

# CXM3524ER

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### Description

The CXM3524ER is 3P10T antenna switch for quad bands GSM and quad bands UMTS dual mode. This IC has a decoder circuit which supports CMOS control. Sony JPHEMT GaAs process is utilized for low insertion loss and high linearity. (Applications: Quad bands GSM and quad bands UMTS dual mode phones)

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### Features

- ◆ Low insertion loss
- ◆ Low voltage drive: 2.5 to 3.3V
- ◆ Supports CMOS control
- ◆ High ESD resistance
- ◆ Eliminates Output DC Blocking Capacitors to RF ports
- ◆ Lead-Free and RoHS Compliant

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### Package

VQFN-34P (3.8mm × 4.4mm × 0.85mm Max.)

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### Structure

GaAs Junction Gate pHEMT (JPHEMT) MMIC Switch, CMOS Decoder

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

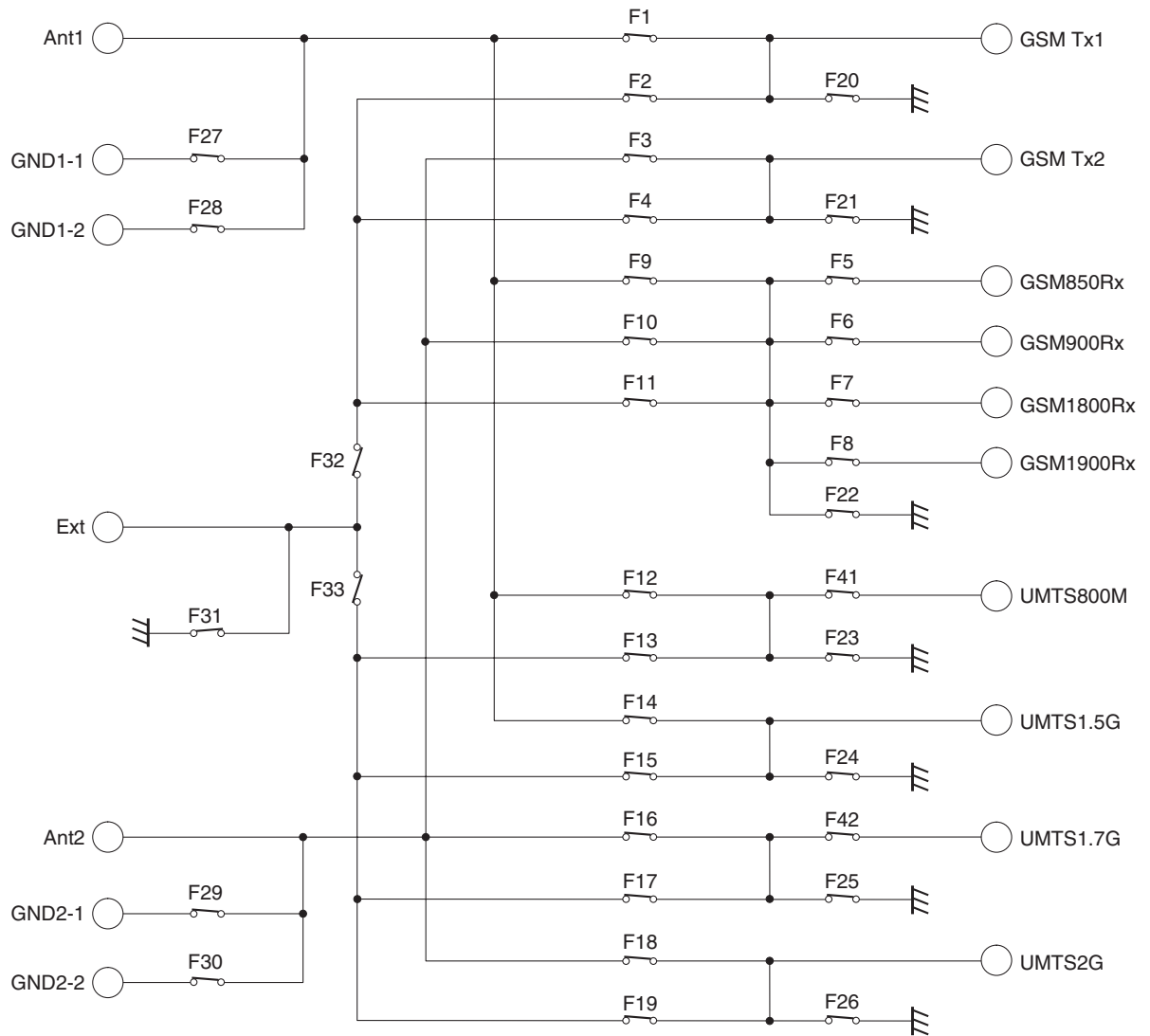
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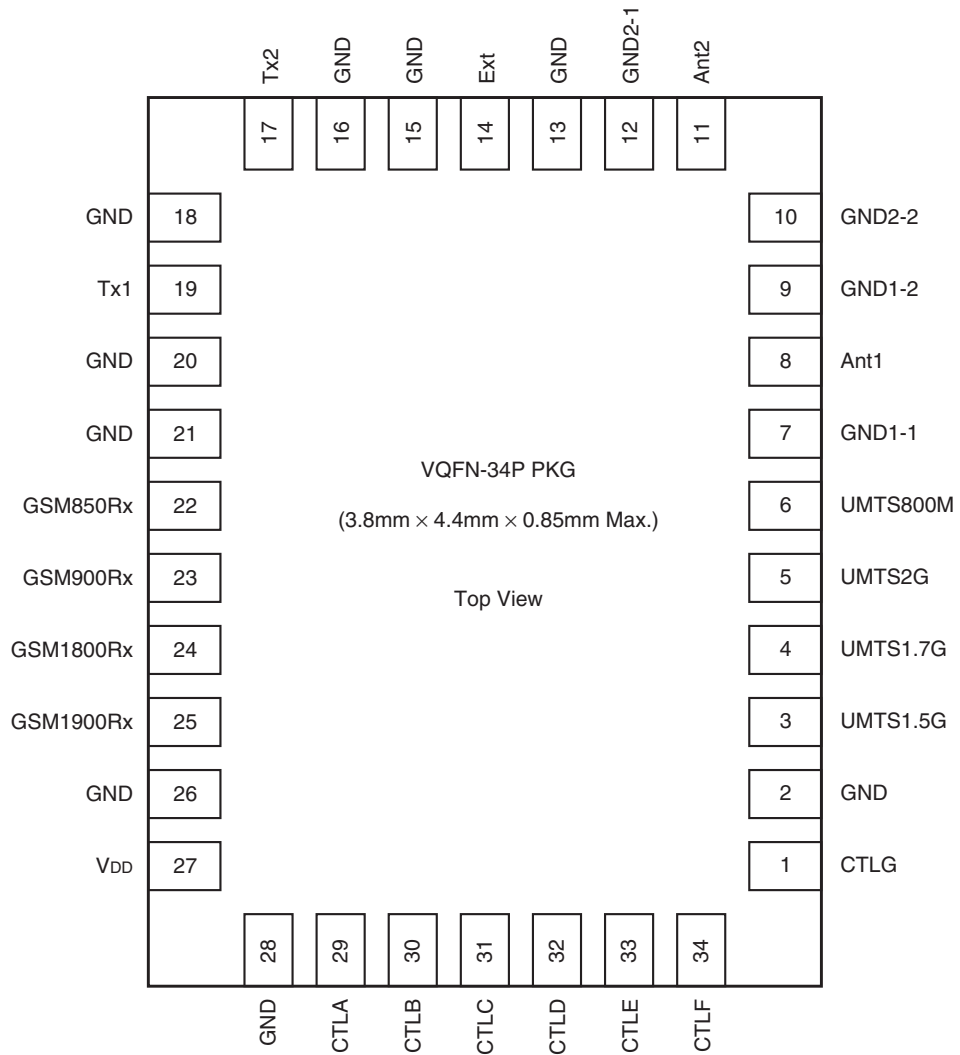
### Absolute Maximum Ratings

