

## Lightem 10G DWDM 100GHz SFP+ Duplex LC Transceiver 40km LSFP+SDW100xxx40

### FEATURES

- 100GHz channel spacing DWDM
- Up to 11.1Gbps Data Links
- Maximum link length of 40km on SMF
- Power dissipation < 1.6W
- DWDM EML transmitter (100GHz), PIN photo-detector
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Standard Operating Range: 0°C to 70°C Operating temperature
- Optional Industrial grade: -40°C to 85°C Operating temperature



### APPLICATIONS

- 10GBASE-ER
- 10G SONET/SDH, OTU2/2e

### ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	+4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	

### RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	-5		+70	°C	Commercial grade
	Tcase	-40		+85	°C	Industrial grade
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		490	mA	
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD		-	40	km	
Coupled fiber			Single mode fiber			SMF

# TELECOM/DATACOM SYSTEM

## ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			490	mA	
<b>Transmitter</b>						
Industrial differential impedance	RIN		100		$\Omega$	1
Differential data input swing	Vin, pp	180		700	mV	
Transmit disable voltage	VD	Vcc-1.3		Vcc	V	
Transmit enable voltage	Ven	Vcc		Vcc+0.8	V	2
Transmit disable assert time				10	us	
<b>Receiver</b>						
Differential data output swing	Vout, pp	400		800	mV	3
Data output rise time	tr	30			ps	4
Data output fall time	tf	30			ps	4
LOS Fault	VLOS fault	Vcc-1.3		VccHost	V	5
LOS Normal	VLOS norm	Vcc		Vcc+0.8	V	5
Power supply rejection	PSR	100			mVpp	6

### Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. 20 – 80 %.
5. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

## OPTICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Note
<b>Transmitter</b>						
Average Launch Power	POUT	-1		3	dBm	1
Optical Wavelength	$\lambda$	c-0.01		c+0.1	nm	
Center Wavelength Spacing			100			
Optical Extinction Ratio	ER	8.2			dB	
Output Eye Mask		Compliant with IEEE 802.3aq				
<b>Receiver</b>						
Receiver Sensitivity	Sen			-16	dBm	2
Input Saturation Power (Overload)	Psat	0			dBm	
Wavelength Range	$\lambda_C$	1270		1610	nm	
LOS De -Assert	LOSD			-17	dBm	
LOS Assert		-30			dBm	
LOS Hysteresis		0.5			dB	

### Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulation
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern, @ 10.3125Gb/s, BER<10<sup>-12</sup>

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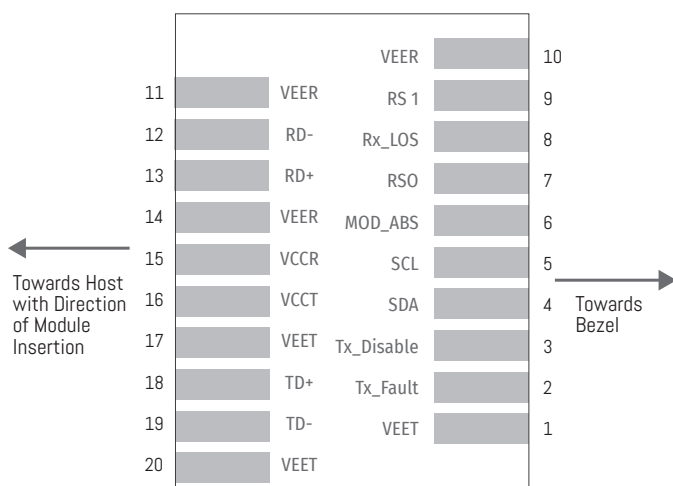
## PIN DESCRIPTION

Pin	Symbol	Name /Description	NOTE
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	T FAULT	Transmitter Fault.	2
3	T DIS	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	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	VCCR	Transmitter Power Supply	
17	VEER	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	VEER	Transmitter Ground (Common with Receiver Ground)	1

