Product Specification

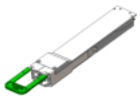
800G (2x400G-FR4) OSFP
Finisar Transceiver

FTCE4717E1PCB

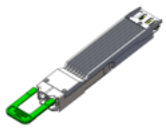
PRODUCT FEATURES

- Hot-pluggable OSFP Type 2
- Supports 2x425Gb/s aggregate bit rate. (Supports 2x400 FR4 and compatible with 2x200 FR4)
- Belly to Belly SMF LC Duplex UPC
- Closed Top heatsink. (RHS and Finned heatsink optional)
- Case temperature range 15-70C
- Single 3.3V power supply, 17W
- Aligned with IEEE 802.3cu
- 8x100G PAM4 EML-based CWDM transmitter
- 8x100G PAM4 retimed 106.25Gb/s PAM4 electrical interface aligned to IEEE 802.3ck

Closed Top



RHS



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APPLICATIONS

- *2km 2x400Gbe with Host FEC*
- *Infiniband NDR*

Finisar® FTCE4717E1PxB 2x400G-FR4 OSFP transceiver modules are designed for use in Gigabit Ethernet links on up to 2km of single mode fiber. They are compliant with the OSFP MSA and portions of IEEE P802.3cu[6] and P802.3ck[7]. Digital diagnostic functions are available via the I2C interface, as specified by the OSFP MSA. The optical transceiver is RoHS compliant as described in Application Note AN-2038[3].

PRODUCT SELECTION

FTCE4717E1PCB (Generic Closed Top Heatsink)
FTCE4717E1PCB-2N (Generic, MSA Riding Heat Sink
FTCE4717E1PCB-2F (Generic, MSA Finned Heatsink)
FTCE4717E1PCB-YY (Customer specific)

E: Ethernet protocol
P: Pull-tab type release
x: C = Commercial or L = Limited temperature range
B: Dual belly-to-belly SMF LC duplex connectors
YY : Customer specific

