1000BASE-DWDM C17~C61 SFP 120km DDM SMF Transceiver

P/N: AE-SFP-D120-XX

Features

- Wavelength selectable to C-band and L-band ITU-T grid wavelengths
- Suitable for use in 100GHz channel spacing DWDM systems
- DWDM SFP MSA Compliant
- Up to 1.25 Gb/s data rate
- Cold Start up Wavelength Compliance
- Low Power Dissipation <1.5W Maximum
- 0ºC to 70ºC Operating Case Temperature
- Diagnostic Performance Monitoring of module temperature, supply
- Voltages, laser bias current, transmit optical power, receive optical power,
- Laser temperature and TEC current
- Extended link budget with APD receiver technology
- RoHS compliant and lead free

Applications

- SFP Transceivers for DWDM SONET/ SDH
- Ethernet IEEE 802.3ae
- Fiber Channel

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.3	4.0	V
Storage Temperature	Tst	-40	85	ºC
Data AC Voltage	TX+-AC	-	2.4	Vpp
Data DC Voltage	TX+-DC	-0.5	2.5	V
Optical Input Received Power	PIN	-	+5	dBm

II. Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case temperature	Tca	-5	-	70	ºC
Total Current	Icc	-	-	450	mA
Module Power Dissipation	Pm	-	0.8	1.5	W

III. Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate Multirate	Mra	155	2488	2667	Mbps
Center Wavelength (SOL)△	λc	λc -25	λc	λc +25	pm
Center Wavelength (EOL)▲	λc	λc -100	λc	λc+100	pm
Optical Transmit Power	Po	0	2	5	dBm
Optical Transmit Power (disabled)	PTX_DISABLE	-	-	-40	dBm
Extinction Ratio	ER	8.2		-	dB
Channel Spacing	Δf	-	100	-	GHz
Jitter Generation	TJP-P	-	-	70	mUI
Spectral Width (-20dB)	DI20	-	0.1	0.3	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Eye Mask	Compliant with Bell core GR-253-CORE & ITU G.957 for SONET/SDH and with IEEE 802.3ae for Ethernet and Fibre Channel				

△ *Laser- Start of Life*
▲*Laser End of life*

IV. Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	VccTX	3.13	3.3	3.47	V
PECL/CML Input	VtxDIFF	500	-	1600	mV
Input Rise/Fall	TR / TF	-	-	160	ps
TX-Fault Fault	Vf	2	-	Vcc	V
TX-Fault Normal	Vn	Vee	-	Vee+0.5	V

TX_DISABLE (asserted)	VDH	2	-	Vcc	V
TX_DISABLE (negated)	VDL	Vee	-	Vee+0.8	V

V. APD Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Receiver Sensitivity(OC24)	Rsens-1	-	-32	-28	dBm
Receiver Sensitivity (OSNR = 20dB)	Rsens-2	-	-	-30	dBm
Maximum Input Power	RX-overload	-	-	-7	dBm
Input Operating Wavelength	λ	1528	-	1564	nm
Reflectance	Rrx	-	-	-27	dB
Loss of Signal Asserted		-45	-	-	dBm
LOS De-Asserted		-	-	-33	dBm
LOS Hysteresis		0.5	-	-	dB

VI. APD Receiver Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	VccRX	3.13	3.3	3.47	V
Differential Output Swing	Vout P-P	370	-	2000	mV
Rise/Fall Time	Tr / Tf	-	-	175	ps
Loss of Signal –Asserted	VOH	2	-	Vcc	V
Loss of Signal –Negated	VOL	Vee	-	Vee+0.5	V

VII. Low Speed Electrical Signal Timings

Parameter	Symbol	Min	Typical	Max	Unit
TX Disable Negate Time	t-on	-	-	20	ms
TX Disable Assert Time	t-off	-	-	20	ms
Time to initialize, including reset of TX_FAULT	t_init	-	-	300	ms
Start-up Time	t_startup	-	-	90	s
TX_FAULT/INT Assert Time	t_fault	-	-	50	ms
TX_DISABLE to Reset	t_reset	10	-	-	ms
LOS Assert Time	t_los_on	-	-	100	us
LOS Negate Time	t_los_off	-	-	100	us
Serial ID Clock Rate	f_serial_clock	-	-	100	kHz

