SONY

DP10T Antenna Switch for GSM/UMTS/LTE Multi-mode Phone

Preliminary

CXM3548XR

Description

The CXM3548XR is a DP10T antenna switch module for GSM /UMTS/LTE multi-mode handset.
The CXM3548XR has a CMOS SPI interface decoder.
The Sony GaAs junction gate pHEMT (JPHEMT) MMIC process is used for low insertion loss and high linearity.
(Application: GSM/UMTS/LTE multi-mode handset SPI interface)

Features

- ◆ Low insertion loss: 0.7 dB (Typ.) TRx (Band 1)
  0.9 dB (Typ.) TRx (Band 7)
  * including recommended circuit
- ◆ Low voltage operation: V_{DD} = 2.5 V
- ◆ SPI interface
- ◆ No DC blocking capacitors
- ◆ Small package size: XQFN-26P (3.3 mm × 3.1 mm × 0.35 mm Typ.)
- ◆ Lead-free and RoHS compliant

Structure

- ◆ GaAs junction-gate PHEMT (JPHEMT) MMIC switch, CMOS decoder

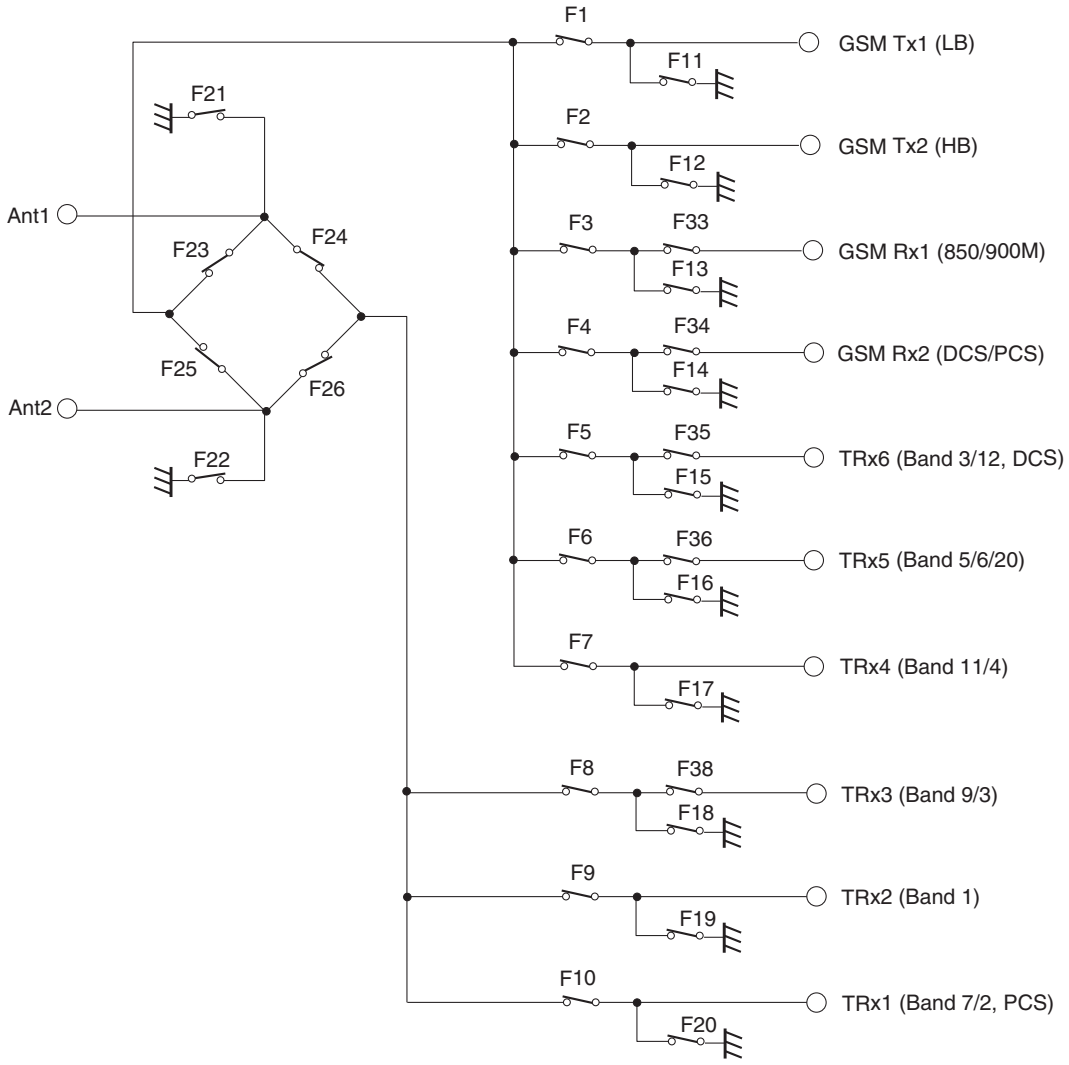
Note on Handling
GaAs MMIC's are ESD sensitive devices. Special handling precautions are required.

Absolute Maximum Ratings

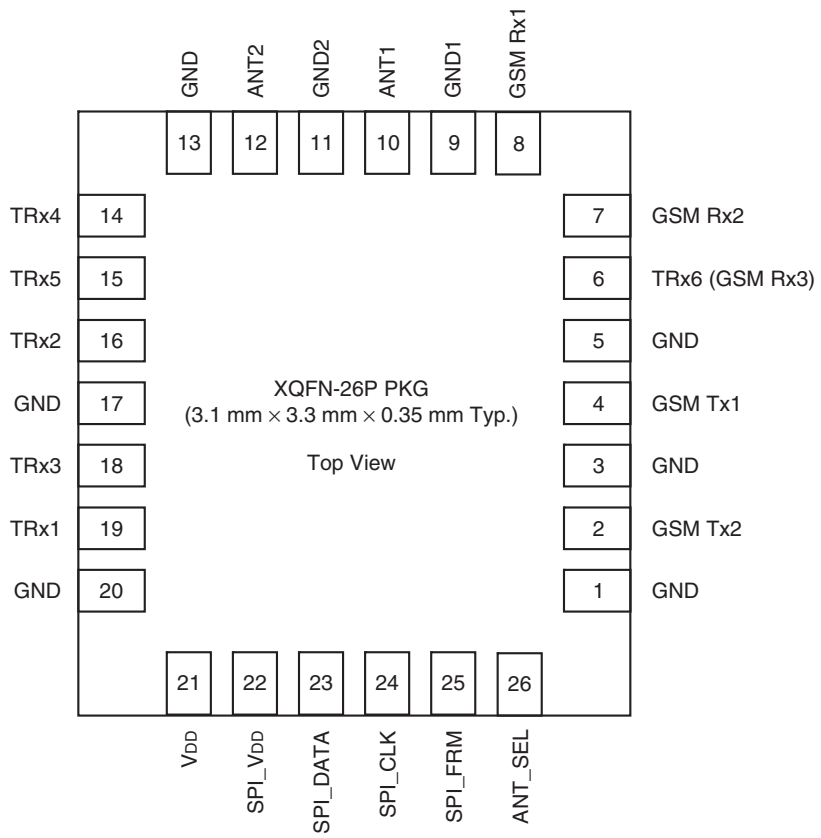
(Ta = 25 ℃)

