



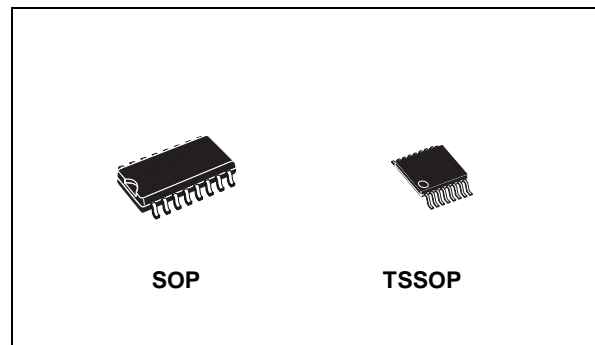
STLVDS104

4-PORT LVDS AND 4-PORT TTL-TO LVDS REPEATERS

- RECEIVER AND DRIVERS MEET OR EXCEED THE REQUIREMENTS OF ANSI EIA/TIA-644 STANDARD, RECEIVERS DIFFERENTIAL INPUT LEVELS, $\pm 100\text{mV}$
- DESIGNED FOR SIGNALING RATES UP TO 630Mbps
- OPERATES FROM A SINGLE 3.3V SUPPLY
- LOW VOLTAGE DIFFERENTIAL SIGNALING WITH TYPICAL OUTPUT VOLTAGE OF 350mV AND A 100 Ω LOAD
- PROPAGATION DELAY TIME: 3.1ns (TYP)
- ELECTRICALLY COMPATIBLE WITH LVDS, PECL, LVPECL, LVTTTL, LVCOMOS, GTL, BTL, CTT, SSTL, OR HSTL OUTPUTS WITH EXTERNAL NETWORK
- BUS TERMINAL ESD (HBM) EXCEEDS 7KV
- SO AND TSSOP PACKAGING

DESCRIPTION

The STLVDS104 is a differential line receiver and a LVTTTL input connected to four differential line drivers that implement the electrical characteristics of low voltage differential signaling, for point to point baseband data transmission over controlled impedance media of approximately 100 Ω . The transmission media can be printed-circuit board traces, backplanes, or cable.



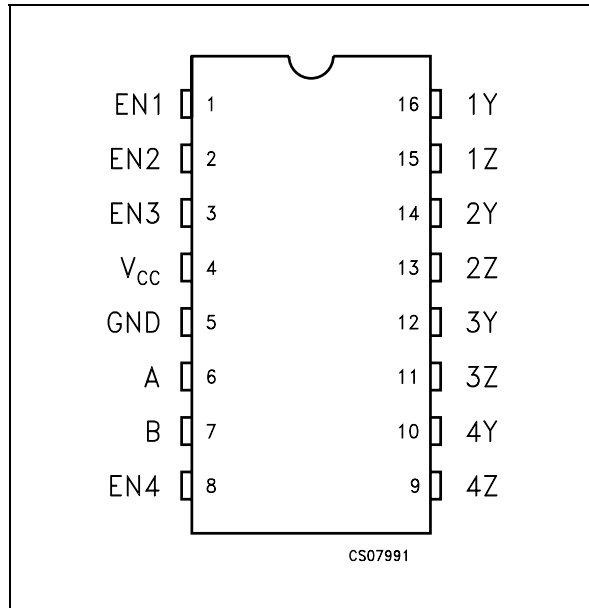
LVDS, as specified in EIA/TIA-644 is a data signaling technique that offers low-power, low noise coupling, and switching speed to transmit data at a speed up to 630Mbps at relatively long distances.

The drivers integrated into the same substrate, along with the low pulse skew of balanced signaling, allow extremely precise timing alignment of the signals repeated from the input. The device allows extremely precise timing alignment of the signal repeated from the input. This is particularly advantageous in distribution or expansion of signals such as clock or serial data stream.

