

GENERAL DESCRIPTION

The SGM21102G is a single-pole/double-throw (SPDT) switch, which supports from 20MHz to 4.0GHz. 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 SGM21102G is available in a Green SC70-6 package.

APPLICATIONS

T/R Switch in 802.11a/b/g/n/ac/ax WLAN Bluetooth System
 Sub-1G RF System
 ISM Band Application
 Industry Application

FEATURES

- **Operating Frequency Range: 20MHz to 4.0GHz**
- **GaAs pHEMT Process**
- **P_{1dB} : 30dBm (TYP) at 2.7V**
- **Low Insertion Loss: 0.17dB (TYP) at 0.9GHz**
- **Low DC Power Consumption**
- **Available in a Green SC70-6 Package**

BLOCK DIAGRAM

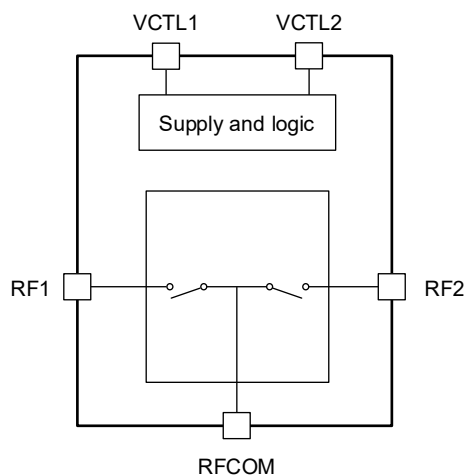


Figure 1. SGM21102G Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM21102G	SC70-6	-40°C to +105°C	SGM21102GGC6G/TR	0DQXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XX = Date Code.

YYY X X

— Date Code - Week
— Date Code - Year
— 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, $V_{CTL} = 0V$ to 7V	32dBm
Junction Temperature	+150°C
Storage Temperature Range	-55°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility ^{(1) (2)}	
HBM	±100V
CDM	±1000V

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.....-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
Operating Frequency Range, f_020MHz to 4.0GHz

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.

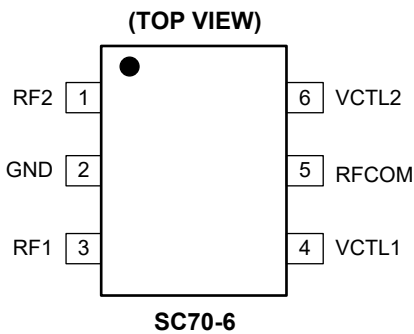
ESD SENSITIVITY CAUTION

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	RF2	RF Port 2.
2	GND	Ground.
3	RF1	RF Port 1.
4	VCTL1	Control Voltage 1.
5	RFCOM	RF Common Port.
6	VCTL2	Control Voltage 2.

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°C, V_{CTL} = 0V to 5V, typical values are at V_{CTL} = 0V and 2.7V, P_{IN} = 0dBm, input and output resistance = 50Ω, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Characteristics						
Control Current	I _{VDD}	V _{CTL_L} = 0V		2	5	μA
		V _{CTL_H} = 5V		2	5	
Control Voltage	V _{CTL_L}			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		0.17	0.30	dB
				0.17	0.40 ⁽¹⁾	
		f ₀ = 1.0GHz to 2.0GHz		0.23	0.40	
				0.23	0.45 ⁽¹⁾	
		f ₀ = 2.0GHz to 3.0GHz		0.33	0.45	
				0.33	0.55 ⁽¹⁾	
f ₀ = 3.0GHz to 4.0GHz		0.43	0.65			
		0.43	0.75 ⁽¹⁾			
Isolation (RF1/RF2 to RFCOM)	ISO	f ₀ = 20MHz to 1.0GHz	24	27		dB
		f ₀ = 1.0GHz to 2.0GHz	24	27		
		f ₀ = 2.0GHz to 3.0GHz	20	24		
		f ₀ = 3.0GHz to 4.0GHz	15	18		
Return Loss (RF1/RF2 to RFCOM)	RL	f ₀ = 20MHz to 1.0GHz	18	19		dB
		f ₀ = 1.0GHz to 2.0GHz	21	22		
		f ₀ = 2.0GHz to 3.0GHz	23	25		
		f ₀ = 3.0GHz to 4.0GHz	23	27		
Input 1dB Compression Point (RF1/RF2 to RFCOM)	P _{1dB}	f ₀ = 0.048GHz, V _{CTL} = 1.8V	29	30		dBm
		f ₀ = 0.048GHz, V _{CTL} = 2.7V	32	33		
		f ₀ = 0.048GHz, V _{CTL} = 5V	32	33		
		f ₀ = 0.5GHz to 3.0GHz, V _{CTL} = 1.8V	25	26		
		f ₀ = 0.5GHz to 3.0GHz, V _{CTL} = 2.7V	29	30		
		f ₀ = 0.5GHz to 3.0GHz, V _{CTL} = 5V	33	34		
		f ₀ = 3.0GHz to 4.0GHz, V _{CTL} = 2.7V	30	31		
		f ₀ = 3.0GHz to 4.0GHz, V _{CTL} = 5V	33	34		

