

Ordering number : EN2294A

	No.2294A	CMOS LSI LC7821, 7822, 7823
		Analog Function Switch

Use

- . Serial data-controlled function select switch suited for use in amplifiers, receivers.

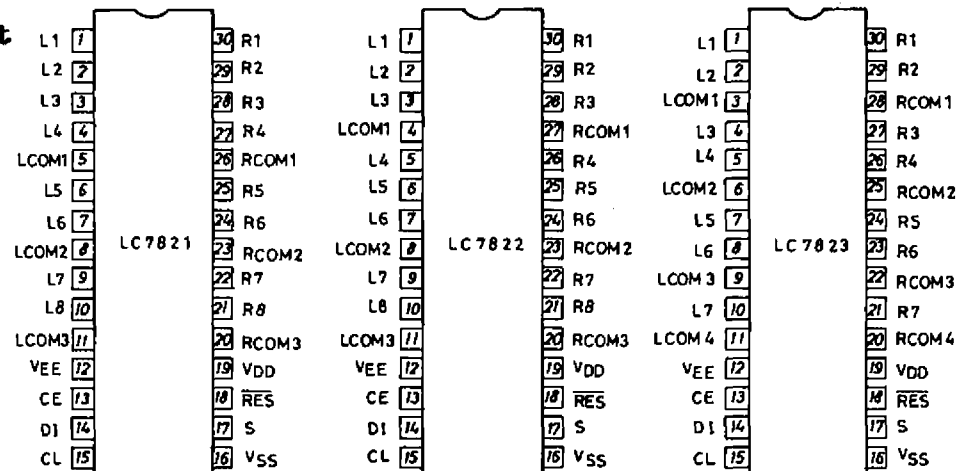
Features

- . Analog switches of 8 channels x 2 (LC7823: 7 channels x 2) are contained. Three types are available according to the internal connection.
- . Control is exercised by serial data. The LC7821, 7822, 7823 may be interfaced with a microcomputer (5V-operated) easily.
- . Even if two ICs of the same type are used, they may be connected to the common bus line because the S (selector) pin is provided.
- . Reset pin used to turn OFF all analog switches
- . Wide dynamic range because of $\pm 20V$ breakdown voltage

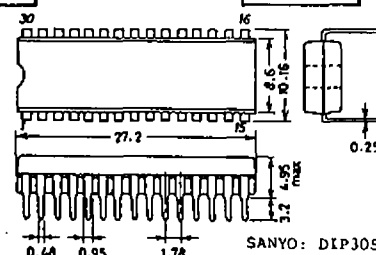
Absolute Maximum Ratings at $T_a = 25^\circ C$

				unit
Maximum Supply Voltage	V_{DDmax}	V_{DD}	-0.3 to +20	V
	V_{EEmax}	V_{EE}	-20 to +0.3	V
Maximum Input Voltage	V_{I1}	DI, CL, CE, S, RES	-0.3 to +20	V
	V_{I2}	L1 to L8, R1 to R8, LCOM1 to LCOM4, RCOM1 to RCOM4	$V_{EE} - 0.3$ to $V_{DD} + 0.3$	V
Analog Switch ON-State Voltage Difference	ΔV_{ON}	Switch ON	0.5	V
Allowable Power Dissipation	P_{dmax}	$T_a \leq 75^\circ C$	100	mW
Operating Temperature	T_{opr}		-30 to +75	$^\circ C$
Storage Temperature	T_{stg}		-40 to +125	$^\circ C$

Pin Assignment



Package Dimensions 3047A
(unit: mm)

