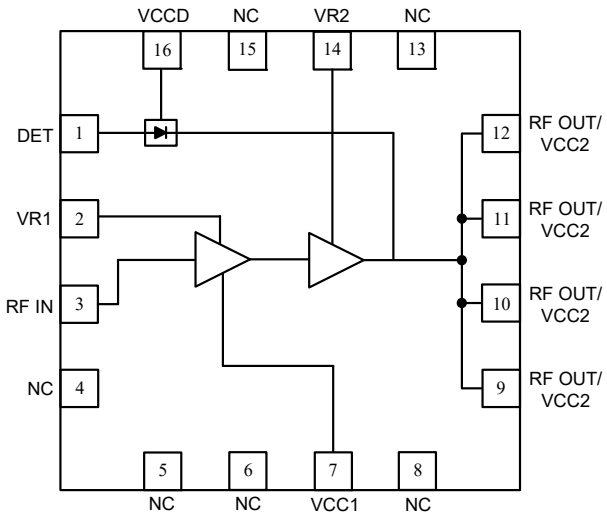
Pb-free & RoHs Product

Features

- 2.0~2.5GHz Frequency Range
- 3.3V~6.0V Supply Voltage
- 20dB~22dB Gain
- 34dBm P1dB@Supply Voltage=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
- ⩾15dB 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 2.0~2.5GHz frequency band. The YP242034 is assembled in a 16-pin, 4×4mm^2, QFN package. It is internally integrated with ESD protection unit.

Ordering Information

Part Number	No. of Devices	Description	Container
YP242034	10	RoHs compliant QFN4*4 surface mount package in bulk quantity	Bulk
YP242034	1000	RoHs compliant QFN4*4 surface mount package in tape and reel	7” Tape and Reel
YP242034-EVB		2.4GHz to 2.5GHz Evaluation Board	

Pin Description

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

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Input RF Power	RF IN	+16	dBm
Supply Voltage	VCC1, VCC2	-0.5 to +8.0	V
Reference Voltage	VR1, VR2	-0.5 to +3.0	V
Operating Ambient Temperature	T_{OP}	-40 to +85	°C
Storage Temperature	T_{ST}	-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.

Electrical Specifications

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC1=VCC2=6V, T_{OP}=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		33.9		dBm	@2.45GHz
Gain	18	20	22	dB	@2.45GHz
EVM		2.5		%	@Pout=+28dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
		1.8		%	@Pout=+27dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
Power Supply					
Reference Voltage 1, VR1		1.8		V	
Reference Voltage 2, VR2		1.26		V	
Quiescent Current (Total), ICQ		280		mA	
1st Stage Quiescent Current, ICQ1		200		mA	
2nd Stage Quiescent Current, ICQ2		80		mA	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC1=VCC2=5.5V, T_{OP}=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		33.4		dBm	@2.45GHz
Gain	18	20	22	dB	@2.45GHz
EVM		2.2		%	@Pout=+27dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
		2.4		%	@Pout=+26dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
Power Supply					
Reference Voltage 1, VR1		1.8		V	
Reference Voltage 2, VR2		1.26		V	
Quiescent Current (Total), ICQ		290		mA	
1st Stage Quiescent Current, ICQ1		230		mA	
2nd Stage Quiescent Current, ICQ2		60		mA	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC1=VCC2=5V, T_{OP}=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		33.2		dBm	@2.45GHz
Gain	18	20	22	dB	@2.45GHz
EVM		2.6		%	@Pout=+27dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
		2.1		%	@Pout=+26dBm, 2442GHz 802.11g, 54Mbps, 64QAM
Power Supply					
Reference Voltage 1, VR1		1.8		V	
Reference Voltage 2, VR2		1.26		V	
Quiescent Current (Total), ICQ		300		mA	
1st Stage Quiescent Current, ICQ1		240		mA	
2nd Stage Quiescent Current, ICQ2		60		mA	

