DATA SHEET

SKY65206-13: WLAN 802.11b/g Intera™ Front-End Module

Features

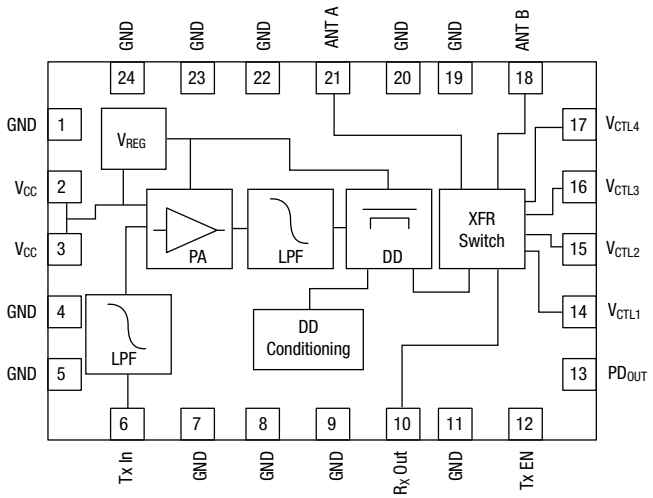
- 2.4–2.5 GHz operation
- Advanced InGaP HBT process
- 27 dB small signal gain
- 802.11g linear power at 3.0% EVM: 16 dBm
- 802.11b mask compliant power: 20 dBm
- Temperature compensated directional RF power detector
- GaAs FET 4-control transfer switch
- Low cost 8 x 7 x 1.4 mm plastic package
- Available on tape and reel
- Lead (Pb)-free and RoHS-compliant MSL-3 @ 240 °C per JEDEC J-STD-020

Description

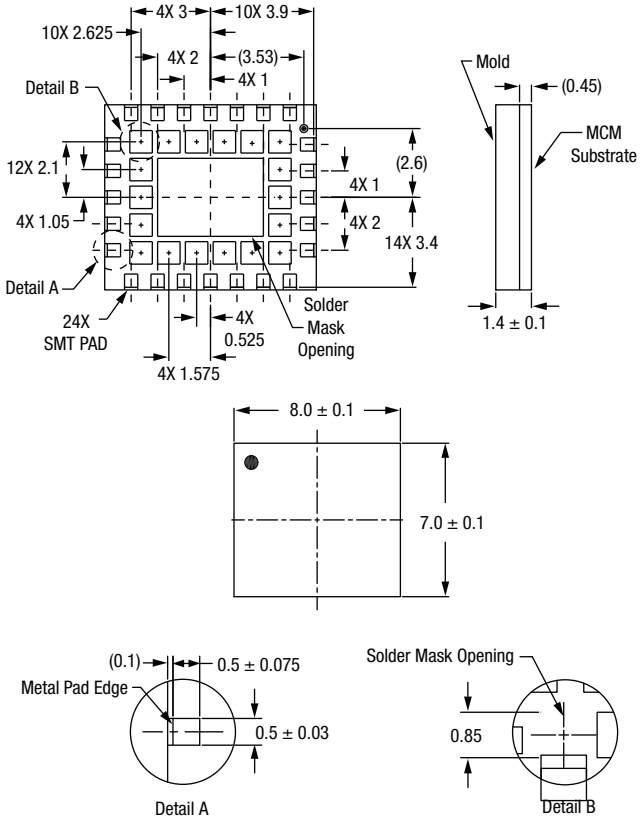
The SKY65206-13 is an integrated Intera RF front-end module for 802.11b/g WLAN applications. A single supply voltage and a positive supply switch control simplifies bias requirements. The PA is manufactured using the Skyworks InGaP HBT process. Modules are 100% RF tested prior to shipment for guaranteed performance. The SKY65206-13 is targeted for high-volume 802.11b/g WLAN access point, PCMCIA, and PC card applications.

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.

