

M54836AP

MITSUBISHI (DCTL LOGIC) 3LE D ■ 6249827 0014715 9 ■ MIT3

ELECTRONIC CHANNEL SELECTOR WITH LED DISPLAY DRIVER

T-77-07-05

DESCRIPTION

The M54836AP, an I^2L semiconductor integrated circuit, consists of a 12-channels selector capable of direct 12-channels tuning and of continuous tuning in both the up and down directions.

FEATURES

- Built-in 8-segment LED driver for displaying the selected channel number
- Available for direct address remote control system
- Continuous brightness control (No limiting resistors are needed)
- Channel skip function is available
- Wide operating voltage range ($V_{CC}=4\sim 13V$)
- High operating output voltage ($V_O=40V_{max}$)

APPLICATION

TV channel selection units

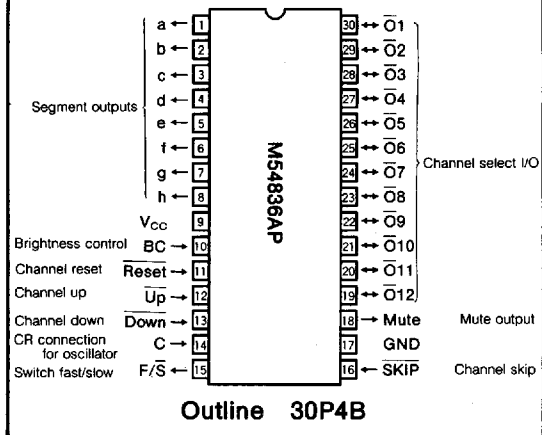
FUNCTIONAL DESCRIPTION

M54836AP is a channel selector IC with a built-in CR oscillator circuit, serving for direct 12-channels tuning and up/down tuning. It contains LED drivers for 8 segment display elements to present the numbers 1 to 12.

When Reset input goes to "L" state, the fixed channel ($\bar{O}1$ output) is selected. When the up or down input is set to low, the on-state of the output moves up or down to the next channel in accordance with the negative edge of the input pulse. If the switch is held down for over $0.8s^*$, the on-state of the output keeps moving over the channels at $0.8s/channel$ scanning rate.

The channels can also be tuned directly by grounding the output of the desired channel, since the output pins, $\bar{O}1\sim\bar{O}12$, have also a command input function.

PIN CONFIGURATION (TOP VIEW)



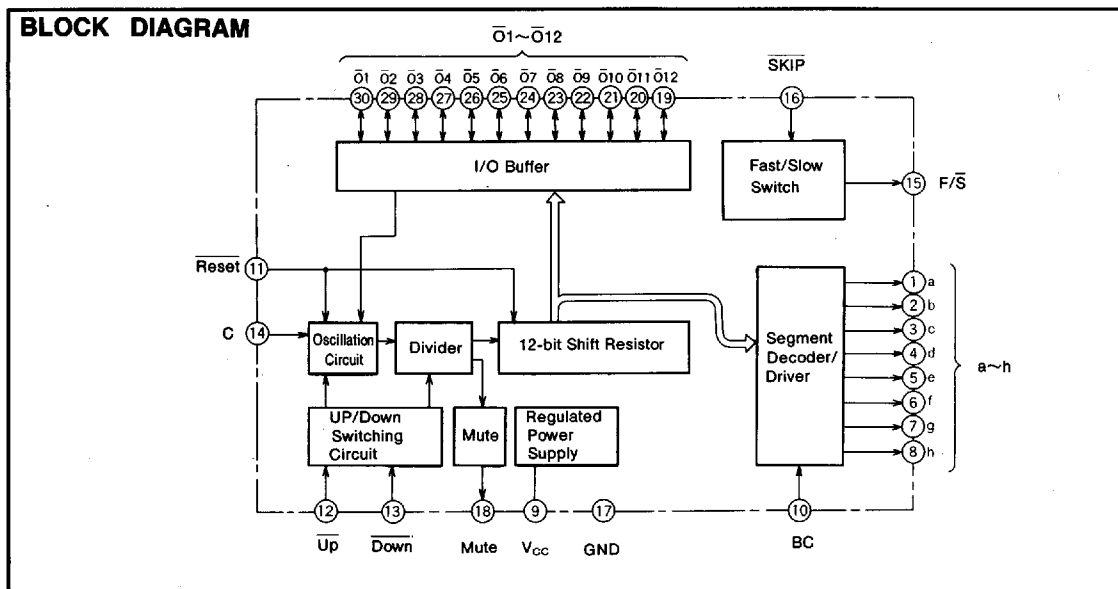
The Mute output provides an AFT · DEF and an audio mute signal during the key operation. (150ms High-Active signal) A channel skip function is available using the SKIP input. (If a channel select output is connected to the SKIP input, the channel is skipped.)

