

Features

RoHS & Pb-Free Product

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

Applications

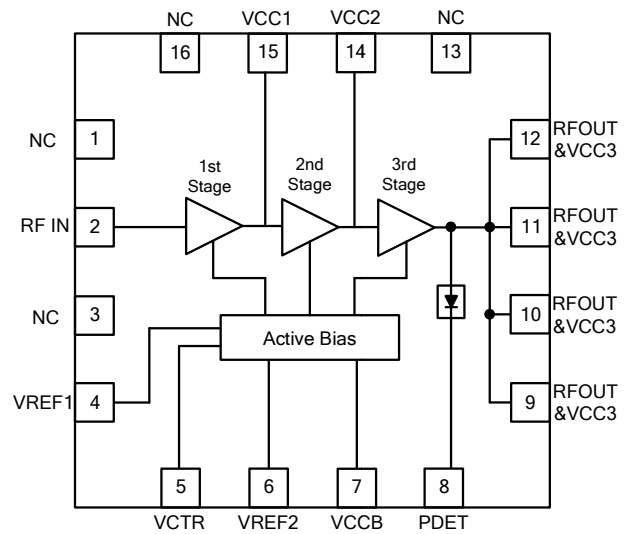
- IEEE 802.11b/g/n WLAN
- WiBro 2.3 GHz to 2.4GHz Applications
- WiMAX 2.5 GHz to 2.7GHz Applications

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, 4×4mm², 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



