

### GENERAL DESCRIPTION

The SGM21102B is a single-pole/double-throw (SPDT) switch for mode switching in WLAN applications. The device features low insertion loss and high isolation. The product uses advanced switching technologies and supports 0.3GHz to 6.0GHz.

The SGM21102B 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 are required on the RF paths as long as no external DC voltage is applied, which can save PCB area and cost.

The SGM21102B is available in a Green XTDFN-1×1-6AL package.

### APPLICATIONS

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

### FEATURES

- **Supply Voltage Range: 2.4V to 3.0V**
- **High Switching Speed**
- **Operating Frequency Range: 0.3GHz to 6.0GHz**
- **Low Insertion Loss**
- **High Isolation**
- **Advanced Silicon-On-Insulator (SOI) Process**
- **No External DC Blocking Capacitors Required**
- **Available in a Green XTDFN-1×1-6AL Package**

### BLOCK DIAGRAM

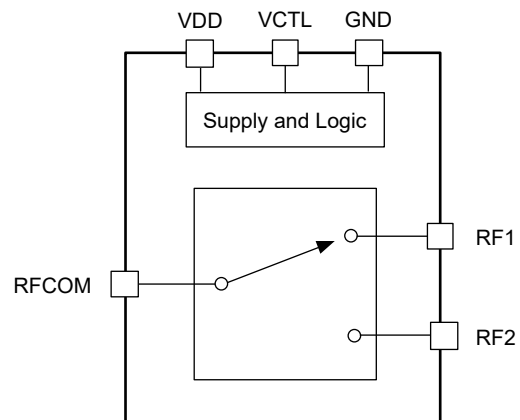


Figure 1. SGM21102B Block Diagram

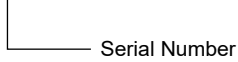
**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM21102B	XTDFN-1×1-6AL	-40°C to +105°C	SGM21102BGXHB6G/TR	01	Tape and Reel, 5000

**MARKING INFORMATION**

NOTE: Fixed character for 01.

**YY**



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,  $V_{CTL}$  ..... 3.4V
- RF Input Power,  $P_{IN}$ ..... 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,  $T_A$  ..... -40°C to +105°C
- Operating Frequency Range,  $f_0$  ..... 0.3GHz to 6.0GHz
- Supply Voltage,  $V_{DD}$ .....2.4V to 3.0V
- Control High Voltage,  $V_{CTL\_H}$ .....1.35V to 3.0V
- Control Low Voltage,  $V_{CTL\_L}$ .....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.

