Specification of IR receiver

Conductor Device Name Table

S	—	R	3	3	1	F	—	LC01	—	N3L
①		②	③	④	⑤	⑥		⑦		⑧

① : Our company Conductor

② : IR Receiver Module

③ : [PKG Configuration]

3 - Casting Type

5 - Transfer Type

④: [Operating Voltage]

3 - 3V~5V

5 - 5V

⑤ : Pin Configuration

1 ; Vout-GND-Vcc

2 ; Vout-Vcc-GND

3 ; Vcc-Vout-GND

4 ; GND-Vcc-Vout

5 ; GND-Vout-Vcc

⑥ : BPF Center Frequencies Spec

D	I	E	F	G	J
32.7 kHz	36.0 kHz	36.7 kHz	37.9 kHz	40.0 kHz	56.7 kHz

⑦ : Package Shape

(A01,A02,A03,A04,B01,B02,B03,C01,……)

⑧ : CHIP TYPE

IR Receiver Modules for Remote Control Systems

◆ Description

The SEK S Series is a Bi-CMOS IC for use in infrared remote control system.
They are transfer-molded, small size, light weight and low current consumption modules.
The strong points of Lumicom IR modules are reliable operation even under disturbing ambient light source, and the protection against uncontrolled output pulses.

◆ Features

- Supply Voltage Range: 2.7V ~ 5.5 V
- TTL and CMOS compatibility
- No external components Except PIN Diode
- Available for Carrier Frequencies between 32.7kHz to 56.7kHz,
  (Adjusted by zener-Diode Fusing, 32.7kHz,36.7kHz,37.9kHz,40kHz,56.7kHz)
- Internal filter for PCM frequency
- Open collector output (built-in Pull-up resistor 40 kΩ)
- Output active low
- No occurrence of disturbance pulses at output pin within nominal conditions.
- Short settling time after power On (below 1msec)
- Enhanced Immunity against all kinds of disturbance light and power noise
- safety against power supply ripple noise for almost set applications.
  (especially, High performance characteristics than the other ICs without electrolytic condenser for power noise suppression.)

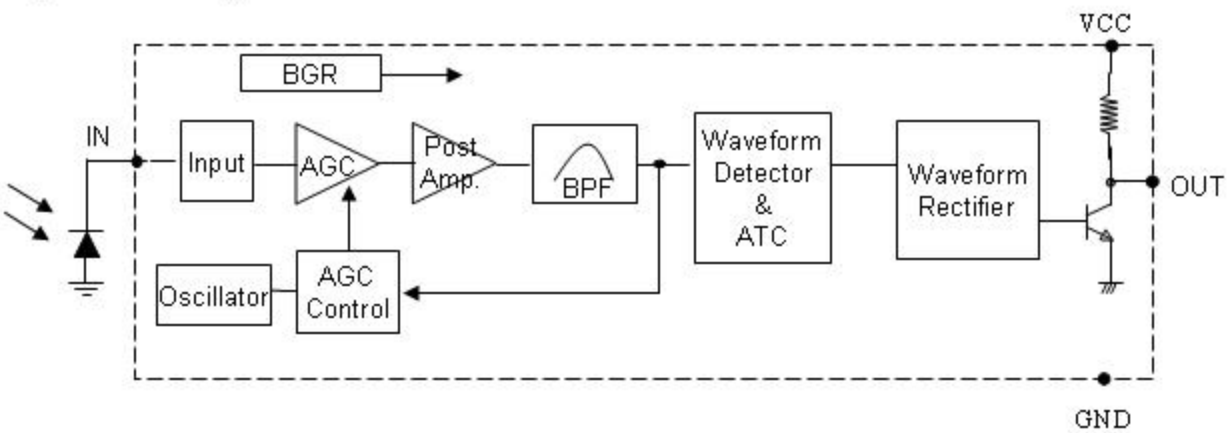
◆ Applications

- TV, VCR, AUDIO
- Home Appliances
- Remote Control Equipment

◆ Ordering Info.(carrier frequencies)

