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LV5219LG

Bi-CMOS IC

LED driver for cell phone

Overview

The LV5219LG is an LED driver IC for cellular phones. It incorporates 17 LED drivers (main, sub, tricolor × 2, and flash) and a switching regulator circuit and supports the step-up through mode. Each LED current level can be adjusted over the I²C serial bus. The LED driver IC also has functions to synchronize a ringing tone with a tricolor LED and to automatically control the brightness of white LEDs by brightness sensor.

Functions

- PWM switching regulator control circuit
 - (Triangular wave oscillator, reference voltage, PWM comparator, driver, DTC, and short-circuit protection circuit incorporated)
 - (Timer-latch type output cut-off circuit in case of overload)
- LED driver
 - Main LCD backlight LED driver × 6 with automatic brightness adjustment
 - LED current 5-bit changeover 0.0mA to 18.6mA
 - Fade in/out function
 - External brightness control function
 - Dim mode 3-bit changeover 0mA to 1.4mA
 - MLED4, MLED5, and MLED6 can be controlled independently
 - Sub LCD backlight LED driver × 2
 - LED current 5-bit changeover 0.0mA to 18.6mA
 - Fade in/out function
 - Independently controlled SLED2
 - Tricolor LED driver × 2
 - LED current 5-bit changeover 0.0mA to 18.6mA
 - Gradation function
 - Ringing tone synchronization function (Forced to operate at SCTL : H)
 - Flash LED driver × 3
 - LED current 5-bit changeover 0.0mA to 18.6mA
 - Independent control

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Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		6	V
Allowable power dissipation	P_d max	Mounted on a board *	1.2	W
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

* Designated board : 40mm×50mm×0.8mm, glass epoxy 4-layer board (2S2P)

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage 1	VBAT		2.7 to 4.5	V
Supply voltage 2	V_{DD}		1.65 to 3	V
Supply voltage 3	V_{DD2}		1.65 to 3	V

* Use the IC so that supply voltages 1, 2, and 3 have a magnitude relationship expressed as $VBAT > V_{DD}$ and $VBAT > V_{DD2}$.

* Powers must be turned on so that VBAT brings up first.

* Powers must be turned off so that VBAT brings down last.

Electrical Characteristics $T_a = 25^\circ\text{C}$, $VBAT = 3.7\text{V}$, $V_{DD} = V_{DD2} = 2.6\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
VBAT system (PVBAT, SVBAT) consumption current	I_{CC1}	RESET : L (standby mode)		0	5	μA
	I_{CC2}	RESET : H (sleep mode)		0.3	5	μA
	I_{CC3}	When the switching regulator is operated.		1.5	2.5	mA
	I_{CC4}	Switching regulator operation LED : ON current set to 0		1.5	2.5	mA
V_{DD} system (V_{DD}) consumption current	I_{CC5}	RESET : L (standby mode)		0	5	μA
	I_{CC6}	RESET : H (sleep mode)		0	5	μA
	I_{CC7}	When the switching regulator is operated.		0	5	μA
	I_{CC8}	Switching regulator operation LED : ON current set to 0		0	5	μA
V_{DD} system (V_{DD2}) consumption current	I_{CC9}	RESET : L (standby mode)		0	5	μA
	I_{CC10}	RESET : H (sleep mode)		0	5	μA
	I_{CC11}	When the switching regulator is operated.		0	5	μA
	I_{CC12}	Switching regulator operation LED : ON current set to 0		0	5	μA
Switching regulator block						
Output voltage 1	V_{O1}	$I_O = 30\text{mA}$, when output set to 5V	4.8	5.0	5.2	V
LED pin voltage	V_{O2}	LED pin voltage Lowest voltage of feed back mode LED pin voltages MLED1, 2, 3, 4, 5, and 6 (except when MLED4, MLED5, and 6 are controlled independently)	0.2	0.3	0.4	V
Clock frequency	f_{OSC}	External capacitance value connected to CT pin is 27pF	0.8	1	1.2	MHz
Changeover voltage	VD1	Voltage for switching from through mode to LED pin fixed voltage mode when the LED pin voltage main current value is set to 18.6mA		0.2		V
Changeover monitoring time	TVD1	Time interval predetermined to detect error for the LED pin voltage when operation is switched over to stepping up with the detection of LED pin voltage.	50		120	μs
Soft start time	TST				1000	μs
Through SW ON resistance	RTH	Load = 100mA		1		Ω

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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
LED driver block						
Minimum output current	I _{MIN1}	Serial data = #00	0.2	0.6	1.7	mA
Maximum output current	I _{MAX1}	Serial data = #1E	17.4	18.6	19.8	mA
Nonlinearity error	LE	*1	-2		2	LSB
Differential linearity error	DLE	*2	-2		2	LSB
LED pin voltage Saturation characteristic 1	VS1	RGB1, RGB2, FLED1, 2 SLED1, 2 MAX current set			0.35	V
LED pin voltage Saturation characteristic 2	VS2	MLED1, 2, 3, 4, 5, 6 set to MAX current			0.2	V
LED current pairing characteristic 1	M1	MLED1, 2, 3, 4, 5, 6 MAX current set			±5	%
LED current pairing characteristic 2	M2	SLED1, 2 MAX current set			±5	%
LED current pairing characteristic 3	M3	R1LED, R2LED MAX current set			±5	%
LED current pairing characteristic 4	M4	G1LED, G2LED MAX current set			±5	%
LED current pairing characteristic 5	M5	B1LED, B2LED MAX current set			±5	%
Leakage current	I _L	LED driver : OFF, V _O = 5V			1	μA
KLED pin on resistance	RKE	KLED1, KLED2 50 mA drive mode		5		Ω
External CTL current 1	VEM1	MLED1, 2, 3 current values, MICTL pin voltage = V _{DD2} , V _{DD2} = 2.6V, RT2 = 120kΩ, V _{DD2} = 1.8V, RT2 = 82kΩ, difference current when serial MISW : OFF	-0.05	0	+0.05	mA
External CTL current 2	VEM2	MLED1, 2, 3 current values, MICTL pin voltage = V _{DD2} ×3/4, V _{DD2} = 2.6V, RT2 = 120kΩ, V _{DD2} = 1.8V, RT2 = 82kΩ, ratio to the current value when serial MISW : OFF	69.6	74.6	79.6	%
External CTL current 3	VEM3	MLED1, 2, 3 current values, MICTL pin voltage = V _{DD2} ×1/2, V _{DD2} = 2.6V, RT2 = 120kΩ, V _{DD2} = 1.8V, RT2 = 82kΩ, ratio to the current value when serial MISW : OFF	42	47	52	%
External CTL current 4	VEM4	MLED1, 2, 3 current values, MICTL pin voltage = V _{DD2} ×1/4, V _{DD2} = 2.6V, RT2 = 120kΩ, V _{DD2} = 1.8V, RT2 = 82kΩ, ratio to the current value when serial MISW : OFF	15.3	20.3	25.3	%
External CTL current 5	VEM5	MLED1, 2, 3 current values, MICTL pin voltage = 0, = V _{DD2} = 2.6V, RT2 = 120kΩ, V _{DD2} = 1.8V, RT2 = 82kΩ, operation to turn off LED by applying 0V to the MICTL pin is prohibited.		0	0.5	mA
SCTL response time	TSCTL	RGB1 and 2LED current delay time when switching SCTL on/off			10	μs

*1 Nonlinearity error : Error from the ideal current value.

*2 Differential linearity error : Error from the ideal increment when increase by 1 bit is made.

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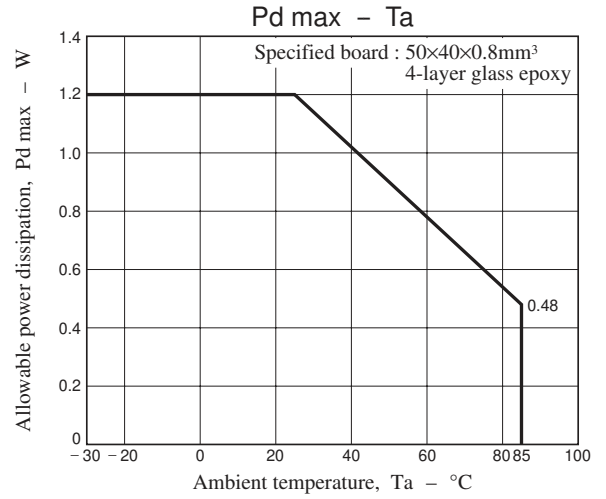
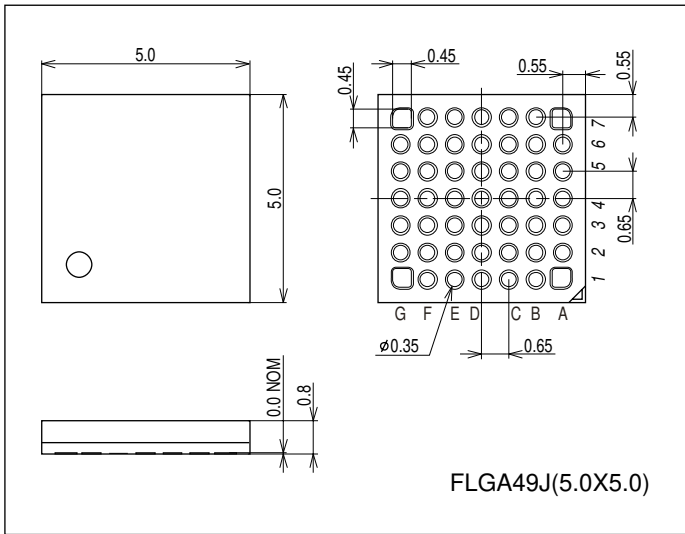
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Brightness sensor information input circuit						
PTD pin threshold voltage 1	VP1	Brightness 1-2 switching PTD pin voltage	0.197	0.247	0.297	V
PTD pin threshold voltage 2	VP2	Brightness 2-3 switching PTD pin voltage	0.241	0.291	0.341	V
PTD pin threshold voltage 3	VP3	Brightness 3-4 switching PTD pin voltage	0.283	0.333	0.383	V
PTD pin threshold voltage 4	VP4	Brightness 4-5 switching PTD pin voltage	0.325	0.375	0.425	V
PTD pin threshold voltage 5	VP5	Brightness 5-6 switching PTD pin voltage	0.369	0.419	0.469	V
PTD pin threshold voltage 6	VP6	Brightness 6-7 switching PTD pin voltage	0.411	0.461	0.511	V
PTD pin threshold voltage 7	VP7	Brightness 7-8 switching PTD pin voltage	0.453	0.503	0.553	V
PTD pin threshold voltage 8	VP8	Brightness 8-9 switching PTD pin voltage	0.492	0.547	0.602	V
PTD pin threshold voltage 9	VP9	Brightness 9-10 switching PTD pin voltage	0.530	0.589	0.648	V
PTD pin threshold voltage 10	VP10	Brightness 10-11 switching PTD pin voltage	0.563	0.631	0.694	V
PTD pin threshold voltage 11	VP11	Brightness 11-12 switching PTD pin voltage	0.605	0.672	0.739	V
PTD pin threshold voltage 12	VP12	Brightness 12-13 switching PTD pin voltage	0.645	0.717	0.789	V
PTD pin threshold voltage 13	VP13	Brightness 13-14 switching PTD pin voltage	0.683	0.759	0.835	V
PTD pin threshold voltage 14	VP14	Brightness 14-15 switching PTD pin voltage	0.721	0.801	0.881	V
PTD pin threshold voltage 15	VP15	Brightness 15-16 switching PTD pin voltage	0.752	0.843	0.920	V
Control circuit block						
High level 1	V _{INH1}	Input high level serial	0.8V _{DD}			V
Low level 1	V _{INL1}	Input low level serial	0		0.2V _{DD}	V
High level 2	V _{INH2}	Input high level RESET, SCTL	1.5			V
Low level 2	V _{INL2}	Input low level RESET, SCTL	0		0.3	V
High output level 1	V _{HO1}	Output high level PTEN, I _L = 1mA	V _{DD} -0.3			V
Low output level 1	V _{LO1}	Output low level PTEN, I _L = -1mA	0		0.3	V
High output level 2	V _{HO2}	Output high level INT, I _L = 1mA	V _{DD} -0.3			V
Low output level 2	V _{LO2}	Output low level INT, I _L = -1mA	0		0.3	V
High output level 3	V _{HO3}	Output high level GPO0, GPO1, GPO2, I _L = 1mA Output setting: when set to buffer output setting	V _{DD} -0.3			V
Low output level 3	V _{LO3}	Output low level GPO0, GPO1, GPO2, I _L = -1mA Output setting: when set to buffer output setting	0		0.3	V
OPEN output leakage current 1	I _{OP1}	Current flows in or out when V _{DD} is applied to output. When GPO0, GPO1, GPO2 output is set to OPEN output.	-1	0	1	μA
OPEN output leakage current 2	I _{OP2}	Current flows in or out when 0V is applied to output. When GPO0, GPO1, GPO2 output is set to OPEN output.	-1	0	1	μA
High input current 1	I _{HIN1}	Current flows in or out when VBAT voltage is applied to PTD pin	-1	0	1	μA
Low input current 1	I _{LIN1}	Current flows in or out when 0V is applied to PTD pin	-1	0	1	μA
High input current 2	I _{HIN2}	Current flows in or out when V _{DD} is applied to MICTL pin	-3	0	3	μA
Low input current 2	I _{LIN2}	Current flows in or out when 0V is applied to MICTL pin	5	6.5	8	μA
High input current 3	I _{HIN3}	Current flows in or out when VBAT voltage is applied to RESET pin	-1	0	1	μA
Low input current 3	I _{LIN3}	Current flows in or out when 0V is applied to RESET pin	-1	0	1	μA
High input current 4	I _{HIN4}	Current flows in or out when V _{DD} is applied to SCTL pin	28	40	52	μA
Low input current 4	I _{LIN4}	Current flows in or out when 0V is applied to SCTL pin	-1	0	1	μA

