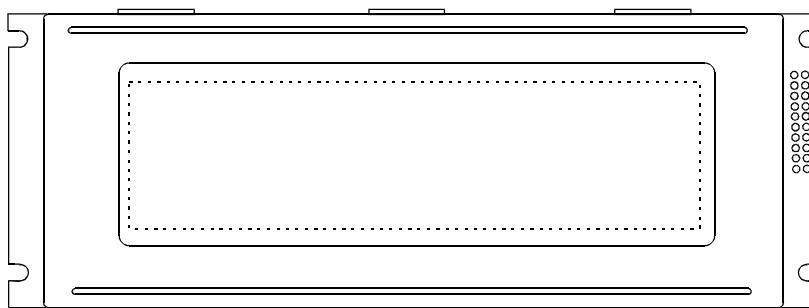




# PRODUCT SPECIFICATION

## HDM64GS24-2

240 x 64 GRAPHICS  
LCD DISPLAY MODULE



|   |       |       |                    |                   |
|---|-------|-------|--------------------|-------------------|
| <b>HANTRONIX, INC.</b><br>10080 BUBB RD.<br>CUPERTINO, CA 95014 | Q.A.: | REV.: | <b>HDM64GS24-2</b> | SHEET 1 OF 9      |
|   | JB    | 1.0   |                    | DATE:<br>12/15/97 |

## 2. Features

| Item              | Specifications      |
|-------------------|---------------------|
| Number of dots    | 240(W) * 64(H) DOTS |
| Duty              | 1 / 64              |
| BIAS              | 1 / 9               |
| Type              | STN-Positive        |
| Display mode      | Transflective-Gray  |
| Viewing direction | 6H                  |
| Input data        | Serial              |
| Backlight         | EL (WHITE)          |

## 3. Mechanical specifications

| Item              | Specifications                   | Unit |
|-------------------|----------------------------------|------|
| Outline dimension | 180.0(W) * 75.0(H) * 15.0 MAX(T) | mm   |
| Viewing area      | 134.0(W) * 40.4(H)               | mm   |
| Active area       | 127.16(W) * 33.88(H)             | mm   |
| Dot size          | 0.49(W) * 0.49(H)                | mm   |
| Dot pitch         | 0.53(W) * 0.53(H)                | mm   |

|   |       |       |                    |                |
|---|-------|-------|--------------------|----------------|
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## 2.Features

| I t e m           | S p e c i f i c a t i o n s |
|-------------------|-----------------------------|
| Number of dots    | 240(W) * 64(H) DOTS         |
| Duty              | 1 / 64                      |
| BIAS              | 1 / 9                       |
| Type              | STN-Positive                |
| Display mode      | Transflective-Grey          |
| Viewing direction | 6H                          |
| Input data        | Parallel                    |
| Backlight         | LED                         |

## 3.Mechanical specifications

| I t e m           | S p e c i f i c a t i o n s      | Unit |
|-------------------|----------------------------------|------|
| Outline dimension | 180.0(W) * 65.0(H) * 15.0 MAX(T) | mm   |
| Viewing area      | 134.0(W) * 40.4(H)               | mm   |
| Active area       | 127.16(W) * 33.88(H)             | mm   |
| Dot size          | 0.49(W) * 0.49(H)                | mm   |
| Dot pitch         | 0.53(W) * 0.53(H)                | mm   |

|   |       |       |                    |                   |
|---|-------|-------|--------------------|-------------------|
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#### 4. Maximum rating

| Item                  |           | Symbol  | Min  | Max     | Unit | Note |
|-----------------------|-----------|---------|------|---------|------|------|
| Supply voltage        | Logic     | Vdd-Vss | -0.3 | 7.0     | V    | —    |
|                       | LCD drive | Vdd-Vee | 0    | 20      | V    | —    |
| Input voltage         |           | Vi      | -0.3 | Vdd+0.3 | V    | —    |
| Operating temperature |           | Topr    | -10  | 70      | °C   | —    |
| Storage temperature   |           | Tstg    | -30  | 70      | °C   | —    |
| Humidity              |           | Hd      | —    | 90      | %RH  | 1    |

Note:1.No dew to be found.

