



SANYO Semiconductors

DATA SHEET

LA7860

LA7860M

Monolithic Linear IC
For Multisynch Display
Deflection IC

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

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)

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Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{21 \text{ max}}$		14	V
Maximum supply current	$I_{14 \text{ max}}$		75	mA
Maximum rush current	$I_{16\text{si} \text{ max}}$		10	mA
	$I_{24\text{si} \text{ max}}$		10	mA
	$I_{25\text{si} \text{ max}}$		2	mA
FBP minimum input voltage	$V_{IN18 \text{ min}}$		-5	V
Allowable power dissipation	$P_d \text{ max}$	[LA7860] *1	0.95	W
		$T_a \leq 70^\circ\text{C}$ [LA7860M] *2	1.1	W
Operating temperature	T_{opr}		-10 to +70	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Note: 1. $T_C \leq 100^\circ\text{C}$, $P_d \text{ max} = 0.95\text{W}$ (The case temperature is the temperature of pin 23.)

2. Measured when mounted on a $100 \times 70 \times 1.15 \text{ mm}^3$, glass epoxy printed circuit board.

Recommended Operating Conditions at $T_a = 25^\circ\text{C}$

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

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

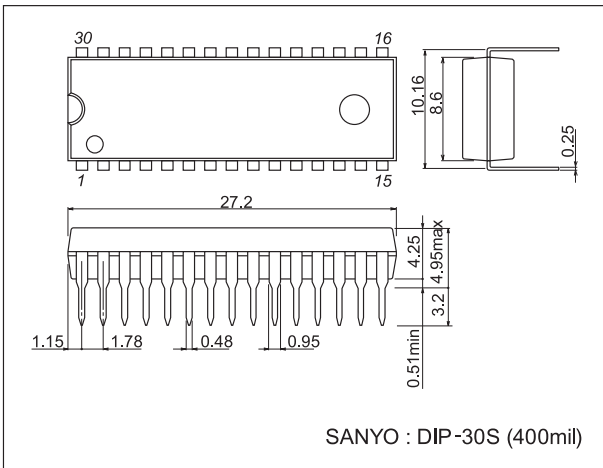
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC21} = 12\text{V}$, $I_{CC14} = 60\text{mA}$

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	max	
V_{CC21} current dissipation	I_{21}		4.2	5.6	7.0	mA
V_{CC14} supply voltage	V_{14}		8.5	9.0	9.5	V
Maximum vertical pull-in frequency	$F_v \text{ max}$		180	210	240	Hz
Minimum vertical pull-in frequency	$F_v \text{ min}$		30.0	37.5	45.0	Hz
Maximum vertical blanking width	$W_b \text{ max}$		740	875	1010	μs
Minimum vertical blanking width	$W_b \text{ min}$		340	400	460	μs
Blanking pulse output high voltage	V_{bh}		4.5	5	5.5	V
Blanking pulse output low voltage	V_{bl}				0.3	V
Vertical blanking output current	$I_{25\text{so}}$		1.6	2		mA
Vertical output pulse width	W_{vd}		255	300	345	μs
Vertical output maximum shift	$P_v \text{ max}$		400	475	550	μs
Vertical output delay	$D_v \text{ min}$				1	μs
Vertical output voltage high	V_{dvh}		4.5	5.0	5.5	V
Vertical output voltage low	V_{dvl}				0.3	V
Vertical output current	$I_{24\text{so}}$		1.7	2.2		mA
Vertical oscillation start voltage	F_{vst}			5.0	6.0	V
Horizontal oscillation start voltage	F_{Hst}			5.0	6.0	V
Minimum horizontal oscillation frequency	$F_H \text{ min}$		25.7	27.1	28.5	kHz
Maximum horizontal oscillation frequency	$F_H \text{ max}$		89.5	94.6	99.7	kHz
Horizontal frequency pull-in range	H_{pull}		3.5	4.1		%
AFC control current	I_{afc}		500	630	760	μA
Horizontal output high voltage	V_{hdh}		4.5	5.0	5.5	V
Horizontal output low voltage	V_{hdl}				0.3	V
Minimum horizontal phase	$Ph \text{ min}$	$T_{fbp} = 2.6 \mu\text{s}$	-2.0	-1.4	-0.8	μs
Maximum horizontal phase	$Ph \text{ max}$	$T_{fbp} = 2.6 \mu\text{s}$	3.5	4.5	5.5	μs
Frequency dependent maximum phase	$Pf \text{ max}$	$T_{fbp} = 2.6 \mu\text{s}$	23	26.5	30	%
Frequency dependent minimum phase	$Pf \text{ min}$	$T_{fbp} = 2.6 \mu\text{s}$	-3	0	3	%
Minimum horizontal output pulse width	$W_h \text{ min}$		21	24	27	%
Maximum horizontal output pulse width	$W_h \text{ max}$		64	67	70	%
Horizontal output current	$I_{16\text{so}}$		1.7	2.3		mA
Synchronized output voltage	V_{co}		4.5	5	5.5	V
Asynchronized output voltage	V_{nco}				0.3	V
FBP input voltage	V_{fbp}		1.2	1.5	1.8	V
EN input voltage	V_{en}		2.0	2.5	3.0	V

