



# HPE Optical Transceivers and Cables

## Technical Specifications



### HPE and HPE B series transceivers

Category	Product Number	Product description	Qty per SKU	Temperature (°C)		Tx power (dbm)		Rx power (dbm)		Wave-length (nm)	Laser	Speed (Gbs)	Length OM3 (m)
				Low	High	Min	Max	Min	Max				
32 Gb <sup>6</sup>	P9H30A	HPE 32 Gb FC 100 m SFP+ Transceiver	1	0	70	-6.2	2	-10.2	2	850	VCSEL	28.05	70/100 <sup>5</sup>
32 Gb <sup>6</sup>	P9H32A	HPE B-Series 32 Gb SW SFP+ Transceiver	1	0	70	-6.2	2	-10.2	2	850	VCSEL	28.05	70/100 <sup>5</sup>
16 Gb <sup>1</sup> FC/10GbE	H6Z42A	HPE 16 Gb FC/10GbE 100 m SFP+ Transceiver	1	0	70	-7.8	0	-10	0	850	VCSEL	14.025	100
16 Gb <sup>1</sup>	QK724A	HPE B-Series 16 Gb SW SFP+ Transceiver	1	0	70	-7.8	0	-10	0	850	VCSEL	14.025	100
4x16 Gb <sup>1</sup>	H6Z76A	HPE B-Series 4x16 Gb SW 100 m SFP+ Transceiver	16	0	70	-7.8	2.4	-11	2.4	850	VCSEL	56.1	100
16 Gb <sup>1</sup>	QK725A	HPE B-Series 16 Gb LW FC 10 km SFP+ Transceiver	1	0	85	-5	2	-12	2	1310	FP/DFB	14.025	10000 <sup>4</sup>
16 Gb <sup>1</sup>	H6Z29A	HPE B-Series 16 Gb LW 25 km SFP+ Transceiver	1	0	70	-2	6	-14	3	1310	FP/DFB	14.025	25000 <sup>4</sup>
4x16 Gb	K2Q88A	HPE B-Series 4x16 Gb 2 km ICL QSFP Transceiver	1	0	70	-6.25	2	-12	2	1310	FP/DFB	56.1	2000 <sup>4</sup>
16 Gb	E7Y09A	HPE 16 Gb SW I Temp (0-85 C) Ext QSFP+ Transceiver	1	0	85	-7.8	0	-10	0	850	VCSEL	14.025	100
16 Gb	E7Y10A	HPE 16 Gb SW C Temp (0-70 C) SFP+ Transceiver	1	0	70	-7.8	0	-10	0	850	VCSEL	14.025	100
10GbE	AP823A	HPE B-Series 10GbE SR SFP+ Transceiver	1	0	70	-7.3	-1	-10	-1	850	VCSEL	10.3125	300
10GbE	AP824A	HPE B-Series 10GbE LR SFP+ Transceiver	1	0	70	-8.2	0.5	-14	0.5	1310	FP/DFB	10.3125	10000 <sup>4</sup>
1GbE	E7Y74A	HPE B-Series 1GbE LX SFP Transceiver	1	0	70	-9	-3	-20	-3	1310	FP/DFB	1.0	550/10 K <sup>4</sup>
10GbE	QK726A	HPE B-Series 10GbE SR SFP+ Transceiver	1	0	70	-7.3	-1	-10	-1	850	VCSEL	10.3125	300
10GbE	QK727A	HPE B-Series 10GbE LR SFP+ Transceiver	1	0	70	-8.2	0.5	-14	0.5	1310	FP/DFB	10.3125	10000 <sup>4</sup>
4x10GbE	E7Y75A	HPE B-Series 40GbE LR QSFP+ Transceiver	1	0	70	-7	2.3	-13.7	2.3	1310	FP/DFB	41.25	10000 <sup>4</sup>
4x10GbE	E7Y76A	HPE B-Series 40GbE SR QSFP+ Transceiver	1	0	70	-7.6	2.4	9.5	2.4	850	VCSEL	41.25	100
10 Gb	QW928A	C-Series 10 Gb FC SW SFP+ Transceiver	1	0	70	-7.3	-1	-10	-1	850	VCSEL	9.85	300
10GbE	AP783A	C-Series 10GbE Short Range SFP+ Transceiver	1	0	70	-7.3	-1	-10	-1	850	VCSEL	10.3125	300
10 Gb	QW929A	C-Series 10 Gb FC LW SFP+ Transceiver	1	0	70	-8.2	0.5	-14	0.5	1310	FP/DFB	9.85	10000 <sup>4</sup>
10GbE	E7Y65A	C-Series 10GbE LR SFP+ Transceiver	1	0	70	-8.2	0.5	-14	0.5	1310	FP/DFB	10.3125	10000 <sup>4</sup>
8 Gb <sup>2</sup>	AJ716B	HPE B-Series 8 Gb SW SFP+ Transceiver	1	-5	85	-8.2	0	-11	0	850	VCSEL	8.5	150
8 Gb <sup>2</sup>	AW538A	HPE B-Series 8 Gb LW 25 km FC SFP+ Transceiver	1	-10	85	-8.4	0.5	-14	0.5	1310	FP/DFB	8.5	25000 <sup>4</sup>
8 Gb <sup>2</sup>	AJ717A	HPE B-Series 8 Gb LW 10 km FC SFP+ Transceiver	1	-10	85	-8.4	0.5	-14	0.5	1310	FP/DFB	8.5	10000 <sup>4</sup>
8 Gb <sup>2</sup>	AJ718A	HPE 8 Gb SW SFP+ Transceiver	1	-5	85	-8.2	0	-11	0	850	VCSEL	8.5	150
8 Gb <sup>2</sup>	AW584A	HPE 8 Gb LW 10 km FC SFP+ Transceiver	1	-10	85	-8.4	0.5	-14	0.5	1310	FP/DFB	8.5	10000 <sup>4</sup>
4 Gb <sup>3</sup>	AJ715A	HPE B-Series 4 Gb SW SFP	1	-10	85	-9	0	-12	0	850	VCSEL	4.25	380

