

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

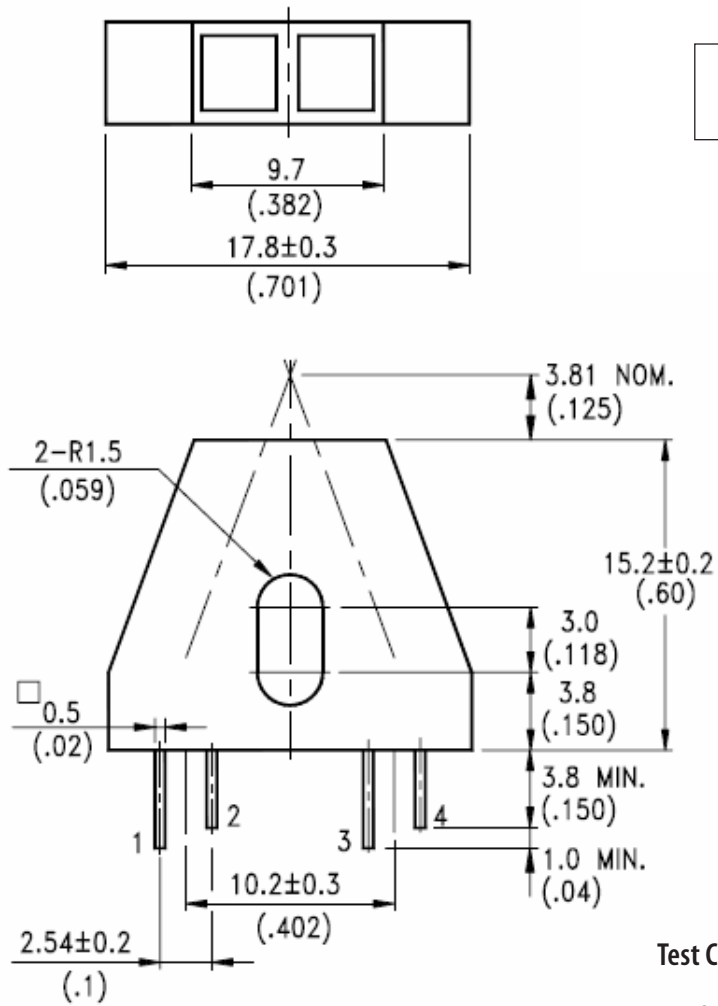
Electrical / Optical Characteristics (Ta=25°C)

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:

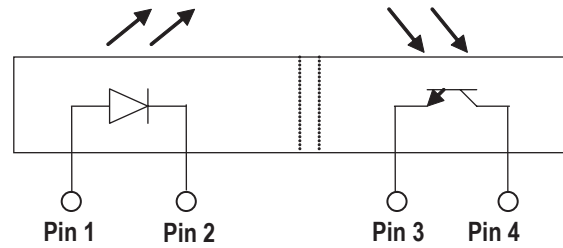
1. All dimensions are in millimeters(inches)
2. Tolerance is $\pm 0.25\text{mm}(0.010")$ unless otherwise noted
3. Specifications are subjected to change specifications without prior notice.

I/O Pins Configuration Table

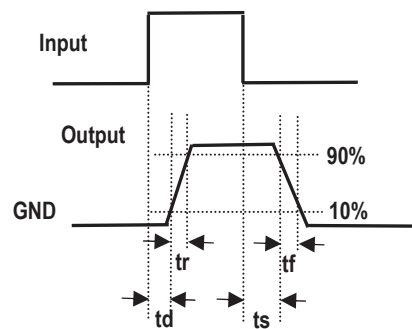
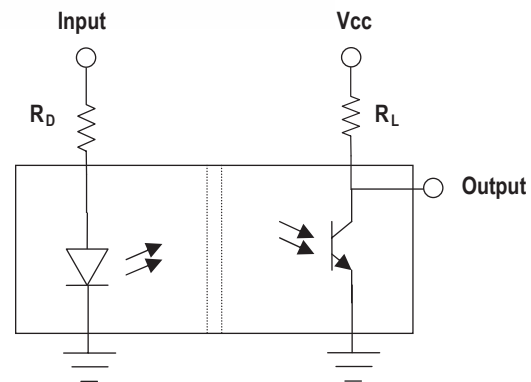
The electrical pin assignments are depicted in the below table.

