



## **MXD8015L**

# **LTE Low Band Low Noise Amplifier**

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### General Description

MXD8015L high gain, low noise amplifier (LNA) is dedicated to LTE low band receive. This product has excellent noise figure of 0.7dB noise figure and 16dB gain.

MXD8015L works under a 1.6V to 3.0V single power supply while consumes 5.5 mA current, in power down (PD) mode, the power consumption will be reduced to less than 1uA.

MXD8015L uses a small 1.1mmx0.7mmx0.45mm LGA 6-pin package.

### Features

- Low noise figure 0.7 dB at 716MHz to 960MHz
- Low operation current 5.5 mA & PD current less than 1uA
- Single supply voltage range 1.6V to 3.0V
- Small package 1.1mmx0.7mmx0.45mm , MSL1
- Low cost BOM
- Lead-Free and RoHS-Compliant

### Applications

LTE DRX  
Cell Phone with LTE  
MID/PAD with LTE

### Pin Configuration/Application Diagram (Top view)

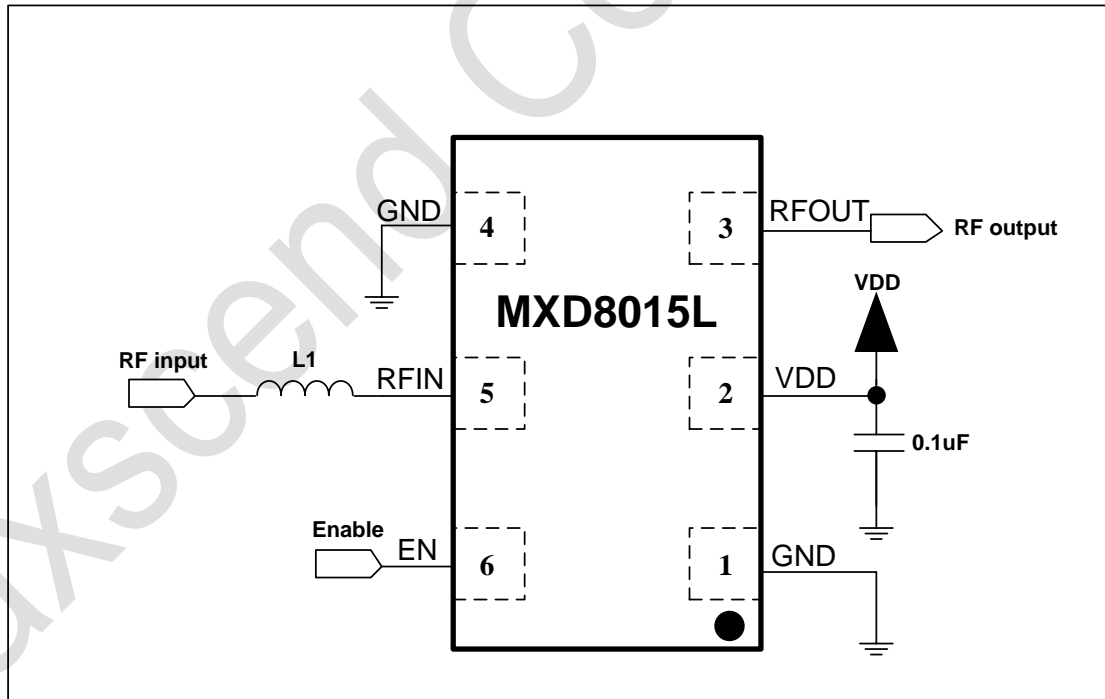


Figure 1.MXD8015L application circuit

Table 1.

| Component | Vendor  | Type                    | Part Number & value |
|-----------|---------|-------------------------|---------------------|
| L1        | Murata  | Wired inductor, high Q  | LQW15AN20N, 20nH    |
|           | various | Ceramic inductor, low Q | 15nH                |

