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REVISIONS

REV.	DESCRIPTION	DATE	APPROVED

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1. **Specification subject to change without notice.**
2. **All dimensions and specifications apply to standard modules. This information may vary for modules with optional features.**
3. **All dimensions are in millimetres.**
4. **Precautions: These precautions apply equally to modules from all makers, not just Densitron. Violation of these guidelines may void the warranty and can cause problems ranging from erratic operation to catastrophic display failure.**

Handling precautions:

? ? This device is susceptible to Electro-Static Discharge (ESD) damage. Observe Anti-Static precautions.

Power supply precautions:

? ? Identify and, at all times, observe absolute maximum ratings for both logic and LC drivers. Note that there is some variance between models.
? ? Prevent the application of reverse polarity to VDD and VSS, however briefly.
? ? Use a clean power source free from transients. Power up conditions are occasionally “jolting” and may exceed the maximum ratings of the module.
? ? The +5V power of the module should also supply the power to all devices that may access the display. Don’t allow the data bus to be driven when the logic supply to the module is turned off.
? ? DO NOT install a capacitor between the VO (contrast) pin and ground. VDD must, at all times, exceed the VO voltage level. The capacitor combines with the contrast potentiometer to form an R-C network which “holds-up” VO, at power-down, possibly damaging the module.

Operating precautions:

? ? DO NOT plug or unplug the module when the system is powered up.
? ? Minimise the cable length between the module and host MPU. (Recommended max. length 30 cm).
? ? For models with EL backlights, do not disable the backlight by interrupting the HV line. Unloaded inverters produce voltage extremes that may arc within a cable or at the display.
? ? Operate the module within the limits of the modules temperature specifications.

Mechanical / Environmental precautions:

? ? Improper soldering is the major cause of module difficulty. Use of flux cleaner is not recommended as they may seep under the elastomeric connection and cause display failure. Densitron recommends the use of Kester “245” no-clean solder.
? ? Mount the module so that it is free from torque and mechanical stress.
? ? Surface of LCD panel should not be touched or scratched. The display front surface is an easily scratched, plastic polariser. Avoid contact and clean only when necessary with soft, absorbent cotton dampened with petroleum benzene.
? ? ALWAYS employ anti-static procedure while handling the module.
? ? Prevent moisture build-up upon the module and observe the environmental constraints for storage temperature and humidity.
? ? DO NOT store in direct sunlight.
? ? If leakage of the liquid crystal material should occur, avoid contact with this material, particularly ingestion. If the body or clothing becomes contaminated by the liquid crystal material, wash thoroughly with water and soap.

Notes: (unless otherwise specified)

Unless otherwise specified: Dimensions are mm Tolerances are: X = ? 3 0.X = ? 0.5 0.XX = ? 0.05	APPROVALS	DATE	DV3 Displays Ltd BIGGIN HILL, ENGLAND	
	DRAWN			
	CHECKED		TITLE: 128x128 LCD module with optional backlight	
	ISSUED		DWG.NO. **DV3000**	SHEET 1 of 8

RECORD OF REVISION

REV	COMMENT	PAGE	DATE

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GENERAL SPECIFICATION

ITEM	CONTENTS
Display Format	128(W) ×128(H)
Dot Size	0.32 ×0.32 mm
View Area	49.0 ×49.0 mm
General Dimensions	72.0 ×70.0 ×17.2 mm
LCD Type	☑ STN Gray ☐ STN Yellow Green ☐ STN Blue ☐ FSTN Positive ☐ FSTN Negative ☐ TN
Polarizer mode	☐ Reflective ☑ Transflective ☐ Transmissive
View Angle	☑ 6 O'clock ☐ 12 O'clock ☐ Others_____
Backlight	☑ LED ☐ EL ☐ CCFL
Backlight Driver type	☑ Internal Power ☐ External Power
Backlight Color	☑ Yellow green ☐ White ☐ Amber ☐ Blue Green ☐ Other
Controller/Driver	KS0107/KS0108
Temperature Range	☑ 0℃~+50℃ ☐ -20℃~+70℃ ☐ -30℃~+80℃
DC/DC Converter	Without

