

L2034

■ Features of L2034 Series

- 20 characters × 4 lines
- STN gray type LCD is used
- 5 × 7 dot matrix + cursor
- 1/16 duty
- 5V single power supply

■ Specification

A. Mechanical Characteristics

Item	Specifications	Unit
Module size (H×V×T) (Reflective type)	98.0×60.0×11.6	mm
Module size (H×V×T) (Built-in LED backlight type)	98.0×60.0×15.8	mm
Viewing area (H×V)	76.0×25.2	mm
Character size (5×7 dot, H×V)	2.95×4.15	mm
Dot size (H×V)	0.55×0.55	mm
Dot space	0.05	mm
Center to center dimension of mounting holes (H×V)	93.0×55.0	mm
Weight (Reflective type)	55	g
Weight (Built-in LED backlight type)	70	g

H : Horizontal, V : Vertical, T : Thickness (max.)

B. Absolute Maximum Ratings

V_{SS} = 0V

Item	Symbol	Conditions	Min.	Max.	Unit
Power supply voltage	V _{DD}		-0.3	6.0	V
	V _{LC}		V _{DD} -12.0	V _{DD}	V
Input voltage	V _{IN}		-0.3	V _{DD} +0.3	V
Operating temp.	T _{opr}		0	+50	°C
Storage temp.	T _{stg}		-20	+60	°C
Storage humidity		≤48hrs	+20	+85	%RH
		≤1000hrs	+20	+65	%RH

C. Electrical Characteristics

V_{DD} = 5V±5%, V_{SS} = 0V, Ta = 0°C to 50°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Power supply voltage	V _{DD}		4.75	5.00	5.25	V
	V _{DD} -V _{LC}		4.0	—	11.0	V
Input * voltage	High	V _{IH1}	2.2	—	V _{DD}	V
	Low	V _{IL1}	0	—	0.6	V
Output ** voltage	High	V _{OH1}	-I _{OH} = 0.205mA	2.4	—	V
	Low	V _{OL1}	I _{OL} = 1.2mA	—	0.4	V
Current consumption	I _{DD}	Ta = 25°C V _{DD} = 5V V _{LC} = 0.25V	—	2.9	4.0	mA
	I _{LC}		—	1.2	2.0	mA
Clock oscillation frequency	f _{osc}	Resistance oscillation	140	220	300	kHz

* Applied to DB₀ ~ DB₇, E, R/W, RS

** Applied to DB₀ ~ DB₇

D. Optical Characteristics

D-1 Reflective type

Viewing angle : 6 o'clock (∅ = 0°), Ta = 25°C, V_{opr} = 4.75V

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Viewing angle	θ ₁	C ≥ 2.0 ∅ = 0°	—	—	-15	deg.
	θ ₂		55	—	—	
	θ ₂ - θ ₁		70	—	—	
Contrast	C	θ = 25°, ∅ = 0°	2	4	—	—
Response time (rise)	t _{on}	θ = 0° ∅ = 0°	—	270	400	ms
Response time (fall)	t _{off}		—	60	100	
Response time (rise)	t _{on}	θ = 0°, ∅ = 0° Ta = 0°C V _{opr} = 5.0V	—	720	1100	ms
Response time (fall)	t _{off}		—	170	350	

D-2 Transflective type

Viewing angle : 6 o'clock (∅ = 0°), Ta = 25°C, V_{opr} = 4.75V, Backlight OFF

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Viewing angle	θ ₁	C ≥ 2.0 ∅ = 0°	—	—	-10	deg.
	θ ₂		50	—	—	
	θ ₂ - θ ₁		60	—	—	
Contrast	C	θ = 25°, ∅ = 0°	2	4	—	—
Response time (rise)	t _{on}	θ = 0° ∅ = 0°	—	270	400	ms
Response time (fall)	t _{off}		—	60	100	
Response time (rise)	t _{on}	θ = 0°, ∅ = 0° Ta = 0°C V _{opr} = 5.0V	—	720	1100	ms
Response time (fall)	t _{off}		—	170	350	

E. Recommended Operating Voltage

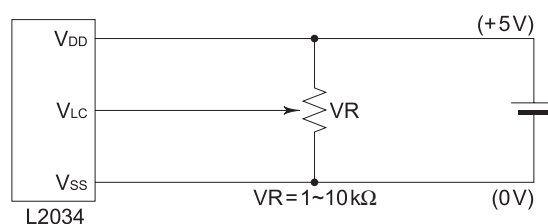
The recommended value of (V_{opr}) for an ambient temperature is as follows.

