

#### SFP-10GB-DW60-80-CN2-AO

Ciena® Compatible TAA Compliant 10GBase-DWDM 100GHz SFP+ Channel 60 Transceiver (SMF, 1529.55nm, 80km, LC, DOM)

#### **Features**

- SFF-8432 and SFF-8472 Compliance
- Temperature-stabilized EML transmitter and APD receiver
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



#### **Applications**

- 8x/10x Fibre Channel
- 10x Gigabit Ethernet over DWDM
- Access and Enterprise

#### **Product Description**

This Ciena® SFP+ transceiver provides 10GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1529.55nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Ciena® 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."



## **Regulatory Compliance**

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

## Wavelength Guide (100GHz ITU-T Channel)

ITU Channel #	Frequency (THZ)	Center Wavelength (nm)
61	196.1	1528.77
60	196.0	1529.55
59	195.9	1530.33
58	195.8	1531.12
57	195.7	1531.90
56	195.6	1532.68
55	195.5	1533.47
54	195.4	1534.25
53	195.3	1535.04
52	195.2	1535.82
51	195.1	1536.61
50	195.0	1537.40
49	194.9	1538.19
48	194.8	1538.98
47	194.7	1539.77
46	194.6	1540.56
45	194.5	1541.35
44	194.4	1542.14
43	194.3	1542.94
42	194.2	1543.73
41	194.1	1544.53
40	194.0	1545.32
39	193.9	1546.12
38	193.8	1546.92
37	193.7	1547.72
36	193.6	1548.51
35	193.5	1549.32
34	193.4	1550.12
33	193.3	1550.92
32	193.2	1551.72
31	193.1	1552.52
30	193.0	1553.33
29	192.9	1554.13

28	192.8	1554.94
27	192.7	1555.75
26	192.6	1556.55
25	192.5	1557.36
24	192.4	1558.17
23	192.3	1558.98
22	192.2	1559.79
21	192.1	1560.61
20	192.0	1561.42
19	191.9	1562.23
18	191.8	1563.05
17	191.7	1563.86

# **Absolute Maximum Ratings**

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	0.5		4.0	V	
Storage Temperature	Tstg	-40		+85	°C	1
Operating Case Temperature	Тс	0		70	°C	
Data Rate	BR	1.2	10.3125	11.3	Gbps	2
Bit Error Rate	BER			10-12		
Supply Current	Icc		450	500	mA	3

### Notes:

- 1. Ambient temperature.
- 2. IEEE 802.3ae.
- 3. For electrical power interface.

## Electrical Characteristics Vcc=3.4 to 3.46V, Tc

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes	
Input Voltage	Vcc	3.14	3.3	3.46	V		
Power Consumption	P <sub>D</sub>			1.5	W		
Transmitter							
Differential Input Impedance	ZIN		100		Ω		
Differential Data Input Swing	VIN,pp	300		850	mV		
Transmit Enable voltage	V <sub>D</sub>	2		Vcc	V		
Transmit Enable voltage	V <sub>EN</sub>	VeeT		VeeT + 0.8	V		

Receiver						
Differential Data Output Swing	VOUT_pp	300		850	mV	
Data Output Rise/Fall Time (20%-80%)	Tr/Tf	28			ps	
LOS Asserted	LOSA	2		Host_Vcc	V	
LOS De-Asserted	LOSD	VeeR		VeeR+ 0.5	V	

### Notes:

1. For electrical power interface.

# **Optical Characteristics**

Parameter	Symbol	Min	Тур.	Max	Unit	Notes	
Transmitter							
Optical Power	PTX	0		4	dBm	1	
Optical Wavelength	λ	λ-0.1	λ	λ+0.1	nm	2	
Extinction Ratio	ER	9			dB		
Spectral Width (-20dB)	Δλ			0.6	nm		
Side Mode Suppression Ratio	SMSR	30			dB		
Relative Intensity Noise	RIN			-128	dB/Hz		
Transmitter Dispersion Penalty	TDP			3.2	dB		
Launch Power of OFF Transmitter	Poff			-30	dBm	1	
Receiver							
Optical Center Wavelength	λc	1260		1620	nm		
Average Receive Power	P <sub>RX</sub>	-24		-7	dBm		
Receiver Sensitivity @ 10.3 GBps	PX_SEN			-24	dBm	3	
Receiver Reflectance	TR <sub>RX</sub>			-27	dB		
LOS Assert	LOSA	-35			dB		
LOS De-assert	LOSD			-27	dB		
LOS Hysteresis	LOSH	0.5			dB		

### Notes:

- 1. Average.
- 2.  $\lambda$  = specified ITU Grid wavelength.
- 3. Measured with PRBS  $2^{31}$ -1 test mode, BER< $10^{-12}$ .

