



BRIGHT LED ELECTRONICS CORP.

LED DISPLAY SPECIFICATION

TOTAL PAGE: 7
 PAGE: 1
 VERSION: 1.0

- COMMODITY : .56”(14.20mm) DRIVER IC THREE DIGIT LED DISPLAY
- DEVICE NUMBER : BT-M512RD-DR1

SHEET / DATE	1	2	3	4	5	6	7				CONTENTS
2002.08.21	-	1.2	1.0	1.0	1.0	1.0	1.0				Original Release
2003.04.03	1.0	1.3	1.0	1.0	1.0	1.0	1.0				Add page 1 & Edit pin connection

TOTAL PAGE	7																
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佰鴻工業股份有限公司

BRIGHT LED ELECTRONICS CORP.
 台北縣板橋市和平路 19 號 3 樓
 3F., No. 19, Ho Ping Road, Pan Chiao City,
 Taipei, Taiwan, R. O. C.
 Tel: 886-2-29591090
 Fax: 886-2-29547006/29558809
www.brtled.com

APPROVED	DRAWER

BRIGHT LED ELECTRONICS CORP.

LED DISPLAY SPECIFICATION

●COMMODITY : 0.56”(14.20mm) THREE DIGIT LED DISPLAY

PAGE: 2

●DEVICE NUMBER : BT-M512RD-DR1

VERSION : 1.3

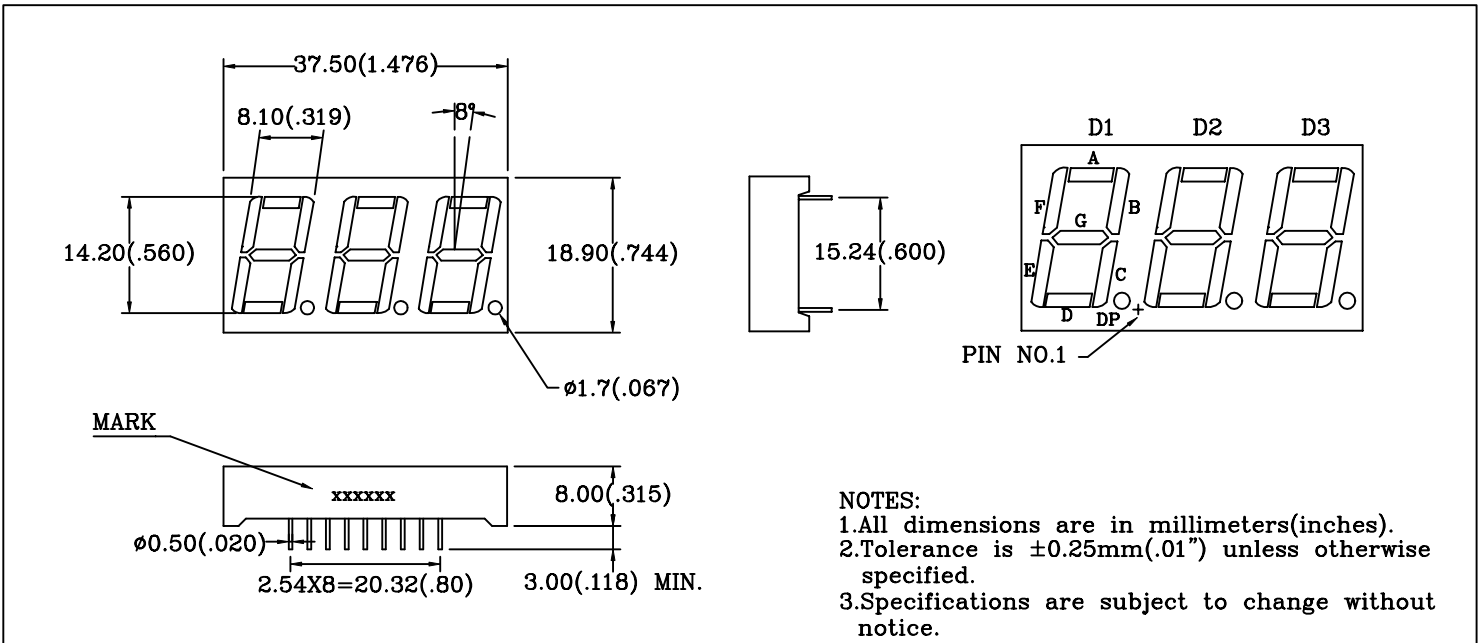
●ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

