

UNCONTROLLED DOCUMENT

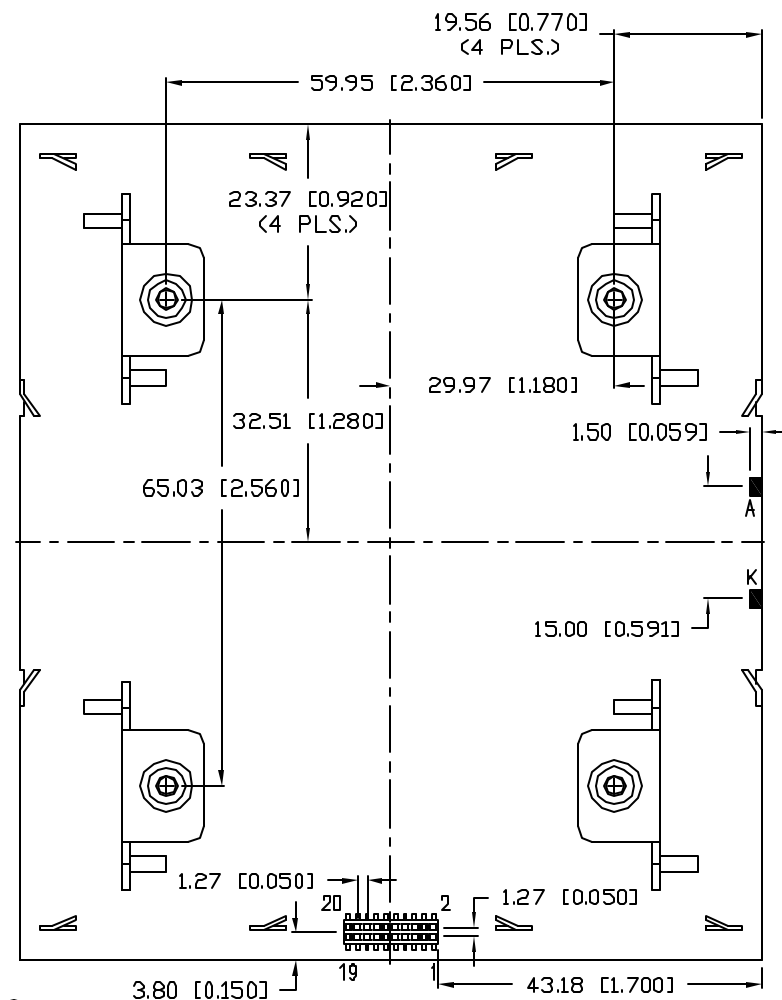
