

C9999-xM-OC

Description

TMC's SFP+ AOC (Active optical cable) is designed for high speed, short range data link via optical fiber. SFP+ AOC provides a high performance, cost effective solution for Data Center / storage and all short range data application.



Features

- RoHS / REACH Compliant
- Operation Case Temperature: 0~70℃
- Typical Fiber Length : 1, 3, 5, 7, 10, 30, 50, 100 meter.
- Hot pluggable
- Single 3.3V power supply
- Low Power Consumption under 300mW
- SFP+ PIN and Dimension Compliant
- Metal enclose for lower EMI
- OFNP type of fiber cable

Applications

- 10Gbps data link

Electromagnetic Interference

- CISPR22 ITE Class B, EN55022 Class B compliant

Immunity

- IEC61000-4-3 Class 2, EN55024
- Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T _s	-10		70	°C	
Relative Humidity	RH	20		80	%	Non condensing
Power Supply Voltage	V _{ccT,R}	0		3.8	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	T _{OP}	0		70	°C	
Power Supply Voltage	V _{ccT,R}	3.14	3.30	3.46	V	
Data Rate			10.3125	10.52	Gb/s	
Power Supply Current	I _{cc}		70	90	mA	TX+RX

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Specification

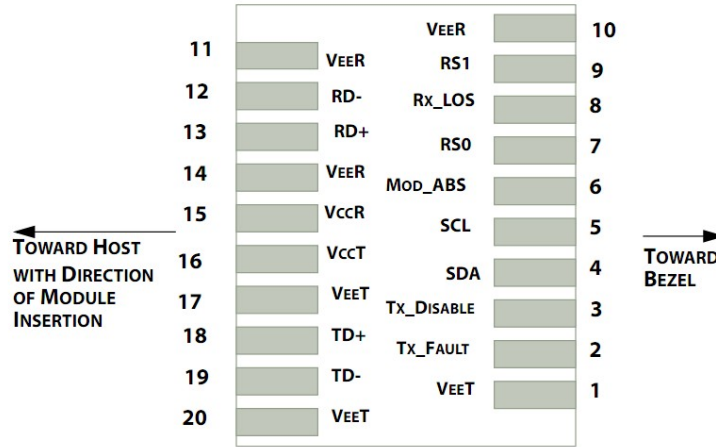
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Typical Fiber Length	L		See Note 3		m	
Differential Data Input Voltage	$V_{IH-V_{IL}}$	200		800	mVpp	Internal AC coupled
Differential Input Impedance	R_{IN}		100		Ω	
TX-Disable Input Voltage-Low	V_{IL}	0		0.8	V	1
TX-Disable Input Voltage-High	V_{IH}	2.0		Vcc	V	1
TX-Fault Output Voltage-Low	V_{OL}	0		0.8	V	2
TX-Fault Output Voltage-High	V_{OH}	2.0		Vcc	V	2
Receiver						
Differential Data Output Voltage	$V_{OH-V_{OL}}$	300		800	mV	Internal AC coupled
Differential Output Impedance	R_{OUT}		100		Ω	
LOS-Asserted Output Voltage-Low	V_{OL}	0		0.8	V	2
LOS-Deasserted Output Voltage-High	V_{OH}	2.0		Vcc	V	2

Notes:

1. TX-Disable has an internal 4.7K Ω to 10K Ω pull-up to VccT
2. Measure with 4.7K Ω pull-up to Vcc on host board
3. The typical fiber length includes 1, 3, 5, 7, 10, 30, 50, 100meter.

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Pin Description



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SFP+ module and Host Electrical contact definition

Pin No.	Pin Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	1
2	Tx_Fault	Transmitter Fault Indication	3	2
3	Tx_Disable	Transmitter Disable	3	3
4	SDA	I2C Data Line	3	4
5	SCL	I2C Clock Line	3	4
6	MOD_ABS	Module Absent	3	4
7	RS0	No connection requirement	3	
8	Rx_LOS	Receiver Loss of Signal indication	3	5
9	RS1	Rate Select 1,control SFP+ transmitter	1	6
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground	1	1
12	RD-	Receiver inverted Data Output	3	
13	RD+	Receiver non-inverted Data Output	3	
14	VeeR	Receiver Ground	1	1
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	1
18	TD+	Transmitter non-inverted Data Input	3	
19	TD-	Transmitter inverted Data Input	3	
20	VeeT	Transmitter Ground	1	1

Note:

- 1, Circuit ground is internally isolated from chassis ground
- 2, Open-Collector outputs, asserted when LD and/or APC function fail.
- 3, Disable when high voltage (>2.0V or Open)
- 4, Should be pulled up with 4.7KΩ – 10KΩ on host board to a voltage between 2.0V and 5.5V. MOD_ABS pulls line low to indicate module is plugged in.
- 5, LOS is open collector output. Should be pulled up with 4.7KΩ – 10KΩ to on host board to a voltage between 2.0V and 5.5V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 6, RS1 is connected to VeeT in module.

