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
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CONTENTS

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

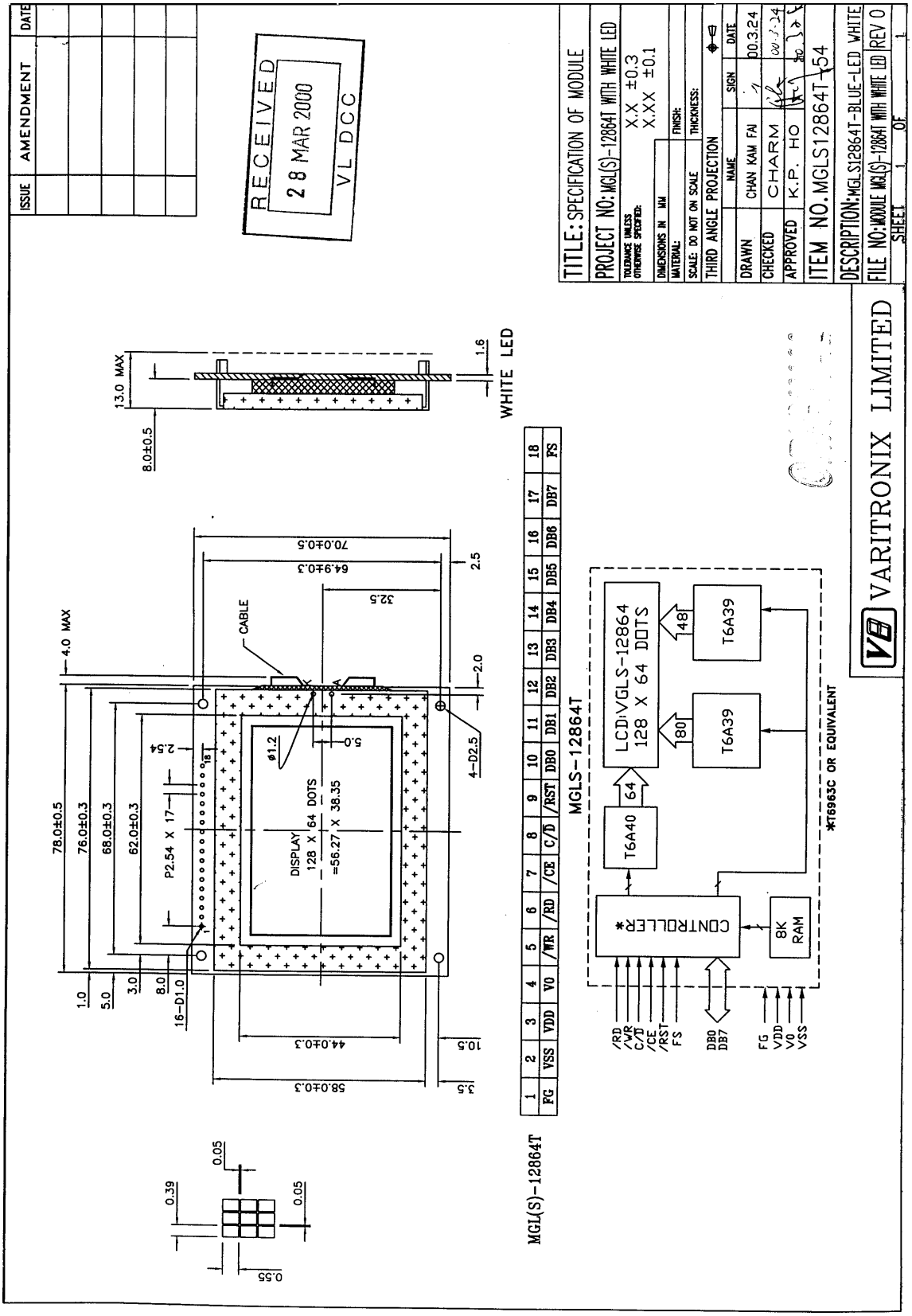


Figure 1: Outline drawing of MGLS12864T-GREEN-LV module.

