

## Data Sheet

### Description

The 4-pin MOST Optical Receiver (ODIN MPR4 02) is a highly integrated CMOS IC combined with a high speed PIN diode designed to receive up to 25 Mbit/s optical data which is biphase coded (up to 50 Mbaud) and convert this optical data to a rail-to-rail data stream. During the low power mode, the PIN diode is still being observed and if activity is detected, the receiver will switch to full power mode. A STATUS-pin indicates if modulated light is received (Light on -> STATUS = low). With the STATUS-pin the power supply of the whole MOST device can be switched ON. The power supply voltage is either 3.3V or 5V.

### Applications

- Optical Receiver for MOST Systems

### Features

Excellent solution for converting high speed data from Plastic Optical Fiber (POF) to digital output.

- Operating @ 3.3V or 5V Power Supply
- High speed receiver up to 25 Mbit/s net data rate (50 MBaud)
- 95°C operating temperature over whole life time
- Photo current sensing, network activity detection and Low Power Mode ( $I_{CC} < 10 \mu A$ )
- Signal detect and Status Output
- Low power consumption
- Pulse width control
- -25dBm guaranteed sensitivity @ 650nm for working in a low attenuation range of PMMA Fiber
- Fully compliant to "MOST® Specification of Physical Layer Rev 1.1"
- RoHS compliant (Lead free and halogen free)

**Table 1. Absolute Maximum Ratings**

Parameter	Symbol	Limit Values		
		min.	max.	Unit
Supply Voltage <sup>[1]</sup>	V <sub>CCMax</sub>	-0.5	6.0	V
Storage Temperature Range	T <sub>STG</sub>	-40	100	°C
Soldering Temperature (>2.5 mm from case bottom t ≤ 10s)	T <sub>S</sub>	–	260	°C
Voltage at any PIN		-0.5	V <sub>CC</sub> +0.5	V
Electrostatic Discharge Voltage Capability <sup>[2]</sup>	ESD	–	2.0	kV

Notes:

1. Maximum supply voltage without causing damage
2. ESD Capability for all Pins HBM (human body model) according JESD22-A114B.

**Table 2. Recommended Operating Conditions**

Parameter	Symbol	Limit Values		
		min.	max.	Unit
Supply Voltage low	V <sub>CC_l</sub>	3.135	3.465	V
Supply Voltage high	V <sub>CC_h</sub>	4.75	5.25	V
Operating Temperature Range (ambient) <sup>[1]</sup>	T <sub>A</sub>	-40	95	°C

Notes:

1. For details see application note “Handling, Storage, Operating and Processing Application Note of ODIN MOST4 Transceiver”

All the data in this specification refers to the operating conditions above and over life time unless otherwise stated.

**Table 3. Optical Signal Characteristics**(22.5 Mbit MOST Data, V<sub>CC</sub> = 3.135 ... 3.465 V or 4.75 ... 5.25 V)

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Peak wavelength of input signal	λ <sub>Peak</sub>	630	650	685	nm
FWHM of input signal	Δλ	–	–	30	nm
Receivable optical power range for data recovery <sup>[1][2]</sup>	P <sub>opt</sub>	-25	–	-2	dBm
Receivable optical power for switching to low power mode <sup>[1]</sup>	P <sub>OFF</sub>	-40	–	-25	dBm

Notes:

1. Optical power data are average values when using a MxT4 xx optical transmitter, measured at the end of a plastic optical fiber with metal insert (diameter 2.90 +/- 0.02 mm). The transmitted data is biphase coded.
2. Measured with worst case pattern. A BER ≤ 10<sup>-9</sup> can be reached.

**Attention**

Stresses above those listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Between 3.465V and 4.75V the device is not specified according Table 2. Therefore operation is limited to the range of 3.135V ... 3.465V or 4.75V ... 5.25V.

