Multimode Multiband Power Amplifier Module for 3G,4G LTE Application

Product ID： VC7643-11

Version： V1.0

Vanchip Technologies

Preliminary Datasheet
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Revision History

Version	Date	Author	Modify Description
1.0	Feb. 2016	Vanchip	

Package: 4.0mm x 6.8mm x 0.83mm

Product Description

The VC7643-11 is a Multi-Band Power Amplifier Module for 3G,4G LTE application. VC7643-11 includes broadband coverage of 690MHz to 2.7GHz in a compact 4.0 mm x 6.8mm package .

The integrated Silicon-on-insulator (SOI) RF switch in VC7643-11 directs broadband power amplifier output signal to either a FDD-LTE band 7 or one of three TDD-LTE bands (Band38/40/ 41).

In order to reuse TDD filters in Rx mode, the SOI RF switch adds two paths connecting to either the T/R1 port (Band 40 Rx) or a shared T/R2 port (Band 7/38/41 Rx).

The VC7643-11 also support HSPA for WCDMA, TD-SCDMA modulation application and optimized for DC-DC converter operation to maximize efficiency .

The VC7643-11 supports 1.4/3/5/10/15/20MHz channel bandwidths for LTE application, and also optimized for DC-DC converter operation to maximize efficiency.

This Module builds upon Vanchip's unique power amplifier technology to provide High linearity efficiency and Pout.

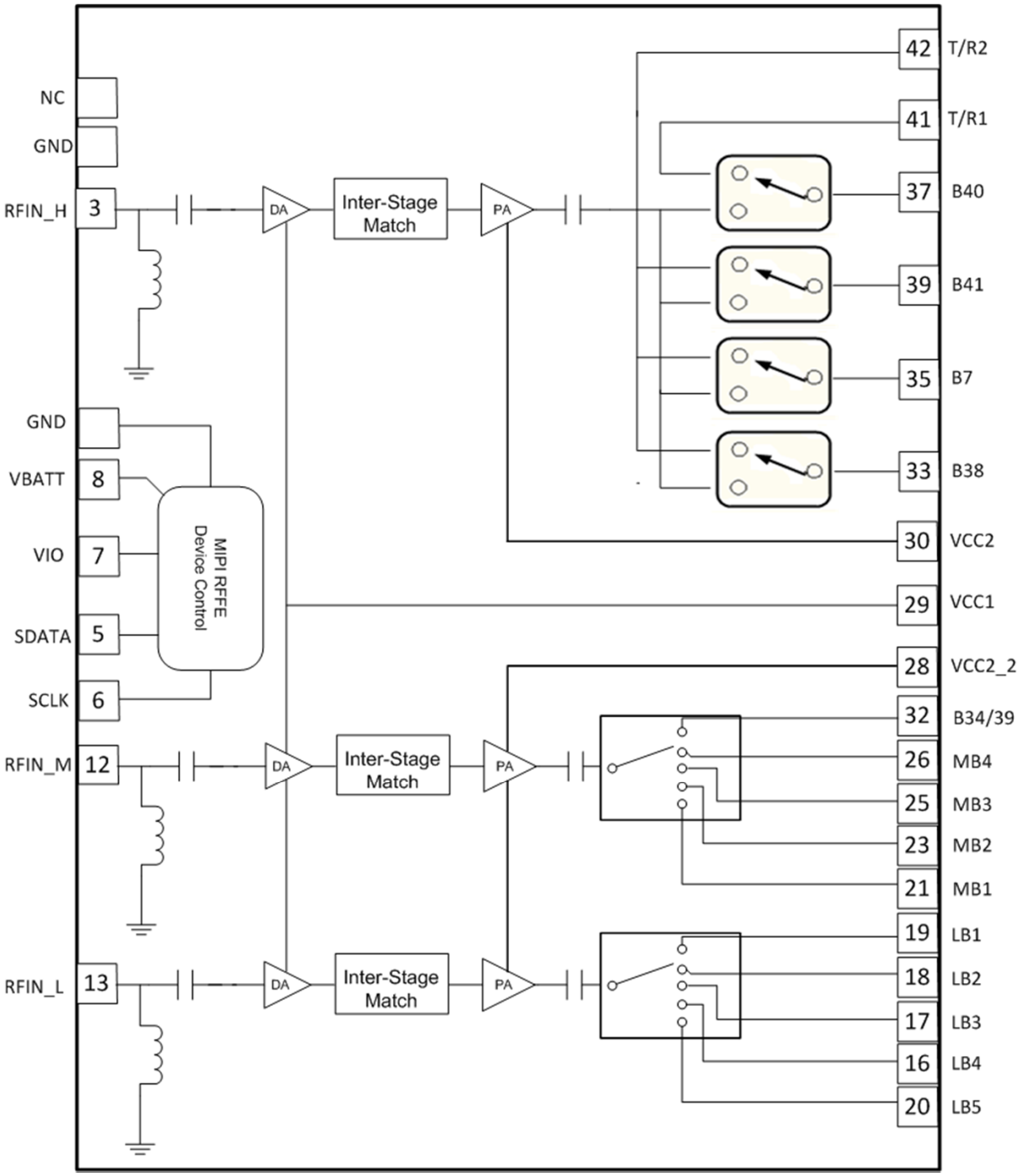
Features

- Fully Compliant with 3G, TDD/FDD-LTE Modulations
- Integrated ESD protection at input
- Integrated DC-Block capacitor at the RF output
- High , Low Gain Mode
- MIPI RFFE Digital Interface
- High Band Frequency Coverage:
  - B40 (2.3 – 2.4GHz) TDD-LTE
  - B41 (2.496 – 2.69GHz) TDD-LTE
  - B7 (2.5 – 2.57GHz) FDD-LTE
  - B38 (2.57 – 2.62GHz) TDD-LTE
  - XGP (2.545 – 2.62GHz) TDD-LTE
- Small Low Profile Package :
  - 4.0 x 6.8x 0.83mm
  - 42 Pad configuration
- Main Process
  - HBT/CMOS/SOI

Applications

- TDD/FDD Multiband Handset and Data cards
- WCDMA Bands 1,2,3,4,5,8
- FDD LTE Bands 1,2,3,4,5,7,8,12,13,17,20,28,30
- TD-SCDMA Bands 34,39
- TDD-LTE Bands 38,39,40,41,XGP

VC7643-11 Functional Block Diagram



Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (Vcc1,Vcc2/Vcc2_2,VBATT)	-0.5 to +5.0	V
MIPI Supply Voltage	2	V
MIPI Signal Level	2	V
RF Input Power	+10	dBm
Output Load VSWR	10:1	-
ESD-Charge Device Model (CDM)	1000	V
ESD-Human Body Mode (HBM)	1000	V
Operating temperature	-30 to +100	˚C
Storage Temperature	-40 to +150	˚C

Recommended Operating Condition

Parameter	Min	Typ.	Max	Unit	Test Condition
Supply Voltage Vcc1	0.55	3.4	3.8	V	
Supply Voltage Vcc2/Vcc2_2	0.55	3.4	3.8	V	
MIPI Supply	1.7	1.8	1.9	V	
Supply Voltage VBATT	3.1	3.4	4.35	V	
MIPI Signal Level	0		0.2*VIO	V	Signal Level Low
	0.8*VIO	1.8	VIO	V	Signal Level High
Leakage Current			10	uA	Applied DC Only：VCC=VBATT=4.35V，
Operating temperature	-25	+25	+85	˚C	

