

# CXM3540XR

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## Description

The CXM3540XR is a high power and high linearity DP4T antenna switch for GSM/UMTS/CDMA applications. The low insertion loss on transmit means increased talk time as the Tx power amplifier can be operated at a lower output level.

The Integrated logic decoder reduces component count and simplifies PCB layout by allowing direct connection of the switch to digital base band control lines with the CMOS logic levels.

Sony GaAs JPHEMT MMIC Process is used.

(Applications: GSM/UMTS GSM/CDMA dual mode handsets, CDMA handsets, UMTS handsets)

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## Features

- ◆ Low insertion loss: 0.30dB (typ.) @34dBm (Cellular Band)  
0.35dB (typ.) @32dBm (PCS Band)
- ◆ High linearity: IIP3 = 70dBm
- ◆ Low voltage operation  $V_{DD} = 2.5V$
- ◆ No DC blocking capacitors
- ◆ Lead-Free and RoHS compliant

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## Package

Small package 22-pin XQFN (2.4mm × 3.3mm × 0.35mm) (Typ.)

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## Structure

GaAs JPHEMT MMIC

This IC is ESD sensitive device. Special handling precautions are required.

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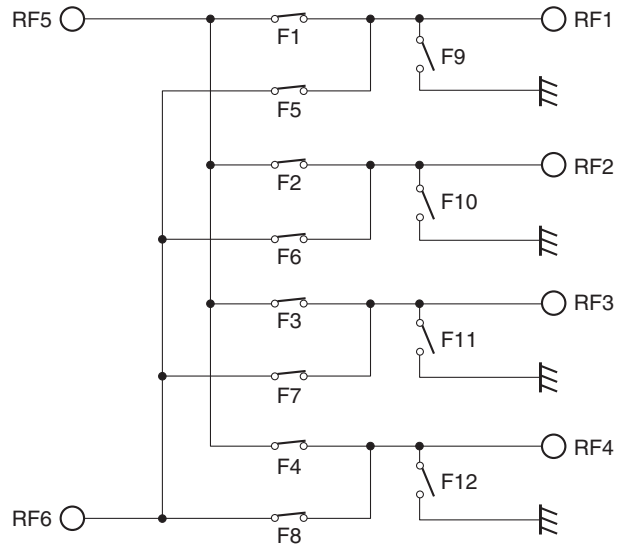


## Absolute Maximum Ratings

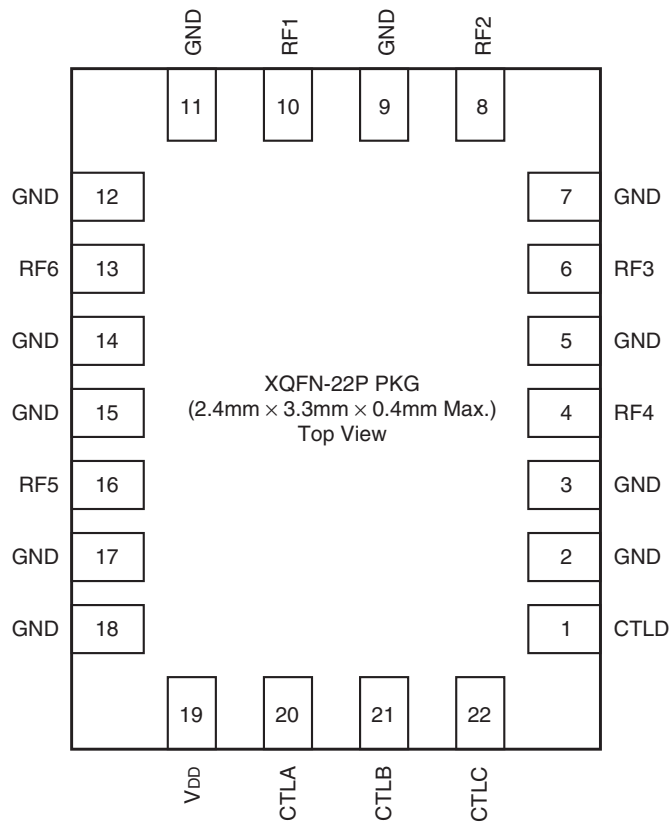
◆ Bias voltage	V <sub>DD</sub>	4	V	(T <sub>a</sub> = 25°C)
◆ Control voltage	V <sub>ctl</sub>	4	V	(T <sub>a</sub> = 25°C)
◆ Input power Max.		35.5	dBm	(824 to 915MHz, T <sub>a</sub> = 25°C) [Duty cycle = 12.5% to 50%]
		34	dBm	(1710 to 1910MHz, T <sub>a</sub> = 25°C) [Duty cycle = 12.5% to 50%]
		32	dBm	(1920 to 1980MHz, T <sub>a</sub> = 25°C)
◆ Operating temperature		-35 to +85	°C	
◆ Storage temperature		-65 to +150	°C	
◆ Maximum power dissipation	PD	500	mW	*1

