1.25Gbps Single-Mode CWDM Duplex SFP Transceiver

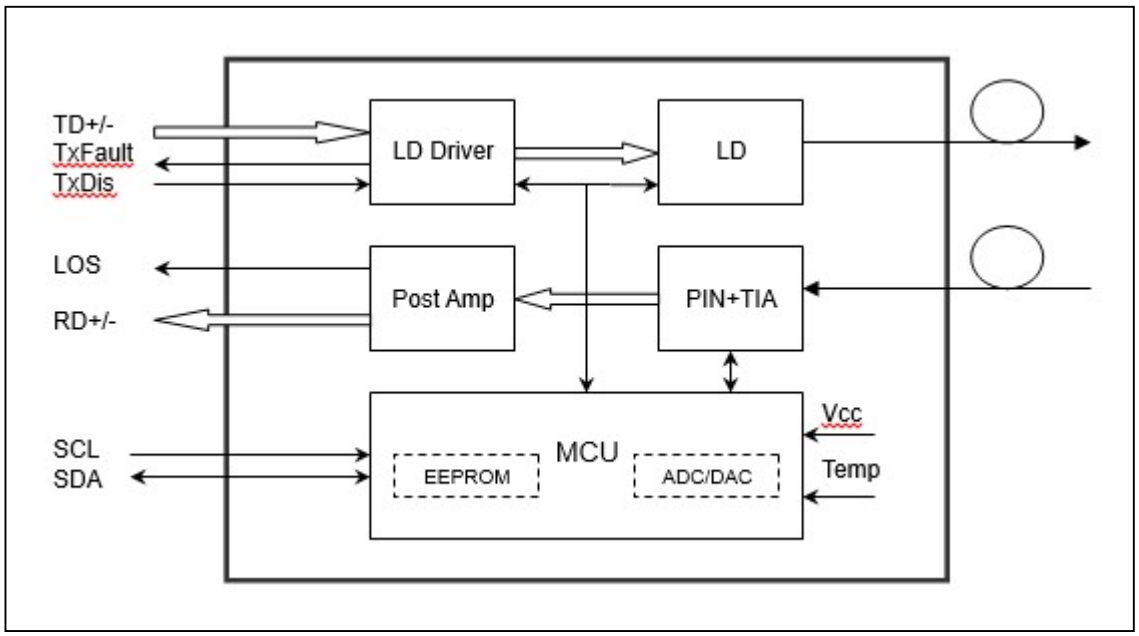
Features

> Operating Data Rate up to 1.25Gbps
> 18-Wavelength CWDM DFB LD Transmitter from 1270nm to 1610nm, with Step 20nm
> 5km with 9/125μm SMF
> Single 3.3V Power Supply and TTL Logic Interface
> Hot-Pluggable SFP Footprint Duplex LC Connector Interface
> Class 1 FDA and IEC60825-1 Laser Safety Compliant
> Operating Case Temperature:
    > Standard: 0°C~+70°C
> Compliant with SFP MSA Specification
> Digital Diagnostic Monitor Interface Compatible with SFF-8472

Applications

> Gigabit Ethernet Switches and Routers
> Fibre Channel Switch Infrastructure
> Switch to Switch Interface
> Other Optical Links

Module Block Diagram



Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Table 2 - Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc			300	mA
Data Rate			1.25		Gbps

Table3 -λC Wavelength Guide

λC Wavelength Guide											
Code	λc	Unit	Code	λc	Unit	Code	λc	Unit	Code	λc	Unit
127	1270	nm	137	1370	nm	147	1470	nm	157	1570	nm
129	1290	nm	139	1390	nm	149	1490	nm	159	1590	nm
131	1310	nm	141	1410	nm	151	1510	nm	161	1610	nm
133	1330	nm	143	1430	nm	153	1530	nm			
135	1350	nm	145	1450	nm	155	1550	nm			

Optical and Electrical Characteristics

Table 4 - Optical and Electrical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Transmitter							
Centre Wavelength		λc	λc-6.5	λc	λc+6.5	nm	
Spectral Width (-20dB)		Δλ			1	nm	
Side Mode Suppression Ratio		SMSR	30			dB	
Average Output Power		Pout	-5		0	dBm	1
Extinction Ratio		ER	9			dB	
Optical Rise/Fall Time (20%~80%)		tr/tf			180	ps	
Data Input Swing Differential		V_{IN}	400		1800	mV	2
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable		2		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Receiver Sensitivity					-23	dBm	3
Receiver Overload			-3			dBm	3
LOS De-Assert		LOS_D			-24	dBm	
LOS Assert		LOS_A	-35			dBm	
LOS Hysteresis			1		4	dB	
Data Output Swing Differential		Vout	370		1800	mV	4
LOS		High	2		Vcc	V	
		Low			0.8	V	

