Product Features

- 30 ~ 2650MHz
- GaAs E-pHEMT MMIC
- Higher linearity
- Low Noise Figure
- High Max input power
- SOT-89 SMD Type package
- Higher productivity
- Lower manufacturing cost
- Pb Free / RoHS Standard

Applications

- Receiver IF Amplifier
- Cellular, GSM, RFID
- Base station
- RF Sub-system
- CATV, Tetra, Satellite system

Package Type : SOT-89

Description

AE305 is a drive or pre-drive amplifier designed in a low cost SOT-89 package.
This MMIC is based on Gallium Arsenide Enhancement Mode pHEMT which shows low current and high IP3.
It is designed as driver devices for infrastructure equipment in the 30~2650MHz Wireless technologies such as IF, Cellular, GSM System. The data in this spec sheet is valid only for 50 ohm application.

Electrical Specifications

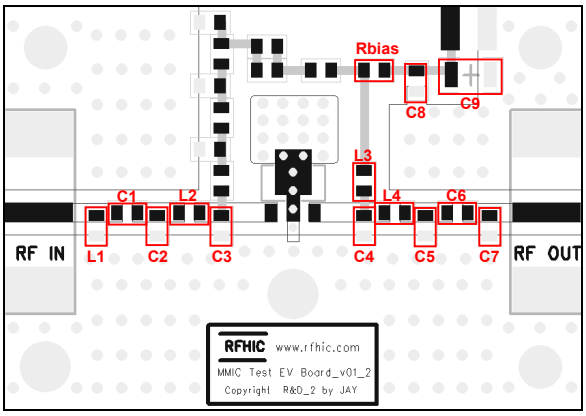
PARAMETER	UNIT	MIN	TYP	MAX	TYP	REMARK
Operating Frequency(fo)	MHz	30	-	2650	-	-
Small Signal Gain(S_{21})	dB	-	14.5 13.5	-	14 13	30~1000MHz 30~2650MHz
Input Return Loss(S_{11})	dB	-	-13	-	-11	-
Output Return Loss(S_{22})	dB	-	-14	-	-12	-
Output IP3(OIP3)	dBm	35	38	-	30	-
1dB Compression Point(P_1dB)	dBm	20	22	-	17	-
Noise Figure(NF)	dB	-	2.5	-	2.6	-
DC Current	mA	-	110	-	48	-
Supply Voltage	V	-	5	-	3.3	-

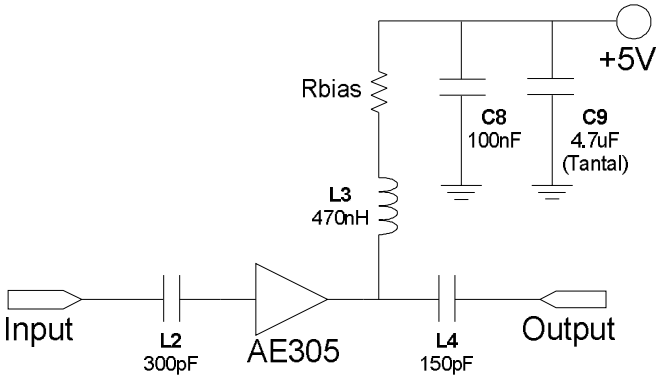
Note
1. Test conditions unless otherwise noted. Freq=500MHz, Vdd=+5V, T=25℃, 50Ω system
2. OIP3 measured with 2 tones at an output power of +5dBm/tone separated by 1MHz

Absolute Maximum Ratings

PARAMETER	UNIT	MIN	TYP	MAX	REMARK
Device Voltage	V	-	5	7	-
Operating Case Temperature	℃	-40	-	85	-
Storage Temperature	℃	-40	-	150	-
ESD Human Body Model	-	-	Class 1A	-	-
Moisture Sensitivity Level	-	-	MSL1	-	-
Junction Temperature (Tj)	℃	-	-	180	@ quiescent current, No RF, Tc = 85℃
Thermal Resistance (Rth)	℃/W	-	70	-	

Application Circuit @ 30 ~ 1000MHz, 50ohm System





EVB BOM			
Description	**Reference Designator**	**Manufacturer**	**Manufacturer's P/N**
CAP, 150pF, 1608	L4	Murata	GRM1885C1H151JA01D
CAP, 300pF, 1608	L2	Murata	GRM1885C1H301JA01D
CAP, 100nF, 1608	C8	Murata	GRM188R71C104KA01D
CAP, 4.7uF, 3216-18	C9	AVX	TAJA475M016RNJ
IND, 470nH, ±10%, 2520, W/W	L3	Taiyo Yuden	LEM2520TR47K
RES, 0Ohm, 1608	C1, C6, Rbias	ROHM	MCR03 EZPJ000
DNP	L1, C2, C3, C4, C5, C7	-	-

Typical Performance

PARAMETER	UNIT	TYPICAL		
Operational Frequency Range	MHz	50	500	1000
Small Signal Gain(S21)	dB	14.5		
Input Return Loss(S11)	dB	-8	-17	-15
Output Return Loss(S22)	dB	-12	-25	-18
Output IP3(OIP3)	dBm	38	38.5	35
1dB Compression Point(P_1dB)	dBm	20	22	21
Noise Figure(NF)	dB	2.4	2.5	2.8