\*1 25mm × 25mm × t: 0.8mm Mounted on standard board (FR-4)

Block Diagram



Pin Configuration



**Pin Description**

Pin No.	Symbol	Pin No.	Symbol
1	CTLD	12	GND
2	GND	13	RF6
3	GND	14	GND
4	RF4	15	GND
5	GND	16	RF5
6	RF3	17	GND
7	GND	18	GND
8	RF2	19	V <sub>DD</sub>
9	GND	20	CTLA
10	RF1	21	CTLB
11	GND	22	CTLC

**Truth Table**

State	CTLA	CTLB	CTLC	CTLD	Active path	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
1	L	L	H	L	RF5-RF1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	ON
2	L	L	H	H	RF5-RF2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	ON
3	L	H	H	L	RF5-RF3	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	ON	OFF	ON
4	H	L	H	L	RF5-RF4	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	ON
5	L	L	L	L	RF6-RF1	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF
6	L	L	L	H	RF6-RF2	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	ON	ON	OFF
7	L	H	L	L	RF6-RF3	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	ON	OFF	ON	ON	OFF
8	H	L	L	L	RF6-RF4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	ON	OFF

**DC Bias Condition**

(Ta = 25°C)

Item	Min.	Typ.	Max.	Unit
V <sub>ctl</sub> (H)	1.5	1.8	3.2	V
V <sub>ctl</sub> (L)	0	—	0.3	
V <sub>DD</sub>	2.5	2.8	3.2	

Electrical Characteristics

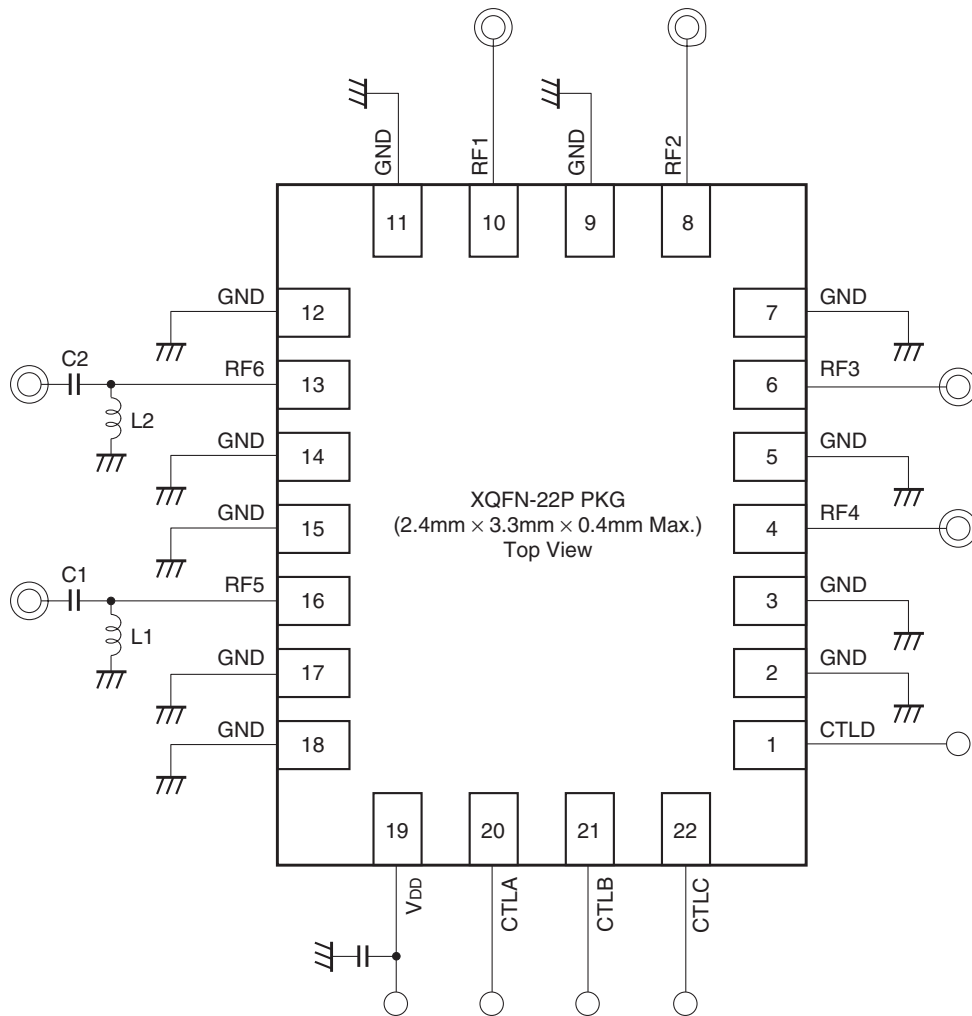
(Ta = +25°C, VDD = 2.8V, Vctl = 0/1.8V)

