

## 1442548F2C-AO

ADTRAN® 1442548F2C Compatible TAA 10GBs XGS-PON OLT XFP Transceiver (SMF, 1577nmTx/1270nmRx, ASC, N2, DOM)

### Features

- Single fiber bi-directional data links TX 9.953Gbps, Burst Mode RX 9.953G/2.488Gbps application
- Complies with ITU G.987.2, ITU G.9807.1
- Complies with INF-8077i
- XFP package with SC Receptacle connector
- Hot Pluggable
- 3.3V power supply
- Single-mode Fiber
- High power 1577nm EML LD & High sensitivity 1270nm APD
- Low EMI and excellent ESD protection
- SD indication
- Digital diagnostic monitor interface
- RoHS compliant and Lead Free



### Applications

- XGS PON OLT
- Access and Enterprise

### Product Description

This ADTRAN® 1442548F2C compatible XFP transceiver provides 10GBase-N2 throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1577nmTx/1270nmRx via an ASC connector. It is guaranteed to be 100% compatible with the equivalent ADTRAN® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



### Absolute Maximum Ratings

| Parameter                   | Symbol | Min. | Typ.           | Max. | Unit |
|-----------------------------|--------|------|----------------|------|------|
| Maximum Supply Voltage      | VCC3   | -0.5 |                | 3.6  | V    |
| Storage Ambient Temperature | Tstg   | -40  |                | 85   | °C   |
| Operating Case Temperature  | Tc     | 0    |                | 70   | °C   |
| Operating Humidity          | OH     | 5    |                | 85   | %    |
| Date Rate                   |        |      | 9.953<br>2.488 |      | Gbps |

### Electrical Characteristics

| Parameter                          | Symbol | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|--------|------|------|------|------|-------|
| Power Supply Voltage               | Vcc3   | 3.13 | 3.3  | 3.47 | V    |       |
| Power Supply Current               | Icc3   |      |      | 1000 | mA   |       |
| Power Consumption                  | P      |      |      | 3    | W    |       |
| Transmitter                        |        |      |      |      |      |       |
| Data Input Differential Swing      |        | 120  |      | 850  | mV   | 1     |
| Input Differential Impedance       |        | 90   | 100  | 110  | Ω    |       |
| Transmitter Enable Voltage - Low   |        | 0    |      | 0.8  | V    |       |
| Transmitter Disable Voltage - High |        | 2.0  |      | VCC  | V    |       |

