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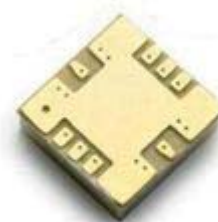


# AMGP-6342

40.5 – 43.5 GHz SMT Packaged Variable Gain Amplifier



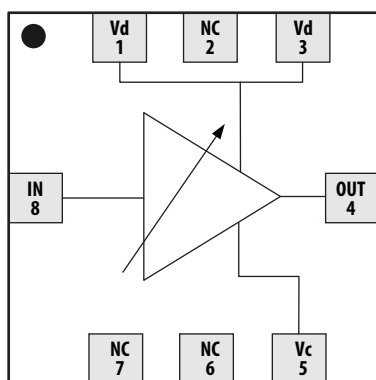
## Data Sheet



### 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  $\Omega$  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

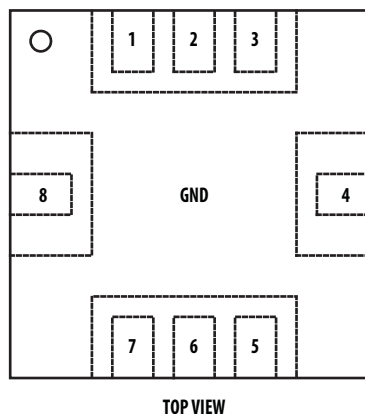
### Features

- 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



**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.

## ELECTRICAL SPECIFICATIONS

**Table 1. Absolute Minimum and Maximum Ratings**

Parameter		Specifications			Comments
Description		Min.	Max.	Unit	
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**

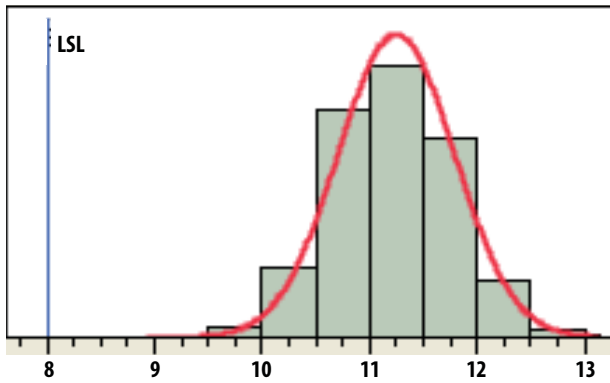
Parameter		Specifications				Comments
Description	Pin	Min.	Typical	Max.	Unit	
Drain Voltage	Vd	4.5	5.0	5.0	V	
Control Voltage	Vc	-1.0		0	V	Vc = -1 V is max. gain state
Frequency range		40.5		43.5	GHz	
Thermal Resistance, $\theta_{ch-b}$			23.9		°C/W	
Case Temperature		-40		+85	°C	
ESD	Human Body Model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

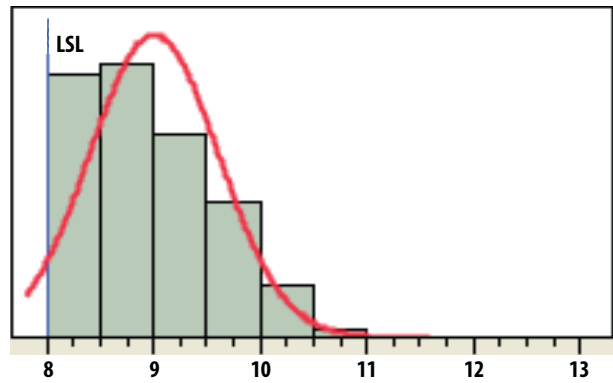
All data measured on a Rogers 4350 demo board at Vd = 5 V, TA = 25° C and 50  $\Omega$  at all ports, unless otherwise specified.