Functional Block Diagram

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

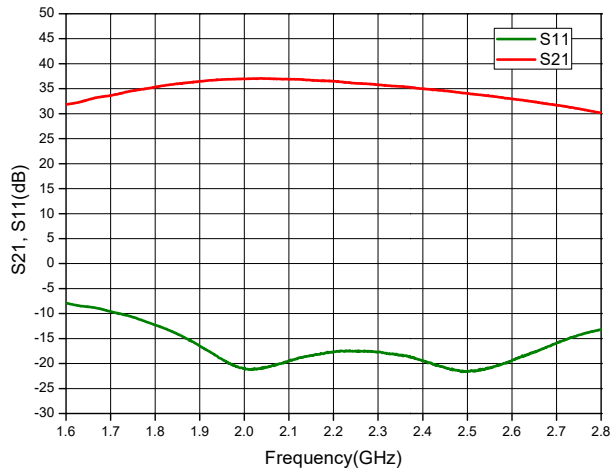
Electrical Characteristics

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

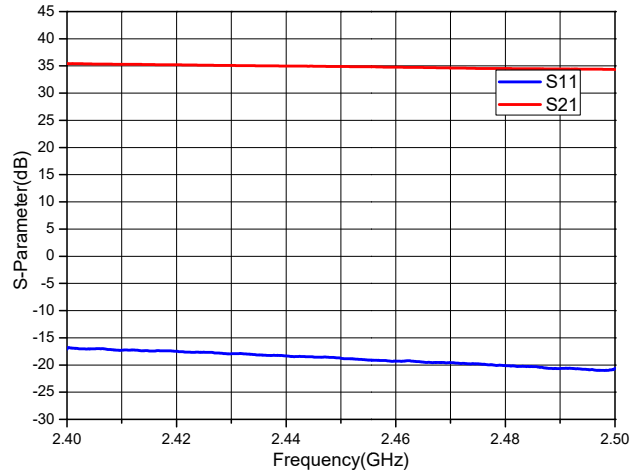
WLAN 802.11g Performance Plots

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

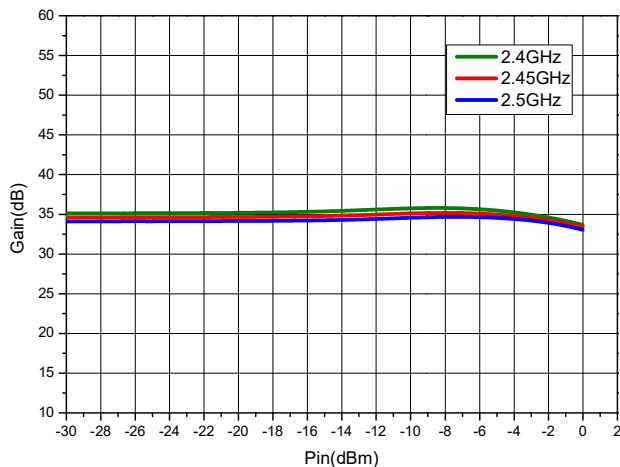
Gain & Return Loss



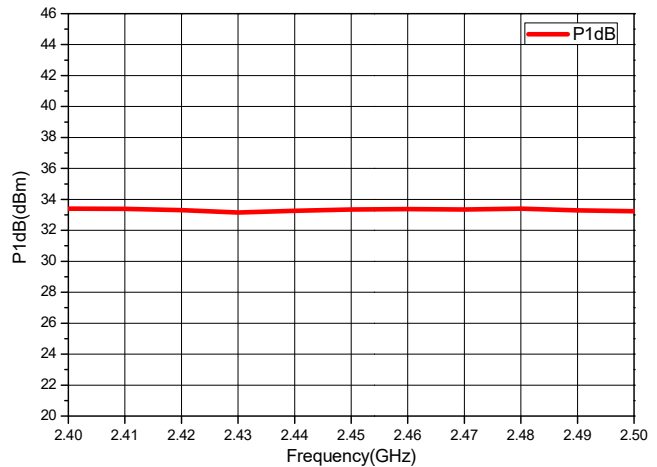
Gain & Return Loss



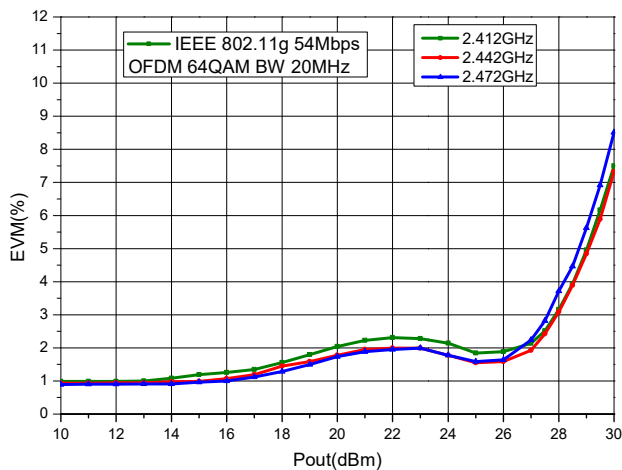
