

# FL tube driver

## BU2879AK

The BU2879AK is a driver IC for fluorescent displays. It is equipped with 26 high-voltage withstand outputs and can display from 11 segments of 15 characters to 16 segments of 8 characters. This IC is equipped with a key scanning function, and general-purpose input pins, and is ideal for front panels in VTRs and other equipment. A serial interface allows functions to be controlled from a microcomputer.

### ●Applications

VCRs

### ●Features

- 1) High withstanding voltage output.
- 2) Display modes: 11S × 15G ~ 16S × 8G.
- 3) Variable display luminance (7 steps).
- 4) 3-wire serial interface.
- 5) Key scanning function (6 × 4).
- 6) Internal pull-down resistance (high voltage withstand output).
- 7) QFP 44 package.

### ●Absolute maximum ratings (Ta = 25°C, V<sub>SS</sub> = 0V)

Parameter	Symbol	Limits	Unit
Applied voltage 1	V <sub>DD</sub>	- 0.3 ~ + 7.0	V
Applied voltage 2	V <sub>EE</sub>	V <sub>DD</sub> + 0.3 ~ V <sub>DD</sub> - 40	V
Input voltage	V <sub>IN</sub>	- 0.3 ~ V <sub>DD</sub> + 0.3	V
Power dissipation	P <sub>d</sub>	850*	mW
Operating temperature	T <sub>opr</sub>	- 25 ~ + 75	°C
Storage temperature	T <sub>stg</sub>	- 55 ~ + 125	°C

Note) Operation is not guaranteed at these values.

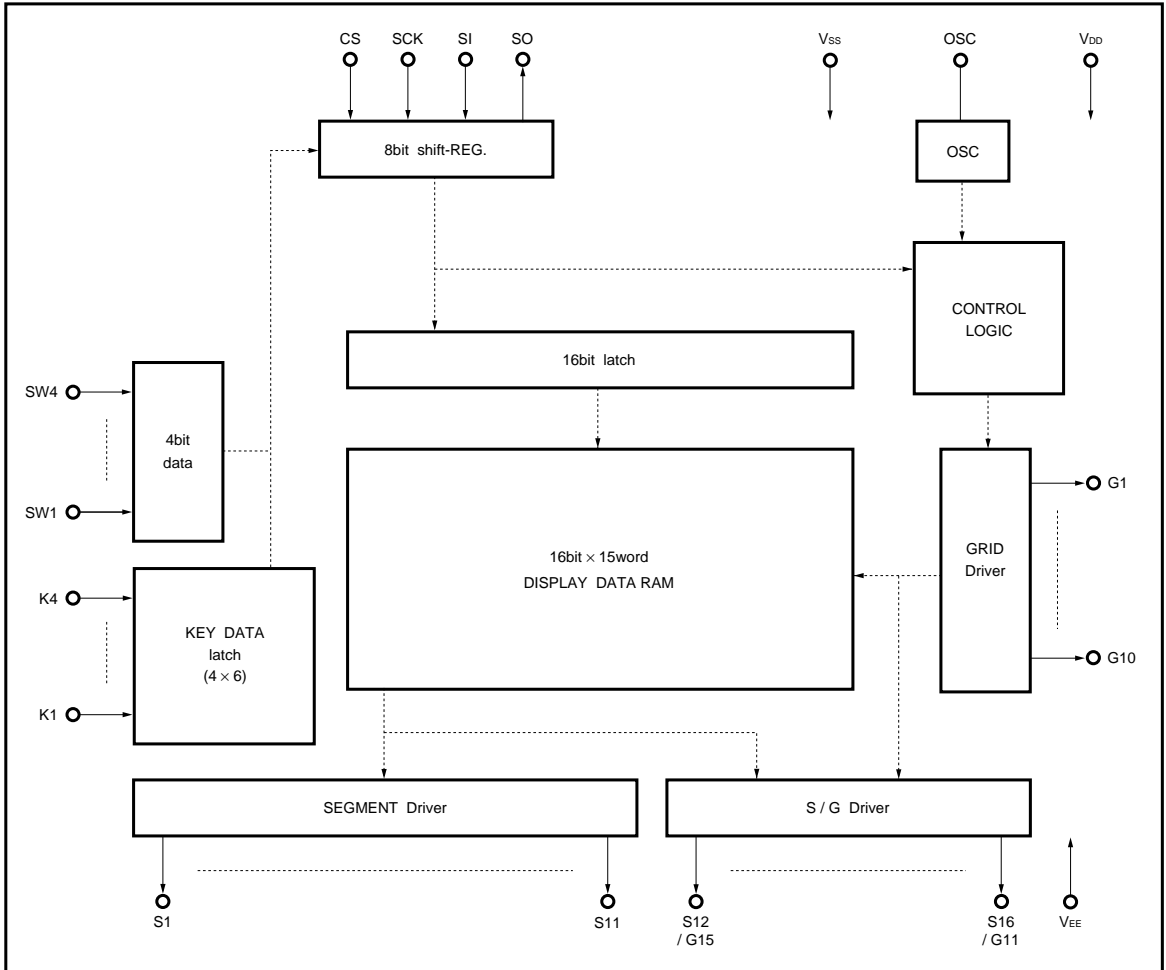
Note) Power dissipation is reduced by 8.5mW for each increase in Ta of 1°C over 25°C.

