



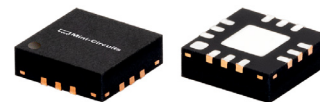
LOW NOISE, HIGH GAIN

Monolithic Amplifier **PMA3-352GLN+**

50Ω 2.5 to 3.5 GHz

THE BIG DEAL

- Flat gain, ± 0.9 dB
- Low noise figure, 0.7 dB typ.
- High gain, up to 28.5 dB typ.
- High IP3, +27.8 dBm typ.



Generic photo used for illustration purposes only

CASE STYLE: DQ1225

+RoHS Compliant

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

APPLICATIONS

- 5G
- WiFi
- WLAN
- UMTS
- LTE
- WiMAX
- S-band Radar

PRODUCT OVERVIEW

The PMA3-352GLN+ is a PHEMT based wideband, low noise MMIC amplifier with a unique combination of low noise, high IP3, and flat gain over wideband making it ideal for sensitive, high-dynamic-range S-band receiver applications. This design operates on a single +5V supply, is well matched for 50Ω and comes in a tiny, low profile package (3 x 3 x 0.89mm), accommodating dense circuit board layouts.

KEY FEATURES

| Feature | Advantages |
|---|---|
| Low noise, 0.7 dB at 3 GHz | Enables lower system noise figure performance. |
| Wide bandwidth with flat gain • ± 0.9 dB over 2.5 to 3.5 GHz | Enables a single amplifier to be used in many wideband applications including defense, instrumentation and more. |
| High Gain, 28.5 dB at 3 GHz | Enables signal amplification without the need for multiple gain stage. Thus minimize effect of subsequent stages on noise figure. |
| High IP3 • +27.8 dBm at 3 GHz • +14.8 dBm at 3 GHz | Combination of low noise and high IP3 makes this MMIC amplifier ideal for use in low noise receiver front end (RFE) as it gives the user advantages of sensitivity and two-tone IM performance at both ends of the dynamic range. |
| 3 x 3mm 12-lead MCLP package | Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB. |

REV. A
ECO-010881
PMA3-352GLN+
RS/CP
240401





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Mini-Circuits

50Ω 2.5 to 3.5 GHz

ELECTRICAL SPECIFICATIONS¹ AT +25°C AND +5 V, UNLESS NOTED OTHERWISE

| Parameter | Condition (GHz) | V _{DD} = +5 V | | | Units |
|---|-----------------|------------------------|-------|-------|-------|
| | | Min. | Typ. | Max. | |
| Frequency Range | | 2.5 | | 3.5 | GHz |
| Noise Figure | 2.5 | — | 0.6 | — | dB |
| | 2.7 | — | 0.7 | — | |
| | 3.0 | — | 0.7 | 1.5 | |
| | 3.2 | — | 0.7 | — | |
| | 3.5 | — | 0.7 | — | |
| Gain | 2.5 | 28.6 | 29.7 | 32.7 | dB |
| | 2.7 | — | 29.1 | — | |
| | 3.0 | 25.7 | 28.5 | 31.4 | |
| | 3.2 | — | 28.2 | — | |
| | 3.5 | 25 | 27.9 | 30.6 | |
| Reverse Isolation | 3.0 | — | 39 | — | dB |
| Input Return Loss | 2.5 | — | 10 | — | dB |
| | 2.7 | — | 10 | — | |
| | 3.0 | — | 11 | — | |
| | 3.2 | — | 11 | — | |
| | 3.5 | — | 11 | — | |
| Output Return Loss | 2.5 | — | 10 | — | dB |
| | 2.7 | — | 10 | — | |
| | 3.0 | — | 10 | — | |
| | 3.2 | — | 10 | — | |
| | 3.5 | — | 10 | — | |
| Output Power at 1dB Compression | 2.5 | — | +14.8 | — | dBm |
| | 2.7 | — | +14.9 | — | |
| | 3.0 | +13.0 | +14.8 | — | |
| | 3.2 | — | +14.2 | — | |
| | 3.5 | — | +14.1 | — | |
| Output IP3 | 2.5 | — | +28.6 | — | dBm |
| | 2.7 | — | +27.9 | — | |
| | 3.0 | +23.1 | +27.8 | — | |
| | 3.2 | — | +27.3 | — | |
| | 3.5 | — | +26.6 | — | |
| Device Operating Voltage (V _{DD}) | | +4.75 | +5.0 | +5.25 | V |
| Device Operating Current (I _{DD}) | | — | 69 | 80 | mA |
| Device Current Variation vs. Temperature ² | | | -26.9 | | μA/°C |
| Device Current Variation vs. Voltage | | | 0.006 | | mA/mV |
| Thermal Resistance, junction-to-ground lead | | | 57.3 | | °C/W |

1. Measured on Mini-Circuits Characterization test board TB-PMA3-352GLN+ with tested board loss being deducted. See Characterization Test Circuit (Fig. 1)

2. (Current at 85°C - Current at -45°C)/130





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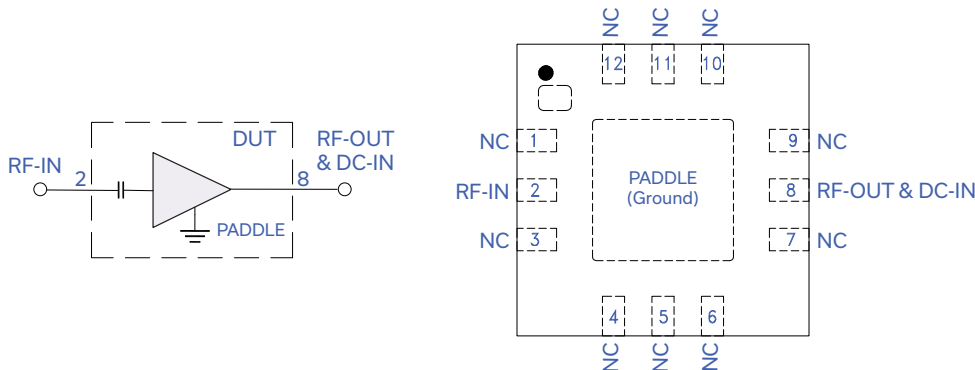
50Ω 2.5 to 3.5 GHz