Block Diagram



Package Dimensions



Absolute Maximum Ratings

Characteristic	Value
RF input power	20 dBm
Supply voltage	4 V
Supply current	600 mA
Operating temperature	-40 °C to +85 °C
Storage temperature	-65 °C to +85 °C
Moisture sensitivity level	MSL-3 @ 240 °C
θ_{JC}	55 °C/W

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: *Although this device is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.*

Pin Descriptions

Pin Number	Symbol	Description
1, 4, 5, 7, 8, 9, 11, 19, 20, 22, 23, 24	GND	Equipotential point. Must be connected to PCB ground via lowest possible impedance.
2, 3	V_{CC}	DC power supply voltage input to power amplifier and to the internal voltage regulator which biases the internal directional detector. Pins are connected together for current sharing.
6	Tx IN	Transmitter RF input port. Nominal input impedance = 50 Ω.
10	Rx OUT	Receiver RF output port. Nominal output impedance = 50 Ω.
12	Tx EN	High impedance DC control voltage input to enable/disable the power amplifier.
13	PD_{OUT}	Detected output voltage from directional detector
14	V_{CTL1}	High impedance DC control voltage input 1 for transfer switch
15	V_{CTL2}	High impedance DC control voltage input 2 for transfer switch
16	V_{CTL3}	High impedance DC control voltage input 3 for transfer switch
17	V_{CTL4}	High impedance DC control voltage input 4 for transfer switch
18	ANT B	RF antenna I/O port B. Nominal impedance = 50 Ω.
21	ANT A	RF antenna I/O port A. Nominal impedance = 50 Ω.

Truth Table

MODE	V_{CTL1} (V)	V_{CTL2} (V)	V_{CTL3} (V)	V_{CTL4} (V)	V_{CC} (V)	Tx EN (V)
Tx-ANTA	3.3	0	0	0	3.3	3
Rx-ANTA	0	3.3	0	0	3.3	0
Rx-ANTB	0	0	3.3	0	3.3	0
Tx-ANTB	0	0	0	3.3	3.3	3

All other conditions not recommended.

General RF Receive Electrical Specifications

T_A = 25 °C, Z_0 = 50 Ω, unless otherwise noted

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Frequency range	F		2400		2500	MHz
Insertion loss	$\lvert S_{21} \rvert$	Small signal		1		dB
In-band ripple	$\lvert \Delta S_{21} \rvert$	Small signal		0.1		dB
Input return loss	$\lvert S_{11} \rvert$	Small signal		19		dB
Output return loss	$\lvert S_{22} \rvert$	Small signal		17		dB

General RF Transmit Electrical Specifications

T_A = 25 °C, V_{CC} = 3.3 V, Z_0 = 50 Ω, unless otherwise noted

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Frequency range	F		2400		2500	MHz
Gain	$\lvert S_{21} \rvert$	Small signal	25	27	31	dB
Gain variation over frequency	$\lvert \Delta S_{21} \rvert$	Small signal		1.4		dB
Quiescent current	I_{CQ}	(No RF signal)		0.12		A
Current consumption	I_{CC}	CW at P_{OUT} = 16 dBm		0.17	0.19	A
Input return loss	$\lvert S_{11} \rvert$	Small signal		11		dB
Output return loss	$\lvert S_{22} \rvert$	Small signal		19		dB
Output P1dB	$P_{1\ dB}$	CW		23		dBm
Detector voltage	PD_{OUT}	CW at P_{OUT} = 4 dBm		0.93		V
Detector voltage	PD_{OUT}	CW at P_{OUT}= 12 dBm		0.826		V
Detector voltage	PD_{OUT}	CW at P_{OUT}= 21 dBm		0.486		V

802.11g Electrical Specifications

OFDM Modulation, 54 Mbps, T_A = 25 °C, V_{CC} = 3.3 V

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Linear power at 2.442 GHz	P_{OUT}	54 Mbps at 3% EVM		16.4		dBm
Current consumption	I_{CC}	54 Mbps at linear power		0.17		A

