


**LPH-13216-27**
**LED PRINTHEAD**

## 1. Description

LPH-13216-27 is an LED imaging device which is used to illuminate a moving photoreceptor within an electronic printer.

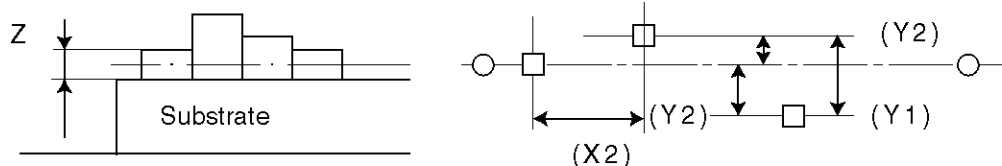
It has 2560 bit Driver ICs which consist of shift register, load, strobe and output driver.

It has an effective printing width of 8.31 inches, a resolution of 300 dot per inch and can perform high-speed and high reliable printing.

## 2. Mechanical Characteristics (refer to Fig. LPH13216270-00010-C1) (Ta=25°C)

No.	Item	Ratings
(1)	Active Length	216.576 ± 0.3mm
(2)	Number of Emitters	2560 dots
(3)	Emitter Size	48 × 40μm ± 5
(4)	Emitter Pitch	84.6μm
(5)	Emitter Location Error X1 (chip to chip) (inside a chip)	± 20μm ± 5μm
(6)	Emitter Y Direction Error Y1 (chip to chip) Emitter Lincarity YL (along LED chips)	Max. 25μm 200μm
(7)	Emitter Height Lincarity (ZL)	Max. 150μm (flatness)
(8)	LED Array Distance from origin Holes (refer to under drawing)	X2=18.712 ± 0.3mm Y2=0.0 ± 0.2mm Z=0.31 ± 0.1mm
(9)	Dimensions	262 <sup>L</sup> × 16 <sup>w</sup> × 18 <sup>H</sup> mm
(10)	Head Weight	approx. 100gr

—	150 μm
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### 3. Optical Characteristics (Ta=20°C)

Item	Sym.	Min	Typ	Max	Unit	Remarks
Light Wavelength	$\lambda_p$	730	740	750	nm	head to head
Light Output (Po MEAN)	Po MEAN	0.59	0.85	1.1	$\mu\text{W}/\text{dot}$	head average ( $\pm 30\%$ )
Light Output Uniformity (Intensity)	$\Delta\text{Po}$	0		$\pm 30$	%/head	Head Overall (2560 LED)
Light Wavelength vs Temperature			+0.2		nm/°C	Peak Wavelength

### 4. Electrical Characteristics

#### 4-1 Electrical Circuit

Item	Summary
(1) Equivalent Circuit	refer to Fig. LPH13216270-00010-C2
(2) Timing Chart	refer to Fig. LPH13216270-00010-C3
(3) Switching characteristics	refer to Item 5
(4) Data Transfer Method	1 input serial transfer
(5) Input Data Rate Per Line	10 MHz Max
(6) Inputs	Data ; Bits 1-2560
	LOAD ; End of Line (Active "H")
	Clock ; 10 MHz Negative edge
	$\overline{\text{STROBE}}$ ; LEDs ON Control (Active "L") 4 Line (640×4)
	Power ; $\pm 0.25$ V DC 4.4 A Peak 640 LEDs ON
(7) Interface (Pin Assignment)	refer to Fig. LPH13216270-00010-C1

#### 4-2 Absolute Maximum Ratings (Ta=25 ± 2°C Vss=0V)

Item	Sym.	Conditions	Min	Typ	Max	Unit	Remarks
Supply Voltage	V <sub>DD</sub>		- 0.3		6.0	V	
Input Voltage	V <sub>IN</sub>		- 0.3		V <sub>DD</sub> + 0.3	V	
LED Junction Temperature	T <sub>J</sub>				80	°C	
Head Temperature	T <sub>H</sub>				50	°C	AL base surface of the head

#### 4-3 Recommended operating Conditions (at Vss=0V, Ta=25±2°C)

Item	Sym.	Conditions	Min	Typ	Max	Unit	Remarks
Supply Voltage	V <sub>DD</sub>		4.75	5.0	5.25	V	
Clock Frequency	f( $\phi$ )	V <sub>DD</sub> =5V			10	MHz	
Clock Duty	tw	V <sub>DD</sub> =5V	45	50	55	%	
"H" Level Input Voltage	V <sub>IH</sub>	V <sub>DD</sub> =5V	2.0		V <sub>DD</sub>	V	
"L" Level Input Voltage	V <sub>IL</sub>		V <sub>SS</sub>		0.8	V	

