



DESCRIPTION

PT2262 is a remote control encoder paired with PT2272 utilizing CMOS Technology. It encodes data and address pins into a serial coded waveform suitable for RF or IR modulation. PT2262 has a maximum of 12 bits of tri-state address pins providing up to 531,441 (or 312) address codes; thereby, drastically reducing any code collision and unauthorized code scanning possibilities.

FEATURES

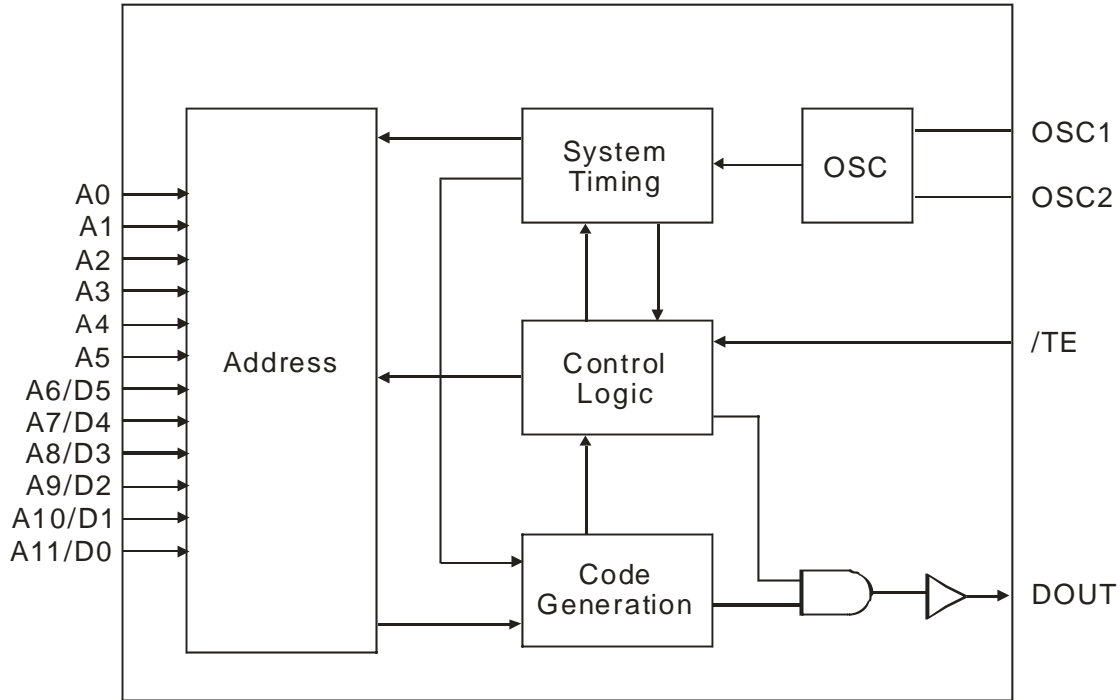
- CMOS Technology
- Low Power Consumption
- Very High Noise Immunity
- Up to 12 Tri-State Code Address Pins
- Up to 6 Data Pins
- Wide Range of Operating Voltage: $V_{cc} = 4 \sim 15$ Volts
- Single Resistor Oscillator
- Latch or Momentary Output Type
- Available in DIP and SOP

APPLICATIONS

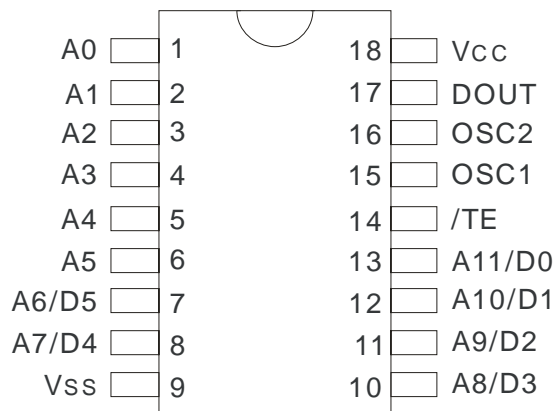
- Car Security System
- Garage Door Controller
- Remote Control Fan
- Home Security/Automation System
- Remote Control Toys
- Remote Control for Industrial Use



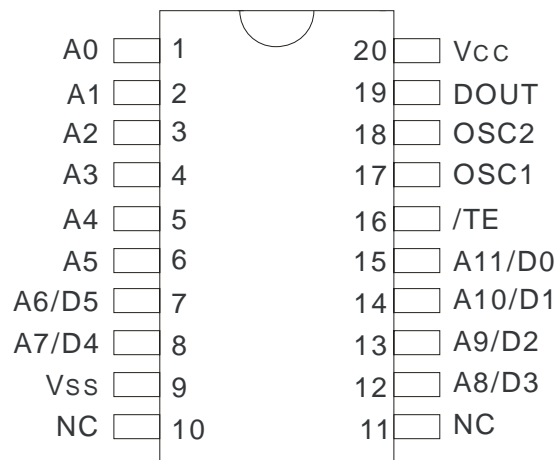
BLOCK DIAGRAM



PIN CONFIGURATION



PT2262
PT2262-IR
PT2262-S18



PT2262S
PT2262-IRS



Remote Control Encoder PT2262

PIN DESCRIPTION

| Pin Name | I/O | Description | Pin No. | |
|----------------|-----|--|------------------|------------------|
| | | | 18 Pins | 20 Pins |
| A0 ~ A5 | I | Code Address Pin Nos.0 ~ 5 These six tri-state pins are detected by PT2262 to determine the encoded waveform bit 0 ~ bit 5. Each pin can be set to "0", "1" or "f" (floating). | 1 ~ 6 | 1 ~ 6 |
| A6/D5 ~ A11/D0 | I | Code Address Pin Nos.6 ~ 11/Data Pin Nos.5 ~ 0. These six tri-state pins are detected by PT2262 to determine the encoded waveform bit 6 ~ bit 11. When these pins are used as address pins, they can be set to "0", "1", or "f" (floating). When these pins are used as data pins, they can be set only to "0" or "1". | 7 ~ 8 10 ~ 13 | 7 ~ 8 12 ~ 15 |
| /TE | I | Transmission Enable. Active Low Signal. PT2262 outputs the encoded waveform to DOUT when this pin is pulled to low. | 14 | 16 |
| OSC 1 | O | Oscillator Pin No.1 | 15 | 17 |
| OSC 2 | I | Oscillator Pin No.2 | | |
| | | A resistor connected between these two pins determine the fundamental frequency of the PT2262. | 16 | 18 |
| DOUT | O | Data Output Pin. The encoded waveform is serially outputted to this pin. When PT2262 is not transmitting, DOUT outputs low (Vss) voltage. | 17 | 19 |
| Vcc | - | Positive Power Supply | 18 | 20 |
| Vss | - | Negative Power Supply | 9 | 9 |



FUNCTIONAL DESCRIPTION

PT2262 encodes the code address and data set at A0 ~ A5 and A6/D5 ~ A11/D0 into a special waveform and outputs it to the DOUT when TE is pulled to "0" (Low State). This waveform is fed to either the RF modulator or the IR transmitter for transmission. The transmitted radio frequency or infrared ray is received by the RF demodulator or IR receiver and reshaped to the special waveform. PT2272 is then used to decode the waveform and set the corresponding output pin(s). Thus completing a remote control encoding and decoding function.

