

PREPARED BY: _____ DATE _____	SHARP LIQUID CRYSTAL DISPLAY GROUP SHARP CORPORATION SPECIFICATION	SPEC No. LC95706
APPROVED BY: _____ DATE _____		FILE No. _____
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		APPLICABLE DIVISION
		<input checked="" type="checkbox"/> DUTY PANEL DEVELOPMENT CENTER <input type="checkbox"/> TFT DEVELOPMENT CENTER <input type="checkbox"/> LCD PRODUCTS DEVELOPMENT CENTER <input type="checkbox"/> EL PRODUCTION DEPT.

SPECIFICATION FOR
 Passive Matrix LCD Module

Model No.
LM20X212

CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED BY *Y. Inoue*

Y. Inoue
 Department General Manager
 Engineering Department 2
 DUTY Panel Development Center
 NARA LCD Group
 SHARP Corporation

2. Construction and Outline

Construction : 5 X 7 dots + cursor, 20-character 2-line
dot-matrix display module (Built-in Yellow-green
backlight LED, positive type)

Outline : See Fig.7.

Interface signals : See Table 5.

Character pattern details : See Fig.7.

Character codes : See Table 9.

There shall be no scratches, stains, chips, distortions and other external drawbacks that may affect the display function. Rejection criteria shall be noted in Inspection Standard (S-U-012-01).

3. Mechanical SpecificationsTable 1

Parameter	Specification	Unit
Outline dimensions	115(W) X 36(H) X 16 MAX(D)	mm
Effective display area	83(W) X 18.6(H)	mm
Display format	20 characters X 2 lines	-
Character format	5 X 7 dots with cursor	-
Character size	3.2(W) X 4.85(H) (5 X 7 dots)	mm
Dot size	0.6(W) X 0.65(H)	mm
Dot spacing	0.05	mm
Character color *	Dark blue	-
Backlight color	Yellow green	-
Weight -	Approx. 50	g

* Due to characteristics of the LC Material, the colors vary with environmental temperature.

4. Electrical Specifications

4.1 Absolute maximum ratings

Table 2

Parameter	Symbol	Min.	Max.	Unit	Remark
Supply voltage (Logic)	VDD-VSS	-0.3	+6.5	V	
Supply voltage (LCD drive)	V0-VSS	0	+6.5	V	VDD>V0
Supply current (Backlight LED)	ILED	-	260	mA	Ta=25°C
Input voltage	VIN	-0.3	VDD+0.3	V	
Storage temperature	Tstg	-25	+70	°C	
Operating temperature	Topr	0	+50	°C	
Reverse voltage (Backlight LED)	VLED-VLSS	-5	-	V	

4.2 Electrical characteristics

Table 3

(Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition	
Supply voltage (Logic)	VDD-VSS	4.75	5	5.25	V	-	
Supply voltage (LCD drive)	V0-VSS	-	0.65*	-	V	VDD=5V	
Input voltage	"L"	VIL	-0.3	-	0.6	V	-
	"H"	VIH	2.2	-	VDD	V	-
Output voltage	"L"	VOL	-	-	0.4	V	IOL=1.2mA
	"H"	VOH	2.4	-	-	V	-IOH=0.205mA
Input leakage current	IIL	-	-	1	uA	-	
Internal oscillating frequency	fosc	-	250	-	KHz	-	
Supply current	IDD	-	1.8	2.5	mA	VDD=5V, V0=0V	
	ILED	-	220	260	mA	VLED-VLSS=5V	
Power dissipation	Pd	-	1109	1312.5	mW	VDD=5V, V0=0V VLED-VLSS=5V	
Supply voltage (Backlight LED)	VLED-VLSS	4.75	5	5.25	V	-	

* Note. After over a hour since backlight begin lighting.

4.3 Timing characteristics

Table 4

VDD=5.0V±5%
Ta=0~50°C

Parameter	Symbol	Min.	Typ.	Max.	Unit
Enable cycle time	tcycE	1000	—	—	ns
Enable pulse width	PWEH	450	—	—	ns
Enable rise/fall time	tEr, tEf	-	—	25	ns
RS,R/W setup time	tAS	140	—	—	ns
Address hold time	tAH	10	—	—	ns
Data setup time	tDSW	195	—	—	ns
Data delay time	tDDR	-	—	320	ns
Data hold time(write)	tH	10	—	—	ns
Data hold time(read)	tDHR	20	—	—	ns

Timing chart: See Fig.1.

