

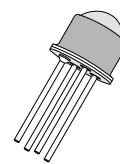
FEATURES

- High spectral sensitivity
- Sensitive to visible light and near infrared
- Adjustable threshold
- Short switching time
- Supply voltage of 4.5 to 16 V
- CMOS-/LSTTL-compatible output
- Photo sensor size: 400 μm x 400 μm
- Option: extended temperature range of -40 to 125 $^{\circ}\text{C}$

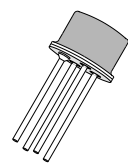
APPLICATIONS

- Receiver for reflecting and non-reflecting light barriers
- Multi-chip modules for absolute encoders

PACKAGES

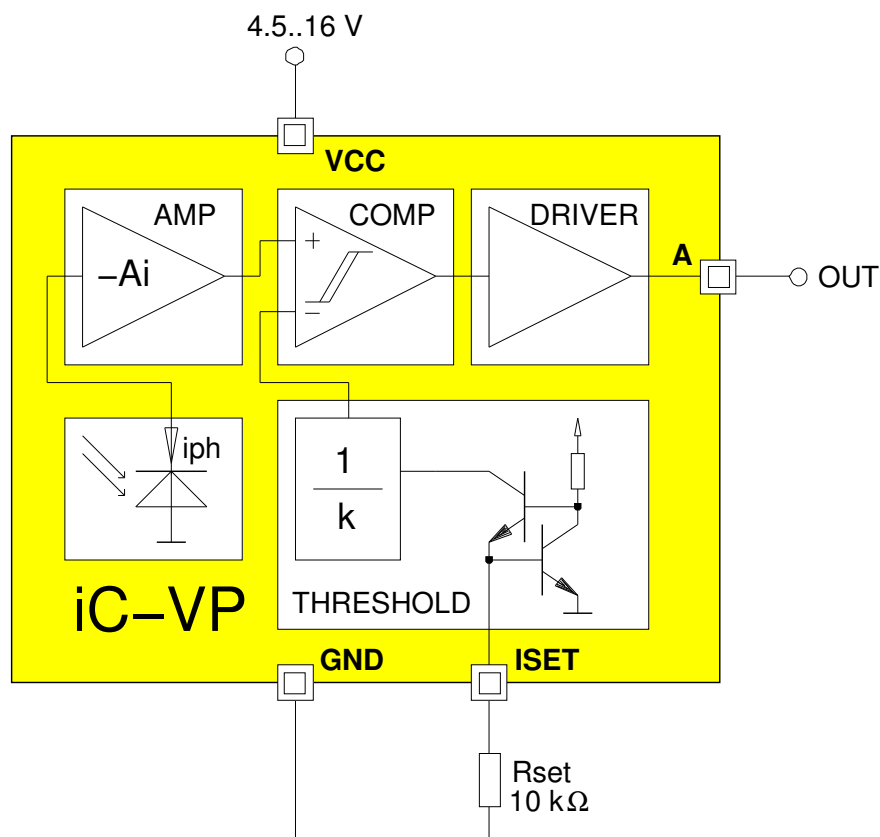


TO18-4L
(lens)



TO18-4F
(flat)

BLOCK DIAGRAM



DESCRIPTION

The iC-VP is a photocurrent amplifier with threshold switch and monolithic integrated sensor diode. The device is meant as a photoelectric detector, in light barriers for example.

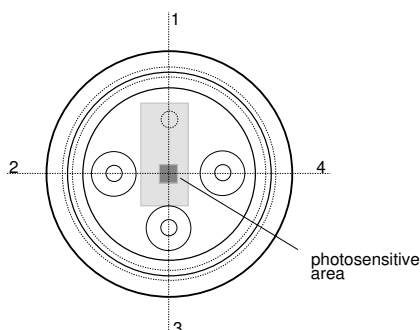
The threshold is adjusted with an external resistor. After approx. 1 μ s delay a photo current of sufficient magnitude creates a low signal which is compatible with CMOS and LSTTL levels at the output.

The iC-VP can be utilised in a customised COB package as a multi-chip module for multi-channel scanning absolute encoders.