#### Notes:

1. CML input, AC coupled

## Optical Characteristics

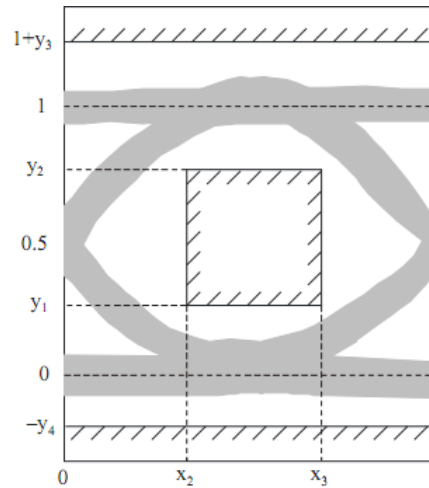
| Parameter                           | Symbol                     | Min. | Typ. | Max.  | Unit  | Notes |
|-------------------------------------|----------------------------|------|------|-------|-------|-------|
| <b>Transmitter</b>                  |                            |      |      |       |       |       |
| Optical Center Wavelength           | $\lambda_C$                | 1575 |      | 1580  | nm    |       |
| Optical Spectrum Width (-20dB)      | $\Delta\lambda$            |      |      | 1     | nm    |       |
| Side Mode Suppression Ratio         | SMSR                       | 30   |      |       | dB    |       |
| Optical Wavelength Diagram          | Compliant with ITU G.987.2 |      |      |       |       | 1     |
| Average Launch Optical Power (BOL)  | AOP2                       | +4.5 |      | +8    | dBm   | 2     |
| Average Launch Optical Power (EOL)  |                            | +4   |      | +8    | dBm   |       |
| Power-OFF Transmitter Optical Power |                            |      |      | -39   | dBm   | 2     |
| Extinction Ratio                    | ER                         | 8.2  |      |       | dB    | 3     |
| Total Jitter                        | TJ                         |      |      | 0.39  | UI    | 3     |
| RIN <sub>15</sub> OMA               |                            |      |      | -128  | dB/Hz |       |
| Transmitter Reflectance             |                            |      |      | -10   | dB    |       |
| Transmitter and Dispersion Penalty  | TDP                        |      |      | 1     | dB    | 4     |
| <b>10G PON Receiver</b>             |                            |      |      |       |       |       |
| Operating Wavelength                |                            | 1260 |      | 1280  | nm    |       |
| Max Optical input                   |                            |      |      | 0     | dBm   | 5     |
| Sensitivity                         | SEN                        |      |      | -28   | dBm   | 6     |
| Saturation Optical Power            | SAT                        | -7   |      |       | dBm   | 6     |
| SD Assert Level                     |                            |      |      | -29   | dBm   |       |
| SD De-assert Level                  |                            | -45  |      |       | dBm   |       |
| Hysteresis                          |                            | 0.5  |      | 6     | dB    |       |
| Receiver Reflectance                |                            |      |      | -12   | dB    |       |
| <b>2.5G PON Receiver</b>            |                            |      |      |       |       |       |
| Operating Wavelength                |                            | 1260 |      | 1280  | nm    |       |
| Max Optical input                   |                            |      |      | 0     | dBm   | 5     |
| Sensitivity                         | SEN                        |      |      | -29.5 | dBm   | 7     |
| Saturation Optical Power            | SAT                        | -9   |      |       | dBm   | 7     |
| SD Assert Level                     |                            |      |      | -30   | dBm   |       |
| SD De-assert Level                  |                            | -45  |      |       | dBm   |       |
| Hysteresis                          |                            | 0.5  |      | 6     | dB    |       |
| Receiver Reflectance                |                            |      |      | -20   | dB    |       |

### Notes:

1. Eye mask figure below, Mask Margin >5%

2. Launched into SMF
3. PRBS2<sup>31</sup>-1 @9.953Gbps
4. Transmit on 20km SMF
5. Input without incurring damage
6. PRBS2<sup>31</sup>-1@9.953Gbps BER  $\leq 1 \times 10^{-3}$
7. PRBS 2<sup>23</sup>-1@2.488Gbps BER  $\leq 1 \times 10^{-4}$

### Transmitter Eye Mask Definitions and Test Procedure



| X3-X2 | Y1   | Y2   | Y3   | Y4   | Unit |
|-------|------|------|------|------|------|
| 0.2   | 0.25 | 0.75 | 0.25 | 0.25 | UI   |

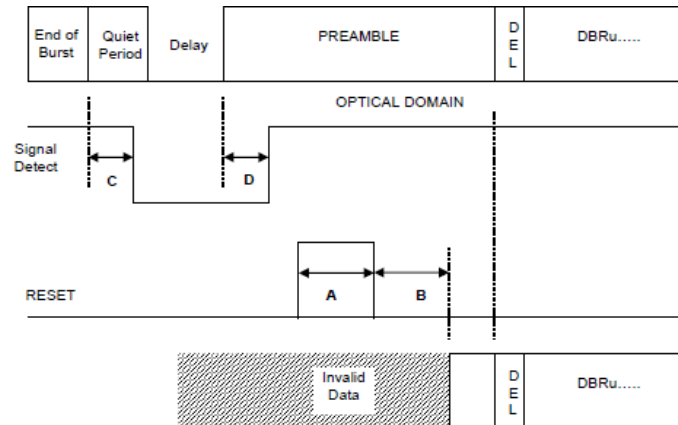
### Timing Parameter Definitions in Burst Mode Sequence

