E-pHEMT MMIC AE617

Product Features

- 5 ~ 1000MHz
- High Gain
- High linearity
- SOIC-8 SMD Type package
- Higher productivity
- Lower manufacturing cost
- Low Noise Figure
- -63dBc CSO 79 Channels @ +40dBmV/ch
- -65dBc CTB 79 Channels @ +40dBmV/ch

Applications

- Low Noise Amplifier for CATV, Satellite
- Cable Modem
- FTTH (G-PON, GE-PON)
- Optical node

Package Type : SOIC-8

Description

AE617 is designed as low cost drive amplifiers for many applications including FTTH, CATV System.
This MMIC is based on Gallium Arsenide Enhancement Mode pHEMT which shows low current draw and very low noise.
The data in this spec sheet is valid only for 75ohm application. 50ohm data is in a separate spec sheet.

Electrical Specifications

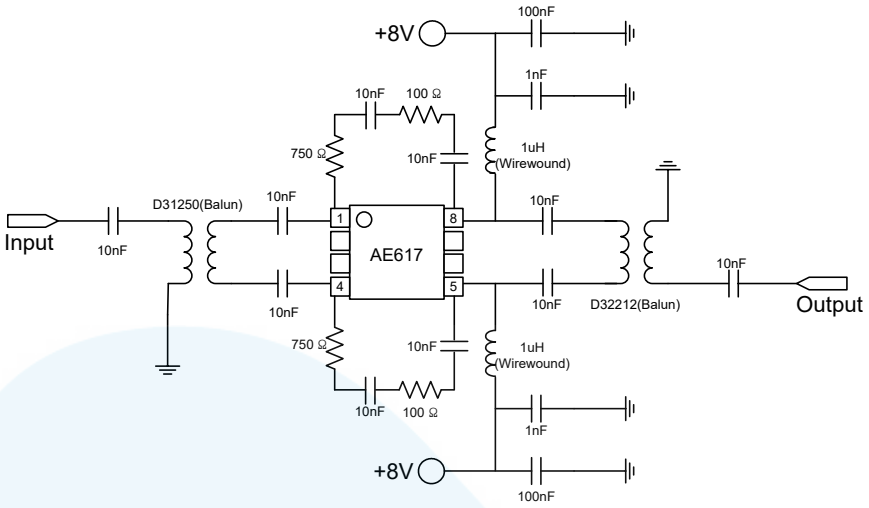
PARAMETER		UNIT	MIN	TYP	MAX	CONDITION
Operating Frequency		MHz	5	-	1000	-
Gain		dB	20 18	22 20.5	- -	30 ~ 1000MHz 5~ 200MHz
Gain Flatness		dB	-	0.5	-	30 ~ 1000MHz
Input Return Loss		dB	-	-17	-	-
Output Return Loss		dB	-	-15	-	-
Output IP3		dBm	38	41	-	@ 500MHz/10dBm 2tone
1dB Compression Point		dBm	25	28	-	@ 500MHz
Noise Figure		dB	-	2	3	30 ~ 1000MHz
CSO	30 ~ 1004MHz	dBc	-	-63	-	79 channel, Flat, +40dBmV
CTB		dBc	-	-65	-	
DC Current		mA	-	260	-	Vdd = 8.0V

Note
1. Test conditions unless otherwise noted. Test Freq = 500MHz, T=25℃, Vdd=8V, 75Ω system
2. OIP3 measured with 2 tones at an output power of +10dBm/tone separated by 1MHz, Test Freq = 500MHz

Absolute Maximum Ratings

PARAMETER	UNIT	MIN	TYP	MAX
Device Voltage	VDC	-	8	12
Operating Temperature	℃	-40	-	85
Storage Temperature	℃	-40	-	150
ESD Human Body Model	-	-	Class 1B	-
Moisture Sensitivity Level	-	-	MSL1	-
Junction Temperature (Tj)	℃	-	-	180
Thermal Resistance (Rth)	℃/W	-	35	-

