

NP-5524-20CD

10G SFP+ 200KM Optical Transceiver

FEATURES

Support data rate up to 11.3Gb/s

Temperature-Stabilized EML Transmitter and APD Receiver

Hot-Pluggable SFP Footprint and Duplex LC Connector

Up to 120km reach for G.652 SMF

Temperature Range:

Commercial: 0°C ~+70°C

Industrial: -40°C ~+85°C

Compliant with SFF-8431

Compliant with SFF-8432

Compliant with SFF-8472

Compliant with IEEE802.3ae



APPLICATIONS

10G Ethernet

OTU2/2e

10G FC

Other Optical Link

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Maximum Supply Voltage	VCC	-0.5	3.6	V
Operating Relative Humidity	RH		95	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Top	0	-	70	°C	NP-5524-20CD
		-40		85		NP-5524-20CDI
Power Supply Voltage	VCC	3.13	3.3	3.47	V	

Data Rate	BR		10.3125	11.3	Gbps	
Transmission Distance	TD			120	km	
Coupled fiber	Single mode fiber					9/125um SMF

Electrical Characteristics (TOP = Tc, Vcc = 3.135 to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current (Commercial)	Icc			450	mA	
Supply Current (Industrial)	Icc			540	mA	
Power Consumption (Commercial)	P			1.5	W	
Power Consumption (Industrial)	P			1.8	W	
Transmitter Section						
CML Inputs(Differential)	Vin	150		1200	mVpp	1
Input Impedance(Differential)	Zin	85	100	115	ohm	
TX_DIS Disable		2		Vcc+0.3	V	
TX_DIS Enable		0		0.8	V	
TX_FAULT Fault		2		Vcc+0.3	V	
TX_FAULT Normal		0		0.5	V	
Receiver Section						
CML Outputs (Differential)	Vout	350		700	mVpp	1
Output Impedance (Differential)	Zout	85	100	115	Ohm	
RX_LOS LOS		2		Vcc+0.3	V	2
RX_LOS Normal		0		0.8	V	2
MOD_DEF (0:2) VoH		2.5			V	With Serial ID
MOD_DEF (0:2) VoL		0		0.5	V	With Serial ID

Note:

1. CML logic, internally AC coupled.
2. Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	NOTE
Power Budget		26			dB	
Data Rate			10.3125	11.3	Gbps	
Transmitter						
Center Wavelength	λ_c	1530	1550	1565	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	Pout	3		5	dBm	2
Extinction Ratio	ER	8.2			dB	
Average Power of OFF Transmitter	Poff			-30	dBm	

Relative Intensity Noise	RIN			-128	dB/Hz	3
Receiver						
Wavelength Range	λ_c	1270		1610	dBm	
Receiver Sensitivity	Pmin			-34	dBm	4
Receiver Overload	Pmax	-9			dBm	
LOS De-Assert	LOSD			-40	dBm	
LOS Assert	LOSA	-45			dBm	
LOS-Hysteresis	Phys	0.5			dB	

Notes:

1. Corresponds to approximately 0.8 nm.
2. Output is coupled into a 9/125um SMF.
3. 12dB reflection.
4. Measured with worst ER, BER less than 1E-12 and PRBS 2³¹-1 at 10.3125Gbps.

Digital Diagnostic Functions

Parameter	Range	Unit	Accuracy	Calibration
Commercial Temperature	0 to +70	°C	±3°C	Internal / External
Industrial Temperature	-40 to +85	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	30 to 100	mA	±10%	Internal / External
TX Power	3 to +5	dBm	±3dB	Internal / External
RX Power	-34 to -9	dBm	±3dB	Internal / External

Note:

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by 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.

Timing Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
TX_Disable Assert Time	t_off			100	us
TX_Disable Negate Time	t_on			2	ms
Time to Initialize Include Reset of TX_FAULT	t_int			300	ms
TX_FAULT from Fault to Assertion	t_fault			100	us
TX_Disable Time to Start Reset	t_reset	10			us
Receiver Loss of Signal Assert Time	T _{A,RX_LOS}			100	us
Receiver Loss of Signal Deassert Time	T _{d,RX_LOS}			100	us
Rate-Select Change Time	t_ratesel			10	us
Serial ID Clock Time	t_serial-clock			100	kHz

SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFF -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h.

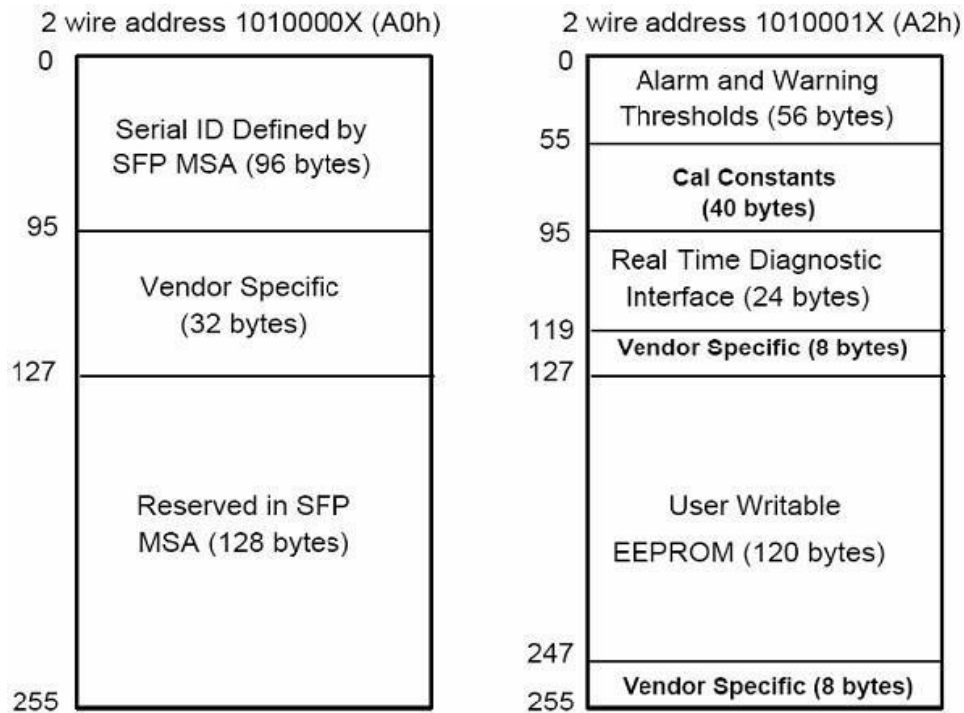
The memory is mapped in Table 1.

