SGM72002
High Linearity SPDT RF Switch

GENERAL DESCRIPTION

The SGM72002 is a low insertion loss, high isolation single-pole/double-throw (SPDT) antenna switch for high linearity TRx applications, supporting from 0.1GHz to 3GHz. High linearity performance makes it suitable for multi-mode multi-band LTE handsets, immune to cellular interferences.

The SGM72002 integrates a GPIO controller and a SPDT RF switch on a single SOI chip. The GPIO controller provides internal decoder and driver for switch control signals, allowing flexibility in RF paths routing and band selection.

The SGM72002 is available in a Green UTDFN-1.1×0.7-6L package, RoHS compliant and halogen free. When no external DC is applied, there is no need for external DC blocking capacitors, saving PCB area and cost.

FEATURES

- **Advanced SOI Process**
- **Broad Frequency Range: 0.1GHz to 3GHz**
- **Low Insertion Loss: 0.3dB (TYP) at 2.7GHz**
- **High Isolation: > 28dB at 2.7GHz**
- **GPIO Control Interface**
- **No External DC Blocking Capacitors Required**
- **Available in a Green UTDFN-1.1×0.7-6L Package**

APPLICATIONS

2G/3G/4G Transmit and Receive

BLOCK DIAGRAM

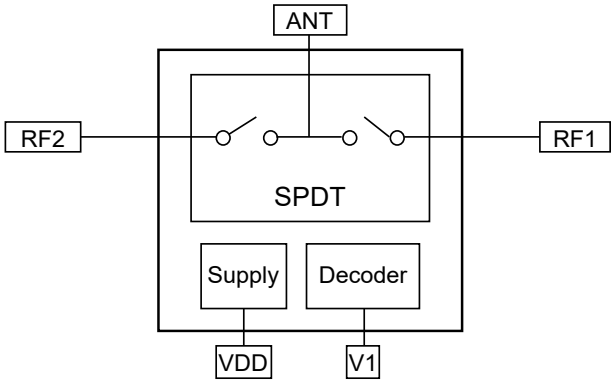


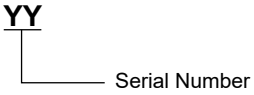
Figure 1. SGM72002 Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM72002	UTDFN-1.1×0.7-6L	-40℃ to +85℃	SGM72002YUEC6G/TR	F8	Tape and Reel, 10000

MARKING INFORMATION

NOTE: Fixed character for F8.



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 (V1 Pin), V_{CTL} 3V
RF Input Power, P_{IN} ..... +33dBm
Junction Temperature ..... +150℃
Storage Temperature Range ..... -55℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM 1000V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range ..... -40℃ to +85℃
Operating Frequency ..... 0.1GHz to 3GHz
Supply Voltage, V_{DD} ..... 2.4V to 3.3V
Control High Voltage, V_{INH} ..... 1.3V to 3V
Control Low Voltage, V_{INL} 0.45V

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

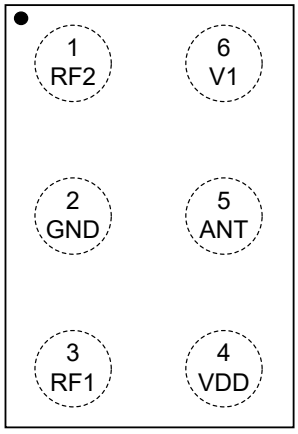
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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

(TOP VIEW)



UTDFN-1.1×0.7-6L

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	RF2	RF Port 2.
2	GND	Ground.
3	RF1	RF Port 1.
4	VDD	DC Power Supply.
5	ANT	Antenna Port.
6	V1	Control.

LOGIC TRUTH TABLE

V1	Active Path
Low	ANT-RF1
High	ANT-RF2

ELECTRICAL CHARACTERISTICS

(Typical values, V_{DD} = 2.8V, T_{OP} = +25℃, P_{IN} = 0dBm, 50Ω, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Specifications						
Supply Voltage	V_{DD}		2.4	2.8	3.3	V
Supply Current	I_{DD}			32	40	μA
Control Voltage	V_{INH}	High	1.3	1.8	3	V
	V_{INL}	Low	0		0.45	
Control Current	I_{CTL}	V_{CTL} = 0V		3	5	μA
Switching Time	t_{SW}	50% of control voltage to 90% of RF power		1	2	μs
Turn-On Time	t_{ON}	Time from V_{DD} = 0V to part ON and RF at 90%		5	10	μs
RF Specifications						
Insertion Loss (ANT to All RF Ports)	IL	0.1GHz to 1.0GHz		0.20	0.40	dB
		1.0GHz to 2.0GHz		0.25	0.45	
		2.0GHz to 2.7GHz		0.30	0.50	
Isolation (ANT to All RF Ports)	ISO	0.1GHz to 1.0GHz	35	40		dB
		1.0GHz to 2.0GHz	28	32		
		2.0GHz to 2.7GHz	26	28		
Input Return Loss (ANT to All RF Ports)	RL	0.1GHz to 1.0GHz	22	30		dB
		1.0GHz to 2.0GHz	20	25		
		2.0GHz to 2.7GHz	17	20		
0.1dB Compression Point (ANT to All RF Ports)	P0.1dB	0.1GHz to 3GHz		+33		dBm
2nd Harmonics	2f0	P_{IN} = 26dBm, 0.1GHz to 3GHz		+95		dBc
3rd Harmonics	3f0	P_{IN} = 26dBm, 0.1GHz to 3GHz		+85		dBc

