



VL-FS-MGLS12864T-54 REV. A
(MGLS12864T-BLUE-LED WHITE)

OCT/2002

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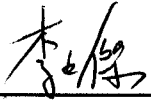
DOCUMENT NUMBER AND REVISION

VL-FS-MGLS12864T-54 REV. A
(MGLS12864T-BLUE-LED WHITE)

DOCUMENT TITLE:

SPECIFICATION
OF
LCD MODULE TYPE

CUSTOMER	
MODEL NUMBER	MGLS12864T-54
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	PHILIP CHENG		2002/10/29
CHECKED BY	TOM LEE		2002/10/29
APPROVED BY	CYRUS CHEUNG		2002/10/29

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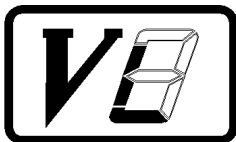
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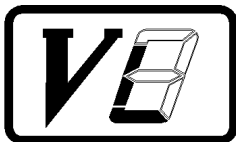
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VARITRONIX LIMITED

Specification of LCD Module Type Item No.: MGLS12864T-54

1. General Description

- 128 x 64 dots STN Negative Blue Transmissive LCD graphic module.
- Driving scheme: 1:64 multiplexed drive, 1/9 bias.
- Viewing direction: 6 O'clock.
- 'TOSHIBA' T6963C flat pack or equivalent LCD controller.
- 'TOSHIBA' T6A39 flat pack or equivalent LCD segment drivers.
- 'TOSHIBA' T6A40 flat pack or equivalent LCD common driver.
- 8K byte display SRAM.
- White LED05 backlight.

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	78.0(W) x 70.0(H) x 13.0 MAX.(D) (Excluded cable) 82.0(W) x 70.0(H) x 13.0 MAX.(D) (Included cable)	mm
Viewing area	62.0(W) x 44.0(H)	mm
Active area	56.27(W) x 38.35(H)	mm
Display format	128(Horizontal) x 64(Vertical)	dots
Dot size	0.39(W) x 0.55(H)	mm
Dot spacing	0.05(W) x 0.05(H)	mm
Dot pitch	0.44(W) x 0.60(H)	mm
Weight	TBD	gram

