AMGP-6342

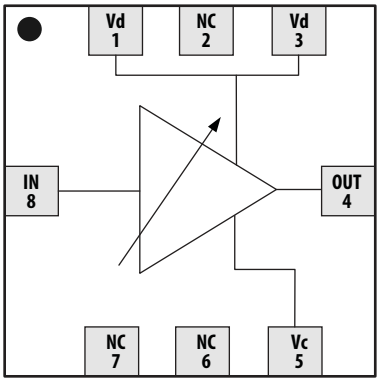
40.5 – 43.5 GHz SMT Packaged Variable Gain Amplifier

Data Sheet

Description

The AMGP-6342 is a broadband variable gain amplifier in a surface mount package designed for use in various applications such as 42 GHz Point-to-Point Radio that operate at frequencies between 40.5 GHz and 43.5 GHz. Over the frequency range it provides 25 dB of gain control with 9 dB small-signal gain and input and output 50 Ω match. OIP3 of +25 is delivered at 43 GHz.

Functional Block Diagram



Pin	Function
1	Vd
2	NC
3	Vd
4	RF_OUT
5	Vc
6	NC
7	NC
8	RF_IN

Attention: Observe Precautions for handling electrostatic sensitive devices.
ESD Machine Model: 40V
ESD Human Body Model: 150V
Refer to Avago Application Note A004R: Electrostatic Discharge Damage and Control.

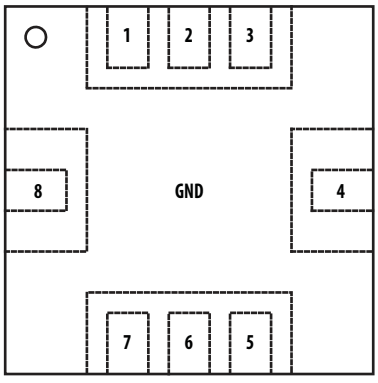
Features

- 5 x 5 mm surface mount package
- RF frequency range from 40.5 to 43.5 GHz
- 9 dB Maximum Gain
- 25 dB Dynamic Range
- +25 dBm Output IP3 @ 43 GHz
- Vd = 5 V and Id = 205 mA
- -1 to 0 V Control voltage (Vc)

Applications

- Microwave Radio Systems
- Test Instrument

Package Diagram



TOP VIEW

ELECTRICAL SPECIFICATIONS

Table 1. Absolute Minimum and Maximum Ratings

Parameter		Specifications			
Description		**Min.**	**Max.**	**Unit**	**Comments**
Drain Voltage	Vd		5.25	V	
Control Voltage	Vc	-3	+1.5	V	
CW Input Power			5	dBm	
MSL			MSL2A		
Channel Temperature			150	°C	
Storage Temperature		-45	150	°C	

Table 2. Recommended Operating Range

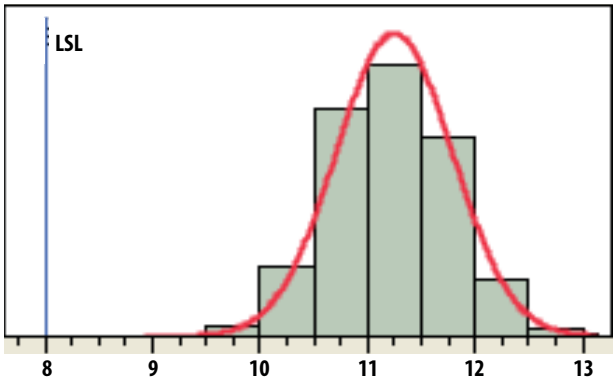
Parameter			Specifications				
Description		**Pin**	**Min.**	**Typical**	**Max.**	**Unit**	**Comments**
Drain Voltage		Vd	4.5	5.0	5.0	V	
Control Voltage		Vc	-1.0		0	V	Vc = -1 V is max. gain state
Frequency range			40.5		43.5	GHz	
Thermal Resistance, θ_{ch-b}				23.9		°C/W	
Case Temperature			-40		+85	°C	
ESD	Human Body Model			150		V	Class 0 is ESD voltage level < 250 V
	Machine Model			40		V	Class A is ESD voltage level < 200 V