Bias voltage	V_{DD}	4	V
SPI bias voltage	SPI_V_{DD}	3.5	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. (TRx1, 2, 3, 4, 5, 6)		32	dBm
Input power max. (Rx1, 2)		13	dBm
Operating temperature		–35 to +90	℃
Storage temperature		–65 to +150	℃

Block Diagram



Pin Configuration

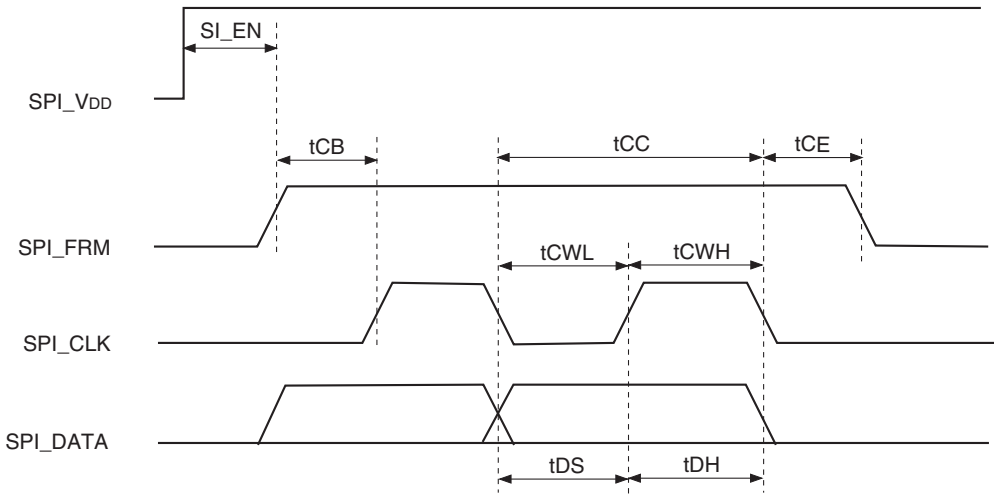


DC Bias Condition

Item	Min.	Typ.	Max.	Unit
V_{DD}	2.5	2.9	3.3	V
SPI_V_{DD}	1.62	1.8	1.98	V
SPI_Vctl (H)	SPI_V_{DD} × 0.7	—	SPI_V_{DD} + 0.3	V
SPI_Vctl (L)	–0.3	—	SPI_V_{DD} × 0.3	V

SPI Timing Characteristic

Item	Symbol	Condition	SPEC			Unit
			Min.	Min.	Min.	
SPI bias current	SPI_I_{DD}	SPI_V_{DD} = 1.8 V	—	200	400	μA
SPI Ctrl current	SPI_Ictl	SPI_V_{DD} = 1.8 V	—	—	10	μA
SPI_Enable	SPI_EN	SPI_V_{DD} ↑ (90 %) to SPI_FRM ↑	10	—	—	μs
Clock freaquency	CLK_Freq	SPI_V_{DD} Enable	—	26	—	MHz
Clock cycle	tCC	CLK_Ereq = 26 MHz	34	38.4	42	ns
Clock begin time	tCB		tCC/2	—	—	ns
Clock end time	tCE		tCC/2	—	—	ns
Clock width High	tCWH		tCC × 0.4	—	—	ns
Clock width Low	tCWL		tCC × 0.4	—	—	ns
Data setup time	tDS		5	—	—	ns
Data hold time	tDH		5	—	—	ns



SPI Control Specification

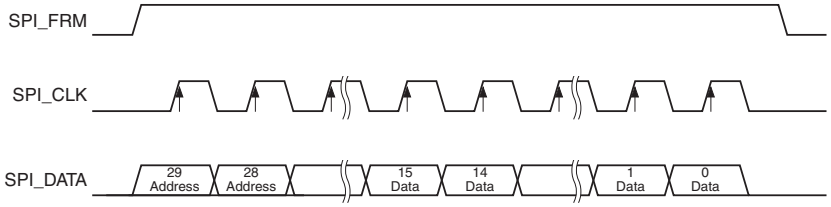
Item	Specification
Address bits	14 bits
Data bits	16 bits
Total bits	30 bits total
Clock edge (data sampling)	Rising edge

Address		Control Data	
29	16	15	0
MSB			LSB

29	28	27	26	25	24	23	22	21	20	19	18	17	16
R/W	Address1			Address2					Address3				
0	0	0	1	0	1	0	0	1	0	0	0	0	0

Port symbol	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	GSM/ UMTS	GSM_ ANT	GSM_ BS1	GSM_ BS2	UMTS _BS1	UMTS _BS2	UMTS _BS3	ANTS_ SEL_SPI	Not Used							
GSM _Tx1	1	1	X	1	X	X	X	X	X	X	X	X	X	X	X	X
GSM _Tx2	1	0	X	1	X	X	X	X	X	X	X	X	X	X	X	X
GSM _Rx1	1	1	1	0	X	X	X	X	X	X	X	X	X	X	X	X
GSM _Rx2	1	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X
TRx6 (GSM_Rx3)	0	X	X	X	0	1	1	X	X	X	X	X	X	X	X	X
TRx5	0	X	X	X	0	1	0	X	X	X	X	X	X	X	X	X
TRx4	0	X	X	X	1	0	0	X	X	X	X	X	X	X	X	X
TRx3	0	X	X	X	1	1	0	X	X	X	X	X	X	X	X	X
TRx2	0	X	X	X	0	0	0	X	X	X	X	X	X	X	X	X
TRx1	0	X	X	X	0	0	1	X	X	X	X	X	X	X	X	X

Port symbol	Bit 8	Pin 26	Active port
	ANT_SEL_SPI	ANT_SEL	
ANT 1/2	1 (H)	H	ANT1
	0 (L)	H	ANT2
	1 (H)	L	ANT2
	0 (L)	L	ANT2



Electrical Characteristics 1 (Ta = 25 ˚C)

DC characteristic

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ˚C)

Item	Condition	Min.	Typ.	Max.	Unit
Bias current	V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V	—	270	500	μA
SPI bias current	SPI_V_{DD} = 1.8 V, signal input	—	200	400	μA
	SPI_V_{DD} = 1.8 V, No signal	—	3.0	10	μA
Ctrl current	V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Vctrl = H	—	0.01	10	μA
Wake-up time		—	—	100	μs
Switching time		—	3	5	μs