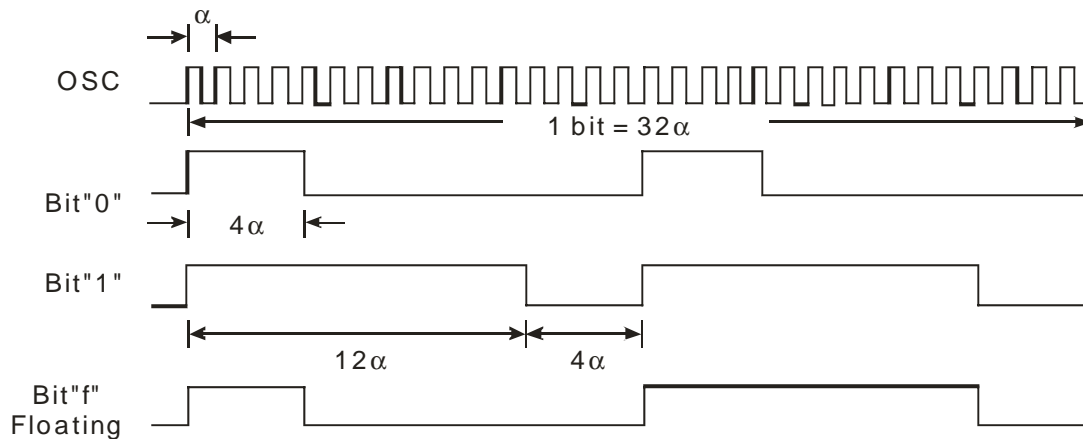
RF OPERATION

CODE BITS

A Code Bit is the basic component of the encoded waveform, and can be classified as either an AD (Address/Data) Bit or a SYNC (Synchronous) Bit.

Address/Data (AD) Bit Waveform

An AD Bit can be designated as Bit "0", "1" or "f" if it is in low, high or floating state respectively. One bit waveform consists of 2 pulse cycles. Each pulse cycle has 16 oscillating time periods. For further details, please refer to the diagram below:



where: α = Oscillating Clock Period

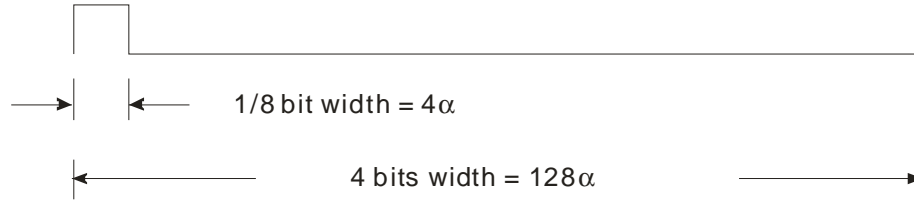


Remote Control Encoder

PT2262

Synchronous (Sync.) Bit Waveform

The Synchronous Bit Waveform is 4 bits long with 1/8 bit width pulse. Please refer to the diagram below:

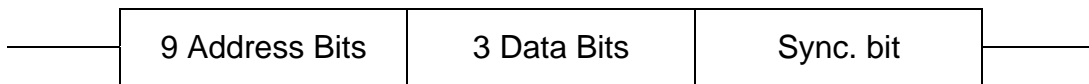


Note: 1 bit = 32α

CODE WORD

A group of Code Bits is called a Code Word. A Code Word consists of 12 AD bits followed by one Sync Bit. The 12 AD bits are determined by the corresponding states of A0 ~ A5 and A6/D5 ~ A11/D0 pins at the time of transmission. When Data Type of PT2262 is used, the address bits will decrease accordingly.

For example: In the 3 Data Type where the address has nine (9) bits, the transmitting format is:



PT2262 / PT2272 has a maximum of twelve (12) Address Bits including the six (6) Address/Data bits. The following diagram shows the code bits with their corresponding pins.

| | | | | | | | | | | | | |
|----|----|----|----|----|----|-----------|-----------|-----------|-----------|--------|--------|-----------|
| A0 | A1 | A2 | A3 | A4 | A5 | A6/D 5 | A7/D 4 | A8/D 3 | A9/D 2 | A10/D1 | A11/A0 | SYNC. BIT |
|----|----|----|----|----|----|-----------|-----------|-----------|-----------|--------|--------|-----------|

One Complete Code Word

| | | | | | | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|----|----|-----|-----|----------|
| 0 Data: | A0 | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | A11 | Sync Bit |
| 1 Data: | A0 | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | D0 | Sync Bit |
| 2 Data: | A0 | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | D1 | D0 | Sync.Bit |
| 3 Data: | A0 | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | D2 | D1 | D0 | Sync.Bit |
| 4 Data: | A0 | A1 | A2 | A3 | A4 | A5 | A6 | A7 | D3 | D2 | D1 | D0 | Sync.Bit |
| 5 Data: | A0 | A1 | A2 | A3 | A4 | A5 | A6 | D4 | D3 | D2 | D1 | D0 | Sync.Bit |
| 6 Data: | A0 | A1 | A2 | A3 | A4 | A5 | D5 | D4 | D3 | D2 | D1 | D0 | Sync.Bit |

The Code Bits A0 ~ A5 and A6/D5 ~ A11/D0 are determined by the states of A0 ~ A5 and A6/D5 ~ A11/D0 pins. For example, when the A0 (Pin No. 1) is set to "1" (Vcc), the Code Bit A0 is synthesized as "1" bit. In the same manner, when it (A0 Pin) is set to "0" (Vss) or left floating, the Code Bit A0 is synthesized as a "0" or "f" bit respectively.

