

ISL29023

Absolute Maximum Ratings

VDD to GND	+4.0V
I ² C Bus (SCL, SDA) and INT Pin Voltage	-0.2V to 4.0V
I ² C Bus (SCL, SDA) and INT Pin Current	<10mA
R _{EXT} Pin Voltage	-0.2V to V _{DD} +0.5V
ESD Ratings	
Human Body Model (HBM)	2kV
Charged Device Model (CDM)	1kV

Thermal Information

Thermal Resistance (Typical)	θ_{JA} (°C/W)
6 Ld ODFN Package (Note 4)	88
Maximum Junction Temperature (T _{JMAX})	+90°C
Storage Temperature Range	-40°C to +100°C
Operating Temperature	-40°C to +85°C
Pb-Free Reflow Profile (*)	see TB477
*Peak temperature during solder reflow +235°C max	

CAUTION: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

NOTE:

- θ_{JA} is measured in free air with the component mounted on a high effective thermal conductivity test board with “direct attach” features. See Tech Brief [TB379](#).

Electrical Specifications V_{DD} = 3V, T_A = +25°C, R_{EXT} = 499kΩ 1% tolerance, 16-bit ADC operation, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITION	MIN (Note 7)	TYP	MAX (Note 7)	UNIT
V _{DD}	Power Supply Range		2.25		3.63	V
I _{DD}	Supply Current			70	85	μA
I _{DD1}	Supply Current when Powered Down	Software disabled or auto power-down		0.01	0.3	μA
V _{I²C}	Supply Voltage Range for I ² C Interface		1.7		3.63	V
f _{OSC}	Internal Oscillator Frequency		675	750	825	kHz
t _{int}	ADC Integration/Conversion Time	16-bit ADC data		90		ms
F _{I²C}	I ² C Clock Rate Range			1 to 400		kHz
DATA_0	Count Output When Dark	E = 0 lux, Range 1 (1k lux)		1	5	Counts
DATA_F	Full Scale ADC Code				65535	Counts
DDATA DATA	Count Output Variation Over Three Light Sources: Fluorescent, Incandescent and Sunlight	Ambient light sensing		±10		%
DATA_1	Light Count Output With LSB of 0.015 lux/count	E = 300 lux, Fluorescent light (Note 5), ALS Range 1 (1k lux)	15000	20000	25000	Counts
DATA_2	Light Count Output With LSB of 0.06 lux/count	E = 300 lux, Fluorescent light (Note 5), ALS Range 2 (4k lux)		5000		Counts
DATA_3	Light Count Output With LSB of 0.24 lux/count	E = 300 lux, Fluorescent light (Note 5), ALS Range 3 (16k lux)		1250		Counts
DATA_4	Light Count Output With LSB of 0.96 lux/count	E = 300 lux, Fluorescent light (Note 5), ALS Range 4 (64k lux)		312		Counts
DATA_IR1	Infrared Count Output	E = 210 lux, Sunlight (Note 6), IR sensing, Range 1	15000	20000	25000	
DATA_IR2	Infrared Count Output	E = 210 lux, Sunlight (Note 6), IR sensing, Range 2		5000		
DATA_IR3	Infrared Count Output	E = 210 lux, Sunlight (Note 6), IR sensing, Range 3		1250		
DATA_IR4	Infrared Count Output	E = 210 lux, Sunlight (Note 6), IR sensing, Range 4		312		
V _{REF}	Voltage of R _{EXT} Pin			0.52		V
V _{IL}	SCL and SDA Input Low Voltage				0.55	V
V _{IH}	SCL and SDA Input High Voltage		1.25			V
I _{SDA}	SDA Current Sinking Capability		4	5		mA
I _{INT}	INT Current Sinking Capability		4	5		mA

NOTES:

- 550nm green LED is used in production test. The 550nm LED irradiance is calibrated to produce the same DATA count against an illuminance level of 300 lux fluorescent light.
- 850nm IR LED is used in production test. The 850nm LED irradiance is calibrated to produce the same DATA_IR count against an illuminance level of 210 lux sunlight at sea level.
- Compliance to datasheet limits is assured by one or more methods: production test, characterization and/or design.

