

Data Sheet

Description

APDS-9102 is a low cost, fast switching speed reflective proximity sensor that incorporates an infrared LED and a phototransistor in a single integrated package. APDS-9102 supports the detection distance of near 0 to approx 8mm, enabling to support a wide range of applications.

Application Support Information

The Application Engineering Group is available to assist you with the application design associated with APDS-9102. You can contact them through your local sales representatives for additional details

Ordering Information

| Part Number | Package | Quantity |
|---------------|-------------|----------|
| APDS-9102-L22 | 4 pin leads | 1600 |

Features

- Detection distance of near 0mm to 8mm
- Fast Switching Speed
- Package size
 - Height – 15.2 mm
 - Width – 5 mm
 - Depth – 17.8 mm
- Operating temperature : -35°C to 65°C
- Lead-free and RoHS Compliant

Applications

APDS-9102 is widely suitable to provide reflective object or proximity sensing suitable for various applications in industrial, office automation and consumer markets.

- Industrial – Automatic vending machines, amusement/gaming machines, coin/bill validators etc
- Office automation – Printers, Copiers etc
- Consumer – Coffee machines, beverage dispensing machines etc

Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Max Rating | Unit |
|---|------------------|---------------------|------|
| Infrared Diode | | | |
| Power Dissipation [1] | P _D | 75 | mW |
| Peak Forward Current (300pps, 10 μs pulse) | I _{CP} | 3 | A |
| Continuous Forward Current | I _F | 50 | mA |
| Reverse Voltage | V _R | 5 | V |
| Phototransistor | | | |
| Power Dissipation [1] | P _C | 100 | mW |
| Collector-Emitter Voltage | V _{CEO} | 30 | V |
| Emitter-Collector Voltage | V _{ECO} | 5 | V |
| Collector Current | I _C | 20 | mA |
| Operating Temperature Range | T _{OP} | -35°C to +65°C | |
| Storage Temperature Range | T _{STG} | -40°C to +100°C | |
| Lead Soldering Temperature (1.6mm(0.063") From Case) | T _S | 260°C for 5 seconds | |

Note:

1. Derate Linearly 1.33mW/°C from 25°C

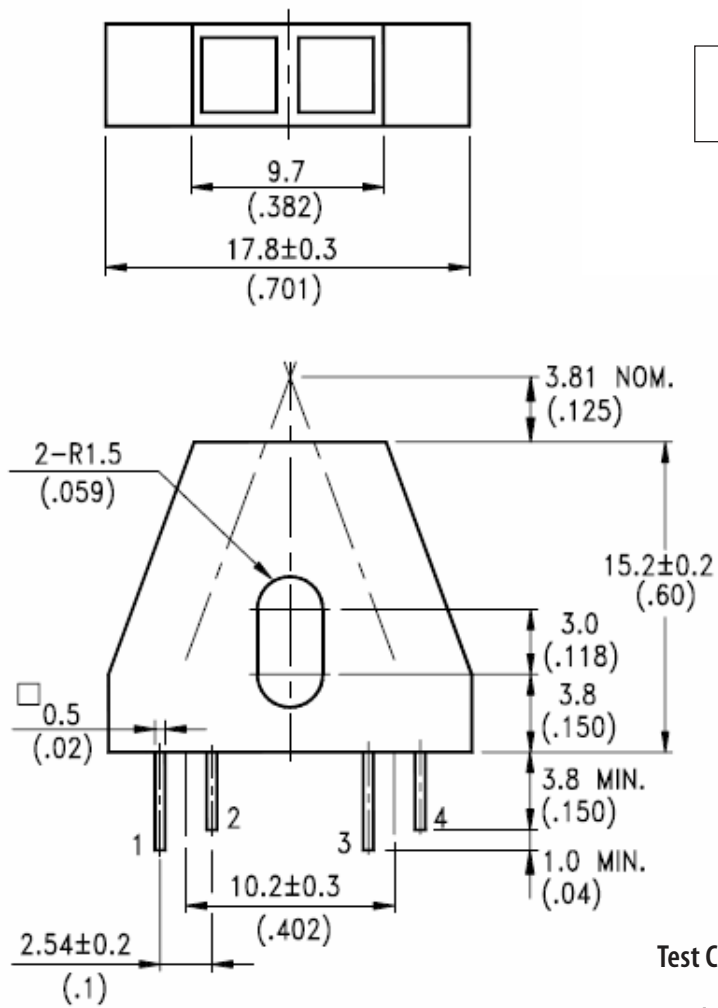
Electrical / Optical Characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|--------------------------------------|----------------------|------|------|------|------|--|
| Input Diode | | | | | | |
| Forward Voltage | V _F | | 1.2 | 1.6 | V | I _F =20mA |
| Reverse Current | I _R | | | 100 | μA | V _R =5V |
| Output Phototransistor | | | | | | |
| Collector-Emitter Breakdown Voltage | V _{(BR)CEO} | 30 | | | V | I _C =1mA |
| Emitter-Collector Breakdown Voltage | V _{(BR)ECO} | 5 | | | V | I _E =0.1mA |
| Collector-Emitter Dark Current | I _{CEO} | | | 100 | nA | V _{CE} =10V |
| Coupler | | | | | | |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | | | 0.4 | V | I _C =0.08mA, I _F =20mA |
| On State Collector Current [2] | I _{C(ON)} | 0.16 | | | mA | V _{CE} =5V, I _F =20mA |

