



VISSEM ELECTRONICS CO.,LTD  
R&D TEAM DEVELOPMENT PART  
395, Chungduk-Ri, Gusung-Eob, Yongin-City,  
Gyeonggi-Do, KOREA 449 - 915  
TEL: +82-31-288-3451~5  
FAX: +82-31-288-3490

# LED DOT MATRIX

# VC096T-16

ISSUED DAY	2002.4.15	ITEM	DESIGN	CHECK	APPROVAL	REFERENCE
REV.NO.	REV.DATE	SIGNATURE				
1.00	2002.6.7					
		DATE				

# 1. MODEL NAME : VC096T-16

## 2. FEATURES

ITEM	DESCRIPTION
DISPLAY COLOR	RED, GREEN, AMBER
DOT SIZE	5(mm)
DOT PITCH	6(mm)
DOT MATRIX	256(16×16)DOTs
SIZE(W×H×D)	96×96×20.5(mm)
WEIGHT	MAX.110(g)
DRIVE MODE	1/16 DUTY DRIVE

## 3. ELECTRICAL SPECIFICATION

### 1) ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITION	UNIT
VOLTAGE	$V_{CC}$	5.25	V
INPUT VOLTAGE	$V_{in}$	-0.25 ~ $V_{CC}$ ~ +0.25	V
OPERATING TEMPERATURE	$T_{opr}$ *	-10 ~ +60	°C
STORAGE TEMPERATURE	$T_{stg}$	-20 ~ +80	°C

DOT LIGHT-UP RATIO	OPERATING TEMPERATURE(°C)
MAX.50%	0 ~ +60
MIN.50%	0 ~ +45

\* LED SURFACE'S TEMPERATURE REMAINS BELOW 60°C.

IN CASE OF NECESSITY, LED SYSTEM REQUIRES COOLING FAN.

### 2) ELECTRICAL CONDITIONS


ITEM	SYMBOL	CONDITION	UNIT
INPUT VOLTAGE	$V_{CC}$	5.0 ± 0.25	V
INTERNAL OSC FREQUENCY	F	Max. 40	MHz
SUPPLY CURRENT FOR MODULE	I	Max. 2.4	A
FRAME FREQUENCY	$F_{fr}$	60~250	Hz

### 3) RECOMMENDABLE OPERATING CONDITIONS

ITEM	SYMBOL	CONDITION	UNIT
INPUT VOLTAGE	$V_{CC}$	5.0	V
OPERATING TEMPERATURE	$T_{opr}$	0 ~ 60	°C

### 4) INPUT LEVEL---SCHMITT TRIGGER(CMOS)

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT "L"	$V_{il}$	-	-	1.5	V
	$V_{t-}$	1.0	-	-	V
INPUT "H"	$V_{ih}$	3.5	-	-	V
	$V_{t+}$	-	-	4.0	V

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#### 4. OPTICAL SPECIFICATION

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
BRIGHTNESS	RED	$L_v$	-	50	-	cd/m <sup>2</sup>
	GREEN		-	55	-	
	AMBER		-	100	-	
PEAK EMISSION WAVELENGTH	RED	$\lambda_p$	-	630	-	nm
	GREEN		-	565	-	
SPECTRUM RADIATION BANDWIDTH	RED	$\Delta \lambda$	-	35	-	nm
	GREEN		-	30	-	
VIEWING ANGLE	VER.	$2\theta_{\frac{1}{2}}$	-	$\pm 35$	-	DEG
	HOR.		-	$\pm 35$	-	

#### [REFERENCE]

- ① DUTY RATIO : 1/16
- ② FRAME FREQUENCY : 250Hz
- ③ MEASUREMENT : PR-650(PHOTO-RESEARCH)
- ④ DISTANCE : 4.5m
- ⑤ GENERAL ALLOWANCE :  $\pm 15\%$
- ⑥ THE VIEWING ANGLE MEANS THAT THE ANGLE UNTIL 50% OF BRIGHTNESS MEASURED FROM THE FRONT PART OF LED MODULE IS MEASURED IN VERTICAL AND HORIZONTAL


