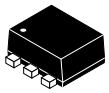
MMIC Amplifier

3 V, 16 mA, 0.1 to 3.6 GHz, MCPH6

SMA3109



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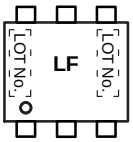
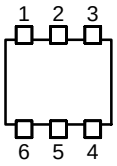
Features

- High Gain: Gp = 23 dB Typ. @ 1 GHz
- Wideband Response: fu = 3.6 GHz
- Low current: I_{CC} = 16 mA Typ
- High Output Power: Po(1dB) = 4 dBm
- Port Impedance: Input/Output 50 Ω
- This is a Pb−Free Device

MARKING DIAGRAM



PIN DESCRIPTION



1: VCC
2: GND
3: OUT
4: GND
5: GND
6: IN

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

Specifications

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Parameter	Ratings	Unit
V_{CC}	Supply Voltage	5	V
I_{CC}	Circuit Current	25	mA
P_D	Allowable Power Dissipation	280	mW
Topr	Operating Temperature	−40 to +85	°C
Tstg	Storage Temperature	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS (Ta = 25°C)

Symbol	Parameter	Ratings			Unit
		Min	Typ	Max	
V_{CC}	Supply Voltage	2.7	3	3.3	V
Topr	Operating Ambient Temperature	−40	+25	+85	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

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ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC} = 3 V, Z_S = Z_L = 50 Ω)

Symbol	Parameter	Conditions	Ratings			Unit
			Min	Typ	Max	
I_{CC}	Circuit Current		11.5	16.0	20.5	mA
Gp	Power Gain	f = 1 GHz	21.0	23.0	26.0	dB
		f = 2.2 GHz	22.0	24.0	27.0	
ISL	Isolation	f = 1 GHz	27.0	31.5	–	dB
		f = 2.2 GHz	27.0	31.5	–	
RLin	Input Return Loss	f = 1 GHz	16.0	20.5	–	dB
		f = 2.2 GHz	10.0	15.0	–	
RLout	Output Return Loss	f = 1 GHz	15.0	20.0	–	dB
		f = 2.2 GHz	10.0	14.0	–	
NF	Noise Figure	f = 1 GHz	–	4.3	5.0	dB
		f = 2.2 GHz	–	4.3	5.0	
Po(1dB)	Gain 1 dB Compression Output Power	f = 1 GHz	4.0	6.4	–	dBm
		f = 2.2 GHz	2.0	4.2	–	
fu	Upper Limit Operating Frequency	3 dB down below flat gain at f = 1 GHz	–	3.6	–	GHz

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTE: Pay attention to handling since it is liable to be affected by static electricity due to the high frequency process adopted.

Test Circuit

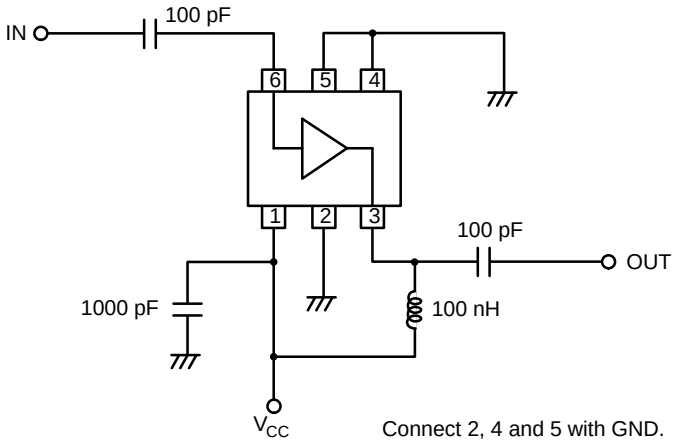
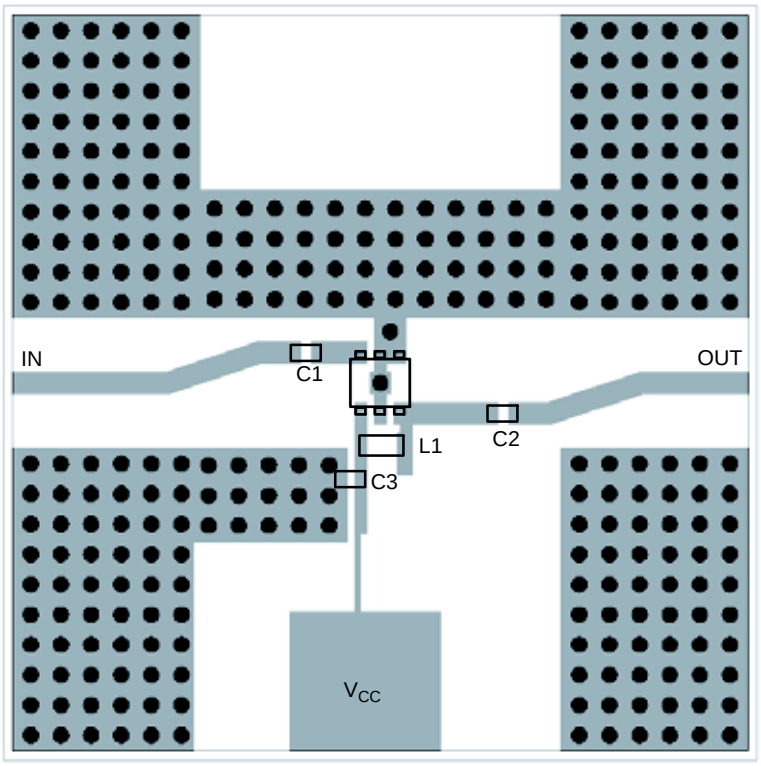


