HT6026
Remote Control Encoder

Features

- Operating voltage: 4V~18V
- Low standby current
- Low power and high noise immunity CMOS technology
- 3^9 different codes
- Minimum of two transmission words
- Built-in oscillator needs only 5% resistor
- Interface with RF or infrared transmission medium
- Minimal external components

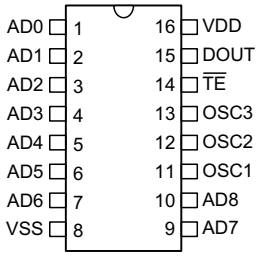
Applications

- Burglar alarm system
- Smoke and fire alarm system
- Garage door controllers
- Car alarm system
- Security system
- Cordless telephones
- Other remote control systems

General Description

The HT6026 is a CMOS LSI encoder designed for remote control system applications. It is capable of encoding 9 bits of information which consists of N address bits and 9–N data bits. Each address/data input is externally trinary programmable by external switches. The programmable address/data is transmitted along with the header bits via an RF or an infrared transmission medium upon receipt of a trigger signal ($\overline{TE}$).

Pin Assignment



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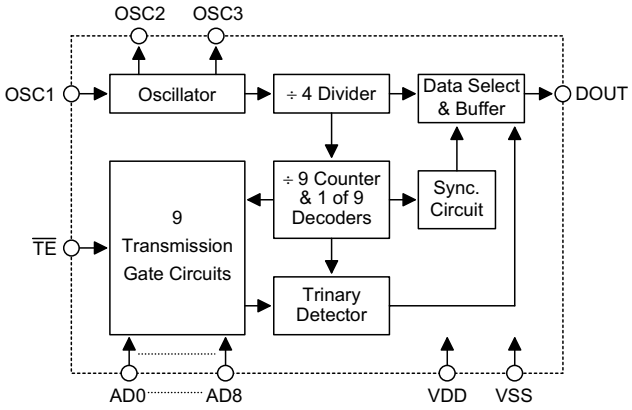
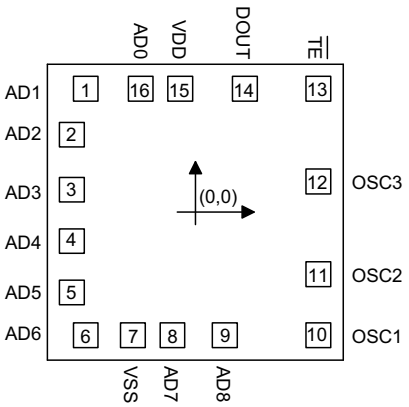
Block Diagram



Pad Coordinates

Unit: μm



Pad No.	X	Y	Pad No.	X	Y
1	–598.00	689.00	9	160.00	–687.00
2	–674.00	433.00	10	670.00	–687.00
3	–674.00	126.00	11	670.00	–347.00
4	–674.00	–162.00	12	670.00	172.00
5	–674.00	–449.00	13	670.50	689.50
6	–598.00	–687.00	14	270.00	689.00
7	–342.00	–687.00	15	–84.00	689.00
8	–127.00	–687.00	16	–299.00	689.00

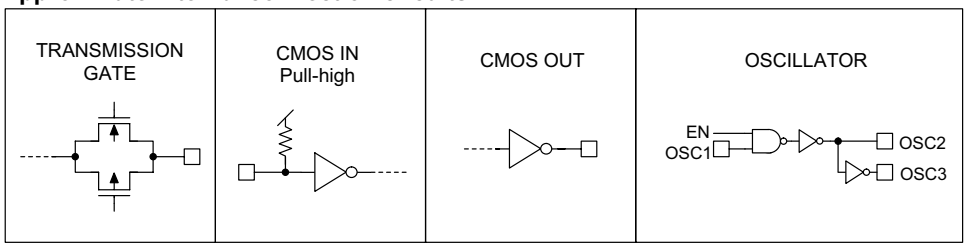
Chip size: 1650 × 1680 $(\mu m)^2$

* The IC substrate should be connected to VSS in the PCB layout artwork.

