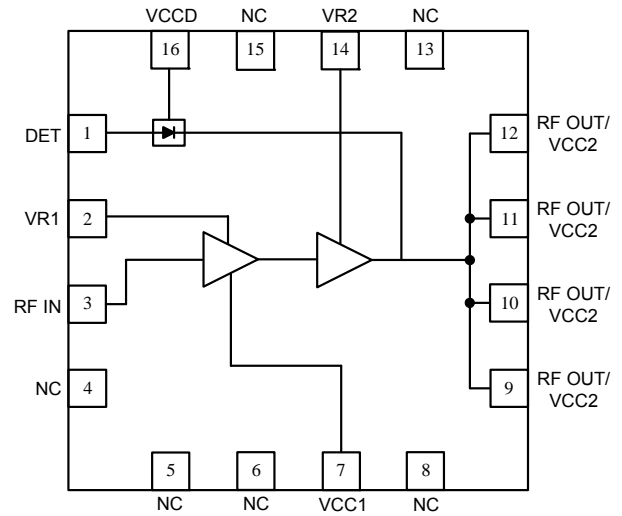


*Pb-free & RoHS Product*

## Features

- 2.4~2.5GHz Frequency Range
- 3.3V~6.0V Operation
- 20dB~22dB Gain
- 34dBm P1dB@VCC=6.0V
- 2.5% EVM@28 dBm for 802.11g 54Mbps, 6.0V
- 1.8% EVM@27 dBm for 802.11g 54Mbps, 6.0V
- 260mA~300mA Quiescent Current
- $\geq 15$ dB Input Return Loss
- Integrated Output Power Detector
- Advanced InGaP/GaAs HBT Technology



**Functional Block Diagram**

## Applications

- IEEE 802.11b/g/n WLAN
- 2.4GHz ISM Wireless Equipment

## Product Description

The YP242034 is a high-power PA based on the highly-reliable InGaP/GaAs HBT technology. It can be easily configured for high-power, high-gain applications with super power-added efficiency while operating over the 2.4~2.5GHz frequency band. The YP242034 is assembled in a 16-pin, 4×4mm<sup>2</sup>, QFN package. It is internally integrated with ESD protection unit.

## Ordering Information

- YP242034      2.4GHz 802.11b/g/n WLAN Power Amplifier
- YP242034EVB    2.4GHz to 2.5GHz Evaluation PCB

## Pin Description

Pin No.	Symbol	Description
1	DET	Detector output signal
2 / 14	VR1 / VR2	Bias current control voltage for the 1 <sup>st</sup> / 2 <sup>nd</sup> stage
3	RF IN	RF input
4, 5, 6, 8, 13, 15	NC	No connection
7	VCC1	Stage 1 collector voltage
9, 10, 11, 12	RF OUT / VCC2	RF output and stage 2 collector voltage
16	VCCD	Detector supply voltage
Pkg Base	GND	Ground connection

## Absolute Maximum Ratings

Parameter	Rating	Unit
Input RF Power	+20	dBm
Supply Voltage	-0.5 to +8.0	V
Bias Voltage	-0.5 to +3.0	V
DC Supply Current	1500	mA
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



**Caution! ESD sensitive device.**

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC=6.0V, ICC=280mA, Temp=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		33.9		dBm	VCC=6.0V@2.45GHz
Gain	18	20	22	dB	VCC=6.0V@2.45GHz
EVM		2.5		%	Pout=+28dBm, VCC=6.0V@2.442GHz 802.11g, 54Mbps, 64QAM
		1.8		%	Pout=+27dBm, VCC=6.0V@2.442GHz 802.11g, 54Mbps, 64QAM
<b>Power Supply</b>					
Operating Voltage		6.0		V	
Reference Voltage 1		1.8		V	
Reference Voltage 2		1.26		V	
Quiescent Current (Total)		280		mA	
ICC1		200		mA	
ICC2		80		mA	



Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC=5.5V, ICC=290mA, Temp=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		33.4		dBm	VCC=5.5V@2.45GHz
Gain	18	20	22	dB	VCC=5.5V@2.45GHz
EVM		2.2		%	Pout=+27dBm, VCC=5.5V@2.442GHz 802.11g, 54Mbps, 64QAM
		2.4		%	Pout=+26dBm, VCC=5.5V@2.442GHz 802.11g, 54Mbps, 64QAM
<b>Power Supply</b>					
Operating Voltage		5.5		V	
Reference Voltage 1		1.8		V	
Reference Voltage 2		1.26		V	
Quiescent Current (Total)		290		mA	
ICC1		230		mA	
ICC2		60		mA	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC=5.0V, ICC=300mA, Temp=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		33.2		dBm	VCC=5.0V@2.45GHz
Gain	18	20	22	dB	VCC=5.0V@2.45GHz
EVM		2.6		%	Pout=+27dBm, VCC=5.0V@2.442GHz 802.11g, 54Mbps, 64QAM
		2.1		%	Pout=+26dBm, VCC=5.0V@2.442GHz 802.11g, 54Mbps, 64QAM
<b>Power Supply</b>					
Operating Voltage		5.0		V	
Reference Voltage 1		1.8		V	
Reference Voltage 2		1.26		V	
Quiescent Current (Total)		300		mA	
ICC1		240		mA	
ICC2		60		mA	



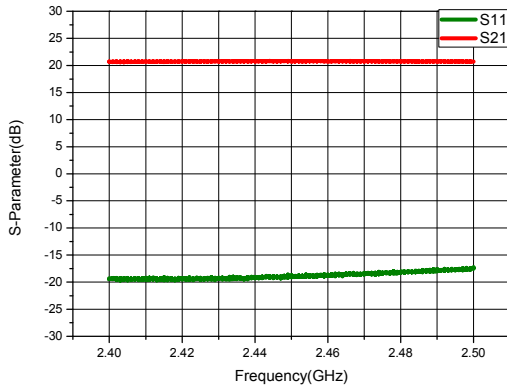
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC=4.2V, ICC=290mA, Temp=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		32		dBm	VCC=4.2V@2.45GHz
Gain	19	21	22	dB	VCC=4.2V@2.45GHz
EVM		2.2		%	Pout=+25dBm, VCC=4.2V@2.442GHz 802.11g, 54Mbps, 64QAM
		2.5		%	Pout=+24dBm, VCC=4.2V@2.442GHz 802.11g, 54Mbps, 64QAM
<b>Power Supply</b>					
Operating Voltage		4.2		V	
Reference Voltage 1		1.8		V	
Reference Voltage 2		1.26		V	
Quiescent Current (Total)		290		mA	
ICC1		230		mA	
ICC2		60		mA	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC=3.3V, ICC=260mA, Temp=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		29.7		dBm	VCC=3.3V@2.45GHz
Gain	20	22	23	dB	VCC=3.3V@2.45GHz
EVM		3.0		%	Pout=+24dBm, VCC=3.3V@2.442GHz 802.11g, 54Mbps, 64QAM
		2.4		%	Pout=+23dBm, VCC=3.3V@2.442GHz 802.11g, 54Mbps, 64QAM
<b>Power Supply</b>					
Operating Voltage		3.3		V	
Reference Voltage 1		1.6		V	
Reference Voltage 2		1.29		V	
Quiescent Current (Total)		260		mA	
ICC1		180		mA	
ICC2		80		mA	

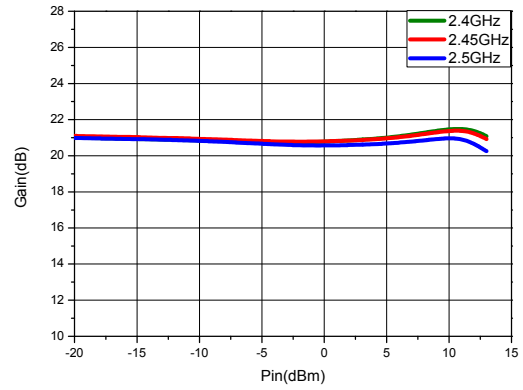
## Typical Performance Plots

(Test Condition: VCC=6.0V, ICC=280mA, T=25°C)

