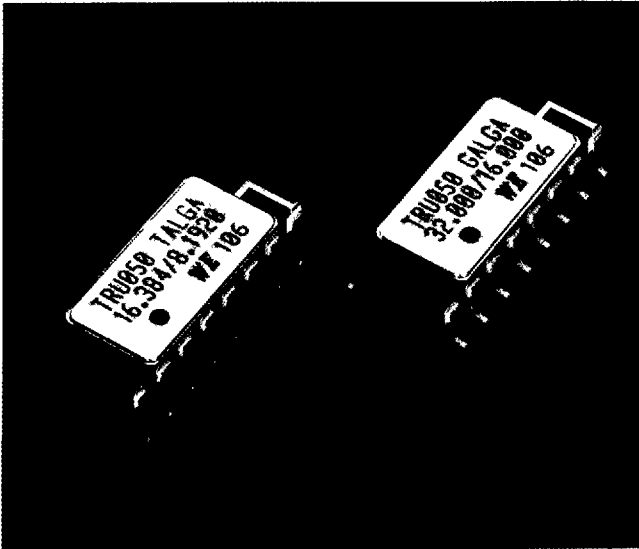


TRU050 Clock Recovery and Data Retiming Unit



Description

The AT&T TRU050 Clock Recovery and Data Retiming Unit is a user-configurable phase-locked loop (PLL). It includes a voltage-controlled crystal oscillator (VCXO), operational amplifier, phase detector and additional integrated functions for use in digital synchronization applications. The TRU050 is available in a surface-mount configuration or in a 16-pin DIP. Because the TRU050 is a single package PLL, it reduces testing requirements and board space. All outputs may be placed in a high-impedance mode for board-level testing.

Typical applications for the TRU050 include timing recovery and data pulse restoration for data signals, clock frequency translation and smoothing, synchronous distributed clock networks, and clock frequency synthesis.

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Input NRZ Data Rates*	DATAIN	0.008	—	52	MHz
Operational Temperature Range					
Commercial	T	0	25	70	°C
Industrial		-40	25	85	°C
Nominal Output Frequency					
Output 1	OUT1	14.0	—	52.0	MHz
Output 2	OUT2	0.06	—	26.0	MHz
Input Data Frequency Deviation					
F (see part numbering information)	ΔF	—	—	± 32	ppm from F_0
G		—	—	± 50	ppm from F_0
Supply Voltage	V_{DD}	4.5	5.0	5.5	V
Supply Current (frequency dependent, $V_{DD} = 5.5$ V)	I_{DD}	25	—	63	mA
Output Voltage Levels ($V_{DD} = 4.5$ V, 5-gate MTTL load)					
Output Logic High	V_{OH}	2.5	V_{DD}	—	V
Output Logic Low	V_{OL}	—	0.2	0.5	V
Transition Times (between 0.5 V and 2.5 V)					
Rise Time	T_{RISE}	0.5	2.5	5.0	ns
Fall Time	T_{FALL}	0.5	2.5	5.0	ns
Symmetry or Duty Cycle					
Output 1	SYM1	40	50	60	%
Output 2	SYM2	45	50	55	%
Recovered Clock	RCLK	40	50	60	%
Input Data					
Input Logic High	V_{IH}	2.0	—	—	V
Input Logic Low	V_{IL}	—	—	0.8	V
Control Voltage Bandwidth ($V_C = 2.5$ V, 3 dB)	BW	50	—	—	kHz
Phase Detector Gain	KD	-0.53 x Data Density			V/rad
Nominal Output Frequency on Loss of Signal (25 °C, $V_{DD} = 5$ V)					
Output 1	OUT1	-75	—	+75	ppm from F_0
Output 2	OUT2	-75	—	+75	ppm from F_0

* For input RZ data, Manchester-encoded data, and input clock recovery applications using the TRU050, please contact an AT&T Applications Engineer.