Power Gain vs. Input Power



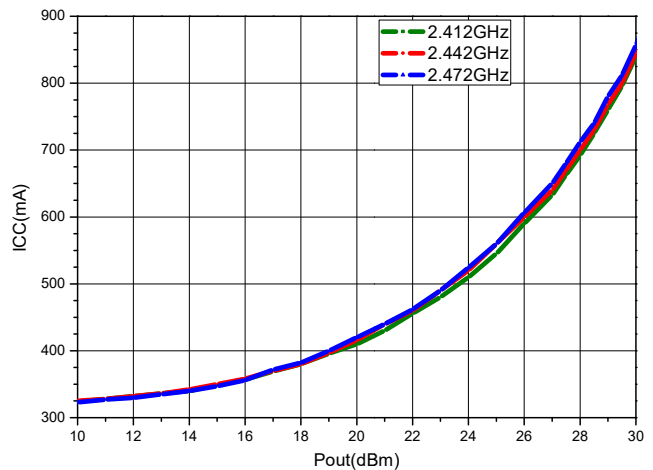
P1dB vs. Frequency



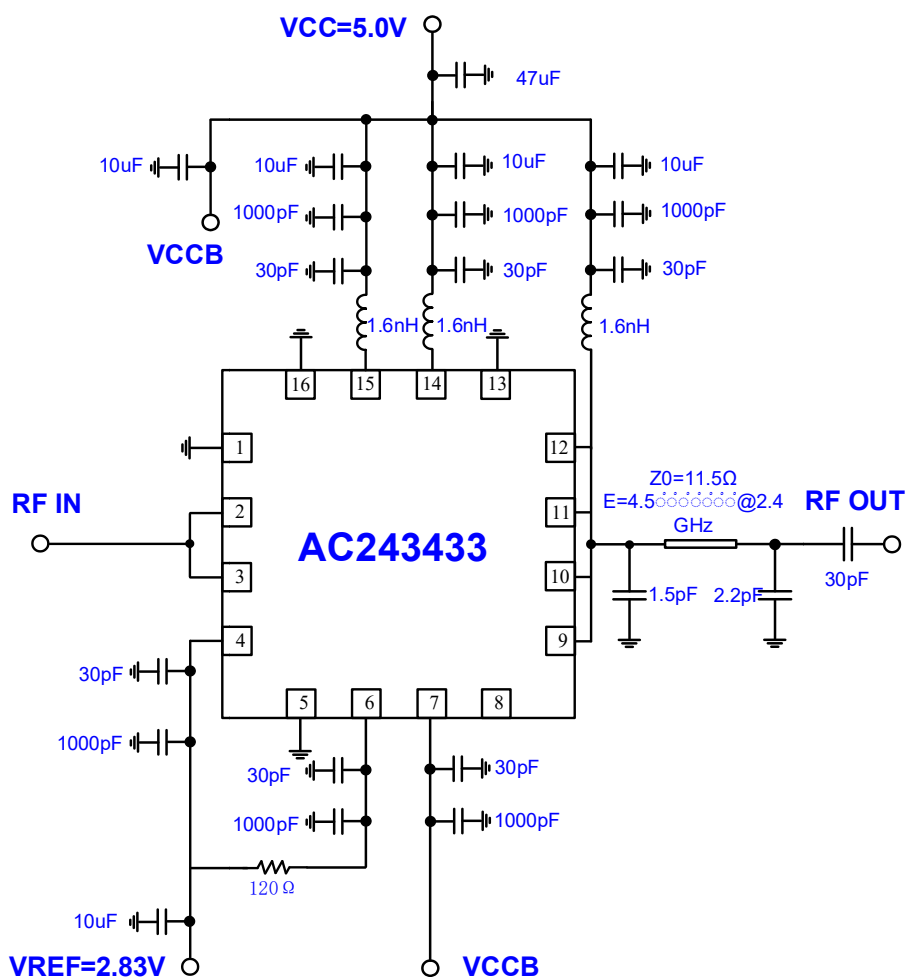
EVM vs. Output Power



ICC vs. Output Power



IC_{CQ}=300mA (no RF)

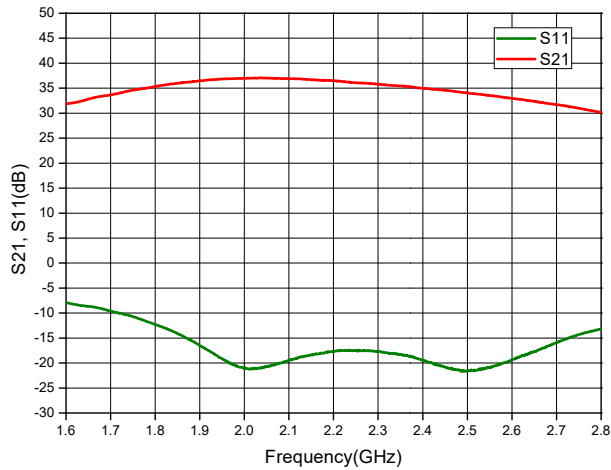


1. Pin5 is power down pin. Apply $>1.5 V_{DC}$ to power off the PA. Apply $0 V_{DC}$ to power on. If the function is not desired, this pin may be connected to GND.
2. Pin8 is active power detection port, if the function is not desired, this pin need to left unterminated (open).