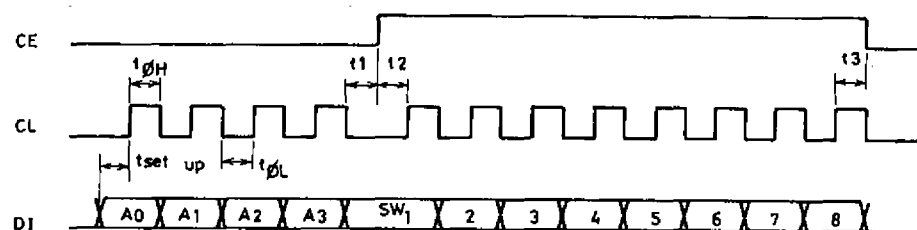


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1138KI/8066KI, TS №2294-1/6

Allowable Operating Conditions at $T_a=25^{\circ}\text{C}$, $V_{SS}=0\text{V}$, $ V_{DD} \geq V_{EE} $				min	typ	max	unit
Maximum Supply Voltage	V_{DD}	$V_{DD}-V_{EE} \geq 12\text{V}: V_{DD}$		6.0		18.5	V
	V_{EE}	$V_{DD}-V_{EE} \geq 12\text{V}: V_{EE}$		-18.5		0	V
Input "H"-Level Voltage	V_{IH1}	DI, CL, CE		4.0		18.5	V
	V_{IH2}	S, RES		$0.7V_{DD}$		V_{DD}	V
Input "L"-Level Voltage	V_{IL1}	DI, CL, CE		0		0.7	V
	V_{IL2}	S, RES		0		$0.3V_{DD}$	V
Analog Switch Input Voltage Range	V_{IN}	L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4		V_{EE}		V_{DD}	V
"L"-Level Clock Pulse Width	$t_{\phi L}$	CL		0.5			μs
"H"-Level Clock Pulse Width	$t_{\phi H}$	CL		0.5			μs
Setup Time	t_{setup}	CL, DI		0.5			μs
	t_1^*	CL, CE		0.5			μs
	t_2^*	CL, CE		0.5			μs
	t_3^*	CL, CE		0.5			μs
Reset Minimum Pulse Width	t_{wRES}	$V_{DD} \geq 6\text{V}: \text{RES}$		1.0			μs
Hysteresis Width	V_H	CL, CE, DI		0.3			V

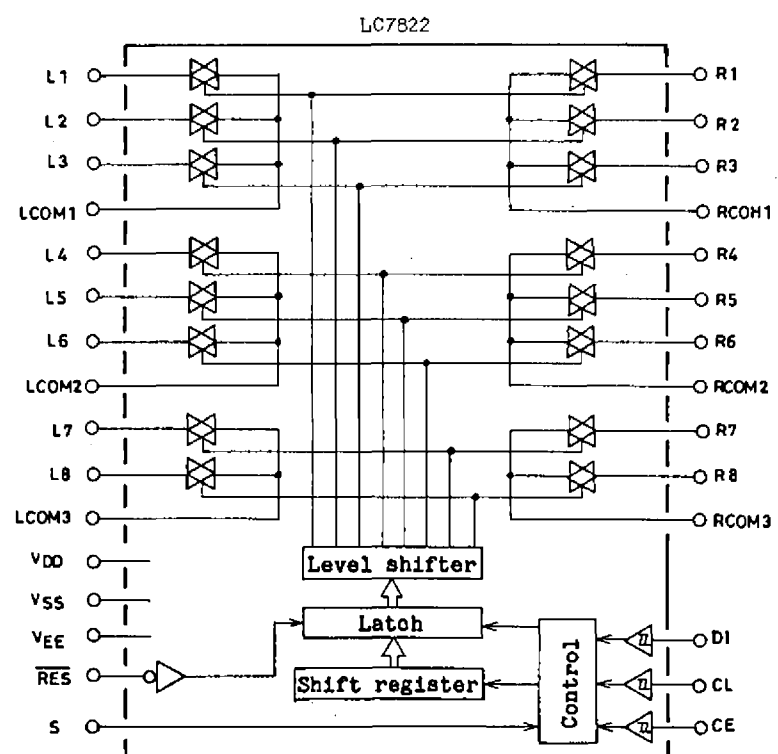
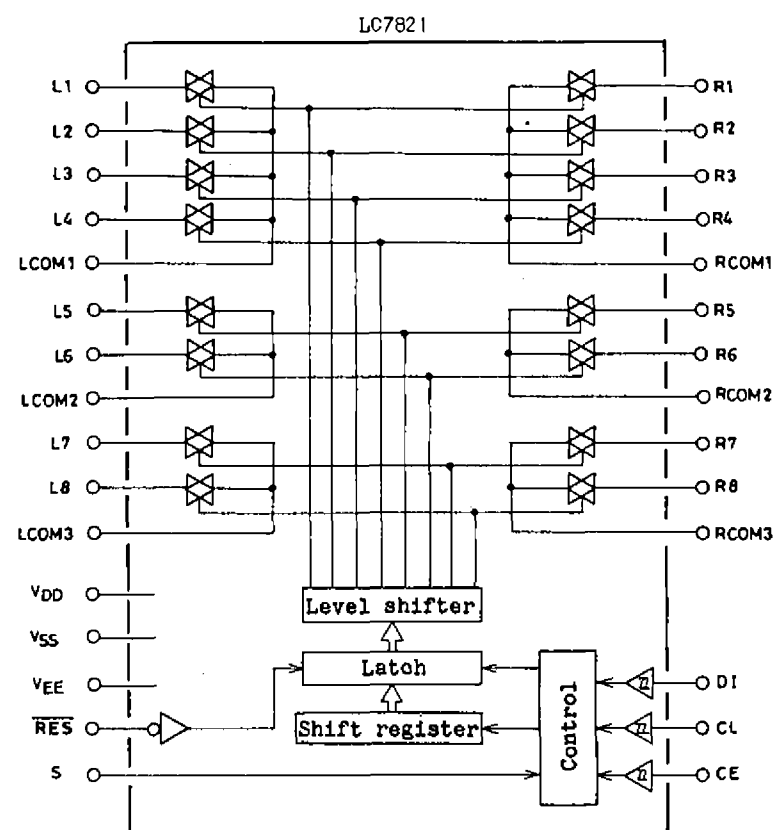
*: CE, CL, DI waveforms