#### 5. Dc Electrical characteristics

(Vdd=+5V±10%,Vss=0V,Ta=25°C)

| Item                |       | Symbol | Condition | Min.    | Typ  | Max. | Unit |
|---------------------|-------|--------|-----------|---------|------|------|------|
| Supply voltage      | Logic | Vdd    | —         | 4.75    | —    | 5.25 | V    |
| "H" input voltage   |       | Vih    | —         | Vdd-2.2 | —    | Vdd  | V    |
| "L" input voltage   |       | Vil    | —         | 0       | —    | 0.8  | V    |
| "H" output voltage  |       | Voh    | —         | Vdd-0.3 | —    | Vdd  | V    |
| "L" output voltage  |       | Vol    | —         | 0       | —    | 0.3  | V    |
| Supply current      |       | Iop    | Vdd=5v    | —       | 13.8 | 25.0 | mA   |
| LCD driving voltage |       | Vlcd   | Vdd-Vo    | 13.2    | 13.6 | 14.0 | V    |

|   |       |       |                    |              |
|---|-------|-------|--------------------|--------------|
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|   | JB    | 1.0   |                    | DATE:        |

6.Ac Electrical characteristics  
Read cycle

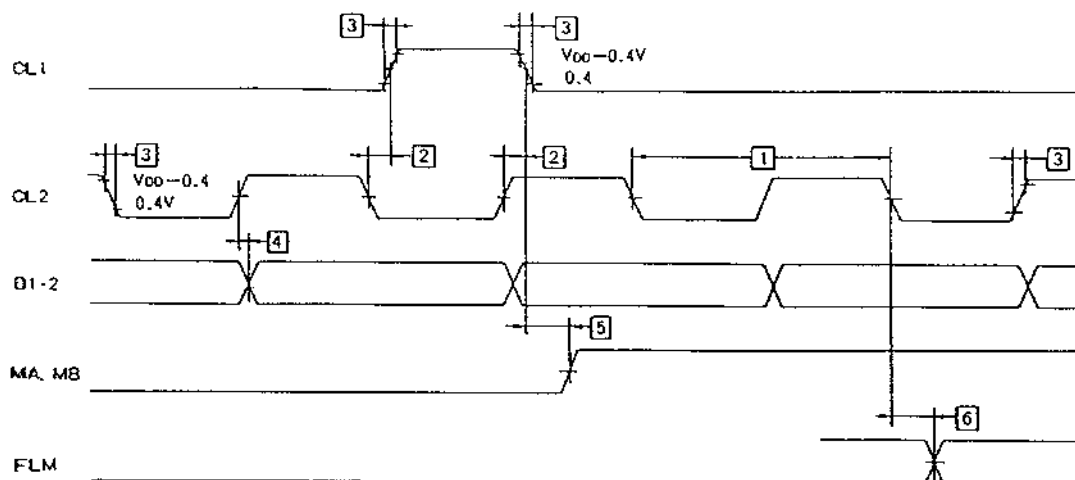
(V<sub>dd</sub>=+5V±10%,V<sub>ss</sub>=0V,T<sub>a</sub>=25°C)

| Item  | Symbol  | Conditions | Min. | Max. | Unit |
|---|---|------------|------|------|------|
| C/D Set up time   | t <sub>CDS</sub>                                  | —          | 100  | —    | ns   |
| C/d Hold time   | t <sub>CDH</sub>                                  | —          | 10   | —    | ns   |
| $\overline{CE}$ , $\overline{RD}$ , $\overline{WR}$ Pulse width | t <sub>CE</sub> ,t <sub>RD</sub> ,t <sub>WR</sub> | —          | 80   | —    | ns   |
| Access time   | t <sub>ACC</sub>                                  | —          | —    | 150  | ns   |
| Output hold time  | t <sub>OH</sub>                                   | —          | 10   | 50   | ns   |

Write cycle

| Item  | Symbol  | Conditions | Min. | Max. | Unit |
|---|---|------------|------|------|------|
| C/D Set up time   | t <sub>CDS</sub>                                  | —          | 100  | —    | ns   |
| C/D Hold time   | t <sub>CDH</sub>                                  | —          | 10   | —    | ns   |
| $\overline{CE}$ , $\overline{RD}$ , $\overline{WR}$ Pulse width | t <sub>CE</sub> ,t <sub>RD</sub> ,t <sub>WR</sub> | —          | 80   | —    | ns   |
| Data set up time  | t <sub>DS</sub>                                   | —          | 80   | —    | ns   |
| Data hold time  | t <sub>DH</sub>                                   | —          | 40   | —    | ns   |

