RoHS Compliant
CWDM 1310 nm Single-mode Transceiver ,24dB margin
Gigabit Interface Converters (GBIC), 3.3/5 V
1.0625Gbd Fiber Channel/1.25 Gigabit Ethernet

Features

- Compliant with Gigabit Interface Converter Specification
- SCA-2 Host connector
- Duplex SC connector
- Differential PECL inputs and outputs
- Single power supply 3.3V and 5V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

Ordering Information

PART NUMBER	WAVELENGTH	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
LS35-CAU-TC-N27	1270 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N29	1290 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N31	1310 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N33	1330 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N35	1350 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N37	1370 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N39	1390 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N41	1410 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N43	1430 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C
LS35-CAU-TC-N45	1450 nm	AC/AC	TTL	3.3/5V	0°C to 70 °C

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	T_S	–40	85	°C	
Supply Voltage	*Vcc*	–0.5	6.0	V	
Input Voltage	V_{IN}	–0.5	*Vcc*	V	
Output Current	I_o	---	50	mA	
Operating Current	I_{OP}	---	400	mA	

Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Case Operating Temperature	T_C	0	70	°C	
Supply Voltage	*Vcc*	3.1	5.25	V	
Supply Current(3.3V)	$I_{TX} + I_{RX}$	---	300	mA	
Supply Current(5V)	$I_{TX} + I_{RX}$	---	400	mA	

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Transmitter Electro-optical Characteristics

***Vcc* = 3.1 V to 5.25 V, T_C = 0 °C to 70 °C**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Output Optical Power 9/125 μm fiber	P_{out}	0	---	+5	dBm	Average
Extinction Ratio	*ER*	7	---	---	dB	
Central Wavelength (-N27)		1264.5	---	1277.5	nm	
Central Wavelength (-N29)		1284.5	---	1297.5	nm	
Central Wavelength (-N31)		1304.5	---	1317.5	nm	
Central Wavelength (-N33)	λ_C	1324.5	---	1337.5	nm	
Central Wavelength (-N35)		1344.5	---	1357.5	nm	
Central Wavelength (-N37)		1364.5	---	1377.5	nm	
Central Wavelength (-N39)		1384.5	---	1397.5	nm	
Central Wavelength (-N41)		1404.5	---	1417.5	nm	
Central Wavelength (-N43)		1424.5	---	1437.5	nm	
Central Wavelength (-N45)		1444.5	---	1457.5	nm	
Spectral Width (-20dB)	$\Delta\lambda$	---	---	1	nm	
Side Mode Suppression Ratio	*SMSR*	30	---	---	dB	
Rise/Fall Time, (20–80%)	$T_{r,\,f}$	---	---	260	ps	
Relative Intensity Noise	*RIN*	---	---	–120	dB/Hz	
Total Jitter	*TJ*	---	---	227	ps	
Output Eye			Compliant with IEEE802.3z			
Max. P_{out} TX-DISABLE Asserted	P_{OFF}	---	---	–45	dBm	
Differential Input Voltage	V_{DIFF}	0.4	---	2.0	V	
TX Disable Voltage-High	V_{IH}	2.0	---	VCC	V	
TX Disable Voltage-Low	V_{IL}	0	---	0.8	V	

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Receiver Electro-optical Characteristics

