IRIS411

IRIS411 QA

用户设备使用的LTE/WCDMA/TD-SCDMA/HSPA/EDGE/GPRS/GSM射频收发器

LTE/WCDMA/TD-SCDMA/HSPA/EDGE/GPRS/GSM Radio Frequency Transceiver for User Equipment QA

特征

Features QA

* 用于LTEI/E-UTRA FDD和TDD的单片射频收发器，具有17个RF输入和8个RF输出

A monolithic RF transceiver for LTEI/E-UTRA FDD and TDD with 17 RF inputs and 8 RF outputs QA

* 支持FDD频段的WCDMA/HSPA，HSDPA支持64-QAM，HSUPA支持16-QAM及以上

Support FDD band WCDMA/HSPA, HSDPA 64-QAM, HSUPA 16-QAM and above QA

* 支持TDD频段的TD-SCDMA/TD-HSPA，TD-HSDPA支持64-QAM，TD-HSUPA支持16-QAM及以上

TD-SCDMA/TD-HSPA in TDD band, 64-QAM in TD-HSDPA, 16-QAM and above in TD-HSUPA QA

* 支持四频段GSM、GRPS、和EDGE

Supporting four-band GSM, GRPS, and EDGE QA

* LTE FDD/WCDMA Rx和Tx路径不需要SAW滤波器

LTE FDD/WCDMA Rx and Tx paths do not require SAW filters QA

* LTE TDD/TD-SCDMA Rx和Tx路径不需要SAW滤波器

LTE TDD/TD-SCDMA Rx and Tx paths do not require SAW filters QA

* GSM/GPRS/EDGE Tx路径不需要SAW滤波器

GSM/GPRS/EDGE Tx path does not need SAW filter QA

* 支持高达39级的GPRS/EDGE和GGE PA爬坡

Support up to 39 GPRS/EDGE and GGE PA climbing QA

* 全集成频率合成，配有环路滤波器

Fully integrated frequency synthesis with loop filter QA

* 片内26MHz DCXO

In-chip 26MHz DCXO QA

* AFCDAC支持19.2、26、38.4或52MHz芯片外TCXO的AFC

AFCDAC supports AFC for 19.2, 26, 38.4, or 52 MHz off-chip TCXO QA

* 包括两个Rx ADC、Tx DAC、数字前端和辅助ADC

Including two Rx ADC, Tx DAC, digital front-end and auxiliary ADC QA

* 集成LDO线性稳压器

Integrated LDO Linear Regulator QA

* MIPI RFFE控制接口，12个GPO

MIPI RFFE control interface, 12 GPOs QA

* 串行外围设备控制接口

Serial peripheral device control interface QA

* 用于GGE的DigRF v1.12接口

DIRF v1.12 Interface for GGE QA

* DigRF v4控制和数据接口（LS、HS1x、两个Rx通道）

DigRF V4 control and data interface (LS, HS1x, two Rx channels) QA

应用

application QA

E-UTRA频段1-14、17-21、23-25、33-41中4G（E-UTRA）、3G（UTRA）和2G（GGE）用户设备，如移动电话和数据调制解调器。

E-UTRA band 1-14, 17-21, 23-25, 33-41 in 4G (E-UTRA), 3G (UTRA) and 2G (GGE) user equipment, such as mobile phones and data modems. QA

一般说明

General description QA

IR1S411是一款用于LTE/E-UTRA FDD/TDD应用（4G）的单片射频收发器。其还提供WCDMA/TD-SCDMA（3G）和GSM/GPRS/EDGE（2G）传统支持。

IR1S411 is a monolithic RF transceiver for LTE/E-UTRA FDD/TDD applications (4G). It also provides traditional support for WCDMA/TD-SCDMA (3G) and GSM/GPRS/EDGE (2G). QA

在4G和3G模式中，高灵敏度、低EVM和高线性度是接收器的显著特点之一，这些特点确保了QPSK、16-QAM和64-QAM的最佳性能，从而提高了智能手机和数据调制解调器日益增长的数据吞吐量。对于4G/3G TDD，IRIS411支持独特的SAW-less配置，以消除Rx SAW滤波器的成本和灵敏度损失。对于4G/3G FDD，IRIS411在接收路径中不需要级间SAW滤波器，这使得4G/3G 射频子系统具有前所未有的集成级别和较低的复杂性。

In 4G and 3G modes, high sensitivity, low EVM and high linearity are one of the significant features of the receiver. These features ensure the best performance of QPSK, 16-QAM and 64-QAM, thus improving the increasing data throughput of smartphones and data modems. For 4G/3G TDD, IRIS411 supports a unique SAW-less configuration to eliminate the cost and sensitivity loss of Rx SAW filters. For 4G/3G FDD, IRIS411 does not need an inter-stage SAW filter in the receiving path, which makes the 4G/3G RF subsystem unprecedented integration level and lower complexity. QA

该发射器提供低EVM以支持16-QAM以实现高吞吐量，并保持低杂散发射，以消除4G/3G发射器中常见的SAW滤波器的射频子系统。在GSM/EDGE模式下，该接收器具有低噪声、高线性等优点。该发射器提供高光谱纯度，再次使严格的杂散发射要求可以满足，无需级间SAW滤波器。

The transmitter provides low EVM to support 16-QAM for high throughput and maintains low spurious emission to eliminate the RF subsystem of SAW filters common in 4G/3G transmitters. In the mode of GSM/EDGE, the receiver has the advantages of low noise and high linearity. The transmitter provides hyperspectral purity, which again meets the stringent stray emission requirements without the need for interstage SAW filters. QA

IRIS411通过提供总共17个RF输入和8个RF输出，很好地满足了先进的多模式多频带射频子系统。将IRIS411置于复杂射频子系统的中心，可以实现非常紧凑的PCB封装，因为其与合成器、Rx ADC、Tx DAG、DCXO、LDO调节器、MIPI RFFE控制接口和高速DigRF v4控制和数据接口完全集成。

IRIS411 satisfies the advanced multi-mode multi-band RF subsystem by providing a total of 17 RF inputs and 8 RF outputs. Placing IRIS411 in the center of complex RF subsystem can achieve very compact PCB package, because it is fully integrated with synthesizer, Rx ADC, Tx DAG, DCXO, LDO regulator, MIPI RFFE control interface and high-speed DigRF V4 control and data interface. QA

订购信息

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 型号编号  Model number QA | 包装  VFBGA  Name QA  Thin fine spacing BGA, 169 balls, 7x7x1mm  describe QA    Packing QA  Catalog  IRIS411  IRIS411 | | | |
|  | | 名称 | 描述 | | |
| IRIS411 | | VFBGA  Structural drawing | | 薄型细间距BGA，169个球，7x7x1 mm  Figure 1: IRIS411 (power pin omitted)  Pin assignment | |

