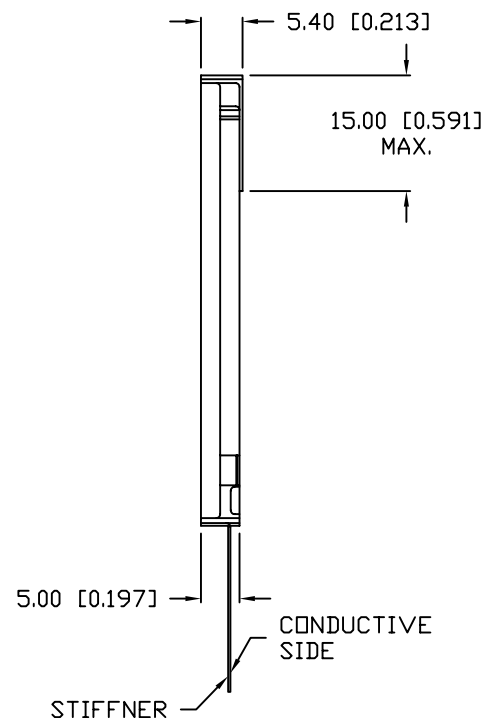


PART NUMBER		REV.
LCM-S320240GCN-28		A
REV.	E.C.N. NUMBER AND REVISION COMMENTS	DATE
A	E.C.N. #11045.	10.23.03



1. CN1: FPC: PITCH 0.5mm, WIDTH 10.5mm.
2. CN2: BHSR-02VS-1(JST); (PIN1-HOT, PIN2-GND).

REV. A	PART NUMBER LCM-S320240GCN-28	CONFIDENTIAL INFORMATION THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF LUMEX INC. EXCEPT AS SPECIFICALLY AUTHORIZED IN WRITING BY LUMEX INC., THE HOLDER OF THIS DOCUMENT SHALL KEEP ALL INFORMATION CONTAINED HEREIN CONFIDENTIAL AND SHALL PROTECT SAME IN WHOLE OR IN PART FROM DISCLOSURE AND DISSEMINATION TO ALL THIRD PARTIES. RELIABILITY NOTE OUR MANY YEARS OF EXPERIENCE DATA ACCUMULATION INDICATE THAT SOLDER HEAT IS A MAJOR CAUSE OF EARLY AND FUTURE FAILURE. PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.	 290 E. HELEN ROAD PALATINE, IL 60067-6976 PHONE: +1.847.359.2790 US WEB: www.lumex.com TW WEB: www.lumex.com.tw				
2.8" COLOR STN, 320 x 240 GRAPHIC MODULE, NEGATIVE, TRANSMISSIVE, CCFL BACKLIGHT, 1/242 DUTY, 6:00 VIEW ANGLE, WEIGHT: 35g.			<table border="1"> <tr> <td>DRAWN BY: CT</td> <td>CHECKED BY:</td> <td>APPROVED BY:</td> <td>DATE: 1.17.03 PAGE: 1 OF 6 SCALE: N/A</td> </tr> </table>	DRAWN BY: CT	CHECKED BY:	APPROVED BY:	DATE: 1.17.03 PAGE: 1 OF 6 SCALE: N/A
DRAWN BY: CT	CHECKED BY:	APPROVED BY:	DATE: 1.17.03 PAGE: 1 OF 6 SCALE: N/A				

PIN CONFIGURATION CN1

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	Vss	-	GND
2	D0	H/L	DISPLAY DATA
3	D1	H/L	DISPLAY DATA
4	D2	H/L	DISPLAY DATA
5	D3	H/L	DISPLAY DATA
6	D4	H/L	DISPLAY DATA
7	D5	H/L	DISPLAY DATA
8	D6	H/L	DISPLAY DATA
9	D7	H/L	DISPLAY DATA
10	VDD	-	LOGIC SUPPLY VOLTAGE
11	VLCD	-	POWER SUPPLY FOR LCD DRIVER
12	V1	-	POWER SUPPLY FOR LCD DRIVER
13	V2	-	POWER SUPPLY FOR LCD DRIVER
14	V3	-	POWER SUPPLY FOR LCD DRIVER
15	V4	-	POWER SUPPLY FOR LCD DRIVER
16	DISPOFF	H/L	DISPLAY CONTROL SIGNAL H:ON, L:OFF
17	CL2	H/L	DATA SHIFT CLOCK
18	M	H/L	CONTROL SIGNAL FOR AC DRIVING
19	CL1	H/L	INPUT DATA LATCH SIGNAL
20	FLM	H/L	SCAN START-UP SIGNAL