#### 5. SIGNAL FUNCTION

##### 1) DATA SIGNAL FUNCTION

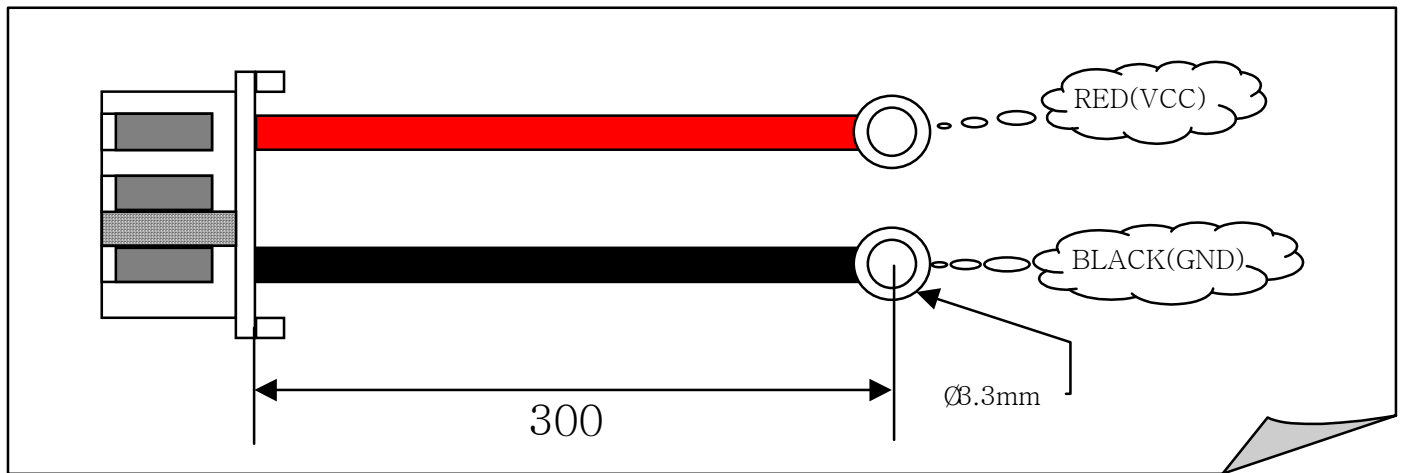
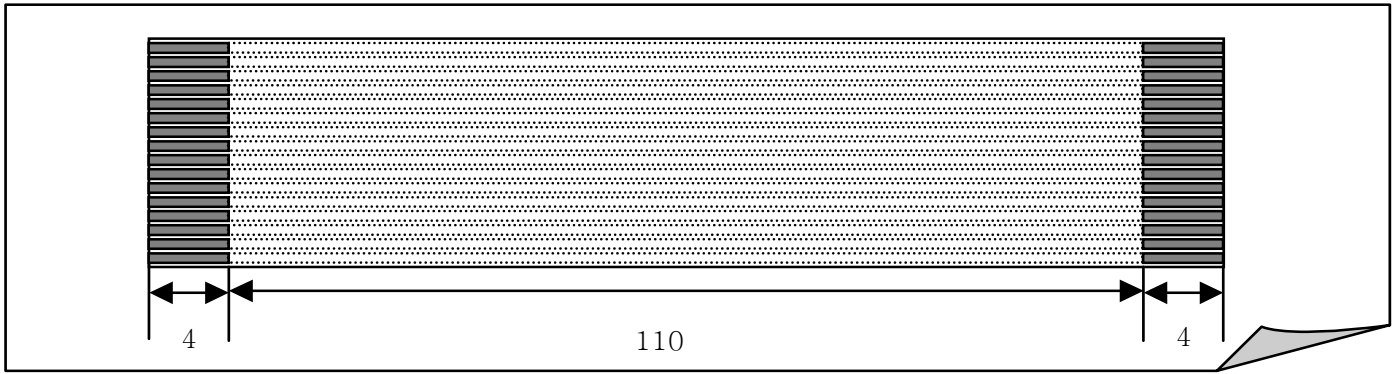
PIN NUMBER	PIN NAME	FUNCTION DESCRIPTION
1	G-CLOCK	NOT USED( <i>MUST BE CONNECTED TO GROUND</i> )
2, 10	GND	GROUND OF THE MODULE
3	OE	DISPLAY ON/OFF CONTROL
4	LATCH	DATA STROBE
5	LOAD	NOT USED( <i>MUST BE CONNECTED TO GROUND</i> )
6	RED	DATA INPUT FOR RED DATA
7	GREEN	DATA INPUT FOR GREEN DATA
8	BLUE	NOT USED( <i>MUST BE CONNECTED TO GROUND</i> )
9	CLOCK	CLOCK SIGNAL FOR INPUT DATA
11, 12, 13, 14	A[3:0]	4BIT LINE ADDRESS
15	VD/CD	NOT USED( <i>MUST BE CONNECTED TO GROUND</i> )
16	CRL/BRT	NOT USED( <i>MUST BE CONNECTED TO GROUND</i> )