Chip		Absolute Maximum Rating				Electro-optical Data (At 10mA)			Surface Color	Segment Color
Emitted Color	Peak Wave Length λP(nm)	Δλ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)		Iv Typ. (mcd)		
						Typ.	Max.			
Green	568	30	80	30	150	2.1	2.5	3.0	Black	White

●ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (VR=5V)	100μA
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature (1/16” From Body).....	260°C For 5 Seconds

PACKAGE DIMENSIONS:



PIN CONNECTION

PIN NO.	Description	PIN NO.	Description
1	VSS	10	Bit 31 Output
2	VLED	11	Bit 32 Output
3	VLED	12	Bit 33 Output
4	Bit 25 Output	13	Bit 34 Output
5	Bit 26 Output	14	Data Enable
6	Bit 27 Output	15	Data Input
7	Bit 28 Output	16	Clock Input
8	Bit 29 Output	17	VDD
9	Bit 30 Output	18	BRT Control

Note: Pin no.2 &3 are internally connected

BRIGHT LED ELECTRONICS CORP.

35-BIT LED DISPLAY DRIVER

● DEVICE NUMBER: BT-M512RD-DR1

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● Table I Serial Data Input Sequence

VERSION:1.0

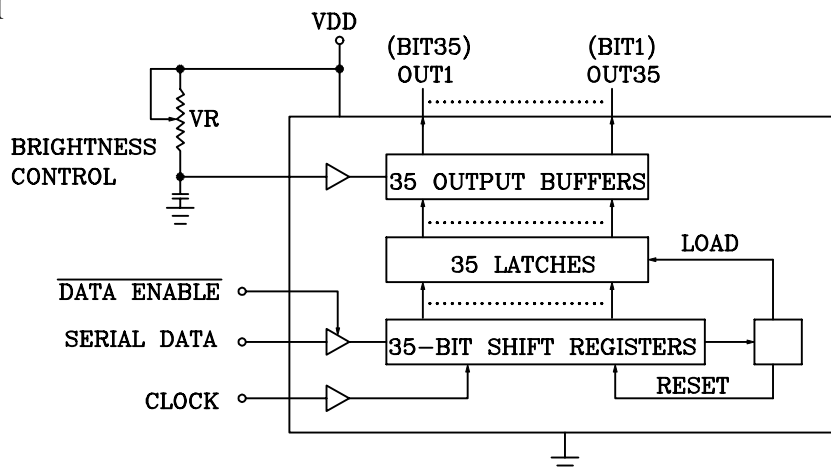
Bit	Digit	Segment	Bit	Digit	Segment
1	1	A	18	3	B
2	1	B	19	3	C
3	1	C	20	3	D
4	1	D	21	3	E
5	1	E	22	3	F
6	1	F	23	3	G
7	1	G	24	3	D.P.
8	1	D.P.	25		Pin4
9	2	A	26		Pin5
10	2	B	27		Pin6
11	2	C	28		Pin7
12	2	D	29		Pin8
13	2	E	30		Pin9
14	2	F	31		Pin10
15	2	G	32		Pin11
16	2	D.P.	33		Pin12
17	3	A	34		Pin13

● FEATURES

- * CMOS TECHNOLOGY
- * CONTINUOUS BRIGHTNESS CONTROL
- * SERIAL DATA INPUT
- * NO LOAD SIGNAL REQUIRED
- * OPTIONAL EXTERNAL DATA ENABLE AND RESET
- * WIDE POWER SUPPLY OPERATION (3.5V TO 10V)
- * TTL COMPATIBILITY
- * 34 OR 35 OUTPUTS, 20mA SINK CAPABILITY
- * ALPHANUMERIC CAPABILITY

