E-pHEMT AE608

Product Features

- 10 ~ 4000MHz
- GaAs E-pHEMT
- 0.7dB Noise Figure
- 32dBm Output IP3
- 14dB Gain @ 1900MHz
- 14dBm P1 dB
- SOT-143 Package
- Single Supply Voltage
- Pb Free / RoHS Standard

Applications

- HF-Band, Cellular, CDMA, W-CDMA, Wimax Front-end Amplifier
- Low-Noise High Linearity Amplifier

Package Type : SOT-143

Description

AE608 is a Low-noise amplifier designed with GaAs E-pHEMT in a low cost SOT-143 package.
This E-pHEMT amplifier is designed as low-noise devices for infrastructure equipment in the 10~4000MHz Wireless technologies such as HF-Band, Cellular, GSM, PCS, CDMA, W-CDMA, Wibro, Bluetooth, Wimax.

Electrical Specifications

PARAMETER	UNIT	MIN	TYP	MAX	CONDITION
Operating Frequency(Fo)	MHz	10	–	4000	-
Gain (S_{21})	dB	12	14	-	-
Input Return Loss (S_{11})	dB	-	-18	-	-
Output Return Loss (S_{22})	dB	-	-10	-	-
Output 3rd Order Intercept Point (OIP3)	dBm	29	32	-	-
Output 1dB compression Point (P_1dB)	dBm	12	14	-	-
Noise Figure(NF)	dB		0.7	0.9	-
DC Operating Current	mA	30	45	60	-
Operating Gate Voltage (Vds=3V, Ids=45mA)	V	-	0.4	-	-
Threshold voltage	V	0.1	0.25	0.4	-

Test Condition
1. 1900MHz, Vdd= +3V, 50ohm System at 25℃
2. OIP3 is measured with two tones, at an output power of +0dBm/tone separated by 1MHz.

Absolute Maximum Ratings

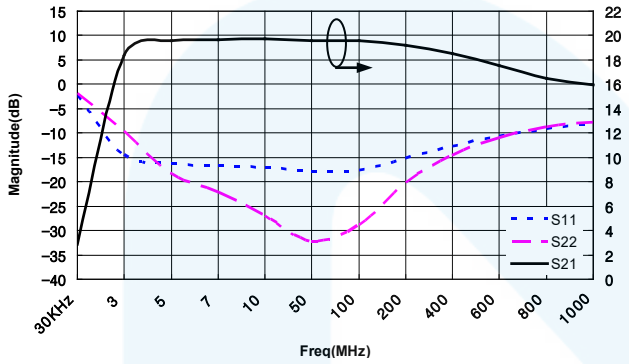
PARAMETER	UNIT	RATING	CONDITION
Operating Case Temperature	℃	-40 ~ 85	-
Storage Temperature	℃	-50 ~ 125	-
Drain-Source Voltage	V	7	-
Drain Current	mA	120	-
Gate-Source Voltage	V	-5 ~ 1	-
Channel Temperature	℃	150	-
RF Input Power	dBm	20	-

Frequency Range @ 10 ~ 1000MHz

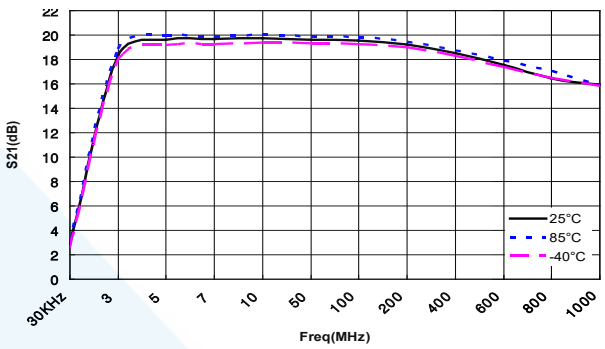
HF-Band, Cellular Performance Data @ V_d=2.5V, Id= 25mA, T_c=25℃

ITEM	DATA	REMARK	ITEM	DATA	REMARK
Gain	18 dB	500 MHz	NF	1.4 dB	10 ~ 1000 MHz
OIP3	23 dBm	500 MHz	P1dB	12 dBm	500 MHz

