DA2715 Wideband Amplifier

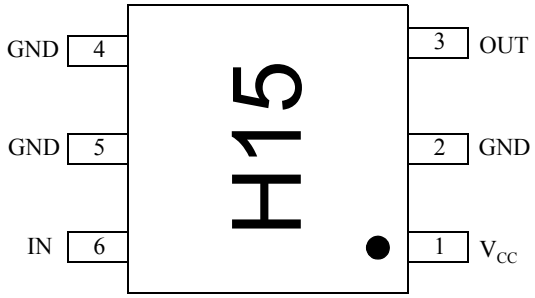
Description

The DA2715 is a general purpose, low-current RF wideband amplifier IC. The input and output of the IC are internally matched to 50Ω for convenient cascading. Applications include IF and RF amplification in wireless voice and data communication products from DC to 3GHz. The DA2715 requires minimal external components for DC bias.

Features

- DC to 3GHz Operation
- Icc = 5.5mA @Vcc = 5V
- Internally Matched Input and Output
- 21dB Small Signal Gain @2GHz
- Single Positive Power Supply
- SOT363 surface-mount package

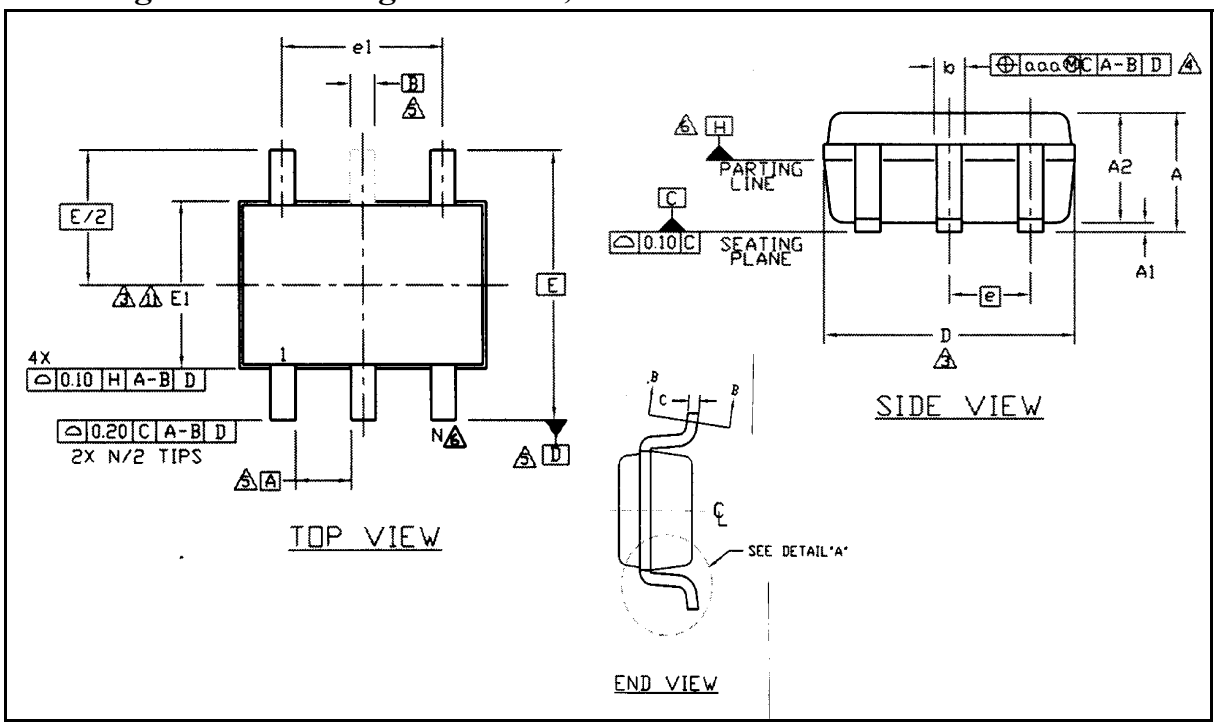
Pin Out Diagram



Pin Descriptions

Number	Name	Description
1	V_{CC}	Power supply pin. An external bypass capacitor is required.
2	GND	Ground connection. Keep PCB traces as short as possible and connect immediately to ground plane for best performance.
3	OUT	Signal output pin. An external series DC blocking capacitor is required
4	GND	Same as pin 2.
5	GND	Same as pin 2.
6	IN	Signal input pin. An external series DC blocking capacitor is required. No DC coupling allowed.

