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[Vishay Semiconductor/Opto Division](#)
[TSSP4P38](#)

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sales@integrated-circuit.com

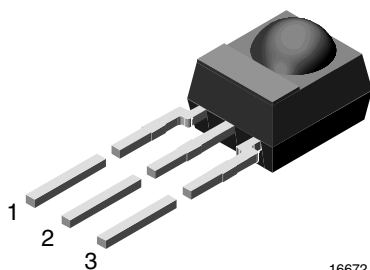


www.vishay.com

TSSP4P38

Vishay Semiconductors

IR Mid Range Proximity Sensors



16672

MECHANICAL DATA

Pinning

1 = OUT, 2 = GND, 3 = V_S

DESCRIPTION

The TSSP4P38 is a compact infrared detector module for proximity sensing applications. 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
- Uses modulated bursts at 38 kHz
- 940 nm peak wavelength
- Photo detector and preamplifier 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



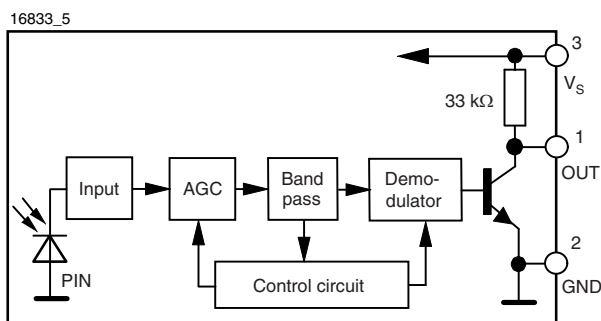
RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

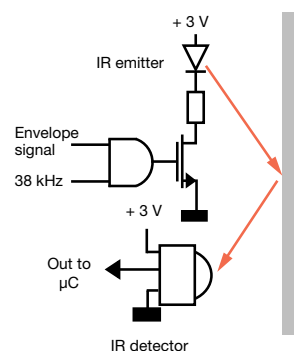
- Object approach detection for activation of displays and user consoles, signaling of alarms, etc.
- Simple gesture controls
- Differentiation of car arrival, static, car departure in parking lots
- Reflective sensors for toilet flush
- Navigational sensor for robotics

PARTS TABLE	
Carrier frequency	38 kHz
Package	Mold
Pinning	1 = OUT, 2 = GND, 3 = V _S
Dimensions (mm)	6.0 W x 6.95 H x 5.6 D
Mounting	Leaded
Application	Proximity sensors

BLOCK DIAGRAM



PROXIMITY SENSING





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ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Supply voltage (pin 3)		V_S	-0.3 to +6	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	$T_{amb} \leq 85$ °C	P_{tot}	10	mW
Soldering temperature	$t \leq 10$ s, 1 mm from case	T_{sd}	260	°C

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 ($T_{amb} = 25$ °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply current	$E_e = 0, V_S = 5$ V	I_{SD}	0.55	0.7	0.9	mA
	$E_v = 40$ klx, sunlight	I_{SH}		0.8		mA
Supply voltage		V_S	2.5		5.5	V
Receiving distance	Direct line of sight, test signal see fig. 1, IR diode TSAL6200, $I_F = 200$ mA	d		45		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: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see fig. 1	E_e min.		0.12	0.25	mW/m ²
Maximum irradiance	$t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$, test signal see fig. 1	E_e max.	50			W/m ²
Directivity	Angle of half receiving distance	$\phi_{1/2}$		± 45		deg

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

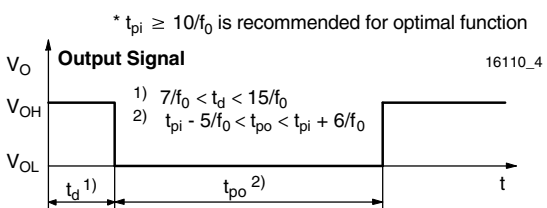
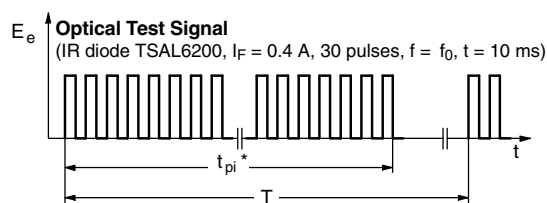