Pin Description

Pin No.	Pin Name	I/O	Internal Connection	Description
1~7	AD0~AD6	I	TRANSMISSION GATE	Input pins for address/data AD0~AD6 setting. They can be externally set to VDD, VSS, or left open.
8	VSS	I	—	Negative power supply (GND)
9~10	AD7~AD8	I	TRANSMISSION GATE	Input pins for address/data AD7~AD8 setting. They can be externally set to VDD, VSS, or left open.
11	OSC1	I	OSCILLATOR	Oscillator input pin
12	OSC2	O	OSCILLATOR	Oscillator output pin
13	OSC3	O	OSCILLATOR	Oscillator output pin
14	$\overline{TE}$	I	CMOS IN Pull-high	Transmission enable, active low
15	DOUT	O	CMOS OUT	Encoder data serial transmission output
16	VDD		—	Positive power supply

Approximate internal connection circuits



Absolute Maximum Ratings

Supply Voltage.....–0.3V to 24V
Input Voltage .....V_{SS}–0.3 to V_{DD}+0.3V
Storage Temperature .....–50°C to 125°C
Operating Temperature .....–20°C to 75°C

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Electrical Characteristics

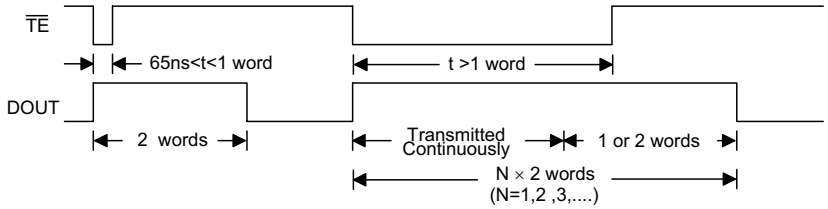
Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V_{DD}	Operating Voltage	—	—	4	—	18	V
I_{STB}	Standby Current	5V	Oscillator stops	—	0.1	0.3	μA
		15V		—	0.1	0.5	μA
I_{DD}	Operating Current	5V	No load, f_{OSC}=18kHz	—	500	900	μA
		15V	No load, f_{OSC}=22kHz	—	2000	3000	μA
I_{DOUT}	Output Drive Current	5V	V_{OH}=0.9V_{DD} (Source)	–1.0	–1.7	—	mA
		15V		–8.0	–14.0	—	mA
		5V	V_{OL}=0.1V_{DD} (Sink)	0.8	1.5	—	mA
		15V		5.0	10.0	—	mA
V_{IH}	"H" Input Voltage	—	—	0.7V_{DD}	—	VDD	V
V_{IL}	"L" Input Voltage	—	—	0	—	0.3V_{DD}	V
$R_{\overline{TE}}$	$\overline{TE}$ Pull-high Resistance	5V	$V_{\overline{TE}}$=0V	—	800	—	kΩ
		15V		—	250	—	kΩ
f_{OSC}	Oscillator Frequency	5V	R_{EXT}=10kΩ C_{EXT}=2000PF R_S=20kΩ	—	18	—	kHz
		15V		—	22	—	kHz

Functional Description

Operation

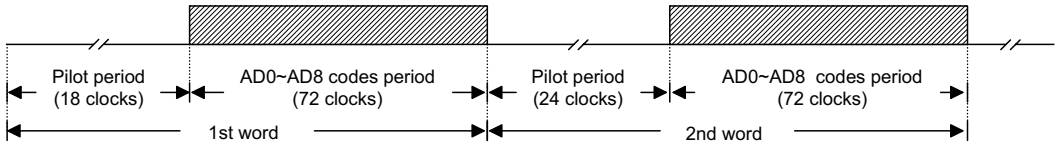
The HT6026 encoder begins a one-word transmission cycle upon receipt of a transmission enable ($\overline{TE}$, active low). This cycle will repeat itself as long as the transmission enable ($\overline{TE}$) is held low. Once the transmission enable returns high, the encoder output completes its final N×2 word cycle, and then stops as shown in the Transmission timing diagram below. The total number of transmission cycles allowed is always automatically adjusted to an even number.