VC7643-11 MIPI RFFE Register Maps

Register 0, Address: 0x00 (PA_CTRL0)					
Register 0	Description	Default	Notes		
[7]	Trigger Select	0	0 = Trigger 0, 1, 2 or' d together		
			1 = Trigger 0, 1, 2 fire independently		
[6:3]	PA Band Select Control Mode	000	Control Mode		
			0000 = PA's Disabled	0101 = LB2_TX (LB/MB)	1011 = MB3_TX (LB/MB)
			0001 = B41_TX (HB)	0110 = LB3_TX (LB/MB)	1100 = MB4_TX (LB/MB)
			0010 = B40_TX (HB)	0111 = LB4_TX (LB/MB)	1101 = MB5_TX (LB/MB)
			0011 = B38_TX (HB)	1110 = LB5_TX (LB/MB)	1111 = PA's Disabled
			1000 = B7_TX (HB)	1001 = MB1_TX (LB/MB)	
			0100 = LB1_TX (LB/MB)	1010 = MB2_TX (LB/MB)	
[2]	PA Enable	0	PA Enable		
			0 = Off		
			1 = On		
[1:0]	PA Mode	00	PA Mode		
			00 = HPM		
			01 = MPM – Not used		
			10 = LPM		
			11 = ULPM – Not used		
Register 1, Address: 0x01 (BIAS_CTRL)					
Register 1	Description	Default	Notes		
[7:4]	Stage 1 (Final) Bias Voltage Reference	0000	0000 = Disable		
			0001=2.65V	0110=2.90V	1011=3.15V
			0010=2.70V	0111=2.95V	1100=3.20V
			0011=2.75V	1000=3.00V	1101=3.25V
			0100=2.80V	1001=3.05V	1110=3.30V
			0101=2.85V	1010=3.10V	1111=3.35V
[3:0]	Stage 2 (Driver) Bias Voltage Reference	0000	0000 = Disable		
			0001=2.65V	0110=2.90V	1011=3.15V
			0010=2.70V	0111=2.95V	1100=3.20V
			0011=2.75V	1000=3.00V	1101=3.25V
			0100=2.80V	1001=3.05V	1110=3.30V
			0101=2.85V	1010=3.10V	1111=3.35V

Register 2, Address: 0x02 (SWITCH_CTRL)					
Register 2	Description	Default	Notes		
[7:4]	Band Switch Control Mode	0000	Control Mode		
			0000 = Switch Off (Standby)	0110 = LB5_TX	1100 = MB3_TX
			0001 = High Isolation	0111 = High Isolation	1101 = MB4_TX
			0010 = LB1_TX	1000 = High Isolation	1110 = MB5_TX
			0011 = LB2_TX	1001 = High Isolation	1111 = High Isolation
			0100 = LB3_TX	1010 = MB1_TX	
			0101 = LB4_TX	1011 = MB2_TX	
[3:0]		0000	Control Mode		
			0000 = Switch Off (Standby)	1010 = B38_Tx	1110 = B41_Rx
			0111 = B7_Rx	1011 = B41_Tx	1111 = High Isolation
			1000 = B7_Tx	1100 = B40_Rx	Rest = High Isolation
			1001 = B40_Tx	1101 = B38_Rx	

VC7643-11 MIPI RFFE Register Maps continued'-- 2

Register 28, Address: 0x1C (PM_TRIG)			
Register 28	Description	Default	Notes
[7:6]	PWR_MODE	00	00 = Normal Operation (ACTIVE)
			01 = Default Settings (STARTUP)
			10 = Low Power (LOW POWER)
			11 = Reserved
[5]	Trigger Mask 2	0	Trigger Enable: 0 Trigger Disable: 1
[4]	Trigger Mask 1	0	Trigger Enable: 0 Trigger Disable: 1
[3]	Trigger Mask 0	0	Trigger Enable: 0 Trigger Disable: 1
[2]	Trigger Register 2	0	Not supported
[1]	Trigger Register 1	0	1 = Latch Register 2 contents
[0]	Trigger Register 0	0	1 = Latch Register 0, 1, 3 contents
Register 29, Address: 0x01D (PROD_ID)			
Register 29	Description	Default	Notes
[7:0]	Product ID	0x1B	Product ID = 0x1B
Register 30, Address: 0x01E (MAN_ID)			
Register 30	Description	Default	Notes
[7:0]	Manufacturer ID	0x38	Manufacturer ID[7:0] = 0x38
Register 31 Address: 0x01F (USID)			
Register 31	Description	Default	Notes
[7:6]	Spare	00	
[5:4]	Manufacturer ID	11	Manufacturer ID[9:8] = 0x11
[3:0]	USID	1111	USID = 1111

Electrical Characteristics for HIGH FDD-LTE Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 7 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	2500	2535	2570	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		28.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		2		dB	Gain at Rx 2620 MHz–2690 MHz
		0.5		dB	Gain at ISM Band 2400-2483MHz
		17		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		31		%	Pout=Pout_Max
Supply Current		590		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-37	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-39	-36	dBc	ACLR1_UTRA
		-43	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-6		dBm	2nd Harmonic
		-30		dBm	3rd Harmonic
		-40	-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands*			-126	dBm/Hz	Rx Band 2620 MHz–2690 MHz
			-108	dBm/Hz	ISM Band 2400-2483MHz
			-140	dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			3.5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input VSWR			2.0:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

* Noise power measured with 20MHz/100RB LTE waveform.

Electrical Characteristics for TDD-LTE Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

TDD-LTE Band 38/41/XGP VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	2496	2595	2690	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		29		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		2.4		dB	Gain at ISM Band 2400-2483MHz
		15		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		30		%	Pout=Pout_Max
Supply Current		610		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-37	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-39	-36	dBc	ACLR1_UTRA
		-43	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-6		dBm	2nd Harmonic
		-30		dBm	3rd Harmonic
		-40	-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands*			-106	dBm/Hz	ISM Band 2447-2483MHz
			-140	dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			3.5	%	Pout = Pout_Max, Load = 50 ohms
DC ON/OFF Time			5	us	
RF ON/OFF Time			5	us	
Input VSWR			2.0:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

* Noise power measured with 20MHz/100RB LTE waveform.

Electrical Characteristics for TDD-LTE Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

TDD-LTE Band 40 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	2300	2350	2400	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		28		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		1		dB	High Gain Mode
Relative Gain		0.3		dB	Gain at ISM Band 2400-2483MHz
		18		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		31		%	Pout=Pout_Max
Supply Current		590		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-38	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-40	-36	dBc	ACLR1_UTRA
		-48	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-30		dBm	3rd Harmonic
		-40	-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands*			-106	dBm/Hz	ISM Band 2447-2483MHz
			-140	dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
DC ON/OFF Time			5	us	
RF ON/OFF Time			5	us	
Input VSWR			2.0:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

* Noise power measured with 20MHz/100RB LTE waveform.

Electrical Characteristics for MID FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 1 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1920	1950	1980	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		29.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		1.5		dB	Gain at Rx 2110 MHz–2170 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		1.8		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		520		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-38	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-42	-36	dBc	ACLR1_UTRA
		-57	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+190MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
			-140	dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for MID FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 2 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1850	1880	1910	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		29.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.5		dB	Gain at Rx 1930 MHz–1990 MHz
		4.5		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		520		mA	POUT = Pout_Max, VBATT = 3.4 V (High)
Adjacent Channel Leakage power Ratio		-38	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-41	-36	dBc	ACLR1_UTRA
		-57	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+80MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
			-140	dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for MID FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 3 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1710	1747	1785	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		29.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.2		dB	Gain at Rx 1805 MHz–1880 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		520		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-38	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-40	-36	dBc	ACLR1_UTRA
		-57	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+95MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio		1.2:1	2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for MID FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 4 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1710	1737.5	1755	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		29		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.2		dB	Gain at Rx 1805 MHz–1880 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		36		%	Pout=Pout_Max
Supply Current		520		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-39	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-39	-36	dBc	ACLR1_UTRA
		-57	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+400MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio		1.2:1	2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for LOW FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band5 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	824	836	849	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		28		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.5		dB	Gain at Rx 869 MHz–894 MHz
		37		dB	Gain at ISM Band 2400-2483MHz
		25		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		34		%	Pout=Pout_Max
Supply Current		530		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-40	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-41	-36	dBc	ACLR1_UTRA
		-64	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-9		dBm	2nd Harmonic
		-20		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+45MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for LOW FDD-LTE Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band8 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	880	897	915	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		28		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.5		dB	Gain at Rx 925 MHz–960 MHz
		36		dB	Gain at ISM Band 2400-2483MHz
		24		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		530		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-38	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-40	-36	dBc	ACLR1_UTRA
		-63	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-9		dBm	2nd Harmonic
		-20		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+45MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for LOW FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 20 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	832	847	862	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		28		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.2		dB	Gain at Rx 1805 MHz–1880 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		34		%	Pout=Pout_Max
Supply Current		530		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-39	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-40	-36	dBc	ACLR1_UTRA
		-57	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT-41MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio		1.2:1	2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for LOW FDD-LTE Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