The segment output current is adjustable by the current value poured into BC input.

Reset, Up, and Down inputs consist of schmitt circuits. Each input requires min $50\mu s$ "L" pulse. If a mechanical key switch is used for up or down input signal, external chattering prevention resistor and capacitor are needed.

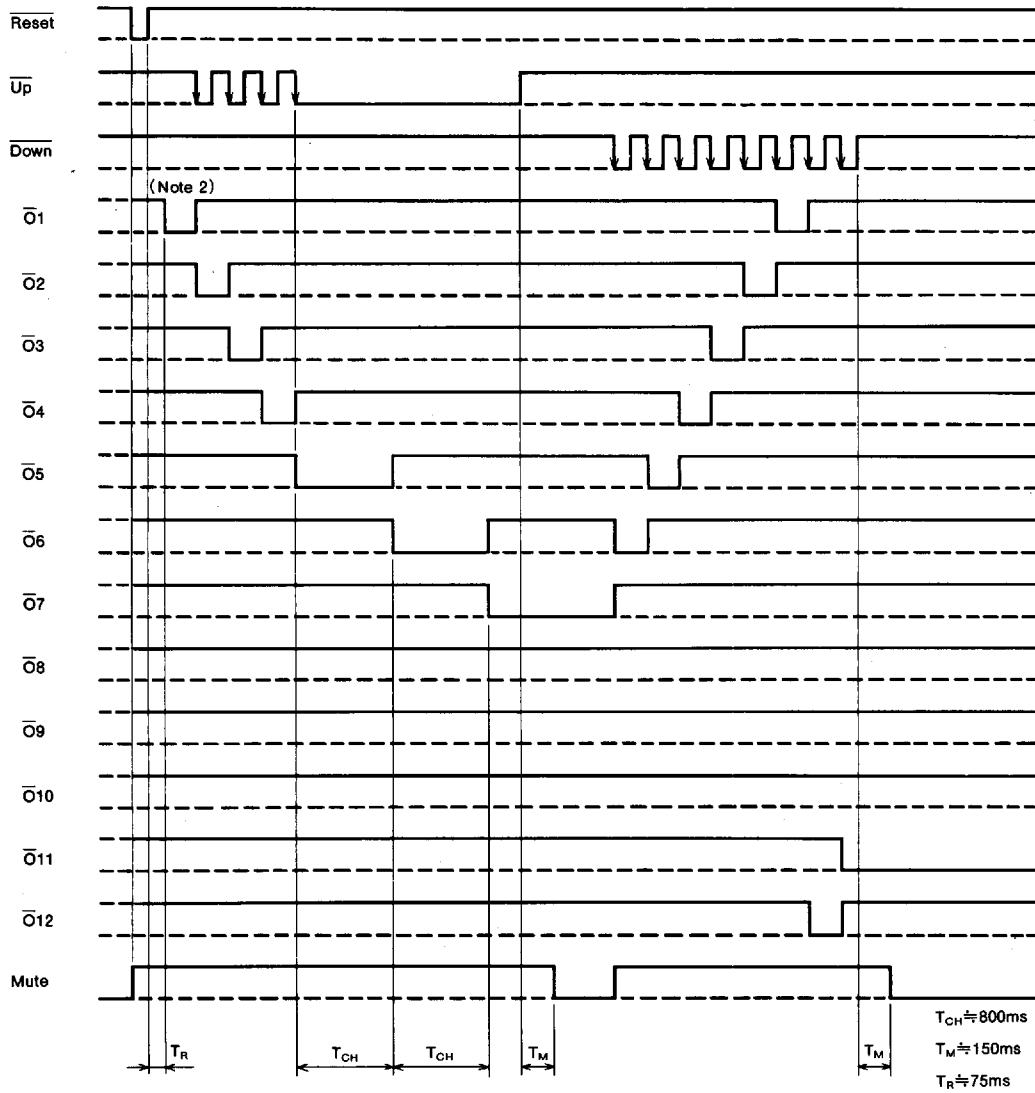
Note 1. * : The oscillation frequency has been set to 25ms.

