M54847AP

2-DIGIT BCD-7-SEGMENT DECODER/DRIVER

DESCRIPTION

The M54847AP is a semiconductor integrated circuit consisting of an IIL 2 digit BCD-7 segment decoder/driver.

FEATURES

- Direct drive of LEDs (common cathode type. No need for current limiting resistors, segment current: 10mA max.)
- Direct drive of fluorescent character displays (Segment withstand output is −25V max at V_{CC}=5V.)
- Data input in both serial and parallel formats
- Brightness control input enables continuous LED brightness adjustment.

APPLICATION

TV channel display

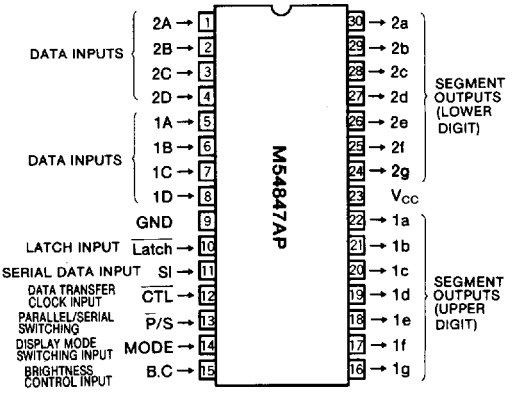
FUNCTIONAL DESCRIPTION

The M54847AP is a 2 digit BCD-7 segment decoder/driver for static drive of LED and fluorescent character displays. The following display modes are possible.

MODE I Numerical display of 00 ~ 99

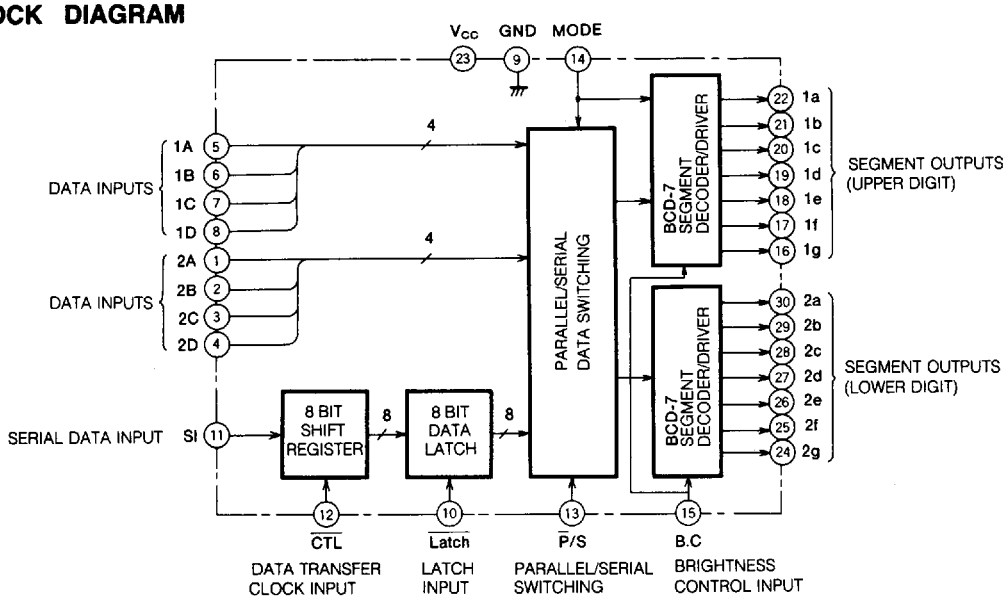
MODE II Numerical display of 0 ~ 39, and AU, CA, −−

PIN CONFIGURATION (TOP VIEW)



Outline 30P4B

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

OPERATING DESCRIPTION

- Display mode

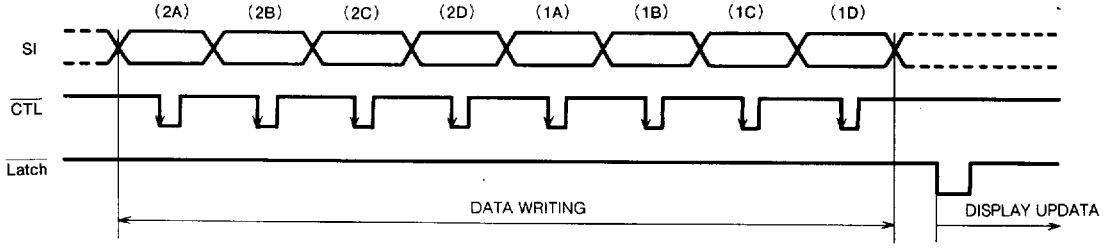
(1) When the mode switching input is high, both digits are driven in accordance with Function Table Ⅰ.

(2) When the mode switching input is low, input 1C and 1D become the character data inputs, driving the display in accordance with Function Table Ⅱ.

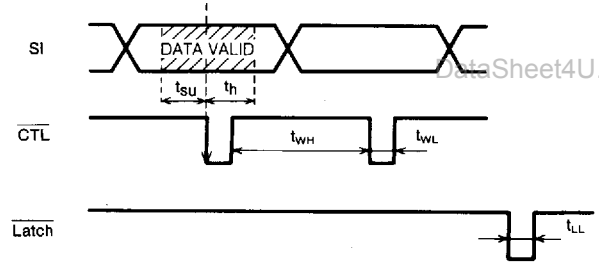
- Serial input data writing

Data 2A→2D and 1A→1D is read sequentially by the low edge of $\overline{CTL}$. After all 8 bits are loaded in the shift register, the display is updated by switching $\overline{Latch}$ input to low.

