FL tube driver
BU2872AK

The BU2872AK is a driver IC for the FL display unit. It has a total of 22 high withstanding voltage output pins, and supports displays ranging from 11-segment 11-character displays to 16-segment 4-character displays. A key scan function, LED drive output, and a general-purpose input pin make this IC ideal for use in the front panels of VTRs and other equipment. A serial interface enables control of all functions through a microcomputer.
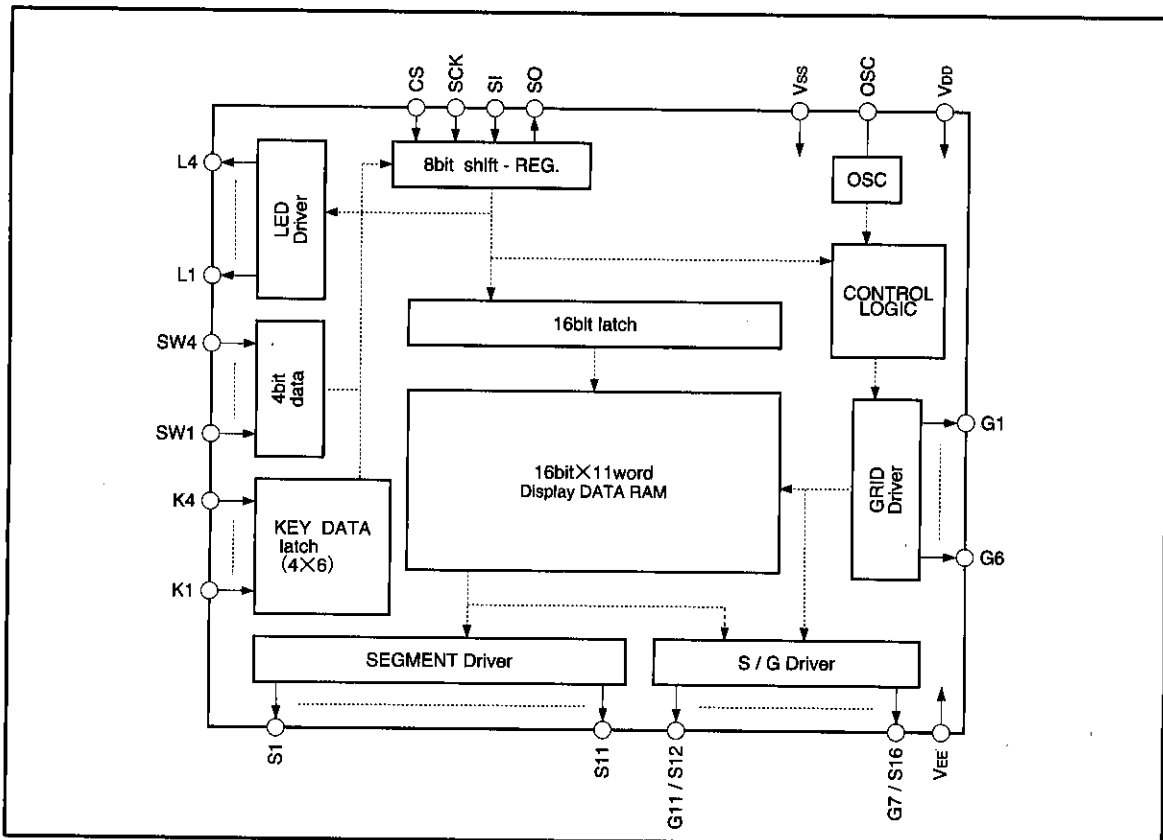
●Application
VTRs

●Features
1) High withstanding voltage output.
2) Display modes : 11S × 11G ～ 16S × 4G
3) Variable display luminance. (in 7 steps)
4) 3-wire serial interface.
5) Key scan function. (6 × 4)
6) Built-in pull-down resistance. (high withstanding voltage output)
7) Package : 44-pin QFP.

