

T6A41

COLUMN DRIVER LSI FOR A DOT MATRIX LCD

The T6A41 is a column driver with 64-output channels for a medium- or small-scale dot matrix LCD.

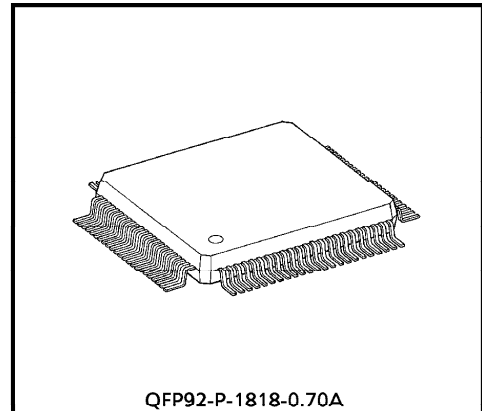
The T6A41 realizes low power LCD systems using the CMOS Si-Gate process.

The T6A41 has two bi-directional data Input/Output pins and three types of data flow (pin program) :

- ① O₁→O₆₄, ② O₆₄→O₁, ③ O₁→O₃₂, O₆₄→O₃₃.

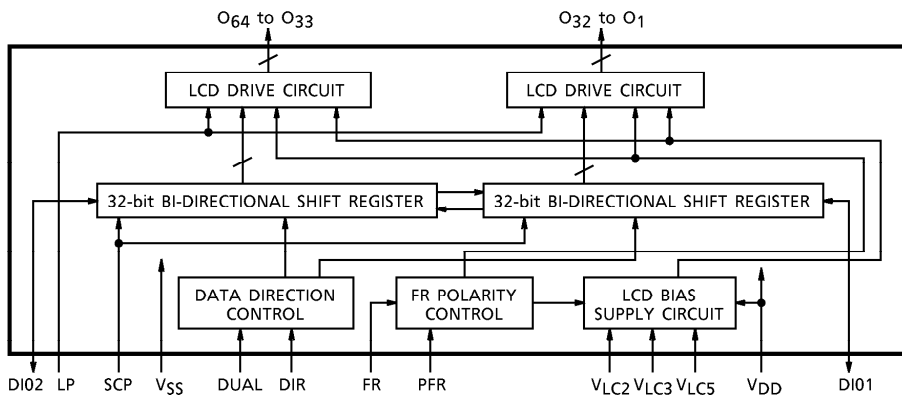
FEATURES

- 64-output column driver
- Three types of data flow (bi-directional) ;
 - ① O₁→O₆₄
 - ② O₆₄→O₁
 - ③ O₁→O₃₂, O₆₄→O₃₃
- High speed operation
- Low power consumption
- Power supply : 5V ± 10%
- 92-pin plastic flat package



Weight: 1.4g (typ.)

