

## Description

### General

The SC(CWDM)12-12ATO transceiver from SANOC is the industry standard 1x9 package with SC duplex fiber optical connector for serial optical data Communications applications specify of Gigabit Ethernet IEEE802.3z / D5 and Fiber Channel. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM with cost effective and high performance. There are eight central wavelengths available at present: **1470nm, 1490nm, 1510nm, 1530nm, 1550nm, 1570nm, 1590nm and 1610nm.**



### Transmitter Section

The transmitter consists of a high-performance MQW DFB structure laser in the optical subassembly (OSA), which is housed within a metal package. In addition, this component is also class 1 laser compliant with according to International Safety Standard IEC-825

### Receiver Section

The receiver contain of an integrated planar InGaAs PIN photodiode coupled to a high sensitivity transimpedance amplifier (TIA) in an OSA. This OSA combination is mated to a post amplifier IC that provides the post amplification and SD (Signal Detect) indication circuit, which provides LVTTTL logic low state output when an unusable input optical signal level is detected.

## Features

- Single + 3.3 V Power Supply
- Compliant with Specification for IEEE802.3z / D5
- Compliant with Specification for Fiber Channel
- 1550 nm Single Mode Fiber, SC Duplex Interface
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Temperature Range : 0°C to +70°C
- RoHS Compliant

## Applications

- Bridges/Routers/intelligent hub and concentrators
- Gigabit Ethernet / Fiber Channel
- Storage Area Network

## Performance Specifications

### Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V <sub>CC</sub>	0	-	5	V
Storage Temperature	T <sub>S</sub>	-40	-	85	°C
Operating Temperature	T <sub>OP</sub>	0	-	70	°C
Lead Soldering Limits	T <sub>SOLD</sub>	-	-	260/10	°C/sec

### General Specifications

Parameter	Symbol	Min	Typ	Max	Units
Data Rate	B	-	1.25	-	Gbps
Supported Link Length on 9/125μm SMF	L	-	120	-	Km

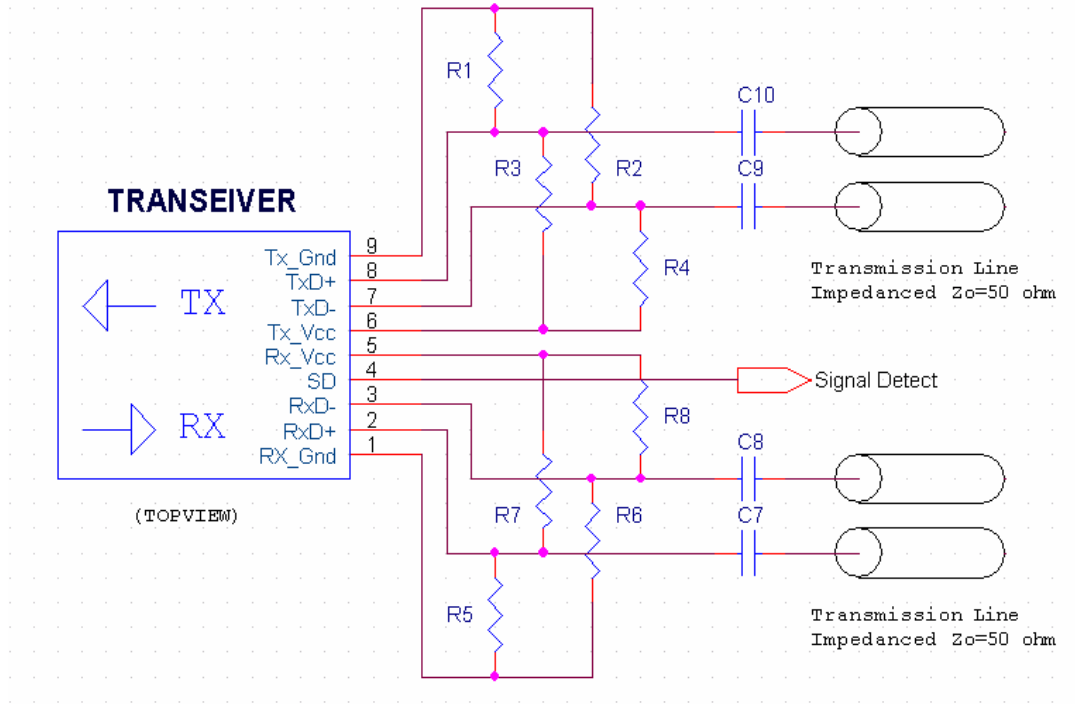
### Optical and Electrical Characteristics

