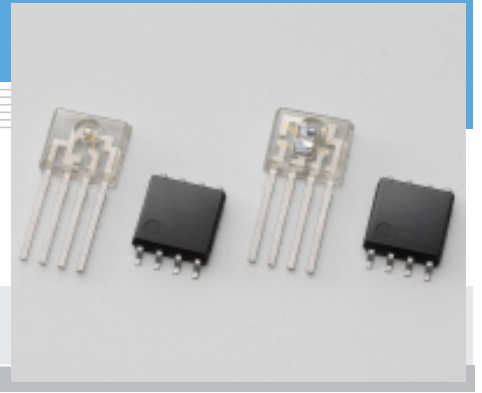


Red LED/photo IC for optical link L9534/S9022

Light emitter/sensor compatible with IEEE1394.b/S100



L9534, H9020, S9022 and H9021 devices are POF (Plastic Optical Fiber) link devices that conform to p1394.b (proposal in IEEE1394). The transmitter is comprised of L9534 LED and its driver IC H9020. The receiver consists of S9022 monolithic photo IC integrating a photodiode with an analog amplifier and its output comparator H9021. These devices make it easy to configure high-speed optical links with transmission rates of up to 125 Mbps.

Features

Transmitter

- L9534 red LED and H9020 LED driver IC
- Peak emission wavelength: 650 nm
- High-speed response and high output power
- LVPECL input

Receiver

- S9022 photo IC and H9021 comparator
- 4 M to 125 Mbps
- Monolithic photo IC (S9022)
- LVPECL output
- Wide dynamic range
- Signal Detecting function

Applications

- Home networks and short-range high-speed data communications

Transmitter (L9534, H9020)

■ Absolute maximum ratings (Ta=25 °C)

Parameter		Symbol	Value	Unit
L9534	Forward current	I _f	40	mA
	Reverse voltage	V _R	3	V
H9020	Supply voltage	V _{ccmax}	-0.5 to +7	V
	Input voltage	V _{imax}	-0.5 to V _{cc} +0.5	V
Operating temperature		T _{opr}	-20 to +70	°C
Storage temperature		T _{stg}	-40 to +85	°C

■ Electrical and optical characteristics [Ta=25 °C, V_{cc}=4.75 to 5.25 V (H9020)] *1

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Data rate		f _D	NRZ	DC	-	125	Mbps
Current consumption		I _{cc}	*2	-	25	35	mA
L9534	Peak emission wavelength	λ _p		640	650	660	nm
	Spectral half width (FWHM)	Δλ		-	10	-	nm
	Fiber coupled optical power	P _o	*2, *3	-6.5	-	-3	dBm
H9020	High level input voltage	V _{ih}		2.15	-	2.4	V
	Low level input voltage	V _{il}		1.5	-	1.75	V
Pulse width distortion		Δt	50 % *4	-1	-	+1	ns
Jitter		Δt _j	50 % *4	-	-	1.5	ns

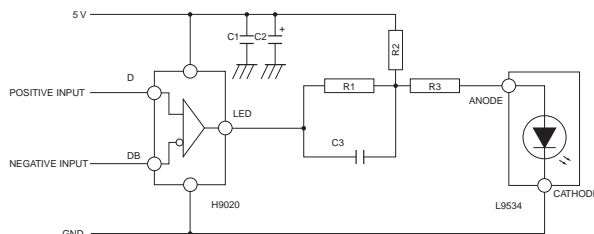
*1: Measured with the recommended driver circuit shown below.

*2: Average value (input signal duty ratio 50 %)

*3: Measured with a plastic fiber GH4001 (φ1 mm SI-POF, NA=0.5) made by Mitsubishi Rayon.

*4: Pseudo-random bi-phase signal at 125 Mbps (NRZ conversion).

