

# MMIC Amplifier

5 V, 19 mA, 0.1 to 3.3 GHz, MCPH6

## SMA3103

### Features

- High Gain:  $G_p = 26.5$  dB Typ. @ 1 GHz
- Wideband Response:  $f_u = 3.3$  GHz
- Low current:  $I_{CC} = 19$  mA Typ
- High Output Power:  $P_o(1\text{dB}) = 5$  dBm
- Port Impedance: Input/Output 50  $\Omega$
- This is a Pb-Free Device

### Specifications

#### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| Symbol    | Parameter                   | Ratings     | Unit             |
|-----------|-----------------------------|-------------|------------------|
| $V_{CC}$  | Supply Voltage              | 6           | V                |
| $I_{CC}$  | Circuit Current             | 40          | mA               |
| $P_D$     | Allowable Power Dissipation | 280         | mW               |
| $T_{opr}$ | Operating Temperature       | -40 to +85  | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature         | -55 to +150 | $^\circ\text{C}$ |

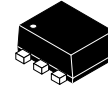
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

#### RECOMMENDED OPERATING CONDITIONS ( $T_a = 25^\circ\text{C}$ )

| Symbol    | Parameter                     | Ratings |     |     | Unit             |
|-----------|-------------------------------|---------|-----|-----|------------------|
|           |                               | Min     | Typ | Max |                  |
| $V_{CC}$  | Supply Voltage                | 4.5     | 5   | 5.5 | V                |
| $T_{opr}$ | Operating Ambient Temperature | -40     | +25 | +85 | $^\circ\text{C}$ |

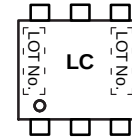
Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

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

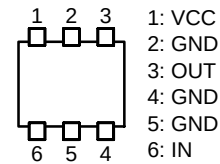


SC-88FL / MCPH6  
CASE 419AS

### MARKING DIAGRAM



### PIN DESCRIPTION



### ORDERING INFORMATION

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

# SMA3103

## ELECTRICAL CHARACTERISTICS (Ta = 25°C, VCC = 5 V, ZS = ZL = 50 Ω)

| Symbol  | Parameter                          | Conditions                             | Ratings |      |      | Unit |
|---------|------------------------------------|----------------------------------------|---------|------|------|------|
|         |                                    |                                        | Min     | Typ  | Max  |      |
| ICC     | Circuit Current                    |                                        | 14.0    | 19.0 | 25.0 | mA   |
| Gp      | Power Gain                         | f = 1 GHz                              | 24.0    | 26.5 | 29.0 | dB   |
|         |                                    | f = 2.2 GHz                            | 24.0    | 27.0 | 30.0 |      |
| ISL     | Isolation                          | f = 1 GHz                              | 31.0    | 33.0 | –    | dB   |
|         |                                    | f = 2.2 GHz                            | 31.0    | 33.0 | –    |      |
| RLin    | Input Return Loss                  | f = 1 GHz                              | 12.0    | 20.0 | –    | dB   |
|         |                                    | f = 2.2 GHz                            | 10.0    | 14.0 | –    |      |
| RLout   | Output Return Loss                 | f = 1 GHz                              | 12.0    | 20.0 | –    | dB   |
|         |                                    | f = 2.2 GHz                            | 10.0    | 16.0 | –    |      |
| NF      | Noise Figure                       | f = 1 GHz                              | –       | 4.7  | 5.3  | dB   |
|         |                                    | f = 2.2 GHz                            | –       | 4.7  | 5.3  |      |
| Po(1dB) | Gain 1 dB Compression Output Power | f = 1 GHz                              | 6.0     | 8.2  | –    | dBm  |
|         |                                    | f = 2.2 GHz                            | 4.0     | 5.7  | –    |      |
| fu      | Upper Limit Operating Frequency    | 3 dB down below flat gain at f = 1 GHz | –       | 3.3  | –    | 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.