◆ Supply voltage	V <sub>DD</sub>	3.6	V	(T <sub>a</sub> = 25°C)
◆ Control voltage	V <sub>ctl</sub>	3.6	V	(T <sub>a</sub> = 25°C)
◆ Maximum input	[GSM Tx1]	36	dBm	(Duty cycle = 12.5%) (T <sub>a</sub> = 25°C)
	[GSM Tx2]	34	dBm	(Duty cycle = 12.5%) (T <sub>a</sub> = 25°C)
	[UMTS800M/1.5G/1.7G/2G]	32	dBm	(T <sub>a</sub> = 25°C)
	[GSM850/900/1800/1900 Rx]	13	dBm	(T <sub>a</sub> = 25°C)
◆ Operating temperature	T <sub>opr</sub>	-30 to +90	°C	
◆ Storage temperature	T <sub>stg</sub>	-65 to +150	°C	

Block Diagram



Pin Configuration



Truth Table

State	CTLA	CTLB	CTLC	CTLD	CTLE	CTLF	CTLG	Active Port	Active Ant	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19
1	H	H	—	H	—	—	H	GSM Tx1	ANT1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
2	H	L	—	H	—	—	H	GSM Tx2	ANT2	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	H	H	L	L	—	—	H	GSM850 Rx	ANT1	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
4	H	H	H	L	—	—	H	GSM900 Rx	ANT1	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
5	H	L	L	L	—	—	H	GSM1800 Rx	ANT2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
6	H	L	H	L	—	—	H	GSM1900 Rx	ANT2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
7	L	—	—	—	L	H	H	UMTS800M	ANT1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
8	L	—	—	—	H	L	H	UMTS1.5G	ANT1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
9	L	—	—	—	H	H	H	UMTS1.7G	ANT2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
10	L	—	—	—	L	L	H	UMTS2G	ANT2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
11	H	H	—	H	—	—	L	GSM Tx1	EXT	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
12	H	L	—	H	—	—	L	GSM Tx2	EXT	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
13	H	H	L	L	—	—	L	GSM850 Rx	EXT	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
14	H	H	H	L	—	—	L	GSM900 Rx	EXT	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
15	H	L	L	L	—	—	L	GSM1800 Rx	EXT	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
16	H	L	H	L	—	—	L	GSM1900 Rx	EXT	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
17	L	—	—	—	L	H	L	UMTS800M	EXT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
18	L	—	—	—	H	L	L	UMTS1.5G	EXT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
19	L	—	—	—	H	H	L	UMTS1.7G	EXT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
20	L	—	—	—	L	L	L	UMTS2G	EXT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

State	CTLA	CTLB	CTLC	CTLD	CTLE	CTLF	CTLG	Active Port	Active Ant	F20	F21	F22	F23	F24	F25	F26	F27	F28	F29	F30	F31	F32	F33	F41	F42		
1	H	H	—	H	—	—	H	GSM Tx1	ANT1	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	ON	ON	
2	H	L	—	H	—	—	H	GSM Tx2	ANT2	ON	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	
3	H	H	L	L	—	—	H	GSM850 Rx	ANT1	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	OFF	OFF	ON	ON	ON	
4	H	H	H	L	—	—	H	GSM900 Rx	ANT1	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	OFF	OFF	ON	ON	ON	
5	H	L	L	L	—	—	H	GSM1800 Rx	ANT2	ON	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	ON	ON	ON	
6	H	L	H	L	—	—	H	GSM1900 Rx	ANT2	ON	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	ON	ON	ON	
7	L	—	—	—	L	H	H	UMTS800M	ANT1	ON	ON	ON	OFF	ON	ON	ON	OFF	OFF	ON	OFF	ON	OFF	OFF	ON	ON	ON	
8	L	—	—	—	H	L	H	UMTS1.5G	ANT1	ON	ON	ON	ON	OFF	ON	ON	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON	ON	
9	L	—	—	—	H	H	H	UMTS1.7G	ANT2	ON	ON	ON	ON	ON	OFF	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON	
10	L	—	—	—	L	L	H	UMTS2G	ANT2	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	ON	ON	ON	
11	H	H	—	H	—	—	L	GSM Tx1	EXT	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	OFF	ON	ON	
12	H	L	—	H	—	—	L	GSM Tx2	EXT	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	OFF	ON	OFF
13	H	H	L	L	—	—	L	GSM850 Rx	EXT	ON	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	ON	ON	ON
14	H	H	H	L	—	—	L	GSM900 Rx	EXT	ON	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	ON	ON	ON
15	H	L	L	L	—	—	L	GSM1800 Rx	EXT	ON	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	ON	ON	ON
16	H	L	H	L	—	—	L	GSM1900 Rx	EXT	ON	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	ON	OFF	ON	ON	ON	ON
17	L	—	—	—	L	H	L	UMTS800M	EXT	ON	ON	ON	OFF	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	ON
18	L	—	—	—	H	L	L	UMTS1.5G	EXT	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	ON
19	L	—	—	—	H	H	L	UMTS1.7G	EXT	ON	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	ON
20	L	—	—	—	L	L	L	UMTS2G	EXT	ON	ON	ON	ON	ON	ON	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	ON

**DC Bias Conditions**

(Ta = -30 to +85°C)

Item	Min.	Typ.	Max.	Unit
V <sub>DD</sub>	2.5	2.9	3.3	V
V <sub>ctl</sub> (H)	1.5	2.9	3.3	V
V <sub>ctl</sub> (L)	0	—	0.3	V

Electrical Characteristics 1

(Ta = 25°C)

Item	Freq [MHz]	Min.	Typ.	Max.	Unit	Conditions
Bias current	—		280	500	μA	V <sub>DD</sub> = 2.9V, V <sub>ctl</sub> = 0V
Ctrl current 1	—		0.01	10	μA	V <sub>DD</sub> = 2.9V, V <sub>ctl</sub> = 2.9V
Ctrl current 2	—		0.01	1	μA	V <sub>DD</sub> = 0V, V <sub>ctl</sub> = 2.9V
Wake up time	—		—	100	μs	V <sub>DD</sub> = 0 to 2.9V
Switching speed	—		—	5	μs	

UMTS800M

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 26dBm)

