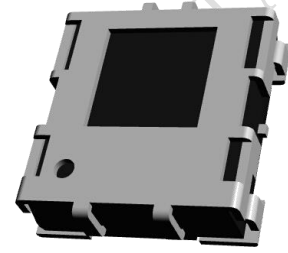


IR Receiver Module for PCM Remote Control Systems

Description

The SNM437 is miniaturized SMD-IR receiver for infrared remote control systems. PIN diodes and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.



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.

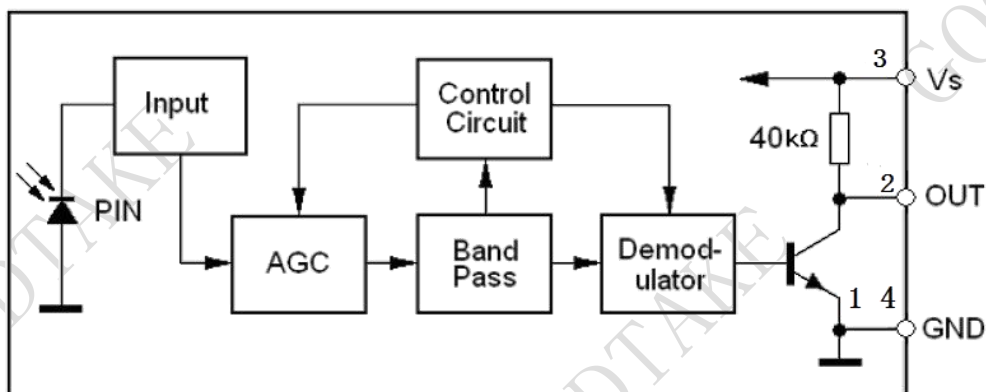
Features

- Photo detector and IC in one single package
- TTL and CMOS compatible
- Output active low
- Enhanced immunity against disturbance from lamps
- No occurrence of disturbance pulses at the output
- Suitable burst ≥ 15 cycles/burst
- RoHS compliant

Applications

- TV
- Audio Video equipments
- Other home appliances with remote control systems

Functional Block Diagram



Absolute Maximum Ratings

Tamb = 25 °C

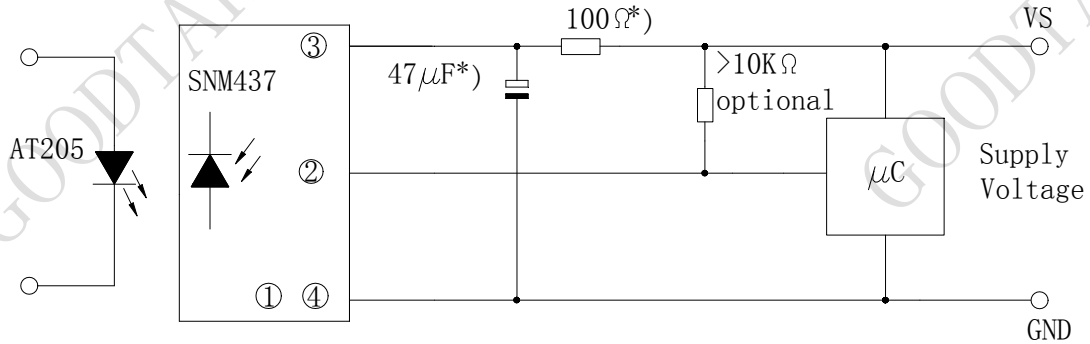
| Parameter | Test Conditions | Symbol | Value | Unit |
|-----------------------------|-----------------|--------|------------|------|
| Supply Voltage | | Vs | -0.3...6.0 | V |
| Supply Current | | Is | 5 | mA |
| Output Voltage | | Vo | -0.3...6.0 | V |
| Output Current | | Io | 5 | mA |
| Operating Temperature range | | Tamb | -25...+85 | °C |
| Storage Temperature range | | Tstg | -25...+85 | °C |
| Power Consumption | | Ptot | 8 | mW |