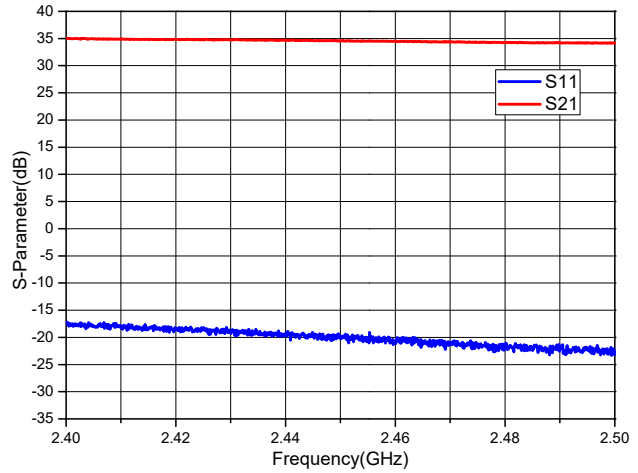
WLAN 802.11g Performance Plots

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

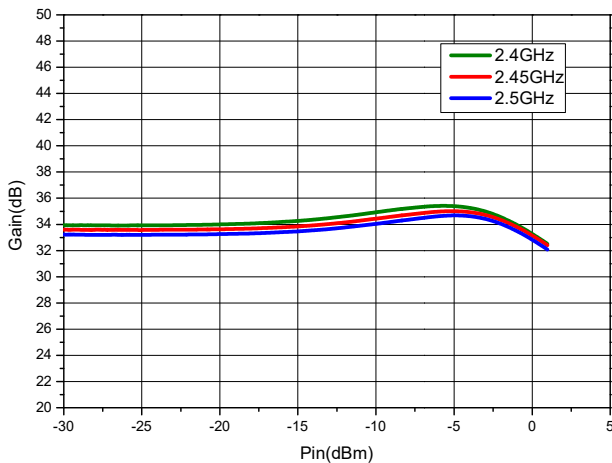
Gain & Return Loss



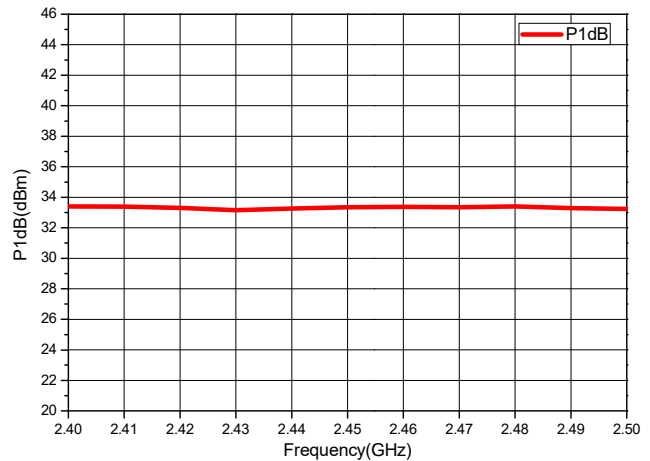
Gain & Return Loss



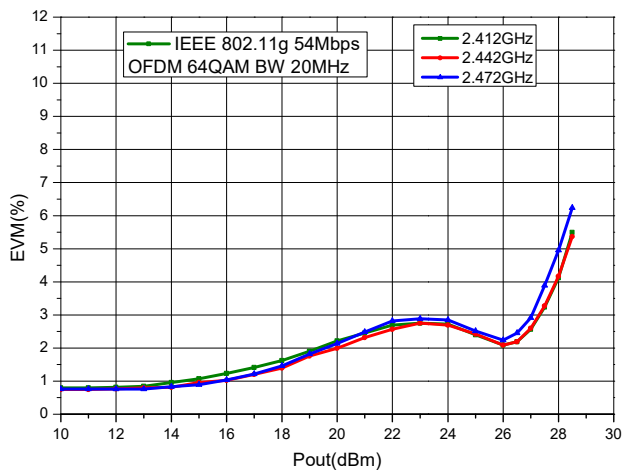
Power Gain vs. Input Power