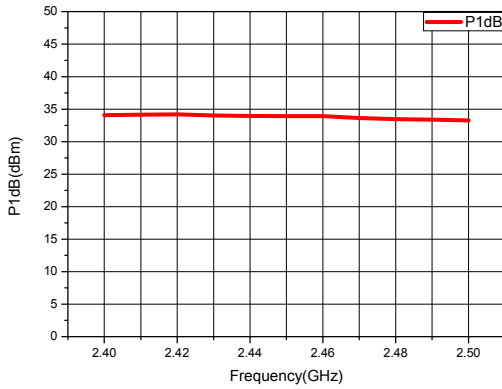
**Small Signal Parameters**



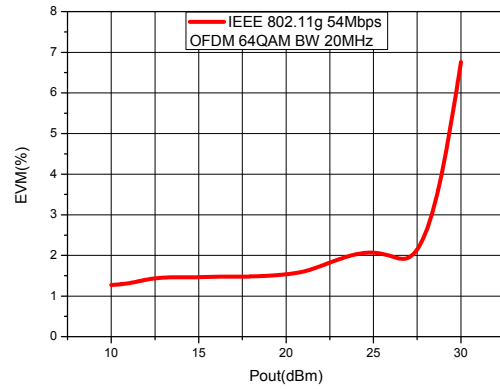
**Power Gain vs. Input Power**



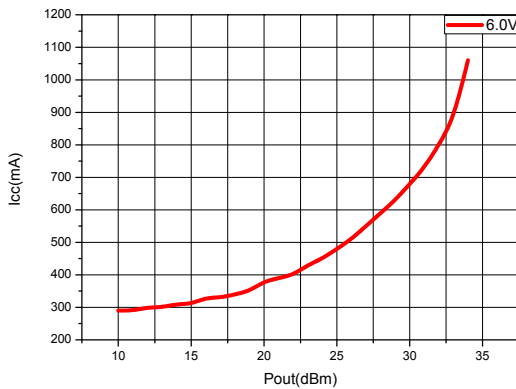
**P1dB vs. Frequency**



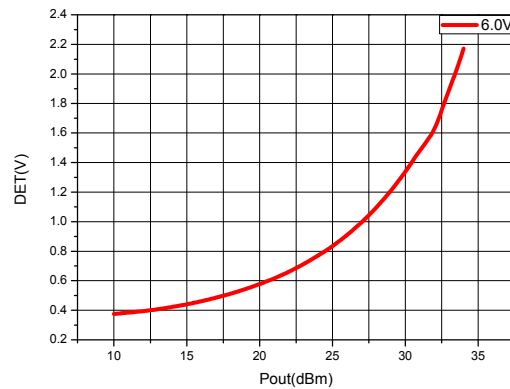
**802.11g EVM vs. Output Power @2.442GHz**



**Icc vs. Output Power @2.45GHz**



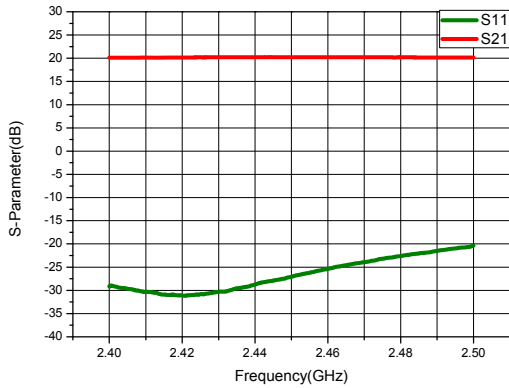
**DET Voltage vs. Output Power @2.45GHz**



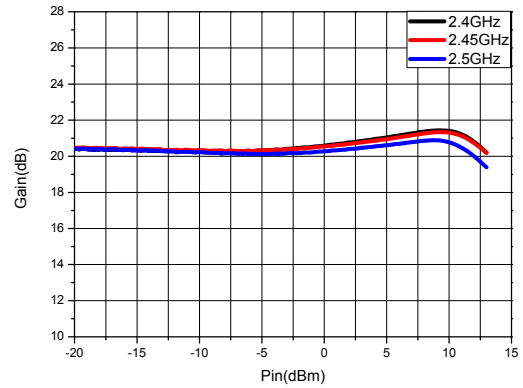


(Test Condition: VCC=5.0V, ICC=300mA, T=25°C)