Name

PIN

目录

Explain

RXBLOW1

A1

Rx Input Low Frequency Band

RXBHI2

A2

Rx Input High Frequency FDD/TDD

RXBHI1

A3

Rx Input High Frequency FDD/TDD

RXAHI7

A4

Rx input high frequency TDD

RXAHI6

A5

Rx input high frequency TDD

RXALOW4

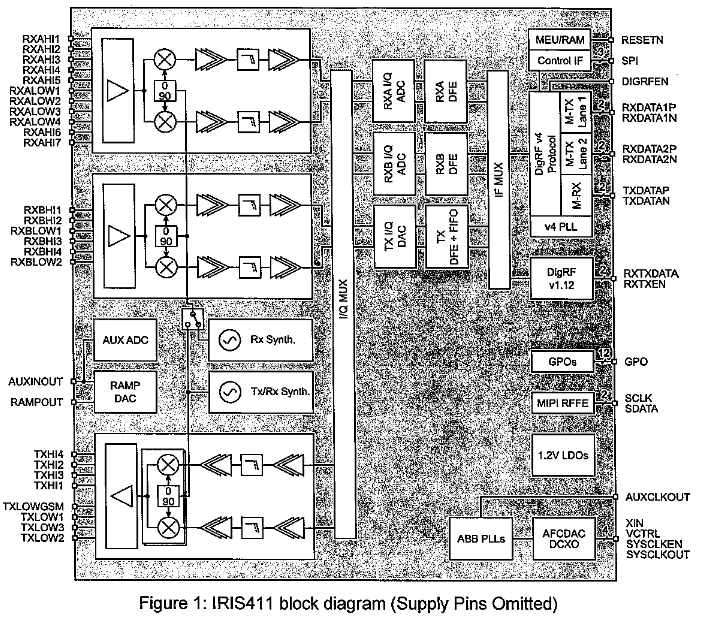
A6

Rx Input Low Frequency Band

# 结构图

# RXALOW3

A7



Rx Input Low Frequency Band

图1：IRIS411结构图（省略电源引脚）

RXALOW2

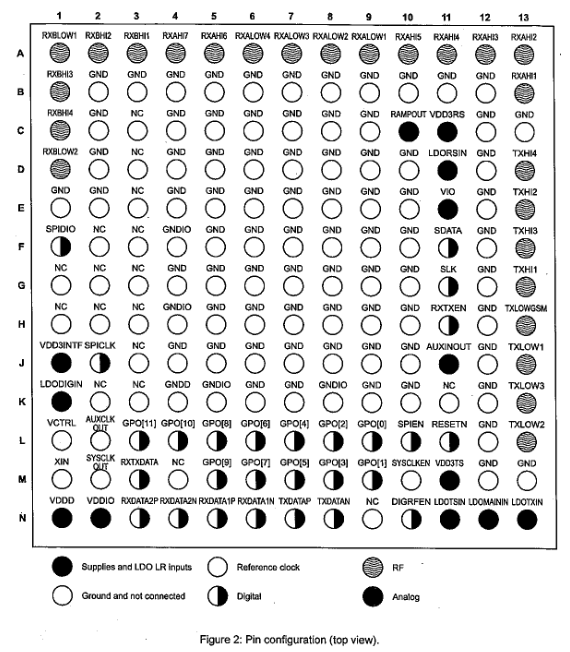
# 管脚分配

| 名称  Rx Input Low Frequency Band | PIN  RXALOW1 | 说明  A9 |
| --- | --- | --- |
| RXBLOW1  Rx Input Low Frequency Band | A1  RXAHI5 | Rx输入低频段  A10 |
| RXBHI2  Rx Input High Frequency FDD | A2  RXAHI4 | Rx输入高频段FDD/TDD  A11 |
| RXBHI1  Rx Input High Frequency FDD | A3  RXAHI3 | Rx输入高频段FDD/TDD  A12 |
| RXAHI7  Rx Input High Frequency FDD | A4  RXAHI2 | Rx输入高频段TDD  A13 |
| RXAHI6  Rx Input High Frequency FDD | A5  RXBHI3 | Rx输入高频段TDD  B1 |
| RXALOW4  Rx Input High Frequency FDD/TDD | A6  RXAHI1 | Rx输入低频段  B13 |
| RXALOW3  Rx Input High Frequency FDD | A7  RXBHI4 | Rx输入低频段  C1 |
| RXALOW2  Rx Input High Frequency FDD/TDD | A8  NC | Rx输入低频段  C3 |
| RXALOW1  Connectionless | A9  RAMPOUT | Rx输入低频段  C10 |
| RXAHI5  GSM PA Slope Signal of Ramp DAC | A10  VDD3RS | Rx输入高频段FDD  C11 |
| RXAHI4  Rx synthesizer 2.85V power supply | A11  RXBLOW2 | Rx输入高频段FDD  D1 |
| RXAHI3  Rx Input Low Frequency Band | A12  NC | Rx输入高频段FDD  D3 |
| RXAHI2  Connectionless | A13  LDORSIN | Rx输入高频段FDD  D11 |
| RXBHI3  Rx synthesizer LDO input (1.6V) | B1  TXHI4 | Rx输入高频段FDD/TDD  D13 |
| RXAHI1  Tx output (>2.3GHz) | B13  NC | Rx输入高频段FDD  E3 |
| RXBHI4  Connectionless | C1  VIO | Rx输入高频段FDD/TDD  E11 |
| NC  MIPI RFFE Power Supply (Provided Internally or Externally) Tx Output High Frequency Band | C3  TXHI2 | 无连接  E13 |
| RAMPOUT  Tx Output High Frequency Band | C10  SPIDIO | Ramp DAC的GSM PA斜坡信号  F1 |
| VDD3RS  SPI Data Signal (DigRF v1.12 Protocol) | C11  NC | Rx合成器2.85V电源  F2 |
| RXBLOW2  Connectionless | D1  NC | Rx输入低频段  F3 |
| NC  Connectionless | D3  SDATA | 无连接  F11 |
| LDORSIN  MIPI RFFE data | D11  TXHI3 | Rx合成器LDO输入（1.6V）  F13 |
| TXHI4  Tx Output High Frequency Band | D13  NC | Tx输出（>2.3GHz）  G1 |
| NC  Connectionless | E3  NC | 无连接  G2 |
| VIO  Connectionless | E11  NC | MIPI RFFE电源（由内部或外部提供）Tx输出高频段  G3 |
| TXHI2  Connectionless | E13  SCLK | Tx输出高频段  G11 |
| SPIDIO  MIPI RFFE clock | F1  TXHI1 | SPI数据信号（DigRF v1.12协议）  G13 |
| NC  Tx Output High Frequency Band | F2  NC | 无连接  H1 |
| NC  Connectionless | F3  NC | 无连接  H2 |
| SDATA  Connectionless | F11  NC | MIPI RFFE数据  H3 |
| TXHI3  Connectionless | F13  RXTXEN | Tx输出高频段  H11 |
| NC  DIGRF v1.12 Enabled Signal | G1  TXLOWGSM | 无连接  H13 |
| NC  Tx Output Low Frequency Band GSM | G2  VDD3INTF | 无连接  J1 |
| NC  2.85V power supply | G3  SPICLK | 无连接  J2 |
| SCLK  SPI clock signal (DigRF V1.12 protocol) | G11  NC | MIPI RFFE clock  J3 |
| TXHI1  Connectionless | G13  AUXINOUT | Tx输出高频段  J11 |
| NC  Auxiliary ADC Input/Slope DAC Auxiliary Output | H1  TXLOW1 | 无连接  J13 |
| NC  Tx Output Low Frequency Band | H2  LDODIGIN | 无连接  K1 |
| NC  2.85V Power Supply for Digital LDO and MIPI RFFE LDO | H3  NC | 无连接  K2 |
| RXTXEN  Connectionless | H11  NC | DIGRF v1.12启用信号  K3 |
| TXLOWGSM  Connectionless | H13  NC | Tx输出低频段GSM  K11 |
| VDD3INTF  Connectionless | J1  TXLOW3 | 2.85V电源  K13 |
| SPICLK  Tx Output Low Frequency Band | J2  VCTRL | SPI时钟信号（DigRF V1.12协议）  L1 |