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Package Dimensions

unit : mm (typ)
3359



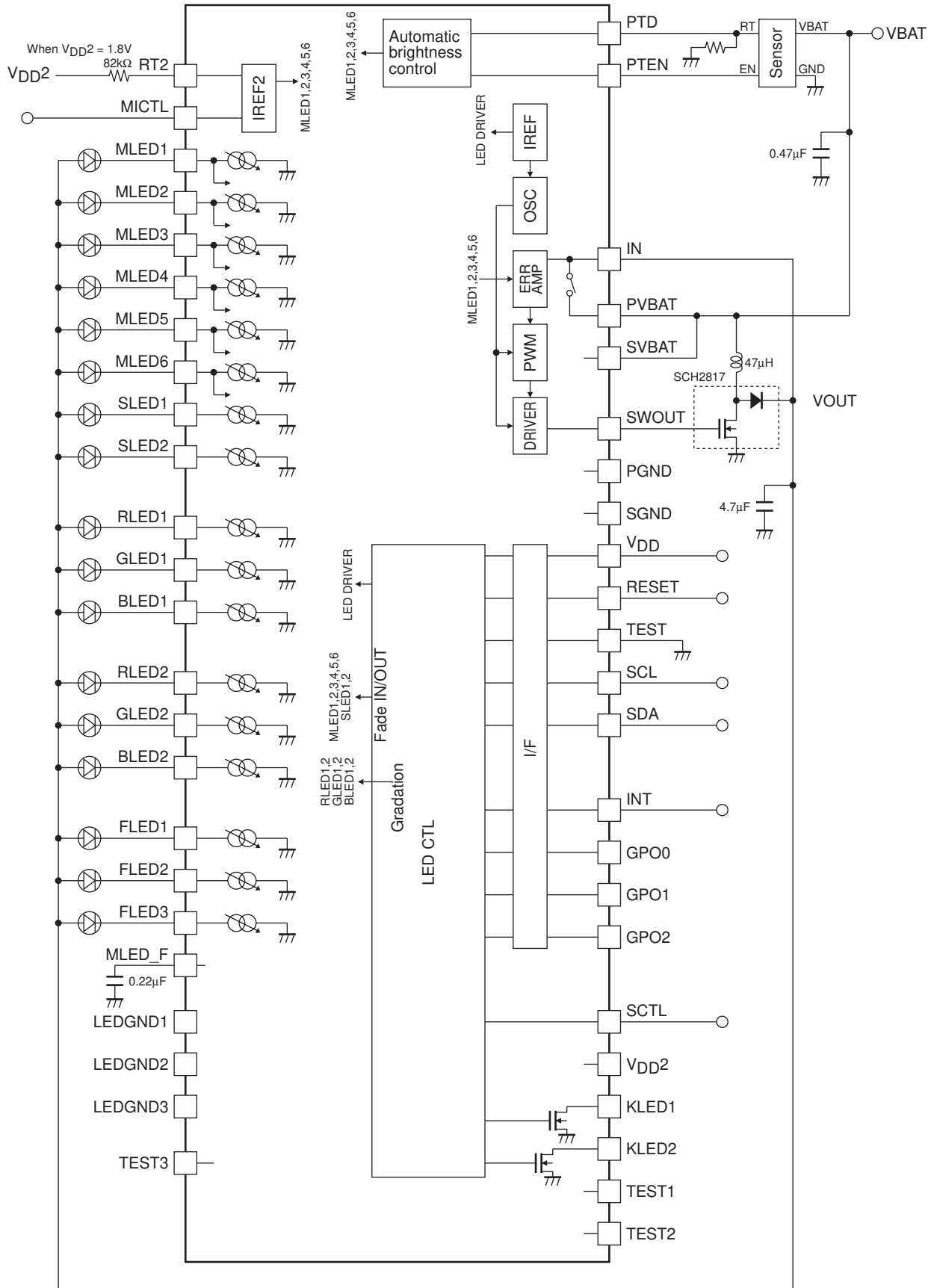
Pin Assignment

G	F	E	D	C	B	A	
TEST3	MLED3	LED GND1	MLED2	SGND	MLED_F	TEST	1
SLED2	MLED4	MLED5	MLED6	MLED1	MICTL	CT	2
SLED1	RLED1	RT2	GPO2	GPO1	SCL	SVBAT	3
LED GND2	RLED2	SDA	PTD	SCTL	INT	IN	4
GLED1	GLED2	RESET	VDD	PTEN	GPO0	PVBAT	5
BLED2	BLED1	FLED3	KLED1	RT	VDD2	SWOUT	6
TEST1	FLED2	FLED1	LED GND3	KLED2	PGND	TEST2	7

Top View

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Block Diagram



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Pin Functions

Pin No.	Pin name	Pin Description	Equivalent Circuit
A1	TEST	Test signal input pin. Be sure to connect the pin to GND.	
A2	CT	Oscillator frequency setting capacitance connection pin. Triangular wave output is generated by connecting an external capacitor across this pin and GND. The clock frequency of the switching regulator and the LED on/off fade time can be adjusted by changing the value of the external capacitor.	
A3	SVBAT	Power pin for analog circuit.	
A4	IN	DC/DC feedback voltage input pin. Feedback is applied so that the input voltage becomes equal to the set voltage in the output voltage fixed mode. Overvoltage limiter is activated when the input voltage rises about 0.6V higher than the fixed mode set voltage. When the input voltage falls, the switching regulator is stopped in about 10ms. This condition is released by resetting the IC or setting the serial RGSW to OFF.	
A5	PVBAT	Power pin for DC/DC pulse output driver.	
A6	SWOUT	DC/DC PWM pulse output pin. The on resistance of both output transistors PCH and NCH are about 10Ω.	
B1	MLED_F	MLED filter capacitor connection pin.	
B2	MICTL	MLED external brightness control pin. The main LED normal current value can be varied by applying a DC voltage to this pin. The set current value is obtained when V _{DD2} voltage is applied. The main LED normal current decreases as the voltage is lowered. The level of current change can be varied by the value of external resistor connected to the RT2 pin.	

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Pin No.	Pin name	Pin Description	Equivalent Circuit
B3	SCL	Serial clock signal input pin.	
B4	INT	Interrupt signal output pin.	
B6	V _{DD2}	Reference power for MLED external sync circuit.	
B7	PGND	DC/DC pulse output driver GND pin.	
C1	SGND	Analog circuit GND pin.	
B5 C3 D3	GPO0 GPO1 GPO2	General-purpose output pins.	
C4	SCTL	RBGLED external sync signal input pin. When the serial R1SW, G1SW, and B1SW, G2SW, and B2SW are set to ON, setting the application voltage H causes tricolor LED to go ON. When the application voltage set to L, tricolor LED goes OFF. Note that if the serial settings SCSW1 and SCSW2 are set to "ignore SCTL," tricolor LED goes ON regardless of the state of SCTL.	
C5	PTEN	Brightness sensor ON/OFF control pin.	
C6	RT	Reference current setting resistor connection pin. By connecting the external resistor between this pin and GND, the reference current is generated. The pin voltage is about 0.25V. Change of this current value enables change of the oscillation frequency and LED driver current value.	

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Pin No.	Pin name	Pin Description	Equivalent Circuit
D6 C7	KLED1 KLED2	Key LED driver output pins.	
C2 D1 F1 F2 E2 D2	MLED1 MLED2 MLED3 MLED4 MLED5 MLED6	Main LCD backlight LED driver pin. Feedback is applied so that the current flow through the output transistor becomes equal to the set current value. The driver current value can be adjusted in 0.6mA steps from about 0.6mA to 18.6mA through serial setting. These pins are also used to switch from through to switching regulator mode and to sense the feedback of the output voltage to the LED pins.	
D4	PTD	Brightness sensor output connection pin. Used to determine the brightness according to the DC input voltage. Must be connected to GND when not to be used.	
D5	V _{DD}	Power pin for IF.	
D7	LEDGND3	LED driver dedicated GND pin 3	
E1	LEDGND1	LED driver dedicated GND pin 1	
E3	RT2	Reference current setting resistor connection pin used when MLED is controlled externally. The resistance value of the external resistor connected to the V _{DD2} pin can set a variable value of the main LED normal mode current that is varied with the MICTL pin.	
E4	SDA	Serial data signal input pin.	
E5	RESET	Reset signal input pin. Reset state when low.	
E7 F7 E6	FLED1 FLED2 FLED3	Flash LED driver pins. Feedback is applied so that the current flow through the output transistor becomes equal to the set current value. Each driver output current value can be adjusted independently with the 0.6 step from about 0.8mA to 18.6mA through serial setting.	

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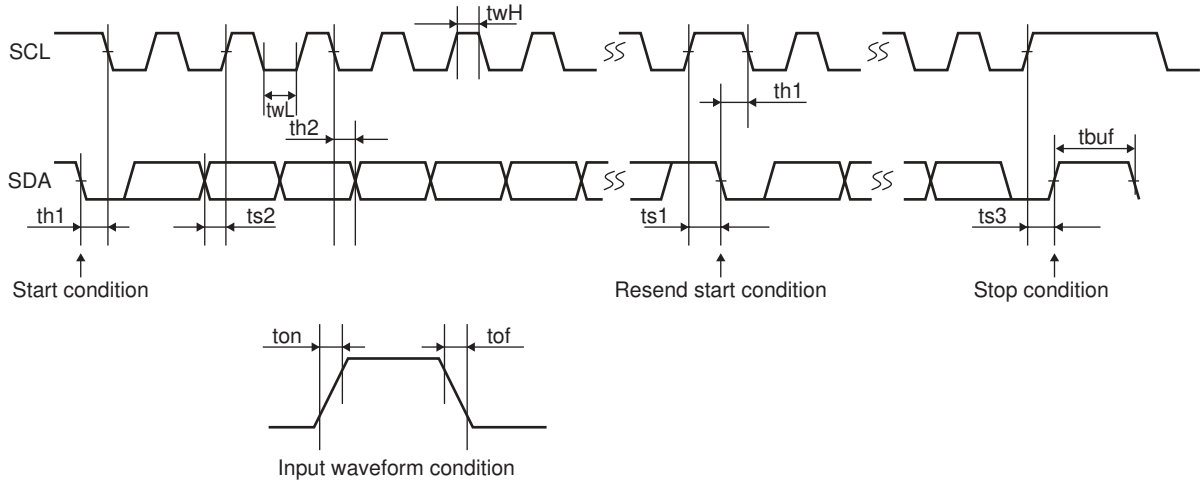
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Pin No.	Pin name	Pin Description	Equivalent Circuit
F3 F4 G5 F5 F6 G6	RLED1 RLED2 GLED1 GLED2 BLED1 BLED2	Tricolor LED driver pins. Feedback is applied so that the current flow through the output transistor becomes equal to the set current value. Each driver output current value can be adjusted independently with the 0.6 step from about 0.8mA to 18.6mA through serial setting. These pins are turned ON only when the SCTL pin is set high or the serial SCTEN and SCSW2 pins are set to ignore SCTL.	
G3 G2	SLED1 SLED2	Sub-LED backlight LED driver pins. Feedback is applied so that the current flow through the output transistor becomes equal to the set current value. The driver output current value can be adjusted independently with the 0.6 step from about 0.8mA to 18.6mA through serial setting.	
G4	LEDGND2	LED driver dedicated GND pin 2.	
G7 A7 G1	TEST1 TEST2 TEST3	Test signal input pin. Be sure to connect the pin to GND.	

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Serial Bus Communication Specifications

I²C serial transfer timing conditions



Standard mode

Parameter	symbol	Conditions	min	typ	max	unit
SCL clock frequency	fscl	SCL clock frequency	0		100	kHz
Data set up 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 data hold time relative to the rise 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 and START conditions	4.7			μs

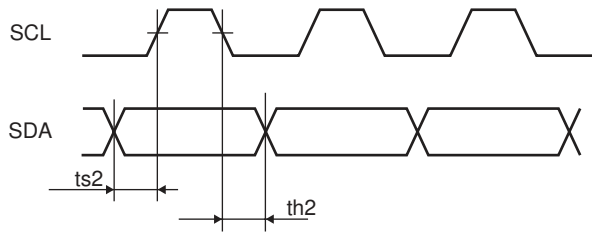
High-speed mode

Parameter	Symbol	Conditions	min	typ	max	unit
SCL clock frequency	fscl	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 data hold time relative to the rise 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

I²C bus transmission method

Start and stop conditions

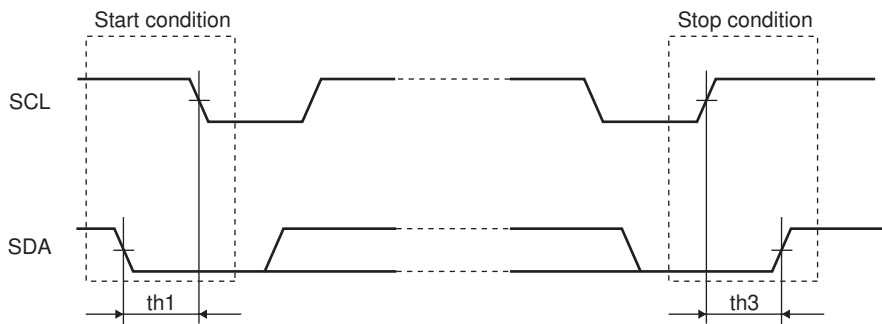
In the I²C bus, SDA must basically be kept in the constant state while SCL is "H" as shown below during data transfer.