Item	Freq [MHz]	UMTS800M - Ant1			UMTS800M - Ext			Unit	Conditions	
		Min.	Typ.	Max.	Min.	Typ.	Max.			
Insertion loss * Non-mounted recommended circuit	824 to 849		0.45	0.60		0.51	0.66	dB		
	869 to 894		0.45	0.60		0.51	0.66	dB		
Insertion loss * Mounted recommended circuit	824 to 849		0.52	0.67		0.70	0.85	dB		
	869 to 894		0.52	0.67		0.70	0.85	dB		
VSWR	824 to 849		1.1	1.5		1.1	1.5	—	UMTS800M Port	
			1.05	1.5		1.05	1.5	—	Ant1, Ext Port	
	869 to 894		1.1	1.5		1.1	1.5	—	UMTS800M Port	
			1.1	1.5		1.1	1.5	—	Ant1, Ext Port	
SW isolation	824 to 849		—	—	16	33		dB	When UMTS800M - Ant1 measurement	
			16	38	16	46		dB	When UMTS800M - Ant2 measurement	
			16	37	—	—	—	dB	When UMTS800M - Ext measurement	
	869 to 894		—	—	16	33		dB	When UMTS800M - Ant1 measurement	
			16	38	16	46		dB	When UMTS800M - Ant2 measurement	
			16	37	—	—	—	dB	When UMTS800M - Ext measurement	
In-Rx band spurious	869 to 894		—	-125		—	-125	dBm		
Harmonics	1648 to 1698		—	-44		—	-44	dBm		
	2472 to 2547		—	-44		—	-44	dBm		
	3296 to 3396		—	-44		—	-44	dBm		
ACLR	824 to 849	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	824 to 849	±10MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 45			-118	-111		-118	-111	dBm	PTx = 21dBm Pblock = -15dBm * The IMD characteristics are design guaranteed.
	fblock = 1715			-122	-112		-118	-111	dBm	
IMD3 * Mounted recommended circuit	fblock = 790			-106	-101		-106	-101	dBm	
	fblock = 2550			-109	-104		-107	-102	dBm	

**UMTS1.5G**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 26dBm)

Item	Freq [MHz]	UMTS1.5G - Ant1			UMTS1.5G - Ext			Unit	Conditions	
		Min.	Typ.	Max.	Min.	Typ.	Max.			
Insertion loss * Non-mounted recommended circuit	1428 to 1448		0.52	0.67		0.65	0.80	dB		
	1476 to 1496		0.55	0.70		0.65	0.80	dB		
Insertion loss * Mounted recommended circuit	1428 to 1448		0.57	0.72		0.70	0.85	dB		
	1476 to 1496		0.60	0.75		0.70	0.85	dB		
VSWR	1428 to 1448		1.15	1.5		1.1	1.5	—	UMTS1.5G Port	
			1.1	1.5		1.1	1.5	—	Ant1, Ext Port	
	1476 to 1496		1.15	1.5		1.1	1.5	—	UMTS1.5G Port	
			1.1	1.5		1.1	1.5	—	Ant1, Ext Port	
SW isolation	1428 to 1448		—	—	16	39		dB	When UMTS1.5G - Ant1 measurement	
			16	28	16	39		dB	When UMTS1.5G - Ant2 measurement	
			16	28	—	—	—	dB	When UMTS1.5G - Ext measurement	
	1476 to 1496		—	—	16	38		dB	When UMTS1.5G - Ant1 measurement	
			16	27	16	38		dB	When UMTS1.5G - Ant2 measurement	
			16	27	—	—	—	dB	When UMTS1.5G - Ext measurement	
In-Rx band spurious	1476 to 1496		—	-125		—	-125	dBm		
Harmonics	2856 to 2896		—	-44		—	-44	dBm		
	4284 to 4344		—	-44		—	-44	dBm		
	5712 to 5792		—	-44		—	-44	dBm		
ACLR	1428 to 1448	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	1428 to 1448	±5MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 48			-111	-105		-110	-105	dBm	PTx = 21dBm Pblock = -15dBm * The IMD characteristics are design guaranteed.
	fblock = 2924			-115	-108		-112	-107	dBm	
IMD3 * Mounted recommended circuit	fblock = 1390			-105	-100		-105	-100	dBm	
	fblock = 4362			-108	-103		-108	-103	dBm	



**UMTS1.7G**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 26dBm)

Item	Freq [MHz]		UMTS1.7G - Ant2			UMTS1.7G - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1750 to 1785			0.55	0.70		0.75	0.90	dB	
	1845 to 1880			0.56	0.71		0.77	0.92	dB	
Insertion loss * Mounted recommended circuit	1750 to 1785			0.60	0.75		0.80	0.95	dB	
	1845 to 1880			0.61	0.76		0.82	0.97	dB	
VSWR	1750 to 1785			1.2	1.5		1.1	1.5	—	UMTS1.7G Port
				1.2	1.5		1.05	1.5	—	Ant2, Ext Port
	1845 to 1880			1.2	1.5		1.1	1.5	—	UMTS1.7G Port
				1.2	1.5		1.05	1.5	—	Ant2, Ext Port
SW isolation	1750 to 1785		16	31		16	41		dB	When UMTS1.7G - Ant1 measurement
			—	—	—	16	34		dB	When UMTS1.7G - Ant2 measurement
			16	24		—	—	—	dB	When UMTS1.7G - Ext measurement
	1845 to 1880		16	30		16	40		dB	When UMTS1.7G - Ant1 measurement
			—	—	—	16	33		dB	When UMTS1.7G - Ant2 measurement
			16	23		—	—	—	dB	When UMTS1.7G - Ext measurement
In-Rx band spurious	1845 to 1880			—	-125		—	-125	dBm	
Harmonics	3500 to 3570			—	-44		—	-44	dBm	
	5250 to 5355			—	-44		—	-44	dBm	
	7000 to 7140			—	-44		—	-44	dBm	
ACLR	1750 to 1785	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	1750 to 1785	±10MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 95			-111	-106		-105	-100	dBm	PTx = 21dBm Pblock = -15dBm * The IMD characteristics are design guaranteed.
	fblock = 3625			-113	-106		-111	-106	dBm	
IMD3 * Mounted recommended circuit	fblock = 1670			-106	-101		-105	-100	dBm	
	fblock = 5390			-111	-106		-113	-106	dBm	

**UMTS2G**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 26dBm)

Item	Freq [MHz]	UMTS2G - Ant2			UMTS2G - Ext			Unit	Conditions	
		Min.	Typ.	Max.	Min.	Typ.	Max.			
Insertion loss * Non-mounted recommended circuit	1920 to 1980		0.52	0.67		0.76	0.91	dB		
	2110 to 2170		0.58	0.73		0.85	1.00	dB		
Insertion loss * Mounted recommended circuit	1920 to 1980		0.57	0.72		0.81	0.96	dB		
	2110 to 2170		0.63	0.78		0.90	1.05	dB		
VSWR	1920 to 1980		1.15	1.5		1.1	1.5	—	UMTS2G Port	
			1.2	1.5		1.05	1.5	—	Ant2, Ext Port	
	2110 to 2170		1.1	1.5		1.15	1.5	—	UMTS2G Port	
			1.15	1.5		1.1	1.5	—	Ant2, Ext Port	
SW isolation	1920 to 1980	16	25		16	35		dB	When UMTS2G - Ant1 measurement	
		—	—	—	16	32		dB	When UMTS2G - Ant2 measurement	
		16	24		—	—	—	dB	When UMTS2G - Ext measurement	
	2110 to 2170	16	24		16	34		dB	When UMTS2G - Ant1 measurement	
		—	—	—	16	31		dB	When UMTS2G - Ant2 measurement	
		16	23		—	—	—	dB	When UMTS2G - Ext measurement	
Isolation Tx ⇒ Rx	1920 to 1980	22	61		22	58		dB	UMTS2G ⇒ GSM1900Rx	
In-Rx band spurious	2110 to 2170		—	-125		—	-125	dBm		
Harmonics	3840 to 3960		—	-44		—	-44	dBm		
	5760 to 5940		—	-44		—	-44	dBm		
	7680 to 7920		—	-44		—	-44	dBm		
ACLR	1920 to 1980	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	1920 to 1980	±10MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 190			-107	-102		-103	-98	dBm	PTx = 21dBm Pblock = -15dBm
	fblock = 4090			-111	-106		-111	-106	dBm	
IMD3 * Mounted recommended circuit	fblock = 1760			-105	-100		-103	-98	dBm	* The IMD characteristics are design guaranteed.
	fblock = 6040			-114	-107		-112	-107	dBm	

