



SANYO Semiconductors

# DATA SHEET

## LA7693X Series

Monolithic Linear IC

For NTSC/PAL/SECAM Color TVs

— Built-in CTV Microcontroller

Video and Sound Processing ICs  
(VIF/SIF/Y/C/Deflection/CbCr IN)

### Overview

The LA7693X series is a single-chip video and sound processor IC with a built-in microcontroller that supports all of the different worldwide broadcasting systems. The IC provides fully integrated solution to rationalize the design of color TV sets, increase productivity, and reduce total costs.

### Functions

- I<sup>2</sup>C bus control system with a built-in microcontroller
- VIF/SIF/Y/C/Deflection/CbCr IN
- Adjustment-free VIF/SIF
- 1X'tal multi-system that supports all broadcasting systems
- No VCO coil required
- Internal sound carrier BPF, 4-system sound carrier trap
- Digital AFT system
- Supports EW (LA76933J, LA76938Y)
- Supports SECAM (LA76936Y, LA76938Y)

### Line-up

| Type name | NTSC | PAL | SECAM | Deflection | CbCr input | E/W |
|-----------|------|-----|-------|------------|------------|-----|
| LA76931K  | ○    | ○   | ×     | ○          | ○          | ×   |
| LA76933J  | ○    | ○   | ×     | ○          | ○          | ○   |
| LA76936Y  | ○    | ○   | ○     | ○          | ○          | ×   |
| LA76938Y  | ○    | ○   | ○     | ○          | ○          | ○   |

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## LA7693X series

### Specifications

#### Maximum Ratings (BIP Chip) at $T_a = 25^\circ\text{C}$

| Parameter                   | Symbol       | Conditions                    | Ratings     | Unit             |
|-----------------------------|--------------|-------------------------------|-------------|------------------|
| Maximum supply voltage      | $V_8$ max    |                               | 7.0         | V                |
|                             | $V_{43}$ max |                               | 7.0         | V                |
|                             | $V_{55}$ max |                               | 7.0         | V                |
| Maximum supply current      | $I_{11}$ max |                               | 25          | mA               |
|                             | $I_{19}$ max |                               | 35          | mA               |
| Allowable power dissipation | $P_d$ max    | $T_a \leq 65^\circ\text{C}^*$ | 1.6         | W                |
| Operating temperature       | $T_{opr}$    |                               | -10 to +65  | $^\circ\text{C}$ |
| Storage temperature         | $T_{stg}$    |                               | -55 to +150 | $^\circ\text{C}$ |

\* Mounted on a substrate : 213mm×140mm×1.6mm, glass epoxy board.

#### Absolute Maximum Ratings (Micro-computer Chip) at $T_a = 25^\circ\text{C}$ , $V_{SS} = 0\text{V}$

| Parameter                 | Symbol                 | Pins             | Conditions       | Ratings |     |              | Unit |
|---------------------------|------------------------|------------------|------------------|---------|-----|--------------|------|
|                           |                        |                  |                  | min     | typ | max          |      |
| Maximum supply voltage    | $V_{DD}$ max           | $V_{DD}$         | Mask             | -0.3    |     | +6.0         | V    |
|                           |                        |                  | Flash            | -0.3    |     | +6.5         | V    |
| Input voltage             | $V_I$                  | $\overline{RES}$ |                  | -0.3    |     | $V_{DD}+0.3$ | V    |
| Output voltage            | $V_O$                  | FILT             |                  | -0.3    |     | $V_{DD}+0.3$ | V    |
| Input/output voltage      | $V_{IO}$               | Ports0, 1        |                  | -0.3    |     | $V_{DD}+0.3$ | V    |
| High level output current | Peak output current *2 | $I_{OPH}$        | Ports04 to 07, 1 |         | -4  |              | mA   |
|                           | Total output current   | $\Sigma I_{OAH}$ | Ports04 to 07, 1 |         | -15 |              | mA   |
| Low level output current  | Peak output current *2 | $I_{OPL}$        | Ports0, 1        |         |     | 20           | mA   |
|                           | Total output current   | $\Sigma I_{OAL}$ | Ports0, 1        |         |     | 30           | mA   |

\*1 J : unted on a MASKROM = 24KB, K : MASKROM = 28KB, L : MASKROM = 32KB, M : MASKROM = 40KB, N : MASKROM = 48KB  
 FB : FLASHROM = 48KB (This production is produced and sold by SANYO under license of the Silicon Storage Technology Inc.)

\*2 The average current for each pin must not be over 1mA.