Type	Carrier Frequency
S-R□□□ D-□-N3L-C	32.7 kHz
S-R□□□ I-□-N3L-C	36.0 kHz
S-R□□□ E-□-N3L-C	36.7 kHz
S-R□□□F-□-N3L-C	37.9 kHz
S-R□□□ G-□-N3L-C	40.0 kHz
S-RL331J-LC01-N3L-C	56.7 kHz

◆ Block Diagram



◆ Absolute Maximum Ratings

(Ta = 25℃)

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	VCC	0	6.5	V
Supply Current	ICC	0	3.0	mA
Output Voltage	Vout	0	6.5	V
Output Current	Iout	0	2.5	mA
Storage Temperature	Tstg	-30	85	℃
Soldering Temperature	Tsd	260℃ ±5℃, Max 5 sec		℃

* Stress above those listed under Absolute Maximum Ratings may cause permanent damage of device. This is stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for longer periods may affect device reliability.

◆ Electro-optical Characteristics

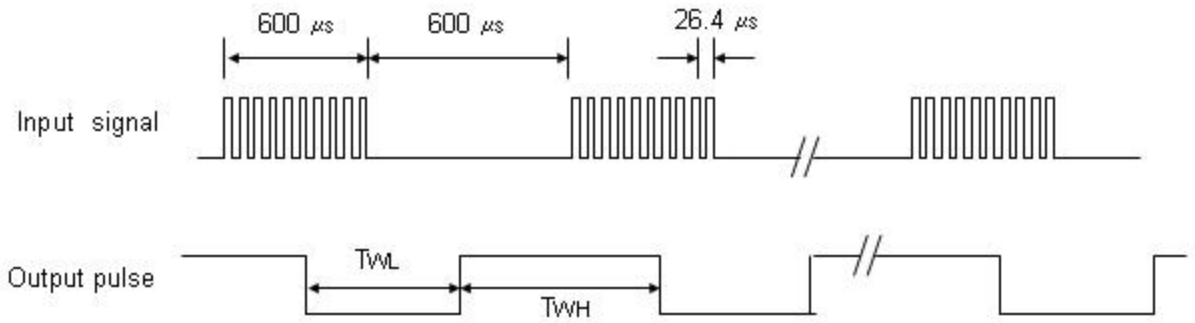
(Ta = 25℃)

Parameter	Symbol	Conditions	Vcc	Min	Typ	Max	Unit
Operating Voltage	Vcc	-	-	2.7	-	5.5	V
Supply Current	Icc	No input signal	5	0.8	1.0	1.5	mA
			3	0.5	0.8	1.2	
B.P.F Center Frequency	fo		5	-	56.7	-	Khz
			3	-	56.7	-	
Peak Wave Length	λP			-	940	-	nm
High Level Output Voltage	VOH	Fig.1	5	Vcc-0.5	-	-	V
			3	Vcc-0.5	-	-	
Low Level Output Voltage	VOL	Fig.1	5	-	0.2	0.4	V
			3		0.2	0.4	
High Level Output Pulse Width	TWH	Fig.1	5	400	600	800	μs
			3	400	600	800	
Low Level Output Pulse Width	TWL	Fig.1	5	400	600	800	μs
			3	400	600	800	
Arrival Distance	L	Fig. 1,2,3	±0°	-	18	-	m
			±30°	-	12	-	
			±45°	-	8	-	
Output Form	Active Low						