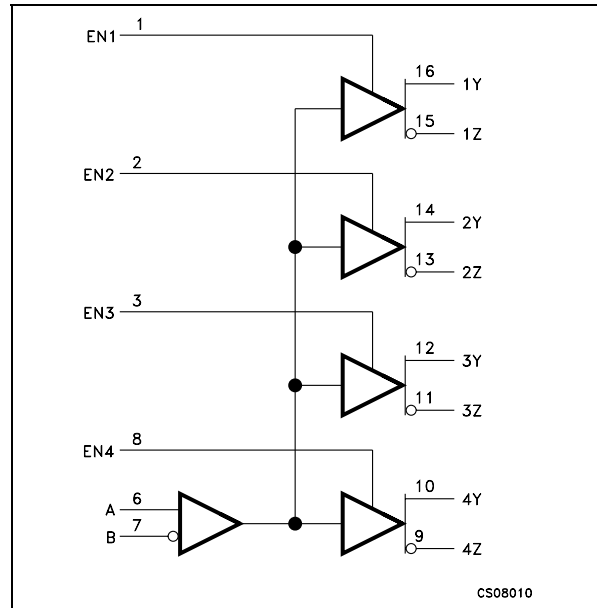
ORDERING CODES

| Type | Temperature Range | Package | Comments |
|--------------|-------------------|-----------------------|-----------------------------------|
| STLVDS104BD | -40 to 85 °C | SO-16 (Tube) | 50parts per tube / 20tube per box |
| STLVDS104BDR | -40 to 85 °C | SO-16 (Tape & Reel) | 2500 parts per reel |
| STLVDS104BTR | -40 to 85 °C | TSSOP16 (Tape & Reel) | 2500 parts per reel |

PIN CONFIGURATION



FUNCTIONAL DIAGRAM



PIN DESCRIPTION

| PIN N° | SYMBOL | NAME AND FUNCTION |
|----------------|-----------------|----------------------|
| 1, 2, 3, 8 | EN1 to EN4 | Enable Driver Inputs |
| 6, 7 | A, B | Receiver Input |
| 9, 11, 13, 15 | 1Z to 4Z | Driver Inputs |
| 10, 12, 14, 16 | 1X to 4X | Driver Inputs |
| 5 | GND | Ground |
| 4 | V _{CC} | Supply Voltage |

FUNCTIONAL TABLE

| INPUT | ENABLES | | OUTPUTS | |
|----------------------------------|---|-----|---------|----|
| | V _{ID} =V _A -V _B | #EN | #Y | #Z |
| X | X | X | Z | Z |
| X | X | L | Z | Z |
| V _{ID} ≥ 100mV | | H | H | L |
| -100mV < V _{ID} < 100mV | | H | ? | ? |
| V _{ID} ≤ -100mV | | H | L | H |

L=Low level, H=High Level, ?=Indeterminate, Z= High Impedance

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------------|------------------------------|---------------|-----------|
| V _{CC} | Supply Voltage (Note 1) | -0.5 to 4 | V |
| V _R | Voltage Range | Enable Inputs | -0.5 to 6 |
| | | A, B, Y or Z | -0.5 to 4 |
| ESD | ESD Protection Voltage (HBM) | Y, Z, to GND | 7 |
| | | All Pins | 2 |
| | | | |
| T _{stg} | Storage Temperature Range | -65 to +150 | °C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Note 1: All voltages except differential I/O bus voltage, are with respect to the network ground terminal.

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|-----------------|---|---------------------|------|---|------|
| V _{CC} | Supply Voltage | 3.0 | 3.3 | 3.6 | V |
| V _{IH} | HIGH Level Input Voltage | 2.0 | | | V |
| V _{IL} | LOW Level Input Voltage | | | 0.8 | V |
| V _{ID} | Magnitude Of Differential Input Voltage | 0.1 | | 3.6 | V |
| V _{IC} | Common Mode Input Voltage | V _{ID} /2 | | 24- V _{ID} /2 V _{CC} -0.8 | V |
| T _A | Operating Temperature Range | -40 | | 85 | °C |