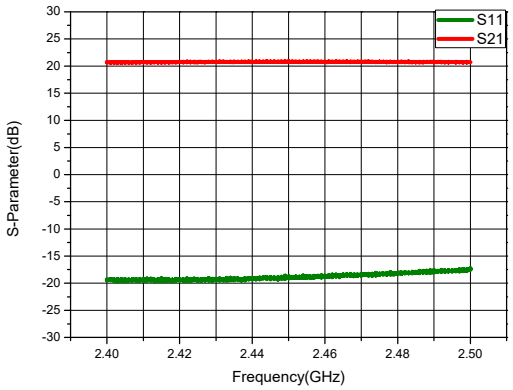
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC1=VCC2=4.2V, T_{OP}=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		32		dBm	@2.45GHz
Gain	19	21	22	dB	@2.45GHz
EVM		2.2		%	@Pout=+25dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
		2.5		%	@Pout=+24dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
Power Supply					
Reference Voltage 1, VR1		1.8		V	
Reference Voltage 2, VR2		1.26		V	
Quiescent Current (Total), ICQ		290		mA	
1st Stage Quiescent Current, ICQ1		230		mA	
2nd Stage Quiescent Current, ICQ2		60		mA	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Compliance and Nominal Conditions					VCC1=VCC2=3.3V, T_{OP}=+25°C, Freq=2.4GHz to 2.5GHz
Frequency Range	2.4	2.45	2.5	GHz	
Output Power@1dB Compression		29.7		dBm	@2.45GHz
Gain	20	22	23	dB	@2.45GHz
EVM		3.0		%	@Pout=+24dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
		2.4		%	@Pout=+23dBm, 2.442GHz 802.11g, 54Mbps, 64QAM
Power Supply					
Reference Voltage 1, VR1		1.6		V	
Reference Voltage 2, VR2		1.29		V	
Quiescent Current (Total), ICQ		260		mA	
1st Stage Quiescent Current, ICQ1		180		mA	
2nd Stage Quiescent Current, ICQ2		80		mA	

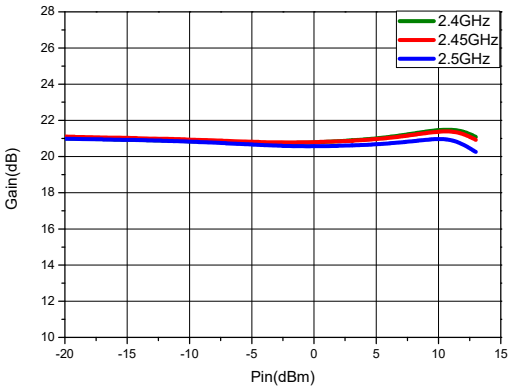
Typical Performance

(Test Condition: VCC1=VCC2=6.0V, ICQ=280mA, T_{OP}=+25°C)

