TSSP77P38

www.vishay.com

Vishay Semiconductors

IR Detector for Mid Range Proximity Sensor



MECHANICAL DATA

Pinning:

1, 4 = GND, 2 = V_S , 3 = OUT

DESCRIPTION

The TSSP77P38 is a compact infrared detector module for proximity sensing application. It receives 38 kHz modulated signals and has a peak sensitivity of 940 nm.

The length of the detector's output pulse varies in proportion to the amount of light reflected from the object being detected.

FEATURES

- Up to 2 m for proximity sensing
- Very low supply current
- Photo detector and preamplifier in one package
- Shielding against EMI
- Supply voltage: 2.5 V to 5.5 V
- Visible light is suppressed by IR filter
- Capable of side or top view
- Insensitive to supply voltage ripple and noise
- Two lenses for high sensitivity and wide receiving angle
- 940 nm peak wavelength
- Material categorization: For definitions of compliance please see <u>www.vishay.com/doc?99912</u>

APPLICATIONS

- Safety switches for garage door, elevator door, gates, and industrial light curtains
- Reflective sensors for toilet, urinal, faucet and hand dryer, and towel dispenser
- Navigational sensor for robotics
- Sensor for large format touch panels
- Object detection in vending machines, parking lots, ATM's, and many others

PARTS TABLE	
CARRIER FREQUENCY	MID RANGE SENSOR
38 kHz ⁽¹⁾	TSSP77P38

Note

⁽¹⁾ Other frequencies available by request

BLOCK DIAGRAM





APPLICATION CIRCUIT





TSSP77P38



www.vishay.com

Vishay Semiconductors

				_	-
ABSOL	LITE	ΜΔΥΠ	MIIM	RATING	S

ABSOLUTE MAXIMUM P	RATINGS			
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage		V _S	- 0.3 to + 6	V
Supply current		I _S	5	mA
Output voltage		Vo	- 0.3 to (V _S + 0.3)	V
Output current		Ι _Ο	5	mA
Junction temperature		Tj	100	°C
Storage temperature range		T _{stg}	- 25 to + 85	°C
Operating temperature range		T _{amb}	- 25 to + 85	°C
Power consumption	T _{amb} ≤ 85 °C	P _{tot}	10	mW

Note

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only . and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect the device reliability.

ELECTRICAL AND OPTI	CAL CHARACTERISTICS	(T _{amb} = 25 °	°C, unless c	otherwise s	pecified)	
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply voltage		Vs	2.5		5.5	V
Supply ourrept	$V_{S} = 5 V, E_{e} = 0$	I _{SD}	0.55	0.7	0.9	mA
Supply current	$E_v = 40$ klx, sunlight	I _{SH}		0.8		mA
Receiving distance	Direct line of sight, IR diode TSAL6200, I _F = 250 mA, test signal see fig. 1	d		40		m
Output voltage low	I _{OSL} = 0.5 mA, E _e = 0.7 mW/m ² , test signal see fig. 1	V _{OSL}			100	mV
Minimum irradiance	Pulse width tolerance: t _{pi} - 5/f _o < t _{po} < t _{pi} + 6/f _{o,} test signal see fig. 1	E _{e min.}		0.2	0.4	mW/m ²
Maximum irradiance	t _{pi} - 5/f _o < t _{po} < t _{pi} + 6/f _o , test signal see fig. 1	E _{e max.}	50			W/m ²
Directivity	Angle of half receiving distance	Φ1/2		± 50		deg

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)







Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

Rev. 1.1, 31-Jan-13





Fig. 3 - Frequency Dependence of Responsivity



Fig. 4 - Sensitivity in Bright Ambient



Fig. 5 - Sensitivity vs. Supply Voltage Disturbances



Fig. 6 - Output Pulse Width vs. Irradiance



Fig. 7 - Sensitivity vs. Ambient Temperature



Fig. 8 - Relative Spectral Sensitivity vs. Wavelength

Rev. 1.1, 31-Jan-13



Fig. 10 - t_{po} vs. Distance Kodak Gray Card Plus 15 %

www.vishay.com



The typical application of the TSSP77P38 is a reflective sensor with analog information contained in its output. Such a sensor is evaluating the time required by the AGC to suppress a quasi continuous signal. The time required to suppress such a signal is longer when the signal is strong than when the signal is weak, resulting in a pulse length corresponding to the distance of an object from the sensor. This kind of analog information can be evaluated by a microcontroller. The absolute amount of reflected light depends much on the environment and is not evaluated. Only sudden changes of the amount of reflected light, and therefore changes in the pulse width, are evaluated using this application.

Example of a signal pattern:



Rev. 1.1, 31-Jan-13

Document Number: 82481

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Example for a sensor hardware:



www.vishay.com

PACKAGE DIMENSIONS in millimeters

There should be no common window in front of the emitter and receiver in order to avoid crosstalk by guided light through the window.