Table 3. RF Electrical Characteristics

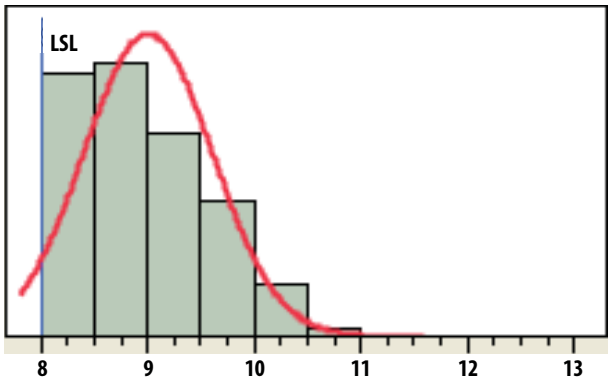
All data measured on a Rogers 4350 demo board at Vd = 5 V, T_A = 25° C and 50 Ω at all ports, unless otherwise specified.

		Performance				
Parameter		**Min.**	**Typical**	**Max.**	**Unit**	**Comments**
Gain	40.5GHz 42GHz 43.5GHz	8	11.3 9 9.3		dB	Vc = -1 V
Gain Dynamic Range	40.5 – 43.5 GHz		25		dB	
Input IP3 (max. Gain)	40.5GHz 42GHz 43.5GHz	8	13 14.4 13.3		dBm	Pin = -5 dBm / Tone
Noise Figure (max. Gain)			10		dB	@ 40.5 GHz
Input Return Loss	40.5 – 43.5 GHz		10		dB	Over dynamic range
Output Return Loss	40.5 – 43.5 GHz		10		dB	Over dynamic range
Drain Current (Id)			205		mA	
Control Voltage			-1/0		V	-1 V = Max. Gain 0 V = Min. Gain
Control Current (Ic)				1	mA	

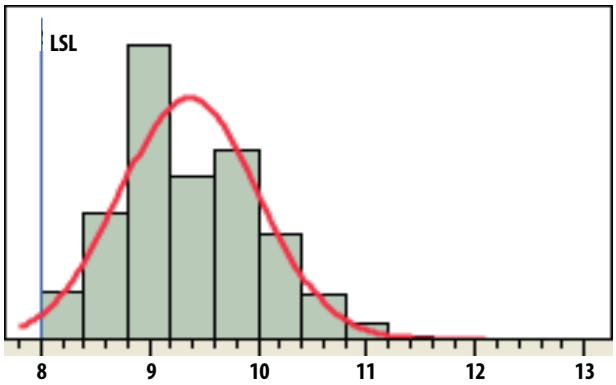
Product Consistency Distribution Charts at 40.5 GHz, 42 GHz and 43.5 GHz, Vd = 5 V, Vc = -1 V. (Sample size of 2,000 pieces)



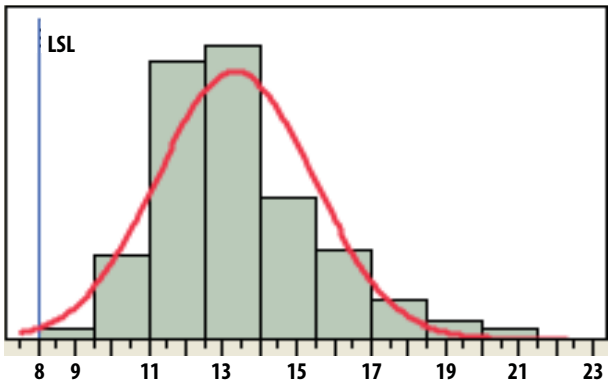
Gain @ 40.5 GHz, Mean = 11.28 dB, LSL = 8 dB



