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   	<h2 style="margin:0;">SEMICONDUCTOR PRODUCT</h2> <h3 style="margin:0;">LN21RUQ</h3>
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TYPE	Red Light Emitting Diode																		
MATERIAL	GaAlAs																		
APPLICATION	Indicators																		
OUTLINE																			
CONNECTION																			
ABSOLUTE MAXIMUM RATINGS	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">P_D</td> <td style="text-align: center;">*IFP</td> <td style="text-align: center;">IFDC</td> <td style="text-align: center;">VR</td> <td style="text-align: center;">T_{opr}</td> <td style="text-align: center;">T_{stg}</td> </tr> <tr> <td style="text-align: center;">70</td> <td style="text-align: center;">150</td> <td style="text-align: center;">30</td> <td style="text-align: center;">3</td> <td style="text-align: center;">-25~+85</td> <td style="text-align: center;">-30~+100</td> </tr> <tr> <td style="text-align: center;">mW</td> <td style="text-align: center;">mA</td> <td style="text-align: center;">mA</td> <td style="text-align: center;">V</td> <td style="text-align: center;">°C</td> <td style="text-align: center;">°C</td> </tr> </table> <p style="text-align: center; margin-top: 5px;">$T_a = 25 \pm 3^\circ C$</p>	P_D	*IFP	IFDC	VR	T _{opr}	T _{stg}	70	150	30	3	-25~+85	-30~+100	mW	mA	mA	V	°C	°C
P_D	*IFP	IFDC	VR	T _{opr}	T _{stg}														
70	150	30	3	-25~+85	-30~+100														
mW	mA	mA	V	°C	°C														

