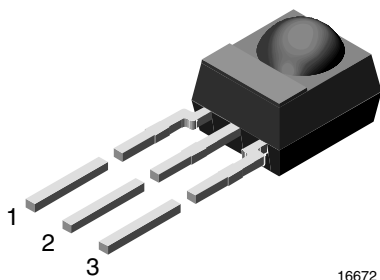


## IR Sensor Module for Reflective Sensor, Light Barrier, and Fast Proximity Applications



## MECHANICAL DATA

### Pinning:

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

## APPLICATIONS

- Reflective sensors for hand dryers, towel or soap dispensers, water faucets, toilet flush
- Vending machine fall detection
- Security and pet gates
- Person or object vicinity activation
- Fast proximity sensors for toys, robotics, drones, and other consumer and industrial uses

## FEATURES

- Up to 2 m for presence and proximity sensing
- Uses modulated bursts of infrared light
- 940 nm peak wavelength
- PIN diode and sensor IC in one package
- Low supply current
- Shielding against EMI
- Visible light is suppressed by IR filter
- Insensitive to supply voltage ripple and noise
- Supply voltage: 2.5 V to 5.5 V
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

## DESCRIPTION

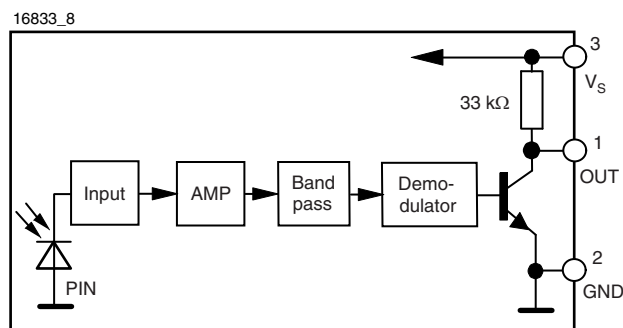
The TSSP40... series are compact infrared detector modules for presence and fast proximity sensing applications. They provide an active low output in response to infrared bursts at 940 nm. The frequency of the burst should correspond to the carrier frequency shown in the parts table.

This component has not been qualified according to automotive specifications.

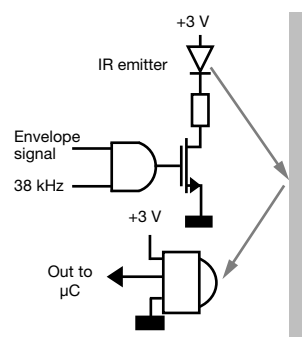
## PARTS TABLE

|                          |        |                                          |
|--------------------------|--------|------------------------------------------|
| <b>Carrier frequency</b> | 38 kHz | TSSP4038                                 |
|                          | 56 kHz | TSSP4056                                 |
| <b>Package</b>           |        | Mold                                     |
| <b>Pinning</b>           |        | 1 = OUT, 2 = GND, 3 = V <sub>S</sub>     |
| <b>Dimensions (mm)</b>   |        | 6.0 W x 6.95 H x 5.6 D                   |
| <b>Mounting</b>          |        | Leaded                                   |
| <b>Application</b>       |        | Presence sensors, fast proximity sensors |

### BLOCK DIAGRAM



## PRESENCE SENSING



**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER                   | TEST CONDITION              | SYMBOL      | VALUE                   | UNIT |
|-----------------------------|-----------------------------|-------------|-------------------------|------|
| Supply voltage (pin 3)      |                             | $V_S$       | -0.3 to +6.0            | V    |
| Supply current (pin 3)      |                             | $I_S$       | 5                       | mA   |
| Output voltage (pin 1)      |                             | $V_O$       | -0.3 to 5.5             | V    |
| Voltage at output to supply |                             | $V_S - V_O$ | -0.3 to ( $V_S + 0.3$ ) | V    |
| Output current (pin 1)      |                             | $I_O$       | 5                       | mA   |
| Junction temperature        |                             | $T_j$       | 100                     | °C   |
| Storage temperature range   |                             | $T_{stg}$   | -25 to +85              | °C   |
| Operating temperature range |                             | $T_{amb}$   | -25 to +85              | °C   |
| Power consumption           | $T_{amb} \leq 85\text{ °C}$ | $P_{tot}$   | 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 OPTICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)

