



# **Digital Pyroelectric Infrared Sensor**

**( Model: RDA-226 )**

## **User's Manual**

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Zhengzhou Winsen Electronics Technology Co., Ltd

# Statement

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Thanks for purchasing our product. In order to let customers use it better and reduce the faults caused by misuse, please read the manual carefully and operate it correctly in accordance with the instructions. If users disobey the terms or remove, disassemble, change the components inside of the sensor, we shall not be responsible for the loss.

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We are devoting ourselves to products development and technical innovation, so we reserve the right to improve the products without notice. Please confirm it is the valid version before using this manual. At the same time, users' comments on optimized using way are welcome.

Please keep the manual properly, in order to get help if you have questions during the usage in the future.

**Zhengzhou Winsen Electronics Technology CO., LTD.**

## RDA-226 Digital Pyroelectric Infrared Sensor

Digital PIR sensor RDA-226, is an integrated design of sensitive element and signal processing chip, packaged sensitive element and IC chip into sensor shield. Sensitive element transfer the human movement signal to high-precision digital chip for data processing. Then the sensor gives digital signal for easy using.

### Features:

- \* High-precision AD signal process
- \* Differential signal input mode, anti-interference ability
- \* Sensitivity, delay time, and light adjustment function
- \* Enable pin controls the sensor output
- \* Low working voltage and power consumption
- \* Digital TTL signal output



### Applications

Security product  
 Human body induction toys  
 Human body induction lamps, and switches  
 Industrial automation control  
 Smart home  
 IOT terminals  
 Intelligent appliance

### Technical Parameter

#### Max Limit

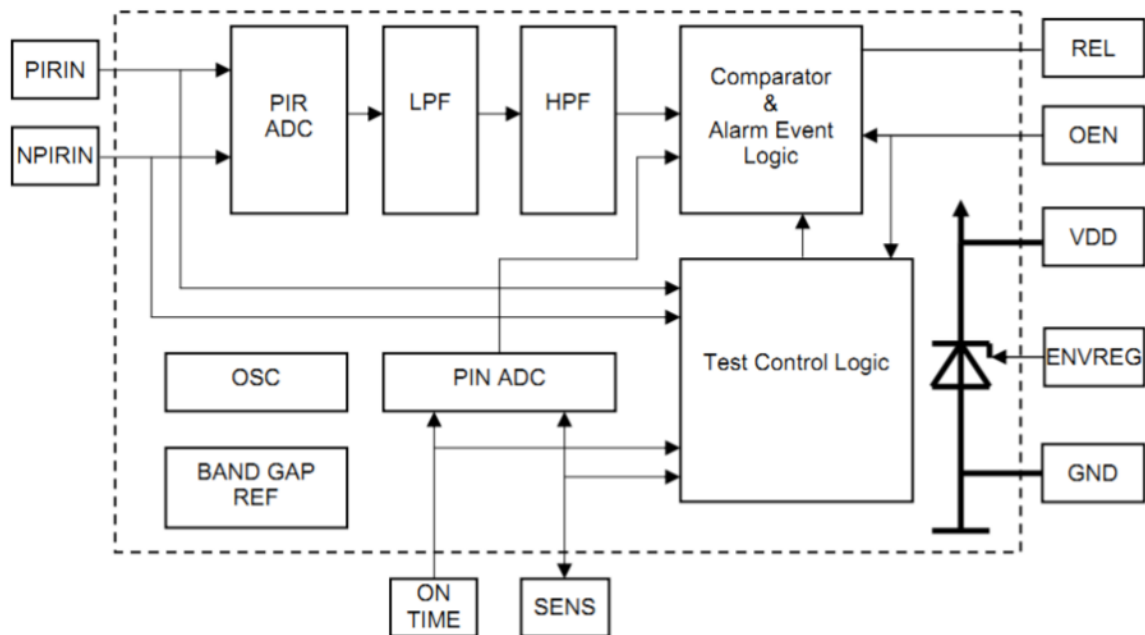
Parameter	Symbol	Min	Max	Unit	
Voltage	$V_{DD}$	-0.3	3.6	V	
Pin limit	$I_{in}$	-100	100	mA	
Storage temperature	$T_{ST}$	-40	125	$^{\circ}C$	