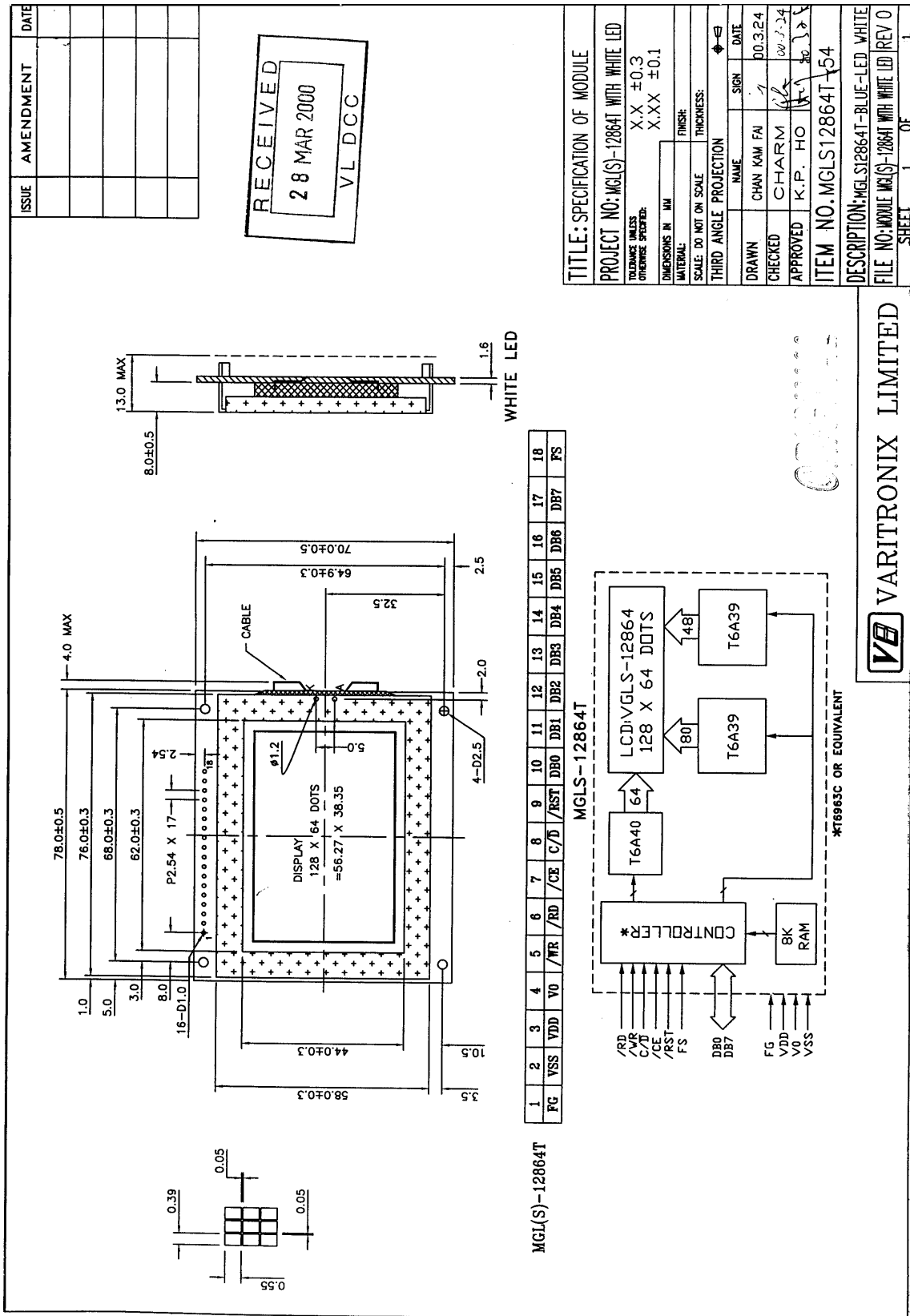
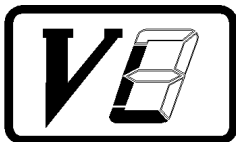


Figure 1: Outline drawing of MGLS12864T-GREEN-LV module.

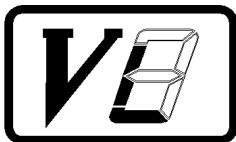


3. Interface signals

Table 2

Pin No.	Symbol	Description
1	FG	Frame ground (see note 1)
2	VSS	Ground (0V)
3	VDD	Power supply for logic (+5V)
4	V0	Power supply for LCD drive
5	/WR	Command/Data write to module when "Low"
6	/RD	Command/Data read from module when "Low"
7	/CE	Chip enable of controller when "Low"
8	C / $\overline{D}$	Command/Data read/write. "High" for command read/write and "Low" for data read/write
9	/RST	Controller reset when "Low"
10	DB0	Data input/output (LSB)
11	DB1	Data input/output
12	DB2	Data input/output
13	DB3	Data input/output
14	DB4	Data input/output
15	DB5	Data input/output
16	DB6	Data input/output
17	DB7	Data input/output (MSB)
18	FS	Font select. "High" for 6 x 8 font & "Low" for 8 x 8 font.
-	K	Cathode of backlight
-	A	Anode of backlight

Note 1: This pin is electrically connected to the metal bezel(frame).
User can choose to connect this pin to VSS or leave it open.