Transmitter Electrical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$	3.15	3.3	3.45	V
Supply Current	$I_{CC}$	-	-	160	mA
Data Differential Input Voltage	$V_{in, pp}$	300	-	1600	mV
Disable Input Voltage	$V_{IL} - V_{CC}$	-1.81	-	-1.48	V
Enable Input Voltage	$V_{IH} - V_{CC}$	-1.16	-	-0.88	V
Transmitter Optical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Output Optical Power	$P_O$	0	-	5	dBm
Center Wavelength	$\lambda_C$	$\lambda_C-6.5$	$\lambda_C$	$\lambda_C+6.5$	nm
Spectral Width (RMS)	$\Delta\lambda$	-	1	-	nm
Optical Rise Time (10%-90%)	$t_r$	-	0.2	-	ns
Optical Fall Time (10%-90%)	$t_f$	-	0.2	-	ns
Extinction Ratio	ER	8.2	-	-	dB

Receiver Electrical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$	3.15	3.3	3.45	V
Supply Current	$I_{CC}$	-	-	100	mA
Data Differential Output Voltage	$V_{out, pp}$	300	-	1000	mV
Data Output Rise Time (10%-90%)	$t_r$	-	0.35	-	ns
Data Output Fall Time (10%-90%)	$t_f$	-	0.35	-	ns
Receiver Optical Characteristics					
Parameter	Symbol	Min	Typ	Max	Unit
Maximum Receiver Power	$P_{in}$	-3	-	-	dBm
Receiver Sensitivity	$P_S$	-	-28	-	dBm
Optical Center Wavelength	$\lambda_C$	1100	-	1600	nm
Signal Detect-Asserted	$P_A$	-	-	-28	dBm avg.
Signal Detect-Deasserted	$P_D$	-36	-	-	dBm avg.
Signal Detect-Hysteresis	$P_A-P_D$	0.5	-	-	dB

**Recommended Circuit Schematic**

**Data Input/Output :**

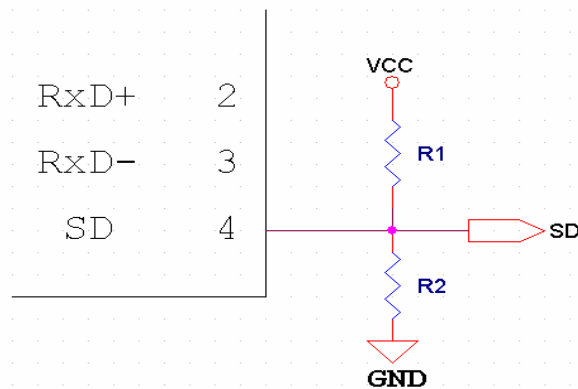


**Figure 1**

R3/R4/R7/R8 = 130 Ω,  
 R1/R2/R5/R6 = 82 Ω  
 C7/C8/C9/C10 = 0.1uF

**Signal Detect:**

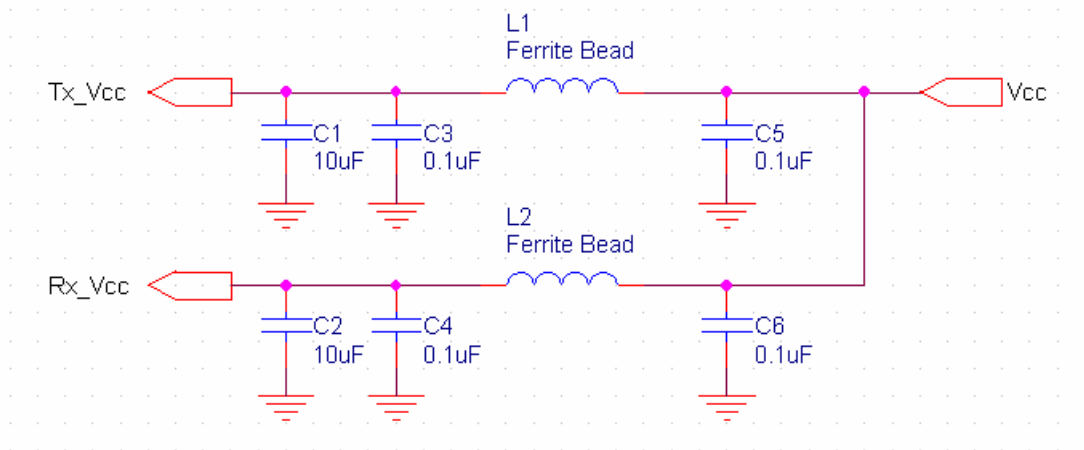
The PECL output option of the signal line may be terminated a 50 ohm resistor to a Vcc-2 volt source or the Thevenin equivalent in order to generate the correct voltage outputs.



