



SANYO Semiconductors

## DATA SHEET

An ON Semiconductor Company

# LV5235V — Bi-CMOS IC 18-channel LED Driver

## Overview

The LV5235V is a 18-channel LED driver IC that is capable of switching between constant-current output and open drain output. It enables 3-wire serial bus control (address designation)/I<sup>2</sup>C serial bus control to be set arbitrarily using an external pin. Also possible are 18-channel LED ON/OFF control and the setting of the PWM luminance in 256 steps. The device also has a built-in fade-in/fade-out function. Up to 32 driver ICs can be connected using the slave address setting pins.

## Features

- 18-channel output constant-current LED driver/open drain output LED driver (selected by using an external pin)
  - Supports separate ON/OFF setting for each LED output, high withstand voltage (VOUT<42V)
    - In the constant-current mode (OUTSCT: L), the reference current is set by the value of resistor connected to the external pin (RT1).
      - Built-in D/A (5 bits) for switching current level ... 0.96mA to 30.7mA (RGB drive)
      - Constant current (I<sub>O</sub> max=50mA) for full-color LEDs × 18 channels
    - In the open drain mode (OUTSCT: M), high current drive (I<sub>O</sub> max=100mA) × 18 channels
    - In the constant-current mode (OUTSCT: H)
      - Only RGB6 is open drain (I<sub>O</sub> max=100mA)
- Luminance adjustment using internal PWM control (256 steps)
  - 8-bit PWM luminance dimming (0% to 99.6%)
  - 6-phase PWM
- Fade-in/fade-out function (PWM control priority), supporting synchronous connection
  - Supports separate fade ON/OFF for each LED output (fade time common for all channels)
  - Interrupt control possible for fade function
- Selection of 3-wire/I<sup>2</sup>C serial bus control signals enabled (switching using an external pin)
  - Slave addressing (5 bits, connection of up to 32 driver ICs possible)
- Low current consumption
- Output malfunction protection circuits (thermal protection function, UVLO detection protection function)

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment. The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for new introduction or other application different from current conditions on the usage of automotive device, communication device, office equipment, industrial equipment etc. , please consult with us about usage condition (temperature, operation time etc.) prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. 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 Semiconductor Co., Ltd.

<http://semicon.sanyo.com/en/network>

## Specifications

### Maximum Ratings at Ta = 25°C

| Parameter                   | Symbol              | Conditions  | Ratings     | Unit |
|-----------------------------|---------------------|-------------|-------------|------|
| Maximum supply voltage      | V <sub>CC</sub> max |             | 6           | V    |
| Output voltage              | V <sub>O</sub> max  | LED off     | 42          | V    |
| Output current              | I <sub>O</sub> max  |             | 100         | mA   |
| Allowable power dissipation | Pd max              | Ta ≤ 25°C * | 1.36        | W    |
| Operating temperature       | Topr                |             | -25 to +75  | °C   |
| Storage temperature         | Tstg                |             | -40 to +125 | °C   |

\* Specified board : 114.3mm × 76.1mm × 1.6mm, glass epoxy board. Exposed Die-pad area is not a substrate mounting.

[Warning]: If you should intend to use this IC continuously under high temperature, high current, high voltage, or drastic temperature change, even if it is used within the range of absolute maximum ratings or operating conditions, there is a possibility of decrease reliability. Please contact us for a confirmation.

### Operating Conditions at Ta = 25°C

| Parameter                      | Symbol             | Conditions       | Ratings    | Unit |
|--------------------------------|--------------------|------------------|------------|------|
| Recommended supply voltage     | V <sub>CC</sub>    | SV <sub>CC</sub> | 5.0        | V    |
| Operating supply voltage range | V <sub>CC</sub> op | SV <sub>CC</sub> | 4.5 to 5.5 | V    |

### Electrical Characteristics at Ta = 25°C, V<sub>CC</sub> = 5.0V

| Parameter                                    | Symbol           | Conditions                                                    | Ratings |      |      | Unit |
|----------------------------------------------|------------------|---------------------------------------------------------------|---------|------|------|------|
|                                              |                  |                                                               | min     | typ  | max  |      |
| Consumption current                          | I <sub>CC2</sub> | LED off                                                       |         | 5    | 7    | mA   |
| Oscillator frequency                         | Fosc             |                                                               | 900     | 1000 | 1100 | kHz  |
| Reference current pin voltage                | VRT              | RT1=22kΩ                                                      | 0.92    | 0.98 | 1.04 | V    |
| MAX output current                           | ΔIL              | V <sub>O</sub> =0.7 to 4.0V(Same channel line regulation)     | -10     |      |      | %    |
| Between bits output current                  | ΔI <sub>OL</sub> | I <sub>O</sub> =30.7mA (Between bits pairing characteristics) |         |      | 5    | %    |
| Maximum LED driver output current 1          | IMAX1            | LED OUTSCT= L                                                 | 28.8    | 30.7 | 32.6 | mA   |
| LED output on resistance 1                   | Ron1             | LED1, LED2, LED3, LED4, LED5 (I <sub>O</sub> = 100mA)         |         | 11   | 22   | Ω    |
| LED output on resistance 2                   | Ron2             | LED6 (I <sub>O</sub> = 100mA)                                 |         | 4    | 10   | Ω    |
| OFF leak current                             | Ileak            | LED OFF                                                       |         |      | 10   | μA   |
| Driver output malfunction protection voltage | Vt               | SV <sub>CC</sub>                                              | 2.58    | 2.70 | 2.82 | V    |

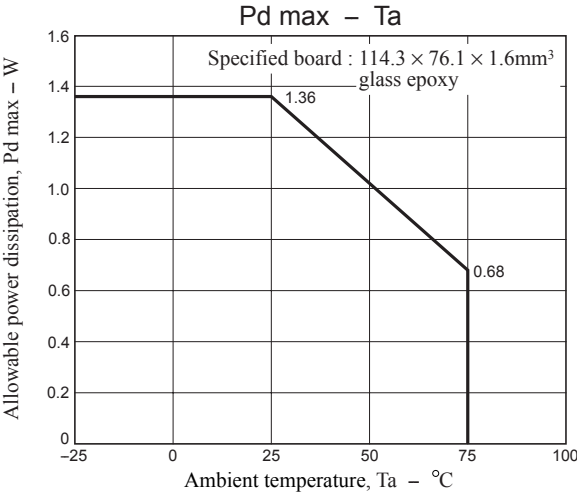
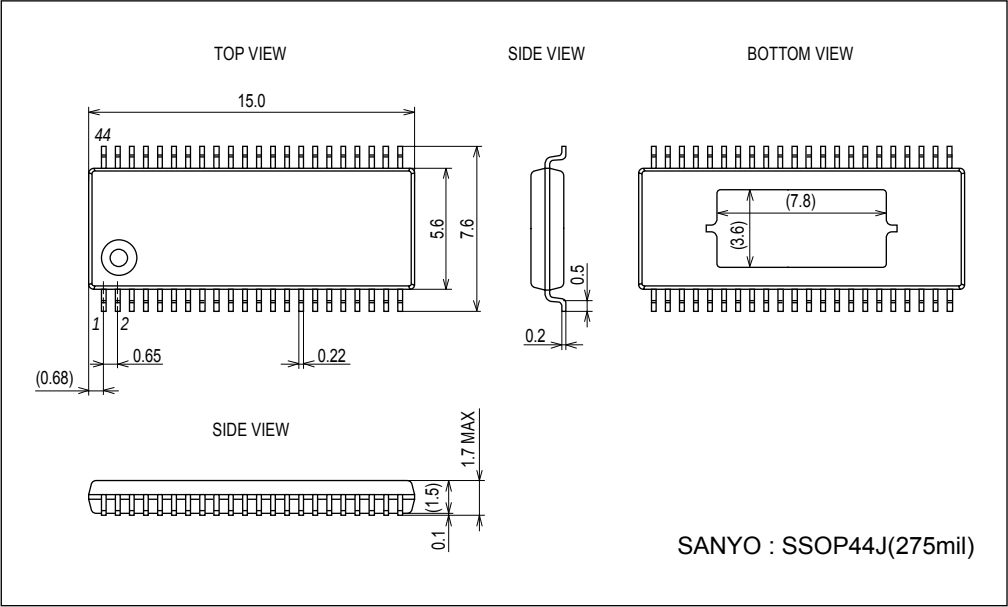
### Control circuit at Ta = 25°C, V<sub>CC</sub> = 5.0V

| Parameter | Symbol | Conditions                      | Ratings              |     |                      | Unit |
|-----------|--------|---------------------------------|----------------------|-----|----------------------|------|
|           |        |                                 | min                  | typ | max                  |      |
| H level 1 | VH1    | Input H level OUTSCT            | 4.7                  |     | 5                    | V    |
| M level 1 | VM1    | Input M level OUTSCT            | 2                    |     | 3.3                  | V    |
| L level 1 | VL1    | Input L level OUTSCT            | -0.2                 |     | 0.3                  | V    |
| H level 2 | VH2    | Input H level CTLSCT            | 0.7× V <sub>CC</sub> |     | V <sub>CC</sub>      | V    |
| L level 2 | VL2    | Input L level CTLSCT            | -0.2                 |     | 0.3                  | V    |
| H level 3 | VH3    | Input H level RESET             | 0.8× V <sub>CC</sub> |     | V <sub>CC</sub>      | V    |
| L level 3 | VL3    | Input L level RESET             | -0.2                 |     | 0.2× V <sub>CC</sub> | V    |
| H level 4 | VH4    | Input H level SCLK, SDATA, SDEN | 0.8× V <sub>CC</sub> |     | V <sub>CC</sub>      | V    |
| L level 4 | VL4    | Input L level SCLK, SDATA, SDEN | -0.2                 |     | 0.2× V <sub>CC</sub> | V    |
| H level 5 | VH7    | Input H level A0 to A4          | 0.7× V <sub>CC</sub> |     | V <sub>CC</sub>      | V    |
| L level 5 | VL7    | Input L level A0 to A4          | -0.2                 |     | 0.3                  | V    |

