E-pHEMT MMIC

AE618

Product Features

- 5 ~ 1000MHz
- 8 ~ 12V Supply Voltage
- Lower manufacturing cost
- -69dBc CSO 79 Channels @ 43dBmV
- -64dBc CTB 79 Channels @ 43dBmV
- -60dBc XMOD 79 Channels @ 43dBmV

Applications

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

Package Type : SOIC-8

Description

AE618 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

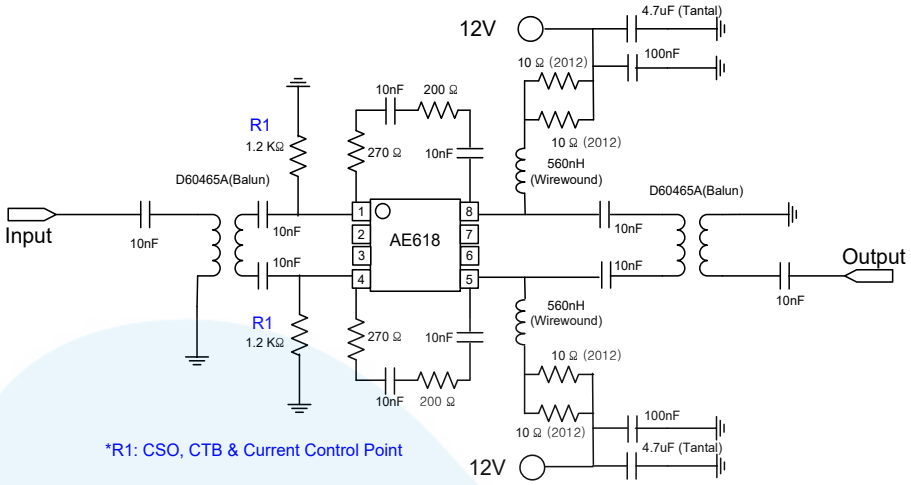
PARAMETER		UNIT	MIN	TYP	MAX	CONDITION
Operating Frequency		MHz	30	-	1000	-
Gain		dB	18	20	-	30 ~ 1000MHz
Gain Flatness		dB	-	0.7	1.5	30 ~ 1000MHz
Input Return Loss		dB	-	-12	-	-
Output Return Loss		dB	-	-15	-	-
Output IP3		dBm	39	44	-	@ 500MHz/10dBm 2tone
1dB Compression Point		dBm	28	32	-	@ 500MHz
Noise Figure		dB	-	2.5	3.5	30 ~ 1000MHz
CSO	30 ~ 1004MHz	dBc	-	-69	-	79 channel, Flat, 43dBmV Vdd = 12V
CTB		dBc	-	-64	-	
XMOD		dBc	-	-60	-	
DC Current		mA	-	410	-	Vdd = 8V
			-	360	-	Vdd = 12V

Note
1. Test conditions unless otherwise noted. Test Freq = 500MHz, T=25℃, Vdd=12V, 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	-	-	14
Current	mA	-	-	650
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	-	10.7	-

Application Circuit @ 30 ~ 1000MHz, 75ohm System, VDD=12V

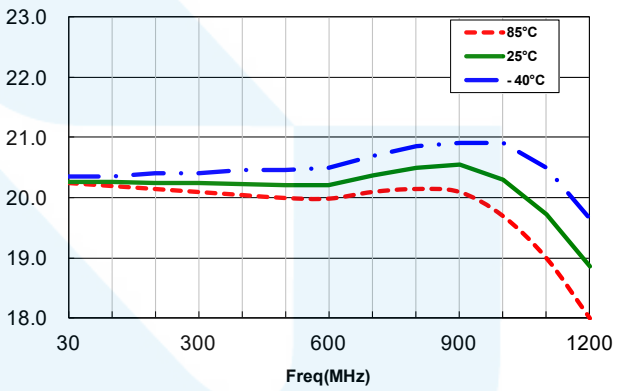


Typical Performance @ VDD=12V, IDS=360mA, T=25℃, 75ohm System

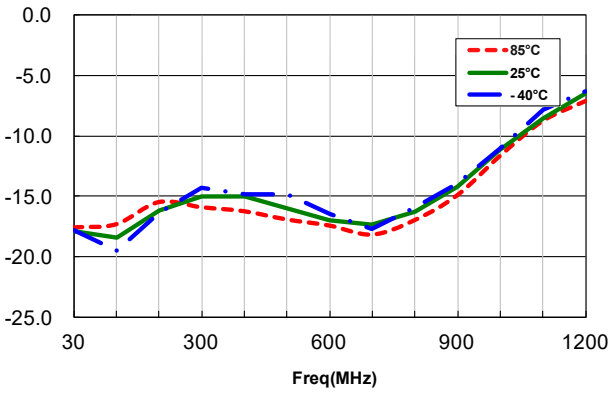
Frequency	MHz	30	500	1000
Gain(S21)	dB	20.2	20.2	20.7
Input Return Loss(S11)	dB	-18.4	-13	-11
Output Return Loss(S22)	dB	-20	-14	-20
Output IP3	dBm	44	44	41
1dB Compression Point	dBm	32	32	29
Noise Figure	dB	1.9	2.2	2.6
CSO*	dBc	-69		
CTB*	dBc	-64		
XMOD*	dBc	-60		
Current	mA	360		

