SONY

CXG1064ATN

High Power 2 × 4 Antenna Switch MMIC with Integrated Control Logic

Description

The CXG1064ATN is a high power antenna switch MMIC. The CXG1064ATN is suited to connect Tx/Rx to one of 4 antennas in cellular handset such as PDC.

The CXG1064ATN has the integrated control logic and can be operated with CMOS input.

This IC is designed using the Sony's GaAs J-FET process which enable the CXG1064ATN to be operated with low voltage.

Features

- Low insertion loss :
  0.35 dB (Typ.) @900 MHz, 0.45 dB (Typ.) @1.5 GHz
- Small package : TSSOP-16 pin
- High power handling : P1dB : 37 dBm
- CMOS compatible input control
- Low bias voltage : V_{DD}=3.0 V

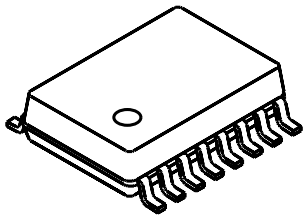
Applications

2 × 4 antenna switch for digital cellular telephones such as PDC handsets.

Structure

GaAs J-FET MMIC

16 pin TSSOP (Plastic)



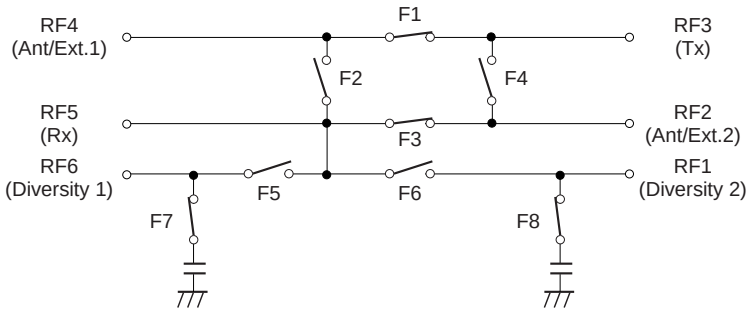
Absolute Maximum Ratings (Ta=25 °C)

• Bias voltage	V_{DD}	7	V
• Control voltage	Vctl	5	V
• Operating temperature	Topr	–35 to +85	°C
• Storage temperature	Tstg	–65 to +150	°C

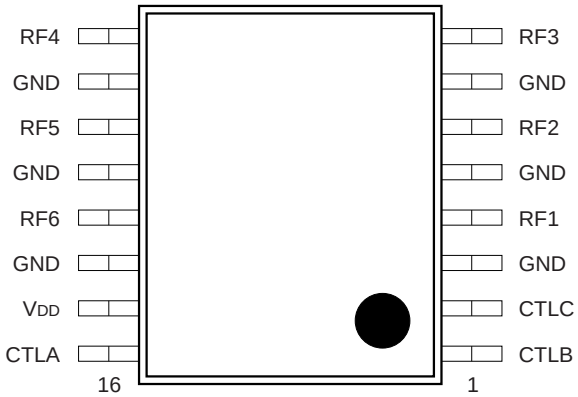
GaAs MMICs are ESD sensitive devices. Special handling precautions are required.

E98Y52-TE

Block Diagram

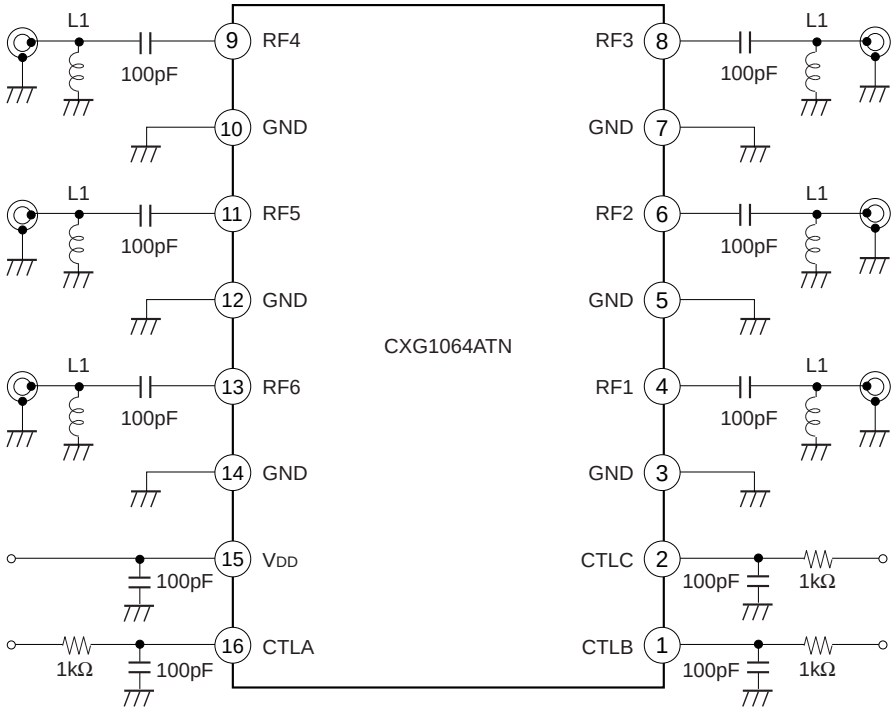


Package Outline/Pin Configuration



16pin TSSOP (PLASTIC)

