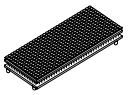
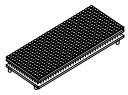
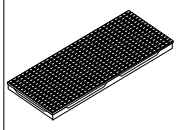
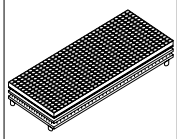
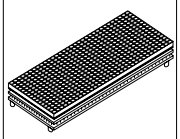
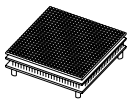
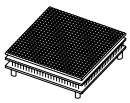
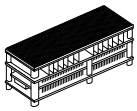
LUM unit series

		COB display type	Cylindrical LED type	Reflection LED type	High-luminance type	Chip LED's type
Type	16×32	LUM-5122MU302	———	———	———	———
Dot size	ϕ2					
Dimensions	40×80mm					
Type	16×32	———	LUM-5123MU300	LUM-5123MU301	———	———
Dot size	ϕ3					
Dimensions	64×128mm					
Type	16×32	———	———	———	———	LUM-512HML300
Dot size	□2.1×2.3					
Dimensions	64×128mm					
Type	16×32	———	LUM-5125MU301	LUM-5125MU302	———	———
Dot size	ϕ5					
Dimensions	96×192mm					
Type	24×24	———	———	LUM-5763MU302	LUM-5763ML300	———
Dot size	ϕ3					
Dimensions	96×96mm					
Type	24×48	LUM-1151MU301	———	———	———	———
Dot size	ϕ1.6					
Dimensions	48×96mm					
Type	24×48	———	———	———	———	LUM-115HML300
Dot size	□2.1×2.3					
Dimensions	96×192mm					

●Main specifications

Size	Display Type	Type	Emitting color	Emitting material	Peak Wave-length (nm)	Dot Dia (mm)	Dot Pitch (mm)	Number of Dot (dot)	Control Circuit		Display Circuit		Lumi-nance Typ. (cd / m²)	Opera-ting Frequ-ency Max. (MHz)	Driving System
									V_{DD} (V)	I_{CC1} Max. (mA)	V_{LED} (V)	I_{CC2} Max. (A)			
□40 ×2	COB	LUM-5122MU302	Red	GaAsP	635	ϕ2	2.5	16 × 32	5	100	5	2.2	60	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								80		
□48 ×2	COB	LUM-1151MU301	Red	GaAsP	635	ϕ1.6	2	24 × 48	5	50	5	3.5	50	20	1 / 24 Duty Dynamic lighting up
			Green	Gap	563								100		
□64	Cylinder Lamp Used Type Milky white	LUM-2563MU301	Red	GaAsP	635	ϕ3.0	4	16 × 16	5	50	5	2.8	100	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								100		
	Reflection Lamp Used Type Milky white	LUM-2563MU302	Red	GaAsP	635								100		
			Green	Gap	563								100		
	Reflection Lamp Used Type Milky White	LUM-2563ML304	Ultra Red	GaAlAs	660								400		
			Green	Gap	563								300		
□64 ×2	Chip LED	LUM-512HML300	Ultra Red	GaAlAs	660	□ 2.1 × 2.3	4	16 × 32	5	30	5	2.7	130	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								130		
	Cylinder Lamp Used Type Milky white	LUM-5123MU300	Red	GaAsP	660	ϕ3.0		16 × 16		100		5.6	100		1 / 16 Duty Dynamic lighting up
			Green	Gap	563								100		
	Reflection Lamp Used Type Milky white	LUM-5123MU301	Red	GaAsP	635								100		
			Green	Gap	563								100		
□96	Cylinder Lamp Used Type Milky white	LUM-2565MU309	Red	GaAsP	635	ϕ5.0	6	16 × 16	5	50	5	2.8	60	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								80		
	Reflection Lamp Used Type Milky white	LUM-2565MU304	Red	GaAsP	635								250		
			Green	Gap	563								250		
	Reflection Lamp Used Type	LUM-2565ML304	Ultra Red	GaAlAs	660	ϕ5.0	6	16 × 16	5	20	5	5.5	600	20	1 / 8 Duty Dynamic lighting up
			Green	Gap	563								700		
□96 ×2	Reflection Lamp Used Type Milky white	LUM-5125MU302	Red	GaAsP	635	ϕ5.0	6	16 × 32	5	100	5	5.6	250	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								250		
	Cylinder Lamp Used Type Milky white	LUM-5125MU301	Red	GaAsP	635	ϕ5.0	6	16 × 32	5	30	5	5.6	60	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								80		
	Chip LED	LUM-115HML300	Ultra Red	GaAsP	660	□ 2.1 × 2.3	4	24 × 48	5	50	5	4.0	100	20	1 / 24 Duty Dynamic lighting up
			Green	Gap	563								100		
□96	Reflection Lamp Used Type Milky white	LUM-5763MU302	Red	GaAsP	635	ϕ3.0	4	24 × 24	5	50	5	3.2	100	20	1 / 24 Duty Dynamic lighting up
			Green	Gap	563								100		
	Reflection Lamp Used Type Milky white	LUM-5763ML300	Ultra Red	GaAlAs	660								250		
			Green	Gap	563								250		
□144	Reflection Lamp Used Type Milky white	LUM-2568MU302	Red	GaAsP	635	ϕ7.5	9	16 × 16	5	50	5	2.8	160	20	1 / 16 Duty Dynamic lighting up
			Green	Gap	563								250		
	Reflection Lamp Used Type	LUM-2568ML302	Ultra Red	GaAlAs	660								200		
			Green	Gap	563								200		
	Reflection Lamp Used Type	LUM-2568ML303	Ultra Red	GaAlAs	660	ϕ7.5	9	16 × 16	5	20	5	5.5	400	20	1 / 8 Duty Dynamic lighting up
			Green	Gap	563								350		
□200	Reflection Lamp Used Type	LUM-2568ML353	Ultra Red	GaAlAs	660	ϕ7.5	12.5	16 × 16	5	20	5	5.5	200	20	1 / 8 Duty Dynamic lighting up
			Green	Gap	563								200		