| NC  Control Voltage of VCTCXO | J3  AUXCLKOUT | 无连接  L2 |
| AUXINOUT  Auxiliary clock output (19.2 MHz, 26 MHz, 38.4 MHz, 52 MHz, 30.72 MHz) | J11  GPO[11] | 辅助ADC输入/斜坡DAC辅助输出  L3 |
| TXLOW1  GPO data | J13  GPO[10] | Tx输出低频段  L4 |
| LDODIGIN  GPO data | K1  GPO[8] | 数字LDO和MIPI RFFE LDO的2.85V电源  L5 |
| NC  GPO data | K2  GPO[6] | 无连接  L6 |
| NC  GPO data | K3  GPO[4] | 无连接  L7 |
| NC  GPO data | K11  GPO[2] | 无连接  L8 |
| TXLOW3  GPO data | K13  GPO[0] | Tx输出低频段  L9 |
| VCTRL  GPO data | L1  SPIEN | VCTCXO的控制电压  L10 |
| AUXCLKOUT  SPI enabled signal (DigRF v1.12 protocol) | L2  RESETN | 辅助时钟输出（19.2MHz，26MHz，38.4MHz，52MHz，30.72MHz）  L11 |
| GPO[11]  Global Reset (Low Activation) | L3  TXLOW2 | GPO数据  L13 |
| GPO[10]  Tx Output Low Frequency Band | L4  XIN | GPO数据  M1 |
| GPO[8]  Crystal input or system docking input | L5  SYSCLKOUT | GPO数据  M2 |
| GPO[6]  System clock output | L6  RXTXDATA | GPO数据  M3 |
| GPO[4]  DigRF v1.12 data | L7  NC | GPO数据  M4 |
| GPO[2]  Connectionless | L8  GPO[9] | GPO数据  M5 |
| GPO[0]  GPO data | L9  GPO[7] | GPO数据  M6 |
| SPIEN  GPO data | L10  GPO[5] | SPI启用信号（DigRF v1.12协议）  M7 |
| RESETN  GPO data | L11  GPO[3] | 全局重置（低激活）  M8 |
| TXLOW2  GPO data | L13  GPO[1] | Tx输出低频段  M9 |
| XIN  GPO data | M1  SYSCLKEN | 晶体输入或系统对接输入  M10 |
| SYSCLKOUT  Enable System Clock Output SYSCLKOUT | M2  VDD3TS | 系统时钟输出  M11 |
| RXTXDATA  Tx synthesizer 2.85V power supply | M3  VDDD | DigRF v1.12数据  N1 |
| NC  Digital Core 1.2V Power Supply (Provided Internally) | M4  VDDIO | 无连接  N2 |
| GPO[9]  Digital I/O 1.2V-1.8V Power Supply (Externally Provided) | M5  RXDATA2P | GPO数据  N3 |
| GPO[7]  DigRF V4 Rx2 interface positive node | M6  RXDATA2N | GPO数据  N4 |
| GPO[5]  DigRF V4 Rx2 interface negative node | M7  RXDATA1P | GPO数据  N5 |
| GPO[3]  DigRF V4 Rx1 interface positive node | M8  RXDATA1N | GPO数据  N6 |
| GPO[1]  DigRF V4 Rx1 interface negative node | M9  TXDATAP | GPO数据  N7 |
| SYSCLKEN  DigRF V4 Tx interface positive node | M10  TXDATAN | 启用系统时钟输出SYSCLKOUT  N8 |
| VDD3TS  DigRF V4 Tx interface negative node | M11  NC | Tx合成器2.85V电源  N9 |
| VDDD  Connectionless | N1  DIGRFEN | 数字核心1.2V电源（从内部提供）  N10 |
| VDDIO  DigRF V4 enabled signal | N2  LDOTSIN | 数字I/O 1.2V-1.8V电源（外部提供）  N11 |
| RXDATA2P  Tx synthesizer LDO input (1.6V) | N3  LDOMAININ | DigRF v4 Rx2接口正节点  N12 |
| RXDATA2N  Main LDO input (1.6V) | N4  LDOTXIN | DigRF v4 Rx2接口负节点  N13 |
| RXDATA1P  Tx LDO input (1.6V) | N5 | DigRF v4 Rx1接口正节点  All other pins: global universal or dedicated grounding |
| RXDATA1N | N6 | DigRF v4 Rx1接口负节点 |
| TXDATAP | N7 | DigRF v4 Tx接口正节点 |
| TXDATAN  AC Electrical Characteristics | N8  Receiver | DigRF v4 Tx接口负节点  In general, unless otherwise specified: 1.5V < VLDOIN < 3.0V, 2.7V < VDD3 < 3.0V, 1.14V < VDDIO < 2.0V, and -30 ~C < Tamb < 85 ~C. Typical values are VLDOIN = 1.6V, VDD3 = 2.85V, VDDIO = 1.8V, Tamb = 25 degree C. The minimum and maximum values are applicable to all frequency bands, including process, voltage and temperature changes. All parameters refer to the input of Rx matching network and are applied to an RX output (RXA/RXB). |
| NC  3.1 GSM/GPRS/EDGE Receiving Mode | N9  parameter | 无连接  SYM |
| DIGRFEN  state | N10  minimum value | DigRF v4启用信号  Model |
| LDOTSIN  Maximum value | N11  Company | Tx合成器LDO输入（1.6V）  1. Overall characteristics |
| LDOMAININ  Receiving frequency range | N12  Frx | 主LDO输入（1.6V）  GSM-850 |
| LDOTXIN  869 | N13 | Tx LDO输入（1.6V）  894 |