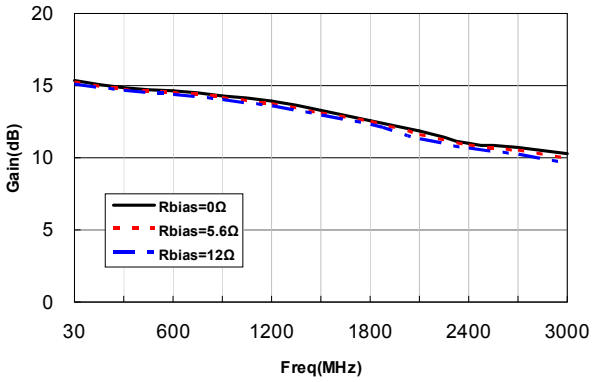
Note
1. Test conditions unless otherwise noted. Freq=30~1000MHz, Vdd=+5V, T=25℃, 50Ω system
2. OIP3 measured with 2 tones at an output power of +5dBm/tone separated by 1MHz

Recommended Bias Resistor Values

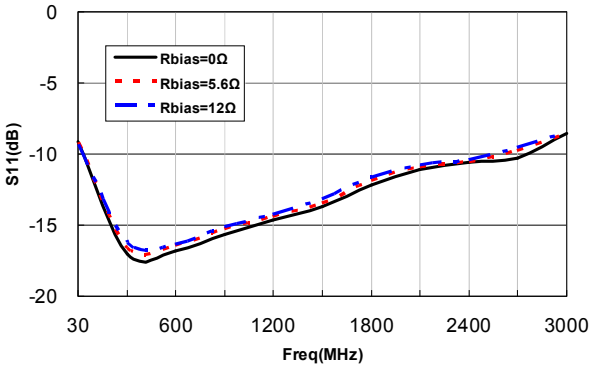
Vsupply	Rbias(5V)	Rbias(4.5V)	Rbias(4V)
5V	0Ω	5.6Ω	12Ω
Current	110mA	92mA	75mA

Typical Performance @ Voltage = 5V, T=25℃, 50ohm System (Rbias)

