

Digital servo controller for VCR

BU2880 Series

The BU2880 is an LSI linear digital-servo controller that allows construction of a VCR servo system using one IC. The DRUM and CAPSTAN systems have digital filters, and the IC is compatible with VISS/VASS overwriting and wide-aspect operation.

● Applications

Video cassette recorders

● Features

- 1) All VCR servo functions on a single chip.
- 2) Digital filters in the DRUM and CAPSTAN speed and phase systems.
- 3) Built-in CTL amplifier with serial gain setting.
- 4) VISS/VASS overwriting and INDEX detection functions for wide-aspect operation.
- 5) DRUM fh compensation calculation function from speed detect function.
- 6) 6.5H discrimination.
- 7) Compatible with 19 μ m heads.

● Absolute maximum ratings (Ta=25°C)

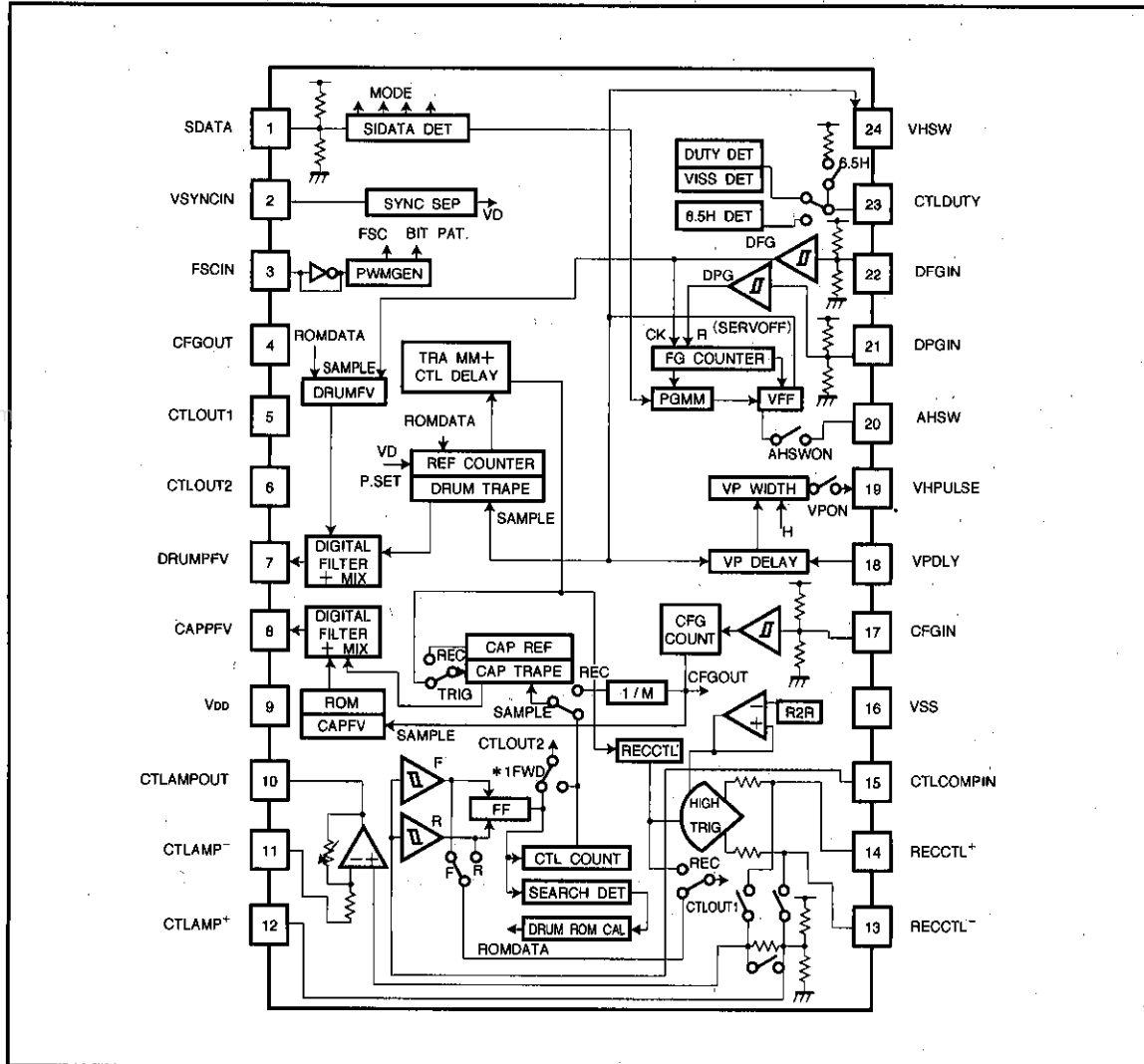
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	7.0	V
Power dissipation	P _d	500*	mW
Operating temperature	T _{opr}	-15~70	°C
Storage temperature	T _{stg}	-55~125	°C