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 ºC)

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 Ta = 25 °C, VDD = 5V±5%,VSS = 0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD –VSS		4.75	5.00	5.25	V
Supply voltage (LCD)	VLCD =VDD –V0	VDD = 5V,Note 1	11.5	12.0	12.5	V
Input signal voltage	VIN	"H" level	VDD -2.2	-	VDD	V
		"L" level	0	-	0.8	V
Supply current (Logic & LCD)	IDD	Character mode, VDD = 5V,Note 1	-	6.1	9.2	mA
		Checker board mode, VDD = 5V, Note 1	-	6.2	9.3	mA
Supply current (LCD)	I0	Character mode, VDD = 5V,Note 1	-	2.2	3.3	mA
		Checker board mode, VDD = 5V, Note 1	-	2.2	3.3	mA
Supply voltage of white LED05 backlight	VLED	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 Ta = 0°C To +50°C, VDD = 5V±5%,VSS=0V

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_{CE}, t_{RD}, t_{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

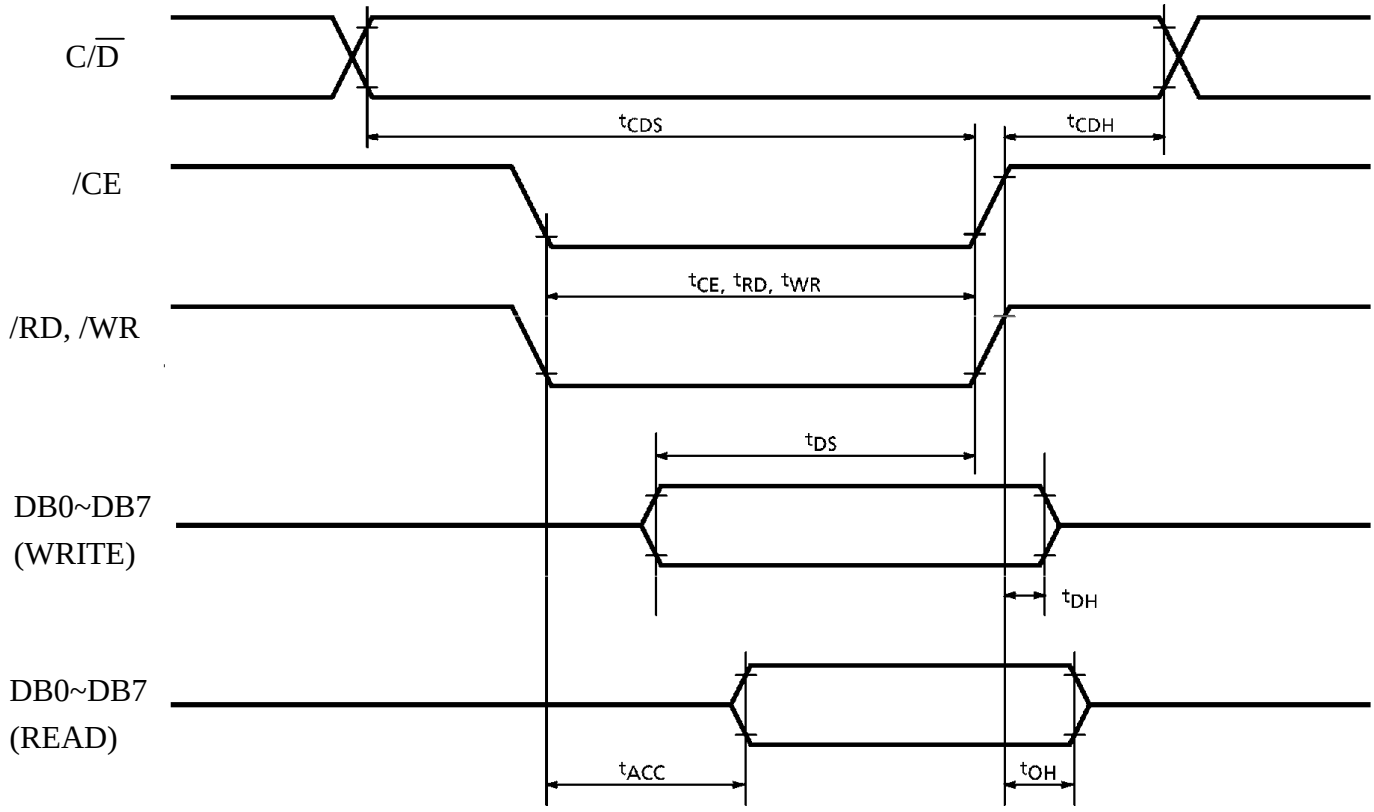


Figure 2: Bus Timing Diagram

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.

