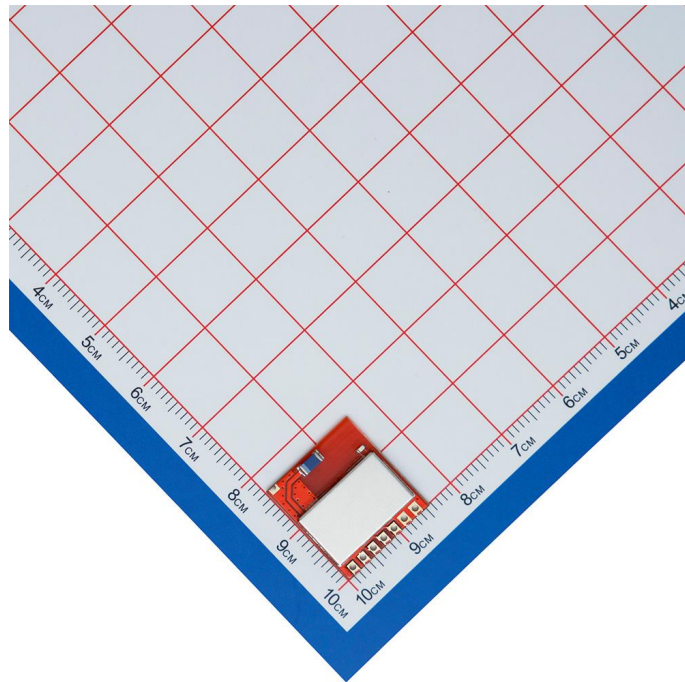




Ling-TR7mini-T Micro Remote Control Module



Item	Details
Product Model	Ling-TR7mini-T
Document Version	V1.2
Release Date	2026-07-30
Brand	FNRFLINK



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1 Product Overview

Ling-TR7mini-T is a miniature 2.4 GHz remote-control transceiver module that supports six transmitter-receiver pairs operating simultaneously.

The module has a ceramic antenna and supports switch-signal input/output and pairing. It can operate in transmit or receive mode and is suitable for space-constrained wireless switches, remote-control applications, and compact status-transmission products.

The module supports the 2.4 GHz ISM band over 2401–2528 MHz, with 2483 MHz as the default frequency. The reference line-of-sight transmission distance is approximately 50 m.

2 Key Features

- Operates in the 2.4 GHz ISM band with GFSK modulation.
- Frequency range: 2401–2528 MHz; default: 2483 MHz.
- Supports six simultaneous operating pairs.
- Supply range: 2.2–3.6 V; 3.0 V typical.
- Typical receiver sensitivity: –88 dBm.
- Typical transmitter operating current: 10.8 mA at 0 dBm.
- Typical transmitter non-transmitting current: 6 μ A.
- Typical receiver current: 7.2 mA; 1 mA or 0.1 mA versions are available on request.
- Supports switch-signal transmission and pairing; stores up to 32 transmitter IDs.
- Selectable momentary and toggle output modes.
- Ceramic antenna and compact SMD package.

3 Typical Applications

- Wireless remote-control switches
- Smart homes
- Smart appliances
- Industrial control
- Instruments and meters
- Compact low-power wireless terminals



4 Technical Specifications

Parameter	Min.	Typical	Max.	Unit	Condition / Description
Operating Voltage	2.2	3.0	3.6	V	Between VCC and G.
Operating Band	2401	2483	2528	MHz	Default: 2483 MHz.
Modulation	-	GFSK	-	-	2.4 GHz wireless link.
Reference Distance	-	50	-	m	Open line-of-sight reference value; verify actual distance in the complete product.
Receiver Sensitivity	-	-88	-	dBm	Typical value.
Transmitter Operating Current	-	10.8	-	mA	POUT = 0 dBm.
Transmitter Non-Transmitting Current	-	6	-	uA	Transmitter standby state.
Receiver Current	-	7.2	-	mA	Standard receiver version; 1 mA and 0.1 mA versions are available on request.
Pairing Capacity	-	32	-	sets	Up to 32 transmitter IDs retained after power-off.
D1-D3 Output Current	-	-	15	mA	Switch-signal output in receive mode.
Antenna Type	-	Ceramic antenna	-	-	Built into the module.
Package Type	-	SMD	-	-	Refer to the dimensional drawing and pad documentation.
Dimensions	-	15.70 x 17.30	-	mm	Excludes process tolerances.
Pad Pitch	-	2.00	-	mm	See dimensional drawing.



