

4 Optical Module

This section introduces the specifications of the optical modules supported by the OLT. The optical modules provide the optical / electrical conversion interfaces for cards.

- Mappings Between Modules and Cards
- EPON Optical Module
- 10G EPON Optical Module
- GPON Optical Module
- XG-PON Optical Module
- GPON&XG-PON Combo Optical Module
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4.1 Mappings Between Modules and Cards

The AN5116-06B/AN5516-06/AN5516-04 supports encapsulation formats including SFP, SFP+ and XFP for pluggable modules.

The module interface types include LC, SC and RJ-45 (for the electrical module). Figure 4-1 shows the modules with different interface types.



Figure 4-1 Module Appearance

Module Type	Application Code	Module Code	Applicable Cards
EPON optical module	PX20+	1.25G-20km-EPON OLT-SFP (PX20+)	EC4B , EC8B, ECOB
10G EPON optical module	10G/1G BASE-PRX30	10/1.25G-20km-10G EPON OLT asymmetric-XFP (10G/1G BASE-PRX30)	XG8A
	10G BASE-PR30	10/1.25G-20km-10G EPON OLT symmetric-XFP (10G BASE-PR30)	XG8A
GPON optical module	CLASS B+	2.5/1.25G-20km-GPON OLT-SFP (CLASS B+)	GC4B , GC8B, GCOB
	CLASS C+	2.5/1.25G-20km-GPON OLT-SFP (CLASS C+)	GC4B , GC8B, GCOB
	CLASS C++	2.5/1.25G-20km-GPON OLT-SFP (CLASS C++)	GC4B , GC8B, GCOB
XG-PON optical module	N1 ODN CLASS	10/2.5G-20km-XG-PON OLT-SFP+ (N1 ODN CLASS)	XP8A (2202171, 2202267)
		10/2.5G-20km-XG-PON OLT-XFP (N1 ODN CLASS)	XP4A , XP8A (2201737)
	N2a ODN CLASS	10/2.5G-20km-XG-PON OLT-XFP (N2a ODN CLASS)	XP4A , XP8A (2201737)

Module Type	Application Code	Module Code	Applicable Cards
GPON&XG-PON Combo optical module	D1 ODN CLASS	10/2.5G:2.5/1.25G-20km-XG-PON: GPON OLT-XFP (D1 ODN CLASS)	XP8C (2202188)
	D2 ODN CLASS	10/2.5G:2.5/1.25G-20km-XG-PON: GPON OLT-XFP (D2 ODN CLASS)	XP8C (2202188)
GE electrical module	10/100/1000BASE-E-T	1.25G-100m-TDM-SFP (10/100/1000BASE-T)	HSUB , HSUC HU1A , HU1B, HU2A, HU2C, GU6B, GU6F GSOF
	1000BASE-T	1.25G-100m-TDM-SFP (1000BASE-T)	HSUB , HSUC HU1A , HU2A, HU2C, GU6F GSOF
GE optical module	1000BASE-SX	1.25G-0.55km-TDM-SFP (1000BASE-SX)	HSUB , HSUC HU1A , HU1B, HU2A, HU2C, GU6F GSOF
	1000BASE-LX	1.25G-15km-TDM-SFP (1000BASE-LX)	HSUB , HSUC HU1A , HU1B, HU2A, HU2C, GU6B, GU6F GSOF
	1000BASE-EX	1.25G-40km-TDM-SFP (1000BASE-EX)	HSUB , HSUC HU1A , HU1B, HU2A, HU2C, GU6B, GU6F GSOF
	1000BASE-ZX1	1.25G-80km-TDM-SFP (1000BASE-ZX1)	HSUB , HSUC HU1A , HU1B, HU2A, HU2C, GU6B, GU6F GSOF
10GE optical module	10GBASE-SR/SW	10G-0.3km-TDM-SFP+ (10GBASE-SR/SW)	HU2C , HU4A
	10GBASE-LR/LW	10G-10km-TDM-SFP+ (10GBASE-LR/LW)	HU2C , HU4A
	I-64.1	10G-10km-TDM-SFP+ (I-64.1)	HSUB HU1B
		10G-10km-TDM-XFP (I-64.1)	HU1A , HU2A
	10GBASE-ER/EW	10G-40km-TDM-SFP+ (10GBASE-ER/EW)	HSUB HU1B , HU2C, HU4A
	S-64.2b	10G-40km-TDM-XFP (S-64.2b)	HU1A , HU2A
	L-64.2	10G-80km-TDM-SFP+ (L-64.2)	HSUB HU1B , HU2C
10G-80km-TDM-XFP (L-64.2)		HU1A , HU2A	