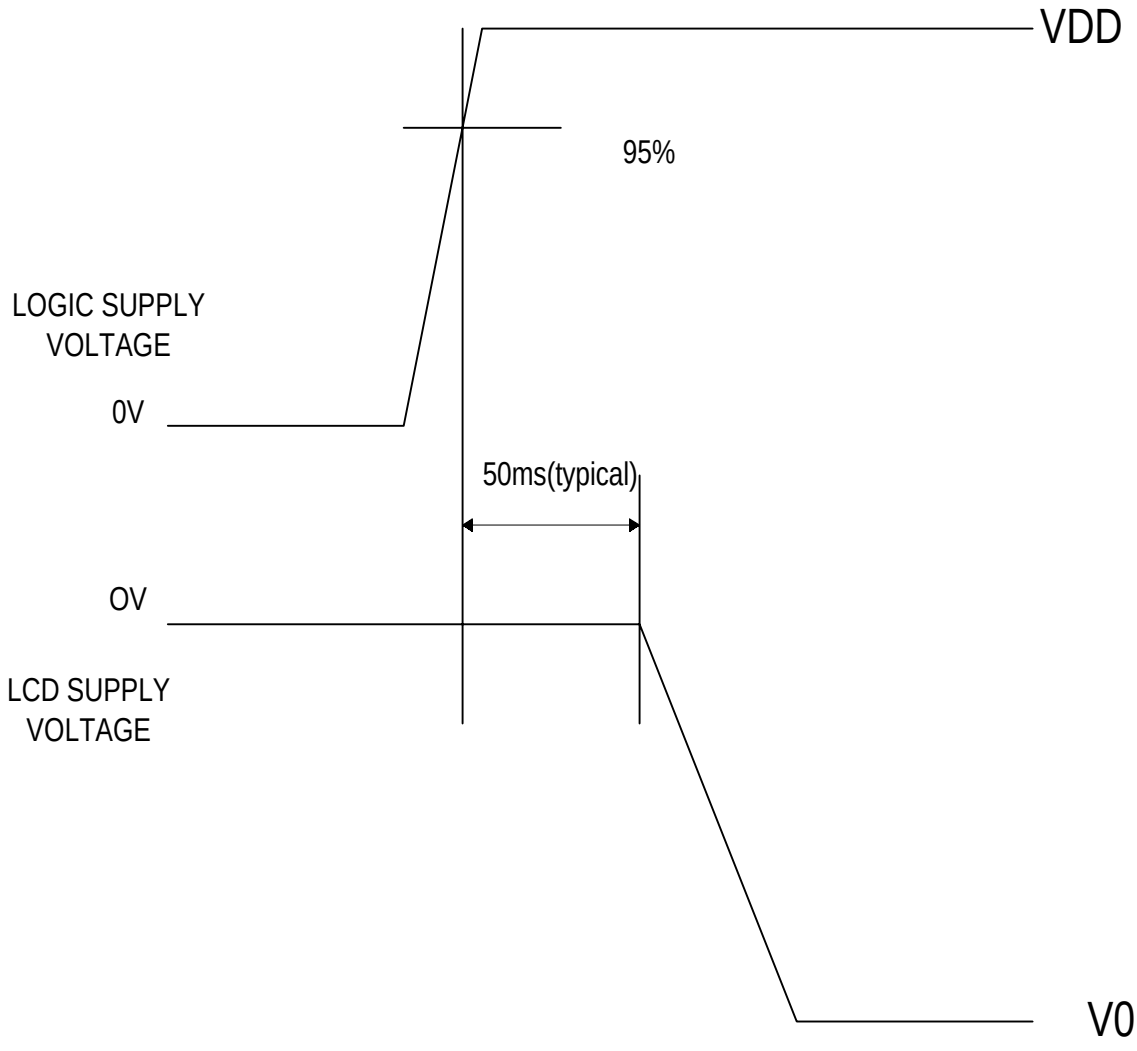


Figure 3: Timing Diagram of VDD Against V0.