The logarithmic characteristic of the AGC in the TSSP77P38 results in an almost linear relationship between distance and pulse width. Ambient light has also some impact to the pulse width of this kind of sensor, making the pulse shorter.







ASSEMBLY INSTRUCTIONS

Reflow Soldering

- Reflow soldering must be done within 72 h while stored under a max. temperature of 30 °C, 60 % RH after opening the dry pack envelope
- Set the furnace temperatures for pre-heating and heating in accordance with the reflow temperature profile as shown in the diagram. Excercise extreme care to keep the maximum temperature below 260 °C. The temperature shown in the profile means the temperature at the device surface. Since there is a temperature difference between the component and the circuit board, it should be verified that the temperature of the device is accurately being measured
- Handling after reflow should be done only after the work surface has been cooled off

VISHAY LEAD (Pb)-FREE REFLOW SOLDER PROFILE

Manual Soldering

- Use a soldering iron of 25 W or less. Adjust the temperature of the soldering iron below 300 °C
- Finish soldering within 3 s
- Handle products only after the temperature has cooled off







TAPING VERSION TSSP77P38TR DIMENSIONS in millimeters







technical drawings according to DIN specifications

Drawing-No.: 9.700-5337.01-4 Issue: 1; 16.10.08 21577



TSSP77P38

Vishay Semiconductors

TAPING VERSION TSSP77P38TT DIMENSIONS in millimeters







technical drawings according to DIN specifications

Drawing-No.: 9.700-5338.01-4 Issue: 3; 09.06.09 21578





REEL DIMENSIONS in millimeters





COVER TAPE PEEL STRENGTH

min. 200

According to DIN EN 60286-3 0.1 N to 1.3 N 300 ± 10 mm/min. 165° to 180° peel angle

LABEL

Standard bar code labels for finished goods

min. 400

The standard bar code labels are product labels and used for identification of goods. The finished goods are packed in final packing area. The standard packing units are labeled with standard bar code labels before transported as finished goods to warehouses. The labels are on each packing unit and contain Vishay Semiconductor GmbH specific data.



VISHAY SEMICONDUCTOR	GmbH STANDARD BAR CODE PR	ODUCT LABEL (finished goods)
PLAIN WRITING	ABBREVIATION	LENGTH
Item-description	-	18
Item-number	INO	8
Selection-code	SEL	3
LOT-/serial-number	BATCH	10
Data-code	COD	3 (YWW)
Plant-code	PTC	2
Quantity	QTY	8
Accepted by	ACC	-
Packed by	PCK	-
Mixed code indicator	MIXED CODE	-
Origin	XXXXXXX+	Company logo
Long bar code top	Туре	Length
Item-number	Ν	8
Plant-code	Ν	2
Sequence-number	Х	3
Quantity	Ν	8
Total length	-	21
Short bar code bottom	Туре	Length
Selection-code	X	3
Data-code	Ν	3
Batch-number	Х	10
Filter	-	1
Total length	-	17

DRY PACKING

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity \leq 60 % RH max.

After more than 72 h under these conditions moisture content will be too high for reflow soldering.

In case of moisture absorption, the devices will recover to the former condition by drying under the following condition: 192 h at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen) or

96 h at 60 $^\circ\text{C}$ + 5 $^\circ\text{C}$ and < 5 % RH for all device containers or

24 h at 125 °C + 5 °C not suitable for reel or tubes.

An EIA JEDEC standard JSTD-020 level 4 label is included on all dry bags.

 Shell life in sealed bag: 12 months at < 40 °C and < 90 % relative humidity (RH) After this bag is opened, devices that will be subjected to soldering
2. After this bag is opened, devices that will be subjected to soldering
retlow or equivalent processing (peak package body temp. 260 °C) must be 2a. Mounted within 72 hours at factory condition of < 30 °C/60 % RH or 2b. Stored at < 5 % RH
3. Devices require baking befor mounting if: Humidity Indicator Card is > 10 % when read at 23 $^\circ$ C ± 5 $^\circ$ C or 2a. or 2b. are not met.
4. If baking is required, devices may be baked for: 192 hours at 40 °C + 5 °C/- 0 °C and < 5 % RH (dry air/nitrogen) or 96 hours at 60 °C ± 5 °C and < 5 % RH for all device containers or 24 hours at 125 °C ± 5 °C not suitable for reels or tubes
Bag Seal Date:
(If blank, see barcode label)
Note: Level and body temperature defined by EIA JEDEC Standard JSTD-02

EIA JEDEC standard JSTD-020 level 4 label is included on all dry bags



ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electro-static sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS (example)

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.





Vishay

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.



ООО "ЛайфЭлектроникс"

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 3010181090000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный) Email: org@lifeelectronics.ru

www.lifeelectronics.ru