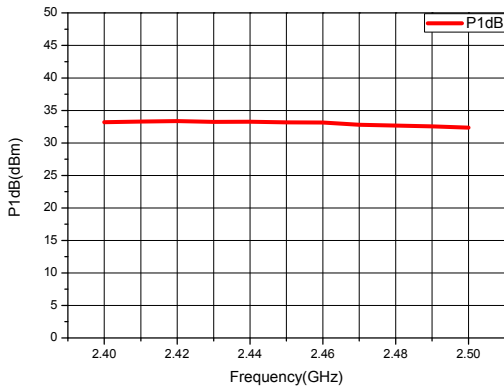
#### Small Signal Parameters



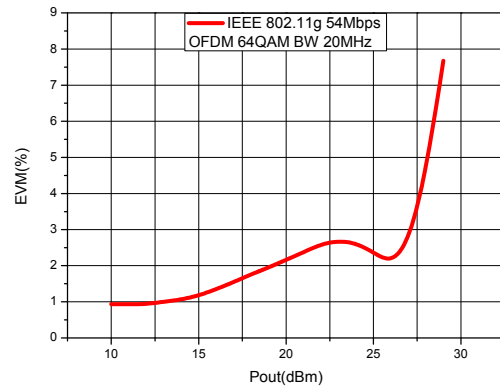
#### Power Gain vs. Input Power



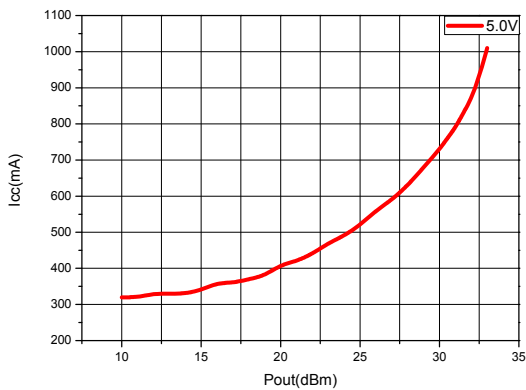
#### P1dB vs. Frequency



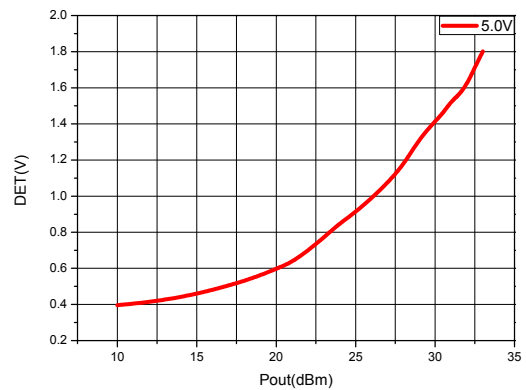
#### 802.11g EVM vs. Output Power @2.442GHz