## 7. Timing characteristics

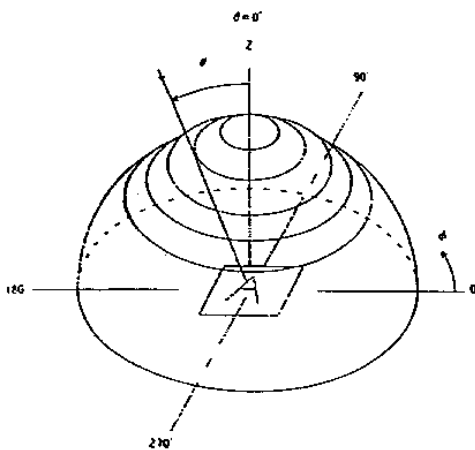


|   |       |       |                    |                   |
|---|-------|-------|--------------------|-------------------|
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## 9. Optical characteristics

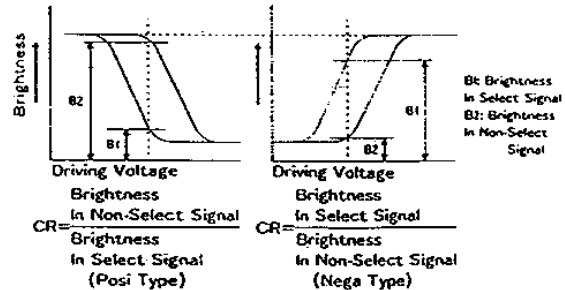
| Parameter   | Symbol          | Temperature (°C) | Standard |      |      | Unit   |
|---|-----------------|------------------|----------|------|------|--------|
|   |                 |                  | Min      | Typ  | Max  |        |
| Driving Voltage<br>V <sub>op</sub><br>V <sub>dd</sub> -V <sub>lcd</sub> | V <sub>op</sub> | 0                | 9.5      | 10.0 | 10.5 | V      |
|   |                 | >5               | 8.8      | 9.3  | 9.8  |        |
|   |                 | >10              | 8.5      | 9.0  | 9.5  |        |
| Response time   | T <sub>r</sub>  | 0                | -        | 450  | 650  | ms     |
|   |                 | >5               | -        | 150  | >50  |        |
|   | T <sub>f</sub>  | 0                | -        | 1200 | >200 |        |
|   |                 | >5               | -        | >50  | 400  |        |
| Frame frequency   | F <sub>f</sub>  |                  |          | 64   | Hz   |        |
| Viewing angle range   | θ y1            | 25               | -40      |      |      | Degree |
|   | θ y2            |                  | 40       |      |      |        |
|   | θ x1            |                  | 40       |      |      |        |
|   | θ x2            |                  | -30      |      |      |        |
| Contrast  | K               | 25               |          | 5    |      |        |

Ⓐ Definition of Viewing Angle  $\theta$  and  $\phi$

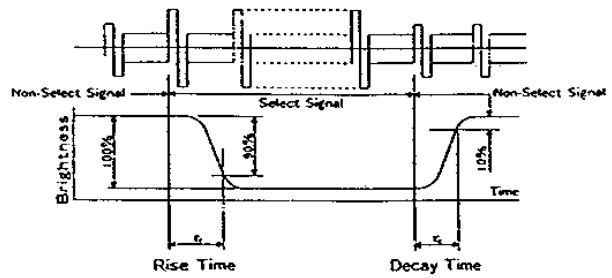


Definition of the viewing direction by the inclination THETA and the azimuth PHA (For reference axis see sub-clause 4.3 of Essential Ratings and characteristics.)

Ⓑ Definition of Contrast Ratio (CR)



Ⓒ Definition of Optical Response Time



In case of Negative type, wave form of changing brightness becomes reverse. (Non-Select Signals: 0%, Select Signals: 100%)

HANTRONIX, INC.  
10080 BUBB RD.  
CUPERTINO, CA 95014

Q.A.:  
JB

REV.:  
1.0

HDM64GS24-2

SHEET 7 OF 9  
DATE: 12/15/97

1 O.EL Backlight characteristics  
 10-1. Maximum ratings

| Item                  | Symbol           | Maximum | Unit             |
|-----------------------|------------------|---------|------------------|
| Supply voltage        | V <sub>max</sub> | 150     | V <sub>rms</sub> |
| Supply frequency      | F <sub>max</sub> | 1000    | Hz               |
| Operating temperature | T <sub>opr</sub> | -20~+50 | °C               |
| Operating humidity    | H <sub>opr</sub> | 90      | %RH.             |
| Storage temperature   | T <sub>stg</sub> | -40~+60 | °C               |
| Storage humidity      | H <sub>stg</sub> | 70      | %RH.             |