V_{opr} = V_{DD}-V_{LC}

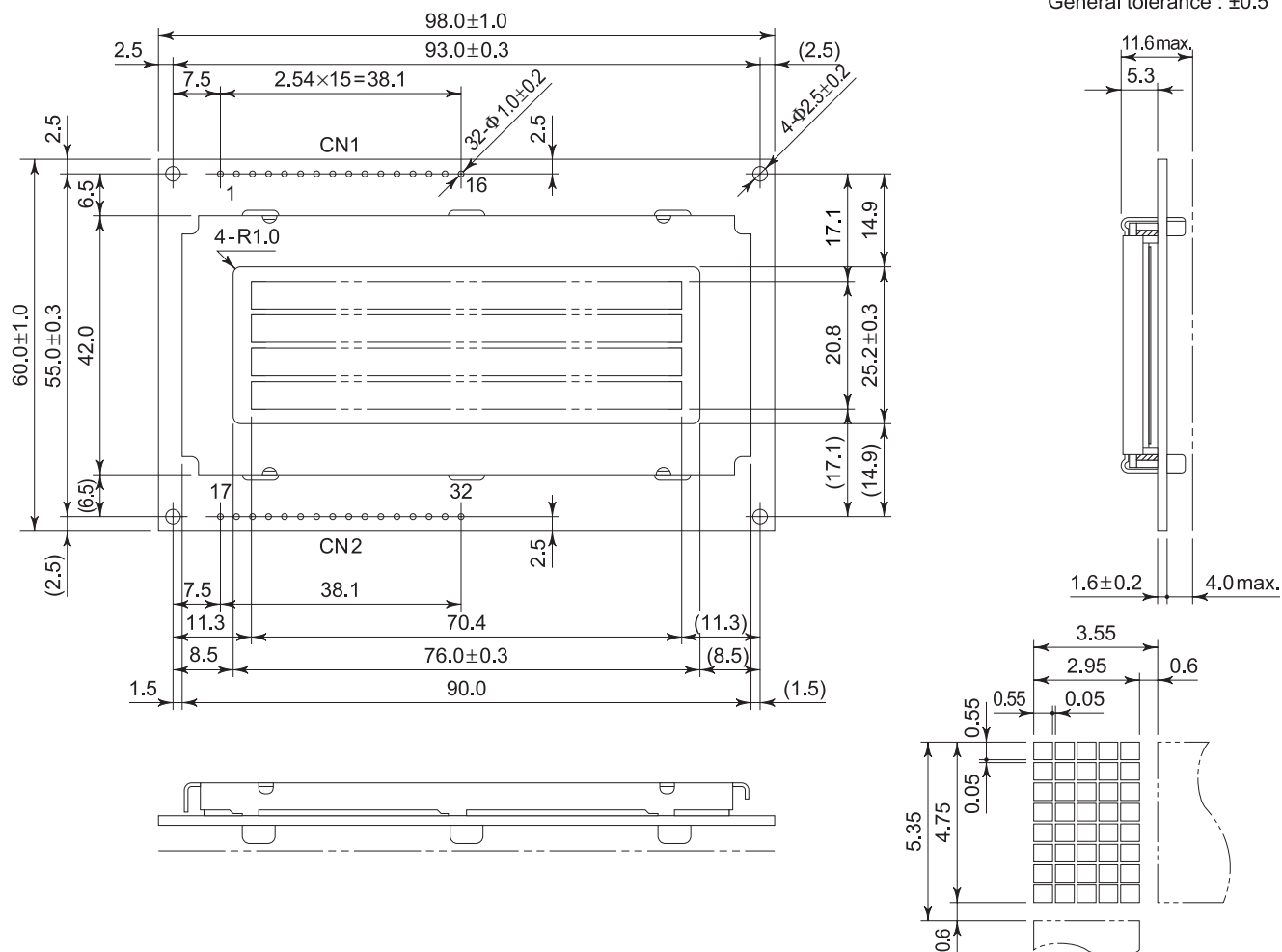
Temperature (°C)	0	25	50
V _{opr} (V)	5.00	4.75	4.50

■ STN Reflective type

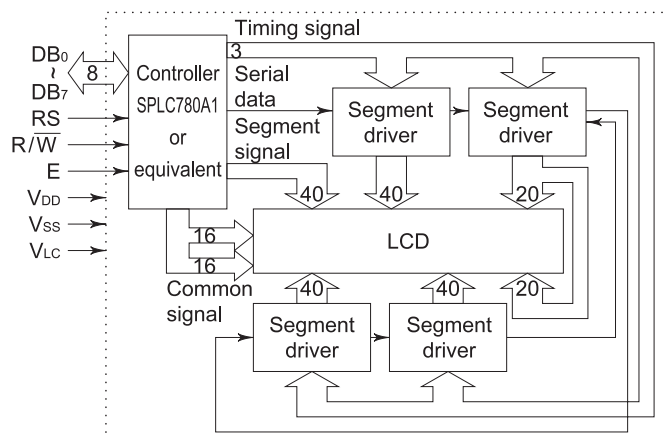
Item	L203400J000
Mechanical Characteristics	A
Absolute Maximum Ratings	B
Electrical Characteristics	C
Optical Characteristics	D-1
Recommended Operating Voltage	E