#### Operating Conditions (Bip Chip) at $T_a = 25^\circ\text{C}$

| Parameter                      | Symbol      | Conditions | Ratings    | Unit |
|--------------------------------|-------------|------------|------------|------|
| Recommended supply voltage     | $V_8$       |            | 5.0        | V    |
|                                | $V_{43}$    |            | 5.0        | V    |
|                                | $V_{55}$    |            | 5.0        | V    |
| Recommended supply current     | $I_{11}$    |            | 19         | mA   |
|                                | $I_{19}$    |            | 31         | mA   |
| Operating supply voltage range | $V_8$ op    |            | 4.7 to 5.3 | V    |
|                                | $V_{43}$ op |            | 4.7 to 5.3 | V    |
|                                | $V_{55}$ op |            | 4.7 to 5.3 | V    |
| Operating supply current range | $I_{11}$ op |            | 28 to 34   | mA   |
|                                | $I_{19}$ op |            | 17 to 21   | mA   |

## LA7693X series

**Recommended Operating Range (Micro-computer Chip)** at  $T_a = -10^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ ,  $V_{SS} = 0\text{V}$

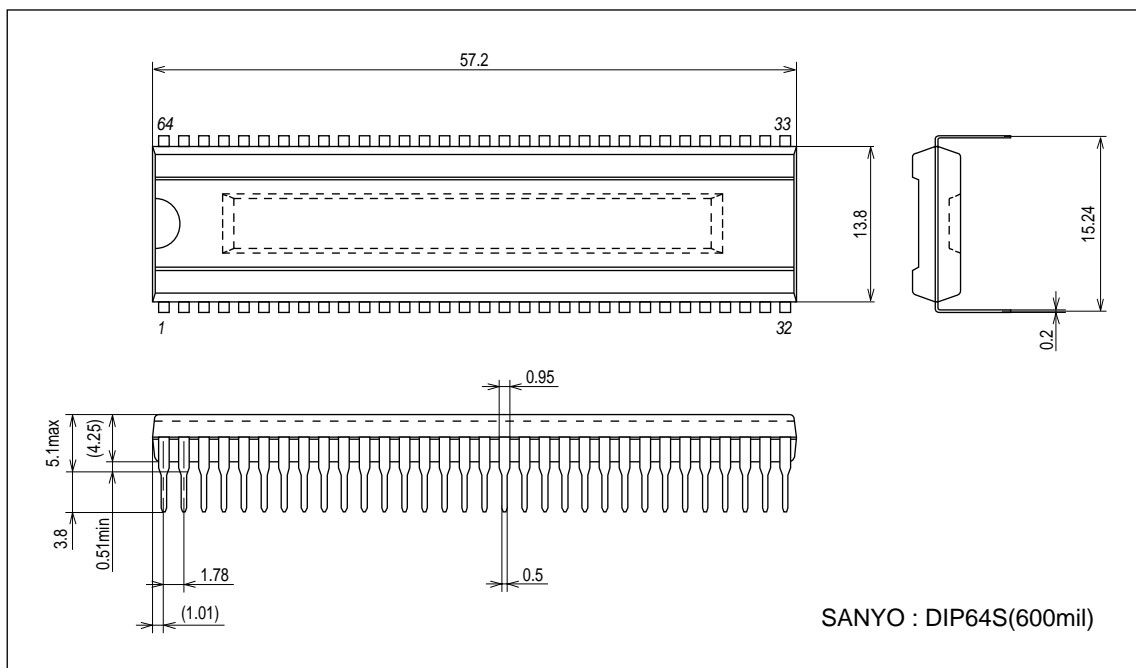
| Parameter                   | Symbol       | Pins  | Conditions   | $V_{DD}$ [V] | Ratings      |       |              | Unit          |
|-----------------------------|--------------|---|--|--------------|--------------|-------|--------------|---------------|
|                             |              |   |  |              | min          | typ   | max          |               |
| Operating supply voltage    | $V_{DD}$     | $V_{DD}$ max  |  |              | 4.5          |       | 5.5          | V             |
| Hold voltage                | $V_{HD}$     | $V_{DD}$  | RAMs and the registers data are kept in HOLD mode. |              | 2.0          |       | 5.5          | V             |
| High level input voltage    | $V_{IH}$ (1) | Ports04 to 07   | Output disable                                     | 4.5 to 5.5   | $0.75V_{DD}$ |       | $V_{DD}$     | V             |
|                             | $V_{IH}$ (2) | Ports00 to 03, 1 (Schmitt)<br>$\overline{\text{RES}}$ (Schmitt) | Output disable                                     | 4.5 to 5.5   | $0.75V_{DD}$ |       | $V_{DD}$     | V             |
| Low level input voltage     | $V_{IL}$ (1) | Ports0  | Output disable                                     | 4.5 to 5.5   | $V_{SS}$     |       | $0.25V_{DD}$ | V             |
|                             | $V_{IL}$ (2) | Ports00 to 03, 1 (Schmitt)<br>$\overline{\text{RES}}$ (Schmitt) | Output disable                                     | 4.5 to 5.5   | $V_{SS}$     |       | $0.25V_{DD}$ | V             |
| Operation cycle time        | tCYC (1)     |   | All functions operating                            | 4.5 to 5.5   | 0.844        | 0.848 | 0.852        | $\mu\text{s}$ |
|                             | tCYC (2)     |   | OSD and Data slicer are not operating              | 4.5 to 5.5   | 0.844        |       | 400          | $\mu\text{s}$ |
| Oscillation frequency range | FmRC         |   | Internal RC oscillation                            | 4.5 to 5.5   | 0.4          | 0.8   | 3.0          | MHz           |

