



No.1465D

LC7570, 7570E

Static Drivers for Vacuum Fluorescent Display for Frequency Display Applications

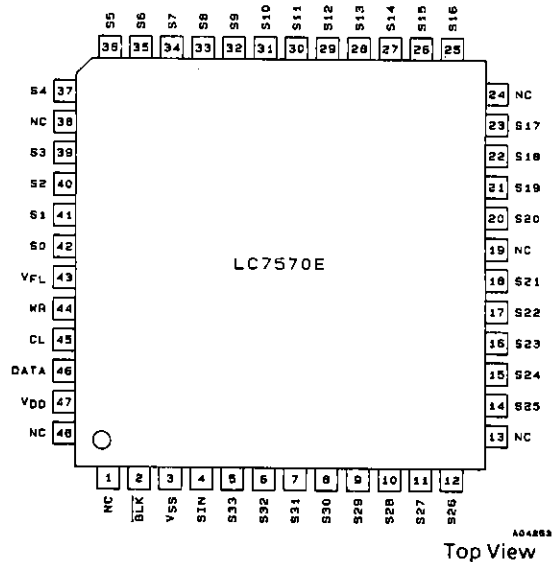
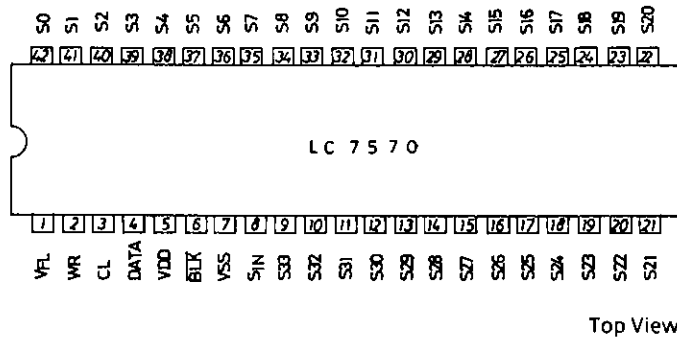
Overview

The LC7570, LC7570E are controller-controlled static drivers for vacuum fluorescent display to be used in electronic tuning frequency indicator applications.

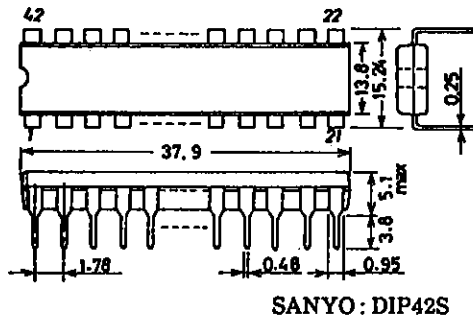
Features

- 34-segment output (With pull-down resistor).
- 5-step A/D converter.
- The display can be forced to the off state with the \overline{BLK} pin.
- Data input : Serial input (CL, DATA, WR).
- The program of a controller can be used to suit the segment outputs to the pin assignment of a vacuum fluorescent display.

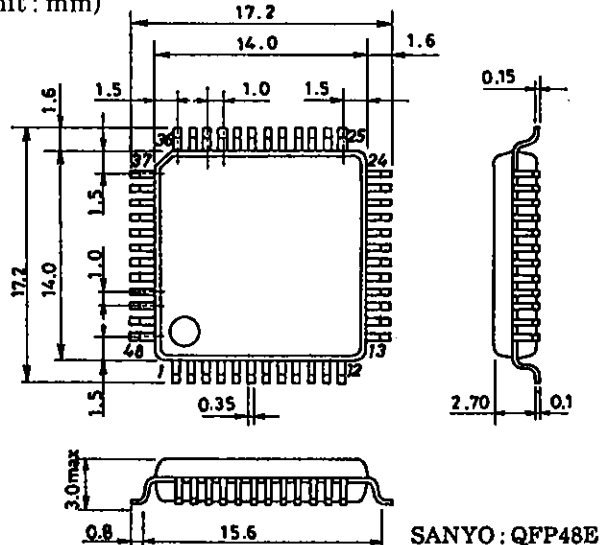
Pin Assignments



Package Dimensions 3025B [LC7570]
(unit: mm)



Package Dimensions 3156 [LC7570E]
(unit: mm)