** Arrival Distance Effected by Environment

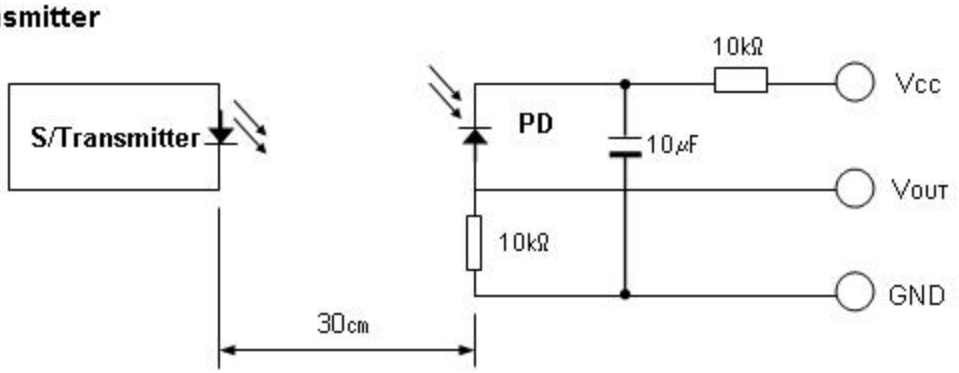
◆ Measurement Conditions

[Fig.1] Output Waveform (at freq.=37.9KHz)



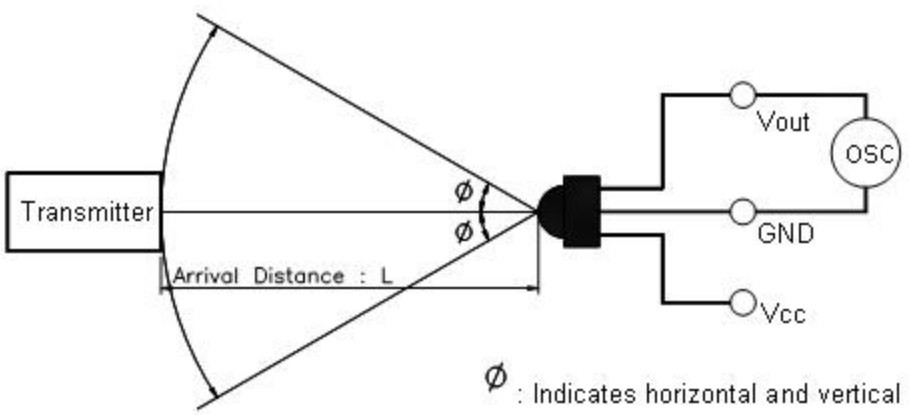
TWL = 400 μs ~ 800 μs , TWH = 400 μs ~ 800 μs

[Fig.2] Transmitter



※ The specifications shall be satisfied under the following conditions. The standard transmitter shall be specified of the burst wave form adjusted to VOUT 200mVp-p upon Po measuring circuit Standard Transmitter

[Fig.3] Test condition of arrival distance



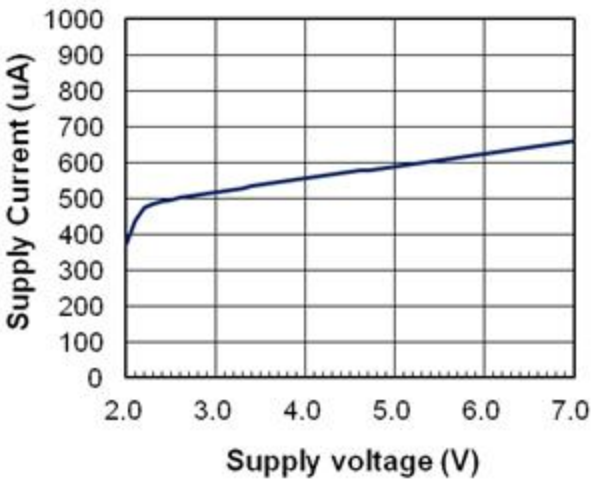
Ø : Indicates horizontal and vertical directions

[Measurement condition for arrival distance]

