

2.4~2.5 GHz RF Front-End Module

Introduction

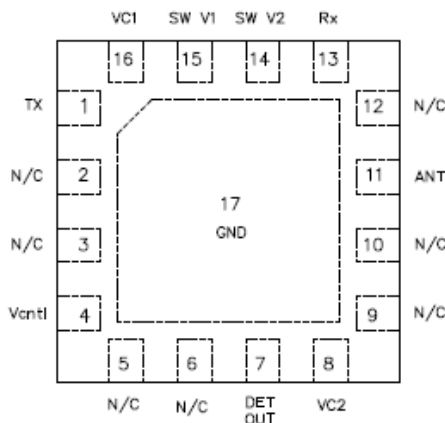
The FM2427 and FM2427U are fully integrated RF front-end module designed for dual-mode 802.11b/g WLAN applications. The device includes SPDT switch, a low-current linearized power amplifier (LPA), and power detector. Biasing and matching circuitries are all integrated to minimize the external components required.

The device is sold in a RoHS compliant miniature 3 x 3 x 0.8 mm (FM2427) or 3 x 3 x 0.5mm (FM2427U) 16-pin QFN package to make automated assembly simple. Its small and thin package size makes the device an ideal solution for radios built in small form factors for mobile applications.

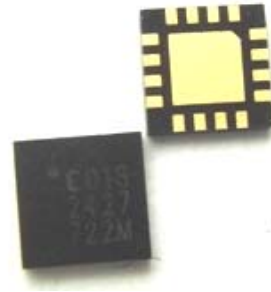
Applications

- IEEE 802.11b DSSS WLAN
- IEEE 802.11g OFDM WLAN
- 2.4 GHz Cordless Phones
- 2.4 GHz ISM Radios

Pin Assignment



< Top View >



Features

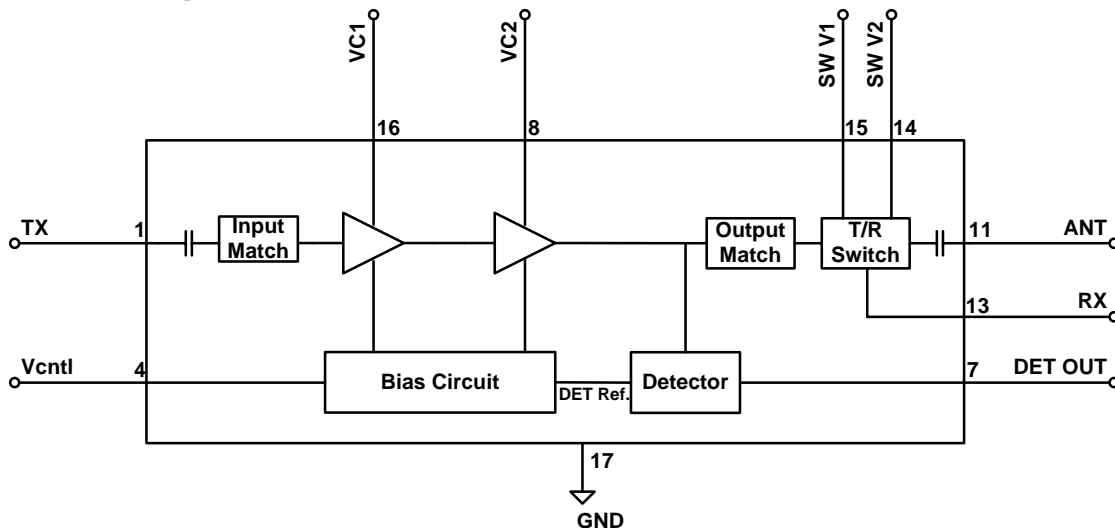
- 2.4 to 2.5 GHz Operating Range
- 25 dB Gain
- 3% EVM at Pout=+16 dBm (Icc=130mA @Vcc=+3.3V) at 54 Mbps OFDM signal
- Input and Output Matched to 50ohm
- On-chip power detector
- +3.3V Supply
- FM2427 : 3 x 3 x 0.8 mm 16-pin QFN Package
- FM2427U : 3 x 3 x 0.5 mm 16-pin QFN Package
- RoHS compliant product



Pin Description

Pin	Pin Name	Pin Description
1	Tx	2.4 GHz Tx input
2	N/C	No connection
3	N/C	No connection
4	Vcntl	2.4 GHz PA control voltage
5	N/C	No connection
6	N/C	No connection
7	DET OUT	Detector output voltage
8	VC2	2.4 GHz PA Vcc
9	N/C	No connection
10	N/C	No connection
11	ANT	RF output Ant
12	N/C	No connection
13	Rx	2.4 GHz Rx output
14	SW V2	SW control voltage 2
15	SW V1	SW control voltage 1
16	VC1	2.4 GHz PA Vcc
17	GND	Package backside ground slug

