REV	E.C.N. NUMBER AND REVISION COMMENTS	DATE
A	ECN-Lumex202300099	08.29.23
B	ECN-Lumex202400014	04.03.24

1.80[0.071]

GREEN

RED

BLUE

1.80[0.071]

⑤ ③ ①

⑥ ④ IC ②

0.650[0.026]

6-0.350[0.014]

⑥ ④ ②

⑤ ③ ①

0.700[0.028]

6-0.500[0.020]

0.325[0.013]   0.325[0.013]
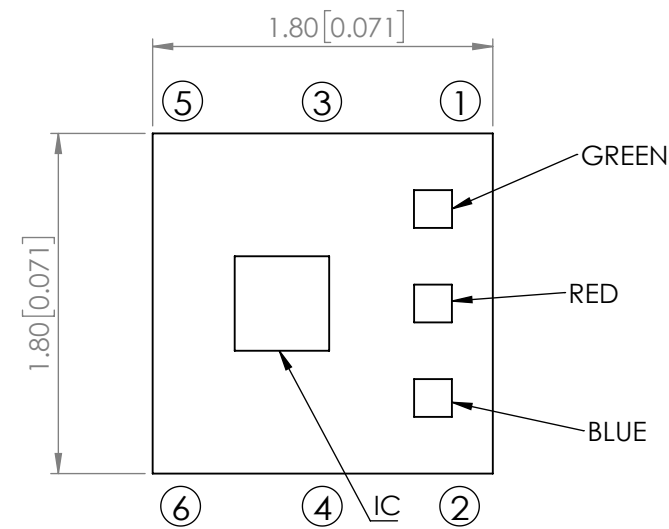
RECOMMENDED SOLDER PAD LAYOUT

0.700[0.028]   0.700[0.028]

6-0.550[0.022]

1.25[0.049]

0.400[0.016]   0.400[0.016]

0.350[0.014]

PIN ASSIMEMT

PIN	SYMBOL	DESCRIPTION
1	VDD	POWER VOLTAGE
2	GND	GROUND
3	CKO	CLOCK OUT
4	CKI	CLOCK IN
5	DAO	DATA OUT
6	DAI	DATA IN
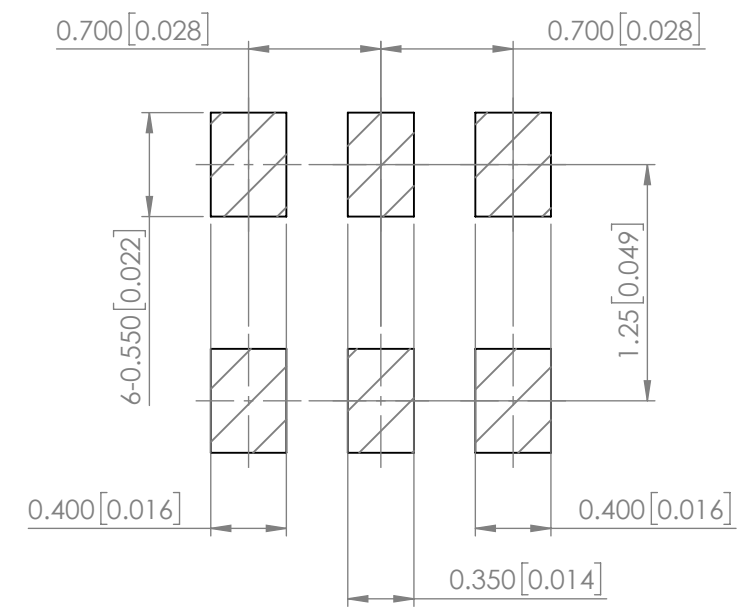
ELECTRICAL CHARACTERISTICS(Ta=25℃ , V$_{DD}$=5.0V)