## Absolute Maximum Ratings

**Table 2.**

| Parameters                     | Range        | Units |
|--------------------------------|--------------|-------|
| Power supply                   | -0.3 ~ 3.3   | V     |
| Other Pin to GND               | -0.3~VDD+0.3 | V     |
| Maximum RF Input Power         | 10           | dBm   |
| Operation Temperature Range    | -40~90       | °C    |
| Junction Temperature           | 150          | °C    |
| Storage temperature Range      | -65~160      | °C    |
| Lead Temperature (soldering)   | 260          | °C    |
| Soldering Temperature (reflow) | 260          | °C    |
| Human Body Mode ESD            | -1500~+1500  | V     |
| Machine Mode ESD               | -125~+125    | V     |
| Charge Device Mode ESD         | -500~+500    | V     |

## Specifications

### DC Characteristics

Typically  $T_A=25^{\circ}\text{C}$  VDD=2.8V, unless otherwise noted

**Table 3.**

| Parameters     | Condition         | Min | Typ | Max | Units |
|----------------|-------------------|-----|-----|-----|-------|
| Supply Voltage |                   | 1.6 | 2.8 | 3.0 | V     |
| Supply Current | EN=High, VDD=2.8V |     | 5.5 |     | mA    |
|                | EN=Low            |     |     | 1   | uA    |
| EN Input High  |                   | 1.0 | 1.8 | VDD | V     |
| EN Input Low   |                   | 0   | 0   | 0.3 | V     |

### AC Characteristics

Typically  $T_A=25^{\circ}\text{C}$  VDD=2.8V, all data measured on Maxscend's EVB, unless otherwise noted

**Table 4. AC Specifications 716MHz-850MHz**

| Parameters  | Conditions       | Min | Typ  | Max  | Units |
|---|------------------|-----|------|------|-------|
| RF Frequency Range  | None             | 716 | -    | 850  | MHz   |
| Operation Current   |                  |     | 5.5  |      | mA    |
| Power Down Current  |                  |     |      | 1    | uA    |
| Power Gain  |                  | 14  | 16   | 18   | dB    |
| Noise Figure <sup>1</sup>   | Note1            | -   | 0.65 | 1.05 | dB    |
| Input Return Loss   |                  | -   | -10  | -6   | dB    |
| Output Return Loss  |                  | -   | -10  | -6   | dB    |
| Reverse Isolation   |                  | -   | -25  | -20  | dB    |
| Stability   |                  | 1.5 | -    | -    | -     |
| Input Power 1-dB Compression Point                                |                  | -4  | 0    | -    | dBm   |
| Inband input 3 <sup>rd</sup> - order intercept point <sup>2</sup> | Note2            | -4  | 1    | -    | dBm   |
| Settling time   | Off to operation | -   | 2    | 3    | us    |

**Note 1: PCB loss is subtracted**

**Note 2: f1 = 790MHz, f2 = 791MHz, p1 = p2 = -25dBm**

**Table 5. AC Specifications 850MHz-960MHz**

| Parameters  | Conditions       | Min | Typ | Max | Units |
|---|------------------|-----|-----|-----|-------|
| RF Frequency Range  | None             | 850 | -   | 960 | MHz   |
| Operation Current   |                  |     | 5.5 |     | mA    |
| Power Down Current  |                  |     |     | 1   | uA    |
| Power Gain  |                  | 14  | 16  | 18  | dB    |
| Noise Figure <sup>1</sup>   | Note1            | -   | 0.7 | 1.1 | dB    |
| Input Return Loss   |                  | -   | -10 | -6  | dB    |
| Output Return Loss  |                  | -   | -10 | -6  | dB    |
| Reverse Isolation   |                  | -   | -25 | -20 | dB    |
| Stability   |                  | 1.5 | -   | -   | -     |
| Input Power 1-dB Compression Point                                |                  | -3  | 1   | -   | dBm   |
| Inband input 3 <sup>rd</sup> – order intercept point <sup>2</sup> | Note2            | -3  | 2   | -   | dBm   |
| Settling time   | Off to operation | -   | 2   | 3   | us    |