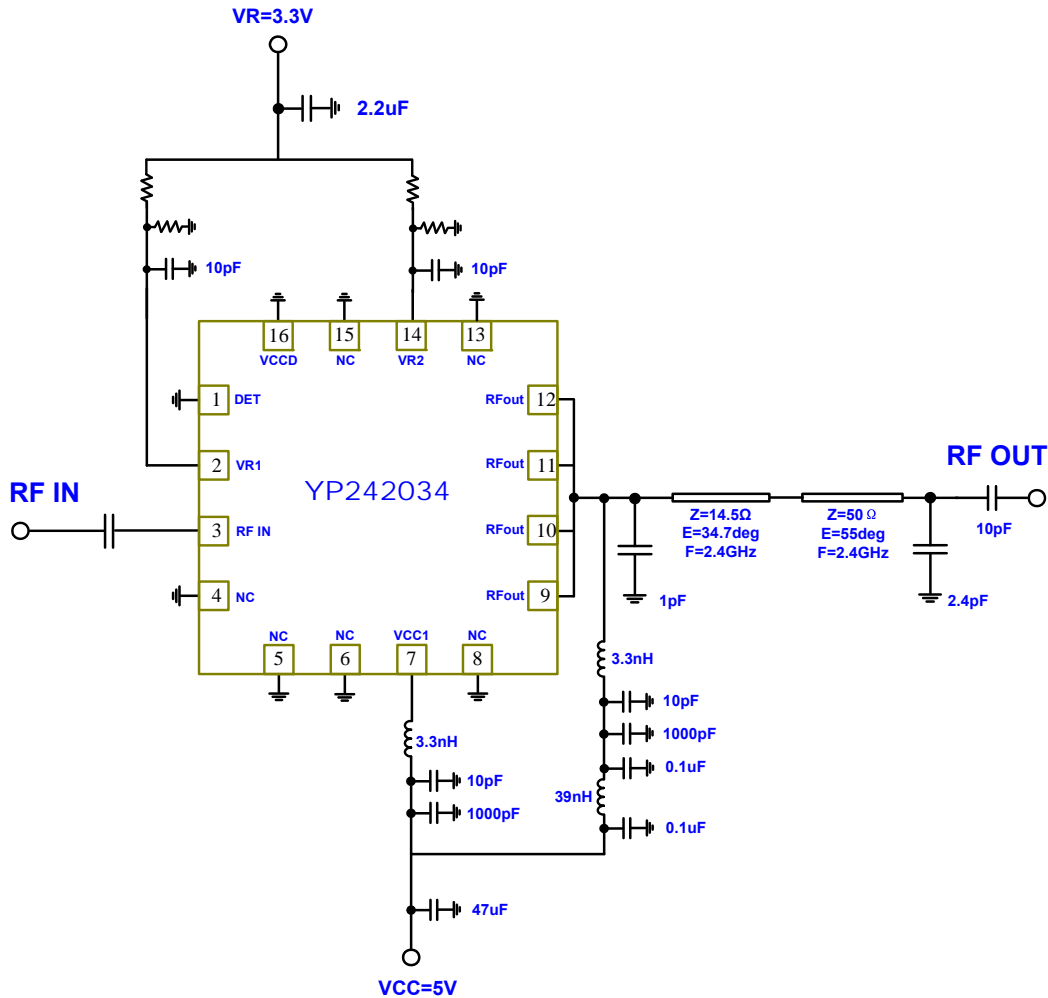
#### Icc vs. Output Power @2.45GHz



#### DET Voltage vs. Output Power @2.45GHz

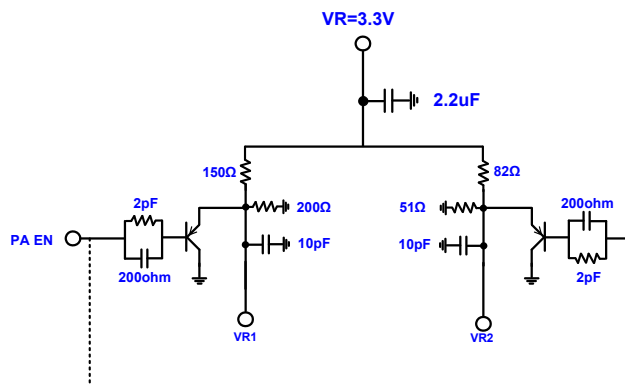


Evaluation Board Schematic for WLAN@VCC=5V



Notes:

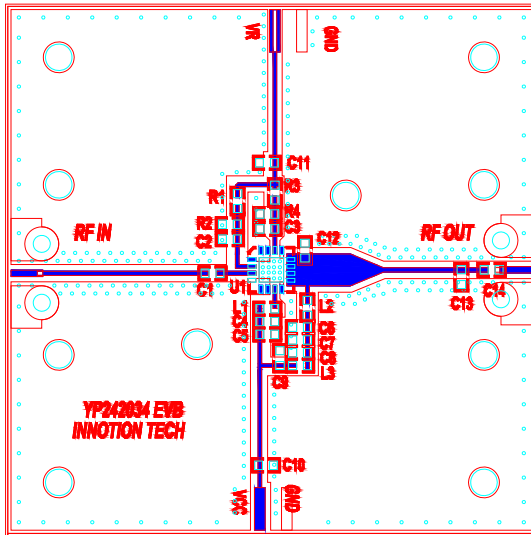
1. Pin1, 16 are active power detection circuit ports, if function is not desired, pin1, 16 may be connected to GND.
2. Please use PA Enable Application Schematic as follow, Apply 3.3V<sub>DC</sub> to power up the power amplifier; Apply 0V<sub>DC</sub> to power down.



## Evaluation Board Layout

Board Size 50mm×50mm, Board Thickness 1mm, Board Material FR-4 ( $\epsilon_r=4.5$ )

**Evaluation Board Top View**



**Layer Detail Physical Characteristics**

Cross Section	Name	Thickness	Material	$\epsilon_r$
Via14	RFS	1 oz	Cu	--
	Core 1	0.23 mm	FR-4	4.5
	RFGND	1 oz	Cu	--
			FR-4	4.5
	PCS	1 oz	Cu	--
			FR-4	4.5
	GND	1oz	Cu	--