FDD-LTE Band 13/17/28 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	699	740	787	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		20		dB	Pout=3dBm at Low Gain Mode
		28.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.2		dB	Gain at Rx 1805 MHz–1880 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		33		%	Pout=Pout_Max
Supply Current		550		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-38	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-40	-36	dBc	ACLR1_UTRA
		-57	-39	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-140		dBm/Hz	ISM Band 2400-2483MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio		1.2:1	2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for WCDMA MID-Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: WCDMA(R99) WCDMA Voice Mode (Uplink Reference Measurement Channel: 12.2 kbps)

WCDMA Band1 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C.					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1920	1950	1980	MHz	
Maximum Output Power (Pout_Max)	28			dBm	
Gain		20		dB	Pout=3dBm at Low Gain Mode
		29.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		1.5		dB	Gain at Rx 2110MHz–2170 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		1.8		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		510		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-45	-38	dBc	ACLR1_UTRA
		-56	-48	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+190MHz
		-141		dBm/Hz	ISM Band 2400-2483MHz
		-141		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for WCDMA MID-Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: WCDMA(R99) WCDMA Voice Mode (Uplink Reference Measurement Channel: 12.2 kbps)

WCDMA Band2 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C.					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1850	1880	1910	MHz	
Maximum Output Power (Pout_Max)	28			dBm	
Gain		25		dB	Pout=3dBm at Low Gain Mode
		29.5		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.5		dB	Gain at Rx 1930 MHz–1990 MHz
		4.5		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		37		%	Pout=Pout_Max
Supply Current		500		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-45	-38	dBc	ACLR1_UTRA
		-56	-48	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+80MHz
		-141		dBm/Hz	ISM Band 2400-2483MHz
		-141	-140	dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for WCDMA MID-Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm

– Signal Configuration: WCDMA(R99) WCDMA Voice Mode (Uplink Reference Measurement Channel: 12.2 kbps)

WCDMA Band3 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C.					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1710	1747	1785	MHz	
Maximum Output Power (Pout_Max)	28.5			dBm	
Gain		25		dB	Pout=3dBm at Low Gain Mode
		29		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.2		dB	Gain at Rx 1805 MHz–1880 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		36		%	Pout=Pout_Max
Supply Current		510		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-45	-38	dBc	ACLR1_UTRA
		-55	-48	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+95MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for WCDMA MID-Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: WCDMA(R99) WCDMA Voice Mode (Uplink Reference Measurement Channel: 12.2 kbps)

WCDMA Band4 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C.					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1710	1737.5	1755	MHz	
Maximum Output Power (Pout_Max)	28			dBm	
Gain		25		dB	Pout=3dBm at Low Gain Mode
		29		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.2		dB	Gain at Rx 1805 MHz–1880 MHz
		4		dB	Gain at ISM Band 2400-2483MHz
		2.5		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		36		%	Pout=Pout_Max
Supply Current		510		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-45	-38	dBc	ACLR1_UTRA
		-55	-48	dBc	ACLR2_UTRA
Harmonic Suppression		-3		dBm	2nd Harmonic
		-25		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+400MHz
		-140		dBm/Hz	ISM Band 2400-2483MHz
		-140		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for WCDMA LOW-Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: WCDMA(R99) WCDMA Voice Mode (Uplink Reference Measurement Channel: 12.2 kbps)

WCDMA Band5 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C.					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	824	836	849	MHz	
Maximum Output Power (Pout_Max)	28			dBm	
Gain		25		dB	Pout=3dBm at Low Gain Mode
		28		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.5		dB	Gain at Rx 869 MHz–894 MHz
		37		dB	Gain at ISM Band 2400-2483MHz
		25		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		36		%	Pout=Pout_Max
Supply Current		510		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-42	-38	dBc	ACLR1_UTRA
		-59	-48	dBc	ACLR2_UTRA
Harmonic Suppression		-12		dBm	2nd Harmonic
		-20		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+45MHz
		-141		dBm/Hz	ISM Band 2400-2483MHz
		-141		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-37	dBm	At load VSWR = 6:1, all phases, RBW 1MHz, POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for WCDMA LOW-Band Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25˚C, Zin/Zout = 50ohm

– Signal Configuration: WCDMA(R99) WCDMA Voice Mode (Uplink Reference Measurement Channel: 12.2 kbps)

WCDMA Band8 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C.					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	880	897	915	MHz	
Maximum Output Power (Pout_Max)	28			dBm	
Gain		25		dB	Pout=3dBm at Low Gain Mode
		28		dB	Pout=Pout_Max at High Gain Mode
Gain Flatness		0.5		dB	High Gain Mode
Relative Gain		0.5		dB	Gain at Rx 925 MHz–960 MHz
		36		dB	Gain at ISM Band 2400-2483MHz
		24		dB	Gain at GPS Band 1574 MHz–1576 MHz
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		500		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-45	-38	dBc	ACLR1_UTRA
		-60	-48	dBc	ACLR2_UTRA
Harmonic Suppression		-9		dBm	2nd Harmonic
		-20		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
Tx Noise in Rx Bands		-133		dBm/Hz	Rx Band fT+45MHz
		-141		dBm/Hz	ISM Band 2400-2483MHz
		-141		dBm/Hz	GPS Band 1574 MHz–1577 MHz
EVM			5	%	Pout = Pout_Max, Load = 50 ohms
Phase Discontinuity Variation			±10	degree	
Input Voltage Standing Wave Ratio			2:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for TDD-LTE Mode

– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm
– Signal Configuration: 3GPP TS36.101, unless otherwise specified .

TDD-LTE Band 39 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Test LTE signal with QPSK/10MHz/12RB					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1880	1900	1920	MHz	
Maximum Output Power (Pout_Max)	28			dBm	MPR = 0 (3GPP TS36.101)
Gain		26		dB	Pout=Pout_Max
Gain Flatness		0.5		dB	
Power Added Efficiency		35		%	Pout=Pout_Max
Supply Current		520		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-39	-33	dBc	ACLR_EUTRA (Pout=Pout_Max)
		-40	-36	dBc	ACLR1_UTRA
		-48	-41	dBc	ACLR2_UTRA
Harmonic Suppression		-5		dBm	2nd Harmonic
		-28		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
EVM			3.5	%	Pout = Pout_Max, Load = 50 ohms
DC ON/OFF Time			5	us	
RF ON/OFF Time			5	us	
Input VSWR			2.0:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

