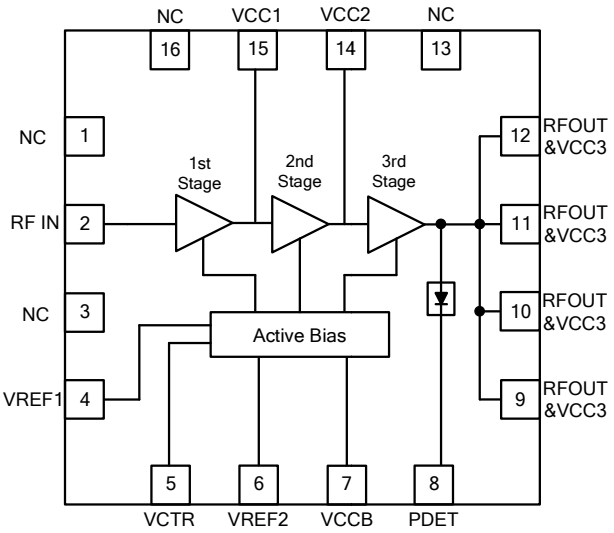
## Features

*RoHS & Pb-Free Product*

- 35dB Gain(Typ)
- 33dBm $P_{-1dB}$ @ VCC=5V
- 2.5% EVM WLAN @Pout=27dBm, VCC=5V
- 320mA Quiescent Current@ VCC=5V
- 5.0V DC Operation
- Integrated Output Power Detector
- ESD protection all ports above 1000V HBM, forward and reverse voltage




**Functional Block Diagram**

## Applications

- IEEE 802.11b/g/n WLAN
- WiBro 2.3 GHz to 2.4GHz Applications
- WiMAX 2.5 GHz to 2.7GHz Applications

## Product Description

The AC243433 is a three-stage, high-linearity, high-gain power amplifier. The device is manufactured on an advanced InGaP/GaAs HBT process. This amplifier provides a typical gain of 35dB and P1dB power of 33dBm, typical bias condition is 5V at 320mA. The input are internally matched to 50Ω and require a minimum of external matching components to cover the entire 2.3GHz to 2.7GHz. The AC243433 is assembled in a 16-Pin, 4×4mm$^2$, QFN package. It is internally integrated with ESD protection circuitry on all ports.

## Pin Description

| Pin No. | Symbol | Description |
|---|---|---|
| 1, 3, 13, 16 | NC | No connection or connect to ground |
| 2 | RF IN | RF input |
| 4, 6 | VREF1/VREF2 | Bias current control voltage |
| 5 | VCTR | Power on/off control voltage |
| 7 | VCCB | Supply voltage for bias circuit |
| 8 | PDET | Output power detector |
| 9, 10, 11, 12 | RFOUT&VCC3 | RF output and Stage3 supply voltage |
| 14, 15 | VCC2/VCC1 | Stage 2/Stage 1 supply voltage |

## Absolute Maximum Ratings

| Parameter | Rating | Unit |
|---|---|---|
| Input RF Power with 50Ω Output Load | +10 | dBm |
| Supply Voltage | -0.5 to +8.0 | V |
| Bias Voltage | -0.5 to +2.9 | V |
| DC Supply Current(no RF) | 600 | mA |
| Operating Ambient Temperature | -40 to +85 | °C |
| Storage Temperature | -40 to +150 | °C |

**Caution!** ESD Sensitive Device.

ESD Rating: Class1C
Value: Passes≥1000V min.
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ESD Rating: Class IV
Value: Passes ≥1000V min.
Test: Charged Device Model (CDM)
Standard: JEDEC Standard JESD22-C101

MSL Rating: Level 3 at +260 °C convection reflow
Standard: JEDEC Standard J-STD-020