I. Pin Descriptions

The electrical pinout of the OSFP module is shown in Figure 1 below

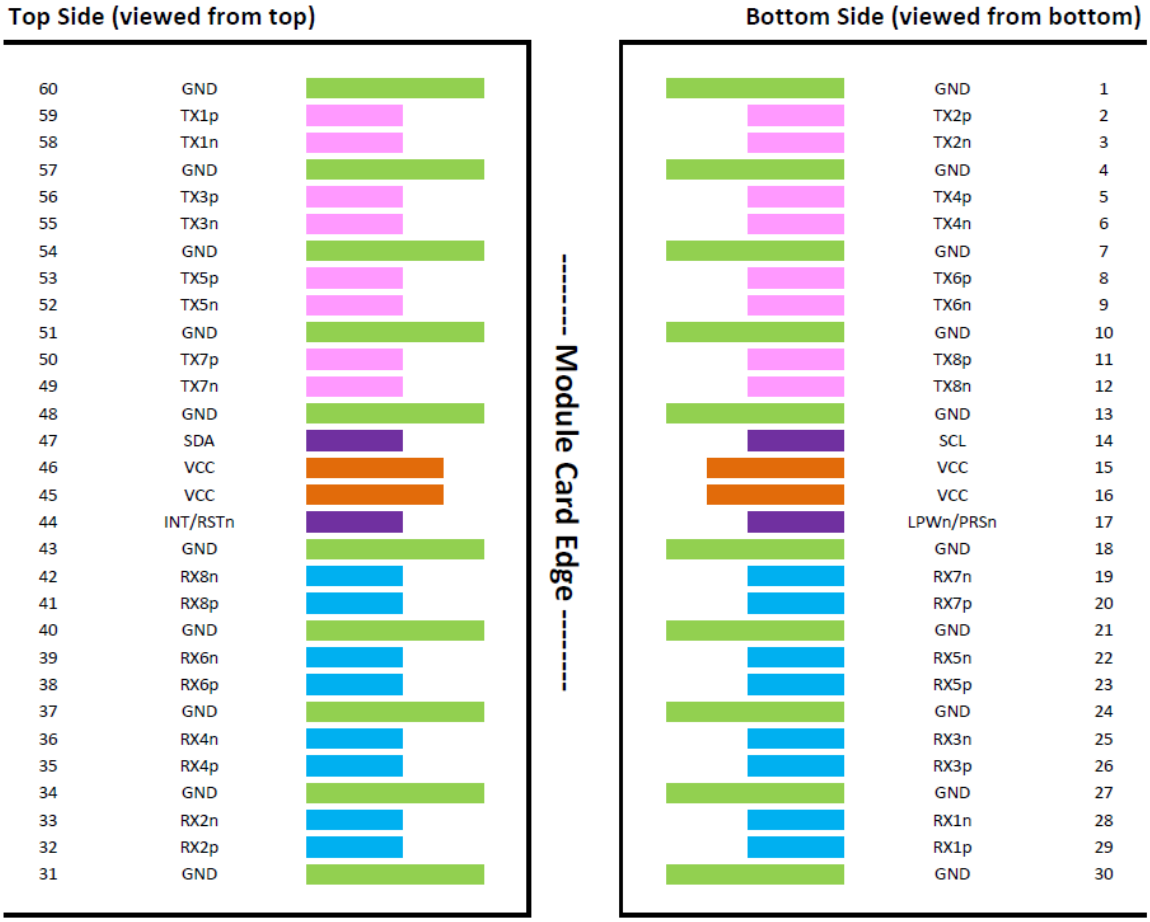

Figure 1 – OSFP Module Pinout (per OSFP MSA)

II. Absolute Maximum Ratings

Module performance is not guaranteed beyond the operating range (see Section VI). Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	T_S	-40		+70	°C	
Case Operating Temperature	T_{OP}	15 20		+70 +60	°C	c-temp l-limited
Relative Humidity	RH	15		65	%	1
Receiver Damage Threshold, per Lane	P_{Rdmg}	5.7			dBm	

Notes:
1. Non-condensing.

III. Module Electrical Characteristics (EOL, T_{OP} = 15 to +70 °C, V_{CC} = 3.135 to 3.465 V)

Aligned to IEEE P802.3ck for 400G-FR4

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			tba	A	
Module total power	P			17	W	1
Transmitter						
Signaling rate per lane		53.125± 100 ppm.			Gbd	
Differential pk-pk input voltage tolerance		900			mV	
Differential to common mode input return loss		Per equation (120G-2) IEEE802.3ck			dB	
Effective return loss, ERL		8.5			dB	
Differential termination mismatch				10	%	
Module stress input test		Per 120G.3.4.1, IEEE802.3ck				2
Single-ended voltage tolerance range		-0.4		3.3	V	
DC common mode voltage		-350		2850	mV	3
Receiver						
Signaling rate per lane		53.125			Gbd	
AC common-mode output voltage (RMS)				17.5	mV	
Differential output voltage				900	mV	
Eye height, differential		15			mV	
Vertical eye closure				12	dB	
Common-mode to differential return loss		Equation (120G-1)			dB	
Effective return loss, ERL		8.5			dB	
Differential termination mismatch				10	%	
Transition time (min, 20% to 80%)		8.5			ps	
DC common mode voltage		-350		2850	mV	3,4

Notes:

1. Maximum total power value is specified across the full temperature and voltage range.
2. Meets BER specified in 120G.1.1.
3. DC common-mode voltage is generated by the host. Specification includes effects of ground offset voltage
4. The signaling rate range is derived from the PMD receiver input.

IV. Optical Characteristics (EOL, T_{OP} = 15 to +70 °C, V_{CC} = 3.135 to 3.465 Volts)

Aligned with 400GBASE-FR4 as being defined by IEEE P802.3cu and 200GBASE-FR4/ IEEE 802.3BS

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Signaling rate (each lane (range)		53.125 ± 100 ppm			GBd	
Modulation format		PAM4				
Lane wavelength (range)		1264.5 1284.5 1304.5 1324.5	1271 1291 1311 1331	1277.5 1297.5 1317.5 1337.5	nm	
Side-mode suppression ratio (SMSR)		30			dB	
Total average launch power				10.4	dBm	
Average launch power, each lane				4.4	dBm	
Average launch power, each lane		-3.2			dBm	1
Difference in launch power between any two lanes (OMAouter) max				3.9	dB	