TO18 metal can packages are available for single-channel light barrier applications.

PACKAGES TO18-4L/F

PIN CONFIGURATION



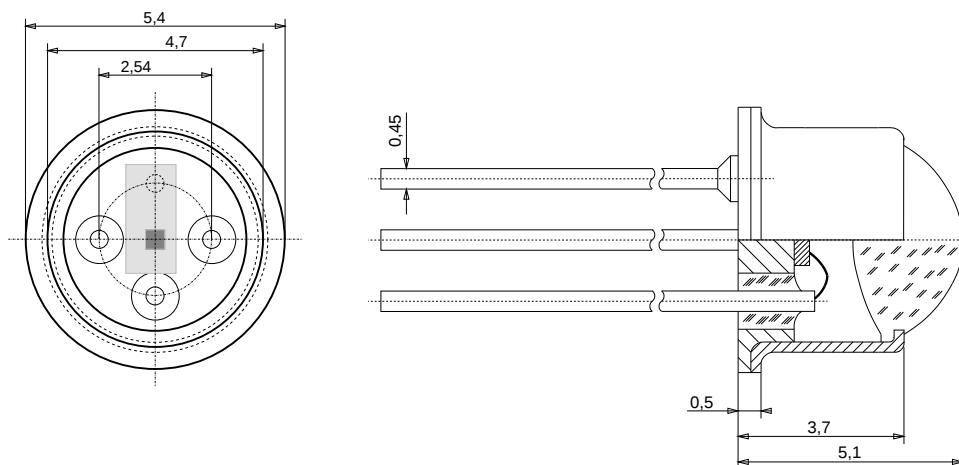
Optical input from top

PIN FUNCTIONS

No. Name Function

1	GND	Ground
2	A	Output
3	ISET	Threshold Adjustment
4	VCC	Supply Voltage 4.5...16 V

PHYSICAL DIMENSIONS (in mm)



PACKAGE LABEL

iC-VP Code
yyww

ABSOLUTE MAXIMUM RATINGS

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

Item No.	Symbol	Parameter	Conditions			Unit
				Min.	Max.	
G001	VCC	Supply Voltage		0	18	V
G002	V(A)	Voltage at Output A		0	VCC	V
G003	I(A)	Current in Output A		-5	8	mA
G004	T _j	Junction Temperature		-40	130	°C
G005	T _s	Storage Temperature		-40	130	°C

THERMAL DATA

Operating Conditions: VCC = 4.5...16 V

Item No.	Symbol	Parameter	Conditions				Unit
				Min.	Typ.	Max.	
T01	T _a	Operating Ambient Temperature Range (extended temperature range on request)	TO18-4L/F package	-25		90	°C

ELECTRICAL CHARACTERISTICS

Operating Conditions: VCC = 4.5...16 V, Tj = -40...125 °C, unless otherwise stated

