

**DATA SHEET**

**SE5004L-EK1: 802.11a/n 26dBm WLAN RF Power Amplifier Evaluation Kit**

**Applications**

- DSSS 5 GHz WLAN (IEEE802.11a)
- DSSS 5 GHz WLAN (IEEE802.11n)
- Access Points, PCMCIA, PC cards

**Features**

- High output power amplifier
  - 26dBm at 5V
- External Analog Reference Voltage ( $V_{REF}$ ) for maximum flexibility
- Buffered, temperature compensated power detector
- 3% EVM, @26dBm, 64 QAM, 54 Mbps
- 32 dB Gain
- Lead Free, RoHS compliant and halogen free package
- 20 pin 4 mm x 4 mm x 0.9 mm QFN

**Product Description**

The SE5004L is a 5GHz power amplifier offering high linear power for wireless LAN applications. The SE5004L incorporates a power detector for closed loop monitoring and control of the output power.

The SE5004L offers high integration for a simplified design, providing quicker time to market and higher application board production yield. The device integrates the input match, the inter-stage match, the output match, the power detector with 15dB of dynamic range and a 3.8GHz notch filter.

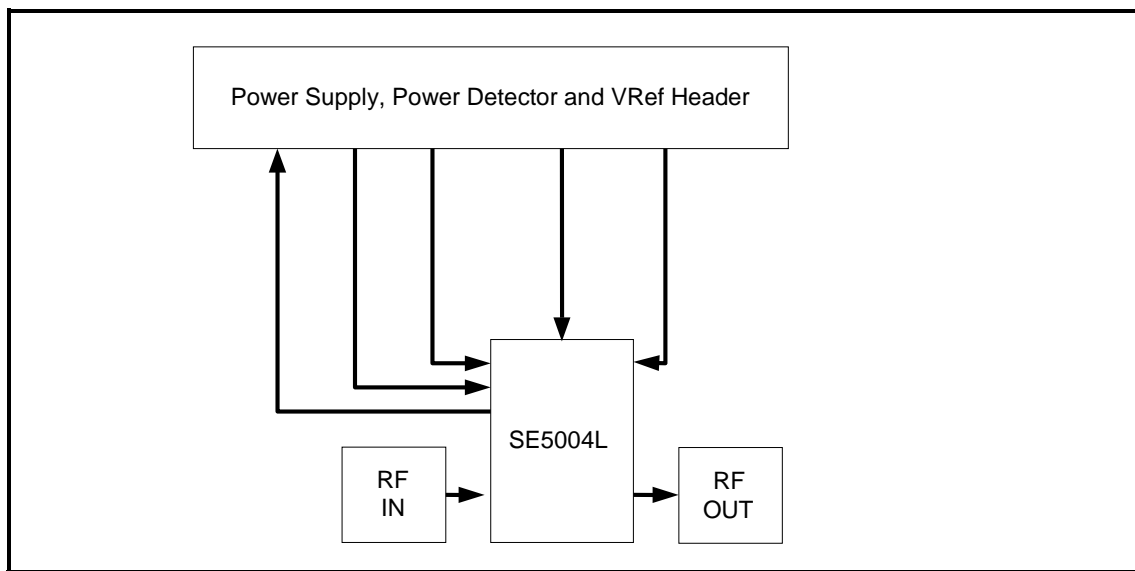
For wireless LAN applications, the device meets the requirements of IEEE802.11a & 802.11n, and delivers approximately 26dBm of linear output power at 5V.

The SE5004L integrates the reference voltage generator. A 2.85V reference voltage on VREF is all that is required to enable or disable the power amplifier.