**4-4 Electrical Characteristics (Ta=25 ± 2°C, VDD=5V, VSS=0V)**

Item	Sym.	Conditions	Min	Typ	Max	Unit	Remarks
"H" Level Input Voltage	V <sub>IH</sub>	—	2.0		V <sub>DD</sub>	V	every input
"L" Level Input Voltage	V <sub>IL</sub>	—	0		0.8	V	every input
"H" Level Input Current	I <sub>IH1</sub>	V <sub>IL</sub> =V <sub>SS</sub>			1.0	μA	DATA
	I <sub>IH2</sub>	V <sub>IL</sub> =V <sub>SS</sub>			1.0	μA	CLK, LOAD
	I <sub>IH3</sub>	V <sub>IL</sub> =V <sub>SS</sub>			10	μA	$\overline{\text{STB}}$
"L" Level Input Current	I <sub>IL1</sub>	V <sub>IL</sub> =V <sub>SS</sub>			-1.0	μA	DATA
	I <sub>IL2</sub>	V <sub>IL</sub> =V <sub>SS</sub>	-80	-250	-500	μA	$\overline{\text{STB}}$
	I <sub>IL3</sub>	V <sub>IL</sub> =V <sub>SS</sub>	—	—	-1.0	μA	CLK
	I <sub>IL4</sub>	V <sub>IL</sub> =V <sub>SS</sub>			-1.0	μA	LOAD
"H" Level Output Current	I <sub>OH</sub>		-3.5	-5.0	-6.7	mA/dot	
Supply Current	I <sub>DD</sub>	f(φ)=10MHz			300	mA	Out put off
Peak	I <sub>DD</sub>	f(φ)=10MHz	2.4	3.6	4.4	A	All LEDs ON (640 dots on)
Average	I <sub>DD</sub>	f(φ)=10MHz				A	$\overline{\text{STB}}$ duty % Max

**5. Switching Characteristics**

Parameter	Symbol	Ratings			Unit	Remarks
		Min	Typ	Max		
CLOCK Frequency	f(φ)	—	—	10	MHz	
CKOCK Rise / Fall Time	t <sub>cr</sub>	—	—	35	ns	
	t <sub>cf</sub>	—	—	35	ns	
LOAD Rise / Fall Time	t <sub>lr</sub>	—	—	35	ns	
	t <sub>lf</sub>	—	—	35	ns	
Data Setup Time	t <sub>sc</sub>	30	—	—	ns	
Data Hold Time	t <sub>hold</sub>	10	—	—	ns	
CLOCK → LOADH Setup Time	t <sub>sl</sub>	50	—	—	ns	
LOAD Signal Pulse Width	t <sub>wL</sub>	40	—	—	ns	
LOAD → $\overline{\text{STROBE}}$ Setup Time	t <sub>ls</sub>	200	—	—	ns	
$\overline{\text{STROBE}}$ → DO Propagation Delay Time	t <sub>psr</sub>	—	—	250	ns	
	t <sub>psf</sub>	—	—	250	ns	