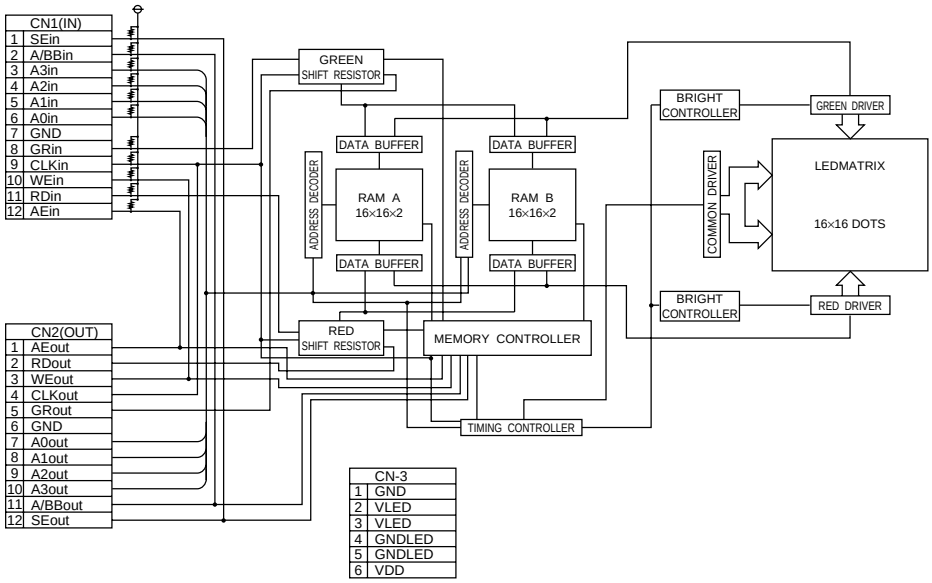
●Recommended operating conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply, control circuit*1		-	5.0	-	V
Power supply, LED's*1	V_{LED}	-	5.0	-	V
High level control input voltage*2	V_{IH}	4.5	-	5.0	V
Low level control input voltage*2	V_{IL}	0	-	1.0	V