Recommended Circuit



∗ DC blocking capacitors (CRF) are needed.
∗ Recommended to use bypass capacitors (Cbypass).
∗ Recommended to use control resistors (RCTL), when it is necessary to improve the electrostatic discharge strength (ESD).

Truth Table

Control			ON	F1	F2	F3	F4	F5	F6	F7	F8
CTLA	CTLB	CTLC									
H	L	L	RF3 → RF2	OFF	ON	OFF	ON	OFF	OFF	ON	ON
H	L	H	RF3 → RF4	ON	OFF	ON	OFF	OFF	OFF	ON	ON
L	L	L	RF5 → RF2	ON	OFF	ON	OFF	OFF	OFF	ON	ON
L	L	H	RF5 → RF4	OFF	ON	OFF	ON	OFF	OFF	ON	ON
L	H	L	RF5 → RF6	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
L	H	H	RF5 → RF1	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF

DC Bias Condition (Ta=25 °C)

Parameter	Min.	Typ.	Max.	Unit.
Vctl (H) A to C	2.4		3.6	V
Vctl (L) A to C	0		0.8	V
V_{DD}	2.6		4.5	V

Electrical Characteristics 1 (Vctl (L)=0 V, Vctl (H)=3 V, Ta=25 °C)

Parameter		Frequency	Condition	Min.	Typ.	Max.	Unit.
Insertion loss	RF3-RF2	889 MHz	*2, *3		0.35	0.60	dB
	RF3-RF4	to 960 MHz	*2, *3		0.35	0.60	dB
	RF5-RF2	810 MHz	*4, *5		0.55	0.80	dB
	RF5-RF4	to 885 MHz	*4, *5		0.55	0.80	dB
	RF5-RF1	810 MHz	*4, *5		0.5	0.75	dB
	RF5-RF6	to 885 MHz	*4, *5		0.5	0.75	dB
Isolation	RF3-RF2	889 MHz	*2, *3	18	20		dB
	RF3-RF4	to 960 MHz	*2, *3	18	22		dB
	RF5-RF2	810 MHz	*4, *5	18	22		dB
	RF5-RF4	to 885 MHz	*4, *5	18	20		dB
	RF5-RF1	810 MHz	*4, *5	25	34		dB
	RF5-RF6	to 885 MHz	*4, *5	22	26		dB
VSWR	Each ON Port	810 MHz to 960 MHz				1.4	
ACP (±50 kHz)	RF3-RF2	889 MHz	*1, *2		–70	–60	dBc
	RF3-RF4	to 960 MHz	*1, *3		–70	–55	dBc
ACP (±100 kHz)	RF3-RF2	889 MHz	*1, *2		–75	–70	dBc
	RF3-RF4	to 960 MHz	*1, *3		–75	–65	dBc
2nd Harmonics	RF3-RF2	889 MHz	*1, *2		–70	–60	dBc
	RF3-RF4	to 960 MHz	*1, *3		–70	–60	dBc
3rd Harmonics	RF3-RF2	889 MHz	*1, *2		–70	–60	dBc
	RF3-RF4	to 960 MHz	*1, *3		–70	–55	dBc
Control current					60	120	µA
Bias current			V_{DD}=3.0 V		0.6	1.1	mA
			V_{DD}=2.8 V		0.6	1.0	mA
Switching speed					1	5	µs

*1 Input signal : ACP (±50 kHz) < –65 dBc, ACP (±100 kHz) < –75 dBc
2nd Harmonics < –65 dBc, 3rd Harmonics < –65 dBc

*2 Pin=29.5 dBm, V_{DD}=3.0 V

*3 Pin=29.5 dBm, V_{DD}=2.8 V

*4 Pin=7 dBm, V_{DD}=3.0

*5 Pin=7 dBm, V_{DD}=2.8

Electrical Characteristics 2 (Vctl (L)=0 V, Vctl (H)=3 V, Ta=25 °C)

