



RoHS compliant
CL-SFP-GPON-OLT 20-49 D
Hot Pluggable, GPON OLT SFP Transceiver
Single SC,+3.3V, 2.5Gb Tx/1.25Gb Rx, 1490nm Tx/1310nm Rx, Class C+

Features



- Single fiber bi-directional data links asymmetric TX 2488Mbps/RX1244Mbps application
- 1490nm continuous-mode DFB laser transmitter and 1310nm burst-mode APD-TIA receiver
- Small Form Factor Pluggable package with SC/UPC Connector
- Single 3.3V power supply
- DDMI function available with internally calibrated mode
- Digital burst RSSI function to monitor the input optical power level
- LVPECL compatible data input/output interface
- LVTTTL transmitter disable control
- LVTTTL transmitter laser fault alarm
- Fast LVTTTL receiver Signal Detect (SD) indication response
- Low EMI and excellent ESD protection
- International Class1 laser safety certified
- Operating temperature range:
 - Commercial: -5°C~70°C
 - Complies with EU Directive 2015/863/EU

Application

- Gigabit-capable Passive Optical Networks (GPON)

Ordering Information

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
CL-SFP-GPON-OLT 20-49 D	AC/AC	TTL	3.3V/5V	-5°C to 70 °C
CL-SFP-GPON-OLT 20-49 Di	AC/AC	TTL	3.3V/5V	-40°C to 85 °C



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Standards

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with ITU-T G.984.2 Amendment 1
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007
- Complies with SFF-8472
- Compatible with TR-NWT-000870 4.1 ESD sensitivity classification Class2.
- Compatible with Telcordia GR-468-CORE

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Ambient Temperature	T _{STG}	-40	85	°C
Storage Humidity	H _s	5	90	%
Operating Humidity	H _o	5	85	%
Power Supply Voltage	V _{CC}	0	3.6	V
Receiver Damaged Threshold		+4		dBm

II. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _c	-5		70	°C	
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V	
Power Consumption	P _w			1.65	W	
Data Rate			TX 2.488 / RX 1.244		Gbps	



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III. Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Total Supply Current	I _{CC}			500	mA	
Transmitter						
Transmitter Differential Input Voltage		400		2400	mV	
Tx_Fault Output Voltage - High	V _{OH}	2.4		V _{CC}	V	LVTTTL
Tx_Fault Output Voltage - Low	V _{OL}	0		0.4	V	LVTTTL
Tx_Disable Input Voltage - High	V _{IH}	2		V _{CC}	V	LVTTTL
Tx_Disable Input Voltage - Low	V _{IL}	0		0.8	V	LVTTTL
Input Differential Impedance	Z _{IN}	85	100	115	Ω	
Receiver						
Receiver Differential Output Voltage		600		1600	mV	LVPECL, DC Coupled
SD Output Voltage - High	V _{OH}	2.4		V _{CC}	V	LVTTTL
SD Output Voltage - Low	V _{OL}	0		0.4	V	LVTTTL
Reset Input Voltage - High	V _{IH}	2.0		V _{CC}	V	LVTTTL
Reset Input Voltage - Low	V _{IL}	0		0.8	V	LVTTTL
RSSI Trigger Input Voltage - High	V _{IH}	2.0		V _{CC}	V	LVTTTL
RSSI Trigger Input Voltage - Low	V _{IL}	0		0.8	V	LVTTTL
Output Differential Impedance	Z _{OUT}	90	100	110	Ω	

IV. Optical and Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Average Output Power	P _{OUT}	+6	+7	+10	dBm	
Center Wavelength	λ _C	1480		1500	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30				
Extinction Ratio	ER	8.2			dB	PRBS 2 ²³ -1+72CID @2.488Gbit/s
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Transmitter OFF Power	P _{OFF}			-39	dBm	
Output Eye Diagram	Compliant with ITU-T G.984.2					
Transmitter Reflectance				-10	dB	