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

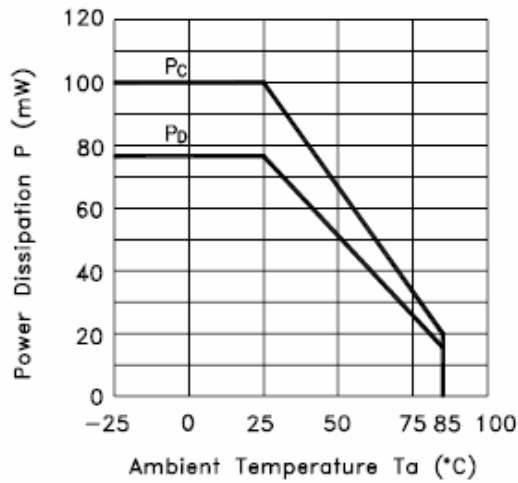
Typical Electrical/Optical Characteristics Curves ($T_a=25^\circ\text{C}$ unless otherwise indicated)

Figure 1. Power Dissipation vs. Ambient Temperature

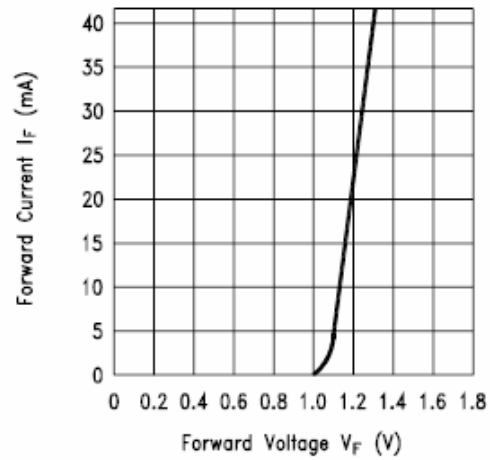


Figure 2. Forward Current vs. Forward Voltage

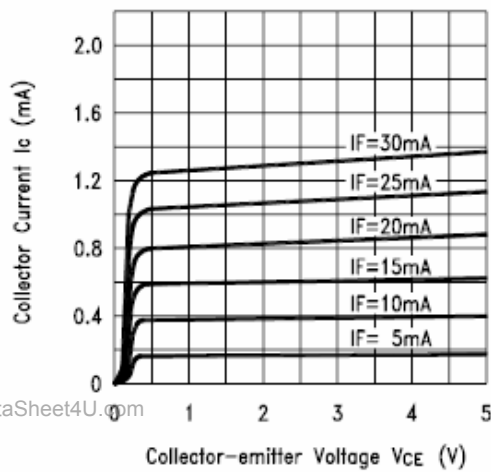


Figure 3. Collector Current vs. Collector-emitter Voltage

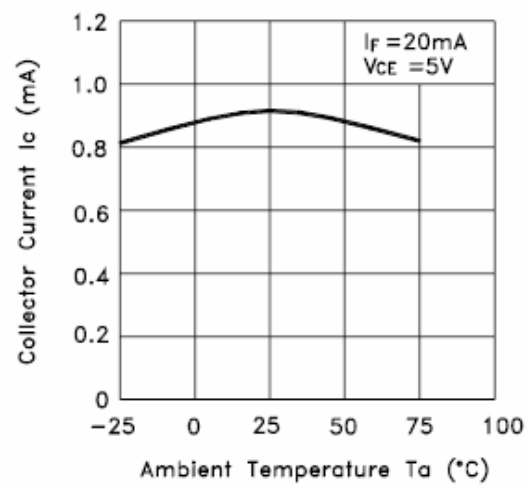


Figure 4. Collector Current vs. Ambient Temperature

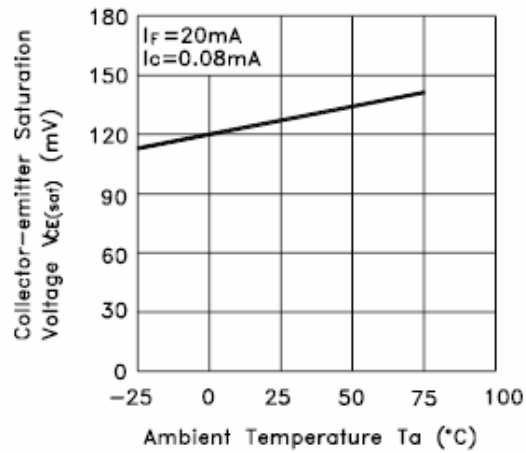


Figure 5. Collector-emitter Saturation Voltage vs. Ambient Temperature

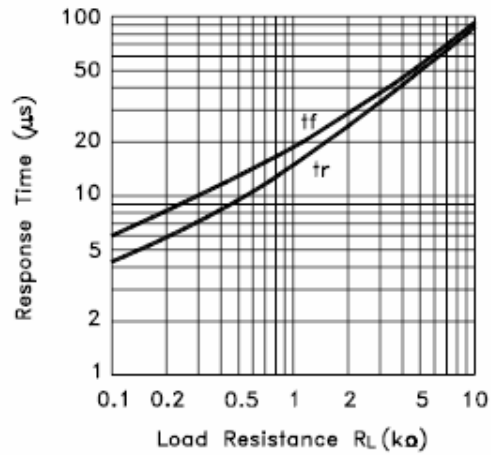


Figure 6. Response Time vs. Load Resistance