

GENERAL DESCRIPTION

The SGM11102W is a single-pole/double-throw (SPDT) transmit and receive switch, which supports from 0.1GHz to 3.8GHz. The device features low control voltage and high isolation.

The SGM11102W 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 SGM11102W is available in a Green SC70-6 package.

APPLICATIONS

2G/3G/4G/5G Applications
Sub-1G RF System
ISM Band Application
Industry Application

FEATURES

- **Operation Frequency Range:** 0.1GHz to 3.8GHz
- **Supply Voltage Range:** 1.65V to 3.3V
- **High Isolation:**
 - $f_0 = 0.1\text{GHz}$, $P_{IN} = 0\text{dBm}$: 55dB (TYP)
 - $f_0 = 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 41dB (TYP)
 - $f_0 = 1.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 34dB (TYP)
 - $f_0 = 2.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 29dB (TYP)
 - $f_0 = 3.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 22dB (TYP)
- **Low Insertion Loss:**
 - $f_0 = 0.1\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.23dB (TYP)
 - $f_0 = 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.32dB (TYP)
 - $f_0 = 1.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.37dB (TYP)
 - $f_0 = 2.7\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.46dB (TYP)
 - $f_0 = 3.8\text{GHz}$, $P_{IN} = 0\text{dBm}$: 0.48dB (TYP)
- **Available in a Green SC70-6 Package**

BLOCK DIAGRAM

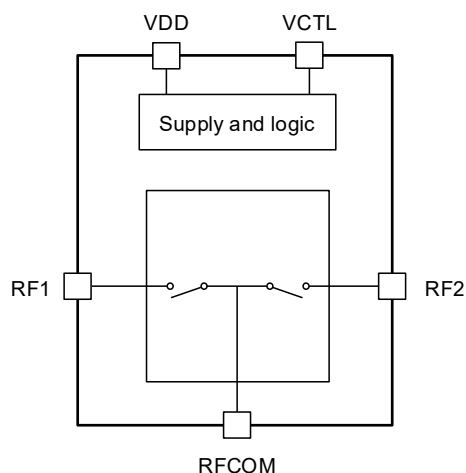


Figure 1. SGM11102W Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM11102W	SC70-6	-40°C to +105°C	SGM11102WGC6G/TR	0JLXX	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

Supply Voltage, V_{DD}	-0.3V to 3.6V
Control Voltage, V_{CTL}	-0.3V to 3.6V
RF Input Power, P_{IN}	38dBm
Storage Temperature Range	-55°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility ^{(1) (2)}	
HBM	±2000V
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	-40°C to +105°C
Operating Frequency Range, f_0	0.1GHz to 3.8GHz
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 0.3V

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.

