

IR Receiver Modules for Remote Control Systems

Description

The ROM-WS138FN-NL series are remote control receiver modules. Pin diode and receiver IC are assembled on one module. Small- sized, light-weight, and low current consumption. modules have been achieved by using resin mold. The demodulated output signal can directly be decoded by a microprocessor.

The main benefit is the reliable function even in disturbed ambient and the protection against uncontrolled output pulses.



Features

- Supply Voltage Range: 2.7V to 6 V
- TTL and CMOS compatibility
- Photo detector and preamplifier in one package.
- Internal filter for PCM frequency
- Open collector output (built-in Pull-up resistor(40 k Ω))
- Output active low
- Enhanced Immunity against all kinds of disturbance light
- No occurrence of disturbance pulses at output pin within nominal conditions.
- Short settling time after power On.(below 1msec)

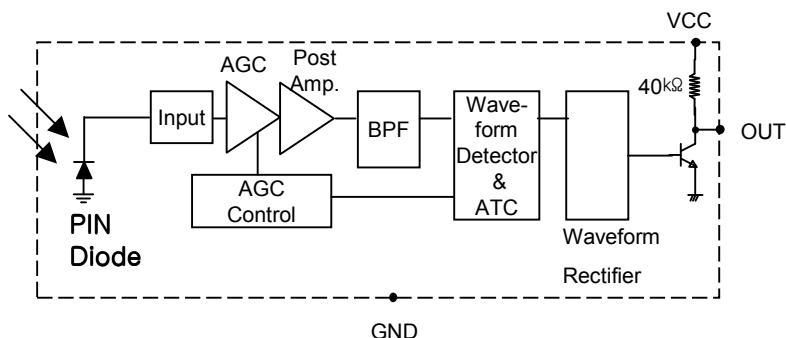
Applications

- Av equipment (TV, DVD, Audio, CD player)
- Home appliances (Computer, Air conditioner, Camera)
- Infrared remote control Toys.

Suitable Data Format

- NEC, RC5, RC6, Toshiba Micon Code, Sharp Code, Grundig Code
- Sony 12bit, Sony 15bit, Matsushita code, Mitsubishi Code, Zenith Code, JVC code

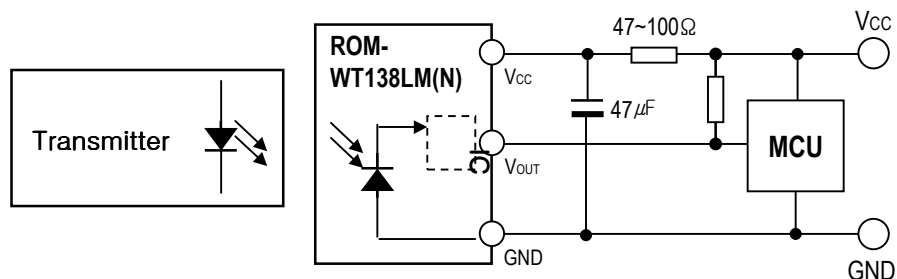
Block Diagram



Ordering Info.(carrier frequencies)

Type	Carrier Frequency
ROM-WS132FN-NL	32.7 kHz
ROM-WS136FN-NL	36.7 kHz
ROM-WS138FN-NL	37.9 kHz
ROM-WS140FN-NL	40.0 kHz
ROM-WS156FN-NL	56.7 kHz

Application Circuit



R-C filter recommended to suppress power supply disturbances.
R-C filter should be connected closely between V_{CC} pin and GND pin.

Absolute Maximum Ratings

(T_a = 25°C)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{CC}	6.5	V
Supply Current	I _{CC}		mA
Output Voltage	V _{OUT}		V
Output Current	I _{OUT}	2.5	mA
Operating Temperature	T _{opr}	-20 ~ +80	°C
Storage Temperature	T _{stg}	-30 ~ +85	°C
Soldering Temperature	T _{sd}	260°C ± 5°C, Max 5 sec	°C

