



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)

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

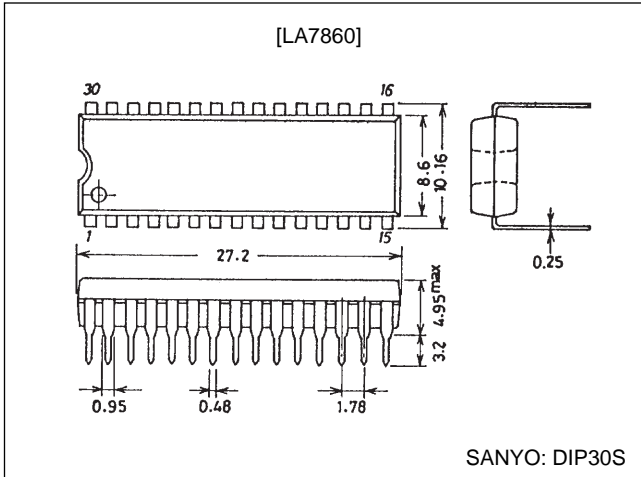
SANYO Electric Co.,Ltd. Semiconductor Business Headquarters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

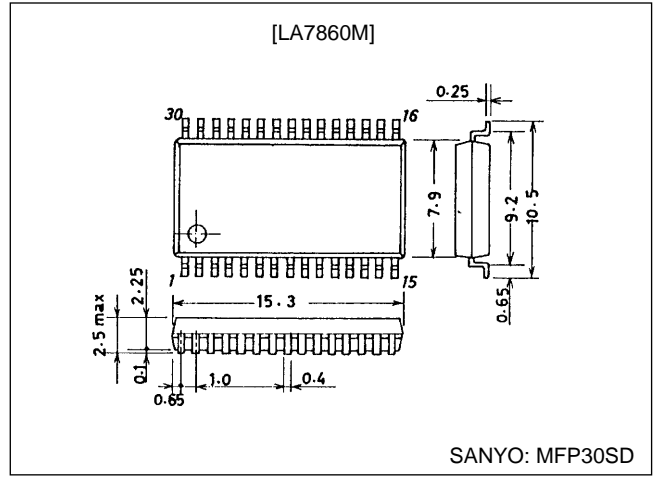
Package Dimensions

unit: mm

3061-DIP30S



3073A-MFP30SD



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{21 \text{ max}}$		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]	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	$V_{21\text{op}}$		10.5 to 13.5	V
Operating supply current	$I_{14\text{op}}$		55 to 65	mA
Recommended input voltage	V_1		2	Vp-p
	V_{30}		2	Vp-p
	$V_{1\text{op}}$		1.0 to 3.0	Vp-p
	$V_{30\text{op}}$		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

