Ordering number : ENN*7900

Preliminary

SANYO Semiconductors
DATA SHEET

Bi-CMOS IC

LV23002M — For Radio Cassette and Mini Component System 1-chip Tuner IC Incorporating PLL

Overview

The LV23002M is a one-chip tuner IC incorporating PLL for radio cassette and mini component system.

Features

- AM
- FM-FE
- FM-IF
- MPX
- PLL

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	V_{CC}	7.0	V
	V_{DD} max	V_{DD}	5.0	V
Maximum input voltage	$V_{IN}1$ max	CE, DI, CL	5.0	V
	$V_{IN}2$ max	XIN	V_{DD}+0.3	V
Maximum output voltage	V_O1 max	DO	6.0	V
	V_O2 max	XOUT, PD	V_{DD}+0.3	V
	V_O3 max	BO1, BO2, AOUT	12.0	V
Allowable power dissipation	Pd max	Ta≤70°C Mounted on a glass epoxy board. Board size : 114.3 mm×76.1mm = 1.6mm	400	mW
Operating temperature	Topr		-20 to +70	°C
Storage temperature	Tstg		-40 to +125	°C

Note : This product should be handled with care because the resistance of one pin against electrostatic discharge damage is low.

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Operating Condition at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.0	V
	V_{DD}		3.0	V
Operating supply voltage range	V_{CC} op		4.0 to 6.0	V
	V_{DD} op		2.5 to 3.6	V

Note : Use the product with the supply voltage applied to V_{CC} and V_{DD}.

PLL block Allowable Operating Range at Ta = -20 to +70°C, V_{SS} = 0V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply voltage	V_{DD}		2.5		3.6	V
Input high level voltage	V_{IH}	CE, CL, DI	$0.7V_{DD}$		5.0	V
Input low level voltage	V_{IL}	CE, CL, DI	0		$0.3V_{DD}$	V
Output voltage	V_O1	DO	0		6.0	V
	V_O2	BO1, BO2, AOUT	0		10	V
Operating frequency	$f_{IN}1$	XIN ; $V_{IN}1$		75		kHz
	$f_{IN}2$	FMIN ; $V_{IN}2$	10		160	MHz
	$f_{IN}3$	AMIN (SNS = 1) ; $V_{IN}3$	2		40	MHz
	$f_{IN}4$	AMIN (SNS = 0) ; $V_{IN}4$	0.5		10	MHz

Note : Due attention must be paid on leak because the XIN pin has an extremely high input impedance.

Operating Characteristics at Ta = 25°C, V_{CC} = 5.0V, V_{DD} = 3.0V, See the specified circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[FM-FE characteristics] : fc = 98MHz, fm = 1kHz, 22.5kHzdev.						
3dB sensitivity	3dB LS	60dBμV EMF, 30%mod output reference, -3dB input		3		dBμV EMF
Actual sensitivity	QS	S/N = Input at S/N = 30dB		10		dBμV EMF
[FM-IF monaural characteristics] : fc = 10.7MHz, fm = 1kHz, 75kHzdev.						
Demodulation output	V_O	100dBμV, 12pin output	210	330	420	mVrms
Channel balance	CB	100dBμV, 13pin output /12pin output	-1.5	0	+1.5	dB
Signal-to-noise ratio	S/N	100dBμV, 12pin output	68	75		dB
Total harmonic distortion (Monaural)	THD	100dBμV, 12pin output		0.3	1.5	%
3dB sensitivity	3dB LS	V_O reference, Input level at which V_O reference is -3dB.		38	44	dBμV
IF count sensitivity	IF-C3	SDC0 = 1, SDC1 = 0,18pin(DO) output	45	51	61	dBμV
Mute attenuation	Mute-Att	100dBμV, 12pin output		68		dB
[FM-IF stereo characteristics] : fc = 10.7MHz, fm = 1kHz, L+R = 90%, Pilot = 10%, V_{IN} = 100dBμV						
Separation	SEP	L-mod, 12pin output /13pin output	28	40		dB
Total harmonic distortion (Main)	THD	Main-mod, 12pin output		0.5	1.5	%
Stereo ON sensitivity	ST-ON	Stereo operation ON at Pilot = 5.5% Stereo not ON at Pilot = 0.6%				
Cap challenge	CR	Stereo ON at fm = 18.6 kHz and 10% modulation fm = 19.4kHz, Stereo ON at fm = 19.4 kHz and 10% modulation				

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[AM characteristics] : fc = 1000kHz, fm = 1kHz, 30%mod						
Detection output 1	V_O1	23dBμV, 12pin output	20	40	80	mVrms
Detection output 2	V_O2	80dBμV, 12pin output	60	110	160	mVrms
Signal-to-noise ratio 1	S/N1	23dBμV, 12pin output	15	20		dB
Signal-to-noise ratio 2	S/N2	80dBμV, 12pin output	47	54		dB
Total harmonic distortion	THD	80dBμV, 12pin output		1.2	3.0	%
IF count sensitivity	IF-C	18pin(DO) output	16	26	36	dBμV
Low-range attenuation	LOW-CUT	V_O2 reference, Pin 12 output at fm = 100Hz	5	8	11	dB
[Current dissipation]						
Current dissipation	ICCFM	No input in FM mode	20	30	40	mA
	ICCAM	No input in AM mode	10	20	30	
	I_{DD}	fr = 83MHz, X'tal = 75kHz, No input to tuner	1	2	5	
[PLL characteristics]						
Internal return resistance	Rf	XIN		8		MΩ
Built-in output resistance	Rd	XOUT		250		kΩ
Hysteresis width	VHIS	CE, CL, DI		$0.1V_{DD}$		V
Output high level voltage	V_{OH}	PD ; I_O = -1mA	V_{DD}-1.0			V
Output low level voltage	$V_{OL}1$	PD ; I_O = 1mA			1.0	V
	$V_{OL}2$	BO1, BO2 ; I_O = 1mA			0.25	V
		BO1, BO2 ; I_O = 5mA			1.25	V
	$V_{OL}3$	DO ; I_O= 1mA			0.25	V
	$V_{OL}4$	AOUT ; I_O = 1mA, AIN = 2.0V			0.5	V
Input high level current	$I_{IH}1$	CE, CL, DI ; V_I = 6.0V			5.0	μA
	$I_{IH}2$	XIN ; V_I = V_{DD}	0.16		0.9	μA
	$I_{IH}3$	AIN ; V_I = 6.0V			200	nA
Input low level current	$I_{IL}1$	CE, CL, DI ; V_I = 0V			5.0	μA
	$I_{IL}2$	XIN ; V_I = 0V	0.16		0.9	μA
	$I_{IL}3$	AIN ; V_I = 0V			200	nA
Output off-leak current	IOFF1	BO1, AOUT, BO2 ; V_O = 10V			5.0	μA
	IOFF2	DO ; V_O = 6.0V			5.0	μA
"H" level 3-state off-leak current	IOFFH	PD ; V_O = 6.0V		0.01	200	nA
"L" level 3-state off-leak current	IOFFL	PD ; V_O = 0V		0.01	200	nA

Package Dimensions

unit : mm

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