LV5235V

Package Dimensions

unit : mm (typ)  
3285A



Pin Assignment

|         |        |       |      |       |       |       |        |       |       |       |       |       |       |       |       |       |       |       |       |    |    |
|---------|--------|-------|------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|----|
| 44      | 43     | 42    | 41   | 40    | 39    | 38    | 37     | 36    | 35    | 34    | 33    | 32    | 31    | 30    | 29    | 28    | 27    | 26    | 25    | 24 | 23 |
| OSC_OUT | OUTSCT | CT    | RT1  | RESET | TEST  | SGND  | CTLSCT | NC    | NC    | LEDB6 | LEDB5 | PGND3 | LEDB4 | LEDB3 | LEDB2 | LEDB1 | A4    | A3    | A2    | A1 | A0 |
| SVCC    | SCLK   | SDATA | SDEN | LEDR1 | LEDR2 | LEDR3 | LEDR4  | PGND1 | LEDR5 | LEDR6 | NC    | NC    | LEDG1 | LEDG2 | LEDG3 | LEDG4 | PGND2 | LEDG5 | LEDG6 | NC | NC |
| 1       | 2      | 3     | 4    | 5     | 6     | 7     | 8      | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    | 21 | 22 |

Top view

## Pin Descriptions

| Pin No. | Pin name           | I/O | Description                                                                                                                                                           |
|---------|--------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | SV <sub>CC</sub>   | -   | Power supply pin                                                                                                                                                      |
| 2       | SCLK               | I   | Serial clock signal input pin                                                                                                                                         |
| 3       | SDATA              | I   | Serial data signal input pin                                                                                                                                          |
| 4       | SDEN               | I   | Serial enable signal input pin                                                                                                                                        |
| 5       | LEDR1              | O   | LEDR1 output pin                                                                                                                                                      |
| 6       | LEDR2              | O   | LEDR2 output pin                                                                                                                                                      |
| 7       | LEDR3              | O   | LEDR3 output pin                                                                                                                                                      |
| 8       | LEDR4              | O   | LEDR4 output pin                                                                                                                                                      |
| 9       | PGND1              | -   | GND pin dedicated for LED driver                                                                                                                                      |
| 10      | LEDR5              | O   | LEDR5 output pin                                                                                                                                                      |
| 11      | LEDR6              | O   | LEDR6 output pin                                                                                                                                                      |
| 12      | NC                 | -   | No connection                                                                                                                                                         |
| 13      | NC                 | -   | No connection                                                                                                                                                         |
| 14      | LEDG1              | O   | LEDG1 output pin                                                                                                                                                      |
| 15      | LEDG2              | O   | LEDG2 output pin                                                                                                                                                      |
| 16      | LEDG3              | O   | LEDG3 output pin                                                                                                                                                      |
| 17      | LEDG4              | O   | LEDG4 output pin                                                                                                                                                      |
| 18      | PGND2              | -   | GND pin dedicated for LED driver                                                                                                                                      |
| 19      | LEDG5              | O   | LEDG5 output pin                                                                                                                                                      |
| 20      | LEDG6              | O   | LEDG6 output pin                                                                                                                                                      |
| 21      | NC                 | -   | No connection                                                                                                                                                         |
| 22      | NC                 | -   | No connection                                                                                                                                                         |
| 23      | A0                 | I   | Slave address input pin A0                                                                                                                                            |
| 24      | A1                 | I   | Slave address input pin A1                                                                                                                                            |
| 25      | A2                 | I   | Slave address input pin A2                                                                                                                                            |
| 26      | A3                 | I   | Slave address input pin A3                                                                                                                                            |
| 27      | A4                 | I   | Slave address input pin A4                                                                                                                                            |
| 28      | LEDB1              | O   | LEDB1 output pin                                                                                                                                                      |
| 29      | LEDB2              | O   | LEDB2 output pin                                                                                                                                                      |
| 30      | LEDB3              | O   | LEDB3 output pin                                                                                                                                                      |
| 31      | LEDB4              | O   | LEDB4 output pin                                                                                                                                                      |
| 32      | PGND3              | -   | GND pin dedicated for LED driver                                                                                                                                      |
| 33      | LEDB5              | O   | LEDB5 output pin                                                                                                                                                      |
| 34      | LEDB6              | O   | LEDB6 output pin                                                                                                                                                      |
| 35      | NC                 | -   | No connection                                                                                                                                                         |
| 36      | NC                 | -   | No connection                                                                                                                                                         |
| 37      | CTL <sub>SCT</sub> | I   | 3-wire serial bus/I <sup>2</sup> C serial bus selecting control pin<br>(L: 3-wire serial, H: I <sup>2</sup> C)                                                        |
| 38      | SGND               | -   | Analog circuit GND pin                                                                                                                                                |
| 39      | TEST               | I   | Test pin (connected to GND)                                                                                                                                           |
| 40      | RESET              | I   | Reset signal input pin                                                                                                                                                |
| 41      | RT1                | O   | LED current setting resistor connection pin 1                                                                                                                         |
| 42      | CT                 | O   | Oscillation frequency setting capacitor connection pin                                                                                                                |
| 43      | OUT <sub>SCT</sub> | I   | Output type switching control pin<br>L: Constant-current output<br>M (terminal OPEN): Open drain output<br>H: Constant-current output, only RGB6 is open drain output |
| 44      | OSC_OUT            | O   | Oscillator output pin (synchronous connection)                                                                                                                        |

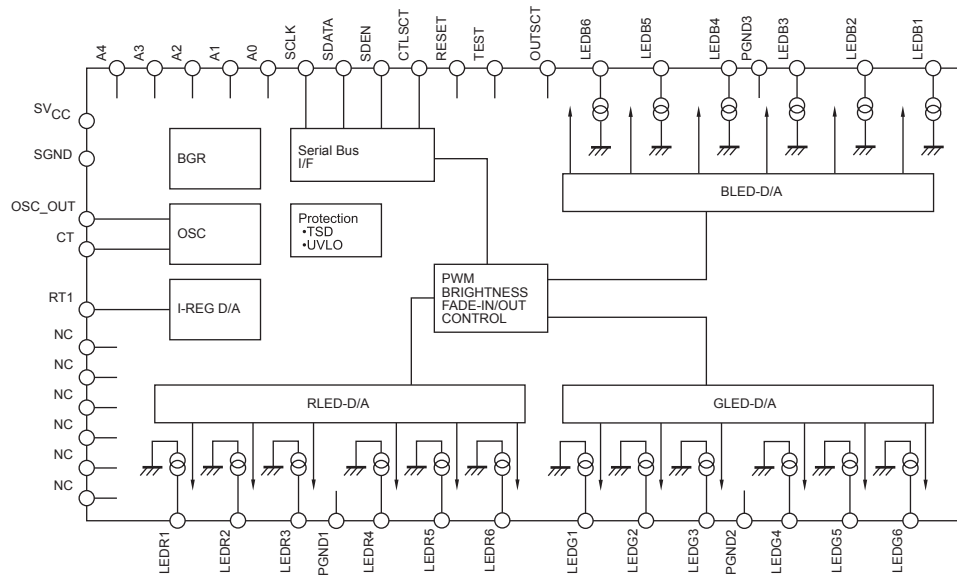
Continued on next page.

Continued from preceding page.

## OUTSCT Settings

|                                  | LED Driver Output Pin                                                                                           |                                                                                                                 |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| OUTSCT pin                       | LED1, LED2, LED3, LED4, LED5                                                                                    | LED6                                                                                                            |
| L=-0.2 to 0.3V                   | Constant current output<br>Built-in current value switching D/A (5 bits)<br>0.96mA to 30.7mA, RT1=22kΩ (f=1MHz) | Constant current output<br>Built-in current value switching D/A (5 bits)<br>0.96mA to 30.7mA, RT1=22kΩ (f=1MHz) |
| M=2.0 to 3.3V<br>(terminal OPEN) | Open drain output<br>Current value is determined by external limiting resistor.<br>R <sub>ON</sub> =11Ω         | Open drain output<br>Current value is determined by external limiting resistor.<br>R <sub>ON</sub> =4Ω          |
| H=4.7 to 5.0V                    | Constant current output<br>Built-in current value switching D/A (5 bits)<br>0.96mA to 30.7mA, RT1=22kΩ (f=1MHz) | Open drain output<br>Current value is determined by external limiting resistor.<br>R <sub>ON</sub> =4Ω          |

## Block Diagram



## Pin Functions

| Pin No. | Pin Name         | Pin function                                                                                                                                                                                                    | Equivalent Circuit |
|---------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1       | SV <sub>CC</sub> | Power supply pin                                                                                                                                                                                                |                    |
| 2       | SCLK             | Serial clock signal input pin                                                                                                                                                                                   |                    |
| 3       | SDATA            | Serial data signal input pin                                                                                                                                                                                    |                    |
| 4       | SDEN             | Serial enable signal input pin                                                                                                                                                                                  |                    |
| 23      | A0               | Slave address setting pin A0                                                                                                                                                                                    |                    |
| 24      | A1               | Slave address setting pin A1                                                                                                                                                                                    |                    |
| 25      | A2               | Slave address setting pin A2                                                                                                                                                                                    |                    |
| 26      | A3               | Slave address setting pin A3                                                                                                                                                                                    |                    |
| 27      | A4               | Slave address setting pin A4                                                                                                                                                                                    |                    |
| 37      | CTLST            | Serial bus communication setting pin<br>When set to low: The 3-wire serial bus signals are set as the input signals.<br>When set to high: The I <sup>2</sup> C serial bus signals are set as the input signals. |                    |

Continued on next page.

