

GENERAL DESCRIPTION

The SGM21102C is a single-pole/double-throw (SPDT) switch, which supports from 20MHz to 6.0GHz. The device has low insertion loss and high isolation. The device features make it suitable for high linearity applications. It also has the positive voltage operation with very low DC power consumption performance.

The SGM21102C is available in a Green ULGA-1×1-6BL package.

APPLICATIONS

T/R Switch in 802.11 a/b/g/n/ac/ax WLAN and Bluetooth System

Sub-1G RF System

ISM Band Application

FEATURES

- **Operating Frequency Range: 20MHz to 6.0GHz**
- **GaAs pHEMT Process**
- **P_{1dB}: 33dBm (TYP) at 2.7V**
- **Low Insertion Loss: 0.2dB (TYP) at 0.9GHz**
- **Low DC Power Consumption**
- **Available in a Green ULGA-1×1-6BL Package**

BLOCK DIAGRAM

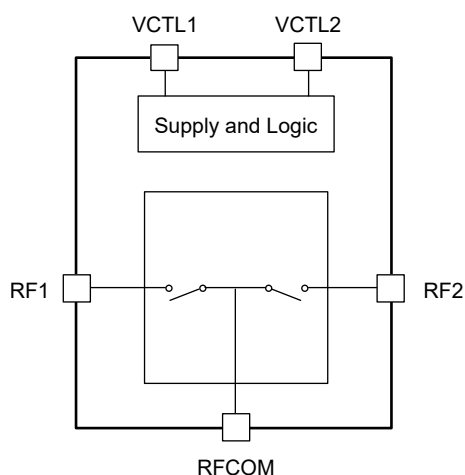


Figure 1. SGM21102C Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM21102C	ULGA-1×1-6BL	-40°C to +105°C	SGM21102CGULAE6G/TR	00	Tape and Reel, 5000

MARKING INFORMATION

NOTE: Fixed character for 00.

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

Control Voltage, V_{CTL} -1.2V to 8.0V
 RF Input Power, $V_{CTL} = 0V$ and 2.7V 33dBm
 RF Input Power, $V_{CTL} = 0V$ and 5.0V 33dBm
 Junction Temperature +150°C
 Storage Temperature Range -55°C to +150°C
 Lead Temperature (Soldering, 10s) +260°C

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range -40°C to +105°C
 Control Voltage High, V_{CTL_H} 1.8V to 5V
 Control Voltage Low, V_{CTL_L} 0V to 0.2V

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.

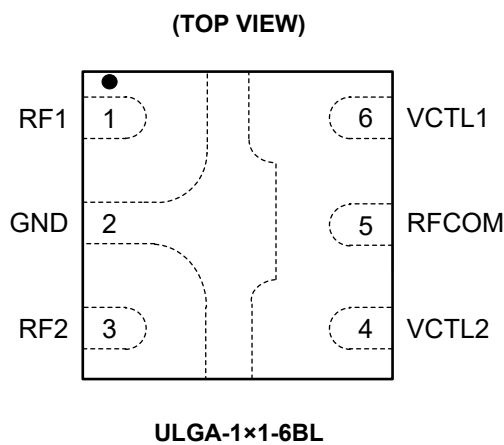
ESD SENSITIVITY CAUTION

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 Port 1.
2	GND	Ground.
3	RF2	RF Port 2.
4	VCTL2	Control Voltage 2.
5	RFCOM	RF Common Port.
6	VCTL1	Control Voltage 1.

LOGIC TRUTH TABLE

VCTL1	VCTL2	RFCOM to RF1	RFCOM to RF2
H	L	Isolation	Insertion Loss
L	H	Insertion Loss	Isolation

