



No.1465D

LC7570, 7570E

Static Drivers for Vacuum Fluorescent Display for Frequency Display Applications

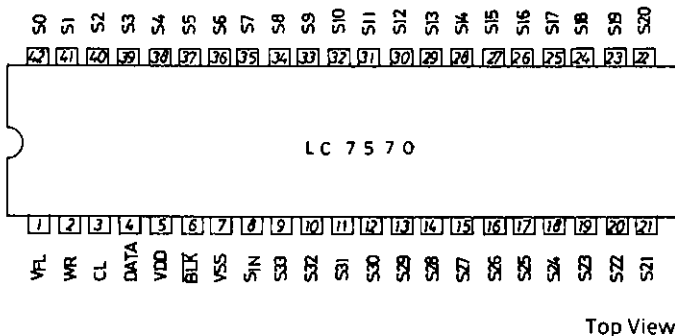
**Overview**

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

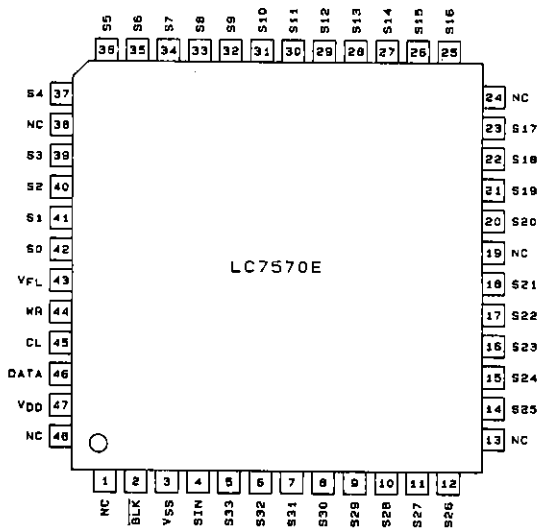
**Features**

- 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**

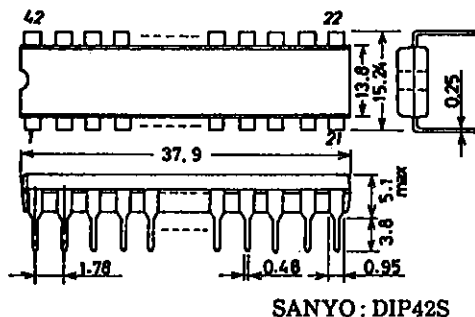


Top View

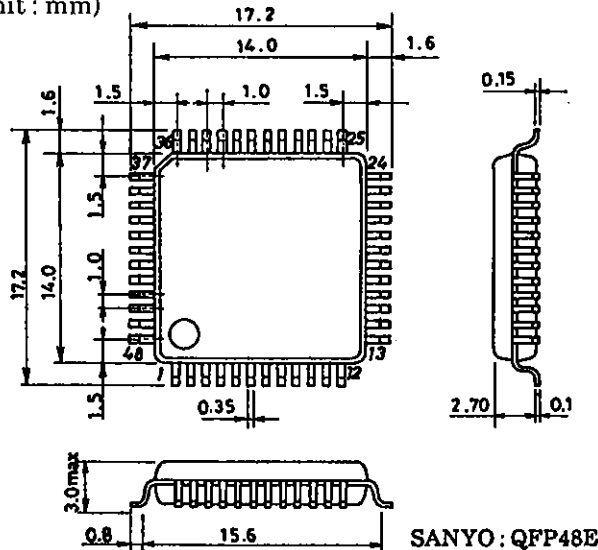


Top View

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



**Package Dimensions 3156 [LC7570E]**  
(unit : mm)



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# LC7570,7570E

## Absolute Maximum Ratings at Ta = 25°C, VSS = 0V

				unit	
Maximum Supply Voltage	V <sub>DD</sub> max	V <sub>DD</sub>	-0.3 to +9.0	V	
Maximum Input Voltage	V <sub>IN</sub> max	CL, DATA, WR, SIN, $\overline{\text{BLK}}$	-0.3 to V <sub>DD</sub> + 0.3	V	
Maximum Output Voltage	V <sub>OUT</sub> max	S0 to S33, V <sub>FL</sub>	V <sub>DD</sub> - 28 to V <sub>DD</sub> + 0.3	V	
Maximum Output Current	I <sub>OUT</sub> max	S0 to S33	3.0	mA	
Allowable Power Dissipation	Pd max	Ta = 75°C	LC7570	500	mW
			LC7570E	480	mW
Operating Temperature	T <sub>opr</sub>		-30 to +75	°C	
Storage Temperature	T <sub>stg</sub>		-40 to +125	°C	