Functional Diagram



Truth Table

State	V1	V2	ANT
1	' 0 '	' 1 '	TX
2	' 1 '	' 0 '	RX

V1, V2: ' 0 ' = 0 to +0.2V, ' 1 ' = +3 to +5V

Specifications

Absolute Maximum Ratings

PARAMETER	RATING
Vcc, Vc1, Vc2, Vcntl	-0.5V to +4.5V
Operating Temperature Range	-20°C to +85°C
Junction Temperature	+150°C
Storage Temperature Range	-65°C to +125°C
Total Power Dissipation, TA = +70°C	1.3 W
Soldering Conditions	260°C peak for 20 seconds

DC Electrical Characteristics (Temp.=25°C)

PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply Voltages					
Vc1		3.0	3.3	3.6	Volts
Vc2		3.0	3.3	3.6	Volts
Vcntl			2.8		Volts
Supply Currents					
Ic1 + Ic2	Quiescent (no RF)		75		mA
Icntl			4		mA

AC Electrical Characteristics (Temp.=25°C)

PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
RF Frequency Range (Note 1)		2.4		2.5	GHz
Power Gain	Vcc = 3.3V, Vcntl = 2.8V		25		dB
Input Return Loss			-10		dB
Output Return Loss			-10		dB
Isolation :					
Tx – Rx		18	20		dB
Tx – Antennas		18	20		dB
P1dB			22		dBm
Bias current @3.3V	Quiescent 64QAM/54Mbps, Pout=16dBm		75 130		mA
Sleep Mode current	Vcc = 3.3V, Vcntl = 0V		2		uA
Detector voltage range	Pout=16 dBm		500		mV
ACPR 1 st Side Lobe	11b, 1 Mbps Long, Pout=16 dBm		-38		dBc
ACPR 2 nd Side Lobe	11b, 1 Mbps Long, Pout=16 dBm		-57		dBc
2 nd Harmonics	Pout=18 dBm		-30		dBc
EVM	64QAM/54Mbps, Pout=16dBm		3		%

Note 1: Operation outside this range is possible, but not guaranteed

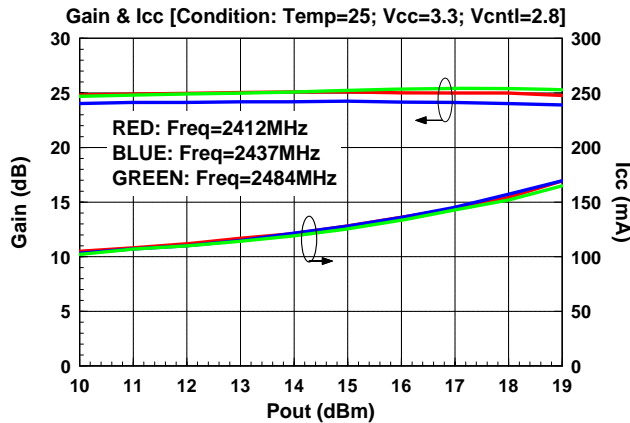
Receive Path Electrical Characteristics (Temp.=25°C)

PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Frequency Range		2.4		2.5	GHz
Insertion Loss	Vcc=3.3V		1.0		dB
Input Return Loss			-10		dB
Output Return Loss			-10		dB
Isolation : Rx - Antennas			20		dB

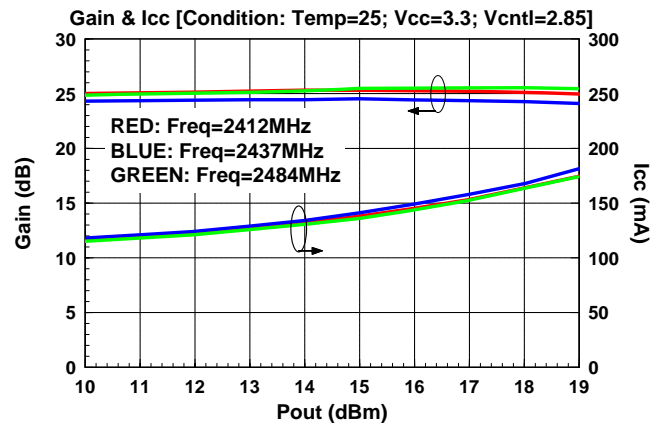
Test Data & Diagrams

Over Freq. Test Data at Vcc=+3.3V, Temp.=+25°C, 11g, 54Mbps 64QAM OFDM

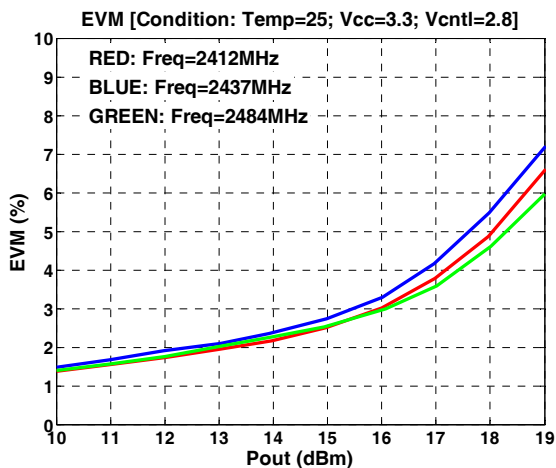
Gain & Icc vs Pout (Vcntl = 2.8V)