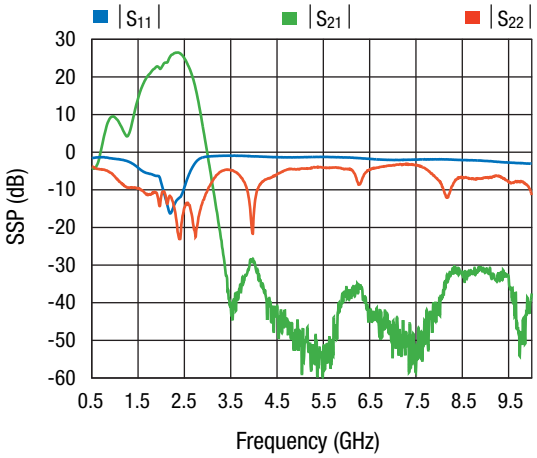
802.11g Electrical Specifications

CCK Modulation, 11 Mbps, T_A = 25 °C, V_{CC} = 3.3 V

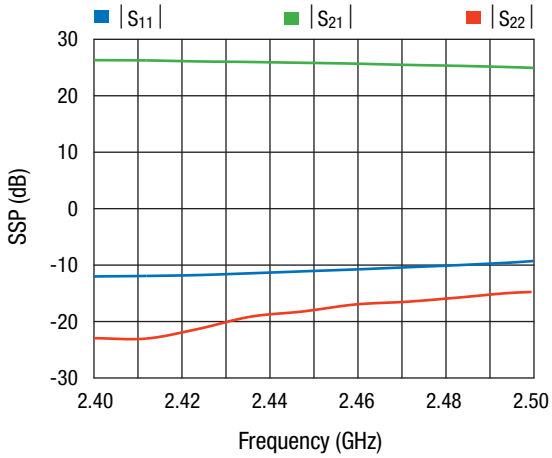
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Linear power at 2.442 GHz	P_{OUT}	11 Mbps		20		dBm
Current consumption	I_{CC}	11 Mbps at compliant power		0.230		A

802.11b data is taken with a raised cosine filter and an alpha factor of 0.7.

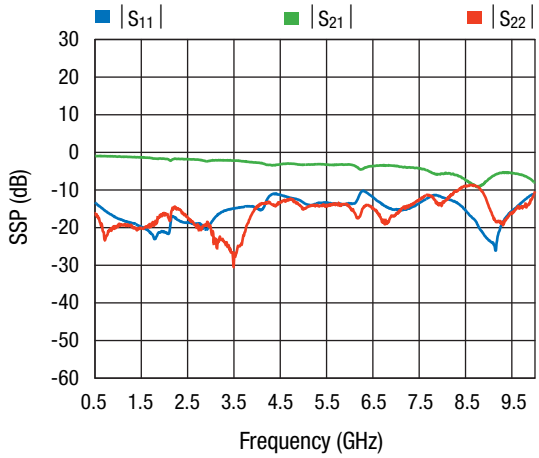
Typical Performance Data



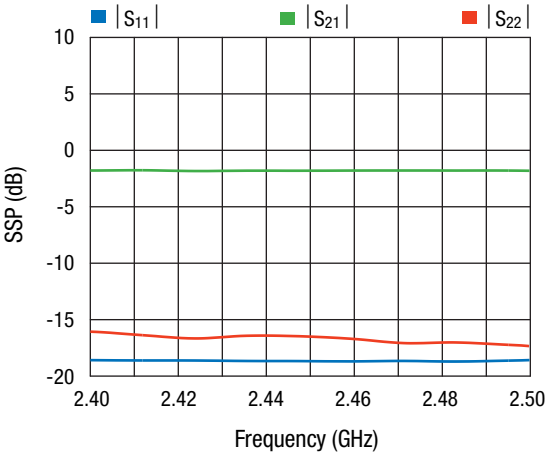
Small Signal Transmit Parameters (Broadband)
Conditions: V_{CC} = 3.3 V, T_A = 25 °C



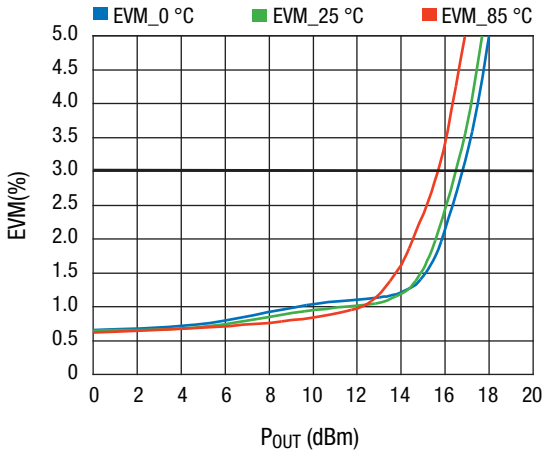
Small Signal Parameters (Narrowband)
Conditions: V_{CC} = 3.3 V, T_A = 25 °C



