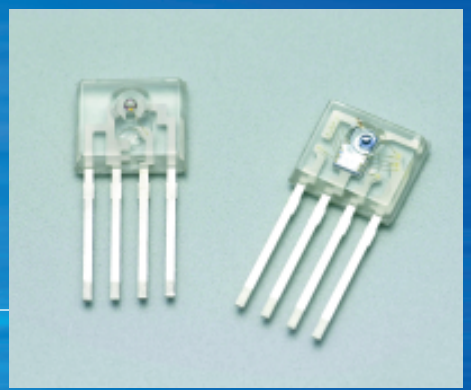


# Red LED/Photo IC for optical link

## L8045/S8046

Emitter/receiver with standby mode suitable for 50 Mbps optical link



L8045 and S8046 are optical communication devices designed for POF (Plastic Optical Fiber) data links. L8045 is a highly reliable, high-power LED that emits red light with a peak at 650 nm optimized for POF. A mini-lens is molded on the package for efficient coupling to a POF. When used with our recommended driver circuit, a 50 Mbps transmitter can be configured at low cost. S8046 is a high sensitivity, high-speed photo IC that receives signals at 50 Mbps and covers a wide dynamic range of 21.5 dB. The output is TTL compatible. S8046 also features a standby mode in which operation automatically switches to low power dissipation mode when no light is input and switches back to normal operation mode when light is input from the optical fiber. The internal IC checks which mode is currently selected and this check signal is available from the mode output terminal. Current consumption in standby mode is approximately 1/400th that of normal operation mode.

### Features

#### L8045

- Peak wavelength: 650 nm
- High reliability
- High output

#### S8046

- Standby mode (low power dissipation)
- 4 to 50 Mbps
- Monolithic photo IC
- Optimum operation when used with L8045
- High reliability
- TTL output
- Wide dynamic range

### Applications

- High-speed data transmission even under poor environmental conditions with high noise

#### L8045

##### ■ Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Forward current	IF	40	mA
Reverse voltage	VR	5	V
Power dissipation *1	Pmax	250	mW
Operating temperature	Topr	-40 to +85	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering	-	230 °C, 5 s, at least 1.8 mm away from package surface	-

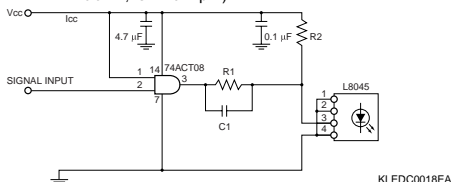
\*1: Derate power dissipation at a rate of 1.75 mW/°C above Ta=25 °C

##### ■ Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Data rate	fD	NRZ	DC	-	50	Mbps
Forward voltage	VF	IF=20 mA	-	1.9	2.3	V
Reverse current	IR	VR=5 V	-	-	10	μA
Peak wavelength	λp	IF=20 mA	-	650	-	nm
Spectral half width (FWHM)	Δλ	IF=20 mA	-	20	-	nm
Fiber-coupled optical output	PO	*2, 3, 4	-13	-	-8	dBm
Rise time at pulse drive	tr	*2, 3, 4 20 to 80 %	-	-	8	ns
Fall time at pulse drive	tf	*2, 3, 4 80 to 20 %	-	-	8	ns
Pulse distortion	ΔT	*2, 3, 4	-3	-	+1	ns
Jitter	Δtj	*2, 3, 4	-	-	3	ns

\*2: Input is a pseudo-random bi-phase signal at 50 Mbps.

\*3: Measured with the recommended driver circuit shown below. (Measurement conditions: Vcc=4.5 to 5.5 V, R1=300 Ω, R2=750 Ω, C1=82 pF)



\*4: Average value (duty ratio 50 %) measured by using a plastic fiber of φ1 mm. SI-POF and NA=0.5 (GH4001 made by Mitsubishi Rayon).

Note)

1: A bypass capacitor (0.1 μF) and another capacitor (4.7 μF) are connected between Vcc and GND at a position within 3 mm from the lead.

2: The center of the optical fiber is aligned with the center of the lens on the package. The distance between the fiber end and the lens is 0.1 mm.

