

**LC6530C,  
6532C**

3025B

T-49-19-04

CMOS LSI

**4-Bit Single Chip Microcomputer**  
**On-Chip PWM Output, 4K/2K-Byte ROM**

E2241A

The LC6530C is a single-chip 4-bit microcomputer that contains a 4K-byte ROM, 1K-bit RAM, has 42 pins, and are fabricated using CMOS process technology. Besides 6 input/output common ports of 24 pins and an input port of 4 pins, and 2 output ports of 8 pins, the LC6530C has specific ports that are used to provide the interrupt function, 4-bit/8-bit serial input/output function, and burst pulse output function. All output ports are of the open drain type with a withstand voltage of 15V and have the option of containing a pull-up resistance bitwise. Other ports than port I<sub>1</sub> to 3, port J provide 20mA drive capability.

With DA converters of PWM type contained, the LC6530C is suited for use in electronic tuning of color TV, VTR and remote control of audio equipment.

The LC6530C is the same as our LC6500 series in the basic architecture of the CPU and the instruction set, but is made more powerful in the stack level and the cycle time and also has an easy-to-use standby function.

The LC6532C is the same as the LC6530C, except that it contains a 2K-byte ROM, 512-bit RAM.

**Features**

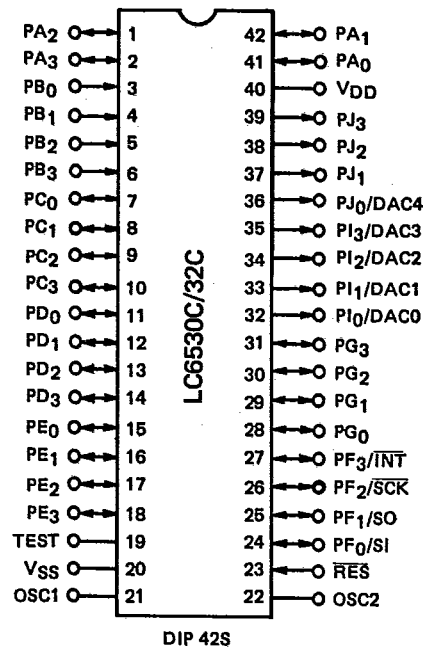
- DA converter
  - 6-bit PWM type (repetitive frequency 20.8kHz) x 3 channels and 14-bit PWM type (repetitive frequency 81.4Hz) x 1 channel
  - (The 14-bit DAC may be divided into 6-bit DAC and 8-bit DAC.)
  - (Note) The repetitive frequency is for 4MHz 1/3 prescaler.
- Instruction set with 80 instructions (common to the LC6500 series)
- ROM/RAM
  - : 4096 bytes/1024 bits (LC6530C)
  - : 2048 bytes/512 bits (LC6532C)
- Instruction cycle time: 2.77μs
- Serial input/output interface x 1 (4 bits/8 bits program-selectable)
- I/O ports
  - Input port : 4 pins
  - Input/output common ports : 24 pins
  - Output ports : 8 pins
  - Output level during reset : For ports C, D, output (H or L) during reset may be specified portwise by option.
  - Pull-up resistance : May be contained bitwise by option. (all output ports)
- Interrupt function
  - Timer interrupt : 1
  - INT pin or serial I/O interrupt : 1
- Stack level : 8 levels (common with interrupt)
- Timer : 4-bit prescaler + 8 bit programmable timer
- Burst pulse (64 x cycle time, duty 50%) output function
- Oscillator option
  - Circuit mode option : Ceramic mode, external clock mode (384kHz to 4.33 MHz)
  - Predivider option : 1/1, 1/3
- Standby function : Standby function available by the HALT instruction, function to absorb oscillation stabilizing period at the ceramic mode
- Supply voltage : 4.5V to 5.5V
- Package : DIP 42S
- Evaluation LSI : LC6595 (evaluation chip), EVA-TB6530/32 (target board)