| Parameter                      | Symbol | Min. | Typ. | Max.            | Unit | Notes |
|--------------------------------|--------|------|------|-----------------|------|-------|
| RSSI Trigger-Low               |        | 0    |      | 0.8             | V    |       |
| RSSI Trigger-High              |        | 2.0  |      | V <sub>cc</sub> | V    |       |
| Data Output Differential Swing |        | 340  |      | 850             | mV   | 1     |
| Reset-Low                      |        | 0    |      | 0.8             | V    |       |
| Reset-High                     |        | 2.0  |      | V <sub>cc</sub> | V    |       |
| SD Voltage-Low                 |        | 0    |      | 0.4             | V    |       |
| SD Voltage-High                |        | 2.4  |      | V <sub>cc</sub> | V    |       |
| Reset Width                    | A      | TBD  |      |                 | ns   |       |
| Reset to Valid Data Delay      | B      | TBD  |      |                 | ns   |       |
| SD De-assert Time              | C      |      |      | TBD             | ns   |       |
| SD Assert Time                 | D      |      |      | TBD             | ns   |       |
| Data recovery time             |        |      |      | 400             | ns   | 2     |
|                                |        |      |      | 400             | ns   | 3     |

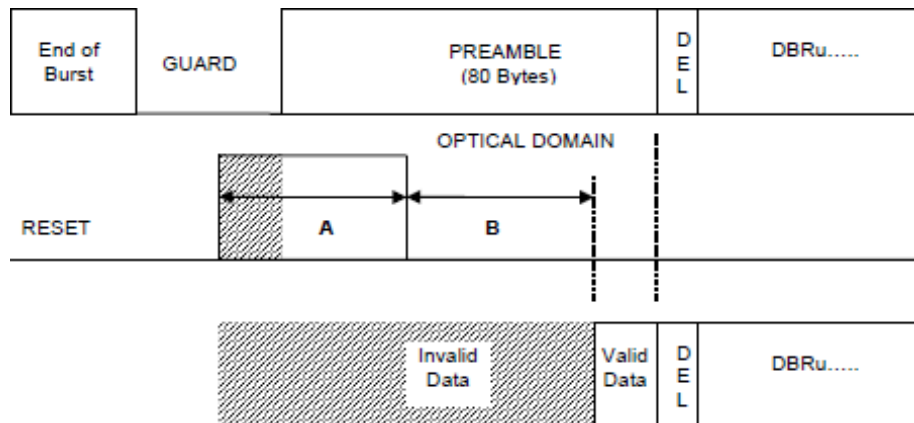
### Notes:

1. CML output, DC coupled
2. PRBS  $2^{23}-1$ @2.488Gbps
3. PRBS  $2^{31}-1$ @9.95Gbps

### Reset Signal Timing Diagram in Normal Mode



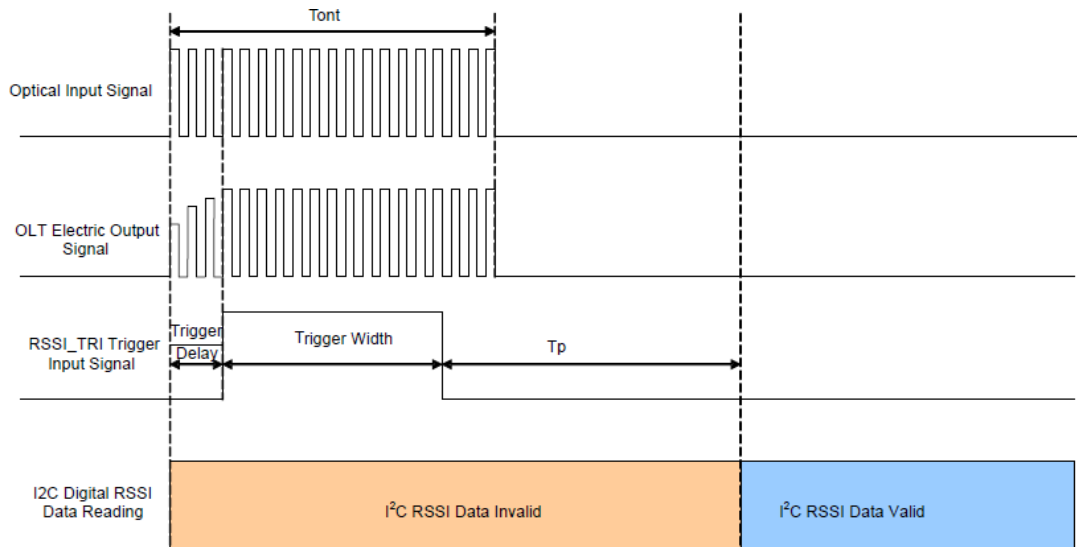
### Reset Signal Timing Diagram in Ranging Mode



