

## INFRARED REMOTE CONTROL TRANSMITTER OF 3004 CODE FORMAT

### DESCRIPTION

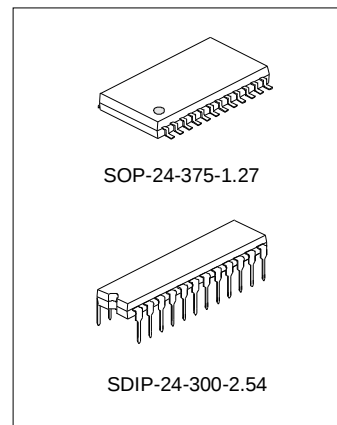
SC3004 is a remote control transmitter utilizing CMOS Technology specially designed for use on general purpose (RC-5) infrared applications with low voltage supply and large debounce time.

### FEATURES

- \* CMOS Technology
- \* Low Voltage Supply
- \* Bi-phase Transmission Technique

### APPLICATIONS

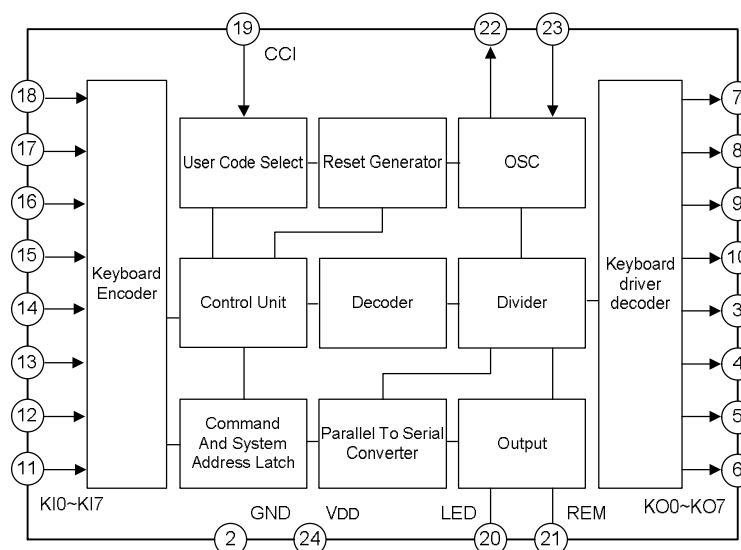
- \* Television
- \* VCR
- \* Audio Equipment
- \* Multi-Media System
- \* Personal Computer



### ORDERING INFORMATION

| Device  | package          |
|---------|------------------|
| SC3004  | SDIP-24-300-2.54 |
| SC3004S | SOP-24-375-1.27  |

### BLOCK DIAGRAM



### ABSOLUTE MAXIMUM RATING (T<sub>amb</sub>=25°C, unless otherwise specified)

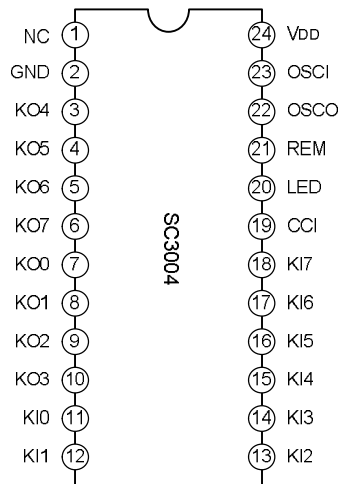
| Characteristics       | Symbol           | Test conditions | Value          | Unit |
|-----------------------|------------------|-----------------|----------------|------|
| Supply Voltage*       | VDD              |                 | VSS -0.3 ~ 5.5 | V    |
| Input Voltage*        | VIN              | VDD=3 V         | -0.5 ~ VDD+0.5 | V    |
| Output Voltage*       | VOU              | VDD=3 V         | -0.5 ~ VDD+0.5 | V    |
| Operating Temperature | T <sub>OPR</sub> | VDD=3 V         | -20~85         | °C   |

