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DESCRIPTION

The iC-OD/L device is an optical position sensitive detector with a monolithic integrated photodiode. The device supersedes one PSD and two conventional photoelectric detectors, e.g. in motion sensors.

Constant light and low-frequency variing light are suppressed by a highpass filter. A lowpass filter reduces high-frequency interference to a minimum. The maximum sensitivity for alternating-light signals (for AC photoelectric currents) is about 100 kHz, with a current amplification of typically 48 dB.

The photoelectric current is partitioned to the two photocurrent amplifiers according to the position of the light signal. The analogue outputs IAC1 and IAC2 offer directly the amplified AC photoelectric current.



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PACKAGES

PIN CONFIGURATION OLGA OD4C



PIN FUNCTIONS No. Name Function

- 1 GND Ground
- 2 VCC +(3.9)4.5 to +13.2 V Supply Voltage
- 3 IAC1 Current Output 1
- 4 IAC2 Current Output 2

PIN CONFIGURATION cDFN10 4 mm x 4 mm



PIN FUNCTIONS No. Name Function

- 1 VCC +(3.9)4.5 to +13.2 V Supply Voltage
- 2 IAC1 Current Output 1
- 3 n/c
- 4 IAC2 Current Output 2
- 5 GND Ground
- 6 n/c
- 7 n/c
- 8 n/c
- 9 n/c 10 n/c
- 10 11/0

PIN CONFIGURATION OBGA™ ODL2C



PIN FUNCTIONS

No. Name Function

- 1 VCC +(3.9)4.5 to +13.2 V Supply Voltage
- 2 IAC1 Current Output 1
- 3 IAC2 Current Output 2
- 4 GND Ground
- 5 n.c.
- 6 n.c.
- 7 n.c.
- 8 n.c.



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PACKAGE DIMENSIONS

cDFN10 4 mm x 4 mm











RECOMMENDED PCB-FOOTPRINT

iC-OD, iC-ODL

OPTICAL POSITION-SENSITIVE DETECTOR (PSD)



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ABSOLUTE MAXIMUM RATINGS

Beyond these values damage may occur; device operation is not guaranteed.

Item	Symbol	Parameter	Conditions			Unit
No.	-			Min.	Max.	
G001	VCC	Supply Voltage		0	15	V
G002	I()	Current in IAC1, IAC2		-1	0	mA
G003	Tj	Junction Temperature		-40	130	°C
G004	Ts	Storage Temperature	see package specifications			

THERMAL DATA

Operating Conditions: VCC = 4.5...13.2 V

ltem	Symbol	Parameter	Conditions				Unit
No.				Min.	Тур.	Max.	
T01	Та	Operating Ambient Temperature Range	cDFN10 oLGA OD4C and oBGA ODL2C, see package	0		70	°C
			specifications				