PAD NAME	TYPE	DESCRIPTION
VDD	POWER	POWER
VSS	GROUND	GROUND
RESET	INPUT	RESET SIGNAL INPUT, (NORMALLY LO; ACTIVE HI)
B.C.	INPUT	DC CURRENT INPUT FOR LED BRIGHTNESS CONTROL
CLK	INPUT	CLOCK INPUT
DATA IN	INPUT	SERIAL DATA INPUT
ENB	INPUT	DATA INPUT ENABLES, (NORMALLY LO; ACTIVE LO)
OUT1~OUT35	OUTPUT	NMOS OUTPUT DRIVERS

● BLOCK DIAGRAM



BRIGHT LED ELECTRONICS CORP.

35-BIT LED DISPLAY DRIVER

● DEVICE NUMBER: BT-M512RD-DR1

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● FUNCTIONAL DESCRIPTION

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1. DATA IS TRANSFERRED SERIALLY VIA 2 SIGNALS: CLOCK AND SERIAL DATA. DATA TRANSFER

WITHOUT THE ADDED INCONVENIENCE OF AN EXTERNAL LOAD SIGNAL IS ACCOMPLISHED BY

USING A FORMAT OF A LEADING "1" FOLLOWED BY THE ALLOWED 35 DATA BITS. THESE 35

DATA BITS ARE LATCHED AFTER THE 36TH HAS BEEN TRANSFERRED. THIS SCHEME PROVIDES

NON-MULTIPLEXED, DIRECT DRIVE TO THE LED DISPLAY. CHARACTERS CURRENTLY DISPLAYED

(THUS, DATA OUTPUT) CHANGES ONLY IF THE SERIAL DATA BITS DIFFER FROM THOSE

PREVIOUSLY TRANSFERRED.

2. DISPLAY BRIGHTNESS IS DETERMINED BY CONTROL OF THE OUTPUT CURRENT FOR LED

DISPLAYS. THIS CONTROL FUNCTION CAN BE ACHIEVED BY VARYING THE CURRENT INTO

B.C. TERMINAL. A SIMPLE WAY IS TO SET AN EXTERNAL VARIABLE RESISTOR ILLUSTRATED IN THE

BLOCK DIAGRAM. TYPICALLY, THE OUTPUT CURRENT IS 36 TIMES GREATER THAN CURRENT INTO B.C. TERMINAL.

3. FIGURE 1 SHOWS THE INPUT DATA FORMAT. A LEADING "1" IS FOLLOWED BY 35 BITS OF DATA. AFTER

THE 36TH HAD BEEN TRANSFERRED, A LOAD SIGNAL IS GENERATED SYNCHRONOUSLY WITH THE

CLOCK HIGH STATE. THIS LOADS THE 35 BITS OF DATA INTO THE LATCHES. [A RESET SIGNAL IS

GENERATED CONSECUTIVELY WITH THE CLOCK LOW WHICH CLEARS ALL SHIFT REGISTERS FOR

THE NEXT SET OF DATA] ALL SHIFT REGISTERS ARE STATIC MASTER-SLAVE, WITH NO CLEAR FOR

THE MASTER PORTION OF THE FIRST REGISTER, ALL OWING CONTINUOUS OPERATION [THERE

MUST BE A COMPLETE OF 36 CLOCKS OR THE SHIFT REGISTERS WILL NOT CLEAR.]

4. WHEN THE CHIP FIRST POWERS ON AN INTERNAL POWER ON RESET SIGNAL IS GENERATED WHICH

RESETS ALL SHIFT REGISTERS AND ALL LATCHES. THE START BIT AND THE FIRST CLOCK RETURN

THE CHIP TO ITS NORMAL OPERATION.