Item No.	Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Total Device							
001	VCC	Permissible Supply Voltage		4.5		16	V
002	I(VCC)	Supply Current in VCC, Output hi	I(A) = 0, iph = 0, A = hi; RSET = 1.4 kΩ RSET = 7 kΩ RSET = 70 kΩ			3.1 1.8 1.5	mA mA mA
003	I(VCC)	Supply Current in VCC, Output hi	I(A) = 0, iph = 0, A = hi, Tj = 27 °C; RSET = 1.4 kΩ RSET = 7 kΩ RSET = 70 kΩ		2.0 1.1 0.8		mA mA mA
004	I(VCC)	Supply Current in VCC, Output lo	I(A) = 0, A = lo; RSET = 1.4 kΩ, iph = 2 μA RSET = 7 kΩ, iph = 200 nA RSET = 70 kΩ, iph = 20 nA			8.1 5.5 5.0	mA mA mA
005	I(VCC)	Supply Current in VCC, Output lo	I(A) = 0, A = lo, Tj = 27 °C; RSET = 1.4 kΩ, iph = 2 μA RSET = 7 kΩ, iph = 200 nA RSET = 70 kΩ, iph = 20 nA		4.3 2.2 1.6		mA mA mA
Photodiode							
101	Aph	Radiant Sensitive Area		0.4 x 0.4			mm²
102	S(λ)max	Spectral Sensitivity	λ = 850 nm		0.5		A/W
103	Se(λ)	Range of Spectral Sensitivity	Se(λ) = 0.1 x S(λ)max	500		1050	nm
104	Ierr	Error Current at Photodiode	Tj = -40 °C Tj = 27 °C Tj = 70 °C Tj = 125 °C			5 5 8 50	nA nA nA nA
Photocurrent Amplifier							
201	fo	Upper Cutoff Frequency	Triangular waveform, iph = 0...(2 x Iphth); RSET = 1.4 kΩ RSET = 7 kΩ RSET = 70 kΩ	400 200 50			kHz kHz kHz
Comparator							
301	Hys	Hysteresis with reference to the Photocurrent Threshold Iphth		-30	-20	-15	%
Threshold Adjustment ISET							
401	V(ISET)	Voltage at ISET	RSET = 1.4...70 kΩ Tj = -40 °C Tj = 27 °C Tj = 70 °C Tj = 125 °C	420	780 660 580 480	830	mV mV mV mV
402	TC	Temperature Coefficient of V(ISET)	Tj = -40 °C Tj = 27 °C Tj = 70 °C Tj = 125 °C	-2.05	-1.83 -1.87 -1.90 -1.93	-1.7	mV/°C mV/°C mV/°C mV/°C
403	Iphth	Photocurrent Threshold for V(A) = lo	RSET = 1.4 kΩ, Tj = 27 °C RSET = 7 kΩ RSET = 70 kΩ		1/500 x ISET 1/880 x ISET 1/1000 x ISET		
404	Emax	Maximum Permissible Illuminance	higher than threshold Iphth, output A stays low; TO18-4L TO18-4F			5 50	klx klx

ELECTRICAL CHARACTERISTICS

Operating Conditions: $V_{CC} = 4.5...16\text{ V}$, $T_j = -40...125\text{ °C}$, unless otherwise stated

Item No.	Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Driver Output A							
501	$V_s(A)_{hi}$	Saturation Voltage hi	$V_s(A)_{hi} = V_{CC} - V(A)$; $I(A) = -400\text{ }\mu\text{A}$ $T_j = 27\text{ °C}$		0.8	1.0	V
502	$V_s(A)_{lo}$	Saturation Voltage lo	$I(A) = 5\text{ mA}$ $T_j = 27\text{ °C}$		0.22	0.4	V
503	$I_{sc}(A)_{hi}$	Short-Circuit Current hi	$V_{CC} = 16\text{ V}$, $V(A) = 0$	-30	-15		mA
504	$I_{sc}(A)_{lo}$	Short-Circuit Current lo	$V(A) = V_{CC}$		38	50	mA