Notes:

1. The optical power is launched into SMF.

2. PECL input, internally AC-coupled and terminated.

3. Measured with a PRBS 2^7-1 test pattern @1250Mbps, BER ≤1×10^{-12}.

4. Internally AC-coupled.

Timing and Electrical

Table 5 - Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	µs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	µs
Tx Disable To Reset	t_reset	10			µs
LOS Assert Time	t_loss_on			100	µs
LOS De-assert Time	t_loss_off			100	µs
Serial ID Clock Rate	f_serial_clock			400	KHz
MOD_DEF (0:2)-High	V_H	2		Vcc	V
MOD_DEF (0:2)-Low	V_L			0.8	V

Diagnostics

Table 5 – Diagnostics Specification

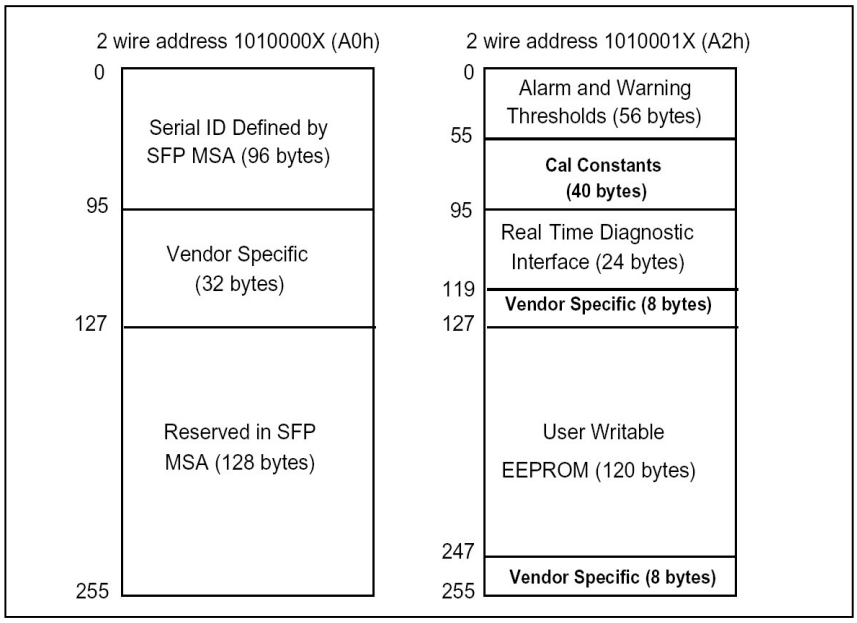
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	0 to -5	dBm	±3dB	Internal / External
RX Power	-23 to -3	dBm	±3dB	Internal / External

Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions via the 2-wire serial interface (SCL, SDA).