Module Type	Application Code	Module Code	Applicable Cards
TDM optical module	100BASE-SX	155M-2km-TDM-SFP (100BASE-SX)	TIMA
	S1.1	155M-15km-TDM-SFP (S1.1)	TIMA , C155A
	L1.1	155M-40km-TDM-SFP (L1.1)	TIMA
	L1.2	155M-80km-TDM-SFP (L1.2)	TIMA

4.2 EPON Optical Module

Item	Specification
Module code	1.25G-20km-EPON OLT-SFP (PX20+)
Optical module type	PX20+
Wavelength range	Tx: 1480 nm to 1500 nm Rx: 1260 nm to 1360 nm
Encapsulation mode	SFP
Rate	Tx: 1.25 Gbit/s Rx: 1.25 Gbit/s
Output optical power	3.5 dBm to 7 dBm (room temperature)
Optical fiber connector type	SC/PC
Transmission distance	20 km
Receiving sensitivity	-30 dBm
Overload optical power	-6 dBm
Extinction ratio	> 9 dB

4.3 10G EPON Optical Module

Item	Specification	
Module code	10/1.25G-20km-10G EPON OLT asymmetric-XFP (10G/1G BASE-PRX30)	10/1.25G-20km-10G EPON OLT symmetric-XFP (10G BASE-PR30)
Optical module type	10/1G BASE-PRX30	10G BASE-PR30
Wavelength range	Tx: 1490 nm (1480 nm to 1500 nm), 1577 nm (1575 nm to 1580 nm) Rx: 1260 nm to 1360 nm	Tx: 1490 nm (1480 nm to 1500 nm), 1577 nm (1575 nm to 1580 nm) Rx: 1270 nm (1260 nm to 1280 nm), 1310 nm (1280 nm to 1360 nm)
Encapsulation mode	XFP	XFP
Rate	Tx: 10.3125 Gbit/s, 1.25 Gbit/s Rx: 1.25 Gbit/s	Tx: 10.3125 Gbit/s, 1.25 Gbit/s Rx: 10.3125 Gbit/s, 1.25 Gbit/s

Version: C

Item	Specification	
Output optical power	1490 nm: 2 dBm to 7 dBm 1577 nm: 2 dBm to 5 dBm	1490 nm: 2 dBm to 7 dBm 1577 nm: 2 dBm to 5 dBm
Optical fiber connector type	SC/PC	SC/PC
Transmission distance	20 km	20 km
Receiving sensitivity	-29.78 dBm	1270 nm: -28 dBm; 1310 nm: -29.78 dBm
Overload optical power	-9.38 dBm	1270 nm: -6 dBm; 1310 nm: -9.38 dBm
Extinction ratio	1490 nm: > 9 dB, 1577 nm: > 6 dB	1490 nm: > 9 dB, 1577 nm: > 6 dB

4.4 GPON Optical Module

Item	Specification		
Module code	2.5/1.25G-20km-GPON OLT-SFP (CLASS B+)	2.5/1.25G-20km-GPON OLT-SFP (CLASS C+)	2.5/1.25G-20km-GPON OLT-SFP (CLASS C++)
Optical module type	CLASS B+	CLASS C+	CLASS C++
Wavelength range	Tx: 1480 nm to 1500 nm Rx: 1260 nm to 1360 nm	Tx: 1480 nm to 1500 nm Rx: 1260 nm to 1360 nm	Tx: 1480 nm to 1500 nm Rx: 1260 nm to 1360 nm, 1290 nm to 1330 nm, 1280 nm to 1360 nm
Encapsulation mode	SFP	SFP	SFP
Rate	Tx: 2.488 Gbit/s Rx: 1.244 Gbit/s	Tx: 2.488 Gbit/s Rx: 1.244 Gbit/s	Tx: 2.488 Gbit/s Rx: 1.244 Gbit/s
Output optical power	2.5 dBm to 5 dBm (room temperature)	4 dBm to 7 dBm (room temperature)	5.5 dBm to 10 dBm (room temperature)
Optical fiber connector type	SC/PC	SC/PC	SC/PC
Transmission distance	20 km	20 km	20 km
Receiving sensitivity	-29 dBm (room temperature)	-31 dBm (room temperature)	-31 dBm (room temperature)
Overload optical power	-8 dBm	-12 dBm	-12 dBm
Extinction ratio	> 8.2 dB	> 8.2 dB	> 8.2 dB