VIII. C-band λc Wavelength Guide

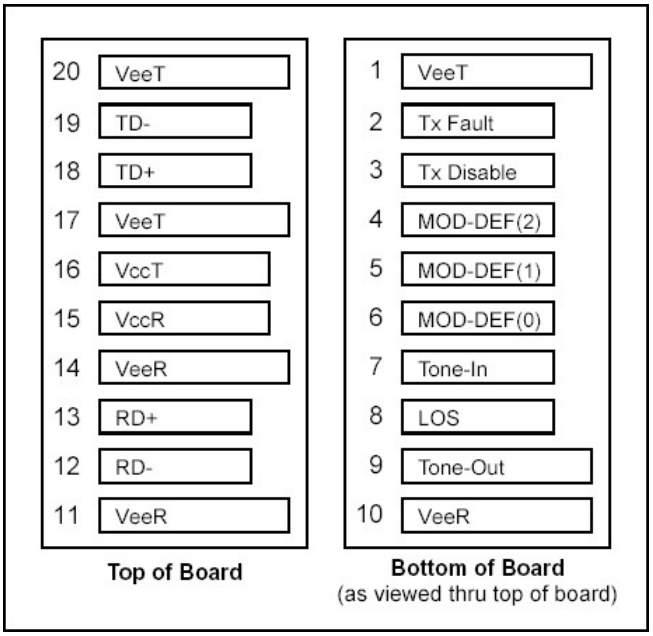
ITU Channel Product Code	Frequency (THz)	Wavelength	ITU Channel Product Code	Frequency (THz)	Wavelength
17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

IX. L-band λc Wavelength Guide

ITU Channel Product Code	Frequency (THz)	Wavelength	ITU Channel Product Code	Frequency (THz)	Wavelength
62	186.2	1610.06	90	189.0	1586.20
63	186.3	1609.19	91	189.1	1585.36
64	186.4	1608.33	92	189.2	1584.53
65	186.5	1607.47	93	189.3	1583.69
66	186.6	1606.61	94	189.4	1582.85
67	186.7	1605.74	95	189.5	1582.02
68	186.8	1604.88	96	189.6	1581.18
69	186.9	1604.03	97	189.7	1580.35
70	187.0	1603.17	98	189.8	1579.52
71	187.1	1602.31	99	189.9	1578.69
72	187.2	1601.46	00	190.0	1577.86
73	187.3	1600.60	01	190.1	1577.03
74	187.3	1599.75	02	190.2	1576.20
75	187.5	1598.89	03	190.3	1575.37

76	187.6	1598.04	04	190.4	1574.54
77	187.7	1597.19	05	190.5	1573.71
78	187.8	1596.34	06	190.6	1572.89
79	187.9	1595.49	07	190.7	1572.06
80	188.0	1594.64	08	190.8	1571.24
81	188.1	1593.79	09	190.9	1570.42
82	188.2	1592.95	10	191.0	1569.59
83	188.3	1592.10	11	191.1	1568.77
84	188.4	1591.26	12	192.2	1567.95
85	188.5	1590.41	13	192.3	1567.13
86	188.6	1589.57	14	191.4	1566.31
87	188.7	1588.73	15	191.5	1565.50
88	188.8	1587.88	16	191.6	1564.68
89	188.9	1587.04			

X. Pin Definitions



XI. Pin Descriptions

Pin Number	Name	Function	Ref.
1	VEET	Transmitter Ground	
2	TX_FAULT/INT	Transmitter Fault	1
3	TX_DISABLE	Transmitter Disable	2
4	MOD-DEF(2)	Module Definition 2	3
5	MOD-DEF(1)	Module Definition 1	3
6	MOD-DEF(0)	Module Definition 0	3
7	Tone in	Rate Select -Not Implemented	

8	LOS	Loss of Signal	4
9	VEER	Receiver Ground	
10	VEER	Receiver Ground	
11	VEER	Receiver Ground	
12	RD-	Inverted Received	
13	RD+	Received Data	
14	VEER	Receiver Ground	
15	VCCR	Receiver Power	
16	VCCT	Transmitter Power	
17	VEET	Transmitter Ground	
18	TD+	Transmit Data	
19	TD-	Inverted Transmit	
20	VEET	Transmitter Ground	

Notes：

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K. resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10 K. resistor.

3. These are the module definition pins. They should be pulled up with a 4.7K – 10K. resistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details).

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10K. resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

XII. 11. Ordering information

Part Number	Product Description
AE-SFP-D120-XX	DWDM SFP, 1.25Gb/s, 1510-1610nm, SMF, 120km, DDM, LC connector, 0°C to +70°C
XX = 17~61 (ITU Channel C-band) 62~16(ITU Channel L-band)	