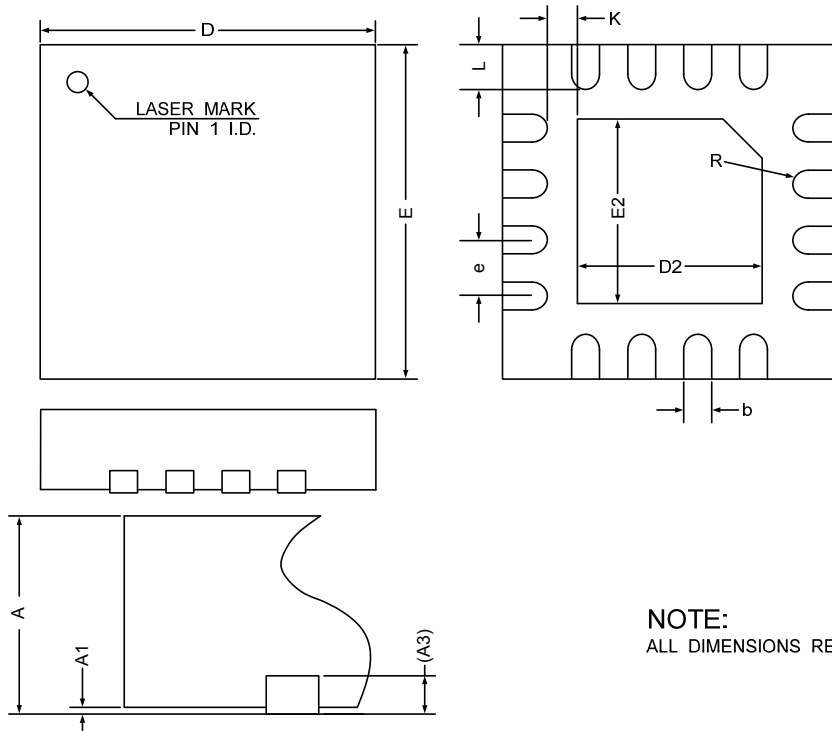
**Circuit Component Designations and Values**

Component	Description	Manufacturer
C1,C2,C3,C4,C6,C14	10pF Chip Capacitor	TDK
C5,C7	1000pF Chip Capacitor	TDK
C8, C9	0.1μF Chip Capacitor	TDK
C10	47μF	AVX
C11	2.2uF Chip Capacitor	TDK
C12	1.0pF Chip Capacitor	DLC
C13	2.4pF Chip Capacitor	DLC
R1	100Ω Chip Resistor	YAGEO
R2	200Ω Chip Resistor	YAGEO
R3	82Ω Chip Resistor	YAGEO
R4	51Ω Chip Resistor	YAGEO
L1,L2	3.3nH Inductor	ATC
L3	39nH Inductor	TDK





Packaging Diagram



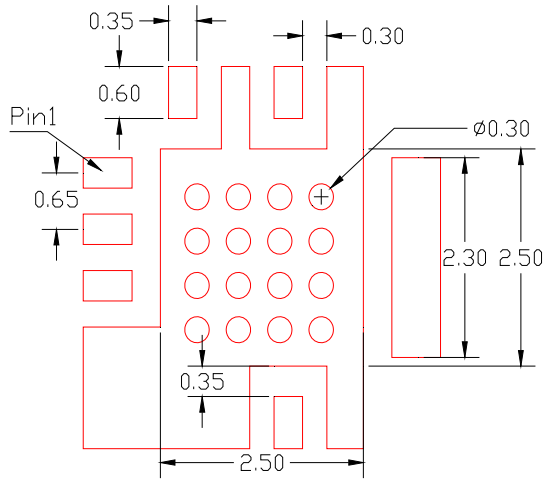
COMMON DIMENSIONS (UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.80	0.85	0.90
A1	0	0.02	0.05
A3	0.203 REF		
b	0.25	0.30	0.35
D	3.95	4.00	4.05
E	3.95	4.00	4.05
D2	2.45	2.50	2.55
E2	2.45	2.50	2.55
e	0.60	0.65	0.70
K	0.375	—	—
L	0.35	0.40	0.45
R	0.09	—	—

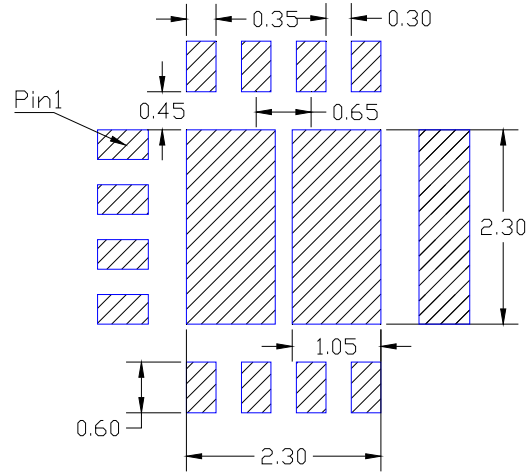
NOTE:  
ALL DIMENSIONS REFER TO JEDEC STANDARD MO-220 WEED-4.