Package and Pin Assignment: 6L, SOT363



Symbols	Dimensions in mm		
	MIN.	NOM.	MAX.
A	--	--	1.00
A1	0.05	0.075	0.10
A2	0.850	0.88	0.90
A3		0.50 BSC	
b	0.15	--	0.30
b1	0.15	0.20	0.25
C	0.10	--	0.20
C1	0.10	0.127	0.15
D	1.90	2.00	2.10
E		2.10 BSC	
E1	1.25	1.30	1.35
L	0.26	0.36	0.46
e1		1.30 BSC	
e		0.65 BSC	
ααα		0.10	

Absolute Maximum Ratings

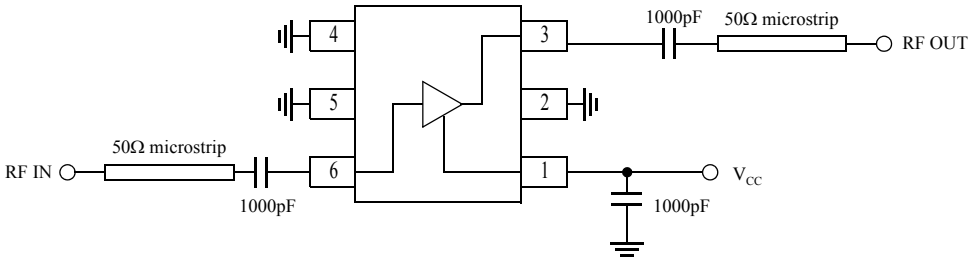
Parameter	Symbol	Rating	Unit
Supply Current	I_{CC}	12	mA
Input RF Power	P_{IN}	0	dBm
Operating Temperature Range	T_A	–40 to 85	°C
Storage Temperature Range		–60 to 150	°C

Electrical Characteristics

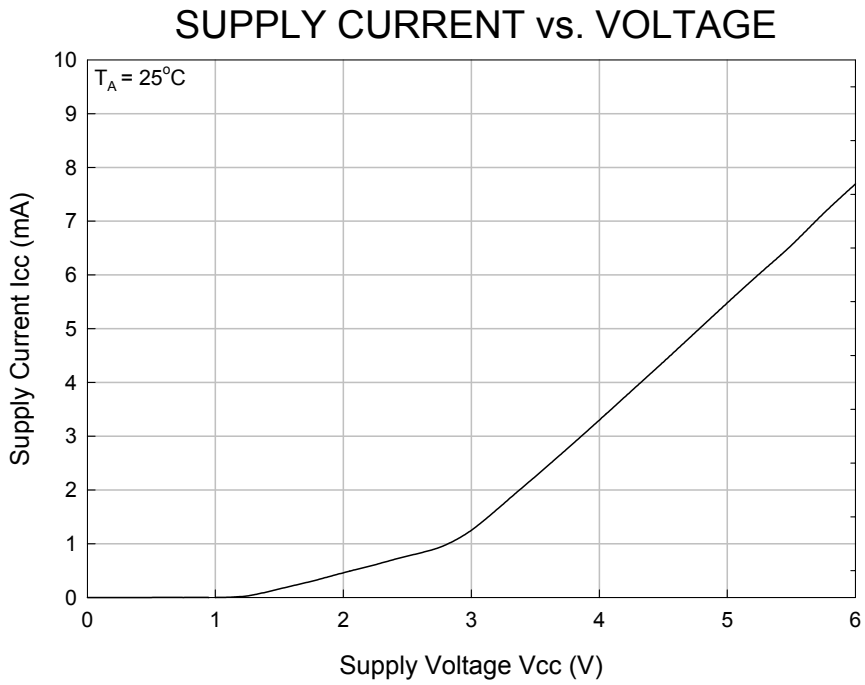
(V_{CC} = 5V, I_{CC} = 5.5mA, and T_A = 25°C unless otherwise noted)