Parameter		Frequency	Condition	Min.	Typ.	Max.	Unit.
Insertion loss	RF3-RF2	1429 MHz	*2, *3		0.45	0.70	dB
	RF3-RF4	to 1453 MHz	*2, *3		0.45	0.70	dB
	RF5-RF2	1477 MHz	*4, *5		0.65	0.95	dB
	RF5-RF4	to 1501 MHz	*4, *5		0.65	0.95	dB
	RF5-RF1	1477 MHz	*4, *5		0.60	0.90	dB
	RF5-RF6	to 1501 MHz	*4, *5		0.60	0.90	dB
Isolation	RF3-RF2	1429 MHz	*2, *3	14	16		dB
	RF3-RF4	to 1453 MHz	*2, *3	16	18		dB
	RF5-RF2	1477 MHz	*4, *5	16	18		dB
	RF5-RF4	to 1501 MHz	*4, *5	14	16		dB
	RF5-RF1	1477 MHz	*4, *5	25	30		dB
	RF5-RF6	to 1501 MHz	*4, *5	18	21		dB
VSWR	Each ON Port	1429 MHz to 1501 MHz				1.4	
ACP (±50 kHz)	RF3-RF2	1429 MHz	*1, *2		–70	–60	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–70	–55	dBc
ACP (±100 kHz)	RF3-RF2	1429 MHz	*1, *2		–75	–70	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–75	–65	dBc
2nd Harmonics	RF3-RF2	1429 MHz	*1, *2		–75	–60	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–70	–55	dBc
3rd Harmonics	RF3-RF2	1429 MHz	*1, *2		–70	–60	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–70	–55	dBc
Control current					60	120	µA
Bias current			V_{DD}=3.0 V		0.6	1.1	mA
			V_{DD}=2.8 V		0.6	1.0	mA
Switching speed					1	5	µs

*1 Input signal : ACP (±50 kHz) < –65 dBc, ACP (±100 kHz) < –75 dBc
2nd Harmonics < –65 dBc, 3rd Harmonics < –65 dBc

*2 Pin=29.5 dBm, V_{DD}=3.0 V

*3 Pin=29.5 dBm, V_{DD}=2.8 V

*4 Pin=7 dBm, V_{DD}=3.0

*5 Pin=7 dBm, V_{DD}=2.8

Electrical Characteristics 3 (Vctl (L)=0 V, Vctl (H)=3 V, Ta=–35 °C to +85 °C)

Parameter		Frequency	Condition	Min.	Typ.	Max.	Unit.
Insertion loss	RF3-RF2	889 MHz	*2, *3		0.35	0.90	dB
	RF3-RF4	to 960 MHz	*2, *3		0.35	0.90	dB
	RF5-RF2	810 MHz	*4, *5		0.55	1.10	dB
	RF5-RF4	to 885 MHz	*4, *5		0.55	1.10	dB
	RF5-RF1	810 MHz	*4, *5		0.5	1.05	dB
	RF5-RF6	to 885 MHz	*4, *5		0.5	1.05	dB
Isolation	RF3-RF2	889 MHz	*2, *3	18	20		dB
	RF3-RF4	to 960 MHz	*2, *3	18	22		dB
	RF5-RF2	810 MHz	*4, *5	18	22		dB
	RF5-RF4	to 885 MHz	*4, *5	18	20		dB
	RF5-RF1	810 MHz	*4, *5	25	34		dB
	RF5-RF6	to 885 MHz	*4, *5	22	26		dB
VSWR	Each ON Port	810 MHz to 960 MHz				1.4	
ACP (±50 kHz)	RF3-RF2	889 MHz	*1, *2		–70	–55	dBc
	RF3-RF4	to 960 MHz	*1, *3		–70	–50	dBc
ACP (±100 kHz)	RF3-RF2	889 MHz	*1, *2		–75	–65	dBc
	RF3-RF4	to 960 MHz	*1, *3		–75	–60	dBc
2nd Harmonics	RF3-RF2	889 MHz	*1, *2		–70	–55	dBc
	RF3-RF4	to 960 MHz	*1, *3		–70	–55	dBc
3rd Harmonics	RF3-RF2	889 MHz	*1, *2		–70	–55	dBc
	RF3-RF4	to 960 MHz	*1, *3		–70	–50	dBc
Control current					60	150	µA
Bias current			V_{DD}=3.0 V		0.6	1.3	mA
			V_{DD}=2.8 V		0.6	1.2	mA
Switching speed					1	5	µs

*1 Input signal : ACP (±50 kHz) < –65 dBc, ACP (±100 kHz) < –75 dBc
2nd Harmonics < –65 dBc, 3rd Harmonics < –65 dBc

