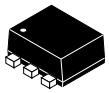
nse

# IC r

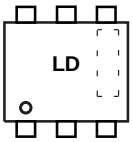
## IIP3 = 15 dBm, Gc = −0.5 dB @ 450 MHz, MCPH6

# A5101

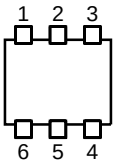


SC−88FL / MCPH6
CASE 419AS

### MARKING DIAGRAM




### PIN DESCRIPTION




1: Base2
2: Collector1
3: Collector2
4: Emitter2
5: Emitter1
6: Base1

### ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

### Features

- Wide Band: Up to Ku Band
- Low Distortion: IIP3 = 20 dBm (@ $I_{CC}$ > 11 mA)
- SMT, Ultra Small Package : 2.0x2.1x0.85 mm
- High Conversion Gain: −0.5 dB (@ 450 MHz)
- Low Voltage Available: 1.2 V and Above
- Pb−Free, Halogen Free And ROHS Compliant

### Specifications

**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C)

| Symbol | Parameter | Ratings | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector−to−Base Voltage | 8 | V |
| $V_{CEO}$ | Collector−to−Emitter Voltage | 6 | V |
| $V_{EBO}$ | Emitter−to−Base Voltage | 2 | V |
| $I_{CC}$ | Collector Current | 50 | mA |
| $P_C$ | Max 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 | |
| $V_{C1E1}$ | Supply Voltage | 1.2 | 3 | 6 | V |
| $V_{C2E1}$ | | 1.2 | 3 | 6 | V |
| $V_{C1E2}$ | | 1.2 | 3 | 6 | V |
| $V_{C2E2}$ | | 1.2 | 3 | 6 | V |

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)

| Symbol | Parameter | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $I_{C1B1O}$ | Collector Cutoff Current | $V_{C1B1}$ = 5 V | − | − | 1 | μA |
| $I_{C2B1O}$ | | $V_{C2B1}$ = 5 V | − | − | 1 | μA |
| $I_{C1B2O}$ | | $V_{C1B2}$ = 5 V | − | − | 1 | μA |
| $I_{C2B2O}$ | | $V_{C2B2}$ = 5 V | − | − | 1 | μA |
| $I_{E1B1O}$ | Emitter Cutoff Current | $V_{E1B1}$ = 1 V | − | − | 1 | μA |
| $I_{E2B1O}$ | | $V_{E2B1}$ = 1 V | − | − | 1 | μA |
| $I_{E1B2O}$ | | $V_{E1B2}$ = 1 V | − | − | 1 | μA |
| $I_{E2B2O}$ | | $V_{E2B2}$ = 1 V | − | − | 1 | μA |
| $h_{FE}1$ | DC Current Gain | $V_{C1E1}$ = 1 V, $I_{C1E1}$ = 3 mA | 20 | − | 120 | |
| $h_{FE}2$ | | $V_{C2E1}$ = 1 V, $I_{C2E1}$ = 3 mA | 20 | − | 120 | |
| $h_{FE}3$ | | $V_{C1E2}$ = 1 V, $I_{C1E2}$ = 3 mA | 20 | − | 120 | |
| $h_{FE}4$ | | $V_{C2E2}$ = 1 V, $I_{C2E2}$ = 3 mA | 20 | − | 120 | |
| Gc | Conversion Gain (Note 1) | $V_{CC}$ = 5 V, $I_{CC}$ = 6 mA,<br>f(RF) = 450 MHz, f(LO) = 500 MHz,<br>P(RF) = −15 dBm, P(LO) = −6 dBm | − | −0.5 | − | dB |
| IIP3 | Input Intercept Point (Note 1) | $V_{CC}$ = 5 V, $I_{CC}$ = 6 mA,<br>f(RF1) = 450 MHz, f(RF2) = 451 MHz, f(LO) = 500 MHz,<br>P(RF1) = P(RF2) = −15 dBm, P(LO) = −6 dBm | − | 15 | − | dBm |

