# FMLN16T

**Low Noise GPS Amplifier**


## Product Features

- High Gain:18.0dB
- Low noise figure 0.75dB@1575.42MHz
- Low operation current 7.0 mA & PD current Less than 1uA
- Single supply voltage range 1.2V to 3.6V
- Small package: 1.1mmx0.7mmx0.45mm
- Low cost BOM
- Lead -Free and RoHS-Compliant

## Product Applications

- Automotive Navigation
- Personal Navigation Device (PND)
- Cell Phone with GPS
- MID/PAD with GPS

## Product Description

FMLN16T high gain, low noise amplifier (LNA) is Dedicated to GPS, GLONASS Galileo and Beidou Standards. This product has an extremely low noise figure of 0.75dB,18.0dB gain and excellent Linearity.

FMLN16T works under a 1.2V to 3.6V single power supply while consumes 7.0 mA current, in Power down (PD) mode, the power consumption Will be reduced to less than 1uA.

FMLN16T uses a small 1.1mmx0.7mmx0.45mm LGA 6-pin package.

 

## Application circuit

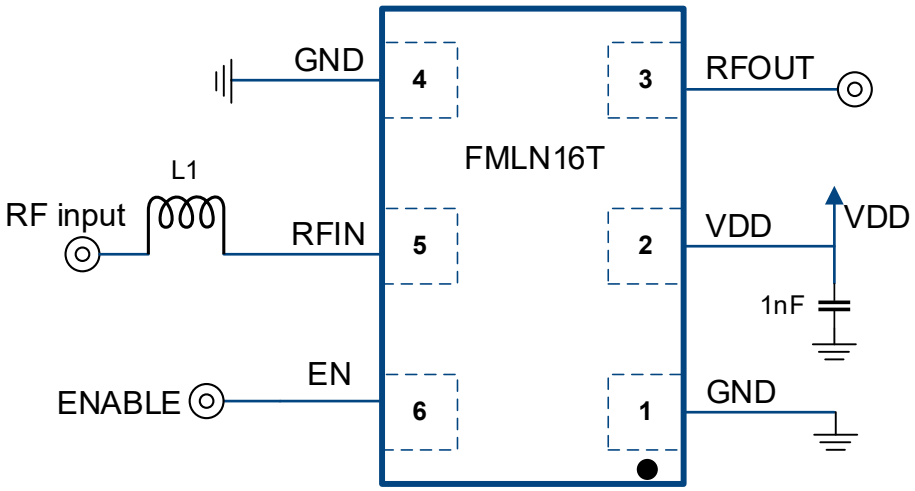


Figure 1 FMLN16T Application circuit

**Table 1:**

| Number | Vendor | Part Number |
|---|---|---|
| L1 | Murata | LQW15AN11N, 11nH |

 

## Pin-out Information

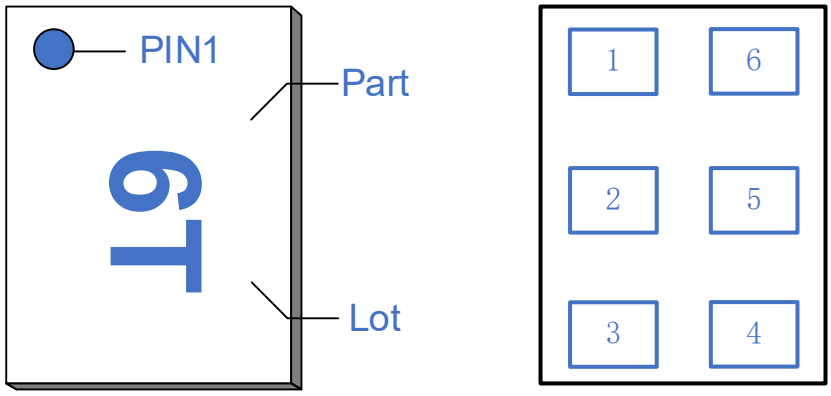


Figure 2 Pin-out Information

**Table 2: Pin Description**

| Pin # | Name | I/O | Description |
|---|---|---|---|
| 1 | GND | AG | Analog VSS |
| 2 | VDD | AP | Power supply,1.2~3.6V |
| 3 | RFOUT | AO | LNA output |
| 4 | GND | AG | Analog VSS |
| 5 | RFIN | AI | LNA input from antenna |
| 6 | EN | DI | Pull high enable, pull low into power down mode |

**Note:** *DI (digital input), DO (digital output), DIO (digital bidirectional), A (analog input), AO (analog output), A/O (analog bidirectional), AP (analog power), AG (analog ground)*

 