Fig. 1 - Output Active Low

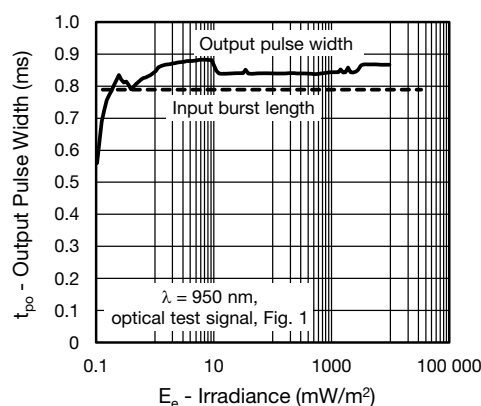


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient



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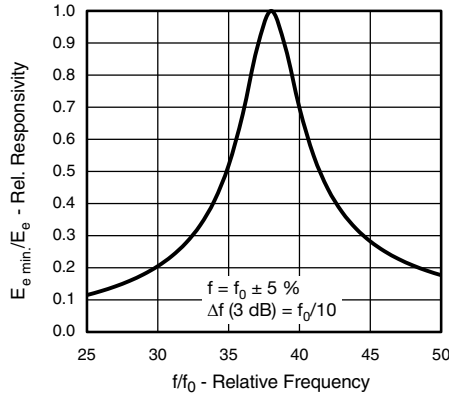


