

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

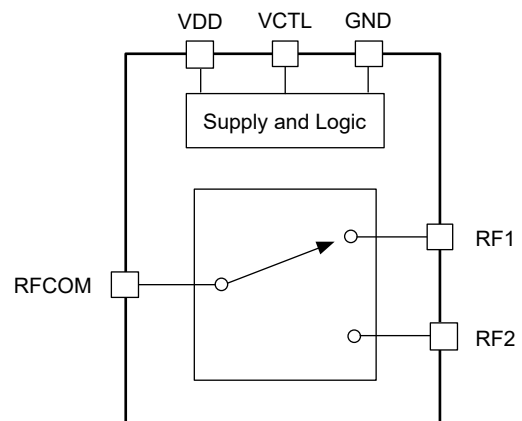


Figure 1. SGM21102B Block Diagram

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

Serial Number

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 ^{(1) (2)}	
HBM	±1000V
CDM	±2000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

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.

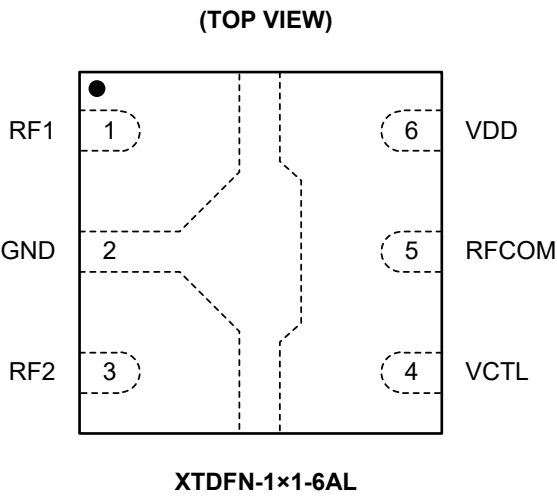
ESD SENSITIVITY CAUTION

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 $T_A = +25^\circ\text{C}$, $V_{DD} = 2.8\text{V}$, $P_{IN} = 0\text{dBm}$, 50Ω , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Characteristics						
Supply Voltage	V_{DD}		2.4	2.8	3.0	V
Supply Current	I_{VDD}			30	65	μA
Control Voltage	V_{CTL_H}		1.35		3.0	V
	V_{CTL_L}		0		0.45	
Control Current	I_{CTL}			2	5	μA
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	μs
RF Characteristics						
Insertion Loss	IL	$f_0 = 300\text{MHz}$		0.30	0.4	dB
				0.30	0.58 ⁽²⁾	
		$f_0 = 1910\text{MHz}$		0.35	0.45	
				0.35	0.62 ⁽²⁾	
		$f_0 = 2690\text{MHz}$		0.39	0.55	
				0.39	0.68 ⁽²⁾	
		$f_0 = 5000\text{MHz}$		0.48	0.65	
				0.48	0.85 ⁽²⁾	
		$f_0 = 6000\text{MHz}$		0.55	0.7	
				0.55	0.90 ⁽²⁾	
Return Loss	RL	$f_0 = 300\text{MHz}$	24 ⁽¹⁾	29		dB
		$f_0 = 1910\text{MHz}$	22 ⁽¹⁾	27		
		$f_0 = 2690\text{MHz}$	20 ⁽¹⁾	25		
		$f_0 = 5000\text{MHz}$	15 ⁽¹⁾	18		
		$f_0 = 6000\text{MHz}$	12 ⁽¹⁾	15		
Isolation (RFCOM to All RF Ports)	ISO	$f_0 = 300\text{MHz}$	50	53		dB
			45 ⁽²⁾	53		
		$f_0 = 1910\text{MHz}$	37	39		
			35 ⁽²⁾	39		
		$f_0 = 2690\text{MHz}$	30	32		
			28 ⁽²⁾	32		
		$f_0 = 5000\text{MHz}$	22	25		
			19 ⁽²⁾	25		
		$f_0 = 6000\text{MHz}$	17	20		
			15 ⁽²⁾	20		
2 nd Harmonics	$2f_0$	$f_0 = 824\text{MHz}$, $P_{IN} = 29\text{dBm}$, CW, 50Ω		-87	-75 ⁽¹⁾	dBc
3 rd Harmonics	$3f_0$			-77	-70 ⁽¹⁾	dBc
Input 0.1dB Compression Point	$P_{0.1dB}$	$f_0 = 0.3\text{GHz}$ to 3.0GHz		32		dBm
		$f_0 = 3.0\text{GHz}$ to 6.0GHz		30		dBm

NOTE:

1. Guaranteed by design, not tested in production.
2. The data contain the worst-case values after reliability verification.