4.5 XG-PON Optical Module

Item	Specification		
Module code	10/2.5G-20km-XG-PON OLT-XFP (N1 ODN CLASS)	10/2.5G-20km-XG-PON OLT-SFP+ (N1 ODN CLASS)	10/2.5G-20km-XG-PON OLT-XFP (N2a ODN CLASS)
Optical module type	N1 ODN CLASS	N1 ODN CLASS	N2a ODN CLASS
Wavelength range	Tx: 1575 nm to 1580 nm Rx: 1260 nm to 1280 nm	Tx: 1575 nm to 1580 nm Rx: 1260 nm to 1280 nm	Tx: 1575 nm to 1580 nm Rx: 1260 nm to 1280 nm
Encapsulation mode	XFP	SFP+	XFP
Rate	Tx: 9.95328 Gbit/s Rx: 2.48832 Gbit/s	Tx: 9.95328 Gbit/s Rx: 2.48832 Gbit/s	Tx: 9.95328 Gbit/s Rx: 2.48832 Gbit/s
Output optical power	2 dBm to 6 dBm (full temperature range)	2 dBm to 6 dBm (full temperature range)	4 dBm to 8 dBm (full temperature range)
Optical fiber connector type	SC/PC	SC/PC	SC/PC
Transmission distance	> 20 km	> 20 km	> 20 km
Receiving sensitivity	-27.5 dBm	-27.5 dBm	-29.5 dBm
Overload optical power	-7 dBm	-7 dBm	-9 dBm
Extinction ratio	> 8.2 dB	> 8.2 dB	> 8.2 dB

4.6 GPON&XG-PON Combo Optical Module

Item	Specification	
Module code	10/2.5G:2.5/1.25G-20km-XG-PON:GPON OLT-XFP (D1 ODN CLASS)	10/2.5G:2.5/1.25G-20km-XG-PON:GPON OLT-XFP (D2 ODN CLASS)
Optical module type	D1 ODN CLASS	D2 ODN CLASS
Wavelength range	GPON ◆ Tx: 1490 nm (1480 nm to 1500 nm) ◆ Rx: 1310 nm (1290 nm to 1330 nm) XG-PON ◆ Tx: 1577 nm (1575 nm to 1580 nm) ◆ Rx: 1270 nm (1260 nm to 1280 nm)	GPON ◆ Tx: 1490 nm (1480 nm to 1500 nm) ◆ Rx: 1310 nm (1290 nm to 1330 nm) XG-PON ◆ Tx: 1577 nm (1575 nm to 1580 nm) ◆ Rx: 1270 nm (1260 nm to 1280 nm)
Encapsulation mode	XFP	XFP

Item	Specification	
Rate	GPON ◆ Tx: 2.488 Gbit/s ◆ Rx: 1.244 Gbit/s XG-PON ◆ Tx: 9.95328 Gbit/s ◆ Rx: 2.48832 Gbit/s	GPON ◆ Tx: 2.488 Gbit/s ◆ Rx: 1.244 Gbit/s XG-PON ◆ Tx: 9.95328 Gbit/s ◆ Rx: 2.48832 Gbit/s
Output optical power	GPON ◆ 1490 nm: 1.5 dBm to 5 dBm XG-PON ◆ 1577 nm: 1 dBm to 6 dBm	GPON ◆ 1490 nm: 3 dBm to 7 dBm XG-PON ◆ 1577 nm: 5 dBm to 8 dBm
Optical fiber connector type	SC/PC	SC/PC
Transmission distance	20 km	20km
Receiving sensitivity	GPON ◆ 1310 nm: -28 dBm XG-PON ◆ 1270 nm: -26.5 dBm	GPON ◆ 1310 nm: -32 dBm XG-PON ◆ 1270 nm: -30.5 dBm
Overload optical power	GPON ◆ 1310 nm: -8 dBm XG-PON ◆ 1270 nm: -7 dBm	GPON ◆ 1310 nm: -12 dBm XG-PON ◆ 1270 nm: -9 dBm
Extinction ratio	> 8.2 dB	> 8.2 dB

