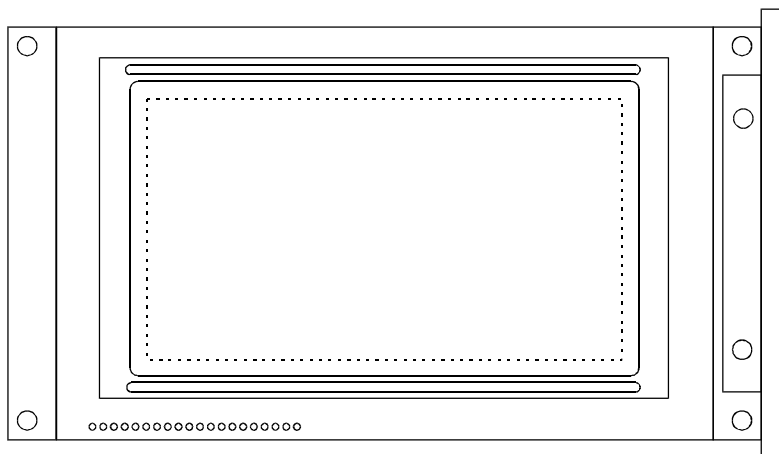




PRODUCT SPECIFICATION

HDM128GS24

240 x 128 GRAPHICS
LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: JB	REV.: 1.0	HDM128GS24	SHEET 1 OF 12 DATE: 12/16/97
---	-------------	--------------	-------------------	---------------------------------

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) * 128(H) DOTS
Duty	1 / 128
BIAS	1 / 12
Type	STN-Positive
Display mode	Transflective-Grey
Viewing direction	6H
Input data	Parallel
Backlight	EL (WHITE)

3.Mechanical specifications

I t e m	S p e c i f i c a t i o n s	Unit
Outline dimension	144.0(W) * 104.0(H) * 11.0 MAX(T)	mm
Viewing area	114.0(W) * 64.0(H)	mm
Active area	107.95(W) * 57.55(H)	mm
Dot size	0.4(W) * 0.4(H)	mm
Dot pitch	0.45(W) * 0.45(H)	mm

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDM128GS24	SHEET 2 OF 12
	JB	1.0		DATE: 12/16/97

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) * 128(H) DOTS
Duty	1 / 128
BIAS	1 / 12
Type	STN-Positive
Display mode	Transflective-Grey
Viewing direction	6H
Input data	Parallel
Backlight	LED (Yellow Green)

3.Mechanical specifications

I t e m	S p e c i f i c a t i o n s	Unit
Outline dimension	144.0(W) * 104.0(H) * 11.0 MAX(T)	mm
Viewing area	114.0(W) * 64.0(H)	mm
Active area	107.95(W) * 57.55(H)	mm
Dot size	0.4(W) * 0.4(H)	mm
Dot pitch	0.45(W) * 0.45(H)	mm

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDM128GS24	SHEET 3 OF 12
	JB	1.0		DATE: 12/16/97

4. Maximum rating

I t e m		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	0	40	°C	—
Storage temperature		Tstg	-20	60	°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)

I t e m		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	—	9.6	13.0	mA
LCD driving voltage		Vlcd	Vdd-Vo	11.7	12.3	12.9	V

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

Q.A.:
JB

REV.:
1.0

HDM128GS24

SHEET 4 OF 12

DATE:
12/16/97

6.Ac Electrical characteristics

(V_{dd}=+5V±10%,V_{ss}=0V,T_a=25°C)

Read cycle

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

Write cycle

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

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

Q.A.:

JB

REV.:

