

IR Sensor

Last updated 3/26/18

IR Sensor Notes

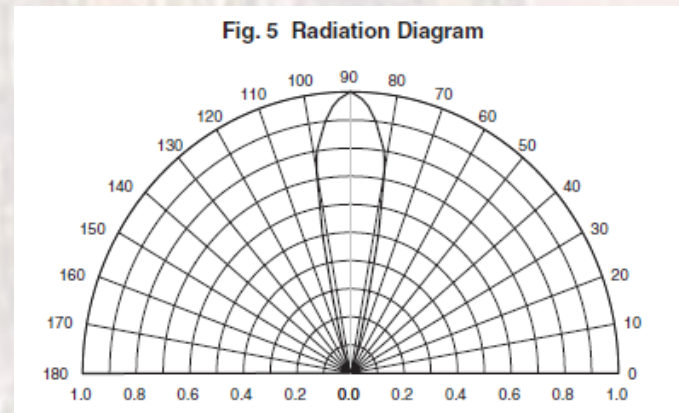
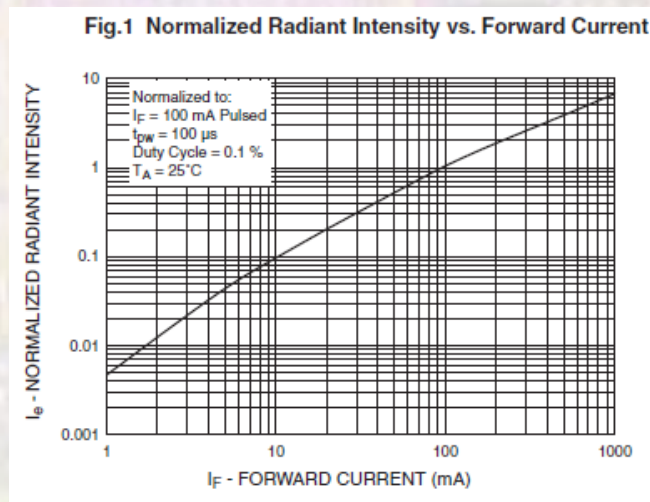
- Obstacle detection
 - Want to know if there is something in front of a sensor
 - Two primary non-contact choices
 - Ultrasonic – sound
 - Optical – light
 - This lab uses optical

IR Sensor Notes

- Obstacle detection
 - To somewhat limit interference from other sources choose Infrared light (IR)
 - Commonly used in remote controls for TV, audio, ...
 - Line of sight technology
 - Requires an IR transmitter and receiver

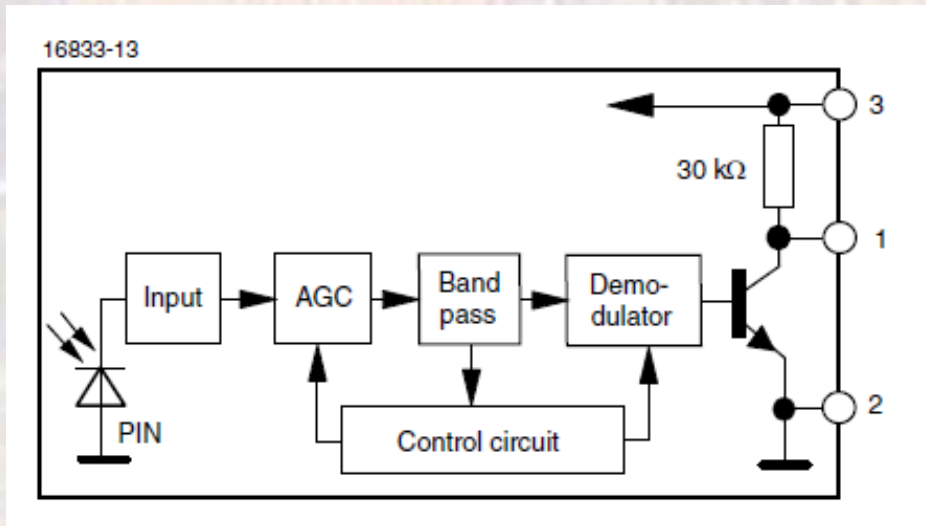
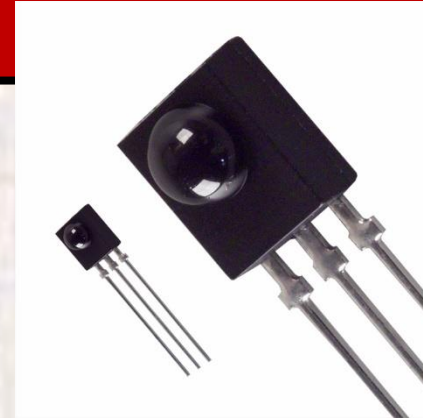
IR Sensor Notes

- Obstacle detection
 - IR transmitter
 - LED which emits in the IR light region
 - Wavelength = 940nm
 - Broad transmit angle – limit this with case and slit window
 - More current – more light
 - Angle dependent