OPTICAL CHARACTERISTICS

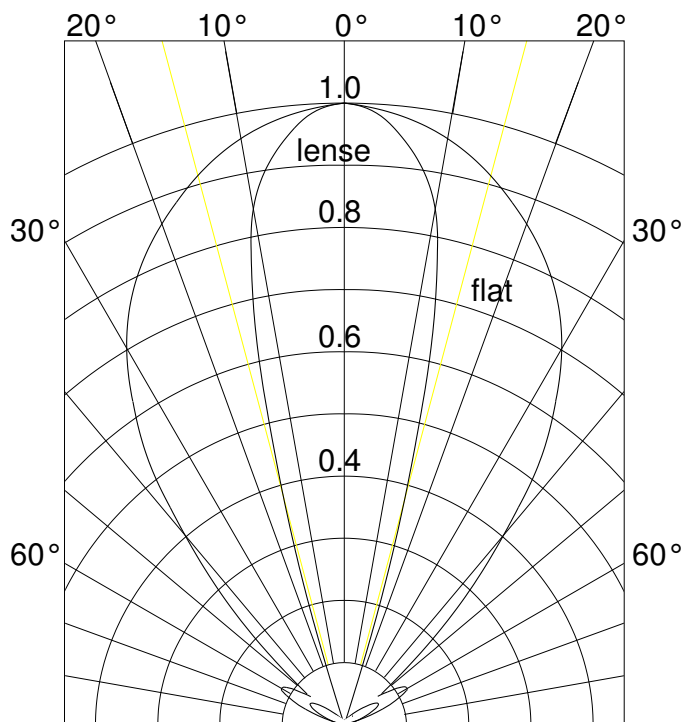


Figure 1: Directional characteristics $S_{rel}(\phi)$

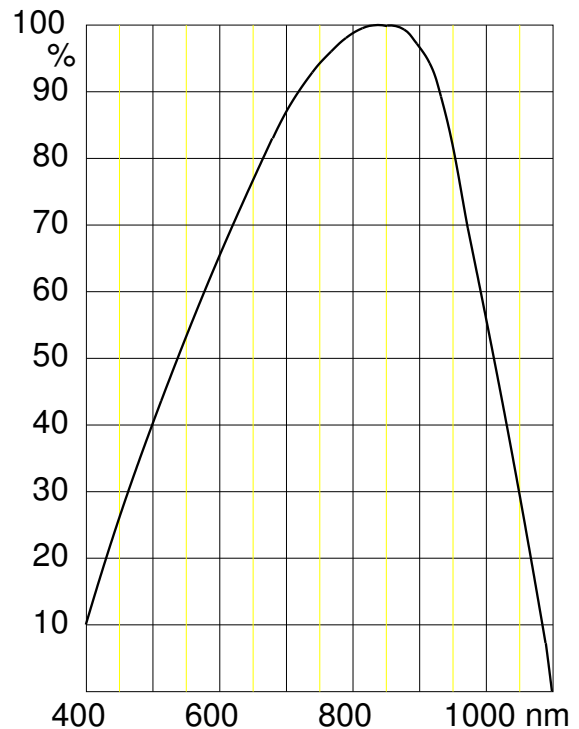


Figure 2: Relative spectral sensitivity $S_{rel}(\lambda)$

iC-Haus expressly reserves the right to change its products and/or specifications. An info letter gives details as to any amendments and additions made to the relevant current specifications on our internet website www.ichaus.de/infoletter; this letter is generated automatically and shall be sent to registered users by email.

Copying – even as an excerpt – is only permitted with iC-Haus' approval in writing and precise reference to source.

iC-Haus does not warrant the accuracy, completeness or timeliness of the specification and does not assume liability for any errors or omissions in these materials.

The data specified is intended solely for the purpose of product description. No representations or warranties, either express or implied, of merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information/specification or the products to which information refers and no guarantee with respect to compliance to the intended use is given. In particular, this also applies to the stated possible applications or areas of applications of the product.

iC-Haus conveys no patent, copyright, mask work right or other trade mark right to this product. iC-Haus assumes no liability for any patent and/or other trade mark rights of a third party resulting from processing or handling of the product and/or any other use of the product.

As a general rule our developments, IPs, principle circuitry and range of Integrated Circuits are suitable and specifically designed for appropriate use in technical applications, such as in devices, systems and any kind of technical equipment, in so far as they do not infringe existing patent rights. In principle the range of use is limitless in a technical sense and refers to the products listed in the inventory of goods compiled for the 2008 and following export trade statistics issued annually by the Bureau of Statistics in Wiesbaden, for example, or to any product in the product catalogue published for the 2007 and following exhibitions in Hannover (Hannover-Messe).

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.

ORDERING INFORMATION

Type	Package	Order Designation
iC-VP	TO18-4L (lens) TO18-4F (flat)	iC-VP TO18-4L iC-VP TO18-4F

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

iC-Haus GmbH
Am Kuemmerling 18
D-55294 Bodenheim
GERMANY

Tel.: +49 (61 35) 92 92-0
Fax: +49 (61 35) 92 92-192
Web: <http://www.ichaus.com>
E-Mail: sales@ichaus.com

Appointed local distributors: http://www.ichaus.com/sales_partners