Electrical Characteristics for TD-SCDMA Mode

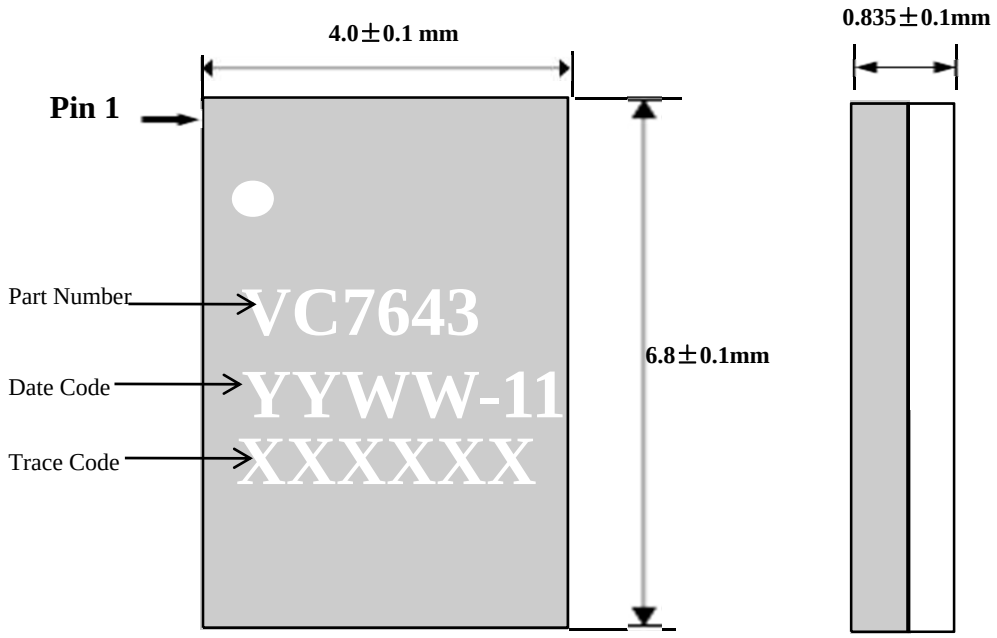
– Conditions: VCC1=VCC2=VBATT = 3.4V, Ta = 25°C, Zin/Zout = 50ohm

TD-SCDMA Band 34/39 VBATT = VCC1 = VCC2 = 3.4 V at Room Temperature +25 ° C. Voice Modulaion					
Characteristics	**Minimum**	**Typical**	**Maximum**	**Unit**	**Test Condition**
Operating Frequency	1880		1920	MHz	
	2010		2025		
Maximum Output Power (Pout_Max)	28			dBm	
Gain	25			dB	Pout=Pout_Max
Gain Flatness		2		dB	
Power Added Efficiency		500		%	Pout=Pout_Max
Supply Current		36		mA	POUT = Pout_Max, VBATT = 3.4 V
Adjacent Channel Leakage power Ratio		-40	-38	dBc	ACLR(±1.6MHz Offset)
		-52	-48	dBc	ACLR(±3.2MHz Offset)
Harmonic Suppression		-5		dBm	2nd Harmonic
		-28		dBm	3rd Harmonic
			-33	dBm	All other harmonics up to 12.75GHz
EVM			3.5	%	Pout = Pout_Max, Load = 50 ohms
DC ON/OFF Time			5	us	
RF ON/OFF Time			5	us	
Input VSWR			2.0:1	—	
Stability (Spurious output)			-36	dBm	At load VSWR = 6:1, all phases, RBW 1MHz,POUT≤28dBm,
Ruggedness	10:1			—	No damage or Permanent Degradation at POUT≤28dBm

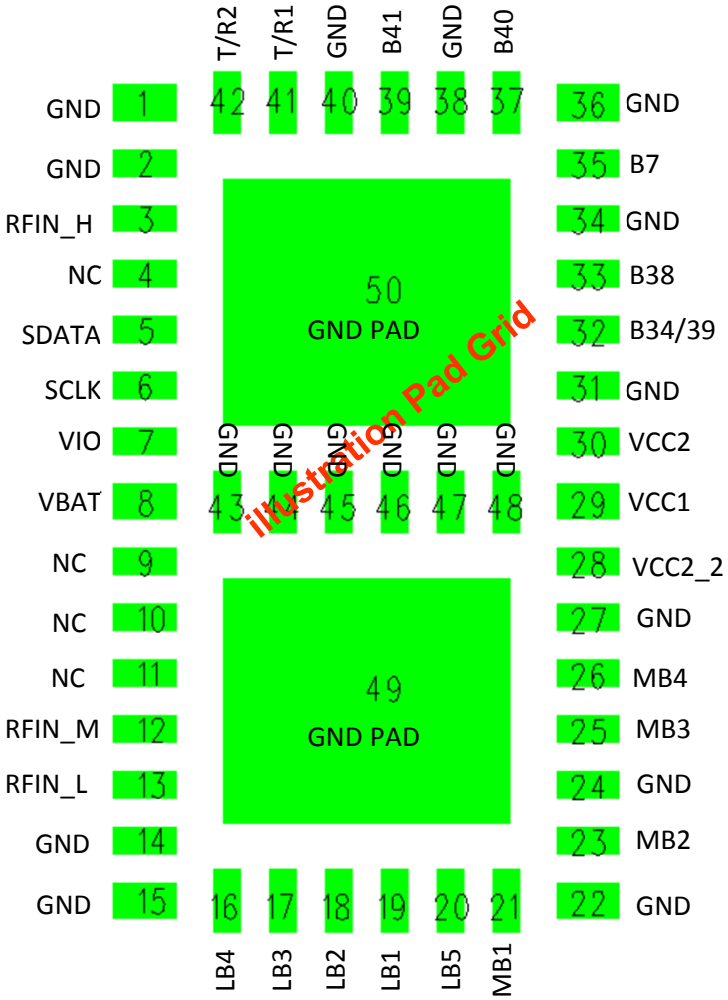
RF Characteristics of SOI Switch

Characteristics	Sym.	Min.	Typ.	Max.	Unit	Test Condition
Frequency coverage	*f0*	2300		2690	MHz	
Insertion Loss	IL		0.8		dB	B40 to T/R1
			0.8		dB	B38 to T/R2
			0.85		dB	B41 to T/R2
			0.9		dB	B7 to T/R2
VSWR				2.0:1		Any RF port tested in Rx mode
Isolation	ISO	25			dB	B7 Tx to B38 Tx
		25			dB	B7 Tx to B40 Tx
		25			dB	B7 Tx to B41 Tx
		25			dB	B40 Tx to T/R1
		30			dB	B38 Tx to T/R2
		25			dB	B41 Tx to T/R2
		25			dB	B40 Tx to T/R2
		30			dB	B38 Tx to T/R1
		30			dB	B41 Tx to T/R1
Switching Time				2.5	us	Isolation to Rx, Isolation to Tx, Tx to Rx, Rx to Tx, Rx to Isolation, and Tx to Isolation

Package Information



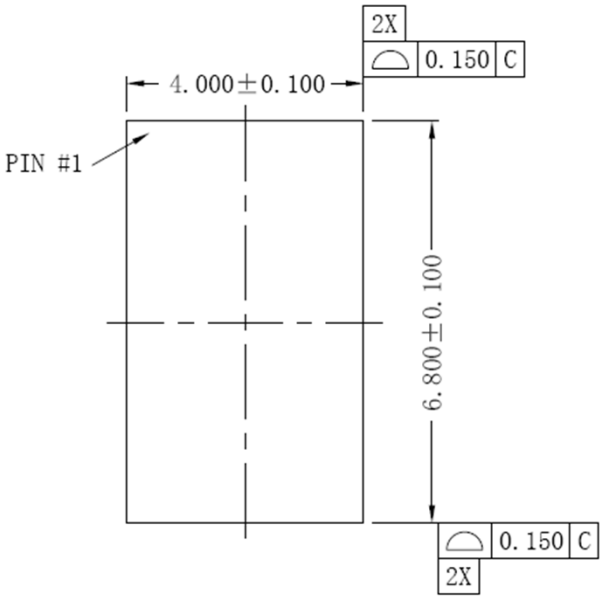
Pin illustration and Description



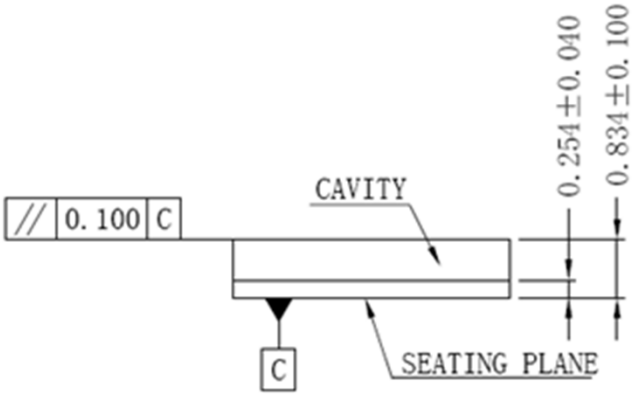
Pad layout as seen from Top View looking through package