Electrical & Optical Characteristics

Tamb = 25 °C Vs = 5.0V

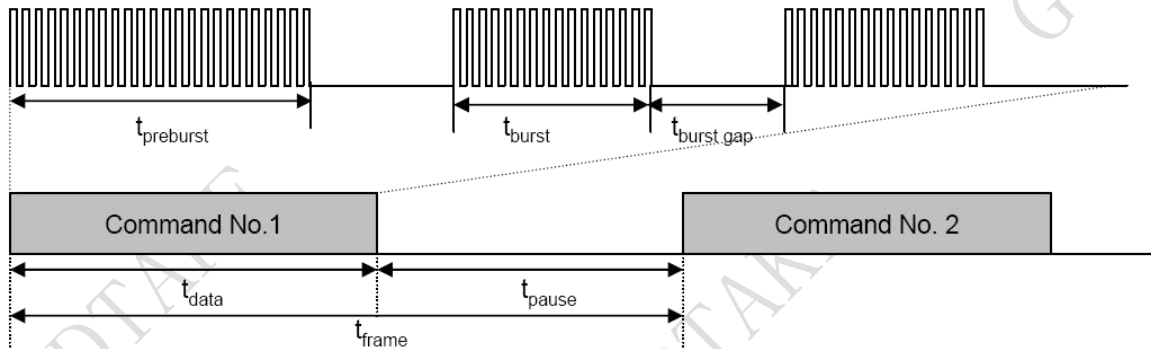
| Parameter | Test Condition | Symbol | Min | Typ | Max | Unit |
|-------------------------------|---|--------|-----|------|------|------|
| Supply current | Vs = 5V, Ev = 0 | Is | | 0.35 | 0.80 | mA |
| | Vs = 3V, Ev = 0 | | 0.2 | 0.32 | | mA |
| Operating Voltage | | Vs | 2.7 | | 5.5 | V |
| Transmission distance | IR diode AT205, If = 400 mA, Ev=150Lux; IR CodeRC5 | Lo | 20 | | - | m |
| Output Voltage Low | Active low | VOL | | 0.2 | 0.40 | V |
| Peak Wavelength | Internal IR filter | λ | | 940 | | nm |
| Carrier frequency | Internal BPF | fc | | 37.9 | | kHz |
| High level output pulse width | Cycle 1.2mS , 50% duty | TWH | 400 | | 800 | μs |
| Low level output pulse width | | TWL | 400 | | 800 | μs |
| Directivity | Angle of half transmission | θ | | ±75° | | Deg |

Applications Circuit



*) recommended to suppress power supply disturbances

Suitable Data Format



Recommended burst timing data

- Minimum burst length (t_{burst}) of 15 pulses per burst.
- Minimum burst gap time ($t_{burst-gap}$) of 20 pulses
- Minimum pause between two commands (t_{pause}) > 22 mS
- Suitable RC protocol : RC-5, RC-6, NEC.

