# NU1009A/NU1015: Integrated Power Stage for High-Integration and High-Efficiency Medium-Power Wireless Power Transmitter

## 1 Features

- Wide Input Voltage: 4V to 12V (NU1009A), 4V to 17V (NU1015)
- Maximum Output Power: 10W (NU1009A), 20W (NU1015)
- Integrated High-Efficiency Full- Bridge FETs
- Integrated FET Driver Optimized for Low EMI
- Integrated 5V DC/DC to IC power supply
- Integrated 3.3V (2.5V configurable) LDO to Bias External Circuit and Provide Reference Voltage
- High-Accuracy, Lossless Current Measurement for FOD and In-Band Communication
- Integrated Lossless Q Factor Detection
- Integrated Low-Error-Rate Digital Demodulation
- Input UVLO and OVP
- Over-Current Protection
- Thermal Shutdown
- I²C Interface
- 4mm×4mm QFN Package

## 2 Applications

- Wireless Power Transmitter Compliant with WPC V1.2.4 Extended Power Profile (EPP)
- Wireless Power Transmitter for Consumer, Industrial, Automotive Aftermarket and Medical Applications
- Motor Drivers

## 3 Descriptions

NU1009A/NU1015 is a family of highly integrated up to 20W full-bridge power stage IC optimized for wireless power transmitter solutions. The device integrates all critical functions, such as high-efficiency power FETs, low-EMI FET driver, bootstrap circuit, 5V integrated DC/DC power supply, 3.3V (2.5V configurable) LDO and lossless current measurement. The proprietary current-measurement circuit provides accurate current reading used by FOD (Foreign Object Detection) power measurement, in-band communication, Q factor detection, and digital demodulation.

The IC also includes protection functions such as input under-voltage lockout, over-voltage protection, over current protection, and thermal shutdown. These provisions further enhance the reliability of the total system solution.

I2C interface is used for communication with the controller and can easily be extended to multi-coil solution. The device is housed in a thermally enhanced 4mm×4mm QFN package.



  

# 10 Package Information

| Orderable Device | Status | Package Type | Package Drawing | Pins | Package Quantity |
|---|---|---|---|---|---|
| NU1009AQCDB | Fab | QFN | QCDB | 33 | 3000 |
| **Orderable Device** | **Eco Plan** | **Lead/Ball Finish** | **MSL Peak Temp** | **OpTemp/℃** | **Device Marking** |
| NU1009AQCDB | Green (RoHS & no Sb/Br) | NiPdAu | Level-2 | -40 to 125 | NU1009AQCDB |

| Orderable Device | Status | Package Type | Package Drawing | Pins | Package Quantity |
|---|---|---|---|---|---|
| NU1015QCDB | Fab | QFN | QCDB | 33 | 3000 |
| **Orderable Device** | **Eco Plan** | **Lead/Ball Finish** | **MSL Peak Temp** | **OpTemp/℃** | **Device Marking** |
| NU1015QCDB | Green (RoHS & no Sb/Br) | NiPdAu | Level-2 | -40 to 125 | NU1015QCDB |