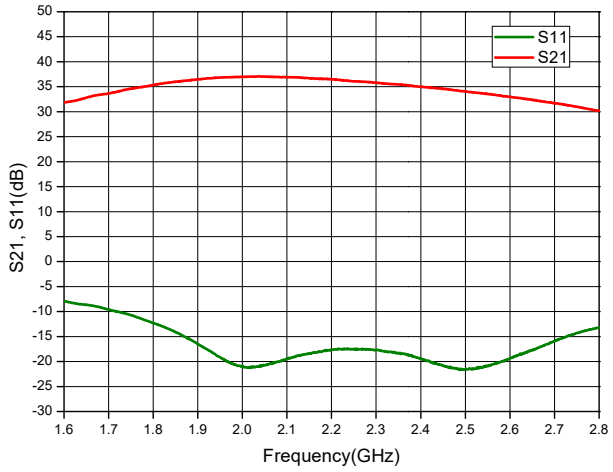
## Electrical Characteristics

| Parameter | Specification | | | Unit | Conditions |
|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | |
| **WLAN IEEE802.11g** | | | | | VCC=VCCB=5.0V, ICC=320mA, Temp=+25°C, 2.4~2.5 GHz |
| Frequency Range | 2.4 | | 2.5 | GHz | |
| $P_{-1dB}$ | | 33 | | dBm | VCC=5.0V@2.442GHz |
| EVM@ Pout=27dBm | | 2.0 | | % | VCC=5.0V@2.442GHz, 802.11g, 54Mbps, 64QAM |
| Current@ Pout=27dBm | | 650 | | mA | VCC=5.0V@2.442GHz, 802.11g, 54Mbps, 64QAM |
| Small Signal Gain | | 34 | | dB | VCC=5.0V@2.442GHz |
| **Power Supply** | | | | | |
| Operating Voltage | | 5.0 | | V | |
| Quiescent Current (no RF) | | 320 | | mA | VCC=VCCB=5.0V,Vref=2.83V |
| Reference Current (Total) | | 3 | | mA | VCC=VCCB=5.0V,Vref=2.83V |
| **WLAN IEEE802.11g** | | | | | VCC=VCCB=5.0V, ICC=210mA, Temp=+25°C, 2.4~2.5 GHz |
| Frequency Range | 2.4 | | 2.5 | GHz | |
| $P_{-1dB}$ | | 33 | | dBm | VCC=5.0V@2.442GHz |
| EVM@ Pout=27dBm | | 3.0 | | % | VCC=5.0V@2.442GHz, 802.11g, 54Mbps, 64QAM |
| Current@ Pout=27dBm | | 510 | | mA | VCC=5.0V@2.442GHz, 802.11g, 54Mbps, 64QAM |
| Small Signal Gain | | 35 | | dB | VCC=5.0V@2.442GHz |
| **Power Supply** | | | | | |
| Operating Voltage | | 5.0 | | V | |
| Quiescent Current (no RF) | | 210 | | mA | VCC=VCCB=5.0V,Vref=2.66V |
| Reference Current (Total) | | 2 | | mA | VCC=VCCB=5.0V,Vref=2.66V |