Transmission timing

Information word

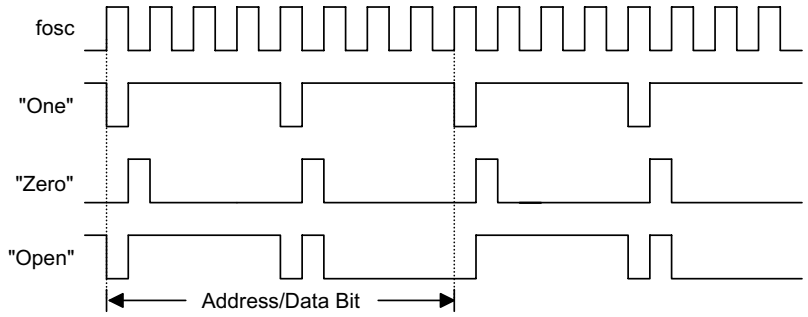
An information word consists of two periods as shown:



Information Composition

Address/data waveform

Each programmable address/data pin can be externally set to one of the following three logic states:



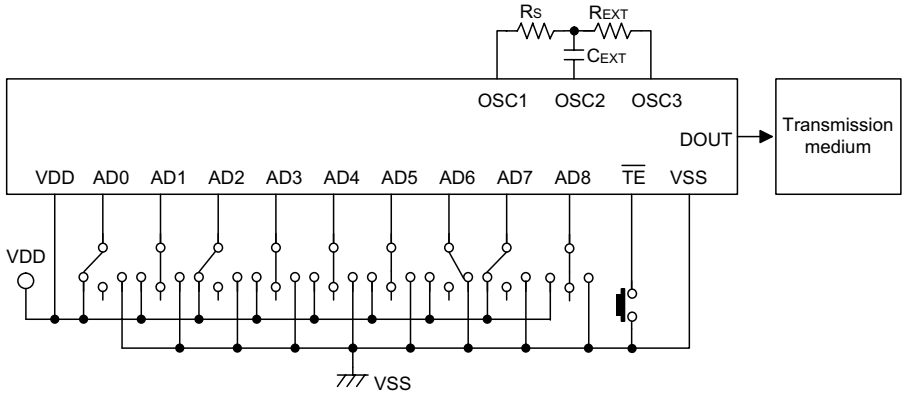
Address/Data bit waveform

Address/data programming (preset)

The status of each address/data pin can be individually preset to logic "high", "low", or "floating". If a transmission enable signal is applied, the encoder scans and transmits the status of the 9-bit address/data serially in the order AD0 to AD8. But if the trigger signal is not applied, the chip only consumes a standby current which is less than 1μA (for VDD=5V).

The address pins are usually preset to transmit data codes with their own particular security codes by the DIP switches or PCB wiring, while the data is selected using push buttons or electronic switches.

The following figure demonstrates an application using the HT6026:



The transmitted information is as listed:

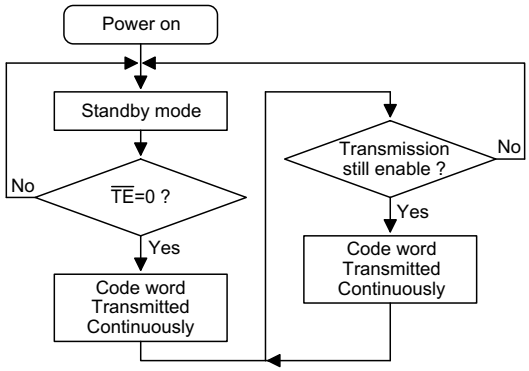
Pilot & Sync.	AD0 1	AD1 Z	AD2 1	AD3 Z	AD4 Z	AD5 Z	AD6 0	AD7 1	AD8 Z

