RF2638

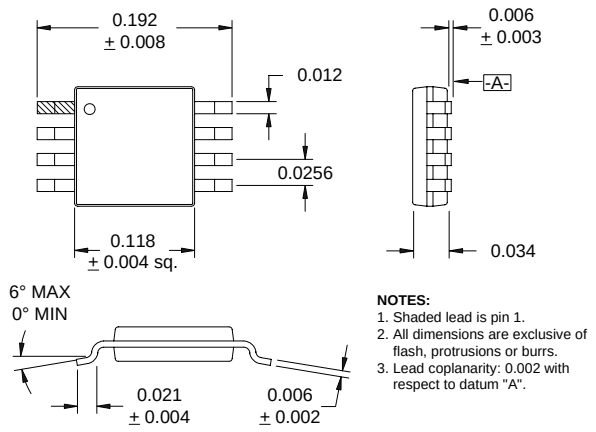
W-CDMA AND CDMA UPCONVERTER/ BPSK MODULATOR

Typical Applications

- W-CDMA Systems
- PCS/Cellular CDMA Systems
- PHS 1500/WLAN 2400 Systems
- General Purpose Upconverter
- BPSK Modulation
- Micro-Cell PCS Base Stations

Product Description

The RF2638 is a complete upconverter designed for cellular, PCS and W-CDMA applications. This device may also be used to directly BPSK modulate a carrier. The unit operates at 3.0V and is designed as part of the RFMD PCS/Cellular CDMA and W-CDMA Chip Sets.



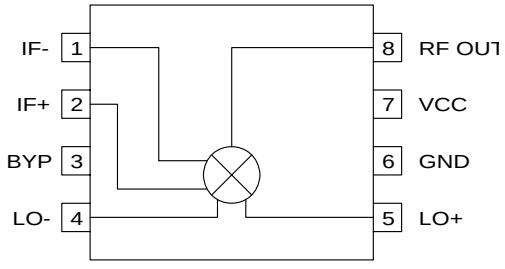
Optimum Technology Matching® Applied

- [ ] Si BJT
- [x] Si Bi-CMOS
- [ ] InGaP/HBT
- [ ] GaAs HBT
- [ ] SiGe HBT
- [ ] GaN HEMT
- [ ] GaAs MESFET
- [ ] Si CMOS
- [ ] SiGe Bi-CMOS

Package Style: MSOP-8

Features

- Supports Dual Mode Operation
- +10dBm Output IP3 (1950MHz)
- +13dBm Output IP3 (830MHz)
- Single 3.0V Power Supply
- Miniature 8-Pin Package
- Double-Balanced Mixer



Functional Block Diagram

Ordering Information

RF2638	W-CDMA and CDMA Upconverter/ BPSK Modulator
RF2638 PCBA-PCS/CEL	Fully Assembled Evaluation Board
RF2638 PCBA-DO	Fully Assembled Evaluation Board

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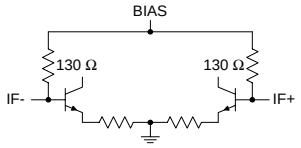
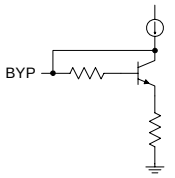
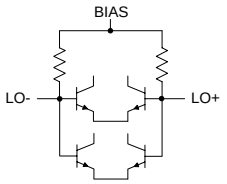
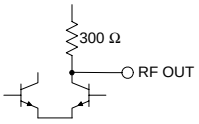
Greensboro, NC 27409, USA
Tel (336) 664 1233
Fax (336) 664 0454
http://www.rfmd.com