MECHANICAL SPECIFICATION

ITEM	CONTENTS
Module Size	72.0(W) ×70.0(H) ×17.2max(D)
View Area	49.0 ×49.0 mm
Dot Size	0.32mm ×0.32mm
Dot Pitch	0.35mm ×0.35mm
Duty Ratio	1/128duty

ABSOLUTE MAXIMUN RATING(Ta=25℃ VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Humidity
Power Supply for Logic	V_{DD}-V_{SS}	-0.3	-	7.1	Volt	
Power Supply for LCD	V_{DD}-Vo	0	-	25.0	Volt	
Input Voltage	V_{IN}	-0.3	-	V_{DD}+0.3	Volt	
Supply Current for LED backlight	I_{LED}	-	-	220	mA	
Operating Temperature	Top	-0	-	+50	℃	Note1
Storage Temperature	Tst	-20	-	+60	℃	Note2

Note1: Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

Ta≦50℃: 80% RH max

Ta>50℃: Absolute humidity must be lower than the humidity of 85%RH at 50℃

Note2: Ta at -20℃ will be<48hrs at60℃will be <120hrs

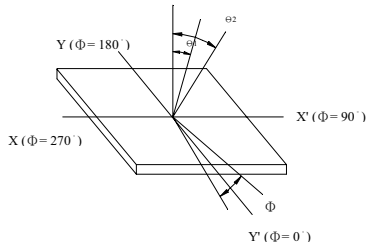
ELECTRICAL CHARACTERISTICS (Ta＝25℃)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply for Logic	V_{DD}-V_{SS}	-	4.7	5.0	5.3	Volt
Input Voltage	V_{IL}	L level	V_{SS}	0.2 V_{DD}	-	Volt
	V_{IH}	H level	0.7 V_{DD}	-	V_{DD}	Volt
LCD Module Driving Voltage	V_{DD}=5.0V V_{DD}-Vo= 13.0V	Ta＝-20℃	-	-	-	Volt
		Ta＝0℃	-	-	-	
		Ta＝25℃	12.5	13.0	13.5	
		Ta＝50℃	-	-	-	
Power Supply Current for LCM	I_{DD} (B/L OFF)	V_{DD}=5.0V	-	6.0	10.0	mA
	I_{LED}	V_{LED}=4.2V	-	120	180	

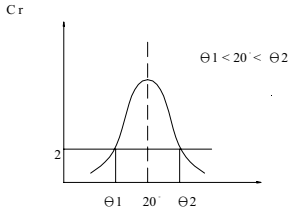
OPTICAL CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle	Θ1-Θ2	--	25	--	deg.		1.2
	Φ	--	20	--	deg.		
Contrast Ratio	Cr	3.5	5	--	--	Θ=20 ◦ Φ=0 ◦	3
Response Time (rise)	Tr	--	100	--	ms	Θ=20 ◦ Φ=0 ◦	4
Response Time (fall)	Tf	--	200	--	ms	Θ=20 ◦ Φ=0 ◦	4

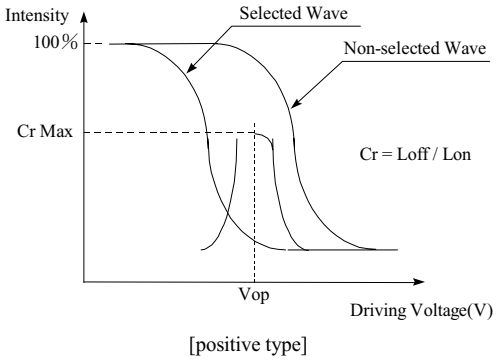
ote 1. Definition of angle Θ & Φ



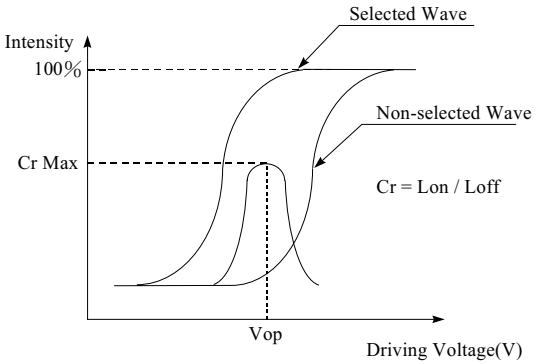
Note 2. Definition of viewing angle Θ1 & Θ2



