PRELIMINARY DATA SHEET

SKY65132: WLAN Power Amplifier Module

Applications

- IEEE802.11 b/g WLAN
- ISM band transmitters
- WCS fixed wireless
- Wireless access nodes

Features

- Single 3.3 V supply
- Linear output power of +29 dBm for IEEE802.11b mask
- Linear output power of +27 dBm for IEEE802.11g mask
- High gain of 34 dB
- Output power detector: 20 dB dynamic range
- Superior gain flatness
- Internal RF match and bias circuits
- Small footprint, MCM 6 x 6 mm SMT package

Description

Skyworks SKY65132 is a Microwave Monolithic Integrated Circuit (MMIC) Power Amplifier (PA) with superior output power, linearity, and efficiency. These features make the SKY65132 ideal for Wireless Local Area Network (WLAN) applications.

The device is fabricated using Skyworks high reliability Indium Gallium Phosphide (InGaP) Heterojunction Bipolar Transistor (HBT) technology. The device is internally matched and mounted in a 20-pin, 6 x 6 mm Multi-Chip Module (MCM) Surface-Mounted Technology (SMT) package, which allows for a highly manufacturable low cost solution.

The device package and pinout for the 20-pin MCM are shown in Figure 1. A block diagram of the SKY65132 is shown in Figure 2.

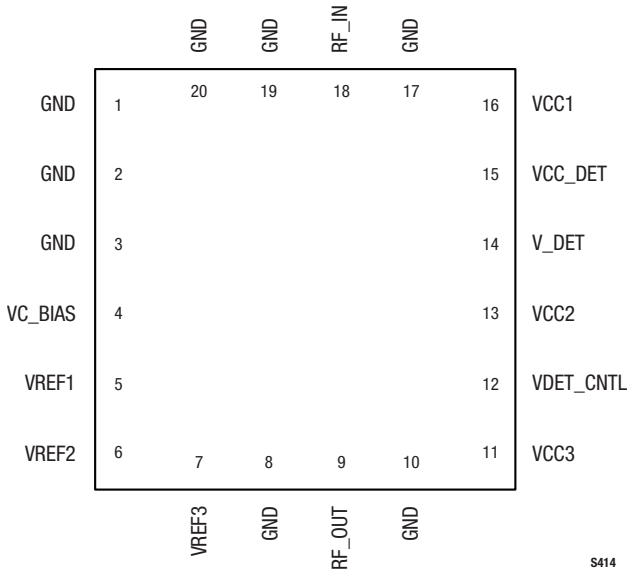


Figure 1. SKY65132 Pinout – 20-Pin MCM (Top View)

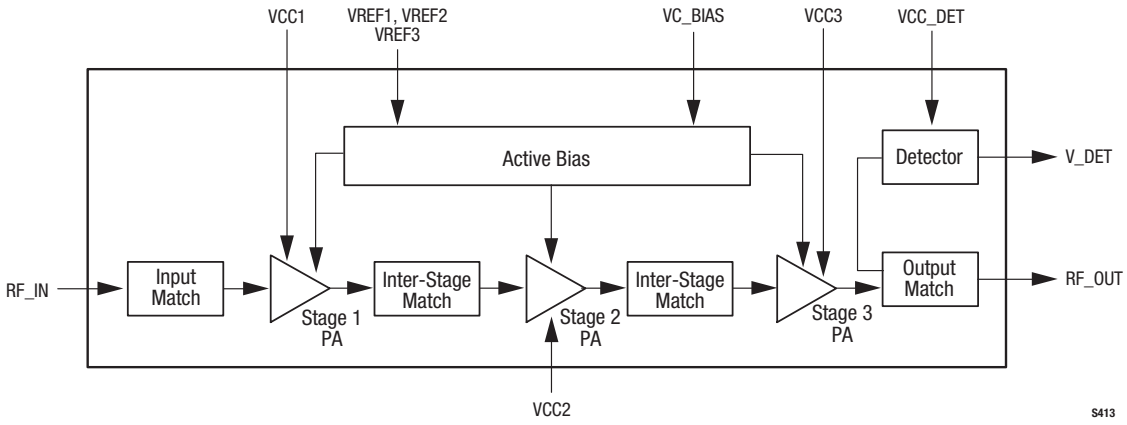


Figure 2. SKY65132 Block Diagram

Technical Description

The SKY65132 PA contains all of the needed RF matching and DC biasing circuits. The device also provides an output power detector voltage and the ability to switch the PA on or off with a simple control signal.

