General Description

ADT2450 is a miniaturized receiver IC for use in the infrared remote control system. It has 5V voltage operating, a high sensitivity, and good noise immunity to a power and external light.
This can also be suitable for high optical and electrical disturbances and good for an 5V application system.
It has the frequency selecting Pads for setting the center frequency of band-pass filter and also has 5 trimming Pads for the fined adjust of center frequency.
This IC is capable of accepting a photodiode directly and include many excellent circuit such as an internal voltage reference for better temperature characteristics, a high gain initial amplifier, a gain control amplifier, a limiter, a band pass filter, a detection circuit, two comparator circuits, gain control circuits, integrator circuits, a waveform shaping circuit assembled on a single chip.
This IC also has a powerful noise suppression to any kinds of external light.

Features

- **5V operating**
- Internal voltage reference and current reference circuit for better temperature characteristics
- Maximum interference safety against optical and electrical disturbances
- No external components necessary
- The Center Frequency can be varied with option PADs
  (32.7kHz, 36.7kHz, 37.9kHz, 40kHz, 56.7kHz)
- **Internal filter for a high frequency lighting fluorescent lamp with AGC control (Powerful Noise cancel)**
- Open collector output (Open collector output with a pull-up resistor)
- Output active low

Absolute Maximum Ratings

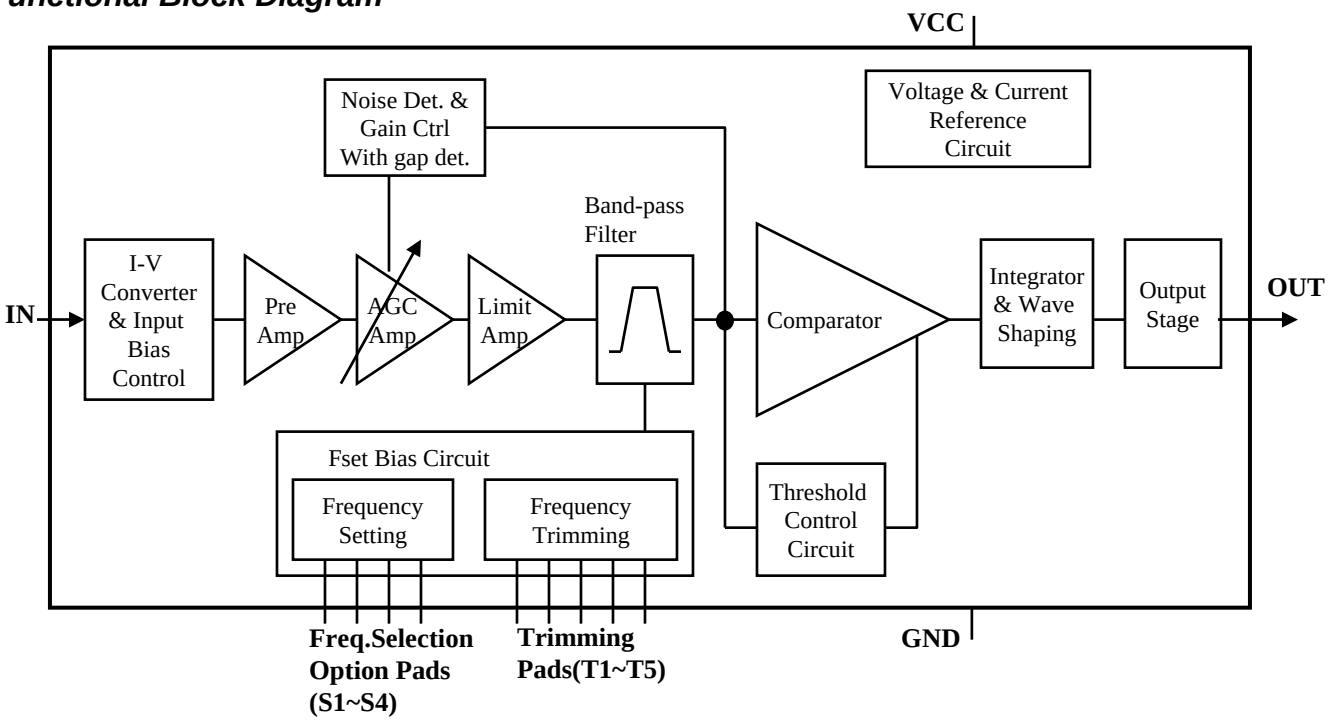
Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	Vcc	0	6.0	V
Output Voltage	Vout	0	6.0	V
Output Current	Iout	0	2.5	mA
Operating Temperature	Topr	-20	80	℃
Storage Temperature	Tst	-40	125	℃