**Note 1: PCB loss is subtracted**

**Note 2: f1 = 900MHz, f2 = 901MHz, p1 = p2 = -25dBm**

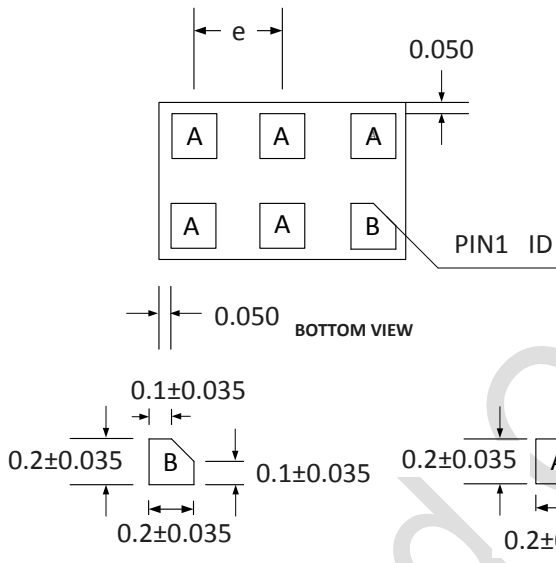
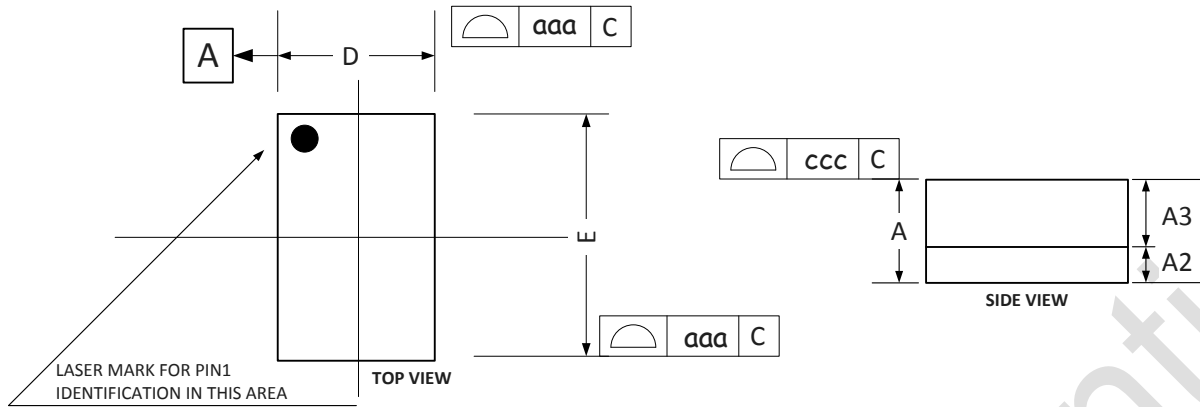
## Pin Descriptions

**Table 6. Pin Descriptions**

| Pin | Pin Name | I/O | Pin Description                                 |
|-----|----------|-----|---|
| 1   | GND      | AG  | Analog VSS                                      |
| 2   | VDD      | AP  | Power supply, 1.6~3.0V                          |
| 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), AI (analog input), AO (analog output), AIO (analog bidirectional), AP (analog power), AG (analog ground),

Outline Dimensions



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. MXD8015L outline dimension