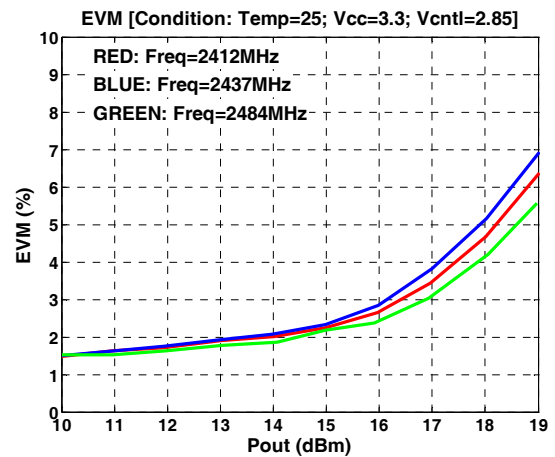
Gain & Icc vs Pout (Vcntl = 2.85V)



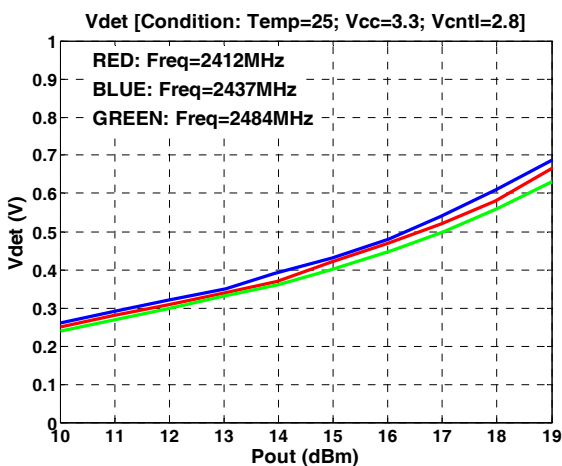
EVM vs Pout (Vcntl = 2.8V)



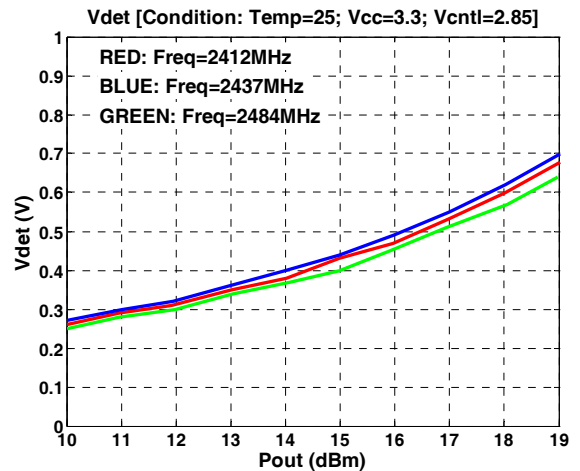
EVM vs Pout (Vcntl = 2.85V)



Vdet vs Pout (Vcntl = 2.8V)

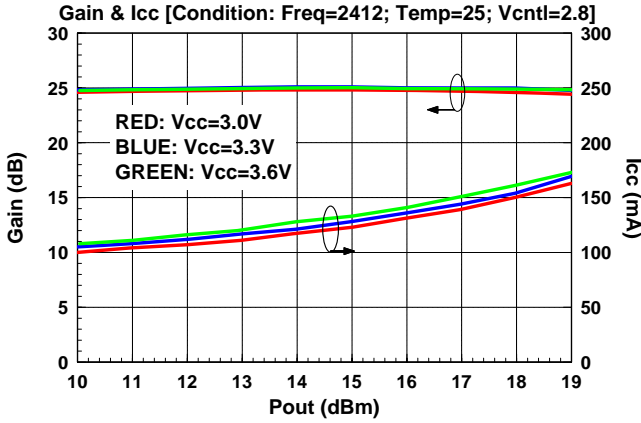


Vdet vs Pout (Vcntl = 2.85V)