Note 3. Definition of contrast ratio (Cr)

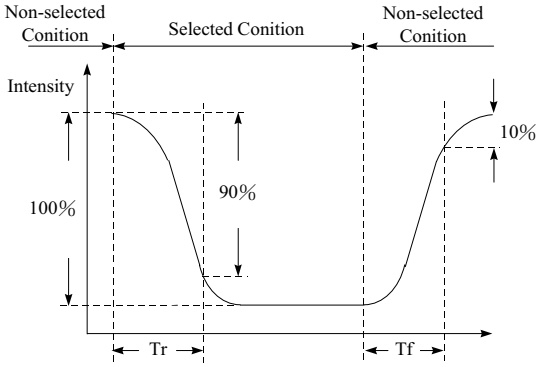


[positive type]



[Negative type]

Note 4. Definition of response time



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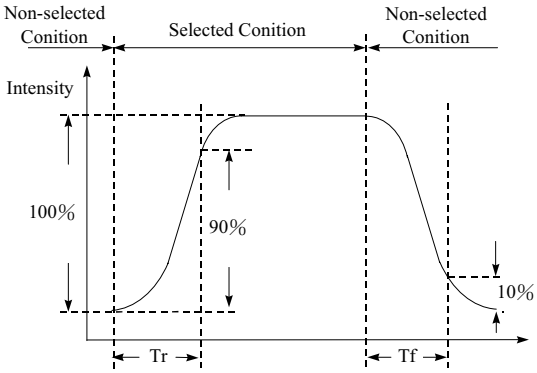
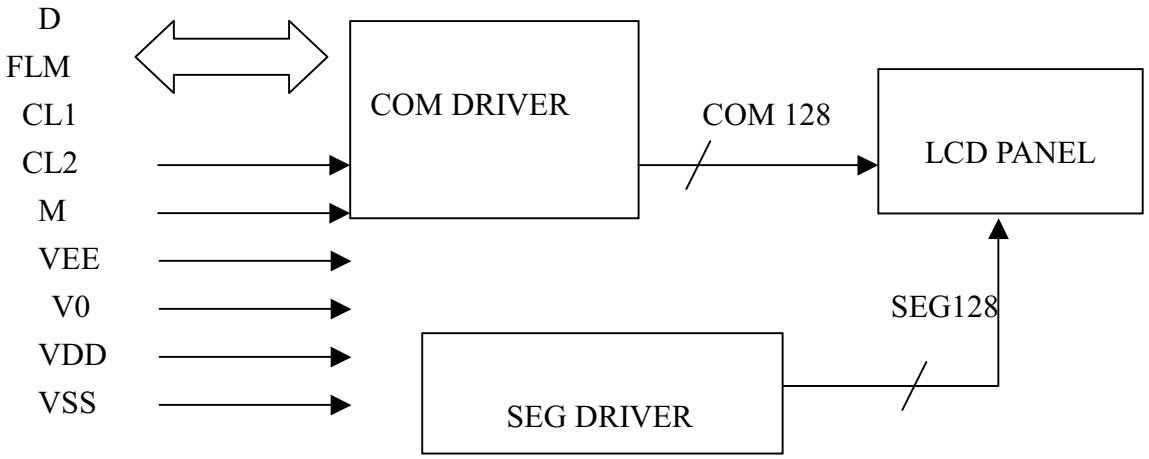


[Negative type]