TRx1 (Band 7, 2)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ˚C, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx1	Band 7	2500-2570	—	0.88	1.08	—	0.90	1.10	dB
			2620-2690	—	0.95	1.15	—	1.00	1.20	
		Band 2	1850-1910	—	0.69	0.84	—	0.69	0.84	dB
			1930-1990	—	0.70	0.85	—	0.70	0.85	
VSWR	ANT-TRx1	RF Port	1850-2690	—	1.35	1.6	—	1.3	1.5	—
		ANT Port	1850-2690	—	1.35	1.6	—	1.3	1.5	
SW isolation	ANT-TRx1	Path: Non Active ANT-TRx1	2500-2690	16	22	—	16	22	—	dB
			1850-1990	16	26	—	16	27	—	
Isolation	ANT-TRx1	Meas. Port: TRx1-Rx2	1850-1910	22	49	—	22	60	—	dB
Rx band sprious	ANT-TRx1		1930-1990, 2620-2690	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx1	Band 7, Band 2	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx1	±5 MHz	1850-1910, 2500-2570	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1850-1910, 2500-2570	—	—	–55	—	—	–55	
IMD2	ANT-TRx1	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 7_Rx Band	Pjam = 120	—	–110	–105	—	–109	–104	dBm
			Pjam = 5190	—	–117	–105	—	–116	–105	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 2_Rx Band	Pjam = 80	—	–113	–105	—	–111	–105	dBm
			Pjam = 3840	—	–114	–105	—	–114	–105	
IMD3	ANT-TRx1	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 7_Rx Band	Pjam = 2415	—	–110	–105	—	–110	–105	dBm
			Pjam = 7725	—	–115	–105	—	–108	–103	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 2_Rx Band	Pjam = 1800	—	–110	–105	—	–110	–105	dBm
			Pjam = 5720	—	–117	–105	—	–110	–105	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx2 (Band 1)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx2	Band 1	1920-1980	—	0.67	0.82	—	0.69	0.84	dB
			2110-2170	—	0.70	0.85	—	0.72	0.87	
VSWR	ANT-TRx2	RF Port	1920-2170	—	1.1	1.5	—	1.1	1.5	—
		ANT Port	1920-2170	—	1.1	1.5	—	1.1	1.5	
SW isolation	ANT-TRx2	Path: Non Active ANT-TRx2	1920-2170	16	24	—	16	23	—	dB
Isolation	ANT-TRx2	Meas. Port: TRx2-TRx1	1920-1980	22	29	—	22	29	—	dB
		Meas. Port: TRx2-Rx2	1920-1980	22	50	—	22	60	—	
Rx band sprious	ANT-TRx2		2110-2170	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx2	Band 1	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx2	±5 MHz	1920-1980	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1920-1980	—	—	–55	—	—	–55	
IMD2	ANT-TRx2	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 1 Rx_Band	Pjam = 190	—	–110	–105	—	–108	–103	dBm
			Pjam = 4090	—	–115	–105	—	–110	–105	
IMD3	ANT-TRx2	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 1 Rx_Band	Pjam = 1760	—	–111	–105	—	–111	–105	dBm
			Pjam = 6040	—	–115	–105	—	–113	–105	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx3 (Band 9, 3)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx3	Band 9	1750-1785	—	0.74	0.89	—	0.74	0.89	dB
			1845-1880	—	0.75	0.90	—	0.75	0.90	
		Band 3	1710-1785	—	0.74	0.89	—	0.74	0.89	dB
			1805-1880	—	0.75	0.90	—	0.75	0.90	
VSWR	ANT-TRx3	RF Port	1710-1880	—	1.1	1.5	—	1.1	1.5	—
		ANT Port	1710-1880	—	1.2	1.5	—	1.2	1.5	
SW isolation	ANT-TRx3	Path: Non Active ANT-TRx3	1710-1880	20	26	—	22	27	—	dB
Rx band sprious	ANT-TRx3		1805-1880	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx3	Band 9, Band 3	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx3	±5 MHz	1710-1785	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1710-1785	—	—	–55	—	—	–55	
IMD2	ANT-TRx3	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 9, 3 Rx_Band	Pjam = 95	—	–115	–106	—	–114	–106	dBm
			Pjam = 3625	—	–114	–106	—	–113	–106	
IMD3	ANT-TRx3	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 9, 3 Rx_Band	Pjam = 1670	—	–110	–105	—	–110	–105	dBm
			Pjam = 5390	—	–113	–106	—	–111	–106	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx4 (Band 11, 4)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx4	Band 11	1428-1463	—	0.73	0.88	—	0.77	0.92	dB
			1476-1511	—	0.76	0.91	—	0.79	0.94	
		Band 4	1710-1755	—	0.85	1.00	—	0.90	1.05	dB
			2110-2155	—	1.05	1.20	—	1.20	1.35	
VSWR	ANT-TRx4	RF Port	1428-1511	—	1.2	1.5	—	1.2	1.5	—
			1710-2155	—	1.45	1.65	—	1.55	1.75	
		ANT Port	1428-1511	—	1.3	1.5	—	1.3	1.5	
			1710-2155	—	1.5	1.7	—	1.6	1.8	
SW isolation	ANT-TRx4	Path: Non Active ANT-TRx4	1428-1511	22	28	—	20	26	—	dB
			1710-2155	16	22	—	16	22	—	
Rx band sprious	ANT-TRx4		1476-1511, 2110-2155	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx4	Band 11, Band 4	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx4	±5 MHz	1428-1463, 1710-1755	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1428-1463, 1710-1755	—	—	–55	—	—	–55	
IMD2	ANT-TRx4	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 11 Rx_Band	Pjam = 48	—	–115	–106	—	–115	–106	dBm
			Pjam = 2924	—	–114	–106	—	–110	–105	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 4 Rx_Band	Pjam = 400	—	–103	–98	—	–101	–96	dBm
			Pjam = 3860	—	–110	–105	—	–107	–102	
IMD3	ANT-TRx4	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 11 Rx_Band	Pjam = 1390	—	–109	–104	—	–108	–103	dBm
			Pjam = 4362	—	–115	–106	—	–116	–106	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 4 Rx_Band	Pjam = 1330	—	–106	–101	—	–106	–101	dBm
			Pjam = 5590	—	–116	–105	—	–115	–105	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx5 (Band 5/6, 20)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx5	Band 5/6	824-849	—	0.73	0.88	—	0.73	0.88	dB
			869-894	—	0.73	0.88	—	0.74	0.89	
		Band 20	832-862	—	0.73	0.88	—	0.73	0.88	dB
			791-821	—	0.73	0.88	—	0.73	0.88	
VSWR	ANT-TRx5	RF Port	824-894	—	1.2	1.5	—	1.2	1.5	—
		ANT Port	824-894	—	1.2	1.5	—	1.2	1.5	
SW isolation	ANT-TRx5	Path: Non Active ANT-TRx5	791-894	22	39	—	22	39	—	dB