**Figure 2**

**Power Coupling:**

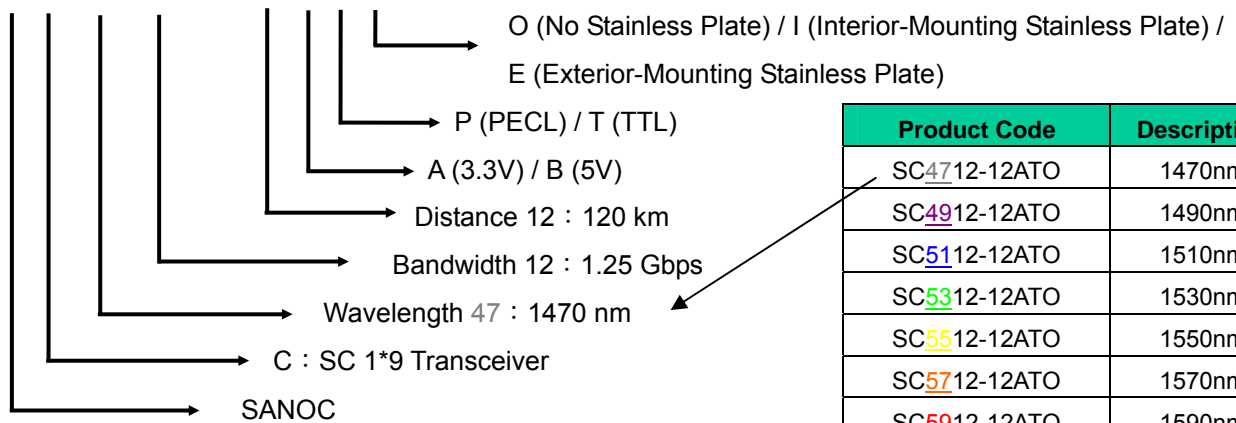
The L1 and L2 can use Ferrite Bead (BLM11A102S) or inductor (4.7uH)



**Figure 3**

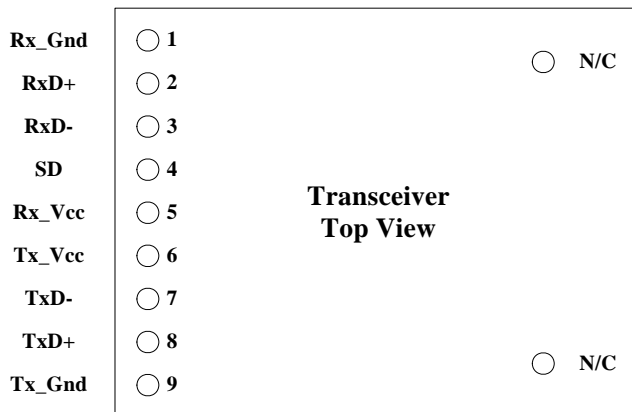
**Ordering Information ( for CWDM )**

**S C 47 12 - 12 A T O**



Product Code	Description
SC4712-12ATO	1470nm
SC4912-12ATO	1490nm
SC5112-12ATO	1510nm
SC5312-12ATO	1530nm
SC5512-12ATO	1550nm
SC5712-12ATO	1570nm
SC5912-12ATO	1590nm
SC6112-12ATO	1610nm

