PCM AMI Line Receiver and Clock Recovery Circuit

GENERAL DESCRIPTION

The XR-T5640 is a monolithic bipolar IC designed for T1 type line receiver application operating at 1.544 M bit/s. It provides all the active circuitry required to perform automatic line build out (ALBO), threshold detection, binary NRZ data and clock recovery.

A clock recovery using crystal filter circuit version of the XR-T5640 is also available as XR-T5740.

FEATURES

On Chip NRZ Data and Clock Recovery
Less than 10 ns Sampling Pulse Over the Operating Range
Triple Matched ALBO Ports
Single 5.1 Power Supply

APPLICATIONS

T1 PCM Line Receiver
T1C PCM Line Receiver (requires external gain)
General Purpose Bipolar Line Receiver

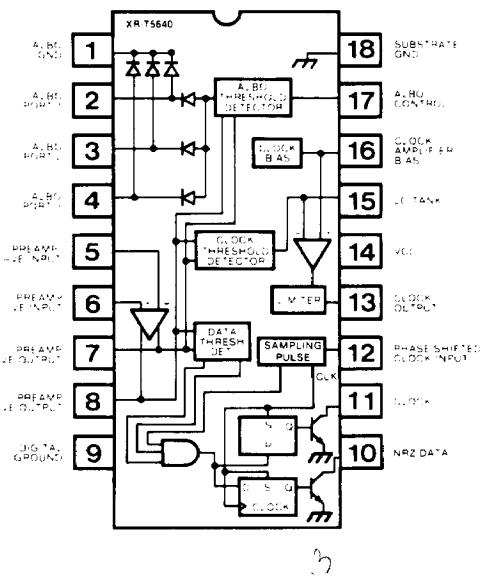
ABSOLUTE MAXIMUM RATINGS

Storage Temperature	−65°C to +150°C
Operating Temperature	−40°C to +85°C
Supply Voltage	−0.5 to +10V
Supply Voltage Surge (10 ms)	+25V
Input Voltage (except Pins 2,3,4,17)	−0.5 to 7V
Input Voltage (Pins 2,3,4,17)	−0.5 to +0.5V
Data Output Voltage (Pins 10,11)	20V
Voltage Surge (Pins 5,6,10,11) (10 msec only)	50V

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-T5640	Ceramic	−40°C to 85°C

FUNCTIONAL BLOCK DIAGRAM



SYSTEM DESCRIPTION

The XR-T5640 is designed as a receiver for interfacing T1 PCM carrier lines on plastic or pulp insulated cables. It can also be used as a general purpose alternate mark inversion (AMI) receiver.

The XR-T5640 is a modified version of XR-T5620 PCM repeater IC. It contains all the active circuitry needed to build a T1 line receiver for interfacing up to 6300 ft. The preamplifier, the clock amplifier, threshold detectors, ALBO port, data latches and output drivers are similar to the ones on XR-T5620. Clock extraction is done by means of an L-C tank circuit.

Bipolar +1 and −1 pulses are combined within the IC to form a binary non-return to zero PCM signal at Pin 10. A synchronous clock signal is made available at Pin 11. Both outputs have open collector transistors.

XR-T5640

ELECTRICAL CHARACTERISTICS

Test Conditions: T_A = 25°C, V_{CC} = 5.1 V ± 5%

PARAMETERS	MIN	TYP	MAX	UNIT	CONDITIONS
Supply Current		22	30	mA	ALBO Off
Clock & Data Output Leakage Current		0	100	μA	$V_{pull\text{-}up}$ = 15V
Amplifier Pin Voltages	2.4	2.9	3.4	V	At Unity DC Gain
Amplifier Output Voltage Swing	2.2			V	
Amplifier Output Offset Voltage	−50	0	50	mV	R_S = 8.2 kΩ
Amplifier Input Bias Current			5	μA	
ALBO on Current	3			mA	
Drive Current		1		mA	
AC CHARACTERISTICS					
Pre-Amplifier					
AC Gain at 1 MHz		50		dB	Open Loop
Input Impedance	20			kΩ	
Output Impedance			200	Ω	
Clock Amplifier					
AC Gain		32		dB	Open Loop
−3 dB Bandwidth	10			MHz	
Delay		10		ns	
Output Impedance			200	Ω	
ALBO					
Off Inpedance	20			kΩ	
On Impedance			25	Ω	
CLOCK DATA OUTPUT BUFFERS					R_L = 130Ω, $V_{pull\text{-}up}$ = 5.1V ± 5%
Rise Time		30		ns	
Fall Time		30		ns	
Output Pulse Width		244		ns	
Sample Pulse Width		10		ns	
V_{OL}		0.7		V	
I_L sink		35		mA	
THRESHOLDS					
ALBO	1.4	1.5	1.6	V	
Clock Drive Current Peak		1.0		mA	At V_O = V_{ALBO} Threshold
Clock Thresholds					
% of ALBO	63		75	%	
Data Threshold					
% of ALBO	40	46	52	%	