INPUT DATA ALLOCATION TABLE

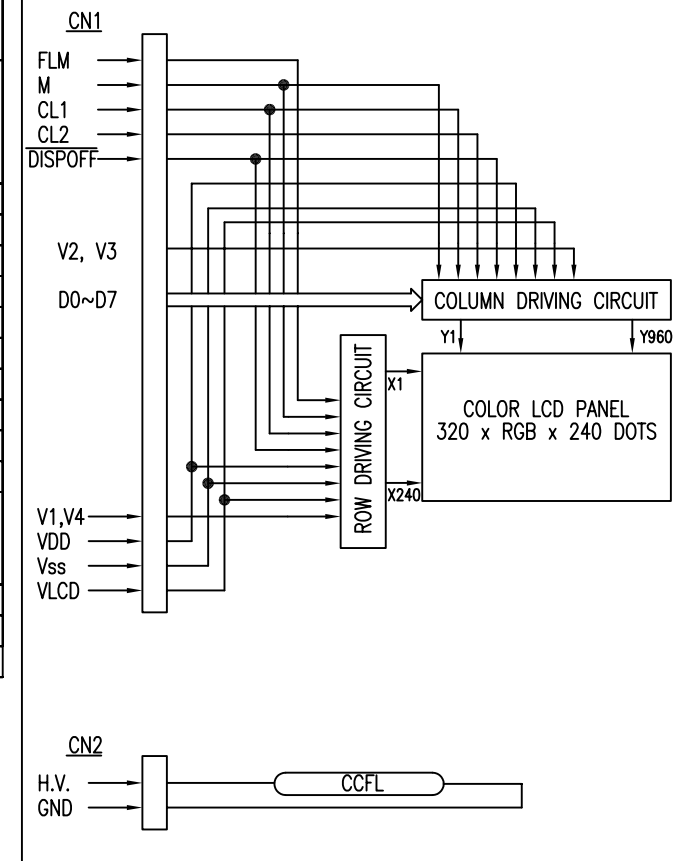
DATA SIGNAL	D7	D6	D5	D4	D3	D2	D1	D0	D7	D6	D5	D4	D3	D2	D1	D0
Y	1	2	3	4	5	6	7	8	9	10	11	12	9	9	9	9
X	1	2	3	4	5	6	7	8	9	10	11	12	5	5	5	5
1	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
2	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
3	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
4	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
5	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
6	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
7	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
8	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
9	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
10	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
238	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
239	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G
240	R	G	B	R	G	B	R	G	B	R	G	B	G	B	R	G

R: RED G: GREEN B: BLUE

PIN CONFIGURATION CN2

PIN NO.	SYMBOL	FUNCTION
1	H.V.	POWER SUPPLY VOLTAGE FOR CCFL
2	GND	CCFL GND

BLOCK DIAGRAM 320 x RGB x 240 DOTS



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2.8" COLOR STN, 320 x 240 GRAPHIC MODULE,
NEGATIVE, TRANSMISSIVE, CCFL BACKLIGHT, 1/242 DUTY,
6:00 VIEW ANGLE, WEIGHT: 35g.