TYPICAL APPLICATION CIRCUIT

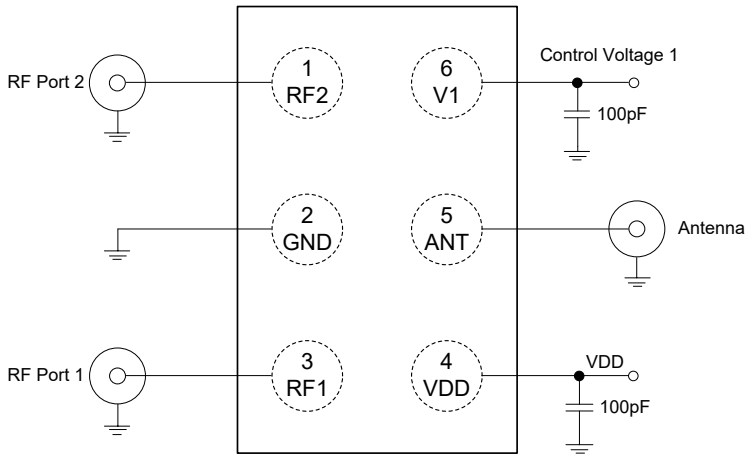


Figure 2. SGM72002 Typical Application Circuit

EVALUATION BOARD LAYOUT

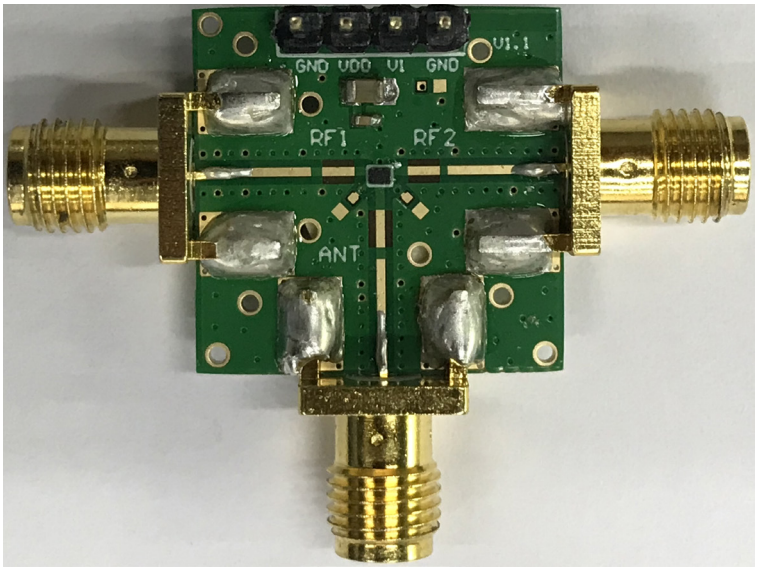
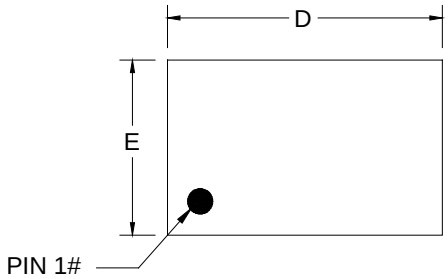


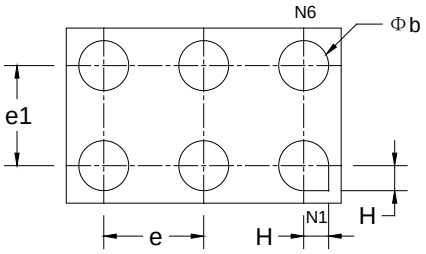
Figure 3. SGM72002 Evaluation Board Layout