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Receiver						
Center Wavelength	λ_c	1260		1360	nm	
Receiver Sensitivity	SEN			-32	dBm	Note 1
Input Saturation Power (Overload)	SAT	-15		-35	dBm	
Dynamic Range		15			dB	Figure 1
Receiver Reflectance				-15	dB	

Note 1: PRBS 2₂₃-1+72CID @1244Mbps, transmitter is operating, BER $\leq 1 \times 10^{-10}$
 Note 2: PRBS 2₂₃-1+72CID @1244Mbps, transmitter is operating, BER $\leq 1 \times 10^{-4}$

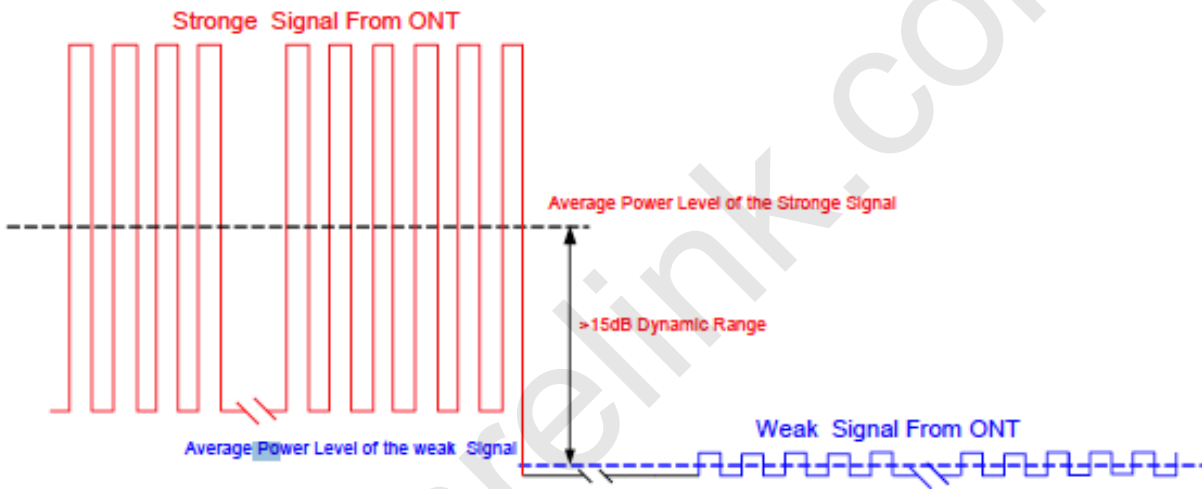


Figure 1 Burst Mode Receiver Dynamic Range in GPON System

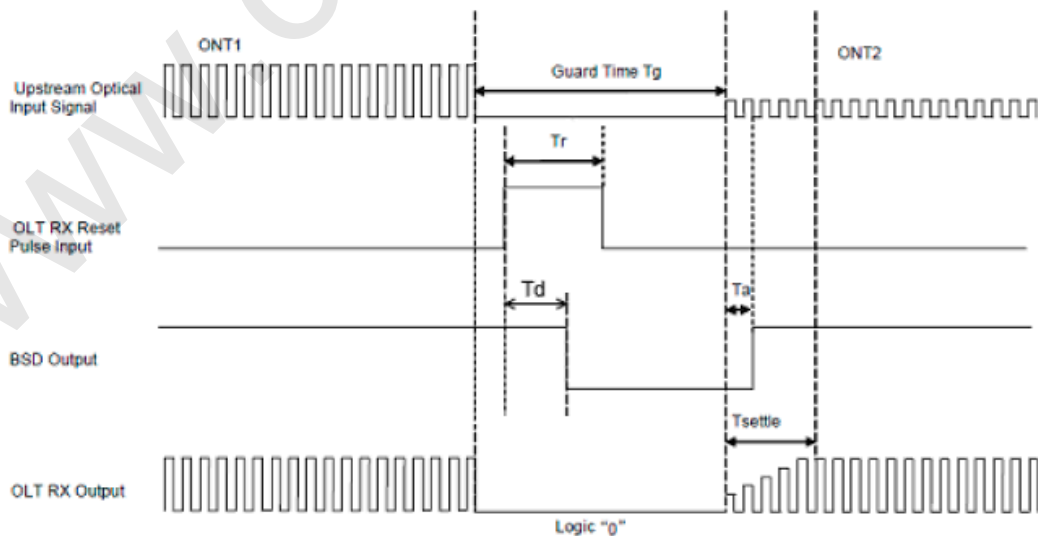


Figure 2.1 Burst Receiver Timing Sequence