**Ordering Information**

Part Number	Package	Remark
SE5004L	20 Pin QFN	Samples
SE5004L-R	20 Pin QFN	Tape and Reel
SE5004L-EK1	Evaluation Kit	Standard

**Functional Block Diagram**

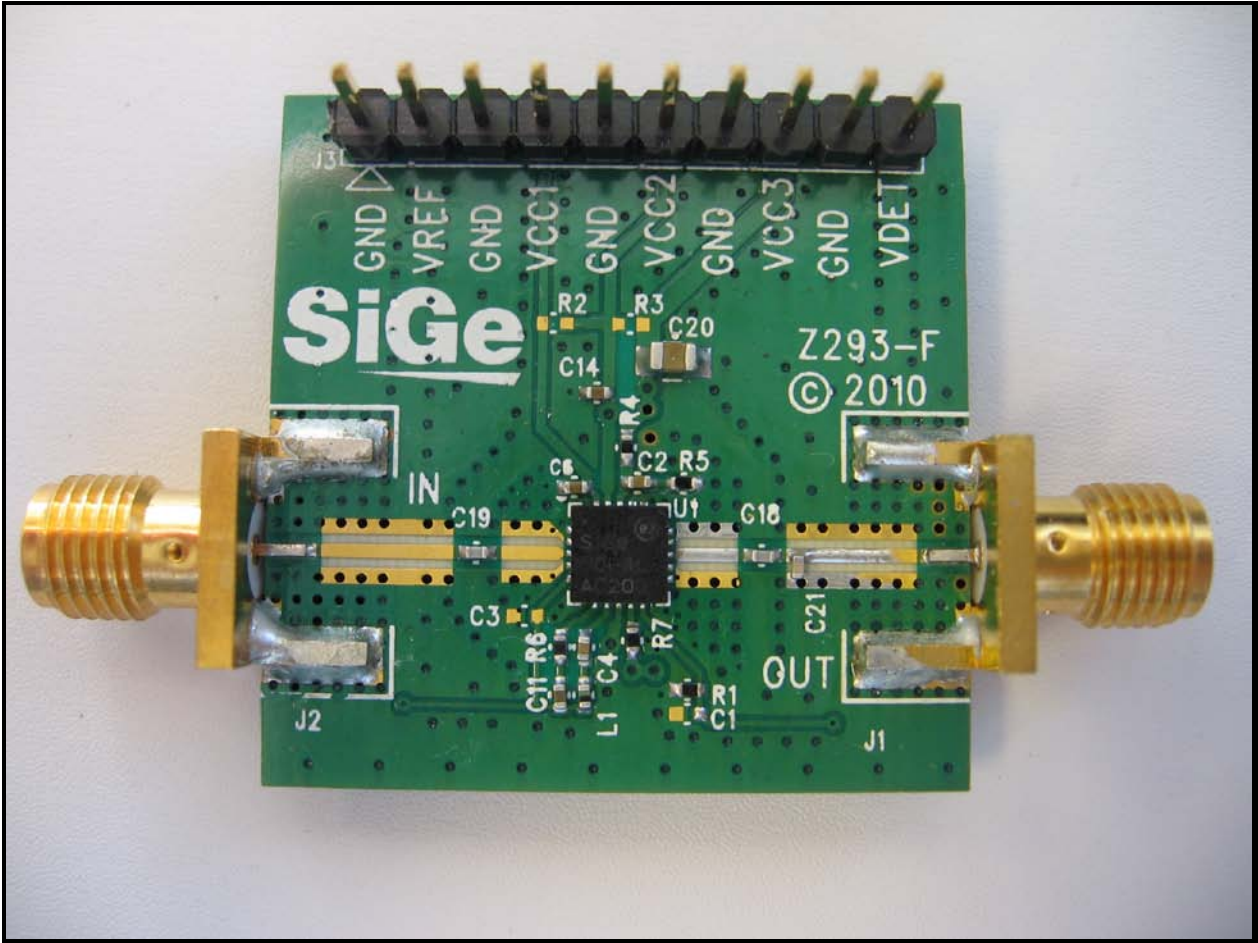


**Figure 1: SE5004L Evaluation Board Block Diagram**

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**Evaluation Board Photo**



**Figure 2: SE5004L Evaluation Board Photo**

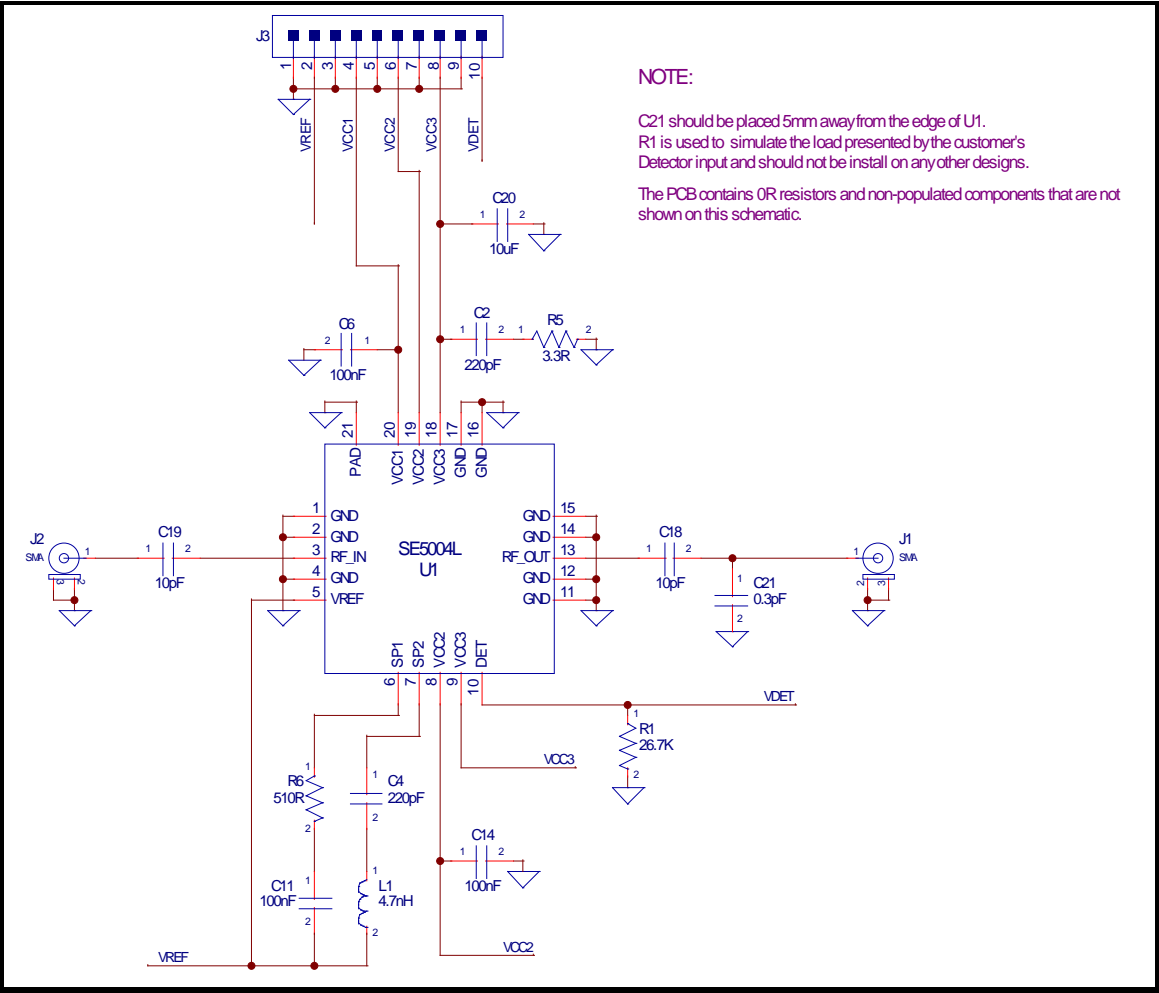
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**Contents of Evaluation Kit**

Quantity	Description	Reference
1	SE5004L Evaluation Board	SE5004L-EV1
1	SE5004L Datasheet	DST-00316
1	SE5004L Evaluation Kit Datasheet	DST-00317

**Table 1: Contents of Evaluation Kit**

**Evaluation Board Schematic**



**Figure 3: Evaluation Board Schematic Diagram**

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**Getting Started**

This section provides the details required to setup the evaluation board and the test equipment for the SE5004L-EK1 evaluation kit. Table 2 describes the pins on the Power and Analog I/O Header. Note: It is recommended to use proper engineering connection practices by making RF and digital connections prior to turning on the power supply.