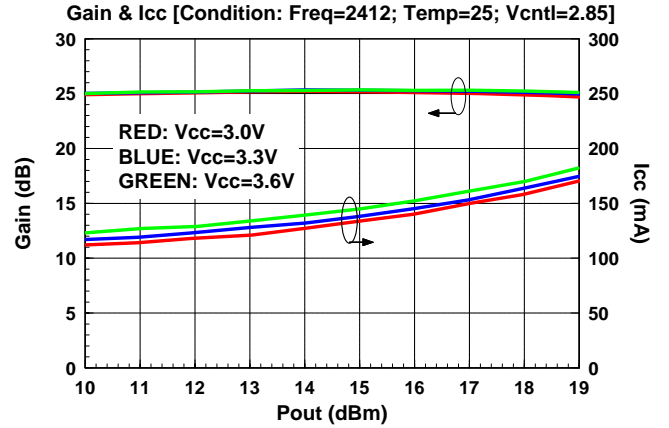


Over Vcc Test Data at Freq.=2412MHz, Temp.=+25°C, 11g, 54Mbps 64QAM OFDM

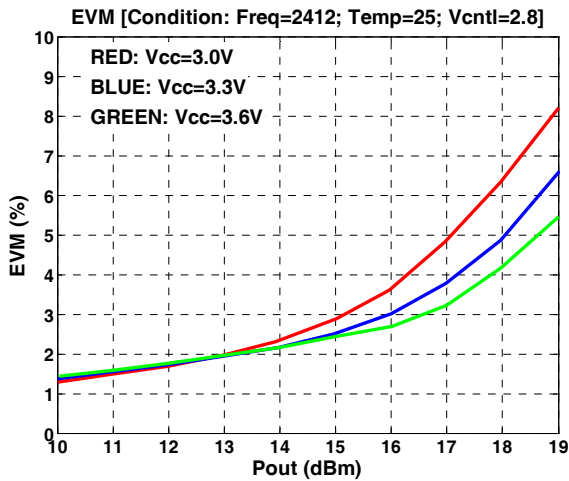
Gain & Icc vs Pout (Vcntl = 2.8V)



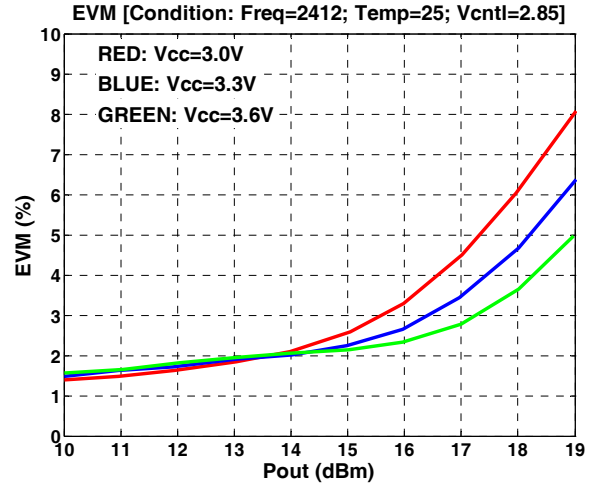
Gain & Icc vs Pout (Vcntl = 2.85V)



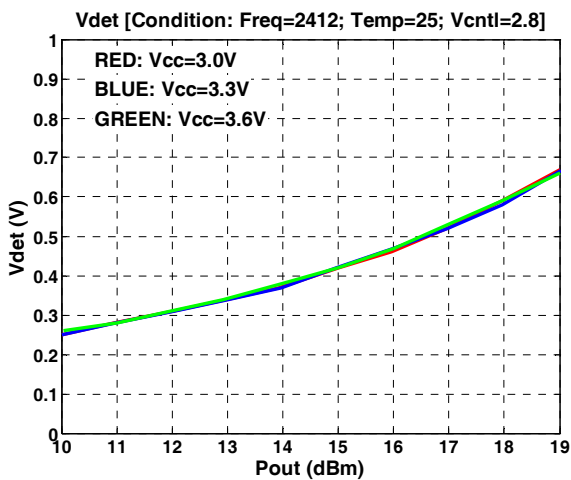
EVM vs Pout (Vcntl = 2.8V)



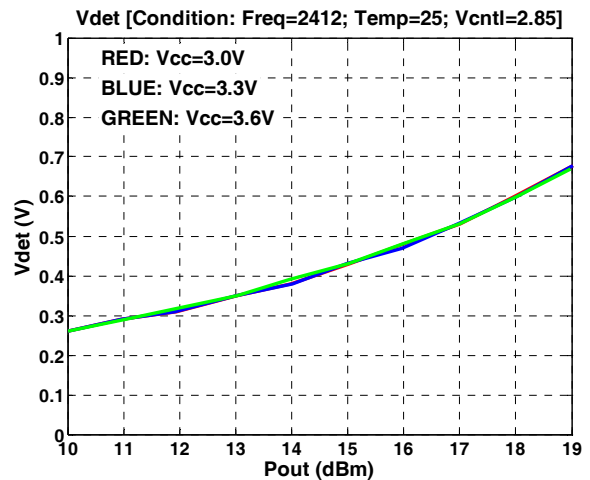
EVM vs Pout (Vcntl = 2.85V)



Vdet vs Pout (Vcntl = 2.8V)

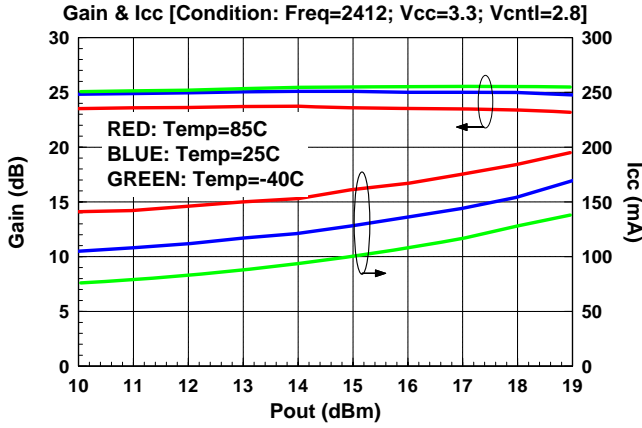


Vdet vs Pout (Vcntl = 2.85V)