#### Working condition

Parameter	Symbol	Min	Typical	Max	Unit	Note
Working condition						
Voltage	$V_{DD}$	2.7	3	3.6	V	
Current	$I_{CC}$	12	15	20	$\mu A$	
Sensitivity	$V_{SENS}$	110		530	$\mu V$	adjustable
Temperature	$W_{ST}$	-20		85	$^{\circ}C$	
Input enable						
High voltage	$V_{IH}$	80			% $V_{DD}$	
Low voltage	$V_{IL}$			20	% $V_{DD}$	
Current	$I_I$	-1		1	$\mu A$	
Output						
Low current	$I_{OL}$	10			mA	
High current	$I_{OH}$			-10	mA	
Block time			2.3		S	
Delay time	$ON_{TIME}$	2		4194	S	adjustable

Input adjustment (sensitivity/delay time)						
Voltage input range		0		VDD	V	0V-1/4VDD
Input bias current		-1		1	uA	
Oscillators and filters						
Low filter cut-off frequency				7	Hz	
High filter cut-off frequency				0.44	Hz	
Chip oscillator frequency	F <sub>clk</sub>			64	KHz	

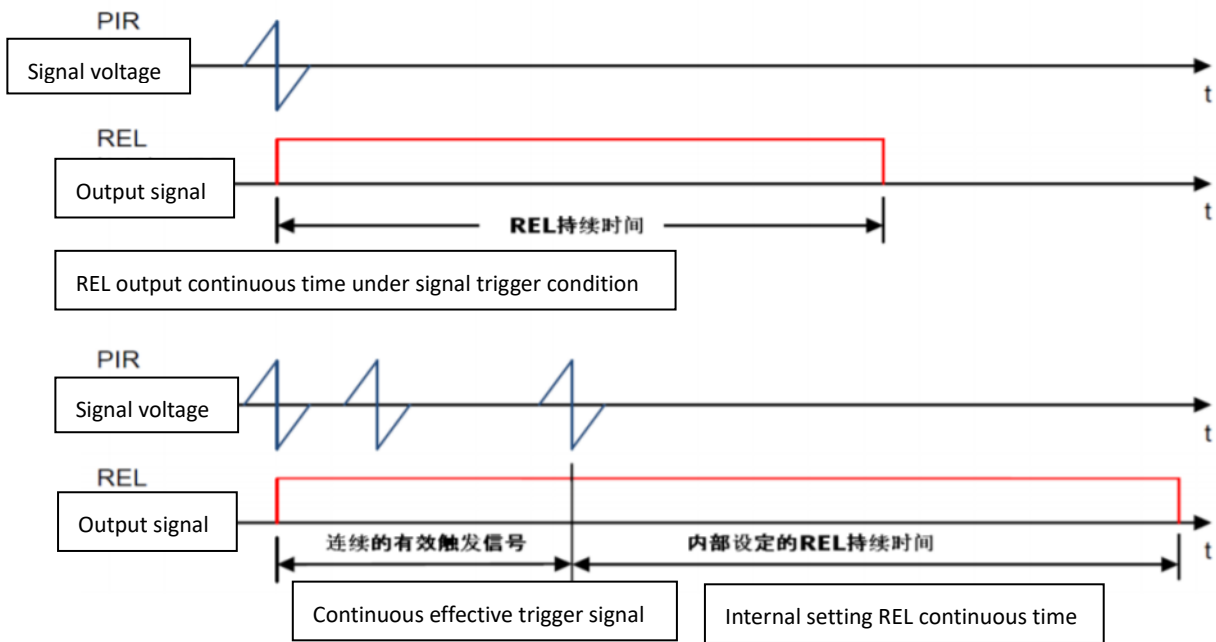
**Internal frame**



**Trigger mode**

When the sensor receives a signal that exceeds the set threshold, a count pulse is generated internally. When the sensor receives the signal again, it generates a second count pulse. When two counts are generated within 4 seconds, the sensor gives high-level TTL output on REL pin.

In addition, when the received signal is more than 5 times of the set threshold, only by a pulse, it gives high-level TTL output on REL pin. The output delay time is effective from the last pulse start time.