6289TA/3256KI, TS No.2241-1/17

LC6530C, 6532C

T-49-19-04

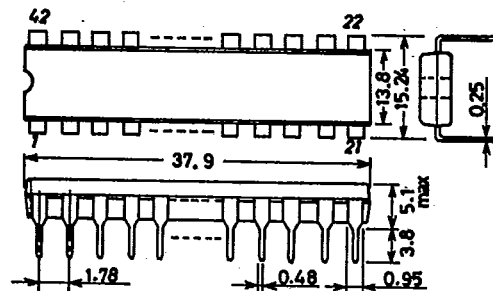
Pin Assignment



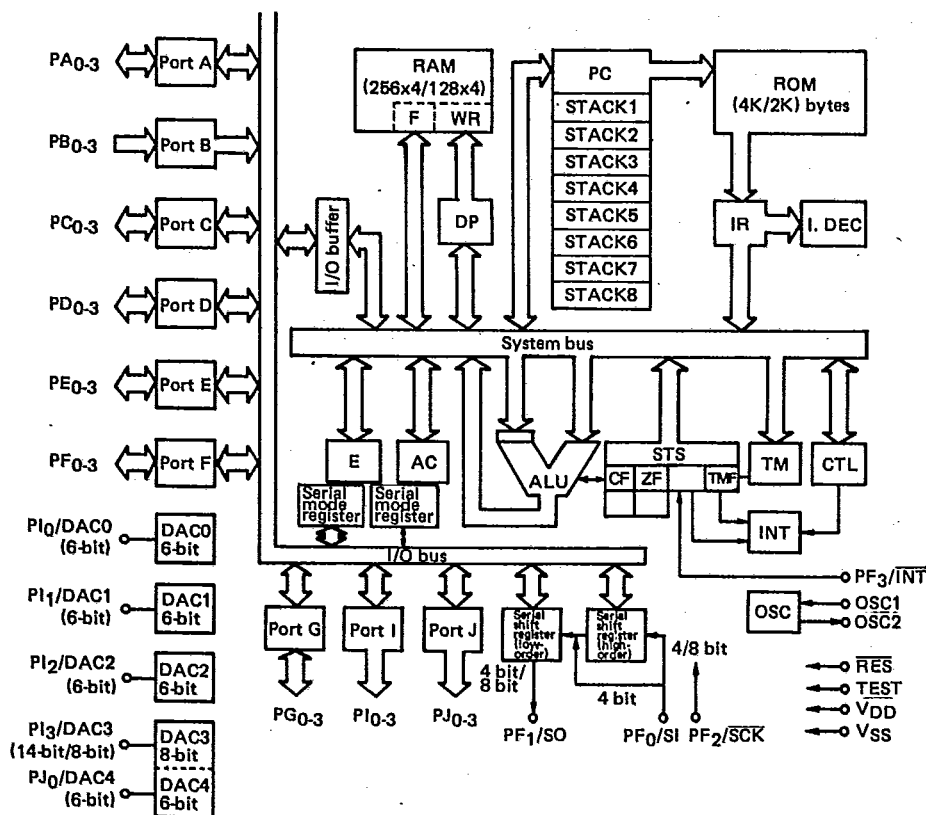
Pin Name

- OSC1, OSC2 : Ceramic resonator for OSC
- PA<sub>0</sub> to 3 : Input/output common port A<sub>0</sub> to 3
- PB<sub>0</sub> to 3 : Input port B<sub>0</sub> to 3
- PC<sub>0</sub> to 3 : Input/output common port C<sub>0</sub> to 3
- PD<sub>0</sub> to 3 : Input/output common port D<sub>0</sub> to 3
- PE<sub>0</sub> to 3 : Input/output common port E<sub>0</sub> to 3
- PF<sub>0</sub> to 3 : Input/output common port F<sub>0</sub> to 3
- PG<sub>0</sub> to 3 : Input/output common port G<sub>0</sub> to 3
- PI<sub>0</sub> to 3 : Output port I<sub>0</sub> to 3
- PJ<sub>0</sub> to 3 : Output port J<sub>0</sub> to 3
- SI : 4-bit/8-bit serial input port
- SO : 4-bit/8-bit serial output port
- SCK : Serial clock input/output
- INT : Interrupt request input
- RES : Reset
- TEST : Test
- DAC0-DAC4 : D/A converter

Case Outline 3025B-D42S1C  
(unit: mm)



SANYO: DIP42S



|     |                             |         |                                   |
|-----|-----------------------------|---------|-----------------------------------|
| RAM | : Data memory               | DAC     | : Digital → analog conversion     |
| F   | : Flag                      | STS     | : Status register                 |
| WR  | : Working register          | ROM     | : Program memory                  |
| AC  | : Accumulator               | PC      | : Program counter                 |
| ALU | : Arithmetic and logic unit | INT     | : Interrupt control               |
| DP  | : Data pointer              | IR      | : Instruction register            |
| E   | : E register                | I. DEC  | : Instruction decoder             |
| CTL | : Control register          | CF, CSF | : Carry flag, carry save flag     |
| OSC | : Oscillator                | ZF, ZSF | : Zero flag, zero save flag       |
| TM  | : Timer                     | EXTF    | : External interrupt request flag |
| SI  | : Serial input              | TMF     | : Internal interrupt request flag |
| SO  | : Serial output             |         |                                   |