F-1 Power Supply**F-2 Dimensions**

Unit : mm

General tolerance : ± 0.5 **F-3 Pin Functions**

No.	No.	Name	Function
1	17	V _{SS}	GND
2	18	V _{DD}	Power supply voltage +5V
3	19	V _{LC}	Liquid crystal driving voltage
4	20	RS	L : Instruction code input H : Data input
5	21	R/W	L : Data write (LCM ← MPU) H : Data read (LCM → MPU)
6	22	E	Enable
7	23	DB ₀	Data bus line
8	24	DB ₁	Data bus line
9	25	DB ₂	Data bus line
10	26	DB ₃	Data bus line
11	27	DB ₄	Data bus line
12	28	DB ₅	Data bus line
13	29	DB ₆	Data bus line
14	30	DB ₇	Data bus line
15	31	NC	—
16	32	NC	—

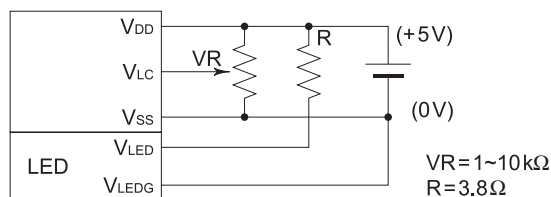
F-4 Block Diagram

L2034

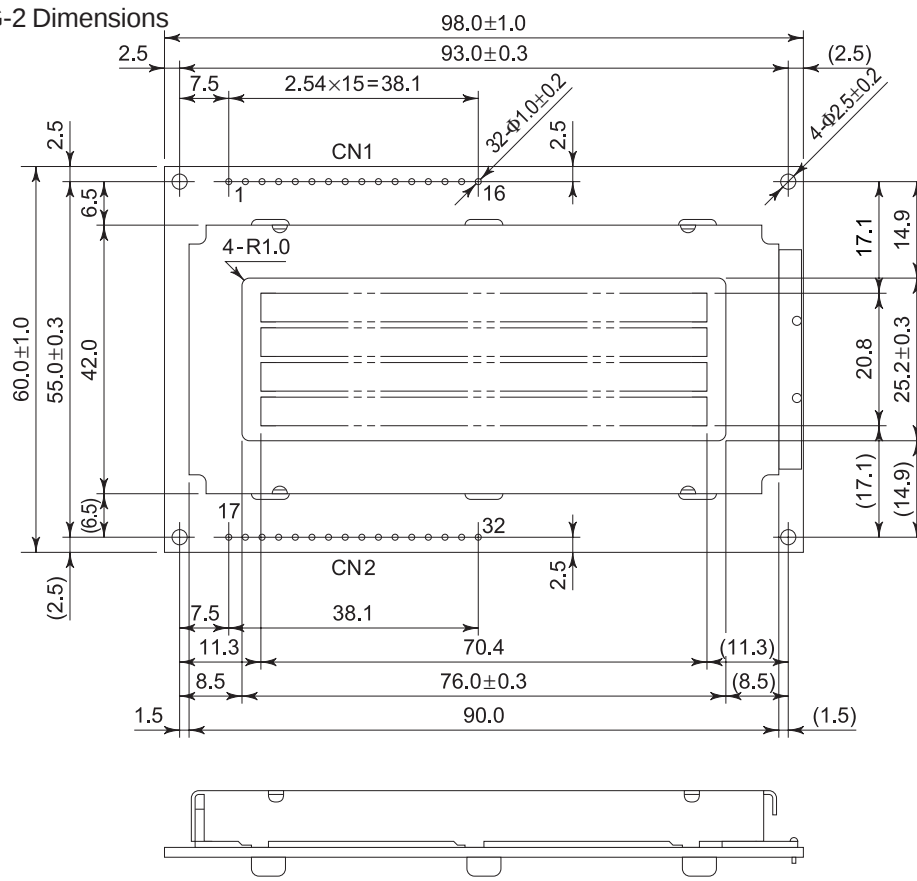
■ STN Transflective, Built-in LED Backlight type

Item	L2034B1J000
Mechanical Characteristics	A
Absolute Maximum Ratings	B
Electrical Characteristics	C
Optical Characteristics	D-2
Recommended Operating Voltage	E