ELECTRICAL CHARACTERISTICS (T_A = -40 to 85°C, and V_{CC} = 3.3V ±10% over recommended operating conditions unless otherwise noted. All typical values are at T_A = 25°C)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------------|---|---|-------|------|-------|------|
| V _{ITH+} | Positive-going Differential Input Voltage Threshold | | | | 100 | mV |
| V _{ITH-} | Negative-going Differential Input Voltage Threshold | | -100 | | | mV |
| V _{OD} | Differential Output Voltage Magnitude | R _L = 100Ω V _{ID} = ±100mV | 247 | 340 | 454 | mV |
| Δ V _{OD} | Change in Differential Output Voltage Magnitude Between Logic State | | -50 | | 50 | mV |
| ΔV _{OC(SS)} | Change in Steady-state Common Mode Output Voltage Between Logic State | | -50 | | 50 | mV |
| V _{OC(SS)} | Steady-state Common Mode Output Voltage | | 1.125 | 1.2 | 1.375 | V |
| V _{OC(PP)} | Peak to Peak Common mode Output Voltage | | | 25 | 150 | mV |
| I _{CC} | Supply Current | Enabled, R _L = 100Ω | | 20 | 30 | mA |
| | | Disabled | | 2.5 | 5 | mA |
| I _I | Input Current (A or B Inputs) | V _I = 0V | -2 | -11 | -20 | μA |
| | | V _I = 2.4V | -1 | -3 | | μA |
| I _{I(OFF)} | Power OFF Input Current | V _{CC} = 1.5V V _I = 2.4V | | 3 | 20 | μA |
| I _{IH} | High Level Input Current | V _{IH} = 2V | | 7 | 20 | μA |
| I _{IL} | Low Level Input Current | V _{IL} = 0.8V | | 3 | 10 | μA |
| I _{OC} | Short Circuit Output Current | V _{O(Y)} or V _{O(Z)} = 0V | | ± 6 | ± 10 | mA |
| | | V _{OD} = 0 | | ± 3 | ± 10 | mA |
| I _{OZ} | High Impedance Output Current | V _O = 0 or 2.4V | | | ± 1 | μA |
| I _{O(OFF)} | Power OFF Output Current | V _{CC} = 1.5V V _O = 2.4V | | | ± 1 | μA |
| C _{IN} | Input Capacitance (A or B Inputs) | V _I = 0.4 sin(4e ^{6πt})+0.5V | | 3 | | pF |
| C _O | Output Capacitance (Y or Z Outputs) | V _I = 0.4 sin(4e ^{6πt})+0.5V, Disabled | | 6 | | pF |

STLVDS104

SWITCHING CHARACTERISTICS ($T_A = -40$ to 85°C , and $V_{CC} = 3.3\text{V}$ unless otherwise noted. All typical values are at $T_A = 25^\circ\text{C}$)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit | |
|--------------|---|---------------------------------------|------|------|------|------|----|
| t_{PLH} | Propagation Delay Time, Low to High Output | $R_L = 100\Omega$ $C_L = 10\text{pF}$ | 2.4 | 3.2 | 4.2 | ns | |
| t_{PHL} | Propagation Delay Time, High to Low Output | | 2.2 | 3.1 | 4.2 | ns | |
| t_r | Differential Output Signal Rise Time | | 0.3 | 0.7 | 1.2 | ns | |
| t_f | Differential Output Signal Fall Time | | 0.3 | 0.7 | 1.2 | ns | |
| $t_{sk(P)}$ | Pulse Skew ($ t_{THL} - t_{TLH} $) | | | 100 | 300 | ps | |
| $t_{sk(O)}$ | Channel-to-channel Output Skew (note1) | | | 50 | 100 | ps | |
| $t_{sk(pp)}$ | Part to part Skew (note2) | | | | 1.5 | ns | |
| t_{PZH} | Propagation Delay Time, High Impedance to High Level Output | | | | 7.2 | 15 | ns |
| t_{PZL} | Propagation Delay Time, High Impedance to Low Level Output | | | | 8.4 | 15 | ns |
| t_{PHZ} | Propagation Delay Time, High Level to High Impedance Output | | | | 3.6 | 15 | ns |
| t_{PLZ} | Propagation Delay Time, Low Level to High Impedance Output | | | 6 | 15 | ns | |

Note 1: $t_{sk(O)}$ is the time difference between the t_{PLH} or t_{PHL} of all drivers of a single device with all their inputs connected together.