**GSM Tx1**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, P<sub>in</sub> = 35dBm)

Item	Freq [MHz]	GSM Tx1 - Ant1			GSM Tx1 - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	824 to 915		0.35	0.50		0.45	0.60	dB	
Insertion loss * Mounted recommended circuit	824 to 915		0.42	0.57		0.67	0.82	dB	
VSWR	824 to 915		1.1	1.5		1.1	1.5	—	GSM Tx1 Port
			1.1	1.5		1.1	1.5	—	Ant1, Ext Port
SW isolation	824 to 915	—	—	—	25	50		dB	When GSM Tx - Ant1 measurement
		25	41		25	44		dB	When GSM Tx - Ant2 measurement
		22	27		—	—	—	dB	When GSM Tx - Ext measurement
Isolation Tx ⇒ Rx	824 to 915	31	44		31	39		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM850Rx
		31	56		31	50		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM900Rx
		31	60		31	54		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM1800Rx
		31	62		31	57		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM1900Rx
		31	43		31	70		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS800M
		31	35		31	43		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS1.5G
		31	38		31	45		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS1.7G
		29	34		31	42		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS2G
Isolation Tx ⇒ Ant	824 to 849	25	41		—	—		dB	Tx1 when selecting Ant1 - GSM850Rx ⇒ Ant1
		—	—		25	37		dB	Tx1 when selecting Ant1 - GSM850Rx ⇒ Ext
	880 to 915	25	38		—	—		dB	Tx1 when selecting Ant1 - GSM900Rx ⇒ Ant1
		—	—		25	39		dB	Tx1 when selecting Ant1 - GSM900Rx ⇒ Ext

**GSM Tx1**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 35dBm)

Item	Freq [MHz]		GSM Tx1 - Ant1			GSM Tx1 - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Harmonics	1648 to 1830	2Tx		-50	-36		-49	-36	dBm	
	2472 to 2745	3Tx		-41	-33		-41	-33	dBm	
	3296 to 3660	4Tx		—	-36		—	-36	dBm	
	4120 to 4575	5Tx		—	-42		—	-42	dBm	
	4944 to 5490	6Tx		—	-46		—	-46	dBm	
	5768 to 6405	7Tx		—	-46		—	-46	dBm	
	6592 to 7320	8Tx		—	-46		—	-46	dBm	
	7416 to 8235	9Tx		—	-46		—	-46	dBm	
	8240 to 9150	10Tx		—	-46		—	-46	dBm	
	9064 to 10065	11Tx		—	-46		—	-46	dBm	
	9888 to 10980	12Tx		—	-46		—	-46	dBm	
	10712 to 11895	13Tx		—	-46		—	-46	dBm	
	11536 to 12810	14Tx		—	-46		—	-46	dBm	
	12360 to 13725	15Tx		—	-46		—	-46	dBm	

**GSM Tx2**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 32dBm)

Item	Freq [MHz]	GSM Tx2 - Ant2			GSM Tx2 - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1710 to 1785		0.43	0.60		0.57	0.72	dB	
	1850 to 1910		0.47	0.65		0.62	0.77	dB	
Insertion loss * Mounted recommended circuit	1710 to 1785		0.48	0.65		0.62	0.77	dB	
	1850 to 1910		0.52	0.70		0.67	0.82	dB	
VSWR	1710 to 1785		1.15	1.5		1.1	1.5	—	GSM Tx2 Port
			1.15	1.5		1.1	1.5	—	Ant2, Ext Port
	1850 to 1910		1.15	1.5		1.1	1.5	—	GSM Tx2 Port
			1.15	1.5		1.1	1.5	—	Ant2, Ext Port
SW isolation	1710 to 1785	22	34		22	49		dB	When GSM Tx2 - Ant1 measurement
		—	—	—	22	32		dB	When GSM Tx2 - Ant2 measurement
		17	23		—	—	—	dB	When GSM Tx2 - Ext measurement
	1850 to 1910	22	33		22	48		dB	When GSM Tx2 - Ant1 measurement
		—	—	—	22	31		dB	When GSM Tx2 - Ant2 measurement
		17	22		—	—	—	dB	When GSM Tx2 - Ext measurement
Isolation Tx ⇒ Rx	1710 to 1910	28	45		28	36		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM850Rx
		28	53		28	46		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM900Rx
		28	54		28	50		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM1800Rx
		28	55		28	52		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM1900Rx
		23	30		23	31		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS800M
		23	30		23	32		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS1.5G
		28	38		28	43		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS1.7G
		23	28		23	31		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS2G
Isolation Tx ⇒ Ant	1710 to 1785	22	27		—	—	—	dB	Tx2 when selecting Ant2 - GSM1800Rx ⇒ Ant2
		—	—	—	19	24		dB	Tx2 when selecting Ext - GSM1800Rx ⇒ Ext
	1850 to 1910	22	26		—	—	—	dB	Tx2 when selecting Ant2 - GSM1900Rx ⇒ Ant2
		—	—	—	19	23		dB	Tx2 when selecting Ext - GSM1900Rx ⇒ Ext

**GSM Tx2**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 32dBm)

Item	Freq [MHz]		GSM Tx2 - Ant2			GSM Tx2 - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Harmonics	3420 to 3570	2Tx		-49	-39		-45	-39	dBm	
	3700 to 3820			-49	-39		-45	-39	dBm	
	5130 to 5355	3Tx		-47	-39		-43	-37	dBm	
	5550 to 5730			-45	-39		-42	-36	dBm	
	6840 to 7140	4Tx		—	-42		—	-42	dBm	
	7400 to 7640			—	-42		—	-42	dBm	
	8550 to 8925	5Tx		—	-45		—	-45	dBm	
	9250 to 9550			—	-45		—	-45	dBm	
	10260 to 10710	6Tx		—	-45		—	-45	dBm	
	11100 to 11460			—	-45		—	-45	dBm	
	11970 to 12495	7Tx		—	-45		—	-45	dBm	

**GSM850Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 0dBm)

Item	Freq [MHz]	GSM850Rx - Ant1			GSM850Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	869 to 894		0.88	1.03		0.92	1.07	dB	
Insertion loss * Mounted recommended circuit	869 to 894		0.93	1.08		1.05	1.20	dB	
VSWR	869 to 894		1.2	1.5		1.2	1.5	—	GSM850Rx Port
			1.1	1.5		1.15	1.5	—	Ant1, Ext Port