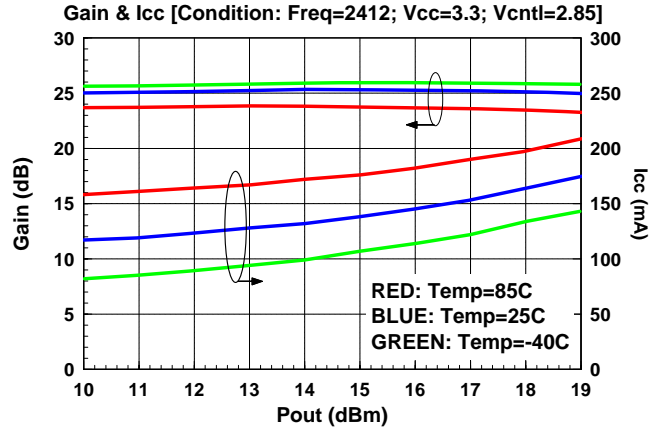


Over Temp. Test Data at Freq.=2412MHz, Vcc=+3.3V, 11g, 54Mbps 64QAM OFDM

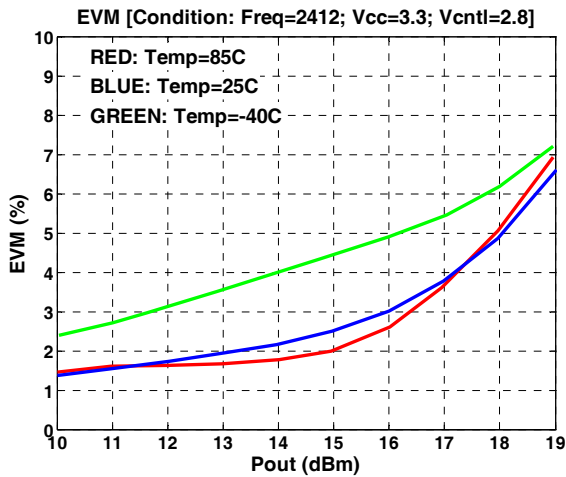
Gain & Icc vs Pout (Vcntl = 2.8V)



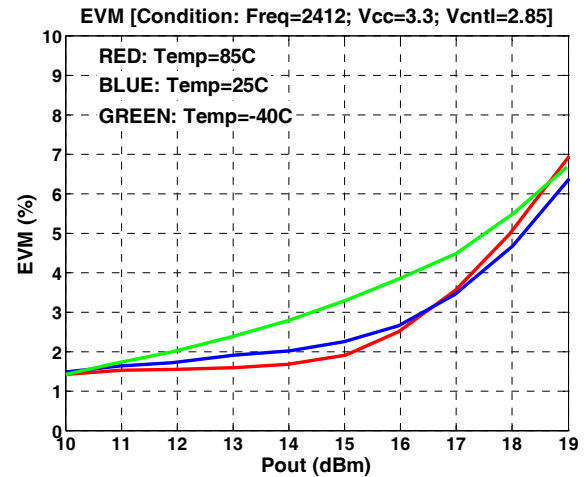
Gain & Icc vs Pout (Vcntl = 2.85V)



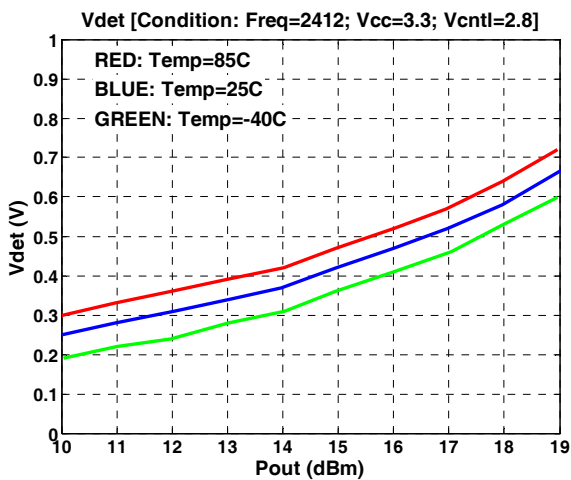
EVM vs Pout (Vcntl = 2.8V)



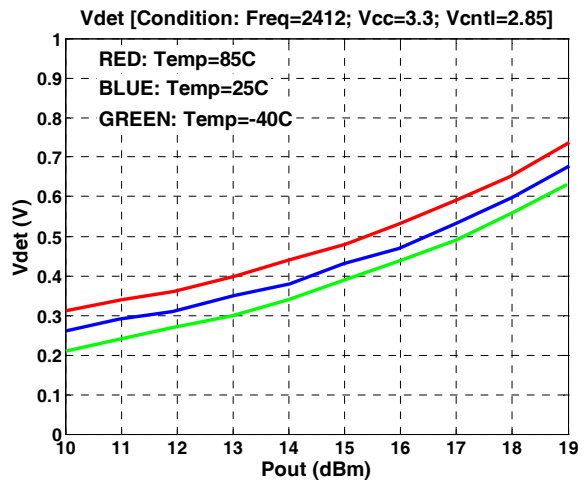
EVM vs Pout (Vcntl = 2.85V)