## Conditions

- (1) V<sub>SS</sub> = 0V
- (2) V<sub>DD</sub> = 5V
- (3) Ta = 25°C ± 2°C

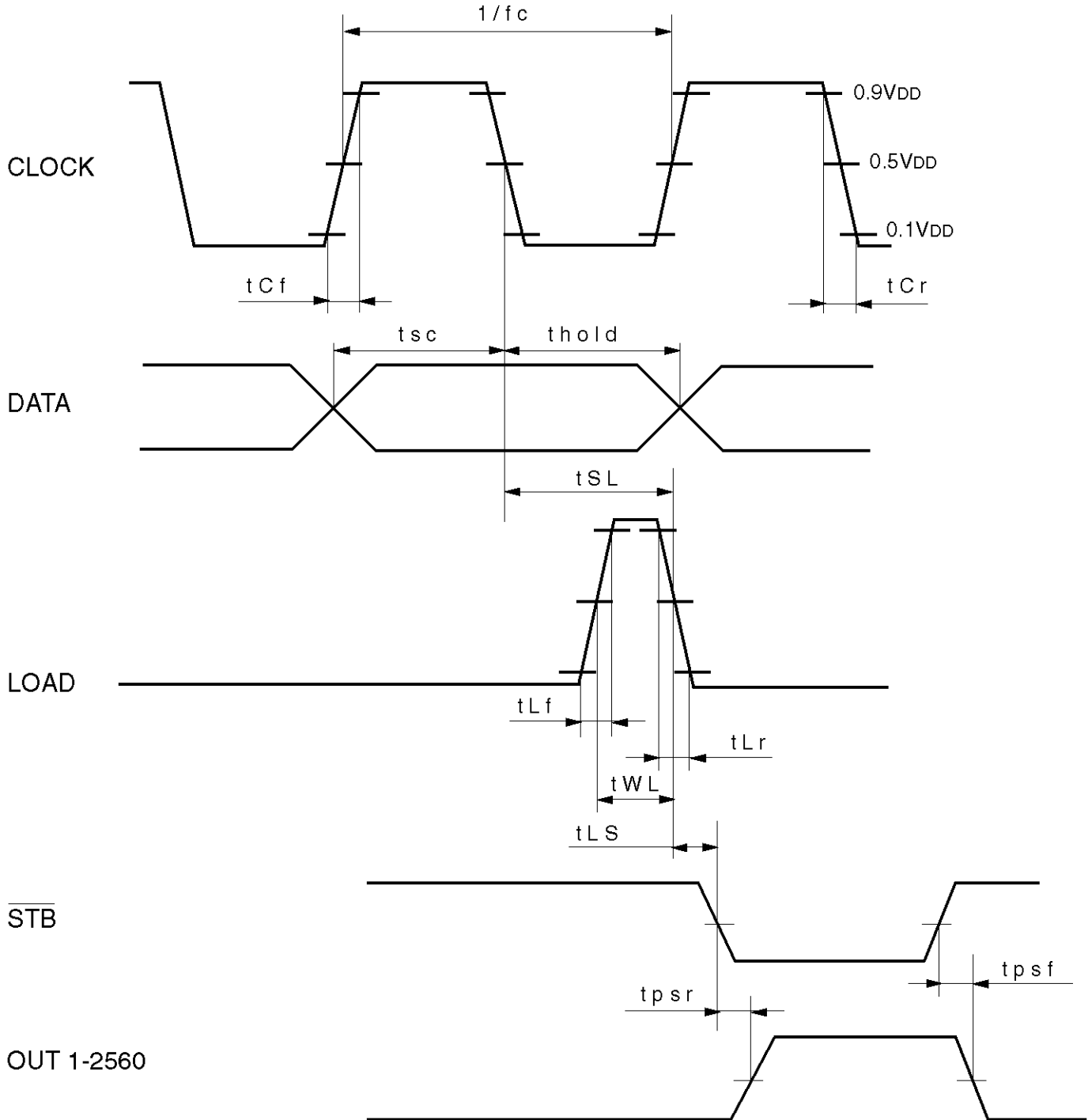
## 6. Enviromental Performance

Item	Guarantee Range
(1) Operating Temperature	5 to 40°C
(2) Operating Humidity	10 to 90 % RH (No Condensation and a max wet bulve temperature of 30°C)
(3) Storage Temperature	-25 to 70°C
(4) Storage Humidity	10 to 90 % RH (No Condensation)