The SKY65132 is a three-stage, HBT InGaP device optimized for high linearity and power efficiency. These features make the device suitable for wideband digital applications, where PA linearity and power consumption are of critical importance (e.g., WLANs).

The device has been characterized with the highest specified data rates for 802.11b (11 Mbps) and 802.11g (54 Mbps). Under these stringent test conditions, the device exhibits excellent spectral purity and power efficiency.

Package and Handling Information

Since the device package is sensitive to moisture absorption, it is baked and vacuum packed before shipping. Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

If the part is attached in a reflow oven, the temperature ramp rate should not exceed 5 °C per second. Maximum temperature should not exceed 225 °C and the time spent at a temperature that exceeds 210 °C should be limited to less than 10 seconds. If the part is manually attached, precaution should be taken to ensure that the part is not subjected to a temperature that exceeds 300 °C for more than 10 seconds.

For additional details on both attachment techniques, precautions, and recommended handling procedures, refer to the Skyworks Application Note, *PCB Design and SMT Assembly/Rework Guidelines for MCM-L Packages* (document number 101752). Additional information on standard SMT reflow profiles can also be found in the JEDEC Standard J-STD-020B.

Production quantities of this product are shipped in a standard tape and reel format. For packaging details, refer to the Skyworks Application Note, *Tape and Reel*, document number 101568.

Electrical and Mechanical Specifications

Signal pin assignments and functional pin descriptions are described in Table 1. The absolute maximum ratings of the SKY65132 are provided in Table 2. Electrical specifications are provided in Table 3.

Typical performance characteristics are shown in Figures 3 through 9. Figure 10 provides a typical evaluation board schematic. Package dimensions for the SKY65132 20-pin MCM are shown in Figure 11, and tape and reel dimensions are shown in Figure 12.

Electrostatic Discharge (ESD) Sensitivity

The SKY65132 is a static-sensitive electronic device. Do not operate or store near strong electrostatic fields. Take proper ESD precautions.

Table 1. SKY65132 Signal Descriptions

Pin #	Name	Description	Pin #	Name	Description
1	GND	Ground	11	VCC3	Stage 3 collector voltage
2	GND	Ground	12	VDET_CNTL	Detector voltage control
3	GND	Ground	13	VCC2	Stage 2 collector voltage
4	VC_BIAS	Bias voltage	14	V_DET	Detector output signal
5	VREF1	Bias reference voltage 1	15	VCC_DET	Detector supply voltage
6	VREF2	Bias referance voltage 2	16	VCC1	Stage 1 collector voltage
7	VREF3	Bias referance voltage 3	17	GND	Ground
8	GND	Ground	18	RF_IN	RF input
9	RF_OUT	RF output	19	GND	Ground
10	GND	Ground	20	GND	Ground

Table 2. SKY65132 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
RF input power	P_{IN}		0	dBm
Supply voltage (VCC1, VC_BIAS, VREF1, VREF2, VCC2, and VCC_DET signals)	VCC		4	V
Supply current (I_D + I_{BIAS})	I_{CC}		980	mA
Power dissipation			2.6	W
Case operating temperature	T_C	–40	+85	°C
Storage temperature	T_{ST}	–55	+125	°C
Junction temperature	T_J		+150	°C

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value.

Table 3. SKY65132 Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
RF input power	P_{IN}			–8	dBm
Supply voltage (VCC1, VC_BIAS, VREF1, VREF2, VCC2, and VCC_DET signals)	VCC	3.0	3.3	3.6	V
Case operating temperature	T_C	–40		+85	°C
Storage temperature	T_{ST}	–55		+125	°C

Table 4. SKY65132 Electrical Specifications
(VCC = 3.3 V, T_C = +25 °C, Test Frequency = 2.442 GHz unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Using IEEE802.11b Complimentary Code Keying Input Signal, Data Rate = 11 Mbps						
Supply current	I_{CC}			950		mA
Output power (Note 1)	P_{OUT}			29		dBm
Power added efficiency (Note 2)	PAE			20		%
Ramp-up/ramp-down (Note 3)	T_S			<0.5		µs
Using IEEE802.11g Orthogonal Frequency Division Multiplexing Input Signal, Data Rate = 54 Mbps						
Supply current	I_{CC}			930		mA
Output power (Note 4)	P_{OUT}			27		dBm
Power added efficiency (Note 2)	PAE			18		%
Using Continuous Wave Input Signals						
Small signal gain	G	P_{IN} = –25 dBm		34		dB
Gain flatness over band		From 2.4 GHz to 2.5 GHz		±1.0		dB
Gain flatness over channel (16.25 MHz)		Over any 16.25 MHz within band		±0.4		dB
Output power @ 1 dB compression	P1dB	P_{IN} = –2 dBm		31		dBm
Quiescent Current	I_Q			400		mA
Noise Figure	NF			4.5		dB
Power added efficiency	PAE	P_{IN} = –2 dBm		32		%
Power Up/Down Control						
Power up	$PA_{_ON/OFF}$		2.7	3.3		V
Power down	$PA_{_ON/OFF}$				0.5	V