## PCB Land Pattern and Stencil Outline

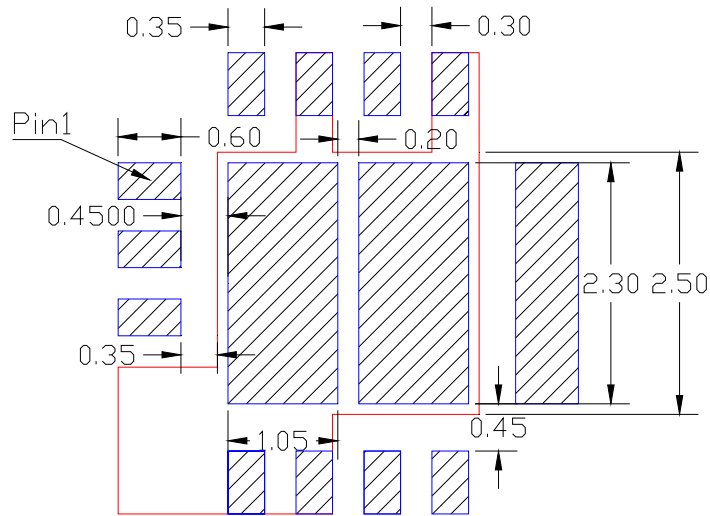
(Units: millimeters)