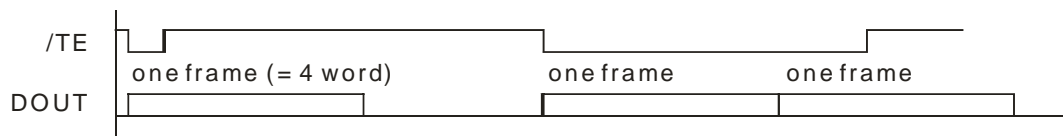


Remote Control Encoder

PT2262

CODE FRAME

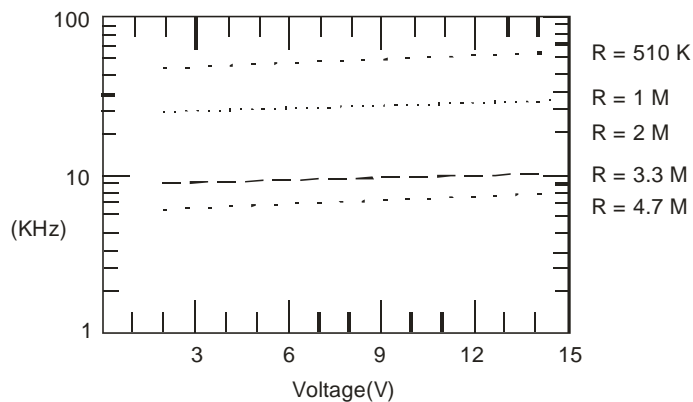
A Code Frame consists of four (4) continuous Code Words. When PT2262 detects "0" on the /TE (meaning, the /TE is active "low"), it outputs a Code Frame at DOUT. If /TE is still active at the time the Code Frame transmission ends, T2262 outputs another Code Frame. It should be noted that the Code Frame is synthesized at the time of transmission.



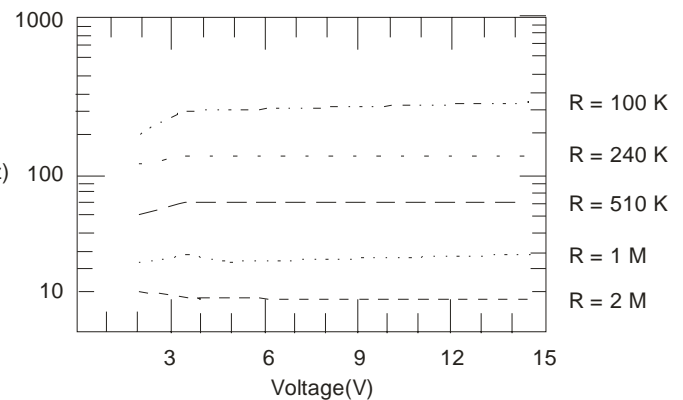
SIGNAL RESISTOR OSCILLATOR

The built-in oscillator circuitry of PT2262 allows a precision oscillator to be constructed by connecting an external resistor between OSC1 and OSC2 pins. For PT2272 to decode correctly the received waveform, the oscillator frequency of PT2272 must be 2.5 ~ 8 times that of transmitting PT2262. The typical oscillator frequency with various resistor values for both PT2262 and PT2272 are shown below:

Encoder OSC Frequency



Decoder OSC Frequency



Suggested oscillator resistor values are shown below.

| PT2262 | PT2272 |
|--------|---------|
| 4.7 M | 820 K* |
| 3.3 M | 680 K* |
| 1.2 M | 200 K** |

Note:

* -- Operates when PT2272's Vcc=5V to 15V

** -- Operates when PT2272's Vcc=3V to 15V

This means that if PT2272 supply voltage is lower than 5V, you need to use a lower oscillator resistor value for both PT2262 and PT2272.

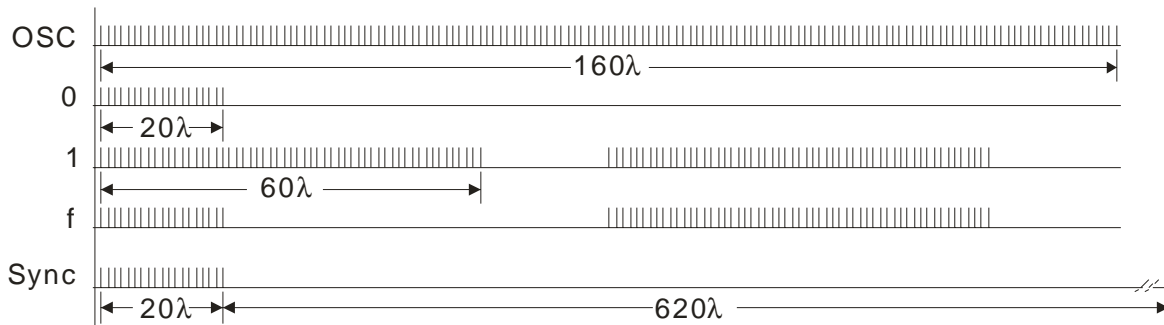


IR OPERATION

In the IR Type of Operation, the functions are similar to the above descriptions except for the output waveform that has a carrier frequency of 38 KHz. Details are as follows:

CODE BITS

The Code Bits are further modulated with a 38 KHz carrier frequency and can be "0", "1" or "f" bit. Their waveforms are shown in the diagram below.



Note : $\lambda = 2$ clock lengths

CODE WORD

A Code Word is made up of code bits and the format is the same as that of the RF Code Word.

CODE FRAME

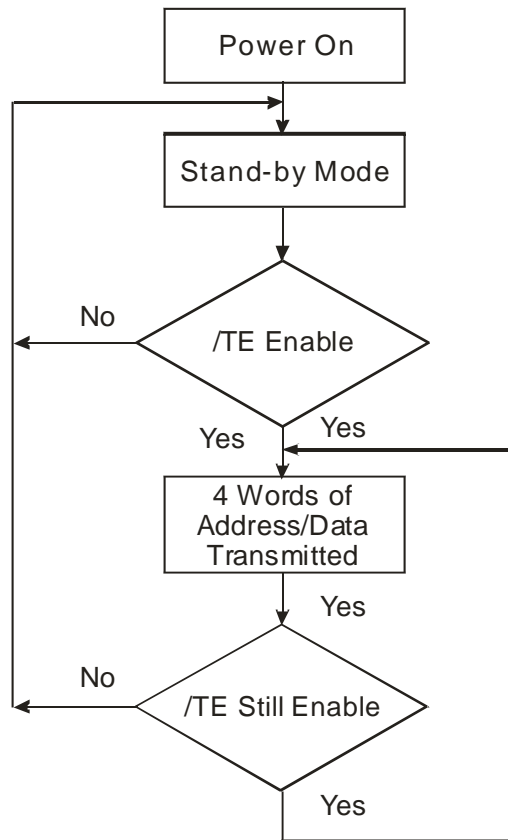
Likewise, a Code Frame is made up of Code Words and the format is the same as that of RF Type of Operation.

OSCILLATOR

The Oscillator Frequency for the IR Type of Operation is twice the carrier frequency. Thus, the oscillator frequency should be kept at 76 KHz. A 430K ~ 560K Ω oscillator resistor between OSC 1 and OSC 2 pins is recommended. It should be noted that the carrier is a 50% duty cycle frequency.