Note 2: $t_{sk(pp)}$ is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with the same supply voltages, at the same temperature, and have identical packages and test circuit.

TYPICAL PERFORMANCE CHARACTERISTICS (unless otherwise specified $T_j = 25^\circ\text{C}$)

Figure 1 : Output Current vs Output High Voltage

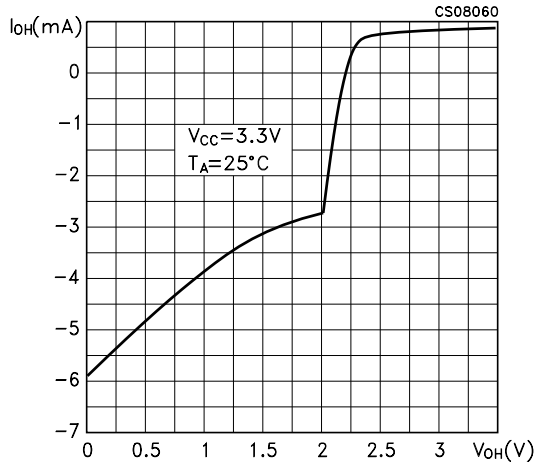


Figure 3 : High to Low Propagation Delay Time

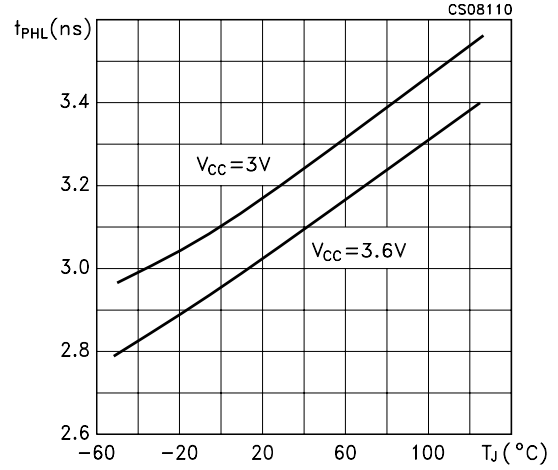


Figure 2 : Output Current vs Output Low Voltage

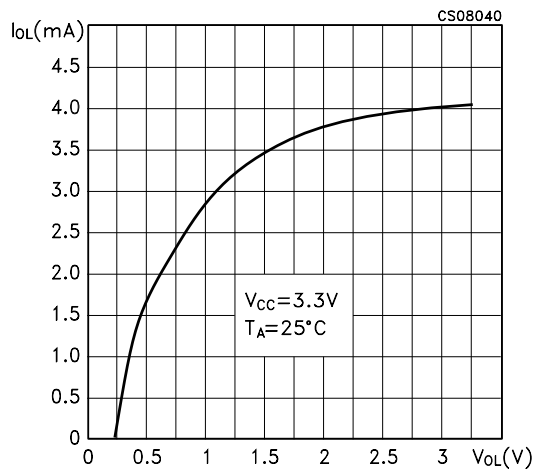
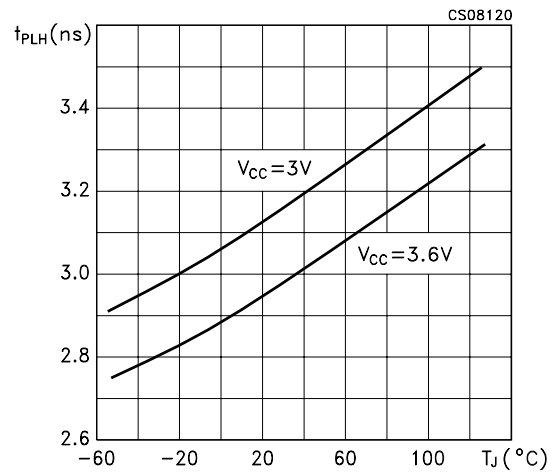
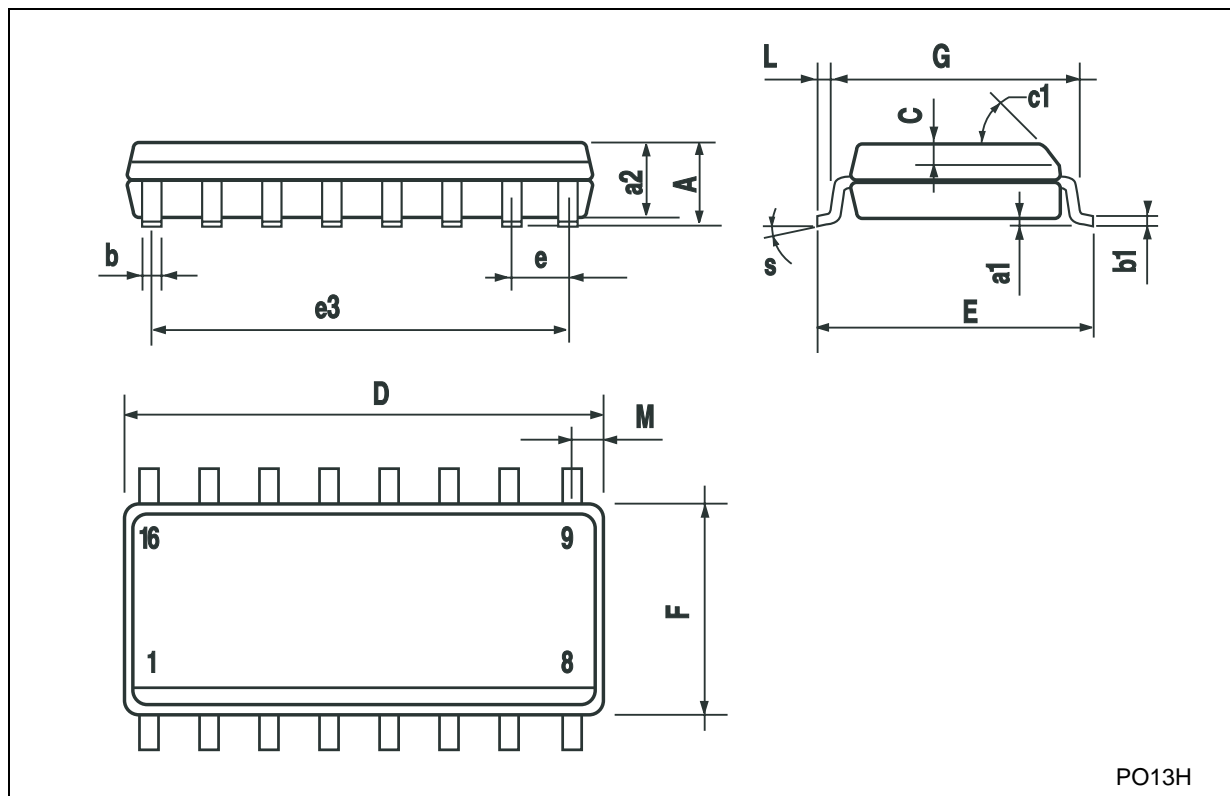