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℃)

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	I_F	30	mA
Pulse Forward Current	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Power Dissipation	P_D	120	mW
Operating Temperature	Topr	−30 ～ +85	℃
Storage Temperature	Tstg	−40 ～ +100	℃
Lead Soldering Temperature	Tsol	260±5℃ for 5sec. (3.0mm from the base of the epoxy bulb)	

I_{FP} Conditions : Pulse Width ≦ 10msec. and Duty ≦ 1/10

(2) Initial Electrical/Optical Characteristics (Ta=25℃)

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	μA
Luminous Intensity	Rank S	Iv	I_F=20[mA]	300	360	420	mcd
	Rank R	Iv	I_F=20[mA]	210	260	300	mcd
	Rank Q	Iv	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 (I_F=20mA,Ta=25℃)

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

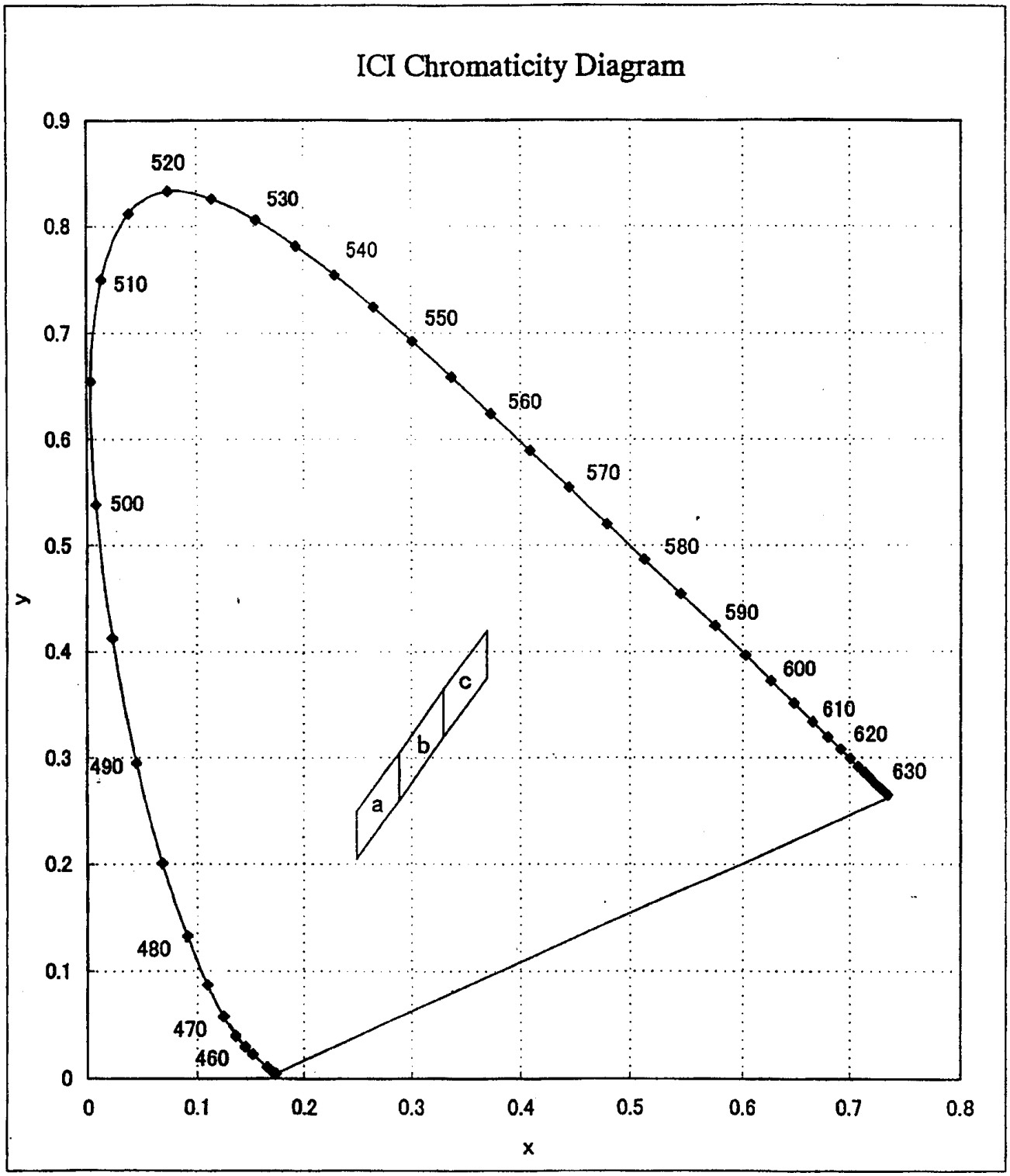
	Rank b			
x	0.290	0.290	0.330	0.330
y	0.260	0.305	0.365	0.320