NOTE: \* = with reference to Vss

**ELECTRICAL CHARACTERISTICS** (Tamb=25°C, unless otherwise specified)

| Characteristics                                    | Symbol             | Test conditions                                                       | Min                   | Typ | Max                 | Unit |
|----------------------------------------------------|--------------------|-----------------------------------------------------------------------|-----------------------|-----|---------------------|------|
| Supply Voltage                                     | V <sub>DD</sub>    | Freq=455KHz                                                           | 2.0                   | 3.0 | 5.5                 | V    |
| Stand-By Current                                   | I <sub>DD</sub>    | V <sub>DD</sub> =3V (Output no load)                                  |                       | 0   | 10                  | μA   |
| Input Current(KI0~KI7,C0~C3)                       | I <sub>IN</sub>    | V <sub>I</sub> =0V T1=0 T2=0 SMS=0                                    |                       | 15  | 600                 | μA   |
| High Level Input Voltage (KI0~KI7,C0~C3,SMS,T1,T2) | V <sub>IH</sub>    | V <sub>DD</sub> =3V,(KI0~KI7 And C0~C3 Connected To V <sub>DD</sub> ) | 0.7 V <sub>DD</sub>   |     |                     | V    |
| Low Level Input Voltage (KI0~KI7,C0~C3,SMS,T1,T2)  | V <sub>IL</sub>    | V <sub>DD</sub> =3V,( T1,T2,OSC,SMS Connected To V <sub>SS</sub> )    |                       |     | 0.3 V <sub>DD</sub> | V    |
| Input Current Leakage (KI0~KI7,C0~C3)              | I <sub>LEAK1</sub> | V <sub>I</sub> =3V V <sub>DD</sub> =3V T1=T2=High                     |                       | 0   | 1.0                 | μA   |
|                                                    |                    | V <sub>I</sub> =0V V <sub>DD</sub> =3V T1=T2=High                     |                       | 0   | 1.0                 |      |
| Input Current Leakage (OSC)                        | I <sub>LEAK2</sub> | V <sub>I</sub> =0V V <sub>DD</sub> =3V T1=T2=High                     |                       | 0   | 1.0                 | μA   |
|                                                    | I <sub>LEAK3</sub> | V <sub>I</sub> =3V V <sub>DD</sub> =3V T1=T2=High                     | 4.5                   | 15  | 30                  |      |
| Input Leakage Current (SMS,T1,T2)                  | I <sub>LEAK4</sub> | V <sub>I</sub> =3V V <sub>DD</sub> =3V T=25°C                         |                       | 0   | 1.0                 | μA   |
|                                                    |                    | V <sub>I</sub> =0V V <sub>DD</sub> =3V T=25°C                         |                       | 0   | 1.0                 |      |
| High Level Output Voltage (Dout, MDOUT)            | V <sub>OH</sub>    | V <sub>DD</sub> =3V I <sub>OH</sub> =0.4mA                            | V <sub>DD</sub> - 0.3 |     |                     | V    |
| Low Level Output Voltage (Dout, MDOUT)             | V <sub>OL</sub>    | V <sub>DD</sub> =3V I <sub>OH</sub> =0.6mA                            |                       |     | 0.35                |      |
| Output Current Leakage (Dout, MDOUT)               | I <sub>LEAK5</sub> | V <sub>O</sub> =3V V <sub>DD</sub> =3V T=25°C                         |                       |     | 10                  | μA   |
|                                                    |                    | V <sub>O</sub> =0V V <sub>DD</sub> =3V T=25°C                         |                       |     | 1                   |      |
| Low Level Output Voltage (KO0~KO7)                 | V <sub>OL</sub>    | V <sub>DD</sub> =3V I <sub>OL</sub> =0.3mA                            |                       |     | 0.8                 | V    |
| Output Current Leakage (KO0~KO7)                   | I <sub>LEAK6</sub> | V <sub>O</sub> =3V V <sub>DD</sub> =3V T=25°C                         |                       | 0   | 1                   | μA   |
|                                                    |                    | V <sub>O</sub> =3V V <sub>DD</sub> =3V T=-25~85°C                     |                       | 3   | 10                  |      |
| Drive Current (Dout, MDout)                        | I <sub>D</sub>     | V <sub>DD</sub> =3V V <sub>O</sub> =1.5V                              | 1.5                   |     | 2                   | mA   |
| Operational Frequency                              | F <sub>osc</sub>   | V <sub>DD</sub> =3V                                                   | 400                   |     | 600                 | KHz  |