NOTE:

1. The data contain the worst-case values after reliability verification.

TYPICAL APPLICATION CIRCUIT

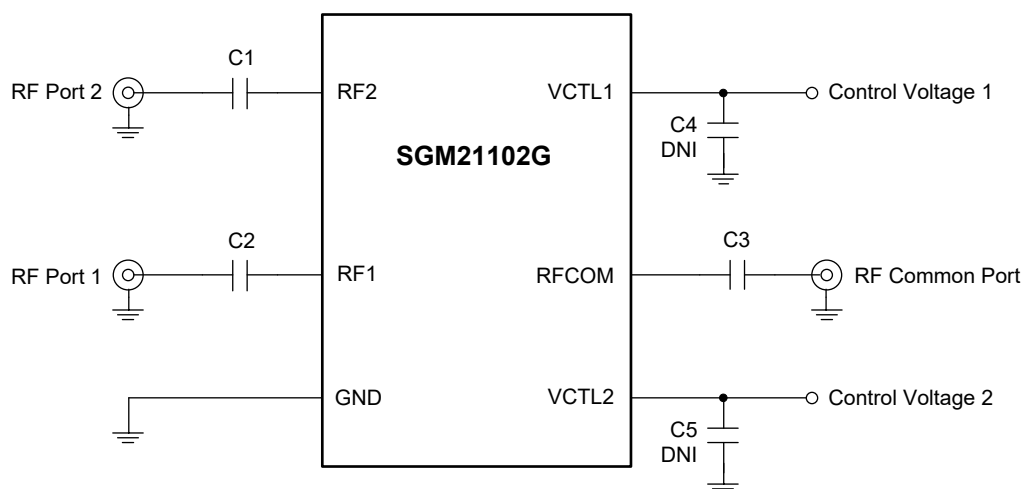


Figure 2. SGM21102G Typical Application Circuit

Table 1. SGM21102G 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)	GRM1551X1E101GA01, 10nF

