**DATA SHEET**
# SE2574L: 2.4 GHz High Efficiency Wireless LAN PA

## Applications

- IEEE802.11b DSSS WLAN
- IEEE802.11g OFDM WLAN
- Embedded, SiP modules

## Features

- Dual Mode IEEE802.11b & IEEE802.11g
- Integrated PA, digital bias control, 50Ω input and output match, 3.2GHz TX Filter.
- Integrated harmonic filter.
- Integrated load insensitive Power Detector, with <1dB error at 2:1 mismatch
- 20 dBm Output Power, 802.11b, 11 Mbps, ACPR <-30 dBc
- 18dBm @ 3.0 % EVM, 802.11g, 54 Mbps
- 2.3 V to 5.0 V direct to battery supply
- Lead free, Halogen free, ROHS compliant , 2 x2x0.9 mm QFN package, MSL 1

## Product Description

The SE2574L is a complete 802.11 b/g WLAN discrete power amplifier. The device provides all the functionality of the power amplifier, power detector, filter, associated input, inter-stage and output matching in an ultra compact 2mm x 2mm x 0.9mm form factor.

The SE2574L is designed for ease of use, with all the critical input and output matching integrated. The SE2574L includes a transmitter power detector with 20 dB of dynamic range and a digital Enable for power on/off control. Harmonic filters and an input 3.2GHz LO rejection filter are integrated on-chip. The power ramp rise/fall time is 0.7 µs typical.

## Ordering Information

| Part No. | Package | Remark |
|---|---|---|
| SE2574L | 8 pin QFN | Samples |
| SE2574L-R | 8 pin QFN | Tape and Reel |
| SE2574L-EK1 | N/A | Evaluation kit |

## Functional Block Diagram

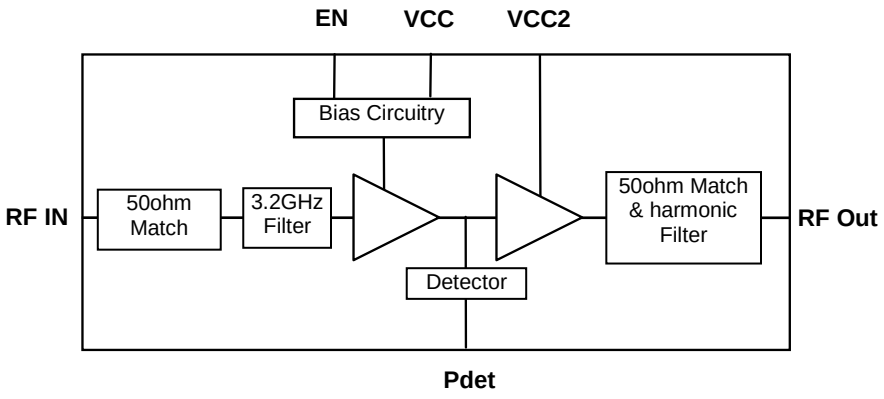


**Figure 1: Functional Block Diagram**

## Pin Out Diagram

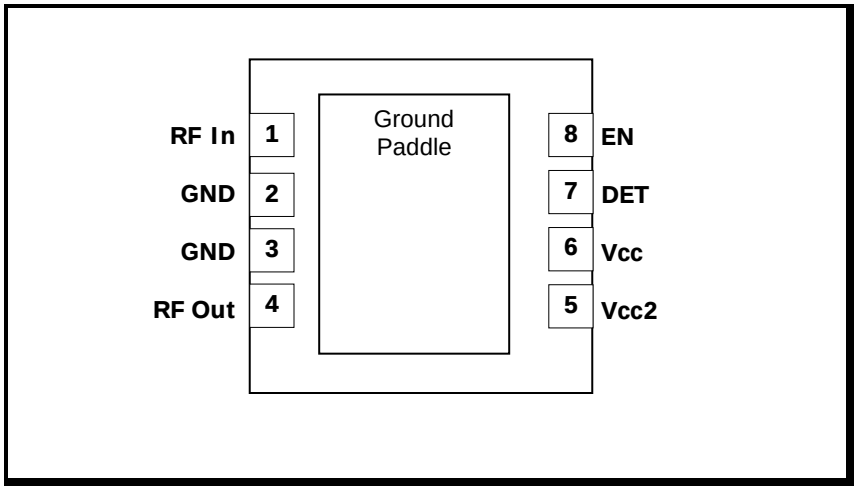


**Figure 2: SE2574L Pin Out (Top View Through Package)**

## Pin Out Description

| Pin No. | Name | Description |
|---|---|---|
| 1 | RF In | RF Input (No DC voltage on the pin, but DC short to ground) |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | RF Out | RF Output (No DC voltage on the pin, DC open to ground) |
| 5 | VCC2 | Final Stage Supply Voltage (May attach directly to battery) |
| 6 | VCC | First Stage Supply Voltage (May attach directly to battery) |
| 7 | DET | Power Detector Output |
| 8 | EN | Power Amplifier Enable |
| Die paddle | GND | Ground |