\* When mounted on a 70 × 70 × 1.6mm glass epoxy board

### ●Recommended operating conditions (Ta = 25°C, V<sub>SS</sub> = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating power supply voltage 1	V <sub>DD</sub>	4.5	5.0	5.5	V
Operating power supply voltage 2	V <sub>EE</sub>	V <sub>DD</sub> - 37	V <sub>DD</sub> - 35	V <sub>DD</sub> - 0	V

●Block diagram



## ●Pins descriptions

Pin No.	Pin	Name	I / O	Function
14, 38	V <sub>DD</sub>	Power supply pin 1	Input	Connected to system power supply.
44	OSC	Oscillation pin	Input / output	Capacitor connection pin for oscillation
7, 43	V <sub>SS</sub>	Ground pin	Input	Connected to system ground.
6	SI	Serial data input	Input	Serial data input starting from MSB
5	SO	Serial data output	Output	Serial data output starting from MSB; output is Nch open drain.
8	SCK	Serial clock input	Input	Serial data read at rising edge.
9	CS	Serial chip select	Input	Serial initialization when LOW, valid at HIGH.
15 ~ 25	S1 ~ S11	High-voltage withstand output pin for segment	Output	Output pin for segment; output is Pch open drain + pull-down resistance.
27	V <sub>EE</sub>	Power supply pin 2	Input	Pull-down resistance connection for FLP driver output.
42 ~ 39, 37 ~ 32	G1 ~ G10	High-voltage withstand output pin for grid	Output	Output pin for grid; output is Pch open drain + pull-down resistance.
26, 28 ~ 31	S12 / G15 ↓ S16 / G11	High-voltage withstand output pin for segment / grid	Output	Used to switch output between segment and grid; output is Pch open drain + pull-down resistance.
10 ~ 13	K1 ~ K4	Key data input pin	Input	Data input pin for key scanning.
1 ~ 4	SW1 ~ SW4	General-purpose input pin	Input	General-purpose input pin; input data can be transmitted serially to microcomputer.

●Electrical characteristics (unless otherwise noted, Ta = 25°C, V<sub>DD</sub> = 5V, V<sub>SS</sub> = 0V, V<sub>DD</sub> - V<sub>EE</sub> = 35V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Supply current	I <sub>DD</sub>	—	—	5	mA	44-pin attachment, at 1000pF oscillation	Fig.1
Input threshold voltage	V <sub>IN</sub>	1.5	—	3.5	V	Pins 1 to 4, 6, 8, 9 to 13	Fig.4
Input current	I <sub>IN</sub>	—	—	10	μA	Pins 1 to 4, 6, 8, 9 to 13	Fig.2
OSC oscillation frequency	F <sub>OSC</sub>	130	200	300	kHz	44-pin attachment, at 1000pF oscillation	Fig.3
Segment output current	I <sub>oseg</sub>	6	—	—	mA	Pins 15 to 26, 28 to 31, V <sub>O</sub> = V <sub>DD</sub> - 2V*	Fig.2
Grid output current	I <sub>ogrd</sub>	18	—	—	mA	Pins 26, 28 to 37, 39 to 42, V <sub>O</sub> = V <sub>DD</sub> - 2V*	Fig.2
Leakage current when OFF	I <sub>OFF</sub>	—	—	10	μA	Pins 15 to 26, 28 to 37, V <sub>O</sub> = V <sub>DD</sub> - V <sub>EE</sub>	Fig.2
Output pull-down resistance	R <sub>D</sub>	35	70	140	kΩ	Pins 15 to 26, 28 to 37	Fig.2
Maximum operating frequency	F <sub>MAX</sub>	—	—	1	MHz	Design guarantee value	Fig.3