Absolute Maximum Ratings

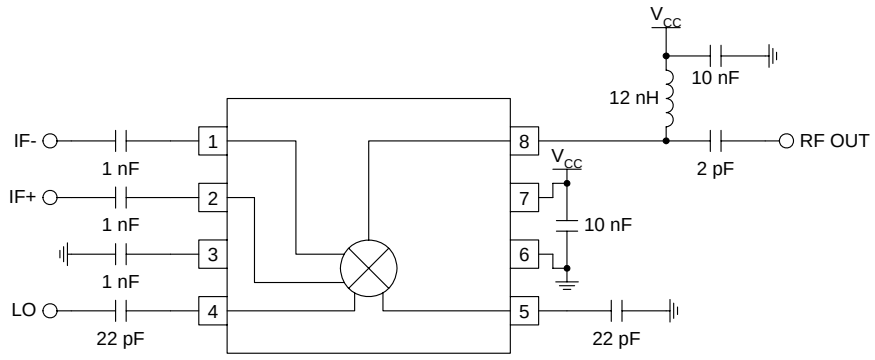
Parameter	Rating	Unit
Supply Voltage	-0.5 to +5.0	V_{DC}
Input RF Power	+3	dBm
Operating Ambient Temperature	-30 to +80	℃
Storage Temperature	-30 to +150	℃

Caution! ESD sensitive device.

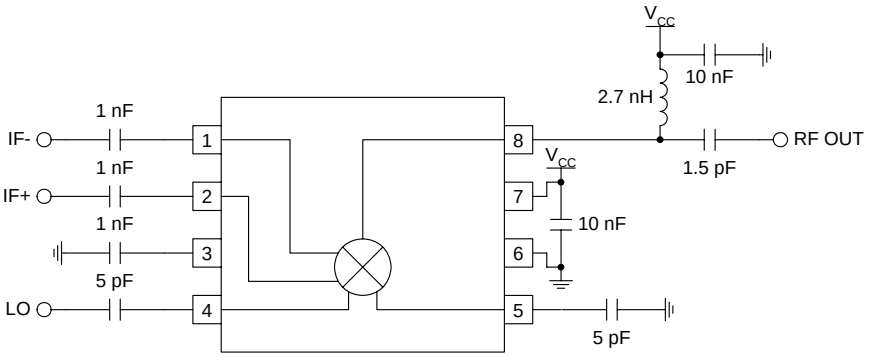
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					T=25°C, V_{CC}=3.0V
RF Output Frequency Range		500 to 2500		MHz	
Spurious Product Rejection		30		dBc	Referenced to RF output
Cellular					T=25°C, V_{CC}=3.0V, LO=960MHz@-3dBm, IF=130MHz@-13dBm
Conversion Gain	-1	-0.5		dB	RF_{OUT}=830MHz
	-2.2	-1		dB	RF_{OUT}=836MHz (Dual-Output board)
Noise Figure		14		dB	RF_{OUT}=830MHz
Output IP3		+13		dBm	P_{IN}=-13dBm per Tone, RF out=830MHz
PCS					T=25°C, V_{CC}=3.0V, LO=1750MHz@-3dBm, IF=130MHz@-13dBm
Conversion Gain	-3.0	-1.5		dB	RF_{OUT}=1880MHz
	-3.5	-2.5		dB	RF_{OUT}=1880MHz (Dual-Output board)
Noise Figure		15		dB	RF_{OUT}=1880MHz
Output IP3	+7	+11		dBm	P_{IN}=-13dBm per Tone, RF out=1880MHz
W-CDMA					T=25°C, V_{CC}=3.0V, LO=2330MHz@-3dBm, IF=380MHz@-13dBm
ACPR	-58	-57	-56	dBc	
Conversion Gain	-2.0	-1.0	0	dB	RF_{OUT}=1950MHz
Noise Figure	13	14	15	dB	RF_{OUT}=1950MHz
Output IP3	+8	+10		dBm	P_{IN}=-13dBm per Tone, RF_{OUT}=1950MHz
Max OIP3			11	dBm	
IF Input					
IF Frequency	DC	130/380	500	MHz	
Differential Input Impedance	220	260	300	Ω	IF=130MHz
IF to RF Output Isolation		30		dB	
IF to LO Isolation		30		dB	
LO Input					
LO Frequency Range		300 to 2700		MHz	
LO Level		-6 to 0		dBm	
LO to RF Output Leakage	-18	-25		dBm	
	-15	-17		dBm	At Cellular band, high side injection (Dual-Output board)
	-14	-15		dBm	At PCS band, low side injection (Dual-Output board)
RF to LO Isolation		30		dB	
LO Input VSWR		2:1			50Ω
Power Supply					
Voltage	2.7	3.0	3.3	V	
Current Consumption		25		mA	