## Absolute Maximum Ratings

These are stress ratings only. Exposure to stresses beyond these maximum ratings may cause permanent damage to, or affect the reliability of the device. Avoid operating the device outside the recommended operating conditions defined below. This device is ESD sensitive. Handling and assembly of this device should be at ESD protected workstations.

| Symbol | Definition | Min. | Max. | Unit |
|---|---|---|---|---|
| VCC | Supply Voltage on VCC | -0.3 | 5.5 | V |
| EN | DC input on EN | -0.3 | 4.0 | V |
| TX | RF Input Power. ANT terminated in 50Ω match | - | 12.0 | dBm |
| $T_A$ | Operating Temperature Range | -40 | 85 | °C |
| $T_{STG}$ | Storage Temperature Range | -40 | 150 | °C |
| $ESD_{HBM}$ | JEDEC JESD22-A114 all pins | - | 500 | V |

## Recommended Operating Conditions

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $T_A$ | Ambient temperature | -40 | 25 | 85 | °C |
| VCC | Supply voltage, nominal operation | 2.7 | 3.3 | 5.0 | V |
| | Supply voltage, output power reduced by 2dB typ | 2.3 | 2.7 | - | |

## DC Electrical Characteristics

Conditions: VCC = 3.3V (default) or VCC = 5.0V (as noted), EN = 3.3V, $T_A$ = 25 °C, as measured on Skyworks Solutions' SE2574L-EK1 evaluation board, all unused ports terminated with 50 ohms, unless otherwise noted.

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CC-G}$ | Total Supply Current | 54 Mbps OFDM signal, 64QAM<br>18dBm, VCC = 3.3V<br>20.5dBm, VCC = 5.0V | - | <br>135<br>150 | - | mA |
| $I_{CC-N}$ | Total Supply Current | 802.11n, MCS7<br>17dBm, VCC = 3.3V<br>19dBm, VCC = 5.0V | - | <br>115<br>130 | - | mA |
| $I_{CC-B}$ | Total Supply Current | 11 Mbps CCK signal, BT = 0.45<br>20dBm, VCC = 3.3V<br>22dBm, VCC = 5.0V | - | <br>160<br>175 | - | mA |
| $I_{CQ}$ | Total Supply Current | No RF VCC = 3.3V<br>VCC = 5V | - | 90<br>100 | - | mA |
| $I_{CC\_OFF}$ | Total Supply Current | EN = 0 V, No RF Applied | - | 1 | 10 | µA |

## Logic Characteristics

Conditions: VCC = 3.3V (default) or VCC = 5.0V (as noted), EN = 3.3V, $T_A$ = 25 °C, as measured on Skyworks Solutions' SE2574L-EK1 evaluation board, all unused ports terminated with 50 ohms, unless otherwise noted.

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{ENH}$ | Logic High Voltage (Module On) | - | 1.8 | - | 3.6 | V |
| $V_{ENL}$ | Logic Low Voltage (Module Off) | - | 0 | - | 0.4 | V |
| $I_{ENH}$ | Input Current Logic High Voltage | - | - | 2 | 10 | µA |
| $I_{ENL}$ | Input Current Logic Low Voltage | - | - | 2 | 10 | µA |

## AC Electrical Characteristics

### 802.11g/n Transmit Characteristics

Conditions: VCC = 3.3V (default) or VCC = 5.0V (as noted), EN = 3.3V, $T_A$ = 25 °C, as measured on Skyworks Solutions' SE2574L-EK1 evaluation board, all unused ports terminated with 50 ohms, unless otherwise noted.