OPERATION FLOW CHART





ABSOLUTE MAXIMUM RATING

| Parameter | Symbol | Condition | Rating | Unit |
|---------------------------|------------------|-----------------------|-----------------------------|------|
| Supply Voltage | V _{cc} | | -0.3 ~ 16.0 | V |
| Input Voltage | V _I | | -0.3 ~ V _{cc} +0.3 | V |
| Output Voltage | V _O | | -0.3 ~ V _{cc} +0.3 | V |
| Maximum Power Dissipation | P _a | V _{cc} = 12V | 300 | mW |
| Operating Temperature | T _{opr} | | -40 ~ +85 | °C |
| Storage Temperature | T _{stg} | | -65 ~ 150 | °C |

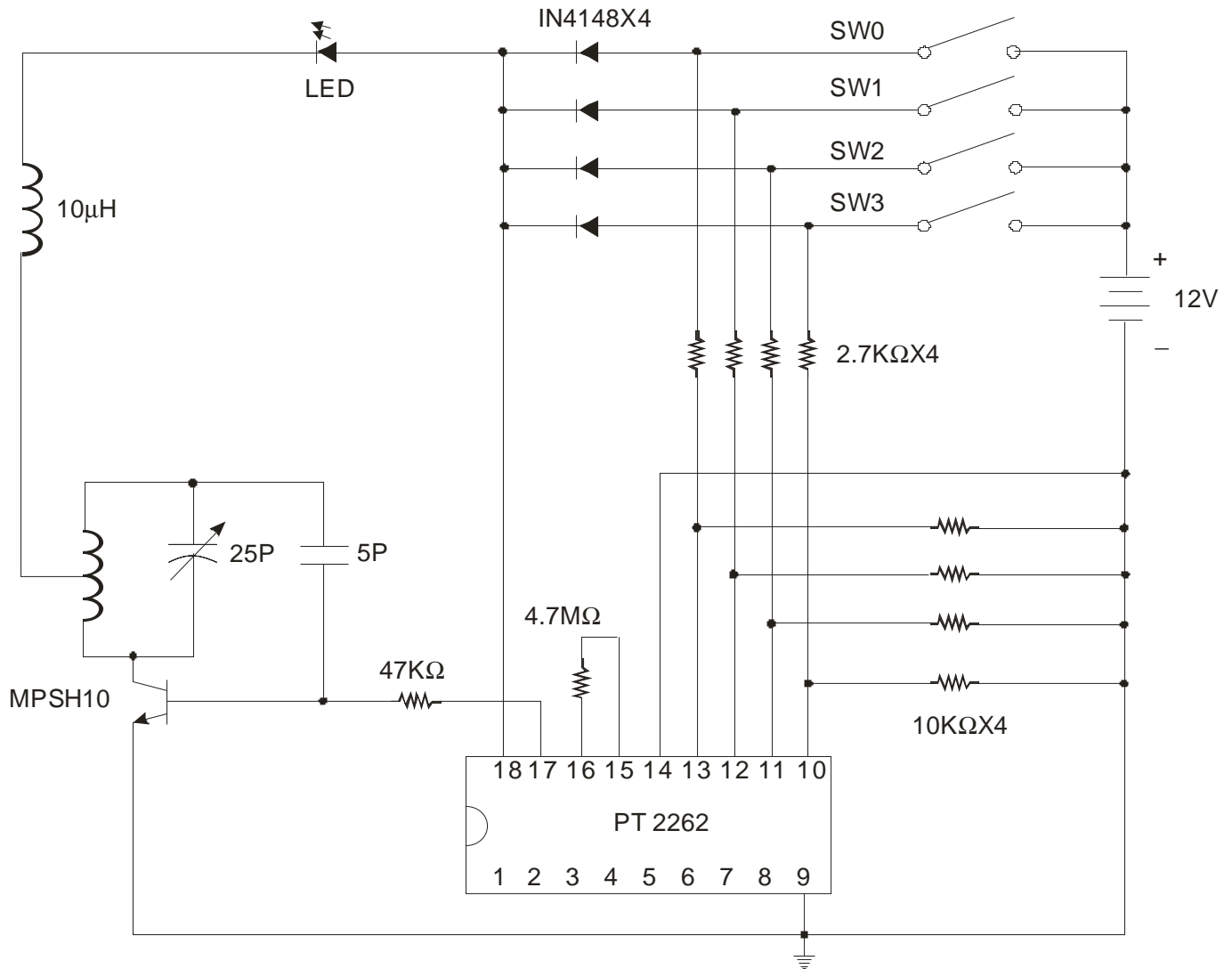
DC ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|-----------------------------|-----------------|--|------|------|------|------|
| Supply Voltage | V _{cc} | | 4 | | 15 | V |
| Stand-by Current | ISB | V _{cc} = 12V OSC2 = 12V A0 ~ A11 Open | | 0.1 | 1 | μA |
| DOUT Output Driving Current | IOH | V _{cc} = 5V VOH = 3V | -3 | | | mA |
| | | V _{cc} = 8V VOH = 4V | -6 | | | mA |
| | | V _{cc} = 12V VOH = 6V | -10 | | | mA |
| DOUT Output Sinking Current | IOL | V _{cc} = 5V, VOL=3V | 2 | | | mA |
| | | V _{cc} = 8V VOL = 4V | 5 | | | mA |
| | | V _{cc} = 12V VOL = 6V | 9 | | | mA |