4. Absolute Maximum Ratings

4.1 Electrical Maximum Ratings(Ta = 25 °C)

Table 3

Parameter	Symbol	Min.	Max.	Unit
Supply voltage (Logic & LCD)	VDD - VSS	-0.3	+7.0	V
Supply voltage (LCD drive)	VLCD=VDD – V0	-0.3	+28.0	V
Input voltage	Vin	-0.3	VDD +3.0	V

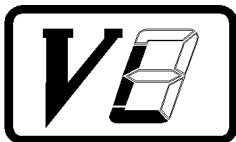
Note:

The modules may be destroyed if they are used beyond the absolute maximum ratings.
All voltage values are referenced to VSS = 0V.

4.2 Environmental Condition

Table 4

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-10°C	+60°C	Dry
Humidity	95% max. RH for Ta ≤ 40°C < 95% RH for Ta > 40°C				no condensation
Vibration (IEC 68-2-6) cells must be mounted on a suitable connector	Frequency: 10 ~ 55 Hz Amplitude: 0.75 mm Duration: 20 cycles in each direction.				3 directions
Shock (IEC 68-2-27) Half-sine pulse shape	Pulse duration : 11 ms Peak acceleration: 981 m/s ² = 100g Number of shocks : 3 shocks in 3 mutually perpendicular axes.				3 directions



5. Electrical Specifications

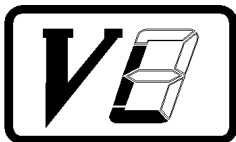
5.1 Typical Electrical Characteristics

At $T_a = 25\text{ }^{\circ}\text{C}$, $V_{DD} = 5\text{V} \pm 5\%$, $V_{SS} = 0\text{V}$.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	$V_{DD} - V_{SS}$		4.75	5.00	5.25	V
Supply voltage (LCD)	$V_{LCD} = V_{DD} - V_0$	$V_{DD} = 5\text{V}$, Note 1	11.5	12.0	12.5	V
Input signal voltage	V_{IN}	“H” level	$V_{DD} - 2.2$	-	V_{DD}	V
		“L” level	0	-	0.8	V
Supply current (Logic & LCD)	I_{DD}	Character mode, $V_{DD} = 5\text{V}$, Note 1	-	6.1	9.2	mA
		Checker board mode, $V_{DD} = 5\text{V}$, Note 1	-	6.2	9.3	mA
Supply current (LCD)	I_0	Character mode, $V_{DD} = 5\text{V}$, Note 1	-	2.2	3.3	mA
		Checker board mode, $V_{DD} = 5\text{V}$, Note 1	-	2.2	3.3	mA
Supply voltage of white LED05 backlight	V_{LED}	Forward current = 40 mA Number of LED dies = (1x1)x2 = 1x2 = 2. Color rank: B	3.1	3.4	3.6	V

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.



5.2 Timing Specifications

At $T_a = 0^{\circ}\text{C}$ To $+50^{\circ}\text{C}$, $V_{DD} = 5\text{V} \pm 5\%$, $V_{SS} = 0\text{V}$

Refer to Fig. 2, the bus timing diagram.

Table 6

Parameter	Symbol	Min.	Max.	Unit
C/D Set-up time	t_{CDS}	100	-	ns
C/D Hold Time	t_{CDH}	10	-	ns
/CE, /RD, /WR Pulse Width	$t_{\text{CE}}, t_{\text{RD}}, t_{\text{WR}}$	80	-	ns
Data Set-up Time	t_{DS}	80	-	ns
Data Hold Time	t_{DH}	40	-	ns
Access Time	t_{ACC}	-	150	ns
Output Hold Time	t_{OH}	10	50	ns

