On-screen display for VCRs
BU2875/BU2875F/BU2857/BU2857F

The BU2875, BU2875F, BU2857 and BU2857F are character generator ICs for VCRs and televisions. The display RAM can store is 12 lines×24 characters, and the on-chip character data ROM can store either 127 or 255 different characters. The characters are displayed in a 12×18 bit matrix, with no space between characters, so two or more characters can be joined to form icons or patterns.

●Applications
VCRs

●Features
1)Compatible with NTSC, PAL, PAL-M, and PAL-N. A non-interlace mode is also provided.
2)Compatible with composite and S-VHS.
3)127 character types (BU2875 and BU2875F) or 255 character types (BU2857 and BU2857F).
4)Color can be specified for each character. Reverse video display, blinking display, and "aluminum option" can be selected.
5)Built-in sync-tip clamp circuit.
6)Built-in synchronization decision circuit.

●Absolute maximum ratings (Ta=25℃)

Parameter		Symbol	Limits	Unit
Power supply voltage		Vcc	−0.3~7.0	V
Power dissipation	BU2875/BU2857	Pd	700 (DIP28)*1	mW
	BU2875F/BU2857F		550 (SOP28)*2	
Operating temperature		Topr	−20~75	℃
Storage temperature		Tstg	−50~150	℃
Pin voltages		—	−0.3~Vcc+0.3	V

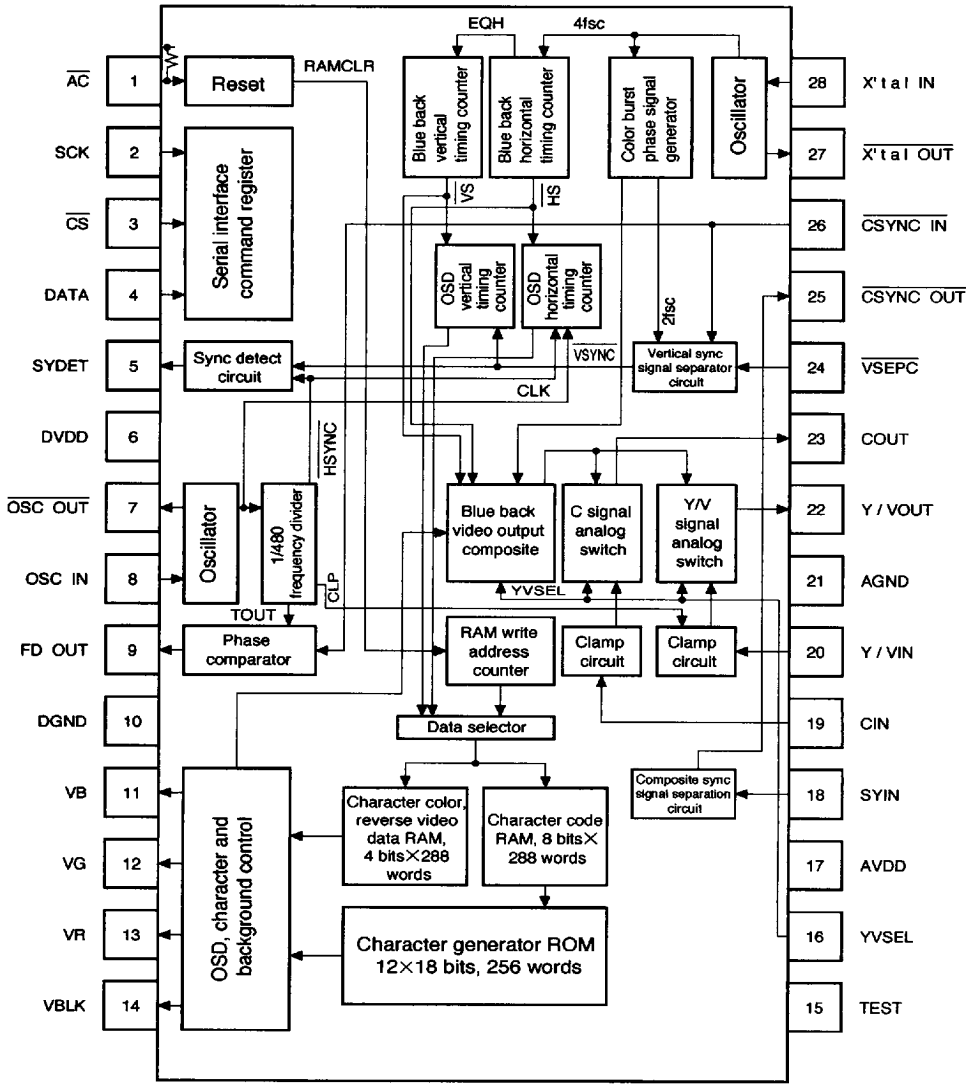
*1 Reduced by 7mW for each increase in Ta of 1°C over 25°C.
*2 Reduced by 5.5mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta=25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	Vcc	4.5	5.0	5.5	V
Input voltage	VIN	0	—	Vcc	V

Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Block diagram



Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Pin description

Pin No.	Input/output	Pin Name	Function
1	Input	$\overline{AC}$	"L" input resets all registers and clears the RAM. Pullup resistor on input.
2	Input	SCK	Clock input for reading data. Data on the DATA pin is read on the rising edge of the clock. Each block of 8 bits is loaded into the register as a command.
3	Input	$\overline{CS}$	Serial interface chip select. Data effective when "L".
4	Input	DATA	Control data input. Data is read synchronously with the rising edge of the signal on the CLK pin.
5	Output	SYDET	The synchronizing signal is used to determine the presence or absence of a video signal, and the result is output on this pin (sync detect). Normally "L", the output goes "H" when no signal is detected.
6	—	DVDD	+5V power supply pin (digital circuit).
7 8	Output Input	$\overline{OSC\ OUT}$ OSC IN	For connection of capacitor and coil for the VCO. Also used as the OSD character output dot clock. The oscillator frequency is $480f_H$ (f_H: horizontal synchronization frequency).
9	Output	FDOUT	AFC circuit phase comparator output.
10	—	DGND	Connect to system ground (digital GND).
11	Output	VB*	B character data output of digital RGB output.
12	Output	VG*	G character data output of digital RGB output.
13	Output	VR*	R character data output of digital RGB output.
14	Output	VBLK	Background data digital output.
15	Input	TEST	Open during normal operation. When "H", the LC oscillator clock is output on pin 11, and the X'tal oscillator clock is output on pin 12. This is used to for checking the oscillation frequencies.
16	Input	YVSEL	For setting the mode of the video signal input/output pins. Set to "L" for separated Y/C, and "H" for composite video.
17	—	AVDD	+5V power supply pin (analog circuit).
18	Input	SYIN	Input for the video signal for the synchronous separation circuit.
19	Input	CIN	C signal input pin for Y/C separation input/output. Leave open when not used (select the mode using pin 16).
20	Input	YIN / VIN	Y signal pin for Y/C separation input/output or composite video signal input (select the mode using pin 16). Use an input level of $2V_{P\text{-}P}$.
21	—	AGND	Connect to system ground (analog GND).
22	Output	YOUT / VOUT	Y signal pin for Y/C separation input/output or composite video signal output (select the mode using pin 16).
23	Output	COUT	C signal output pin for Y/C separation input/output. Leave open when not used (select the mode using pin 16).
24	Input	$\overline{VSEPC}$	Input for external vertical synchronization signal. (open when not used). Logical sum of this and the internally separated vertical synchronization signal is taken.
25	Output	$\overline{CSYNCOUT}$	Output for composite synchronization signal (slicer output).
26	Input	$\overline{CSYNCIN}$	Input for composite synchronization signal. This is input to the AFC phase comparator and vertical synchronization signal separation circuit. Normally connected to pin 25.
27 28	Output Input	$\overline{X'tal\ OUT}$ X' tal IN	For connection of a capacitor for oscillation, or a crystal. For generation of internal video signal. Use a crystal oscillator with a frequency of 4fsc.

* For superimposition, the VR, VG, and VB outputs display in monochrome.

Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Function of the $\overline{AC}$ pin

When the $\overline{AC}$ pin is set to "L", all registers are cleared, and character code FFH is written to all RAM addresses (RAM clear function). For this reason, do not send commands until writing of data to the RAM is complete. The time requires to write the data to the RAM is

$3 / f_{OSC} \times 288$ [sec]

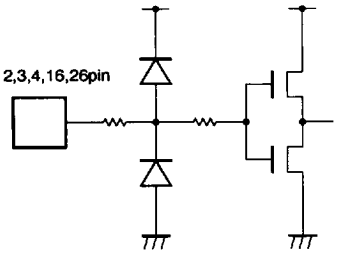
(f_{OSC} : the LC oscillator frequency.)

●YVSEL setting

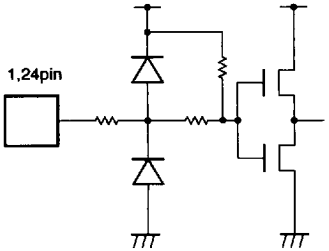
YVSEL	YIN / VIN YOUT / VOUT	CIN COUT
L	Y signal input/output	C signal input/output
H	Composite video signal input/output	Unused (open)

●Input / output circuits

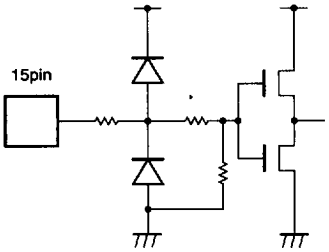
Inputs



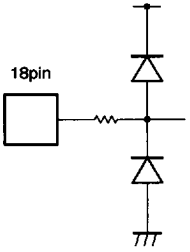
Input with pullup resistors

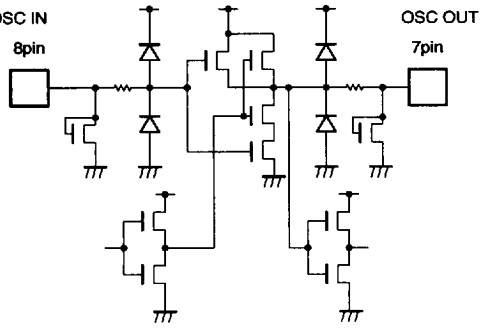


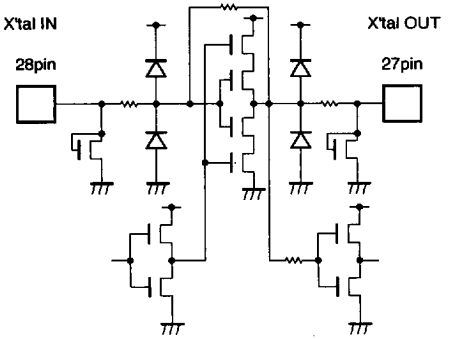
Input with pulldown resistors



SYIN





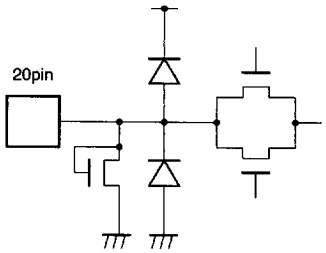


7828999 0022692 481

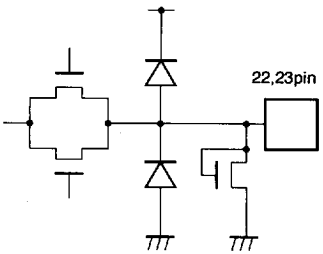
Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Input / output circuits