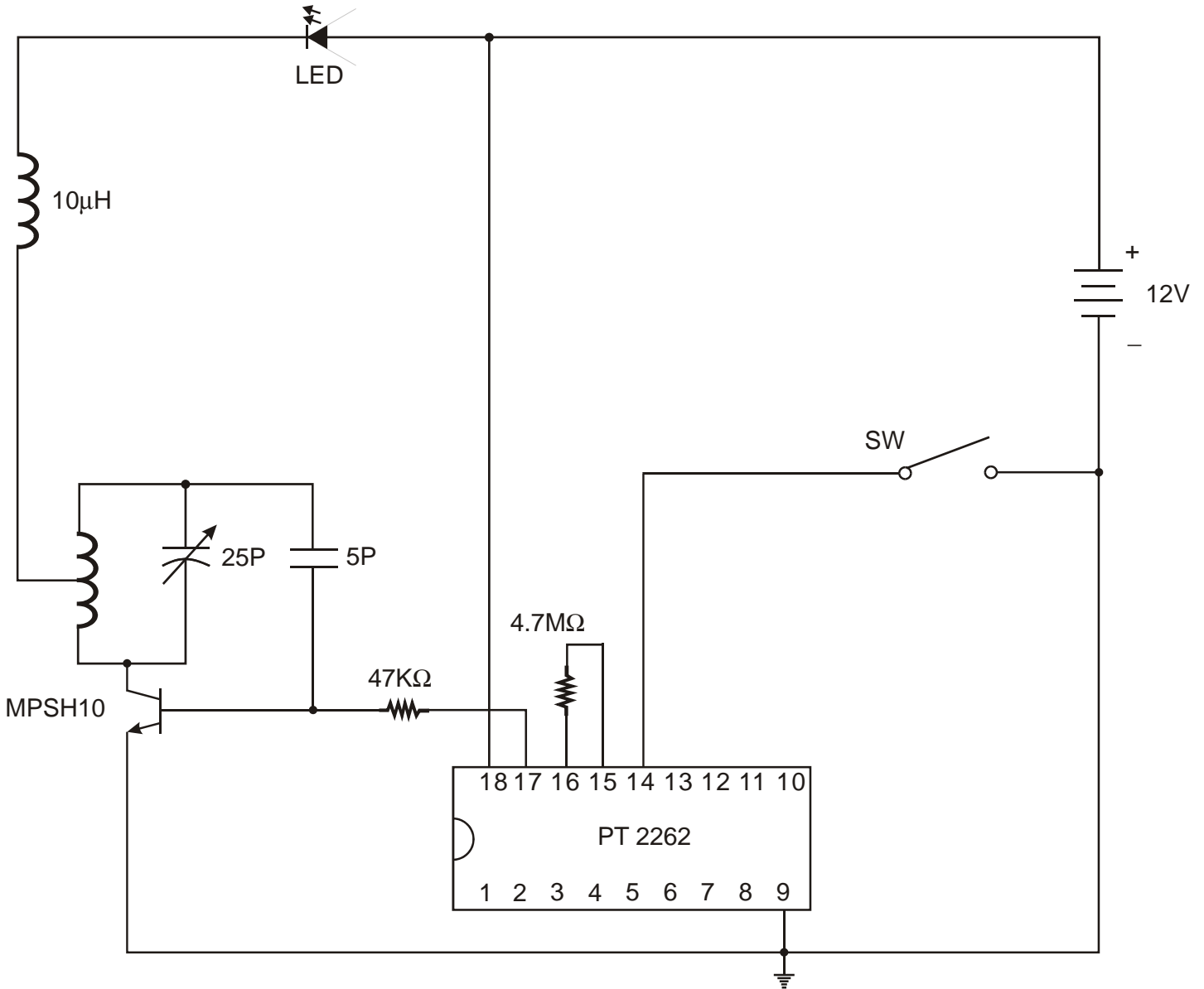
APPLICATION CIRCUIT

UHF BAND 4 DATA TRANSMITTER CIRCUIT IS RECOMMENDED



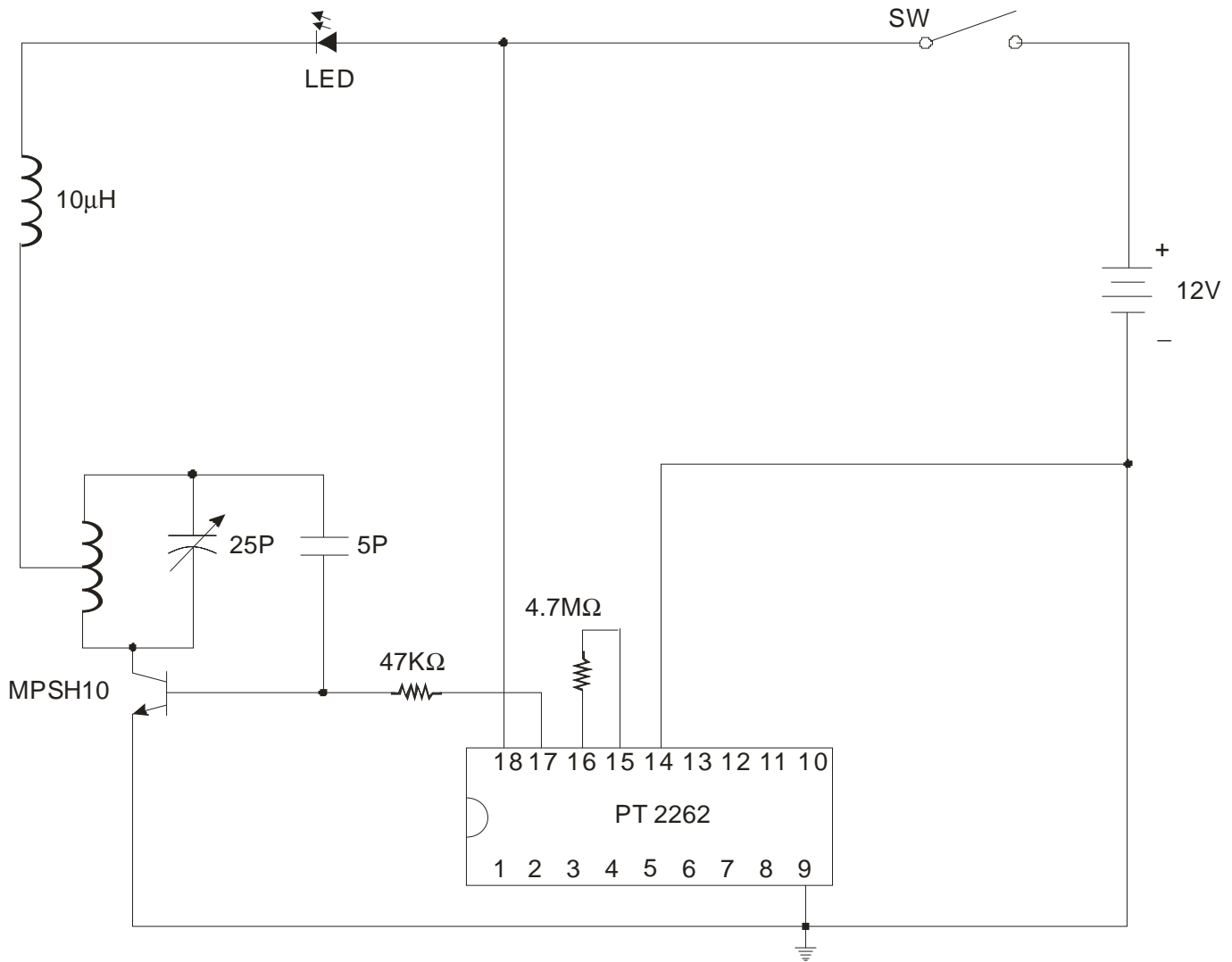


UHF BAND ADDRESS-ONLY (ZERO DATA) TRANSMITTER CIRCUIT IS RECOMMENDED



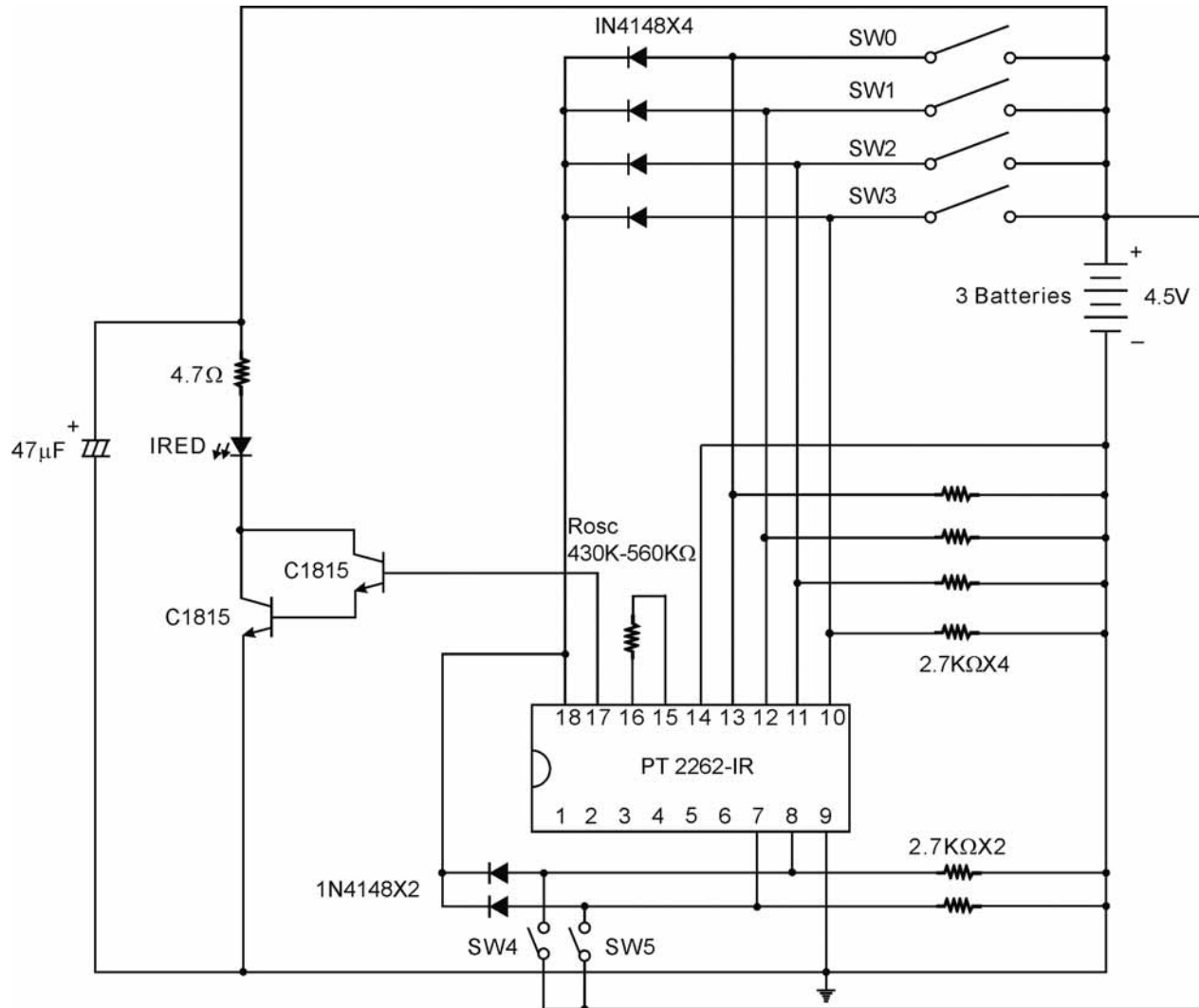


UHF BAND ADDRESS-ONLY (ZERO DATA) ZERO-STAND-BY TRANSMITTER CIRCUIT IS RECOMMENDED.





INFRARED RAY 6-DATA CIRCUIT. ADJUST ROSC TO GET 38KHZ CARRIER PULSE AT DOUT PIN IS RECOMMENDED.





ORDERING INFORMATION

| Order Part Number | Package Type | Top ode |
|-------------------|----------------------|------------|
| PT2262-D (L) | 18 Pins, DIP, 300mil | PT2262-D |
| PT2262-IR (L) | 18 Pins, DIP, 300mil | PT2262-IR |
| PT2262-S18 (L) | 18 Pins, SOP, 300mil | PT2262-S18 |
| PT2262S (L) | 20 Pins, SOP, 300mil | PT2262-S |
| PT2262-IRS (L) | 20 Pins, SOP, 300mil | PT2262-IRS |

