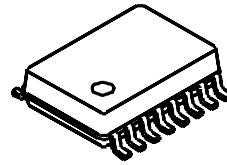


High Power 2 × 4 Antenna Switch MMIC with Integrated Control Logic

Description

The CXG1106TN is a high power antenna switch MMIC for PDC 800MHz and 1.5GHz handsets. The CXG1106TN is suited to connect Tx/Rx to one of 4 antennas. The CXG1106TN has on-chip logic circuit for operation with 3 CMOS inputs. The Sony JFET process is used for low insertion loss and low voltage operation.

16 pin TSSOP (Plastic)



Features

- Low insertion loss: 0.25dB @900MHz, 0.35dB @1.5GHz
- High linearity: Harmonic < -65dBc
- CMOS compatible input control
- Small package: 16-pin TSSOP (2.7mm × 3.5mm)

Applications

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

Structure

GaAs J-FET MMIC

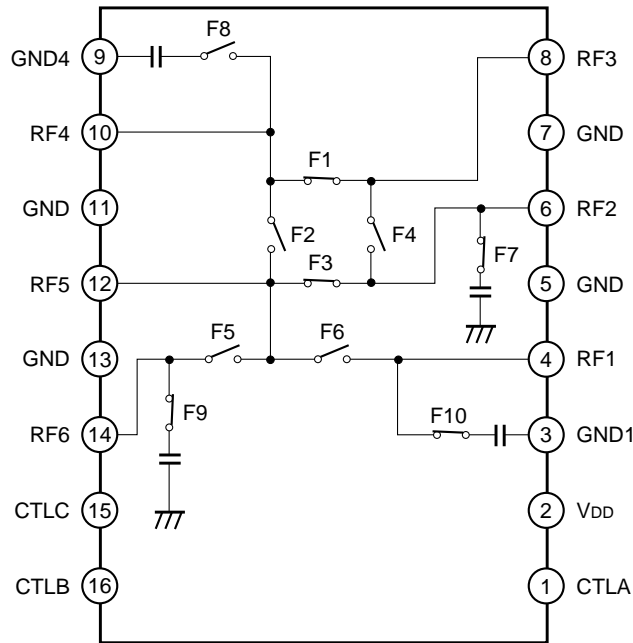
Absolute Maximum Ratings (Ta = 25°C)

• Bias voltage	V _{DD}	7	V
• Control voltage	V _{DD}	5	V
• Operating temperature	T _{opr}	-35 to +85	°C
• Storage temperature	T _{stg}	-65 to +150	°C

GaAs MMICs are ESD sensitive devices. Special handling precautions are required. The actual ESD test data will be available later.

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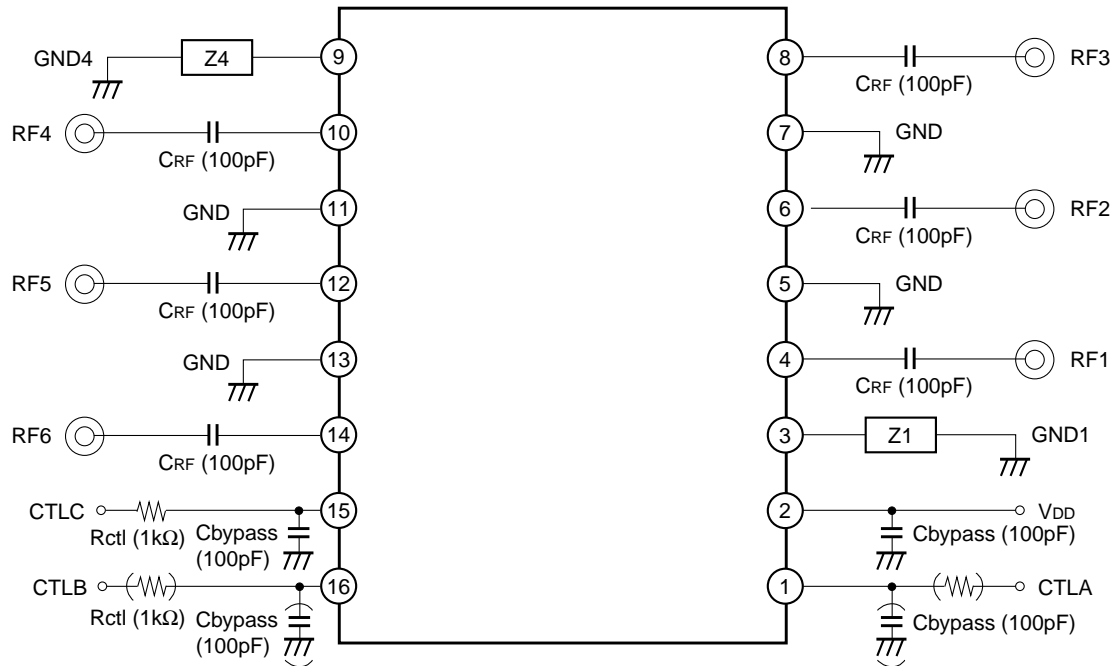
Block Diagram/Pin Configuration



