

CND0209A

Infrared Optocal Module (IrDA)

Infrared data link for cellular phones, peripheral devices

■ Features

- Compliant with IrDA Ver.1.2
- Light emitting function for remote controller
- Corresponding reflow solder (260°C)
- Ultra-small top view package (2.0 mm × 8.2 mm × 1.7 mm)

■ Type

- GaAlAs LED + IC + PIN Photodiode

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Operating supply voltage	V_{CC}	-0.5 to +3.8	V
Output voltage	V_O	-0.5 to +3.8	V
Input voltage	V_I	-0.5 to +3.8	V
Shutdown input voltage	V_{SD}	-0.5 to +3.8	V
LED operating supply voltage	V_{LEDA}	-0.5 to +7.0	V
Pulse forward current *	I_{FP}	300	mA
Low level output current	I_{OL}	10	mA
Operating ambient temperature	T_{opr}	-20 to +70	°C
Storage temperature	T_{stg}	-30 to +85	°C

Note) *: $t_w \leq 90 \mu\text{s}$, Duty $\leq 25\%$

■ Operating Condition

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating supply voltage	V_{CC}		2.4	2.8	3.3	V
LED operating supply voltage	V_{LEDA}		2.8		4.5	V

■ Electrical-Optical Characteristics $V_{CC} = 2.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
High level supply current *1	I_{CCH}	$E_I = 0$, $V_I = 0.5 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$		90	120	μA
Low level supply current *1	I_{CCL}	$E_I = 3 \text{ mW/cm}^2$, $V_I = 0.5 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$		150	360	μA
Shut down supply current *1	I_{CCSD}	$V_I = 0.5 \text{ V}$, $V_{CC} \geq V_{SD} \geq V_{CC} \times 0.8$ (SD = High)		10	200	nA
Maximum reception distance *4	L_{max}	$V_{LEDA} = 3.2 \text{ V to } 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, External components	23			cm
Minimum reception distance	L_{min}	$V_{LEDA} = 2.8 \text{ V to } 4.2 \text{ V}$, LED power: 150 mW/sr			0	cm
Data Rates	—		9.6		115.2	kbps
RC maximum reception distance	L_{maxR}	$V_{LEDA} = 3.2 \text{ V}$, $V_{CC} \geq V_{SD} \geq V_{CC} - 0.3 \text{ V}$ RC Receiver sensitivity = 0.0125 $\mu\text{W/cm}^2$	10			m

