

iC-VP

PHOTOSWITCH



FEATURES

- ◆ High spectral sensitivity
- ◆ Sensitive to visible light and near infrared
- ◆ Adjustable threshold
- ◆ Short switching time
- ◆ Supply voltage of 4.5..16V
- ◆ CMOS/LSTTL-compatible output
- ◆ Photosensor size: $400 \times 400 \mu\text{m}^2$
- ◆ Option: enhanced temperature range of $-40..125^\circ\text{C}$

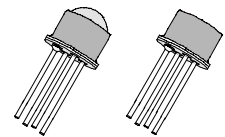
APPLICATIONS

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

PACKAGES

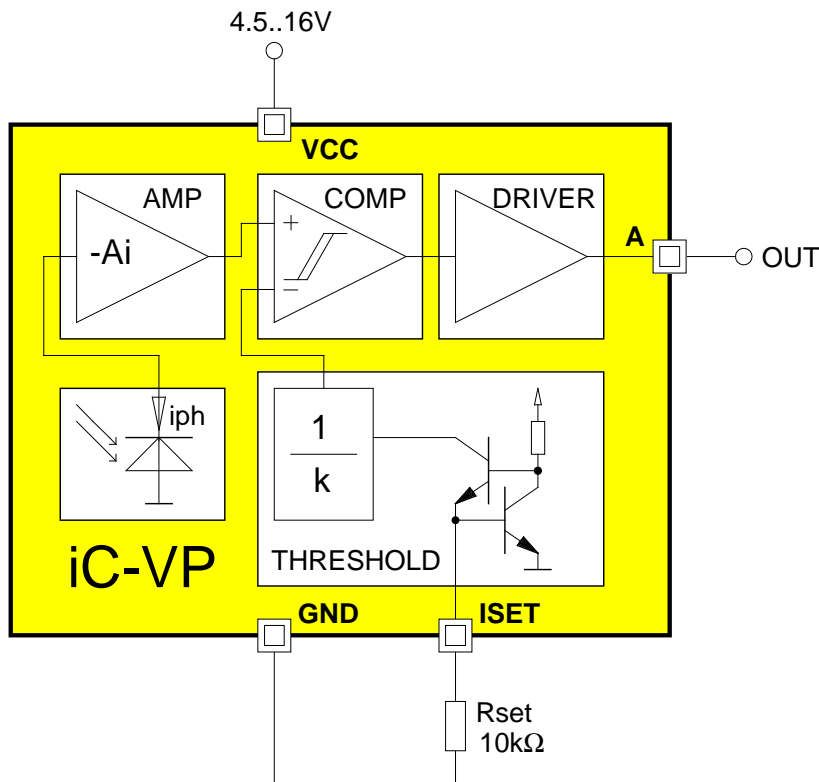


customized COB
chip size $2.17\text{mm} \times 1.0\text{mm}$



TO18-4L/F

BLOCK DIAGRAM



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Rev A0

DESCRIPTION

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

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

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

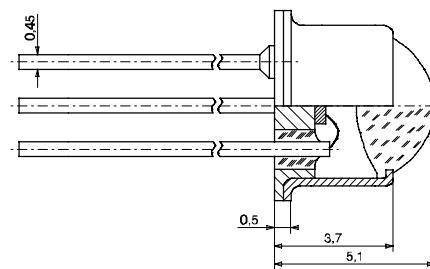
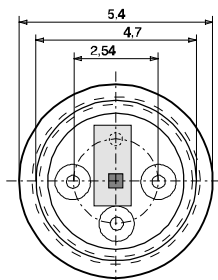
TO18 metal can packages are available for single-channel light barrier applications.

PACKAGES TO18-4

PACKAGE LABEL

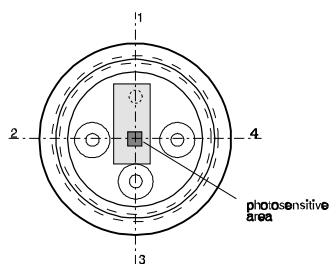


PHYSICAL DIMENSIONS (dimensions given in mm)



PIN CONFIGURATION

(top view)



PIN FUNCTIONS

No. Name Function

- | No. | Name | Function |
|-----|------|--|
| 1 | GND | Ground |
| 2 | A | Output |
| 3 | ISET | Threshold Adjustment;
Attachment RSET |
| 4 | VCC | Supply Voltage 4.5..16V |

optical input from top

ABSOLUTE MAXIMUM RATINGS

Values beyond which damage may occur; device operation is not guaranteed.