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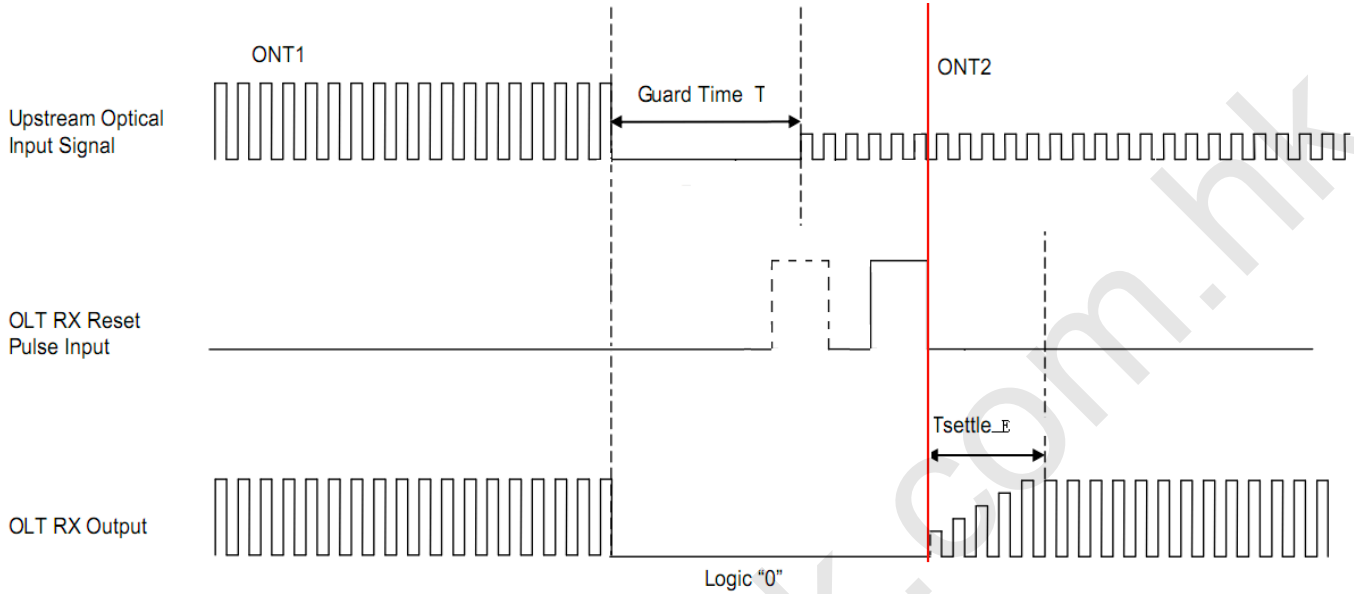


Figure 2.2 Burst Receiver Timing Sequence

V. Receiver Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Guard Time	T_G	32			bit	
Reset Pulse Width ⁽¹⁾	T_R		16		bit	
Receiver Amplitude Recovery Time ⁽²⁾	T_{SETTLE}			24	bit	
	T_{SETTLE_E}			16	bit	
Signal Detect Assert Time	T_A			25	ns	
Signal Detect De-assert Time	T_D			10	ns	

1. Reset Pulse support 2 modes in Figure2.

2. SD signal pulls down immediately after Reset signal, and pulls up while detected RX burst signal till the next Reset signal.