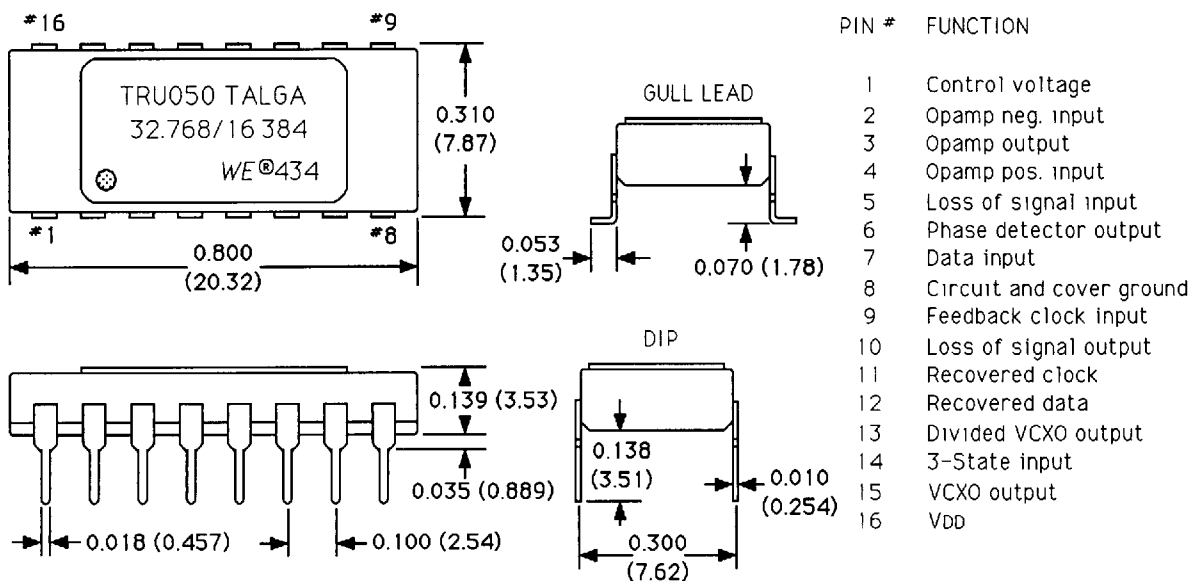
Mechanical Characteristics

Parameter	Description
Mechanical Shock	MIL-STD-883, Method 2002, Condition B.
Mechanical Vibration	MIL-STD-883, Method 2007, Condition A.
Solderability	MIL-STD-883, Method 2003.
Gross Leak Test	All units tested to MIL-STD-883, Method 1014.
Fine Leak Test	All units tested to MIL-STD-883, Method 1014.
Marking	Laser marking.

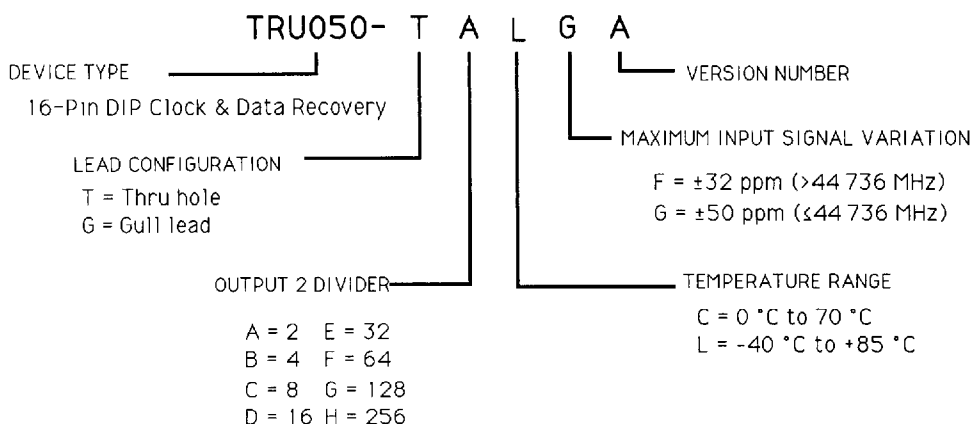
Outline Diagram

TRU050 Package

Dimensions are in inches and (millimeters).



Part Numbering Information



Note: Other specifications may be available upon request. Gull lead devices are available in tape and reel. WE 434 is the date code and represents the year 199(4) and the week (34) of manufacture.