When data transfer is not made, both SCL and SDA are in the "H" state.

When SCL = SDA = "H", change of SDA from "H" to "L" enables the start conditions to start access.

When SCL is "H", change of SDA from "L" to "H" enables the stop conditions to stop access.



Data transfer and acknowledgement response

After establishment of start conditions, data transfer is made by one byte (8 bits).

Data transfer enables continuous transfer of any number of bytes.

Each time the 8-bit data is transferred, the ACK signal is sent from the receive side to the send side.

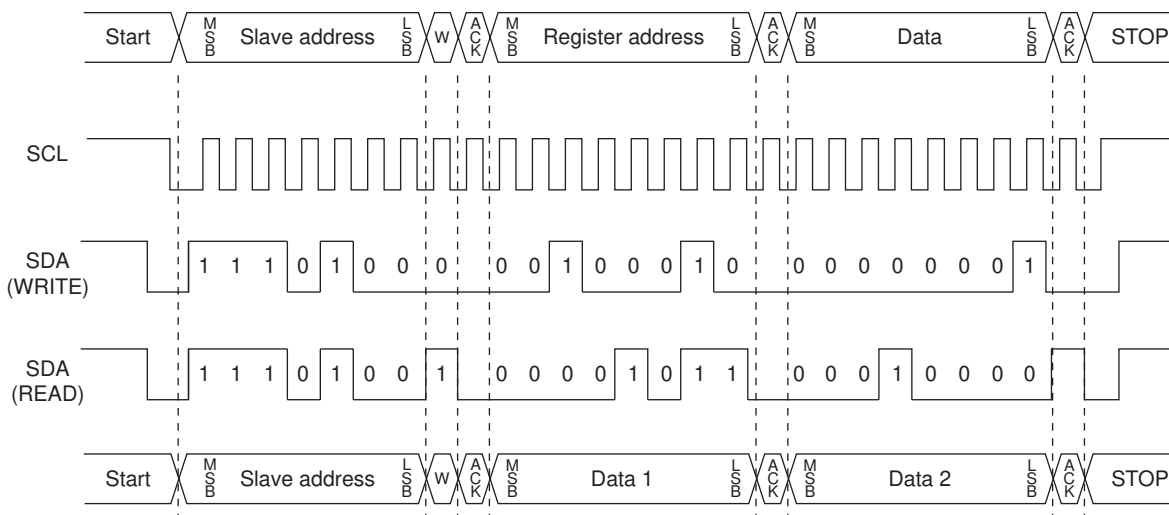
The ACK signal is issued when SDA on the send side is released and SDA on the receive side is set "L" immediately after fall of the clock pulse at the SCL eighth bit of data transfer to "L".

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

In the I²C bus, there is no CE signal. Instead, 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 slave address and subsequent transfer direction.

The 7-bit address is transferred sequentially from MSB and the second byte is WRITE when the eighth bit is "L" and READ when the eighth bit is "H".

In LV5219LG, the slave address is specified as (1110100).



Data transfer write format

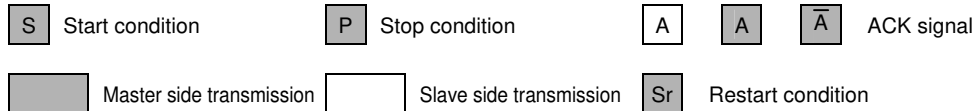
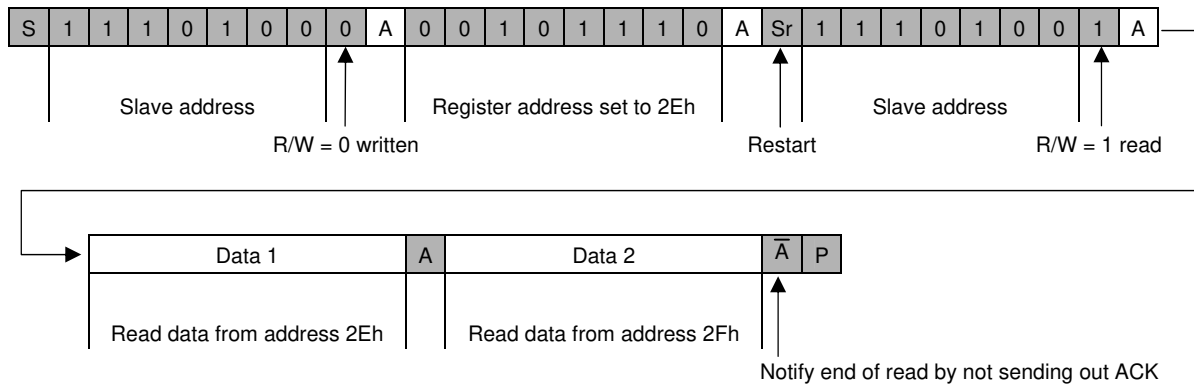
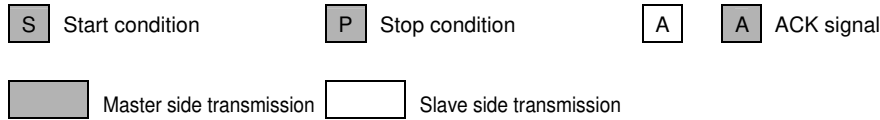
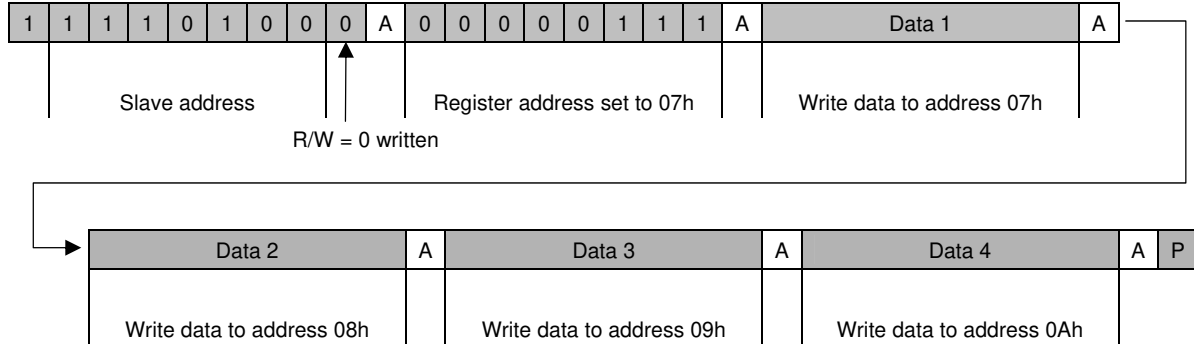
The slave address and Write command must be allocated to the first byte and the register address in the serial map must be designated in the second byte.

For the third byte, data transfer is carried out to the address designated by the register address which is written in the second byte. Subsequently, if data continues, the register address value is automatically incremented for the fourth and subsequent bytes.

Thus, continuous data transfer starting at the designated address is made possible.

After the register address reaches 7Fh, the transfer address for the next byte is set to 00h.

Data write example



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Serial modes setting

address : 00h (LEDCTL) LED Setting 1 Register Write

00h (LEDCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MLED6	MLED5	MLED4	MSW2	MSW1	FXSW	RGSW	STBY
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 : STBY (Standby setting)

0 : Standby state *Default

1 : Active state

D1 : RGSW (Switching regulator operation setting)

0 : Switching regulator forced to OFF *Default

1 : Switching regulator waiting for step-up

D2 : FXSW (Fixed output voltage mode setting)

0 : Auto step-up mode *Default

1 : Fixed voltage step-up mode (fixed at voltage set through serial VD)

D3 : MSW1 (Main LED output setting (dim mode))

0 : Dim mode OFF *Default

1 : Dim mode ON

D4 : MSW2 (Main LED output setting (normal mode))

0 : Normal mode OFF *Default

1 : Normal mode ON

D5 : MLED4 (MLED4 output setting)

0 : OFF *Default

1 : ON

D6 : MLED5 (MLED5 output setting)

0 : OFF *Default

1 : ON

D7 : MLED6 (MLED6 output setting)

0 : OFF *Default

1 : ON

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address : 01h (LEDCTL2) LED Setting 2 Register Write

01h (LEDCTL2)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	SPM6	SPM5	SPM4	SPS2	S2SW	S1SW	MISW	VOCSW
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 : VOCSW (Step-up setting)

0 : Manual setting *Default

1 : Automatic setting

*Sets, when FXSW is set to OFF, whether automatic step-up is to be carried out or not when LEDs other than the main LEDs are turned on.

In automatic setting mode, stepping-up is carried out when LEDs other than the MLEDs are turned on.

D1 : MISW (MICTL setting = Enable brightness adjustment for LEDs other than main LEDs)

0 : MICTL disabled *Default

1 : MICTL enabled

D2 : S1SW (SLED1 output setting)

0 : OFF *Default

1 : ON

D3 : S2SW (SLED2 output setting)

0 : OFF *Default

1 : ON

D4 : SPS2 (SLED2 independent control setting)

0 : OFF ...Same operation as SLED1 when set to OFF. *Default

1 : ON ...When set to ON, operate as SLED2 set current, independently of SLED1.

D5 : SPM4 (MLED4 independent control setting)

0 : OFF ...Same operation as MLED1, 2, and 3 when set to OFF. *Default

1 : ON ...When set to ON, operate as MLED4 set current, irrespective of main LEDs.

D6 : SPM5 (MLED5 independent control setting)

0 : OFF ...Same operation as MLED1, 2, and 3 when set to OFF. *Default

1 : ON ...When set to ON, operate as MLED5 set current, irrespective of main LEDs.

D7 : SPM6 (MLED6 independent control setting)

0 : OFF ...Same operation as MLED1, 2, and 3 when set to OFF. *Default

1 : ON ...When set to ON, operate as MLED6 set current, irrespective of main LEDs.

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address : 02h (LEDCTL3) LED Setting 3 Register Write

02h (LEDCTL3)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	SCSW2	B2SW	G2SW	R2SW	SCSW1	B1SW	G1SW	R1SW
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 : R1SW (RLED1 output setting)
 0 : OFF *Default
 1 : ON

D1 : G1SW (GLED1 output setting)
 0 : OFF *Default
 1 : ON

D2 : B1SW (BLED1 output setting)
 0 : OFF *Default
 1 : ON

D3 : SCSW1 (SCTL signal enable 1 RLED1, GLED1, BLED1 setting)
 0 : SCTL enabled *Default
 1 : SCTL disabled

D4 : R2SW (RLED2 output setting)
 0 : OFF *Default
 1 : ON

D5 : G2SW (GLED2 output setting)
 0 : OFF *Default
 1 : ON

D6 : B2SW (BLED2 output setting)
 0 : OFF *Default
 1 : ON

D7 : SCSW2 (SCTL signal enable 2 RLED2, GLED2, BLED2 setting)
 0 : SCTL enabled *Default
 1 : SCTL disabled

*SCTL is the external sync pin input used for the synchronization with the sound signal from the sound source IC. It turns on and off the tricolor LEDs.

*The SCTL signal can be enabled or disabled with the SCT signal enable setting.

The relationships among SCSW, SCTL, and RLED, GLED, and BLED are shown below.

SCSW1	SCTL pin	RLED1, GLED1, BLED1 State
0	L	Turn off
0	H	Turn-on enable
1	L	Turn-on enable
1	H	Turn-on enable

Forced off regardless of the serial command when set to turn off.
 When set to "turn-on enable," the LEDs can be turned on with the serial command R1SW, G1SW, or B1SW, or can be automatically turned on and off in the gradation/pulse mode.

SCSW2	SCTL pin	RLED2, GLED2, BLED2 State
0	L	Turn off
0	H	Turn-on enable
1	L	Turn-on enable
1	H	Turn-on enable

Forced off regardless of the serial command when set to turn off.
 When set to "turn-on enable," the LEDs can be turned on with the serial command R2SW, G2SW, or B2SW, or B1SW, or can be automatically turned on and off in the gradation/pulse mode.

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address : 03h (LEDCTL4) LED Setting 4 Register Write

03h (LEDCTL4)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MFSW	KESW4	KESW3	KESW2	KESW1	F3SW	F2SW	F1SW
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 : F1SW (FLED1 output setting)
0 : OFF *Default
1 : ON

D1 : F2SW (FLED2 output setting)
0 : OFF *Default
1 : ON

D2 : F3SW (FLED3 output setting)
0 : OFF *Default
1 : ON

D3 : KESW1 (KLED1 output setting 1)
0 : Forced *Default
1 : Automatic

D4 : KESW2 (KLED1 output setting 2)
0 : OFF *Default
1 : ON
* Controllable only when KESW1 is set to "Forced."