Rx band sprious	ANT-TRx5		869-894	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx5		2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx5	±5 MHz	824-849	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	824-849	—	—	–55	—	—	–55	
IMD2	ANT-TRx5	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 5/6 Rx_Band	Pjam = 45	—	–123	–108	—	–123	–108	dBm
			Pjam = 1715	—	–123	–109	—	–123	–109	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 20 Rx_Band	Pjam = 41	—	–123	–108	—	–123	–108	dBm
			Pjam = 1653	—	–123	–109	—	–123	–109	
IMD3	ANT-TRx5	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 5/6 Rx_Band	Pjam = 790	—	–108	–103	—	–108	–103	dBm
			Pjam = 2550	—	–112	–105	—	–112	–105	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 20 Rx_Band	Pjam = 888	—	–108	–103	—	–108	–103	dBm
			Pjam = 2500	—	–112	–105	—	–112	–105	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx6 (Band 3, 12)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx6	Band 3	1710-1785	—	0.95	1.10	—	0.86	1.01	dB
			1805-1880	—	1.01	1.16	—	0.92	1.07	
		Band 12	698-716	—	0.73	0.88	—	0.73	0.88	dB
			728-746	—	0.71	0.86	—	0.71	0.86	
VSWR	ANT-TRx6	RF Port	698-746, 1710-1880	—	1.35	1.6	—	1.25	1.5	—
		ANT Port	698-746, 1710-1880	—	1.45	1.65	—	1.3	1.55	
SW isolation	ANT-TRx6	Path: Non Active ANT-TRx6	698-746	22	43	—	22	50	—	dB
			1710-1880	16	25	—	16	29	—	
Rx band sprious	ANT-TRx6		728-746, 1805-1880	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx6	Band 3, Band 12	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx6	±5 MHz	698-716, 1710-1785	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	698-716, 1710-1785	—	—	–55	—	—	–55	
IMD2	ANT-TRx6	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 3 Rx_Band	Pjam = 95	—	–111	–106	—	–110	–105	dBm
			Pjam = 3625	—	–113	–106	—	–111	–106	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 12 Rx_Band	Pjam = 30	—	–120	–106	—	–120	–106	dBm
			Pjam = 1444	—	–115	–105	—	–115	–105	
IMD3	ANT-TRx6	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 3 Rx_Band	Pjam = 1670	—	–108	–103	—	–108	–103	dBm
			Pjam = 5390	—	–111	–106	—	–112	–106	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 12 Rx_Band	Pjam = 677	—	–108	–103	—	–108	–103	dBm
			Pjam = 2151	—	–107	–102	—	–107	–102	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Tx1 (LB)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 35 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Tx1		824-915	—	0.62	0.77	—	0.61	0.76	dB
	ANT-Tx1	RF Port	824-915	—	1.25	1.5	—	1.2	1.5	—
		ANT Port	824-915	—	1.25	1.5	—	1.2	1.5	
SW isolation	ANT-Tx1	Path: Non Active ANT-Tx1	824-915	25	39		25	44		dB
Isolation Tx-Rx	ANT-Tx1	Meas. Port: Tx1-Rx1	824-915	31	46	—	31	58	—	dB
		Meas. Port: Tx1-Rx2		31	53	—	31	52	—	
		Meas. Port: Tx1-TRx6		31	45	—	31	45	—	
		Meas. Port: Tx1-TRx1		31	49	—	31	50	—	
		Meas. Port: Tx1-TRx2		31	57	—	31	52	—	
		Meas. Port: Tx1-TRx3		31	50	—	31	51	—	
		Meas. Port: Tx1-TRx4		31	39	—	30	35	—	
		Meas. Port: Tx1-TRx5		31	56	—	31	50	—	
Isolation Tx-ANT	ANT-Rx1		824-915	25	42	—	25	42	—	dB
Harmonics	ANT-Tx1		1648-1830 (2Tx)	—	–47	–36	—	–47	–36	dBm/ 3 MHz
			2472-2745 (3Tx)	—	–40	–36	—	–40	–36	
			3296-3660 (4Tx)	—	—	–36	—	—	–36	
			4120-4575 (5Tx)	—	—	–42	—	—	–42	
			4944-5490 (6Tx)	—	—	–46	—	—	–46	
			5768-6405 (7Tx)	—	—	–46	—	—	–46	
			6592-7320 (8Tx)	—	—	–46	—	—	–46	
			7416-8235 (9Tx)	—	—	–46	—	—	–46	
			8240-9150 (10Tx)	—	—	–46	—	—	–46	
			9064-10065 (11Tx)	—	—	–46	—	—	–46	
			9888-10980 (12Tx)	—	—	–46	—	—	–46	
			10712-11895 (13Tx)	—	—	–46	—	—	–46	
			11536-12810 (14Tx)	—	—	–46	—	—	–46	
			12360-13725 (15Tx)	—	—	–46	—	—	–46	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Rx1 (850M/900M)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 0 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Rx1		869-894, 925-960	—	1.01	1.16	—	0.97	1.12	dB
VSWR	ANT-Rx1	RF Port	869-960	—	1.35	1.6	—	1.3	1.5	—
		ANT Port	869-960	—	1.35	1.6	—	1.3	1.5	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Tx2 (HB)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 32 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Tx2		1710-1785	—	0.91	1.06	—	0.80	0.95	dB
			1850-1910		0.94	1.09		0.82	0.97	
VSWR	ANT-TX2	RF Port	1710-1785, 1850-1910	—	1.45	1.6	—	1.25	1.5	—
		ANT Port	1710-1785, 1850-1910	—	1.5	1.65	—	1.25	1.5	
SW isolation	ANT-Tx2	Path: Non Active ANT-Tx2	1710-1910	21	25		21	25		dB
Isolation Tx-Rx	ANT-Tx2	Meas. Port: Tx2-Rx1	1710-1785, 1850-1910	28	42	—	28	51	—	dB
		Meas. Port: Tx2-Rx2		28	52	—	28	50	—	
		Meas. Port: Tx2-TRx6		28	41	—	28	40	—	
		Meas. Port: Tx2-TRx1		23	36	—	23	36	—	
		Meas. Port: Tx2-TRx2		23	45	—	23	43	—	
		Meas. Port: Tx2-TRx3		23	49	—	23	51	—	
		Meas. Port: Tx2-TRx4		23	30	—	23	29	—	
		Meas. Port: Tx2-TRx5		23	29	—	21	26	—	
Isolation Tx-ANT	ANT-Rx2		1710-1910	22	31	—	22	31	—	dB
Harmonics	ANT-Tx2		3420-3570 (2Tx)	—	–50	–39	—	–50	–39	dBm/ 3 MHz
			3700-3820 (2Tx)	—	–50	–39	—	–50	–39	
			5130-5355 (3Tx)	—	–49	–39	—	–49	–39	
			5550-5730 (3Tx)	—	–49	–39	—	–49	–39	
			6840-7140 (4Tx)	—	—	–42	—	—	–42	
			7400-7640 (4Tx)	—	—	–42	—	—	–42	
			8550-8925 (5Tx)	—	—	–45	—	—	–45	
			9250-9550 (5Tx)	—	—	–45	—	—	–45	
			10260-10710 (6Tx)	—	—	–45	—	—	–45	
			11100-11460 (6Tx)	—	—	–45	—	—	–45	
			11970-12495 (7Tx)	—	—	–45	—	—	–45	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Rx2 (DCS/PCS)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = 25 ℃, Pin = 0 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Rx2	DCS	1805-1880	—	1.40	1.55	—	1.28	1.43	dB
		PCS	1930-1990	—	1.48	1.63	—	1.35	1.50	
VSWR	ANT-Rx2	RF Port	1805-1990	—	1.45	1.65	—	1.4	1.6	—
		ANT Port	1805-1990	—	1.7	1.9	—	1.5	1.7	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