* Reduced by 5mW for each increase in Ta of 1°C over 25°C.

● Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V _{DD}	4.5	5.0	5.5	V

● Block diagram



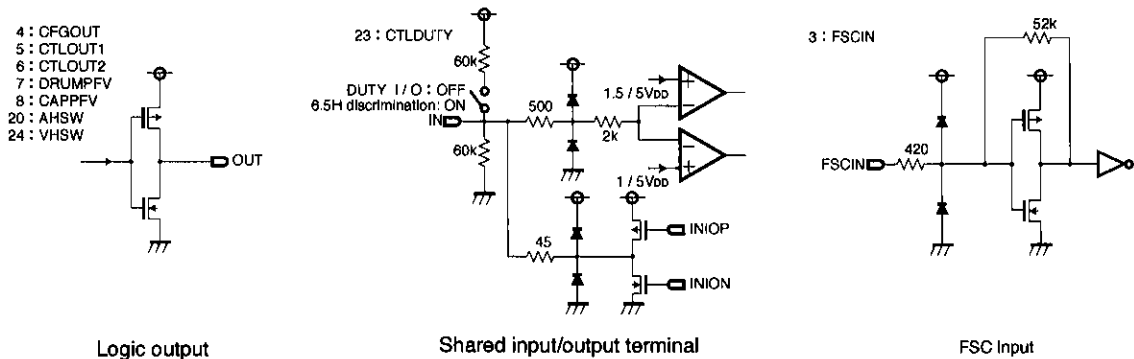
Digital servos

VCR components

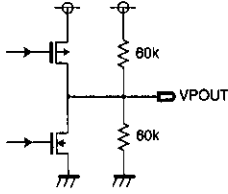
● Pin descriptions

Pin No.	Pin name	Function
1	SDATA	Serial data input (tri-state)
2	VSYNCIN	Composite sync input
3	FSCIN	System clock input
4	CFGOUT	CFG divider output
5	CTLOUT1	CTL comparator output
6	CTLOUT2	CTL divider output
7	DRUMPFV	DRUM control output (digital filter output)
8	CAPPFV	CAPSTAN control output (digital filter output)
9	V _{DD}	Power supply
10	CTLAMPOUT	CTLAMP output
11	CTLAMP ⁻	CTLAMP - input
12	CTLAMP ⁺	CTLAMP + input
13	RECCTL ⁻	Recording CTL - output
14	RECCTL ⁺	Recording CTL + output
15	CTLCOMPIN	CTL comparator input
16	VSS	GND
17	CFGIN	CFG input
18	VPDLY	Quasi-VH pulse delay amount control input
19	VHPULSE	Quasi-VH pulse output
20	AHSW	Head switch audio output
21	DPGIN	DRUM PG input
22	DFGIN	DRUM FG input
23	CTLDUTY	Duty discrimination, VISS discrimination, 6.5H discrimination output / VASS duty control input
24	VHSW	HEAD SW video output

