



CUSTOMER :

PANEL TYPE : DE-4832-FSP6 – LM6019B-DF2

REVISION NO :

APPROVED BY : (FOR CUSTOMER USE ONLY)

APPROVED BY	CHECKED BY	PREPARED BY	CPT FILE NO.	DATE ISSUED
		STN		208/1/01

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1. BASIC OPERATIONS

1.1 FEATURES

- (1) FSTN type STN type
- (2) Blue mode Gray mode Yellow-Green mode
- (3) Postive type Negative type
- (4) Transmissive Transflective Reflective
- (5) Viewing direction : 3H 6H 9H 12H
- (6) 1/320 duty 1/18 bias

1.2 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Operating temperature	Top	-20~70	°C
Storage Temperature	Tst	-30~80	°C

1.3 Mechanical Data

No.	ITEM	SPECIFICATION	UNIT
1	PANEL DIMENSION	133.0° 93.7	mm
2	VIEWING AREA	125.5° 87.2	mm
3	ACTIVE AREA	119.985° 79.985	mm
4	NO. OF DOTS	480° 320	
5	DOT SIZE	0.235° 0.235	mm
6	DOT PITCH	0.250° 0.250	mm

2. OPTICAL CHARACTERISTICS

2.1 LCD Driving Conditions

(Ta = 25)

Voltage	Duty	Bias
24.3	1/320	1/18

2.2 ELECTRO-OPTICAL CHARACTERISTICS

No	Parameter	Symbol	Temperature()	Standard			Unit	Remarks
				Min	Typ	Max		
1	Driving Voltage	Vop	0	24.4	25.1	25.9	V	Note 1
			25	23.6	24.3	25.0		
			50	22.5	23.2	23.9		
2	Response time	Tr	0	-	387	-	Degree	Note 2
			25	-	126	-		
			50	-	68	-		
		Tf	0	-	710	-		
			25	-	308	-		
			50	-	135	-		
3	Frame frequency	Ff		-	70	-	HZ	Note 3
4	Viewing angle range	£F	25	-	40	-	Degree	Note 4
		£B		-	26	-		
		£R		-	28	-		
		£L		-	29	-		
5	Contrast Ratio	K	0	6.2	7.8	-		
			25	5.6	7.0	-		
			50	3.3	4.1	-		

Note

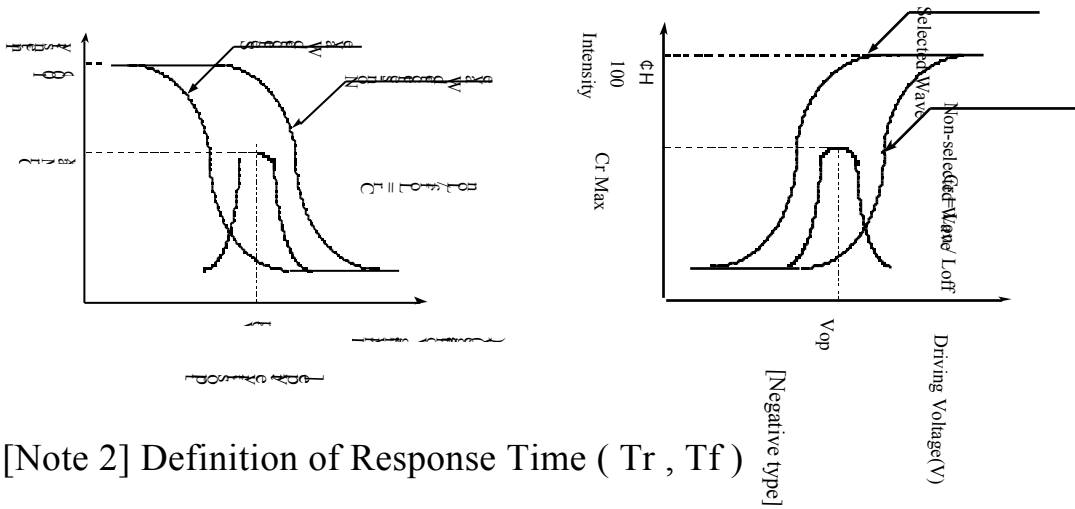
° Frame frequency is defined as follows :