* 79channels_Flat, +43dBmV

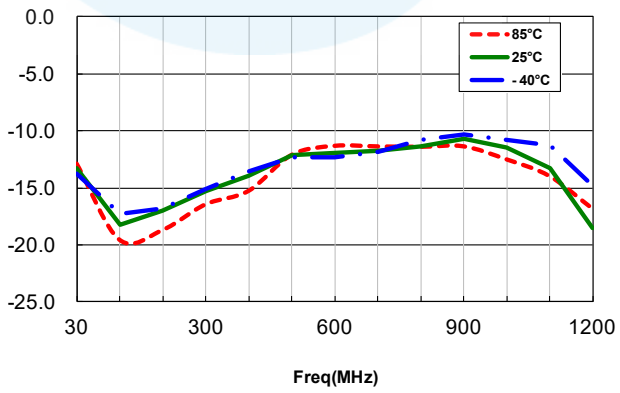
Frequency vs. Gain



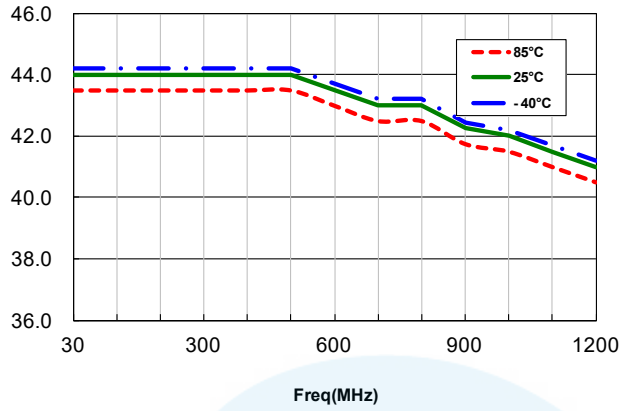
Frequency vs. S11



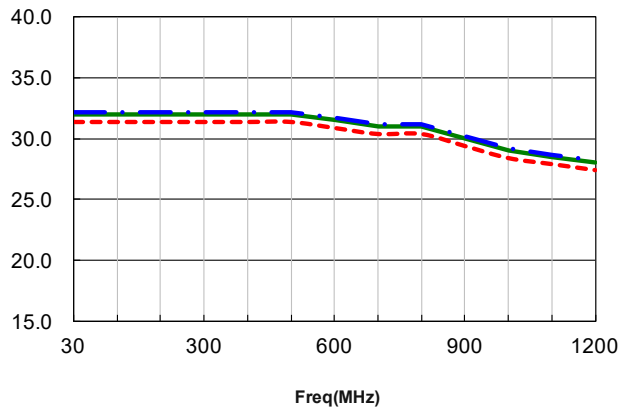
Frequency vs. S22



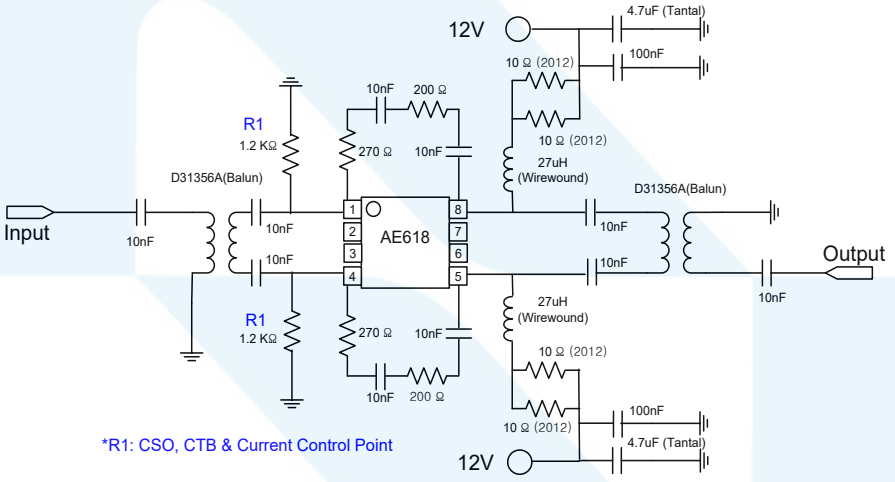
Frequency vs. OIP3



Frequency vs. P1dB



Application Circuit @ 5 ~ 200MHz, 75ohm System, VDD=12V

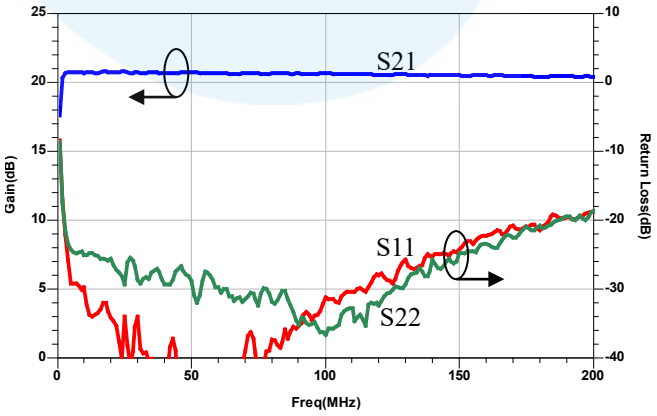


Typical Performance @ VDD=12V, IDS=360mA, T=25℃, 75ohm System

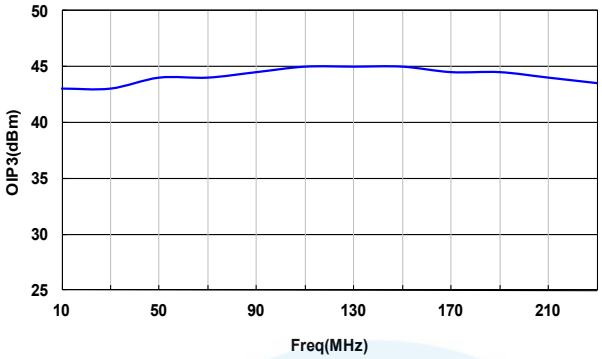
PARAMETER	UNIT	TYPICAL		
Frequency	MHz	5	100	200
Gain(S21)	dB	20.7	20.6	20.4
Input Return loss(S11)	dB	-29	-31	-19
Output Return loss(S22)	dB	-24	-36	-19
Output IP3	dBm	43	45	44
1dB Compression Point	dBm	32	32	31
Noise Figure	dB	2.0	2.4	2.8
CSO*	dBc	-78		
CTB*	dBc	-79		
XMOD*	dBc	-73		
Current	mA	360		