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

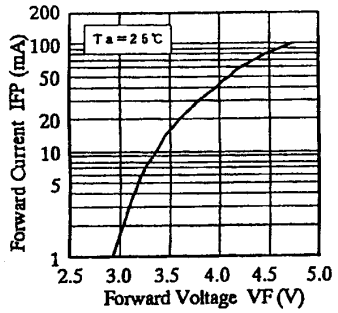
※ One delivery will include the consecutive two ranks of products.
The quantity-ratio of the two ranks is decided by Nichia.
Measurement Uncertainty of the Color Coordinates : ±0.02

2.TYPICAL INITIAL OPTICAL/ELECTRICAL CHARACTERISTICS

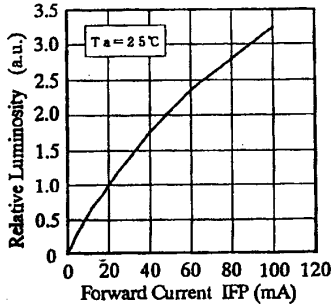
Please refer to figures No.STLZ-A906042, No.STLZ-A801473.


ICI Chromaticity Diagram
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
y
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
x
520
530
540
550
560
570
580
590
600
610
620
630
510
500
490
480
470
460
a
b
c

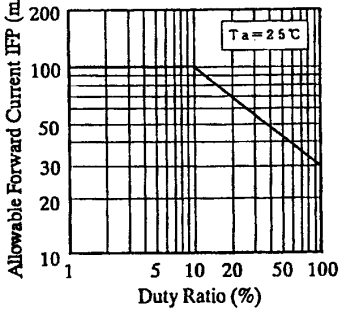
■ Forward Voltage vs. Forward Current



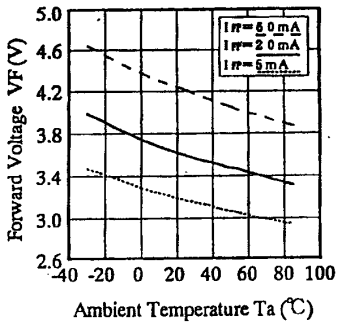
■ Forward Current vs. Relative Luminosity



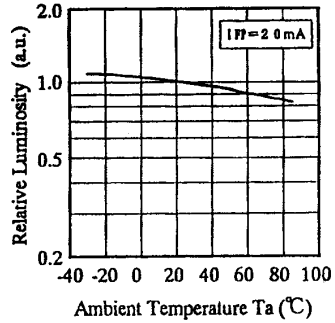
■ Duty Ratio vs. Allowable Forward Current



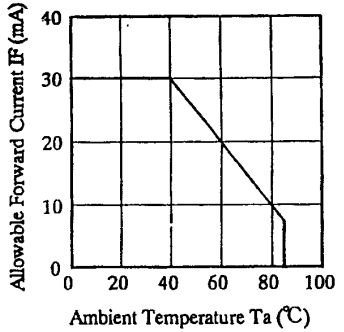
■ Ambient Temperature vs. Forward Voltage