Pin	Function	Description	Interface Schematic
1	IF-	Balanced IF input pin. This pin is internally DC-biased and should be DC-blocked if connected to a device with a DC level present. For single-ended input operation, one pin is used as an input and the other IF input is AC-coupled to ground. The balanced, input impedance is 260Ω.	
2	IF+	Same as pin 1, except complementary input.	See pin 1.
3	BYP	Bypass pin for internal bias circuitry. Bypass with a 1nF capacitor.	
4	LO-	Balanced LO input pin. This pin is internally DC-biased and should be DC-blocked if connected to a device with a DC level present. For single-ended input operation, one pin is used as an input and the other LO input is AC-coupled to ground.	
5	LO+	Same as pin 4, except complementary input.	See pin 4.
6	GND	Ground connection. For best performance, keep traces physically short and connect immediately to ground plane.	
7	VCC	Supply voltage pin. External bypassing is required. External RF, LO, and IF bypassing is required. The trace length between the pin and the bypass capacitors should be minimized. The ground side of the bypass capacitors should connect immediately to ground plane.	
8	RF OUT	RF output pin.	

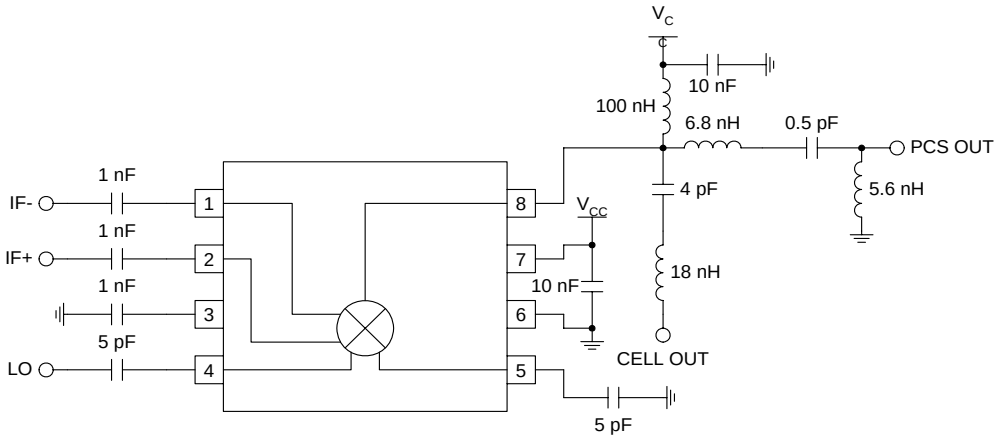
Application Schematic
836MHz



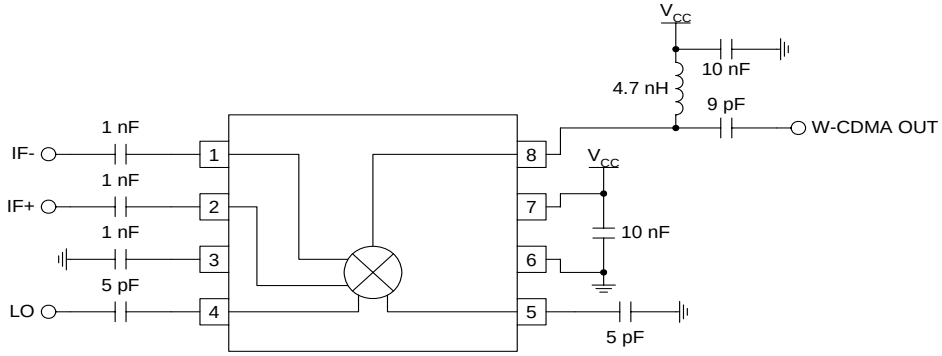
Application Schematic
1880MHz



Application Schematic
Dual-Band Output (836MHz/1880MHz)

