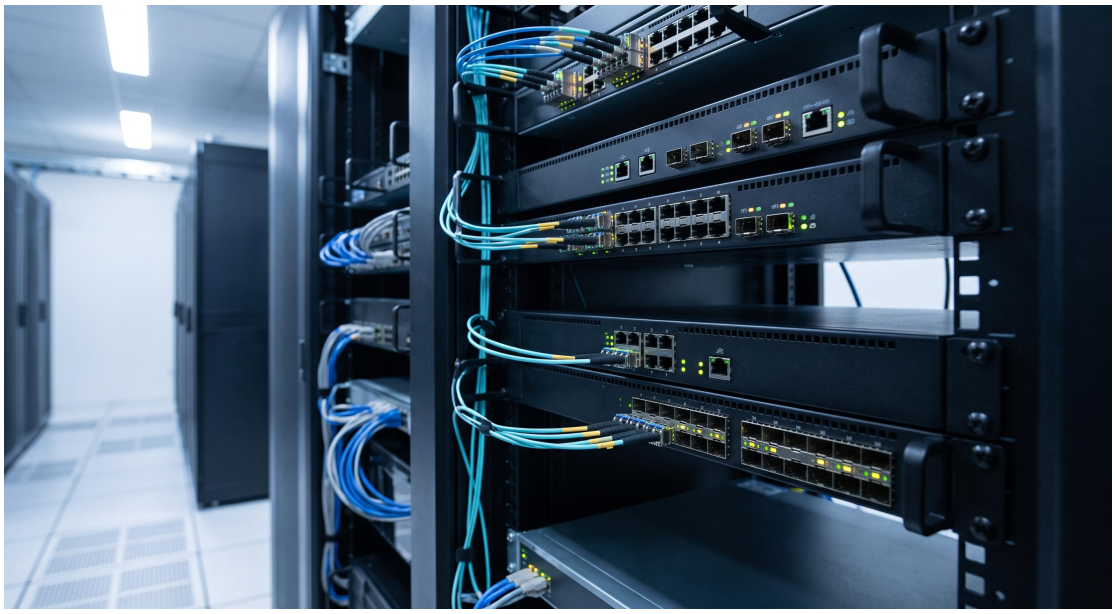
SFP Transceiver Digital Optical Monitoring (DOM) Alarm Threshold Reference Sheet - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document serves as the definitive technical reference for the Digital Optical Monitoring (DOM) alarm and warning threshold specifications applicable to the full suite of SFP, SFP+, and QSFP+ optical transceivers. Designed for network architects, procurement engineers, and field deployment specialists, this datasheet provides comprehensive parameters for real-time performance monitoring, predictive fault analysis, and proactive link maintenance. By standardizing the DOM alarm thresholds across all form factors, this document ensures seamless interoperability within heterogeneous network infrastructures, reduces unplanned downtime, and enhances the overall reliability of high-speed optical links.



HARDWARE ARCHITECTURE & SILICON

The DOM functionality is embedded within the transceiver's microcontroller unit (MCU) and is compliant with the SFF-8472 and SFF-8636 management interface standards. The onboard calibration circuitry continuously measures key operational parameters, including:

- Transmitted Optical Power (Tx Power): Monitors the output power of the laser diode to ensure it remains within the specified operating window.
- Received Optical Power (Rx Power): Measures the incoming optical power to detect signal degradation or link loss anomalies.
- Laser Bias Current: Tracks the current supplied to the laser diode, which is a critical indicator of laser aging and impending failure.
- Temperature: Monitors the internal transceiver temperature to prevent

thermal stress and ensure optimal operating conditions.

- Supply Voltage: Verifies the integrity of the voltage supplied to the transceiver, safeguarding against power supply fluctuations.

The alarm and warning thresholds are pre-programmed at the factory and are categorized into two distinct severity levels:

- Alarm (High/Low): Indicates a critical deviation from the normal operating range. An alarm condition typically triggers an immediate system alert and requires urgent investigation, as it often signifies an imminent link failure or hardware damage.

- Warning (High/Low): Indicates a non-critical deviation from the optimal operating range. A warning condition serves as a proactive notification, allowing network operators to perform preventative maintenance or adjust link parameters before a more severe fault occurs.

KEY FEATURES & ROUTING LOGIC

- PROACTIVE FAULT MANAGEMENT: Continuous real-time monitoring of five critical parameters enables the prediction of laser degradation and fiber link deterioration, allowing for 'fail-before-break' maintenance strategies.