Truth Table

On Pass	CTLA	CTLB	CTLC	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
RF3 – RF2	H	—	L	L	H	L	H	L	L	L	H	H	H
RF3 – RF4	H	—	H	H	L	H	L	L	L	H	L	H	H
RF5 – RF2	L	L	L	H	L	H	L	L	L	L	H	H	H
RF5 – RF4	L	L	H	L	H	L	H	L	L	H	L	H	H
RF5 – RF6	L	H	L	L	L	L	L	H	L	H	H	L	H
RF5 – RF1	L	H	H	L	L	L	L	L	H	H	H	H	L

Recommended Circuit



When using this IC, the following external components should be used:

- Rctl: This resistor is used to improve ESD performance. 1kΩ is recommended.
- CRF: This capacitor is used for RF decoupling and must be used for all application. 100pF is recommended.
- Cbypass: This capacitor is used for DC line filtering. 100pF is recommended.

DC Bias Condition (Ta = 25°C)

Item	Min.	Typ.	Max.	Unit
V _{DD}	+2.4	+3.0	+3.6	V
V _{ctl} (H)	+2.0	+3.0	+3.6	V
V _{ctl} (L)	0		+0.4	V

Electrical Characteristics 1

(Ta = 25°C)

Item	Symbol	Port	Condition	Min.	Typ.	Max.	Unit
Insertion loss	IL	RF3 – RF2	*1		0.25	0.50	dB
		RF3 – RF4	*1		0.25	0.50	dB
		RF5 – RF2	*2		0.45	0.70	dB
		RF5 – RF4	*2		0.55	0.80	dB
		RF5 – RF6	*2		0.35	0.60	dB
		RF5 – RF1	*2		0.35	0.60	dB
Isolation	ISO.	RF3 – RF2	*1	20	23		dB
		RF3 – RF4	*1	23	26		dB
		RF5 – RF2	*2	25	28		dB
		RF5 – RF4	*2	21	24		dB
		RF5 – RF6	*2	22	25		dB
		RF5 – RF1	*2	27	33		dB
VSWR	VSWR		50Ω		1.2	1.6	—
Harmonics	2fo	RF3 – RF2	*3		-75	-60	dBc
		RF3 – RF4	*3		-75	-60	dBc
	3fo	RF3 – RF2	*3		-67	-60	dBc
		RF3 – RF4	*3		-67	-60	dBc
ACP	±50kHz	RF3 – RF2	*3		-67	-57	dBc
		RF3 – RF4	*3		-67	-57	dBc
	±100kHz	RF3 – RF2	*3		-75	-65	dBc
		RF3 – RF4	*3		-75	-65	dBc
1dB compression input power	P1dB	RF3 – RF2	V _{DD} = 2.8V	33	35		dBm
		RF3 – RF4	V _{DD} = 2.8V	33	35		dBm
Switching speed	TSW				2		μs
Bias current	I _{DD}		V _{DD} = 3.0V		0.45	0.75	mA
Control current	I _{ctl}		V _{ctl} (H) = 3V		40	70	μA

*1 Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 889MHz to 960MHz

*2 Pin = 10dBm, 0/3V control, V_{DD} = 3.0V, 810MHz to 885MHz

*3 π/4-shifted DQPSK, Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 889MHz to 960MHz,
ACP (±50kHz) < -70dBc, ACP (±100kHz) < -75dBc, 2nd harmonic < -75dBc, 3rd harmonic < -75dBc

Electrical Characteristics 2

(Ta = 25°C)