* Stress above those listed under Absolute Maximum Ratings may cause permanent damage of device. This is stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for longer periods may affect device reliability.
During overload conditions (VIN>Vcc or VIN<GND), those voltage on Vcc pins with respect to ground must not exceed the values defined by the absolute maximum ratings.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Voltage	Vcc	4.5	5.0	5.5	V
Input Frequency	Fin	30	38	60	kHz
Operating Temperature	Top	-20	25	80	℃

Functional Block Diagram



* fc(center frequency) can be varied with 4 option Pads
: 32.7kHz, 36.7kHz, 37.9kHz, 40.0kHz, 56.7kHz

Fc(Center Frequency)	PAD Setting Method (S1,S2,S3,S4)
32.7 kHz	S4(PAD10) is Ground
36.7 kHz	S3(PAD11) is Ground
37.9 kHz	S2(PAD12) is Ground
40.0 kHz	S1(PAD13) is Ground
56.7 kHz	No Connection

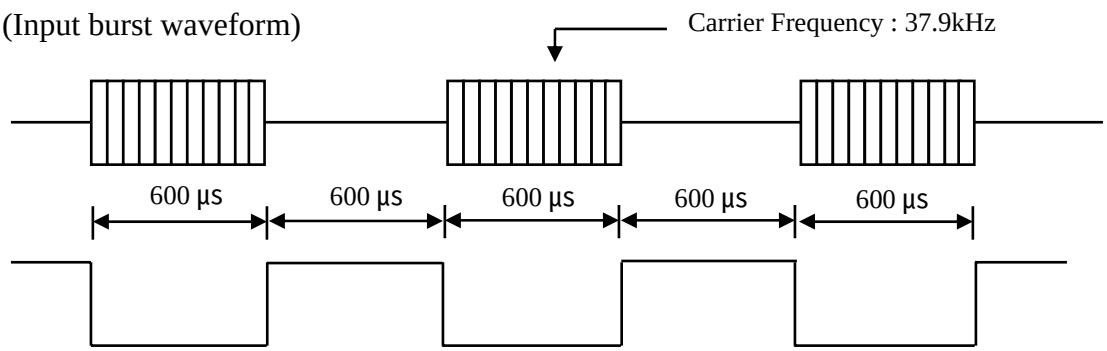
Electrical Specifications

Specifications hold over the Recommended Operating Conditions, unless otherwise noted herein.
All values are at **25℃** and **Vcc=5.0V**.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Current	Icc	---	1.2	2.5	mA	Iin = 0 μA
Max. Input current	I_{IN}	300	-	800	uA	Vin = 0 V
Max. Voltage gain	Av	85	95	110	dB	fin=37.9kHz,Vin=30μVp-p When AGC is Off.
BPF Bandwidth	f_{BW}	-	4.0	6.0	kHz	-3dB Bandwidth Vin=30μVp-p
Output pulse width	t_{PW1}	500	-	800	μs	fin=37.9kHz, burst wave Vin=500 μVp-p note*1
	t_{PW2}	500	-	800	μs	fin=37.9kHz, burst wave Vin= 50mVp-p note*1
Low level output voltage	V_{OL}	-	0.2	0.4	V	Isink=2.5mA
High level output voltage	V_{OH}	4.8	5.0	-	V	-

Note 1 :