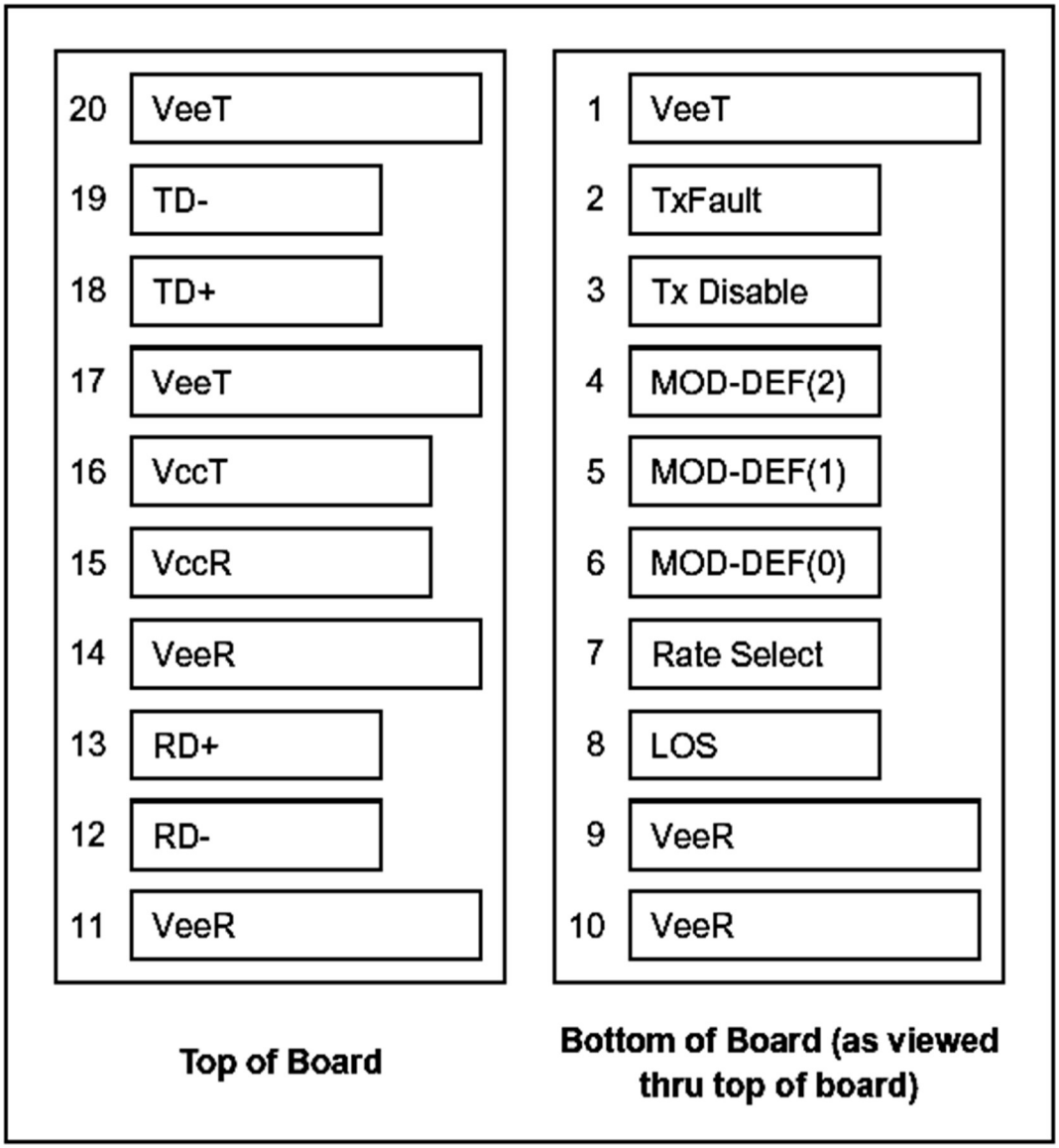
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