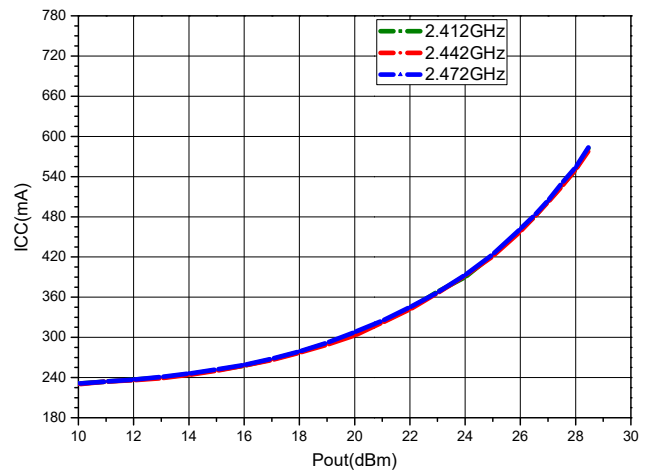
P1dB vs. Frequency



EVM vs. Output Power

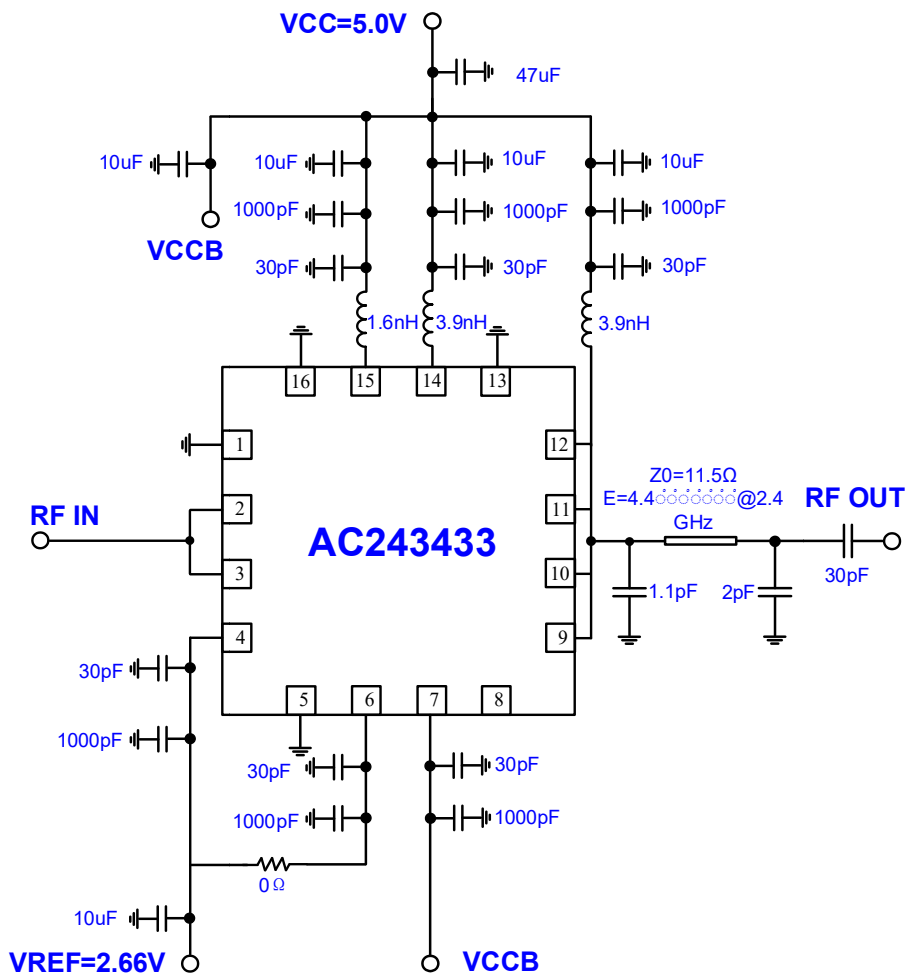


ICC vs. Output Power



Evaluation Board Schematic for WLAN Application

ICCQ=210mA (no RF)



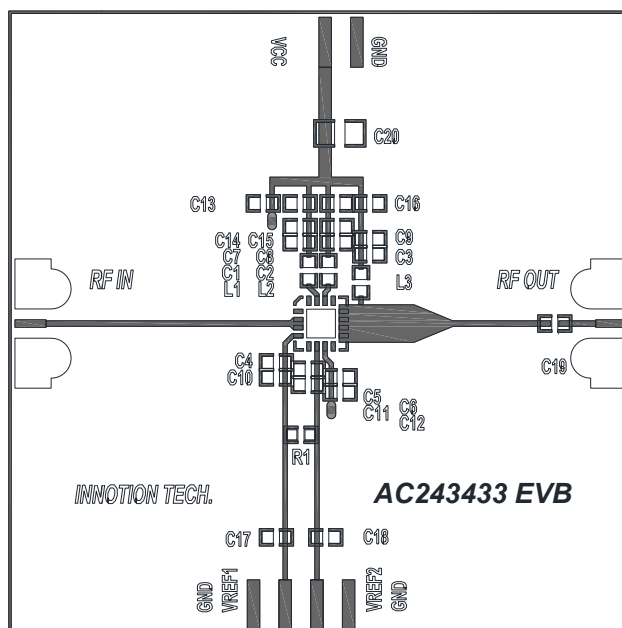
Notes:

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).