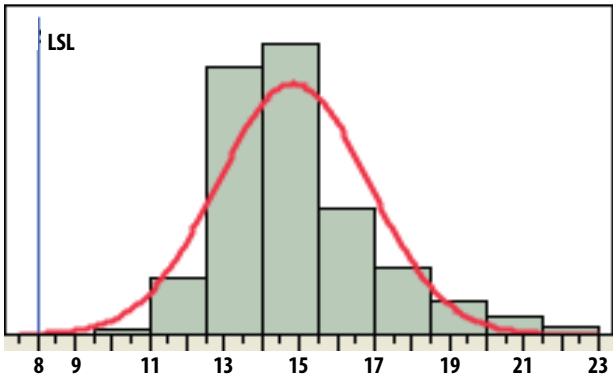
Gain @ 42 GHz, Mean = 8.97 dB, LSL = 8 dB



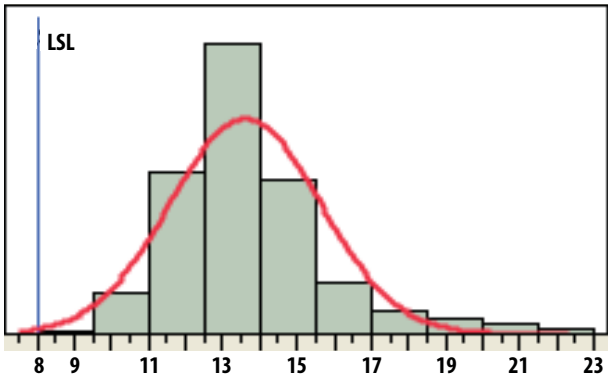
Gain @ 43.5 GHz, Mean = 9.33 dB, LSL = 8 dB



IIP3 @ 40.5 GHz, Mean = 12.92 dBm, LSL = 8 dBm



IIP3 @ 42 GHz, Mean = 14.42 dBm, LSL = 8 dBm



IIP3 @ 43.5 GHz, Mean = 13.33 dBm, LSL = 8 dBm

Selected performance plots

All data measured on connectorized Rogers 4350 demo board at Vd = 5 V, T_A = 25° C and 50 Ω at all ports, unless otherwise specified.