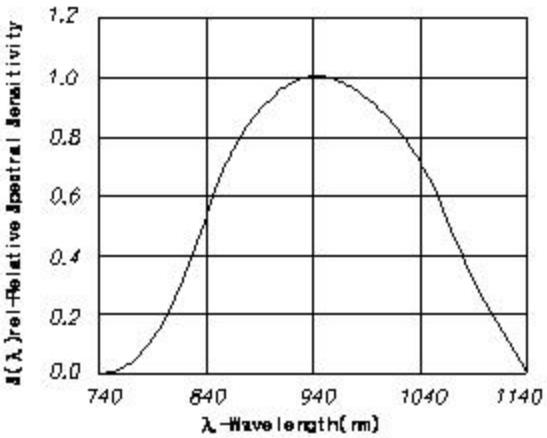
☞ Ambient light source : Detecting surface illumination shall be irradiate 200 ±50Lux under ordinary white fluorescence lamp without high frequency lighting

◆ Electrical / Optical Characteristics

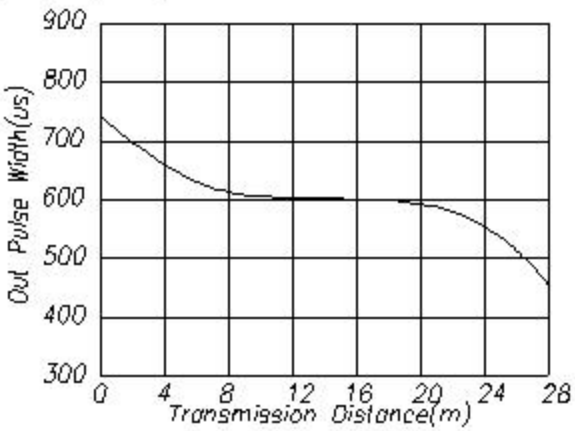
[Fig.4] Supply Current vs. Voltage



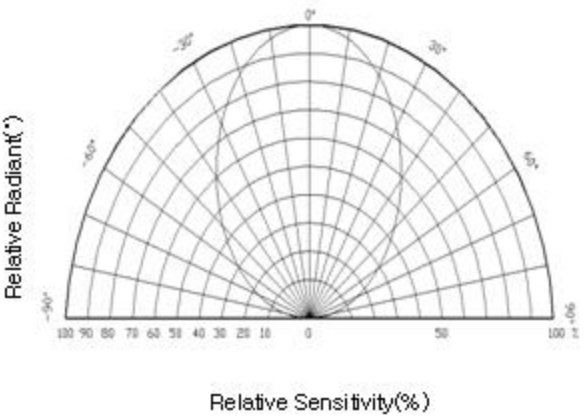
[Fig.5] Relative Spectral Sensitivity



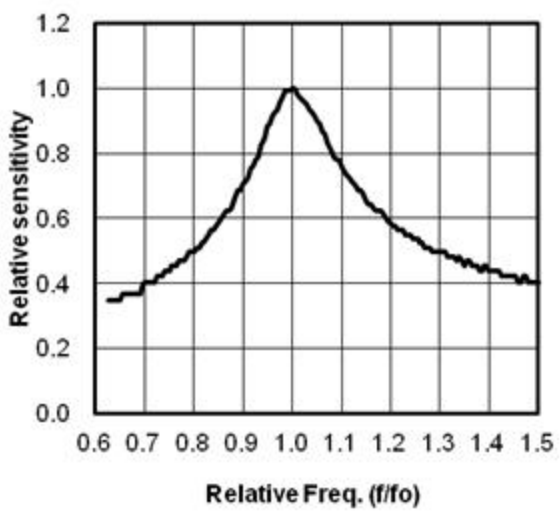
[Fig.6] Output Pulse Width vs. Distance



[Fig.7] Directivity



[Fig.8] BPF Fc Curve



ESD Test Results

Parameter	Conditions	Specification	Results
Machine Model	C=200pF, R=0Ω	Min ±200V	>±200V
Human Body Model	C=100pF, R=1.5kΩ	Min ±2000V	>±2000V
Charged Device Model	R=100MΩ, 1Ω	Min ±400V	>±400V