| PARAMETER                  | TEST CONDITION                                                                             | SYMBOL              | MIN. | TYP.     | MAX. | UNIT              |
|----------------------------|--------------------------------------------------------------------------------------------|---------------------|------|----------|------|-------------------|
| Supply current (pin 3)     | $E_v = 0, V_S = 5\text{ V}$                                                                | $I_{SD}$            | 0.55 | 0.7      | 0.9  | mA                |
|                            | $E_v = 40\text{ klx}$ , sunlight                                                           | $I_{SH}$            | -    | 0.8      | -    | mA                |
| Supply voltage             |                                                                                            | $V_S$               | 2.5  | -        | 5.5  | V                 |
| Transmission distance      | $E_v = 0$ , test signal see fig. 1, IR diode TSAL6200, $I_F = 200\text{ mA}$               | $d$                 | -    | 25       | -    | m                 |
| Output voltage low (pin 1) | $I_{OSL} = 0.5\text{ mA}$ , $E_e = 2\text{ mW/m}^2$ , test signal see fig. 1               | $V_{OSL}$           | -    | -        | 100  | mV                |
| Minimum irradiance         | Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1 | $E_{e\text{ min.}}$ | -    | 0.4      | 0.7  | mW/m <sup>2</sup> |
| Maximum irradiance         | $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see fig. 1                        | $E_{e\text{ max.}}$ | 50   | -        | -    | W/m <sup>2</sup>  |
| Directivity                | Angle of half transmission distance                                                        | $\phi_{1/2}$        | -    | $\pm 45$ | -    | deg               |

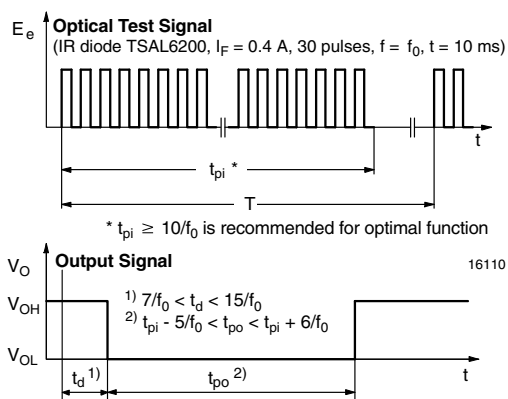
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Output Active Low