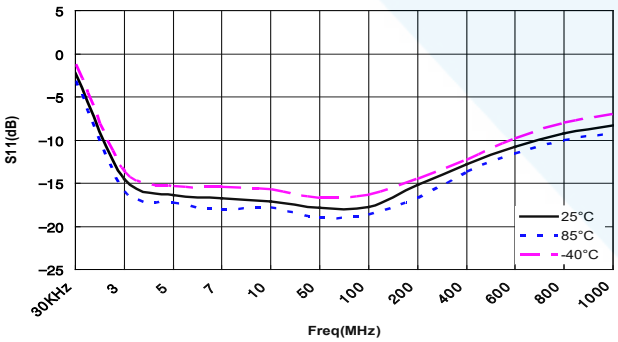
S-Parameter vs. Frequency(25℃)



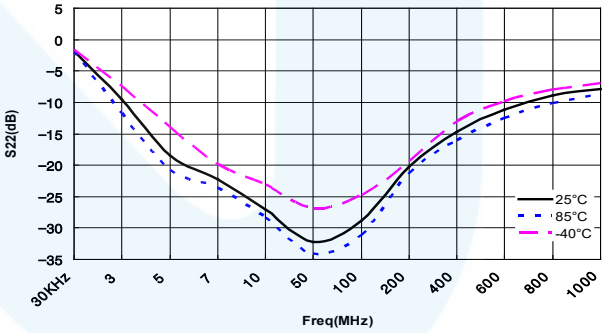
Gain vs. Frequency



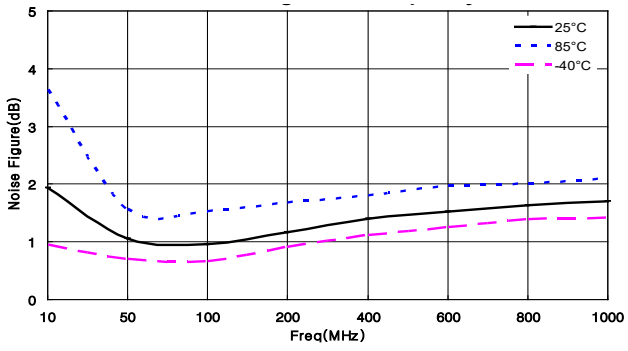
Input Return Loss vs. Frequency



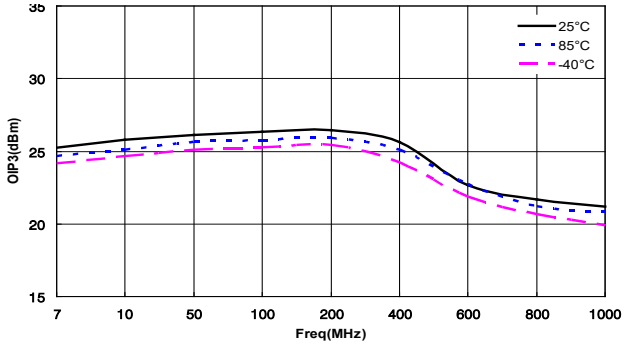
Output Return Loss vs. Frequency



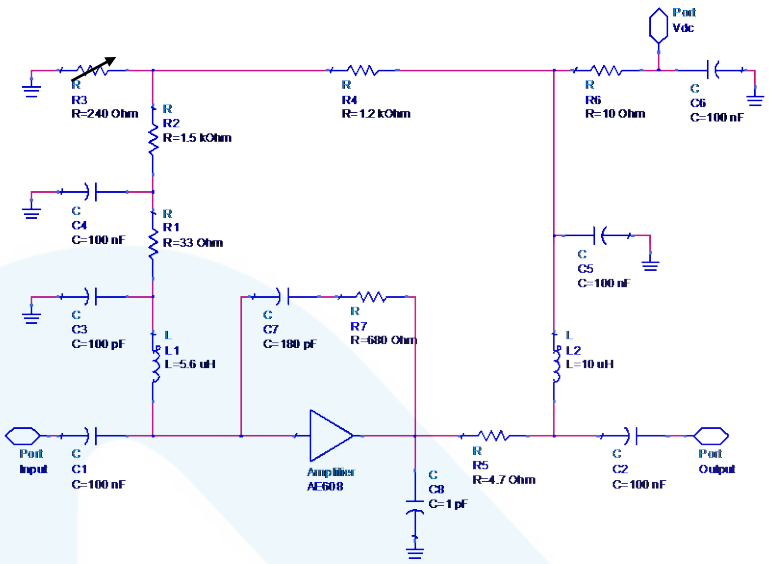
Noise Figure vs. Frequency