## Pin Description

| Pin Name                               | Pins | I/O              | Functions                                                                                                                                                                                                                                                                                                                                                                                                                               | Options                                                                                                                                                                                                       | During Reset                                                                  |
|----------------------------------------|------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| VDD                                    | 1    | —                | Power supply                                                                                                                                                                                                                                                                                                                                                                                                                            | —                                                                                                                                                                                                             | —                                                                             |
| VSS                                    | 1    | —                |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                               |                                                                               |
| OSC1                                   | 1    | Input            | • Pins for 2-pin ceramic oscillation                                                                                                                                                                                                                                                                                                                                                                                                    | (1) External clock                                                                                                                                                                                            | —                                                                             |
| OSC2                                   | 1    | Output           |                                                                                                                                                                                                                                                                                                                                                                                                                                         | (2) 2-pin CF OSC<br>(3) Predivider option<br>1. No predivider<br>2. 1/3 predivider                                                                                                                            |                                                                               |
| PA0<br>PA1<br>PA2<br>PA3               | 4    | Input/<br>output | • Input/output port A0 to 3<br>4-bit input (IP instruction)<br>4-bit output (OP instruction)<br>Single-bit decision (BP, BNP instructions)<br>Single-bit set/reset (SPB, RPB instructions)                                                                                                                                                                                                                                              | (1) Open drain type output<br>(2) With pull-up resistance<br><br>(1), (2): Specified bit by bit.                                                                                                              | • "H" output<br>(Output Nch transistor OFF)                                   |
| PB0<br>PB1<br>PB2<br>PB3               | 4    | Input            | • Input port B0 to 3<br>4-bit input (IP instruction)<br>Single-bit decision (BP, BNP instructions)<br>• PB3 is used to exercise standby control.                                                                                                                                                                                                                                                                                        | —                                                                                                                                                                                                             | —                                                                             |
| PC0<br>PC1<br>PC2<br>PC3               | 4    | Input/<br>output | • Input/output port C0 to 3<br>The functions are the same as for the PA0 to 3.<br>• Output ("H" or "L") during reset may be specified by option.                                                                                                                                                                                                                                                                                        | (1) Open drain type output<br>(2) With pull-up resistance<br>(3) Output during reset: "H"<br>(4) Output during reset: "L"<br>• (1), (2): Specified bit by bit.<br>• (3), (4): Specified in a group of 4 bits. | • "H" output<br>• "L" output<br>(Option-selectable)                           |
| PD0<br>PD1<br>PD2<br>PD3               | 4    | Input/<br>output | • Input/output port D0 to 3<br>The functions, options are the same as for the PC0 to 3.                                                                                                                                                                                                                                                                                                                                                 | Same as for the PC0 to 3.                                                                                                                                                                                     | Same as for the PC0 to 3.                                                     |
| PE0<br>PE1<br>PE2<br>PE3               | 4    | Input/<br>output | • Input/output port E0 to 3<br>4-bit input (IP instruction)<br>4-bit output (OP instruction)<br>Single-bit decision (BP, BNP instructions)<br>Single-bit set/reset (SPB, RPB instructions)<br>• The PE0 provides burst pulse (64 x T <sub>cyc</sub> ) output function.                                                                                                                                                                  | (1) Open drain type output<br>(2) With pull-up resistance<br><br>(1), (2): Specified bit by bit.                                                                                                              | • "H" output<br>(Output Nch transistor OFF)                                   |
| PF0/SI<br>PF1/SO<br>PF2/SCK<br>PF3/INT | 4    | Input/<br>output | • Input/output port F0 to 3<br>The functions, options are the same for the PE0 to 3. (Note)<br>• PF0 to 3: Also used for serial interface, INT input.<br>Program-selectable.<br>• 4 bits/8 bits of serial input/output: Program-selectable<br>SI...4-bit/8-bit serial input port<br>SO...4-bit/8-bit serial output port<br>SCK...Interrupt clock input/output<br>INT...Interrupt request input<br>(Note) No burst pulse output function | Same as for the PE0 to 3.                                                                                                                                                                                     | Same as for the PE0 to 3.<br>Serial port:<br>Disable<br>Interrupt source: INT |