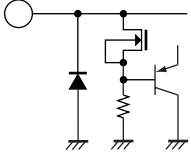
Continued from preceding page.

| Pin No. | Pin Name | Pin function                                                                                                                                                                                                                                                                                                                                  | Equivalent Circuit |
|---------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 38      | SGND     | GND pin                                                                                                                                                                                                                                                                                                                                       |                    |
| 39      | TEST     | Test pin<br>This pin must always be connected to GND.                                                                                                                                                                                                                                                                                         |                    |
| 40      | RESET    | Reset signal input pin<br>Reset status when set to low.                                                                                                                                                                                                                                                                                       |                    |
| 41      | RT1      | Reference current setting resistor connection pin.<br>By connecting the external resistor between this pin and GND, the reference current is generated. The pin voltage is approximately 0.98V. By changing the current level, it is possible to change the oscillator frequency and LED driver current value (in the constant-current mode). |                    |
| 42      | CT       | Oscillator frequency setting capacitor connection pin/oscillator input pin.<br>By changing the value of capacitance, it is possible to change the oscillator frequency. The capacitor must be connected to this pin of the master-side IC. The CT pin of the slave-side IC must be connected as the oscillator input pin.                     |                    |
| 43      | OUTSCT   | LED driver output type setting pin<br>When set to low: Constant-current output is set for the LED driver.<br>When set to middle: Open drain output is set for the LED driver.<br>When set to high: Constant-current output is set for the LED driver. However, open drain output is set for the only LED6 driver.                             |                    |
| 44      | OSC_OUT  | Oscillator output pin<br>When a multiple number of driver ICs are connected for use, the oscillators can be connected in synchronization by connecting the OSC_OUT output to the CT pin of the ICs to be connected.                                                                                                                           |                    |

Continued on next page.

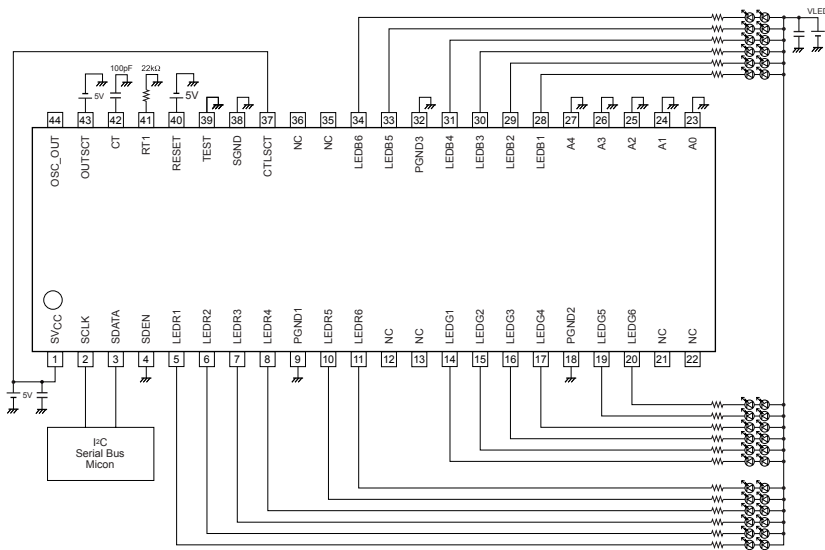
# LV5235V

Continued from preceding page.

| Pin No.                                                                            | Pin Name                                                                                                                            | Pin function                                                                                                                                                                                                                                                                                                                                                                              | Equivalent Circuit                                                                  |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 5<br>6<br>7<br>8<br>10<br>14<br>15<br>16<br>17<br>19<br>28<br>29<br>30<br>31<br>33 | LEDR1<br>LEDR2<br>LEDR3<br>LEDR4<br>LEDR5<br>LEDG1<br>LEDG2<br>LEDG3<br>LEDG4<br>LEDG5<br>LEDB1<br>LEDB2<br>LEDB3<br>LEDB4<br>LEDB5 | LEDR1 output pin<br>LEDR2 output pin<br>LEDR3 output pin<br>LEDR4 output pin<br>LEDR5 output pin<br>LEDG1 output pin<br>LEDG2 output pin<br>LEDG3 output pin<br>LEDG4 output pin<br>LEDG5 output pin<br>LEDB1 output pin<br>LEDB2 output pin<br>LEDB3 output pin<br>LEDB4 output pin<br>LEDB5 output pin<br>If these pins are not going to be used, they must always be connected to GND. |  |
| 11<br>20<br>34                                                                     | LEDR6<br>LEDG6<br>LEDB6                                                                                                             | LEDR6 output pin<br>LEDG6 output pin<br>LEDB6 output pin                                                                                                                                                                                                                                                                                                                                  |                                                                                     |
| 9<br>18<br>32                                                                      | PGND1<br>PGND2<br>PGND3                                                                                                             | GND pin dedicate for LEDR<br>GND pin dedicate for LEDG<br>GND pin dedicate for LEDB                                                                                                                                                                                                                                                                                                       |                                                                                     |
| 12<br>13<br>21<br>22<br>35<br>36                                                   | NC                                                                                                                                  | No connection                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |

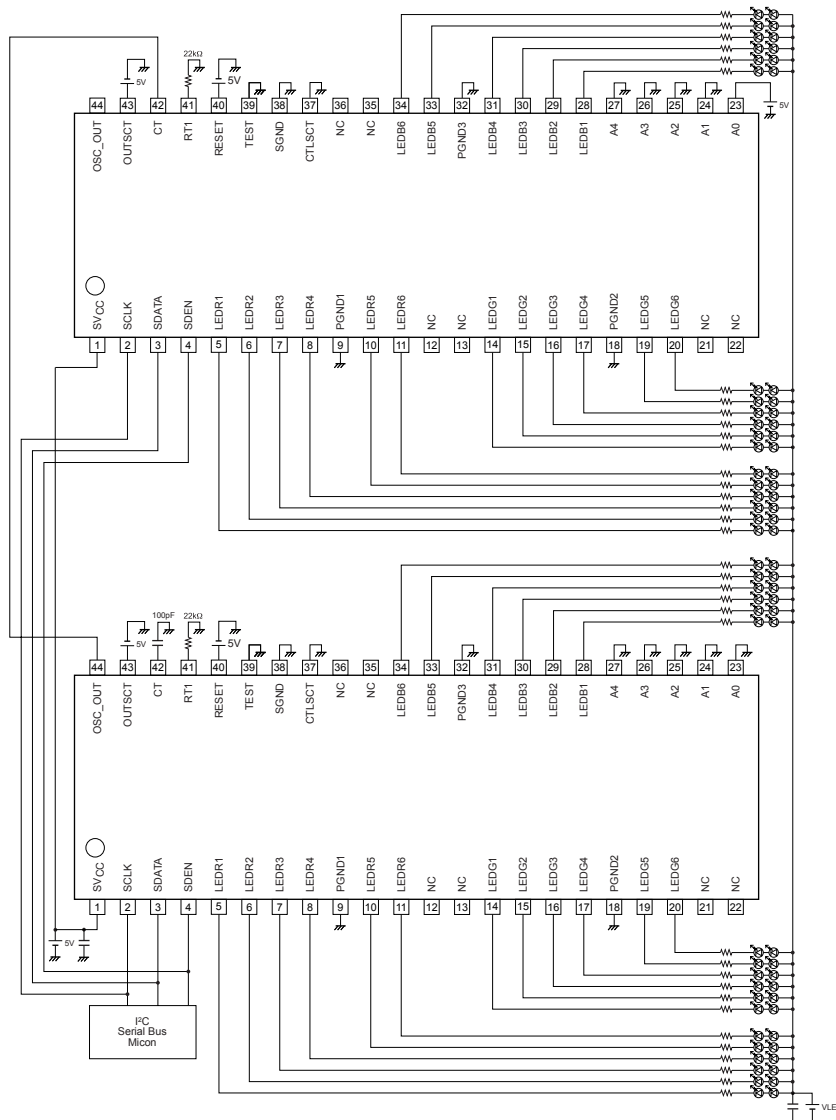
## Application Circuit Diagrams

- Specifications when one driver IC is used



Use as a master-side IC  
 Slave selection: A0-A4: low  
 Address setting: Master (100-0000)  
 Nothing must be connected to the NC pins

- Specifications when more than one driver IC is used



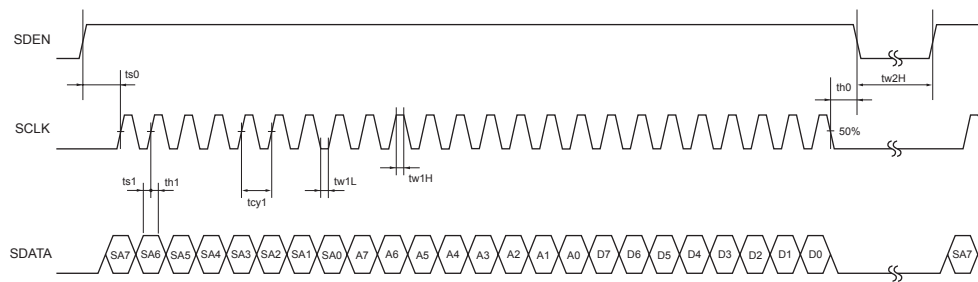
Use as a slave-side IC  
 Slave selection: A0 high: A1-A4 low  
 Address setting: Slave (100-0001)

Use as a master-side IC  
 Slave selection: A0-A4: low  
 Address setting: Master (100-0000)  
 Nothing must be connected to the NC pins

The oscillator frequency is determined by the master IC.  
 The synchronous connection of the oscillator can be established by connecting the oscillator output (OSC\_OUT) to the CT pins of the slave-side ICs.  
 Nothing must be connected to the NC pins.