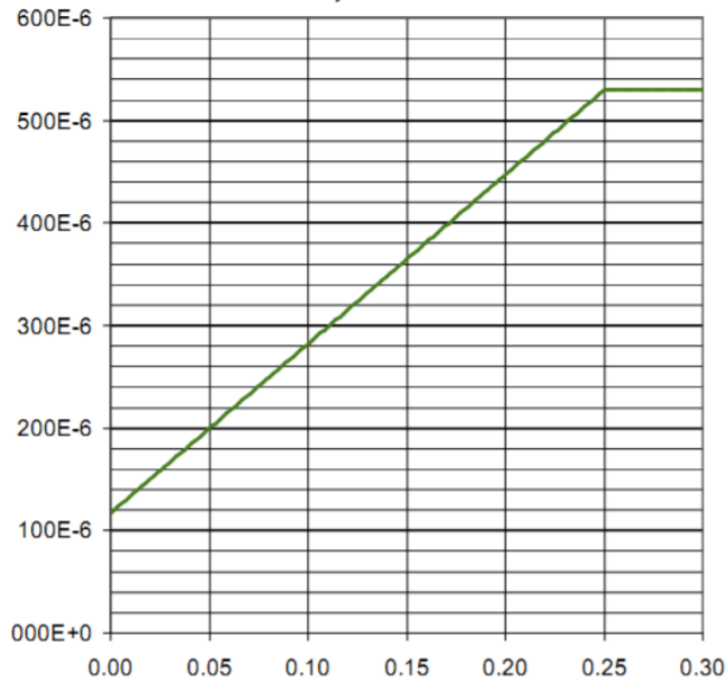


**Sensitivity adjustment**

The input voltage on SENS pin, determines the comparison threshold for the input signal. When connected to ground, the sensor comparison threshold is the lowest, sensitivity is highest, that is, detection distance is the farthest.

When the input voltage is over 1/4VDD, it would choose max threshold, sensitivity is the lowest, that is, the detection distance is minimal.

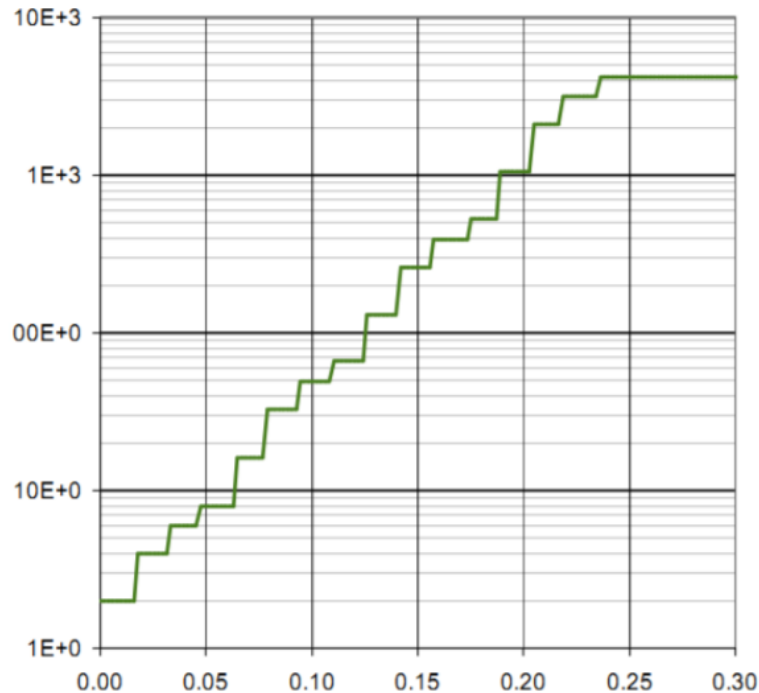
The sensing distance is not linear with the voltage on the SENS pin. With different Fresnel lenses, the sensitivity is different, and distance depends on actual measurement.