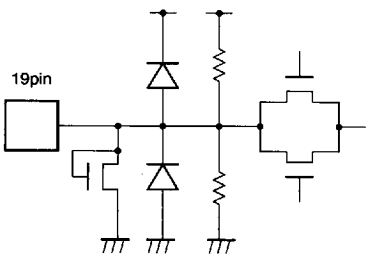
Y/V IN



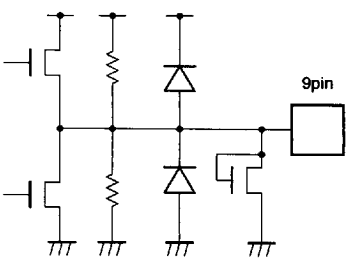
Y/V OUT, COUT



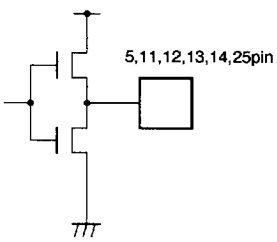
CIN



FD OUT



Outputs



Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Electrical characteristics (Unless otherwise specified: Ta=25℃ and V_{DD}=5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
"L" input voltage	V_{IL2}	0	—	1.5	V	For CMOS input	Fig.3
"H" input voltage	V_{IH2}	3.5	—	V_{DD}	V	For CMOS input	Fig.3
"L" output voltage	V_{OL1}	—	—	0.4	V	For OSC *1	Fig.1
"H" output voltage	V_{OH1}	4.6	—	—	V	For OSC *1	Fig.2
"L" output voltage	V_{OL2}	—	—	0.4	V	I_{OL} ≦2mA (CMOS output)	Fig.1
"H" output voltage	V_{OH2}	4.6	—	—	V	I_{OH} ≦ 1mA (CMOS output)	Fig.2
Video signal input level	V_{VI}	—	2.0	—	V_{P-P}	Pins 18 and 20 (when white peak) *2	—
Video signal output level	V_{VO}	—	1.85	—	V_{P-P}	Pin 22 (when white peak) *3	Fig.5
C signal input level	V_{CI}	—	1.4	3.0	V_{P-P}	19pin *2	—
C signal output level	V_{CO}	—	1.4	—	V_{P-P}	23pin *3	Fig.5
LC oscillator frequency	f_{OSC}	—	480f_H	—	MHz	f_H: horizontal synchronization signal frequency	—
Input pullup resistance	I_{IR}	—	28	—	kΩ	Pullup input	Fig.3
Operating current	I_{DS}	—	—	25	mA	*4	Fig.4

*1 When an external clock is connected to the oscillator pin (50% duty cycle).
*2 Signal level of the externally input signal in external synchronization mode (superimpose).
*3 Signal level of the internally generated signal in internal synchronization mode.
*4 All characters displayed with fosc = 7.55MHz.
◎Not designed for radiation resistance.

Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Measurement circuits

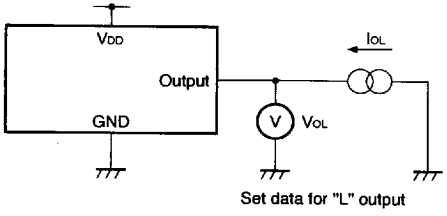


Fig. 1 "L" output voltage measurement circuit

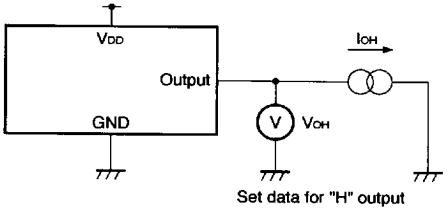


Fig. 2 "H" output voltage measurement circuit

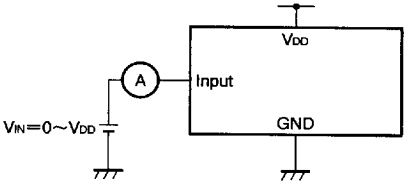


Fig. 3 Input voltage measurement circuit

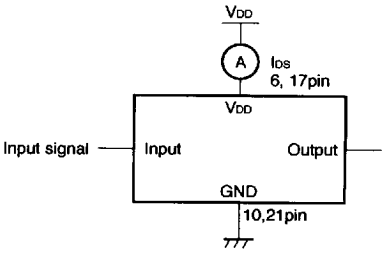


Fig. 4 Operating current measurement circuit

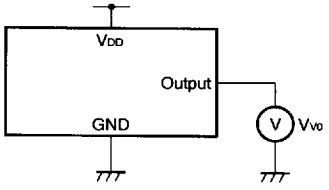


Fig. 5 Video signal output voltage measurement circuit

Powered by ICminer.com Electronic-Library Service CopyRight 2003

●Application example

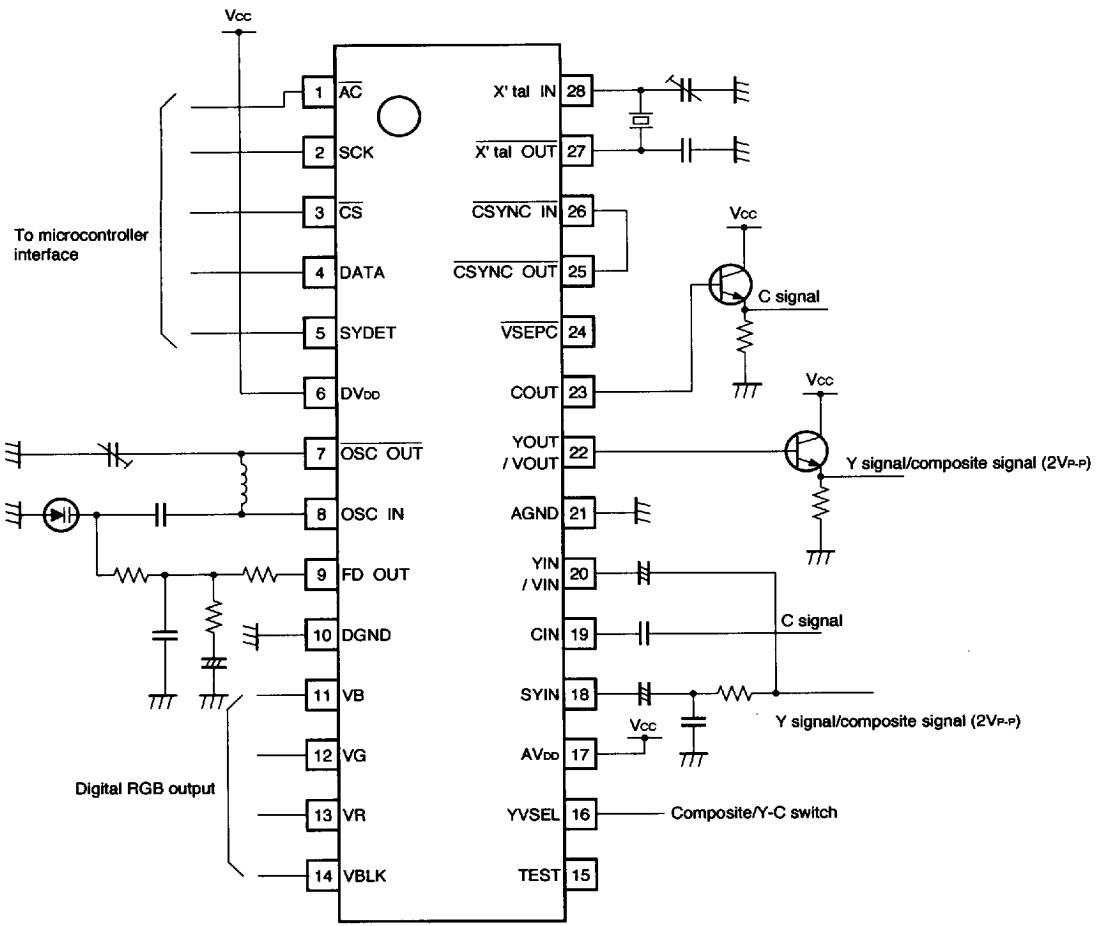
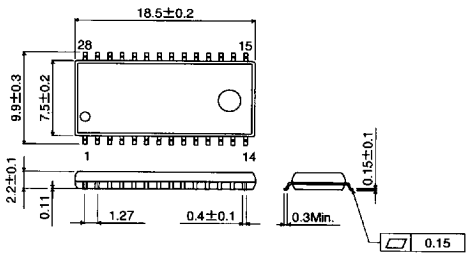


Fig. 6

Powered by ICminer.com Electronic-Library Service CopyRight 2003

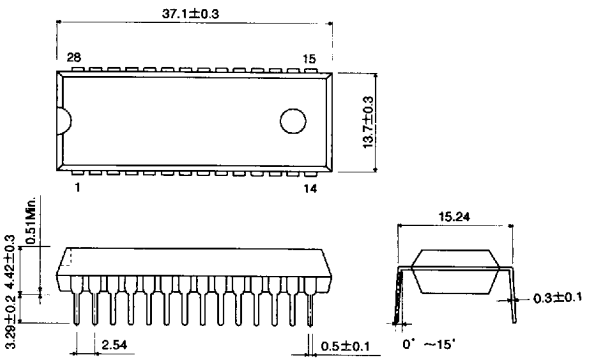
●External dimensions (Units: mm)

BU2875F / BU2857F



SOP28

BU2875 / BU2857



DIP28

Powered by ICminer.com Electronic-Library Service CopyRight 2003