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[MSA-0886-BLKG](#)

EN

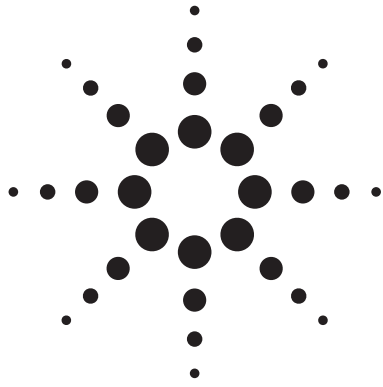
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Cette fiche technique est
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Agilent MSA-0886 Cascadable Silicon Bipolar MMIC Amplifier

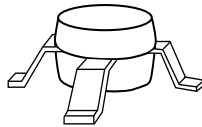
Data Sheet

Description

The MSA-0886 is a high performance silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a low cost, surface mount plastic package. This MMIC is designed for use as a general purpose $50\ \Omega$ gain block above 0.5 GHz and can be used as a high gain transistor below this frequency. Typical applications include narrow and moderate band IF and RF amplifiers in commercial and industrial applications.

The MSA-series is fabricated using Agilent's 10 GHz f_T , 25 GHz f_{MAX} , silicon bipolar MMIC process which uses nitride self-alignment, ion implantation, and gold metallization to achieve excellent performance, uniformity and reliability. The use of an external bias resistor for temperature and current stability also allows bias flexibility.

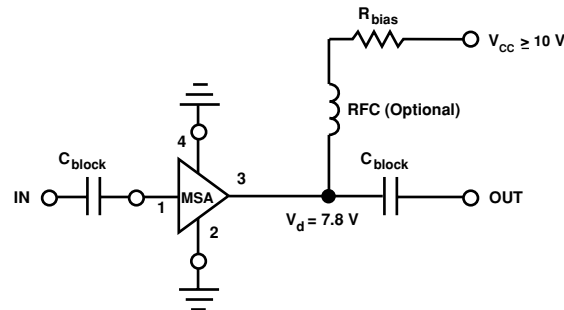
86 Plastic Package



Features

- Lead-free Option Available
- Usable Gain to 5.5 GHz
- High Gain:
32.5 dB Typical at 0.1 GHz
22.5 dB Typical at 1.0 GHz
- Low Noise Figure:
3.3 dB Typical at 1.0 GHz
- Surface Mount Plastic Package
- Tape-and-Reel Packaging Option Available
- Lead-free Option Available

Typical Biasing Configuration



MSA-0886 Absolute Maximum Ratings

| Parameter | Absolute Maximum ^[1] |
|------------------------------------|---------------------------------|
| Device Current | 65 mA |
| Power Dissipation ^[2,3] | 500 mW |
| RF Input Power | +13 dBm |
| Junction Temperature | 150°C |
| Storage Temperature | -65°C to 150°C |

Thermal Resistance^{[2]:}

$$\theta_{jc} = 140^{\circ}\text{C/W}$$

Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. $T_{\text{CASE}} = 25^{\circ}\text{C}$.
3. Derate at $7.1 \text{ mW}/^{\circ}\text{C}$ for $T_{\text{C}} > 80^{\circ}\text{C}$.

Electrical Specifications^[1], $T_{\text{A}} = 25^{\circ}\text{C}$

| Symbol | Parameters and Test Conditions: $I_{\text{d}} = 36 \text{ mA}$, $Z_{\text{o}} = 50 \Omega$ | Units | Min. | Typ. | Max. |
|-------------------|---|-------|------|--------------|------|
| GP | Power Gain ($ S_{21} ^2$) f = 0.1 GHz f = 1.0 GHz | dB | 20.5 | 32.5 22.5 | |
| VSWR | Input VSWR f = 0.1 to 3.0 GHz | | | 2.1:1 | |
| | Output VSWR f = 0.1 to 3.0 GHz | | | 1.9:1 | |
| NF | 50 Ω Noise Figure f = 1.0 GHz | dB | | 3.3 | |
| P ₁ dB | Output Power at 1 dB Gain Compression f = 1.0 GHz | dBm | | 12.5 | |
| IP ₃ | Third Order Intercept Point f = 1.0 GHz | dBm | | 27.0 | |
| t _D | Group Delay f = 1.0 GHz | psec | | 140 | |
| V _d | Device Voltage | V | 6.2 | 7.8 | 9.4 |
| dV/dT | Device Voltage Temperature Coefficient | mV/°C | | -17.0 | |

Note:

1. The recommended operating current range for this device is 20 to 40 mA. Typical performance as a function of current is on the following page.