**GSM900Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 0dBm)

Item	Freq [MHz]	GSM900Rx - Ant1			GSM900Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	925 to 960		0.89	1.04		0.94	1.09	dB	
Insertion loss * Mounted recommended circuit	925 to 960		0.94	1.09		1.07	1.25	dB	
VSWR	925 to 960		1.2	1.5		1.2	1.5	—	GSM900Rx Port
			1.05	1.5		1.1	1.5	—	Ant1, Ext Port

**GSM1800Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 0dBm)

Item	Freq [MHz]	GSM1800Rx - Ant2			GSM1800Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1805 to 1880		0.93	1.08		1.20	1.35	dB	
Insertion loss * Mounted recommended circuit	1805 to 1880		0.98	1.13		1.23	1.38	dB	
VSWR	1805 to 1880		1.25	1.5		1.2	1.5	—	GSM1800Rx Port
			1.2	1.5		1.25	1.5	—	Ant2, Ext Port

**GSM1900Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 0dBm)

Item	Freq [MHz]	GSM1900Rx - Ant2			GSM1900Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1930 to 1990		0.95	1.10		1.21	1.36	dB	
Insertion loss * Mounted recommended circuit	1930 to 1990		1.00	1.15		1.24	1.39	dB	
VSWR	1930 to 1990		1.3	1.7		1.2	1.5	—	GSM1900Rx Port
			1.3	1.7		1.3	1.7	—	Ant2, Ext Port



Electrical Characteristics 2

(Ta = -30 to +85°C)

Item	Freq [MHz]	Min.	Typ.	Max.	Unit	Conditions
Bias current	—		290	550	μA	V <sub>DD</sub> = 2.9V, V <sub>ctl</sub> = 0V
Ctrl current 1	—		0.1	20	μA	V <sub>DD</sub> = 2.9V, V <sub>ctl</sub> = 2.9V
Ctrl current 2	—		0.1	2	μA	V <sub>DD</sub> = 0V, V <sub>ctl</sub> = 2.9V
Wake up time	—		—	100	μs	V <sub>DD</sub> = 0 to 2.9V
Switching speed	—		—	5	μs	

UMTS800M

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 26dBm)

Item	Freq [MHz]	UMTS800M - Ant1			UMTS800M - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	824 to 849		—	0.70		—	0.76	dB	
	869 to 894		—	0.70		—	0.76		
Insertion loss * Mounted recommended circuit	824 to 849		—	0.77		—	0.95	dB	
	869 to 894		—	0.77		—	0.95		
VSWR	824 to 849		—	1.5		—	1.5	—	UMTS800M Port
			—	1.5		—	1.5	—	Ant1, Ext Port
	869 to 894		—	1.5		—	1.5	—	UMTS800M Port
			—	1.5		—	1.5	—	Ant1, Ext Port
SW isolation	824 to 849	—	—	—	16	—	—	dB	When UMTS800M – Ant1 measurement
		16	—	—	16	—	—		When UMTS800M – Ant2 measurement
		16	—	—	—	—	—		When UMTS800M – Ext measurement
	869 to 894	—	—	—	16	—	—	dB	When UMTS800M – Ant1 measurement
		16	—	—	16	—	—		When UMTS800M – Ant2 measurement
		16	—	—	—	—	—		When UMTS800M – Ext measurement
In-Rx band spurious	869 to 894		—	-125		—	-125	dBm	
Harmonics	1648 to 1698		—	-44		—	-44		
	2472 to 2547		—	-44		—	-44		
	3296 to 3396		—	-44		—	-44		
ACLR	824 to 849	±5MHz		—	-50		—	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	824 to 849	±10MHz		—	-55		—		
IMD2 * Mounted recommended circuit	fblock = 45			—	-108		—	dBm	PTx = 21dBm Pblock = -15dBm
	fblock = 1715			—	-109		—		
IMD3 * Mounted recommended circuit	fblock = 790			—	-98		—	dBm	* The IMD characteristics are design guaranteed.
	fblock = 2550			—	-101		—		

**UMTS1.5G**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, P<sub>in</sub> = 26dBm)

Item	Freq [MHz]		UMTS1.5G - Ant1			UMTS1.5G - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1428 to 1448			—	0.77		—	0.90	dB	
	1476 to 1496			—	0.80		—	0.90	dB	
Insertion loss * Mounted recommended circuit	1428 to 1448			—	0.82		—	0.95	dB	
	1476 to 1496			—	0.85		—	0.95	dB	
VSWR	1428 to 1448			—	1.5		—	1.5	—	UMTS1.5G Port
				—	1.5		—	1.5	—	Ant1, Ext Port
	1476 to 1496			—	1.5		—	1.5	—	UMTS1.5G Port
				—	1.5		—	1.5	—	Ant1, Ext Port
SW isolation	1428 to 1448		—	—	—	16	—		dB	When UMTS1.5G - Ant1 measurement
			16	—		16	—		dB	When UMTS1.5G - Ant2 measurement
			16	—		—	—	—	dB	When UMTS1.5G - Ext measurement
	1476 to 1496		—	—	—	16	—		dB	When UMTS1.5G - Ant1 measurement
			16	—		16	—		dB	When UMTS1.5G - Ant2 measurement
			16	—		—	—	—	dB	When UMTS1.5G - Ext measurement
In-Rx band spurious	1476 to 1496			—	-125		—	-125	dBm	
Harmonics	2856 to 2896			—	-44		—	-44	dBm	
	4284 to 4344			—	-44		—	-44	dBm	
	5712 to 5792			—	-44		—	-44	dBm	
ACLR	1428 to 1448	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	1428 to 1448	±10MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 48			—	-102		—	-102	dBm	PTx = 21dBm Pblock = -15dBm * The IMD characteristics are design guaranteed.
	fblock = 2924			—	-105		—	-104	dBm	
IMD3 * Mounted recommended circuit	fblock = 1390			—	-97		—	-97	dBm	
	fblock = 4362			—	-100		—	-100	dBm	

**UMTS1.7G**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, P<sub>in</sub> = 26dBm)

Item	Freq [MHz]		UMTS1.7G - Ant2			UMTS1.7G - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1750 to 1785			—	0.80		—	1.00	dB	
	1845 to 1880			—	0.81		—	1.02	dB	
Insertion loss * Mounted recommended circuit	1750 to 1785			—	0.85		—	1.05	dB	
	1845 to 1880			—	0.86		—	1.07	dB	
VSWR	1750 to 1785			—	1.5		—	1.5	—	UMTS1.7G Port
				—	1.5		—	1.5	—	Ant2, Ext Port
	1845 to 1880			—	1.5		—	1.5	—	UMTS1.7G Port
				—	1.5		—	1.5	—	Ant2, Ext Port
SW isolation	1750 to 1785		16	—		16	—		dB	When UMTS1.7G - Ant1 measurement
			—	—	—	16	—		dB	When UMTS1.7G - Ant2 measurement
			16	—		—	—	—	dB	When UMTS1.7G - Ext measurement
	1845 to 1880		16	—		16	—		dB	When UMTS1.7G - Ant1 measurement
			—	—	—	16	—		dB	When UMTS1.7G - Ant2 measurement
			16	—		—	—	—	dB	When UMTS1.7G - Ext measurement
In-Rx band spurious	1845 to 1880			—	-125		—	-125	dBm	
Harmonics	3500 to 3570			—	-44		—	-44	dBm	
	5250 to 5355			—	-44		—	-44	dBm	
	7000 to 7140			—	-44		—	-44	dBm	
ACLR	1750 to 1785	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	1750 to 1785	±10MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 95			—	-103		—	-97	dBm	PTx = 21dBm Pblock = -15dBm * The IMD characteristics are design guaranteed.
	fblock = 3625			—	-103		—	-103	dBm	
IMD3 * Mounted recommended circuit	fblock = 1670			—	-98		—	-97	dBm	
	fblock = 5390			—	-103		—	-103	dBm	

