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_{SS} = 0V)

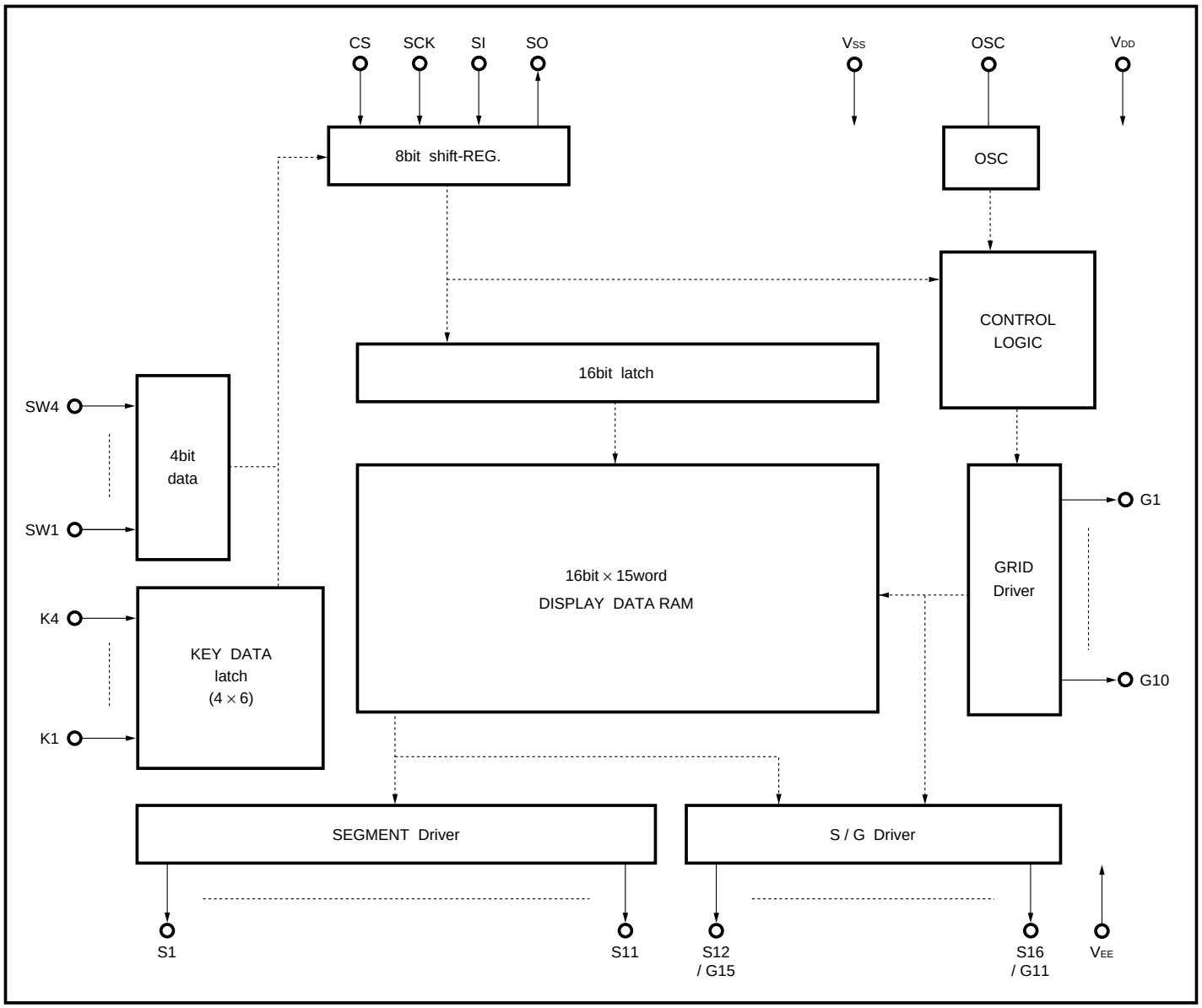
Parameter	Symbol	Limits	Unit
Applied voltage 1	V_{DD}	– 0.3 ~ + 7.0	V
Applied voltage 2	V_{EE}	V_{DD} + 0.3 ~ V_{DD} – 40	V
Input voltage	V_{IN}	– 0.3 ~ V_{DD} + 0.3	V
Power dissipation	Pd	850*	mW
Operating temperature	Topr	– 25 ~ + 75	°C
Storage temperature	Tstg	– 55 ~ + 125	°C

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_{SS} = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating power supply voltage 1	V_{DD}	4.5	5.0	5.5	V
Operating power supply voltage 2	V_{EE}	V_{DD} – 37	V_{DD} – 35	V_{DD} – 0	V