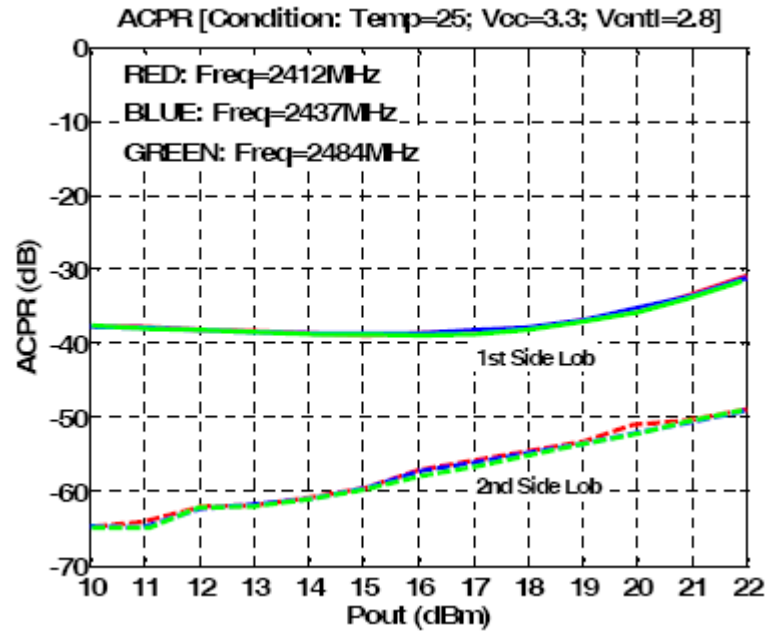
Vdet vs Pout (Vcntl = 2.8V)



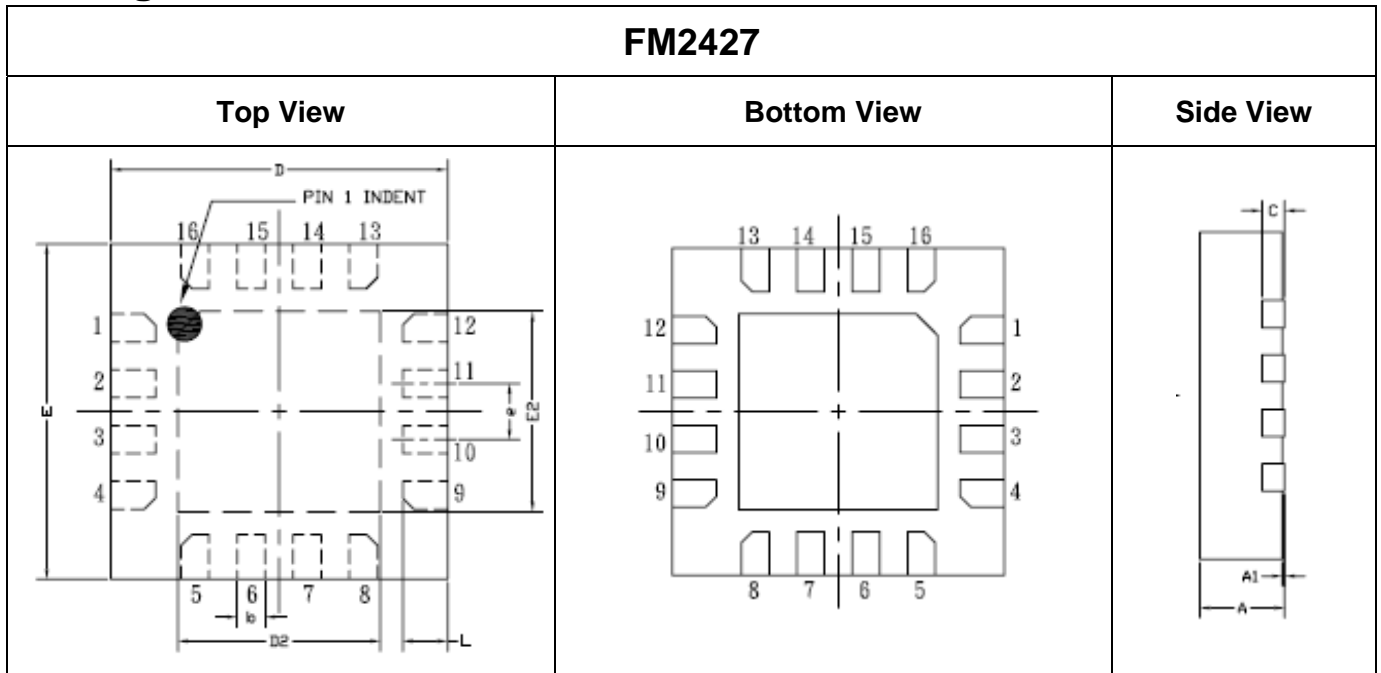
Vdet vs Pout (Vcntl = 2.85V)