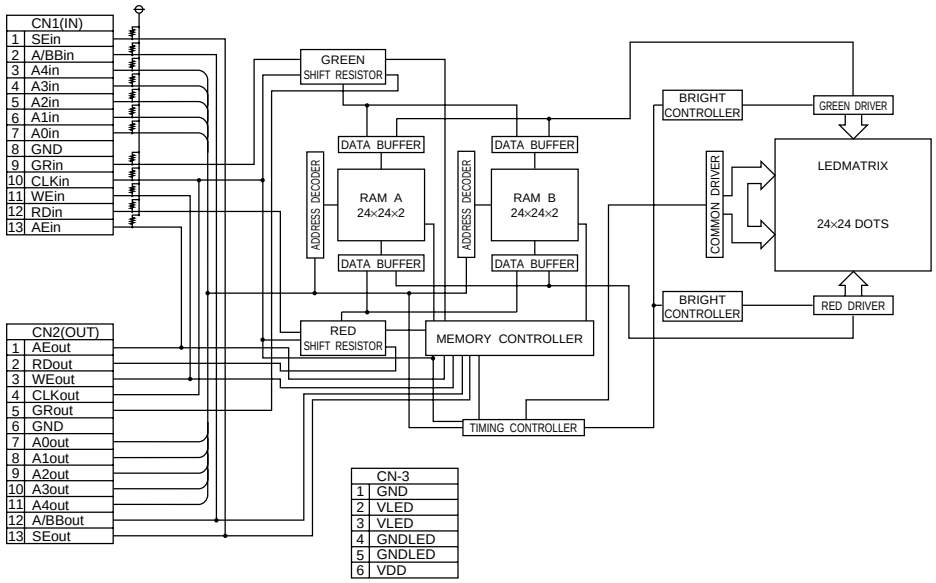
*1 ±5%
*2 When power voltage for LED's is 5V

●Block diagrams

(1) 16 ×16 dot matrix unit



(2) 24 ×24 dot matrix unit



●Pin descriptions

(1) CN-1

1) RDin

Data input for red LED. LED is on when this pin is HIGH, and off when it is LOW.

2) GRin

Data input for green LED. LED is on when this pin is HIGH, and off when it is LOW.

3) CLKin

Clock input. Used to load RDin and GRin data. Data is loaded into the internal shift registor at the leading edge of the CLK signal.

4) A0in - A3(A4)in

RAM address input. This specifies the address in memory to which display data will be written.

5) WEin

Write control signal. When this signal is HIGH, the contents of the internal shift registor are written to memory.
(Only valid when AEin is HIGH.)

6) AEin

Address control signal. When this signal is HIGH, the current address in A0in - A3 (A4)in is specified.

7) A/ BBin

Control signal for selecting memory where data will be written. When this signal is HIGH, ARAM is selected, and when it is LOW, BRAM is selected. (Only valid when SEin is HIGH.) The contents of the memory not selected for writing will be displayed.

8) SEin

This signal determines whether memory selection will be made by external control or internal control. When this signal is HIGH, the A/ BBin signal determines whether ARAM or BRAM is selected. When ARAM is selected for writing, the BRAM data is displayed, and when BRAM is selected for writing, the ARAM data is displayed. When this signal is LOW, data will be written to a different memory (from address 0) after the last memory address (15 or 23) is written to. The display data will change simultaneously with the memory change.

9) ENBin

Display output is Enable. It becomes display state HIGH level, non-display state at Low level.