1.0

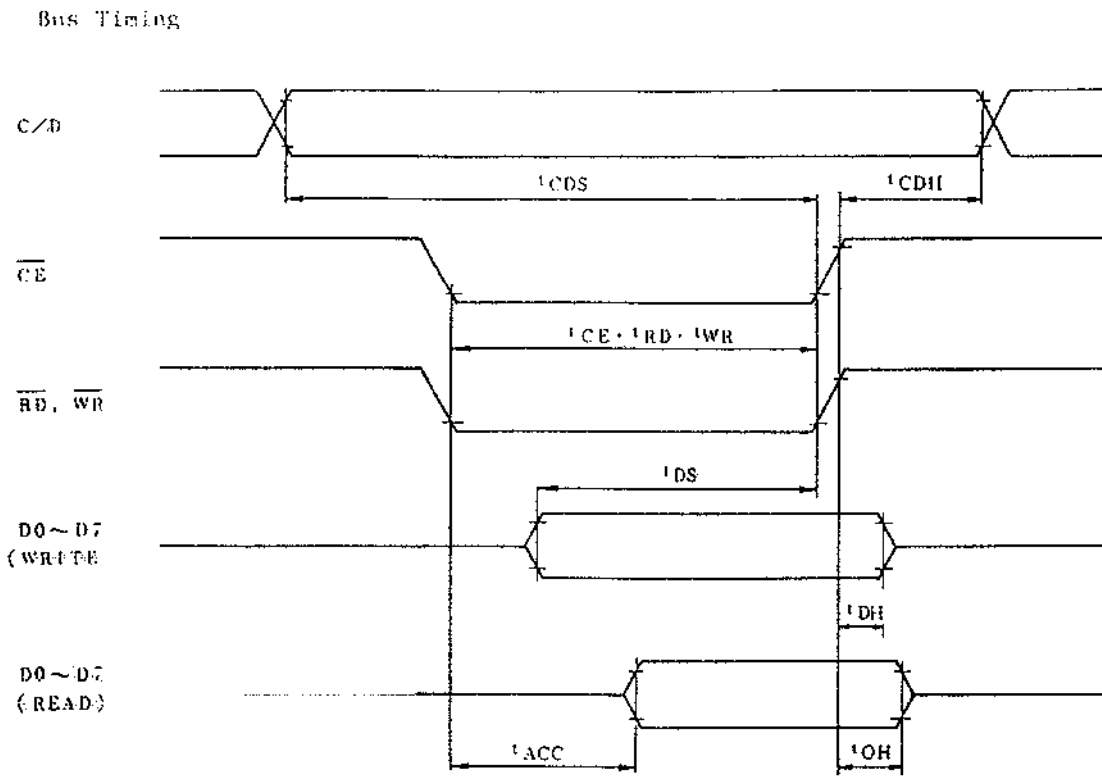
HDM128GS24

SHEET 5 OF 12

DATE:

12/16/97

7. Timing characteristics



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

Q.A.:
JB

REV.:
1.0

HDM128GS24

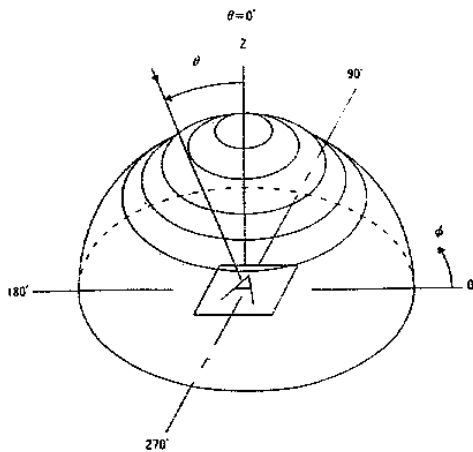
SHEET 6 OF 12

DATE:
12/16/97

9. Optical characteristics

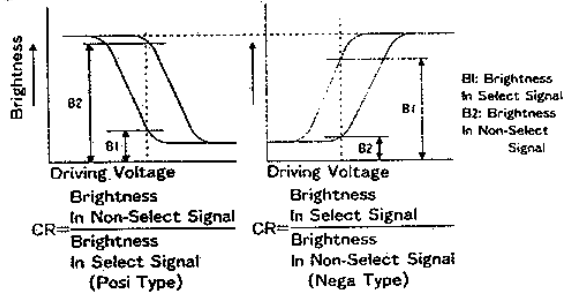
Parameter	Symbol	Temperature (°C)	Standard			Unit
			Min	Typ	Max	
Driving Voltage V _{op} V _{dd} -V _{lcd}		-20	18.2	18.6	19.0	V
		25	17.1	17.5	17.9	
		70	15.9	16.3	16.7	
Response time	T _r	-20		2600	3900	ms
		25		140	200	
	T _f	25		6900	10400	
		70		300	500	
Frame frequency	F _f			64	Hz	
Viewing angle range	θ y1	25	30			Degree
	θ y2		30			
	θ x1		30			
	θ x2		30			
Contrast	K	25		3		

Ⓐ Definition of Viewing Angle θ and ϕ

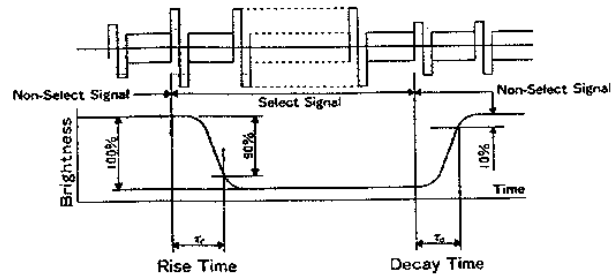


Definition of the viewing direction by the inclination THETA and the azimuth.
 PH (For reference axis see sub-clause 4.5 of Essential Ratings and characteristics.)