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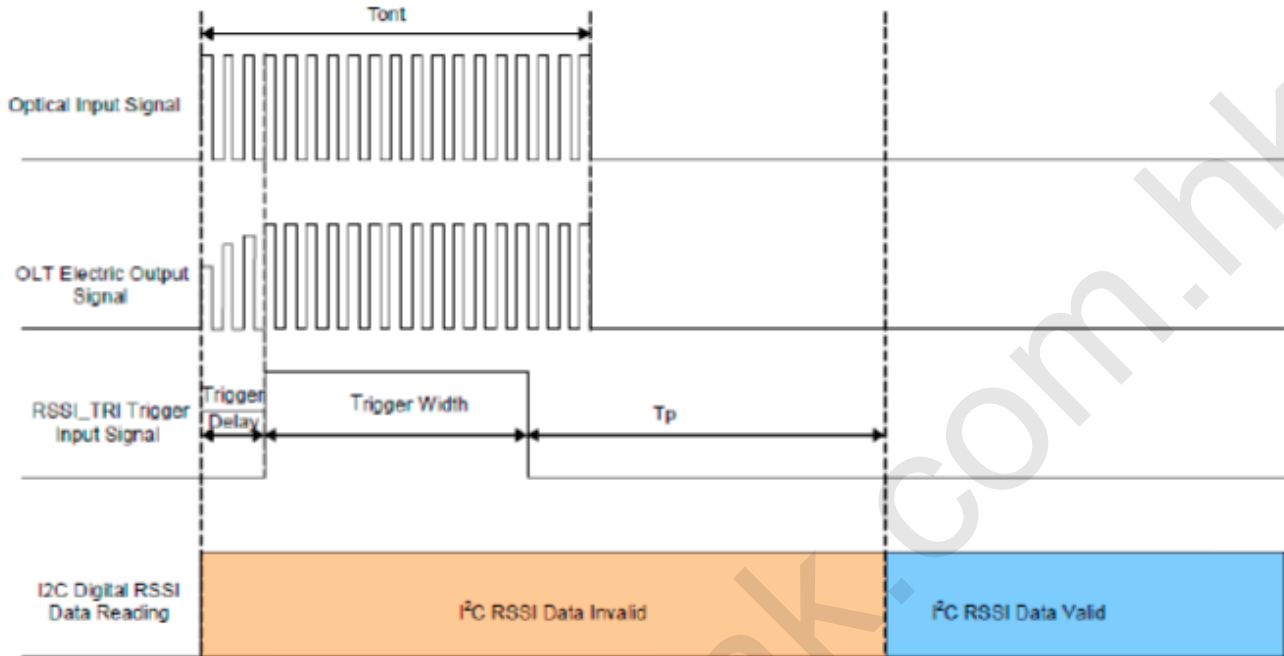