## Serial Bus Communication Specifications

### 1) 3-wire serial bus transfer timing conditions



| Parameter       | Symbol | Conditions                                    | Min. | Typ. | Max. | Unit |
|-----------------|--------|-----------------------------------------------|------|------|------|------|
| Cycle time      | tcy1   | SCLK clock period                             | 200  | -    | -    | ns   |
| Data setup time | ts0    | SDEN setup time relative to the rise of SCLK  | 90   | -    | -    | ns   |
|                 | ts1    | SDATA setup time relative to the rise of SCLK | 60   | -    | -    | ns   |
| Data hold time  | th0    | SDEN hold time relative to the fall of SCLK   | 200  | -    | -    | ns   |
|                 | th1    | SDATA hold time relative to the fall of SCLK  | 60   | -    | -    | ns   |
| Pulse width     | tw1L   | Low period pulse width of SCLK                | 90   | -    | -    | ns   |
|                 | tw1H   | High period pulse width of SCLK               | 90   | -    | -    | ns   |
|                 | tw2L   | Low period pulse width of SDEN                | 1    | -    | -    | μs   |

Data length: 24 bits

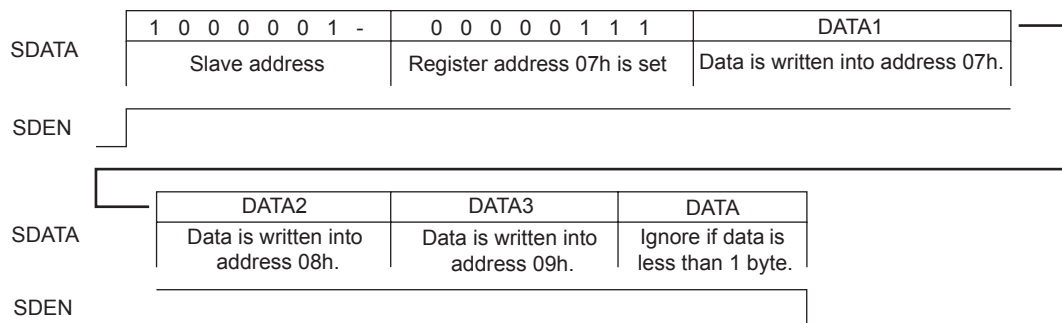
Clock frequency: 5 MHz or less

When 24 SCLK clock signals have been input during the high period of SDEN, the SDATA is taken in at the rising edge of SCLK.

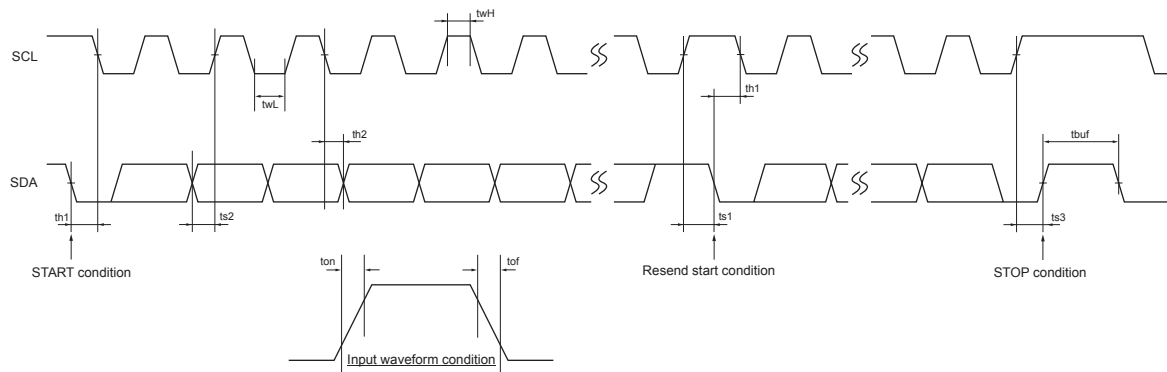
Note: If the number of SCLK clock signals during the high period of SDEN is 23 or less, SDATA is not taken in. If it is 25 or more, the register address is automatically incremented every time 1 byte is taken in.

The slave address is assigned by the first byte, and the register address on the serial map is specified by the next byte. The third byte transfers the data to the address specified by the register address that was written by the second byte and if the data subsequently continues even after this, the register address is automatically incremented for the fourth and subsequent bytes. As a result, it is possible to send the data continuously from the specified addresses. Data of less than one byte is ignored. However, when the address reaches 2ch, the next byte to be transferred becomes 00h.

Example of a write operation:



## 2) I<sup>2</sup>C serial transfer timing conditions



### Standard mode

| Parameter                 | Symbol | Conditions                                      | Min. | Typ. | Max. | Unit |
|---------------------------|--------|-------------------------------------------------|------|------|------|------|
| SCL clock frequency       | fsc1   | SCL clock frequency                             | 0    | -    | 100  | kHz  |
| Data setup time           | ts1    | SCL setup time relative to the fall of SDA      | 4.7  | -    | -    | μs   |
|                           | ts2    | SDA setup time relative to the rise of SCL      | 250  | -    | -    | ns   |
|                           | ts3    | SCL setup time relative to the rise of SDA      | 4.0  | -    | -    | μs   |
| Data hold time            | th1    | SCL hold time relative to the fall of SDA       | 4.0  | -    | -    | μs   |
|                           | th2    | SDA hold time relative to the fall of SCL       | 0    | -    | -    | μs   |
| Pulse width               | twL    | SCL pulse width for the L period                | 4.7  | -    | -    | μs   |
|                           | twH    | SCL pulse width for the H period                | 4.0  | -    | -    | μs   |
| Input waveform conditions | ton    | SCL and SDA (input) rise time                   | -    | -    | 1000 | ns   |
|                           | tof    | SCL and SDA (input) fall time                   | -    | -    | 300  | ns   |
| Bus free time             | tbuf   | Time between STOP condition and START condition | 4.7  | -    | -    | μs   |

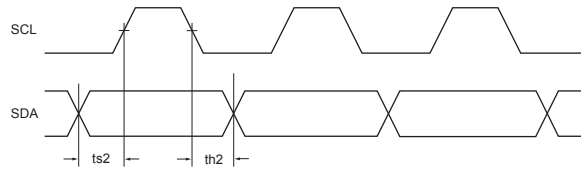
### High-speed mode

| Parameter                 | Symbol | Conditions                                 | Min. | Typ. | Max. | Unit |
|---------------------------|--------|--------------------------------------------|------|------|------|------|
| SCL clock frequency       | fsc1   | SCL clock frequency                        | 0    | -    | 400  | kHz  |
| Data setup time           | ts1    | SCL setup time relative to the fall of SDA | 0.6  | -    | -    | μs   |
|                           | ts2    | SDA setup time relative to the rise of SCL | 100  | -    | -    | ns   |
|                           | ts3    | SCL setup time relative to the rise of SDA | 0.6  | -    | -    | μs   |
| Data hold time            | th1    | SCL hold time relative to the fall of SDA  | 0.6  | -    | -    | μs   |
|                           | th2    | SDA hold time relative to the fall of SCL  | 0    | -    | -    | μs   |
| Pulse width               | twL    | SCL pulse width for the L period           | 1.3  | -    | -    | μs   |
|                           | twH    | SCL pulse width for the H period           | 0.6  | -    | -    | μs   |
| Input waveform conditions | ton    | SCL and SDA (input) rise time              | -    | -    | 300  | ns   |
|                           | tof    | SCL and SDA (input) fall time              | -    | -    | 300  | ns   |
| Bus free time             | tbuf   | Time between STOP and START conditions     | 1.3  | -    | -    | μs   |

## I<sup>2</sup>C bus transfer method

### Start and stop conditions

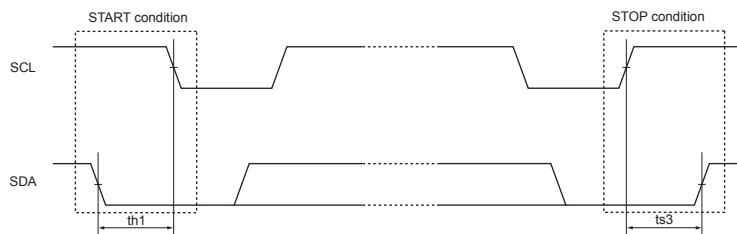
During data transfer operation using the I<sup>2</sup>C bus, SDA must basically be kept in constant state while SCL is “H” as shown below.



When data is not being transferred, both SCL and SDA are set in the “H” state.

When SCL=SDA is “H,” the start condition is established when SDA is changed from “H” to “L,” and access is started.

When SCL is “H,” the stop condition is established when SDA is changed from “L” to “H,” and access is ended.



### Data transfer and acknowledgement response

After the start condition has been established, the data is transferred one byte (8 bits) at a time.

Any number of bytes of data can be transferred continuously.

Each time the 8-bit data is transferred, the ACK signal is sent from the receive side to the send side. The ACK signal is issued when SDA on the send side is released and SDA on the receive side is set to “L” immediately after fall of the clock pulse at the SCL eighth bit of data transfer to “L.”

When the next 1-byte transfer is left in the receive state after sending the ACK signal from the receive side, the receive side releases SDA at the fall of the SCL ninth clock.

In the I<sup>2</sup>C bus, there is no CE signal. In its place, a 7-bit slave address is assigned to each device, and the first byte of transfer is assigned to the command (R/W) representing the 7-bit address and subsequent transfer direction. Note that only write is valid in this IC. The 7-bit address is transferred sequentially starting with MSB, and the eighth bit is set to “L” which indicates a write.