PARAMETER		MIN	TYP	MAX	UNITS	TEST COND
SUPPLY VOLTAGE	V$_{DD}$	4.5	5	5.5	V	-
OUTPUT CURRENT (PER CHIP)	I$_{OL}$	-	20	-	mA	-
OPERATION CURRENT	I$_{DYN}$	-	-	1.2	mA	V$_{DD}$=5V RGB OFF
INPUT VOLTAGE(HIGH)	V$_{IH}$	2.7	-	V$_{DD}$+0.4	V	-
INPUT VOLTAGE(LOW)	V$_{IL}$	-0.4	-	1.0	V	-
PULL-UP RESISTANCE (CI , DI)	R$_{IN}$	-	80K	-	Ω	-
CI FREQUENCY	C$_{FREQ}$	-	-	15	MHz	-
CI HIGH PULSE WIDTH	T$_{CKH}$	30	-	-	ns	-
CI LOW PULSE WIDTH	T$_{CKL}$	30	-	-	ns	-
DI TO CI RISE SETUP	T$_{SETUP}$	10	-	-	ns	-
DI TO CI RISE HOLD	T$_{HOLD}$	5	-	-	ns	-
OUTPUT HIGH "H"	V$_{OH}$	4.5	-	-	V	4mA@VDD=5V
OUTPUT HIGH "L"	V$_{OL}$	-	-	0.4	V	4mA@VDD=5V

MOISTURE SENSITIVE DEVICE
PER JEDEC LEVEL 4 STANDARDS

*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN= +DECIMAL PRECISION / -0.00   MAX.= +0.00 / -DECIMAL PRECISION

1.8(L)*1.8(W)*0.65(H)mm, SURFACE MOUNT LED, RGB FULL COLOR, 13-BIT PWM FOR EACH OF RGB OUTPUTS, DUAL-WIRE LINES, WATER CLEAR LENS,TAPE & REEL

DATE : 2023.08.29	DRAWN BY : T.S.
PAGE : 1 OF 4	CHKD BY : E.C.
SCALE : NTF	APRVD BY : G.Y.
UNIT : mm [INCH]	(Pb)

ELECTRO-OPTICAL CHARACTERISTIC TA=25℃

PARAMETER		MIN	TYP	MAX	UNITS	TEST COND
PEAK WAVELENGTH	R	-	630	-	nm	@VDD=5V (DIMMING[4:0]=1F OUT_R/G/B[7:0]=FF)
	G	-	520	-		
	B	-	470	-		
LUMINOUS INTENSITY	R	-	425	-	mcd	
	G	-	1350	-		
	B	-	270	-		
VIEWING ANGLE		-	120	-	2x theta1/2	
EMITTED COLOR		RED / GREEN / BLUE				
EPOXY LENS FINISH		WATER CLEAR				

ABSOLUTE MAXIMUM RATINGS TA=25℃

| PARAMETER		MAX	UNITS
SUPPLY VOLTAGE	V_{DD}	6.5	V
LED FORWARD CURRENT (PER CHIP)	I_{OUT}	20	mA
POWER DISSIPATION	P_D	400	mW
STORAGE TEMPERATURE	-	-40 TO +90	℃
OPERATING TEMPERATURE	-	-25 TO +85	℃

*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN= $^{+DECIMAL\ PRECISION}_{-0.00}$ MAX.= $^{+0.00}_{-DECIMAL\ PRECISION}$

COMMAND SET

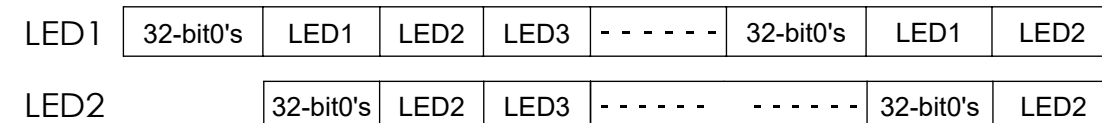| 32-bit0's | FLAG[2:0] | DIMMING[4:0] | BLUE[7:0] | GREEN[7:0] | RED[7:0] | FLAG[2:0] | ...... | ...... | FLAG[2:0] | DIMMING[4:0] | BLUE[7:0] | GREEN[7:0] | RED[7:0] | 32-bit 1 |
| SRART | | LED 1 | | | | | LED 2 | LED N-1 | | LED N | | | | End of frame |