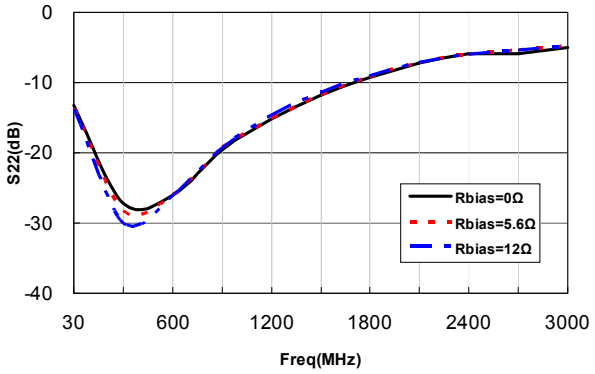
Gain vs Frequency



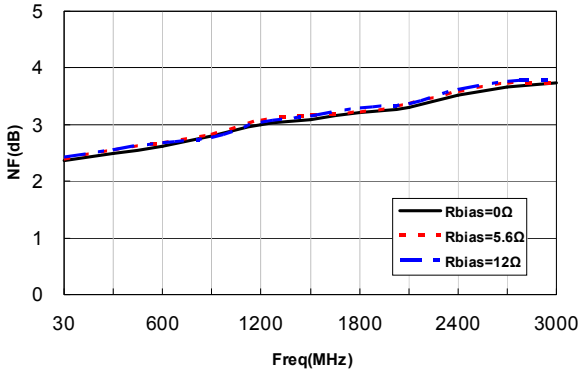
Input R/L vs Frequency



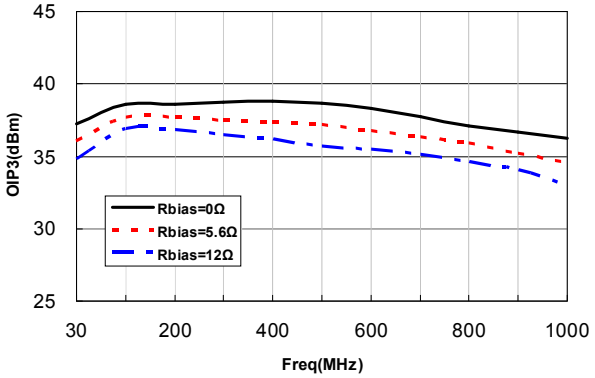
Output R/L vs Frequency



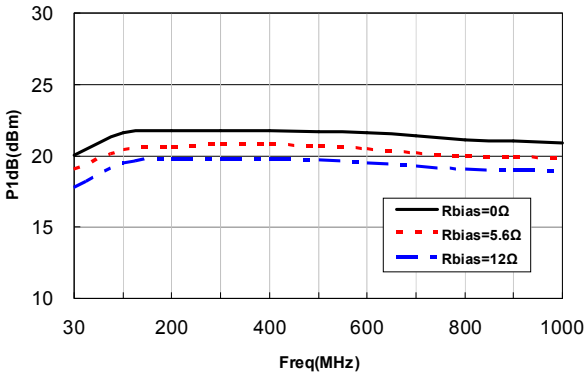
Noise Figure vs Frequency



OIP3 vs Frequency

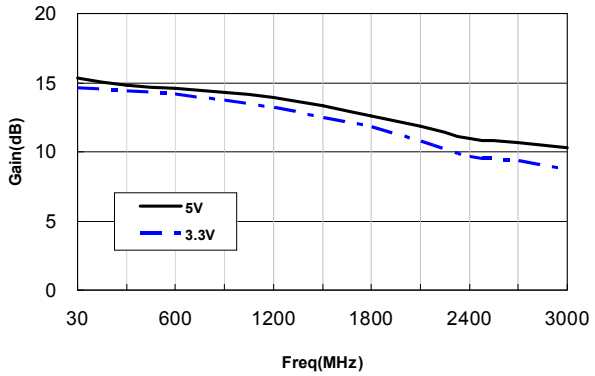


P1dB vs Frequency

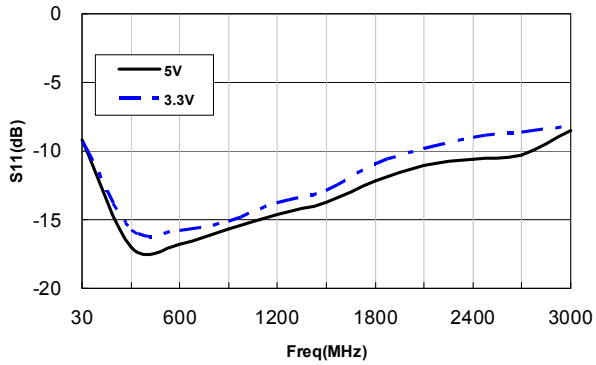


Typical Performance @ Voltage = 5V(110mA) & 3.3V(48mA), T=25℃, 50ohm System

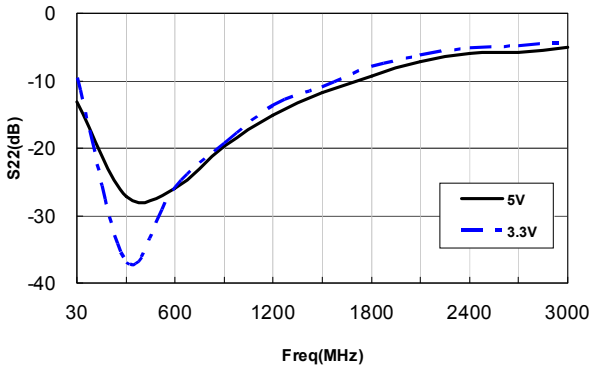
Gain vs Frequency



