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## GPON ONU Stick B+ I-temp VP-GSB134IS-AA

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### Product Overview

The VP-GSB134IS-AA represents a G.984.2 compliant (GPON) Optical Network Terminal (ONT) module in a Small Form-factor Pluggable (SFP) package. This device integrates a bi-directional optical transceiver and GPON MAC functionality, enabling a direct GPON uplink to customer premise equipment (CPE) equipped with a standard SFP port. This integration provides an asymmetric 1.244Gbps upstream and 2.488 Gbps downstream connection without necessitating a separate power supply at the CPE. The VP-GSB134IS-AA incorporates a comprehensive ONT management system, encompassing alarms, provisioning, and IGMP functions to facilitate stand-alone IPTV solutions at the ONT level

### Features

- Simplex SC/APC Connector, Integrated Diplexer Transceiver
- SFP MSA, digital diagnostics SFF-8472 Compliant
- Compliant to FSAN G.984.2 Specifications
- 1244 Mbps Tx, 2488 Mbps Rx Asymmetric Data Rate
- Operating case temperature: -40~85°C and 0~85°C
- Subscriber location identifier (SLID)
- PON Link Status notification
- Dying Gasp notification support
- Response the TX power shut-down command from OLT when OLT detect anomaly
- TC Layer GEM encapsulation mode
- OMCI support per ITU-T G.988
- 28 dB link budget; Class B+, 20 km reach
- Compliant to IEC-60825 Class 1 laser diode
- RoHS compliant
- Internal Calibration

### Ordering Information

| Part Number    | Description       |
|----------------|-------------------|
| VP-GSB134IS-AA | GPON OLT D I-temp |

## Absolute Maximum Ratings

| Parameter                   | Symbol | Min  | Typical | Max  | Unit | Notes |
|-----------------------------|--------|------|---------|------|------|-------|
| Storage Temperature         | TS     | -40  |         | +85  | °C   |       |
| Operating Voltage           | VCC    | 3.14 | 3.30    | 3.46 | V    |       |
| Operating Relative Humidity | RH     | 5    |         | 95   | %    |       |

## Recommended Specifications

| Parameter                               | Symbol         | Min | Typical | Max    | Unit | Notes |
|-----------------------------------------|----------------|-----|---------|--------|------|-------|
| Operating Case Temperature              | TC             | -40 |         | 85     | °C   |       |
| Total Tx and Rx Supply Current          | ICC            |     | 600     |        | mA   |       |
| Power Dissipation                       | PD             |     | 2       |        | W    |       |
| Bit Rate(Tx)                            | BR             |     | 1244.16 |        | Mbps |       |
| Bit Rate(Rx)                            | BR             |     | 2488.32 |        | Mbps |       |
| Transmission Distance                   | TD             |     |         | 20,000 | m    |       |
| Module Initialize time                  | T_Initial      |     |         | 70     | s    |       |
| Two-wire serial interface<br>Clock rate | f_serial_clock |     |         | 80     | Khz  |       |

## Optical - Transmitter

| Parameter                           | Symbol                          | Min  | Typical | Max  | Unit | Notes |
|-------------------------------------|---------------------------------|------|---------|------|------|-------|
| Center Wavelength Range             | $\lambda_C$                     | 1290 | 1310    | 1330 | nm   |       |
| Average Output Power                | P <sub>OUT</sub>                | 0.5  | -       | 5    | dBm  |       |
| Average Output Power (Laser Off)    | P <sub>OUT-OFF</sub>            | -    | -       | -40  | dBm  |       |
| Side Mode Suppression Ratio         | SMSR                            | 30   | -       | -    | dB   |       |
| Spectral Width (-20dB)              | $\lambda_{20}$                  | -    | -       | 1    | nm   |       |
| Extinction Ratio                    | ER                              | 10   | -       | -    | dB   |       |
| Optical Rise and Fall Time(20%-80%) | TR/TF                           | -    | -       | 250  | ps   |       |
| Jitter Generation                   | JG                              | -    | -       | 0.2  | UI   |       |
| Transmitter Output Eye              | Compliant with G.984.2 Figure 3 |      |         |      |      |       |