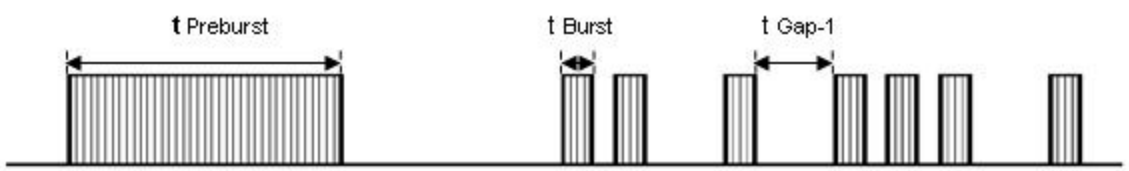
◆ Suitable Data format for S-RL331J-LC01-N3L-C Series ;

Grundig® code, NEC code, Philips RC5 code, Philips RC6 code, Toshiba Micom Code, Sharp Code, Sony 12bit Code, Matsushita Code, Zenith Code, JVC Code,.

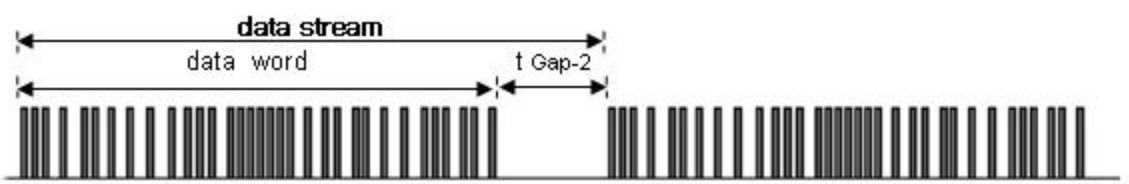
◆ Data signal limitation for S-RL331J-LC01-N3L-C Series

Item	Symbol	Time
Minimum burst length	t_{Burst}	150us
Minimum gap time after each burst	t_{Gap-1} t_{Gap-2}	300us
Minimum gap time in the data stream (For bursts greater than 700usec)	$t_{Pause-1}$ $t_{Pause-2}$	> "(2×burst length)+30msec"
Maximum number of continuous short bursts/second	-	2000 Bit/sec

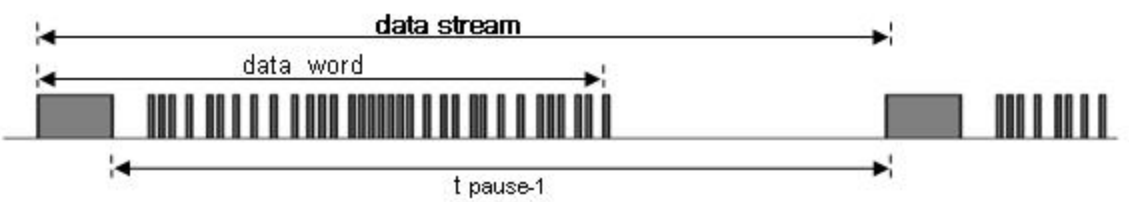
[Fig. 9] Data Signal diagram



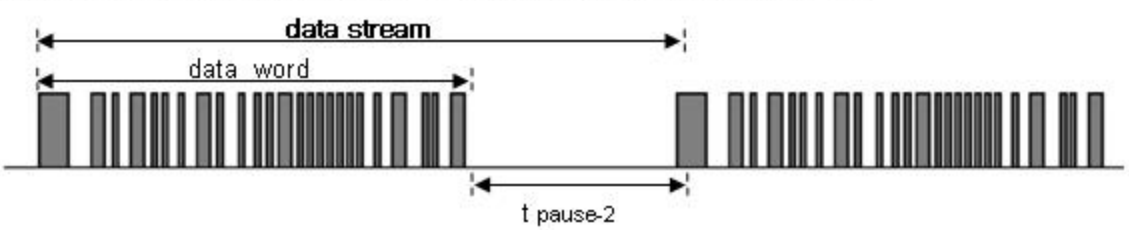
▶ Case-1 : All Burst Signal ≤ 700usec (e.g. RCMM code , XMP code)