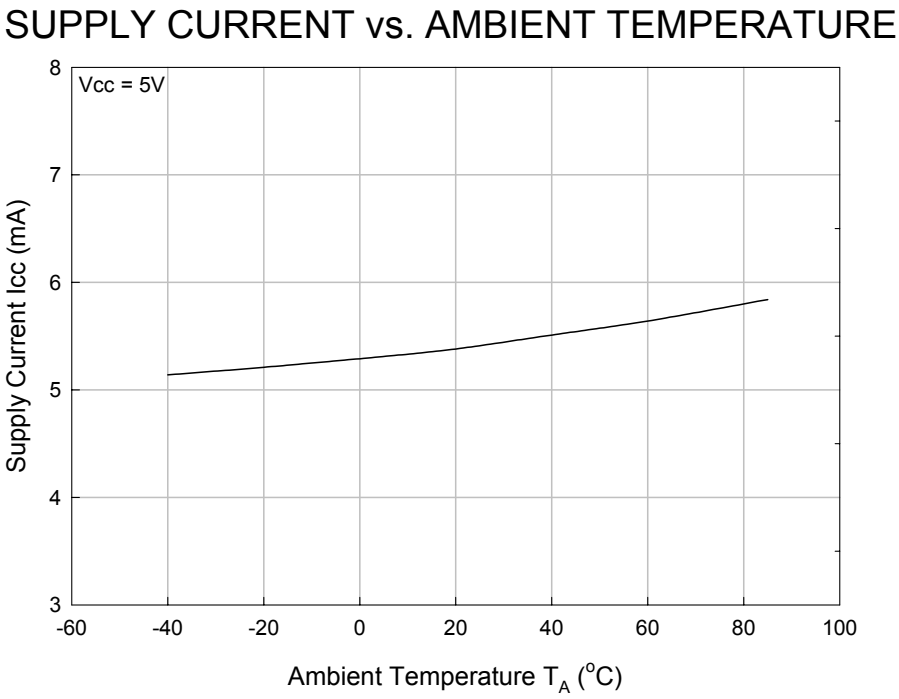
Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
Power Supply						
Supply Voltage	V_{CC}	Applied to pin 1		5		V
Supply Current	I_{CC}			5.5		mA
AC Characteristics						
Frequency Range			DC		3	GHz
Gain (output connected through bias tee)		Frequency = 1GHz Frequency = 2GHz Frequency = 3GHz		21 21 21		dB dB dB
Gain Flatness		100MHz to 1.8GHz		±1		dB
Noise Figure	NF	Frequency = 1GHz		4		dB
Input Return Loss		In a 50Ω system		10		dB
Output Return Loss		In a 50Ω system		10		dB
Output P_{1dB}	P_{1dB}	Frequency = 1GHz Frequency = 2GHz		-7 -7		dBm dBm
Reverse Isolation		Frequency = 1GHz		29		dB

Evaluation Board Schematic

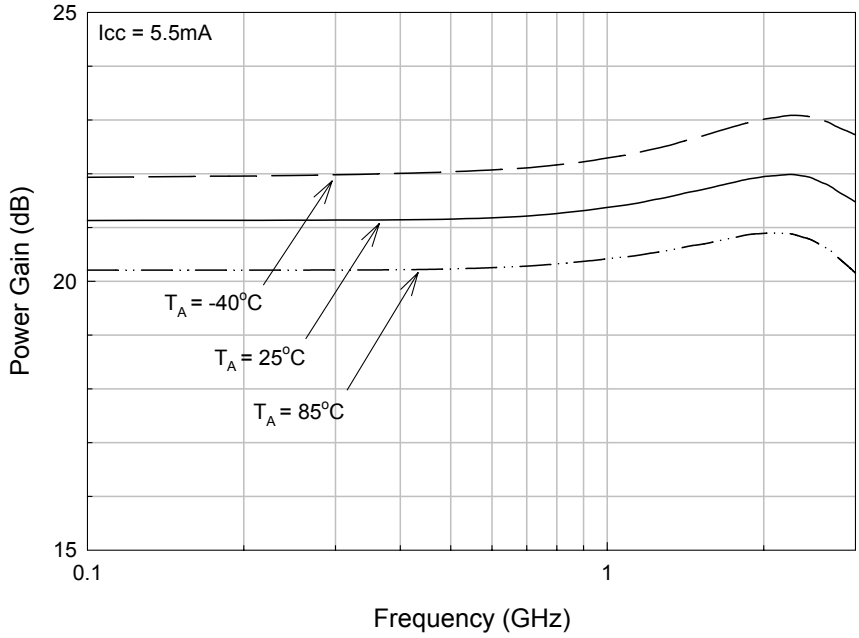


Typical Characteristics (T_A = 25°C)