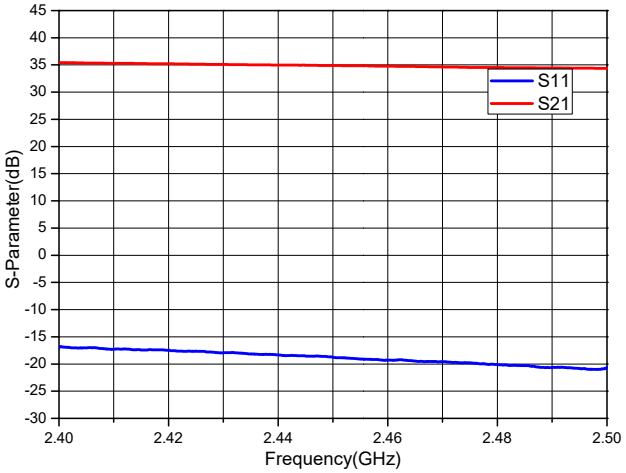
# WLAN 802.11g Performance Plots

**VCC=VCCB=5V, ICCQ=320mA(no RF), T=25°C**

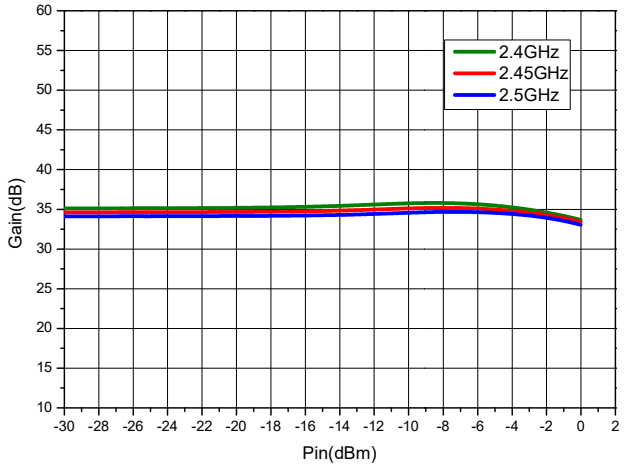
## Gain & Return Loss



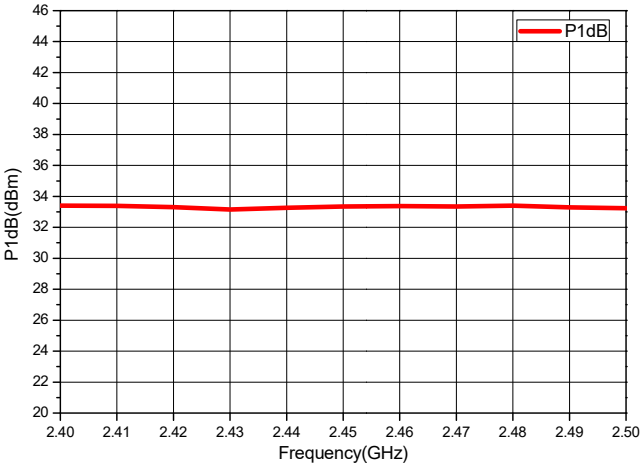

## Gain & Return Loss



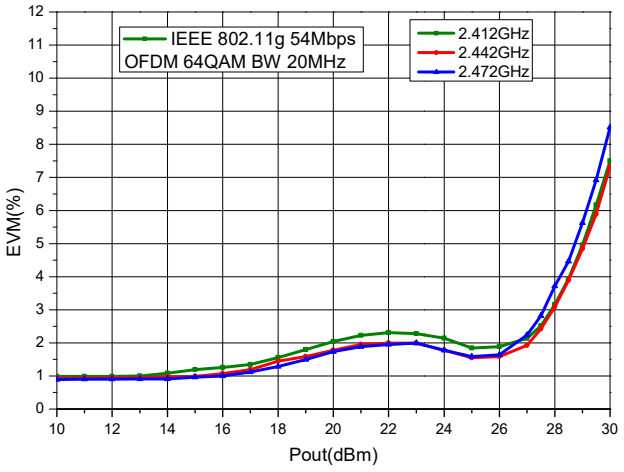

## Power Gain vs. Input Power



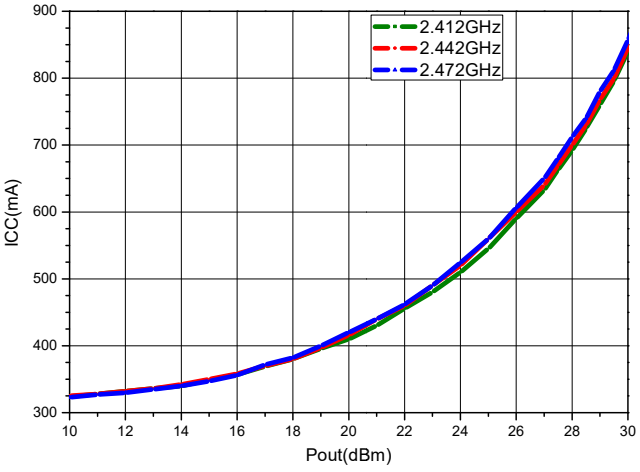

## P1dB vs. Frequency




## EVM vs. Output Power

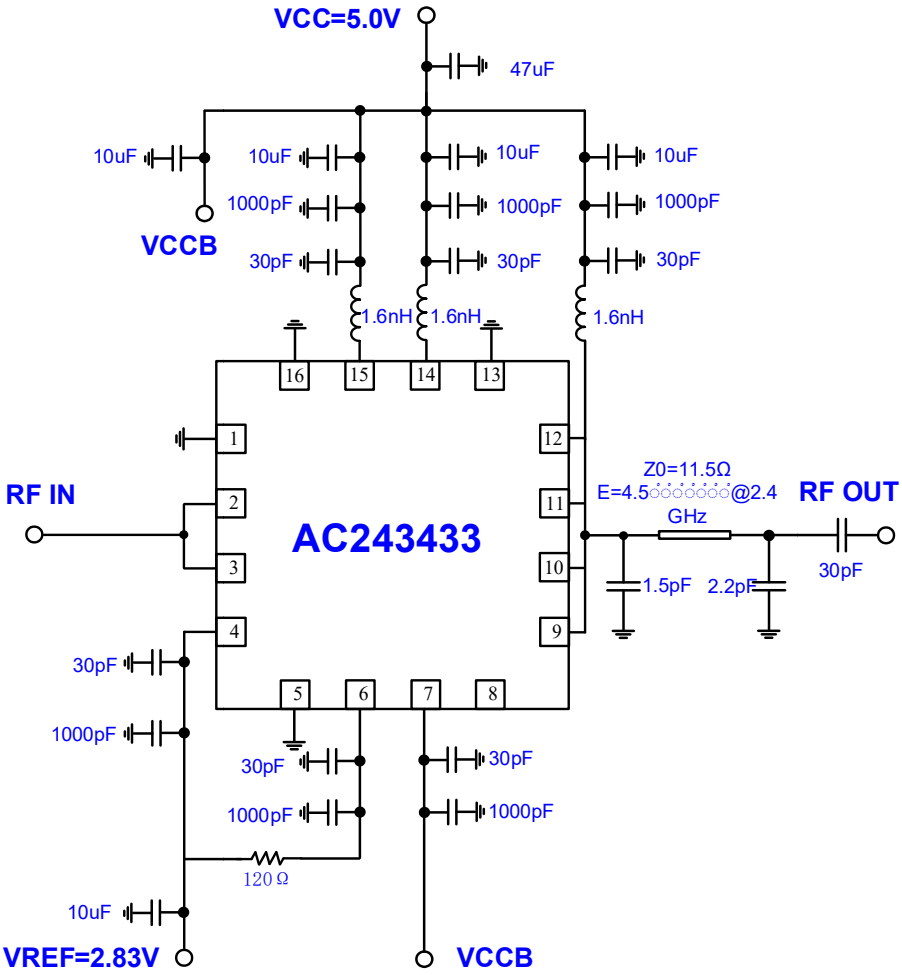



## ICC vs. Output Power



# Evaluation Board Schematic for WLAN Application

ICCQ=300mA (no RF)