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PAGE: 2 OF 6
SCALE: N/A

ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN.	TYP.	MAX.	
SUPPLY VOLTAGE FOR LOGIC	V _{DD}	—	2.5	3.3	4.5	V
POWER SUPPLY FOR LCD DRIVER	V _{LCD}	—	—	25.0	—	V
	V1	—	—	23.44	—	V
	V2	—	—	21.87	—	V
	V3	—	—	3.13	—	V
	V4	—	—	1.56	—	V
INPUT SIGNAL VOLTAGE	V _{IH}	"H" LEVEL	0.8V _{DD}	—	—	V
	V _{IL}	"L" LEVEL	—	—	0.2V _{DD}	
POWER SUPPLY CURRENT	I _{DD}	V _{DD} =3.3V	—	2.0	3.0	mA
	I _{LCD}	V _{IN} =V _{DD} OR V _{SS}	—	—	1.5	
	I _{IN}	V _{DD} =3.3V	—	—	10.0	
FRAME FREQUENCY (NOTE 1)	f _{FLM}	—	60	75	90	Hz
CCFL BACKLIGHT	STARTING VOLTAGE	V _S	T _a =5°C	700	—	V _{rms}
	LAMP VOLTAGE	V _L	T _a =25°C	—	270	V _{rms}
	FREQUENCY	f _L	T _a =25°C	40	60	KHz
	LAMP CURRENT	I _L	T _a =25°C	—	1.5	mArms
	BRIGHTNESS	—	—	50	—	cd/m ²

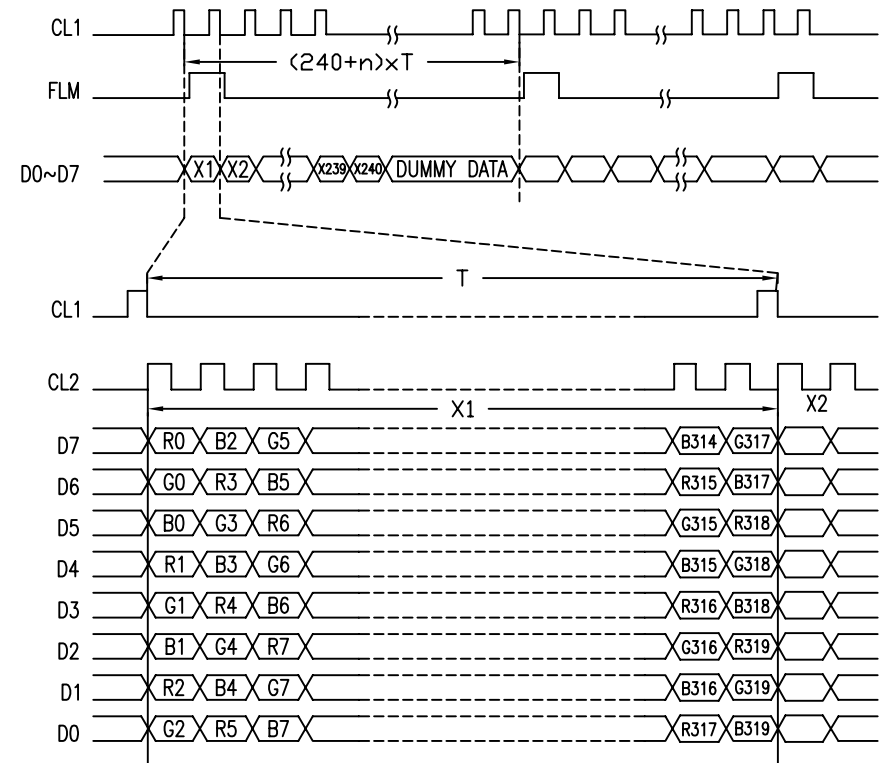
CAUTION:

1. MAKE SURE THAT THERE IS NO FLICKER AND RIPPLE PHENOMENON WHEN SETTING THE FRAME FREQUENCY.

ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	TEST CONDITION	STANDARD VALUE		UNIT
			MIN	MAX	
SUPPLY VOLTAGE FOR LOGIC	V _{DD} -V _{SS}	T _a =25°C	-0.3	7.0	V
POWER SUPPLY FOR LCD DRIVER	V _{LCD} -V _{SS}	T _a =25°C	0	40.0	V
INPUT VOLTAGE	V _I	T _a =25°C	-0.3	V _{DD} +0.3	V
OPERATING TEMPERATURE	T _{opr}	—	0	+50	°C
STORAGE TEMPERATURE	T _{stg}	—	-20	+70	°C

INTERFACE TIMING CHART



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REV.

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PART NUMBER

LCM-S320240GCN-28

2.8" COLOR STN, 320 x 240 GRAPHIC MODULE,
NEGATIVE, TRANSMISSIVE, CCFL BACKLIGHT, 1/242 DUTY,
6:00 VIEW ANGLE, WEIGHT: 35g.