ELECTRICAL CHARACTERISTICS

($T_A = +25^\circ\text{C}$, $V_{CTL} = 0\text{V}$ to 5V , typical values are at $V_{CTL} = 0\text{V}$ and 2.7V , $P_{IN} = 0\text{dBm}$, input and output resistance = 50Ω , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Characteristics						
Control Current	I _{CTL}	V _{CTL_L} = 0V		2	5	μA
		V _{CTL_H} = 5V		2	5	
Control Voltage	V _{CTL_L}		0	0	0.2	V
	V _{CTL_H}		1.8	2.7	5	
Switching-On Time	t _{ON}	50% control to 90% RF		410	1000	ns
Switching-Off Time	t _{OFF}	50% control to 10% RF		260	1000	
Switching Rise Time	t _{RISE}	10% to 90% RF		125		ns
Switching Fall Time	t _{FALL}	90% to 10% RF		130		
RF Characteristics						
Insertion Loss (RF1/RF2 to RFCOM)	IL	f ₀ = 20MHz to 1.0GHz		0.21	0.45	dB
		f ₀ = 1.0GHz to 3.0GHz		0.30	0.70	
		f ₀ = 3.0GHz to 4.0GHz		0.42	0.80	
		f ₀ = 4.0GHz to 6.0GHz		0.56	0.85	
Isolation (RF1/RF2 to RFCOM)	ISO	f ₀ = 20MHz to 1.0GHz	25	26		dB
		f ₀ = 1.0GHz to 3.0GHz	21	26		
		f ₀ = 3.0GHz to 4.0GHz	16	23		
		f ₀ = 4.0GHz to 6.0GHz	10	13		
Return Loss (RF1/RF2 to RFCOM)	RL	f ₀ = 20MHz to 1.0GHz	26	28		dB
		f ₀ = 1.0GHz to 3.0GHz	15	18		
		f ₀ = 3.0GHz to 4.0GHz	12	15		
		f ₀ = 4.0GHz to 6.0GHz	13	16		
Input 1dB Compression Point (RF1/RF2 to RFCOM)	P _{1dB}	f ₀ = 2.45GHz, V _{CTL} = 0V and 1.8V	23	24		dBm
		f ₀ = 2.45GHz, V _{CTL} = 0V and 2.7V	32	33		
		f ₀ = 2.45GHz, V _{CTL} = 0V and 5.0V	32	33		
		f ₀ = 48MHz, V _{CTL} = 0V and 2.7V	25	26		

TYPICAL APPLICATION CIRCUIT

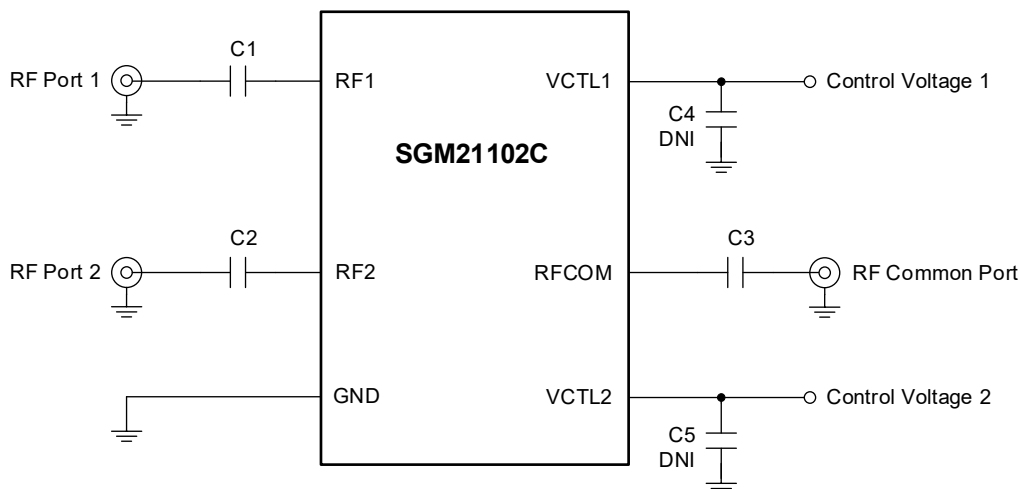


Figure 2. SGM21102C Typical Application Circuit

Table 1.SGM21102C Function Table

Component	Matching Band	Vendor	Dimension	Part Number & Value
C1, C2, C3	> 500MHz	Murata	1.0mm × 0.5mm (0402)	GRM1551X1E101GA01, 100pF
C1, C2, C3	< 50MHz	Murata	1.0mm × 0.5mm (0402)	GRM155R71E103JA01, 10nF