●Block diagram



●Pins descriptions

Pin No.	Pin	Name	I / O	Function
14, 38	V_{DD}	Power supply pin 1	Input	Connected to system power supply.
44	OSC	Oscillation pin	Input / output	Capacitor connection pin for oscillation
7, 43	V_{SS}	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_{EE}	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_{DD} = 5V, V_{SS} = 0V, V_{DD} – V_{EE} = 35V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement circuit
Supply current	I_{DD}	—	—	5	mA	44-pin attachment, at 1000pF oscillation	Fig.1
Input threshold voltage	V_{IN}	1.5	—	3.5	V	Pins 1 to 4, 6, 8, 9 to 13	Fig.4
Input current	I_{IN}	—	—	10	µA	Pins 1 to 4, 6, 8, 9 to 13	Fig.2
OSC oscillation frequency	F_{OSC}	130	200	300	kHz	44-pin attachment, at 1000pF oscillation	Fig.3
Segment output current	Ioseg	6	—	—	mA	Pins 15 to 26, 28 to 31, $V_O = V_{DD} – 2V$*	Fig.2
Grid output current	Iogrd	18	—	—	mA	Pins 26, 28 to 37, 39 to 42, $V_O = V_{DD} – 2V$*	Fig.2
Leakage current when OFF	I_{OFF}	—	—	10	µA	Pins 15 to 26, 28 to 37, $V_O = V_{DD} – V_{EE}$	Fig.2
Output pull-down resistance	R_D	35	70	140	kΩ	Pins 15 to 26, 28 to 37	Fig.2
Maximum operating frequency	F_{MAX}	—	—	1	MHz	Design guarantee value	Fig.3
〈Serial transmission〉							
Input data hold	T_{SH}	0.16	—	—	µs	—	—
Input data setup	T_{SS}	0.16	—	—	µs	—	—
Output data delay	T_D	—	—	0.3	µs	—	—
Input clock cycle	T_{SCYC}	0.5	—	—	µs	—	—
Input clock "H" width	T_{SW}	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

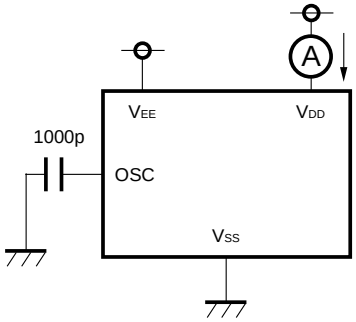


Fig.1

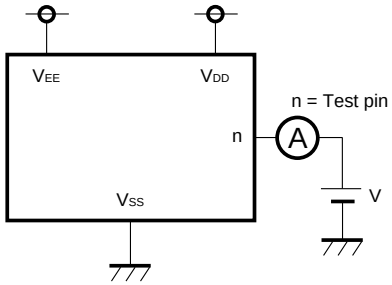


Fig.2

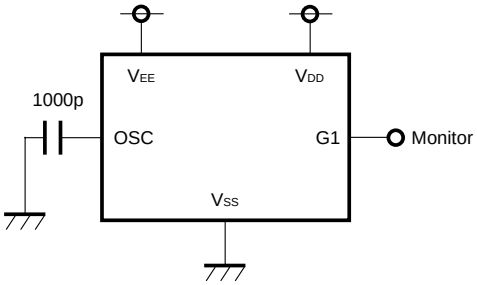


Fig.3

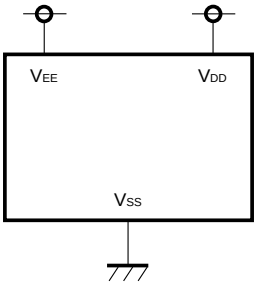


Fig.4

●Electrical characteristic curves

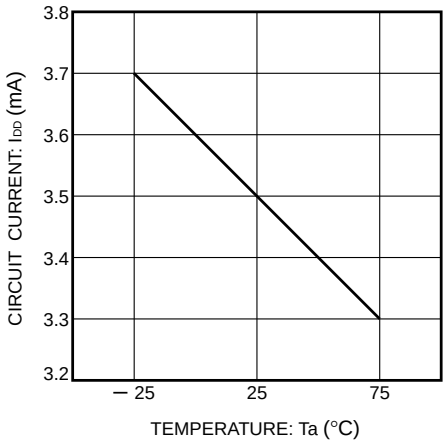


Fig. 5 Supply current temperature characteristics

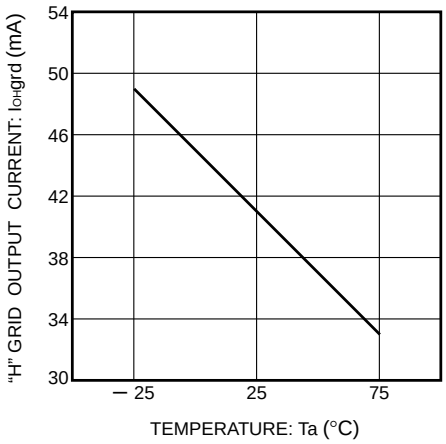


Fig. 6 "H" grid output current temperature characteristics

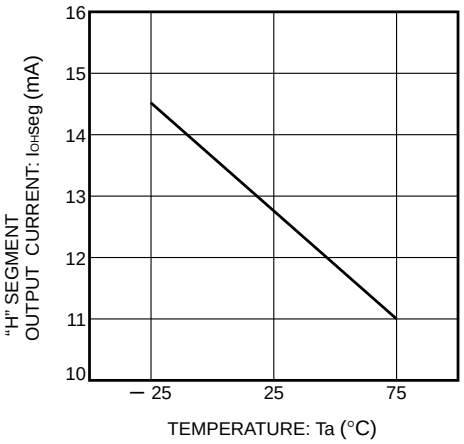
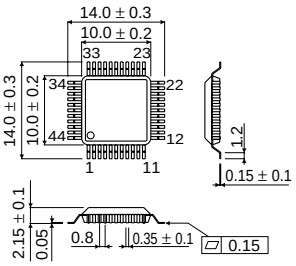


Fig.7 "H" segment output current temperature characteristics

●External dimensions (Units: mm)



QFP44

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