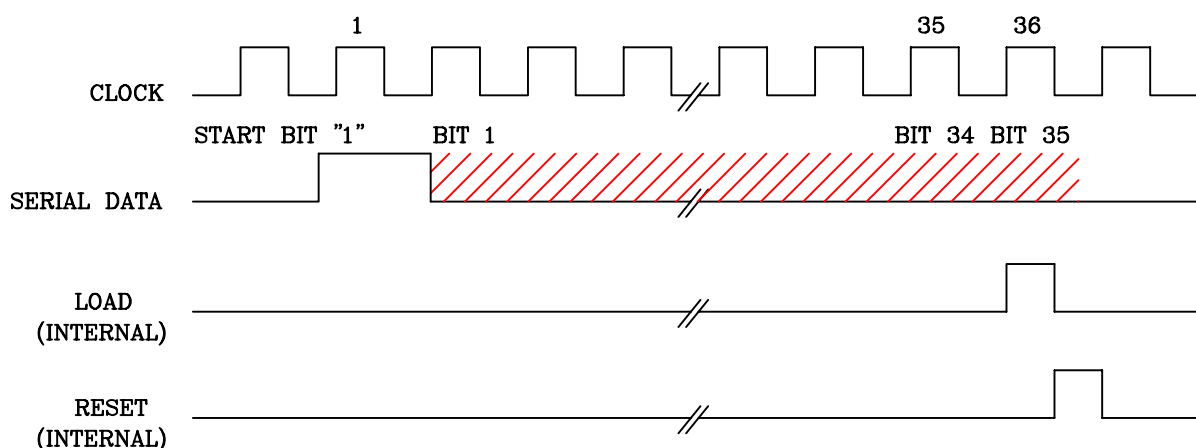


FIG.1 INPUT DATA FORMAT

BRIGHT LED ELECTRONICS CORP.

35-BIT LED DISPLAY DRIVER

● DEVICE NUMBER: BT-M512RD-DR1

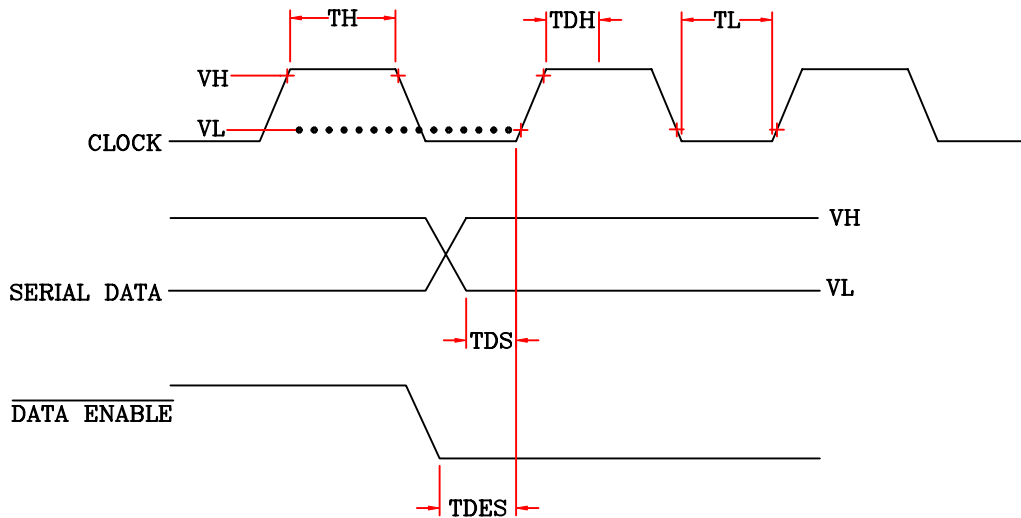
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● ABSOLUTE MAXIMUM RATINGS, $T_a=25^{\circ}\text{C}$ (UNLESS OTHERWISE SPECIFIED)

VERSION:1.0

CHARACTERISTICS	SYMBOL	RATING	UNIT
SUPPLY VOLTAGE	VDD	+3.5~+10	V
CLOCK FREQUENCY	Fosc	500K	Hz
INPUT VOLTAGE	V_{IN}	-0.3~VDD+0.3	V
INPUT B.C. CURRENT	I_{BC}	550	μA
OUTPUT SUSTAINING VOLTAGE	V_{DS}	12	V
OUT CONTINUOUS CURRENT	IOUT	20	mA