Parameter		Performance				Comments
		Min.	Typical	Max.	Unit	
Gain	40.5GHz	8	11.3		dB	Vc = -1 V
	42GHz		9			
	43.5GHz		9.3			
Gain Dynamic Range	40.5 – 43.5 GHz		25		dB	
Input IP3 (max. Gain)	40.5GHz	8	13		dBm	Pin = -5 dBm / Tone
	42GHz		14.4			
	43.5GHz		13.3			
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	

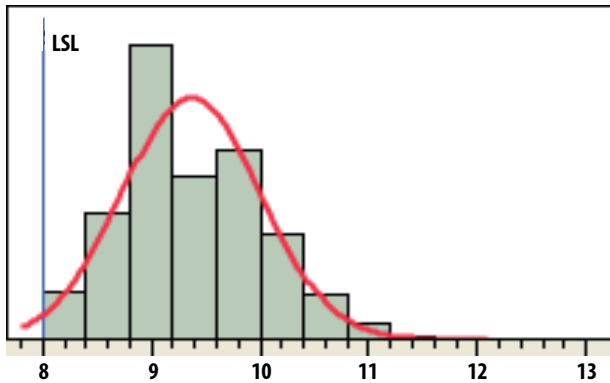
**Product Consistency Distribution Charts at 40.5 GHz, 42 GHz and 43.5 GHz,  $V_d = 5\text{ V}$ ,  $V_c = -1\text{ V}$ .  
(Sample size of 2,000 pieces)**



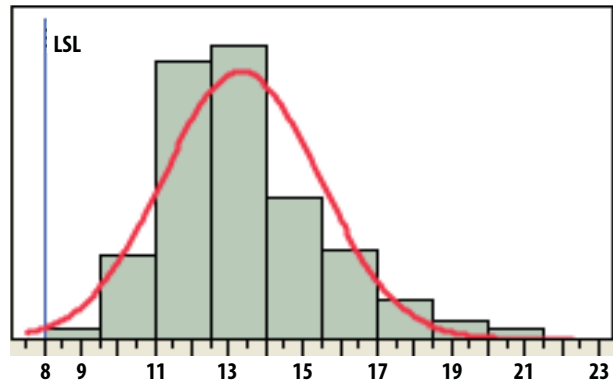
Gain @ 40.5 GHz, Mean = 11.28 dB, LSL = 8 dB



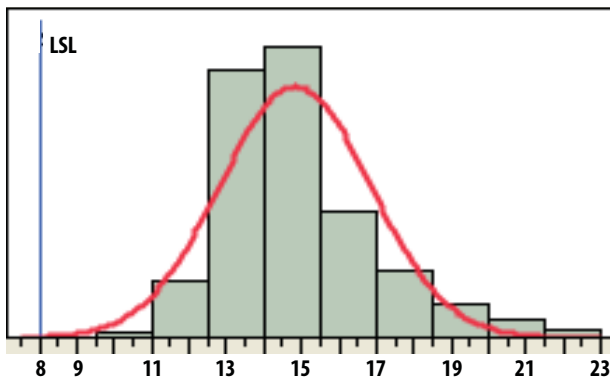
Gain @ 42 GHz, Mean = 8.97 dB, LSL = 8 dB



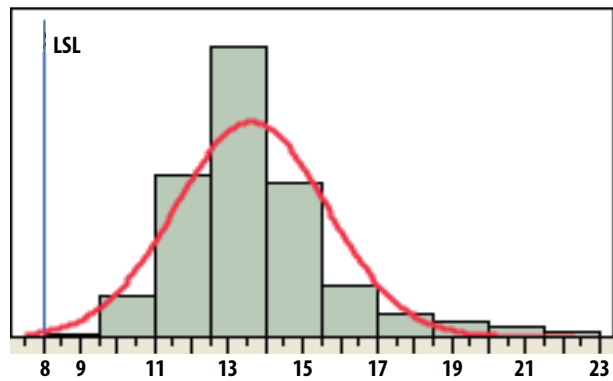
Gain @ 43.5 GHz, Mean = 9.33 dB, LSL = 8 dB



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  $V_d = 5\text{ V}$ ,  $T_A = 25^\circ\text{ C}$  and  $50\ \Omega$  at all ports, unless otherwise specified.