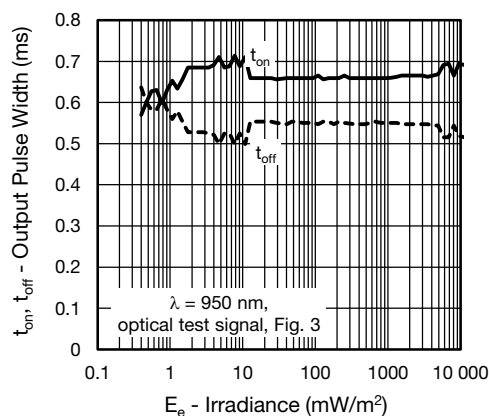


Fig. 4 - Output Pulse Diagram

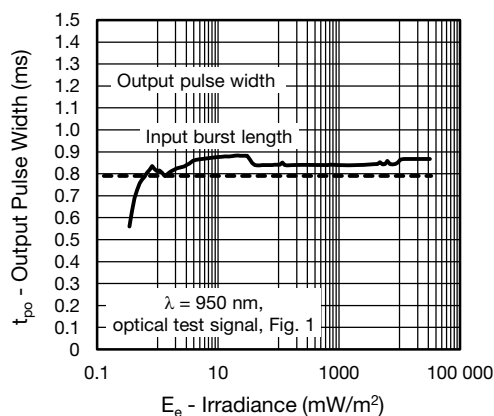


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

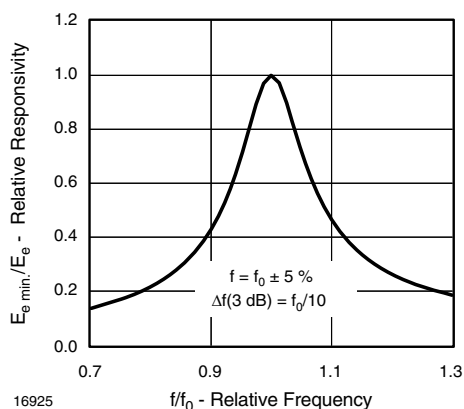


Fig. 5 - Frequency Dependence of Responsivity

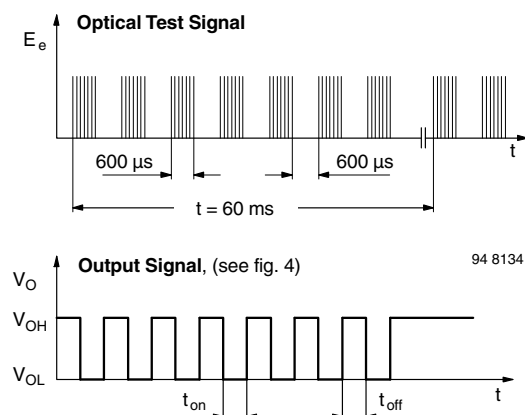


Fig. 3 - Output Function

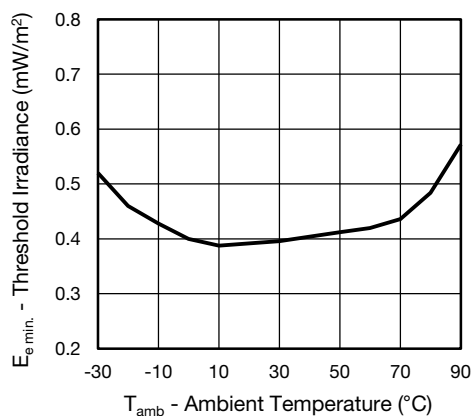


Fig. 6 - Sensitivity vs. Ambient Temperature

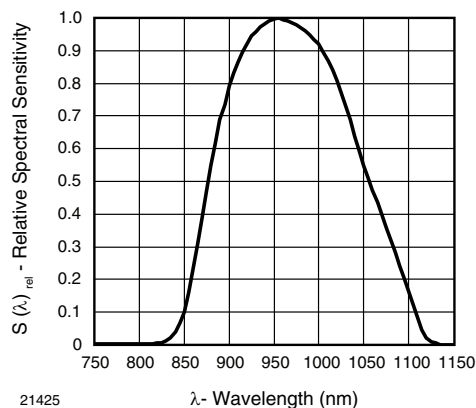


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

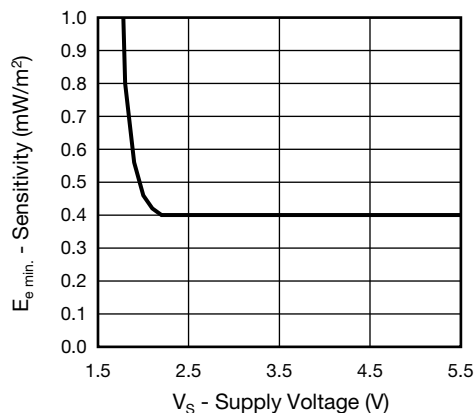


Fig. 9 - Sensitivity vs. Supply Voltage

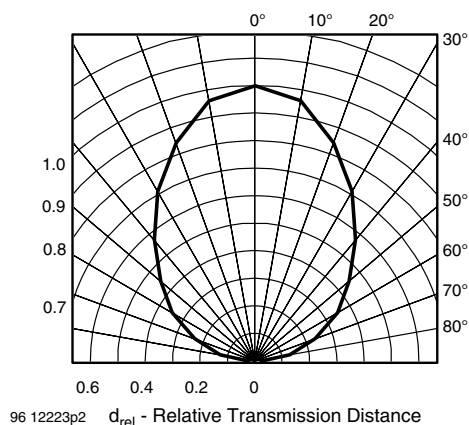
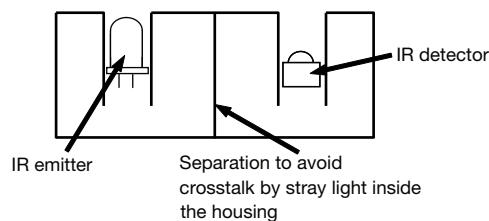