(2) CN-2

1) RDout

Data output for red LED. The signal is output simultaneously with CLK after passing through internal bit shift register 16 (24, 32, 48). If LED modules are connected serially, this pin will be connected to the next module's RDin pin.

2) GRout

Data output for green LED. The signal is output simultaneously with CLK after passing through internal bit shift register 16 (24, 32, 48). If LED modules are connected serially, this pin will be connected to the next module's RDin pin.

3) CLKout

Clock signal output. This pin outputs the CLKin signal. The pin connects to the next module's CLKin pin.

4) A0out - A3 (A4)out

Address signal output. These pins output the signals of A0in - A3 (A4)in. The pins connect to the next module's A0in - A3 (A4)in pins.

5) WEout

WE (write control) signal output. This pin outputs the WEin signal. The pin connects to the next module's WEin pin.

6) AEout

AE (address control) signal output. This pin outputs the AEin signal. The pin connects to the next module's AEin pin.

7) A/ BBout

A/ BB (selection of memory for writing) signal output. This pin outputs the A / BBout signal. The pin connects to the next module's A/ BBin pin.

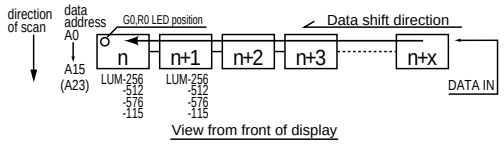
8) SEout

SE (memory selection control) signal output. This pin outputs the SEin signal. The pin connects to the next module's SEin pin.

9) ENBout
ENB signal output. The ENBin signal is outputted. It is connected to ENBin of the next module.

(3) CN-3
1) GND
Control circuit ground.
2) VLED
Supply voltage for LED.
3) GNDLED
LED ground
(4) VDD
Supply voltage for control circuit.

●Attention points in handling LED dot matrix units
(1) Do not drop a dot matrix unit. This may cause deformation of the display or cracks in the solder.
(2) Be sure to mount the unit in the correct direction. Otherwise, the flow of data will be reversed.



(3) Excessive heat in the unit can cause a drop in luminosity and other operational problems. Use a fan or other means to ensure sufficient heat dissipation.
(4) The current required for the power supply varies greatly depending on the frequency of turning the LED on. Use a stable power supply which has sufficient capacity to handle sudden changes in load.
(5) When joining units together to form a panel, design the panel to allow sufficient overall heat dissipation and leave enough clearance for thermal expansion.
(As a general guideline, leave a gap of 0.3 mm between units.)
(6) Do not rub the display surface or use organic solvents such as thinner to clean the display surface.
(7) These units use high density LSI circuits. Therefore, take sufficient measures to protect them from electrostatic discharge.
(8) Do not short-circuit the units or apply unnecessarily high voltages to them.
(9) Do not use the units in conditions where the circuits will be directly exposed to wind and rain.
(10) If a unit is used at high frequency or if several units are connected together and the signal cable is long, noise may cause malfunctioning. In this case, use a shielded cable and terminate end components.
(11) As time passes, a difference in luminance may develop between LEDs which illuminate frequently and LEDs which do not. This will be particularly apparent if certain LEDs remain constantly illuminated.
(12) Ground the control circuit and LED close to the power supply equipment.

Note: This product may be classified as a strategic good (or function) determined by the foreign exchange and foreign trade laws. Therefore, when export this product, be sure to consult ROHM. This product is not designed for radiation resistance.