## Absolute Maximum Conditions

**Table 3:**

| Parameters | Minimum | Maximum | Units |
|---|---|---|---|
| Supply voltage | -0.3 | 3.6 | V |
| RF input power | | +10 | dBm |
| Storage temperature | -65 | +160 | ℃ |
| Junction Temperature | | 150 | ℃ |
| Operating temperature | -40 | +85 | ℃ |
| Lead Temperature(soldering) | | 260 | ℃ |
| Human Body Model, Class 1C | -2000 | +2000 | V |
| Machine Mode ESD | -125 | +125 | V |
| Charge Device Mode ESD | -500 | +500 | V |

**1: Test condition 50% duty cycle, VSWR=1:1, +25 ° C**

**Note:** *Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.*

## Specifications

## DC Characteristics

**Table 4:**

| Parameters | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Supply voltage | | 1.2 | 2.8 | 3.6 | V |
| Supply current | EN=High | | 7.0 | | mA |
| | VDD=1.8V | | 4.0 | | |
| | EN=Low | | | 1 | μA |
| EN Input High | | 0.8 | | | V |
| EN Input Low | | | | 0.6 | V |

**(Typically VDD = 2.8 V, $T_A$ = +25 ℃, Unless Otherwise Noted)**

 

## AC Characteristics

**Table 5:**

| Parameters | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| RF Operating frequency | None | | 1575.42 | | MHz |
| Power Gain | | | 18.0 | | dB |
| Noise Figure | | | 0.75 | | dB |
| Input Return Loss | Note1 | | -10 | | dB |
| Output Return Loss | | | -10 | | dB |
| Reverse Isolation | Note1 | | -26 | | dB |
| VSWR | Note1 | | 1.9 | | |
| Input Power 1-dB Compression Point | 1575MHz | | -10 | | dBm |
| | 900MHz | | -2 | | |
| | 2400MHz | | -9 | | |
| Input IP2 | Note6 | | 42 | | dBm |
| Input In-Band IP3 | Note4 | | -1 | | dBm |
| Input Out-Band IP3 | Note5 | | +15 | | dBm |
| Stability | Note3 | 1.5 | | | |
| Jammed Noise Figure | Note2 | | 0.75 | | dB |

**(Typically VDD = 2.80 V, TA = +25 ℃, all data measured on Lingchip' s EVB, Unless Otherwise Noted)**

**Note1:** *sweep power -30dBm,1575.42MHz*

**Note2:** *jammed* signal @ 1.8GHz *& 950 MHz, -30dBm*

**Note3:** *frequency range 500MHz-5GHz*

**Note4:** *f1=1574.5MHz, f2=1575.5MHz, -30dBm*

**Note5:** *f1=2400MHz, f2=2000MHz, -30dBm IP3=pin-(IM3-Gain1575MHz)/2*

**Note6:** *f1=2475MHz, f2=900MHz, -30dBm, IP2=pin-(IM2- Gain1575MHz), IMD2 referred to input port.*

**Note7:** *Beidou frequency range B1: 1559.052MHz — 1591.788MHz*

 

**Table 6:**

| Parameters | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| RF Operating frequency | None | | 1575.42 | | MHz |
| Power Gain | | | 16.0 | | dB |
| Noise Figure | | | 0.95 | | dB |
| Input Return Loss | Note1 | | -10 | | dB |
| Output Return Loss | | | -10 | | dB |
| Reverse Isolation | Note1 | | -25 | | dB |
| VSWR | Note1 | | 1.9 | | |
| Input Power 1-dB Compression Point | 1575MHz | | -11 | | dBm |
| | 900MHz | | -1 | | |
| | 2400MHz | | -9 | | |
| Input IP2 | Note6 | | 38 | | dBm |
| Input In-Band IP3 | Note4 | | -3 | | dBm |
| Input Out-Band IP3 | Note5 | | +13 | | dBm |
| Stability | Note3 | 1.5 | | | |
| Jammed Noise Figure | Note2 | | 0.95 | | dB |