Typical Characteristics

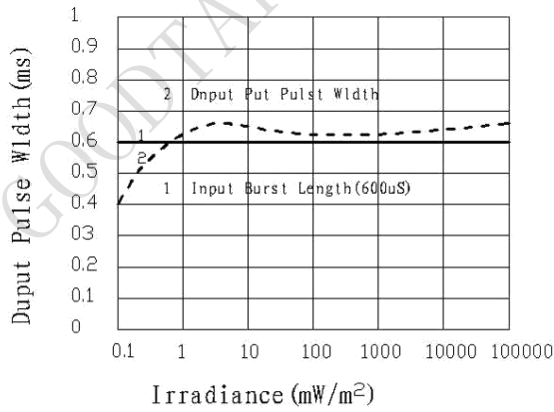


Figure 1. Pulse Length and Sensitivity in Dark Ambient

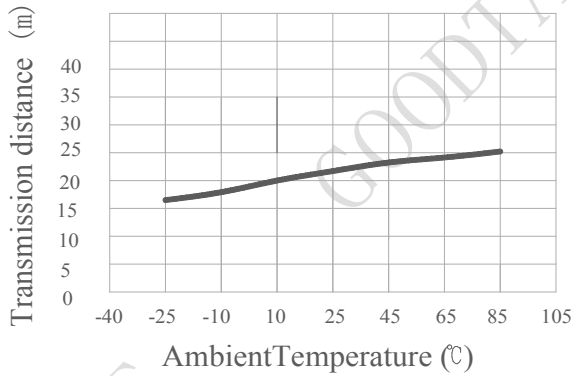


Fig.2 Transmission distance VS. Ambient Temperature

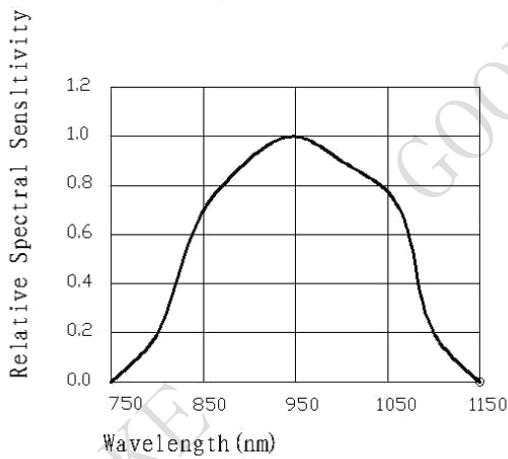


Figure3. Relative Spectral Sensitivity VS. Wavelength

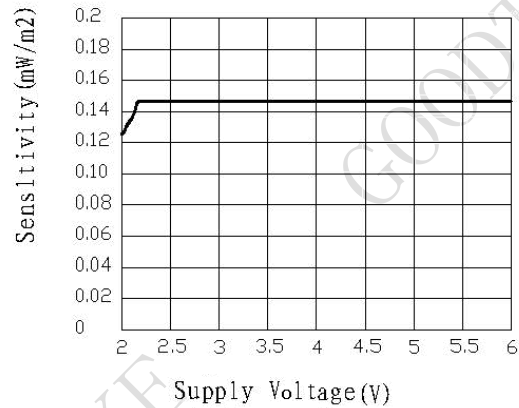


Figure 4. Sensitivity VS. Supply Voltage

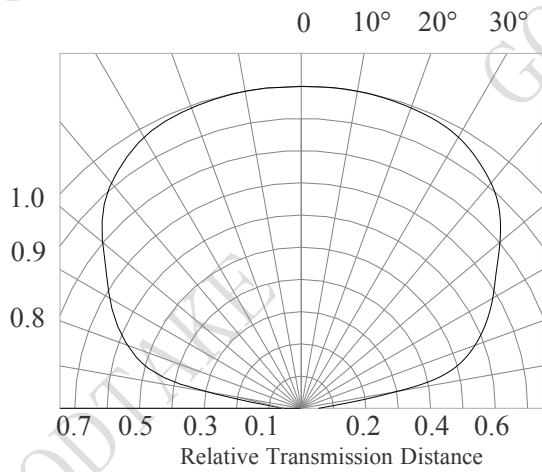


Figure.5 Vertical Directivity

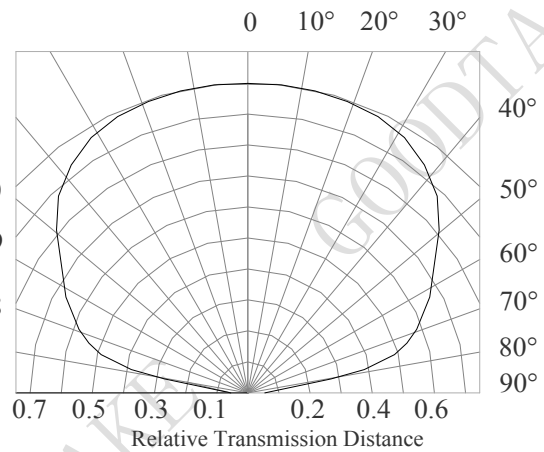


Figure.6 Horizontal Directivity

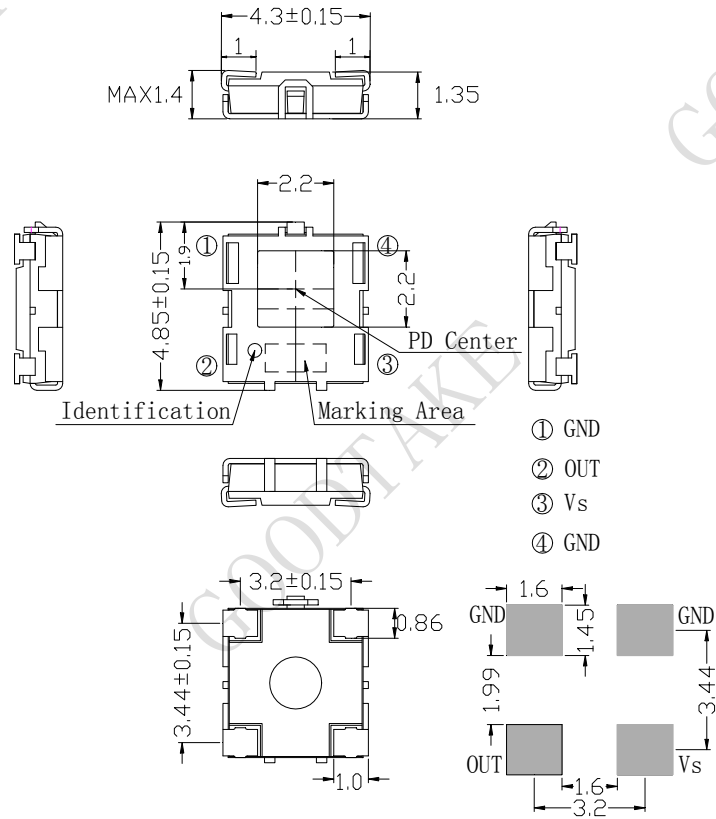
Reliability

| Test Item | Test Method | Test Condition | Sample = n pcs. | Failure = n pcs. | | | |
|---------------------------------|--|--------------------------|-----------------|------------------|----|---|----|
| High Temp Storage | Tstg at max +85°C | 1000 hours | 22 | 0 | | | |
| Low Temperature Storage | Tstg at min -25°C | 1000 hours | 22 | 0 | | | |