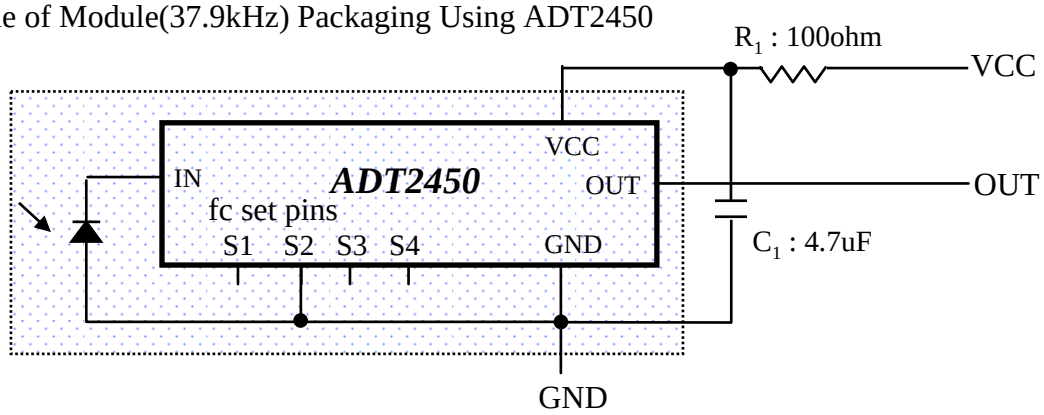
(Input burst waveform)



(Output pulse)

Application Guide

1. Example of Module(37.9kHz) Packaging Using ADT2450



2. Functional Guide of ADT2450

-. ADT2450 has high gain amplifier for high sensitivity.
So if you want better characteristic of receivable distance,
you have much careful attention in bonding of GND pads and shielding to GND.

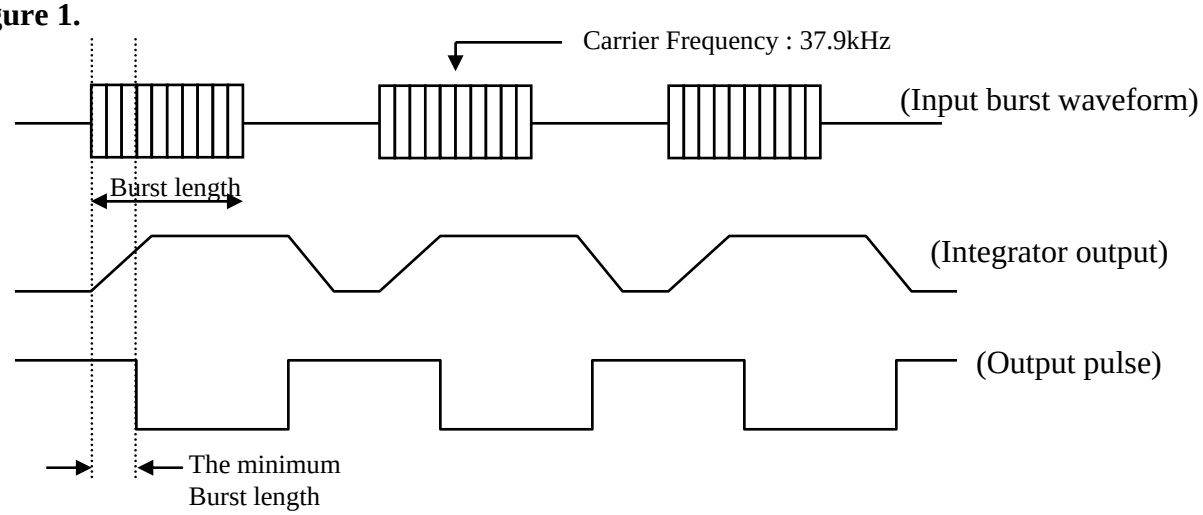
-. For more better distance performance, it is important to suppress the supply noise.
The supply filter R_1,C_1 have to be located close to IC if possible.

-. The photo diode are the important factor in IR receiver module and you select it considerately.

-. In packaging of IR module, the photo lens is good for receiving of photo signal.
But if the chip is included in the lens, the chip also receives the photo signal and the signal acts as a noise in the chip.
So when you design the lens or module frame, the above point must be considered.

-. In the detection or demodulation(wave shape) of incoming signal,
ADT2450 need the minimum burst length of modulated signals.
The incoming photo signal is modulated with proper carrier signal(e.g.37.9kHz) and if the '1' data bit is modulated with carrier signal, the period of data bit'1' is important.
Because the carrier signals is in this period, in the Integrator & Wave Shape block of ADT2450 the integration need minimum period to the reach of appropriately level.
Hence the minimum burst length is important characteristic and specification of remote control systems. The minimum burst length of ADT2450 is about 10~11 cycles of carrier. (~10~11*Tfc)
You can easily understand as see the figure 1.

Figure 1.



*** The min. burst length of ADT2450 : ~10-~11cycles of carrier (~10~11*Tfc)**