MHz

所有其他管脚：全球通用接地或专用接地

GSM-900



数字

电源和LDO LR输入

接地和无连接

图2：引脚 配置（俯视图）

类比

射频

参考时钟

925

960

# 交流电气特性

接收器

一般情况下，除非另有说明：1.5V≤VLDOIN≤3.0V，2.7V≤VDD3≤3.0V，1.14V≤VDDIO≤2.0V，-30°C≤Tamb≤85°C。典型值为VLDOIN=1.6V，VDD3=2.85V，VDDIO=1.8V，Tamb=25°C。最小值和最大值适用于所有频段，包括过程、电压和温度的变化。所有参数均参照Rx匹配网络的输入，并应用于一个Rx输出（RXA/RXB）。

DCS 1800

## 3.1 GSM/GPRS/EDGE接收模式

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 参数 | SYM  1880 | 状态 | | 最小值  1930  PCS 1900 | | 型号  1990 | 最大值 | 单位  Noise figure |
| 1．总体特性  Frx  High Frequency > 2.3GHz:  FDD:7  3.3 WCDMA/HSPA Receiving Mode  TDD: 38, 40, 41  2300  parameter  4. Rx synthesizer characteristics  2690  SYM  MHz  8-PSK RMS EVM  Receiving Frequency Range (band limitation defined by 3GPP in TS 36.101)  state  Synthesizer switching time  High Frequency > 2.3GHz:  minimum value  FDD:7  TDD: 38, 40, 41  Model  Tsyn, RX  Maximum value  EVMrx  Company  Receiving Frequency Range (band limitation defined by 3GPP in TS 36.101)  1. Overall characteristics  High Frequency > 2.3GHz:  FDD:7  Receiving Frequency Range (Central Frequency)  TDD: 38, 40, 41  Frx  Band 1 (High Frequency)  100  Receiving Frequency Range (band limitation defined by 3GPP in TS 36.101)  2112.4  DB  High frequency < 2.2GHz:  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  TDD: 33, 34, 35, 36, 37, 39  2167.6  1805  MHz  2200  Mu s  3. Baseband characteristics  High frequency < 2.2GHz:  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  Band 2 (High Frequency)  TDD: 33, 34, 35, 36, 37, 39  2.5  1932.4  3.2 TD-SCDMA/HSDPA Receiving Mode  Channel Selectivity of Adjacent Signals  1987.6  parameter  High frequency < 2.2GHz:  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  GMSK RMS phase error  TDD: 33, 34, 35, 36, 37, 39  SYM  BBset  Band 3 (High Frequency)  state  1807.4  High frequency < 2.2GHz:  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  TDD: 33, 34, 35, 36, 37, 39  minimum value  1877.6  0.2MHz offset GMSK signal  Model  Tamb=+25deg  Low frequency:  FDD: 5, 6, 8, 12, 13, 14, 17, 18, 19, 20  Maximum value  TDD: Not applicable  Band 4 (High Frequency)  728  2112.4  960  Company  2152.6  Low frequency:  1. Overall characteristics  FDD: 5, 6, 8, 12, 13, 14, 17, 18, 19, 20  TDD: Not applicable  Receiving frequency range  Band 5 (Low Frequency)  Frx  Low frequency:  871.4  FDD: 5, 6, 8, 12, 13, 14, 17, 18, 19, 20  TDD: Not applicable  Band 34 (F), 39 (A)  891.6  2. Gain and PC Characteristics  Noise figure  And 40 (E)  NF  Tamb=+25 degrees C  DB  3.9  1880  Band 6 (Low Frequency)  DB  Error vector size  877.4  EVMrx  Pin's QPSK signal=-60 dBm  882.6  2400  2. Gain and PC Characteristics  Maximum voltage gain  Maximum voltage gain  Grx, Max  MHz  To an I/Q output, Tamb=+25 degree C  94  Band 8 (Low Frequency)  Noise figure  DB  927.4  Minimum voltage gain  Grx, min  To an I/Q output, Tamb=+25 degree C  NF  957.6  0.4MHz offset GMSK signal  DB  Tamb=+25 degree C (band A/E/F)  3. Rx synthesizer characteristics  Synthesizer switching time  GRrx, Max  Tsyn, RX  Band 9 (High Frequency)  100  1847.4  Mu s  3.8  Launcher  NF  In general, unless otherwise specified: 1.5V < VLDOIN < 3.0V, 2.7V < VDD3 < 3.0V, 1.14V < VDDIO < 2.0V, - 30 ~C < Tamb < 85 ~C, the typical values are VLDOIN = 1.6V, VDD3 = 2.85V, VDDIO = 1-SV, Tamb = 25 ~C. The minimum and maximum values are applicable to all frequency bands, including process, voltage and temperature changes.  1877.4  GSM/GPRS/EDGE Transmitting Mode  parameter  SYM  38  state  minimum value  DB  Model  Maximum value  Tamb=+25 degrees C  Company  Band 10 (High Frequency)  1. Overall characteristics  Error vector size  Transmitting Frequency Range  2112.4  Frx  Low Frequency, GSM850  824  EVMrx  2167.6  849  MHz  Pin's QPSK signal=-60 dBm  Low Frequency, GSM900  880  915  Support for other bands is not excluded  High frequency, DCS  1710  1785  DB  Noise figure  High frequency, PCS  1850  NF  1910  Tamb=+25 degrees C  2. Gain and PC Characteristics  2. GSMK mode  Output Power of GSMK Mode  94  PoutGMSK  3.5  Maximum voltage gain  DBm  0.6MHz offset GMSK signal  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  DB  ModSp  Grx, Max  200 kHz, 30 kHz BW  Error vector size  DEG  -35  EVMrx  To an I/Q output, Tamb=+25 degree C  DBc  Pin's QPSK signal=-60 dBm  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  250kHz, 30kHz BW  -40  94  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  50  400 kHz, 30 kHz BW  2. Gain and PC Characteristics  -62  Maximum voltage gain  Grx, Max  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  DB  To an I/Q output, Tamb=+25 degree C  600 kHz-1.8 MHz, 30 kHz BW  -65  Minimum voltage gain  94  modulation accuracy  DB  ModAcc  RMS of phase error  Grx, min  DB  2.5  Minimum voltage gain  DB  To an I/Q output, Tamb=+25 degree C  modulation accuracy  Grx, min  ModAcc  Peak value of phase error  To an I/Q output, Tamb=+25 degree C  10  DB  3. PSK mode  Maximum output power  PoutGMax  Minimum voltage gain  DB  3. Rx synthesizer characteristics  DBm  Synthesizer switching time  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  DB  ModSp  Tsyn, RX  200 kHz, 30 kHz BW  Error vector size  -35  3. Rx synthesizer characteristics  DBc  0.6MHz offset CW signal  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  100  Synthesizer switching time  250kHz, 30kHz BW  Grx, min  -40  Mu s  Tsyn, RX  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  LTE FDD/TDD Receiving Mode  400 kHz, 30 kHz BW  parameter  -60  SYM  Modulation Spectrum Measurement Around Carrier Frequency in 30 kHz Resolution BW  state  60  600 kHz-1.8 MHz, 30 kHz  minimum value  -63  100  Model  Tamb=+25 degrees C  modulation accuracy  Maximum value  EVMRMS  RMS EVM  Company  3.5  1. Overall characteristics  Mu s  DB  Receiving Frequency Range (band limitation defined by 3GPP in TS 36.101)  4. Tx synthesizer characteristics | | | | | | | | |
| 接收频率范围  Establishment time of synthesizer | frx  Tsyn, RX | GSM-850  100 | | 869  Mu s | | TDSCDMA transmission mode | 894  parameter | MHz  SYM |