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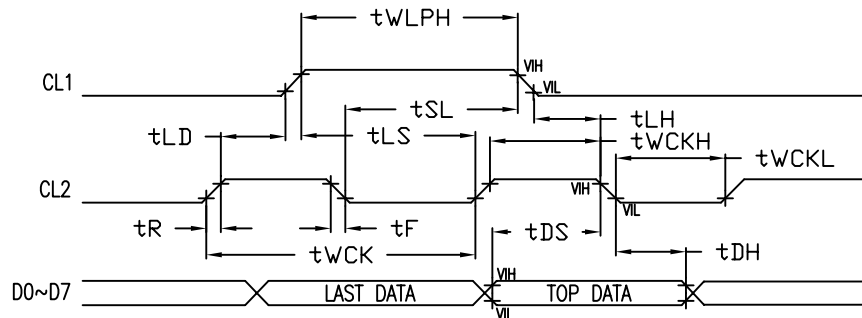
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PAGE: 3 OF 6

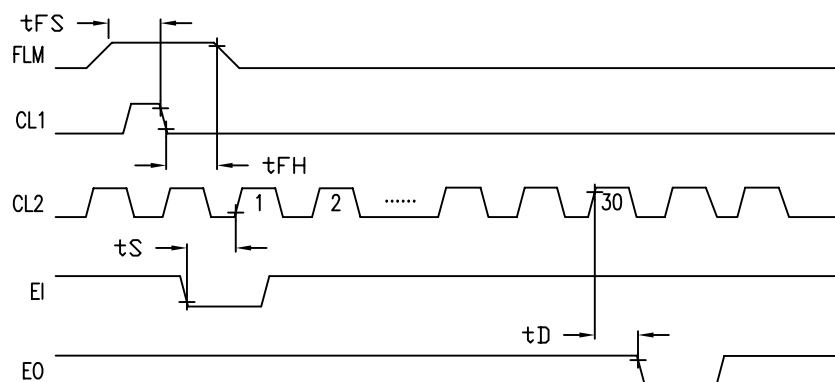
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UNCONTROLLED DOCUMENT

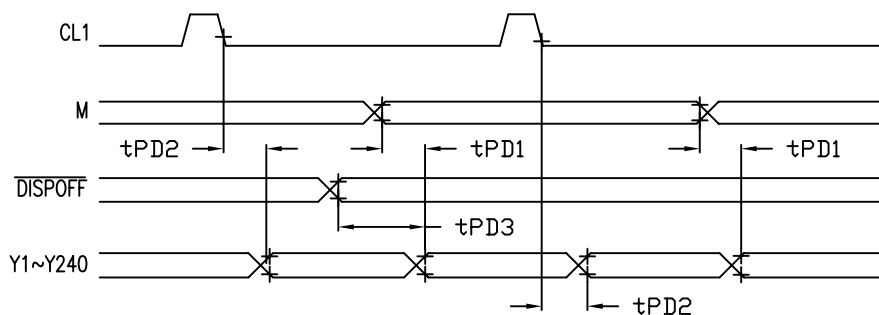
INPUT TIMING CHARACTERISTIC



INPUT/OUTPUT TIMING CHARACTERISTIC



INPUT/OUTPUT TIMING CHARACTERISTIC



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LCM-S320240GCN-28

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REV. E.C.N. NUMBER AND REVISION COMMENTS

DATE

SEE PAGE 1.

AC CHARACTERISTICS

(VDD = 3.0~4.5V, Vss = 0V, Ta = -20°C~+85°C)