Common side supply voltage

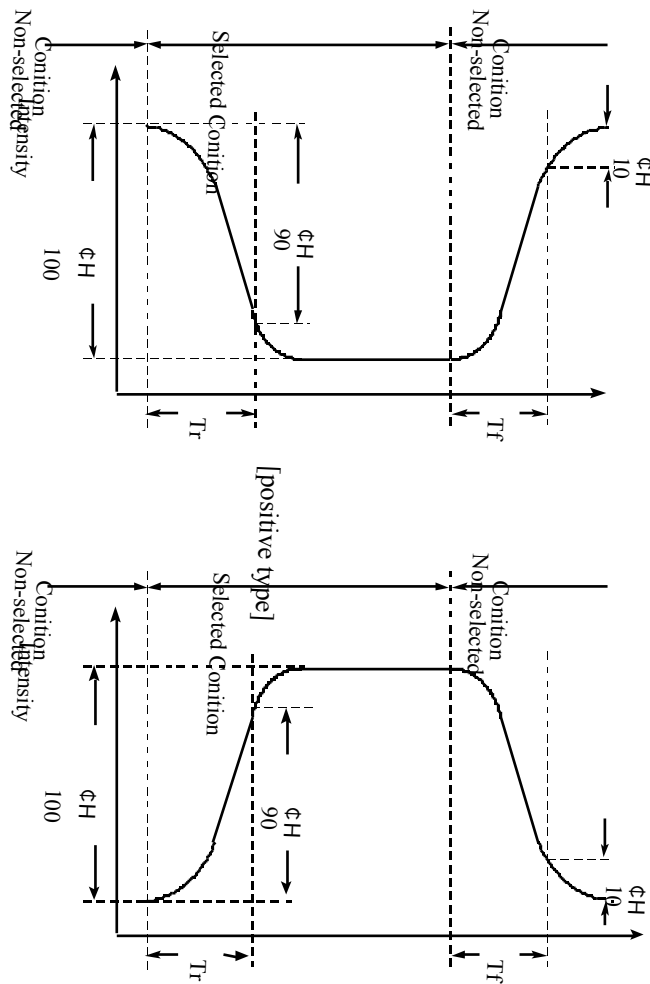
peak-to-peak/2 = 1 period

° Contrast Ratio = Intensity in off state / Intensity in on state

[Note 1] Definition of Operation Voltage (Vop)



[Note 2] Definition of Response Time (Tr, Tf)



Conditions :

Operating Voltage : Vop

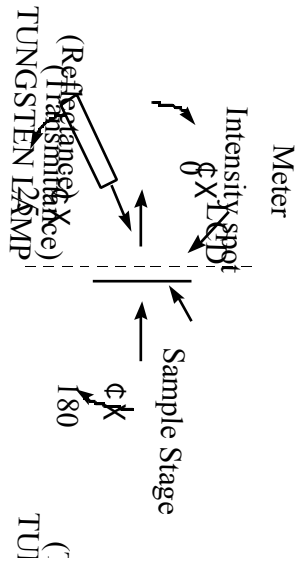
Frame Frequency : 70 HZ

Viewing Angle(θ): 0°X0°

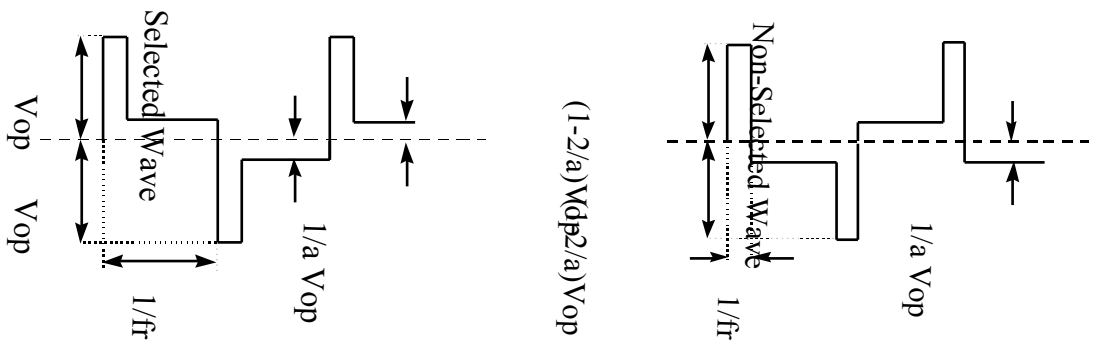
Driving Waveform : 1/N duty , 1/a bias

[Note 3]