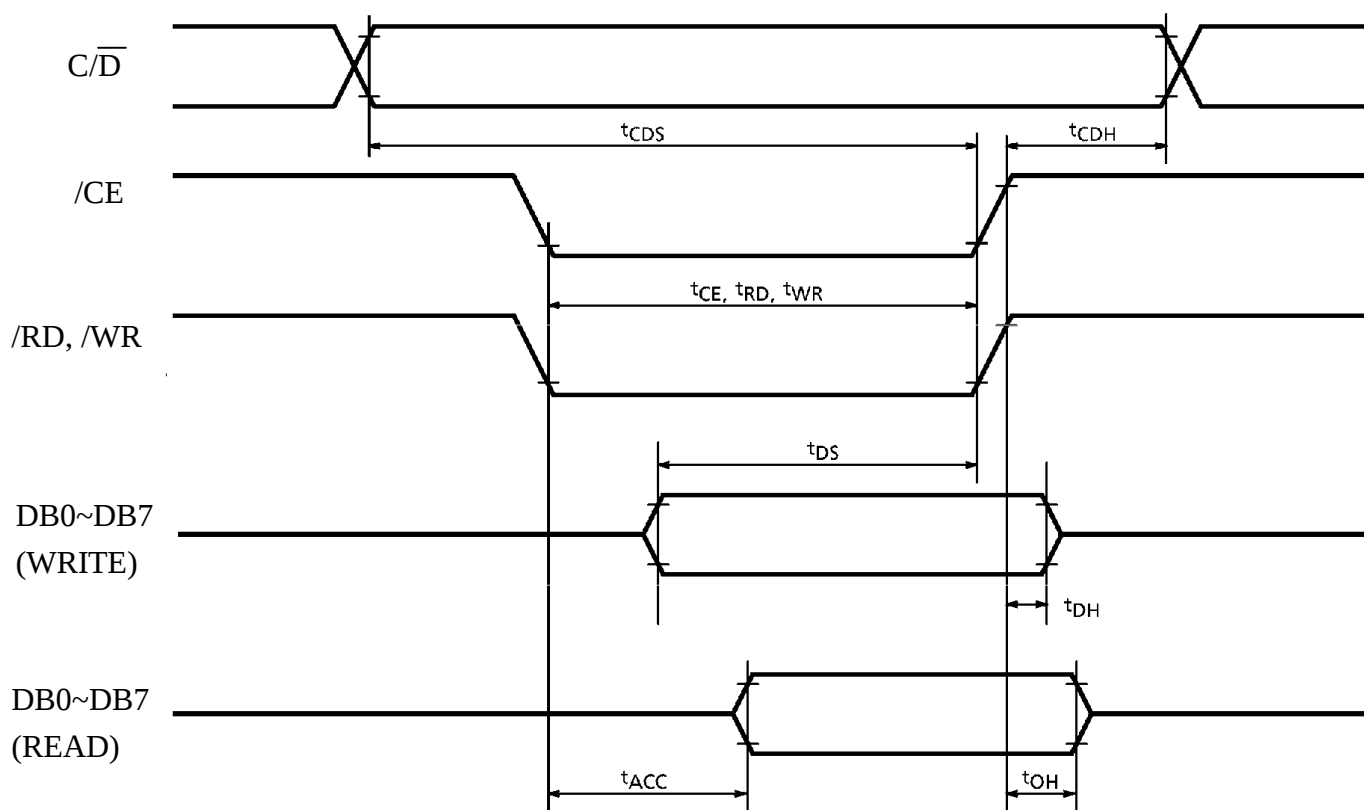
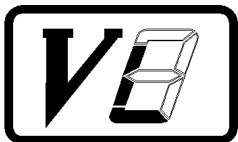


Figure 2: Bus Timing Diagram



5.3 Timing Diagram of VDD Against Vo.

Power on sequence shall meet the requirement of Figure 3, the timing diagram of VDD against V0.