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN.	TYP.	MAX.	
SHIFT CLOCK PERIOD	t_{WCK}	-	50	-	-	ns
SHIFT CLOCK "H" PULSE WIDTH	t_{WCKH}	-	15	-	-	ns
SHIFT CLOCK "L" PULSE WIDTH	t_{WCKL}	-	15	-	-	ns
DATA SETUP TIME	t_{DS}	-	10	-	-	ns
DATA HOLD TIME	t_{DH}	-	12	-	-	ns
LATCH PULSE "H" PULSE WIDTH	t_{WLP}	-	15	-	-	ns
SHIFT CLOCK RISE TO LATCH PULSE RISE TIME	t_{LD}	-	0	-	-	ns
SHIFT CLOCK FALL TO LATCH PULSE FALL TIME	t_{SL}	-	30	-	-	ns
LATCH PULSE RISE TO SHIFT CLOCK RISE TIME	t_{LS}	-	25	-	-	ns
LATCH PULSE FALL TO SHIFT CLOCK FALL TIME	t_{LH}	-	25	-	-	ns
ENABLE SETUP TIME	t_S	-	10	-	-	ns
INPUT SIGNAL RISE TIME	t_R	-	-	-	50	ns
INPUT SIGNAL FALL TIME	t_F	-	-	-	50	ns
OUTPUT DELAY TIME(1)	t_D	-	-	-	30	ns
OUTPUT DELAY TIME(2)	t_{PD1}	-	-	-	1.2	ns
OUTPUT DELAY TIME(3)	t_{PD2}	-	-	-	1.2	ns
OUTPUT DELAY TIME(4)	t_{PD3}	-	-	-	1.2	ns
FLM SETUP TIME	t_{FS}	-	100	-	-	ns
FLM HOLD TIME	t_{FH}	-	1.2	-	-	ns

UNCONTROLLED DOCUMENT

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2.8" COLOR STN, 320 x 240 GRAPHIC MODULE,
NEGATIVE, TRANSMISSIVE, CCFL BACKLIGHT, 1/242 DUTY,
6:00 VIEW ANGLE, WEIGHT: 35g.

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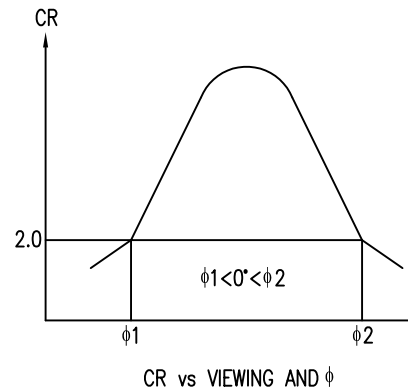
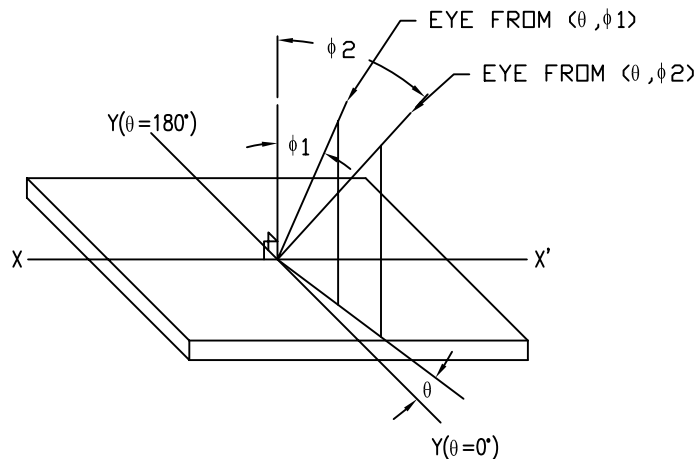
PAGE: 4 OF 6

SCALE: N/A

OPTICAL CHARACTERISTICS								
ITEM		SYMBOL	CONDITION		STANDARD VALUE			UNIT
					MIN.	TYP.	MAX.	
VIEWING ANGLE RANGE		$\phi 1, \phi 2$	$CR \geq 2$	X AXIS	—	60	—	DEG.
				Y AXIS	—	35	—	
CONTRAST RATIO		CR	$\phi = 0^\circ$		—	30	—	—
CHROMATICITY COORDINATES		R	$\theta = 0^\circ, \phi = 0^\circ$		0.45	0.50	0.55	—
					0.27	0.33	0.38	—
		G			0.23	0.28	0.33	—
					0.45	0.50	0.55	—
		B			0.10	0.15	0.20	—
					0.11	0.16	0.21	—
		W			0.24	0.29	0.34	—
					0.28	0.33	0.38	—
RESPONSE TIME	RISE: NOTE 1	T_r			—	100	160	ms
	FALL: NOTE 2	T_f			—	150	250	

NOTES:

1. THE TIME THAT THE LUMINANCE LEVEL REACHES 90% OF FULL BRIGHTNESS LEVEL FROM 0% WHEN "ON" SIGNAL IS APPLIED.
2. THE TIME THAT THE LUMINANCE LEVEL REACHES 10% OF FULL BRIGHTNESS LEVEL FROM 100% WHEN "OFF" SIGNAL IS APPLIED.

