SONY

SP8T Antenna Switch for GSM/UMTS

CXG1228XR

Description

The CXG1228XR is a high power SP8T antenna switch for GSM/UMTS applications. The low insertion loss on transmit means increased talk time as the Tx power amplifier can be operated at a lower output level. On chip logic reduces component count and simplifies PCB layout by allowing direct connection of the switch to digital baseband control lines with CMOS logic levels. It requires 3 CMOS control lines. The Sony GaAs JPHEMT MMIC process is used for low insertion loss.
(Applications: GSM/UMTS dual-mode handsets)

Features

◆ Insertion loss (Tx1) 0.35dB (Typ.) @34dBm (GSM 900)

Package

Small and low height package size: 20-pin XQFN (2.7mm × 2.7mm × 0.4mm (Max.))

Structure

GaAs JPHEMT MMIC

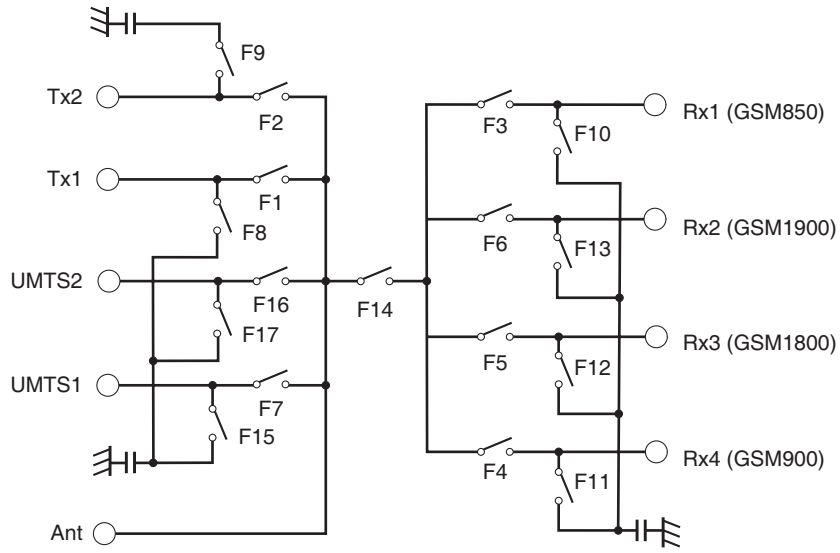
This IC is ESD sensitive device. Special handling precautions are required.
The actual ESD test data will be available later.

Absolute Maximum Ratings

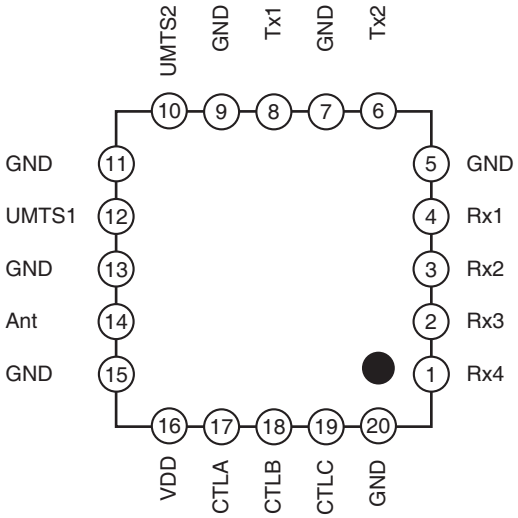
(Ta = 25℃)

◆ Bias voltage	V_{DD}	7	V
◆ Control voltage	Vctl	5	V
◆ Input power max. (Tx1)		36	dBm (Duty cycle = 12.5 to 50%)
◆ Input power max. (Tx2)		34	dBm (Duty cycle = 12.5 to 50%)
◆ Input power max. (UMTS1, UMTS2)		32	dBm
◆ Input power max. (all_Rx)		13	dBm
◆ Operating temperature		– 35 to + 85	℃
◆ Storage temperature		– 65 to + 150	℃