Ⓑ 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

HDM128GS24

SHEET 7 OF 12

DATE:
 12/16/97

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

I t e m	Symbol	Maximum	Unit
Supply voltage	Vmax	170	Vrms
Supply frequency	Fmax	1000	Hz
Operating temperature	Topr	-30~+50	°C
Operating humidity	Hopr	90	%RH.
Storage temperature	Tstg	-40~+60	°C
Storage humidity	Hstg	70	%RH.

10-2.Using specification

I t e m	Specification	Unit
Operating voltag	110	Vrms
Frequency	400	Hz

10-3.Electrical characteristics

I t e m	Condition	Unit	Min	Typ	Max
Initiate intensity	(sinewave) VAC 110	cd/m ²	48	60	—
CIE color coordinate	Vrms		0.3245		
			0.3922		
Current density	Freq 400	mA/cm ²	0.131		
Power density	Hz	mW/cm ²	3.07		
Color			WHITE		

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDM128GS24	SHEET 8 OF 12
	JB	1.0		DATE:

1 O.LED Backlight characteristics

10-1.Maximum ratings

I t e m	Symbol	Condition	Min.	Max.	Unit
Forward current	If	Ta:25℃	—	2250	mA
Reverse voltage	Vr	Ta:25℃	—	8	V
Power dissipation	Po	Ta:25℃	—	10.3	W
Operating temperature	Topr	—	-20	70	℃
Storage temperature	Tstg	—	-40	80	℃

10-2.Electrical characteristics

Ta=25℃

I t e m	Symbol	Condition	Min.	Typ	Max.	Unit
Forward voltage	Vf	If:900 mA	—	4.35	4.6	V
Reverse current	Ir	VR: 8 V	—	—	0.2	mA
Luminous intensity	Iv	If:900 mA	—	170	—	cd/m ²
Wevelength	λp	If:900 mA	—	570	—	nm
Color	Yellow Green					

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDM128GS24	SHEET 9 OF 12
	JB	1.0		DATE:

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

Item	Condition	Spec.	Unit
Tube current	f1:40 KHZ Ta:25 °C	6	mArms Max.
Power consumption	f1:40 KHZ Ta:25 °C	1.5	W