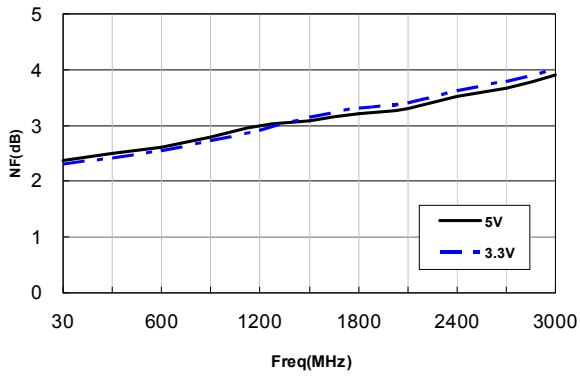
Input R/L vs Frequency



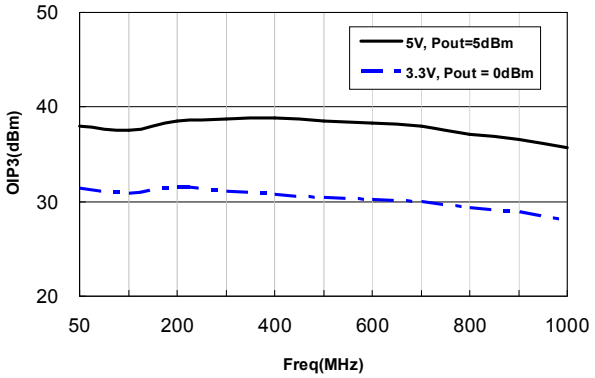
Output R/L vs Frequency



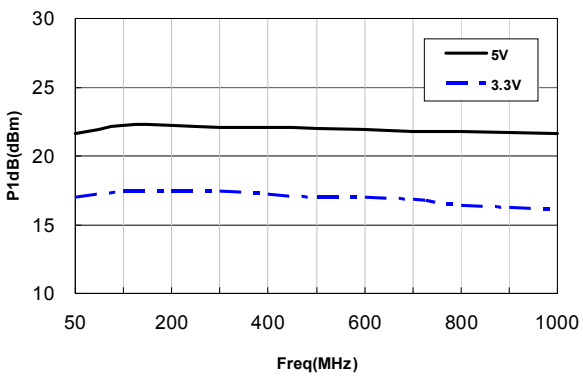
Noise Figure vs Frequency



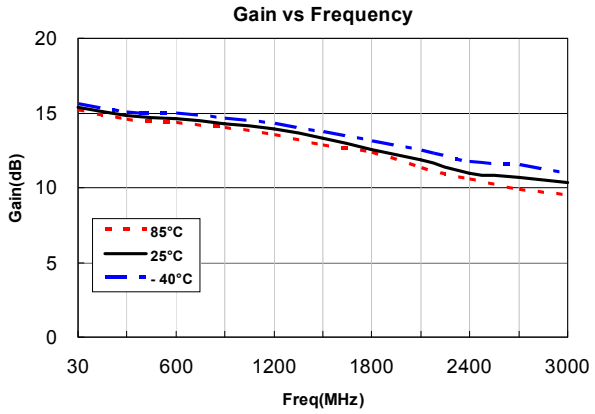
OIP3 vs Frequency

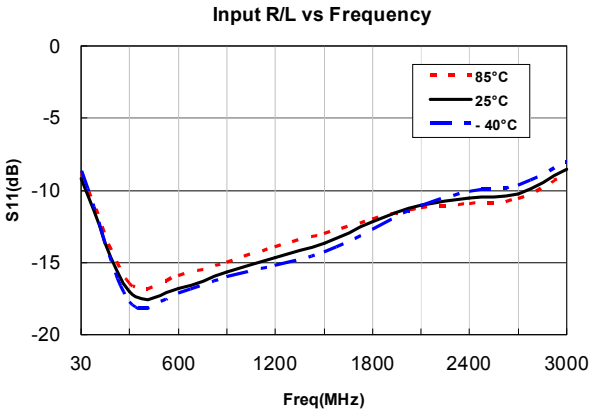


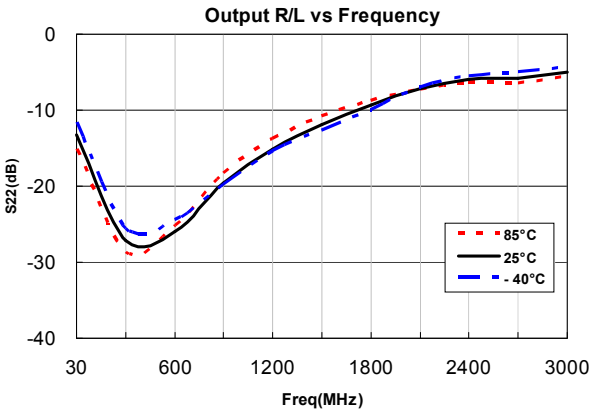
P1dB vs Frequency

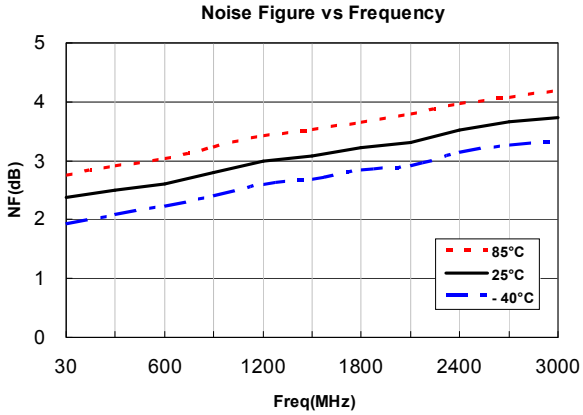


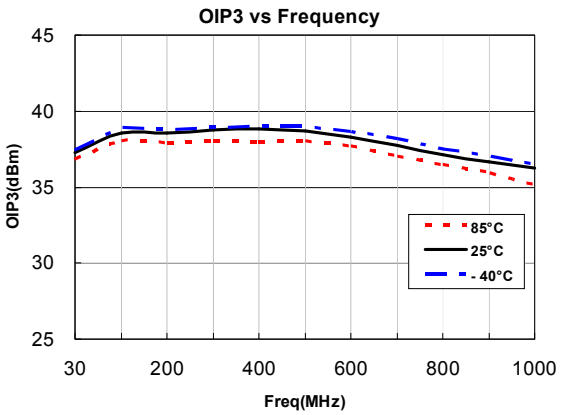
Typical Performance @ Voltage = 5V, 50ohm System(Temperature)