### RSSI Timing Sequence

| Parameter                               | Symbol | Min. | Typ. | Max. | Unit | Notes |
|-----------------------------------------|--------|------|------|------|------|-------|
| Optical Signal During Time              | Tont   | 1200 |      |      | ns   |       |
| RSSI Trigger width                      | TW     | 500  |      |      | ns   |       |
| RSSI Trigger Delay                      | TD     | 150  |      |      | ns   |       |
| I <sup>2</sup> C Access Prohibited Time |        | 500  |      |      | μs   |       |

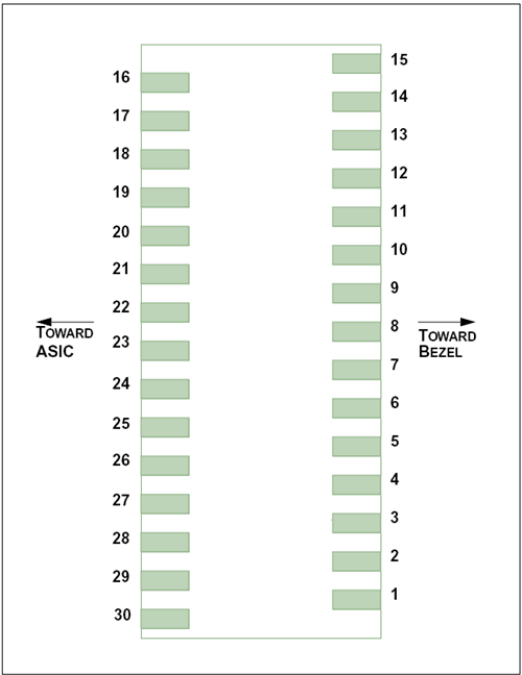
## Timing Parameter Definitions in RSSI Trigger



