

CND0216A

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 (1.6 mm × 7.2 mm × 2.6 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
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}		2.8		4.5	V
Input/output supply voltage	V_{IO}		1.5	1.8	3.0	V

■ Electrical-Optical Characteristics $V_{CC} = 3.2 \text{ V}$, $V_{IO} = 1.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
High level supply current *1	I_{CCH}	$E_I = 0$, $V_I = 0.5 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$		110	150	μA
Low level supply current *1	I_{CCL}	$E_I = 3 \text{ mW/cm}^2$, $V_I = 0.5 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$		170	380	μA
Shut down supply current *1	I_{CCSD}	$V_I = 0.5 \text{ V}$, $V_{IO} \geq V_{SD} \geq V_{IO} - 0.3$ (SD = High)		10	200	nA
Maximum reception distance *4	L_{max}	$V_{SD} \leq 0.5 \text{ V}$, External components	23	40		cm
RC maximum reception distance	L_{maxR}	RC S = $0.05 \mu\text{W/cm}^2$	5			m
Data Rates	—		9.6		115.2	kbps
SD high level input voltage	V_{IHSD}		$V_{IO} - 0.5$		V_{IO}	V
SD low level input voltage	V_{ILSD}		0		0.5	V

■ Electrical-Optical Characteristics (Continued) $V_{CC} = 3.2 \text{ V}$, $V_{IO} = 1.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transmitter						
Peak emission wavelength ^{*1}	λ_p	$V_{SD} \leq 0.5 \text{ V}$, Duty 3/16 (IrDA mode)	878	883	888	nm
		$V_{SD} \leq 0.5 \text{ V}$, Duty 25% (RC mode)	878	894	910	nm
Pulse forward current ^{*1}	I_{FP}	$V_{SD} \leq 0.5 \text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5 \text{ V}$, (IrDA mode)	40	60	90	mA
		$V_{CC} = 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$, (RC mode)	240	270	300	mA
		$V_{CC} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$, (RC mode)	190	220	250	mA
Center radiant intensity ^{*1, 2, 9}	$\theta_T = 0$	$V_{CC} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5 \text{ V}$, (IrDA mode)	9	20		mW/sr
		$V_{CC} = 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$, (RC mode)	40	73	110	mW/sr
		$V_{CC} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$, (RC mode)	36	68	102	mW/sr
	$\theta_T = \pm 15$	$V_{CC} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, I-TXD Duty 3/16, R-TXD $\leq 0.5 \text{ V}$, (IrDA mode)	6	10		mW/sr
		$V_{CC} = 4.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$, (RC mode)	28	40	63	mW/sr
		$V_{CC} = 3.2 \text{ V}$, $V_{SD} \leq 0.5 \text{ V}$, R-TXD Duty 25%, I-TXD $\leq 0.5 \text{ V}$, (RC mode)	28	38	60	mW/sr
High level input voltage ^{*1}	V_{IH}	I-TXD	$V_{IO} - 0.5$		V_{IO}	V
		R-TXD	$V_{IO} - 0.5$		V_{IO}	V
Low level input voltage ^{*1}	V_{IL}		0		0.5	V
TX half-angle	θ_T		± 15			°
Rise time ^{*1, 3}	t_r	$t_w = 1.6 \mu\text{s}$, $R_L = 50 \Omega$		0.3	0.6	μs
Fall time ^{*1, 3}	t_f	$t_w = 1.6 \mu\text{s}$, $R_L = 50 \Omega$		0.3	0.6	μs
TX wake up time ^{*7}	t_{Twu}			0.3	1	μs
Intensity delay time ^{*1, 3}	I_{DT}				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

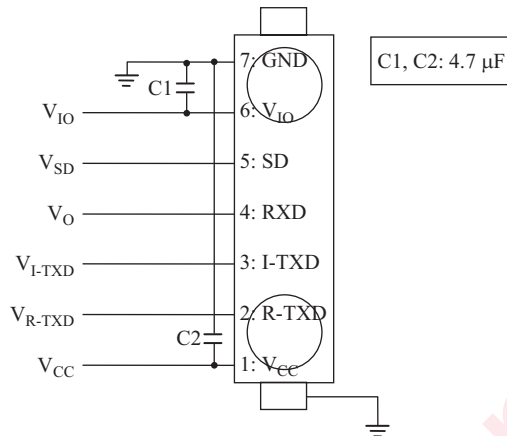
■ Electrical-Optical Characteristics (Continued) $V_{CC} = 3.2 \text{ V}$, $V_{IO} = 1.8 \text{ V}$, $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Receiver						
Minimum input irradiance	$E_{I\min}$	$V_{SD} \leq 0.5 \text{ V}$		2.2	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 $I_{OH} = -200 \mu\text{A}$, $V_{SD} \leq 0.5 \text{ V}$	$V_{IO} - 0.3$		V_{IO}	V
Low level output voltage *6	V_{OL}	$I_{OL} = 200 \mu\text{A}$, $V_{SD} \leq 0.5 \text{ V}$			0.3	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
Rise time	t_r	$C_L = 15 \text{ pF}$		100	300	ns
Fall time	t_f	$C_L = 15 \text{ pF}$		100	300	ns