<sup>1</sup> The 16 G transceivers are multi-rate and support both 8 G and 4 G data rates.

<sup>2</sup> The 8 G transceivers are multi-rate and support both 4 G and 2 G data rates.

<sup>3</sup> The 4 G transceivers are multi-rate and support both 2 G and 1 G data rates.

<sup>4</sup> Single mode fiber.

<sup>5</sup> OM4 fiber (m)

<sup>6</sup> The 32 G transceivers are multi-rate and support both 16 G and 8 G data rates.

### Compatibility information

HPE transceivers are developed and tested to work with specific hardware products. As such, it is important that HPE customers and business partners use the correct transceiver designed for their product.

## 10 G-Base SFP transmitter characteristics\*

Description	Unit	10 GBASE-SW	10 GBASE-SR	10 GBASE-LW	10 GBASE-LR
<b>Signaling speed (nominal)</b>	GBd	9.95328	10.3125	9.95328	10.3125
<b>Signaling speed variation from nominal (max)</b>	ppm	±20	±100	±20	±100
<b>Center wavelength (range)</b>	nm	840 to 860		1260 to 1355	
<b>RMS spectral width<sup>a</sup> (max)</b>		See footnote <sup>b</sup>			
<b>Side Mode Suppression Ratio (min)</b>	dB			30	
<b>Average launch power (max)</b>	dBm	See footnote <sup>c</sup>		0.5	
<b>Average launch power<sup>d</sup> (min)</b>	dBm	-7.3		-8.2	
<b>Launch power (min) in OMA</b>		See footnote <sup>b</sup>			
<b>Launch power (min) in OMA minus TDP<sup>e</sup></b>	dBm			-6.2	
<b>Optical Modulation Amplitude<sup>f</sup> (min)</b>	dBm			-5.2	
<b>Average launch power of OFF transmitter<sup>g</sup> (max)</b>	dBm	-30		-30	
<b>Extinction ratio (min)</b>	dB	3		3.5	
<b>RIN<sup>h</sup>OMA (max)</b>	dB/Hz	-128		-128	
<b>Optical Return Loss Tolerance (max)</b>	dB	12		12	
<b>Encircled flux</b>		See footnote <sup>b</sup>			
<b>Transmitter Reflectance<sup>i</sup> (max)</b>	dB			-12	
<b>Transmitter eye mask definition (X1, X2, X3, Y1, Y2, Y3)</b>		(0.25, 0.40, 0.45, 0.25, 0.28, 0.40)		(0.25, 0.40, 0.45, 0.25, 0.28, 0.40)	
<b>Transmitter and dispersion penalty<sup>j</sup> (max)</b>	dB	3.9		3.2	