| Symbol | Parameter | Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $F_{IN}$ | Frequency Range | - | | 2400 | - | 2500 | MHz |
| Pout | Output Power, 3.3V | 54Mbps, OFDM, 64 QAM, EVM = 3% | | - | 18 | - | dBm |
| | | 11Mbps, CCK, BT = 0.45, Mask | | - | 20 | - | |
| | | 802.11n, HT20, all data rates, Mask | | - | 22 | - | |
| | | 802.11n, HT40, all data rates, Mask | | - | 20 | - | |
| | Output Power, 5.0V | 54Mbps, OFDM, 64 QAM, EVM = 3% | | - | 20.5 | - | |
| | | 11Mbps, CCK, BT = 0.45, Mask | | - | 22 | - | |
| | | 802.11n, HT20, all data rates, Mask | | - | 24 | - | |
| | | 802.11n, HT40, all data rates, Mask | | - | 22 | - | |
| $P_{1dB}$ | P1dB | - | | - | 25.0 | - | dBm |
| $S_{21}$ | Small Signal Gain | - | | 25 | 28 | 29 | dB |
| $\Delta S_{21}$ | Small Signal Gain Variation | Gain variation over single 20MHz channel<br>Gain Variation over band | | -<br>- | 0.5<br>- | -<br>1.1 | dB |
| $S_{21}$ 3.2 | Gain @ limit at Ref-vco spur frequency | 3206 to 3312 MHz | | - | - | 15 | dB |
| 2f | Harmonics | 1 Mbps, BPSK, | 20dBm, 3.3V<br>22dBm, 5.0V | - | -50 | -45 | dBm/MHz |
| 3f | | | 20dBm, 3.3V<br>22dBm, 5.0V | - | -50<br>-48 | -45<br>-43 | dBm/MHz |
| $t_{dr}$, $t_{df}$ | Delay & rise/fall Time | 50 % of $V_{EN}$ edge and 90/10 % of final output power level | | - | 0.7 | - | µs |
| $S_{11}$ | Input Return Loss | - | | 7 | 10 | - | dB |
| STAB | Stability | CW, $P_{OUT}$ = 20 dBm, VCC = 3.3V<br>0.1 GHz – 20 GHz<br>Load VSWR = 10:1 | | All non-harmonically related outputs less than -42 dBm/MHz | | | |
| RU | Ruggedness | $P_{IN}$ = 12dBm, VCC = 3.3V<br>Load VSWR = 10:1 | | No permanent damage | | | |

## Power Detector Characteristics

Conditions: VCC = 3.3V (default) or VCC = 5.0V (as noted), EN = 3.3V, $T_A$ = 25 °C, as measured on Skyworks Solutions' SE2574L-EK1 evaluation board, all unused ports terminated with 50 ohms, unless otherwise noted.

| Symbol | Parameter | Condition | VCC = 3.3V | | | VCC = 5V | | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| $F_{OUT}$ | Frequency Range | - | 2400 | - | 2500 | 2400 | - | 2500 | MHz |
| PDR | Power detect range, CW | Measured at ANT | 0 | - | 23 | 0 | - | 23 | dBm |
| $PDZ_{src}$ | DC source impedance on PD_OUT | - | - | 1 | - | - | 1 | - | k Ω |
| $PDV_{NoRF}$ | Output Voltage, $P_{OUT}$ = No RF | Measured into 1MΩ | - | 0.12 | - | - | 0.12 | - | V |
| $PDV_{p18}$ | Output Voltage, $P_{OUT}$ = 18 dBm CW | Measured into 1MΩ | - | 0.60 | - | - | 0.55 | - | V |
| $PDV_{p20}$ | Output Voltage, $P_{OUT}$ = 20 dBm CW | Measured into 1MΩ | - | 0.75 | - | - | 0.70 | - | V |
| $PDV_{p23}$ | Output Voltage, $P_{OUT}$ = 23 dBm CW | Measured into 1MΩ | - | NA | - | - | 1.00 | - | V |
| $LPF_{-3dB}$ | Power detect low pass filter -3dB corner frequency | Measured into 1MΩ | 260 | 290 | 400 | 270 | 290 | 400 | kHz |