Block Diagram



Pin Configuration



Truth Table

Mode	CTL			F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17
	A	B	C																	
Tx1 GSM850/900	H	H	L	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON	OFF	ON
Tx2 GSM1800/1900	H	L	L	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON
Rx1 GSM850	L	L	L	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	ON	ON	ON	ON	OFF	ON
Rx2 GSM1900	L	H	L	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	ON	ON	ON	OFF	ON	ON	OFF	ON
Rx3 GSM1800	L	H	H	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	ON	OFF	ON	ON	ON	OFF	ON
Rx4 GSM900	L	L	H	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	ON	OFF	ON	ON	ON	ON	OFF	ON
UMTS1	H	L	H	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON
UMTS2	H	H	H	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	OFF	ON	ON	OFF

DC Bias Condition

(Ta = – 35°C to + 85°C)

Item	Min.	Typ.	Max.	Unit
Vctl (H)	2.0	2.8	3.6	V
Vctl (L)	0	—	0.4	V
V_{DD}	2.8	—	3.6	V

Electrical Characteristics

(Ta = 25℃)

Item	Symbol	Port	Condition	Min.	Typ.	Max.	Unit
Insertion loss	IL	ANT - Tx1	*1		0.35	0.50	dB
		ANT - Tx2	*2		0.50	0.65	
		ANT - Rx1	*3, *4		0.78	0.93	
		ANT - Rx2	*5, *6		1.10	1.25	
		ANT - Rx3	*5, *6		1.10	1.25	
		ANT - Rx4	*3, *4		0.78	0.93	
		ANT - UMTS1	*7		0.52	0.67	
			*8		0.60	0.75	
		ANT - UMTS2	*7		0.48	0.63	
			*8		0.53	0.68	
Isolation	ISO.	ANT - Rx1	*1	30	36		dB
		ANT - Rx2		30	36		
		ANT - Rx3		30	36		
		ANT - Rx4		30	36		
		ANT - Tx2		34	40		
		ANT - UMTS1		24	29		
		ANT - UMTS2		30	36		
		ANT - Rx1	*2	20	25		
		ANT - Rx2		22	28		
		ANT - Rx3		26	30		
		ANT - Rx4		25	30		
		ANT - Tx1		22	27		
		ANT - UMTS1		20	25		
		ANT - UMTS2		27	32		
		ANT - Rx1	UMTS1	25	33		
		ANT - Rx2		28	35		
		ANT - Rx3		28	35		
		ANT - Rx4		30	37		
		ANT - Tx1		20	23		
		ANT - Tx2		28	35		
		ANT - UMTS2		22	27		
		ANT - Rx1	UMTS2	25	30		
		ANT - Rx2		27	32		
		ANT - Rx3		29	34		
		ANT - Rx4		30	35		
		ANT - Tx1		20	26		
		ANT - Tx2		30	36		
		ANT - UMTS1		17	20		
		Tx1 - Rx1	*1	28	33		
		Tx1 - Rx2		30	35		
		Tx1 - Rx3		32	37		
		Tx1 - Rx4		35	40		
		Tx2 - Rx1	*2	20	23		
		Tx2 - Rx2		20	26		
		Tx2 - Rx3		25	29		
		Tx2 - Rx4		25	31		

Item	Symbol	Port	Condition	Min.	Typ.	Max.	Unit
VSWR	VSWR				1.20		—
Harmonics*	2fo	ANT - Tx1	*1		– 43	– 39	dBm
	3fo				– 33	– 30	
	2fo	ANT - Tx2	*2		– 36	– 32	
	3fo				– 33	– 29	
	2fo	ANT - UMTS1	*7		– 45	– 41	
	3fo				– 42	– 38	
	2fo	ANT - UMTS2	*7		– 47	– 43	
	3fo				– 43	– 39	
Control current	Ictl		Vctl = 2.8V		25	45	μA
Supply current	Idd		V_{DD} = 2.8V		0.30	0.45	mA
Switching speed	Swt		V_{DD} = 2.8V Vctl = 2.8V		5	8	μS

Note) Electrical Characteristics are measured with all RF ports terminated in 50Ω.