| Pin Name                                                                                                                                         | Pins | I/O              | Functions                                                                                                                                                                                                                                                                                                                                                                                                                                                | Options                                                                                                                                                                                                                                                                                     | During Reset                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| PG <sub>0</sub><br>PG <sub>1</sub><br>PG <sub>2</sub><br>PG <sub>3</sub>                                                                         | 4    | Input/<br>output | • Input/output port G <sub>0</sub> to 3<br>The functions, options are the same<br>for the PE <sub>0</sub> to 3.<br>(Note) No burst pulse output function                                                                                                                                                                                                                                                                                                 | Same as for the PE <sub>0</sub> to 3.                                                                                                                                                                                                                                                       | Same as for the<br>PE <sub>0</sub> to 3.                                                                                                      |
| PI <sub>0</sub> /DAC <sub>0</sub><br>PI <sub>1</sub> /DAC <sub>1</sub><br>PI <sub>2</sub> /DAC <sub>2</sub><br>PI <sub>3</sub> /DAC <sub>3</sub> | 4    | Output           | • Output-only port I <sub>0</sub> to 3<br>4-bit output (OP instruction)<br>Single-bit decision (BP, BNP instructions)<br>Single-bit set/reset (SPB, RPB instructions)<br>• PWM type DA converter output port<br>DAC <sub>0</sub> to 3<br>DAC <sub>0</sub> } ...6 bit DA converter output<br>DAC <sub>1</sub> }<br>DAC <sub>2</sub> }<br>DAC <sub>3</sub> ...a. 14 bits<br>DA converter output<br>b. 8 bits<br>DA converter output<br>(option-selectable) | (1) Open drain type output<br>(2) With pull-up resistance<br>(1), (2): Specified bit by bit.<br><br>DAC <sub>3</sub> output option<br>a. 14-bit DAC<br>b. 8-bit DAC<br>Port } option<br>DAC }<br>a. Port output<br>b. DAC output<br>(Positive output)<br>c. DAC output<br>(Negative output) | • "H" output<br>Port output<br>DAC output<br>(Negative output selected mode)<br>• "L" output<br>DAC output<br>(Positive output selected mode) |
| PJ <sub>0</sub> /DAC <sub>4</sub><br>PJ <sub>1</sub><br>PJ <sub>2</sub><br>PJ <sub>3</sub>                                                       | 4    | Output           | • Output-only port J <sub>0</sub> to 3<br>4-bit output (OP instruction)<br>Single-bit decision (BP, BNP instructions)<br>Single-bit set/reset (SPB, RPB instructions)<br>• PWM type DA converter output port<br>DAC <sub>4</sub><br>DAC <sub>4</sub> ...6-bit DA converter output                                                                                                                                                                        | (1) Open drain type output<br>(2) With pull-up resistance<br>(1), (2): Specified bit by bit.<br>Port } option<br>DAC }<br>(PJ <sub>0</sub> /DAC <sub>4</sub> only)<br>a. Port output<br>b. DAC output<br>(Positive output)<br>c. DAC output<br>(Negative output)                            | • "H" output<br>Port output<br>DAC output<br>(Negative output selected mode)<br>• "L" output<br>DAC output<br>(Positive output selected mode) |
| $\overline{\text{RES}}$                                                                                                                          | 1    | Input            | • System reset<br>For power-up reset, C is connected<br>externally.<br>• For reset start, "L" level is applied<br>for 4 clock cycles or more.                                                                                                                                                                                                                                                                                                            | —                                                                                                                                                                                                                                                                                           | —                                                                                                                                             |
| TEST                                                                                                                                             | 1    | Input            | • LSI test pin<br>Normally connected to V <sub>SS</sub> .                                                                                                                                                                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                           | —                                                                                                                                             |

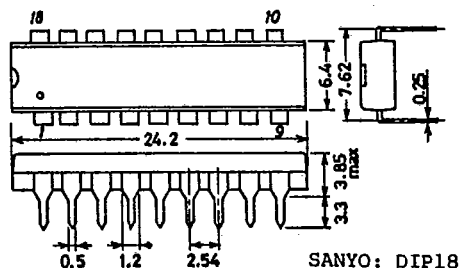
For further details, refer to the separate catalog of the LC6530C, 6532C.

T-90-20

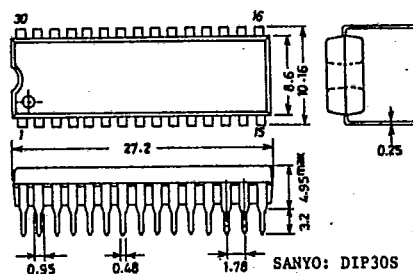
# CASE OUTLINES OF 8/4-BIT MICROCOMPUTERS, GATE ARRAYS

- All of Sanyo microcomputer case outlines are illustrated below.
- All dimensions are in mm, and dimensions which are not followed by min. or max. are represented by typical values.
- No marking is indicated.