**PIN CONFIGURATIONS**



## PIN DESCRIPTION

| PIN NO. | Symbol  | DESCRIPTIONS                                 |
|---------|---------|----------------------------------------------|
| 1       | NC      | NOT CONNECT                                  |
| 2       | GND     | Negative Power Supply                        |
| 3-10    | KO0-KO7 | Scan Driver Pins                             |
| 11-18   | KI0-KI7 | Key Sense Input Pins                         |
| 19      | CCI     | User Code Select                             |
| 20      | LED     | Led Pin                                      |
| 21      | REM     | Generate Output Data Pin (with carrier wave) |
| 22      | OSCO    | Oscillator output                            |
| 23      | OSCI    | Oscillator input                             |
| 24      | VDD     | Power Supply                                 |

## FUNCTIONAL DESCRIPTION

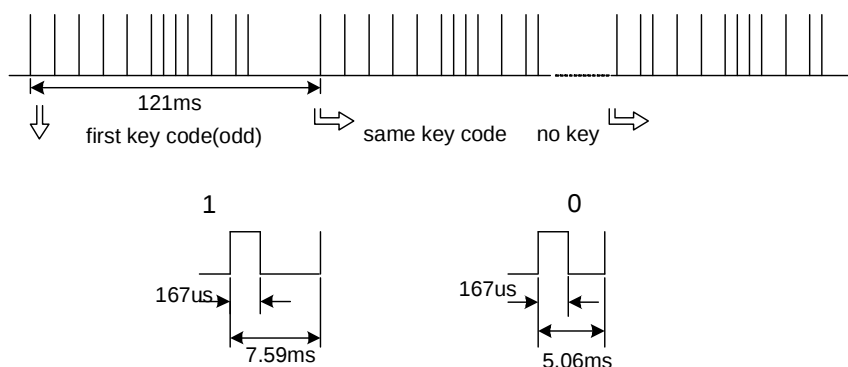
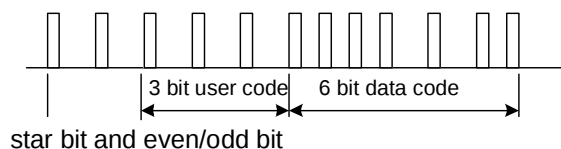
SC3004 CODE FORMAT:

| Start bit | Even/odd | User code |    |    | Data code |    |    |    |    |    |
|-----------|----------|-----------|----|----|-----------|----|----|----|----|----|
| 1         | 1/0      | S2        | S1 | S0 | D5        | D4 | D3 | D2 | D1 | D0 |

User code can be set to one of following (decided by pin CCI):

| line     | KO0 | KO1 | KO2 | KO3 | KO4 | KO5 | KO6 |
|----------|-----|-----|-----|-----|-----|-----|-----|
| S2 S1 S0 | 000 | 001 | 010 | 011 | 100 | 101 | 111 |

The SC3004 code format is showed as following:



Note: Even/odd bit: the bit will retake when a key is pressed.