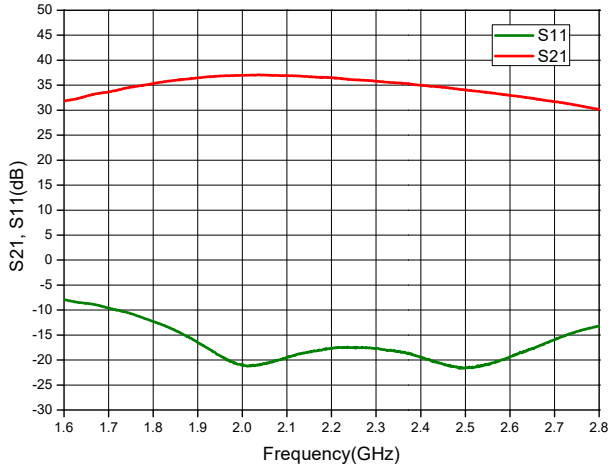

Notes:

1. Pin5 is power down pin. Apply >1.5 $V_{DC}$ to power off the PA. Apply 0 $V_{DC}$ to power on. If the function is not desired, this pin may be connected to GND.
2. Pin8 is active power detection port, if the function is not desired, this pin need to left unterminated (open).

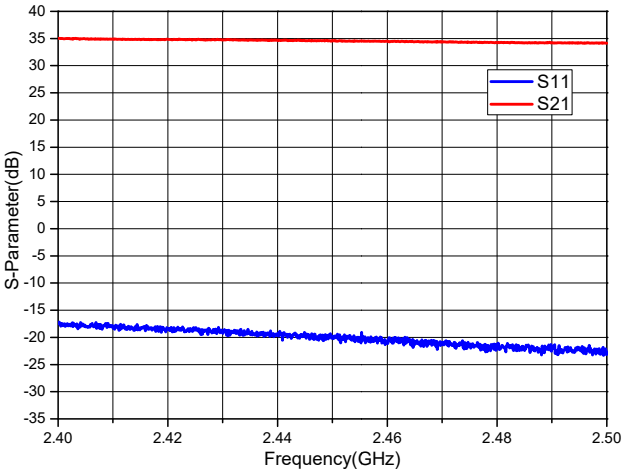
# WLAN 802.11g Performance Plots

**VCC=VCCB=5V, ICCQ=210mA(no RF), T=25°C**

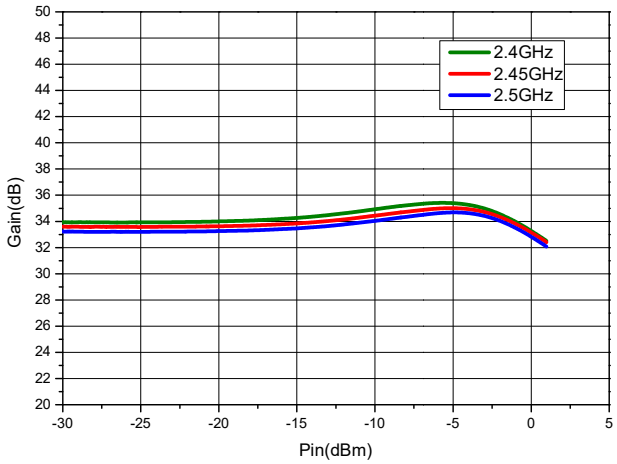
## Gain & Return Loss



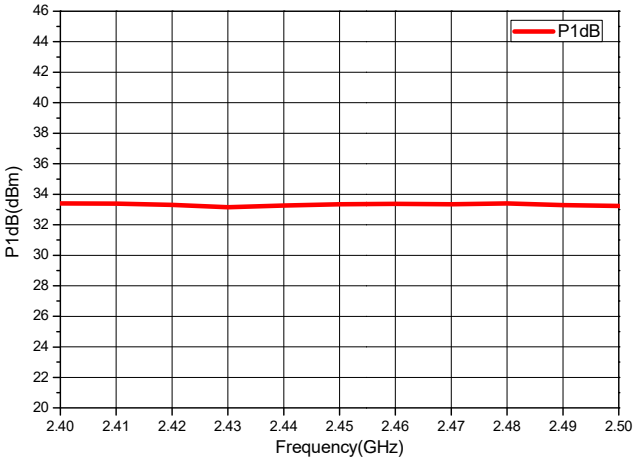

## Gain & Return Loss



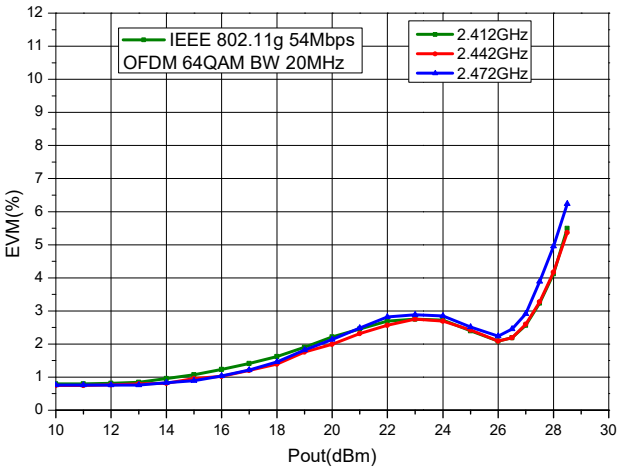