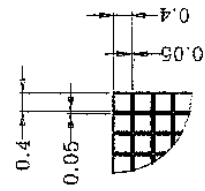
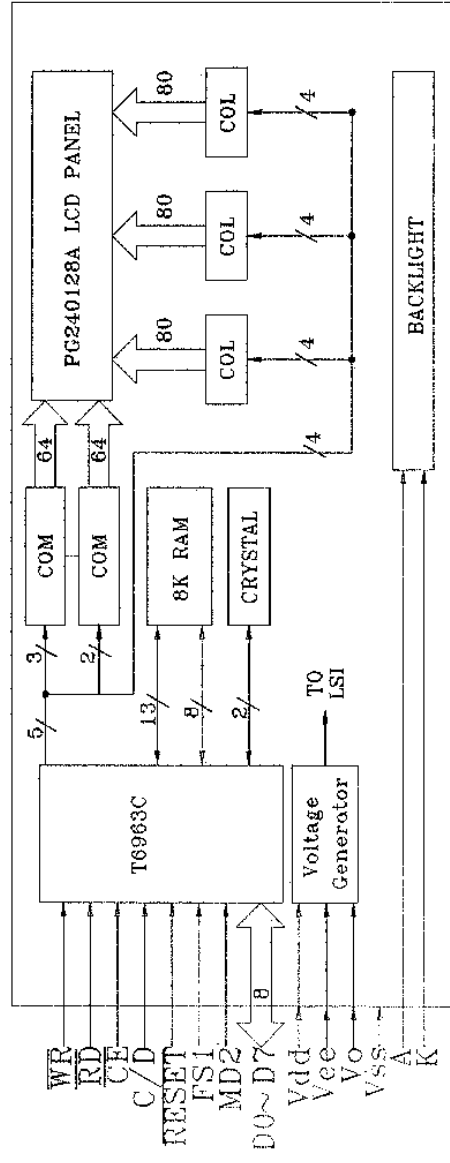
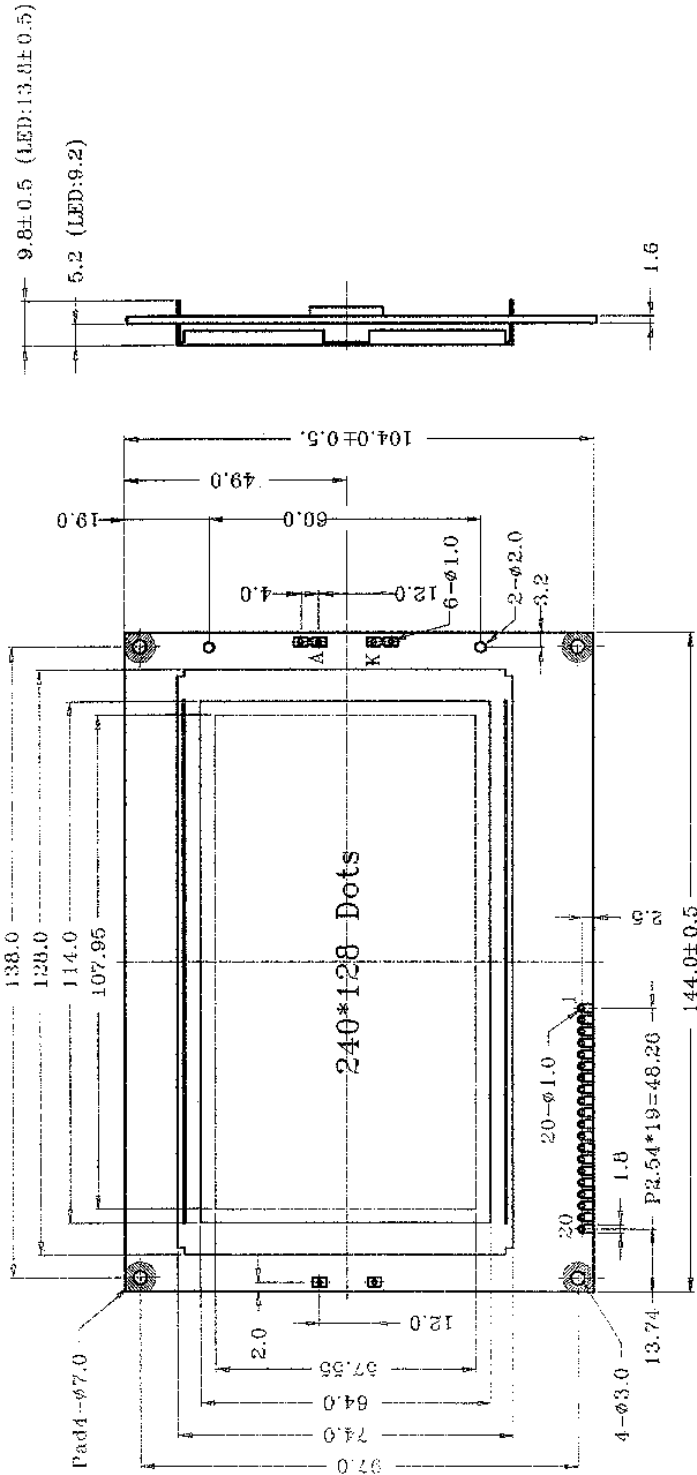
10-2.Electrical characteristics

Item	Condition	Spec.	Unit
Start voltage	Ta:0 °C	600	Vrms
Start voltage	Ta:25°C	375	Vrms
Tube voltage	Ta:25°C	250	Vrms
Tube current	Ta:25°C	5	mArms
Drive frequency	Ta:25°C	40	KHZ

10-3.Optical characteristics

Item	Condition	Min	Typ.	Max.	Unit
Average brightness	Invertor output current=5 mArms	400	450	—	cd/m ²
Brightness uniformity		70%	—	—	
Chromaticity		X	0.30	0.32	0.34
	Y	0.36	0.38	0.40	

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDM128GS24	SHEET 10 OF 12
	JB	1.0		DATE: 12/16/97



The tolerance unless classified ±0.3mm

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDM128GS24	SHEET 11 OF 12
	JB	1.0		DATE:

