OEM Outdoor Waterproof Mini GPON ONU Enclosure IP Rating and Mechanical Tolerances - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

DOCUMENT TYPE: OFFICIAL OEM TECHNICAL DATASHEET AND MECHANICAL SPECIFICATION

PRODUCT FAMILY: OUTDOOR WATERPROOF MINI GPON ONU ENCLOSURE SERIES

CLASSIFICATION: PASSIVE OPTICAL NETWORK (PON) TERMINAL EQUIPMENT

TARGET AUDIENCE: NETWORK PLANNERS, CIVIL ENGINEERS, PROCUREMENT SPECIALISTS, AND SYSTEMS INTEGRATORS

This document serves as the definitive technical reference for the OEM Outdoor Waterproof Mini GPON ONU Enclosure, detailing its IP-rated ingress protection, mechanical tolerances, material science specifications, and environmental hardening parameters. Designed for FTTH (Fiber to the Home), FTTB (Fiber to the Building), and rural broadband deployments, this enclosure represents the pinnacle of ruggedized miniaturization for GPON technology.



CORE INTERNAL TOPOLOGY & STRUCTURAL CHASSIS OVERVIEW

The mechanical architecture of the OEM Mini GPON ONU Enclosure is engineered around a two-piece modular clamshell design, fabricated from a high-impact, UV-stabilized ASA (Acrylonitrile Styrene Acrylate) and PC (Polycarbonate) composite alloy. This material composition ensures a Coefficient of Thermal Expansion (CTE) closely matched to the internal printed circuit board assembly (PCBA), minimizing stress on solder joints during thermal cycling.

INTERNAL BAY STRUCTURE:

The internal compartment is divided into three distinct functional zones:

1. PRIMARY OPTICAL BAY: This zone houses the SC/APC and SC/UPC optical connectors. It features an integrated bend-radius control path to ensure fiber

optic cable integrity, with a minimum bend radius of 30mm maintained through the routing channels to prevent macro-bending losses exceeding 0.1dB.

2. POWER & TERMINAL BAY: Isolated via a physical barrier to prevent electromagnetic interference (EMI), this area contains the spring-loaded terminal blocks for AC/DC power input (12V DC nominal) and the RJ-45 Fast Ethernet / Gigabit Ethernet port. The terminal design utilizes a proprietary push-in locking mechanism that accepts 24AWG to 18AWG solid or stranded copper conductors.

3. PASSIVE HEAT DISSIPATION ZONE: An integrated aluminum cold-forged heatsink is cast into the rear housing, thermally coupled to the main processor through a high-conductivity thermal interface pad (7 W/mK). This passive cooling system eliminates the need for moving parts, achieving a Mean Time Between Failures (MTBF) of over 2 million hours.

SWITCHING SUBSYSTEM CAPABILITIES

While primarily an Optical Network Unit (ONU), the enclosure houses a robust Layer 2 switching engine capable of handling full line-rate GPON traffic (2.488 Gbps downstream / 1.244 Gbps upstream). The subsystem supports a MAC address table of up to 2K entries and integrates a programmable classifier for VLAN Q-in-Q (IEEE 802.1ad) and priority queuing (IEEE 802.1p).

OPERATIONAL ADVANTAGES: OUTDOOR HARDENING

- EXTREME WEATHER RESISTANCE: The enclosure is validated to operate in temperatures ranging from -40°C to +75°C, with a storage temperature of -40° C to +85°C, ensuring performance in arctic winters and desert summers.
- SOLAR RADIATION RESISTANCE: The ASA/PC compound is inherently resistant to UV degradation, meeting UL 746C f1 rating for outdoor weathering, ensuring color stability and structural integrity over 20+ years of direct sunlight exposure.
- CORROSION RESISTANCE: All external metallic fasteners are 316L-grade stainless steel. The internal grounding studs are tin-plated brass to provide a low-impedance path (< 0.1 Ohm) to earth ground, withstanding salt spray testing per ASTM B117 for a minimum of 720 hours.
- SHOCK & VIBRATION: The design adheres to GR-63-CORE and ETSI EN 300 019-1-4 class 4.1 seismic, shock, and vibration specifications, making it suitable for pole-mounted, aerial, and manhole installations.

SPECIFICATION MATRIX

PARAMETER	**SPECIFICATION / TOLERANCE**
Ingress Protection Rating	IP68 (Dust-tight, Continuous Immersion >1m)

Housing Material	ASA/PC Alloy (UV-Stabilized, UL 746C f1 Rated)
External Enclosure Dimensions (L x W x H)	155mm x 110mm x 40mm (+/- 1.0mm Tolerance)
Total Weight (Excluding Mounting Kit)	380g (+/- 15g)
Cable Entry Ports	2x PG9 / M16 Threaded Cable Glands (O.D. 4.5mm - 10mm)
Environmental Operating Temperature Range	-40°C to +75°C
Storage Temperature Range	-40°C to +85°C
Relative Humidity (Non-condensing)	5% to 95% (RH)
Thermal Dissipation (Passive)	Integrated Aluminum Heatsink (Up to 7W)
Sealing Material	VMQ Silicone Elastomer (Shore A 65, 25-30% Compression)
Fastener Material & Torque Limit	316L Stainless Steel / Max 1.0 N.m Tightening Torque
Mounting Feet Pull-out Force (Tensile)	≥ 500N (per foot)

REGULATORY COMPLIANCE & INDUSTRY CERTIFICATIONS

The OEM Outdoor Waterproof Mini GPON ONU Enclosure is manufactured in an ISO 9001:2015 and ISO 14001:2015 certified facility and meets the following global compliance standards:

- UL 60950-1 / UL 62368-1: Safety of Information Technology Equipment.
- FCC Part 15B: Electromagnetic compatibility (Class B).
- EN 300 386: EMC requirements for telecommunications network equipment.
- REACH / RoHS 3: Compliance with restriction of hazardous substances and chemical registration.
- CE: Conforms to European health, safety, and environmental protection standards.