D5 : KESW3 (KLED2 output setting 1)
0 : Forced *Default
1 : Automatic

D6 : KESW4 (KLED2 output setting 2)
0 : OFF *Default
1 : ON
* Controllable only when KESW3 is set to "Forced."

D7 : MFSW (Main LED filter ON/OFF setting)
0 : OFF *Default
1 : ON
*Operate for main LED current other than dim mode.

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address : 04h (MLEDDACTL) MLED Current Setting Register Write

04h (MLEDDACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MAINL [2]	MAINL [1]	MAINL [0]	MAINH [4]	MAINH [3]	MAINH [2]	MAINH [1]	MAINH [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : MAINH [0] to MAINH [4] (MLED1, 2, and 3 current settings (normal mode))

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

D5 to D7 : MAINL [0] to MAINL [2] (MLED current settings (dim mode))

D7	D6	D5	Current value (mA)
0	0	0	0.2
0	0	1	0.4
0	1	0	0.6
0	1	1	0.8
1	0	0	1.0
1	0	1	1.2
1	1	0	1.4
1	1	1	0.0

*Default

LED is turned off when these bits are set to 111. Fade out operation using this setting is prohibited.

Use of fade out operation is inhibited.

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address : 05h (M4DACTL) MLED4 Current Setting Register Write

05h (M4DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	M4C [4]	M4C [3]	M4C [2]	M4C [1]	M4C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : M4C [0] to M4C [4] (MLED4 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

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address : 06h (M5DACTL) MLED5 Current Setting Register Write

06h (M5DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	M5C [4]	M5C [3]	M5C [2]	M5C [1]	M5C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : M5C [0] to M5C [4] (MLED5 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

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address : 07h (M6_VD_DACTL) MLED6 Current Setting/Output Setting Register Write

07h (M6_VD_DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	VD [2]	VD [1]	VD [0]	M6C [4]	M6C [3]	M6C [2]	M6C [1]	M6C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : M6C [0] to M6C [4] (MLED6 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

D5 to D7 : VD [0] to VD [2] (Output DC settings)

D7	D6	D5	Output Voltage (V)
0	0	0	5.0
0	0	1	4.3
0	1	0	4.5
0	1	1	4.7
1	0	0	4.9
1	0	1	5.1
1	1	0	5.3
1	1	1	5.5

*Default

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address : 08h (S1DACTL) SLED1 Current Setting Register Write

08h (S1DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	S1C [4]	S1C [3]	S1C [2]	S1C [1]	S1C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : S1C [0] to S1C [4] (SLED1 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

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address : 09h (S2DACTL) SLED2 Current Setting Register Write

09h (S2DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	S2C [4]	S2C [3]	S2C [2]	S2C [1]	S2C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : S2C [0] to S2C [4] (SLED2 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

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address : 0Ah (R1DACTL) RLED1 Current Setting Register Write

0Ah (R1DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MAXC1 [2]	MAXC1 [1]	MAXC1 [0]	R1C [4]	R1C [3]	R1C [2]	R1C [1]	R1C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : R1C [0] to R1C [4] (RLED1 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

D5 to D7 : MAXC1 [0] to MAXC1 [2] (Group 1 (RLED1, GLED1, BLED1) maximum current value settings)

D7	D6	D5	Max. Current value (mA)
0	0	0	18.6 (100%)
0	0	1	16.275 (87%)
0	1	0	13.95 (75%)
0	1	1	11.625 (62.5%)
1	0	0	9.3 (50%)
1	0	1	6.975 (37.5%)
1	1	0	4.65 (25%)
1	1	1	2.325 (12.5%)

*Default

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address : 0Bh (G1DACTL) GLED1 Current Setting Register Write

0Bh (G1DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	G1C [4]	G1C [3]	G1C [2]	G1C [1]	G1C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : G1C [0] to G1C [4] (GLED1 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

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address : 0Ch (B1DACTL) BLED1 Current Setting Register Write

0Ch (B1DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	B1C [4]	B1C [3]	B1C [2]	B1C [1]	B1C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : B1C [0] to B1C [4] (BLED1 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

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address : 0Dh (R2DACTL) RLED2 Current Setting Register Write

0Dh (R2DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MAXC2 [2]	MAXC2 [1]	MAXC2 [0]	R2C [4]	R2C [3]	R2C [2]	R2C [1]	R2C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : R2C [0] to R2C [4] (RLED2 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

D5 to D7 : MAXC2 [0] to MAXC2 [2] (Group 2 (RLED2, GLED2, BLED2) maximum current value settings)

D7	D6	D5	Max. Current value (mA)
0	0	0	18.6 (100%)
0	0	1	16.275 (87%)
0	1	0	13.95 (75%)
0	1	1	11.625 (62.5%)
1	0	0	9.3 (50%)
1	0	1	6.975 (37.5%)
1	1	0	4.65 (25%)
1	1	1	2.325 (12.5%)

*Default

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address : 0Eh (G2DACTL) GLED2 Current Setting Register Write

0Eh (G2DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	G2C [4]	G2C [3]	G2C [2]	G2C [1]	G2C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : G2C [0] to G2C [4] (GLED2 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

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address : 0Fh (B2DACTL) BLED2 Current Setting Register Write

0Fh (B2DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	B2C [4]	B2C [3]	B2C [2]	B2C [1]	B2C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : B2C [0] to B2C [4] (BLED2 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

LED is turned off when these bits are set to 11111. Fade out operation using this setting is prohibited.

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address : 10h (F1DACTL) FLED1 Current Setting Register Write

10h (F1DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MAXCF [2]	MAXCF [1]	MAXCF [0]	F1C [4]	F1C [3]	F1C [2]	F1C [1]	F1C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : F1C [0] to F1C [4] (FLED1 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

D5 to D7 : MAXCF [0] to MAXCF [2] (Flash LED (FLED1, FLED2, FLED3) maximum current value settings)

D7	D6	D5	Max. Current value (mA)
0	0	0	18.6 (100%)
0	0	1	16.275 (87%)
0	1	0	13.95 (75%)
0	1	1	11.625 (62.5%)
1	0	0	9.3 (50%)
1	0	1	6.975 (37.5%)
1	1	0	4.65 (25%)
1	1	1	2.325 (12.5%)

*Default

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address : 11h (F2DACTL) FLED2 Current Setting Register Write

11h (F2DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	F2C [4]	F2C [3]	F2C [2]	F2C [1]	F2C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : F2C [0] to F2C [4] (FLED2 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

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address : 12h (F3DACTL) FLED3 Current Setting Register Write

12h (F3DACTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	-	F3C [4]	F3C [3]	F3C [2]	F3C [1]	F3C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D4 : F3C [0] to F3C [4] (FLED3 current settings)

D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0.6
0	0	0	0	1	1.2
0	0	0	1	0	1.8
0	0	0	1	1	2.4
0	0	1	0	0	3.0
0	0	1	0	1	3.6
0	0	1	1	0	4.2
0	0	1	1	1	4.8
0	1	0	0	0	5.4
0	1	0	0	1	6.0
0	1	0	1	0	6.6
0	1	0	1	1	7.2
0	1	1	0	0	7.8
0	1	1	0	1	8.4
0	1	1	1	0	9.0
0	1	1	1	1	9.6
1	0	0	0	0	10.2
1	0	0	0	1	10.8
1	0	0	1	0	11.4
1	0	0	1	1	12.0
1	0	1	0	0	12.6
1	0	1	0	1	13.2
1	0	1	1	0	13.8
1	0	1	1	1	14.4
1	1	0	0	0	15.0
1	1	0	0	1	15.6
1	1	0	1	0	16.2
1	1	0	1	1	16.8
1	1	1	0	0	17.4
1	1	1	0	1	18.0
1	1	1	1	0	18.6
1	1	1	1	1	0.0

*Default

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address : 13h (MFCTL) MLED Fade Time Setting Register Write

13h (MFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	MFOUT [2]	MFOUT [1]	MFOUT [0]	MFIN [2]	MFIN [1]	MFIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : MFIN [0] to MFIN [2] (Fin slope settings (MLED))

D2	D1	D0	MFIN (Normal Mode)	MFIN (Dim Mode)	*Default
0	0	0	No slope	No slope	
0	0	1	0.050s	0.012s	
0	1	0	0.1s	0.025s	
0	1	1	0.15s	0.04s	
1	0	0	0.2s	0.05s	
1	0	1	0.25s	0.065s	
1	1	0	0.3s	0.08s	
1	1	1	0.5s	0.125s	

D3 to D5 : MFOUT [0] to MFOUT [2] (Fout slope settings (MLED))

D5	D4	D3	MFOUT (Normal Mode)	MFOUT (Dim Mode)	*Default
0	0	0	No slope	No slope	
0	0	1	0.1s	0.025s	
0	1	0	0.15s	0.04s	
0	1	1	0.2s	0.05s	
1	0	0	0.25s	0.065s	
1	0	1	0.3s	0.08s	
1	1	0	0.5s	0.125s	
1	1	1	1.0s	0.25s	

address : 14h (SFCTL) MLED Fade Time Setting Register Write

14h (SFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	SFOUT [2]	SFOUT [1]	SFOUT [0]	SFIN [2]	SFIN [1]	SFIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : SFIN [0] to SFIN [2] (Fin slope settings (SLED1, SLED2))

D2	D1	D0	SFIN	*Default
0	0	0	No slope	
0	0	1	0.050s	
0	1	0	0.1s	
0	1	1	0.15s	
1	0	0	0.2s	
1	0	1	0.25s	
1	1	0	0.3s	
1	1	1	0.5s	

D3 to D5 : SFOUT [0] to SFOUT [2] (Fout slope settings (SLED1, SLED2))

D5	D4	D3	SFOUT	*Default
0	0	0	No slope	
0	0	1	0.1s	
0	1	0	0.15s	
0	1	1	0.2s	
1	0	0	0.25s	
1	0	1	0.3s	
1	1	0	0.5s	
1	1	1	1.0s	

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address : 15h (R1FCTL) RLED1 Fade Time Setting Register Write

15h (R1FCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	R1FOUT [2]	R1FOUT [1]	R1FOUT [0]	R1FIN [2]	R1FIN [1]	R1FIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : R1FIN [0] to R1FIN [2] (Fin slope settings (RLED1))

D2	D1	D0	R1FIN
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT1 time setting.

D3 to D5 : R1FOUT [0] to R1FOUT [2] (Fout slope settings (RLED1))

D5	D4	D3	R1FOUT
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT1 time setting.

address : 16h (G1FCTL) GLED1 Fade Time Setting Register Write

16h (G1FCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	G1FOUT [2]	G1FOUT [1]	G1FOUT [0]	G1FIN [2]	G1FIN [1]	G1FIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : G1FIN [0] to G1FIN [2] (Fin slope settings (GLED1))

D2	D1	D0	G1FIN
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT1 time setting.

D3 to D5 : G1FOUT [0] to G1FOUT [2] (Fout slope settings (GLED1))

D5	D4	D3	G1FOUT
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT1 time setting.

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address : 17h (B1FCTL) BLED1 Fade Time Setting Register Write

17h (B1FCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	B1FOUT [2]	B1FOUT [1]	B1FOUT [0]	B1FIN [2]	B1FIN [1]	B1FIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : B1FIN [0] to B1FIN [2] (Fin slope settings (BLED1))

D2	D1	D0	B1FIN
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT1 time setting.

D3 to D5 : B1FOUT [0] to B1FOUT [2] (Fout slope settings (BLED1))

D5	D4	D3	B1FOUT
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT1 time setting.