Fig. 3 - Frequency Dependence of Responsivity

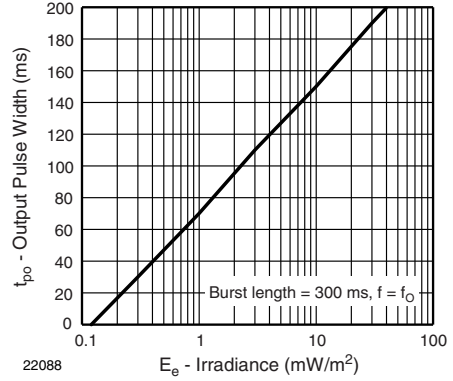


Fig. 6 - Max. Output Pulse Width vs. Irradiance

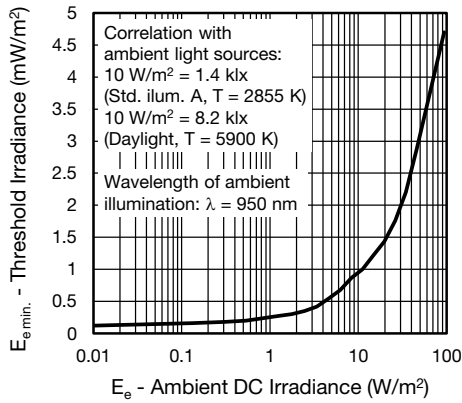


Fig. 4 - Sensitivity in Bright Ambient

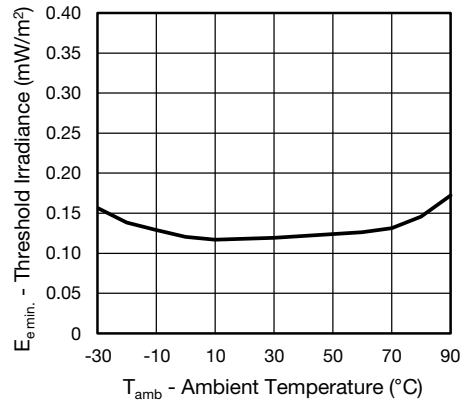


Fig. 7 - Sensitivity vs. Ambient Temperature

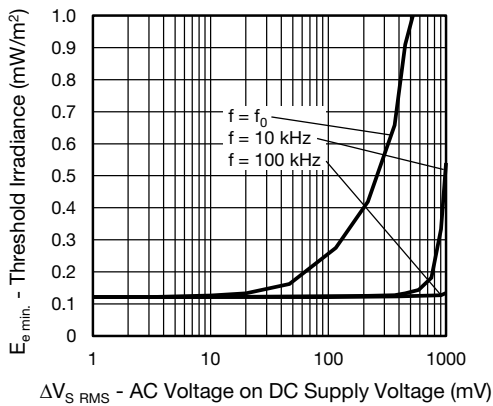


Fig. 5 - Sensitivity vs. Supply Voltage Disturbances

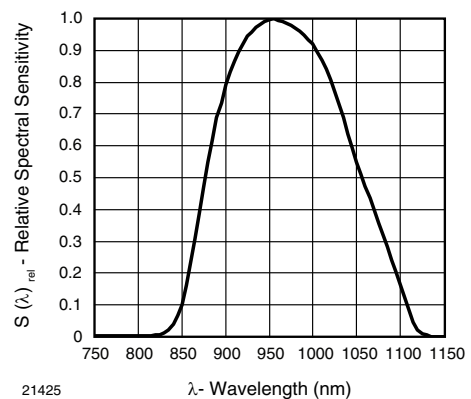


Fig. 8 - Relative Spectral Sensitivity vs. Wavelength



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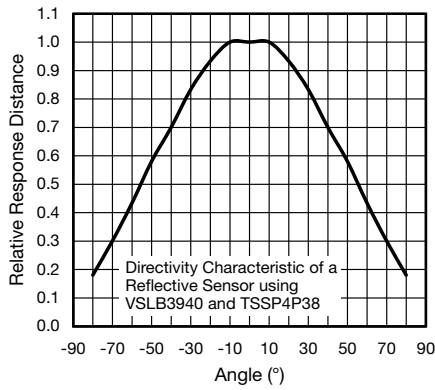