SERIAL DATA WRITING



INPUT TIMING DIAGRAM



MINIMUM VALUES
$t_{su} = 20\mu s$
$t_h = 20\mu s$
$t_{WH} = 30\mu s$
$t_{WL} = 10\mu s$
$t_{LL} = 10\mu s$

FUNCTION TABLE Ⅰ

Data input				Segment output							Display
A	B	C	D	a	b	c	d	e	f	g	
L	L	L	L	H	H	H	H	H	H	L	0
H	L	L	L	L	H	H	L	L	L	L	1
L	H	L	L	H	H	L	H	H	L	H	2
H	H	L	L	H	H	H	H	L	L	H	3
L	L	H	L	L	H	H	L	L	H	H	4
H	L	H	L	H	L	H	H	L	H	H	5
L	H	H	L	H	L	H	H	H	H	H	6
H	H	H	L	H	H	H	L	L	L	L	7
L	L	L	H	H	H	H	H	H	H	H	8
H	L	L	H	H	H	H	H	L	H	H	9
L	H	L	H	L	L	L	L	L	L	H	-
H	H	L	H	H	L	L	H	H	H	H	E
L	L	H	H	H	L	L	H	H	H	L	C
H	L	H	H	L	L	L	L	L	L	L	Blank
L	H	H	H	L	L	H	H	H	L	H	o
H	H	H	H	L	L	L	L	L	L	L	Blank

FUNCTION TABLE Ⅱ

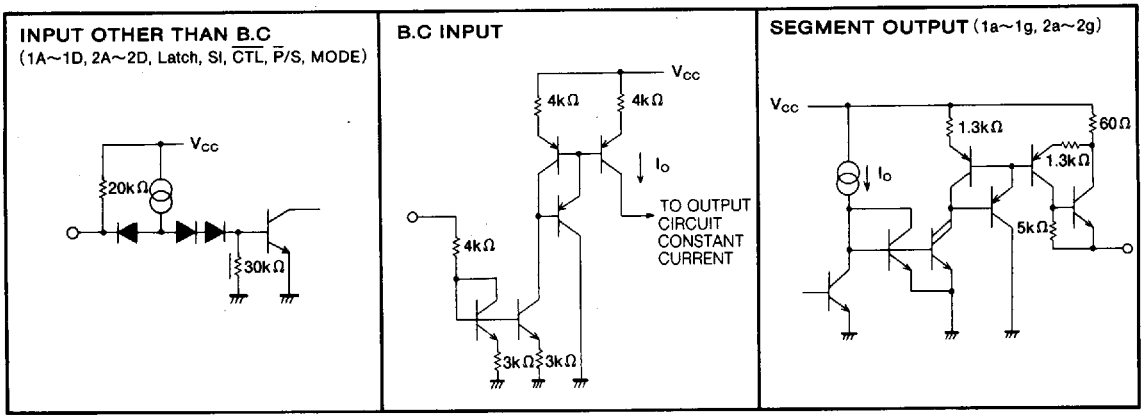
Data input		Other data 1A, 1B 2A~2D	Display	
1C	1D		First digit	Second digit
L	L	X	−(Note 1)	−(Note 1)
H	L	X	C	A
L	H	X	A	U
H	H	−	(Note 2)	(Note 3)

Note 1 : Only segment g lights.
2 : When both 1C and 1D inputs are high, first digit display blanking or numerical display of 1, 2 or 3 is determined by 1A, 1B input state.

Data input				Segment output							Display
1A	1B	1C	1D	1a	1b	1c	1d	1e	1f	1g	
L	L	H	H	L	L	L	L	L	L	L	Blank
H	L	H	H	L	H	H	L	L	L	L	1
L	H	H	H	H	H	L	H	H	L	H	2
H	H	H	H	H	H	H	H	L	L	H	3

Note 3 : Other digit codes are identical to those in function table Ⅰ.

I/O CIRCUIT DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_a = −10~+60℃, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		−0.5~+7	V
V_I	Input voltage		−0.5~+V_{CC}	V
$V_{CC}-V_O$	Voltage between supply and output		−0.5~+35	V
Topr	Operating temperature		−10~+60	℃
Tstg	Storage temperature		−40~+125	℃
P_d	Power dissipation	T_a = 60℃	800	mW

RECOMMENDED OPERATING CONDITIONS (T_a = −10~+60℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		4.5	5	6	V
Iseg	Segment current				−10	mA
V_O	Output withstand voltage when output is off				−25	V

ELECTRICAL CHARACTERISTICS (T_a = −10~+60℃, unless otherwise noted)

Symbol	Parameter	Test conditions		Limits			Unit
				Min	Typ*	Max	
V_{IH}	High input voltage	V_{CC} = 4.5~6V		2		V_{CC}	V
V_{IL}	Low input voltage	V_{CC} = 4.5~6V		0		0.6	V
I_{IH}	High input current	V_{CC} = 6V	B.C input	0.5	0.75	1.2	mA
		V_{IH} = 6V	Inputs other than B.C			50	μA
I_{IL}	Low input current	V_{CC} = 6V	B.C input			50	μA
		V_{IL} = 0V	Inputs other than B.C	−280	−400	−650	μA
Iseg	Segment output current	V_{CC} = 5V, V_O = 2V, B.C pin is connected to V_{CC}		−10			mA
Islk	Segment leak current	V_{CC} = 5V, V_O = −25V				−50	μA
I_{CC1}	Supply voltage	V_{CC} = 6V, All inputs and outputs are open			4	8	mA

* : Typical values are at T_a = 25℃.