- STANDARDIZED ALARM LOGIC: The alarm and warning thresholds are strictly defined per the SFF-8472 standard, ensuring consistent performance and

behavior across all transceiver types, regardless of the host system.

- ENHANCED LINK STABILITY: By providing an early warning system for optical signal degradation, DOM facilitates dynamic adjustments to transmission power or link equalization, maintaining a robust and error-free connection.

- DIAGNOSTIC INTERFACE: All monitored data is accessible via the standard I2C serial interface, integrating seamlessly with Simple Network Management Protocol (SNMP) and other network management systems for centralized monitoring.

- TEMPERATURE COMPENSATED CALIBRATION: Each transceiver undergoes a rigorous factory calibration process that compensates for temperature variations, ensuring that the DOM readings remain accurate and reliable over the entire commercial or industrial operating temperature range.

- COMPATIBILITY ASSURANCE: This reference sheet provides compatibility and guaranteed threshold performance for all standard wavelength variants (850nm, 1310nm, 1550nm), data rates, and transmission distances (Short Reach, Long Reach, Extended Reach).

COMPLIANCE & STANDARDS

- SFF-8472: Management Interface for SFP Transceivers

- SFF-8636: Management Interface for QSFP+ and QSFP28 Transceivers

- IEEE 802.3: Ethernet Standards (specific clauses for 1000BASE, 10GBASE,

40GBASE, 100GBASE)

- RoHS & REACH: Compliance with environmental substance restrictions

- TUV Rheinland, UL, and FDA/CDRH: Laser safety certification (Class 1 Laser Product)

- Telcordia GR-468-CORE: Reliability and quality assurance for optical components

- MSA (Multi-Source Agreement): Physical and electrical compatibility specifications for all form factors.

TECHNICAL SPECIFICATIONS

- Form Factors Supported: SFP, SFP+, SFP28, QSFP+, QSFP28

- Monitoring Parameters (5): Temperature, Supply Voltage, Tx Bias Current, Tx Power, Rx Power

- Communication Bus: I2C (2-Wire Serial Interface)

- Alarm/Warning Structure: High and Low thresholds for each of the 5 parameters

- Threshold Accuracy: Compliant with SFF-8472 Rev 12.0 requirements (typically +-2% or better)

- Calibration: Internally calibrated and temperature-compensated during manufacturing

- Operating Temperature Range (Commercial): 0 ° C to +70 ° C (Case

Temperature)

- Operating Temperature Range (Industrial): -40°C to +85°C (Case Temperature)

- Optional

- Data Rate Support: Up to 25.78 Gbps per lane for SFP28, up to 28.05 Gbps per lane for QSFP28

- Electrical Interface: AC-coupled CML (current-mode logic) inputs and outputs

- Optical Interface: Duplex LC or MPO connector (depending on form factor)

- Power Consumption: Varies by form factor (typ. <1W for SFP+, typ. <3.5W for QSFP+)

- MTBF: > 1,000,000 hours at 25°C (per Telcordia SR-332).

Parameter	**Specification**
Parameter Monitored	Temperature, Supply Voltage, Tx Bias Current, Tx Power, Rx Power
Alarm - High Limit	Typically +95 ° C (Temp) / +3.6V (Voltage) / +18mA (Bias) / +4.0 dBm (Tx) / +3.0 dBm (Rx) - Refer to specific transceiver datasheet for exact values
Alarm - Low Limit	Typically -10 ° C (Temp) / +2.7V (Voltage) / +1.5mA (Bias) / -4.0 dBm (Tx) / -14.0 dBm (Rx) - Refer to specific transceiver datasheet for exact values

Warning - High Limit	Typically +80 ° C (Temp) / +3.4V (Voltage) / +15mA (Bias) / +2.0 dBm (Tx) / +2.0 dBm (Rx) - Refer to specific transceiver datasheet for exact values
Warning - Low Limit	Typically 0°C (Temp) / +2.9V (Voltage) / +2.5mA (Bias) / -2.0 dBm (Tx) / -12.0 dBm (Rx) - Refer to specific transceiver datasheet for exact values
Monitoring Interface	I2C Serial Bus (SDA, SCL) with A0h and A2h address space per SFF-8472
Feature Support	Soft Tx Disable, Soft Rate Select, LOS (Loss of Signal) monitoring