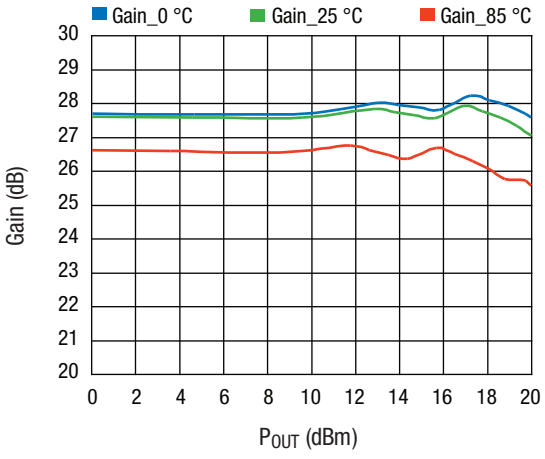
Small Signal Receive Parameters (Broadband)
Conditions: T_A = 25 °C



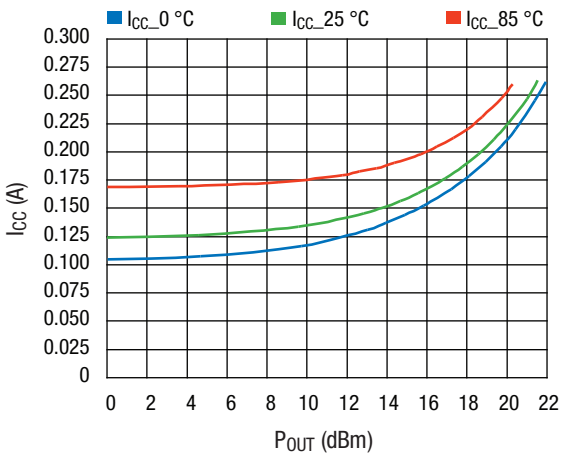
Small Signal Receive Parameters (Narrowband)
Conditions: T_A = 25 °C



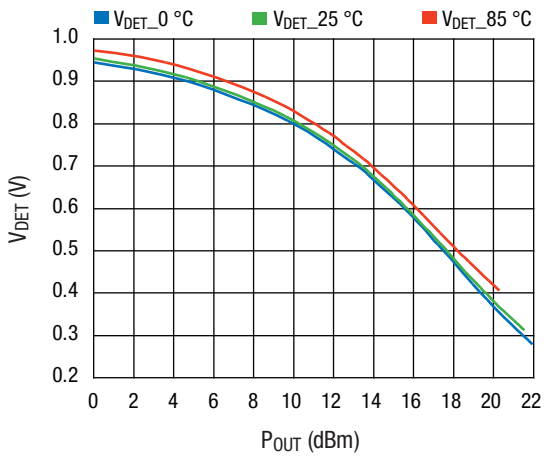
EVM vs. P_{OUT}
V_{CC} = 3.3 V, F_C = 2.45 GHz, OFDM 54 Mbps