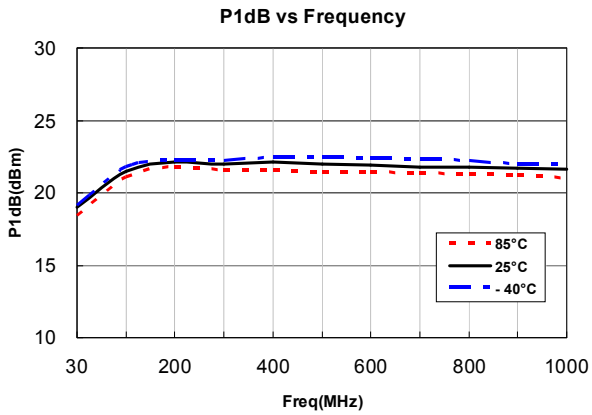




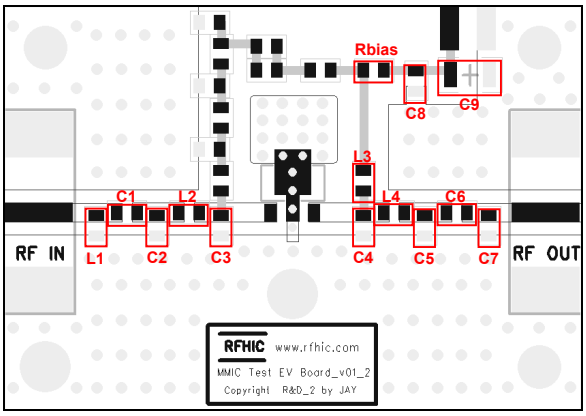


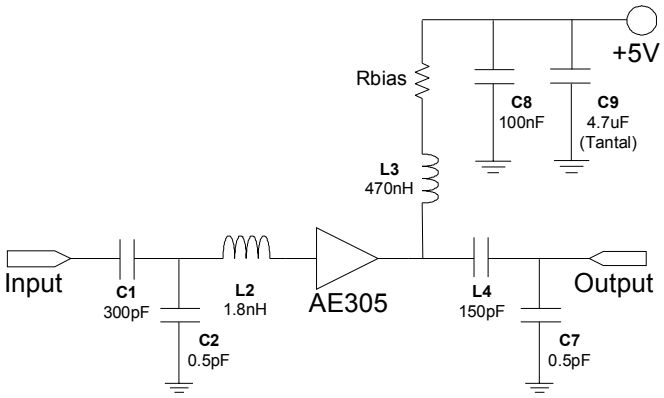






Application Circuit @ 30 ~ 2650MHz, 50ohm System





EVB BOM			
Description	**Reference Designator**	**Manufacturer**	**Manufacturer's P/N**
CAP, 0.5pF, 1608	C2, C7	Murata	GRM1885C1HR50CZ01D
CAP, 150pF, 1608	L4	Murata	GRM1885C1H151JA01D
CAP, 300pF, 1608	C1	Murata	GRM1885C1H301JA01D
CAP, 100nF, 1608	C8	Murata	GRM188R71C104KA01D
CAP, 4.7uF, 3216-18	C9	AVX	TAJA475M016RNJ
IND, 1.8nH, 1608	L2	Taiyo Yuden	HK1608 1N8S
IND, 470nH, ±10%, 2520, W/W	L3	Taiyo Yuden	LEM2520TR47K
RES, 0Ohm, 1608	C6, Rbias	ROHM	MCR03 EZPJ000
DNP	L1, C3, C4, C5	-	-

Typical Performance

PARAMETER	UNIT	TYPICAL			
Operational Frequency Range	MHz	50	1000	2000	2650
Small Signal Gain(S21)	dB	13.5			
Input Return Loss(S11)	dB	-8	-13	-17	-13
Output Return Loss(S22)	dB	-13	-14	-10	-8
Output IP3(OIP3)	dBm	38.5	35.5	34.5	29.5
1dB Compression Point(P_1dB)	dBm	20	22	21.5	17
Noise Figure(NF)	dB	2.5	2.8	3.3	4

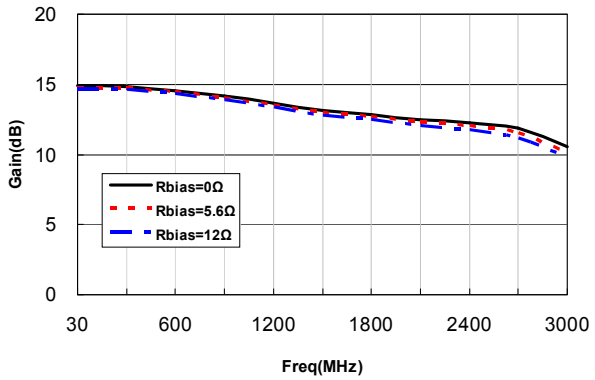
Note
1. Test conditions unless otherwise noted. Freq=30~2650MHz, Vdd=+5V, T=25℃, 50Ω system
2. OIP3 measured with 2 tones at an output power of +5dBm/tone separated by 1MHz

Recommended Bias Resistor Values

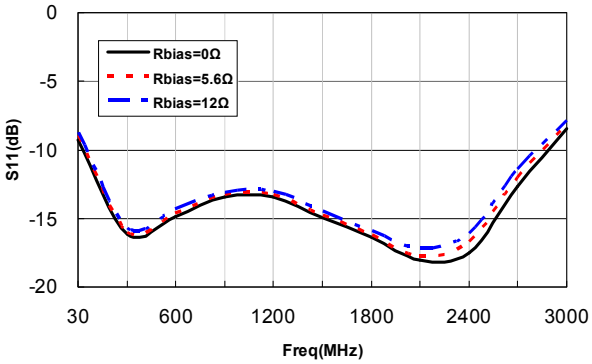
Vsupply	Rbias(5V)	Rbias(4.5V)	Rbias(4V)
5V	0Ω	5.6Ω	12Ω
Current	110mA	92mA	75mA

Typical Performance @ Voltage = 5V, T=25℃, 50ohm System (Rbias)