## Power Gain vs. Input Power



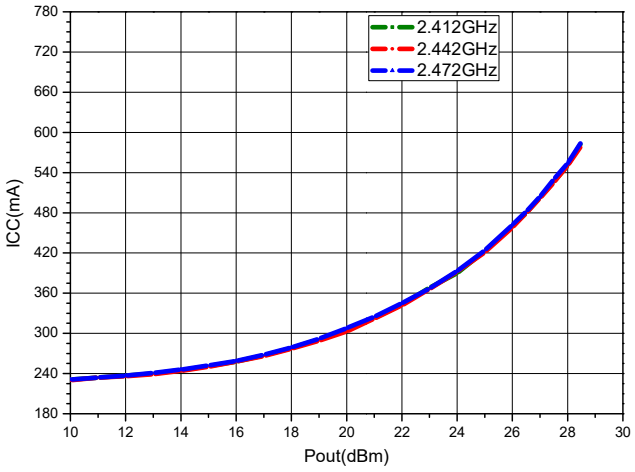

## P1dB vs. Frequency




## EVM vs. Output Power

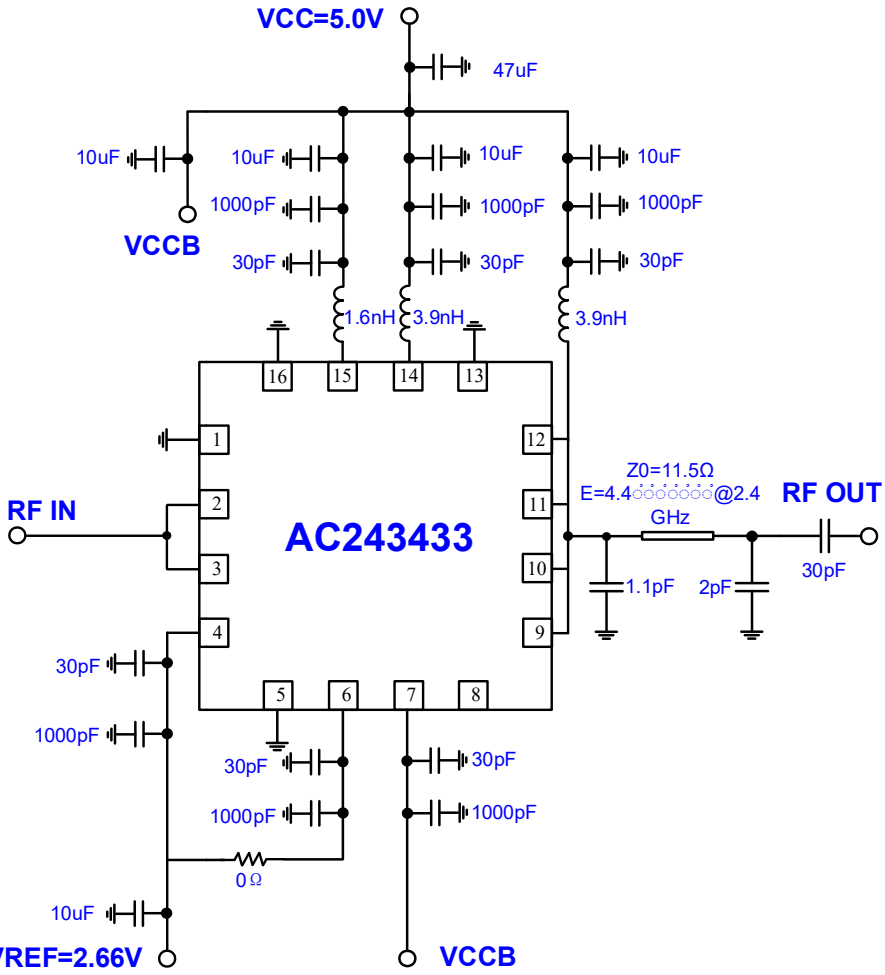



## ICC vs. Output Power



# Evaluation Board Schematic for WLAN Application

ICCQ=210mA (no RF)



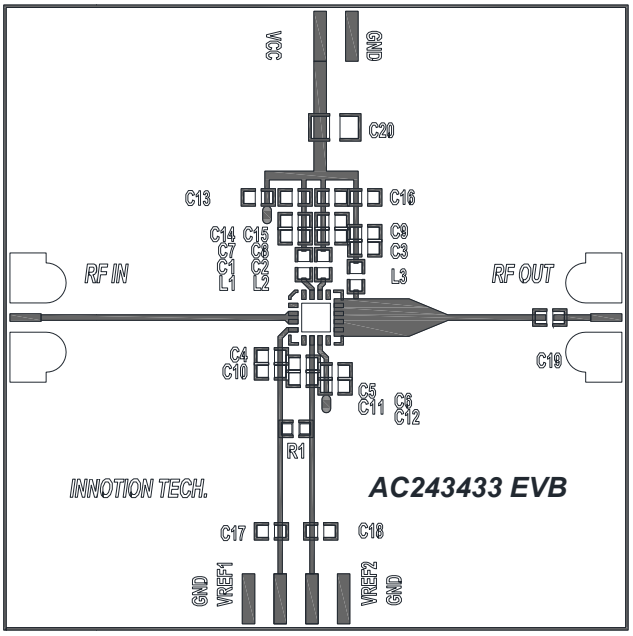

Notes:

3. Pin5 is power down pin. Apply >1.5 $V_{DC}$ to power off the PA. Apply 0 $V_{DC}$ to power on. If the function is not desired, this pin may be connected to GND.
4. Pin8 is active power detection port, if the function is not desired, this pin need to left unterminated (open).