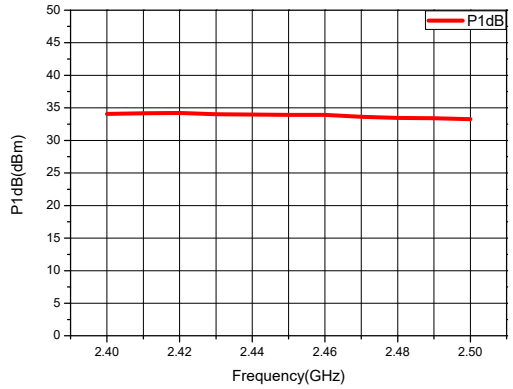
Small Signal Parameters



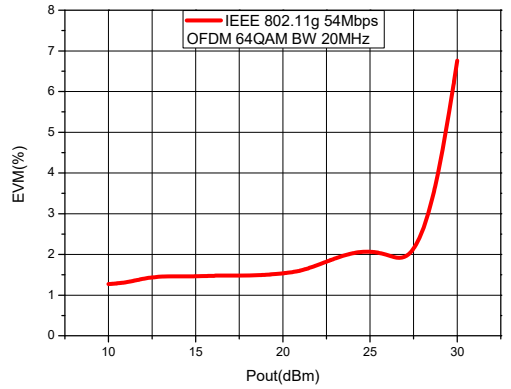
Power Gain vs. Input Power



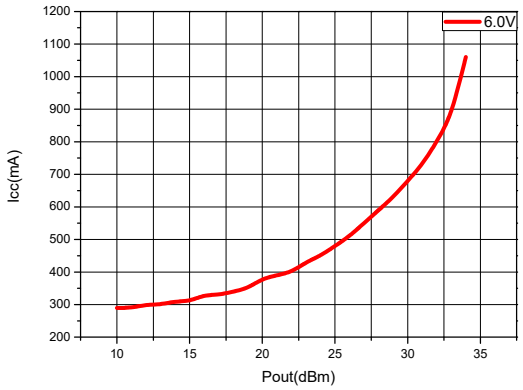
P1dB vs. Frequency



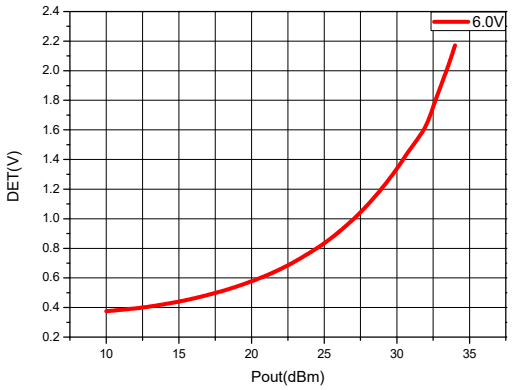
802.11g EVM vs. Output Power @2.442GHz



Icc vs. Output Power @2.45GHz

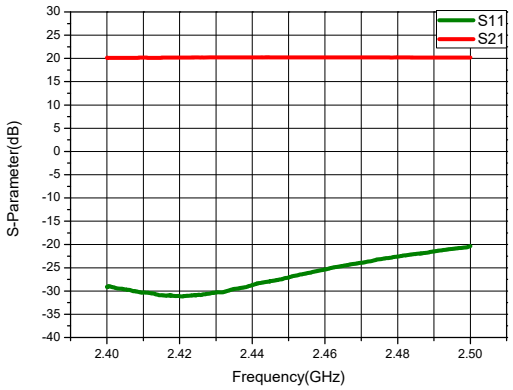


DET Voltage vs. Output Power @2.45GHz

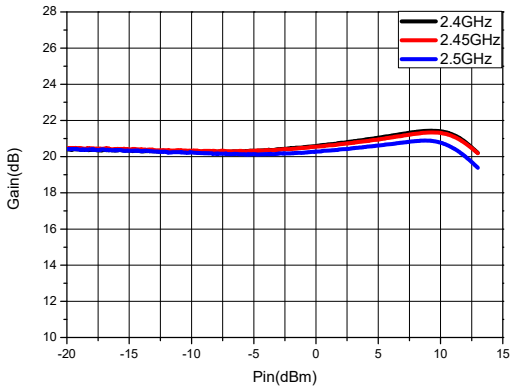


(Test Condition: VCC1=VCC2=5.0V, ICQ=300mA, T_{OP}=+25°C)