**UMTS2G**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 26dBm)

Item	Freq [MHz]	UMTS2G - Ant2			UMTS2G - Ext			Unit	Conditions	
		Min.	Typ.	Max.	Min.	Typ.	Max.			
Insertion loss * Non-mounted recommended circuit	1920 to 1980		—	0.77		—	1.01	dB		
	2110 to 2170		—	0.83		—	1.10	dB		
Insertion loss * Mounted recommended circuit	1920 to 1980		—	0.82		—	1.06	dB		
	2110 to 2170		—	0.88		—	1.15	dB		
VSWR	1920 to 1980		—	1.5		—	1.5	—	UMTS2G Port	
			—	1.5		—	1.5	—	Ant2, Ext Port	
	2110 to 2170		—	1.5		—	1.5	—	UMTS2G Port	
			—	1.5		—	1.5	—	Ant2, Ext Port	
SW isolation	1920 to 1980	16	—		16	—		dB	When UMTS2G - Ant1 measurement	
		—	—	—	16	—		dB	When UMTS2G - Ant2 measurement	
		16	—		—	—	—	dB	When UMTS2G - Ext measurement	
	2110 to 2170	16	—		16	—		dB	When UMTS2G - Ant1 measurement	
		—	—	—	16	—		dB	When UMTS2G - Ant2 measurement	
		16	—		—	—	—	dB	When UMTS2G - Ext measurement	
Isolation Tx ⇒ Rx	1920 to 1980	22	—		22	—		dB	When UMTS2G ⇒ GSM1900Rx	
In-Rx band spurious	2110 to 2170		—	-125		—	-125	dBm		
Harmonics	3840 to 3960		—	-44		—	-44	dBm		
	5760 to 5940		—	-44		—	-44	dBm		
	7680 to 7920		—	-44		—	-44	dBm		
ACLR	1920 to 1980	±5MHz		—	-50		—	-50	dBc	RBW = 30kHz, Channel power measurement (Bandwidth 3.84MHz)
	1920 to 1980	±10MHz		—	-55		—	-55	dBc	
IMD2 * Mounted recommended circuit	fblock = 190			—	-99		—	-95	dBm	PTx = 21dBm Pblock = -15dBm * The IMD characteristics are design guaranteed.
	fblock = 4090			—	-103		—	-103	dBm	
IMD3 * Mounted recommended circuit	fblock = 1760			—	-97		—	-95	dBm	
	fblock = 6040			—	-104		—	-104	dBm	

**GSM Tx1**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 35dBm)

Item	Freq [MHz]	GSM Tx1 - Ant1			GSM Tx1 - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	824 to 915		—	0.60		—	0.70	dB	
Insertion loss * Mounted recommended circuit	824 to 915		—	0.67		—	0.92	dB	
VSWR	824 to 915		—	1.5		—	1.5	—	GSM Tx1 Port
			—	1.5		—	1.5	—	Ant1, Ext Port
SW isolation	824 to 915	—	—	—	25	—		dB	When GSM Tx1 - Ant1 measurement
		25	—		25	—		dB	When GSM Tx1 - Ant2 measurement
		22	—		—	—	—	dB	When GSM Tx1 - Ext measurement
Isolation Tx ⇒ Rx	824 to 915	31	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM850Rx
		31	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM900Rx
		31	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM1800Rx
		31	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ GSM1900Rx
		31	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS800M
		30	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS1.5G
		31	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS1.7G
		29	—		31	—		dB	Tx1 when selecting Tx1 - Ant1 and Tx1-Ext ⇒ UMTS2G
Isolation Tx ⇒ Ant	824 to 849	25	—		—	—		dB	Tx1 when selecting Ant1 - GSM850Rx ⇒ Ant1
		—	—		25	—		dB	Tx1 when selecting Ant1 - GSM850Rx ⇒ Ext
	880 to 915	25	—		—	—		dB	Tx1 when selecting Ant1 - GSM900Rx ⇒ Ant1
		—	—		25	—		dB	Tx1 when selecting Ant1 - GSM900Rx ⇒ Ext

**GSM Tx1**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 35dBm)

Item	Freq [MHz]		GSM Tx1 - Ant1			GSM Tx1 - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Harmonics	1648 to 1830	2Tx		—	-33		—	-33	dBm	
	2472 to 2745	3Tx		—	-30		—	-30	dBm	
	3296 to 3660	4Tx		—	-36		—	-36	dBm	
	4120 to 4575	5Tx		—	-42		—	-42	dBm	
	4944 to 5490	6Tx		—	-46		—	-46	dBm	
	5768 to 6405	7Tx		—	-46		—	-46	dBm	
	6592 to 7320	8Tx		—	-46		—	-46	dBm	
	7416 to 8235	9Tx		—	-46		—	-46	dBm	
	8240 to 9150	10Tx		—	-46		—	-46	dBm	
	9064 to 10065	11Tx		—	-46		—	-46	dBm	
	9888 to 10980	12Tx		—	-46		—	-46	dBm	
	10712 to 11895	13Tx		—	-46		—	-46	dBm	
	11536 to 12810	14Tx		—	-46		—	-46	dBm	
	12360 to 13725	15Tx		—	-46		—	-46	dBm	

**GSM Tx2**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 32dBm)

Item	Freq [MHz]	GSM Tx2 - Ant2			GSM Tx2 - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1710 to 1785		—	0.70		—	0.82	dB	
	1850 to 1910		—	0.75		—	0.87	dB	
Insertion loss * Mounted recommended circuit	1710 to 1785		—	0.75		—	0.87	dB	
	1850 to 1910		—	0.80		—	0.92	dB	
VSWR	1710 to 1785		—	1.5		—	1.5	—	GSM Tx2 Port
			—	1.5		—	1.5	—	Ant2, Ext Port
	1850 to 1910		—	1.5		—	1.5	—	GSM Tx2 Port
			—	1.5		—	1.5	—	Ant2, Ext Port
SW isolation	1710 to 1785	22	—		22	—		dB	When GSM Tx2 - Ant1 measurement
		—	—	—	22	—		dB	When GSM Tx2 - Ant2 measurement
		17	—		—	—	—	dB	When GSM Tx2 - Ext measurement
	1850 to 1910	22	—		22	—		dB	When GSM Tx2 - Ant1 measurement
		—	—	—	22	—		dB	When GSM Tx2 - Ant2 measurement
		17	—		—	—	—	dB	When GSM Tx2 - Ext measurement
Isolation Tx ⇒ Rx	1710 to 1910	28	—		28	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM850Rx
		28	—		28	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM900Rx
		28	—		28	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM1800Rx
		28	—		28	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ GSM1900Rx
		23	—		23	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS800M
		23	—		23	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS1.5G
		28	—		28	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS1.7G
		23	—		23	—		dB	Tx2 when selecting Tx2 - Ant2 and Tx2-Ext ⇒ UMTS2G
Isolation Tx ⇒ Ant	1710 to 1785	22	—		—	—	—	dB	Tx2 when selecting Ant2 - GSM1800Rx ⇒ Ant2
		—	—	—	19	—		dB	Tx2 when selecting Ext - GSM1800Rx ⇒ Ext
	1850 to 1910	22	—		—	—	—	dB	Tx2 when selecting Ant2 - GSM1900Rx ⇒ Ant2
		—	—	—	19	—		dB	Tx2 when selecting Ext - GSM1900Rx ⇒ Ext