Ordering Information

| Part Numbers | No. of Devices | Comments |
|---------------|----------------|----------|
| MSA-0886-BLK | 100 | Bulk |
| MSA-0886-BLKG | 100 | Bulk |
| MSA-0886-TR1 | 1000 | 7" Reel |
| MSA-0886-TR1G | 1000 | 7" Reel |
| MSA-0886-TR2 | 4000 | 13" Reel |
| MSA-0886-TR2G | 4000 | 13" Reel |

Note: Order part number with a "G" suffix if lead-free option is desired.

MSA-0886 Typical Scattering Parameters^[1] ($Z_0 = 50 \Omega$, $T_A = 25^\circ\text{C}$, $I_d = 36 \text{ mA}$)

| Freq. GHz | S_{11} | | S_{21} | | | S_{12} | | | S_{22} | | k |
|--------------|----------|------|----------|-------|-----|----------|------|-----|----------|------|------|
| | Mag | Ang | dB | Mag | Ang | dB | Mag | Ang | Mag | Ang | |
| 0.1 | .63 | -22 | 32.5 | 42.12 | 160 | -36.7 | .015 | 54 | .62 | -24 | 0.68 |
| 0.2 | .56 | -41 | 31.3 | 36.68 | 143 | -33.9 | .020 | 50 | .55 | -46 | 0.64 |
| 0.4 | .43 | -69 | 28.6 | 26.94 | 119 | -29.1 | .035 | 52 | .43 | -79 | 0.69 |
| 0.6 | .35 | -88 | 26.4 | 20.89 | 104 | -27.0 | .045 | 49 | .34 | -103 | 0.77 |
| 0.8 | .30 | -104 | 24.2 | 16.21 | 93 | -25.3 | .054 | 50 | .29 | -124 | 0.83 |
| 1.0 | .27 | -116 | 22.4 | 13.20 | 83 | -24.2 | .062 | 49 | .26 | -139 | 0.87 |
| 1.5 | .27 | -144 | 19.2 | 9.15 | 65 | -21.6 | .083 | 46 | .23 | -172 | 0.93 |
| 2.0 | .31 | -166 | 16.7 | 6.84 | 49 | -19.5 | .105 | 41 | .22 | 163 | 0.96 |
| 2.5 | .35 | 178 | 14.8 | 5.50 | 38 | -17.9 | .128 | 36 | .21 | 149 | 0.96 |
| 3.0 | .40 | 162 | 12.9 | 4.41 | 25 | -17.4 | .135 | 30 | .20 | 132 | 1.01 |
| 3.5 | .45 | 149 | 11.4 | 3.72 | 13 | -16.8 | .145 | 25 | .19 | 124 | 1.02 |
| 4.0 | .51 | 137 | 9.9 | 3.14 | 1 | -16.1 | .157 | 19 | .18 | 121 | 1.01 |
| 5.0 | .61 | 116 | 7.3 | 2.31 | -22 | -15.7 | .164 | 10 | .17 | 130 | 1.00 |
| 6.0 | .68 | 100 | 4.6 | 1.69 | -42 | -15.2 | .173 | 4 | .23 | 143 | 0.95 |

Typical Performance, $T_A = 25^\circ\text{C}$

(unless otherwise noted)

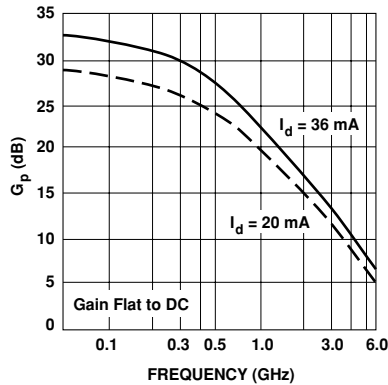


Figure 1. Typical Power Gain vs. Frequency, $I_d = 36 \text{ mA}$.