Figure 3 RSSI TIMING SEQUENCE

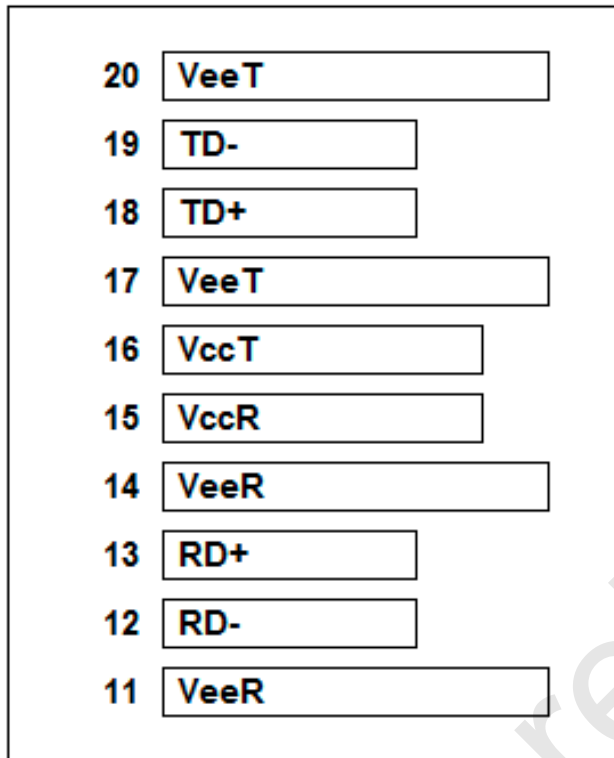
I. RSSI Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		V_{cc}	V	
RSSI Trigger Delay	T_D	0		3000	ns	
Optical Signal During Time	T_{ONT}	300			ns	
RSSI Trigger width	T_W	300		$T_{ONT} - T_D$	ns	
I2C Access Prohibited Time	T_p			500	μs	