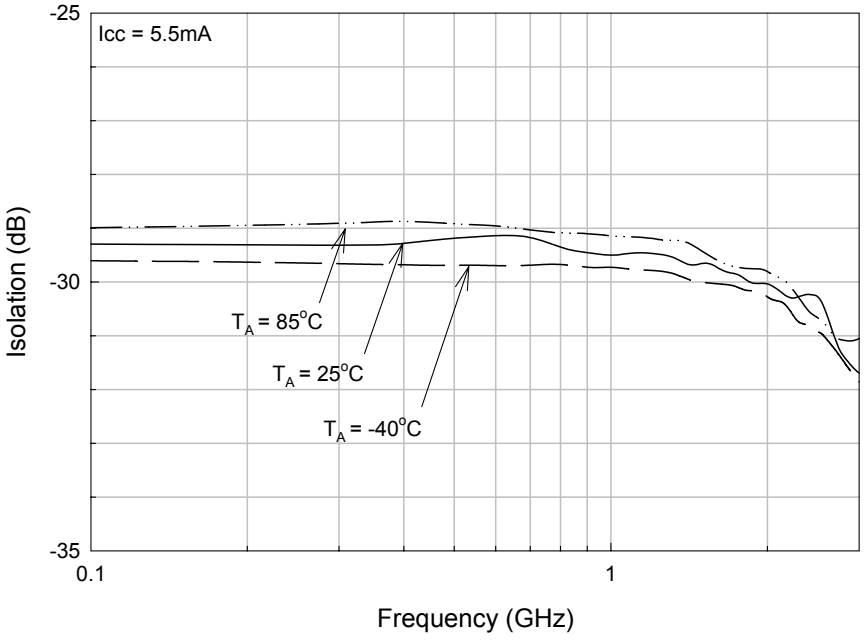




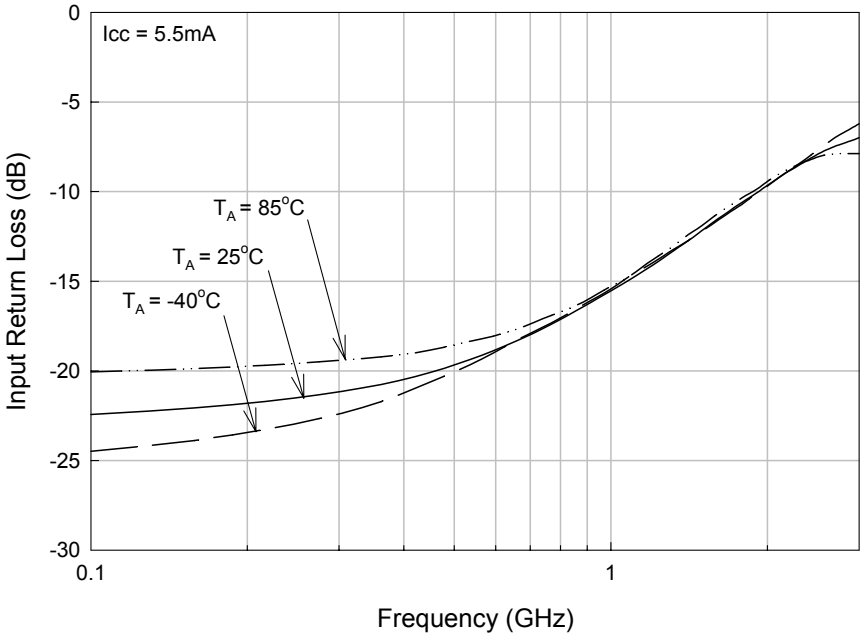
POWER GAIN vs. FREQUENCY



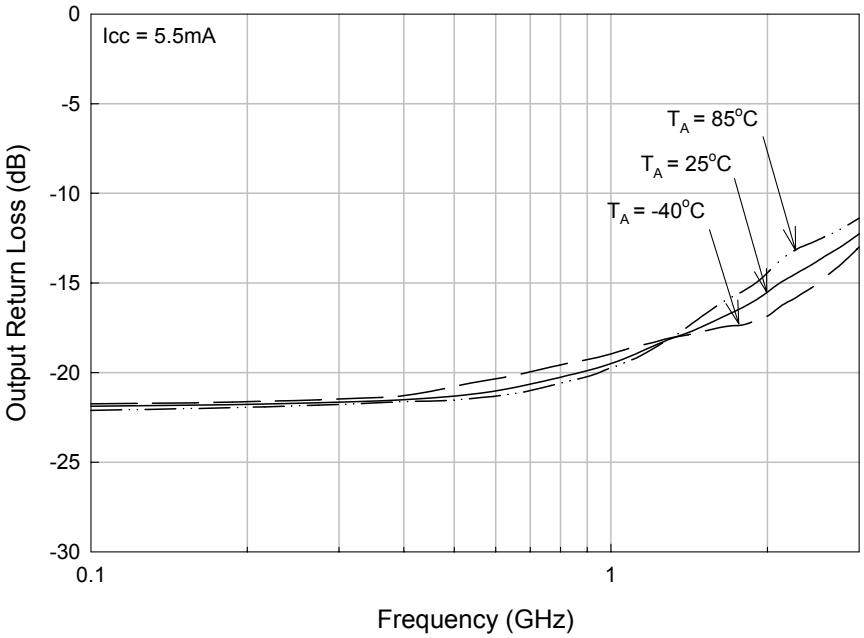
ISOLATION vs. FREQUENCY



