Ordering number: EN1465D

CMOS LSI

No.1465D

LC7570, 7570E

Static Drivers for Vacuum Fluorescent Display for Frequency Display Applications

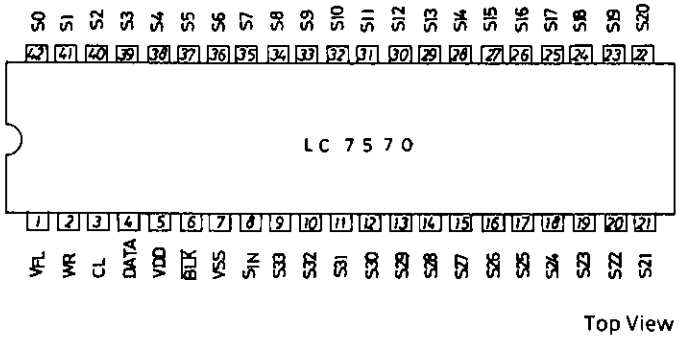
Overview

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

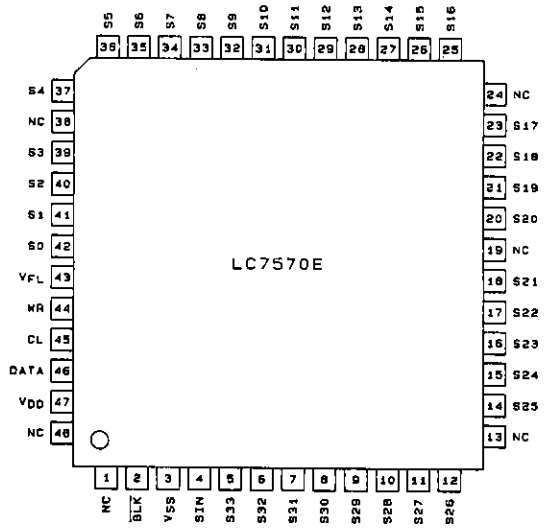
Features

- 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

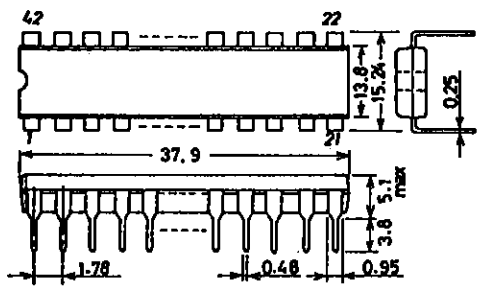


Top View



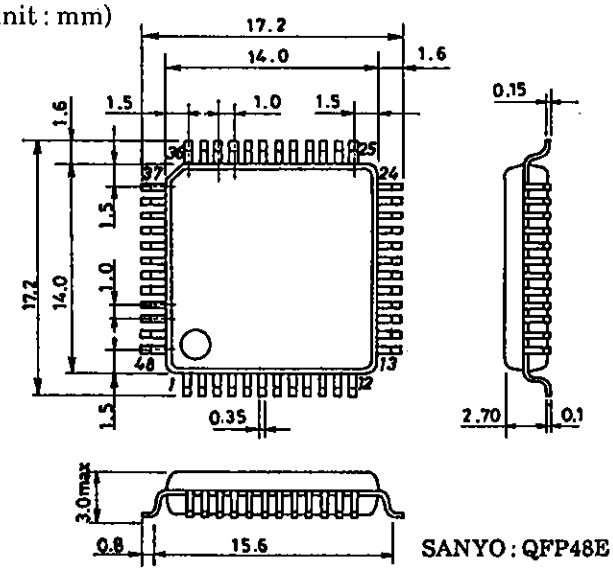
Top View

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



SANYO: DIP42S

Package Dimensions 3156 [LC7570E]
(unit: mm)



SANYO: QFP48E

Absolute Maximum Ratings at Ta = 25°C, V_{SS} = 0V

					unit
Maximum Supply Voltage	V_{DD} max	V_{DD}		−0.3 to +9.0	V
Maximum Input Voltage	V_{IN} max	CL,DATA,WR,SIN,$\overline{BLK}$		−0.3 to V_{DD}+0.3	V
Maximum Output Voltage	V_{OUT} max	S0 to S33,V_{FL}		V_{DD}−28 to V_{DD}+0.3	V
Maximum Output Current	I_{OUT} max	S0 to S33		3.0	mA
Allowable Power Dissipation	Pd max	Ta = 75°C	LC7570	500	mW
			LC7570E	480	mW
Operating Temperature	Topr			−30 to +75	°C
Storage Temperature	Tstg			−40 to +125	°C