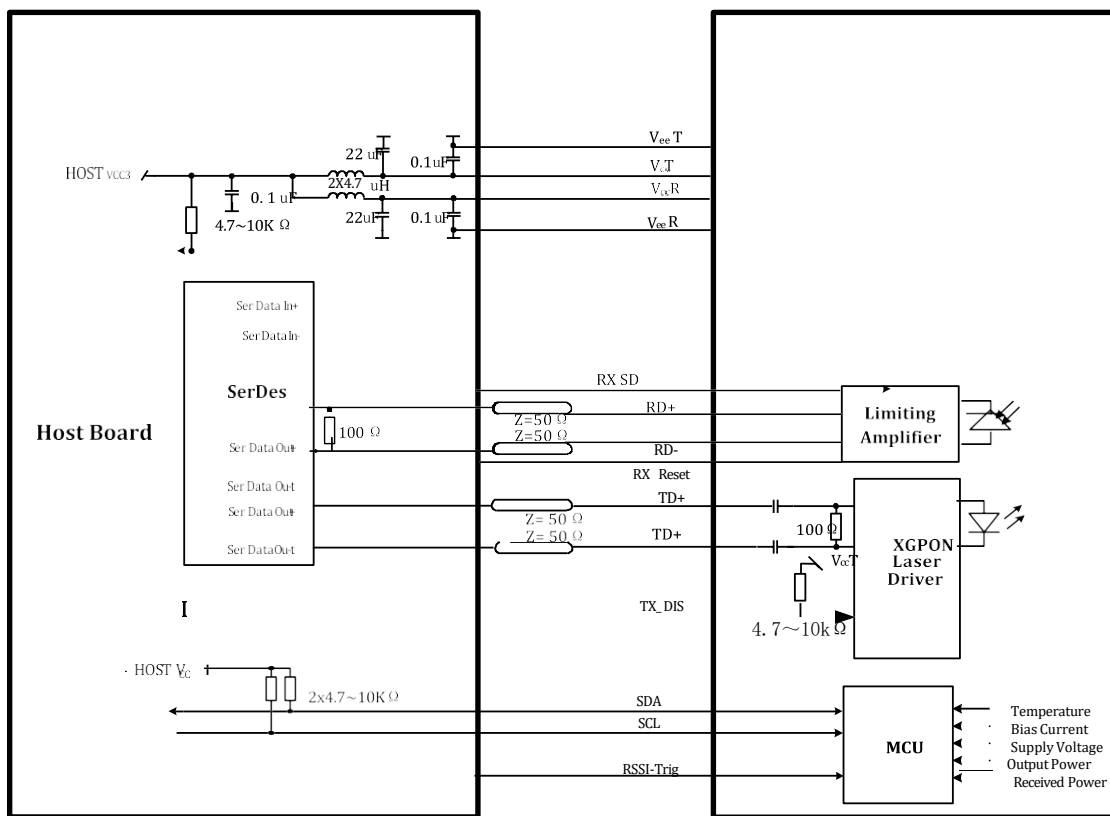
## Pin Descriptions

| Pin | Name     | Descriptions                     | Notes                                                      |
|-----|----------|----------------------------------|------------------------------------------------------------|
| 1   | GND      | Module Ground                    |                                                            |
| 2   | TX_FAULT | Transmitter Status Indication    | Low : Normal; High: Abnormal                               |
| 3   | NC       | Not Connected                    |                                                            |
| 4   | NC       | Not Connected                    |                                                            |
| 5   | TX_DIS   | Transmitter Disable              | LVTTTL Input by 10k pull up resistor, Low : transmitter on |
| 6   | NC       | Not Connected                    |                                                            |
| 7   | GND      | Module Ground                    |                                                            |
| 8   | VCC3_TX  | Transmitter 3.3V Power Supply    |                                                            |
| 9   | VCC3_RX  | Receiver 3.3V Power Supply       |                                                            |
| 10  | SCL      | The clock line                   | The clock line of two wire serial interface                |
| 11  | SDA      | The data line                    | The data line of two wire serial interface                 |
| 12  | MOD_ABS  | Indicates Module is not present. | Grounded in the Module                                     |
| 13  | RX_Reset | Burst Receiver Reset             | LVTTTL, High level Reset                                   |
| 14  | SD       | SD Indication                    | LVTTTL output, active LOW when the receiver lost signal    |
| 15  | GND      | Module Ground                    |                                                            |
| 16  | GND      | Module Ground                    |                                                            |
| 17  | RD_N     | Inverted Received Data Out       | CML output, DC coupled; No squelch function                |
| 18  | RD_P     | Non-inverted Received Data Out   | CML output, DC coupled; No squelch function                |
| 19  | GND      | Module Ground                    |                                                            |