# LV5235V

## Slave address condition

|               | SLAVE ADDRESS |     |     |     |     |     |     |     |
|---------------|---------------|-----|-----|-----|-----|-----|-----|-----|
|               | SA7           | SA6 | SA5 | SA4 | SA3 | SA2 | SA1 | SA0 |
| resister name | -             | -   | A4  | A3  | A2  | A1  | A0  | -   |
| default       | 1             | 0   | 0   | 0   | 0   | 0   | 0   | -   |

| Terminal PIN |    |    |    |    |
|--------------|----|----|----|----|
| A4           | A3 | A2 | A1 | A0 |
| L            | L  | L  | L  | L  |
| L            | L  | L  | L  | H  |
| L            | L  | L  | H  | L  |
| L            | L  | L  | H  | H  |
| L            | L  | H  | L  | L  |
| L            | L  | H  | L  | H  |
| L            | L  | H  | H  | L  |
| L            | L  | H  | H  | H  |
| L            | H  | L  | L  | L  |
| L            | H  | L  | L  | H  |
| L            | H  | L  | H  | L  |
| L            | H  | L  | H  | H  |
| L            | H  | H  | L  | L  |
| L            | H  | H  | L  | H  |
| L            | H  | H  | H  | L  |
| L            | H  | H  | H  | H  |
| H            | L  | L  | L  | L  |
| H            | L  | L  | L  | H  |
| H            | L  | L  | H  | L  |
| H            | L  | L  | H  | H  |
| H            | L  | H  | L  | L  |
| H            | L  | H  | L  | H  |
| H            | L  | H  | H  | L  |
| H            | L  | H  | H  | H  |
| H            | H  | L  | L  | L  |
| H            | H  | L  | L  | H  |
| H            | H  | L  | H  | L  |
| H            | H  | L  | H  | H  |
| H            | H  | H  | L  | L  |
| H            | H  | H  | L  | H  |
| H            | H  | H  | H  | L  |
| H            | H  | H  | H  | H  |

| SA7 | SA6 | SA5 | SA4 | SA3 | SA2 | SA1 | SA0 |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 1   | 0   | 0   | 0   | 0   | 0   | 0   | -   |
| 1   | 0   | 0   | 0   | 0   | 0   | 1   | -   |
| 1   | 0   | 0   | 0   | 0   | 1   | 0   | -   |
| 1   | 0   | 0   | 0   | 0   | 1   | 1   | -   |
| 1   | 0   | 0   | 0   | 1   | 0   | 0   | -   |
| 1   | 0   | 0   | 0   | 1   | 0   | 1   | -   |
| 1   | 0   | 0   | 0   | 1   | 1   | 0   | -   |
| 1   | 0   | 0   | 0   | 1   | 1   | 1   | -   |
| 1   | 0   | 0   | 1   | 0   | 0   | 0   | -   |
| 1   | 0   | 0   | 1   | 0   | 0   | 1   | -   |
| 1   | 0   | 0   | 1   | 0   | 1   | 0   | -   |
| 1   | 0   | 0   | 1   | 0   | 1   | 1   | -   |
| 1   | 0   | 0   | 1   | 1   | 0   | 0   | -   |
| 1   | 0   | 0   | 1   | 1   | 0   | 1   | -   |
| 1   | 0   | 0   | 1   | 1   | 1   | 0   | -   |
| 1   | 0   | 0   | 1   | 1   | 1   | 1   | -   |
| 1   | 0   | 1   | 0   | 0   | 0   | 0   | -   |
| 1   | 0   | 1   | 0   | 0   | 0   | 1   | -   |
| 1   | 0   | 1   | 0   | 0   | 1   | 0   | -   |
| 1   | 0   | 1   | 0   | 0   | 1   | 1   | -   |
| 1   | 0   | 1   | 0   | 1   | 0   | 0   | -   |
| 1   | 0   | 1   | 0   | 1   | 0   | 1   | -   |
| 1   | 0   | 1   | 0   | 1   | 1   | 0   | -   |
| 1   | 0   | 1   | 0   | 1   | 1   | 1   | -   |
| 1   | 0   | 1   | 1   | 0   | 0   | 0   | -   |
| 1   | 0   | 1   | 1   | 0   | 0   | 1   | -   |
| 1   | 0   | 1   | 1   | 0   | 1   | 0   | -   |
| 1   | 0   | 1   | 1   | 0   | 1   | 1   | -   |
| 1   | 0   | 1   | 1   | 1   | 0   | 0   | -   |
| 1   | 0   | 1   | 1   | 1   | 0   | 1   | -   |
| 1   | 0   | 1   | 1   | 1   | 1   | 0   | -   |
| 1   | 0   | 1   | 1   | 1   | 1   | 1   | -   |

:LV5235

# LV5235V

## Serial each mode setting

|               | ADDRESS : 00h |        |        |        |    |    |     |    |
|---------------|---------------|--------|--------|--------|----|----|-----|----|
|               | D7            | D6     | D5     | D4     | D3 | D2 | D1  | D0 |
| register name | -             | PWM[2] | PWM[1] | PWM[0] | -  | -  | MAS | -  |
| default       | 0             | 0      | 0      | 0      | 0  | 0  | 0   | 0  |

| D6 | D5 | D4 | time(ms) |
|----|----|----|----------|
| 0  | 0  | 0  | 0.5      |
| 0  | 0  | 1  | 1.0      |
| 0  | 1  | 0  | 2.0      |
| 0  | 1  | 1  | 4.0      |
| 1  | 0  | 0  | 8.0      |
| -  | -  | -  | -        |
| -  | -  | -  | -        |
| -  | -  | -  | -        |
| -  | -  | -  | -        |

PWM cycle setting

\*Default

| D1 | MAS    |
|----|--------|
| 0  | Master |
| 1  | Slave  |

Master/Slave setting

\*Default

|               | ADDRESS : 01h |         |         |         |    |        |        |        |
|---------------|---------------|---------|---------|---------|----|--------|--------|--------|
|               | D7            | D6      | D5      | D4      | D3 | D2     | D1     | D0     |
| register name | -             | FOUT[2] | FOUT[1] | FOUT[0] | -  | FIN[2] | FIN[1] | FIN[0] |
| default       | 0             | 0       | 0       | 0       | 0  | 0      | 0      | 0      |

| D6 | D5 | D4 | time(ms) |
|----|----|----|----------|
| 0  | 0  | 0  | No slope |
| 0  | 0  | 1  | 0.5      |
| 0  | 1  | 0  | 1.0      |
| 0  | 1  | 1  | 2.0      |
| 1  | 0  | 0  | 4.0      |
| 1  | 0  | 1  | 8.0      |
| 1  | 1  | 0  | 16.0     |
| 1  | 1  | 1  | 32.0     |

Fout slope setting

\*Default

Speed of fade a step

(It takes 256 above-mentioned, set value × seconds until the fade is completed.)

| D2 | D1 | D0 | time(ms) |
|----|----|----|----------|
| 0  | 0  | 0  | No slope |
| 0  | 0  | 1  | 0.5      |
| 0  | 1  | 0  | 1.0      |
| 0  | 1  | 1  | 2.0      |
| 1  | 0  | 0  | 4.0      |
| 1  | 0  | 1  | 8.0      |
| 1  | 1  | 0  | 16.0     |
| 1  | 1  | 1  | 32.0     |

Fin slope setting

\*Default

Speed of fade a step

(It takes 256 above-mentioned, set value × seconds until the fade is completed.)

# LV5235V

|               | ADDRESS : 02h |    |    |         |         |         |         |         |
|---------------|---------------|----|----|---------|---------|---------|---------|---------|
|               | D7            | D6 | D5 | D4      | D3      | D2      | D1      | D0      |
| register name | -             | -  | -  | RLED[4] | RLED[3] | RLED[2] | RLED[1] | RLED[0] |
| default       | 0             | 0  | 0  | 0       | 0       | 0       | 0       | 0       |

| D4 | D3 | D2 | D1 | D0 | Current value (mA) |
|----|----|----|----|----|--------------------|
| 0  | 0  | 0  | 0  | 0  | 0.96               |
| 0  | 0  | 0  | 0  | 1  | 1.92               |
| 0  | 0  | 0  | 1  | 0  | 2.88               |
| 0  | 0  | 0  | 1  | 1  | 3.84               |
| 0  | 0  | 1  | 0  | 0  | 4.80               |
| 0  | 0  | 1  | 0  | 1  | 5.76               |
| 0  | 0  | 1  | 1  | 0  | 6.72               |
| 0  | 0  | 1  | 1  | 1  | 7.68               |
| 0  | 1  | 0  | 0  | 0  | 8.64               |
| 0  | 1  | 0  | 0  | 1  | 9.60               |
| 0  | 1  | 0  | 1  | 0  | 10.56              |
| 0  | 1  | 0  | 1  | 1  | 11.52              |
| 0  | 1  | 1  | 0  | 0  | 12.48              |
| 0  | 1  | 1  | 0  | 1  | 13.44              |
| 0  | 1  | 1  | 1  | 0  | 14.40              |
| 0  | 1  | 1  | 1  | 1  | 15.36              |
| 1  | 0  | 0  | 0  | 0  | 16.32              |
| 1  | 0  | 0  | 0  | 1  | 17.28              |
| 1  | 0  | 0  | 1  | 0  | 18.24              |
| 1  | 0  | 0  | 1  | 1  | 19.20              |
| 1  | 0  | 1  | 0  | 0  | 20.16              |
| 1  | 0  | 1  | 0  | 1  | 21.12              |
| 1  | 0  | 1  | 1  | 0  | 22.08              |
| 1  | 0  | 1  | 1  | 1  | 23.04              |
| 1  | 1  | 0  | 0  | 0  | 24.00              |
| 1  | 1  | 0  | 0  | 1  | 24.96              |
| 1  | 1  | 0  | 1  | 0  | 25.92              |
| 1  | 1  | 0  | 1  | 1  | 26.88              |
| 1  | 1  | 1  | 0  | 0  | 27.84              |
| 1  | 1  | 1  | 0  | 1  | 28.80              |
| 1  | 1  | 1  | 1  | 0  | 29.76              |
| 1  | 1  | 1  | 1  | 1  | 30.72              |