CR vs VIEWING AND ϕ

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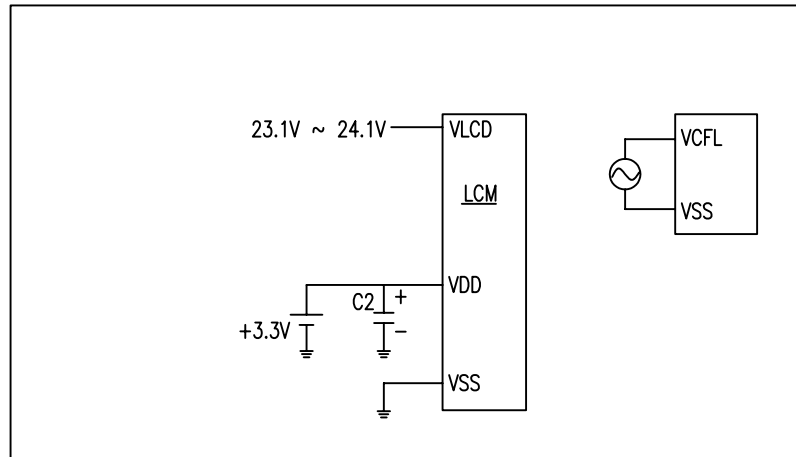
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POWER SUPPLY FOR LCM

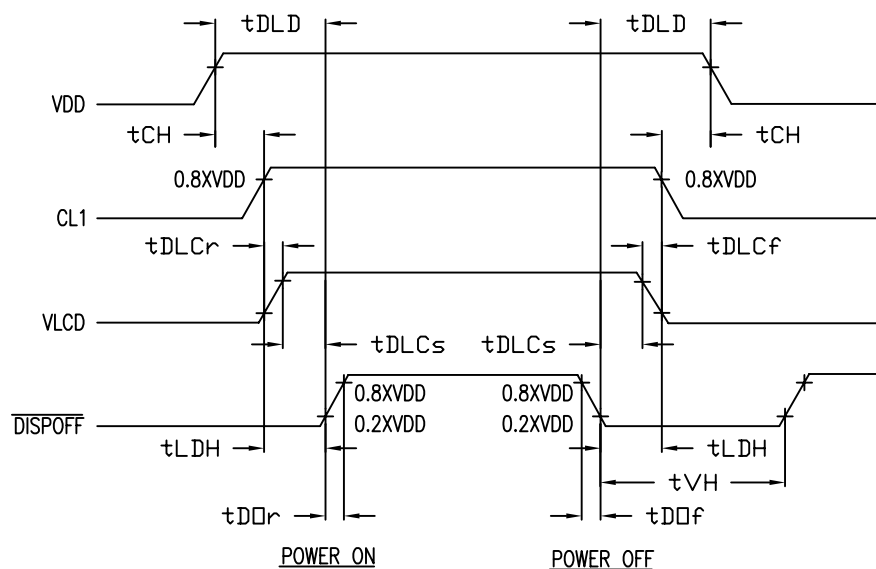


POWER SUPPLY SEQUENCE

SYMBOL	MIN.	MAX.	UNIT
t_{DLD}	200	—	ms
t_{CH}	0	—	ms
t_{LDH}	20	—	ms
t_{DOr}	—	100	ns
t_{DOF}	—	100	ns
t_{DLCr}	0	—	ms
t_{DLCf}	0	—	ms
t_{DLCs}	20	—	ms
t_{VH}	200	—	ms

WARNING:

1. POWER ON/OFF SHOULD BE PERFORMED USING DISPOFF FUNCTION.
2. INCORRECT POWER SUPPLY SIGNAL SEQUENCE MAY CAUSE PERMANENT DAMAGE TO THE LCD.



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