## Optical – Receiver

| Parameter                              | Symbol               | Min  | Typical | Max  | Unit | Notes |
|----------------------------------------|----------------------|------|---------|------|------|-------|
| Center Wavelength Range                | $\lambda_c$          | 1480 | 1490    | 1500 | nm   |       |
| Overload                               |                      | -8   |         |      | dBm  |       |
| Sensitivity(BOL Room Temp)             | Sen                  |      |         | -28  | dBm  |       |
| Signal Detect Assertion Level          | SDA                  |      |         | -29  | dBm  |       |
| Signal Detect De-Assertion Level       | SDD                  | -45  |         |      | dBm  |       |
| Hysteresis                             | P <sub>SDA-SDD</sub> | 0.5  |         | 6    | dB   |       |
| 1310nm Tx to 1490nm Rx Crosstalk       |                      |      |         | -47  | dB   |       |
| 1555nm Rx to 1490nm Isolation          |                      | 30   |         |      | dB   |       |
| (1550-1560nm) Ext to 1490 Rx Isolation |                      | 34   |         |      | dB   |       |
| Back Reflection @ 1310nm               |                      |      |         | -12  | dB   |       |
| Back Reflection @ 1490nm               |                      |      |         | -27  | dB   |       |
| Rx Reflectance                         |                      |      |         | -20  | dB   |       |
| 1530nm to 1490nm Rx Isolation          |                      | 7    |         |      | dB   |       |
| 1539nm to 1490nm Rx Isolation          |                      | 22   |         |      | dB   |       |
| 1625nm to 1490nm Rx Isolation          |                      | 22   |         |      | dB   |       |

## Electrical – Transmitter

| Parameter                       | Symbol              | Min | Typical | Max  | Unit     | Notes |
|---------------------------------|---------------------|-----|---------|------|----------|-------|
| Differential Data Input Voltage | V <sub>IN,P-P</sub> | 100 |         | 1000 | mVpp     | 1     |
| Input Differential Impedance    | Z <sub>IN</sub>     |     | 100     |      | $\Omega$ | 2     |

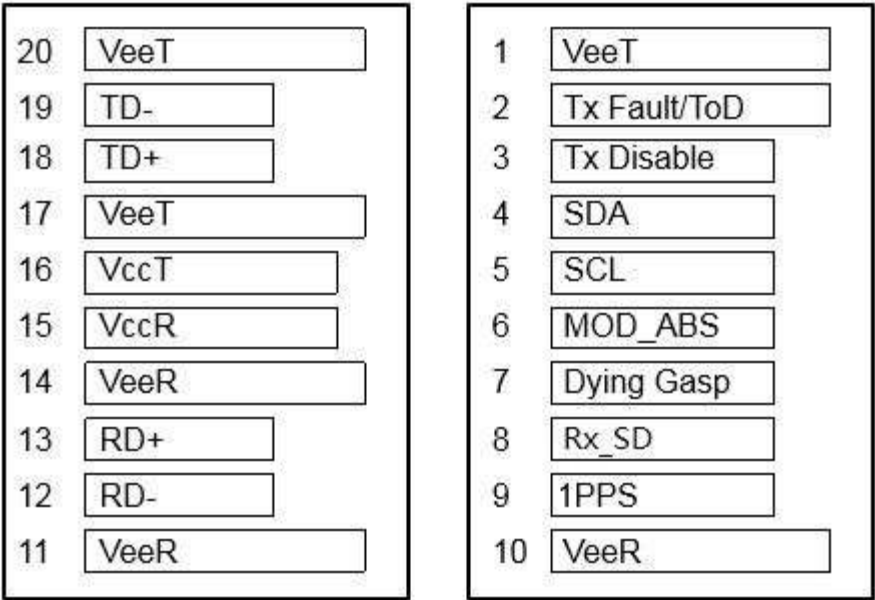
1. TXD+/- . AC-coupled.
2. TXD+/- .

## Electrical – Receiver

| Parameter                         | Symbol   | Min | Typical | Max  | Unit | Notes |
|-----------------------------------|----------|-----|---------|------|------|-------|
| Differential Output Voltage       |          | 370 |         | 1000 | mV   | 1     |
| Signal Detect Output HIGH Voltage | VSD_High | 2.4 |         |      | V    | 2     |
| Signal Detect Output LOW Voltage  | VSD_Low  | 0   |         | 0.8  | V    | 3     |
| Data Output Rise and Fall Time    | TR/TF    |     | 160     |      | ps   |       |

1. CML output, AC coupled(0.1uF)
2. LVTTTL with internal 1k pull up resistor. Asserts HIGH when input data amplitude is above threshold.
3. LVTTTL. De-asserts LOW when input data amplitude is below threshold.