Figure 1. Test Circuit

Design of the Evaluation Board



Symbol	Value
C1, C2	100 pF
C3	1000 pF
L1	100 nH

Figure 2. Design of the Evaluation Board

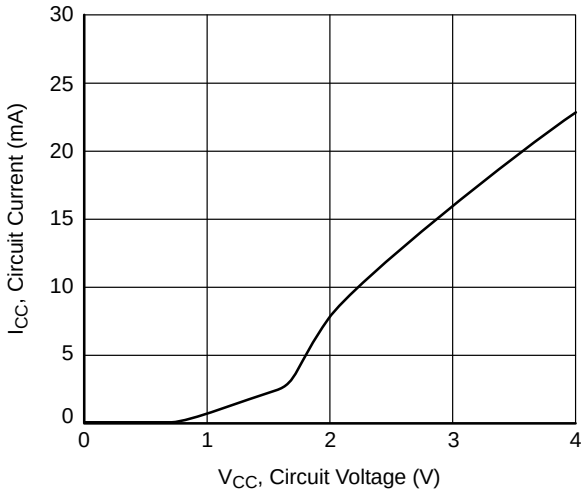


Figure 3. I_{CC} − V_{CC}

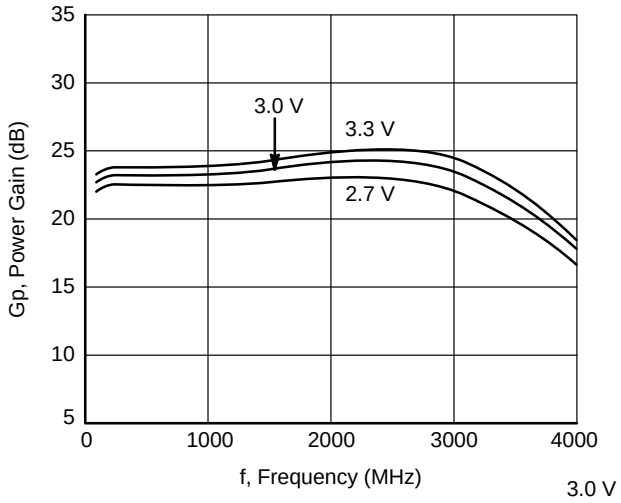


Figure 4. Gp − f

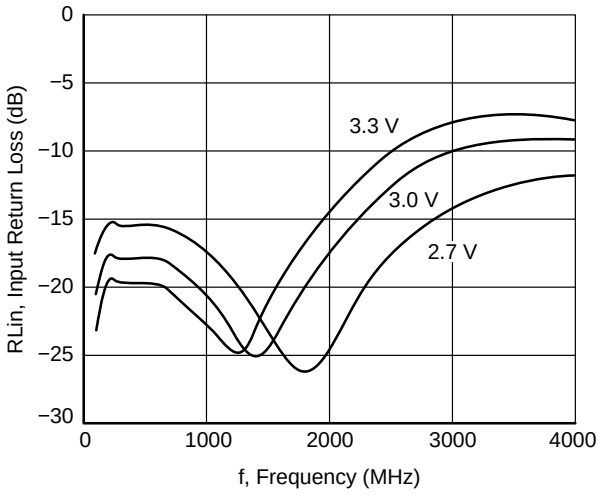


Figure 5. RLin − f

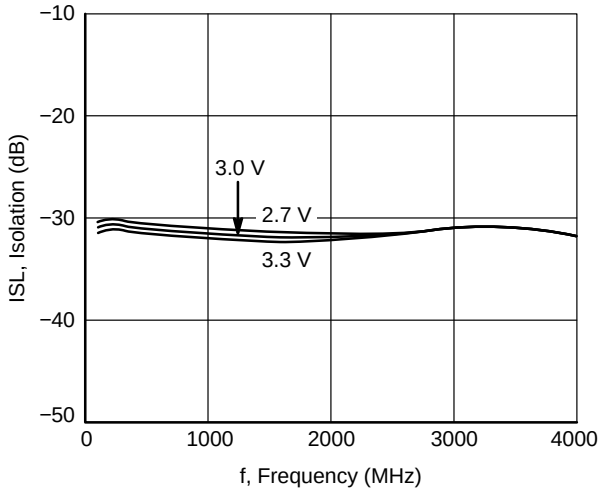


Figure 6. ISL − f

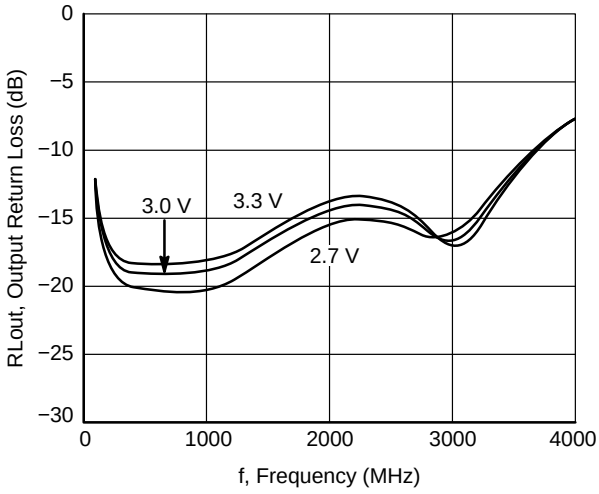


Figure 7. RLout − f

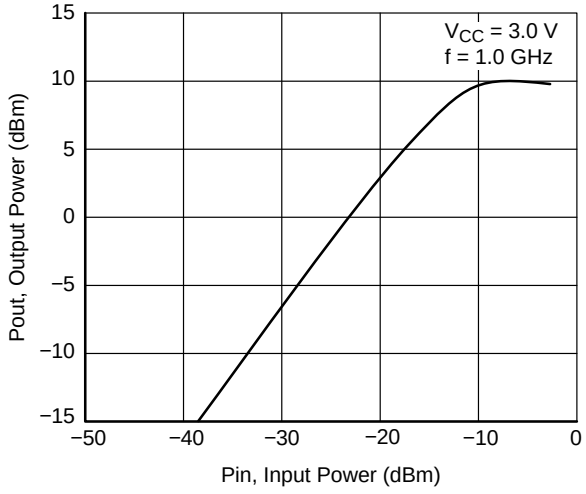


Figure 8. Pout − Pin

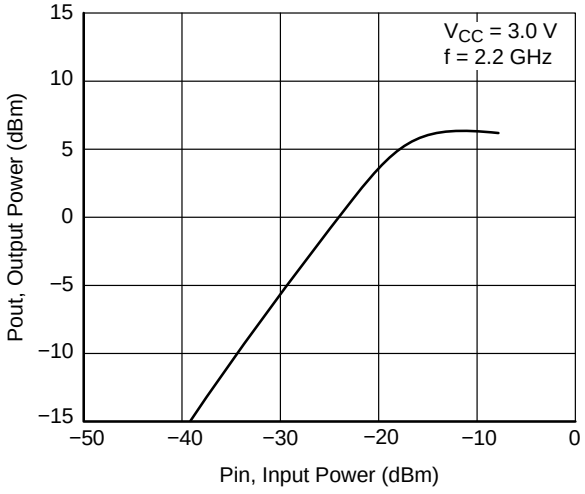


Figure 9. Pout − Pin

S Parameter

