HSGQ-GPON OLT Model

Product Specification

Specifications	Package	Data Rate	Wavelength	Laser	Transmit Optical Power	Interface	Receiving Sensitivity
GPON OLT B+	SFP	1.25Gbps/1.25Gbps	Tx1490/Rx1310	DFB/APD	3dBm~5dBm	SC	<=-30dBm
GPON OLT C++	SFP	1.25Gbps/1.25Gbps	Tx1490/Rx1310	DFB/APD	5dBm~7dBm	SC	<=-32dBm
GPON OLT C+++	SFP	1.25Gbps/1.25Gbps	Tx1490/Rx1310	DFB/APD	7dBm~10dBm	SC	<=-32dBm
GPON OLT C++++	SFP	1.25Gbps/1.25Gbps	Tx1490/Rx1310	DFB/APD	9dBm~10dBm	SC	<=-32dBm

Product Features

- Single Power Supply 3.3V
- Small Form-factor Pluggable (SFP)
- Digital diagnostic monitor compatible with SFF-8472
- Compliant with ITU-T G.984.2
- Integrated WDM filter for dual wavelength Operate at 1490 Tx/1310nm Rx
- 1490nm DFB continuos-mode transmitter
- 1310nm burst-mode APD-TIA receiver
- LVTTL transmitter disable input and transmitter fault output
- Hot pluggable capability
- LVPECL compatible data input/output interface
- SC Receptacle optical connector
- Compliant with ROHS standard

Digital RSSI Timing Specification

Parameter	Minimum	Typical	Maximum	Unit
RSSI Trigger Delay	25	-	-	ns
RSSI Sampling Time	300	-	-	ns
Internal I2C Delay	-	-	500	us
Receiver PowerDDM(RSSI)Error	-	-	+/-3	dB

a) RSSI_ACQ input signal rising edge will trigger RSSI sampling, and falling edge will trigger internal digital RSSI information written to I2C. It is recommended that host shall not trigger RSSI_ACQ input again until RSSI data is valid in I2C from previous RSSI trigger.
b) RSSI DDM working range is between -8 to -28dBm. RSSI DDM accuracy is better than +/-3dB for input power level between -10 to -28dBm, the accuracy reduces to +/-5dBm to -10 dBm. If the data pattern is at least 2^7-1 or longer, a minimum average of 8 times is strongly recommended to maintain the RSSI reading accuracy.

Absolute Maximum Rating

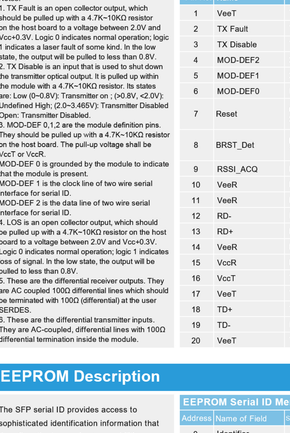
Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	℃
Operating Temperature	Top	0	+70	℃
Supply Voltage	Vcc	-0.5	+3.6	V
Power Supply Current	Icc	-	400	mA
Voltage at any Input Pin	Vin	0	Vcc	V

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Operating Temperature	Ts	0	+70	℃
Supply Voltage	Top	3.1	3.5	V
Tx Data Rate	-	-	-	Mb/s
Rx Data Rate	-	-	-	Mb/s

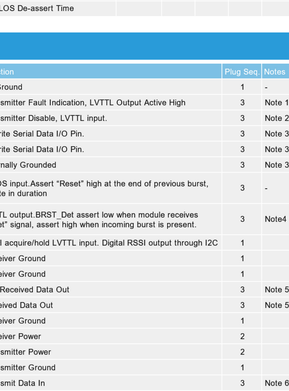
Monitoring Interface

The interface is an extension of the serial ID interface defined in the SFP MSA specification. The specifications define a 256 byte memory map in E²PROM which is accessible over a 2 wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is backward compatible with both the GBIC specification and the SFP MSA. Please see Figure 1.



Pin Assignment & Function Definitions

It is the responsibility of the system integrator to assure that no thermal, energy, or voltage hazard exists during the hot-plug-unplug sequence. It is also the responsibility of the system integrator and end-user to minimize static electricity and the probability of ESD events by careful design.



Applications

- Gigabit Ethernet Passive Optical Networks (GPON CLASS C++) –OLT side

Operating Conditions

Transmitter (T=0 to +70˚C, VCC =3.1~3.5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Central Wavelength	λC	1480	1490	1500	nm
Spectral Width	Δλ	-	-	1	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Output Power	Po	4.5	-	10	dBm
Extinction Ratio	ER	8.2	-	-	dB
Output power at transmit off	-	-	-	-40	dBm
Differential Input Voltage	V_{in}- V_k	200	-	1600	mV
TX Disable Input Voltage Low	TX_DIS ABLEL	0	-	0.8	V
TX Disable Input Voltage High	TX_DIS ABLEH	2.0	-	Vcc	V
TX Fault Output Voltage Low	TX_FAULTL	0	-	0.8	V
TX Fault Output Voltage High	TX_FAULTH	2.0	-	Vcc+0.3	V
Eye Diagram	Compliance with ITU-T G.984.2				