Comparison threshold with SENS input voltage

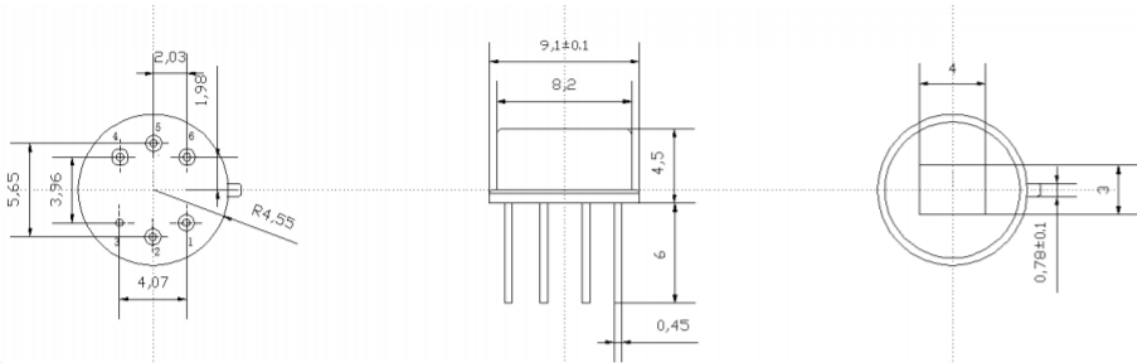
### Delay time adjustment

The delay time is the high-level TTL output duration time when sensor reaches the comparison threshold. The input voltage of ONTIME pin, determines the duration of output signal. The relationship between output delay time and voltage, is as below for your reference. When the voltage value exceeds 1/4VDD, it would choose max delay time.



Pin voltage	PIN ADC count	ON Time in seconds	ON Time
$V_{DD} * 1/128$ or less	0	2	2 sec
$V_{DD} * 3/128$	1	4	4 sec
$V_{DD} * 5/128$	2	6	6 sec
$V_{DD} * 7/128$	3	8	8 sec
$V_{DD} * 9/128$	4	16	16 sec
$V_{DD} * 11/128$	5	33	32 sec
$V_{DD} * 13/128$	6	49	49 sec
$V_{DD} * 15/128$	7	66	1 min 5 sec
$V_{DD} * 17/128$	8	131	2 min 11 sec
$V_{DD} * 19/128$	9	262	4 min 22 sec
$V_{DD} * 21/128$	10	393	6 min 33 sec
$V_{DD} * 23/128$	11	524	8 min 44 sec
$V_{DD} * 25/128$	12	1049	17 min 28 sec
$V_{DD} * 27/128$	13	2097	34 min 57 sec
$V_{DD} * 29/128$	14	3146	52 min 25 sec

### Component Structure (Unit: mm)

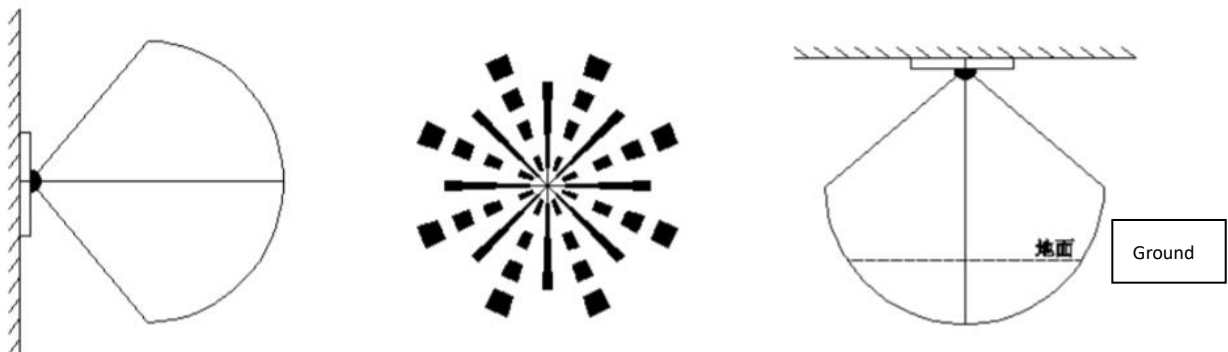


### Pin Definition

Item	Name	Definition
1	SENS	Sensitivity pin (0-1/4V <sub>DD</sub> )
2	CDS	photo-cell adjustment pin, OEN PIN (20% V <sub>DD</sub> ~80%V <sub>DD</sub> )
3	VSS	power ground
4	VDD	sensor power supply pin
5	REL	sensor output pin, TTL high/low level output
6	ONTime	delay time adjustment pin (0-1/4V <sub>DD</sub> )