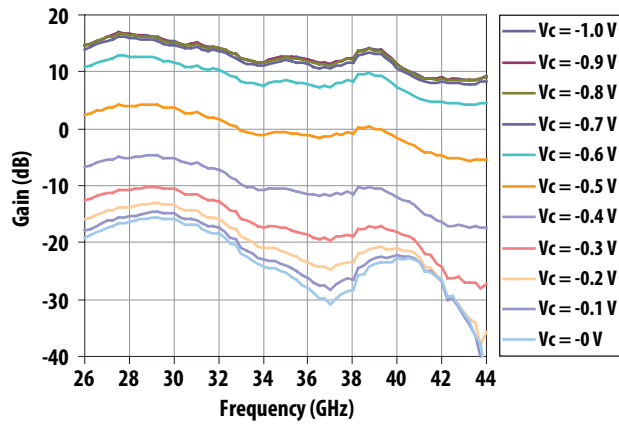


Figure 1. Broadband Gain over Gain Control Voltage  $V_c$

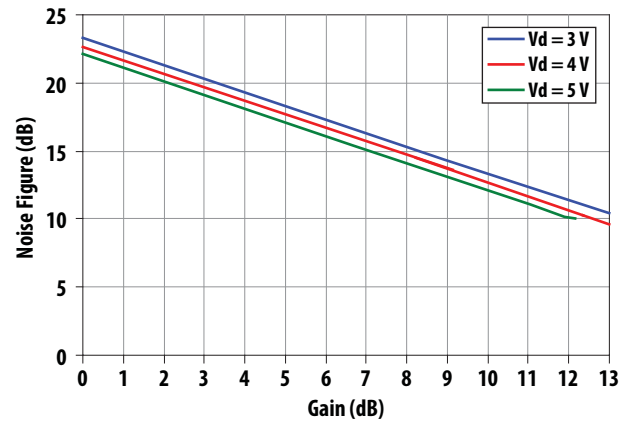


Figure 2. Noise Figure vs Gain @ 40 GHz over  $V_d = 3, 4$  and  $5\text{ V}$

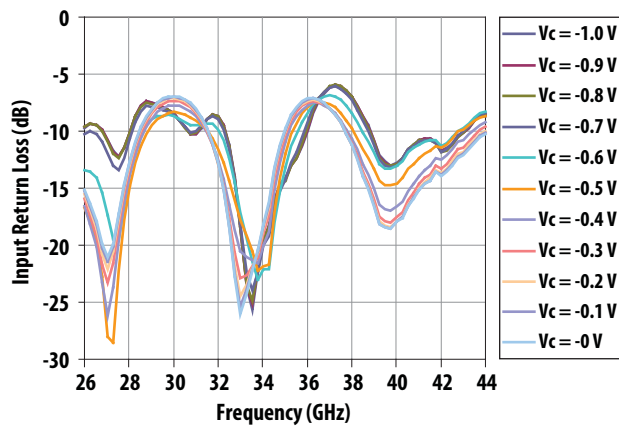


Figure 3. Broadband Input Return Loss over Gain Control Voltage  $V_c$

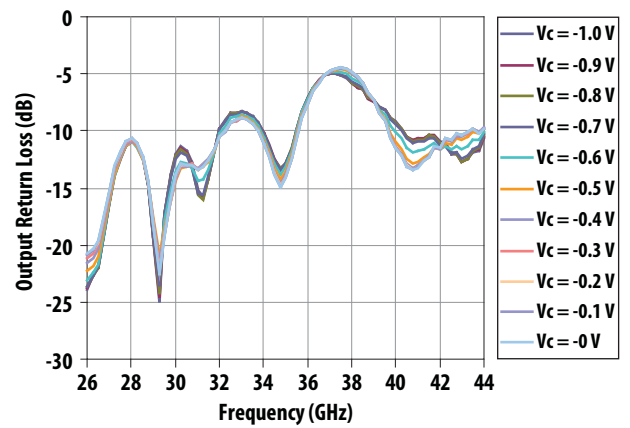


Figure 4. Broadband Output Return Loss over Gain Control Voltage  $V_c$

