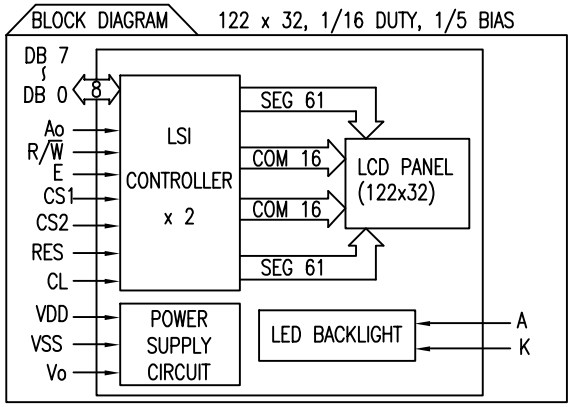
UNCONTROLLED DOCUMENT

A B

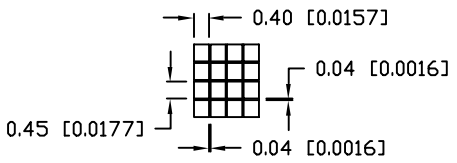
PART NUMBER	REV.
LCM–X12232GXX	B

REV.	E.C.N. NUMBER AND REVISION COMMENTS	DATE
A	E.C.N. #10433./	6–8–98
B	E.C.N. #10BRDR. & REDRAWN.	10–2–98

BLOCK DIAGRAM — 122 x 32, 1/16 DUTY, 1/5 BIAS

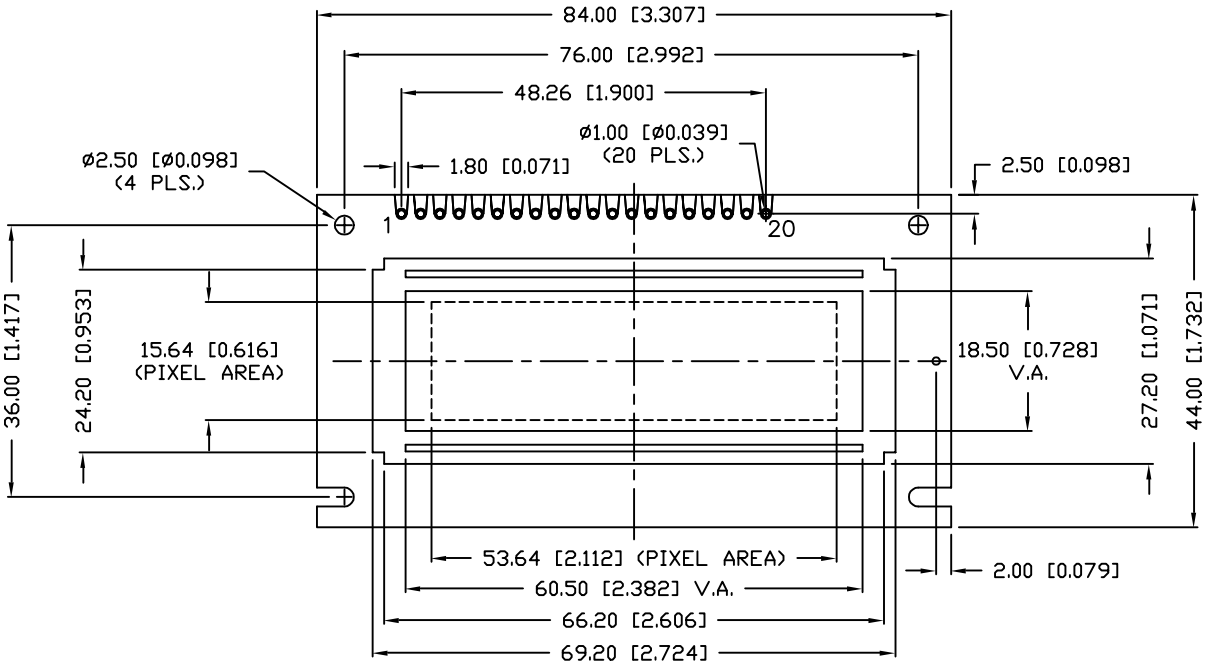


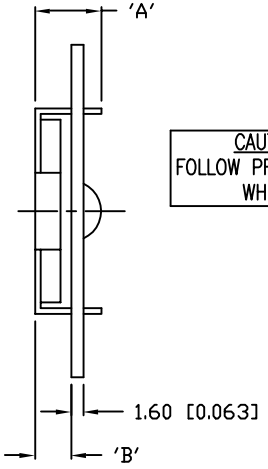
PIXEL DETAIL



P/N PREFIX/SUFFIX TABLE			
LCM–X		DXX	DESCRIPTION
STANDARD	S	SR	STN, REFLECTIVE
HIGH TEMP.	H	SF	STN, TRANSFLECTIVE(W/ BACKLIGHT)

TYPE DIM.	A	B
WITH BACKLIGHT	12.7	8.7
NO BACKLIGHT	8.8	4.8





CAUTION: STATIC SENSITIVE DEVICE
FOLLOW PROPER E.S.D. HANDLING PROCEDURES
WHEN WORKING WITH THIS PART.