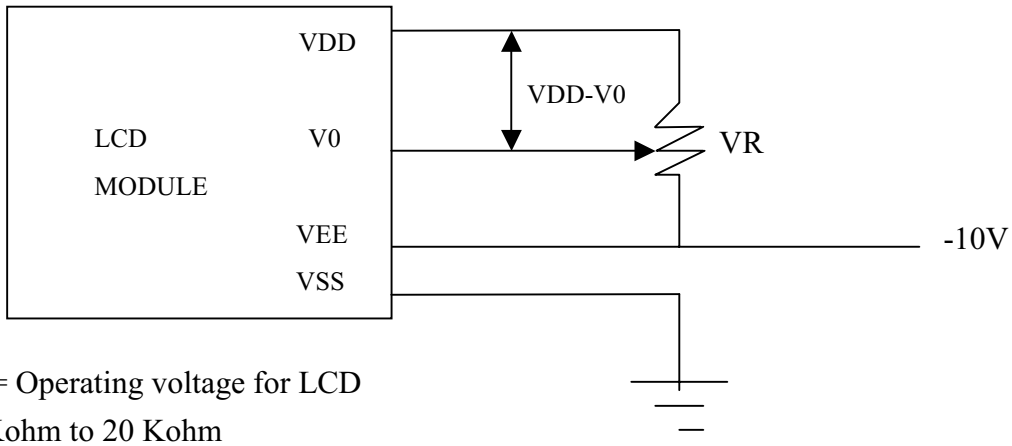
INTERFACE PIN ASSIGNMENT

PIN	SYMBOL	FUNCTIONS
1	D	DATA SERIAL INPUT
2	FLM	Frame start signal
3	M	AC Signal for LCD driving
4	CL1	Common driver data shift signal: also latches the data of the line immediately above.
5	CL2	Clock pulse for segment shift register
6	N/A	
7	VDD	Power supply for logic circuit (5V)
8	VSS	Power supply for logic circuit GND
9	VEE	Power voltage for LCD driving circuit
10	VLCD	Negative Voltage Power supply.
BL1	LED+	No connection
BL2	LED-	No connection