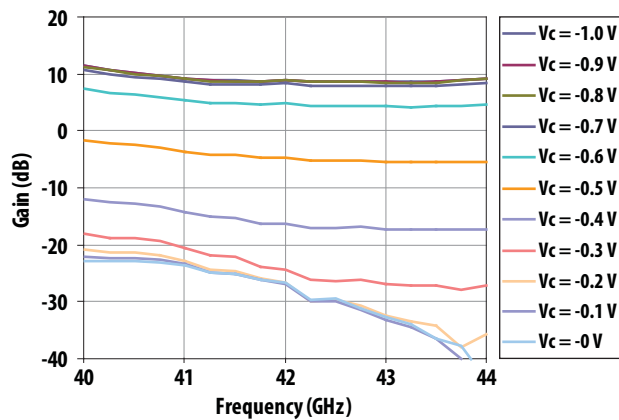


Figure 5. Gain in 40-43.5 GHz Band over Gain Control Voltage  $V_c$

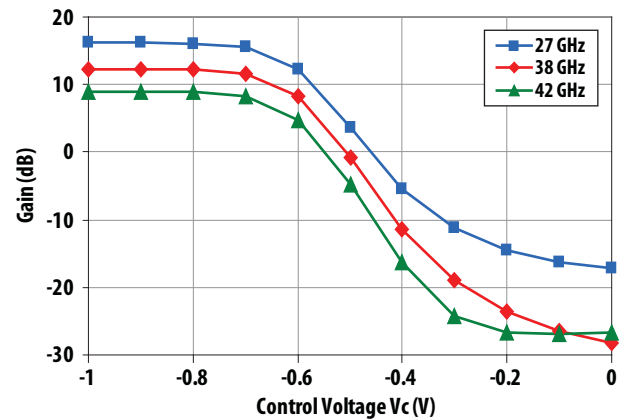


Figure 6. Gain vs Control Voltage  $V_c$  @ 27, 38 and 42 GHz

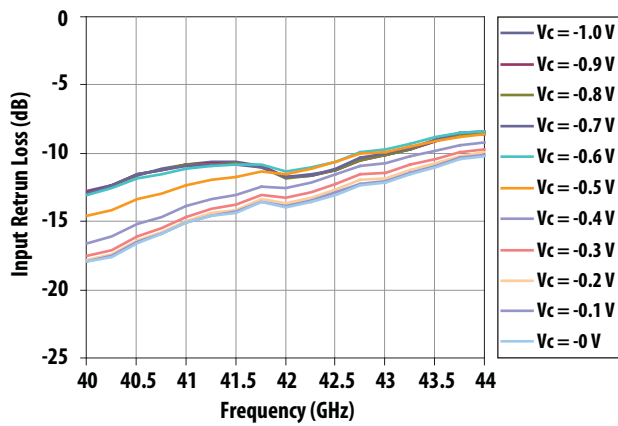


Figure 7. Input Return Loss in 40-43.5 GHz Band over Gain Control Voltage  $V_c$

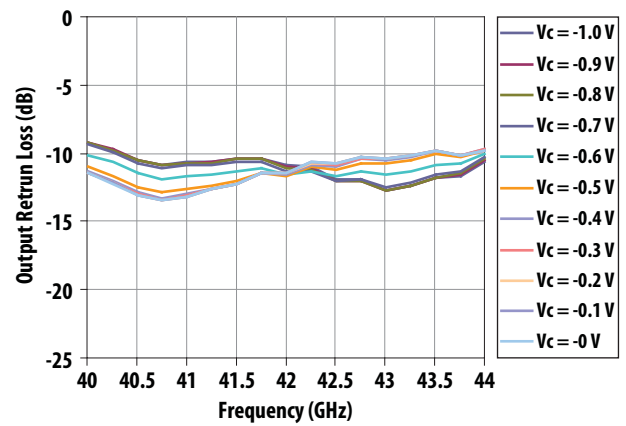


Figure 8. Output Return Loss in 40-43.5 GHz Band over Gain Control Voltage  $V_c$

