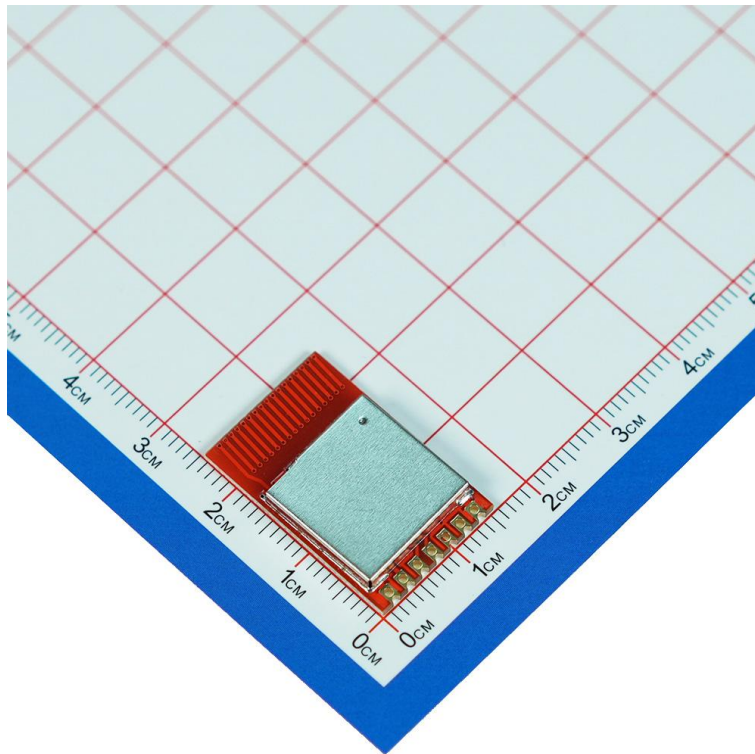




Ling-T3A Transmitter Module Datasheet



Item	Details
Product Model	Ling-T3A
Document Version	V2.1
Release Date	2026-07-04
Brand	FNRF



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1 Product Overview

Ling-T3A is an integrated RF remote-control transmitter module with an on-board antenna, RF transmission, and FB1527 digital encoding. With keys connected, it operates as a remote-control transmitter and is suitable for compact remote-control products where an external antenna is impractical.

The module can form an RF remote-control system with compatible receiver/decoder modules such as Ling-R1. The receiver can use momentary, toggle, interlock, serial-output, or other modes according to its datasheet.

2 Key Features

- Operating voltage: 2.2-5.5 V; typical: 3.0 V.
- Typical maximum output power: 10 dBm.
- Typical transmit current: 8 mA at 3 V.
- Integrated FB1527 digital encoding with a built-in random address code.
- Standby current below 1 μ A.
- Four key inputs, supporting up to 15 combined key values.
- On-board antenna, reducing the need for external antenna design in the complete product.

3 Typical Applications

- Remote Controls
- Wireless Switches
- Smart Homes
- Security Alarms
- Smart Appliances
- Toys and Small Wireless Control Devices



4 Technical Specifications

4.1 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit	Condition / Description
Supply Voltage Range	VDD	-0.3	5.5	V	Absolute Maximum
I/O Pin Voltage	VIO	-0.3	VDD+0.3	V	Absolute Maximum
Operating Temperature Range	TA	-30	80	degC	Ambient Temperature
Storage Temperature Range	TSTG	-40	125	degC	Storage Conditions
ESD Rating	VESD	-	2	kV	Human-Body Model

4.2 Performance Specifications

Parameter	Minimum	Typical	Maximum	Unit	Condition / Description
Frequency	-	433.92	-	MHz	-
Operating Voltage	2.2	3.0	5.5	V	VDD
Operating Current	-	8	-	mA	3 V
Standby Current	-	-	1	uA	-
Output Power	-	10	-	dBm	-
Frequency Deviation	-	±30	-	kHz	RF Frequency Deviation
Modulation	-	ASK	-	-	-
Transmit Shutoff Delay	0.5	-	-	ms	Power off Delay Time



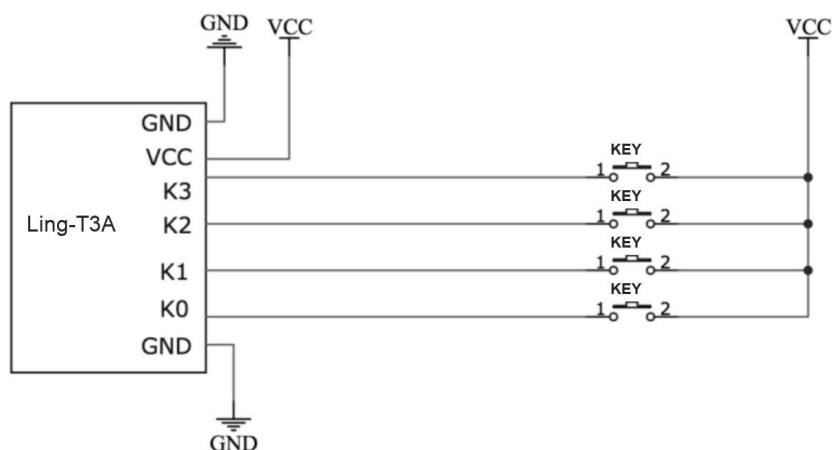
5 Pins and Operation



Bottom View

Pin Name	Type	Function	Description
GND	Power	Power Ground	Connect to system ground.
K0	Input	Key Input	High-level trigger; corresponds to receiver D3 output.
K1	Input	Key Input	High-level trigger; corresponds to receiver D2 output.
K2	Input	Key Input	High-level trigger; corresponds to receiver D1 output.
K3	Input	Key Input	High-level trigger; corresponds to receiver D0 output.
VCC	Power	Positive Supply	2.2~5.5 V; typical: 3.0 V.
GND	Power	Power Ground	Connect to system ground.