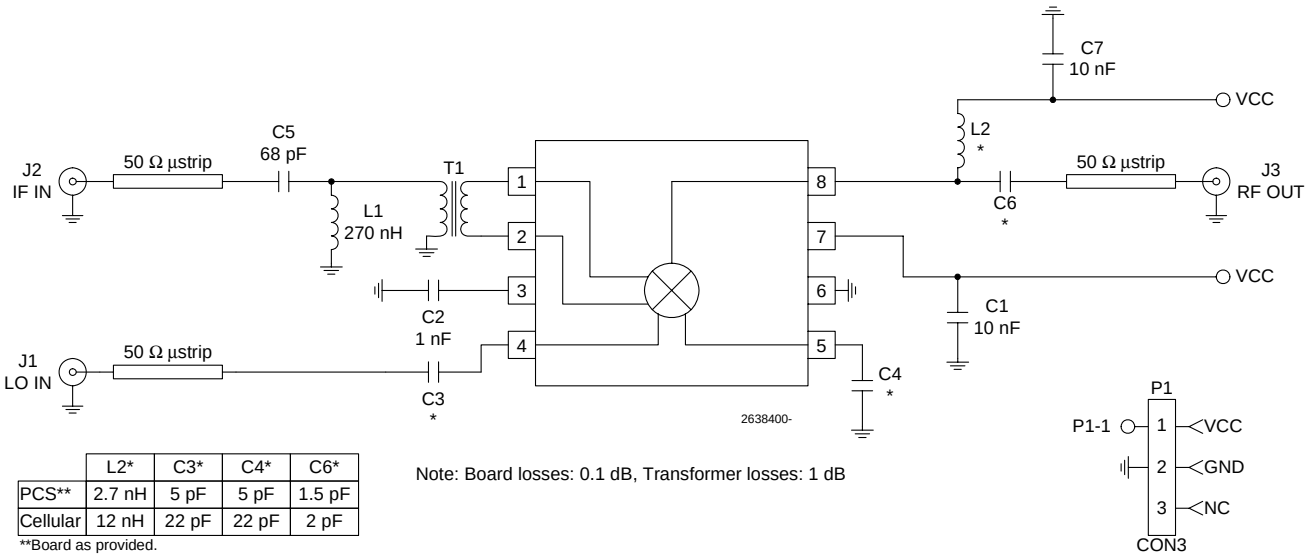


Application Schematic
W-CDMA (1950MHz)



Evaluation Board Schematic - PCS/Cellular
RF=1880MHz, IF=130MHz

(Download Bill of Materials from www.rfmd.com.)