BLOCK DIAGRAM

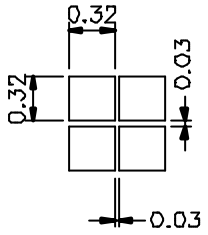


POWER SUPPLY

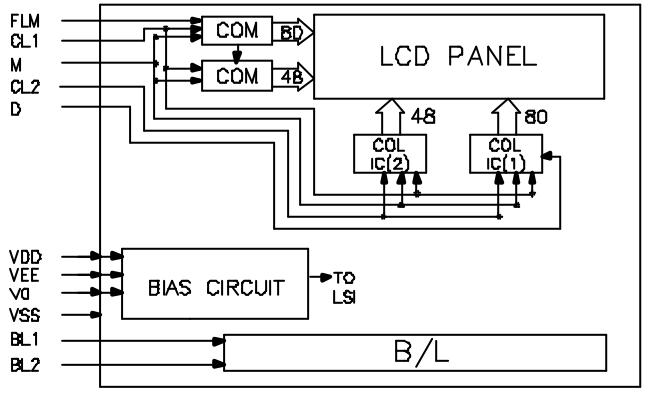


* VDD-V0 = Operating voltage for LCD
* VR = 10 Kohm to 20 Kohm

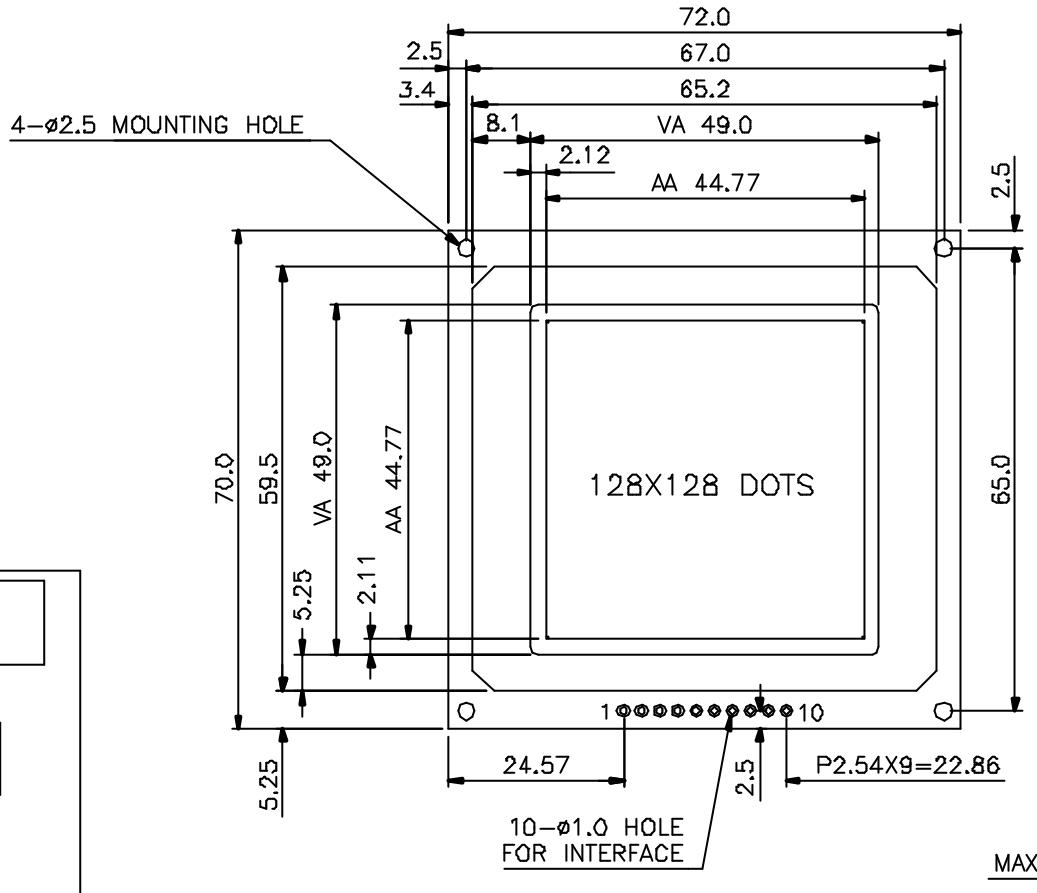
DV3000

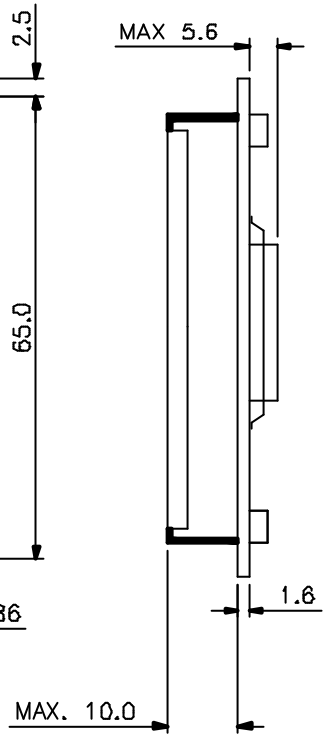


DOT SIZE



CIRCUIT DIAGRAM





APPROVED BY		
CHECK BY		
CHECK BY		
DRAWING BY	ANGELA	2000.7.15

DENSITRON TECHNOLOGIES plc

SHEET:1/1	TOLERANCE:±0.3	UNIT:mm
SIZE:A4	ANGLES:±0.5°	SCALE:NTS

INTERFACE PIN / B/L TYPE	1	2	3	4	5	6	7	8	9	10	BL1	BL2
LED-SMT	D	FLM	M	CL1	CL2	N/A	VDD	VSS	VEE	VLCD	LED(+)	LED(-)