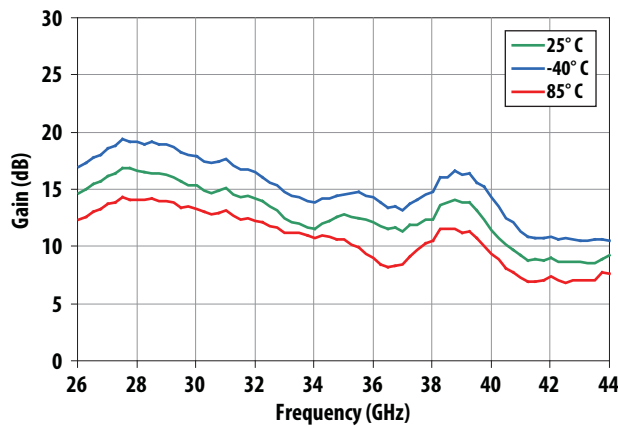


Figure 9. Broadband Gain Over Temperature

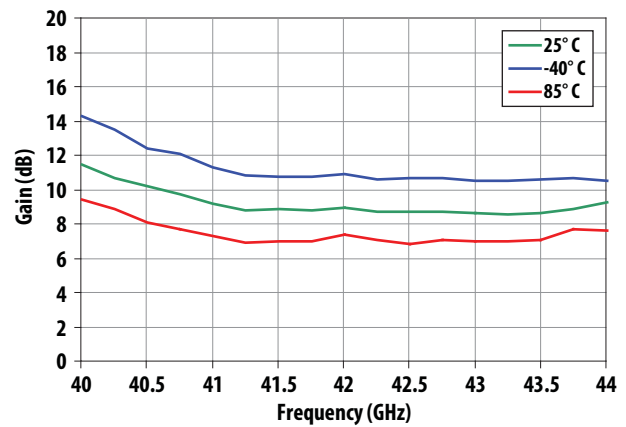


Figure 10. Gain in 40-43.5 GHz Band Over Temperature

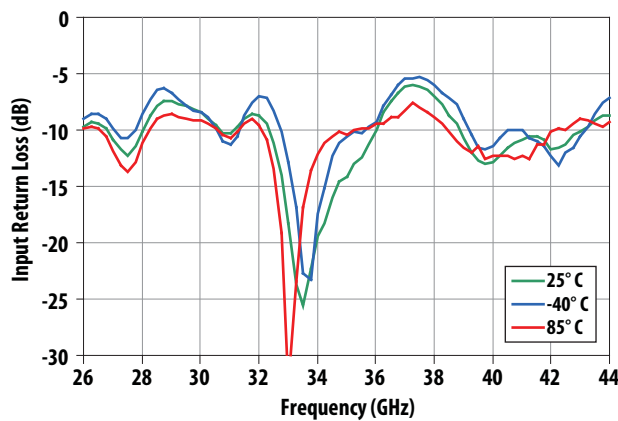


Figure 11. Broadband Input Return Loss Over Temperature

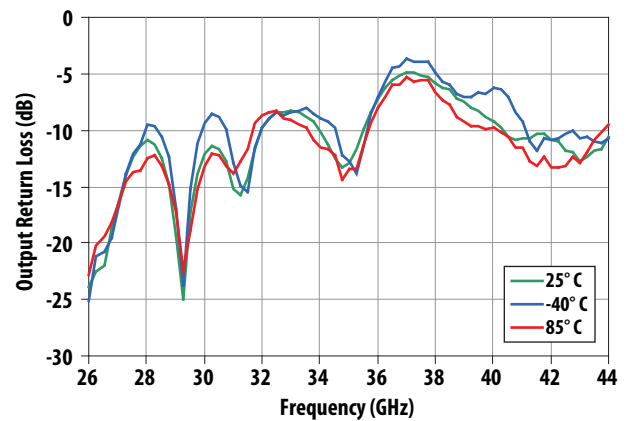


Figure 12. Broadband Output Return Loss Over Temperature

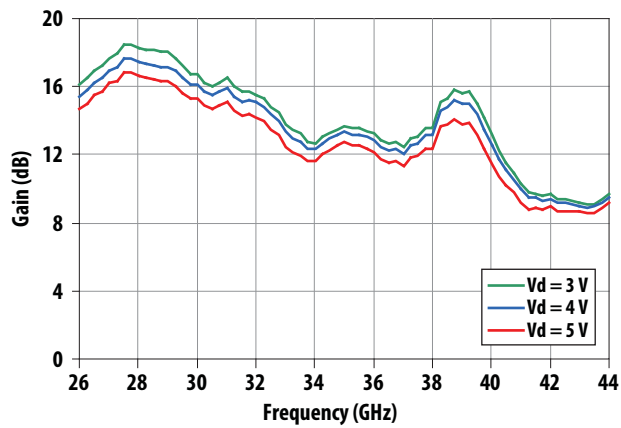


