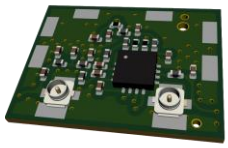

Product image for illustration Purposes only

Introduction

The easyRadio eRICA is a cost effective and high-performance power amplifier module. Incorporating a power amp (PA) and low-noise amplifier (LNA) that boosts range performance for all easyRadio eRIC-LoRa and eRA-LoRa series RF modules.

eRICA increases effective radiated power to 27dBm from a 5dBm input for the transmitting device.

When used at the receiving end an additional gain of up to 10dB is achievable due to the onboard LNA.

Can be used with any RF module within the frequency band 850-950MHz.

Features

- Small footprint. Compatible pins to eRIC Series
- Up to 27dBm (0.5 W) output power.
- High Transmit Power Efficiency
- Low receive current consumption
  - 3 mA for High Gain Mode
  - 26 uA for Low Gain Mode
- Operates from 2 V to 3.7 V
- RoHS complaint
- Line of Sight (LoS) range 15km+

Applications

eRICA is suitable for any RF device requiring long range operation over the band 850MHz to 950MHz. Popular for Wireless Sensor Networks, Industrial Internet-of-Things (IIOT), Smart Grid Wireless netw0rks and wireless metering.

RAIL | SECURITY | FINANCE | ASSET TRACKING | INDUSTRIAL CONTROL | SENSORS | REMOTE MONITORING

AGRICULTURAL | DATA LOGGING | SMART HOME | INTERNET OF THINGS | MACHINE TO MACHINE |

INDUSTRIAL SENSING | ENERGY MONITORING | HVAC CONTROL AND MONITORING | FACILITIES MANAGEMENT

Table of Contents

1. eRICA Power Amp overview

The easyRadio eRICA power amp integrates a power amplifier (PA), a low-noise amplifier (LNA), switches, two coaxial U.FL straight jacks (SMT) for connections to transceiver antenna U.FL or antenna pin, and RF matching circuit for performance wireless systems.

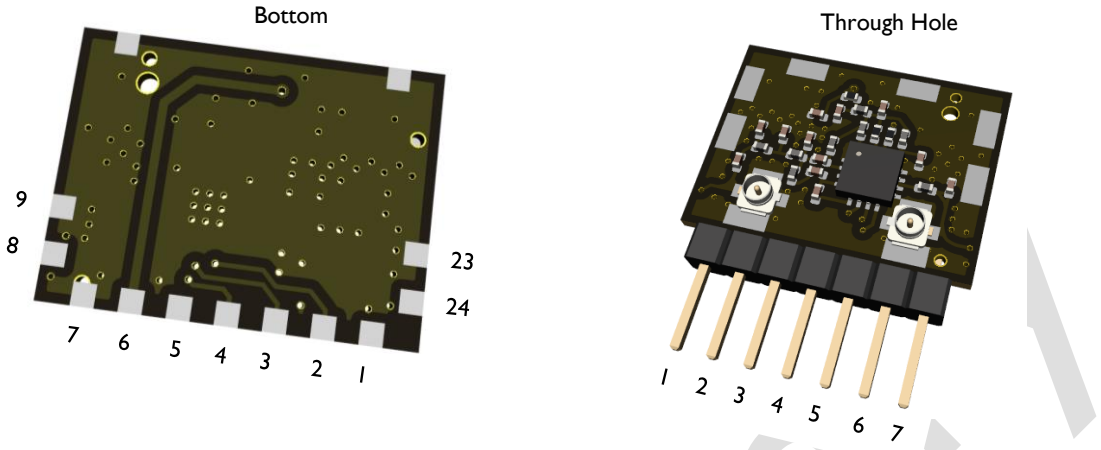

Figure 1 Pinouts & Pad identification

2. Pin/Pad Description

Pin No	Description	eRIC connection pin	Notes
1	NC		
2	High Gain Mode (HGM)		Pull high to enable
3	RX Enable	19	
4	TX Enable	18	
5	NC		
6	VCC		
7	GND		
8	Antenna from RF module		If not using eRICA U.FL connector
9	GND		
23	GND		
24	Product Antenna		If not using eRICA U.FL connector

3. Mechanical & Production

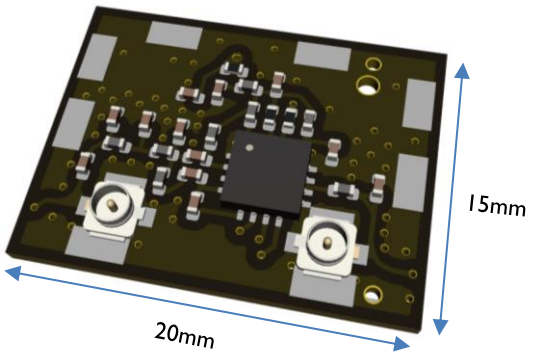

Figure 2 Mechanical Drawing

3.1 PCB Layout Notes

Pitch of the connection pads is 2.54mm.