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ELECTRICAL CHARACTERISTICS

Operating Conditions: VCC = 4.513.2 V, λ = 880 nm, 1j = -2585 °C, unless otherwise noted							
ltem No.	Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
Totel Device							u
001	VCC	Permissible Supply Voltage VCC	Tj = -2585 °C Tj = 060 °C	4.5 3.9		13.2 13.2	V V
002	I(VCC)	Supply Current in VCC	iph = 0 Tj = 27 °C	0.55	0.95	2.4	mA mA
003	Vs()	Saturation Voltage at IAC1, IAC2	$Vs() = VCC - V(); I() = -400 \mu A$			0.5	V
004	10()	Output Bias Current in IAC1, IAC2	iph = 0 Tj = 27 °C	-210	-108		μA μA
Photo	diode		<u> </u>		<u> </u>		
101	$S(\lambda)_{max}$	Spectral Sensitivity		1	0.5		A/W
102	λ_{ar}	Range of Spectral Sensitivity	$Se(\lambda_{ar}) = 0.1 \times S(\lambda)_{max}$	500	1	1050	nm
103	A _{ph} ()	Radiant Sensitive Area iC-OD		2	2.63 x 0.8	38	mm²
104	A _{ph} ()	Radiant Sensitive Area iC-ODL		8.42 x 0.88		38	mm²
Photo	Current Ar	nplifier IAC1, IAC2	1				<u></u>
201	I()	Output Current Operating Range in IAC1, IAC2		-500		0	μA
202	Pe() _{pk}	Permissible Irradiance for Alternating Light (peak value)	f = fc; ic-OD iC-ODL			2.2 0.7	μW μW
203	ISUM	Sum of Output Currents (RMS)	$\begin{split} \text{ISUM} &= \text{I}(\text{IAC1}) + \text{I}(\text{IAC2}); \\ \text{f} &= \text{fc}, \text{ Ee}()_{\text{ac}} = 30 \mu\text{W/cm}^2 \\ \text{Tj} &= 27 ^\circ\text{C} \end{split}$	-25	-50		μΑ μΑ
204	iph() _{dc}	DC Photo Current Capabillity	Position of light spot arbitrary Tj = -2585 °C Tj = 060 °C Tj = 27 °C, position of light spot centered	2.7 4.5	16		μΑ μΑ μΑ
205	Ev() _{dc}	Permissible Ambient Light Level	Standard Illuminant A at T = 2856 K; iC-OD iC-ODL		250 75		lx Ix
206	fc	Bandpass Center Frequency			100		kHz
207	Q	Filter Q-Factor	Q = fc / (fhc - flc)	0.35	0.5	0.52	
208	I()/ISUM	Single Amplifier Output Current to Sum of Output Currents	f = fc, position of light spot centered	0.40		0.60	
209	I() _{min} / ISUM	Smaller Output Current to Sum of Output Currents	f = fc, position of light spot 1 mm out of center	0.13		0.18	
210	Ai() _{fc}	Photo Current Gain for Alternat- ing Light	Ai() _{fc} = ISUM / (iph1 + iph2); f = fc, position of light spot centered	44	48	52	dB
211	dAi() _{fc}	Change of Photo Current Gain	f = fc, position of light spot 1 mm out of center	-10		10	%
212	Ai() ₁₀₀	Low-Frequency Photo Current Gain	f = 100 Hz	1	3	6	dB
213	Vn(Vout)	RMS Noise Voltage	With external filter: R1, R3 = 10 kΩ, C1, C3 = 120 pF, R2, R4 = 50 kΩ, C2, C4 = 100 pF (see Fig. 6)		2.1	2.8	mV
214	t _{on} (VCC)	Power-on Setup Time	Tj = 27 °C		30	50	μs μs
215	ton(VCC)	Power-on Setup Time	$VCC = 0 \rightarrow 4 V;$ Tj = 060 °C Tj = 27 °C		70	100	µs µs



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TYPICAL CHARACTERISTICS





External filter (RG850) improves the suppression of ambient light by a factor of ca. 20 to 30.



Figure 2: Relative spectral sensitivity

APPLICATIONS INFORMATION



Figure 3: The light spot impinges to the left



Figure 4: The light spot impinges in the center



Figure 5: The light spot impinges to the right

Examples of output signals

The oscilloscope pictures show the signal patterns at iC-OD outputs IAC1 and IAC2 when receiving a 5 μ s light pulse. The differential signal shown has been calculated. Both of the outputs are terminated with 10 k Ω . An external filter is not used.



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Example: external filter





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We understand suitable application of our published designs to be state-of-the-art technology which can no longer be classed as inventive under the stipulations of patent law. Our explicit application notes are to be treated only as mere examples of the many possible and extremely advantageous uses our products can be put to.



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ORDERING INFORMATION

Туре	Package	Order Designation
iC-OD	- OLGA OD4C cDFN10 4 mm x 4 mm	iC-OD chip iC-OD oLGA OD4C iC-OD cDFN10
iC-ODL	- OBGA™ ODL2C	iC-ODL chip iC-ODL oBGA ODL2C

For technical support, information about prices and terms of delivery please contact:

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