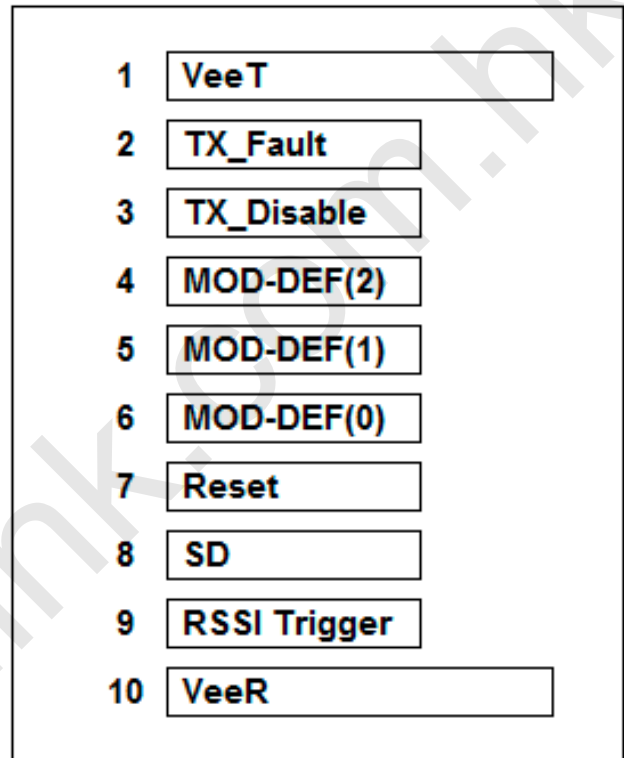


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VII. Pin Diagram



Top Of Board



Bottom Of Board

As Viewed Through Top of Board

VIII. Pin Definitions

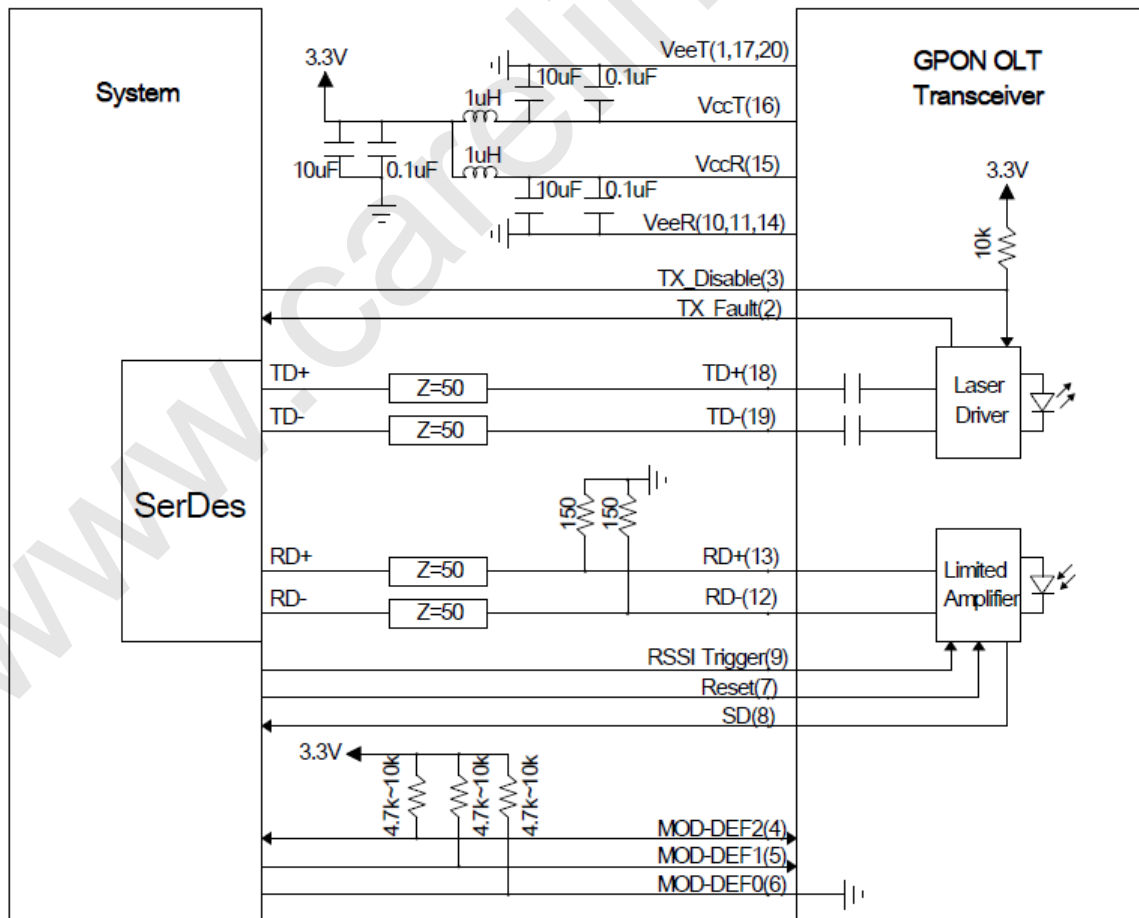
Pin No	Symbol	Name/Description	Power Seq.	Note
1	V _{EE} T	Transmitter Ground	1st	
2	TX_Fault	Transmitter Fault Indication	3rd	High: abnormal; Low: normal
3	TX_Disable	Transmitter Disable	3rd	High: transmitter disable; Low: transmitter enable. Internally 4.7k-10kΩ pull-up.
4	MOD-DEF2	Module Definition 2	3rd	The data line of two wire serial interface
5	MOD-DEF1	Module Definition 1	3rd	The clock line of two wire serial interface
6	MOD-DEF0	Module Definition 0	3rd	Connected to Ground in the transceiver
7	Reset	Receiver Reset	3rd	High: reset the receiver
8	SD	Signal Detect	3rd	High: signal detected; Low: loss of signal;



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9	RSSI Trigger	RSSI Trigger for Transceiver A/D Conversion	3rd	High: enable RSSI A/D conversion
10	V _{EE} R	Receiver Ground	1st	
11	V _{EE} R	Receiver Ground	1st	
12	RD-	Inv. Receiver Data Out	3rd	LVPECL logic output, DC coupled
13	RD+	Receiver Data Out	3rd	LVPECL logic output, DC coupled
14	V _{EE} R	Received Ground	1st	
15	V _{CC} R	Receiver Power	2nd	
16	V _{CC} T	Transmitter Power	2nd	
17	VEET	Transmitter Ground	1st	
18	TD+	Transmit Data In	3rd	LVPECL logic input, AC coupled
19	TD-	Inv. Transmit Data In	3rd	LVPECL logic input, AC coupled
20	VEET	Transmitter Ground	1st	

