

Advance Information

This document contains information on a product under development. The parametric information contains target parameters which are subject to change.

Distinguishing Features

- 10KH ECL Compatible Inputs
- Registered or Transparent Operation
- TTL-Compatible Outputs
- Separate TTL and ECL Supply Pins
- TTL-Compatible Control Inputs
- 68-pin PLCC Package
- Typical Power Dissipation: 550 mW

Applications

- CCIR601
- SMPTE RP125
- EBU 3246-E

Related Devices

- Bt296

Bt297

27 MHz VideoNet™ 10KH ECL to TTL 11-Bit Translator

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Product Description

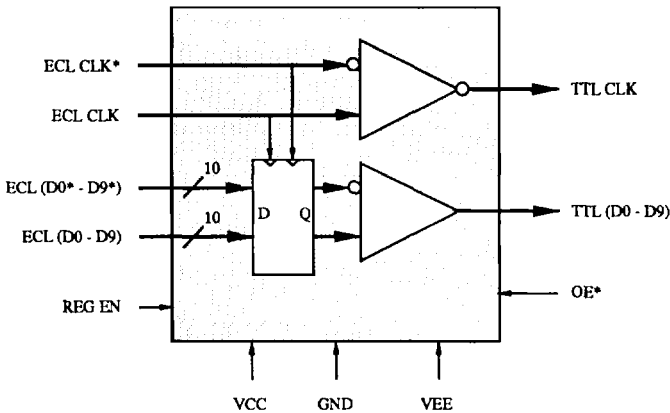
The Bt297 ECL/TTL Translator converts 11 bits of differential 10KH ECL data to 11 bits of TTL data.

The Bt297 incorporates all translators in one package to eliminate delay skew that results when using multiple devices.

The REG EN input controls whether the input data is registered or the data register is bypassed (transparent operation).

The TTL clock and data outputs may be three-stated asynchronously to the clock by the OE* pin.

Functional Block Diagram



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L297001 Rev. D

Pin Descriptions

| Pin Name | Description |
|------------------------------|--|
| TTL (D0–D9) | TTL data outputs (TTL compatible). |
| TTL CLK | TTL clock output (TTL compatible). |
| ECL (D0–D9) ECL (D0*–D9*) | Differential ECL data inputs (ECL compatible). ECL data is latched by the ECL CLK signals, converted to TTL levels, and output onto the TTL data pins. Single-ended ECL operation may be used by connecting the ECL (D0*–D9*) pins to VBB (–2 V). If a pair of ECL inputs are left floating or are in the same logical state, the corresponding TTL output will be a logical zero. |
| ECL CLK, ECL CLK* | Differential ECL clock inputs (ECL compatible). Single-ended ECL operation may be used by connecting the ECL CLK pin to VBB (–2 V). If REG EN is a logical one, the ECL CLK is inverted and output onto the TTL CLK output pin. If REG EN is a logical zero, the ECL CLK is not inverted before being output onto the TTL CLK output pin. |
| REG EN | Register enable control input (TTL compatible). A logical one enables the D0–D9 input data to be registered by the data input register. A logical zero bypasses the data input register, enabling transparent operation. |
| OE* | Output enable control (TTL compatible). A logical one three-states the TTL (D0–D9) and TTL CLK outputs asynchronously to the clock. |
| VCC | TTL power supply. All VCC pins must be connected together as close to the device as possible. |
| GND | Ground. All GND pins must be connected together as close to the device as possible. |
| VEE | ECL power supply. All VEE pins must be connected together as close to the device as possible. |

Recommended Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Units |
|-------------------------------|--------|-------|------|-------|-------|
| Device Ground | GND | 0 | 0 | 0 | Volts |
| TTL Power Supply | VCC | +4.75 | +5.0 | +5.25 | Volts |
| ECL Power Supply | VEE | -4.9 | -5.2 | -5.5 | Volts |
| Ambient Operating Temperature | TA | 0 | | +70 | °C |

Note: Thermal equilibrium is established by applying power for at least 2 minutes while maintaining a transverse air flow of 400 linear feet per minute over the device either mounted in the test socket or on the printed circuit board.

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Absolute Maximum Ratings

| Parameter | Symbol | Min | Typ | Max | Units |
|-------------------------------------|--------|---------|-----|-----------|-------|
| VEE (measured to GND) | | | | -8.0 | Volts |
| VCC (measured to GND) | | | | +7.0 | Volts |
| Voltage on Any ECL Pin | | -1.8 V | | GND | Volts |
| Voltage on Any TTL Pin | | GND-0.5 | | VCC + 0.5 | Volts |
| Ambient Operating Temperature | TA | -55 | | +125 | °C |
| Storage Temperature | TS | -65 | | +150 | °C |
| Junction Temperature | TJ | | | +150 | °C |
| Vapor Phase Soldering (1 minute) | TVSOL | | | 220 | °C |

Note: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ECL DC Characteristics

| Parameter | Symbol | TA (°C.) | Min | Typ | Max | Units |
|---|--------|----------|-------|-----|-------|-------|
| Input High Voltage* | VIH | 0 | -1170 | | -840 | mV |
| | | +25 | -1130 | | -810 | mV |
| | | +70 | -1070 | | -735 | mV |
| Input Low Voltage* | VIL | 0 | -1950 | | -1480 | mV |
| | | +25 | -1950 | | -1480 | mV |
| | | +70 | -1950 | | -1450 | mV |
| Input Current (Vin = VIHmax or VIL min) | IIN | 0 | | | 10 | μA |
| | | +25 | | | 10 | μA |
| | | +70 | | | 10 | μA |
| Common Mode Voltage Range Differential Input Voltage | | | tbd | | -310 | mV |
| | | | | | mV | |
| Input Impedance Input Capacitance | | | -2450 | tbd | | Ohms |
| | | | 185 | tbd | | pF |
| ECL VEE Supply Current | IEE | 0 | | 5 | 7 | mA |
| | | +25 | | 5 | 7 | mA |
| | | +70 | | 5 | 7 | mA |

Test conditions (unless otherwise specified): "Recommended Operating Conditions." Typical values are based on nominal temperature, i.e., room, and nominal voltage, i.e., 5 V.