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*UNLESS OTHERWISE SPECIFIED TOLERANCE IS ±0.25mm (±0.010")

REV.	PART NUMBER
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122 x 32 DOT MATRIX GRAPHIC MODULE,
1/16 DUTY, 1/5 BIAS.

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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.

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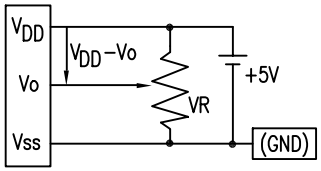
PART NUMBER	REV.
LCM-X12232GXX	B

REV.	E.C.N. NUMBER AND REVISION COMMENTS	DATE
	SEE PAGE #1./	

PIN CONFIGURATION [A]

PIN NO.	SYMBOL	LEVEL	FUNCTION	
1	Vss	–	POWER SUPPLY	GND (0V)
2	V_{DD}	–		5V
3	Vo	–		FOR LCD DRIVE
4	Ao	H/L	REGISTER SELECT SIGNAL H: DATA INPUT L: INSTRUCTION INPUT	
5	CS1	H,H->L	CHIP SELECT SIGNAL FOR IC1	
6	CS2	H,H->L	CHIP SELECT SIGANL FOR IC2	
7	CL	H/L	CLOCK INPUT (2kHz)	
8	E	H/L	ENABLE SIGNAL (NO PULL-UP RESISTOR)	
9	R/$\overline{W}$	H/L	H: DATA READ (MODULE-->MPU) L: DATA WRITE (MODULE<--MPU)	
10~17	DB0~DB7	H/L	DATA BIT 0-7	
18	RST	L	RESET SIGNAL	
19	A	–	ANODE	LED BACKLIGHT
20	K	–	CATHODE	LED BACKLIGHT

V_{DD}-Vo: LCD DRIVING VOLTAGE
VR: 10KΩ -20KΩ



READ/WRITE TIMING FOR 68 PORT MPU

PARAMETER		SIGNAL	SYMBOL	MIN	MAX	UNIT
ADDRESS HOLD TIME		CS R/$\overline{W}$ Ao	t_{AH6}	10	–	ns
ADDRESS SETUP TIME			t_{AS6}	20	–	ns
SYSTEM CYCLE TIME			t_{CYC6}	1000	–	ns
DATA SETUP TIME		DO~D7	t_{DS6}	80	–	ns
DATA HOLD TIME			t_{DH6}	10	–	ns
OUTPUT DISABLE TIME			t_{OH6}	10	60	ns
ACCESS TIME			t_{ACC6}	–	90	ns
ENABLE PULSE WIDTH	(READ)	E	t_{EW}	100	–	ns
	(WRITE)			80	–	ns

ELECTRICAL CHARACTERISTICS

V_{DD}=4.5V to 5.5V, T_A=25°C

ITEM		SYMBOL	CONDITION	STANDARD VALUE			UNIT
				MIN.	TYP.	MAX.	
SUPPLY VOLTAGE FOR LOGIC		V_{DD}-Vss	–	–	5.0	–	V
SUPPLY CURRENT FOR LOGIC		I_{DD}	V_{DD}=5V	–	–	3.0	mA
INPUT VOLTAGE**	HIGH	V_{IH}	–	0.2	–	V_{DD}	V
	LOW	V_{IL}	–	0	–	0.8	V
OUTPUT VOLTAGE***	HIGH	V_{OH}	I_{OH} =-3mA	2.4	–	–	V
	LOW	V_{OL}	I_{OL}=3ma	–	–	0.4	V
*LED BACKLIGHT	VOLTAGE	Vf	–	–	4.2	4.6	V
	CURRENT	If	–	–	170	330	mA
	POWER CUNSUMPTION	PD	–	–	710	–	mW
	LUMINOUS	L	If=170mA	70	–	–	cd/m²
	COLOR	–	–	–	–	–	nm

*ONLY APPLIES TO MODULES WITH BACKLIGHT
[A] **APPLIED TO TERMINALS DB0~DB7
***APPLIED TO TERMINALS E, Ao, DB0~DB7

ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	TEST CONDITION	STANDARD VALUE MIN	STANDARD VALUE MAX	UNIT
SUPPLY VOLTAGE FOR LOGIC	V_{DD}-Vss	Ta=25°C	4.75	5.25	V
SUPPLY VOLTAGE FOR LCD DRIVE	V_{DD}-Vo	–	4.8@50°C	5.2@0°C	V
INPUT VOLTAGE	V_I	Ta=25°C	Vss	V_{DD}	V
OPERATING TEMPERATURE	Topr	LCM-S	0	50	°C
		LCM-H	-20	70	°C
STORAGE TEMPERATURE	Tstg	LCM-S	-20	70	°C
		LCM-H	-30	85	°C

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