

Gaqqee LX-PB225M 22.5W Mini Fast Charging Module

User Instruction Manual

1. Introduction

The Gaqqee LX-PB225M is a compact and high-performance 22.5W fast charging module designed for DIY power bank projects and other portable power applications. It supports a wide range of fast charging protocols and is suitable for single-string 3.7V (full 4.2V) lithium batteries, including polymer, 18650, and 21700 types. This module features a digital display for battery percentage and offers both Type-C and USB output interfaces.

2. Features

- Small volume, high power, and high efficiency.
- Supports full fast charging protocols including PPS/PD3.0/PD2.0, QC4+/QC4/QC3.0/QC2.0, FCP, SCP (5V4.5A or 4.5V/5A), HSCP, SFCP, PE1.1.
- Charging current up to 5A, efficiency up to 96%.
- Output power up to 22.5W, efficiency up to 95%.
- Automatic load detection / light load detection.
- High-current USB output interface.
- Supports small current mode.
- Digital tube display for battery percentage and LED power indicator.
- Built-in output overcurrent/short circuit protection.
- Charge timeout/over-voltage protection.

3. Specifications

Parameter	Value/Description
Model	LX-PB225M
Input/Output Power	Up to 22.5W
Charging Current	Up to 5A
Efficiency (Charging)	Up to 96%
Efficiency (Output)	Up to 95%
Supported Battery Type	Single string 3.7V (full 4.2V) lithium batteries (polymer, 18650, 21700)
Input/Output Ports	Type-C (supports input and output), USB (high current output)
Display	Digital tube display (percentage), LED indicator
Dimensions (approx.)	33.00mm x 28.00mm (Board thickness 6mm, with digital display 8.5mm)

Supported Fast Charging Protocols:

- BC1.2/5V2.4A
- PD2.0/3.0/PPS
- QC2.0/3.0/4.0
- AFC, FCP, SCP, VOOC/DASH/WARP PE2.0/PE1.1, SFCP

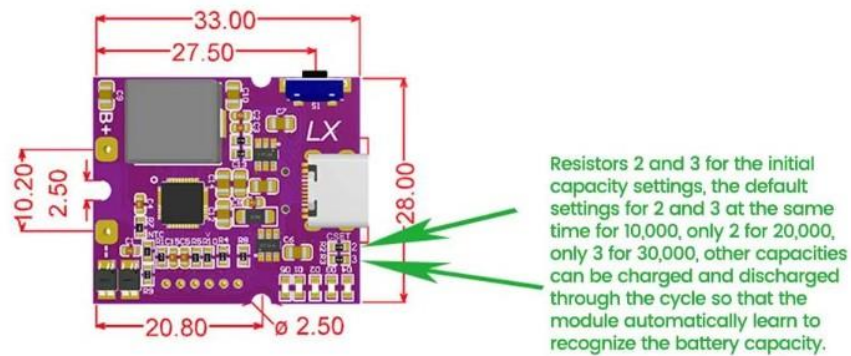


Figure 1: Module Dimensions and Capacity Resistor Settings. Resistors 2 and 3 are for initial capacity settings. Default settings for 2 and 3 at the same time are 10,000mAh. For 2 only, 20,000mAh. For 3 only, 30,000mAh. Other capacities can be charged and discharged through the cycle so that the module automatically learns to recognize the battery capacity.

4. Setup and Installation

Careful wiring is essential for the safe and proper operation of the LX-PB225M module. Please follow these instructions precisely:

1. **Battery Compatibility:** This module is designed for single-string 3.7V (full 4.2V) lithium batteries only. Do NOT connect other battery types. Ensure your battery is not aging for optimal performance.
2. **Parallel Connection ONLY:** Batteries MUST be connected in parallel. Connecting batteries in series will damage the motherboard. The number of batteries in parallel is not limited, but ensure they are all 3.7V lithium cells.
3. **Wiring Thickness and Length:** Battery and motherboard cables must be sufficiently thick to handle the required current. For fast charging, cables should pass 10A; for non-fast charging, at least 7A. Keep wires as short as possible to minimize resistance and power loss.
4. **Welding Connections:** All battery connections (B+ and B-) MUST be welded. Twisted wires will result in insufficient power supply and potential malfunction.
5. **Polarity Check:** Pay extreme attention to battery polarity. Connecting the battery in reverse will permanently damage the motherboard.
6. **Pre-Wiring Test:** Before connecting the battery, it is highly recommended to plug in the module and check if the indicator light is normal. This helps verify the module's basic functionality before full battery integration.