Pin #	Symbol	Description
3	RFIN_H	High Band (HB) RF Signal Input
4	NC	No Connect
5	SDATA	MIPI Data
6	SCLK	MIPI Clock
7	VIO	MIPI Supply
8	VBATT	Battery Supply
9	NC	No Connect
10	NC	No Connect
11	NC	No Connect
12	RFIN_M	Mid Band (MB) RF Signal Input
13	RFIN_L	Low Band (LB) RF Signal Input
16	LB4	LB 4 RF OUT
17	LB3	LB 3 RF OUT
18	LB2	LB 2 RF OUT
19	LB1	LB 1 RF OUT
20	LB5	LB 5 RF OUT
21	MB1	MB 1 RF OUT
23	MB2	MB 2 RF OUT
25	MB3	MB 3 RF OUT
26	MB4	MB 4 RF OUT
28	VCC2_2	MB/LB 2nd Stage PA Collector Supply
29	VCC1	HB/MB/LB 1st Stage PA Collector Supply
30	VCC2	HB Stage2 PA Collector Supply
32	B34/39	Bands 34/39 RF OUT
33	B38	Band 38 RF OUT
35	B7	Band 7 RF OUT
37	B40	Band 40 RF OUT
39	B41	Band 41 RF OUT
41	T/R1	B40 Rx Port
42	T/R2	B7/B38/B41 Rx Port
Ground Pin		1,2,14,15,22,24,27,31,34,36,38,40
Ground PAD		Ground Pad is Module Underside

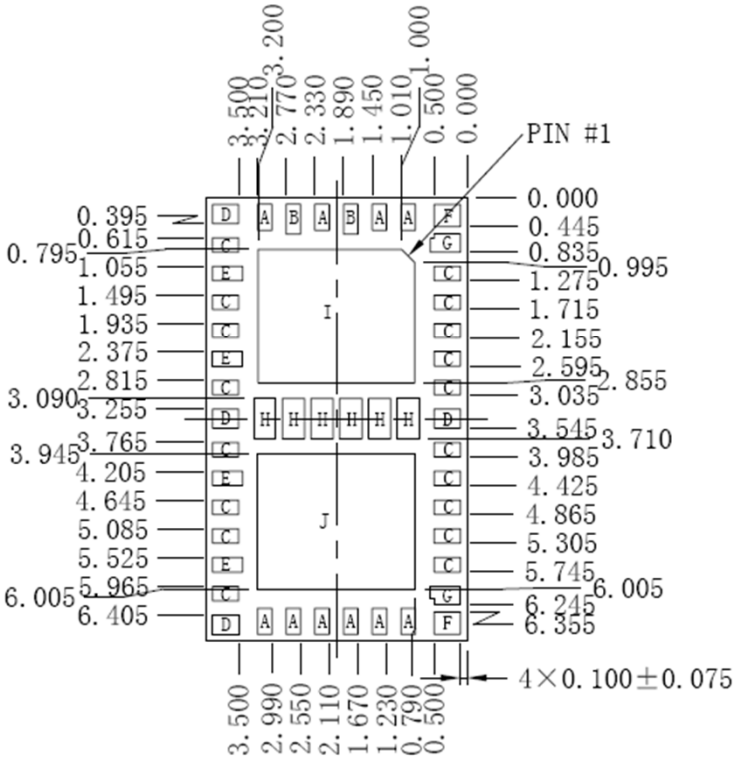
Package Outline (Unit: mm)