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address : 18h (RGB1GRCTL) RGB1 Gradation Setting Register Write

18h (RGB1GRCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	GHB1	GHG1	GHR1	GR1M1	GRON1	AT1 [2]	AT1 [1]	AT1 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : AT1 [0] to AT1 [2] (Automatic ON/OFF period settings (RED1, GLED1, BLED1))

D2	D1	D0	AT1	
0	0	0	0.0625s	*Default
0	0	1	0.125s	
0	1	0	0.25s	
0	1	1	0.5s	
1	0	0	1s	
1	0	1	2s	
1	1	0	4s	
1	1	1	8s	

D3 : GRON1 (Automatic ON/OFF function setting (RLED1, GLED1, BLED1))

0 : OFF *Default

1 : ON

D4 : GR1M1 (Execute gradation once (RLED1, GLED1, BLED1))

0 : OFF *Default

1 : ON

D5 : GHR1 (Period mode setting (RLED1))

0 : Standard period *Default

1 : 1/2 period

D6 : GHG1 (Period mode setting (GLED1))

0 : Standard period *Default

1 : 1/2 period

D7 : GHB1 (Period mode setting (BLED1))

0 : Standard period *Default

1 : 1/2 period

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address : 19h (RGB1PUCTL) RGB1 Pulse Mode Setting Register Write

19h (RGB1PUCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	PRON1	PT1 [2]	PT1 [1]	PT1 [0]	HO1 [2]	HO1 [1]	HO1 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : HO1 [0] to HO1 [2] (Hold time settings (RLED1, GRLD1, BLED1))

D2	D1	D0	HOLD TIME	
0	0	0	None	*Default
0	0	1	ON/OFF period ×1	
0	1	0	ON/OFF period ×2	
0	1	1	ON/OFF period ×3	
1	0	0	ON/OFF period ×4	
1	0	1	ON/OFF period ×5	
1	1	0	ON/OFF period ×6	
1	1	1	ON/OFF period ×7	

D3 to D5 : PT1 [0] to PT1 [2] (Flashing count settings (RLED1, GRLD1, BLED1))

D5	D4	D3	Pulse Count	
0	0	0	ON/OFF period ×1	*Default
0	0	1	ON/OFF period ×2	
0	1	0	ON/OFF period ×3	
0	1	1	ON/OFF period ×4	
1	0	0	ON/OFF period ×5	
1	0	1	ON/OFF period ×6	
1	1	0	ON/OFF period ×7	
1	1	1	ON/OFF period ×8	

D6 : PRON1 (Pulse mode setting (RLED1, GRLD1, BLED1))

0 : OFF *Default

1 : Pulse mode

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address : 1Ah (R1AOFFCTL) RLED1 OFF Position Setting Register Write

1Ah (R1AOFFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	R1Aoff [5]	R1Aoff [4]	R1Aoff [3]	R1Aoff [2]	R1Aoff [1]	R1Aoff [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : R1Aoff [0] to R1Aoff [5] (RLED1 automatic OFF position settings)

address : 1Bh (R1AONCTL) RLED1 ON Position Setting Register Write

1Bh (R1AONCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	R1Aon [5]	R1Aon [4]	R1Aon [3]	R1Aon [2]	R1Aon [1]	R1Aon [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : R1Aon [0] to R1Aon [5] (RLED1 automatic ON position settings)

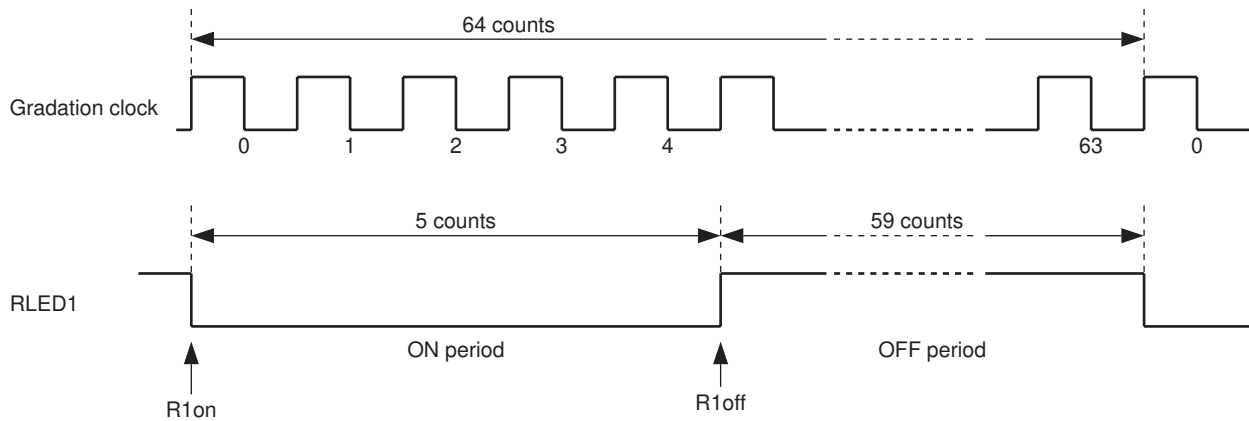
*R1Aoff = R1Aon = FF specifies "ON throughout the entire period."

R1Aoff = R1Aon ≠ FF specifies "Off throughout the entire period."

LED control output waveform (RLED1), same for GLED1 and BLED1.

Rise position of clock 0 when D5 - D0 are set to all 0.

Rise position of clock 63 when D5 - D0 are set to all 1.



When :R1on R1AONCTL 00000000 (00h)

R1off R1AOFFCTL 00000101 (05h)

address : 1Ch (G1AOFFCTL) GLED1 OFF Position Setting Register Write

1Ch (G1AOFFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	G1Aoff [5]	G1Aoff [4]	G1Aoff [3]	G1Aoff [2]	G1Aoff [1]	G1Aoff [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : G1Aoff [0] to G1Aoff [5] (GLED1 automatic OFF position settings)

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address : 1Dh (G1AONCTL) GLED1 ON Position Setting Register Write

1Dh (G1AONCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	G1Aon [5]	G1Aon [4]	G1Aon [3]	G1Aon [2]	G1Aon [1]	G1Aon [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : G1Aon [0] to G1Aon [5] (GLED1 automatic ON position settings)

*G1Aoff = G1Aon = FF specifies "ON throughout the entire period."

G1Aoff = G1Aon ≠ FF specifies "OFF throughout the entire period."

address : 1Eh (B1AOFFCTL) BLED1 OFF Position Setting Register Write

1Eh (B1AOFFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	B1Aoff [5]	B1Aoff [4]	B1Aoff [3]	B1Aoff [2]	B1Aoff [1]	B1Aoff [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : B1Aoff [0] to B1Aoff [5] (BLED1 automatic OFF position settings)

address : 1Fh (B1AONCTL) BLED1 ON Position Setting Register Write

1Fh (B1AONCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	B1Aon [5]	B1Aon [4]	B1Aon [3]	B1Aon [2]	B1Aon [1]	B1Aon [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : B1Aon [0] to B1Aon [5] (BLED1 automatic ON position settings)

*B1Aoff = B1Aon = FF specifies "ON throughout the entire period."

B1Aoff = B1Aon ≠ FF specifies "OFF throughout the entire period."

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address : 20h (R2FCTL) RLED2 Fade Time Setting Register Write

20h (R2FCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	R2FOUT [2]	R2FOUT [1]	R2FOUT [0]	R2FIN [2]	R2FIN [1]	R2FIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : R2FIN [0] to R2FIN [2] (Fin slope settings (RLED2))

D2	D1	D0	R2FIN
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT2 time setting.

D3 to D5 : R2FOUT [0] to R2FOUT [2] (Fout slope settings (RLED2))

D5	D4	D3	R2FOUT
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT2 time setting.

address : 21h (G2FCTL) GLED2 Fade Time Setting Register Write

21h (G2FCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	G2FOUT [2]	G2FOUT [1]	G2FOUT [0]	G2FIN [2]	G2FIN [1]	G2FIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : G2FIN [0] to G2FIN [2] (Fin slope settings (GLED2))

D2	D1	D0	G2FIN
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT2 time setting.

D3 to D5 : G2FOUT [0] to G2FOUT [2] (Fout slope settings (GLED2))

D5	D4	D3	G2FOUT
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT2 time setting.

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address : 22h (B2FCTL) BLED2 Fade Time Setting Register Write

22h (B2FCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	B2FOUT [2]	B2FOUT [1]	B2FOUT [0]	B2FIN [2]	B2FIN [1]	B2FIN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : B2FIN [0] to B2FIN [2] (Fin slope settings (BLED2))

D2	D1	D0	B2FIN
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT2 time setting.

D3 to D5 : B2FOUT [0] to B2FOUT [2] (Fout slope settings (BLED2))

D5	D4	D3	R2FOUT
0	0	0	No slope
0	0	1	1/16
0	1	0	1/8
0	1	1	1/4
1	0	0	3/8
1	0	1	1/2
1	1	0	3/4
1	1	1	Slope MAX

*Default

The slope time MAX is 1/2 of the AT2 time setting.

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address : 23h (RGB2GRCTL) RGB2 Gradation Setting Register Write

23h (RGB2GRCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	GHB2	GHG2	GHR2	GR1M2	GRON2	AT2 [2]	AT2 [1]	AT2 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : AT2 [0] to AT2 [2] (Automatic ON/OFF period settings (RED2, GLED2, BLED2))

D2	D1	D0	AT2	
0	0	0	0.0625s	*Default
0	0	1	0.125s	
0	1	0	0.25s	
0	1	1	0.5s	
1	0	0	1s	
1	0	1	2s	
1	1	0	4s	
1	1	1	8s	

D3 : GRON2 (Automatic ON/OFF function setting (RLED2, GLED2, BLED2))

0 : OFF *Default

1 : ON

D4 : GR1M2 (Execute gradation once (RLED2, GLED2, BLED2))

0 : OFF *Default

1 : ON

D5 : GHR2 (Period mode setting (RLED2))

0 : Standard period *Default

1 : 1/2 period

D6 : GHG2 (Period mode setting (GLED2))

0 : Standard period *Default

1 : 1/2 period

D7 : GHB2 (Period mode setting (BLED2))

0 : Standard period *Default

1 : 1/2 period

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address : 24h (RGB2PUCTL) RGB2 Pulse Mode Setting Register Write

24h (RGB2PUCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	PRON2	PT2 [2]	PT2 [1]	PT2 [0]	HO2 [2]	HO2 [1]	HO2 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : HO2 [0] to HO2 [2] (Hold time settings (RLED2, GRLD2, BLED2))

D2	D1	D0	HOLD TIME	
0	0	0	None	*Default
0	0	1	ON/OFF period ×1	
0	1	0	ON/OFF period ×2	
0	1	1	ON/OFF period ×3	
1	0	0	ON/OFF period ×4	
1	0	1	ON/OFF period ×5	
1	1	0	ON/OFF period ×6	
1	1	1	ON/OFF period ×7	

D3 to D5 : PT2 [0] to PT2 [2] (Flashing count settings (RLED2, GRLD2, BLED2))

D5	D4	D3	PULSE	
0	0	0	ON/OFF period ×1	*Default
0	0	1	ON/OFF period ×2	
0	1	0	ON/OFF period ×3	
0	1	1	ON/OFF period ×4	
1	0	0	ON/OFF period ×5	
1	0	1	ON/OFF period ×6	
1	1	0	ON/OFF period ×7	
1	1	1	ON/OFF period ×8	

D6 : PRON2 (Pulse mode setting (RLED2, GRLD2, BLED2))

0 : OFF *Default

1 : Pulse mode

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address : 25h (R2AOFFCTL) RLED2 OFF Position Setting Register Write

25h (R2AOFFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	R2Aoff [5]	R2Aoff [4]	R2Aoff [3]	R2Aoff [2]	R2Aoff [1]	R2Aoff [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : R2Aoff [0] to R2Aoff [5] (RLED2 automatic OFF position settings)

address : 26h (R2AONCTL) RLED2 ON Position Setting Register Write

26h (R2AONCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	R2Aon [5]	R2Aon [4]	R2Aon [3]	R2Aon [2]	R2Aon [1]	R2Aon [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : R2Aon [0] to R2Aon [5] (RLED2 automatic ON position settings)

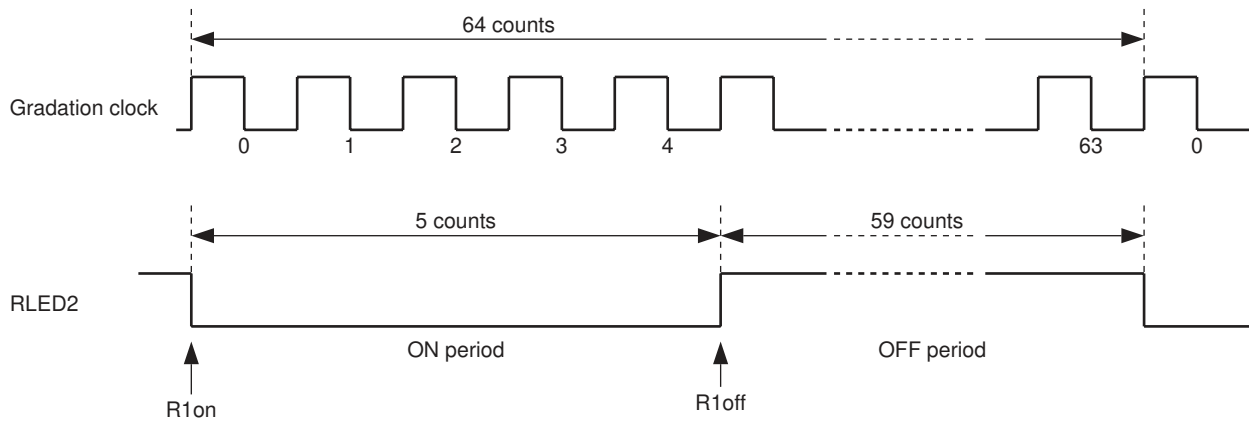
*R2Aoff = R2Aon = FF specifies "ON throughout the entire period."

R2Aoff = R2Aon ≠ FF specifies "OFF throughout the entire period."

LED control output waveform (RLED2), same for GLED2 and BLED2.

Rise position of clock 0 when D5 - D0 are set to all 0.

Rise position of clock 63 when D5 - D0 are set to all 1.



When :R2on R2AONCTL 00000000 (00h)

R2off R2AOFFCTL 00000101 (05h)

address : 27h (G2AOFFCTL) GLED2 OFF Position Setting Register Write

27h (G2AOFFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	G2Aoff [5]	G2Aoff [4]	G2Aoff [3]	G2Aoff [2]	G2Aoff [1]	G2Aoff [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : G2Aoff [0] to G2Aoff [5] (GLED2 automatic OFF position settings)

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address : 28h (G2AONCTL) GLED2 ON Position Setting Register Write

28h (G2AONCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	G2Aon [5]	G2Aon [4]	G2Aon [3]	G2Aon [2]	G2Aon [1]	G2Aon [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : G2Aon [0] to G2Aon [5] (GLED2 automatic ON position settings)

*G2Aoff = G2Aon = FF specifies "ON throughout the entire period."