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit		
Insertion loss	IL	RF5 - RF1, 2, 3, 4 RF6 - RF1, 2, 3, 4	*1		0.30	0.45	dB		
			1575.42MHz		0.30	0.45			
			*2		0.35	0.50			
			*3		0.40	0.55			
Isolation	ISO.	RF5 - RF1, 2, 3, 4 RF6 - RF1, 2, 3, 4	*1	25	38		dB		
			1575.42MHz	24	36				
			*2	22	35				
			*3	21	30				
VSWR	VSWR		824 to 2170MHz		1.1		—		
Harmonics	2fo	RF5 - RF1, 2, 3, 4 RF6 - RF1, 2, 3, 4	*1		-60	-36	dBm		
	3fo				-45	-36			
	2fo		*2			-60	-36	dBm	
	3fo					-45	-36		
	2fo		*9			-95	-75	dBc	
	3fo					-90	-75		
	2fo			*10			-95		-75
	3fo						-90		-75
	P <sub>0.2dB</sub> compression input power		P <sub>0.2dB</sub>	RF5 - RF1, 2, 3, 4 RF6 - RF1, 2, 3, 4	824 to 930MHz	35.5			dBm
					1710 to 1980MHz	33.5			
IMD3	IMD3	RF5 - RF1, 2, 3, 4 RF6 - RF1, 2, 3, 4	*4, *8		-110		dBm		
			*5, *8		-110				
Input IP3	IIP3	RF5 - RF1, 2, 3, 4 RF6 - RF1, 2, 3, 4	*6, *8	65	70		dBm		
			*7, *8	65	70				
Control current	Ictl		Vctl = 1.8V		0.005	10	μA		
Supply current	Idd		VDD = 2.8V		0.15	0.3	mA		
Switching speed	Swt		VDD = 2.8V, Vctl = 0V/1.8V		2	5	μs		

Electrical characteristics are measured with all RF ports terminated in 50Ω.

- \*1 Pin = 34dBm, f = 824 to 960MHz
- \*2 Pin = 32dBm, f = 1710 to 1990MHz
- \*3 Pin = 10dBm, f = 2110 to 2170MHz
- \*4 Ptx = 21.5dBm, Pjam = -15dBm, ftx = 835MHz, fjam = 790MHz, fim = 880MHz
- \*5 Ptx = 21.5dBm, Pjam = -15dBm, ftx = 1950MHz, fjam = 1760MHz, fim = 2140MHz
- \*6 Pin = 27 + 27dBm, 835 + 836MHz, IIP3 = (3 × Pout - IM3)/2 + Loss
- \*7 Pin = 27 + 27dBm, 1950 + 1951MHz, IIP3 = (3 × Pout - IM3)/2 + Loss
- \*8 Measured with recommended circuit
- \*9 Pin = 25dBm, f = 890 to 930MHz
- \*10 Pin = 25dBm, f = 1920 to 1980MHz