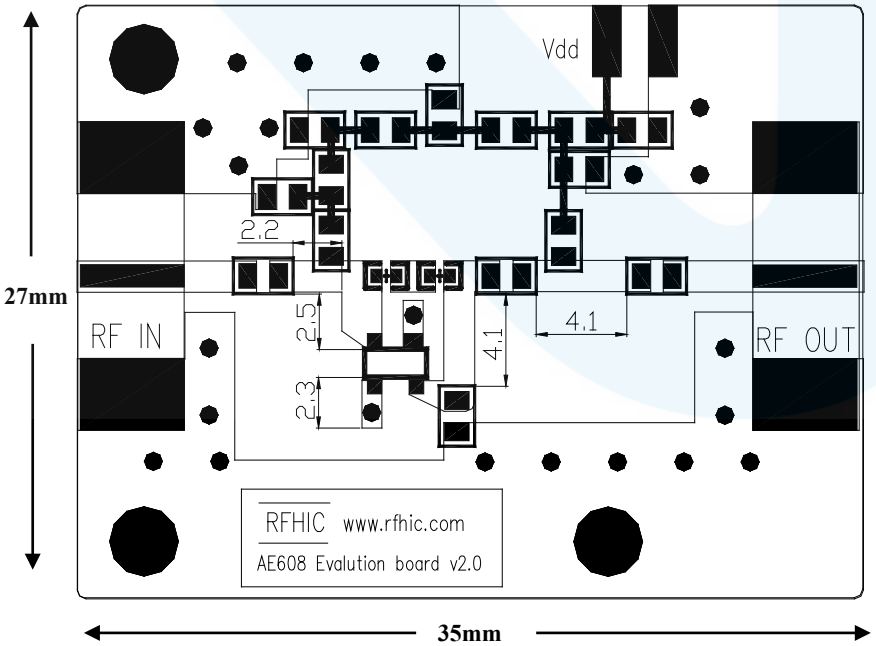
OIP3 vs. Frequency



Application Circuit @ 10 ~ 1000MHz



PCB Evaluation Board Layout Pattern



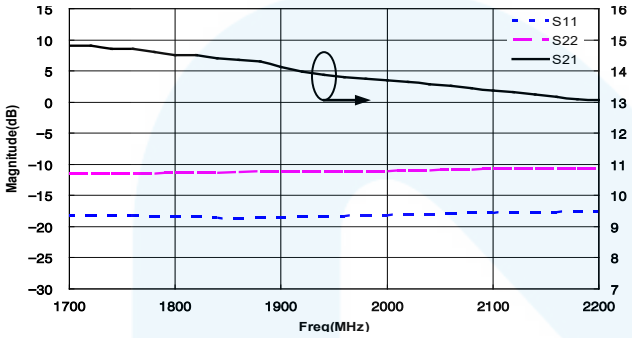
PCB material (FR4), PCB thickness (0.8t), Via hole (Φ0.6)

Frequency Range @ 1700 ~ 2200MHz

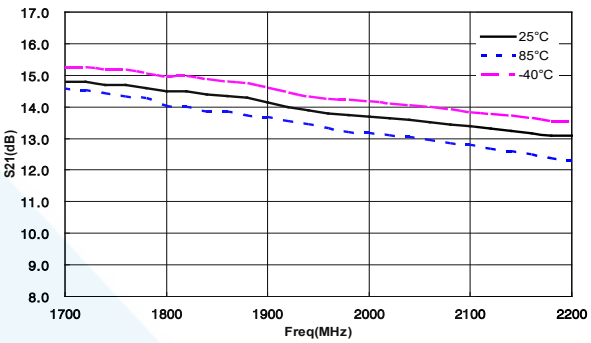
PCS, DCS, WCDMA Performance Data @V_d=3V, Id=45mA, T_c=25℃