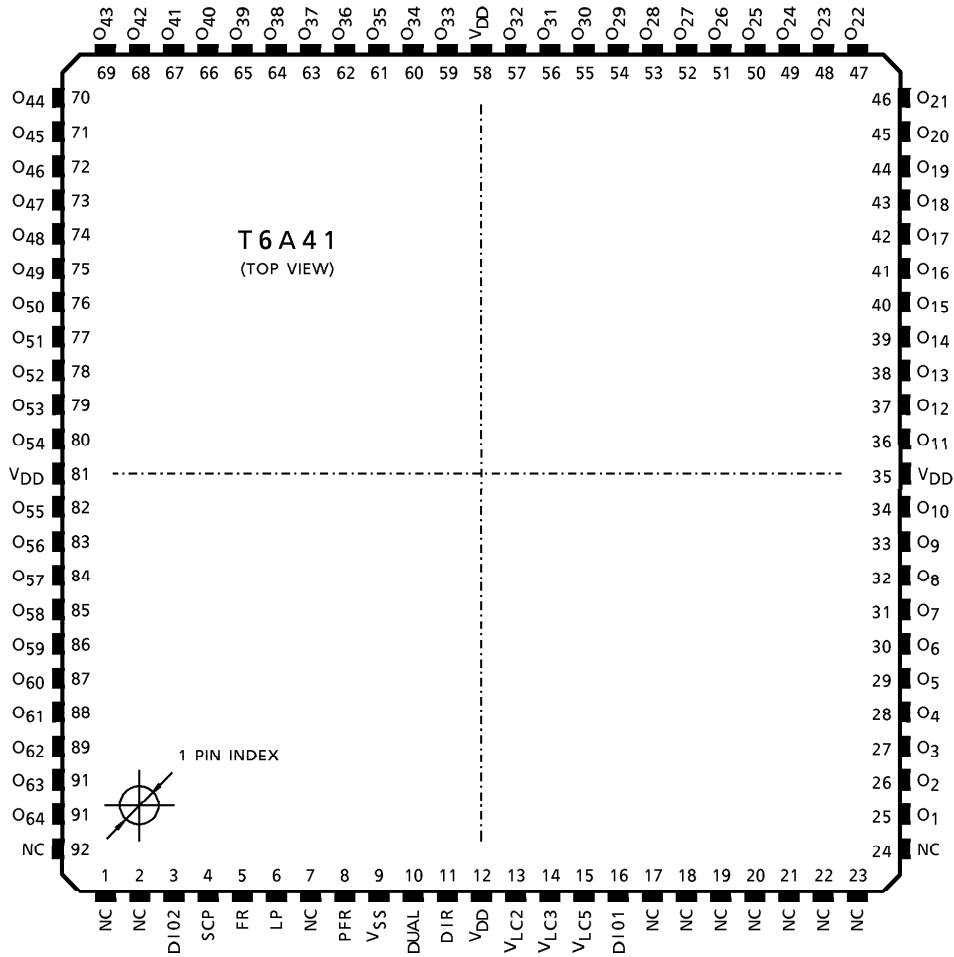
BLOCK DIAGRAM



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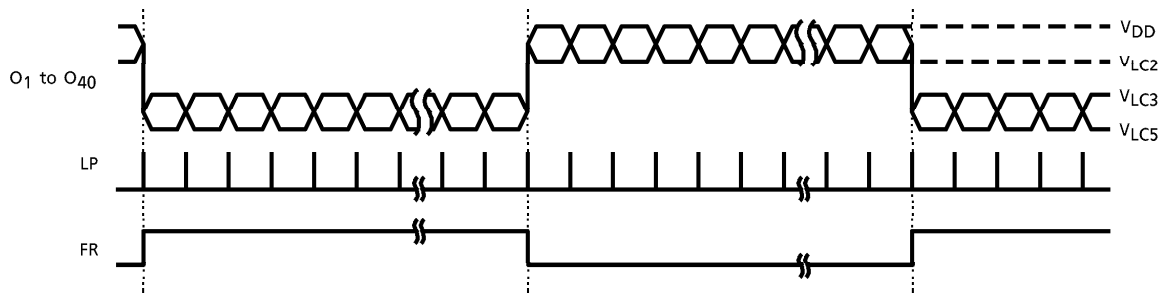
PIN ASSIGNMENT



PIN FUNCTIONS

| PIN NAME | I/O | FUNCTIONS | LEVEL | | | | | |
|-----------------------------------|--------|---|-------------------------------------|---|-----|------|------------|---------------------------------|
| O ₁ to O ₆₄ | Output | LCD drive signal output | V _{DD} to V _{LC5} | | | | | |
| DIO1, DIO2 | I/O | Bi-directional data input and output | V _{DD} to V _{SS} | | | | | |
| SCP | Input | (Shift Clock Pulse) Shift clock pulse input | | | | | | |
| FR | Input | (Frame) Frame signal input | | | | | | |
| LP | Input | (Latch Pulse) Latch pulse signal input | | | | | | |
| DUAL | Input | (Dual Mode) Selects dual mode or single mode data flow. | | DUAL | DIR | DIO1 | DIO2 | DATA DIRECTION |
| | | | | L | L | OUT | IN | O ₆₄ →O ₁ |
| | | | | L | H | IN | OUT | O ₁ →O ₆₄ |
| | | | H | L | — | — | Do not use | |
| H | H | IN | IN | O ₁ →O ₃₂ , O ₆₄ →O ₃₃ | | | | |
| DIR | Input | (Direction) Selects input data flow direction. | | | | | | |
| PFR | Input | (Polarity of Flame) Usually connected to V _{SS} | | | | | | |
| V _{LC2} | — | Power supply for LCD drive | — | | | | | |
| V _{LC3} | — | Power supply for LCD drive | | | | | | |
| V _{LC5} | — | Power supply for LCD drive | | | | | | |
| V _{DD} | — | Power supply (5V) | | | | | | |
| V _{SS} | — | Power supply (0V) | | | | | | |

TIMING DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| ITEM | SYMBOL | RATING | UNIT |
|-----------------------|--|--------------------------------|------|
| Supply Voltage (1) | V _{DD} (Note 1) | - 0.3 to 7.0 | V |
| Supply Voltage (2) | V _{LC2} , V _{LC3} , V _{LC5} (Note1, 2) | - 0.3 to 7.0 | V |
| Input Voltage | V _{IN} (Note 1) | - 0.3 to V _{DD} + 0.3 | V |
| Operating Temperature | T _{opr} | - 20 to 75 | °C |
| Storage Temperature | T _{stg} | - 55 to 125 | °C |

(Note 1) Referenced to V_{SS} = 0V

(Note 2) Ensure that the following condition is always maintained.

$$V_{DD} \geq V_{LC2} \geq V_{LC3} \geq V_{LC5}$$

ELECTRICAL CHARACTERISTICS

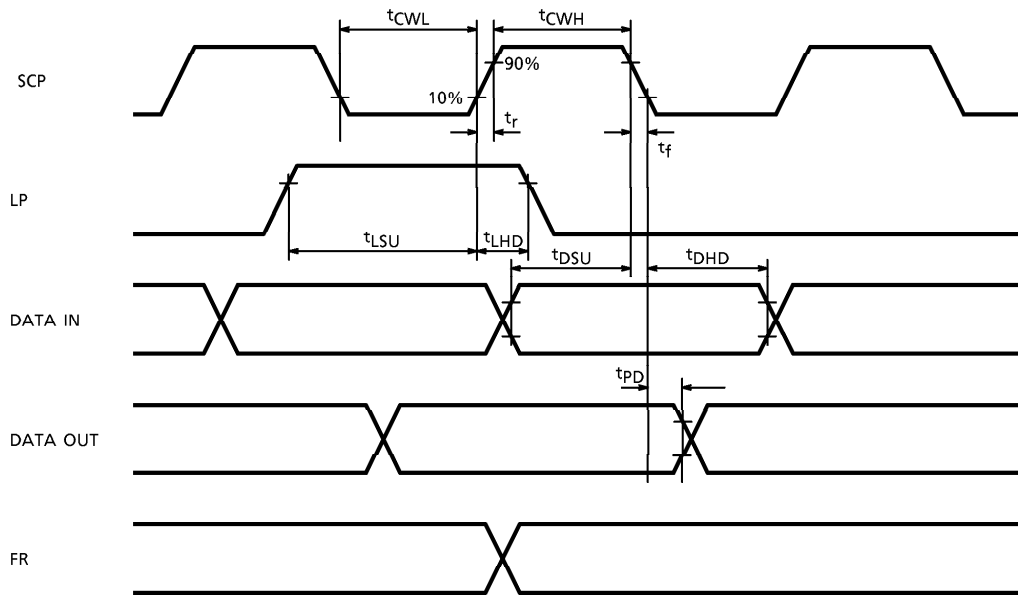
DC CHARACTERISTICS

TEST CONDITIONS (Unless otherwise noted, V_{SS} = 0V, V_{DD} = 5.0V ± 10%, V_{LC5} = 0V, Ta = - 20 to 75°C)

| ITEM | SYMBOL | TEST CIRCUIT | TEST CONDITIONS | MIN | TYP. | MAX | UNIT | PIN NAME | |
|-----------------------|------------------|-----------------|--|---------------------------|------|--------------------------|------|-----------------------------------|-----------------|
| Operating Voltage (1) | — | — | — | 4.5 | 5.0 | 5.5 | V | V _{DD} | |
| Operating Voltage (2) | — | — | — | 0 | — | V _{DD} - 3.0 | V | V _{LC5} | |
| Input Voltage | H Level | V _{IH} | — | V _{DD} - 1.0 | — | V _{DD} | V | (*) | |
| | L Level | V _{IL} | — | 0 | — | 1.0 | V | (*) | |
| Output Voltage | H Level | V _{OH} | I _{OH} = - 0.4mA | V _{DD} - 0.4 | — | V _{DD} | V | DIO1, DIO2 | |
| | L Level | V _{OL} | I _{OH} = 0.4mA | 0 | — | 0.4 | V | DIO1, DIO2 | |
| Output Resistance | R _{COL} | — | I _d = ± 50μA | — | — | 30 | kΩ | O ₁ to O ₆₄ | |
| Operating Frequency | f _{scp} | — | Ta = - 20 to 75°C | — | — | 400 | kHz | SCP | |
| Current Consumption | I _{SS} | — | V _{DD} = 5.0V V _{LC2} = 3.0V V _{LC3} = 2.0V V _{LC5} = 0.0V f _{FR} = 39Hz f _{scp} = 250kHz O ₁ to O ₈₀ : No Load | Binary Data Input | — | — | 1.0 | mA | V _{SS} |
| | | | | Input Data : LOW Constant | — | — | 0.4 | mA | |

(*) DIO1, DIO2, SCP, FR, LP, PFR, DUAL, DIR

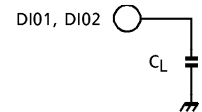
AC CHARACTERISTICS



TEST CONDITIONS ($V_{SS} = 0V$, $V_{DD} = 5V \pm 10\%$, $V_{LC5} = 0V$, $T_a = -20$ to $75^\circ C$)

| ITEM | SYMBOL | MIN | MAX | UNIT |
|------------------------|--------------------|-----|-----|------|
| Operating Frequency | f_{scp} | — | 400 | kHz |
| SCP Pulse Width | t_{CWH}, t_{CWL} | 800 | — | ns |
| SCP Rise / Fall Time | t_r, t_f | — | 200 | ns |
| LP Set-up Time | t_{LSU} | 500 | — | ns |
| LP Hold Time | t_{LHD} | — | 10 | ns |
| Data Set-up Time | t_{DSU} | 300 | — | ns |
| Data Hold Time | t_{DHD} | 300 | — | ns |
| Output Data Delay Time | t_{PD} (Note) | — | 500 | ns |

LOAD CIRCUIT



$C_L = 50pF$
(including wiring capacitance)

(Note) With load circuit connected

APPLICATION CIRCUIT