| state | minimum value | GSM-900  Maximum value  Model  Company | | 925  Transmitting Frequency Range  1. Overall characteristics  Frx | | Band 34 (F), 39 (A) and 40 (E) | 960  1880 |  |
| 2400 | MHz | DCS 1800  Pout, Max  Maximum output power | | 1805  0.5 | | DBm | 1880  Neighboring Channel Leakage Rate (+1.6MHz) | ACLR |
| Pout = - 40dBm.. 0.5dBm | Pout <-40dBm | PCS 1900  -43  -80 | | 1930  DBc  DBm | | Adjacent Channel Leakage Rate +3.2MHz Migration | 1990  AltCLR | Pout = 30 dBm.. 0.5 dBm |
| 噪声系数 | NF  -60 | Tamb=+25deg  DBc  Adjacent Channel Leakage Rate +3.2MHz Migration | | Pout< -30dBm  AltCLR | | 3  -80 |  | dB  DBm |
| 误差矢量大小  Error vector size | EVMrx  EVMrx | GMSK rms相位误差  Pout = 37dBm.. Pout, Max | | 2. Gain and PC Characteristics | | 2  Programmable gain range | GRtx | deg |
|  | 85 | 8-PSK rms EVM  DB  Programmable gain step resolution | | GStx | | 2.5  0.125 |  | DB |
| 2. 增益和PGC特性  Band 5  Low frequency:  DBm  FDD: 5, 6, 8, 12, 13, 14, 17, 18, 19, 20  Company  Error vector size  826.4  EVMrx  4. Rx synthesizer characteristics  Pout = 37dBm.. Pout, Max  Low frequency:  FDD: 5, 6, 8, 12, 13, 14, 17, 18, 19, 20  1. Overall characteristics  846.6  MHz  Maximum output power  Pout, Max  2. Gain and PC Characteristics  Transmitting Frequency Range (Central Frequency)  0.5  Programmable gain range  DBm  GRtx  Neighboring Channel Leakage Rate (+20MHz)  Synthesizer switching time  ACLR  Pout = - 40dBm.. 0.5dBm  Pout <-40dBm  Frx  -41  85  -80  Band 6  DBc  DBm  DB  Neighboring Channel Leakage Rate +40MHz Migration  832.4  AltCLR  Programmable gain step resolution  Pout = 35 dBm.. 0.5 dBm  Band 1  GStx  -45  DBc  Tsyn, RX  Neighboring Channel Leakage Rate +40MHz Migration  AltCLR  837.6  Pout< -35dBm  0.125  1992.4  -80  DBm  DB  Error vector size  Stopband attenuation of BB filter  EVMrx  3. Baseband characteristics  Pout = 37dBm.. Pout, Max  BB filter passband edge  FC  2. Gain and PC Characteristics  Programmable gain range  GRtx  Band 8  2.5  85  1977.6  DB  882.4  Programmable gain step resolution  MHz  GStx  BB filter passband edge  Stopband attenuation of BB filter  0.125  MHz  DB  Fin=20MHz  3. Baseband characteristics  912.6  BB filter passband edge  FC  50  12.5  MHz  DB  Stopband attenuation of BB filter  4. Tx synthesizer characteristics  Fin=25MHz  Synthesizer switching time  25  Tsyn, TX  DB  4. Rx synthesizer characteristics  Synthesizer switching time  Band 9  Tsyn, RX  100  100  100  1752.4  Mu s  Band 2    Mu s  Package shape  Table 1: Packaging Diameter, see Figure 3  TDD/FDD LTE Emission Mode  REF  1782.4  minimum value  parameter  Model  1852.4  Maximum value  SYM  Company  state  0.83  0.93  minimum value  1.03  Mm  Model  A1  Maximum value  0.22  Company  Mm  Fin=5.12MHz  A2  1. Overall characteristics  Band 10  0.71  Transmitting Frequency Range (band limitation defined by 3GPP in TS 36.101)  1907.6  Mm  Frx  1712.4  High Frequency > 2.3GHz:  0.50  Mu s  FDD:7  Mm  TDD: 38, 40, 41  0.50  2300  1767.6  Mm  3. Baseband characteristics  2690  MHz  Transmitting Frequency Range (band limitation defined by 3GPP in TS 36.101)  REF  Maximum output power  minimum value  Model  Maximum value  High Frequency > 2.3GHz:  Company  Pout, Max  FDD:7  7.0  TDD: 38, 40, 41  Mm  D1  6.0  Mm  Band 3  0.5  7.0  Transmitting Frequency Range (band limitation defined by 3GPP in TS 36.101)  WCDMA/HSUPA transmission mode  Mm  E1  High Frequency > 2.3GHz:  6.0  1712.4  FDD:7  Mm  DBm  TDD: 38, 40, 41  1.33  0.30  Neighboring Channel Leakage Rate (+5MHz)  Mm  ACLR  parameter  Transmitting Frequency Range (band limitation defined by 3GPP in TS 36.101)  Definition  Pout = - 40dBm.. 0.5dBm  5.1 List of Abbreviations  ABB  1782.6  Analog baseband  High frequency < 2.2GHz:  MPR  Pout <-40dBm  Maximum power reduction  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  ACLR  25  Adjacent channel leakage ratio  TDD: 33, 34, 35, 36, 37, 39  Na  Not applicable / not available  1710  AFC  Automatic frequency control circuit  N. C.  -43  Not connected  2025  ASM  SYM  Antenna switch module  PA  -80  Power amplifier  BB  Baseband  PMU  Power Management Unit  High frequency < 2.2GHz:  BW  FC  Bandwidth  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  RBW  DBc  Resolution bandwidth  TDD: 33, 34, 35, 36, 37, 39  Ch.  Channel  PGC  DBm  Programmable gain control  CW  state  Continuous wave, single-tone sine  RF  Neighboring Channel Leakage Rate (+10MHz)  Radio-frequency  DBB  Band 4  Digital baseband  RFFE  deviation  RF front-end  DFE  Digital front-end  High frequency < 2.2GHz:  RMS  AltCLR  Root-mean-square  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  DL  1712.4  Downlink  TDD: 33, 34, 35, 36, 37, 39  Rx  Pout = 40 dBm.. 0.5 dBm  Receiver  E-UTRA  minimum value  Evolved UTRA (LTE)  Sig.  Signal  FDD  Frequency division duplex  SPI  -60  Serial peripheral interface  HS  High speed  TCXO  Temp. -compensated crystal oscillator  High frequency < 2.2GHz:  HS1P  1752.6  High speed 1 primary  FDD: 1, 2, 3, 4, 9, 10, 11, 21, 23, 24, 25  TDD  DBc  Time division duplex  TDD: 33, 34, 35, 36, 37, 39  HS2S  Model  High speed 2 secondary  VFBGA  Neighboring Channel Leakage Rate (+10MHz)  Very thin-profile fine-pitch ball grid array  IC  Integrated Circuit  Tx  deviation  Transmitter  LS  DB  Low speed  UL  AltCLR  Uplink  LSB  Least significant bit  Low frequency:  UTRA  Pout< -40dBm  Universal Terrestrial Radio Access  FDD: 5, 6, 8, 12, 13, 14, 17, 18, 19, 20  MIP1  Maximum value  Mobile Industry Processor Interface  699  MSB  Most significant bit  915  -80 | | | | | | | | |
| 最大电压增益 | GRrx, max | | Tamb=+25°C |  | | 94 |  | dB |
| 最小电压增益 | Grx, min | | Tamb=+25°C |  | | 5 |  | dB |
| **3. 基带特性** | | | | | | | | |
| 相邻信号的信道选择性 | BBset | 0.2MHz偏移GMSK信号 | | |  | 1 |  | dB |
|  |  | 0.4MHz偏移GMSK信号 | | |  | 38 |  |  |
|  |  | 0.6MHz偏移GMSK信号 | | |  | 50 |  |  |
|  |  | 0.6MHz偏移CW信号 | | |  | 60 |  |  |
| **4. Rx合成器特性** | | | | | | | | |
| 合成器切换时间 | Tsyn, rx |  | |  | | 100 |  | μs |

