

### GENERAL DESCRIPTION

The SGM72022A is a double-pole/double-throw (DPDT) transfer switch, which supports from 0.4GHz to 5.8GHz. The device features low insertion loss and high isolation, which make it suitable for high linearity and 2G/3G/4G/5G applications.

The SGM72022A has the ability to integrate DPDT transfer 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 routing and band 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 SGM72022A is available in a Green ULGA-1.1×1.5-10L package.

### BLOCK DIAGRAM

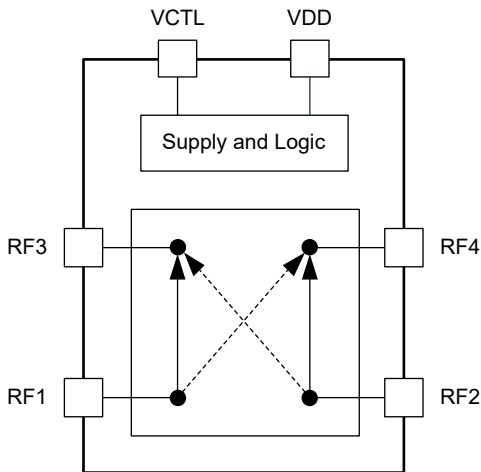


Figure 1. SGM72022A Block Diagram

### FEATURES

- Low Insertion Loss
- Operating Frequency Range: 0.4GHz to 5.8GHz
- High Isolation
- GPIO Interface for 1.3V to V<sub>DD</sub> Control Logic
- Broadband Performance Suitable for All Cellular Modulation Schemes up to 5.8GHz
- Ultra-Low Current Consumption
- Linearity and Harmonic Performance Ideally Suited for LTE Applications
- No External DC Blocking Capacitors Required
- Available in a Green ULGA-1.1×1.5-10L Package

### APPLICATIONS

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

### LOGIC TRUTH TABLE

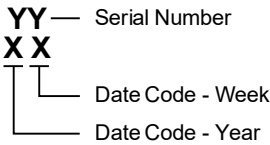
VCTL	ACTIVE PATH
L	RF1 to RF3, RF2 to RF4
H	RF1 to RF4, RF2 to RF3

**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM72022A	ULGA-1.1×1.5-10L	-40°C to +85°C	SGM72022AYULU10G/TR	6G XX	Tape and Reel, 5000

**MARKING INFORMATION**

NOTE: XX = Date Code.



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,  $V_{CTL}$  .....3.6V
- Maximum Input Power .....  
 .....39dBm (1:1 VSWR, +25°C, 25%DC)
- 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 +85°C
- Operating Frequency Range .....0.4GHz to 5.8GHz
- Supply Voltage Range,  $V_{DD}$  .....1.7V to 3.3V
- Control Low Voltage,  $V_{CTL\_L}$  .....0V to 0.45V
- Control High Voltage,  $V_{CTL\_H}$  .....1.3V to 3.3V

**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.

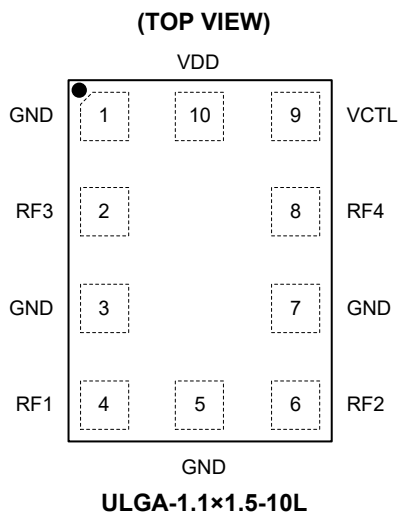
**ESD SENSITIVITY CAUTION**

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, 3, 5, 7	GND	Ground.
2	RF3	RF Port 3.
4	RF1	RF Port 1.
6	RF2	RF Port 2.
8	RF4	RF Port 4.
9	VCTL	Logic Control.
10	VDD	Supply Voltage.