LC7570,7570E

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}, V_{SS} = 0\text{V}$

				unit	
Maximum Supply Voltage	$V_{DD \text{ max}}$	V_{DD}	-0.3 to +9.0	V	
Maximum Input Voltage	$V_{IN \text{ max}}$	CL, DATA, WR, SIN, $\overline{\text{BLK}}$	-0.3 to $V_{DD} + 0.3$	V	
Maximum Output Voltage	$V_{OUT \text{ max}}$	S0 to S33, V_{FL}	$V_{DD} - 28$ to $V_{DD} + 0.3$	V	
Maximum Output Current	$I_{OUT \text{ max}}$	S0 to S33	3.0	mA	
Allowable Power Dissipation	$P_d \text{ max}$	$T_a = 75^\circ\text{C}$	LC7570	500	mW
			LC7570E	480	mW
Operating Temperature	T_{opr}		-30 to +75	$^\circ\text{C}$	
Storage Temperature	T_{stg}		-40 to +125	$^\circ\text{C}$	

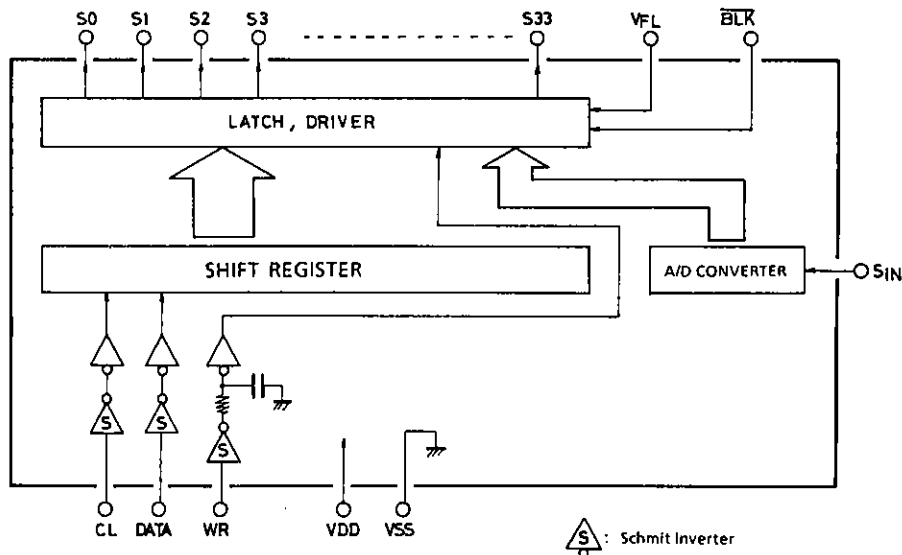
Allowable Operating Ranges at $T_a = -30$ to $+75^\circ\text{C}, V_{SS} = 0\text{V}$

			min	typ	max	unit
Supply Voltage	V_{DD}	V_{DD}	4.5		8.0	V
Input High Level Voltage	V_{IH}	$\overline{\text{BLK}}$	$0.7V_{DD}$		V_{DD}	V
Input Low Level Voltage	V_{IL}	$\overline{\text{BLK}}$	0		$0.3V_{DD}$	V
Rise Trigger Threshold Voltage	V_P	CL, DATA, WR	$0.8V_{DD}$		V_{DD}	V
Fall Trigger Threshold Voltage	V_N	CL, DATA, WR	0		$0.2V_{DD}$	V
Output Voltage	V_{OUT}	S0 to S33, V_{FL}	$V_{DD} - 28$		V_{DD}	V
Write Pulse Width	P_w	WR	20			μs