●Block diagram

ROHM

● Pin descriptions

Pin	Name	Pin No.	I/O	Function
V$_{DD}$	Power supply pin 1	14, 38	I	Connected to the power supply of the system
OSC	Oscillation pin	44	I/O	Connected to the oscillation capacitor
V$_{SS}$	GND pin	7, 43	I	Connected to the ground of the system
SI	Serial data input	6	I	Serial data input starting from MSB
SO	Serial data output	5	O	Serial data output starting from MSB
SCK	Serial clock input	8	I	Serial data read at rising edge.
CS	Serial chip select	9	I	Serial initialization at "L", effective at "H"
S1~S11	High withstanding voltage output pin for segment	15~25	O	Output pin for segment Output: Pch open・drain + pull-down resistance
V$_{EE}$	Power supply pin 2	27	I	Pull-down resistance connection for FLP driver
G1~G6	High withstanding voltage output pin for grid	37~32	O	Output pin for grid Output: Pch open・drain + pull-down resistance
S12 / G11~S16 / G7	High withstanding voltage output pin for segment/grid	26, 28~31	O	Segment/grid output selectable pin Output: Pch open・drain + pull-down resistance
L1~L4	Output pin for LED	42~39	O	Output pin for LED; output is CMOS output
K1~K4	Key data input pin	10~13	I	Data input pin for key scanning
SW1~SW4	General-purpose input pin	1~4	I	General-purpose input pin Input data sent to microcomputer in serial format

● Absolute maximum ratings (Ta=25℃, Vss=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$_{DD}$−35	V
Input voltage	V$_{IN}$	−0.3~V$_{DD}$+0.3	V
Power dissipation	Pd	850*1	mW
Operating temperature	Topr	−25~75	℃
Storage temperature	Tstg	−55~125	℃

* Operation is not guaranteed at these values.

*1 Effective when the product is mounted on a 70 mm x 70 mm x 1.6 mm glass epoxy PCB
   Power should be reduced by 8.5 mW for each 1°C at temperatures of Ta=25°C or higher.

● Recommended operating conditions (Ta=25℃, Vss=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$_{DD}$−32	V$_{DD}$−30	V$_{DD}$−0	V

● Electrical characteristics (unless otherwise noted, Ta=25℃, VDD=5V, VSS=0V, VDD-VEE=30V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Circuit current	IDD	—	—	5	mA	44-pin external 1000 pF, when oscillated	Fig.1
Input threshold voltage	VIN	1.5	—	3.5	V	1~4, 6, 8, 9~13pin	Fig.5
Input current	IIN	—	—	10	μA	1~4, 6, 8, 9~13pin	Fig.2
Oscillation frequency	FOSC	130	200	300	kHz	44-pin external 1000 pF	Fig.4
Segment output current	IOseg	7	—	—	mA	15~26, 28~31pin Vo=VDD−2V *2	Fig.2
Grid output current	IOgrd	20	—	—	mA	26, 28~37pin Vo=VDD−2V *2	Fig.2
OFF leakage current	IOFF	—	—	10	μA	15~26, 28~37pin Vo=VDD−VEE	Fig.2
Output pull-down resistance	RD	15	31	60	kΩ	15~26, 28~37pin	Fig.2
LED output "H" voltage	VOH	4.0	—	—	V	39~42pin Io=1mA	Fig.3
LED output "L" voltage	VOL	—	—	1.0	V	39~42pin Io=−10mA	Fig.3
〈Serial transfer〉							
Input data hold	TSH	0.16	—	—	μS		—
Input data setup	TSS	0.16	—	—	μS		—
Output data delay	TD	—	—	0.3	μS		—
Input clock cycle	TSCYC	0.5	—	—	μS		—
Input clock "H" width	T	40	—	60	%	Input clock cycle at minimum value	—