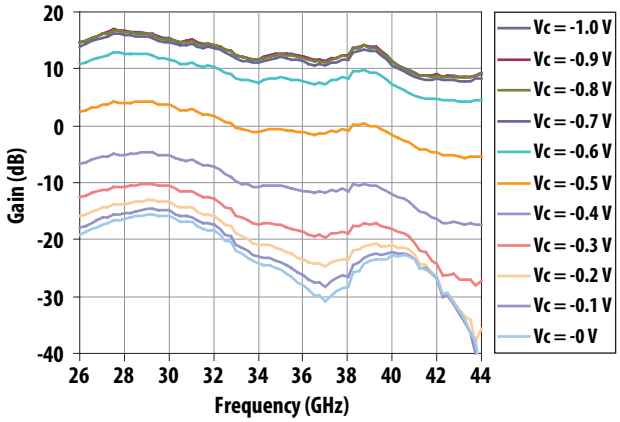


Figure 1. Broadband Gain over Gain Control Voltage Vc

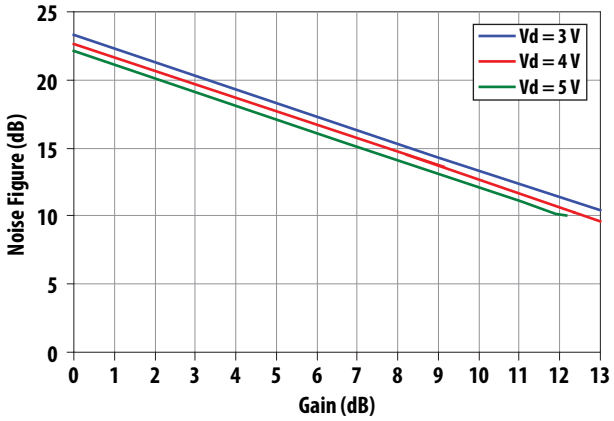


Figure 2. Noise Figure vs Gain @ 40 GHz over Vd = 3, 4 and 5 V

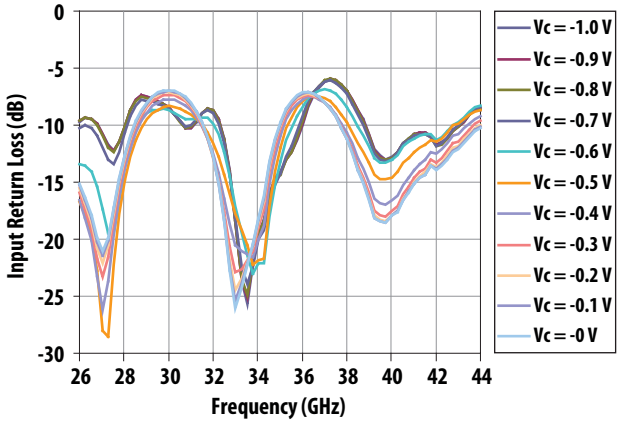


Figure 3. Broadband Input Return Loss over Gain Control Voltage Vc

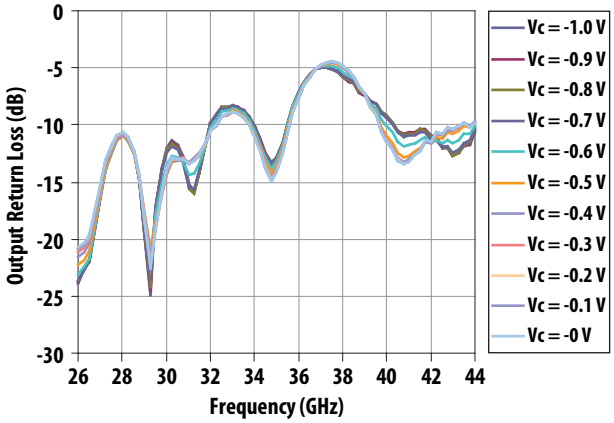


Figure 4. Broadband Output Return Loss over Gain Control Voltage Vc

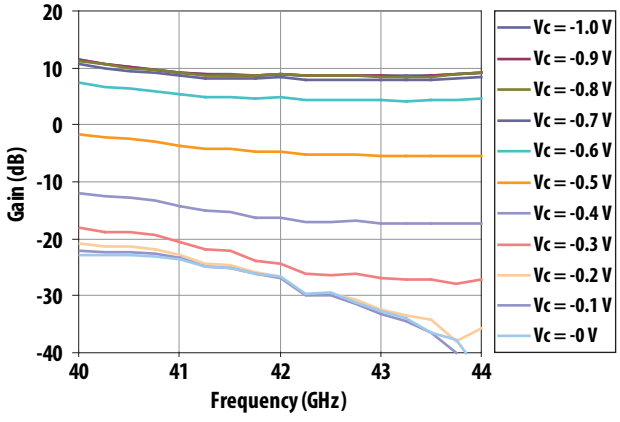


Figure 5. Gain in 40-43.5 GHz Band over Gain Control Voltage Vc

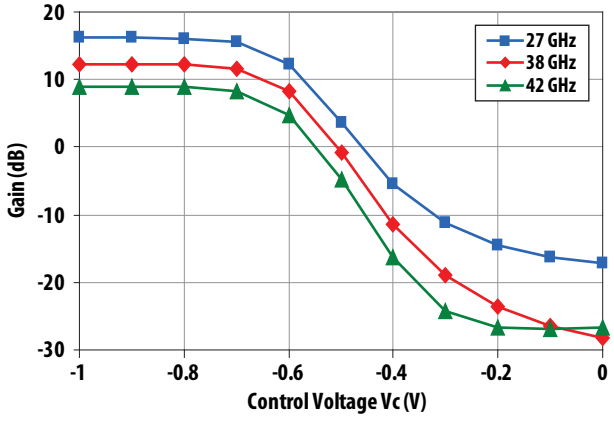