* 8channels_Flat, +47dBmV

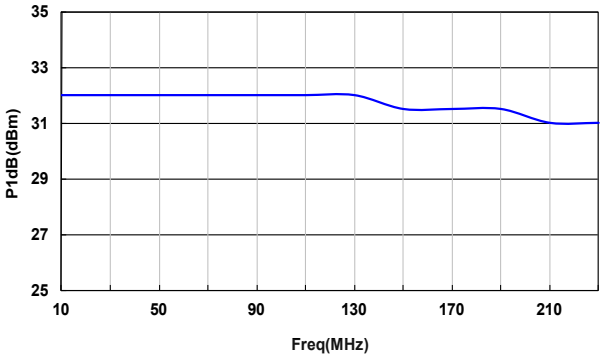
S-Parameter



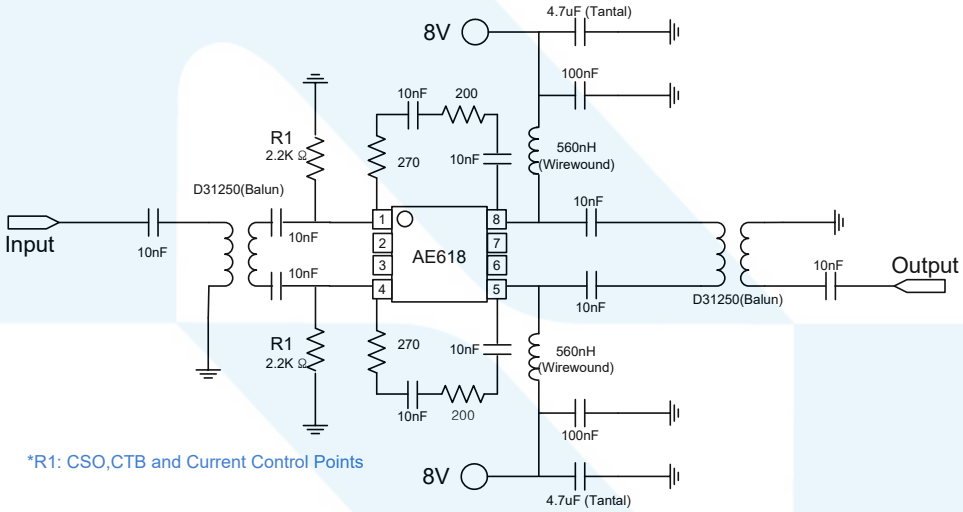
Frequency vs. OIP3



Frequency vs. P1dB



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

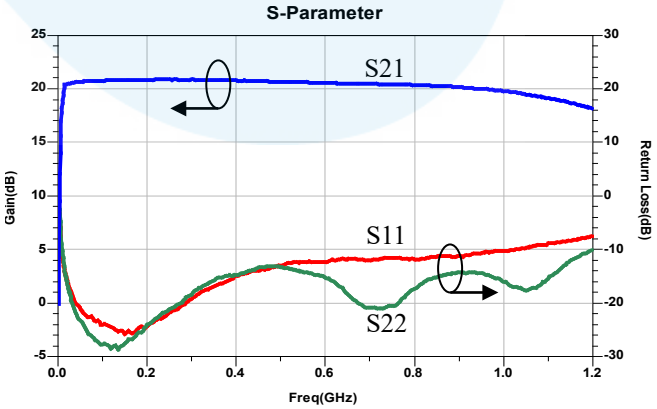


Typical Performance @ VDD=8V, IDS=410mA, T=25℃, 75ohm System

PARAMETER	UNIT	TYPICAL		
Frequency	MHz	30	500	1000
Gain(S21)	dB	20.5	20.6	19.8
Input Return loss(S11)	dB	-18	-13	-11
Output Return loss(S22)	dB	-19	-14	-16
Output IP3	dBm	44	43	39
1dB Compression Point	dBm	31	31	27