BLOCK DIAGRAM



TIMING DIAGRAM

(1) Up/Down channel selection

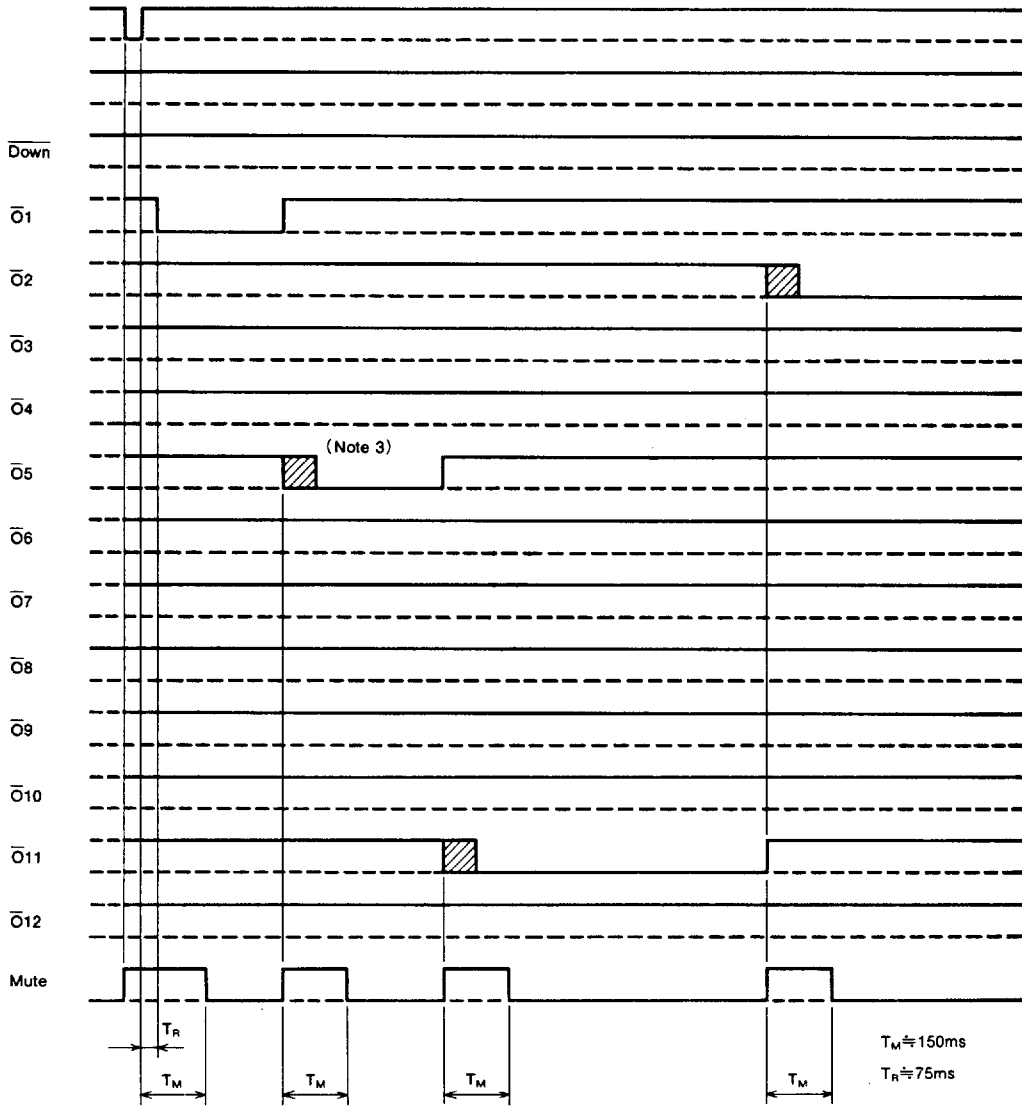



Note 2 : When Reset input goes to "L" state, all channel select output ($\bar{O}1 \sim \bar{O}12$) are set to "H" state.
About 75mS after Reset input becomes to "H" state, $\bar{O}1$ channel select output is set to "L" state.