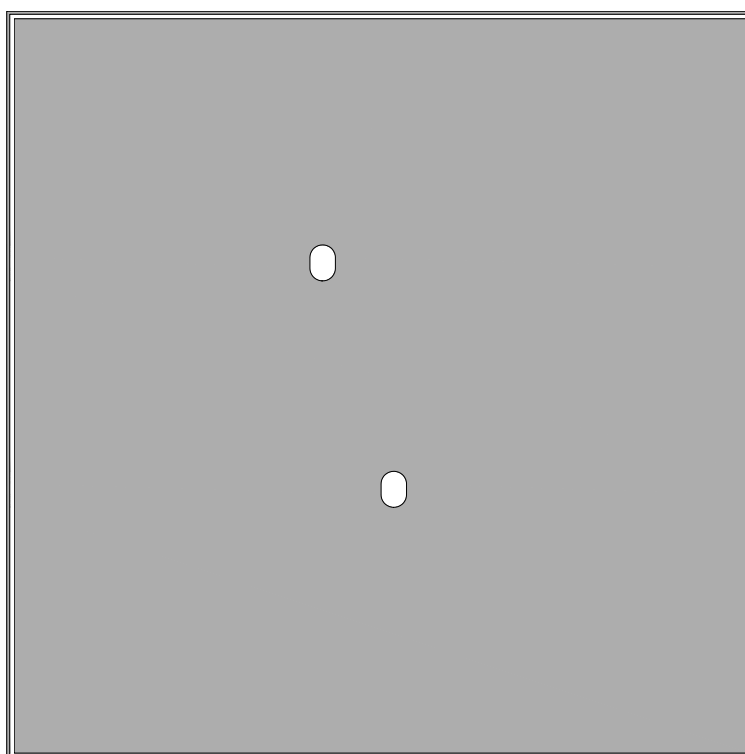
Evaluation Board Layout

Board Size 50mm × 50mm

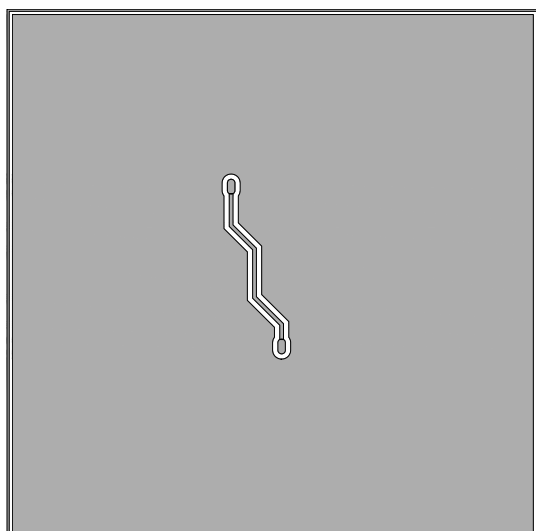
Board Thickness 0.8mm, Board Material FR4, Multi-Layer