##### 2) POWER SIGNAL FUNCTION


PIN NUMBER	PIN NAME	FUNCTION DESCRIPTION
1, 2	GND	GROUND OF THE MODULE
3	V <sub>CC</sub>	SUPPLY VOLTAGE FOR MODULE

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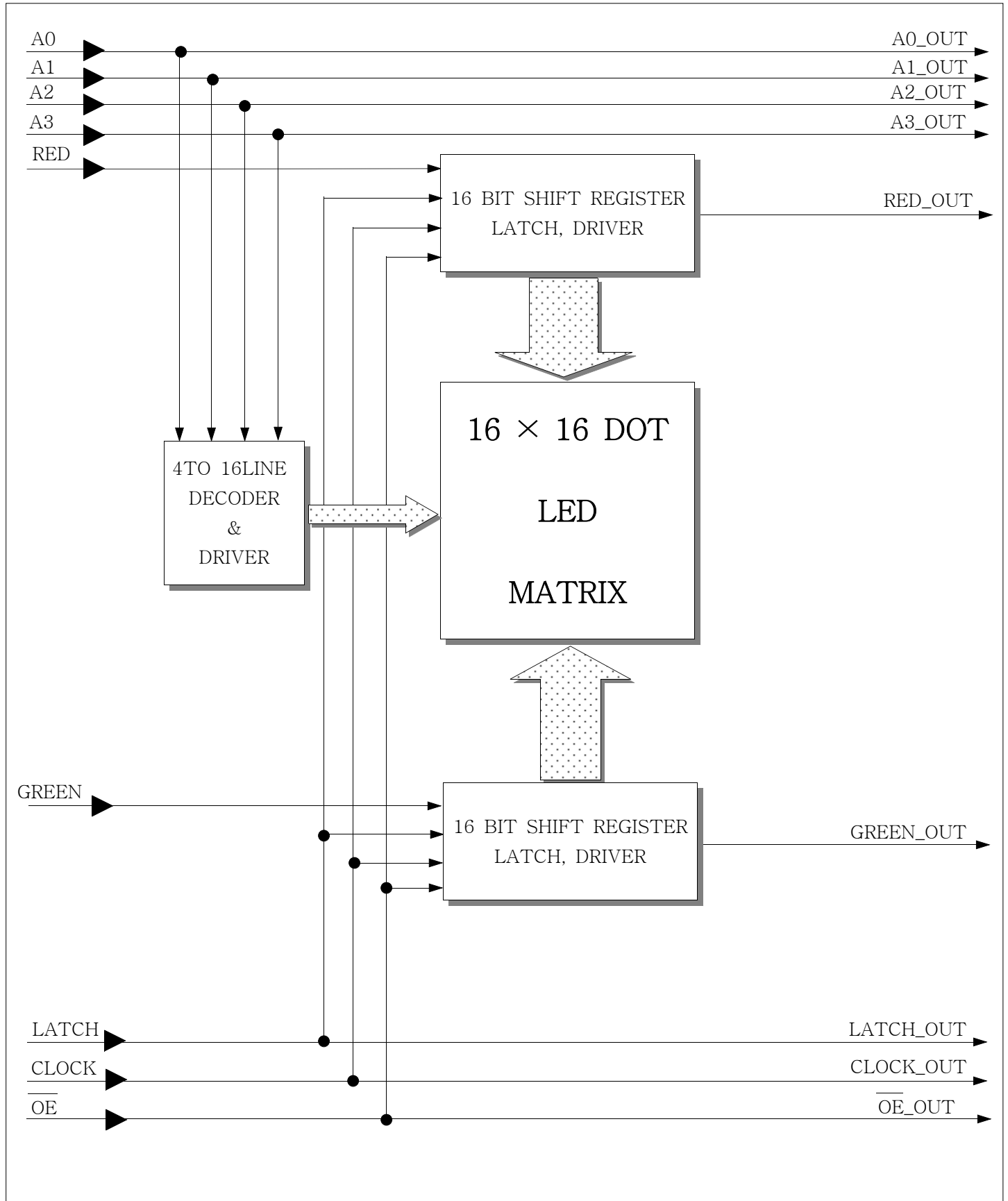
### 3) CONNECTOR CABLE SPECIFICATION