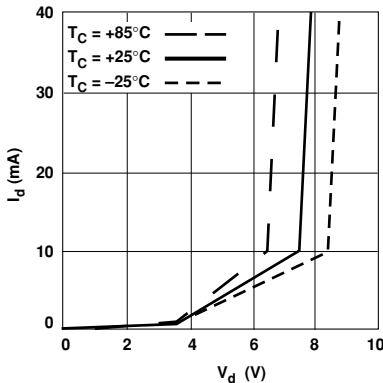


Figure 2. Device Current vs. Voltage.

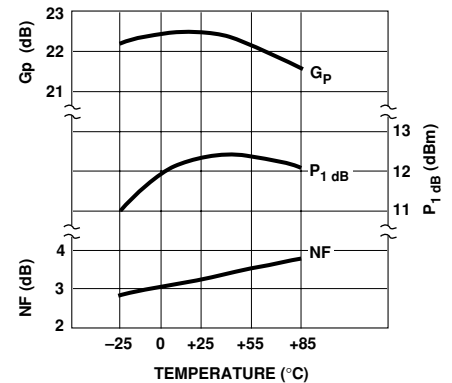


Figure 3. Output Power at 1 dB Gain Compression, NF and Power Gain vs. Case Temperature, $f = 1.0 \text{ GHz}$, $I_d = 36 \text{ mA}$.

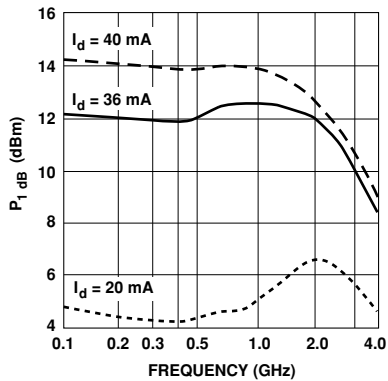


Figure 4. Output Power at 1 dB Gain Compression vs. Frequency.

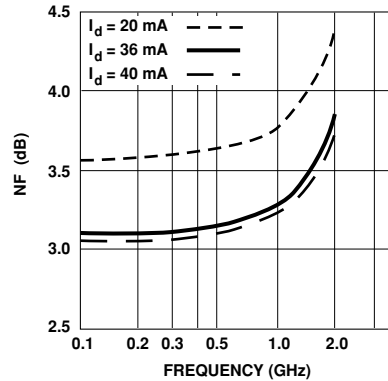
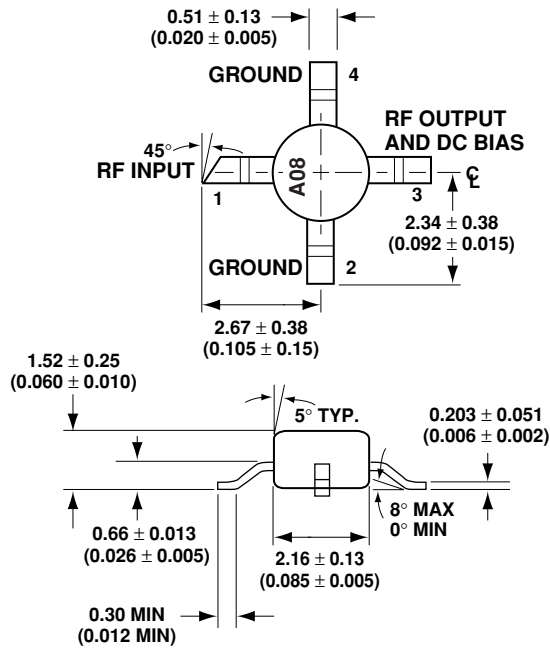


Figure 5. Noise Figure vs. Frequency.

86 Plastic Package Dimensions



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Obsoletes 5989-2083EN

April 8, 2005

5989-2744EN



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