Pin Definitions

Pin Diagram



Pin Descriptions

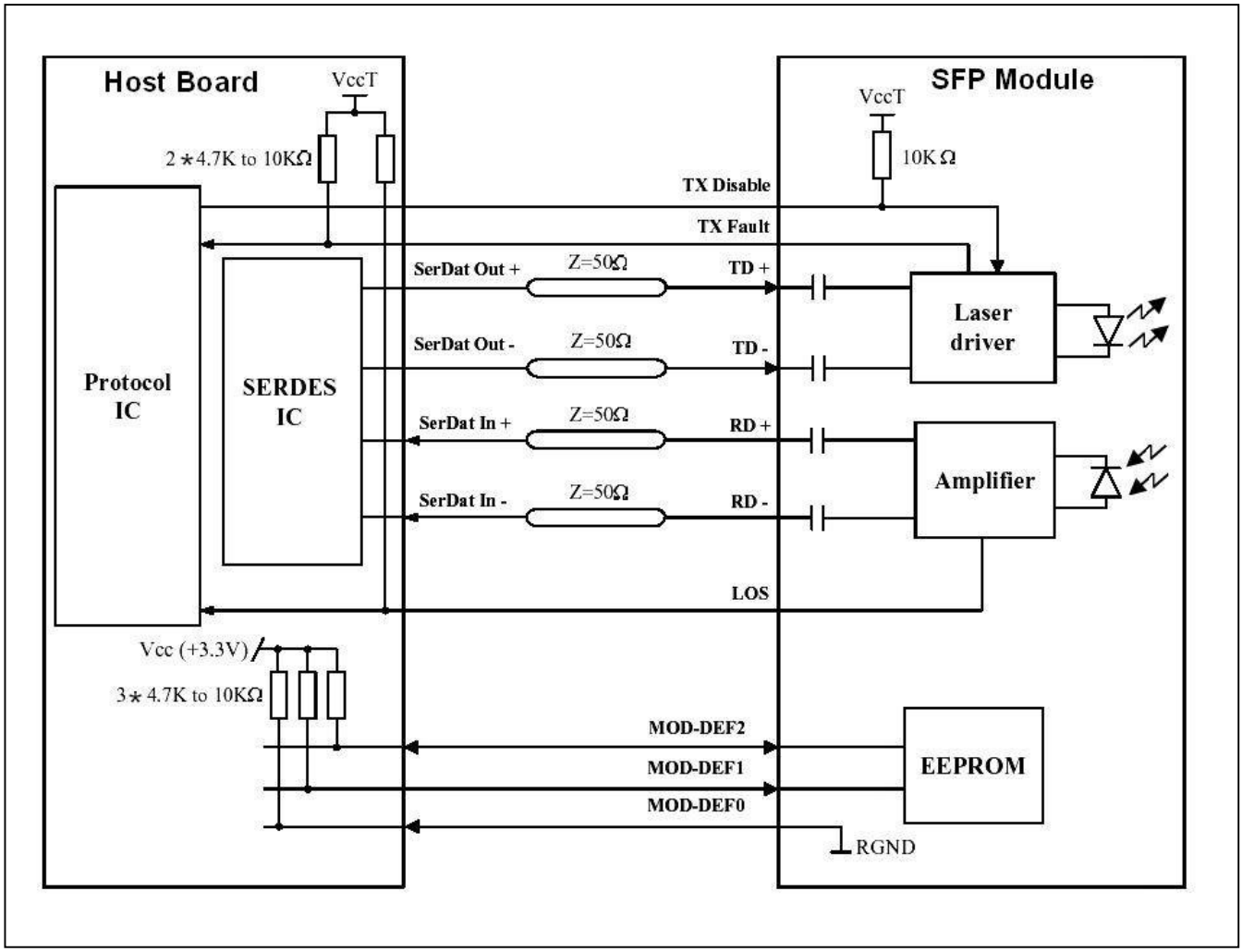
Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V_{EER}	Receiver ground	1	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V_{EET}	Transmitter Ground	1	

Notes:

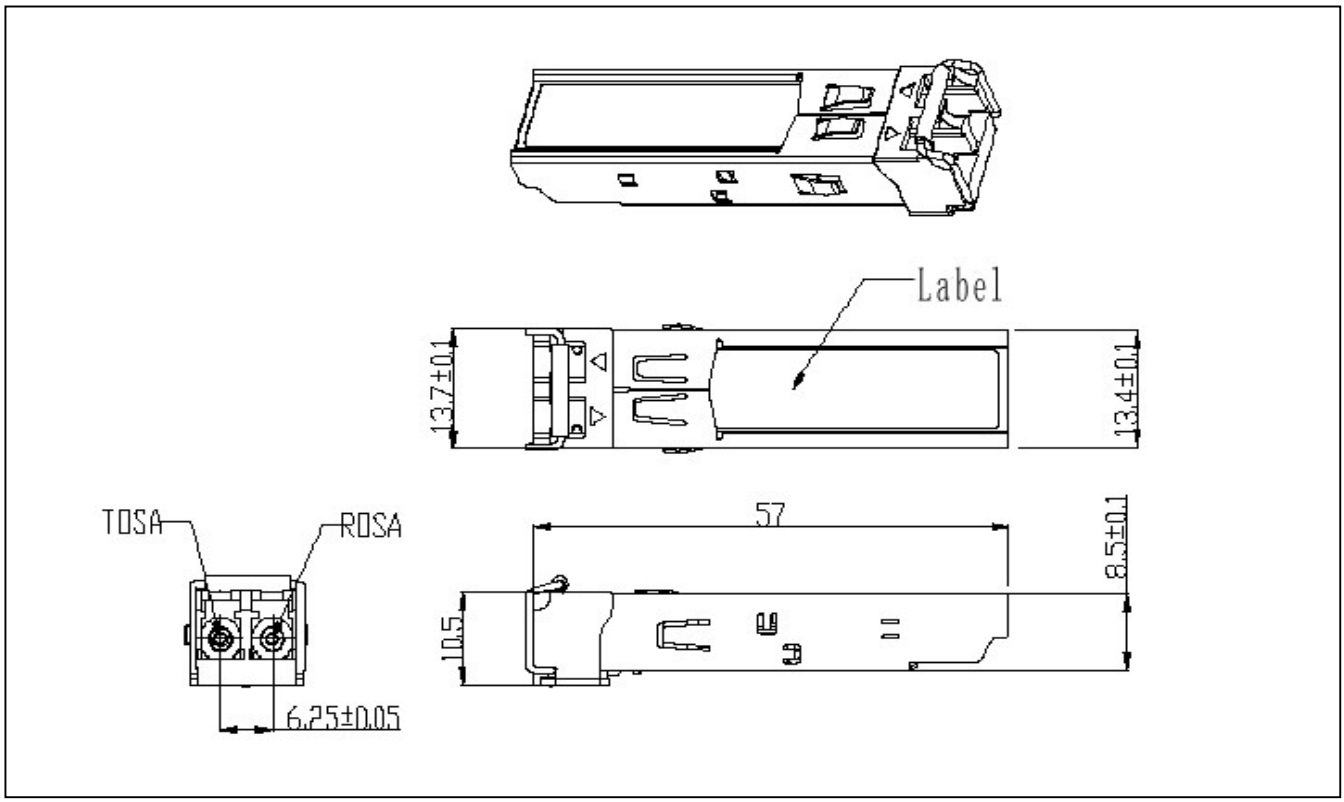
Plug Seq.: Pin engagement sequence during hot plugging.