● Input/output circuits

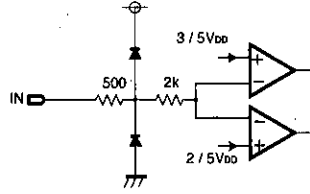


19 : VHPULSE



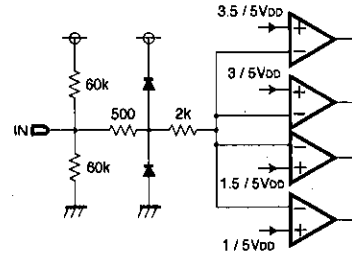
Tri-state output

2 : VSYNCIN
18 : VPDLY



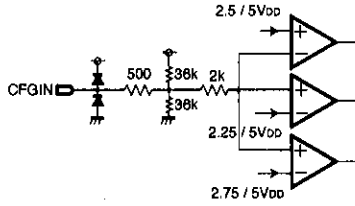
Two-value input

1 : SDATA



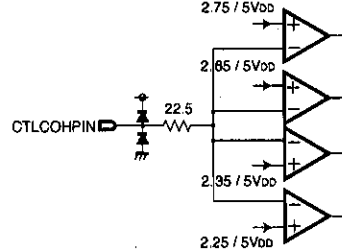
Three-value input

17 : CFGIN



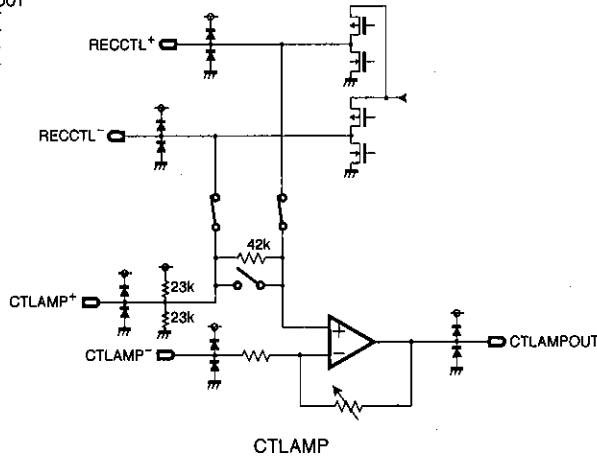
CFG input (zero cross comparator)

15 : CTLCOMP IN



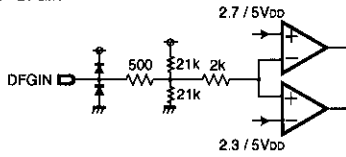
CTL comparator input

10 : CTLAMPOUT
11 : CTLAMP-
12 : CTLAMP+
13 : RECCTL-
14 : RECCTL+



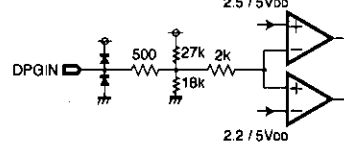
CTLAMP

22 : DFGIN



DFG input

21 : DPGIN



DPG input

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Circuit current	I _{DD}	—	27	38	mA	
Power on reset threshold	V _{PON}	1.0	1.5	2.0	V	
Two-value output high voltage	V _H	4.0	4.5	—	V	I _{LOAD} =1.5mA
Two-value output low voltage	V _L	—	0.4	1.0	V	I _{LOAD} =1.5mA
Two-value input threshold	V _{TH}	2.5	3.0	3.5	V	Schmitt level +0V, -1.0V
Two-value input current	I _{LIN}	—	0	1	μA	V _{IN} =V _{DD} , GND
Pullup input current	I _{PU}	59	83	116	μA	V _{IN} =GND
CFG input current	I _{CFG}	100	140	196	μA	V _{IN} =V _{DD} , GND
Three-value output high voltage	V _{H3}	4.0	4.5	—	V	I _{LOAD} =1.5mA
Three-value output low voltage	V _{L3}	—	0.4	1.0	V	I _{LOAD} =1.5mA
Three-value output mid voltage	V _{M3}	2.0	2.5	3.0	V	
Three-value input "H" threshold	V _{TINH}	3.10	3.50	4.00	V	Schmitt level +0V, -0.5V
Three-value input "L" threshold	V _{TINL}	1.00	1.50	1.90	V	Schmitt level +0V, -0.5V
Three-value input current (+/-)	I _{TIN}	59	83	116	μA	V _{IN} =V _{DD} , GND
FSC operating input level	V _{RCK}	0.2	—	4.0	V _{PP}	AC coupled, duty: 40 to 60%, C=1000pF
FSC input current (+/-)	I _{FSCIN}	61	85	119	μA	V _{IN} =V _{DD} , GND
RECCTL output high voltage	V _{RCTH}	4.00	4.56	—	V	I _{LOAD} =2.0mA
RECCTL output low voltage	V _{RCTL}	—	0.16	0.60	V	I _{LOAD} =2.0mA
(CTLAMP)						
Output high voltage	V _{OH}	3.8	4.3	—	V	I _{LOAD} =1.0mA
Output low voltage	V _{OL}	—	0.2	0.5	V	I _{LOAD} =1.0mA
CTLAMP comparator level	V _{CTL}	200	250	300	mV	With respect to bias
CTLAMP comparator width	V _{CO}	75	100	125	mV	
CTLAMP bias level	V _{BI}	2.4	2.5	2.6	V	