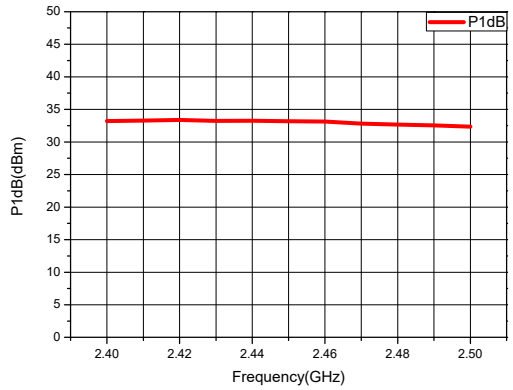
Small Signal Parameters



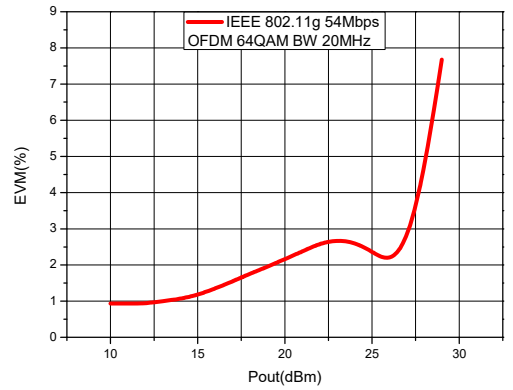
Power Gain vs. Input Power



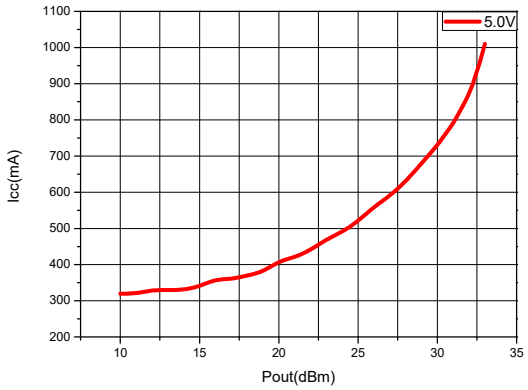
P1dB vs. Frequency



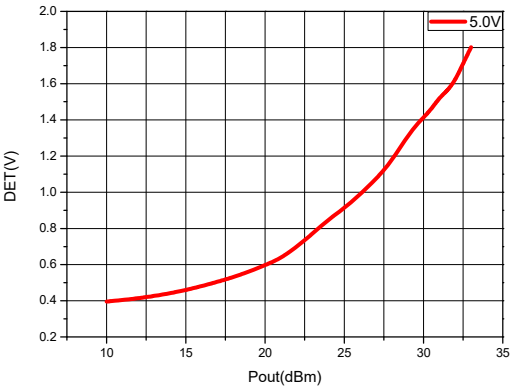
802.11g EVM vs. Output Power @2.442GHz



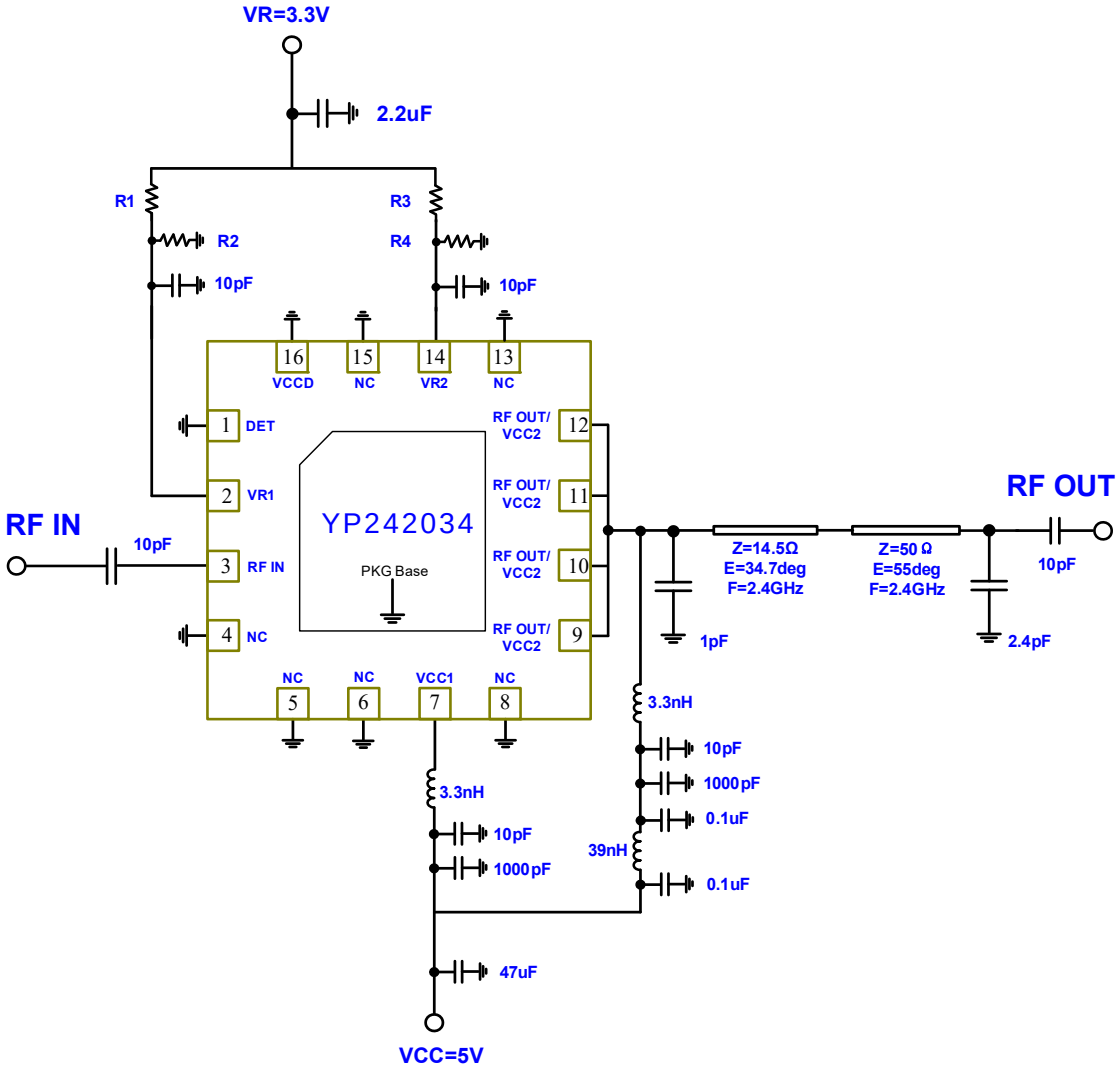
Icc vs. Output Power @2.45GHz



DET Voltage vs. Output Power @2.45GHz