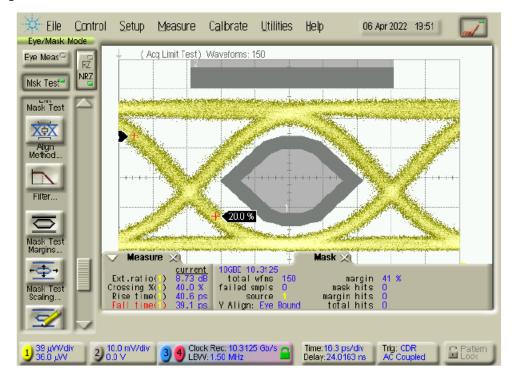
# **Pin Descriptions**

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	TX_Fault	Transmitter Fault.	
3	TX_Disable	Transmitter Disable. Laser output disabled on "high" or "open."	2
4	SDA	2-Wire Serial Interface Data.	3
5	SCL	2-Wire Serial Interface Clock.	3
6	MOD_ABS	Module Absent. Grounded within the module.	3
7	RS0	Rate Select O. Not used.	
8	LOS	Loss of Signal indication. "Logic 0" indicates normal operation.	4
9	RS1	Rate Select 1. Not used.	1
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Receiver Inverted Data out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground).	1
18	TD+	Transmitter Non-Inverted Data In. AC Coupled.	
19	TD-	Transmitter Inverted Data In. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

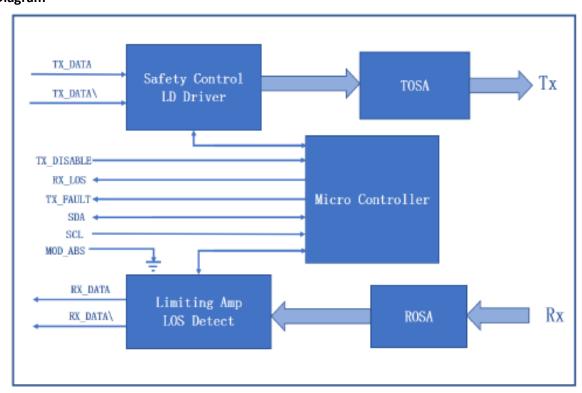
### Notes:

- 1. Circuit ground is isolated form chassis ground.
- 2. Disable TDIS>2Vor open. Enable TDIS<0.8V.
- 3. Should be pulled up with  $4.7k\Omega$ -10K $\Omega$  on host board to a voltage between 2V and 3.46V.
- 4. LOS is open collector output.

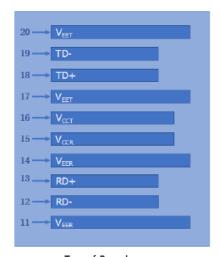
### **Typical eye Diagram**



### **Block Diagram**

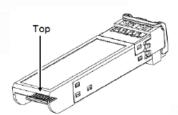


# **Electrical Pad Layout**

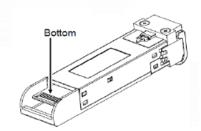


 $1 \longrightarrow V_{EET}$   $2 \longrightarrow TX\_FAULT$   $3 \longrightarrow TX\_DISABLE$   $4 \longrightarrow SDA$   $5 \longrightarrow SCL$   $6 \longrightarrow MOD\_ABS$   $7 \longrightarrow RSO$   $8 \longrightarrow LOS$   $9 \longrightarrow RS1$   $10 \longrightarrow V_{EER}$ 

Top of Board



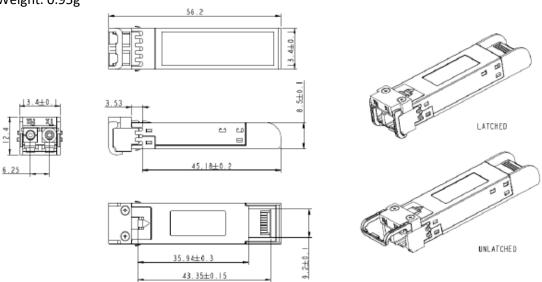
Bottom of Board



# **Mechanical Specifications**

Module Weight: 16.5g

Dust Cap Weight: 0.95g



All Dimensions are ±0.2mm unless otherwise specified

#### **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 in engrained 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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