5 Pin Assignment



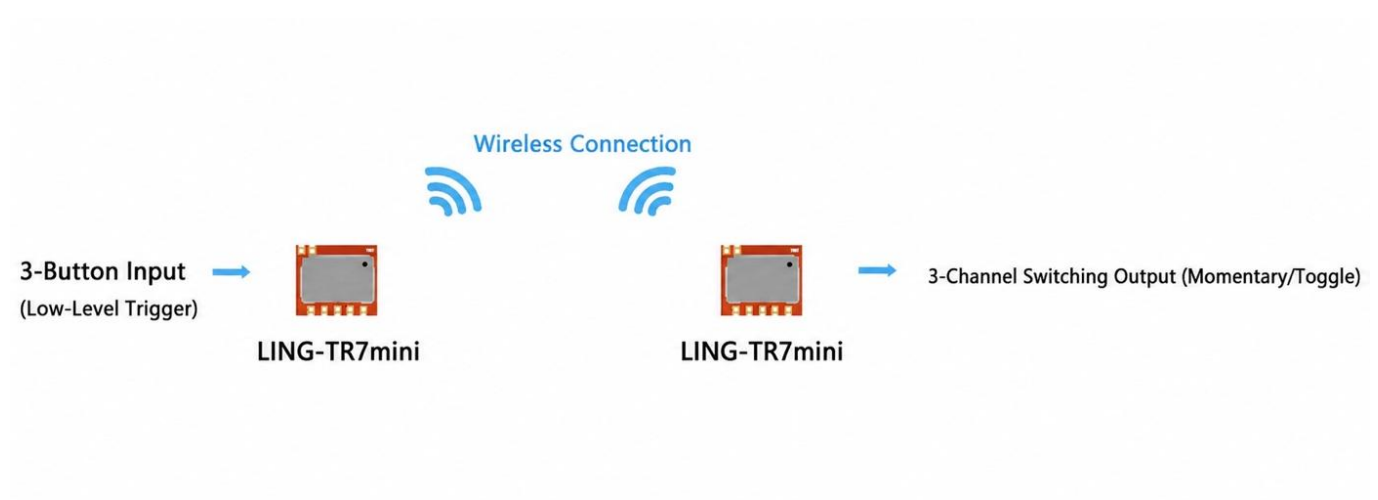
Bottom View

Pin Name	Type	Function	Description
VCC	Power	Positive Supply	2.2~3.6 V; 3.0 V typical.
D1-D3	Input / Output	Switch-Signal Input / Output	Connect keys in transmit mode; low-level triggering. Outputs high in receive mode; maximum output current is 15 mA.
KL	Input	Pairing Control	Quickly double-press to G twice to enter pairing mode; press any transmitter key to pair.
MC	Input	Output Mode Selection	Floating: momentary; high level: toggle.
WM	Input	Operating Mode Selection	Floating: transmit; high level: receive.
G	Power	Ground	Use common ground with the external circuit.



6 Operation and Working Modes

Mode	WM Pin	MC Pin	D1-D3 State	Description
Transmit Mode	Floating	Any	Input	Connect D1-D3 to keys or MCU I/O; low level triggers transmission.
Receive Momentary Mode	High Level	Floating	Output	When a paired transmitter signal is received, the corresponding output follows the key action momentarily.
Receive Toggle Mode	High Level	High Level	Output	When a paired transmitter signal is received, the corresponding output toggles and holds.



Pairing:

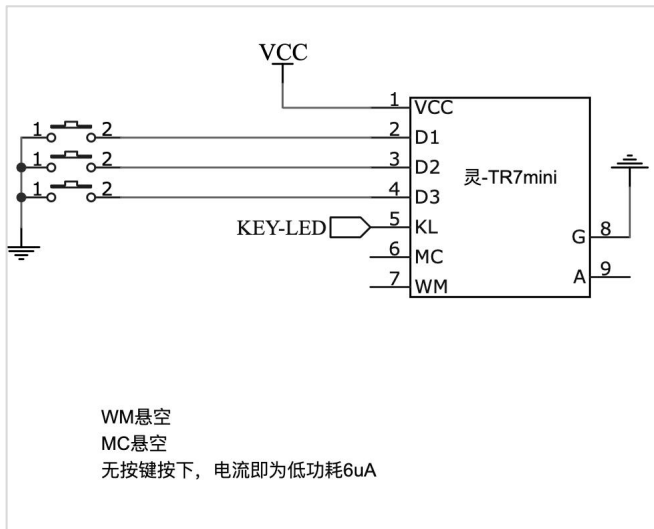
Double-press the receiver-side “Pairing Key”. The module LED flashes to enter pairing mode. Within 10 seconds, press any transmitter key once; the receiver LED flashes rapidly twice to confirm successful pairing. Pairings are retained after power-off, and one receiver module stores up to 32 transmitter IDs.

Clearing:

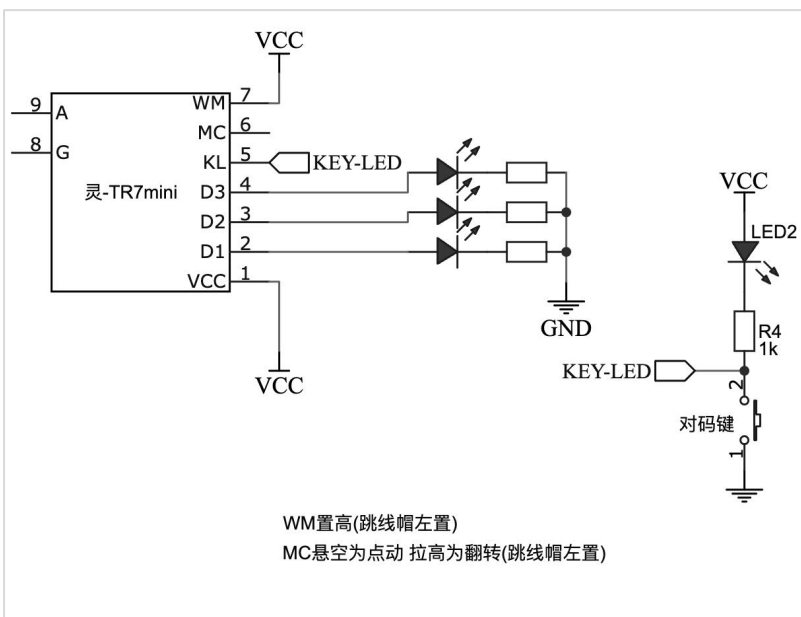
Press and hold the receiver-side “Pairing Key” for more than 6 seconds until the module LED turns off to clear all stored pairings.



Transmit Mode:



Receive Mode:



LED Indication:

The indicator flashes when data is received or transmitted.



7 Quick Connection

Module Pin	Connection Target	Description
VCC	3.0 V/3.3 V Supply	Supply range: 2.2–3.6 V; do not connect directly to 5 V.
G	System GND	Must share ground with the external circuit.
D1–D3	Keys or MCU I/O	Low-level triggering in transmit mode; high-level output in receive mode.
KL	Key to GND	Used for receiver-side pairing and clearing.
MC	Jumper or MCU I/O	Select momentary or toggle in receive mode.
WM	Jumper or MCU I/O	Select transmit or receive mode.

8 Pairing and Clearing

Action	Method	Result
Pairing	Double-press the receiver-side pairing key. When the module LED flashes, press any key once within 10 seconds.	The receiver LED flashes rapidly twice to indicate successful pairing.
Clearing	Press and hold the receiver-side pairing key for more than 6 seconds until the module LED turns off.	Clears stored transmitter IDs.
Storage Capacity	–	One receiver module stores up to 32 transmitter IDs; retained after power-off.

9 LED Indication

State	LED Indication
Pairing Mode	LED flashes.
Pairing Successful	LED flashes rapidly twice.
Operating State	LED is off; it flashes when data is received or transmitted.



10 MCU Integration Recommendations

D1-D3 on Ling-TR7mini-T are switch-signal interfaces. In receive mode, the MCU can sample D1-D3 as ordinary digital inputs; in transmit mode, it can drive D1-D3 low through I/O to trigger the corresponding wireless keys. Control products should add software debouncing, state confirmation, and timeout protection to avoid unintended operation caused by load interference or edge bounce.