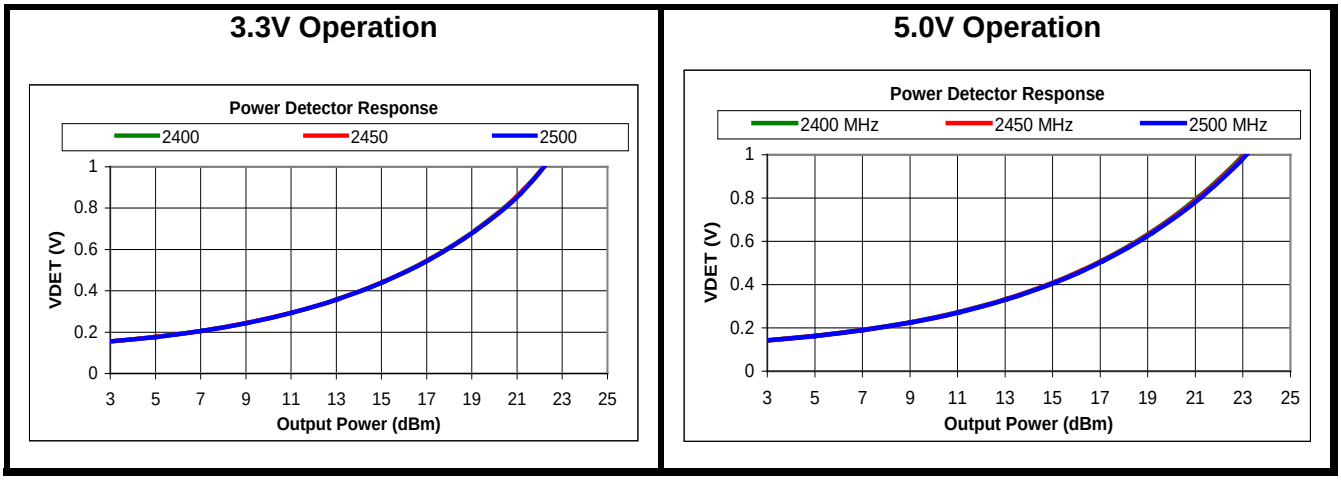


**Figure 3: SE2574L Power Detector Characteristics**

## Package Diagram

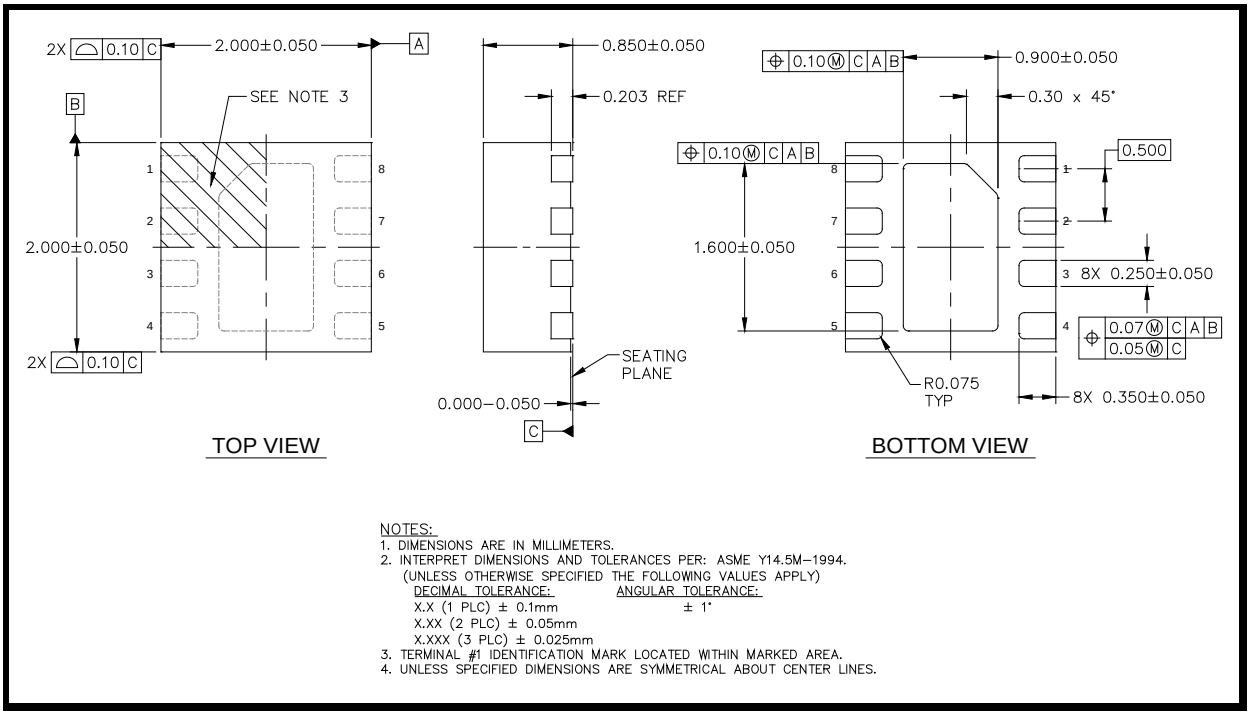


**Figure 4: SE2574L Package Diagram**

## Recommended Land Pattern

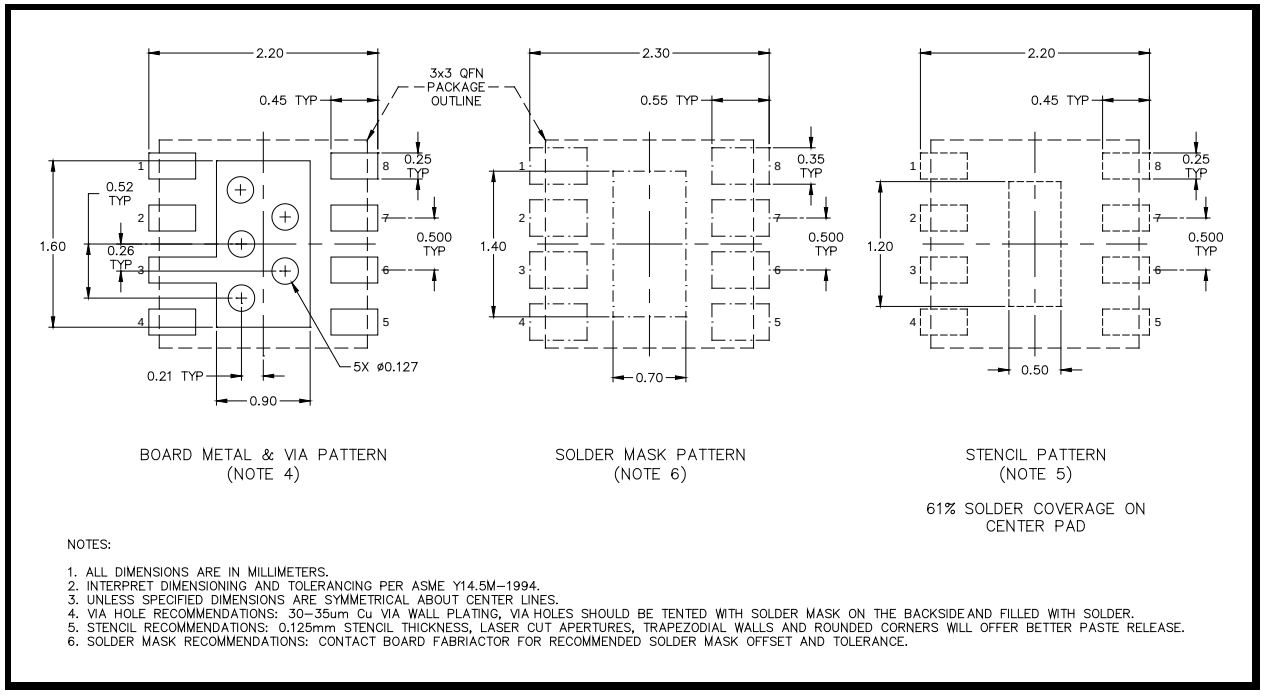


**Figure 5: SE2574L Package Diagram**

## Branding Information

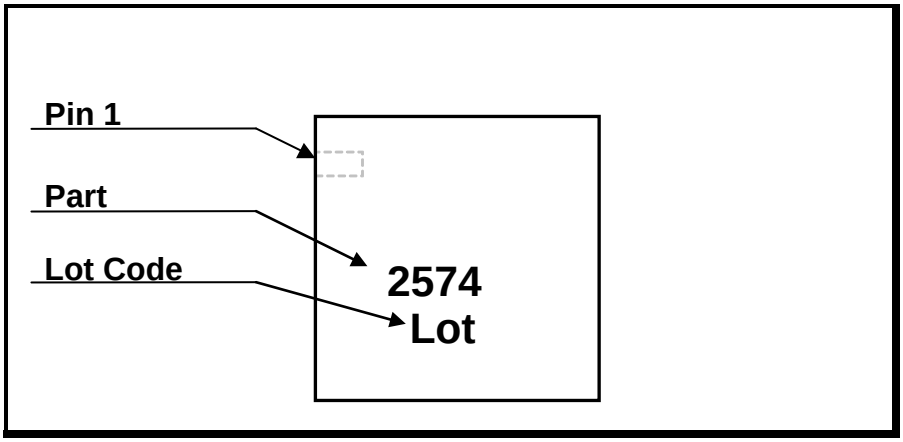


**Figure 6: SE2574L Branding and Pin 1 Location (Top View)**

### Package Handling Information

Because of its sensitivity to moisture absorption, instructions on the shipping container label must be followed regarding exposure to moisture after the container seal is broken, otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly. The SE2574L is capable of withstanding a Pb free solder reflow. Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. If the part is manually attached, precaution should be taken to insure that the device is not subjected to temperatures above its rated peak temperature for an extended period of time. For details on both attachment techniques, precautions, and handling procedures recommended, please refer to:

- "*QFN solder reflow and rework information application note*", *Document Number QAD-00045*
- "*Handling, packing, shipping and use of moisture sensitive QFN application note*", *Document Number QAD-00044*

Caution! Class 1B ESD sensitive device

## Tape and Reel Information

| Parameter | Value |
|---|---|
| Devices Per Reel | 3000 |
| Reel Diameter | 7 inches |
| Tape Width | 12 millimeters |

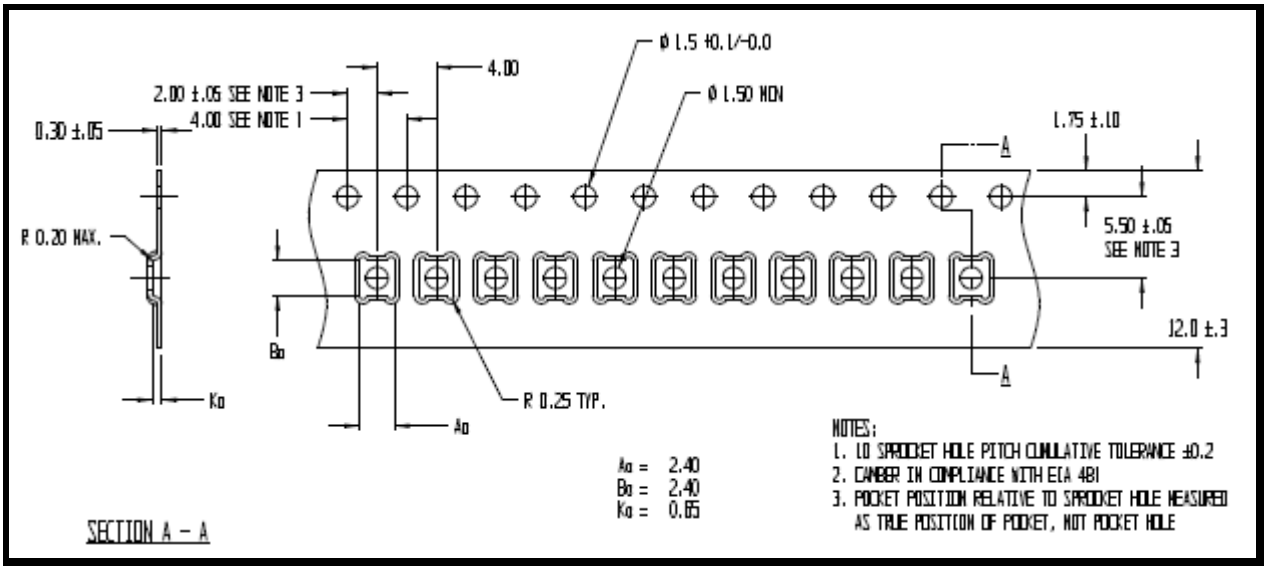


**Figure 8: SE2574L-R Tape and Reel Information**

## Document Change History

| Revision | Date | Notes |
|---|---|---|
| 1.0 | 12/4/2009 | Created |
| 1.1 | 4/30/2010 | Updated Package Marking Diagram |
| 1.2 | 6/10/2010 | Updated tape and reel information |
| 1.3 | 6/22/2010 | Updated gain specification MIN limit from 25dB to 24dB |
| 1.4 | 11/01/2010 | Updated ESD specification. |
| 1.5 | 12/18/2010 | Added 802.11n Mask Compliant Power Rating |
| 1.6 | 1/31/2011 | Added 802.11N to ICC table |
| 1.7 | 4/10/2012 | Updated with Skyworks logo and disclaimer statement |

Стандарт Электрон Связь

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**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** sales@st-electron.ru

**Адрес:** 198099, Санкт-Петербург, Промышленная ул, дом № 19, литера Н, помещение 100-Н Офис 331