**(Typically VDD = 1.80 V, TA = +25 ℃, all data measured on Lingchip' s EVB, Unless Otherwise Noted)**

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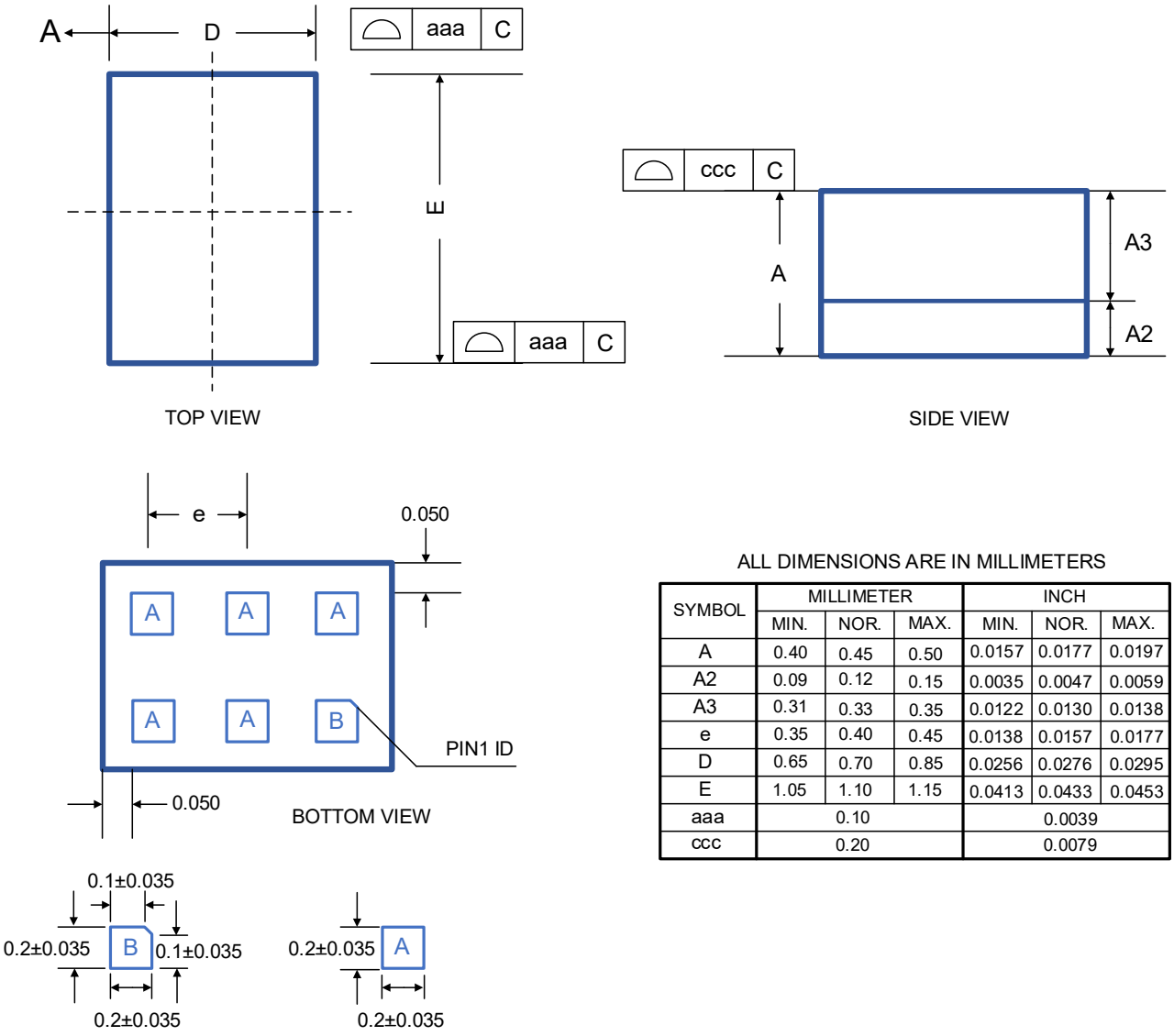
## Package Outline Dimension




ALL DIMENSIONS ARE IN MILLIMETERS

| SYMBOL | MILLIMETER | | | INCH | | |
|---|---|---|---|---|---|---|
| | MIN. | NOR. | MAX. | MIN. | NOR. | MAX. |
| A | 0.40 | 0.45 | 0.50 | 0.0157 | 0.0177 | 0.0197 |
| A2 | 0.09 | 0.12 | 0.15 | 0.0035 | 0.0047 | 0.0059 |
| A3 | 0.31 | 0.33 | 0.35 | 0.0122 | 0.0130 | 0.0138 |
| e | 0.35 | 0.40 | 0.45 | 0.0138 | 0.0157 | 0.0177 |
| D | 0.65 | 0.70 | 0.85 | 0.0256 | 0.0276 | 0.0295 |
| E | 1.05 | 1.10 | 1.15 | 0.0413 | 0.0433 | 0.0453 |
| aaa | 0.10 | | | 0.0039 | | |
| ccc | 0.20 | | | 0.0079 | | |

Figure 2 Package Outline Dimension

## ESD Sensitivity

Integrated circuits are ESD sensitive and can be damaged by static electric charge. Proper ESD protection techniques should be applied when devices are operated.

## RoHS Compliant

This product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE) , and are considered RoHS compliant.