ABSOLUTE MAXIMUM RATINGS³

| Parameter | Ratings |
|---|--|
| Operating Temperature (ground lead) | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature | +150°C |
| Total Power Dissipation | 1.0 W |
| Input Power (CW), V _d = +5 V | +29 dBm (5 minutes max.) +10 dBm (continuous) |
| DC Voltage | +8.5 V |

3. Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.

SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



| Function | Pad Number | Description (See Figure 1) |
|----------------|-------------------|---|
| RF-IN | 2 | Connects to RF input via C1 |
| RF-OUT & DC-IN | 8 | Connects to RF output via C2 and V _{DD} via L1 |
| Ground | Paddle | Connects to ground |
| No Connection | 1,3 to 7, 9 to 12 | Not used internally. Connected to ground on test board |



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RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

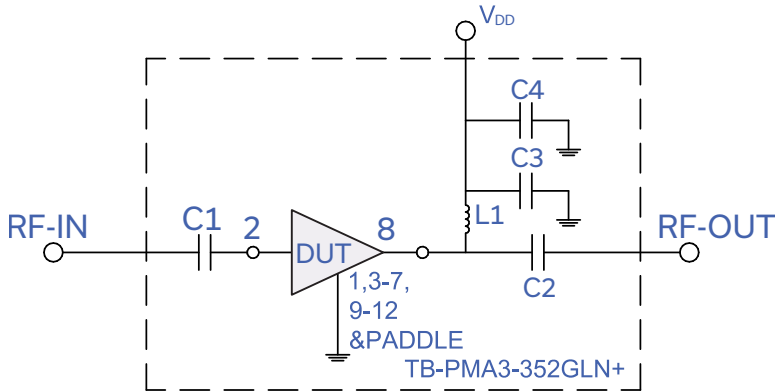


Fig 1. Application and Characterization Circuit

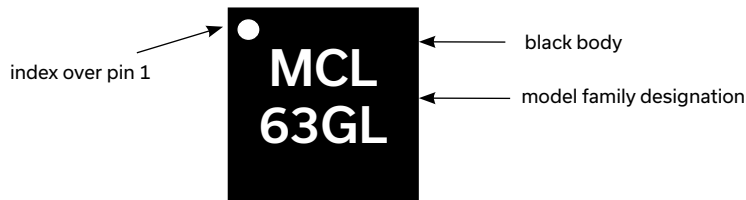
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA3-352GLN+)
Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain and Return Loss: $P_{IN} = -35\text{dBm}$
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.

| Component | Size | Value | P/N | Manufacturer |
|-----------|------|-------|-------------------|--------------|
| C1 | 0402 | 22pF | GRM1555C1H220JA01 | Murata |
| C2 | 0402 | 22pF | GRM1555C1H220JA01 | Murata |
| C3 | 0402 | 100pF | GRM1555C1H101JA01 | Murata |
| C14 | 1206 | 22uF | GRM31CR61H106KA12 | Murata |
| L1 | 0402 | 10nH | LQG15HSIONJD2 | Murata |

PRODUCT MARKING



Marking may contain other features or characters for internal lot control



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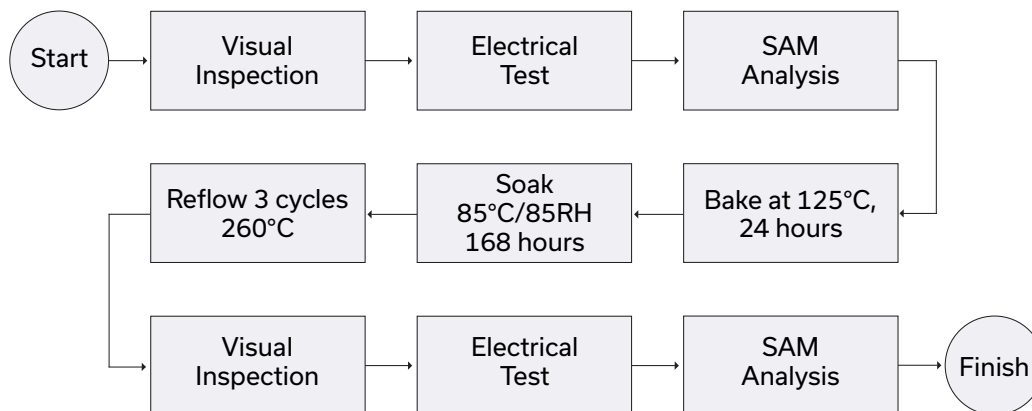
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

| | |
|--|--|
| Performance Data | Data Table |
| | Swept Graphs |
| | S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style | DQ1225 Plastic package, exposed paddle, lead finish: Matte Tin |
| Tape & Reel Standard quantities available on reel | F66 7" reels with 20, 50, 100, 200, 500, 1K, 2K or 3K devices |
| Suggested Layout for PCB Design | PL-611 |
| Evaluation Board | TB-PMA3-352GLN+ |
| Environmental Ratings | ENV08T1 |

ESD RATING

Human Body Model (HBM): Class 1C (1000 to <2000V) in accordance with ANSI/ESD STM 5.1 - 2001

MSL TEST FLOW CHART



NOTES

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp



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