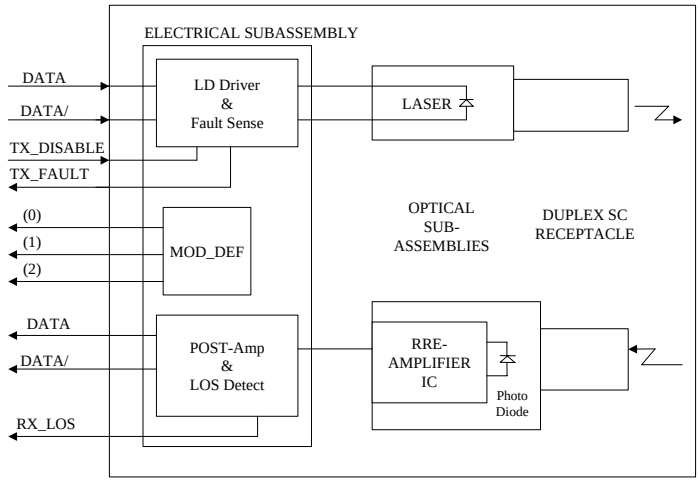
***Vcc* = 3.1 V to 5.25 V, T_C = 0 °C to 70 °C**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Optical Input Power-maximum (BER < 10^{-12})	P_{IN}	–1	---	---	dBm	
Optical Input Power-minimum (Sensitivity) (BER < 10^{-12})	P_{IN}	---	–26	–24	dBm	Note 1
Operating Center Wavelength	λ_C	1460	---	1620	nm	
Optical Return Loss	*ORL*	12	---	---	dB	
Signal Detect-Asserted	P_A	---	---	–24	dBm	
Signal Detect-Deasserted	P_D	–35	---	---	dBm	
Differential Output Voltage	V_{DIFF}	0.5	---	1.2	V	
Data Output Rise, Fall Time (20–80%)	$T_{r,f}$	---	---	0.35	ns	
Receiver Loss of Signal Output Voltage-Low	RX_LOS_L	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	RX_LOS_H	2.4	---	V_{CC}	V	

Note 1: The receiver photo diode may be destroyed if the received optical power higher than maximum optical input power. A 5dB single-mode optical attenuator may be introduced when the transmission distance is under 20km.

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Block Diagram of Transceiver



TOP VIEW (Label side)

Transmitter Section

The transmitter section consists of a InGaAsP laser in an eye safe optical subassembly (OSA) which mates to the fiber cable. The laser OSA is driven by a LD driver IC which converts differential input LVPECL (3.3V) or PECL (5V) logic signals into an analog laser driving current.

TX_DISABLE

The TX_DISABLE signal is high (TTL logic “1”) to turn off the laser output. The laser will turn on when TX_DISABLE is low (TTL logic “0”).

Receiver Section

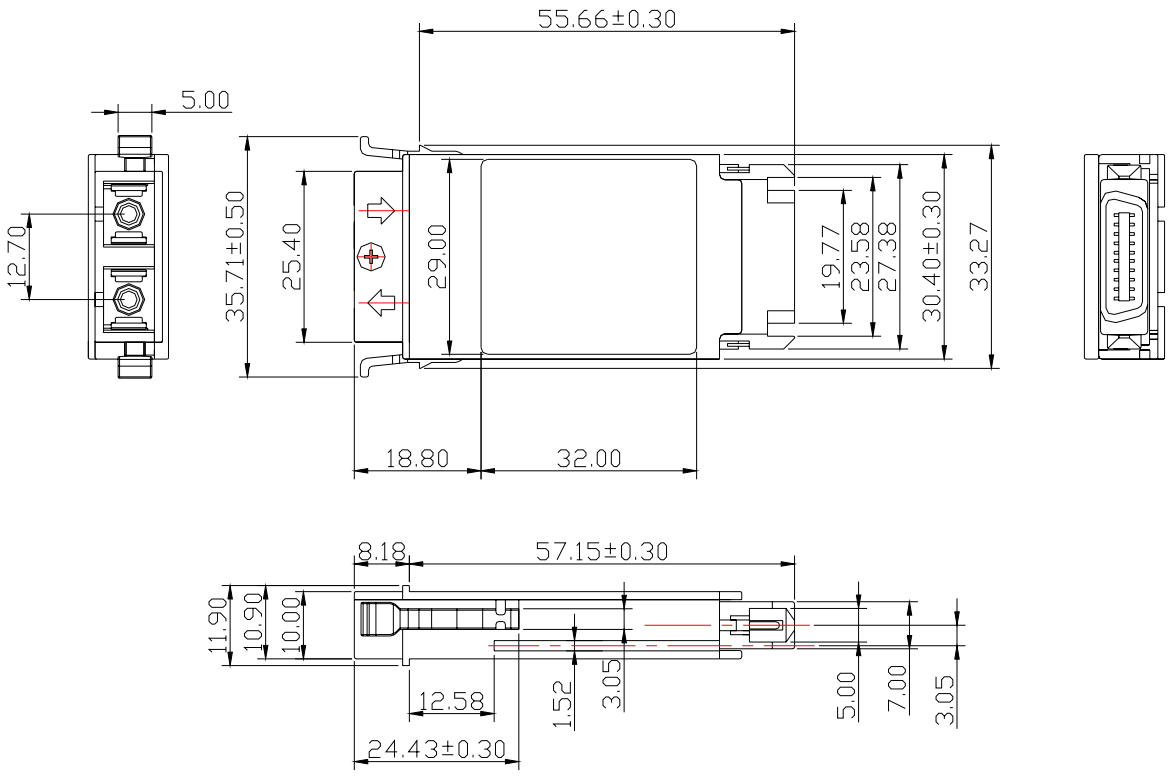
The receiver utilizes an InGaAs PIN photodiode mounted together with a trans-impedance preamplifier IC in an OSA. This OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