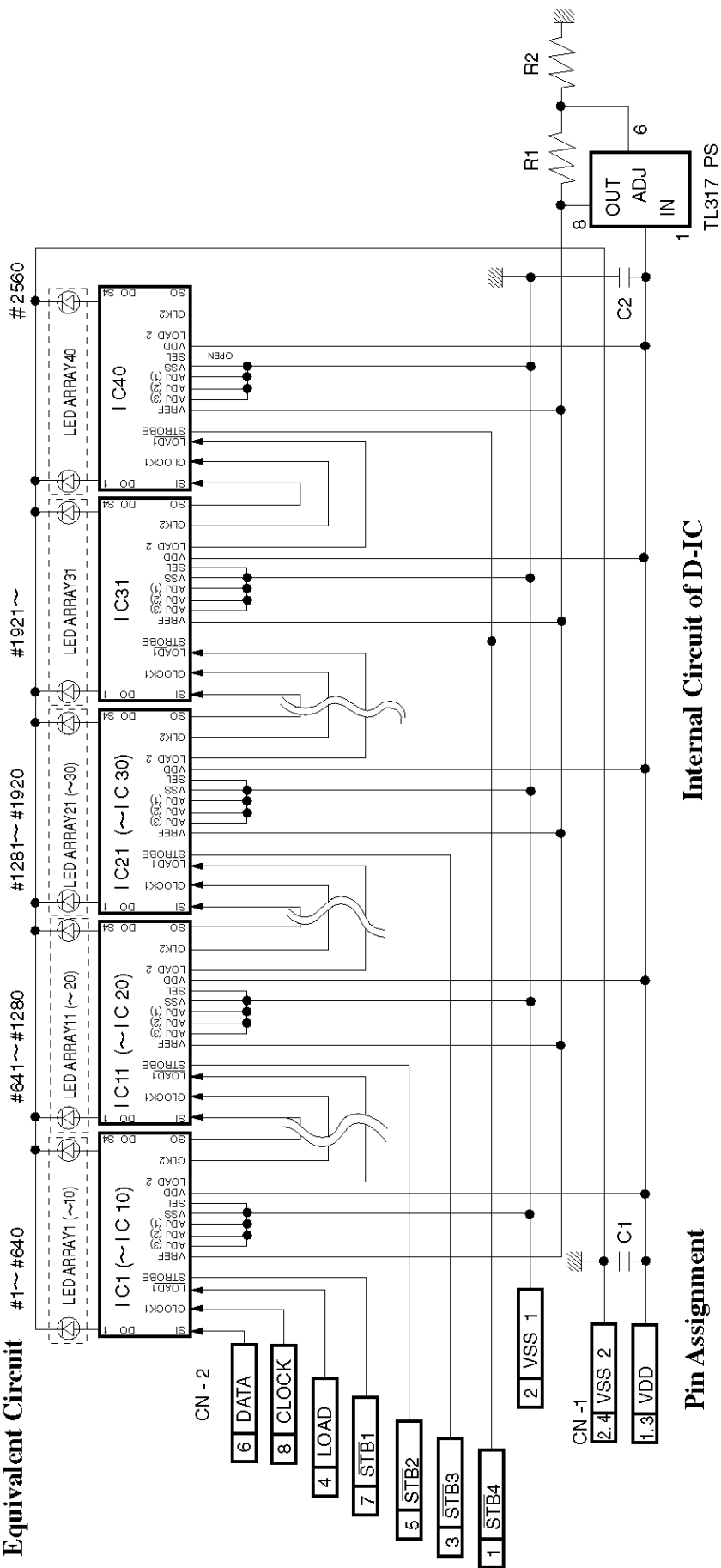
## 7. Life

- (1) Operating Conditions  
LED ON Duty Cycle/Line 10% MAX
- (2) Judgement Criteria  
The point where the minimum light output declines 10% from the initial value.
- (3) Life (LED on time)  
100 hours min

Timing Chart



**Equivalent Circuit**



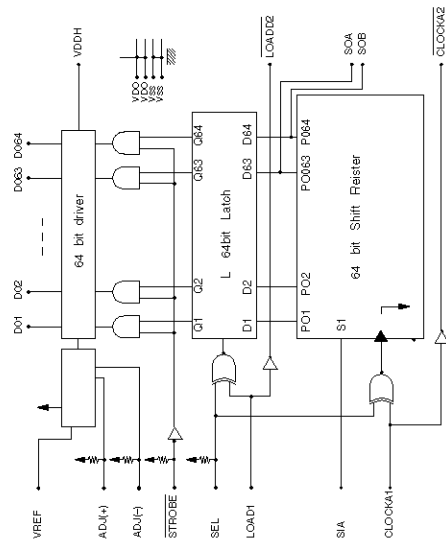
**Pin Assignment**

CN-1		CN-2	
	Signal		Signal
1	V <sub>DD</sub>	1	STB 4
2	V <sub>SS</sub> 2	2	V <sub>SS</sub> 1
3	V <sub>DD</sub>	3	STB 3
4	V <sub>SS</sub> 2	4	LOAD
		5	STB 2
		6	DATA
		7	STB 1
		8	CLOCK

CN-1 : DF11-4DP-2DSA (HIROSE)

CN-2 : DF11-8DP-2DSA (HIROSE)

**Internal Circuit of D-IC**





 **CAUTION**

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## Precautionary instructions in handling gallium arsenic products

Special precautions must be taken in handling this product because it contains, gallium arsenic, which is designated as a toxic substance by law. Be sure to adhere strictly to all applicable laws and regulations enacted for this substance, particularly when it comes to disposal.

Manufactured by ; **Tottori SANYO Electric Co., Ltd.**

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