# 11 Mechanical Data

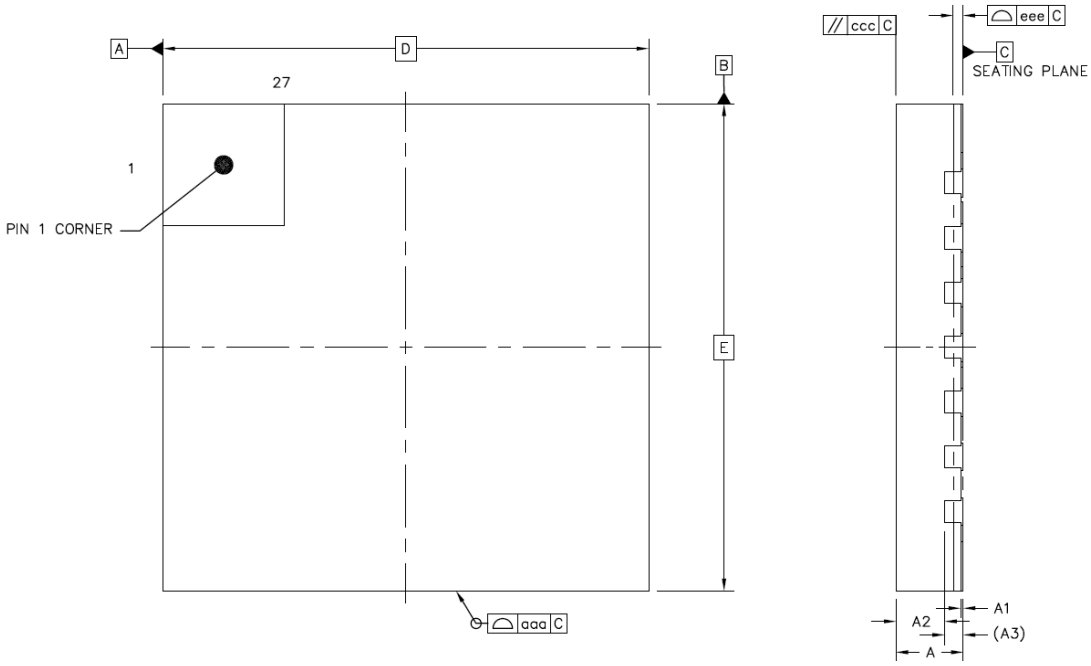


Fig 13. Top View (left) and Side View (right) of Package Outline

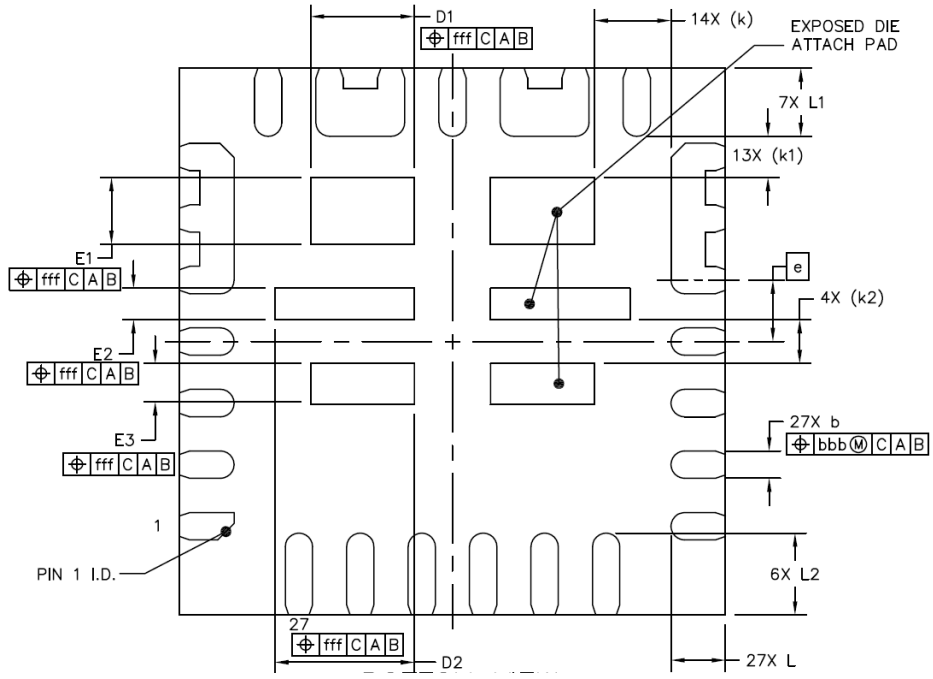


Fig 14. Bottom View of Package Outline

| SYMBOL | Dimensions in Millimeters | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.5 | 0.55 | 0.6 |
| A1 | 0.00 | 0.02 | 0.05 |
| A2 | --- | 0.4 | --- |
| A3 | 0.152 REF | | |
| B | 0.15 | 0.2 | 0.25 |
| D | 4 BSC | | |
| E | 4 BSC | | |
| e | 0.45 BSC | | |
| D1 | 0.66 | 0.76 | 0.86 |
| D2 | 0.92 | 1.02 | 1.12 |
| E1 | 0.39 | 0.49 | 0.59 |
| E2 | 0.13 | 0.23 | 0.33 |
| E3 | 0.2 | 0.3 | 0.4 |
| L | 0.3 | 0.4 | 0.5 |
| L1 | 0.4 | 0.5 | 0.6 |
| L2 | 0.5 | 0.6 | 0.7 |
| K | 0.56 REF | | |
| K1 | 0.3 REF | | |
| K2 | 0.32 REF | | |
| aaa | 0.1 | | |
| ccc | 0.1 | | |
| eee | 0.08 | | |
| bbb | 0.1 | | |
| fff | 0.1 | | |

# 12 Revision History

| Date | Changes |
|---|---|
| Oct. 2018 | Update the EC table.<br>Update the document format. |
| Aug. 2018 | Initial Release. |