Wiring Diagram:

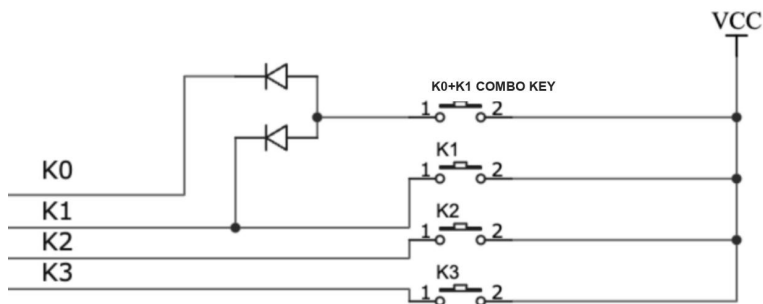




4 Keys, combinable to 15 values; high-level trigger

For more keys, use Ling-T3MAX, use Ling-R1-M5N serial mode, supports up to 25 Keys.

Combined keys require isolation diodes, for example:



Operation:

Option 1



Option 2



Option 3





6 Operating Method

The module is a key-triggered remote-control transmitter. When a key input is triggered, it transmits the corresponding FB1527 encoded signal; transmission stops when the key is released.

Item	Description
Trigger Method	Triggered by key input; follow the pin assignment for the active level.
Encoding Method	FB1527 digital encoding with a built-in random 20-bit address code.
Receiver Pairing	Can be used with Ling-R1 series receiver modules.
Output Link	ASK/OOK RF transmit link; receiver output depends on the operating mode of the receiver module.

7 Encoding and Key Values

FB1527 encoding consists of an address code and a key value. After the receiver recognizes the same address code and key value, it outputs according to its configured momentary, toggle, interlock, serial, or other mode.

Pin	Hexadecimal Key Value	Description
K0	0x08	Corresponds to receiver D3 output
K1	0x04	Corresponds to receiver D2 output
K2	0x02	Corresponds to receiver D1 output
K3	0x01	Corresponds to receiver D0 output

Key values can be viewed with the Development Assistant:



When using combined keys, add isolation diodes to prevent crosstalk between keys. The combined key value equals the sum of the individual key weights.



8 Power-Supply Design Recommendations

- VCC must operate within the voltage range specified in this datasheet; 3 V or 3.3 V is recommended.
- Place a 0.1 μ F decoupling capacitor near the module at the power entry.
- Transmit current is approximately 8 mA at 3 V; allow margin for battery, regulator, and trace voltage drop.
- Key-input and external LED circuits must not apply a voltage above VCC directly to module I/O.

9 EMC and Interference-Immunity Recommendations

- For long key lines, avoid parallel routing with motor wires, relay wires, or high-dv/dt switching-power nodes.
- If the enclosure contains motors, buzzers, relays, or high-current LEDs, keep the module and antenna away from interference sources.
- During complete-product ESD testing, prioritize verification of enclosure openings, keycaps, and interfaces; add structural isolation or input protection as necessary.
- For products sensitive to range and false triggering, test co-channel interference and simultaneous use of multiple units in the target environment.

10 PCB Layout Recommendations

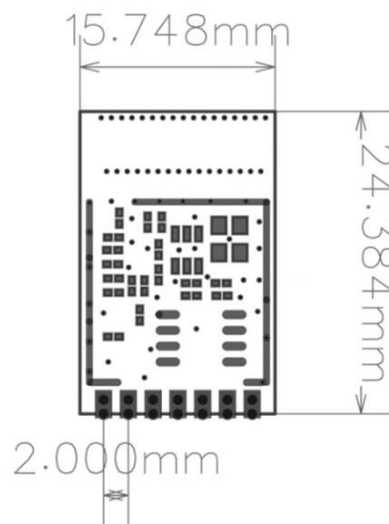
- Keep module power and ground traces short and wide; do not share a long, narrow ground-return path with high-current loads.
- Keep key-input traces short and away from the RF antenna end and high-noise power nodes.
- If external LEDs are used, do not route their return path through antenna-clearance areas or sensitive key-input areas.
- When panels or production fixtures contact the module, avoid concentrating mechanical stress near pads and the antenna.



11 Antenna and Mechanical Recommendations

- Antenna type: on-board antenna. Keep antenna clearance according to the module outline and complete-product structure.
- Keep the antenna area away from metal enclosures, batteries, large copper areas, and shields.
- 315 MHz and 433.92 MHz versions have different antenna lengths and matching; confirm the frequency version during product selection.
- Before mass production, test range and consistency in the final enclosure, with the final battery, and in the final installation orientation.

12 Dimensions



13 Ordering and Technical Support

Technical documentation, configuration software, and test tools are available from the FNRf Wireless website:

www.fnr-f-tech.com

During product selection, confirm frequency, antenna type, number of keys, receiver model, and application environment.



Appendix Development Tools

Development Assistant	Signal Assistant
	
Difference: 1、Measures data values 2、Requires an encoding type (1527, etc.)	Difference: 1、Measures signal strength 2、No encoding restriction (ASK/OOK modulation)
Use: 1、Displays the address code and key value of a remote control/transmitter module 2、Displays remote-control frequency, pulse width, and encoding type 3、Volume testing of remote-control products	Use: 1. Displays signal strength of a remote control/transmitter module (relative value) 2. Compares antenna performance 3. Volume testing of remote-control products
Power Supply: TYPE-C	Power Supply: TYPE-C