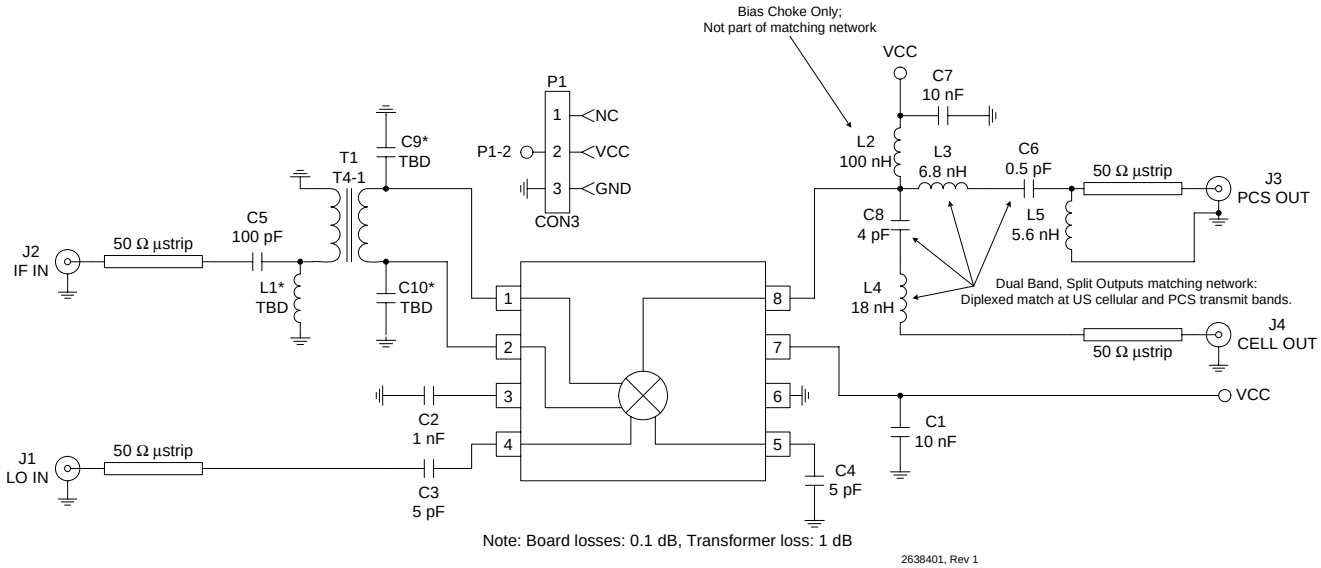


	L2*	C3*	C4*	C6*
PCS**	2.7 nH	5 pF	5 pF	1.5 pF
Cellular	12 nH	22 pF	22 pF	2 pF

**Board as provided.

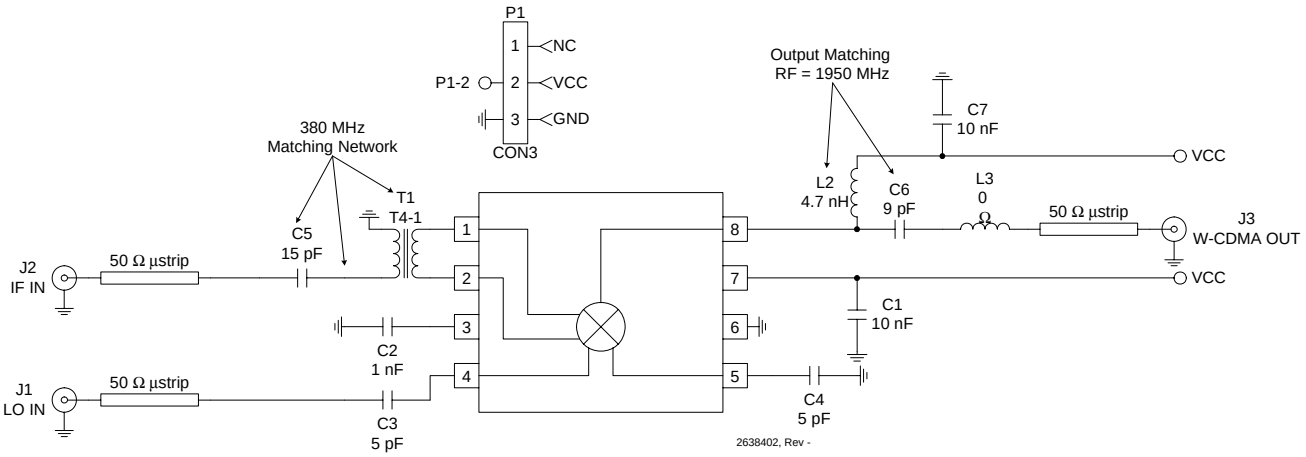
Note: Board losses: 0.1 dB, Transformer losses: 1 dB

Evaluation Board Schematic - Dual Output
Cellular Out=836MHz, PCS Out=1880MHz, IF=130MHz



Note: Board losses: 0.1 dB, Transformer loss: 1 dB

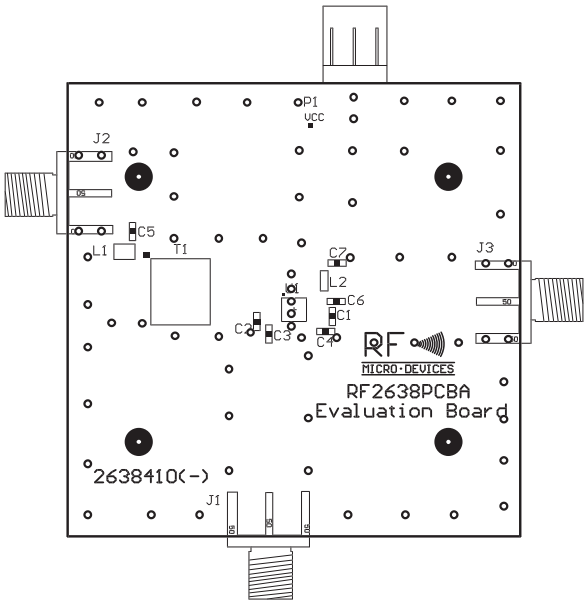
Evaluation Board Schematic - W-CDMA
RF=1950MHz, IF=380MHz