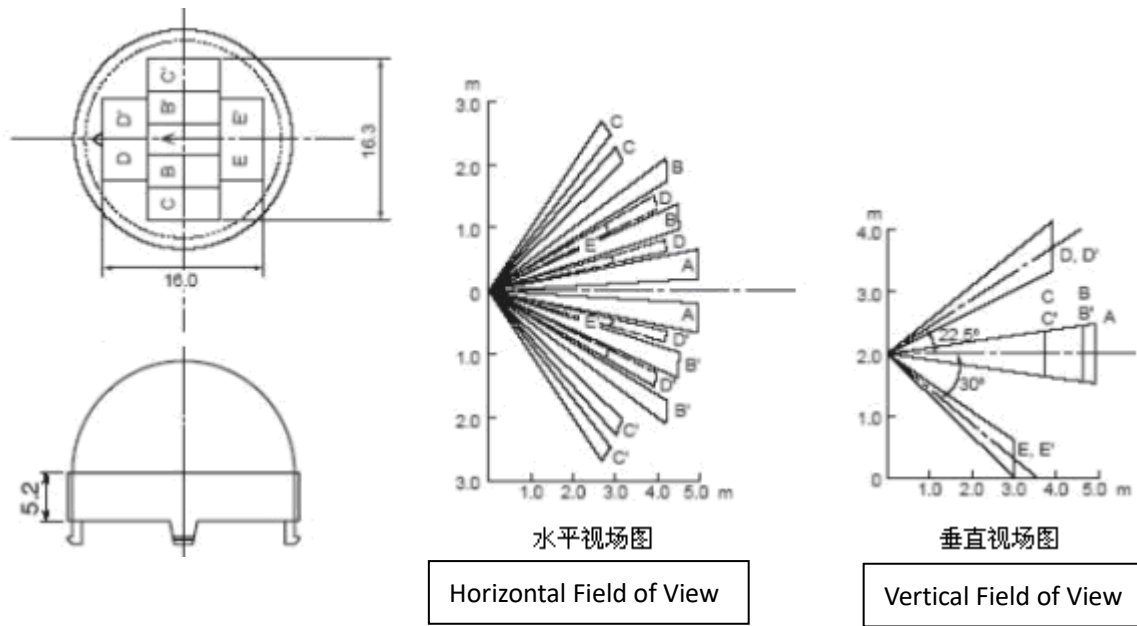
### Detection Range:

The detection angle and distance is relevant to Fresnel lens and SENS pin voltage. Below picture is for reference only.

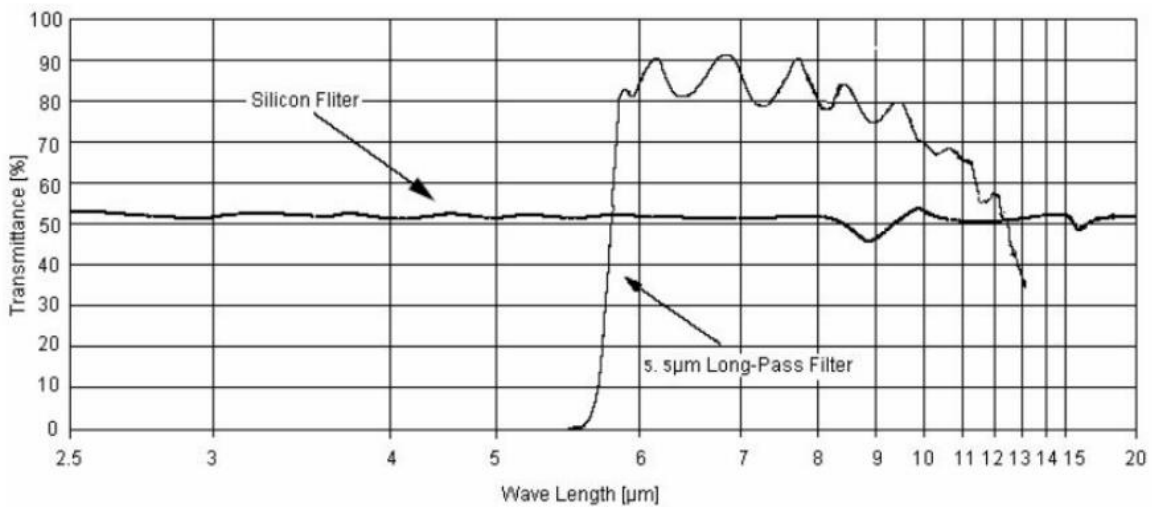


### Fresnel Lens:

Fresnel Lens used, would determine the sensor's detection angle and distance, which can correspond to a variety of detection range and distance, according to customers' requirement.