Outer Optical Modulation Amplitude (OMAouter), each lane min for TDECQ < 1.4 dB for 1.4 dB ≤ TDECQ ≤ 3.4 dB		 -0.2 -1.6 + TDECQ		3.7	 dBm dBm	
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane				3.4	dB	
Transmitter eye closure for PAM4 (TECQ), each lane				3.4	dB	
TDECQ – TECQ				2.5	dB	
Average launch power of OFF transmitter, each lane				-16	dBm	
Extinction ratio		3.5			dB	
Transmitter transition time				17	pS	
Transmitter over/under-shoot				22	%	
Transmitter power excursion				1.8	dBm	
$RIN_{17.1}OMA$				-136	dB/Hz	
Optical return loss tolerance				17.1	dB	
Transmitter reflectance				-26	dB	2

Notes:
1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Transmitter reflectance is defined looking into the transmitter

Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Ref.**
Receiver						
Signaling rate (each lane (range)		53.125 ± 100 ppm			GBd	
Modulation format		PAM4				
Lane wavelength (range)		1264.5 1284.5 1304.5 1324.5	1271 1291 1311 1331	1277.5 1297.5 1317.5 1337.5	nm	
Damage threshold, each lane		5.4			dBm	1
Average receive power, each lane				4.4	dBm	
Average receive power, each lane		-7.2			dBm	2
Receive power (OMAouter), each lane				3.7	dBm	
Difference in receive power between any two lanes (OMAouter)				4.1	dB	
Receiver reflectance				-26	dB	
Receiver sensitivity (OMA_{outer}), each lane (max) for SECQ < 1.4 dB for 1.4 dB ≤ SECQ ≤ 3.4 dB				 -4.6 -6 + SECQ	 dBm dBm	
Receiver sensitivity (OMAouter), each lane				-2.6		3
Conditions of stressed receiver sensitivity test:[4]						
Stressed eye closure for PAM4 (SECQ), lane under test		3.4			dB	5
OMAouter of each aggressor lane		1.5			dBm	

Notes:
1. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.
2. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
3. Measured with conformance test signal at TP3 (see 151.8.13) for the BER specified in 151.1.1.

4. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

V. General Characteristics

Parameter		Symbol	Min	Typ	Max	Units	Ref.
Bit Rate (all wavelengths combined)		BR			2x 425	Gb/s	
Bit Error Ratio		BER			$2.4x10^{-4}$		
Maximum Supported Distances							
Fiber Type							
SMF per G.652		Lmax1			2	km	

VI. Environmental Specifications

Finisar FTCE4717E1PxB 2x400G FR4 OSFP transceivers have an operating case temperature range of 15°C to +70°C.

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	T_{op}	15		+70	°C	
Storage Temperature	T_{sto}	-40		+85	°C	

VII. Regulatory Compliance

The FTCE4717E1PCB transceivers are RoHS compliant. Copies of certificates are available from Coherent Corp. upon request.

The FTCE4717E1PCB transceiver modules are Class 1 laser eye safety compliant per IEC 60825-1.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

VIII. Digital Diagnostics Functions

FTCD4517E1PxB DR8 OSFP transceivers support the I2C-based diagnostics interface specified by the SFF Commitee[1]. See also Finisar Application Note AN-20xx (TBD).

IX. Management Interface

Modules shall be compliant to Common Management Interface Specification (CMIS) Rev. 5.0.

The following AppSel are supported:

2x400 Application1

2x200 Application2

Host and Media Interface Settings

	Media Interface ID	Host Interface ID
400G-FR4	1Dh	50h
200G-FR4	18h	0Fh

X. Mechanical Specification

Finisar FTCE4717E1PxB 2x400G-FR4 OSFP transceivers are compatible with the OSFP MSA Specification for pluggable TYPE-2 form factor modules.