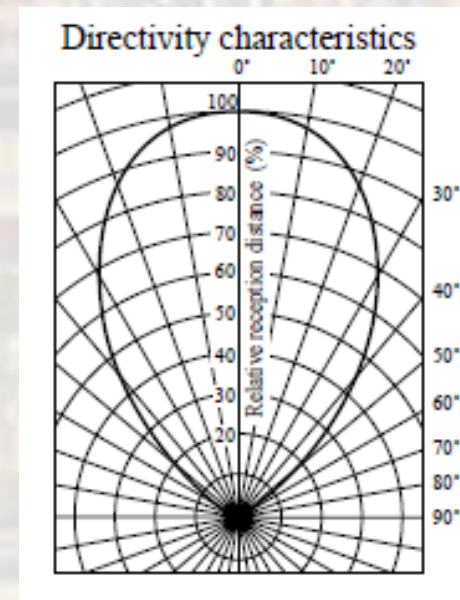
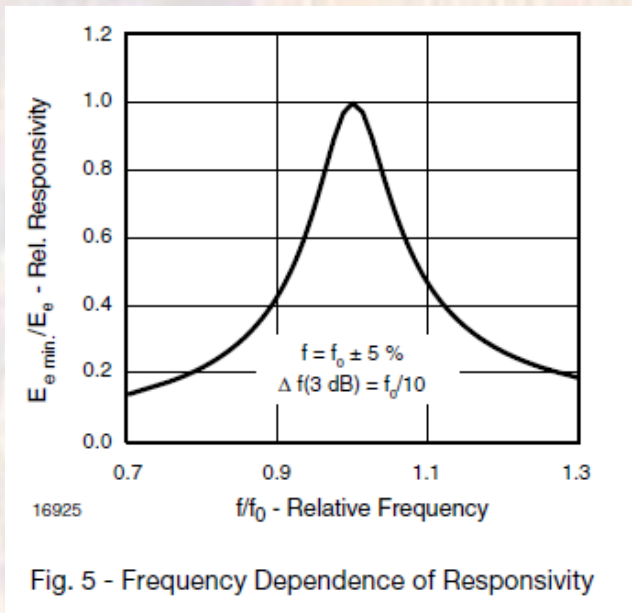
IR Sensor Notes

- Obstacle detection
- IR receiver
 - Detects IR light
 - Uses signal processing to limit the 'recognized' signal
 - Our detector recognizes 38Kz square waves (carrier frequency)



IR Sensor Notes

- Obstacle detection
 - IR receiver
 - Sensitive to angle
 - Light intensity (LED drive)
 - Carrier frequency



IR Sensor Notes

- Obstacle detection
 - IR receiver
 - Can use carrier frequency modification to change the relative sensitivity
 - Use this to detect relative distance
 - if detected at 35KHz or 41KHz – must be close
 - If only detected at 38KHz - must be far

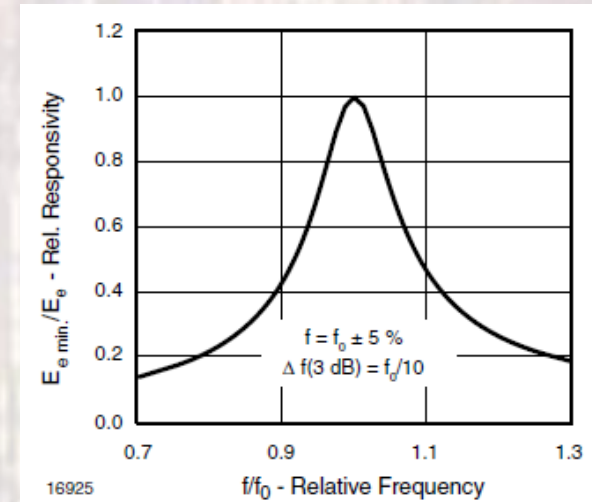
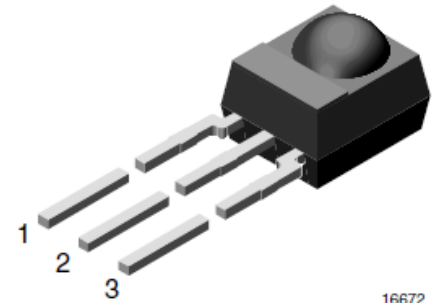
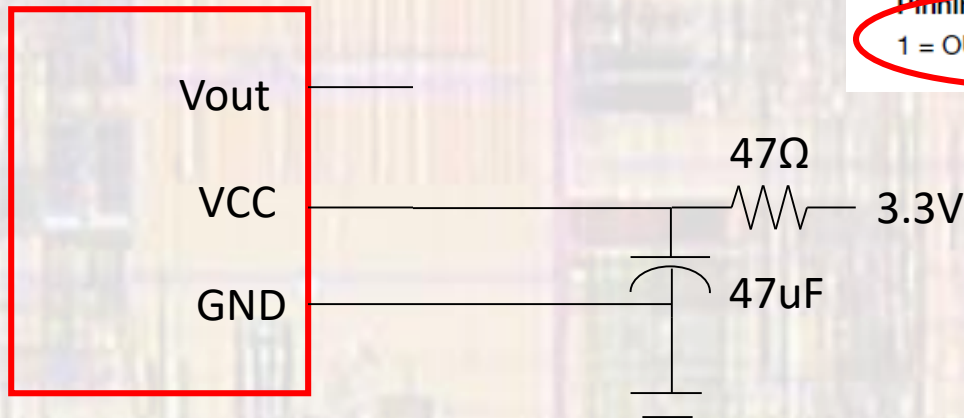