32 consecutive 0's denote the start of a command for SMD-LX1818RGBDWCTR LED. After receiving 32 0's, SMD-LX1818RGBDWCTR gets the following 32 bits as the received command, including FLAG, DIMMING, BLUE, GREEN and RED fields.
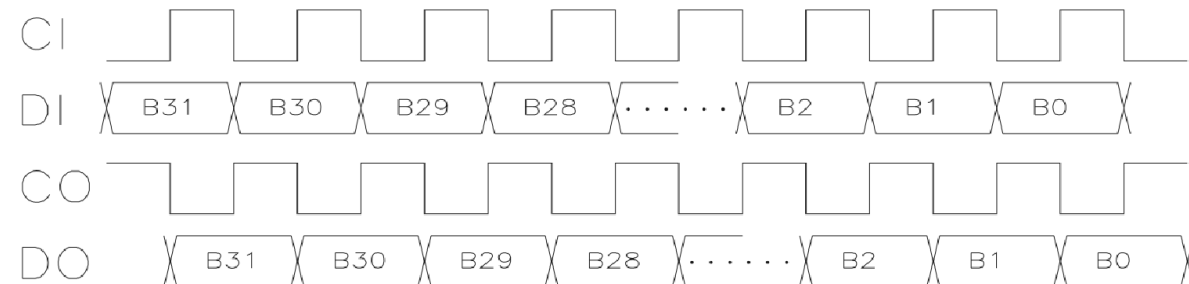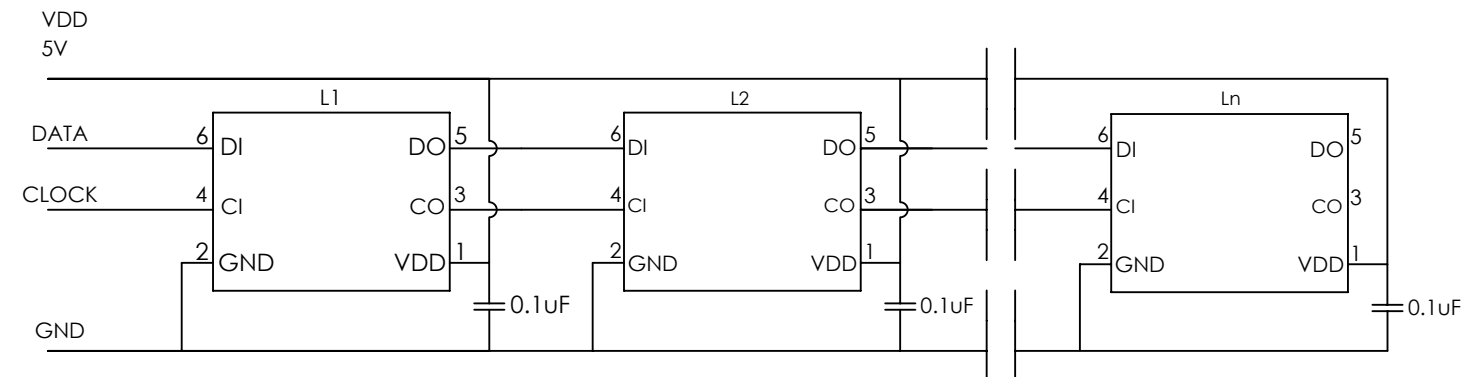