(Serial transmission)

Input data hold	T <sub>SH</sub>	0.16	—	—	μs	—	—
Input data setup	T <sub>SS</sub>	0.16	—	—	μs	—	—
Output data delay	T <sub>D</sub>	—	—	0.3	μs	—	—
Input clock cycle	T <sub>SCYC</sub>	0.5	—	—	μs	—	—
Input clock "H" width	T <sub>SW</sub>	40	—	60	%	At minimum input clock cycle	—

\* For the high voltage withstand output pins for the segment / grid of pins 26 and 28 to 31, when segment output is specified, segment output current is output, and when grid output is specified, grid current is output.

●Measurement circuits

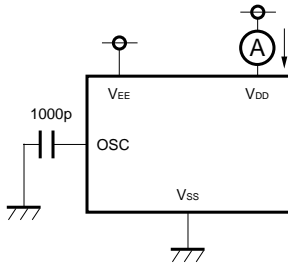


Fig.1

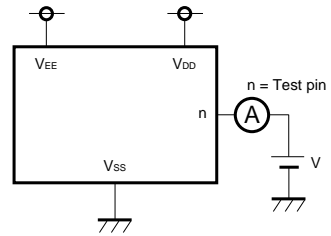


Fig.2

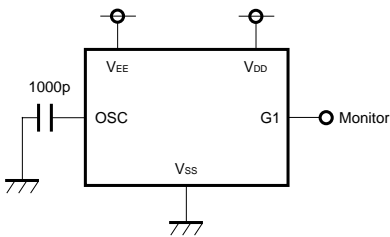


Fig.3

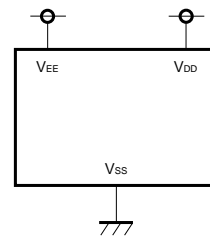


Fig.4

●Electrical characteristic curves

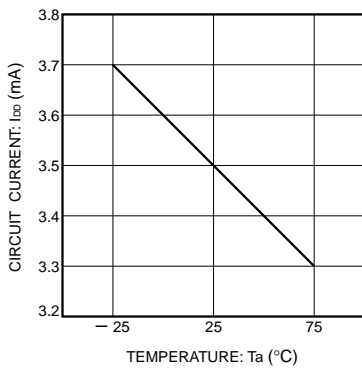


Fig. 5 Supply current temperature characteristics

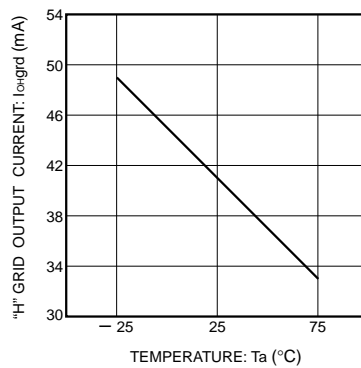


Fig. 6 "H" grid output current temperature characteristics

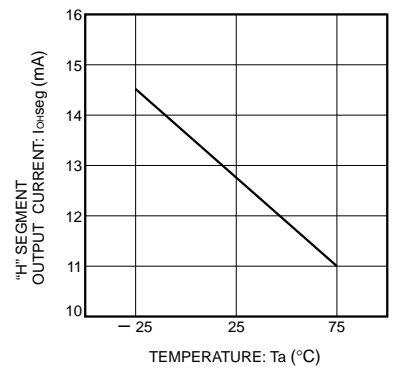


Fig.7 "H" segment output current temperature characteristics

●External dimensions (Units: mm)