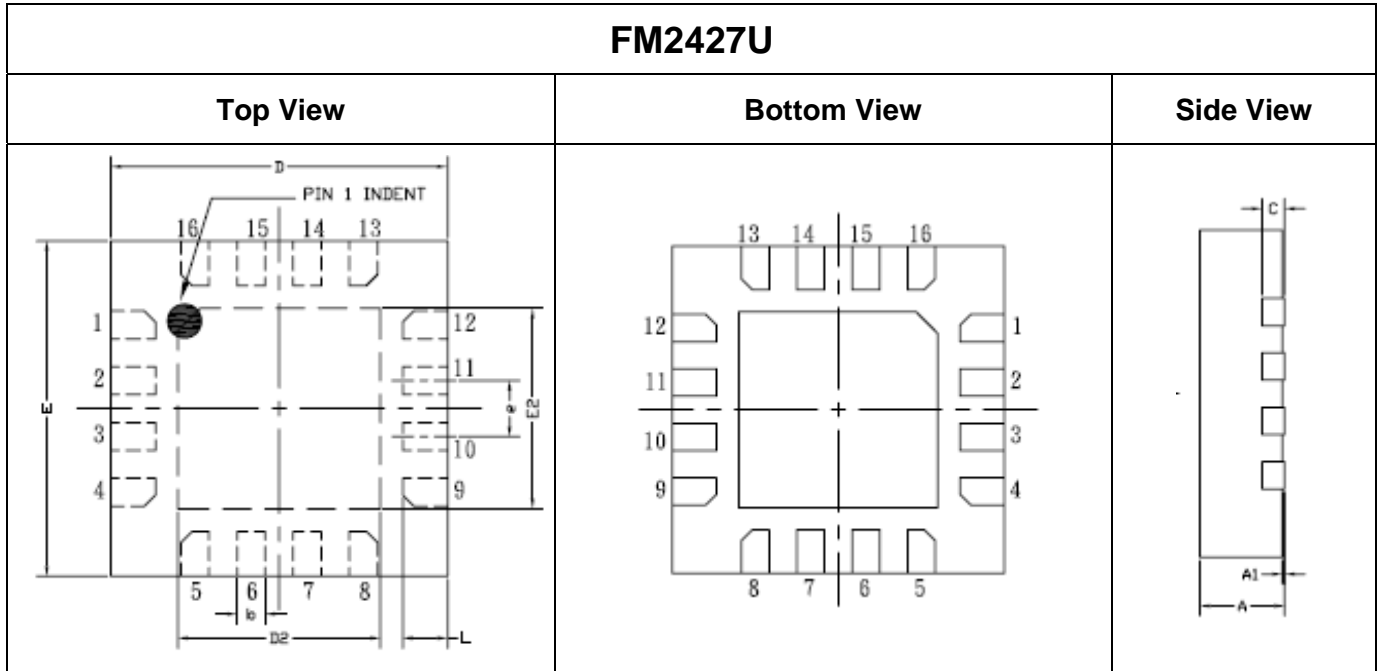
ACPR Performance at Freq.=2412 MHz, Vcc=+3.3V, Vcntl=2.8 V, Temp.=+25°C, 802.11b, 1Mbps Long



Package Dimensions



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.01	0.03	0.05
b	0.18	0.25	0.30
c	-	0.20 REF.	-
D	2.90	3.00	3.10
D2	-	1.7 BSC	-
e	-	0.50 BSC	-
E	2.90	3.00	3.10
E2	-	1.7 BSC	-
L	0.35	0.40	0.45