Fig. 8 - Directivity

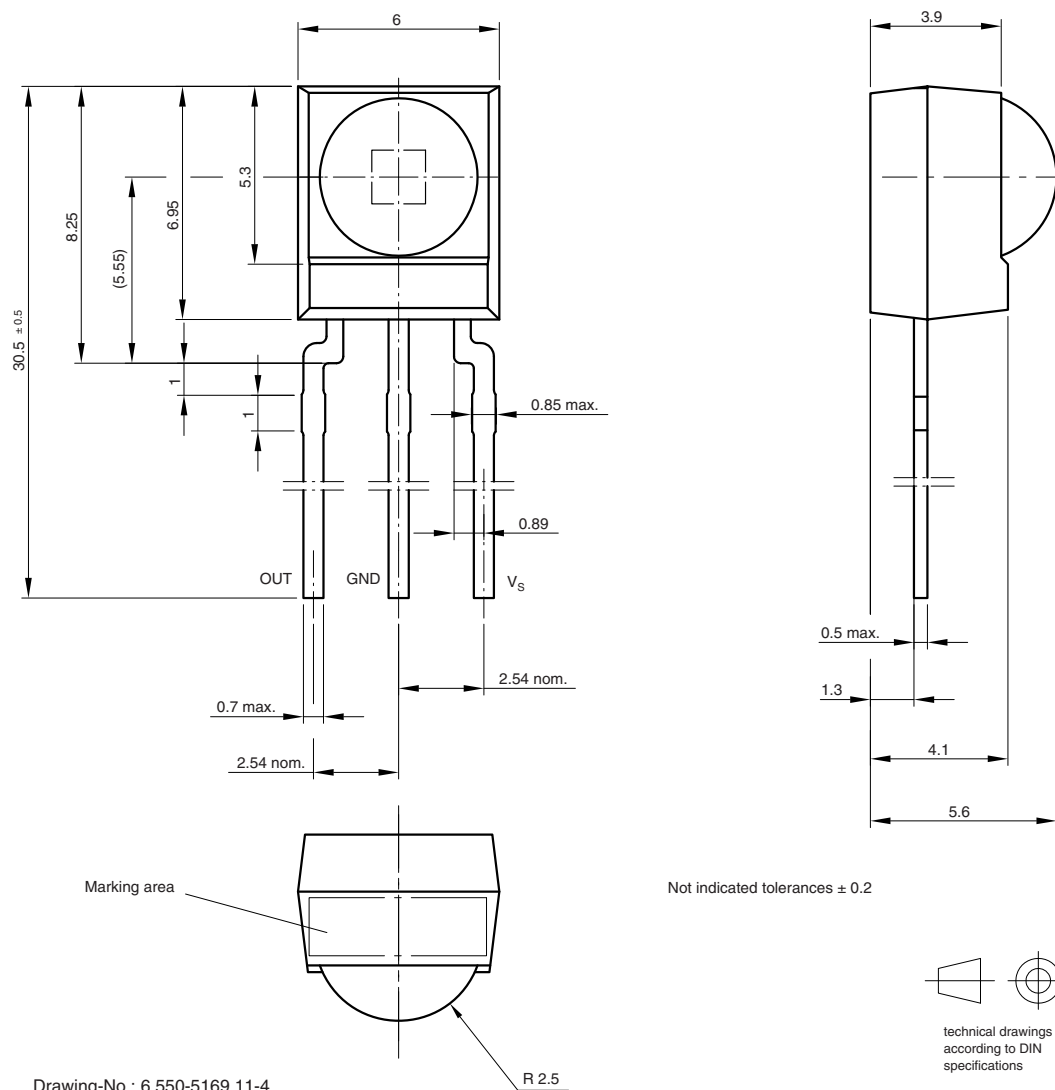
The typical application of these devices is a reflective or beam break sensor with active low “detect” or “no detect” information contained in its output. The TSSP4056 is also suitable for fast (~ 5 ms) proximity sensor applications for ranges between 10 cm and 2 m. Please see application note “Vishay’s TSSP4056 Sensor for Fast Proximity Sensing” ([www.vishay.com/doc?82741](http://www.vishay.com/doc?82741)).