ITEM	VENDOR	MODEL NO.	SPECIFICATION	HOUSING MODEL NO.
DATA CABLE	G.Y CONNECTOR	FCZ100-16SS-K	16PIN, 1mm PITCH	FPC-16-120
POWER CABLE	G.Y CONNECTOR	GW-03	3PIN, 2.54mm PITCH	GH-0324-300R

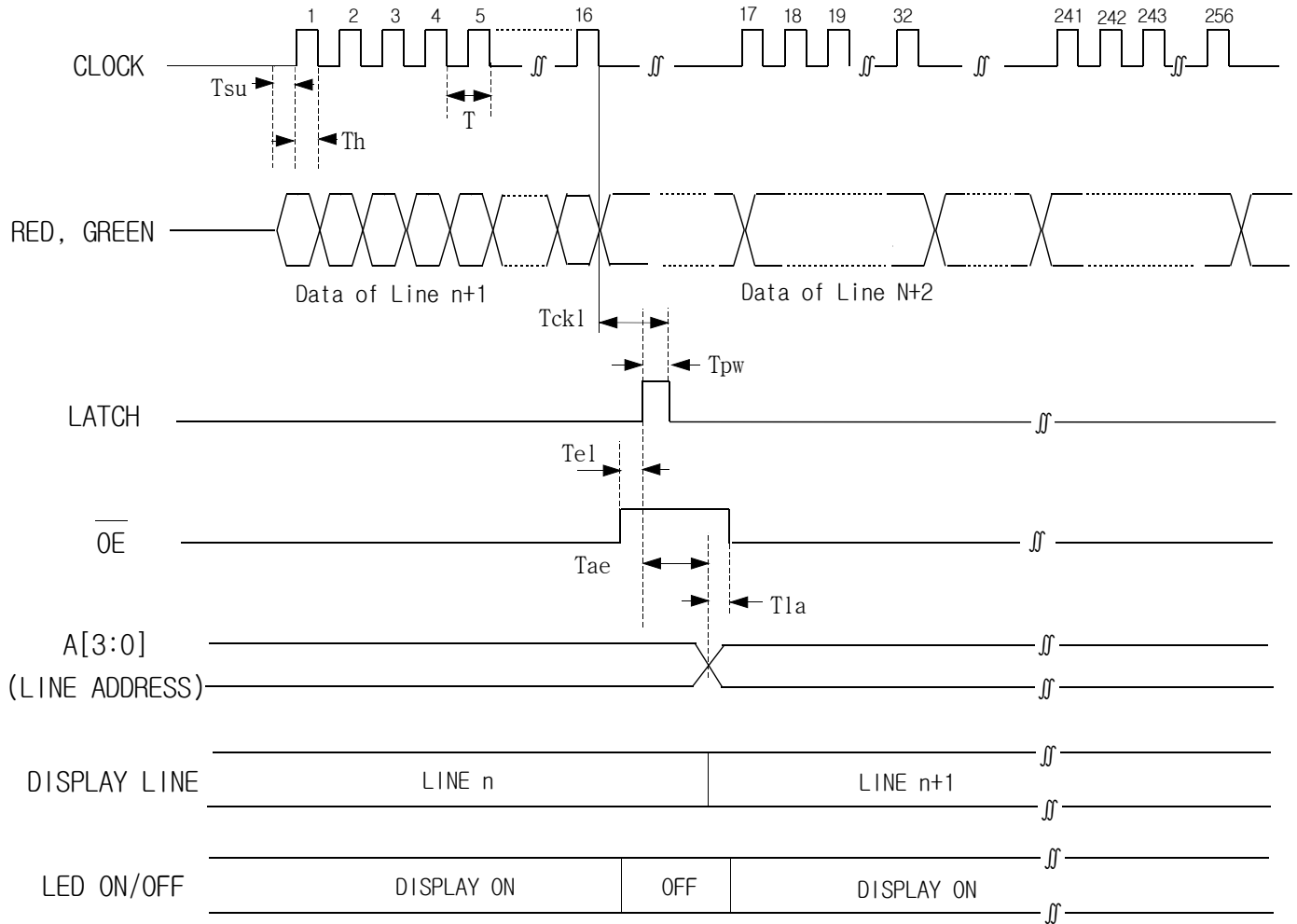
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## 6. BLOCK DIAGRAM