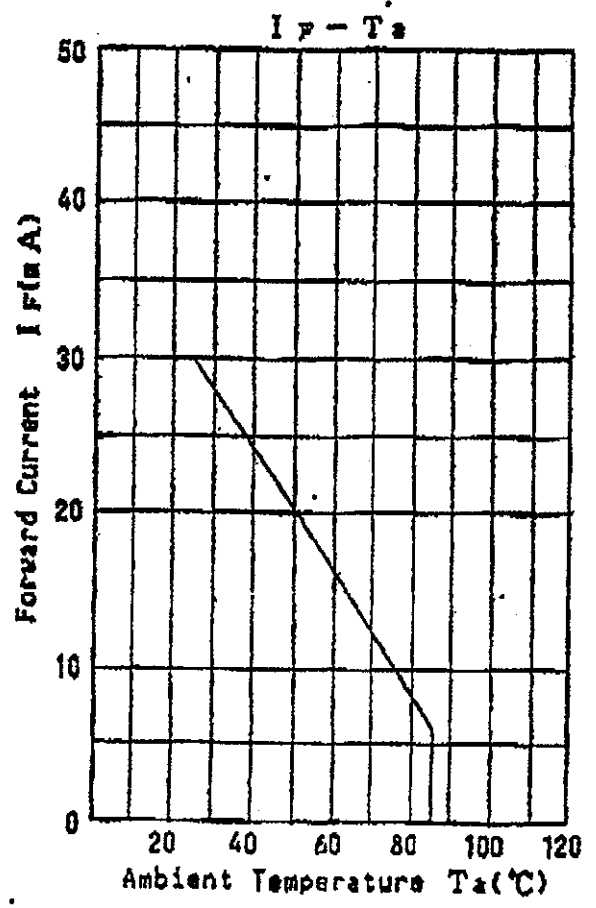
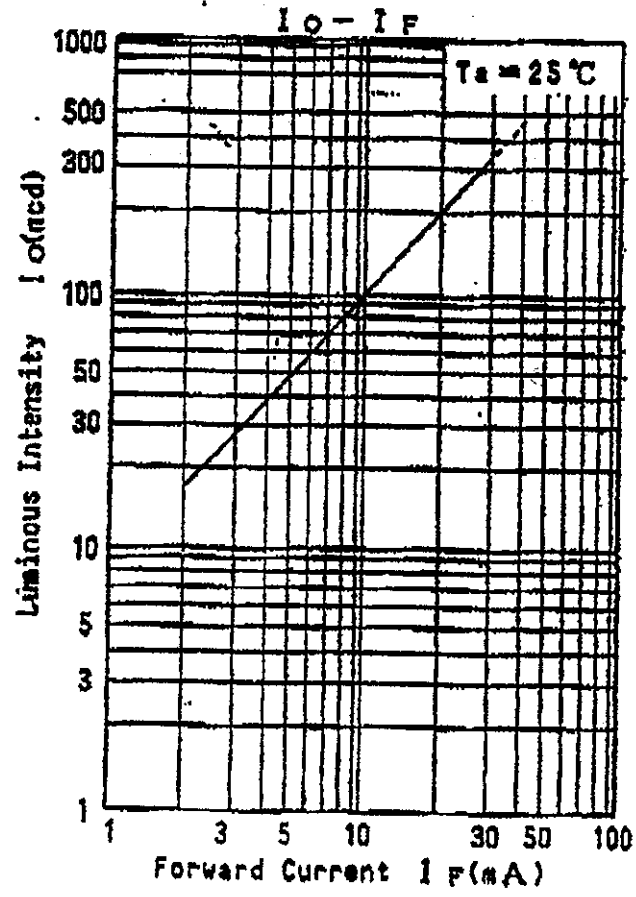
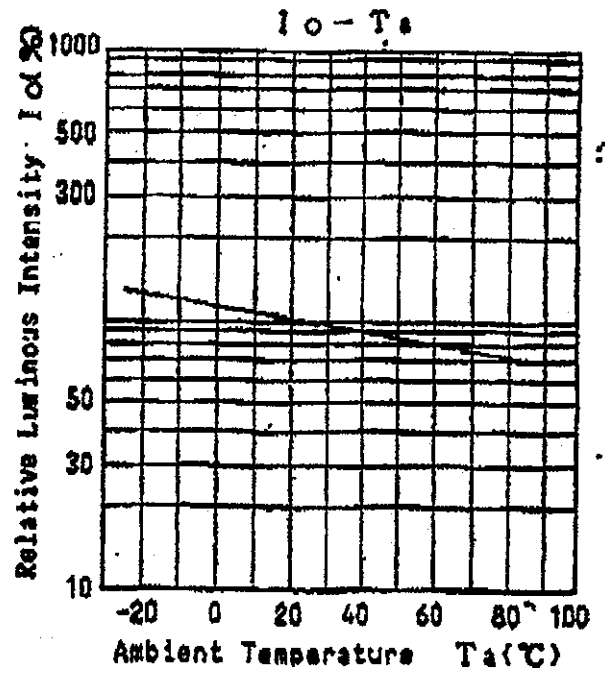
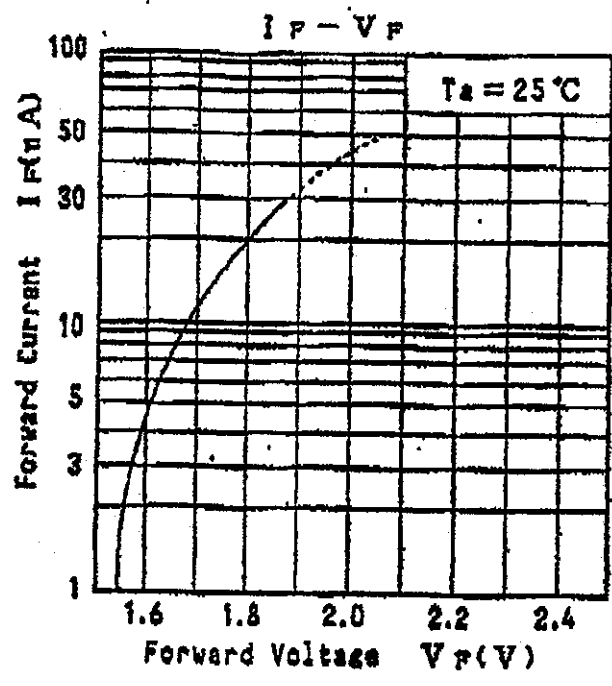
Test Specification

	Condition	Typ	Limit		Unit
			Min	Max	
VF	IF=20mA	1.8		2.6	V
IR	VR=3V			100	μA
I _o	IF=20mA DC	200	120		mcd
λ _p	IF=20mA DC	660			nm
Δλ	IF=20mA DC	20			nm

*1 The condition of IFP is duty 10%, Pulse width 1msec.
 *2 Lead material and surface treatment : . Fe type + solder dipping

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LN21RUQ RELIABILITY TEST DATA

