High-Performance PCM Repeater

GENERAL DESCRIPTION

The XR-C262Z is a high-performance monolithic repeater IC for pulse-code modulated (PCM) telephone systems. It is designed to operate as a regenerative repeater at 1.544 Megabits per second (Mbps) data rate on T1-type PCM lines.

The XR-C262Z operates with a single 6.8 volt power supply, and with a typical supply current of 13 mA. It provides bipolar output drive with high-current handling capability. The clock-extractor section of XR-C262Z uses the resonant-tank circuit principle, rather than the injection-locked oscillator technique used in earlier monolithic repeater designs. The bipolar output drivers are designed to go to their "off" state automatically, when there is no input signal present.

FEATURES

Contains all Necessary Active Components of a PCM Repeater
Uses L-C Tank for Clock Recovery
Low-Voltage Operation (6.8 volts)
Low-Current Drain (13 mA, typical)
High-Current Bipolar Output Drivers
On-Chip ALBO Port
Automatic Zero-Input Shutdown
Increased Reliability Over Discrete Designs
2 Megabit Operation Capability
Pin-to-Pin Compatible with XR-C262 with Improved Switching Characteristics

APPLICATIONS

PCM Repeater for T1 Systems
PCM Repeater for 2 M Bit/s Systems

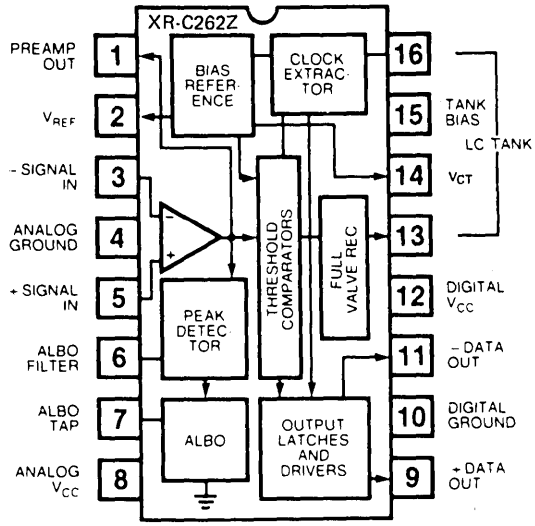
ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-65°C to +150°C
Operating Temperature	-40°C to +85°C
Supply Voltage	-0.5 to +10 V
Input Voltage (Except Pin 6,7)	-0.5 to +7 V
Input Voltage (Pin 6,7)	-0.5 to +0.5 V
Data Output Voltage (Pin 9,11)	+20 V
Voltage Surge (Pin 3,5,9,11) (10 msec only)	50 V

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-C262Z	Ceramic	-40°C to +85°C

FUNCTIONAL BLOCK DIAGRAM



SYSTEM DESCRIPTION

The XR-C262Z contains all the active functions required to build one side of a T1 or 2 M bit/s PCM repeater. T1 is the most widely used PCM transmission system, operating at 1.544 M bit/s. It can operate on either pulp or plastic insulated twisted pair cables. Although the cable gauge may vary, the total cable loss should not exceed 36 dB at 772 kHz. For a 22 gauge pulp insulated cable and a bit error rate (BER) of less than 10^{-6}, the max allowable repeater to repeater spacing is about 6300 feet.

Bipolar PCM signal is attenuated and dispersed in time as it travels along a transmission cable. This signal, when received, is amplified and reconstructed by the preamplifier automatic line build out (ALBO), clock and data threshold detector circuits contained within the XR-C262Z. Amplitude equalization and frequency spectrum shaping is achieved through the variable impedance of the ALBO ports and its associated ALBO network.

Incoming pulse stream is full wave rectified and timing information is extracted by the clock threshold detector. Clock recovery is then achieved by pulsing a tank circuit tuned to 1.544 MHz.

Data is sampled and stored in the output data latches. Buffer drivers are then enabled to produce precisely timed output pulses whose width and time of occurence are controlled by the regenerated clock signal.

ELECTRICAL CHARACTERISTICS

Test Conditions: $+V_{CC}$ = 6.8 V, T_A = −40°C to +85°C, unless specified otherwise.

PARAMETERS	MIN	TYP	MAX	UNIT	CONDITIONS
SUPPLY CURRENT					
Digital Current	6	10	13	mA	Measured at Pin 12
Analog Current	1.5	3.5	5	mA	Measured at Pin 8
Total Current		13	15	mA	
PREAMPLIFIER					
Input Offset Voltage	−15		+15	mV	Measured between Pins 3 & 5
Open Loop Gain	58	69	76	dB	
Output High Level	4.3			V	Measured at Pin 1
Output Low Level			0.8	V	Measured at Pin 1
CLOCK RECOVERY SECTION					
Clock Drive Swing (High)	5.1			V	Measured at Pin 13
Clock Drive Swing (Low)			4.0	V	Measured at Pin 13
Clock Bias	3.8	4		V	Measured at Pin 15
Clock Source Input Current		0.5	4	μA	Measured at Pin 16
COMPARATOR THRESHOLDS					
ALBO Threshold	0.75	0.9	1.1	V	Measured at Pin 1 relative to Pin 14
Clock Threshold	0.323	0.4	0.517	V	
Data Threshold	0.323	0.4	0.517	V	
INTERNAL REFERENCE VOLTAGES					
Reference Voltage	5.0	5.45	5.65	V	Measured at Pin 2
Divider Center Tap	2.5	2.78	2.85	V	Measured at Pin 14
ALBO SECTION					
Off Voltage		10	75	mV	Measured at Pin 7
On Voltage	1.2		1.7	V	Measured at Pin 7
On Impedance			15	Ω	Measured at Pin 7
Filter Drive Current	0.7	1	3	mA	Drive Current available at Pin 6
OUTPUT DRIVER SECTION					Measured at Pins 9 & 11
Output High Swing	5.9	6.8		V	R_L = 400Ω
Output Low Swing	0.5	0.7	1.0	V	I_L = 15 mA
Leakage Current			100	μA	Measured with output in off state
Output Pulse Width	298	324	350	nsec	
Output Rise Time			80	nsec	
Output Fall Time			80	nsec	
Pulse Width Unbalance			15	nsec	