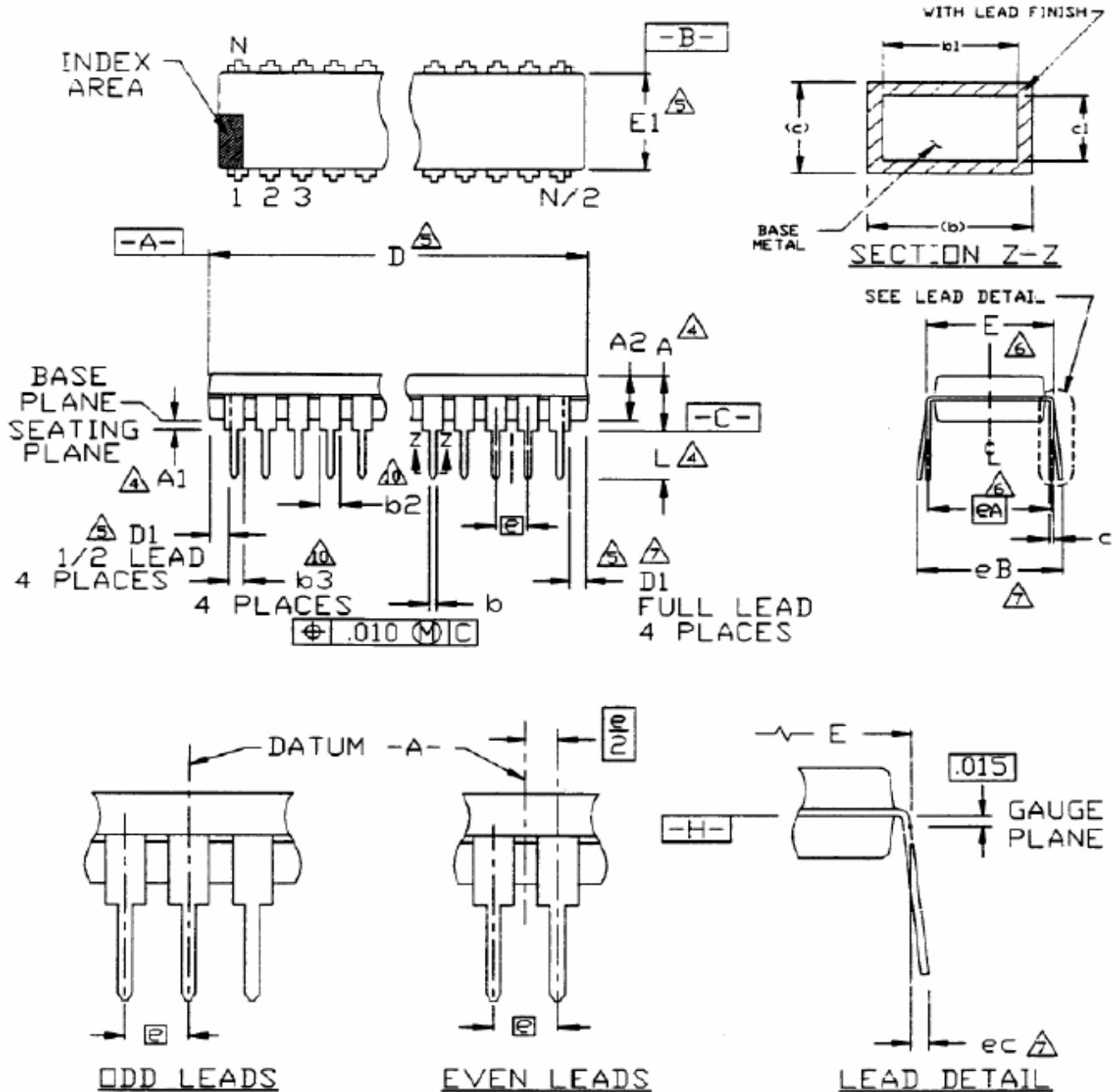
Notes:

1. (L) = Lead Free
2. The Lead Free mark is put in front of the date code.



PACKAGE INFORMATION

18 PINS, DIP, 300MIL





Remote Control Encoder

PT2262

| Symbol | Min. | Nom. | Max. |
|--------|------------|-------|-------|
| A | - | - | 0.210 |
| A1 | 0.150 | | |
| A2 | 0.115 | 0.130 | 0.195 |
| b | 0.014 | 0.018 | 0.022 |
| b2 | 0.045 | 0.060 | 0.070 |
| b3 | 0.03 | 0.039 | 0.045 |
| c | 0.008 | 0.010 | 0.014 |
| c1 | 0.008 | 0.010 | 0.011 |
| D | 0.880 | 0.900 | 0.920 |
| D1 | 0.005 | - | - |
| E | 0.300 | 0.310 | 0.325 |
| E1 | 0.240 | 0.250 | 0.280 |
| e | 0.100 BAS. | | |
| eA | 0.300 BAS. | | |
| eB | - | - | 0.430 |
| eC | 0.000 | - | 0.600 |
| L | 0.115 | 0.130 | 0.150 |

Note:

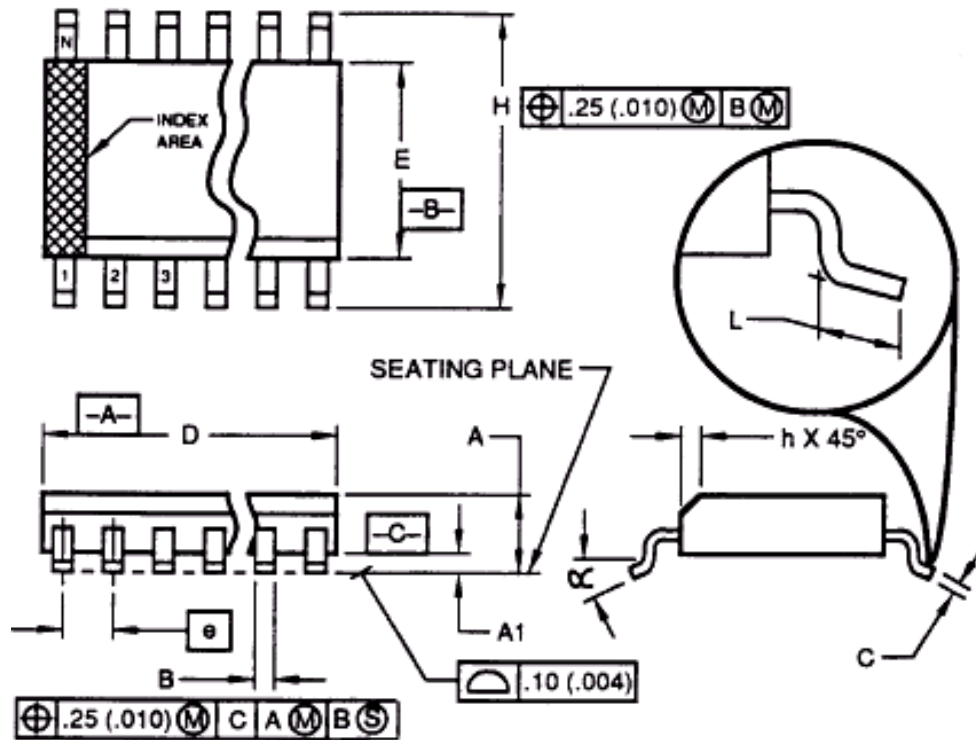
- All dimensioning are in INCHES.
 - Dimensioning and tolerancing per ANSI Y14.5M-1982.
 - Dimension "A", "A1" and "L" are measured with package seated in JEDEC Seating Plane Gauge GS-3.
 - "D", "D1" and "E1" dimensions do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.010 inch.
 - "E" and "eA" measured with the leads constrained to be perpendicular to datum \square -C.
 - "eB" and "eC" are measured at the lead tips with the leads unconstrained.
 - "N" is the number of terminal position (N=18).
 - Pointed or rounded lead tips are preferred to ease insertion.
 - "b2" and "b3" maximum dimensions are not include dambar protrusions. Dambar protrusions shall not exceed 0.010 inch (0.25mm)
 - Distance between leads including Dambar protrusions to be 0.005 inch minimum.
 - Datum plane \square -H coincident with the bottom of lead, where lead exits body.
 - Refer to JEDEC MS-001, Variation AC
- JEDEC is the trademark of JEDEC SOLID STATE TECHNOLOGY ASSOCIATION.