Top View



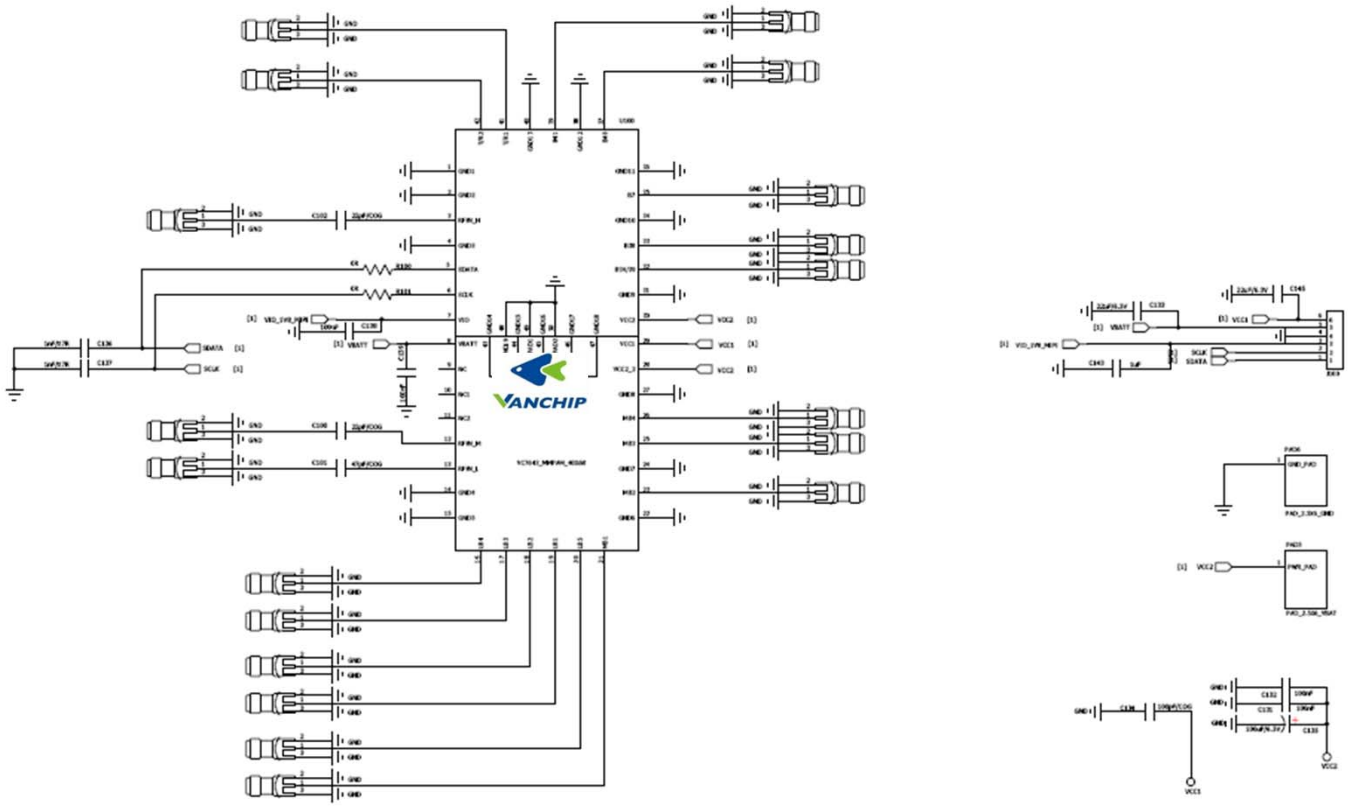
Side View



Bottom View

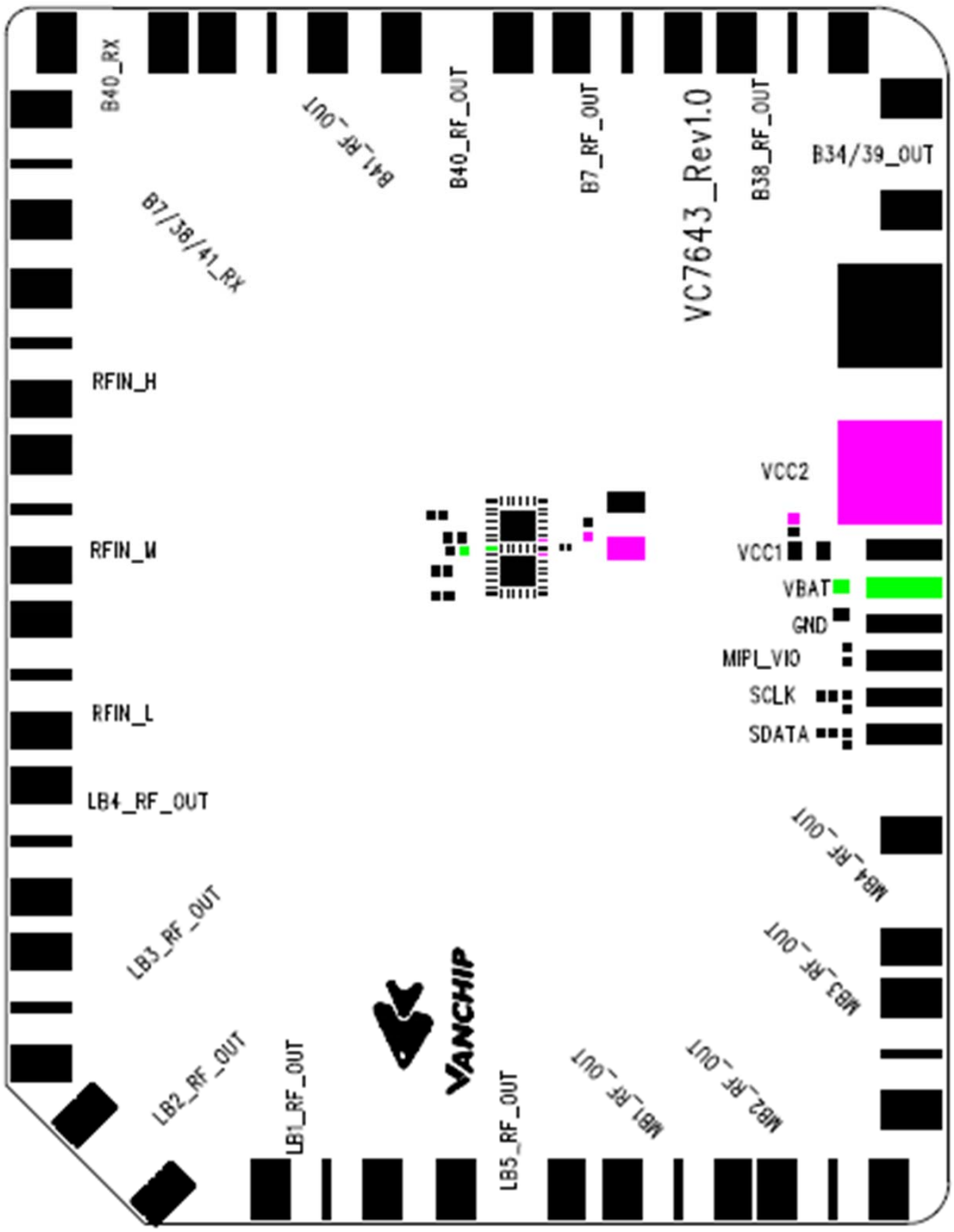
A=0.220×0.400mm TYP (X, Y)
B=0.220×0.460mm TYP (X, Y)
C=0.400×0.220mm TYP (X, Y)
D=0.400×0.290mm TYP (X, Y)
E=0.460×0.220mm TYP (X, Y)
F=0.400×0.340mm TYP (X, Y)
G=0.400×0.280mm TYP (X, Y)
H=0.340×0.620mm TYP (X, Y)
I=2.400×2.060mm TYP (X, Y)
J=2.420×2.060mm TYP (X, Y)

EVB Schematic Diagram

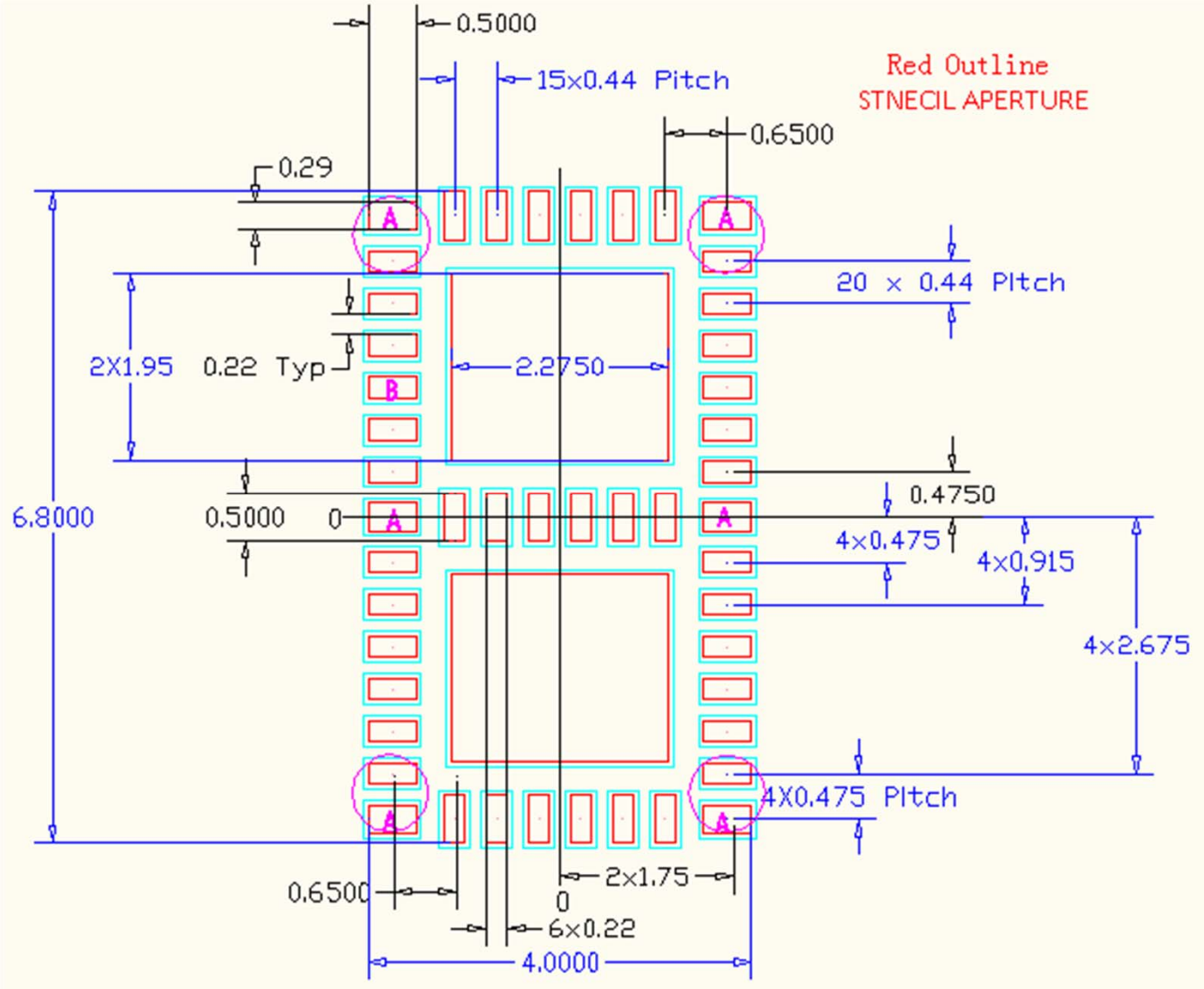


Note:
1. ALL RF Input and output Trace with 50 Ohm Microstrip-line.
2. RF OUTPUT DC-Block less.