PACKAGE OUTLINE DIMENSIONS

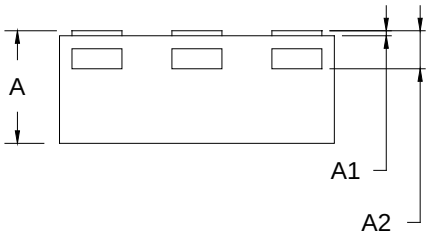
UTDFN-1.1×0.7-6L



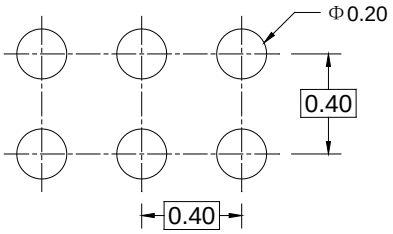
TOP VIEW



BOTTOM VIEW



SIDE VIEW



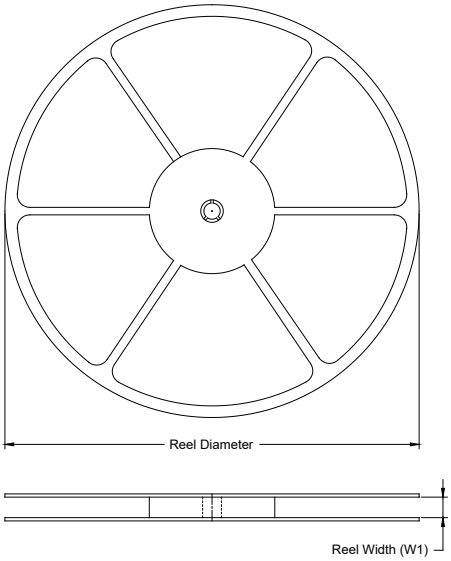
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.400	0.450	0.500
A1	0.000	0.020	0.050
A2	0.152 REF		
D	1.050	1.100	1.150
E	0.650	0.700	0.750
b	0.150	0.200	0.250
e	0.300	0.400	0.500
e1	0.300	0.400	0.500
H	0.100 REF		

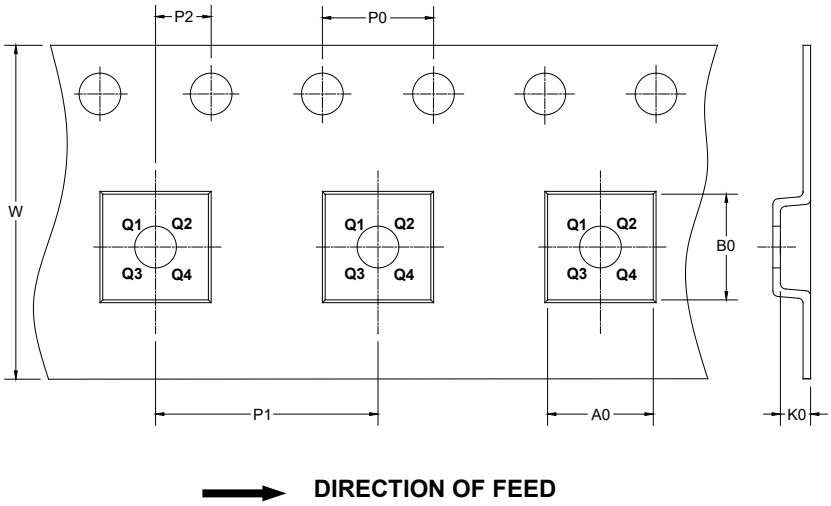
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



DIRECTION OF FEED

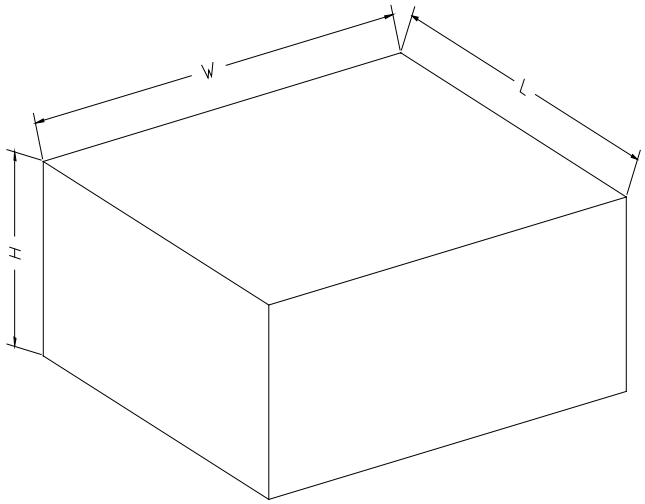
NOTE: The picture is only for reference. Please make the object as the standard.

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
UTDFN-1.1×0.7-6L	7″	9.5	0.80	1.20	0.55	4.0	2.0	2.0	8.0	Q1

DD0001

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