Noise Figure	dB	1.8	2.1	2.4
CSO*	dBc	-74		
CTB*	dBc	-65		
XMOD*	dBc	-61		
Current	mA	410		

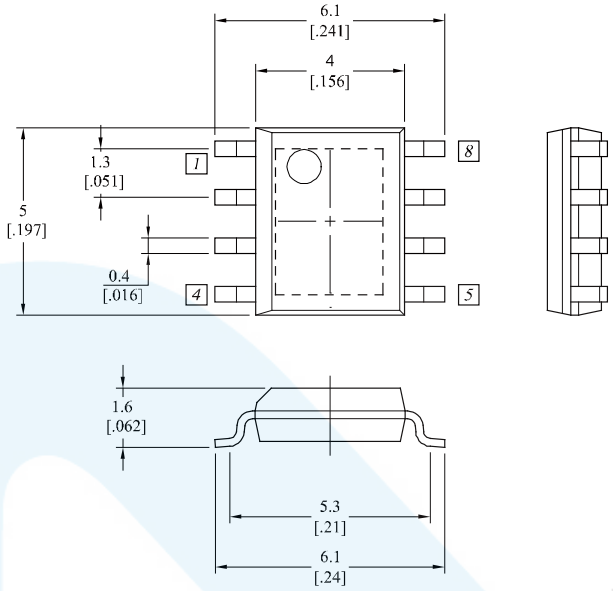
* 79channels_Flat, +43dBmV

S-Parameter



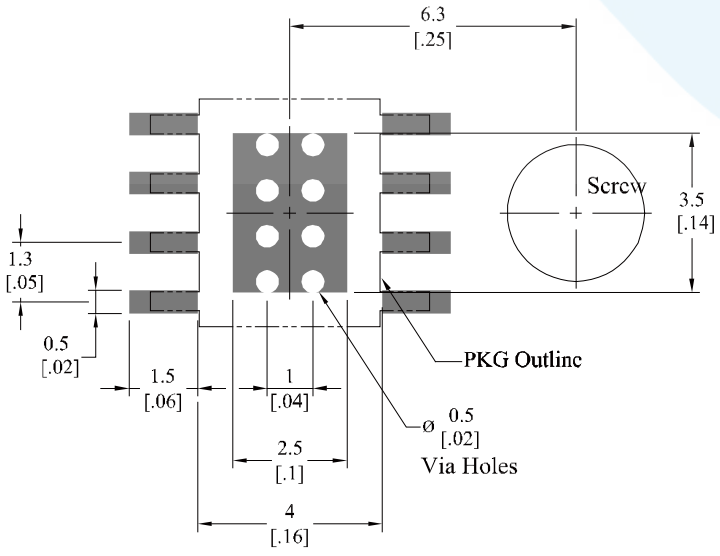
Package Dimensions (Type: SOIC-8)

* 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
AE618	2014.04.18	1.4	Thermal Resistance (1p)	-
AE618	2013.12.13	1.3	5~200MHz Application Circuit	-
AE618	2013.07.25	1.2	Vdd=8V Application Circuit	-

Certification

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