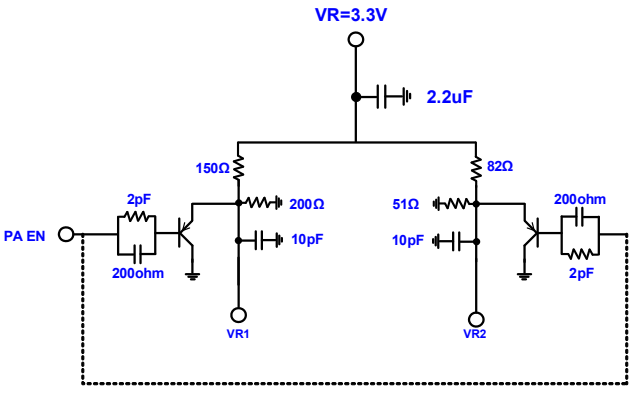


Evaluation Board Schematic for WLAN @ VCC1=VCC2=5.0V, T_{OP}=+25°C



Notes:

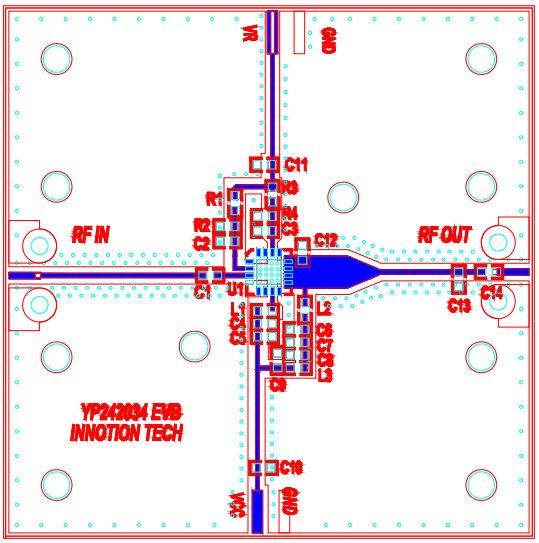
1. Pin1, 16 are active power detection circuit ports, if function is not desired, pin1, 16 may be connected to GND.
2. Please use PA Enable Application Schematic as follow. Apply 3.3V_{DC} to power up the power amplifier; Apply 0V_{DC} to power down.