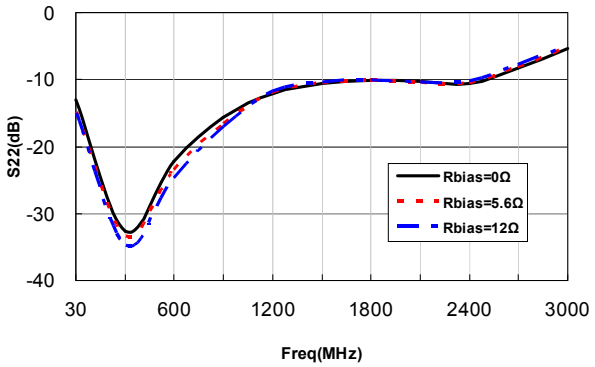
Gain vs Frequency



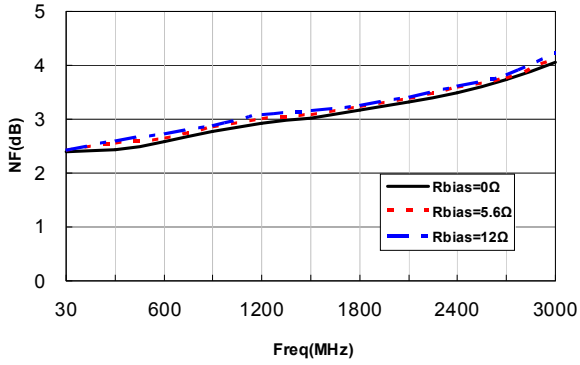
Input R/L vs Frequency



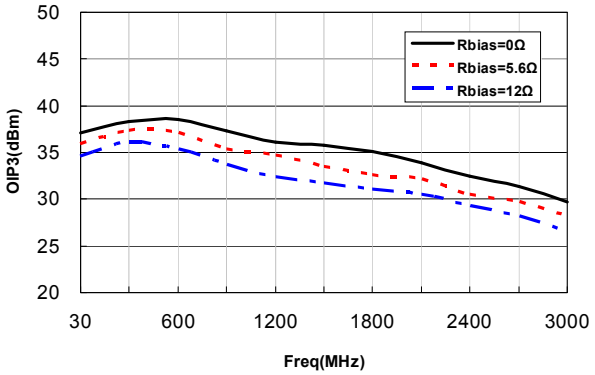
Output R/L vs Frequency



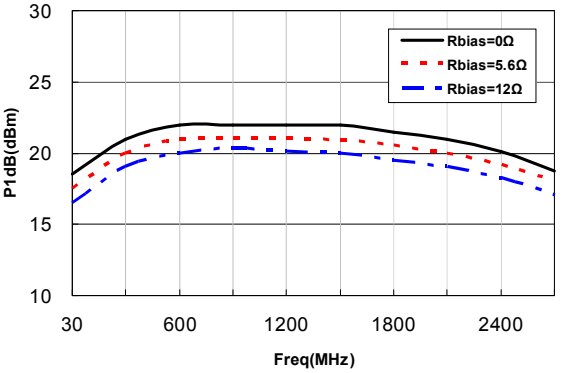
Noise Figure vs Frequency



OIP3 vs Frequency

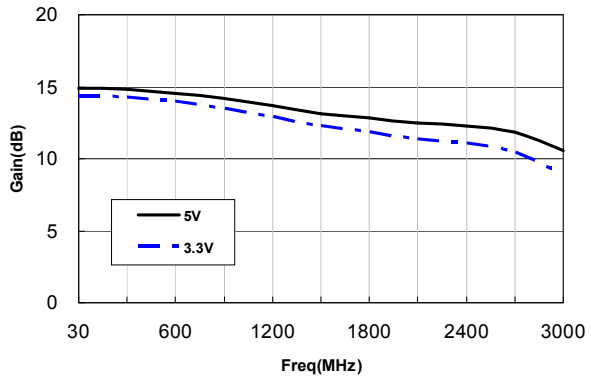


P1dB vs Frequency

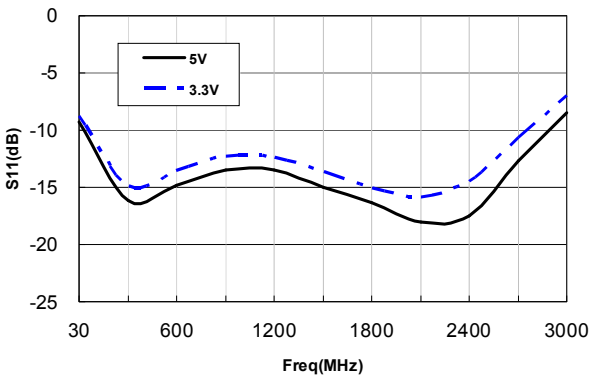


Typical Performance @ Voltage = 5V(110mA) & 3.3V(48mA), T=25℃, 50ohm System

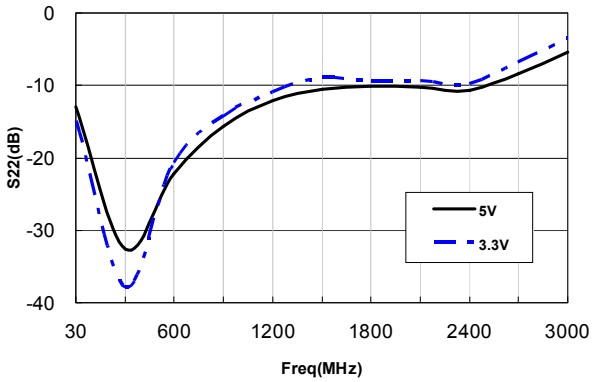
Gain vs Frequency



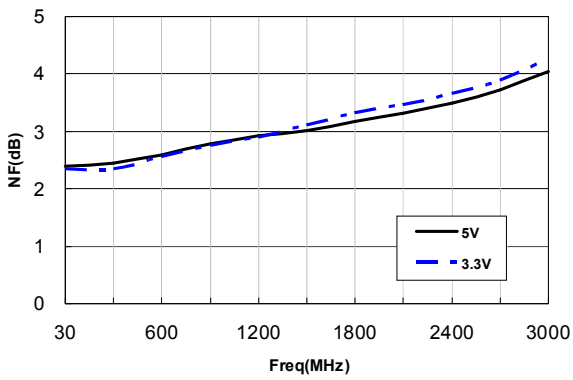
Input R/L vs Frequency



