Transceiver 1TX 1RX 2.5Gbps 64-Pin HVQFP EP Tray

Manufacturer:	Texas Instruments, Inc
Package/Case:	QFP
Product Type:	Discrete Semiconductor Modules
RoHS:	RoHS Compliant/Lead free RoHS
Lifecycle:	Active
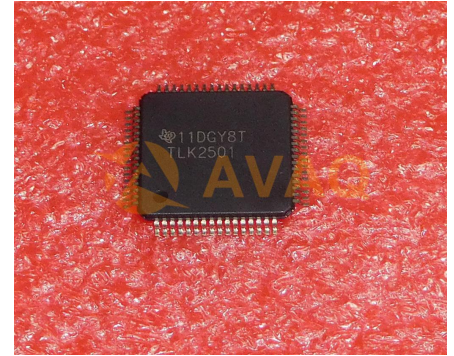
Images are for reference only

Inquiry

General Description

The TLK2501 is a member of the transceiver family of multigigabit transceivers used in ultrahigh-speed bidirectional point-to-point data transmission systems. The TLK2501 supports an effective serial interface speed of 1.5 Gbps to 2.5 Gbps, providing up to 2 Gbps of data bandwidth. The TLK2501 is pin-for-pin compatible with the TLK2500. The TLK2501 is both pin-for-pin compatible with and functionally identical to the TLK1501, a 0.6 to 1.5 Gbps transceiver, and the TLK3101, a 2.5 to 3.125 Gbps transceiver, providing a wide range of performance solutions with no required board layout changes.

The primary application of this chip is to provide very high-speed I/O data channels for point-to-point baseband data transmission over controlled impedance media of approximately 50 . The transmission media can be printed-circuit board, copper cables, or fiber-optic cable. The maximum rate and distance of data transfer is dependent upon the attenuation characteristics of the media and the noise coupling to the environment.

This device can also be used to replace parallel data transmission architectures by providing a reduction in the number of traces, connector terminals, and transmit/receive terminals. Parallel data loaded into the transmitter is delivered to the receiver over a serial channel, which can be a coaxial copper cable, a controlled impedance backplane, or an optical link. It is then reconstructed into its original parallel format. It offers significant power and cost savings over current solutions, as well as scalability for higher data rate in the future.

The TLK2501 performs data conversion parallel-to-serial and serial-to-parallel. The clock extraction functions as a physical layer interface device. The serial transceiver interface operates at a maximum speed of 2.5 Gbps. The transmitter latches 16-bit parallel data at a rate based on the supplied reference clock (GTX_CLK). The 16-bit parallel data is internally encoded into 20 bits using an 8-bit/10-bit (8B/10B) encoding format. The resulting 20-bit word is then transmitted differentially at 20 times the reference clock (GTX_CLK) rate. The receiver section performs the serial-to-parallel conversion on the input data, synchronizing the resulting 20-bit wide parallel data to the extracted reference clock (RX_CLK). It then decodes the 20 bit wide data using 8-bit/10-bit decoding format resulting in 16 bits of parallel data at the receive data terminals (RXD0-15). The outcome is an effective data payload of 1.20 Gbps to 2.0 Gbps (16 bits data x the GTX_CLK frequency).

The TLK2501 is housed in a high performance, thermally enhanced, 64-pin VQFP PowerPAD package. Use of the PowerPAD package does not require any special considerations except to note that the PowerPAD, which has an exposed die pad on the bottom of the device, is a metallic thermal and electrical conductor. It is recommended that the TLK2501 PowerPAD is soldered to the thermal land on the board. All ac performance specifications in this data sheet are measured with the PowerPAD soldered to the test board.

The TLK2501 provides an internal loopback capability for self-test purposes. Serial data from the serializer is passed directly to the deserializer, allowing the protocol device a functional self-check of the physical interface.

The TLK2501 is designed to be hot plug capable. An on-chip power-on reset circuit holds the RX_CLK low during power up. This circuit also holds the parallel side output signal terminals as well as DOUTTXP and DOUTTXN in a high-impedance state during power up.

The TLK2501 has a loss of signal detection circuit for conditions where the incoming signal no longer has a sufficient voltage amplitude to keep the clock recovery circuit in lock.

To prevent a data bit error from causing a data packet from being interpreted as a comma and thus causing the erroneous word alignment by the comma detection circuit, the comma word alignment circuit is turned off after the link is properly established in TLK2501.

The TLK2501 allows users to implement redundant ports by connecting receive data bus terminals from two TLK2501 devices together. Asserting the LCKREFN to go to a low state causes the receive data bus terminals, RXD[0:15], RX_CLK and RX_ER, RX_DV/LOS to go to a high-impedance state. This places the device in a ransmit-only mode since the receiver is not tracking the data.

The TLK2501 uses a 2.5-V supply. The I/O section is 3 V compatible. With the 2.5-V supply the chipset is very power-efficient, consuming less than 360 mW typically. The TLK2501 is characterized for operation from –40°C to 85°C.