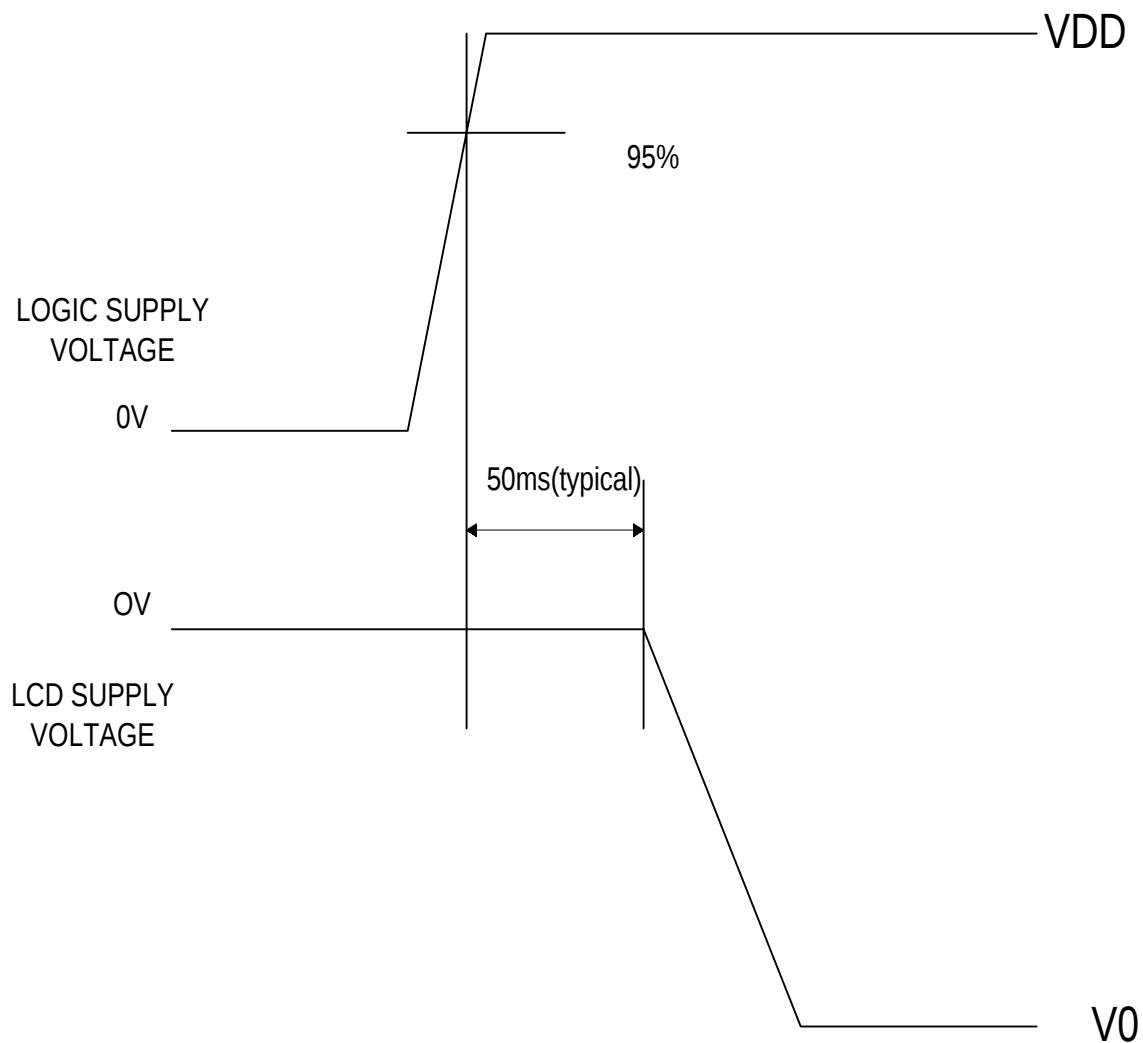
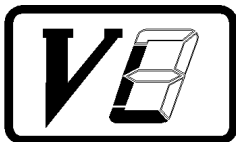


Figure 3: Timing Diagram of VDD Against V0.



6. APPENDIX

These specifications shall be applied to the White LED-Lamp (LED or LEDs),
NSPWF50BS, which is supplied by Nichia Corporation (Nichia).