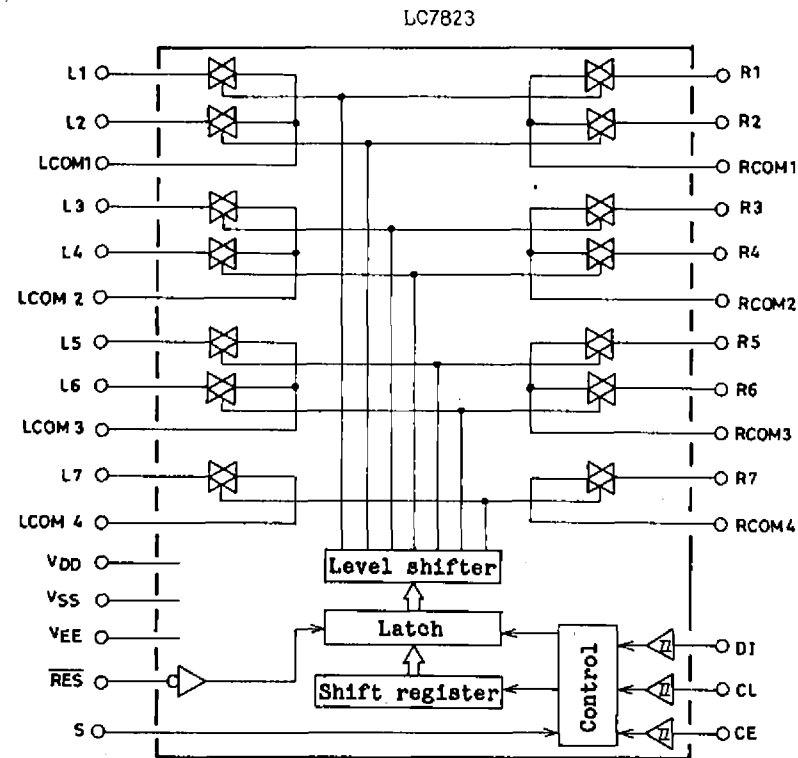
Electrical Characteristics at $T_a=25^{\circ}\text{C}$, $V_{SS}=0\text{V}$				min	typ	max	unit
Analog Switch ON-State Resistance	R_{ON1}	$I=1\text{mA}$, $V_{DD}-V_{EE}=12\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4			150		ohm
	R_{ON2}	$I=1\text{mA}$, $V_{DD}-V_{EE}=37\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4			70		ohm
Total Harmonic Distortion	THD1	$V_{IN}=1\text{Vrms}$, $f=1\text{kHz}$, $V_{DD}-V_{EE}=37\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4		0.0015	0.01		%
	THD2	$V_{IN}=0.1\text{Vrms}$, $f=1\text{kHz}$, $V_{DD}-V_{EE}=37\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4		0.01	0.05		%
Feedthrough	F_{TH}	$V_{IN}=0\text{dBV}$, $f=10\text{kHz}$, $V_{DD}-V_{EE}=37\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4			55		dB
Crosstalk	CT	$V_{IN}=0\text{dBV}$, $f=10\text{kHz}$, $V_{DD}-V_{EE}=37\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4			75		dB
Input "H"-Level Current	I_{IH}	$V_I=18.5\text{V}$: DI, CL, CE, S, RES				10	μA
Input "L"-Level Current	I_{IL}	$V_I=0\text{V}$: DI, CL, CE, S, RES		-10			μA
Analog Switch OFF-State Leakage Current	I_{OFF}	$V_I=V_{EE}$ to $V_{EE}+37\text{V}$: L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4		-10		10	μA
Current Dissipation	I_{DD}	V_{DD}				1.0	mA

LC7821,7822,7823

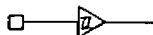
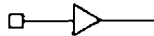
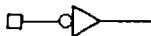
Equivalent Circuit Block Diagram