Fig. 9 - Angle Characteristic

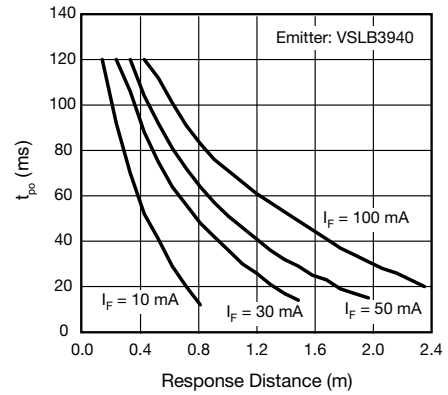


Fig. 11 - t_{po} vs. Distance Kodak Gray Card Plus 15 %

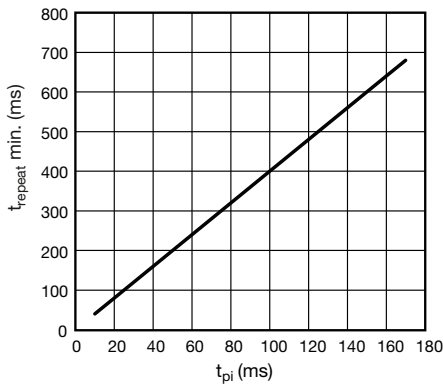


Fig. 10 - Max. Rate of Bursts

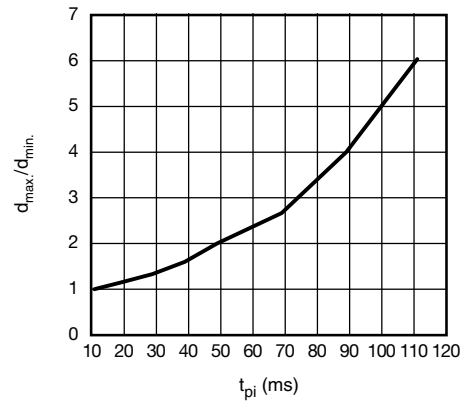
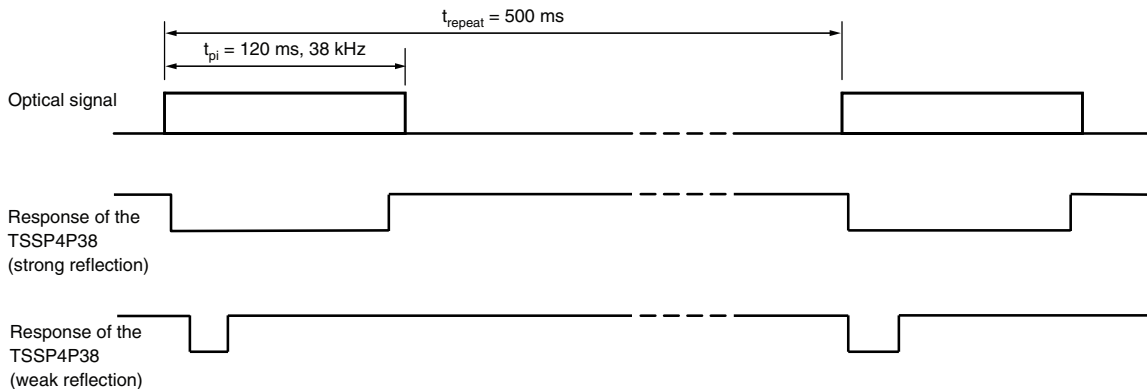


Fig. 12 - Dynamic Range of Sensor vs. t_{pi}

The typical application of the TSSP4P38 is a reflective sensor with analog information contained in its output. The sensor evaluates the time required by the AGC to suppress a quasi continuous signal. The time required to suppress a continuous signal is longer when the signal is strong than when the signal is weak. The result is an output pulse length which corresponds 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 on the infrared reflectivity of the object and is not evaluated. Only changes in the amount of reflected light, and therefore changes in the pulse width can be evaluated with accuracy.

Example of a signal pattern:



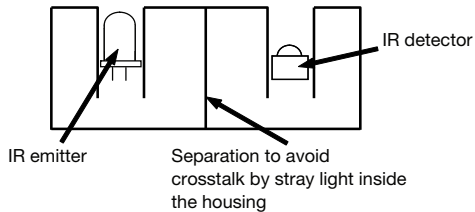


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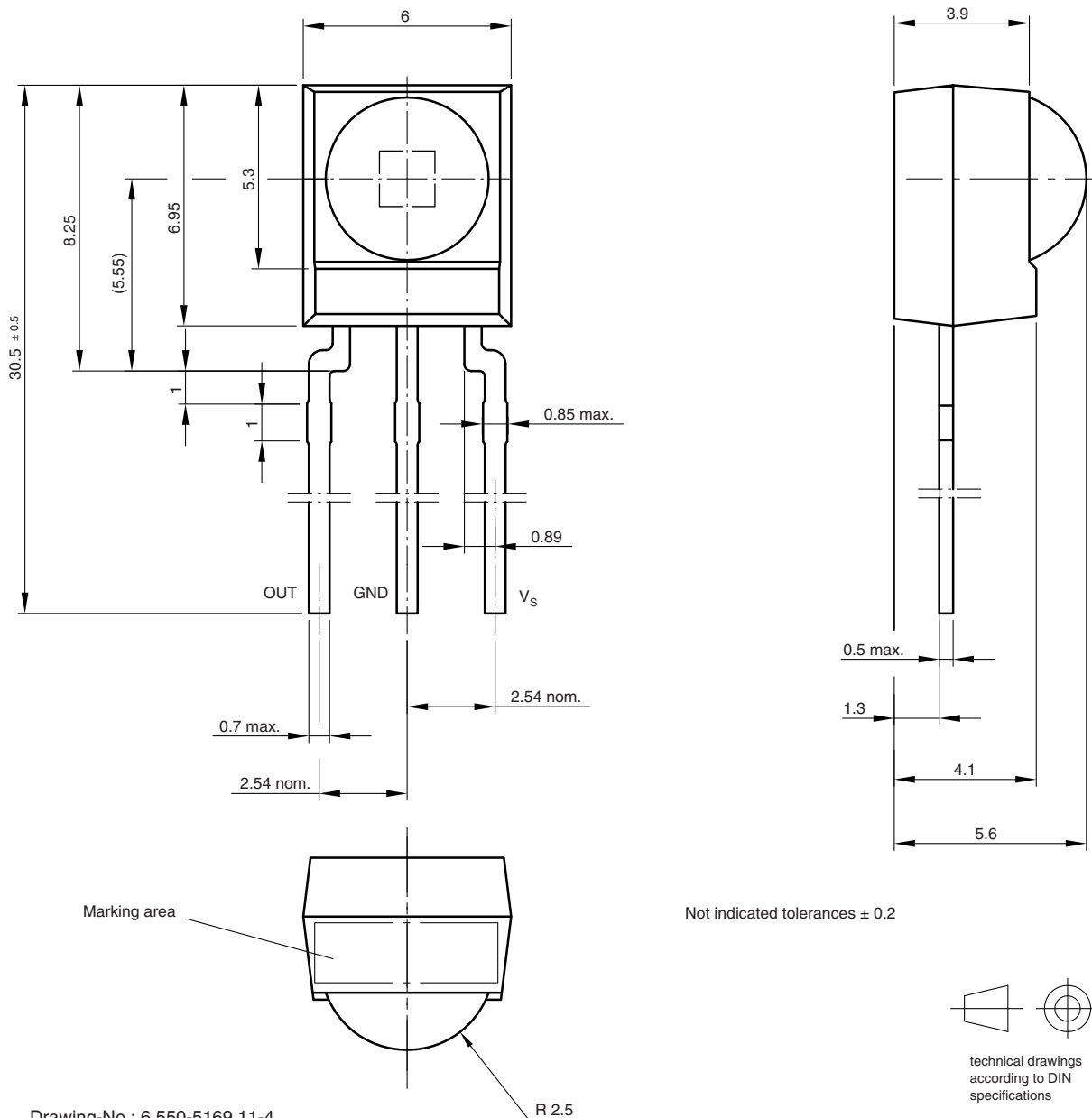
Example for a sensor hardware:



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

The logarithmic characteristic of the AGC in the TSSP4P38 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.

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5169.11-4

Issue: 13; 17.12.08

16003



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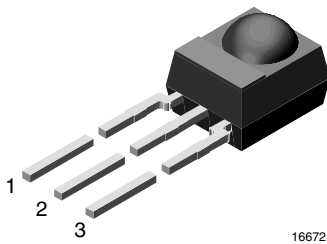
Molded IR Receiver Packaging Options

Vishay Semiconductors

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



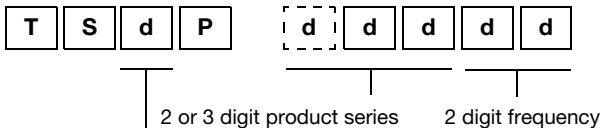
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AVAILABLE FOR

- 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

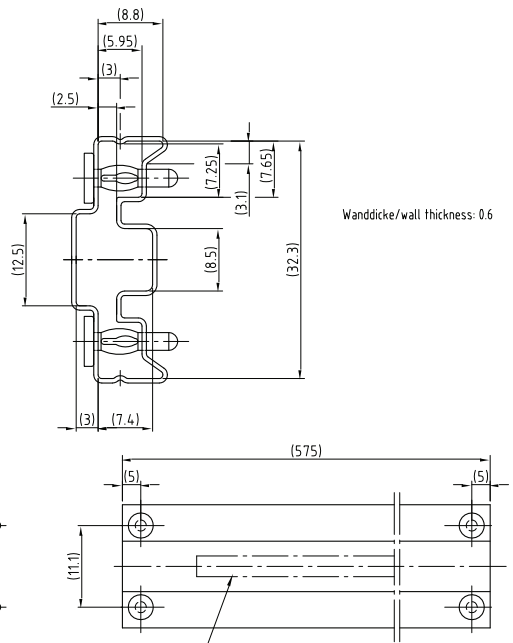
- d = "digit", please consult the list of available devices create a valid part number.