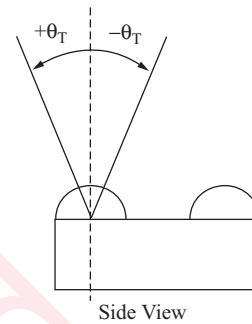
■ Electrical-Optical Characteristics (Continued)

Note) Measuring circuit

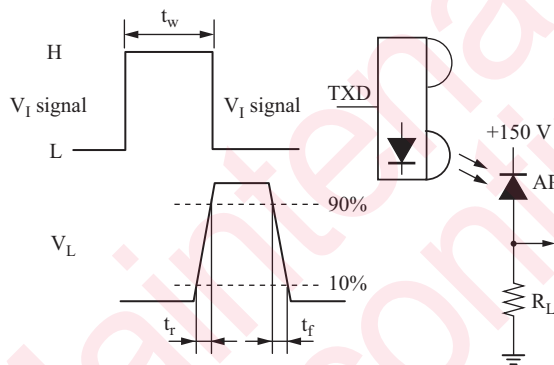
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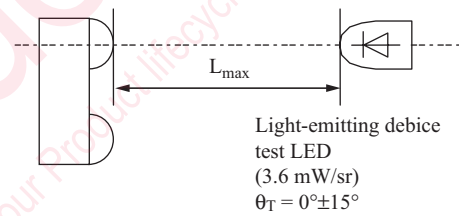
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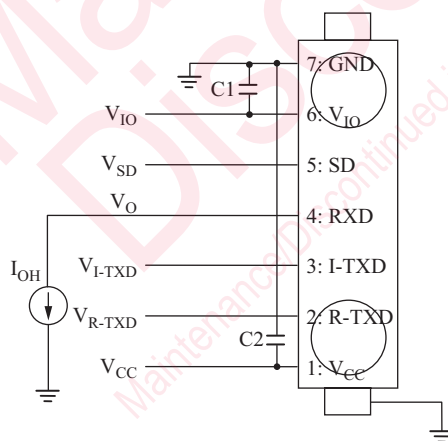
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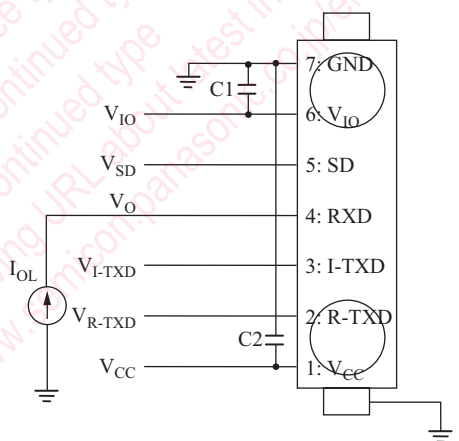
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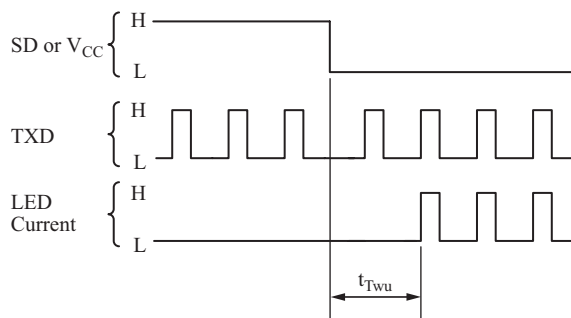


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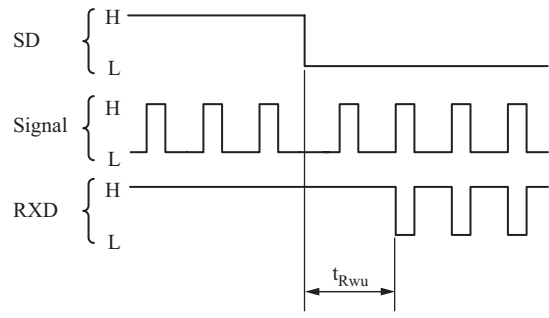
*7:

TX wake up time



*8:

RX wake up time



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

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