TYPICAL APPLICATION CIRCUIT

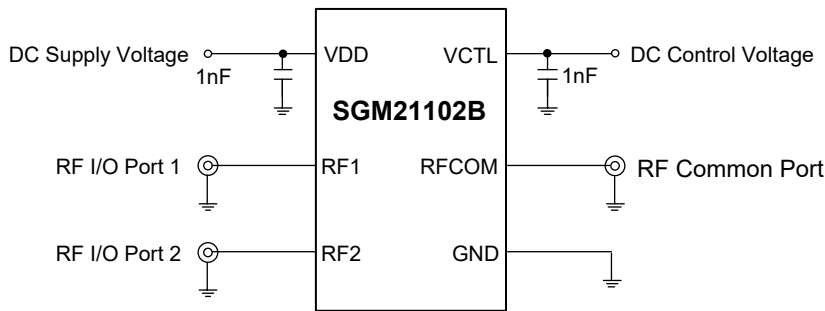


Figure 2. SGM21102B Typical Application Circuit

EVALUATION BOARD LAYOUT

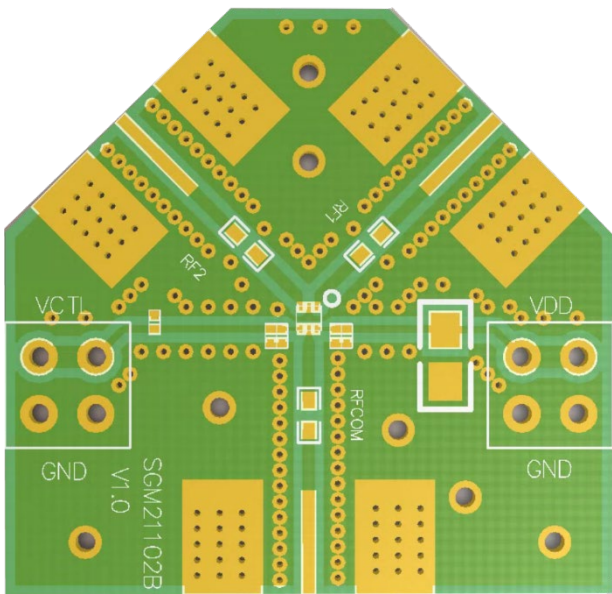


Figure 3. SGM21102B Evaluation Board Layout

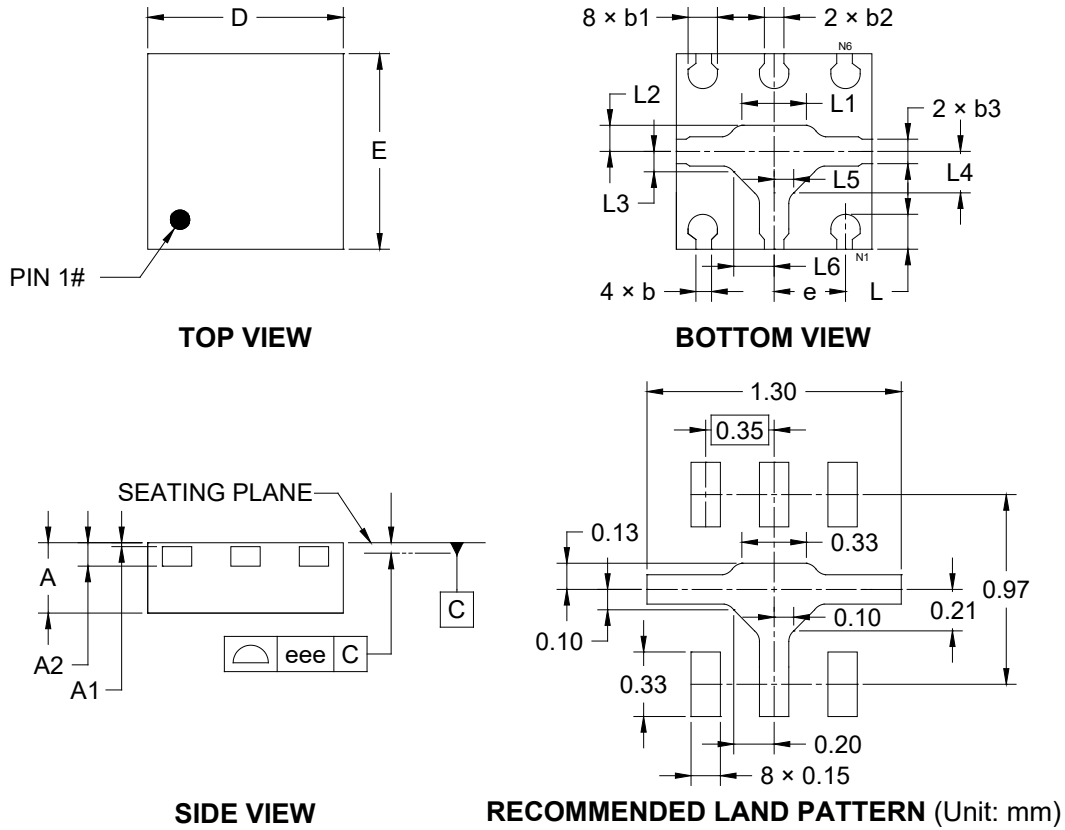
REVISION HISTORY

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

JUNE 2025 – REV.A to REV.A.1	Page
Updated Electrical Characteristics	4
Changes from Original (NOVEMBER 2023) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

XTDFN-1×1-6AL



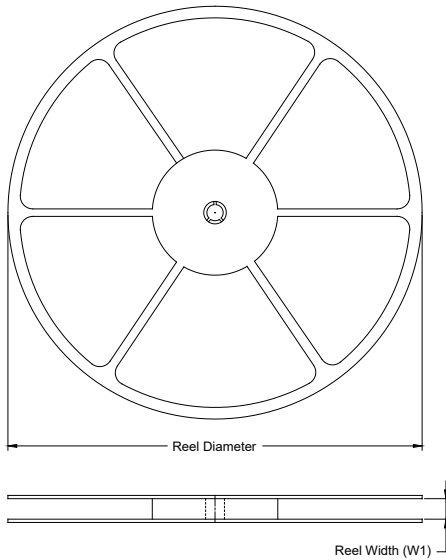
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.310	-	0.410