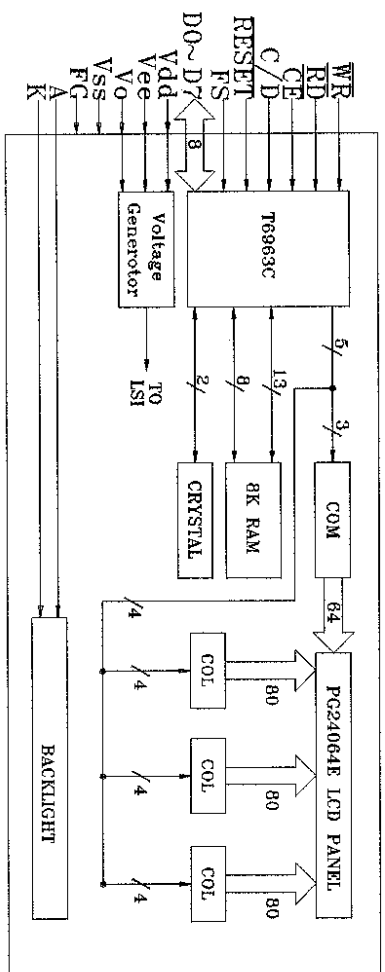
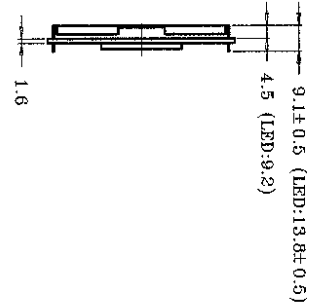
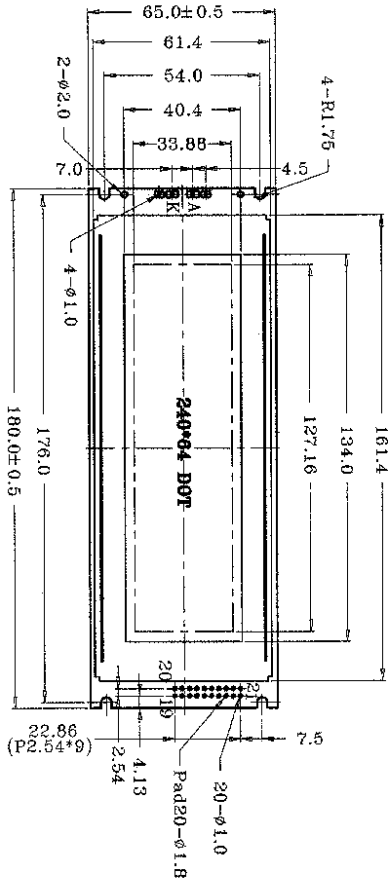
10-2. Using specification

| Item              | Specification | Unit             |
|-------------------|---------------|------------------|
| Operating voltage | 100           | V <sub>rms</sub> |
| Frequency         | 400           | Hz               |

10-3. Electrical characteristics

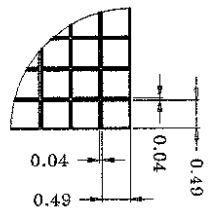
| Item                 | Condition             | Unit               | Min   | Typ  | Max |
|----------------------|-----------------------|--------------------|-------|------|-----|
| Initiate intensity   | (sinewave)<br>VAC 100 | cd/m <sup>2</sup>  | 71    | 72.9 | —   |
| CIE color coordinate | V <sub>rms</sub>      |                    | 0.31  |      |     |
|                      |                       |                    | 0.43  |      |     |
| Current density      | Freq 400              | mA/cm <sup>2</sup> | 0.174 |      |     |
| Power density        | Hz                    | mW/cm <sup>2</sup> | —     |      |     |
| Color                |                       |                    | WHITE |      |     |





The tolerance unless classified ±0.3mm

SCALE:10/1



| PIN NO. | SIGNAL |
|---------|--------|
| 1       | FG     |
| 2       | VSS    |
| 3       | Vdd    |
| 4       | V0     |
| 5       | WR     |
| 6       | RD     |
| 7       | CE     |
| 8       | C/D    |
| 9       | Vcc    |
| 10      | RESET  |
| 11      | DB0    |
| 12      | DB1    |
| 13      | DB2    |
| 14      | DB3    |
| 15      | DB4    |
| 16      | DB5    |
| 17      | DB6    |
| 18      | DB7    |
| 19      | FS     |
| 20      | N.C    |