*2 Pin=29.5 dBm, V_{DD}=3.0 V

*3 Pin=29.5 dBm, V_{DD}=2.8 V

*4 Pin=7 dBm, V_{DD}=3.0

*5 Pin=7 dBm, V_{DD}=2.8

Electrical Characteristics 4 (Vctl (L)=0 V, Vctl (H)=3 V, Ta=–35 °C to +85 °C)

Parameter		Frequency	Condition	Min.	Typ.	Max.	Unit.
Insertion loss	RF3-RF2	1429 MHz	*2, *3		0.45	1.00	dB
	RF3-RF4	to 1453 MHz	*2, *3		0.45	1.00	dB
	RF5-RF2	1477 MHz	*4, *5		0.65	1.25	dB
	RF5-RF4	to 1501 MHz	*4, *5		0.65	1.25	dB
	RF5-RF1	1477 MHz	*4, *5		0.60	1.2	dB
	RF5-RF6	to 1501 MHz	*4, *5		0.60	1.2	dB
Isolation	RF3-RF2	1429 MHz	*2, *3	14	16		dB
	RF3-RF4	to 1453 MHz	*2, *3	16	18		dB
	RF5-RF2	1477 MHz	*4, *5	16	18		dB
	RF5-RF4	to 1501 MHz	*4, *5	14	16		dB
	RF5-RF1	1477 MHz	*4, *5	25	30		dB
	RF5-RF6	to 1501 MHz	*4, *5	18	21		dB
VSWR	Each ON Port	1429 MHz to 1501 MHz				1.4	
ACP (±50 kHz)	RF3-RF2	1429 MHz	*1, *2		–70	–55	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–70	–50	dBc
ACP (±100 kHz)	RF3-RF2	1429 MHz	*1, *2		–75	–65	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–75	–60	dBc
2nd Harmonics	RF3-RF2	1429 MHz	*1, *2		–75	–55	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–70	–50	dBc
3rd Harmonics	RF3-RF2	1429 MHz	*1, *2		–70	–55	dBc
	RF3-RF4	to 1453 MHz	*1, *3		–70	–50	dBc
Control current					60	150	µA
Bias current			V_{DD}=3.0 V		0.6	1.3	mA
			V_{DD}=2.8 V		0.6	1.2	mA
Switching speed					1	5	µs

*1 Input signal : ACP (±50 kHz) < –65 dBc, ACP (±100 kHz) < –75 dBc
2nd Harmonics < –65 dBc, 3rd Harmonics < –65 dBc

*2 Pin=29.5 dBm, V_{DD}=3.0 V

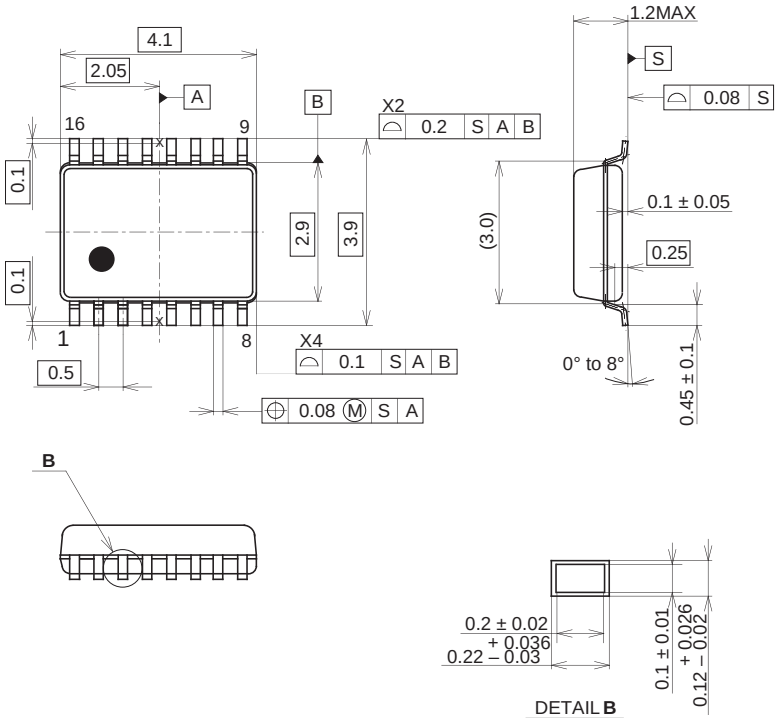
*3 Pin=29.5 dBm, V_{DD}=2.8 V

*4 Pin=7 dBm, V_{DD}=3.0

*5 Pin=7 dBm, V_{DD}=2.8

Package Outline Unit : mm

16PIN TSSOP(PLASTIC)



SONY CODE	TSSOP-16P-L01
EIAJ CODE	————————
JEDEC CODE	————————

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.03g