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Marking Specification

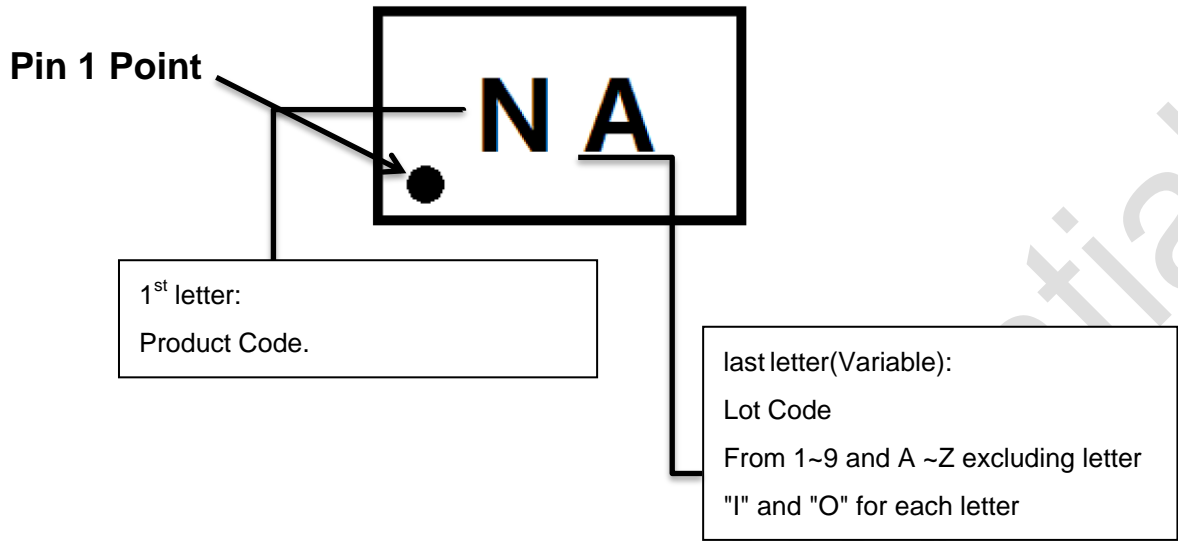
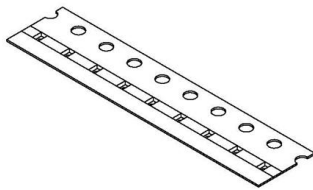
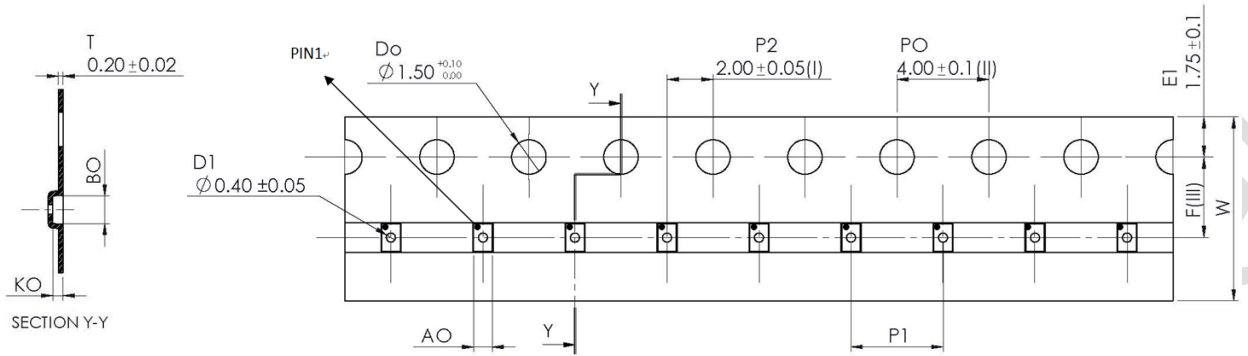


Figure 3. Marking specification (Top View)

**Tape and Reel Dimensions**


|    |               |
|----|---------------|
| Ao | 0.80 +/- 0.03 |
| Bo | 1.20 +/- 0.03 |
| Ko | 0.56 +/- 0.03 |
| F  | 3.50 +/- 0.05 |
| P1 | 4.00 +/- 0.10 |
| W  | 8.00 +/- 0.10 |