Evaluation Board Layout

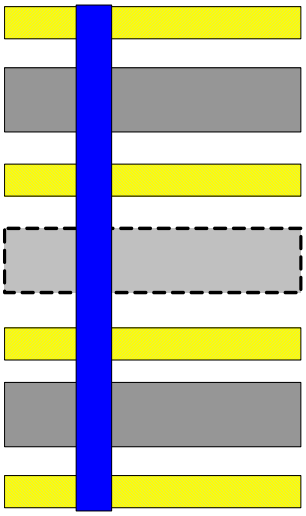
Board Size 50mm×50mm, Board Thickness 1mm, Board Material FR-4 (ε_r=4.5)

Evaluation Board Top View



Layer Detail Physical Characteristics

Cross Section

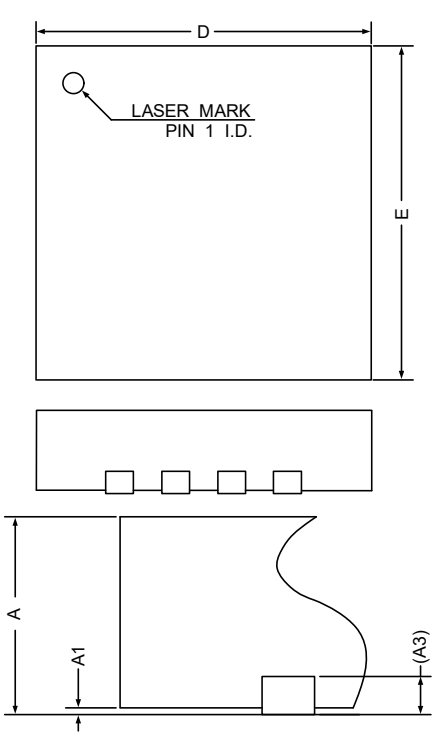


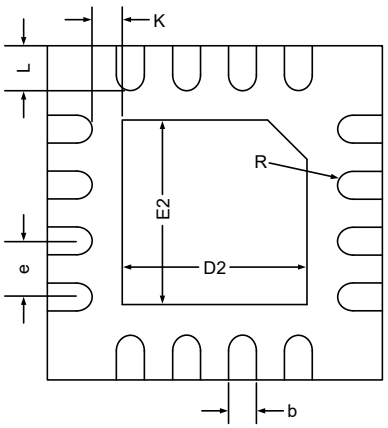
Name	Thickness	Material	εr
RFS	1 oz	Cu	--
Core 1	0.23 mm	FR-4	4.5
RFGND	1 oz	Cu	--
		FR-4	4.5
PCS	1 oz	Cu	--
		FR-4	4.5
GND	1oz	Cu	

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	150Ω 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





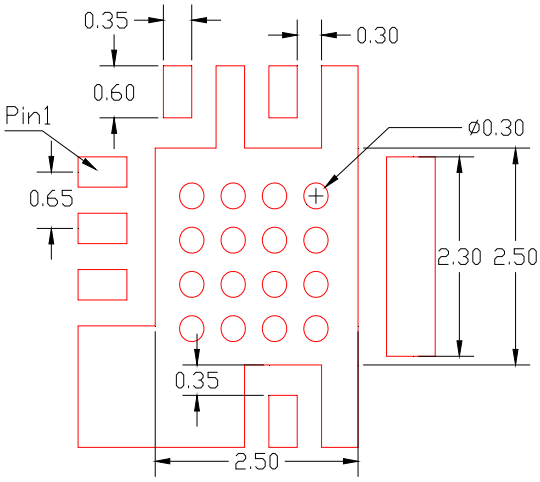
COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

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	—	—

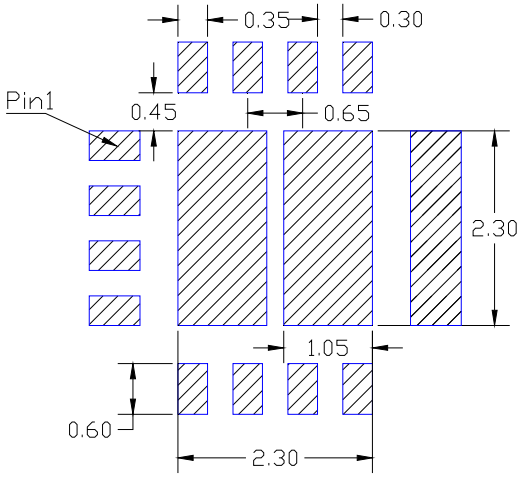
NOTE:
ALL DIMENSIONS REFER TO JEDEC STANDARD MO-220 WEED-4.