DATA CODE

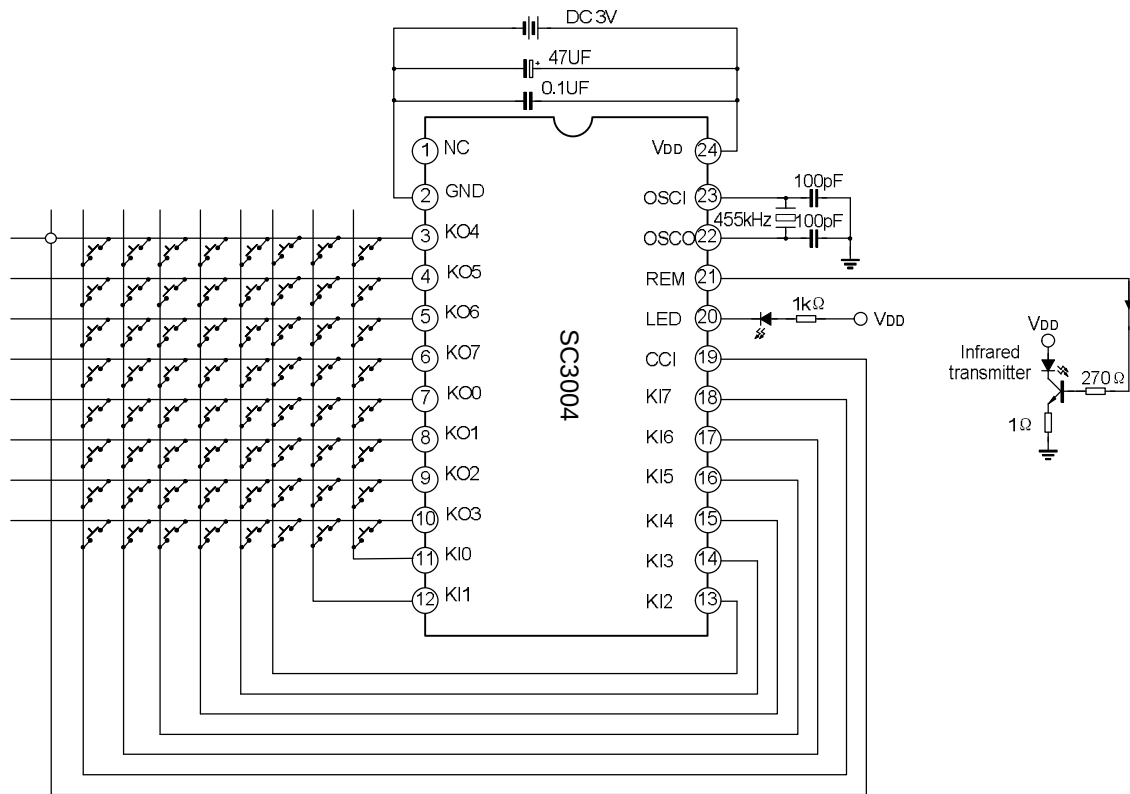
| Pin no | KO0 | KO1 | KO2 | KO3 | KO4 | KO5 | KO6 | KO7 | Data code |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----------|
| KI0    | .   |     |     |     |     |     |     |     | 00        |
|        |     | .   |     |     |     |     |     |     | 01        |
|        |     |     | .   |     |     |     |     |     | 02        |
|        |     |     |     | .   |     |     |     |     | 03        |
|        |     |     |     |     | .   |     |     |     | 04        |
|        |     |     |     |     |     | .   |     |     | 05        |
|        |     |     |     |     |     |     | .   |     | 06        |
|        |     |     |     |     |     |     |     | .   | 07        |
| KI1    | .   |     |     |     |     |     |     |     | 08        |
|        |     | .   |     |     |     |     |     |     | 09        |
|        |     |     | .   |     |     |     |     |     | 0A        |
|        |     |     |     | .   |     |     |     |     | 0B        |
|        |     |     |     |     | .   |     |     |     | 0C        |
|        |     |     |     |     |     | .   |     |     | 0D        |
|        |     |     |     |     |     |     | .   |     | 0E        |
|        |     |     |     |     |     |     |     | .   | 0F        |
| KI2    | .   |     |     |     |     |     |     |     | 10        |
|        |     | .   |     |     |     |     |     |     | 11        |
|        |     |     | .   |     |     |     |     |     | 12        |
|        |     |     |     | .   |     |     |     |     | 13        |
|        |     |     |     |     | .   |     |     |     | 14        |
|        |     |     |     |     |     | .   |     |     | 15        |
|        |     |     |     |     |     |     | .   |     | 16        |
|        |     |     |     |     |     |     |     | .   | 17        |
| KI3    | .   |     |     |     |     |     |     |     | 18        |
|        |     | .   |     |     |     |     |     |     | 19        |
|        |     |     | .   |     |     |     |     |     | 1A        |
|        |     |     |     | .   |     |     |     |     | 1B        |
|        |     |     |     |     | .   |     |     |     | 1C        |
|        |     |     |     |     |     | .   |     |     | 1D        |
|        |     |     |     |     |     |     | .   |     | 1E        |
|        |     |     |     |     |     |     |     | .   | 1F        |
| KI4    | .   |     |     |     |     |     |     |     | 20        |
|        |     | .   |     |     |     |     |     |     | 21        |
|        |     |     | .   |     |     |     |     |     | 22        |
|        |     |     |     | .   |     |     |     |     | 23        |
|        |     |     |     |     | .   |     |     |     | 24        |
|        |     |     |     |     |     | .   |     |     | 25        |
|        |     |     |     |     |     |     |     |     |           |