Electrical Characteristics in the Allowable Operating Ranges

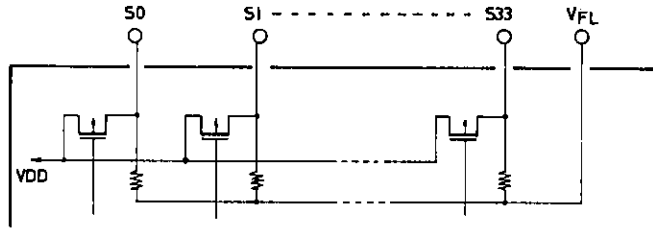
			min	typ	max	unit
Hysteresis Width	V_H	CL, DATA, WR	$0.15V_{DD}$		$0.6V_{DD}$	V
Input High Level Current	I_{IH}	CL, DATA, WR, SIN, $\overline{\text{BLK}}$: $V_I = 8\text{V}$			5.0	μA
Input Low Level Current	I_{IL}	CL, DATA, WR, SIN, $\overline{\text{BLK}}$: $V_I = 0\text{V}$	-5.0			μA
Output High Level Voltage	V_{OH}	S0 to S33 : $I_O = 2.5\text{mA}$	$V_{DD} - 2.8$			V
Output OFF-State Voltage	V_{OFF}	S0 to S33 : $V_{FL} = V_{DD} - 25\text{V}$, output OFF			$V_{DD} - 24$	V
Self-Contained Resistance in Output	r_o	S0 to S33 : $V_{DD} = 5\text{V}$, $V_{FL} = -20\text{V}$	70	170	400	k Ω
A/D Converter						
1st Step Light-Up Voltage	AD1	SIN		$0.1V_{DD}$		V
2nd Step Light-Up Voltage	AD2	SIN		$0.2V_{DD}$		V
3rd Step Light-Up Voltage	AD3	SIN		$0.3V_{DD}$		V
4th Step Light-Up Voltage	AD4	SIN		$0.4V_{DD}$		V
5th Step Light-Up Voltage	AD5	SIN		$0.5V_{DD}$		V
Supply Current	I_{DD}	V_{DD} : input = 0V, output = open			3.0	mA

Equivalent Circuit Block Diagram



Pin Description

S0 to S33, V_{FL} : Segment outputs and common pin for pull-down resistors.



$\overline{\text{BLK}}$: Input for making display unlighted
 $\overline{\text{BLK}} = \text{「 0 」} (V_{SS}) \dots\dots \text{Unlighted}$
 $\overline{\text{BLK}} = \text{「 1 」} (V_{DD}) \dots\dots \text{Lighted}$

CL, DATA, WR : Data input

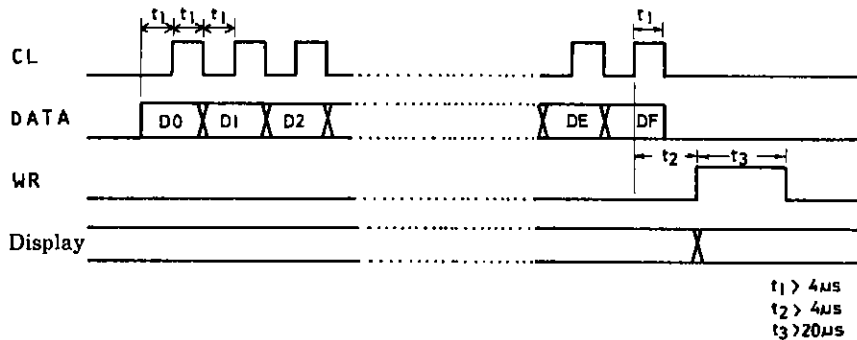
V_{DD}, V_{SS} : Power supply pin

SIN : A/D converter input

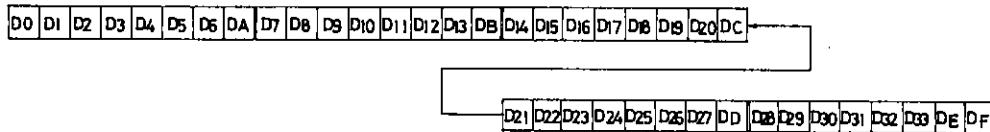
- 1st step light-up level 0.1V_{DD} (typ)
- 2nd step light-up level 0.2V_{DD} (typ)
- 3rd step light-up level 0.3V_{DD} (typ)
- 4th step light-up level 0.4V_{DD} (typ)
- 5th step light-up level 0.5V_{DD} (typ)

NC : No connect

Data Input



Inputting starts at D0.



- D0 to D33 : Display data
- DA to DE : Dummy bit (don't care)
- DF : S29 to S33 select
- Dn = 「 1 」 : Sn = 「 1 」 (= V_{DD})
- Dn = 「 0 」 : Sn = 「 0 」 (= V_{FL})
- DF = 「 0 」 : D29 to D33 → S29 to S33
- DF = 「 1 」 : AD1 → S33
- AD2 → S32
- AD3 → S31
- AD4 → S30
- AD5 → S29

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