## 3.2 TD-SCDMA/HSDPA接收模式

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | **SYM** | **状态** | | **最小值** | **型号** | **最大值** | **单位** |
| **1．总体特性** | | | | | | | |
| 接收频率范围 | frx | 波段34（F）、39（A）  和40（E） | | 1880 |  | 2400 | MHz |
| 噪声系数 | NF | Tamb=+25°C（波段A/E/F） | |  | 3.8 |  | dB |
| 误差矢量大小 | EVMrx | Pin的QPSK信号= -60dBm | |  | 4 |  | % |
| **2. 增益和PGC特性** | | | | | | | |
| 最大电压增益 | Grx, max | | 至一个I/Q输出，Tamb=+25°C |  | 94 |  | dB |
| 最小电压增益 | Grx, min | | 至一个I/Q输出，Tamb=+25°C |  | 5 |  | dB |
| **3. Rx合成器特性** | | | | | | | |
| 合成器切换时间 | Tsyn, rx |  | |  | 100 |  | μs |

## 3.3 WCDMA/HSPA接收模式

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | **SYM** | **状态** | | **最小值** | **型号** | **最大值** | **单位** |
| **1．总体特性** | | | | | | | |
| 接收频率范围（中心频率） | frx | 波段1（高频） | | 2112.4 |  | 2167.6 | MHz |
|  |  | 波段2（高频） | | 1932.4 |  | 1987.6 |  |
|  |  | 波段3（高频） | | 1807.4 |  | 1877.6 |  |
|  |  | 波段4（高频） | | 2112.4 |  | 2152.6 |  |
|  |  | 波段5（低频） | | 871.4 |  | 891.6 |  |
|  |  | 波段6（低频） | | 877.4 |  | 882.6 |  |
|  |  | 波段8（低频） | | 927.4 |  | 957.6 |  |
|  |  | 波段9（高频） | | 1847.4 |  | 1877.4 |  |
|  |  | 波段10（高频） | | 2112.4 |  | 2167.6 |  |
|  |  | 不排除支持其他波段 | |  |  |  |  |
| 噪声系数 | NF | Tamb=+25°C | |  | 3.5 |  | dB |
| 误差矢量大小 | EVMrx | Pin的QPSK信号= -60dBm | |  | 4 |  | % |
| **2. 增益和PGC特性** | | | | | | | |
| 最大电压增益 | Grx, max | | 至一个I/Q输出，Tamb=+25°C |  | 94 |  | dB |
| 最小电压增益 | Grx, min | | 至一个I/Q输出，Tamb=+25°C |  | 5 |  | dB |
| **3. Rx合成器特性** | | | | | | | |
| 合成器切换时间 | Tsyn, rx |  | |  | 100 |  | μs |

## LTE FDD/TDD接收模式

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | **SYM** | **状态** | | **最小值** | **型号** | **最大值** | **单位** |
| **1．总体特性** | | | | | | | |
| 接收频率范围（根据TS 36.101中3GPP定义的波段限制） | frx | 高频>2.3GHz：  FDD：7  TDD：38, 40, 41 | | 2300 |  | 2690 | MHz |
|  |  |  |  |  |
|  |  |  |  |  |
|  | 高频< 2.2GHz：  FDD：1,2,3,4,9,10,11,21,23,24,25  TDD：33,34,35,36,37,39 | | 1805 |  | 2200 |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  | 低频：  FDD：5,6,8,12,13,14,17,18,19,20  TDD：不适用 | | 728 |  | 960 |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| 噪声系数 | NF | Tamb=+25°C | |  | 3.9 |  | dB |
| 误差矢量大小 | EVMrx | Pin的QPSK信号= -60dBm | |  | 4 |  | % |
| **2. 增益和PGC特性** | | | | | | | |
| 最大电压增益 | Grx, max | | 至一个I/Q输出，Tamb=+25°C |  | 94 |  | dB |
| 最小电压增益 | Grx, min | | 至一个I/Q输出，Tamb=+25°C |  | 5 |  | dB |
| **3. Rx合成器特性** | | | | | | | |
| 合成器切换时间 | Tsyn, rx |  | |  | 100 |  | μs |