EVB illustration



PCB Layout Dimensions Diagram (Unit in mm)

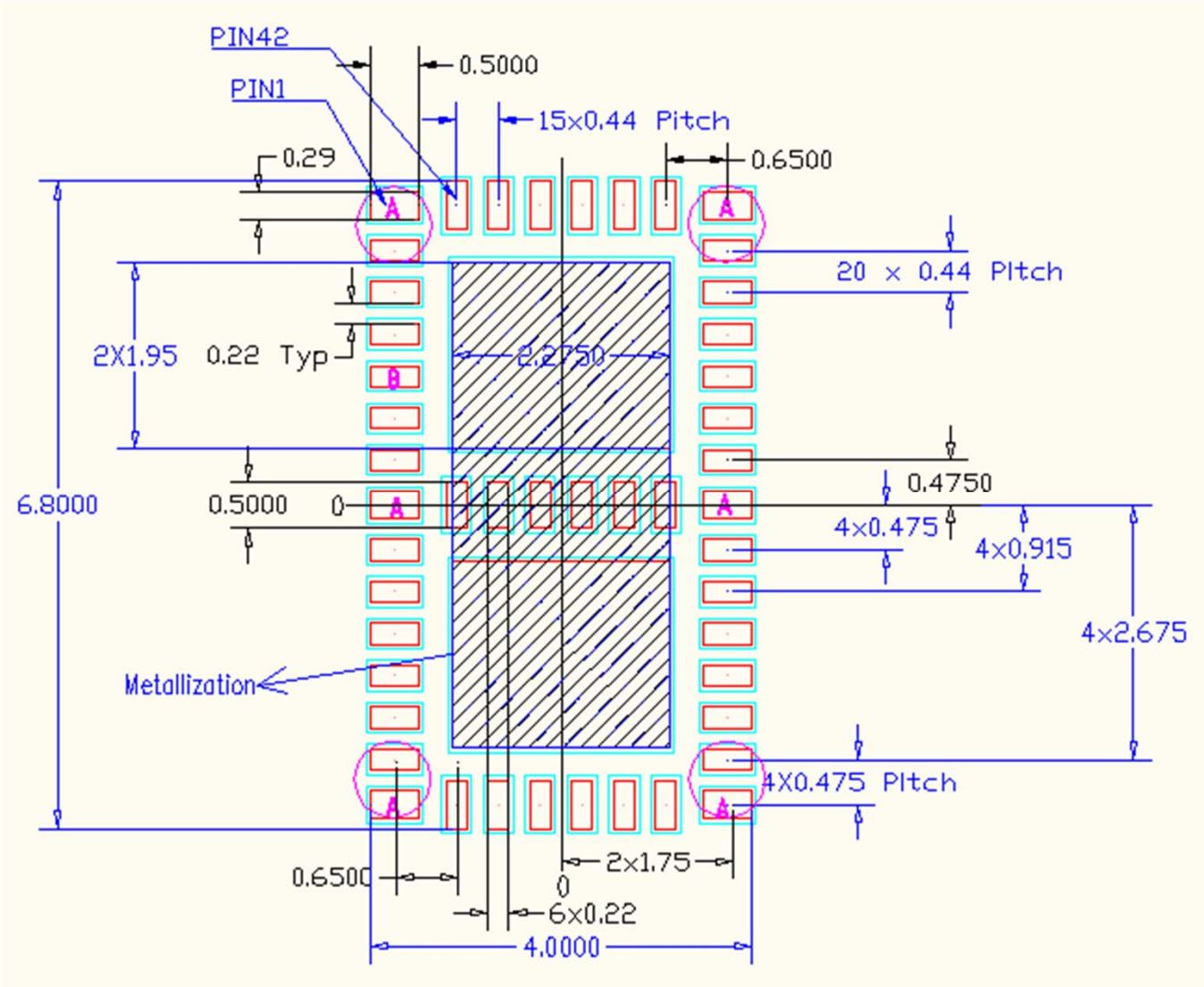


TOP View
STNECIL APERTURE

Note: Unless otherwise specified

1. All DIMENSIONS ARE IN MILLMETERS.
2. DIMENSIONS AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.

PCB Layout Dimensions Diagram (Unit in mm)

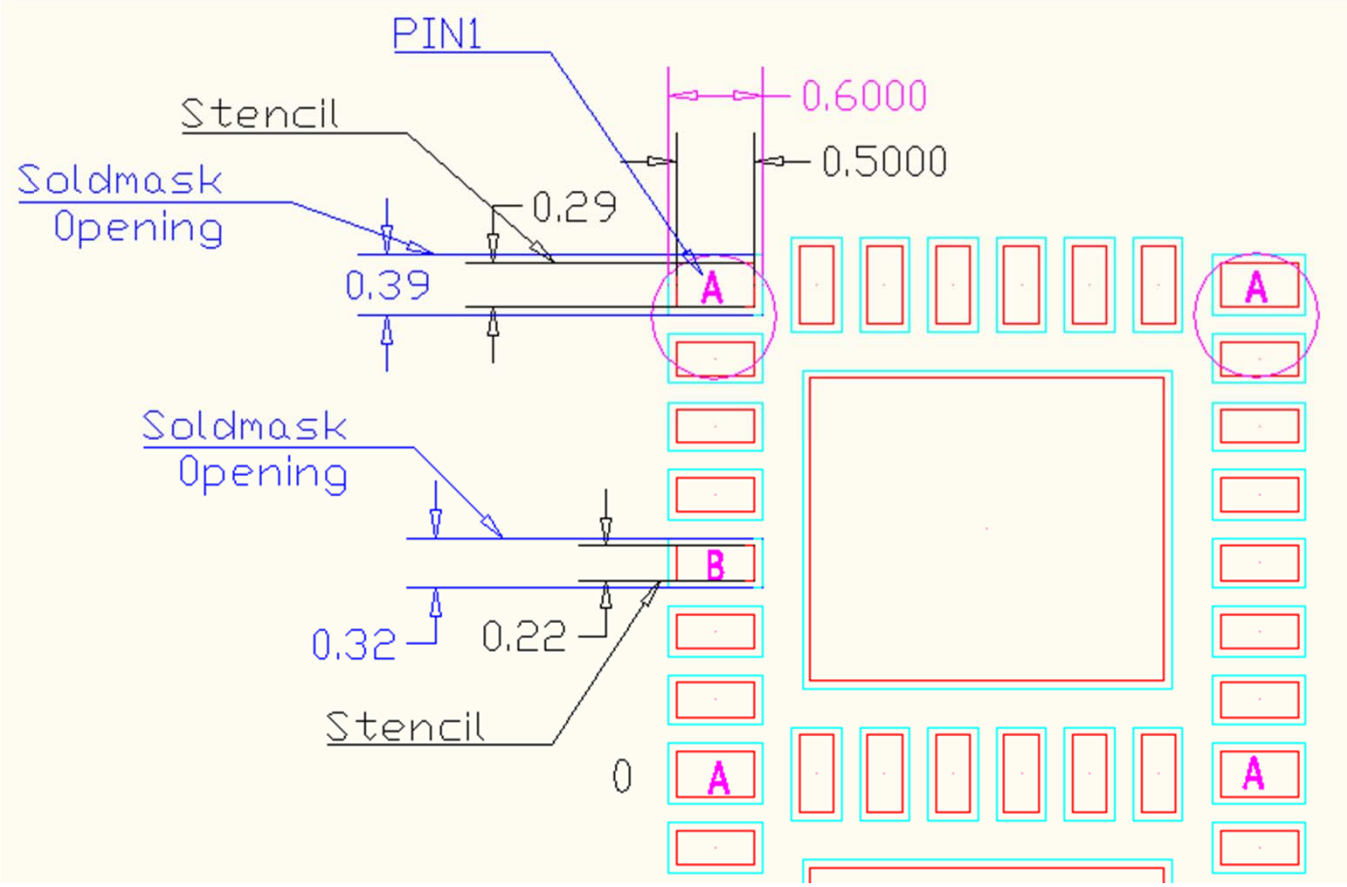


TOP View
Metallization Suggestion

Note: Unless otherwise specified

1. All DIMENSIONS ARE IN MILLMETERS.
2. DIMENSIONS AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.

PCB Layout Dimensions Diagram (Unit in mm)