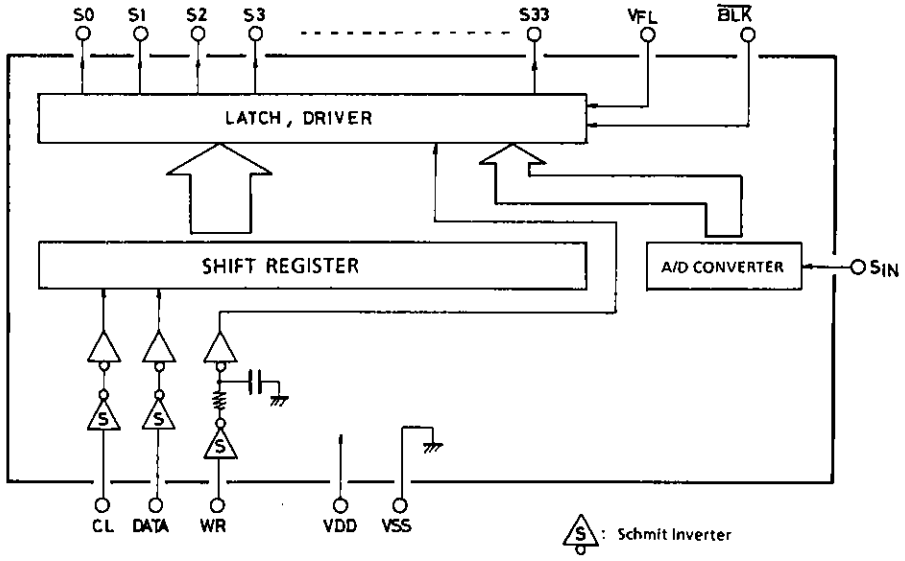
Allowable Operating Ranges at Ta = −30 to +75°C, V_{SS} = 0V

			min	typ	max	unit
Supply Voltage	V_{DD}	V_{DD}	4.5		8.0	V
Input High Level Voltage	V_{IH}	$\overline{BLK}$	0.7V_{DD}		V_{DD}	V
Input Low Level Voltage	V_{IL}	$\overline{BLK}$	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	Pw	WR	20			μs

Electrical Characteristics in the Allowable Operating Ranges

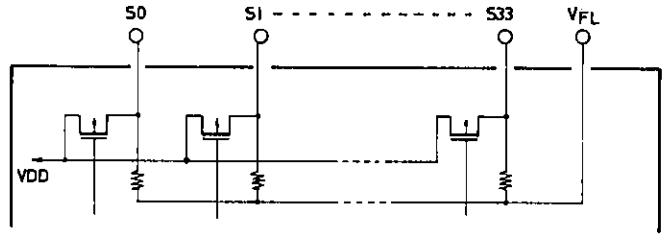
			min	typ	max	unit
Hysteresis Width	V_H	CL,DATA,WR	0.15V_{DD}		0.6V_{DD}	V
Input High Level Current	I_{IH}	CL,DATA,WR,SIN,$\overline{BLK}$: V_I = 8V			5.0	μA
Input Low Level Current	I_{IL}	CL,DATA,WR,SIN,$\overline{BLK}$: V_I = 0V	−5.0			μA
Output High Level Voltage	V_{OH}	S0 to S33 : I_O = 2.5mA	V_{DD}−2.8			V
Output OFF-State Voltage	V_{OFF}	S0 to S33 : V_{FL} = V_{DD} − 25V, output OFF			V_{DD}−24	V
Self-Contained Resistance in Output	ro	S0 to S33 : V_{DD} = 5V, V_{FL} = −20V	70	170	400	kΩ
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.



$\overline{BLK}$: Input for making display unlighted
$\overline{BLK}$ = ⌈ 0 ⌋ (V_{SS}) ..... Unlighted
$\overline{BLK}$ = ⌈ 1 ⌋ (V_{DD}) ..... Lighted

CL,DATA,WR : Data input

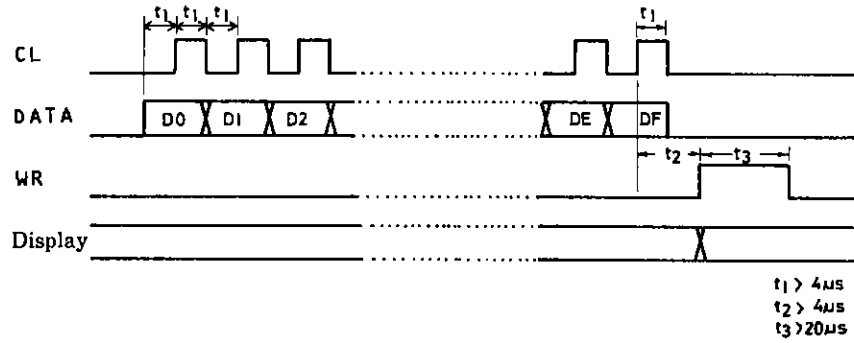
V_{DD},V_{SS} : Power supply pin

SIN : A/D converter input

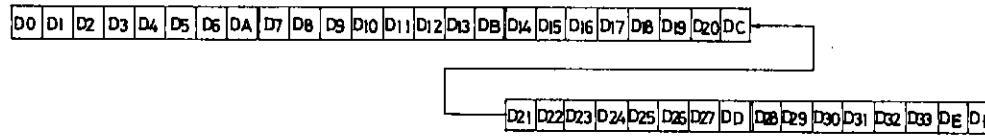
1st step light-up level	$0.1V_{DD}$ (typ)
2nd step light-up level	$0.2V_{DD}$ (typ)
3rd step light-up level	$0.3V_{DD}$ (typ)
4th step light-up level	$0.4V_{DD}$ (typ)
5th step light-up level	$0.5V_{DD}$ (typ)

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