Figure 4 : Low to High Propagation Delay Time



SO-16 MECHANICAL DATA

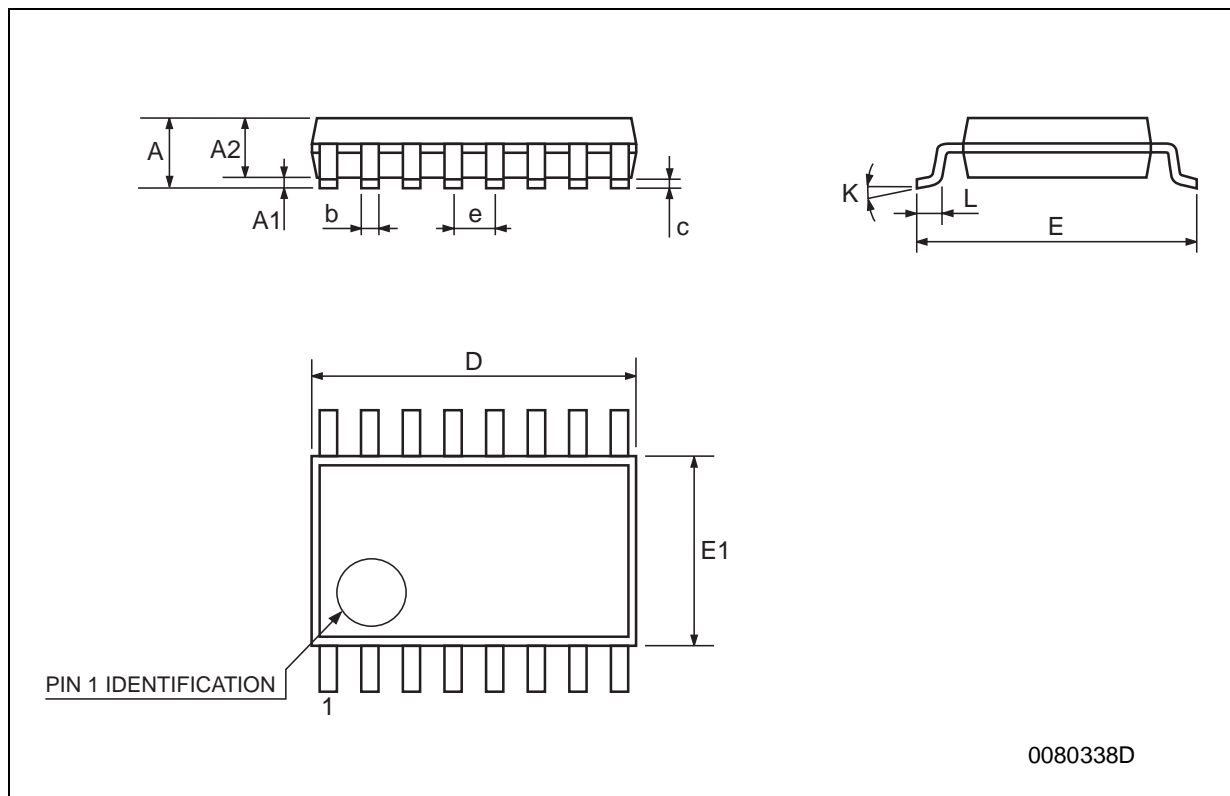
| DIM. | mm. | | | inch | | |
|------|------------|------|------|----------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.004 | | 0.008 |
| a2 | | | 1.65 | | | 0.064 |
| b | 0.35 | | 0.46 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.019 | |
| c1 | 45° (typ.) | | | | | |
| D | 9.8 | | 10 | 0.385 | | 0.393 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 8.89 | | | 0.350 | |
| F | 3.8 | | 4.0 | 0.149 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.208 |
| L | 0.5 | | 1.27 | 0.019 | | 0.050 |
| M | | | 0.62 | | | 0.024 |
| S | 8 | | | ° (max.) | | |



PO13H

TSSOP16 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|----------|------|-------|------------|--------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.2 | | | 0.047 |
| A1 | 0.05 | | 0.15 | 0.002 | 0.004 | 0.006 |
| A2 | 0.8 | 1 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | | 0.30 | 0.007 | | 0.012 |
| c | 0.09 | | 0.20 | 0.004 | | 0.0079 |
| D | 4.9 | 5 | 5.1 | 0.193 | 0.197 | 0.201 |
| E | 6.2 | 6.4 | 6.6 | 0.244 | 0.252 | 0.260 |
| E1 | 4.3 | 4.4 | 4.48 | 0.169 | 0.173 | 0.176 |
| e | | 0.65 BSC | | | 0.0256 BSC | |
| K | 0° | | 8° | 0° | | 8° |
| L | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |



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