Item	Symbol	Port	Condition	Min.	Typ.	Max.	Unit
Insertion loss	IL	RF3 – RF2	*1		0.40	0.65	dB
		RF3 – RF4	*1		0.35	0.60	dB
		RF5 – RF2	*2		0.60	0.85	dB
		RF5 – RF4	*2		0.80	1.05	dB
		RF5 – RF6	*2		0.40	0.65	dB
		RF5 – RF1	*2		0.40	0.65	dB
Isolation	ISO.	RF3 – RF2	*1	17	20		dB
		RF3 – RF4	*1	21	24		dB
		RF5 – RF2	*2	24	27		dB
		RF5 – RF4	*2	19	22		dB
		RF5 – RF6	*2	18	21		dB
		RF5 – RF1	*2	25	31		dB
VSWR	VSWR		50Ω		1.2	1.6	—
Harmonics	2fo	RF3 – RF2	*3		-75	-60	dBc
		RF3 – RF4	*3		-75	-60	dBc
	3fo	RF3 – RF2	*3		-67	-60	dBc
		RF3 – RF4	*3		-67	-60	dBc
ACP	±50kHz	RF3 – RF2	*3		-67	-57	dBc
		RF3 – RF4	*3		-67	-57	dBc
	±100kHz	RF3 – RF2	*3		-75	-65	dBc
		RF3 – RF4	*3		-75	-65	dBc
1dB compression input power	P1dB	RF3 – RF2	V _{DD} = 2.8V	33	35		dBm
		RF3 – RF4	V _{DD} = 2.8V	33	35		dBm
Switching speed	TSW				2		μs
Bias current	I _{DD}		V _{DD} = 3.0V		0.45	0.75	mA
Control current	I _{ctl}		V _{ctl} (H) = 3V		40	70	μA

*1 Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 1429MHz to 1453MHz

*2 Pin = 10dBm, 0/3V control, V_{DD} = 3.0V, 1477MHz to 1501MHz

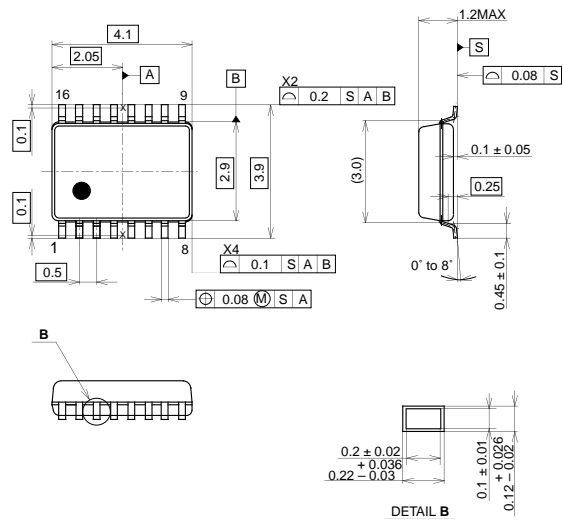
*3 π/4-shifted DQPSK, Pin = 29.5dBm, 0/3V control, V_{DD} = 3.0V, 1429MHz to 1453MHz,

ACP (±50kHz) < -70dBc, ACP (±100kHz) < -75dBc, 2nd harmonic < -75dBc, 3rd harmonic < -75dBc

Package Outline

Unit: mm

16PIN TSSOP (PLASTIC)

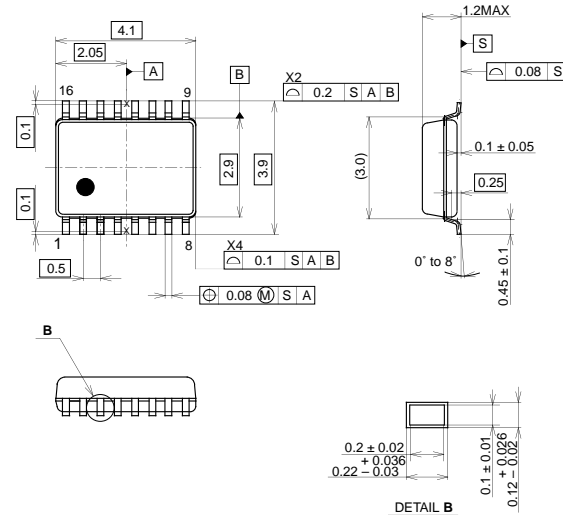


PACKAGE STRUCTURE

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

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

16PIN TSSOP (PLASTIC)



PACKAGE STRUCTURE

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

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

LEAD PLATING SPECIFICATIONS

ITEM	SPEC.
LEAD MATERIAL	COPPER ALLOY
SOLDER COMPOSITION	Sn-Bi Bi:1-4wt%
PLATING THICKNESS	5-18µm