1. SPECIFICATIONS

(1) Absolute Maximum Rating

(Ta=25°C)

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	IF	30	mA
Pulse Forward Current	IFP	100	mA
Reverse Voltage	VR	5	V
Power Dissipation	PD	120	mW
Operating Temperature	Topr	-30 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +100	°C
Lead Soldering Temperature	Tsol	260±5°C for 5sec. (3.0mm from the base of the epoxy bulb)	

IFP Conditions : Pulse Width ≤ 10msec. and Duty ≤ 1/10

(2) Initial Electrical/Optical Characteristics

(Ta=25°C)

Electrical & Optical Characteristics							(TA=25°C)
Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage		V _F	I _F =20[mA]	—	3.6	4.0	V
Reverse Current		I _R	V _R = 5[V]	—	—	50	μ A
Luminous Intensity	Rank S	I _v	I _F =20[mA]	300	360	420	mcd
	Rank R	I _v	I _F =20[mA]	210	260	300	mcd
	Rank Q	I _v	I _F =20[mA]	150	180	210	mcd

※ One delivery will include three different ranks of products. The quantity-ratio of the three ranks is decided by Nichia.

Measurement Uncertainty of the Luminous Intensity : ±10%

Color Ranks

(IF=20mA, Ta=25°C)

	Rank a			
x	0.250	0.250	0.290	0.290
y	0.205	0.250	0.305	0.260

	Rank b			
x	0.290	0.290	0.330	0.330
y	0.260	0.305	0.365	0.320

	Rank c			
x	0.330	0.330	0.370	0.370
y	0.320	0.365	0.420	0.375

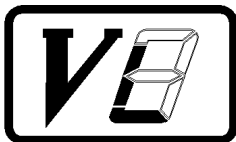
※ One delivery will include the consecutive two ranks of products.

The quantity-ratio of the two ranks is decided by Nichia.