Electro-optical Characteristics

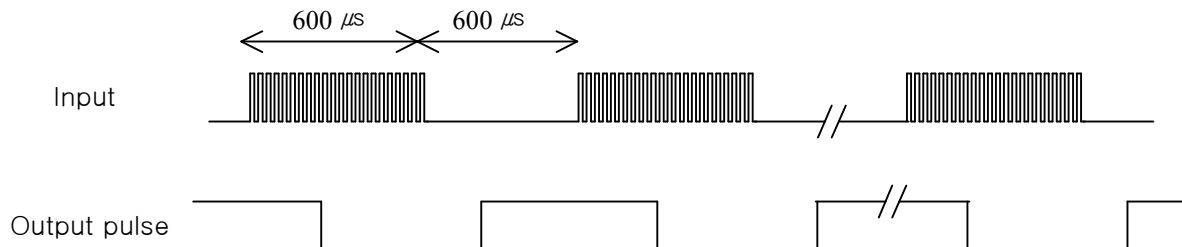
(T_a = 25°C)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Supply Voltage	V _{CC}			2.7	–	6.0	V
Supply Current	I _{CC}	No input signal		0.8	1.2	1.5	mA
B.P.F Center Frequency	f _o			–3	f _o	+3	%
Peak Wave Length	λ _P			–	940	–	nm
High Level Output Voltage	V _{OH}	Fig.1		V _{CC} –0.5	–	–	V
Low Level Output Voltage	V _{OL}	Fig.1		–	0.2	0.4	V
High Level Output Pulse Width	T _{WH}	Fig.1		450	600	750	μs
Low Level Output Pulse Width	T _{WL}	Fig.1		450	600	750	μs
Arrival Distance	L	Fig. 1,2,3	±0°	7		–	m
			±30°	7		–	m
			±45°	5		–	m
Output Form	Active Low						

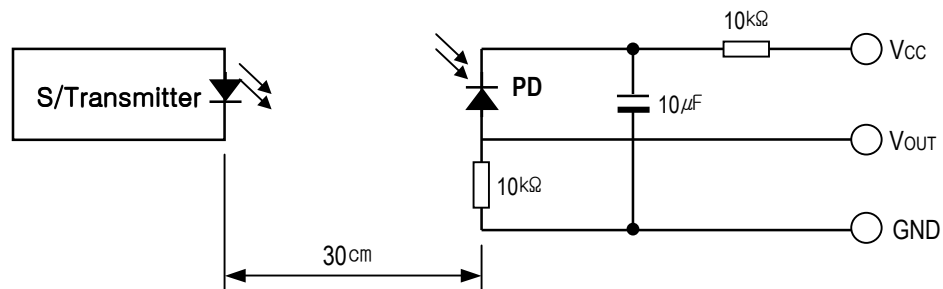
** Arrival Distance Effected by Environment

Measurement Conditions

[Fig.1] $f=37.9\text{KHz}$, burst with 22 pulses

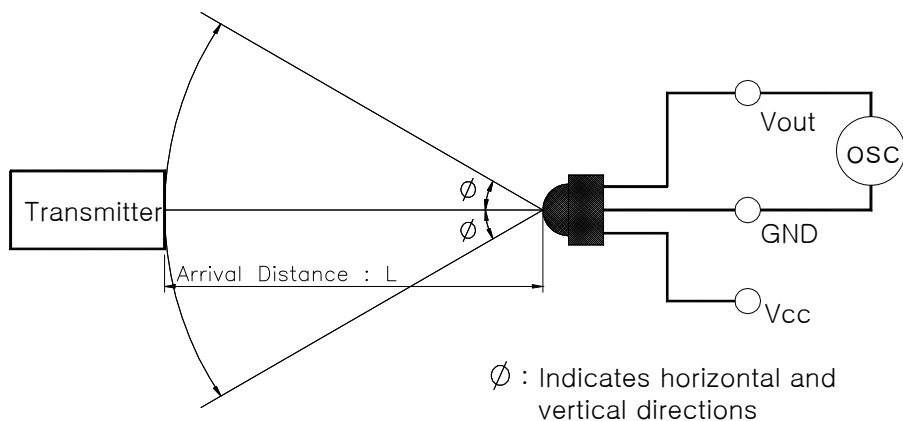


[Fig.2] Transmitter



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

[Fig.3] Test condition of arrival distance

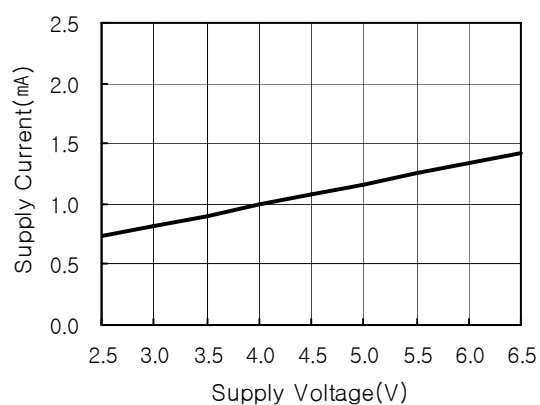


[Measurement condition for arrival distance]

