7×1.1-6L	-40°C to +85°C	SGM21102AYULP6G/TR	5H	Tape and Reel, 10000

MARKING INFORMATION

NOTE: Fixed character for 5H.

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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<sub>DD</sub>..... 3.6V
- Control Voltage, V<sub>CTL</sub> ..... 3.3V
- RF Input Power, P<sub>IN</sub>..... 32dBm
- 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, T<sub>A</sub> ..... -40°C to +85°C
- Operating Frequency Range, f<sub>0</sub> ..... 0.7GHz to 6.0GHz
- Supply Voltage, V<sub>DD</sub>.....2.4V to 3.3V
- Control High Voltage, V<sub>CTLH</sub> ..... 1.35V to 3.3V
- Control Low Voltage, V<sub>CTLL</sub> .....0V to 0.45V

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.

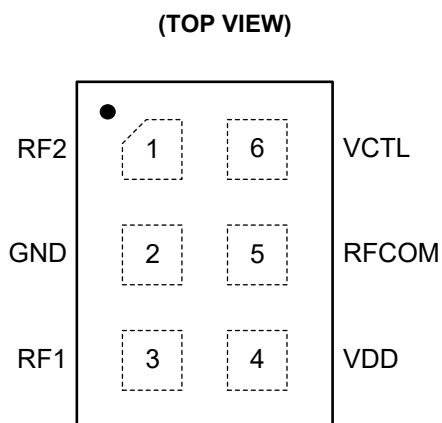
ESD SENSITIVITY CAUTION

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**



ULGA-0.7×1.1-6L

**PIN DESCRIPTION**

PIN	NAME	FUNCTION
1	RF2	RF I/O Port 2.
2	GND	Ground.
3	RF1	RF I/O Port 2.
4	VDD	DC Supply Voltage.
5	RFCOM	RF Common Port.
6	VCTL	DC Control Voltage.

**TRUTH TABLE**

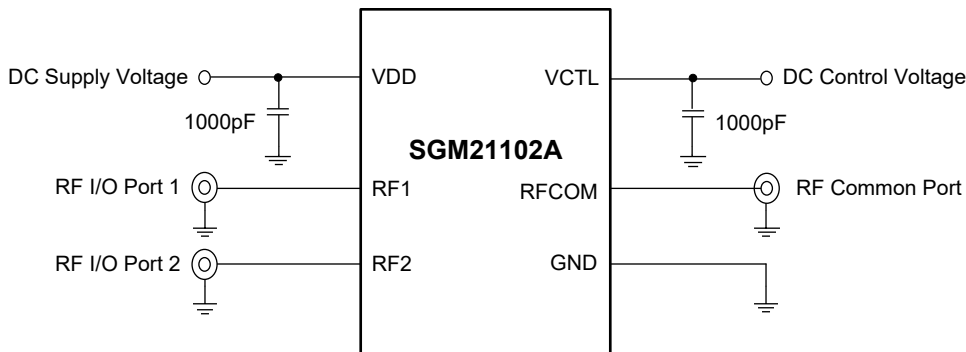
VCTL	ON PATH
Low	RFCOM to RF1
High	RFCOM to RF2