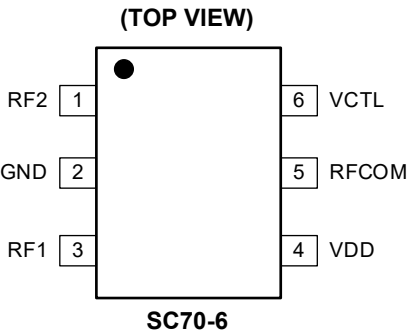
ESD SENSITIVITY CAUTION

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

($T_A = +25^\circ\text{C}$, $V_{DD} = 1.65\text{V}$ to 3.3V , $P_{IN} = 0\text{dBm}$, $Z_S = Z_L = 50\Omega$, $V_{CTL_L} = 0\text{V}$, $V_{CTL_H} = 1.8\text{V}$, typical values are at $V_{DD} = 1.8\text{V}$, 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	90	μA
Control Current	I_{CTL}				7	μA
Control Voltage	V_{CTL_H}	High	1.3		3.3	V
	V_{CTL_L}	Low	0		0.3	
Switching Time	t_{SW}	50% of control voltage to 90%/10% RF power		1.3	2.0	μs
Turn-On Time	t_{ON}	Time from $V_{DD} = 0\text{V}$ to part on and RF at 90%		20		μs
RF Characteristics						
Insertion Loss	IL	$f_0 = 0.1\text{GHz}$, $P_{IN} = 0\text{dBm}$		0.23	0.3	dB
				0.23	0.45 ⁽¹⁾	
		$f_0 = 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$		0.32	0.4	
				0.32	0.51 ⁽¹⁾	
		$f_0 = 1.7\text{GHz}$, $P_{IN} = 0\text{dBm}$		0.37	0.45	
				0.37	0.57 ⁽¹⁾	
		$f_0 = 2.7\text{GHz}$, $P_{IN} = 0\text{dBm}$		0.46	0.55	
				0.46	0.66 ⁽¹⁾	
Isolation (RFCOM to All RF Ports)	ISO	$f_0 = 0.1\text{GHz}$, $P_{IN} = 0\text{dBm}$	50	55		dB
		$f_0 = 0.8\text{GHz}$, $P_{IN} = 0\text{dBm}$	36	41		
		$f_0 = 1.7\text{GHz}$, $P_{IN} = 0\text{dBm}$	29	34		
		$f_0 = 2.7\text{GHz}$, $P_{IN} = 0\text{dBm}$	24	29		
		$f_0 = 3.8\text{GHz}$, $P_{IN} = 0\text{dBm}$	18	22		
VSWR	VSWR	$f_0 = 0.1\text{GHz}$ to 3.8GHz		1.2:1		
Input Power at 0.1dB Compression Point	$P_{0.1\text{dB}}$	$f_0 = 0.1\text{GHz}$ to 2.7GHz		38		dBm
		$f_0 = 2.7\text{GHz}$ to 3.8GHz		37		
2 nd Harmonic	$2f_0$	$P_{IN} = 26\text{dBm}$, $f_0 = 910\text{MHz}$		-100		dBc
		$P_{IN} = 35\text{dBm}$, $f_0 = 910\text{MHz}$		-90		
		$P_{IN} = 32\text{dBm}$, $f_0 = 1900\text{MHz}$		-91		
3 rd Harmonic	$3f_0$	$P_{IN} = 26\text{dBm}$, $f_0 = 910\text{MHz}$		-101		
		$P_{IN} = 35\text{dBm}$, $f_0 = 910\text{MHz}$		-91		
		$P_{IN} = 32\text{dBm}$, $f_0 = 1900\text{MHz}$		-92		

NOTE:

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

TYPICAL APPLICATION CIRCUIT

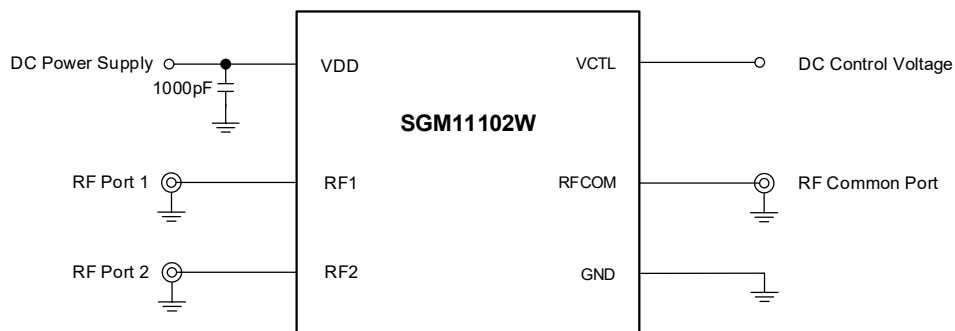


Figure 2. SGM11102W Typical Application Circuit

EVALUATION BOARD LAYOUT

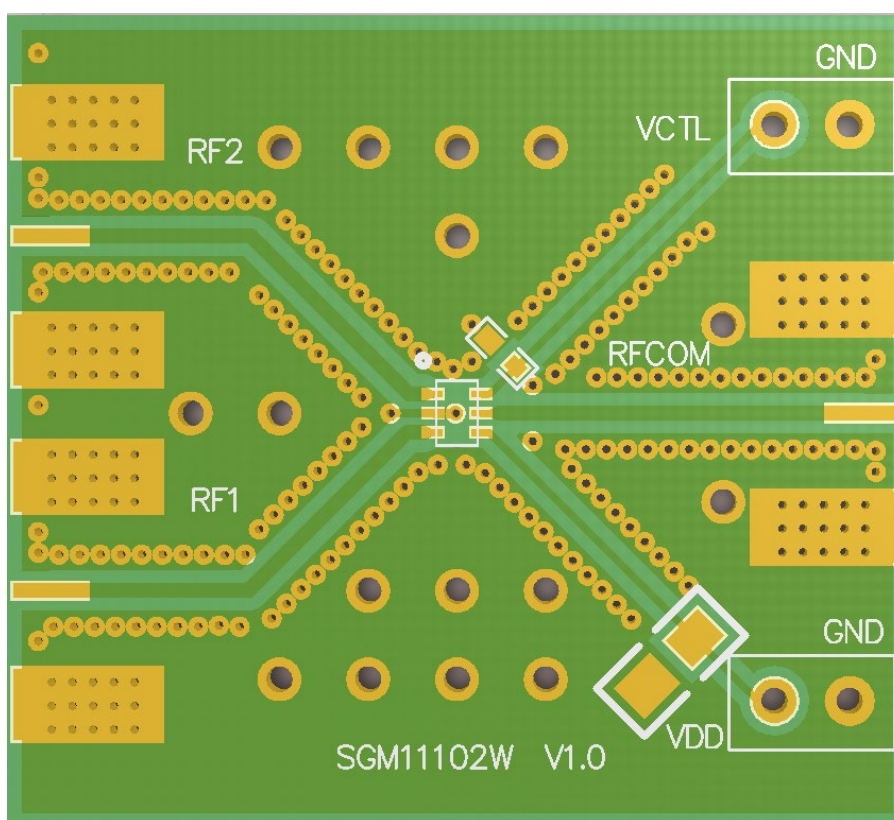


Figure 3. SGM11102W Evaluation Board Layout

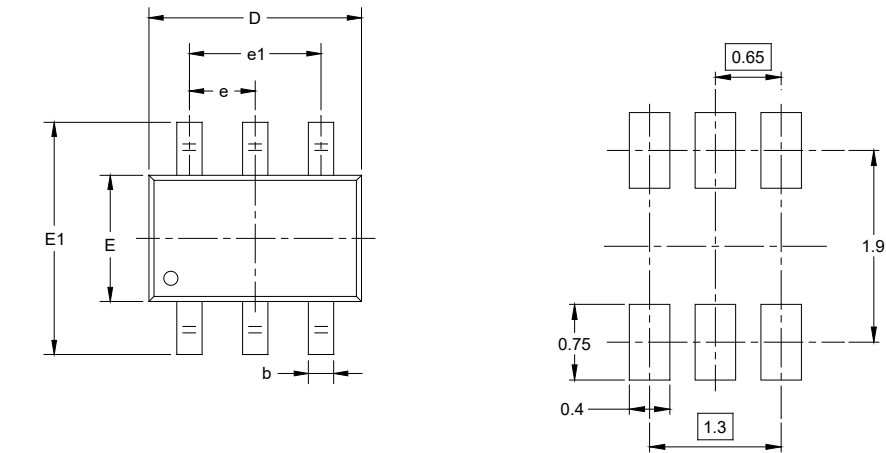
REVISION HISTORY

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

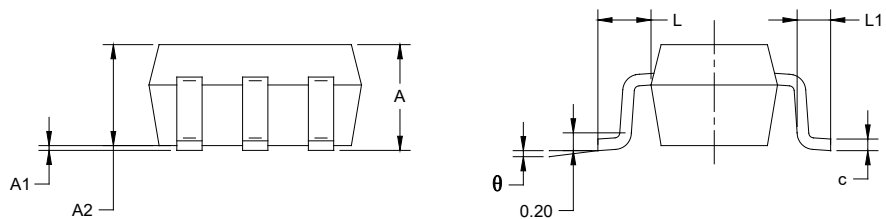
JUNE 2025 – REV.A to REV.A.1		Page
Updated Electrical Characteristics		4
Changes from Original (SEPTEMBER 2024) to REV.A		Page
Changed from product preview to production data.....		All