TEST CONDITION AND RESULT

TEST ITEM	TEST CONDITION	RESULTS
Consecutive operating life test	IF DC max, $T_a=25^{\circ}\text{C}$, $t=1,000\text{h}$	0/100
High temperature storage life test	T_{stg} max, $t=1,000\text{h}$	0/100
Low temperature storage life test	T_{stg} min, $t=1,000\text{h}$	0/100
Tropical life test	$T_a=60^{\circ}\text{C}$, $\text{RH} \geq 90\%$, $t=1,000\text{h}$	0/100
Soldering test	$T_a=230 \pm 5^{\circ}\text{C}$, $t=5\text{sec}$, 1cycle, flux	0/50
Soldering heat test	$T_a=280 \pm 5^{\circ}\text{C}$, $t=10\text{sec}$, 1cycle	0/100
Temperature cycle test (gaseous phase)	T_{stg} min $\sim 25^{\circ}\text{C}$ $\sim T_{stg}$ max $\sim 25^{\circ}\text{C}$ (30min 5min 30min 5min) X 10 cycles	0/100
Thermal shock test (liquid phase)	T_{stg} max $\sim 0^{\circ}\text{C}$ (5min 5min) X 10 cycles	0/100
Fall test	Maple Wood $h=75\text{cm}$, 3 cycles	0/50
Terminal strength test	$V=1\text{Kg}$, $t=30\text{sec}$	0/50
Lead Bending	$W=0.5\text{Kg}$, 2 cycles	0/50

ITEM	SYMBOL	CONDITIONS	LIMIT	UNIT
Forward Voltage	V_F	Same as the specification	Upper $\times 1.2$	V
Reverse Leakage Current	IR	Same as the specification	Upper $\times 2.0$	μA
Luminous Intensity	I_o	Same as the specification	Min $\times 70$	%

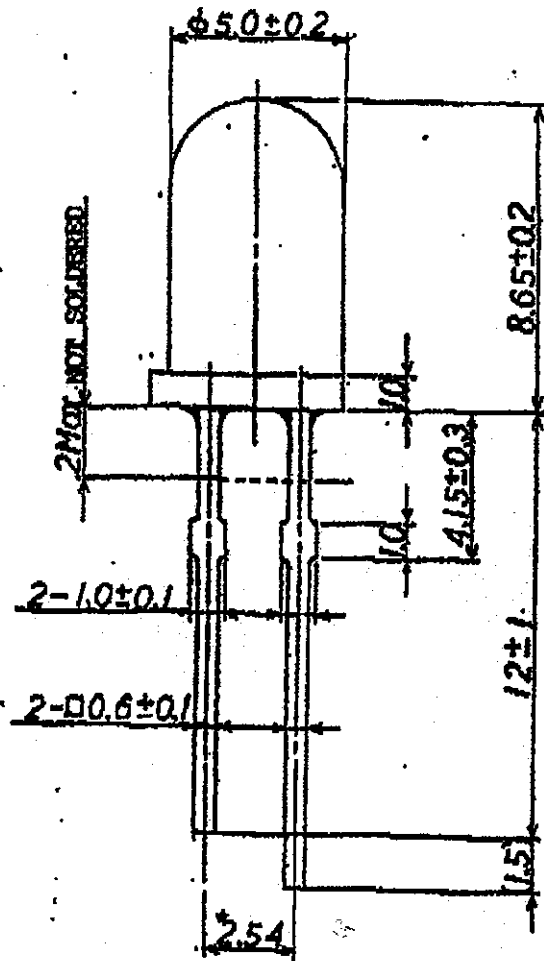
* note : Operating Life Stability $\geq 50\%$

* Assurance for LED

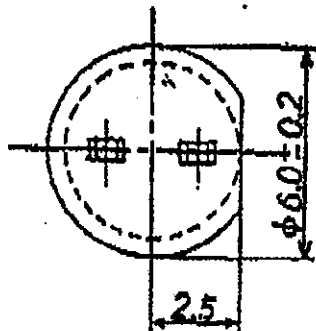
Assurance for LED within each condition is mentioned above.

