

GENERAL DESCRIPTION

The SGM72322A is a double-pole/double-throw (DPDT) switch, which supports from 0.4GHz to 3.8GHz. The device features low insertion loss and high isolation, which make it suitable for high linearity and 2G/3G/4G applications.

The SGM72322A has the ability to integrate DPDT 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 routing and band selection.

No external DC blocking capacitors required on the RF paths as long as no external DC voltage is applied, which can save PCB area and cost.

The SGM72322A is available in a Green UTQFN-2x2-12AL package.

APPLICATIONS

- Simultaneous Voice and LTE Systems
- Diversity Antenna Switching

FEATURES

- **Operating Frequency Range: 0.4GHz to 3.8GHz**
- **Supply Voltage Range: 1.7V to 3.3V**
- **Low Insertion Loss**
- **High Isolation**
- **Advanced Silicon-On-Insulator (SOI) Process**
- **Single Control Voltage Input**
- **GSM Power Handling**
- **No External DC Blocking Capacitors Required**
- **Available in a Green UTQFN-2x2-12AL Package**

BLOCK DIAGRAM

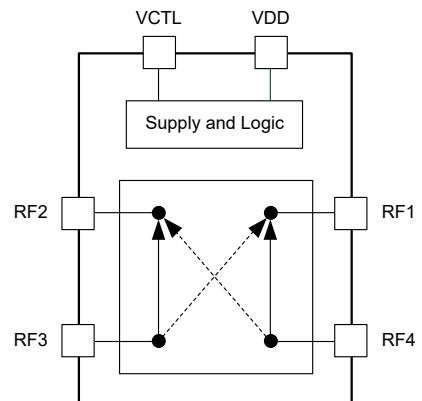


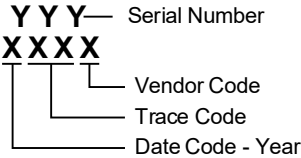
Figure 1. SGM72322A Block Diagram

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM72322A	UTQFN-2x2-12AL	-40°C to +85°C	SGM72322AYURV12G/TR	MCU XXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXX = Date Code, Trace Code and Vendor 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
- 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 +85°C
- Operating Frequency Range 0.4GHz to 3.8GHz
- Supply Voltage Range, V_{DD} 1.7V to 3.3V
- Control Logic Voltage Low, V_{CTL_L} 0V to 0.45V
- Control Logic Voltage High, 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.

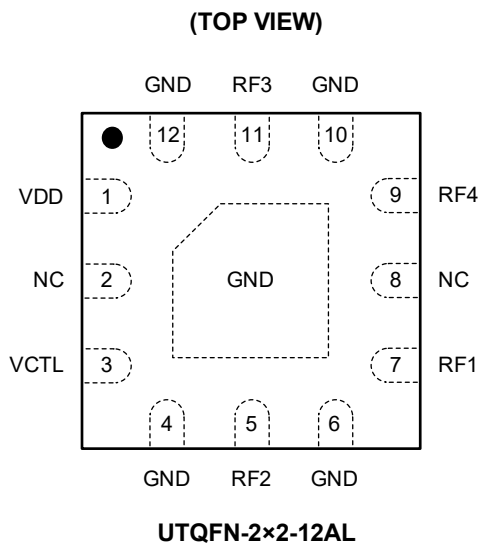
ESD SENSITIVITY CAUTION

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	VDD	Supply Voltage.
2, 8	NC	No Connection.
3	VCTL	DC Control Voltage.
4, 6, 10, 12	GND	Ground.
5	RF2	RF Port 2.
7	RF1	RF Port 1
9	RF4	RF Port 4.
11	RF3	RF Port 3.
Exposed Pad	GND	Ground.