RLED current value setting

\* Default

# LV5235V

|               | ADDRESS : 03h |    |    |         |         |         |         |         |
|---------------|---------------|----|----|---------|---------|---------|---------|---------|
|               | D7            | D6 | D5 | D4      | D3      | D2      | D1      | D0      |
| register name | -             | -  | -  | GLED[4] | GLED[3] | GLED[2] | GLED[1] | GLED[0] |
| default       | 0             | 0  | 0  | 0       | 0       | 0       | 0       | 0       |

| D4 | D3 | D2 | D1 | D0 | Current value (mA) |
|----|----|----|----|----|--------------------|
| 0  | 0  | 0  | 0  | 0  | 0.96               |
| 0  | 0  | 0  | 0  | 1  | 1.92               |
| 0  | 0  | 0  | 1  | 0  | 2.88               |
| 0  | 0  | 0  | 1  | 1  | 3.84               |
| 0  | 0  | 1  | 0  | 0  | 4.80               |
| 0  | 0  | 1  | 0  | 1  | 5.76               |
| 0  | 0  | 1  | 1  | 0  | 6.72               |
| 0  | 0  | 1  | 1  | 1  | 7.68               |
| 0  | 1  | 0  | 0  | 0  | 8.64               |
| 0  | 1  | 0  | 0  | 1  | 9.60               |
| 0  | 1  | 0  | 1  | 0  | 10.56              |
| 0  | 1  | 0  | 1  | 1  | 11.52              |
| 0  | 1  | 1  | 0  | 0  | 12.48              |
| 0  | 1  | 1  | 0  | 1  | 13.44              |
| 0  | 1  | 1  | 1  | 0  | 14.40              |
| 0  | 1  | 1  | 1  | 1  | 15.36              |
| 1  | 0  | 0  | 0  | 0  | 16.32              |
| 1  | 0  | 0  | 0  | 1  | 17.28              |
| 1  | 0  | 0  | 1  | 0  | 18.24              |
| 1  | 0  | 0  | 1  | 1  | 19.20              |
| 1  | 0  | 1  | 0  | 0  | 20.16              |
| 1  | 0  | 1  | 0  | 1  | 21.12              |
| 1  | 0  | 1  | 1  | 0  | 22.08              |
| 1  | 0  | 1  | 1  | 1  | 23.04              |
| 1  | 1  | 0  | 0  | 0  | 24.00              |
| 1  | 1  | 0  | 0  | 1  | 24.96              |
| 1  | 1  | 0  | 1  | 0  | 25.92              |
| 1  | 1  | 0  | 1  | 1  | 26.88              |
| 1  | 1  | 1  | 0  | 0  | 27.84              |
| 1  | 1  | 1  | 0  | 1  | 28.80              |
| 1  | 1  | 1  | 1  | 0  | 29.76              |
| 1  | 1  | 1  | 1  | 1  | 30.72              |

GLED current value setting

\* Default

# LV5235V

|               | ADDRESS : 04h |    |    |         |         |         |         |         |
|---------------|---------------|----|----|---------|---------|---------|---------|---------|
|               | D7            | D6 | D5 | D4      | D3      | D2      | D1      | D0      |
| register name | -             | -  | -  | BLED[4] | BLED[3] | BLED[2] | BLED[1] | BLED[0] |
| default       | 0             | 0  | 0  | 0       | 0       | 0       | 0       | 0       |

| D4 | D3 | D2 | D1 | D0 | Current value (mA) |
|----|----|----|----|----|--------------------|
| 0  | 0  | 0  | 0  | 0  | 0.96               |
| 0  | 0  | 0  | 0  | 1  | 1.92               |
| 0  | 0  | 0  | 1  | 0  | 2.88               |
| 0  | 0  | 0  | 1  | 1  | 3.84               |
| 0  | 0  | 1  | 0  | 0  | 4.80               |
| 0  | 0  | 1  | 0  | 1  | 5.76               |
| 0  | 0  | 1  | 1  | 0  | 6.72               |
| 0  | 0  | 1  | 1  | 1  | 7.68               |
| 0  | 1  | 0  | 0  | 0  | 8.64               |
| 0  | 1  | 0  | 0  | 1  | 9.60               |
| 0  | 1  | 0  | 1  | 0  | 10.56              |
| 0  | 1  | 0  | 1  | 1  | 11.52              |
| 0  | 1  | 1  | 0  | 0  | 12.48              |
| 0  | 1  | 1  | 0  | 1  | 13.44              |
| 0  | 1  | 1  | 1  | 0  | 14.40              |
| 0  | 1  | 1  | 1  | 1  | 15.36              |
| 1  | 0  | 0  | 0  | 0  | 16.32              |
| 1  | 0  | 0  | 0  | 1  | 17.28              |
| 1  | 0  | 0  | 1  | 0  | 18.24              |
| 1  | 0  | 0  | 1  | 1  | 19.20              |
| 1  | 0  | 1  | 0  | 0  | 20.16              |
| 1  | 0  | 1  | 0  | 1  | 21.12              |
| 1  | 0  | 1  | 1  | 0  | 22.08              |
| 1  | 0  | 1  | 1  | 1  | 23.04              |
| 1  | 1  | 0  | 0  | 0  | 24.00              |
| 1  | 1  | 0  | 0  | 1  | 24.96              |
| 1  | 1  | 0  | 1  | 0  | 25.92              |
| 1  | 1  | 0  | 1  | 1  | 26.88              |
| 1  | 1  | 1  | 0  | 0  | 27.84              |
| 1  | 1  | 1  | 0  | 1  | 28.80              |
| 1  | 1  | 1  | 1  | 0  | 29.76              |
| 1  | 1  | 1  | 1  | 1  | 30.72              |

BLED current value setting

\* Default

# LV5235V

|               | ADDRESS : 05h |      |      |      |    |      |      |      |
|---------------|---------------|------|------|------|----|------|------|------|
|               | D7            | D6   | D5   | D4   | D3 | D2   | D1   | D0   |
| register name | -             | B2ON | G2ON | R2ON | -  | B1ON | G1ON | R1ON |
| default       | 0             | 0    | 0    | 0    | 0  | 0    | 0    | 0    |

|    |      |
|----|------|
| D6 | B2ON |
| 0  | OFF  |
| 1  | ON   |

LEDB2 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D5 | G2ON |
| 0  | OFF  |
| 1  | ON   |

LEDG2 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D4 | R2ON |
| 0  | OFF  |
| 1  | ON   |

LEDR2 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D2 | B1ON |
| 0  | OFF  |
| 1  | ON   |

LEDB1 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D1 | G1ON |
| 0  | OFF  |
| 1  | ON   |

LEDG1ON/OFF setting  
\* Default

|    |      |
|----|------|
| D0 | R1ON |
| 0  | OFF  |
| 1  | ON   |

LEDR1 ON/OFF setting  
\* Default

|               | ADDRESS : 06h |      |      |      |    |      |      |      |
|---------------|---------------|------|------|------|----|------|------|------|
|               | D7            | D6   | D5   | D4   | D3 | D2   | D1   | D0   |
| register name | -             | B4ON | G4ON | R4ON | -  | B3ON | G3ON | R3ON |
| default       | 0             | 0    | 0    | 0    | 0  | 0    | 0    | 0    |

|    |      |
|----|------|
| D6 | B4ON |
| 0  | OFF  |
| 1  | ON   |

LEDB4 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D5 | G4ON |
| 0  | OFF  |
| 1  | ON   |

LEDG4 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D4 | R4ON |
| 0  | OFF  |
| 1  | ON   |

LEDR4 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D2 | B3ON |
| 0  | OFF  |
| 1  | ON   |

LEDB3 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D1 | G3ON |
| 0  | OFF  |
| 1  | ON   |

LEDG3 ON/OFF setting  
\* Default

|    |      |
|----|------|
| D0 | R3ON |
| 0  | OFF  |
| 1  | ON   |

LEDR3 ON/OFF setting  
\* Default

# LV5235V

|               | ADDRESS : 07h |      |      |      |    |      |      |      |
|---------------|---------------|------|------|------|----|------|------|------|
|               | D7            | D6   | D5   | D4   | D3 | D2   | D1   | D0   |
| register name | -             | B6ON | G6ON | R6ON | -  | B5ON | G5ON | R5ON |
| default       | 0             | 0    | 0    | 0    | 0  | 0    | 0    | 0    |

| D6 | B6ON |
|----|------|
| 0  | OFF  |
| 1  | ON   |

LEDB6 ON/OFF setting

\* Default

| D5 | G6ON |
|----|------|
| 0  | OFF  |
| 1  | ON   |

LEDG6 ON/OFF setting

\* Default

| D4 | R6ON |
|----|------|
| 0  | OFF  |
| 1  | ON   |

LEDR6 ON/OFF setting

\* Default

| D2 | B5ON |
|----|------|
| 0  | OFF  |
| 1  | ON   |

LEDB5 ON/OFF setting

\* Default

| D1 | G5ON |
|----|------|
| 0  | OFF  |
| 1  | ON   |

LEDG5 ON/OFF setting

\* Default

| D0 | R5ON |
|----|------|
| 0  | OFF  |
| 1  | ON   |

LEDR5 ON/OFF setting

\* Default

|               | ADDRESS : 09h |    |          |          |          |          |          |          |
|---------------|---------------|----|----------|----------|----------|----------|----------|----------|
|               | D7            | D6 | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | 0             | 0  | R5PON[1] | R5PON[0] | R3PON[1] | R3PON[0] | R1PON[1] | R1PON[0] |
| default       | 0             | 0  | 0        | 0        | 0        | 0        | 0        | 0        |

| D5 | D4 | R5PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDR5 output setting

\* Default

| D3 | D2 | R3PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDR3 output setting

\* Default

| D1 | D0 | R1PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDR1 output setting

\* Default

# LV5235V

|               | ADDRESS : 0ah |    |          |          |          |          |          |          |
|---------------|---------------|----|----------|----------|----------|----------|----------|----------|
|               | D7            | D6 | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | 0             | 0  | R6PON[1] | R6PON[0] | R4PON[1] | R4PON[0] | R2PON[1] | R2PON[0] |
| default       | 0             | 0  | 0        | 0        | 0        | 0        | 0        | 0        |

| D5 | D4 | R6PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDR6 output setting

\* Default

| D3 | D2 | R4PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDR4 output setting

\* Default

| D1 | D0 | R2PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDR2 output setting

\* Default

|               | ADDRESS : 0bh |    |          |          |          |          |          |          |
|---------------|---------------|----|----------|----------|----------|----------|----------|----------|
|               | D7            | D6 | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | 0             | 0  | G5PON[1] | G5PON[0] | G3PON[1] | G3PON[0] | G1PON[1] | G1PON[0] |
| default       | 0             | 0  | 0        | 0        | 0        | 0        | 0        | 0        |

| D5 | D4 | G5PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDG5 output setting