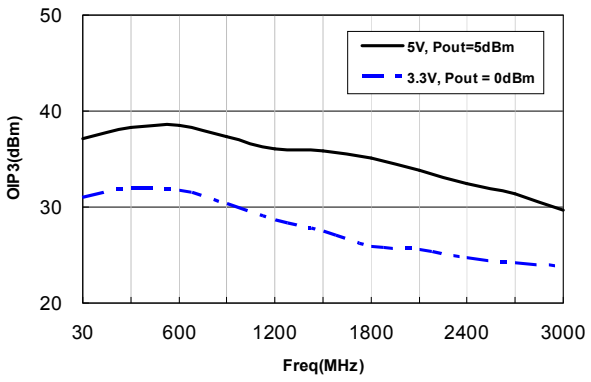
Output R/L vs Frequency



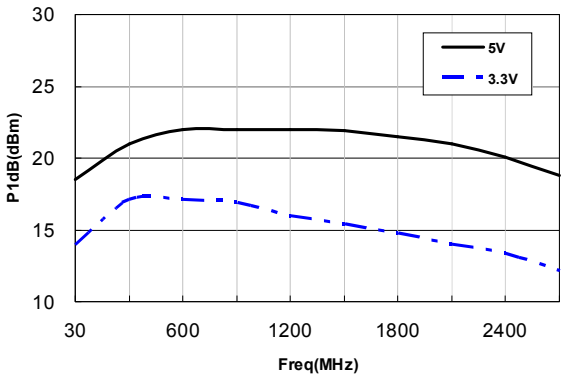
Noise Figure vs Frequency



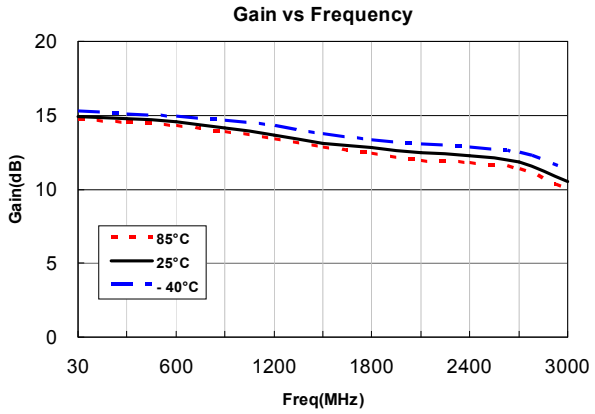
OIP3 vs Frequency

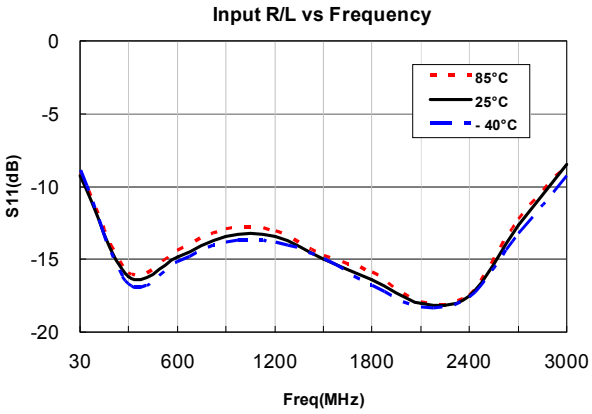


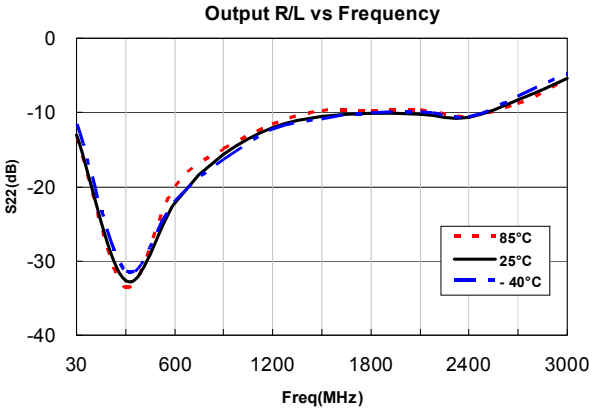
P1dB vs Frequency

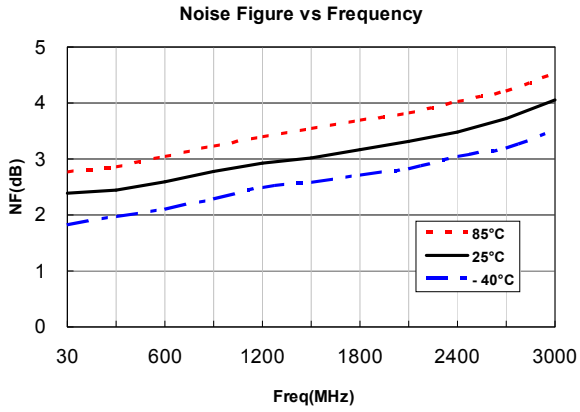


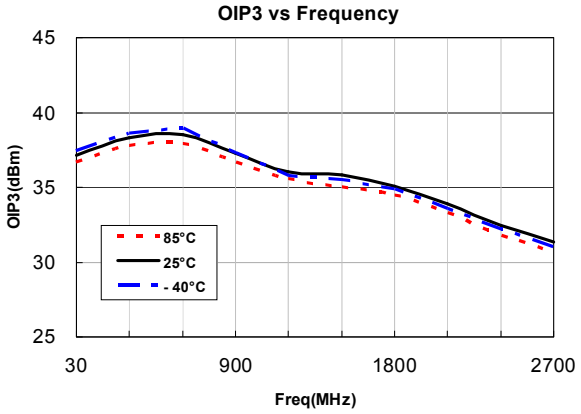
Typical Performance @ Voltage = 5V, 50ohm System (Temperature)

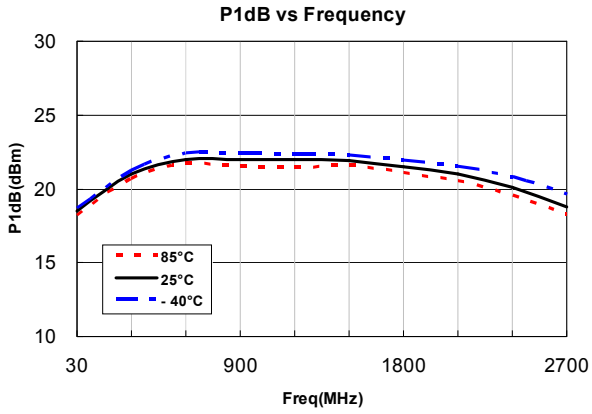






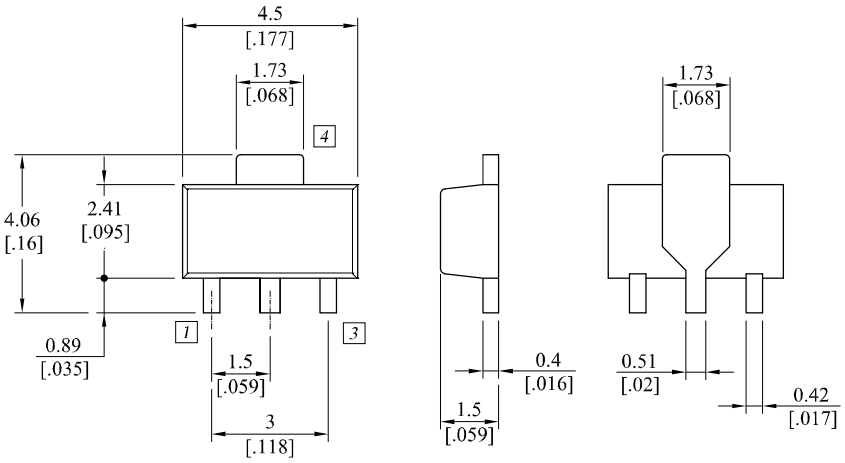






Package Dimensions (Type: SOT-89)