EVALUATION BOARD LAYOUT

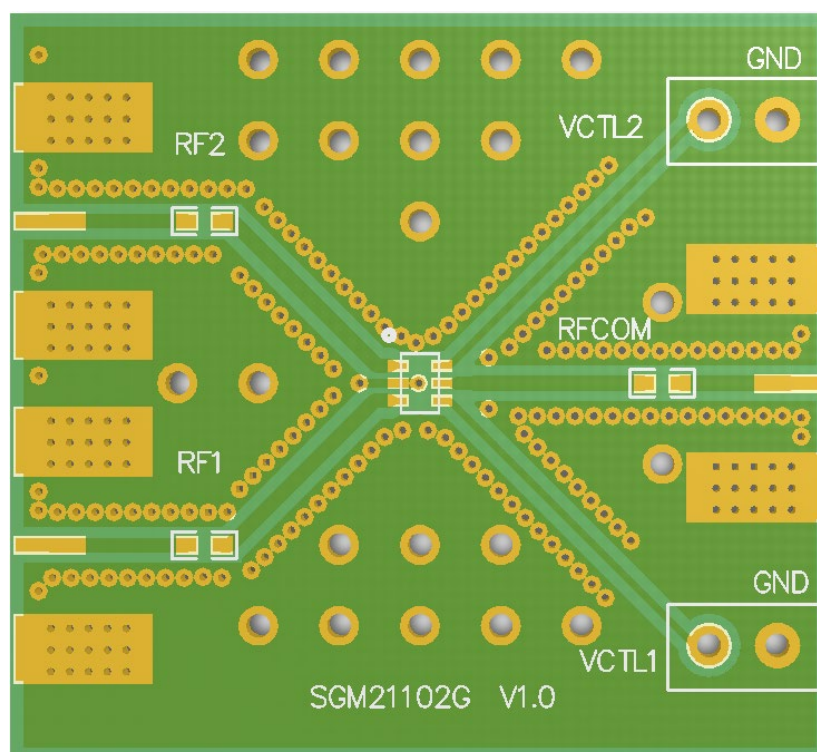


Figure 3. SGM21102G Evaluation Board Layout

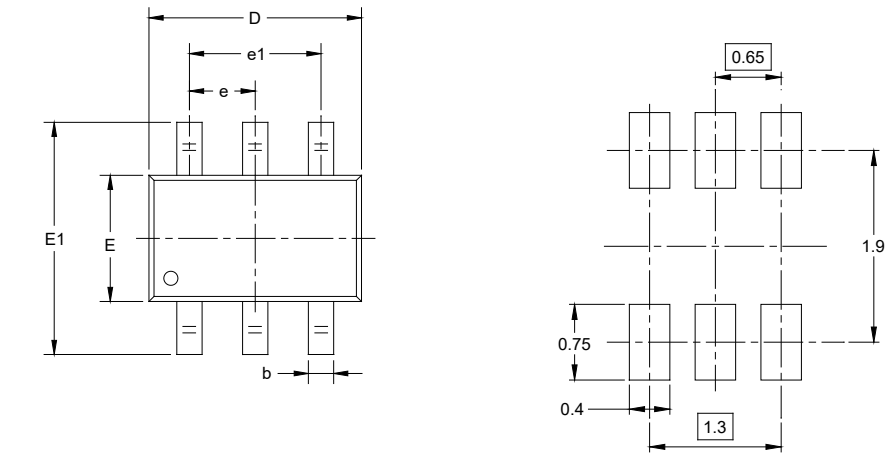
REVISION HISTORY

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

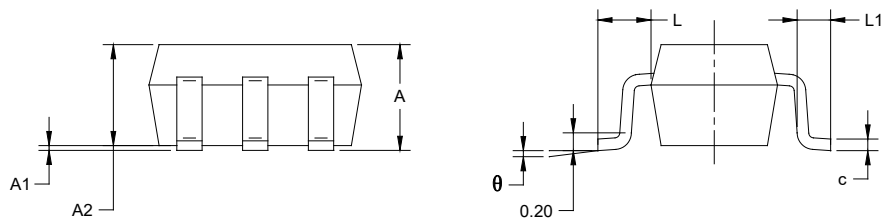
JUNE 2025 – REV.A to REV.A.1	Page
Updated Electrical Characteristics	4
Changes from Original (NOVEMBER 2023) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

SC70-6



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.220	0.003	0.009
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.65 TYP		0.026 TYP	
e1	1.300 BSC		0.051 BSC	
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

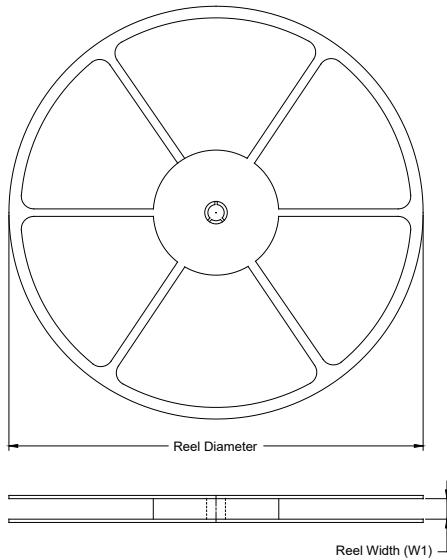
NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

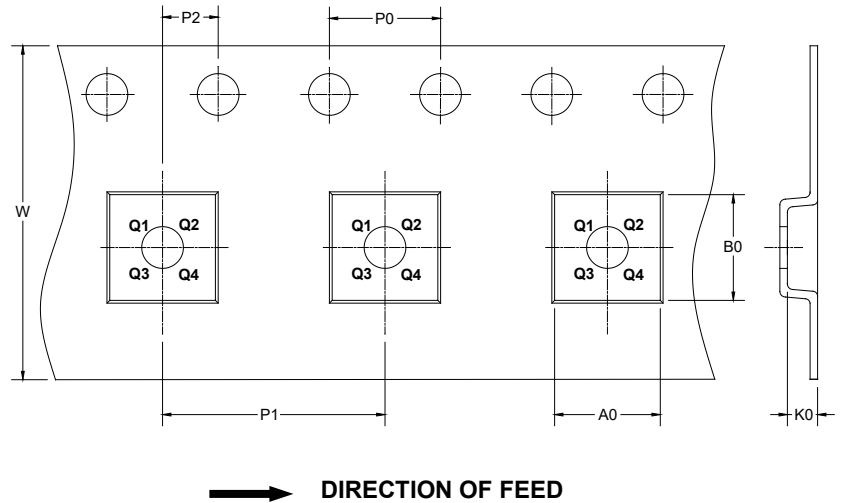
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

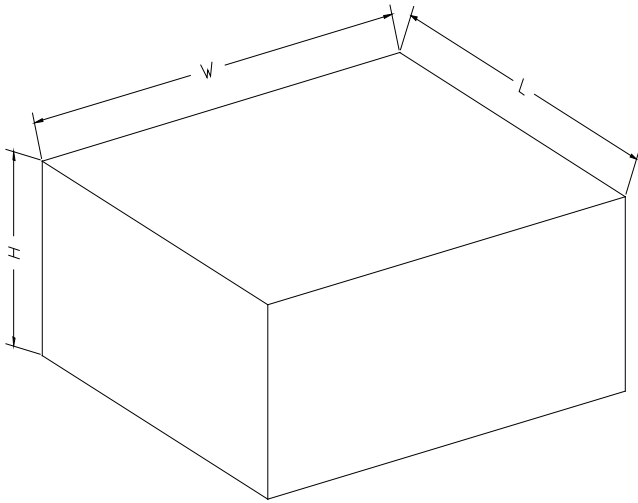
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SC70-6	7"	9.5	2.40	2.50	1.20	4.0	4.0	2.0	8.0	Q3

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