



# LA7938

## Electronic Channel Select System Control Circuit for TV/VCR Use

### Overview

The SANYO LA7938 monolithic linear TV/VCR electronic tuner system controller IC integrates all the peripheral circuitry for a TV or VTR tuner, with the exception of the microcontroller, into a single chip.

It incorporates a 2-input/4-output band-switch, 5.0V and 5.75V voltage regulators, comparator, sync signal processing circuit, AFT DC shift circuit and constant current circuit. Each PNP output of the band-switch circuit typically sources 40mA, eliminating the need for external current drivers.

The LA7938 operates from a recommended supply voltage range of 8.7 to 12.5V. It is available in 22-pin shrink DIPs.

### Features

- Integrates all tuner peripheral circuits except controller.
- Band-switch outputs source up to 40mA.
- Regulators each supply up to 50mA.
- 22-pin shrink DIP.

### Specifications

#### Maximum Ratings at $T_a = 25^\circ\text{C}$

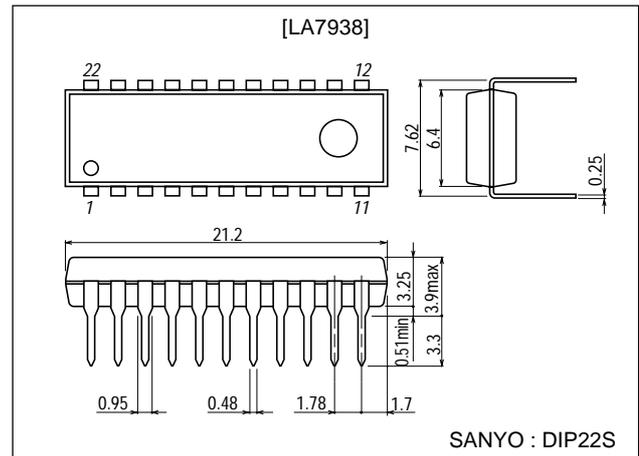
Parameter	Symbol	Conditions	Ratings	Unit
Allowable power dissipation	$P_d \text{ max}$	$T_a \leq 65^\circ\text{C}$	1000	mW
Operating temperature	$T_{opr}$		-20 to +65	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$
[Band-switch]				
$V_{CC1}$ maximum supply voltage	$V_{18} \text{ max}$		13	V
Maximum load current	$I_{19} \text{ max}$		-50	mA
	$I_{20} \text{ max}$		-50	mA
	$I_{21} \text{ max}$		-50	mA
	$I_{22} \text{ max}$		-50	mA
Applied input voltage	$V_6 \text{ max}$		3.5	V
	$V_5 \text{ max}$		3.5	V

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### Package Dimensions

unit:mm

3059-DIP22S



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Parameter	Symbol	Conditions	Ratings	Unit
[Sync detector]				
Positive input voltage	$V_1$ max		3.5	V
Negative input voltage	$-V_1$ max		-1.4	V
Applied input voltage (Pin 3)	$V_3$ max	$V_{CC1}=13V$	10	V
Applied input voltage	$V_4$ max	$V_{CC1}=V_{CC2}=12V$	4.6	V
[Voltage regulators]				
$V_{CC2}$ supply voltage	$V_{13}$ max		13	V
+5.75V output current	$I_{12}$ max		-50*	mA
+5.0V output current	$I_9$ max		-50*	mA
[Comparator]				
Maximum input voltage	$V_8$ max	$V_{CC2}=13V$	13	V
	$V_{10}$ max	$V_{CC2}=13V$	13	V
Applied output voltage	$V_{11}$ max		6	V
[+31V constant current source]				
Applied voltage	$V_{14}$ max		43	V
[AFT shift circuit]				
Maximum input voltage	$V_{16}$ max	$V_{CC1}=13V$	13	V

\* : The rating for the total current drawn from both the 5.0V and 5.75V supplies is 70mA.