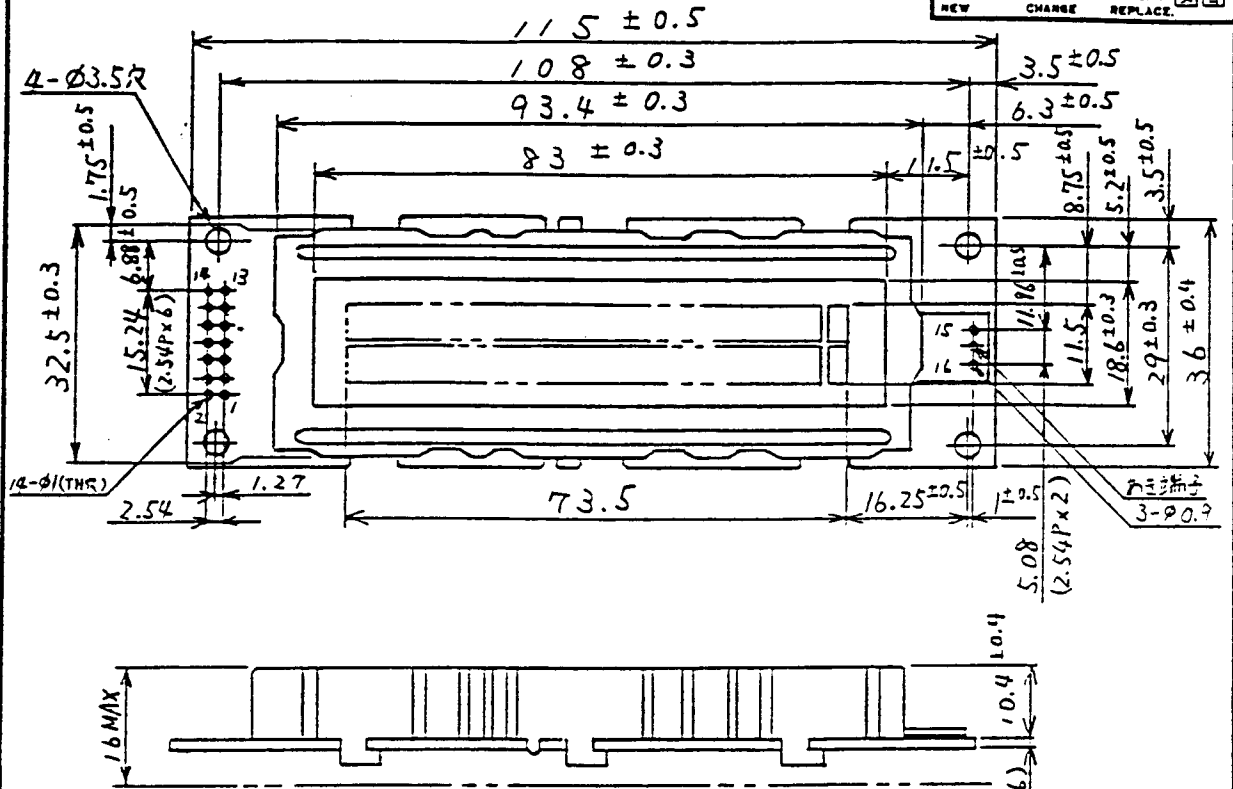
4.4 Interface signals

Table 5

Pin No.	Symbol	Description	Connection
1	VSS	Ground potential	GND:0V
2	VDD	Power supply	+5V
3	V0	Contrast adjustment voltage	Adjust the contrast by changing the supply voltage from 0V to 5V.
4	RS	Register select signal	Control signal inputs (For details, see section 6 and 7.)
5	R/W	Read/write select signal	
6	E	Operation(data read/write enable signal)	
7	DB0	Code I/O data LSB	Data bus line :DB7 may also be used to check the busy flag. :Lines DB0~DB3 are not used when interfacing with a 4-bit microprocessor. (For details, see section 6 and 7.)
8	DB1	Code I/O data 2nd bit	
9	DB2	Code I/O data 3rd bit	
10	DB3	Code I/O data 4th bit	
11	DB4	Code I/O data 5th bit	
12	DB5	Code I/O data 6th bit	
13	DB6	Code I/O data 7th bit	
14	DB7	Code I/O data MSB	
15	VLSD	Power supply (+)	5V power supply between VLSD and VLSS.
16	VLSS	Power supply (-)	

Fig.7 Module Outline Dimension.

出図 ISSUE	19 . . .
設計通報 DRAWING INFO.	連絡書 INFORMATION
No. () 号による	
新設・変更・書換 NEW CHARGE REPLACE	図面



PIN No.	Sig.	PIN No.	Sig.
14	DB ₇	13	DB ₆
12	DB ₅	11	DB ₄
10	DB ₃	9	DB ₂
8	DB ₁	7	DB ₀
6	E	5	R/W
4	RS	3	V ₀
2	V _{DD}	1	V _{SS}

PIN No.	Sig.
15	V _{LED}
16	V _{ISS}

Character Pattern Details

指示なき寸法公差は UNSPECIFIED TOL TO BE とする

△ 19 . . .	LM20X212	名 称	20-character 2-1line LCD Unit
△ 19 . . .	LM20X21A	NAME	Outline Dimensions
年月日 DATE	訂正記事 REVISE	設計者 DESIGNER	担当者 PREPA
材 質 MATERIAL	板厚 THICKNESS	仕 上 FINISH	尺 度 SCALE
			1/1
設計 DESIGN	本図 TRACE	検図 CHECK	承認 APPROVE
SHARP CORPORATION			作成日付 DATE
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