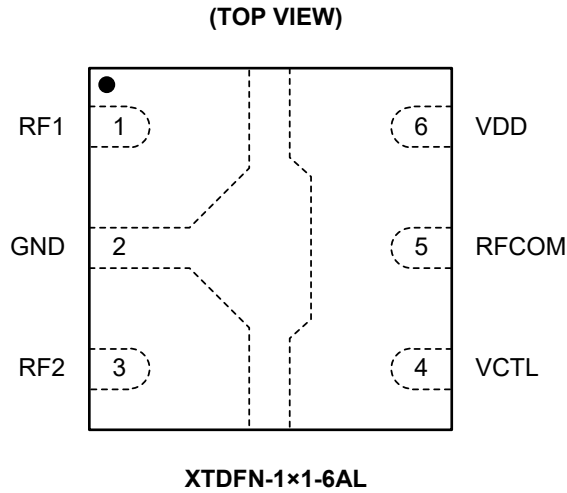
**ESD SENSITIVITY CAUTION**

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**



**PIN DESCRIPTION**

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

**TRUTH TABLE**

VCTL	ON PATH
High	RFCOM to RF1
Low	RFCOM to RF2

## ELECTRICAL CHARACTERISTICS

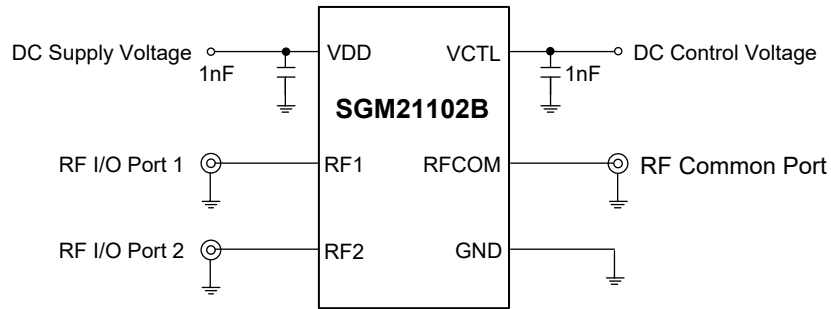
(Typical values are at  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 2.8\text{V}$ ,  $P_{IN} = 0\text{dBm}$ ,  $50\Omega$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>DC Characteristics</b>						
Supply Voltage	$V_{DD}$		2.4	2.8	3.0	V
Supply Current	$I_{VDD}$			30	65	$\mu\text{A}$
Control Voltage	$V_{CTL\_H}$		1.35		3.0	V
	$V_{CTL\_L}$		0		0.45	
Control Current	$I_{CTL}$			2	5	$\mu\text{A}$
Switching Speed	$t_{RISE}$	10% RF to 90% RF		300	450	ns
Switching Time	$t_{SW}$	50% VCTL to 90% RF		710	990	ns
Turn-On Time	$t_{ON}$	50% $V_{DD}$ to 90% of RF		5	10	$\mu\text{s}$
<b>RF Characteristics</b>						
Insertion Loss	IL	$f_0 = 300\text{MHz}$		0.30	0.58	dB
		$f_0 = 1910\text{MHz}$		0.35	0.62	
		$f_0 = 2690\text{MHz}$		0.39	0.68	
		$f_0 = 5000\text{MHz}$		0.48	0.85	
		$f_0 = 6000\text{MHz}$		0.55	0.90	
Return Loss	RL	$f_0 = 300\text{MHz}$	24 <sup>(1)</sup>	29		dB
		$f_0 = 1910\text{MHz}$	22 <sup>(1)</sup>	27		
		$f_0 = 2690\text{MHz}$	20 <sup>(1)</sup>	25		
		$f_0 = 5000\text{MHz}$	15 <sup>(1)</sup>	18		
		$f_0 = 6000\text{MHz}$	12 <sup>(1)</sup>	15		
Isolation (RFCOM to All RF Ports)	ISO	$f_0 = 300\text{MHz}$	45	53		dB
		$f_0 = 1910\text{MHz}$	35	39		
		$f_0 = 2690\text{MHz}$	28	32		
		$f_0 = 5000\text{MHz}$	19	25		
		$f_0 = 6000\text{MHz}$	15	20		
2 <sup>nd</sup> Harmonics	$2f_0$	$f_0 = 824\text{MHz}$ , $P_{IN} = 29\text{dBm}$ , CW, $50\Omega$		-87	-75 <sup>(1)</sup>	dBc
3 <sup>rd</sup> Harmonics	$3f_0$			-77	-70 <sup>(1)</sup>	dBc
Input 0.1dB Compression Point	$P_{0.1dB}$	$f_0 = 0.3\text{GHz}$ to $3.0\text{GHz}$		32		dBm
		$f_0 = 3.0\text{GHz}$ to $6.0\text{GHz}$		30		dBm

## NOTE:

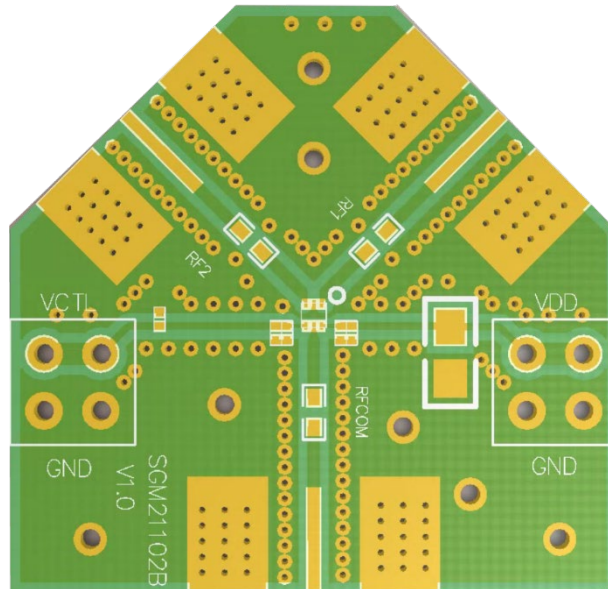
1. Guaranteed by design, not tested in production.

**TYPICAL APPLICATION CIRCUIT**



**Figure 2. SGM21102B Typical Application Circuit**

**EVALUATION BOARD LAYOUT**



**Figure 3. SGM21102B Evaluation Board Layout**

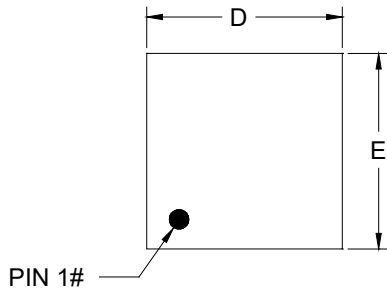
**REVISION HISTORY**

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

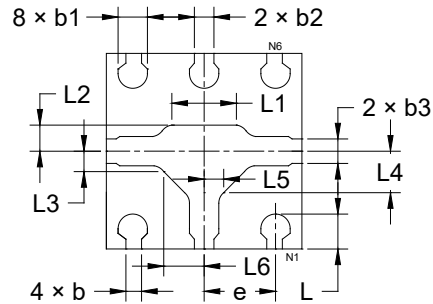
Changes from Original (NOVEMBER 2023) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