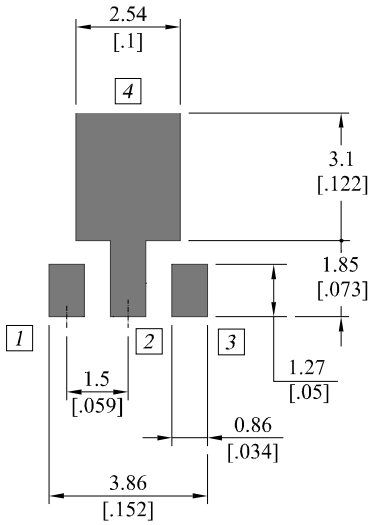
* Unit: mm[inch] | Tolerance ±0.2[.008]



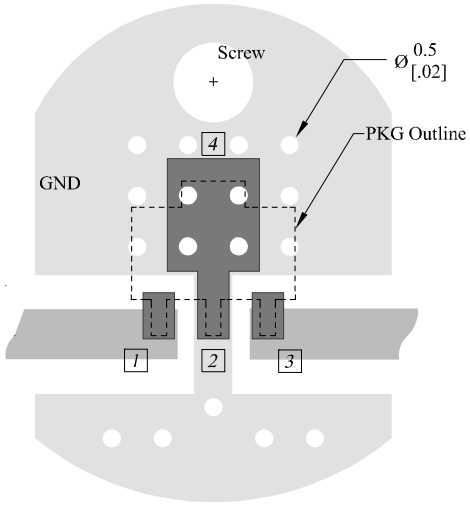
▲ Top View ▲ Side View ▲ Bottom View

Pin Description			
Pin No	**Function**	**Pin No**	**Function**
1	Input	4	GND
2	GND		-
3	Output / Bias		-

Recommended Pattern



Recommended Mounting Configuration



*** 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
AE305	2014.4.11	1.3	Revision : Absolute Maximum Ratings	-
AE305	2012.10.17	1.2	New datasheet format	-
AE305	2012.5.8	1.1	Added test data of application of 3.3V supply voltage	-
AE305	2012.3.2	1.0	Initial Release.	-