Note:

2. Reflective surface is Eastman Kodak(or equivalent) neutral white paper with 90% diffused reflectance placed at 3.81mm(0.15") from read head.

APDS-9102 Package Outline



NOTES:

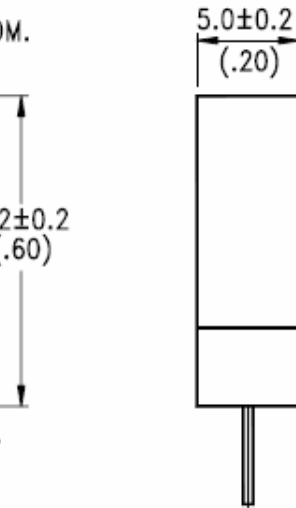
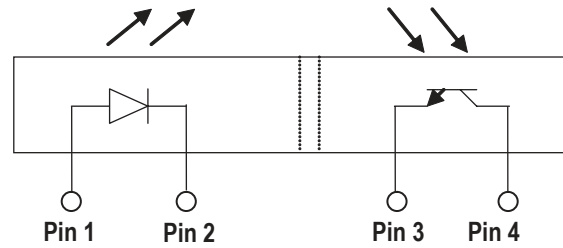
1. All dimensions are in millimeters(inches)
2. Tolerance is ± 0.25 mm(0.010 ") unless otherwise noted
3. Specifications are subjected to change specifications without prior notice.

I/O Pins Configuration Table

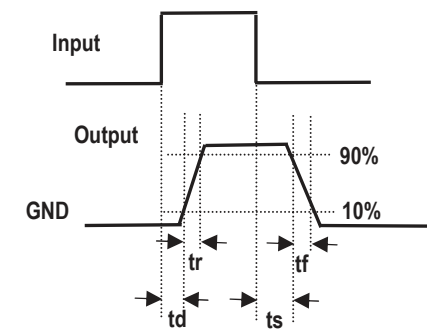
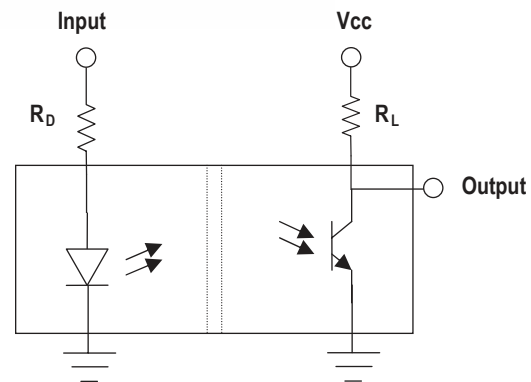
The electrical pin assignments are depicted in the below table.

| Pin | Function | Description |
|-----|-----------|---------------------------|
| 1 | Anode | LED Anode |
| 2 | Cathode | LED Cathode |
| 3 | Emitter | Phototransistor Emitter |
| 4 | Collector | Phototransistor Collector |

APDS-9102 Block Diagram



Test Circuit for Response Time



APDS-9102 Performance Charts

Typical Electrical/Optical Characteristics Curves ($T_a=25^\circ\text{C}$ unless otherwise indicated)