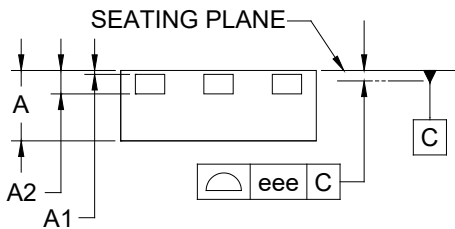
XTDFN-1x1-6AL



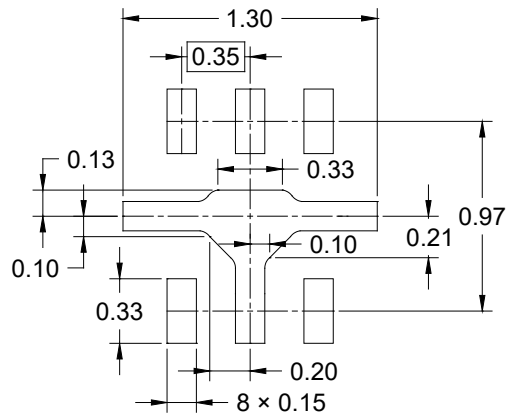
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

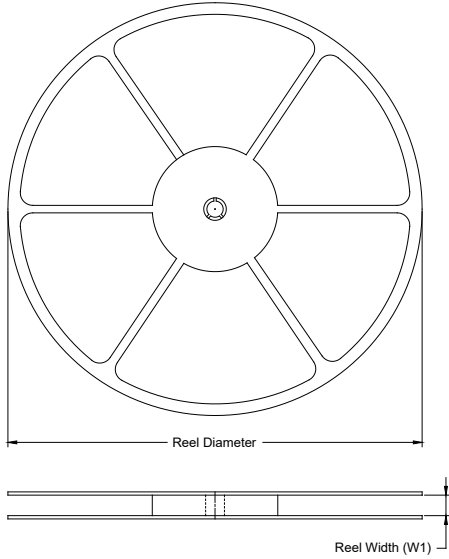
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.310	-	0.410
A1	-0.010	-	0.050
A2	0.120 REF		
b	0.030	-	0.130
b1	0.100	-	0.200
b2	0.050	-	0.150
b3	0.075	-	0.175
D	0.900	-	1.100
E	0.900	-	1.100
e	0.350 BSC		
L	0.075	-	0.275
L1	0.330 REF		
L2	0.130 REF		
L3	0.100 REF		
L4	0.210 REF		
L5	0.100 REF		
L6	0.200 REF		
eee	0.080		

NOTE: This drawing is subject to change without notice.

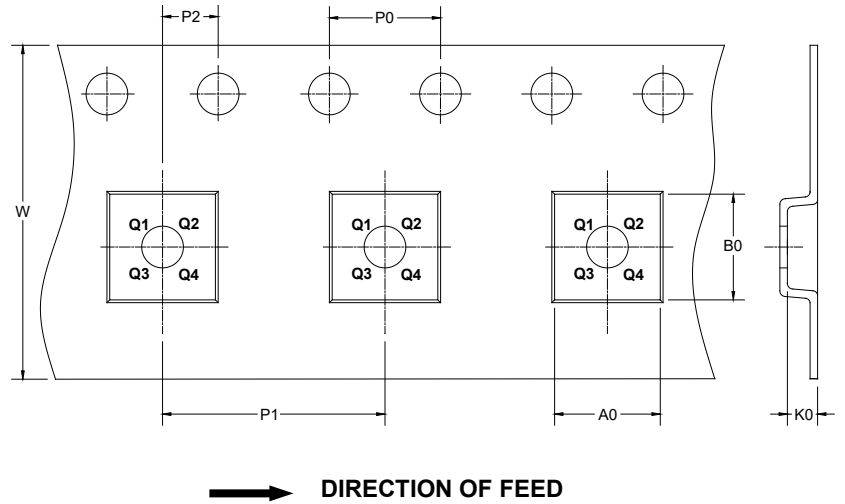
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



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

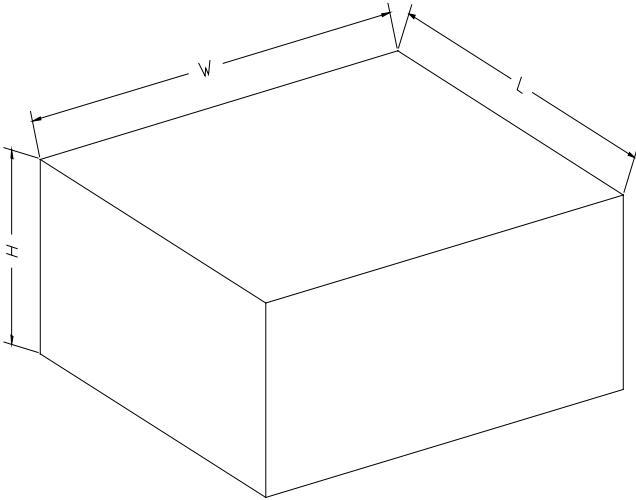
### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
XTDFN-1×1-6AL	7"	9.5	1.13	1.13	0.53	4.0	4.0	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

DD0002