ET6401-PSM4

40G QSFP+ LR4 Parallel Single-Mode Optical Transceiver

Product Overview

The ET6401-PSM4 is a parallel 40 Gbps Quad Small Form-factor Pluggable (QSFP+) optical transceiver. The transceiver provides increased port density with total system cost savings. The QSFP+ full-duplex optical transceiver offers four independent transmit and receive channels, each capable of 10 Gbps operation, for an aggregate data rate of 40 Gbps over 10 km of single-mode fiber. An optical fiber ribbon cable with an MTP/MPO connector can be plugged into the QSFP+ transceiver receptacle. Proper alignment is ensured by the guide pins inside the receptacle. The cable usually cannot be twisted for proper channel-to-channel alignment. Electrical connection is achieved through a z-pluggable 38-pin connector per QSFP+ Multi-Source Agreement (MSA) requirement. The transceiver operates with a single +3.3V power supply. LVCMOS/LVTTL global control signals, such as Module Present, Reset, Interrupt and Low Power Mode, are available with the transceiver. A two-wire serial interface is available to send and receive more complex control signals, and to receive digital diagnostic information. Individual channels can be addressed and unused channels can be shut down for maximum design flexibility. The ET6401-PSM4 is designed with a form factor, optical/electrical connection, and digital diagnostic interface according to the QSFP+ MSA. The transceiver has been designed to meet the harshest external operating conditions, including temperature, humidity, and EMI interference. The transceiver can be managed through an I2C two-wire serial interface.

Key Features and Benefits

- 4 Parallel lanes design
- Up to 11.2 Gbps data rate per channel
- Aggregate bandwidth of up to 44 Gbps
- QSFP+ MSA compliant
- Up to 10 km transmission over single-mode fiber (SMF)
- Maximum power consumption 3.5 W
- Single +3.3 V power supply
- Operating case temperature: 0 to 70°C
- RoHS-6 compliant

Applications

- 40G Ethernet
- Infiniband QDR, DDR, and SDR
- Data center and enterprise networking

Optical Transceiver

Specifications

Absolute Maximum Ratings

Note that operation in excess of any absolute maximum ratings might cause permanent damage to this transceiver.

Parameter	Minimum	Maximum	Unit
Storage Temperature	-40	85	°C
Operating Case Temperature	0	70	°C
Power Supply Voltage	-0.5	3.6	V
Relative Humidity (non-condensation)	0	85	%
Damage Threshold, Each Lane	3.3		dBm

Recommended Operating Conditions and Power Supply Requirements

Parameter	Minimum	Typical	Maximum	Unit
Operating Case Temperature	0		70	°C
Power Supply Voltage	3.135	3.3	3.465	V
Data Rate, Each Lane		10.3125	11.2	Gb/s
Control Input Voltage High	2		Vcc	V
Control Input Voltage Low	0		0.8	V
Link Distance with G.652	0.002		10	km

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Specifications

Electrical Characteristics

The following electrical characteristics are defined over the recommended operating environment unless otherwise specified.

Parameter	Minimum	Typical	Maximum	Unit
Power Consumption			3.5	W
Supply Current			1.1	A
Transceiver Power-on Initialization Time			2000	ms
Transmitter (Each Lane)				
Single-ended Input Voltage Tolerance	-0.3		4.0	V
AC Common Mode Input Voltage Tolerance	15			mV
Differential Input Voltage Swing Threshold	50			mVpp
Differential Input Voltage Swing	190		700	mVpp
Differential Input Impedance	90	100	100	Ohm
Differential Input Return Loss	See IEEE 802.3ba 86A.4.11			dB
J2 Jitter Tolerance	0.17			UI
J9 Jitter Tolerance	0.29			UI
Data Dependent Pulse Width Shrinkage (DDPWS) Tolerance	0.07			UI
Receiver (Each Lane)				
Single-ended Output Voltage	-0.3		4.0	V
AC Common Mode Output Voltage			7.5	mV
Differential Output Voltage Swing	300		850	mVpp
Differential Output Impedance	90	100	110	Ohm
Termination Mismatch at 1 MHz			5	%
Differential Output Return Loss	See IEEE 802.3ba 86A.4.2.1			dB
Common Mode Output Return Loss	See IEEE 802.3ba 86A.4.2.2			dB
Output Transition Time	28			ps
J2 Jitter Output			0.42	UI
J9 Jitter Output			0.65	UI

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Specifications

Transmitter Optical Characteristics

All parameters are specified under the recommended operating conditions with PRBS31 data pattern unless otherwise specified.

Parameter	Minimum	Typical	Maximum	Unit
Center Wavelength	1260	1310	1355	nm
Side Mode Suppression Ratio	30			dB
Total Average Launch Power			7.5	dBm
Average Launch Power, Each Lane	-5.5		1.5	dBm
Optical Modulation Amplitude (OMA), Each Lane	-4.5		2.5	dBm
Difference in Launch Power Between any Two Lanes (OMA)			6.5	dB
Launch Power in OMA Minus Transmitter and Dispersion Penalty (TDP), Each Lane	-5.5			dBm
TDP, Each Lane			3.2	dB
Extinction Ratio	3.5			dB
Relative Intensity Noise			-128	dB/Hz
Optical Return Loss Tolerance			12	dB
Transmitter Reflectance			-12	dB
Average Launch Power OFF Transmitter, Each Lane			-30	dBm

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Specifications

Receiver Optical Characteristics

All parameters are specified under the recommended operating conditions with PRBS31 data pattern unless otherwise specified.

Parameter	Minimum	Typical	Maximum	Unit
Center Wavelength	1260	1310	1355	nm
Damage Threshold, Each Lane	3.3			dBm
Average Receive Power, Each Lane	-12.6		1.5	dBm
Receiver Reflectance			-12	dB
Receive Power (OMA), Each Lane			2.5	dBm
Receiver Sensitivity (OMA), Each Lane			-12.6	dBm
Difference in Receive Power Between any Two Lanes (OMA)			7.5	dB
LOS Assert	-30			dBm
LOS Deassert			-15	dBm
LOS Hysteresis	0.5			dB
Receiver Electrical 3 dB Upper Cutoff Frequency, Each Lane			12.3	GHz

For More Information

To find out more about Edgecore Networks Corporation products and solutions, visit www.edge-core.com.

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