Multi-source Agreement (MSA) of 10 Gbit/s Miniature Device (XMD)

XMD01

Electrical & Optical Interfaces of TOSA DML

Rev. 1.2
January 17, 2006

Description

This technical document has been created by the XMD MSA committee. This document is offered to both users and suppliers of 10Gbit/s compact optical sub-assembly (OSA) modules as a basis for a technical agreement. However, it is not a warranted document. Each OSA supplier will have its own datasheet. If the users wish to find a warranted document, they should consult the datasheet of the chosen OSA supplier.

The MSA committee reserves the rights at any time to add, amend or withdraw technical data contained in this document.

Revision History

Revision	Date	Purpose/Changes
1.0	June 7, 2004	First public issue
1.1	October 29, 2004	Addition of Scope. Addition of optical interfaces and reference for ITU-T G.959.1. Ammend the definition of the impedance. Changes the items and the values of the specifications.
1.2	January 17, 2006	Addition of SC documents. Change document name to identify connector type.

1 Scope

The XMD MSA committee has created this technical document to specify the electrical and optical interface of TOSA DML. The specifications were based on the investigation of uncooled TOSA driven by external LD driver.

2 Reference Documents

[1] XMD03
"Physical Interface of LC TOSA Type 1 Package"

[2] XMD05
"Physical Interface of SC TOSA Type 1 Package"

[3] IEC62007-1
"Semiconductor optoelectronic devices for fibre optic system applications - Part 1: Essential ratings and characteristics"

[4] IEC62007-2
"Semiconductor optoelectronic devices for fibre optic system applications - Part 2: Measuring methods"

[5] IEEE 802.3ae
"IEEE Standard for Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Media Access Control (MAC) Parameters, Physical Layer, and Management Parameters for 10 Gb/s Operation"

[6] ANSI INCITS 364-2003
"Information Technology - Fibre Channel 10 Gigabit (10GFC)"

[7] Telcordia GR-253-CORE
"SONET Transport Systems: Common Generic Criteria"

[8] ITU-T G.691
"Optical interfaces for single channel STM-64, STM-256 and other SDH systems with optical amplifiers"

[9] ITU-T G.693
"Optical interfaces for intra-office systems"

[10] ITU-T G.709
"Network node interface for the Optical Transport Network (OTN)"

[11] ITU-T G.959.1
"Optical transport network physical layer interfaces"

[12] Telcordia GR-468-CORE
"Generic Reliability Assurance Requirements for Optoelectronic Devices Used In Telecommunications Equipment"

[13] IEC 60825-1
"Safety of laser products-Part 1: Equipment classification, requirements and user's guide"

[14] IEC 60825-2
"Safety of laser products-Part 2: Safety of optical fibre communication systems - Interpretation sheet 1"

[15] FDA CDRH21CFR 1040.10
"Performance standards for light-emitting products (Laser products.)"

[16] FDA CDRH21CFR 1040.11
"Performance standards for light-emitting products (Specific purpose laser products.)"

3 Abbreviations

DML	Direct modulation laser diode
LD	Laser diode
OSA	Optical sub-assembly
PD	Photo diode
ROSA	Receiver optical sub-assembly
TOSA	Transmitter optical sub-assembly

4 Electrical Interface

Table 1 Specifications of electrical and optical performances

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}	CW	—	—	50	mA	
Operating current	I_{op}	CW	—	—	160	mA	
Slope efficiency	η	CW	—	—	—	W/A	Note 1
Operating voltage	V_{op}	CW	—	—	3.0	V	
Monitor current	I_{mon}	CW	0.1	—	2	mA	
Monitor responsivity		CW	—	—	—	A/W	Note 1
Capacitance (PD)		V_{rd}=5V	—	—	20	pF	
Dark current (PD)		V_{rd}=5V	—	—	0.1	μA	
Thermister resistance	R_{th}	25degC	9.5	—	10.5	kΩ	
Thermister B constant	B		3800	3900	4000	K	
Driving LD conditions							
Driver output impedance	Z_s		— —	25 50	— —	Ω	Fig. 1

Note 1: Specified by each vendor.

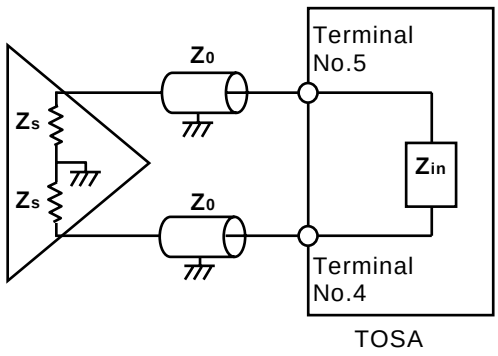

Fig. 1 Definition of the impedances

Z_{in} includes LD, series resistance, etc. Driver output impedance Z_S is only specified in the table. The other Z_0 and Z_{in} are specified by each vendor.

5 Optical Interface

The applicable optical interface shall be specified by each vendor considering the following.

Ethernet (IEEE802.3)	10GBASE-LW/LR
Optical Device	-

ANSI 10GFC	1200-SM-LL-L
Optical Device	-

Telcordia (GR-253-CORE)	SR-1	IR-1
Optical Device	DM	DM

ITU-T (G.691)	I-64.1r	I-64.1	S-64.1	L-64.1
Optical Device	MLM	SLM	-	SLM

ITU-T (G.693)	VSR600-2R1	VSR600-2M1	VSR2000-2R1
Optical Device	MLM	MLM	SLM

ITU-T (G.959.1)	P1I1-2D1r	P1I1-2D1	P1S1-2D1	P1L1-2D1
Optical Device	MLM	SLM	-	SLM