Key Features

Hot-Plug Protection

1.5 to 2.5 Gigabits Per Second (Gbps) Serializer/Deserializer

High-Performance 64-Pin VQFP Thermally Enhanced Package (PowerPAD)

2.5-V Power Supply for Low Power Operation

Programmable Voltage Output Swing on Serial Output

Interfaces to Backplane, Copper Cables, or Optical Converters

Rated for Industrial Temperature Range

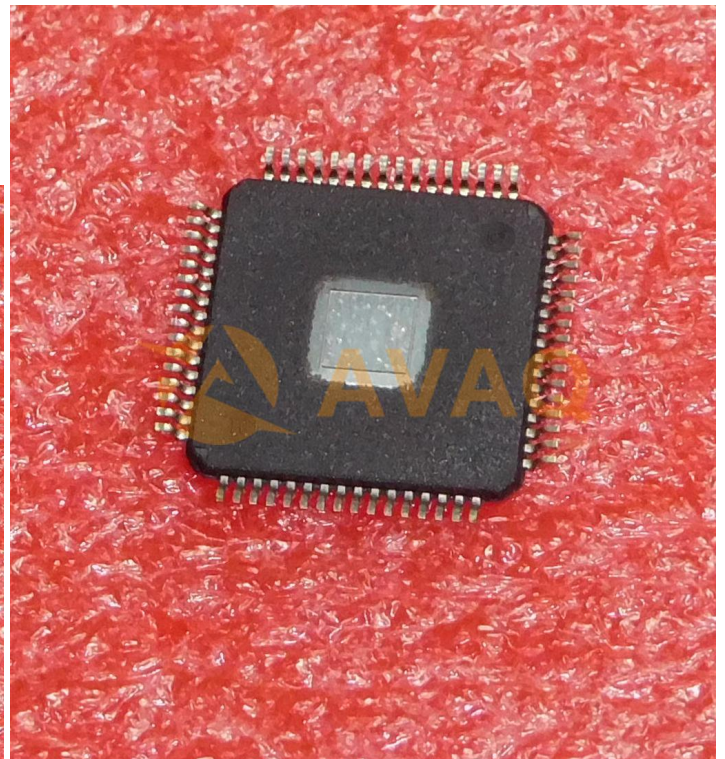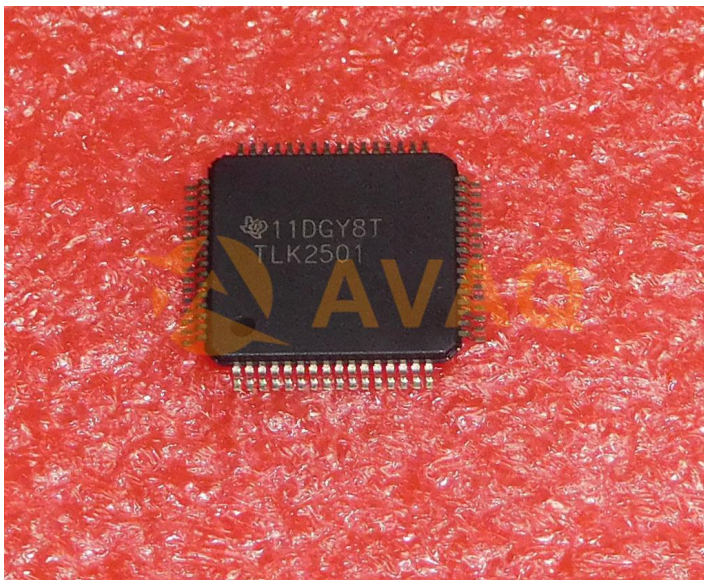On-Chip 8-Bit/10-Bit (8B/10B) Encoding/Decoding, Comma Alignment, and Link Synchronization

On-Chip PLL Provides Clock Synthesis From Low-Speed Reference

Receiver Differential Input Thresholds 200 mV Minimum

Typical Power: 360 mW

Loss of Signal (LOS) Detection

Ideal for High-Speed Backplane Interconnect and Point-to-Point Data Link

Recommended For You

TLK1501IRCP

Texas Instruments, Inc

QFP

TLK2701IRCP

Texas Instruments, Inc

HVQFP64

TLK3114SBGNT

Texas Instruments, Inc

289-BGA19x19

DS90CP04TLQX/NOPB

Texas Instruments, Inc

QFN

TLK10021GWQ

Texas Instruments, Inc

NFBGA144

DS90CP04TLQ

Texas Instruments, Inc

QFN

TLK2501IRCPR

Texas Instruments, Inc

HVQFP-64

TLK3104SAGNT

Texas Instruments, Inc

289-BGA

TLK4120IGPV

Texas Instruments, Inc

BGA

DS90CP04TLQ/NOPB

Texas Instruments, Inc

WQFN32

TLK3118GDV

Texas Instruments, Inc

BGA

TLK3114SCGPV

Texas Instruments, Inc

BGA

TLK3114SAGNT

Texas Instruments, Inc

289-BGA19x19

TLK1501IRCPG4

Texas Instruments, Inc

64-HVQFP

TLK3114SCZPV

Texas Instruments, Inc

BGA