ITEM	DATA	REMARK	ITEM	DATA	REMARK
Gain	13.9 dB	1940 MHz	NF	0.7 dB	1700 ~ 2200 MHz
OIP3	32.5 dBm	1700 ~ 2200 MHz	P1dB	14 dBm	1700 ~ 2200 MHz

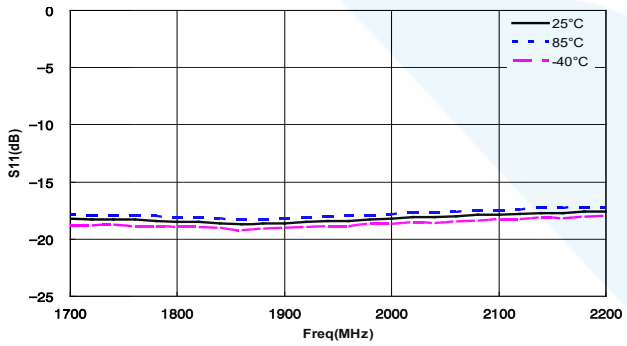
S-Parameter vs. Frequency(25℃)



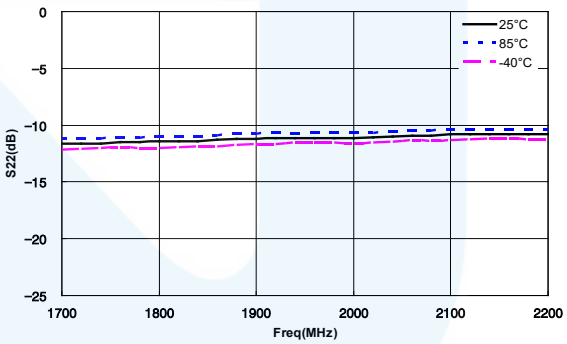
Gain vs. Frequency



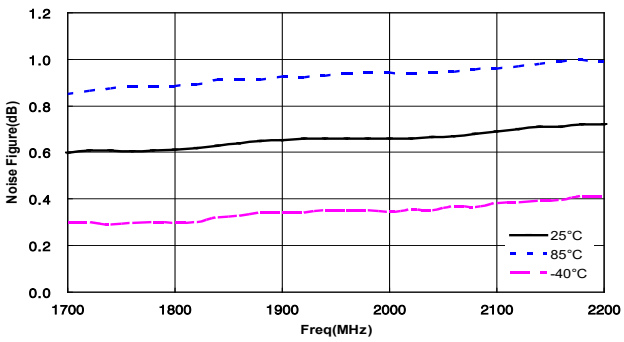
Input Return Loss vs. Frequency



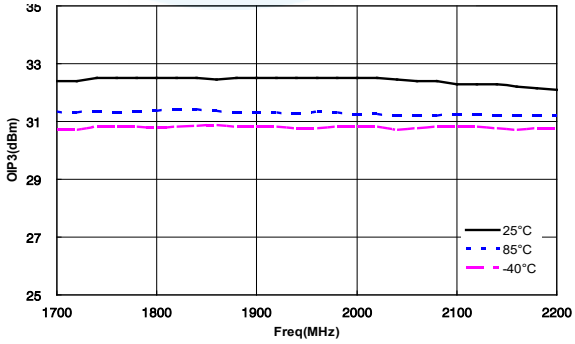
Output Return Loss vs. Frequency



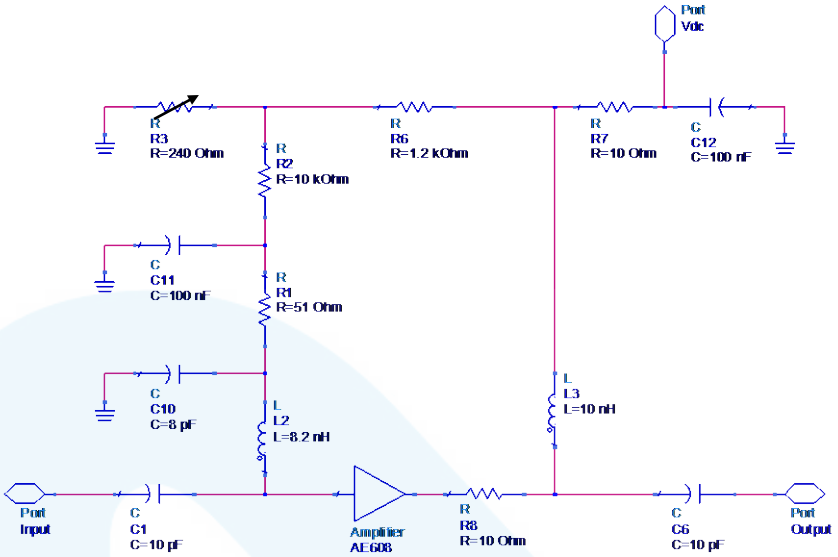