(Note) FLASH-ROM erase/write temperature range :  $T_a = 25 \pm 2^{\circ}\text{C}$  ( $V_{DD} = 4.5$  to  $5.5\text{V}$ )

### Package Dimensions

unit : mm (typ)

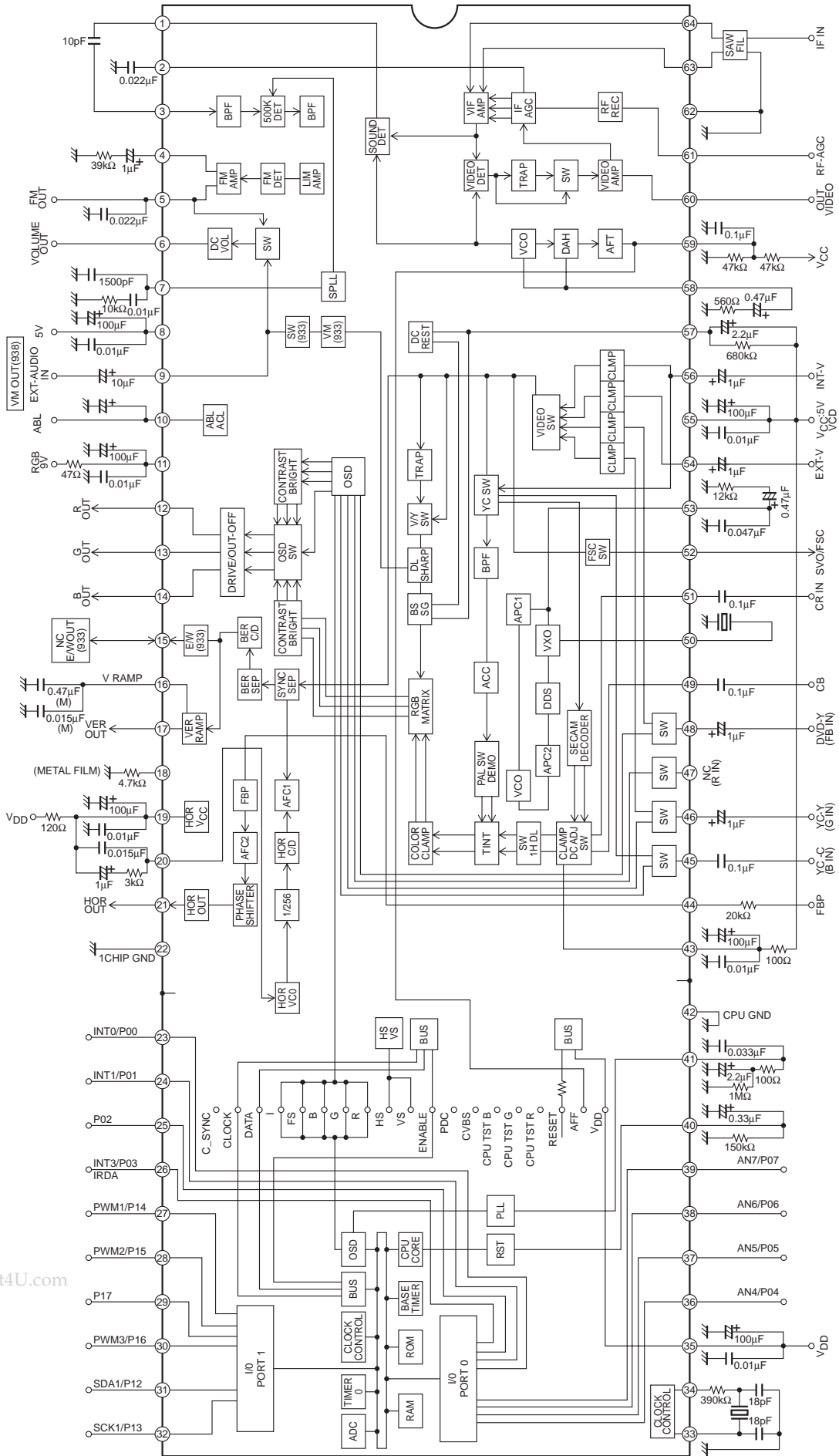
3300





# LA7693X series

## Block Diagram 2 LA76936Y/938Y



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