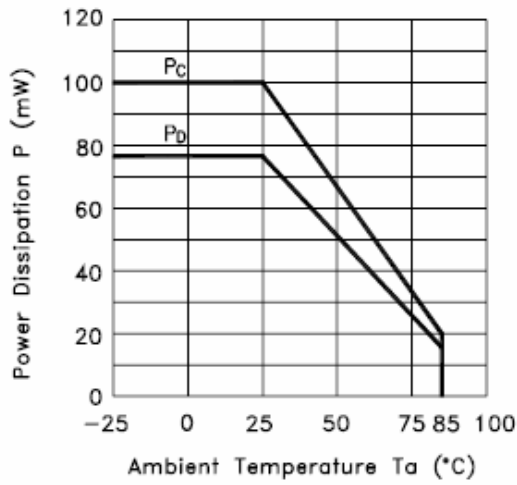


Figure 1. Power Dissipation vs. Ambient Temperature

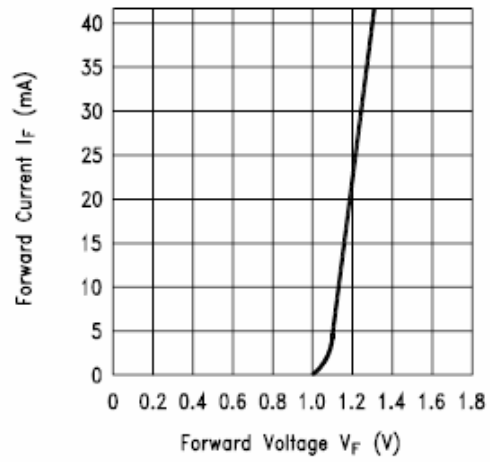


Figure 2. Forward Current vs. Forward Voltage

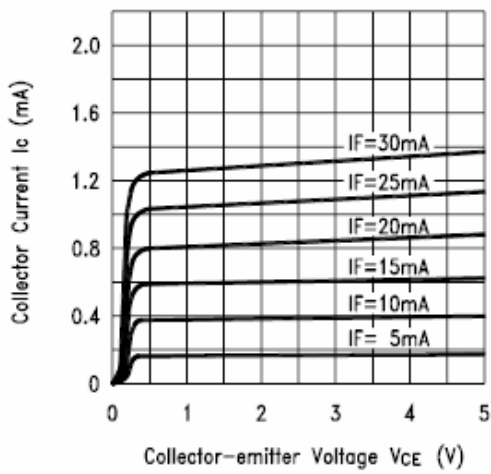


Figure 3. Collector Current vs. Collector-emitter Voltage

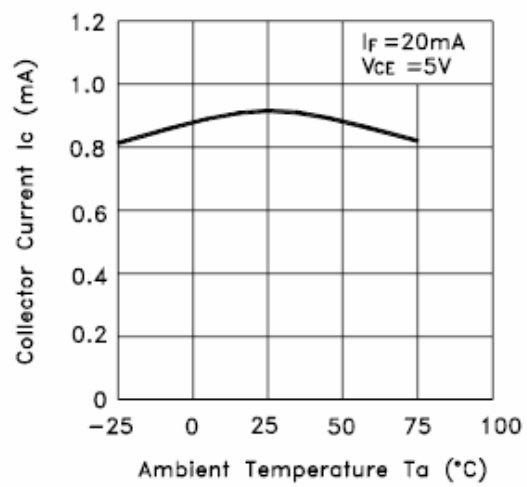


Figure 4. Collector Current vs. Ambient Temperature

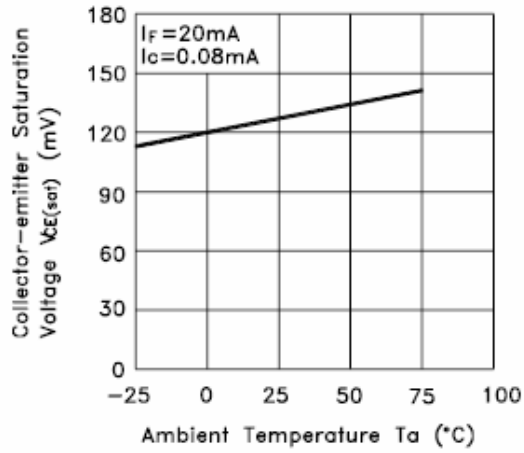


Figure 5. Collector-emitter Saturation Voltage vs. Ambient Temperature

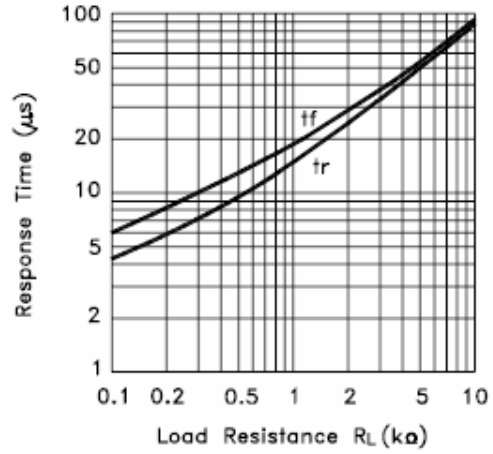


Figure 6. Response Time vs. Load Resistance

For product information and a complete list of distributors, please go to our web site: www.avagotech.com

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