The serial command is transmitted with MSB first, DI is latched at the rising edge of CI clock. CO and DO are re-generated for the next SMD-LX1818RGBDWCTR LED. CO is inverted from CI. When 32 consecutive 0's are encountered, the next 1 is expected to start a 32-bit command, i.e., FLAG[2:0]=1xx. When FLAG[2:0]=1xx, then DIMMING,BLUE, GREEN and RED fields are latched respectively.
while the current 32-bit command is got,SMD-LX1818RGBDWCTR passes remaining command bits to the next SMD-LX1818RGBDWCTR After the last one command is issued for the last LED (LED n), the following 32 consecutive 1's denote the end of the current command for SMD-LX1818RGBDWCTR LED(End of Frame) and wait for next 32 consecutive 0's to start a new command set.(Note:SMD-LX1818RGBDWCTR is workable either with or without "End of Frame" command, but MCU should issue the extra N/2 numbers of clocks signal if there are N LEDs totally connected in the strip to make sure the data transfer and display of the last one LED is complete and correct)
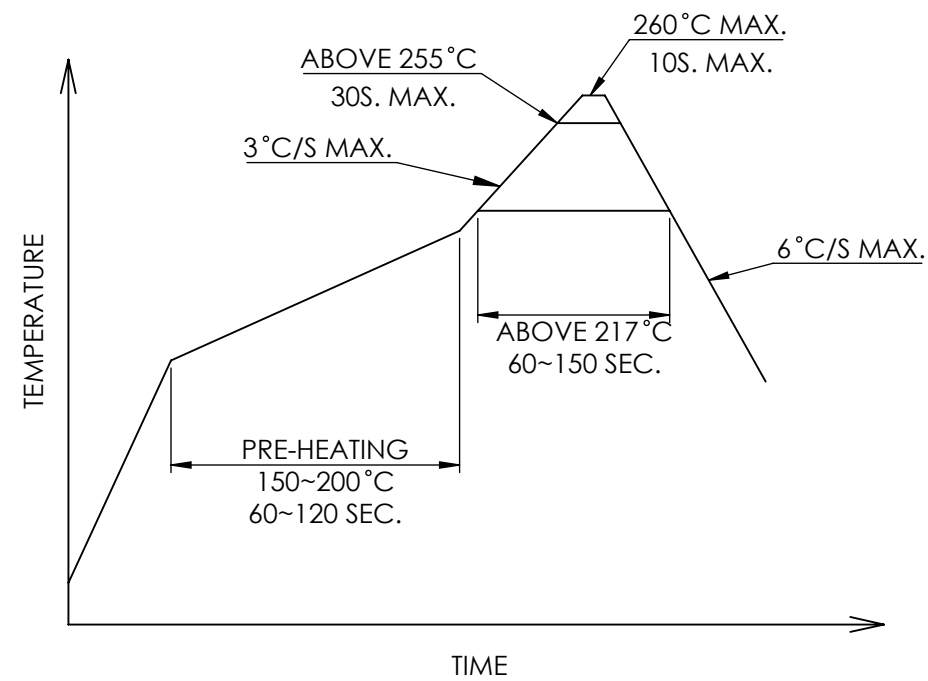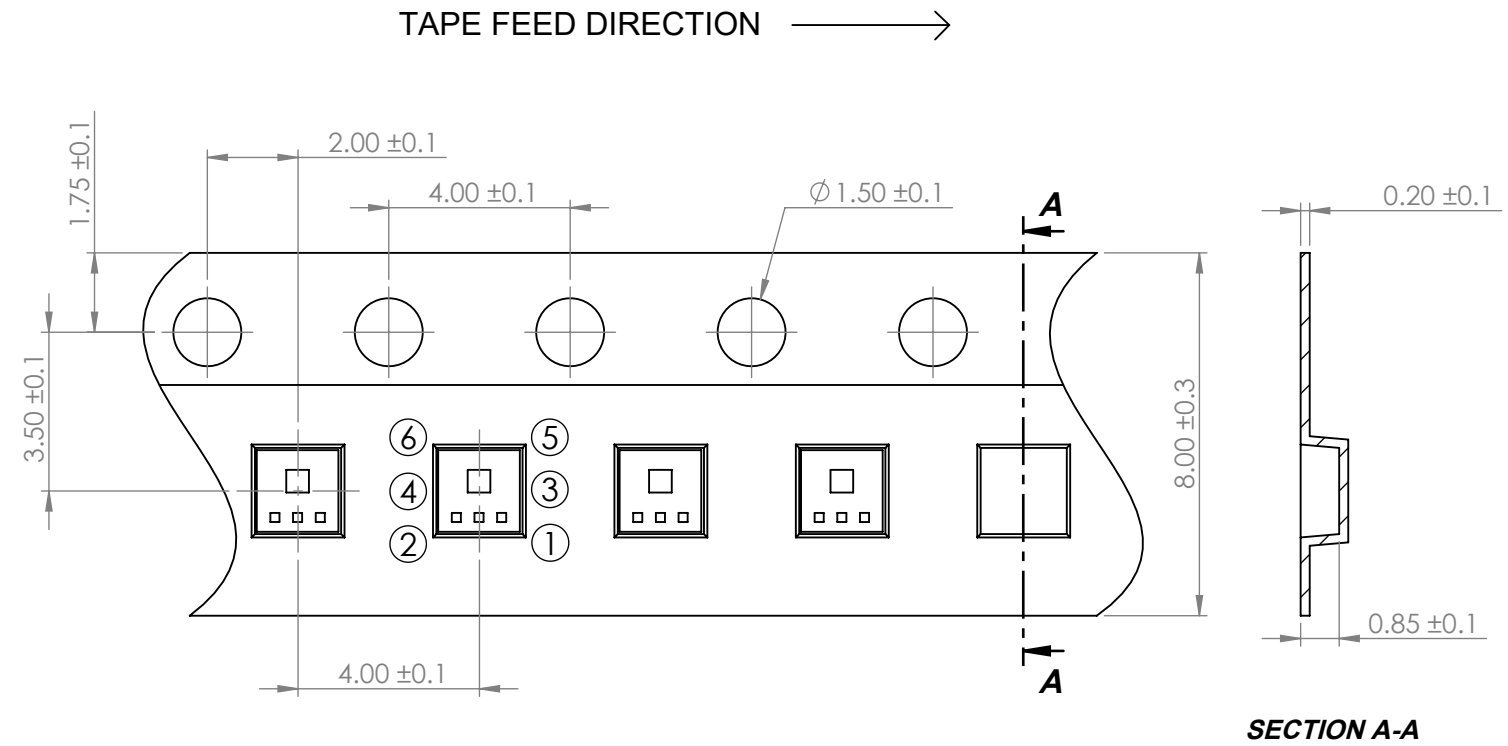
| LED1 | 32-bit0's | LED1 | LED2 | LED3 | - - - - - - | 32-bit0's | LED1 | LED2 |