**GSM Tx2**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, P<sub>in</sub> = 32dBm)

Item	Freq [MHz]		GSM Tx2 - Ant2			GSM Tx2 - Ext			Unit	Conditions
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Harmonics	3420 to 3570	2Tx		—	-39		—	-39	dBm	
	3700 to 3820			—	-39		—	-39	dBm	
	5130 to 5355	3Tx		—	-39		—	-37	dBm	
	5550 to 5730			—	-39		—	-36	dBm	
	6840 to 7140	4Tx		—	-42		—	-42	dBm	
	7400 to 7640			—	-42		—	-42	dBm	
	8550 to 8925	5Tx		—	-45		—	-45	dBm	
	9250 to 9550			—	-45		—	-45	dBm	
	10260 to 10710	6Tx		—	-45		—	-45	dBm	
	11100 to 11460			—	-45		—	-45	dBm	
	11970 to 12495	7Tx		—	-45		—	-45	dBm	



**GSM850Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, P<sub>in</sub> = 0dBm)

Item	Freq [MHz]	GSM850Rx – Ant1			GSM850Rx – Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	869 to 894		—	1.13		—	1.17	dB	
Insertion loss * Mounted recommended circuit	869 to 894		—	1.18		—	1.30	dB	
VSWR	869 to 894		—	1.5		—	1.5	—	GSM850Rx Port
			—	1.5		—	1.5	—	Ant1, Ext Port

**GSM900Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, P<sub>in</sub> = 0dBm)

Item	Freq [MHz]	GSM900Rx - Ant1			GSM900Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	925 to 960		—	1.14		—	1.19	dB	
Insertion loss * Mounted recommended circuit	925 to 960		—	1.19		—	1.35	dB	
VSWR	925 to 960		—	1.5		—	1.5	—	GSM900Rx Port
			—	1.5		—	1.5	—	Ant1, Ext Port

**GSM1800Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 0dBm)

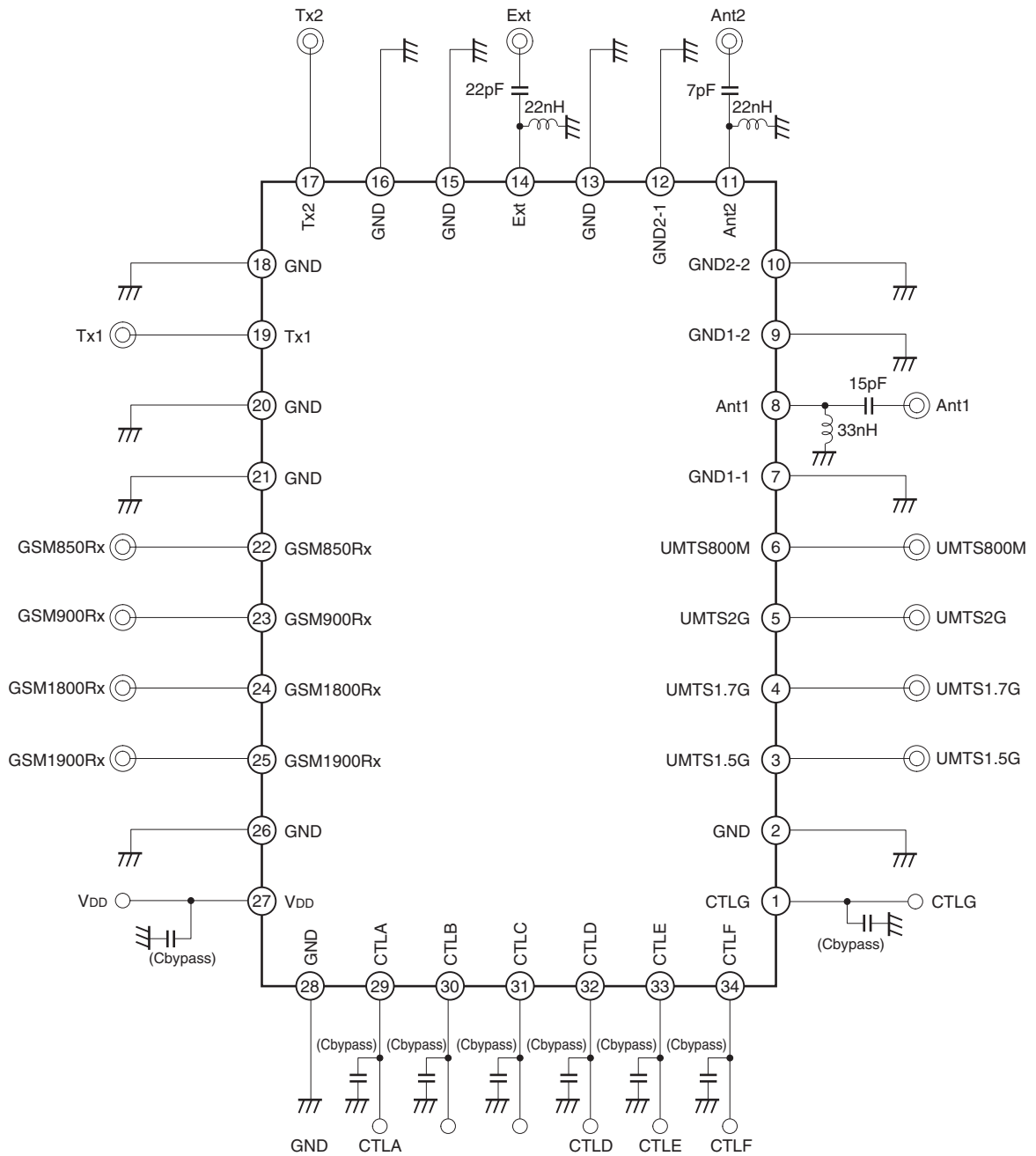
Item	Freq [MHz]	GSM1800Rx - Ant2			GSM1800Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1805 to 1880		—	1.18		—	1.45	dB	
Insertion loss * Mounted recommended circuit	1805 to 1880		—	1.23		—	1.48	dB	
VSWR	1805 to 1880		—	1.5		—	1.5	—	GSM1800Rx Port
			—	1.5		—	1.5	—	Ant2, Ext Port

**GSM1900Rx**

(V<sub>DD</sub> = 2.9V, V<sub>ctl</sub> = 0/2.9V, Pin = 0dBm)

Item	Freq [MHz]	GSM1900Rx - Ant2			GSM1900Rx - Ext			Unit	Conditions
		Min.	Typ.	Max.	Min.	Typ.	Max.		
Insertion loss * Non-mounted recommended circuit	1930 to 1990		—	1.20		—	1.46	dB	
Insertion loss * Mounted recommended circuit	1930 to 1990		—	1.25		—	1.49	dB	
VSWR	1930 to 1990		—	1.7		—	1.5	—	GSM1900Rx Port
			—	1.7		—	1.7	—	Ant2, Ext Port

Recommended Circuit



\*1 When the DC level of the connected device is GND or open, no DC blocking capacitors are required.