Figure 6. Gain vs Control Voltage Vc @ 27, 38 and 42 GHz

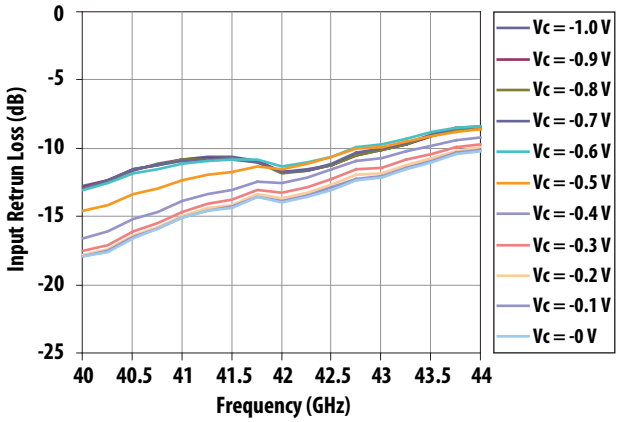


Figure 7. Input Return Loss in 40-43.5 GHz Band over Gain Control Voltage Vc

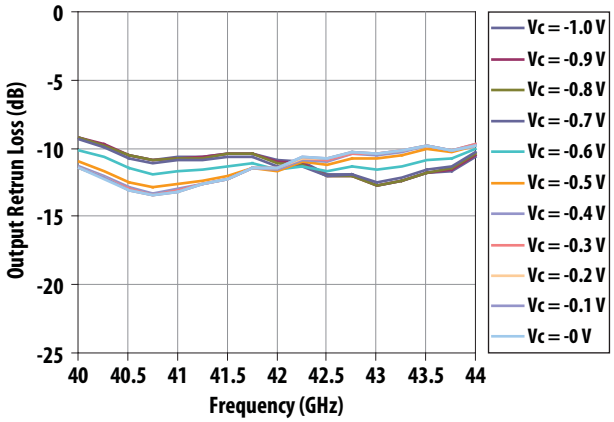


Figure 8. Output Return Loss in 40-43.5 GHz Band over Gain Control Voltage Vc

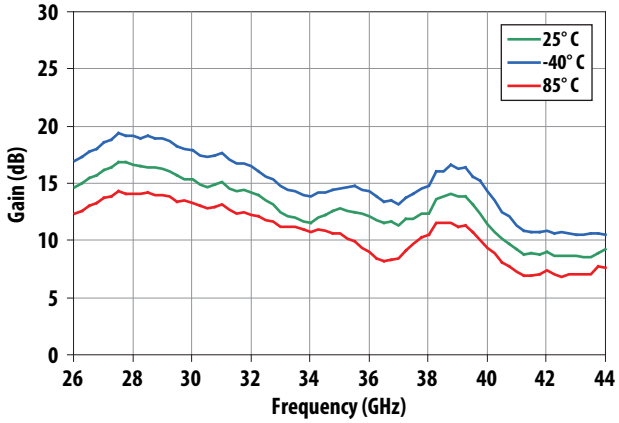


Figure 9. Broadband Gain Over Temperature

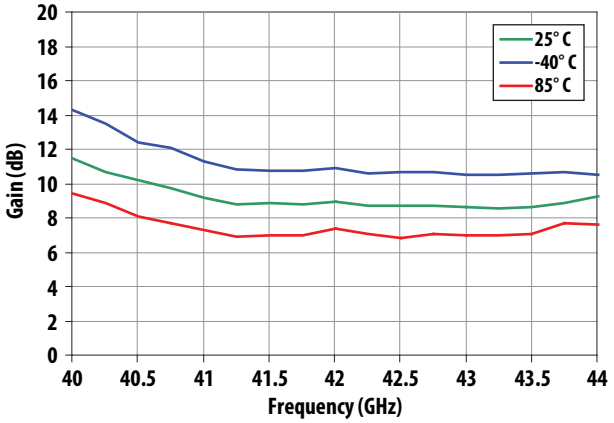


Figure 10. Gain in 40-43.5 GHz Band Over Temperature

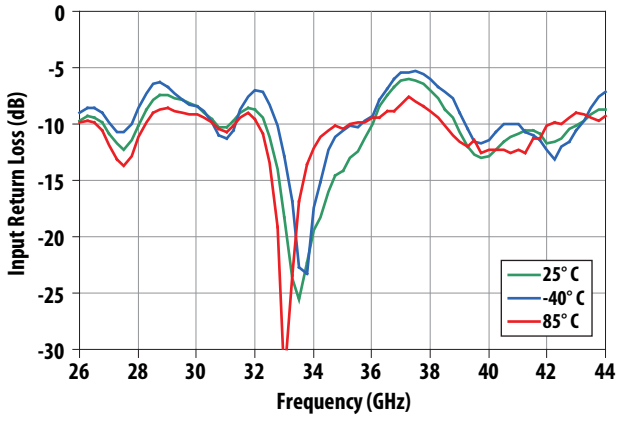