A1	-0.010	-	0.050
A2	0.120 REF		
b	0.030	-	0.130
b1	0.100	-	0.200
b2	0.050	-	0.150
b3	0.075	-	0.175
D	0.900	-	1.100
E	0.900	-	1.100
e	0.350 BSC		
L	0.075	-	0.275
L1	0.330 REF		
L2	0.130 REF		
L3	0.100 REF		
L4	0.210 REF		
L5	0.100 REF		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

NOTE: This drawing is subject to change without notice.

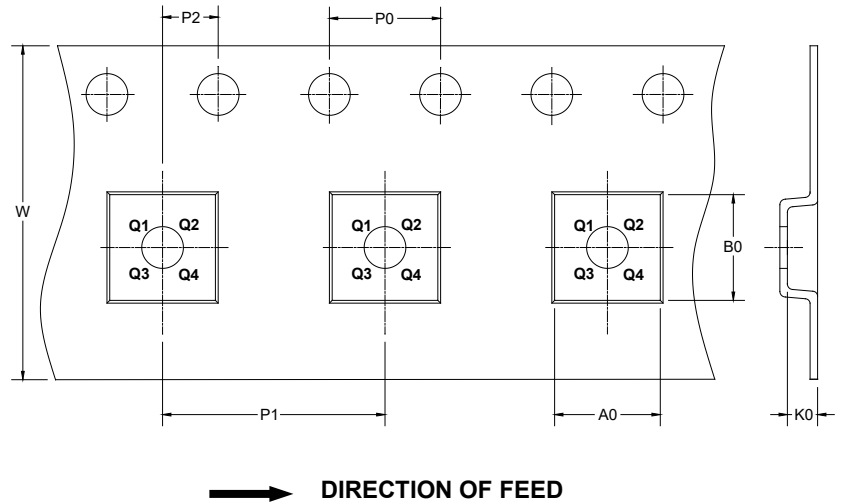
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

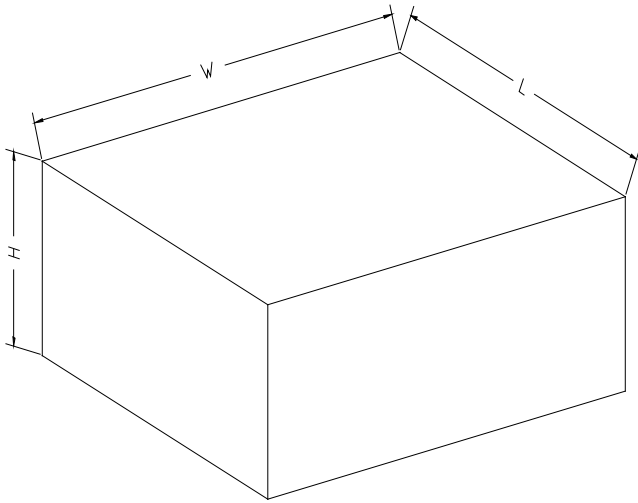
KEY PARAMETER LIST OF TAPE AND REEL

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

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