Example for a sensor hardware:



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

### PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.11-4

Issue: 13; 17.12.08

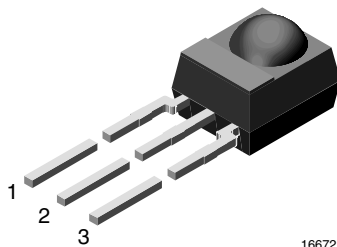
16003



## IR Receiver Modules for Remote Control Systems

Vishay offers stock molded IR receivers in four different packages:

- Loose packed in tubes, mounted on tape for reel or ammpack, or packed bulk in plastic bags.
- Vishay IR receiver with metal holders are packed in plastic trays. Vishay IR receiver with plastic holders are packed in plastic tubes.



### FEATURES

- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



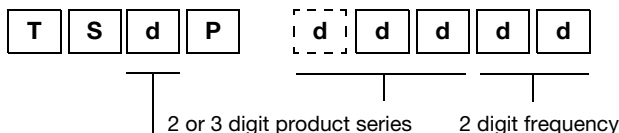
**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)

### AVAILABLE FOR

- TSOP348..
- TSOP344..
- TSOP343..
- TSOP341..
- TSOP44...
- TSOP48...
- TSOP41...
- TSOP324..
- TSOP323..
- TSOP322..
- TSOP321..
- TSOP24...
- TSOP22...
- TSOP21...
- TSOP345..
- TSOP325..
- TSOP43...
- TSOP23...
- TSSP4..
- TSMP4..

### LOOSE PACKED IN TUBE

### ORDERING INFORMATION



O = for IR receiver applications  
M = for repeater/learning applications  
S = for sensor applications

#### Note

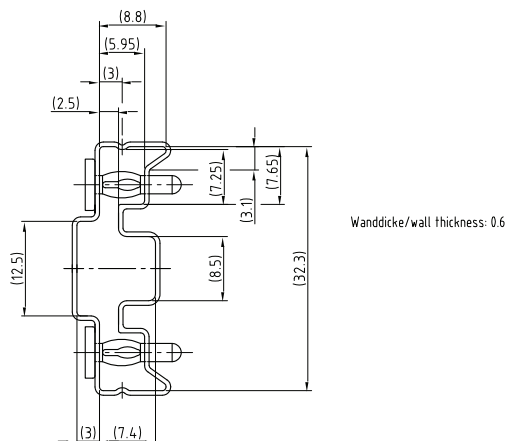
- d = "digit", please consult the list of available devices create a valid part number.

**Example: TSOP4838**

### PACKAGING QUANTITY

- 90 pieces per tube
- 24 tubes per carton

### PACKAGING DIMENSIONS in millimeters



Wanddicke/wall thickness: 0.6



1:1

Drawing-No.: 9.700-5185.0-4  
Rev. 13; Date: 20.11.03  
20273-1

Druck / Printing for tubes  
1.400-5548.0-3 Version 1

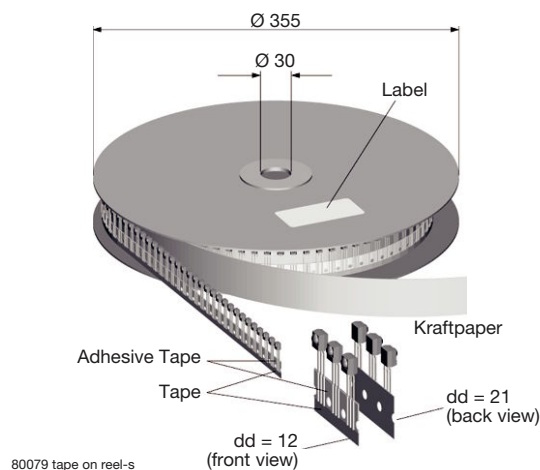


## TAPE AND REEL/AMMOPACK

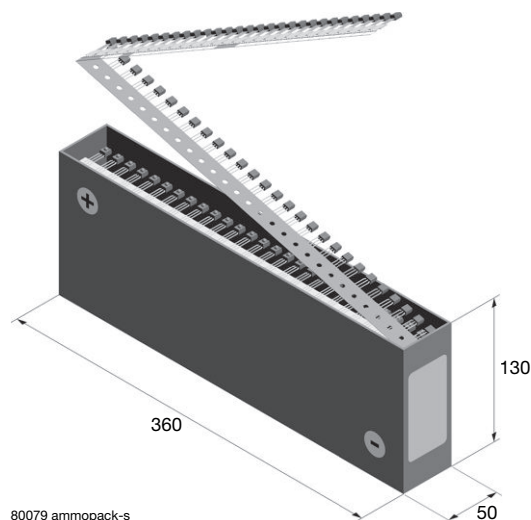
Up to 3 consecutive components may be missing if the gap is followed by at least 6 components. A maximum of 0.5 % of the components per reel quantity may be missing. At least 5 empty positions are present at the start and the end of the tape to enable insertion.