Figure 11. Broadband Input Return Loss Over Temperature

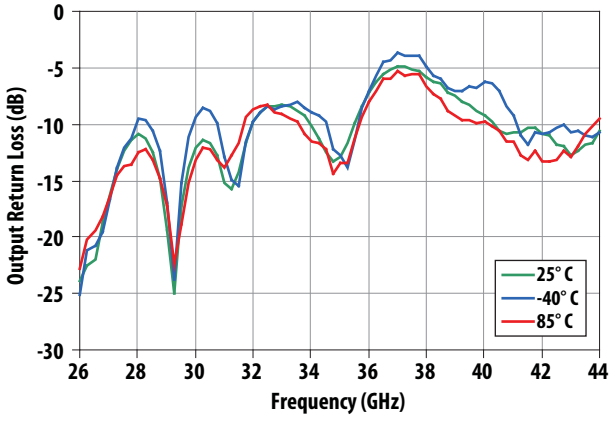


Figure 12. Broadband Output Return Loss Over Temperature

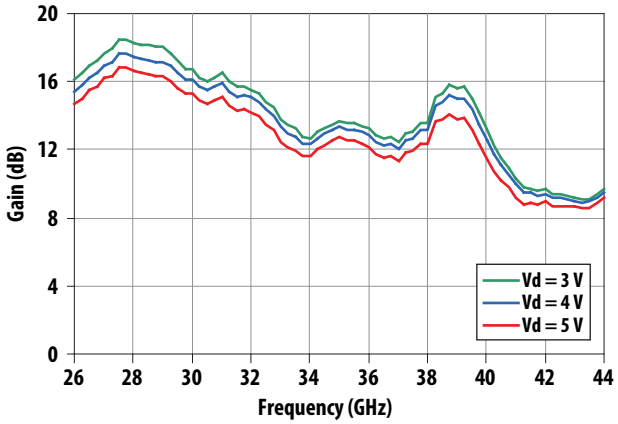


Figure 13. Broadband Gain Over Drain Bias Vd

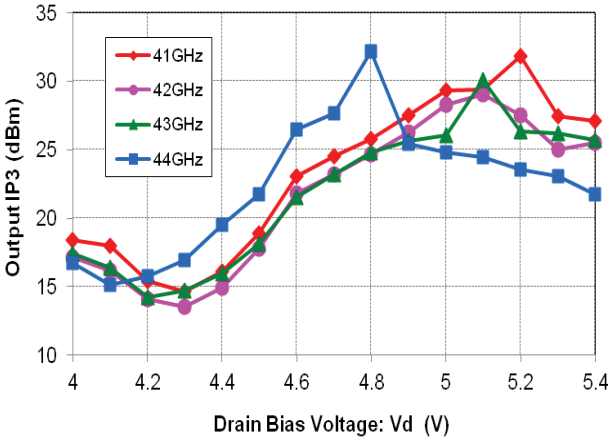


Figure 14. Output IP3 vs. Drain Bias Vd

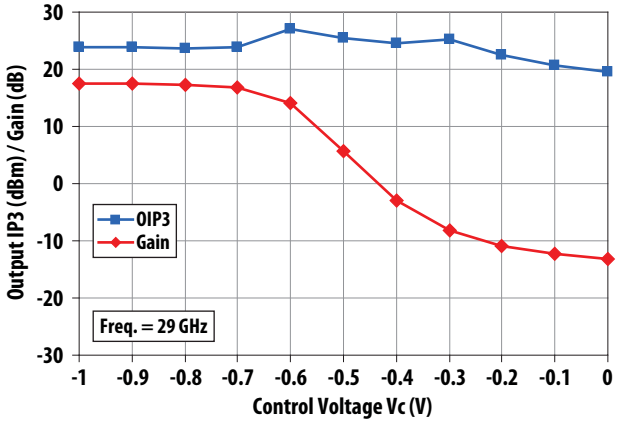


Figure 15. Output IP3 and Gain vs. Control Voltage @ 29 GHz

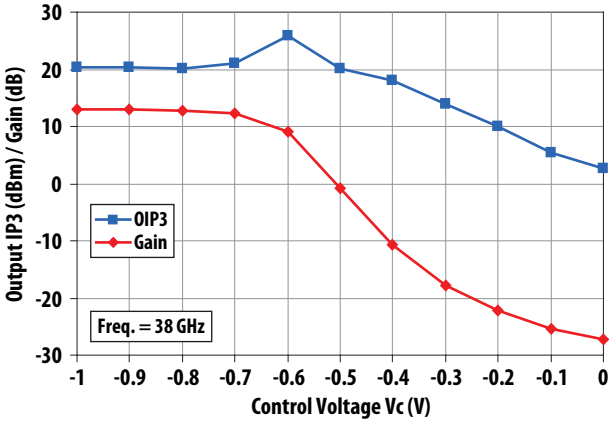


Figure 16. Output IP3 and Gain vs. Control Voltage @ 38 GHz

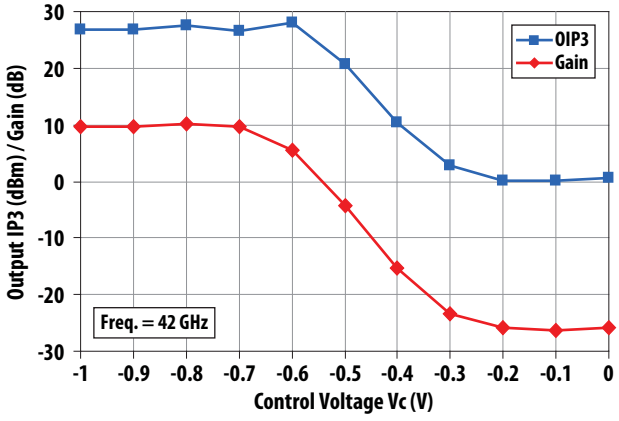