INPUT RETURN LOSS vs. FREQUENCY



OUTPUT RETURN LOSS vs. FREQUENCY



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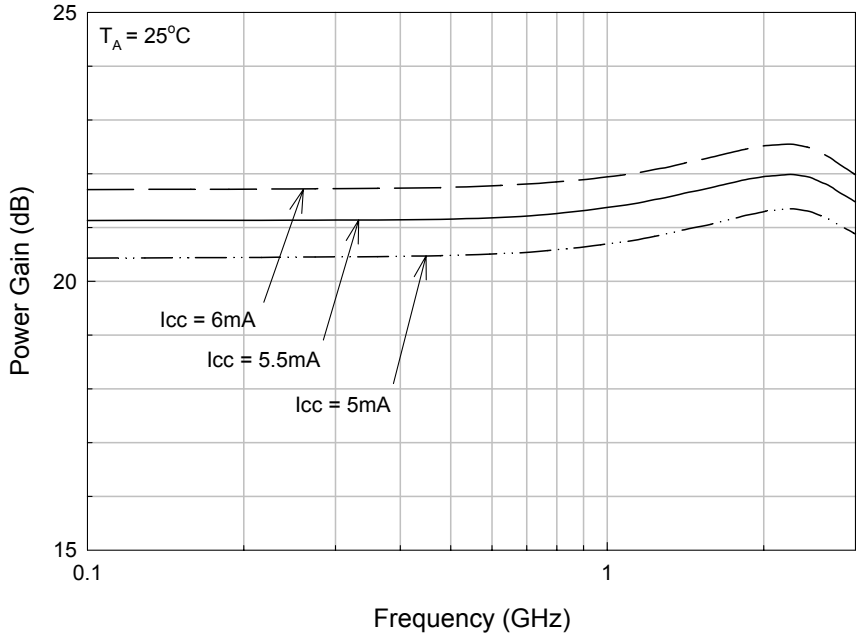