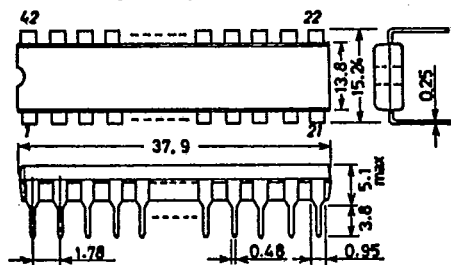
Case Outline—[3007A] unit: mm



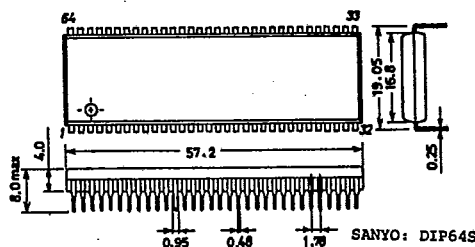
Case Outline—[3061] unit: mm



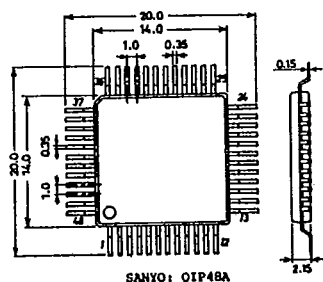
Case Outline—[3025B] unit: mm



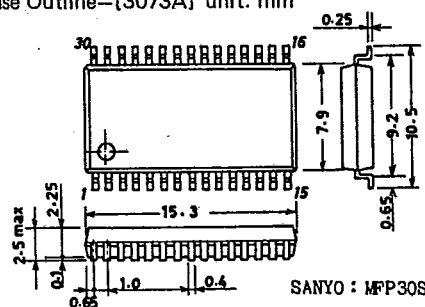
Case Outline—[3071] unit: mm



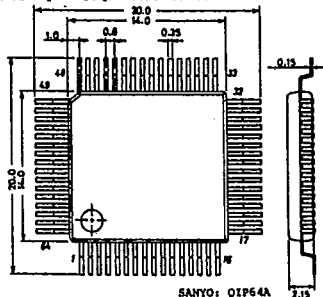
Case Outline—[3052A] unit: mm



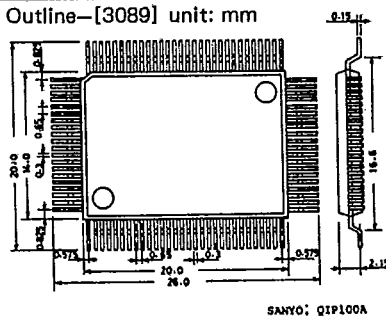
Case Outline—[3073A] unit: mm



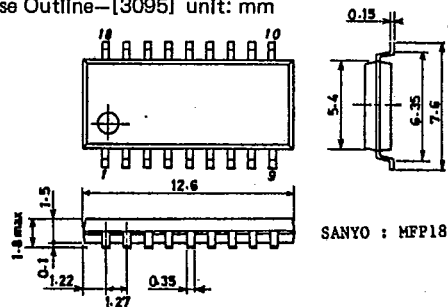
Case Outline—[3057] unit: mm



Case Outline—[3089] unit: mm

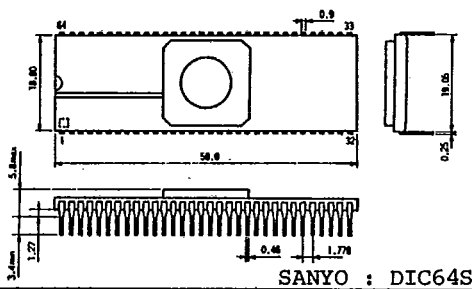


Case Outline—[3095] unit: mm

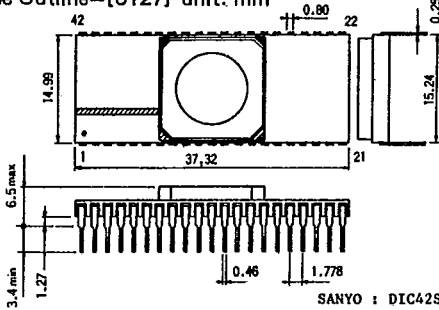


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Case Outline—[3126] unit: mm



Case Outline—[3127] unit: mm



Case Outline—[3128] unit: mm