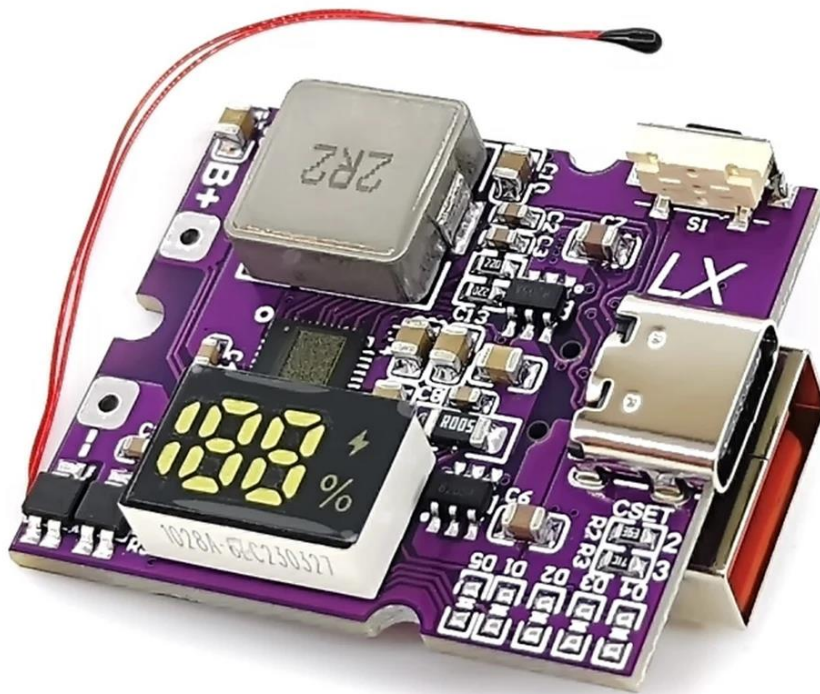


Figure 2: Back of the Module with Important Warning. The text indicates: 'Before connecting the battery, be sure to plug in and check if the indicator light is normal. Please plug in and test before wiring. It is normal for it to heat up during use.'

7. **B+ Connection:** Connect the battery positive terminal to the B+ interface. This connection must be welded, and the wire must be thick and not too long.
8. **B- Connection:** Connect the battery negative terminal to the B- connector. This connection must be soldered, and the wire must be thick and not too long.
9. **Post-Wiring Verification:** After wiring the module, use a multimeter to measure the voltage at the B+ and B- contacts while the module is charging and discharging. The voltage should be the same or have a very small difference. A large difference indicates a wiring problem or an aging battery.