Note 1: Defined as the maximum power level for which the IEEE802.11b transmit mask requirements are met.

Note 2: Measured at the specified average output RF power and modulation type.

Note 3: Ramp-up and ramp-down times are defined from the 10% to 90% power points.

Note 4: Defined as the maximum power level for which the IEEE802.11g transmit mask requirements are met.

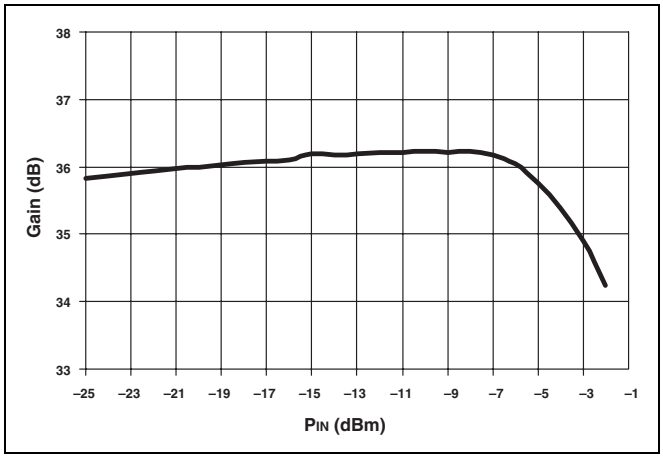


Figure 3. Typical Gain vs P_{IN} @ 2.442 GHz

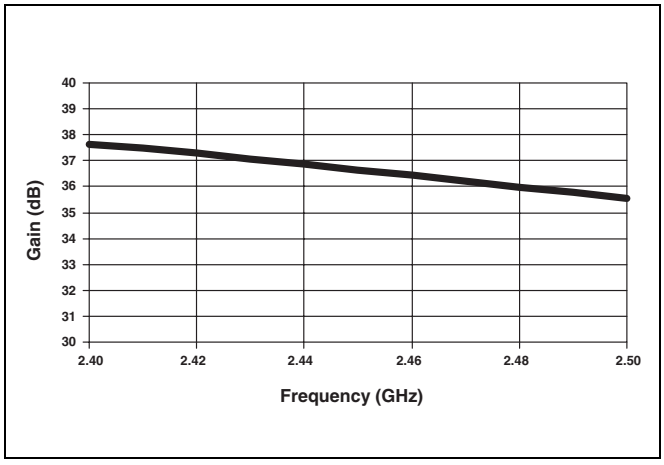


Figure 4. Typical Gain vs Frequency Response

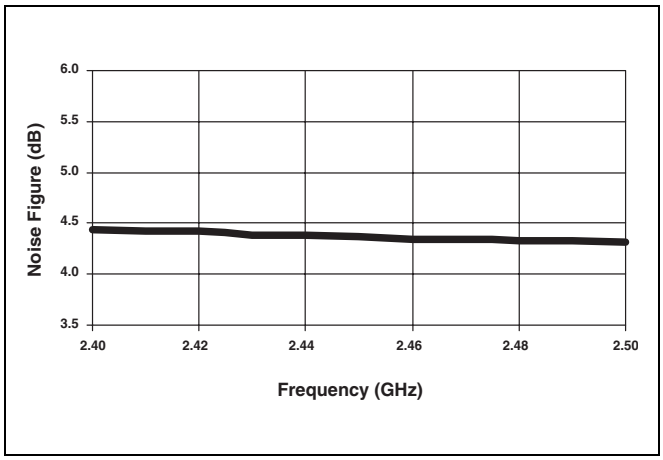