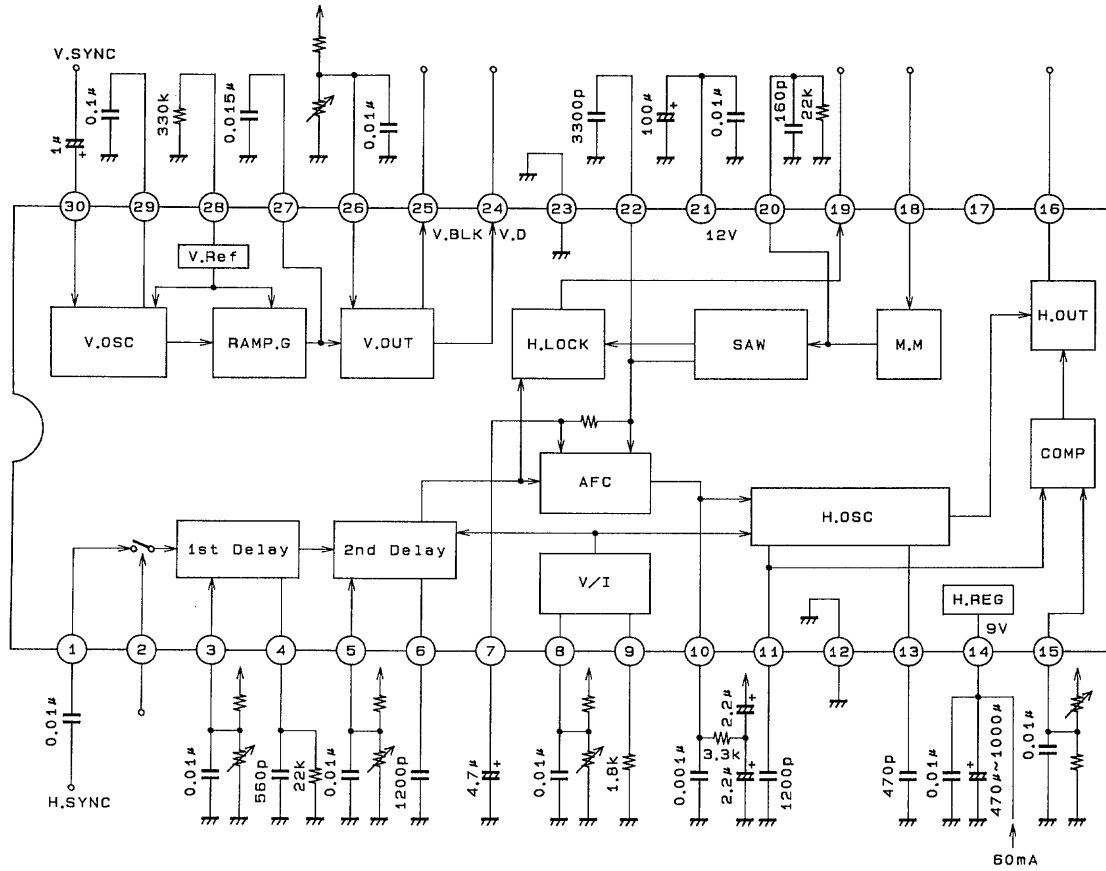
Where Th is one horizontal cycle, and Tdelf is 20-pin operation period.

LA7860, 7860M

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

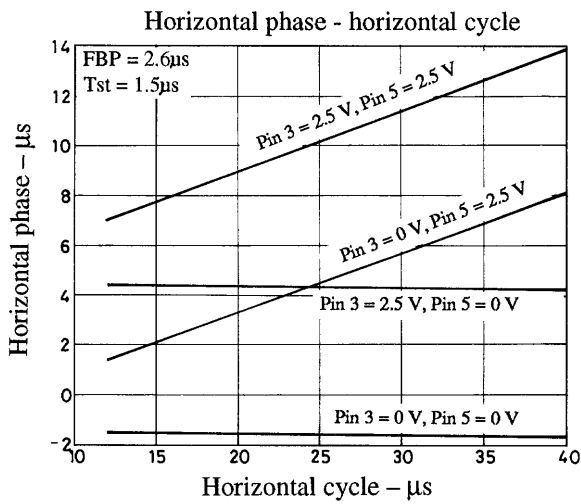
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
V_{CC21} current dissipation	I_{21}		4.2	5.6	7.0	mA
V_{CC14} supply voltage	V_{14}		8.5	9.0	9.5	V
Maximum vertical pull-in frequency	$F_v \text{ max}$		180	210	240	Hz
Minimum vertical pull-in frequency	$F_v \text{ min}$		30.0	37.5	45.0	Hz
Maximum 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	$Ph \text{ min}$	$T_{fbp} = 2.6\text{ }\mu\text{s}$	-2.0	-1.4	-0.8	μs
Maximum horizontal phase	$Ph \text{ max}$	$T_{fbp} = 2.6\text{ }\mu\text{s}$	3.5	4.5	5.5	μs
Frequency dependent maximum phase	$Pf \text{ max}$	$T_{fbp} = 2.6\text{ }\mu\text{s}$	23	26.5	30	%
Frequency dependent minimum phase	$Pf \text{ min}$	$T_{fbp} = 2.6\text{ }\mu\text{s}$	-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

Equivalent Circuit Block Diagram and Peripheral Circuit



A01095

Unit (resistance: Ω, capacitance: F)



- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of September, 1998. Specifications and information herein are subject to change without notice.