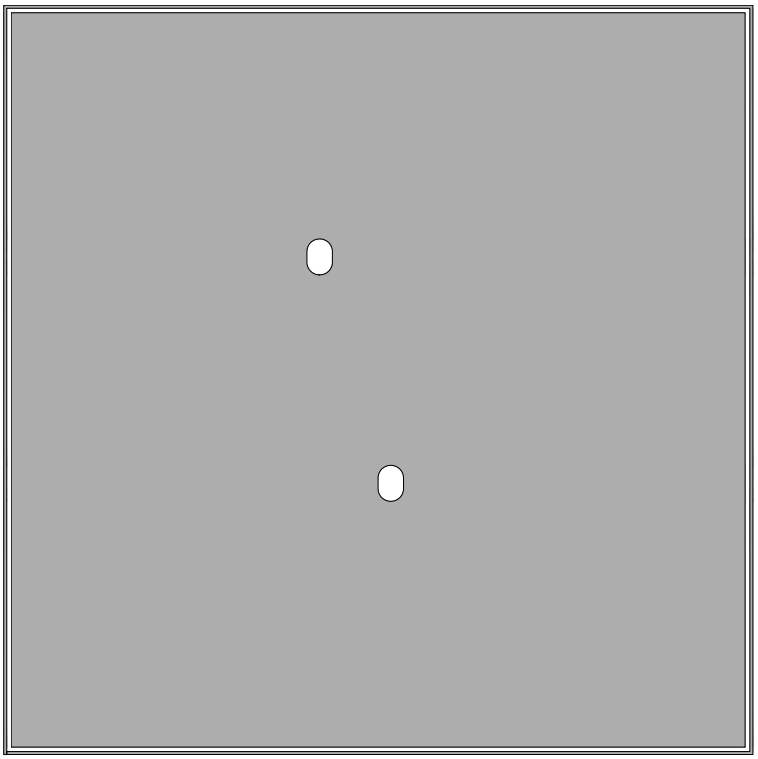
# Evaluation Board Layout

Board Size 50mm×50mm

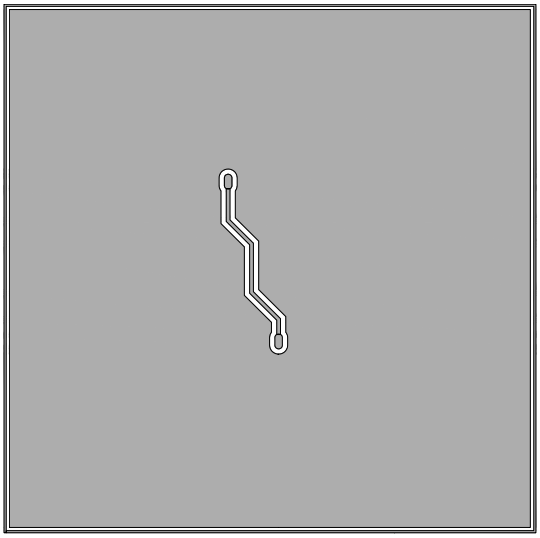
Board Thickness 0.8mm, Board Material FR4, Multi-Layer