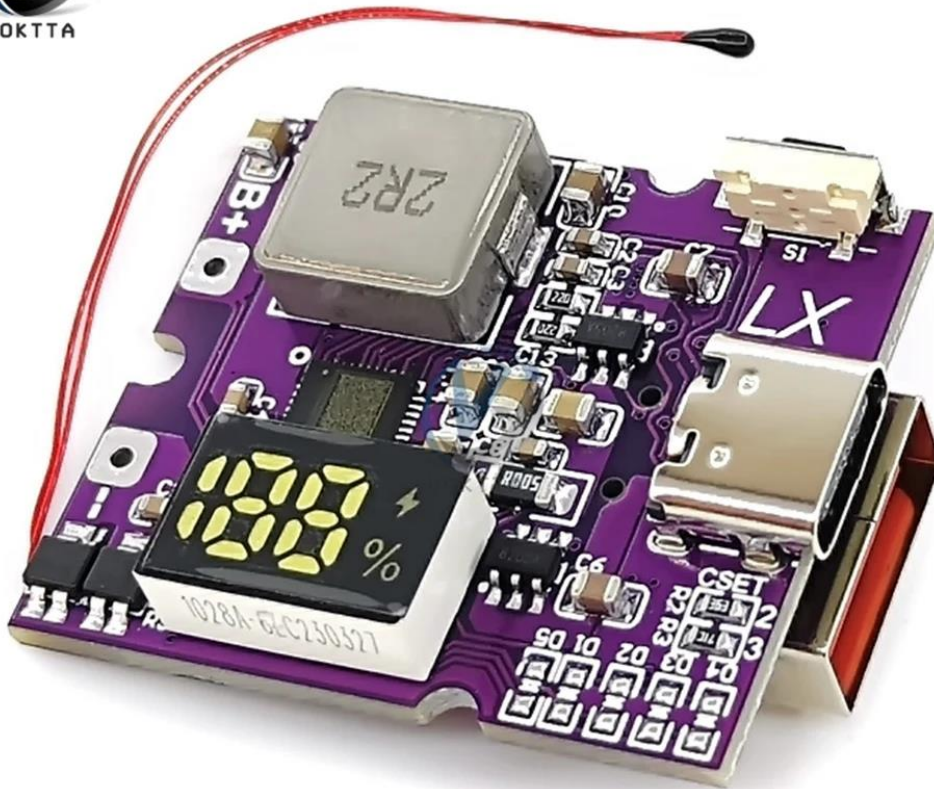


Figure 3: LX-PB225M Module Overview (Type-C + USB with Digital Display).

5. Operating Instructions

The module features a button for controlling output and display, and various ports for charging and discharging:

- **Button Functionality:**
 - **Short Press:** Activates the USB port and the lightly loaded Type-C output port for external device discharge and illuminates the power display.
 - **Double-Click:** Deactivates the USB port and Type-C output port, turning off the power display. If an external power supply is connected (charging the module), only the output ports will be closed, and the display may remain active to show charging status.

- **Type-C Port:** Supports both input (charging the power bank) and output (discharging to devices).
- **USB Port:** Provides high current output for charging external devices.
- **Digital Display:** Shows the current battery percentage, providing a clear indication of the power bank's charge level.

6. Maintenance

- **Keep Dry:** Avoid exposing the module to moisture or liquids, which can cause short circuits and damage.
- **Cleanliness:** Keep the module free from dust and debris. Use a soft, dry brush or compressed air for cleaning if necessary.
- **Temperature:** Operate and store the module within recommended temperature ranges. Extreme temperatures can affect performance and lifespan.
- **Physical Protection:** Handle the module with care to prevent physical damage to components or solder joints.
- **Battery Health:** Ensure the connected lithium batteries are in good condition and not aging, as this directly impacts the module's performance and safety.

7. Troubleshooting

- **Module Not Functioning After Wiring:**
 - Check all wiring connections for correct polarity (B+ to positive, B- to negative). Reverse polarity will damage the board.
 - Ensure all connections are securely welded. Loose or twisted wires can prevent proper power flow.
 - Verify that the battery voltage is within the specified 3.7V (4.2V full charge) range for lithium batteries. Connecting batteries with higher voltage or different chemistry will damage the module.
 - Confirm that batteries are connected in parallel, not in series. Series connection will burn the motherboard.
- **Module Heats Up Excessively:**
 - Some heat generation is normal during high-power charging/discharging due to the module's compact size.

- Ensure adequate ventilation around the module.
- Check if the connected wires are sufficiently thick and short. Thin or long wires can cause resistance and increased heat.
- If heat is excessive and accompanied by malfunction, disconnect power immediately and re-check all wiring and battery conditions.
- **Digital Display Not Working or Incorrect:**
 - Ensure the module is powered on (short press the button).
 - Check battery connections. A poor connection can lead to inaccurate readings or no display.
 - If the module is new, allow it to complete a few charge/discharge cycles for accurate battery capacity recognition.
- **Charging/Discharging Issues (Slow or None):**
 - Verify that the input power source (for charging the power bank) is sufficient and stable.
 - Check the output cable and the device being charged. Ensure they are compatible with fast charging protocols if fast charging is expected.
 - Measure voltage at B+ and B- during operation with a multimeter. A significant voltage difference between charging and discharging indicates a wiring issue or an aging battery.

8. User Tips

- **Use Quality Batteries:** Always use high-quality, non-aging 3.7V lithium batteries for the best performance and safety.
- **Proper Ventilation:** When integrating into a DIY power bank enclosure, ensure there is sufficient airflow to dissipate heat, especially during high-power operation.
- **Test Before Enclosing:** Fully test the module's functionality, including charging and discharging, before permanently enclosing it in a case.
- **Capacity Recognition:** For new setups or after changing batteries, allow the module to complete a full charge and discharge cycle to accurately recognize the battery capacity for the digital display.

- **Short Circuit Prevention:** Be extremely careful to prevent any metal objects from short-circuiting the module's exposed contacts, especially during assembly.

9. Warranty and Support

For warranty claims or technical support, please contact your retailer or the manufacturer directly. Keep your purchase receipt as proof of purchase. This manual provides general guidance; specific issues may require professional assistance.