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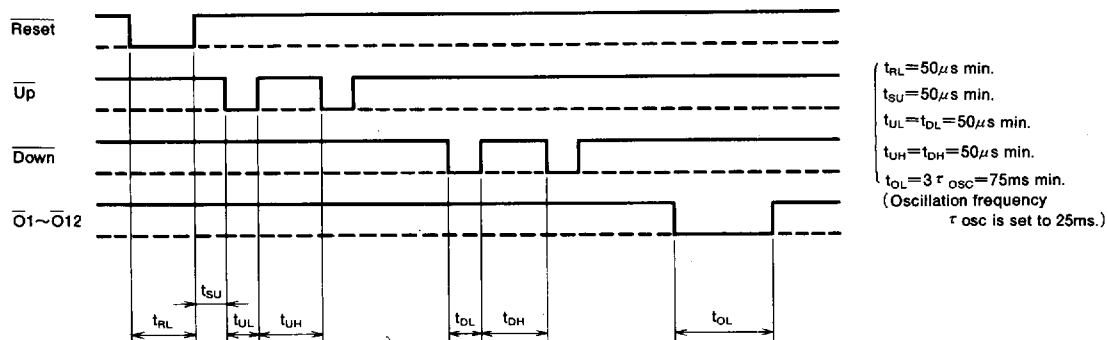
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(2) Direct channel selection



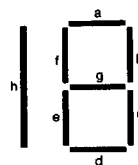
Note 3 :  is input from the key switch.

(3) Input signal timing



SEGMENT OUTPUT TRUTH TABLE

Channel	Segment output							
	a	b	c	d	e	f	g	h
$\overline{O1}$	L	H	H	L	L	L	L	L
$\overline{O2}$	H	H	L	H	H	L	H	L
$\overline{O3}$	H	H	H	H	L	L	H	L
$\overline{O4}$	L	H	H	L	L	H	H	L
$\overline{O5}$	H	L	H	H	L	H	H	L
$\overline{O6}$	H	L	H	H	H	H	H	L
$\overline{O7}$	H	H	H	L	L	L	L	L
$\overline{O8}$	H	H	H	H	H	H	H	L
$\overline{O9}$	H	H	H	H	L	H	H	L
$\overline{O10}$	H	H	H	H	H	H	L	H
$\overline{O11}$	L	H	H	L	L	L	L	H
$\overline{O12}$	H	H	L	H	H	L	H	H