Electrical Characteristics 2 (Ta = –30 to +85 ˚C)

DC characteristic

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ˚C)

Item	Condition	Min.	Typ.	Max.	Unit
Bias current	V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V	—	300	600	μA
SPI bias current	SPI_V_{DD} = 1.8 V, signal input	—	220	450	μA
	SPI_V_{DD} = 1.8 V, No signal	—	3.0	10	μA
Ctrl current	V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Vctrl = H	—	0.01	10	μA
Wake-up time		—	—	100	μs
Switching time		—	—	5	μs

TRx1 (Band 7, 2)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ˚C, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx1	Band 7	2500-2570	—	—	1.18	—	—	1.20	dB
			2620-2690	—	—	1.25	—	—	1.30	
		Band 2	1850-1910	—	—	0.94	—	—	0.94	dB
			1930-1990	—	—	0.95	—	—	0.95	
VSWR	ANT-TRx1	RF Port	1850-2690	—	—	1.6	—	—	1.5	—
		ANT Port	1850-2690	—	—	1.6	—	—	1.5	
SW isolation	ANT-TRx1	Path: Non Active ANT-TRx1	2500-2690	16	—	—	16	—	—	dB
			1850-1990	16	—	—	16	—	—	
Isolation	ANT-TRx1	Meas. Port: TRx1-Rx2	1850-1910	22	—	—	22	—	—	dB
Rx band sprious	ANT-TRx1		1930-1990, 2620-2690	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx1	Band 7, Band 2	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx1	±5 MHz	1850-1910, 2500-2570	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1850-1910, 2500-2570	—	—	–55	—	—	–55	
IMD2	ANT-TRx1	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 7_Rx Band	Pjam = 120	—	—	–102	—	—	–101	dBm
			Pjam = 5190	—	—	–102	—	—	–102	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 2_Rx Band	Pjam = 80	—	—	–102	—	—	–102	dBm
			Pjam = 3840	—	—	–102	—	—	–102	
IMD3	ANT-TRx1	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 7_Rx Band	Pjam = 2415	—	—	–102	—	—	–102	dBm
			Pjam = 7725	—	—	–102	—	—	–100	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 2_Rx Band	Pjam = 1800	—	—	–102	—	—	–102	dBm
			Pjam = 5720	—	—	–102	—	—	–102	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx2 (Band 1)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx2	Band 1	1920-1980	—	—	0.92	—	—	0.94	dB
			2110-2170	—	—	0.95	—	—	0.97	
VSWR	ANT-TRx2	RF Port	1920-2170	—	—	1.5	—	—	1.5	—
		ANT Port	1920-2170	—	—	1.5	—	—	1.5	
SW isolation	ANT-TRx2	Path: Non Active ANT-TRx2	1920-2170	16	—		16	—		dB
Isolation	ANT-TRx2	Meas. Port: TRx2-TRx1	1920-1980	22	—	—	22	—	—	dB
		Meas. Port: TRx2-Rx2	1920-1980	22	—	—	22	—	—	
Rx band sprious	ANT-TRx2		2110-2170	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx2	Band 1	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx2	±5 MHz	1920-1980	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1920-1980	—	—	–55	—	—	–55	
IMD2	ANT-TRx2	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 1 Rx_Band	Pjam = 190	—	—	–102	—	—	–100	dBm
			Pjam = 4090	—	—	–102	—	—	–102	
IMD3	ANT-TRx2	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 1 Rx_Band	Pjam = 1760	—	—	–102	—	—	–102	dBm
			Pjam = 6040	—	—	–102	—	—	–102	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx3 (Band 9, 3)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx3	Band 9	1750-1785	—	—	0.99	—	—	0.99	dB
			1845-1880	—	—	1.00	—	—	1.00	
		Band 3	1710-1785	—	—	0.99	—	—	0.99	dB
			1805-1880	—	—	1.00	—	—	1.00	
VSWR	ANT-TRx3	RF Port	1710-1880	—	—	1.5	—	—	1.5	—
		ANT Port	1710-1880	—	—	1.5	—	—	1.5	
SW isolation	ANT-TRx3	Path: Non Active ANT-TRx3	1710-1880	20	—	—	22	—	—	dB
Rx band sprious	ANT-TRx3		1805-1880	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx3	Band 9, Band 3	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx3	±5 MHz	1710-1785	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1710-1785	—	—	–55	—	—	–55	
IMD2	ANT-TRx3	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 9, 3 Rx_Band	Pjam = 95	—	—	–103	—	—	–103	dBm
			Pjam = 3625	—	—	–103	—	—	–103	
IMD3	ANT-TRx3	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 9, 3 Rx_Band	Pjam = 1670	—	—	–102	—	—	–102	dBm
			Pjam = 5390	—	—	–103	—	—	–103	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx4 (Band 11, 4)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx4	Band 11	1428-1463	—	—	0.98	—	—	1.02	dB
			1476-1511	—	—	1.01	—	—	1.04	
		Band 4	1710-1755	—	—	1.10	—	—	1.15	dB
			2110-2155	—	—	1.30	—	—	1.45	
VSWR	ANT-TRx4	RF Port	1428-1511	—	—	1.5	—	—	1.5	—
			1710-2155	—	—	1.65	—	—	1.75	
		ANT Port	1428-1511	—	—	1.5	—	—	1.5	
			1710-2155	—	—	1.7	—	—	1.8	
SW isolation	ANT-TRx4	Path: Non Active ANT-TRx4	1428-1511	22	—	—	20	—	—	dB
			1710-2155	16	—	—	16	—	—	
Rx band sprious	ANT-TRx4		1476-1511, 2110-2155	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx4	Band 11, Band 4	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx4	±5 MHz	1428-1463, 1710-1755	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	1428-1463, 1710-1755	—	—	–55	—	—	–55	
IMD2	ANT-TRx4	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 11 Rx_Band	Pjam = 48	—	—	–103	—	—	–103	dBm
			Pjam = 2924	—	—	–103	—	—	–102	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 4 Rx_Band	Pjam = 400	—	—	–95	—	—	–93	dBm
			Pjam = 3860	—	—	–102	—	—	–99	
IMD3	ANT-TRx4	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 11 Rx_Band	Pjam = 1390	—	—	–101	—	—	–100	dBm
			Pjam = 4362	—	—	–103	—	—	–103	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 4 Rx_Band	Pjam = 1330	—	—	–98	—	—	–98	dBm
			Pjam = 5590	—	—	–102	—	—	–102	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx5 (Band 5/6, 20)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx5	Band 5/6	824-849	—	—	0.98	—	—	0.98	dB
			869-894	—	—	0.98	—	—	0.99	
		Band 20	832-862	—	—	0.98	—	—	0.98	dB
			791-821	—	—	0.98	—	—	0.98	
VSWR	ANT-TRx5	RF Port	824-894	—	—	1.5	—	—	1.5	—
		ANT Port	824-894	—	—	1.5	—	—	1.5	
SW isolation	ANT-TRx5	Path: Non Active ANT-TRx5	791-894	22	—	—	22	—	—	dB
Rx band sprious	ANT-TRx5		869-894	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx5		2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx5	±5 MHz	824-849	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	824-849	—	—	–55	—	—	–55	
IMD2	ANT-TRx5	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 5/6 Rx_Band	Pjam = 45	—	—	–105	—	—	–105	dBm
			Pjam = 1715	—	—	–106	—	—	–106	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 20 Rx_Band	Pjam = 41	—	—	–105	—	—	–105	dBm
			Pjam = 1653	—	—	–106	—	—	–106	
IMD3	ANT-TRx5	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 5/6 Rx_Band	Pjam = 790	—	—	–100	—	—	–100	dBm
			Pjam = 2550	—	—	–102	—	—	–102	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 20 Rx_Band	Pjam = 888	—	—	–100	—	—	–100	dBm
			Pjam = 2500	—	—	–102	—	—	–102	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