PCB Land Pattern and Stencil Outline

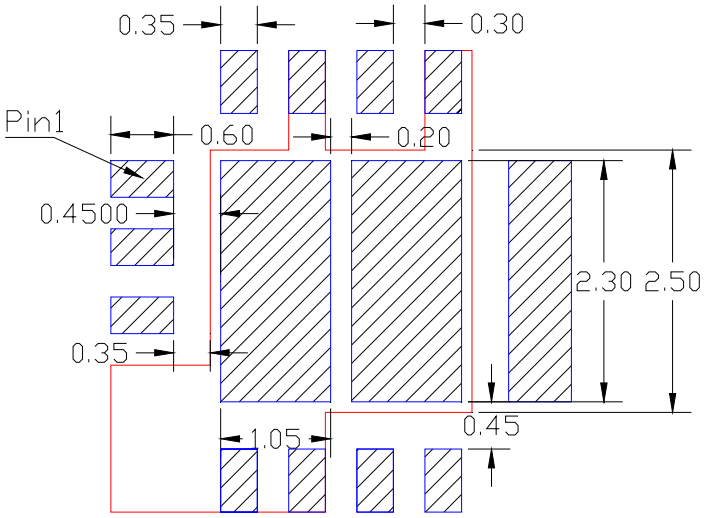
(Units: millimeters)



PCB Land Pattern (Top View)