Noise Figure vs. Frequency



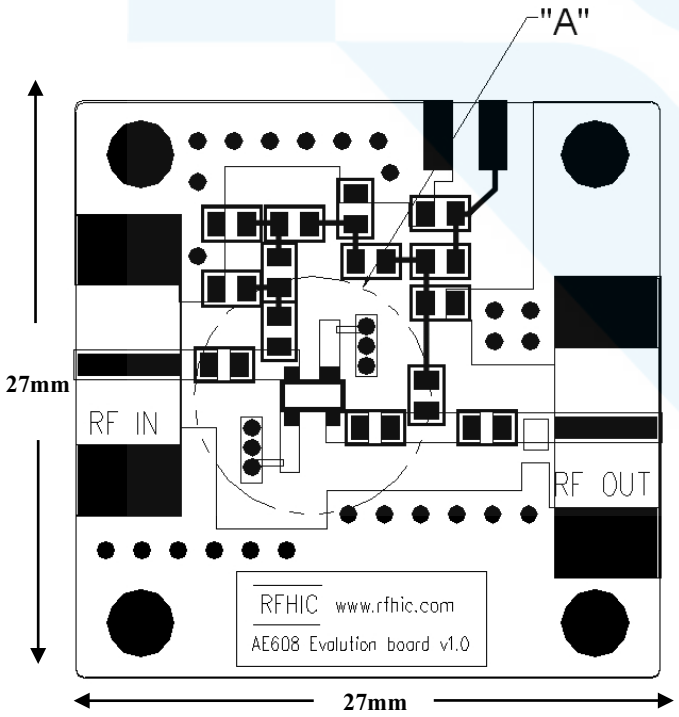
OIP3 vs. Frequency

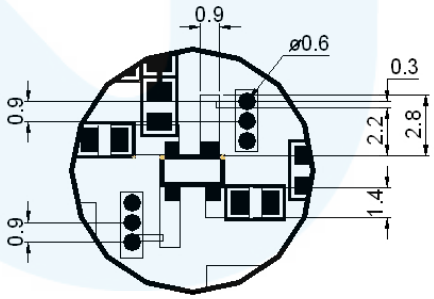


Application Circuit @ 1700 ~ 2200MHz



PCB Evaluation Board Layout Pattern





Detail A

PCB material (FR4), PCB thickness (0.8t), Via hole (Φ0.6)

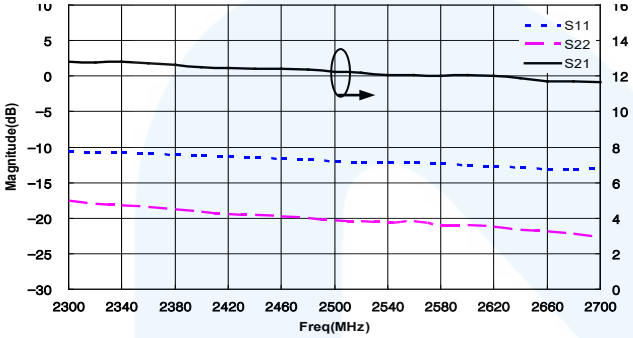
The line-length between AE608 and Ground via can affect RF performance of the device. To obtain the measured data, it is highly recommended to refer to “Detail A” above .