<sup>a</sup> RMS spectral width is the standard deviation of the spectrum.

<sup>b</sup> Trade-offs are available between spectral width, center wavelength and minimum optical modulation amplitude.

<sup>c</sup> The 10 GBASE-S launch power shall be the lesser of the class 1 safety limit or the average receive power (max).

<sup>d</sup> Average launch power (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.

<sup>e</sup> TDP is transmitter and dispersion penalty.

<sup>f</sup> Even if the TDP < 1 dB, the OMA (min) must exceed this value.

<sup>g</sup> Examples of an OFF transmitter are: no power supplied to the PMD, laser shutdown for safety conditions, activation of a PMD\_global\_transmit\_disable or other optional transmitter shut down conditions.

<sup>h</sup> The encircled flux at 19 µm shall be greater than or equal to 86% and the encircled flux at 4.5 µm shall be less than or equal to 30% when measured into Type A1a (50/125 µm multimode) fibre per ANSI/TIA/EIA-455-203-2001.

<sup>i</sup> Transmitter reflectance is defined looking into the transmitter.

<sup>j</sup> TDP (max) and OMA (min) are at the respective wavelength and spectral width as specified.

## 10 G-Base SFP transmitter characteristics\*

Description	Unit	10 GBASE-S	10 GBASE-SR
<b>Signaling speed (nominal)</b>	GBd	10.3125	10.3125
10 GBASE-SR or 10 GBASE-LR 10 GBASE-SW or 10 GBASE-LW		9.95328	9.95328
<b>Signaling speed variation from nominal (max)</b>	ppm	±100	±100
<b>Center wavelength (range)</b>	nm	840 to 860	1260 to 1355
<b>Average receive power<sup>a</sup> (max)</b>	dBm	-1.0	0.5
<b>Average receive power<sup>b</sup> (min)</b>	dBm	-9.9	-14.4
<b>Receiver sensitivity (max) in OMA<sup>c</sup></b>	mW (dBm)	0.077 (-11.1)	0.055 (-12.6)
<b>Receiver Reflectance (max)</b>	dB	-12	-12
<b>Stressed receiver sensitivity in OMA<sup>d</sup> (max)</b>	mW (dBm)	0.18 (-7.5)	0.093 (-10.3)
<b>Vertical eye closure penalty<sup>e</sup> (min)</b>	dB	3.5	2.2
<b>Stressed eye jitter<sup>f</sup> (min)</b>	UI pk-pk	0.3	0.3
<b>Receive electrical 3 dB upper cutoff frequency (max)</b>	GHz	12.3	12.3

<sup>a</sup> The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having a power level equal to the average receive power (max) plus at least 1 dB.

<sup>b</sup> Average receive power (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.

<sup>c</sup> Receiver sensitivity is informative.

<sup>d</sup> Measured with conformance test signal at TP3 for BER = 10<sup>-12</sup>.

<sup>e</sup> The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effect of CDR circuits.

<sup>f</sup> Vertical eye closure penalty is a test condition for measuring stressed receiver sensitivity. It is not a required characteristic of the receiver.

<sup>g</sup> Stressed eye jitter is a test condition for measuring stressed receiver sensitivity. It is not a required characteristic of the receiver.