●**Connector signals**

(1) 16 ×16 and 16 ×32 (except for LUM-512HML Series) dot matrix unit

No.	CN-1 signal name
1	SEin
2	A / BBin
3	A3in
4	A2in
5	A1in
6	A0in
7	GND
8	GRin
9	CLKin
10	WEin
11	RDin
12	AEin

No.	CN-2 signal name
1	AEout
2	RDout
3	WEout
4	CLKout
5	GRout
6	GND
7	A0out
8	A1out
9	A2out
10	A3out
11	A / BBout
12	SEout

No.	CN-3 signal name
1	GND
2	VLED
3	VLED
4	GNDLED
5	GNDLED
6	VDD

(2) LUM-512HML Series

No.	CN-1signal name
1	SEin
2	A / BBin
3	A3in
4	A2in
5	A1in
6	A0in
7	GND
8	GRin
9	CLKin
10	WEin
11	RDin
12	AEin
13	ENBin

No.	CN-2 signal name
1	ENBout
2	AEout
3	RDout
4	WEout
5	CLKout
6	GRout
7	GND
8	A0out
9	A1out
10	A2out
11	A3out
12	A / BBin
13	ENBout

No.	CN-3 signal name
1	GND
2	VLED
3	VLED
4	GNDLED
5	GNDLED
6	VDD

(3) 24 ×24 and 24 ×48 (except for LUM-115HML Series) dot matrix unit

No.	CN-1 signal name
1	SEin
2	A / BBin
3	A4in
4	A3in
5	A2in
6	A1in
7	A0in
8	GND
9	GRin
10	CLKin
11	WEin
12	RDin
13	AEin

No.	CN-2 signal name
1	AEout
2	RDout
3	WEout
4	CLKout
5	GRout
6	GND
7	A0out
8	A1out
9	A2out
10	A3out
11	A4out
12	A / BBout
13	SEout

No.	CN-3 signal name
1	GND
2	VLED
3	VLED
4	GNDLED
5	GNDLED
6	VDD

(4) LUM-115HML Series

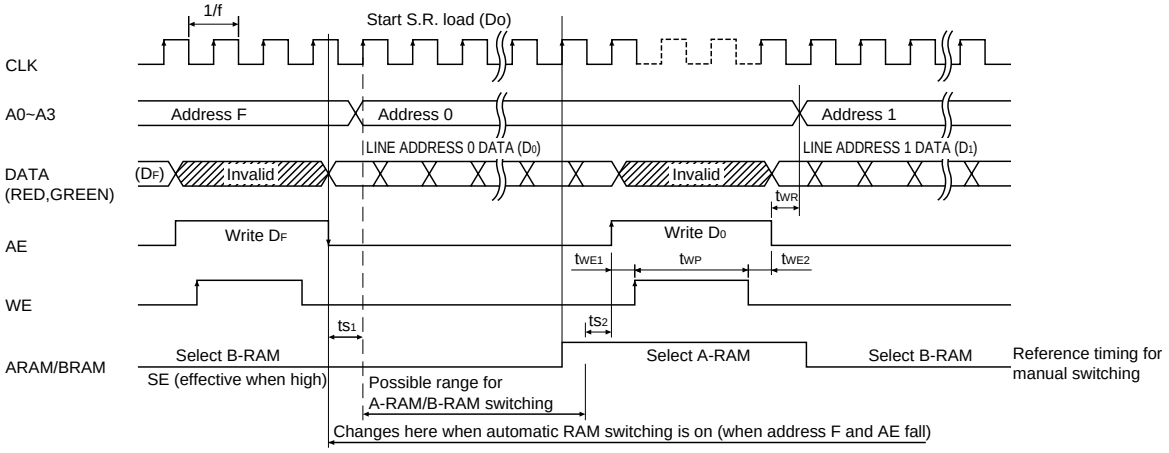
No.	CN-1 signal name
1	A / BBin
2	A4in
3	A3in
4	A2in
5	A1in
6	A0in
7	GND
8	GRin
9	CLKin
10	WEin
11	RDin
12	AEin
13	ENBin

No.	CN-2 signal name
1	ENBout
2	AEout
3	RDout
4	WEout
5	CLKout
6	GRout
7	GND
8	A0out
9	A1out
10	A2out
11	A3out
12	A4out
13	A/ BBout