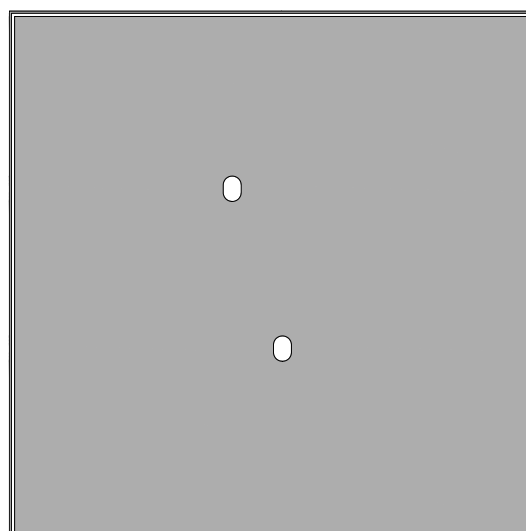
Top-Layer



Middle-Layer1

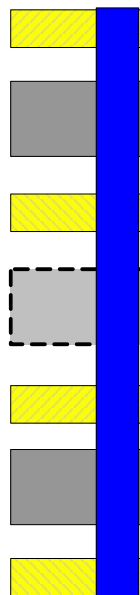


Middle-Layer2

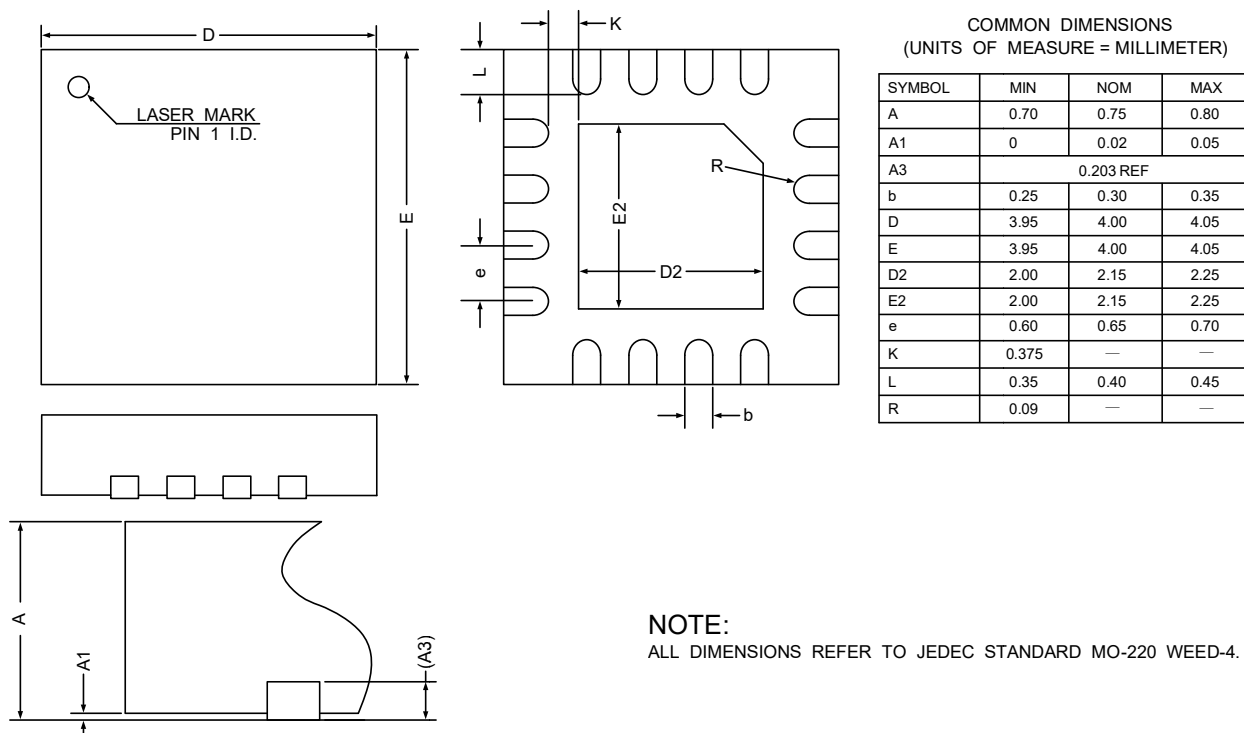


Bottom-Layer

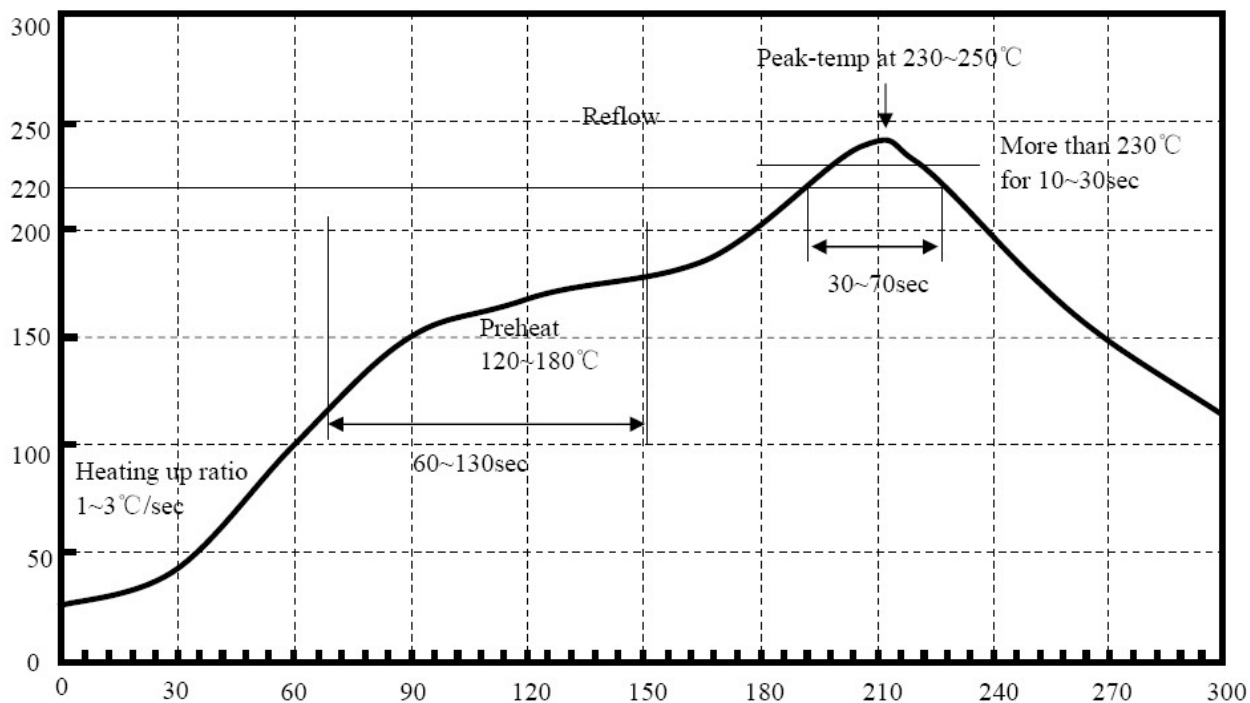
Layer Details of DEMO Board

Cross Section	Name	Thickness	Material	ϵ_r
 Via14	Top-Layer	1 oz	Cu	--