| LED2 | | 32-bit0's | LED2 | LED3 | - - - - - - | - - - - - - | 32-bit0's | LED2 |

FLAG [2:0] : 1xx to start a 32-bit command
DIMMING [4:0]   : 32-level current control for R/G/B drivers
BLUE [7:0]   : 256 gray levels for blue LED
GREEN [7:0]   : 256 gray levels for green LED
RED [7:0] : 256 gray levels for red LED

5V APPLICATION CIRCUIT

LUMEX® Creating LED and LCD Solutions Together™	425 N. GARY AVE. CAROL STREAM, IL 60188 PHONE : 800-278-5666 FAX : 630-315-2150 WEB : WWW.LUMEX.COM	1.8(L)*1.8(W)*0.65(H)mm, SURFACE MOUNT LED, RGB FULL COLOR, 13-BIT PWM FOR EACH OF RGB OUTPUTS, DUAL-WIRE LINES, WATER CLEAR LENS,TAPE & REEL

DATE : 2023.08.29	DRAWN BY : T.S.
PAGE : 3 OF 4	CHKD BY : E.C.
SCALE : NTF	APRVD BY : G.Y.
UNIT : mm [INCH]	(Pb)

PROFILE

260°C MAX.
10S. MAX.

ABOVE 255°C
30S. MAX.

3°C/S MAX.

6°C/S MAX.

ABOVE 217°C
60~150 SEC.

TEMPERATURE

PRE-HEATING
150~200°C
60~120 SEC.

TIME

CARRIER TAPE DIMENSION

TAPE FEED DIRECTION ⟶

2.00 ±0.1

4.00 ±0.1

Ø 1.50 ±0.1

1.75 ±0.1

3.50 ±0.1

8.00 ±0.3

4.00 ±0.1

A

A

0.20 ±0.1

0.85 ±0.1

SECTION A-A

NOTE:
1. PACKAGE: 2000 PCS/REEL.

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