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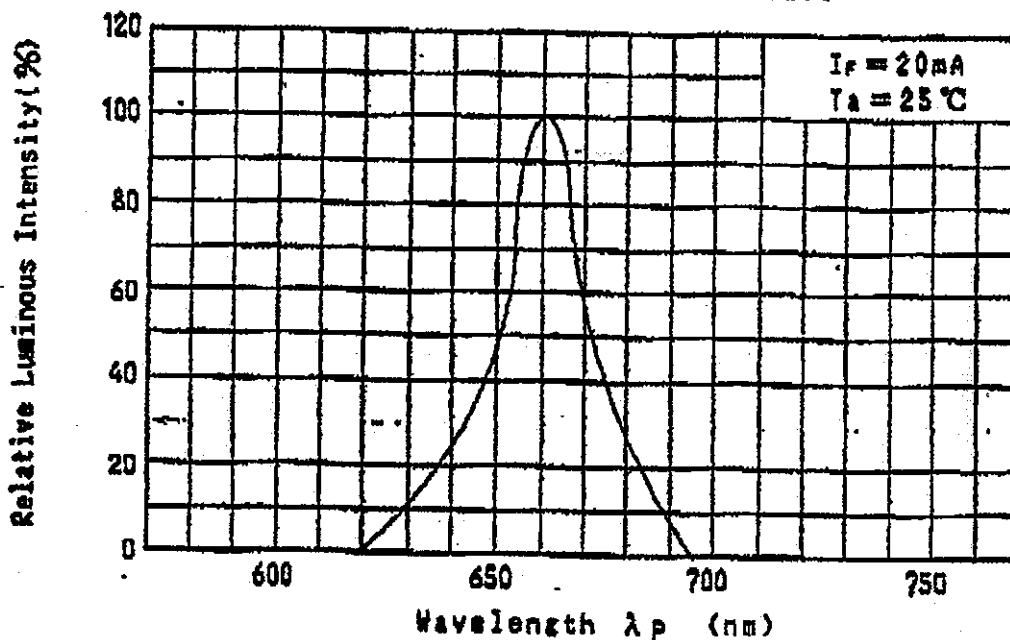
1: Anode
 2: Cathode

* Lead wire dimension.
 (The bottom of lead)

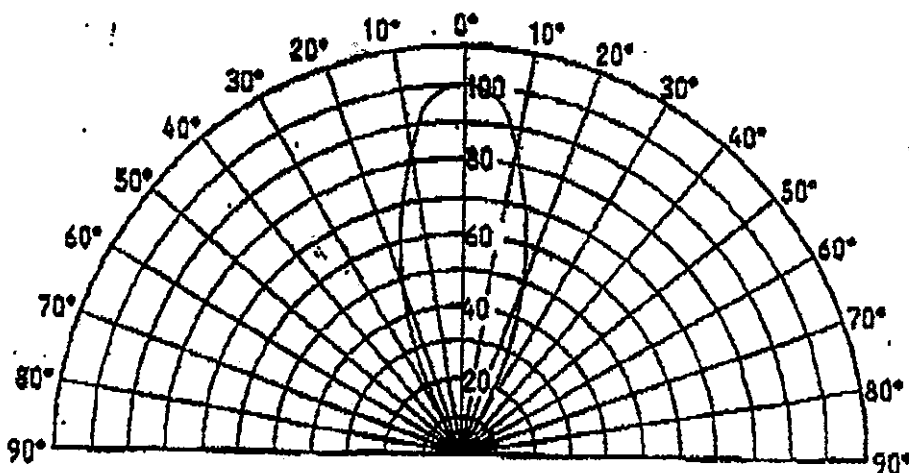
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Relative Luminous Intensity
Wavelength Characteristics



Directive Characteristics



3. Electro-optical characteristics (Note 2)

Parameter		Symbol		Condition	Min	Typ	Max	U
Threshold current		I_{th}		CW	20	40	65	
Operating current		I_{op}		$P_o=3mW$	30	50	75	
Operating voltage		V_{op}		$P_o=3mW$	-	1.75	2.5	
Wavelength		λ_L	(Note 3)	$P_o=3mW$	775	790	810	
Radiation angle	Parallel	$\theta_{ }$	(Note 4)	$P_o=3mW$	8	11	16	
	Perpendicular	θ_{\perp}	(Note 4)	$P_o=3mW$	20	33	45	
Differential efficiency		η	(Note 3)	$2mW/(I(3mW)-I(1mW))$	0.1	0.4	0.7	π
PIN dark current		I_d		$V_r(PIN)=30V$	-	-	0.1	
PIN photo-current		I_p		$P_o=3mW$ $V_r(PIN)=5V$	0.2	0.6	1.0	
Emission point angle accuracy	X direction	θ_x		$P_o=3mW$	-	-	± 2	
	Y direction	θ_y		$P_o=3mW$	-	-	± 3	
Oscillation mode		Single transverse mode						

(Note 2) Initial value

(Note 3) Sampling inspection by lot

(Note 4) Angle of 50% peak intensity (FWHM)