## S8046

### ■ 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
Output current	Io	10	mA
Power dissipation	P	250 *5	mW
Operating temperature	Topr	-40 to +85	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering	-	230 °C, 5 s, at least 1.8 mm away from package surface	-

\*5: Derate power dissipation at a rate of 1.75 mW/°C above Ta=25 °C

### ■ Electrical and optical characteristics (Ta=25 °C, Vcc=4.5 to 5.5 V)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Data rate	fD	bi-phase signal	4	-	50	Mbps
Current consumption (in operation mode)	Icco	*6, 7	-	-	40	mA
Current consumption (in standby mode)	Iccs	Pin = ∞	-	-	100	μA
Maximum receivable input power	Pimax	*6, 7, 9, 10	-8	-	-	dBm
Minimum receivable input power	Pimin	*6, 7, 9, 10	-	-	-29.5	dBm
Output voltage	H level output voltage	Voh	Ioh = -150 μA *6, 7	2.7	-	V
	L level output voltage	Vol	Iol = 1.6 mA *6, 7	-	0.4	V
	Rise time	tr	-	-	5	ns
	Fall time	tf	0.4 to 2.7 V *6, 7	-	5	ns
Pulse width distortion	Δt	*6, 7	-4	-	+8	ns
Jitter	Δtj	*6, 7	-	-	5	ns
Operation mode to standby mode switching input power	Psi	*6, 7, 9	-	-	-33	dBm
Standby mode to operation mode switching input power	Pop	*6, 7, 9	-	-	-30	dBm
Standby mode to operation mode switching time	tso	*6	-	-	200	μs
Operation mode to standby mode switching time	tos	*6	-	-	500	μs
Mode output	H level voltage	Vmh	*11	3.0	-	V
	L level voltage	Vml	*11	-	0.5	V

\*6: Input is a pseudo-random bi-phase signal at 50 Mbps.

\*7: CL=5 pF (including parasitic capacitance of probes, connectors and PC board)

\*8: Optical input signal is generated by our standard signal generator.

\*9: Average value (at 50 % duty ratio)

\*10: Pe=10<sup>-9</sup>

\*11: "H" in standby mode, "L" in operation mode

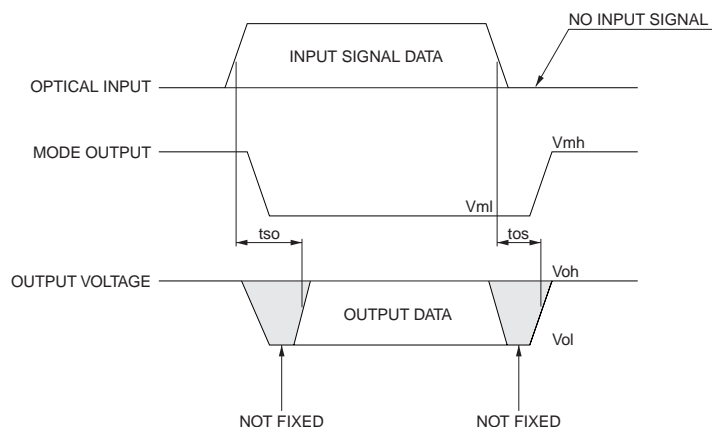
Note)

3: A bypass capacitor (0.1 μF) and another capacitor (4.7 μF) are connected between Vcc and GND at a position within 3 mm from the lead.

4: The center of the optical fiber is aligned with the center of the lens on the package. The distance between the fiber end and the lens is 0.1 mm.

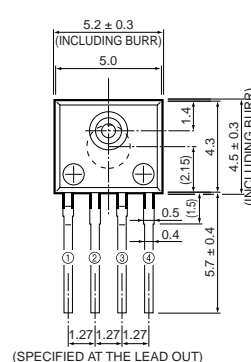
5: Output becomes undefined at a baud rate less than 4 Mbps.

### ■ Mode switching chart (S8046)

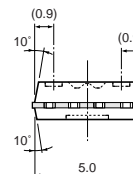
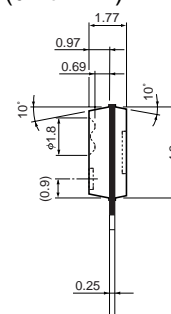


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### ■ Dimensional outline (unit: mm)



(SPECIFIED AT THE LEAD OUT)



PIN No.	L8045	S8046
①	CATHODE	MODEOUT
②	CATHODE	GND
③	ANODE	Vout
④	CATHODE	Vcc

Tolerance unless otherwise noted: ±0.1, ±0.2  
Shaded area indicates burr.  
Values in parentheses indicate reference value.

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Cat. No. KPIC1041E01  
Dec. 2000 DN