- (I) Measured from centreline of sprocket hole to centreline of pocket.
- (II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
- (III) Measured from centreline of sprocket hole to centreline of pocket.
- (IV) Other material available.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

**Figure 4. Tape and reel dimensions**

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## Reflow Chart

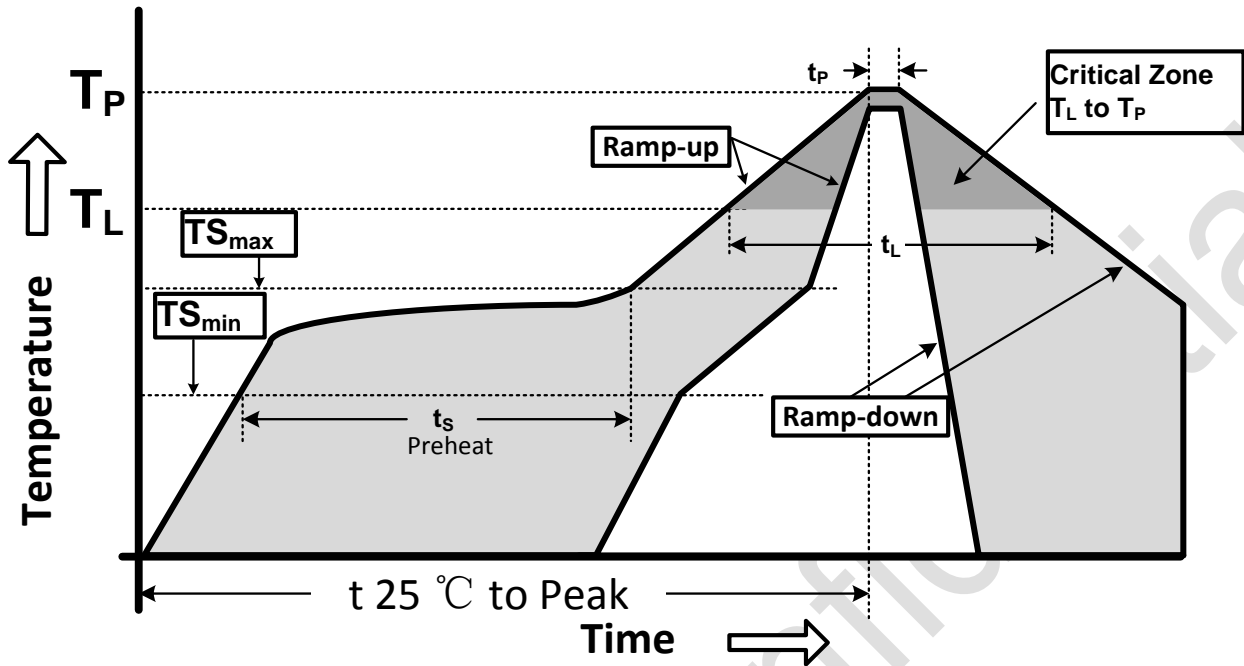


Figure 5. Recommended Lead-Free Reflow Profile

Table 7. Reflow condition

| Profile Parameter                                | Lead-Free Assembly, Convection, IR/Convection |
|--|---|
| Ramp-up rate ( $TS_{max}$ to $T_p$ )             | 3°C/second max.                               |
| Preheat temperature ( $TS_{min}$ to $TS_{max}$ ) | 150°C to 200°C                                |
| Preheat time ( $t_s$ )                           | 60 - 180 seconds                              |
| Time above $T_L$ , 217°C ( $t_L$ )               | 60 - 150 seconds                              |
| Peak temperature ( $T_p$ )                       | 260°C   |
| Time within 5°C of peak temperature( $t_p$ )     | 20 - 40 seconds                               |
| Ramp-down rate                                   | 6°C/second max.                               |
| Time 25°C to peak temperature                    | 8 minutes max.                                |

**ESD Sensitivity**

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

**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.



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