

## PROLABS – SR4-QSFP-40G-C

**40Gb/s QSFP+ Short Wavelength (850nm) Optical Transceiver**

### SR4-QSFP-40G-C Overview

PROLABS's SR4-QSFP-40G-C QSFP+ optical transceiver is a parallel fiber optical module with four independent optical transmit and receive channels. It combines the higher density attractions of parallel modules with some of the key advantages normally associated with SFP+ based modules.

### Product Features

- Supports 41.2 Gb/s aggregate bit rates
- Compliant with QSFP+ MSA
- Compliant with SFF-8436
- Four independently addressable transmit and receive channels
- Uncooled 4x10Gb/s 850nm transmitter
- Differential, internally AC-coupled data I/Os
- Electrically z-pluggable, allowing port population on demand.
- Electrically hot-pluggable
- Single 3.3V power supply
- Built-in Digital Diagnostic functions
- Optical connectivity via industry standard MPO/MTP terminated fiber ribbon
- Operating temperature range: 0°C to 70°C.

### Applications

- High-speed interconnects within and between switches, routers and transport equipment
- Serve-Server Clusters, Super-computing interconnections
- Proprietary backplanes
- Interconnects rack-to-rack, shelf-to-shelf, board-to-board, board-to-optical backplane
- 10GBASE-SR & 40GBASE-SR4 applications
- Infiniband SDR, DDR and QDR applications

### Ordering Information

<b>Part Number</b>	<b>Description</b>
SR4-QSFP-40G-C	40Gb/s QSFP+ Transceiver, 4 channels x 10.3125 Gbps. 100m over MMF.

## General Specifications – Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Operating Case Temperature	$T_{OP}$	- 5		75	°C	
Storage Temperature	$T_{STO}$	- 40		100	°C	
ESD resistance	$V_{ESD}$			+/- 500	V	Note 1
Supply Voltage	$V_{CC}$	- 0.5		3.63	V	Note 2
Voltage on any pin	$V_{PIN}$	- 0.3		$V_{CC}+0.5$	V	
Differential Input Voltage Amplitude	$DIVA$			1600	mV <sub>p-p</sub>	Note 3
Relative Humidity (Non-condensing)	MOS	5		95	%	

Note 1: All pins withstand 500V based on Human Body Model, JEDEC JESD22-A114-D.

Note 2: Applies to all input supply voltages. Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the devices at those or any other conditions above those indicated in the Recommended Operating Conditions of this specification is NOT implied. Also note that exposure to maximum rating conditions for extended periods of time may affect device reliability.

Note 3: Differential input voltage amplitude is peak to peak value.

## General Specifications – Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Power Supply Voltage	$V_{CC}$	3.135	3.3	3.465	V	Note 1
Power Consumption	$P_D$		0.8	1.5	W	
Operating Case Temperature	$T_{CASE}$	0		70	°C	
Differential Input Voltage Amplitude	$DIVA$	200		1200	mV <sub>p-p</sub>	
Signaling Rate (per channel)	$SR$	2.5		10.3125	Gbps	Note 2
Power Supply Noise	$PSN$			50	mV <sub>p-p</sub>	Note 3

Note 1: Applies to all input supply voltages

Note 2: Data patterns are to have maximum run lengths and DC balance shifts no worse than that of a pseudo random bit sequence of length 231-1 (PRBS-31).

Note 3: Power supply noise is defined at the supply side of the recommended filter for all VCC supplies over the frequency range of 1 kHz to 10.3125 GHz with the recommended power supply filter in place.

## Optical Characteristics – Transmitter

$V_{CC}=3.135V$  to  $3.465V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	$P_{out}$			- 1	dBm	Note 1
Optical Center Wavelength	$\lambda_C$	840		860	nm	
Optical Modulation Amplitude	OMA	0.13			mW	Note 2
Extinction Ratio	ER	3			dB	
Spectral Width	$\Delta\lambda$			0.65	nm	Note 3
Relative Intensity Noise(OMA)	RIN			- 130	dB/Hz	
Optical Eye Mask		Compliant to Standard				
Launch Power of OFF Transmitter	$P_{OUT\_OFF}$			- 30	dBm	

Note 1: The output optical power is compliant with IEC 60825-1 Amendment 2, Class 1M Accessible Emission Limits.

Note 2: OMA are peak to peak values

Note 3: Spectral width is measured as defined in EIA/TIA-455-127 Spectral Characterization of Multimode Laser Diodes.

## Optical Characteristics – Receiver

$V_{CC}=3.135V$  to  $3.465V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	$\lambda_C$	840		860	nm	
Average Input Power	$P_{IN}$	- 9.5		2.4	dBm	Note 1
Optical Return Loss	ORL			12	dB	Note 2
Signal Detect Assert	$P_{SA}$			- 10	dBm	
Signal Detect De-Assert	$P_{SD}$	- 30			dBm	

Note 1: Average optical input power for a channel is measured for a BER of 10-12. The BER is measured using a fast rise/fall time source with low RIN and the other channels operating with incident power of > 1 dBm average power.