\* Optical interface specifications per IEEE 802.3ae 10 GBASE-SR, LR

## Fiber Channel SFP characteristics (4 G, 8 G, 16 G and 32 GFC)\*

FC-0	Unit	800-SM-LC-L	800-SM-LC-L	1600-SM-LC-L	1600-SM-LZ-I	400-SN	800-SN	1600-SN	3200-SN	3200-SM-LC-L
<b>Nominal signaling rate</b>	Mbd	8,500	8,500	14,025	14,025	4,250	8,500	14,025	28,050	28,050
<b>Operating distance (SM)</b>	m	2-10,000	2-1,400	0.5-10,000	0.5-2,000	NA	NA	NA	NA	0.5-10,000
<b>Operating distance (OM2)</b>	m					0.5-150	0.5-50	0.5-35	0.5-20	
<b>Operating distance (OM3)</b>	m					0.5-380	0.5-150	0.5-100	0.5-70	
<b>Operating distance (OM4)</b>	m					0.5-400	0.5-190	0.5-125	0.5-100	
<b>Fibre core diameter</b>	µm					50	50	50	50	9
<b>Transmitter (gamma-T)</b>										
<b>Center wavelength, max</b>	nm	1370	1370	1325	1500	860	860	860	860	1325
<b>Center wavelength, min</b>	nm			1295	1485	840	840	840	840	1295
<b>RMS spectral width, max</b>	nm					0.65	0.65	0.59	0.57	
<b>Optical modulation amplitude, min</b>	mW (dBm)	0.290	0.174	0.631	0.473	0.247	0.302	0.331	0.479	0.631
		(-5.4)	(-7.6)	(-2.0)	(-3.25)	(-6.1)	(-5.2)	(-4.8)	(-3.2)	(-2)
<b>Side-mode suppression</b>	dB	30	NA	30	30					30
<b>-20 dB spectral width</b>	nm	1	NA	1	1					1
<b>Average launched power, max</b>	dBm									
<b>Average launched power, min</b>	dBm	-8.4	-10.6	-5.0	-6.25	-9	-8.2	-7.8	-6.2	-5.0
<b>Rise/fall time (20-80%), max</b>	ps		NA			90				
<b>Transmitter waveform distortion penalty (TWD<sub>Po</sub>), max</b>	dB					NA	4.3	NA	NA	
<b>Vertical Eye Closure Penalty (VECP<sub>q</sub>), max</b>	dB					NA	NA	2.56	3.13	
<b>RIN<sub>12OMA</sub>, max</b>	dB/Hz	-128	-128	-130	-130	-130	-130	-130	-130	-130
<b>RIN<sub>12OMA</sub>, max (OM3,OM4)</b>	dB/Hz					-120	-128	-128	-129	
<b>Extinction Ratio, min</b>	dB		3.5		3.0					4.0
<b>Transmitter and dispersion penalty (TDP), max</b>	dB	3.2	3.2	4.4	3.0					2.7
<b>Receiver (gamma-R)</b>										
<b>Average received power, max</b>	dBm	+0.5	+0.5	+2.0	+2.0		0		2	2
<b>Rx jitter tolerance test, OMA</b>	mW	0.066	0.066	0.095	0.095	0.154	0.200	0.214	0.295	0.12
	dBm	(-11.8)	(-11.8)	(-10.2)	(-10.2)	(-8.1)	(-7.0)	(-6.7)	(-5.3)	(-9.2)
<b>Rx jitter tracking test, jitter and pk-pk amplitude frequency</b>	(kHz, UI)	(510, 1) (100, 5)	(510, 1) (100, 5)	(840, 1) (168, 5)	(840, 1) (168, 5)	NA	(510, 1) (100, 5)	(840, 1) (168, 5)	(500,1) (100,5)	(500,1) (100,5)
<b>Unstressed receiver sensitivity, OMA</b>	mW	0.042	0.042	0.063	0.063	0.061	0.076	0.089	0.095	0.072
	dBm	(-13.8)	(-13.8)	(-12.0)	(-12.0)	(-12.1)	(-11.2)	(-10.5)	(-10.2)	(-11.4)
<b>Receiver electrical 3 dB upper cutoff frequency, max</b>	GHz	12	12	18	18	5.0	12	18		
<b>Stressed test source</b>										
<b>Stressed receiver sensitivity, OMA (OM3, OM4)</b>	mW (dBm)					0.126 (-9.0)	0.151 (-8.2)	0.170 (-7.7)	0.263 (-5.8)	
<b>receiver vertical eye closure penalty (OM3, OM4)</b>						0.75	3.1	2.5	3.1	
<b>Receiver DDPWS component of DJ</b>						NA	0.238	0.14		
<b>Receiver DJ</b>							0.322	0.22	0.1	