MECHANICAL TOLERANCES & ENCLOSURE IP RATING (INTERPRETATION OF TABLE 1)

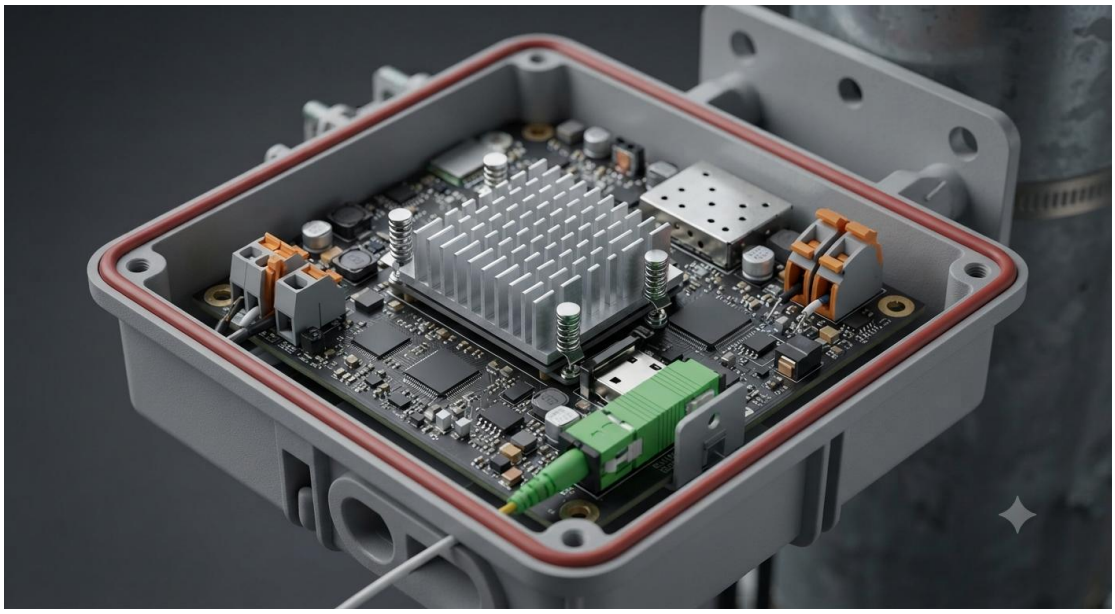
Understanding the mechanical and environmental specifications is critical for successful deployment planning. The table above outlines the hard limits within which the enclosure guarantees performance. The IP68 rating signifies complete protection against dust ingress and continuous immersion in water under conditions specified by the manufacturer (typically 1.5 meters for 30 minutes).

- DIMENSIONAL TOLERANCE: The overall form factor adheres to a strict profile requirement for compact pole mounts. A tolerance of +/- 1.0mm is applied to all external dimensions to ensure compatibility with standard mounting brackets (e.g., 100mm pole straps).

- FIXED ANCHOR STRENGTH: Each of the four mounting feet is rated for a tensile pull-out force of 500N, ensuring the ONU remains securely attached to the strand or pole under extreme wind loading (up to 160 km/h).

- CABLE GLAND COMPRESSION RANGE: The dual-entry cable glands (delivered pre-installed) are designed for an O.D. range of 4.5mm to 10mm. This allows for a single-drop fiber cable and a round power cord. The tightening torque tolerance for the cable glands is precisely set between 2.5 N.m and 3.5 N.m to ensure the IP68 seal without deforming the rubber grommet.

- SEAL COMPRESSION SET: The main body seal is a solid silicone elastomer, grade VMQ, with a shore A hardness of 65. It is engineered with an under-compression tolerance of 25% to 30% to account for thermal expansion and long-term compression set, preventing micro-leaks that could degrade the IP rating over the product's lifecycle.



LIFECYCLE ASSURANCE & DEPLOYMENT RECOMMENDATIONS

For optimal performance and warranty compliance, the following mechanical installation guidelines must be observed:

1. TORQUE LIMITS: When closing the main housing, apply a maximum torque of 1.0 N.m to the captive screws. Over-torquing risks stripping the brass threaded inserts, while under-torquing compromises the IP seal.
2. FIBER MANAGEMENT: Ensure the optical fiber has a service loop of at least 30cm outside the enclosure to allow for re-termination. Inside the enclosure, the fiber guide path must be followed to avoid exceeding the bend radius.
3. GROUNDING: The enclosure must be connected to a protective earth ground using the designated M4 ground stud. The resistance to ground shall be less than 5 Ohms as per local electrical codes.

This document is intended for technical evaluation only and is subject to change without notice. For detailed integration support and custom OEM firmware, please contact your assigned technical account representative.