*Relative to GND.

The specified limits shown can be met only after thermal equilibrium has been established. Thermal equilibrium is established by applying power for at least 2 minutes while maintaining a transverse air flow of 400 linear feet per minute over the device, either mounted in the test socket or on the printed circuit board.

TTL DC Characteristics

| Parameter | Symbol | Min | Typ | Max | Units |
|--|-----------------|----------------|-----|-----------------|----------|
| Input High Voltage* | V _{IH} | 2.0 | | TTL VCC +0.5 | Volts |
| Input Low Voltage* | V _{IL} | TTLGND -0.5 | | 0.8 | Volts |
| Input High Current (V _{in} = 2.4 V) | I _{IH} | | | 70 | μA |
| Input Low Current (V _{in} = 0.4 V) | I _{IL} | | | -0.7 | mA |
| Output High Voltage* (I _{OH} = -2.0 mA) | V _{OH} | 2.5 | | | Volts |
| Output Low Voltage* (I _{OL} = 20 mA) | V _{OL} | | | 0.5 | Volts |
| Three-State Output Current V _{out} = V _{OHmin} V _{out} = V _{OLmax} | I _{OZ} | | | 10 -10 | μA μA |
| Output Capacitance | | | tbd | | pF |
| Input Capacitance | | | tbd | | pF |
| TTL VCC Supply Current | I _{CC} | | 100 | 130 | mA |

Test conditions (unless otherwise specified): "Recommended Operating Conditions." Typical values are based on nominal temperature, i.e., room, and nominal voltage, i.e., 5 V.

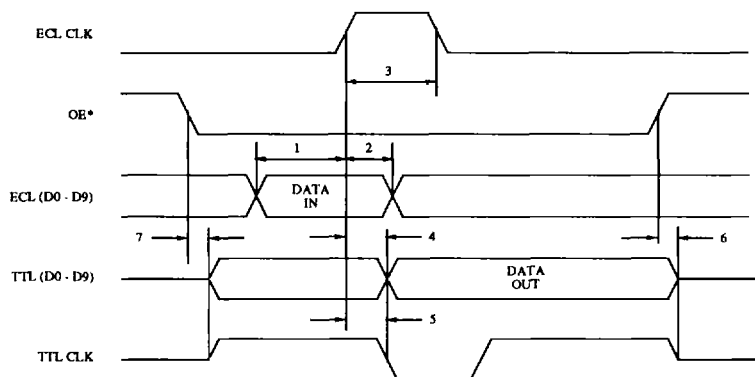
*Relative to GND.

AC Characteristics—Registered Operation

| Parameter | Symbol | Min | Typ | Max | Units |
|------------------------|--------|-----|-----|-----|-------|
| ECL D0–D9 Setup Time | 1 | 3 | | | ns |
| ECL D0–D9 Hold Time | 2 | 3 | | | ns |
| ECL CLK High Time | 3 | 10 | | | ns |
| Clock Rate | | tbd | | 27 | MHz |
| TTL D0–D9 Output Delay | 4 | tbd | | 10 | ns |
| TTL CLK Output Delay | 5 | tbd | | 10 | ns |
| Output Disable Time | 6 | tbd | | 15 | ns |
| Output Enable Time | 7 | tbd | | 15 | ns |

Test conditions (unless otherwise specified): "Recommended Operating Conditions." ECL input values are -0.89 to -1.69 V, with input rise/fall times ≤ 4 ns, measured between the 20% and 80% points. Timing reference points at 50% for inputs and outputs. Typical values are based on nominal temperature, i.e., room, and nominal voltage, i.e., 5 V.

Timing Waveforms—Registered Operation



Registered Input/Output Timing.

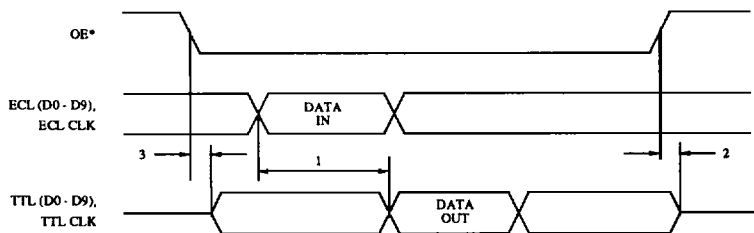
AC Characteristics—Transparent Operation

| Parameter | Symbol | Min | Typ | Max | Units |
|---------------------|--------|-----|-----|-----|-------|
| Output Delay | 1 | tbd | | 10 | ns |
| Output Disable Time | 2 | tbd | | 15 | ns |
| Output Enable Time | 3 | tbd | | 15 | ns |

Test conditions (unless otherwise specified): "Recommended Operating Conditions." ECL input values are -0.89 to -1.69 V, with input rise/fall times ≤ 4 ns, measured between the 20% and 80% points. Timing reference points at 50% for inputs and outputs. Typical values are based on nominal temperature, i.e., room, and nominal voltage, i.e., 5 V.



Timing Waveforms—Transparent Operation



Transparent Input/Output Timing.

Ordering Information

| Model Number | Package | Ambient Temperature Range |
|---------------------|----------------------------------|--|
| Bt297KPJ | 68-pin Plastic J-lead | 0° to +70° C |