1. Connect Supply.
  - a. Connect the supply ground to Pin 1 of J3.
  - b. Connect 5 V to Pin 4, 6 and 8 of J3.
2. Power Amplifier Enable. By applying 2.85 V on Vref (Pin 2, J3), the power amplifier is enabled. By placing a GND on Vref (Pin 2, J3), the power amplifier is disabled and placed in a “shutdown” state, drawing minimal current.
3. Measure Performance.
  - a. 5GHz amplifier performance can be monitored by applying an RF signal to connector J2 (RFIN), and monitoring the output power on the RFout port connector J1.
  - b. Detector performance can be monitored on Pin 10 of J4.
  - c. Care should be taken not to overdrive the amplifier by applying too much RF on the input to the device. -20dBm provides a suitable starting input power for the device.

Pin	Pin Number	Description	Recommended setting
<b>J3 Header 10 x 1</b>			
GND	1,3,5,7,9	Ground	Connect to Ground
Vref	2	Reference voltage supply	Connect to 2.85V power supply.
VCC	4,6,8	Supply voltage	Connect to 5 V power supply
VDet	10	Detector Output	Monitor voltage by connecting to volt-meter.

**Table 2: Power and Analog I/O Header**

**Evaluation Board Bill of Materials**

Table 3: Shows the components used in the design of the SE5004L evaluation board. Skyworks Solutions does not endorse any specific vendors.

VALUE	MANUFACTURER	MANUFACTURER_PN	PACKAGE	DESCRIPTION
220pF	MURATA	GRM1555C1H221JA01	0402	Multilayer Ceramic
100nF	MURATA	GRM155R71C104KA88D	0402	Multilayer Ceramic
10pF	MURATA	GRM1555C1H100JZ01	0402	Multilayer Ceramic
10uF	MURATA	GRM21BR61A106KE19	0805	ceramic
0.3pF	MURATA	GJM1555C1HR30BB01D	0402	RF, High Q, Low Loss
SMA	Johnson Components	142-0701-851	END LAUNCH	SMA End Launch Straight Jack Receptacle
10X1	Samtec	TSW-110-07-G-S	100MIL	100mil Header
4.7nH	MURATA	LQG15HN4N7S02D	0402	Monolithic Inductor (Air-core)
26.7K	Panasonic	ERJ2RK2672	0402	Thick Film Chip Resistor
3.3R	Panasonic	ERJ2GEJ3R3	0402	Thick Film Chip Resistor
510R	Panasonic	ERJ2GEJ511	0402	Thick Film Chip Resistor
SE5004L	Skyworks Solutions	SE5004L	QFN400X400	5GHz ,26dBm Power Amplifier with Power Detector

**Table 3: SE5004L Evaluation Board BOM**

Notes:

- Schematic and BOM has been designed to optimize performance in 802.11an applications.



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**Document Change History**

Revision	Date	Notes
1.0	Nov-03-2009	Created
1.1	Jan-14-2010	Updated Pinout
1.2	Jan-15-2010	Updated the schematic
1.3	Jan-18-2010	Updated Power and Signal Header definitions
1.4	Feb-11-2010	Updated schematic and BOM
1.5	Mar-31-2010	Corrected text in "Getting Started" section. Simplified the schematic.
1.6	Apr-19-2010	Updated schematic and BOM
1.7	Oct-27-2010	Updated schematic, BOM and Photo

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