## Operating Conditions at $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Operating voltage range	$V_{CC}$ op		8.7 to 12.5	V

## (Band Switch Truth Table)

Input		Output			
A (Pin 6)	B (Pin 5)	F1 (Pin 19)	F2 (Pin 20)	F3 (Pin 21)	F4 (Pin 22)
L	L	H	Z	Z	Z
H	L	Z	H	Z	Z
L	H	Z	Z	H	Z
H	H	Z	Z	Z	H

Z : HIGH-impedance

## Operating Characteristics at $T_a = 25^\circ C$ , $V_{CC1}$ , $V_{CC2}=12V$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current drain 1	$I_{CC1}$			9.0		mA
Quiescent current drain 2	$I_{CC2}$			7.0		mA
[Band-switch]						
Output saturation voltage	$F_1$ (sat.)	$I_O=-40mA$			0.7	V
	$F_2$ (sat.)	$I_O=-40mA$			0.7	V
	$F_3$ (sat.)	$I_O=-40mA$			0.7	V
	$F_4$ (sat.)	$I_O=-40mA$			0.7	V
Input high-level voltage	$V_{5HI}$	Open gate type microcomputer must be in OFF state (pull-up resistance on chip).				
	$V_{6HI}$					
Input low-level voltage	$V_{5LO}$				0.8	V
	$V_{6LO}$				0.8	V
Output leakage current	$I_{FL}$		-50			$\mu A$
[Sync circuit]						
Input threshold voltage	$V_{1TH}$		0.4	0.72	1.5	V
Pin 2 output saturation voltage	$V_2$ (sat)	$I_{SINK}=10mA$			1.0	V
Pin 3 high-level input	$V_3HI$		5.0			V
Pin 3 low-level input	$V_3HO$				3.0	V
Pin 4 output saturation voltage	$V_4$ (sat)	$I_{SINK}=2mA$			0.7	V
[+5.75V, +5.0V regulators]						
+5.75V output voltage	$V_{12}$	$I_{12}=-20mA$	5.35	5.75	6.15	V
+5.75 output voltage regulation	$V_{12Reg}$	$I_{12}=5mA \rightarrow 20mA$	-25		+25	mV
+5.0V output voltage	$V_9$	$I_9=-20mA$	4.6	5.0	5.4	V
+5.0V output voltage regulation	$V_{9Reg}$	$I_9=5mA \rightarrow 20mA$		50	100	mV

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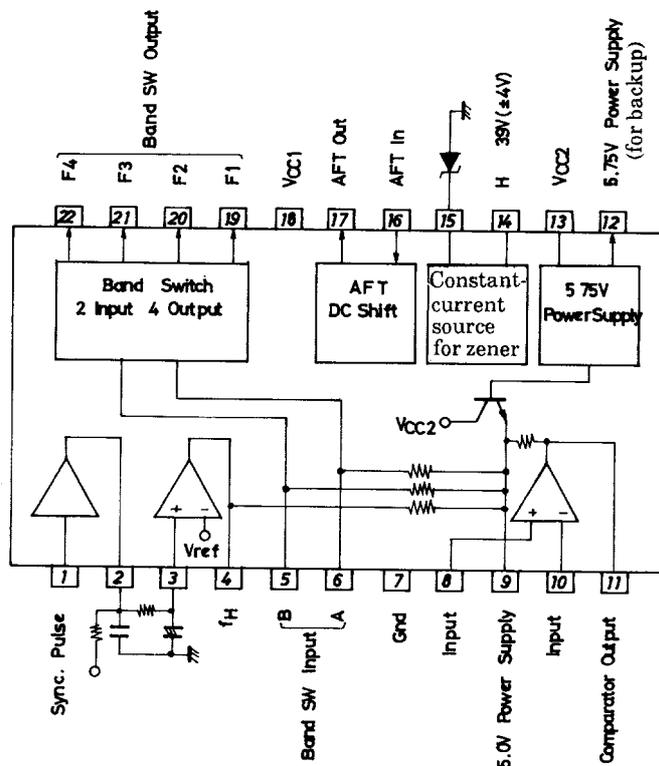
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[31V current source]						
Pin 15 output current	$I_{15}$		4.2	6.0	7.8	mA
[AFT shift current]						
DC shift voltage	$V_{16-V17}$		4.23	4.73	5.23	V
Pin 17 maximum output voltage	$V_{17 \text{ max}}$		5.35	5.75	6.15	V
[Comparator]						
Maximum operating input voltage	$V_{8 \text{ to } 10 \text{ max}}$		9.0			V
Minimum operating input voltage	$V_{8 \text{ to } 10 \text{ min}}$				0.7	V
Output saturation voltage	$V_{11(\text{sat})}$	$I_{\text{SINK}}=2\text{mA}$			0.7	V

## Block Diagram

[For backup purposes]



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