| Temperature humidity Bias Test | Applied the specific voltage at Ta = +85°C / RH =85% | 1000 hours | 22 | 0 | | | |
| Thermal cycling | Temperature cycle chart | | | 20 cycles | 22 | 0 | |
| | Sequence /cycle | Temp (°C) | Time (minute) | | | | |
| | LT storage | -25 | 30 | | | | |
| | Restored in Standard atmosphere | | | | | | 10 |
| | HT storage | +85 | 30 | | | | |
| Restored in Standard atmosphere | | | 10 | | | | |
| Electro Static Discharge | HBM C = 100pF, R = 1.5kΩ, 4kV | each pin apply test once | 22 | 0 | | | |
| Operating life test | Apply with specified working voltage (3V) and resistive load 4.7kΩ, continuous operation with temperature below maximum rating | 1000 hours | 22 | 0 | | | |
| Terminal strength (Tension) | Attach 5N weight to terminal | 30secs @ terminal | 22 | 0 | | | |

Judging criteria: Compare all electrical data of the tested devices before and after tests, no significant difference accepted.

Package Outline

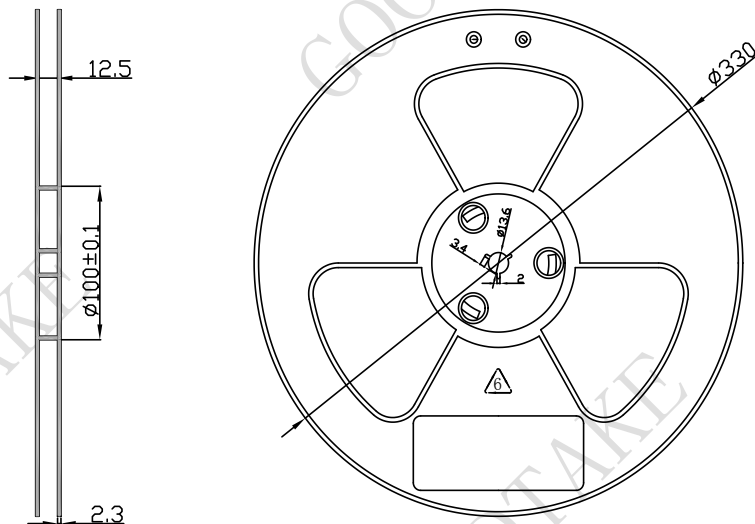
Dimensions in mm: tolerance $\pm 0.2\text{mm}$