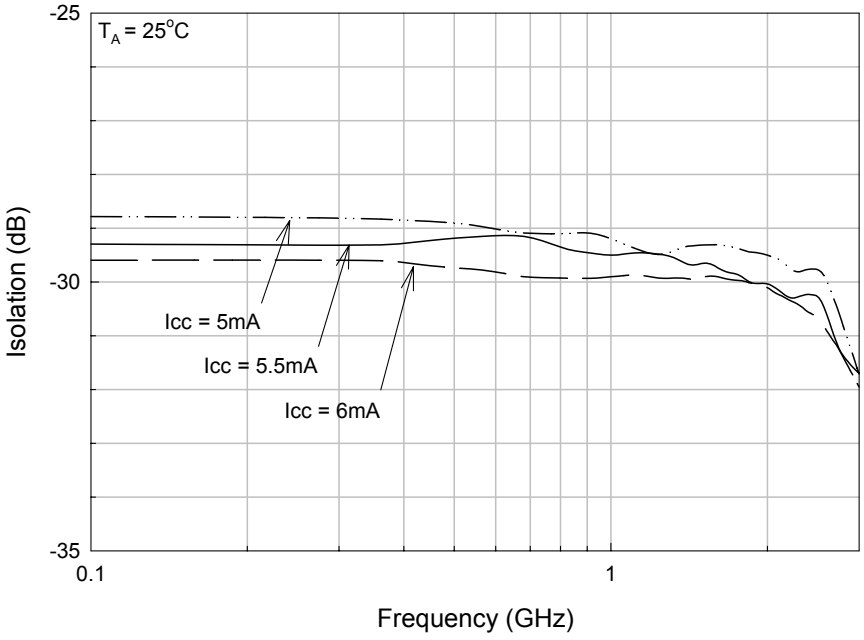
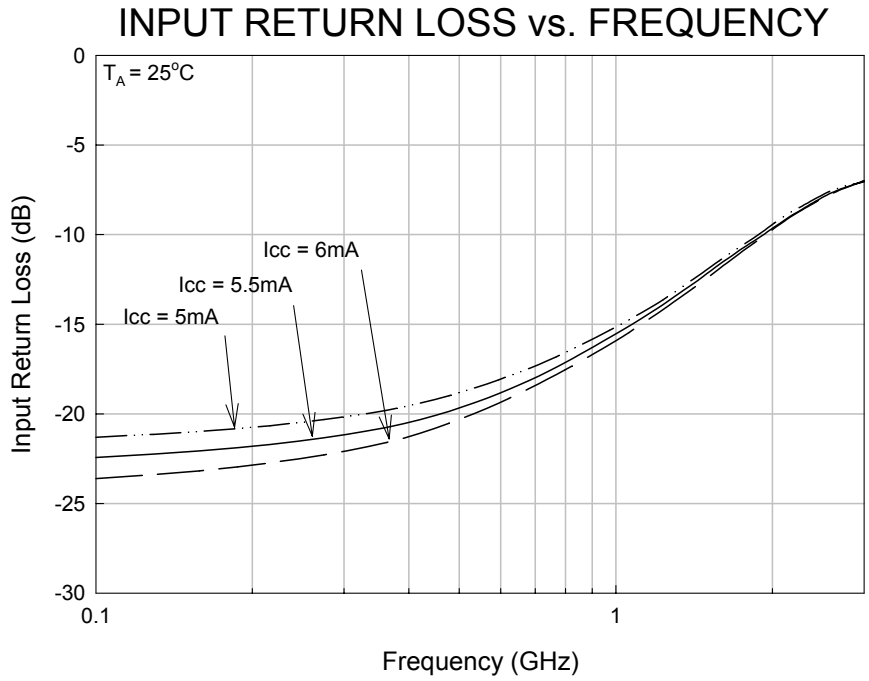
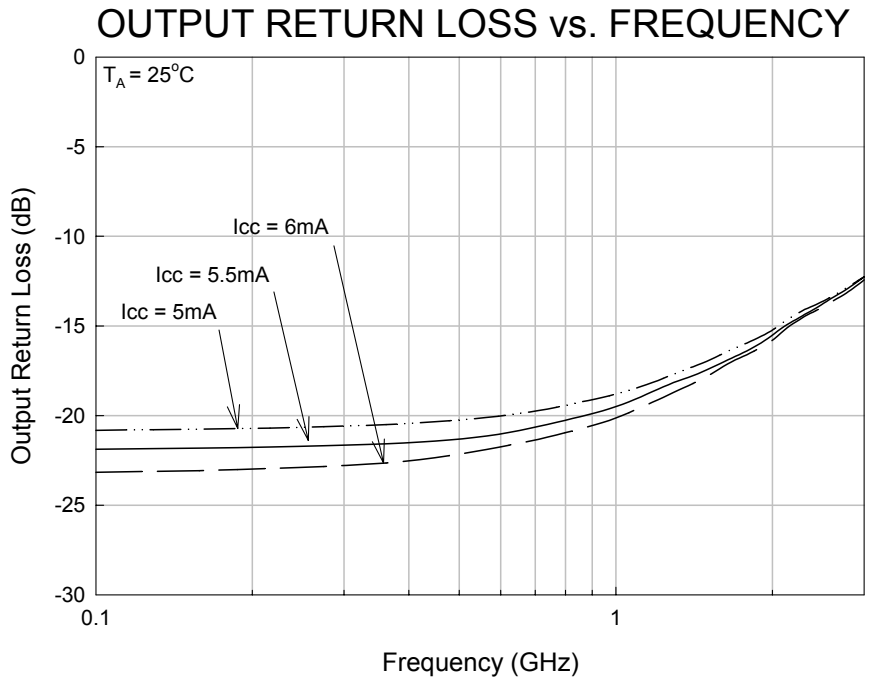
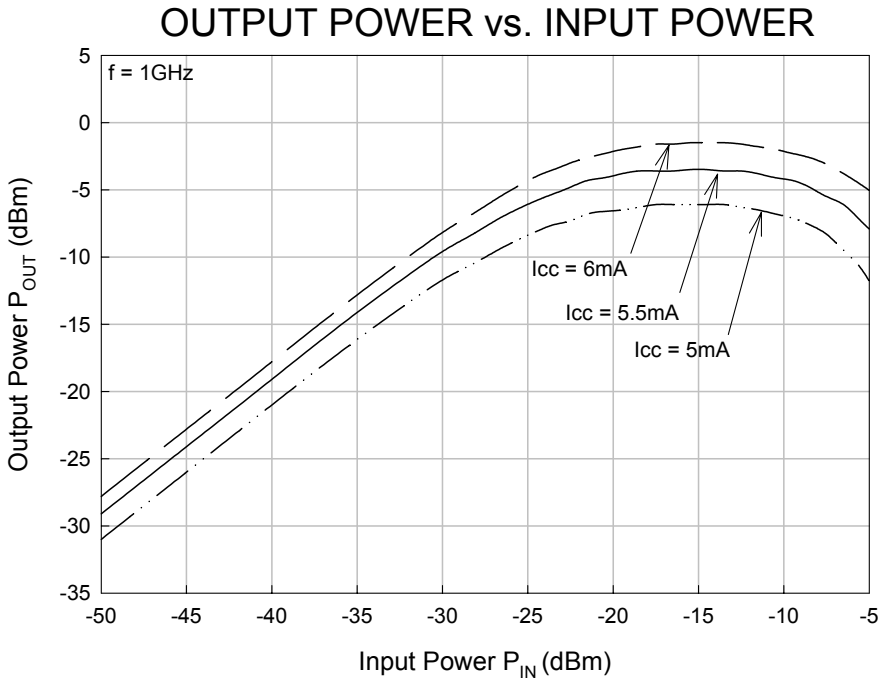