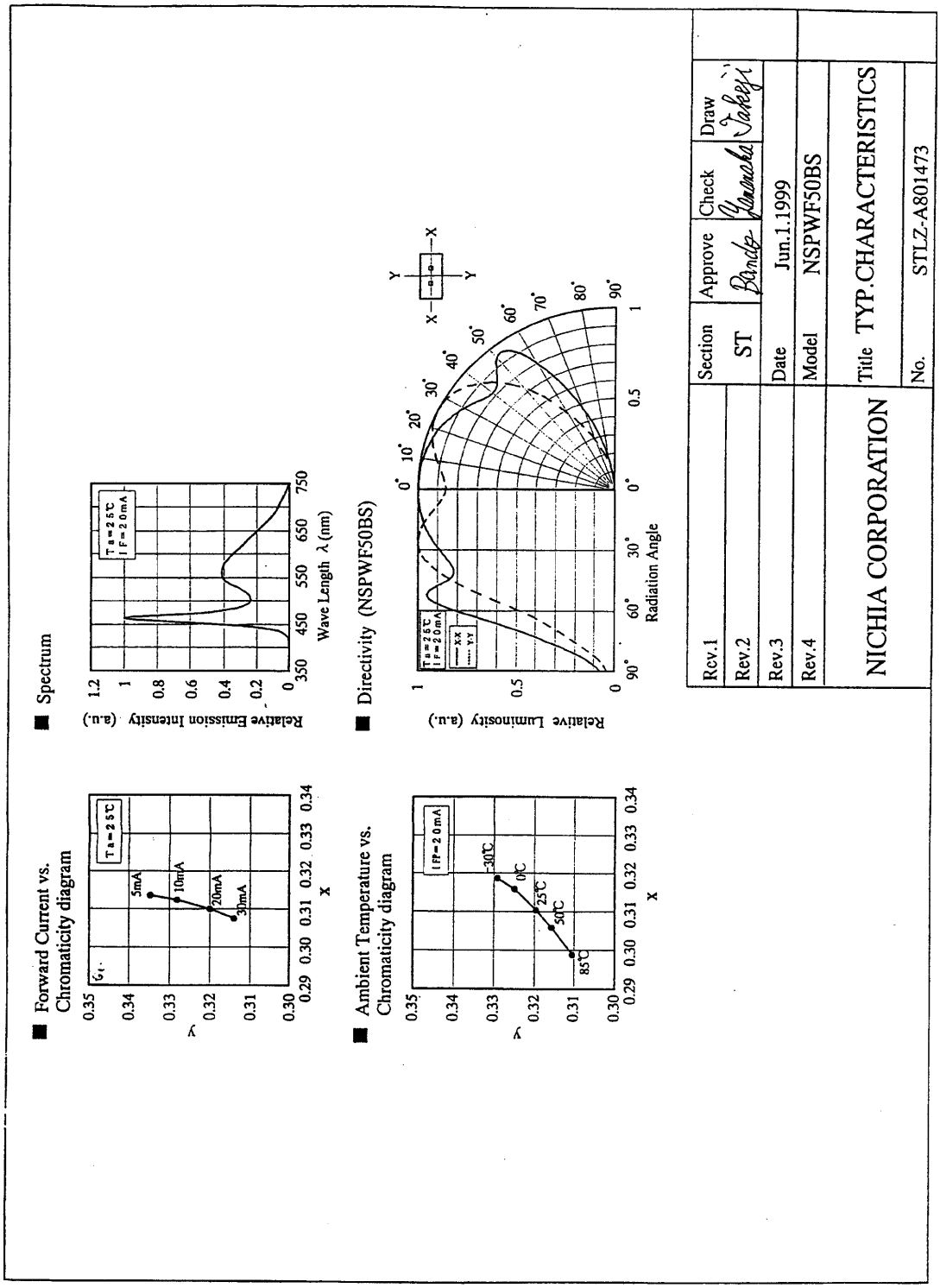
■ Ambient Temperature vs. Relative Luminosity



■ Ambient Temperature vs. Allowable Forward Current



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



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