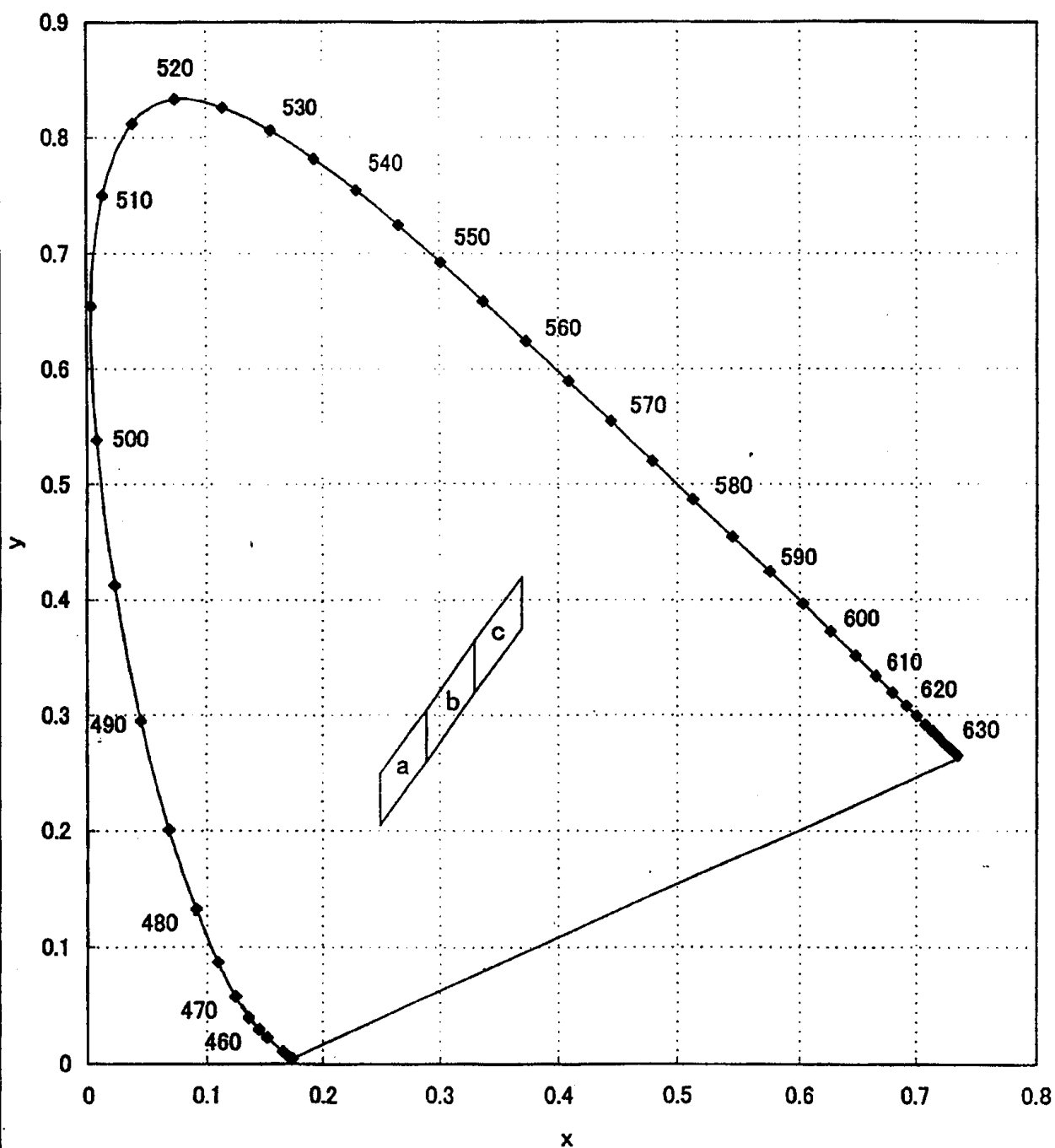
Measurement Uncertainty of the Color Coordinates : ±0.02

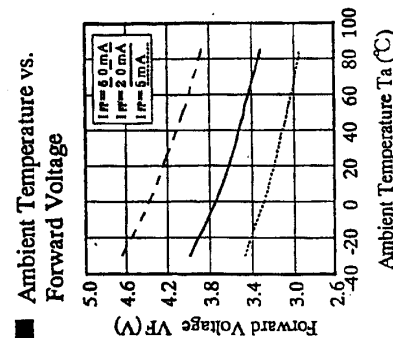
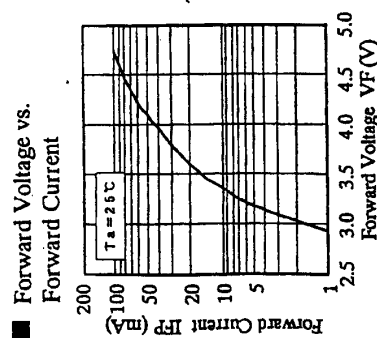
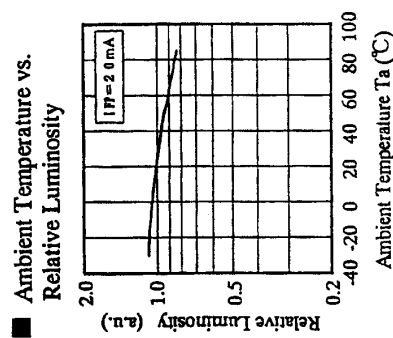
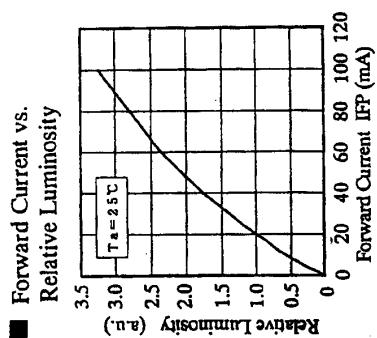
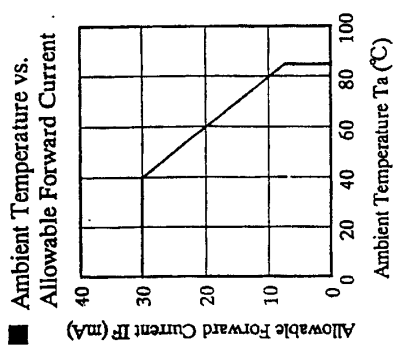
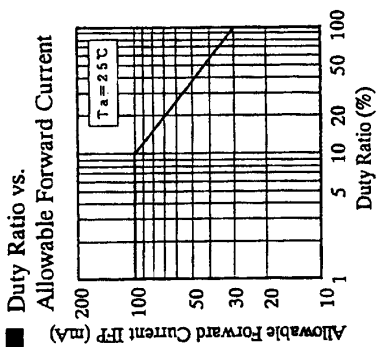
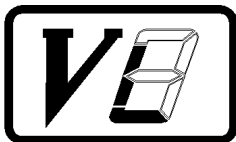
2. TYPICAL INITIAL OPTICAL/ELECTRICAL CHARACTERISTICS