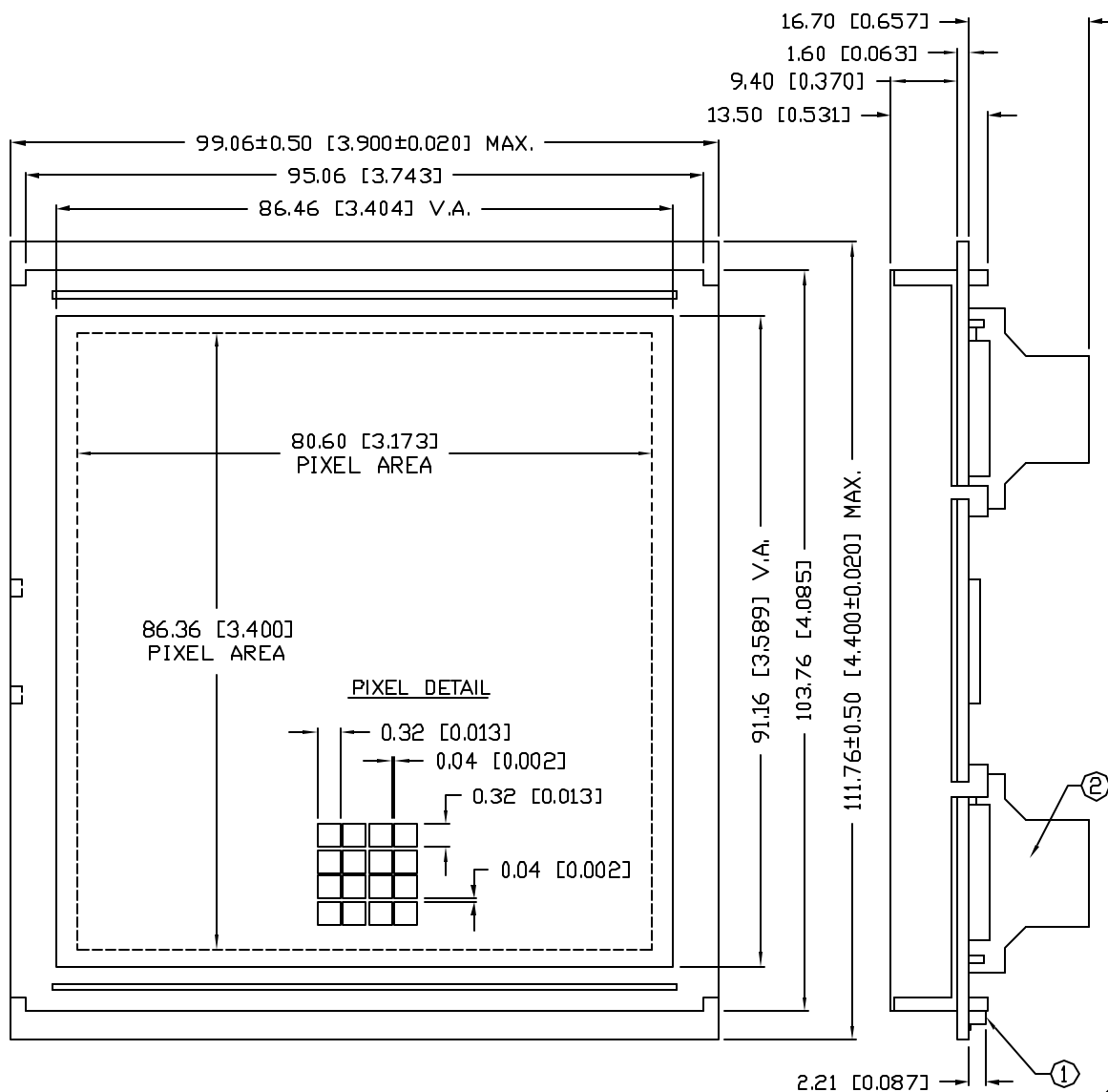
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PART NUMBER