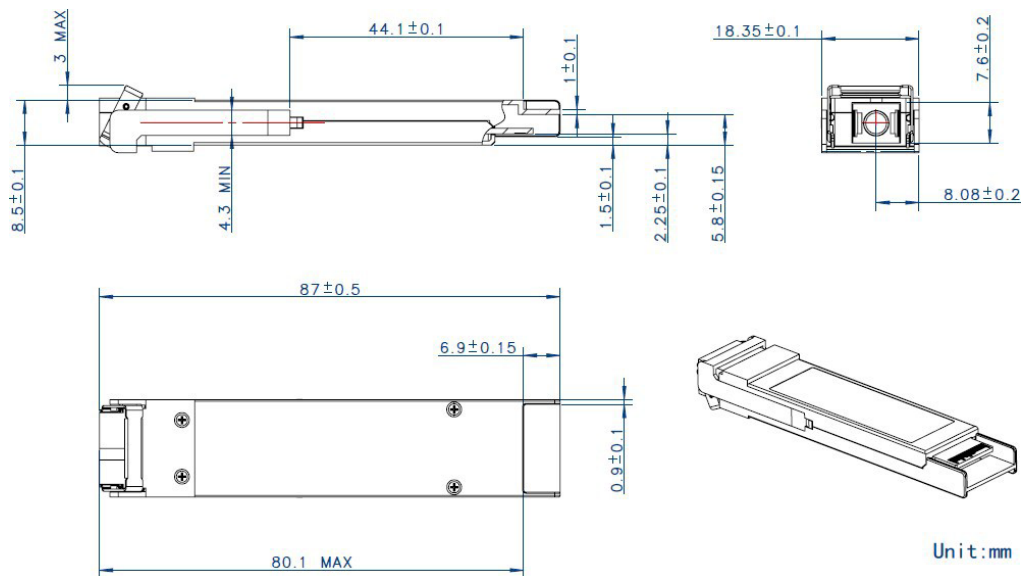
|           |           |                               |                                             |
|-----------|-----------|-------------------------------|---------------------------------------------|
| <b>20</b> | NC        | Not Connected                 |                                             |
| <b>21</b> | RSSI_TRIG | RSSI Trigger for Transceiver  | High value indicates start RSSI measurement |
| <b>22</b> | NC        | Not Connected                 |                                             |
| <b>23</b> | GND       | Module Ground                 |                                             |
| <b>24</b> | NC        | Not Connected                 |                                             |
| <b>25</b> | NC        | Not Connected                 |                                             |
| <b>26</b> | GND       | Module Ground                 |                                             |
| <b>27</b> | GND       | Module Ground                 |                                             |
| <b>28</b> | TX_N      | Inverted Transmit Data in     | CML input, AC coupled                       |
| <b>29</b> | TX_P      | Non-Inverted Transmit Data in | CML input, AC coupled                       |
| <b>30</b> | GND       | Module Ground                 |                                             |



## Typical Interface Circuit

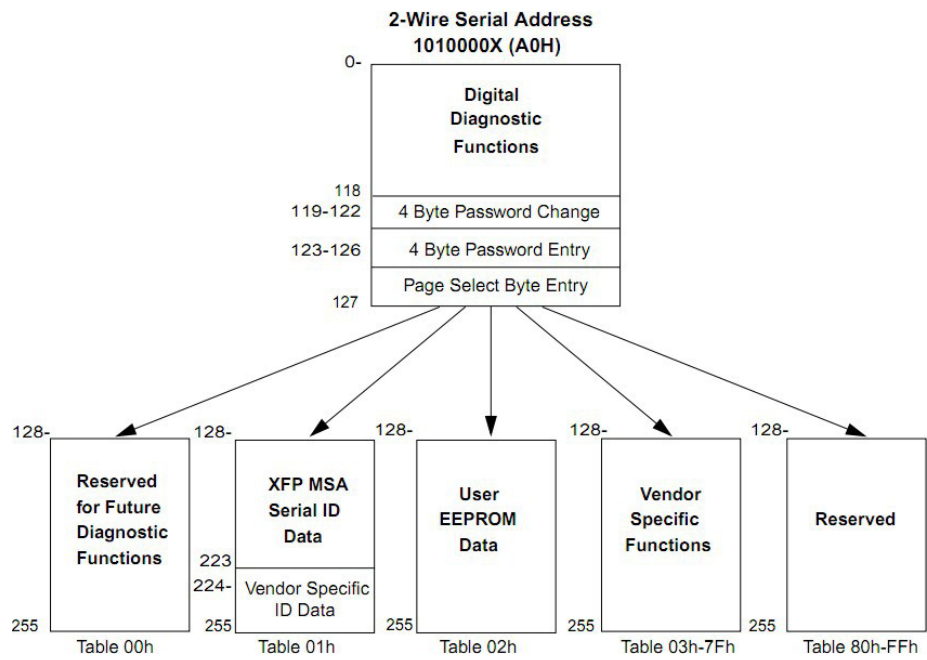


## Mechanical Specifications



**EEPROM Information**

EEPROM memory map specific data field description is as below:



## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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