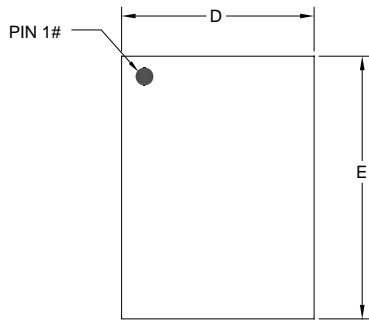
**ELECTRICAL CHARACTERISTICS**

(T<sub>A</sub> = +25°C, V<sub>DD</sub> = 1.7V to 3.3V, typical values are at V<sub>DD</sub> = 2.8V, P<sub>IN</sub> = 0dBm, input and output resistance = 50Ω, unless otherwise noted.)

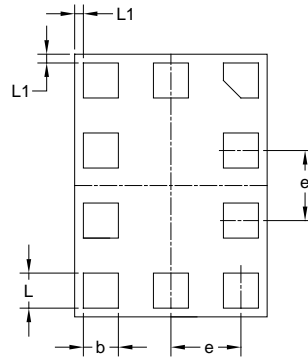
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>DC Characteristics</b>						
Supply Voltage	V <sub>DD</sub>		1.7	2.8	3.3	V
Supply Current	I <sub>VDD</sub>			60	80	μA
Control Voltage	V <sub>CTL_H</sub>	High	1.3	1.8	3.3	V
	V <sub>CTL_L</sub>	Low	0		0.45	
Control Current	I <sub>CTL</sub>			2	8	μA
Switching Time	t <sub>SW</sub>	10% VCTL to 90% RF		2	3	μs
Turn-On Time	t <sub>ON</sub>	50% V <sub>DD</sub> to 90% RF			20	μs
<b>RF Characteristics</b>						
Insertion Loss (RF1/RF2 to RF3/RF4)	IL	f <sub>0</sub> = 0.4GHz to 1.0GHz		0.30	0.50	dB
		f <sub>0</sub> = 1.0GHz to 2.0GHz		0.32	0.60	
		f <sub>0</sub> = 2.0GHz to 2.7GHz		0.34	0.70	
		f <sub>0</sub> = 3.0GHz to 3.8GHz		0.47	0.80	
		f <sub>0</sub> = 4.8GHz to 5.8GHz		0.66	1.15	
Isolation (RF1/RF2 to RF3/RF4; RF1 to RF2, RF3 to RF4)	ISO	f <sub>0</sub> = 0.4GHz to 1.0GHz	30	33		dB
		f <sub>0</sub> = 1.0GHz to 2.0GHz	27	30		
		f <sub>0</sub> = 2.0GHz to 2.7GHz	20	22		
		f <sub>0</sub> = 3.0GHz to 3.8GHz	16	19		
		f <sub>0</sub> = 4.8GHz to 5.8GHz	14	18		
2 <sup>nd</sup> Harmonic	2f <sub>0</sub>	f <sub>0</sub> = 824MHz to 915MHz, P <sub>IN</sub> = 35dBm		-88		dBc
3 <sup>rd</sup> Harmonic	3f <sub>0</sub>	f <sub>0</sub> = 824MHz to 915MHz, P <sub>IN</sub> = 35dBm		-80		dBc
Input Return Loss (RF1/RF2 to RF3/RF4)	RL	f <sub>0</sub> = 0.4GHz to 5.8GHz		-15		dB
0.1dB Compression Point (RF1/RF2 to RF3/RF4)	P <sub>0.1dB</sub>	f <sub>0</sub> = 0.4GHz to 5.8GHz		38		dBm
VSWR (RF1, RF2, RF3, RF4)	VSWR	f <sub>0</sub> = 0.4GHz to 5.8GHz		1.5		
2 <sup>nd</sup> Order Intermodulation	IMD2	f <sub>1</sub> > 800MHz at 20dBm, f <sub>2</sub> > 2.5GHz at -15dBm		-105		dBm
3 <sup>rd</sup> Order Intermodulation	IMD3	f <sub>1</sub> > 800MHz at 20dBm, f <sub>2</sub> > 2.5GHz at -15dBm		-105		dBm