1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 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 4.7k~10kΩ resistor. Its states are:
   Low (0 to 0.8V): Transmitter on
   (>0.8V, < 2.0V): Undefined
   High (2.0 to 3.465V): Transmitter Disabled
   Open: Transmitter Disabled
3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
   Mod-Def 0 is grounded by the module to indicate that the module is present
   Mod-Def 1 is the clock line of two wire serial interface for serial ID
   Mod-Def 2 is the data line of two wire serial interface for serial ID
4) LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
5) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit



Mechanical Dimensions



Regulatory Compliance

ADVANCE SFP transceivers are designed to be Class I Laser safety compliant and is certified per the following standards

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120294-000
Product Safety	BST	EN 60825-1：2007 EN 60825-2：2004 EN 60950-1：2006	BT0905142002
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ0902008346/CHEM
EMC	CCIC	EN 55022：2006+A1：2007 EN 55024：1998+A1：2001+A2：2003	CTE09050018

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
2. Telcordia GR-253-CORE and ITU-T G.957 Specifications.

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by ADVANCE before they become applicable to any particular order or contract. In accordance with the ADVANCE policy of continuous improvement specifications may change without notice.

The publication of information in this data sheet does not imply freedom from patent or other protective rights of ADVANCE or others. Further details are available from any ADVANCE sales representative.

Ordering Information

Advance Part Code	Description
NW-SFP0-01-25-1270-005D	1.25G;SM1270nm (1264-1277.5) 5km with DDM
NW-SFP0-01-25-1290-005D	1.25G;SM1290nm (1284-1297.5) 5km with DDM
NW-SFP0-01-25-1310-005D	1.25G;SM1310nm (1304-1317.5) 5km with DDM
NW-SFP0-01-25-1330-005D	1.25G;SM1330nm (1324-1337.5) 5km with DDM
NW-SFP0-01-25-1350-005D	1.25G;SM1350nm (1344-1357.5) 5km with DDM
NW-SFP0-01-25-1370-005D	1.25G;SM1370nm (1364-1377.5) 5km with DDM
NW-SFP0-01-25-1390-005D	1.25G;SM1390nm (1384 1397.5) 5km with DDM
NW-SFP0-01-25-1410-005D	1.25G;SM1410nm (1404-1417.5) 5km with DDM
NW-SFP0-01-25-1430-005D	1.25G;SM1430nm (1424-1437.5) 5km with DDM
NW-SFP0-01-25-1450-005D	1.25G;SM1450nm (1444 1457.5) 5km with DDM
NW-SFP0-01-25-1470-005D	1.25G;SM1470nm (1464-1477.5) 5km with DDM
NW-SFP0-01-25-1490-005D	1.25G;SM1490nm (1484-1497.5) 5km with DDM
NW-SFP0-01-25-1510-005D	1.25G;SM1510nm (1504-1517.5) 5km with DDM
NW-SFP0-01-25-1530-005D	1.25G;SM1530nm (1524-1537.5) 5km with DDM
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NW-SFP0-01-25-1570-005D	1.25G;SM1570nm (1564-1577.5) 5km with DDM
NW-SFP0-01-25-1590-005D	1.25G;SM1590nm (1584-1597.5) 5km with DDM
NW-SFP0-01-25-1610-005D	1.25G;SM1610nm (1604-1617.5) 5km with DDM