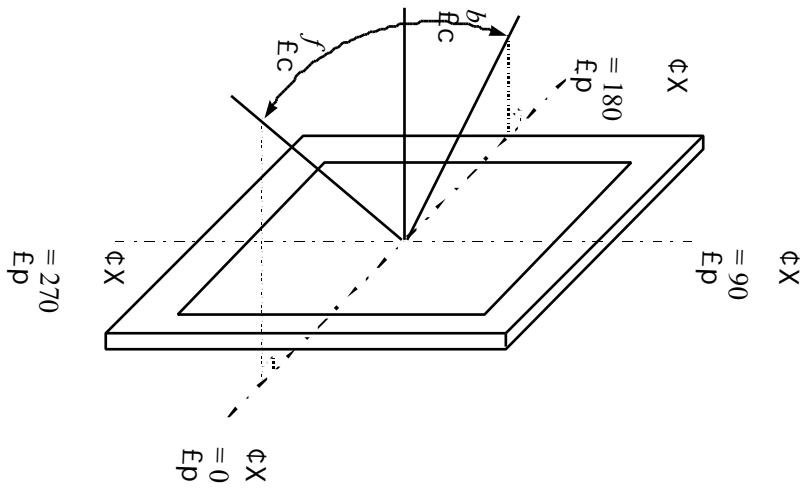
° Description of Measuring Equipment and Driving Waveforms



Multiples Driving (1/N duty , 1/a bias)



[Note 4] Definition of viewing angle



3. RELIABILITY TEST

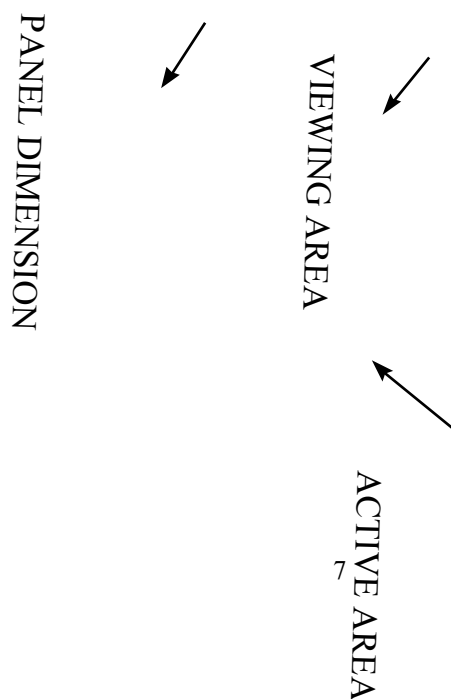
No	ITEM	Conditions		Note
1	HIGH TEMP.Operation	70	120 HR	
2	HIGH TEMP.Storage	80	120 HR	
3	LOW TEMP.Operation	-20	120 HR	
4	LOW TEMP.Storage	-30	120 HR	
5	HIGH TEMP/HUMID Storage	50 90 RH	120 HR	
6	THERMAL SHOCK	-20 ~ 70	10 cycle -20,30 min 70,30 min	

4. APPEARANCE CHECK

CONDITION OF APPEARANCE CHECK :

- (1) Specimen shall be checked by eyes in distance of 30cm under 40w fluorescence lamp.
- (2) Checking direction shall be in 45 degree from perpendicular line of specimen surface.

DEFINITION OF THE AREA :



5. HANDLING PRECAUTIONS

- (1) Treat polarizer very carefully since it is easy to be damaged.
- (2) When cleaning the display surface, use soft cloth (e.g., gauze) with a solvent (recommended below) and wipe lightly.

- ethyl alcohol
- iso-propanol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvents :

- water
- ketone
- aromatics

- (3) Direct current causes electro-chemical reaction with remarkable degradation of the display quality. Give careful consideration to prevent direct current at ON/OFF timing and during operation.
- (4) Avoid strong shock and drop from a height.
- (5) To prevent LCD panels from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity.
- (6) Give careful consideration to avoid electrical static discharge with causes uneven contrast.
- (7) Even a small condensation on the contact pads (terminals) causes electro-chemical reaction which makes missing row and column. Give careful attention to avoid condensation. When assembling with zebra connector, clean the surface of the pads with alcohol and keep the air very clean.



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