## 发射器

一般情况下，除非另有说明：1.5V≤VLDOIN≤3.0V，2.7V≤VDD3≤3.0V，1.14V≤VDDIO≤2.0V，-30°C≤Tamb≤85°C，典型值为VLDOIN =1.6V，VDD3=2.85V，VDDIO =1-SV，Tamb =25°C。最小值和最大值适用于所有频段，包括过程、电压和温度的变化。

## GSM/GPRS/EDGE发射模式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | | **SYM** | | **状态** | | | | **最小值** | | **型号** | **最大值** | | **单位** |
| **1．总体特性** | | | | | | | | | | | | | |
| 发射频率范围 | | frx | | 低频，GSM850 | | | | 824 | |  | 849 | | MHz |
|  | |  | | 低频，GSM900 | | | | 880 | |  | 915 | |  |
|  | |  | | 高频，DCS | | | | 1710 | |  | 1785 | |  |
|  | |  | | 高频，PCS | | | | 1850 | |  | 1910 | |  |
| **2. GSMK模式** | | | | | | | | | | | | | |
| GSMK模式输出功率 | | | PoutGMSK | | | |  | | 2 | | | dBm | |
| 在30 kHz分辨率BW中围绕载波频率的调制频谱测量 | ModSp | | | | 200kHz, 30kHz BW | | |  | | -35 |  | | dBc |
|  | | | | 250kHz, 30kHz BW | | |  | | -40 |  | |  |
|  | | | | 400kHz, 30kHz BW | | |  | | -62 |  | |  |
|  | | | | 600kHz-1.8MHz, 30kHz BW | | | | | -65 |  | |  |
| 调制精确度 | ModAcc | | | | | 相位误差均方根 | |  | | 2.5 |  | | dB |
| 相位误差峰值 | |  | | 10 |  | | dB |
| **3. PSK模式** | | | | | | | | | | | | | |
| 最大输出功率 | | PoutGMax | |  | | | |  | | 0 |  | | dBm |
| 在30 kHz分辨率BW中围绕载波频率的调制频谱测量 | ModSp | | | | 200kHz, 30kHz BW | | |  | | -35 |  | | dBc |
|  | | | | 250kHz, 30kHz BW | | |  | | -40 |  | |  |
|  | | | | 400kHz, 30kHz BW | | |  | | -60 |  | |  |
|  | | | | 600kHz-1.8MHz, 30kHz | | | | | -63 |  | |  |
| 调制精确度 | EVMRMS | | | | | RMS EVM | |  | | 3.5 |  | | dB |
| **4. Tx合成器特性** | | | | | | | | | | | | | |
| 合成器建立时间 | | Tsyn, rx | |  | | | |  | | 100 |  | | μs |

## TDSCDMA发射模式

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | **SYM** | **状态** | | **最小值** | | **型号** | **最大值** | **单位** |
| **1．总体特性** | | | | | | | | |
| 发射频率范围 | frx | 波段34（F）、39（A）和40（E） | | 1880 | |  | 2400 | MHz |
| 最大输出功率 | Pout,max |  | |  | | 0.5 |  | dBm |
| 邻通道泄漏率±1.6MHz | ACLR | Pout =-40dBm..0.5dBm  Pout <-40dBm | |  | | -43  -80 |  | dBc  dBm |
| 邻通道泄漏率±3.2MHz偏移 | AltCLR | Pout = -30dBm .. 0.5dBm | |  | | -60 |  | dBc |
| AltCLR | Pout< -30dBm | |  | | -80 |  | dBm |
| 误差矢量大小 | EVMrx | Pout = -37dBm .. Pout,max | |  | | 4 |  | % |
| **2. 增益和PGC特性** | | | | | | | | |
| 程控增益范围 | GRtx | |  |  | | 85 |  | dB |
| 可编程增益阶跃分辨率 | GStx | |  |  | | 0.125 |  | dB |
| **3. 基带特性** | | | | | | | | |
| BB滤波器通带边缘 | fc |  | | |  | 1.33 |  | MHz |
| BB滤波器阻带衰减 |  | fin=5.12MHz | | |  | 25 |  | dB |
| **4. Rx合成器特性** | | | | | | | | |
| 合成器切换时间 | Tsyn, rx |  | |  | | 100 |  | μs |