● TIMING CHART & TIMING CONDITIONS



VDD=+5V, $T_a=25^{\circ}\text{C}$, UNLESS OTHERWISE SPECIFIED

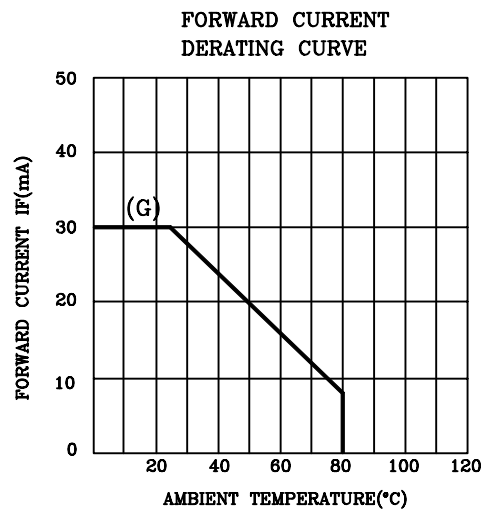
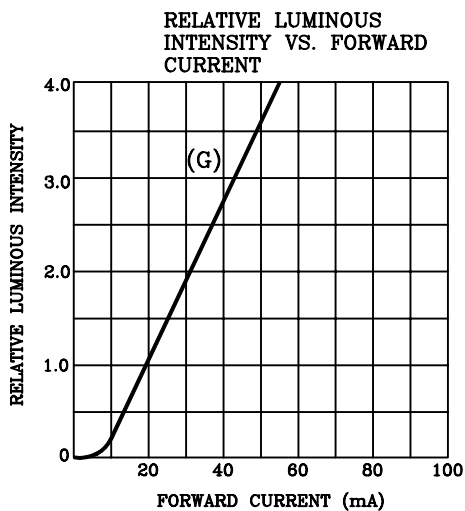
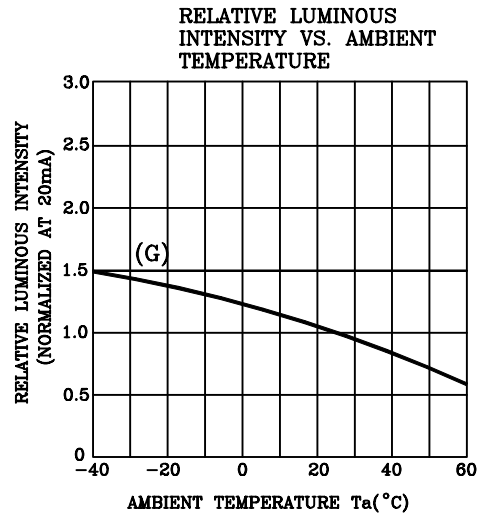
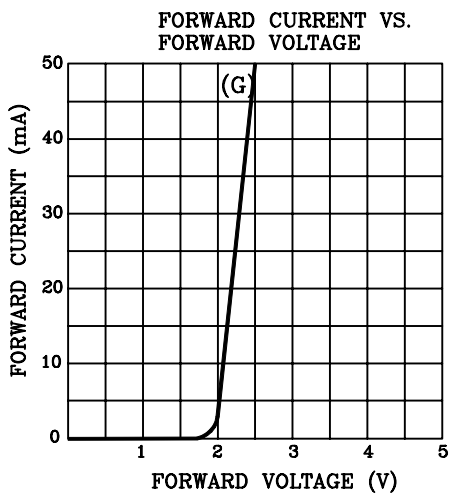
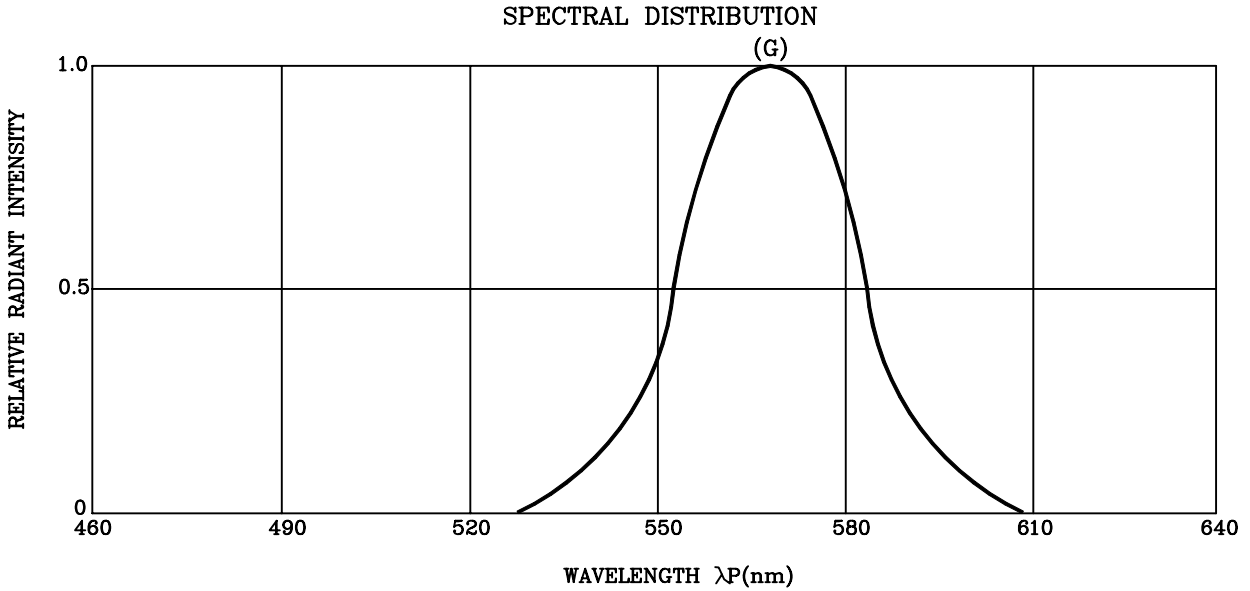
ITEM	DESCRIPTION	MIN	TYP	MAX	UNIT
TH	CLOCK INPUT HIGH TIME	950	-	-	nS
TL	CLOCK INPUT LOW TIME	950	-	-	nS
TDS	SERIAL DATA SET-UP TIME	300	-	-	nS
TDH	SERIAL DATA HOLD TIME	300	-	-	nS
TDES	DATA ENABLE SET-UP TIME	100	-	-	nS