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## 7. TIMING CHART

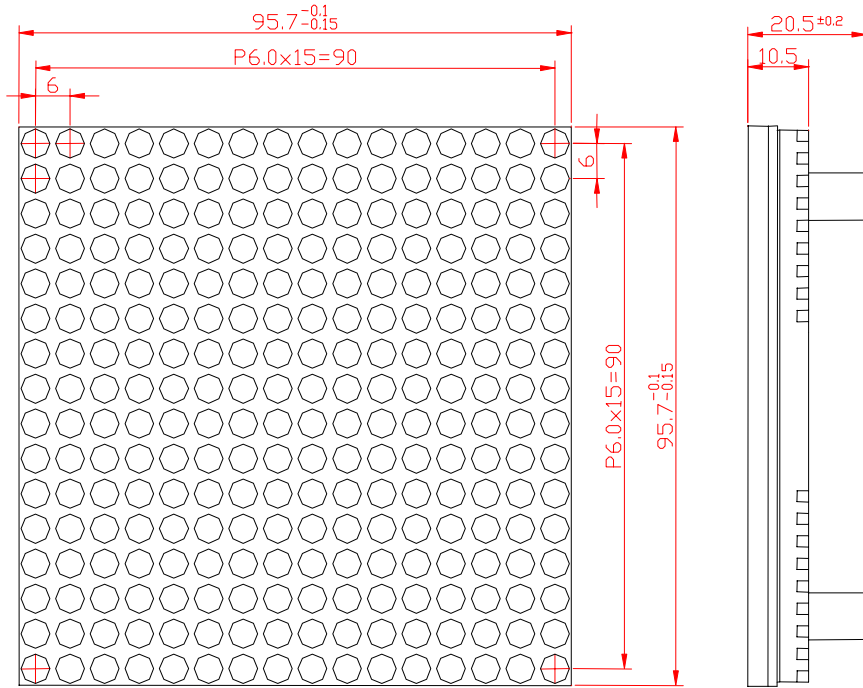


( $T_a=25^{\circ}\text{C}$ ,  $V_{cc}=5\text{V}$ )

CHARACTERISTICS	SYMBOL	MIN.	MAX.	UNIT
CLOCK CYCLE	T	-	25	MHz
DATA SETUP TIME	$T_{su}$	5	-	ns
DATA HOLD TIME	$T_h$	5	-	ns
LATCH PULSE WIDTH	$T_{pw}$	20	-	ns
CLOCK-LATCH TIME	$T_{ckl}$	20	-	ns
ENABLE-LATCH TIME	$T_{el}$	10	-	ns
ADDRESS-ENABLE TIME	$T_{ae}$	20	-	ns
LATCH-ADDRESS TIME	$T_{la}$	20	-	ns