Receiver (T=0 to +70˚C, VCC =3.1~3.5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Wavelength Range	λ	1260	-	1360	nm
MIN. Input Power (Sensitivity)	P_{MIN}	-	-	-31	dBm
MAX. Input Power (Saturation)	P_{MAX}	-12	-	-	dBm
Signal Detect-Asserted	P_A	-	-	-30	dBm
Signal Detect-Deasserted	P_D	-45	-	-	dBm
Signal Detect Hysteresis	P_{HYS}	0.5	-	6	dB
Return Loss	ORL	12	-	-	dB
RX Loss of Signal Output Voltage Low	RX_LOSL	0	-	0.8	V
RX Loss of Signal Output Voltage High	RX_LOSH	2.0	-	Vcc+0.3	V
LOS Assert Time	TAssert	-	-	100	ns
LOS De-assert Time	TDeassert	-	-	12.8	ns

Function Definition

Notes:
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 (0~0.8V): Transmitter on ; (>0.8V, <2.0V): Undefined High; (2.0~3.465V): Transmitter Disabled Open: Transmitter Disabled.
3, MOD-DEF 0,1,2 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 on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.
5. These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

Pin No.	Name	Function	Plug Seq.	Notes
1	VeeT	Tx Ground	1	-
2	TX Fault	Transmitter Fault Indication, LVTTL Output Active High	3	Note 1
3	TX Disable	Transmitter Disable, LVTTL input.	3	Note 2
4	MOD-DEF2	2-Write Serial Data I/O Pin.	3	Note 3
5	MOD-DEF1	2-Write Serial Data I/O Pin.	3	Note 3
6	MOD-DEF0	Internally Grounded	3	Note 3
7	Reset	CMOS input.Assert "Reset" high at the end of previous burst, 2 byte in duration	3	-
8	BRST_Det	LVTTL output.BRST_Det assert low when module receives "reset" signal, assert high when incoming burst is present.	3	Note4
9	RSSI_ACQ	RSSI acquire/hold LVTTL input. Digital RSSI output through I2C	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv Transmit Data In	3	Note 6
20	VeeT	Transmitter Ground	1	

EEPROM Description

The SFP serial ID provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. The serial interface uses the 2-wire serial CMOS E²PROM protocol defined for the ATMEL AT24C01A/02/04 family of components.

When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the E²PROM that are not write-protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver.

The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually orsequentially.

Note:

1. The"xx"byte should be filled in according to practical case.

2. Note that, A0H is readable and writeable , A2H is readable and write-protected.

EEPROM Serial ID Memory Contents (A0h)

Address	Name of Field	Size/Bytes	Hex	Description of Field
0	Identifier	1	03	SFP
1	Ext. Identifer	1	04	MOD4
2	Connector	1	01	SC
3-10	Transceiver	8	00 00 00 00 00 00 00 00	Transceiver Code Field,not applicable
11	Encoding	1	03	NRZ encoding
12	BR, nominal	1	19	2488.32Mbps
13	Reserved	1	00	Reserved
14	Length(9um)-km	1	14	20(Units of km)
15	Length (9um)	1	C8	200(Units of 100 m)
16	Length (50um)	1	00	Not Support MMF
17	Length (62.5um)	1	00	Not Support MMF
18	Length (copper)	1	00	Not Support Copper
19	Reserved	1	00	-
20-35	Vendor name	16	XXXXX	"HSGQ"
36	Reserved	1	00	-
37-39	Vendor OUI	3	00 00 00	-
40-55	Vendor PN	16	XXXXX	"PART NUMBER " (ASC II)
56-59	Vendor rev	4	xx xx xx xx	ASC II ("31 2E 31 20" means 1.1 revision)
60-61	Wavelength	2	05 D2	1490nm Laser wavelength
62	Reserved	1	00	-
63	CC BASE	1	xx	Check sum of bytes 0 - 62
64-65	Options	2	00 1A	LOS, TX_FAULT and TX_DISABLE
66	BR, max	1	00	-
67	BR, min	1	00	-
68-83	Vendor SN	16	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	SN: xxxxxxxxx (ASC II)
84-91	Vendor date code	8	xx xx xx xx xx xx 20 20	Year(2 bytes),Month (2 bytes), Day(2bytes)(ASC II)
92	Diagnostic type	1	58	Externally Calibrated
93	Enhanced option	1	B0	Diagnostic(Optional Alarm/warning flags) Soft TX_FAULT monitoring implemented Soft RX_LOS monitoring implemented
94	SFF-8472	1	01	Includes functionality described in Rev 9.4 SFF-8472
95	CC EXT	1	xx	Check sum of bytes 64 - 94
96-127	Vendor specific	32	-	Vendor Specific EEPROM
128-255	Reserved	128	-	Reserved for future use

For more information, please visit: http://www.hsgq.com

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