TRx6 (Band 3, 12)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃ , Pin = 26 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-TRx6	Band 3	1710-1785	—	—	1.20	—	—	1.11	dB
			1805-1880	—	—	1.26	—	—	1.17	
		Band 12	698-716	—	—	0.98	—	—	0.98	dB
			728-746	—	—	0.96	—	—	0.96	
VSWR	ANT-TRx6	RF Port	698-746, 1710-1880	—	—	1.6	—	—	1.5	—
		ANT Port	698-746, 1710-1880	—	—	1.65	—	—	1.55	
SW isolation	ANT-TRx6	Path: Non Active ANT-TRx6	698-746	22	—	—	22	—	—	dB
			1710-1880	16	—	—	16	—	—	
Rx band sprious	ANT-TRx6		728-746, 1805-1880	—	—	–125	—	—	–125	dBm
Harmonics	ANT-TRx6	Band 3, Band 12	2Tx	—	—	–44	—	—	–44	dBm/ 3.84 MHz
			3Tx	—	—	–44	—	—	–44	
			4Tx	—	—	–44	—	—	–44	
ACLR	ANT-TRx6	±5 MHz	698-716, 1710-1785	—	—	–50	—	—	–50	dBc/ 3.84 MHz
		±10 MHz	698-716, 1710-1785	—	—	–55	—	—	–55	
IMD2	ANT-TRx6	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 3 Rx_Band	Pjam = 95	—	—	–103	—	—	–102	dBm
			Pjam = 3625	—	—	–103	—	—	–103	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 12 Rx_Band	Pjam = 30	—	—	–103	—	—	–103	dBm
			Pjam = 1444	—	—	–102	—	—	–102	
IMD3	ANT-TRx6	Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 3 Rx_Band	Pjam = 1670	—	—	–100	—	—	–100	dBm
			Pjam = 5390	—	—	–103	—	—	–103	
		Ptx = 21.5 dBm, Pjam = –15 dBm Meas. = Band 12 Rx_Band	Pjam = 677	—	—	–100	—	—	–100	dBm
			Pjam = 2151	—	—	–99	—	—	–99	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Tx1 (LB)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 35 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Tx1		824-915	—	—	0.87	—	—	0.86	dB
	ANT-Tx1	RF Port	824-915	—	—	1.5	—	—	1.5	—
		ANT Port	824-915	—	—	1.5	—	—	1.5	
SW isolation	ANT-Tx1	Path: Non Active ANT-Tx1	824-915	25	—		25	—		dB
Isolation Tx-Rx	ANT-Tx1	Meas. Port: Tx1-Rx1	824-915	31	—	—	31	—	—	dB
		Meas. Port: Tx1-Rx2		31	—	—	31	—	—	
		Meas. Port: Tx1-TRx6		31	—	—	31	—	—	
		Meas. Port: Tx1-TRx1		31	—	—	31	—	—	
		Meas. Port: Tx1-TRx2		31	—	—	31	—	—	
		Meas. Port: Tx1-TRx3		31	—	—	31	—	—	
		Meas. Port: Tx1-TRx4		31	—	—	30	—	—	
		Meas. Port: Tx1-TRx5		31	—	—	31	—	—	
Isolation Tx-ANT	ANT-Rx1		824-915	25	—	—	25	—	—	dB
Harmonics	ANT-Tx1		1648-1830 (2Tx)	—	—	–36	—	—	–36	dBm/ 3 MHz
			2472-2745 (3Tx)	—	—	–36	—	—	–36	
			3296-3660 (4Tx)	—	—	–36	—	—	–36	
			4120-4575 (5Tx)	—	—	–42	—	—	–42	
			4944-5490 (6Tx)	—	—	–46	—	—	–46	
			5768-6405 (7Tx)	—	—	–46	—	—	–46	
			6592-7320 (8Tx)	—	—	–46	—	—	–46	
			7416-8235 (9Tx)	—	—	–46	—	—	–46	
			8240-9150 (10Tx)	—	—	–46	—	—	–46	
			9064-10065 (11Tx)	—	—	–46	—	—	–46	
			9888-10980 (12Tx)	—	—	–46	—	—	–46	
			10712-1189 (13Tx)	—	—	–46	—	—	–46	
			11536-12810 (14Tx)	—	—	–46	—	—	–46	
			12360-13725 (15Tx)	—	—	–46	—	—	–46	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Rx1 (850M/900M)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃ , Pin = 0 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Rx1		869-894, 925-960	—	—	1.26	—	—	1.22	dB
VSWR	ANT-Rx1	RF Port	869-960	—	—	1.6	—	—	1.5	—
		ANT Port	869-960	—	—	1.6	—	—	1.5	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