No.	CN-3 signal name
1	GND
2	VLED
3	VLED
4	GNDLED
5	GNDLED
6	VDD

●Timing diagram

(1) 16 ×16 and 16 ×32 dot matrix units

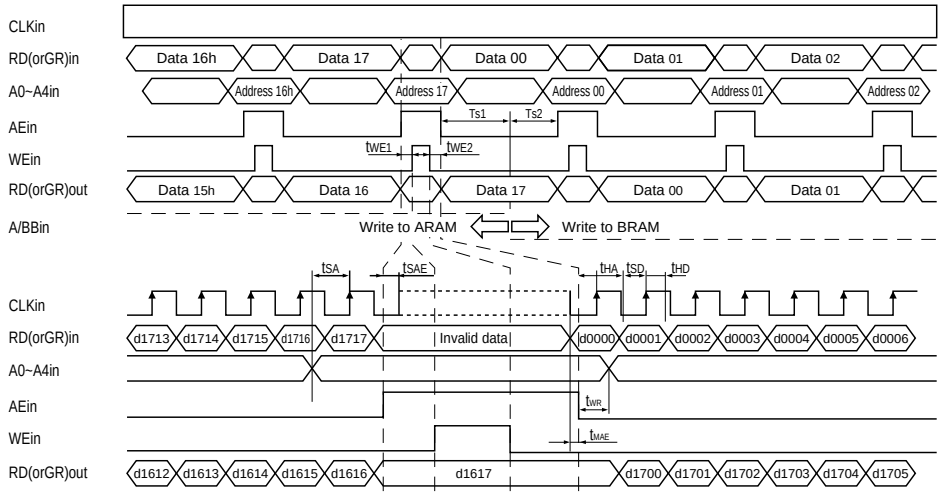


Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	f	-	-	20*	MHz
Address hold time	t_{WR}	15	-	-	ns
Address enable hold time (1)	t_{WE1}	50	-	-	ns
Address enable hold time (2)	t_{WE2}	30	-	-	ns
Write pulse time	t_{WP}	50	-	-	ns
RAM select time (1)	t_{S1}	15	-	-	ns
RAM select time (2)	t_{S2}	15	-	-	ns

* Unit specifications

1) When AE is high, the display data is ineffective and the timing of the RAM switching is not related to the display.
2) The display data is read when clock rises and is output when the clock rises.
3) During the interval while AEin is high, data is not read and the previous data is preserved as the output.
4) The switching of the RAM is by A / BB (SEin = H) or by the A0 to A3 addresses changing from 15 to 0.

(2) 24 ×24 and 24 ×48 dot matrix units



1) The display data is read when the clock rises and is output when the clock falls.
2) During the interval while AEin is High, data is not read and the previous data is preserved as the output. When AE is High, the display data is ineffective.
3) The switching of the RAM is by A / BB (SEin = “H”) or by the A0 to A4 addresses changing from 23 to 0.
4) The timing of the RAM switching is not related to the display.
5) The d17xx in the chart above represents the data of the xx bit of data 17.
6) AEin rises while CLKin is “L”.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	f	-	-	20*	MHz
Address hold time	t_{WR}	15	-	-	ns
Address enable hold time (1)	t_{WE1}	26	-	-	ns
Address enable hold time (2)	t_{WE2}	20	-	-	ns
Write pulse time	t_{WP}	50	-	-	ns
RAM select time (1)	t_{S1}	15	-	-	ns
RAM select time (2)	t_{S2}	15	-	-	ns
Address setup time	t_{SA}	0	-	-	ns
Address hold time	t_{HA}	10	-	-	ns
Data setup time	t_{SD}	10	-	-	ns
Data hold time	t_{HD}	10	-	-	ns
Address enable setup time	t_{SAE}	10	-	-	ns
Address enable hold time	t_{HAE}	0	-	-	ns

* Unit specifications