■ Electrical-Optical Characteristics (Continued) $V_{CC} = 2.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transmitter						
Peak emission wavelength *1	λ_p	$V_{SD} \leq 0.5 \text{ V}$ (IrDA mode), $V_{LEDA} = 3.2 \text{ V}$, Duty 3/16	878		888	nm
		$V_{SD} \leq 0.5 \text{ V}$ (IrDA mode), $V_{LEDA} = 3.2 \text{ V}$, Duty 3/16, $T_a = -20^\circ\text{C}$ to $+70^\circ\text{C}$	850		900	nm
		$V_{CC} = 3.0 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, (RC mode) $V_{LEDA} = 2.8 \text{ V}$, Duty 25%	878		910	nm
Pulse forward current *1	I_{FP}	$V_{LEDA} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5 \text{ V}$	40	60	90	mA
		$V_{LEDA} = 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$	220	250	280	mA
		$V_{LEDA} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$	170	200	230	mA
Center radiant intensity *1, 2, 9	$\theta_T = 0$	$V_{LEDA} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5 \text{ V}$ (IrDA mode)	9	20		mW/sr
		$V_{LEDA} = 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$ (RC mode)	40	73		mW/sr
		$V_{LEDA} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$ (RC mode)	36	68		mW/sr
	$\theta_T = \pm 15$	$V_{LEDA} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5 \text{ V}$ (IrDA mode)	6	10		mW/sr
		$V_{LEDA} = 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$ (RC mode)	28	40		mW/sr
		$V_{LEDA} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$ (RC mode)	28	38		mW/sr
High level input voltage *1	V_{IH}	I-TXD $V_{CC} = 2.4 \text{ V}$ to 3.3 V , $V_{SD} \leq 0.5 \text{ V}$	$V_{CC} - 0.3$		V_{CC}	V
		R-TXD $V_{CC} = 2.4 \text{ V}$ to 3.3 V , $V_{SD} \leq 0.5 \text{ V}$	1.5	1.8	V_{CC}	V
Low level input voltage *1	V_{IL}	$V_{CC} = 2.4 \text{ V}$ to 3.3 V , $V_{SD} \leq 0.5 \text{ V}$	0		0.7	V
TX half-angle	θ_T		± 15			°
Rise time *1, 3	t_r	$V_{LEDA} = 3.2 \text{ V}$, $t_w = 1.6 \mu\text{s}$, $R_L = 50 \Omega$		0.3	0.6	μs
Fall time *1, 3	t_f	$V_{LEDA} = 3.2 \text{ V}$, $t_w = 1.6 \mu\text{s}$, $R_L = 50 \Omega$		0.3	0.6	μs
TX wake up time *7	t_{Twu}			0.3	1	μs
Intensity delay time *1, 3	I_{DT}	$V_{LEDA} = 3.2 \text{ V}$			400	ns
Maximum pulse width	$T_{wLEDmax}$	I-TXD, R-TXD = Low \rightarrow High	20	50	100	μs
Overshoot	O_S				25	%
Edge jitter	E_J		-40		40	ns

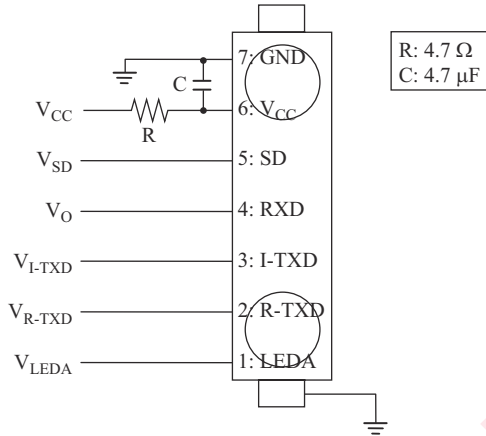
■ Electrical-Optical Characteristics (Continued) $V_{CC} = 2.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Receiver						
Minimum input irradiance	$E_{I\min}$	$V_{SD} \leq 0.5 \text{ V}$		2.3	6.8	$\mu\text{W}/\text{cm}^2$
Maximum input irradiance	$E_{I\max}$	$V_{SD} \leq 0.5 \text{ V}$	500			mW/cm^2
High level output voltage *5	V_{OH}	Non signal condition $I_{OH} = -200 \mu\text{A}$, $V_{SD} \leq 0.5 \text{ V}$	$V_{CC} - 0.3$		V_{CC}	V
Low level output voltage *6	V_{OL}	$I_{OL} = 500 \mu\text{A}$, $V_{SD} \leq 0.5 \text{ V}$			0.5	V
RX half angle	θ_R		± 15			°
RXD output pulse width	T_{WR}	$C_L = 15 \text{ pF}$, 9.6 kbps to 115.2 kbps	1.3	2.3	4.2	μs
RX wake up time *8	t_{Rwu}	$E_I = 8.1 \mu\text{W}/\text{cm}^2$		250	400	μs
Receiver latency time	t_L	$E_I = 8.1 \mu\text{W}/\text{cm}^2$		100	200	μs
Rise time	t_r	$C_L = 15 \text{ pF}$		100	300	ns
Fall time	t_f	$C_L = 15 \text{ pF}$		100	300	ns

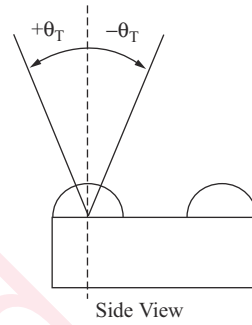
■ Electrical-Optical Characteristics (Continued)