(To be continued)

(Continued)

| Pin no | K00 | K01 | K02 | K03 | K04 | K05 | K06 | K07 | Data code |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----------|
| K14    |     |     |     |     |     |     | •   |     | 26        |
|        |     |     |     |     |     |     |     | •   | 27        |
| K15    | •   |     |     |     |     |     |     |     | 28        |
|        |     | •   |     |     |     |     |     |     | 29        |
|        |     |     | •   |     |     |     |     |     | 2A        |
|        |     |     |     | •   |     |     |     |     | 2B        |
|        |     |     |     |     | •   |     |     |     | 2C        |
|        |     |     |     |     |     | •   |     |     | 2D        |
|        |     |     |     |     |     |     | •   |     | 2E        |
|        |     |     |     |     |     |     |     | •   | 2F        |
| K16    | •   |     |     |     |     |     |     |     | 30        |
|        |     | •   |     |     |     |     |     |     | 31        |
|        |     |     | •   |     |     |     |     |     | 32        |
|        |     |     |     | •   |     |     |     |     | 33        |
|        |     |     |     |     | •   |     |     |     | 34        |
|        |     |     |     |     |     | •   |     |     | 35        |
|        |     |     |     |     |     |     | •   |     | 36        |
|        |     |     |     |     |     |     |     | •   | 37        |
| K17    | •   |     |     |     |     |     |     |     | 38        |
|        |     | •   |     |     |     |     |     |     | 39        |
|        |     |     | •   |     |     |     |     |     | 3A        |
|        |     |     |     | •   |     |     |     |     | 3B        |
|        |     |     |     |     | •   |     |     |     | 3C        |
|        |     |     |     |     |     | •   |     |     | 3D        |
|        |     |     |     |     |     |     | •   |     | 3E        |
|        |     |     |     |     |     |     |     | •   | 3F        |