Recommended Circuit

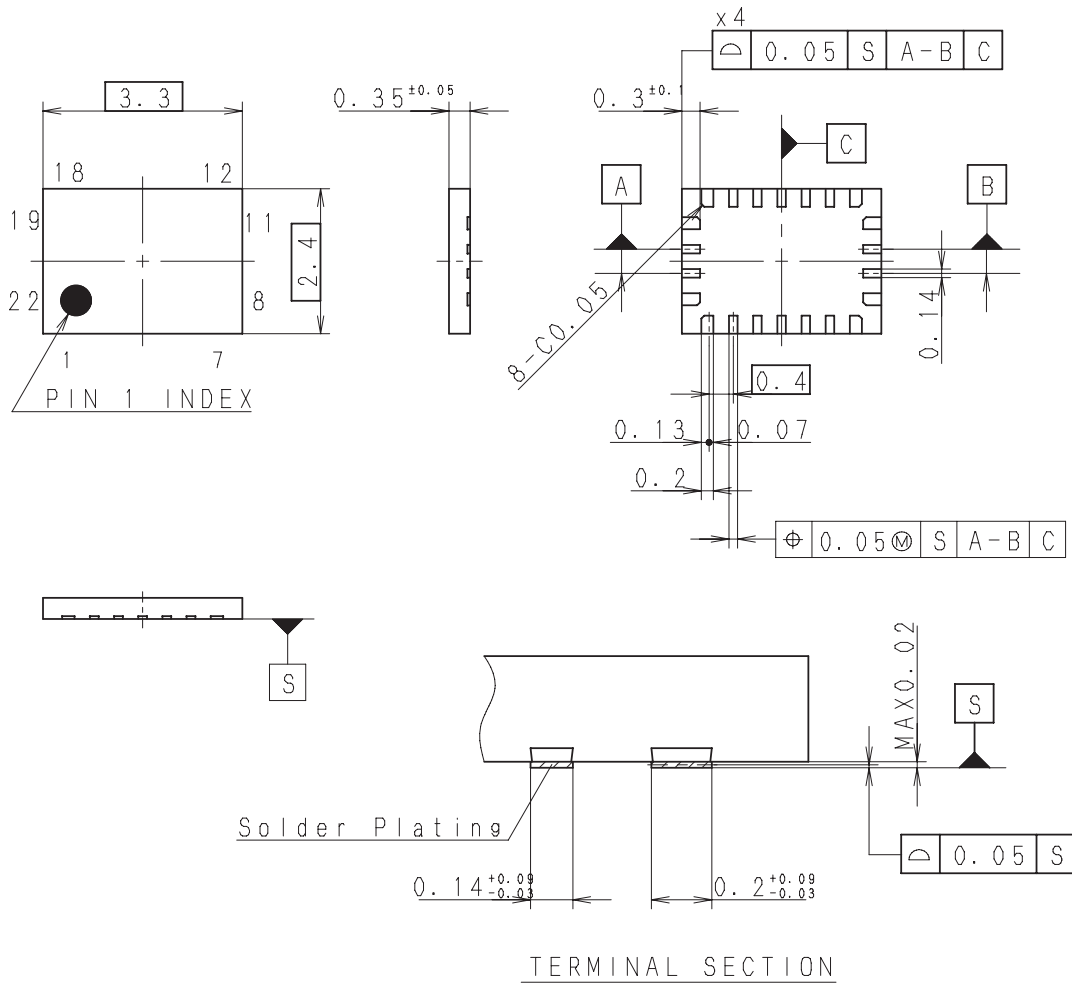


- Note) 1. No DC blocking capacitors are required on all RF ports.  
 2. DC levels of all RF ports are GND.  
 3. L1, L2, C1 and C2 are recommended on Ant port for ESD protection.

Package Outline

(Unit: mm)

22 PIN XQFN (PLASTIC)



Note:Cutting burr of lead are 0.05mm MAX.

PACKAGE STRUCTURE

SONY CODE	XQFN-22P-01
JEITA CODE	_____
JEDEC CODE	_____

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

AP-4000-22008S Rev. 0

LEAD PLATING SPECIFICATIONS

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