Frequency Range @ 2300 ~ 2700MHz

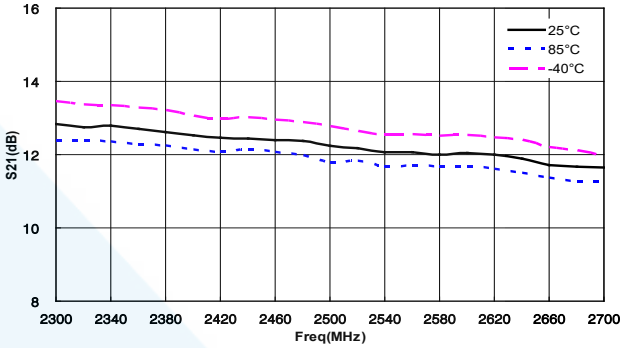
Wimax, OFDM Performance Data @ V_d=3V, Id=45mA, T_c=25℃

ITEM	DATA	REMARK	ITEM	DATA	REMARK
Gain	12 dB	2600 MHz	NF	0.8 dB	2300 ~ 2700 MHz
OIP3	34 dBm	2600 MHz	P1dB	13.5 dBm	2300 ~ 2700 MHz

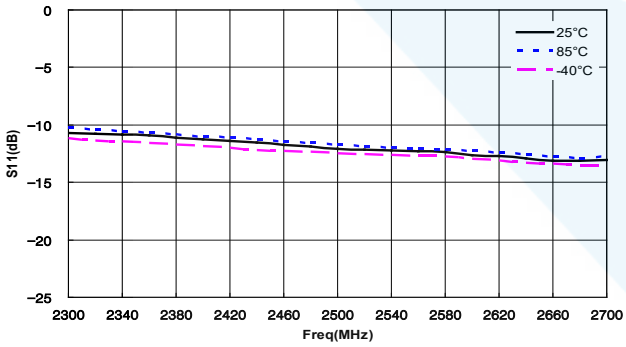
S-Parameter vs. Frequency(25℃)