### Notes:

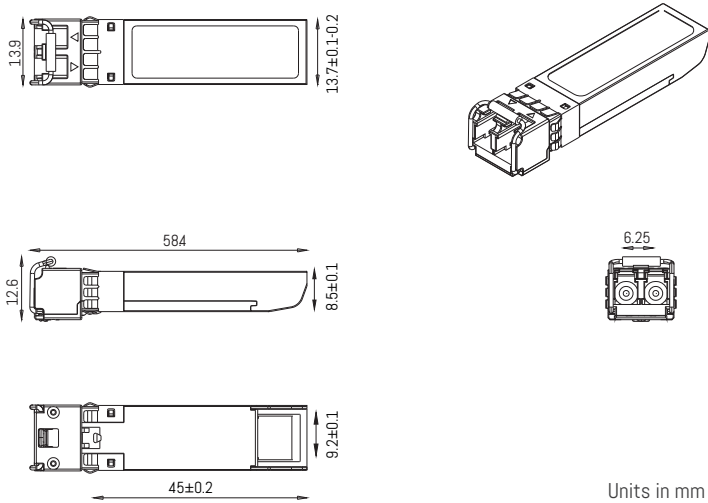
- 1.Circuit ground is internally isolated from chassis ground.
- 2.TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- 3.Laser output disabled on TDIS >2.0V or open, enabled on TDIS<0.8V.
- 4.Should be pulled up with 4.7kΩ - 10kΩ host board to a voltage between 2.0V and 3.6V. MOD\_ABS pulls line low to indicate module is plugged in.
- 5.Internally pulled down per SFF-8431 Rev 4.1.
- 6.LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

## PIN OUT OF CONNECTOR BLACK ON HOST BOARD



# TELECOM/DATACOM SYSTEM

## MECHANICAL DIMENSIONS



## CHANNEL SELECTION

Channel	Wavelength(nm)	Frequency (THz)	Channel	Wavelength(nm)	Frequency (THz)
C17	1563.86	191.70	C39	1546.12	193.90
H17	1563.45	191.75	H39	1545.72	193.95
C18	1563.05	191.80	C40	1545.32	194.00
H18	1562.64	191.85	H40	1544.92	194.05
C19	1562.23	191.90	C41	1544.53	194.10
H19	1561.83	191.95	H41	1544.13	194.15
C20	1561.42	192.00	C42	1543.73	194.20
H20	1561.01	192.05	H42	1543.33	194.25
C21	1560.61	192.10	C43	1542.94	194.30
H21	1560.20	192.15	H43	1542.54	194.35
C22	1559.79	192.20	C44	1542.14	194.40
H22	1559.39	192.25	H44	1541.75	194.45
C23	1558.98	192.30	C45	1541.35	194.50
H23	1558.58	192.35	H45	1540.95	194.55
C24	1558.17	192.40	C46	1540.56	194.60
H24	1557.77	192.45	H46	1540.16	194.65
C25	1557.36	192.50	C47	1539.77	194.70
H25	1556.96	192.55	H47	1539.37	194.75
C26	1556.55	192.60	C48	1538.98	194.80
H26	1556.15	192.65	H48	1538.58	194.85
C27	1555.75	192.70	C49	1538.19	194.90
H27	1555.34	192.75	H49	1537.79	194.95

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Channel	Wavelength(nm)	Frequency (THz)	Channel	Wavelength(nm)	Frequency (THz)
C28	1554.94	192.80	C50	1537.40	195.00
H28	1554.54	192.85	H50	1537.00	195.05
C29	1554.13	192.90	C51	1536.61	195.10
H29	1553.73	192.95	H51	1536.22	195.15
C30	1553.33	193.00	C52	1535.82	195.20
H30	1552.93	193.05	H52	1535.43	195.25
C31	1552.52	193.10	C53	1535.04	195.30
H31	1552.12	193.15	H53	1534.64	195.35
C32	1551.72	193.20	C54	1534.25	195.40
H32	1551.32	193.25	H54	1533.86	195.45
C33	1550.92	193.30	C55	1533.47	195.50
H33	1550.52	193.35	H55	1533.07	195.55
C34	1550.12	193.40	C56	1532.68	195.60
H34	1549.72	193.45	H56	1532.29	195.65
C35	1549.32	193.50	C57	1531.90	195.70
H35	1548.91	193.55	H57	1531.51	195.75
C36	1548.51	193.60	C58	1531.12	195.80
H36	1548.11	193.65	H58	1530.72	195.85
C37	1547.72	193.70	C59	1530.33	195.90
H37	1547.32	193.75	H59	1529.94	195.95
C38	1546.92	193.80	C60	1529.55	196.00
H38	1546.52	193.85	H60	1529.16	196.05
Non ITU	Peak wavelength between 1528.77nm-1563.86		C61	1528.77	196.10

## ORDERING INFORMATION

PN	Description
LSFP+SDW100xxx40-x	Lightem 10G DWDM 100GHz SFP+ Duplex LC SM Chxx 40km
xxx-	Channel
	C7-C61
x-	I: optional industrial grade
eg LSFP+SDW100C3740-I	Lightem 10G DWDM 100GHz SFP+ Duplex LC SM Ch37 40km Industrial grade