**ELECTRICAL CHARACTERISTICS**(Typical values are at  $V_{DD} = 2.8V$ ,  $P_{IN} = 0dBm$ ,  $T_A = +25^{\circ}C$ ,  $50\Omega$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>DC Characteristics</b>						
Supply Voltage	$V_{DD}$		2.4	2.8	3.3	V
Supply Current	$I_{DD}$			30	65	$\mu A$
Control Voltage	$V_{CTL\_H}$		1.35		3.3	V
	$V_{CTL\_L}$		0		0.45	
Control Current	$I_{CTL}$			2	5	$\mu A$
Switching Speed	$t_{RISE}$	10% RF to 90% RF		300		ns
Switching Time	$t_{SW}$	50% $V_{CTL}$ to 90% of RF		810	1100	ns
Turn-On Time	$t_{ON}$	50% $V_{DD}$ to 90% of RF		5	10	$\mu s$
<b>RF Characteristics</b>						
Insertion Loss	IL	$f_0 = 700MHz$ to $900MHz$		0.35	0.55	dB
		$f_0 = 900MHz$ to $1900MHz$		0.38	0.60	
		$f_0 = 1900MHz$ to $2690MHz$		0.39	0.65	
		$f_0 = 2690MHz$ to $6000MHz$		0.65	0.85	
Return Loss	RL	$f_0 = 700MHz$ to $900MHz$		25		dB
		$f_0 = 900MHz$ to $1900MHz$		23		
		$f_0 = 1900MHz$ to $2690MHz$		20		
		$f_0 = 2690MHz$ to $6000MHz$		16		
Isolation (RFCOM to All RF Ports)	ISO	$f_0 = 700MHz$ to $900MHz$	34	40		dB
		$f_0 = 900MHz$ to $1900MHz$	27	32		
		$f_0 = 1900MHz$ to $2690MHz$	25	28		
		$f_0 = 2690MHz$ to $6000MHz$	14	18		
Isolation (RF1 to RF2 Port/ RF2 to RF1 Port)	ISO	$f_0 = 700MHz$ to $900MHz$		41		dB
		$f_0 = 900MHz$ to $1900MHz$		33		
		$f_0 = 1900MHz$ to $2690MHz$		28		
		$f_0 = 2690MHz$ to $6000MHz$		18		
2 <sup>nd</sup> Harmonics	$2f_0$	$f_0 = 824MHz$ , $P_{IN} = 29dBm$ , CW, $50\Omega$		-91		dBc
3 <sup>rd</sup> Harmonics	$3f_0$			-101		dBc
Input 0.1dB Compression Point	$P_{0.1dB}$	$f_0 = 0.7GHz$ to $6.0GHz$		30		dBm

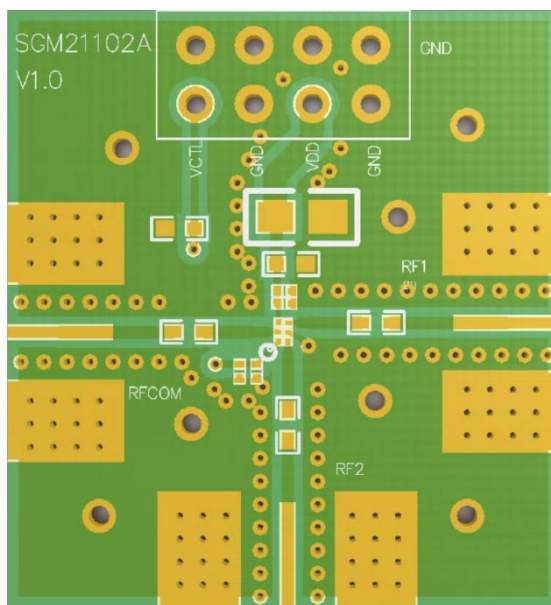
NOTE: All electrical characteristics are measured with all RF ports terminated by  $50\Omega$  loads.

**TYPICAL APPLICATION CIRCUIT**



**Figure 2. SGM21102A Typical Application Circuit**

**EVALUATION BOARD LAYOUT**



**Figure 3. SGM21102A Evaluation Board Layout**

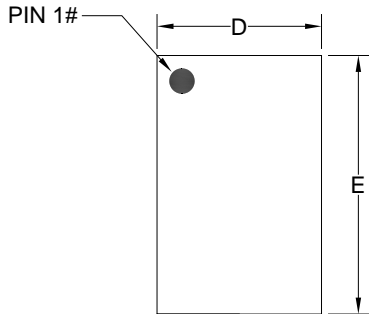
**REVISION HISTORY**

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

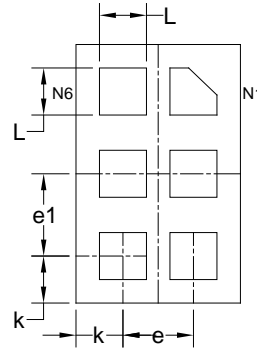
Changes from Original (MAY 2023) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