Figure 5. Typical Noise Figure Performance vs Frequency

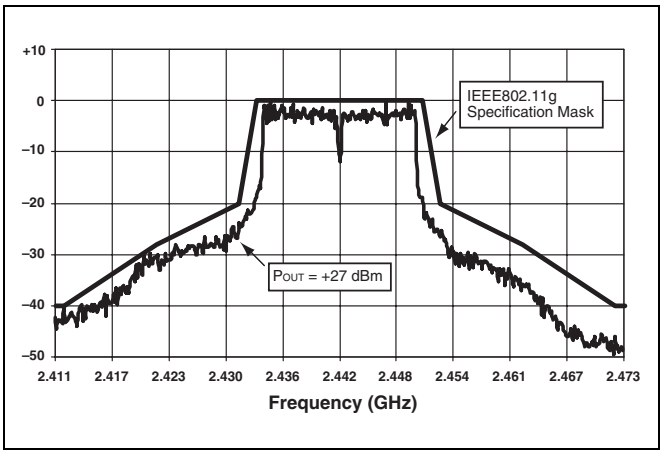


Figure 6. Output Spectrum Response for 802.11g (64 Quadrature Amplitude Modulated, 54 Mbps Input Signal)

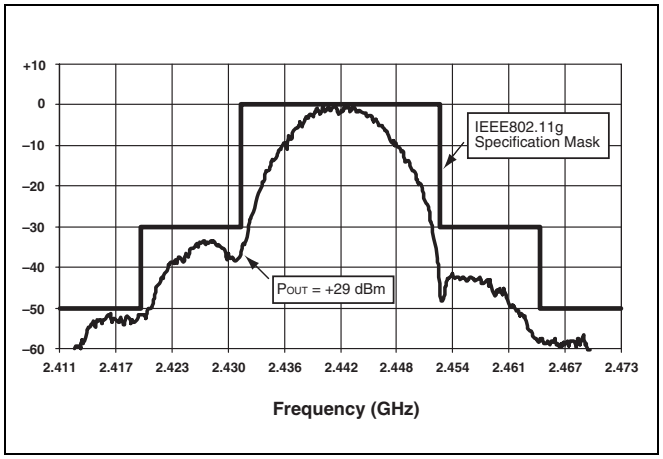


Figure 7. Output Spectrum Response for 802.11b CCK-Coded (11 Mbps Input Signal)

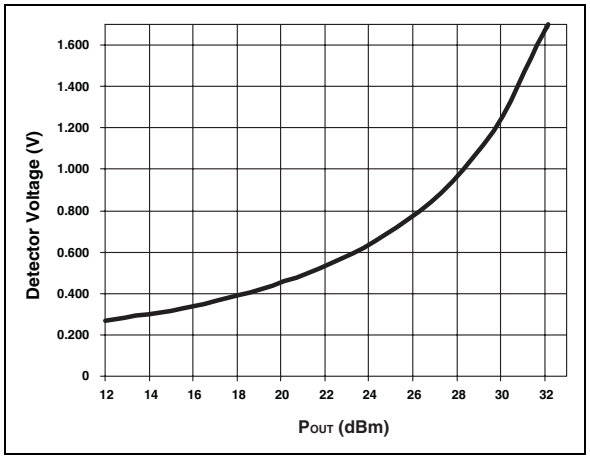


Figure 8. Detector Output Voltage vs RF Output Power

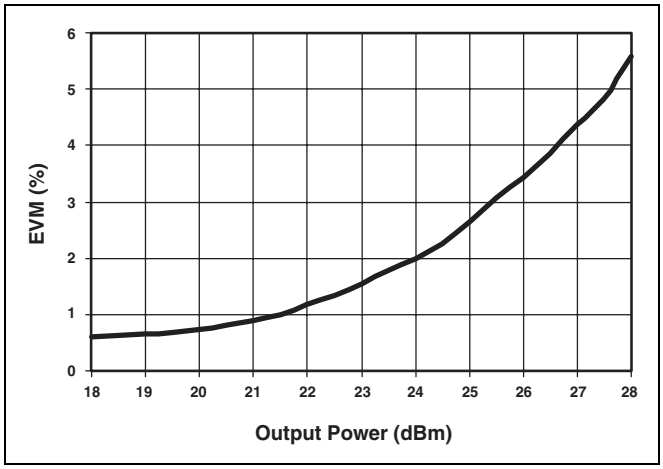


Figure 9. EVM vs P_{OUT} for 802.11g (64 Quadrature Amplitude Modulated, 54 Mbps Input Signal)

