

Flat Gain Amplifier

YSF-272+

The Big Deal:

- Ultra Flat Gain Response:
± 0.7 dB over 2300-2700 MHz
- Excellent Combination of gain,
P1dB, IP3 and NF
- 50Ω Input and Output:
no External Components Required



CASE STYLE: DL1636

Product Overview:

YSF-272+ is an advanced amplifier module in a Mini-Circuits System In Package **MSiP[®]**. This module is fully matched to 50Ω in/out impedance and has built-in Input & Output DC block capacitors. It is enclosed in a 5 x 6 mm MCLP plastic package. The YSF-272+ uses E-PHEMT technology enabling it to work with a single positive supply voltage.

Key Features

| Feature | Advantages |
|--|---|
| Superior Gain Flatness ± 0.7dB | The YSF-272+ provides industry leading gain flatness over the 2GHz Wimax and UMTS bands (2.3,2.5 and 2.5 to 2.7GHz) making this ideal for use in applications where gain-flatness and repeatability are critical performance requirements. |
| High Gain | The YSF-272+ is a two-stage design with internal feedback and bias to provide flat 20 dB nominal gain, supporting applications where a single gain block must overcome large system losses such as long cable runs and lossy components. |
| Strong Combination of Performance | The YSF-272+ provides a strong combination of performance parameters including high gain (20 dB), high IP3 (+35 dBm) and P1dB (+20 dBm) and low noise figures (2.4 dB) that are difficult to achieve in a single stage design and available only in the YSF amplifier series. |
| Integrated Matching, DC Blocking and Bias in Small Package | The YSF-272+ includes all support circuits including: Matching, Bias and DC Blocking, all integrated into a single 5x6mm package making the total footprint equal to or smaller than most solutions. |
| Excellent Return Loss | The YSF-272+ includes integrated input and output matching and bias circuits to make this amplifier a simple, complete drop-in solution. The matching circuits provide excellent output return loss (20dB), and are designed to give optimal P1dB and IP3 performance in a 50Ω environment. |
| High Reverse Isolation | With 30 dB of reverse isolation – the YSF-272+ is an ideal gain block for use in integrated systems to minimize VSWR interactions resulting from cascading highly reflective components such as sharp filters. |

Notes

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Flat Gain Amplifier

2.3-2.7 GHz

Product Features

- Matched 50-ohm surface mount amplifier
- High gain, 19 dB typ.
- Up to +20 dBm typ. output power
- High IP3, +35 dBm
- Low Noise Figure, 2.5 dB typ.
- High directivity, 30 dB isolation
- Internal Input & Output DC Block
- Separate terminal for DC
- Protected by us patent 8,994,157



YSF-272+

CASE STYLE: DL1636

Typical Applications

- WiMax
- Portable Wireless
- Receivers & transmitters
- Radar

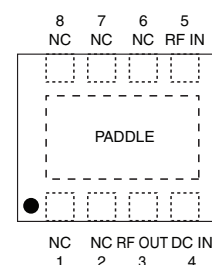
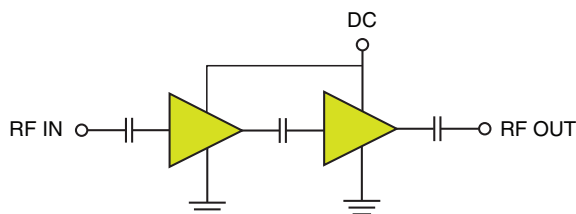
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

General Description

YSF-272+ is an advanced amplifier module in a Mini-Circuits System In Package **MSiP®**. This module is fully matched to 50Ω in/out impedance and has built-in Input & Output DC block capacitors. It is enclosed in a 5 x 6 mm MCLP plastic package. The YSF-272+ uses E-PHEMT* technology enabling it to work with a single positive supply voltage.

simplified schematic and pad description



| Function | Pad Number | Description |
|----------|------------|------------------------|
| RF-IN | 5 | RF Input |
| RF-OUT | 3 | RF Output |
| DC | 4 | DC Supply |
| GND | Paddle | Connected to ground |
| NOT USED | 1,2,6,7,8 | No internal connection |

*Enhancement mode Pseudomorphic High Electron Mobility Transistor

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Electrical Specifications⁽¹⁾ at 25°C, Zo=50Ω unless noted

| Parameter | Condition (MHz) | Min. | Typ. | Max. | Units |
|--|-----------------|------|-------|------|-------|
| Frequency Range | | 2300 | | 2700 | MHz |
| Gain | 2300 | 17.6 | 19.5 | 21.5 | dB |
| | 2500 | 17.1 | 19.0 | 21.5 | |
| | 2700 | 16.2 | 18.0 | 20.5 | |
| Gain Flatness | | | 0.7 | | ±dB |
| Input Return Loss | 2300 | — | 12.6 | | dB |
| | 2500 | 10.0 | 15.0 | | |
| | 2700 | — | 18.0 | | |
| Output Return Loss | 2300 | — | 20.0 | | dB |
| | 2500 | 12.0 | 17.0 | | |
| | 2700 | — | 14.0 | | |
| Reverse Isolation | | | 30.0 | | dB |
| Output Power @ 1 dB compression | 2300 | — | 20.0 | | dBm |
| | 2500 | 18.0 | 20.0 | | |
| | 2700 | — | 20.0 | | |
| Output Power @ 3 dB compression | | | 21.0 | | dBm |
| Output IP3 | 2300 | — | 34.0 | | dBm |
| | 2500 | 30.0 | 35.0 | | |
| | 2700 | — | 35.0 | | |
| Noise Figure | 2300 | | 2.5 | — | dB |
| | 2500 | | 2.5 | 3.5 | |
| | 2700 | | 2.5 | — | |
| Device Operating Voltage | | | 5 | | V |
| Device Operating Current | | | 118 | 145 | mA |
| Device Current Variation vs. Temperature ⁽²⁾ | | | 2 | | µA/°C |
| Device Current Variation vs Voltage | | | 0.002 | | mA/mV |
| Thermal Resistance, junction-to-ground lead ⁽³⁾ | | | 56 | | °C/W |