**Pin Assignment**

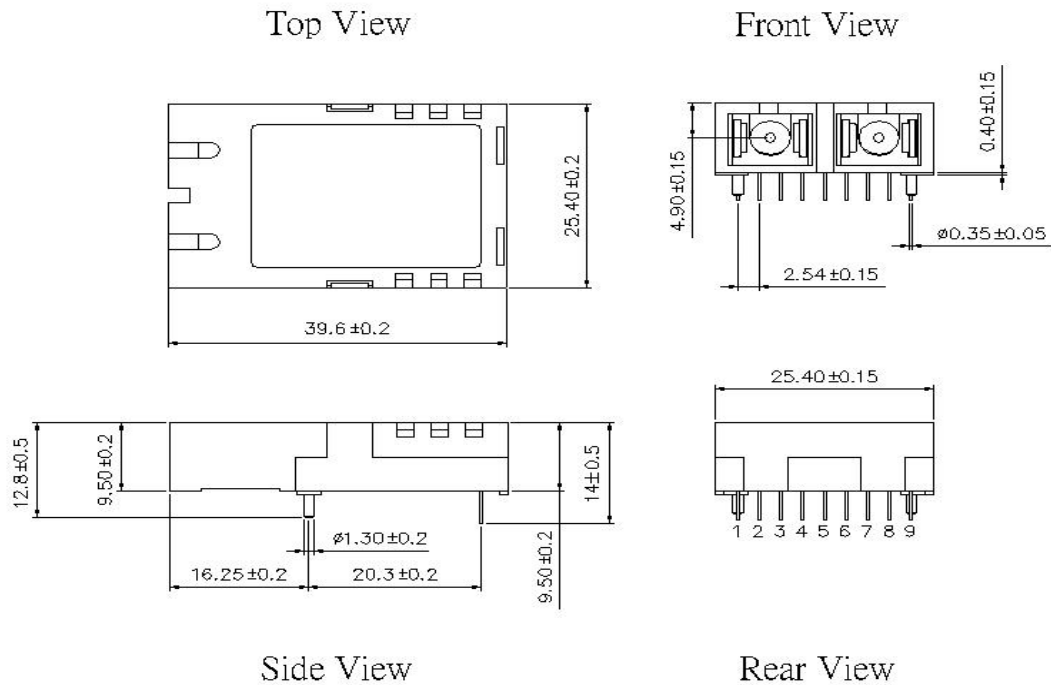


### Pin Description

Pin	Symbol	Function Description
1	Rx_Gnd	Receiver Signal Ground Directly connect this pin to receiver signal ground plane.
2	RxD+	Receiver Data Out RD+ is used to PECL output. Terminate this high-speed differential PECL output with standard PECL techniques at the follow-on device. Reference Figure 1.
3	RxD-	Receiver Data Out Bar RD- is used to PECL output. Terminate this high-speed differential PECL output with standard PECL techniques at the follow-on device. Reference Figure 1.
4	SD	Signal Detect Normal optical input levels to the receiver result in a logic "1" output, Voh, asserted. Low input optical levels to the receiver result in a fault condition indicated by a logic "0" output Vol, deasserted. There are several types for output interface, PECL, CMOS and TTL. Reference Figure 2.
5	Rx_Vcc	Receiver Power Supply Provide (+5/+3.3V) via the recommended receiver power supply filter. Reference Figure 3.
6	Tx_Vcc	Transmitter Power Supply Provide (+5/+3.3V) via the recommended transmitter power supply filter. Reference Figure 3.
7	TxD-	Transmitter Data In Bar TxD- is used to PECL input. Terminate this high-speed differential PECL input with standard PECL techniques at transmitter input pin. Reference Figure 1.
8	TxD+	Transmitter Data In TxD+ is used to PECL input. Terminate this high-speed differential PECL input with standard PECL techniques at transmitter input pin. Reference Figure 1.
9	Tx_Gnd	Transmitter Signal Ground Directly connect this pin to transmitter signal ground plane.

### Package Outline Drawing

Dimension (unit:mm)



### RoHS Reference

Material Classify	Substance	Reference	Standard	Analysis	Equipment
Heavy Metals	Lead (Pb)/ Lead Compounds	2002/95/EC	< 1000 ppm	US EPA 3050B	ICP-AES
	Cadmium (Cd)/ Cadmium Compounds	2002/95/EC	< 100 ppm	EN1122-2001 91/338/EEC	ICP-AES
	Mercury ( Hg ) / Mercury Compounds	2002/95/EC	< 1000 ppm	US EPA 3052	ICP-AES
	Hexavalent-Chromium( Cr6+)Compounds	2002/95/EC	< 1000 ppm	US EPA 3060A & 7196A	UV-VIS
Brominated Organic Compounds	PolyBrominated Biphenyls (PBB)	2002/95/EC	< 1000 ppm	US EPA 3540 & 3550	GC/MS
	PolyBromo Diphenyl Ethers(PBDE)	2002/95/EC	< 1000 ppm	US EPA 3540 & 3550	GC/MS

**Qualification Information**

Heading	Test	Conditions	Sample Size	Reference
Mechanical & Physical	Mechanical Shock	5 times/axis 500G , 1.0ms	11	MIL-STD-883 Method 2002
	Vibration	20G , 20Hz - 2000HZ 4min/cycle ,4cycles/axis	11	MIL-STD-883 Method 2007
	Thermal Shock	Delta T=100°C	11	MIL-STD-883 Method 2003
	Solderability	-	11	MIL-STD-883 Method 2007
	Fiber Pull	1Kg ; 3times ; 5sec	11	Bellcore 983
Endurance	Accelerated Aging	85°C , 5000hrs	25	Bellcore 983 Section 5.18
	High Temperature Storage	85°C , 2000hrs	11	Bellcore 983
	Low Temperature Storage	-40°C , 2000hrs	11	Bellcore 983
	Temperature Cycling	500 cycles.	11	Bellcore 983 Section 5.20
	Cyclic Moisture Resistance	10 cycles	11	Bellcore 983 Section 5.23
	Damp Heat	40°C , 95% RH , 1344hrs	11	MIL-STD-202 Method 103
Special Test	Internal Moisture	<5000ppm water vapor	11	MIL-STD-883 Method 1018
	Flammability	-	-	TR357 Sec.4.4.2.5
	ESD Threshold	-	6	Bellcore 983 Section 5.22