Note 2: Return loss is measured as defined in TIA/EIA-455-107A Determination of Component Reflectance or Link/System Return Loss Using a Loss Test Set.

## Electrical Characteristics – Transmitter

$V_{CC}=3.135V$  to  $3.465V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential Input Return Loss	$D_{IRL}$	Compliant to Standard			dB	
Differential Input Voltage Amplitude (Peak to Peak)	$\Delta V_{IN}$	200		1200	mV <sub>P-P</sub>	Note 1
Differential Input Impedance	$Z_{IN}$	80		120	' $\Omega$	

Note 1: Differential input voltage is defined as the peak to peak value of the differential voltage between TxNp and TxNn. Data inputs are CML compatible

## Electrical Characteristics – Receiver

$V_{CC}=3.135V$  to  $3.465V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Receiver Mask Compliance		Compliant to Standard				Note 1
Output Differential Load Impedance	$Z_L$	80		120	' $\Omega$	
Output Differential Return Loss	$D_{RL_{OUT}}$	Compliant to Standard			dB	Note 2
Receiver J2 Jitter	$J_{2_{RX}}$			0.42	UI	
Receiver J9 Jitter	$J_{9_{RX}}$			0.65	UI	

Note 1: Eye Mask is compliant to IEEE 802.3ba: (X1, X2) = (0.29, 0.5) UI, (Y1, Y2) = (150, 425) mV with a hit ration of  $5.0 \times 10^{-5}$  per sample

Note 2: Output differential return loss is compliant to IEEE 802.3ba: Return Loss(f) > 12 –  $2 \times \sqrt{f}$ ;  $0.01 < f < 4.11$  and  $6.3 - 13 \log_{10}(f/5.5)$ ;  $4.11 < f < 11.1$

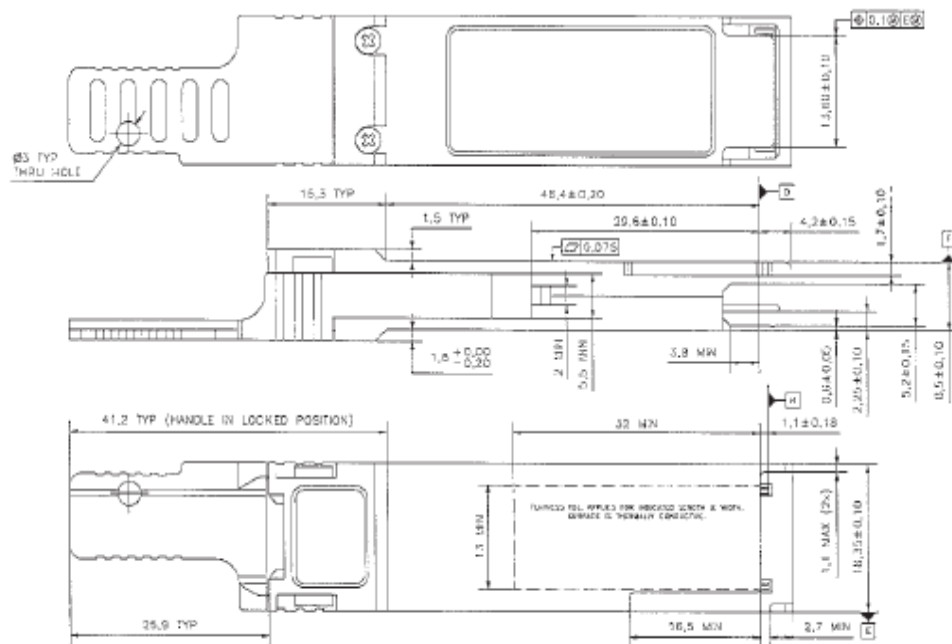
Diagram illustrating the components and assembly of a fiber optic patch panel, showing the top and bottom views of the main body and the connector plug.

**Top View Components:**

- TOP LABEL  
SEE SEPARATE MARKING SPECIFICATION.
- MATERIAL WITH INDUSTRY STANDARD OSPF CONNECTOR.
- TEST TO HELP THE WORKING FROM WIRE  
CONTAINING THE LABEL AT THE WORKING END  
DOES NOT REACT FOR 100% WAVELENGTH
- SPRING LOADED PULL TAB / LATCH  
MATERIAL: GLASS REINFORCED THERMOPLASTIC  
PLATE CLASS RATING UL94-V0
- MATERIAL WITH IEC/ISO STANDARD FIBER CONNECTOR PLUG

**Bottom View Components:**

- BOTTOM LABEL  
SEE SEPARATE MARKING SPECIFICATION.
- SMALLER INTERNAL PLATING



## Block Diagram of Transceiver