*** Harmonics measured with Tx inputs harmonically matched. The use of harmonic matching is recommended to ensure optimum performance.**

*1 Power incident on Tx1, Pin = 34dBm, 824 to 915MHz, V_{DD} = 2.8V, Tx1 enabled

*2 Power incident on Tx2, Pin = 32dBm, 1710 to 1910MHz, V_{DD} = 2.8V, Tx2 enabled

*3 Power incident on Ant, Pin = 10dBm, 869 to 894MHz, V_{DD} = 2.8V, Rx1 or Rx4 enabled

*4 Power incident on Ant, Pin = 10dBm, 925 to 960MHz, V_{DD} = 2.8V, Rx1 or Rx4 enabled

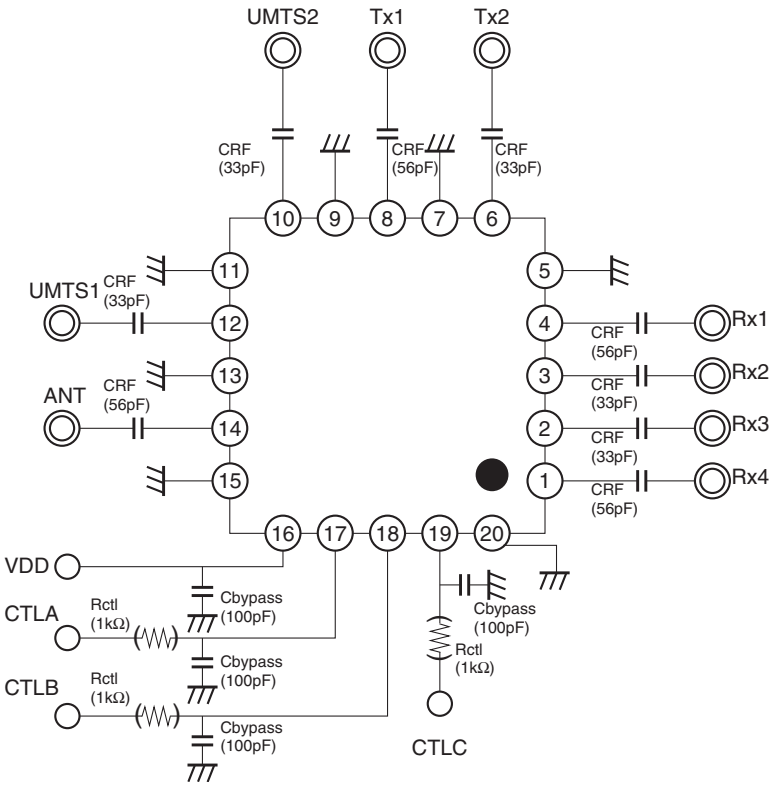
*5 Power incident on Ant, Pin = 10dBm, 1805 to 1880MHz, V_{DD} = 2.8V, Rx2 or Rx3 enabled

*6 Power incident on Ant, Pin = 10dBm, 1930 to 1990MHz, V_{DD} = 2.8V, Rx2 or Rx3 enabled

*7 Power incident on UMTS1 or UMTS2, Pin = 26dBm, 1920 to 1980MHz, V_{DD} = 2.8V, UMTS1 or UMTS2 enabled

*8 Power incident on Ant, Pin = 10dBm, 2110 to 2170MHz, V_{DD} = 2.8V, UMTS1 or UMTS2 enabled