For A SMT PAD Detail

3x This Rotation
3x Rotation 180°

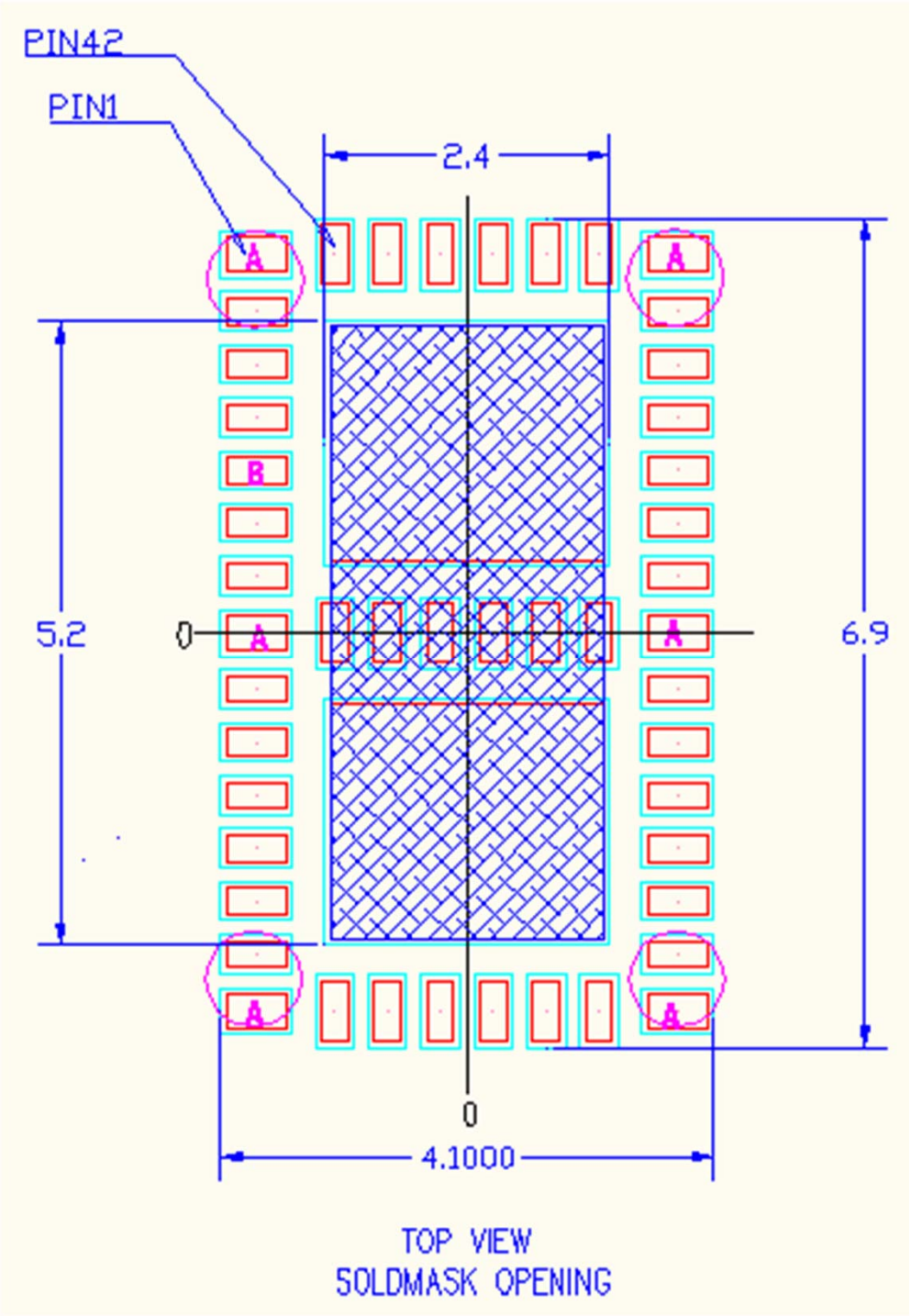
For B SMT PAD Detail

12x This Rotation
12x Rotation 180°
6x Rotation 90° CW
6x Rotation 90° CCW

Note: Unless otherwise specified

1. All DIMENSIONS ARE IN MILLMETERS.
2. DIMENSIONS AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.

PCB Layout Dimensions Diagram (Unit in mm)



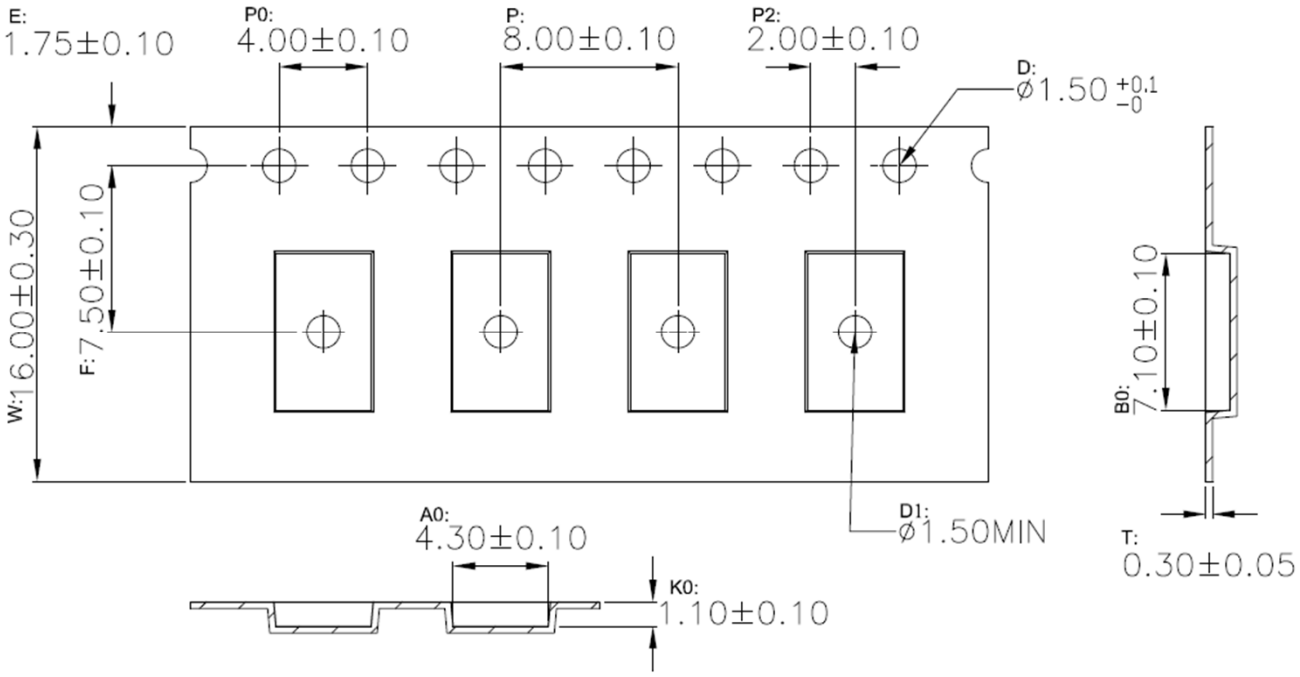
Note: Unless otherwise specified

1. All DIMENSIONS ARE IN MILLMETERS.
2. DIMENSIONS AND TOLERANCING IN ACCORDANCE WITH ASME Y14.5M-1994.

Tape and Reel

VC7643-11 carrier tape basic dimensions are based on EIA 481. The pocket is designed to hold the part for shipping and loading onto SMT manufacturing equipment, while protecting the body and the solder terminals from damaging stresses.

Prior to shipping, moisture sensitive parts (MSL level 3) are baked and placed into the pockets of the carrier tape. A cover tape is sealed over the top of the entire length of the carrier tape. The reel is sealed in a moisture barrier ESD bag with the appropriate units of desiccant and a humidity indicator card, which is placed in a cardboard shipping box. It is important to note that unused moisture sensitive parts need to be resealed in the moisture barrier bag. If the reels exceed the exposure limit and need to be rebaked, most carrier tape and shipping reels are not rated as bakeable at 125° C.



1. 10 sprocket hole pitch cumulative tolerance ±0.20.
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness : 0.30±0.05mm.
6. Packing length per 19" reel : 490.0 Meters.
7. Component load per 13" reel : 6000 pcs.