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● Measurement circuit

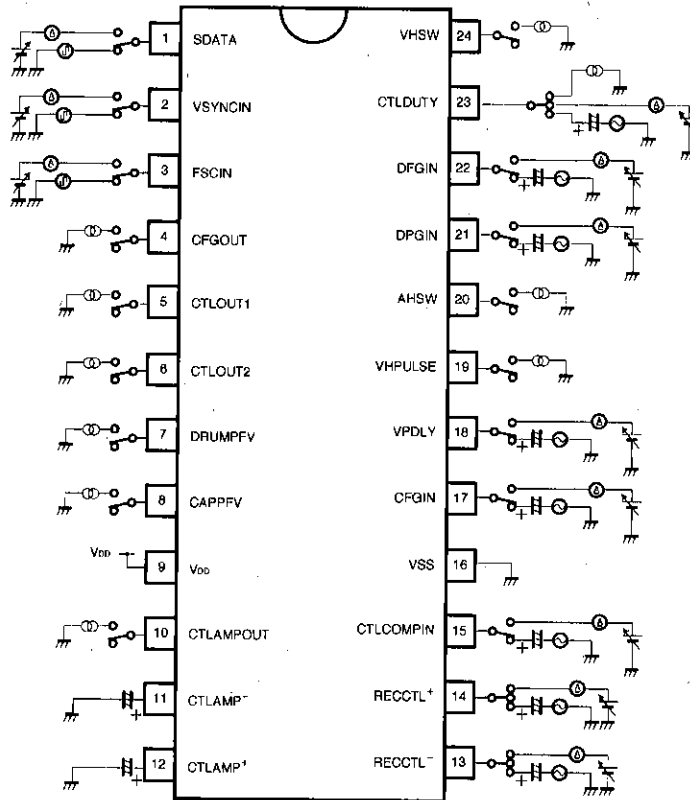


Fig.1

● Electrical characteristic curves

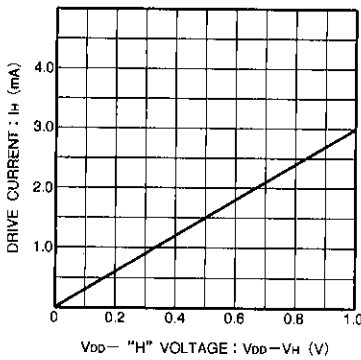


Fig. 2 Two-value output "H" voltage vs. drive current characteristics

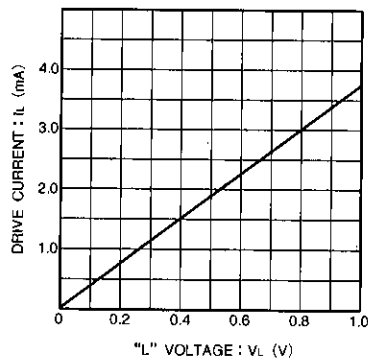


Fig. 3 Two-value output "L" voltage vs. drive current characteristics

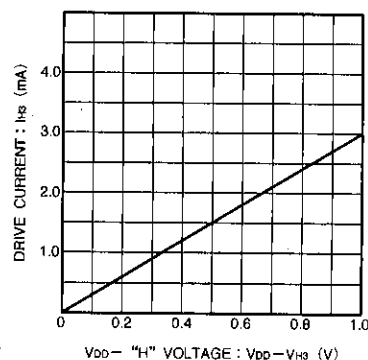


Fig. 4 Three-value output "H" voltage vs. drive current characteristics

●Electrical characteristic curves

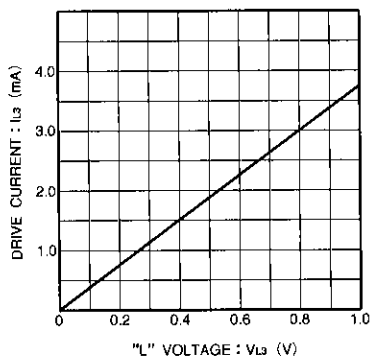