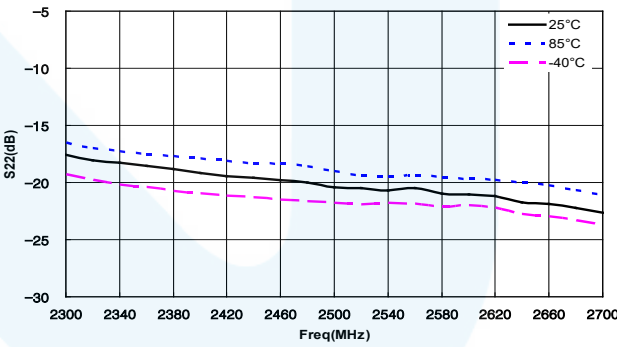
Gain vs. Frequency



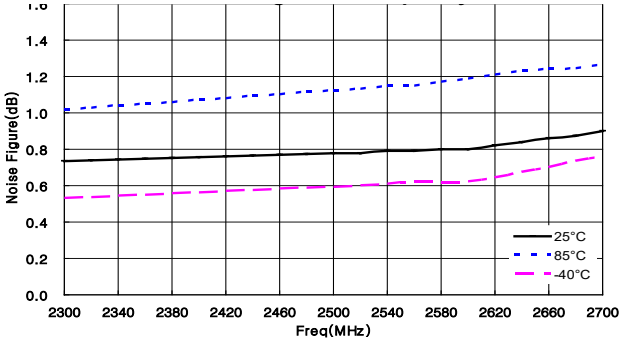
Input Return Loss vs. Frequency



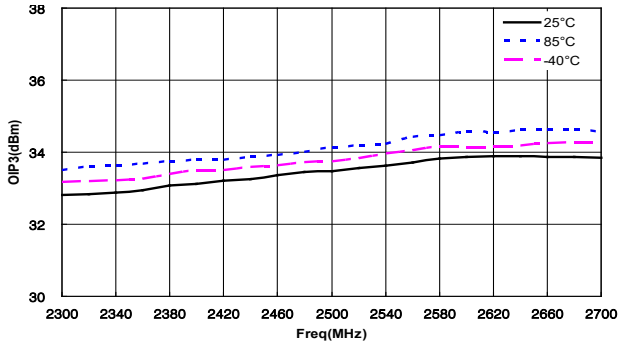
Output Return Loss vs. Frequency



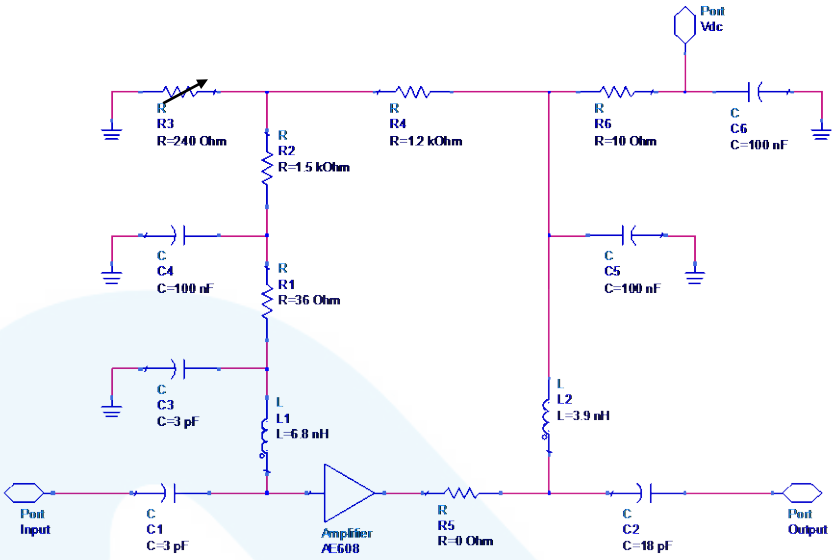
Noise Figure vs. Frequency



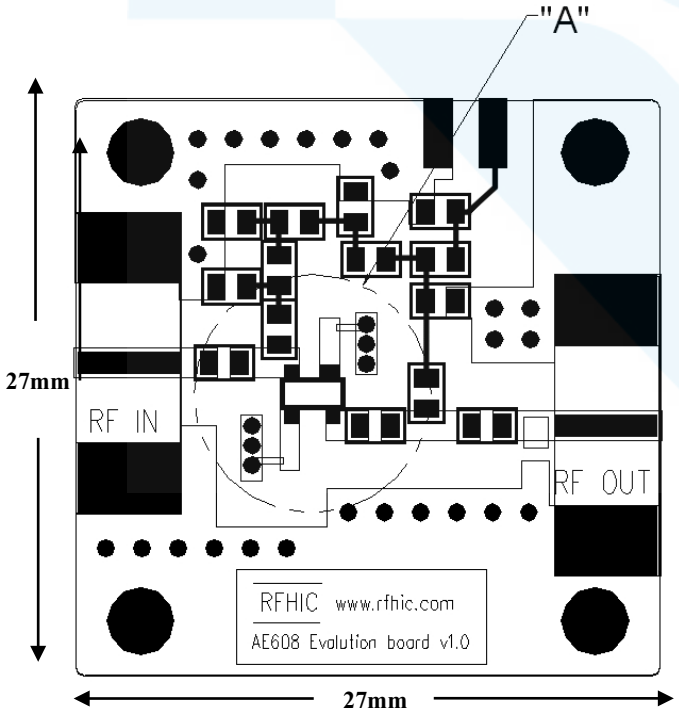
OIP3 vs. Frequency

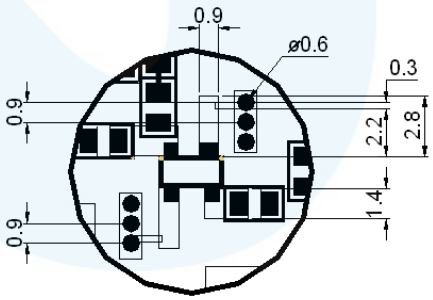


Application Circuit @ 2300 ~ 2700MHz



PCB Evaluation Board Layout Pattern





Detail A

PCB material (FR4), PCB thickness (0.8t), Via hole (Φ0.6)