\* Default

| D3 | D2 | G3PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDG3 output setting

\* Default

| D1 | D0 | G1PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDG1 output setting

\* Default

# LV5235V

|               | ADDRESS : 0ch |    |          |          |          |          |          |          |
|---------------|---------------|----|----------|----------|----------|----------|----------|----------|
|               | D7            | D6 | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | 0             | 0  | G6PON[1] | G6PON[0] | G4PON[1] | G4PON[0] | G2PON[1] | G2PON[0] |
| default       | 0             | 0  | 0        | 0        | 0        | 0        | 0        | 0        |

| D5 | D4 | G6PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDG6 output setting

\* Default

| D3 | D2 | G4PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDG4 output setting

\* Default

| D1 | D0 | G2PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDG2 output setting

\* Default

|               | ADDRESS : 0dh |    |          |          |          |          |          |          |
|---------------|---------------|----|----------|----------|----------|----------|----------|----------|
|               | D7            | D6 | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | 0             | 0  | B5PON[1] | B5PON[0] | B3PON[1] | B3PON[0] | B1PON[1] | B1PON[0] |
| default       | 0             | 0  | 0        | 0        | 0        | 0        | 0        | 0        |

| D5 | D4 | B5PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDB5 output setting

\* Default

| D3 | D2 | B3PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDB3 output setting

\* Default

| D1 | D0 | B1PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDB1 output setting

\* Default

# LV5235V

|               | ADDRESS : 0eh |    |          |          |          |          |          |          |
|---------------|---------------|----|----------|----------|----------|----------|----------|----------|
|               | D7            | D6 | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | 0             | 0  | B6PON[1] | B6PON[0] | B4PON[1] | B4PON[0] | B2PON[1] | B2PON[0] |
| default       | 0             | 0  | 0        | 0        | 0        | 0        | 0        | 0        |

| D5 | D4 | B6PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDB6 output setting

\* Default

| D3 | D2 | B4PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDB4 output setting

\* Default

| D1 | D0 | B2PON                             |
|----|----|-----------------------------------|
| 0  | 0  | PMW output priority               |
| 0  | 1  | Fade output priority              |
| 1  | 0  | Compulsion ON/OFF output priority |
| -  | -  | -                                 |

LEDB2 output setting

\* Default

|               | ADDRESS : 0fh |    |      |      |      |      |      |      |
|---------------|---------------|----|------|------|------|------|------|------|
|               | D7            | D6 | D5   | D4   | D3   | D2   | D1   | D0   |
| register name | 0             | 0  | R6FD | R5FD | R4FD | R3FD | R2FD | R1FD |
| default       | 0             | 0  | 0    | 0    | 0    | 0    | 0    | 0    |

| D5 | R6FD            |
|----|-----------------|
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDR6 fade function ON/OFF setting

\* Default

| D4 | R5FD            |
|----|-----------------|
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDR5 fade function ON/OFF setting

\* Default

| D3 | R4FD            |
|----|-----------------|
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDR4 fade function ON/OFF setting

\* Default

| D2 | R3FD            |
|----|-----------------|
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDR3 fade function ON/OFF setting

\* Default

| D1 | R2FD            |
|----|-----------------|
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDR2 fade function ON/OFF setting

\* Default

| D0 | R1FD            |
|----|-----------------|
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDR1 fade function ON/OFF setting

\* Default

# LV5235V

|               | ADDRESS : 10h |    |      |      |      |      |      |      |
|---------------|---------------|----|------|------|------|------|------|------|
|               | D7            | D6 | D5   | D4   | D3   | D2   | D1   | D0   |
| register name | 0             | 0  | G6FD | G5FD | G4FD | G3FD | G2FD | G1FD |
| default       | 0             | 0  | 0    | 0    | 0    | 0    | 0    | 0    |

|    |                 |
|----|-----------------|
| D5 | G6FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDG6 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D4 | G5FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDG5 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D3 | G4FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDG4 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D2 | G3FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDG3 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D1 | G2FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDG2 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D0 | G1FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDG1 fade function ON/OFF setting  
\* Default

|               | ADDRESS : 11h |    |      |      |      |      |      |      |
|---------------|---------------|----|------|------|------|------|------|------|
|               | D7            | D6 | D5   | D4   | D3   | D2   | D1   | D0   |
| register name | 0             | 0  | B6FD | B5FD | B4FD | B3FD | B2FD | B1FD |
| default       | 0             | 0  | 0    | 0    | 0    | 0    | 0    | 0    |

|    |                 |
|----|-----------------|
| D5 | B6FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDB6 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D4 | B5FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDB5 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D3 | B4FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDB4 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D2 | B3FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDB3 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D1 | B2FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDB2 fade function ON/OFF setting  
\* Default

|    |                 |
|----|-----------------|
| D0 | B1FD            |
| 0  | Fade invalidity |
| 1  | Fade effective  |

LEDB1 fade function ON/OFF setting  
\* Default

# LV5235V

|               | ADDRESS : 12h |    |      |      |      |      |      |      |
|---------------|---------------|----|------|------|------|------|------|------|
|               | D7            | D6 | D5   | D4   | D3   | D2   | D1   | D0   |
| register name | 0             | 0  | R6CM | R5CM | R4CM | R3CM | R2CM | R1CM |
| default       | 0             | 0  | 0    | 0    | 0    | 0    | 0    | 0    |

| D5 | R6CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDR6 compulsion ON/OFF setting  
\* Default

| D4 | R5CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDR5 compulsion ON/OFF setting  
\* Default

| D3 | R4CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDR4 compulsion ON/OFF setting  
\* Default

| D2 | R3CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDR3 fade function ON/OFF setting  
\* Default

| D1 | R2CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDR2 fade function ON/OFF setting  
\* Default

| D0 | R1CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDR1 fade function ON/OFF setting  
\* Default

|               | ADDRESS : 13h |    |      |      |      |      |      |      |
|---------------|---------------|----|------|------|------|------|------|------|
|               | D7            | D6 | D5   | D4   | D3   | D2   | D1   | D0   |
| register name | 0             | 0  | G6CM | G5CM | G4CM | G3CM | G2CM | G1CM |
| default       | 0             | 0  | 0    | 0    | 0    | 0    | 0    | 0    |

| D5 | G6CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDG6 compulsion ON/OFF setting  
\* Default

| D4 | G5CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDG5 compulsion ON/OFF setting  
\* Default

| D3 | G4CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDG4 compulsion ON/OFF setting  
\* Default

| D2 | G3CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDG3 fade function ON/OFF setting  
\* Default

| D1 | G2CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDG2 fade function ON/OFF setting  
\* Default

| D0 | G1CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDG1 fade function ON/OFF setting  
\* Default

# LV5235V

|               | ADDRESS : 14h |    |      |      |      |      |      |      |
|---------------|---------------|----|------|------|------|------|------|------|
|               | D7            | D6 | D5   | D4   | D3   | D2   | D1   | D0   |
| register name | 0             | 0  | B6CM | B5CM | B4CM | B3CM | B2CM | B1CM |
| default       | 0             | 0  | 0    | 0    | 0    | 0    | 0    | 0    |

| D5 | B6CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDB6 compulsion ON/OFF setting

\* Default

| D4 | B5CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDB5 compulsion ON/OFF setting

\* Default

| D3 | B4CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDB4 compulsion ON/OFF setting

\* Default

| D2 | B3CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDB3 fade function ON/OFF setting

\* Default

| D1 | B2CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDB2 fade function ON/OFF setting

\* Default

| D0 | B1CM           |
|----|----------------|
| 0  | Compulsion OFF |
| 1  | Compulsion ON  |

LEDB1 fade function ON/OFF setting

\* Default

|               | ADDRESS : 15h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | R1PWM[7]      | R1PWM[6] | R1PWM[5] | R1PWM[4] | R1PWM[3] | R1PWM[2] | R1PWM[1] | R1PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDR1 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{R1PWM}[7:0]}{256}$$

|               | ADDRESS : 16h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | G1PWM[7]      | G1PWM[6] | G1PWM[5] | G1PWM[4] | G1PWM[3] | G1PWM[2] | G1PWM[1] | G1PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDG1 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{G1PWM}[7:0]}{256}$$

|               | ADDRESS : 17h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | B1PWM[7]      | B1PWM[6] | B1PWM[5] | B1PWM[4] | B1PWM[3] | B1PWM[2] | B1PWM[1] | B1PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDB1 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{B1PWM}[7:0]}{256}$$

# LV5235V

|               | ADDRESS : 18h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | R2PWM[7]      | R2PWM[6] | R2PWM[5] | R2PWM[4] | R2PWM[3] | R2PWM[2] | R2PWM[1] | R2PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDR2 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{R2PWM}[7:0]}{256}$$

|               | ADDRESS : 19h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | G2PWM[7]      | G2PWM[6] | G2PWM[5] | G2PWM[4] | G2PWM[3] | G2PWM[2] | G2PWM[1] | G2PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDG2 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{G2PWM}[7:0]}{256}$$

|               | ADDRESS : 1ah |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | B2PWM[7]      | B2PWM[6] | B2PWM[5] | B2PWM[4] | B2PWM[3] | B2PWM[2] | B2PWM[1] | B2PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDB2 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{B2PWM}[7:0]}{256}$$

|               | ADDRESS : 1bh |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | R3PWM[7]      | R3PWM[6] | R3PWM[5] | R3PWM[4] | R3PWM[3] | R3PWM[2] | R3PWM[1] | R3PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDR3 PWM Duty setting (DefaultALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{R3PWM}[7:0]}{256}$$

|               | ADDRESS : 1ch |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | G3PWM[7]      | G3PWM[6] | G3PWM[5] | G3PWM[4] | G3PWM[3] | G3PWM[2] | G3PWM[1] | G3PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDG3 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{G3PWM}[7:0]}{256}$$

|               | ADDRESS : 1dh |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | B3PWM[7]      | B3PWM[6] | B3PWM[5] | B3PWM[4] | B3PWM[3] | B3PWM[2] | B3PWM[1] | B3PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDB3 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{B3PWM}[7:0]}{256}$$