Application Circuit @ 30 ~ 1000MHz, 75ohm System, VDD=8V

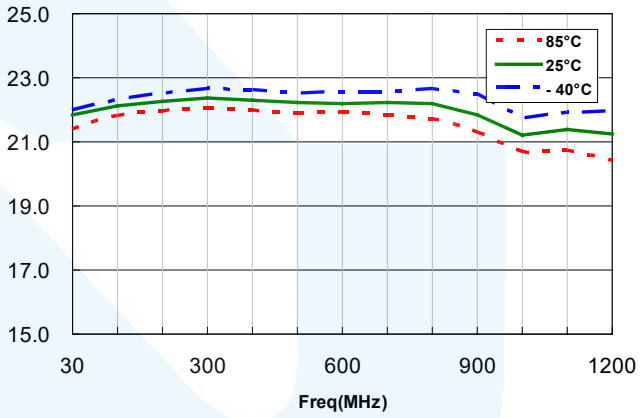


Typical Performance @ VDD=8V, IDS=260mA, T=25℃, 75ohm System

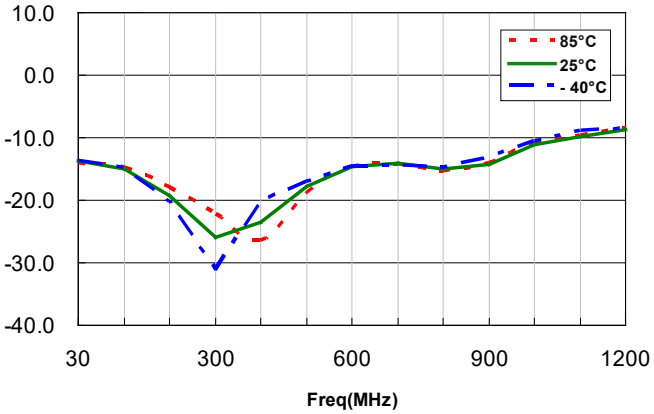
PARAMETER	UNIT	TYPICAL		
Frequency	MHz	30	500	1000
Gain(S21)	dB	21.9	22.3	22.1
Input Return Loss(S11)	dB	-14	-21	-19
Output Return Loss(S22)	dB	-12	-17	-16
Output IP3	dBm	42.5	42.9	42
1dB Compression Point	dBm	28	28	27
Noise Figure	dB	2.0	2.3	2.6
CSO*	dBc	-63		
CTB*	dBc	-65		
Current	mA	260		