PACKAGE OUTLINE DIMENSIONS

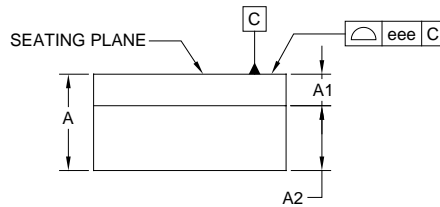
ULGA-1.1x1.5-10L



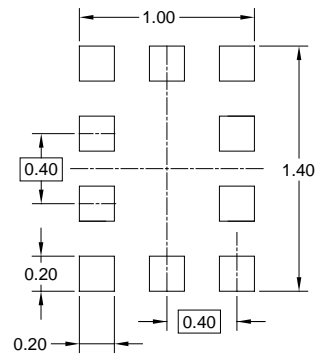
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

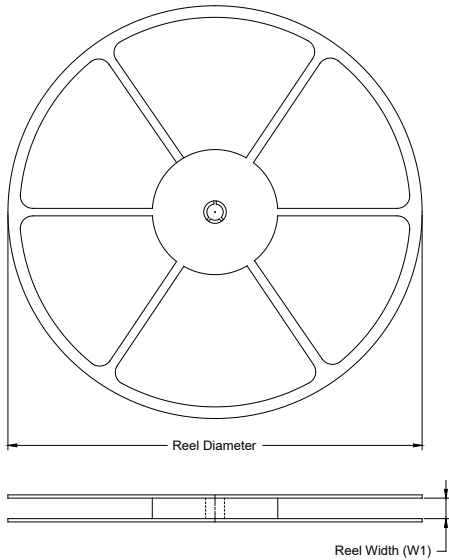
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1	0.150	0.180	0.210
A2	0.370 REF		
b	0.150	0.200	0.250
D	1.050	1.100	1.150
E	1.450	1.500	1.550
e	0.400 BSC		
L	0.150	0.200	0.250
L1	0.000	0.050	0.100
eee	0.100		

NOTE: This drawing is subject to change without notice.

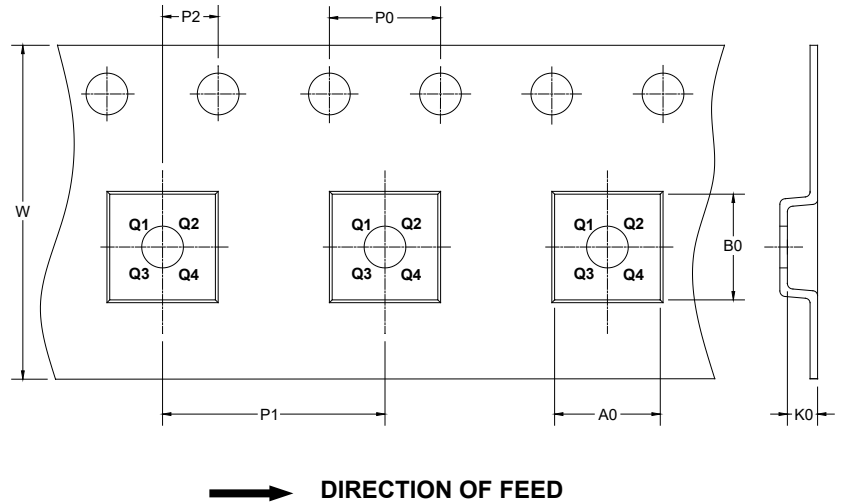
# PACKAGE INFORMATION

## 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
ULGA-1.1×1.5-10L	7"	9.5	1.3	1.7	0.75	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