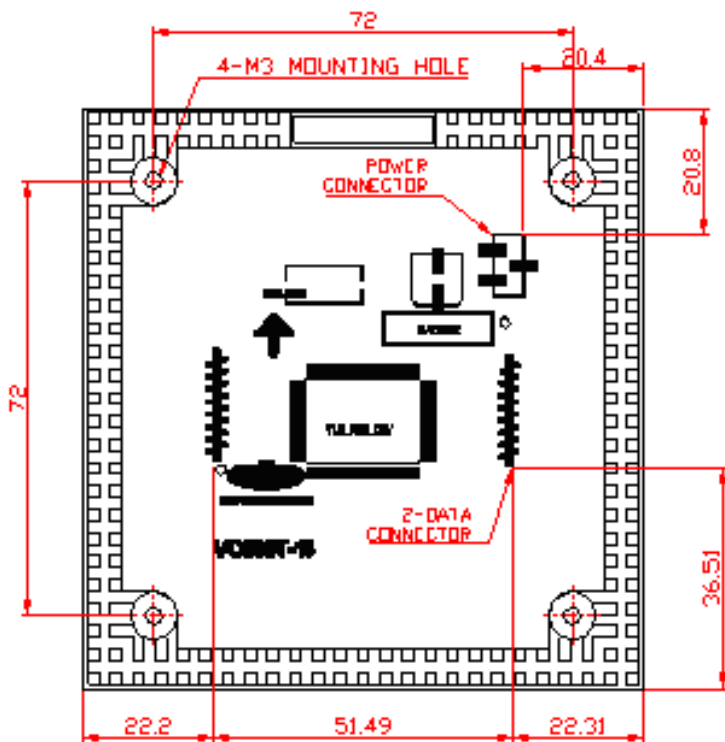
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## 8. DIMENSION




FRONT VIEW

SIDEVIEW




REAR VIEW

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## ● Precautions in installing LED Module


1. Please escape the place where electromagnetic wave and noise is, which might cause malfunction to LED module, when install LED Display Board.
2. Since over voltage and reverse voltage might cause the problem in internal circuit and LED, please make sure and check the input voltage range, before operation.
3. Please escape the high humidity and leakage place which cause the LED module to be broken
4. The temperature of the surface of LED module shall be under 60°C during operation.
5. Heating from LED might cause damage in LED module or/and malfunction in LED display board, user shall prepare suitable ventilation and cooling facility.
6. Even though the brightness become lower and lower, after long time use, it's prohibited to input over voltage in order to increase the brightness, which might cause severe damage to LED Module.  
For the best operation, user shall operate LED module according to data sheet.
7. Please turn off the power supply, when display data are not charged.
8. Please be careful not to exposure LED Module to the dust, dirt, base, gas and other noxious gas, when install LED Display.
9. User shall consider the weight of LED module enough, when prepare steel structure and install LED Display Board.

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## ● Precautions in using LED Module

1. Any jumper and switch is set up properly before delivery, please do not modify or/and change setting without consulting with manufacturer.
2. The circuit part of LED Module include CMOS components, please treat carefully with consideration of static electricity
3. Impact and vibration to LED Module might be the reason of disconnection and dot off, please escape those factors.
4. It's highly recommended to escape the high temperature & humidity and be careful not to exposure LED module to dust, dirt, base and SO2 Gas and other noxious Gas in order to escape the potential problem.
5. Please be careful not to be scratched and hurt on the surface of LED module.
6. It's prohibited to clean up LED module with solvent.  
In order to clean up LED module, it's highly recommended to use a piece of dried cloth and smooth brush.
7. Stacking LED modules without anti-impact material and wearing out the surface or/and edge of LED modules might cause fatal problem.
8. Please be careful not to exposure LED Module to the dust, dirt, base, gas and other noxious gas, when install LED Display.
9. User shall consider the weight of LED module enough, when prepare steel structure and install LED Display Board.
10. It's highly recommended to use twisted cable or shielded wire in order to remove the noise from high frequency.
11. When user use and store LED module, please pack LED module with anti-static material.

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