Tensile strength of the tape: > 15 N

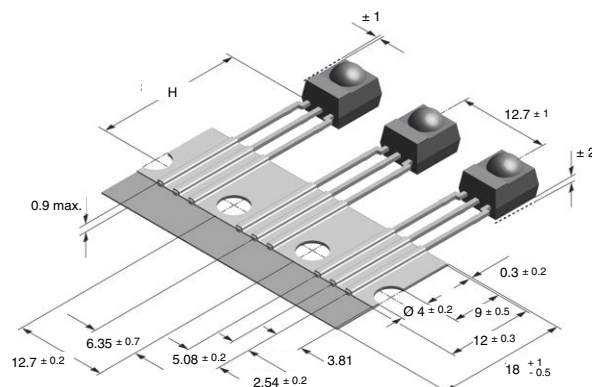
Pulling force in the plane of the tape, at right angles to the reel: > 5 N



80079 tape on reel-s



80079 ammpack-s



| VERSION | DIMENSION "H" |
|---------|---------------|
| BS      | 20 ± 0.5      |
| PS      | 23.3 ± 0.5    |
| OS      | 26 ± 0.5      |

## ORDERING INFORMATION

T S d P

O = for IR receiver applications  
M = for repeater/learning applications  
S = for sensor applications

d d d d d

2 or 3 digit product series  
2 digit frequency

S S 1

SS1 for T and R, bulk or ammpack

d d d d

dd = BS, PS or OS  
Tape and reel  
dd = 12 or 21

Z

Ammpack

### Note

- d = "digit", please consult the list of available devices create a valid part number.

Example: TSOP4838SS1BS12

TSOP2238SS1BS12Z

## PACKAGING QUANTITY

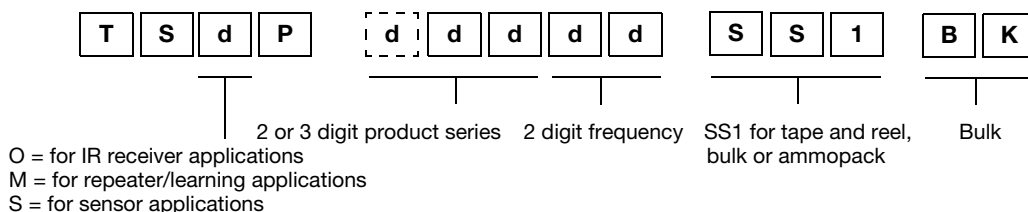
- 1000 pieces per reel
- 1000 pieces per ammpack



## BULK PACKAGING

The option “BK” signifies bulk packaging in conductive plastic bags. A maximum of 0.3 % of the components per box may be missing.

## ORDERING INFORMATION



### Note

- d = “digit”, please consult the list of available devices create a valid part number.

EXAMPLE: TSOP4838SS1BK

TSOP2238SS1BK

## PACKAGING QUANTITY

- 250 pieces per bag (each bag is individually boxed)
- 6 bags per carton

## OUTER PACKAGING

| CARTON BOX DIMENSIONS in millimeters                           |           |       |        |
|----------------------------------------------------------------|-----------|-------|--------|
|                                                                |           |       |        |
| KINDS OF CARTON BOX                                            | THICKNESS | WIDTH | LENGTH |
| <b>Packaging Plastic Tubes</b><br>(Normal/auxiliary devices)   | 80        | 150   | 600    |
| <b>Packaging Plastic Trays</b><br>(Devices with metal holders) | 120       | 290   | 490    |
| <b>Tape and Reel Box</b><br>(Taping in reels)                  | 400       | 310   | 410    |
| <b>Ammo-Box</b><br>(Zigzag taping)                             | 50        | 130   | 350    |



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