# LV5235V

|               | ADDRESS : 1eh |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | R4PWM[7]      | R4PWM[6] | R4PWM[5] | R4PWM[4] | R4PWM[3] | R4PWM[2] | R4PWM[1] | R4PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDR4 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{R4PWM}[7:0]}{256}$$

|               | ADDRESS : 1fh |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | G4PWM[7]      | G4PWM[6] | G4PWM[5] | G4PWM[4] | G4PWM[3] | G4PWM[2] | G4PWM[1] | G4PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDG4 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{G4PWM}[7:0]}{256}$$

|               | ADDRESS : 20h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | B4PWM[7]      | B4PWM[6] | B4PWM[5] | B4PWM[4] | B4PWM[3] | B4PWM[2] | B4PWM[1] | B4PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDB4 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{B4PWM}[7:0]}{256}$$

|               | ADDRESS : 21h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | R5PWM[7]      | R5PWM[6] | R5PWM[5] | R5PWM[4] | R5PWM[3] | R5PWM[2] | R5PWM[1] | R5PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDR5 PWM Duty setting (DefaultALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{R5PWM}[7:0]}{256}$$

|               | ADDRESS : 22h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | G5PWM[7]      | G5PWM[6] | G5PWM[5] | G5PWM[4] | G5PWM[3] | G5PWM[2] | G5PWM[1] | G5PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDG5 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{G5PWM}[7:0]}{256}$$

|               | ADDRESS : 23h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | B5PWM[7]      | B5PWM[6] | B5PWM[5] | B5PWM[4] | B5PWM[3] | B5PWM[2] | B5PWM[1] | B5PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDB5 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{B5PWM}[7:0]}{256}$$

## LV5235V

|               | ADDRESS : 24h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | R6PWM[7]      | R6PWM[6] | R6PWM[5] | R6PWM[4] | R6PWM[3] | R6PWM[2] | R6PWM[1] | R6PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDR6 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{R6PWM}[7:0]}{256}$$

|               | ADDRESS : 25h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | G6PWM[7]      | G6PWM[6] | G6PWM[5] | G6PWM[4] | G6PWM[3] | G6PWM[2] | G6PWM[1] | G6PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDG6 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{G6PWM}[7:0]}{256}$$

|               | ADDRESS : 26h |          |          |          |          |          |          |          |
|---------------|---------------|----------|----------|----------|----------|----------|----------|----------|
|               | D7            | D6       | D5       | D4       | D3       | D2       | D1       | D0       |
| register name | B6PWM[7]      | B6PWM[6] | B6PWM[5] | B6PWM[4] | B6PWM[3] | B6PWM[2] | B6PWM[1] | B6PWM[0] |
| default       | 0             | 0        | 0        | 0        | 0        | 0        | 0        | 0        |

LEDB6 PWM Duty setting (Default ALL0)

| D   | Duty (%) |
|-----|----------|
| 00h | 0.0      |
| ffh | 99.6     |

$$\text{Duty (\%)} = \frac{\text{B6PWM}[7:0]}{256}$$

# LV5235V

## LV5235V serial map

• Table upper row: Register name      Table the lower: Default value

|     | A7               | A6 | A5 | A4 | A3 | A2 | A1 | A0 | D7         | D6        | D5         | D4        | D3         | D2       | D1         | D0   |
|-----|------------------|----|----|----|----|----|----|----|------------|-----------|------------|-----------|------------|----------|------------|------|
| 00h | 0                | 0  | 0  | 0  | 0  | 0  | 0  | 0  | ×          | PWM[2:0]  |            |           | ×          | ×        | MAS        | ×    |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 01h | 0                | 0  | 0  | 0  | 0  | 0  | 0  | 1  | ×          | FOUT[2:0] |            |           | ×          | FIN[2:0] |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 02h | 0                | 0  | 0  | 0  | 0  | 0  | 1  | 0  | ×          | ×         | ×          | RLED[4:0] |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 03h | 0                | 0  | 0  | 0  | 0  | 0  | 1  | 1  | ×          | ×         | ×          | GLED[4:0] |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 04h | 0                | 0  | 0  | 0  | 0  | 1  | 0  | 0  | ×          | ×         | ×          | BLED[4:0] |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 05h | 0                | 0  | 0  | 0  | 0  | 1  | 0  | 1  | ×          | B2ON      | G2ON       | R2ON      | ×          | B1ON     | G1ON       | R1ON |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 06h | 0                | 0  | 0  | 0  | 0  | 1  | 1  | 0  | ×          | B4ON      | G4ON       | R4ON      | ×          | B3ON     | G3ON       | R3ON |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 07h | 0                | 0  | 0  | 0  | 0  | 1  | 1  | 1  | ×          | B6ON      | G6ON       | R6ON      | ×          | B5ON     | G5ON       | R5ON |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 08h | 0                | 0  | 0  | 0  | 1  | 0  | 0  | 0  | ×          | 0         | 0          | 0         | ×          | 0        | 0          | 0    |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 09h | 0                | 0  | 0  | 0  | 1  | 0  | 0  | 1  | ×          | ×         | R5PON[1:0] |           | R3PON[1:0] |          | R1PON[2:0] |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 0ah | 0                | 0  | 0  | 0  | 1  | 0  | 1  | 0  | 0          | 0         | R6PON[1:0] |           | R4PON[1:0] |          | R2PON[1:0] |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 0bh | 0                | 0  | 0  | 0  | 1  | 0  | 1  | 1  | 0          | 0         | G5PON[1:0] |           | G3PON[1:0] |          | G1PON[1:0] |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 0ch | 0                | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 0          | 0         | G6PON[1:0] |           | G4PON[1:0] |          | G2PON[1:0] |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 0dh | 0                | 0  | 0  | 0  | 1  | 1  | 0  | 1  | 0          | 0         | B5PON[1:0] |           | B3PON[1:0] |          | B1PON[1:0] |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 0eh | 0                | 0  | 0  | 0  | 1  | 1  | 1  | 0  | 0          | 0         | B6PON[1:0] |           | B4PON[1:0] |          | B2PON[1:0] |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 0fh | 0                | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 0          | 0         | R6FD       | R5FD      | R4FD       | R3FD     | R2FD       | R1FD |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 10h | 0                | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0          | 0         | G6FD       | G5FD      | G4FD       | G3FD     | G2FD       | G1FD |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 11h | 0                | 0  | 0  | 1  | 0  | 0  | 0  | 1  | 0          | 0         | B6FD       | B5FD      | B4FD       | B3FD     | B2FD       | B1FD |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 12h | 0                | 0  | 0  | 1  | 0  | 0  | 1  | 0  | 0          | 0         | R6CM       | R5CM      | R4CM       | R3CM     | R2CM       | R1CM |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 13h | 0                | 0  | 0  | 1  | 0  | 0  | 1  | 1  | 0          | 0         | G6CM       | G5CM      | G4CM       | G3CM     | G2CM       | G1CM |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 14h | 0                | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 0          | 0         | B6CM       | B5CM      | B4CM       | B3CM     | B2CM       | B1CM |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 15h | 0                | 0  | 0  | 1  | 0  | 1  | 0  | 1  | R1PWM[7:0] |           |            |           |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 16h | 0                | 0  | 0  | 1  | 0  | 1  | 1  | 0  | G1PWM[7:0] |           |            |           |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 17h | 0                | 0  | 0  | 1  | 0  | 1  | 1  | 1  | B1PWM[7:0] |           |            |           |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 18h | 0                | 0  | 0  | 1  | 1  | 0  | 0  | 0  | R2PWM[7:0] |           |            |           |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 19h | 0                | 0  | 0  | 1  | 1  | 0  | 0  | 1  | G2PWM[7:0] |           |            |           |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
| 1ah | 0                | 0  | 0  | 1  | 1  | 0  | 1  | 0  | B2PWM[7:0] |           |            |           |            |          |            |      |
|     |                  |    |    |    |    |    |    |    | 0          | 0         | 0          | 0         | 0          | 0        | 0          | 0    |
|     | Register address |    |    |    |    |    |    |    | Data       |           |            |           |            |          |            |      |

Continued on next page.

Continued from preceding page.

|                  | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 | D7         | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|------------------|----|----|----|----|----|----|----|----|------------|----|----|----|----|----|----|----|
| 1bh              | 0  | 0  | 0  | 1  | 1  | 0  | 1  | 1  | R3PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 1ch              | 0  | 0  | 0  | 1  | 1  | 1  | 0  | 0  | G3PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 1dh              | 0  | 0  | 0  | 1  | 1  | 1  | 0  | 1  | B3PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 1eh              | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 0  | R4PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 1fh              | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 1  | G4PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 20h              | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | B4PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 21h              | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 1  | R5PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 22h              | 0  | 0  | 1  | 0  | 0  | 0  | 1  | 0  | G5PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 23h              | 0  | 0  | 1  | 0  | 0  | 0  | 1  | 1  | B5PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 24h              | 0  | 0  | 1  | 0  | 0  | 1  | 0  | 0  | R6PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 25h              | 0  | 0  | 1  | 0  | 0  | 1  | 0  | 1  | G6PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 26h              | 0  | 0  | 1  | 0  | 0  | 1  | 1  | 0  | B6PWM[7:0] |    |    |    |    |    |    |    |
|                  |    |    |    |    |    |    |    |    | 0          | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| Register address |    |    |    |    |    |    |    |    | Data       |    |    |    |    |    |    |    |

- SANYO Semiconductor Co.,Ltd. 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 Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents 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 Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require 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 consent of SANYO Semiconductor 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 Semiconductor Co.,Ltd. product that you intend to use.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of August, 2011. Specifications and information herein are subject to change without notice.