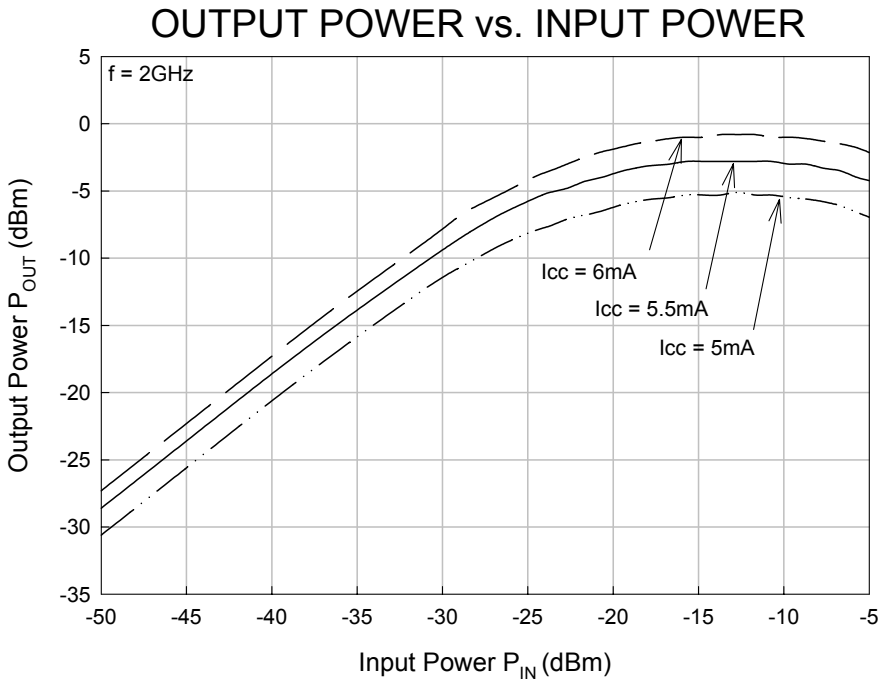
ISOLATION vs. FREQUENCY




INPUT RETURN LOSS vs. FREQUENCY
T_A = 25°C
Icc = 6mA
Icc = 5.5mA
Icc = 5mA
Input Return Loss (dB)
0
-5
-10
-15
-20
-25
-30
0.1
1
Frequency (GHz)

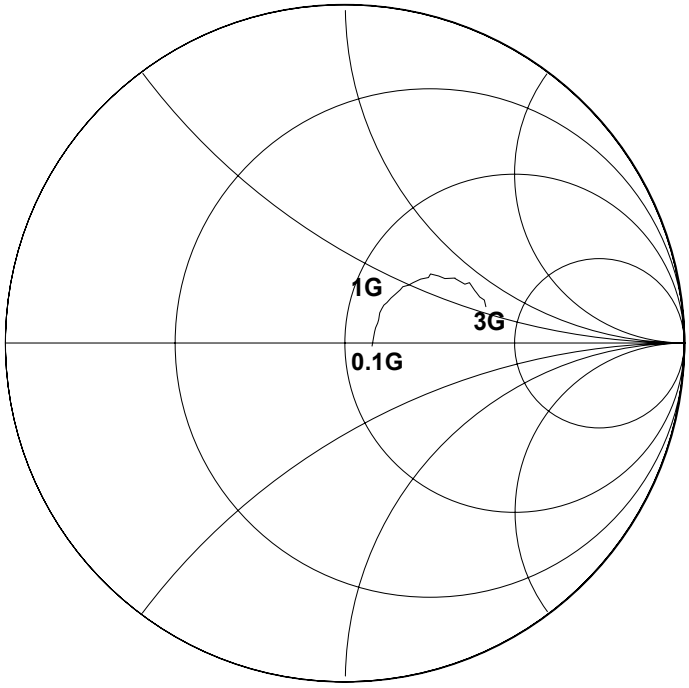

OUTPUT RETURN LOSS vs. FREQUENCY
T_A = 25°C
Icc = 6mA
Icc = 5.5mA
Icc = 5mA
Output Return Loss (dB)
0
-5
-10
-15
-20
-25
-30
0.1
1
Frequency (GHz)