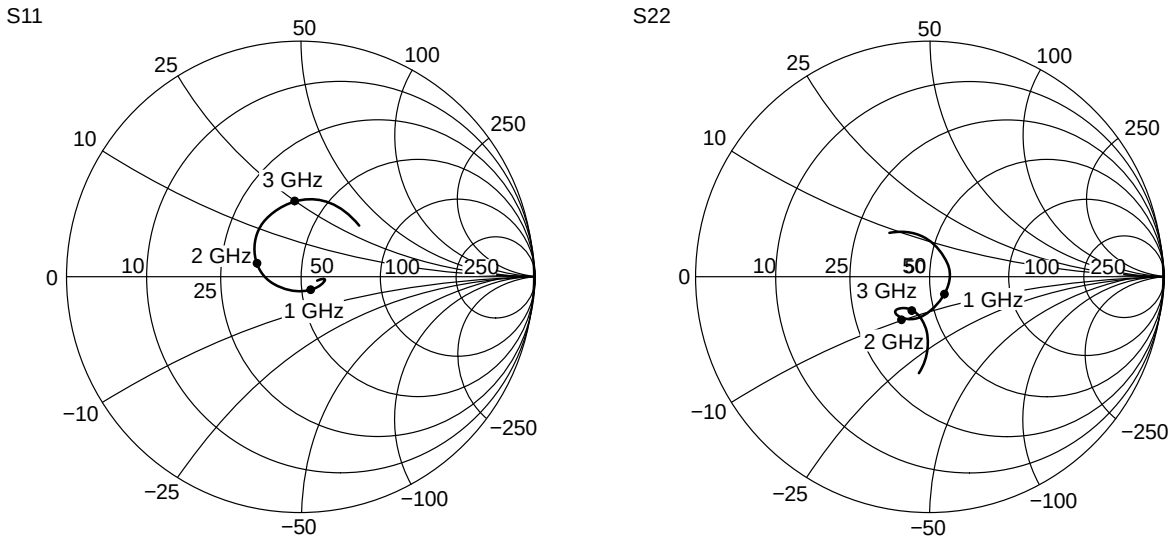
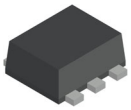


Figure 10. S Parameter

ORDERING INFORMATION

Device	Specific Device Marking	Package Type (JEITA, JEDEC)	Package Type	Shipping†
SMA3109−TL−E	LF	SC−88FL (Pb−Free)	MCPH6 (Pb−Free)	3000 / Tape & Reel

†For Information On Tape And Reel Specifications, Including Part Orientation And Tape Sizes, Please Refer To Our Tape And Reel Packaging Specifications Brochure, Brd8011/D.



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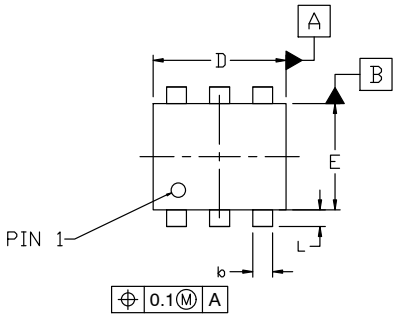
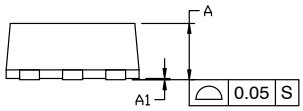
ISSUE A

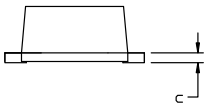
DATE 28 SEP 2022



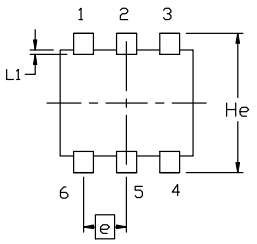
TOP VIEW



SIDE VIEW



FRONT VIEW



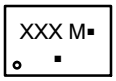
BOTTOM VIEW

NOTES:

1. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND THE BAR PROTRUSIONS.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.80	0.85	0.90
A1	0.00	---	0.02
b	0.25	0.30	0.40
c	0.12	0.15	0.25
D	1.94	2.00	2.06
E	1.54	1.60	1.66
He	2.05	2.10	2.15
L	0.19	0.25	0.31
L1	0.00	0.07	0.12
e	0.65 BSC		

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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