Detailed ID information (A0h) is listed in Table 2.

And the DDM specification at address A2h.

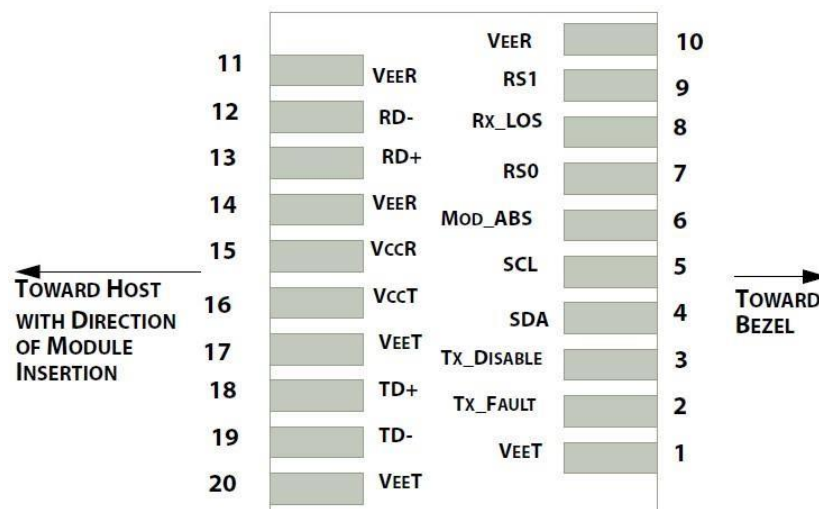
For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Table 1- Digital Diagnostic Memory Map (Specific Data Field Descriptions)



Pin Diagram

Diagram of Host Board Connector Block Pin Numbers and Name



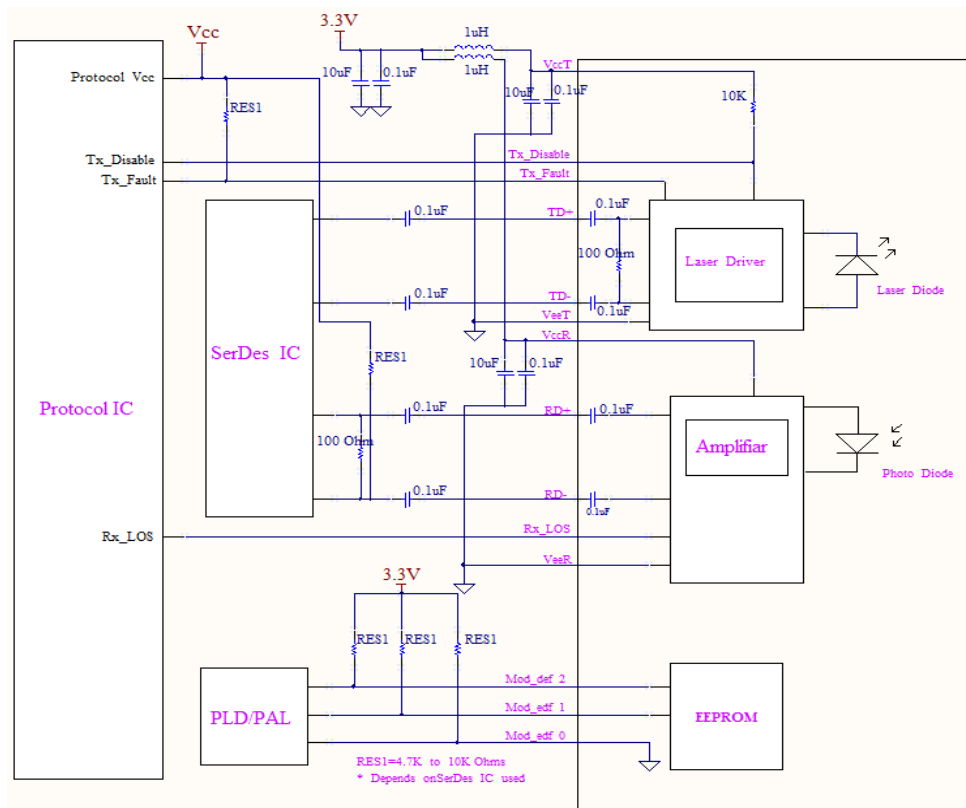
Pin Descriptions

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	4
5	SCL	2 wire serial interface clock input (SCL)	4
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	4
7	RS0	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	5
8	LOS	Receiver Loss of Signal Indication	6
9	RS1	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	1
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1
15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter inverted data out put	
19	TD-	Transmitter non-inverted data out put	
20	VeeT	Module transmitter ground	1

Note:

1. Circuit ground is internally isolated from chassis ground
2. Tx FAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on Tx DIS >2.0V or open, enabled on Tx DIS <0.8V.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Recommend Circuit Schematic



Mechanical Specifications (Unit: mm)