**Evaluation Board**

**Figure 2. Evaluation Board**

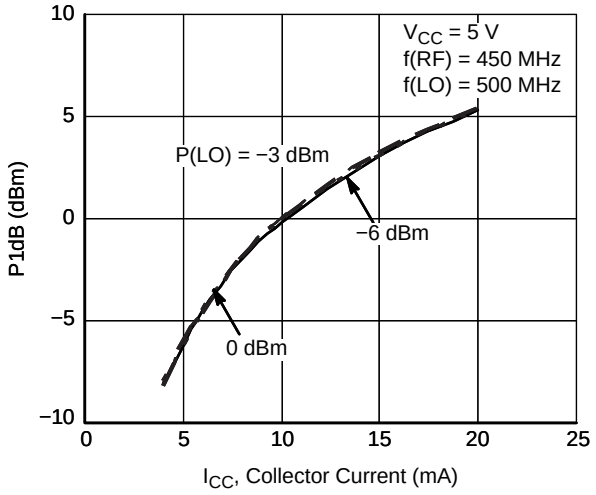



**Figure 4. P1dB − $I_{CC}$**

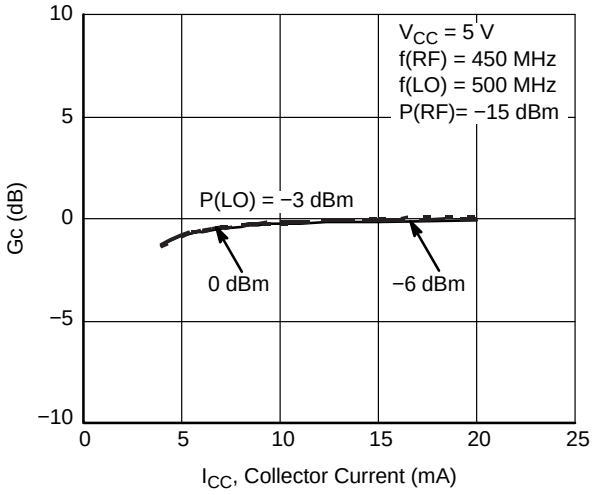



**Figure 5. $G_C$ − $I_{CC}$**

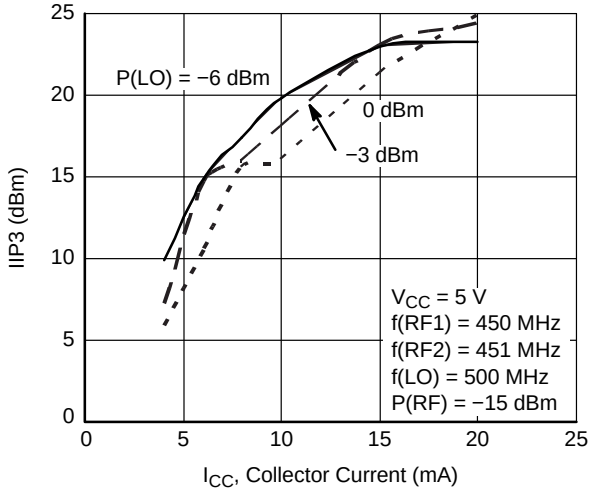
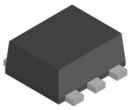



**Figure 6. IIP3 − $I_{CC}$**

## ORDERING INFORMATION

| Device Order Number | Specific Device Marking | Package Type (JEITA, JEDEC) | Package Type | Shipping† |
|---|---|---|---|---|
| SMA5101−TL−H | LD | SC−88FL (Pb−Free/Halogen Free) | MCPH6 (Pb−Free/Halogen 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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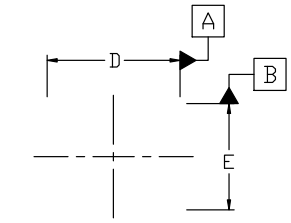
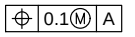
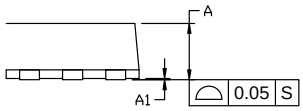
DATE 28 SEP 2022

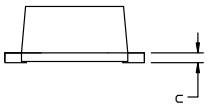


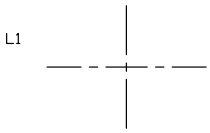

TOP VIEW




SIDE VIEW




FRONT VIEW



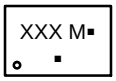

BOTTOM VIEW

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 |
| | | | |

**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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