Fig. 5 Three-value output "L" voltage vs. drive current characteristics

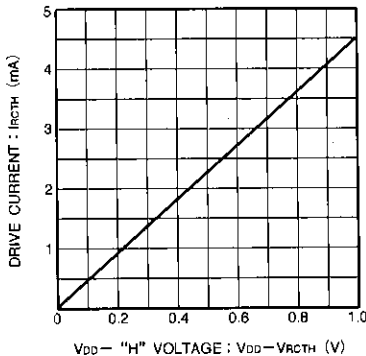


Fig. 6 RECCTL output "H" voltage vs. drive current characteristics

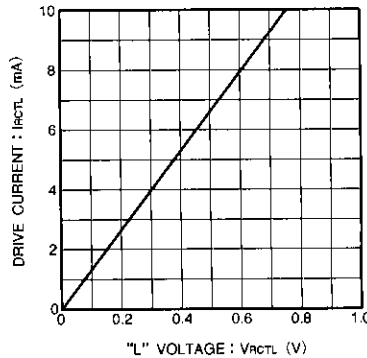


Fig. 7 RECCTL output "L" voltage vs. drive current characteristics

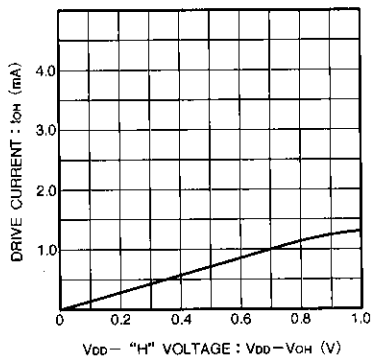


Fig. 8 CTLAMP output "H" voltage vs. drive current characteristics

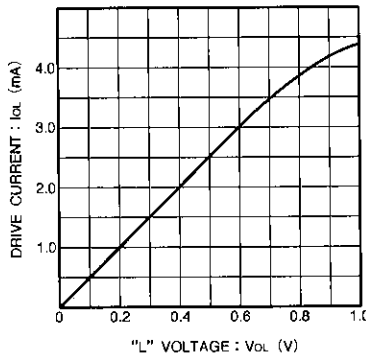
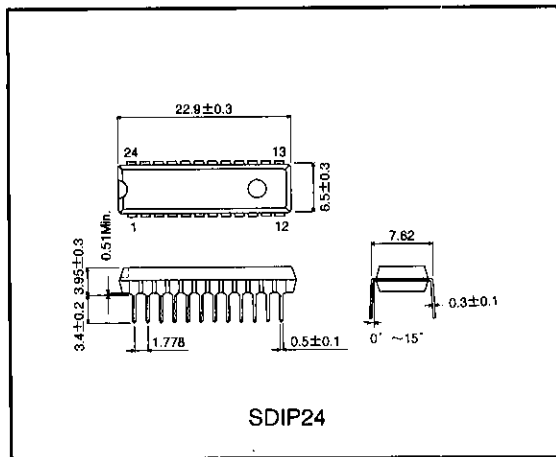


Fig. 9 CTLAMP output "L" voltage vs. drive current characteristics

●External dimensions (Units: mm)



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