Z: floating

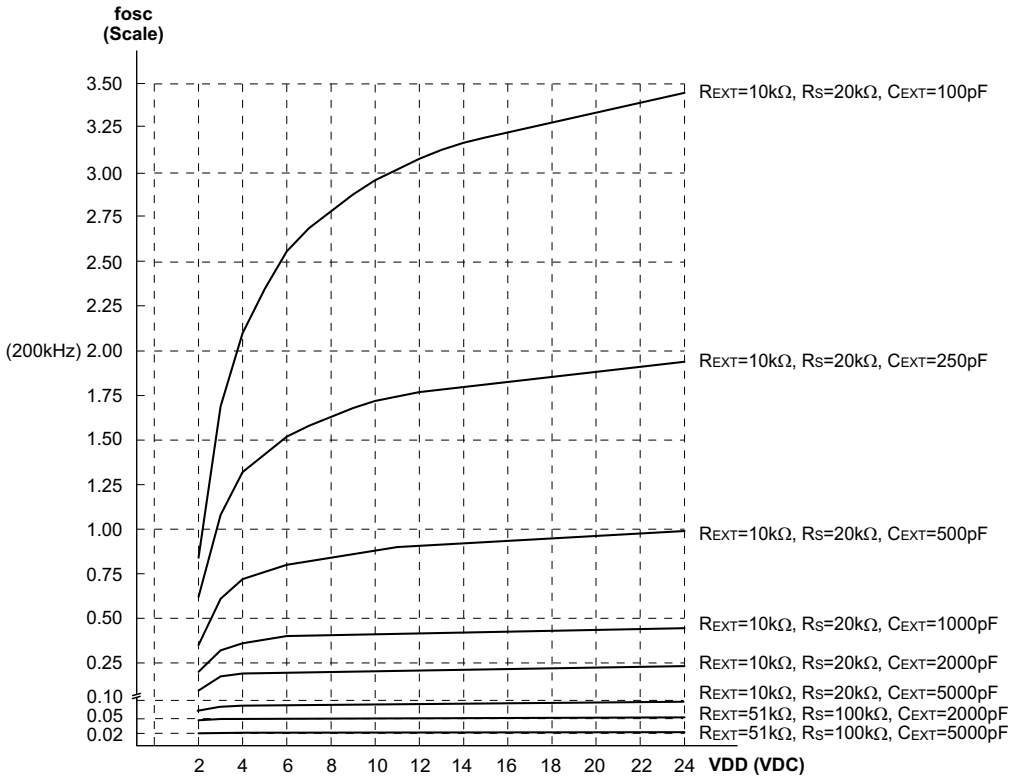
Transmission enable

Transmission is enabled by applying a low signal to the $\overline{TE}$ pin. The HT6026 is enabled and outputs address/data codes from the DOUT pin when $\overline{TE}$ is set to "low" for more than 65ns.

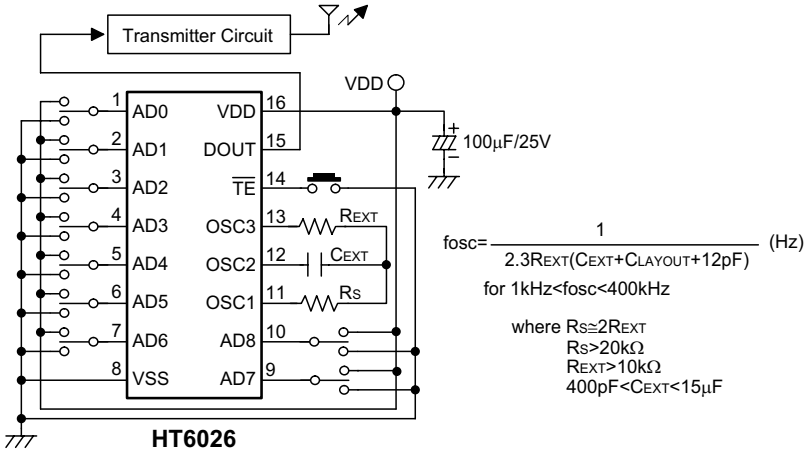
Flowchart



Oscillator frequency vs supply voltage



Application Circuit



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