**Table 4.1 AC Electrical Characteristics 45Mbaud (44.1kHz)**

Parameter	Symbol	Limit	Values		Unit
		min.	typ.	max.	
Output Rise Time @ V <sub>CC_L</sub> [1][4]	t <sub>r_l</sub>	–	6	9	ns
Output Rise Time @ V <sub>CC_h</sub> [1][4]	t <sub>r_h</sub>	–	5	9	ns
Output Fall Time @ V <sub>CC_L</sub> [1][4]	t <sub>f_l</sub>	–	6	9	ns
Output Fall Time @ V <sub>CC_h</sub> [1][4]	t <sub>f_h</sub>	–	5	9	ns
Output Pulse Width Variation 1UI [1][2][3][4][5]	t <sub>PWV</sub>	16.5	–	31.0	ns
Output Average Pulse Width Distortion [1][2][3][4]	t <sub>APWD</sub>	-3.3	–	7.0	ns
Data Dependent Link Jitter [2][3][4]	t <sub>DDJ</sub>	–	–	3.3	ns
Uncorrelated Link Jitter [2][3][4]	t <sub>UJ</sub>	–	–	1.0	ns
Power-up time at detection of rising V <sub>CC</sub>	t <sub>PU0</sub>	–	0.1	6	ms
Power-up time from low power mode	t <sub>PU</sub>	–	0.5	6	ms
Low Power mode timer delay	t <sub>LPM</sub>	–	0.005	2	ms

Notes:

1. Capacitive Load is max. 10pF.
2. MOST Data 44.1 kHz FS corresponds to a 45 Mbaud data stream.
3. The optical input signal has to fulfill following requirements: t<sub>PWV(min)</sub> = 20.0 ns, t<sub>PWV(max)</sub> = 24.3 ns, t<sub>APWD(min)</sub> = -1.4 ns and t<sub>APWD(max)</sub> = 1.4 ns, t<sub>DDJ(max)</sub> = 0.77 ns, t<sub>UJ(max)</sub> = 0.33 ns, Positive Overshoot within 0UI...2/3UI = -20...40%, Extinction Ratio min = 10dB. Variation within those limits does not significantly change t<sub>PWV</sub>.
4. Characterized with Avago Characterization Boards as described in the Application note "Application Note MOST circuit for Avago ODIN Transceiver".
5. Limits for 2UI are 38.6 ... 53.1ns and for 3UI they are 60.8 ... 75.2ns.

**Table 4.2 Electrical Characteristics 49.152Mbaud (48kHz)**

Parameter	Symbol	Limit	Values		Unit
		min.	typ.	max.	
Output Rise Time @ V <sub>CC_L</sub> [1][4]	t <sub>r_l</sub>	–	6	9	ns
Output Rise Time @ V <sub>CC_h</sub> [1][4]	t <sub>r_h</sub>	–	5	9	ns
Output Fall Time @ V <sub>CC_L</sub> [1][4]	t <sub>f_l</sub>	–	6	9	ns
Output Fall Time @ V <sub>CC_h</sub> [1][4]	t <sub>f_h</sub>	–	5	9	ns
Output Pulse Width Variation 1UI [1][2][3][4][5]	t <sub>PWV</sub>	15.1	–	28.5	ns
Output Average Pulse Width Distortion [1][2][3][4]	t <sub>APWD</sub>	-3.0	–	6.4	ns
Data Dependent Link Jitter [2][3][4]	t <sub>DDJ</sub>	–	–	3.1	ns
Uncorrelated Link Jitter [2][3][4]	t <sub>UJ</sub>	–	–	0.9	ns
Power-up time at detection of rising V <sub>CC</sub>	t <sub>PU0</sub>	–	0.1	6	ms
Power-up time from low power mode	t <sub>PU</sub>	–	0.5	6	ms
Low Power mode timer delay	t <sub>LPM</sub>	–	0.005	2	ms

Notes:

1. Capacitive Load is max. 10pF.
2. MOST Data 48kHz FS corresponds to a 49.152Mbaud data stream.
3. The optical input signal has to fulfill following requirements: t<sub>PWV(min)</sub> = 18.37ns, t<sub>PWV(max)</sub> = 22.32ns, t<sub>APWD(min)</sub> = -1.28ns, t<sub>APWD(max)</sub> = 1.28ns, t<sub>DDJ(max)</sub> = 0.71 ns and t<sub>UJ(max)</sub> = 0.3ns, Positive Overshoot within 0UI...2/3UI = -20...40%, Extinction Ratio min = 10dB. Variation within those limits does not significantly change t<sub>PWV</sub>.
4. Characterized with Avago Characterization Boards as described in the Application note "Application Note MOST circuit for Avago ODIN Transceiver".
5. Limits for 2UI are 35.47 ... 48.825ns and for 3UI are 55.81 ... 69.17ns.

**Table 5. DC Electrical Characteristics**

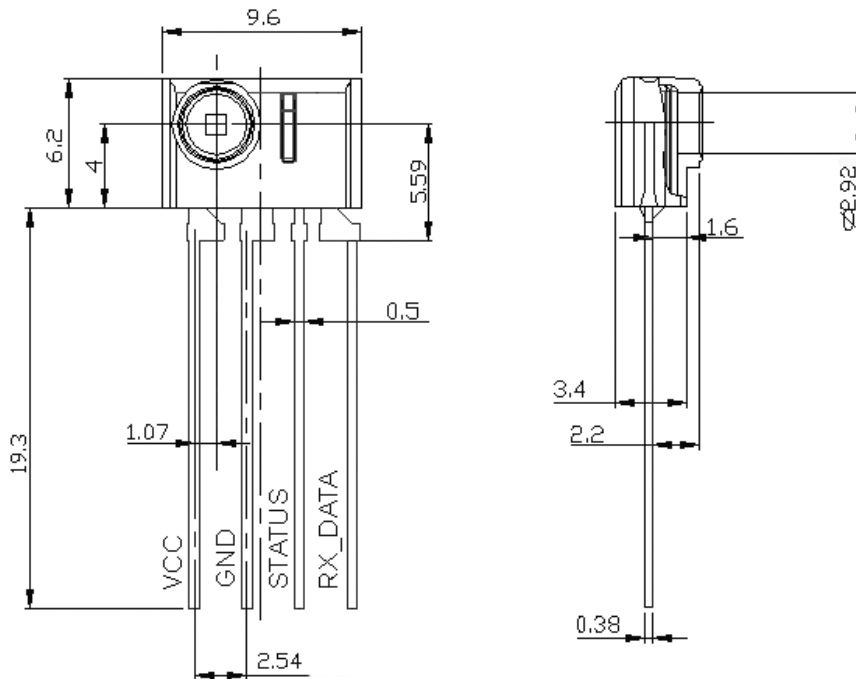
Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Supply Voltage low	V <sub>CC,l</sub>	3.135	3.3	3.465	V
Supply Voltage high	V <sub>CC,h</sub>	4.75	5	5.25	V
Low Level Output Voltage Data and Status Pin <sup>[1]</sup>	V <sub>OL</sub>	–	–	0.4	V
High Level Output Voltage Data Pin <sup>[1]</sup>	V <sub>OH</sub>	2.5	3.3	3.7	V
High Level Output Voltage Status Pin <sup>[1]</sup>	V <sub>OH</sub>	2.5	–	V <sub>CC</sub>	V
Supply Current Full Power Mode	I <sub>CC,FPM</sub>	–	–	15	mA
Supply Current LowPower Mode	I <sub>CC,LPM</sub>	–	–	10	μA

Notes:

1. Resistor load must not be smaller than 50kOhm

### Package Outlines

(Cavity as Interface Package)



Dimensions in mm

For a more detailed drawing please contact Avago Technologies.

## Disclaimer

The information herein is given to describe certain components and shall not be considered as a guarantee of characteristics.

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## Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Avago Technologies Office.

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## Information

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## Revision History

Current Document: AV02-0745EN - November 6, 2007	
Previous Version: AV02-0745EN - October 3, 2007	
Page	Subjects (major changes since last revision)
3	Additional specification for rise and fall time. Rounding of decimal places.

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