Figure 13. Broadband Gain Over Drain Bias  $V_d$

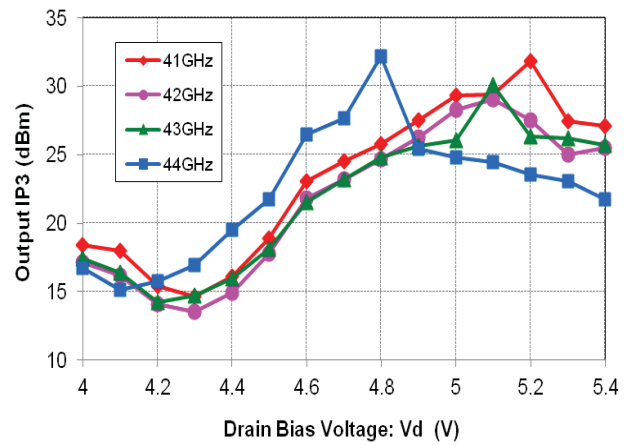


Figure 14. Output IP3 vs. Drain Bias  $V_d$

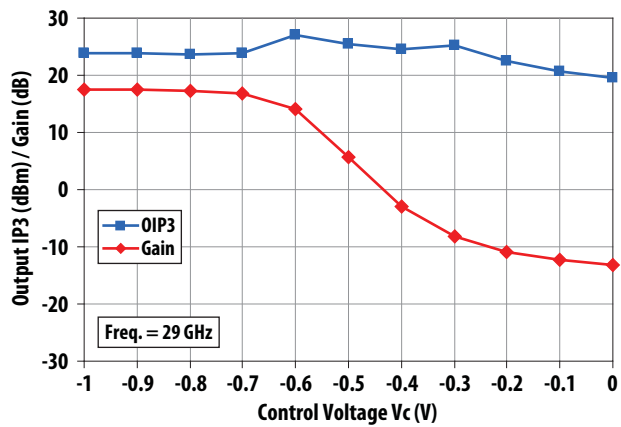


Figure 15. Output IP3 and Gain vs. Control Voltage @ 29 GHz

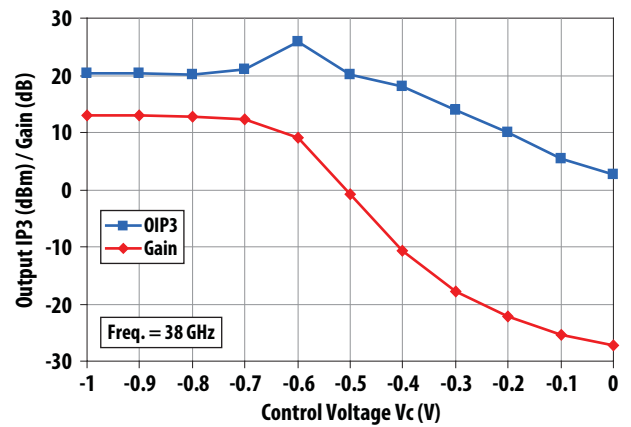


Figure 16. Output IP3 and Gain vs. Control Voltage @ 38 GHz

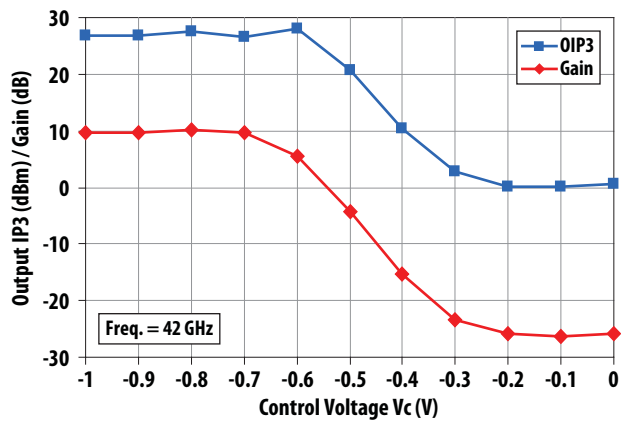


Figure 17. Output IP3 and Gain vs Control Voltage @ 42 GHz

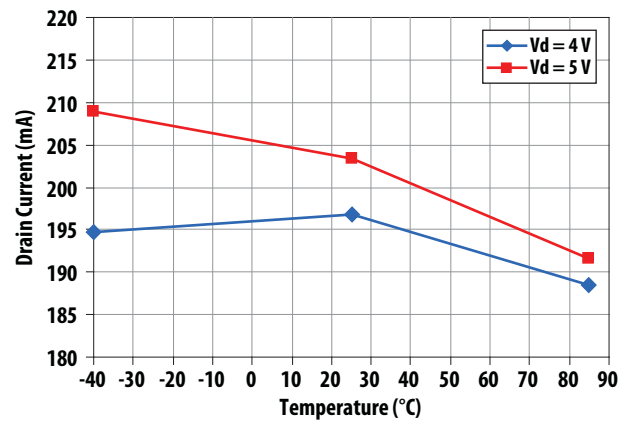