### Test Circuit

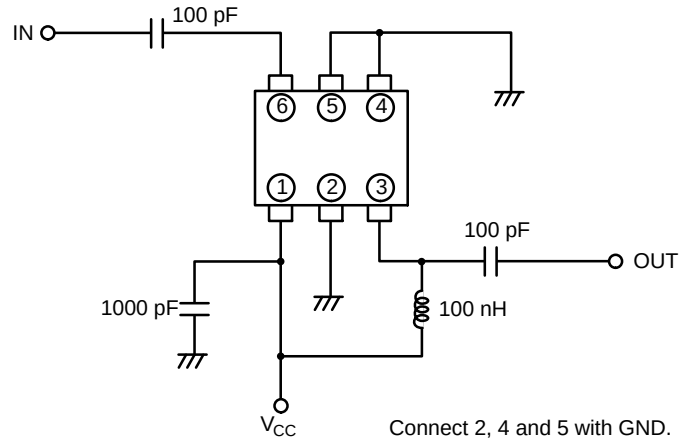


Figure 1. Test Circuit

## Design of the Evaluation Board

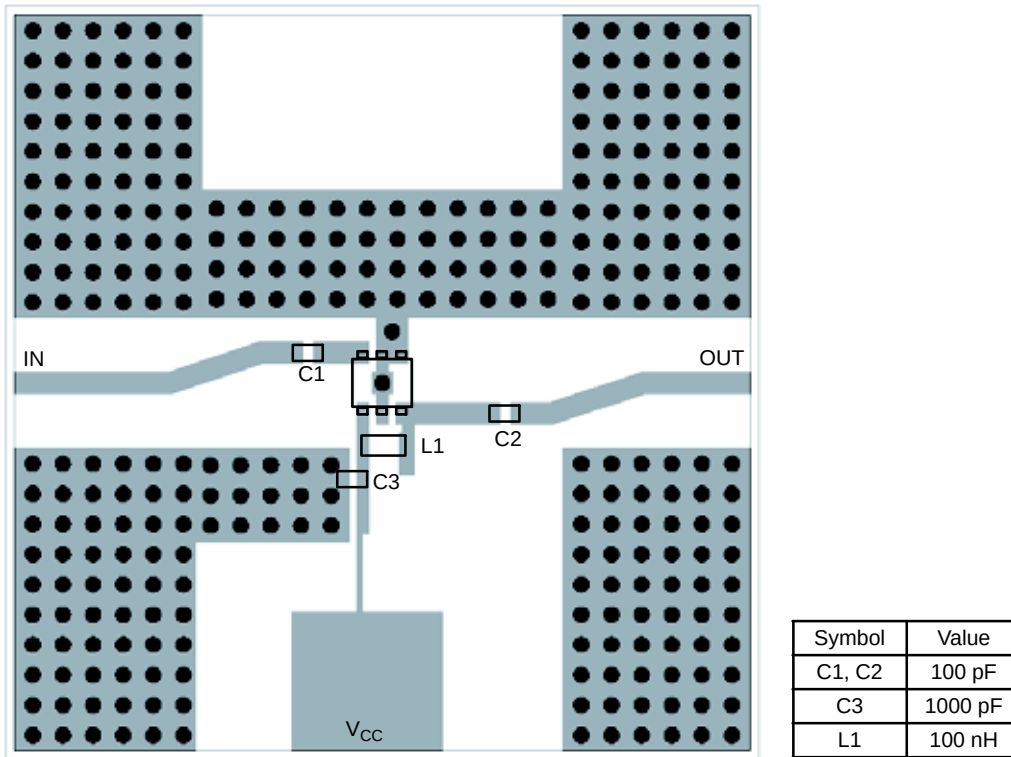
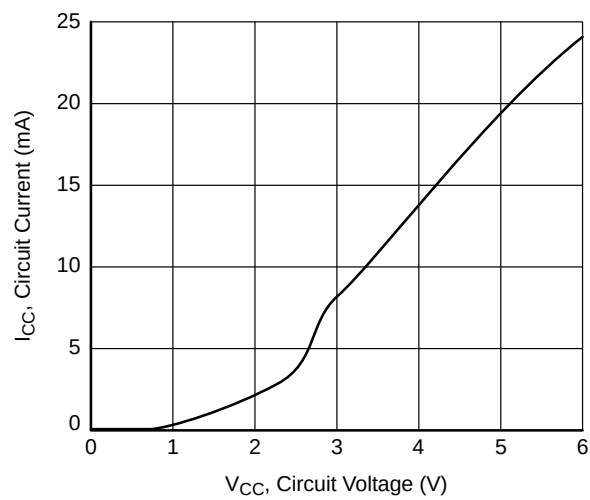


