TELAIRE®

Application Note

SM-UART-04L
Laser Dust Sensor

SM-UART-04L Laser Dust Sensor is designed to operate in a moderate environment and provides excellent performance. It's embedded optical design leverages the strength from laser technology, which allows customers to achieve excellent performance with balanced reliability. SM-UART-04L is an ideal solution for industrial and consumer applications.

SM-UART-04L laser dust sensor detects dust particle concentration in air by using an optical sensing method. A laser light emitting diode (laser LED) and a photo sensor are optically arranged in the device. The photo sensor detects the reflected laser LED light by dust particles in air. The dust sensor can detect small particles such as, cigarette smoke and distinguish small particles, such as smoke from large house dust, by the pulse pattern of the signal output.

Features

- Laser Optical Dust
  - High Accuracy
  - Fast Response
- UART Output
- Compact in Size
- Flexible Mounting Style

Applications

- Indoor Air Quality Monitoring
- Air Cleaners and Purifiers
- Air Conditioners and HVAC
- Outdoor Dust Monitoring

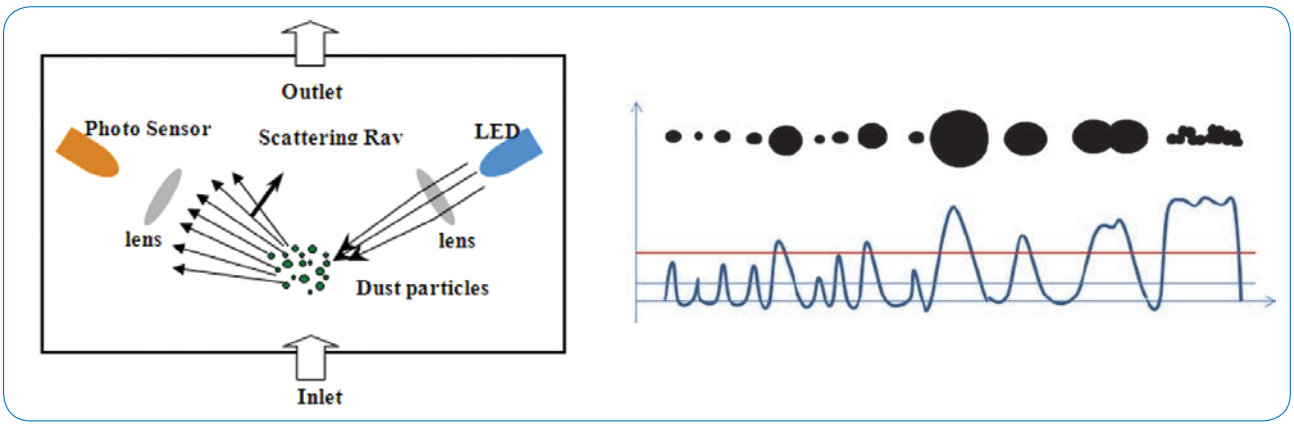
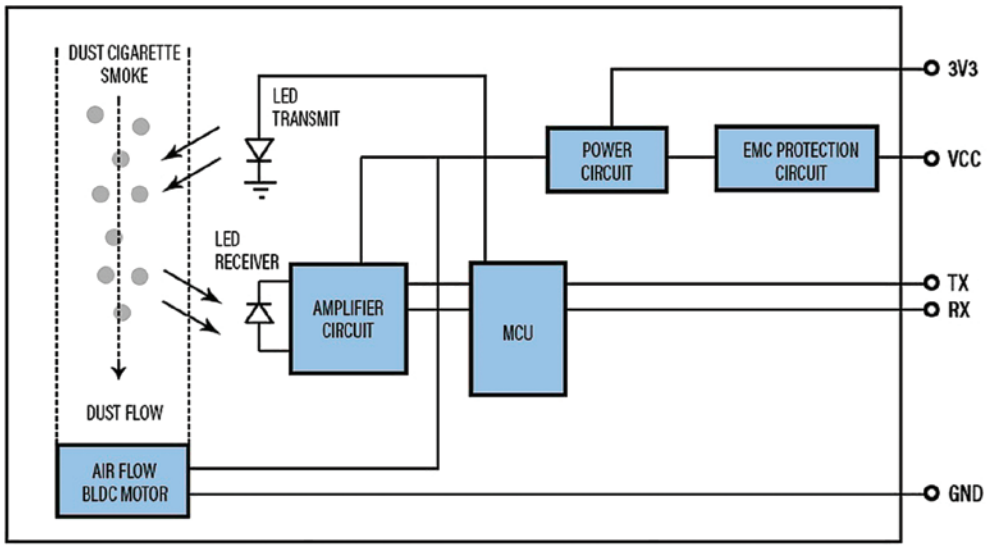


Figure 1 : Detection Principle

Amphenol
Advanced Sensors

SM-UART-04L Laser Dust Sensor

Block Diagram



Calibration

Calibration carried out with cigarette smoke per GB/T1880

Absolute Maximum Ratings

Absolute Maximum Ratings			
Parameter	**Symbol**	**Rating**	**Unit**
Supply Voltage	Vcc	0 to + 5.5	V
Operating Temperature	Topr	-10 to 50	°C
Storage Temperature	Tstg	-30 to 70	°C
Operating Humidity (1)	RHopr	0 to 95	%
Storage Humidity (1)	RHstg	0 to 95	%

1) Non-condensing

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Particle Size		D	0.3	2.5	10	um
Detection Range		D_{reg}	1	—	999	μg/m³
Resolution		R	—	1	—	μg /m³
Indication Error (2)	1 ~100 ug/m³	D_{err}	—	—	+/-10	μg /m³
	100~999 ug/m³		—	—	+/-10	%
Warm-Up Time		t_{wup} (2)	—	5	—	s
Response Time		t_{rsp} (2)	—	1	—	s
Average Trouble-free Working Time		T	—	40000	—	hour
Supply Voltage		V_{CC}	4.8	5	5.2	V
Supply Voltage Ripple		V_{CC} Ripple	—	—	30	mV
Current Consumption		I_{CC} (2)	—	60	100	mA
Output (UART)		3.3V				

1) Non-condensing 2) Testing at T=25°C, RH=40-60%