⁽¹⁾ Measured on Mini-Circuits Characterization test board TB-616+. See Characterization Test Circuit (Fig. 1)

⁽²⁾ D(+85°C to -45°C)

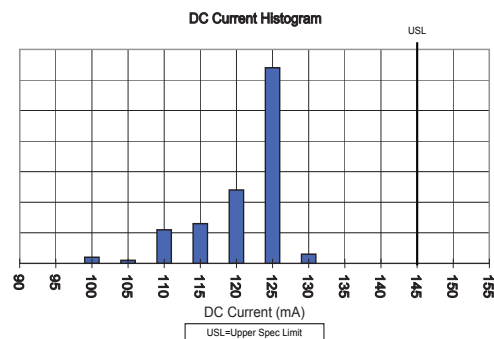
⁽³⁾ Thermal Resistance= $\frac{\text{Hot spot temperature} - \text{Ground lead temperature}}{\text{Power Dissipation}}$

Absolute Maximum Ratings

| Parameter | Ratings | Units |
|--------------------------------------|------------|-------|
| Operating Temperature ⁽⁴⁾ | -40 to 85 | °C |
| Storage Temperature | -65 to 150 | °C |
| DC Voltage on Pad 4 | 7 | V |
| Power Dissipation | 1.5 | W |
| Input Power | 21 | dBm |

Note: Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.

⁽⁴⁾ Case is defined as ground paddle.



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Characterization Test Circuit

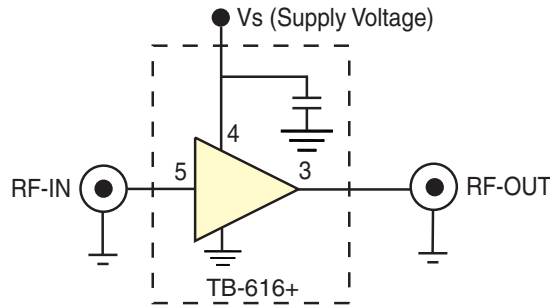


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization Test Fixture TB-616+) Gain, Return loss, Output power at 1dB compression (P1 dB), Output IP3 (OIP3) and Noise Figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain: $P_{in} = -25\text{dBm}$
2. Output IP3 (OIP3): Two tones, spaced 10 MHz apart, 2.5 dBm/tone at output.

Recommended Application Circuit

(refer to evaluation board for PCB Layout and component values)

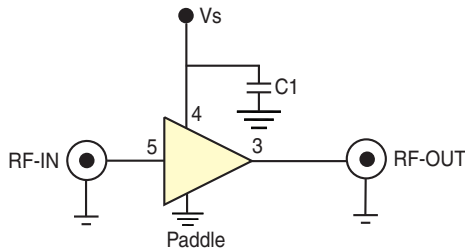
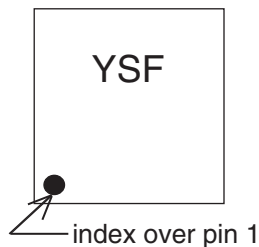


Fig 2. Recommended Application Circuit

Product Marking



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Additional Detailed Technical Information

additional information is available on our dash board. To access this information [click here](#)

| | |
|---|--|
| Performance Data | Data Table |
| | Swept Graphs |
| | S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style | DL1636 Plastic package, exposed paddle, lead finish: tin/silver/nickel |
| Tape & Reel Standard quantities available on reel | F68 7" reels with 20, 50, 100, 200, 500 or 1K devices. 13" reels with 2K, or 4K devices. |
| Suggested Layout for PCB Design | PL-352 |
| Evaluation Board | TB-616-5+ |
| Environmental Ratings | ENV08T1 |

ESD Rating

Human Body Model (HBM): Class 1A in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M1 (25V) in accordance with ANSI/ESD STM5.2-1999



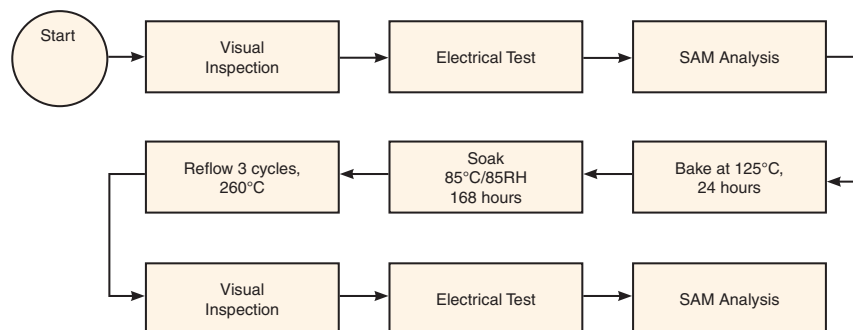
Attention

Observe precautions
for handling electrostatic
sensitive devices

MSL Rating

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

MSL Test Flow Chart



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