Typical Performance Curves

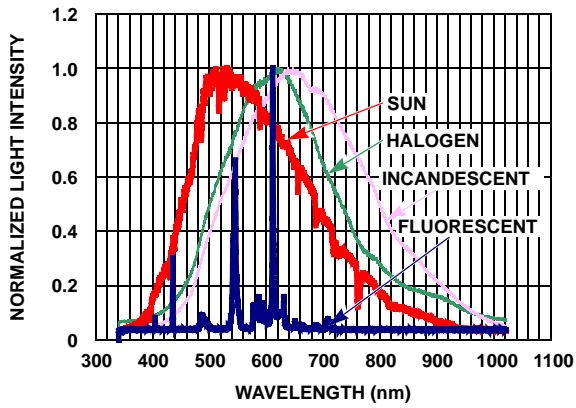


FIGURE 3. NORMALIZED SPECTRAL RESPONSE OF LIGHT SOURCES

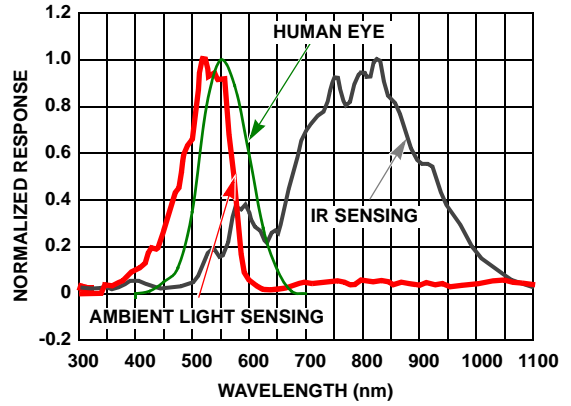


FIGURE 4. NORMALIZED SPECTRAL RESPONSE FOR AMBIENT LIGHT SENSING AND IR SENSING

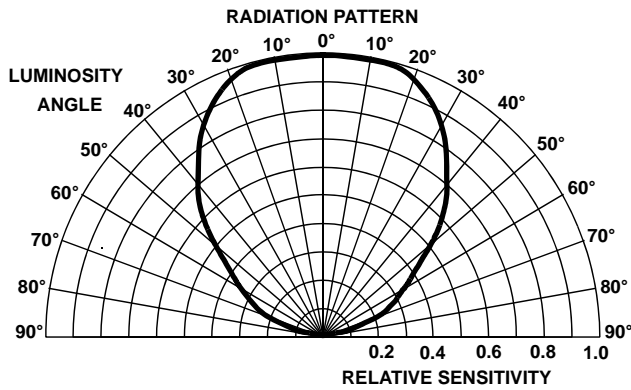


FIGURE 5. RADIATION PATTERN

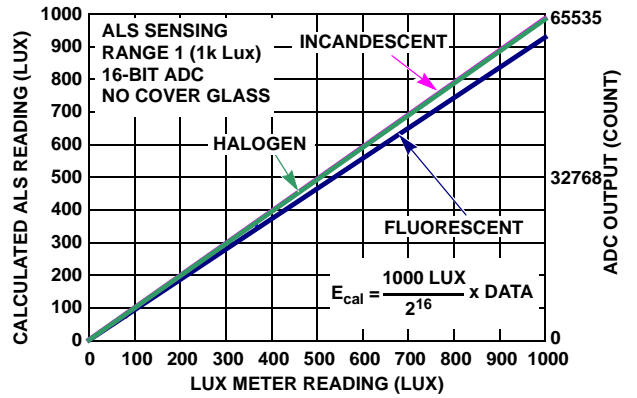


FIGURE 6. SENSITIVITY TO THREE LIGHT SOURCES

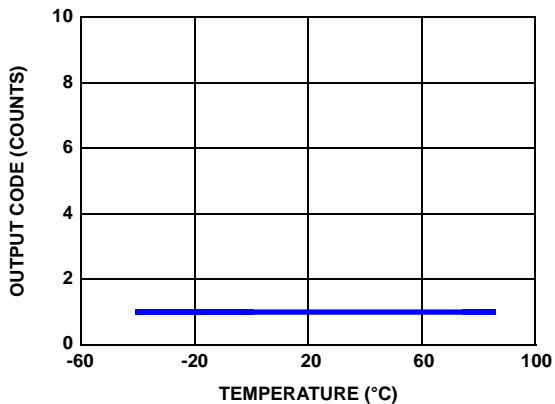


FIGURE 7. OUTPUT CODE FOR 0 LUX vs TEMPERATURE

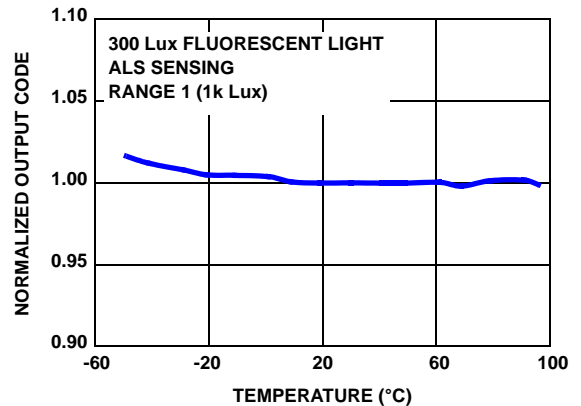


FIGURE 8. OUTPUT CODE vs TEMPERATURE