	Core 1	240um	FR-4	4.2
	Mid-Layer1	1 oz	Cu	--
			FR-4	4.2
	Mid-Layer2	1 oz	Cu	--
			FR-4	4.2
	Bottom-Layer	1oz	Cu	

Packaging Diagram



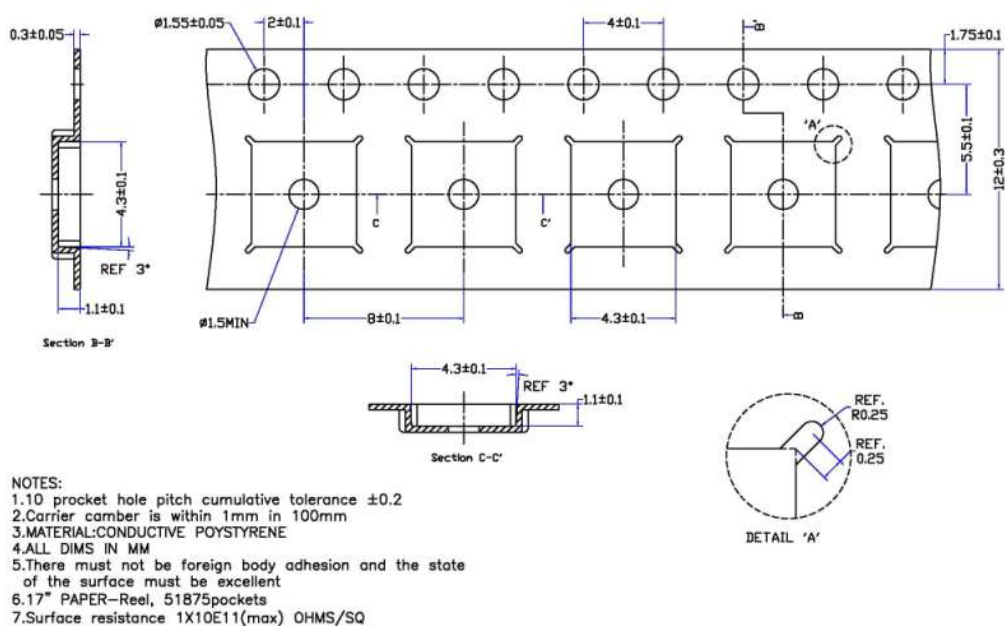
Recommended Solder Temperature



Recommended Temperature

Sn95.5Ag4.0Cu0.5

Tape dimensions and Orientation



Reel dimensions and Orientation