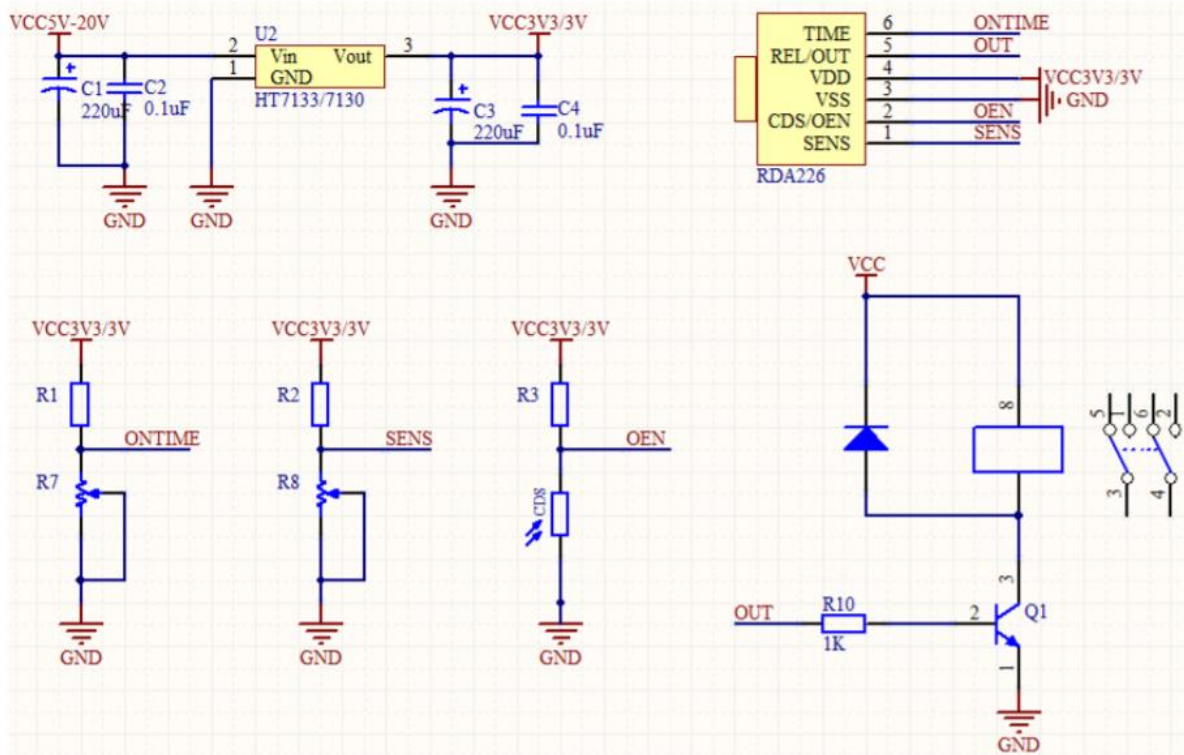
### Wave Length



Note: The graph shows a typical 5um infrared filter reference, and the curve is the average of infrared pass rate. The window material is a special vacuum coating of semiconductor wafers.

### Application





**Cautions:**

1. The sensor's parameter is obtained by standard testing condition after 1 minute's settling time.
2. Please pay attention on Sensor's window direction, must combine with Fresnel lens to get a perfect detecting angle.
3. Sensors detecting distance is affected by ambient temperature, moving objects' temperature, Fresnel lens, Amplifier amplification factor, the comparator threshold voltage setting...etc. please take a comprehensive consideration of various parameters when using the sensors.
4. Please do not touch the window area to avoid damaging to the optical filter.
5. Please handle the sensor with care when using it.
6. Please try to use hand soldering and make the soldering time as short as possible. Soldering temperature should be less than 350°C, and soldering time be less than 3 seconds.
7. Please get electrostatic protective measures when using this product.

**Note:** To keep continual product development, we reserve the right to change design features without prior notice.

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