Figure 2. Design of the Evaluation Board

Figure 3.  $I_{CC} - V_{CC}$

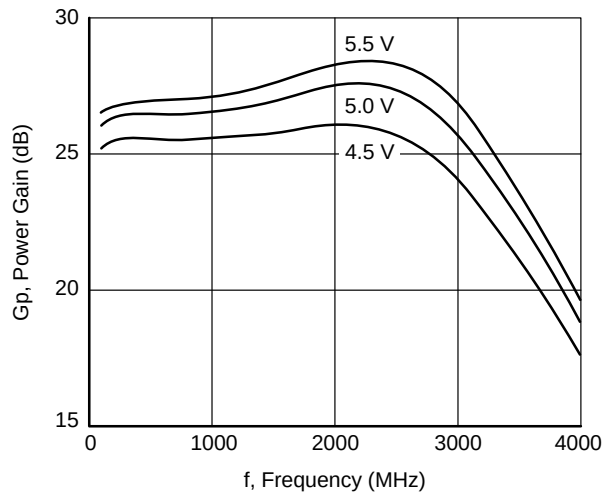


Figure 4.  $G_p - f$

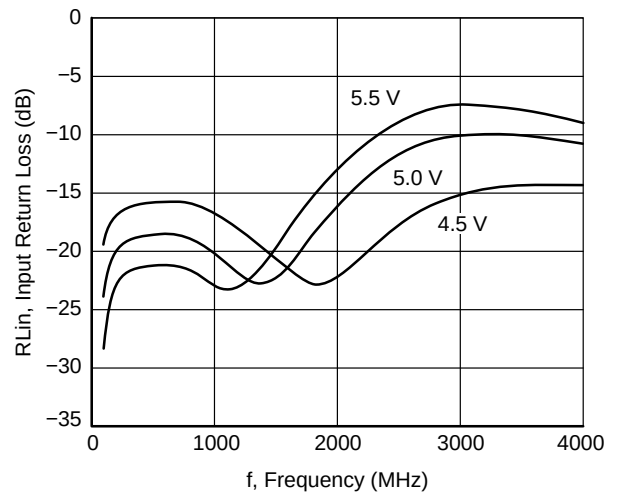


Figure 5.  $RL_{in} - f$

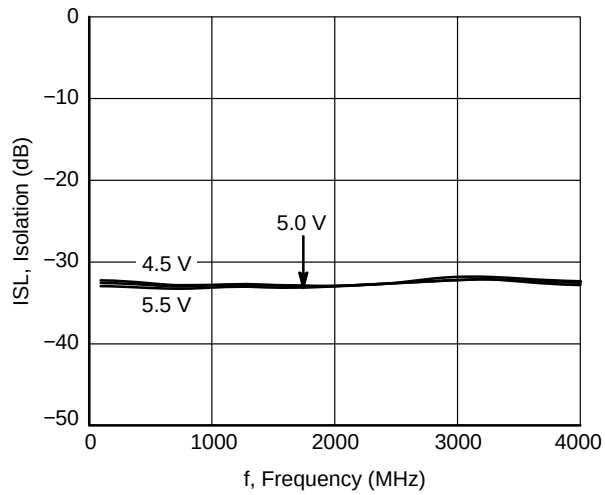


Figure 6.  $ISL - f$

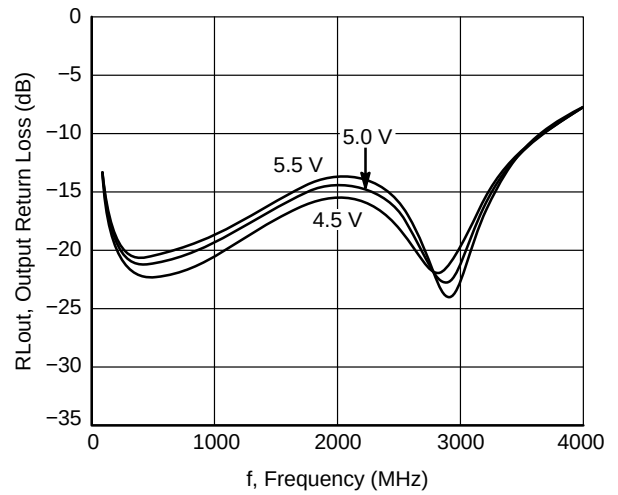


Figure 7.  $RL_{out} - f$

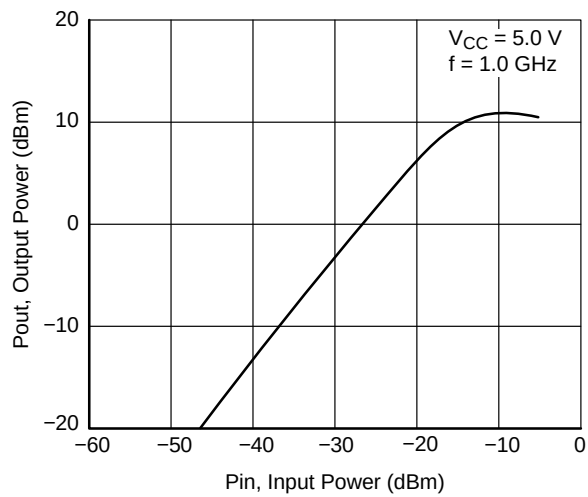


Figure 8.  $P_{out} - P_{in}$

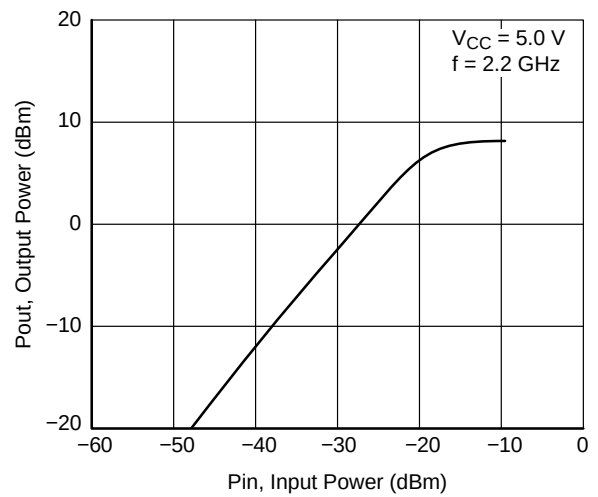


Figure 9.  $P_{out} - P_{in}$

# SMA3103

## S Parameter

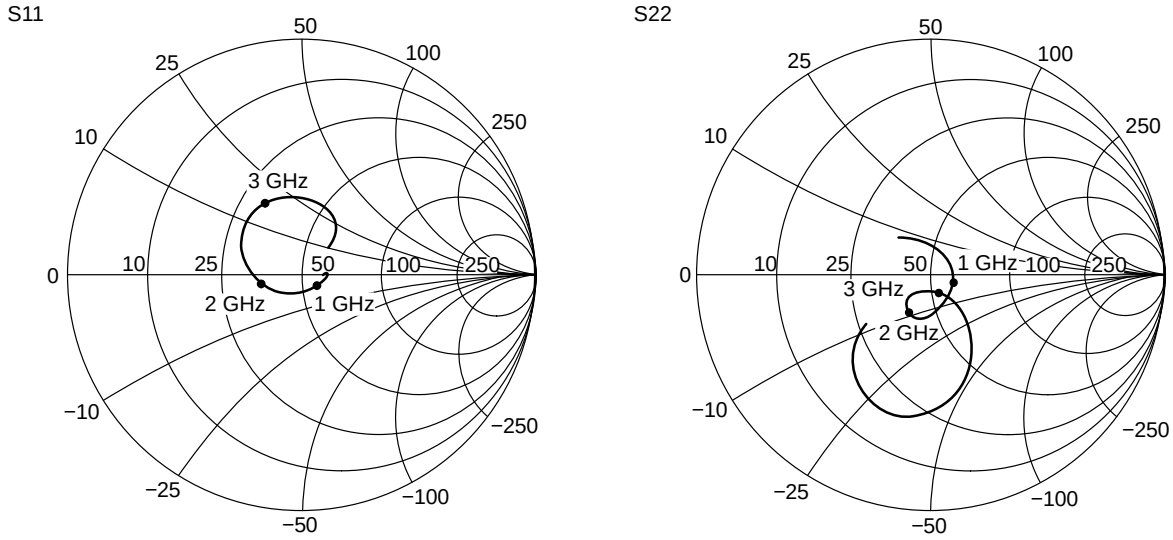
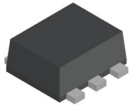


Figure 10. S Parameter

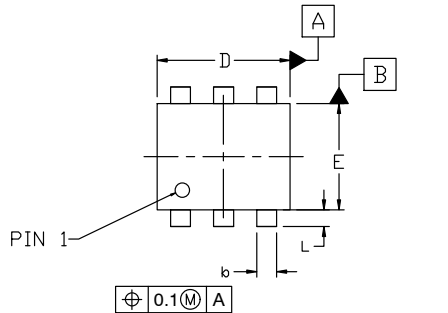
## ORDERING INFORMATION

| Device       | Specific Device Marking | Package Type (JEITA, JEDEC) | Package Type    | Shipping <sup>†</sup> |
|--------------|-------------------------|-----------------------------|-----------------|-----------------------|
| SMA3103-TL-E | LC                      | SC-88FL (Pb-Free)           | MCPH6 (Pb-Free) | 3000 / Tape & Reel    |

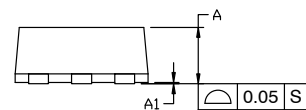
<sup>†</sup>For Information On Tape And Reel Specifications, Including Part Orientation And Tape Sizes, Please Refer To Our Tape And Reel Packaging Specifications Brochure, Brd8011/D.


**SC-88FL / MCPH6**  
**CASE 419AS**  
**ISSUE A**

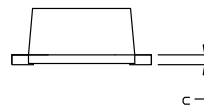
DATE 28 SEP 2022



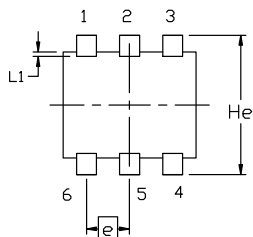
TOP VIEW



SIDE VIEW



FRONT VIEW

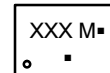


BOTTOM VIEW

## 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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