Receive Loss (RX_LOS)

The RX_LOS is high (logic “1”) when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in LVTTL level.

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Dimensions



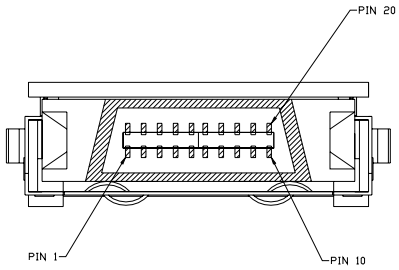
ALL DIMENSIONS ARE±0.20mm UNLESS OTHERWISE SPECIFIED

Unit: mm

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Pin Assignment

Pin-Out

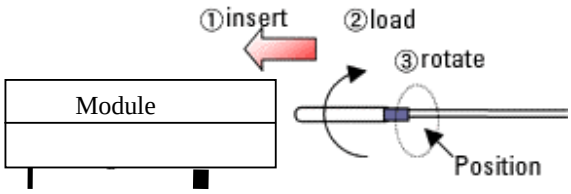


Pin	Signal Name	Description
1	*RX_LOS*	Receiver Loss of Signal, TTL High, open collector
2	R_{GND}	Receiver Ground
3	R_{GND}	Receiver Ground
4	*MOD_DEF (0)*	TTL Low
5	*MOD_DEF (1)*	SCL Serial Clock Signal
6	*MOD_DEF (2)*	SDA Serial Data Signal
7	*TX_DISABLE*	Transmit Disable
8	T_{GND}	Transmit Ground
9	T_{GND}	Transmit Ground
10	*TX_FAULT*	Transmit Fault
11	R_{GND}	Receiver Ground
12	*RX–*	Receive Data Bar, Differential PECL, ac coupled
13	*RX+*	Receive Data, Differential PECL, ac coupled
14	R_{GND}	Receiver Ground
15	V_{CCR}	Receiver Power Supply
16	V_{CCT}	Transmitter Power Supply
17	T_{GND}	Transmitter Ground
18	*TX+*	Transmit Data, Differential PCEL, ac coupled
19	*TX–*	Transmit Data Bar, Differential PCEL, ac coupled
20	T_{GND}	Transmitter Ground

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Optical Receptacle Cleaning Recommendations

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patchcord, the fiber end should be cleaned up by using Cletop® cleaning cassette.

Cleaning of patchcord	**Cleaning of fiber stub**
	 1. Insert Ensure that stick is held straight when inserting into sleeve. 2. Load Apply sufficient pressure (approx 600-700g) to ensure ferrule a little depressed in sleeve. 3. Rotate Rotate stick clockwise 4-5 times, while ensuring direct contact with ferrule end-face is maintained. *Notice: Number of possible wipes: Maintenance (repair)* *~1 use / piece* *Equipment construction: 4 uses / piece (max.)*

Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw

Eye Safety Mark

The LS3 series Single-mode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Caution

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Note : All information contained in this document is subject to change without notice.

Headquarters :
12 Shyr Jiann Road, Hsinchu Industrial Park, Hukow,
Hsinchu Hsien,, Taiwan 303
TEL: +886-3-5986799
FAX: +886-3-5986655
Website: www.apacoe.com.tw