EVALUATION BOARD LAYOUT

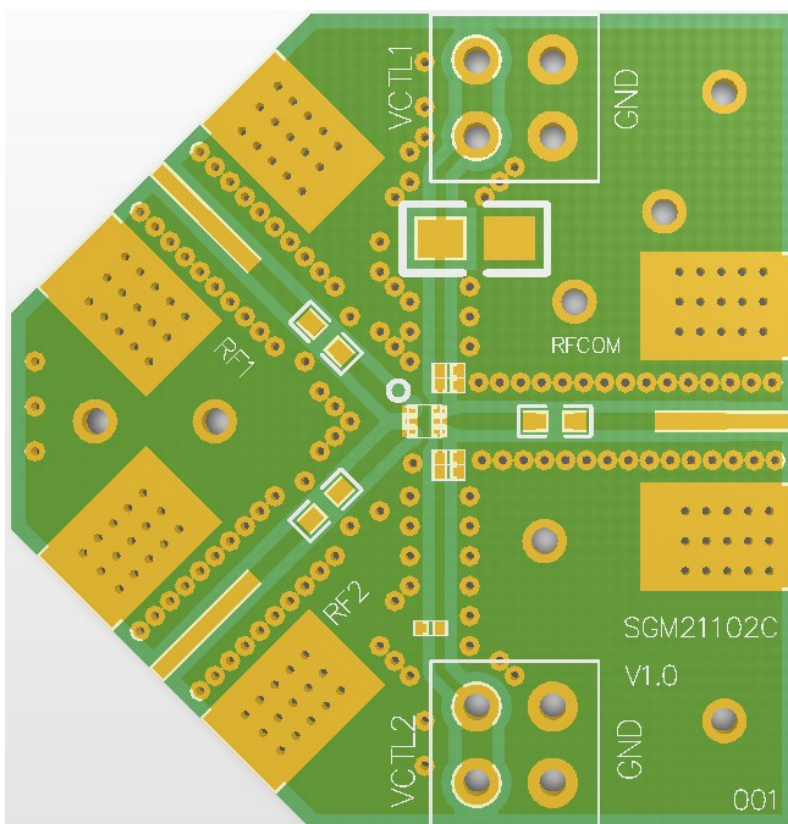


Figure 3. Evaluation Board Layout

REVISION HISTORY

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

MAY 2025 – REV.A to REV.A.1	Page
Updated Typical Application Circuit	5
Changes from Original (OCTOBER 2023) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

ULGA-1×1-6BL



Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.450	-	0.550
A1	0.170 REF		
b	0.090	-	0.190
b1	0.100	-	0.200
D	0.900	-	1.100
E	0.900	-	1.100
e	0.350 BSC		
e1	0.355 BSC		
L	0.100	-	0.200
L1	0.075 REF		
L2	0.800	-	0.900
L3	0.425 REF		
L4	0.370 REF		
L5	0.471 REF		
L6	0.177 REF		
L7	0.505	-	0.605
L8	0.463 REF		
L9	0.330 REF		
eee	0.100		



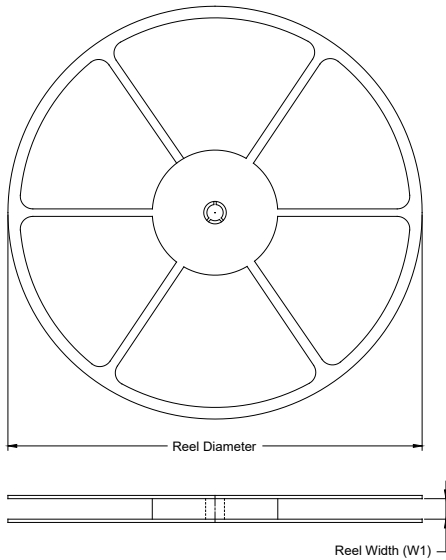
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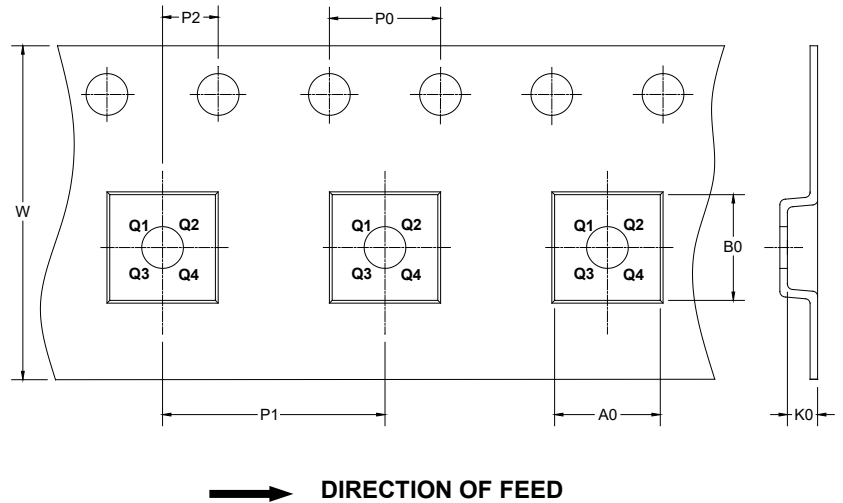
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

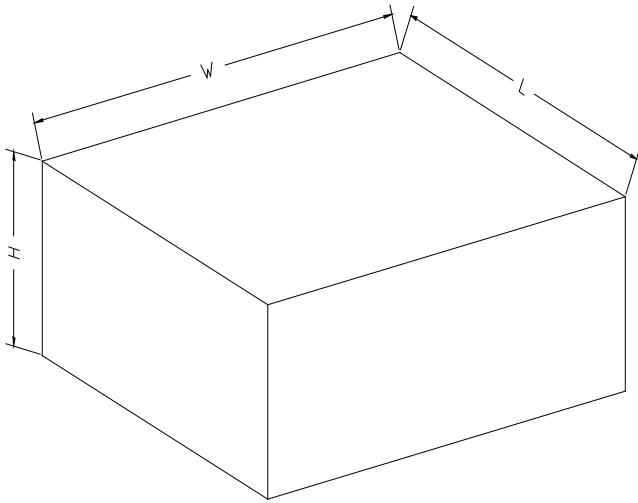
KEY PARAMETER LIST OF TAPE AND REEL

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-1×1-6BL	7"	9.5	1.16	1.16	0.74	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