G2Aoff = G2Aon ≠ FF specifies "OFF throughout the entire period."

address : 29h (B2AOFFCTL) BLED2 OFF Position Setting Register Write

29h (B2AOFFCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	B2Aoff [5]	B2Aoff [4]	B2Aoff [3]	B2Aoff [2]	B2Aoff [1]	B2Aoff [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : B2Aoff [0] to B2Aoff [5] (BLED2 automatic OFF position settings)

address : 2Ah (B2AONCTL) BLED2 ON Position Setting Register Write

2Ah (B2AONCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	B2Aon [5]	B2Aon [4]	B2Aon [3]	B2Aon [2]	B2Aon [1]	B2Aon [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D5 : B2Aon [0] to B2Aon [5] (BLED2 automatic ON position settings)

*B2Aoff = B2Aon = FF specifies "ON throughout the entire period."

B2Aoff = B2Aon ≠ FF specifies "OFF throughout the entire period."

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address : 2Bh (KEYCTL) KLED1, KLED2 Changeover Voltage Setting Register Write

2Bh (KEYCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	KEY2C [3]	KEY2C [2]	KEY2C [1]	KEY2C [0]	KEY1C [3]	KEY1C [2]	KEY1C [1]	KEY1C [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D3 : KEY1C [0] to KEY1C [3] (KEYLED control changeover voltage)

D3	D2	D1	D0	KEY1C	
0	0	0	0	Brightness 1	Bright→Dark
0	0	0	1	Brightness 2	*Default
0	0	1	0	Brightness 3	
0	0	1	1	Brightness 4	
0	1	0	0	Brightness 5	
0	1	0	1	Brightness 6	
0	1	1	0	Brightness 7	
0	1	1	1	Brightness 8	
1	0	0	0	Brightness 9	
1	0	0	1	Brightness 10	
1	0	1	0	Brightness 11	
1	0	1	1	Brightness 12	
1	1	0	0	Brightness 13	
1	1	0	1	Brightness 14	
1	1	1	0	Brightness 15	
1	1	1	1	Inhibited	

*Lit (KLED : ON) when dark if KLED automatic ON is set.

*The setting brightness 2 means that KLED turns on when a changeover from brightness 3 to brightness 2 occurs if KLED automatic ON is set.

D4 to D7 : KEY2C [0] to KEY2C [3] (KEYLED control changeover voltage)

D7	D6	D5	D4	KEY2C	
0	0	0	0	Brightness 1	Bright→Dark
0	0	0	1	Brightness 2	*Default
0	0	1	0	Brightness 3	
0	0	1	1	Brightness 4	
0	1	0	0	Brightness 5	
0	1	0	1	Brightness 6	
0	1	1	0	Brightness 7	
0	1	1	1	Brightness 8	
1	0	0	0	Brightness 9	
1	0	0	1	Brightness 10	
1	0	1	0	Brightness 11	
1	0	1	1	Brightness 12	
1	1	0	0	Brightness 13	
1	1	0	1	Brightness 14	
1	1	1	0	Brightness 15	
1	1	1	1	Inhibited	

*Lit (KLED : ON) when dark if KLED automatic ON is set.

*The setting brightness 2 means that KLED turns on when a changeover from brightness 3 to brightness 2 occurs if KLED automatic ON is set.

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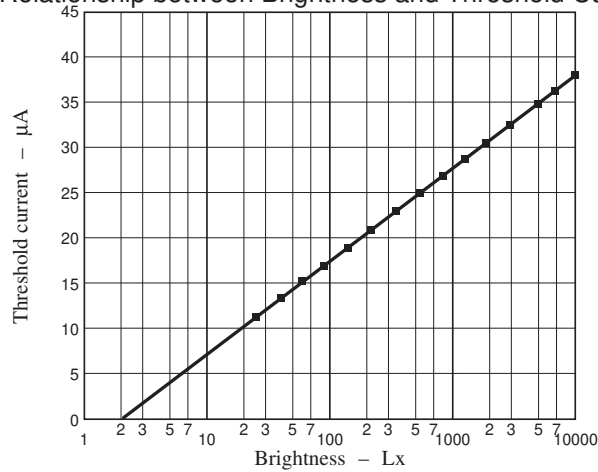
Brightness Levels

Brightness (Lx)	Threshold Current (μA)	Threshold Voltage (V)	Brightness Level
			Brightness 1
25	11	0.25	
			Brightness 2
40	12.8	0.29	
			Brightness 3
60	14.6	0.33	
			Brightness 4
90	16.3	0.38	
			Brightness 5
140	18	0.42	
			Brightness 6
220	19.7	0.46	
			Brightness 7
350	21.4	0.50	
			Brightness 8
550	23.1	0.55	
			Brightness 9
850	24.8	0.59	
			Brightness 10
1300	26.5	0.63	
			Brightness 11
1900	28.2	0.67	
			Brightness 12
3000	30.5	0.72	
			Brightness 13
5000	33	0.76	
			Brightness 14
7000	35.5	0.80	
			Brightness 15
10000	38	0.84	
			Brightness 16

The resistance value of the external resistor is 22KΩ
Compatible with LOG type brightness sensor.

Adjustment of sensor variations sensitivity variance
When TDA 0.42V is set
When TAU 0.84V is set

Relationship between Brightness and Threshold Current



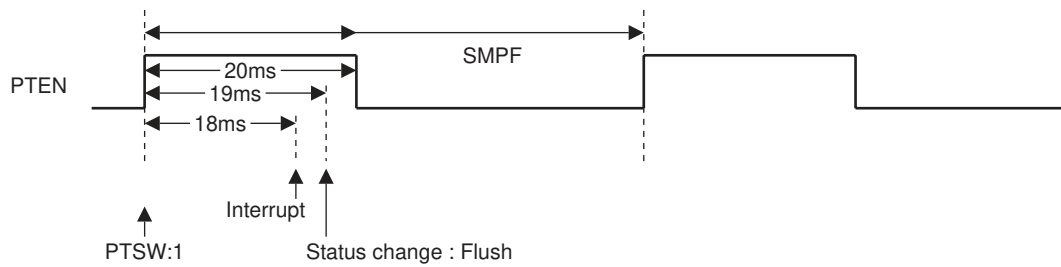
LV5219LG

address : 2Ch (PTCTL) Automatic Brightness Control Mode Setting 1 Register Write

2Ch (PTCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	SWCTL	PTSW	KISW	SMPN [1]	SMPN [0]	SMPF [2]	SMPF [1]	SMPF [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : SMPF [0] to SMPF [2] (Brightness sensor sampling period settings)

D2	D1	D0	SMPF	
0	0	0	131.072ms	*Default
0	0	1	262.144ms	
0	1	0	524.288ms	
0	1	1	1.049s	
1	0	0	2.098s	
1	0	1	4.196s	
1	1	0	8.392s	
1	1	1	20ms	



* Continuous operation when SMPF is set to 20 ms and intermittent operation otherwise.

D3 to D4 : SMPN [0] to SMPN [1] (Brightness sensor sampling count settings)

D4	D3	SMPN	
0	0	1 time	*Default
0	1	2 times	
1	0	3 times	
1	1	4 times	

D5 : KISW (MLED fixed/automatic current settings)

- 0 : Fixed *Default
- 1 : Automatic (brightness control)

D6 : PTSW (Sensor ON/OFF)

- 0 : OFF *Default
- 1 : ON

D7 : SWCTL (Sensor ON/OFF SW polarity)

- 0 : Standard *Default
- 1 : Inverted

LV5219LG

address : 2Dh (INTMASK) INT Mask Setting Register Write

2Dh (INTMASK)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	INTCR	-	INTM6	INTM5	INTM4	INTM3	INTM2	INTM1
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 : INTM1 (INT1 mask setting - interrupt source 1 mask)

0 : OFF *Default

1 : ON

D1 : INTM2 (INT2 mask setting - interrupt source 2 mask)

0 : OFF *Default

1 : ON

D2 : INTM3 (INT3 mask setting - interrupt source 3 mask)

0 : OFF *Default

1 : ON

D3 : INTM4 (INT4 mask setting - interrupt source 4 mask)

0 : OFF *Default

1 : ON

D4 : INTM5 (INT5 mask setting - interrupt source 5 mask)

0 : OFF *Default

1 : ON

D5 : INTM6 (INT6 mask setting - interrupt source 6 mask)

0 : OFF *Default

1 : ON

D7 : INTCR (INT clear)

0 : INT accepted *Default

1 : INT cleared

*This bit is set to 0 to enable interrupts after the interrupt is cleared.

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address : 2Eh (INTDET) INT Detection Register - Read only

2Eh (INTDET)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	-	INT6	INT5	INT4	INT3	INT2	INT1
R/W	R	R	R	R	R	R	R	R
Default	0	0	0	0	0	0	0	0

D0 : INT1 (interrupt source 1)
0 : OFF *Default
1 : ON
*Brightness detection for KEY-LED (read only)

D1 : INT2 (interrupt source 2)
0 : OFF *Default
1 : ON
*End of white LED fade IN/OUT (read only)

D2 : INT3 (interrupt source 3)
0 : OFF *Default
1 : ON
*End of group 1 (RLED1, GLED1, BLED1) fade IN/OU (read only)

D3 : INT4 (interrupt source 4)
0 : OFF *Default
1 : ON
*End of group 2(RLED2, GLED2, BLED2) fade IN/OU (read only)

D4 : INT5 (interrupt source 5)
0 : OFF *Default
1 : ON
*End of group 1 (RLED1, GLED1, BLED1) gradation (read only)

D5 : INT6 (interrupt source 6)
0 : OFF *Default
1 : ON
*End of group 2(RLED2, GLED2, BLED2) gradation (read only)

Interrupts associated with the 1 bits of the INT Detection Register occur.

LV5219LG

address : 2Fh (STATUS) Status Detect Register - Read only

2Fh (STATUS)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	XM [3]	XM [2]	XM [1]	XM [0]	-	-	KEYON	DCDC
R/W	R	R	R	R	R	R	R	R
Default	0	0	0	0	0	0	0	0

D0 : DCDC (DC/DC step-up state (read only))
 0 : Through ...DC/DC is not stepped-up. *Default
 1 : Step-up ...DC/DC stepped-up.

D1 : KEYON (KEY ON/OFF(read only))
 0 : OFF ...Brightness is above or equal to the KEYLED changeover voltage. *Default
 1 : ON ...Brightness is less than the KEYLED changeover voltage.

D4 to D7 : XM [0] to XM [3] (Brightness information (read only))

D7	D6	D5	D4	XM	
0	0	0	0	Brightness 1	*Default
0	0	0	1	Brightness 2	
0	0	1	0	Brightness 3	
0	0	1	1	Brightness 4	
0	1	0	0	Brightness 5	
0	1	0	1	Brightness 6	
0	1	1	0	Brightness 7	
0	1	1	1	Brightness 8	
1	0	0	0	Brightness 9	
1	0	0	1	Brightness 10	
1	0	1	0	Brightness 11	
1	0	1	1	Brightness 12	
1	1	0	0	Brightness 13	
1	1	0	1	Brightness 14	
1	1	1	0	Brightness 15	
1	1	1	1	Brightness 16	

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address : 30h (PTMDACTL0) Automatic Brightness Control Mode Current Settings 0 Register Write

30h (PTMDACTL0)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN0 [6]	YMAIN0 [5]	YMAIN0 [4]	YMAIN0 [3]	YMAIN0 [2]	YMAIN0 [1]	YMAIN0 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN0 [0] to YMIAN0 [6] (MLED current settings (normal mode) * MLED current settings for brightness 1

D6	D5	D4	D3	D2	D1	D0	Current value (mA)
0	0	0	0	0	0	0	0.15 inhibited
0	0	0	0	0	0	1	0.3 inhibited
0	0	0	0	0	1	0	0.45 inhibited
0	0	0	0	0	1	1	0.6
0	0	0	0	1	0	0	0.75
0	0	0	0	1	0	1	0.90
0	0	0	0	1	1	0	1.05
0	0	0	0	1	1	1	1.20
0	0	0	1	0	0	0	1.35
0	0	0	1	0	0	1	1.50
0	0	0	1	0	1	0	1.65
0	0	0	1	0	1	1	1.80
0	0	0	1	1	0	0	1.95
0	0	0	1	1	0	1	2.10
0	0	0	1	1	1	0	2.25
0	0	0	1	1	1	1	2.40
0	0	1	0	0	0	0	2.55
0	0	1	0	0	0	1	2.70
0	0	1	0	0	1	0	2.85
0	0	1	0	0	1	1	3.00
0	0	1	0	1	0	0	3.15
0	0	1	0	1	0	1	3.30
0	0	1	0	1	1	0	3.45
0	0	1	0	1	1	1	3.60
0	0	1	1	0	0	0	3.75
0	0	1	1	0	0	1	3.90
0	0	1	1	0	1	0	4.05
0	0	1	1	0	1	1	4.20
0	0	1	1	1	0	0	4.35
0	0	1	1	1	0	1	4.50
0	0	1	1	1	1	0	4.65
0	0	1	1	1	1	1	4.80
0	1	0	0	0	0	0	4.95
0	1	0	0	0	0	1	5.10
0	1	0	0	0	1	0	5.25
0	1	0	0	0	1	1	5.40
0	1	0	0	1	0	0	5.55
0	1	0	0	1	0	1	5.70
0	1	0	0	1	1	0	5.85
0	1	0	0	1	1	1	6.00
0	1	0	1	0	0	0	6.15
0	1	0	1	0	0	1	6.30
0	1	0	1	0	1	0	6.45
0	1	0	1	0	1	1	6.60
0	1	0	1	1	0	0	6.75
0	1	0	1	1	0	1	6.90