Equivalent Circuit Block Diagram



Pin Description

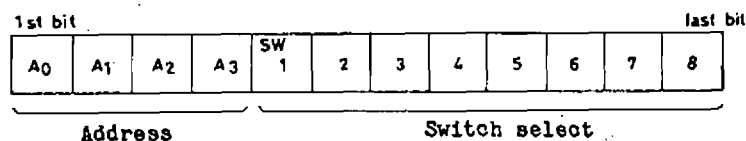
Pin Name	I/O	Internal Equivalent Circuit	Function																																											
V _{DD} , V _{SS} , V _{EE}			Power supply pins																																											
L1toL8, R1toR8, LCOM1toLCOM4, RCOM1toRCOM4		See Block Diagram.	Input/output pins for analog switches.																																											
CL, DI, CE	I		Serial data input pins (Schmitt buffer) CL --- Clock input pin DI --- Data input pin CE --- Chip enable pin																																											
S	I		Select pin in the two ICs-used mode When the S pin is brought to "L" or "H" level, the addresses will become as shown below. <table border="1" data-bbox="1245 1949 1627 2172"><thead><tr><th rowspan="2">Type No.</th><th rowspan="2">S Pin</th><th colspan="4">Address</th></tr><tr><th>A₀</th><th>A₁</th><th>A₂</th><th>A₃</th></tr></thead><tbody><tr><td rowspan="2">LC7821</td><td>L</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>H</td><td>1</td><td>1</td><td>0</td><td>1</td></tr><tr><td rowspan="2">LC7822</td><td>L</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>H</td><td>1</td><td>0</td><td>1</td><td>1</td></tr><tr><td rowspan="2">LC7823</td><td>L</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>H</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></tbody></table>	Type No.	S Pin	Address				A ₀	A ₁	A ₂	A ₃	LC7821	L	0	1	0	1	H	1	1	0	1	LC7822	L	0	0	1	1	H	1	0	1	1	LC7823	L	0	1	1	1	H	1	1	1	1
Type No.	S Pin	Address																																												
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LC7823	L	0	1	1	1																																									
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RES	I		Reset pin When power is applied, the state of the analog switches will be indeterminate. When this pin is brought to "L" level, all analog switches will be turned OFF.																																											

LC7821, 7822, 7823

Operation Description

1. Data input method

The LC7821, 7822, 7823 are controlled by inputting serial data to the CL, DI, CE pins. Data consists of 12 bits in all (address: 4 bits, data: 8 bits).



Each switch No. corresponds to analog switches L1 to L8, R1 to R8.
Set the bit of a switch to be turned ON to 1.

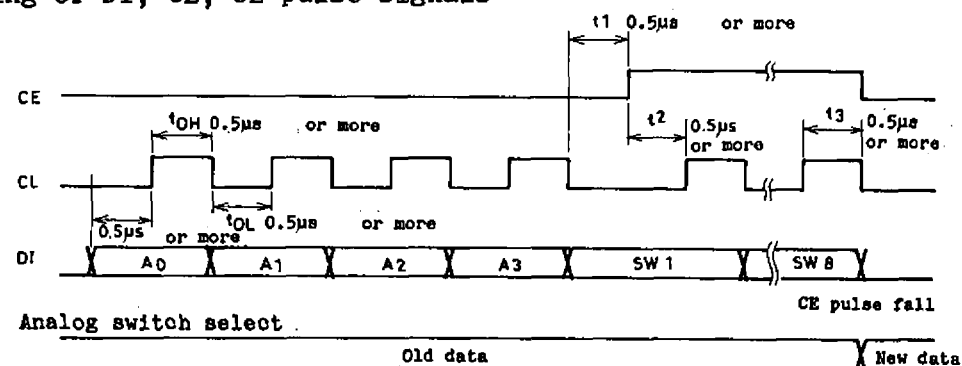
0 ----- OFF
1 ----- ON

The address is used for chip select when connected to the common bus line.
When the S pin is brought to "L" or "H" level, the transmit data will become as shown below.

Type No.	S Pin	Address			
		A0	A1	A2	A3
LC7821	L	0	1	0	1
	H	1	1	0	1
LC7822	L	0	0	1	1
	H	1	0	1	1
LC7823	L	0	1	1	1
	H	1	1	1	1

Note: For the LC7823, the bit of switch 8 becomes "don't care" (0 or 1).
The reason for this is that the LC7823 contains 7 channels x 2 of analog switches.

2. Timing of DI, CL, CE pulse signals



Data is fetched into the inside on the positive transition of the CL pulse and latched on the negative transition of the CE pulse.

3. Reset pin

When power is applied, the state of the analog switches will be indeterminate. All analog switches may be turned OFF by connecting C, R to this pin externally.