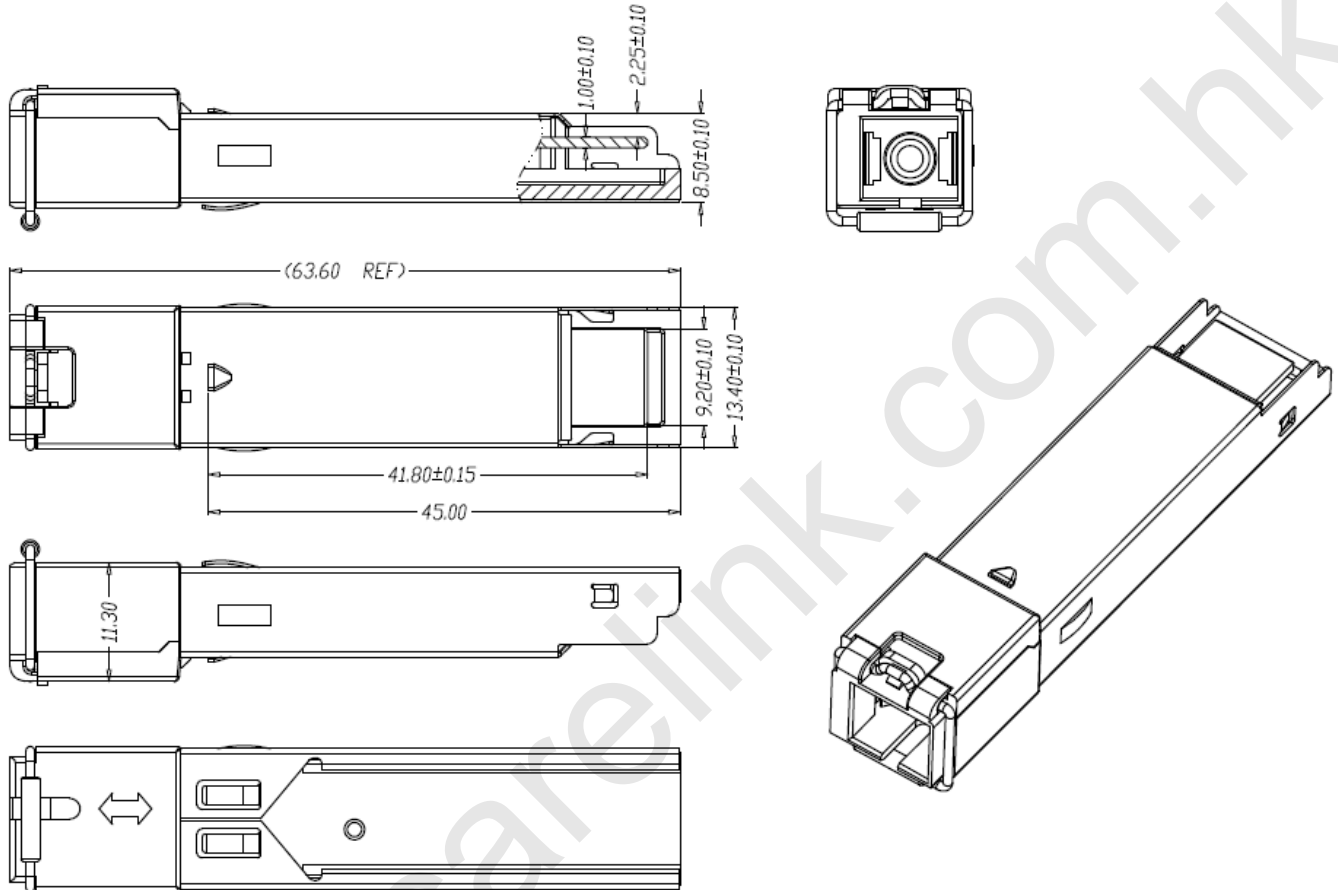
IX. Typical Application Circuit





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X. Package Outline (Unit: mm)



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