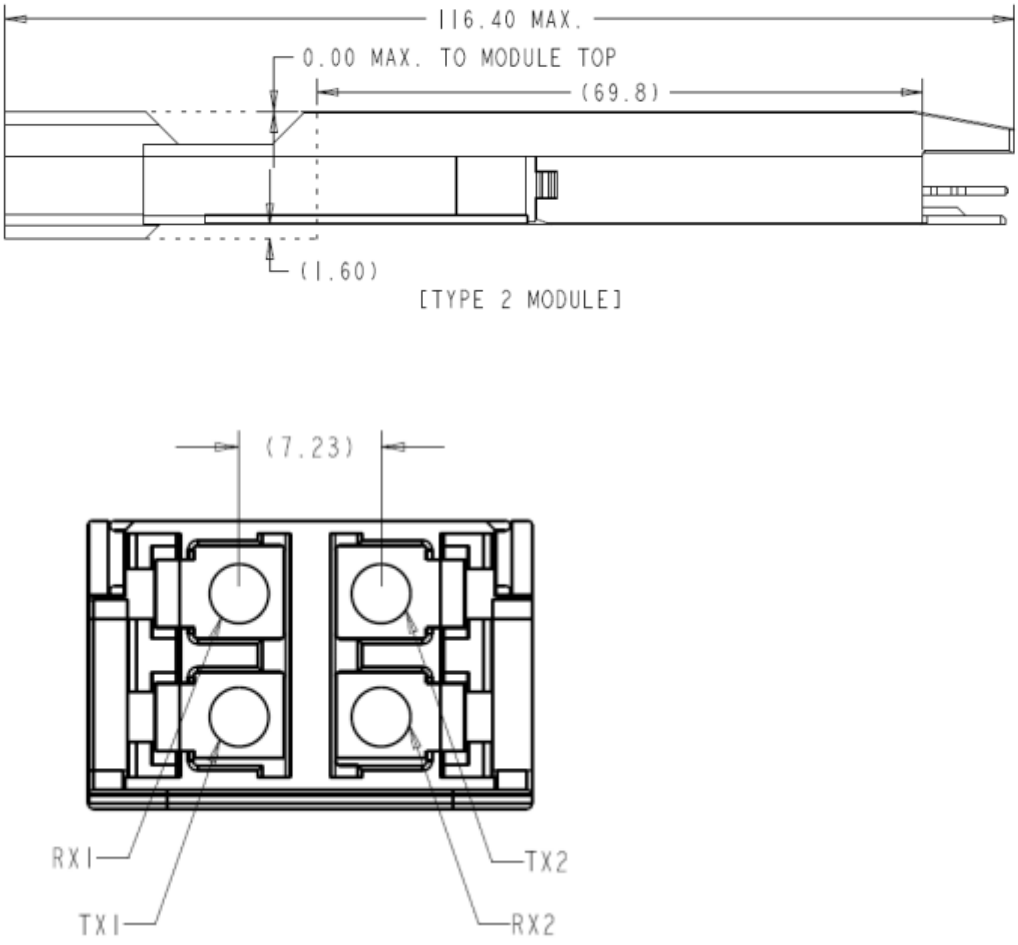

Figure 2. FTCE4717E1PCB Mechanical Dimensions. (Closed Top)

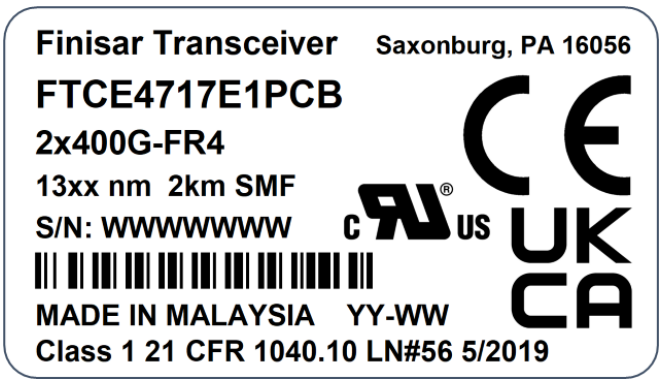

Figure 3. Product Label
15.5mm x 27.5mm

VIII. Reference

1. OSFP Specification for OSFP Octal small form factor pluggable module

2. Directive 2011/65/EU of the European Council Parliament and of the Council, "on the restriction of the use of certain hazardous substances in electrical and electronic equipment" as well as Commission Delegated Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU. Certain products may use one or more exemptions as allowed by the Directive.

3. Application Note AN-2038: "II-VI Implementation of RoHS Compliant Transceivers".

4. Application Note AN-2153, Initialization, Finisar Corporation.

5. Application Note AN-2154, EEPROM Map, Finisar Corporation.

6. IEEE P802.3cu 400 Gb/s Operation over Single-Mode Fiber at 100 Gb/s per Wavelength, 400GBASE-FR4

7. IEEE P802.3ck Physical Layer Specifications and Management Parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces Based on 100 Gb/s Signaling, 400GAUI-4 C2M

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