OUTPUT POWER vs. INPUT POWER
f = 1GHz
Output Power P_{OUT} (dBm)
Input Power P_{IN} (dBm)
Icc = 6mA
Icc = 5.5mA
Icc = 5mA
5
0
-5
-10
-15
-20
-25
-30
-35
-50
-45
-40
-35
-30
-25
-20
-15
-10
-5

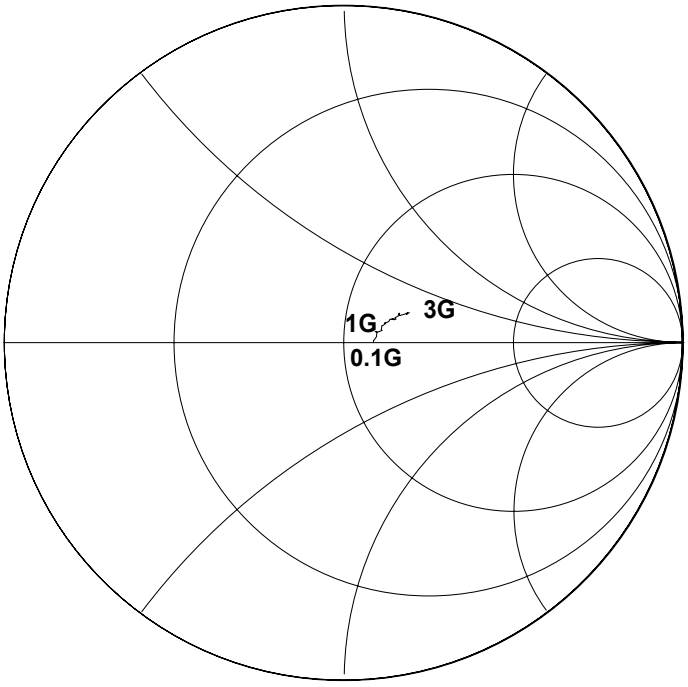

OUTPUT POWER vs. INPUT POWER
f = 2GHz
Output Power P_{OUT} (dBm)
Input Power P_{IN} (dBm)
Icc = 6mA
Icc = 5.5mA
Icc = 5mA
5
0
-5
-10
-15
-20
-25
-30
-35
-50
-45
-40
-35
-30
-25
-20
-15
-10
-5

S-Parameter (Vcc = 5V)

S_{11}-Frequency



S_{22}-Frequency



S-Parameter Table

(V_{CC} = 5V, I_{CC} = 5.5mA, P_{IN} = -35dBm, and T_A = 25°C)

Frequency (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	Mag.	Phase (deg)	Mag.	Phase (deg)	Mag.	Phase (deg)	Mag.	Phase (deg)
100	0.080	2.9	11.2	-2.9	0.035	-1.5	0.087	-1.1
200	0.087	10.5	11.2	-7.2	0.035	-1.7	0.090	2.4
400	0.10	24.9	11.2	-15.2	0.034	-2.0	0.094	9.2
600	0.12	35.7	11.3	-23.0	0.034	-2.5	0.099	14.7
800	0.15	41.6	11.4	-31.44	0.034	-3.5	0.10	17.4
950	0.17	43.8	11.4	-37.3	0.033	-4.7	0.11	18.9
1200	0.21	44.5	11.6	-47.6	0.033	-6.7	0.12	21.6
1450	0.25	42.9	11.8	-58.4	0.033	-7.5	0.13	23.8
1600	0.27	41.5	11.9	-64.6	0.033	-7.3	0.14	24.9
1800	0.31	38.9	12.1	-73.7	0.033	-7.7	0.15	26.1
2000	0.34	35.3	12.3	-83.3	0.032	-10.2	0.16	26.3
2150	0.36	32.4	12.4	-91.8	0.031	-12.8	0.16	25.9
2400	0.39	27.3	12.3	-105.2	0.029	-15.3	0.18	25.7
2600	0.41	23.3	12.1	-116.9	0.028	-15.8	0.19	25.3
2800	0.43	19.1	11.8	-128.1	0.027	-16.4	0.20	24.4
3000	0.43	14.6	11.4	-138.8	0.026	-16.6	0.22	22.9
3200	0.42	10.1	11.0	-149.3	0.026	-14.3	0.23	20.7
3400	0.39	6.5	10.4	-161.9	0.026	-12.1	0.24	17.9
3600	0.37	4.9	9.6	-175.1	0.027	-10.8	0.25	15.5
3800	0.34	4.7	8.7	173.7	0.027	-9.8	0.25	13.3
4000	0.32	4.6	7.8	164.2	0.027	-8.6	0.27	11.0