Digital Diagnostic Monitor Interface

Two-wire interface ID: Data Fields – Address A0h

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Data Address	Size (Bytes)	Name of Field	Description of Field
BASE ID FIELDS			
0	1	Identifier	Type of transceiver
1	1	Ext.Identifier	Extended identifier of type transceiver
2	1	Connector	Code for connector type
3-10	8	Transceiver	Code for electronic compatibility or optical compatibility
11	1	Encoding	Code for high speed serial encoding algorithm
12	1	BR, Nominal	Nominal signaling rate, units of 100MBd.
13	1	Rate Identifier	Type of rate select functionality
14	1	Length(SMF, km)	Link length supported for single mode fiber, units of km
15	1	Length(SMF)	Link length supported for single mode fiber, units of 100 m
16	1	Length(50um)	Link length supported for 50 um OM2 fiber, units of 10 m
17	1	Length(62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Length(OM3)	Link length supported for 50 um OM3 fiber, units of 10 m
20-35	16	Vendor name	SFP vendor name (ASCII)
36	1	Unallocated	
37-39	3	Vendor OUI	SFP vendor IEEE company ID
40-55	16	Vendor PN	Part number provided by SFP vendor (ASCII)
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)
60-61	2	Wavelength	Laser wavelength
62	1	Unallocated	
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)
EXTENDED ID FIELDS			
64-65	2	Options	Indicates which optional transceiver signals are implemented
66	1	BR,max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number provided by vendor (ASCII)
84-91	8	Date code	Vendor's manufacturing date code
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)
VENDOR SPECIFIC ID FIELDS			
96-191	32	User EEPROM	User writable non-volatile memory
192-255	128	Vendor Specific	Vendor Specific EEPROM

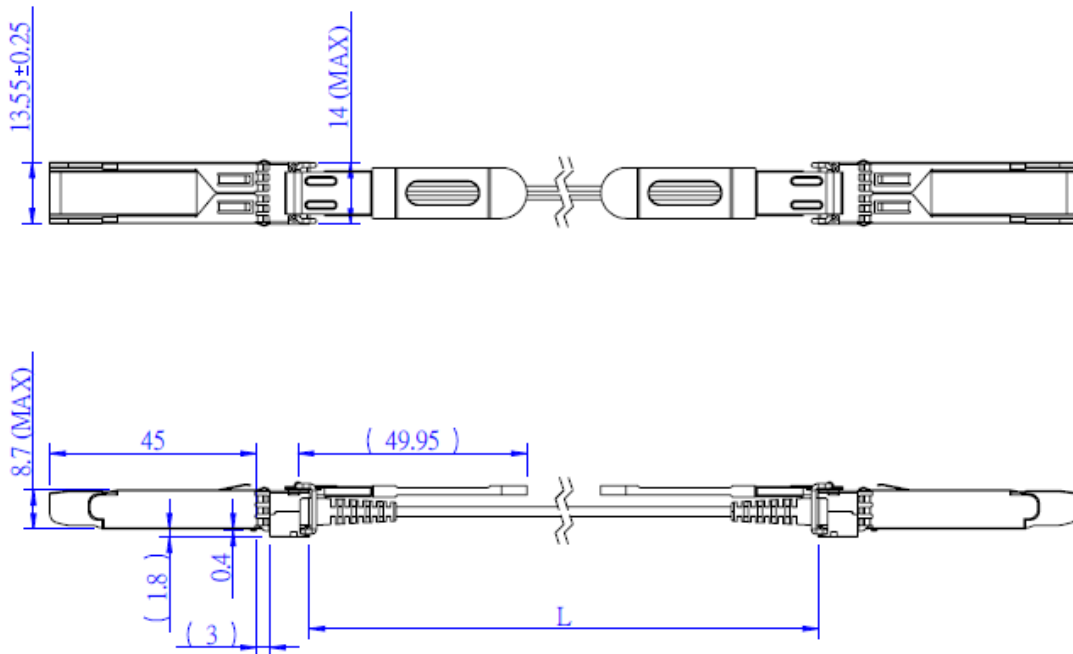
Diagnostics: Data Fields – Address A2h

Data Address	Size (Bytes)	Name of Field	Description of Field
DIAGNOSTIC AND CONTROL/STATUS FIELDS			
BASE ID FIELDS			

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0-39	40	A/W Thresholds	Diagnostic Flag Alarm and Warning Thresholds
40-55	16	Unallocated	
56-91	36	Ext Cal Constants	Diagnostic calibration constants for optional External Calibration
92-94	3	Unallocated	
95	1	CC_DMI	Check code for Base Diagnostic Fields (addresses 0 to 94)
96-105	10	Diagnostics	Diagnostic Monitor Data (internally or externally calibrated)
106-109	4	Unallocated	
110	1	Status	Optional Status Bits
111	1	Reserved	Reserved for SFF-8079
112-113	2	Alarm Flags	Diagnostic Alarm Flag Status Bits
114-115	2	Unallocated	
116-117	2	Warning Flags	Diagnostic Warning Flag Status Bits
118-119	2	Ext Status/Control	Extended module control and status bytes
GENERAL USE FIELDS			
120-127	8	Vendor Specific	Vendor specific memory addresses
128-247	120	User EEPROM	User writable non-volatile memory
248-255	8	Vendor Control	Vendor specific control addresses

Mechanical Dimensions (mm)



Document Revision History

Version	Date	Modification
1.0	Jun 23, 2014	New Release.
1.1	Aug 14, 2014	Typical fiber length: Max. → Typ.

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		Fiber length symbol: A→L Modify Mechanical Dimension to comply MSA standard
1.2	Nov 26, 2014	Typical Fiber Length: Modify the typical fiber length→ 1, 3, 5, 7, 10, 30, 50, 100 meter
1.3	Mar 20, 2015	Low power consumption under 300mW Power Supply Current: typ. →70mA, max→90mA