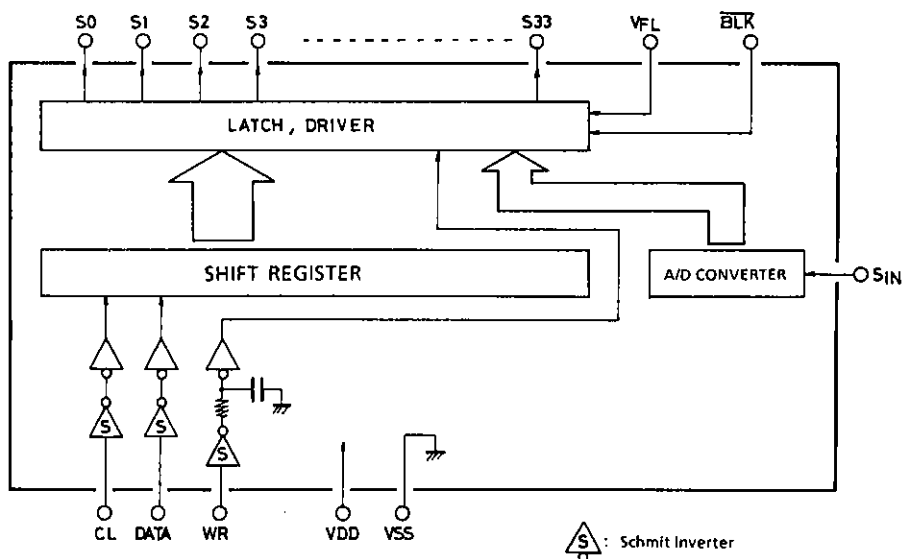
## Allowable Operating Ranges at Ta = -30 to +75°C, VSS = 0V

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

## Electrical Characteristics in the Allowable Operating Ranges

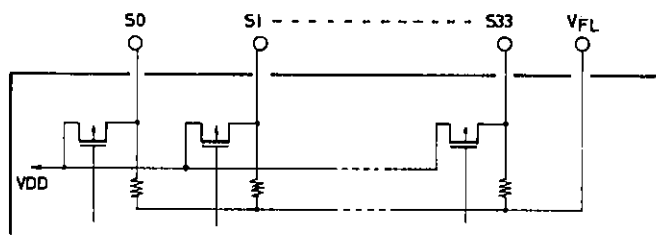
			min	typ	max	unit
Hysteresis Width	V <sub>H</sub>	CL, DATA, WR	0.15V <sub>DD</sub>	0.6V <sub>DD</sub>		V
Input High Level Current	I <sub>IH</sub>	CL, DATA, WR, SIN, $\overline{\text{BLK}}$ : V <sub>I</sub> = 8V			5.0	μA
Input Low Level Current	I <sub>IL</sub>	CL, DATA, WR, SIN, $\overline{\text{BLK}}$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

## Equivalent Circuit Block Diagram



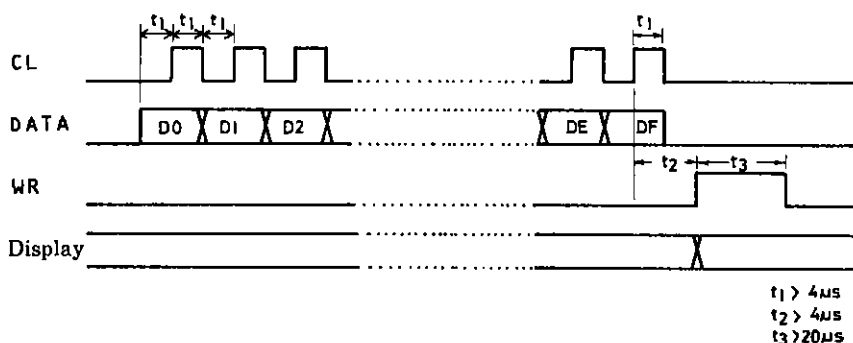
Pin Description

S0 to S33, V<sub>FL</sub> : Segment outputs and common pin for pull-down resistors.

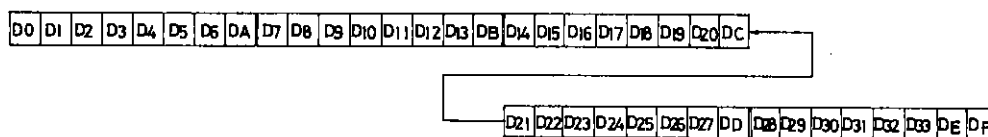


- $\overline{\text{BLK}}$  : Input for making display unlighted  
 $\overline{\text{BLK}} = \lceil 0 \rceil (V_{SS})$  ..... Unlighted  
 $\overline{\text{BLK}} = \lceil 1 \rceil (V_{DD})$  ..... Lighted
- CL, DATA, WR : Data input
- V<sub>DD</sub>, V<sub>SS</sub> : Power supply pin
- SIN : A/D converter input
  - 1st step light-up level ..... 0.1V<sub>DD</sub> (typ)
  - 2nd step light-up level ..... 0.2V<sub>DD</sub> (typ)
  - 3rd step light-up level ..... 0.3V<sub>DD</sub> (typ)
  - 4th step light-up level ..... 0.4V<sub>DD</sub> (typ)
  - 5th step light-up level ..... 0.5V<sub>DD</sub> (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 =  $\lceil 1 \rceil$  : Sn =  $\lceil 1 \rceil (=V_{DD})$
- Dn =  $\lceil 0 \rceil$  : Sn =  $\lceil 0 \rceil (=V_{FL})$
- DF =  $\lceil 0 \rceil$  : D29 to D33 → S29 to S33
- DF =  $\lceil 1 \rceil$  : AD1 → S33  
 AD2 → S32  
 AD3 → S31  
 AD4 → S30  
 AD5 → S29

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