Remote Control Encoder

PT2262

18 PINS, SOP, 300MIL



| Symbol | Min. | Nom. | Max. |
|----------|-----------|------|-------|
| A | 2.35 | - | 2.65 |
| A1 | 0.10 | - | 0.30 |
| B | 0.33 | - | 0.51 |
| C | 0.23 | - | 0.32 |
| D | 11.35 | - | 11.75 |
| E | 7.40 | - | 7.60 |
| e | 1.27 BAS. | | |
| H | 10.00 | - | 10.65 |
| h | 0.25 | - | 0.75 |
| L | 0.40 | - | 1.27 |
| ∞ | 0° | - | 8° |



Notes:

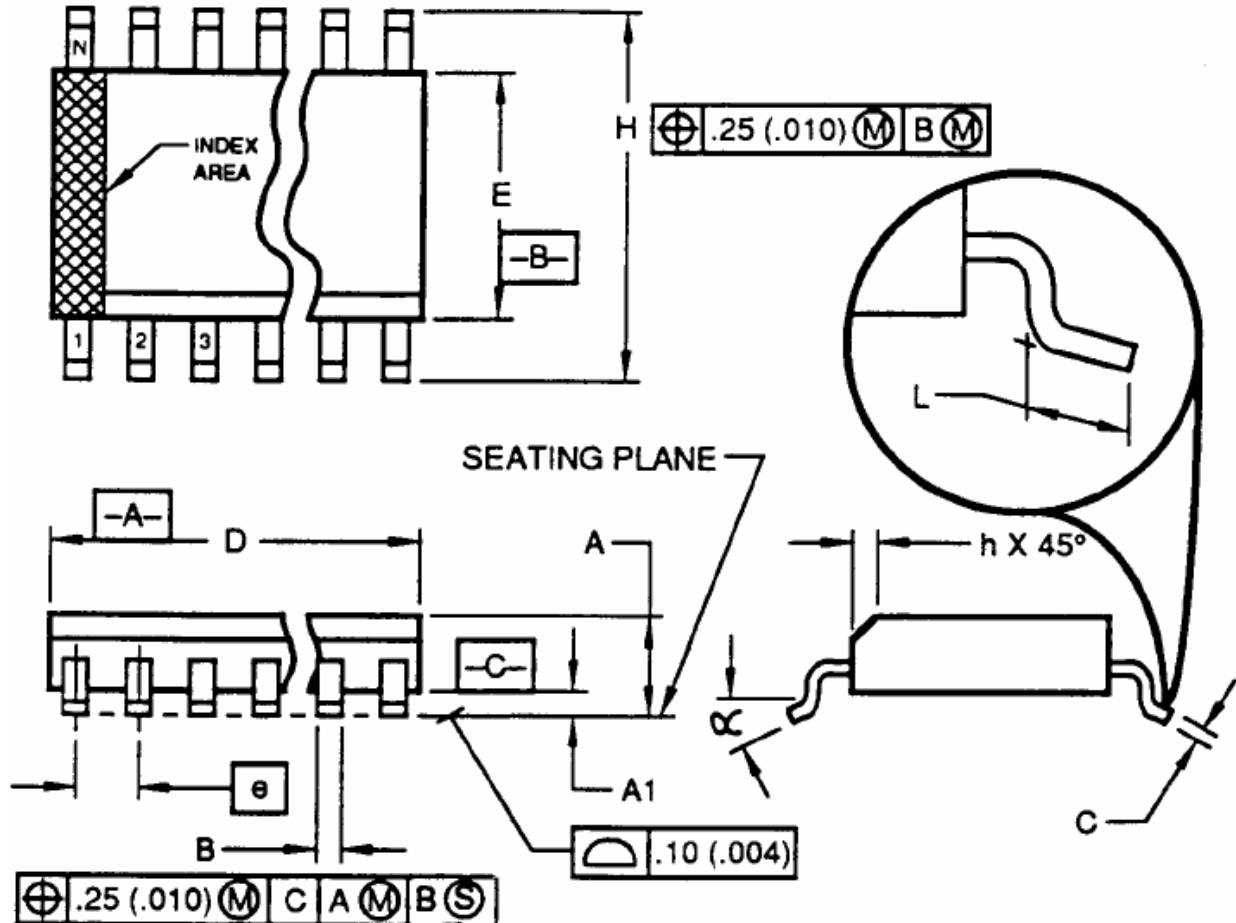
1. Dimensioning and tolerancing per ANSI Y14.5-1982.
2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold Flash. protrusion or gate burrs shall not exceed 0.15mm (0.006 in) per side.
3. Dimension "E" does not include interlead flash or protrusions. Interlead flash or protrusions shall not exceed 0.25mm (0.010 in) per side.
4. The chamfer on the body is optional. It is not present, a visual index feature must be located within the crosshatched area.
5. "L" is the length of the terminal for soldering to substrate.
6. "N" is the number of terminal positions. (N=18)
7. The lead width "B" as measured 0.36mm (0.014 in) or greater above the seating plane, shall not exceed a maximum value of 0.61mm (0.24 in)
8. Controlling dimension: MILLIMETER.
9. Refer to JEDEC MS-013 Variation AB.
JEDEC is the trademark of JEDEC SOLID STATE TECHNOLOGY ASSOCIATION.



Remote Control Encoder

PT2262

20 PINS, SOP, 300 MIL



| Symbol | Min. | Nom. | Max. |
|----------|-------|-----------|-------|
| A | 2.35 | - | 2.65 |
| A1 | 0.10 | - | 0.30 |
| B | 0.33 | - | 0.51 |
| C | 0.23 | - | 0.32 |
| D | 12.60 | - | 13.00 |
| E | 7.40 | - | 7.60 |
| e | - | 1.27 BSC. | - |
| H | 10.00 | - | 10.65 |
| h | 0.25 | - | 0.75 |
| L | 0.40 | - | 1.27 |
| α | 0° | - | 8° |



1. Dimensioning and tolerancing per ANSI Y14.5M-1982.
2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold Flash, protrusion or gate burrs shall not exceed 0.15 mm (0.006 in) per side.
3. Dimension "E" does not include interlead flash or protrusions. Interlead flash or protrusions shall not exceed 0.25 mm (0.010 in) per side.
4. The chamfer on the body is optional. If it is not present, a visual index feature must be located within the crosshatched area.
5. "L" is the length of the terminal for soldering to a substrate.
6. N is the number of the terminal positions (N=20)
7. The lead width "B" as measured 0.36 mm (0.014 in) or greater above the seating plane, shall not exceed a maximum value of 0.61 mm (0.24 in).
8. Controlling dimension : MILLIMETER.
9. Refer to JEDEC MS-013, Variation AC.
JEDEC is the trademark of JEDEC SOLID STATE TECHNOLOGY ASSOCIATION.