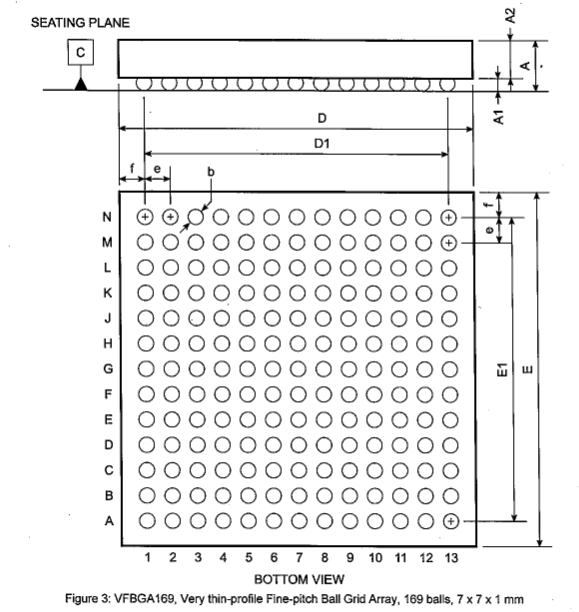
## WCDMA/HSUPA发射模式

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | **SYM** | **状态** | | **最小值** | | **型号** | **最大值** | **单位** |
| **1．总体特性** | | | | | | | | |
| 发射频率范围（中心频率） | frx | 波段1 | | 1992.4 | |  | 1977.6 | MHz |
|  |  | 波段2 | | 1852.4 | |  | 1907.6 |  |
|  |  | 波段3 | | 1712.4 | |  | 1782.6 |  |
|  |  | 波段4 | | 1712.4 | |  | 1752.6 |  |
|  |  | 波段5 | | 826.4 | |  | 846.6 |  |
|  |  | 波段6 | | 832.4 | |  | 837.6 |  |
|  |  | 波段8 | | 882.4 | |  | 912.6 |  |
|  |  | 波段9 | | 1752.4 | |  | 1782.4 |  |
|  |  | 波段10 | | 1712.4 | |  | 1767.6 |  |
| 最大输出功率 | Pout,max |  | |  | | 0.5 |  | dBm |
| 邻通道泄漏率±5MHz | ACLR | Pout =-40dBm..0.5dBm  Pout <-40dBm | |  | | -43  -80 |  | dBc  dBm |
| 邻通道泄漏率±10MHz  偏移 | AltCLR | Pout = -40dBm .. 0.5dBm | |  | | -60 |  | dBc |
| Pout< -40dBm | |  | | -80 |  | dBm |
| 误差矢量大小 | EVMrx | Pout = -37dBm .. Pout,max | |  | | 4 |  | % |
| **2. 增益和PGC特性** | | | | | | | | |
| 程控增益范围 | GRtx | |  |  | | 85 |  | dB |
| 可编程增益阶跃分辨率 | GStx | |  |  | | 0.125 |  | dB |
| **3. 基带特性** | | | | | | | | |
| BB滤波器通带边缘 | fc |  | | |  | 2.5 |  | MHz |
| BB滤波器阻带衰减 |  | fin=20MHz | | |  | 50 |  | dB |
| **4. Tx合成器特性** | | | | | | | | |
| 合成器切换时间 | Tsyn, tx |  | |  | | 100 |  | μs |

## TDD/FDD LTE发射模式

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **参数** | **SYM** | **状态** | | **最小值** | | **型号** | **最大值** | **单位** |
| **1．总体特性** | | | | | | | | |
| 发射频率范围（根据TS 36.101中3GPP定义的波段限制） | frx | 高频>2.3GHz：  FDD：7  TDD：38, 40, 41 | | 2300 | |  | 2690 | MHz |
|  |  | |  |  |  |
|  |  | |  |  |  |
|  | 高频< 2.2GHz：  FDD：1,2,3,4,9,10,11,21,23,24,25  TDD：33,34,35,36,37,39 | | 1710 | |  | 2025 |  |
|  |  |  | |  |  |  |
|  |  |  | |  |  |  |
|  |  |  | |  |  |  |
|  |  | 低频：  FDD：5,6,8,12,13,14,17,18,19,20 | | 699 | |  | 915 |  |
|  |  |  | |  |  |  |
|  |  |  | |  |  |  |
| 最大输出功率 | Pout,max |  | |  | | 0.5 |  | dBm |
| 邻通道泄漏率±20MHz | ACLR | Pout =-40dBm..0.5dBm  Pout <-40dBm | |  | | -41  -80 |  | dBc  dBm |
| 邻通道泄漏率±40MHz偏移 | AltCLR | Pout = -35dBm .. 0.5dBm | |  | | -45 |  | dBc |
| Pout< -35dBm | |  | | -80 |  | dBm |
| 误差矢量大小 | EVMrx | Pout = -37dBm .. Pout,max | |  | | 4 |  | % |
| **2. 增益和PGC特性** | | | | | | | | |
| 程控增益范围 | GRtx | |  |  | | 85 |  | dB |
| 可编程增益阶跃分辨率 | GStx | |  |  | | 0.125 |  | dB |
| **3. 基带特性** | | | | | | | | |
| BB滤波器通带边缘 | fc |  | | |  | 12.5 |  | MHz |
| BB滤波器阻带衰减 |  | fin=25MHz | | |  | 25 |  | dB |
| **4. Rx合成器特性** | | | | | | | | |
| 合成器切换时间 | Tsyn, rx |  | |  | | 100 |  | μs |

# 封装外形



底座平面

底视图

图3：VFBGA169，薄型细间距BGA，169个球，7x7x1 mm

表1：封装直径，见图3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **REF** | **最小值** | **型号** | **最大值** | **单位** |
| A | 0.83 | 0.93 | 1.03 | mm |
| A1 |  | 0.22 |  | mm |
| A2 |  | 0.71 |  | mm |
| e |  | 0.50 |  | mm |
| f |  | 0.50 |  | mm |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **REF** | **最小值** | **型号** | **最大值** | **单位** |
| D |  | 7.0 |  | mm |
| D1 |  | 6.0 |  | mm |
| E |  | 7.0 |  | mm |
| E1 |  | 6.0 |  | mm |
| b |  | 0.30 |  | mm |
|  |  |  |  |  |

# 定义

## 5.1 缩写列表

|  |  |  |  |
| --- | --- | --- | --- |
| ABB | 模拟基频（Analog baseband） | MPR | 最大功率降低（Maximum power reduction） |
| ACLR | 邻信道泄漏功率比（Adjacent channel leakage ratio） | na | 不适用（not applicable / not available） |
| AFC | 自动频率控制电路（Automatic frequency control） | n. c. | 无连接（not connected） |
| ASM | 天线开关模块（Antenna switch module） | PA | 功放（Power amplifier） |
| BB | 基带（Baseband） | PMU | 电源管理单元（Power management unit） |
| BW | 带宽（Bandwidth） | RBW | 解析带宽（Resolution bandwidth） |
| ch. | 通道（Channel） | PGC | 可编程增益控制（Programmable gain control） |
| CW | 连续波，单音正弦（Continuous wave, single-tone sine） | RF | 射频（Radio-frequency） |
| DBB | 数字基带（Digital baseband） | RFFE | 射频前端（RF front-end） |
| DFE | 数字前端（Digital front-end） | RMS | 均方根（Root-mean-square） |
| DL | 下行链路（Downlink） | Rx | 接收器（Receiver） |
| E-UTRA | Evolved UTRA (LTE) | sig. | 信号（Signal） |
| FDD | 频分双工（Frequency division duplex） | SPI | 串行外围设备接口（Serial peripheral interface） |
| HS | 高速（High speed） | TCXO | 温补晶振（Temp.-compensated crystal oscillator） |
| HS1P | High speed 1 primary | TDD | 时分双工（Time division duplex） |
| HS2S | High speed 2 secondary | VFBGA | 薄型细间距BGA（Very thin-profile fine-pitch ball grid array） |
| IC | 集成电路（Integrated circuit） | Tx | 发射器（Transmitter） |
| LS | 低速（Low speed） | UL | 上行链路（Uplink） |
| LSB | 最低有效位（Least significant bit） | UTRA | 通用地面无线接入（Universal Terrestrial Radio Access） |
| MIP1 | 移动行业处理器接口（Mobile industry processor interface） |  |  |
| MSB | 最高有效位（Most significant bit） |  |  |