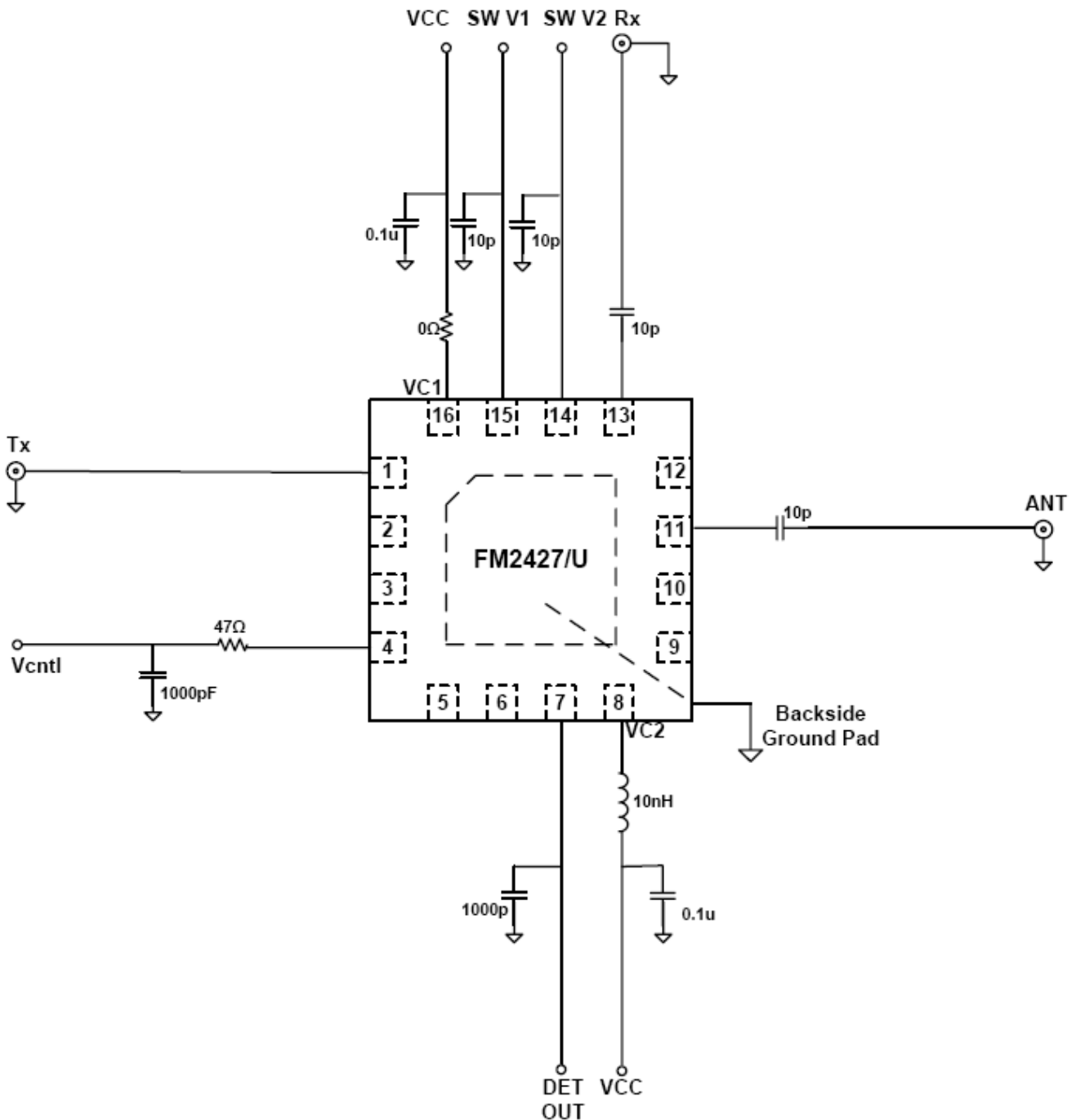


SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.40	-	0.55
A1	0	0.002	0.004
b	0.20	0.25	0.30
c	-	0.06 REF.	-
D	2.95	3.00	3.05
D2	-	1.70 BSC	-
e	-	0.50 BSC	-
E	2.95	3.00	3.03
E2	-	1.70 BSC	-
L	0.35	0.40	0.45

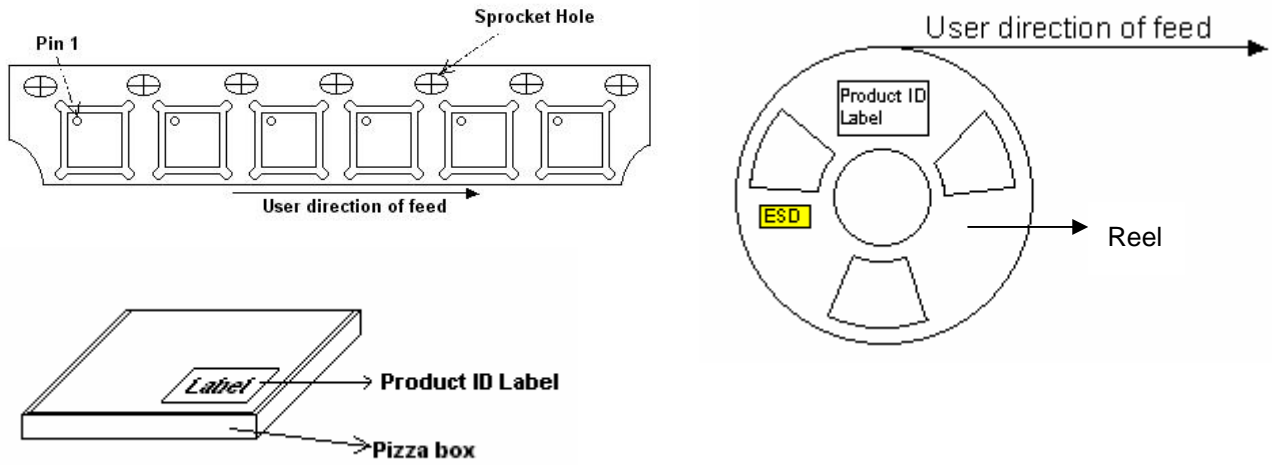
Application Note

Specified data on the datasheet is evaluated with configuration below. However, fine tuning may be required due to difference in the actual product board layout. Evaluation PCB design will be provided upon request. It is very important to make all RF and DC connections before applying RF or DC power. Use short, shielded twisted pair test leads to avoid interference. Always wear an ESD wrist strap when handling RF IC.

Typical Application Circuit



Packing Information



Ordering Information

Ordering Number	Component Packing
FM2427	1000pcs / Tape & Reel
FM2427U	1000pcs / Tape & Reel

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