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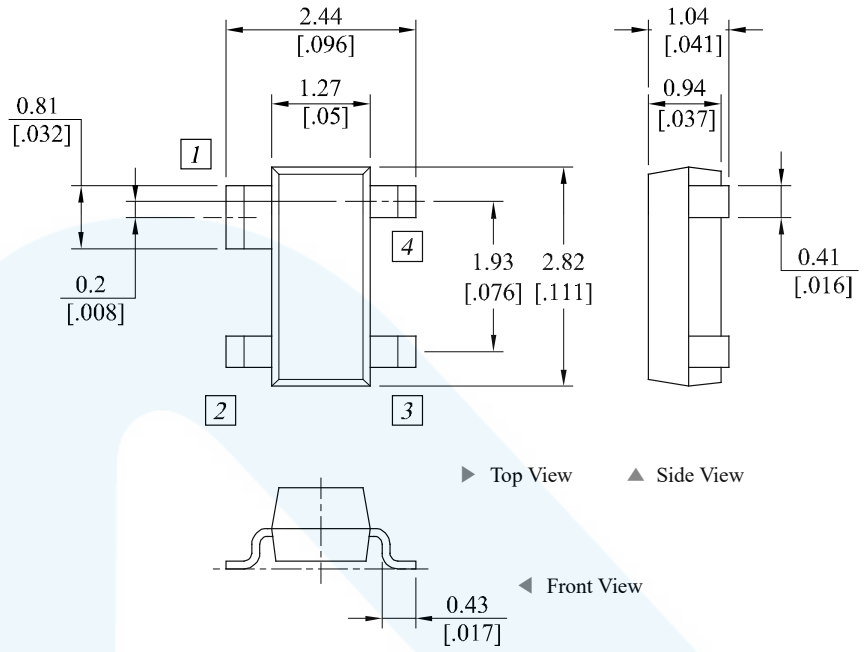
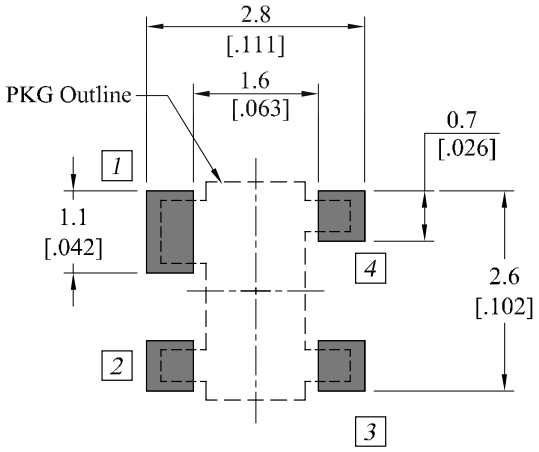
Package Dimensions (Type: SOT-143)

* Unit: mm[inch] | Tolerance ±0.2[.008]



Pin Description			
Pin No	**Function**	**Pin No**	**Function**
1	GND	3	GND
2	Input	4	Output, Vd

Recommended Pattern



*** Mounting Configuration Notes**

1. Ground / thermal via holes are critical for the proper performance of this device.
2. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
3. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via hole region contacts the heatsink.
4. Do not put solder mask on the backside of the PCB in the region where the board contacts the heatsink.
5. RF trace width depends upon the PCB material and construction.
6. Use 1 oz. Copper minimum

Revision History

Part Number	Release Date	Version	Modification	Data Sheet Status
AE608	2012.10.17	1.4	New datasheet format	-
AE608	2012.2.18	1.3	-	-

Certification

This product is manufactured by a company that is certified for the AS9100D quality management system.