

GENERAL DESCRIPTION

The SGM11102G is a single-pole/double-throw (SPDT) 2G/3G/4G/5G transmit and receive switch, which supports from 0.1GHz to 5.8GHz. The device features low control voltage and high isolation.

The SGM11102G 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 SGM11102G is available in a Green XTDFN-1.1×0.7-6L package.

APPLICATIONS

2G/3G/4G/5G Applications

FEATURES

- **Operation Frequency Range: 0.1GHz to 5.8GHz**
- **Supply Voltage Range: 1.65V to 3.3V**
- **High Isolation:**
 - $f_0 < 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 43dB (TYP)
 - $f_0 = 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 40dB (TYP)
 - $f_0 = 1.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 34dB (TYP)
 - $f_0 = 2.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 30dB (TYP)
 - $f_0 = 3.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 27dB (TYP)
 - $f_0 = 5.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 20dB (TYP)
- **Low Insertion Loss:**
 - $f_0 < 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.24dB (TYP)
 - $f_0 = 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.26dB (TYP)
 - $f_0 = 1.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.28dB (TYP)
 - $f_0 = 2.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.30dB (TYP)
 - $f_0 = 3.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.36dB (TYP)
 - $f_0 = 5.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.68dB (TYP)
- **Available in a Green XTDFN-1.1×0.7-6L Package**

BLOCK DIAGRAM

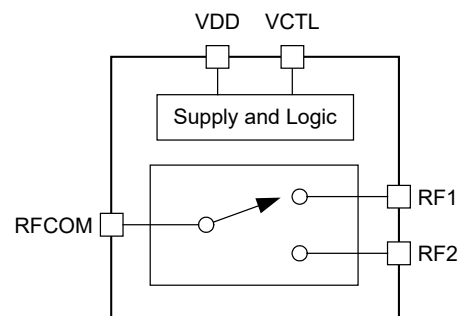


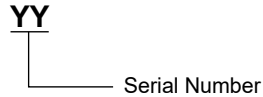
Figure 1. SGM11102G Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM11102G	XTDFN-1.1×0.7-6L	-40°C to +90°C	SGM11102GYXGG6G/TR	6S	Tape and Reel, 10000

MARKING INFORMATION

NOTE: Fixed character for 6S.



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}	-0.3V to 3.6V
Control Voltage, V_{CTL}	-0.3V to 3.6V
RF Input Power, P_{IN}	39dBm
Junction Temperature.....	+150°C
Storage Temperature Range.....	-55°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility	
HBM.....	2000V
CDM.....	2000V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range.....	-40°C to +90°C
Operating Frequency Range, f_0	0.1GHz to 5.8GHz
Supply Voltage, V_{DD}	1.65V to 3.3V
Control High Voltage, V_{CTL_H}	1.3V to 3.3V
Control Low Voltage, V_{CTL_L}	0V to 0.35V

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.

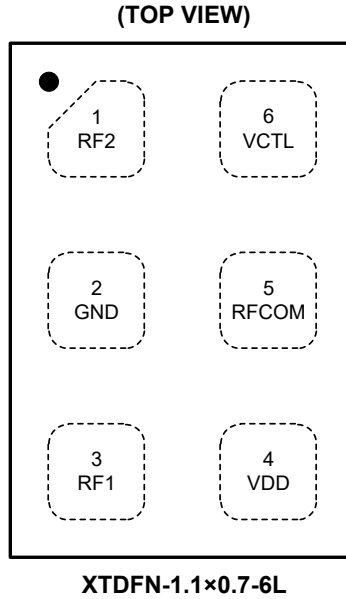
ESD SENSITIVITY CAUTION

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	VDD	DC Power Supply.
5	RFCOM	RF Common Port.
6	VCTL	DC Control Voltage.