\* Optical interface specifications per FCI-PI-6 rev. 3.1

## Product specifications

	OM3 Cables	OM4 Cables
<b>Mode type</b>	Multimode	Multimode
<b>Connectors</b>	LC/LC	LC/LC, MPO/ MPO
<b>Cable color</b>	Aqua	Blue
<b>Core/cladding (µM)</b>	50/125	50/125
<b>Operating wavelengths</b>	850 nm	850 nm
<b>Effective modal bandwidth (850 nm)</b>	2000 MHz-km	4700 MHz-km
<b>RoHS compliant?</b>	Yes	Yes
<b>Jacket material</b>	OFNR LSZH	OFNR LSZH

## Maximum reach

Transfer rate	OM3**	OM4
<b>28.05 Gb</b>	70 m	100 m
<b>14.025 Gb</b>	100 m	125 m
<b>10 Gb (Ethernet)</b>	300 m	380 m
<b>8.5 Gb</b>	150 m	190 m
<b>4.25 Gb</b>	270 m	400 m
<b>2 Gb</b>	500 m	-
<b>1 Gb</b>	860 m	-

## HPE Fiber Optic Cables

### Portfolio overview

SKU	HPE PremierFlex OM4 Cables	Quantity per pack
<b>QK737A</b>	HPE PremierFlex OM4 50 m LC/LC FC Cable	1
<b>QK736A</b>	HPE PremierFlex OM4 30 m LC/LC FC Cable	1
<b>QK735A</b>	HPE PremierFlex OM4 15 m LC/LC FC Cable	1
<b>QK734A</b>	HPE PremierFlex OM4 5 m LC/LC FC Cable	1
<b>QK733A</b>	HPE PremierFlex OM4 2 m LC/LC FC Cable	1
<b>QK732A</b>	HPE PremierFlex OM4 1 m LC/LC FC Cable	1
<b>H6Z30A</b>	HPE PremierFlex OM4 100 m MPO/MPO FC Cable	1
<b>QK731A</b>	HPE PremierFlex OM4 50 m MPO/MPO FC Cable	1
<b>QK729A</b>	HPE PremierFlex OM4 10 m MPO/MPO FC Cable	1
<b>K2Q47A</b>	HPE PremierFlex OM4 15 m MPO to 4xLC FC Cable	1
<b>K2Q46A</b>	HPE PremierFlex OM4 5 m MPO to 4xLC FC Cable	1
SKU	HPE OM3 Cables	
<b>AJ839A</b>	HPE OM3 50 m Multi-mode LC/LC FC Cable	1
<b>AJ838A</b>	HPE OM3 30 m Multi-mode LC/LC FC Cable	1
<b>AJ837A</b>	HPE OM3 15 m Multi-mode LC/LC FC Cable	1
<b>AJ836A</b>	HPE OM3 5 m Multi-mode LC/LC FC Cable	1
<b>AJ835A</b>	HPE OM3 2 m Multi-mode LC/LC FC Cable	1
<b>AJ834A</b>	HPE OM3 1 m Multi-mode LC/LC FC Cable	1
<b>AJ833A</b>	HPE OM3 .5 m Multi-mode LC/LC FC Cable	1
SKU	HPE 12 Gb Mini SAS HD AOC Cables	
<b>E7V97A</b>	HPE 100 m Mini SAS HD Active Optical Cable	1
<b>E7V96A</b>	HPE 25 m Mini SAS HD Active Optical Cable	1
<b>E7V95A</b>	HPE 10 m Mini SAS HD Active Optical Cable	1
SKU	HPE Single Mode Cables	
<b>AK346A</b>	HPE 5 m Single Mode LC/LC FC Cable	1
<b>AK345A</b>	HPE 2 m Single Mode LC/LC FC Cable	1

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