Fig. 5 - Frequency Dependence of Responsivity

IR Sensor Notes

- Obstacle detection
- IR receiver
- Works best if you filter VCC



16672

MECHANICAL DATA

Pinning for TSOP341..., TSOP343..., TSOP345...:

1 = OUT, 2 = GND, 3 = V_S

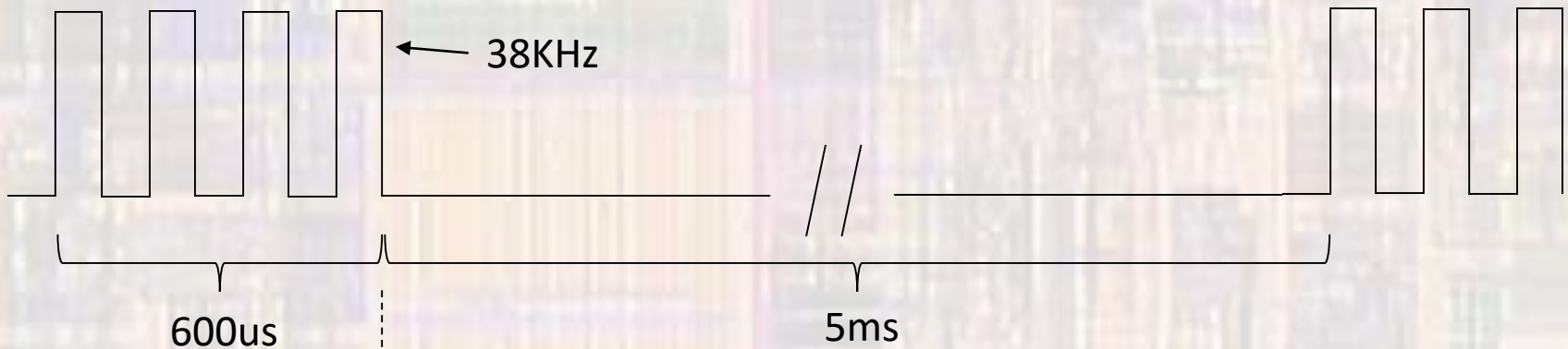
Pinning for TSOP321..., TSOP323..., TSOP325...:

1 = OUT, 2 = V_S , 3 = GND

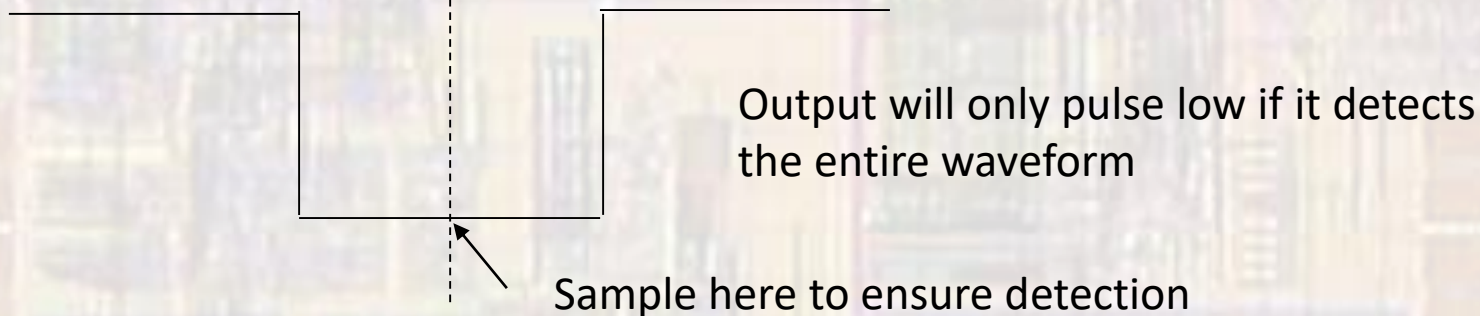
IR Sensor Notes

- Obstacle detection

- Required LED output waveform



- Detector output waveform



IR Sensor Notes

- Obstacle detection
 - Notes
 - Too much light can saturate the detector and stop it from working
 - Very sensitive to reflections – carefully adjust angles to avoid reflection from the board or tabletop
 - Align the sensor behind the transmitter to maximize the effectiveness of the shield
 - Think about using 2 timers to control the LED output