Example: TSOP4838

PACKAGING QUANTITY

- 90 pieces per tube
- 24 tubes per carton

PACKAGING DIMENSIONS in millimeters



Drawing-No.: 9.700-5185.0-4
 Rev. 13; Date: 20.11.03
 20073-1

Druck / Printing for tubes
 1400-5548.0-3 Version 1



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Molded IR Receiver Packaging Options

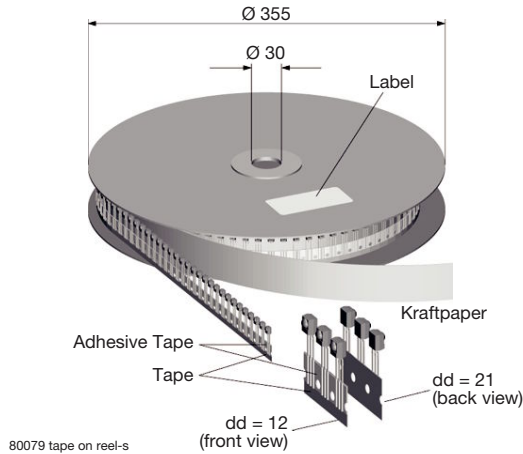
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TAPE AND REEL/AMMOPACK

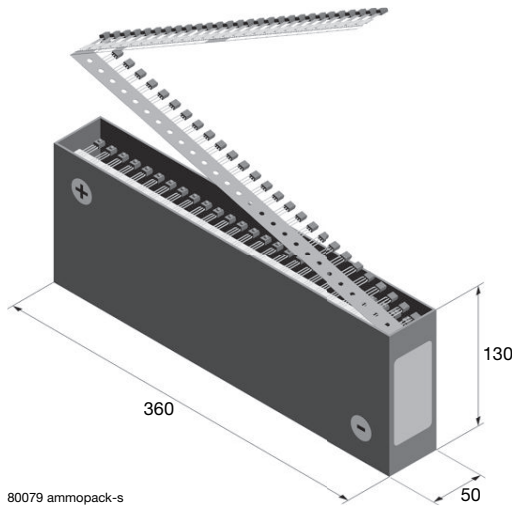
Up to 3 consecutive components may be missing if the gap is followed by at least 6 components. A maximum of 0.5 % of the components per reel quantity may be missing. At least 5 empty positions are present at the start and the end of the tape to enable insertion.

Tensile strength of the tape: > 15 N

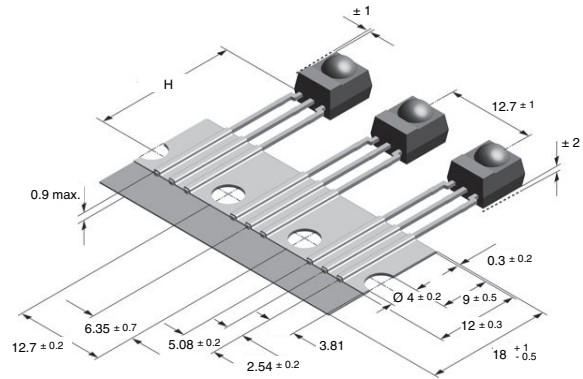
Pulling force in the plane of the tape, at right angles to the reel: > 5 N



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

Ampmpack

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



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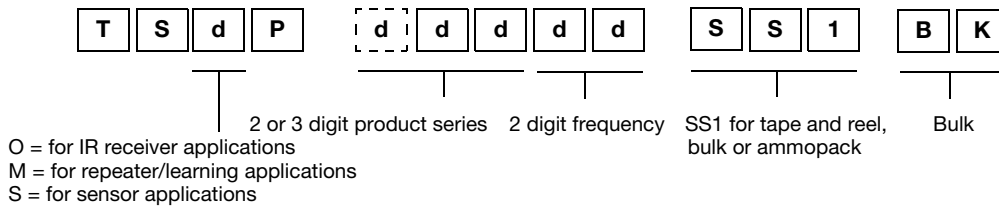
Molded IR Receiver Packaging Options

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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
Packaging Plastic Tubes (Normal/auxiliary devices)	80	150	600
Packaging Plastic Trays (Devices with metal holders)	120	290	490
Tape and Reel Box (Taping in reels)	400	310	410
Ammo-Box (Zigzag taping)	50	130	350



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