It is recommended that the module is mounted on a double-sided PCB and that the area below the module be flooded with additional copper ground plane if possible. This should be connected to pad 23 (RF Ground) and pad 7 (Power Ground).

The recommended pad layout is shown below. Pads should be solid with no hole.

3.2 Production - soldering

eRICA modules have been designed for reflow soldering but should only be subjected to this process once. Multiple passes may cause permanent internal component damage.

Please contact LPRS Technical Department for further details and the suggested thermal profiles.

3.3 Conformal coating.

Conformally coating LPRS's RF products may adversely affect the operation and RF performance of the device and therefore we would not recommend this course of action. If your application requires a coating of some kind, customers should conduct their own tests to ensure suitability. Whilst the RF shielding CAN will provide some protection, all care and attention should be taken to ensure the coating does not flow into the module.
Please note that conformal coating of the module with any substance will invalidate the warranty.

If your application must have a conformal coating please contact LPRS to discuss further.

4. Absolute Maximum Ratings

Operating Temperature Range	-40° C to +85° C
Input RF Level	10 dBm
Supply Voltage, V_{DD}	-0.3 to 3.8 Volts
Voltage on any digital pin	-0.3 to VDD +0.3, max 3.8 Volts
Storage Temperature Range	-50° C to +150° C

Performance Data: eRICA. Supply +3.0 Volt ± 5%, Temperature 20° C

DC Parameters	Pin	Min	Typical	Max	Units	Notes
Supply Voltage (Vcc)	6	2.0	3	3.8	Volts	
Transmit supply current	6		302	370	mA	5dBm input (typical) 10dBm input (Max)
Receive supply current	6		3.7		mA	
RF Parameters						
Antenna Impedance	24/u.FL		50		Ohms	Product Antenna
Frequency Range		850	-	950	MHz	
RF Transmit						
Gain	24/u.FL		27		dBm	5dBm at 868MHz
RF Receive						
Receive Gain			10		dB	@ 868MHz, with High Gain Mode (HGM) 1
Mechanical						
Size			15 x 20 x 2.2		mm	
Pin Pitch			2.54		mm	(Standard 0.1 Inches)
Weight			1.5		grams	

5. Power Supply

The supply used to power the transceiver should be 'clean' and free from ripple and noise (<20mV p-p total).

It is suggested that 100nF ceramic capacitors be used to de-couple the supply close to the power pins of the transceiver. The use of 'switch mode' power supplies should generally be avoided as they can generate both conducted and radiated high frequency noise that can be very difficult to eliminate.
This noise may considerably reduce the performance of any radio device that is connected or adjacent to such a supply.

For battery powered applications, we would recommend LPRS's range of 3.6V Lithium primary cells, available in all sizes including ½ AA, A, AAA, C, D, DD which range in capacity from 1.2aH to 19aH.

6. Antennas

The eRICA can be used with the various common types of antenna that match the 50Ω RF Input / Output such as a monopole (whip), a tuned helical antenna, a PCB loop antenna or a ceramic 'chip' antenna.

Monopole antennas are resonant with a length corresponding to one quarter of the electrical wavelength (Lambda/4). They are very easy to implement and can simply be a 'piece of wire' or PCB track which at 868MHz should be approximately 8.6cm in length. This should be kept straight, in 'free space' and well away from all other circuitry, conducting objects and metalwork and should preferably be connected directly to the Antenna pin (24) of the transceiver.

If the antenna needs to be remote it should be connected via a 50Ω coaxial feeder cable or transmission line. A 50Ω transmission line can be constructed on FR4 board material by using a 3mm wide PCB track over a ground plane and this should be kept as short as possible.

The eRICA is also fitted with two u.FL RF connectors wired in parallel with pin 23 (RF Gnd) and pin 24 (RF In/Out). LPRS can supply suitable antennas fitted with matching connectors and low loss cable assemblies.

Helical antennas are also resonant and generally chosen for their more compact dimensions. They are more difficult to optimise than monopole antennas and are critical with regard to any surrounding conducting objects that can easily 'de-tune' them. They operate most efficiently when there is a substantial ground plane for them to radiate against.

PCB loop antennas are the most compact antennas but are less effective than the other types. They are also more difficult to design and must be carefully 'tuned' for best performance.

Chip antennas are attractive as they are compact and if used in accordance with the manufacturer's specifications can provide very good performance.

The Internet can provide much useful information on the design of Short Range Device (SRD) Antennas.

7. Product Order Code

Name	Description	Order Code
eRICA	Power Amplifier	ERICA

Please contact the sales office for availability.

8. MTBF

TBA

9. Regulatory Approvals

TBA

http://www.lprs.co.uk/knowledge-centre/regulatory-approvals.html

10. Document History

Issue	Date	Revision
1.0	November 2019	Preliminary datasheet

Changes to this Document This data sheet has been updated to reflect changes throughout the range of LPRS modules. Specific changes are recorded in the documentation history above.

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