Please refer to figures No.STLZ-A906042, No.STLZ-A801473.



ICI Chromaticity Diagram

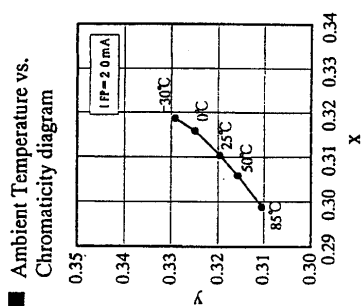
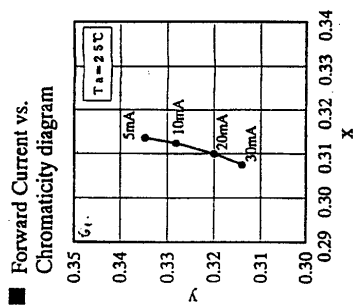
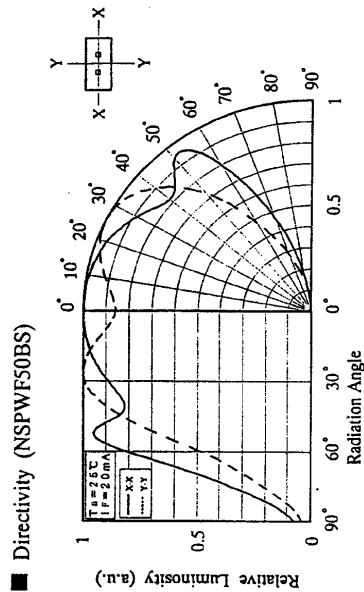
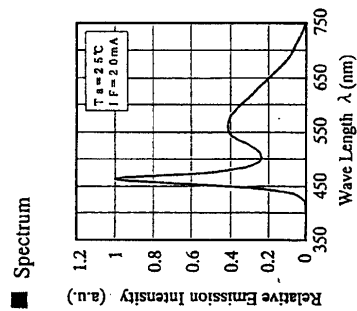




Rev.1	Section	Approve	Check	Draw
Rev.2	ST	Bando	Y. Yamashita	Tamura
Rev.3	Date	Jun.1,1999		
Rev.4	Model	NSPWxxxx		
Title TYP.CHARACTERISTICS				
No. STLZ-A906042				

NICHIA CORPORATION





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Rev.2	ST	Bande	Handaka	Sakaya
Rev.3	Date	Jun.1.1999		
Rev.4	Model	NSPWF50BS		
NICHIA CORPORATION		Title TYP.CHARACTERISTICS		
		No.	STLZ-A801473	

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