* 79channels_Flat, +40dBmV

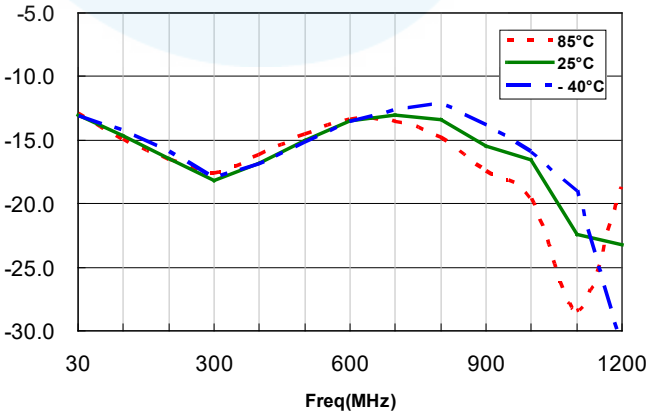
Frequency vs. Gain



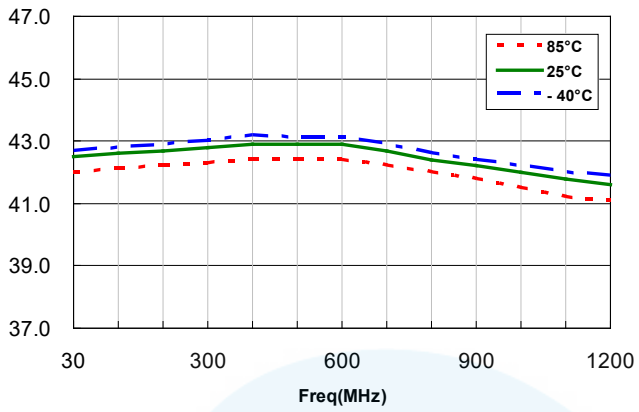
Frequency vs. S11



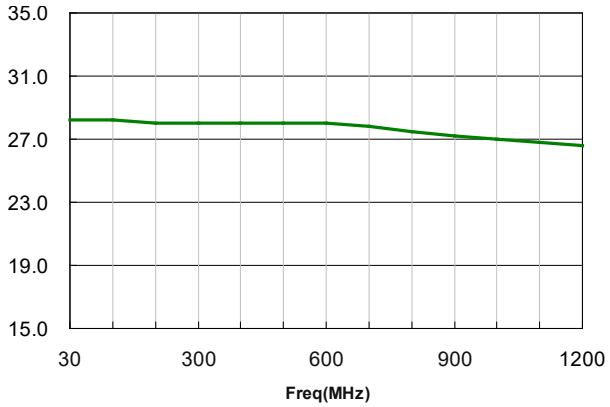
Frequency vs. S22



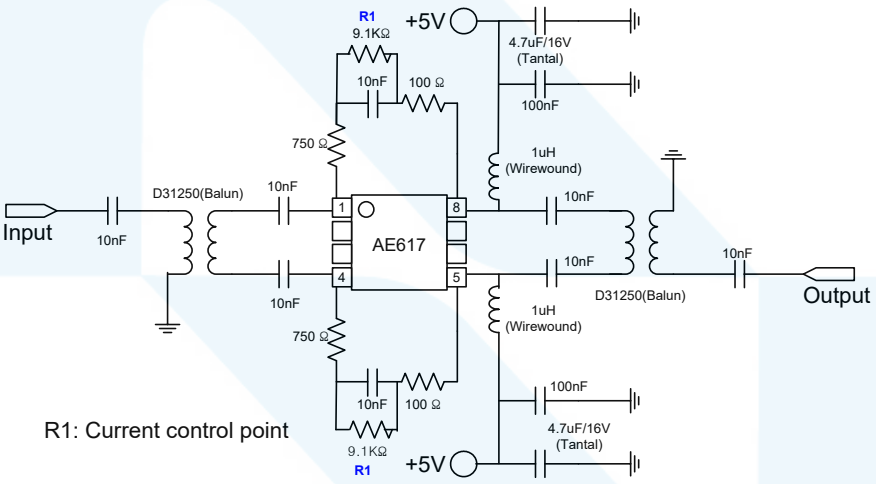
Frequency vs. OIP3



Frequency vs. P1dB



Application Circuit @ 30 ~ 1000MHz, 75ohm System, VDD=5V

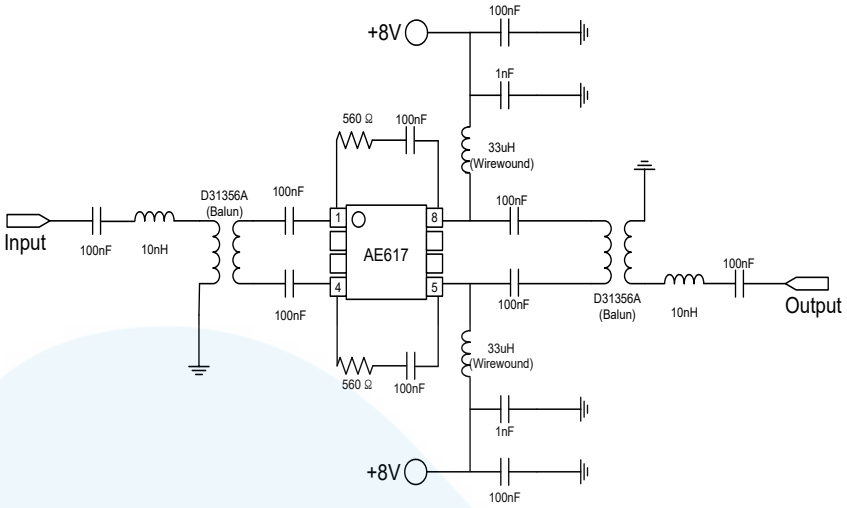


Typical Performance

PARAMETER	UNIT	TYPICAL		
Frequency	MHz	30	500	1000
Gain(S21)	dB	21.6	22.0	21.6
Input Return Loss(S11)	dB	-13	-20	-14
Output Return Loss(S22)	dB	-13	-15	-24
Output IP3	dBm	39	40	34.5
1dB Compression Point	dBm	24.5	24.5	22
Noise Figure	dB	2.0	2.0	2.4
CSO*	dBc	-69.7		
CTB*	dBc	-67.5		
Current	mA	210		