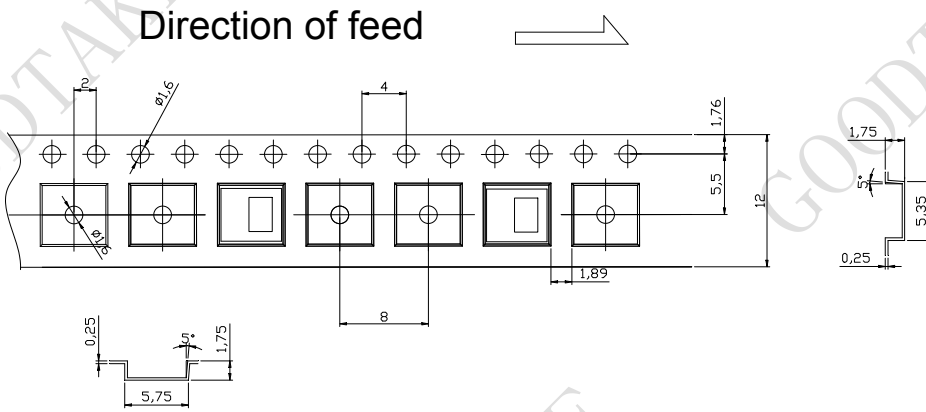
Proposed pad layout from component side

Taping Specifications

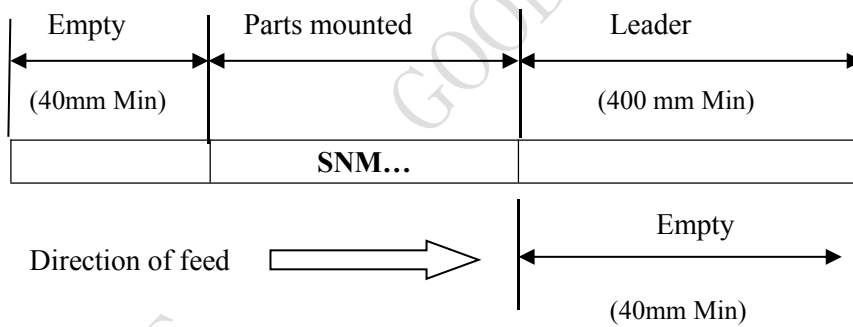
(1) Shape and dimensions of reels: unit in mm



(2) Dimensions of tape

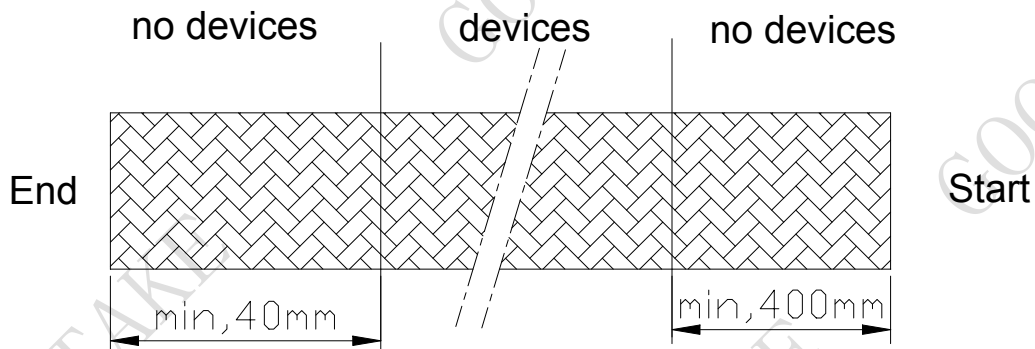


(3) Configuration of tape

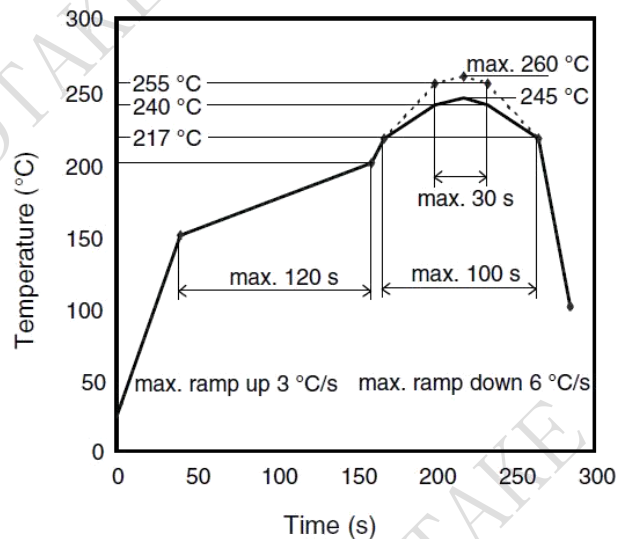


(4) Quantity: 3,000pcs/ reel

Leader And Trailer Dimensions



Reflow Soldering profile



Soldering Iron: With rating 25watt or below, ESD protected iron, maximum 350 °C & complete soldering within 3 seconds. Do not put force on device while soldering, and leave 2 seconds or more before apply heat to another terminal pad.

Pb-free solder : Pb-free soldering paste, melting temperature: 230~235°C
Compositions : Sn/Ag 3%/ Cu 0.5%

Antistatic Dry Packing

Opto devices in SMD package may be sensitive to moisture. Devices are taped & reeled, sealed in antistatic bag with silica gel desiccants.

Do not open the sealed moisture-proof bag before ready to use. If sealing is void, baking treatment may be required.

Storage

Shelf life – Devices should be stored in its original packing, in a controlled environment of temperature less than 40°C and relative humidity below 90%.
Suggested shelf life is 12 months.

Floor life – MSL:4. After opening of the sealed package, the reeled devices should be consumed within 72 hours, in a controlled environment with such condition of $T_{amb} < 30\text{ }^{\circ}\text{C}$, $RH = < 60\%$.
Remaining unused parts should be stored in DRY BOX.

Drying (Baking Process) -

If original packing is voided (such as faded silica gel or exceeded storage time), baking treatment should be performed with the following conditions: $T_{storage} = 40 \pm 5\text{ }^{\circ}\text{C}$, $RH < 5\%$, time = 192hours.