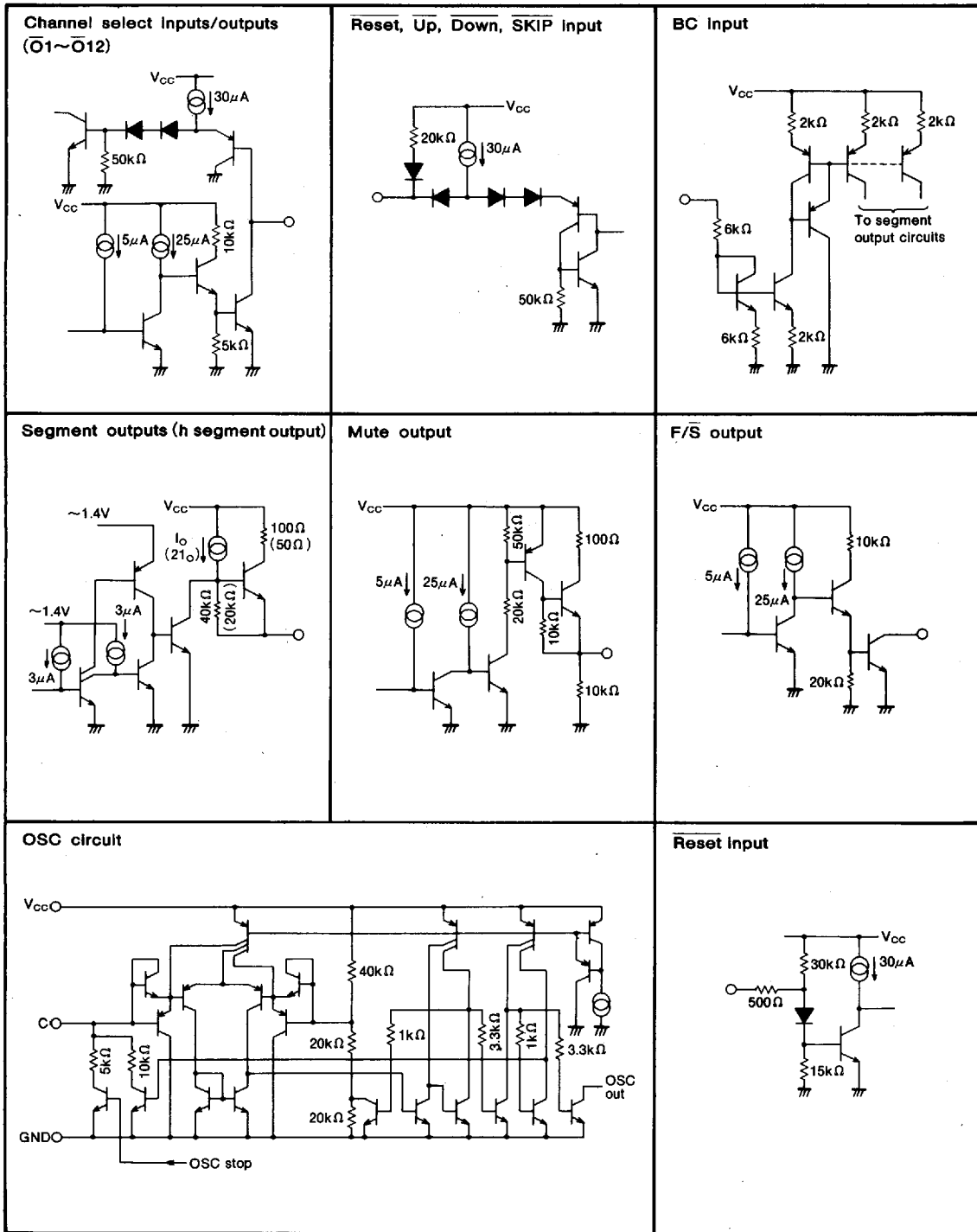
PRECAUTIONS FOR USE

1. If a mechanical key switch is used for up or down input signal, external chattering prevention resistor and capacitor are needed. Up/Down inputs consist of schmitt trigger circuits.
2. Segment output current is set to under 20mA at $V_{CC} = 6V$, and 7mA at $V_{CC} = 13V$.
3. Chattering prevention circuits are provided for the channel select inputs ($\overline{O1} \sim \overline{O12}$). A minimum input pulse width of 75mS is required.
4. Attaching a capacitor to the \overline{Reset} input, the power-on reset function can be activated when power supply is applied to the IC.

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INPUT/OUTPUT CIRCUITS (Resistance value and current value are typical values at $V_{CC}=5V$ and $T_a=25^\circ C$.)



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ABSOLUTE MAXIMUM RATINGS ($T_a = -10 \sim +70^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Condition	Limits	Unit
V_{CC}	Supply voltage		14	V
V_i	Input voltage	Up, Down, SKIP Reset	14 3	V
V_o	Output voltage	$\bar{O}1 \sim \bar{O}12$	45	V
V_{seg}	Segment output voltage	a~h Output is "on" Output is "off"	V_{CC} 3	V
T_{opr}	Operating temperature		$-10 \sim +70$	$^\circ\text{C}$
T_{stg}	Storage temperature		$-40 \sim +125$	$^\circ\text{C}$
P_d	Power dissipation		700	mW
V_{Mute}	Mute output voltage	Mute	V_{CC}	V