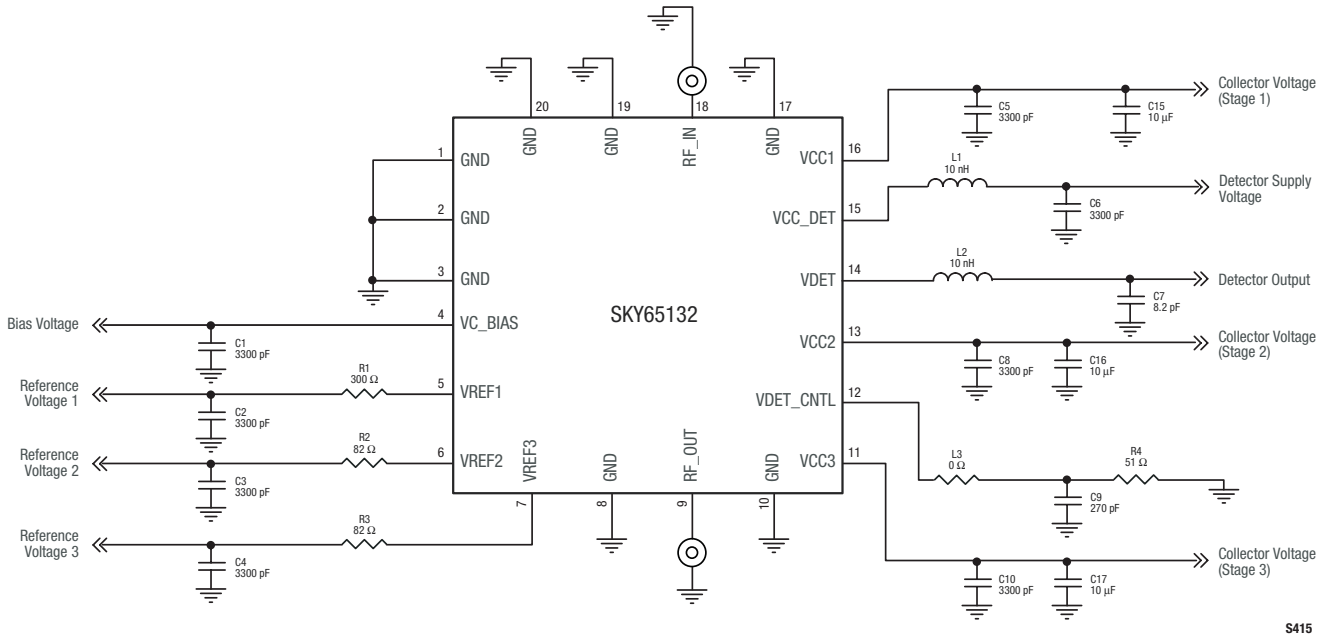


Figure 10. SKY65132 Evaluation Board Schematic

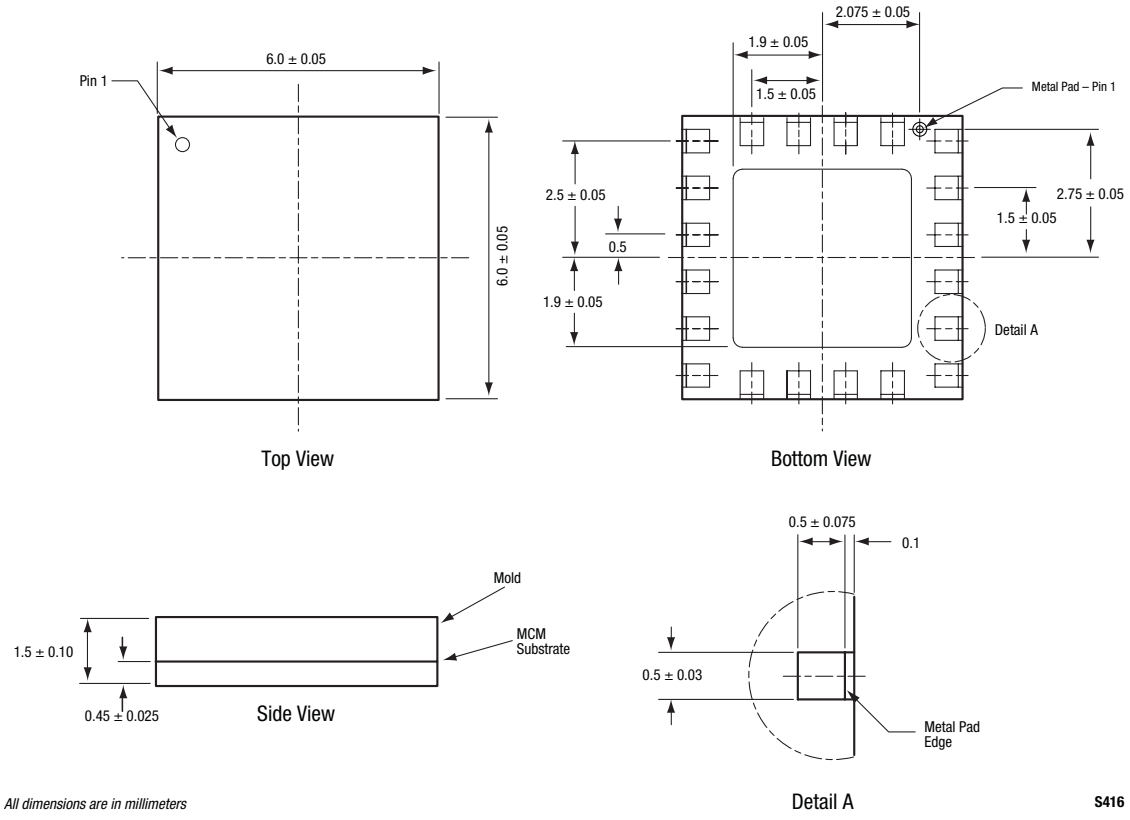
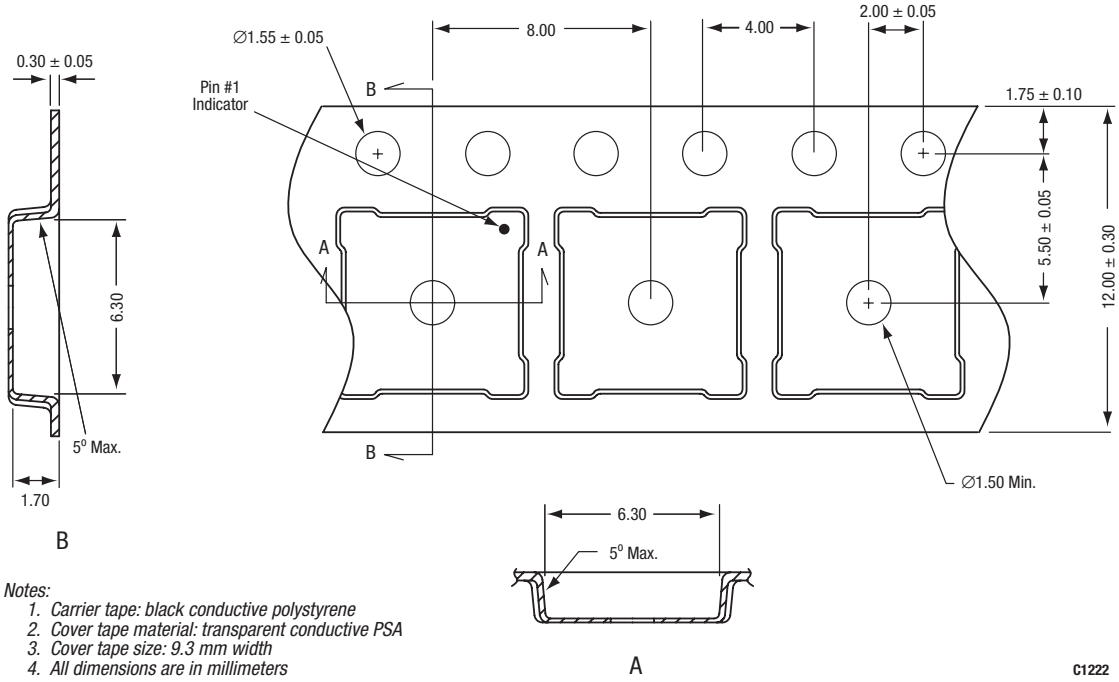


Figure 11. SKY65132 20-Pin MCM Package Dimensions



Notes:
1. *Carrier tape: black conductive polystyrene*
2. *Cover tape material: transparent conductive PSA*
3. *Cover tape size: 9.3 mm width*
4. *All dimensions are in millimeters*

Figure 12. SKY65132 20-Pin MCM Tape and Reel Dimensions

Ordering Information

Model Name	Manufacturing Part Number	Evaluation Kit Part Number
SKY65132 WLAN Power Amplifier Module	SKY65132-11	TW13-D121

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