GSM Tx2 (HB)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 32 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Tx2		1710-1785	—	—	1.16	—	—	1.05	dB
			1850-1910	—	—	1.19	—	—	1.07	
VSWR	ANT-Tx2	RF Port	1710-1785, 1850-1910	—	—	1.6	—	—	1.5	—
		ANT Port	1710-1785, 1850-1910	—	—	1.65	—	—	1.5	
SW isolation	ANT-Tx2	Path: Non Active ANT-Tx2	1710-1910	21	—		21	—		dB
Isolation Tx-Rx	ANT-Tx2	Meas. Port: Tx2-Rx1	1710-1785, 1850-1910	28	—	—	28	—	—	dB
		Meas. Port: Tx2-Rx2		28	—	—	28	—	—	
		Meas. Port: Tx2-TRx6		28	—	—	28	—	—	
		Meas. Port: Tx2-TRx1		23	—	—	23	—	—	
		Meas. Port: Tx2-TRx2		23	—	—	23	—	—	
		Meas. Port: Tx2-TRx3		23	—	—	23	—	—	
		Meas. Port: Tx2-TRx4		23	—	—	23	—	—	
		Meas. Port: Tx2-TRx5		23	—	—	21	—	—	
Isolation Tx-ANT	ANT-Rx2		1710-1910	22	—	—	22	—	—	dB
Harmonics	ANT-Tx2		3420-3570 (2Tx)	—	—	–39	—	—	–39	dBm/ 3 MHz
			3700-3820 (2Tx)	—	—	–39	—	—	–39	
			5130-5355 (3Tx)	—	—	–39	—	—	–39	
			5550-5730 (3Tx)	—	—	–39	—	—	–39	
			6840-7140 (4Tx)	—	—	–42	—	—	–42	
			7400-7640 (4Tx)	—	—	–42	—	—	–42	
			8550-8925 (5Tx)	—	—	–45	—	—	–45	
			9250-9550 (5Tx)	—	—	–45	—	—	–45	
			10260-10710 (6Tx)	—	—	–45	—	—	–45	
			11100-11460 (6Tx)	—	—	–45	—	—	–45	
			11970-12495 (7Tx)	—	—	–45	—	—	–45	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

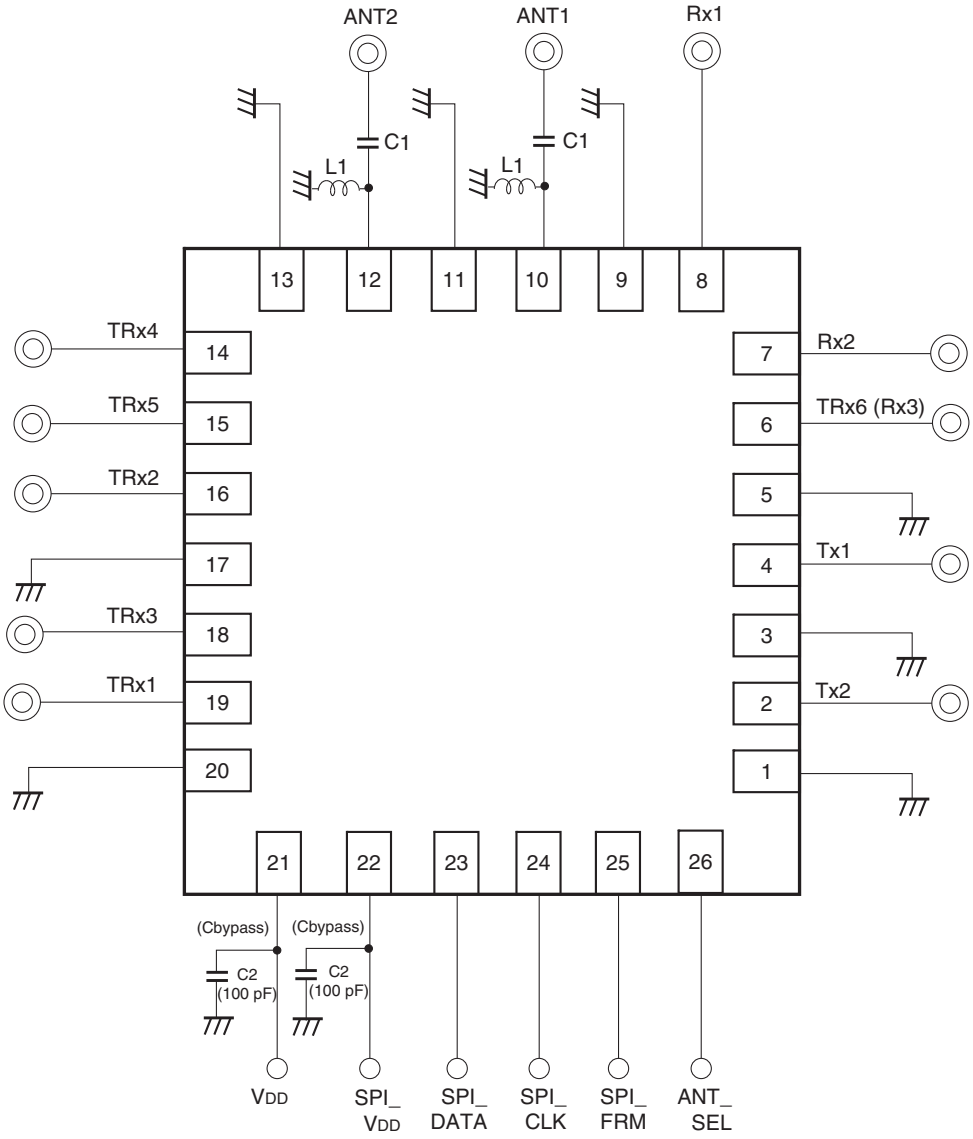
GSM Rx2 (DCS/PCS)

(V_{DD} = 2.9 V, SPI_V_{DD} = 1.8 V, Ta = –30 to +85 ℃, Pin = 0 dBm)

Item	State	Condition	Frequency [MHz]	ANT1			ANT2			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	
Insertion loss	ANT-Rx2	DCS	1805-1880	—	—	1.65	—	—	1.53	dB
		PCS	1930-1990	—	—	1.73	—	—	1.60	
VSWR	ANT-Rx2	RF Port	1805-1990	—	—	1.65	—	—	1.6	—
		ANT Port	1805-1990	—	—	1.9	—	—	1.7	

Electrical Characteristics are measured with recommended circuit and RF ports terminated in 50 Ω.

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 inductor (22 nH) and C1 capacitor (8.2 pF) are recommended on Ant port for ESD protection.
4. C2 capacitor (100 pF) is recommended.