Gain vs. P_{OUT}
V_{CC} = 3.3 V, F_C = 2.442 GHz, OFDM 54 Mbps

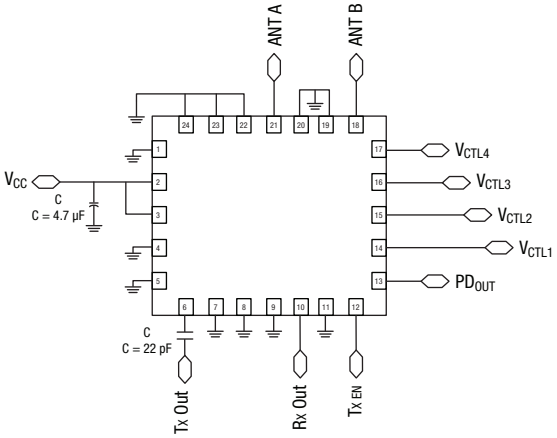


I_{CC} vs. P_{OUT}
V_{CC} = 3.3 V, F_C = 2.45 GHz, OFDM 54 Mbps

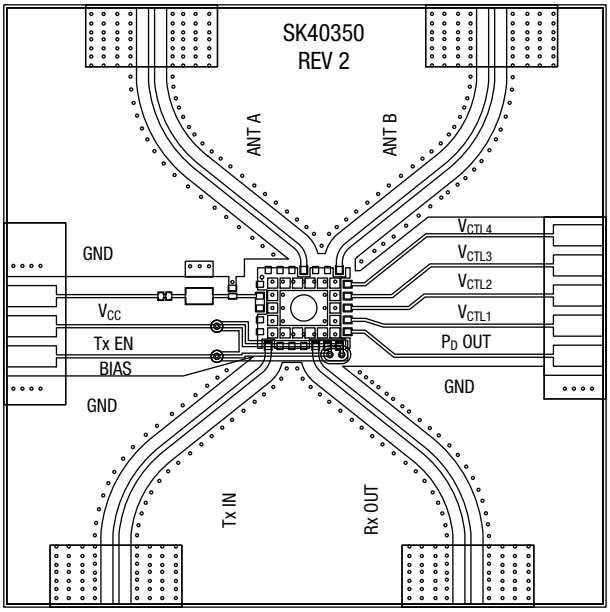


V_{DET} vs. P_{OUT}
V_{CC} = 3.3 V, F_C = 2.45 GHz, OFDM 54 Mbps

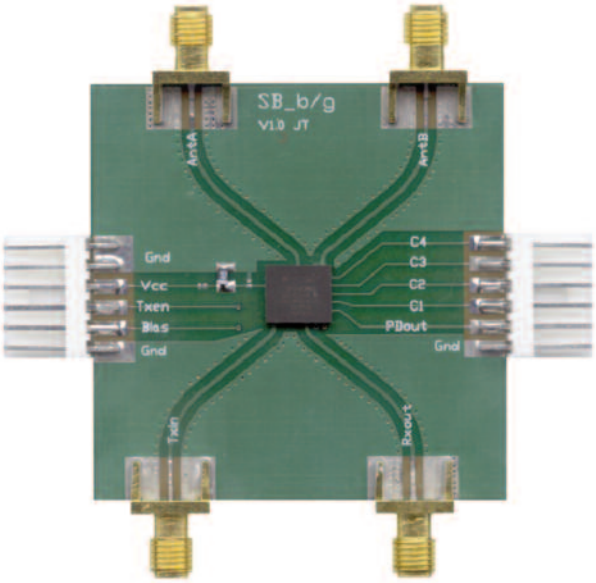
Application Circuit



Board Layout



Board Photograph



Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

Tape and Reel Information

Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.

Control Pin Table

Pin Name	Application Board Port Name
V_{CTL1}	C_1
V_{CTL2}	C_2
V_{CTL3}	C_3
V_{CTL4}	C_4

Test Procedure

Use the following procedure to set up the SKY65206 evaluation board for testing. Refer to the Application Circuit and Board Layout for guidance:

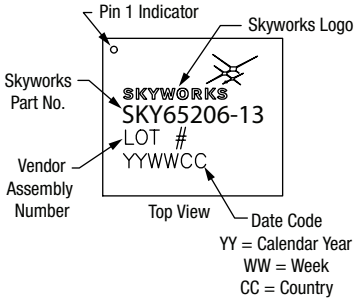
1. Connect a 3.3 V supply to V_{CC}. If available, enable the current limiting function of the power supply to 600 mA.
2. Connect a 3.3V supply to V_{CTL} 1–4. See Truth Table. Unused V_{CTL} pins must be grounded or set to 0 V. Do not float the connections.
3. Connect a 3 V supply to Tx EN. See Truth Table.
4. No connection to BIAS pin.
5. Connect a DVM to V_{DET}.
6. Connect a signal generator to the RF signal input port. Set it to the desired RF frequency at a power level of -15 dBm or less to the evaluation board, but do not enable the RF signal.
7. Connect a spectrum analyzer to the RF signal output port.

IMPORTANT: *Terminate all unused ports in 50 Ω.*

8. Enable the power supplies.
9. Enable the RF signal.
10. Take measurements.

CAUTION: *If any of the input signals exceed the rated maximum values, the SKY65206 Evaluation Board can be permanently damaged.*

Branding Specifications



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