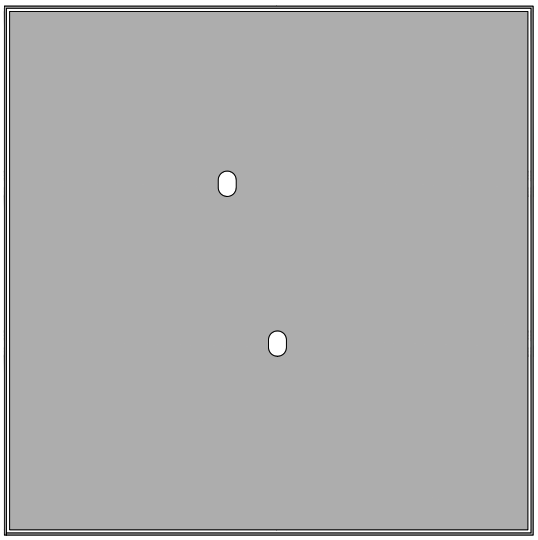

Top-Layer



Middle-Layer1

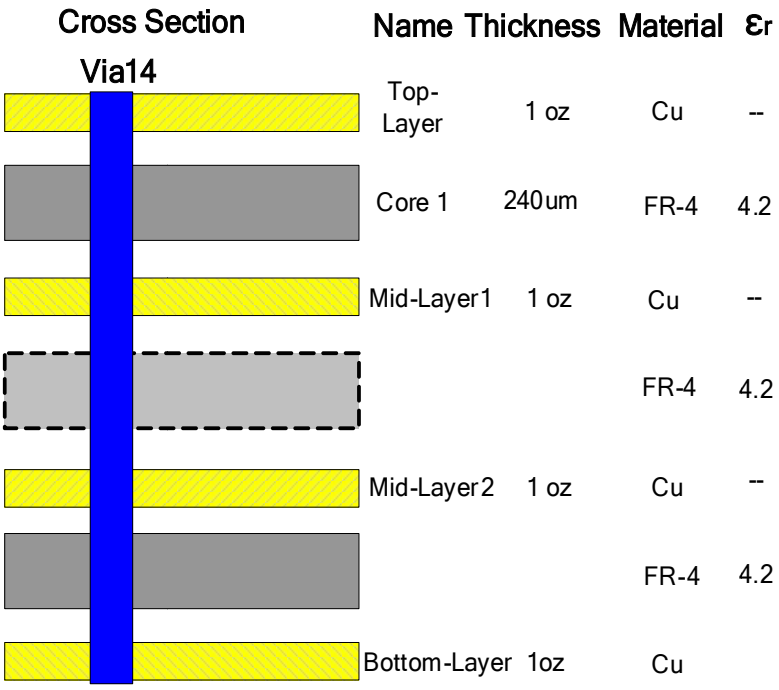


Middle-Layer2

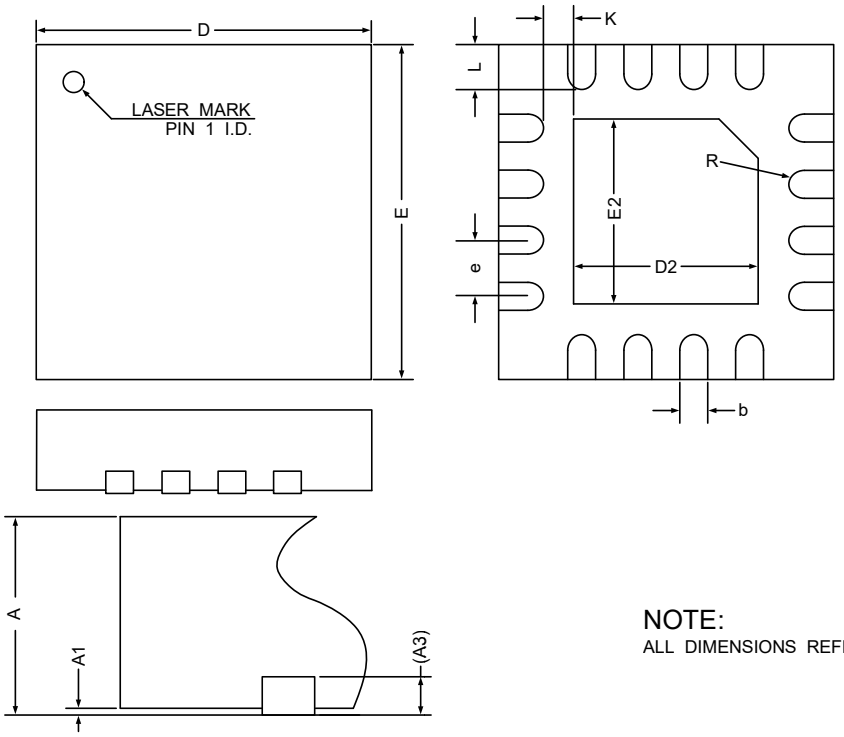


Bottom-Layer

## Layer Details of DEMO Board



# Packaging Diagram

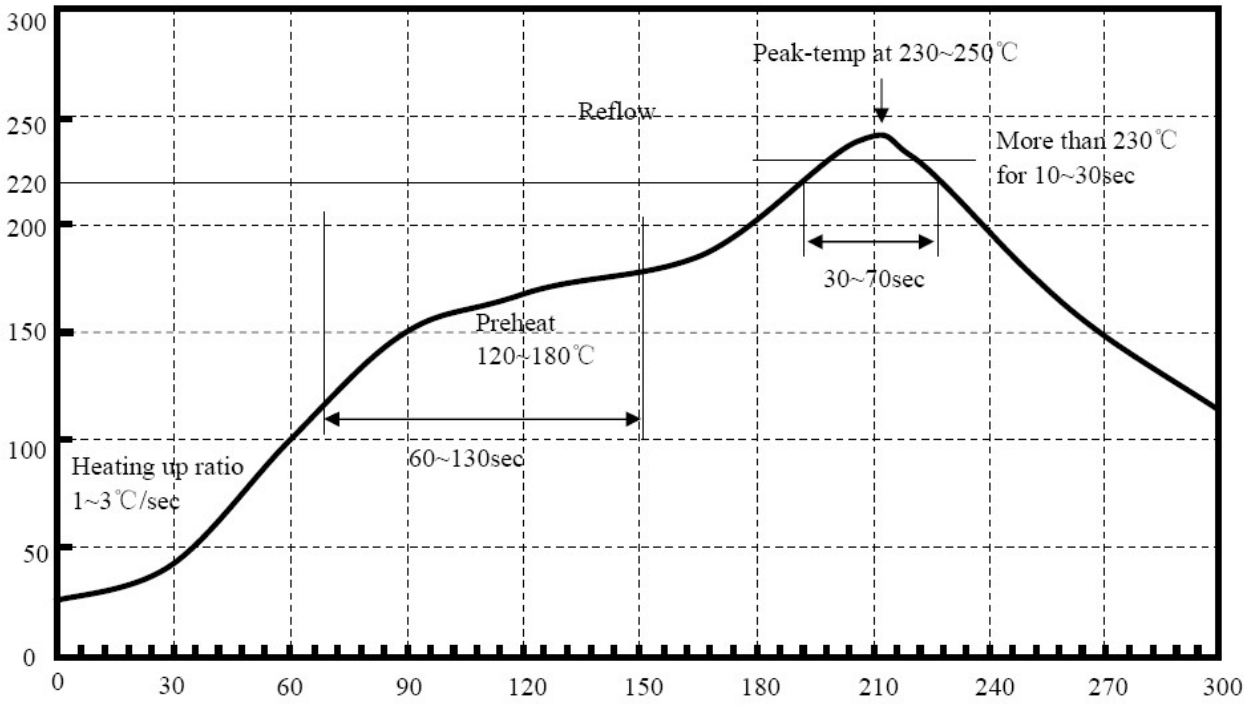



COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 0.70 | 0.75 | 0.80 |