Recommended Circuit

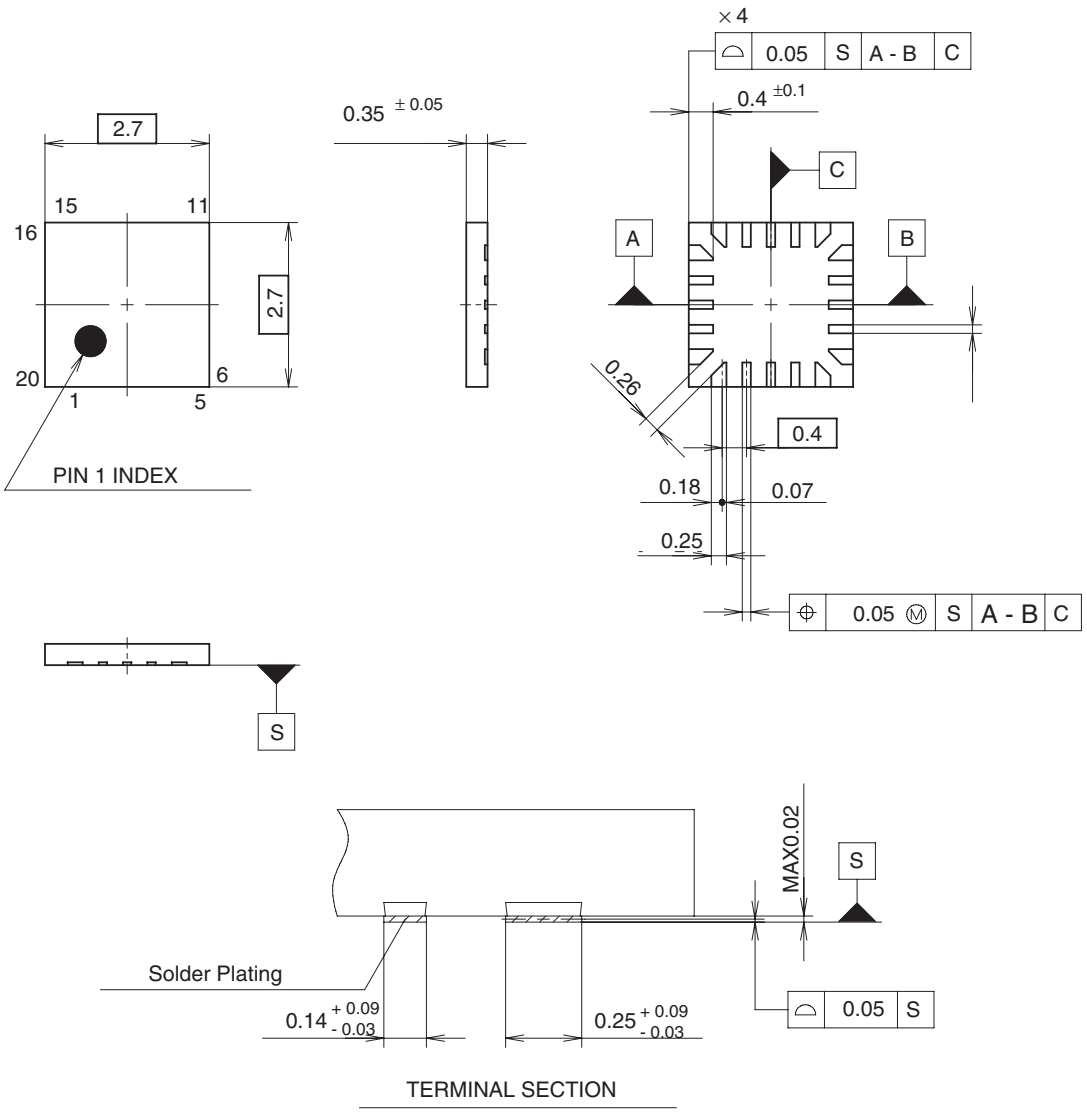


When using this IC, the following external components should be used:
Rctl: This resistor is used to improve ESD performance.1KΩ is recommended.
C_{RF}: This capacitor is used for RF decoupling and must be used for all applications.
Cbypass: This capacitor is used for DC line filtering.100pF is recommended.

Package Outline

(Unit: mm)

20 PIN XQFN (PLASTIC)



TERMINAL SECTION

Note : Cutting burr of lead are 0.05mm MAX.

SONY CODE	XQFN-2OP-01
JEITA CODE	————
JEDEC CODE	————

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.01g

LEAD PLATING SPECIFICATIONS

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