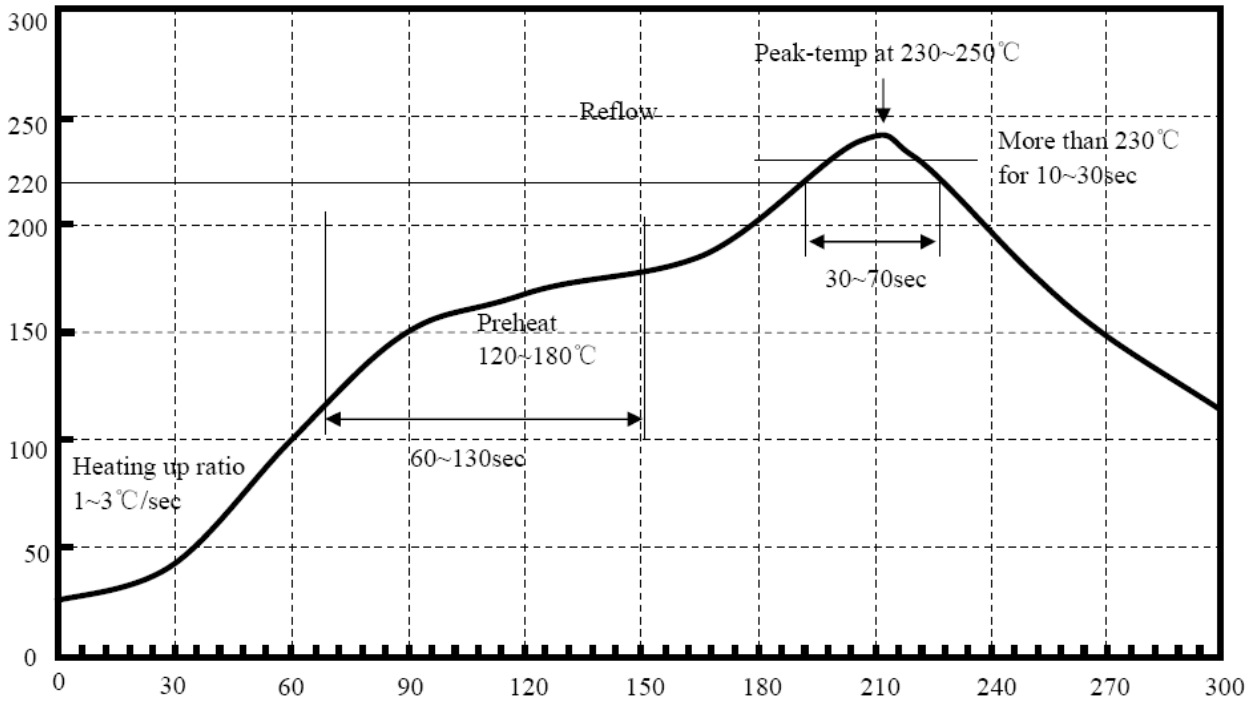


Stencil Outline



Combined PCB Land Pattern and Stencil Outline

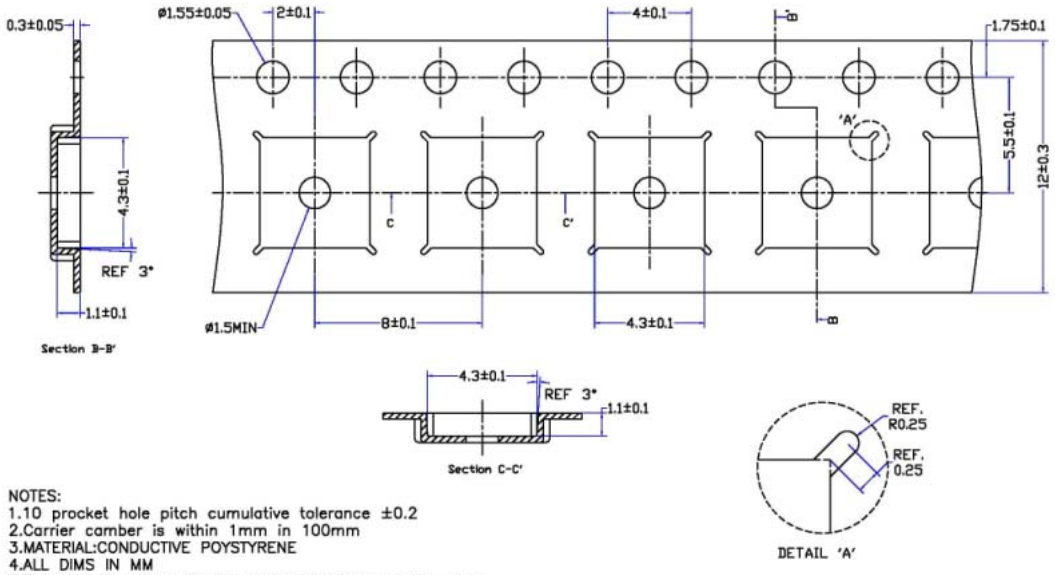
Recommended Solder Temperature



Recommended Temperature

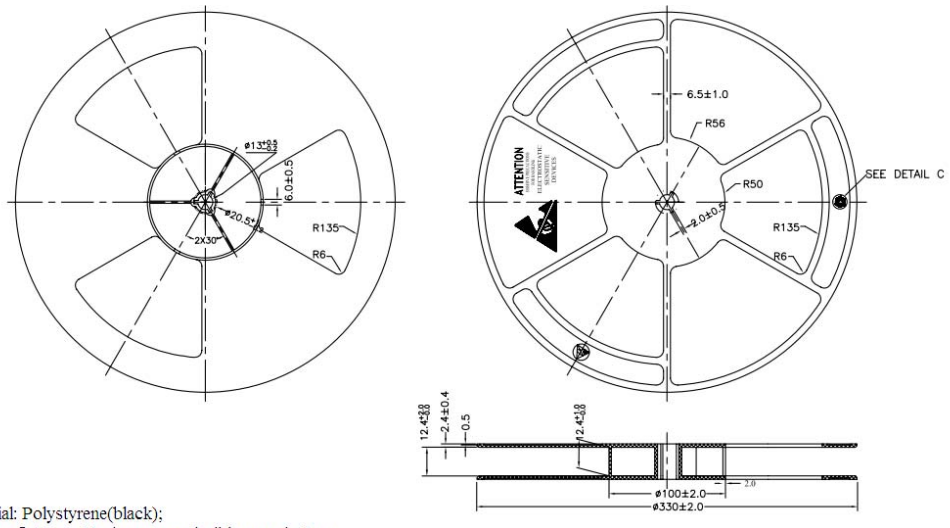
Sn95.5Ag4.0Cu0.5

Tape dimensions and Orientation



NOTES:
1.10 procket hole pitch cumulative tolerance ±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 1X10E11(max) 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: 105TO 1010/OHMS/SQ;
5. General tolerances: ±0.25