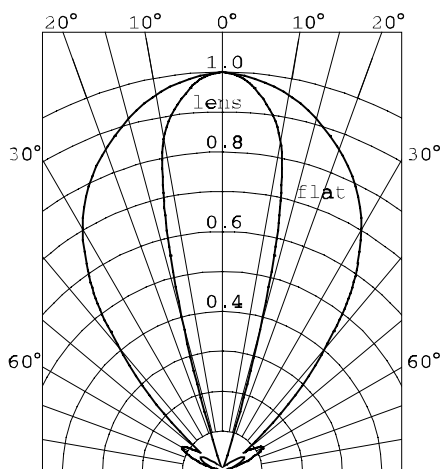
Item	Symbol	Parameter	Conditions	Fig.			Unit
					Min.	Max.	
G001	VCC	Supply Voltage			0	18	V
G002	V(A)	Voltage at Output A			0	VCC	V
G003	I(A)	Current in Output A			-5	8	mA
TG1	T _j	Junction Temperature			-40	130	°C
TG2	T _s	Storage Temperature			-40	130	°C

THERMAL DATA

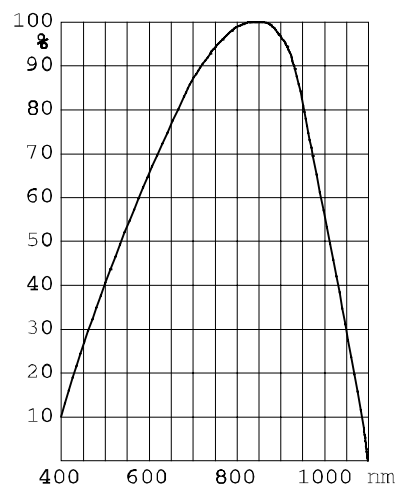
Operating Conditions: VCC= 4.5..16V

Item	Symbol	Parameter	Conditions	Fig.				Unit
					Min.	Typ.	Max.	
T1	T _a	Operating Ambient Temperature Range (extended temperature range on request)	TO18-4 package		-25		90	°C

TYPICAL CHARACTERISTICS



Directional characteristics $S_{rel}(\varphi)$



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

All voltages are referenced to ground unless otherwise noted.

All currents into the device pins are positive; all currents out of the device pins are negative.

ELECTRICAL CHARACTERISTICS

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

Item	Symbol	Parameter	Conditions	Tj °C	Fig.				Unit
						Min.	Typ.	Max.	
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= 1.4kΩ RSET= 7kΩ RSET= 70kΩ					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; RSET= 1.4kΩ RSET= 7kΩ RSET= 70kΩ	27 27 27			2.0 1.1 0.8		mA mA mA
004	I(VCC)	Supply Current in VCC, Output lo	I(A)= 0, A= lo; RSET= 1.4kΩ, iph= 2μA RSET= 7kΩ, iph= 200nA RSET= 70kΩ, iph= 20nA					8.1 5.5 5.0	mA mA mA
005	I(VCC)	Supply Current in VCC, Output lo	I(A)= 0, A= lo; RSET= 1.4kΩ, iph= 2μA RSET= 7kΩ, iph= 200nA RSET= 70kΩ, iph= 20nA	27 27 27			4.3 2.2 1.6		mA mA mA
Photodiode									
006	Aph	Radiant Sensitive Area				0.4 × 0.4			mm ²
007	S(λ)max	Spectral Sensitivity	λ= 850nm				0.5		A/W
008	Se(λ)	Range of Spectral Sensitivity	Se(λ)= 0.1×S(λ)max			500		1050	nm
009	Ierr	Error Current at Photodiode		-40 27 70 125			25	5 5 8 50	nA nA nA nA
Photocurrent Amplifier									
101	fo	Upper Cutoff Frequency	triangular waveform iph= 0..(2×Iphth); RSET= 1.4kΩ RSET= 7kΩ RSET= 70kΩ			400 200 50			kHz kHz kHz
Comparator									
201	Hys	Hysteresis in refer to the Photocurrent Threshold Iphth				-30	-20	-15	%
Threshold Adjustment ISET									
301	V(ISET)	Voltage at ISET	RSET= 1.4..70kΩ	-40 27 70 125		420	780 660 580 480	830	mV mV mV mV mV
302	TC	Temperature Coefficient of V(ISET)		-40 27 70 125		-2.05	-1.83 -1.87 -1.90 -1.93	-1.7	mV/°C mV/°C mV/°C mV/°C mV/°C
303	Iphth	Photocurrent Threshold for V(A)= lo	RSET= 1.4kΩ RSET= 7kΩ RSET= 70kΩ	27			1/500 ×ISET 1/880 ×ISET 1/1000 ×ISET		

ELECTRICAL CHARACTERISTICS

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

Item	Symbol	Parameter	Conditions	Tj °C	Fig.				Unit	
						Min.	Typ.	Max.		
Driver Stage, Output A										
401	Vs(A)hi	Saturation Voltage hi	Vs(A)hi= VCC-V(A); I(A)= -400µA	27			0.8	1.0		V V
402	Vs(A)lo	Saturation Voltage lo	I(A)= 5mA	27			0.22	0.4		V V
403	Isc(A)hi	Short-Circuit Current hi	VCC= 16V, V(A)= 0			-30	-15			mA
404	Isc(A)lo	Short-Circuit Current lo	V(A)= VCC				38	50		mA

ORDERING INFORMATION

Type	Package	Order designation
iC-VP	customized	iC-VP-BLCC type, iC-VP-BMST type
iC-VP	TO18-4 lens	iC-VP-TO18-4L
iC-VP	TO18-4 flat	iC-VP-TO18-4F

For information about prices, terms of delivery, options for other case types, etc., please contact:

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

Tel +49-6135-9292-0
Fax +49-6135-9292-192
<http://www.ichaus.com>

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