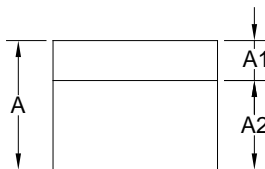
ULGA-0.7x1.1-6L



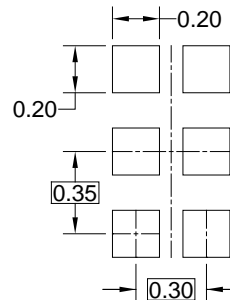
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

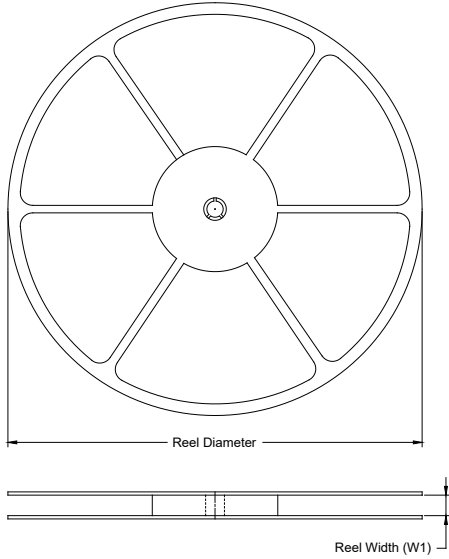
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1	0.140	0.170	0.200
A2	0.330	0.380	0.430
D	0.650	0.700	0.750
E	1.050	1.100	1.150
e	0.300 BSC		
e1	0.350 BSC		
k	0.200 REF		
L	0.200 TYP		

NOTE: This drawing is subject to change without notice.

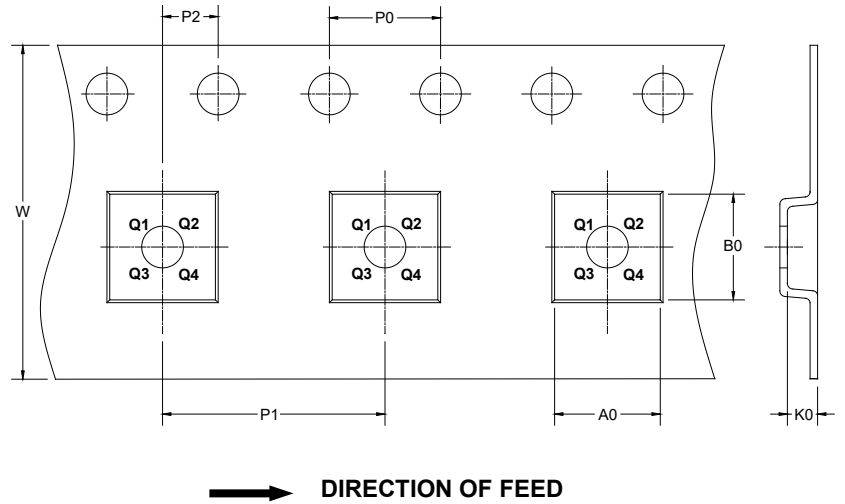
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



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

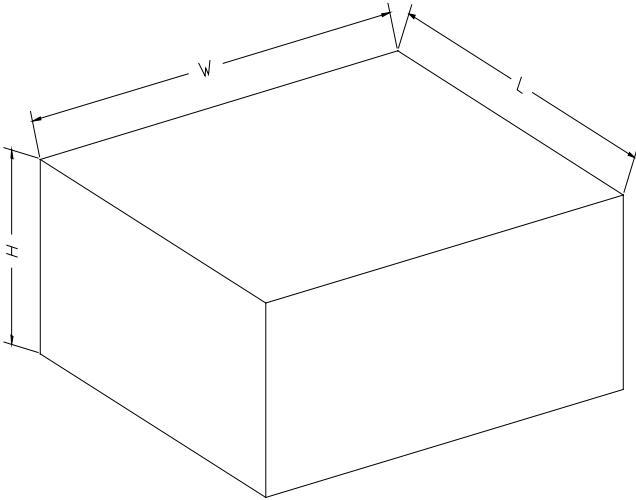
### KEY PARAMETER LIST OF TAPE AND REEL

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-0.7×1.1-6L	7"	9.5	0.82	1.22	0.66	4.0	2.0	2.0	8.0	Q1

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# 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

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