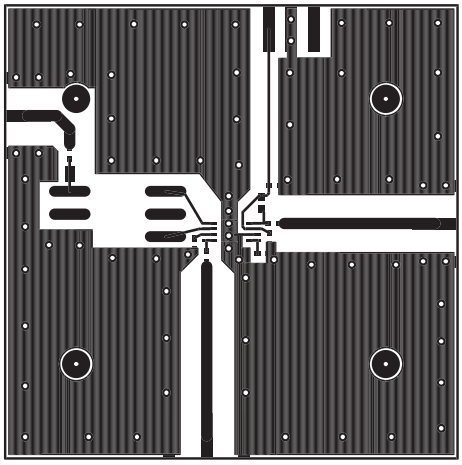


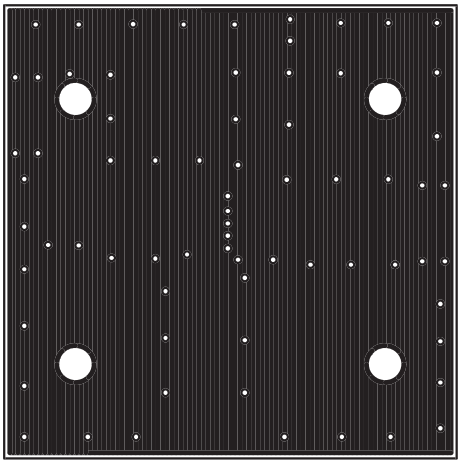
Note: Board losses: 0.1 dB, Transformer loss: 1.62 dB

Evaluation Board Layout
PCS/Cellular
Board Size 2.0” x 2.0”

Board Thickness 0.031”, Board Material FR-4



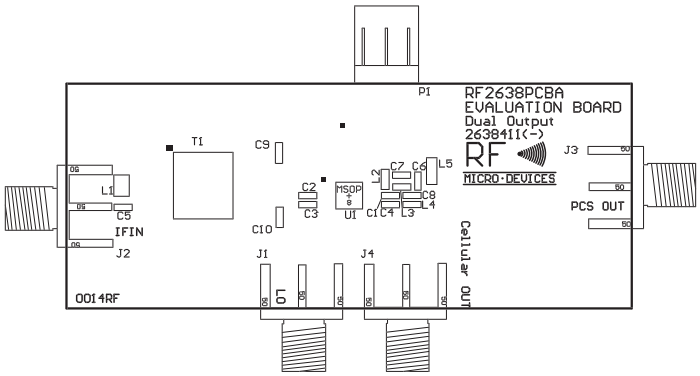


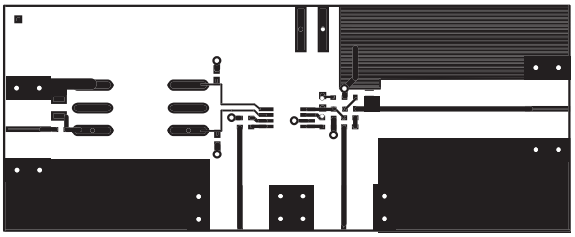


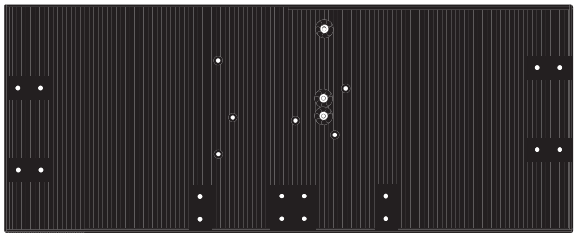
Evaluation Board Layout
Dual Output
Board Size 2.5” x 1.0”

Board Thickness 0.060”, Board Material FR-4, Multi-Layer

(Intermediate layers (Ground Plane and Power Plane [V_{CC1}]) are not shown.)







Evaluation Board Layout
W-CDMA
Board Size 2.5” x 1.0”

Board Thickness 0.060”, Board Material FR-4, Multi-Layer

(Intermediate layers (Ground Plane and Power Plane [V_{CC1}]) are not shown.)