▶ Case-2 : tPreburst > 700usec & tBurst(Data Bit) ≤ 700usec (e.g. NEC , Toshiba code)



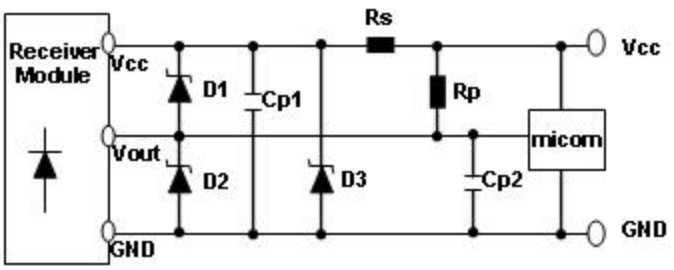
▶ Case-3 : tPreburst & tBurst(Data Bit) > 700usec (e.g. SONY , RC5 code)



◆ External Application Circuit - Power Noise reduction & ESD Protection

[Fig.10] Application for power supply ripple suppression

A further influence to the IR receiver modules may come from a supply voltage which is not stable.
Such a disturbed supply voltage can caused by switching power supply.
which is not filtered well or by other components in the circuit which produced spikes on the supply line.
This disturbed supply will reduce the sensitivity of receiver modules.
This application circuit will filter the disturbed supply voltage.



Component	Recommend
1) Rs	Typ. 100ohm (47 ohm ~470ohm)
2) Cp1	Typ. 100uF (47uF ~ 100uF)
3) Rp	Optional (10K ohm or more)
4) Cp2	Typ. 2nF (1nF ~ 10nF)
5) D1~D3	Zener diode or protection diode

◆ Reliability Test Items

Parameter	Test conditions		Remark
High Temperature	Ta=+70, Vcc=5.0V	t=240h	※1, ※2
Low Temperature	Ta=-20, Vcc=5.0V	t=240h	※1, ※2
High Temp./ High Humidity	Ta=+60℃ 90%RH, Vcc=5.0V	t=240h	※1, ※2
Heat Cycle	Ta=-30℃(0.5h) to +80℃(0.5h)	20 cycle	※2, ※3
Fall Test	Height=75cm, 3 times		※4

※ 1. Supply voltage of load test is 5V.
※ 2. Electro-optical characteristics shall be satisfied after leaving 2 hours in the normal condition.
※ 3. Heat cycle test shall repeat above condition 20 times under no load.
※ 4. The test devices shall be dropped three time on the hard wooden board from a height of 75㎝.

◆ Material Configuration

Parameter	Configuration	Remark
IC	Silicon(99%)	
Photo diode	Silicon(99%)	
Lead frame	Iron(99.5%), Silver(0.5%)	
Epoxy resin	Resin(55.5%), Hardener(45.5%)	
Silver epoxy	Silver(80%), Resin(10%), Hardener(10%)	
Bond wire	Gold(99.99%)	
Shield Case	Iron(99%), Tin(1%)	Inside

◆ **External Dimension** (Unit : mm)

Connection method of DC connector'head:
1 ---- Red ---- 1 VCC
3 ----Black --- 2 GND
2 ----white --- 3 IR

3M sponge sticker

Thickness: 1mm

◆ **PKG Back-side Marking Lay-out**

1F N3L ; Code

S K ; OUR COMPANY CONDUCTOR

A B 2C D ; A: Year , B: Month , 2C: Date , D:Lot No.

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