**PCB Land Pattern (Top View)**

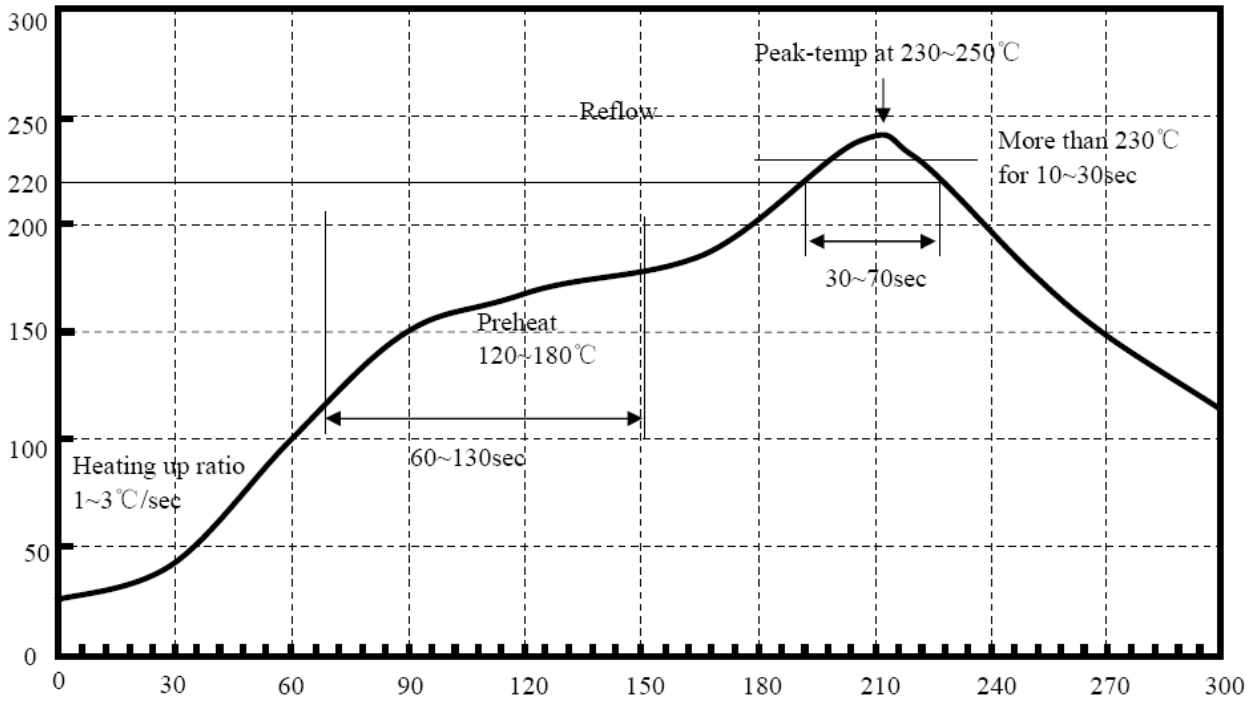


**Stencil Outline**



**Combined PCB Land Pattern and Stencil Outline**

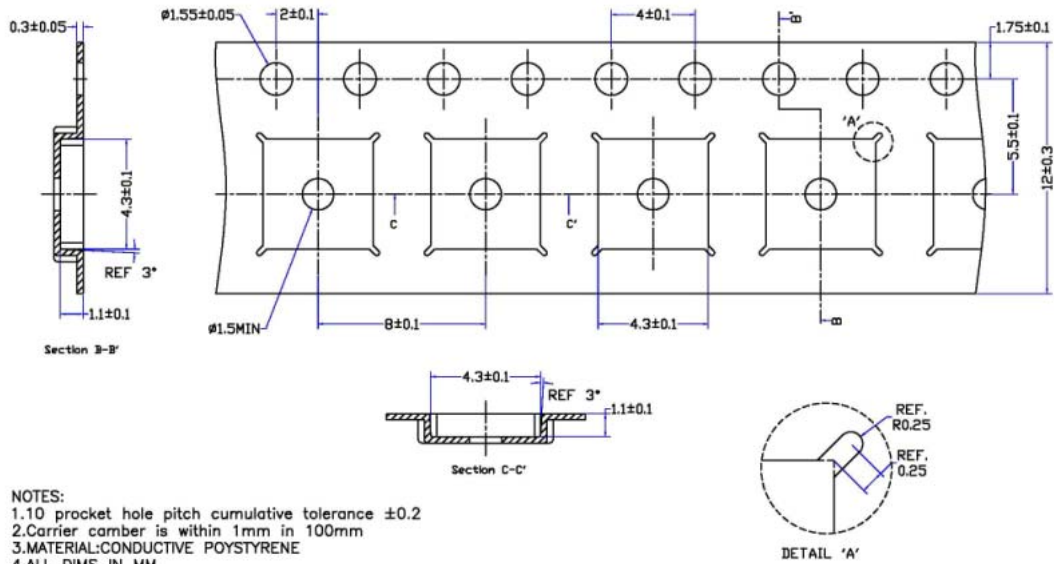
**Recommended Solder Temperature**



**Recommended Temperature**

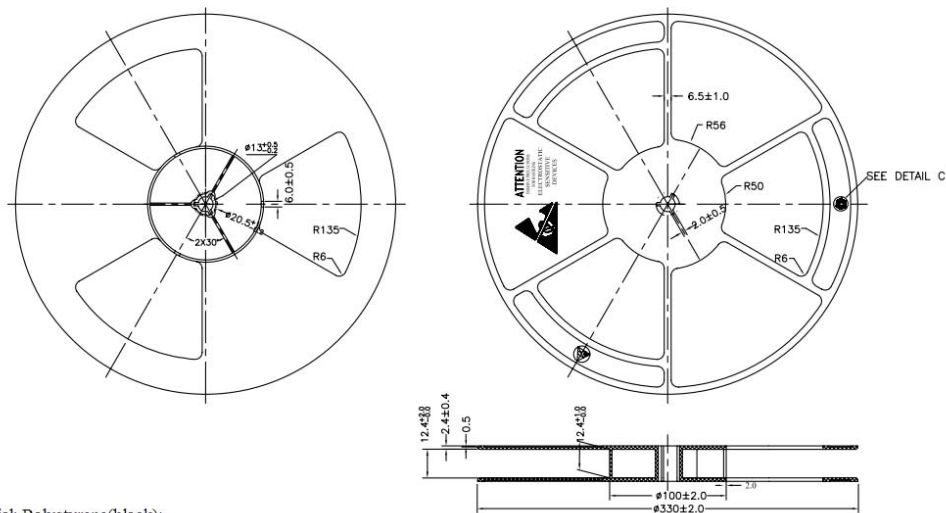
**Sn95.5Ag4.0Cu0.5**

### Tape dimensions and Orientation



- NOTES:
- 1.10 pocket hole pitch cumulative tolerance  $\pm 0.2$
  - 2.Carrier camber is within 1mm in 100mm
  - 3.MATERIAL:CONDUCTIVE POYSTYRENE
  - 4.ALL DIMS IN MM
  - 5.There must not be foreign body adhesion and the state of the surface must be excellent
  - 6.17" PAPER-Reel, 51875pockets
  - 7.Surface resistance  $1 \times 10^{11}(\text{max}) \text{ OHMS/SQ}$

### Reel dimensions and Orientation



- Notes:
1. Material: Polystyrene(black);
  2. Surface flatness: Maximum permissible error is 3mm;
  3. Dimensions in millimeters;
  4. Surface resistance:  $10^5 \text{ TO } 10^{10} \text{ OHMS/SQ}$ ;
  5. General tolerances:  $\pm 0.25$