Figure 17. Output IP3 and Gain vs Control Voltage @ 42 GHz

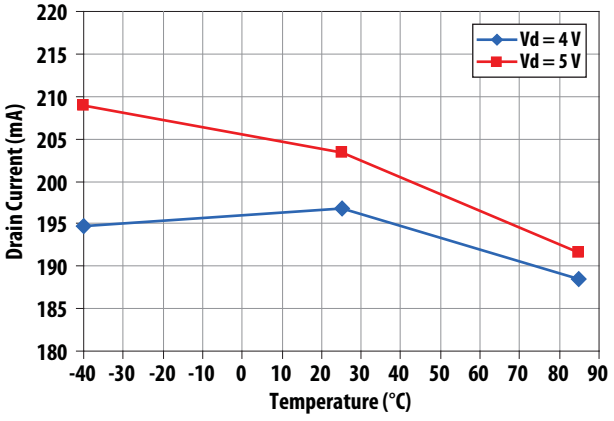
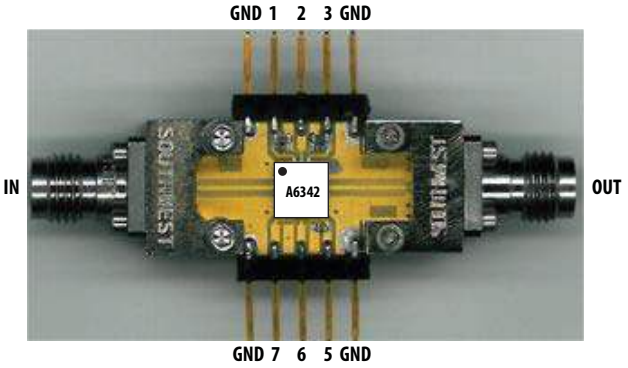
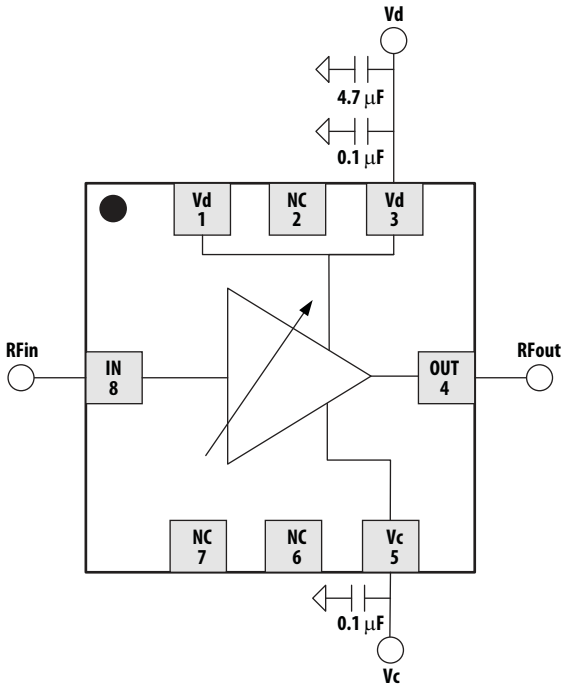


Figure 18. Drain Bias Current vs Temperature over Vd

Evaluation Board Description



Demo board circuit for AMGP-6342



Note: Pins 1 and 3 are internally connected. Only either pin 2 or pin 4 should be used for Vd, not both.

Table 4. Pin Description

Pin #	Function	Biasing	Comment
GND	GND		
1	Vd	5.0 V	Pins 2 & 4 are internally connected
2	NC		
3	Vd (opt)	5.0 V (opt)	Pins 2 & 4 are internally connected
GND	GND		
GND	GND		
5	Vc	-1 to 0 V	< 1 mA
6	NC		
7	NC		
GND	GND		

Package Dimension, PCB Layout and Tape and Reel information

Please refer to Avago Technologies Application Note 5521, AMxP-xxxx production Assembly Process (Land Pattern B).

Part Number Ordering Information

Part Number	Devices per Container	Container
AMGP-6342-BLKG	10	antistatic bag
AMGP-6342-TR1G	100	7" Reel
AMGP-6342-TR2G	500	7" Reel

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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