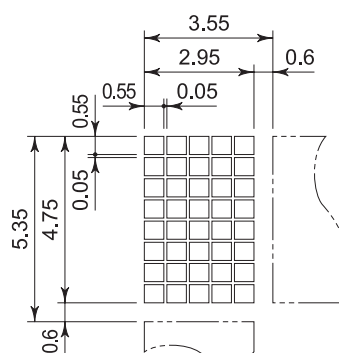
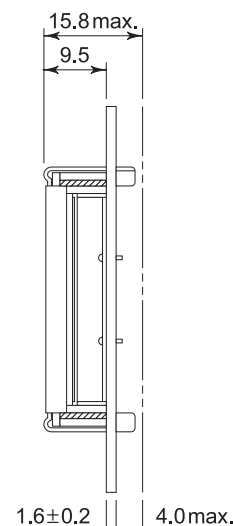
G-1 Power Supply



G-2 Dimensions



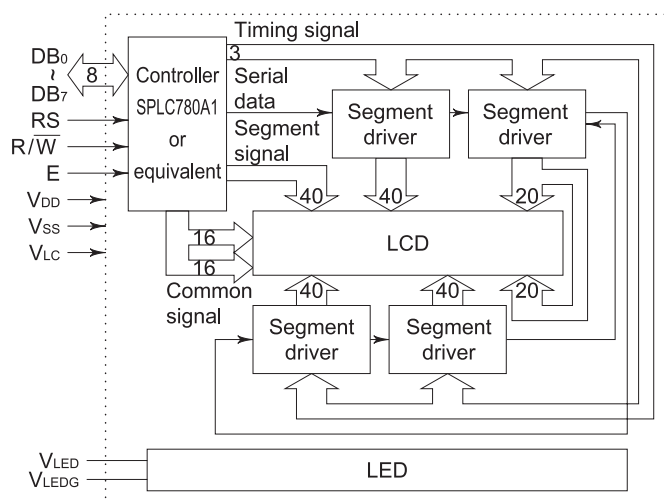
Unit : mm
General tolerance : ±0.5

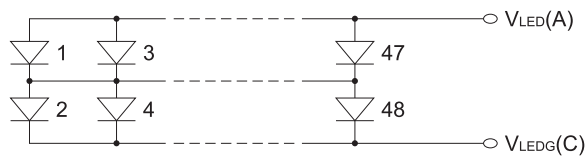


G-3 Pin Functions

No.	No.	Name	Function
1	17	VSS	GND
2	18	VDD	Power supply voltage +5V
3	19	VLC	Liquid crystal driving voltage
4	20	RS	L : Instruction code input H : Data input
5	21	R/W	L : Data write (LCM ← MPU) H : Data read (LCM → MPU)
6	22	E	Enable
7	23	DB0	Data bus line
8	24	DB1	Data bus line
9	25	DB2	Data bus line
10	26	DB3	Data bus line
11	27	DB4	Data bus line
12	28	DB5	Data bus line
13	29	DB6	Data bus line
14	30	DB7	Data bus line
15	31	VLED	Anode
16	32	VLEDG	Cathode

G-4 Block Diagram

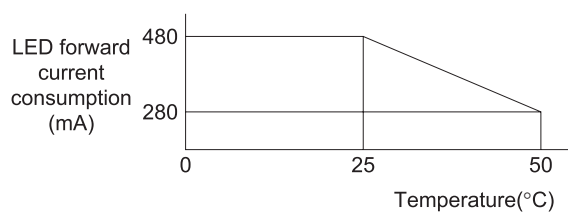


G-5 LED Backlight**G-5-1 LED Circuit Diagram****G-5-2 Absolute Maximum Ratings**

Ta = 25°C

Item	Symbol	Specifications	Unit
LED forward current consumption*	I _F	480	mA
LED reverse voltage	V _R	8	V
LED allowable dissipation	P _D	2.0	W

* LED forward current consumption and operating temperature characteristics are as follows.

**G-5-3 Electrical Characteristics**

Ta = 25°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
LED forward input voltage	V _F	I _F = 240mA	3.8	4.1	4.4	V
LED reverse current	I _R	V _R = 8V	—	—	2.4	mA

G-5-4 Optical Characteristics

Ta = 25°C

Item	Symbol	Conditions	Specifications	Unit
Surface brightness (panel upper side)	B _p	I _F = 240mA V _{opr} = 0V	4.5 min. 5 typ.	cd/m ²
LED brightness	L	I _F = 240mA	40 min. 50 typ.	cd/m ²
LED service life			50,000 typ.	h
LED color			Yellowgreen	