Package Dimensions

unit : mm (typ)
3061

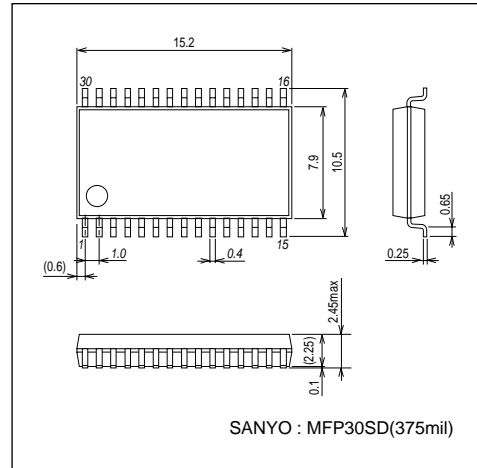
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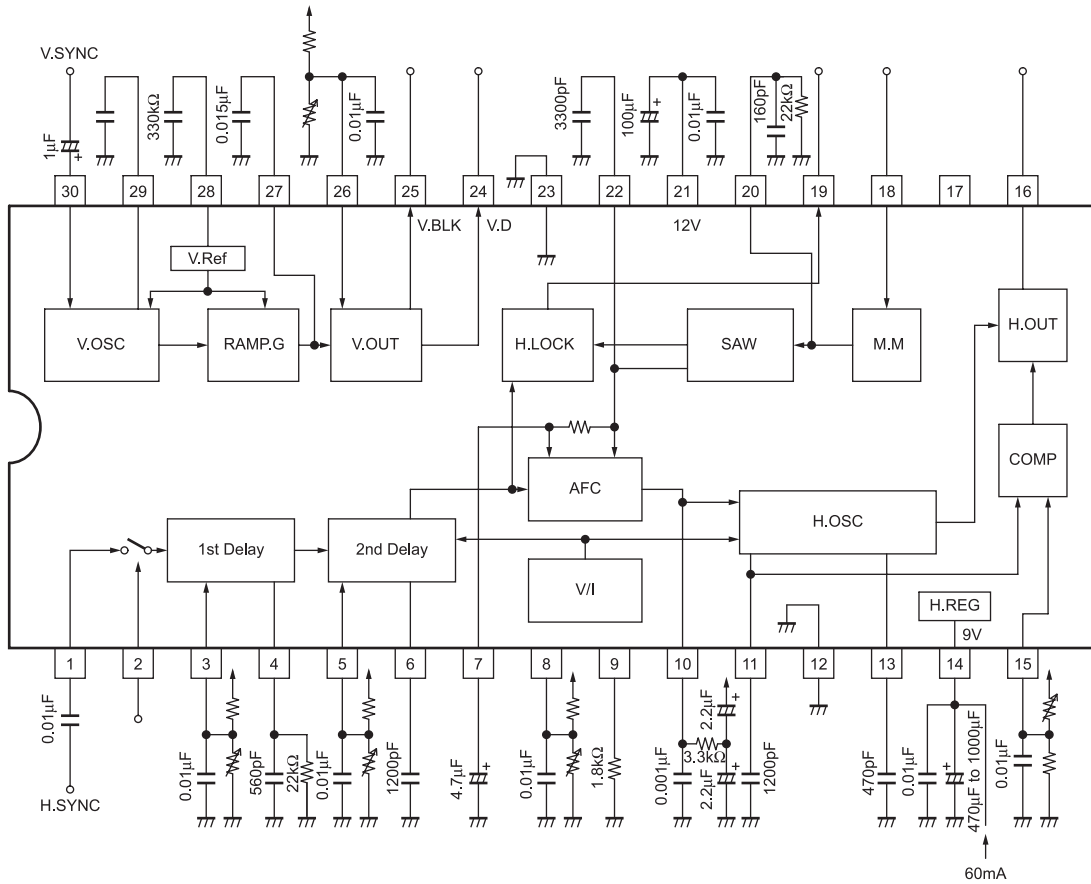
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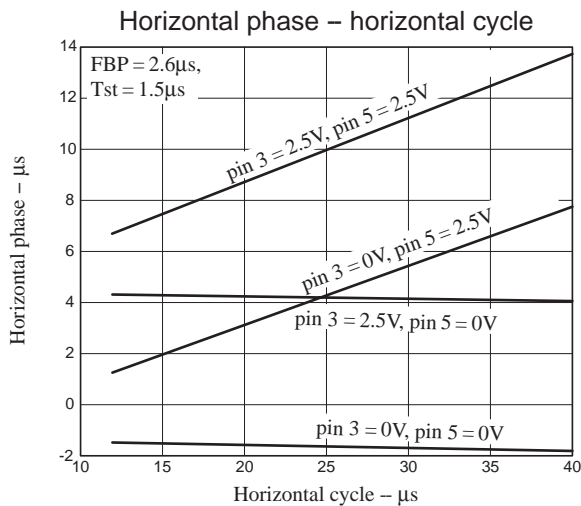
unit : mm (typ)
3173C

[LA7860M]



Block Diagram and Peripheral Circuit





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