BRIGHT LED ELECTRONICS CORP.

TYPICAL CHARACTERISTICS

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RELIABILITY TEST

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DEVICE NO.: BT-M512RD-DR1

VERSION:1.0

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power If=30mA Ta=Under room temperature Test time=1,000hrs(-24hrs,+72hrs)	0/10
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021 :B-11	Ta=65°C ± 5°C RH=90%-95% Test time=240hrs±2hrs	0/10
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High Ta=85°C ± 5°C Test time=1,000hrs(-24hrs,+72hrs)	0/10
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta= -35°C ± 5°C Test time=1,000hrs(-24hrs,+72hrs)	0/10
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	-35°C ~ 25°C ~ 85°C ~ 25°C 30min 5min 30min 5min Test Time=10cycle	0/10
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	85°C ± 5°C ~ -35°C ± 5°C 10min 10min Test Time=10cycle	0/10
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	T.sol=260 ± 5°C Dwell Time=10 ± 1 sec.	0/10
	Solderability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021 :A-2	T.sol=230 ± 5°C Dwell Time=5 ± 1 sec.	0/10

JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	VF	IF=10mA	Over Ux1.2
Reverse current	IR	VR=5V	Over Ux2
Luminous intensity	IV	IF=10mA	Below Sx0.5

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.