Automotive Sensor Products

Multizone Solar Sensors

Figure 1: Multizone Solar Sensors

General Description

Multizone (3D) sensors detect solar irradiation intensity and direction acting on the vehicle and allow the climate control system to compensate thermal loads in different passenger compartment zones for optimal comfort.

Features

- Solar irradiation intensity measurement
- Solar Elevation and Azimuth detection
- Linear output proportional to irradiance level
- Capable of integrating additional functions such as ambient light sensing, temperature sensing and visual indicators (alarm LED, battery charging status for PHEV vehicles etc.)
- Operates with wide range of windscreen types
- Customer tailored spectral characteristics

Benefits

- Patented hemispheric calibration technology compensates mechanical assembly irregularities, optimizes sensor performance and gives full styling flexibility
- Customized styling and mechanical interface
- Customized output interface

Applications

- Automotive HVAC Control (Multizone systems)
- Interior and Exterior Lighting Control
- Visual Indicators

Operation

Basic Principle

Solar radiation acts on the vehicle by generating thermal heat inside of the passenger compartment. Depending on the sun elevation and direction, the separate zones of the passenger compartment get different thermal loads. Multizone solar sensors measure solar irradiation intensity and solar direction (expressed in Elevation and Azimuth angles) and provide these signals to the advanced vehicle climate control system to compute and compensate solar thermal loads in different passenger compartment zones for occupant comfort.

Packaging Options

Custom packaging can be provided to meet any need, please contact Littelfuse Engineering for details.

Hemispheric Calibration Technology

During calibration procedure solar sensor signals are gathered by rotating the sensor over full hemisphere. Individual calibration tables are generated and stored in sensor memory. Sensor algorithm uses calibration tables to adjust calculated raw values and so improve precision of Intensity, Azimuth and Elevation determination. Hemispheric calibration optimizes sensor performance by compensating variations in photodiode sensitivity, mechanical assembly and plastic cover transparency.

Typical Output Response Characteristics

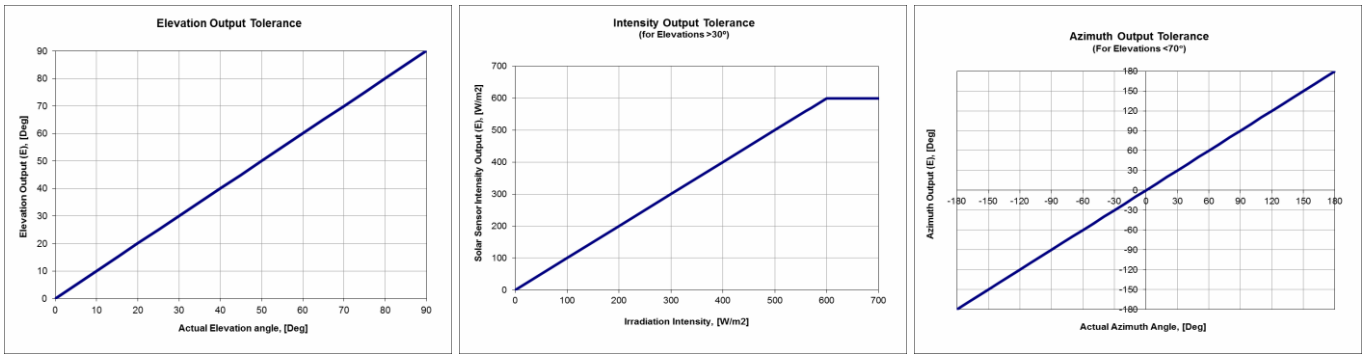

Figure 2: Output Characteristics

Electrical Characteristics

Parameter	Min.	Typ.	Max.	Unit
Power Requirements				
5 V Supply Voltage	4.5	-	5.5	V
12 V Supply Voltage	9	-	16	V
Operating Current	0.025	6		mA
Sleep Current		20	100	µA
Output Types				
LIN 2.0, LIN 2.1, LIN J2602, Analog Pulse Train				
Temperature Range				
Operating Temperature	-40		105	°C
Storage Temperature	-40		125	°C

Typical Output Tolerances

Parameter	Range	Tol.	Unit
Illumination Intensity (Visible Light, Ambient Response)			
Part to Part	0 to 10000 lx	± 7	%
Over Temperature	0 to 10000 lx	± 10	%
Over Lifetime	0 to 10000 lx	± 10	%
Irradiation Intensity (IR Light, Sunload Response)			
Part to Part	0 to 1000 W/m²	± 5	%
Over Temperature	0 to 1000 W/m²	± 10	%
Over Lifetime	0 to 1000 W/m²	± 10	%
Elevation (Angle: 10 to 90°)			
Part to Part	10 to 90°	± 5	%
Over Temperature	10 to 90°	± 7	%
Over Lifetime	10 to 90°	± 8	%
Azimuth (Angle: -180 to +180°)			
Part to Part	-180 to +180°	± 2.8	%
Over Temperature	-180 to +180°	± 4	%
Over Lifetime	-180 to +180°	± 6	%

Littelfuse

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