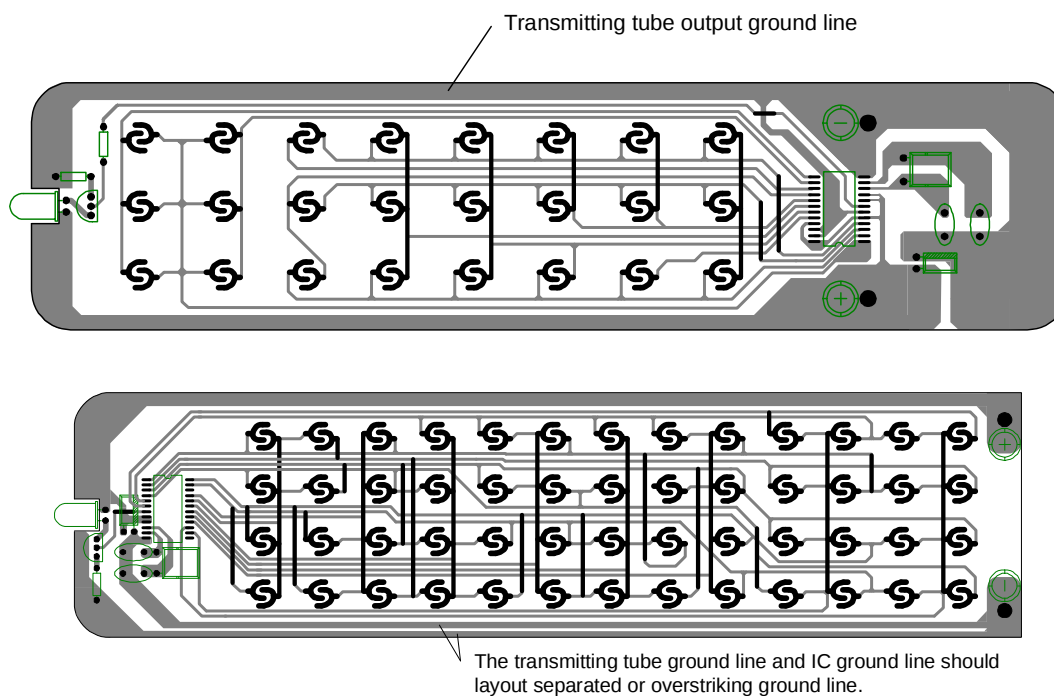
## APPLICATION CIRCUIT



○ connect directly

NOTE: Pin 19 connect with one of scan driver pin to decide the user code

## PCB WIRE LAYOUT SCHEMATIC



The above IC only use to hint, not to specified.

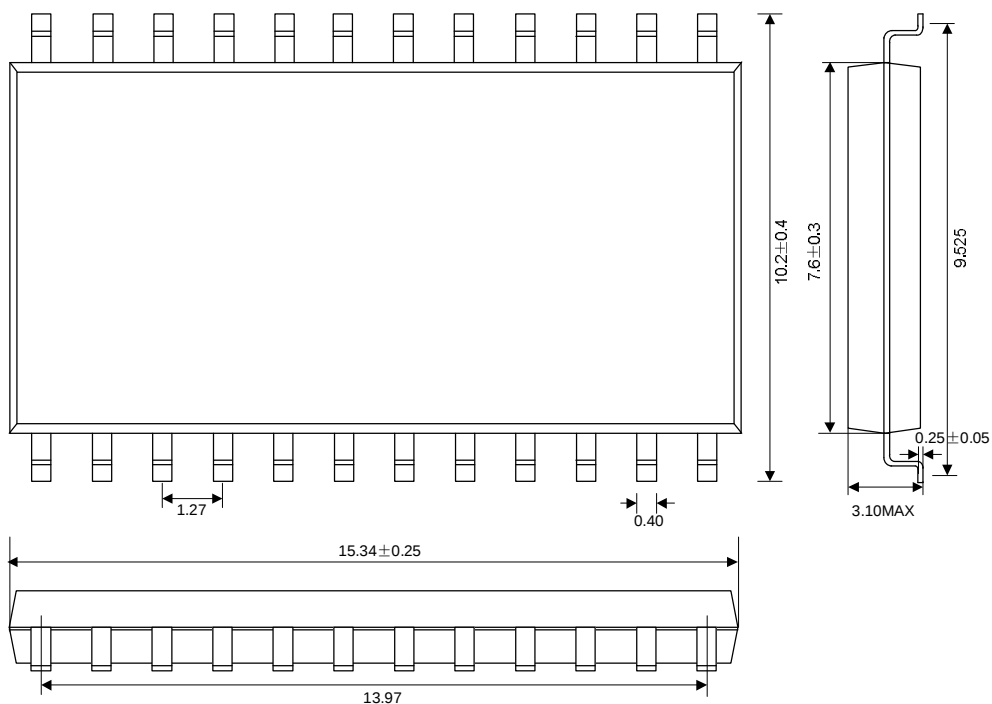
Note:

- \* In wire layout, the power filter capacitor should near to IC.
- \* In wire layout, should avoid power line and ground line too long.
- \* Recommended infrared transmit unit and IC ground line should layout separated, or over striking lines.
- \* The emitter of triode connect 1Ω resistor at least.
- \* Recommended triode use 9014.

PACKAGE OUTLINE

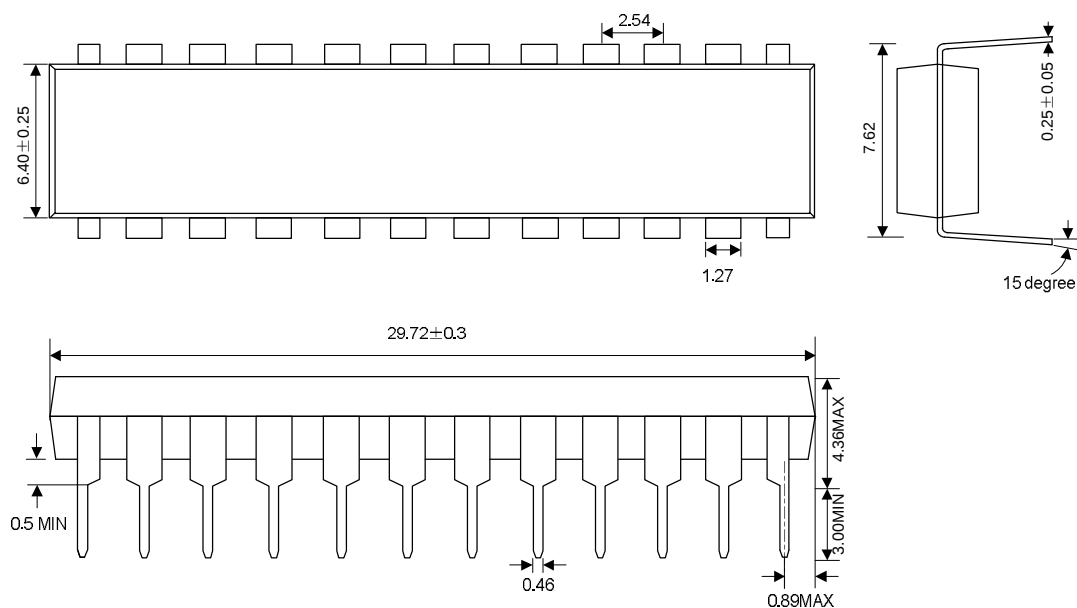
SOP-24-375-1.27

Unit: mm



SDIP-24-300-2.54

Unit: mm



**HANDLING MOS DEVICES:**

Electrostatic charges can exist in many things. All of our MOS devices are internally protected against electrostatic discharge but they can be damaged if the following precautions are not taken:

- Persons at a work bench should be earthed via a wrist strap.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed for dispatch in antistatic/conductive containers.

**Note:** IC oscillator input mustn't be on the outside layer, thus to avoid the abnormal working when human body touches the remote controller without crust in testing.

## Attachment

## Revision History

| Data       | REV | Description                          | Page |
|------------|-----|--------------------------------------|------|
| 2003.04.17 | 1.0 | Original                             |      |
| 2003.06.17 | 1.1 | Modify "TYPICAL APPLICATION CIRCUIT" | 7    |