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D6	D5	D4	D3	D2	D1	D0	Current value (mA)
0	1	0	1	1	1	0	7.05
0	1	0	1	1	1	1	7.20
0	1	1	0	0	0	0	7.35
0	1	1	0	0	0	1	7.50
0	1	1	0	0	1	0	7.65
0	1	1	0	0	1	1	7.80
0	1	1	0	1	0	0	7.95
0	1	1	0	1	0	1	8.10
0	1	1	0	1	1	0	8.25
0	1	1	0	1	1	1	8.40
0	1	1	1	0	0	0	8.55
0	1	1	1	0	0	1	8.70
0	1	1	1	0	1	0	8.85
0	1	1	1	0	1	1	9.00
0	1	1	1	1	0	0	9.15
0	1	1	1	1	0	1	9.30
0	1	1	1	1	1	0	9.45
0	1	1	1	1	1	1	9.60
1	0	0	0	0	0	0	9.75
1	0	0	0	0	0	1	9.90
1	0	0	0	0	1	0	10.05
1	0	0	0	0	1	1	10.20
1	0	0	0	1	0	0	10.35
1	0	0	0	1	0	1	10.50
1	0	0	0	1	1	0	10.65
1	0	0	0	1	1	1	10.80
1	0	0	1	0	0	0	10.95
1	0	0	1	0	0	1	11.10
1	0	0	1	0	1	0	11.25
1	0	0	1	0	1	1	11.40
1	0	0	1	1	0	0	11.55
1	0	0	1	1	0	1	11.70
1	0	0	1	1	1	0	11.85
1	0	0	1	1	1	1	12.00
1	0	1	0	0	0	0	12.15
1	0	1	0	0	0	1	12.30
1	0	1	0	0	1	0	12.45
1	0	1	0	0	1	1	12.60
1	0	1	0	1	0	0	12.75
1	0	1	0	1	0	1	12.90
1	0	1	0	1	1	0	13.05
1	0	1	0	1	1	1	13.20
1	0	1	1	0	0	0	13.35
1	0	1	1	0	0	1	13.50
1	0	1	1	0	1	0	13.65
1	0	1	1	0	1	1	13.80
1	0	1	1	1	0	0	13.95
1	0	1	1	1	0	1	14.10
1	0	1	1	1	1	0	14.25
1	0	1	1	1	1	1	14.40
1	1	0	0	0	0	0	14.55
1	1	0	0	0	0	1	14.70

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D6	D5	D4	D3	D2	D1	D0	Current value (mA)
1	1	0	0	0	1	0	14.85
1	1	0	0	0	1	1	15.00
1	1	0	0	1	0	0	15.15
1	1	0	0	1	0	1	15.30
1	1	0	0	1	1	0	15.45
1	1	0	0	1	1	1	15.60
1	1	0	1	0	0	0	15.75
1	1	0	1	0	0	1	15.90
1	1	0	1	0	1	0	16.05
1	1	0	1	0	1	1	16.20
1	1	0	1	1	0	0	16.35
1	1	0	1	1	0	1	16.50
1	1	0	1	1	1	0	16.65
1	1	0	1	1	1	1	16.80
1	1	1	0	0	0	0	16.95
1	1	1	0	0	0	1	17.10
1	1	1	0	0	1	0	17.25
1	1	1	0	0	1	1	17.40
1	1	1	0	1	0	0	17.55
1	1	1	0	1	0	1	17.70
1	1	1	0	1	1	0	17.85
1	1	1	0	1	1	1	18.00
1	1	1	1	0	0	0	18.15
1	1	1	1	0	0	1	18.30
1	1	1	1	0	1	0	18.45
1	1	1	1	0	1	1	18.60
1	1	1	1	1	0	0	0.00
1	1	1	1	1	0	1	0.00
1	1	1	1	1	1	0	0.00
1	1	1	1	1	1	1	0.00

address : 31h (PTMDACTL1) Automatic Brightness Control Mode Current Setting 1 Register Write

31h (PTMDACTL1)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN1 [6]	YMAIN1 [5]	YMAIN1 [4]	YMAIN1 [3]	YMAIN1 [2]	YMAIN1 [1]	YMAIN1 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN1 [0] to YMIAN1 [6] (MLED current settings for brightness 2)

*The current values are the same as those for the MLED current settings.

address : 32h (PTMDACTL2) Automatic Brightness Control Mode Current Setting 2 Register Write

32h (PTMDACTL2)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN2 [6]	YMAIN2 [5]	YMAIN2 [4]	YMAIN2 [3]	YMAIN2 [2]	YMAIN2 [1]	YMAIN2 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN2 [0] to YMIAN2 [6] (MLED current settings for brightness 3)

*The current values are the same as those for the MLED current settings.

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address : 33h (PTMDACTL3) Automatic Brightness Control Mode Current Setting 3 Register Write

33h (PTMDACTL3)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN3 [6]	YMAIN3 [5]	YMAIN3 [4]	YMAIN3 [3]	YMAIN3 [2]	YMAIN3 [1]	YMAIN3 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN3 [0] to YMIAN3 [6] (MLED current settings for brightness 4)

*The current values are the same as those for the MLED current settings.

address : 34h (PTMDACTL4) Automatic Brightness Control Mode Current Setting 4 Register Write

34h (PTMDACTL4)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN4 [6]	YMAIN4 [5]	YMAIN4 [4]	YMAIN4 [3]	YMAIN4 [2]	YMAIN4 [1]	YMAIN4 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN4 [0] to YMIAN4 [6] (MLED current settings for brightness 5)

*The current values are the same as those for the MLED current settings.

address : 35h (PTMDACTL5) Automatic Brightness Control Mode Current Setting 5 Register Write

35h (PTMDACTL5)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN5 [6]	YMAIN5 [5]	YMAIN5 [4]	YMAIN5 [3]	YMAIN5 [2]	YMAIN5 [1]	YMAIN5 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN5 [0] to YMIAN5 [6] (MLED current settings for brightness 6)

*The current values are the same as those for the MLED current settings.

address : 36h (PTMDACTL6) Automatic Brightness Control Mode Current Setting 6 Register Write

36h (PTMDACTL6)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN6 [6]	YMAIN6 [5]	YMAIN6 [4]	YMAIN6 [3]	YMAIN6 [2]	YMAIN6 [1]	YMAIN6 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN6 [0] to YMIAN6 [6] (MLED current settings for brightness 7)

*The current values are the same as those for the MLED current settings.

address : 37h (PTMDACTL7) Automatic Brightness Control Mode Current Setting 7 Register Write

37h (PTMDACTL7)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN7 [6]	YMAIN7 [5]	YMAIN7 [4]	YMAIN7 [3]	YMAIN7 [2]	YMAIN7 [1]	YMAIN7 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN7 [0] to YMIAN7 [6] (MLED current settings for brightness 8)

*The current values are the same as those for the MLED current settings.

address : 38h (PTMDACTL8) Automatic Brightness Control Mode Current Setting 8 Register Write

38h (PTMDACTL8)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN8 [6]	YMAIN8 [5]	YMAIN8 [4]	YMAIN8 [3]	YMAIN8 [2]	YMAIN8 [1]	YMAIN8 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN8 [0] to YMIAN8 [6] (MLED current settings for brightness 9)

*The current values are the same as those for the MLED current settings.

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address : 39h (PTMDACTL9) Automatic Brightness Control Mode Current Setting 9 Register Write

39h (PTMDACTL9)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIN9 [6]	YMAIN9 [5]	YMAIN9 [4]	YMAIN9 [3]	YMAIN9 [2]	YMAIN9 [1]	YMAIN9 [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAN9 [0] to YMIAN9 [6] (MLED current settings for brightness 10)

*The current values are the same as those for the MLED current settings.

address : 3Ah (PTMDACTLA) Automatic Brightness Control Mode Current Setting A Register Write

3Ah (PTMDACTLA)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAINA [6]	YMAINA [5]	YMAINA [4]	YMAINA [3]	YMAINA [2]	YMAINA [1]	YMAINA [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIANA [0] to YMIANA [6] (MLED current settings for brightness 11)

*The current values are the same as those for the MLED current settings.

address : 3Bh (PTMDACTLB) Automatic Brightness Control Mode Current Setting B Register Write

3Bh (PTMDACTLB)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAINB [6]	YMAINB [5]	YMAINB [4]	YMAINB [3]	YMAINB [2]	YMAINB [1]	YMAINB [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIANB [0] to YMIANB [6] (MLED current settings for brightness 12)

*The current values are the same as those for the MLED current settings.

address : 3Ch (PTMDACTLC) Automatic Brightness Control Mode Current Setting C Register Write

3Ch (PTMDACTLC)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAINC [6]	YMAINC [5]	YMAINC [4]	YMAINC [3]	YMAINC [2]	YMAINC [1]	YMAINC [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIANC [0] to YMIANC [6] (MLED current settings for brightness 13)

*The current values are the same as those for the MLED current settings.

address : 3Dh (PTMDACTLD) Automatic Brightness Control Mode Current Setting D Register Write

3Dh (PTMDACTLD)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAIND [6]	YMAIND [5]	YMAIND [4]	YMAIND [3]	YMAIND [2]	YMAIND [1]	YMAIND [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIAND [0] to YMIAND [6] (MLED current settings for brightness 14)

*The current values are the same as those for the MLED current settings.

address : 3Eh (PTMDACTLE) Automatic Brightness Control Mode Current Setting E Register Write

3Eh (PTMDACTLE)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAINE [6]	YMAINE [5]	YMAINE [4]	YMAINE [3]	YMAINE [2]	YMAINE [1]	YMAINE [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIANE [0] to YMIANE [6] (MLED current settings for brightness 15)

*The current values are the same as those for the MLED current settings.

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address : 3Fh (PTMDACTLF) Automatic Brightness Control Mode Current Setting F Register Write

3Fh (PTMDACTLF)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	YMAINF [6]	YMAINF [5]	YMAINF [4]	YMAINF [3]	YMAINF [2]	YMAINF [1]	YMAINF [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D6 : YMIANF [0] to YMIANF [6] (MLED current settings for brightness 16)

*The current values are the same as those for the MLED current settings.

address : 40h (PTCTL2) Automatic Brightness Control Mode Setting 2 Register Write

40h (PTCTL2)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	TUP [3]	TUP [2]	TUP [1]	TUP [0]	TDWN [3]	TDWN [2]	TDWN [1]	TDWN [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D3 : TDWNE [0] to TDWN [3] (MLED current, brightness control change time (when decreasing))

D3	D2	D1	D0	TDWN	
0	0	0	0	0.256ms	*Default
0	0	0	1	0.512ms	
0	0	1	0	1.024ms	
0	0	1	1	2.048ms	
0	1	0	0	4.096ms	
0	1	0	1	8.192ms	
0	1	1	0	16.384ms	
0	1	1	1	32.768ms	
1	0	0	0	65.536ms	
1	0	0	1	131.072ms	
1	0	1	0	262.144ms	
1	0	1	1	524.288ms	
1	1	0	0	1.049s	
1	1	0	1	2.097s	
1	1	1	0	4.194s	
1	1	1	1	8.389s	

D4 to D7 : TUP [0] to TUP [3] (MLED current, brightness control change time (when increasing))

D7	D6	D5	D4	TUP	
0	0	0	0	0.256ms	*Default
0	0	0	1	0.512ms	
0	0	1	0	1.024ms	
0	0	1	1	2.048ms	
0	1	0	0	4.096ms	
0	1	0	1	8.192ms	
0	1	1	0	16.384ms	
0	1	1	1	32.768ms	
1	0	0	0	65.536ms	
1	0	0	1	131.072ms	
1	0	1	0	262.144ms	
1	0	1	1	524.288ms	
1	1	0	0	1.049s	
1	1	0	1	2.097s	
1	1	1	0	4.194s	
1	1	1	1	8.389s	

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address : 41h (PTCTL3) Automatic Brightness Control Mode Setting 3 Register Write

41h (PTCTL3)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	-	TAU [2]	TAU [1]	TAU [0]	-	TAD [2]	TAD [1]	TAD [0]
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 to D2 : TAD [0] to TAD [2] (For sensor variation adjustment 1) *MIN setting : Value established when sensor variation adjustment 2 is set to 0.84V

140 lux

D2	D1	D0	threshold voltage (V)	
0	0	0	0.32	*Default
0	0	1	0.34	
0	1	0	0.37	
0	1	1	0.39	
1	0	0	0.42	
1	0	1	0.44	
1	1	0	0.47	
1	1	1	0.49	

D4 to D6 : TAU [0] to TAU [2] (For sensor variation adjustment 2) * MAX setting

10000 lux

D6	D5	D4	threshold voltage (V)	
0	0	0	0.65	*Default
0	0	1	0.71	
0	1	0	0.78	
0	1	1	0.84	
1	0	0	0.90	
1	0	1	0.97	
1	1	0	1.03	
1	1	1	1.10	

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address : 42h (GPOCTL) GPO Setting Register Write

42h (GPOCTL)	D7	D6	D5	D4	D3	D2	D1	D0
Register name	MFXTSW	-	GPO22	GPO12	GPO02	GPO21	GPO11	GPO01
R/W	W	W	W	W	W	W	W	W
Default	0	0	0	0	0	0	0	0

D0 : GPO01 (GPO0 output setting 1)
0 : Low output *Default
1 : High output

D1 : GPO11 (GPO1 output setting 1)
0 : Low output *Default
1 : High output

D2 : GPO21 (GPO2 output setting 1)
0 : Low output *Default
1 : High output

D3 : GPO02 (GPO0 output setting 2)
0 : OPEN *Default
1 : Buffer output

D4 : GPO12 (GPO1 output setting 2)
0 : OPEN *Default
1 : Buffer output

D5 : GPO22 (GPO2 output setting 2)
0 : OPEN *Default
1 : Buffer output

D7 : MFXTSW (Step-up mode settings in which LED pins are set to the same level)
0 : Turns on the step-up mode in which the LED pins are set to the predetermined voltage level when the voltage at the MLED pins goes down and a mode change from through to step-up occurs.
*Default
1 : Turns on the fixed voltage output mode when the voltage at the MLED pins goes down and a mode change from through to step-up occurs.