LOGIC TRUTH TABLE

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

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{DD} = 1.7V to 3.3V, typical values are at V_{DD} = 2.8V, P_{IN} = 0dBm, input and output resistance = 50Ω, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Characteristics						
Supply Voltage	V _{DD}		1.7	2.8	3.3	V
Supply Current	I _{VDD}			60	93	μA
Control Voltage	V _{CTL_H}	High	1.3	1.8	3.3	V
	V _{CTL_L}	Low	0		0.45	
Control Current	I _{CTL}			0.1	5	μA
Switching Time	t _{SW}	10% VCTL to 90% RF		2	3	μs
Turn-On Time	t _{ON}	50% V _{DD} to 90%RF			20	μs
RF Characteristics						
Insertion Loss (RF1/RF2 to RF3/RF4)	IL	f ₀ = 0.4GHz to 1.0GHz		0.43	0.90	dB
		f ₀ = 1.0GHz to 2.0GHz		0.55	1.10	
		f ₀ = 2.0GHz to 2.7GHz		0.64	1.20	
		f ₀ = 3.0GHz to 3.8GHz		0.94	1.35	
Isolation (RF1/RF2 to RF3/RF4, RF1 to RF2, RF3 to RF4)	ISO	f ₀ = 0.4GHz to 1.0GHz	30	32		dB
		f ₀ = 1.0GHz to 2.0GHz	29	30		
		f ₀ = 2.0GHz to 2.7GHz	22	23		
		f ₀ = 3.0GHz to 3.8GHz	17	18		
Input Return Loss (RF1/RF2 to RF3/RF4)	RL	f ₀ = 0.4GHz to 3.8GHz		20		dB
2 nd Harmonics	2f ₀	f ₀ = 824MHz to 915MHz, P _{IN} = 35dBm		-90		dBc
3 rd Harmonics	3f ₀	f ₀ = 824MHz to 915MHz, P _{IN} = 35dBm		-81		dBc
0.1dB Compression Point (RF1/RF2 to RF3/RF4)	P _{0.1dB}	f ₀ = 0.4GHz to 3.8GHz		39		dBm
VSWR (RF1, RF2, RF3, RF4)	VSWR	f ₀ = 0.4GHz to 3.8GHz		1.35		
2 nd Order Intermodulation	IMD2	f ₁ > 800MHz at 20dBm, f ₂ > 2.5GHz at -15dBm		-105		dBm
3 rd Order Intermodulation	IMD3	f ₁ > 800MHz at 20dBm, f ₂ > 2.5GHz at -15dBm		-105		dBm

TYPICAL APPLICATION CIRCUIT

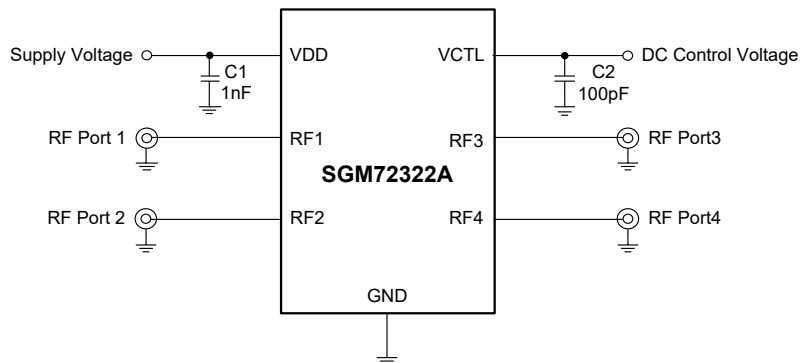


Figure 2. SGM72322A Typical Application Circuit

EVALUATION BOARD LAYOUT

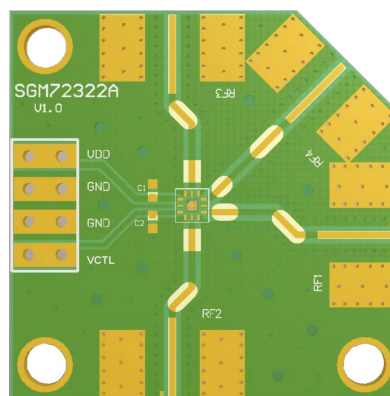
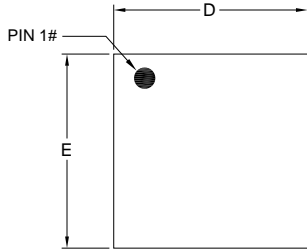


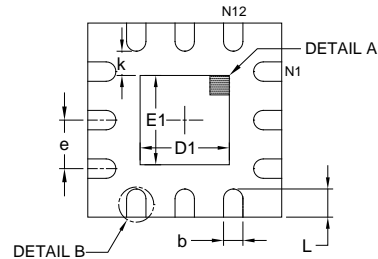
Figure 3. SGM72322A Evaluation Board Layout

PACKAGE OUTLINE DIMENSIONS

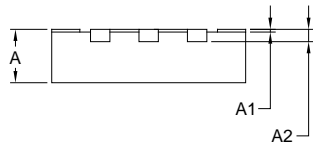
UTQFN-2x2-12AL



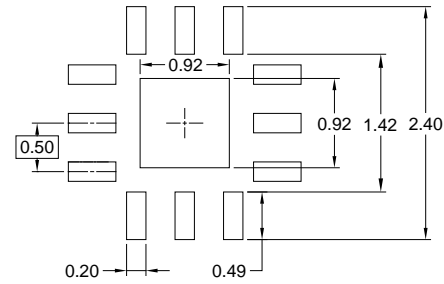
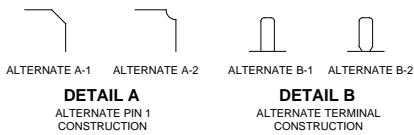
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1	0.000	-	0.050
A2	0.127 REF		
b	0.150	0.200	0.250
D	1.900	2.000	2.100
D1	0.820	0.920	1.020
E	1.900	2.000	2.100
E1	0.820	0.920	1.020
e	0.500 BSC		
k	0.150	-	-
L	0.220	0.290	0.360

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
UTQFN-2×2-12AL	7"	9.5	2.25	2.25	0.75	4.0	4.0	2.0	8.0	Q1

000001

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