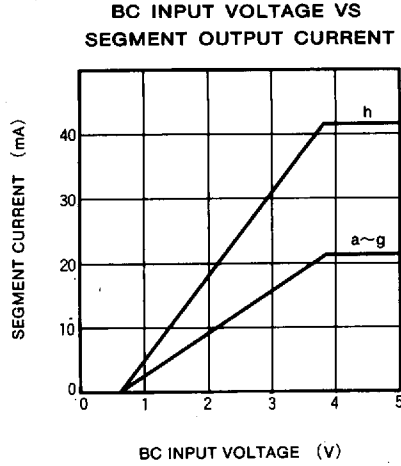
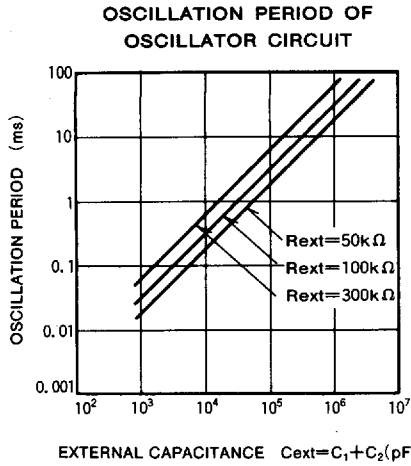
RECOMMENDED OPERATING CONDITIONS ($T_a = -10 \sim +70^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Condition	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage	$I_{seg} \ a \sim g \leq -20\text{mA}, h \leq -40\text{mA}$	4	5	6	V
V_o	Output voltage	$I_{seg} \ a \sim g \leq -7\text{mA}, h \leq -14\text{mA}$		12	13	
V_o	Output voltage	$\bar{O}1 \sim \bar{O}12, I_{OL} = 1\text{mA}$			40	V
I_{OL}	"L" output current	$\bar{O}1 \sim \bar{O}12$		1	3	mA
I_{seg1}	Segment output current	a~g segment output $V_{CC}=6\text{V}$ $V_{CC}=13\text{V}$			-20 -7	mA
I_{seg2}	Segment output current	h segment output $V_{CC}=6\text{V}$ $V_{CC}=13\text{V}$			-40 -14	mA
I_{OH}	"H" output current	Mute output			-5	mA
R_{ext}	External for oscillator circuit		50		300	k Ω
C_{2ext}	External capacitor for oscillator circuit		2200		100000	pF
C_{1ext}	External capacitor for oscillator circuit		0.1		2.2	μF

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Condition	Limits			Unit	
			Min	Typ	Max		
V_{IH}	"H" input voltage	Up, Down, SKIP $\bar{O}1 \sim \bar{O}12$	$V_{CC}=4 \sim 6\text{V}$	3		V_{CC}	V
V_{IL}	"L" input voltage	Up, Down, Reset, SKIP $\bar{O}1 \sim \bar{O}12$		0		0.8	
I_{IH}	"H" input current	Up, Down, SKIP $\bar{O}1 \sim \bar{O}12$	$V_{CC} = 6\text{V}, V_i = 6\text{V}$ $= 6\text{V}, V_i = 40\text{V}$			50	μA
I_{IL}	"L" input current	Up, Down, Reset, SKIP $\bar{O}1 \sim \bar{O}12$		$V_{CC}=6\text{V}$ $V_i=0\text{V}$			
V_{OL}	"L" output voltage	$\bar{O}1 \sim \bar{O}12$	$V_{CC}=4 \sim 6\text{V}$ $I_{OL}=3\text{mA}$				-300
I_{seg}	Segment output current	a~g output h output		$V_{CC}=5\text{V}, V_o=2\text{V}$ ($BC=V_{CC}$)	-15	-20	-600
I_{CC}	Circuit current	$V_{CC}=6\text{V}$ $V_{CC}=13\text{V}$	Display "off" ($BC="L"$)	-30	-40	-60	mA
τ_{OSC}	Oscillation period	$V_{CC}=5\text{V}, R=120\text{k}\Omega, C_1=0.68\mu\text{F}, C_2=2200\text{pF}$		17.5	25	32.5	
I_{MOH}	Mute output current	$V_{OH}=3.5\text{V}, V_{CC}=5\text{V}$				-5	mA
T_{CH}	Channel Up, Down scan period	$V_{CC}=5\text{V}, R=120\text{k}\Omega, C_1=0.68\mu\text{F}, C_2=2200\text{pF}$		560	800	1040	ms
T_{MB}	Mute pulse width	$V_{CC}=5\text{V}, R=120\text{k}\Omega, C_1=0.68\mu\text{F}, C_2=2200\text{pF}$		100	150	200	ms
I_{sIk}	Segment leak current	a~g output h output	$V_{CC}=6\text{V}, V_o=0\text{V}$ Display "off" ($BC=GND$)			-50	μA
						-100	

TYPICAL CHARACTERISTICS ($V_{CC}=5V, T_a=25^\circ C$)



APPLICATION EXAMPLE (Skip of CH11 and CH12)