Precautions for serial transmission and use

- * When the switching regulator is to be started, the LED driver must be turned off.
- * When the MLED4, 5 and 6 settings are to be turned on as the main LED drivers, either MLED4, MLED5, and MLED6 must be turned off after fade out, or they must be set to “always ON.”
- * When the SLED2 setting is to be turned on as the SLED driver, either SLED2 must be turned off after fade out, or it must be set to “always ON.”
- * When LED pins are not to be used
When no LED is to be connected to the LED pin, the LED driver pin must be connected to VBAT.
- * Thermal shutdown operation
At a high temperature, the thermal shutdown is activated. In this case, all of the LEDs are turned off, and the voltage stepping-up operation is stopped.
The serial registers are held in the HOLD state. When the temperature goes down to the normal level, the IC self-restores.
However, the IC will not self-restore if the short-circuit prevention circuit (SCP) is activated when DC/DC circuit is turned off.
- * IN pin H limit operation
When the IN pin becomes approximately 0.6V higher than the DC/DC set voltage, the H limit operation is triggered.
H limit operation causes DC/DC circuit to stop the voltage stepping-up operation, but when the voltage falls to the normal level, the IC self-restores.
The H limit voltage becomes approximately 0.6V higher than the fixed mode set voltage and varies when the set voltage changes. When the set voltage is 4.3V, the H limit voltage will be approximately 4.9V, and when the set voltage is approximately 5.0V, the H limit voltage will be approximately 5.6V.
H limit operation is also effective in a mode in which the LED pin voltage is made constant, so in this mode as well a fixed mode output voltage must be set in consideration of the H limit voltage.
- * RESET serial communication
The RESET pin must be cleared (L→H) after VBAT is started.
V_{DD} and V_{DD2} are unrelated to the RESET function.
Serial communication does not take place until V_{DD} is started after RESET is released, When voltage V_{DD} does not exist, no communication can be carried out and RESET is not triggered, either.
The registers hold their state.
- * Regarding the switching regulator short-circuit protection circuit (SCP)
When the switching regulator output falls, it is assumed that a short circuit has occurred, and the SCP is activated to prevent an excessively large current from flowing. When the IN pin voltage falls by about 30mV from the no-load output value, an internal timer operates. If the reduced voltage condition continues for 10msec, the LV5219LG will judge that a short circuit has occurred, and stop the switching regulator control circuit.
After the switching regulator control circuit has stopped, it does not self-restore. However, it can be reset by either applying a RESET, or sending a command to set the serial control RGSW to 0.

In a mode in which the LED pin voltage is made constant, the same operation takes place when the MLED pin voltage falls by 60mV, and the SCP is activated. As in the case of the constant voltage mode, a self-restore does not take place, and the resetting method is also the same.

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Serial map

Address	Register name	Description	R/W	Data								
				D7	D6	D5	D4	D3	D2	D1	D0	
00h	LEDCTL1	LED Settings 1 Register	W	MLED6	MLED5	MLED4	MSW2	MSW1	FXSW	RGSW	STBY	
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
01h	LEDCTL2	LED Settings 2 Register	W	SPM6	SPM5	SPM4	SPS2	S2SW	S1SW	MISW	VOCSW	
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
02h	LEDCTL3	LED Settings 3 Register	W	SCSW2	B2SW	G2SW	R2SW	SCSW1	B1SW	G1SW	R1SW	
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
03h	LEDCTL4	LED Settings 4 Register	W	MFSW	KESW4	KESW3	KESW2	KESW1	F3SW	F2SW	F1SW	
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
04h	MLEDDACCTL	MLED Current Setting Register	W	MAINL [2 : 0]			MAINH [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
05h	M4DACTL	MLED4 Current Setting Register	W	-	-	-	M4C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
06h	M5DACTL	MLED5 Current Setting Register	W	-	-	-	M5C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
07h	M6_VD_DACTL	MLED6 Current Output Setting Register	W	VD [2 : 0]			MC6 [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
08h	S1DACTL	SLED1 Current Setting Register	W	-	-	-	S1C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
09h	S2DACTL	SLED2 Current Setting Register	W	-	-	-	S2C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
0Ah	R1DACTL	RLED1 Current Setting Register	W	MAXC1 [2 : 0]			R1C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
0Bh	G1DACTL	GLED1 Current Setting Register	W	-	-	-	G1C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
0Ch	B1DACTL	BLED1 Current Setting Register	W	-	-	-	B1C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
0Dh	R2DACTL	RLED2 Current Setting Register	W	MAXC2 [2 : 0]			R2C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
0Eh	G2DACTL	GLED2 Current Setting Register	W	-	-	-	G2C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
0Fh	B2DACTL	BLED2 Current Setting Register	W	-	-	-	B2C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0

Upper column : Register name, Middle column : Read/Write, Lower column : Default value

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Address	Register name	Description	R/W	Data								
				D7	D6	D5	D4	D3	D2	D1	D0	
10h	F1DACTL	FLED1 Current Setting Register	W	MAXCF [2 : 0]			F1C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
11h	F2DACTL	FLED2 Current Setting Register	W	-	-	-	F2C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
12h	F3DACTL	FLED3 Current Setting Register	W	-	-	-	F3C [4 : 0]					
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
13h	MFCTL	MLED Fade Time Setting Register	W	-	-	MFOUT [2 : 0]			MFIN [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
14h	SFCTL	SLED Fade Time Setting Register	W	-	-	SFOUT [2 : 0]			SFIN [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
15h	R1FCTL	RLED1 Fade Time Setting Register	W	-	-	R1FOUT [2 : 0]			R1FIN [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
16h	G1FCTL	GLED1 Fade Time Setting Register	W	-	-	G1FOUT [2 : 0]			G1FIN [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
17h	B1FCTL	BLED1 Fade Time Setting Register	W	-	-	B1FOUT [2 : 0]			B1FIN [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
18h	RGB1GRCTL	RGB1 Gradation Setting Register	W	GHB1	GHG1	GHR1	GR1M1	GRON1	AT1 [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
19h	RGB1PUCTL	RGB1 Pulse Mode Setting Register	W	-	PRON1	PT1 [2 : 0]			HO1 [2 : 0]			
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
1Ah	R1AOFFCTL	RLED1 OFF Position Setting Register	W	-	-	R1Aoff [5 : 0]						
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
1Bh	R1AONCTL	RLED1 ON Position Setting Register	W	-	-	R1Aon [5 : 0]						
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
1Ch	G1AOFFCTL	GLED1 OFF Position Setting Register	W	-	-	G1Aoff [5 : 0]						
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
1Dh	G1AONCTL	GLED1 ON Position Setting Register	W	-	-	G1Aon [5 : 0]						
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
1Eh	B1AOFFCTL	BLED1 OFF Position Setting Register	W	-	-	B1Aoff [5 : 0]						
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0
1Fh	B1AONCTL	BLED1 ON Position Setting Register	W	-	-	B1Aon [5 : 0]						
				W	W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0	0

Upper column : Register name, Middle column : Read/Write, Lower column : Default value

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Address	Register name	Description	R/W	Data							
				D7	D6	D5	D4	D3	D2	D1	D0
20h	R2FCTL	RLED2 Fade Time Setting Register	W	-	-	R2FOUT [2 : 0]			R2FIN [2 : 0]		
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
21h	G2FCTL	GLED2 Fade Time Setting Register	W	-	-	G2FOUT [2 : 0]			G2FIN [2 : 0]		
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
22h	B2FCTL	BLED2 Fade Time Setting Register	W	-	-	B2FOUT [2 : 0]			B2FIN [2 : 0]		
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
23h	RGB2GRCTL	RGB2 Gradation Setting Register	W	GHB2	GHG2	GHR2	GR1M2	GRON2	AT2 [2 : 0]		
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
24h	RGB2PUCTL	RGB2 Pulse Mode Setting Register	W	-	PRON2	PT2[2:0]			HO2[2:0]		
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
25h	R2AOFFCTL	RLED2 OFF Position Setting Register	W	-	-	R2Aoff [5 : 0]					
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
26h	R2AONCTL	RLED2 ON Position Setting Register	W	-	-	R2Aon [5 : 0]					
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
27h	G2AOFFCTL	GLED2 OFF Position Setting Register	W	-	-	G2Aoff [5 : 0]					
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
28h	G2AONCTL	GLED2 ON Position Setting Register	W	-	-	G2Aon [5 : 0]					
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
29h	B2AOFFCTL	BLED2 OFF Position Setting Register	W	-	-	B2Aoff [5 : 0]					
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
2Ah	B2AONCTL	BLED2 ON Position Setting Register	W	-	-	B2Aon [5 : 0]					
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
2Bh	KEYCTL	KLED1, KLED2 Changeover Voltage Setting Register	W	KEY2C [3 : 0]				KEY1C [3 : 0]			
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
2Ch	PTCLT1	Automatic Brightness Control Mode Settings 1 Register	W	SWCTL	PTSW	KISW	SMPN [1 : 0]		SMPF [2 : 0]		
				W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	
2Dh	INTMASK	INT Mask Setting Register	W	INTCR	-	INTM6	INTM5	INTM4	INTM3	INTM2	INTM1
				W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	
2Eh	INTDET	INT Detection Register	R	-	-	INT6	INT5	INT4	INT3	INT2	INT1
				R	R	R	R	R	R	R	
				0	0	0	0	0	0	0	
2Fh	STATUS	Status Detection Register	R	XM [3 : 0]				-	-	KEYON	DCDC
				R	R	R	R	R	R	R	
				0	0	0	0	0	0	0	

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Address	Register name	Description	R/W	Data								
				D7	D6	D5	D4	D3	D2	D1	D0	
30h	PTMDACTL0	Automatic Brightness Control Mode Settings Current Settings 0	W	-	YMAIN0 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
31h	PTMDACTL1	Automatic Brightness Control Mode Settings Current Settings 1	W	-	YMAIN1 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
32h	PTMDACTL2	Automatic Brightness Control Mode Settings Current Settings 2	W	-	YMAIN2 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
33h	PTMDACTL3	Automatic Brightness Control Mode Settings Current Settings 3	W	-	YMAIN3 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
34h	PTMDACTL4	Automatic Brightness Control Mode Settings Current Settings 4	W	-	YMAIN4 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
35h	PTMDACTL5	Automatic Brightness Control Mode Settings Current Settings 5	W	-	YMAIN5 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
36h	PTMDACTL6	Automatic Brightness Control Mode Settings Current Settings 6	W	-	YMAIN6 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
37h	PTMDACTL7	Automatic Brightness Control Mode Settings Current Settings 7	W	-	YMAIN7 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
38h	PTMDACTL8	Automatic Brightness Control Mode Settings Current Settings 8	W	-	YMAIN8 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
39h	PTMDACTL9	Automatic Brightness Control Mode Settings Current Settings 9	W	-	YMAIN9 [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
3Ah	PTMDACTLA	Automatic Brightness Control Mode Settings Current Settings A	W	-	YMAINA [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
3Bh	PTMDACTLB	Automatic Brightness Control Mode Settings Current Settings B	W	-	YMAINB [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
3Ch	PTMDACTLC	Automatic Brightness Control Mode Settings Current Settings C	W	-	YMAINC [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
3Dh	PTMDACTLD	Automatic Brightness Control Mode Settings Current Settings D	W	-	YMAIND [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
3Eh	PTMDACTLE	Automatic Brightness Control Mode Settings Current Settings E	W	-	YMAINE [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	
3Fh	PTMDACTLF	Automatic Brightness Control Mode Settings Current Settings F	W	-	YMAINE [6 : 0]							
				W	W	W	W	W	W	W	W	
				0	0	0	0	0	0	0	0	

Upper column : Register name, Middle column : Read/Write, Lower column : Default value

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Address	Register name	Contents	R/W	Data							
				D7	D6	D5	D4	D3	D2	D1	D0
40h	PTCLT2	Automatic Brightness Control Mode Settings 2 Register	W	TUP [3 : 0]				TDWN [3 : 0]			
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
41h	PTCLT3	Automatic Brightness Control Mode Settings 3 Register	W	-	TAU [2 : 0]			-	TAD [2 : 0]		
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
42h	GPOCTL	GPO Register	W	MFXTSW	-	GPO22	GPO12	GPO02	GPO21	GPO11	GPO01
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0
43h	TEST	For Testing Inhibited		-	-	-	-	-	-	-	
				W	W	W	W	W	W	W	W
				0	0	0	0	0	0	0	0

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