Transmitter I/O Triggering Recommendations

Item	Recommendation
Trigger Method	MCU I/O triggers D1-D3 at low level to activate the corresponding wireless keys.
Trigger Duration	Hold for at least 50-100 ms, then release to high impedance or high level.
Repeated Transmission	Control products may repeat triggering 2-3 times as needed and suppress repeated actions at the receiver.
Safety Handling	For loads such as motors, door locks, heaters, and relays, add interlocking, timeout, and state confirmation at the receiver.

11 Power-Supply Design Recommendations

- The module supply range is 2.2-3.6 V; design for a 3.0 V or 3.3 V system.
- Typical transmit-state current is 10.8 mA at 0 dBm. Keep VCC traces short, wide, and close; do not share long, narrow power paths with loads such as relays, motors, buzzers, or backlights.
- Place a 0.1 uF decoupling capacitor near module VCC/G, and add a 4.7 uF-22 uF bulk capacitor according to the complete-product supply.
- For battery-powered applications, verify low-voltage operation, voltage dip during transmission, and communication success rate in receive mode.
- When debugging range or unintended-operation issues, use an oscilloscope near the module VCC/G pins to observe supply voltage dips, spikes, and ripple.



12 EMC and Interference-Immunity Recommendations

- Keep the module and ceramic antenna away from DC-DC inductors, relays, motors, compressors, buzzers, high-current harnesses, and high-voltage switching nodes.
- Configure flyback, suppression, isolation, and suitable return paths for inductive loads such as relays, motors, and coils in accordance with complete-product EMC requirements.
- When D1-D3 drive external loads, do not exceed the 15 mA output-current limit directly; use transistors, MOSFETs, relays, or driver ICs for high-current loads.
- If false triggering, missed pairing, or reduced range occurs during load operation, test no-load, load-operation, enclosure-assembled, and actual-installation conditions separately.
- Production testing should record supply, current version, output mode, antenna orientation, enclosure condition, load operation, and communication success rate.

13 PCB Layout Recommendations

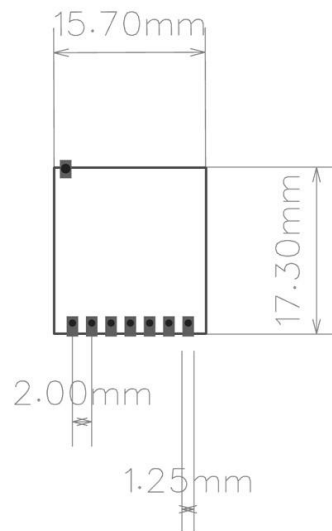
- When placing the module, prioritize clearance around the ceramic antenna. Avoid copper areas, metal structures, batteries, shields, and high-noise components near the antenna.
- Keep the VCC/G power loop short, and prevent high-current load return paths from passing through the module ground.
- Keep digital lines such as D1-D3, KL, MC, and WM as short as possible; avoid long parallel routing near motor wiring, power-switching nodes, and the antenna area.
- If D1-D3 connect to external keys, consider key-line protection, pull-up/pull-down, and debouncing according to complete-product ESD requirements.
- The module bottom pads and ceramic-antenna orientation must match the package, dimensional drawing, and production placement orientation; inspect carefully on the first article.



14 Antenna and Mechanical Recommendations

- Ling-TR7mini-T has a built-in ceramic antenna; reserve a clearance area for the antenna in the complete-product mechanical design.
- Do not place metal enclosures, batteries, large copper areas, shields, or high-noise components close to the ceramic antenna.
- Before finalizing the enclosure, test range and success rate with the final enclosure, installation orientation, battery/harness locations, and target operating environment.
- If the product is installed in a metal cabinet, behind a wall, or in a high-interference 2.4 GHz environment, first adjust module location and antenna orientation.
- Enclosure materials, battery location, and fastening method may vary between batches and affect communication; verify in the actual assembly condition before mass production.

15 Dimensions





16 Ordering and Technical Support

Technical documentation and test tools are available from the FNRFLINK Wireless website:

WWW.FNRFLINK.COM

For certified products, long-range products, or high-interference sites, complete range, false-trigger, and EMC-related verification with the final product structure, actual power supply, load operation, enclosure assembly, and installation environment.