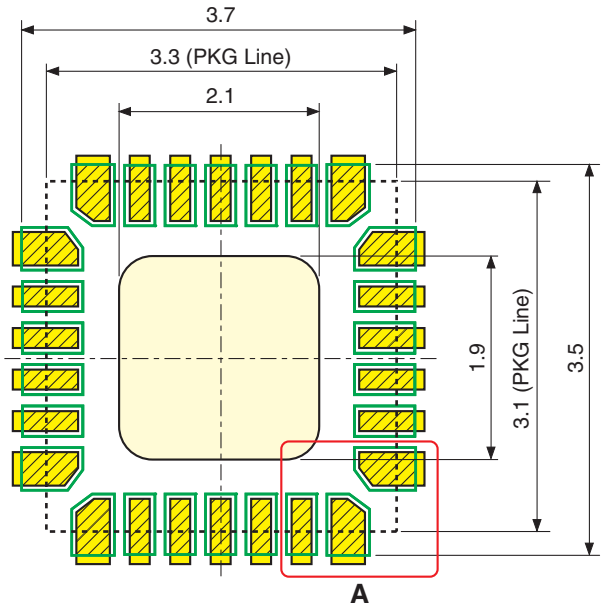
Recommended Land Pattern

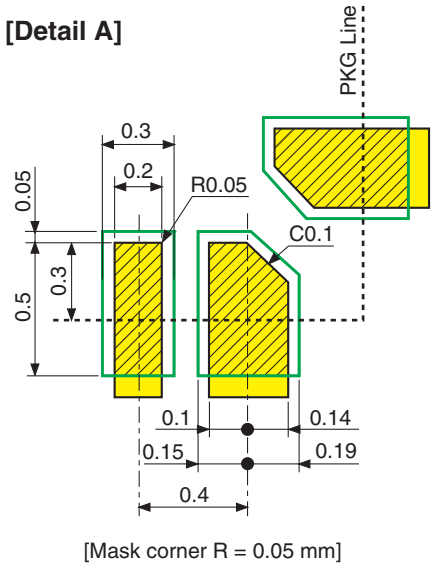
- PKG size: 3.3 mm × 3.1 mm
- Pin pitch: 0.4 mm

: Land
: Mask (Open Area)
: Resist (Open Area)
: Metal area in board (*1)

*1: GND plane is recommended

[Metal Mask Thickness: 110 µm]

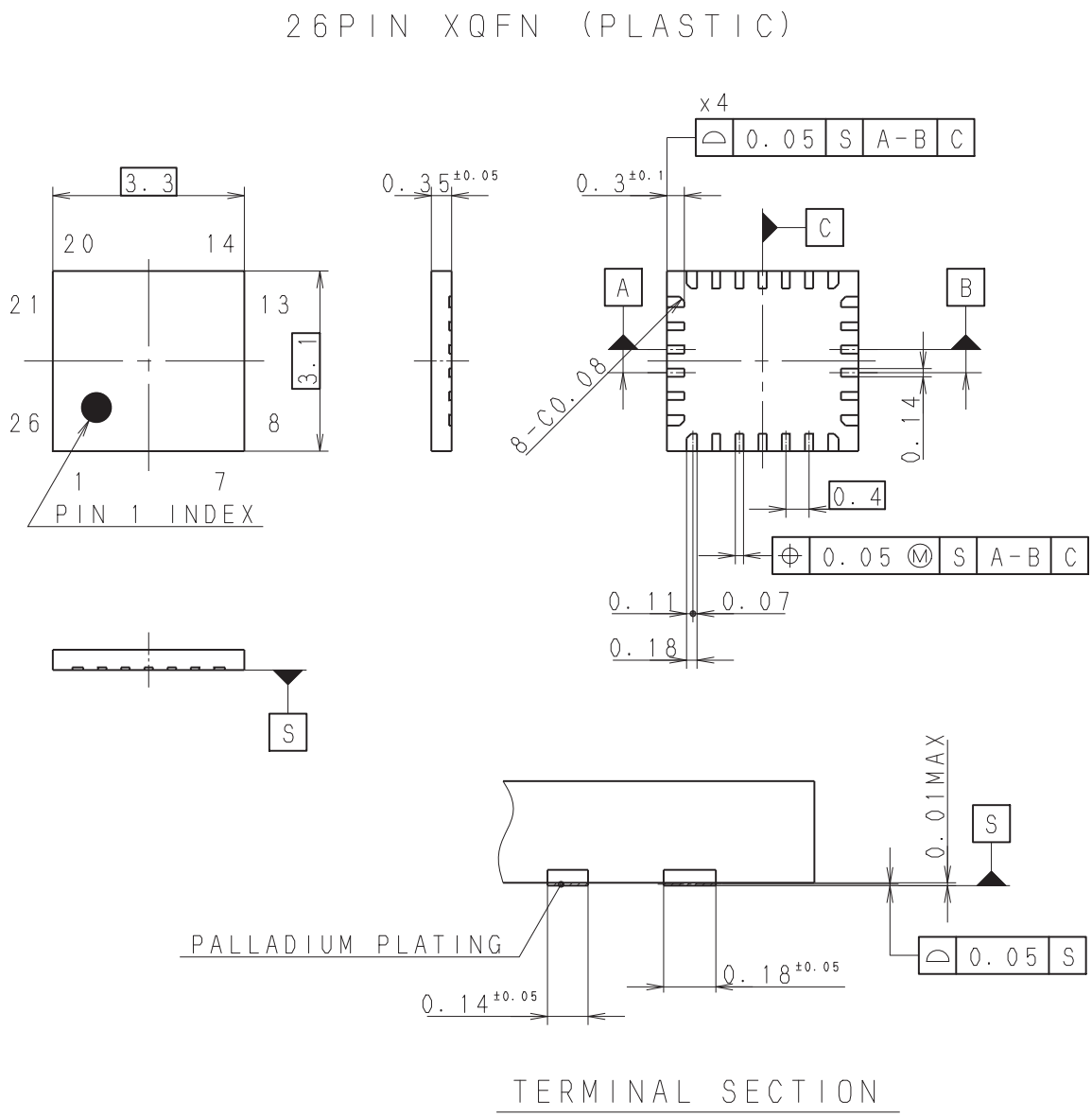




[Mask corner R = 0.05 mm]

Package Outline

(Unit: mm)



Note:Terminal burr height 0.05mm MAX.

SONY CODE	XQFN-26P-01
JEITA CODE	————
JEDEC CODE	————

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	PALLADIUM PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.009g

PART No. AP-4000-26010S	Rev. 1
ISSUED 10.10.27	REVISED 10.11.04
PRODUCTION LINE	COMPILING DIV. SONY SEMICONDUCTOR KYUSHU
REMARKS PKG CODE:XR-026-M	