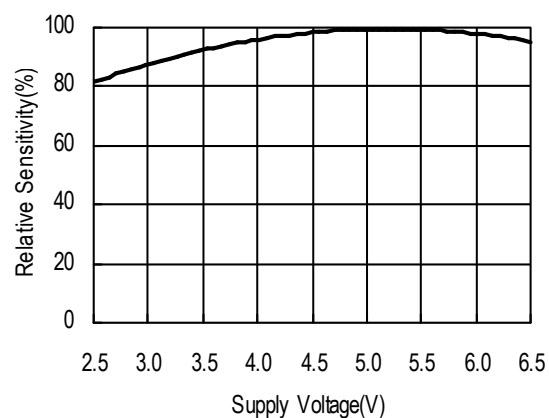
☞ Ambient light source : Detecting surface illumination shall be irradiate $200 \pm 50\text{Lux}$ under ordinary white fluorescence lamp without high frequency lighting

Electrical/Optical Characteristics

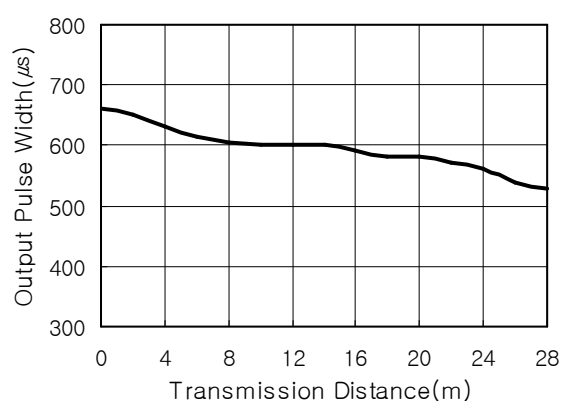
[Fig.4] Supply Current vs. Voltage



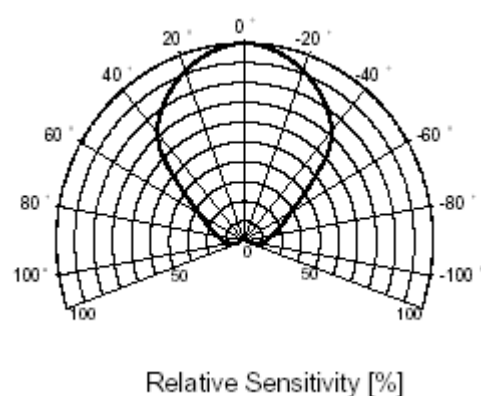
[Fig.5] Sensitivity vs. Supply Voltage



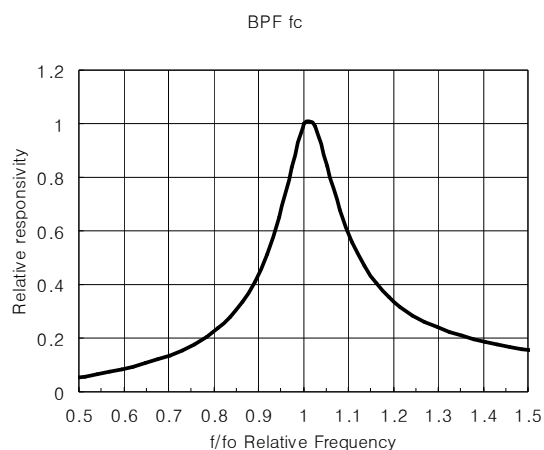
[Fig.6] Output Pulse Width vs. Distance



[Fig.7] Directivity (Horizontal)



[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 ±800V	>±800V

Suitable Data Format

The circuit of the ROM-WS138FN-NL series is designed in that way that unexpected output pulses due to noise or disturbance signals are avoided. A band pass filter, an integrator stage and an automatic gain control are used to suppress such disturbances.

The distinguishing mark between data signal (not suppressed) and disturbance signal (suppressed) are carrier frequency, burst length and Signal Gap Time (see diagram below).

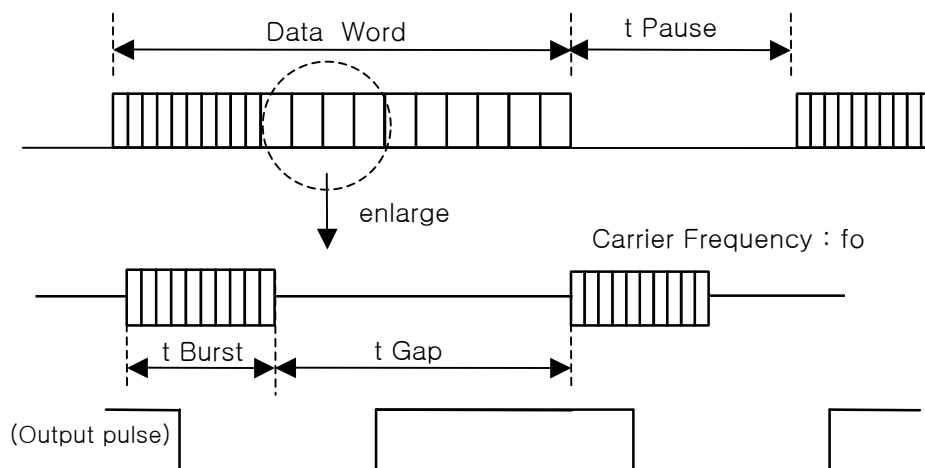
The data signal should full-fill the following condition :

- Carrier frequency should be close to center frequency of the band-pass.
- Burst length should be 300us/burst or longer.
- After each burst a gap time of at least 300us is necessary.
- The data format should not make a continuous signal transmission.
- There must be a Signal Gap Time (longer than 20 ms) at least each 100 ms, or each data command.