*2 Each of the high withstanding voltage output pins, pins 26 and 28 to 31, outputs the segment output current when set to the segment output and
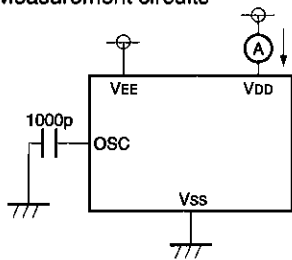 qthe grid current when set to the grid output.
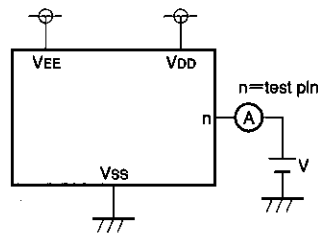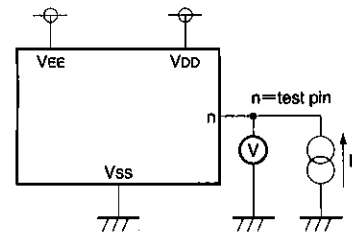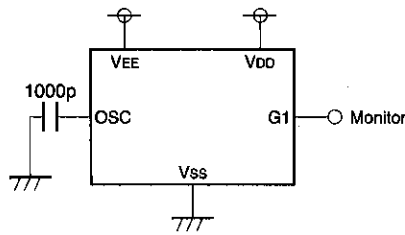
● Measurement circuits
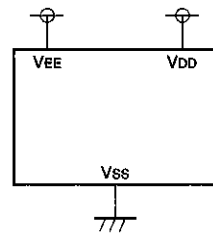

Fig.1

Fig.2

Fig.3

Fig.4

Fig.5

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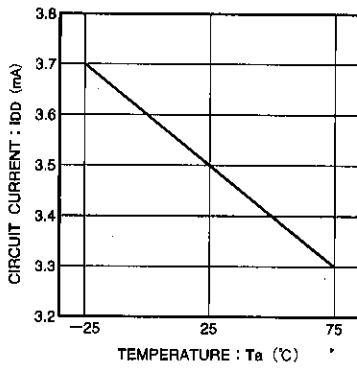●Electrical characteristic curves

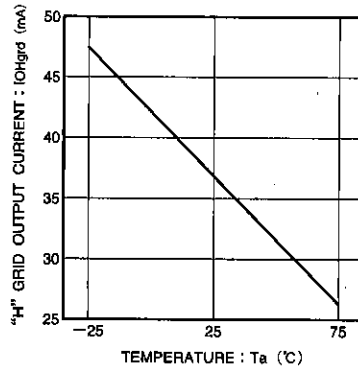Fig.6 Circuit current temperature
characteristic

Fig.7 "H" grid output current
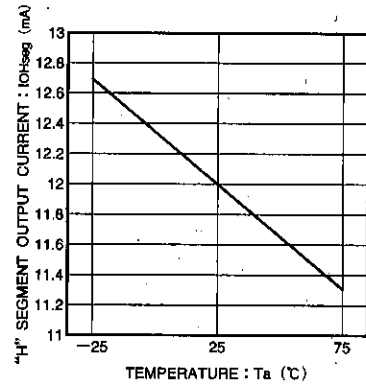temperature characteristic

Fig.8 "H" segment output current
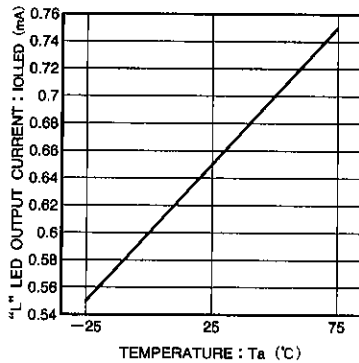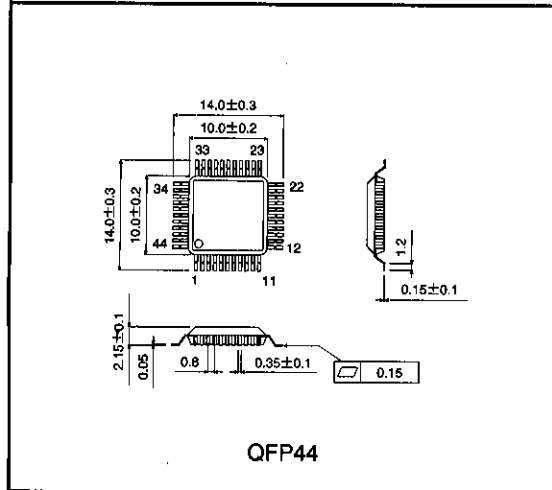temperature characteristic

Fig. 9 "L" LED output current
temperature characteristic

●External dimensions (Units: mm)

QFP44

FL drivers

Notes

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