REV.

LCM-S224240GWF-3

PRELIMINARY IN P/N DIR



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RELIABILITY NOTE

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290 E. HELEN ROAD
PALATINE, IL 60067-6976
PHONE: +1.847.359.2790
US WEB: www.lumex.com
TW WEB: www.lumex.com.tw

DRAWN BY:

CHECKED BY:

APPROVED BY:

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PAGE: 1 OF 3

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224 x 240 GRAPHIC LCD MODULE. FSTN. TRANSFLECTIVE.
NEGATIVE CHARGE PUMP, LED BACKLIGHT,
1/240 DUTY, 1/12 BIAS.

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ELECTRICAL CHARACTERISTICS

 $V_{DD}=4.7V$ to $5.25V$, $T_A=25^{\circ}C$

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN.	TYP.	MAX.	
SUPPLY VOLTAGE FOR LOGIC	$V_{DD}-V_{SS}$	—	4.5	5.0	5.5	V
REGISTER DATA RETENTION VOLTAGE	V_{OH}	—	2.0	—	6.0	V
INPUT LEAKAGE CURRENT	I_{II}	$V_I=V_{DD}$. SEE NOTE 5.	—	0.05	2.0	μA
OUTPUT LEAKAGE CURRENT	I_{LO}	$V_I=V_{SS}$. SEE NOTE 5.	—	0.10	5.0	μA
OPERATING SUPPLY CURRENT	I_{OPR}	SEE NOTE 4.	—	11	15	mA
QUIESCENT SUPPLY CURRENT	I_Q	SLEEP MODE. $V_{OSC1}=V_{CS}=V_{RD}=V_{DD}$	—	0.05	20.0	μA
OSCILLATOR FREQUENCY	F_{OSC}	MEASURED AT CRYSTAL,	1.0	—	10.0	MHZ
EXTERNAL CLOCK FREQUENCY	F_{CL}	47.5% DUTY CYCLE.	1.0	—	10.0	MHZ
OSCILLATOR FEEDBACK RESISTANCE	R_F	SEE NOTE 6.	0.5	1.0	3.0	M Ω
TTL						
HIGH-LEVEL INPUT VOLTAGE	V_{IHT}	SEE NOTE 1.	$0.5V_{DD}$	—	V_{DD}	V
LOW-LEVEL INPUT VOLTAGE	V_{ILT}	SEE NOTE 1.	V_{SS}	—	$0.2V_{DD}$	V
HIGH-LEVEL OUTPUT VOLTAGE	V_{OHT}	$I_{OH}=-5.0mA$ SEE NOTE 1.	2.4	—	—	V
LOW-LEVEL OUTPUT VOLTAGE	V_{OLT}	$I_{OL}=5.0mA$ SEE NOTE 1.	—	—	$V_{SS}+0.4$	V
CMOS						
HIGH-LEVEL INPUT VOLTAGE	V_{IHC}	SEE NOTE 2.	$0.8V_{DD}$	—	V_{DD}	V
LOW-LEVEL INPUT VOLTAGE	V_{ILC}	SEE NOTE 2.	V_{SS}	—	$0.2V_{DD}$	V
HIGH-LEVEL OUTPUT VOLTAGE	V_{OHC}	$I_{OH}=2.0mA$ SEE NOTE 2.	$V_{DD}-0.4$	—	—	V
LOW-LEVEL OUTPUT VOLTAGE	V_{OLC}	$I_{OH}=1.6mA$ SEE NOTE 2.	—	—	$V_{SS}+0.4$	V
OPEN-DRAIN						
LOW-LEVEL OUTPUT VOLTAGE	V_{OLN}	$I_{OL}=6.0mA$	—	—	$V_{SS}+0.4$	V
SCHMITT-TIGGER						
RISE-EDGE THRESHOLD VOLTAGE	V_{T+}	SEE NOTE 3.	$0.5V_{DD}$	$0.7V_{DD}$	$0.8V_{DD}$	V
FALLING-EDGE THRESHOLD VOLTAGE	V_{T-}	SEE NOTE 3.	$0.2V_{DD}$	$0.3V_{DD}$	$0.5V_{DD}$	V
LED BACKLIGHT	VOLTAGE	$I_f=1050mA$	3.75	4.0	4.25	V
	CURRENT	—	—	1050	—	mA
	POWER CONSUMPTION	—	—	4.2	—	W
	LUMINOUS	$I_f=160mA$	—	TBD	—	cd/m ²
	COLOR	—	—	572	—	nm

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PRELIMINARY IN P/N DIR

ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	TEST CONDITION	STANDARD VALUE		UNIT
			MIN	MAX	
SUPPLY VOLTAGE FOR LOGIC	V_{DD}	$T_a=25^{\circ}C$	-0.3	7.0	V
INPUT VOLTAGE	V_{IN}	$T_a=25^{\circ}C$	-0.3	$V_{SS} 0.3$	V
OPERATING TEMPERATURE	T_{opr}	—	0	50	$^{\circ}C$
STORAGE TEMPERATURE	T_{stg}	—	-20	70	$^{\circ}C$

NOTES:

- D0 TO D7, $\overline{CS}$, $\overline{RD}$, $\overline{WR}$, V_{D0} TO V_{D7} , V_{A0} TO V_{A15} , $\overline{VRD}$, $\overline{VWR}$ AND $\overline{VCE}$ ARE TTL-LEVEL INPUTS.
- SEL1, TD, XD0 TO XD3, XSCL, LP, WF, YDIS ARE CMOS-LEVEL OUTPUTS.
- RES IS A SCHMITT-TIGGER INPUT. THE PULSEWIDTH ON RES MUST BE AT LEAST 200 μs . NOTE THAT PULSES OF MORE THAN A FEW SECONDS WILL CAUSE DC VOLTAGES TO BE APPLIED TO THE LCD PANEL.
- $F_{OSC} = 10$ MHZ, NO LOAD (NO DISPLAY MEMORY), INTERNAL CHARACTER GENERATOR, 256 x 200 PIXEL DISPLAY. THE OPERATING SUPPLY CURRENT CAN BE REDUCED BY APPROXIMATELY 1 MA BY SETTING BOTH CLO AND THE DISPLAY OFF.
- V_{D0} TO V_{D7} AND $D0$ TO $D7$ HAVE INTERNAL FEEDBACK CIRCUITS SO THAT IF THE INPUTS BECOME HIGH-IMPEDANCE, THE INPUT STATE IMMEDIATELY PRIOR TO THAT IS HELD. BECAUSE OF THE FEEDBACK CIRCUIT, INPUT CURRENT FLOW OCCURS WHEN THE INPUTS ARE IN AN INTERMEDIATE STATE.
- BECAUSE THE OSCILLATOR CIRCUIT INPUT BIAS CURRENT IS IN THE ORDER OF μA , DESIGN THE PRINTED CIRCUIT BOARD SO AS TO REDUCE LEAKAGE CURRENTS.



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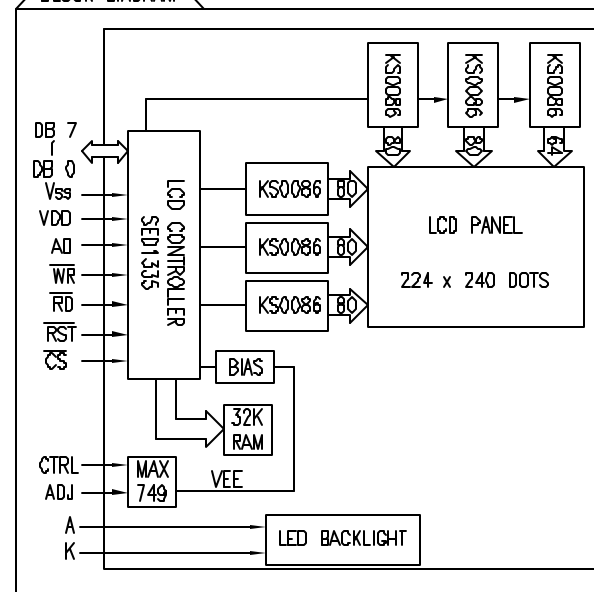
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PIN CONFIGURATION

PIN NO.	SYMBOL	LEVEL	FUNCTION	
1	V _{SS}	L	POWER SUPPLY	GND (0V)
2	V _{DD}	H		5V
3	CTRL	-	NEGATIVE SUPPLY VOLTAGE ON/OFF PIN	
4	A0	-	DATA TYPE SELECT	
5	WR	L	WRITE SIGNAL	
6	RD	L	READ SIGNAL	
7~14	DB0~DB7	H/L	DATA BUS- 8 BIT MODE.	
15	$\overline{CS}$	L	CHIP SELECT SIGNAL	
16	$\overline{RST}$	L	RESET SIGNAL	
17	ADJ	-	OPERATING VOLTAGE (NEGATIVE) ADJUST PIN	
18	N/C	-	NO CONNECTION	
19	A	4.2V	ANODE	LED BACKLIGHT
20	K	GND	CATHODE	LED BACKLIGHT

BLOCK DIAGRAM



Pb

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