Pin Out Definition



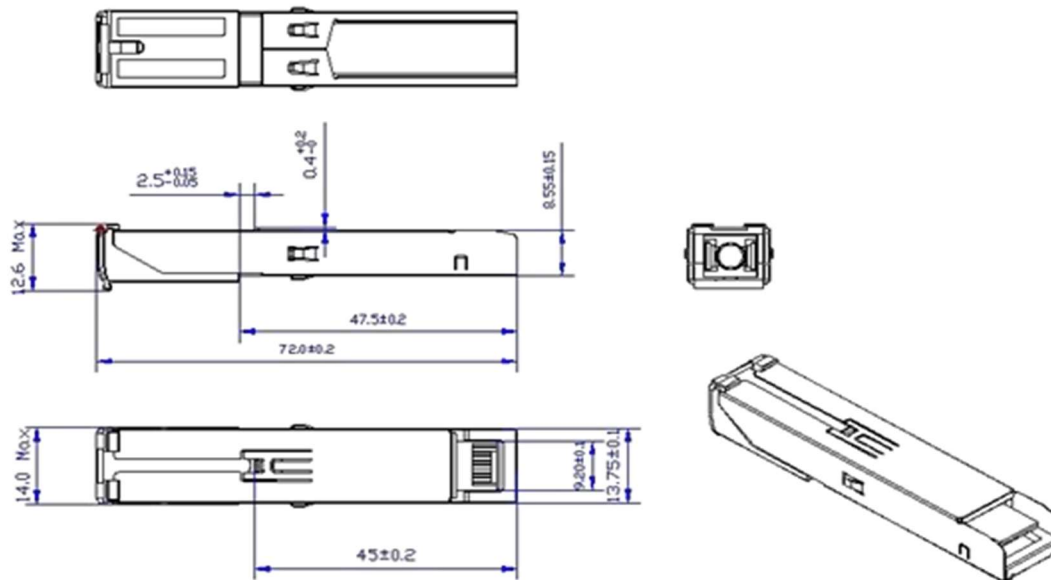
Electrical Pin Definition

| PIN # | Symbol       | Description  | Remarks                                                                                               | Notes   |
|-------|--------------|--------------|-------------------------------------------------------------------------------------------------------|---------|
| 1     | VeeT         | NA           | Module Transmitter Ground                                                                             |         |
| 2     | Tx Fault/ToD | LVTTL-O      | Tx Fault/Time of Day                                                                                  | 1       |
| 3     | TX_DISABLE   | LVTTL-I      | Transmitter Shut-off                                                                                  | 6       |
| 4     | SDA          | LVTTL-I/O    | 2-Wire Serial Interface Data Line (MOD-DEF2)                                                          | 2,7     |
| 5     | SCL          | LVTTL-I      | 2-Wire Serial Interface Clock (MOD-DEF1)                                                              | 2,7     |
| 6     | MOD_ABS      | NA           | Module Absent, connected to VeeT or VeeR in the module                                                |         |
| 7     | DYING GASP   | Analog Input | Dying Gasp message indicator, active low this pin has been directly connected to MAC IC in the module | 3,4,5,7 |
| 8     | Rx_SD        | LVTTL-O      | Rx signal detect                                                                                      |         |
| 9     | 1PPS         | LVTTL-O      | 1 Pulse per second                                                                                    |         |
| 10    | VeeR         | NA           | Module Receiver Ground                                                                                |         |
| 11    | VeeR         | NA           | Module Receiver Ground                                                                                |         |
| 12    | RXD-         | CML-O        | Receiver Inverted Data Output                                                                         |         |
| 13    | RXD+         | CML-O        | Receiver Non-Inverted Data Output                                                                     |         |
| 14    | VeeR         | NA           | Module Receiver Ground                                                                                |         |
| 15    | VCCR         | NA           | Module Receiver 3.3V Supply                                                                           |         |
| 16    | VCCT         | NA           | Module Transmitter 3.3V Supply                                                                        |         |
| 17    | VeeT         | NA           | Module Transmitter Ground                                                                             |         |
| 18    | TXD+         | CML-I        | Transmitter Non-Inverted Data Input, CML, 100ohm differential impedance                               |         |
| 19    | TXD-         | CML-I        | Transmitter Inverted Data Input, CML, 100ohm differential impedance                                   |         |

|    |      |    |                           |  |
|----|------|----|---------------------------|--|
| 20 | VeeT | NA | Module Transmitter Ground |  |
|----|------|----|---------------------------|--|

1. Default Factory Mode is Tx Fault. For Small Cell type of applications, during Activation/ provisioning, it will be software configured to ToD.
2. This PIN is an open collector/drain output pin and shall be pulled up with 4.7K-10K ohms to a Host\_Vcc on the host board.
3. PIN7 can support Dying Gasp function. Dying Gasp function is managed by software. If software disable the dying gasp function, ignore the PIN7 input voltage.
4. If software enable the function, PIN7 input voltage below Dying Gasp Assert Voltage threshold, the module will report dying gasp PLOAM to OLT.
5. Dying Gasp Voltage threshold 1.5V ( typical), once software enable Dying gasp, meanwhile the pin7 input is below this threshold, it will trigger dying gasp function, transceiver will reset.
6. Host device shall maintain power to ONU module for at least 10ms during power supply drop.
7. ONU re-online process includes downlink & uplink synchronization, authentication and configuration release, etc., it normally takes >= 5 seconds
8. Transceiver full power on need 80s. Any I2C visiting.etc need to operate after this power on period.

## Mechanical Diagram



## Revision History

| Date       | Rev | Description             |
|------------|-----|-------------------------|
| 07/15/2024 | 1.0 | Release version         |
| 01/24/2025 | 1.1 | New branding guidelines |

## For more information

Vitex LLC

32 Mercer St.  
Hackensack, NJ 07601

201-296-0145  
info@vitextech.com  
www.vitextech.com