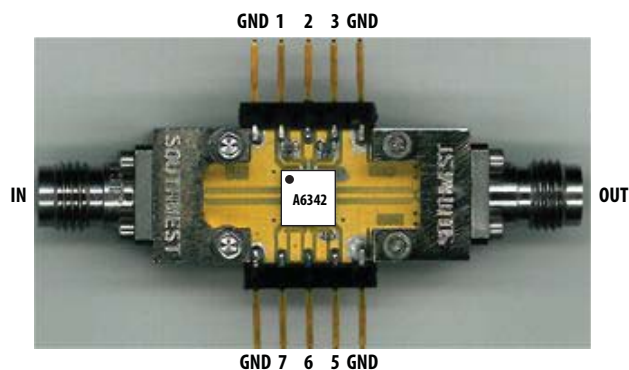


Figure 18. Drain Bias Current vs Temperature over  $V_d$

## Evaluation Board Description



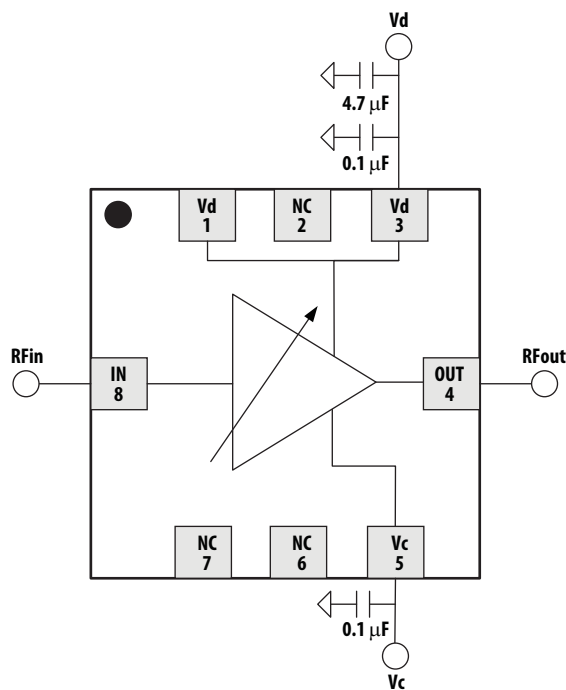
**Table 4. Pin Description**

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).

## 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.

## 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

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