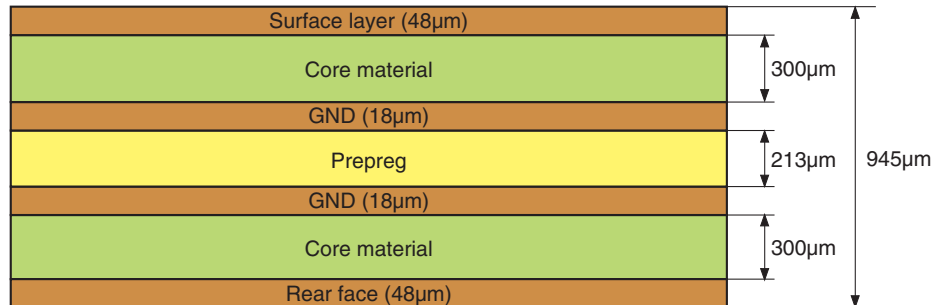
\*2 The DC level of each RF pin is GND.

\*3 Cbypass: This capacitor is used for DC line bypass (100pF is recommended.)

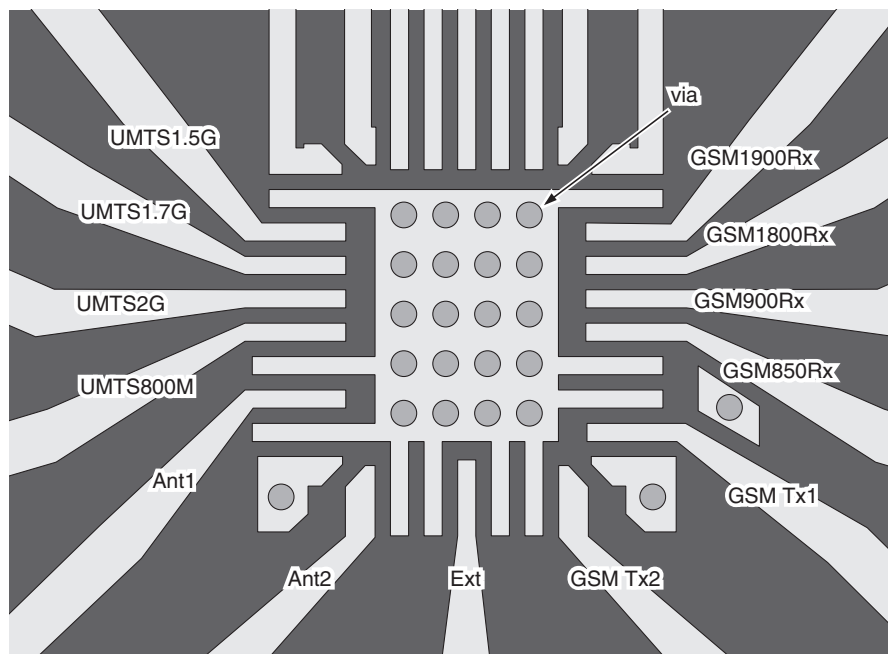
**Evaluation Board**

The board as shown below is used for the CXM3524ER characteristics measurement.

**<Layer structure>**

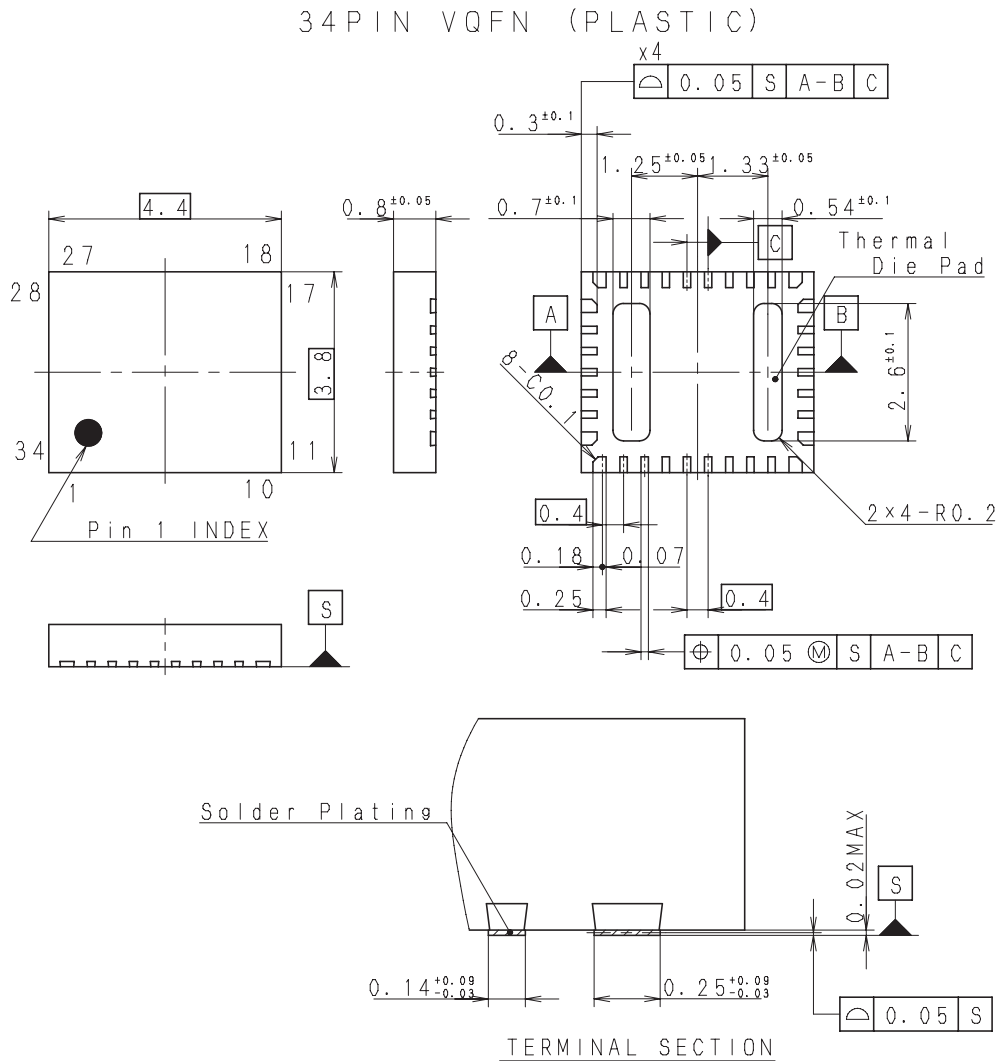


**<Surface layer pattern (Device-mounted area)>**



Package Outline

(Unit: mm)



Note: Cutting burr of lead are 0.05mm MAX.

SONY CODE	VQFN-34P-01
JEITA CODE	—
JEDEC CODE	—

AP-4000-34001S Rev. 0

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
TERMINAL TREATMENT	SOLDER PLATING
TERMINAL MATERIAL	COPPER ALLOY
PACKAGE MASS	0.04g

LEAD PLATING SPECIFICATIONS

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