| 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 | 2.00 | 2.15 | 2.25 |
| E2 | 2.00 | 2.15 | 2.25 |
| 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.

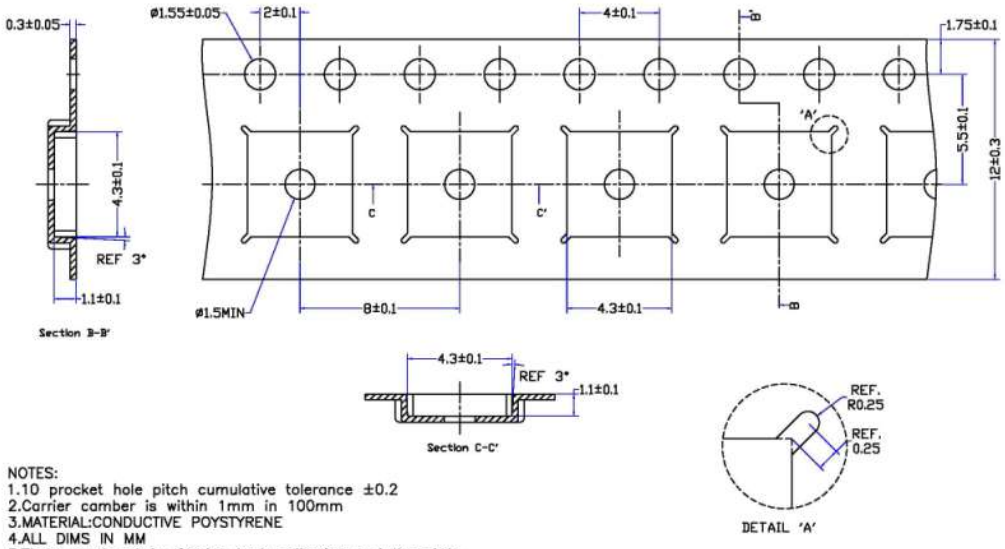
# Recommended Solder Temperature




**Recommended Temperature**

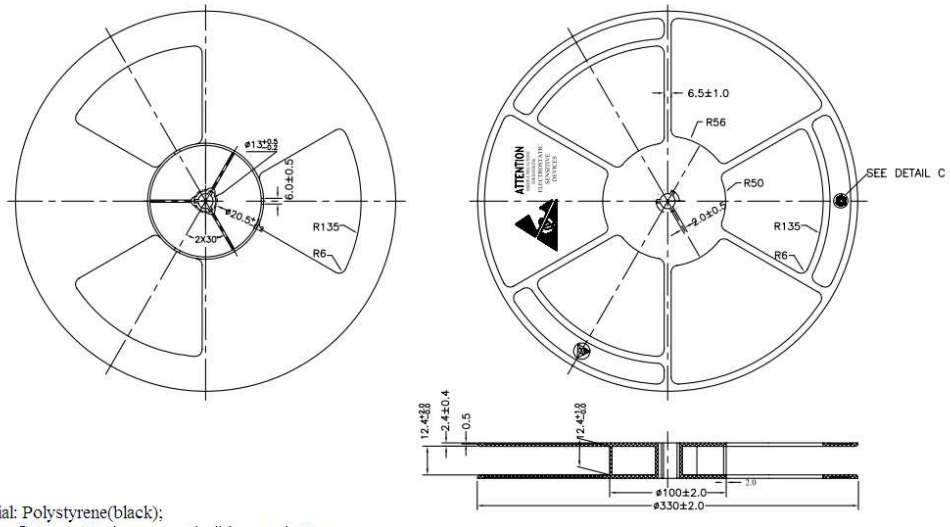
**Sn95.5Ag4.0Cu0.5**

# 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