Ordering number : EN 4373A

Monolithic Linear IC

No.4373A

LA7860, 7860M

Deflection IC Supports Multisynch Display

Overview

The LA7860, 7860M display deflection integrated circuit supports multisynch and high-definition displays. Implemented through proprietary Sanyo circuit technology, it offers unsurpassed low-noise performance.

Its outstanding characteristic is the simplified processing it offers for screen settling in response to fluctuations in horizontal scan frequency, which has required numerous components and complex control procedures in the past. This has been made possible through a combination of the conventional phase shift function (H. SHIFT) with a new horizontal oscillation frequency dependent phase shift function (S. GAIN) implemented internally in the IC.

Control pins for various other internal functions support control at 0 to 2.5V dc, making it possible to simply control horizontal oscillation frequency and horizontal and vertical image phase directly with a microcomputer. When used in conjunction with an interface such as a DAC, it will also support system bus applications.

Features

- Supports multisynch displays
- DC control
- Low noise
- Supports polar input signals
- TTL output

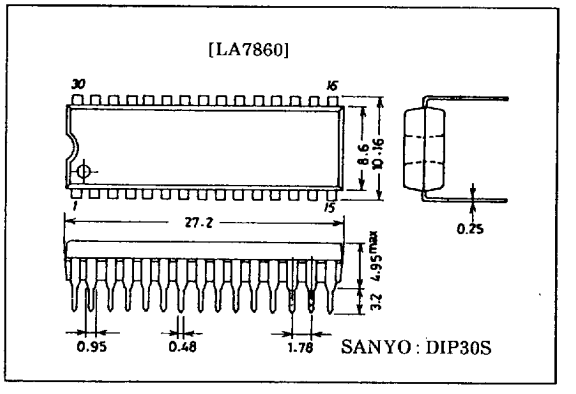
Functions

- Horizontal frequency independent screen phase shift (H. SHIFT)
- Horizontal frequency dependent screen phase shift (S. GAIN)
- Vertical screen phase shift (V. SHIFT)
- Horizontal oscillation frequency control (H. OSC)
- Horizontal synchronization and detection (H. LOCK)
- Vertical blanking output (V. BLK)

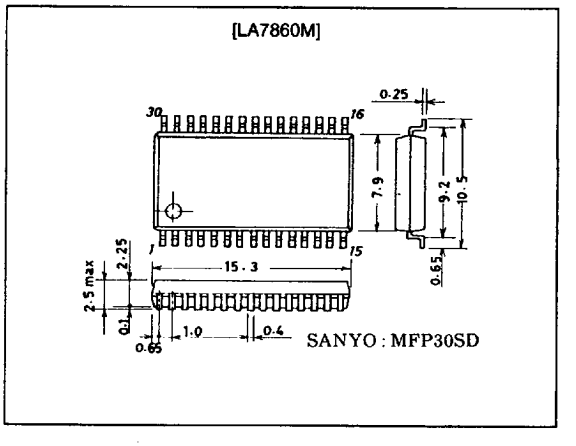
Package Dimensions

unit: mm

3061-DIP30S



3073A-MFP30SD



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{21} max		14	V
Maximum supply current	I_{14} max		75	mA
Maximum rush current	I_{16}si max		10	mA
	I_{24}si max		10	mA
	I_{25}si max		2	mA
FBP minimum input voltage	V_{IN18} min		−5	V
Allowable power dissipation	Pd max	[LA7860]	0.95	W*1
		Ta ≤ 70°C [LA7860M]	1.1	W*2
Operating temperature	Topr		−10 to +70	°C
Storage temperature	Tstg		−55 to +150	°C

Note: 1. TC ≤ 100°C, Pd max = 0.95 W (The case temperature is the temperature of pin 23.)
2. Measured when mounted on a 100 × 70 × 1.15 mm glass epoxy printed circuit board.

Recommended Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	unit
Recommended supply voltage	V_{21}		12	V
Recommended supply current	I_{14}		60	mA
Operating supply voltage	V_{21}op		10.5 to 13.5	V
Operating supply current	I_{14}op		55 to 65	mA
Recommended input voltage	V_1		2	Vp-p
Operating input voltage	V_{30}		2	Vp-p
	V_1op		1.0 to 3.0	Vp-p
	V_{30}op		1.0 to 3.0	Vp-p
Maximum horizontal input width	V_{IN1} max		3/20	Th
Maximum vertical input width	V_{IN30} max		3	ms
Maximum FBP input width	V_{IN18} max		1/5 + Tdelf	Th

Where Th is one horizontal cycle, and Tdelf is 20-pin operation period.

Operating Characteristics at Ta = 25 °C, V_{CC21} = 12 V, I_{CC14} = 60 mA

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
$V_{CC}21$ current dissipation	I_{21}		4.2	5.6	7.0	mA
$V_{CC}14$ supply voltage	V_{14}		8.5	9.0	9.5	V
Maximum vertical pull-in frequency	Fv max		180	210	240	Hz
Minimum vertical pull-in frequency	Fv min		30.0	37.5	45.0	Hz
Maximum vertical blanking width	Wb max		740	875	1010	µs
Minimum vertical blanking width	Wb min		340	400	460	µs
Blanking pulse output high voltage	Vbh		4.5	5	5.5	V
Blanking pulse output low voltage	Vbl				0.3	V
Vertical blanking output current	I_{25}so		1.6	2		mA
Vertical output pulse width	Wvd		255	300	345	µs
Vertical output maximum shift	Pv max		400	475	550	µs
Vertical output delay	Dv min				1	µs
Vertical output voltage high	Vdvh		4.5	5.0	5.5	V
Vertical output voltage low	Vdvl				0.3	V
Vertical output current	I_{24}so		1.7	2.2		mA
Vertical oscillation start voltage	Fvst			5.0	6.0	V
Horizontal oscillation start voltage	FHst			5.0	6.0	V
Minimum horizontal oscillation frequency	FH min		25.7	27.1	28.5	kHz
Maximum horizontal oscillation frequency	FH max		89.5	94.6	99.7	kHz
Horizontal frequency pull-in range	Hpull		3.5	4.1		%
AFC control current	Iafc		500	630	760	µA
Horizontal output high voltage	Vhdh		4.5	5.0	5.5	V
Horizontal output low voltage	Vhdl				0.3	V
Minimum horizontal phase	Ph min	Tfbp = 2.6 µs	−2.0	−1.4	−0.8	µs
Maximum horizontal phase	Ph max	Tfbp = 2.6 µs	3.5	4.5	5.5	µs
Frequency dependent maximum phase	Pf max	Tfbp = 2.6 µs	23	26.5	30	%
Frequency dependent minimum phase	Pf min	Tfbp = 2.6 µs	−3	0	3	%
Minimum horizontal output pulse width	Wh min		21	24	27	%
Maximum horizontal output pulse width	Wh max		64	67	70	%
Horizontal output current	I_{16}so		1.7	2.3		mA
Synchronized output voltage	Vco		4.5	5	5.5	V
Asynchronized output voltage	Vnco				0.3	V
FBP input voltage	Vfbp		1.2	1.5	1.8	V
EN input voltage	Ven		2.0	2.5	3.0	V

Equivalent Circuit Block Diagram and Peripheral Circuit

Unit (Resistance: Ω, Capacitance: F)