■ Recommended connection circuit



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Receiver (S9022, H9021)

Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Supply voltage	Vcc	-0.5 to +7.0	V
Output voltage	Vo	-0.5 to Vcc+0.5	V
Operating temperature	Topr	-20 to +70	°C
Storage temperature	Tstg	-40 to +85	°C

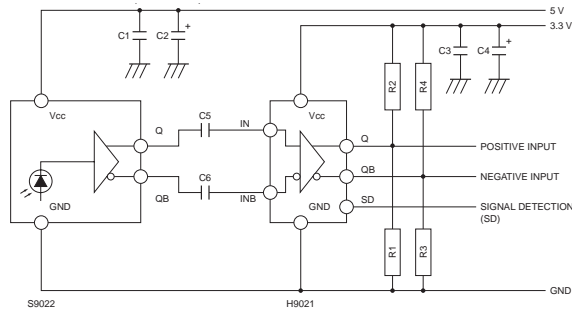
Electrical and optical characteristics [Ta=25 °C, Vcc=4.75 to 5.25 V (S9022), Vcc=3.0 to 3.6 V (H9021)] *5

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Data rate	fD	NRZ signal	4	-	125	Mbps
Minimum overload	Pimax		-2	-	-	dBm
Minimum receiver input power	Pimin		-	-	-22	dBm
Signal detection level	Psd		-	-	-24	dBm
Current consumption	S9022	CL=3 pF, RL=∞, *6	-	-	35	mA
	H9021		-	-	60	
Output voltage	High level output voltage	Voh	Vcc -1.1	-	Vcc -0.8	V
	Low level output voltage	Vol	Vcc -1.8	-	Vcc -1.6	V
	Rise time	tr	-	-	2	ns
	Fall time	tf	20 to 80 % *7	-	-	2
Pulse width distortion	Δt	*7	-1.5	-	+1.5	ns
Jitter	Δtj	*7	-	-	2.5	ns
SD	High level output voltage	Vsdh	No-load	Vcc -1.1	-	V
	Low level output voltage	Vsdl	No-load	-	-	Vcc -1.6

*5: Measured with the recommended driver circuit shown below.

*6: Average value (input optical signal duty ratio 50 %) *7: Pseudo-random bi-phase signal at 125 Mbps (NRZ conversion).

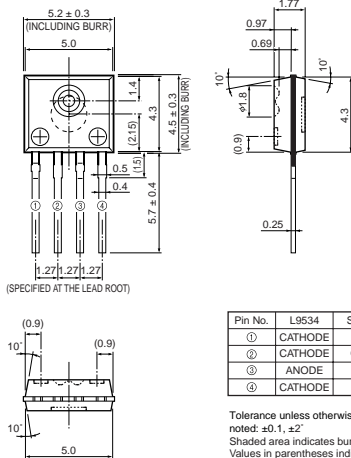
Recommended connection circuit



Symbol	Recommended value	Symbol	Recommended value
C1	0.1 μF	C6	0.1 μF
C2	4.7 μF	R1	82 Ω
C3	0.1 μF	R2	120 Ω
C4	4.7 μF	R3	82 Ω
C5	0.1 μF	R4	120 Ω

Dimensional outlines (unit: mm)

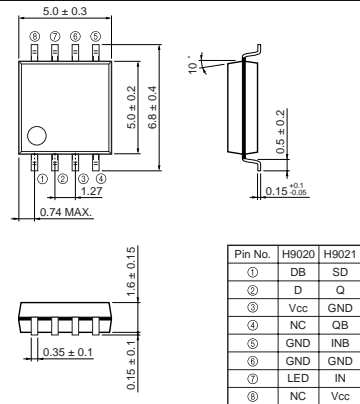
L9534, S9022



Tolerance unless otherwise noted: ±0.1, ±2°
Shaded area indicates burr.
Values in parentheses indicate reference value.

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H9020, H9021



Tolerance unless otherwise noted: ±0.1, ±2°
Shaded area indicates burr.
Values in parentheses indicate reference value.

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