LOGIC TRUTH TABLE

VCTL	ON PATH
Low	RFCOM to RF1
High	RFCOM to RF2

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{DD} = 1.65V to 3.3V, P_{IN} = 0dBm, Z_S = Z_L = 50Ω, V_{CTL_L} = 0V, V_{CTL_H} = 1.8V, typical values are at V_{DD} = 1.8V, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Characteristics						
Supply Voltage	V _{DD}		1.65	1.8	3.3	V
Supply Current	I _{VDD}			62	100	μA
Control Current	I _{CTL}				5	μA
Control Voltage	V _{CTL_H}	High	1.3		3.3	V
	V _{CTL_L}	Low	0		0.35	
Switching Time	t _{SW}	50% of control voltage to 90%/10% RF power		1.2	2	μs
Turn-On Time	t _{ON}	Time from V _{DD} = 0V to part on and RF at 90%		10		μs
RF Characteristics						
Insertion Loss	IL	f ₀ < 0.8GHz, P _{IN} = 0dBm		0.24		dB
		f ₀ = 0.8GHz, P _{IN} = 0dBm		0.26	0.50	
		f ₀ = 1.7GHz, P _{IN} = 0dBm		0.28	0.52	
		f ₀ = 2.7GHz, P _{IN} = 0dBm		0.30	0.55	
		f ₀ = 3.8GHz, P _{IN} = 0dBm		0.36	0.61	
		f ₀ = 5.8GHz, P _{IN} = 0dBm		0.68	0.90	
Isolation (RFCOM to All RF Ports)	ISO	f ₀ < 0.8GHz, P _{IN} = 0dBm		43		dB
		f ₀ = 0.8GHz, P _{IN} = 0dBm	38	40		
		f ₀ = 1.7GHz, P _{IN} = 0dBm	32	34		
		f ₀ = 2.7GHz, P _{IN} = 0dBm	28	30		
		f ₀ = 3.8GHz, P _{IN} = 0dBm	25	27		
		f ₀ = 5.8GHz, P _{IN} = 0dBm	16	20		
VSWR	VSWR	f ₀ = 0.1GHz to 3.0GHz		1.2:1		
		f ₀ = 3.0GHz to 5.8GHz		1.5:1		
Input Power at 0.1dB Compression Point	P _{0.1dB}	f ₀ = 0.1GHz to 3.0GHz		39		dBm
		f ₀ = 3.0GHz to 5.8GHz		38		
2 nd Harmonic	2f ₀	P _{IN} = 26dBm, f ₀ = 950MHz		-104		dBc
		P _{IN} = 35dBm, f ₀ = 950MHz		-94		
		P _{IN} = 32dBm, f ₀ = 1800MHz		-96		
3 rd Harmonic	3f ₀	P _{IN} = 26dBm, f ₀ = 950MHz		-109		dBc
		P _{IN} = 35dBm, f ₀ = 950MHz		-91		
		P _{IN} = 32dBm, f ₀ = 1800MHz		-95		