Note) Measuring circuit

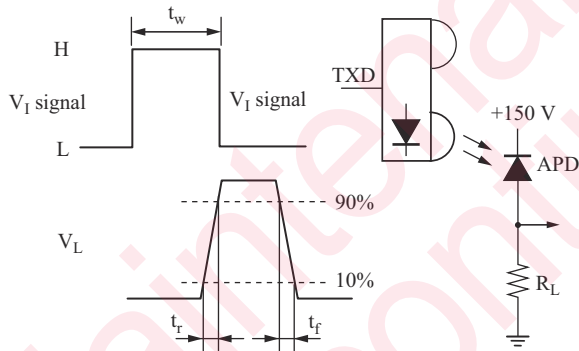
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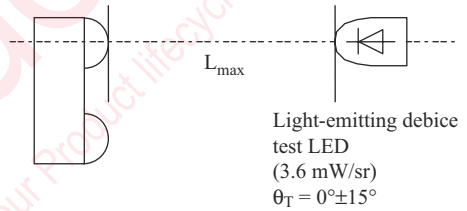
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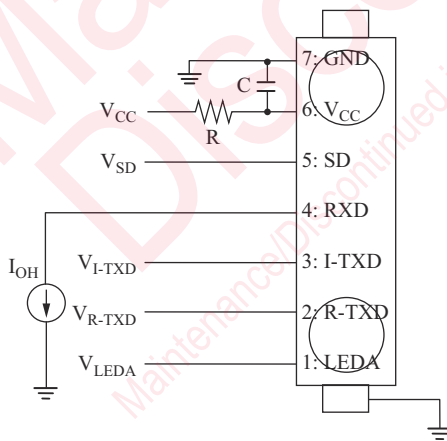
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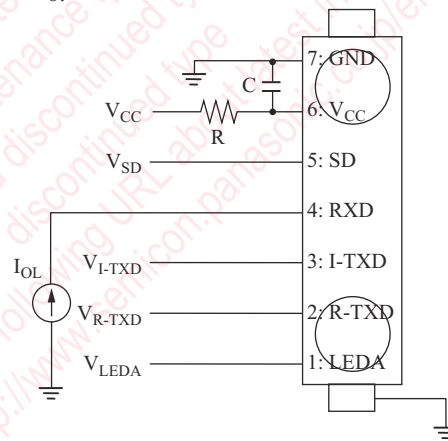
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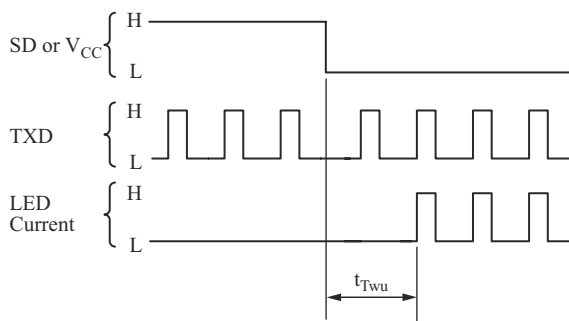


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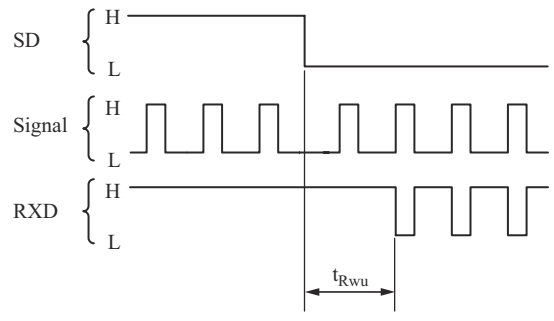
*7:

TX wake up time



*8:

RX wake up time



*9: Eye-Safety IEC60825-1 Class1 Eye safe

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