* 79channels_Flat, +37dBmV

Application Circuit @ 5 ~ 200MHz, 75ohm System, VDD=8V

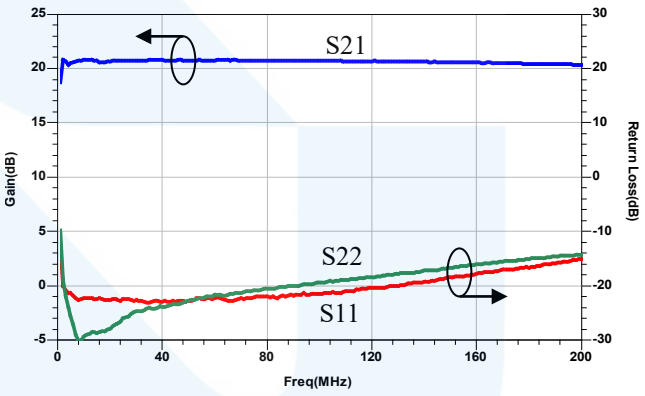


Typical Performance @ VDD=8V, IDS=260mA, T=25℃, 75ohm System

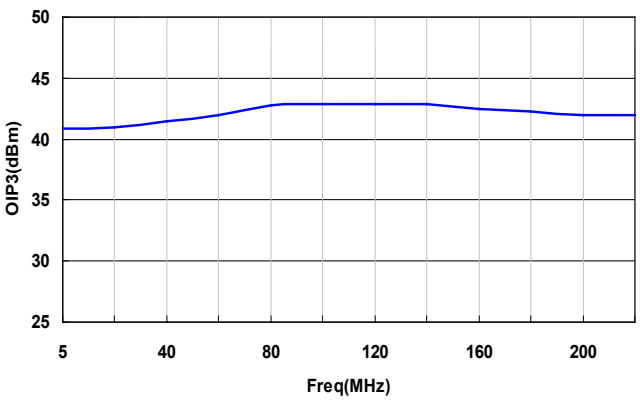
PARAMETER	UNIT	TYPICAL		
Frequency	MHz	5	100	200
Gain(S21)	dB	20.7	20.8	20.5
Input Return Loss(S11)	dB	-22	-20	-20
Output Return Loss(S22)	dB	-20	-30	-21
Output IP3	dBm	40.9	42.9	42
1dB Compression Point	dBm	27.7	28.7	28
Noise Figure	dB	2.1	2.4	2.9
CSO*	dBc	-77.5		
CTB*	dBc	-76.8		
Current	mA	260		

* 8channels_Flat, +45dBmV

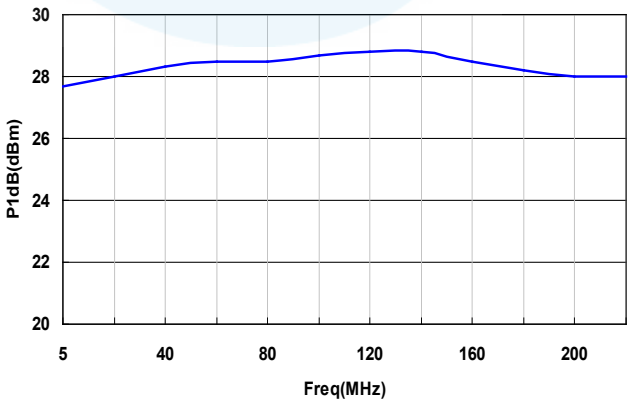
S-Parameter



Frequency vs. OIP3

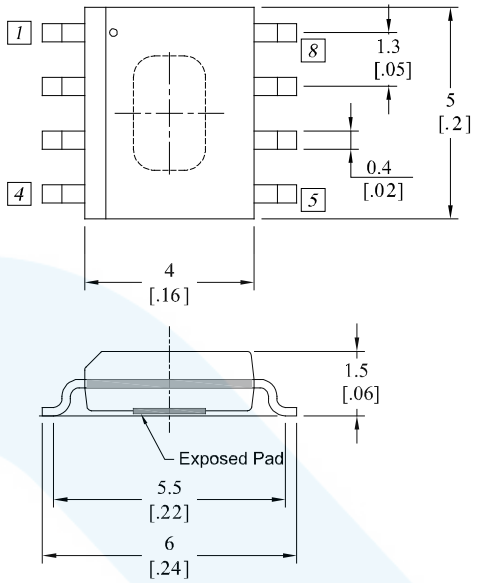


Frequency vs. P1dB



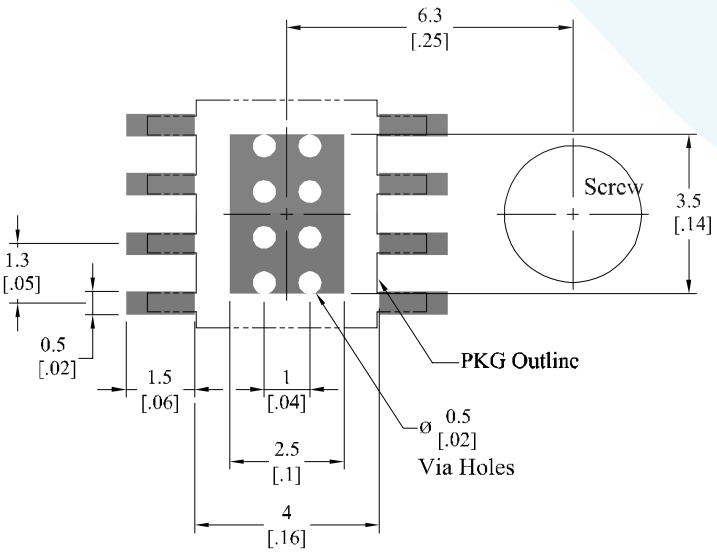
Package Dimensions (Type: SOIC-8)

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



Pin Description			
Pin No	**Function**	**Pin No**	**Function**
1	RF IN(2)	5	RF OUT(1)
2	GND	6	GND
3	GND	7	GND
4	RF IN(1)	8	RF OUT(2)

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 heat sink. Ensure that the ground / thermal via hole region contacts the heat sink.
4. Do not put solder mask on the backside of the PCB in the region where the board contacts the heat sink.
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
AE617	2014.04.18	1.3	Thermal Resistance (1p)	-
AE617	2012.03.24	1.2	Vdd=5V Application circuit	-
AE617	2012.10.09	1.1	Document revision	-

Certification

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