TYPICAL APPLICATION CIRCUIT

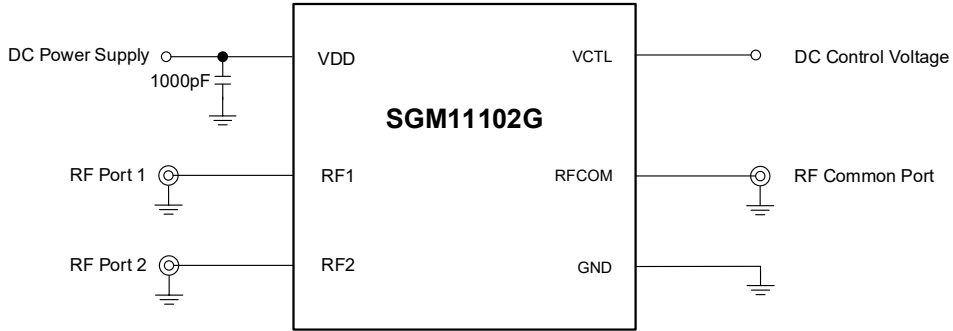


Figure 2. SGM11102G Typical Application Circuit

EVALUATION BOARD LAYOUT

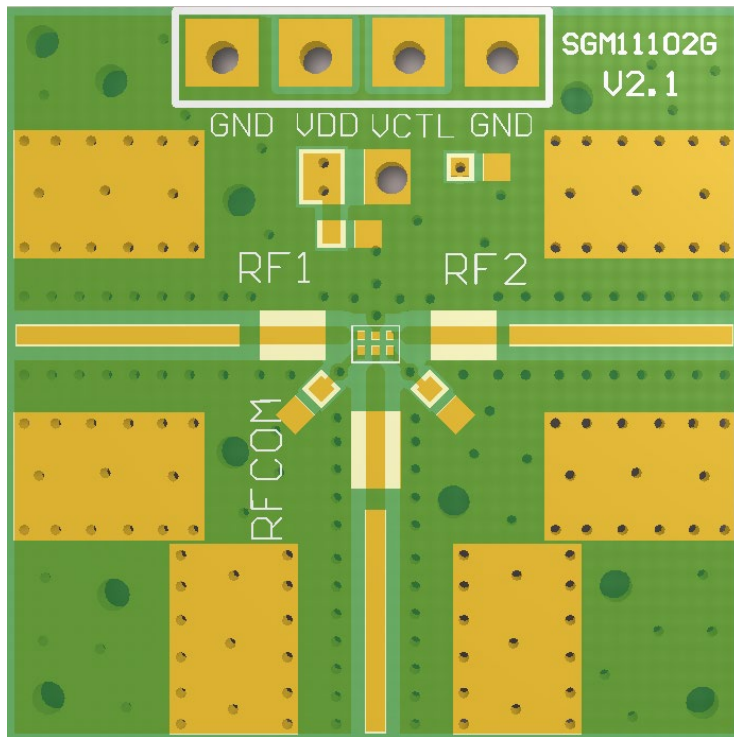


Figure 3. SGM11102G Evaluation Board Layout

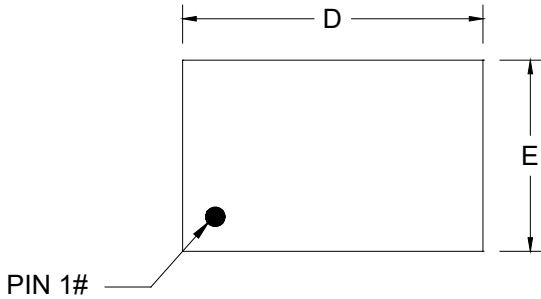
REVISION HISTORY

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

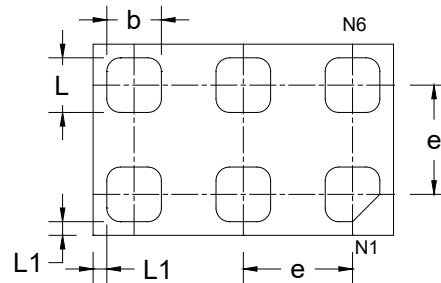
NOVEMBER 2023 – REV.A.2 to REV.A.3	Page
Updated Features and Electrical Characteristics.....	1, 4
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SEPTEMBER 2023 – REV.A.1 to REV.A.2	Page
Updated Features and Electrical Characteristics.....	1, 4
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JULY 2023 – REV.A to REV.A.1	Page
Updated Features and Electrical Characteristics.....	1, 4
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Changes from Original (MARCH 2023) to REV.A	Page
Changed from product preview to production data.....	All
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PACKAGE OUTLINE DIMENSIONS

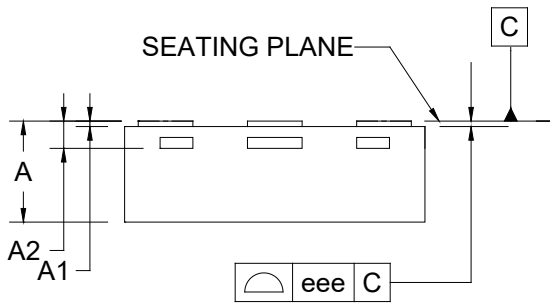
XTDFN-1.1×0.7-6L



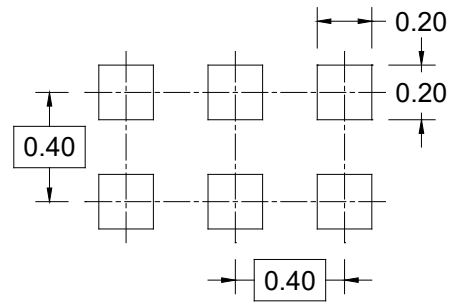
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.340	-	0.400
A1	0.000	-	0.050
A2	0.100 REF		
b	0.150	-	0.250
D	1.000	-	1.200
E	0.600	-	0.800
e	0.400 BSC		
L	0.100	-	0.300
L1	0.000	-	0.100
eee	0.050		

NOTE: This drawing is subject to change without notice.

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-1.1×0.7-6L	7"	9.5	0.80	1.20	0.55	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

DD0002