4.7 GE / 10GE Module

GE Electrical Module

Item	Specification	
Module code	1.25G-100m-TDM-SFP (10/100/1000BASE-T)	1.25G-100m-TDM-SFP (1000BASE-T)
Module type	10/100/1000BASE-T	1000BASE-T
Encapsulation mode	SFP	SFP
Rate	1.25 Gbit/s	1.25 Gbit/s
Connector type	RJ-45	RJ-45
Transmission distance	100m	100m

GE Optical Module

Item	Specification			
Module code	1.25G-0.55km-TDM-SFP (1000BASE-SX)	1.25G-15km-TDM-SFP (1000BASE-LX)	1.25G-40km-TDM-SFP (1000BASE-EX)	1.25G-80km-TDM-SFP (1000BASE-ZX1)
Optical module type	1000BASE-SX	1000BASE-LX	1000BASE-EX	1000BASE-ZX1
Wavelength range	770 nm to 860 nm	1275 nm to 1350 nm	1275 nm to 1350 nm	1500 nm to 1580 nm
Encapsulation mode	SFP	SFP	SFP	SFP
Rate	1.25 Gbit/s	1.25 Gbit/s	1.25 Gbit/s	1.25 Gbit/s
Output optical power	-9.5 dBm to -4 dBm	-8 dBm to -3 dBm	-5 dBm to 0 dBm	-2 dBm to 3 dBm
Optical fiber connector type	LC	LC	LC	LC
Transmission distance	0.55 km ^{Note 1}	15 km	40 km	80 km
Receiving sensitivity	-17 dBm	-20 dBm	-23 dBm	-25 dBm
Overload optical power	0 dBm	-3 dBm	-3 dBm	-3 dBm
Extinction ratio	> 9 dB	9.0 dB to 15 dB	9.0 dB to 15 dB	9.0 dB to 15 dB
Note 1: @50/125um fiber				

10GE Optical Module

Item	Specification					
Module code	10G-0.3km-TDM-SFP+ (10GBASE-SR/SW)	10G-10km-TDM-SFP+ (10GBASE-LR/LW)	10G-10km-TDM-SFP+ (I-64.1) / 10G-10km-TDM-XFP (I-64.1)	10G-40km-TDM-SFP+ (10GBASE-ER/EW)	10G-40km-TDM-XFP (S-64.2b)	10G-80km-TDM-SFP+ (L-64.2) / 10G-80km-TDM-XFP (L-64.2)
Optical module type	10GBASE-SR/SW	10GBASE-LR/LW	10GBASE-LR/LW I-64.1 P1I1-2D1	10GBASE-ER/EW	10GBASE-ER/EW S-64.2b P1S1-2D2b	10GBASE-ZR/ZW L-64.2 P1L1-2D2
Wavelength range	840 nm to 860 nm	1260 nm to 1355 nm	1290 nm to 1330 nm	1530 nm to 1565 nm	1530 nm to 1565 nm	1530 nm to 1565 nm
Encapsulation mode	SFP+	SFP+	SFP+/XFP	SFP+	XFP	SFP+/XFP
Rate	9.953 Gbit/s to 11.09 Gbit/s ^{Note 1}	1.2288 Gbit/s to 10.3125 Gbit/s ^{Note 1}	9.953 Gbit/s to 11.3 Gbit/s	9.953 Gbit/s to 10.3125 Gbit/s ^{Note 1}	9.953 Gbit/s to 11.3 Gbit/s	9.953 Gbit/s to 11.3 Gbit/s
Output optical power	-7.3 dBm to -1 dBm	-8.2 dBm to 0.5 dBm	-6 dBm to -1 dBm	-4.7 dBm to 4 dBm	-1 dBm to 2 dBm	0 dBm to 4 dBm
Optical fiber connector type	LC	LC	LC	LC	LC	LC
Transmission distance / dispersion tolerance	0.3 km	10 km 33 ps/nm	10 km	40 km	40 km 800 ps/nm	80 km 1600 ps/nm
Receiving sensitivity	-11.1 dBm OMA	-14.4 dBm	-14 dBm	-15.8 dBm	-17 dBm	-24 dBm
Overload optical power	-13 dBm	0.5 dBm	-1 dBm	-1 dBm	-1 dBm	-7 dBm
Extinction ratio	3 dB to 6 dB	3.5 dB to 6.5 dB	> 6 dB	> 3 dB	> 8.2 dB	> 9 dB
Note 1: Without the CDR function.						