Some examples for suitable data format are :

NEC Code, RC5, Toshiba Code, Matsushita Code. Mitsubishi Code. Sony Code.

[Fig. 8] Data Signal diagram



- ※ t Gap : Signal gap time between two burst in pulses of carrier.
- ※ t pause : Data pause between two data words.
- ※ t Burst : Length of a burst in pulses of the carrier frequency.

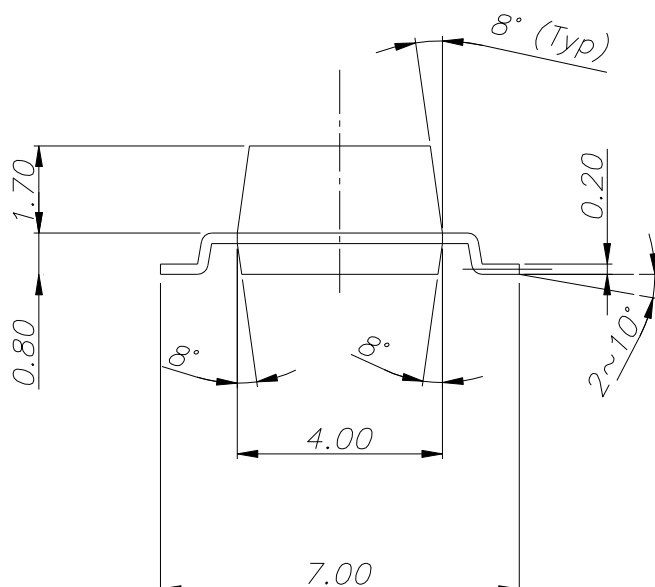
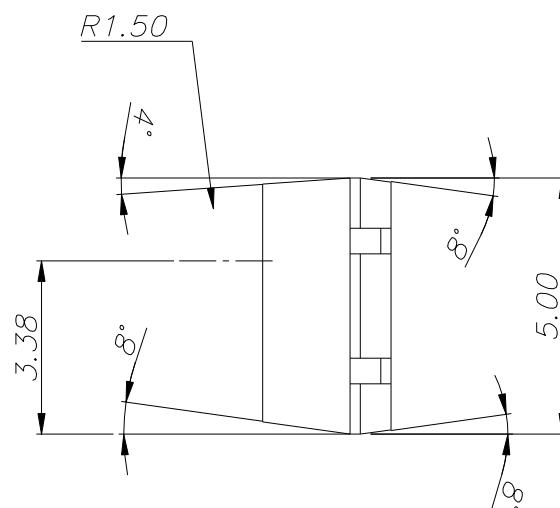
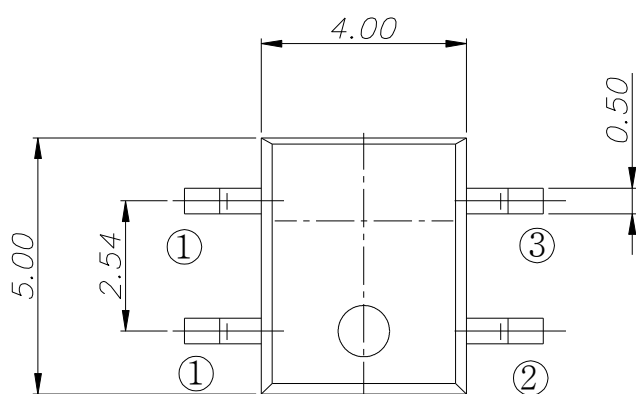
Disturbance Suppression

When a disturbance signal is applied to the ROM-WS138FN-NL series, it can still receive the data signal. However the sensitivity is reduced to that level that no unexpected pulses will occurrence.

Some examples for such disturbance signals which are suppressed by the ROM-WS138FN-NL series are :

- Signals from fluorescent lamps with electronic ballast with high or low modulation.
- Continuous signal at 38 kHz or at any other frequency,
- DC light (from tungsten bulb or sunlight)

◆ External Dimension (Unit : mm)



NOTE:

1. PIN CONFIG.

- ① GND
- ② Vcc
- ③ Vout

2. G.T ± 0.3

(UNIT:mm)