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°

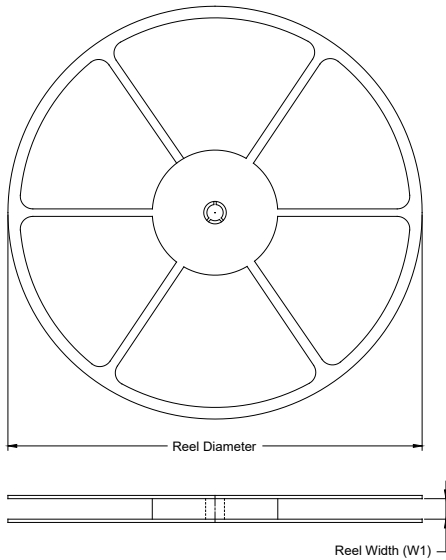
NOTES:

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

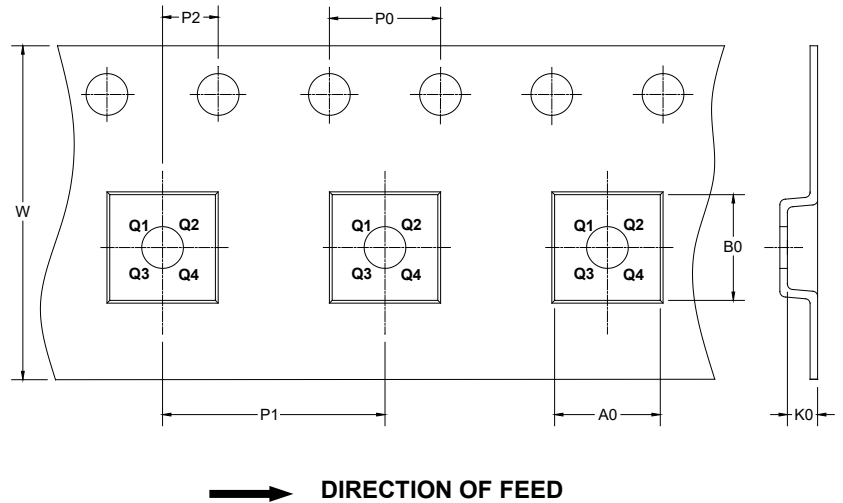
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

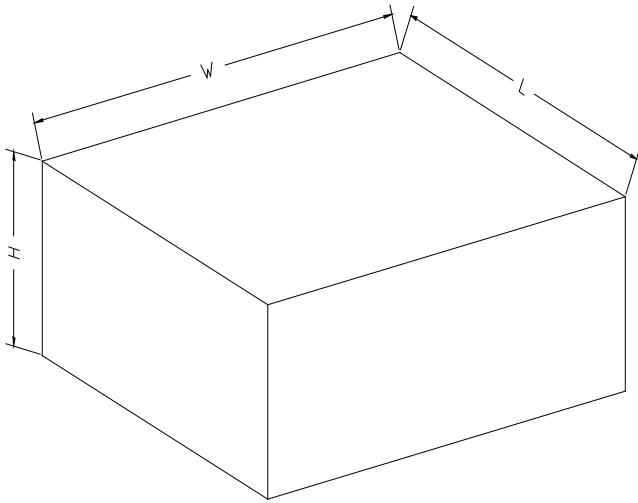
KEY PARAMETER LIST OF TAPE AND REEL

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